

IV. ТЕХНИЧЕСКИ ИЗИСКВАНИЯ И СПЕЦИФИКАЦИИ ЗА ИЗПЪЛНЕНИЕ НА ПОРЪЧКАТА

Г) Технически изисквания и спецификации за обособена позиция № 2 по предмета на поръчката, представляващ:

Наименование на материала: Триполюсни товари прекъсвач-разединители НН с лят корпус от 100 А до 1250 А

Съкратено наименование на материала: Тов. прек. с лят корпус 100-1250 А

Област: Н – Електрически уредби СрН/НН **Категория:** 17– Комутационни апарати

НН за защита

Мерна единица: Брой

Аварийни запаси: Да

Характеристика на материала:

Товаровите прекъсвач-разединители представляват механични комутационни апарати, способни да провеждат и да включват/изключват ръчно електрически ток във вериги при нормални условия и да провеждат за определено време токове във вериги при условията на претоварване и късо съединение.

Тялото (корпусът) на товарите прекъсвач-разединители НН са изработени чрез формоване на устойчив на нагряване, на огън и на механични удари изолационен материал. Използваните в конструкцията изолационни материали съответстват на изискванията на т. 7 от БДС EN 60947-1:2007.

Управлението се осъществява ръчно посредством лост. Включването/изключването на контактите на трите полюса се осъществява едновременно с висока скорост, която не зависи от действията на оператора. Товарите прекъсвач-разединители изпълняват разединяваща функция, която е обозначена с предвидения от стандарта символ.

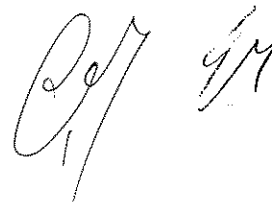
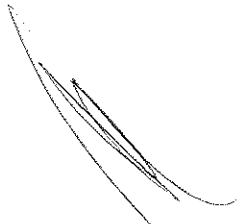
Лостът за управление при вертикално монтиране на товарите прекъсвач-разединители се движи в направление „нагоре – надолу“, при което контактите се затварят при движение „нагоре“. Товарите прекъсвач-разединители са снабдени с ясно видимо от челната страна средство за указване на затвореното и отвореното положение на контактната система. Конструкцията осигурява защита срещу проникване на твърди тела и вода до степен най-малко IP20 за клемните съединения и IP40 за челната повърхност на прекъсвача, съгласно БДС EN 60529+A1:2004

Стойностите на прегряването на частите на товарите прекъсвач-разединители при нормален работен режим при температура до 40°C не трябва да надвишават посочените в таблица 2 и таблица 3 от БДС EN 60947-1:2007 стойности.

Товарите прекъсвач-разединители са маркирани с информацията съгласно т. 5.2 от БДС EN 60947-3:2002 и СЕ маркировка за съответствие.

Товарите прекъсвач-разединители се доставят с предпазни клемови капаци, изолиращи фазови сепаратори и разширители и удължители на входа и на изхода, подходящи за свързване към шинна система, изработена с алуминиеви шини с правоъгълно сечение.

PPD 15 -033



Товаровите прекъсвач-разединители са пакетирани в картонени кутии, на които са залепени етикети с наименование на материала „Товарови прекъсвач-разединители“, техническите данни, годината на производство, партидният номер и стандарта, в съответствие с който са произведени и изпитани - БДС EN 60947-3:2002.

Използване:

Товаровите прекъсвач-разединители са предназначени за монтиране в електромерни табла за индиректно измерване на електрическата енергия и се използват за ръчно включване и изключване на захранващите вериги.

Съответствие на предлаганото изпълнение с нормативно-техническите документи:

Товаровите прекъсвач-разединители трябва да отговарят на приложимите български и международни стандарти и нормативно-техническите документи, включително на посочените по-долу стандарти или еквиваленти и на техните валидни изменения и поправки:

- БДС EN 60947-1:2007 „Комутационни апарати за ниско напрежение. Част 1: Общи правила (IEC 60947-1:2007)“; и
- БДС EN 60947-3:2002 „Комутационни апарати за ниско напрежение. Част 3: Товарови прекъсвачи, разединители, товаров прекъсвач-разединители и апарати, комбинирани с предпазители (IEC 60947-3:1999 + поправка юли 1999)“
- БДС EN 60529+A1:2004 Степени на защита, осигурени от обвивката (IP код) (IEC 60529:1989+A1:1999)

и да бъдат оценени положително по реда и при условията на Наредбата за съществения изисквания и оценяване на съответствието на електрически съоръжения, предназначени за използване в определени граници на напрежението, приета с ПМС № 182 от 6.07.2001 г., обн., ДВ, бр. 62 от 13.07.2001 г.

Изисквания към документацията и изпитванията:

№ по ред	Документ	Приложение № или текст
1.	Точно означение на типа, производителя и страната на производство (произход) и последно издание на каталога на производителя	1. BC160NT305-160-V 2. BC160NT305-160-V 3. BD250NE305 + SE-BD-0250-V001 4. BH630NE305 + SE-BH-0630-V001 OEZ-Чехия, каталог J1-2013-A
2.	Техническо описание и чертежи с нанесени на тях размери	каталог J1-2013-A –
3.	ЕО декларация за съответствие	приложена

PPD 15 -033

№ по ред	Документ	Приложение № или текст
4.	Протоколи от типови изпитвания на английски или български език, проведени от независима изпитвателна лаборатория – заверени копия, с приложен списък на отделните изпитвания на български език	приложени към ОП1 приложени
5.	Сертификат/акредитация на независимата изпитвателна лаборатория, провела типовите изпитвания по т. 4 – заверено копие	приложен
6.	Инструкции за транспортиране, складиране, монтиране, вкл. въртящия момент на затягане на клемовите съединения, обслужване и поддържане	приложени

Забележка: Всички оригинални документи трябва да бъдат на български език или с превод на български език. (Каталозите и протоколите от проверките и изпитванията могат да бъдат и само на английски език.)

Технически данни

1. Параметри на електрическата разпределителна мрежа

№ по ред	Параметър	Стойност
1.1	Номинално напрежение	400 / 230 V
1.2	Максимално напрежение	440 / 253 V
1.3	Номинална честота	50 Hz
1.4	Брой проводници в разпределителната мрежа	4 проводна мрежа (L ₁ , L ₂ , L ₃ , PEN)
1.5	Схема на разпределителната мрежа	TN-C

2. Характеристики на работната среда

№ по ред	Характеристика	Стойност
2.1	Място на монтиране	На закрито
2.2	Максимална околна температура	+ 40°C
2.3	Минимална околна температура	Минус 5°C
2.4	Максимална средна околна температура за период от 24 ч.	+ 35°C
2.5	Относителна влажност (при 20°C)	До 90 %
2.6	Степен на замърсяване	3
2.7	Надморска височина	До 2000 m

3. Общи технически характеристики

PPD 15 -033

№ по ред	Характеристика	Изискване	Гарантирано предложение
3.1	Брой на полюсите	3	3
3.2	Обявено работно напрежение (U_e)	690 V AC	690 V AC
3.3	Обявена честота	50 Hz	50 Hz
3.4	Обявено импулсно напрежение (U_{imp})	min 6 kV	8 kV
3.5	Обявено изолационно напрежение (U_i)	690 V	690 V
3.6	Категория на приложение (при 400 V AC)	AC 22 В или по-висока	AC 22 А
3.7	Степен на защита от проникване на твърди тела и вода съгласно БДС EN 60529+A1:2004	-	-
3.7.1	Клемни съединения	min IP20	IP20
3.7.2	Челна повърхност	min IP40	IP40
3.8	Акcesoари	а) Два комплекта разширители и удължител за свързване към шинна система от алуминиева шина с правоъгълно сечение б) Два комплекта предпазни клемови капаци и изолиращи фазови сепаратори	Два комплекта разширители и удължител за свързване към шинна система от алуминиева шина с правоъгълно сечение Два комплекта предпазни клемови капаци и изолиращи фазови сепаратори
3.9	Експлоатационна дълготрайност	min 30 години	30 години

4. Триполюсни товарови прекъсвач-разединители НН с лят корпус от 100 А до 1250 А

4.1 Триполюсен товаров прекъсвач-разединител НН с лят корпус от 100 А

Номер на стандарта	Тип/референтен номер съгласно каталога на производителя
20 17 0000	BC160NT305-160-V-20585
Наименование на материала	Триполюсен товаров прекъсвач-разединител НН с лят корпус от 100 А

PPD 15 -033

Съкратено наименование на материала		Тов. прек. с лят корпус 100 А	
№ по ред	Технически параметър	Изискване	Гарантирано предложение
4.1.1	Обявен ток (I_e)	100 А	160 А
4.1.2	Изпитване на включвателната и изключвателната способност съгл. т. т. 4.3.5.2 и 4.3.5.3 от БДС EN 60947-3:2002	min 300 А (1,05 $U_e \cos\phi=0,65$)	1280 А АС - 23 А
4.1.3	Обявен краткотрайно издържан ток (I_{cw}) съгл. т. 4.3.6.1 от БДС EN 60947-3:2002	min 1200 А / 1 s	2 000 А / 1 s
4.1.4	Износоустойчивост	-	-
4.1.4a	Електрическа (брой к.ц.)	min 300 бр.	6 000 бр.
4.1.4b	Механична (брой к.ц.)	min 1700 бр.	20 000 бр.
4.1.5	Максимални размери ВхШхД (Дълбочината „Д“ не включва лоста за управление)	162x106x121 mm	130x75x70
4.1.6	Тегло, kg	Да се посочи	1,kg

4.2 Триполюсен товаров прекъсвач-разединител НН с лят корпус от 160 А

Номер на стандарта		Тип/референтен номер съгласно каталога на производителя	
20 17 0001		BC160NT305-160-V-20585	
Наименование на материала		Триполюсен товаров прекъсвач-разединител НН с лят корпус от 160 А	
Съкратено наименование на материала		Тов. прек. с лят корпус 160 А	
№ по ред	Технически параметър	Изискване	Гарантирано предложение
4.2.1	Обявен ток (I_e)	160 А	160 А
4.2.2	Изпитване на включвателната и изключвателната способност съгл. т. т. 4.3.5.2 и 4.3.5.3 от БДС EN 60947-3:2002	min 480 А (1,05 $U_e \cos\phi=0,65$)	1280 А АС - 23 А
4.2.3	Обявен краткотрайно издържан ток (I_{cw}) съгл. т. 4.3.6.1 от БДС EN 60947-3:2002	min 1920 А / 1 s	2 000 А / 1 s

PPD 15 -033

Номер на стандарта		Тип/референтен номер съгласно каталога на производителя	
20 17 0001		BC160NT305-160-V-20585	
Наименование на материала		Триполюсен товаров прекъсвач-разединител НН с лят корпус от 160 А	
Съкратено наименование на материала		Тов. прек. с лят корпус 160 А	
№ по ред	Технически параметър	Изискване	Гарантирано предложение
4.2.4	Износоустойчивост	-	-
4.2.4a	Електрическа (брой к.ц.)	min 200 бр.	6 000 бр.
4.2.4b	Механична (брой к.ц.)	min 1400 бр.	20 000 бр.
4.2.5	Максимални размери ВхШхД (Дълбочината „Д“ не включва лоста за управление)	182x136x100 mm	130x75x70
4.2.6	Тегло, kg	Да се посочи	1,kg

4.3 Триполюсен товаров прекъсвач-разединител НН с лят корпус от 250 А

Номер на стандарта		Тип/референтен номер съгласно каталога на производителя	
20 17 0002		BD250NE305-14414 + SE-BD-0250-V001-24120	
Наименование на материала		Триполюсен товаров прекъсвач-разединител НН с лят корпус от 250 А	
Съкратено наименование на материала		Тов. прек. с лят корпус 250 А	
№ по ред	Технически параметър	Изискване	Гарантирано предложение
4.3.1	Обявен ток (I_n)	250 А	250 А
4.3.2	Изпитване на включвателната и изключвателната способност съгл. т. т. 4.3.5.2 и 4.3.5.3 от БДС EN 60947-3:2002	min 750 А ($1,05 U_n \cos\phi=0,65$)	2000 А AC – 23 В
4.3.3	Обявен краткотрайно издържан ток (I_{cw}) съгл. т. 4.3.6.1 от БДС EN 60947-3:2002	min 3000 А / 1 s	3000 А / 5 s
4.3.4	Износоустойчивост	-	-
4.3.4a	Електрическа (брой к.ц.)	min 200 бр.	3 000 бр.
4.3.4b	Механична (брой к.ц.)	min 1400 бр.	30 000 бр.
4.3.5	Максимални размери ВхШхД (Дълбочината „Д“ не включва лоста за управление)	225x140x129 mm	225x105x105

Номер на стандарта		Тип/референтен номер съгласно каталога на производителя	
20 17 0002		BD250NE305-14414 + SE-BD-0250-V001-24120	
Наименование на материала		Триполюсен товаров прекъсвач-разединител НН с лят корпус от 250 А	
Съкратено наименование на материала		Тов. прек. с лят корпус 250 А	
№ по ред	Технически параметър	Изискване	Гарантирано предложение
4.3.6	Тегло, kg	Да се посочи	3kg

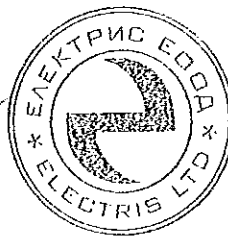
4.4 Триполюсен товаров прекъсвач-разединител НН с лят корпус от 400 А

Номер на стандарта		Тип/референтен номер съгласно каталога на производителя	
20 17 0003		BH630NE305-14412 + SE-BH-0630-V001-25120	
Наименование на материала		Триполюсен товаров прекъсвач-разединител НН с лят корпус от 400 А	
Съкратено наименование на материала		Тов. прек. с лят корпус 400 А	
№ по ред	Технически параметър	Изискване	Гарантирано предложение
4.4.1	Обявен ток (I_b)	400 А	630 А
4.4.2	Изпитване на включвателната и изключвателната способност съгл. т. т. 4.3.5.2 и 4.3.5.3 от БДС EN 60947-3:2002	min 1200 А ($1,05 U_e, \cos\phi=0,65$)	5040 А AC – 23 В
4.4.3	Обявен краткотрайно издържан ток (I_{cw}) съгл. т. 4.3.6.1 от БДС EN 60947-3:2002	min 4800 А / 1 s	7 500 А / 5 s
4.4.4	Износоустойчивост	-	-
4.4.4a	Електрическа (брой к.ц.)	min 200 бр.	5 000 бр.
4.4.4b	Механична (брой к.ц.)	min 800 бр.	20 000 бр.
4.4.5	Максимални размери ВxШxД (Дълбочината „Д“ не включва лоста за управление)	298x192x157 mm	275x140x105
4.4.6	Тегло, kg	Да се посочи	5.4kg

4.5 Триполюсен товаров прекъсвач-разединител НН с лят корпус от 630 А

PPD 15 -033

Номер на стандарта		Тип/референтен номер съгласно каталога на производителя	
20 17 0004		BH630NE305-14412 + SE-BH-0630-V001-25120	
Наименование на материала		Триполюсен товаров прекъсвач-разединител НН с лят корпус от 630 А	
Съкратено наименование на материала		Тов. прек. с лят корпус 630 А	
№ по ред	Технически параметър	Изискване	Гарантирано предложение
4.5.1	Обявен ток (I_e)	630 А	630 А
4.5.2	Изпитване на включвателната и изключвателната способност съгл. т. т. 4.3.5.2 и 4.3.5.3 от БДС EN 60947-3:2002	min 1890 А ($1,05 U_e \cos\phi=0,65$)	5040 А AC – 23 В
4.5.3	Обявен краткотрайно издържан ток (I_{cw}) съгл. т. 4.3.6.1 от БДС EN 60947-3:2002	min 7560 А / 1 s	7 500 А / 5 s
4.5.4	Износоустойчивост	-	-
4.5.4a	Електрическа (брой к.ц.)	min 200 бр.	5 000 бр.
4.5.4b	Механична (брой к.ц.)	min 800 бр.	20 000 бр.
4.5.5	Максимални размери ВхШхД (Дълбочината „Д“ не включва лоста за управление)	289x212x157 mm	275x140x105
4.5.6	Тегло, kg	Да се посочи	5.4kg



PPD 15 -033

OEZ.

ES PROHLÁŠENÍ O SHODĚ / CE DECLARATION OF CONFORMITY
Číslo / No. : 219301/0803

My / We, **OEZ s.r.o.**
Šedivská 339, 561 51 Letohrad, Česká republika

prohlašujeme na svou výlučnou odpovědnost, že
declare on our own responsibility that

Výrobek: Jističe MCCB
Product: Moulded case circuit breakers

Typ / Type: BC160

Příslušenství / Accessory:

Je ve shodě s následujícími normami:
complies with the following standards:

České normy / Czech standards	Evropské normy / European standards
ČSN EN 60947-2:03ed.3+A1:01+consolidated ed.2.2:01 ČSN EN 60947-2ed.2:04	EN 60947-2:2003 - including amendments EN 60947-1:2004 - including amendments

a následujícími nařízeními vlády, ve znění pozdějších předpisů (NV)
and the following government regulations (NV), as amended

NV 17/2003 Sb. v platném znění	2006/95/ES - including amendments
--------------------------------	-----------------------------------

Elektrotechnický zkušební ústav, Pod Lisem 129, 171 02 Praha 71, Česká republika
zkoušel / certifikoval daný výrobek a vydal:
tested / certified the product and issued:

EZU Certifikát / EZU Certificate: 1060249 ze dne 3.4.2006
EZU zkušební protokol / EZU test report: 600332-03/01 ze dne 29.3.2006

Poslední dvojčíslí roku, v němž bylo označení CE na výrobek umístěno: 06
Last two digits of the year in which the CE mark was placed on the product:

Místo vydání: Letohrad
Place of issue:
signature:

Datum vydání: 27.03.2008
Date of issue:

Zástupce výrobce a podpis:
Manufacturer's representative and

Funkce: generální ředitel
Position: general director

Ing. Jaroslav Toman

OEZ.

OEZ s.r.o.
Šedivská 339, Letohrad 561 51
Česká republika
IČO: 49810146, DIČ: CZ49810146



ВАРНО С ОРВИТНАА

OEZ

ES PROHLASENI O SHODE / ДЕКЛАРАЦИЯ ЗА СЪОТВЕТСТВИЕ Cislo/№ : 219301/0803

My / Hue OEZ s.r.o.
Sedivska 339, 561 51 Letohrad, Ceska republika

prohlasujeme na svou vylucnou odpovednost, ze
декларираме на своя собствена отговорност, че

Vyrobek: Jistice MCCB
Продукт: Прекъсвачи лят корпус

Typ/ Typ: BC160

Prislusenstvi / Аксесоари:

je ve shode s nasledujicimi normami:
отговаря на следните стандарти:

Ceske normy / Чехски стандарти	Evropske normy / Европейски стандарти
CSN EN 60947-2:03ed.3+A1:01+consolidated ed.2.2:01 CSN EN 60947-2ed.2:04	EN 60947-2:2003 – включително изменения EN 60947-1:2004 - включително изменения

a nasledujicimi narizenimi vlady, ve zneni pozdejsich predpisu (NV)
и следните държавни наредби (NV), изменен

NV 17/2003 Sb. v platnem zneni	2006/95/ES - включително изменения
--------------------------------	------------------------------------

Elektrotechnicky zkusebni ustav, Pod Lisem 129,171 02 Praha 71, Ceska republika
zkousel / certifikoval dany vyrobek a vydal:
проверен / сертифициран продукт и издаден:

EZU Certifikat / EZU Сертификат: 1060249 от 3.04.2006
EZU zkusebni protokol / EZU тест протокол: 600332-03/01 от 29.03.2006

Posledni dvojicisli roku, v nemz bylo oznaceni CE na vyrobek umisteno: 06
Последните две цифри на годината, през която маркировката се нанася върху продукта:

Misto vydani: Letohrad
Място на издаване:

Zastupce vyrobce a podpis: Ing. Jaroslav Toman
Представител на производителя и подпис

Datum vydani: 27.03.2008
Дата на издаване:

Funkce: generalni reditel
Позиция: генерален директор

OEZ &r.o.
Sedivska 339, Letohrad
561 51
Ceska republika
IČO: 49810146, DIČ:
CZ49810146



ВЯРНО С ОРИГИНАЛА


OEZ.**ES PROHLÁŠENÍ O SHODĚ / CE DECLARATION OF CONFORMITY**
Číslo / No. : 205602/0803

My / We, **OEZ s.r.o.**
Šedivská 339, 561 51 Letohrad, Česká republika

prohlašujeme na svou výlučnou odpovědnost, že
declare on our own responsibility that

Výrobek: Jističe MCCB
Product: Moulded case circuit breakers

Typ / Type: BD250

Příslušenství / Accessory:
BD250SE.05, BD250NE.05, SE-BD-, SP-BHD-X, SV-BHD-X,
ZO-BD-0250-, ZV-BD-0250-, PS-BHD-, MB-BD-, MB-BHD-,
RP-, MP-BD-X, CS-BD-..., OD-BD-, OD-BHD-, SO-BHD-,

je ve shodě s následujícími normami:
complies with the following standards:

České normy / Czech standards	Evropské normy / European standards
ČSN EN 60947-1:05ed.3	EN 60947-1:00 - including amendments
ČSN EN 60947-2:07+1:07	EN 60947-2:03 - including amendments
ČSN EN 61000-4-5:07ed.2	EN 61000-4-5:95 - including amendments
ČSN EN 61000-4-2:97+A1:99+Z1:01	EN 61000-4-2:95 - including amendments
ČSN EN 61000-4-3:06ed.3	EN 61000-4-3:02 - including amendments

a následujícími nařízeními vlády, ve znění pozdějších předpisů (NV)
and the following government regulations (NV), as amended

NV 17/2003 Sb. v platném znění NV 616/2006 Sb. v platném znění	2006/95/ES - including amendments 2004/108/ES - including amendments
-------------------------------------------------------------------	-------------------------------------------------------------------------

Elektrotechnický zkušební ústav, Pod Lisem 129, 171 02 Praha 71, Česká republika
zkoušel / certifikoval daný výrobek a vydal:
tested / certified the product and issued:

EZU Certifikát / EZU Certificate: 1070838 ze dne 19.10.2007
EZU zkušební protokol / EZU test report: 703774-01/01 ze dne 12.10.2007

Poslední dvojčíslí roku, v němž bylo označení CE na výrobek umístěno: 01
Last two digits of the year in which the CE mark was placed on the product:

Místo vydání: Letohrad
Place of issue:
signature:

Datum vydání: 27.03.2008
Date of issue:

Zástupce výrobce a podpis:
Manufacturer's representative and

Funkce: generální ředitel
Position: general director

Ing. Jaroslav Toman


OEZ.

OEZ s.r.o.
Šedivská 339, Letohrad 561 51
Česká republika
IČO: 49810146, DIČ: CZ49810146


ВЕРНО СЕРТИФИКАЦА


OEZ.**ES PROHLÁŠENÍ O SHODĚ / CE DECLARATION OF CONFORMITY**

Číslo / No. : 211802/0803

My / We, **OEZ s.r.o.**
 Šedivská 339, 561 51 Letohrad, Česká republika

prohlašujeme na svou výlučnou odpovědnost, že
 declare on our own responsibility that

Výrobek: Jističe MCCB
 Product: Moulded case circuit breakers

Typ / Type: BH630

Příslušenství / Accessory:
 BH630SE.05, BH630NE.05, SE-BH-, SP-BHD-X, SV-BHD-X,
 ZO-BH-0630-, ZV-BH-0630-, PS-BHD-, MB-BH-, MB-BHD-,
 RP-, MP-BH-X, CS-BH-..., OD-BH-, OD-BHD-, SO-BHD-,

je ve shodě s následujícími normami:
 complies with the following standards:

České normy / Czech standards	Evropské normy / European standards
ČSN EN 60947-1:05ed.3 ČSN EN 60947-2:07ed.3+1:07	EN 60947-1:00 - including amendments EN 60947-2:04 - including amendments

a následujícími nařízeními vlády, ve znění pozdějších předpisů (NV)
 and the following government regulations (NV), as amended

NV 17/2003 Sb. v platném znění NV 616/2006 Sb. v platném znění	2006/95/ES - including amendments 2004/108/ES - including amendments
-------------------------------------------------------------------	-------------------------------------------------------------------------

Elektrotechnický zkušební ústav, Pod Lisem 129, 171 02 Praha 71, Česká republika
 zkoušel / certifikoval daný výrobek a vydal:
 tested / certified the product and issued:

EZU Certifikát / EZU Certificate: 1070840 ze dne 19.10.2007
 EZU zkušební protokol / EZU test report: 703777-01/01 ze dne 09.10.2007

Poslední dvojčíslí roku, v němž bylo označení CE na výrobek umístěno: 01
 Last two digits of the year in which the CE mark was placed on the product:

Místo vydání: Letohrad
 Place of issue:
 signature:

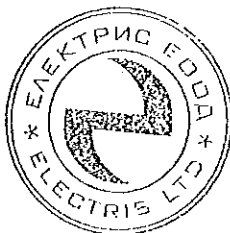
Zástupce výrobce a podpis:
 Manufacturer's representative and

Ing. Jaroslav Toman

Datum vydání: 27.03.2008
 Date of issue:

Funkce: generální ředitel
 Position: general director

OEZ.
 OEZ s.r.o.
 Šedivská 339, Letohrad 561 51
 Česká republika
 IČO: 49810146, DIČ: CZ49810146



ВЯРНО С ОРВИТНАААА

OEZ

ES PROHLASENI O SHODE / ДЕКЛАРАЦИЯ ЗА СЪОТВЕТСТВИЕ

Cislo/№: 211802/0803

My / Hue OEZ s.r.o.
Sedivska 339, 561 51 Letohrad, Ceska republika

prohlasujeme na svou vylucnou odpovednost, ze
deklarujeme na своя собствена отговорност, че

Vyrobek: Jistice MCCB
Продукт: Прекъсвачи лят корпус

Typ / Тип: BH630

Prislusenstvi / Аксесоари:
BH630SE.05, BH630NE.05, SE-BH-, SP-BHD-X, SV-BHD-X,
ZO-BH-0630-, ZV-BH-0630-, PS-BHD-, MB-BH-, MB-BHD-,
RP-, MP-BH-X, CS-BH-..., OD-BH-, OD-BHD-, SO-BHD-,

je ve shode s nasledujicimi normami:
отговаря на следните стандарти:

Ceske normy / Чехски стандарти	Evropske normy / Европейски стандарти
CSN EN 60947-1:05ed.3 CSN EN 60947-2:07ed.3+1:07	EN 60947-1:00 - включително изменения EN 60947-2:04 - включително изменения

a nasledujicimi narizenimi vlady, ve zneni pozdejsich predpisu (NV)
and the following government regulations (NV), as amended

NV 17/2003 Sb. v platnem zneni NV 616/2006 Sb. v platnem zneni	2006/95/ES - включително изменения 2004/108/ES - включително изменения
-------------------------------------------------------------------	---------------------------------------------------------------------------

Elektrotechnicky zkusebni ustav, Pod Lisem 129,171 02 Praha 71, Ceska republika
zkousel / certifikoval dany vyrobek a vydal:
проверен / сертифициран продукт и издаден:

EZU Certifikat / EZU Сертификат: 1070840 от 19.10.2007
EZU zkusebni protokol / EZU тест протокол: 703777-01/01 от 09.10.2007

Posledni dvojcisli roku, v nemz bylo oznaceni CE na vyrobek umisteno: 01
Последните две цифри на годината, през която маркировката се нанася върху продукта:

Misto vydani: Letohrad
Място на издаване:

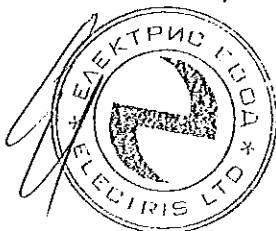
Zastupce vyrobce a podpis:
Представител на производителя и подпис

Ing. Jaroslav Toman

Datum vydani: 27.03.2008
Дата на издаване:

Funkce: generalni reditel
Позиция: генерален директор

OEZ &r.o.
Sedivska 339, Letohrad
561 51
Ceska republika
IČO: 49810146, DIC:
CZ49810146



СЕРТИФИКАТ

СПИСЪК НА ИЗПИТАНИЯТА ЗА
Триполюсен товаров прекъсвач-разединител НН с лят корпус
от 100 А

Удостоверение за **Распределително устройство и механизъм за управление ниско напрежение: Част 2: Автоматични прекъсвачи**

Клиент:

ООО "OEZ s.r.o." Šedivská 339 56151 Letohrad CZ
 Тел.: 00420-465-672 111 факс: 00420-465-672 151
 e-mail : zkusebna@oez.cz

Производител:

ООО "OEZ s.r.o." Šedivská 339 56151 Letohrad CZ
 Тел.: 00420-465-672 111 факс: 00420-465-672 151
 e-mail : zkusebna@oez.cz

Място на производство:

ООО "OEZ s.r.o." Šedivská 339 56151 Letohrad CZ
 Тел.: 00420-0465-672 111 факс: 00420-465-672 151
 e-mail : zkusebna@oez.cz

Типово обозначение:

BC160NT305-160-V-20585

Търговска марка



Място на проведане на изпитанията:

Институт EZÚ , Pod Lisem 129 171 02 Praha 71 – Trója
 Тел.: 00420-266 104 111 факс.: 00420-284 680 070
 e-mail : testing@ezu.cz

Описание:

Автоматичен прекъсвач-разединител НН с лят корпус BC160N

Приложиме стандарти:

IEC 60 947-2:95+A1:97+A2:01

In	160A
полоса:	3
последоват. исп. :	I, II, III, Прилож. C,F,G,H

	Фамилия, имя:	Дата:	Подпись:
Испитан от:	Ярослав Клипа	29.03.2006	
Проверил:	Ян Главаты	29.03.2006	

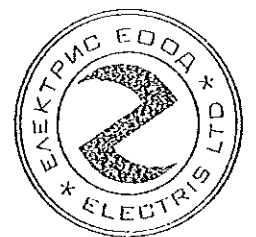
Характеристики	
Тип на автоматичния прекъсвач:	BC160NT305-160-V-20585
Брой на полюсите	3
вид на тока	AC

Брой на фазите	3			
Номинална честота	50/60Гц			
категория на приложение	A			
контролна температура	40°C			
пригодност за изолации	Да			
Номинални и пределни значения				
работно напрежение (Ue):		690	B	
импулсно напрежение без пробив (Uimp)		8	кВ	
номинално напрежение на изолация (Ui)		690	B	
Условен термичен ток (Ith/Ithe)		100	A	
Номинален ток (In)		100	A	
Номинално работно напрежение (U)		415/500/690	B	
Характеристики на автоматичния прекъсвач				
U/B	Icm/kA	Icu/kA	Ics/kA	
415	2,8			
500				
690				

СПИСЪК НА ИЗПИТАНИЯТА

1. Вериги за управление
2. Спомагателни вериги
3. Изключватели
4. Маркировка
5. Последователност на изпитанията I
6. Общи експлоатационни характеристики
7. Граници и характеристики на изключване
8. Изключвател с обратно зависима задръжка по време
9. Характеристики на изключване в зависимост на температурата на околния въздух
10. Изключване при късо съединение
11. Изключване при претоварване

12. Характеристики на сработване в зависимост от температурата на околната среда
13. Допълнително изпитание на ампер-секундната характеристика
14. Допълнително изпитание на изключвателя за определено време
15. Изпитание на диелектрични свойства
16. Проверка на диелектричната якост
17. Проверка на повърхностните разстояния
18. Изпитание на механична експлоатационна способност
19. Механическа износоустойчивост
20. Коммутационна износоустойчивост
21. Допълнителане при претоварване
22. Проверка на диелектричната издръжливост
23. Проверка на превишена температура
24. Проверка на максимално-токовия изключвател
25. Последователност на изпитанията II
26. Проверка на диелектричната якост
27. Проверка за превишена температура
28. Максимални изключватели при претоварване
29. Превишение на температурата на клемите
30. Последователност на изпитанията III
31. Номинална пределна коммутационна способност
32. Изключвател при претоварване
33. Последователност на операциите (0-t-C0)
34. Проверка на здравината на изолацията
35. Допълнителни изпитания на изключвателя на всеко полюс поотделно
36. Последователност на изпитанията при късо съединение на 1 полюс
37. Допълнителни изисквания към авт. прекъсвачи с електронна защита
38. Изпитание за устойчивост по отношение на индуцираните преходни
39. високочестотни смущения
40. Изпитание на сух климат
41. Изпитание на устойчивости по отношение на електростатични смущения
42. Изпитание на топлинен удар
43. Изпитание на влажен климат
44. Изпитание на радиочастотни лъчения
45. Загуба на мощност
46. Последователност на изпитания за авт. прекъсвачи за ИТ система



СПИСЪК НА ИЗПИТАНИЯТА ЗА
Триполюсен товар прекъсвач-разединител НН с лят корпус
от 160 А

Удостоверение за **Распределително устройство и механизъм за управление ниско напрежение: Част 2: Автоматични прекъсвачи**

Клиент: ООО "OEZ s.r.o." Šedivská 339 56151 Letohrad CZ
 Тел.: 00420-465-672 111 факс: 00420-465-672 151
 e-mail : zkusebna@oez.cz

Производител: ООО "OEZ s.r.o." Šedivská 339 56151 Letohrad CZ
 Тел.: 00420-465-672 111 факс: 00420-465-672 151
 e-mail : zkusebna@oez.cz

Място на производство: ООО "OEZ s.r.o." Šedivská 339 56151 Letohrad CZ
 Тел.: 00420-0465-672 111 факс: 00420-465-672 151
 e-mail : zkusebna@oez.cz

Типово обозначение: BC160NT305-160-V-20585

Търговска марка: **OEZ®**

Място на проведане на изпитанията: Институт EZÚ , Pod Lisem 129 171 02 Praha 71 – Trója
 Тел.: 00420-266 104 111 факс.: 00420-284 680 070
 e-mail : testing@ezu.cz

Описание: Автоматичен прекъсвач-разединител НН с лят корпус BC160N

Приложиме стандарти: IEC 60 947-2:95+A1:97+A2:01

In	160A
полюса:	3
последоват. исп. :	I, II, III, Прилож. C,F,G,H

	Фамилия, имя:	Дата:	Подпись:
Испитан от:	Ярослав Клипа	29.03.2006	
Проверил:	Ян Главаты	29.03.2006	

Характеристики	
Тип на автоматичния прекъсвач:	BC160NT305-160-V-20585
Брой на полюсите	3
вид на тока	АС

(Handwritten signatures and marks)

Брой на фазите	3			
Номинална честота	50/60Гц			
категория на приложение	A			
контролна температура	40°C			
пригодност за изолации	Да			
Номинални и пределни значения				
работно напрежение (Ue):	690	B		
импулсно напрежение без пробив (Uimp)	8	кВ		
номинално напрежение на изолация (Ui)	690	B		
Условен термичен ток (Ith/Ithe)	160	A		
Номинален ток (In)	160	A		
Номинално работно напрежение (U)	415/500/690	B		
Характеристики на автоматичния прекъсвач				
U/V	Icm/kA	Icu/kA	Ics/kA	
415	52	25	13	
500		12	6	
690		6	3	

СПИСЪК НА ИЗПИТАНИЯТА

1. Вериги за управление
2. Сномагателни вериги
3. Изключватели
4. Маркировка
5. Последователност на изпитанията I
6. Общи експлоатационни характеристики
7. Граници и характеристики на изключване
8. Изключвател с обратно зависима задръжка по време
9. Характеристики на изключване в зависимост на температурата на околния въздух
10. Изключване при късо съединение
11. Изключване при претоварване

12. Характеристики на сработване в зависимост от температурата на околната среда
13. Допълнително изпитание на ампер-секундната характеристика
14. Допълнително изпитание на изключвателя за определено време
15. Изпитание на диелектрични свойства
16. Проверка на диелектричната якост
17. Проверка на повърхностните расстояния
18. Изпитание на механична експлоатационна способност
19. Механическа износоустойчивост
20. Коммутационна износоустойчивост
21. Допълнителане при претоварване
22. Проверка на диелектричната издръжливост
23. Проверка на превишена температура
24. Проверка на максимално-токовия изключвател
25. Последователност на изпитанията II
26. Проверка на диелектричната якост
27. Проверка за превишена температура
28. Максимални изключватели при претоварване
29. Превишение на температурата на клемите
30. Последователност на изпитанията III
31. Номинална пределна коммутационна способност
32. Изключвател при претоварване
33. Последователност на операциите (0-t-C0)
34. Проверка на здравината на изолацията
35. Допълнителни изпитания на изключвателя на всеко полюс поотделно
36. Последователност на изпитанията при късо съединение на 1 полюс
37. Допълнителни изисквания към авт. прекъсвачи с електронна защита
38. Изпитание за устойчивост по отношениюма индуцираните преходни
39. високочестотни смущения
40. Изпитание на сух климат
41. Изпитание на устойчивости по отношению на електростатични смущения
42. Изпитание на топлинен удар
43. Изпитание на влажен климат
44. Изпитание на радиочастотни лъчения
45. Загуба на мощност
46. Последователност на изпитания за авт. прекъсвачи за IT система



СПИСЪК НА ИЗПИТАНИЯТА ЗА
Триполюсен товар прекъсвач-разединител НН с лят корпус
от 250 А

Удостоверение за *Распределително устройство и механизъм за управление ниско напрежение: Част 2: Автоматични прекъсвачи*

Клиент:

ООО "OEZ s.r.o." Šedivská 339 56151 Letohrad CZ
 Тел.: 00420-465-672 111 факс: 00420-465-672 151
 e-mail : zkusebna@oez.cz

Производител:

ООО "OEZ s.r.o." Šedivská 339 56151 Letohrad CZ
 Тел.: 00420-465-672 111 факс: 00420-465-672 151
 e-mail : zkusebna@oez.cz

Място на производство:

ООО "OEZ s.r.o." Šedivská 339 56151 Letohrad CZ
 Тел.: 00420-0465-672 111 факс: 00420-465-672 151
 e-mail : zkusebna@oez.cz

Типово обозначение:

BD250NE305-14414 + SE-BD-0250-V001-24120

Търговска марка



Място на проведане на изпитанията:

Институт EZÚ , Pod Lisem 129 171 02 Praha 71 – Trója
 Тел.: 00420-266 104 111 факс.: 00420-284 680 070
 e-mail : testing@ezu.cz

Описание:

Автоматичен прекъсвач-разединител НН с лят корпус BD250N

Приложиме стандарти:

IEC 60 947-2:95+A1:97+A2:01

In	250А
полоса:	3
последоват. исп. :	I, II, III, Прилож. C,F,G,H

	Фамилия, имя:	Дата:	Подпись:
Испитан от:	Ярослав Клипа	06.03.2007	
Проверил:	Ян Главаты	06.03.2007	

Характеристики		
Тип на автоматичния прекъсвач:		BD250NE305-14414 + SE-BD-0250-V001-24120
Брой на полюсите		3
вид на тока		АС
Брой на фазите		3

Номинална честота	50/60Гц		
категория на приложение	A		
контролна температура	40°C		
пригодност за изолация	Да		
Номинални и пределни значения			
работно напрежение (Ue):	690		B
импулсно напрежение без пробив (Uimp)	8		кВ
номинално напрежение на изолация (Ui)	690		B
Условен термичен ток (Ith/Ithe)	250		A
Номинален ток (In)	250		A
Номинално работно напрежение (U)	415/500/690		B
Характеристики на автоматичния прекъсвач			
U/B	Icm/kA	Icu/kA	Ics/kA
415	4		
500			
690			

СПИСЪК НА ИЗПИТАНИЯТА

1. Вериги за управление
2. Спомагателни вериги
3. Изключватели
4. Маркировка
5. Последователност на изпитанията I
6. Общи експлоатационни характеристики
7. Граници и характеристики на изключване
8. Изключвател с обратно зависима задръжка по време
9. Характеристики на изключване в зависимост на температурата на околния въздух
10. Изключване при късо съединение
11. Изключване при претоварване
12. Характеристики на сработване в зависимост от температурата на околната среда

13. Допълнително изпитание на ампер-секундната характеристика
14. Допълнително изпитание на изключвателя за определено време
15. Изпитание на диелектрични свойства
16. Проверка на диелектричната якост
17. Проверка на повърхностните разстояния
18. Изпитание на механична експлоатационна способност
19. Механическа износоустойчивост
20. Коммутационна износоустойчивост
21. Допълнителане при претоварване
22. Проверка на диелектричната издръжливост
23. Проверка на превишена температура
24. Проверка на максимално-токовия изключвател
25. Последователност на изпитанията II
26. Проверка на диелектричната якост
27. Проверка за превишена температура
28. Максимални изключватели при претоварване
29. Превिшение на температурата на клемите
30. Последователност на изпитанията III
31. Номинална пределна коммутационна способност
32. Изключвател при претоварване
33. Последователност на операциите (0-t-C0)
34. Проверка на здравината на изолацията
35. Допълнителни изпитания на изключвателя на всеко полюс поотделно
36. Последователност на изпитанията при късо съединение на 1 полюс
37. Допълнителни изисквания към авт. прекъсвачи с електронна защита
38. Изпитание за устойчивост по отношение на индуцираните преходни
39. високочестотни смущения
40. Изпитание на сух климат
41. Изпитание на устойчивости по отношение на електростатични смущения
42. Изпитание на топлинен удар
43. Изпитание на влажен климат
44. Изпитание на радиочастотни лъчения
45. Загуба на мощност
46. Последователност на изпитания за авт. прекъсвачи за IT система



5

СПИСЪК НА ИЗПИТАНИЯТА ЗА
Триполюсен товар прекъсвач-разединител НН с лят корпус
от 400 А

Удостоверение за *Распределително устройство и механизъм за управление ниско напрежение: Част 2: Автоматични прекъсвачи*

Клиент:

ООО "OEZ s.r.o." Šedivská 339 56151 Letohrad CZ
 Тел.: 00420-465-672 111 факс: 00420-465-672 151
 e-mail : zkusebna@oez.cz

Производител:

ООО "OEZ s.r.o." Šedivská 339 56151 Letohrad CZ
 Тел.: 00420-465-672 111 факс: 00420-465-672 151
 e-mail : zkusebna@oez.cz

Място на производство:

ООО "OEZ s.r.o." Šedivská 339 56151 Letohrad CZ
 Тел.: 00420-0465-672 111 факс: 00420-465-672 151
 e-mail : zkusebna@oez.cz

Типово обозначение:

BH630NE305-14412 + SE-BH-0630-V001-25120

Търговска марка

OEZ®

Място на проведане на изпитанията:

Институт EZÚ , Pod Lisem 129 171 02 Praha 71 – Trója
 Тел.: 00420-266 104 111 факс.: 00420-284 680 070
 e-mail : testing@ezu.cz

Описание:

Автоматичен прекъсвач-разединител НН с лят корпус BH630

Приложиме стандарти:


IEC 60 947-2:95+A1:97+A2:01

In	630А
полюса:	3
последоват. исп. :	I, II, III, Прилож. C,F,G,H

	Фамилия, имя:	Дата:	Подпись:
Испитан от:	Ярослав Клипа	06.03.2007	
Проверил:	Ян Главаты	06.03.2007	

Характеристики		
Тип на автоматичния прекъсвач:		BH630NE305-14412 + SE-BH-0630-V001-25120
Брой на полюсите		3
вид на тока		АС



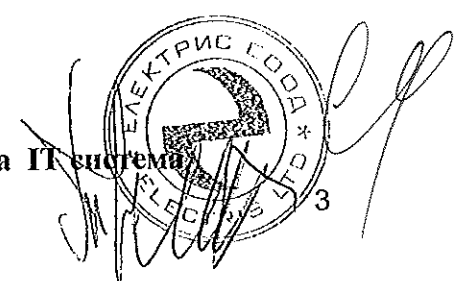




Брой на фазите	3			
Номинална честота	50/60Гц			
категория на приложение	A			
контролна температура	40°C			
пригодност за изолации	Да			
Номинални и пределни значения				
работно напрежение (Ue):	690			B
импулсно напрежение без пробив (Uimp)	8			кВ
номинално напрежение на изолация (Ui)	690			B
Условен термичен ток (Ith/Ithe)	400			A
Номинален ток (In)	400			A
Номинално работно напрежение (U)	415/500/690			B
Характеристики на автоматичния прекъсвач				
U/B	Icm/kA	Icu/kA	Ics/kA	
415	14			
500				
690				

СПИСЪК НА ИЗПИТАНИЯТА

1. Вериги за управление
2. Спомагателни вериги
3. Изключватели
4. Маркировка
5. Последователност на изпитанията I
6. Общи експлоатационни характеристики
7. Граници и характеристики на изключване
8. Изключвател с обратно зависима задръжка по време
9. Характеристики на изключване в зависимост на температурата на околния въздух
10. Изключване при късо съединение
11. Изключване при претоварване

12. Характеристики на сработване в зависимост от температурата на околната среда
13. Допълнително изпитание на ампер-секундната характеристика
14. Допълнително изпитание на изключвателя за определено време
15. Изпитание на диелектрични свойства
16. Проверка на диелектричната якост
17. Проверка на повърхностните расстояния
18. Изпитание на механична експлоатационна способност
19. Механическа износоустойчивост
20. Коммутационна износоустойчивост
21. Допълнителане при претоварване
22. Проверка на диелектричната издръжливост
23. Проверка на превишена температура
24. Проверка на максимално-токовия изключвател
25. Последователност на изпитанията II
26. Проверка на диелектричната якост
27. Проверка за превишена температура
28. Максимални изключватели при претоварване
29. Превिшение на температурата на клемите
30. Последователност на изпитанията III
31. Номинална пределна коммутационна способност
32. Изключвател при претоварване
33. Последователност на операциите (0-t-C0)
34. Проверка на здравината на изолацията
35. Допълнителни изпитания на изключвателя на всеко полюс поотделно
36. Последователност на изпитанията при късо съединение на 1 полюс
37. Допълнителни изисквания към авт. прекъсвачи с електронна защита
38. Изпитание за устойчивост по отношение на индуцираните преходни
39. високочестотни смущения
40. Изпитание на сух климат
41. Изпитание на устойчивости по отношение на електростатични смущения
42. Изпитание на топлинен удар
43. Изпитание на влажен климат
44. Изпитание на радиочастотни лъчения
45. Загуба на мощност
46. Последователност на изпитанията за авт. прекъсвачи за IT системи





СПИСК НА ИЗПИТАНИЯТА ЗА
Триполюсен товар прекъсвач-разединител НН с лят корпус
от 630 А

Удостоверение за **Распределително устройство и механизъм за управление ниско напрежение: Част 2: Автоматични прекъсвачи**

Клиент: ООО "OEZ s.r.o." Šedivská 339 56151 Letohrad CZ
 Тел.: 00420-465-672 111 факс: 00420-465-672 151
 e-mail : zkusebna@oez.cz

Производител: ООО "OEZ s.r.o." Šedivská 339 56151 Letohrad CZ
 Тел.: 00420-465-672 111 факс: 00420-465-672 151
 e-mail : zkusebna@oez.cz

Място на производство: ООО "OEZ s.r.o." Šedivská 339 56151 Letohrad CZ
 Тел.: 00420-0465-672 111 факс: 00420-465-672 151
 e-mail : zkusebna@oez.cz

Типово обозначение: BH630NE305-14412 + SE-BH-0630-V001-25120

Търговска марка



Място на проведане на изпитанията: Институт EZÚ , Pod Lisem 129 171 02 Praha 71 – Trója
 Тел.: 00420-266 104 111 факс.: 00420-284 680 070
 e-mail : testing@ezu.cz

Описание: Автоматичен прекъсвач-разединител НН с лят корпус BH630

Приложиме стандарти: IEC 60 947-2:95+A1:97+A2:01

In	630А
полуса:	3
последоват. исп. :	I, II, III, Прилож. C,F,G,H

	Фамилия, имя:	Дата:	Подпись:
Испитан от:	Ярослав Клипа	06.03.2007	
Проверил:	Ян Главаты	06.03.2007	

Характеристики	
Тип на автоматичния прекъсвач:	BH630NE305-14412 + SE-BH-0630-V001-25120
Брой на полюсите	3
вид на тока	АС

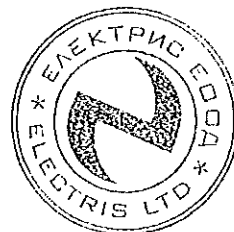


Брой на фазите	3			
Номинална честота	50/60Гц			
категория на приложение	A			
контролна температура	40°C			
пригодност за изоляции	Да			
Номинални и пределни значения				
работно напрежение (Ue):	690		B	
импулсно напрежение без пробив (Uimp)	8		кВ	
номинално напрежение на изолация (Ui)	690		B	
Условен термичен ток (Ith/Ithe)	630		A	
Номинален ток (In)	630		A	
Номинално работно напрежение (U)	415/500/690		B	
Характеристики на автоматичния прекъсвач				
U/B	Icm/kA	Icu/kA	Ics/kA	
415	14			
500				
690				

СПИСЪК НА ИЗПИТАНИЯТА

1. Вериги за управление
2. Спознавателни вериги
3. Изключватели
4. Маркировка
5. Последователност на изпитанията I
6. Общи експлоатационни характеристики
7. Граници и характеристики на изключване
8. Изключвател с обратно зависима задръжка по време
9. Характеристики на изключване в зависимост на температурата на околния въздух
10. Изключване при късо съединение
11. Изключване при претоварване

12. Характеристики на сработване в зависимост от температурата на околната среда
13. Допълнително изпитание на ампер-секундната характеристика
14. Допълнително изпитание на изключвателя за определено време
15. Изпитание на диелектрични свойства
16. Проверка на диелектричната якост
17. Проверка на повърхностните разстояния
18. Изпитание на механична експлоатационна способност
19. Механическа износоустойчивост
20. Коммутационна износоустойчивост
21. Допълнителане при претоварване
22. Проверка на диелектричната издръжливост
23. Проверка на превишена температура
24. Проверка на максимално-токовия изключвател
25. Последователност на изпитанията II
26. Проверка на диелектричната якост
27. Проверка за превишена температура
28. Максимални изключватели при претоварване
29. Превिшение на температурата на клемите
30. Последователност на изпитанията III
31. Номинална пределна коммутационна способност
32. Изключвател при претоварване
33. Последователност на операциите (0-t-C0)
34. Проверка на здравината на изолацията
35. Допълнителни изпитания на изключвателя на всеко полюс поотделно
36. Последователност на изпитанията при късо съединение на 1 полюс
37. Допълнителни изисквания към авт. прекъсвачи с електронна защита
38. Изпитание за устойчивост по отношение на индуцираните преходни
39. высокочестотни смущения
40. Изпитание на сух климат
41. Изпитание на устойчивости по отношение на електростатични смущения
42. Изпитание на топлинен удар
43. Изпитание на влажен климат
44. Изпитание на радиочестотни лъчения
45. Загуба на мощност
46. Последователност на изпитанията за авт. прекъсвачи за IT система



3



Český institut pro akreditaci, o.p.s.
130 00 Praha 3, Olšanská 54/3

vydává

OSVĚDČENÍ O AKREDITACI

č. 635 / 2012

Elektrotechnický zkušební ústav, s.p.
se sídlem Pod Lísemí 129, 171 02 Praha 8 - Troja, IČ 00001481

pro zkušební laborator č. 1056
Zkušební laboratoř

Předmět akreditace:

Zkoušení výrobků, dílů, součástí, materiálů a pomůcek v rozsahu uvedeném v příloze tohoto osvědčení.

Toto osvědčení o akreditaci vydal Český institut pro akreditaci, o.p.s. na základě posouzení splnění akreditačních požadavků podle

ČSN EN ISO/IEC 17025:2005

a po zjištění, že zkušební laboratoř je odborně způsobilá objektivně a nezávisle vykonávat činnosti uvedené v rozsahu předměti akreditace.

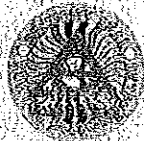
Adresát tohoto osvědčení je oprávněn používat při své činnosti v rozsahu tohoto osvědčení a po dobu jeho platnosti vedle svého názvu označení zkušební laboratoř akreditovaně CIA č. 1056, pod podmínkou, že bude vždy postupovat v souladu s příslušnými předpisy vztahujícími se k činnosti akreditované zkušební laboratoře, a to zejména ČSN EN ISO/IEC 17011 čl. 8.1, ČSN EN ISO/IEC 17025, zákona č. 22/1997Sb. o technických požadavcích na výrobky, ve znění pozdějších předpisů, včetně navazujících předpisů vydaných Českým institutem pro akreditaci, o.p.s.

Prokáže-li se, že adresát tohoto osvědčení neplní akreditační požadavky rozhodně pro jeho vydání a nedodržíje závazky podmínující akreditaci, může Český institut pro akreditaci, o.p.s. účinnost tohoto osvědčení pozastavit nebo osvědčení o akreditaci zrušit.

Toto osvědčení je vydáno v souladu s ustanovením § 16 odst. 1 zákona č. 22/1997 Sb., o technických požadavcích na výrobky a v souladu s ustanovením § 151 zákona č. 500/2004 Sb., správní řád.

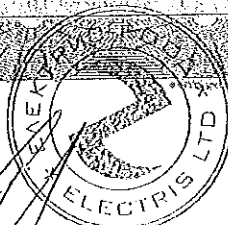
Toto osvědčení je platné do 15.10.2017

V Praze dne 07.11.2012



Ing. Jiří Růžička, MBA
ředitel

Českého institutu pro akreditaci, o.p.s.



ЧЕШКИ ИНСТИТУТ ПО АКРЕДИТАЦИЯ
130 00 Praha 3, Olšanská 54/3

издава

СЕРТИФИКАТ ЗА АКРЕДИТАЦИЯ

№ 635 / 2012

Институт за електрически изпитвания, S. P.
седалище Pod Lisem 129, 171 02 Praha 8 - Troja., IC 00001481

за Изследователските лаборатории №1056
Изпитвателна лаборатория

Предмет на акредитацията:

Изпитване на продукти, части, компоненти, материали и оборудване в степента, посочена в приложението към настоящото удостоверение.

Настоящият сертификат за акредитация, издаден от Чешкия институт за акредитация въз основа на оценка на съответствието с изискванията за акредитация на

ISO / IEC 17025:2005

констатира, че лабораторията за изпитване е компетентна обективно и независимо да изпълнява дейностите, посочени в обхвата на акредитацията.

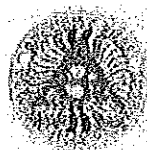
Адресатът на това удостоверение има право да упражнява своята дейност в обхвата на сертификата и срока на валидност на идентификация "изпитвателна лаборатория, акредитирана от ČIA №1056" при условие, че тя винаги ще действа в съответствие със съответните разпоредби, отнасящи се до дейността на акредитираните лаборатории за изпитване, по-специално EN ISO/IEC 17011, член 8.1, ISO EN / IEC 17025, Закон № 22/1 997Sb., за техническите изисквания към продуктите, като по-късно законодателство, включително свързаните с правилник, издаден от Чешкия институт по акредитация

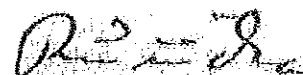
Ако се докаже, че адресатът на този сертификат не отговаря на изискванията за акредитация, приложими за издаване и не спазва задълженията за акредитация, Чешкият институт за акредитация може да спре действието или отнеме сертификата за акредитация.

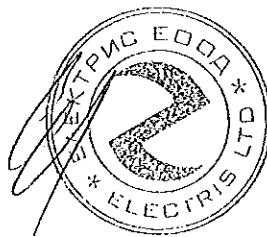
Това удостоверение се издава в съответствие с § 16, параграф 1 от Закон № 22/1997 Sb., за техническите изисквания към продуктите, в съответствие с § 151 от Закон № 500/2004 Sb., на Административнопроцесуалния кодекс.

Този сертификат е валиден до 15-ти октомври 2017

Прага, 07.11.2012

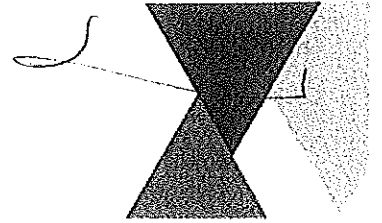



Ing. Jiří Růžička, MBA
Директор
Чешки институт по акредитация









OEZ s.r.o

Sedivska 339, Letohrad,

Czech Republic

Letohrad, 25. 6. 2012

INSTRUCTIONS FOR TRANSPORTATION FOR THE DEVICES DELIVERED BY OEZ s.r.o.

The devices must not be transported in the environment with high humidity, presence of corrosive substances or rapid changes of temperature and condensing vapours. The devices are delivered and must be stored in disengaged condition.

The devices must be transported in an environment with the following parameters as EN 60721-3-1.

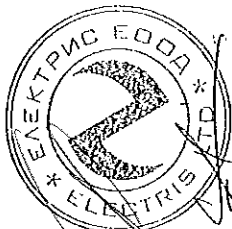
Transport conditions are treated in compliance with the Incoterms 2010 devised and published by the International Chamber of Commerce. Each commercial invoice issued by OEZ s.r.o. clearly specify the beforehand agreed delivery term.



OEZ s. r. o.
Sedivská 339, Letohrad 561 51
Česká republika
IČO: 49810146, DIČ: CZ49810146

Ivan Hanzl
Regional Export Manager

OEZ s.r.o., Sedivska 339, 561 51 Letohrad, Czech Republic
phone: +420 465 672 268, fax: +420 465 672 398, e-mail: ivan.hanzl@oez.com , www.oez.com



КОПИО С ОРИГИНАЛА

OEZ s.r.o.
Sedivská 339
561 51 Letohrad
Czech Republic

T +420 465 672 111
F +420 465 672 151
E mail: oeztrade.cz@oez.com, www.oez.cz



ОЕЗ s.r.o
Седивска 339, Летохрад
Чехия

Летохрад, 25.06.2012

Инструкция за транспорт на апаратурата доставена от ОЕЗ s.r.o

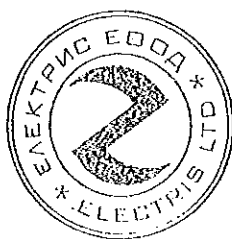
Апаратурата не трябва да се транспортира в среда с висока влажност, с наличие на корозивни вещества с резки промени на температурата или при наличие на кондензирани изпарения. Прекъсвачите са доставени и трябва да се складираат при подходящи условия.

Апаратурата трябва да се транспортира в среда със следните параметри, съгласно EN 60721-3-1.

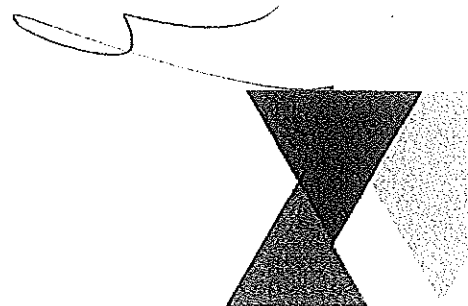
Условията на транспортиране са в съответствие с Инкотермс 2010, подразделени и публикувани от Международната камера за търговия. Всяка търговска фактура, издадена от ОЕЗ s.r.o точно спесифицира предварително уговорените условия на доставка.

Иван Ханзел
Регионален мениджър експорт

ОЕЗ s.r.o, Седивска 339, Летохрад, Чехия
тел.: +420 465 672 268, факс: +420 465 672 398
e-mail: ivan.hanzl@oez.com, www.oez.com



OEZ



OEZ s.r.o

**Sedivska 339, Letohrad,
Czech Republic**

Letohrad, 25. 6. 2012

INSTRUCTIONS FOR STORAGE FOR THE DEVICES DELIVERED BY OEZ s.r.o.

The devices must not be stored in the environment with high humidity, presence of corrosive substances or rapid changes of temperature and condensing vapours. The devices are delivered and must be stored in disengaged condition.

The device must be store in an environment with the following parameters as ČSN EN 60721-3-1: 1K2/1Z1/1B1/1C2/1S2/1M2.

OEZ.

OEZ s. r. o.
Sedivská 339, Letohrad 561 51
Česká republika
IČO: 498 10146, DIČ: CZ49810146
73

Ivan Hanzl
Regional Export Manager

OEZ s.r.o., Sedivska 339, 561 51 Letohrad, Czech Republic
phone: +420 465 672 266, fax: +420 465 672 398, e-mail: ivan.hanzl@oez.com, www.oez.com



ВЯРНО С ОРИГИНАЛА

OEZ s.r.o.
Sedivská 339
561 51 Letohrad
Czech Republic

T +420 465 672 111
F +420 465 672 151
E mail: oeztrade.cz@oez.com, www.oez.cz

ОЕЗ s.r.o
Седивска 339, Летоград
Чехия

Летоград, 25.06.2012

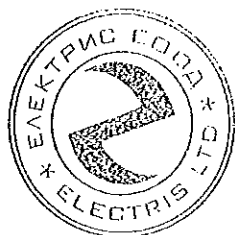
Условия за съхранение на апаратурата доставена от ОЕЗ s.r.o

Апаратурата не трябва да се складира в среда с висока влажност, с наличие на корозивни вещества с резки промени на температурата или при наличие на кондензирани изпарения. Прекъсвачите са доставени и трябва да се складираат при подходящи условия.

Апаратурата трябва да се складира в среда със следните параметри, отговарящи на CSN EN 60721-3-1:1K2/1Z1/1B1/1C2/1S2/1M2.

Иван Ханзел
Регионален мениджър експорт

ОЕЗ s.r.o, Седивска 339, Летоград, Чехия
тел.: +420 465 672 268, факс: +420 465 672 398
e-mail: ivan.hanzl@oez.com, www.oez.com



IEC**IECEE
CB
SCHEME**

Ref. Certif. No.

CZ-1642IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST
CERTIFICATES FOR ELECTRICAL EQUIPMENT
(IECEE) CB SCHEMESYSTEME CEI D'ACCEPTATION MUTUELLE DE
CERTIFICATS D'ESSAIS DES EQUIPEMENTS
ELECTRIQUES (IECEE) METHODE OC**CB TEST CERTIFICATE
CERTIFICAT D'ESSAI OC**Product
Produit

Circuit-breaker

Name and address of the applicant
Nom et adresse du demandeurOEZ s. r. o.
Šedivská 339, 561 51 Letohrad, Czech RepublicName and address of the manufacturer
Nom et adresse du fabricantOEZ s. r. o.
Šedivská 339, 561 51 Letohrad, Czech RepublicName and address of the factory
Nome et adresse de l'usineOEZ s. r. o.
Šedivská 339, 561 51 Letohrad, Czech RepublicRatings and principal characteristics
Valeurs nominales et caractéristiques principales

690 V AC, 50/60 Hz, 1600 A, Uimp = 8 kV

Trademark (if any)
Marque de fabrique (si elle existe)Model / Type Ref.
Ref. De type

BL1600

Additional information (if necessary)
Information complémentaire (si nécessaire)

PUBLICATION

EDITION

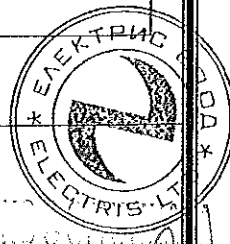
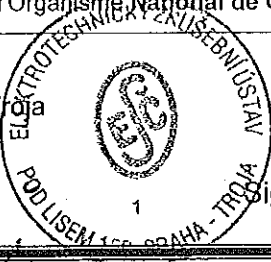
A sample of the product was tested and found
to be in conformity with
Un échantillon de ce produit a été essayé et a été
considéré conforme à la

IEC 60947-2

2003+consolidated ed. 2.2:2001

As shown in the Test Report Ref. No. which forms part
of this Certificate
Comme indiqué dans le Rapport d'essais numéro de
référence qui constitue partie de ce Certificat

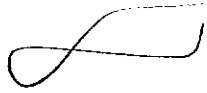
600332-02/01 of: 23.02.2006

This CB Test Certificate is issued by the National Certification Body
Ce Certificat d'essai OC est établi par l'Organisme National de CertificationElektrotechnický zkušební ústav
Pod lisem 129, 171 02 Praha 8 – Troja
Czech Republic

Date: 24.2.2006

Signature: Pavel Kudrna
Certification and Inspection Manager

ELEKTROTECHNICKÝ ZKUŠEBNÍ ÚSTAV



ELECTROTECHNICAL TESTING INSTITUTE - CZECH REPUBLIC
ELEKTROTECHNISCHE PRÜFANSTALT - TSCHHECHISCHE REPUBLIK
INSTITUT ELECTROTECHNIQUE D'ESSAIS - RÉPUBLIQUE TCHÉQUE
ЭЛЕКТРОТЕХНИЧЕСКИЙ ИСПЫТАТЕЛЬНЫЙ ИНСТИТУТ - ЧЕШСКАЯ РЕСПУБЛИКА

Pod lísem 129, 171 02 Praha 8 - Troja

CERTIFICATE

No.: 1060792

Product: Circuit breakers

Type: BL 1600

Rating: Ue = 690 V AC, Iu = 1600 A, Icu = 65 kA

Ordering firm: OEZ s.r.o.
Šedivská 339, 561 51 Letohrad, Czech Republic

Manufacturer: OEZ s.r.o.
Šedivská 339, 561 51 Letohrad, Czech Republic

Trade mark:

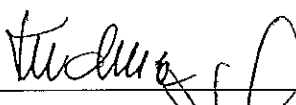
The test results are stated in the test-report No.: 603126-01/01 of: 25.09.2006

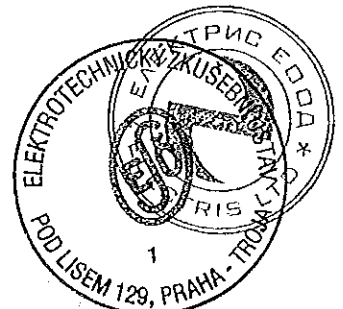
A sample of the product was found to be in conformity with:
ČSN EN 60947-1:05 ed.3, ČSN EN 60947-2:04 ed.2,
ČSN EN 55022:99+A1:01+A2:03+1:01+2:03+3:05+4:05, ČSN EN 60947-4-2:01 ed.2+A1:02

The validity of the certificate is limited to: 30.9.2009

6.10.2006

Prague


Pavel Kudrna
Certification and Inspection Manager



603126-01

ELEKTROTECHNICKÝ ZKUŠEBNÍ ÚSTAV



[Handwritten mark]

ELECTROTECHNICAL TESTING INSTITUTE - CZECH REPUBLIC
ELEKTROTECHNISCHE PRÜFANSTALT - TSCHHECHISCHE REPUBLIK
INSTITUT ELECTROTECHNIQUE D'ESSAIS - RÉPUBLIQUE TCHÈQUE
ЭЛЕКТРОТЕХНИЧЕСКИЙ ИСПЫТАТЕЛЬНЫЙ ИНСТИТУТ - ЧЕШСКАЯ РЕСПУБЛИКА

Pod lisem 129, 171 02 Praha 8 - Troja

CERTIFIKÁT

č.: 1060792

Výrobek: Jistič

Typ: BL 1600

Jmenovité hodnoty: $U_e = 690 \text{ V AC}$, $I_u = 1600 \text{ A}$, $I_{cu} = 65 \text{ kA}$

Objednavatel: OEZ s.r.o.
Šedivská 339, 561 51 Letohrad, Česká republika

Výrobce: OEZ s.r.o.
Šedivská 339, 561 51 Letohrad, Česká republika

Obchodní značka:

Výsledky zkoušek jsou uvedeny v protokolu č.: 603126-01/01 ze dne: 25.09.2006

Vzorek zkoušeného výrobku je ve shodě s požadavky:
ČSN EN 60947-1:05 ed.3, ČSN EN 60947-2:04 ed.2,
ČSN EN 55022:99+A1:01+A2:03+1:01+2:03+3:05+4:05, ČSN EN 60947-4-2:01 ed.2+A1:02

Shoda výrobku s uvedenými normami a předpisy zajišťuje shodu výrobku se základními požadavky nařízení vlády č. 17/2003 Sb. v platném znění a certifikát může být použit jako podklad pro Prohlášení o shodě podle zákona č. 22/97 Sb. o technických požadavcích na výrobky, v platném znění.

Platnost certifikátu je omezena do: 30.9.2009

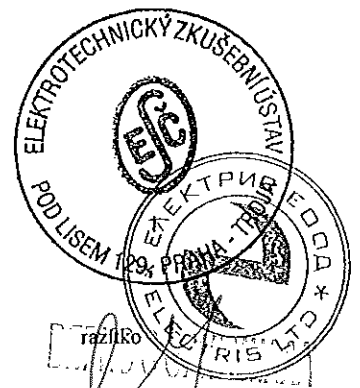
6.10.2006

V Praze dne

[Handwritten signature]

[Handwritten signature]

Ing. Pavel Kudrna
Manažer pro certifikaci a inspekce



603126-01

TEST REPORT
IEC 60 947-2
Low-voltage switchgear and controlgear
Part 2: Circuit - breakers

Report Reference No.....: 600332-02/01

Tested by (name+signature).....: Jaroslav Klípa

Witnessed by (name+signature).....: Jan Hlavatý

Supervised by (name+signature).....: Jan Hlavatý

Approved by (name+signature).....: Jan Hlavatý

Date of issue: 23.2.06

CB Testing Laboratory: EZÚ

Address.....: Pod Lisem 129 171 02
Praha 71- Trója

Testing location/ procedure: CBTL RMT SMT WMT TMP

Testing location/ address.....:

Applicant's name: OEZ s.r.o.

Address:Šedivská 339 56151Letohrad

Test specification:

Standard: IEC 60 947 - 2 : 2003 (3rd Edition)+ consolidated ed.2.2:01

Test procedure: CB / CCA

Non-standard test method.....: N/A

Test Report Form No.: IEC60947_2C

TRF Originator: KEMA Nederland B.V.

Master TRF: Dated 2004-12

Copyright © 2004 IEC System for Conformity Testing and Certification of Electrical Equipment (IECEE), Geneva, Switzerland. All rights reserved.

This publication may be reproduced in whole or in part for non-commercial purposes as long as the IECEE is acknowledged as copyright owner and source of the material. IECEE takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

Test item description: Circuit-breaker

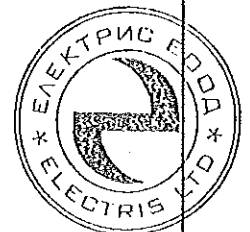
Trade Mark: **OEZ**

Manufacturer.....: OEZ s.r.o.

Address.....: OEZ s.r.o. Šedivská 339 56151 Letohrad

Model/Type reference: BL1600

Ratings.....:



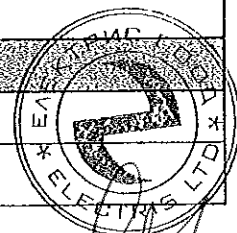
Particulars: test item vs. test requirements

3. Classification

3.1. Utilization category: (A or B).....	A
3.2. Interruption medium: (air, vacuum, gas Break)	Air
3.3. Design: (open construction, moulded case)	moulded case
3.4. Method of controlling the operation mechanism: (dependent manual operation, independent manual operation, dependent power operation, independent power operation)	independent manual operation
3.5. Suitability for insulation: (suitable, not -suitable)	suitable
3.6. Provision for maintenance: (maintainable, non maintainable)	non maintainable
3.7. Method of installation: (fixed, plug in, withdrawable :	withdrawable
3.8. Degree of protection: (IP code).....	IP20
4.8. Integral fuses (integrally fused circuit-breakers) Type and characteristics of SCPD	N/A
4.9. Switching overvoltages: (when Uimp. is declared)	Yes
7.3 Electromagnetic compatibility (EMC) Environment A or B.....	Yes
Circuit-breaker for use on phase-earthed systems.....	Yes
Circuit-breaker for use in IT systems	Yes
Rated and limiting values, main circuit	
- rated operational voltage: Ue (V).....	415V/500V/690V AC
- rated insulation voltage: Ui (V).....	690V
- rated impulse withstand voltage: Uimp (kV).....	8kV
- rated operational current: Ie (A).....	1600A
- kind of current.....	AC
- conventional free air thermal current: Ith (A)	1600A
- conventional enclosed thermal current: Ithe (A).....	N/A
- current rating for four-pole circuit-breakers: (A)	N/A
- number of poles	3
- rated frequency: (Hz)	50/60Hz
- integral fuses (rated values)	No
- suitability for environment (A or B)	B

Rated duty

- eight-hour duty	Yes
- uninterrupted duty: Iu (A).....	1600A



Handwritten signatures and scribbles at the bottom of the page.

Stamp: ELECTRIS LTD

Short-circuit characteristic	
rated short-time making capacity: I_{cm} (kA).....:	415V 140kA, 500V 95kA, 690V 60kA
rated ultimate short-circuit breaking capacity: I_{cu} (kA).....:	415V 65kA, 500V 45kA, 690V 20kA
rated service short-circuit breaking capacity: I_{cs} (kA).....:	415V 36kA, 500V 30kA, 690V 20kA
rated short-time withstand current: I_{cw} (kA/s).....:	20kA/1s
Control circuits	N/A
Electrical control circuits	
- kind of current: (AC, DC).....:	
- rated frequency: (Hz).....:	
- rated control circuit voltage: U_c (nature, frequency, V) :	
- rated control supply voltage: U_s (nature, frequency V) :	
Air supply control circuits: (pneumatic or electro-pneumatic) :	
- rated pressure and its limit.....:	
- volumes of air, at atmospheric pressure, required for each closing and each opening operation.....:	
Auxiliary circuits	
Rated and limiting values, auxiliary circuits.....:	
- rated operational voltage U_e (V).....:	500V AC 240V DC
- rated insulation voltage: U_i (V).....:	500V
- rated operational current: I_e (A).....:	1,5A AC 0,3A DC
- kind of current.....:	AC/DC
- rated frequency: (Hz).....:	50/60HZ
- number of circuits.....:	4
- number and kind of contact elements.....:	2a and 2b
- rated uninterrupted current: I_u (A).....:	6A
- utilization category: (AC, DC, current and voltage).....:	1,5A/500V/AC15 0,3A /240V/DC13



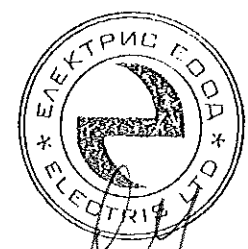
[Handwritten signature]

[Handwritten signature]

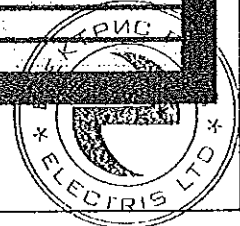
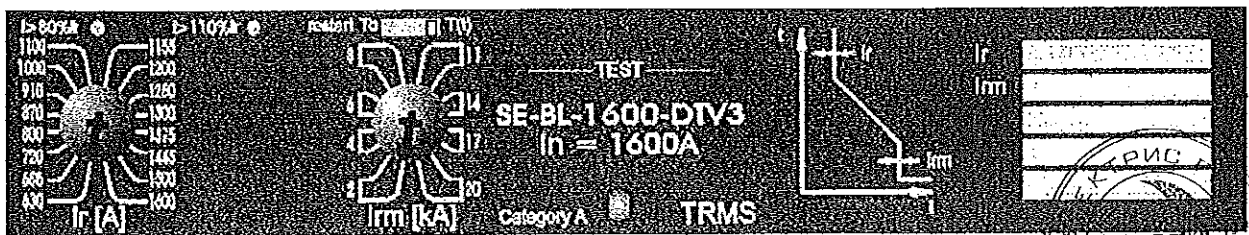
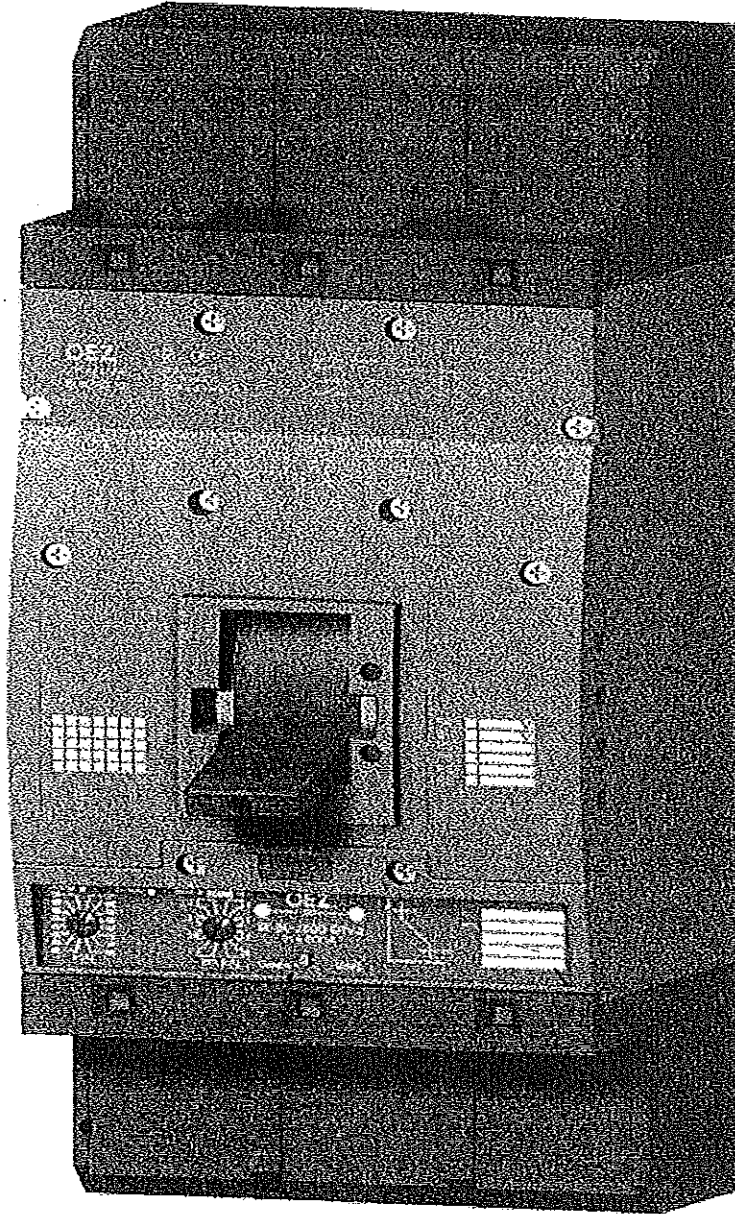
[Handwritten text]

Short-circuit characteristic	
Rated conditional short-circuit current: I_{cn} (kA)	-
Co-ordination of short-circuit protective devices	
- kind of protective device	-
Releases	
1) shunt release.....	Yes
2) Over current release	Yes
a) instantaneous.....	Yes
b) definite time delay.....	X
c) inverse time delay	X
- independent of previous load	X
- dependent on previous load; (for example thermal type release).....	X
3) Undervoltage release (for opening)	Yes
4) Other releases.....	X
Characteristics :	
1) Shunt release and undervoltage release (for opening):	
- rated control circuit voltage: U_c (nature, frequency, V) :	AC/DC, 50/60Hz, 24V, 48V, 110V, 230V, 400V
- kind of current.....	AC/DC
-rated frequency: (if AC).....	50/60Hz

2) Overcurrent release	
- rated current	1600A
- kind of current.....	AC
- rated frequency: (if AC).....	50/60Hz
- current setting (or range of settings).....	0,4 -1Ir
- time settings (or range of settings)	X



Copy of marking plate



Handwritten signature

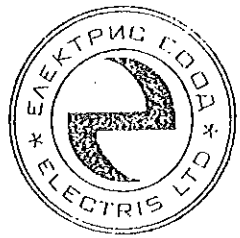
Handwritten signature

Summary of testing:

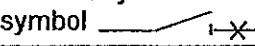

[Empty rectangular box for testing summary]

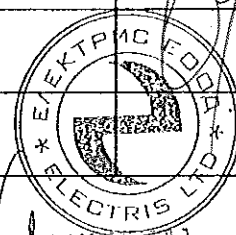


Test item particulars	
Classification of installation and use	X
Supply Connection	X
.....	
.....	
Possible test case verdicts:	
- test case does not apply to the test object	N/A
- test object does meet the requirement	P(Pass)
- test object does not meet the requirement	F(Fail)
Testing	
Date of receipt of test item	
Date (s) of performance of tests	
General remarks:	
<p>This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IEC 60384-14.</p> <p>The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.</p> <p>"(see Enclosure #)" refers to additional information appended to the report. "(see appended table)" refers to a table appended to the report.</p> <p>Throughout this report a comma (point) is used as the decimal separator.</p>	
General product information:	

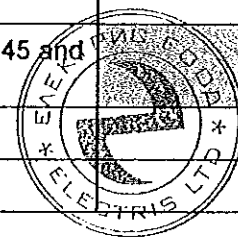


ΕΛΕΚΤΡΙΣ ΕΠΔΑ

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
5.2	MARKING		
a)	The following data shall be marked on the circuit-breaker itself or on a name plate or nameplates attached to the circuit-breaker, and located in a place such that they are visible and legible when the circuit-breaker is installed.		
	- rated current:	1600A	
	- suitability for isolation, if applicable, with the symbol 	Yes	
	- indication of the open and closed position: with O and I respectively, if symbols are used	Yes	
b)	Marking on equipment not needed to be visible after mounting:		
	- manufacturer's name or trademark	OEZ	
	- type designation or serial number	BL1600	
	- IEC 60947-2 if the manufacturer compliance with this standard.	Yes	
	- utilization category	A	
	- rated operational voltage(s) Ue	415V, 500V, 690V AC	
	- Circuit-breaker for use in IT systems: Circuit-breaker for which all values of rated voltage have not been tested according to annex H or are not covered by such testing, shall be identified by the symbol  which shall be marked on the circuit-breaker immediately following these values of rated voltage	Circuit-breaker is suitable for use in IT systems 415V, 500V, 690V	P
	- value (or range) of the rated frequency and/or the indication DC (or symbol)	50/60Hz	
	- rated service short-circuit breaking capacity. Ics	36kA/415V, 30kA/500V, 20kA/690V	
	- rated ultimate short-circuit breaking capacity. Icu	65kA/415V, 45/500V, 20kA/690V	
	- rated short-time withstand current, (Icw) and associated short-time delay, for utilization category B	N/A	
	- line and load terminals, unless their connection is immaterial	Yes	
	- neutral pole terminals, if applicable, by the letter N	N/A	
	- protective earth terminal, where applicable, by the symbol acc. 7.1.9.3 of part 1	N/A	




IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	- ref. temperature for non-compensated thermal releases, if different from 30°C	+40°C	
c)	Marked on the circuit-breaker as specified in item b), or shall be made available in the manufacturer's published information:		
	- rated short-circuit making capacity (Icm) (if higher than specified in 4.3.5.1	140kA/415V	
	- rated insulation voltage. (Ui) if higher than the maximum rated operational voltage)	690V	
	- rated impulse withstand voltage (Uimp), when declared.	8kV	
	- pollution degree if other than 3	3	
	- conventional enclosed thermal current (Ithe) if different from the rated current:	Ith=In	
	- IP Code, where applicable:	IP20	
	- minimum enclosure size and ventilation data (if any) to which marked ratings apply:	N/A	
	- details of minimum distance between circuit-breaker and earthed metal parts for circuit-breaker intended for use without enclosure:	Vide catalogue	
	- r.m.s sensing if applicable, according to F.4.1.1	yes	
	- suitability for environment A or B	B \	
d)	The following data concerning the opening and closing devices of the circuit-breaker shall be placed either on their own nameplates or on the nameplate of the circuit-breaker:		
	- rated control circuit voltage of the closing device, and rated frequency for AC:	N/A	
	- rated control circuit voltage of the shunt release and/or of the under-voltage release, and rated frequency:	24,48,110,230,400,500VAC 24,48,110,220V DC 50/60Hz	
	- rated current of indirect over-current releases:	N/A	
	- number and type of auxiliary contacts and kind of current, rated frequency (if AC) and rated voltages of the auxiliary switches, if different from those of the main circuit.	Vide catalogue	
e)	Terminal shall be clearly and permanently identified in acc. with IEC 60445 and annex L :		
	- line terminal	satisfy	
	- load terminal	satisfy	



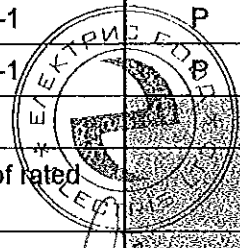
Handwritten signature

Handwritten signature

XXXXXXXXXXXXXXXXXXXX

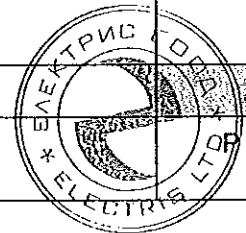
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	- neutral pole terminal "N"	N/A	
	- protective earth terminal 	N/A	
	- terminal of coils (A/B)	N/A	
	- terminal of shunt release (B)	satisfy	
	- terminals of under-voltage release (D)	satisfy	
	- terminals of interlocking electromagnets (E)	N/A	
	- terminals of indicated light devices (X)	N/A	
	- terminals of contact elements for switching devices (no)	N/A	

7.1	CONSTRUCTION		
7.1.1	Withdrawable circuit-breaker	satisfy	
	In the disconnected position (main- and auxiliary circuits)		
	Isolating distances for circuit-breaker suitable for isolating warranted:	26mm	P
	Mechanism fitted with a reliable indicating device with indicates the position of the isolating contacts.	yes	P
	Mechanism fitted with interlocks which only permit the isolating contacts to be separate or re-closed when main contacts are open	yes	P
	Mechanism fitted with interlock, which only permit the main contacts to be closed when the isolating contacts are fully closed.	yes	P
	Mechanism fitted with interlock, which only permit the main contacts to be closed when in disconnected position.	yes	P
	The isolating distances between the isolating contacts cannot be inadvertently reduced.	yes	P
7.1.1.1	Resistance to abnormal heat and fire	Satisfy IEC 60947-1	P
7.1.2	Current-carrying parts and their connection	Satisfy IEC 60947-1	P
7.1.3	Clearences and creepage distances:		
	For circuit-breakers for which the manufacturer has declared a value of rated impulse withstand voltage. (Uimp.)		
	Clearences distances:	20mm	



СЕРТЫфіКАЦЫЯ

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	- Uimp is given as:	8kV	
	- max. value of rated operational voltage to earth	400V	
	- nominal voltage of supply system:	N/A	
	- overvoltage category:	IV	
	- pollution degree:	3	
	- field-in or homogeneous:	inhomogeneous	
	- minimum clearances (mm):	8mm	
	- measured clearances (mm):	12,5mm	P
	Creepage distances:		
	- rated insulation voltage Ui (V)	690V	
	- pollution degree	3	
	- comparative tracking index (VTI)	400V	
	- material group	2	
	Minimum creepage distances (mm)	9mm	
	Measured creepage distances (mm)	32mm	P
7.1.4 part 1	Actuator		
7.1.4.1 part 1	Insulation		
	The actuator of the equipment shall be insulated from the live parts for the rated insulation voltage and, if applicable, the rated impulse withstand voltage	satisfy	P
	If it is made of metal, it shall be capable of being satisfactorily connected to a protective conductor unless it is provided with additional reliable insulation	satisfy	P
	If it is made of or covered by insulating material, any internal metal part, which might become accessible in the event of insulation failure, shall also be insulated from live parts for the rated insulation voltage	satisfy	P
7.1.4.2	Direction of movement		
	The direction of operation for actuators of devices shall normally conform to IEC 60447.	satisfy	

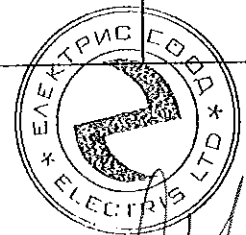


Handwritten signature

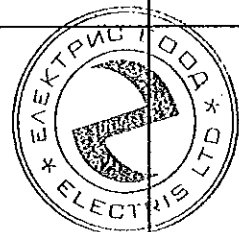
Handwritten signature

11.03.2014 14:14:11

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Where devices cannot conform to these requirements, e.g. due to special applications or alternative mounting positions, they shall be clearly marked such that there is no doubt as to the "I" and "O" positions and the direction of operation	satisfy	P
7.1.5 part 1	Indication of contact position		
7.1.5.1 part 1	Indicating means		
	When an equipment is provided with means for indicating the closed and open positions, these positions shall be unambiguous and clearly indicated	satisfy	P
	This is done by means of a position indicating device (see 2.3.18)	satisfy	P
	If symbols are used, they shall indicate the closed and open position respectively, in accordance with IEC 60417-2:		
	- 60417-2-IEC-5007 I On (power)	satisfy	P
	- 60417-2-IEC-5007 O Off (power)	satisfy	P
	For equipment operated by means of two push-buttons, only the push-button designated for the opening operation shall be red or marked with the symbol "O"	N/A	
	Red colour shall not be used for any other push-button	N/A	
	The colours of other push-buttons, illuminated push-buttons and indicator lights shall be in accordance with IEC 60073	N/A	
7.1.5.2 part 1	Indication by the actuator		
	When the actuator is used to indicate the position of the contacts, it shall automatically take up or stay, when released, in the position corresponding to that of the moving contacts; in this case, the actuator shall have two distinct rest positions corresponding to those of the moving contacts, but for automatic opening a third distinct position of the actuator may be provided	satisfy	P



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
7.1.6	Additional safety requirements for equipment suitable for isolation		
7.1.6.1	Additional constructional requirements for equipment suitable for isolation (Ue > 50 V):		
	Equipment suitable for isolation shall provide in the open position an isolation distance in acc. with the requirements necessary to satisfy the isolating function. Indication of the main contacts shall be provide by one or more of the following means:		
	- the position of the actuator	yes	P
	- a separate mechanical indicator	N/A	
	- visibility of the moving contacts	not	
	When means are provided or to lock the equipment in the open position, locking only be possible when contacts are in the open position	satisfy	P
	Actuator front-plate fitted to the equipment in a manner which ensures correct contact position indication and locking	yes	P
	The indicated open position is the only position in which the specified isolation distances between the contacts is ensured.	Satisfy	P
	- minimum clearances across open contacts (see Table XIII, Part 1) (mm) :	8mm	
	- measured clearances (mm) :	20mm	P
	- test Uimp across gap (kV) :	8kV	P
7.1.6.2	Supplementary requirements for equipment with provision for electrical interlocking with contactors or circuit-breakers:		N/A
	auxiliary switch shall be rated according to IEC 60 947-5-1		
	If equipment suitable for isolation is provided with an auxiliary switch for the purpose of electrical interlocking with contactor (s) or circuit-breaker(s) and intended to be used in motor circuits, the following requirements shall apply unless the equipment is rated for AC-23 utilization category		
	The time interval between the opening of the contacts of the auxiliary switch and the contacts of the main poles shall be sufficient to ensure that the associated contactor or circuit-breaker interrupts the current before the main poles of the equipment open		

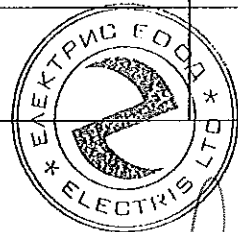


Handwritten signature

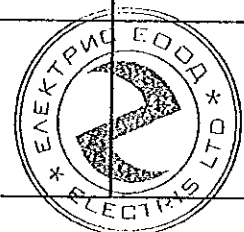
Handwritten signature

Handwritten text

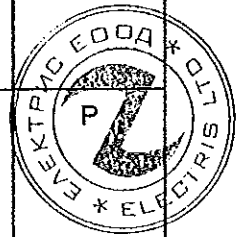
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Unless otherwise stated in the manufacturer's technical literature, the time interval shall be not less than 20 ms when the equipment is operated according to the manufacturer's instructions		
	Compliance shall be verified by measuring the time interval between the instant of opening of the auxiliary switch and the instant of opening of the main poles under no-load conditions when the equipment is operated according to the manufacturer's instructions		
	During the closing operation the contacts of the auxiliary switch shall close after or simultaneously with the contacts of the main poles		
	A suitable opening time interval may also be provided by an intermediate position (between the ON and OFF position) at which the interlocking contact(s) is (are) open and the main poles remain closed		
7.1.6.3	Supplementary requirements for equipment provided with means for padlocking the open position:		
	the locking means shall be designed in such a way that it cannot be removed with the appropriate padlock(s) installed	satisfy	P
	Alternatively, the design may provide padlockable means to prevent access to the actuator	N/A	
	test force F applied to the actuator in an attempt to operate to the closed position (N) :	495N	P
	rated impulse withstand voltage (kV) :	8kV	P
	test Uimp on open main contacts at the test force		P
7.1.7	Terminals		
7.1.7.1	All parts of terminals which maintain contact and carry current shall be of metal having adequate mechanical strength	satisfy	P/
	Terminal connections shall be such that necessary contact pressure is maintained	satisfy	P
	Terminals shall be so constructed that the conductor is clamped between suitable surfaces without damage to the conductor and terminal	satisfy	P




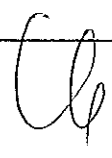
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Terminal shall not allow the conductor to be displaced or to be displaced themselves in a manner detrimental to the operator of equipment and the insulation voltage shall not be reduced below the rated value	satisfy	P
7.1.7.2	Connection capacity		
	type of conductors :		
	minimum cross-sectional area of conductor (mm ²) :		
	maximum cross-sectional area of conductor (mm ²) :	1000mm ²	
	number of conductors simultaneously connectable to the terminal :	1	
7.1.7.3	Connection		
	terminals for connection to external conductors shall be readily accessible during installation	satisfy	P
	clamping screws and nuts shall not serve to fix any other component	satisfy	P
7.1.7.4	Terminal identification and marking		
	terminal intended exclusively for the neutral conductor	N/A	
	protective earth terminal	N/A	
	other terminals	N/A	
7.1.8 part 1	Additional requirements for equipment provided with a neutral pole		N/A
	When an equipment is provided with a pole intended only for connecting the neutral, this pole shall be clearly identified to that effect by the letter N (see 7.1.7.4.).		
	A switched neutral pole shall break not before and shall make not after the other poles		
	For equipment having a value of conventional thermal current (free air or enclosed, see 4.3.2.1 and 4.3.2.2) not exceeding 63 A, this value shall be identical for all poles		
	For higher conventional thermal current values, the neutral pole may have a value of conventional thermal current different from that of the other poles, but not less than half that value or 63 A, whichever is the higher		

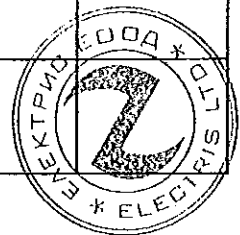


IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	if a pole with a appropriate making and breaking capacity is used as a neutral pole, then all poles, incl. the neutral pole, shall operate substantially together.		
7.1.9	Provisions for protective earthing		N/A
7.1.9.1	The exposed conductive parts (e.g. chassis, framework and fixed parts of metal enclosures) other than those which cannot constitute a danger shall be electrically interconnected and connected to a protective earth terminal for connection to an earth electrode or to an external protective conductor		
part 1	This requirement can be met by the normal structural parts providing adequate electrical continuity and applies whether the equipment is used on its own or incorporated in an assembly		
	Exposed conductive parts are considered not to constitute a danger if they cannot be touched on large areas or grasped with the hand or if they are of small size (approximately 50 mm x 50 mm) or are so located as to exclude any contact with live parts		
7.1.9.2 part 1	Protective earth terminal		
	The protective earth terminal shall be readily accessible and so placed that the connection of the equipment to the earth electrode or to the protective conductor is maintained when the cover or any other removable part is removed	satisfy	P
	The protective earth terminal shall be suitably protected against corrosion	satisfy	P
	In the case of equipment with conductive structures, enclosures, etc., means shall be provided, if necessary, to ensure electrical continuity between the exposed conductive parts the equipment and the metal sheathing of connecting conductors	satisfy	P
	The protective earth terminal shall have no other function, except when it is intended to be connected to a PEN conductor (see 2.1.1.5 – Note). In this case, it shall also have the function of a neutral terminal in addition to meeting the requirements applicable to the protective earth terminal	satisfy	P

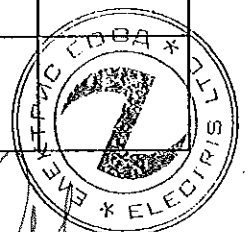


Handwritten signatures and initials are present at the bottom of the page, including a large signature on the left and several smaller ones on the right.

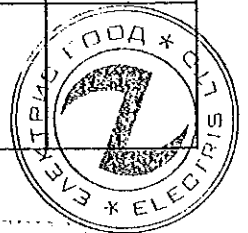
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
7.1.9.3	Protective earth terminal marking and identification		
	The protective earth terminal shall be clearly and permanently identified by its marking	satisfy	P
	The identification shall be achieved by colour (green-yellow mark) or by the notation PE, or PEN, as applicable, in accordance with IEC 60445, subclause 5.3, or, in the case of PEN, by a graphical symbol for use on equipment	satisfy	P
	Graphical symbol to be used: 60417-2-IEC-5019  Protective earth (ground) in accordance with IEC 60417-2	satisfy	P
7.1.10	Enclosure for equipment		N/A
7.1.10.1	Design		N/A
	The enclosure, when it is opened: all parts requiring access for installation and maintenance are readily accessible		
	Sufficient space shall be provided inside the enclosure		
	The fixed parts of a metal enclosure shall be electrically connected to the other exposed conductive parts of the equipment and connected to a terminal which enables them to be earthed or connected to a protective conductor		
	Under no circumstances shall a removable metal part of the enclosure be insulated from the part carrying the earth terminal when the removable part is in place		
	The removable parts of the enclosure shall be firmly secured to the fixed parts by a device such that they cannot be accidentally loosened or detached owing to the effects of operation of the equipment or vibrations		
	When an enclosure is so designed as to allow the covers to be opened without the use of tools, means shall be provided to prevent loss of the fastening devices		
	If the enclosure is used for mounting push-buttons, it shall not be possible to remove the buttons from the outside of the enclosure		



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
7.1.10.2	Insulation		
	If, in order to prevent accidental contact between a metallic enclosure and live parts, the enclosure is partly or completely lined with insulating material, then this lining shall be securely fixed to the enclosure	satisfy	P
7.1.11	Degree of protection of enclosed equipment		
	Degree of protection.	IP20	
	Test for first characteristic.	IP20	
	Test for first numeral	2	P
	Test for second characteristic	IP20	
	Test for second numeral	0	P
7.1.12 part 1	Conduit pull-out, torque and bending with metallic conduits		N/A
	Polymeric enclosures of equipment, whether integral or not, provided with threaded conduit entries, intended for the connection of extra heavy duty, rigid threaded metal conduits complying with IEC 60981, shall withstand the stresses occurring during its installation such as pull-out, torque, bending	<i>Ce</i>	
7.2	Performance requirements		
7.2.1	Operating condition		
7.2.1.1	Closing		
	For a circuit-breaker to be closed safely on to the making current corresponding to its rated short-circuit making capacity, it is essential that it should be operated with the same speed and the same firmness as during the type test for proving the short-circuit making capacity	satisfy	P
7.2.1.1.1	Dependent manual closing		N/A
	For a circuit-breaker having a dependent manual closing mechanism, it is not possible to assign a short-circuit making capacity rating irrespective of the conditions of mechanical operation		
	Such a circuit-breaker should not be used in circuits having a prospective peak making current exceeding 10 kA		



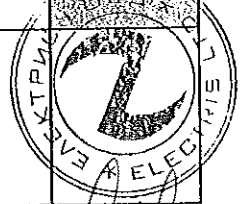
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	However, this does not apply in the case of a circuit-breaker having a dependent manual closing mechanism and incorporating an integral fast-acting opening release which causes the circuit-breaker to break safely, irrespective of the speed and firmness with which it is closed on to prospective peak currents exceeding 10 kA; in this case, a rated short-circuit making capacity can be assigned		
7.2.1.1.2	Independent manual closing		
	A circuit-breaker having an independent manual closing mechanism can be assigned a short-circuit making capacity rating irrespective of the conditions of mechanical operation	satisfy	P
7.2.1.1.3	Dependent power closing		N/A
	At 110% of the rated control supply voltage, the closing operation performed on no-load shall not cause any damage to the circuit-breaker.		
	At 85% of the rated control supply voltage, the closing operation shall be performed when the current established by the circuit-breaker is equal to its rated making capacity within the limits allowed by the operation of its relays or releases and, if a maximum time is stated for the closing operation, in a time not exceeding this maximum time limit.	Ag	
7.2.1.1.4	Independent power closing		N/A
	A circuit-breaker having an independent power closing operation can be assigned a rated short-circuit making capacity irrespective of the conditions of power closing		
	Means for charging the operating mechanism, as well as the closing control components, shall be capable of operating in accordance with the manufacturer's specification		
7.2.1.1.5	Stored energy closing		N/A
	Capable ensuring closing of the circuit-breaker in any condition between no-load and its rated making capacity		
	- when the stored energy is retained within the circuit-breaker, a device is provided which indicates when the storing mechanism is fully charged.		



REVISIONS

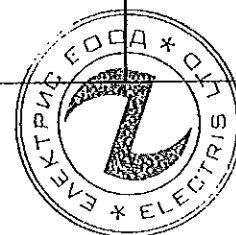
REVISIONS

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	- means for charging the operating mechanism and closing control components operates when auxiliary supply voltage is between 85% and 110% of the rated control supply voltage.		
	- not possible for the moving contacts to move from the open position, unless the charge is sufficient for satisfactory completion of the closing operation.		
	- by manually operated circuit-breaker is the direction of operation indicated. (not for circuit-breaker with an independent manual closing operation.)		
	- For trip free circuit-breaker it shall not be possible to maintain the contacts in the touching or closed position when the release is in the position to trip the circuit-breaker.		
7.2.1.2	Opening		
7.2.1.2.1	Circuit-breakers which open automatically shall be trip-free and, unless otherwise agreed between manufacturer and user, shall have their energy for the tripping operation stored prior to the completion of the closing operation		
7.2.1.2.2	Opening by undervoltage releases		
7.2.1.3. a part 1	Operating voltage		
	An under-voltage relay or release, when associated with a switching device, shall operate to open the equipment even on a slowly falling voltage within the range between 70% and 35% of its rated voltage	satisfy	P
	An under-voltage relay or release shall prevent the closing of the equipment when the supply voltage is below 35% of the rated voltage of the relay or release; it shall permit closing of the equipment at supply voltages equal to or above 85% of its rated value	satisfy	P
	Unless otherwise stated in the relevant product standard, the upper limit of the supply voltage shall be 110% of its rated value	satisfy	P
7.2.1.3. b part 1	Operating time		N/A
	For a time-delay under-voltage relay or release, the time-lag shall be measured from the instant when the voltage reaches the operating value until the instant when the relay or release actuates the tripping device of the equipment		



Handwritten signatures and stamps at the bottom of the page, including a large signature on the left and a circular stamp on the right.

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
7.2.1.2.3	Opening by shunt releases		
7.2.1.4 part 1	Limits of operation of shunt releases		
	A shunt release for opening shall cause tripping under all operating conditions of an equipment when the supply voltage of the shunt release measured during the tripping operation remains between 70% and 110% of the rated control supply voltage and, if a.c., at the rated frequency	satisfy	P
7.2.1.5 part 1	Limits of operation of current operated relays and released		
	Limits of operation of current operated relays and releases shall be stated in the relevant product standard	satisfy	P
7.2.1.2.4	Opening by over-current releases		
a)	Opening under short-circuit conditions		
	The short-circuit release shall cause tripping of the circuit-breaker with an accuracy of 20% of the tripping current value of the current setting for all values of the current setting of the short-circuit current release	ssatisfy	P
	Where necessary for over-current co-ordination the manufacturer shall provide information (usually curves) showing	satisfy <i>ll</i>	P
	- maximum cut-off (let-through) peak current as a function of prospective current (r.m.s. symmetrical)	Enclosure no	P
	- I^2t characteristics for circuit-breakers of utilization category A and, if applicable, B for circuit-breakers with instantaneous override (see not to 8.3.5)	Enclosure no	P
b)	Opening under overload conditions		
1)	Instantaneous or definite time-delay operation		
	The release shall cause tripping of the circuit-breaker with an accuracy of $\pm 10\%$ of the tripping current value of the current setting for all values of current setting of the overload release	satisfy	P



9

[Signature]

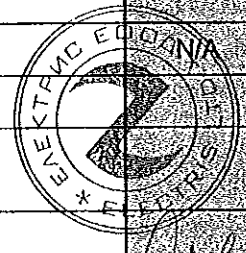
[Stamp]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

2)	Inverse timer-delay operation		
	At the reference temperature and at 1,05 times the current setting with the conventional non-tripping current, the opening release being energized on all poles, tripping shall not occur in less than the conventional time from the cold state, i.e. with the circuit-breaker at the reference temperature	satisfy	P
	Moreover, when at the end of the conventional time the value of current is immediately raised to 1,30 times the current setting, i.e. with the conventional tripping current, tripping shall then occur in less than the conventional time later	satisfy	P
	If a release is declared by the manufacturer as substantially independent of ambient temperature, the current values of table 6 shall apply within the temperature band declared by the manufacturer, within a tolerance of 0,3%/K	satisfy	P
	The width of the temperature band shall be at least 10 K on either side of the reference temperature	satisfy	P
7.2.4.2	Operational performance capability		
7.2.4.2 part 1	The operational performance off-load for which the tests are made with the control circuits energized and the main circuit not energized, in order to demonstrate that the equipment meets the operating conditions specified at the upper and lower limits of supply voltage and/or pressure specified for the control circuit during closing and opening operations	satisfy	P
	The operational performance on-load during which the equipment shall make and break the specified current corresponding, where relevant, to its utilization category for the number of operations stated in the relevant product standard	satisfy	P

8	TESTS		
8.2.4	Mechanical properties of terminals		
	Mechanical strength of terminals		
	maximum cross-sectional area of conductor (mm ²) :	1000mm ²	
	diameter of thread (mm) :	10mm	

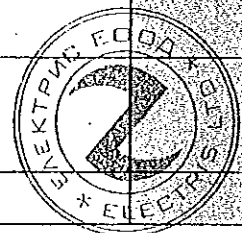
TRF No. IEC60947_2C



Handwritten signature and a rectangular stamp at the bottom right of the page.

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

	torque (Nm) :	25Nm	
	5 times on 2 separate clamping units	satisfy	P
	Testing for damage to and accidental loosening of conductor (flexion test)		N/A
	conductor of the smallest cross-sectional area (mm ²) :		
	number of conductor of the smallest cross section :		
	diameter of bushing hole (mm) :		
	height between the equipment and the platen :		
	mass at the conductor(s) (kg) :		
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		
	Pull-out test		
	force (N) :		
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		
	conductor of the largest cross-sectional area (mm ²) :		
	number of conductor of the largest cross section :		
	diameter of bushing hole (mm) :		
	height between the equipment and the platen :		
	mass at the conductor(s) (kg) :		
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		
	Pull-out test		
	force (N) :		
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		
	conductor of the largest and smallest cross-sectional area (mm ²) :		
	number of conductor of the smallest cross section, number of conductor of the largest cross section :		
	diameter of bushing hole (mm) :		



[Handwritten signature]

[Handwritten signature]

СЕРТИФИКАТ

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	height between the equipment and the platen :		
	mass at the conductor(s) (kg) :		
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		
	Pull-out test		
	force (N) :		
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		

8.3.3	TEST SEQUENCE I: GENERAL PERFORMANCE CHARACTERISTICS		
8.3.3.1	Tripping limits and characteristic		
8.3.3.1.2	Opening under short-circuit conditions		
	Manufacturer's name or trademark	OEZ s.r.o.	
	Type designation or serial number	BL1600	
	Sample no:	1	
	Rated operational voltage: Ue (V)	415V,500V,690V AC	
	Rated current: In (A)	1600A	
	Ambient temperature 10-40 °C :	safisty	P
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.	23kA	
	Range of adjustable setting current. (A)	23kA	
	Time delay stated by the manufacturer, in the case of definite time delay releases.	N/A	
	Test current: 80% of the rated, or minimum adjustable setting current: (A)	18,4kA	
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	No operate of the release No operate of the release No operate of the release	P

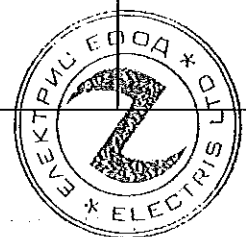


[Handwritten signature]

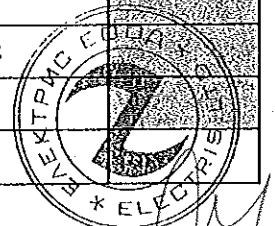
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:	N/A	
	Test current: 80% of the maximum adjustable setting current: (A)	N/A	
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	N/A	
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:	N/A <i>cl</i>	
	Test current: 120% of the rated, or minimum adjustable setting current: (A)	27,6kA	
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:	N/A	

EJ

[Handwritten signature]



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test current: 120% of the maximum adjustable setting current: (A)	N/A	
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	N/A	
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:	N/A	
	Test current: tripping current declared for single pole operation (A)	23kA	
	Operating time: < 200 ms in case of instantaneous release: L1: L2: L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by manufacturer in case of definite time delay releases L2: L3:	N/A	
8.3.3.1.3	Opening under overload conditions		
a)	Instantaneous or definite time-delay releases		
	Manufacturer's name or trademark	OEZ s.r.o.	
	Type designation or serial number	BL1600	
	Sample no:	1	
	Rated operational voltage: Ue (V)	415V,500V,690V AC	
	Rated current: In (A)	1600A	
	Ambient temperature 10-40 °C :	safisty	



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.	2000A - 20000A	
	Range of adjustable setting current. (A)	2000A - 20000A	
	Time delay stated by the manufacturer, in the case of definite time delay releases.	N/A	
	Test current: 90% of the rated, or minimum adjustable setting current: (A)	1800A	
	Operating time: >0,2s in case of instantaneous releases:	No operate of the release	P
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.	N/A	
	Test current: 90% of the maximum adjustable setting current: (A)	18000A	
	Operating time: >0,2s in case of instantaneous releases	No operate of the release	P
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.	N/A	
	Test current: 110% of the rated, or minimum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A)	2200A N/A	
	Operating time: <0,2s in case of instantaneous releases:	operate of the release	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.	N/A	
	Test current: 110% of the maximum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A)	22000A N/A	
	Operating time: <0,2s in case of instantaneous releases	operate of the release	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.	N/A	
b)	Inverse time delay releases		
	Manufacturer's name or trademark	OEZ s.r.o.	
	Type designation or serial number	BL1600	

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Sample no:	1	
	Rated operational voltage: Ue (V)	415V, 500V, 690V AC	
	Rated current: In (A)	1600A	
	For releases dependent of ambient air temperature: Reference temperature	N/A	
	Test ambient temperature (°C)	N/A	
	If test made at a difference ambient temperature: Acc. manufacturer's correction temperature/current data:	N/A	
	Range of adjustable setting current: (A)	N/A	
	For releases independent of ambient temperature: Test made at 30°C and/or at 20/40°C	yes	
	Test ambient air temperature:	30°C	
	Releases, dependent of ambient air temperature: Reference temperature (°C)	N/A	
	Releases, independent of ambient air temperature: at 30°C		
	Test current: 105% of the rated, or minimum adjustable setting current: (A)	661.5A	
	Conventional non-tripping time: 1h when In < 63A, 2h when In > 63 A	No operate of the release	P
	Test current: 130% of the rated, or minimum adjustable setting current: (A)	819A	
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	Operate of the release	P
	Test current: 105% of the maximum adjustable setting current: (A)	1680A	
	Conventional non-tripping time: 1h when In < 63A, 2h when In > 63 A	No operate of the release	P
	Test current: 130% of the maximum adjustable setting current: (A)	2080A	
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	Operate of the release	P
	Releases, independent of ambient air temperature: at 20°C or 40°C		
	Test ambient air temperature:	40°C	

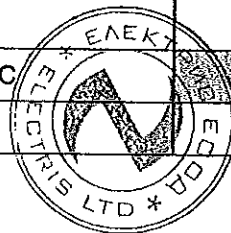


[Handwritten signature]

[Handwritten signature]

[Handwritten signature]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test current: 105% of the rated, or minimum adjustable setting current: (A)	661,5A	
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$	No operate of the release	P
	Test current: 130% of the rated, or minimum adjustable setting current: (A)	819A	
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$	Operate of the release	P
	Test current: 105% of the maximum adjustable setting current: (A)	1680A	
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$	No operate of the release	P
	Test current: 130% of the maximum adjustable setting current: (A)	2080A	
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$	Operate of the release	P
	An additional test, at a current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer		
	Releases, dependent of ambient air temperature: Reference temperature (°C)	N/A	
	Releases, independent of ambient air temperature: at 30°C	30°C	
	Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A)	Instantaneous rease $\pm 20\%$ short-circuit release $\pm 10\%$ Inverse time-delay releases $\pm 30\%$	P
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)	yes	P
	Releases, independent of ambient air temperature: at 20°C or 40°C		
	Test ambient air temperature:	40°C	



[Stamp]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A)	Instantaneous rease $\pm 20\%$ short-circuit release $\pm 10\%$ Inverse time-delay releases $\pm 30\%$	
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)	yes	P
8.3.3.1.4	Additional test for definite time-delay releases		N/A
a)	Time delay		
	Test is made at a current equal to 1,5 times the current setting		
	<u>overload releases:</u> (all phase poles loaded)		
	<u>short-circuit releases:</u> two poles in series carrying the test current, using successively all possible combinations of poles having a short-circuit release.		
	Test current: 1,5 times of the rated, or minimum adjustable setting current: (A)		
	Operating time, <u>overload releases:</u> (s)		
	Time-delay: between the limits stated by the manufacturer:		
	Operating time, <u>short-circuit releases:</u> (s) .....L1-I.....L1-I.....L2-I		
	Time-delay: between the limits stated by the manufacturer:		
	Test current: 1,5 times of the maximum adjustable setting current: (A)		
	Operating time, <u>overload releases:</u> (s)		
	Time-delay: between the limits stated by the manufacturer:		
	Operating time, <u>short-circuit releases:</u> (s) .....L1-I.....L1-I.....L2-I		
	Time-delay: between the limits stated by the manufacturer:		



Handwritten signatures and initials are present at the bottom of the page, including a large signature on the left and another on the right.

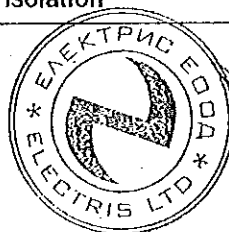
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
b)	Non-tripping duration		N/A
	Firstly, the test current equal to 1,5 times the current setting is maintained for a time interval equal to the non-tripping duration stated by the manufacturer.		
	<u>overload releases:</u> (all phase poles loaded)		
	<u>short-circuit releases:</u> two poles in series carrying the test current, using successively all possible combinations of poles having a short-circuit release.		
	Test current: 1,5 times of the rated, or minimum adjustable setting current: (A)		
	Time interval: non-tripping duration stated by the manufacturer: (s)		
	Operating time, <u>overload releases:</u> the circuit-breaker does not trip:		
	Operating time, <u>short-circuit releases:</u> the circuit-breaker does not trip: L1-L2: L1-L3: L2-L3:		
	Test current: 1,5 times of maximum adjustable setting current: (A)		
	Time interval: non-tripping duration stated by the manufacturer: (s)	<i>[Handwritten mark]</i>	
	Operating time, <u>overload releases:</u> the circuit-breaker does not trip:		
	Operating time, <u>short-circuit releases:</u> the circuit-breaker does not trip: L1-L2: L1-L3: L2-L3:		
	Then, the current is reduced to the rated current and maintained at this value for twice the time-delay stated by the manufacturer. The circuit-breaker shall not trip.		
	Test current: of the rated, or minimum adjustable setting current: (A)		
	Time interval: twice the delay-time stated by the manufacturer: (s)		
	Operating time, <u>overload releases:</u> the circuit-breaker does not trip:		
	Operating time, <u>short-circuit releases:</u> the circuit-breaker does not trip: L1-L2: L1-L3: L2-L3:		

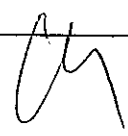
[Handwritten signature]



[Handwritten signature]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test current: maximum adjustable setting current: (A)		
	Operating time, <u>overload releases</u> : the circuit-breaker does not trip:		
	Operating time, <u>short-circuit releases</u> : the circuit-breaker does not trip: L1-L2: .....L1-l L2-L3:		
8.3.3.2	Test of dielectric properties, impulse withstand voltage (U _{imp} indicated):		
8.3.3.4 part1	The 1,2/50 μ s impulse voltage shall be applied five times for each polarity at intervals of 1s minimum		
	- rated impulse withstand voltage (kV) :	8kV main circuits 6kV auxiliary circuits	
	- sea level of the laboratory:	340m	
	- test U _{imp} main circuits (kV) :	9,6kV	P
	- test U _{imp} auxiliary circuits (kV) :	7,2kV	P
	- test U _{imp} control circuits (kV) :	N/A	
	- test U _{imp} on open main contacts (equipment suitable for isolating) (kV) :	14,5kV <i>au</i>	P
a)	Application of test voltage		
	i) Between all terminals of the main circuit connected together (incl. control and auxiliary circuits connected to the main circuit) and the enclosure or mounting plate, with the contacts in all normal positions of operation.	meets	P
	ii) Between all terminals of the main circuit and the other poles connected together and to the enclosure or mounting plate, with the contacts in all normal positions of operation.	meets	P
	iii) Between each control and auxiliary circuit not normally connected to the main circuit and: - the main circuit.	meets	P
	- other circuits	meets	P
	- exposed conductive parts	meets	P
	- enclosure of mounting plate	meets	P
	iv) equipment suitable for isolation	meets	P
	equipment not suitable for isolation	N/A	

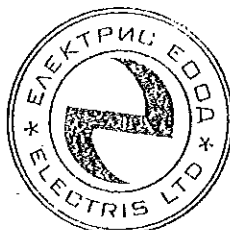


IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	- no unintentional disruptive discharge during the test's	no	P
	Test of dielectric properties, dielectric withstand voltage (Uimp not indicated):		N/A
	- rated insulation voltage (V) :	N/A	
	- main circuits, test voltage for 1 min (V)	N/A	
	- auxiliary circuits, test voltage for 1 min (V)	N/A	
	- control circuits, test voltage for 1 min (V)	N/A	
8.3.3.2.2	Application of test voltage		
1)	with circuit-breaker in the closed position		
	- between all live parts of all poles connected together and the frame of the circuit-breaker .	meets	P
	- between each pole and all the other poles connected to the frame of the circuit-breaker	meets	P
2)	with the circuit-breaker in the open position and, additionally, in the tripped position, if any.		P
	- between all live parts of all poles connected together and the frame of the circuit-breaker.	meets	P
	- between the terminals of one side connected together and the terminals of the other side connected together.	meets 	P
b)	Control and auxiliary circuits		
1)	- between all the control and auxiliary circuits which are not normally connected to the main circuit, connected together, and the frame of the circuit-breaker.	meets	P
2)	- where appropriate, between each part of the control an auxiliary circuits which may be isolated from the other parts during normal operation and all the other parts connected together.	meets	P
	No unintentional disruptive discharge during the test's	no	P
8.3.3.2	For circuit-breaker suitable for isolation, the leakage current shall be measured through each pole with the contacts in the open position, at a test voltage of 1,1 Ue, and shall not exceed 0,5mA.	0,02mA	P






IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
8.3.3.3	Mechanical operation and operational performance capability		
8.3.3.3.2	Construction and mechanical operation		
a)	Construction		
	A withdrawable circuit-breaker shall be checked for the requirements stated in 7.1.1	satisfy	P
	A circuit-breaker with stored energy operation shall be checked for compliance with 7.2.1.1.5, regarding the charge indicator and the direction of operation of manual energy storing	N/A	
b)	Mechanical operation		
	A circuit-breaker with dependent power operation shall comply with the requirements stated in 7.2.1.1.3	N/A	
	A circuit-breaker with dependent power operation shall operate with the operating mechanism charged to the minimum and maximum limits stated by the manufacturer	N/A	
	A circuit-breaker with stored energy operation shall comply with the requirements stated in 7.2.1.5 with the auxiliary supply voltage at 85% and 110% of the rated control supply voltage.	N/A	
	It shall also be verified that the moving contacts cannot be moved from the open position when the operating mechanism is charged to slightly below the full charge as evidenced by the indicating device	N/A	
	For a trip-free circuit-breaker it shall not be possible to maintain the contacts in the touching or closed position when the tripping release is in the position to trip the circuit-breaker	satisfy	P
	If the closing and opening times of a circuit-breaker are stated by the manufacturer, such times shall comply with the stated values	Satisfy	P
c)	Undervoltage releases		
	Undervoltage releases shall comply with the requirements of 7.2.1.3 of Part 1. For this purpose, the release shall be fitted to a circuit-breaker having the maximum current rating for which the release is suitable	satisfy	

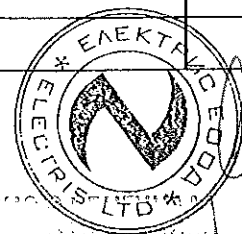


Handwritten signatures and initials, including a large signature on the left and another on the right, along with some faint text below them.

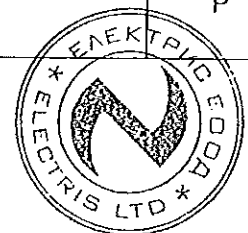
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
i)	Drop out voltage		
	It shall be verified that the release operates to open the circuit-breaker between the voltage limits specified	satisfy	P
	The voltage shall be reduced from rated voltage at a rate to reach 0 V in approximately 30 s	satisfy	P
	The test for the lower limit is made without current in the main circuit and without previous heating of the release coil	satisfy	P
	In the case of a release with a range of rated voltages, this test applies to the maximum voltage of the range	satisfy	P
	The test for the upper limit is made starting from a constant temperature corresponding to the application of rated control supply voltage to the release and rated current in the main poles of the circuit-breaker	satisfy	P
	This test may be combined with the temperature-rise test of 8.3.3.6	satisfy	P
	In the case of a release with a range of rated voltages, this test is made at both the minimum and maximum rated control supply voltages	satisfy	P
ii)	Test for limits of operation		
	Starting with the circuit-breaker open, at the temperature of the test room, and with the supply voltage at 30% rated maximum control supply voltage, it shall be verified that the circuit-breaker cannot be closed by the operation of the actuator	satisfy	P
	When the supply voltage is raised to 85% of the minimum control supply voltage, it shall be verified that the circuit-breaker can be closed by the operation of the actuator	satisfy	P
iii)	Performance under overvoltage conditions		
	With the circuit-breaker closed and without current in the main circuit, it shall be verified that the undervoltage release will withstand the application of 110% rated control supply voltage for 4 h without impairing its functions	satisfy	P



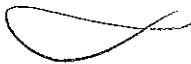
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
d)	Shunt releases		
	Shunt releases shall comply with the requirements of 7.2.1.4 of Part 1. For this purpose, the release shall be fitted to a circuit-breaker having the maximum rated current for which the release is suitable	satisfy	P
	It shall be verified that the release will operate to open the circuit-breaker at 70% rated control supply voltage when tested at an ambient temperature of + 55 °C ± 2 °C without current in the main poles of the circuit-breaker	satisfy	P
	In the case of a release having a range of rated control supply voltages, the test voltage shall be 70% of the minimum rated control supply voltage	satisfy	P
8.3.3.3.3	Operational performance capability without current.		
	Type designation or serial number	BL1600	
	Sample no:	1	
	Rated current In (A)	1600A	
	Rated operational voltage: Ue (V)	690V	
	Rated control supply voltage of closing mechanism: Uc (V)	N/A	
	Rated control supply voltage of shunt releases: Uc (V)	230V AC	
	Rated control supply voltage undervoltage releases: Uc (V)	230V AC	
	Ambient temperature 10-40 °C :	23°C	P
	Number of operating cycles per hour	180/hour	P
	Number of cycles without current (total) (closing mechanism energized at the rated Uc)	6000	P
	Number of cycles without current (without releases)	4800	P
	Applied voltage: closing mechanism (V)	N/A	
	10% of total cycles for circuit-breaker with fitted shunt release: (50% at the beginning- and 50% at the end of the test.) Energized at the rated Uc	600	P
	Applied voltage: shunt releases (V)	500V AC	P



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	10% of total cycles for circuit-breaker with undervoltage releases: (50% at the beginning- and 50% at the end of the test.) Energized at the minimum rated U_c	600	P
	10 cycles without applied voltage at the undervoltage releases. (Shall not possible to close the circuit-breaker.)	meets	P
	Applied voltage: undervoltage releases (V)	24V AC	P
	Electrical components do not exceed the value indicated in tab. 7.	N/A	
8.3.3.3.4	Operational performance capability with current.		
	Rated current: I_n (A)	1600A	
	Maximum rated operational voltage: U_e (V)	690V	
	Conductor cross-sectional area (mm^2) :	1000 mm^2	P
	Number of operating cycles per hour	180/hour	P
	Number of cycles with current (total) (closing mechanism energized at the rated U_c)	4000	P
	Applied voltage: closing mechanism (V)	N/A	
	For circuit-breaker fitted with adjustable releases, test shall be made with the overload setting at maximum and short-circuit setting at minimum.	satisfy	P
	Conditions, make/break operations:		
	- test voltage $U/U_e = 1,0$ (V) L1:	690V	
	..... L2:	690V	
	..... L3:	690V	
	- test current $I/I_e = 1,0$ (A)..... L1:	1600A	
	..... L2:	1600A	
	..... L3:	1600A	
	- power factor/time constant:	0,8	
	- frequency: (Hz)	50Hz	
	- on-time (ms):	60ms	
	- off-time (s):	20s	
	Electrical components do not exceed the value indicated in tab. 7.	meets	P



ELEKTRIK BODU ELETRIS LTD

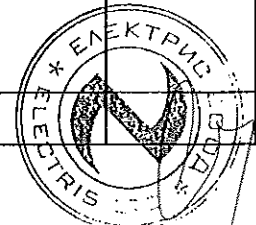


IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
8.3.3.3.5	Additional test of operational performance capability without current for withdrawable circuit-breaker.		
	Number of operations cycles : 100	satisfy	
	After test, the isolating contacts, withdrawable mechanism and interlocks shall be suitable for further service.	meets	P
8.3.3.4	Overload performance		N/A
	this test applies to circuit-breaker of rated current up to and including 630 A		
	Type designation or serial number		
	Sample no:		
	Rated current I_n (A)		
	Rated operational voltage: U_e (V)		
	Rated control supply voltage of closing mechanism: U_c (V)		
	Rated control supply voltage of shunt releases: U_c (V)		
	Rated control supply voltage undervoltage releases: U_c (V)		
	Ambient temperature 10-40 °C :		
	Number of operating cycles per hour		
	Maximum rated operational voltage: U_e (V)		
	Number of operating cycles per hour		
	Number of cycles with current (total) (closing mechanism energized at the rated U_c)		
	Applied voltage: closing mechanism (V)		
	For circuit-breaker fitted with adjustable releases, test shall be made with the overload/short-circuit settings at maximum.		
	Conditions, overload operations:		
	- test voltage $U/U_e = 1,05$ (V) .....L1: .....L2: .....L3:		
	- test current AC/DC: $I/I_e = 6,0/2.5$ (A) .....L1: .....L2: .....L3:		
	- power factor/time constant:		

Handwritten signature or mark in the table area.

Handwritten signature at the bottom left.

Handwritten signature at the bottom center.



Handwritten text at the bottom right.

[Handwritten mark]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	- Number of cycles manually opened: 9		
	- Number of cycles automatically opened by an overload release: 3		
	- frequency: (Hz)		
	- on-time max 2s:		
8.3.3.5	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V	1380V	
	- no breakdown or flashover	meets	P

[Handwritten mark]

[Handwritten signature]

[Handwritten signature]



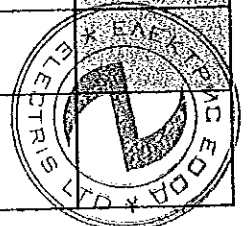
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
8.3.3.6	Verification of temperature-rise		
	- the values of temperature-rise do not exceed the those specified in tab. 7.	meets	P
	Temperature rise of main circuit terminals ≤ 80 K (K) :	Max. 72K	P
	conductor cross-sectional area (mm ²) :	1000mm ²	
	test current I_e (A) :	1600A	
8.3.3.7	Verification of overload releases		
	Test current: 1.45 times the value of their current setting at the reference temperature: (A)	2320A	
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$	31'47"	P
8.3.3.8	Verification of undervoltage and shunt releases		
	Circuit-breaker fitted with undervoltage releases. The release shall not operate at 70% of the minimum control supply voltage -	satisfy	P
	and shall operate at 35% of the maximum control supply voltage.	satisfy <i>Uy</i>	P
	Circuit-breaker fitted with shunt releases. The release shall operate at 70% of the minimum rated control supply voltage. Test made at room temperature.	satisfy	P



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

8.3.3.9	Verification of the main contact position for circuit-breakers for isolation		
	actuating force for opening (N)	230N	—
	test force with blocked main contacts for 10 s (N)	690N	—
	Dependent power operation		
	Supply voltage of 110% of rated voltage (V).....:	N/A	
	Three attempts of 5 s to operate the equipment at intervals of 5 min.	satisfy	P
	Independent power operation		
	Three attempts to operate the equipment by the stored energy.	satisfy	P
	Lockability of driving mechanism in OFF-position at test force and blocked main contacts	690N	
	Position indicator does not show OFF-position after capture of test force at blocked main contacts	meets	P

8.3.4	TEST SEQUENCE II (Ics):		
8.3.4.1	Test of rated service short-circuit breaking capacity		
	Test sequence of operation: O – t – CO – t – CO		
	Type designation or serial number	BL1600	
	Sample no:	2, 3, 4	
	Rated current: In (A)	1600A	
	Rated operational voltage: Ue (V)	415V, 500V, 690V AC	
	Rated service short-circuit breaking capacity: (kA)	36kA/415V, 30kA/500V, 20kA/690V	
	Rated control supply voltage of closing mechanism: Uc (V)	N/A	
	Rated control supply voltage of shunt release: Uc (V)	N/A	
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.	satisfy	



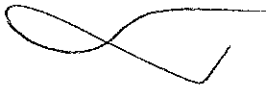
[Handwritten signature]

[Handwritten signature]

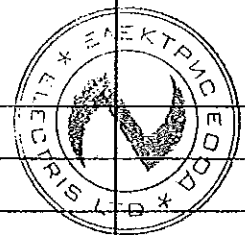
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	closing mechanism energized with 85% at the rated Uc: (V)	N/A	
	The circuit-breaker is mounted complete on its own support or an equivalent support.	satisfy	
	Test made in free air:	satisfy	
	Distances of the metallic screen's: (all sides)	Vide catalogue	
	The characteristics of the metallic screen:		
	- woven wire mesh	N/A	
	- perforated metal	N/A	
	- expanded metal	yes	
	- ratio hole area/total area: 0,45-0,65	satisfy	
	- size of hole: <30mm ²	satisfy	
	- finish: bare or conductive plating	satisfy	
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:	N/A	
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long	satisfy	
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	
	Conductor cross-sectional area (mm ²) :	1000mm ²	
	If terminals unmarked: line connected at: (underside/upside)	N/A	
	Tightening torques: (Nm)	25Nm	
	Test sequence of operation: O – t – CO – t – CO		
	- test voltage U/Ue = 1,05 (V).....	L1: 436V L2: 436V L3: 436V	
	- r.m.s. test current AC/DC: (A)	L1: 37,0kA AC L2: 36,1kA AC L3: 36,0kA AC	
	power factor/time constant :	0,25	
	- Factor "n"	2,1	
	- peak test current (A) :	75,2kA	



Handwritten signatures and initials are present at the bottom of the page, including a large signature on the left and several smaller ones on the right.



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test sequence "O"		
	- max. let-through current: (kApeak) .....L1: .....L2: .....L3:	71,8kA 67,2kA 62,3kA	
	- Joule integral I ² dt (A ² s) .....L1: .....L2: .....L3:	27 . 10 ⁶ A ² s 26 . 10 ⁶ A ² s 21 . 10 ⁶ A ² s	
	Pause, t: (min)	3min	
	Test sequence "CO"		
	- max. let-through current: (kApeak) .....L1: .....L2: .....L3:	67,1kA 53,6kA 52,0kA	
	- Joule integral I ² dt (A ² s) .....L1: .....L2: .....L3:	26 . 10 ⁶ A ² s 24 . 10 ⁶ A ² s 21 . 10 ⁶ A ² s	
	Pause, t: (min)	3min	
	Test sequence "CO"		
	- max. let-through current: (kApeak) .....L1: .....L2: .....L3:	47,1kA 70,2kA 61,4kA	
	- Joule integral I ² dt (A ² s) .....L1: .....L2: .....L3:	20,0 . 10 ⁶ A ² s 27,4 . 10 ⁶ A ² s 24,8 . 10 ⁶ A ² s	
	Melting of the fusible element	no	P
	Holes in the PE-sheet for test sequence "O"	no	P
	Cracks observed	no	P
	Test sequence of operation: O – t – CO – t – CO		
	- test voltage U/U _e = 1,05 (V).....L1: .....L2: .....L3:	525V 525V 525V	
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: .....L3:	31,2kA AC 30,0kA AC 30,7kA AC	
	power factor/time constant :	0,25	
	- Factor "n"	2,1	
	- peak test current (A) :	65,4kA	



11.11.2011 10:00:00

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test sequence "O"		
	- max. let-through current: (kA _{peak}) .....L1: .....L2: .....L3:	64,5kA 57,8kA 54,0kA	
	- Joule integral I ² dt (A ² s) .....L1: .....L2: .....L3:	21,8 . 10 ⁶ A ² s 19,8 . 10 ⁶ A ² s 14,6.10 ⁶ A ² s	
	Pause, t: (min)	3min	
	Test sequence "CO"		
	- max. let-through current: (kA _{peak}) .....L1: .....L2: .....L3:	57,30kA 48,9kA 49,4kA	
	- Joule integral I ² dt (A ² s) .....L1: .....L2: .....L3:	19,0 . 10 ⁶ A ² s 15,0 . 10 ⁶ A ² s 16,7.10 ⁶ A ² s	
	Pause, t: (min)	3min	
	Test sequence "CO"		
	- max. let-through current: (kA _{peak}) .....L1: .....L2: .....L3:	57,1kA 48,0kA 40,2kA	
	- Joule integral I ² dt (A ² s) .....L1: .....L2: .....L3:	20,0 . 10 ⁶ A ² s 13,8 . 10 ⁶ A ² s 10,4.10 ⁶ A ² s	
	Melting of the fusible element	No	P
	Holes in the PE-sheet for test sequence "O"	No	P
	Cracks observed	No	P
	Test sequence of operation: O – t – CO – t – CO		
	- test voltage U/U _e = 1,05 (V).....L1: .....L2: .....L3:	725V 725V 725V	
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: .....L3:	20,1kA AC 20,8kA AC 19,8kA AC	
	power factor/time constant :	0,3	
	- Factor "n"	2,0	
	- peak test current (A) :	40,0kA	



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test sequence "O"		
	- max. let-through current: (kA _{peak}) .....L1: .....L2: .....L3:	38,2kA 39,9kA 40,2kA	
	- Joule integral I ² dt (A ² s) .....L1: .....L2: .....L3:	9,7 · 10 ⁶ A ² s 7,6 · 10 ⁶ A ² s 6,8 · 10 ⁶ A ² s	
	Pause, t: (min)	3min	
	Test sequence "CO"		
	- max. let-through current: (kA _{peak}) .....L1: .....L2: .....L3:	37,1kA 38,9kA 33,2kA	
	- Joule integral I ² dt (A ² s) .....L1: .....L2: .....L3:	7,1 · 10 ⁶ A ² s 7,0 · 10 ⁶ A ² s 5,2 · 10 ⁶ A ² s	
	Pause, t: (min)	3min	
	Test sequence "CO"		
	- max. let-through current: (kA _{peak}) .....L1: .....L2: .....L3:	40,8kA 38,3kA 38,0kA	
	- Joule integral I ² dt (A ² s) .....L1: .....L2: .....L3:	8,8 · 10 ⁶ A ² s 7,9 · 10 ⁶ A ² s 6,2 · 10 ⁶ A ² s	
	Melting of the fusible element	No	P
	Holes in the PE-sheet for test sequence "O"	No	P
	Cracks observed	No	P
8.3.4.2	Operational performance capability with current.		
	Rated current: I _n (A)	1600A	
	Maximum rated operational voltage: U _e (V)	690V	
	Conductor cross-sectional area (mm ²) :	1000mm ²	
	Number of operating cycles per hour	180/hour	
	Number (5% of the number given in column 4, tab. 8) of cycles with current (total) (closing mechanism energized at the rated U _c)	25	
	Applied voltage: closing mechanism (V)	N/A	

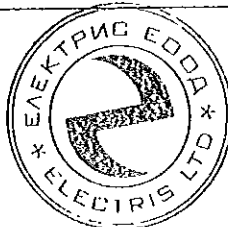


[Handwritten signature]

[Handwritten signature]

[Handwritten text]

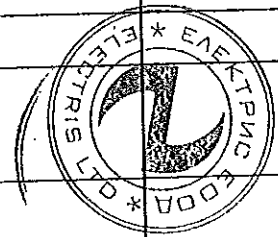
IEC 60 947-2					
Clause	Requirement – Test	Result – Remark			Verdict
	For circuit-breaker fitted with adjustable releases, test shall be made with the overload setting at maximum and short-circuit setting at minimum.	satisfy			
	Conditions, make/break operations:				
	Sample no	2	3	4	
	- test voltage $U/U_e = 1,0$ (V)	L1: 415V	500V	690V	
	.....	L2: 415V	500V	690V	
	.....	L3: 415V	500V	690V	
	- test current $I/I_e = 1,0$ (A)	L1: 1600A			
	.....	L2: 1600A			
	.....	L3: 1600A			
	- power factor/time constant:	0,8			
	- frequency: (Hz)	50Hz			
	- on-time (ms):	60ms			
	- off-time (s):	20s			
	Electrical components do not exceed the value indicated in tab. 7.	satisfy			P
8.3.4.3	Verification of dielectric withstand				
	- equal to twice the rated operational voltage with a minimum of 1000 V	1380V			
	- no breakdown or flashover	no			P
	Sample no	2	3	4	
	- the leaking current for circuit-breaker suitable for isolation: ($<2mA / 1.1 U_e$)	0,08mA	0,1mA	0,17mA	P
8.3.4.4	Verification of temperature-rise				
	- the values of temperature-rise do not exceed the those specified in tab. 7.	satisfy			P
	Temperature rise of main circuit terminals. ≤ 80 K (K) :	Max. 73K			P
	conductor cross-sectional area (mm ²) :	1000mm ²			
	test current I_e (A) :	1600A			
8.3.4.5	Verification of overload releases				
	Test current: 1.45 times the value of their current setting at the reference temperature: (A)	2320A			
	Conventional tripping time: $<1h$ when $I_n < 63A$, $<2h$ when $I_n > 63 A$	32'38"	32'45"	32'59"	P



[Handwritten signatures and stamps]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

8.3.4	TEST SEQUENCE II/III (Ics=Icu):		N/A
8.3.4.1	Test of rated service short-circuit breaking capacity		
	Test sequence of operation: O – t – CO – t – CO		
	Type designation or serial number		
	Sample no:		
	Rated current: In (A)		
	Rated operational voltage: Ue (V)		
	Rated service short-circuit breaking capacity: (kA)		
	Rated control supply voltage of closing mechanism: Uc (V)		
	Rated control supply voltage of shunt release: Uc (V)		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		
	closing mechanism energized with 85% at the rated Uc: (V)		
	The circuit-breaker is mounted complete on its own support or an equivalent support.	<i>Ch</i>	
	Test made in free air:		
	Distances of the metallic screen's: (all sides)		
	The characteristics of the metallic screen:		
	- woven wire mesh		
	- perforated metal		
	- expanded metal		
	- ratio hole area/total area: 0,45-0,65		
	- size of hole: <30mm ²		
	- finish: bare or conductive plating		
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		



[Handwritten signatures]

[Handwritten text]



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Circuit is earthed at: (load-star- or supply-star point)		
	Conductor cross-sectional area (mm ²) :		
	If terminals unmarked: line connected at: (underside/upside)		
	Tightening torques: (Nm)		
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		
	- Operation time: (s) .....L1: .....L2: .....L3:		
	Test sequence of operation: O – t – CO – t – CO		
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: .....L3:	<i>Am</i>	
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: .....L3:		
	power factor/time constant :		
	- Factor "n"		
	- peak test current (A) :		
	Test sequence "O"		
	- max. let-through current: (kA _{peak}) .....L1: .....L2: .....L3:		
	- Joule integral I ² dt (A ² s) .....L1: .....L2: .....L3:		
	Pause, t: (min)		
	Test sequence "CO"		
	- max. let-through current: (kA _{peak}) .....L1: .....L2: .....L3:		



[Handwritten signature]

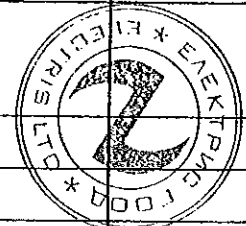
[Handwritten mark]

[Handwritten signature]

[Handwritten text]

[Handwritten signature]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	- Joule integral I^2dt (A ² s) .....L1: .....L2: .....L3:		
	Pause, t: (min)		
	Test sequence "CO"		
	- max. let-through current: (kA _{peak}) .....L1: .....L2: .....L3:		
	- Joule integral I^2dt (A ² s) .....L1: .....L2: .....L3:		
	Melting of the fusible element		
	Holes in the PE-sheet for test sequence "O"		
	Cracks observed		
8.3.4.2	Operational performance capability with current.		
	Rated current: I _n (A)		
	Maximum rated operational voltage: U _e (V)	Ch	
	Conductor cross-sectional area (mm ²) :		
	Number of operating cycles per hour		
	Number (5% of the number given in column 4, tab. 8) of cycles with current (total) (closing mechanism energized at the rated U _c)		
	Applied voltage: closing mechanism (V)		
	For circuit-breaker fitted with adjustable releases, test shall be made with the overload setting at maximum and short-circuit setting at minimum.		
	Conditions, make/break operations:		
	- test voltage U/U _e = 1,0 (V) .....L1: .....L2: .....L3:		
	- test current I/I _e = 1,0 (A) .....L1: .....L2: .....L3:		
	- power factor/time constant:		
	- frequency: (Hz)		
	- on-time (ms):		
	- off-time (s):		



[Handwritten signatures]

[Handwritten text]

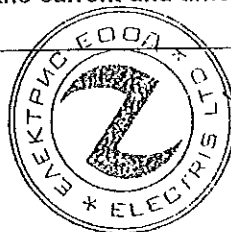
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Electrical components do not exceed the value indicated in tab. 7.		
8.3.4.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V		
	- no breakdown or flashover		
	- the leaking current for circuit-breaker suitable for isolation: (<2mA / 1,1 Ue)		
8.3.4.4	Verification of temperature-rise		
	- the values of temperature-rise do not exceed the those specified in tab. 7.		
	Temperature rise of main circuit terminals. ≤ 80 K (K) :		
	conductor cross-sectional area (mm²) :		
	test current Ie (A) :		
8.3.4.5	Verification of overload releases		
	Test current: 1,45 times the value of their current setting at the reference temperature: (A)	<i>cy</i>	
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A		
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		
	- Operation time: (s) .....L1:		
	.....L2:		
	.....L3:		



cy *cy* *cy* *cy*

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

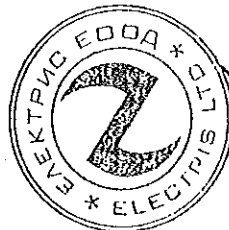
8.3.5	TEST SEQUENCE III (Icu)		
	Rated ultimate short-circuit breaking		
	Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current.		
	For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV.		
	For integrally fused circuit-breakers, test sequence V applies in place of this sequence.		
	Type designation or serial number	BL1600	
	Sample no:	5, 6, 7	
	Rated current: In (A)	1600A	
	Rated operational voltage: Ue (V)	415,500,690V AC	
	Rated ultimate short-circuit breaking capacity: (kA)	65kA/415V, 45kA/500V, 20kA/690V	
	Rated control supply voltage of closing mechanism: Uc (V)	N/A	
	Rated control supply voltage of shunt release: Uc (V)	N/A	
	This test sequence need not be made when Icu = Ics		
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:	3'52"	
	Sample no:	5 6 7	
	- Operation time: (s)	L1: 3'50" 3'42" 3'52"	
	.....	L2: 3'59" 3'41" 3'54"	
	.....	L3: 3'58" 3'43" 3'59"	
8.3.5.2	Test of rated ultimate short-circuit breaking capacity		
	The test sequence of operations is O – t – CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.	satisfy	



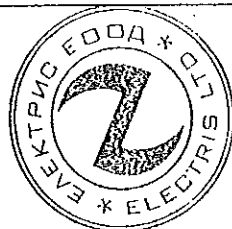
[Handwritten signature]

[Handwritten text]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	closing mechanism energized with 85% at the rated Uc: (V)	N/A	
	The circuit-breaker is mounted complete on its own support or an equivalent support.	satisfy	
	Test made in free air:	satisfy	
	Distances of the metallic screen's: (all sides)	Vide catalogue	
	The characteristics of the metallic screen:		
	- woven wire mesh	N/A	
	- perforated metal	N/A	
	- expanded metal	yes	
	- ratio hole area/total area: 0,45-0,65	satisfy	
	- size of hole: <30mm ²	satisfy	
	- finish: bare or conductive plating	satisfy	
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long	satisfy	
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	
	Conductor cross-sectional area (mm ²) :	1000mm ²	
	If terminals unmarked: line connected at: (underside/upside)	N/A	
	Tightening, torques: (Nm)	25Nm	
	Test sequence of operation: O – t – CO		
	- test voltage U/Ue = 1,05 (V)	L1: 436V L2: 436V L3: 436V	
	- r.m.s. test current AC/DC: (A)	L1: 64,8kA L2: 66,2kA L3: 65,1kA	
	power factor/time constant :	0,17	
	- Factor "n"	2,2	
	- peak test current (Amax) :	145,4kA	



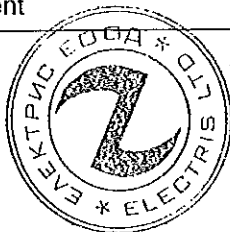
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test sequence "O"		
	- max. let-through current: (kA _{peak}) .....L1: .....L2: .....L3:	142,1kA 123,2kA 117,5kA	
	- Joule integral I ² dt (A ² s) .....L1: .....L2: .....L3:	102 . 10 ⁶ A ² s 95,7 . 10 ⁶ A ² s 93,1 . 10 ⁶ A ² s	
	Pause, t: (min)	3min	
	Test sequence "CO"		
	- max. let-through current: (kA _{peak}) .....L1: .....L2: .....L3:	131,7kA 147,4kA 120,0kA	
	- Joule integral I ² dt (A ² s) .....L1: .....L2: .....L3:	95,7 . 10 ⁶ A ² s 101,8 . 10 ⁶ A ² s 91,1 . 10 ⁶ A ² s	
	Melting of the fusible element	no	P
	Holes in the PE-sheet for test sequence "O"	no	P
	Cracks observed	no	P
	Test sequence of operation: O – t – CO		
	- test voltage U/U _e = 1,05 (V) .....L1: .....L2: .....L3:	525V 525V 525V	
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: .....L3:	45,1kA 45,2kA 46,0kA	
	power factor/time constant :	0,23	
	- Factor "n"	2,1	
	- peak test current (A _{max}) :	96,2kA	
	Test sequence "O"		
	- max. let-through current: (kA _{peak}) .....L1: .....L2: .....L3:	93,2kA 91,0kA 87,1kA	
	- Joule integral I ² dt (A ² s) .....L1: .....L2: .....L3:	51,2 . 10 ⁶ A ² s 41,6 . 10 ⁶ A ² s 39,4 . 10 ² A ² s	
	Pause, t: (min)	3min	



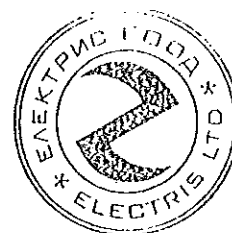
[Handwritten signature]

[Handwritten text]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test sequence "CO"		
	- max. let-through current: (kA _{peak}) .....L1: .....L2: .....L3:	94,2kA 87,6kA 82,4kA	
	- Joule integral I ² dt (A ² s) .....L1: .....L2: .....L3:	46,2 . 10 ⁶ A ² s 30,0 . 10 ⁶ A ² s 38,7 . 10 ⁶ A ² s	
	Melting of the fusible element	no	P
	Holes in the PE-sheet for test sequence "O"	no	P
	Cracks observed	no	P
	Test sequence of operation: O – t – CO		
	- test voltage U/U _e = 1,05 (V) .....L1: .....L2: .....L3:	725V 725V 725V	
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: .....L3:	20,0kA 20,5kA 20,1kA	
	power factor/time constant :	0,28	
	- Factor "n"	2,0	
	- peak test current (A _{max}) :	41,0kA	
	Test sequence "O"		
	- max. let-through current: (kA _{peak}) .....L1: .....L2: .....L3:	41,7kA 39,0kA 34,1kA	
	- Joule integral I ² dt (A ² s) .....L1: .....L2: .....L3:	7,9 . 10 ⁶ A ² s 7,3 . 10 ⁶ A ² s 6,7 . 10 ⁶ A ² s	
	Pause, t: (min)	3min	
	Test sequence "CO"		
	- max. let-through current: (kA _{peak}) .....L1: .....L2: .....L3:	42,0kA 39,7kA 37,3kA	
	- Joule integral I ² dt (A ² s) .....L1: .....L2: .....L3:	7,4 . 10 ⁶ A ² s 8,6 . 10 ⁶ A ² s 7,1 . 10 ⁶ A ² s	
	Melting of the fusible element	No	P

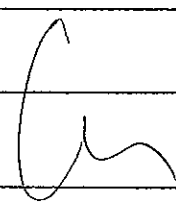


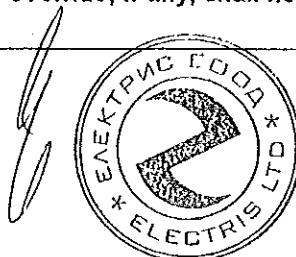
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Holes in the PE-sheet for test sequence "O"	no	P
	Cracks observed	no	P
8.3.5.3	Verification of dielectric withstand		
	Sample no:	5 6 7	
	- equal to twice the rated operational voltage with a minimum of 1000 V	1000V 1000V 1380V	
	- no breakdown or flashover	no	P
	Sample no:	5 6 7	
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue)	0,09mA 0,42mA 0,59mA	P
8.3.5.6	Verification of temperature-rise		
	Sample no:	5 6 7	
	- the values of temperature-rise do not exceed the those specified in tab. 7.	satisfy	P
	Temperature rise of main circuit terminals. ≤ 80 K (K) :	Max 71K 75K 73K	P
	conductor cross-sectional area (mm²) :	1000mm²	
	test current Ie (A) :	1600A	
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:	1'28"	
	Sample no:	5 6 7	
	- Operation time: (s)	L1: 1'26" 1'26" 1'29"	P
	.....L2:	1'24" 1'24" 1'31"	
	.....L3:	1'20" 1'29" 1'32"	



СЕРТИФИКАТ

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
8.3.6	TEST SEQUENCE IV		N/A
	Rated short-time withstand current		
	Except where the combined test sequence applies, this test sequence applies to circuit-breakers of utilization category B and to those circuit-breaker of category A covered by note 3 of table 4, and comprises the following tests:		
	Where integrally fused circuit-breaker are of utilization category B, they shall meet the requirements of this sequence.		
	Type designation or serial number		
	Sample no:		
	Rated current: In (A)		
	Rated operational voltage: Ue (V)		
	Rated short-time withstand current: (kA/s)		
	Rated frequency: (Hz)		
8.3.6.1	Verification of overload releases		
	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		
	- Operation time: (s) .....L1: .....L2: .....L3:		
8.3.6.2	Test of rated short-time withstand current.		
	For this test, any over-current release, including the instantaneous override, if any, likely to operate during the test, shall be rendered inoperative.		
	- test frequency: (Hz)		
	- duration of the test: (s)		
	- test frequency: (Hz)		
	- power factor / time constant (ms):		
	- factor "n"		
	- test voltage: (V) .....L1: .....L2: .....L3:		

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	- r.m.s. test current: (kA) .....L1: .....L2: .....L3:		
	- highest peak current: (kA)		
8.3.6.3	Verification of temperature-rise		
	- the values of temperature-rise do not exceed the those specified in tab. 7.		
	Temperature rise of main circuit terminals. ≤ 80 K (K) :		
	conductor cross-sectional area (mm ²) :		
	test current I _e (A) :		
8.3.6.4	Test of short-circuit breaking capacity at the max. short-time withstand current.		
	Rated short-time withstand current: (kA/s)		
	Test sequence: O – t – CO		
	max. available time setting of the short-time delay short-circuit release. (s)		
	- test voltage U/U _e = 1,05 (V) .....L1: .....L2: .....L3:		
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: .....L3:		
	- test frequency: (Hz)		
	- power factor / time constant (ms):		
	- factor "n"		
	Test sequence "O"		
	- max. let-through current: (kA _{peak}) .....L1: .....L2: .....L3:		
	- Joule integral I ² dt (A ² s) .....L1: .....L2: .....L3:		
	Pause, t: (min)		
	- the circuit-breaker shall remain closed for the short-time corresponding to the max. available time setting of the short-time delay short-circuit release and -		
	- the instantaneous override, if any, shall not operate.		



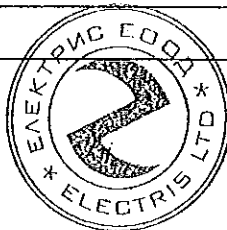


ΕΛΕΚΤΡΙΚΗ ΕΤΑΙΡΙΑ

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	-pause: t (s)		
	Test sequence "CO"		
	- max. let-through current: (kA _{peak}) .....L1: .....L2: .....L3:		
	- Joule integral I ² dt (A ² s) .....L1: .....L2: .....L3:		
	Pause, t: (min)		
	- the circuit-breaker shall remain closed for the short-time corresponding to the max. available time setting of the short-time delay short-circuit release and -		
	- the instantaneous override, if any, shall not operate.		
	- if the circuit-breaker has a making current release, this requirement does not apply to the CO operation, if the prospective current exceeds the pre-determined value, since it will then operate.		
8.3.6.5	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V		
	- no breakdown or flashover		
8.3.6.6	Verification of overload releases		
	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		
	- Operation time: (s) .....L1: .....L2: .....L3:		

8.3.7	TEST SEQUENCE V		N/A
	Performance of integrally fused circuit-breakers		
	STAGE 1		
	Type designation or serial number		
	Sample no:		

TRF No. IEC60947_2C

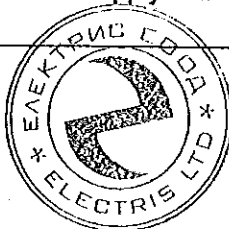


[Handwritten signature]

ELEKTRIS EOOD LTD

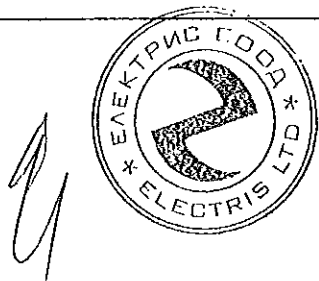
[Handwritten signature]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Rated current: In (A)		
	Rated operational voltage: Ue (V)		
	Value of prospective current equal to the selectivity limit current, as declared by the manufacturer. (kA)		
	Type of integrated fuses (all details)		
	Rated control supply voltage of closing mechanism: Uc (V)		
	Rated control supply voltage of shunt release: Uc (V)		
8.3.7.1	Short-circuit at the selectivity limit current		
	Test sequences "O"		
	Fuses shall be fitted		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		
	closing mechanism energized with 85% at the rated Uc: (V)		
	The circuit-breaker is mounted complete on its own support or an equivalent support.		
	Test made in free air:		
	Distances of the metallic screen's: (all sides)		
	The characteristics of the metallic screen:		
	- woven wire mesh		
	- perforated metal		
	- expanded metal		
	- ratio hole area/total area: 0,45-0,65		
	- size of hole: <30mm ²		
	- finish: bare or conductive plating		
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		
	Circuit is earthed at: (load-star- or supply-star point)		



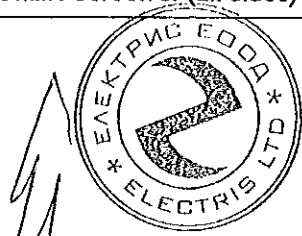
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Conductor cross-sectional area (mm ²) :		
	If terminals unmarked: line connected at: (underside/upside)		
	Tightening torques: (Nm)		
	- test voltage U/Ue = 1,05 (V) L1: L2: L3:		
	- r.m.s. test current AC/DC: (A) L1: L2: L3:		
	power factor/time constant :		
	- factor "n"		
	- peak test current (Amax) :		
	Test sequence "O"		
	- max. let-through current: (kA _{peak}) L1: L2: L3:		
	- Joule integral I ² dt (A ² s) L1: L2: L3:		
	- fuses shall still intact L1: L2: L3:		
8.3.7.2	Verification of temperature-rise		
	- the values of temperature-rise do not exceed the those specified in tab. 7.		
	Temperature rise of main circuit terminals. ≤ 80 K (K) :		
	conductor cross-sectional area (mm ²) :		
	test current I _e (A) :		
8.3.7.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V		
	- no breakdown or flashover		

TRF No. IEC60947_2C

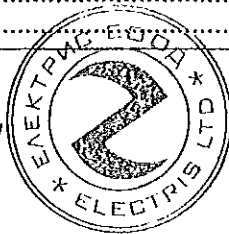


2006/06/01

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	STAGE 2		
	Type designation or serial number		
	Sample no:		
	Rated current: In (A)		
	Rated operational voltage: Ue (V)		
	1.1 time the value of prospective current equal to the selectivity limit current, as declared by the manufacturer. (kA)		
	Type of integrated fuses (all details)		
	Rated control supply voltage of closing mechanism: Uc (V)		
	Rated control supply voltage of shunt release: Uc (V)		
8.3.7.4	Verification of overload releases		
	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		
	- Operation time: (s) .....L1: .....L2: .....L3:		
8.3.7.5	Short-circuit at 1,1 times the take-over current		
8.3.7.1	Short-circuit at the selectivity limit current		
	Test sequences "O"		
	Fuses shall be fitted		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		
	closing mechanism energized with 85% at the rated Uc: (V)		
	The circuit-breaker is mounted complete on its own support or an equivalent support.		
	Test made in free air:		
	Distances of the metallic screen's: (all sides)		

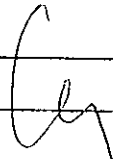


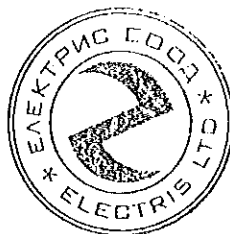
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	The characteristics of the metallic screen:		
	- woven wire mesh		
	- perforated metal		
	- expanded metal		
	- ratio hole area/total area: 0,45-0,65		
	- size of hole: <30mm ²		
	- finish: bare or conductive plating		
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		
	Fuse "F": copper wire: diameter 0.8 mm, 50 mm long		
	Circuit is earthed at: (load-star- or supply-star point)		
	Conductor cross-sectional area (mm ²) :		
	If terminals unmarked: line connected at: (underside/upside)		
	Tightening torques: (Nm)		
	1.1 time the value of prospective current equal to the selectivity limit current, as declared by the manufacturer. (kA)		
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: .....L3:		
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: .....L3:		
	power factor/time constant :		
	- factor "n"		
	- peak test current (Amax) :		
	Test sequence "O"		
	- max. let-through current: (kA _{peak}) .....L1: .....L2: .....L3:		
	- Joule integral I ² dt (A ² s) .....L1: .....L2: .....L3:		



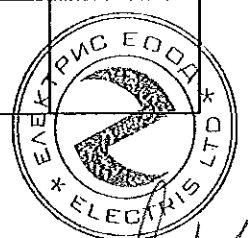
ENKTRPAE ESOA

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

	- at least two of the fuses shall have blown .....L1: .....L2: .....L3:		
8.3.7.6	Short-circuit at ultimate short-circuit breaking capacity		
	Type designation or serial number		
	Sample no:		
	Rated current: In (A)		
	Rated operational voltage: Ue (V)		
	Rated ultimate short-circuit breaking capacity. (kA)		
	Type of integrated fuses (all details)		
	Rated control supply voltage of closing mechanism: Uc (V)		
	Rated control supply voltage of shunt release: Uc (V)		
	Test sequences: O – t – CO		
	Fuses shall be fitted		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		
	closing mechanism energized with 85% at the rated Uc: (V)		
	The circuit-breaker is mounted complete on its own support or an equivalent support.		
	Test made in free air:		
	Distances of the metallic screen's: (all sides)		
	The characteristics of the metallic screen:		
	- woven wire mesh		
	- perforated metal		
	- expanded metal		
	- ratio hole area/total area: 0,45-0,65		
	- size of hole: <30mm ²		
	- finish: bare or conductive plating		


IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		
	Circuit is earthed at: (load-star- or supply-star point)		
	Conductor cross-sectional area (mm ²) :		
	If terminals unmarked: line connected at: (underside/upside)		
	Tightening torques: (Nm)		
	- test voltage U/Ue = 1,05 (V) L1: L2: L3:		
	- r.m.s. test current AC/DC: (A) L1: L2: L3:	Ch	
	power factor/time constant :		
	- factor "n"		
	- peak test current (A) :		
	Test sequence "O"		
	- max. let-through current: (kA _{peak}) L1: L2: L3:		
	- Joule integral I ² dt (A ² s) L1: L2: L3:		
	Pause: t (s)		
	new fitted fuses		
	Test sequence "CO"		
	- max. let-through current: (kA _{peak}) L1: L2: L3:		
	- Joule integral I ² dt (A ² s) L1: L2: L3:		



[Handwritten signature]

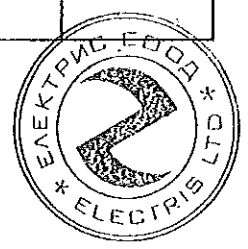
[Handwritten signature]



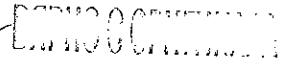
[Handwritten signature]
ELECTRIS LTD

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

8.3.7.7	Verification of dielectric withstand		
	- equal twice time rated operational voltage with a minimum of 1000 V (new fuses fitted)		
	- no breakdown or flashover		
8.3.7.8	Verification of overload releases		
	The operation of overload releases shall be verified at 2.5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		
	- Operation time: (s) .....L1: .....L2: .....L3:		

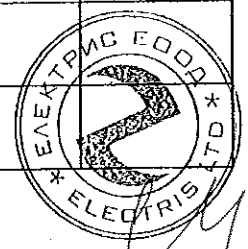
8.3.8	Combined test sequence		N/A
	At the discretion of, or in agreement with the manufacturer, this sequence may be applied to circuit-breaker of utilization cat. B:		
	Type designation or serial number		
	Sample no:		
	Rated current: In (A)		
	Rated operational voltage: Ue (V)		
	Rated short-time withstand current: (kA/s)		
	Rated frequency: (Hz)		
8.3.8.1	Verification of overload releases		
	The operation of overload releases shall be verified twice times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		
	- Operation time: (s) .....L1: .....L2: .....L3:		



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

8.3.8.2	Test of rated short-time withstand current.		
	For this test, any over-current release, including the instantaneous override, if any, likely to operate during the test, shall be rendered inoperative.		
	- test frequency: (Hz)		
	- duration of the test: (s)		
	- test frequency: (Hz)		
	- power factor / time constant (ms):		
	- factor "n"		
	- test voltage: (V) .....L1: .....L2: .....L3:		
	- r.m.s. test current: (kA) .....L1: .....L2: .....L3:	C ₁	
	- highest peak current: (kA)		
8.3.8.3	Test of rated service short-circuit breaking capacity		
	At the highest voltage applicable to the rated short-time current.		
	Test sequence of operation: O – t – CO – t – CO		
	Type designation or serial number		
	Sample no:		
	Rated current: I _n (A)		
	Rated operational voltage: U _e (V)		
	Rated service short-circuit breaking capacity: (kA)		
	Rated control supply voltage of closing mechanism: U _c (V)		
	Rated control supply voltage of shunt release: U _c (V)		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		
	closing mechanism energized with 85% at the rated U _c : (V)		
	The circuit-breaker is mounted complete on its own support or an equivalent support.		



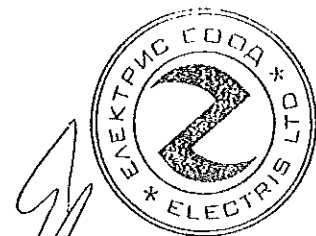
[Handwritten signature]

[Handwritten signature]

[Handwritten signature]

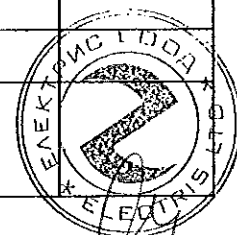


IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test made in free air:		
	Distances of the metallic screen's: (all sides)		
	The characteristics of the metallic screen:		
	- woven wire mesh		
	- perforated metal		
	- expanded metal		
	- ratio hole area/total area: 0,45-0,65		
	- size of hole: <30mm ²		
	- finish: bare or conductive plating		
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		
	Circuit is earthed at: (load-star- or supply-star point)		
	Conductor cross-sectional area (mm ²):		
	If terminals unmarked: line connected at: (underside/upside)		
	Tightening torques: (Nm)		
	Test sequence of operation: O – t – CO – t – CO		
	The highest voltage applicable to the rated short-time current.		
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: .....L3:		
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: .....L3:		
	power factor/time constant :		
	- Factor "n"		
	- peak test current (A) :		

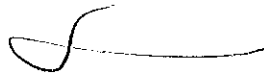


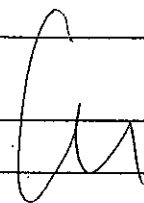
XXXXXXXXXXXXXXXXXXXX



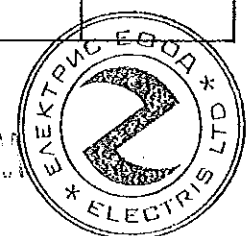
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test sequence "O"		
	- max. let-through current: (kA _{peak}) L1: L2: L3:		
	- Joule integral I ² dt (A ² s) L1: L2: L3:		
	Pause, t: (min)		
	Test sequence "CO"		
	- max. let-through current: (kA _{peak}) L1: L2: L3:		
	- Joule integral I ² dt (A ² s) L1: L2: L3:		
	Pause, t: (min)		
	Test sequence "CO"		
	- max. let-through current: (kA _{peak}) L1: L2: L3:		
	- Joule integral I ² dt (A ² s) L1: L2: L3:		
	The circuit-breaker shall remain closed for the short-time corresponding to the max. available time setting of the short-time delay short-circuit release.		
	During this test the instantaneous override shall not operate		
	- and the making current release shall operate		
8.3.8.4	Operational performance capability with current.		
	Rated current: I _n (A)		
	Maximum rated operational voltage: U _e (V)		
	Conductor cross-sectional area (mm ²) :		
	Number of operating cycles per hour		
	Number (5% of the number given in column 4, tab. 8) of cycles with current (total) (closing mechanism energized at the rated U _c)		



DATE: 03/07/2011



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Applied voltage: closing mechanism (V)		
	For circuit-breaker fitted with adjustable releases, test shall be made with the overload setting at maximum and short-circuit setting at minimum.		
	Conditions, make/break operations:		
	- test voltage $U/U_e = 1,0$ (V).....L1: .....L2: .....L3:		
	- test current $I/I_e = 1,0$ (A) .....L1: .....L2: .....L3:		
	- power factor/time constant:		
	- frequency: (Hz)		
	- on-time (ms):		
	- off-time (s):		
	Electrical components do not exceed the value indicated in tab. 7.		
8.3.8.5	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V		
	- no breakdown or flashover		
	- the leaking current for circuit-breaker suitable for isolation: (<2mA / 1,1 Ue)		
8.3.8.7	Verification of temperature-rise		
	- the values of temperature-rise do not exceed the those specified in tab. 7.		
	Temperature rise of main circuit terminals. ≤ 80 K (K) :		
	conductor cross-sectional area (mm ²) :		
	test current I_e (A) :		
8.3.8.7	Verification of overload releases		
	Test current: 1,45 times the value of their current setting at the reference temperature: (A)		
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$		

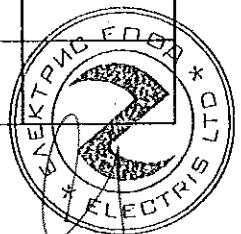




ENKTRPVC EOOD * ELECTRIS LTD

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		
	- Operation time: (s) .....L1:		
	.....L2:		
	.....L3:		

Annex B	Circuit-breakers incorporating residual current protection		N/A
B.3	Classification etc....		

Annex C	Individual pole short-circuit test sequence		
	Circuit-breaker for use on phase-earthed systems		
C.2	Test of individual pole short-circuit breaking capacity		
	A short-circuit test is made with a value of prospective current (I _{su}) equal to 25% of the ultimate rated short-circuit breaking capacity (I _{cu})		
	Type designation or serial number	BL1600	
	Sample no:	8	
	Rated current: I _n (A)	1600A	
	Rated operational voltage: U _e (V)	500V	
	Rated ultimate short-circuit breaking capacity: (kA)	45kA	
	Rated control supply voltage of closing mechanism: U _c (V)	N/A	
	Rated control supply voltage of shunt release: U _c (V)	N/A	
	The test sequence of operations is O – t - CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.	satisfy	
	closing mechanism energized with 85% at the rated U _c : (V)	N/A	

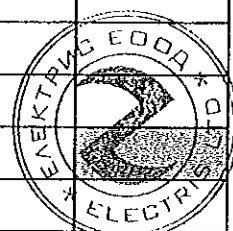


[Handwritten signature]

[Handwritten signature]

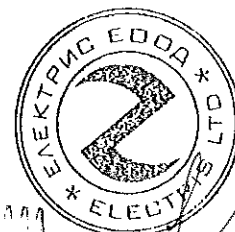
ESTRONG CHINA

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	The circuit-breaker is mounted complete on its own support or an equivalent support.	satisfy	
	Test made in free air:	satisfy	
	Distances of the metallic screen's: (all sides)	Vide catalogue	
	The characteristics of the metallic screen:		
	- woven wire mesh	N/A	
	- perforated metal	N/A	
	- expanded metal	yes	
	- ratio hole area/total area: 0,45-0,65	Satisfy	
	- size of hole: <30mm ²	satisfy	
	- finish: bare or conductive plating	satisfy	
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long	satisfy	
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	
	Conductor cross-sectional area (mm ²) :	1000mm ²	
	If terminals unmarked: line connected at: (underside/upside)	N/A	
	Tightening torques: (Nm)	25Nm	
	Test sequence of operation: O – t – CO		
	Test circuit according figure: 9	satisfy	
	- test voltage U/Ue = 1,05 (V) .....L1:	525V	
	.....L2:	525V	
	.....L3:	525V	
	short-circuit test current (I _{su}): equal to 25% of the ultimate rated short-circuit breaking capacity (I _{cu})		
	- r.m.s. test current AC/DC: (A):	12kA AC	
	power factor/time constant :	0,27	
	- Factor "n"	2	
	- peak test current (A _{max}) :	24,1kA	
	Test sequence "O" L1		
	- max. let-through current: (kA _{peak}) .....L1:	23,5 kA	



[Handwritten signatures and illegible text]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	- Joule integral I ² dt (A ² s) .....L1:	3,5 . 10 ⁶ A ² s	
	Pause, t: (min)	3min	
	Test sequence "CO" L1		
	- max. let-through current: (kApeak) .....L1:	23,8kA	
	- Joule integral I ² dt (A ² s) .....L1:	3,4 . 10 ⁶ A ² s	
	Test sequence "O" L2		
	- max. let-through current: (kApeak) .....L2:	24,8kA	
	- Joule integral I ² dt (A ² s) .....L2:	3,7 . 10 ⁶ A ² s	
	Pause, t: (min)	3min	
	Test sequence "CO" L2		
	- max. let-through current: (kApeak) .....L2:	22,9A	
	- Joule integral I ² dt (A ² s) .....L2:	3,1 . 10 ⁶ A ² s	
	Test sequence "O" L3		
	- max. let-through current: (kApeak) .....L3:	23,9kA	
	- Joule integral I ² dt (A ² s) .....L3:	3,2 . 10 ⁶ A ² s	
	Pause, t: (min)	3min	
	Test sequence "CO" L3		
	- max. let-through current: (kApeak) .....L3:	24,1kA	
	- Joule integral I ² dt (A ² s) .....L3:	3,6 . 10 ⁶ A ² s	
	Melting of the fusible element	no	P
	Holes in the PE-sheet for test sequence "O"	no	P
	Cracks observed	no	P
C.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V	1000V	
	- no breakdown or flashover	no	P

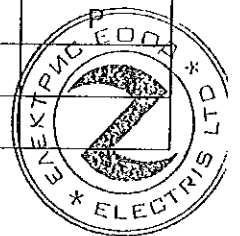


[Handwritten signatures]

[Handwritten text]

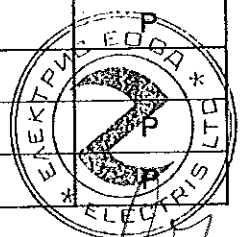
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

C.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2.5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:	1'22"	
	- Operation time: (s) L1:	1'26"	P
	..... L2:	1'20"	
	..... L3:	1'21"	
Annex F	Additional tests for circuit-breakers with electronic over-current protection		
F.4.	Immunity tests		
F.4.1.	Tests regarding non-sinusoidal currents resulting from harmonics		
F.4.1.1.	Test conditions		
	Option b)		
	Desired values:		
	Third harmonic >60%		
	Fifth harmonic >14%		
	Seventh harmonic >7%		
	Actual values:		
	Third harmonic	72,49%	P
	Fifth harmonic	34,3%	P
	Seventh harmonic	8,21%	P
F.4.1.3.	Test procedure		
	Non-tripping current 0,9Ir	1440A	
	Testing time	Non-tripping 2380sec.	P
	Tripping current 2 Ir	3200 A	
	Release time	3'59 "	P
	Tripping current 2x Ir	3200A	
	Release time	4'08"	P
	Performance criterion A of F.2.1.2.		

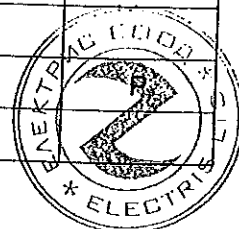


[Handwritten signatures and marks]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
F.4.2.	Current dips		
	The test circuit shall be in accordance with figure F.2. IEC60947-2,		
	The current applied according to figure F.5 and to table F.1	It did not trip	P
	Performance criterion B of F. 2.1.2.		P
F.4.3. IEC61000-4-2	Electrostatic discharges		
	At level	4	
Annex J.2.2.	Test voltage	8kV	
	Non-tripping current 0,9xIr	1440A	
	Test data	it did not trip	P
	Tripping current 2xIr	3200A	
	Release time	3'59"	P
	Performance criterion B of F. 2.1.2.		P
F.4.4. IEC61000-4-3	Radiated radio-frequency electromagnetic fields		
Annex J.2.3.	Non-tripping current 0,9xIr	1440A	
	Test data	it did not trip	P
	Tripping current 2xIr	3200A	
	Release time	4'03"	P
	Performance criterion A of F. 2.1.2.		P
F.4.5.	Electrical fast transients/bursts (EFT/B)		
F.5.2.2.1. IEC61000-4-4	Non-tripping current 0,9xIr	1440A	
	Testing time	1'	P
Annex J.2.4.	Tripping current 2xIr	3200A	
	Release time	3'93"	P
	Performance criterion A of F. 2.1.2.		P
F.4.6. IEC61000-4-5	Surges		
	Non-tripping current 0,9xIr	1440A	
	Total number of pulses	20	
Annex J.2.5.	Tripping current 2xIr	3200A	
	Release time	4'01"	
	Performance criterion B of F. 2.1.2.		

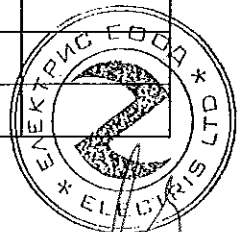


IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
F.4.7. Annex J.2.6.	Conducted disturbances induced by radio-frequency fields (common mode)		
	Non-tripping current $0,9 \times I_r$	1440A	
	Test data	it did not trip	P
	Tripping current $2 \times I_r$	3200A	
	Release time	4'07"	P
	Performance criterion A of F. 2.1.2		P
F.5.4. Annex J.3.3.	Radiated RF disturbances (30MHz -1GHz)		
Figure F.3.	Meet the condions for classes "B"		P
F.6.	Suitability for multiple frequencies		N/A
F.6.	Suitability for multiple frequencies		
F.7.	Dry heat test		
	Ambient temperature	+40°C	
	Testing time	168h	
	Test data	it did not trip	P
F.7.3.	Verificatin of overload releases:		
7.2.1.2.4.b)	Instanteanous release:		
	setting release	20kA	
	Tripping current	19,4kA	P
	Inverse time-delay releases :		
	Ambient temperature	+30°C	
	Non-tripping current $1,05 \times I_r$	1680A	
	Testing time	>2h	P
	Tripping current $1,3 \times I_r$	2080A	
	Release time	34'18"	P
	Ambient temperature	+50°C	
	Non-tripping current $1,05 \times I_r$	1680A	
	Testing time	>2h	P
	Tripping current $1,3 \times I_r$	2080A	
	Release time	34'39"	



[Handwritten signatures and stamps]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
F.8.	Damp heat test		
IEC 60068-2-30	The upper temperature	+55°C	
	The number of cycles	6	
F.8.2.	Verification of overload releases		
7.2.1.2.4.b)	Instantaneous release:		
	setting release 8xIr	12800A	
	Tripping current	12650A	P
	setting release 4xIr	6400A	
	Tripping current	6370A	P
	Inverse time-delay releases :		
	Ambient temperature	+30°C	
	Non-tripping current 1,05xIr	1680A	
	Testing time	>2h	P
	Tripping current 1,3xIr	2080A	
	Release time	36'35"	P
	Ambient temperature	+50°C	
	Non-tripping current 1,05xIr	1680A	
	Testing time	>2h	P
	Tripping current 1,3xIr	2080A	
	Release time	36'47"	P
F.9.	Temperature variation cycles at a specified		
IEC60068-2-14	Number of operating	28	
	Test data	it did not trip	P
F.8.2.	Verification of overload releases:		
7.2.1.2.4.b)	Instantaneous release:		
	setting release 8xIr	12800A	
	Tripping current	12620A	P
	setting release 4xIr	6400A	
	Tripping current	6290A	P
	Inverse time-delay releases :		
	Ambient temperature	+30°C	
	Non-tripping current 1,05xIr	1680A	



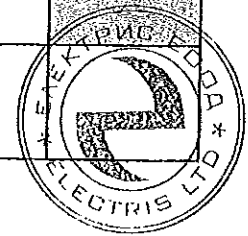
[Handwritten signature]

[Handwritten signature]

[Handwritten signature]

TESTING CENTER

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Testing time	>2h	P
	Tripping current 1,3xIr	2080A	
	Release time	36'37"	P
	Ambient temperature	+50°C	
	Non-tripping current 1,05xIr	1680A	
	Testing time	>2h	P
	Tripping current 1,3xIr	2080A	
	Release time	36'28"	P
Annex G	Power loss		
	Phase L1	118W	
	L2	117W	
	L3	119W	
Annex H	Individual pole short-circuit test sequence		
	Circuit-breaker for use in IT systems		
H.2	Test of individual pole short-circuit breaking capacity		
	A short-circuit test is made on the individual poles of a multipole circuit-breaker at a value of prospective current (I_{pr}) equal to 1,2 times the max. setting of the short-time delay release tripping current or, in the absence of such a release, 1,2 time the max. setting of the tripping current of the instantaneous release, or, where relevant 1,2 times the max. setting of the definite time delay release tripping current, but not exceeding 50kA.		
	Type designation or serial number	BL1600	
	Sample no:	9	
	Rated current: I_n (A)	1600A	
	Rated operational voltage: U_e (V)	690V	
	Rated ultimate short-circuit breaking capacity: (kA)	23kA	
	Rated control supply voltage of closing mechanism: U_c (V)	N/A	
	Rated control supply voltage of shunt release: U_c (V)	N/A	
	The test sequence of operations is O – t - CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.	satisfy	



[Handwritten signatures and stamps]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	closing mechanism energized with 85% at the rated Uc: (V)	N/A	
	The circuit-breaker is mounted complete on its own support or an equivalent support.	Satisfy	
	Test made in free air:	satisfy	
	Distances of the metallic screen's: (all sides)	Vide catalogue	
	The characteristics of the metallic screen:		
	- woven wire mesh	N/A	
	- perforated metal	N/A	
	- expanded metal	yes	
	- ratio hole area/total area: 0,45-0,65	Satisfy	
	- size of hole: <30mm ²	satisfy	
	- finish: bare or conductive plating	satisfy	
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long	satisfy	
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	
	Conductor cross-sectional area (mm ²) :	1000mm ²	
	If terminals unmarked: line connected at: (underside/upside)	N/A	
	Tightening torques: (Nm)	25Nm	
	Test sequence of operation: O – t – CO		
	Test circuit according figure: 9	satisfy	
	- test voltage U/Ue = 1,05 (V) L1:	725V'	
	..... L2:	725V	
	..... L3:	725V	
	Short-circuit test current (I _{IT}): equal to 1,2 times the max. setting of the short-time delay release tripping current,	N/A	
	or, in the absence of such a release, 1,2 time the max. setting of the tripping current of the instantaneous release,	satisfy	



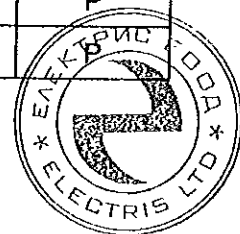
[Handwritten signature]

[Handwritten signature]



ЕЛЕКТРИС ЛТД

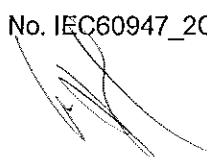
[Handwritten signature]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	or, where relevant 1,2 times the max. setting of the definite time delay release tripping current, but not exceeding 50kA.	N/A	
	- r.m.s. test current AC/DC: (A)	20000A AC	
	power factor/time constant :	0,27	
	- Factor "n"	2,0	
	- peak test current (Amax) :	40,3 kA	
	Test sequence "O" L1		
	- max. let-through current: (kApeak) .....L1:	40,9kA	
	- Joule integral I ² dt (A ² s) .....L1:	7,2 . 10 ⁶ A ² s	
	Pause, t: (min)	3min	
	Test sequence "CO" L1		
	- max. let-through current: (kApeak) .....L1:	40,1kA	
	- Joule integral I ² dt (A ² s) .....L1:	7,4 . 10 ⁶ A ² s	
	Test sequence "O" L2		
	- max. let-through current: (kApeak) .....L2:	40,0kA	
	- Joule integral I ² dt (A ² s) .....L2:	6,7 . 10 ⁶ A ² s	
	Pause, t: (min)	3min	
	Test sequence "CO" L2		
	- max. let-through current: (kApeak) .....L2:	39,3kA	
	- Joule integral I ² dt (A ² s) .....L2:	6,5 . 10 ⁶ A ² s	
	Test sequence "O" L3		
	- max. let-through current: (kApeak) .....L3:	38,4kA	
	- Joule integral I ² dt (A ² s) .....L3:	6,6 . 10 ⁶ A ² s	
	Pause, t: (min)	3min	
	Test sequence "CO" L3		
	- max. let-through current: (kApeak) .....L3:	40,1kA	
	- Joule integral I ² dt (A ² s) .....L3:	7,0 . 10 ⁶ A ² s	
	Melting of the fusible element	no	P
	Holes in the PE-sheet for test sequence "O"	no	P
	Cracks observed	no	



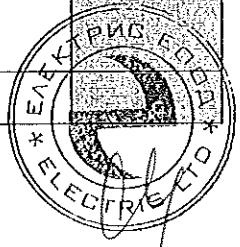
DATE: 03.08.2011

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
H.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V	1380V	
	- no breakdown or flashover	no	P
H.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2.5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:	1'22"	
	- Operation time: (s) L1:	1'21"	P
	..... L2:	1'17"	
	..... L3:	1'23"	
H.5	Marking		
	Circuit-breaker for which all values of rated voltage have not been tested according to this annex or are not covered by such testing, shall be identified by the symbol  which shall be marked on the circuit-breaker immediately following these values of rated voltage	satisfy 	P
Annex M	Modular residual current devices (without integral current breaking device)		N/A
M.8.3	Operating characteristics		
	Type designation or serial number		
	Sample no:		
	Rated current: In (A)		
	Rated operational voltage: Ue (V)		
	Rated frequency (Hz)		
	Terminal type or through conductor type		
	MRCB with sensing means and processing device combined or separate	Combined/separate	
	MRCB with voltage source		
	Operating automatically in case of failure of the voltage source.	Yes/no	
	Rated insulation voltage (Ui)		



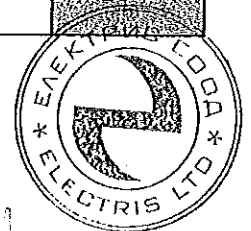


ЕЛЕКТРИЧЕСКОЕ ОТДЕЛЕНИЕ

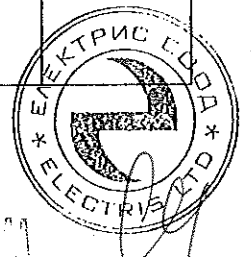


IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Rated impulse withstand voltage (U_{imp})		
	Characteristics of the voltage source of MRCDS		
	Rated values of the voltage source of MRCDS (U_s)		
	Rated values of the frequencies of the voltage source of MRCDS		
	Rated insulation voltage (U_i)		
	Rated impulse withstand voltage (U_{imp})		
M.4.1.3	Characteristics of auxiliary contacts		
M.4.2	Characteristics of MRCDS concerning their residual current function		
M.4.2.2	Operating characteristic in case of residual current with d.c. component		
	Type AC MRCDS		
	Type A MRCDS		
	Type B MRCDS		
M.4.3	Behaviour under short-circuit conditions		
	Rated conditional short-circuit current (I_{cc})		
	Rated conditional residual short-circuit current ($I_{\Delta c}$)		
	Rated short-time withstand current (I_{cw})		
	Rated residual short-time withstand current ($I_{\Delta w}$)		
	Peak withstand current		
M.4.4	Preferred and limiting values		
	Preferred values of the rated residual operating current ($I_{\Delta n}$)		
	Minimum value of the rated residual non-operating current ($I_{\Delta no}$)		
	Limiting value of the non-operating overcurrent in the case of a single-phase load in a multiphase circuit		
	Preferred values of rated voltage of the voltage source of MRCDS		
	Compliance with constructional requirements		
MI	Test sequence MI		

СЕРТИФИКАЦИЯ
ЭЛЕКТРИС ЛТД



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
M.8.3.4.2	Verification of operating in case of steady increase of the residual current (figure M.1)		
	Increase the residual current from 0,2 IΔn to IΔn in 30 sec. Required: value between 0,2 IΔn and IΔn		
	Min. setting IΔn.(mA): Intern. setting IΔn.(mA): Max. setting IΔn.(mA):		
M.8.3.4.3	Verification of operating in case of closing on residual current (figure M.2)		
	The MRCD is closes on IΔn or each specified setting Required : no value exceeds the specified limiting value of Table B1 (300 ms) or Table B2 (500 ms) and a non actuating time of 60 ms		
	Min. setting IΔn.(ms): Intern. setting IΔn.(ms): Max. setting IΔn.(ms):		
M.8.3.4.4	Verification of operating in case of a sudden appearance of the residual current (figure M.2 and M3)		
	A residual current is sudden appear on the MRCD of IΔn Required : no value exceeds the specified limiting value of Table B1: .300 ms) or Table B2 (500 ms) and a non actuating time of 60 ms		
	Min. setting IΔn.(ms): Intern. setting IΔn.(ms): Max. setting IΔn.(ms):		
	A residual current is sudden appear on the MRCD of 2 IΔn Required : no value exceeds the specified limiting value of Table B1: 150 ms) or Table B2 (200 ms) and a non actuating time of 60 ms		
	Min. setting IΔn.(ms): Intern. setting IΔn.(ms): Max. setting IΔn.(ms):		
	A residual current is sudden appear on the MRCD of <input type="checkbox"/> 5 IΔn or <input type="checkbox"/> 0,25 A Required : no value exceeds the specified limiting value of Table B1: 40ms) or Table B2 (150 ms) and a non actuating time of 60 ms		



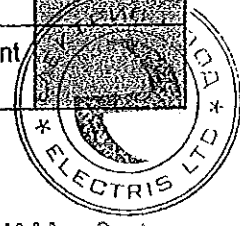
Handwritten signatures and stamps at the bottom of the page, including a large signature on the left and a stamp on the right.

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		
	A residual current is sudden appear on the MRCD of <input type="checkbox"/> 10 IΔn or <input type="checkbox"/> 0,5 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		
	A residual current is sudden appear on the MRCD of IΔn: 5 A Required : no value exceeds the specified limiting value of Table B1 (40 ms)		
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		
	A residual current is sudden appear on the MRCD of IΔn: 10 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms	<i>Ch</i>	
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		
	A residual current is sudden appear on the MRCD of IΔn: 20 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		
	A residual current is sudden appear on the MRCD of IΔn: 50 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		

[Handwritten signatures]



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	A residual current is sudden appear on the MRCD of IΔn: 100 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		
	Min. setting IΔn.(ms): Intern. setting IΔn.(ms): Max. setting IΔn.(ms):		
	A residual current is sudden appear on the MRCD of IΔn: 200 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		
	Min. setting IΔn.(ms): Intern. setting IΔn.(ms): Max. setting IΔn.(ms):		
	A residual current is sudden appear on the MRCD of IΔn: 500 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		
	Min. setting IΔn.(ms): Intern. setting IΔn.(ms): Max. setting IΔn.(ms):		
M.8.3.4.5	Verification of the limiting non-operating time of time delayed type MRCDs (figure M3)		
	A residual current is sudden appear on the MRCD of 2 IΔn for a time declared by the manufacturer Required : The MRCD shall not operated		
	Min. setting IΔn. Min. setting time delay (ms): Min. setting IΔn. Max. setting time delay (ms):		
M.8.3.5	Tests at the temperature limits		
M.8.3.5.1	General (clause B.8.2.5 applies)		
	Minimum temperature (°C)		
	Maximum temperature (°C)		
M.8.3.5.2	Verification of operating in case of a sudden appearance of the residual current at -5°C or minimum temperature limit (figure M.2 and M3)		



[Handwritten signature]

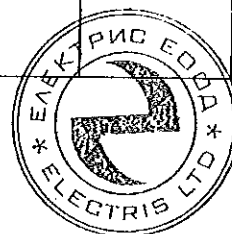
[Handwritten signature]

[Handwritten signature]

ELECTRIS LTD

[Handwritten signature]

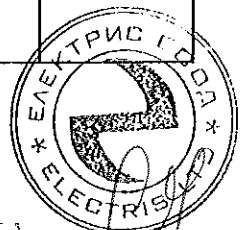
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	A residual current is sudden appear on the MRCD of $I_{\Delta n}$ Required : no value exceeds the specified limiting value of Table B1: 300 ms) or Table B2 (500 ms) and a non actuating time of 60 ms		
	Min. setting $I_{\Delta n}$.(ms): Interm. setting $I_{\Delta n}$.(ms): Max. setting $I_{\Delta n}$.(ms):		
	A residual current is sudden appear on the MRCD of $2 I_{\Delta n}$ Required : no value exceeds the specified limiting value of Table B1: 150 ms) or Table B2 (200 ms) and a non actuating time of 60 ms		
	Min. setting $I_{\Delta n}$.(ms): Interm. setting $I_{\Delta n}$.(ms): Max. setting $I_{\Delta n}$.(ms):		
	A residual current is sudden appear on the MRCD of <input type="checkbox"/> $5 I_{\Delta n}$ or <input type="checkbox"/> 0,25 A Required : no value exceeds the specified limiting value of Table B1: 40ms) or Table B2 (150 ms) and a non actuating time of 60 ms	<i>Am</i>	
	Min. setting $I_{\Delta n}$.(ms): Interm. setting $I_{\Delta n}$.(ms): Max. setting $I_{\Delta n}$.(ms):		
	A residual current is sudden appear on the MRCD of <input type="checkbox"/> $10 I_{\Delta n}$ or <input type="checkbox"/> 0,5 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		
	Min. setting $I_{\Delta n}$.(ms): Interm. setting $I_{\Delta n}$.(ms): Max. setting $I_{\Delta n}$.(ms):		
	Verification of the limiting non-operating time of time delayed type MRCDs at – 5°C or minimum temperature limit (figure M3)		
	A residual current is sudden appear on the MRCD of $2 I_{\Delta n}$ for a time declared by the manufacturer Required : The MRCD shall not operated		
	Min. setting $I_{\Delta n}$. Min. setting time delay (ms): Min. setting $I_{\Delta n}$. Max. setting time delay (ms):		



Handwritten signatures and initials.

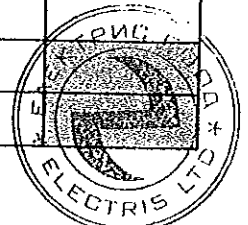
Handwritten text: ELECTRIS LTD

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
M.8.3.5.3	Verification of operating in case of a sudden appearance of the residual current at +40°C (figure M.2 and M3)		
	Load :	_____ A	
	Torque :	_____ Nm	
	Connection :	_____ mm ²	
	A residual current is sudden appear on the MRCD of IΔn Required : no value exceeds the specified limiting value of Table B1: 300 ms) or Table B2 (500 ms) and a non actuating time of 60 ms		
	Min. setting IΔn.(ms): Intern. setting IΔn.(ms): Max. setting IΔn.(ms):		
	A residual current is sudden appear on the MRCD of 2 IΔn Required : no value exceeds the specified limiting value of Table B1: 150 ms) or Table B2 (200 ms) and a non actuating time of 60 ms		
	Min. setting IΔn.(ms): Intern. setting IΔn.(ms): Max. setting IΔn.(ms):		
	A residual current is sudden appear on the MRCD of <input type="checkbox"/> 5 IΔn or <input type="checkbox"/> 0,25 A Required : no value exceeds the specified limiting value of Table B1: 40ms) or Table B2 (150 ms) and a non actuating time of 60 ms		
	Min. setting IΔn.(ms): Intern. setting IΔn.(ms): Max. setting IΔn.(ms):		
	A residual current is sudden appear on the MRCD of <input type="checkbox"/> 10 IΔn or <input type="checkbox"/> 0,5 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		
	Min. setting IΔn.(ms): Intern. setting IΔn.(ms): Max. setting IΔn.(ms):		



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

	A residual current is sudden appear on the MRCD of 2 IΔn for a time declared by the manufacturer Required : The MRCD shall not operated		
	Min. setting IΔn. Min. setting time delay (ms): Min. setting IΔn. Max. setting time delay (ms):		
M.8.4.	Verification of dielectric properties		
M.8.4.1	Verification of rated impuls withstand voltage		
	rated impulse withstand voltage		
	test impulse voltage (see table 12 part 1)		
	test impulse voltage for isolating (see table 14 part 1)		
M.8.4.1.2	Verification of rated impulse withstand voltage with respect to the monitored circuit		
M.8.4.1.2.1	Test for terminal type MRCD		
M.8.4.1.2.2	Tests for MRCDs of through-conductor type		
M.8.4.1.3	Verification of rated impulse withstand of the voltage source circuit (if applicable)		
M.8.5	Verification of the operation of the test device at the limits of the rated voltage		
	For MRCDs having an adjustable time-delay the test is made at the maximum setting of time-delay:	_____ s	
M.8.5.a	Setting IΔn or minimum setting of IΔn	_____ A	
	Test voltage (1,1 x Ue max)	_____ V	
	Number of operations	25	
	Interval time	5 s	
	Tripping	<input type="checkbox"/> Yes / <input type="checkbox"/> No	
M.8.5.b	Setting IΔn or minimum setting of IΔn	_____ A	
	Test voltage 0,85 x Ue max)	_____ V	
	Number of operations	3	
	Interval time	5 s	
	Tripping	<input type="checkbox"/> Yes / <input type="checkbox"/> No	
M.8.5.c	Setting IΔn or minimum setting of IΔn	_____ A	
	Test voltage (1,1 x Ue max)	_____ V	

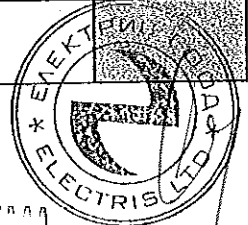


91

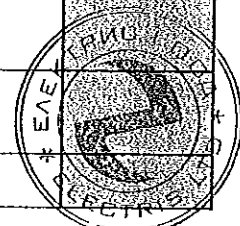
[Handwritten signature]

ESRHO 0071111111

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Number of operations	1	
	Operating means of the test device held in close position	5 s	
	Tripping	<input type="checkbox"/> Yes / <input type="checkbox"/> No	
M.8.6	Verification of the limiting value of non-operating current under overcurrent conditions , in case of a single phase load.		
M.8.6	Circuit diagram	Fig. M4 _____	
	Setting I Δ n or minimum setting of I Δ n if adjustable	_____ A	
	Test current equal to the lower value of: <input type="checkbox"/> 6 x I Δ n or <input type="checkbox"/> 80 % of the maximum short-circuit release current setting	_____ A	
	Test voltage: <input type="checkbox"/> rated voltage or <input type="checkbox"/> any convenient voltage	_____ V	
	Test frequency	_____ Hz	
	Power factor (0,5)	_____	
	Current flow time	2 s	
	Interval time	60 s	
	Calibration plot number	_____	
	No tripping / change of state		
M.8.7	Resistance against unwanted tripping due to surge currents resulting from impulse voltages		
M.8.7.2	Verification of the resistance to unwanted tripping in case of loading of the network capacitance		
B.8.6.1	Current surge test for RMCDs (0,5 μ s / 100kHz ring wave test)		
	One pole of the MRCD is submitted to 10 applications of a surge current according to the following requirements:		
	- peak value: 200 A + 10/0%		
	- virtual front time: 0,5 μ s \pm 30%		
	- period of the following oscillatory wave: 10 μ s \pm 20%		



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	- each successive peak: about 60% of the preceding peak		
	The polarity shall be inverted after every two applications		
	The interval between two consecutive applications shall be about 30 s		
	During the test the MRCD shall not trip:	-	
M.8.7.3	Verification of the resistance to unwanted tripping in case of flashover without follow-on current.		
B.8.6.2	Verification of behaviour at surge current up to 250 A (8/20 µs surge current test)		
	One pole of the MRCD is submitted to 10 applications of a surge current according to the following requirements:		
	- peak value: 250 A + 10/0%		
	- virtual front time: 8 µs ± 20%		
	- virtual time to half value: 20 µs ± 20%		
	- peak of reverse current: less than 30% of peak value		
	The polarity shall be inverted after every two applications		
	The interval between two consecutive applications shall be about 30 s		
	During the test the MRCD shall not trip:		
M.8.8	Verification of the behaviour in case of an earth fault current comprising a d.c. component.		
M.8.8.2	Type A MRCD		
	For MRCDs the operation of which depends on a voltage source the test are made at 1,1 and 0,85 times the rated voltage of the voltage source (Us).		
M.8.8.2.2	Verification of operation in case of a continuous rise of a residual pulsating direct current		
	Rated voltage	_____ V	
B.8.7.2.1	- steady increase from zero to: 1,4 IΔn for IΔn > 0,01 A with 1,4 IΔn/30 A/s (mA)	_____ mA	
	- steady increase from zero to: 2 IΔn for IΔn < 0,01 A with 2 IΔn/30 A/s (mA)	_____ mA	
	- angle = 0 (+/-) :		

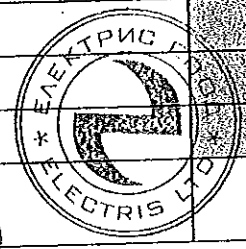


[Handwritten signature]

[Handwritten signature]

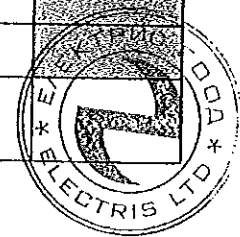
ESTRUCO

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	- angle = 90 (+/-) :		
	- angle = 135 (+/-) :		
	No value exceeds the relevant specified limiting values		
M.8.8.2.3	Verification of operation in case of a suddenly appearing residual pulsating direct current		
B.8.7.2.2	Verification of the correct operation in case of suddenly appearing residual pulsating direct currents by closing S2 (angle = 0°)		
	Rated voltage	_____ V	
	RCCB's with $I_{\Delta n} > 0,015$ A:		
	- maximum break time (ms) at: 1,4 $I_{\Delta n}$ (+/-) :		
	- maximum break time (ms) at: 2,8 $I_{\Delta n}$ (+/-) :		
	- maximum break time (ms) at: 7 $I_{\Delta n}$ (+/-) :		
	- maximum break time (ms) at: 14 $I_{\Delta n}$ (+/-) :		
	No value exceeds the relevant specified limiting value		
	RCCB's with $I_{\Delta n} = 0,015$ A:		
	- maximum break time (ms) at: 2 $I_{\Delta n}$ (+/-) :		
	- maximum break time (ms) at: 4 $I_{\Delta n}$ (+/-) :		
	- maximum break time (ms) at: 10 $I_{\Delta n}$ (+/-) :		
	- maximum break time (ms) at: 20 $I_{\Delta n}$ (+/-) :		
	No value exceeds the relevant specified limiting value		
M.8.8.2.4	Verification of operation with load at reference temperature		
	Rated voltage	_____ V	
B.8.7.2.1	- steady increase from zero to: 1,4 $I_{\Delta n}$ for $I_{\Delta n} > 0,015$ A with 1,4 $I_{\Delta n}/30$ A/s (mA)	_____ mA	
	- steady increase from zero to: 2 $I_{\Delta n}$ for $I_{\Delta n} < 0,015$ A with 2 $I_{\Delta n}/30$ A/s (mA)	_____ mA	
	- angle = 0 (+/-) :		
	- angle = 90 (+/-) :		
	- angle = 135 (+/-) :		
	No value exceeds the relevant specified limiting values		



Handwritten signatures and marks at the bottom of the page.

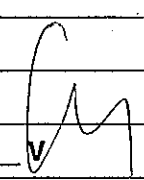
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
M.8.8.2.5	Verification of operation of a residual pulsating direct current superimposed by a smooth direct current of 6 mA.		
	Rated voltage	_____ V	
B.8.7.2.1	- steady increase from zero to: 1,4 IΔn for IΔn > 0,015 A with 1,4 IΔn/30 A/s (mA) + 6 mA	_____ mA	
	- steady increase from zero to: 2 IΔn for IΔn < 0,015 A with 2 IΔn/30 A/s (mA) + 6 mA	_____ mA	
	- angle = 0 (+/-) :		
	No value exceeds the relevant specified limiting values		
M.8.8.3	Type B MRCD		
M.8.8.3.2	Verification of operation in case of a slowly rising residual smooth direct current		
	Rated voltage (1,1*Un)	_____ V	
B.8.7.2.1	- steady increase from zero to: 2 IΔn A with 1,4 IΔn/30 A/s (mA)	_____ mA	
	- angle = 90 (+/-) :		
	Operation shall occur between 0,5 and 2IΔn		
	Rated voltage (0,85*Un)	_____ V	
B.8.7.2.1	- steady increase from zero to: 2 IΔn A with 1,4 IΔn/30 A/s (mA)	_____ mA	
	- angle = 90 (+/-) :		
	Operation shall occur between 0,5 and 2IΔn		
M.8.8.3.3	Verification of operation in case of a suddenly appearing residual smooth direct current		
B.8.7.2.2	Verification of the correct operation in case of suddenly appearing a smooth residual direct currents by closing S2		
	Rated voltage (1,1*Un)	_____ V	
	RCCB's with IΔn > 0,015 A:		
	- maximum break time (ms) at: 2 IΔn (+/-) :		
	- maximum break time (ms) at: 4 IΔn (+/-) :		
	- maximum break time (ms) at: 10 IΔn (+/-) :		
	- maximum break time (ms) at: 20 IΔn (+/-) :		
	No value exceeds the relevant specified limiting value		

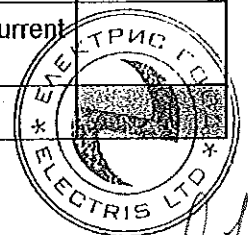


[Handwritten signature]

[Handwritten signature]

[Handwritten text]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
B.8.7.2.2	Verification of the correct operation in case of suddenly appearing a smooth residual direct currents by closing S2		
	Rated voltage (0,85*Un)	_____ V	
	RCCB's with IΔn > 0,015 A:		
	- maximum break time (ms) at: 2 IΔn (+/-) :		
	- maximum break time (ms) at: 4 IΔn (+/-) :		
	- maximum break time (ms) at: 10 IΔn (+/-) :		
	- maximum break time (ms) at: 20 IΔn (+/-) :		
	No value exceeds the relevant specified limiting value		
M.8.8.3.4	Verification of operation in case of a slowly rising residual current resulting from a fault in a circuit fed by a three-pulse star or a six-pulse connection.		
	Rated voltage (1,1*Un)	_____ V	
B.8.7.2.1	- steady increase from zero to: 2 IΔn A with 1,4 IΔn/30 A/s (mA)	_____ mA	
	- angle = 90 (+/-) :		
	Operation shall occur between 0,5 and 2IΔn		
	Rated voltage (0,85*Un)	_____ V	
B.8.7.2.1	- steady increase from zero to: 2 IΔn A with 1,4 IΔn/30 A/s (mA)	_____ mA	
	- angle = 90 (+/-) :		
	Operation shall occur between 0,5 and 2IΔn		
M.8.8.3.5.	Verification of operation in case of a slowly rising residual current resulting from a fault in a circuit fed by two-pulse bridge connection line-to-line.		
	Rated voltage (Un)	_____ V	
B.8.7.2.1	- steady increase from zero to: 2 IΔn A with 1,4 IΔn/30 A/s (mA)	_____ mA	
	- angle = 0 (+/-) :		
	Operation shall occur between 0,5 and 1,4IΔn		
M.8.8.3.6	Verification of operation with load at the reference temperature		
M.8.8.3.6- M.8.8.3.2	Verification of operation in case of a slowly rising residual smooth direct current		
	Rated voltage (1,1*Un)	_____ V	



СЕРТИФИКАТ

[Handwritten signature]

[Handwritten signature]

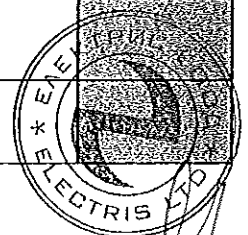
[Handwritten signature]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
B.8.7.2.1	- steady increase from zero to: 2 IΔn A with 1,4 IΔn/30 A/s (mA)	_____ mA	
	- angle = 90 (+/-)	:	
	Operation shall occur between 0,5 and 2IΔn		
	Rated voltage (0,85*Un)	_____ V	
B.8.7.2.1	- steady increase from zero to: 2 IΔn A with 1,4 IΔn/30 A/s (mA)	_____ mA	
	- angle = 90 (+/-)	:	
	Operation shall occur between 0,5 and 2IΔn		
M.8.8.3.6- M.8.8.3.4	Verification of operation in case of a slowly rising residual current resulting from a fault in a circuit fed by a three-pulse star or a six-pulse connection		
	Rated voltage (1,1*Un)	_____ V	
B.8.7.2.1	- steady increase from zero to: 2 IΔn A with 1,4 IΔn/30 A/s (mA)	_____ mA	
	- angle = 90 (+/-)	:	
	Operation shall occur between 0,5 and 2IΔn		
	Rated voltage (0,85*Un)	_____ V	
B.8.7.2.1	- steady increase from zero to: 2 IΔn A with 1,4 IΔn/30 A/s (mA)	_____ mA	
	- angle = 90 (+/-)	:	
	Operation shall occur between 0,5 and 2IΔn		
M.8.8.3.6- M.8.8.3.5	Verification of operation in case of a slowly rising residual current resulting from a fault in a circuit fed by two-pulse bridge connection line-to-line.		
	Rated voltage (Un)	_____ V	
B.8.7.2.1	- steady increase from zero to: 2 IΔn A with 1,4 IΔn/30 A/s (mA)	_____ mA	
	- angle = 0 (+/-)	:	
	Operation shall occur between 0,5 and 1,4IΔn		
M.8.9.	Verification of the behaviour of MRCDs with separate sensing means in case of a failure of the sensing means connection		
M.8.9.2	Test method 1		
	Rated voltage of the sensing means		
	Interval time Required <5 sec		



[Handwritten signatures and stamps]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
M.8.9.3	Test method 2		
	Test shall be carried out as follows: - The test device is activated - The sensing means are disconnected and the test device is activated. The MRCD shall not operate		
	Rated voltage of the sensing means		
	Test device activated MRCD shall operate		
	Rated voltage of the sensing means		
	Sensing device disconnected and Test device activated MRCD shall not operate		
M.8.10	Verification of temperature-rise of terminal type MRCDs		
M.8.10.2	Tambient: _____ °C		
8.3.2.5	Main circuits		
	Conventional thermal current I_{th}	_____ A	
	Conventional thermal current for enclosure I_{the}	_____ A	
	Conventional thermal current for the neutral pole	_____ A	
	Cabling characteristics		
	Cable	_____ mm ²	
	Bar / number / length	_____ mm / ___ / ___ m	
	Arrangement	<input type="checkbox"/> 3 phase - <input type="checkbox"/> poles on serie	
	Tightening torque	_____ Nm	
	Neutral pole (if applicable)		
	Cable	_____ mm ²	
	Bar / number / length	_____ mm / ___ / ___ m	
	Tightening torque	_____ Nm	
	Terminals(see table 2)		
	Manual operating means		
	Parts which need not be touched but not hand held		
	Parts which need not be touched during normal operation		



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

M.8.11	Verification of mechanical and electrical endurance		
	500 off-load operations controlled by the test device		
	Rated voltage:	_____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Result:	after____ operations,	
	500 off load operations by passing the rated residual operating current I _{Δn} through one current path		
	Rated voltage:	_____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Rated residual current	_____ mA	
	Result:	after____ operations,	
	500 on-load operations controlled by the test device		
	Rated voltage:	_____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Test current	_____ A	
	Power factor	_____	
	Test circuit	<i>Ch</i>	
	Result:	after____ operations,	
	500 on-load operations by passing the rated residual operating current I _{Δn} through one current path.		
	Rated voltage:	_____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Test current	_____ A	
	Power factor	_____	
	Test circuit		
	Rated residual current	_____ mA	
	Result:	after____ operations,	
	Show no damage		
	High voltage test: twice rated voltage	Test voltage: _____ V	
	A residual current is sudden appear on the MRCD of I _{Δn} (_____ mA) Required : no value exceeds the specified limiting value of Table B1: .300 ms) or Table B2 (500 ms) and a non actuating time of 60 ms		

Handwritten signature

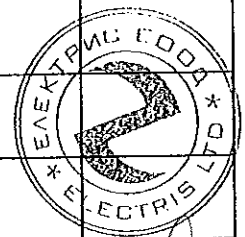
Handwritten signature

20090601



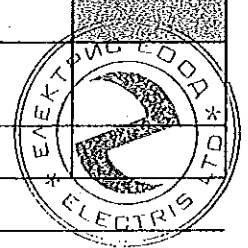
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

	Rated current: In (A)		
	Rated operational voltage: Ue (V)		
	Value of prospective current equal to the selectivity limit current, as declared by the manufacturer. (kA)		
	Type of integrated fuses (all details)		
	Rated control supply voltage of closing mechanism: Uc (V)		
	Rated control supply voltage of shunt release: Uc (V)		
8.3.7.1	Short-circuit at the selectivity limit current		
	Test sequences "O"		
	Fuses shall be fitted		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		
	closing mechanism energized with 85% at the rated Uc: (V)		
	The circuit-breaker is mounted complete on its own support or an equivalent support.		
	Test made in free air:		
	Distances of the metallic screen's: (all sides)		
	The characteristics of the metallic screen:		
	- woven wire mesh		
	- perforated metal		
	- expanded metal		
	- ratio hole area/total area: 0,45-0,65		
	- size of hole: <30mm ²		
	- finish: bare or conductive plating		
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		
	Circuit is earthed at: (load-star- or supply-star point)		



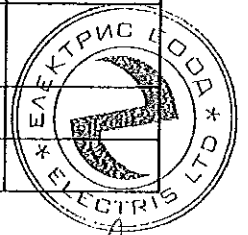
Handwritten signatures and initials are present at the bottom of the page, including a large signature on the left and several smaller ones on the right.

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Conductor cross-sectional area (mm ²) :		
	If terminals unmarked: line connected at: (underside/upside)		
	Tightening torques: (Nm)		
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: .....L3:		
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: .....L3:		
	power factor/time constant :		
	- factor "n"		
	- peak test current (Amax) :		
	Test sequence "O"		
	- max. let-through current: (kApeak) .....L1: .....L2: .....L3:		
	- Joule integral I ² dt (A ² s) .....L1: .....L2: .....L3:		
	- fuses shall still intact .....L1: .....L2: .....L3:		
8.3.7.2	Verification of temperature-rise		
	- the values of temperature-rise do not exceed the those specified in tab. 7.		
	Temperature rise of main circuit terminals. ≤ 80 K (K) :		
	conductor cross-sectional area (mm ²) :		
	test current Ie (A) :		
8.3.7.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V		
	- no breakdown or flashover		



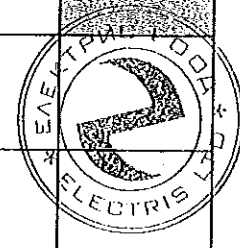
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict



	STAGE 2		
	Type designation or serial number		
	Sample no:		
	Rated current: In (A)		
	Rated operational voltage: Ue (V)		
	1.1 time the value of prospective current equal to the selectivity limit current, as declared by the manufacturer. (kA)		
	Type of integrated fuses (all details)		
	Rated control supply voltage of closing mechanism: Uc (V)		
	Rated control supply voltage of shunt release: Uc (V)		
8.3.7.4	Verification of overload releases		
	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		
	- Operation time: (s)	L1: L2: L3:	
8.3.7.5	Short-circuit at 1,1 times the take-over current		
8.3.7.1	Short-circuit at the selectivity limit current		
	Test sequences "O"		
	Fuses shall be fitted		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		
	closing mechanism energized with 85% at the rated Uc: (V)		
	The circuit-breaker is mounted complete on its own support or an equivalent support.		
	Test made in free air:		
	Distances of the metallic screen's: (all sides)		

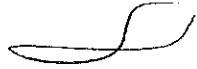


Handwritten signatures and stamps at the bottom of the page.

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	The characteristics of the metallic screen:		
	- woven wire mesh		
	- perforated metal		
	- expanded metal		
	- ratio hole area/total area: 0,45-0,65		
	- size of hole: <30mm ²		
	- finish: bare or conductive plating		
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		
	Fuse "F": copper wire: diameter 0.8 mm, 50 mm long		
	Circuit is earthed at: (load-star- or supply-star point)		
	Conductor cross-sectional area (mm ²) :		
	If terminals unmarked: line connected at: (underside/upside)		
	Tightening torques: (Nm)		
	1.1 time the value of prospective current equal to the selectivity limit current, as declared by the manufacturer. (kA)		
	- test voltage U/Ue = 1,05 (V) L1: L2: L3:		
	- r.m.s. test current AC/DC: (A) L1: L2: L3:		
	power factor/time constant :		
	- factor "n"		
	- peak test current (Amax) :		
	Test sequence "O"		
	- max. let-through current: (kApeak) L1: L2: L3:		
	- Joule integral I ² dt (A ² s) L1: L2: L3:		

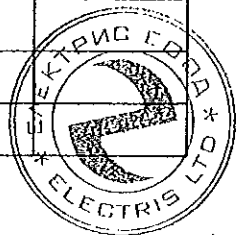


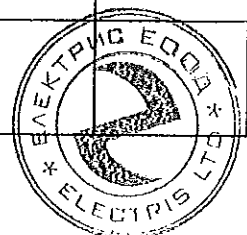


IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

	- at least two of the fuses shall have blown .....L1: .....L2: .....L3:		
8.3.7.6	Short-circuit at ultimate short-circuit breaking capacity		
	Type designation or serial number		
	Sample no:		
	Rated current: In (A)		
	Rated operational voltage: Ue (V)		
	Rated ultimate short-circuit breaking capacity. (kA)		
	Type of integrated fuses (all details)		
	Rated control supply voltage of closing mechanism: Uc (V)		
	Rated control supply voltage of shunt release: Uc (V)		
	Test sequences: O – t – CO		
	Fuses shall be fitted		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		
	closing mechanism energized with 85% at the rated Uc: (V)		
	The circuit-breaker is mounted complete on its own support or an equivalent support.		
	Test made in free air:		
	Distances of the metallic screen's: (all sides)		
	The characteristics of the metallic screen:		
	- woven wire mesh		
	- perforated metal		
	- expanded metal		
	- ratio hole area/total area: 0,45-0,65		
	- size of hole: <30mm ²		
	- finish: bare or conductive plating		



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		
	Circuit is earthed at: (load-star- or supply-star point)		
	Conductor cross-sectional area (mm ²) :		
	If terminals unmarked: line connected at: (underside/upside)		
	Tightening torques: (Nm)		
	- test voltage U/Ue = 1,05 (V) L1: L2: L3:		
	- r.m.s. test current AC/DC: (A) L1: L2: L3:		
	power factor/time constant :		
	- factor "n"		
	- peak test current (A) :		
	Test sequence "O"		
	- max. let-through current: (kA _{peak}) L1: L2: L3:		
	- Joule integral I ² dt (A ² s) L1: L2: L3:		
	Pause: t (s)		
	new fitted fuses		
	Test sequence "CO"		
	- max. let-through current: (kA _{peak}) L1: L2: L3:		
	- Joule integral I ² dt (A ² s) L1: L2: L3:		



[Handwritten signature]

[Handwritten signature]

XXXXXXXXXXXXXXXXXXXX

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
8.3.7.7	Verification of dielectric withstand		
	- equal twice time rated operational voltage with a minimum of 1000 V (new fuses fitted)		
	- no breakdown or flashover		
8.3.7.8	Verification of overload releases		
	The operation of overload releases shall be verified at 2.5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		
	- Operation time: (s) .....L1: .....L2: .....L3:		

8.3.8	Combined test sequence		N/A
	At the discretion of, or in agreement with the manufacturer, this sequence may be applied to circuit-breaker of utilization cat. B:		
	Type designation or serial number		
	Sample no:		
	Rated current: In (A)		
	Rated operational voltage: Ue (V)		
	Rated short-time withstand current: (kA/s)		
	Rated frequency: (Hz)		
8.3.8.1	Verification of overload releases		
	The operation of overload releases shall be verified twice times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		
	- Operation time: (s) .....L1: .....L2: .....L3:		



[Handwritten signature]

[Handwritten signature]

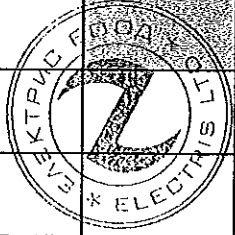
[Handwritten signature]

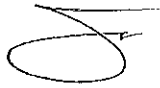
DATE: 03.07.2014

[Handwritten signature]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

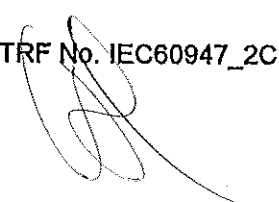


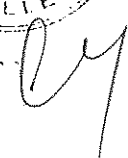
8.3.8.2	Test of rated short-time withstand current.		
	For this test, any over-current release, including the instantaneous override, if any, likely to operate during the test, shall be rendered inoperative.		
	- test frequency: (Hz)		
	- duration of the test: (s)		
	- test frequency: (Hz)		
	- power factor / time constant (ms):		
	- factor "n"		
	- test voltage: (V) .....L1: .....L2: .....L3:		
	- r.m.s. test current: (kA) .....L1: .....L2: .....L3:		
	- highest peak current: (kA)		
8.3.8.3	Test of rated service short-circuit breaking capacity		
	At the highest voltage applicable to the rated short-time current.		
	Test sequence of operation: O – t – CO – t – CO		
	Type designation or serial number		
	Sample no:		
	Rated current: In (A)		
	Rated operational voltage: Ue (V)		
	Rated service short-circuit breaking capacity: (kA)		
	Rated control supply voltage of closing mechanism: Uc (V)		
	Rated control supply voltage of shunt release: Uc (V)		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		
	closing mechanism energized with 85% at the rated Uc: (V)		
	The circuit-breaker is mounted complete on its own support or an equivalent support.		





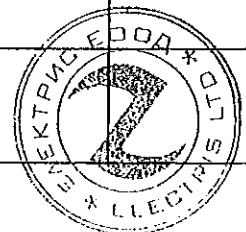
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test made in free air:		
	Distances of the metallic screen's: (all sides)		
	The characteristics of the metallic screen:		
	- woven wire mesh		
	- perforated metal		
	- expanded metal		
	- ratio hole area/total area: 0,45-0,65		
	- size of hole: <30mm ²		
	- finish: bare or conductive plating		
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		
	Circuit is earthed at: (load-star- or supply-star point)		
	Conductor cross-sectional area (mm ²) :		
	If terminals unmarked: line connected at: (underside/upside)		
	Tightening torques: (Nm)		
	Test sequence of operation: O – t – CO – t – CO		
	The highest voltage applicable to the rated short-time current.		
	- test voltage U/Us = 1,05 (V) .....L1: .....L2: .....L3:		
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: .....L3:		
	power factor/time constant :		
	- Factor "n"		
	- peak test current (A) :		



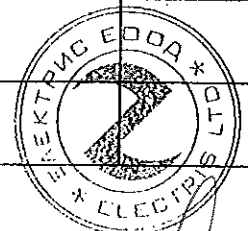
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

	Test sequence "O"		
	- max. let-through current: (kA _{peak}) .....L1: .....L2: .....L3:		
	- Joule integral I ² dt (A ² s) .....L1: .....L2: .....L3:		
	Pause, t: (min)		
	Test sequence "CO"		
	- max. let-through current: (kA _{peak}) .....L1: .....L2: .....L3:		
	- Joule integral I ² dt (A ² s) .....L1: .....L2: .....L3:		
	Pause, t: (min)		
	Test sequence "CO"		
	- max. let-through current: (kA _{peak}) .....L1: .....L2: .....L3:		
	- Joule integral I ² dt (A ² s) .....L1: .....L2: .....L3:		
	The circuit-breaker shall remain closed for the short-time corresponding to the max. available time setting of the short-time delay short-circuit release.		
	During this test the instantaneous override shall not operate		
	- and the making current release shall operate		
8.3.8.4	Operational performance capability with current.		
	Rated current: I _n (A)		
	Maximum rated operational voltage: U _e (V)		
	Conductor cross-sectional area (mm ²) :		
	Number of operating cycles per hour		
	Number (5% of the number given in column 4, tab. 8) of cycles with current (total) (closing mechanism energized at the rated U _c)		



Handwritten text or stamp at the bottom right of the page.

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Applied voltage: closing mechanism (V)		
	For circuit-breaker fitted with adjustable releases, test shall be made with the overload setting at maximum and short-circuit setting at minimum.		
	Conditions, make/break operations:		
	- test voltage $U/U_e = 1,0$ (V).....L1: .....L2: .....L3:		
	- test current $I/I_e = 1,0$ (A) .....L1: .....L2: .....L3:		
	- power factor/time constant:		
	- frequency: (Hz)		
	- on-time (ms):		
	- off-time (s):		
	Electrical components do not exceed the value indicated in tab. 7.		
8.3.8.5	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V		
	- no breakdown or flashover		
	- the leaking current for circuit-breaker suitable for isolation: ($<2\text{mA} / 1,1 U_e$)		
8.3.8.7	Verification of temperature-rise		
	- the values of temperature-rise do not exceed the those specified in tab. 7.		
	Temperature rise of main circuit terminals. ≤ 80 K (K) :		
	conductor cross-sectional area (mm ²) :		
	test current I_e (A) :		
8.3.8.7	Verification of overload releases		
	Test current: 1,45 times the value of their current setting at the reference temperature: (A)		
	Conventional tripping time: $<1\text{h}$ when $I_n < 63\text{A}$, $<2\text{h}$ when $I_n > 63\text{A}$		



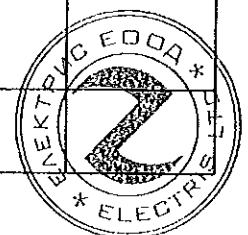
REVISION 3.0 (REVISED)
REVISION 2.0 (REVISED)

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		
	- Operation time: (s) .....L1: .....L2: .....L3:		

Annex B	Circuit-breakers incorporating residual current protection	N/A
B.3	Classification etc....	

Annex C	Individual pole short-circuit test sequence		
	Circuit-breaker for use on phase-earthed systems		
C.2	Test of individual pole short-circuit breaking capacity		
	A short-circuit test is made with a value of prospective current (I _{su}) equal to 25% of the ultimate rated short-circuit breaking capacity (I _{cu})		
	Type designation or serial number	BL1000	
	Sample no:	8	
	Rated current: I _n (A)	1000A	
	Rated operational voltage: U _e (V)	500V	
	Rated ultimate short-circuit breaking capacity: (kA)	45kA	
	Rated control supply voltage of closing mechanism: U _c (V)	N/A	
	Rated control supply voltage of shunt release: U _c (V)	N/A	
	The test sequence of operations is O – t - CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.	satisfy	
	closing mechanism energized with 85% at the rated U _c : (V)	N/A	

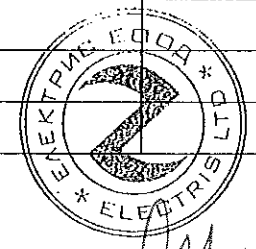


[Handwritten signature]

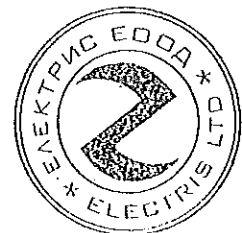
[Handwritten signature]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

	The circuit-breaker is mounted complete on its own support or an equivalent support.	satisfy	
	Test made in free air:	satisfy	
	Distances of the metallic screen's: (all sides)	Vide catalogue	
	The characteristics of the metallic screen:		
	- woven wire mesh	N/A	
	- perforated metal	N/A	
	- expanded metal	yes	
	- ratio hole area/total area: 0,45-0,65	Satisfy	
	- size of hole: <math><30\text{mm}^2</math>	satisfy	
	- finish: bare or conductive plating	satisfy	
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long	satisfy	
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	
	Conductor cross-sectional area (mm ²) :	600mm ²	
	If terminals unmarked: line connected at: (underside/upside)	N/A	
	Tightening torques: (Nm)	25Nm	
	Test sequence of operation: O – t – CC		
	Test circuit according figure: 9	satisfy	
	- test voltage $U/U_e = 1,05$ (V) L1:	525V	
	..... L2:	525V	
	..... L3:	525V	
	short-circuit test current (I _{su}): equal to 25% of the ultimate rated short-circuit breaking capacity (I _{cu})		
	- r.m.s. test current AC/DC: (A):	12kA AC	
	power factor/time constant :	0,27	
	- Factor "n"	2	
	- peak test current (A _{max}) :	24,1kA	

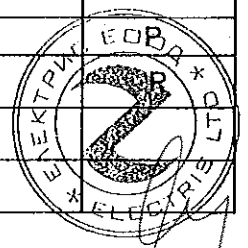


IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	- Joule integral I ² dt (A ² s) .....L1:	3,4 . 10 ⁶ A ² s	
	Pause, t: (min)	3min	
	Test sequence "CO" L1		
	- max. let-through current: (kApeak) .....L1:	23,2kA	
	- Joule integral I ² dt (A ² s) .....L1:	3,1 . 10 ⁶ A ² s	
	Test sequence "O" L2		
	- max. let-through current: (kApeak) .....L2:	24,0kA	
	- Joule integral I ² dt (A ² s) .....L2:	3,8 . 10 ⁶ A ² s	
	Pause, t: (min)	3min	
	Test sequence "CO" L2		
	- max. let-through current: (kApeak) .....L2:	23,75A	
	- Joule integral I ² dt (A ² s) .....L2:	3,6 . 10 ⁶ A ² s	
	Test sequence "O" L3		
	- max. let-through current: (kApeak) .....L3:	24,2kA	
	- Joule integral I ² dt (A ² s) .....L3:	3,6 . 10 ⁶ A ² s	
	Pause, t: (min)	3min	
	Test sequence "CO" L3		
	- max. let-through current: (kApeak) .....L3:	22,9kA	
	- Joule integral I ² dt (A ² s) .....L3:	3,0 . 10 ⁶ A ² s	
	Melting of the fusible element	no	P
	Holes in the PE-sheet for test sequence "O"	no	P
	Cracks observed	no	P
C.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V	1000V	
	- no breakdown or flashover	no	P



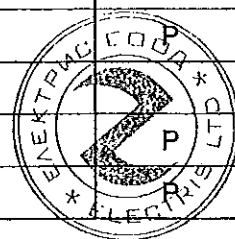
[Handwritten signatures and stamps]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
C.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2.5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:	1'22"	
	- Operation time: (s)	L1: 1'20" L2: 1'25" L3: 1'18"	P
	.....L1: 1'21" L2: 1'24" L3: 1'21"		
	.....L2: 1'23" L3: 1'19"		
Annex F	Additional tests for circuit-breakers with electronic over-current protection		
F.4.	Immunity tests		
F.4.1.	Tests regarding non-sinusoidal currents resulting from harmonics		
F.4.1.1.	Test conditions		
	Option b)		
	Desired values:		
	Third harmonic >60%		
	Fifth harmonic >14%		
	Seventh harmonic >7%		
	Actual values:		
	Third harmonic	72,49%	P
	Fifth harmonic	34,3%	P
	Seventh harmonic	8,21%	P
F.4.1.3.	Test procedure		
	Non-tripping current 0,9I _r	900A	
	Testing time	Non-tripping 2380sec.	P
	Tripping current 2 I _r	2000 A	
	Release time	3'58 "	P
	Tripping current 2x I _r	2000A	
	Release time	4'01"	
	Performance criterion A of F.2.1.2.		

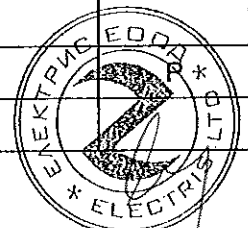


Handwritten signatures and marks at the bottom of the page.

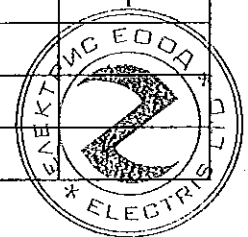
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
F.4.2.	Current dips		
	The test circuit shall be in accordance with figure F.2. IEC60947-2,		
	The current applied according to figure F.5 and to table F.1	It did not trip	P
	Performance criterion B of F. 2.1.2.		P
F.4.3. IEC61000-4-2	Electrostatic discharges		
	At level	4	
Annex J.2.2.	Test voltage	8kV	
	Non-tripping current 0,9xIr	900A	
	Test data	it did not trip	P
	Tripping current 2xIr	2000A	
	Release time	3'59"	P
	Performance criterion B of F. 2.1.2.		P
F.4.4.IEC61000-4-3	Radiated radio-frequency electromagnetic fields		
Annex J.2.3.	Non-tripping current 0,9xIr	900A	
	Test data	it did not trip	P
	Tripping current 2xIr	2000A	
	Release time	4'03"	P
	Performance criterion A of F. 2.1.2.		P
F.4.5.	Electrical fast transients/bursts (EFT/B)		
F.5.2.2.1. IEC61000-4-4	Non-tripping current 0,9xIr	900A	
	Testing time	1'	P
Annex J.2.4.	Tripping current 2xIr	2000A	
	Release time	3'95"	P
	Performance criterion A of F. 2.1.2.		P
F.4.6. IEC61000-4-5	Surges		
	Non-tripping current 0,9xIr	900A	
Annex J.2.5.	Total number of pulses	20	
	Tripping current 2xIr	2000A	
	Release time	4'01"	
	Performance criterion B of F. 2.1.2.		



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
F.4.7. Annex J.2.6.	Conducted disturbances induced by radio-frequency fields (common mode)		
	Non-tripping current 0,9xIr	900A	
	Test data	it did not trip	P
	Tripping current 2 xIr	2000A	
	Release time	4'03"	P
	Performance criterion A of F. 2.1.2		P
F.5.4. Annex J.3.3.	Radiated RF disturbances (30MHz -1GHz)		
Figure F.3.	Meet the condions for classes "B"		P
F.6.	Suitability for multiple frequencies		N/A
F.6.	Suitability for multiple frequencies		
F.7.	Dry heat test		
	Ambient temperature	+40°C	
	Testing time	168h	
	Test data	it did not trip	P
F.7.3.	Verificatin of overload releases:		
7.2.1.2.4.b)	Instantaneous release:		
	setting release	12kA	
	Tripping current	12,05kA	P
	Inverse time-delay releases :		
	Ambient temperature	+30°C	
	Non-tripping current 1,05xIr	1050A	
	Testing time	>2h	P
	Tripping current 1,3xIr	1300A	
	Release time	34'25"	P
	Ambient temperature	+50°C	
	Non-tripping current 1,05xIr	1050A	
	Testing time	>2h	P
	Tripping current 1,3xIr	1300A	
	Release time	34'47"	



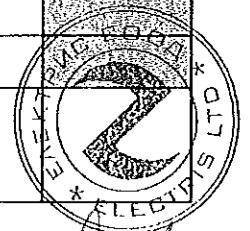
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
F .8.	Damp heat test		
IEC 60068-2-30	The upper temperature	+55°C	
	The number of cycles	6	
F.8.2.	Verification of overload releases		
7.2.1.2.4.b)	Instantaneous release:		
	setting release 8xIr	8000A	
	Tripping current	7990A	P
	setting release 4xIr	4000A	
	Tripping current	3990A	P
	Inverse time-delay releases :		
	Ambient temperature	+30°C	
	Non-tripping current 1,05xIr	1050A	
	Testing time	>2h	P
	Tripping current 1,3xIr	1300A	
	Release time	36'05"	P
	Ambient temperature	+50°C	
	Non-tripping current 1,05xIr	1050A	
	Testing time	>2h	P
	Tripping current 1,3xIr	1300A	
	Release time	36'52"	P
F .9.	Temperature variation cycles at a specified		
IEC60068-2-14	Number of operating	28	
	Test data	it did not trip	P
F.8.2.	Verification of overload releases:		
7.2.1.2.4.b)	Instantaneous release:		
	setting release 8xIr	8000A	
	Tripping current	7970A	P
	setting release 4xIr	4000A	
	Tripping current	3970A	P
	Inverse time-delay releases :		
	Ambient temperature	+30°C	
	Non-tripping current 1,05xIr	1050A	



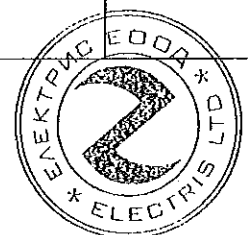
[Handwritten signatures]

[Faint stamp or text at the bottom right]

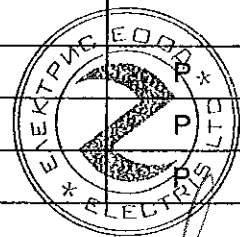
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Testing time	>2h	P
	Tripping current 1,3xIr	1300A	
	Release time	36'25"	P
	Ambient temperature	+50°C	
	Non-tripping current 1,05xIr	1050A	
	Testing time	>2h	P
	Tripping current 1,3xIr	1300A	
	Release time	36'14"	P
Annex G	Power loss		
	Phase L1	99W	
	L2	95W	
	L3	94W	
Annex H	Individual pole short-circuit test sequence		
	Circuit-breaker for use in IT systems		
H.2	Test of individual pole short-circuit breaking capacity		
	A short-circuit test is made on the individual poles of a multipole circuit-breaker at a value of prospective current (I_{pr}) equal to 1,2 times the max. setting of the short-time delay release tripping current or, in the absence of such a release, 1,2 time the max. setting of the tripping current of the instantaneous release, or, where relevant 1,2 times the max. setting of the definite time delay release tripping current, but not exceeding 50kA.		
	Type designation or serial number	BL1000	
	Sample no:	9	
	Rated current: In (A)	1000A	
	Rated operational voltage: Ue (V)	690V	
	Rated ultimate short-circuit breaking capacity: (kA)	20kA	
	Rated control supply voltage of closing mechanism: Uc (V)	N/A	
	Rated control supply voltage of shunt release: Uc (V)	N/A	
	The test sequence of operations is O – t - CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.	satisfy	



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	closing mechanism energized with 85% at the rated Uc: (V)	N/A	
	The circuit-breaker is mounted complete on its own support or an equivalent support.	Satisfy	
	Test made in free air:	satisfy	
	Distances of the metallic screen's: (all sides)	Vide catalogue	
	The characteristics of the metallic screen:		
	- woven wire mesh	N/A	
	- perforated metal	N/A	
	- expanded metal	yes	
	- ratio hole area/total area: 0,45-0,65	Satisfy	
	- size of hole: <30mm ²	satisfy	
	- finish: bare or conductive plating	satisfy	
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long	satisfy	
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	
	Conductor cross-sectional area (mm ²):	600mm ²	
	If terminals unmarked: line connected at: (underside/upside)	N/A	
	Tightening torques: (Nm)	25Nm	
	Test sequence of operation: O – t – CO		
	Test circuit according figure: 9	satisfy	
	- test voltage U/Ue = 1,05 (V) L1:	725V	
	..... L2:	725V	
	..... L3:	725V	
	Short-circuit test current (I _{IT}): equal to 1,2 times the max. setting of the short-time delay release tripping current,	N/A	
	or, in the absence of such a release, 1,2 time the max. setting of the tripping current of the instantaneous release,	satisfy	



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	or, where relevant 1,2 times the max. setting of the definite time delay release tripping current, but not exceeding 50kA.	N/A	
	- r.m.s. test current AC/DC: (A)	16800A AC	
	power factor/time constant :	0,27	
	- Factor "n"	2,0	
	- peak test current (Amax) :	33,6 kA	
	Test sequence "O" L1		
	- max. let-through current: (kApeak) .....L1:	35,0kA	
	- Joule integral I ² dt (A ² s) .....L1:	20,2 . 10 ⁶ A ² s	
	Pause, t: (min)	3min	
	Test sequence "CO" L1		
	- max. let-through current: (kApeak) .....L1:	32,1kA	
	- Joule integral I ² dt (A ² s) .....L1:	22,4 . 10 ⁶ A ² s	
	Test sequence "O" L2		
	- max. let-through current: (kApeak) .....L2:	31,4kA	
	- Joule integral I ² dt (A ² s) .....L2:	19,9 . 10 ⁶ A ² s	
	Pause, t: (min)	3min	
	Test sequence "CO" L2		
	- max. let-through current: (kApeak) .....L2:	33,3kA	
	- Joule integral I ² dt (A ² s) .....L2:	23,4 . 10 ⁶ A ² s	
	Test sequence "O" L3		
	- max. let-through current: (kApeak) .....L3:	32,8kA	
	- Joule integral I ² dt (A ² s) .....L3:	24,1 . 10 ⁶ A ² s	
	Pause, t: (min)	3min	
	Test sequence "CO" L3		
	- max. let-through current: (kApeak) .....L3:	33,7kA	
	- Joule integral I ² dt (A ² s) .....L3:	23,8 . 10 ⁶ A ² s	
	Melting of the fusible element	no	
	Holes in the PE-sheet for test sequence "O"	no	
	Cracks observed	no	




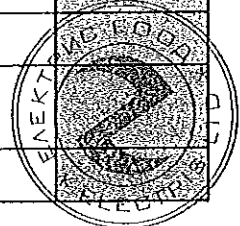
[Handwritten signature]

[Handwritten signature]

[Handwritten signature]

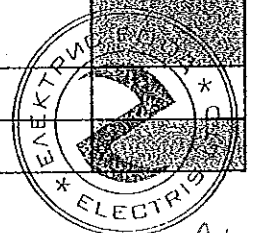
[Handwritten signature]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
H.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V	1380V	
	- no breakdown or flashover	no	P
H.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2.5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:	1'22"	
	- Operation time: (s)	L1: 1'19" 1'21" 1'22" L2: 1'22" 1'21" 1'20" L3: 1'21" 1'22" 1'19"	P
H.5	Marking		
	Circuit-breaker for which all values of rated voltage have not been tested according to this annex or are not covered by such testing, shall be identified by the symbol  which shall be marked on the circuit-breaker immediately following these values of rated voltage	satisfy	P
Annex M	Modular residual current devices (without integral current breaking device)		N/A
M.8.3	Operating characteristics		
	Type designation or serial number		
	Sample no:		
	Rated current: In (A)		
	Rated operational voltage: Ue (V)		
	Rated frequency (Hz)		
	Terminal type or through conductor type		
	MRCD with sensing means and processing device combined or separate	Combined/separate	
	MRCD with voltage source		
	Operating automatically in case of failure of the voltage source.	Yes/no	
	Rated insulation voltage (Ui)		



[Handwritten signatures]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Rated impulse withstand voltage (U_{imp})		
	Characteristics of the voltage source of MRCDs		
	Rated values of the voltage source of MRCDs (U_s)		
	Rated values of the frequencies of the voltage source of MRCDs		
	Rated insulation voltage (U_i)		
	Rated impulse withstand voltage (U_{imp})		
M.4.1.3	Characteristics of auxiliary contacts		
M.4.2	Characteristics of MRCDs concerning their residual current function		
M.4.2.2	Operating characteristic in case of residual current with d.c. component		
	Type AC MRCD		
	Type A MRCD		
	Type B MRCD		
M.4.3	Behaviour under short-circuit conditions		
	Rated conditional short-circuit current (I_{cc})		
	Rated conditional residual short-circuit current ($I_{\Delta c}$)		
	Rated short-time withstand current (I_{cw})		
	Rated residual short-time withstand current ($I_{\Delta w}$)		
	Peak withstand current		
M.4.4	Preferred and limiting values		
	Preferred values of the rated residual operating current ($I_{\Delta n}$)		
	Minimum value of the rated residual non-operating current ($I_{\Delta no}$)		
	Limiting value of the non-operating overcurrent in the case of a single-phase load in a multiphase circuit		
	Preferred values of rated voltage of the voltage source of MRCDs		
	Compliance with constructional requirements		
MI	Test sequence MI		



[Handwritten signature]

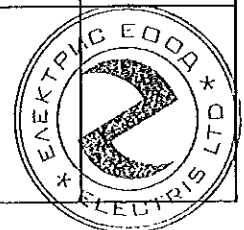
[Handwritten signature]

[Handwritten signature]

DATE: 06/07/2004

[Handwritten signature]

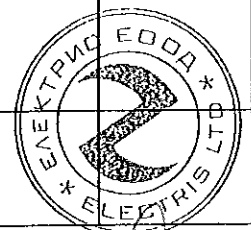
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
M.8.3.4.2	Verification of operating in case of steady increase of the residual current (figure M.1)		
	Increase the residual current from 0,2 I _{Δn} to I _{Δn} in 30 sec. Required: value between 0,2 I _{Δn} and I _{Δn}		
	Min. setting I _{Δn} .(mA): Interm. setting I _{Δn} .(mA): Max. setting I _{Δn} .(mA):		
M.8.3.4.3	Verification of operating in case of closing on residual current (figure M.2)		
	The MRCD is closes on I _{Δn} or each specified setting Required : no value exceeds the specified limiting value of Table B1 (300 ms) or Table B2 (500 ms) and a non actuating time of 60 ms		
	Min. setting I _{Δn} .(ms): Interm. setting I _{Δn} .(ms): Max. setting I _{Δn} .(ms):		
M.8.3.4.4	Verification of operating in case of a sudden appearance of the residual current (figure M.2 and M3)		
	A residual current is sudden appear on the MRCD of I _{Δn} Required : no value exceeds the specified limiting value of Table B1: 300 ms) or Table B2 (500 ms) and a non actuating time of 60 ms		
	Min. setting I _{Δn} .(ms): Interm. setting I _{Δn} .(ms): Max. setting I _{Δn} .(ms):		
	A residual current is sudden appear on the MRCD of 2 I _{Δn} Required : no value exceeds the specified limiting value of Table B1: 150 ms) or Table B2 (200 ms) and a non actuating time of 60 ms		
	Min. setting I _{Δn} .(ms): Interm. setting I _{Δn} .(ms): Max. setting I _{Δn} .(ms):		
	A residual current is sudden appear on the MRCD of <input type="checkbox"/> 5 I _{Δn} or <input type="checkbox"/> 0,25 A Required : no value exceeds the specified limiting value of Table B1: 40ms) or Table B2 (150 ms) and a non actuating time of 60 ms		



[Handwritten signature]

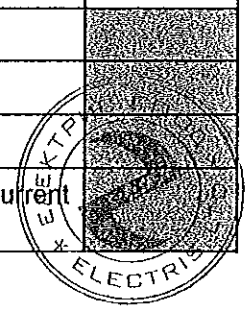
[Handwritten signature]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	<p>Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):</p>		
	<p>A residual current is sudden appear on the MRCD of <input type="checkbox"/>10 IΔn or <input type="checkbox"/> 0,5 A</p> <p>Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms</p>		
	<p>Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):</p>		
	<p>A residual current is sudden appear on the MRCD of IΔn: 5 A</p> <p>Required : no value exceeds the specified limiting value of Table B1 (40 ms)</p>		
	<p>Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):</p>		
	<p>A residual current is sudden appear on the MRCD of IΔn: 10 A</p> <p>Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms</p>		
	<p>Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):</p>		
	<p>A residual current is sudden appear on the MRCD of IΔn: 20 A</p> <p>Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms</p>		
	<p>Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):</p>		
	<p>A residual current is sudden appear on the MRCD of IΔn: 50 A</p> <p>Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms</p>		
	<p>Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):</p>		



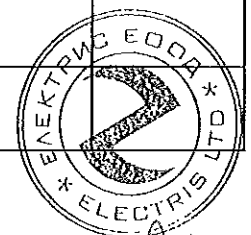
Handwritten signatures and marks at the bottom of the page, including a large signature on the left and several smaller ones on the right.

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	A residual current is sudden appear on the MRCD of IΔn: 100 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		
	A residual current is sudden appear on the MRCD of IΔn: 200 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		
	A residual current is sudden appear on the MRCD of IΔn: 500 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		
M.8.3.4.5	Verification of the limiting non-operating time of time delayed type MRCDs (figure M3)		
	A residual current is sudden appear on the MRCD of 2 IΔn for a time declared by the manufacturer Required : The MRCD shall not operated		
	Min. setting IΔn. Min. setting time delay (ms): Min. setting IΔn. Max. setting time delay (ms):		
M.8.3.5	Tests at the temperature limits		
M.8.3.5.1	General (clause B.8.2.5 applies)		
	Minimum temperature (°C)		
	Maximum temperature (°C)		
M.8.3.5.2	Verification of operating in case of a sudden appearance of the residual current at -5°C or minimum temperature limit (figure M.2 and M3)		



[Handwritten signatures and text]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	A residual current is sudden appear on the MRCD of $I_{\Delta n}$ Required : no value exceeds the specified limiting value of Table B1: 300 ms) or Table B2 (500 ms) and a non actuating time of 60 ms		
	Min. setting $I_{\Delta n}$.(ms): Interm. setting $I_{\Delta n}$.(ms): Max. setting $I_{\Delta n}$.(ms):		
	A residual current is sudden appear on the MRCD of $2 I_{\Delta n}$ Required : no value exceeds the specified limiting value of Table B1: 150 ms) or Table B2 (200 ms) and a non actuating time of 60 ms		
	Min. setting $I_{\Delta n}$.(ms): Interm. setting $I_{\Delta n}$.(ms): Max. setting $I_{\Delta n}$.(ms):		
	A residual current is sudden appear on the MRCD of <input type="checkbox"/> $5 I_{\Delta n}$ or <input type="checkbox"/> 0,25 A Required : no value exceeds the specified limiting value of Table B1: 40ms) or Table B2 (150 ms) and a non actuating time of 60 ms		
	Min. setting $I_{\Delta n}$.(ms): Interm. setting $I_{\Delta n}$.(ms): Max. setting $I_{\Delta n}$.(ms):		
	A residual current is sudden appear on the MRCD of <input type="checkbox"/> $10 I_{\Delta n}$ or <input type="checkbox"/> 0,5 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		
	Min. setting $I_{\Delta n}$.(ms): Interm. setting $I_{\Delta n}$.(ms): Max. setting $I_{\Delta n}$.(ms):		
	Verification of the limiting non-operating time of time delayed type MRCDs at – 5°C or minimum temperature limit (figure M3)		
	A residual current is sudden appear on the MRCD of $2 I_{\Delta n}$ for a time declared by the manufacturer Required : The MRCD shall not operated		
	Min. setting $I_{\Delta n}$. Min. setting time delay (ms): Min. setting $I_{\Delta n}$. Max. setting time delay (ms):		



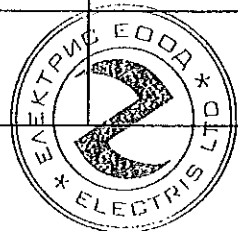
[Handwritten signature]

[Handwritten signature]

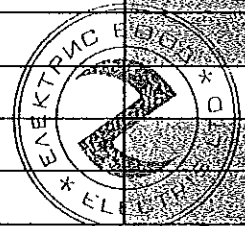
[Handwritten signature]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

M.8.3.5.3	Verification of operating in case of a sudden appearance of the residual current at +40°C (figure M.2 and M3)		
	Load :	_____ A	
	Torque :	_____ Nm	
	Connection :	_____ mm ²	
	A residual current is sudden appear on the MRCD of IΔn Required : no value exceeds the specified limiting value of Table B1: 300 ms) or Table B2 (500 ms) and a non actuating time of 60 ms		
	Min. setting IΔn.(ms): Intern. setting IΔn.(ms): Max. setting IΔn.(ms):		
	A residual current is sudden appear on the MRCD of 2 IΔn Required : no value exceeds the specified limiting value of Table B1: 150 ms) or Table B2 (200 ms) and a non actuating time of 60 ms		
	Min. setting IΔn.(ms): Intern. setting IΔn.(ms): Max. setting IΔn.(ms):		
	A residual current is sudden appear on the MRCD of <input type="checkbox"/> 5 IΔn or <input type="checkbox"/> 0,25 A Required : no value exceeds the specified limiting value of Table B1: 40ms) or Table B2 (150 ms) and a non actuating time of 60 ms		
	Min. setting IΔn.(ms): Intern. setting IΔn.(ms): Max. setting IΔn.(ms):		
	A residual current is sudden appear on the MRCD of <input type="checkbox"/> 10 IΔn or <input type="checkbox"/> 0,5 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		
	Min. setting IΔn.(ms): Intern. setting IΔn.(ms): Max. setting IΔn.(ms):		



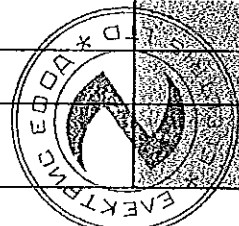
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	A residual current is sudden appear on the MRCD of 2 IΔn for a time declared by the manufacturer Required : The MRCD shall not operated		
	Min. setting IΔn. Min. setting time delay (ms): Min. setting IΔn. Max. setting time delay (ms):		
M.8.4.	Verification of dielectric properties		
M.8.4.1	Verification of rated impuls withstand voltage		
	rated impulse withstand voltage		
	test impulse voltage (see table 12 part 1)		
	test impulse voltage for isolating (see table 14 part 1)		
M.8.4.1.2	Verification of rated impulse withstand voltage with respect to the monitored circuit		
M.8.4.1.2.1	Test for terminal type MRCD		
M.8.4.1.2.2	Tests for MRCDs of through-conductor type		
M.8.4.1.3	Verification of rated impulse withstand of the voltage source circuit (if applicable)		
M.8.5	Verification of the operation of the test device at the limits of the rated voltage		
	For MRCDs having an adjustable time-delay the test is made at the maximum setting of time-delay:	_____ s	
M.8.5.a	Setting IΔn or minimum setting of IΔn	_____ A	
	Test voltage (1,1 x Ue max)	_____ V	
	Number of operations	25	
	Interval time	5 s	
	Tripping	<input type="checkbox"/> Yes / <input type="checkbox"/> No	
M.8.5.b	Setting IΔn or minimum setting of IΔn	_____ A	
	Test voltage 0,85 x Ue max)	_____ V	
	Number of operations	3	
	Interval time	5 s	
	Tripping	<input type="checkbox"/> Yes / <input type="checkbox"/> No	
M.8.5.c	Setting IΔn or minimum setting of IΔn	_____ A	
	Test voltage (1,1 x Ue max)	_____ V	



Handwritten signatures and stamps at the bottom of the page.

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

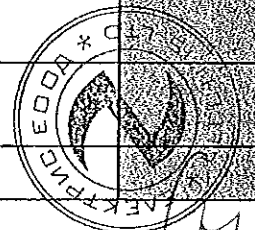
	Number of operations	1	
	Operating means of the test device held in close position	5 s	
	Tripping	<input type="checkbox"/> Yes / <input type="checkbox"/> No	
M.8.6	Verification of the limiting value of non-operating current under overcurrent conditions , in case of a single phase load.		
M.8.6	Circuit diagram	Fig. M4 _____	
	Setting I Δ n or minimum setting of I Δ n if adjustable	_____ A	
	Test current equal to the lower value of: <input type="checkbox"/> 6 x I Δ n or <input type="checkbox"/> 80 % of the maximum short-circuit release current setting	_____ A	
	Test voltage: <input type="checkbox"/> rated voltage or <input type="checkbox"/> any convenient voltage	_____ V	
	Test frequency	_____ Hz	
	Power factor (0,5)	_____	
	Current flow time	2 s	
	Interval time	60 s	
	Calibration plot number	_____	
	No tripping / change of state		
M.8.7	Resistance against unwanted tripping due to surge currents resulting from impulse voltages		
M.8.7.2	Verification of the resistance to unwanted tripping in case of loading of the network capacitance		
B.8.6.1	Current surge test for RMCDs (0,5 μ s / 100kHz ring wave test)		
	One pole of the MRCD is submitted to 10 applications of a surge current according to the following requirements:		
	- peak value: 200 A + 10/0%		
	- virtual front time: 0,5 μ s \pm 30%		
	- period of the following oscillatory wave: 10 μ s \pm 20%		



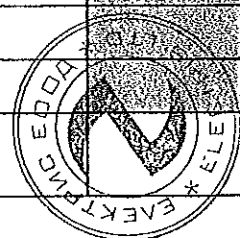
[Handwritten signatures and initials]

[Handwritten text or stamp]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	- each successive peak: about 60% of the preceding peak		
	The polarity shall be inverted after every two applications		
	The interval between two consecutive applications shall be about 30 s		
	During the test the MRCD shall not trip:	-	
M.8.7.3	Verification of the resistance to unwanted tripping in case of flashover without follow-on current.		
B.8.6.2	Verification of behaviour at surge current up to 250 A (8/20 µs surge current test)		
	One pole of the MRCD is submitted to 10 applications of a surge current according to the following requirements:		
	- peak value: 250 A + 10/0%		
	- virtual front time: 8 µs ± 20%		
	- virtual time to half value: 20 µs ± 20%		
	- peak of reverse current:: less than 30% of peak value		
	The polarity shall be inverted after every two applications		
	The interval between two consecutive applications shall be about 30 s		
	During the test the MRCD shall not trip:		
M.8.8	Verification of the behaviour in case of an earth fault current comprising a d.c. component.		
M.8.8.2	Type A MRCD		
	For MRCDs the operation of which depends on a voltage source the test are made at 1,1 and 0,85 times the rated voltage of the voltage source (Us).		
M.8.8.2.2	Verification of operation in case of a continuous rise of a residual pulsating direct current		
	Rated voltage	_____ V	
B.8.7.2.1	- steady increase from zero to: 1,4 IΔn for IΔn > 0,01 A with 1,4 IΔn/30 A/s (mA)	_____ mA	
	- steady increase from zero to: 2 IΔn for IΔn < 0,01 A with 2 IΔn/30 A/s (mA)	_____ mA	
	- angle = 0 (+/-) :		



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	- angle = 90 (+/-) :		
	- angle = 135 (+/-) :		
	No value exceeds the relevant specified limiting values		
M.8.8.2.3	Verification of operation in case of a suddenly appearing residual pulsating direct current		
B.8.7.2.2	Verification of the correct operation in case of suddenly appearing residual pulsating direct currents by closing S2 (angle = 0°)		
	Rated voltage	_____ V	
	RCCB's with $I_{\Delta n} > 0,015$ A:		
	- maximum break time (ms) at: 1,4 $I_{\Delta n}$ (+/-) :		
	- maximum break time (ms) at: 2,8 $I_{\Delta n}$ (+/-) :		
	- maximum break time (ms) at: 7 $I_{\Delta n}$ (+/-) :		
	- maximum break time (ms) at: 14 $I_{\Delta n}$ (+/-) :		
	No value exceeds the relevant specified limiting value		
	RCCB's with $I_{\Delta n} = 0,015$ A:		
	- maximum break time (ms) at: 2 $I_{\Delta n}$ (+/-) :		
	- maximum break time (ms) at: 4 $I_{\Delta n}$ (+/-) :		
	- maximum break time (ms) at: 10 $I_{\Delta n}$ (+/-) :		
	- maximum break time (ms) at: 20 $I_{\Delta n}$ (+/-) :		
	No value exceeds the relevant specified limiting value		
M.8.8.2.4	Verification of operation with load at reference temperature		
	Rated voltage	_____ V	
B.8.7.2.1	- steady increase from zero to: 1,4 $I_{\Delta n}$ for $I_{\Delta n} > 0,015$ A with 1,4 $I_{\Delta n}/30$ A/s (mA)	_____ mA	
	- steady increase from zero to: 2 $I_{\Delta n}$ for $I_{\Delta n} < 0,015$ A with 2 $I_{\Delta n}/30$ A/s (mA)	_____ mA	
	- angle = 0 (+/-) :		
	- angle = 90 (+/-) :		
	- angle = 135 (+/-) :		
	No value exceeds the relevant specified limiting values		



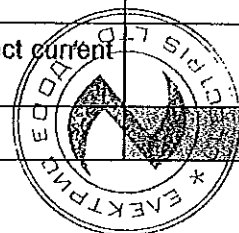
[Handwritten signatures and markings]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

M.8.8.2.5	Verification of operation of a residual pulsating direct current superimposed by a smooth direct current of 6 mA.		
	Rated voltage	_____ V	
B.8.7.2.1	- steady increase from zero to: 1,4 IΔn for IΔn > 0,015 A with 1,4 IΔn/30 A/s (mA) + 6 mA	_____ mA	
	-steady increase from zero to: 2 IΔn for IΔn < 0,015 A with 2 IΔn/30 A/s (mA) + 6 mA	_____ mA	
	- angle = 0 (+/-) :		
	No value exceeds the relevant specified limiting values		
M.8.8.3	Type B MRCD		
M.8.8.3.2	Verification of operation in case of a slowly rising residual smooth direct current		
	Rated voltage (1,1*Un)	_____ V	
B.8.7.2.1	- steady increase from zero to: 2 IΔn A with 1,4 IΔn/30 A/s (mA)	_____ mA	
	- angle = 90 (+/-) :		
	Operation shall occur between 0,5 and 2IΔn		
	Rated voltage (0,85*Un)	_____ V	
B.8.7.2.1	- steady increase from zero to: 2 IΔn A with 1,4 IΔn/30 A/s (mA)		
	- angle = 90 (+/-) :		
	Operation shall occur between 0,5 and 2IΔn		
M.8.8.3.3	Verification of operation in case of a suddenly appearing residual smooth direct current		
B.8.7.2.2	Verification of the correct operation in case of suddenly appearing a smooth residual direct currents by closing S2		
	Rated voltage (1,1*Un)	_____ V	
	RCCB's with IΔn > 0,015 A:		
	- maximum break time (ms) at: 2 IΔn (+/-) :		
	- maximum break time (ms) at: 4 IΔn (+/-) :		
	- maximum break time (ms) at: 10 IΔn (+/-) :		
	- maximum break time (ms) at: 20 IΔn (+/-) :		
	No value exceeds the relevant specified limiting value		

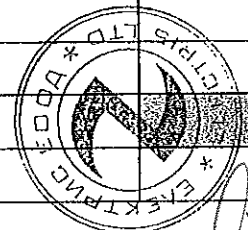


IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
B.8.7.2.2	Verification of the correct operation in case of suddenly appearing a smooth residual direct currents by closing S2		
	Rated voltage (0,85*Un)	_____ V	
	RCCB's with IΔn > 0,015 A:		
	- maximum break time (ms) at: 2 IΔn (+/-) :		
	- maximum break time (ms) at: 4 IΔn (+/-) :		
	- maximum break time (ms) at: 10 IΔn (+/-) :		
	- maximum break time (ms) at: 20 IΔn (+/-) :		
	No value exceeds the relevant specified limiting value		
M.8.8.3.4	Verification of operation in case of a slowly rising residual current resulting from a fault in a circuit fed by a three-pulse star or a six-pulse connection.		
	Rated voltage (1,1*Un)	_____ V	
B.8.7.2.1	- steady increase from zero to: 2 IΔn A with 1,4 IΔn/30 A/s (mA)	_____ mA	
	- angle = 90 (+/-) :		
	Operation shall occur between 0,5 and 2IΔn		
	Rated voltage (0,85*Un)	_____ V	
B.8.7.2.1	- steady increase from zero to: 2 IΔn A with 1,4 IΔn/30 A/s (mA)	_____ mA	
	- angle = 90 (+/-) :		
	Operation shall occur between 0,5 and 2IΔn		
M.8.8.3.5.	Verification of operation in case of a slowly rising residual current resulting from a fault in a circuit fed by two-pulse bridge connection line-to-line.		
	Rated voltage (Un)	_____ V	
B.8.7.2.1	- steady increase from zero to: 2 IΔn A with 1,4 IΔn/30 A/s (mA)	_____ mA	
	- angle = 0 (+/-) :		
	Operation shall occur between 0,5 and 1,4IΔn		
M.8.8.3.6	Verification of operation with load at the reference temperature		
M.8.8.3.6- M.8.8.3.2	Verification of operation in case of a slowly rising residual smooth direct current		
	Rated voltage (1,1*Un)	_____ V	



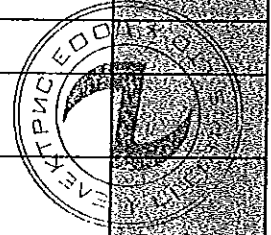
[Handwritten signatures and initials]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
B.8.7.2.1	- steady increase from zero to: 2 IΔn A with 1,4 IΔn/30 A/s (mA)	_____ mA	
	- angle = 90 (+/-) :		
	Operation shall occur between 0,5 and 2IΔn		
	Rated voltage (0,85*Un)	_____ V	
B.8.7.2.1	- steady increase from zero to: 2 IΔn A with 1,4 IΔn/30 A/s (mA)	_____ mA	
	- angle = 90 (+/-) :		
	Operation shall occur between 0,5 and 2IΔn		
M.8.8.3.6- M.8.8.3.4	Verification of operation in case of a slowly rising residual current resulting from a fault in a circuit fed by a three-pulse star or a six-pulse connection		
	Rated voltage (1,1*Un)	_____ V	
B.8.7.2.1	- steady increase from zero to: 2 IΔn A with 1,4 IΔn/30 A/s (mA)	_____ mA	
	- angle = 90 (+/-) :		
	Operation shall occur between 0,5 and 2IΔn		
	Rated voltage (0,85*Un)	_____ V	
B.8.7.2.1	- steady increase from zero to: 2 IΔn A with 1,4 IΔn/30 A/s (mA)	_____ mA	
	- angle = 90 (+/-) :		
	Operation shall occur between 0,5 and 2IΔn		
M.8.8.3.6- M.8.8.3.5.	Verification of operation in case of a slowly rising residual current resulting from a fault in a circuit fed by two-pulse bridge connection line-to-line.		
	Rated voltage (Un)	_____ V	
B.8.7.2.1	- steady increase from zero to: 2 IΔn A with 1,4 IΔn/30 A/s (mA)	_____ mA	
	- angle = 0 (+/-) :		
	Operation shall occur between 0,5 and 1,4IΔn		
M.8.9.	Verification of the behaviour of MRCDs with separate sensing means in case of a failure of the sensing means connection		
M.8.9.2	Test method 1		
	Rated voltage of the sensing means		
	Interval time Required <5 sec		



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

M.8.9.3	Test method 2		
	Test shall be carried out as follows: - The test device is activated - The sensing means are disconnected and the test device is activated. The MRCD shall not operate		
	Rated voltage of the sensing means		
	Test device activated MRCD shall operate		
	Rated voltage of the sensing means		
	Sensing device disconnected and Test device activated MRCD shall not operate		
M.8.10	Verification of temperature-rise of terminal type MRCDs		
M.8.10.2	T _{ambient} : _____ °C		
8.3.2.5	Main circuits		
	Conventional thermal current I _{th}	_____ A	
	Conventional thermal current for enclosure I _{the}	_____ A	
	Conventional thermal current for the neutral pole	_____ A	
	Cabling characteristics		
	Cable	_____ mm ²	
	Bar / number / length	_____ mm / ___ / ___ m	
	Arrangement	<input type="checkbox"/> 3 phase - <input type="checkbox"/> poles on serie	
	Tightening torque	_____ Nm	
	Neutral pole (if applicable)		
	Cable	_____ mm ²	
	Bar / number / length	_____ mm / ___ / ___ m	
	Tightening torque	_____ Nm	
	Terminals(see table 2)		
	Manual operating means		
	Parts which need not be touched but not hand held		
	Parts which need not be touched during normal operation		

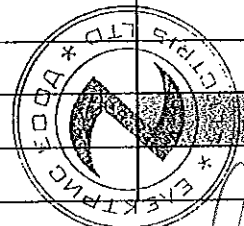


90

SP

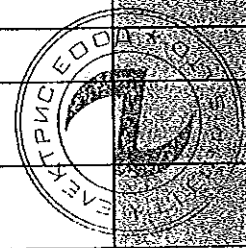
600332-04/01

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
B.8.7.2.1	- steady increase from zero to: 2 IΔn A with 1,4 IΔn/30 A/s (mA)	_____ mA	
	- angle = 90 (+/-)	:	
	Operation shall occur between 0,5 and 2IΔn		
	Rated voltage (0,85*Un)	_____ V	
B.8.7.2.1	- steady increase from zero to: 2 IΔn A with 1,4 IΔn/30 A/s (mA)	_____ mA	
	- angle = 90 (+/-)	:	
	Operation shall occur between 0,5 and 2IΔn		
M.8.8.3.6- M.8.8.3.4	Verification of operation in case of a slowly rising residual current resulting from a fault in a circuit fed by a three-pulse star or a six-pulse connection		
	Rated voltage (1,1*Un)	_____ V	
B.8.7.2.1	- steady increase from zero to: 2 IΔn A with 1,4 IΔn/30 A/s (mA)	_____ mA	
	- angle = 90 (+/-)	:	
	Operation shall occur between 0,5 and 2IΔn		
	Rated voltage (0,85*Un)	_____ V	
B.8.7.2.1	- steady increase from zero to: 2 IΔn A with 1,4 IΔn/30 A/s (mA)	_____ mA	
	- angle = 90 (+/-)	:	
	Operation shall occur between 0,5 and 2IΔn		
M.8.8.3.6- M.8.8.3.5.	Verification of operation in case of a slowly rising residual current resulting from a fault in a circuit fed by two-pulse bridge connection line-to-line.		
	Rated voltage (Un)	_____ V	
B.8.7.2.1	- steady increase from zero to: 2 IΔn A with 1,4 IΔn/30 A/s (mA)	_____ mA	
	- angle = 0 (+/-)	:	
	Operation shall occur between 0,5 and 1,4IΔn		
M.8.9.	Verification of the behaviour of MRCDs with separate sensing means in case of a failure of the sensing means connection		
M.8.9.2	Test method 1		
	Rated voltage of the sensing means		
	Interval time Required <5 sec		



Handwritten signatures and initials are present at the bottom of the page, including a large signature on the left and several smaller ones on the right, some overlapping the ENEC stamp.

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
M.8.9.3	Test method 2		
	Test shall be carried out as follows: - The test device is activated - The sensing means are disconnected and the test device is activated. The MRCD shall not operate		
	Rated voltage of the sensing means		
	Test device activated MRCD shall operate		
	Rated voltage of the sensing means		
	Sensing device disconnected and Test device activated MRCD shall not operate		
M.8.10	Verification of temperature-rise of terminal type MRCDs		
M.8.10.2	Tambient: _____ °C		
8.3.2.5	Main circuits		
	Conventional thermal current I_{th}	_____ A	
	Conventional thermal current for enclosure I_{the}	_____ A	
	Conventional thermal current for the neutral pole	_____ A	
	Cabling characteristics		
	Cable	_____ mm ²	
	Bar / number / length	_____ mm / ___ / ___ m	
	Arrangement	<input type="checkbox"/> 3 phase - <input type="checkbox"/> poles on serie	
	Tightening torque	_____ Nm	
	Neutral pole (if applicable)		
	Cable	_____ mm ²	
	Bar / number / length	_____ mm / ___ / ___ m	
	Tightening torque	_____ Nm	
	Terminals(see table 2)		
	Manual operating means		
	Parts which need not be touched but not hand held		
	Parts which need not be touched during normal operation		

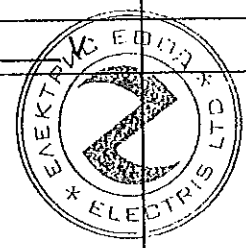


[Handwritten signature]

[Handwritten signature]

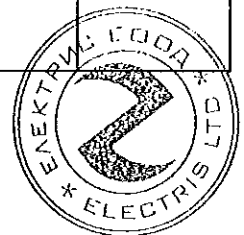
600332-04/01

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
M.8.11	Verification of mechanical and electrical endurance		
	500 off-load operations controlled by the test device		
	Rated voltage:	___ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Result:	after___ operations,	
	500 off load operations by passing the rated residual operating current I _{Δn} through one current path		
	Rated voltage:	___ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Rated residual current	___ mA	
	Result:	after___ operations,	
	500 on-load operations controlled by the test device		
	Rated voltage:	___ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Test current	___ A	
	Power factor	___	
	Test circuit		
	Result:	after___ operations,	
	500 on-load operations by passing the rated residual operating current I _{Δn} through one current path.		
	Rated voltage:	___ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Test current	___ A	
	Power factor	___	
	Test circuit		
	Rated residual current	___ mA	
	Result:	after___ operations,	
	Show no damage		
	High voltage test: twice rated voltage	Test voltage: _____	
	A residual current is sudden appear on the MRCD of I _{Δn} (___ mA) Required : no value exceeds the specified limiting value of Table B1: 300 ms) or Table B2 (500 ms) and a non actuating time of 60 ms		



[Handwritten signatures and stamps]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
M.8.12.	Verification of the behaviour of MRCDs in case of failure of the voltage source for MRCDs classified under M.3.2.2.1		
M.8.12.2	Determination of the limiting value of the voltage source		
	Source voltage (Us)	Max Us: _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
		Min Us: _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Adjustable residual current setting	_____ mA (lowest)	
	Adjustable time-delay setting	_____ s	
	Time period of voltage decreasing	30 s or a period enough with respect to delayed opening	
	Min voltage to automatic opening ($U > 0,85 \times Us$)		
	A residual current is sudden appear on the MRCD of $I\Delta n$ (_____ mA) at a value just above highest measured value Required : no value exceeds the specified limiting value of Table B1: 300 ms		
	It's not possible to switch "ON" by manual operating means at a lower value than the lower measured value.		
M.8.12.3	Verification of automatic opening in case of voltage source failure		
	Source voltage (Us)	Max Us: _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
		Min Us: _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Adjustable residual current setting	_____ mA (lowest)	
	Adjustable time-delay setting	_____ s	
	Time period	Max 1 s or max. 1 s+time delay setting	
	Time period to automatic opening		
	No value exceeds the relevant specified limiting value		

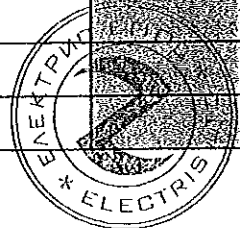


[Handwritten signature]

[Handwritten signature]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

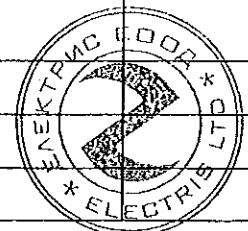
M.8.13	Verification of the behaviour of MRCDs with voltage source as classified under M.3.2.2.2 in case of failure of the voltage source.		
	Source voltage (Us)	Max Us: _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
		Min Us: _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Adjustable residual current setting	_____ mA (lowest)	
	Adjustable time-delay setting	_____ s	
	Switch off and reclosed Sa or S1 and reduced the source voltage to 70 %	70% Us = _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Time period to automatic opening		
MII	Test sequence MII		
M.8.14	Verification of the behaviour of the MRCD under short-circuit conditions		
	Type designation or serial number		
	Sample no:		
M.8.14.3	Verification of the rated conditional short-circuit current (I_{cc})		
	Verification of the coordination between the MRCD and the SCPD		
	Test circuit according to figure :		
	Point of test circuit which is directly earthed :		
	Grid distance "a" (mm) :		
	Silver wire diameter (mm) :		
	Used SCPD during the tests		
	Prospective current (A) :		
	Prospective current obtained (A) :		
	Power factor / ratio n :		
	Power factor / ratio n obtained :		
	Plot no.		
	Test sequence: O-t-O		



TRF No. IEC60947_2C

ELECTRIS

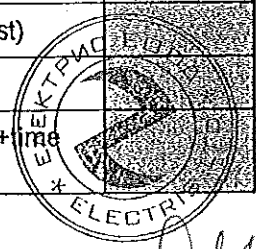
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	I^2t (kA ² s); I_p (kA) :	First O: I_p : _____ kA I^2t ; _____ kA ² s Plot no. _____	
		Second O: I_p : _____ kA I^2t ; _____ kA ² s Plot no.: _____	
	If tested at separate testing station see report	No.: _____ of _____ testing station	
	During tests no endangering of operator, no permanent arcing, no flashover and no melting of fuse F		
	After the tests no damage impairing further use		
8.3.3.5	Dielectric strength test of the main circuit at test voltage of 2 Un for 1 min:		
	Test voltage		
B.8.10.3.2	The RCCB shall trip with a test current of 1,25 I _{Δn} (ms) in minimum setting	I test: _____ mA trip time: _____ ms	
M.8.12.3	Verification of automatic opening in case of voltage source failure		
	Source voltage (Us)	Max Us: _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
		Min Us: _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Adjustable residual current setting	_____ mA (lowest)	
	Adjustable time-delay setting	_____ s	
	Time period	Max 1 s or max. 1 s+time delay setting	
	Time period to automatic opening		
	No value exceeds the relevant specified limiting value		
	The polyethylene sheet shows no holes		
M.8.14.4	Verification of rated short-time withstand current (I _{cw})		



[Handwritten signatures and stamps]

8

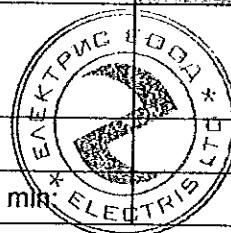
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test circuit according to figure :		
	Point of test circuit which is directly earthed :		
	Grid distance "a" (mm) :		
	Prospective current (A) :		
	Prospective current obtained (A) :		
	Power factor / ratio <i>n</i> :		
	Power factor / ratio <i>n</i> obtained :		
	Plot no.		
	Test sequence: O		
	I^2t (kA ² s); I_p (kA) :	I_p : _____ kA I^2t ; _____ kA ² s Test duration: _____ ms Plot no. _____	
	If tested at separate testing station see report	No.: _____ of _____ testing station	
	During tests no endangering of operator, no permanent arcing, no flashover and no melting of fuse F		
	After the tests no damage impairing further use		
8.3.3.5	Dielectric strength test of the main circuit at test voltage of 2 U_n for 1 min:		
	Test voltage	-	
B.8.10.3.2	The RCCB shall trip with a test current of 1,25 $I_{\Delta n}$ (ms) in minimum setting :	I test: _____ mA trip time: _____ ms	
M.8.12.3	Verification of automatic opening in case of voltage source failure		
	Source voltage (U_s)	Max U_s : _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
		Min U_s : _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Adjustable residual current setting	_____ mA (lowest)	
	Adjustable time-delay setting	_____ s	
	Time period	Max 1 s or max. 1 s+ time delay setting	



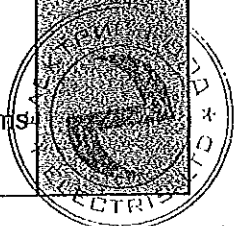
Handwritten signatures and initials at the bottom of the page.

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

	Time period to automatic opening		
	No value exceeds the relevant specified limiting value		
	The polyethylene sheet shows no holes		
M.8.14.5	Verification of the rated conditional residual short-circuit current ($I\Delta c$)		
	Test circuit according to figure :		
	Point of test circuit which is directly earthed :		
	Grid distance "a" (mm) :		
	Silver wire diameter (mm) :		
	Used SCPD during the tests		
	Prospective current (A) :		
	Prospective current obtained (A) :		
	Power factor / ratio n :		
	Power factor / ratio n obtained :		
	Plot no.		
	Test sequence: O-t-O		
	I^2t (kA ² s); I_p (kA) :	First O: I_p : _____ kA I^2t ; _____ kA ² s Plot no. _____	
		Second O: I_p : _____ kA I^2t ; _____ kA ² s Plot no.: _____	
	If tested at separate testing station see report	No.: _____ of _____ testing station	
	During tests no endangering of operator, no permanent arcing, no flashover and no melting of fuse F		
	After the tests no damage impairing further use		
8.3.3.5	Dielectric strength test of the main circuit at test voltage of $2 U_n$ for 1 min		

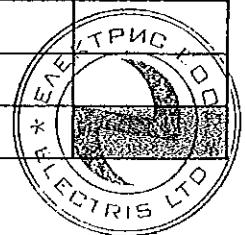


IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test voltage	-	
B.8.10.3.2	The RCCB shall trip with a test current of 1,25 I Δ n (ms) in minimum setting :	I test: _____ mA trip time: _____ ms	
M.8.12.3	Verification of automatic opening in case of voltage source failure		
	Source voltage (Us)	Max Us: _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
		Min Us: _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Adjustable residual current setting	_____ mA (lowest)	
	Adjustable time-delay setting	_____ s	
	Time period	Max 1 s or max. 1 s+time delay setting	
	Time period to automatic opening		
	No value exceeds the relevant specified limiting value		
	The polyethylene sheet shows no holes		
M.8.14.6	Verification of rated residual short-time withstand current (I Δ w)		
	Test circuit according to figure :		
	Point of test circuit which is directly earthed		
	Grid distance "a" (mm) :		
	Prospective current (A) :		
	Prospective current obtained (A) :		
	Power factor / ratio n :		
	Power factor / ratio n obtained :		
	Plot no.		
	Test sequence: O		
	I Δ t (kA 2 s); I Δ p (kA) :	I Δ p : _____ kA I Δ t: _____ kA 2 s Test duration: _____ ms Plot no. _____	



Handwritten signatures and a date stamp: 20100827

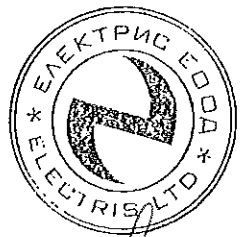
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	If tested at separate testing station see report	No.: _____ of _____ testing station	
	During tests no endangering of operator, no permanent arcing, no flashover and no melting of fuse F		
	After the tests no damage impairing further use		
8.3.3.5	Dielectric strength test of the main circuit at test voltage of 2 Un for 1 min:		
	Test voltage	-	
B.8.10.3.2	The RCCB shall trip with a test current of 1,25 IΔn (ms) in minimum setting :	I test: _____ mA trip time: _____ ms	
M.8.12.3	Verification of automatic opening in case of voltage source failure		
	Source voltage (Us)	Max Us: _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
		Min Us: _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Adjustable residual current setting	_____ mA (lowest)	
	Adjustable time-delay setting	_____ s	
	Time period	Max 1 s or max. 1 s+time delay setting	
	Time period to automatic opening		
	No value exceeds the relevant specified limiting value		
	The polyethylene sheet shows no holes		
M.III	Test sequence MIII		
M.8.15	Verification of effects of environmental conditions		
	Type designation or serial number		
	Sample no:		
B.8.10.3.2	The RCCB shall trip with a test current of 1,25 IΔn (ms) in minimum setting :	I test: _____ mA trip time: _____ ms	
M.IV	Test sequence MIV		
M.8.16	Verification of electromagnetic compatibility		



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

TABLE: Heating Test			
Test voltage (V)		20V	—
Ambient (°C)		40°C	—
Thermocouple Locations	max. temperature measured, (°C)	max. temperature limit, (°C)	
Terminals for external connections	105	110	
Manual operating means non-metallic	58	65	
Parts intended to be touched non-metallic	67	80	
Parts which need be touched for normal operation non-metallic	84	90	

TABLE: dielectric strength		
test voltage applied between:	test potential applied (V)	breakdown / flashover (Yes/No)
Between all the terminals main circuit	1890V	no
Between each pole of the main circuit and the other poles and to the mounting plate	1890V	no
Between each control and auxiliary circuit not normally connected to the main circuit and the main circuit	1890V	no
Between each control and auxiliary circuit not normally connected to the main circuit and the other circuit	1890V	no
Between each control and auxiliary circuit not normally connected to the main circuit and the mounting plate	1890V	no
For equipment suitable for isolation, across the poles of the main circuit	1890V	no
supplementary information:		



Handwritten signatures and stamps at the bottom right of the page.

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

TABLE: impact resistance			N/A
impacts per surface	surface tested	impact energy (Nm)	comments
-	-	-	-
supplementary information:			

TABLE: electrical data (in normal conditions)						
fuse #	I rated (A)	U (V)	P (W)	I (mA)	I fuse (mA)	condition/status
X	1000A	690V	100W	X	X	-40 - +50°C
supplementary information:						

TABLE: clearance and creepage distance measurements						
clearance cl and creepage distance dcr at/of:	Up (V)	U r.m.s. (V)	required cl (mm)	cl (mm)	required dcr (mm)	dcr (mm)
-	976V	690V	8mm	12,5mm	9mm	32mm
supplementary information: distance auxiliary circuits from live partes is 25mm						

TABLE: distance through insulation measurements				
distance through insulation di at/of:	U r.m.s. (V)	test voltage (V)	required di (mm)	di (mm)
-	-	-	-	-
supplementary information:				



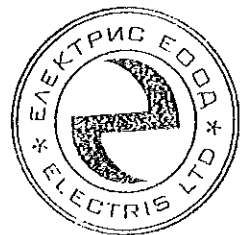
[Handwritten signatures and stamps]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	TABLE: ball pressure test of thermoplastics		N/A
	allowed impression diameter (mm)		—
part		test temperature (°C)	impression diameter (mm)
		-	-
supplementary information:			

TABLE: threaded part torque test			
threaded part identification	diameter of thread (mm)	column number (I, II, or III)	applied torque (Nm)
connector	10mm	I,II and III	25Nm
supplementary information:			

Handwritten signature

TABLE: over-voltage and under-voltage test					
test	operating condition	rated voltage (V)	test voltage (V)	temperature (°C)	comments
-	-	-	-	-	-
supplementary information: Isn't dependent upon outer power supply					



Handwritten signature

Handwritten signature

Handwritten signature and stamp

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

TABLE: Resistance to fire (Glow wire test)

no.	Specimen							Verdict
	Description	Colour	Thick (mm)	Temp °C	burning after t(s)	drops	support burning	
1	Base circuit breaker	blue	2mm	960°C	0	EN60695 -2-11	-	P
2	Insulating barrier	grey	1,6m	960°C	0	EN60695 -2-11	-	P
3	Rod	red	1,9mm	960°C	0	EN60695 -2-11	-	P
4	Transformer frame	black	1,1m	960°C	0	EN60695 -2-11	-	P
5	Frame arc chute	white	2,4mm	960°C	0	EN60695 -2-11	-	P
6	Cam	black	1,1m	960°C	0	EN60695 -2-11	-	P

TABLE: Resistance to tracking (tracking test)

no.	Specimen							Verdict
	Description	Colour	Drops (no.)	Impress (mm)	Burning	Current (A)	Result	
1	-	-	-	-	-	-	-	-
2								
3								
4								
5								
6								
7								
8								
9								
10								

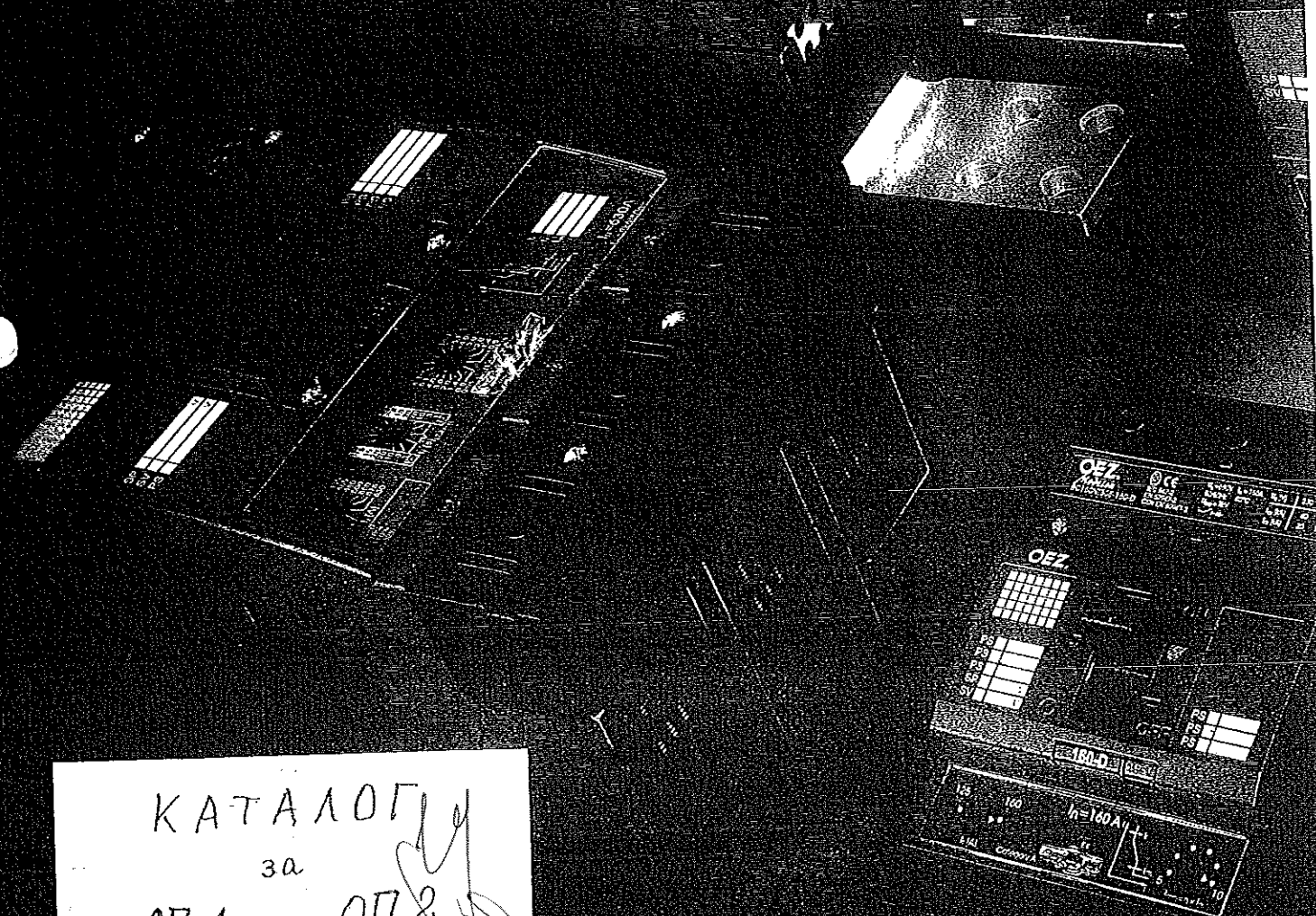


[Handwritten signature]
[Handwritten text]

OEZ

Modeion

Moulded case circuit breakers













ΚΑΤΑΛΟΓ
3α
ΟΠ 1 и ΟΠ 2



OEZA



CONTENTS

	INDEX	A
	SPECIFICATIONS TO SELECT CIRCUIT BREAKER AND SWITCH-DISCONNECTOR	B
	DESCRIPTION OF OVERCURRENT RELEASES	B
	FUNCTIONS, PROPERTIES AND OVERVIEW OF OVERCURRENT RELEASES	B
	PURCHASE ORDER EXAMPLE	B
	BC160N	D
	BD250N, BD250S	E
	BH630N, BH630S	F
	BL1000S	G
	BL1600S	H
	DELAY UNIT	P
	AUTOMATIC STANDBY UNITS MODI	P
	TESTER OF OVERCURRENT RELEASES OF CIRCUIT BREAKERS	P
	CONTROL RELAYS FOR BD250 AND BH630	P
	RESIDUAL CURRENT MONITOR	P
	SPARE PARTS OF CIRCUIT BREAKERS AND SWITCH-DISCONNECTORS MODEION	P
	THE USAGE OF SWITCH-DISCONNECTORS AT GIVEN OVERCURRENT PROTECTION	R
	GLOSSARY OF TERMS	S





INDEX

5

SSV8000-6KK	P4
SSV8001-6KK	P4
SSV8200-6KK	P4
SSV8700-OKK	P4
SSV8701-OKK	P4
SSV8702-OKK	P4
SSV8703-OKK	P4
SSV8704-OKK	P4
SSV8705-OKK	P4
SSV8706-OKK	P4
SSV8900-OKK	P4

B

BC160NT305-100-D	D4
BC160NT305-100-L	D4
BC160NT305-100-M	D4
BC160NT305-100-N	D5
BC160NT305-125-D	D4
BC160NT305-125-L	D4
BC160NT305-125-N	D5
BC160NT305-160-D	D4
BC160NT305-160-L	D4
BC160NT305-160-N	D5
BC160NT305-160-V	D5
BC160NT305-16-D	D4
BC160NT305-16-M	D4
BC160NT305-20-D	D4
BC160NT305-20-M	D4
BC160NT305-25-D	D4
BC160NT305-25-M	D4
BC160NT305-32-D	D4
BC160NT305-32-M	D4
BC160NT305-32-N	D5
BC160NT305-40-D	D4
BC160NT305-40-L	D4
BC160NT305-40-M	D4
BC160NT305-40-N	D5
BC160NT305-50-D	D4
BC160NT305-50-L	D4
BC160NT305-50-M	D4
BC160NT305-50-N	D5
BC160NT305-63-D	D4
BC160NT305-63-L	D4
BC160NT305-63-M	D4
BC160NT305-63-N	D5
BC160NT305-80-D	D4
BC160NT305-80-L	D4
BC160NT305-80-M	D4
BC160NT305-80-N	D5
BC160NT405--L	D6
BC160NT405--D	D6
BC160NT405--N	D6
BC160NT405-160-V	D8
BC160NT406--L	D7
BC160NT406--D	D7
BC160NT406--N	D7
BD250NE305	E4
BD250NE405	E5
BD250NE406	E5
BD250SE305	E4

BD250SE405	E5
BD250SE406	E5
BH630NE305	F4
BH630NE405	F5
BH630NE406	F5
BH630SE305	F4
BH630SE405	F5
BH630SE406	F5
BL1000SE305	G4
BL1000SE320	G4
BL1600SE305	H4
BL1600SE320	H4
BZ-BX-X230-A	P2

C

CS-BC-A011	D10
CS-BC-A021	D10
CS-BC-A033	D10
CS-BC-B021	D10
CS-BC-PS01	D10
CS-BC-B014	D10
CS-BC-A411	D11
CS-BC-A421	D11
CS-BC-B421	D11
CS-BC-B414	D11
CS-BC-PS41	D11
CS-BC-S006	D9
CS-BC-S416	D9
CS-BC-S406	D9
CS-BC-S016	D9
CS-BD-A011	E8
CS-BD-A021	E8
CS-BD-A037	E9
CS-BD-A039	E9
CS-BD-A421	E9
CS-BD-B011	E8
CS-BD-B012	E8
CS-BD-B014	E8
CS-BD-B021	E8
CS-BD-B022	E8
CS-BD-B411	E8
CS-BD-B412	E8
CS-BD-B414	E9
CS-BD-B421	E9
CS-BD-B422	E9
CS-BD-PS41	E9
CS-BD-JT75	E9
CS-BD-JX75	E9
CS-BD-PS01	E8
CS-BD-T011	E8
CS-BD-T411	E8
CS-BD-Z039	E9
CS-BH-A011	F8
CS-BH-A021	F8
CS-BH-A037	F9
CS-BH-A039	F9
CS-BH-PS01	F8
CS-BH-A421	F8
CS-BH-B011	F8
CS-BH-B012	F8
CS-BH-B014	F8

CS-BH-B021	F8
CS-BH-B022	F8
CS-BH-B031	F8
CS-BH-B032	F8
CS-BH-B411	F8
CS-BH-B412	F8
CS-BH-B414	F9
CS-BH-B421	F9
CS-BH-B422	F8
CS-BH-B431	F9
CS-BH-B432	F9
CS-BH-PS41	F9
CS-BH-JT75	F9
CS-BH-JX75	F9
CS-BH-PS01	F8
CS-BH-T011	F8
CS-BH-T411	F8
CS-BH-Z039	F8
CS-BL-A010	H7
CS-BL-A020	H7
CS-BL-A021	H7
CS-BL-A022	H7
CS-BL-A015	H7
CS-BL-A016	H7
CS-BL-B002	H7
CS-BL-B003	H7
CS-BL-B004	H7
CS-BL-W010	H7
CS-BL-W011	H7

M

MB-BD-PV05	E13
MB-BHD-PV03	E13, F13
MB-BH-PV04	F13
MB-BL-PP07	H9
MB-BL-PV08	H9
MB-BL-VV06	H9
MP-BC-X024-B	D14
MP-BC-X048-B	D14
MP-BC-X110-B	D14
MP-BC-X230-B	D14
MP-BD-X024	E13
MP-BD-X024-P	E13
MP-BD-X048	E13
MP-BD-X048-P	E13
MP-BD-X110	E13
MP-BD-X110-P	E13
MP-BD-X230	E13
MP-BD-X230-P	E13
MP-BH-X024	F13
MP-BH-X024-P	F13
MP-BH-X048	F13
MP-BH-X048-P	F13
MP-BH-X110	F13
MP-BH-X110-P	F13
MP-BH-X230	F13
MP-BH-X230-P	F13
MP-BL-X110	H9
MP-BL-X110-P	H9
MP-BL-X230	H9
MP-BL-X230-P	H9

N

NS-BC-0010	D12
NS-BC-0010-Au	D12

O

OD-BC-DIN1	D11
OD-BC-KS02	D14
OD-BC-KS03	D14
OD-BC-MS33	D11
OD-BC-UP01	D14
OD-BC-KA02	D14
OD-BC-KS42	D14
OD-BC-KS43	D14
OD-BD-KK01	E14
OD-BD-KS01	E14
OD-BD-KS03	E14
OD-BD-KS43	E14
OD-BD-MT75	E10
OD-BD-MZ39	E10
OD-BD-UP01	E14
OD-BD-VP01	E14
OD-BD-VP02	E14
OD-BHD-KA01	E14, F14
OD-BHD-KA02	E14, F14
OD-BHD-KS02	E14, F14
OD-BHD-KS42	E14, F14
OD-BHD-KT01	E14, F14
OD-BHD-MS39	E10, F10
OD-BHD-MS75	E10, F10
OD-BHD-PP01	E14, F14
OD-BHD-RX01	P3
OD-BHD-RX02	P3
OD-BHD-RA03	P3
OD-BHD-RD04	P3
OD-BH-KK01	F14
OD-BH-KS01	F14
OD-BH-KS03	F14
OD-BH-KS43	F14
OD-BH-MT75	F10
OD-BH-MZ39	F10
OD-BH-UP01	F14
OD-BH-VP01	F14
OD-BH-VP02	F14
OD-BL-KA01	H10
OD-BL-KS01	H10
OD-BL-KS02	H10
OD-BL-KS03	H10
OD-BL-KS04	H10
OD-BL-KS08	H10
OD-BL-KS09	H10
OD-BL-KT01	H10
OD-BL-MS02	H10
OD-BL-UP01	H10
OD-BL-VP01	H10

P

PS-BC-0010	D12
PS-BC-0010-Au	D12
PS-BHD-0010	E11, F11
PS-BHD-0010-Au	E11, F11
PS-BHD-0020	E11, F11

INDEX

PS-BHD-0020-AuE11, F11
 PS-BHD-0100E11, F11
 PS-BHD-0100-AuE11, F11
 PS-BHD-0200E11, F11
 PS-BHD-0200-AuE11, F11
 PS-BHD-1000E11, F11
 PS-BHD-1000-AuE11, F11
 PS-BHD-1100E11, F11
 PS-BHD-1100-AuE11, F11
 PS-BHD-2000E11, F11
 PS-BHD-2000-AuE11, F11
 PS-BL-2200H8
 PS-BL-2200-AuH8

R

RCD-BC3-EF06D8
 RCD-BC3-EF16D8
 RCD-BC3-EA06D8
 RCD-BC3-EA16D8
 RCD-BC4-EF06D8
 RCD-BC4-EF16D8
 RCD-BC4-EA06D8
 RCD-BC4-EA16D8
 RCD-BC0-EF16D8
 RCD-BC0-EA06D8
 RCD-BC0-EF06D8
 RCD-BC0-EA16D8
 RP-BC-CB10D14
 RP-BC-CD10D14
 RP-BC-CK10D13
 RP-BC-CK20D13
 RP-BC-CK21D13
 RP-BC-CK30D13
 RP-BC-CK31D13
 RP-BC-CN10D13
 RP-BC-CN11D13
 RP-BC-CN20D13
 RP-BC-CN21D13
 RP-BC-CP10D13
 RP-BC-CP20D13
 RP-BC-CP21D13
 RP-BC-CH10D13
 RP-BC-CH20D13
 RP-BD-CK10E12
 RP-BD-CK20E12

RP-BD-CK21E12
 RP-BD-CK30E12
 RP-BD-CK31E12
 RP-BH-CK10F12
 RP-BH-CK20F12
 RP-BH-CK21F12
 RP-BH-CK30F12
 RP-BH-CK31F12
 RP-BHD-CB10E13, F13
 RP-BHD-CD10E13, F13
 RP-BHD-CN40E12, F12
 RP-BHD-CN41E12, F12
 RP-BHD-CN60E12, F12
 RP-BHD-CN61E12, F12
 RP-BHD-CP10E12, F12
 RP-BHD-CP20E12, F12
 RP-BHD-CP21E12, F12
 RP-BHD-CH10E13, F13
 RP-BHD-CH20E13, F13
 RP-BL-CB10H9
 RP-BL-CK10H9
 RP-BL-CK52H9
 RP-BL-CK53H9
 RP-BL-CK54H9
 RP-BL-CK55H9
 RP-BL-CN10H9
 RP-BL-CN20H9
 RP-BL-CP10H9
 RP-BL-CP11H9
 RP-BL-CH10H9

S

SB-BL-0002H5
 SE-BD-0100-4D01H6
 SE-BD-0100-DTV3E6
 SE-BD-0100-MTV8E6
 SE-BD-0100-MTV9E6
 SE-BD-0160-4D01E6
 SE-BD-0160-DTV3E6
 SE-BD-0160-L001E6
 SE-BD-0160-MTV8E6
 SE-BD-0160-MTV9E6
 SE-BD-0200-L001E6
 SE-BD-0250-4D01E6
 SE-BD-0250-DTV3E6

SE-BD-0250-L001E6
 SE-BD-0250-MTV8E6
 SE-BD-0250-MTV9E6
 SE-BD-0250-V001E6
 SE-BH-0250-4D01F6
 SE-BH-0250-DTV3F6
 SE-BH-0250-L001F6
 SE-BH-0250-MTV8F6
 SE-BH-0250-MTV9F6
 SE-BH-0315-L001F6
 SE-BH-0400-4D01F6
 SE-BH-0400-DTV3F6
 SE-BH-0400-L001F6
 SE-BH-0400-MTV8F6
 SE-BH-0400-MTV9F6
 SE-BH-0500-L001F6
 SE-BH-0630-4D01F6
 SE-BH-0630-DTV3F6
 SE-BH-0630-L001F6
 SE-BH-0630-MTV8F6
 SE-BH-0630-MTV9F6
 SE-BH-0630-V001F6
 SE-BL-0630-DTV3H5
 SE-BL-0630-MTV8H5
 SE-BL-0630-U001H5
 SE-BL-1000-DTV3H5
 SE-BL-1000-MTV8H5
 SE-BL-1000-U001H5
 SE-BL-1250-DTV3H5
 SE-BL-1250-MTV8H5
 SE-BL-1250-U001H5
 SE-BL-1600-DTV3H5
 SE-BL-1600-MTV8H5
 SE-BL-1600-U001H5
 SE-BL-1600-V001H5
 SE-BL-J1000-DTV3G5
 SE-BL-J1000-MTV8G5
 SE-BL-J1000-U001G5
 SE-BL-J1000-V001G5
 SE-BL-J315-DTV3G5
 SE-BL-J315-MTV8G5
 SE-BL-J315-U001G5
 SE-BL-J630-DTV3G5
 SE-BL-J630-MTV8G5
 SE-BL-J630-U001G5

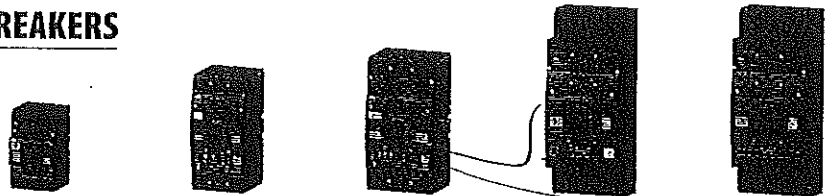
SE-BL-J800-DTV3G5
 SE-BL-J800-MTV8G5
 SE-BL-J800-U001G5
 SO-BHD-0010E14, F14
 SO-BL-0010H10
 SP-BC-X024D12
 SP-BC-X110D12
 SP-BC-X230D12
 SP-BHD-0002E11, F11
 SP-BHD-X024E11, F11
 SP-BHD-X024-0001E11, F11
 SP-BHD-X110E11, F11
 SP-BHD-X110-0001E11, F11
 SP-BHD-X230E11, F11
 SP-BHD-X230-0001E11, F11
 SP-BL-X024H8
 SP-BL-X048H8
 SP-BL-X110H8
 SP-BL-X230H8
 SP-BL-X400H8
 SP-BL-X500H8
 SV-BC-X024D12
 SV-BC-X110D12
 SV-BC-X230D12
 SV-BHD-X024E11, F11
 SV-BHD-X110E11, F11
 SV-BHD-X230E11, F11
 SV-BL-X024H8
 SV-BL-X048H8
 SV-BL-X110H8
 SV-BL-X230H8
 SV-BL-X400H8
 SV-BL-X500H8

Z

ZO-BD-0250-300E4
 ZO-BD-0250-400E5
 ZO-BH-0630-300F4
 ZO-BH-0630-400F5
 ZV-BD-0250-300E4
 ZV-BD-0250-400E5
 ZV-BH-0630-300F4
 ZV-BH-0630-400F5
 ZV-BL-1600-300G4, H4

SPECIFICATIONS TO SELECT CIRCUIT BREAKERS

>>> for AC operation



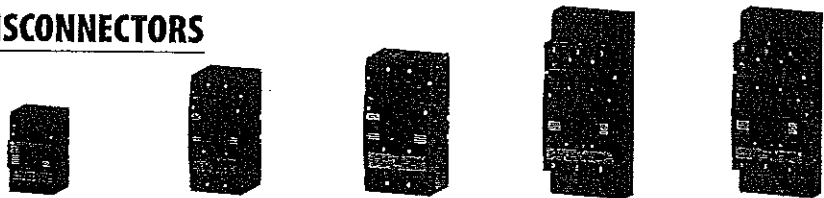
Type		160 A	250 A	630 A	1000 A	1600 A
Rated normal current	I_n	160 A	250 A	630 A	1000 A	1600 A
Rated operating voltage	U_n	max. 690 V a.c., 250 V d.c.		max. 690 V a.c.	max. 690 V a.c.	max. 690 V a.c.
Rated frequency	f_n	50/60 Hz		50/60 Hz	50/60 Hz	50/60 Hz
Utilization category (selectivity)		A	A	A	A,B	A,B
Rated short-circuit ultimate breaking capacity ^a	I_{cu} / U_n	NORMAL SUPERIOR 25 kA / 415 V a.c.	36 kA / 415 V a.c. 65 kA / 415 V a.c.	36 kA / 415 V a.c. 65 kA / 415 V a.c.	65 kA / 415 V a.c.	65 kA / 415 V a.c.
Rated short-time withstand current at $U_n = 690$ V a.c.	I_{cs} / t	—	2.5 kA / 1 s	8 kA / 50 ms, 7 kA / 300 ms, 6.5 kA / 1 s	15 kA / 1 s	20 kA / 1 s
Dimensions W x H x D		75 x 135 x 70 mm	105 x 225 x 105 mm	140 x 275 x 105 mm	210 x 350 x 135 mm	210 x 350 x 135 mm
Number of poles		3, 4	3, 4	3, 4	3	—
Residual current device		•	—	—	—	—
Additional cover for overcurrent release		—	•	•	—	—
Plug-in design		—	•	•	—	—
Withdrawable design		—	•	•	•	•
Front/rear connection		•/•	•/•	•/•	•/•	•/•
Connection - busbars/cable lugs/cables		•/•/•	•/•/•	•/•/•	•/•/•	•/•/•
Potential terminals		•	•	•	•	•
Switches - auxiliary/relative/signal/early		•/-/•/-	•/•/•/•	•/•/•/•	•/•/•/-	•/•/•/-
Shunt trip		•	•	•	•	•
Undervoltage release/with early contact		•/-	•/•	•/•	•/-	•/-
Hand drive/with adjustable lever		•/•	•/•	•/•	•/•	•/•
Motor drive/with counter of cycles		•/+	•/•	•/•	•/•	•/•
Lever with locking		•	•	•	•	•
Mechanical interlocking - for hand drive/with Bowden cable		•/+	•/•	•/•	•/•	•/•
Terminal cover IP20		•	•	•	•	•

• available, -- unavailable, + being prepared

^a - in case circuit breaker connection is reversed (input terminals 2, 4, 6, output terminals 1, 3, 5) I_{cu} does not change

SPECIFICATIONS TO SELECT SWITCH-DISCONNECTORS

>>> for AC and DC operation



Type		160 A	250 A	630 A	1000 A	1600 A
Rated operating current	I_n	160 A	250 A	630 A	1000 A	1600 A
Rated operating voltage	U_n	max. 690 V a.c., 440 V d.c.		max. 690 V a.c., 440 V d.c.	max. 690 V a.c., 440 V d.c.	max. 690 V a.c., 440 V d.c.
Rated frequency	f_n	50/60 Hz		50/60 Hz	50/60 Hz	50/60 Hz
Utilization category (switching mode)		AC-23B / 690 V a.c.	AC-23B / 690 V a.c. DC-23B / 440 V d.c.	AC-23B / 690 V a.c.	AC-23B / 690 V a.c. DC-23B / 440 V d.c.	AC-23B / 690 V a.c.
Rated short-time withstand current at $U_n = 690$ V a.c.	I_{cs} / t	2 kA / 1 s	3 kA / 5 s	8 kA / 5 s	15 kA / 1 s	20 kA / 1 s
Rated short-circuit making capacity	I_{cm} / U_n	2.8 kA / 415 V a.c.	4 kA / 415 V a.c.	13 kA / 415 V a.c.	30 kA / 415 V a.c.	40 kA / 415 V a.c.
Dimensions W x H x D		75 x 130 x 70 mm	105 x 225 x 105 mm	140 x 275 x 105 mm	210 x 350 x 135 mm	210 x 350 x 135 mm
Number of poles		3, 4	3, 4	3, 4	3	—
Residual current device		•	—	—	—	—
Plug-in design		—	•	•	—	—
Withdrawable design		—	•	•	•	•
Front/rear connection		•/•	•/•	•/•	•/•	•/•
Connection - busbars/cable lugs/cables		•/•/•	•/•/•	•/•/•	•/•/•	•/•/•
Potential terminals		•	•	•	•	•
Switches - auxiliary/relative/signal/early		•/-/•/-	•/•/•/•	•/•/•/•	•/•/•/-	•/•/•/-
Shunt trip		•	•	•	•	•
Undervoltage release/with early contact		•/-	•/•	•/•	•/-	•/-
Hand drive/with adjustable lever		•/•	•/•	•/•	•/•	•/•
Motor drive/with counter of cycles		•/+	•/•	•/•	•/•	•/•
Lever with locking		•	•	•	•	•
Mechanical interlocking - for hand drive/with Bowden cable		•/+	•/•	•/•	•/•	•/•
Terminal cover IP20		•	•	•	•	•

• available, -- unavailable, + being prepared

FUNCTIONS AND PROPERTIES OF THE OVERCURRENT RELEASES

Introduction

Overcurrent release which measures/monitors the current passing through the circuit breaker is part of every circuit breaker. Its main task is to get an impulse for circuit breaker switching off if the value of current which is given by tripping characteristic of each circuit breaker or overcurrent release is exceeded. The switching off itself based on the impulse from the overcurrent release is ensured by the switching system – another main part of each circuit breaker.

Division

Overcurrent releases can be divided into two basic types - electronic and thermomagnetic (bimetallic) ones. Electronic releases can be solved by discrete components and integrated circuits. Thermomagnetic releases use bimetal for the evaluation of overload and magnetic circuit for the evaluation of short-circuit. BC160 circuit breaker has a thermomagnetic release. BD250, BH630, BL1000, BL1600S circuit breakers have an electronic release.

Properties, specifications

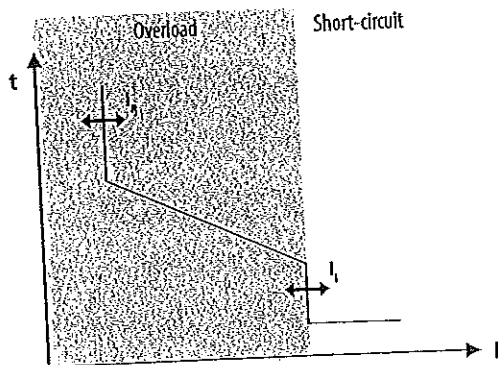
The circuit breakers with both the thermomagnetic and overcurrent releases protect against overload and short-circuit respectively. Circuit breaker tripping is given by the tripping characteristic of the overcurrent release. Tripping characteristic defines the time when the circuit breaker switches off in passage of a current higher than the rated current I_n or reduced current I_a .

The tripping characteristic can be divided into two principal ranges:

1st range:

- in this range a „dependent time release“ (also called thermal release) ensures device protection against „Overload“
- the dependent time release means that the breaking time depends indirectly on the strength of current, i.e. the higher is the current (overload), the shorter is the releasing time - the releasing time is given by the tripping characteristic of the overcurrent release

Tripping characteristic of the basic overcurrent release



- overload limit is given by rated current I_n or reduced current I_a - the value of I_a can be set for most types of the overcurrent releases - I_a or I_n must be never higher than the rated current of the protected device
- EN 60 947-2 sets two fixed values of time and current that must be always met by the circuit breaker:

Conventional non-tripping current

- the circuit breaker must not break $1.05 I_n$ or I_a in 2 hours

Conventional tripping current

- The circuit breaker must break $1.3 I_n$ or I_a in 2 hours ($1.2 I_n$ or I_a shall apply for protection of motors)
- circuit breakers with I_n or I_a lower than 63 A have conventional non-breaking an breaking time of 1 hour
- remaining part of the tripping characteristic is given by the manufacturer (the standard states max. tolerances of values for individual ranges)

- for some overcurrent releases it is possible to set the cut-off time of thermal release at $7.2 I_a$ - parameter t_k - so called thermal release delay, to enable, for instance, start of a motor (the start can last up to 30 s, and the current reaches on average $7.2 I_a$)

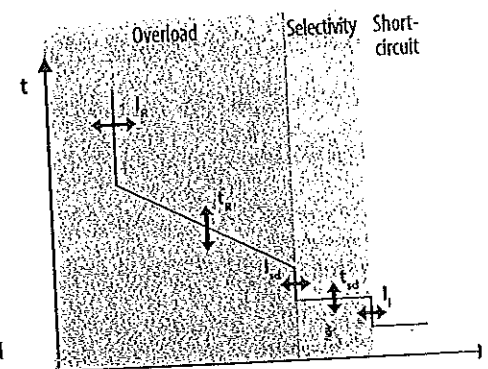
2nd range:

- in this range an „independent time release“ (also called short-circuit release) ensures device protection against „Short-circuit“ - parameter I_1
- independent time release means that the cut-off time is independent of the value of current; as soon as current reaches certain value, the circuit breaker will immediately trip (the cut-off time is 10 to 30 ms; some overcurrent releases enable setting of delay 50 ms) - the value of the short-circuit release I_1 can be set for most types of overcurrent releases, and thus to adapt it to the impedance loop and enable start of a motor

Special overcurrent releases

- the short-circuit protection range is further divided; it contains, beside the short-circuit release also a selective release
- according to EN 60 947-2 this range is called independent time-delayed release - parameter I_{sd}
- unlike the short-circuit release, the selective release can have delay of up to 1000 ms - parameter t_{ss} - thus it can reach a higher or full selectivity with assigned or backup circuit breakers or fuses

Tripping characteristic of the special overcurrent release



cy

FUNCTIONS AND PROPERTIES OF THE OVERCURRENT RELEASES

Basic overcurrent releases

D, DTV3 -- for protection of distribution transformers and lines with a minimum motor load

- it is possible to set reduced current I_R and the value of short-circuit release I_S

M -- for protection of motors

- it is possible to set reduced current I_R
- The value of short-circuit release is fixed at $10 \times I_n$

MTV8 -- TV mode -- for protection of distribution transformers and lines feeding motors

- it is possible to set reduced current I_R
- it is possible to set thermal release delay t_x to enable motor starting
- it is possible to set the short-circuit release value I_S and its delay to enable motor starting

-- M mode -- for protection of motors (complete protection of motors)

- it is possible to set reduced current I_R
- it is possible to set thermal release delay t_x to enable motor starting
- undervoltage release is active, and will switch off the circuit breaker in 4 s in phase failure
- it is possible to set the short-circuit release value I_S and its delay to enable motor starting

L, L001 -- for protection of lines with small current impulses

- the value of rated current I_n is fixed (the circuit breakers are manufactured in standardized series of currents)
- the value of short-circuit release I_S is fixed at $4 I_n$

Overcurrent release label

The label is divided into several functional areas:

- Setting tripping characteristic parameters:** Features three rotary switches for setting I_R [A] (values: 100, 110, 115, 125, 137, 144, 160, 172), $T_{(t)}$ (values: 180, 190, 200, 210, 220, 231, 243, 250), and I_S [A] (values: $4 \times I_n$, $8 \times I_n$). A "restart" button is also present.
- Recording set values:** A graph showing the tripping characteristic curve with I on the vertical axis and t on the horizontal axis. Below the graph are three horizontal bars for recording values.
- LED Indicators:** A row of four LEDs labeled "TRIP", ">110%", "80%", "70%", and "RUN".
- TEST Button:** A circular button labeled "TEST".
- Technical Specifications:** $I_n = 250A$, Category A, TRMS SE-BD-0250-Drv3.

Additional labels at the bottom of the image describe the components:

- Signalling release state and value of passing current by means of LED
- Terminals for connection of a tester
- Designation of an overcurrent releases - basic parameters

FUNCTIONS AND PROPERTIES OF THE OVERCURRENT RELEASES

Overcurrent release setting

Reduced current I_R



- ✓ reduced current I_R shall be set according to the rated current of the protected device or, for instance, permissible load current of the cable
- ↓ undesired circuit breaker trip will take place during normal operation
- ↑ overload of the protected device or cable can occur

Thermal memory T (restart)

Thermal memory provides protection of the protected device against repeated overload, in particular in attempt at restart after switching off by overload

- **thermal memory switched on** - the circuit breaker „remembers“ previous thermal overload
 - after circuit breaker switching off by overload it is not possible to switch it on again for a time; it is necessary to wait until the both protected device and the circuit breaker will „cool down“
 - the circuit breaker remembers previous thermal overload even after drop of current in the circuit below I_n or I_{pr} and at next thermal overload the releasing time of the thermal release is shortened (the time follows from the tripping characteristic in so called „hot“ state)
 - the thermal memory must remain active in protection of distribution transformers, lines and motors
- **thermal memory switched off** - the circuit breaker „does not remember“ previous thermal overload
 - after circuit breaker switching off by overload the thermal memory will reset, and the circuit breaker can be immediately switched on again, and in the next overload the releasing time is not shortened (the time follows from the tripping characteristic in so called „cold“ state)

- after drop of current in the circuit below the set value of I_R the thermal memory is reset, and in next overload the releasing time is not shortened (the time follows from the tripping characteristic in so called „cold“ state)
- thermal memory can be switched off only in certain cases, when the protected device is rated for repeated overload (e.g. spot welding machines or rail cranes)

TV/M mode

TV - mode for protection of distribution transformers and lines feeding mainly motors
 - undercurrent release is not active

M - mode for direct protection of motors
 - undercurrent release is active (in phase failure the circuit breaker trips in 4 s)

Thermal release delay t_R



- ✓ in protection of motors or lines with prevailing motor load it is necessary to set the thermal release delay t_R correctly and thus enable motor starting
- ↓ undesired circuit breaker switching off will take place in motor starting
- ↑ overload of the motor or cable can occur

Short-circuit release value I_s



- ✓ the short-circuit release value I_s must be set higher than the maximum peak current in the circuit (making current of the protected device) and at the same time it must be set to fulfil the conditions of automatic disconnection from the power supply in failure
- ↓ undesired circuit breaker switching off will take place (e.g. in motor starting)
- ↑ circuit breaker will not disconnect the circuit from power supply in case of failure (short-circuit) in prescribed time

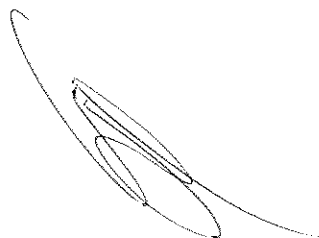
■ in protection of motors or lines with motor or capacitive load it is suitable to set a delay of the short-circuit release to enable motor starting (e.g. a motor can take up to 15 I for 10 ÷ 15 ms in starting)

Setting TV/M mode of the thermal memory

<p>Upper left quarter - M mode - thermal memory switched off</p>	<p>Upper right quarter - M mode - thermal memory switched on permanently</p>
<p>Lower left quarter - TV mode - thermal memory switched off</p>	<p>Lower right quarter - TV mode - thermal memory switched on</p>



- Legend:
- ✓ correct setting
 - ↓ wrong setting - low value
 - ↑ wrong setting - high value



OVERVIEW OF BASIC OVERCURRENT RELEASES



BC160

BD250

BH630

BL1000

BL1600

Lines

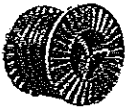
12 ÷ 160 A

40 ÷ 250 A

100 ÷ 630 A

125 ÷ 1 000 A

315 ÷ 1 600 A



OPTIMUM

EXPANDED

SIMPLE

L

L001

L001

Distribution transformers

25 kVA
50 kVA
63 kVA

63 kVA
100 kVA
160 kVA

160 kVA
250 kVA
400 kVA

250 kVA
400 kVA
630 kVA

400 kVA
630 kVA
1 000 kVA



OPTIMUM

EXPANDED

Motors

7.5 ÷ 55 kW

22 ÷ 132 kW

75 ÷ 315 kW

75 ÷ 315 kW

75 ÷ 315 kW



OPTIMUM

M

MTVB - TV mode

MTVB - TV mode

MTVB - TV mode

MTVB - TV mode

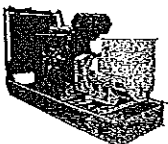
Generators

30 ÷ 150 kVA

80 ÷ 400 kVA

100 ÷ 630 kVA

250 ÷ 1 000 kVA



OPTIMUM

MTVB - TV mode

MTVB - TV mode

MTVB - TV mode

MTVB - TV mode

OVERVIEW OF SPECIAL OVERCURRENT RELEASES

Short-circuit protection

BC160 - overcurrent release N



Circuit breaker BC160 with overcurrent release of N type protects against short-circuit only

- it does not protect in the overload range – it does not react to low over-currents
- it is possible to set the value of the short-circuit release from 5 to 10 I_n
- suitable for protection of e.g. motors with own overload protection
- overcurrent release indicates switching off by short-circuit

Protection in TN-S, TN-C-S networks - 4-pole design of circuit breakers

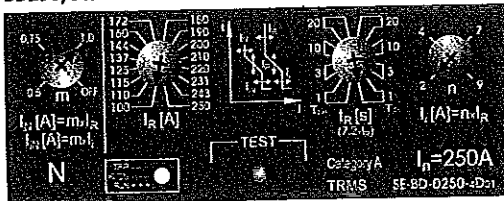
BC160 - overcurrent release D



BC160 circuit breaker of 4-pole design can have an overcurrent release, which reacts also to the value of current in the fourth/N pole

- the value of reduced current I_a and of short-circuit release I_{sc} for the fourth pole is the same as for the other three poles
- all the other properties and parameters are identical to those of the standard overcurrent release of type D

BD250, BH630 - overcurrent release 4D01

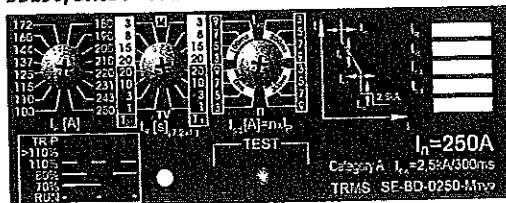


BD250 and BH630 circuit breakers of 4-pole design can have an overcurrent release of type 4D01, which reacts also to the value of current in the fourth/N pole

- protects against both overcurrent and short-circuit
- setting of reduced current $I_a = 0.4 \div 1 I_n$
- thermal memory can be switched on/off (ON = t_{tr} , OFF = t_{tr})
- setting of delay of the thermal release 1 s, 3 s, 10 s a 20 s
- setting of the value of the short-circuit release I_{sc} in 4 steps
- I_a setting, t_{tr} and I_{sc} by means of rotary switches is stepwise
- the overcurrent release indicates operating state and the value of the passing current by means of LED

Time selective protection

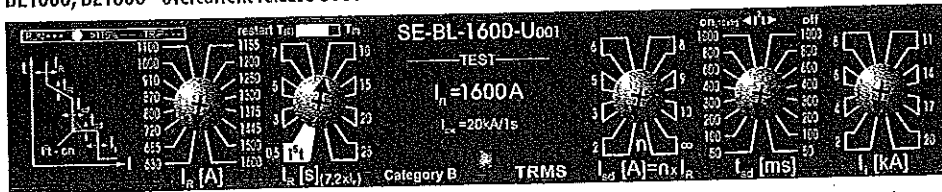
BD250, BH630 - overcurrent release MTV9



It is designed for demanding applications with a complicated load and required high selectivity with fuses or circuit breakers

- the MTV9 release is based on MTV8 release, and in addition enables setting a value of the selective release including delay
- protects against both overcurrent and short-circuit
- setting of reduced current $I_a = 0.4 \div 1 I_n$
- thermal memory can be switched on/off (ON = T_{tr} , OFF = T_{tr})
- TV mode – for protection of lines and distribution transformers (undercurrent release is not active)
- M mode – for protection of motors (undercurrent release is active)
- setting of delay of thermal release t_{tr}
- setting of the value of selective release I_{sd} in 4 steps (independent time-delayed release)
- setting of delay of the selective release t_{sd} 0 ms, 100 ms, 200 ms or 300 ms
- setting of I_{tr} , t_{tr} , I_{sd} and t_{sd} by means of rotary switches is stepwise
- the overcurrent release indicates operating state and the value of the passing current by means of LED

BL1000, BL1600 - overcurrent release U001



It is designed for demanding applications with a complicated load and required high selectivity with fuses or circuit breakers

- protects against both overcurrent and short-circuit
- setting of reduced current $I_a = 0.4 \div 1 I_n$
- thermal memory can be switched on/off (ON = T_{tr} , OFF = T_{tr})
- setting of delay of the thermal release t_{tr} in 8 steps, possibility of setting of gradient of characteristic of the thermal release I^2t (adaptation of time-current characteristic of the fuse)
- setting of the value of selective release I_{sd} in 8 steps (independent time-delayed release)
- setting of delay of the selective release t_{sd} 50 to 1 000 ms including possibility of setting of a gradient of characteristic I^2t (adaptation of the tripping characteristic of the fuse)
- setting of the value of the short-circuit release I_{sc} in 8 steps
- setting of I_{tr} , t_{tr} , I_{sd} and t_{sd} by means of rotary switches is stepwise
- the overcurrent release indicates operating state and the value of the passing current by means of LED

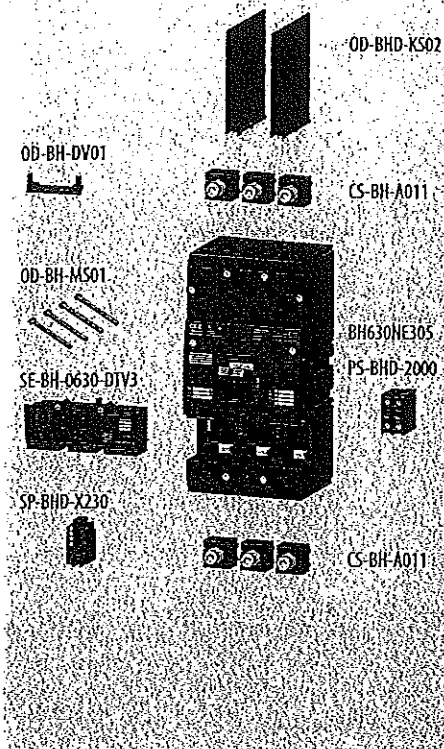
PURCHASE ORDER EXAMPLE

Example: You need circuit breaker for a transformer and outgoing lines of the circuit breaker will be formed by Cu busbars. Further requirements: signalization of main contacts and remote control of the circuit breaker.

Your purchase order:
(do not enter text from grey area into your purchase order)

NUMBER	TYPE	PRODUCT CODE
--------	------	--------------

1 pc	BH630NE305	14412	switching unit with rated current 630 A and rated short-circuit ultimate capacity 36 kA components of the switching unit are
			<ul style="list-style-type: none"> ■ connecting sets for connecting Cu/Al busbars or cable lugs (CS-BH-A011) ■ insulating barriers (OD-BHD-KS02) ■ mounting bolts set for installing switching unit (OD-BH-MS01) ■ conductor holder (OD-BH-DV01)
1 pc	SE-BH-0630-DIV3	25100	overcurrent release for protection of transformers and lines with the rated current up to 630 A and its regulation 0 -- 60 %
1 pc	PS-BHD-2000	13689	auxiliary switch (2x make contact)
1 pc	SP-BHD-X230	24420	undervoltage release (230 V a.c., 400, 500 V/220 V d.c.)



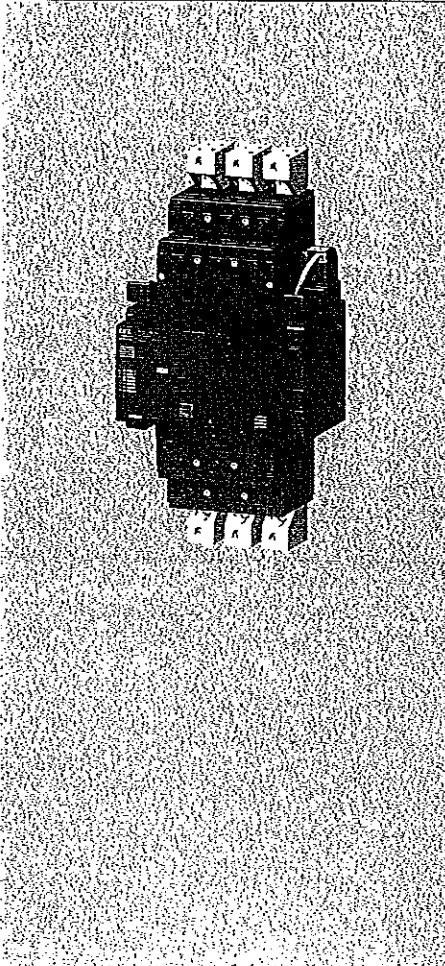
CUSTOM ASSEMBLY OF CIRCUIT BREAKERS

- at customer's request
- warranty not only for components, but for the entire configuration
- after-consulting with OEZ company, based on particular specification of your configuration
- the delivery terms in 1 - 4 weeks
- extra charge for completion and special packing

Your order should include the following specification:

- type of circuit breaker switching unit
- type, rated current and adjustment of the electronic release
- types of connecting terminal
 - for input terminals of circuit breaker
 - for output terminals of circuit breaker
- installation requirements, type and function of auxiliary switches
- installation requirement and type of auxiliary releases, including rated voltage
- requirements for fitting circuit breaker with drive
 - type of hand drive, including accessories (control lever, bearing, shaft)
 - motor drive type including control voltage and your demand for counter of cycles, extension cable and sealable cover of switch on button
- required withdrawable or plug-in design of circuit breakers
- requirement for fitting withdrawable device with signalling of individual positions
- requirement for sealing the overcurrent release

Auxiliary circuits of the withdrawable design will be installed according to the wiring diagram supplied by the customer.



NOTES

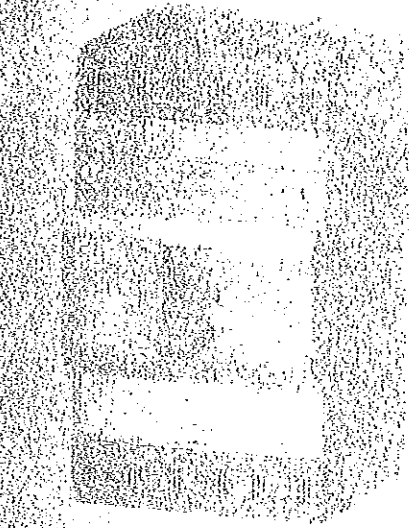
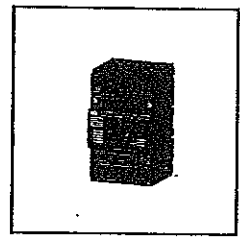
Grid area for notes.

[Handwritten signature]

[Handwritten signature]

Handwritten signature

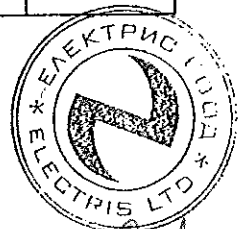
MOULDED CASE CIRCUIT BREAKERS BC160N



Handwritten signature

Handwritten signature

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
M.8.12.	Verification of the behaviour of MRCDs in case of failure of the voltage source for MRCDs classified under M.3.2.2.1		
M.8.12.2	Determination of the limiting value of the voltage source		
	Source voltage (Us)	Max Us: _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
		Min Us: _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Adjustable residual current setting	_____ mA (lowest)	
	Adjustable time-delay setting	_____ s	
	Time period of voltage decreasing	30 s or a period enough with respect to delayed opening	
	Min voltage to automatic opening ($U > 0,85 \times Us$)		
	A residual current is sudden appear on the MRCD of $I\Delta n$ (_____ mA) at a value just above highest measured value Required : no value exceeds the specified limiting value of Table B1: 300 ms		
	It's not possible to switch "ON" by manual operating means at a lower value than the lower measured value.		
M.8.12.3	Verification of automatic opening in case of voltage source failure		
	Source voltage (Us)	Max Us: _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
		Min Us: _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Adjustable residual current setting	_____ mA (lowest)	
	Adjustable time-delay setting	_____ s	
	Time period	Max 1 s or max. 1 s+time delay setting	
	Time period to automatic opening		
	No value exceeds the relevant specified limiting value		



[Handwritten signature]

[Handwritten signature]

[Handwritten signature]

[Handwritten signature]

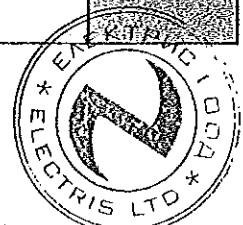
[Handwritten signature]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

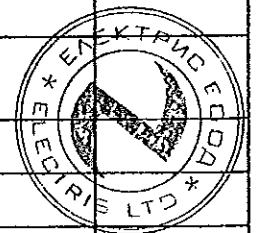
M.8.13	Verification of the behaviour of MRCDs with voltage source as classified under M.3.2.2.2 in case of failure of the voltage source.		
	Source voltage (Us)	Max Us: _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
		Min Us: _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Adjustable residual current setting	_____ mA (lowest)	
	Adjustable time-delay setting	_____ s	
	Switch off and reclosed Sa or S1 and reduced the source voltage to 70 %	70% Us = _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Time period to automatic opening		
MII	Test sequence MII		
M.8.14	Verification of the behaviour of the MRCD under short-circuit conditions		
	Type designation or serial number	<i>Ch</i>	
	Sample no:		
M.8.14.3	Verification of the rated conditional short-circuit current (I _{cc})		
	Verification of the coordination between the MRCD and the SCPD		
	Test circuit according to figure :		
	Point of test circuit which is directly earthed :		
	Grid distance "a" (mm) :		
	Silver wire diameter (mm) :		
	Used SCPD during the tests		
	Prospective current (A) :		
	Prospective current obtained (A) :		
	Power factor / ratio <i>n</i> :		
	Power factor / ratio <i>n</i> obtained :		
	Plot no.		
	Test sequence: O-t-O		

Handwritten signature

Handwritten signature



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	I _t (kA ² s); I _p (kA) :	First O: I _p : _____ kA I _t ; _____ kA ² s Plot no. _____	
		Second O: I _p : _____ kA I _t ; _____ kA ² s Plot no.: _____	
	If tested at separate testing station see report	No.: _____ of _____ testing station	
	During tests no endangering of operator, no permanent arcing, no flashover and no melting of fuse F		
	After the tests no damage impairing further use		
8.3.3.5	Dielectric strength test of the main circuit at test voltage of 2 U _n for 1 min:		
	Test voltage		
B.8.10.3.2	The RCCB shall trip with a test current of 1,25 I _{Δn} (ms) in minimum setting :	I test: _____ mA trip time: _____ ms	
M.8.12.3	Verification of automatic opening in case of voltage source failure		
	Source voltage (Us)	Max Us: _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
		Min Us: _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Adjustable residual current setting	_____ mA (lowest)	
	Adjustable time-delay setting	_____ s	
	Time period	Max 1 s or max. 1 s+time delay setting	
	Time period to automatic opening		
	No value exceeds the relevant specified limiting value		
	The polyethylene sheet shows no holes		
M.8.14.4	Verification of rated short-time withstand current (I _{ow})		



[Handwritten signature]

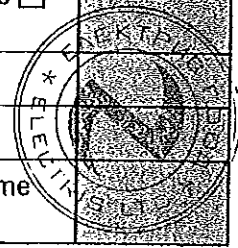
[Handwritten signature]

[Handwritten signature]

ELEXTRONIC S.p.A.

[Handwritten signature]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test circuit according to figure :		
	Point of test circuit which is directly earthed :		
	Grid distance "a" (mm) :		
	Prospective current (A) :		
	Prospective current obtained (A) :		
	Power factor / ratio <i>n</i> :		
	Power factor / ratio <i>n</i> obtained :		
	Plot no.		
	Test sequence: O		
	I^2t (kA ² s); I_p (kA) :	I_p : _____ kA I^2t ; _____ kA ² s Test duration: _____ ms Plot no. _____	
	If tested at separate testing station see report	No.: _____ of _____ testing station	
	During tests no endangering of operator, no permanent arcing, no flashover and no melting of fuse F		
	After the tests no damage impairing further use		
8.3.3.5	Dielectric strength test of the main circuit at test voltage of 2 U_n for 1 min:		
	Test voltage	-	
B.8.10.3.2	The RCCB shall trip with a test current of 1,25 $I_{\Delta n}$ (ms) in minimum setting :	I test: _____ mA trip time: _____ ms	
M.8.12.3	Verification of automatic opening in case of voltage source failure		
	Source voltage (U_s)	Max U_s : _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
		Min U_s : _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Adjustable residual current setting	_____ mA (lowest)	
	Adjustable time-delay setting	_____ s	
	Time period	Max 1 s or max. 1 s+time delay setting	



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Time period to automatic opening		
	No value exceeds the relevant specified limiting value		
	The polyethylene sheet shows no holes		
M.8.14.5	Verification of the rated conditional residual short-circuit current (I _{Δc})		
	Test circuit according to figure :		
	Point of test circuit which is directly earthed :		
	Grid distance "a" (mm) :		
	Silver wire diameter (mm) :		
	Used SCPD during the tests		
	Prospective current (A) :		
	Prospective current obtained (A) :		
	Power factor / ratio <i>n</i> :		
	Power factor / ratio <i>n</i> obtained :		
	Plot no.		
	Test sequence: O-t-O		
	I ² t (kA ² s); I _p (kA) :	First O: I _p : _____ kA I ² t; _____ kA ² s Plot no. _____	
		Second O: I _p : _____ kA I ² t; _____ kA ² s Plot no.: _____	
	If tested at separate testing station see report	No.: _____ of _____ testing station	
	During tests no endangering of operator, no permanent arcing, no flashover and no melting of fuse F		
	After the tests no damage impairing further use		
8.3.3.5	Dielectric strength test of the main circuit at test voltage of 2 U _n for 1 min:		



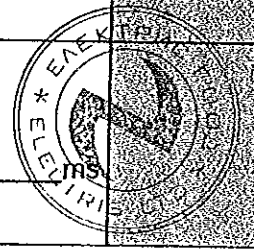
[Handwritten signature]

[Handwritten signature]

[Handwritten signature]

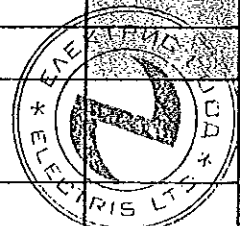
[Handwritten mark]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test voltage	-	
B.8.10.3.2	The RCCB shall trip with a test current of 1,25 I _{Δn} (ms) in minimum setting :	I test: _____ mA trip time: _____ ms	
M.8.12.3	Verification of automatic opening in case of voltage source failure		
	Source voltage (Us)	Max Us: _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
		Min Us: _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Adjustable residual current setting	_____ mA (lowest)	
	Adjustable time-delay setting	_____ s	
	Time period	Max 1 s or max. 1 s+time delay setting	
	Time period to automatic opening		
	No value exceeds the relevant specified limiting value		
	The polyethylene sheet shows no holes	<i>As</i>	
M.8.14.6	Verification of rated residual short-time withstand current (I _{Δw})		
	Test circuit according to figure :		
	Point of test circuit which is directly earthed :		
	Grid distance "a" (mm) :		
	Prospective current (A) :		
	Prospective current obtained (A) :		
	Power factor / ratio <i>n</i> :		
	Power factor / ratio <i>n</i> obtained :		
	Plot no.		
	Test sequence: O		
	I _t ² (kA ² s); I _p (kA) :	I _p : _____ kA I _t ² : _____ kA ² s Test duration: _____ ms Plot no. _____	



[Handwritten signatures and stamps]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	If tested at separate testing station see report	No.: _____ of _____ testing station	
	During tests no endangering of operator, no permanent arcing, no flashover and no melting of fuse F		
	After the tests no damage impairing further use		
8.3.3.5	Dielectric strength test of the main circuit at test voltage of 2 Un for 1 min:		
	Test voltage	-	
B.8.10.3.2	The RCCB shall trip with a test current of 1,25 IΔn (ms) in minimum setting :	I test: _____ mA trip time: _____ ms	
M.8.12.3	Verification of automatic opening in case of voltage source failure		
	Source voltage (Us)	Max Us: _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
		Min Us: _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Adjustable residual current setting	_____ mA (lowest)	
	Adjustable time-delay setting	_____ s	
	Time period	Max 1 s or max. 1 s+time delay setting	
	Time period to automatic opening		
	No value exceeds the relevant specified limiting value		
	The polyethylene sheet shows no holes		
M.III	Test sequence MIII		
M.8.15	Verification of effects of environmental conditions		
	Type designation or serial number		
	Sample no:		
B.8.10.3.2	The RCCB shall trip with a test current of 1,25 IΔn (ms) in minimum setting :	I test: _____ mA trip time: _____ ms	
M.IV	Test sequence MIV		
M.8.16	Verification of electromagnetic compatibility		



[Handwritten signature]

[Handwritten signature]

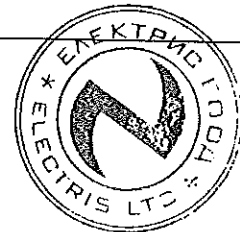
[Handwritten signature] **ESTRUCOPRINTING**

[Handwritten mark]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

TABLE: Heating Test			
Test voltage (V)		20V	—
Ambient (°C)		40°C	—
Thermocouple Locations	max. temperature measured, (°C)	max. temperature limit, (°C)	
Terminals for external connections	105	110	
Manual operating means non-metallic	58	65	
Parts intended to be touched non-metallic	67	80	
Parts which need be touched for normal operation non-metallic	84	90	

TABLE: dielectric strength		
test voltage applied between:	test potential applied (V)	breakdown / flashover (Yes/No)
Between all the terminals main circuit	1890V	no
Between each pole of the main circuit and the other poles and to the mounting plate	1890V	no
Between each control and auxiliary circuit not normally connected to the main circuit and the main circuit	1890V	no
Between each control and auxiliary circuit not normally connected to the main circuit and the other circuit	1890V	no
Between each control and auxiliary circuit not normally connected to the main circuit and the mounting plate	1890V	no
For equipment suitable for isolation, across the poles of the main circuit	1890V	no
supplementary information:		



[Handwritten signature]
 ELECTRIC LTD

[Handwritten mark]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

TABLE: impact resistance			N/A
impacts per surface	surface tested	impact energy (Nm)	comments
-	-	-	-
supplementary information:			

TABLE: electrical data (in normal conditions)						
fuse #	I rated (A)	U (V)	P (W)	I (mA)	I fuse (mA)	condition/status
X	1000A	690V	100W	X	X	-40 - +50°C
supplementary information:						

TABLE: clearance and creepage distance measurements						
clearance cl and creepage distance dcr at/of:	Up (V)	U r.m.s. (V)	required cl (mm)	cl (mm)	required dcr (mm)	dcr (mm)
-	976V	690V	8mm	12,5mm	9mm	32mm
supplementary information: distance auxiliary circuits from live partes is 25mm						

TABLE: distance through insulation measurements				
distance through insulation di at/of:	U r.m.s. (V)	test voltage (V)	required di (mm)	di (mm)
-	-	-	-	-
supplementary information:				



ΕΛΕΚΤΡΙΣ

[Handwritten signature]

[Handwritten signature]

[Handwritten signature]

[Handwritten signature]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

TABLE: ball pressure test of thermoplastics			N/A
allowed impression diameter (mm)			—
part	test temperature (°C)	impression diameter (mm)	
-	-	-	
supplementary information:			

TABLE: threaded part torque test			
threaded part identification	diameter of thread (mm)	column number (I, II, or III)	applied torque (Nm)
connector	10mm	I,II and III	25Nm
supplementary information:			

TABLE: over-voltage and under-voltage test					
test	operating condition	rated voltage (V)	test voltage (V)	temperature (°C)	comments
-	-	-	-	-	-
supplementary information: Isn't dependent upon outer power supply					



[Handwritten signature]

ΕΛΕΚΤΡΟΝΙΚΗ ΕΠΙΧΕΙΡΗΣΗ

[Handwritten initials]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

TABLE: Resistance to fire (Glow wire test)

no.	Specimen							Verdict
	Description	Colour	Thick (mm)	Temp °C	burning after t (s)	drops	support burning	
1	Base circuit breaker	blue	2mm	960°C	0	EN60695-2-11	-	P
2	Insulating barrier	grey	1,6m	960°C	0	EN60695-2-11	-	P
3	Rod	red	1,9mm	960°C	0	EN60695-2-11	-	P
4	Transformer frame	black	1,1m	960°C	0	EN60695-2-11	-	P
5	Frame arc chute	white	2,4mm	960°C	0	EN60695-2-11	-	P
6	Cam	black	1,1m	960°C	0	EN60695-2-11	-	P

TABLE: Resistance to tracking (tracking test)

no.	Specimen							Verdict
	Description	Colour	Drops (no.)	Impress (mm)	Burning	Current (A)	Result	
1	-	-	-	-	-	-	-	
2								
3								
4								
5								
6								
7								
8								
9								
10								



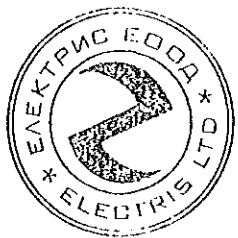
[Handwritten signatures and stamps]

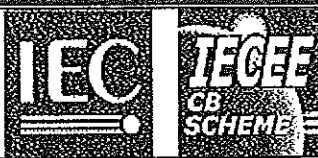
National Differences for (country name)		
:	
:	
:	
:	
:	
:	

Handwritten signature

Handwritten signature

Handwritten signature
ELECTRIS



	Ref. Certif. No.
	CZ-1643

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE) CB SCHEME

SYSTEME CEI D'ACCEPTATION MUTUELLE DE CERTIFICATS D'ESSAIS DES EQUIPEMENTS ELECTRIQUES (IECEE) METHODE OC

CB TEST CERTIFICATE CERTIFICAT D'ESSAI OC

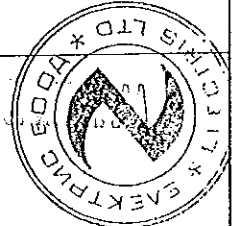
Product Produit	Circuit-breaker	
Name and address of the applicant Nom et adresse du demandeur	OEZ s. r. o. Šedivská 339, 561 51 Letohrad, Czech Republic	
Name and address of the manufacturer Nom et adresse du fabricant	OEZ s. r. o. Šedivská 339, 561 51 Letohrad, Czech Republic	
Name and address of the factory Nom et adresse de l'usine	OEZ s. r. o. Šedivská 339, 561 51 Letohrad, Czech Republic	
Ratings and principal characteristics Valeurs nominales et caractéristiques principales	690 V AC, 50/60 Hz, 1000 A, Uimp = 8 kV	
Trademark (if any) Marque de fabrique (si elle existe)		
Model / Type Ref. Ref. De type	BL1000	
Additional information (if necessary) Information complémentaire (si nécessaire)	PUBLICATION	EDITION
A sample of the product was tested and found to be in conformity with Un échantillon de ce produit a été essayé et a été considéré conforme à la	IEC 60947-2	2003+consolidated ed. 2.2:2001
As shown in the Test Report Ref. No. which forms part of this Certificate Comme indiqué dans le Rapport d'essais numéro de référence qui constitue partie de ce Certificat	600332-04/01 of: 21.02.2006	

This CB Test Certificate is issued by the National Certification Body
Ce Certificat d'essai OC est établi par l'Organisme National de Certification

Elektrotechnický zkušební ústav
Pod lísem 129, 171 02 Praha 8 – Troja
Czech Republic



(Handwritten Signature)



Date: 24.2.2006

Signature: Pavel Kudrna
Certification and Inspection Manager



TEST REPORT**IEC 60 947-2****Low-voltage switchgear and controlgear****Part 2: Circuit - breakers**

Report Reference No.....: 600332-04/01

Tested by (name+signature).....:

Jaroslav Klípa

Witnessed by (name+signature).....:

Jan Hlavatý

Supervised by (name+signature).....:

Jan Hlavatý

Approved by (name+signature).....:

Jan Hlavatý

Date of issue.....: 21.2.06

CB Testing Laboratory.....: EZÚ

Address.....: Pod Lisem 129 171 02
Praha 71- TrójaTesting location/ procedure.....: CBTL RMT SMT WMT TMP

Testing location/ address.....:

Applicant's name.....: OEZ s.r.o.

Address: Šedivská 339 56151 Letohrad

Test specification:Standard.....: IEC 60 947 - 2 : 2003 (3rd Edition)+ consolidated ed.2.2:01

Test procedure.....: CB / CCA

Non-standard test method.....: N/A

Test Report Form No.....: IEC60947_2C

TRF Originator.....: KEMA Nederland B.V.

Master TRF.....: Dated 2004-12

Copyright © 2004 IEC System for Conformity Testing and Certification of Electrical Equipment (IECEE), Geneva, Switzerland. All rights reserved.

This publication may be reproduced in whole or in part for non-commercial purposes as long as the IECEE is acknowledged as copyright owner and source of the material. IECEE takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

Test item description.....: Circuit-breaker

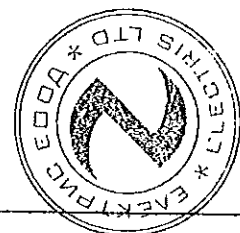
Trade Mark.....: **OEZ**

Manufacturer.....: OEZ s.r.o.

Address.....: OEZ s.r.o. Šedivská 339 56151 Letohrad

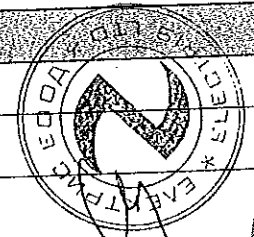
Model/Type reference.....: BL1000

Ratings.....:



TRF No. IEC60947_2C

Particulars: test item vs. test requirements	
3. Classification	
3.1. Utilization category: (A or B).....	A
3.2. Interruption medium: (air, vacuum, gas Break)	Air
3.3. Design: (open construction, moulded case)	moulded case
3.4. Method of controlling the operation mechanism: (dependent manual operation, independent manual operation, dependent power operation, independent power operation)	independent manual operation
3.5. Suitability for insulation: (suitable, not -suitable)	suitable
3.6. Provision for maintenance: (maintainable, non maintainable)	non maintainable
3.7. Method of installation: (fixed, plug in, withdrawable :	withdrawable
3.8. Degree of protection: (IP code).....	IP20
4.8. Integral fuses (integrally fused circuit-breakers) Type and characteristics of SCPD.....	N/A
4.9. Switching overvoltages: (when Uimp. is declared)	Yes
7.3 Electromagnetic compatibility (EMC) Environment A or B.....	Yes
Circuit-breaker for use on phase-earthed systems.....	Yes
Circuit-breaker for use in IT systems	Yes
Rated and limiting values, main circuit	
- rated operational voltage: Ue (V).....	415V/500V/690V AC
- rated insulation voltage: Ui (V)	690V
- rated impulse withstand voltage: Uimp (kV).....	8kV
- rated operational current: Ie (A).....	1000A
- kind of current.....	AC
- conventional free air thermal current: Ith (A)	1000A
- conventional enclosed thermal current: Ithe (A).....	N/A
- current rating for four-pole circuit-breakers: (A)	N/A
- number of poles	3
- rated frequency: (Hz)	50/60Hz
- integral fuses (rated values)	No
- suitability for environment (A or B).....	B
Rated duty	
- eight-hour duty.....	Yes
- uninterrupted duty: Iu (A).....	1000A



Handwritten signatures and initials are present at the bottom of the page, including a large signature on the left and several smaller ones on the right.

Short-circuit characteristic	
rated short-time making capacity: I_{cm} (kA).....:	415V 140kA, 500V 95kA, 690V 60kA
rated ultimate short-circuit breaking capacity: I_{cu} (kA).....:	415V 65kA, 500V 45kA, 690V 20kA
rated service short-circuit breaking capacity: I_{cs} (kA).....:	415V 36kA, 500V 30kA, 690V 20kA
rated short-time withstand current: I_{cw} (kA/s).....:	15kA/1s
Control circuits:	N/A
Electrical control circuits	
- kind of current: (AC, DC).....:	
- rated frequency: (Hz).....:	
- rated control circuit voltage: U_c (nature, frequency, V) :	
- rated control supply voltage: U_s (nature, frequency V) :	
Air supply control circuits: (pneumatic or electro-pneumatic) :	
- rated pressure and its limit.....:	
- volumes of air, at atmospheric pressure, required for each closing and each opening operation.....:	
Auxiliary circuits	
Rated and limiting values, auxiliary circuits.....:	
- rated operational voltage U_e (V).....:	500V AC 240V DC
- rated insulation voltage: U_i (V).....:	500V
- rated operational current: I_e (A).....:	1,5A AC 0,3A DC
- kind of current.....:	AC/DC
- rated frequency: (Hz).....:	50/60HZ
- number of circuits.....:	4
- number and kind of contact elements.....:	2a and 2b
- rated uninterrupted current: I_u (A).....:	6A
- utilization category: (AC, DC, current and voltage).....:	1,5A/500V/AC15 0,3A /240V/DC13



Short-circuit characteristic

Rated conditional short-circuit current: I_{cn} (kA) : -
Co-ordination of short-circuit protective devices :
- kind of protective device : -

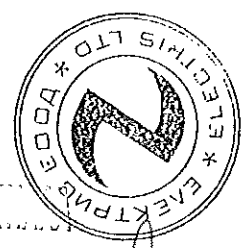
Releases

1) shunt release..... : Yes
2) Over current release : Yes
a) instantaneous..... : Yes
b) definite time delay : X
c) inverse time delay : X
- independent of previous load : X
- dependent on previous load; (for example thermal type release)..... : X
3) Undervoltage release (for opening) : Yes
4) Other releases..... : X

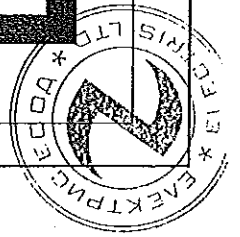
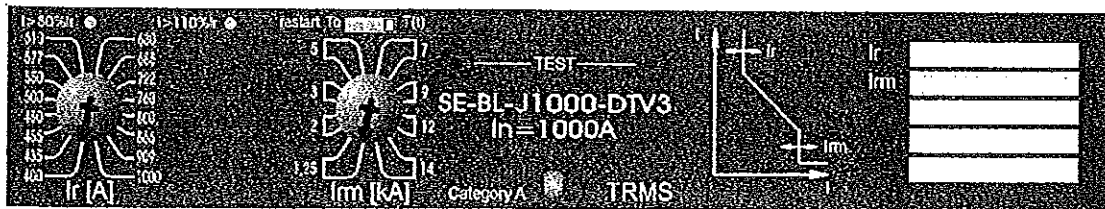
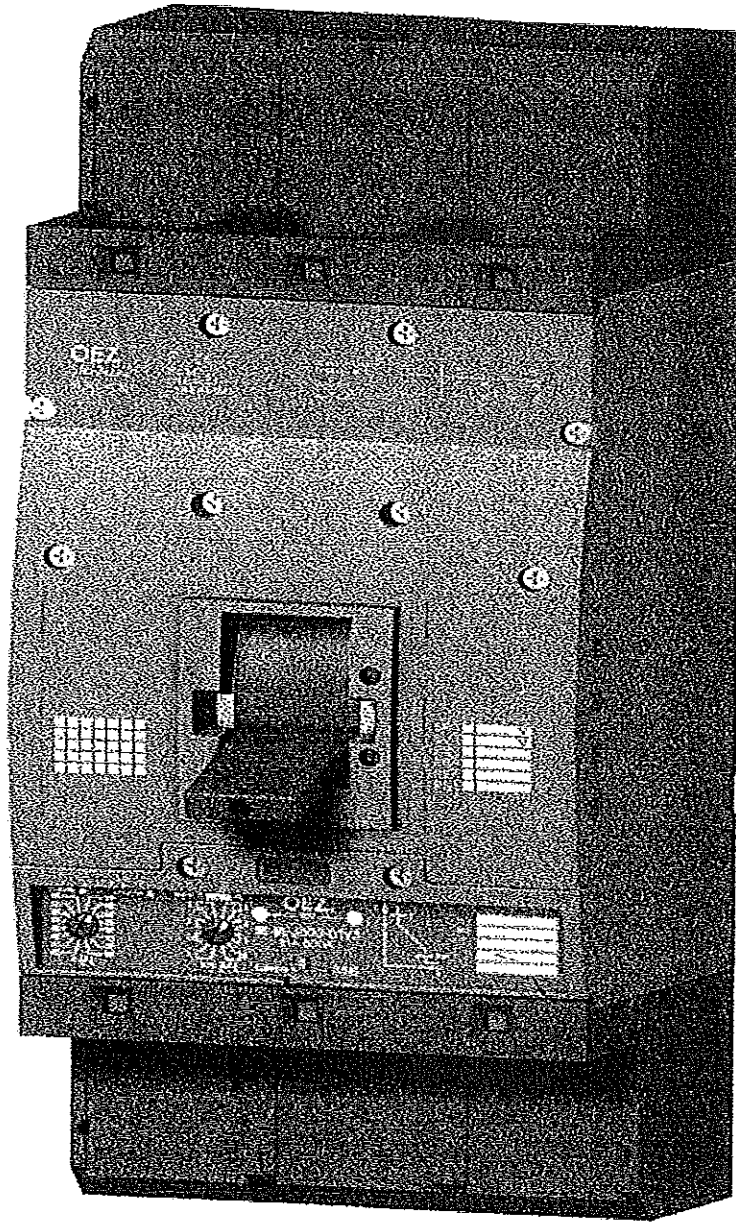
Characteristics :

1) Shunt release and undervoltage release (for opening):
- rated control circuit voltage: U_c (nature, frequency, V) : AC/DC, 50/60Hz, 24V, 48V, 110V, 230V, 400V
- kind of current : AC/DC
-rated frequency: (if AC) : 50/60Hz

2) Overcurrent release :
- rated current : 1000A
- kind of current : AC
- rated frequency: (if AC) : 50/60Hz
- current setting (or range of settings) : 0,4 -1Ir
- time settings (or range of settings) : X

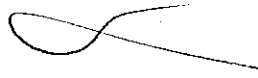


Copy of marking plate



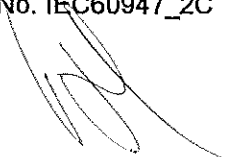
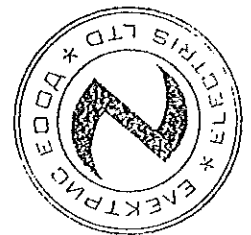
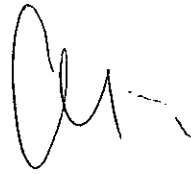
Handwritten signatures and initials at the bottom of the page.

Handwritten text or code at the bottom right of the page.



Summary of testing:

[Empty rectangular box for testing summary]



ELEKTROTECHNICKÝ ZKUŠEBNÍ ÚSTAV



ELECTROTECHNICAL TESTING INSTITUTE - CZECH REPUBLIC
ELEKTROTECHNISCHE PRÜFANSTALT - TSCHECHISCHE REPUBLIK
INSTITUT ELECTROTECHNIQUE D'ESSAIS - RÉPUBLIQUE TCHÈQUE
ЭЛЕКТРОТЕХНИЧЕСКИЙ ИСПЫТАТЕЛЬНЫЙ ИНСТИТУТ - ЧЕШСКАЯ РЕСПУБЛИКА

Pod lísem 129, 171 02 Praha 8 - Troja

CERTIFICATE

No.: 1050028

Product: Circuit breakers

Type: BL1000S

Rating: Ue = 690 V, Iu = 1000 A, 50/60 Hz, Ics = 20 kA

Ordering firm: OEZ s. r. o.
Šedivská 339, 561 51 Letohrad, Czech Republic

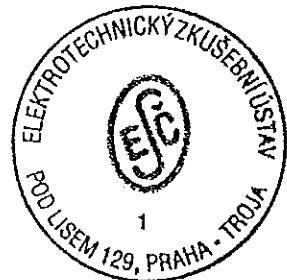
Manufacturer: OEZ s. r. o.
Šedivská 339, 561 51 Letohrad, Czech Republic

Trade mark:

The test results are stated in the test-report No.: 404329-01/01 of: 24.11.2004

A sample of the product was found to be in conformity with:
ČSN EN 60947-1:2000 ed.2 +A1:2001+A2:2002, ČSN EN 60947-2:2004 ed.2

The validity of the certificate is limited to: 30.11.2007



10.1.2005

Prague

Pavel Kudrna
Certification and Inspection Manager

Stamp



404329-01

ELEKTROTECHNICKÝ ZKUŠEBNÍ ÚSTAV



ELECTROTECHNICAL TESTING INSTITUTE - CZECH REPUBLIC
ELEKTROTECHNISCHE PRÜFANSTALT - TSCHHECHISCHE REPUBLIK
INSTITUT ELECTROTECHNIQUE D'ESSAIS - RÉPUBLIQUE TCHÈQUE
ЭЛЕКТРОТЕХНИЧЕСКИЙ ИСПЫТАТЕЛЬНЫЙ ИНСТИТУТ - ЧЕШСКАЯ РЕСПУБЛИКА

Pod lisem 129, 171 02 Praha 8 - Troja

CERTIFIKÁT

č.: 1050028

Výrobek: Jistič

Typ: BL1000S

Jmenovité hodnoty: $U_c = 690 \text{ V}$, $I_u = 1000 \text{ A}$, 50/60 Hz, $I_{cs} = 20 \text{ kA}$

Objednavatel: OEZ s. r. o.
Šedivská 339, 561 51 Letohrad, Česká republika

Výrobce: OEZ s. r. o.
Šedivská 339, 561 51 Letohrad, Česká republika

Obchodní značka:

Výsledky zkoušek jsou uvedeny v protokolu č.: 404329-01/01 ze dne: 24.11.2004

Vzorek zkoušeného výrobku je ve shodě s požadavky:
ČSN EN 60947-1:2000 ed.2 +A1:2001+A2:2002, ČSN EN 60947-2:2004 ed.2

Shoda výrobku s uvedenými normami a předpisy zajišťuje shodu výrobku se základními požadavky nařízení vlády č. 17/2003 Sb., 163/2002 Sb. v platném znění a certifikát může být použit jako podklad pro Prohlášení o shodě podle zákona č. 22/97 Sb. o technických požadavcích na výrobky, v platném znění.

Platnost certifikátu je omezena do: 30.11.2007

10.1.2005

V Praze dne



Ing. Pavel Kudrna
Majitel pro certifikaci a inspekce

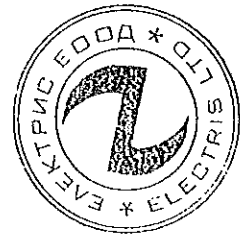


razítko



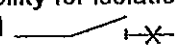

404329-01

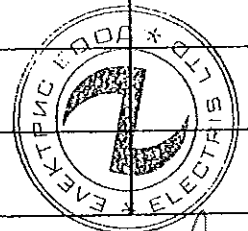
Test item particulars	
Classification of installation and use	X
Supply Connection	X
.....	
.....	
Possible test case verdicts:	
- test case does not apply to the test object	N/A
- test object does meet the requirement.....	P(Pass)
- test object does not meet the requirement.....	F(Fail)
Testing	
Date of receipt of test item	
Date (s) of performance of tests	
General remarks:	
<p>This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IEC 60384-14.</p> <p>The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.</p> <p>"(see Enclosure #)" refers to additional information appended to the report. "(see appended table)" refers to a table appended to the report.</p> <p>Throughout this report a comma (point) is used as the decimal separator.</p>	
General product information:	



[Handwritten signature]

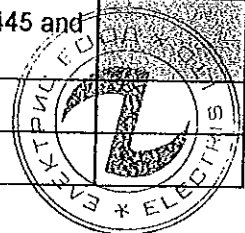
[Handwritten signature]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
5.2	MARKING		
a)	The following data shall be marked on the circuit-breaker itself or on a name plate or nameplates attached to the circuit-breaker, and located in a place such that they are visible and legible when the circuit-breaker is installed.		
	- rated current:	1000A	
	- suitability for isolation, if applicable, with the symbol 	Yes	
	- indication of the open and closed position: with O and I respectively, if symbols are used	Yes	
b)	Marking on equipment not needed to be visible after mounting:		
	- manufacturer's name or trademark	OEZ	
	- type designation or serial number	BL1000	
	- IEC 60947-2 if the manufacturer compliance with this standard.	Yes	
	- utilization category	A	
	- rated operational voltage(s) Ue	415V, 500V, 690V AC	
	- Circuit-breaker for use in IT systems: Circuit-breaker for which all values of rated voltage have not been tested according to annex H or are not covered by such testing, shall be identified by the symbol  which shall be marked on the circuit-breaker immediately following these values of rated voltage	Circuit-breaker is suitable for use in IT systems 415V, 500V, 690V	P
	- value (or range) of the rated frequency and/or the indication DC (or symbol)	50/60Hz	
	- rated service short-circuit breaking capacity. Ics	36kA/415V, 30kA/500V, 20kA/690V	
	- rated ultimate short-circuit breaking capacity. Icu	65kA/415V, 45/500V, 20kA/690V	
	- rated short-time withstand current, (Icw) and associated short-time delay, for utilization category B	N/A	
	- line and load terminals, unless their connection is immaterial	Yes	
	- neutral pole terminals, if applicable, by the letter N	N/A	
	- protective earth terminal, where applicable, by the symbol acc. 7.1.9.3 of part 1	N/A	




Handwritten signatures and a rectangular stamp are present at the bottom of the page.

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	- ref. temperature for non-compensated thermal releases, if different from 30°C	+40°C	
c)	Marked on the circuit-breaker as specified in item b), or shall be made available in the manufacturer's published information:		
	- rated short-circuit making capacity (Icm) (if higher than specified in 4.3.5.1)	140kA/415V	
	- rated insulation voltage. (Ui) if higher than the maximum rated operational voltage)	690V	
	- rated impulse withstand voltage (Uimp), when declared.	8kV	
	- pollution degree if other than 3	3	
	- conventional enclosed thermal current (Ithe) if different from the rated current:	Ith=In	
	- IP Code, where applicable:	IP20	
	- minimum enclosure size and ventilation data (if any) to which marked ratings apply:	N/A	
	- details of minimum distance between circuit-breaker and earthed metal parts for circuit-breaker intended for use without enclosure:	Vide catalogue	
	- r.m.s sensing if applicable, according to F.4.1.1	yes	
	- suitability for environment A or B	B	
d)	The following data concerning the opening and closing devices of the circuit-breaker shall be placed either on their own nameplates or on the nameplate of the circuit-breaker:		
	- rated control circuit voltage of the closing device, and rated frequency for AC:	N/A	
	- rated control circuit voltage of the shunt release and/or of the under-voltage release, and rated frequency:	24,48,110,230,400,500VAC 24,48,11,220V DC 50/60Hz	
	- rated current of indirect over-current releases:	N/A	
	- number and type of auxiliary contacts and kind of current, rated frequency (if AC) and rated voltages of the auxiliary switches, if different from those of the main circuit.	Vide catalogue	
e)	Terminal shall be clearly and permanently identified in acc. with IEC 60445 and annex L :		
	- line terminal	satisfy	
	- load terminal	satisfy	

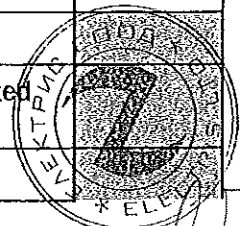


[Handwritten signatures and marks]

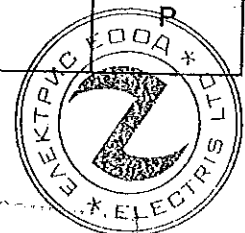
[Faint printed text]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	- neutral pole terminal "N"	N/A	
	- protective earth terminal 	N/A	
	- terminal of coils (A/B)	N/A	
	- terminal of shunt release (B)	satisfy	
	- terminals of under-voltage release (D)	satisfy	
	- terminals of interlocking electromagnets (E)	N/A	
	- terminals of indicated light devices (X)	N/A	
	- terminals of contact elements for switching devices (no)	N/A	

7.1	CONSTRUCTION		
7.1.1	Withdrawable circuit-breaker	satisfy	
	In the disconnected position (main- and auxiliary circuits)		
	Isolating distances for circuit-breaker suitable for isolating warranted:	26mm	P
	Mechanism fitted with a reliable indicating device with indicates the position of the isolating contacts.	yes	P
	Mechanism fitted with interlocks which only permit the isolating contacts to be separate or re-closed when main contacts are open	yes	P
	Mechanism fitted with interlock, which only permit the main contacts to be closed when the isolating contacts are fully closed.	yes	P
	Mechanism fitted with interlock, which only permit the main contacts to be closed when in disconnected position.	yes	P
	The isolating distances between the isolating contacts cannot be inadvertently reduced.	yes	P
7.1.1.1	Resistance to abnormal heat and fire	Satisfy IEC 60947-1	P
7.1.2	Current-carrying parts and their connection	Satisfy IEC 60947-1	P
7.1.3	Clearances and creepage distances:		
	For circuit-breakers for which the manufacturer has declared a value of rated impulse withstand voltage. (Uimp.)		
	Clearances distances:	20mm	



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	- Uimp is given as:	8kV	
	- max. value of rated operational voltage to earth	400V	
	- nominal voltage of supply system:	N/A	
	- overvoltage category:	IV	
	- pollution degree:	3	
	- field-in or homogeneous:	inhomogeneous	
	- minimum clearances (mm):	8mm	
	- measured clearances (mm):	12,5mm	P
	Creepage distances:		
	- rated insulation voltage Ui (V)	690V	
	- pollution degree	3	
	- comparative tracking index (V)	400	
	- material group	2	
	Minimum creepage distances (mm)	9mm	
	Measured creepage distances (mm)	32mm	P
7.1.4 part 1	Actuator		
7.1.4.1 part 1	Insulation		
	The actuator of the equipment shall be insulated from the live parts for the rated insulation voltage and, if applicable, the rated impulse withstand voltage	satisfy	P
	If it is made of metal, it shall be capable of being satisfactorily connected to a protective conductor unless it is provided with additional reliable insulation	satisfy	P
	If it is made of or covered by insulating material, any internal metal part, which might become accessible in the event of insulation failure, shall also be insulated from live parts for the rated insulation voltage	satisfy	P
7.1.4.2	Direction of movement		
	The direction of operation for actuators of devices shall normally conform to IEC 60447.	satisfy	P



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Where devices cannot conform to these requirements, e.g. due to special applications or alternative mounting positions, they shall be clearly marked such that there is no doubt as to the "I" and "O" positions and the direction of operation	satisfy	P
7.1.5 part 1	Indication of contact position		
7.1.5.1 part 1	Indicating means		
	When an equipment is provided with means for indicating the closed and open positions, these positions shall be unambiguous and clearly indicated	satisfy	P
	This is done by means of a position indicating device (see 2.3.18)	satisfy	P
	If symbols are used, they shall indicate the closed and open position respectively, in accordance with IEC 60417-2:		
	- 60417-2-IEC-5007 I On (power)	satisfy	P
	- 60417-2-IEC-5007 O Off (power)	satisfy	P
	For equipment operated by means of two push-buttons, only the push-button designated for the opening operation shall be red or marked with the symbol "O"	N/A	
	Red colour shall not be used for any other push-button	N/A	
	The colours of other push-buttons, illuminated push-buttons and indicator lights shall be in accordance with IEC 60073	N/A	
7.1.5.2 part 1	Indication by the actuator		
	When the actuator is used to indicate the position of the contacts, it shall automatically take up or stay, when released, in the position corresponding to that of the moving contacts; in this case, the actuator shall have two distinct rest positions corresponding to those of the moving contacts, but for automatic opening a third distinct position of the actuator may be provided	satisfy	P

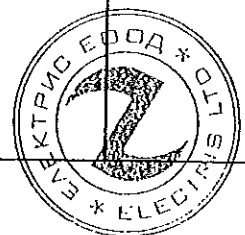


[Handwritten signatures]

[Handwritten signature]
 [Stamp: ДИПЛОМ ИЛИ СЕРТИФИКАТ]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

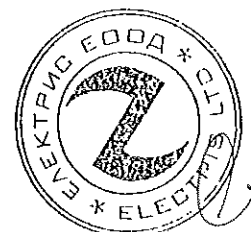
7.1.6	Additional safety requirements for equipment suitable for isolation		
7.1.6.1	Additional constructional requirements for equipment suitable for isolation (Ue > 50 V):		
	Equipment suitable for isolation shall provide in the open position an isolation distance in acc. with the requirements necessary to satisfy the isolating function. Indication of the main contacts shall be provide by one or more of the following means:		
	- the position of the actuator	yes	P
	- a separate mechanical indicator	N/A	
	- visibility of the moving contacts	not	
	When means are provided or to lock the equipment in the open position, locking only be possible when contacts are in the open position	satisfy	P
	Actuator front-plate fitted to the equipment in a manner which ensures correct contact position indication and locking	yes	P
	The indicated open position is the only position in which the specified isolation distances between the contacts is ensured.	Satisfy	P
	- minimum clearances across open contacts (see Table XIII, Part 1) (mm) :	8mm	
	- measured clearances (mm) :	20mm	P
	- test Uimp across gap (kV) :	8kV	P
7.1.6.2	Supplementary requirements for equipment with provision for electrical interlocking with contactors or circuit-breakers:		N/A
	auxiliary switch shall be rated according to IEC 60 947-5-1		
	If equipment suitable for isolation is provided with an auxiliary switch for the purpose of electrical interlocking with contactor (s) or circuit-breaker(s) and intended to be used in motor circuits, the following requirements shall apply unless the equipment is rated for AC-23 utilization category		
	The time interval between the opening of the contacts of the auxiliary switch and the contacts of the main poles shall be sufficient to ensure that the associated contactor or circuit-breaker interrupts the current before the main poles of the equipment open		



[Handwritten signatures and marks]

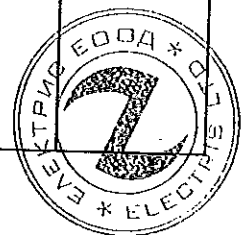
[Faint rectangular stamp]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Unless otherwise stated in the manufacturer's technical literature, the time interval shall be not less than 20 ms when the equipment is operated according to the manufacturer's instructions		
	Compliance shall be verified by measuring the time interval between the instant of opening of the auxiliary switch and the instant of opening of the main poles under no-load conditions when the equipment is operated according to the manufacturer's instructions		
	During the closing operation the contacts of the auxiliary switch shall close after or simultaneously with the contacts of the main poles		
	A suitable opening time interval may also be provided by an intermediate position (between the ON and OFF position) at which the interlocking contact(s) is (are) open and the main poles remain closed		
7.1.6.3	Supplementary requirements for equipment provided with means for padlocking the open position:		
	the locking means shall be designed in such a way that it cannot be removed with the appropriate padlock(s) installed	satisfy	P
	Alternatively, the design may provide padlockable means to prevent access to the actuator	N/A	
	test force F applied to the actuator in an attempt to operate to the closed position (N):	495N	P
	rated impulse withstand voltage (kV):	8kV	P
	test Uimp on open main contacts at the test force		P
7.1.7	Terminals		
7.1.7.1	All parts of terminals which maintain contact and carry current shall be of metal having adequate mechanical strength	satisfy	P
	Terminal connections shall be such that necessary contact pressure is maintained	satisfy	P
	Terminals shall be so constructed that the conductor is clamped between suitable surfaces without damage to the conductor and terminal	satisfy	P



Handwritten signatures and marks are present at the bottom of the page, including a large signature on the left and another on the right, along with some illegible text.

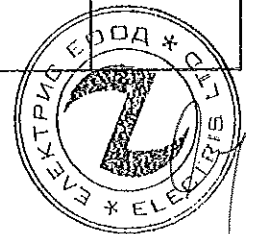
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Terminal shall not allow the conductor to be displaced or to be displaced themselves in a manner detrimental to the operator of equipment and the insulation voltage shall not be reduced below the rated value	satisfy	P
7.1.7.2	Connection capacity		
	type of conductors :		
	minimum cross-sectional area of conductor (mm ²) :		
	maximum cross-sectional area of conductor (mm ²) :	600mm ²	
	number of conductors simultaneously connectable to the terminal :	1	
7.1.7.3	Connection		
	terminals for connection to external conductors shall be readily accessible during installation	satisfy	P
	clamping screws and nuts shall not serve to fix any other component	satisfy	P
7.1.7.4	Terminal identification and marking		
	terminal intended exclusively for the neutral conductor	N/A	
	protective earth terminal	N/A	
	other terminals	N/A	
7.1.8 part 1	Additional requirements for equipment provided with a neutral pole		N/A
	When an equipment is provided with a pole intended only for connecting the neutral, this pole shall be clearly identified to that effect by the letter N (see 7.1.7.4.).		
	A switched neutral pole shall break not before and shall make not after the other poles		
	For equipment having a value of conventional thermal current (free air or enclosed, see 4.3.2.1 and 4.3.2.2) not exceeding 63 A, this value shall be identical for all poles		
	For higher conventional thermal current values, the neutral pole may have a value of conventional thermal current different from that of the other poles, but not less than half that value or 63 A, whichever is the higher		




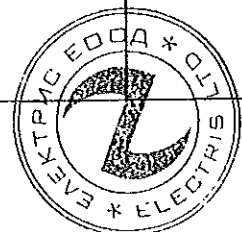
[Handwritten signatures and marks]

[Faint rectangular stamp]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	if a pole with a appropriate making and breaking capacity is used as a neutral pole, then all poles, incl. the neutral pole, shall operate substantially together.		
7.1.9	Provisions for protective earthing		N/A
7.1.9.1	The exposed conductive parts (e.g. chassis, framework and fixed parts of metal enclosures) other than those which cannot constitute a danger shall be electrically interconnected and connected to a protective earth terminal for connection to an earth electrode or to an external protective conductor		
part 1	This requirement can be met by the normal structural parts providing adequate electrical continuity and applies whether the equipment is used on its own or incorporated in an assembly		
	Exposed conductive parts are considered not to constitute a danger if they cannot be touched on large areas or grasped with the hand or if they are of small size (approximately 50 mm x 50 mm) or are so located as to exclude any contact with live parts		
7.1.9.2 part 1	Protective earth terminal		
	The protective earth terminal shall be readily accessible and so placed that the connection of the equipment to the earth electrode or to the protective conductor is maintained when the cover or any other removable part is removed	satisfy	P
	The protective earth terminal shall be suitably protected against corrosion	satisfy	P
	In the case of equipment with conductive structures, enclosures, etc., means shall be provided, if necessary, to ensure electrical continuity between the exposed conductive parts the equipment and the metal sheathing of connecting conductors	satisfy	P
	The protective earth terminal shall have no other function, except when it is intended to be connected to a PEN conductor (see 2.1.1.5 – Note). In this case, it shall also have the function of a neutral terminal in addition to meeting the requirements applicable to the protective earth terminal	satisfy	P



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
7.1.9.3	Protective earth terminal marking and identification		
	The protective earth terminal shall be clearly and permanently identified by its marking	satisfy	P
	The identification shall be achieved by colour (green-yellow mark) or by the notation PE, or PEN, as applicable, in accordance with IEC 60445, subclause 5.3, or, in the case of PEN, by a graphical symbol for use on equipment	satisfy	P
	Graphical symbol to be used:  Protective earth (ground) in accordance with IEC 60417-2	satisfy	P
7.1.10	Enclosure for equipment		N/A
7.1.10.1	Design		N/A
	The enclosure, when it is opened: all parts requiring access for installation and maintenance are readily accessible		
	Sufficient space shall be provided inside the enclosure		
	The fixed parts of a metal enclosure shall be electrically connected to the other exposed conductive parts of the equipment and connected to a terminal which enables them to be earthed or connected to a protective conductor		
	Under no circumstances shall a removable metal part of the enclosure be insulated from the part carrying the earth terminal when the removable part is in place		
	The removable parts of the enclosure shall be firmly secured to the fixed parts by a device such that they cannot be accidentally loosened or detached owing to the effects of operation of the equipment or vibrations		
	When an enclosure is so designed as to allow the covers to be opened without the use of tools, means shall be provided to prevent loss of the fastening devices		
	If the enclosure is used for mounting push-buttons, it shall not be possible to remove the buttons from the outside of the enclosure		



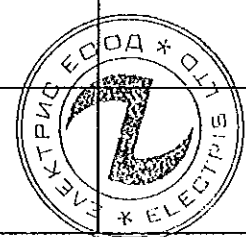
CONFIDENTIAL

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
7.1.10.2	Insulation		
	If, in order to prevent accidental contact between a metallic enclosure and live parts, the enclosure is partly or completely lined with insulating material, then this lining shall be securely fixed to the enclosure	satisfy	P
7.1.11	Degree of protection of enclosed equipment		
	Degree of protection.	IP20	
	Test for first characteristic.	IP20	
	Test for first numeral	2	P
	Test for second characteristic	IP20	N/A
	Test for second numeral	0	P
7.1.12 part 1	Conduit pull-out, torque and bending with metallic conduits		N/A
	Polymeric enclosures of equipment, whether integral or not, provided with threaded conduit entries, intended for the connection of extra heavy duty, rigid threaded metal conduits complying with IEC 60981, shall withstand the stresses occurring during its installation such as pull-out, torque, bending		
7.2	Performance requirements		
7.2.1	Operating condition		
7.2.1.1	Closing		
	For a circuit-breaker to be closed safely on to the making current corresponding to its rated short-circuit making capacity, it is essential that it should be operated with the same speed and the same firmness as during the type test for proving the short-circuit making capacity	satisfy	P
7.2.1.1.1	Dependent manual closing		N/A
	For a circuit-breaker having a dependent manual closing mechanism, it is not possible to assign a short-circuit making capacity rating irrespective of the conditions of mechanical operation		
	Such a circuit-breaker should not be used in circuits having a prospective peak making current exceeding 10 kA		



[Handwritten signatures and marks]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	However, this does not apply in the case of a circuit-breaker having a dependent manual closing mechanism and incorporating an integral fast-acting opening release which causes the circuit-breaker to break safely, irrespective of the speed and firmness with which it is closed on to prospective peak currents exceeding 10 kA; in this case, a rated short-circuit making capacity can be assigned		
7.2.1.1.2	Independent manual closing		
	A circuit-breaker having an independent manual closing mechanism can be assigned a short-circuit making capacity rating irrespective of the conditions of mechanical operation	satisfy	P
7.2.1.1.3	Dependent power closing		N/A
	At 110% of the rated control supply voltage, the closing operation performed on no-load shall not cause any damage to the circuit-breaker.		
	At 85% of the rated control supply voltage, the closing operation shall be performed when the current established by the circuit-breaker is equal to its rated making capacity within the limits allowed by the operation of its relays or releases and, if a maximum time is stated for the closing operation, in a time not exceeding this maximum time limit.		
7.2.1.1.4	Independent power closing		N/A
	A circuit-breaker having an independent power closing operation can be assigned a rated short-circuit making capacity irrespective of the conditions of power closing		
	Means for charging the operating mechanism, as well as the closing control components, shall be capable of operating in accordance with the manufacturer's specification		
7.2.1.1.5	Stored energy closing		N/A
	Capable ensuring closing of the circuit-breaker in any condition between no-load and its rated making capacity		
	- when the stored energy is retained within the circuit-breaker, a device is provided which indicates when the storing mechanism is fully charged.		

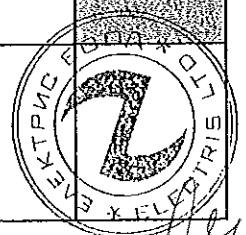


[Handwritten signature]

[Handwritten signature]

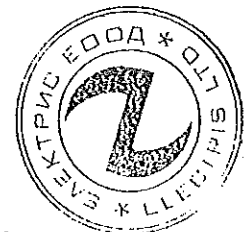
[Stamp]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	- means for charging the operating mechanism and closing control components operates when auxiliary supply voltage is between 85% and 110% of the rated control supply voltage.		
	- not possible for the moving contacts to move from the open position, unless the charge is sufficient for satisfactory completion of the closing operation.		
	- by manually operated circuit-breaker is the direction of operation indicated. (not for circuit-breaker with an independent manual closing operation.)		
	- For trip free circuit-breaker it shall not be possible to maintain the contacts in the touching or closed position when the release is in the position to trip the circuit-breaker.		
7.2.1.2	Opening		
7.2.1.2.1	Circuit-breakers which open automatically shall be trip-free and, unless otherwise agreed between manufacturer and user, shall have their energy for the tripping operation stored prior to the completion of the closing operation		
7.2.1.2.2	Opening by undervoltage releases		
7.2.1.3. a part 1	Operating voltage		
	An under-voltage relay or release, when associated with a switching device, shall operate to open the equipment even on a slowly falling voltage within the range between 70% and 35% of its rated voltage	satisfy	P
	An under-voltage relay or release shall prevent the closing of the equipment when the supply voltage is below 35% of the rated voltage of the relay or release; it shall permit closing of the equipment at supply voltages equal to or above 85% of its rated value	satisfy	P
	Unless otherwise stated in the relevant product standard, the upper limit of the supply voltage shall be 110% of its rated value	satisfy	P
7.2.1.3. b part 1	Operating time		N/A
	For a time-delay under-voltage relay or release, the time-lag shall be measured from the instant when the voltage reaches the operating value until the instant when the relay or release actuates the tripping device of the equipment		



Handwritten signatures and initials are present at the bottom of the page, including a large signature on the left and several smaller ones on the right, some overlapping the stamp.

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
7.2.1.2.3	Opening by shunt releases		
7.2.1.4 part 1	Limits of operation of shunt releases		
	A shunt release for opening shall cause tripping under all operating conditions of an equipment when the supply voltage of the shunt release measured during the tripping operation remains between 70% and 110% of the rated control supply voltage and, if a.c., at the rated frequency	satisfy	P
7.2.1.5 part 1	Limits of operation of current operated relays and releases		
	Limits of operation of current operated relays and releases shall be stated in the relevant product standard	satisfy	P
7.2.1.2.4	Opening by over-current releases		
a)	Opening under short-circuit conditions		
	The short-circuit release shall cause tripping of the circuit-breaker with an accuracy of 20% of the tripping current value of the current setting for all values of the current setting of the short-circuit current release	satisfy	P
	Where necessary for over-current co-ordination the manufacturer shall provide information (usually curves) showing	satisfy	P
	- maximum cut-off (let-through) peak current as a function of prospective current (r.m.s. symmetrical)	Enclosure no	P
	- I^2t characteristics for circuit-breakers of utilization category A and, if applicable, B for circuit-breakers with instantaneous override (see not to 8.3.5)	Enclosure no	P
b)	Opening under overload conditions		
1)	Instantaneous or definite time-delay operation		
	The release shall cause tripping of the circuit-breaker with an accuracy of $\pm 10\%$ of the tripping current value of the current setting for all values of current setting of the overload release	satisfy	P

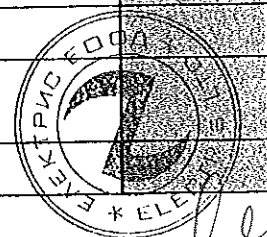


IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

2)	Inverse timer-delay operation		
	At the reference temperature and at 1,05 times the current setting with the conventional non-tripping current, the opening release being energized on all poles, tripping shall not occur in less than the conventional time from the cold state, i.e. with the circuit-breaker at the reference temperature	satisfy	P
	Moreover, when at the end of the conventional time the value of current is immediately raised to 1,30 times the current setting, i.e. with the conventional tripping current, tripping shall then occur in less than the conventional time later	satisfy	P
	If a release is declared by the manufacturer as substantially independent of ambient temperature, the current values of table 6 shall apply within the temperature band declared by the manufacturer, within a tolerance of 0,3%/K	satisfy	P
	The width of the temperature band shall be at least 10 K on either side of the reference temperature	satisfy	P
7.2.4.2	Operational performance capability		
7.2.4.2 part 1	The operational performance off-load for which the tests are made with the control circuits energized and the main circuit not energized, in order to demonstrate that the equipment meets the operating conditions specified at the upper and lower limits of supply voltage and/or pressure specified for the control circuit during closing and opening operations	satisfy	P
	The operational performance on-load during which the equipment shall make and break the specified current corresponding, where relevant, to its utilization category for the number of operations stated in the relevant product standard	satisfy	P

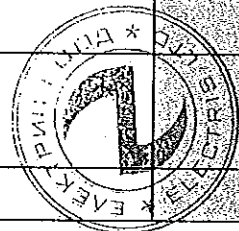
8	TESTS		
8.2.4	Mechanical properties of terminals		N/A
	Mechanical strength of terminals		
	maximum cross-sectional area of conductor (mm ²) :	600mm ²	
	diameter of thread (mm) :	10mm	

TRF No. IEC0947_2C



Handwritten signatures and marks at the bottom of the page.

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	torque (Nm) :	25Nm	
	5 times on 2 separate clamping units	satisfy	P
	Testing for damage to and accidental loosening of conductor (flexion test)		N/A
	conductor of the smallest cross-sectional area (mm ²) :		
	number of conductor of the smallest cross section :		
	diameter of bushing hole (mm) :		
	height between the equipment and the platen :		
	mass at the conductor(s) (kg) :		
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		
	Pull-out test		
	force (N) :		
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		
	conductor of the largest cross-sectional area (mm ²) :		
	number of conductor of the largest cross section :		
	diameter of bushing hole (mm) :		
	height between the equipment and the platen :		
	mass at the conductor(s) (kg) :		
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		
	Pull-out test		
	force (N) :		
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		
	conductor of the largest and smallest cross-sectional area (mm ²) :		
	number of conductor of the smallest cross section, number of conductor of the largest cross section :		
	diameter of bushing hole (mm) :		

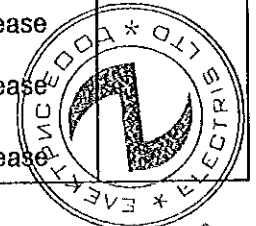


[Handwritten signature]

[Handwritten signature]

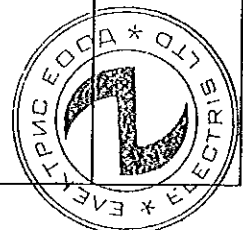
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	height between the equipment and the platen :		
	mass at the conductor(s) (kg) :		
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		
	Pull-out test		
	force (N) :		
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		

8.3.3	TEST SEQUENCE I: GENERAL PERFORMANCE CHARACTERISTICS		
8.3.3.1	Tripping limits and characteristic		
8.3.3.1.2	Opening under short-circuit conditions		
	Manufacturer's name or trademark	OEZ s.r.o.	
	Type designation or serial number	BL1000	
	Sample no:	1	
	Rated operational voltage: Ue (V)	415V,500V,690V AC	
	Rated current: In (A)	1000A	
	Ambient temperature 10-40 °C :	safisty	P
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.	16kA	
	Range of adjustable setting current. (A)	16kA	
	Time delay stated by the manufacturer, in the case of definite time delay releases.	N/A	
	Test current: 80% of the rated, or minimum adjustable setting current: (A)	12,8kA	
	Operating time: >0,2s in case of instantaneous releases:		P
	L1-L2:	No operate of the release	
	L1-L3:	No operate of the release	
	L2-L3:	No operate of the release	



[Handwritten signatures and marks]

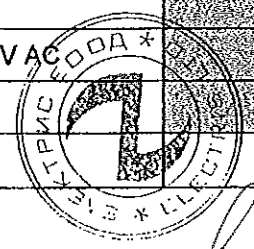
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:	N/A	
	Test current: 80% of the maximum adjustable setting current: (A)	N/A	
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	N/A	
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:	N/A	
	Test current: 120% of the rated, or minimum adjustable setting current: (A)	19,2kA	
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:	N/A	



[Handwritten signature]

TPVC EOODA * LTD BULGARIA * ELECTRIC

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test current: 120% of the maximum adjustable setting current: (A)	N/A	
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	N/A	
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:	N/A	
	Test current: tripping current declared for single pole operation (A)	16kA	
	Operating time: < 200 ms in case of instantaneous release: L1: L2: L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by manufacturer in case of definite time delay releases L2: L3:	N/A	
8.3.3.1.3	Opening under overload conditions		
a)	Instantaneous or definite time-delay releases		
	Manufacturer's name or trademark	OEZ s.r.o.	
	Type designation or serial number	BL1000	
	Sample no:	1	
	Rated operational voltage: Ue (V)	415V,500V,690V AC	
	Rated current: In (A)	1000A	
	Ambient temperature 10-40 °C :	safisty	



[Handwritten signature]

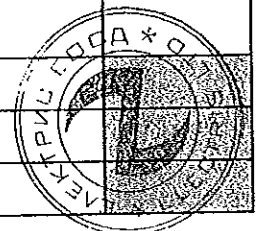
[Handwritten signature]

[Handwritten signature]

[Handwritten signature]

CONOSCIMENTA

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.	1250A - 14000A	
	Range of adjustable setting current. (A)	1250A - 14000A	
	Time delay stated by the manufacturer, in the case of definite time delay releases.	N/A	
	Test current: 90% of the rated, or minimum adjustable setting current: (A)	1125A	
	Operating time: >0,2s in case of instantaneous releases:	No operate of the release	P
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.	N/A	
	Test current: 90% of the maximum adjustable setting current: (A)	12600A	
	Operating time: >0,2s in case of instantaneous releases	No operate of the release	P
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.	N/A	
	Test current: 110% of the rated, or minimum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A)	1375A N/A	
	Operating time: <0,2s in case of instantaneous releases:	operate of the release	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.	N/A	
	Test current: 110% of the maximum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A)	15400A N/A	
	Operating time: <0,2s in case of instantaneous releases	operate of the release	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.	N/A	
b)	Inverse time delay releases		
	Manufacturer's name or trademark	OEZ s.r.o.	
	Type designation or serial number	BL1000	

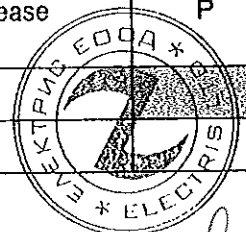


4

[Handwritten signature]

600332-04/01

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Sample no:	1	
	Rated operational voltage: Ue (V)	415V, 500V, 690V AC	
	Rated current: In (A)	1000A	
	For releases dependent of ambient air temperature: Reference temperature	N/A	
	Test ambient temperature (°C)	N/A	
	If test made at a difference ambient temperature: Acc. manufacturer's correction temperature/current data:	N/A	
	Range of adjustable setting current: (A)	N/A	
	For releases independent of ambient temperature: Test made at 30°C and/or at 20/40°C	yes	
	Test ambient air temperature:	30°C	
	Releases, dependent of ambient air temperature: Reference temperature (°C)	N/A	
	Releases, independent of ambient air temperature: at 30°C		
	Test current: 105% of the rated, or minimum adjustable setting current: (A)	420A	
	Conventional non-tripping time: 1h when In < 63A, 2h when In > 63 A	No operate of the release	P
	Test current: 130% of the rated, or minimum adjustable setting current: (A)	520A	
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	Operate of the release	P
	Test current: 105% of the maximum adjustable setting current: (A)	1050A	
	Conventional non-tripping time: 1h when In < 63A, 2h when In > 63 A	No operate of the release	P
	Test current: 130% of the maximum adjustable setting current: (A)	1300A	
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	Operate of the release	P
	Releases, independent of ambient air temperature: at 20°C or 40°C		
	Test ambient air temperature:	40°C	



[Handwritten signature]

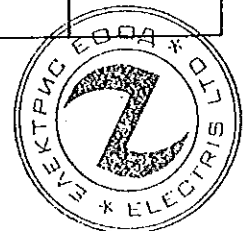
[Handwritten signature]

[Handwritten signature]

DATE: 30/01/2011

[Handwritten signature]

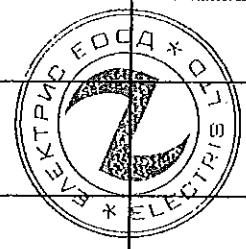
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test current: 105% of the rated, or minimum adjustable setting current: (A)	420A	
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$	No operate of the release	P
	Test current: 130% of the rated, or minimum adjustable setting current: (A)	520A	
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$	Operate of the release	P
	Test current: 105% of the maximum adjustable setting current: (A)	1050A	
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$	No operate of the release	P
	Test current: 130% of the maximum adjustable setting current: (A)	1300A	
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$	Operate of the release	P
	An additional test, at a current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer		
	Releases, dependent of ambient air temperature: Reference temperature (°C)	N/A	
	Releases, independent of ambient air temperature: at 30°C	30°C	
	Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A)	Instantaneous rease $\pm 20\%$ short-circuit release $\pm 10\%$ Inverse time-delay releases $\pm 30\%$	P
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)	yes	P
	Releases, independent of ambient air temperature: at 20°C or 40°C		
	Test ambient air temperature:	40°C	



[Handwritten signatures]

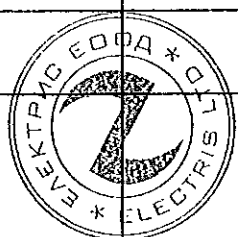
J

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A)	Instantaneous rease $\pm 20\%$ short-circuit release $\pm 10\%$ Inverse time-delay releases $\pm 30\%$	
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)	yes	P
8.3.3.1.4	Additional test for definite time-delay releases		N/A
a)	Time delay		
	Test is made at a current equal to 1,5 times the current setting		
	<u>overload releases:</u> (all phase poles loaded)		
	<u>short-circuit releases:</u> two poles in series carrying the test current, using successively all possible combinations of poles having a short-circuit release.		
	Test current: 1,5 times of the rated, or minimum adjustable setting current: (A)		
	Operating time, <u>overload releases:</u> (s)		
	Time-delay: between the limits stated by the manufacturer:		
	Operating time, <u>short-circuit releases:</u> (s) .....L1-l.....L1-l.....L2-l		
	Time-delay: between the limits stated by the manufacturer:		
	Test current: 1,5 times of the maximum adjustable setting current: (A)		
	Operating time, <u>overload releases:</u> (s)		
	Time-delay: between the limits stated by the manufacturer:		
	Operating time, <u>short-circuit releases:</u> (s) .....L1-l.....L1-l.....L2-l		
	Time-delay: between the limits stated by the manufacturer:		



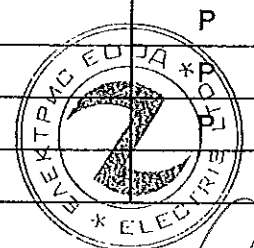
[Handwritten signatures and initials]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
b)	Non-tripping duration		N/A
	Firstly, the test current equal to 1,5 times the current setting is maintained for a time interval equal to the non-tripping duration stated by the manufacturer.		
	<u>overload releases</u> : (all phase poles loaded)		
	<u>short-circuit releases</u> : two poles in series carrying the test current, using successively all possible combinations of poles having a short-circuit release.		
	Test current: 1,5 times of the rated, or minimum adjustable setting current: (A)		
	Time interval: non-tripping duration stated by the manufacturer: (s)		
	Operating time, <u>overload releases</u> : the circuit-breaker does not trip:		
	Operating time, <u>short-circuit releases</u> : the circuit-breaker does not trip: L1-L2: L1-L3: L2-L3:		
	Test current: 1,5 times of maximum adjustable setting current: (A)		
	Time interval: non-tripping duration stated by the manufacturer: (s)		
	Operating time, <u>overload releases</u> : the circuit-breaker does not trip:		
	Operating time, <u>short-circuit releases</u> : the circuit-breaker does not trip: L1-L2: L1-L3: L2-L3:		
	Then, the current is reduced to the rated current and maintained at this value for twice the time-delay stated by the manufacturer. The circuit-breaker shall not trip.		
	Test current: of the rated, or minimum adjustable setting current: (A)		
	Time interval: twice the delay-time stated by the manufacturer: (s)		
	Operating time, <u>overload releases</u> : the circuit-breaker does not trip:		
	Operating time, <u>short-circuit releases</u> : the circuit-breaker does not trip: L1-L2: L1-L3: L2-L3:		



Handwritten signatures and a rectangular stamp at the bottom of the page.

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test current: maximum adjustable setting current: (A)		
	Operating time, <u>overload releases</u> : the circuit-breaker does not trip:		
	Operating time, <u>short-circuit releases</u> : the circuit-breaker does not trip: L1-L2: .....L1-l L2-L3:		
8.3.3.2	Test of dielectric properties, impulse withstand voltage (Uimp indicated):		
8.3.3.4 part1	The 1,2/50µs impulse voltage shall be applied five times for each polarity at intervals of 1s minimum		
	- rated impulse withstand voltage (kV) :	8kV main circuits 6kV auxiliary circuits	
	- sea level of the laboratory:	340m	
	- test Uimp main circuits (kV) :	9,6kV	P
	- test Uimp auxiliary circuits (kV) :	7,2kV	P
	- test Uimp control circuits (kV) :	N/A	
	- test Uimp on open main contacts (equipment suitable for isolating) (kV) :	14,5kV	P
a)	Application of test voltage		
	i) Between all terminals of the main circuit connected together (incl. control and auxiliary circuits connected to the main circuit) and the enclosure or mounting plate, with the contacts in all normal positions of operation.	meets	P
	ii) Between all terminals of the main circuit and the other poles connected together and to the enclosure or mounting plate, with the contacts in all normal positions of operation.	meets	P
	iii) Between each control and auxiliary circuit not normally connected to the main circuit and: - the main circuit	meets	P
	- other circuits	meets	P
	- exposed conductive parts	meets	P
	- enclosure of mounting plate	meets	
	iv) equipment suitable for isolation	meets	
	equipment not suitable for isolation	N/A	



[Handwritten signature]

[Handwritten signature]

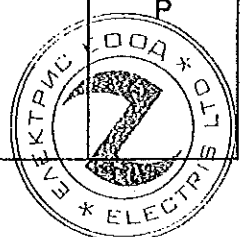
[Handwritten signature]

[Handwritten text]

[Handwritten signature]

8

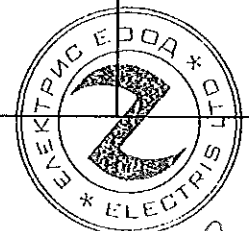
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	- no unintentional disruptive discharge during the test's	no	P
	Test of dielectric properties, dielectric withstand voltage (Uimp not indicated):		N/A
	- rated insulation voltage (V) :	N/A	
	- main circuits, test voltage for 1 min (V)	N/A	
	- auxillary circuits, test voltage for 1 min (V)	N/A	
	- control circuits, test voltage for 1 min (V)	N/A	
8.3.3.2.2	Application of test voltage		
1)	with circuit-breaker in the closed position		
	- between all live parts of all poles connected together and the frame of the circuit-breaker .	meets	P
	- between each pole and all the other poles connected to the frame of the circuit-breaker	meets	P
2)	with the circuit-breaker in the open position and, additionally, in the tripped position, if any.		P
	- between all live parts of all poles connected together and the frame of the circuit-breaker.	meets	P
	- between the terminals of one side connected together and the terminals of the other side connected together.	meets	P
b)	Control and auxiliary circuits		
1)	- between all the control and auxiliary circuits which are not normally connected to the main circuit, connected together, and the frame of the circuit-breaker.	meets	P
2)	- where appropriate, between each part of the control an auxiliary circuits which may be isolated from the other parts during normal operation and all the other parts connected together.	meets	P
	No unintentional disruptive discharge during the test's	no	P
8.3.3.2	For circuit-breaker suitable for isolation, the leakage current shall be measured through each pole with the contacts in the open position, at a test voltage of 1,1 Ue, and shall not exceed 0,5mA.	0,02mA	P



[Handwritten signatures]

[Faint stamp]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
8.3.3.3	Mechanical operation and operational performance capability		
8.3.3.3.2	Construction and mechanical operation		
a)	Construction		
	A withdrawable circuit-breaker shall be checked for the requirements stated in 7.1.1	satisfy	P
	A circuit-breaker with stored energy operation shall be checked for compliance with 7.2.1.1.5, regarding the charge indicator and the direction of operation of manual energy storing	N/A	
b)	Mechanical operation		
	A circuit-breaker with dependent power operation shall comply with the requirements stated in 7.2.1.1.3	N/A	
	A circuit-breaker with dependent power operation shall operate with the operating mechanism charged to the minimum and maximum limits stated by the manufacturer	N/A	
	A circuit-breaker with stored energy operation shall comply with the requirements stated in 7.2.1.5 with the auxiliary supply voltage at 85% and 110% of the rated control supply voltage.	N/A	
	It shall also be verified that the moving contacts cannot be moved from the open position when the operating mechanism is charged to slightly below the full charge as evidenced by the indicating device	N/A	
	For a trip-free circuit-breaker it shall not be possible to maintain the contacts in the touching or closed position when the tripping release is in the position to trip the circuit-breaker	satisfy	P
	If the closing and opening times of a circuit-breaker are stated by the manufacturer, such times shall comply with the stated values	Satisfy	P
c)	Undervoltage releases		
	Undervoltage releases shall comply with the requirements of 7.2.1.3 of Part 1. For this purpose, the release shall be fitted to a circuit-breaker having the maximum current rating for which the release is suitable	satisfy	



[Handwritten signature]

[Handwritten signature]

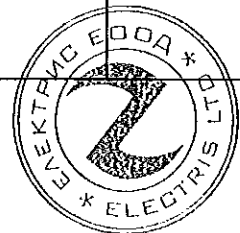
[Handwritten signature]

DATE: [] [] [] [] [] [] [] [] [] []

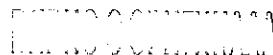
[Handwritten signature]



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
i)	Drop out voltage		
	It shall be verified that the release operates to open the circuit-breaker between the voltage limits specified	satisfy	P
	The voltage shall be reduced from rated voltage at a rate to reach 0 V in approximately 30 s	satisfy	P
	The test for the lower limit is made without current in the main circuit and without previous heating of the release coil	satisfy	P
	In the case of a release with a range of rated voltages, this test applies to the maximum voltage of the range	satisfy	P
	The test for the upper limit is made starting from a constant temperature corresponding to the application of rated control supply voltage to the release and rated current in the main poles of the circuit-breaker	satisfy	P
	This test may be combined with the temperature-rise test of 8.3.3.6	satisfy	P
	In the case of a release with a range of rated voltages, this test is made at both the minimum and maximum rated control supply voltages	satisfy	P
ii)	Test for limits of operation		
	Starting with the circuit-breaker open, at the temperature of the test room, and with the supply voltage at 30% rated maximum control supply voltage, it shall be verified that the circuit-breaker cannot be closed by the operation of the actuator	satisfy	P
	When the supply voltage is raised to 85% of the minimum control supply voltage, it shall be verified that the circuit-breaker can be closed by the operation of the actuator	satisfy	P
iii)	Performance under overvoltage conditions		
	With the circuit-breaker closed and without current in the main circuit, it shall be verified that the undervoltage release will withstand the application of 110% rated control supply voltage for 4 h without impairing its functions	satisfy	P

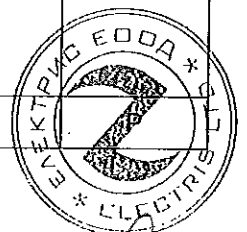


Handwritten signatures and initials at the bottom of the page.

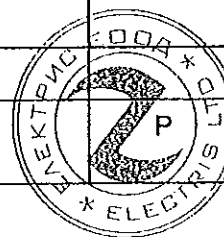


IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

d)	Shunt releases		
	Shunt releases shall comply with the requirements of 7.2.1.4 of Part 1. For this purpose, the release shall be fitted to a circuit-breaker having the maximum rated current for which the release is suitable	satisfy	P
	It shall be verified that the release will operate to open the circuit-breaker at 70% rated control supply voltage when tested at an ambient temperature of + 55 °C ± 2 °C without current in the main poles of the circuit-breaker	satisfy	P
	In the case of a release having a range of rated control supply voltages, the test voltage shall be 70% of the minimum rated control supply voltage	satisfy	P
8.3.3.3.3	Operational performance capability without current.		
	Type designation or serial number	BL1000	
	Sample no:	1	
	Rated current In (A)	1000A	
	Rated operational voltage: Ue (V)	690V	
	Rated control supply voltage of closing mechanism: Uc (V)	N/A	
	Rated control supply voltage of shunt releases: Uc (V)	230V AC	
	Rated control supply voltage undervoltage releases: Uc (V)	230V AC	
	Ambient temperature 10-40 °C :	23°C	P
	Number of operating cycles per hour	180/hour	P
	Number of cycles without current (total) (closing mechanism energized at the rated Uc)	6000	P
	Number of cycles without current (without releases)	4800	P
	Applied voltage: closing mechanism (V)	N/A	
	10% of total cycles for circuit-breaker with fitted shunt release: (50% at the beginning- and 50% at the end of the test.) Energized at the rated Uc	600	P
	Applied voltage: shunt releases (V)	500V AC	

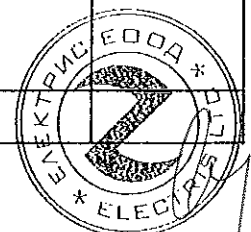


IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	10% of total cycles for circuit-breaker with undervoltage releases: (50% at the beginning- and 50% at the end of the test.) Energized at the minimum rated U _c	600	P
	10 cycles without applied voltage at the undervoltage releases. (Shall not possible to close the circuit-breaker.)	meets	P
	Applied voltage: undervoltage releases (V)	24V AC	P
	Electrical components do not exceed the value indicated in tab. 7.	N/A	
8.3.3.3.4	Operational performance capability with current.		
	Rated current: I _n (A)	1000A	
	Maximum rated operational voltage: U _e (V)	690V	
	Conductor cross-sectional area (mm ²) :	600mm ²	P
	Number of operating cycles per hour	180/hour	P
	Number of cycles with current (total) (closing mechanism energized at the rated U _c)	4000	P
	Applied voltage: closing mechanism (V)	N/A	
	For circuit-breaker fitted with adjustable releases, test shall be made with the overload setting at maximum and short-circuit setting at minimum.	satisfy	P
	Conditions, make/break operations:		
	- test voltage U/U _e = 1,0 (V) .....L1: .....L2: .....L3:	750V 750V 750V	
	- test current I/I _e = 1,0 (A) .....L1: .....L2: .....L3:	1000A 1000A 1000A	
	- power factor/time constant:	0,8	
	- frequency: (Hz)	50Hz	
	- on-time (ms):	60ms	
	- off-time (s):	20s	
	Electrical components do not exceed the value indicated in tab. 7.	meets	



[Handwritten signatures and marks]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
8.3.3.3.5	Additional test of operational performance capability without current for withdrawable circuit-breaker.		
	Number of operations cycles : 100	satisfy	
	After test, the isolating contacts, withdrawable mechanism and interlocks shall be suitable for further service.	meets	P
8.3.3.4	Overload performance		N/A
	this test applies to circuit-breaker of rated current up to and including 630 A		
	Type designation or serial number		
	Sample no:		
	Rated current I _n (A)		
	Rated operational voltage: U _e (V)		
	Rated control supply voltage of closing mechanism: U _c (V)		
	Rated control supply voltage of shunt releases: U _c (V)		
	Rated control supply voltage undervoltage releases: U _c (V)		
	Ambient temperature 10-40 °C :		
	Number of operating cycles per hour		
	Maximum rated operational voltage: U _e (V)		
	Number of operating cycles per hour		
	Number of cycles with current (total) (closing mechanism energized at the rated U _c)		
	Applied voltage: closing mechanism (V)		
	For circuit-breaker fitted with adjustable releases, test shall be made with the overload/short-circuit settings at maximum.		
	Conditions, overload operations:		
	- test voltage U/U _e = 1,05 (V) L1: L2: L3:		
	- test current AC/DC: I/I _e = 6,0/2.5 (A) L1: L2: L3:		
	- power factor/time constant:		



[Handwritten signatures and stamps]

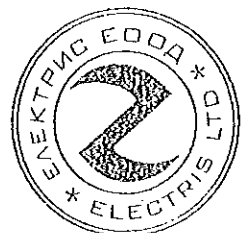
5

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	- Number of cycles manually opened: 9		
	- Number of cycles automatically opened by an overload release: 3		
	- frequency: (Hz)		
	- on-time max 2s:		
8.3.3.5	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V	1380V	
	- no breakdown or flashover	meets	P

[Handwritten signature]

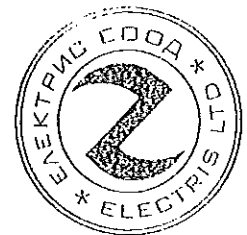
[Handwritten signature]

[Faint rectangular stamp]



[Handwritten mark]

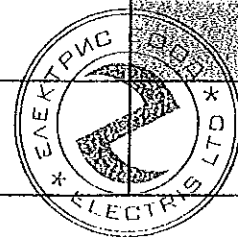
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
8.3.3.6	Verification of temperature-rise		
	- the values of temperature-rise do not exceed the those specified in tab. 7.	meets	P
	Temperature rise of main circuit terminals ≤ 80 K (K) :	Max. 72K	P
	conductor cross-sectional area (mm ²) :	600mm ²	
	test current I _e (A) :	1000A	
8.3.3.7	Verification of overload releases		
	Test current: 1.45 times the value of their current setting at the reference temperature: (A)	1450A	
	Conventional tripping time: <1h when I _n < 63A, <2h when I _n > 63 A	32'02"	P
8.3.3.8	Verification of undervoltage and shunt releases		
	Circuit-breaker fitted with undervoltage releases. The release shall not operate at 70% of the minimum control supply voltage -	satisfy	P
	and shall operate at 35% of the maximum control supply voltage.	satisfy	P
	Circuit-breaker fitted with shunt releases. The release shall operate at 70% of the minimum rated control supply voltage. Test made at room temperature.	satisfy	P



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

8.3.3.9	Verification of the main contact position for circuit-breakers for isolation		
	actuating force for opening (N)	230N	—
	test force with blocked main contacts for 10 s (N)	690N	—
	Dependent power operation		
	Supply voltage of 110% of rated voltage (V).....:	N/A	
	Three attempts of 5 s to operate the equipment at intervals of 5 min.	satisfy	P
	Independent power operation		
	Three attempts to operate the equipment by the stored energy.	satisfy	P
	Lockability of driving mechanism in OFF-position at test force and blocked main contacts	690N	
	Position indicator does not show OFF-position after capture of test force at blocked main contacts	meets	P

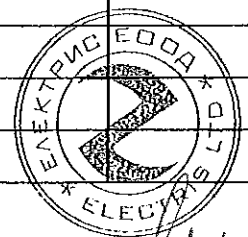
8.3.4	TEST SEQUENCE II (Ics):		
8.3.4.1	Test of rated service short-circuit breaking capacity		
	Test sequence of operation: O – t – CO – t – OO		
	Type designation or serial number	BL1000	
	Sample no:	2, 3, 4	
	Rated current: In (A)	1000A	
	Rated operational voltage: Ue (V)	415V,500V,690V AC	
	Rated service short-circuit breaking capacity: (kA)	36kA/415V, 30kA/500V, 20kA/690V	
	Rated control supply voltage of closing mechanism: Uc (V)	N/A	
	Rated control supply voltage of shunt release: Uc (V)	N/A	
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.	satisfy	



Handwritten signature

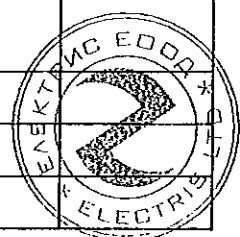
Handwritten text

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	closing mechanism energized with 85% at the rated Uc: (V)	N/A	
	The circuit-breaker is mounted complete on its own support or an equivalent support.	satisfy	
	Test made in free air:	satisfy	
	Distances of the metallic screen's: (all sides)	Vide catalogue	
	The characteristics of the metallic screen:		
	- woven wire mesh	N/A	
	- perforated metal	N/A	
	- expanded metal	yes	
	- ratio hole area/total area: 0,45-0,65	satisfy	
	- size of hole: <30mm ²	satisfy	
	- finish: bare or conductive plating	satisfy	
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:	N/A	
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long	satisfy	
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	
	Conductor cross-sectional area (mm ²):	600mm ²	
	If terminals unmarked: line connected at: (underside/upside)	N/A	
	Tightening torques: (Nm)	25Nm	
	Test sequence of operation: O – t – CO – t – CO.		
	- test voltage U/Ue = 1,05 (V).....L1: .....L2: .....L3:	436V 436V 436V	
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: .....L3:	36,2kA AC 37,3kA AC 36,2kA AC	
	power factor/time constant :	0,25	
	- Factor "n"	2,1	
	- peak test current (A) :	75,5kA	



Handwritten signatures and stamps at the bottom of the page, including a large signature on the left and a stamp on the right.

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test sequence "O"		
	- max. let-through current: (kApeak) .....L1:	73,8kA	
	.....L2:	64,0kA	
	.....L3:	61,0kA	
	- Joule integral I ² dt (A ² s) .....L1:	28 . 10 ⁶ A ² s	
	.....L2:	24 . 10 ⁶ A ² s	
	.....L3:	20 . 10 ⁶ A ² s	
	Pause, t: (min)	3min	
	Test sequence "CO"		
	- max. let-through current: (kApeak) .....L1:	58,2kA	
	.....L2:	63,6kA	
	.....L3:	55,0kA	
	- Joule integral I ² dt (A ² s) .....L1:	24 . 10 ⁶ A ² s	
	.....L2:	25 . 10 ⁶ A ² s	
	.....L3:	19 . 10 ⁶ A ² s	
	Pause, t: (min)	3min	
	Test sequence "CO"		
	- max. let-through current: (kApeak) .....L1:	52,0kA	
	.....L2:	64,3kA	
	.....L3:	70,2kA	
	- Joule integral I ² dt (A ² s) .....L1:	20,1 . 10 ⁶ A ² s	
	.....L2:	26,8 . 10 ⁶ A ² s	
	.....L3:	27,2 . 10 ⁶ A ² s	
	Melting of the fusible element	no	P
	Holes in the PE-sheet for test sequence "O"	no	P
	Cracks observed	no	P
	Test sequence of operation: O – t – CO – t – CO		
	- test voltage U/U _e = 1,05 (V).....L1:	525V	
	.....L2:	525V	
	.....L3:	525V	
	- r.m.s. test current AC/DC: (A)		
	.....L1:	30,2kA AC	
	.....L2:	30,3kA AC	
	.....L3:	31,2kA AC	
	power factor/time constant :	0,25	
	- Factor "n"	2,1	
	- peak test current (A) :	65,4kA	

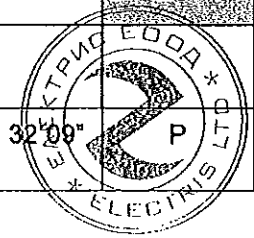


IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

	Test sequence "O"		
	- max. let-through current: (kA _{peak}) .....L1: 63,1kA.....L2: 55,8kA.....L3: 57,0kA		
	- Joule integral I ² dt (A ² s) .....L1: 20,7 . 10 ⁶ A ² s.....L2: 17,8 . 10 ⁶ A ² s.....L3: 14,4 . 10 ⁶ A ² s		
	Pause, t: (min)	3min	
	Test sequence "CO"		
	- max. let-through current: (kA _{peak}) .....L1: 44,0kA.....L2: 58,9kA.....L3: 51,2kA		
	- Joule integral I ² dt (A ² s) .....L1: 11,1 . 10 ⁶ A ² s.....L2: 18,0 . 10 ⁶ A ² s.....L3: 13,2 . 10 ⁶ A ² s		
	Pause, t: (min)	3min	
	Test sequence "CO"		
	- max. let-through current: (kA _{peak}) .....L1: 56,0kA.....L2: 44,3kA.....L3: 42,2kA		
	- Joule integral I ² dt (A ² s) .....L1: 18,7 . 10 ⁶ A ² s.....L2: 12,5 . 10 ⁶ A ² s.....L3: 13,2 . 10 ⁶ A ² s		
	Melting of the fusible element	No	P
	Holes in the PE-sheet for test sequence "O"	No	P
	Cracks observed	No	P
	Test sequence of operation: O – t – CO – t – CO		
	- test voltage U/U _e = 1,05 (V).....L1: 725V.....L2: 725V.....L3: 725V		
	- r.m.s. test current AC/DC: (A) .....L1: 20,0kA AC.....L2: 19,8kA AC.....L3: 20,2kA AC		
	power factor/time constant :	0,3	
	- Factor "n"	2,0	
	- peak test current (A) :	40,1kA	



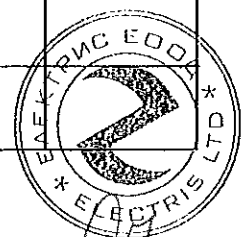
IEC 60 947-2					
Clause	Requirement – Test	Result – Remark			Verdict
	For circuit-breaker fitted with adjustable releases, test shall be made with the overload setting at maximum and short-circuit setting at minimum.	satisfy			
	Conditions, make/break operations:				
	Sample no	2	3	4	
	- test voltage $U/U_e = 1,0$ (V) .....L1:	415V	500V	690V	
	.....L2:	415V	500V	690V	
	.....L3:	415V	500V	690V	
	- test current $I/I_e = 1,0$ (A) .....L1:	1000A			
	.....L2:	1000A			
	.....L3:	1000A			
	- power factor/time constant:	0,8			
	- frequency: (Hz)	50Hz			
	- on-time (ms):	60ms			
	- off-time (s):	20s			
	Electrical components do not exceed the value indicated in tab. 7.	satisfy			P
8.3.4.3	Verification of dielectric withstand				
	- equal to twice the rated operational voltage with a minimum of 1000 V	1380V			
	- no breakdown or flashover	no			P
	Sample no	2	3	4	
	- the leaking current for circuit-breaker suitable for isolation: ($<2\text{mA} / 1.1 U_e$)	0,1mA	0,09mA	0,15mA	P
8.3.4.4	Verification of temperature-rise				
	- the values of temperature-rise do not exceed the those specified in tab. 7.	satisfy			P
	Temperature rise of main circuit terminals. ≤ 80 K (K) :	Max. 72K			P
	conductor cross-sectional area (mm ²) :	600mm ²			
	test current I_e (A) :	1000A			
8.3.4.5	Verification of overload releases				
	Test current: 1.45 times the value of their current setting at the reference temperature: (A)	1450A			
	Conventional tripping time: $<1\text{h}$ when $I_n < 63\text{A}$, $<2\text{h}$ when $I_n > 63\text{A}$	32'12"	32'22"	32'09"	



Handwritten signatures and initials.

Handwritten text or stamp at the bottom right.

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
8.3.4	TEST SEQUENCE II/III (Ics=Icu):		N/A
8.3.4.1	Test of rated service short-circuit breaking capacity		
	Test sequence of operation: O – t – CO – t – CO		
	Type designation or serial number		
	Sample no:		
	Rated current: In (A)		
	Rated operational voltage: Ue (V)		
	Rated service short-circuit breaking capacity: (kA)		
	Rated control supply voltage of closing mechanism: Uc (V)		
	Rated control supply voltage of shunt release: Uc (V)		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		
	closing mechanism energized with 85% at the rated Uc: (V)		
	The circuit-breaker is mounted complete on its own support or an equivalent support:		
	Test made in free air:		
	Distances of the metallic screen's: (all sides)		
	The characteristics of the metallic screen:		
	- woven wire mesh		
	- perforated metal		
	- expanded metal		
	- ratio hole area/total area: 0,45-0,65		
	- size of hole: <30mm ²		
	- finish: bare or conductive plating		
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		



[Handwritten signature]

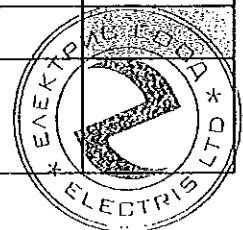
[Handwritten mark]

[Handwritten signature]

[Handwritten text]

[Handwritten signature]

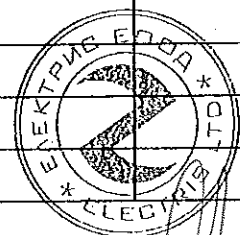
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Circuit is earthed at: (load-star- or supply-star point)		
	Conductor cross-sectional area (mm ²) :		
	If terminals unmarked: line connected at: (underside/upside)		
	Tightening torques: (Nm)		
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		
	- Operation time: (s) .....L1: .....L2: .....L3:		
	Test sequence of operation: O – t – CO – t – CO		
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: .....L3:		
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: .....L3:		
	power factor/time constant :		
	- Factor "n"		
	- peak test current (A) :		
	Test sequence "O"		
	- max. let-through current: (kA _{peak}) .....L1: .....L2: .....L3:		
	- Joule integral I ² dt (A ² s) .....L1: .....L2: .....L3:		
	Pause, t: (min)		
	Test sequence "CO"		
	- max. let-through current: (kA _{peak}) .....L1: .....L2: .....L3:		



[Handwritten signature]

[Handwritten signature]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	- Joule integral I^2dt (A ² s) .....L1: .....L2: .....L3:		
	Pause, t: (min)		
	Test sequence "CO"		
	- max. let-through current: (kA _{peak}) .....L1: .....L2: .....L3:		
	- Joule integral I^2dt (A ² s) .....L1: .....L2: .....L3:		
	Melting of the fusible element		
	Holes in the PE-sheet for test sequence "O"		
	Cracks observed		
8.3.4.2	Operational performance capability with current.		
	Rated current: I _n (A)		
	Maximum rated operational voltage: U _e (V)		
	Conductor cross-sectional area (mm ²) :		
	Number of operating cycles per hour		
	Number (5% of the number given in column 4, tab. 8) of cycles with current (total) (closing mechanism energized at the rated U _c)		
	Applied voltage: closing mechanism (V)		
	For circuit-breaker fitted with adjustable releases, test shall be made with the overload setting at maximum and short-circuit setting at minimum.		
	Conditions, make/break operations:		
	- test voltage U/U _e = 1,0 (V) .....L1: .....L2: .....L3:		
	- test current I/I _e = 1,0 (A) .....L1: .....L2: .....L3:		
	- power factor/time constant:		
	- frequency: (Hz)		
	- on-time (ms):		
	- off-time (s):		

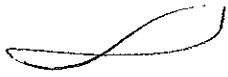


[Handwritten signature]

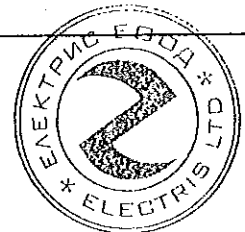
[Handwritten signature]

[Handwritten signature]

600332-04/01



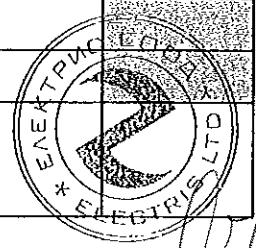
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Electrical components do not exceed the value indicated in tab. 7.		
8.3.4.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V		
	- no breakdown or flashover		
	- the leaking current for circuit-breaker suitable for isolation: (<2mA / 1,1 Ue)		
8.3.4.4	Verification of temperature-rise		
	- the values of temperature-rise do not exceed the those specified in tab. 7.		
	Temperature rise of main circuit terminals. ≤ 80 K (K) :		
	conductor cross-sectional area (mm²) :		
	test current Ie (A) :		
8.3.4.5	Verification of overload releases		
	Test current: 1,45 times the value of their current setting at the reference temperature: (A)		
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A		
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		
	- Operation time: (s) .....L1:		
	.....L2:		
	.....L3:		



Handwritten signatures and initials at the bottom of the page.

ENKTRVIC EBDIA * LTD * ELECTRIS LTD

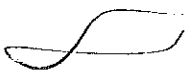
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
8.3.5	TEST SEQUENCE III (Icu)		
	Rated ultimate short-circuit breaking		
	Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current.		
	For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV.		
	For integrally fused circuit-breakers, test sequence V applies in place of this sequence.		
	Type designation or serial number	BL1000	
	Sample no:	5, 6, 7	
	Rated current: In (A)	1000A	
	Rated operational voltage: Ue (V)	415,500,690V AC	
	Rated ultimate short-circuit breaking capacity: (kA)	65kA/415V, 45kA/500V, 20kA/690V	
	Rated control supply voltage of closing mechanism: Uc (V)	N/A	
	Rated control supply voltage of shunt release: Uc (V)	N/A	
	This test sequence need not be made when Icu = Ics		
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:	3'52"	
	Sample no:	5 6 7	
	- Operation time: (s)	L1: 3'51" 3'52" 3'50"	
	.....	L2: 3'54" 3'49" 3'48"	
	.....	L3: 3'50" 3'50" 3'47"	
8.3.5.2	Test of rated ultimate short-circuit breaking capacity		
	The test sequence of operations is O – t – CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.	satisfy	



[Handwritten signature]

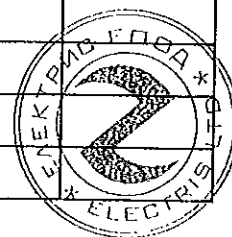
[Handwritten signature]

[Handwritten signature]



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

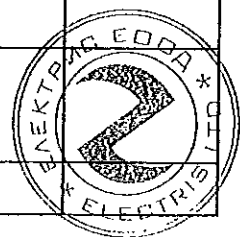
	closing mechanism energized with 85% at the rated U_c : (V)	N/A	
	The circuit-breaker is mounted complete on its own support or an equivalent support.	satisfy	
	Test made in free air:	satisfy	
	Distances of the metallic screen's: (all sides)	Vide catalogue	
	The characteristics of the metallic screen:		
	- woven wire mesh	N/A	
	- perforated metal	N/A	
	- expanded metal	yes	
	- ratio hole area/total area: 0,45-0,65	satisfy	
	- size of hole: <math> < 30\text{mm}^2 </math>	satisfy	
	- finish: bare or conductive plating	satisfy	
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long	satisfy	
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	
	Conductor cross-sectional area (mm^2):	600 mm^2	
	If terminals unmarked: line connected at: (underside/upside)	N/A	
	Tightening, torques: (Nm)	25Nm	
	Test sequence of operation: O – t – CO		
	- test voltage $U/U_e = 1,05$ (V)	L1: 436V L2: 436V L3: 436V	
	- r.m.s. test current AC/DC: (A)	L1: 65,7kA L2: 67,1kA L3: 65,8kA	
	power factor/time constant :	0,17	
	- Factor "n"	2,2	
	- peak test current (A_{max}) :	146,8kA	



Handwritten signatures and initials at the bottom of the page.

Stamp: [ELECTRIS]

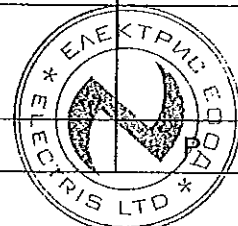
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test sequence "O"		
	- max. let-through current: (kA _{peak}) .....L1: 145,5kA.....L2: 118kA.....L3: 111,8kA		
	- Joule integral I ² dt (A ² s) .....L1: 99 . 10 ⁶ A ² s.....L2: 91,2 . 10 ⁶ A ² s.....L3: 87,3 . 10 ⁶ A ² s		
	Pause, t: (min)	3min	
	Test sequence "CO"		
	- max. let-through current: (kA _{peak}) .....L1: 127,1kA.....L2: 144,8kA.....L3: 113,0kA		
	- Joule integral I ² dt (A ² s) .....L1: 92,4 . 10 ⁶ A ² s.....L2: 98,2 . 10 ⁶ A ² s.....L3: 85,3 . 10 ⁶ A ² s		
	Melting of the fusible element	no	P
	Holes in the PE-sheet for test sequence "O"	no	P
	Cracks observed	no	P
	Test sequence of operation: O – t – CO		
	- test voltage U/U _e = 1,05 (V) .....L1: 525V.....L2: 525V.....L3: 525V		
	- r.m.s. test current AC/DC: (A) .....L1: 45,6kA.....L2: 46,0kA.....L3: 45,2kA		
	power factor/time constant :	0,23	
	- Factor "n"	2,1	
	- peak test current (A _{max}) :	96,0kA	
	Test sequence "O"		
	- max. let-through current: (kA _{peak}) .....L1: 95,8kA.....L2: 89,0kA.....L3: 85,3kA		
	- Joule integral I ² dt (A ² s) .....L1: 47,2 . 10 ⁶ A ² s.....L2: 39,1 . 10 ⁶ A ² s.....L3: 37,7 . 10 ⁶ A ² s		
	Pause, t: (min)	3min	



Handwritten signatures and initials are present at the bottom of the page, including a large signature on the left and several smaller ones on the right.

J

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test sequence "CO"		
	- max. let-through current: (kApeak) .....L1: .....L2: .....L3:	87,6kA 94,1kA 84,0kA	
	- Joule integral I ² dt (A ² s) .....L1: .....L2: .....L3:	38,4 . 10 ⁶ A ² s 47,3 . 10 ⁶ A ² s 32,5 . 10 ⁶ A ² s	
	Melting of the fusible element	no	P
	Holes in the PE-sheet for test sequence "O"	no	P
	Cracks observed	no	P
	Test sequence of operation: O – t – CO		
	- test voltage U/Ue = 1,05 (V) .....L1: .....L2: .....L3:	725V 725V 725V	
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: .....L3:	20,2kA 20,8kA 20,0kA	
	power factor/time constant :	0,28	
	- Factor "n"	2,0	
	- peak test current (Amax) :	41,2kA	
	Test sequence "O"		
	- max. let-through current: (kApeak) .....L1: .....L2: .....L3:	40,8kA 37,9kA 35,2kA	
	- Joule integral I ² dt (A ² s) .....L1: .....L2: .....L3:	8,5 . 10 ⁶ A ² s 6,9 . 10 ⁶ A ² s 6,5 . 10 ⁶ A ² s	
	Pause, t: (min)	3min	
	Test sequence "CO"		
	- max. let-through current: (kApeak) .....L1: .....L2: .....L3:	37,4kA 38,2kA 41,3kA	
	- Joule integral I ² dt (A ² s) .....L1: .....L2: .....L3:	7,6 . 10 ⁶ A ² s 7,2 . 10 ⁶ A ² s 8,8 . 10 ⁶ A ² s	
	Melting of the fusible element	No	



J
J

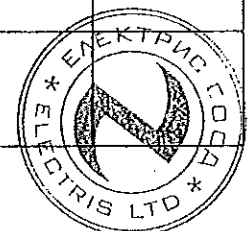
.....
.....

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Holes in the PE-sheet for test sequence "O"	no	P
	Cracks observed	no	P
8.3.5.3	Verification of dielectric withstand		
	Sample no:	5 6 7	
	- equal to twice the rated operational voltage with a minimum of 1000 V	1000V 1000V 1380V	
	- no breakdown or flashover	no	P
	Sample no:	5 6 7	
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue)	0,31mA 0,59mA 0,75mA	P
8.3.5.6	Verification of temperature-rise		
	Sample no:	5 6 7	
	- the values of temperature-rise do not exceed the those specified in tab. 7.	satisfy	P
	Temperature rise of main circuit terminals. ≤ 80 K (K) :	Max 74K 78K 76K	P
	conductor cross-sectional area (mm²) :	600mm ²	
	test current Ie (A) :	1000A	
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:	1'22"	
	Sample no:	5 6 7	
	- Operation time: (s)	L1: 1'21" 1'22" 1'23" L2: 1'24" 1'22" 1'20" L3: 1'19" 1'20" 1'18"	P



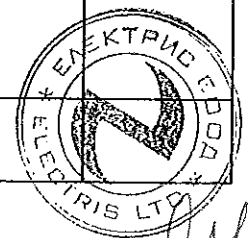
[Handwritten signatures and initials]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
8.3.6	TEST SEQUENCE IV		N/A
	Rated short-time withstand current		
	Except where the combined test sequence applies, this test sequence applies to circuit-breakers of utilization category B and to those circuit-breaker of category A covered by note 3 of table 4, and comprises the following tests:		
	Where integrally fused circuit-breaker are of utilization category B, they shall meet the requirements of this sequence.		
	Type designation or serial number		
	Sample no:		
	Rated current: In (A)		
	Rated operational voltage: Ue (V)		
	Rated short-time withstand current: (kA/s)		
	Rated frequency: (Hz)		
8.3.6.1	Verification of overload releases		
	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		
	- Operation time: (s) L1: L2: L3:		
8.3.6.2	Test of rated short-time withstand current.		
	For this test, any over-current release, including the instantaneous override, if any, likely to operate during the test, shall be rendered inoperative.		
	- test frequency: (Hz)		
	- duration of the test: (s)		
	- test frequency: (Hz)		
	- power factor / time constant (ms):		
	- factor "n"		
	- test voltage: (V) L1: L2: L3:		



[Handwritten signatures and initials]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	- r.m.s. test current: (kA) .....L1: .....L2: .....L3:		
	- highest peak current: (kA)		
8.3.6.3	Verification of temperature-rise		
	- the values of temperature-rise do not exceed the those specified in tab. 7.		
	Temperature rise of main circuit terminals. ≤ 80 K (K) :		
	conductor cross-sectional area (mm ²) :		
	test current I _e (A) :		
8.3.6.4	Test of short-circuit breaking capacity at the max. short-time withstand current.		
	Rated short-time withstand current: (kA/s)		
	Test sequence: O – t – CO		
	max. available time setting of the short-time delay short-circuit release. (s)		
	- test voltage U/U _e = 1,05 (V) .....L1: .....L2: .....L3:		
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: .....L3:		
	- test frequency: (Hz)		
	- power factor / time constant (ms):		
	- factor "n"		
	Test sequence "O"		
	- max. let-through current: (kA _{peak}) .....L1: .....L2: .....L3:		
	- Joule integral I ² dt (A ² s) .....L1: .....L2: .....L3:		
	Pause, t: (min)		
	- the circuit-breaker shall remain closed for the short-time corresponding to the max. available time setting of the short-time delay short-circuit release and -		
	- the instantaneous override, if any, shall not operate.		

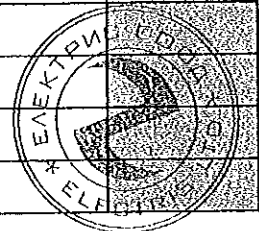


[Handwritten signatures and marks]

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

	-pause: t (s)		
	Test sequence "CO"		
	- max. let-through current: (kA _{peak}) .....L1: .....L2: .....L3:		
	- Joule integral I ² dt (A ² s) .....L1: .....L2: .....L3:		
	Pause, t: (min)		
	- the circuit-breaker shall remain closed for the short-time corresponding to the max. available time setting of the short-time delay short-circuit release and -		
	- the instantaneous override, if any, shall not operate.		
	- if the circuit-breaker has a making current release, this requirement does not apply to the CO operation, if the prospective current exceeds the pre-determined value, since it will then operate.		
8.3.6.5	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V		
	- no breakdown or flashover		
8.3.6.6	Verification of overload releases		
	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		
	- Operation time: (s) .....L1: .....L2: .....L3:		

8.3.7	TEST SEQUENCE V	N/A
	Performance of integrally fused circuit-breakers	
	STAGE 1	
	Type designation or serial number	
	Sample no:	



COMMERCIAL INFORMATION

<input type="checkbox"/> Circuit breakers	D4
<input type="checkbox"/> Switch-disconnectors	D5, D8
<input type="checkbox"/> Residual current devices	D8
<input type="checkbox"/> Connecting sets for residual current device	D9
<input type="checkbox"/> Residual current monitor	D9
<input type="checkbox"/> Current transformers for residual current monitor	D9
<input type="checkbox"/> Connecting sets	D10
<input type="checkbox"/> Mounting sets	D11
<input type="checkbox"/> Switches	D12
<input type="checkbox"/> Shunt trips	D12
<input type="checkbox"/> Undervoltage releases	D12
<input type="checkbox"/> Delay unit	D13
<input type="checkbox"/> Hand drives	D13
<input type="checkbox"/> Mechanical interlocking and parallel switching	D14
<input type="checkbox"/> Motor drives	D14
<input type="checkbox"/> Accessories	D14

TECHNICAL INFORMATION

<input type="checkbox"/> Circuit breakers, switch-disconnectors	
- specifications	D15
- diagram	D16
- connecting, mounting	D18
- defonization space	D21
- dimensions	D25
<input type="checkbox"/> Residual current devices	
- specifications	D22
- diagram	D23
- connecting, mounting	D24
<input type="checkbox"/> Overcurrent releases	
- description, specifications	D37
<input type="checkbox"/> Connecting sets	
- specifications	D18
<input type="checkbox"/> Switches	
- specifications	D45
<input type="checkbox"/> Shunt trips	
- specifications	D46
<input type="checkbox"/> Undervoltage releases	
- specifications, diagram	D47
<input type="checkbox"/> Hand drives	
- description, specifications	D48
<input type="checkbox"/> Mechanical interlocking and parallel switching	
- description, specifications, dimensions	D49
<input type="checkbox"/> Motor drives	
- description, specifications, dimensions	D50

ay

SUMMARY OF MODELS AND ACCESSORIES

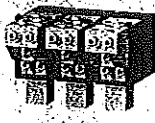
CONNECTING SETS

Double block terminals



CS-BC-B021

Output terminals



CS-BC-B014

Front connection



CS-BC-A011

Rear connection



CS-BC-A021

Potential terminals



CS-BC-PS01

Reduction for BA...*33



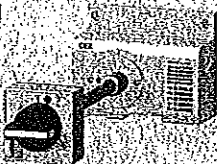
CS-BC-A033

HAND DRIVES

Hand drive unit - front
RP-BC-CK20
RP-BC-CP..



Hand drive unit - front
RP-BC-CH1
RP-BC-CH..



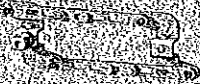
Hand drive unit - right side
RP-BC-CK30



Hand drive unit - left side
RP-BC-CK31



Mechanical parallel switching
RP-BC-CD10

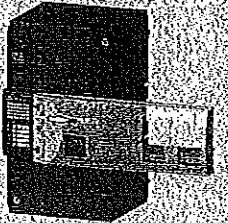


Mechanical interlocking
RP-BC-CB10

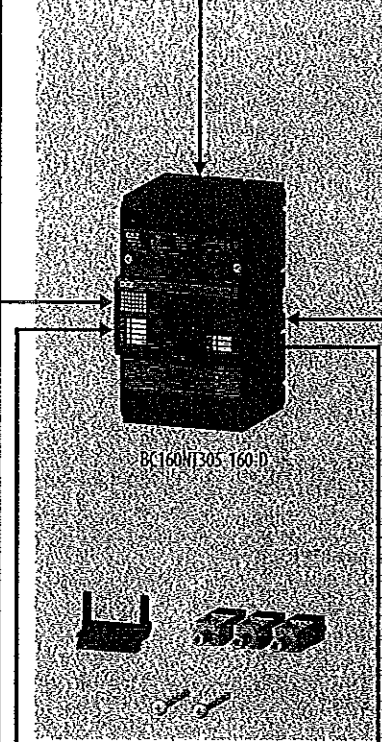


MOTOR DRIVES

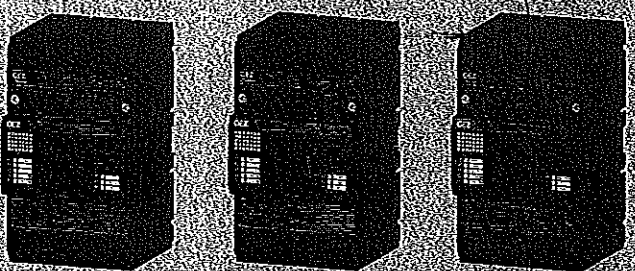
Motor drive - side MP-BC-X..-B



CIRCUIT BREAKERS



BC160N1305-160-D

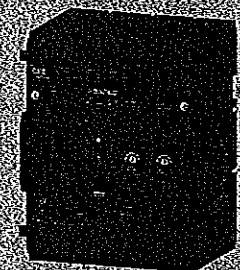


BC160N1305-160-J

BC160N1305-100-M

BC160N1305-160-N

RESIDUAL CURRENT DEVICE



RCD-BC4-EA10

SWITCH-DISCONNECTOR



BC160N1305-160-V

AUXILIARY RELEASES

Shunt trip Undervoltage release



SV-BC-X..



SP-BC-X..

SWITCHES

Signal switch Auxiliary switch



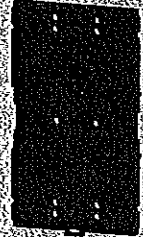
NS-BC-0010



PS-BC-0010

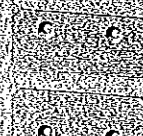
MOUNTING SETS

Adapter for U rail 35 mm



OD-BC-DIN1

Reduction for BA...*33



OD-BC-MS33

ACCESSORIES

Lever with locking



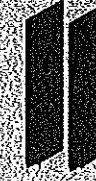
OD-BC-UP01

Terminal cover - IP20



OD-BC-KS03

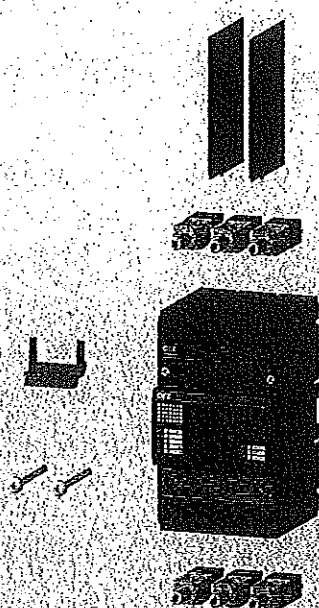
Insulating barriers



CS-BC-KS02

Handwritten signature

CIRCUIT BREAKERS



- Circuit breaker includes:
 - 2 connecting sets for connecting Cu/Al cables with cross-sections $2.5 \div 95 \text{ mm}^2$
 - in case of the connection of the fine stranded conductor, we recommend using of the end sleeve (connecting sets are installed in the circuit breaker)
 - insulating barriers OD-BC-KS02
 - mounting bolts set OD-BC-MS01 (2x M3x30)
 - conductor holder OD-BC-DV01

- the method of power circuit connection must observe recommendations, see page D18 as well as deionization space, see page D21

¹⁾ - for connecting in another way, one may use CS-BC... connecting sets, see page D10, D11

Characteristic D - distribution

■ protection lines and transformers

Rating (A)	Model	Product code	Setting (A)	I _{Δn} (A)	Weight (kg)	Package (pc)
16	BC160NT305-16-D	20209	12.5 ÷ 16	160 ÷ 240	1.00	1
20	BC160NT305-20-D	20211	16 ÷ 20	200 ÷ 300	1.00	1
25	BC160NT305-25-D	20212	20 ÷ 25	250 ÷ 375	1.00	1
32	BC160NT305-32-D	20213	25 ÷ 32	160 ÷ 320	1.00	1
40	BC160NT305-40-D	20215	32 ÷ 40	200 ÷ 400	1.00	1
50	BC160NT305-50-D	20217	40 ÷ 50	250 ÷ 500	1.00	1
63	BC160NT305-63-D	20219	50 ÷ 63	315 ÷ 630	1.00	1
80	BC160NT305-80-D	20222	63 ÷ 80	400 ÷ 800	1.00	1
100	BC160NT305-100-D	20204	80 ÷ 100	500 ÷ 1 000	1.00	1
125	BC160NT305-125-D	20206	100 ÷ 125	625 ÷ 1 250	1.00	1
160	BC160NT305-160-D	20208	125 ÷ 160	800 ÷ 1 600	1.00	1

- TECHNICAL INFORMATION, see page D15, D37

Characteristic M - motor

■ motors protection

Rating (A)	Model	Product code	Setting (A)	I _{Δn} (A)	Weight (kg)	Package (pc)
16	BC160NT305-16-M	20243	12.5 ÷ 16	160	1.00	1
20	BC160NT305-20-M	20244	16 ÷ 20	200	1.00	1
25	BC160NT305-25-M	20245	20 ÷ 25	250	1.00	1
32	BC160NT305-32-M	20246	25 ÷ 32	320	1.00	1
40	BC160NT305-40-M	20247	32 ÷ 40	400	1.00	1
50	BC160NT305-50-M	20248	40 ÷ 50	500	1.00	1
63	BC160NT305-63-M	20249	50 ÷ 63	630	1.00	1
80	BC160NT305-80-M	20250	63 ÷ 80	800	1.00	1
100	BC160NT305-100-M	20242	80 ÷ 100	1 000	1.00	1

- TECHNICAL INFORMATION, see page D15, D37

Characteristic L - lines

■ protection lines with low starting currents

■ without I_{Δn} setting

Rating (A)	Model	Product code	I _{Δn} (A)	Weight (kg)	Package (pc)
40	BC160NT305-40-L	20214	160	1.00	1
50	BC160NT305-50-L	20216	200	1.00	1
63	BC160NT305-63-L	20218	252	1.00	1
80	BC160NT305-80-L	20221	320	1.00	1
100	BC160NT305-100-L	20203	400	1.00	1
125	BC160NT305-125-L	20205	500	1.00	1
160	BC160NT305-160-L	20207	640	1.00	1

- TECHNICAL INFORMATION, see page D15, D37

CIRCUIT BREAKERS

3P

Characteristic N - only short-circuit release

IP/A	SP	Product code	I(A)	U(A)	Weight(kg)	Package (pc)	
32		BC160NT305-32-N	20641	-	160 ÷ 320	1.00	1
40		BC160NT305-40-N	20642	-	200 ÷ 400	1.00	1
50		BC160NT305-50-N	20643	-	250 ÷ 500	1.00	1
63		BC160NT305-63-N	20644	-	315 ÷ 630	1.00	1
80		BC160NT305-80-N	20645	-	400 ÷ 800	1.00	1
100		BC160NT305-100-N	20646	-	500 ÷ 1000	1.00	1
125		BC160NT305-125-N	20647	-	625 ÷ 1250	1.00	1
160		BC160NT305-160-N	20621	-	800 ÷ 1600	1.00	1

- TECHNICAL INFORMATION, see page D15, D37

SWITCH-DISCONNECTOR

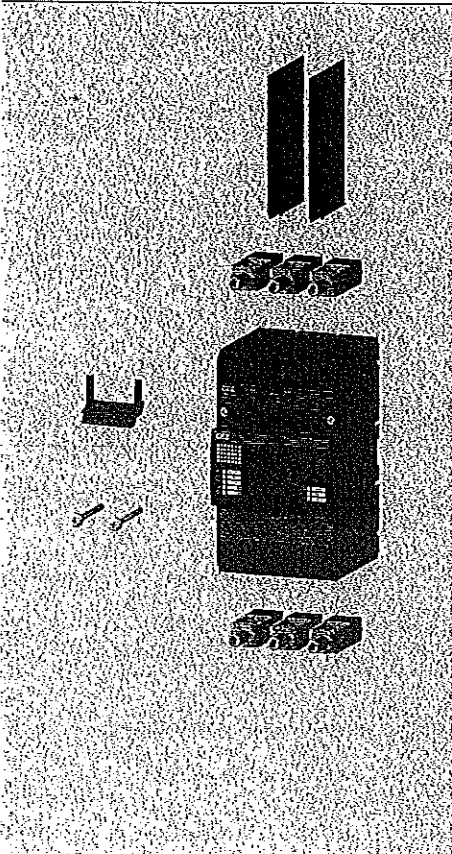
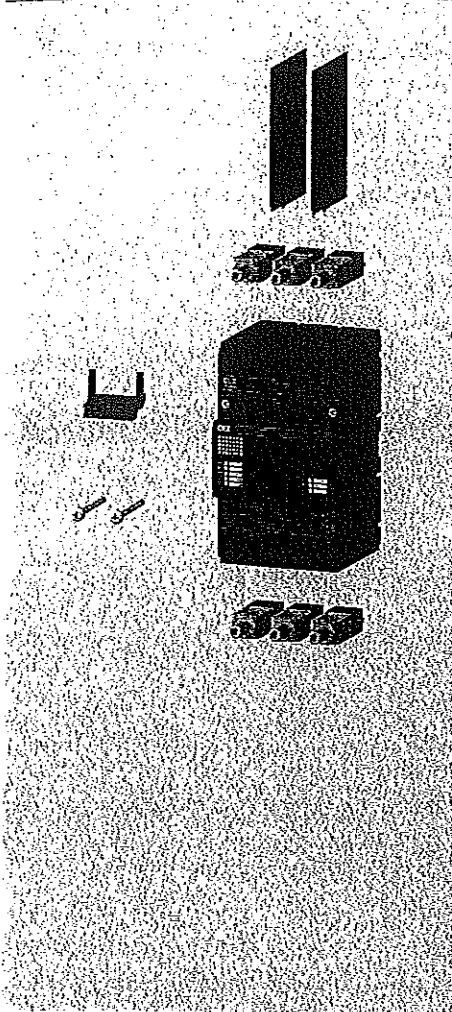
3P

- Switch-disconnector includes: - 2 connecting sets for connecting Cu/Al cables with cross-sections 2.5 ÷ 95 mm²¹⁾
- in case of the connection of the fine stranded conductor, we recommend using of the end sleeve (connecting sets are installed in the switch-disconnector)
- insulating barriers OD-BC-KS02
- mounting bolts set OD-BC-MS01 (2x M3x30)
- conductor holder OD-BC-DV01

¹⁾ - for connecting in another way, one may use CS-BC-... connecting sets, see page D10, D11

IP/A	SP	Product code	Weight(kg)	Package (pc)	
160		BC160NT305-160-V	20585	1.00	1

- TECHNICAL INFORMATION, see page D15



CIRCUIT BREAKERS

3P + N



- Circuit breaker includes:
- connecting terminals for connecting Cu/Al cables with cross-sections $2.5 \div 95 \text{ mm}^2$
 - in case of the connection of the fine stranded conductor, we recommend using of the end sleeve (connecting terminals are installed in the circuit breaker)
 - insulating barriers OD-BC-KS02 and OD-BC-KS42
 - 2 sets of mounting bolts OD-BC-MS01 (4x M3x30)
 - conductor holder OD-BC-DV01 (it is installed in the circuit breaker)

- the method of power circuit connection must observe recommendations, see page D18 as well as deionization space, see page D21

¹⁾ - for connecting in another way, it is necessary to use CS-BC... connecting sets, see page D10, D11

Characteristic D - distribution

3P + N - for unprotected N conductor

■ protection lines and transformers

I _n (A)	Typ.	Product code	I _n setting (A)	I _{MA}	Weight (kg)	Package (pcs)
16	BC160NT405-16-D	33617	12.5 ÷ 16	160 ÷ 240	1.3	1
20	BC160NT405-20-D	33616	16 ÷ 20	200 ÷ 300	1.3	1
25	BC160NT405-25-D	33615	20 ÷ 25	250 ÷ 375	1.3	1
32	BC160NT405-32-D	33614	25 ÷ 32	160 ÷ 320	1.3	1
40	BC160NT405-40-D	33613	32 ÷ 40	200 ÷ 400	1.3	1
50	BC160NT405-50-D	33611	40 ÷ 50	250 ÷ 500	1.3	1
63	BC160NT405-63-D	33609	50 ÷ 63	315 ÷ 630	1.3	1
80	BC160NT405-80-D	33607	63 ÷ 80	400 ÷ 800	1.3	1
100	BC160NT405-100-D	33605	80 ÷ 100	500 ÷ 1 000	1.3	1
125	BC160NT405-125-D	33603	100 ÷ 125	625 ÷ 1 250	1.3	1
160	BC160NT405-160-D	33601	125 ÷ 160	800 ÷ 1 600	1.3	1

- TECHNICAL INFORMATION, see page D15, D37

Characteristic L - lines

3P + N - for unprotected N conductor

■ protection lines with low starting currents

■ without I_n setting

I _n (A)	Typ.	Product code	I _n setting (A)	I _{MA}	Weight (kg)	Package (pcs)
40	BC160NT405-40-L	33612	-	160	1.3	1
50	BC160NT405-50-L	33610	-	200	1.3	1
63	BC160NT405-63-L	33608	-	252	1.3	1
80	BC160NT405-80-L	33606	-	320	1.3	1
100	BC160NT405-100-L	33604	-	400	1.3	1
125	BC160NT405-125-L	33602	-	500	1.3	1
160	BC160NT405-160-L	33600	-	640	1.3	1

- TECHNICAL INFORMATION, see page D15, D37

- custom production

Characteristic N - only short-circuit release

3P + N - for unprotected N conductor

■ without I_n setting

I _n (A)	Typ.	Product code	I _n setting (A)	I _{MA}	Weight (kg)	Package (pcs)
32	BC160NT405-32-N	33625	-	160 ÷ 320	1.3	1
40	BC160NT405-40-N	33624	-	200 ÷ 400	1.3	1
50	BC160NT405-50-N	33623	-	250 ÷ 500	1.3	1
63	BC160NT405-63-N	33622	-	315 ÷ 630	1.3	1
80	BC160NT405-80-N	33621	-	400 ÷ 800	1.3	1
100	BC160NT405-100-N	33620	-	500 ÷ 1 000	1.3	1
125	BC160NT405-125-N	33619	-	625 ÷ 1 250	1.3	1
160	BC160NT405-160-N	33618	-	800 ÷ 1 600	1.3	1

- TECHNICAL INFORMATION, see page D15, D37

- custom production

CIRCUIT BREAKERS

4P



Circuit breaker includes:

- connecting terminals for connecting Cu/Al cables with cross-sections $2.5 \div 95 \text{ mm}^2$ ¹⁾
- in case of the connection of the fine stranded conductor, we recommend using of the end sleeve (connecting terminals are installed in the circuit breaker)
- insulating barriers OD-BC-KS02 and OD-BC-KS42
- 2 sets of mounting bolts OD-BC-MS01 (4x M3x30)
- conductor holder OD-BC-DV01 (it is installed in the circuit breaker)

- the method of power circuit connection must observe recommendations, see page D18 as well as deratization space, see page D21

¹⁾ - for connecting in another way, it is necessary to use CS-BC-... connecting sets, see page D10, D11

Characteristic D - distribution**4P - for protected N conductor**

■ protection lines and transformers

ICAT	Typ	Product code	Setting (A)	ICAT	Weight (kg)	Package (pcs)
16	BC160NT406-16-D	33644	12.5 + 16	160 ÷ 240	1.3	1
20	BC160NT406-20-D	33643	16 + 20	200 ÷ 300	1.3	1
25	BC160NT406-25-D	33642	20 ÷ 25	250 ÷ 375	1.3	1
32	BC160NT406-32-D	33641	25 + 32	160 ÷ 320	1.3	1
40	BC160NT406-40-D	33640	32 ÷ 40	200 ÷ 400	1.3	1
50	BC160NT406-50-D	33638	40 + 50	250 ÷ 500	1.3	1
63	BC160NT406-63-D	33636	50 + 63	315 ÷ 630	1.3	1
80	BC160NT406-80-D	33634	63 + 80	400 ÷ 800	1.3	1
100	BC160NT406-100-D	33632	80 ÷ 100	500 ÷ 1000	1.3	1
125	BC160NT406-125-D	33630	100 + 125	625 ÷ 1250	1.3	1
160	BC160NT406-160-D	33628	125 + 160	800 ÷ 1600	1.3	1

- TECHNICAL INFORMATION, see page D15, D37

Characteristic L - lines**4P - for protected N conductor**

■ protection lines with low starting currents

■ without I_n setting

ICAT	Typ	Product code	Setting (A)	ICAT	Weight (kg)	Package (pcs)
40	BC160NT406-40-L	33639	-	160	1.3	1
50	BC160NT406-50-L	33637	-	200	1.3	1
63	BC160NT406-63-L	33635	-	252	1.3	1
80	BC160NT406-80-L	33633	-	320	1.3	1
100	BC160NT406-100-L	33631	-	400	1.3	1
125	BC160NT406-125-L	33629	-	500	1.3	1
160	BC160NT406-160-L	33627	-	640	1.3	1

- TECHNICAL INFORMATION, see page D15, D37

- custom production

Characteristic N - only short-circuit release**4P - for protected N conductor**■ without I_n setting

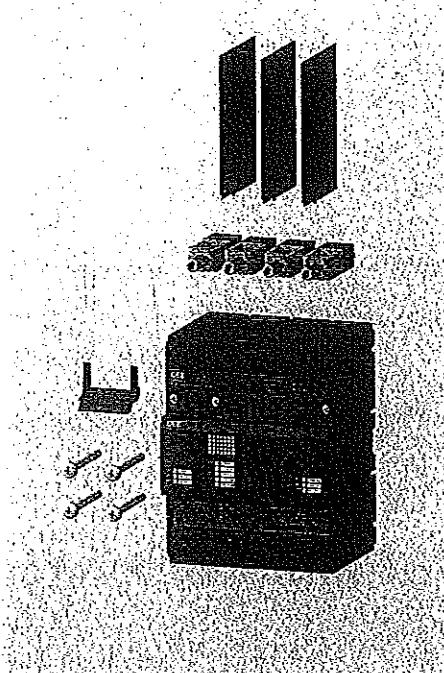
ICAT	Typ	Product code	Setting (A)	ICAT	Weight (kg)	Package (pcs)
32	BC160NT406-32-N	33652	-	160 ÷ 320	1.3	1
40	BC160NT406-40-N	33651	-	200 ÷ 400	1.3	1
50	BC160NT406-50-N	33650	-	250 ÷ 500	1.3	1
63	BC160NT406-63-N	33649	-	315 ÷ 630	1.3	1
80	BC160NT406-80-N	33648	-	400 ÷ 800	1.3	1
100	BC160NT406-100-N	33647	-	500 ÷ 1000	1.3	1
125	BC160NT406-125-N	33646	-	625 ÷ 1250	1.3	1
160	BC160NT406-160-N	33645	-	800 ÷ 1600	1.3	1

- TECHNICAL INFORMATION, see page D15, D37

- custom production

SWITCH-DISCONNECTOR

4P



Switch-disconnector includes:

- 2 connecting sets for connecting Cu/Al cables with cross-sections $2.5 \div 95 \text{ mm}^2$ ¹⁾
- in case of the connection of the fine stranded conductor, we recommend using of the end sleeve (connecting sets are installed in the switch-disconnector)
- insulating barriers OD-BC-KS02 and OD-BC-KS42
- 2 sets of mounting bolts OD-BC-MS01 (4x M3x30)
- conductor holder OD-BC-DV01 (it is installed in the switch-disconnector)

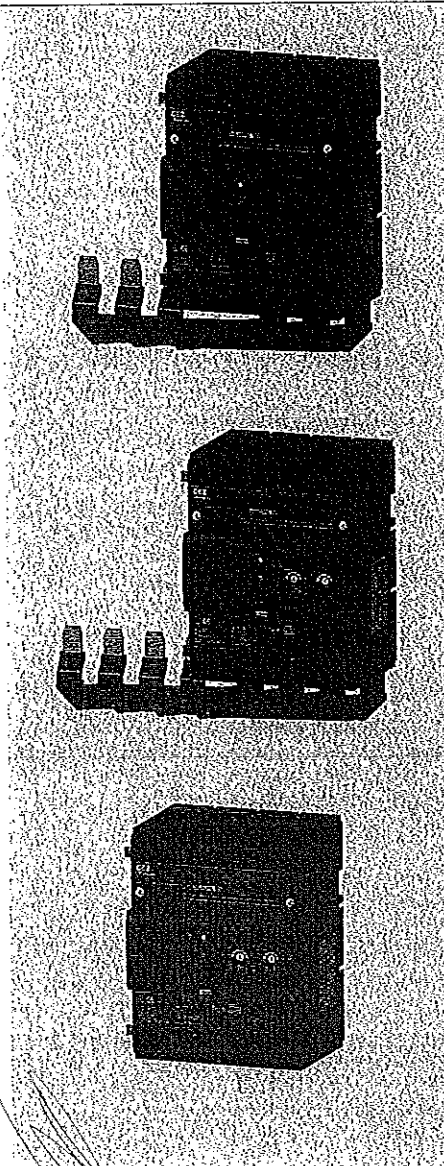
¹⁾ - for connecting in another way, one may use CS-BC-... connecting sets, see page D10, D11

Type	Product code	Description	Weight (kg)	Package (pc)
160	BC160NT405-160-V	33626	1.3	1

- TECHNICAL INFORMATION, see page D15

RESIDUAL CURRENT DEVICES

3P 4P



3-pole design, with interconnecting busbars

Type	Product code	Description	Weight (kg)	Package (pc)
RCD-BC3-EF06	37745	I _n 63 A, I _{Δn} 0.3 A, without t _{Δn} setting	1.44	1
RCD-BC3-EF16	37746	I _n 160 A, I _{Δn} 0.3 A, without t _{Δn} setting	1.65	1
RCD-BC3-EA06	37747	I _n 63 A, I _{Δn} 0.03 ÷ 3 A, without t _{Δn} setting	1.44	1
RCD-BC3-EA16	37748	I _n 160 A, I _{Δn} 0.03 ÷ 3 A, without t _{Δn} setting	1.65	1

- CS-BC-L006 or CS-BC-L016 is part of residual current module
 - TECHNICAL INFORMATION, see page D22

4-pole design, with interconnecting busbars

Type	Product code	Description	Weight (kg)	Package (pc)
RCD-BC4-EF06	37753	I _n 63 A, I _{Δn} 0.3 A, without t _{Δn} setting	1.75	1
RCD-BC4-EF16	37754	I _n 160 A, I _{Δn} 0.3 A, without t _{Δn} setting	2.03	1
RCD-BC4-EA06	37755	I _n 63 A, I _{Δn} 0.03 ÷ 3 A, without t _{Δn} setting	1.75	1
RCD-BC4-EA16	37756	I _n 160 A, I _{Δn} 0.03 ÷ 3 A, without t _{Δn} setting	2.03	1

- CS-BC-L406 or CS-BC-L416 is part of residual current module
 - TECHNICAL INFORMATION, see page D22

4-pole design, without interconnecting busbars

Type	Product code	Description	Weight (kg)	Package (pc)
RCD-BC0-EF16	37761	I _n 160 A, I _{Δn} 0.3 A, without t _{Δn} setting	1.27	1
RCD-BC0-EA16	37762	I _n 160 A, I _{Δn} 0.03 ÷ 3 A, without t _{Δn} setting	1.27	1
RCD-BC0-EF06	38375	I _n 63 A, I _{Δn} 0.3 A, without t _{Δn} setting	1.27	1
RCD-BC0-EA06	38376	I _n 63 A, I _{Δn} 0.03 ÷ 3 A, without t _{Δn} setting	1.27	1

- TECHNICAL INFORMATION, see page D22

ay

CONNECTING SETS FOR RESIDUAL CURRENT DEVICE

3P, 4



Type	Product code	Description	Weight (kg)	Packages
CS-BC-5006	38379	Interconnecting busbars, $I_n = 63$ A, for 3P design	0.17	1
CS-BC-5016	38380	Interconnecting busbars, $I_n = 160$ A, for 3P design	0.44	1

- TECHNICAL INFORMATION, see page D24

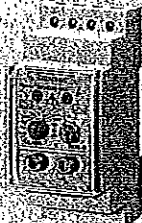


Type	Product code	Description	Weight (kg)	Packages
CS-BC-5406	38383	Interconnecting busbars, $I_n = 63$ A, for 4P design	0.21	1
CS-BC-5416	38384	Interconnecting busbars, $I_n = 160$ A, for 4P design	0.64	1

- TECHNICAL INFORMATION, see page D24

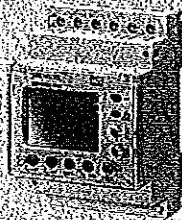
RESIDUAL CURRENT MONITOR

3P, 4



Type	Product code	Description	Weight (kg)	Packages
SSV8000-6KK	42658	Analogue design, $I_{\Delta n}$ and $t_{\Delta n}$ setting	0.18	1

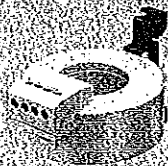
- TECHNICAL INFORMATION, see page P4



Type	Product code	Description	Weight (kg)	Packages
SSV8001-6KK	42659	Digital design, $I_{\Delta n}$ and $t_{\Delta n}$ setting	0.26	1
SSV8200-6KK	42660	Digital design, $I_{\Delta n}$ and $t_{\Delta n}$ setting, 4 channels	0.26	1

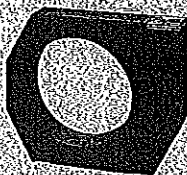
- TECHNICAL INFORMATION, see page P4

CURRENT TRANSFORMERS FOR RESIDUAL CURRENT MONITOR



Type	Product code	Description	Weight (kg)	Packages
SSV8700-OKK	42661	Internal diameter 20 mm, including holder on „U“ rail according to EN 60715 wide 35 mm	0.09	1
SSV8701-OKK	42662	Internal diameter 30 mm, including holder on „U“ rail according to EN 60715 wide 35 mm	0.11	1

- TECHNICAL INFORMATION, see page P4



Type	Product code	Description	Weight (kg)	Packages
SSV8702-OKK	42663	Internal diameter 35 mm, including holder on the panel	0.2	1
SSV8703-OKK	42664	Internal diameter 70 mm, including holder on the panel	0.31	1
SSV8704-OKK	42665	Internal diameter 105 mm, including holder on the panel	0.6	1
SSV8705-OKK	42666	Internal diameter 140 mm, including holder on the panel	1.35	1
SSV8706-OKK	42667	Internal diameter 210 mm, including holder on the panel	2.25	1

- TECHNICAL INFORMATION, see page P4



Type	Product code	Description	Weight (kg)	Packages
SSV8900-1KK	42668	Holder on „U“ rail according to EN 60715 wide 35 mm for current transformers with internal diameter up to and including 105 mm	0.01	2

- TECHNICAL INFORMATION, see page P4

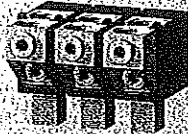
CONNECTING SETS



3 terminals

Type	Product code	Description	Size (mm)	Method of connection	Weight (kg)	Package set
CS-BC-A011	20223	Front connection		Cu/Al busbars, cable lugs	0.05	1

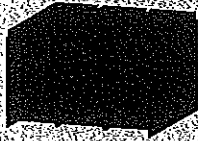
- TECHNICAL INFORMATION, see page D18



CS-BC-B021	20237	Double block terminal	2x (25 + 120)	Cu/Al cables	0.18	1
------------	-------	-----------------------	---------------	--------------	------	---

- TECHNICAL INFORMATION, see page D18

- terminals cover included - degree of protection IP20



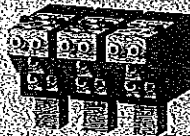
CS-BC-A021	20236	Rear connection		Cu/Al busbars, cable lugs	0.18	1
------------	-------	-----------------	--	---------------------------	------	---

- TECHNICAL INFORMATION, see page D18



CS-BC-PS01	20239	Potential terminals	15 + 25, 4 - 6	Cu flexible conductor	0.01	1
------------	-------	---------------------	----------------	-----------------------	------	---

- TECHNICAL INFORMATION, see page D18



CS-BC-B014	34957	Block terminals for 5 cables	5x (25 - 25)	Cu/Al cables	0.18	1
------------	-------	------------------------------	--------------	--------------	------	---

- TECHNICAL INFORMATION, see page D18

- terminals cover included - degree of protection IP20



CS-BC-A033	20608	Reduction for BA...*33		Cu/Al busbars, cable lugs	0.11	1
------------	-------	------------------------	--	---------------------------	------	---

TECHNICAL INFORMATION, see page D18

- for total replacement of BA...*33 circuit breaker also is necessary the OD-BC-MS33 mounting set

¹⁾ - one set provides for connecting one side of the circuit breaker (set includes three terminals with necessary coupling elements)

CROSS REFERENCE

CONNECTING SETS

3P 4P

1 terminal

Types	Product code	Description	Terminals	Method of connection	Weight (kg)	Package set
CS-BC-A411	33653	Front connection		Cu/Al busbars, cable lugs	0.02	1

- TECHNICAL INFORMATION, see page D18

CS-BC-A421	33654	Rear connection		Cu/Al busbars, cable lugs	0.02	1
------------	-------	-----------------	--	---------------------------	------	---

- TECHNICAL INFORMATION, see page D18

CS-BC-B421	33658	Double block terminal	2x (25 + 120)	Cu/Al cables	0.25	1
------------	-------	-----------------------	---------------	--------------	------	---

- TECHNICAL INFORMATION, see page D18

- terminals cover included - degree of protection IP20

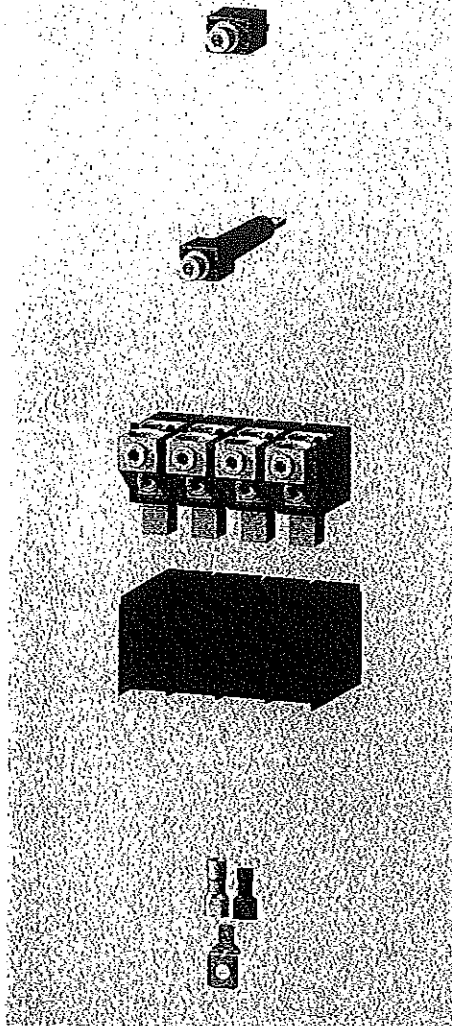
CS-BC-B414	34958	Block terminal for 5 cables	5x (2,5 + 25)	Cu/Al cables	0.24	1
------------	-------	-----------------------------	---------------	--------------	------	---

- TECHNICAL INFORMATION, see page D18

- terminals cover included - degree of protection IP20

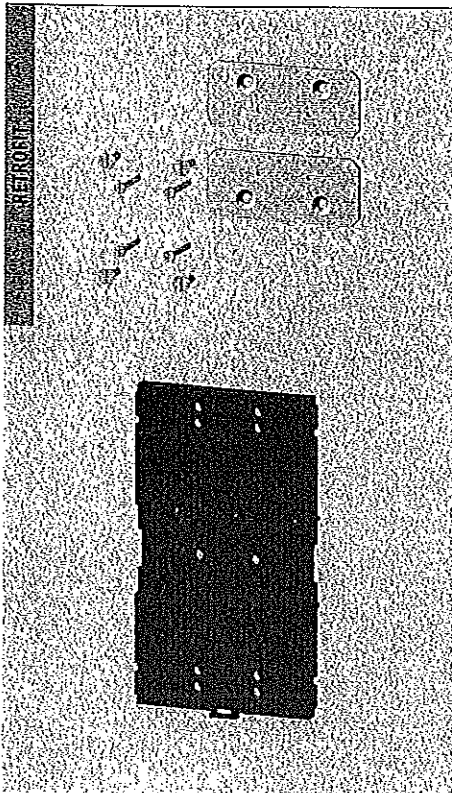
CS-BC-PS41	36030	Potential terminals	1,5 + 2,5/4 + 6	Cu flexible conductor	0.005	1
------------	-------	---------------------	-----------------	-----------------------	-------	---

- TECHNICAL INFORMATION, see page D18



MOUNTING SETS

3P 4P



Types	Product code	Description	Weight (kg)	Package set
OD-BC-MS33	20625	Reduction for BA... *33	0.13	1

- for total replacement of BA... *33 circuit breaker 2 connecting sets CS-BC-A033 are necessary

OD-BC-DIN1	20238	For mounting on U ² rail according to EN 60715 wide 35 mm	0.05	1
------------	-------	----------------------------------------------------------------------	------	---

- DIMENSIONS, see page D29

²⁾ - one set provides for replacing one circuit breaker (set includes coupling elements necessary to assemble circuit breaker and mounting set)

RETROFIT - sets, which enable replacement of older circuit breakers by a new circuit breakers without switchboard reconstruction

SWITCHES

3P



Auxiliary - signal state of the main contacts

Type	Product code	Operating voltage	Contacts	Weight (kg)	Package
PS-BC-0010	20227	60 + 250 V a.c./d.c.		0.01	1
PS-BC-0010-Au	20228	5 + 60 V a.c./d.c.		0.01	1

- TECHNICAL INFORMATION, see page D45

Signal - signal tripping of circuit breaker by overcurrent release

Type	Product code	Description	Contacts	Weight (kg)	Package
NS-BC-0010	20225	60 + 250 V a.c./d.c.		0.01	1
NS-BC-0010-Au	20226	5 + 60 V a.c./d.c.		0.01	1

- TECHNICAL INFORMATION, see page D45

SHUNT TRIPS

3P



Type	Product code	Operating voltage	Weight (kg)	Package
SV-BC-X024	20233	24, 48 V a.c./d.c.	0.05	1
SV-BC-X110	20234	110, 230 V a.c./110, 220 V d.c.	0.05	1
SV-BC-X230	20235	230, 400 V a.c./220 V d.c.	0.05	1

- TECHNICAL INFORMATION, see page D46

UNDERVOLTAGE RELEASES

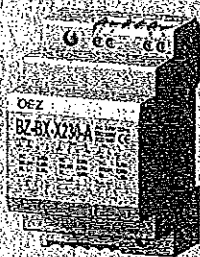
3P



Type	Product code	Operating voltage	Description	Weight (kg)	Package
SP-BC-X024	20229	24, 48 V a.c./d.c.		0.05	1
SP-BC-X110	20231	110, 230 V a.c./110, 220 V d.c.		0.05	1
SP-BC-X230	20232	230, 400 V a.c./220 V d.c.		0.05	1

- TECHNICAL INFORMATION, see page D47

DELAY UNIT

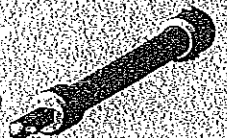
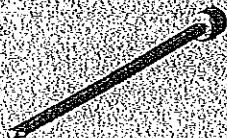
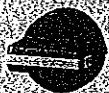
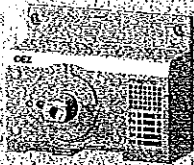
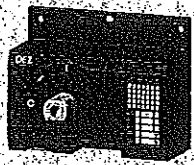


Type	Product code	Description	Weight (kg)	Package
BZ-BX-X230-A	36696	- enables to delay the undervoltage release tripping of circuit breakers Modelon	0.12	1

- the delay can be set up at three levels (according to wiring)

- TECHNICAL INFORMATION, see page P2

HAND DRIVES



Type	Product code	Name - description	Weight (kg)	Package (pcs)
RP-BC-CK10	20560	Hand drive unit - without locking	0.08	1
RP-BC-CK20	20593	Hand drive unit - with locking	0.08	1

- TECHNICAL INFORMATION, see page D48

Hand drive unit must be fitted with:

- for control on the circuit breaker - hand drive lever RP-BC-CP.
- for control on the switchboard door - extension shaft RP-BC-CH..
- hand drive bearing RP-BC-CN..
- hand drive lever RP-BC-CP.

RP-BC-CK21	20594	Hand drive unit - yellow - with locking	0.08	1
------------	-------	-----------------------------------------	------	---

- TECHNICAL INFORMATION, see page D48

Hand drive unit must be fitted with:

- for control on the switching unit - hand drive lever RP-BC-CP.
- for control on the switchboard door - extension shaft RP-BC-CH..
- hand drive bearing RP-BC-CN..
- hand drive lever RP-BC-CP.

RP-BC-CK30	20595	Hand drive unit for right side control - without locking	0.14	1
------------	-------	----------------------------------------------------------	------	---

RP-BC-CK31	20596	Hand drive unit left side control - without locking	0.14	1
------------	-------	-----------------------------------------------------	------	---

- TECHNICAL INFORMATION, see page D48

Hand drive unit must be fitted with: with the extension shaft RP-BC-CH.., with the hand drive bearing RP-BC-CN.., with the hand drive lever RP-BC-CP.

RP-BC-CP10	20561	Hand drive lever - black - without locking	0.02	1
------------	-------	--------------------------------------------	------	---

RP-BC-CP20	20562	Hand drive lever - black - with locking	0.02	1
------------	-------	-----------------------------------------	------	---

- TECHNICAL INFORMATION, see page D48

RP-BC-CP21	20597	Hand drive lever - red - with locking	0.02	1
------------	-------	---------------------------------------	------	---

- TECHNICAL INFORMATION, see page D48

RP-BC-CN10	20564	Hand drive bearing - degree of protection IP40	0.05	1
------------	-------	------------------------------------------------	------	---

RP-BC-CN20	20565	Hand drive bearing - degree of protection IP66	0.05	1
------------	-------	------------------------------------------------	------	---

- TECHNICAL INFORMATION, see page D48

- is used in combination with the black lever of RP-BC-CP10 or RP-BC-CP20 hand drive

RP-BC-CN11	20598	Hand drive bearing - degree of protection IP40 - yellow	0.05	1
------------	-------	---------------------------------------------------------	------	---

RP-BC-CN21	20599	Hand drive bearing - degree of protection IP66 - yellow	0.05	1
------------	-------	---------------------------------------------------------	------	---

- TECHNICAL INFORMATION, see page D48

- is used in combination with the red lever of RP-BC-CP21 hand drive

RP-BC-CH10	20563	Extension shaft - length 350 mm	0.12	1
------------	-------	---------------------------------	------	---

- TECHNICAL INFORMATION, see page D48

RP-BC-CH20	20600	Extension shaft - telescopic, length 199 - 352 mm	0.92	1
------------	-------	---------------------------------------------------	------	---

- TECHNICAL INFORMATION, see page D48

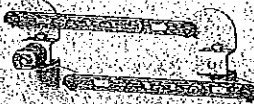
MECHANICAL INTERLOCKING AND PARALLEL SWITCHING

3P 4P



Type	Product code	Name	Weight (kg)	Package (pc)
RP-BC-CB10	20601	Mechanical interlocking	0.09	1

- TECHNICAL INFORMATION, see page D49
- Mechanical interlocking must be fitted with: 2 hand drive units RP-BC-CK.. (cannot be combined with hand drive unit for side control) 2 hand drive levers RP-BC-CP.

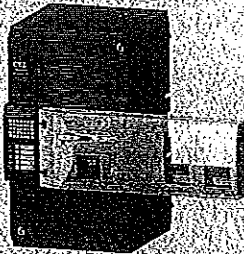


RP-BC-CD10	20602	Mechanical parallel switching	0.11	1
------------	-------	-------------------------------	------	---

- TECHNICAL INFORMATION, see page D49
- Mechanical parallel switching must be fitted with: 2 hand drive units RP-BC-CK.. (cannot be combined with hand drive unit for side control) 1 hand drive lever RP-BC-CP.

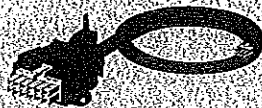
MOTOR DRIVES

3P 4P



Type	Product code	Name	Weight (kg)	Package (pc)
MP-BC-X024-B	34450	Motor drive side, 24V a.c./d.c.	0.9	1
MP-BC-X048-B	34451	Motor drive side, 48V a.c./d.c.	0.9	1
MP-BC-X110-B	34452	Motor drive side, 110V a.c./d.c.	0.9	1
MP-BC-X230-B	34453	Motor drive side, 230V a.c./d.c.	0.9	1

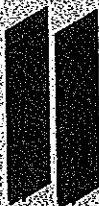
- TECHNICAL INFORMATION, see page D50



OD-BC-KA02-A	34454	Extension cable, length 0,6 m, for motor drive	0.1	1
OD-BC-KA02-B	37510	Extension cable, length 3 m, for motor drive	0.2	1

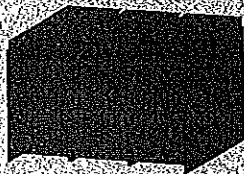
ACCESSORIES

3P 4P



Type	Product code	Name	Weight (kg)	Package (pc)
OD-BC-KS02	20224	Insulating barriers - set (two pieces), for 3P and 4P design	0.03	1
OD-BC-KS42	33660	Insulating barrier - one piece, for 4P design	0.02	1

- Included with each circuit breaker or switch-disconnector order
- in case connection is reversed (supply to terminals 2, 4, 6) it is necessary to install these barriers also on the lower side, for more detailed information see page D21



OD-BC-KS03	20240	Terminal cover - degree of protection IP20, for 3P	0.05	1
OD-BC-KS43	33661	Terminal cover - degree of protection IP20, for 4P	0.07	1

- increases degree of protection of connection point to IP20, e.g. when used with cable lugs



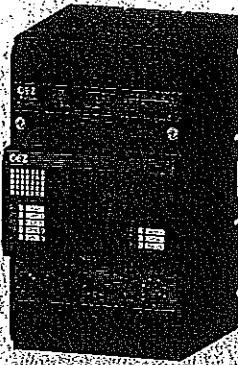
OD-BC-UP01	20241	Lever with locking		1
------------	-------	--------------------	--	---

- enables to lock the circuit breaker/switch-disconnector in „switched off manually“ position (loaded)
- locking is possible using padlock with shank diameter 3 ÷ 4 mm

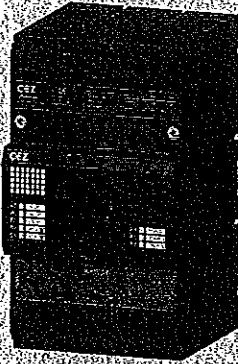
ag

CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

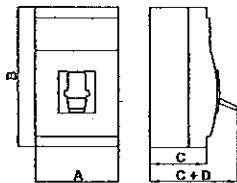
3P 4P



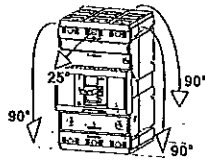
Circuit breaker



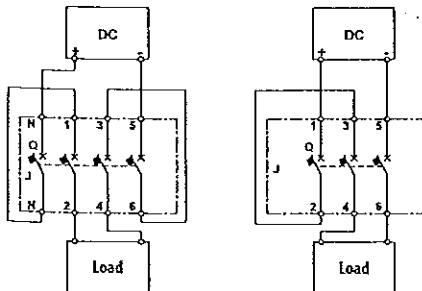
Switch-disconnector



Dimensions



Installation positions



Connection of 3P circuit breaker in DC circuit up to 250 V d.c. Connection of 4P circuit breaker in DC circuit up to 440 V d.c.

	CIRCUIT BREAKER	SWITCH-DISCONNECTOR
Type	BC160NT	BC160NT-CV
Series	NORMAL	
Dimensions A x B x C + D (3P/4P design)	75/100 x 130 x 70 + 23 mm	75/100 x 130 x 70 + 23 mm
Weight (3P/4P design)	1/1.3 kg	1/1.3 kg
Standards	EN 60947-2, IEC 60947-2	EN 60947-3, IEC 60947-3
Approval marks	CE	CE
Number of poles	3, 4	3, 4
Rated current	16 ÷ 160 A ²⁾	-
Rated normal current	16 ÷ 160 A ²⁾	160 A
Rated operating current	-	160 A
Rated operating voltage	U _e max. 690 V a.c. max. 250 V d.c. (3P) max. 440 V d.c. (4P)	max. 690 V a.c. max. 250 V d.c. (3P) max. 440 V d.c. (4P)
Rated frequency	f _n 50/60 Hz	50/60 Hz
Rated impulse withstand voltage	U _{imp} 8 kV	8 kV
Rated insulation voltage	U _i 690 V	690 V
Utilization category (selectivity)	690 V a.c.	A
Utilization category (switching mode)	AC-3 (16 ÷ 100 A) AC-2 (125 ÷ 160 A) DC-22A	AC-23 A DC-22A
Rated short-time withstand current	I _t / t	2 kA/1 s
Rated short-circuit ultimate breaking capacity (rms) ¹⁾	I _{cu} / U _e 6 kA/690 V a.c. 12 kA/500 V a.c. 25 kA/415 V a.c. 40 kA/230 V a.c. 25 kA/250 V d.c. τ = max. 15 ms (3P) 20 kA/440 V d.c. τ = max. 15 ms (4P)	-
Off time at I _{cu}	t _{off} 7 ms	-
Rated short-circuit service breaking capacity (rms)	I _{cs} / U _e 3 kA/690 V a.c. 6 kA/500 V a.c. 13 kA/415 V a.c. 20 kA/230 V a.c. 13 kA/250 V d.c. τ = max. 10 ms (3P) 13 kA/440 V d.c. τ = max. 10 ms (4P)	-
Rated short-circuit making capacity (peak value)	I _{ms} / U _e 52 kA/415 V a.c.	2.8 kA/415 V a.c.
Losses per 1 pole at I _n = 160 A	15 W	15 W
Mechanical endurance	20 000 cycles	20 000 cycles
Electrical endurance (U _e = 415 V a.c.)	6 000 cycles	6 000 cycles
Switching frequency	120 cycles/hr	120 cycles/hr
Control force (3P/4P design)	55/65 N	55/65 N
Degree of protection from front side of the device	IP40	IP40
Degree of protection of terminals	IP20	IP20
Operating conditions		
Reference ambient temperature	40 °C	40 °C
Ambient temperature range	40 °C - +55 °C	40 °C - +55 °C
Working environment	dry and tropical climate	dry and tropical climate
Climatic resistance	EN 60068	EN 60068
Pollution degree	3	3
Max. sea level	2 000 m	2 000 m
Seismic resistance	3g (8 ÷ 50) Hz	3g (8 ÷ 50) Hz
Designated conditions		
Front/rear connection	•/•	•/•
Plug-in design	-	-
Withdrawable design	-	-
Accessories		
Switches - auxiliary/relative/signal/early	•/-/•/-	•/-/•/-
Shunt trip/with signal switch	•/•	•/•
Undervoltage release/with early switch/with signal switch	•/-/•	•/-/•
Front hand drive/side drive right/left	•/•/•	•/•/•
Mechanical interlocking - with Bowden cable/for hand drive	-/•	-/•
Motor drive/with counter of cycles	•/-	•/-
Lever with locking	•	•

• available, - unavailable, + being prepared

¹⁾ - in case circuit breaker connection is reversed (input terminals 2, 4, 6, output terminals 1, 3, 5) I_{cu} does not change

²⁾ - ranges of rated currents vary according to characteristics see page D37

- protection of Modeion switch-disconnectors, see page R

CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Specifications

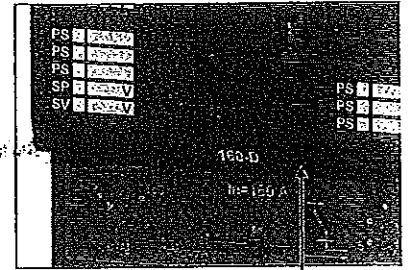
Description of push button function and signalling

TEST push button - by pressing you will switch off the circuit breaker/switch-disconnector, including to actuate the auxiliary switches

Inspection push button - by pressing you will simulate tripping of the circuit breaker by the overcurrent release, including to actuate the auxiliary switches and signal switch. Pressing

requires a suitable instrument, such as a wire with cross-section of about 1 mm.

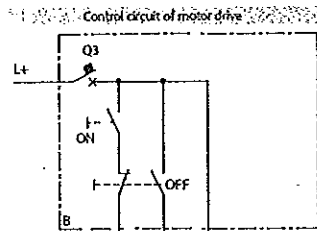
Signalling of tripping by the overcurrent release - after tripping of the circuit breaker by the overcurrent release, it will display the indicator.



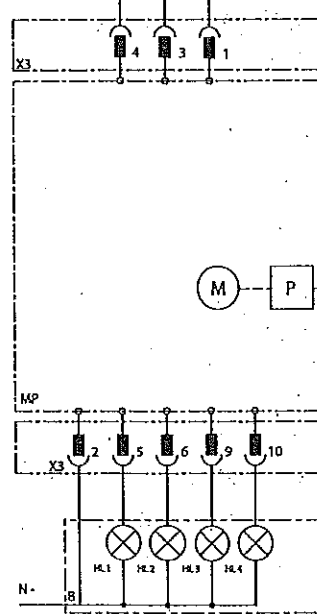
TEST push button

Diagram

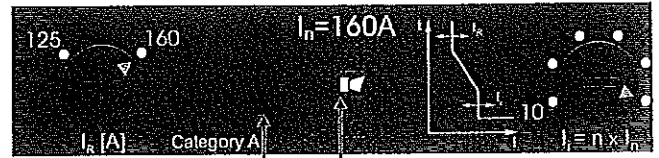
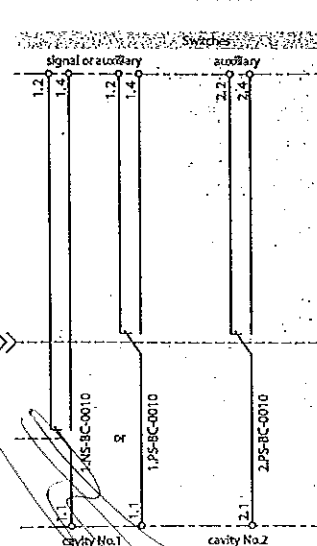
Circuit breaker with accessories (3-pole design)



Motor drive

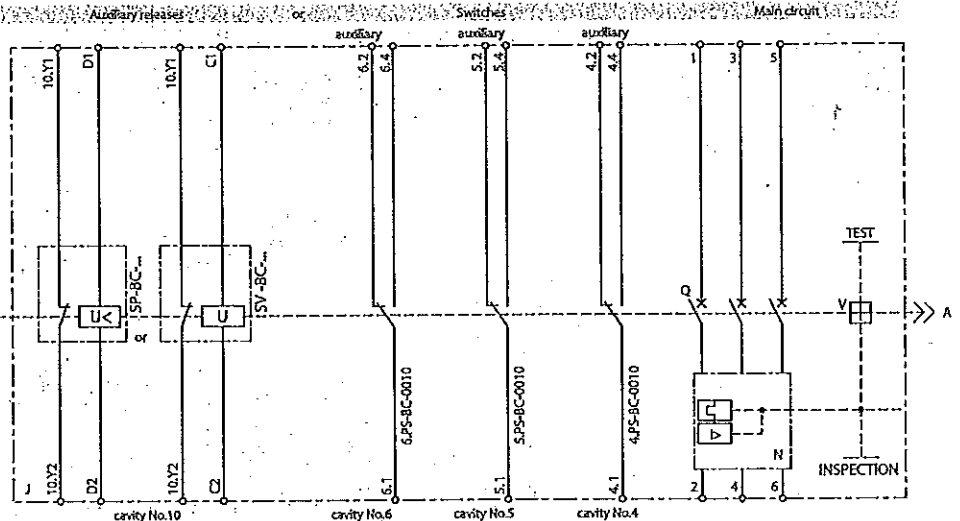


Control circuit of motor drive signalling



INSPECTION push button

Signalling of tripping by the overcurrent rel - signalling is for circuit breakers with characteristics M and N



Power losses (per 1 pole)

I _n (A)	W (W)
16	4
20	4
25	4
32	4
40	4
50	5
63	6
80	10
100	15
125	15
160	15

CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Diagram

Circuit breaker with accessories (4-pole design)

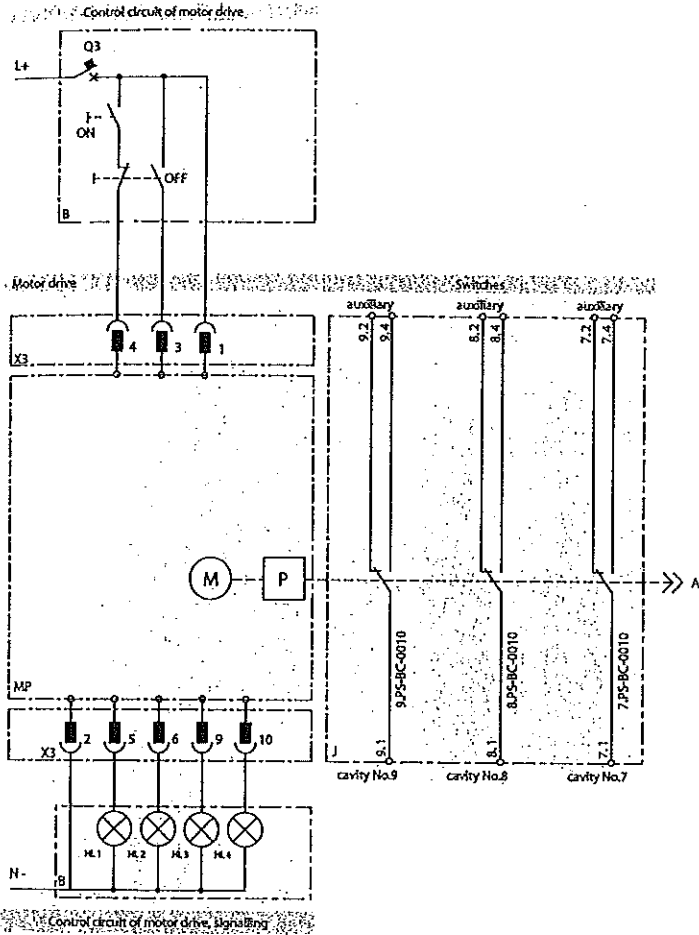
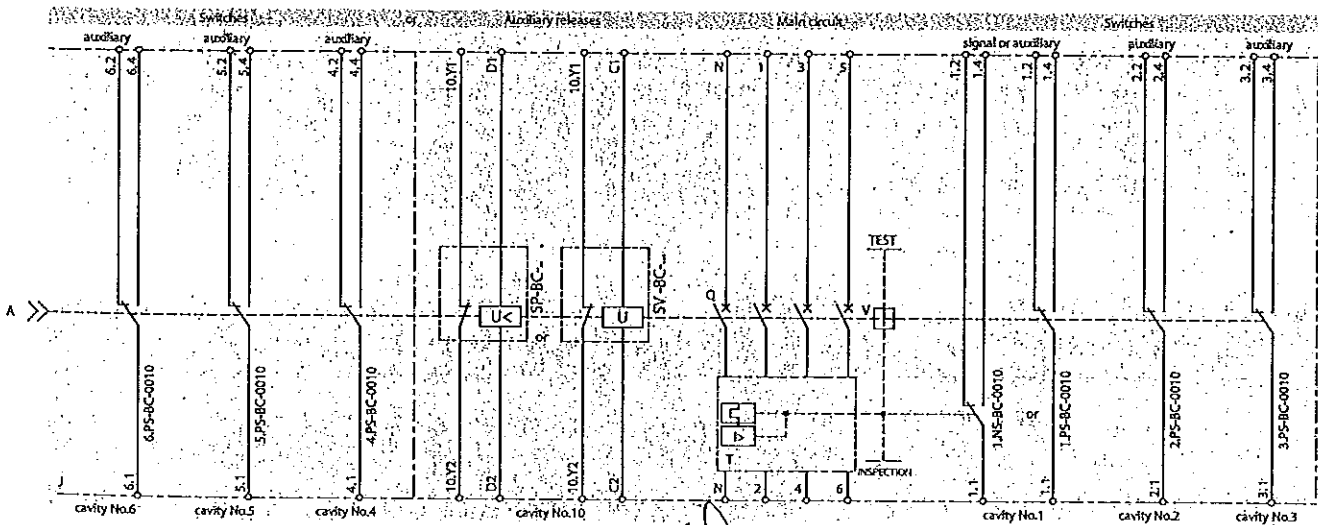


Diagram description

- MP motor drive - MP-BC...
 - M motor
 - P gear unit
 - X3 connector for connection of control and signalling circuits
 - B recommended wiring of the control circuits
- It is not a part of motor drive
 - ON switch on button
 - OFF switch off button
 - Q3 motor drive circuit breaker - see page D50
 - J circuit breaker BC 160
 - Q main contacts
 - T thermomagnetic overcurrent release
 - 3P+N (3 poles are protected, N pole is unprotected)
 - 4P (all 4 poles are protected)
 - V trip-free mechanism
 - TEST push button to test release
 - REVIZE inspection push button of release
 - SP-BC-X undervoltage release
 - SV-BC-X shunt trip
 - HL1 remote failure signalling (Unreliable switching on or switching off)
max. permissible load 10 W
 - HL2 signalling of circuit breaker lever position (loaded) max. permissible load 10 W
 - HL3 signalling of opening of the front safety cover of the drive max. permissible load 10 W
 - HL4 signalling of exertion of the drive locking bar max. permissible load 10 W
- ⚡ voltage on terminals 5, 6, 9, 10 is the same as U of the motor drive



CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Specifications

Connecting and installation

Power circuit

- connected with Cu/Al busbars or cables and possibly cables with cable lugs
- connection sets are produced to provide greater connecting options, see page D10
- generally, conductors from the supply are connected to input terminals 1, 3, 5 and conductors from the load to terminals 2, 4, 6; however, it is possible to reverse the connection (exchanging input and output terminals without limiting rated short-circuit ultimate breaking capacity I_{sc})
- In case of reversed connection, circuit breaker/switch-disconnector must be fitted with ODBL-KS02 insulating barriers also on the side of terminals 2, 4, 6, for more detailed information see page D21

- we recommend painting the connecting busbars
- input and output conductors/busbars must be mechanically enforced in order to avoid transferring electrodynamic forces to the circuit breaker during short-circuiting
- the method of connecting the power circuit must observe the deionization space of the circuit breaker/switch-disconnector, see page D21

Auxiliary circuits

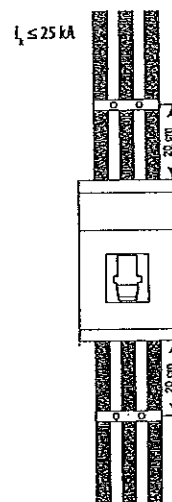
- switches, shunt trips or undervoltage releases are connected using flexible Cu conductors with cross-section $0.5 \div 1 \text{ mm}^2$ directly to terminals on these devices

Recommended minimum cross-sections of cables, busbars and flexibars

Circuit breaker	cables (mm ²)		busbars (width (mm) x height (mm))	
	20	25	25	32
16	2,5	-	-	-
20	2,5	-	-	-
25	4	-	-	-
32	6	-	-	-
40	10	-	-	-
50	10	16	-	-
63	16	25	-	-
80	25	35	-	-
100	35	50	16 x 2; 12 x 3	16 x 4; 12 x 5
125	50	70	16 x 4; 12 x 5	16 x 5; 12 x 6
160	70	95	16 x 5; 12 x 6	16 x 6; 12 x 8

- it is necessary to follow the relevant valid standards when cables are designed

Mechanical reinforcement of conductors for BC



Connecting set specifications

Circuit breaker	In	cable range set connection cross-sections (mm ²)				busbars and flexibars (mm x mm)	terminal information
		type of cable	core strands	core strand	ground strand of		
CS-BC-B021	160		2x (25 ⁰ ÷ 120)	2x (25 ÷ 120)	2x (25 ⁰ ÷ 120)	2x (25 ÷ 120)	page D25
CS-BC-B421	160		2x (25 ⁰ ÷ 120)	2x (25 ÷ 120)	2x (25 ⁰ ÷ 120)	2x (25 ÷ 120)	page D31
CS-BC-A011	160					16 x ...	page D25
CS-BC-A411	160						page D31
CS-BC-A021	160					16 x ...	page D26
CS-BC-A421	160						page D32
CS-BC-PS01	10/16				1,5 ÷ 2,5/4 ÷ 6		
CS-BC-PS41	10/16				1,5 ÷ 2,5/4 ÷ 6		
CS-BC-A033	160		RETROFIT – reduction for circuit breaker BA...*33 with front connection			30 x ...	page D27
CS-BC-B014	160		5x (2,5 ÷ 25)	5x (2,5 ÷ 25)	5x (2,5 ÷ 25)	5x (2,5 ÷ 25)	page D26
CS-BC-B414	160		5x (2,5 ÷ 25)	5x (2,5 ÷ 25)	5x (2,5 ÷ 25)	5x (2,5 ÷ 25)	page D32

RETROFIT – sets, which enable replacement of older circuit breakers by a new circuit breakers without switchboard reconstruction

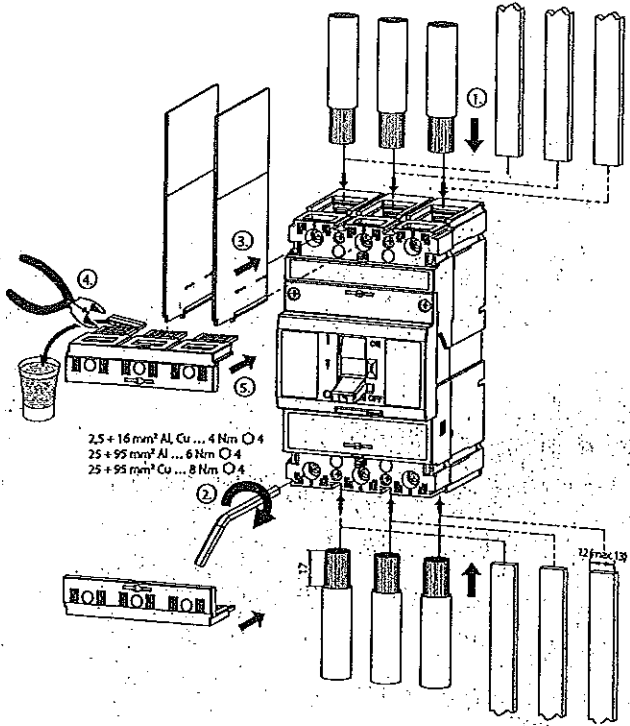
⁰ stranded conductor with cross-sections 25 mm² ÷ 50 mm² only with end sleeve

ag

CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

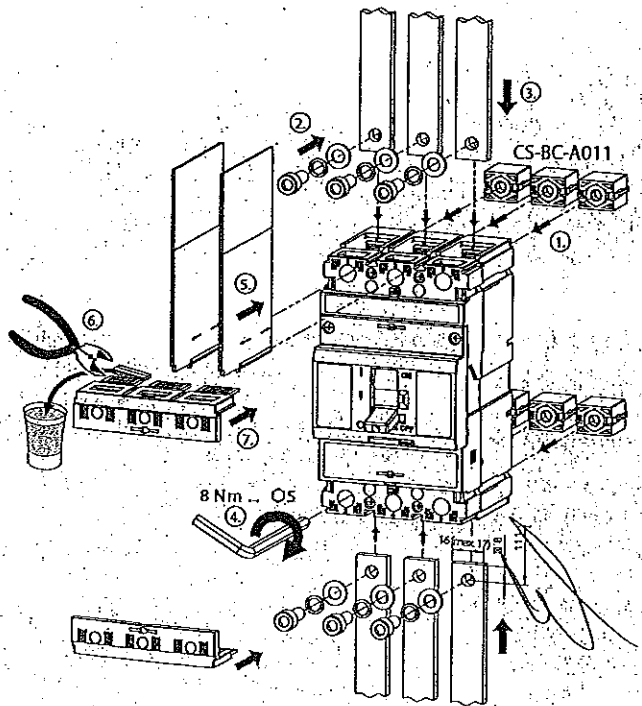
Connecting and installation

Front connection - Cu/Al cables, busbars (connecting set is a part of circuit breaker/switch-disconnector)

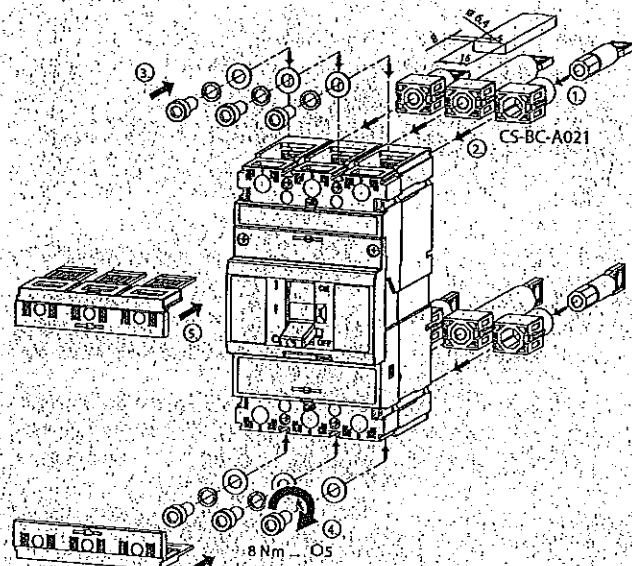


Handwritten mark

Front connection - Cu/Al busbars



Rear connection - Cu/Al busbars

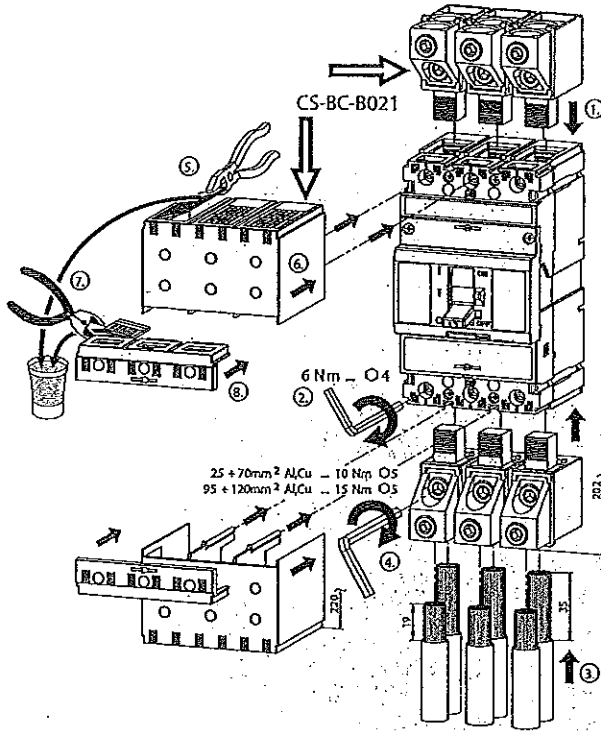


Handwritten mark

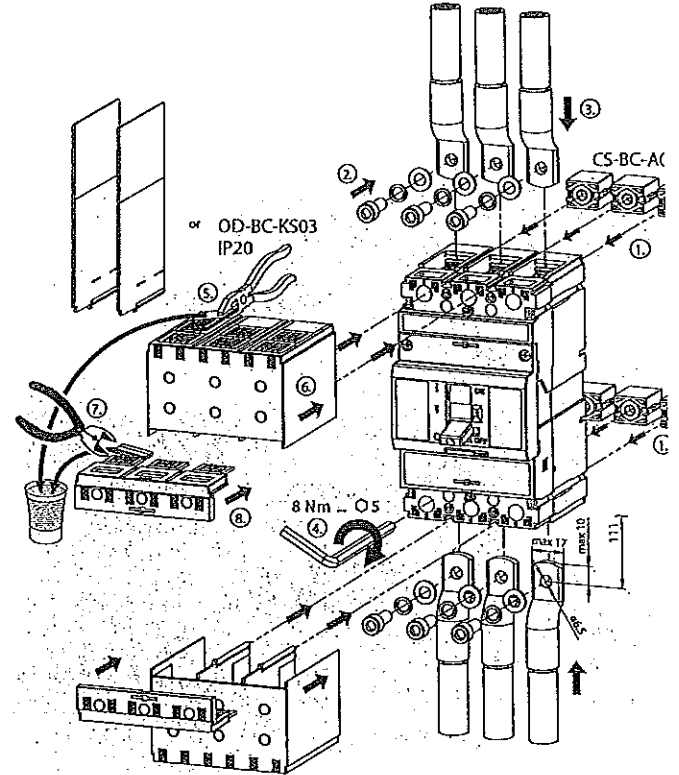
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Connecting and installation

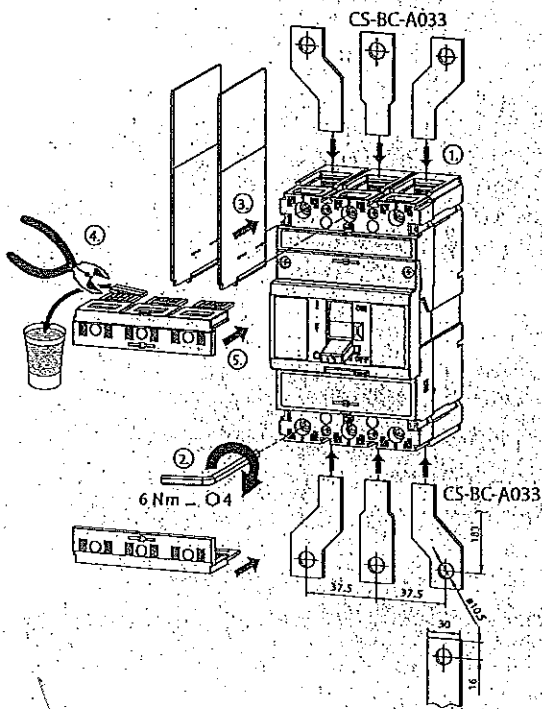
Front connection - 2x Cu/Al cables



Front connection - cable lugs



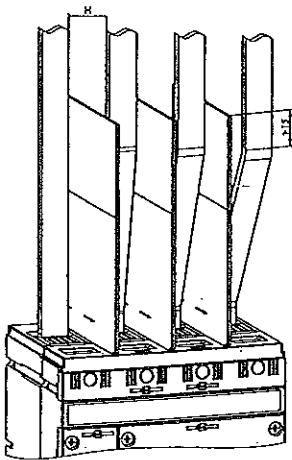
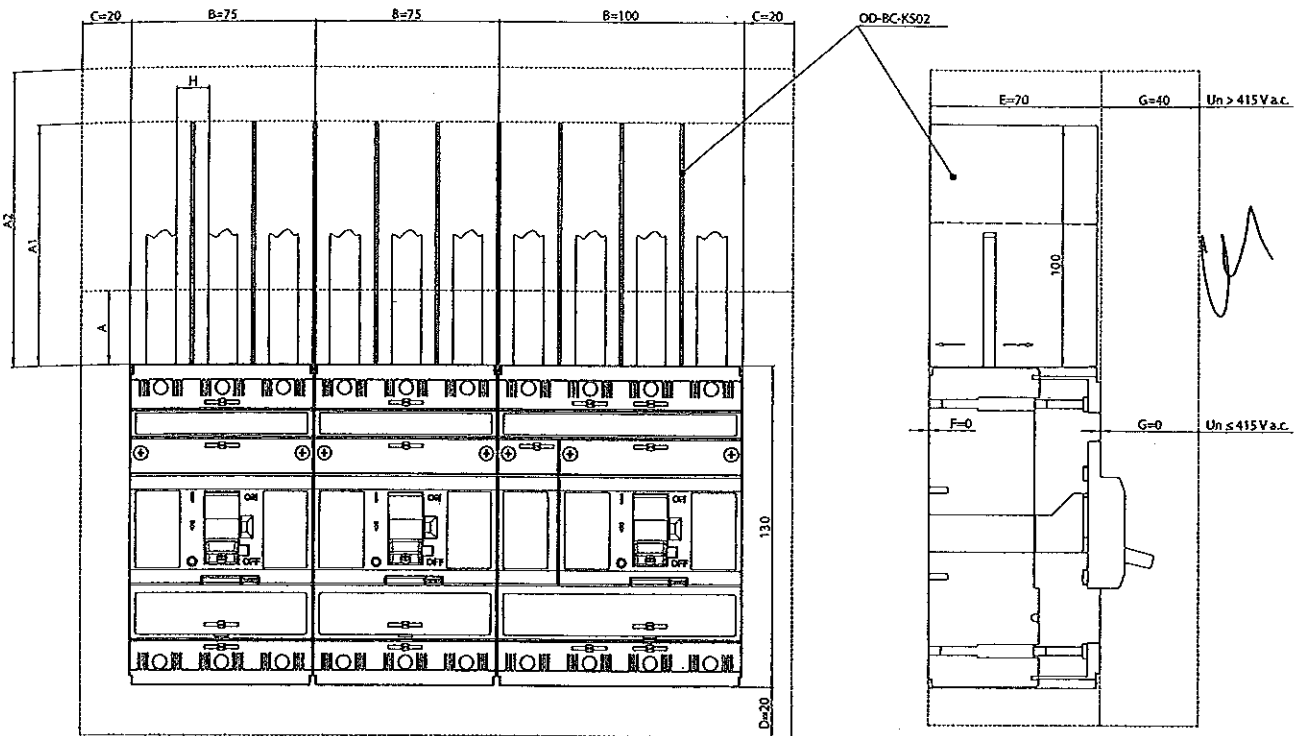
Front connection - reduction to BA...*33



Handwritten signature or mark.

CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Deionization spaces



A... minimum distance between the circuit breaker/switch-disconnector and uninsulated earthed wall (applicable for connection using insulated conductors, cables, flexibars or with rear connection)

A1... minimum insulation length of bare conductors (using OD-BC-KS02 and OD-BC-KS42 insulating barriers from 50 mm to max. 100 mm, or by adding additional insulation for the conductors with barriers to obtain at least A1 value)

A	50 mm
A1	100 mm
A2	150 mm
H	30 mm

A2... minimum distance:

- between the circuit breaker/switch-disconnector and uninsulated earthed wall (applicable for uninsulated conductors and busbars)
- between the circuit breaker/switch-disconnector and busbar
- between two circuit breakers/switch-disconnectors situated vertically above one another
- between uninsulated connections of two circuit breakers/switch-disconnectors above one another

C, D, E, F, G... minimum distance between the circuit breaker/switch-disconnector and uninsulated earthed wall

H... minimum distance between uninsulated conductors

USE OF INSULATING BARRIERS AND TERMINAL COVERS WITH CIRCUIT BREAKERS AND SWITCH-DISCONNECTORS

FIXED DESIGN

- front connection

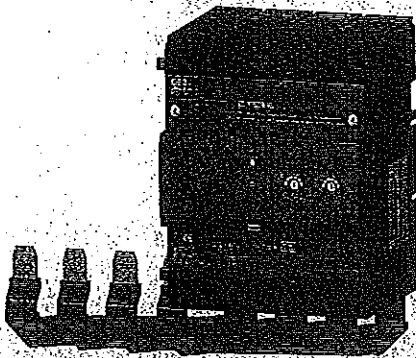
- terminals N, 1, 3, 5 - it is always necessary to use OD-BC-KS02 and OD-BC-KS42 insulating barriers or OD-BC-KS03 and OD-BC-KS43 terminal cover (when using CS-BC-B421 connections sets for connecting circuit breaker/switch-disconnector, the terminal cover is included in the connecting set)

- terminals N, 2, 4, 6 - it is always necessary to use OD-BC-KS02 and OD-BC-KS42 insulating barriers or a OD-BC-KS43 terminal cover if circuit breaker/switch-disconnector is connected to the supply using terminals N, 2, 4, 6 (when using CS-BC-B421 connections sets for connecting circuit breaker/switch-disconnector, the terminal cover is included in the connecting set)

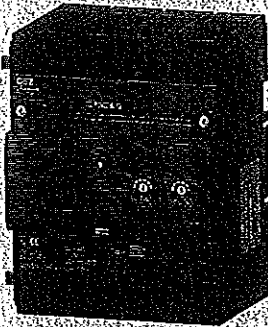
- rear connection

- insulating barriers and covers need not be used

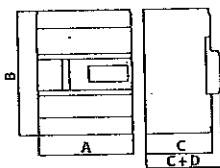
RESIDUAL CURRENT DEVICES



RCD-BC3-E...
RCD-BC4-E...



RCD-BC0-E...



Dimensions

Specifications

		RESIDUAL CURRENT DEVICE	
		RCD-BC3-E... RCD-BC4-E...	RCD-BC0-E
Dimensions A x B x C + D		100 x 130 x 70 + 10 mm	100 x 130 x 70 + 10 mm
Weight		1.7 kg	1.3 kg
Standards		EN 60947-2 IEC 60947-2	EN 60947-2 IEC 60947-2
Approval marks		CE (E) (S)	CE (E) (S)
Type		A	A
Number of poles		3; 4	3; 4
Rated current		63; 160 A	63; 160 A
Rated residual current		RCD-...EF... 0,3 - fixed/ RCD-...EA... /0,03; 0,1; 0,3; 0,5; 1,0; 3,0 A	0,3 - fixed/ /0,03; 0,1; 0,3; 0,5; 1,0; 3,0 A
Maximum inactivity time		RCD-...EF... 0 - without delay/ RCD-...EA... /0; 0,1; 0,2; 0,3; 0,5; 1,0 s	0 - without delay/ /0; 0,1; 0,2; 0,3; 0,5; 1,0 s
Rated voltage		U_n 440 V a.c.	440 V a.c.
Rated operating voltage		U_c 80 + 253 V a.c./ /80 + 440 V a.c.	80 + 253 V a.c./ /80 + 440 V a.c.
Rated impulse voltage		U_{sp} 6 kV	6 kV
Rated frequency		f_n 50/60 Hz	50/60 Hz
Losses per 1 pole		4 W	4 W
Mechanical/electrical endurance		8 000 cycles	8 000 cycles
Degree of protection from front side of the device		IP40	IP40
Degree of protection of terminals		IP20	IP20
Method of mounting		side	side
Installation on „U“ rail		•	•
Use		circuit breaker BC160	circuit breaker BC160
Operating conditions			
Reference temperature		40 °C	40 °C
Ambient temperature range		-40 + +55 °C	-40 + +55 °C
Working environment		dry and tropical climate	dry and tropical climate
Pollution degree		3	3
Max. sea level		2 000 m	2 000 m
Seismic resistance		3g (8 + 50) Hz	3g (8 + 50) Hz
Accessories			
Connecting sets are part of delivery/have to be bought separately		•/-	-/•

Description

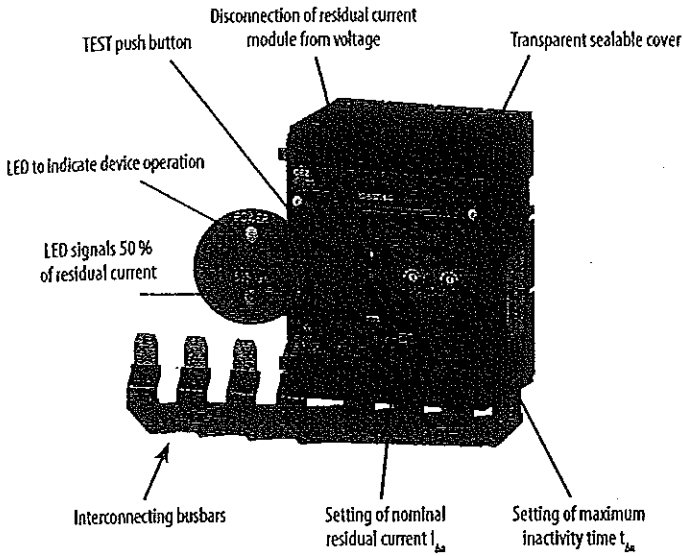
- Designed to protect against leakage/residual current
- Accessories for BC160NT circuit breakers... - simple mounting on left side of the device
- Can be mounted on DIN rail by means of adapter
- Can be connected with the circuit breaker by interconnecting busbars (can be part of the device itself) or by standard cable
- Design according to the way of connection:
 - Version without interconnecting busbars (they are not a part of module)
 - Interconnecting busbars can be bought separately, see RCD connection
 - can be connected to the circuit breaker by a cable, see RCD connection (cable is not part of the module)
 - Version with interconnecting busbars
 - the interconnecting busbars for connection to the circuit breaker are part of the (module circuit breaker terminals N, 2, 4, 6 and module terminals N, 1, 3, 5 are connected)
- The circuit breaker is switched off by special shunt trip, that is part of the residual current module
- Design according to nominal current:
 - Version up to 63 A for BC160NT ... circuit breakers up to 63 A
 - Version up to 160 A for BC160NT ... circuit breakers from 80 up to 160 A

- Design according to the parameters setting:
 - Version with fixed residual current $I_{\Delta n} = 300$ mA, without del
 - Design with gradual setting of residual current $I_{\Delta n}$ and with setting of ultimate no action time of $t_{\Delta n}$ (see table)
 - When there is set $I_{\Delta n} = 0.03$ A the delay is always 0 s !
- Setting can be sealed
- Module can be connected directly by means of CU/Al cable max. 95 mm²
- For other connection standard BC160 terminals with the exception of rear connection can be used
- LED to indicate device operation
- LED signals 50 % $I_{\Delta n}$
- Remote signalling of 50 % $I_{\Delta n}$ by means of make contact (or at RCD-BC-EA..)
- Remote signalling of circuit breaker switch off based on $I_{\Delta n}$ let by means of break contact in shunt trip
- Mechanism for disconnection of electronic parts of module for voltage - disconnection has to be done before the insulation resistor test is effected
- TEST push button - complete test of the device by means of simulation of real residual current
- Circuit breaker can not be assembled by another shunt trip undervoltage release
- Two circuit breakers with residual current module can be assembled neither by mechanical interlocking nor by parallel switching

RESIDUAL CURRENT DEVICES

3P 4P

Description

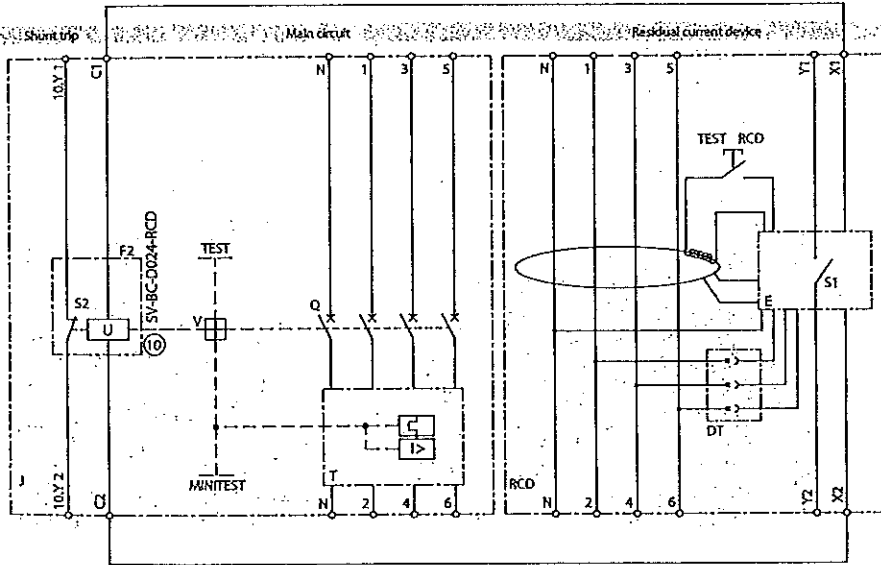


Signal contact specifications

Signalling switch of switch off by a failure		
Rated operating voltage	U_e	230 V a.c.
Rated insulation voltage	U_i	250 V
Rated impulse withstand voltage	U_{imp}	4 kV
Rated frequency	f_n	50/60 Hz
Rated operating current	I_n/U_e	2 A/ 230 V a.c.
Thermal current	I_{th}	6 A
Arrangement of contacts		01

Signalling switch for reaching the value of 50%		
Rated operating voltage	U_e	230 V a.c./ 30 V d.c.
Rated insulation voltage	U_i	250 V
Rated impulse withstand voltage	U_{imp}	6 kV
Rated frequency	f_n	50/60 Hz
Rated operating current	I_n/U_e	5 A/ 250 V a.c. 5 A/ 30 V d.c.
Thermal current	I_{th}	5 A
Arrangement of contacts		10

Wiring diagram



- J circuit breaker BC160
- RCD residual current device
- Q main contacts
- V trip-free mechanism
- T thermomagnetic overcurrent release
- E electronic of residual current device
- TEST push button to test release
- MINITEST inspection push button of release
- TEST RCD button of residual current module
- S1 signalling of 50% residual current value
- S2 signalling switch of switch off by a failure
- F2 shunt trip
- DT disconnection of residual current module from voltage

Total max. switching off time

	Maximum inactivity times, adapted 2016					
	0 ms	100 ms	200 ms	300 ms	400 ms	600 ms
$1x I_{n}$	< 70 ms	< 230 ms	< 350 ms	< 440 ms	< 630 ms	< 1 200 ms
$2x I_{n}$	< 40 ms	< 200 ms	< 320 ms	< 430 ms	< 620 ms	< 1 200 ms
$5x I_{n}$	< 40 ms	< 210 ms	< 310 ms	< 420 ms	< 630 ms	< 1 200 ms

Handwritten signatures and marks.

RESIDUAL CURRENT DEVICES

Connecting and installation

Reduction of rated current of circuit breaker according to connection type

Circuit breaker	Rated current of circuit breaker	Residual current device	Connection between circuit breaker and RCD	Inlet/outlet cables	Reduction coefficient k	Adjusted current	Real current I ₁ (I _n = 40 A) ¹⁾ I ₂ = I ₁ × k	Real current I ₂ (I _n = 100 A)
BC160NT305-160-D	160 A	RCD-BC0-EF16	CS-BC-S016 ²⁾	Cu, 70 mm ² ³⁾	0.9	160 A	144 A	(160 x 0.90)
		RCD-BC0-EA16	CS-BC-S416 ²⁾			125 A	112.5 A	(125 x 0.90)
		RCD-BC3-EF16	CS-BC-L016	Cu, 70 mm ² ³⁾	0.95	160 A	152 A	(160 x 0.95)
		RCD-BC3-EA16	CS-BC-L416 ²⁾			125 A	119 A	(125 x 0.95)
BC160NT405-160-D	160 A	RCD-BC0-EF16	CS-BC-S016 ²⁾	Cu, 95 mm ² ³⁾	1	160 A	160 A	
		RCD-BC0-EA16	CS-BC-S416 ²⁾			125 A	125 A	
BC160NT305-160-L	160 A	RCD-BC3-EF16	CS-BC-L016	Cu, 95 mm ² ³⁾	1	160 A	160 A	
		RCD-BC3-EA16	CS-BC-L416 ²⁾			125 A	125 A	
BC160NT405-160-L	160 A	RCD-BC4-EF16	CS-BC-L416 ²⁾	Cu, 70 mm ² ³⁾	1	160 A	160 A	
		RCD-BC4-EA16	CS-BC-L416 ²⁾			125 A	125 A	

¹⁾ - for others circuit breaker is reduction coefficient k = 1

²⁾ - connecting sets can be mounted on both upper/lower terminals

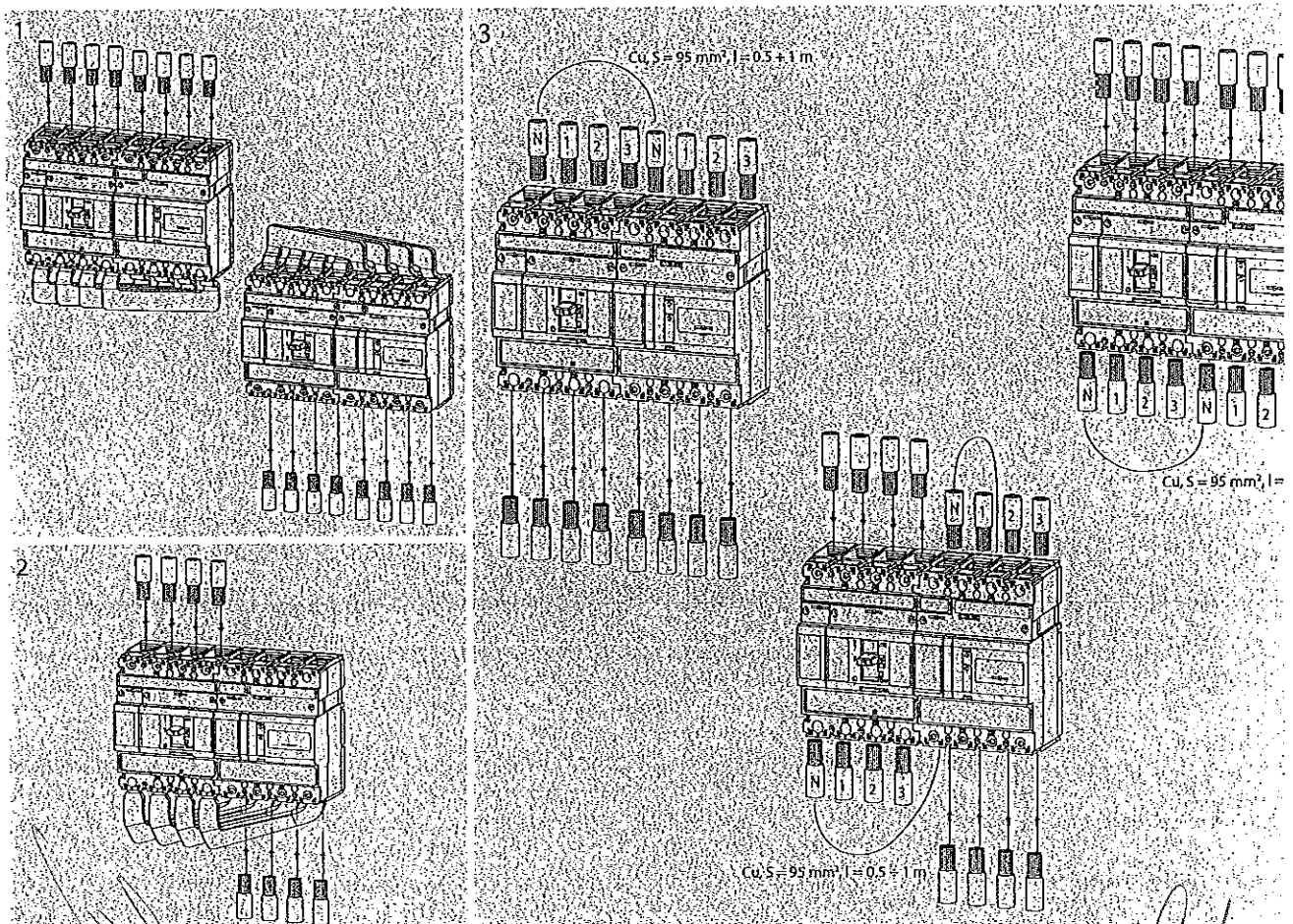
³⁾ - coefficients „k“ are not dependent on ambient temperature

⁴⁾ - dependency of nominal current I_n on ambient temperature can be found in the catalogue, see page D37

⁵⁾ - length of cables 2 m is given by standard EN 60 947-1

⁶⁾ - cables length 0.5 up to 1 m

- In case of the connection of the fine stranded conductor, we recommend using of the end sleeve

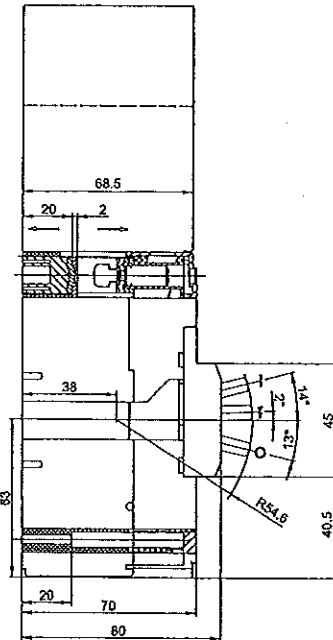
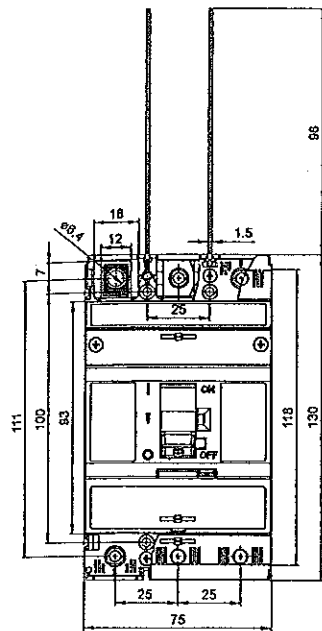


CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

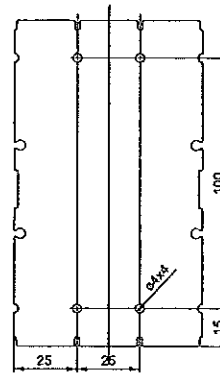
3P

Dimensions

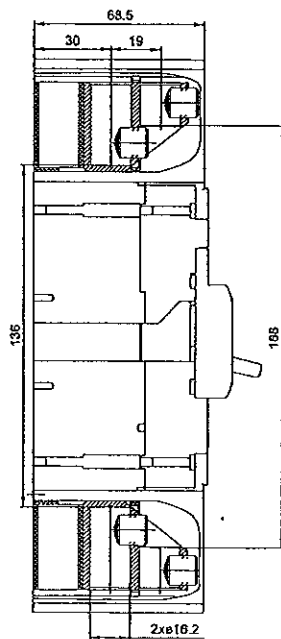
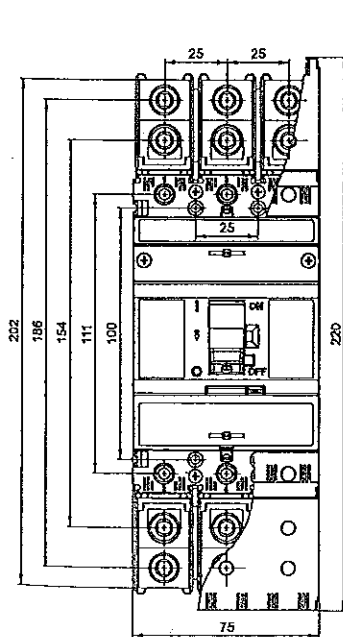
Fixed design, front connection



Drilling diagram

*Handwritten signature*

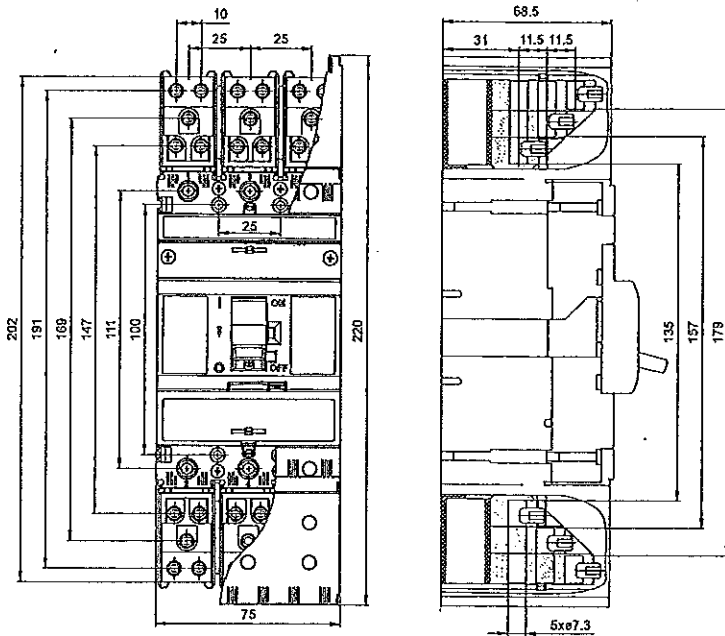
Fixed design, front connection (CS-BC-B021 connecting set)

*Handwritten signature**Handwritten signature*

CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

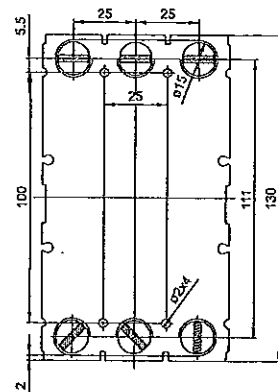
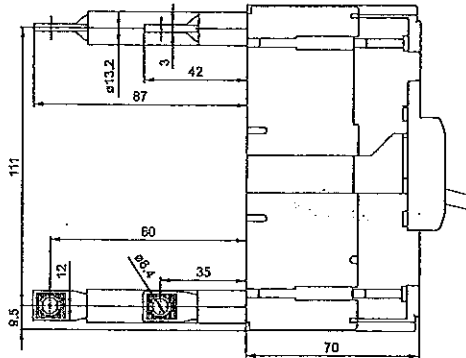
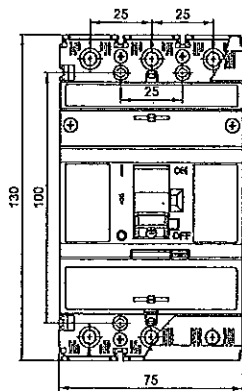
Dimensions

Fixed design, front connection (CS-BC-B014 connecting set)



Fixed design, rear connection (CS-BC-A021 connecting set)

Drilling diagram



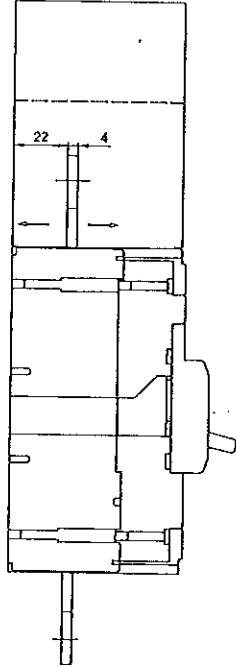
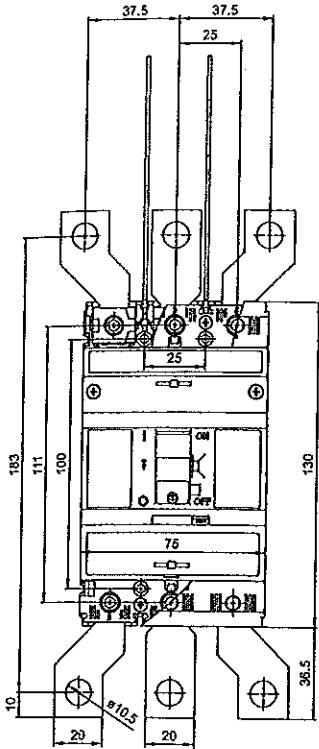
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

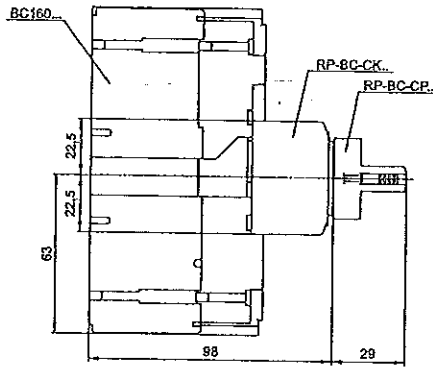
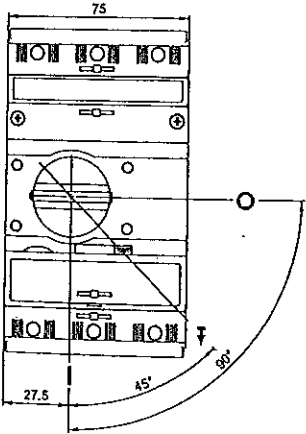
Fixed design, front connection (CS-BC-A033 connecting set)

RETROFIT

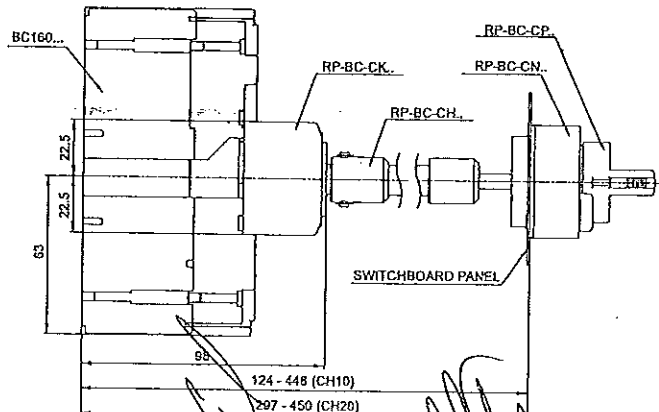
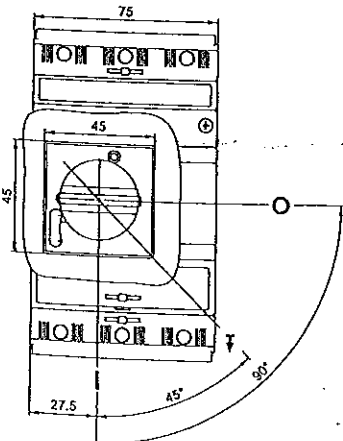
- reduction for BA...*33 circuit breaker



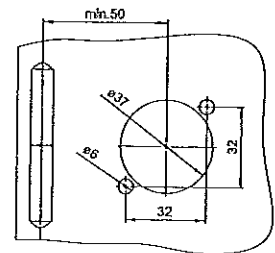
Fixed design, front hand drive



Fixed design, hand drive - front, with adjustable lever



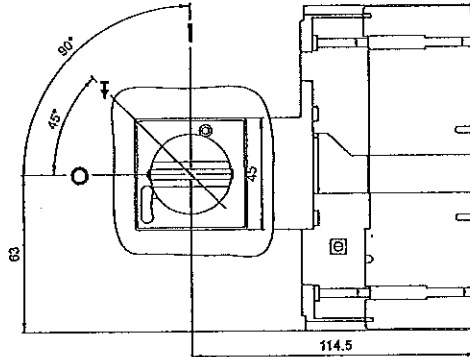
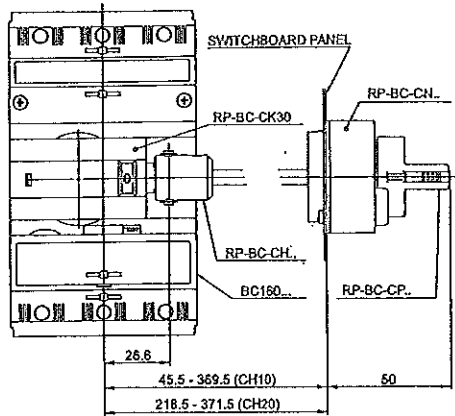
Switchboard door modification



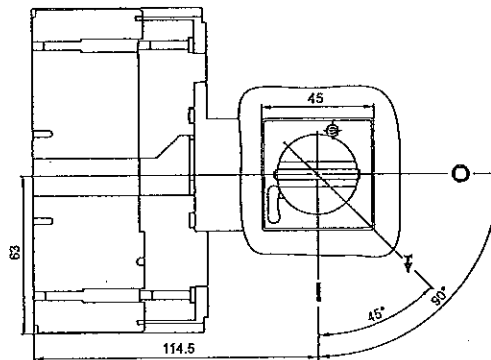
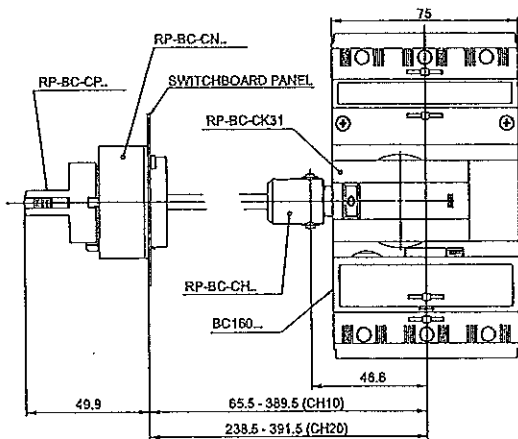
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

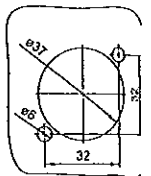
Fixed design, hand drive - control on right side, with adjustable lever



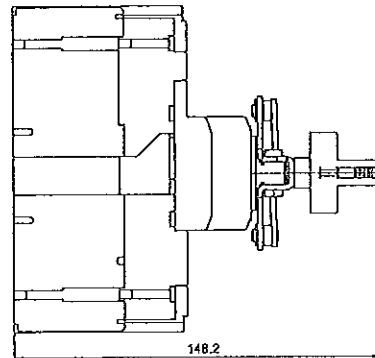
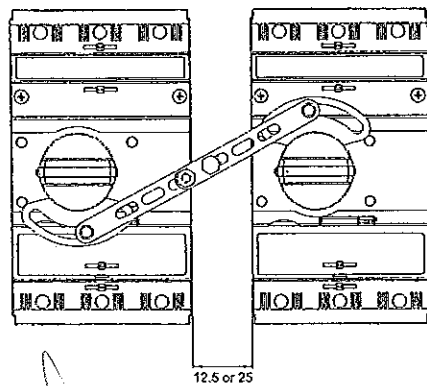
Fixed design, hand drive - control on left side, with adjustable lever



Switchboard modification



Fixed design, circuit breaker with RP-BC-CB10 mechanical interlocking

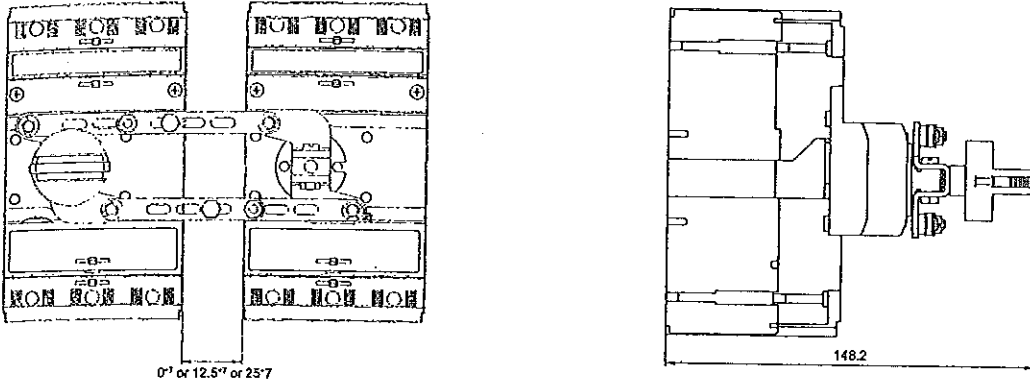


CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

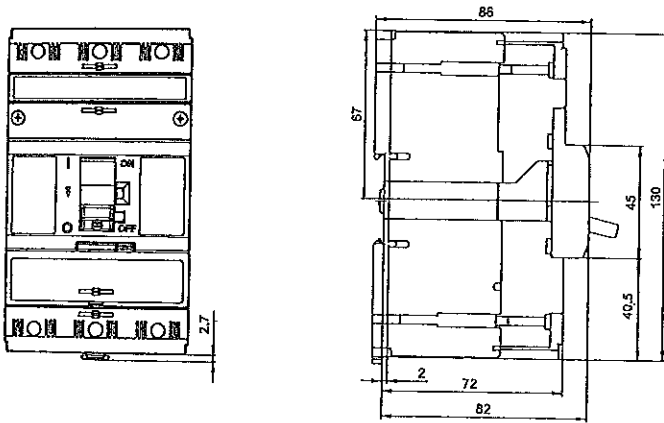
3P

Dimensions

Fixed design, circuit breaker with RP-BC-CD10 mechanical parallel switching

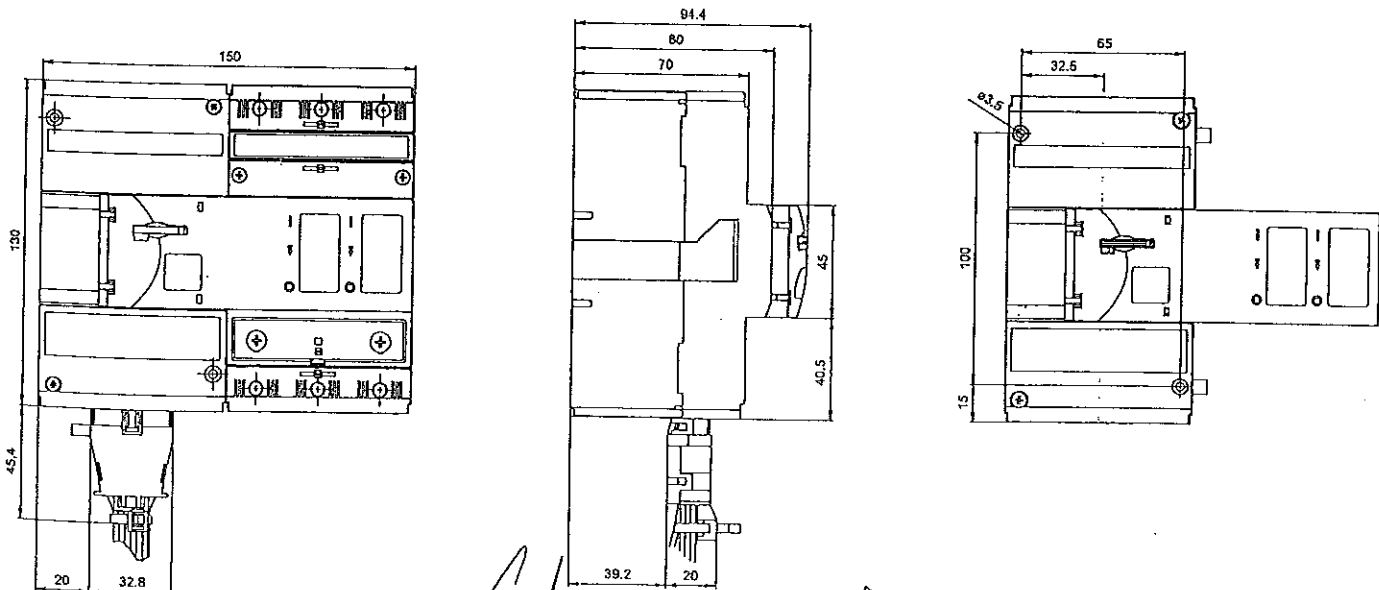


Fixed design, installation on 35 mm DIN rail



Fixed design, motor drive

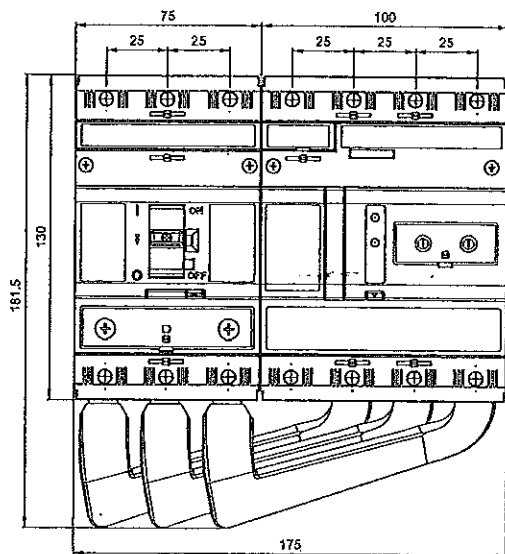
Drilling diagram



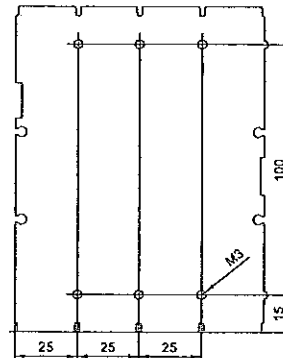
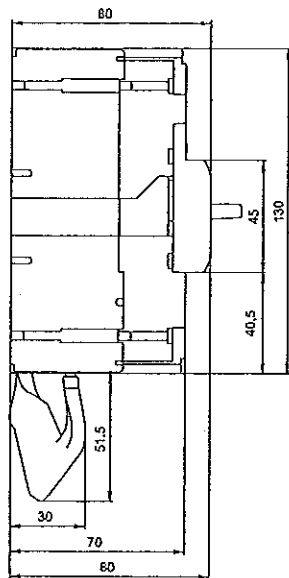
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

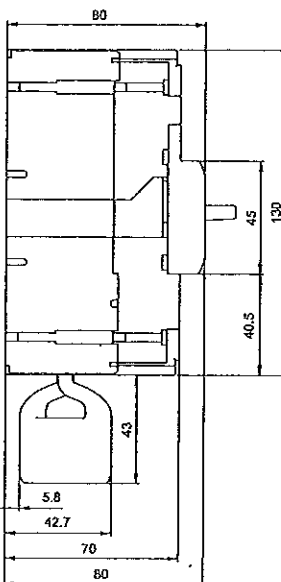
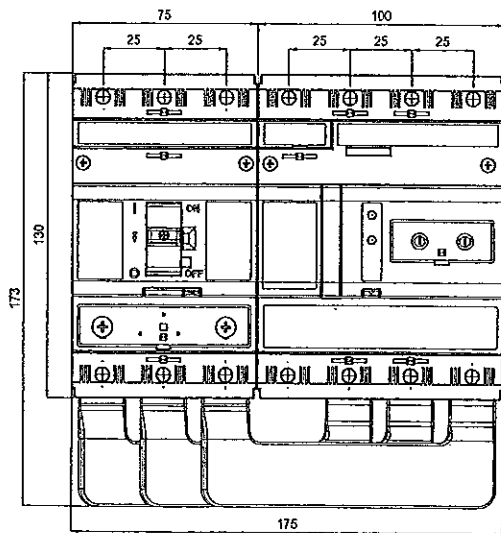
Fixed design, residual current device, rear connection



Drilling diagram



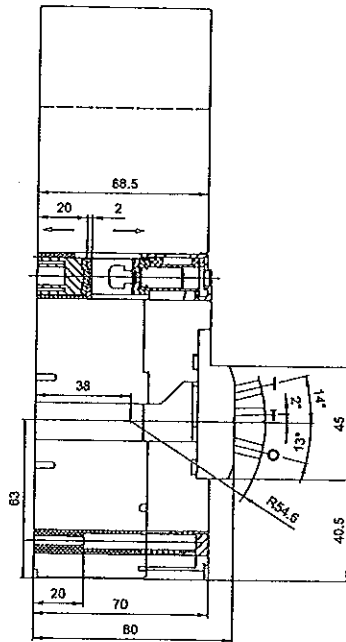
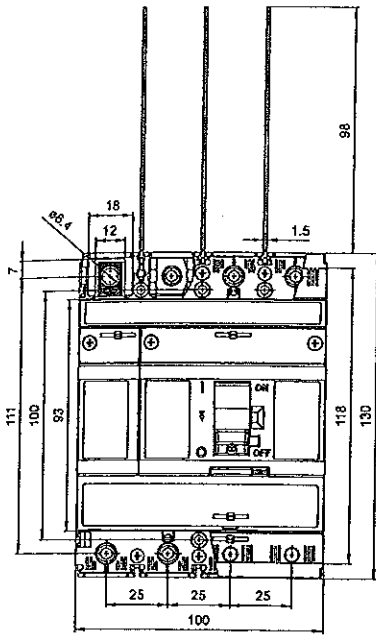
Fixed design, residual current device, bottom connection



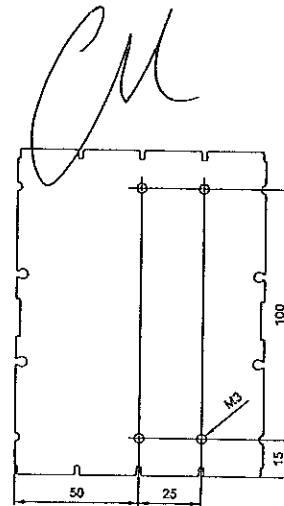
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

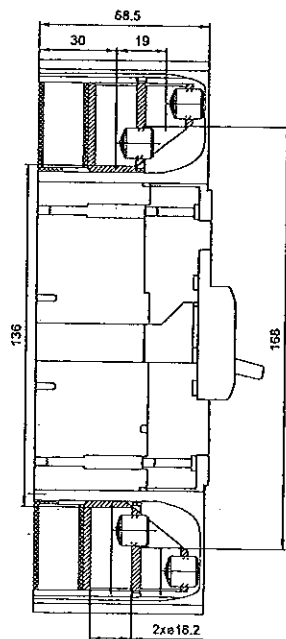
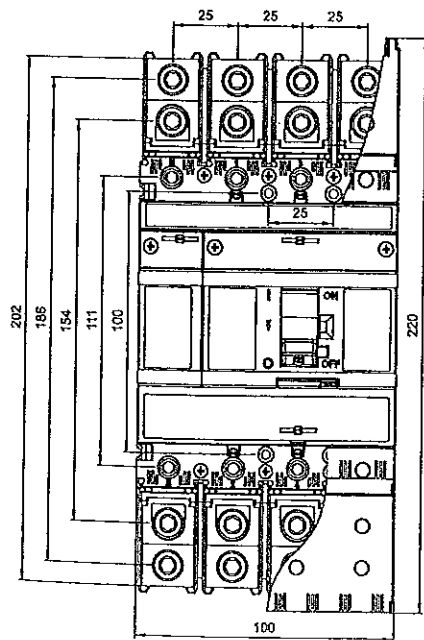
Fixed design, front connection



Drilling diagram



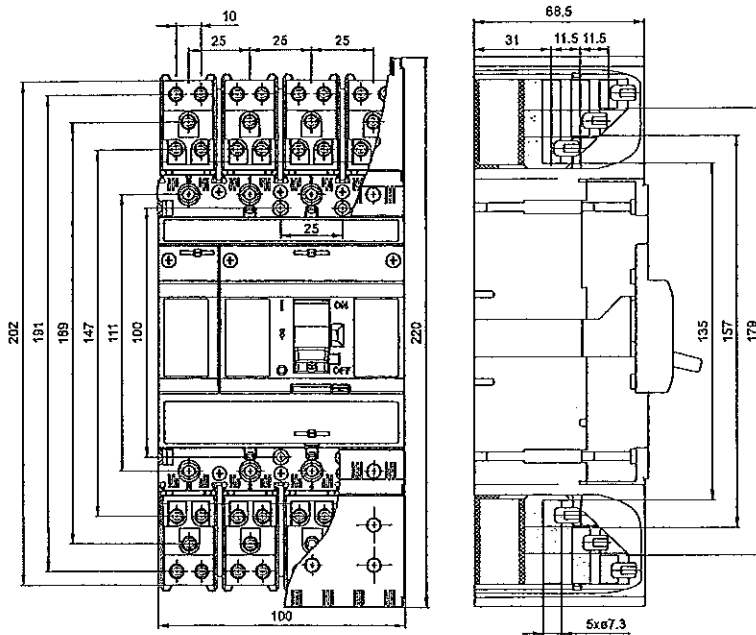
Fixed design, front connection (CS-BC-B421 connecting set)



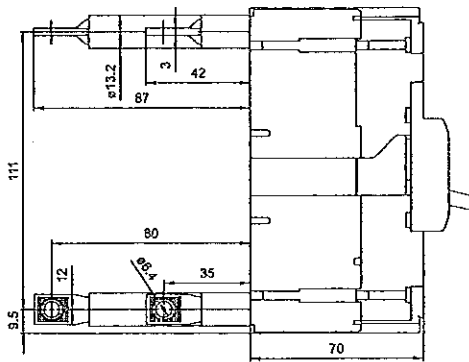
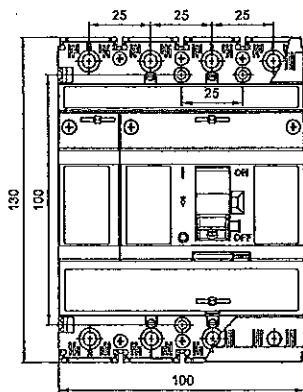
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

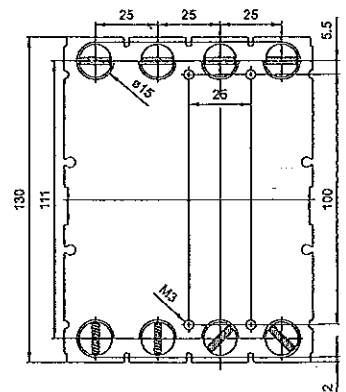
Fixed design, front connection (CS-BC-B414 connecting set)



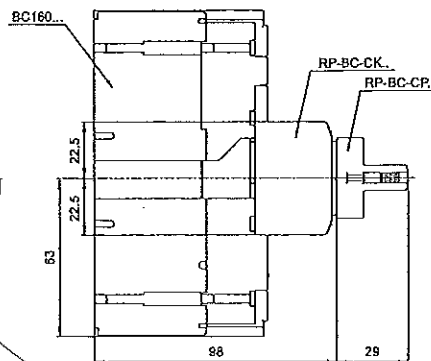
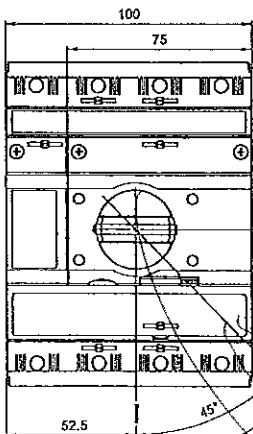
Fixed design, rear connection (CS-BC-A421 connecting set)



Drilling diagram



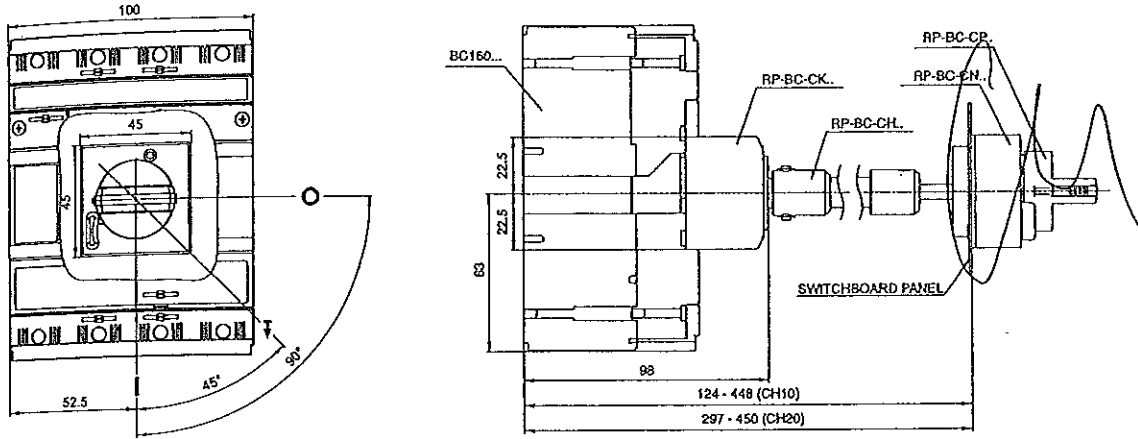
Fixed design, front hand drive



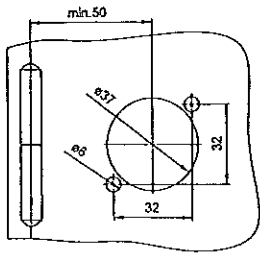
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

Fixed design, hand drive - front, with adjustable lever



Switchboard door modification

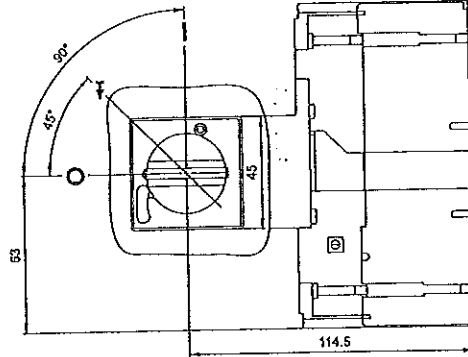
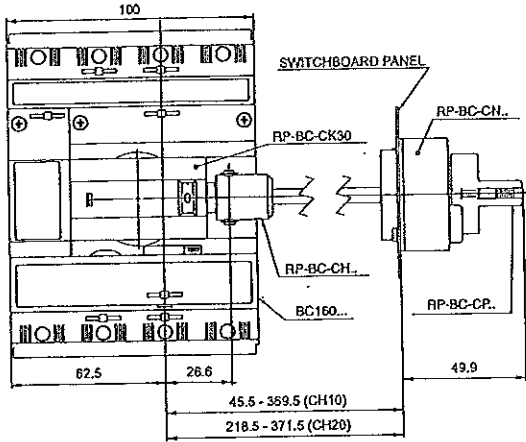


[Handwritten signatures]

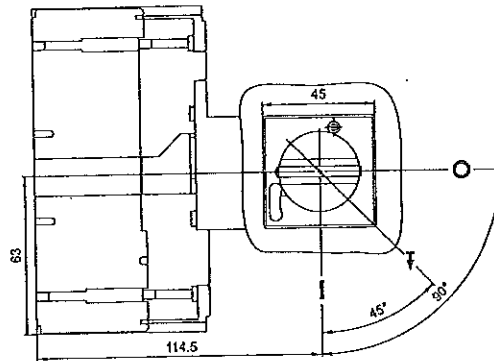
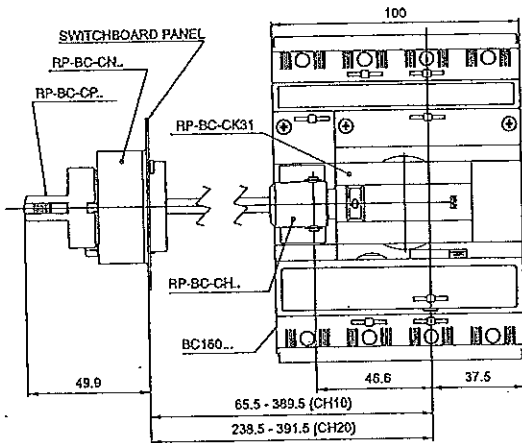
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

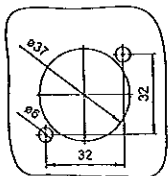
Fixed design, hand drive - control on right side, with adjustable lever



Fixed design, hand drive - control on left side, with adjustable lever



Switchboard modification

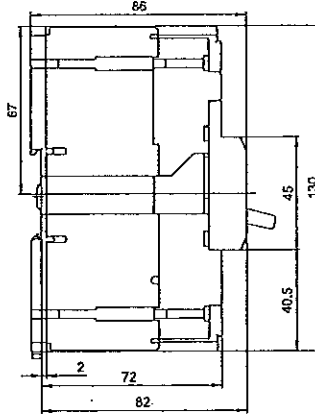
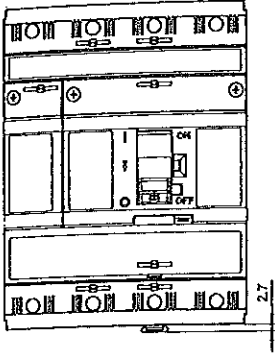


ay

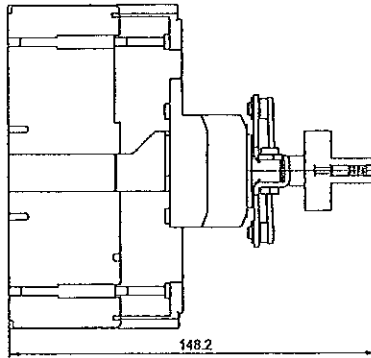
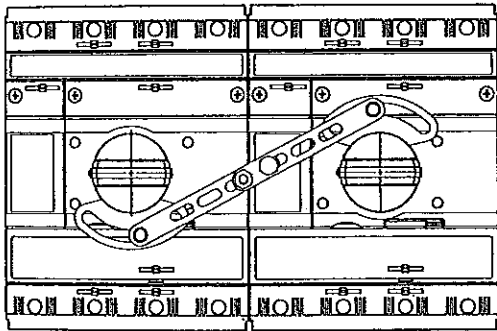
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

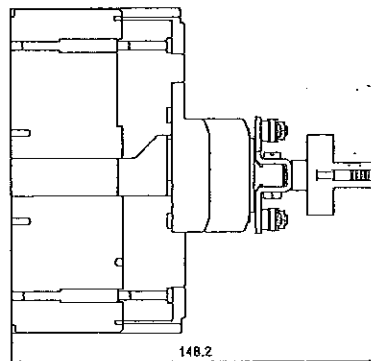
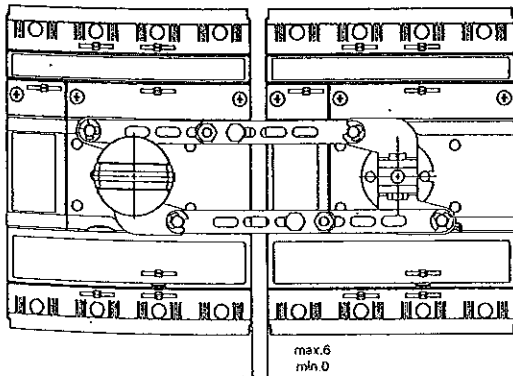
Fixed design, Installation on 35 mm DIN rail



Fixed design, circuit breaker with RP-BC-CB10 mechanical interlocking



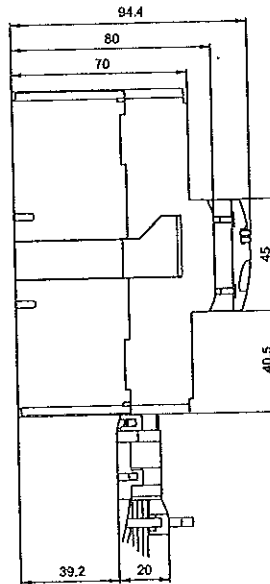
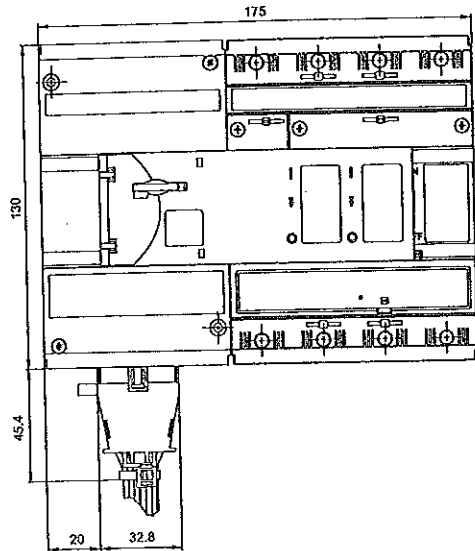
Fixed design, circuit breaker with RP-BC-CD10 mechanical parallel switching



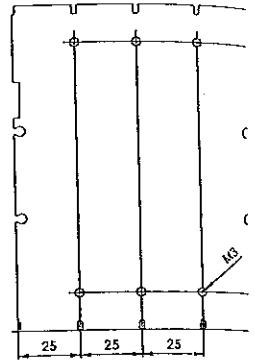
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

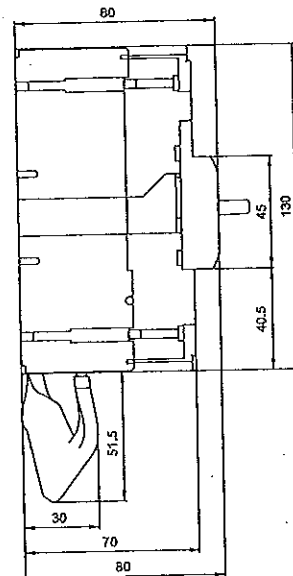
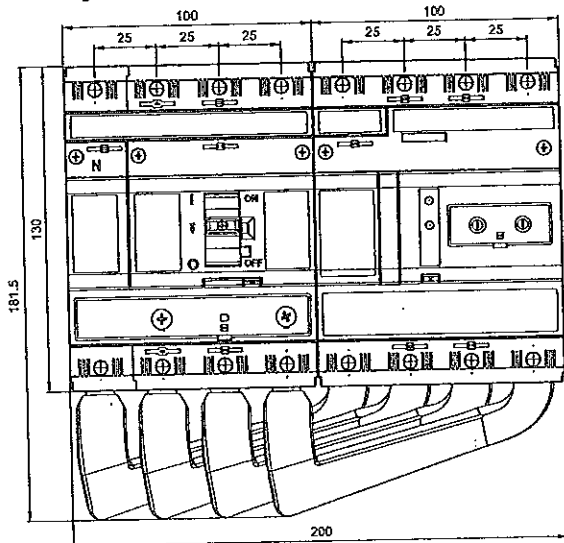
Fixed design, motor drive



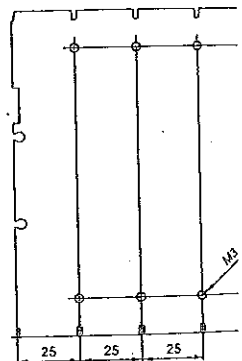
Drilling diagram



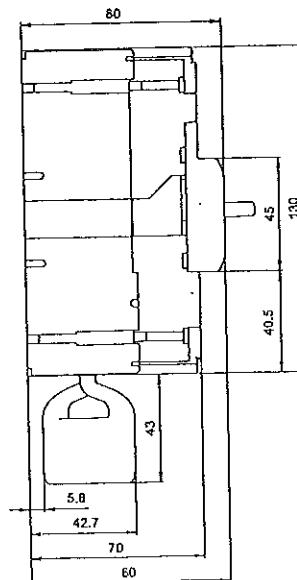
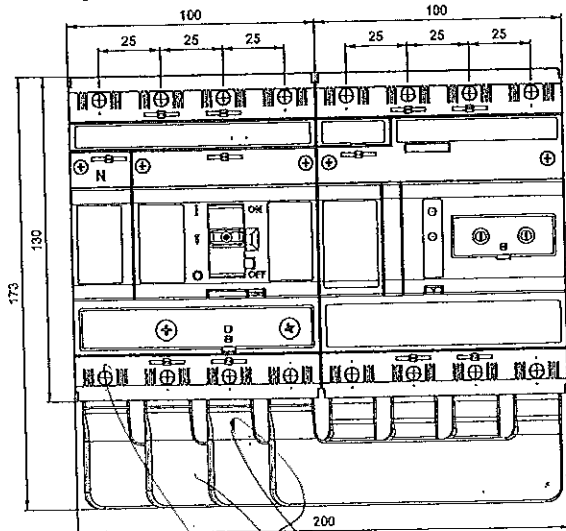
Fixed design, Residual current device, rear connection



Drilling diagram



Fixed design, Residual current device, bottom connection



OVERCURRENT RELEASES

3P, 4P

Overcurrent release is built into circuit breaker. Release cannot be demounted and exchanged.

4-pole circuit breakers are produced in variants:

- 3P+N (3 poles are protected, N pole is unprotected)
- 4P (all 4 poles are protected)

Permissible strength of N pole is 100% I_n .

Tripping characteristics

Circuit breakers are supplied with four types of tripping characteristics.

They are designated with the letters:

- „L” - lines (3P, 3P+N, 4P)
 - protection lines with low starting currents
- „D” - distribution (3P, 3P+N, 4P)
 - protection lines and transformers
- „M” - motor (3P, 3P+N, 4P)
 - motors protection
- „N” - only short-circuit release (3P, 4P)

■ BC160N circuit breakers with “L” characteristic have a given and fixed rated current value. The circuit breakers are produced with I_n values in a standardized series of currents 40 ÷ 160 A see table. Short-circuit release is fixed at the setting 4x I_n .

■ BC160 circuit breakers with “D” characteristic have the option of setting to a reduced current in a range of approximately 0.75 ÷ 1 I_n . The circuit breakers are produced with I_n values in a standardized series of currents 16 ÷ 160 A see table. Short-circuit release is adjustable. Adjustment values are given in the table.

■ BC160N circuit breakers with “M” characteristic have the option of setting to a reduced current in a range of approximately 0.75 ÷ 1 I_n . The circuit breakers are produced with I_n values in a standardized series of currents 16 ÷ 100 A see table. Short-circuit release is fixed at the setting 10x I_n . Circuit breakers are not produced in 4-pole design.

■ BC160N circuit breakers with “N” characteristic have only short-circuit release. They are produced with I_n values in a standardized series of currents from 32 A to 160 A. Short-circuit release is adjustable. Values are given in the table.

Circuit breaker designation is set according to the requested rated current and protection characteristics.

For example: Motors protection with $I_n = 32$ A. Type designation will be BC160NT305-32M.

Tripping characteristic setting:

■ dependent release (thermal) L (for circuit breakers with characteristics „D” and „M”). Dependent release (reduced current value I_r) is being set in a continuous range using the I_r adjustment dial on the overcurrent release. The I_r adjustment range is 0.75 ÷ 1 I_n .

■ Independent instantaneous release (short-circuit trip) I (for circuit breakers with “D” and “N” characteristics). With an independent instantaneous release (short-circuit current value I_s), adjustment is possible in a continuous range. All values are given in the table.

■ The value of short-circuit release in DC circuit

In case that the circuit breaker is used in a DC circuit, it is necessary to set the value of the short-circuit release correctly. DC circuit the short-circuit release $I_s(DC) = I_s \times \sqrt{2}$

Rated currents in accordance with ambient temperature

I_n (A)	16	15	16	17	19
20	19	20	22	25	
25	23	25	28	31	
32	29	32	36	41	
40	38	40	45	53	
50	48	50	56	64	
63	57	63	69	83	
80	73	80	88	100	
100	92	100	108	122	
125	112	125	133	145	
160	145	160	168	175	

Ranges of overcurrent release and their possible setting at 40 °C

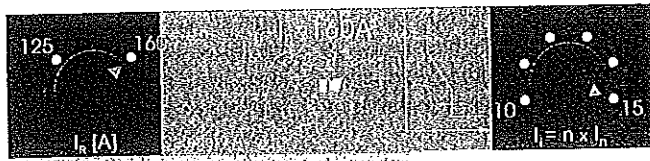
I_n (A)	BC160NT305-L		BC160NT305-D		BC160NT305-M		BC160NT305-N	
	I_r (A)	I_s (A)	I_r (A)	I_s (A)	I_r (A)	I_s (A)	I_s (A)	
16	-	-	12.5 ÷ 16	160 ÷ 240	12.5 ÷ 16	160	-	
20	-	-	16 ÷ 20	200 ÷ 300	16 ÷ 20	200	-	
25	-	-	20 ÷ 25	250 ÷ 375	20 ÷ 25	250	-	
32	-	-	25 ÷ 32	160 ÷ 320	25 ÷ 32	320	160 ÷ 320	
40	40	160	32 ÷ 40	200 ÷ 400	32 ÷ 40	400	200 ÷ 400	
50	50	200	40 ÷ 50	250 ÷ 500	40 ÷ 50	500	250 ÷ 500	
63	63	252	50 ÷ 63	315 ÷ 630	50 ÷ 63	630	315 ÷ 630	
80	80	320	63 ÷ 80	400 ÷ 800	63 ÷ 80	800	400 ÷ 800	
100	100	400	80 ÷ 100	500 ÷ 1 000	80 ÷ 100	1 000	500 ÷ 1 000	
125	125	500	100 ÷ 125	625 ÷ 1 250	-	-	625 ÷ 1 250	
160	160	640	125 ÷ 160	800 ÷ 1 600	-	-	800 ÷ 1 600	

Tripping characteristic class

Tripping times of the overcurrent release of circuit breakers BC160 with characteristic M at 7.2 I_n corresponds to the release class 10 A, 10 and 20 according to EN 60947-4-1.

I_n (A)		
16	BC160NT305-16-M	10A
20	BC160NT305-20-M	10A
25	BC160NT305-25-M	10A
32	BC160NT305-32-M	10
40	BC160NT305-40-M	10
50	BC160NT305-50-M	20
63	BC160NT305-63-M	20
80	BC160NT305-80-M	20
100	BC160NT305-100-M	20

OVERCURRENT RELEASES - D



Reduced current

Short-circuit release

$I_n = 16\text{ A}$
BC160NT305-16-D

$I_n = 20\text{ A}$
BC160NT305-20-D

$I_n = 25\text{ A}$
BC160NT305-25-D

$I_n = 32\text{ A}$
BC160NT305-32-D

$I_n = 40\text{ A}$
BC160NT305-40-D

$I_n = 50\text{ A}$
BC160NT305-50-D

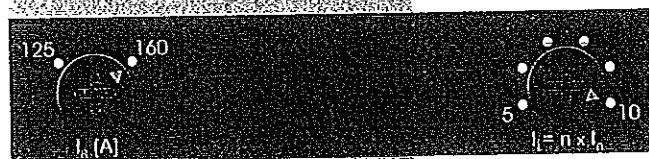
$I_n = 63\text{ A}$
BC160NT305-63-D

$I_n = 80\text{ A}$
BC160NT305-80-D

$I_n = 100\text{ A}$
BC160NT305-100-D

$I_n = 125\text{ A}$
BC160NT305-125-D

$I_n = 160\text{ A}$
BC160NT305-160-D

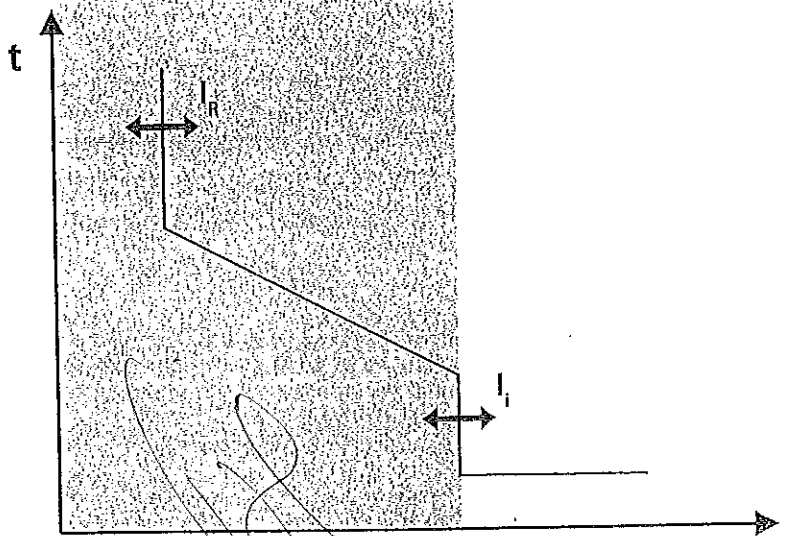


Properties

- suitable for protection of lines and distribution transformers
- protects against both overcurrent and short circuit
- reduced current setting $I_R = 0.75 \div 1 I_n$
- setting of short-circuit release:
 - circuit breakers with $I_n = 16\text{ A}, 20\text{ A}, 25\text{ A}, 32\text{ A}$ in the range of $10 \div 15 I_n$
 - circuit breakers with $I_n = 40\text{ A to } 160\text{ A}$ in the range of $5 \div 10 I_n$
- setting of I_R and I_t by means of knobs is smooth and linear in the marked range
- overcurrent release indicates circuit breaker switching off by overcurrent or short circuit by an optical symbol
- the values of parameters of the overcurrent release are set by the manufacturer to maximum

Data for the project

Circuit breaker	BC160NT305-...
Overcurrent release	D
Overcurrent release setting	
Reduced current	$I_R \dots \text{A}$
Short-circuit release current	$I_t \dots \text{A} (\dots \times I_n)$



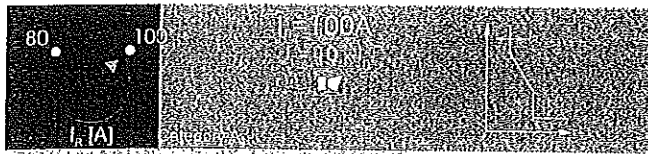
IMPORTANT

- the set value of current of the short-circuit release must correspond to the impedance loop - conditions must be fulfilled for automatic disconnection from power supply in case of failure

Handwritten signature

OVERCURRENT RELEASES - M

3P 4P



$I_n = 16\text{ A}$
BC160NT305-16-M

$I_n = 20\text{ A}$
BC160NT305-20-M

$I_n = 25\text{ A}$
BC160NT305-25-M

$I_n = 32\text{ A}$
BC160NT305-32-M

$I_n = 40\text{ A}$
BC160NT305-40-M

$I_n = 50\text{ A}$
BC160NT305-50-M

$I_n = 63\text{ A}$
BC160NT305-63-M

$I_n = 80\text{ A}$
BC160NT305-80-M

$I_n = 100\text{ A}$
BC160NT305-100-M

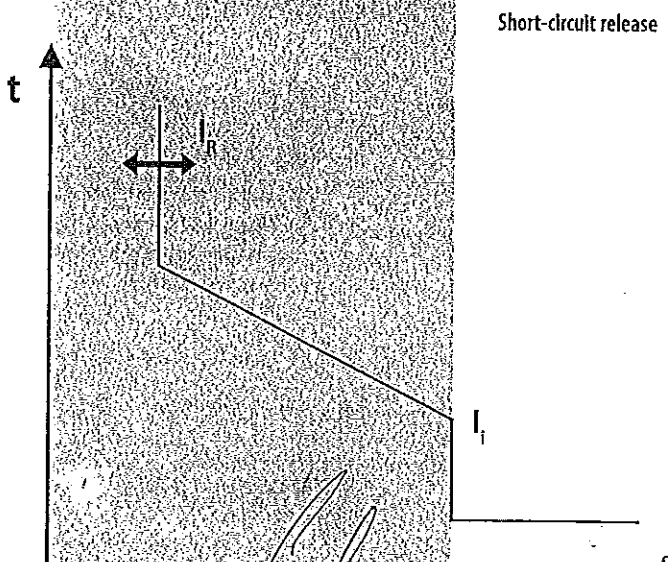


Properties

- appropriate for protection of motors
- protects against both overcurrent and short circuit
- reduced current setting $I_b = 0.75 \div 1 I_n$
- the value of the short-circuit release is fixed at $10 I_n$
- setting of I_b by means of knob is smooth and linear in the marked range
- overcurrent release indicates circuit breaker switching off by overcurrent or short circuit by an optical symbol
- the values of parameters of the overcurrent release are set by the manufacturer to maximum

Data for the project

Circuit breaker	BC160NT305-...
Overcurrent release	M
Overcurrent release setting	I_b ... A
Reduced current	I_b ... A ($10 \times I_n$)
Short-circuit release current	I_s ... A ($10 \times I_n$)

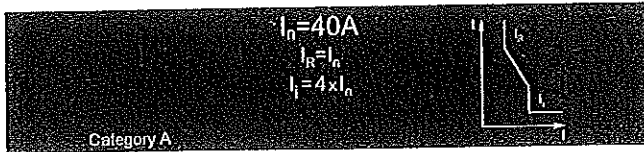


IMPORTANT

- reduced current I_b must not be higher than rated current of the motor

OVERCURRENT RELEASES - L

$I_n = 40 \text{ A}$
BC160NT305-40-L



$I_n = 50 \text{ A}$
BC160NT305-50-L

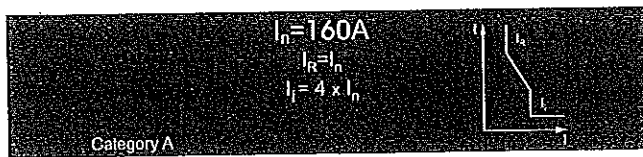
$I_n = 63 \text{ A}$
BC160NT305-63-L

$I_n = 80 \text{ A}$
BC160NT305-80-L

$I_n = 100 \text{ A}$
BC160NT305-100-L

$I_n = 125 \text{ A}$
BC160NT305-125-L

$I_n = 160 \text{ A}$
BC160NT305-160-L

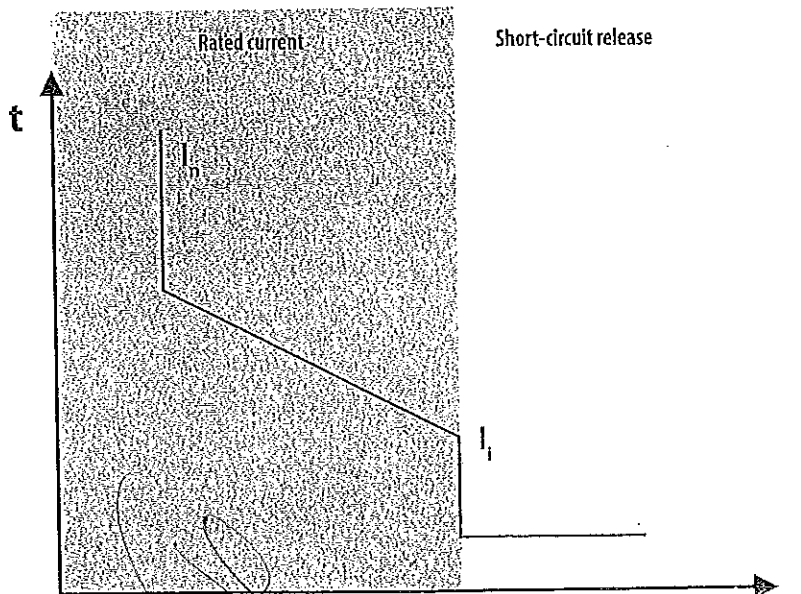


Properties

- the release is suitable for protection of lines with low impulse currents
- protects against both overcurrent and short circuit
- it is not possible to set a reduced current I_R
- the value of the short-circuit release I_I is fixed at $4 I_n$

Data for the project

Circuit breaker	BC160NT305-...
Overcurrent release	L
Overcurrent release values	
Rated current	I_n A
Short-circuit release current	I_I A ($4 \times I_n$)

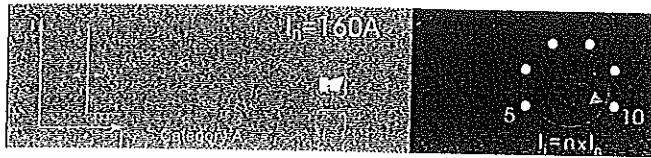


IMPORTANT

- high impulse current must not be in the circuit - undesirable breaking would take place, because the current of the short-circuit release is fixed at $4 I_n$

ly

OVERCURRENT RELEASES - N



Short-circuit release

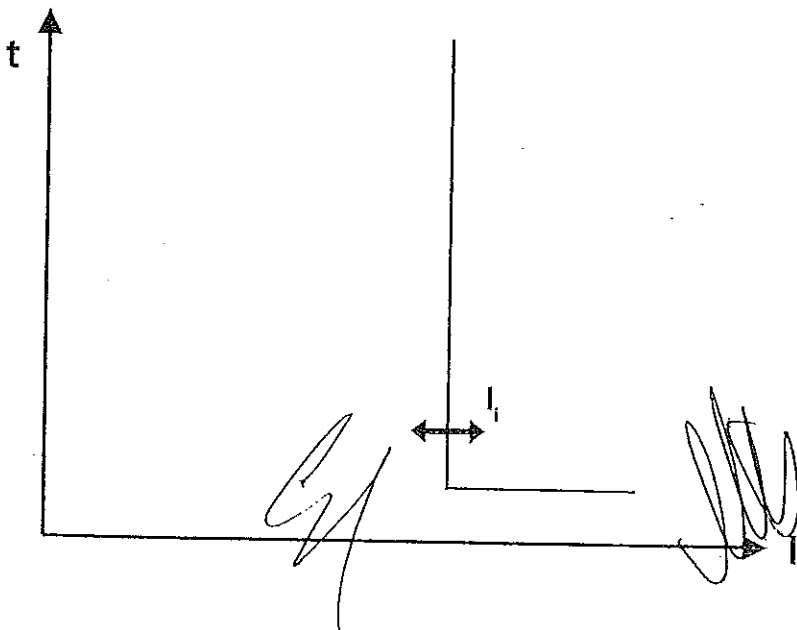
$I_n = 32\text{ A}$ BC160NT305-32-N		
$I_n = 40\text{ A}$ BC160NT305-40-N		
$I_n = 50\text{ A}$ BC160NT305-50-N		
$I_n = 63\text{ A}$ BC160NT305-63-N		
$I_n = 80\text{ A}$ BC160NT305-80-N		
$I_n = 100\text{ A}$ BC160NT305-100-N		
$I_n = 125\text{ A}$ BC160NT305-125-N		
$I_n = 160\text{ A}$ BC160NT305-160-N		

Properties

- for protection of e.g. motors with own overload protection
- it does not protect in the overload range – it does not react to low over-currents
- the set values of the short-circuit release within $5 \div 10 I_n$
- setting of I_s by means of knobs is smooth and linear in the marked range
- the overcurrent release indicates circuit breaker switching off by short circuit by an optical symbol
- the values of parameters of the overcurrent release are set by the manufacturer to maximum

Data for the project

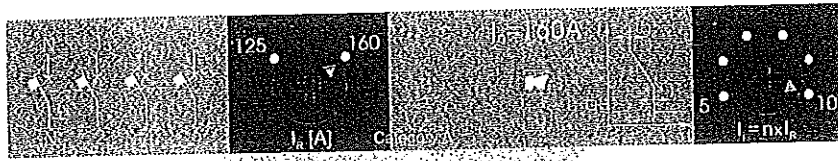
Circuit breaker	BC160NT305
Overcurrent release	N
Overcurrent release setting	
Rated current	I_n A
Short-circuit release current	I_s A ($n \times I_n$)



IMPORTANT

- the set value of current of the short-circuit release must correspond to the impedance loop - conditions must be fulfilled for automatic disconnection from power supply in case of failure

OVERCURRENT RELEASES - D



$I_n = 16 \text{ A}$
BC160NT406-16-D

$I_n = 20 \text{ A}$
BC160NT406-20-D

$I_n = 25 \text{ A}$
BC160NT406-25-D

$I_n = 32 \text{ A}$
BC160NT406-32-D

$I_n = 40 \text{ A}$
BC160NT406-40-D

$I_n = 50 \text{ A}$
BC160NT406-50-D

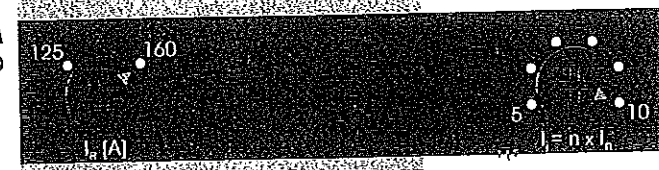
$I_n = 63 \text{ A}$
BC160NT406-63-D

$I_n = 80 \text{ A}$
BC160NT406-80-D

$I_n = 100 \text{ A}$
BC160NT406-100-D

$I_n = 125 \text{ A}$
BC160NT406-125-D

$I_n = 160 \text{ A}$
BC160NT406-160-D

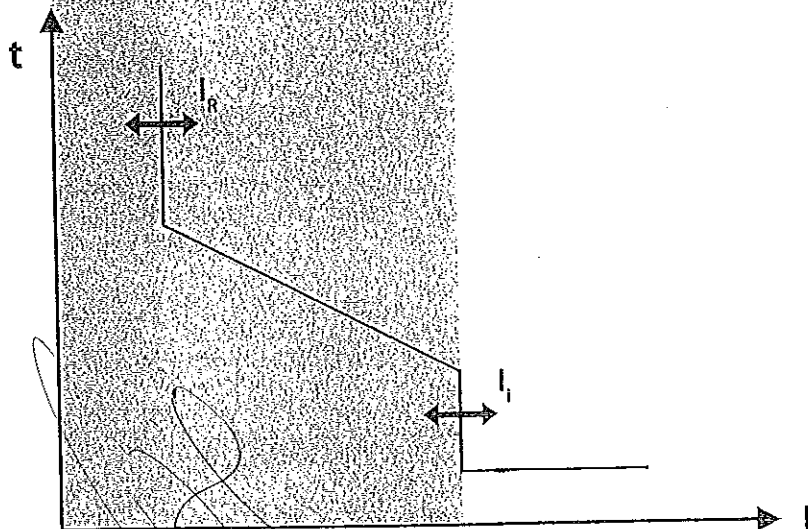


Properties

- it is appropriate for protection of lines and distributive transformers with protected „N” conductor in TN-C-S TN-S networks
- protects against both overcurrent and short circuit
- reduced current setting $I_n = 0.75 \div 1 I_n$
- setting of short-circuit release:
 - circuit breakers with $I_n = 16 \text{ A}, 20 \text{ A}, 25 \text{ A}, 32 \text{ A}$ in the range of $10 \div 15 I_n$
 - circuit breakers with $I_n = 40 \text{ A}$ to 160 A in the range of 5
- the value of reduced current I_n and of short-circuit release for the fourth pole is the same as for the other three
- setting of I_n and I_s by means of knobs is smooth and I in the marked range
- the overcurrent release indicates circuit breaker switch off by short circuit by an optical symbol
- the values of parameters of the overcurrent release: by the manufacturer to maximum

Data for the project

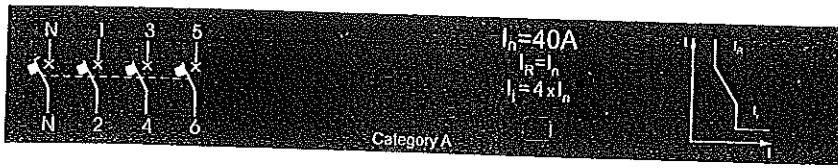
Circuit breaker	BC160NT406-
Overcurrent release	D
Overcurrent release setting	
Reduced current	I_n A
Short-circuit release current	I_s A ($n \times I_n$)



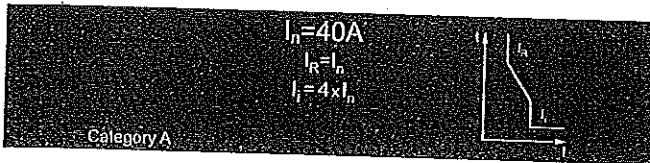
IMPORTANT

- the set value of current of the short-circuit release must correspond to the impedance loop - conditions must be fulfilled for automatic disconnection from power supply in case of failure

OVERCURRENT RELEASES - L



$I_n = 40 A$
 BC160NT406-40-L



$I_n = 50 A$
 BC160NT406-50-L

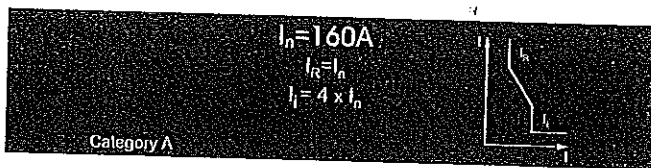
$I_n = 63 A$
 BC160NT406-63-L

$I_n = 80 A$
 BC160NT406-80-L

$I_n = 100 A$
 BC160NT406-100-L

$I_n = 125 A$
 BC160NT406-125-L

$I_n = 160 A$
 BC160NT406-160-L



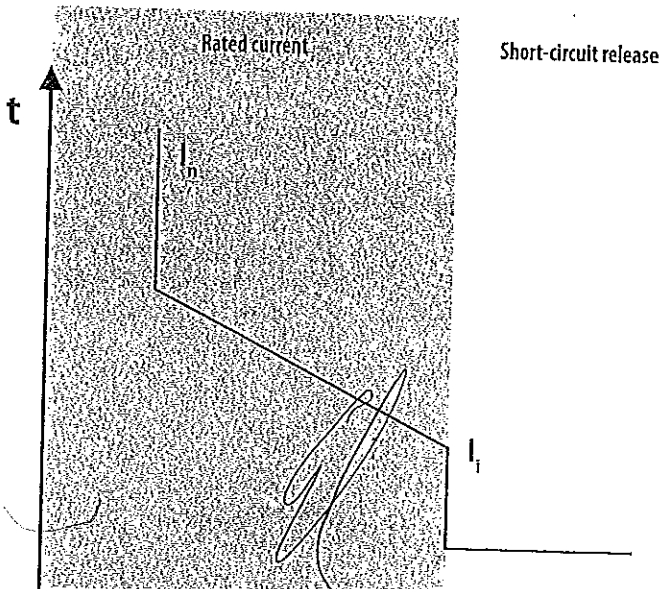
Properties

- it is appropriate for protection of lines with low starting currents including the protected „N“ conductor in TN-C-S and TN-S networks
- it protects against overcurrent and short circuit
- it is not possible to set a reduced current I_R
- the value of the reduced release I_I is fixed at $4 I_n$
- the value of reduced current I_R and of short-circuit release I_I for the fourth pole is the same as for the other three poles
- the values of parameters of the overcurrent release are set by the manufacturer to maximum

Data for the project

Circuit breaker
 Overcurrent release
 Overcurrent release values
 Rated current
 Short-circuit release current

BC160NT406
 L
 A
 A (4x I_n)

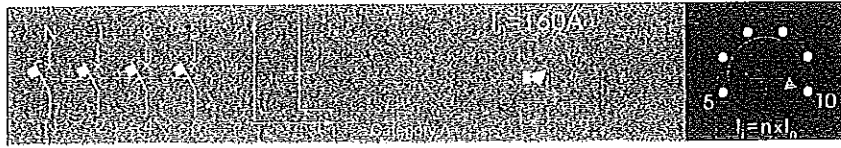


IMPORTANT

- high impulse current must not be in the circuit - undesirable breaking would take place, because the current of the short-circuit release is fixed at $4 I_n$

[Handwritten signature]

OVERCURRENT RELEASES - N



Short-circuit release

$I_n = 32 \text{ A}$
BC160NT406-32-N

$I_n = 40 \text{ A}$
BC160NT406-40-N

$I_n = 50 \text{ A}$
BC160NT406-50-N

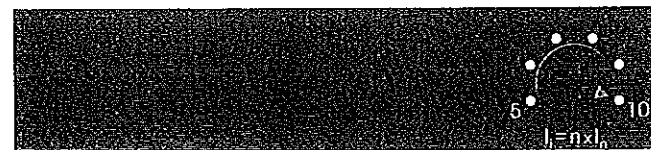
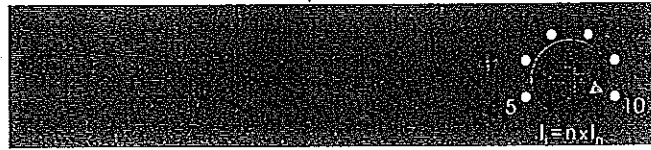
$I_n = 63 \text{ A}$
BC160NT406-63-N

$I_n = 80 \text{ A}$
BC160NT406-80-N

$I_n = 100 \text{ A}$
BC160NT406-100-N

$I_n = 125 \text{ A}$
BC160NT406-125-N

$I_n = 160 \text{ A}$
BC160NT406-160-N

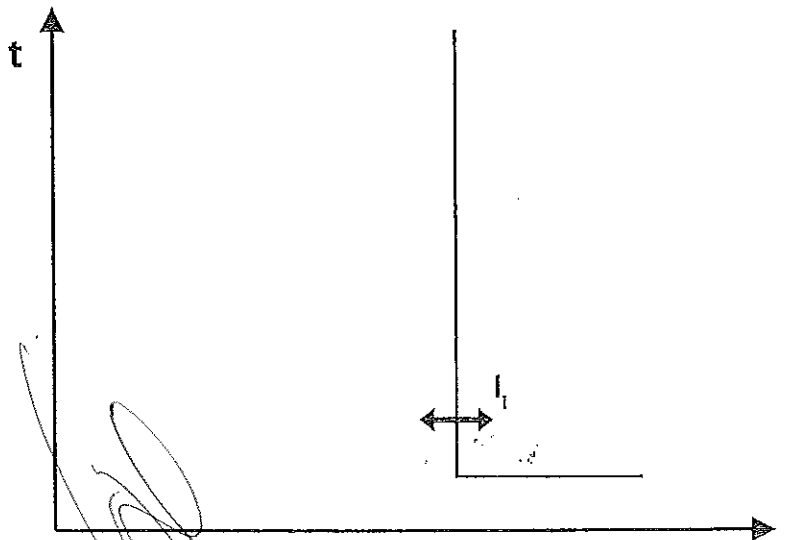


Properties

- the release is suitable for protection of e.g. motors own overload protection in TN-C-S a TN-S network
- it does not protect in the overload range – it does to low over-currents
- the set values of the short-circuit release within 5-
- the value of the short-circuit release I_s for the four the same as for the other three poles
- setting of I_s by means of knobs is smooth and linear marked range
- the overcurrent release indicates circuit breaker sw off by short circuit by an optical symbol
- the values of parameters of the overcurrent release by the manufacturer to maximum

Data for the project

Circuit breaker	BC160NT406
Overcurrent release	N
Overcurrent release setting	
Rated current	I_n A
Rated current	I_n A



IMPORTANT

- the set value of current of the short-circuit release must correspond to the impedance lo - conditions must be fulfilled for automatic disconnection from power supply in case of fail

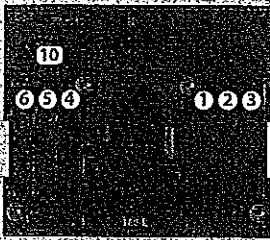
SWITCHES



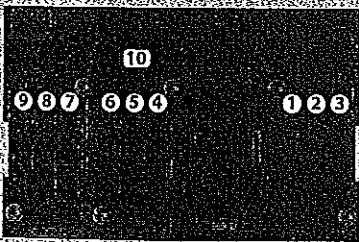
Auxiliary switch PS-BC-0010 / PS-BC-0010-Au
- make-and-break contact



Signal switch NS-BC-0010 / NS-BC-0010-Au
- make-and-break contact
- switch can be used only in cavity No. 1



Position of cavities in BC160N... circuit breaker/
switch-disconnector. When one of cavities 4, 5
or 6 is in use, cannot be used with a shunt trip or
undervoltage release.



Position of cavities in BC160NT4... circuit breaker/
switch-disconnector. When one of cavities 4, 5 or 6
is in use, cannot be used a shunt trip or undervoltage
release.

Specifications

TYPE	PS-BC-0010/NS-BC-0010	PS-BC-0010-Au/NS-BC-0010-Au
Rated operating voltage U_e	60 ÷ 250 V a.c. 60 ÷ 250 V d.c.	5 ÷ 60 V a.c. 5 ÷ 60 V d.c.
Rated insulation voltage U_i	250 V	250 V
Rated impulse withstand voltage U_{imp}	4 kV	4 kV
Rated frequency f_n	50/60 Hz	50/60 Hz
Rated operating current I_n / U_e	AC-12 6 A/250V AC-15 5 A/60V, 3 A/110V, 1.5 A/230V DC-12 0.25 A/250V DC-13 0.5 A/60V, 0.2 A/110V, 0.1 A/250V	0.004 ÷ 0.1 A/5 ÷ 60V 0.004 ÷ 0.1 A/5 ÷ 60V 0.1 A/60V 0.004 ÷ 0.1 A/5 ÷ 60V
Thermal current I_{th}	6 A	0.5 A
Arrangement of contacts	001	001
Connection cross-section S	0.5 ÷ 1 mm ²	0.5 ÷ 1 mm ²
Degree of protection of terminals (connected switch)	IP20	IP20

Function, name and location of switches according to type designation

TYPE	Switch name	Position of switch	Switch function
PS-BC-0010	Auxiliary	Cavity 1 ¹⁾ , 2, 3, 4, 5, 6 ¹⁾	Signals state of circuit breaker/switch-disconnector's main contacts
NS-BC-0010	Signal	Cavity 1 ²⁾	Signals tripping of circuit breaker by overcurrent release

¹⁾ - when one of cavities 4, 5 or 6 is in use for auxiliary switches, cannot be used a shunt trip or undervoltage release

²⁾ - in cavity 1, PS-BC-0010 auxiliary switch and NS-BC-0010 signal switch cannot be used simultaneously

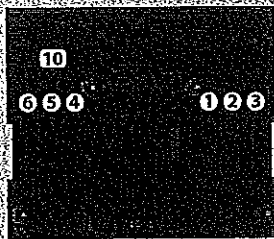
States of switches in circuit breaker/switch-disconnector

Cavity	1	2	3	4	5	6	7	8
State of circuit breaker								
Circuit breaker lever position								
State of the main contacts								
PS-BC-0010	1	0	0	0	0	0	0	0
NS-BC-0010	0	1	0	0	0	0	0	0
SV-BC-X... SP-BC-X...	0	0	0	1	0	0	0	0
Switched on	1	1	1	1	1	1	1	1
Switched off manually (loaded state)	0	0	0	1	0	1	0	1
Switched off by the overcurrent release or INSPECTION push button	0	0	0	1	1	0	0	1
Switched off by auxiliary release	0	0	0	1	0	1	0	0
Switched off by TEST push button	0	0	0	1	0	1	0	1

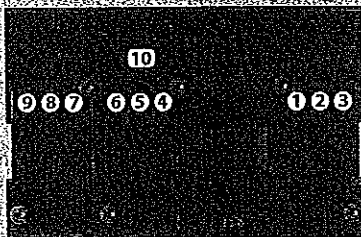
note: 0 - contact open, 1 - contact closed

* only 4P design

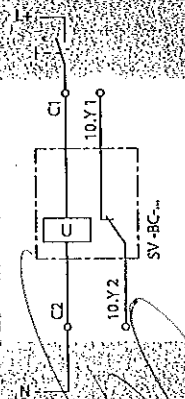
SHUNT TRIPS



Position of cavities in BC160NT... circuit breaker/switch-disconnector. When shunt trip is used, cavities 4, 5, 6 cannot be used for auxiliary switches.



Position of cavities in BC160NT4... circuit breaker/switch-disconnector. When one of cavities 4, 5 or 6 is in use, cannot be used a shunt trip or undervoltage release.



Specifications

Type		SV-BC-X
Rated operating voltage	U_e	24, 48, 110, 230, 400 V a.c. 24, 48, 110, 220 V d.c.
Rated frequency	f_n	50/60 Hz
Input power at 1.1 U_e	AC DC	2 VA 2 W
Characteristic		$U \geq 0.7 U_e$ the circuit breaker must trip
Time to switching off		15 ms
Loading time		∞
Connection cross-section	S	$0.5 \div 1 \text{ mm}^2$
Degree of protection of terminals (connected release)		IP20
Position in cavity No.		10

Type		SIGNAL SWITCH signals tripping by shunt trip
Rated operating voltage	U_e	230 V a.c.
Rated insulation voltage	U_i	250 V
Rated impulse withstand voltage	U_{imp}	4 kV
Rated frequency	f_n	50/60 Hz
Rated operating current	I/U_e	2 A/230 V a.c.
Thermal current	I_{th}	6 A
Arrangement of contacts		01

Type designation according to rated operating voltage

Rated operating voltage	Type designation
24, 48 V a.c./d.c.	SV-BC-X024
110, 230 V a.c./110, 220 V d.c.	SV-BC-X110
230, 400 V a.c./220 V d.c.	SV-BC-X230

The specific rated operating voltage of the release is set up by jumpers directly on the release. The setting from the manufacturer is always to the value corresponding to the type designation. (see fig. 1)

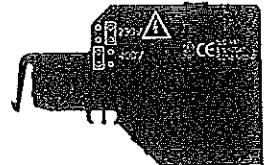
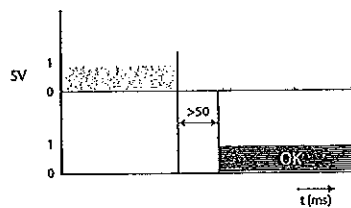


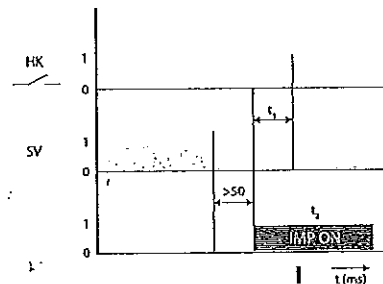
Fig. 1 - The rated operating voltage setting

Reaction time of the shunt trip



Cooperation of motor drive and shunt trip

It is necessary to keep time delay when the control of the circuit breaker is done by motor drive and shunt trip at once. The following time delays have to be kept between the disconnection of voltage from the shunt trip and the control impulse for switch on of the motor drive:



States and positions of circuit breaker/switch-disconnector lever

States of circuit breaker/switch-disconnector	Lever position of breaker/switch-disconnector
Switched on	↑
Switched off by releases or by TEST push button	↓
Switched off manually or by motor drive electrically (loaded state)	○

Description of graphs

Symbol	Description
HK	Main contacts
OK	Circuit breaker is ready for further
IMP ON	Make impulse for the motor drive
SV	Control voltage on the shunt trip

$t_1 = 70 \text{ ms}$ (mode 1, 2), 140 ms (mode 3)
 $t_2 = 60 \div 500 \text{ ms}$ (mode 1, 3), $60 - \infty$ (mode 2)

UNDervOLTAGE RELEASes



Specifications

Type	SP-BC...	
Rated operating voltage	U_c	24, 48, 110, 230, 400 V a.c. 24, 48, 110, 220 V d.c.
Rated frequency	f_n	50/60 Hz
Input power at 1.1 U_c	AC DC	2 VA 2 W
Characteristic ¹⁾	$U \leq 0.35 U_c$ the circuit breaker must trip $U \geq 0.85 U_c$ it is possible to switch on the circuit breaker	
Time to switching off		15 ms
Loading time		∞
Connection cross-section	S	0.5 ÷ 1 mm ²
Degree of protection of terminals (connected release)		IP20
Position in cavity No.		10

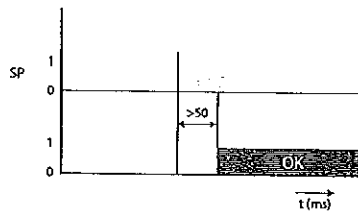
¹⁾ - tripping of the undervoltage release can be delayed using the delay unit B7-BX-X230-A, for more detailed information see page P2

Type designation according to rated operating voltage

24, 48 V a.c./d.c.	SP-BC-X024
110, 230 V a.c./110, 220 V d.c.	SP-BC-X110
230, 400 V a.c./220 V d.c.	SP-BC-X230

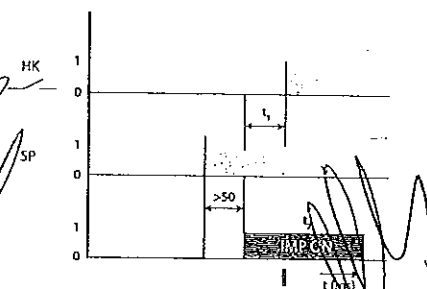
The specific rated operating voltage of the release is set up by jumpers directly on the release. The setting from the manufacturer is always to the value corresponding to the type designation (see fig. 1).

Reaction time of the undervoltage release



Cooperation of motor drive and undervoltage release

It is necessary to keep time delay when the control of the circuit breaker is done by motor drive and undervoltage release at once. The following time delays have to be kept between bringing the voltage to the undervoltage release and the control impulse for switch on of the motor drive:



States and positions of circuit breaker/switch-disconnector lever

Switched on	↑
Switched off by releases or by TEST push button	↓
Switched off manually or by motor drive electrically (loaded state)	○

Description of graphs

Symbol	Description
HK	Main contacts
OK	Circuit breaker is ready for further handling
IMP ON	Make impulse for the motor drive
SP	Control voltage on the undervoltage release

$t_1 = 70$ ms (mode 1, 2), 140 ms (mode 3)
 $t_2 = 60 \div 500$ ms (mode 1, 3), $60 \div \infty$ (mode 2)

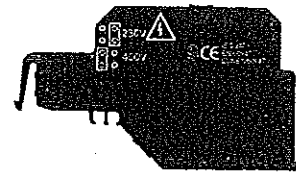
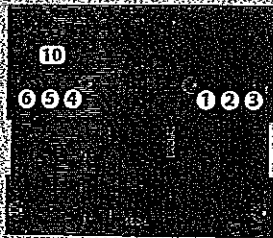
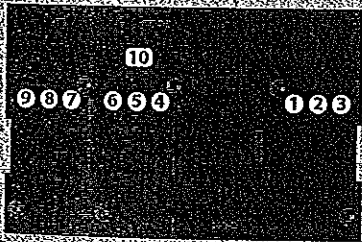


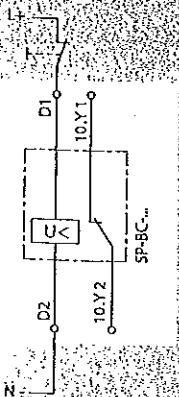
Fig. 1 - The rated operating voltage setting



Position of cavities in BC160NT... circuit breaker/switch-disconnector. When undervoltage release is used, cavities 4, 5, 6 cannot be used for auxiliary switches.



Position of cavities in BC160NT4... circuit breaker/switch-disconnector. When one of cavities 4, 5 or 6 is in use, cannot be used a shunt trip or undervoltage release.



HAND DRIVES

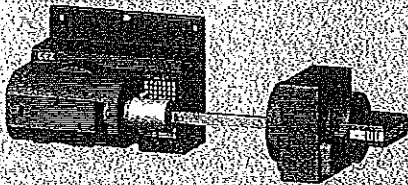
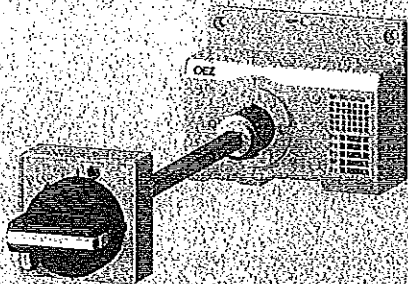
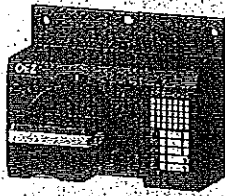


Fig. 3 - DIMENSIONS, see page D28, D34

Description

The hand drive permits controlling the circuit breaker/switch-disconnector by turning the lever, e.g. to switch machines on and off. Modular conception of the drives enables simple mounting on the circuit breaker (also additionally) after the cover of cavities is removed. The fixed drive can be sealed. The drive and its accessories are ordered separately according to your choice, see page D13.

■ The hand drive makes possible to control the circuit breaker:

a) from the front panel (fig. 1)

- Hand drive unit RP-BC-CK..
- + Hand drive lever RP-BC-CP..

b) through the switchboard door (fig. 2)

- Hand drive unit RP-BC-CK..
- + Extension shaft RP-BC-CH..
- + Hand drive bearing PR-BC-CH..
- + Hand drive lever + RP-BC-CP..

c) through the side wall of the switchboard (fig. 3)

- in left- or right-side designs
- Hand drive unit for side control right RP-BC-CK30 or left RP-BC-CK31
- + Extension shaft RP-BC-CH..
- + Hand drive bearing PR-BC-CH..
- + Hand drive lever + RP-BC-CP..

■ The hand drive unit is fixed directly to circuit breaker or switch-disconnector.

■ The hand drive bearing is fixed to the switchboard door and it provides degree of protection IP40 or IP66.

■ Hand drive lever is fixed on the hand drive unit or on the hand drive bearing.

■ The extension shaft is supplied in two options, standard (length 350 mm - can be shortened) and telescopic (adjustable length 199 ÷ 352 mm).

Enhanced safety for operator:

■ The hand drive unit and hand drive lever are also supplied with the possibility to lock the circuit breaker in position „switched off manually“. The unit and lever of the hand drive can be locked using three padlocks with shank diameter max. 4 mm.

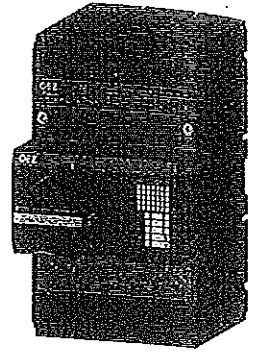


Fig. 1 - DIMENSIONS, see page D27, D33

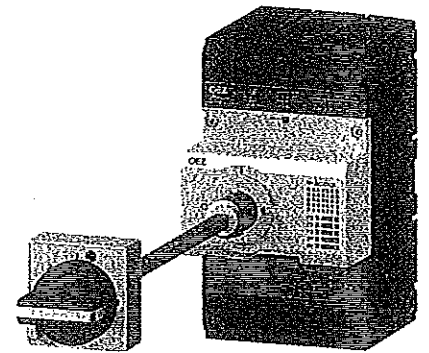


Fig. 2 - DIMENSIONS, see page D27, D33

■ Each hand drive bearing prevents the switchboard door from opening when the circuit breaker is switched on or in a state of being switched off by releases. By means of the device, it is possible to turn off this locking and to open the door. Locking of the switchboard door opening also is possible in the circuit breaker's switched off manually state. It is necessary to activate the locking by means of the lever on the bearing and to lock the hand drive.

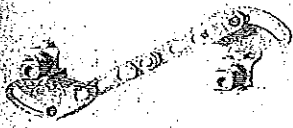
■ Two circuit breakers with hand drives can be fitted also with reciprocal mechanical interlocking or mechanical parallel switching, see page D49.

Specifications

Type	Description	Colour	Locking while the circuit breaker is in OFF state	degree of protection	switched on	switched off manually and locked	switchboard door opening with the circuit breaker switched on	Length mm
RP-BC-CK10	Hand drive unit	blue	no	-	-	-	-	-
RP-BC-CK20	Hand drive unit	blue	yes	-	-	-	-	-
RP-BC-CK21	Hand drive unit	yellow	yes	-	-	-	-	-
RP-BC-CK30	Hand drive unit - right side	blue	no	-	-	-	-	-
RP-BC-CK31	Hand drive unit - left side	blue	no	-	-	-	-	-
RP-BC-CP10	Hand drive lever	black	no	-	-	-	-	-
RP-BC-CP20	Hand drive lever	black	yes	-	-	-	-	-
RP-BC-CP21	Hand drive lever	red	yes	-	-	-	-	-
RP-BC-CH10	Hand drive bearing	black	-	IP40	yes	yes	yes	350 (can be shortened)
RP-BC-CH11	Hand drive bearing	yellow	-	IP40	yes	yes	yes	350 (can be shortened)
RP-BC-CH20	Hand drive bearing	black	-	IP66	yes	yes	yes	199 ÷ 352
RP-BC-CH21	Hand drive bearing	yellow	-	IP66	yes	yes	yes	199 ÷ 352
RP-BC-CH10	Extension shaft	-	-	-	-	-	-	telescopic design
RP-BC-CH20	Extension shaft	-	-	-	-	-	-	telescopic design

MECHANICAL INTERLOCKING AND PARALLEL SWITCHING

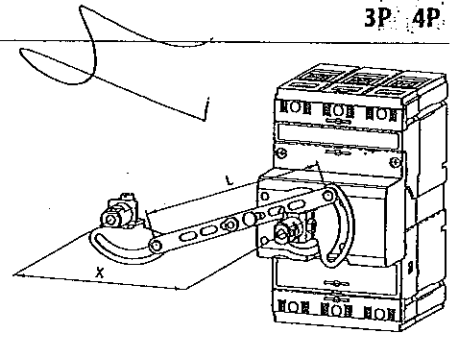
3P 4P



RP-BC-CB10 Mechanical interlocking

Provides mechanical interlocking of two circuit breakers/switch-disconnectors so that they cannot both be tripped simultaneously, but only one of them at a time. Both circuit breakers may be switched off simultaneously. Interlocking can be used between two BC160N circuit breakers. Both circuit breakers must be equipped with a hand drive (at least one with a hand drive unit and hand drive lever) see page D48. In order to use the interlocking, it is absolutely necessary to comply with the dimensions that are shown in the figure and given in the table. For correct function and signalling the state of the BC160 circuit breaker with RP-BC-CB10 mechanical interlocking, circuit breaker must be switched off, or switch-disconnector must be in loaded position.

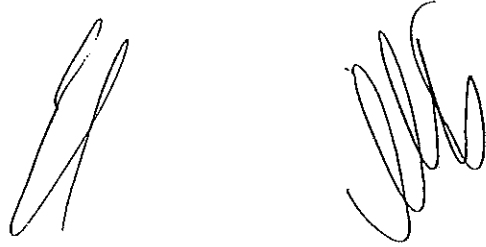
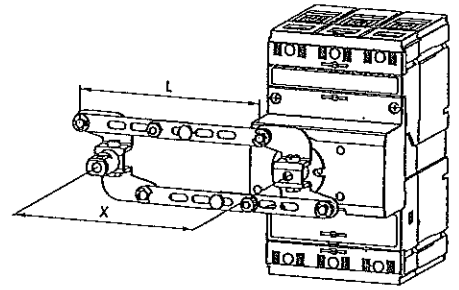
Dimension	(mm)
X	87.5 or 100
L	94.5 or 106



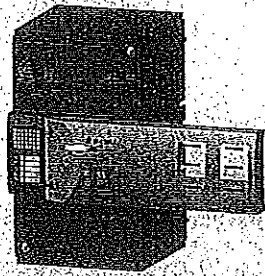
RP-BC-CD10 Mechanical parallel switching

Enables for simultaneous switching of two circuit breakers/switch-disconnectors. Parallel switching can be used between two BC160N circuit breakers. Both circuit breakers must be equipped with a hand drive unit and at least one with a hand drive lever, see page D48. In order to use parallel switching, it is absolutely necessary to comply with the dimensions that are shown in the figure and given in the table.

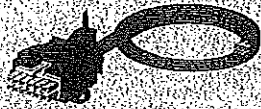
Dimension	(mm)
X	75 ⁺⁷ or 87.5 ⁺⁷ or 100 ⁺⁷



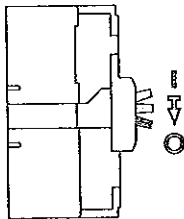
MOTOR DRIVES



Motor drive side MP-BC-X...-B



Connecting cable OD-BC-KA02



Symbol	Description
■	Switched on manually or by motor drive electrically
▼	Switched off by overcurrent releases, shunt trip or undervoltage release, TEST or INSPECTION push button
○	Switched off manually or by motor drive electrically, loaded state

Description

- Motor drive is an accessory of the circuit breaker/switch-disconnector, by means of which it is possible to switch the circuit breaker or switch-disconnector on and off remotely. Modular conception of the drives enables simple mounting on the circuit breaker also additionally. The drive is used for both remote and local control of 3-pole and 4-pole circuit breakers BC160. It is manufactured in the design for side mounting next to the circuit breaker on the switchboard panel or on DIN rail. The mounting of motor drive to the circuit breaker is done by bayonet mechanism placed on the side of the circuit breaker. The mounted motor drive can be locked by means of terminal cover seal.
- Modeion BC160 circuit breakers with the motor drive are intended for industrial, power engineering and infrastructure applications. The motor drives have a system of direct control of the circuit breaker, without a spring storage unit.
- The motor drive can work in the local or remote control mode. The local control mode is used, for instance in loss of control voltage. Local control of the circuit breaker is accessible only after lifting the transparent safety cover of the drive off. This action locks the remote electrical control circuits automatically. The lifted off position of the cover can be indicated remotely.

- The circuit breaker is switched on and off by means of the control lever driver. After returning the safety cover to the original position, the drive is switched into the remote control mode automatically.
- After lifting the safety cover off it is possible to handle an automatic mode presetting change-over switch. Under the transparent cover there is also a red LED which lighting indicates a failure (unfinished switching on/off/loading operations).
- Electronics circuits of the motor drive block erroneous control processes, e.g. drive cycling after overcurrent or auxiliary release tripping.
- Side drive can be locked in off position of the circuit breaker by up to three padlocks with shaft diameter with shank diameter max. 4 mm. It is possible to signal the locking remotely. The protective cover of the drives can also be sealed.
- The position of the main contacts of the circuit breaker is indicated by the position of the circuit breaker driver lever under the transparent protective cover of the drive. The wound up position of the circuit breaker can also be signalled remotely.
- In the remote control mode the circuit breaker is switched on and off by ON and OFF push buttons respectively. The motor drive accessories include an extension cable OD-BC-KA02.

Motor drive automatic mode presettings

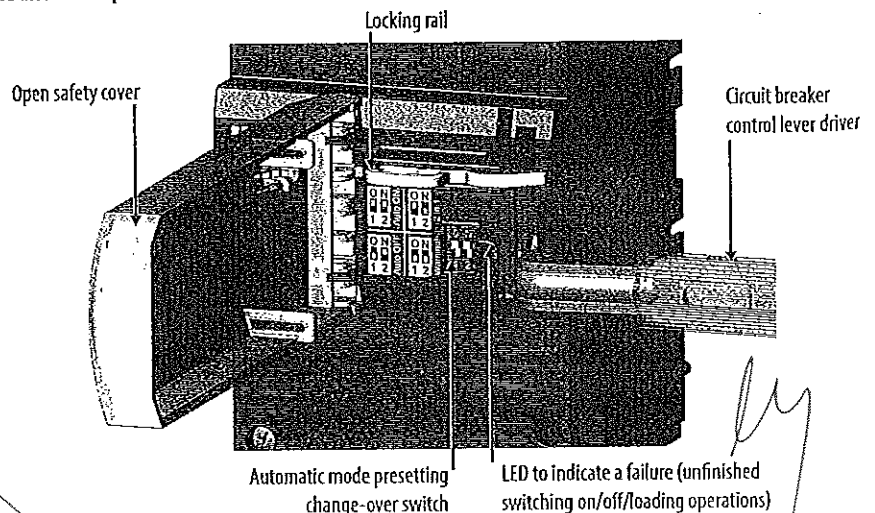
Symbol position	Automatic mode presetting	Description	Circuit breaker switching on/off position	Circuit breaker loading on position	Circuit breaker switching on/off position
■	1	Automatic loading is on	- By overcurrent release	Motor drive performs automatically	By pressing of ON push button
■	2	Automatic loading is off	- By inspection push button - By auxiliary release	The operator must press the OFF push button	By pressing of ON push button
■	3	Simultaneous loading and switching on	- By TEST push button	By pressing of ON push button the motor drive will loading and switch on the circuit breaker**)	
■		The motor drive is out of operation, the red LED is lighting			

^{*)} Standard factory setting of the switch.

^{**)} When the circuit breaker is switched off by the motor drive electrically with the use of the OFF push button, the circuit breaker control lever gets into the wound up position automatically, independently of the automatic mode presetting.

^{***)} By pressing the OFF push button, the motor drive only winds the circuit breaker up to the position.

Side drive description



MOTOR DRIVES

Diagram

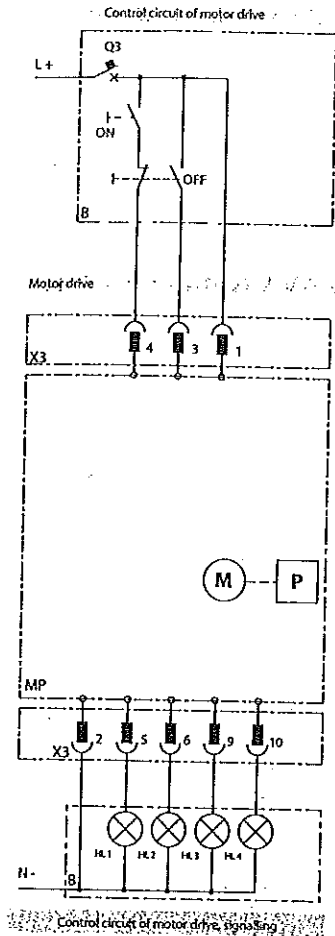


Diagram description

- MP motor drive - MP-BC...
 - M motor
 - P gear unit
 - X3 connector for connection of control and signalling circuits
 - B recommended wiring of the control circuits - it is not a part of MP-BC...
 - ON switch on button
 - OFF switch off button
 - Q3 motor drive circuit breaker
 - HL1 remote failure signalling (unreliable switching on or switching off), max. permissible load 10 W ¹⁾
 - HL2 signalling of circuit breaker lever position "loaded", max. permissible load 10 W ¹⁾
 - HL3 signalling of opening of the front safety cover of the drive, max. permissible load 10 W ¹⁾
 - HL4 signalling of exertion of the drive locking bar, max. permissible load 10 W ¹⁾
- ¹⁾ voltage on terminals 5, 6, 7, 8, 9, 10 is the same as U_e of the motor drive

For complete wiring diagram of the circuit breaker BC160 with motor drive see page D16

Specifications

		MP-BC...-B
Rated operating voltage	U _e	24, 48, 110, 230 V a.c. 24, 48, 110, 220 V d.c.
Rated frequency	f	50/60 Hz
Control impulse length	for switching on	60 ms + ∞ ¹⁾
	for switching off	60 ms + ∞ ¹⁾
Time to switching on		< 70 ms ¹⁾
Time to switching off		< 50 ms ¹⁾
Frequency of cycles ON/OFF		5 cycles/min
Frequency of cycles - instant successive ON/OFF		10 cycles
Mechanical endurance		20 000 cycles
Input power	AC	100 VA
	DC	100 W
Starting current		12 A / 24 V a.c./d.c.
		6 A / 48 V a.c./d.c.
		4 A / 110 V a.c./d.c.
		2 A / 230 V a.c. / 220 V d.c.
Protection	24, 48, 110 V a.c.; 230 V a.c.	LPN-4C-1; LPN-2C-1
	24, 48, 110 V d.c.; 220 V d.c.	LPN-DC-4C-1; LPN-DC-2C-1
Type		00-BC-KA02
Number of conductors		8
Conductor cross-section		0.25 mm ²
Conductor lengths		0.6 m

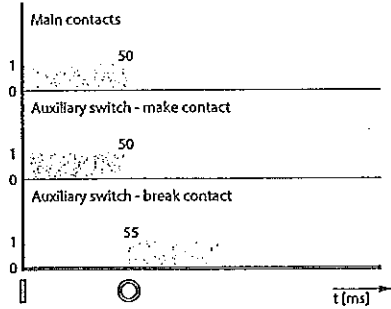
¹⁾ The values depends on the motor drive automatic mode presetting, see pages D50, D52, D53, D54

MOTOR DRIVES

Specifications

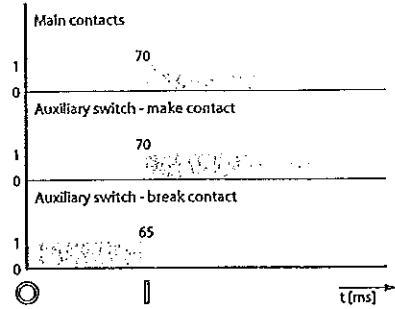
Circuit breaker switching off by motor drive electrically with OFF push button

Automatic operation No. 1, 2, 3



Circuit breaker switching on electrically by motor drive with ON push button

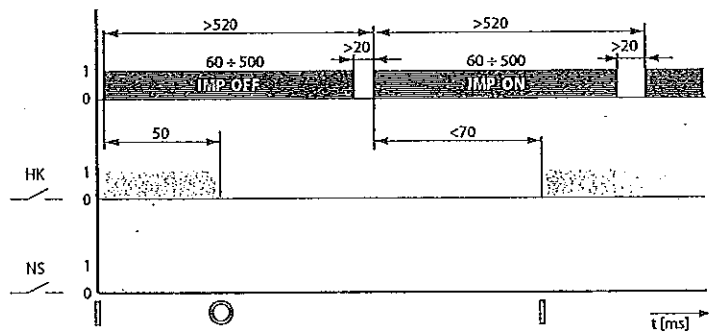
Automatic operation No. 1, 2, 3



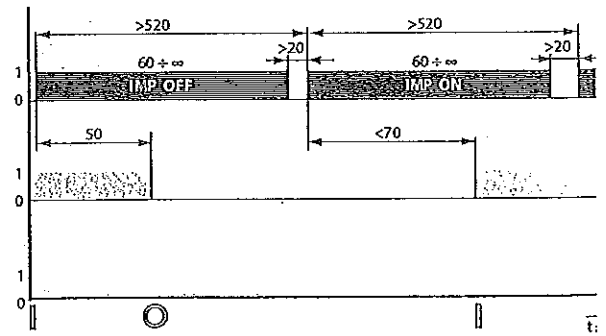
Recommended control impulses

Circuit breaker switching on and off by motor drive electrically using the ON and OFF push buttons

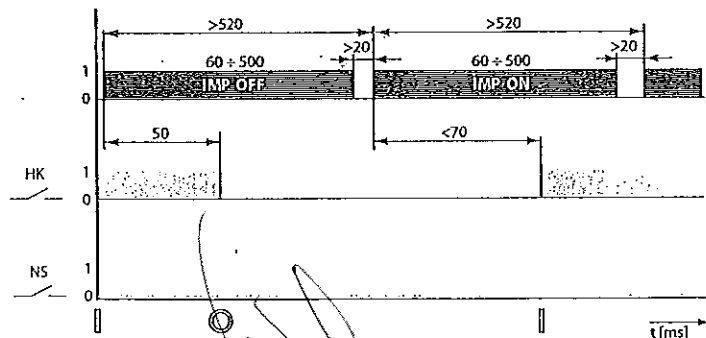
Automatic operation No. 1



Automatic operation No. 2



Automatic operation No. 3



Description of graphs

Symbol	Description
HK	Main contacts
NS	Signal switch
IMP ON	Make impulse for the motor drive
IMP OFF	Break impulse for the motor drive
⏏	Switched on
⏏	Switched off manually or by motor drive electrically (loaded state)

Handwritten signature

Handwritten signature

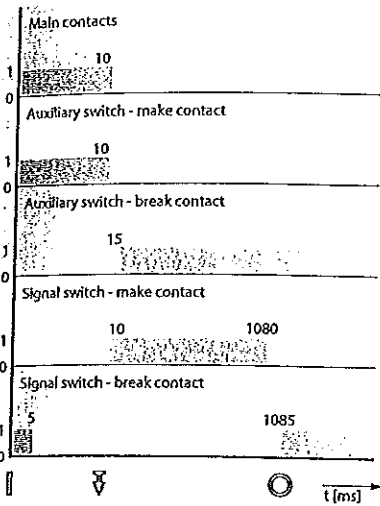
MOTOR DRIVES

Specifications

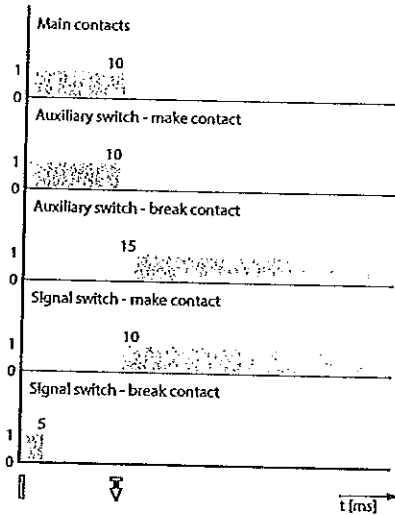
Circuit breaker switching off by overcurrent release or inspection push button



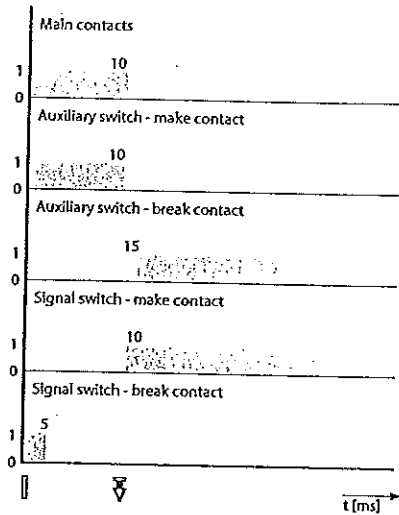
Automatic operation No. 1



Automatic operation No. 2



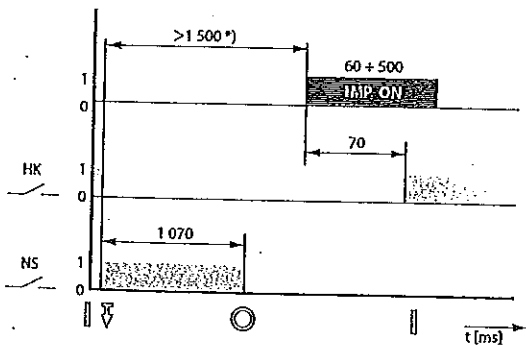
Automatic operation No. 3



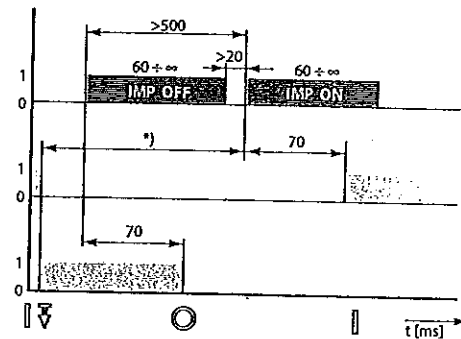
Recommended control Impulses

Circuit breaker switching on with motor drive after its tripping by overcurrent release or inspection push button

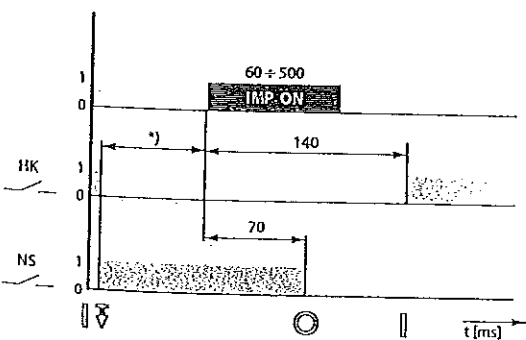
Automatic operation No. 1



Automatic operation No. 2



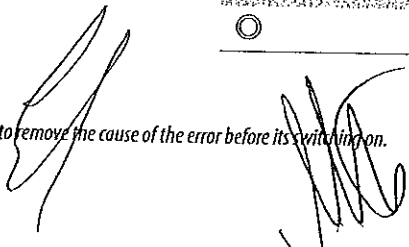
Automatic operation No. 3



Description of graphs

Symbol	Description
HK	Main contacts
NS	Signal switch
IMP ON	Make impulse for the motor drive
IMP OFF	Break impulse for the motor drive
|	Switched on
∇	Switched off by releases TEST or INSPECTION push button
○	Switched off manually or by motor drive electrically (loaded state)

*) If the circuit breaker was switched off by an overcurrent release, it is necessary to remove the cause of the error before its switching on.

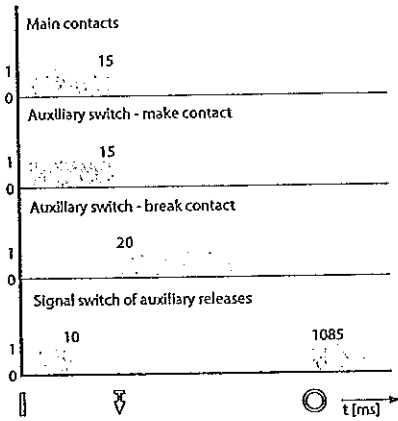


MOTOR DRIVES

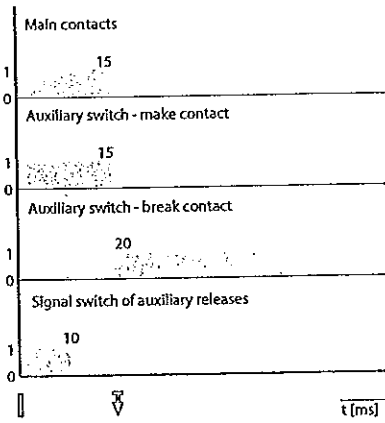
Specifications

Circuit breaker switching off by shunt trip, undervoltage release or TEST push button

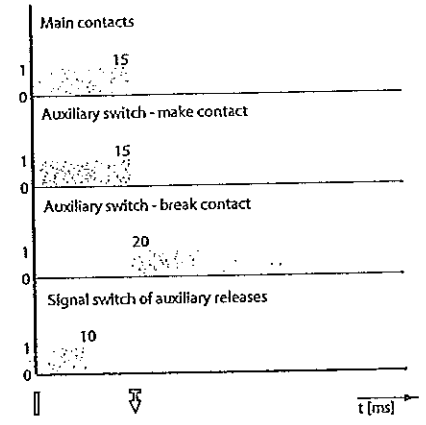
Automatic operation No. 1



Automatic operation No. 2



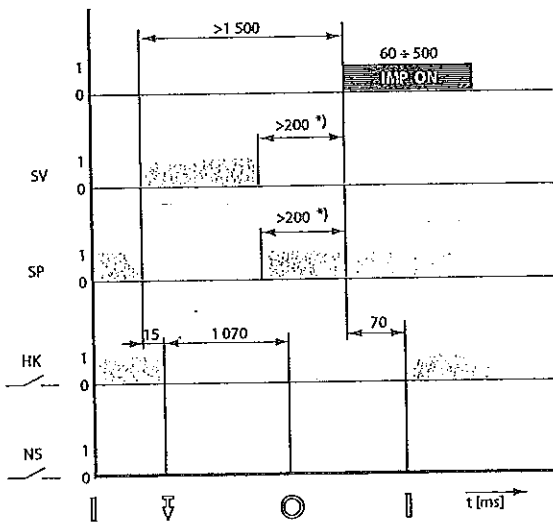
Automatic operation No. 3



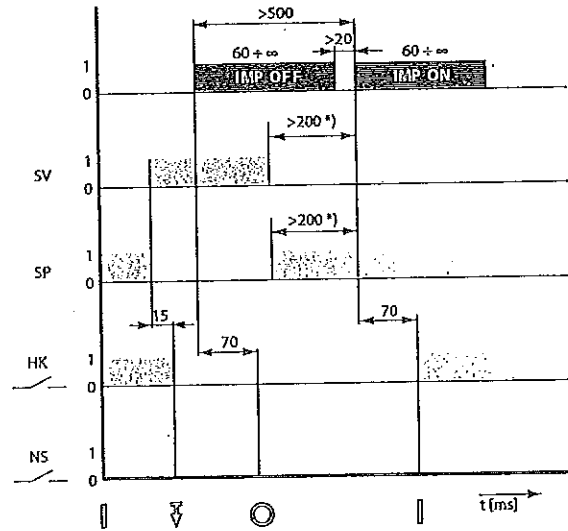
Recommended control impulses

Circuit breaker switching on by motor drive after tripping by shunt trip or undervoltage release

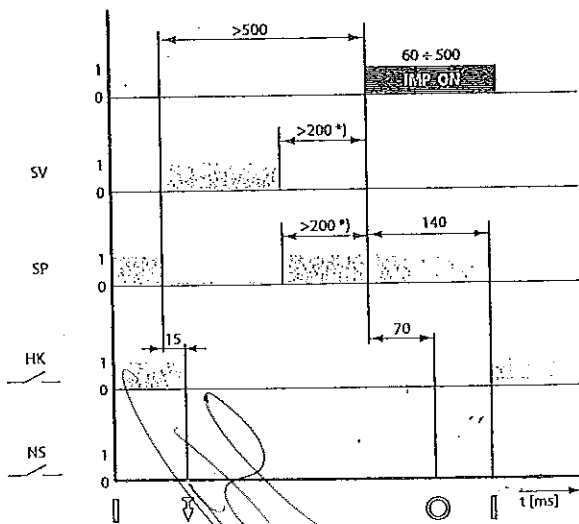
Automatic operation No. 1



Automatic operation No. 2



Automatic operation No. 3



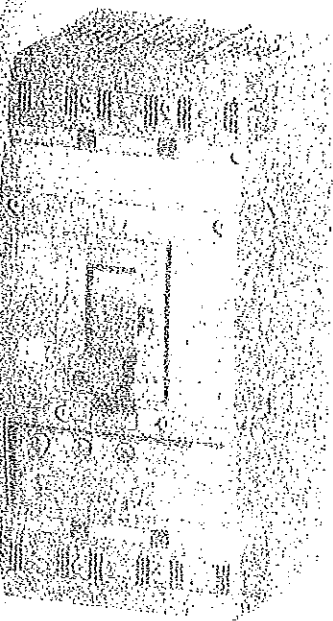
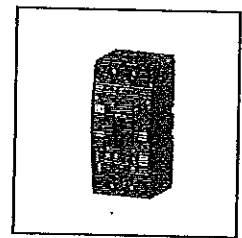
Description of graphs

Symbol	Description
HK	Main contacts
NS	Signal switch
SV	Impulse for shunt trip
SP	Impulse for undervoltage release
IMP ON	Make impulse for the motor drive
IMP OFF	Break impulse for the motor drive
|	Switched on
∇	Switched off by releases, TEST or INSPECTION push button
○	Switched off manually or by motor drive electrically (loaded state)

*) Restart is only possible after deactivation of shunt trip or undervoltage release.

[Handwritten mark]

MOULDED CASE CIRCUIT BREAKERS BD250N, BD250S



[Handwritten signature]

[Handwritten signature]

COMMERCIAL INFORMATION

<input type="checkbox"/> Switching units, plug-in device, withdrawable device.....	E4
<input type="checkbox"/> Overcurrent releases, switch-disconnector unit.....	E6
<input type="checkbox"/> Residual current monitor.....	E7
<input type="checkbox"/> Current transformers for residual current monitor.....	E7
<input type="checkbox"/> Connecting sets.....	E7
<input type="checkbox"/> Mounting sets.....	E10
<input type="checkbox"/> Switches.....	E11
<input type="checkbox"/> Shunt trips.....	E11
<input type="checkbox"/> Undervoltage releases.....	E11
<input type="checkbox"/> Delay unit.....	E11
<input type="checkbox"/> Hand drives.....	E12
<input type="checkbox"/> Mechanical interlocking and parallel switching.....	E13
<input type="checkbox"/> Motor drives.....	E13
<input type="checkbox"/> Control relay.....	E13
<input type="checkbox"/> Accessories.....	E14

TECHNICAL INFORMATION

<input type="checkbox"/> Circuit breakers, switch-disconnectors	
- specifications.....	E15
- diagram.....	E16
- connecting, mounting.....	E18
- defonization spaces.....	E22
- dimensions.....	E24
<input type="checkbox"/> Plug-in device	- description, specifications, diagram.....E50
<input type="checkbox"/> Withdrawable device	- description, specifications, diagram.....E52
<input type="checkbox"/> Overcurrent releases	
DTV3 - distribution	
- description, specifications.....	E54
MTV8 - motor	
- description, specifications.....	E55
L001 - lines	
- description, specifications.....	E57
MTV9 - motor with adjustable timing selectivity	
- description, specifications.....	E58
4D01 - distribution with N-pole protection	
- description, specifications.....	E60
<input type="checkbox"/> Connecting sets	- specifications.....E19
<input type="checkbox"/> Switches	- specifications, diagram.....E61
<input type="checkbox"/> Shunt trips	- specifications, diagram.....E62
<input type="checkbox"/> Undervoltage releases	- specifications, diagram.....E64
<input type="checkbox"/> Hand drives	- description, specifications.....E66
<input type="checkbox"/> Mechanical interlocking and parallel switching	- description, specifications, dimensions.....E67
<input type="checkbox"/> Motor drives	- description, specifications, diagram.....E69

SUMMARY OF MODELS AND ACCESSORIES

CONNECTING SETS

- Crimp terminals CS-BD-1011
- Block terminals CS-BD-B011
- Block terminals CS-BD-B012
- Double block terminals CS-BD-B021, CS-BD-B022
- Block terminals CS-BD-B014
- Rear connection CS-BD-A021
- Front connection CS-BD-A011
- Potential terminals CS-BD-PS01

HAND DRIVES

- BP-BD-CC
- BP-BD-CF
- BP-BD-CN
- BP-BD-CG

Mechanical parallel switching

BP-BD-CD10

Mechanical interlocking

BP-BD-CB10

Mechanical blocking with Bowden cable

BP-BD-PV05

BP-BD-PV03

MOTOR DRIVES

MP-BD-X

MD-BD-XA02

MD-BD-PP01

SWITCHING UNIT

BD250SE30S

BD250NE30S

PLUG-IN DEVICE

ZO-BD-0250-300

WITHDRAWABLE DEVICE

ZV-BD-0250-300

SWITCHES PS-BHD

- Simple
- Double
- Make and break
- Early

SHUNT TRIP

SV-BHD-X

UNDERVOLTAGE RELEASE

SP-BHD-X

OVERCURRENT RELEASES

- SE-BD-11001
- SE-BD-110V3
- SE-BD-0250/1001
- SE-BD-110V8
- SE-BD-110V9
- SE-BD-17001

SWITCH-DISCONNECTOR UNIT

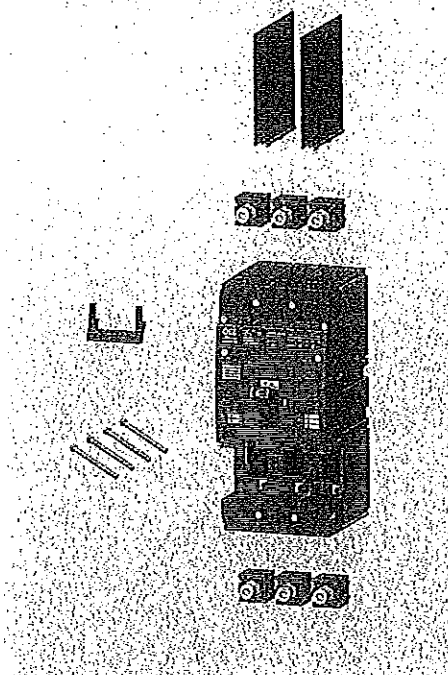
ACCESSORIES TO ZO... AND ZV

- Connecting cable OD-BHD-KA01
- Signalling of position SO-BHD-0010
- Keying set OD-BD-KK01

ACCESSORIES

- Lever with locking OD-BD-UP01
- Sealing insert OD-BD-VP01
- Additional cover for overcurrent release OD-BD-VP02
- Terminal cover OD-BD-KS03
- Insulating barriers OD-BHD-KS02

SWITCHING UNITS



Type	Product code	I(A)	IK(A)	Weight (kg)	Package (p)
BD250NE305	14414	250	36	2.84	1
BD250SE305	14415	250	65	2.84	1

- TECHNICAL INFORMATION, see page E15
 - the method of power circuit connection must observe recommendations, see page E18 as well as deionization space, see pag

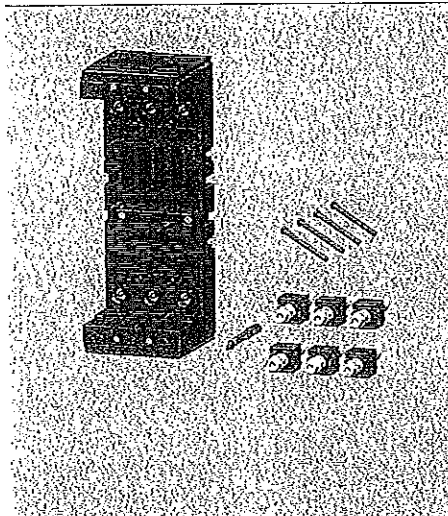
Switching unit: includes

- 2 CS-BD-A011 connecting sets - for connecting busbars or cable lug
- insulating barriers OD-BHD-KS02
- mounting bolts set OD-BD-MS01 (4x M4x35)
- conductor holder OD-BD-DV01.

must be fitted with - by overcurrent release SE-BD-... (circuit breaker)
 or switch-disconnector unit SE-BD-0250-V001 (switch-disconnector)

*) - for connecting in another way, it is necessary to use CS-BD-... connecting sets, see page E8

PLUG-IN DEVICE



Type	Product code	Name	Weight (kg)	Package (p)
Z0-BD-0250-300	14558	Plug-in device	1.593	1

- TECHNICAL INFORMATION, see page page E50

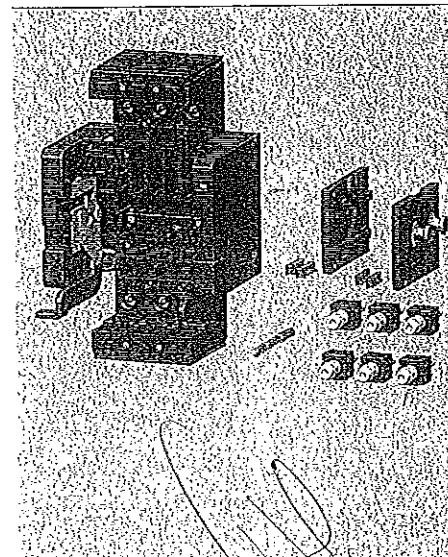
Plug-in device: includes

- complete accessories for assembly circuit breakers/switch-disconnector in plug-in design
- mounting bolts set (4x M4x40) - for affixing switching unit to plug-in device

must be fitted with - switching unit BD250..305

- for connecting plug-in device with busbars or cable lugs, connecting sets CS-BD-A011 can be used, that are included in the package of the BD250..305 switching unit - for connecting in another way, it is necessary to use CS-BD-... connecting sets, see page E8

WITHDRAWABLE DEVICE



Type	Product code	Name	Weight (kg)	Package (p)
ZV-BD-0250-300	14557	Withdrawable device	2.692	1

- TECHNICAL INFORMATION, see page E52

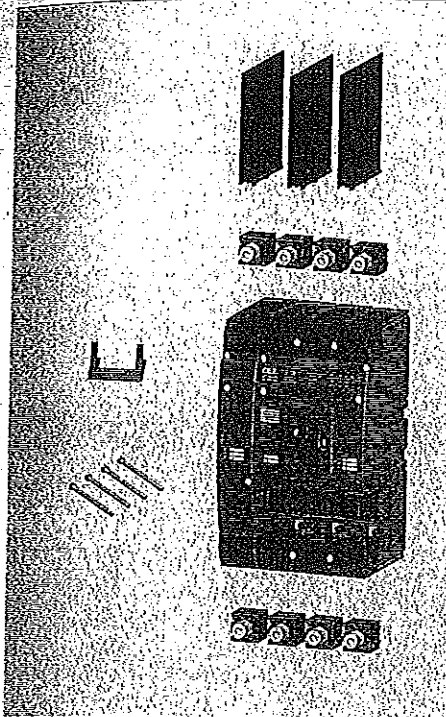
Withdrawable device: includes

- complete accessories for assembly circuit breakers/switch-disconnector in withdrawable design

must be fitted with - switching unit BD250..305

- for connecting withdrawable device with busbars or cable lugs, connecting sets CS-BD-A011 can be used, that are included in the package of the BD250..305 switching unit - for connecting in another way, it is necessary to use CS-BD-... connecting sets, see page E8

SWITCHING UNITS



Type	Product code	(kA)	(kA)		Weight (kg)	Package (pc)
BD250NE405	19571	250	36	3P + N-conductor switching	3.7	1
BD250SE405	19573	250	65	3P + N-conductor switching	3.7	1
BD250NE406	19572	250	36	4P-conductor protection	3.9	1
BD250SE406	19574	250	65	4P-conductor protection	3.9	1

- TECHNICAL INFORMATION, see page E15

- the method of power circuit connection must observe recommendations, see page E18 as well as deionization space, see page E23

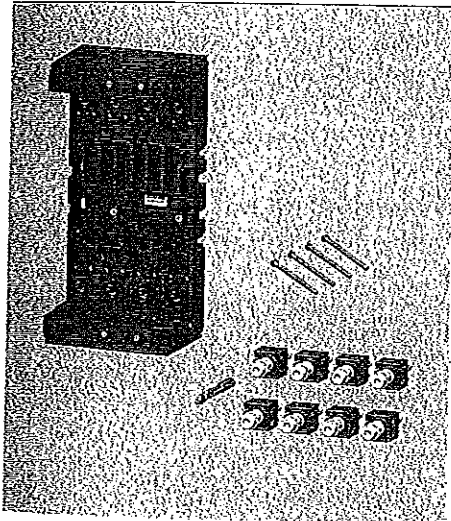
Switching unit: includes

- 2 connecting sets - for connecting busbars or cable lugs¹⁾
- insulating barriers
- mounting bolts set OD-BD-MS01 (4x M4x35)
- conductor holder OD-BD-DV01

must be fitted with - by overcurrent release SE-BD-... (circuit breaker)
or switch-disconnector unit SE-BD-0250-V001 (switch-disconnector)

¹⁾ - for connecting in another way, it is necessary to use CS-BD-... connecting sets, see page E8

PLUG-IN DEVICE



Type	Product code	Name	Weight (kg)	Package (pc)
Z0-BD-0250-400	20651	Plug-in device	2.1	1

- TECHNICAL INFORMATION, see page E50

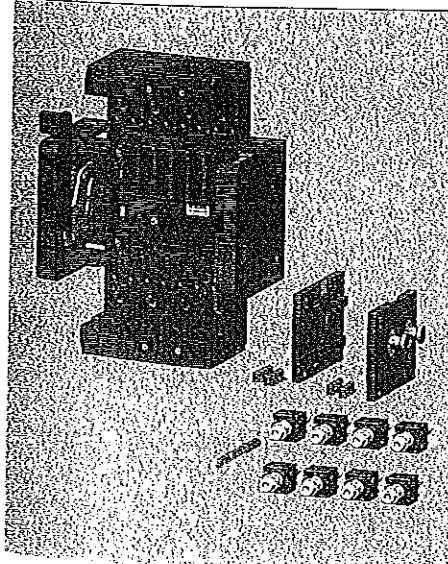
Plug-in device: includes

- complete accessories for assembly circuit breakers/switch-disconnectors in plug-in design
- mounting bolts set (4x M4x40) - for affixing switching unit to plug-in device

must be fitted with - switching unit BD250..405 or BD250..406

- for connecting plug-in device with busbars or cable lugs, connecting sets can be used, that are included in the package of the BD250..40.. switching unit - for connecting in another way, it is necessary to use CS-BD-... connecting sets, see page E8

WITHDRAWABLE DEVICE



Type	Product code	Name	Weight (kg)	Package (pc)
ZV-BD-0250-400	20652	Withdrawable device	3.2	1

- TECHNICAL INFORMATION, see page E52

Withdrawable device: includes

- complete accessories for assembling breaker/switch-disconnector in withdrawable design

must be fitted with - switching unit BD250..405 or BD250..406

- for connecting withdrawable device with busbars or cable lugs, connecting sets can be used, that are included with the BD250..40.. switching unit - for connecting in another way, it is necessary to use CS-BD-... connecting sets, see page E8

OVERCURRENT RELEASES

3P

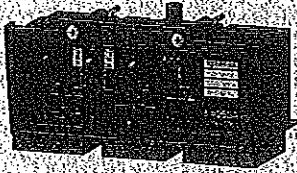


DTV3 - characteristic D - distribution

■ protection lines and transformers

I _n (A)	Type	Product code	Description	Weight (kg)	Package (p)
100	SE-BD-0100-DTV3	24300	I _n setting = 40 ÷ 100 A	0.317	1
160	SE-BD-0160-DTV3	24200	I _n setting = 63 ÷ 160 A	0.317	1
250	SE-BD-0250-DTV3	24100	I _n setting = 100 ÷ 250 A	0.317	1

- TECHNICAL INFORMATION, see page E54



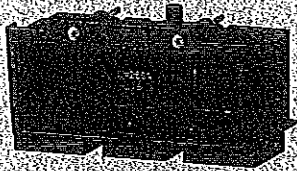
MTV8 - characteristic M - motor

■ direct protection for motors and generators

■ suitable also for protection lines and transformers

I _n (A)	Type	Product code	Description	Weight (kg)	Package (p)
100	SE-BD-0100-MTV8	24310	I _n setting = 40 ÷ 100 A	0.317	1
160	SE-BD-0160-MTV8	24210	I _n setting = 63 ÷ 160 A	0.317	1
250	SE-BD-0250-MTV8	24110	I _n setting = 100 ÷ 250 A	0.317	1

- TECHNICAL INFORMATION, see page E55



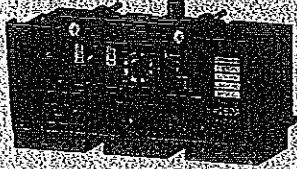
L001 - characteristic L - lines

■ protection lines with low starting currents

■ without I_n setting

I _n (A)	Type	Product code	Description	Weight (kg)	Package (p)
160	SE-BD-0160-L001	20612	Without I _n setting	0.317	1
200	SE-BD-0200-L001	20666	Without I _n setting	0.317	1
250	SE-BD-0250-L001	20613	Without I _n setting	0.317	1

- TECHNICAL INFORMATION, see page E57



MTV9 - characteristic M - motor with adjustable timing selectivity

■ direct protection for motors and generators

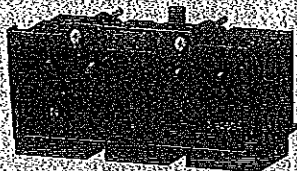
■ suitable also for protection lines and transformers

■ enables setting delay of independent release to 0, 100, 200 or 300 ms

I _n (A)	Type	Product code	Description	Weight (kg)	Package (p)
100	SE-BD-0100-MTV9	17304	I _n setting = 40 ÷ 100 A	0.317	1
160	SE-BD-0160-MTV9	19569	I _n setting = 63 ÷ 160 A	0.317	1
250	SE-BD-0250-MTV9	19570	I _n setting = 100 ÷ 250 A	0.317	1

- TECHNICAL INFORMATION, see page E58

OVERCURRENT RELEASES



4D01 - characteristic D - distribution with N-pole protection

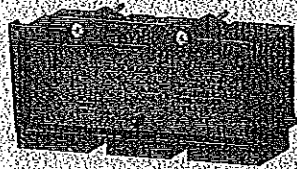
■ protection lines and transformers in TN-C-S and TN-S networks

I _n (A)	Type	Product code	Description	Weight (kg)	Package (p)
100	SE-BD-0100-4D01	33423	I _n setting = 40 ÷ 100 A	0.327	1
160	SE-BD-0160-4D01	33424	I _n setting = 63 ÷ 160 A	0.327	1
250	SE-BD-0250-4D01	33425	I _n setting = 100 ÷ 250 A	0.327	1

- TECHNICAL INFORMATION, see page E60

- intended for BD250.406 switching unit

SWITCH-DISCONNECTOR UNIT

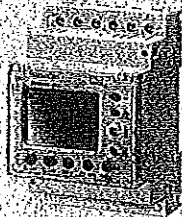
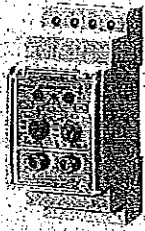


I _n (A)	Type	Product code	Name	Weight (kg)	Package (p)
250	SE-BD-0250-V001	24120	Switch-disconnector unit	0.267	1

- TECHNICAL INFORMATION, see page E15

RESIDUAL CURRENT MONITOR

3P 4P



Type	Product code	Description	Weight (kg)	Package (set)
SSV8000-6KK	42658	Analogue design, $I_{\Delta n}$ and $t_{\Delta n}$ setting	0.18	1

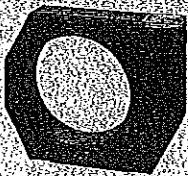
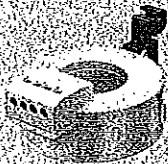
- TECHNICAL INFORMATION, see page P4

Type	Product code	Description	Weight (kg)	Package (set)
SSV8001-6KK	42659	Digital design, $I_{\Delta n}$ and $t_{\Delta n}$ setting	0.26	1
SSV8200-6KK	42660	Digital design, $I_{\Delta n}$ and $t_{\Delta n}$ setting, 4 channels	0.26	1

- TECHNICAL INFORMATION, see page P4

CURRENT TRANSFORMERS FOR RESIDUAL CURRENT MONITOR

3P 4P



Type	Product code	Description	Weight (kg)	Package (set)
SSV8700-OKK	42661	Internal diameter 20 mm, including holder on „U“ rail according to EN 60715 wide 35 mm	0.09	1
SSV8701-OKK	42662	Internal diameter 30 mm, including holder on „U“ rail according to EN 60715 wide 35 mm	0.11	1

- TECHNICAL INFORMATION, see page P4

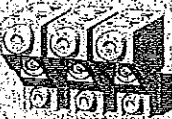
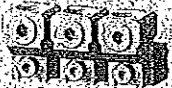
Type	Product code	Description	Weight (kg)	Package (set)
SSV8702-OKK	42663	Internal diameter 35 mm, including holder on the panel	0.2	1
SSV8703-OKK	42664	Internal diameter 70 mm, including holder on the panel	0.31	1
SSV8704-OKK	42665	Internal diameter 105 mm, including holder on the panel	0.6	1
SSV8705-OKK	42666	Internal diameter 140 mm, including holder on the panel	1.35	1
SSV8706-OKK	42667	Internal diameter 210 mm, including holder on the panel	1.25	1

- TECHNICAL INFORMATION, see page P4

Type	Product code	Description	Weight (kg)	Package (set)
SSV8 900-1KK	42668	Holder on „U“ rail according to EN 60715 wide 35 mm for current transformers with internal diameter up to and including 105 mm	0.01	2

- TECHNICAL INFORMATION, see page P4

CONNECTING SETS



3 terminals

Type	Product code	Description	S (mm)	Method of connection	Weight (kg)	Package (set)
CS-BD-T011	24810	Clamp terminals	16 ÷ 150	Cu cables, flexbars	0.24	1

- TECHNICAL INFORMATION, see page E19

CS-BD-B011	24751	Block terminals	25 ÷ 150	Cu/Al cables	0.21	1
------------	-------	-----------------	----------	--------------	------	---

- TECHNICAL INFORMATION, see page E19

CS-BD-B012	17534	Block terminals	150 ÷ 240	Cu/Al cables	0.2	1
------------	-------	-----------------	-----------	--------------	-----	---

- TECHNICAL INFORMATION, see page E19

- using the OD-BD-KS03 cover the degree of protection IP20 is fulfilled

CS-BD-B021	24752	Double block terminals	2x (25 ÷ 150)	Cu/Al cables	0.51	1
------------	-------	------------------------	---------------	--------------	------	---

CS-BD-B022	13808	Double block terminals	2x (150 ÷ 240)	Cu/Al cables	0.62	1
------------	-------	------------------------	----------------	--------------	------	---

- TECHNICAL INFORMATION, see page E19

- using the OD-BD-KS03 cover the degree of protection IP20 is fulfilled

CS-BD-B014	20119	Block terminals for 6 cables	6x (6 ÷ 35)	Cu/Al cables	0.3	1
------------	-------	---------------------------------	-------------	--------------	-----	---

- TECHNICAL INFORMATION, see page E19

- using the OD-BD-KS03 cover the degree of protection IP20 is fulfilled

CS-BD-A021	24770	Rear connection		Cu/Al busbars, cable lugs	0.237	1
------------	-------	-----------------	--	---------------------------	-------	---

- TECHNICAL INFORMATION, see page E19

CS-BD-PS01	13682	Potential terminals	1.5 ÷ 2.5; 4 ÷ 6	Cu flexible conductor	0.017	1
------------	-------	---------------------	------------------	-----------------------	-------	---

- TECHNICAL INFORMATION, see page E19

CS-BD-A011	24750	Front connection		Cu/Al busbars, cable lugs, flexbars	0.12	1
------------	-------	------------------	--	-------------------------------------	------	---

- TECHNICAL INFORMATION, see page E19

- Included in every supply of switching units

1 terminal

Type	Product code	Description	S (mm)	Method of connection	Weight (kg)	Package (set)
CS-BD-T411	19578	Clamp terminal	16 ÷ 150	Cu cables, flexbars	0.08	1

- TECHNICAL INFORMATION, see page E19

CS-BD-B411	19582	Block terminal	25 ÷ 150	Cu/Al cables	0.07	1
------------	-------	----------------	----------	--------------	------	---

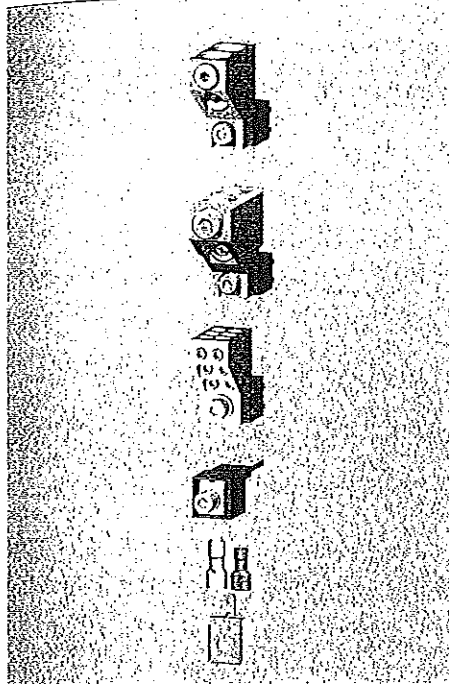
- TECHNICAL INFORMATION, see page E19

CS-BD-B412	19577	Block terminal	150 ÷ 240	Cu/Al cables	0.07	1
------------	-------	----------------	-----------	--------------	------	---

- TECHNICAL INFORMATION, see page E19

¹⁾ - set includes three terminals

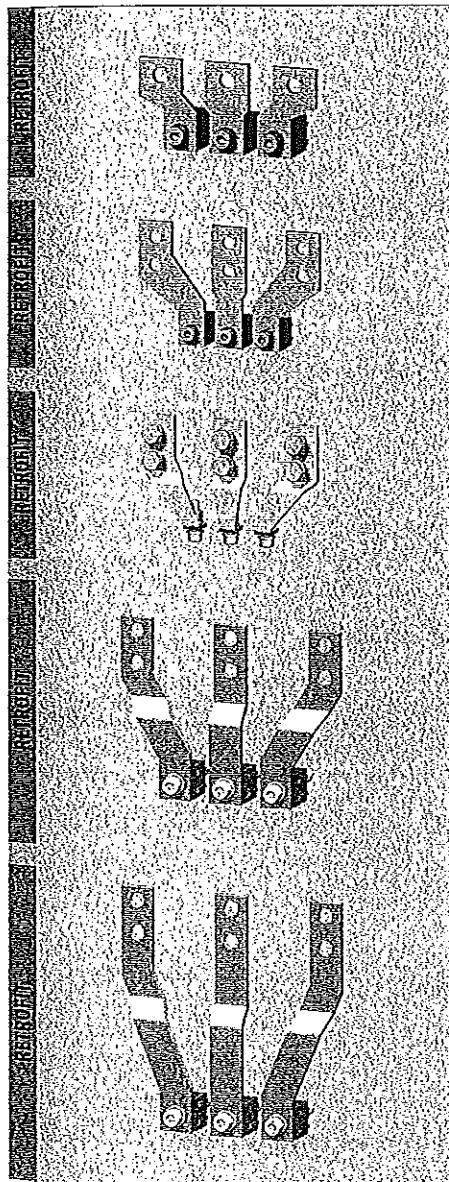
CONNECTING SETS



1 terminal

Type	Product code	Description	Terminal (mm)	Method of connection	Weight (kg)	Package (pcs)
CS-BD-B421	19579	Double block terminal 2x (25 ÷ 150)		Cu/Al cables	0.17	1
- TECHNICAL INFORMATION, see page E19						
CS-BD-B422	19580	Double block terminal 2x (150 ÷ 240)		Cu/Al cables	0.21	1
- TECHNICAL INFORMATION, see page E19						
CS-BD-B414	21170	Block terminal for 6 cables	6x (6 ÷ 35)	Cu/Al cables	0.1	1
- TECHNICAL INFORMATION, see page E19						
CS-BD-A421	19581	Rear connection		Cu/Al busbars, cable lugs	0.08	1
- TECHNICAL INFORMATION, see page E19						
CS-BD-P541	36031	Potential terminal	15 ÷ 2,5/4 ÷ 6		0.005	1
- TECHNICAL INFORMATION, see page E19						

CONNECTING SETS

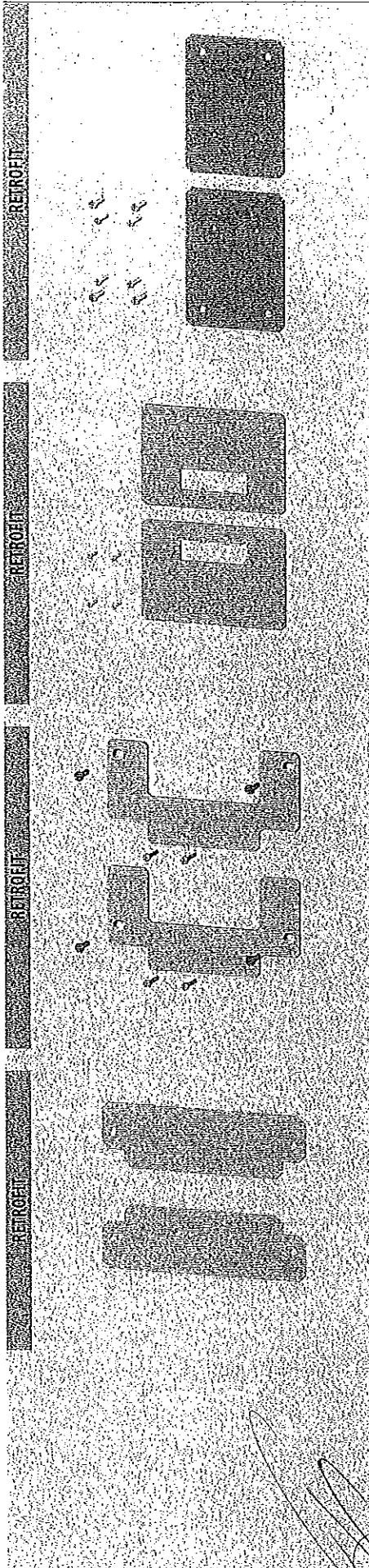


3 terminals

Type	Product code	Description	Method of connection	Weight (kg)	Package (pcs)
CS-BD-A037	24772	Reduction for BA...*37-50 front connection	Cu/Al busbars, cable lugs, flexibars	0.3	1
- TECHNICAL INFORMATION, see page E19					
CS-BD-A039	24773	Reduction for BA...*39-50 a J2UX50 front connection	Cu/Al busbars, cable lugs, flexibars	0.447	1
- TECHNICAL INFORMATION, see page E19 - for total replacement of BA...*39-50 or J2UX50 circuit breaker with front connection OD-BHD-MS39 connecting set is necessary					
CS-BD-Z039	18201	Reduction for BA...*39 a J2UX rear connection	Cu/Al busbars, cable lugs, flexibars	0.739	1
- TECHNICAL INFORMATION, see page E19 - for total replacement of BA...*39 or J2UX circuit breaker with rear connection OD-BD-MZ39 and CS-BD-A021 connecting sets are necessary					
CS-BD-JX75	18023	Reduction for BA...*39-75 and J2UX75 front connection, withdrawable design	Cu/Al busbars, cable lugs, flexibars	0.558	1
- TECHNICAL INFORMATION, see page E19 - for total replacement of BA...*39-75 or J2UX75T circuit breakers with front connection in withdrawable design OD-BHD-MS75 connecting set and ZO-BD-0250-300 plug-in device or ZV-BD-0250-300 withdrawable device are necessary					
CS-BD-JT75	18024	Reduction for J2UX75T front connection, withdrawable design	Cu/Al busbars, cable lugs, flexibars	0.711	1
- TECHNICAL INFORMATION, see page E19 - for total replacement of J2UX75T circuit breaker with front connection in withdrawable design OD-BHD-MS75 connecting set and ZO-BD-0250-300 plug-in device or ZV-BD-0250-300 withdrawable device are necessary					

sets, which enable replacement of older circuit breakers by a new circuit breakers without switchboard reconstruction

MOUNTING SETS



Type	Product code	Description	Weight(kg)	Package (set)
OD-BHD-MS39	24741	Reduction for BA...*39-50 and J2UX50 - front connection	0.7	1

- DIMENSIONS see page E28

- for total replacement of BA...*39-50 or J2UX50 circuit breaker with front connection 2 connecting sets CS-BD-A039 are necessary

OD-BD-MZ39	18203	Reduction for BA...*39 and J2UX - rear connection	1.255	1
------------	-------	---------------------------------------------------	-------	---

- DIMENSIONS see page E28

- for total replacement of BA...*39 or J2UX circuit breaker with rear connection 2 connecting sets CS-BD-Z039 and CS-BD-A021 are necessary

OD-BD-MT75	33330	Reduction for J2UX75T - front connection, withdrawable design		1
------------	-------	---------------------------------------------------------------	--	---

- DIMENSIONS see page E34, E38

- for total replacement of J2UX75T circuit breaker with front connection in withdrawable design 2 connecting sets CS-BD-JT75 or Z0-BD-0250-300 plug-in device or ZV-BD-0250-300 withdrawable device are necessary

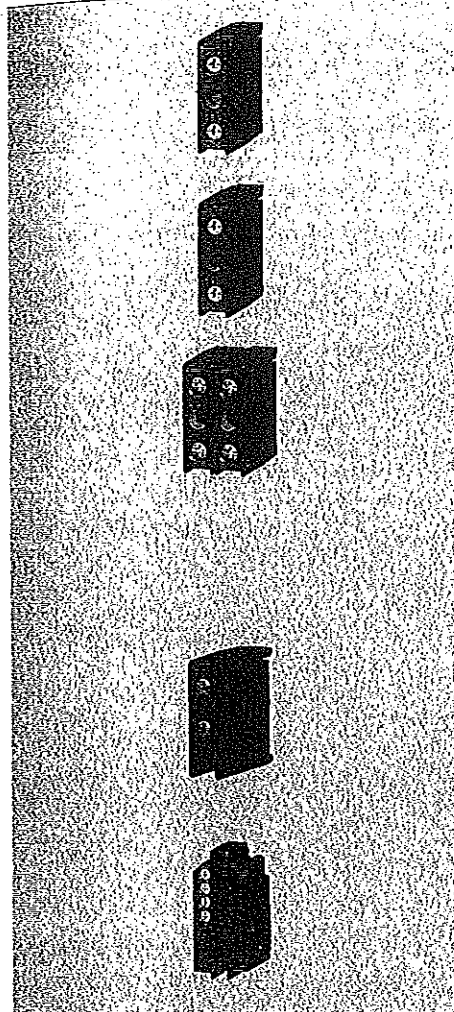
OD-BHD-MS75	14563	Reduction for BA...*39-75 and J2UX75 - front connection withdrawable design	0.446	1
-------------	-------	-----------------------------------------------------------------------------	-------	---

- DIMENSIONS see page E34, E37

- for total replacement of BA...*39-75 or J2UX75 circuit breaker with front connection in withdrawable design 2 connecting sets CS-BD-MT75 and Z0-BD-0250-300 plug-in device or ZV-BD-0250-300 withdrawable device are necessary

*) - one set provides for replacing one circuit breaker (set includes coupling elements necessary to assemble circuit breaker and mounting set)

RETROFIT - sets, which enable replacement of older circuit breakers by a new circuit breakers without switchboard reconstruct

SWITCHES

Single make contacts

Type	Product code	Operating voltage	Contacts	Weight (kg)	Package (pcs)
PS-BHD-1000	24700	60 ÷ 500 V a.c./d.c.		0.012	1
PS-BHD-1000-Au	24702	5 ÷ 60 V a.c./d.c.		0.012	1

Single break contacts

Type	Product code	Operating voltage	Contacts	Weight (kg)	Package (pcs)
PS-BHD-0100	24701	60 ÷ 500 V a.c./d.c.		0.013	1
PS-BHD-0100-Au	24703	5 ÷ 60 V a.c./d.c.		0.013	1

Double

Type	Product code	Operating voltage	Contacts	Weight (kg)	Package (pcs)
PS-BHD-0200	13690	60 ÷ 500 V a.c./d.c.		0.026	1
PS-BHD-0200-Au	13693	5 ÷ 60 V a.c./d.c.		0.026	1
PS-BHD-1100	13691	60 ÷ 500 V a.c./d.c.		0.025	1
PS-BHD-1100-Au	13694	5 ÷ 60 V a.c./d.c.		0.025	1
PS-BHD-2000	13689	60 ÷ 500 V a.c./d.c.		0.024	1
PS-BHD-2000-Au	13692	5 ÷ 60 V a.c./d.c.		0.024	1

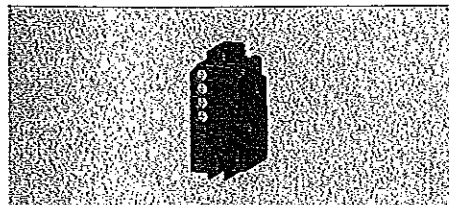
Make-and-break

Type	Product code	Operating voltage	Contacts	Weight (kg)	Package (pcs)
PS-BHD-0010	18021	60 ÷ 250 V a.c./d.c.		0.013	1
PS-BHD-0010-Au	18022	5 ÷ 60 V a.c./d.c.		0.013	1
PS-BHD-0020	35 893	60 ÷ 250 V a.c./d.c.		0.026	1
PS-BHD-0020-Au	37407	5 ÷ 60 V a.c./d.c.		0.026	1

Early

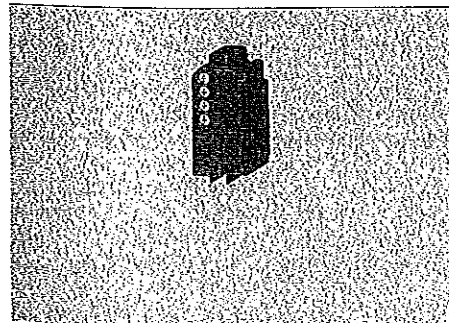
Type	Product code	Description	Contacts	Weight (kg)	Package (pcs)
SP-BHD-0002	16169	Early contact		0.045	1

- TECHNICAL INFORMATION for all switch, see page E61

3P 4P
SHUNT TRIPS


Type	Product code	Operating voltage	Weight (kg)	Package (pcs)
SV-BHD-X024	24650	24, 40, 48 V a.c./d.c.	0.14	1
SV-BHD-X110	24630	110 V a.c./d.c.	0.14	1
SV-BHD-X230	24620	230, 400, 500 V a.c./220 V d.c.	0.14	1

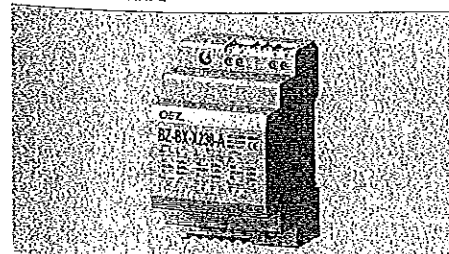
- TECHNICAL INFORMATION, see page E62

3P 4P
UNDERVOLTAGE RELEASES


Type	Product code	Operating voltage	Description	Weight (kg)	Package (pcs)
SP-BHD-X024	24450	24, 40, 48 V a.c./d.c.		0.11	1
SP-BHD-X110	24430	110 V a.c./d.c.		0.11	1
SP-BHD-X230	24420	230, 400, 500 V a.c./220 V d.c.		0.11	1
SP-BHD-X024-0001 ¹⁾	24550	24, 40, 48 V a.c./d.c.	early contact	0.12	1
SP-BHD-X110-0001 ¹⁾	24530	110 V a.c./d.c.	early contact	0.12	1
SP-BHD-X230-0001 ¹⁾	24520	230, 400, 500 V a.c./220 V d.c.	early contact	0.12	1

- TECHNICAL INFORMATION, see page E64

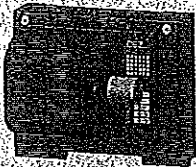
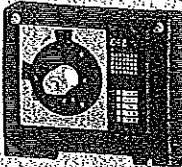
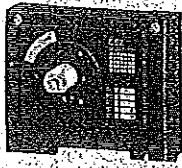
¹⁾ - cannot be used in combination with motor drive MP-BD-X...

DELAY UNIT


Type	Product code	Description	Weight (kg)	Package (pcs)
BZ-BX-X230-A	36696	- enables to delay the undervoltage release tripping of circuit breakers Modeion	0.12	1

- TECHNICAL INFORMATION, see page P2

HAND DRIVES



Type	Product code	Name - description		Weight (kg)	Package
RP-BD-CK10	13651	Hand drive unit	- without locking	0.223	1
RP-BD-CK20	13652	Hand drive unit	- with locking	0.223	1

- TECHNICAL INFORMATION, see page E66

Hand drive unit must be fitted with: for controlling on switch unit - with the black hand drive lever RP-BHD-CP10 or RP-BHD-CP20
 for controlling through the switchboard door - with the extension shaft RP-BHD-CH..
 - with the hand drive bearing RP-BHD-CN..
 - with the hand drive lever RP-BHD-CP..

RP-BD-CK21	13684	Hand drive unit - yellow label	- with locking	0.223	1
------------	-------	--------------------------------	----------------	-------	---

- TECHNICAL INFORMATION, see page E66

Hand drive unit must be fitted with: for controlling on switch unit - with the red hand drive lever RP-BHD-CP21
 for controlling through the switchboard door - with the extension shaft RP-BHD-CH..
 - with the hand drive bearing RP-BHD-CN..
 - with the hand drive lever RP-BHD-CP..

RP-BD-CK30	37250	Hand drive unit for right side control		0.484	1
------------	-------	----------------------------------------	--	-------	---

RP-BD-CK31	37251	Hand drive unit left side control		0.484	1
------------	-------	-----------------------------------	--	-------	---

- TECHNICAL INFORMATION, see page E66

RP-BHD-CP10	13655	Hand drive lever - black	- without locking	0.075	1
-------------	-------	--------------------------	-------------------	-------	---

RP-BHD-CP20	13656	Hand drive lever - black	- with locking	0.075	1
-------------	-------	--------------------------	----------------	-------	---

- TECHNICAL INFORMATION, see page E66

RP-BHD-CP21	13657	Hand drive lever - red	- with locking	0.075	1
-------------	-------	------------------------	----------------	-------	---

- TECHNICAL INFORMATION, see page E66

RP-BHD-CN40	37246	Hand drive bearing	degree of protection IP40	0.14	1
-------------	-------	--------------------	---------------------------	------	---

- TECHNICAL INFORMATION, see page E66

- is used in combination with the black lever of RP-BHD-CP10, RP-BHD-CP20 hand drives

RP-BHD-CN41	37247	Hand drive bearing - yellow label	degree of protection IP40	0.14	1
-------------	-------	-----------------------------------	---------------------------	------	---

- TECHNICAL INFORMATION, see page E66

- is used in combination with the red lever of RP-BHD-CP21 hand drive

RP-BHD-CN60	37248	Hand drive bearing	degree of protection IP66	0.14	1
-------------	-------	--------------------	---------------------------	------	---

- TECHNICAL INFORMATION, see page E66

- is used in combination with the black lever of RP-BHD-CP10, RP-BHD-CP20 hand drives

RP-BHD-CN61	37249	Hand drive bearing - yellow label	degree of protection IP66	0.14	1
-------------	-------	-----------------------------------	---------------------------	------	---

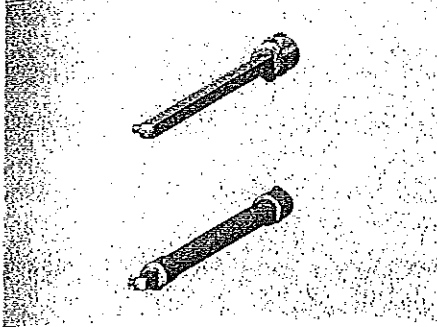
- TECHNICAL INFORMATION, see page E66

- is used in combination with the red lever of RP-BHD-CP21 hand drive

lu

HAND DRIVES

3P 4P



Type	Product code	Name - description	Weight (kg)	Package (pc)
RP-BHD-CH10	13658	Extension shaft - length 365 mm, can be shortened	0.205	1

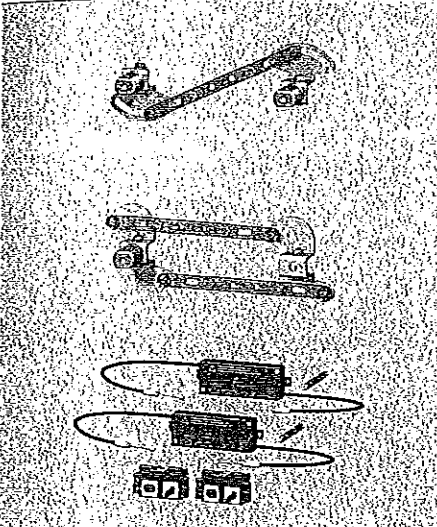
- TECHNICAL INFORMATION, see page E66

RP-BHD-CH20	13659	Extension shaft - telescopic, length 245 ÷ 410 mm	0.255	1
-------------	-------	---------------------------------------------------	-------	---

- TECHNICAL INFORMATION, see page E66

MECHANICAL INTERLOCKING AND PARALLEL SWITCHING

3P 4P



Type	Product code	Name - description	Weight (kg)	Package (pc)
RP-BHD-CB10	18290	Mechanical interlocking - for fixed design	0.16	1

- TECHNICAL INFORMATION, see page E67

- mechanical interlocking must be fitted with: 2 hand drive units RP-BD-CK..
2 hand drive levers RP-BHD-CP.

RP-BHD-CD10	18289	Mechanical parallel switching - for fixed design	0.23	1
-------------	-------	--------------------------------------------------	------	---

- TECHNICAL INFORMATION, see page E67

- mechanical parallel switching must be fitted with: 2 hand drive units RP-BD-CK..
the hand drive lever RP-BHD-CP.

MB-BD-PV05	19612	Mechanical interlocking - for two circuit breakers BD250	0.448	1
------------	-------	----------------------------------------------------------	-------	---

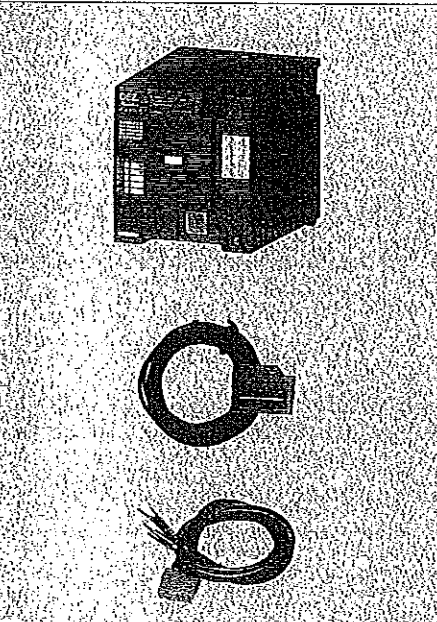
MB-BD-PV03	19613	Mechanical interlocking - for one BD250 and one BH630 circuit breaker	0.448	1
------------	-------	-----------------------------------------------------------------------	-------	---

- TECHNICAL INFORMATION, see page E67

- mechanical blocking with Bowden cable is intended for fixed, plug-in and withdrawable design

MOTOR DRIVES

3P 4P



Type	Product code	Name - description	Operating voltage	Weight (kg)	Package (pc)
MP-BD-X024 ¹⁾	21216	Motor drive	24V a.c./d.c.	1.529	1
MP-BD-X048 ¹⁾	19790	Motor drive	48V a.c./d.c.	1.529	1
MP-BD-X110	13537	Motor drive	110V a.c./d.c.	1.529	1
MP-BD-X230	13535	Motor drive	230V a.c./220V d.c.	1.529	1
MP-BD-X024-P ¹⁾	20592	Motor drive - with counter of cycles	24V a.c./d.c.	1.546	1
MP-BD-X048-P ¹⁾	19791	Motor drive - with counter of cycles	48V a.c./d.c.	1.546	1
MP-BD-X110-P	13686	Motor drive - with counter of cycles	110V a.c./d.c.	1.546	1
MP-BD-X230-P	13538	Motor drive - with counter of cycles	230V a.c./220V d.c.	1.546	1

- TECHNICAL INFORMATION, see page E69

- motor drive cannot be used in combination with SP-BHD-X...0001

¹⁾ - custom production

OD-BHD-PP01	13688	Counter of cycles - cable length 1.1 m	0.08	1
-------------	-------	----------------------------------------	------	---

- DIMENSIONS see page E30

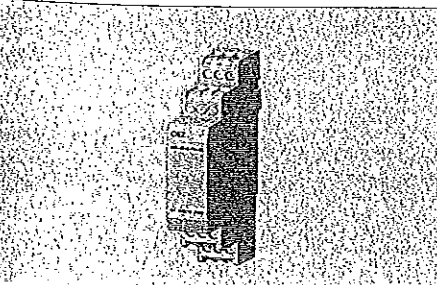
- upon agreement with the manufacturer, different conductor lengths can be supplied

OD-BHD-KA02	13809	Extension cable - to motor drive 12 wires, length 0.6 m	0.1	1
-------------	-------	---------------------------------------------------------	-----	---

- TECHNICAL INFORMATION, see page E69

- upon agreement with the manufacturer, different conductor lengths can be supplied

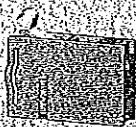
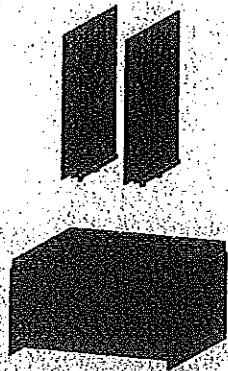
CONTROL RELAY



Type	Product code	Specifications	Weight (kg)	Package (pc)
OD-BHD-RX01	37425	24V a.c./d.c.	0.06	1
OD-BHD-RX02	37426	48V a.c./d.c.	0.06	1
OD-BHD-BA03	37427	110 ÷ 230V a.c.	0.06	1
OD-BHD-BD04	37428	110V d.c.	0.06	1

- TECHNICAL INFORMATION, see page P3

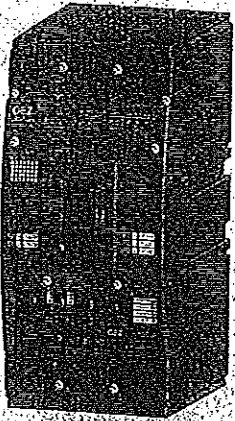
ACCESSORIES



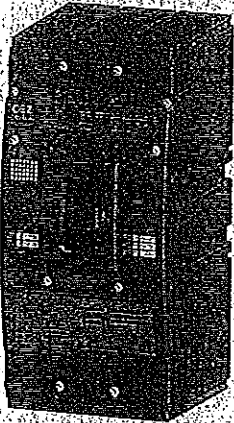
Type	Product code	Name - description	Weight (kg)	Package
OD-BHD-KS02	24740	Insulating barriers - set (two pieces), for 3P and 4P design	0.077	1
OD-BHD-KS42	19575	Insulating barrier - one piece, for 4P design	0.039	1
- included with each switching unit order - in case circuit breaker/switch-disconnector connection is reversed (supply to terminals 2, 4, 6) it is necessary in most cases to install these barriers also on the lower side - for more detailed information see page E22				
OD-BD-KS03	13534	Terminal cover - degree of protection IP20, for 3P design	0.098	1
OD-BD-KS43	19576	Terminal cover - degree of protection IP20, for 4P design	0.141	1
- Increases degree of protection of connection point to IP20 when using CS-BD-B012, B021, B022 and B014 block type terminals - intended for fixed, plug-in and withdrawable design				
OD-BD-UP01	13533	Lever with locking	0.009	1
- enables to lock the circuit breaker in „switched off manually“ position (loaded) - locking is possible using padlock with shank diameter 4 ÷ 6 mm				
OD-BD-VP01	15328	Bolt sealing insert	0.001	2
- enables sealing for: - cover of cavities - terminal cover - overcurrent release - hand drive unit - motor drive				
OD-BD-VP02	18215	Additional cover for overcurrent release	0.08	1
- enables sealing for overcurrent releases such as circuit breakers in the main meter switchboard				
OD-BHD-KA01	14555	Connecting cable - to connect the circuit breaker/switch-disconnector accessories in the plug-in/withdrawable design - 15 wires (it is possible for plug-in design and fixed design)	0.12	1
SO-BHD-0010	14560	Signalling of position - signals circuit breaker position in the plug-in or withdrawable device	0.018	1
- TECHNICAL INFORMATION, see page E50, E52				
OD-BD-KK01	14559	Keying set - prevents inserting in the plug-in or withdrawable devices beyond the switching unit	0.002	1
- TECHNICAL INFORMATION, see page E50, E52				
OD-BHD-KT01	14642	Cover of switch on button - for motor drive, cover can be sealed	0.002	1
- TECHNICAL INFORMATION, see page E69				

CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

3P 4P



Circuit breaker



Switch-disconnector

Specifications

	CIRCUIT BREAKER	SWITCH-DISCONNECTOR
Type	BD250N, BD250S	
Dimensions A x B x C + D (3P/4P design)	105/140 x 225 x 105 + 43 mm	105/140 x 225 x 105 + 43 mm
Weight (3P/4P design)	3 kg/4 kg	3 kg/4 kg
Standards	EN 60947-2, IEC 60947-2	EN 60947-3, IEC 60947-3
Approval marks		
Number of poles	3, 4	3, 4
Rated current	100, 160, 200, 250 A	250 A
Rated normal current	250 A	250 A
Rated operating current		250 A
Rated operating voltage	max. 690 V a.c.	max. 690 V a.c. max. 440 V d.c.
Rated frequency	50/60 Hz	50/60 Hz
Rated impulse withstand voltage	8 kV	8 kV
Rated insulation voltage	690 V	690 V
Utilization category (selectivity)	690 V a.c.	A
Utilization category (switching mode)	690 V a.c. 440 V d.c.	AC-23B DC-23B
Rated short-time withstand current at $U_n = 690$ V a.c.	2.5 kA/1 s	3 kA/5 s

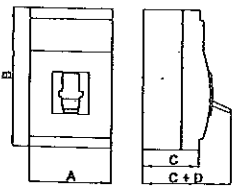
Series		NORMAL	SUPERIOR
		BD250N	BD250S
Rated short-circuit ultimate breaking capacity (rms) ¹⁾	I_{cu}	60 kA	100 kA
		36 kA	65 kA
		16 kA	25 kA
		10 kA	13 kA
		30 kA	50 kA
Rated short-circuit service breaking capacity (rms)	I_{cs}	18 kA	36 kA
		8 kA	13 kA
		5 kA	8 kA
		75 kA	140 kA
		5 kA	8 kA
Rated short-circuit making capacity (peak value)	I_{cm} / U_e	140 kA	415 V a.c.
Switching off time at I_n		10 ms	
Losses per 1 pole fixed/withdrawable design		18 W/25 W	18 W/25 W
Mechanical endurance		30 000 cycles	30 000 cycles
Electrical endurance		3 000 cycles	3 000 cycles
Switching frequency		120 cycles/hr	120 cycles/hr
Control force		80 N	80 N
Degree of protection from front side of the device		IP40	IP40
Degree of protection of terminals		IP20	IP20

Operating condition		
Reference ambient temperature	40 °C	40 °C
Ambient temperature range	-40 °C - +55 °C	-40 °C - +55 °C
Working environment	dry and tropical climate	dry and tropical climate
Climatic resistance	EN 60068	EN 60068
Pollution degree	3	3
Max. sea level	2 000 m	2 000 m
Seismic resistance	3g (8 ÷ 50) Hz	3g (8 ÷ 50) Hz

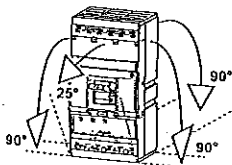
Design modifications		
Front/rear connection	o/o	o/o
Plug-in design 3P/4P	o/o	o/o
Withdrawable design 3P/4P	o/o	o/o

Accessories		
Switches - auxiliary/relative/signal/early	o/o/o/o	o/o/o/o
Shunt trip	o	o
Undervoltage release/with early switch	o/o	o/o
Front hand drive/with adjustable lever	o/o	o/o
Mechanical interlocking-with Bowden cable/for hand drive	o/o	o/o
Motor drive/with counter of cycles	o/o	o/o
Lever with locking	o	o
Bolt sealing insert/additional cover for overcurrent release	o/o	o/o

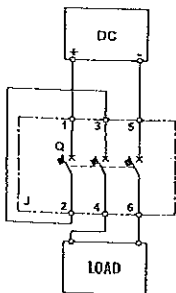
o - available, - unavailable, + being prepared
¹⁾ - in case circuit breaker connection is reversed (input terminals 2, 4, 6, output terminals 1, 3, 5) I_{cu} does not change - protection of Modeion switch-disconnectors, see page R



Dimensions



Installation positions - fixed, plug-in and withdrawable design



Connection of switch-disconnector for DC circuits

CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Diagram

Circuit breaker with accessories (3-pole design)

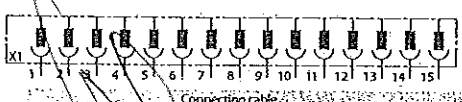
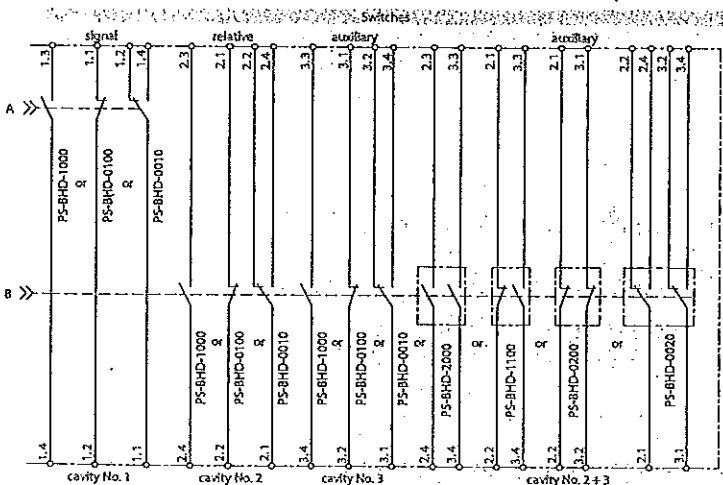
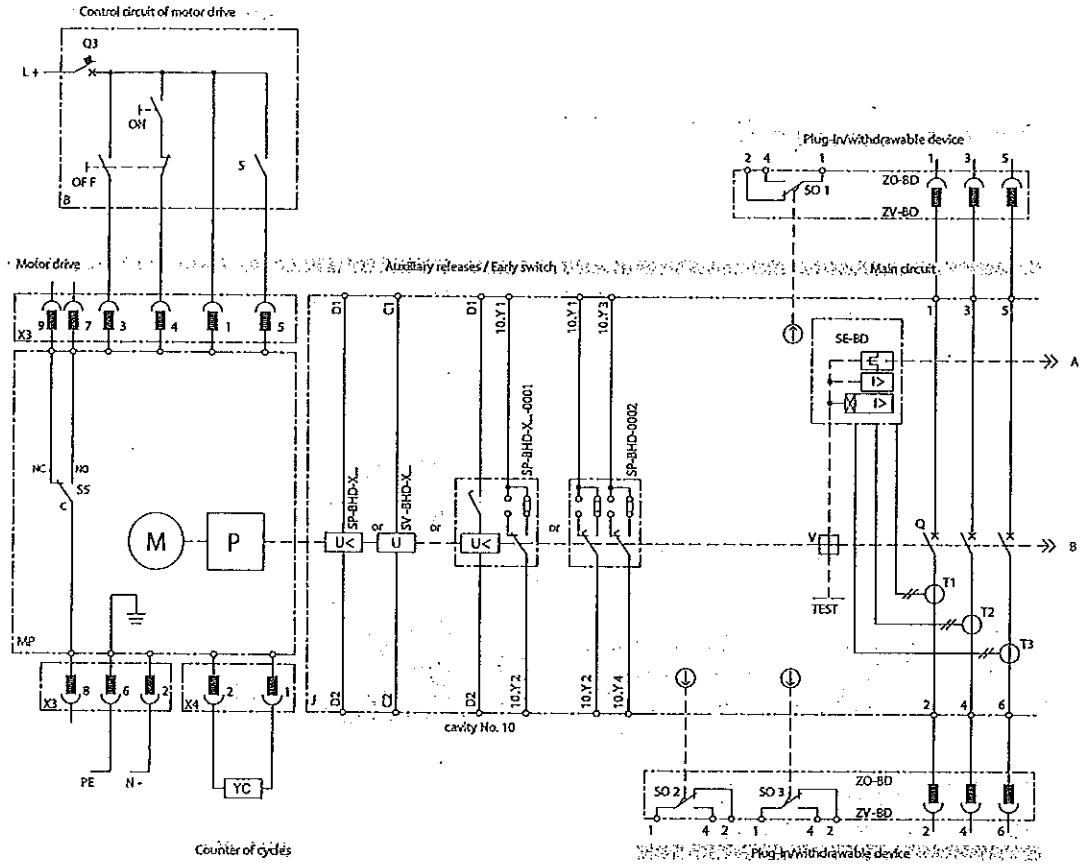


Diagram description (3P and 4P design)

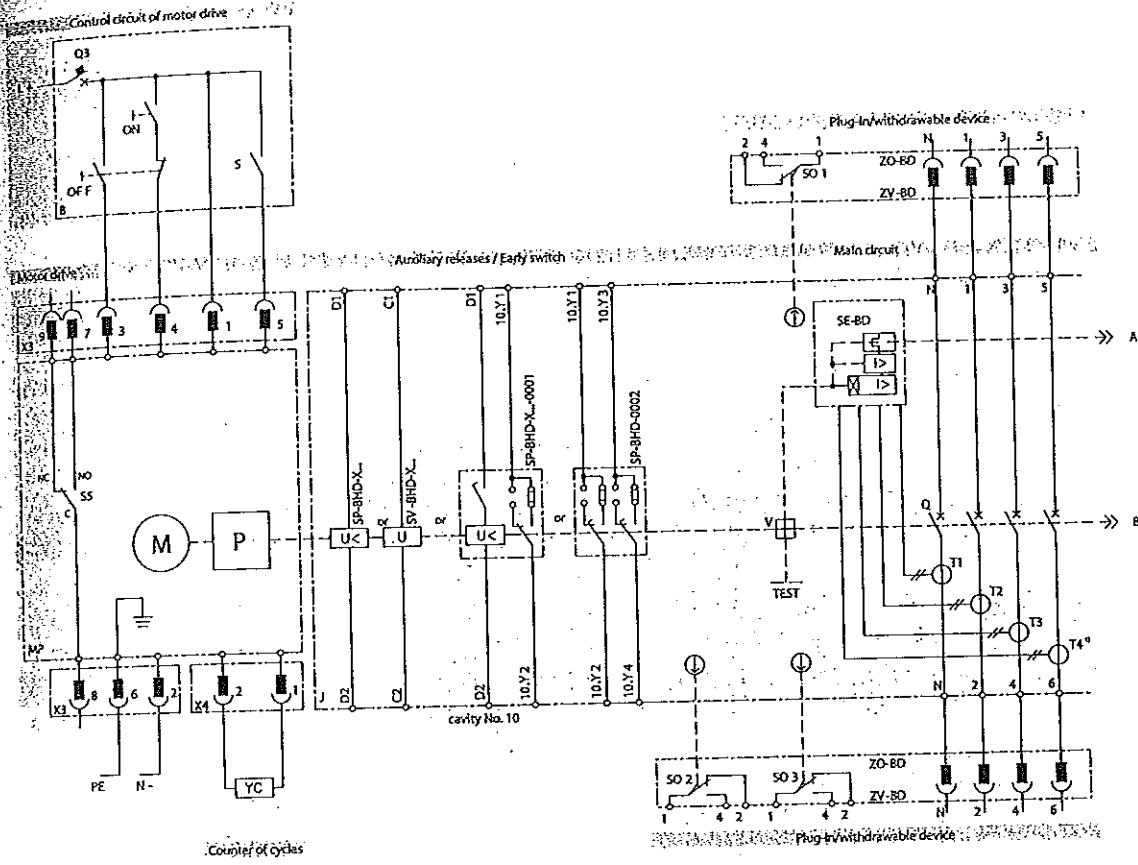
- MP motor drive - MP-BD-X
- M motor
- P storage device
- X3 connector for connection of control circuits
- X4 connector for external counter of cycles
- SS switch to indicate AUTO (NO-C) / MANUAL (NC-C) modes
- YC external counter of cycles - OD-BHD-PP01
- B recommended wiring of the control circuits - it is not a part of motor drive
- ON switch on button
- OFF switch off button
- S switch for energy storage (switched on = automatic storage, switch may be continuously switched on)
- O3 motor drive circuit breaker - see page E69
- J switching unit - BD250..305
- Q main contacts
- T1, T2, T3, T4 current transformers
- V trip-free mechanism
- SE-BD circuit breaker - overcurrent release - SE-BD switch-disconnector
- switch-disconnector unit - SE-BD-0250-V001
- TEST push button to test release
- ZO-BD plug-in device - ZO-BD-0250-300
- ZV-BD withdrawable device - ZV-BD-0250-300
- X1, X2 connecting cable - OD-BHD-KA01
- SO1, SO2, SO3 contacts signalling circuit breaker/switch-disconnector position in plug-in or withdrawable device SO-BHD-0010 - for more detailed information see page E50, E52
- SP-BHD-X undervoltage release
- SV-BHD-X shunt trip
- SP-BHD-X..0001 undervoltage release with early contact
- SP-BHD-0002 early contact

1) - only for 4-pole design of BD250..406 switching unit

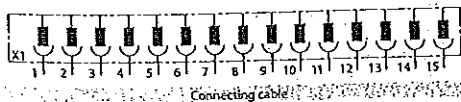
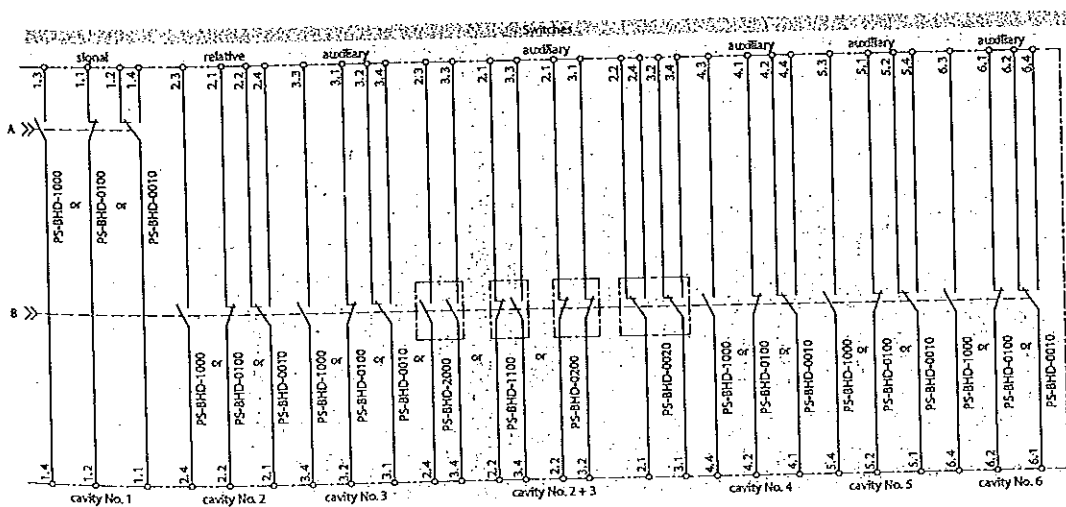
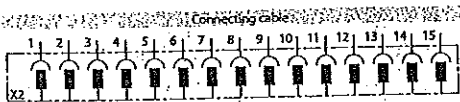
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Diagram

Circuit breaker with accessories (4-pole design)



Count of cycles



[Handwritten signatures]

CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Connecting and installation

Power circuit

- connected with Cu/Al busbars or cables and possibly cables with cable lugs
- connection sets are produced to provide greater connecting options, see page E8
- generally, conductors from the supply are connected to input terminals 1, 3, 5 and conductors from the load to terminals 2, 4, 6; however, it is possible to reverse the connection (exchanging input and output terminals without limiting rated short-circuit ultimate breaking capacity I_{cs})

in case of reversed connection, in the majority of cases, circuit breaker/switch-disconnector must be fitted with OD-BHD-KS02 insulating barriers also on the side of terminals 2, 4, 6, for more detailed information see page E22

we recommend painting the connecting busbars

input and output conductors/busbars must be mechanically reinforced in order to avoid transferring electrodynamic forces to the circuit breaker/switch-disconnector during short-circuiting

the method of connecting the power circuit must observe the deionization space of the circuit breaker/switch-disconnector, see page E23

Auxiliary circuits

switches, shunt trips or undervoltage releases are connected using flexible Cu conductors with cross-section $0.5 \div 1 \text{ mm}^2$ directly to terminals on these devices

motor drive and auxiliary circuits of the plug-in or withdrawable design are connected using a connector

Recommended min. cross-sections of cables, busbars and flexibars for fixed, plug-in and withdrawable designs

I _N (A)	Cables (mm ²)		Busbars W x H (mm)	
	Cu	Al	Cu	Al
40	10	16	-	-
50	10	16	-	-
63	16	25	-	-
80	25	35	-	-
100	35	50	20 x 2	25 x 2
125	50	70	25 x 2	25 x 3
160	70	95	25 x 3	25 x 4
200	95	120	25 x 4	25 x 5
250	120	150	25 x 5	25 x 6

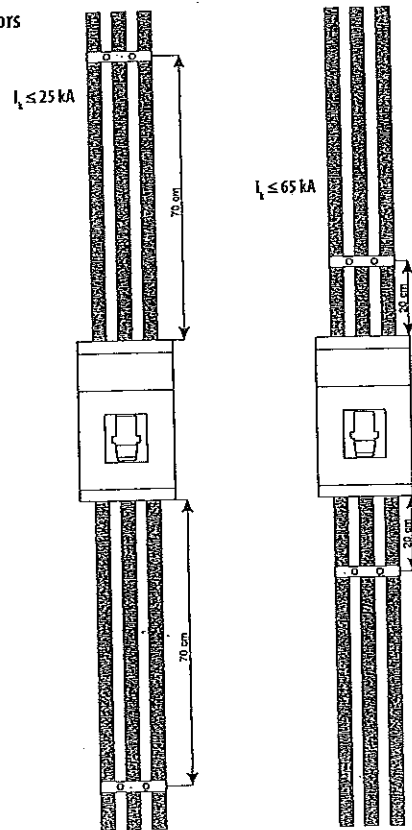
- It is necessary to follow the relevant valid standards when cables are designed

Maximum circuit breaker/switch-disconnector loads in accordance with ambient temperature

Circuit breaker/switch-disconnector BD250 - connection by Cu cable 1x 120 mm² per pole

50 °C	60 °C	65 °C	70 °C
250 A	250 A	250 A	250 A

Mechanical reinforcement of conductors for BD250



[Handwritten signature]

[Handwritten signature]

CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Connecting and installation

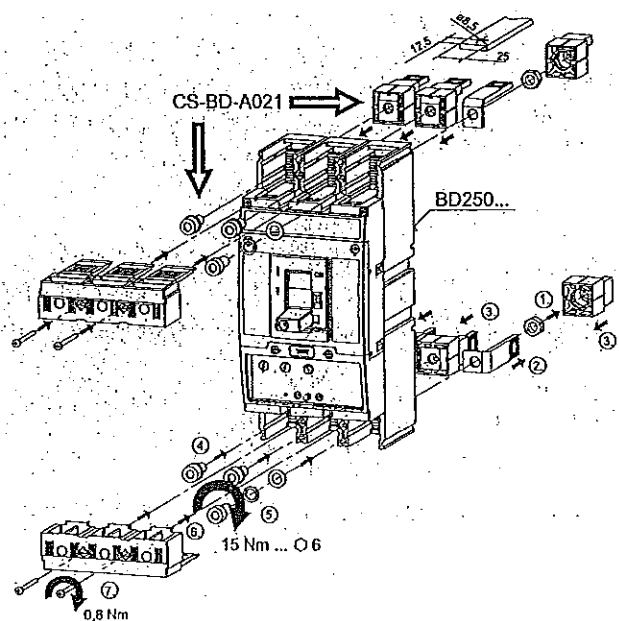
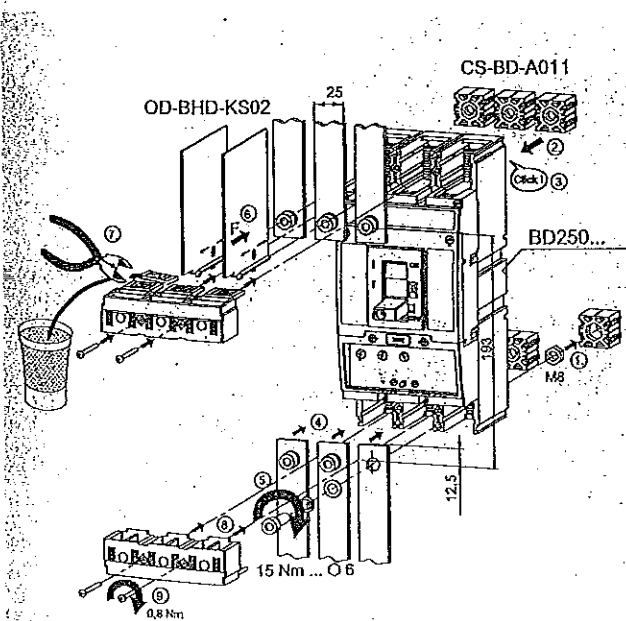
Connecting set specifications

Type of cable	Cable strands of connection cross-sections (mm ²)				Dimensions of cable (mm) Drawing 10740	
	flexor stranded	sector solid	round stranded	round solid		
CS-BD-A011	250				25 x ...	
CS-BD-A021	250				25 x ... page E27, E41	
CS-BD-B421						
CS-BD-T011	250	16 ÷ 150 Cu	10 ÷ 150 Cu	16 ÷ 150 Cu	10 ÷ 150 Cu	
CS-BD-T411						
CS-BD-B011	250	25 ÷ 150 Cu/Al	16 ÷ 150 Cu/Al	25 ÷ 150 Cu/Al	16 ÷ 150 Cu/Al	
CS-BD-B411						
CS-BD-B012	250	150 ÷ 240 Cu/Al	120 ÷ 240 Cu/Al	150 ÷ 240 Cu/Al	120 ÷ 240 Cu/Al	
CS-BD-B412					page E24, E39	
CS-BD-B021	250	2x (25 ÷ 150) Cu/Al	2x (16 ÷ 150) Cu/Al	2x (25 ÷ 150) Cu/Al	2x (16 ÷ 150) Cu/Al	
CS-BD-B421					page E24, E39	
CS-BD-B022	250	2x (150 ÷ 240) Cu/Al	2x (120 ÷ 240) Cu/Al	2x (150 ÷ 240) Cu/Al	2x (120 ÷ 240) Cu/Al	
CS-BD-B422					page E25, E40	
CS-BD-B014	250	6x (6 ÷ 35) Cu/Al	6x (6 ÷ 35) Cu/Al	6x (6 ÷ 35) Cu/Al	6x (6 ÷ 35) Cu/Al	
CS-BD-B414					page E26, E40	
CS-BD-A037	250	RETROFIT - reduction for circuit breaker BA...*37 with front connection				page E26, E41
CS-BD-A039	250	RETROFIT - reduction for circuit breaker BA...*39 and J2UX with front connection				page E27
CS-BD-Z039	250	RETROFIT - reduction for circuit breaker BA...*39 and J2UX with rear connection				page E28
CS-BD-J275	250	RETROFIT - reduction for circuit breaker BA...39-75 and J2UX75 with front connection in plug-in or withdrawable device				page E28
CS-BD-J775	250	RETROFIT - reduction for circuit breaker J2UX75T with front connection in plug-in or withdrawable device				page E34, E38
CS-BD-PS01	10/16	1.5÷2.5/4÷6 Cu flexible conductor				
CS-BD-PS41	10/16	1.5÷2.5/4÷6 Cu flexible conductor				

RETROFIT - sets, which enable replacement of older circuit breakers by a new circuit breakers without switchboard reconstruction

Front connection - Cu/Al busbars

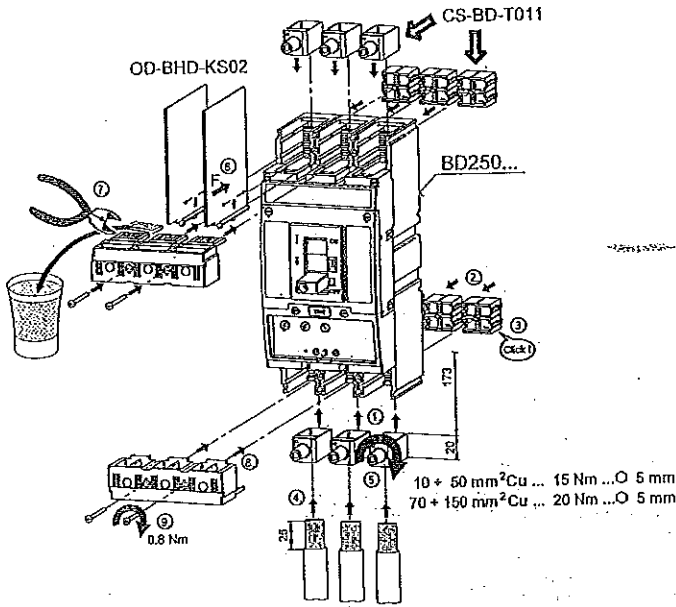
Rear connection - Cu/Al busbars



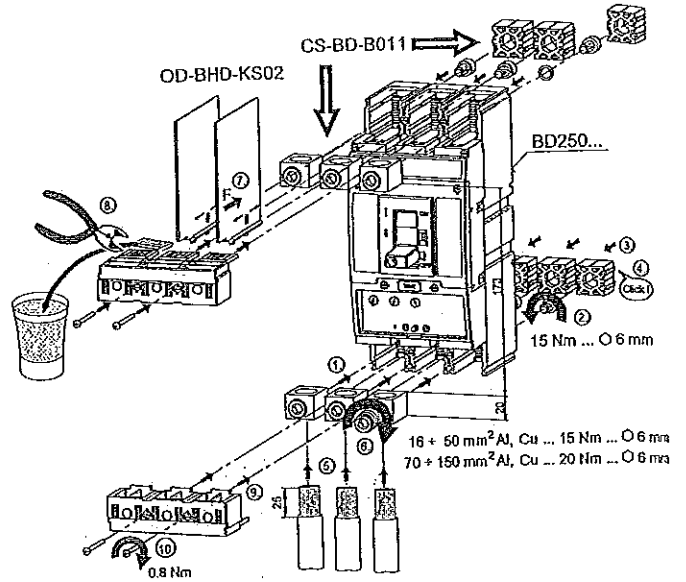
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Connecting and installation

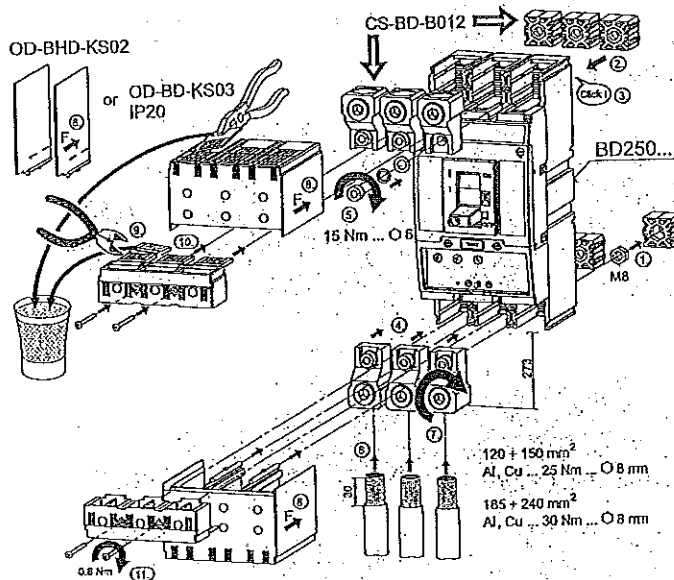
Front connection - Cu cables



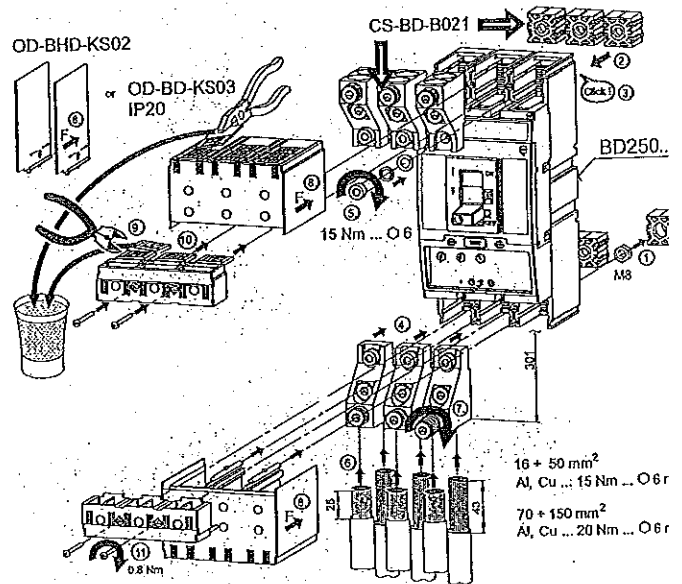
Front connection - Cu/Al cables - up to 150 mm²



Front connection - Cu/Al cables up to 240 mm²



Front connection - 2 Cu/Al cables

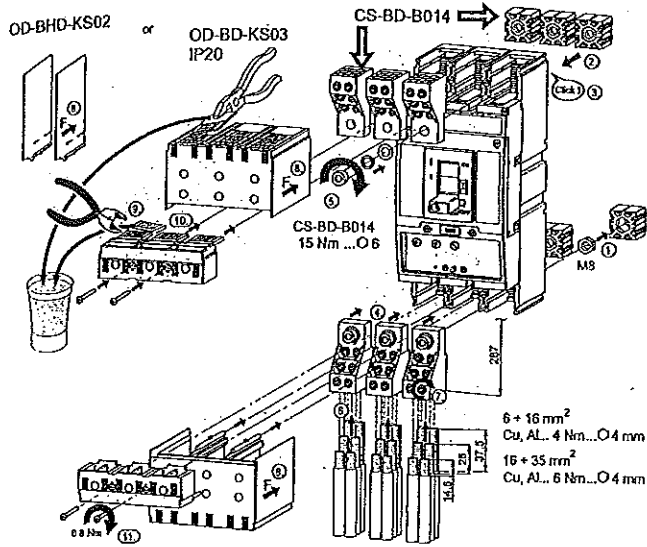


CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

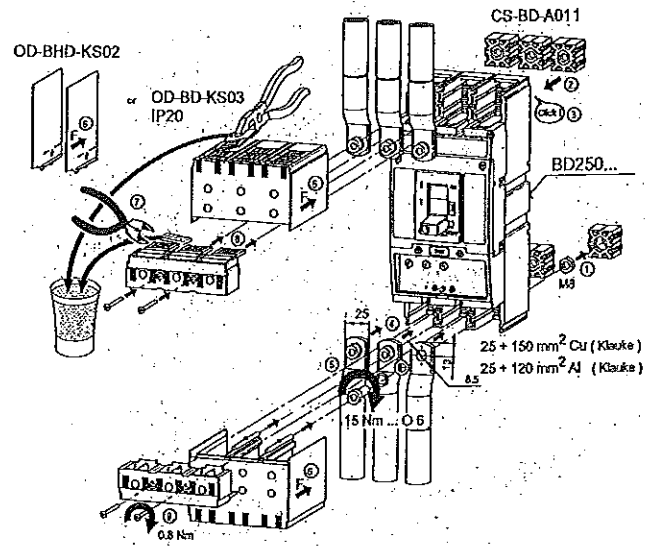
3P 4P

Connecting and installation

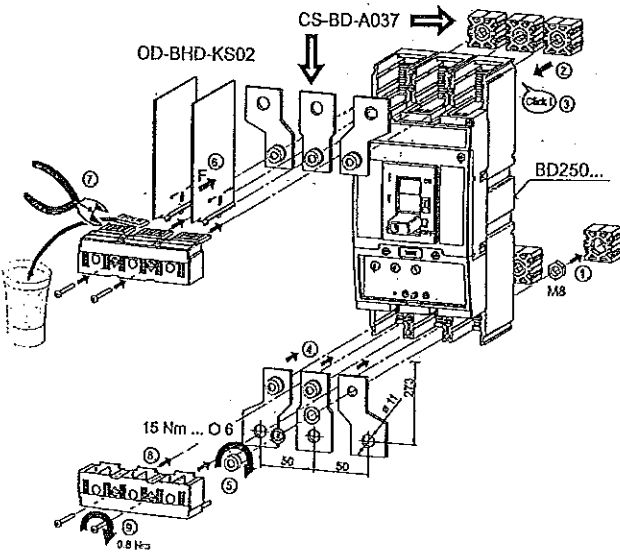
Front connection - 6 Cu/Al cables



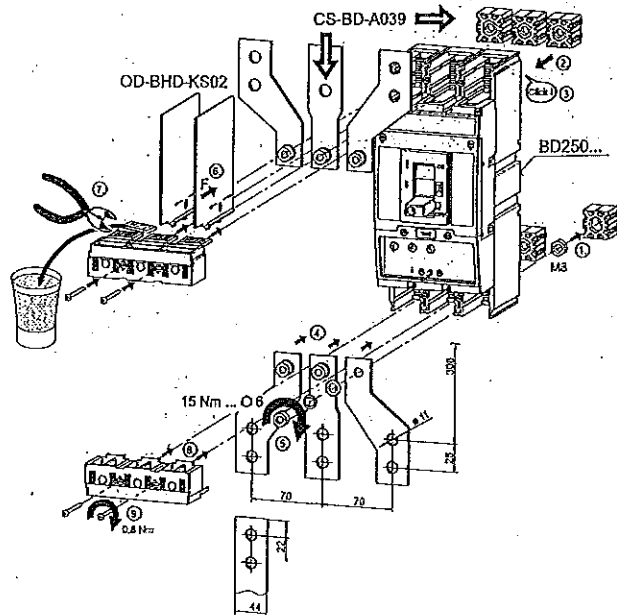
Front connection - cable lugs



Front connection - reduction BD to BA... *37



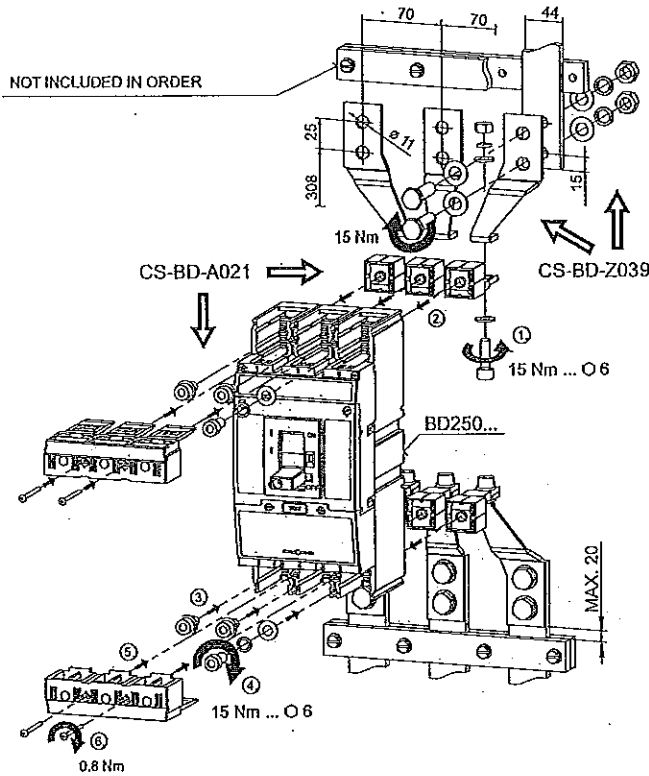
Front connection - reduction BD to BA... *39 and J2UX



CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Connecting and installation

Rear connection – reduction BD to BA ...*39 and J2UX with rear connection



Deionization spaces

USE OF INSULATING BARRIERS AND TERMINAL COVERS WITH CIRCUIT BREAKERS AND SWITCH-DISCONNECTORS

■ **FIXED DESIGN**

- front connection

- terminals 1, 3, 5 (upper side)

- a) if $U_e \geq 415$ V a.c., it is necessary to use OD-BHD-KS02 insulating barriers or a OD-BHD-KS03 terminal cover
- b) if insulated conductors are not used for connecting power circuit to terminals 1, 3, 5, flexibars connection, it is necessary to use OD-BHD-KS02 insulating barriers or a OD-BHD-KS03 terminal cover

- terminals 2, 4, 6 (lower side)

only in case that circuit breaker/switch-disconnector is connected to the source using terminals 2, 4, 6 and furthermore:

- a) if $U_e \geq 415$ V a.c., it is necessary to use OD-BHD-KS02 insulating barriers or a OD-BHD-KS03 terminal cover
- b) if insulated conductors are not used for connecting power circuit to terminals 2, 4, 6, flexibars connection, it is necessary to use OD-BHD-KS02 insulating barriers or a OD-BHD-KS03 terminal cover

- rear connection

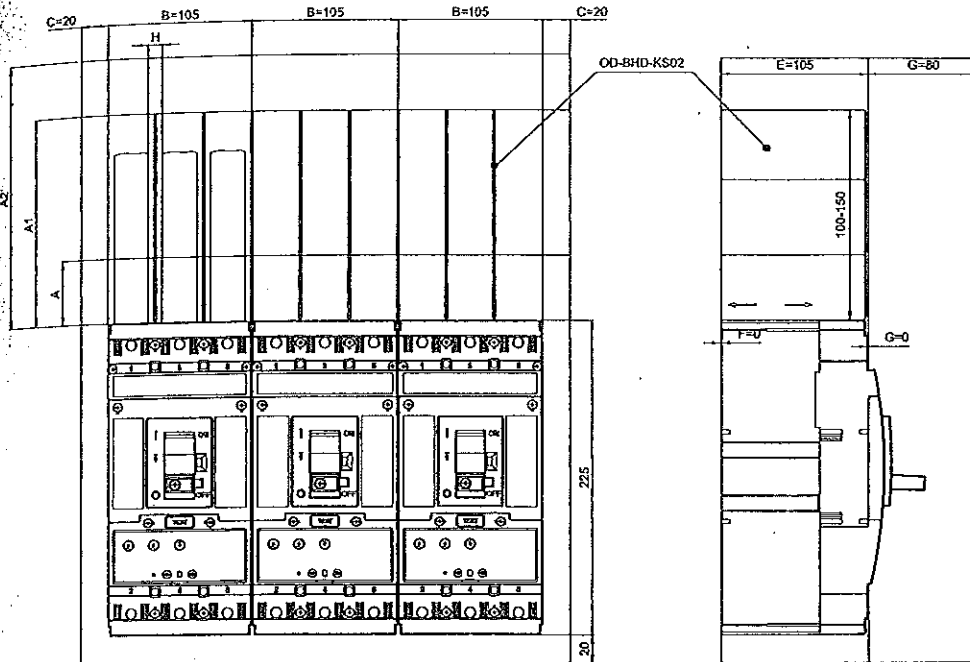
- insulating barriers and terminal covers need not be used

■ **PLUG-IN AND WITHDRAWABLE DEVICE**

- insulating barriers and terminal covers need not be used

CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Deionization spaces



A... minimum distance between the circuit breaker/switch-disconnector and uninsulated earthed wall (applicable for connection using insulated conductors, cables, flexibars or with rear connection)

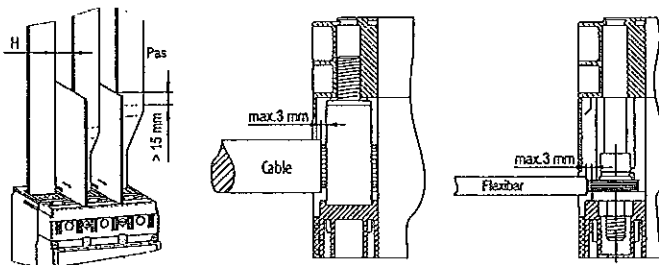
A1... minimum insulation length of bare conductors (using OD-BHD-KS02 insulating barriers from 100 mm to max. 150 mm, or by adding additional insulation for the conductors with barriers to obtain at least A1 value)

- A2... minimum distance:
- between the circuit breaker/switch-disconnector and uninsulated earthed wall (applicable for uninsulated conductors and busbars)
 - between the circuit breaker/switch-disconnector and busbar
 - between two circuit breakers/switch-disconnectors situated vertically above one another
 - between uninsulated connections of two circuit breakers/switch-disconnectors above one another

C, D, E, F, G... minimum distance between the circuit breaker/switch-disconnector and uninsulated earthed wall

H... minimum distance between uninsulated conductors

- minimum distance of circuit breakers without using of uninsulated barriers is 50 mm



When insulating conductors, cables, flexibars or rear connection are used up to $U \leq 415$ V a.c., it is not necessary to use OD-BHD-KS02 insulating barriers.

		20	21	22	23	24
U _{sc} [kV]		10	15	20	25	30
I _{sc} [kA]		10	15	20	25	30
I _{sc} [kA]		10	15	20	25	30
I _{sc} [kA]		10	15	20	25	30
I _{sc} [kA]		10	15	20	25	30
I _{sc} [kA]		10	15	20	25	30
< 80	≥ 10	A [mm]	50	50	50	50
		A1 [mm]	100	150	100	150
		A2 [mm]	200	250	200	250
	≥ 30	A [mm]	50	50	50	50
		A1 [mm]	100	150	100	150
		A2 [mm]	150	200	150	200
≥ 80	≥ 10	A [mm]	50	50	50	50
		A1 [mm]	100	150	100	150
		A2 [mm]	150	200	150	200

pozn.: I_{sc} - max. short-circuit current in the protected circuit (rms)

[Handwritten signature]

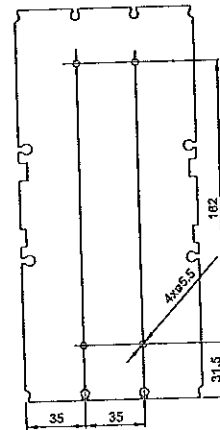
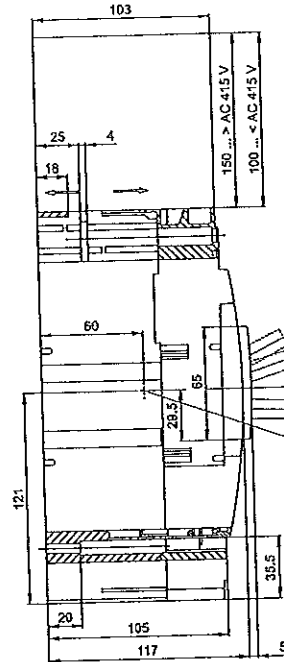
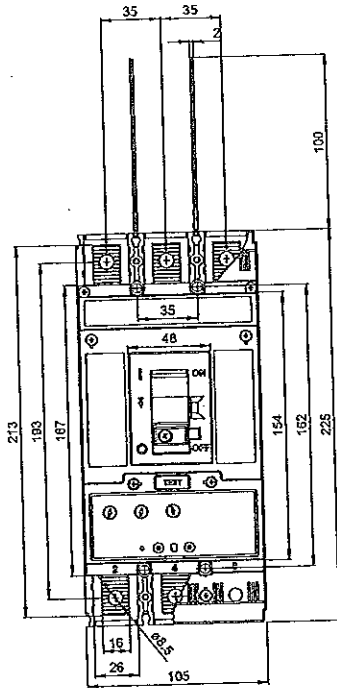
[Handwritten signature]

CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

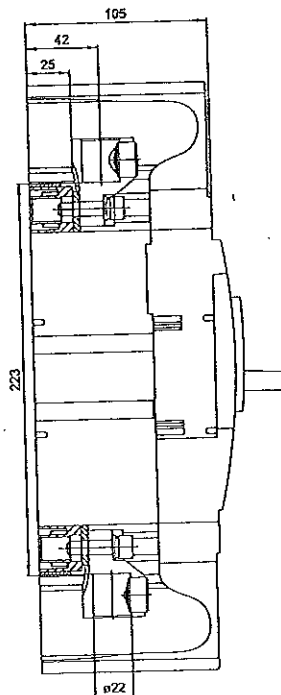
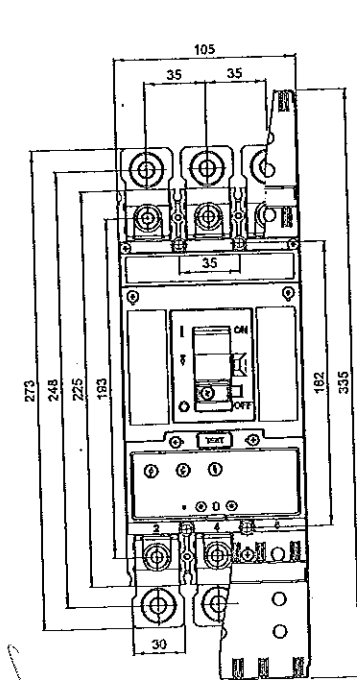
Dimensions

Fixed design, front connection

Drilling diagram



Fixed design, front connection (CS-BD-B012 connecting set)

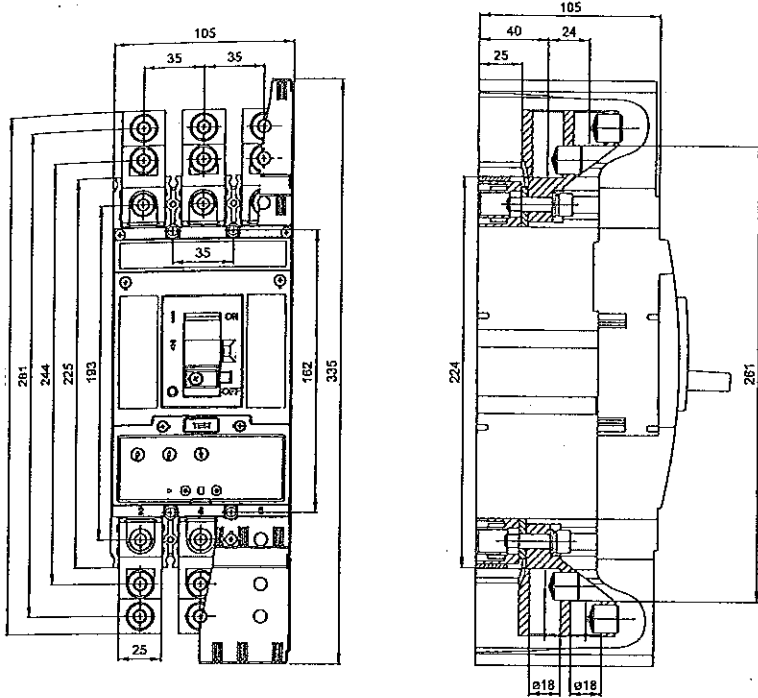


CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

3P

Dimensions

Standard design, front connection (CS-BD-B021 connecting set)

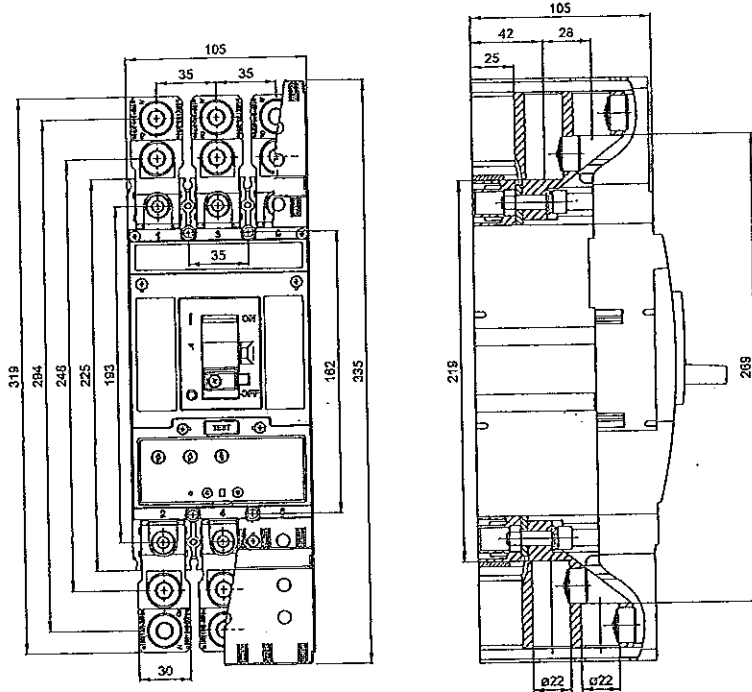


[Handwritten signatures]

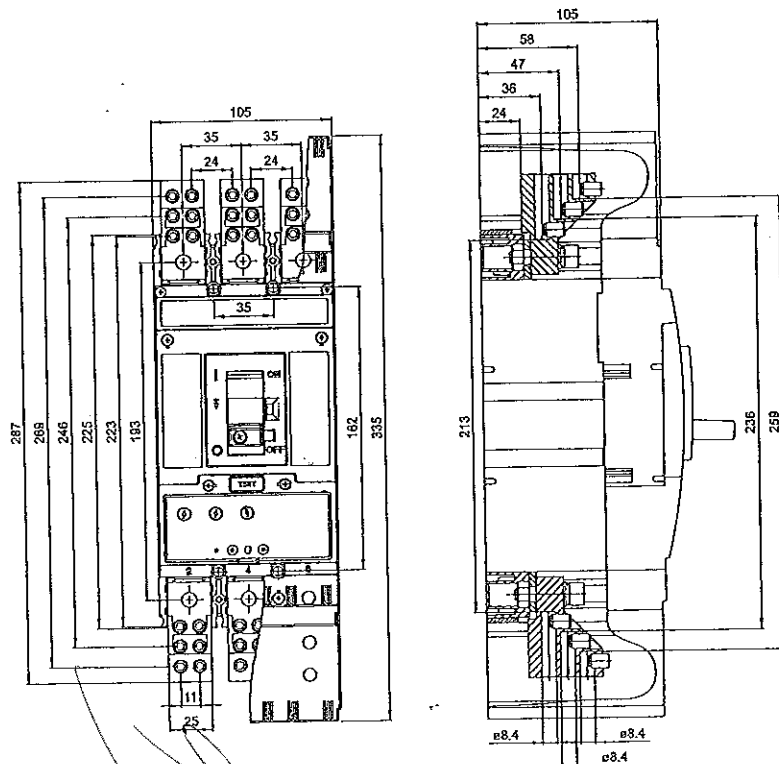
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

Fixed design, front connection (CS-BD-B022 connecting set)



Fixed design, front connection (CS-BD-B014 connecting set)



ay

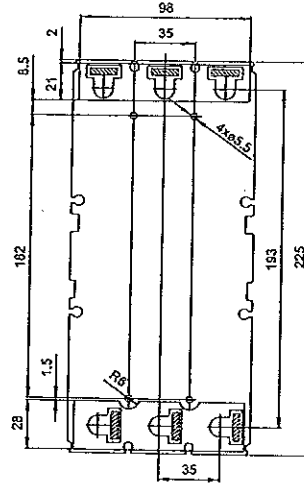
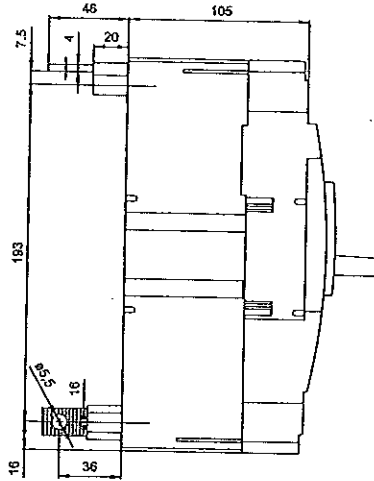
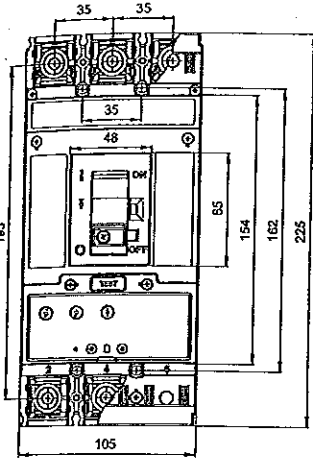
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

3P

Dimensions

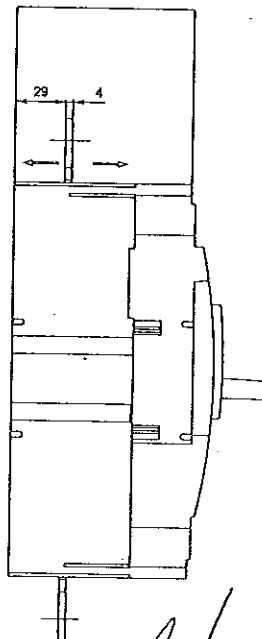
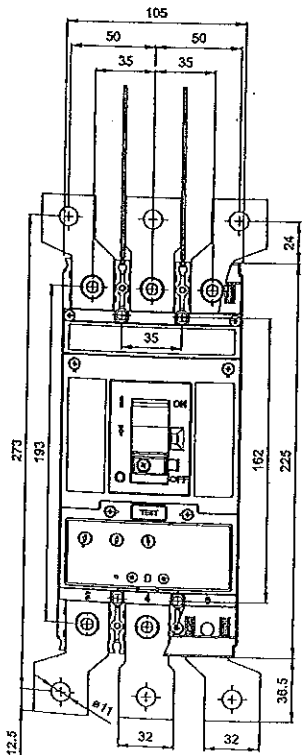
Fixed design, rear connection (CS-BD-A021 connecting set)

Drilling diagram



Fixed design, front connection (CS-BD-A037 connecting set)

RETROFIT

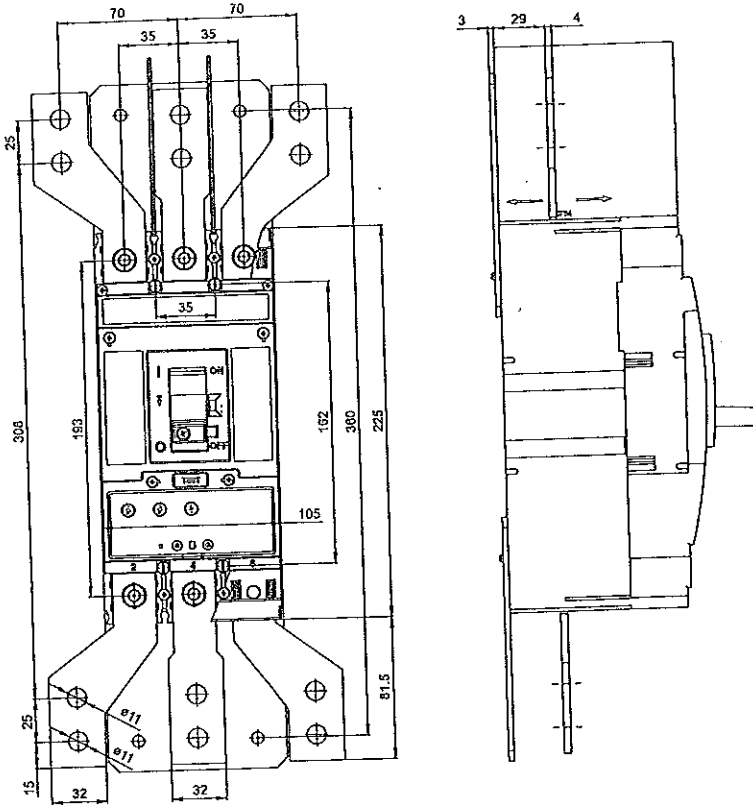


CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

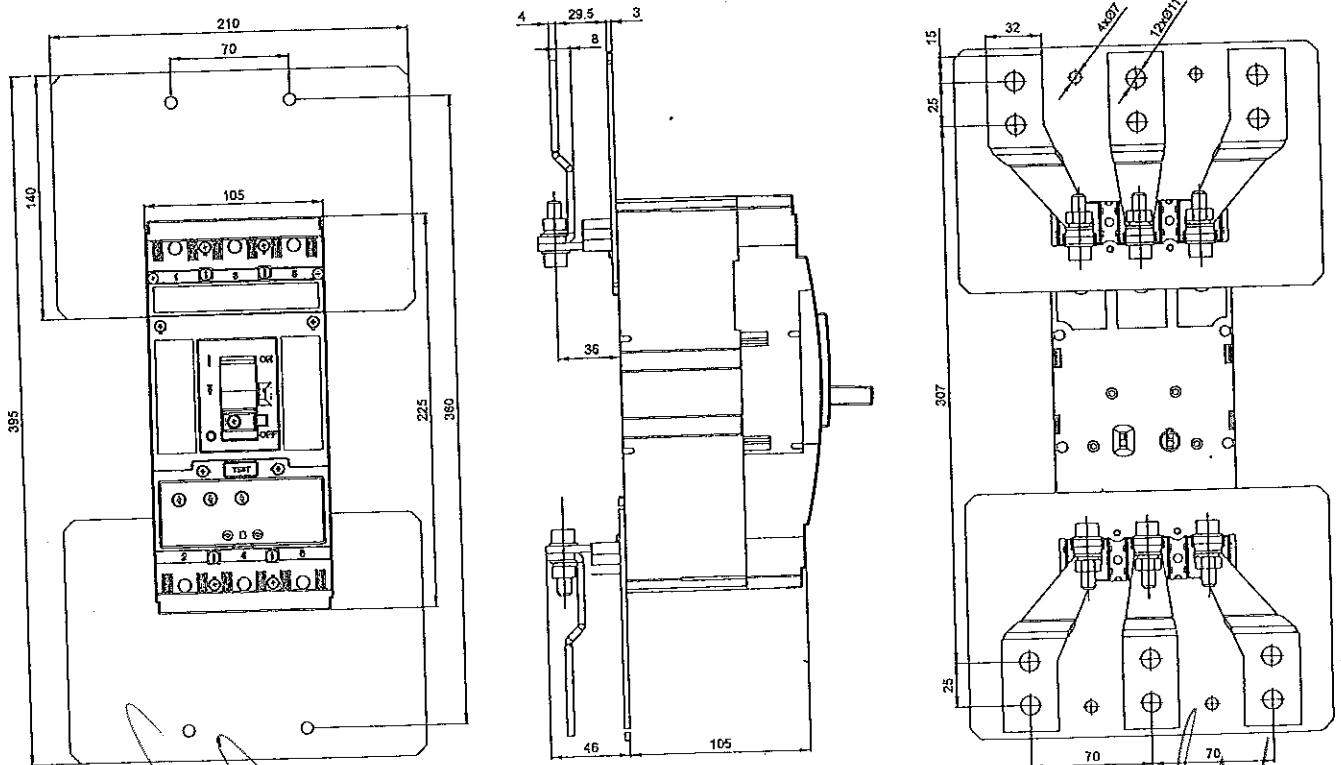
Fixed design, front connection (CS-BD-A039 connecting set, OD-BHD-MS39 mounting set)

RETROFIT



Fixed design, rear connection (CS-BD-Z039 connecting set, OD-BD-MZ39 mounting set)

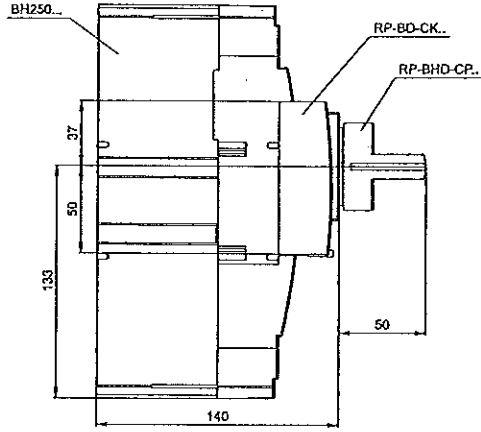
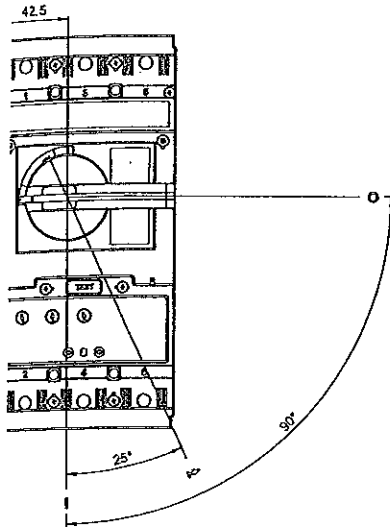
RETROFIT



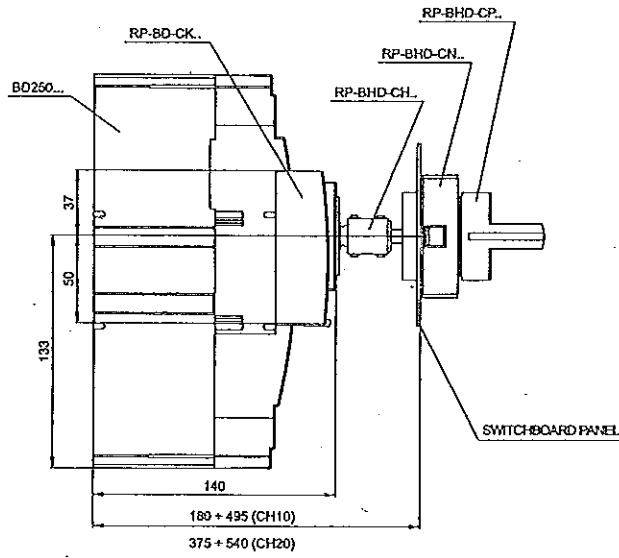
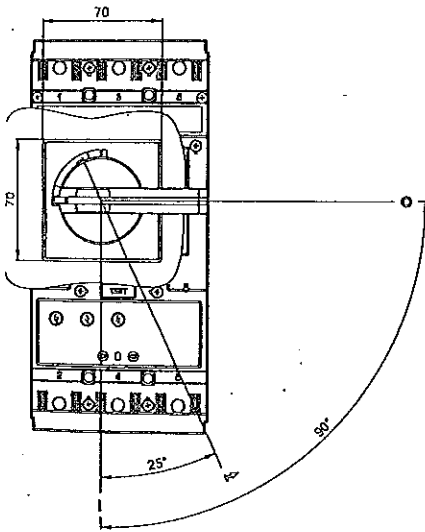
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

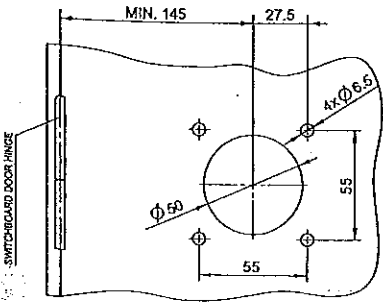
Fixed design, hand drive



Fixed design, hand drive - front, with adjustable lever



Switchboard door modification

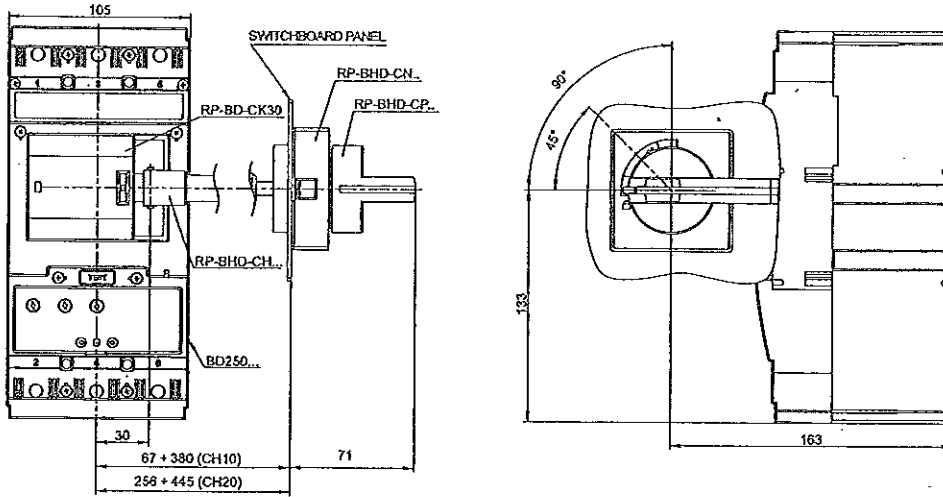


[Handwritten signatures]

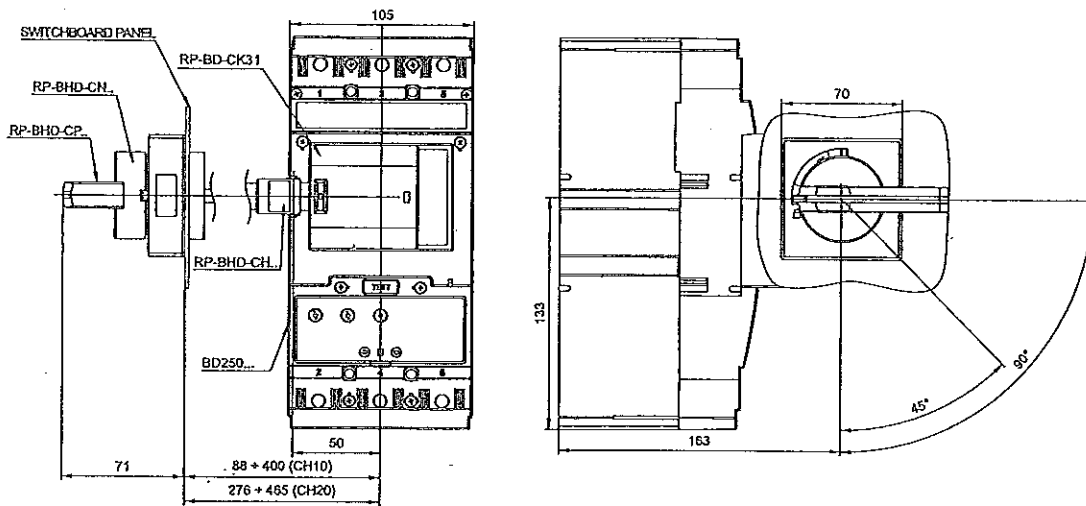
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

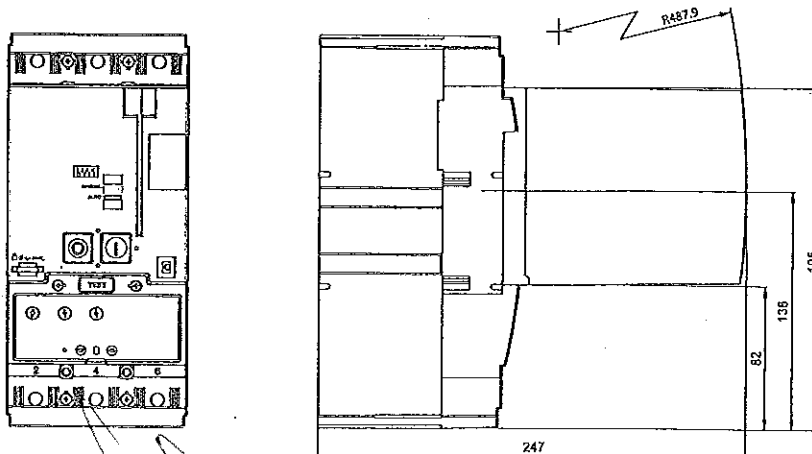
Fixed design, hand drive - control on right side, with adjustable lever



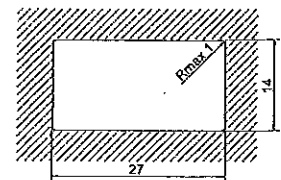
Fixed design, hand drive - control on left side, with adjustable lever



Fixed design, MP-BD-X... motor drive



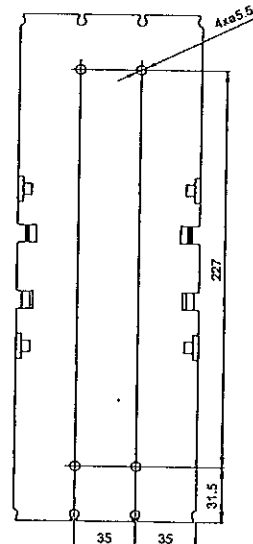
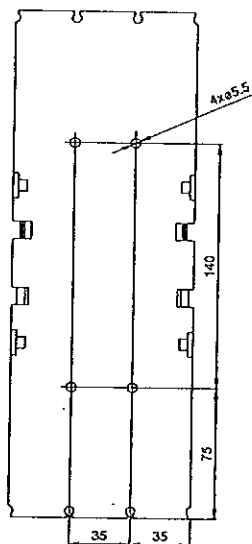
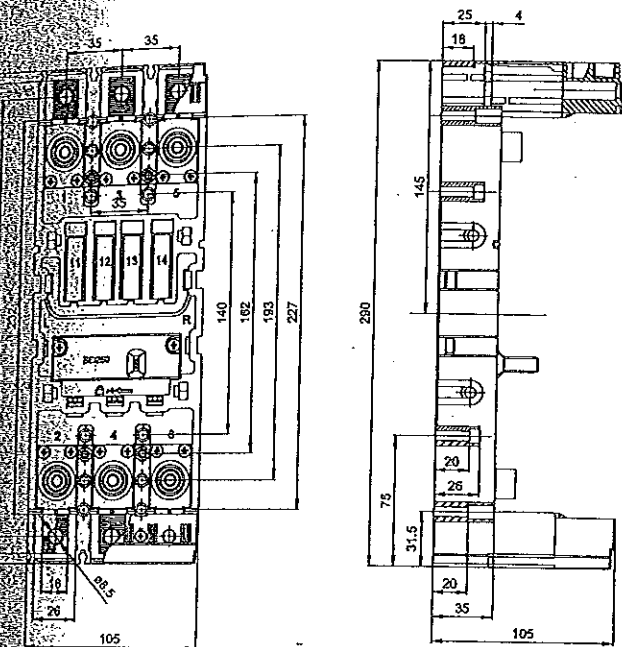
Opening dimensions in switchboard door for external counter of cycles



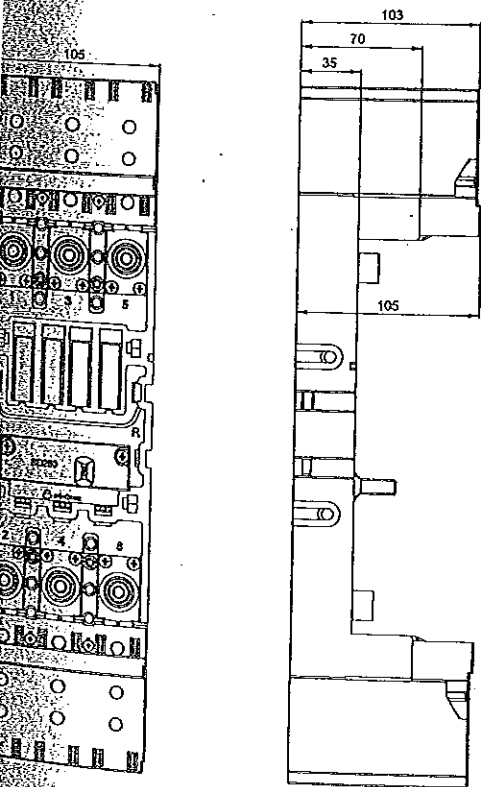
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Drilling diagram

Dimensions
in device



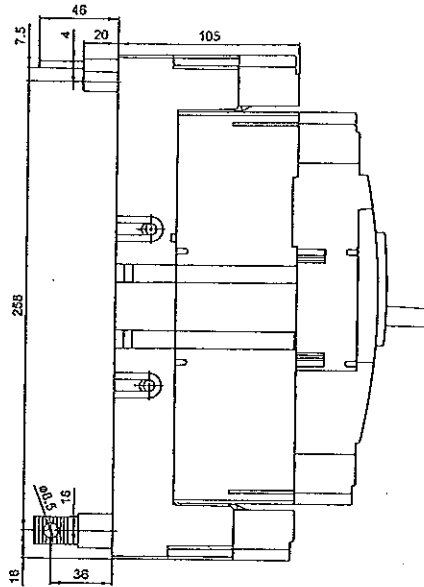
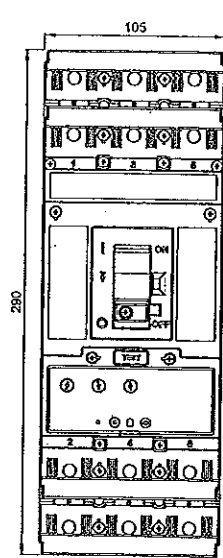
in device, QD-BD-KS03 terminal cover



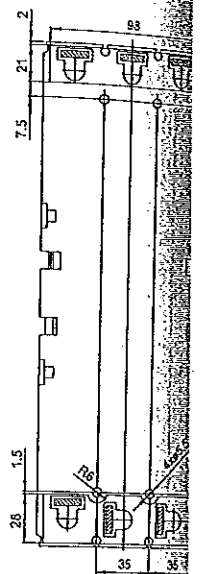
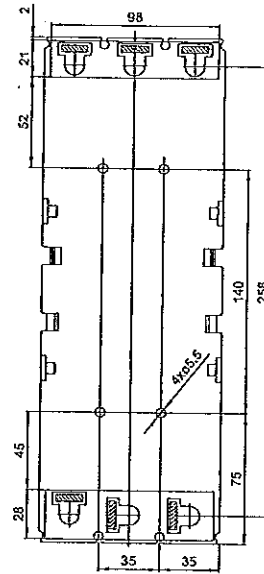
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

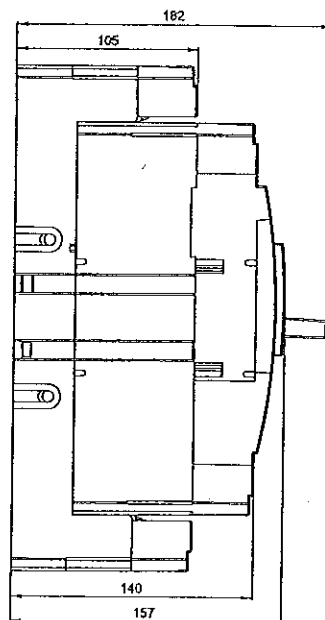
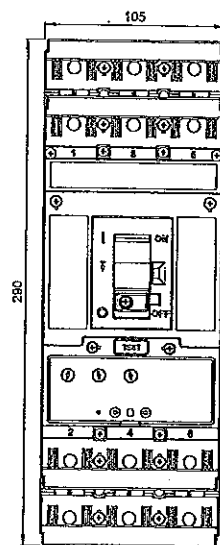
Plug-in design



Drilling diagram



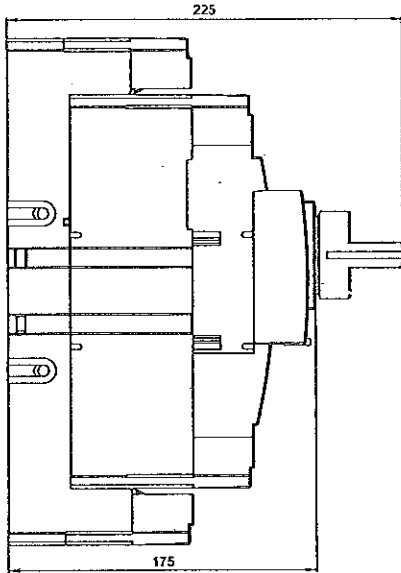
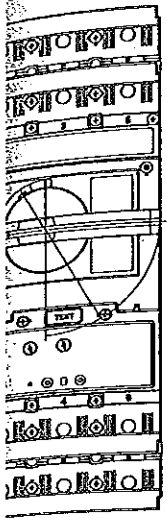
Plug-in design



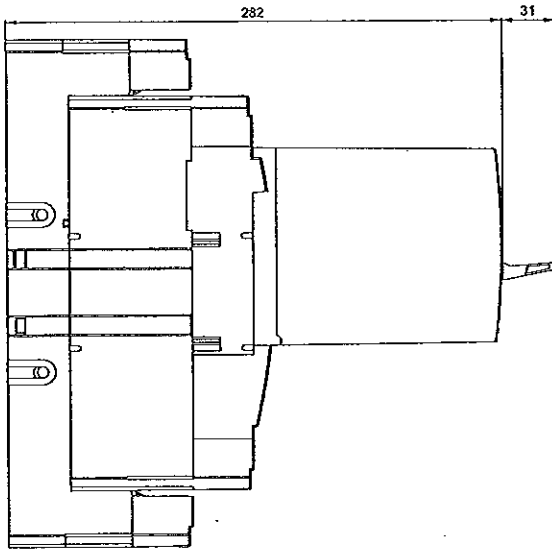
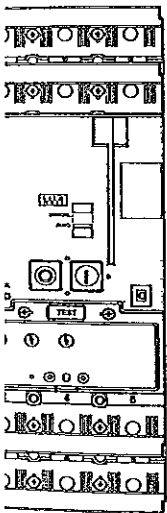
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

in design, hand drive



in design, motor drive

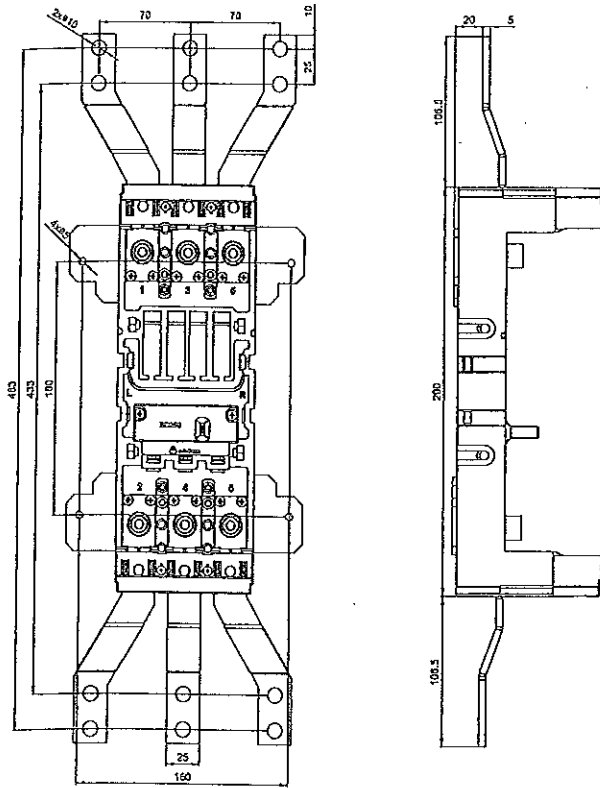


CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

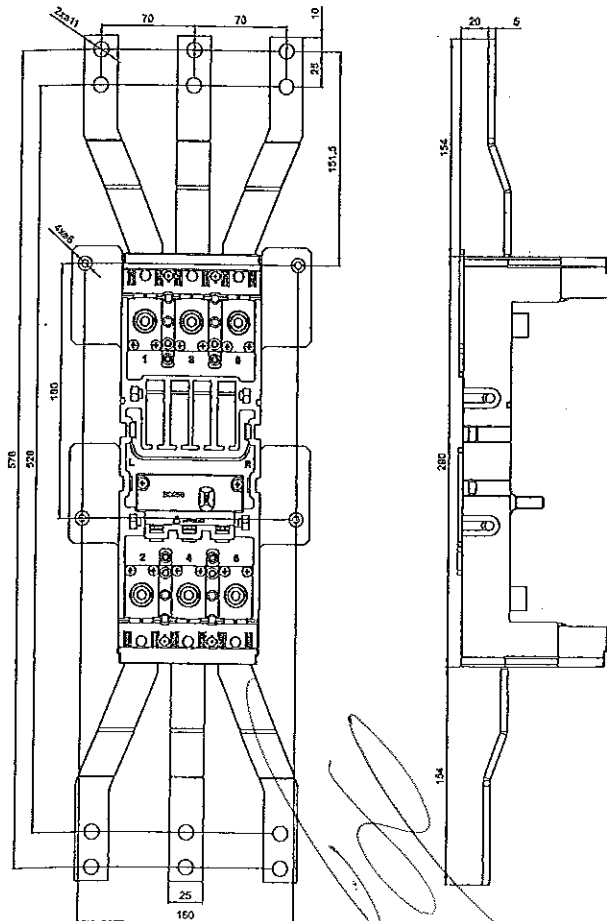
Plug-in device (CS-BD-JX75 connecting set, OD-BHD-MS75 mounting set)

RETROFIT



Plug-in device (CS-BD-JT75 connecting set, OD-BD-MT75 mounting set)

RETROFIT



Handwritten mark resembling the letter 'C'.

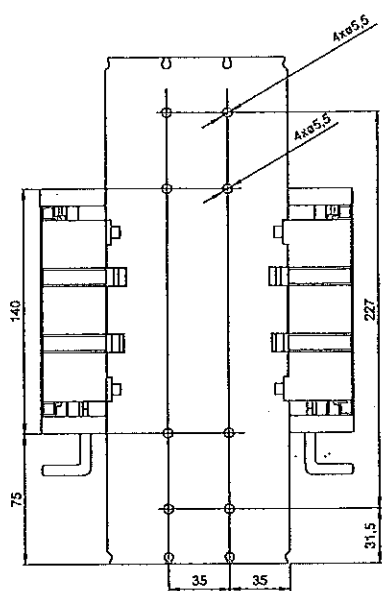
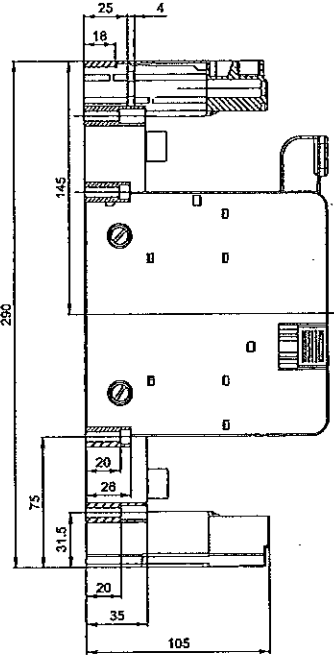
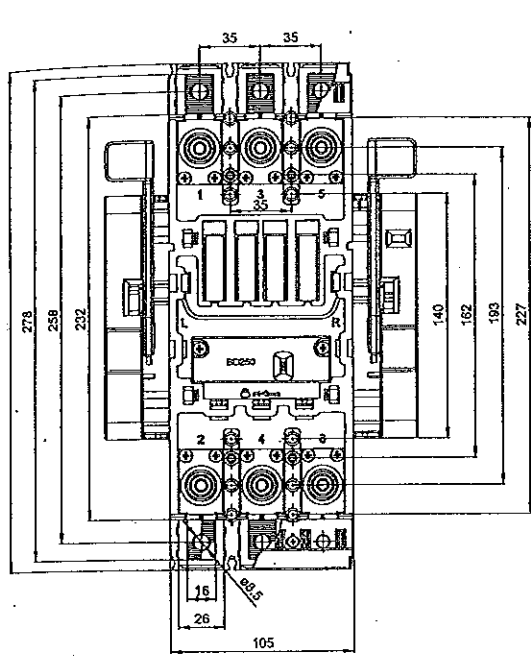
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

3P

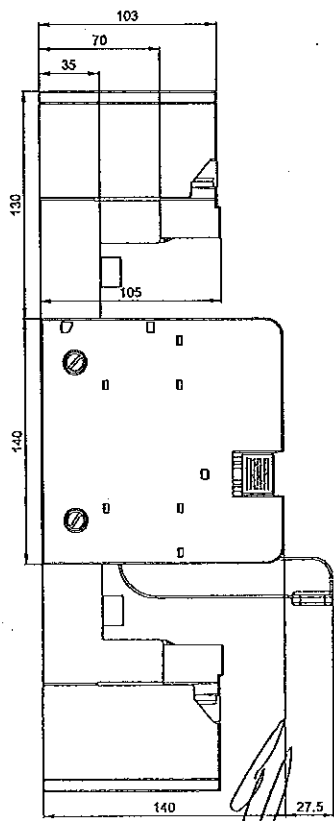
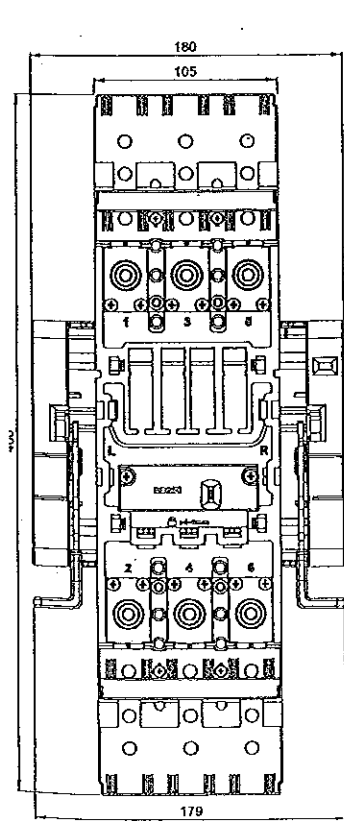
Dimensions

Withdrawable device

Drilling diagram



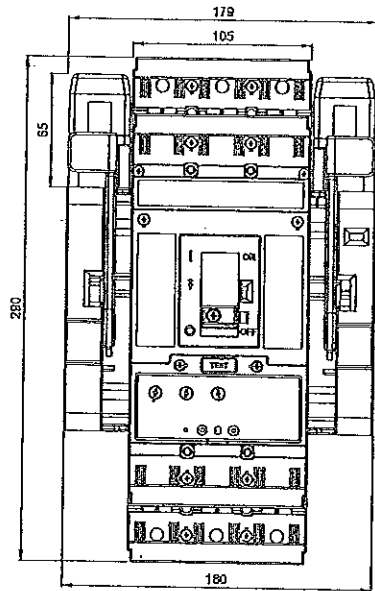
Withdrawable device, OD-BD-KS03 terminal cover



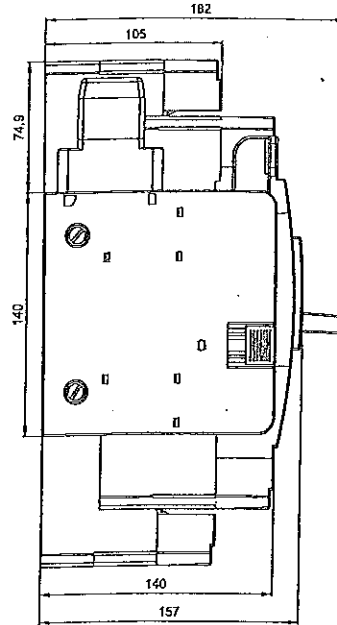
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

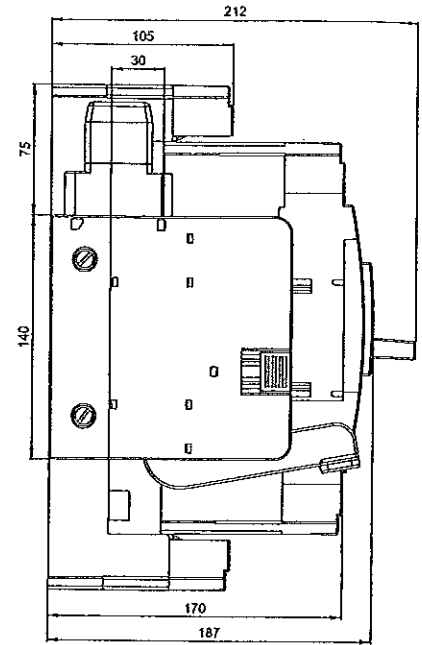
Withdrawable design



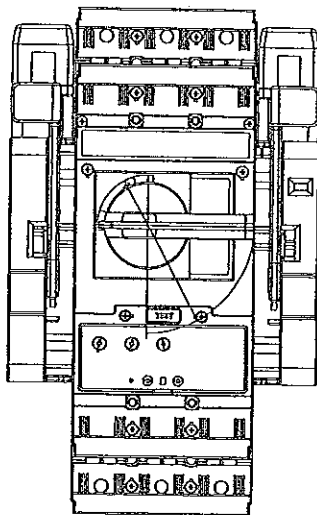
Working position



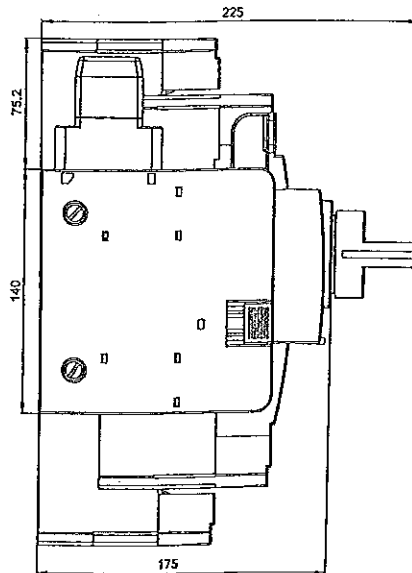
Inspection position



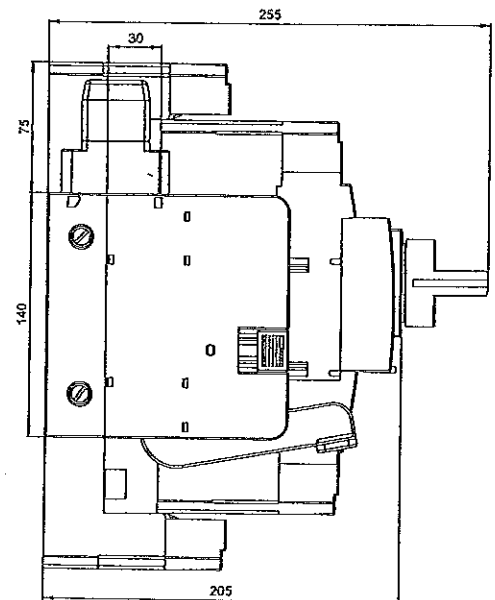
Withdrawable design, hand drive



Working position



Inspection position



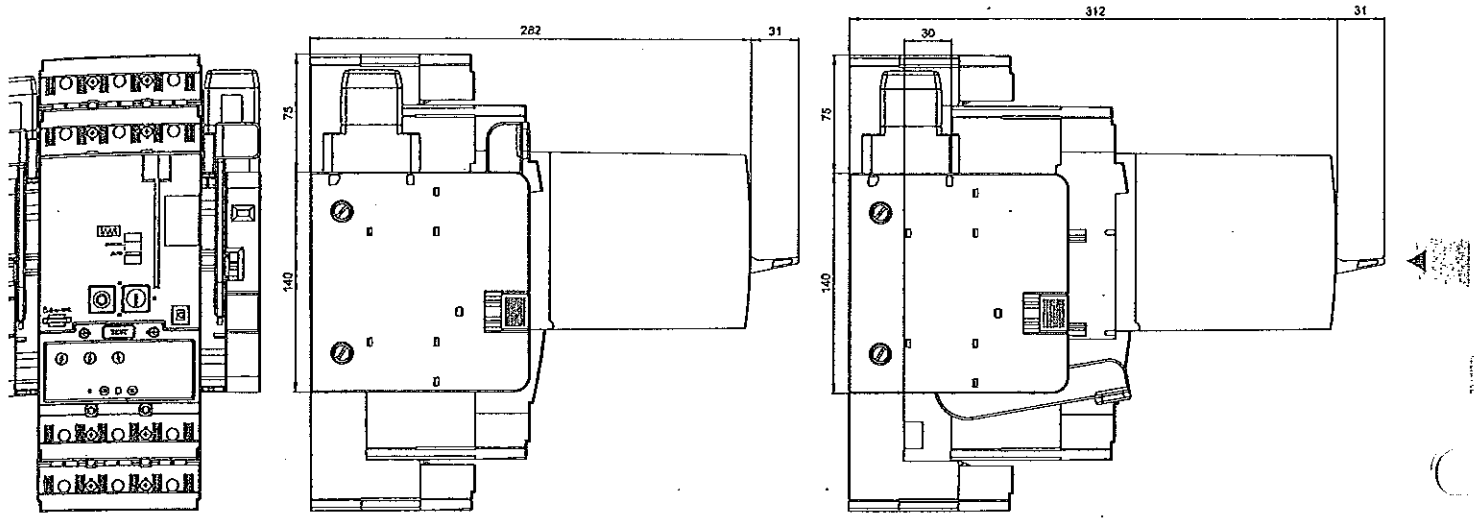
RCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

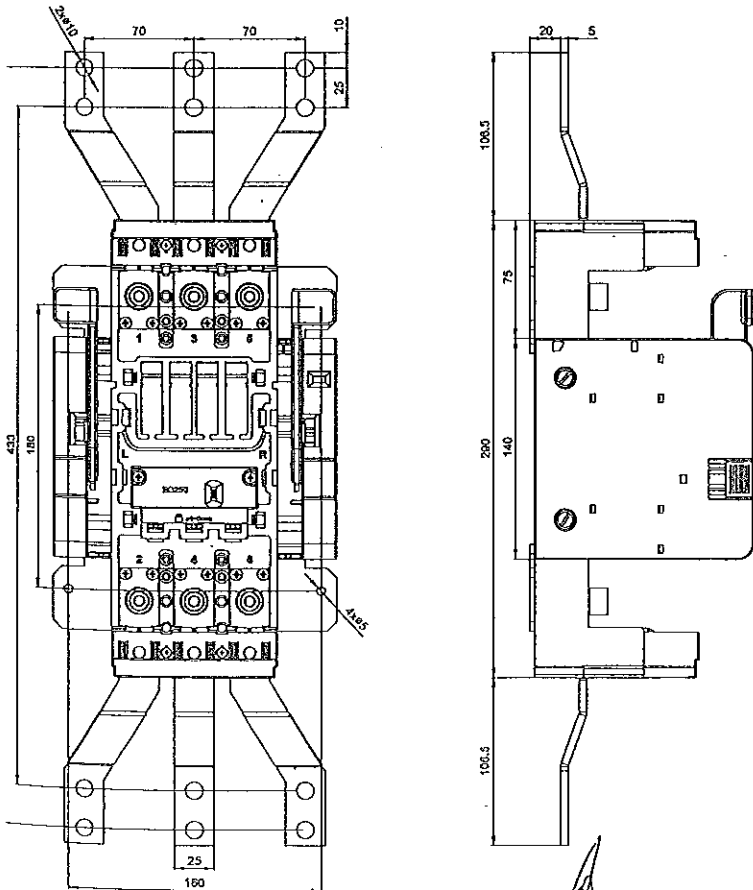
Drawable design, motor drive

Working position

Inspection position



Drawable device (CS-BD-JX75 connecting set, OD-BHD-MS75 mounting set)

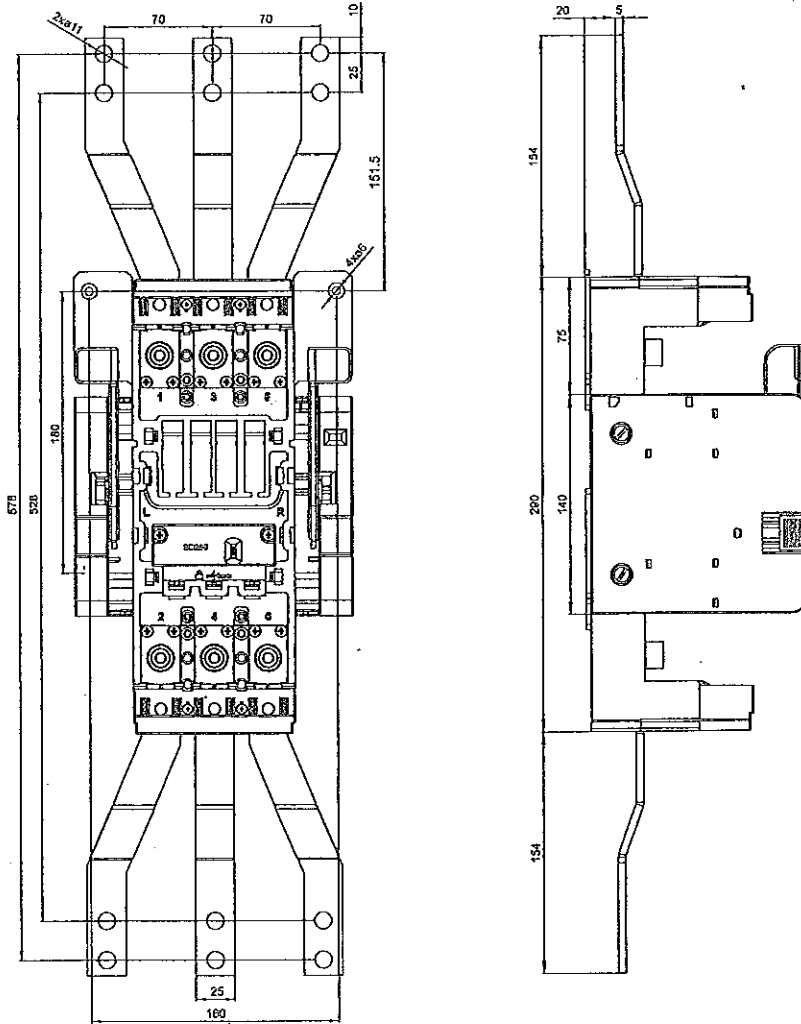


CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

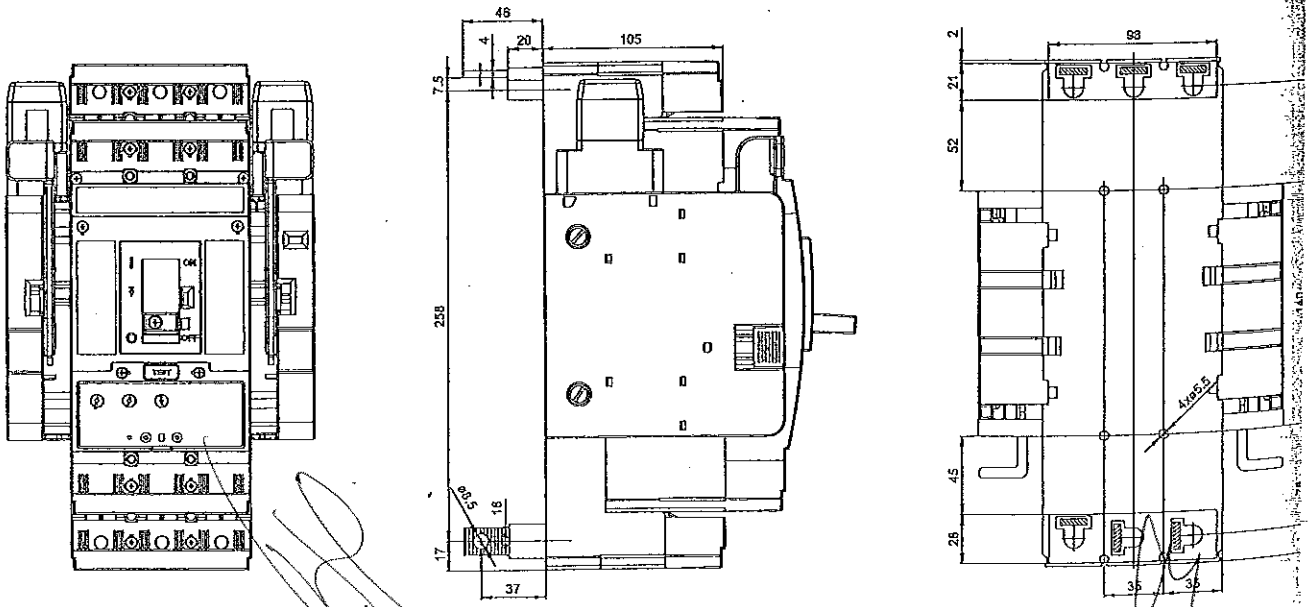
Dimensions

Withdrawable device (CS-BD-JT75 connecting set, OD-BD-MT75 mounting set)

RETROFIT



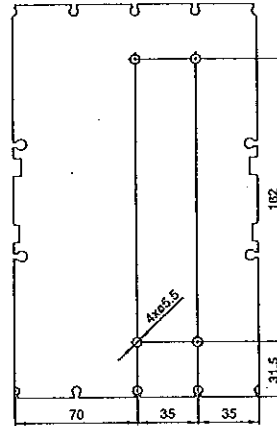
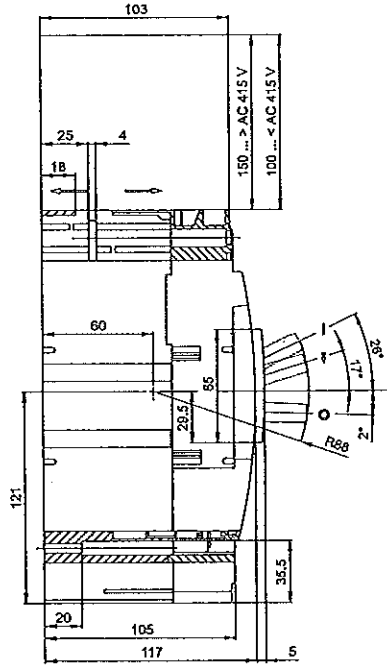
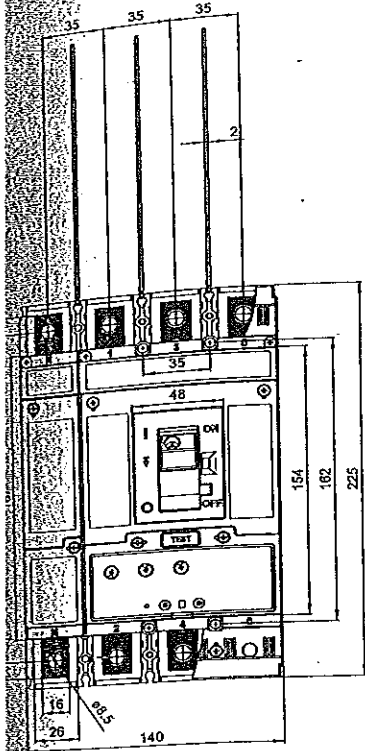
Withdrawable device, rear connection (CS-BD-A021 connecting set)



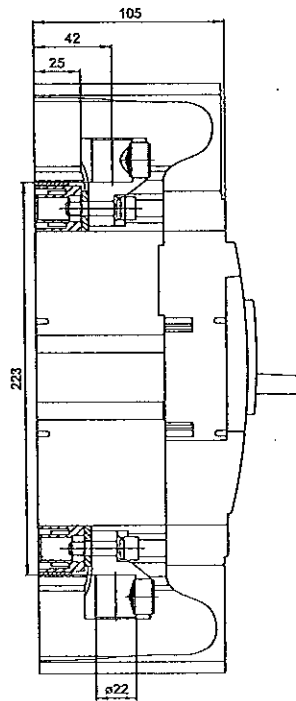
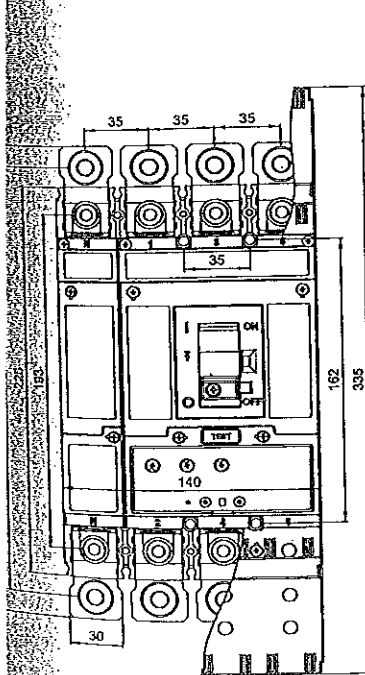
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Drilling diagram

Design, front connection



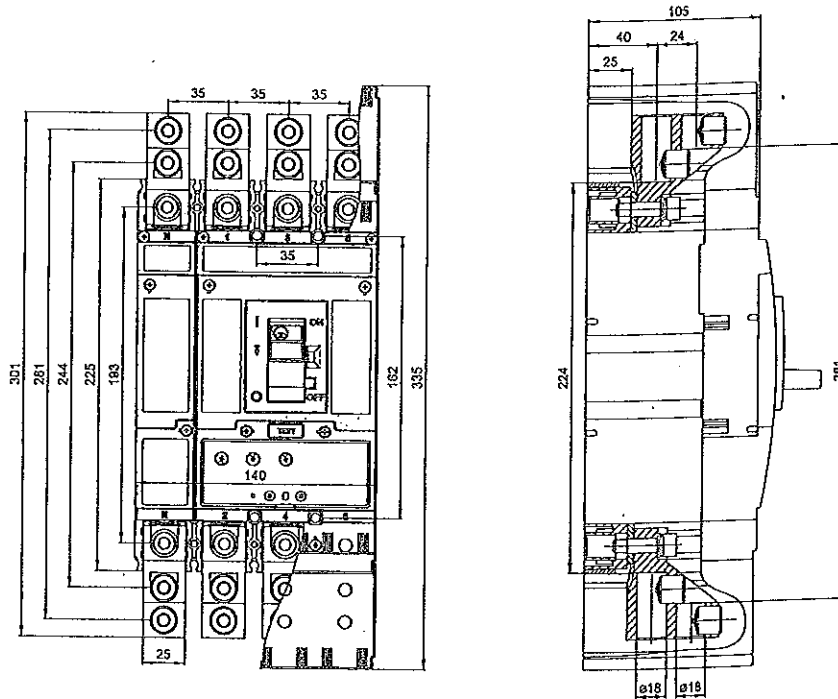
Design, front connection (CS-BD-B012 + CS-BD-B412 connecting sets)



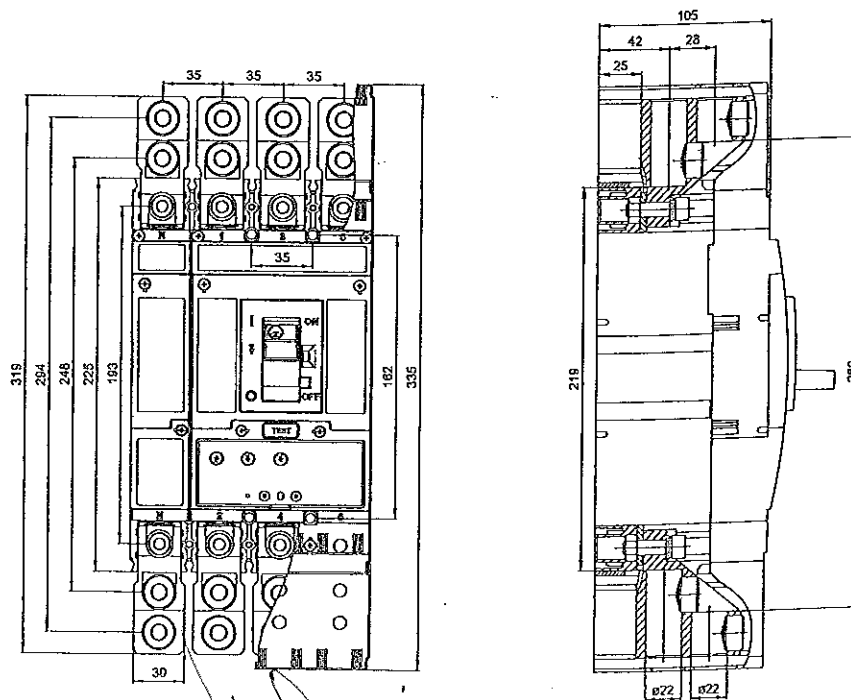
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

Fixed design, front connection (CS-BD-B021 + CS-BD-B421 connecting sets)



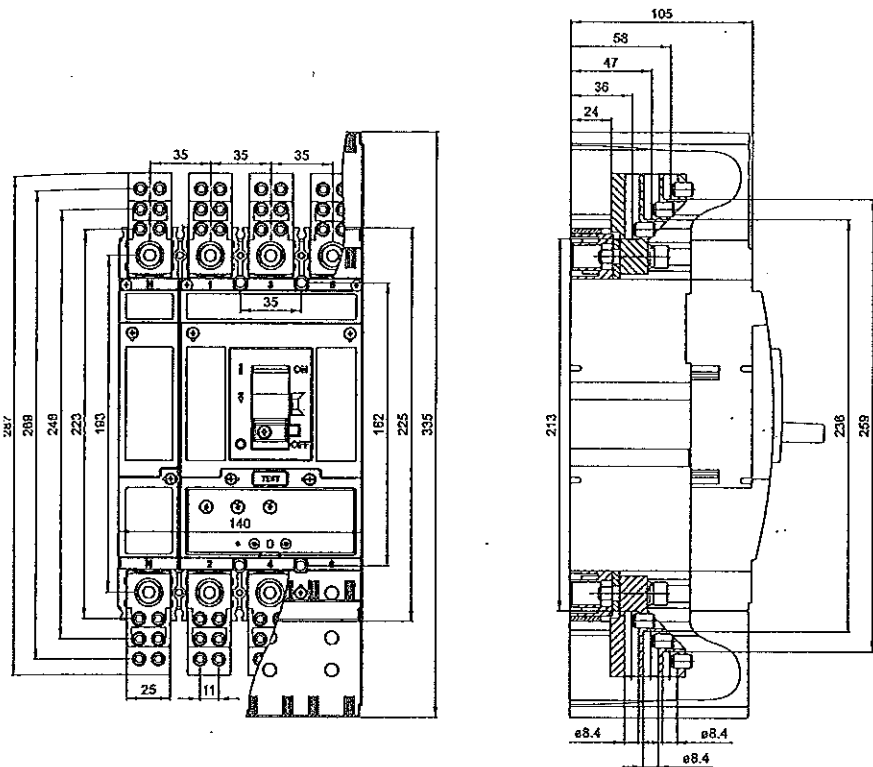
Fixed design, front connection (CS-BD-B022 + CS-BD-B422 connecting sets)



CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

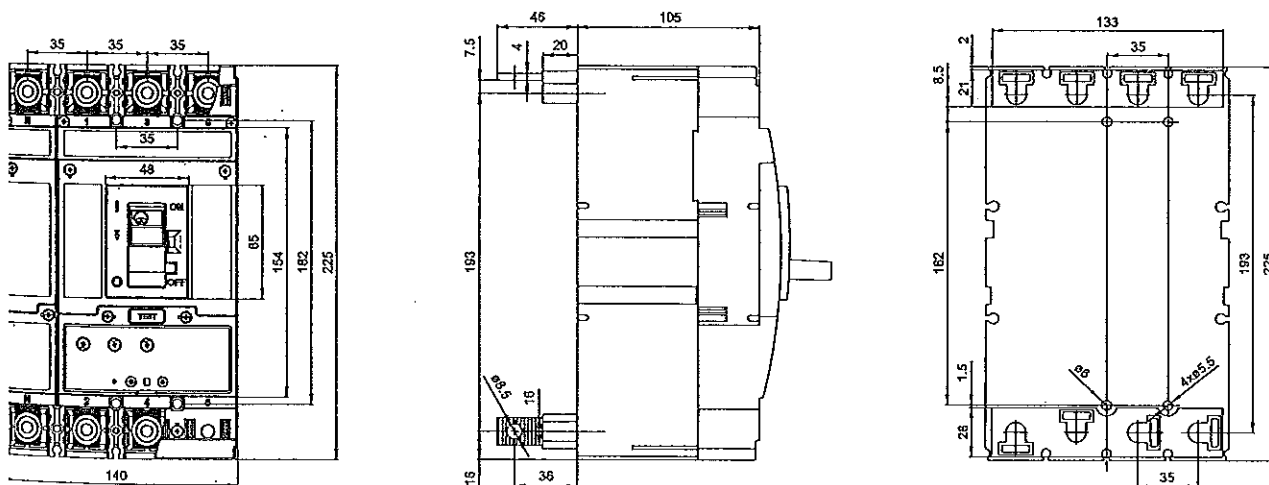
Dimensions

Fixed design, front connection (CS-BD-B014 + CS-BD-B414 connecting sets)



Fixed design, rear connection (CS-BD-A021 + CS-BD-A421 connecting sets)

Drilling diagram



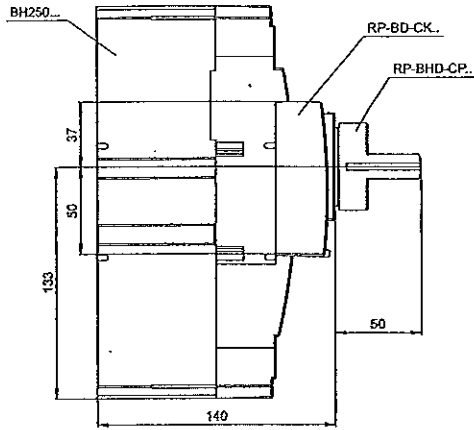
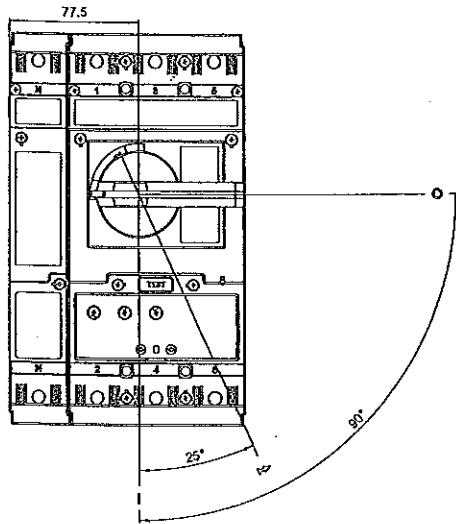
[Handwritten signature]

[Handwritten signature]

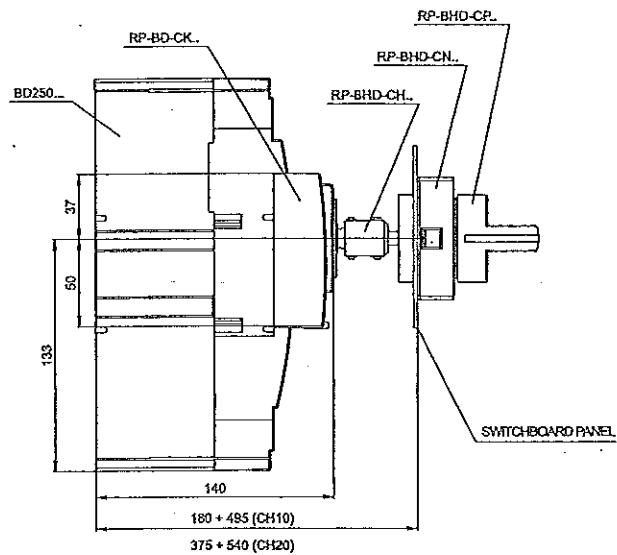
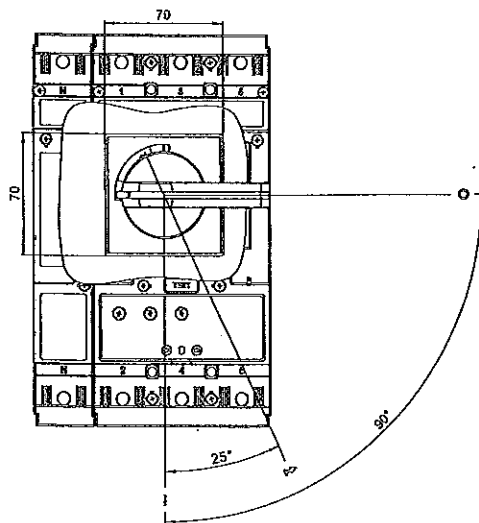
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

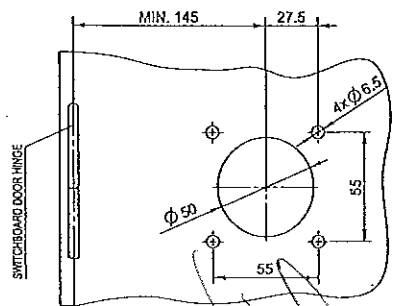
Fixed design, hand drive



Fixed design, hand drive - front, with adjustable lever



Switchboard door modification



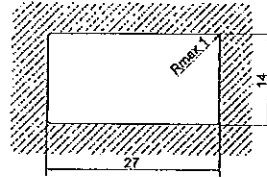
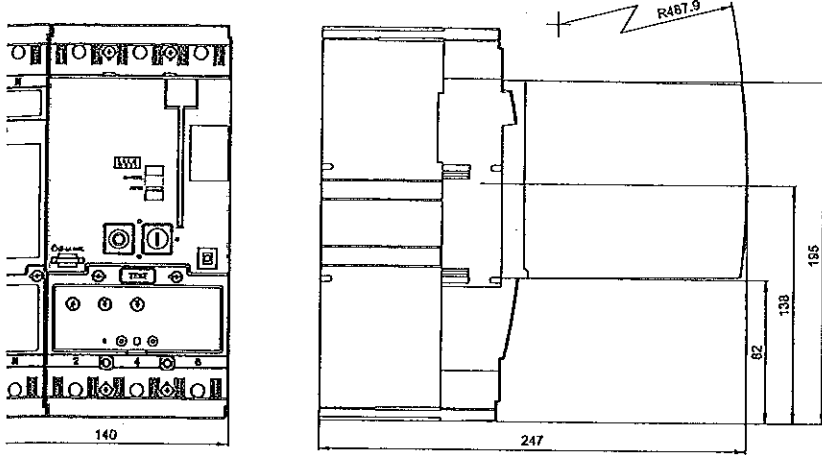
Handwritten signature

CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

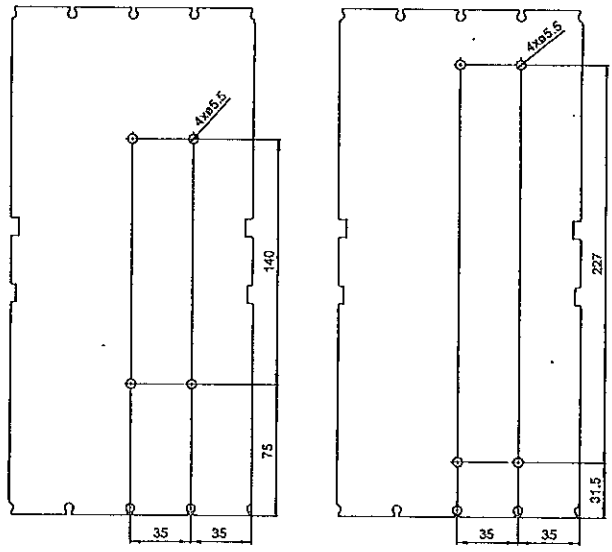
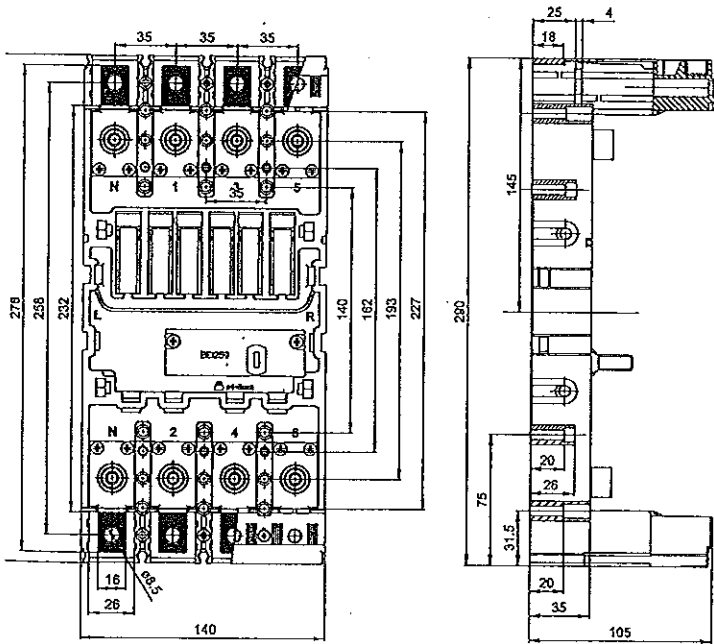
Standard design, motor drive

Opening dimensions in switchboard door for external counter of cycles



Fit-in device

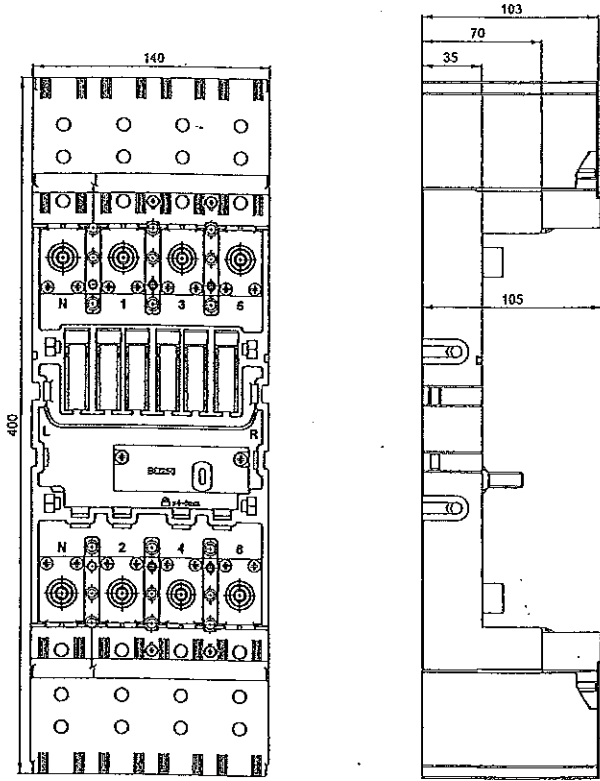
Drilling diagram



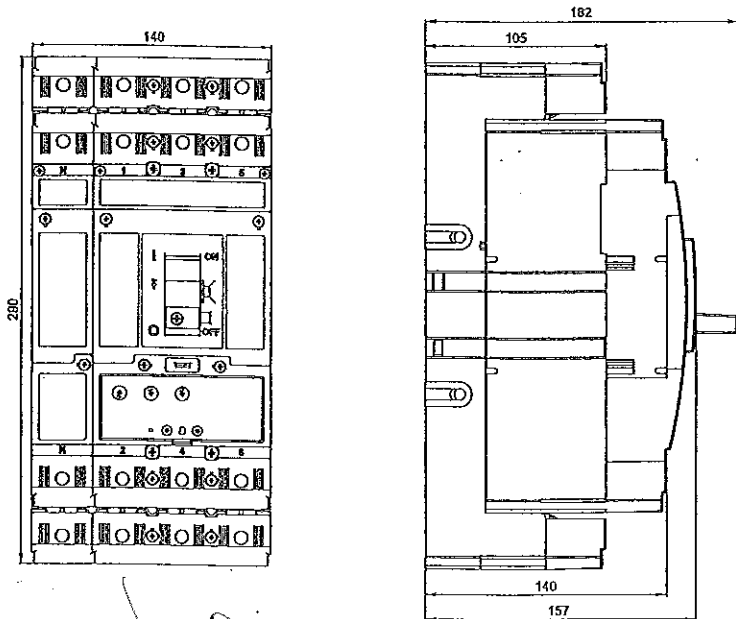
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

Plug-in device, OD-BD-KS43 terminal cover



Plug-in design



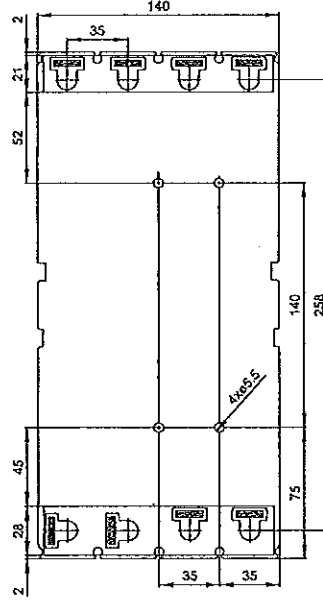
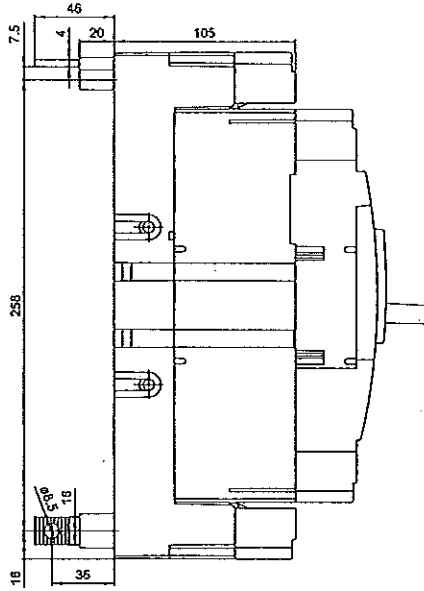
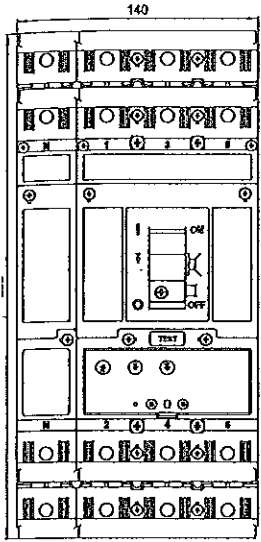
M

CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

lug-in design, rear connection (CS-BD-A021 + CS-BD-A421 connecting sets)

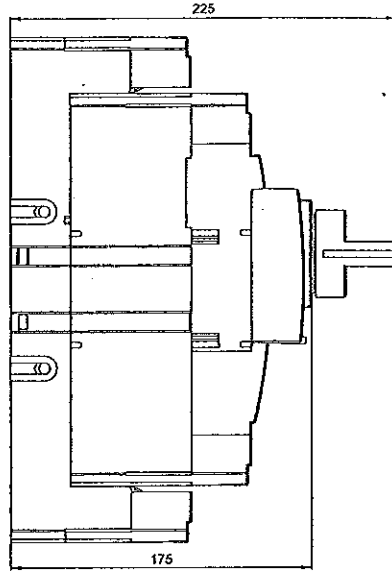
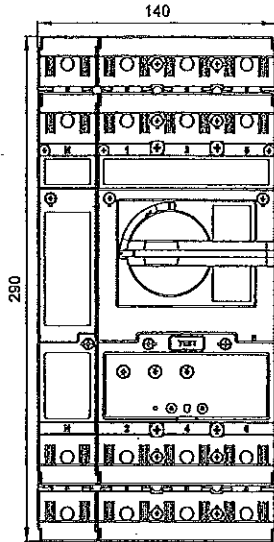
Drilling diagram



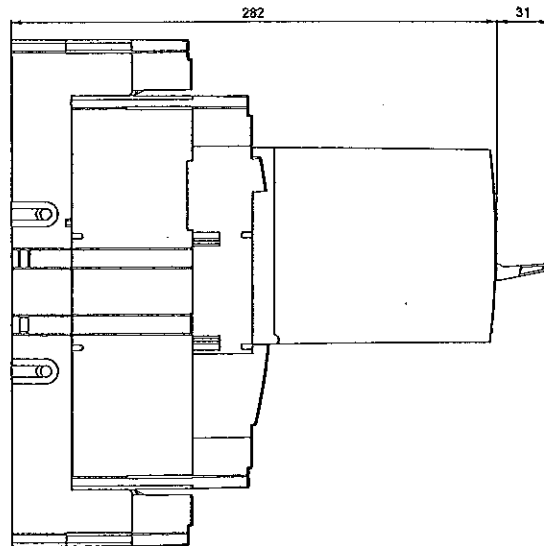
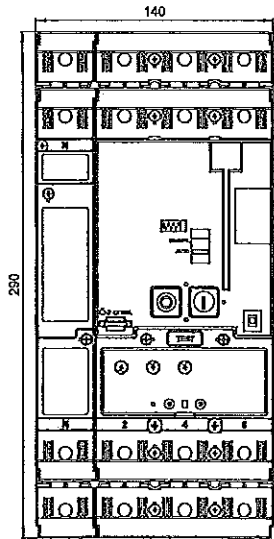
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

Plug-in design, hand drive



Plug-in design, motor drive

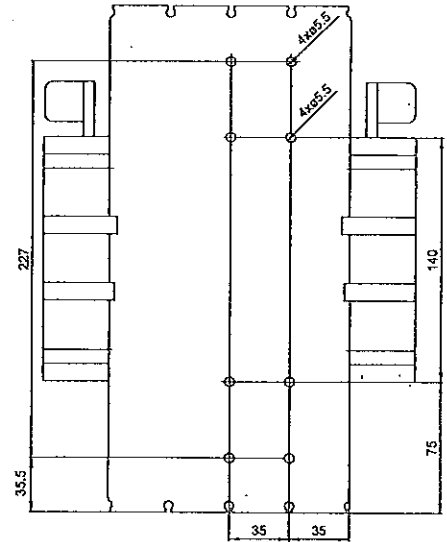
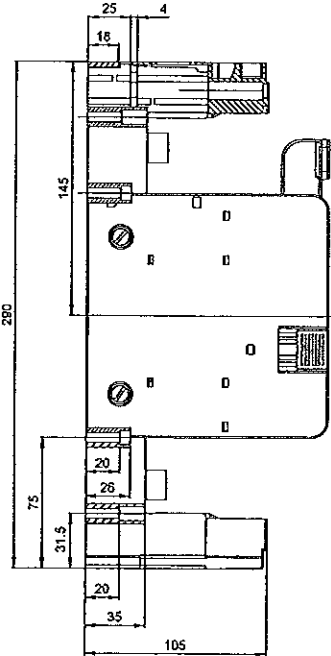
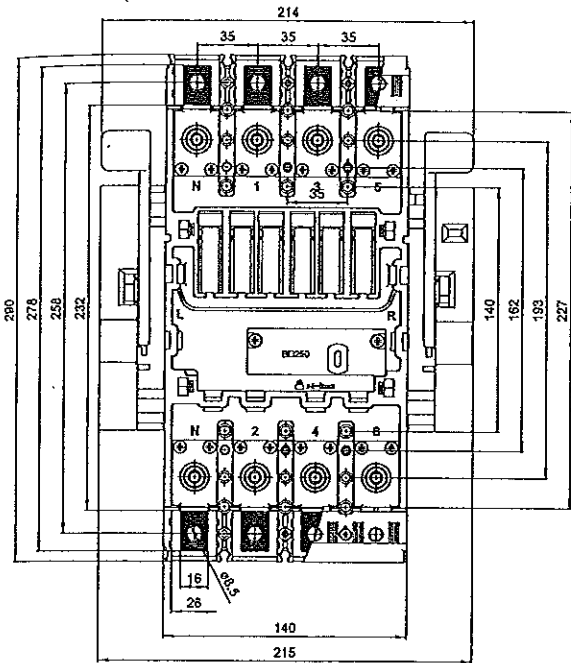


CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

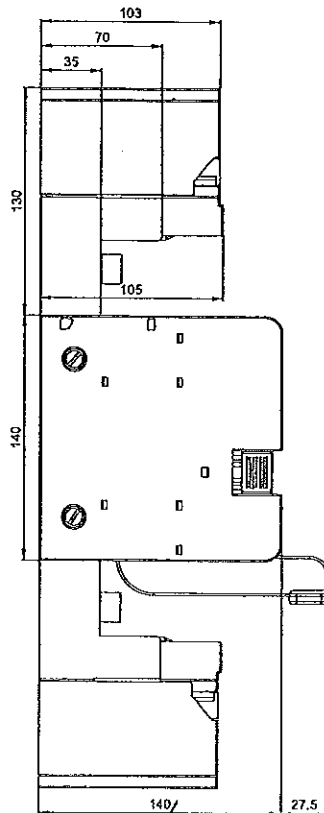
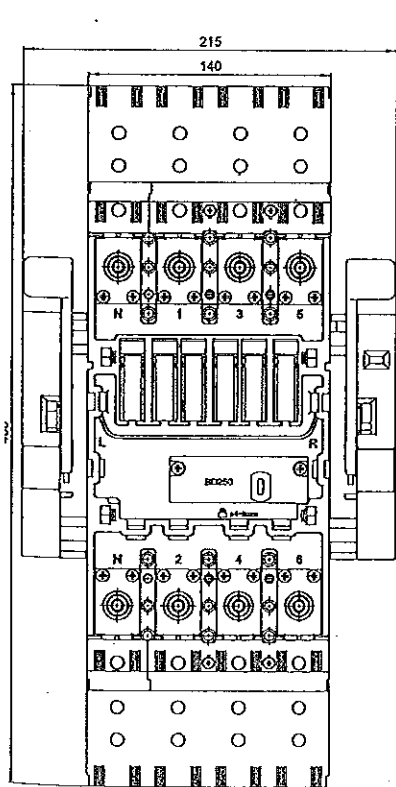
Dimensions

Withdrawable device

Drilling diagram



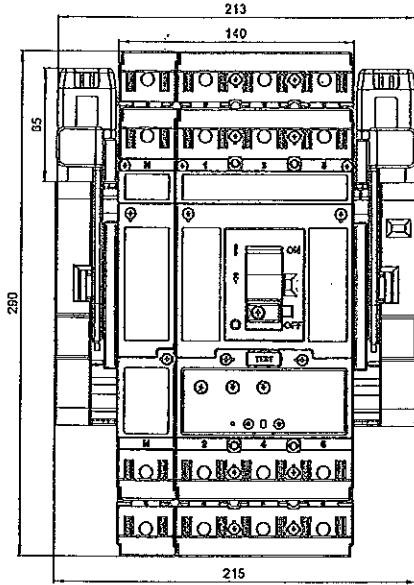
Withdrawable device, OD-BD-KS43 terminal cover



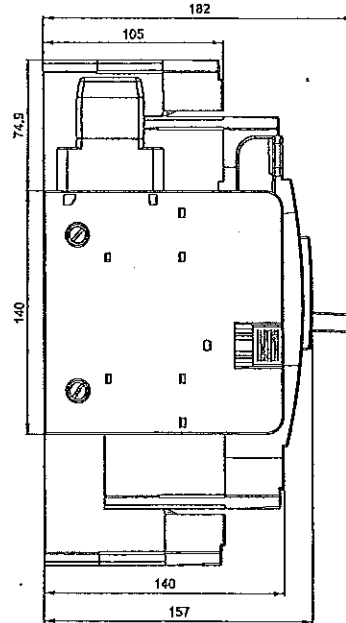
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

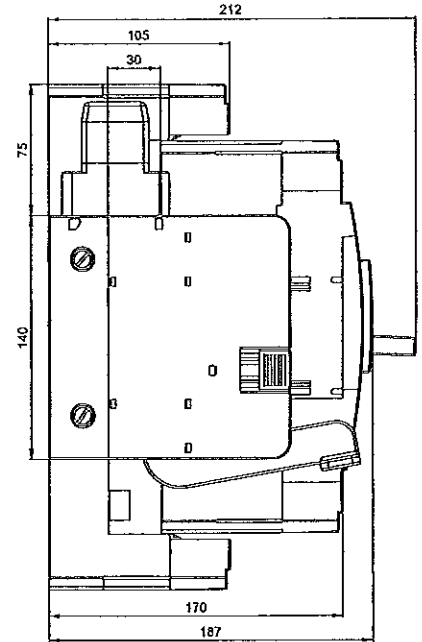
Withdrawable design



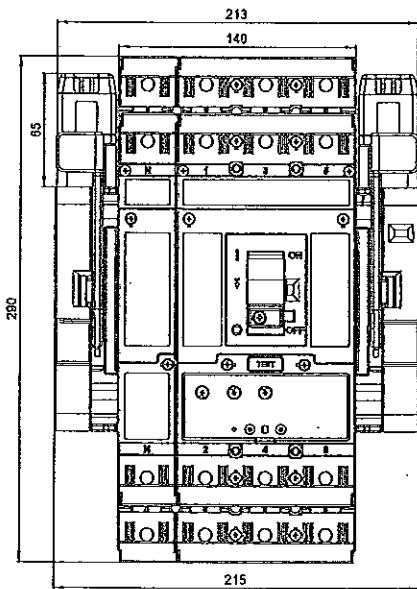
Working position



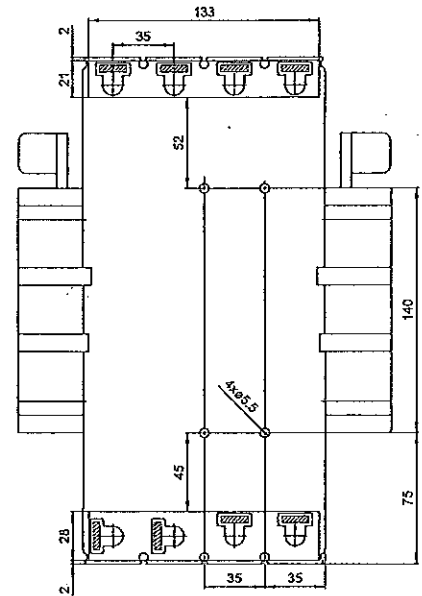
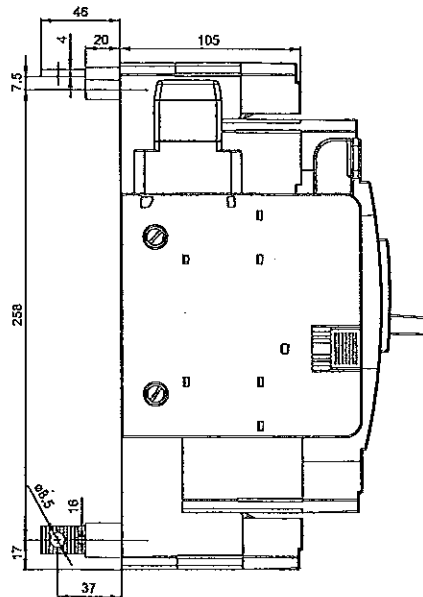
Inspection position



Withdrawable design, rear connection (CS-BD-A021 + CS-BD-A421 connecting sets)



Drilling diagram



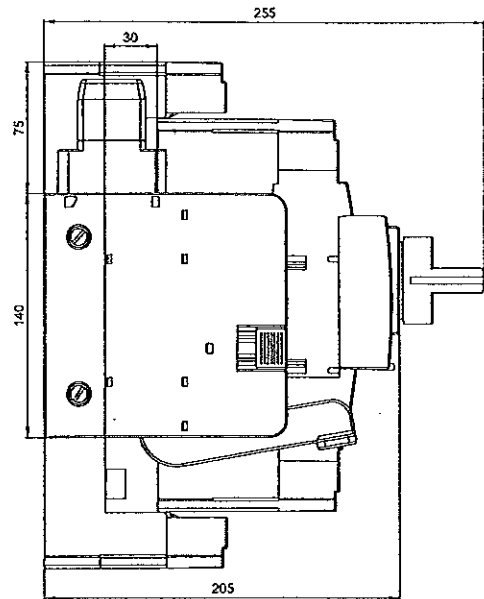
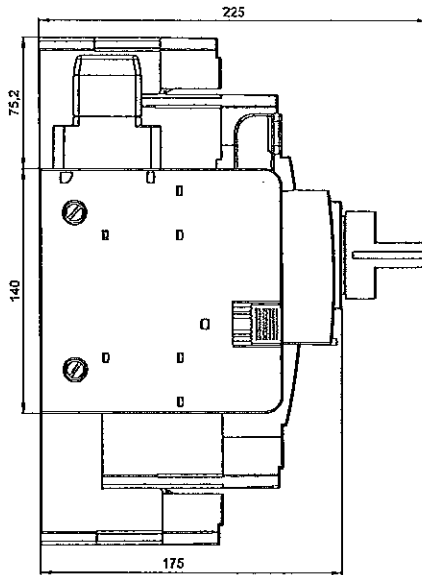
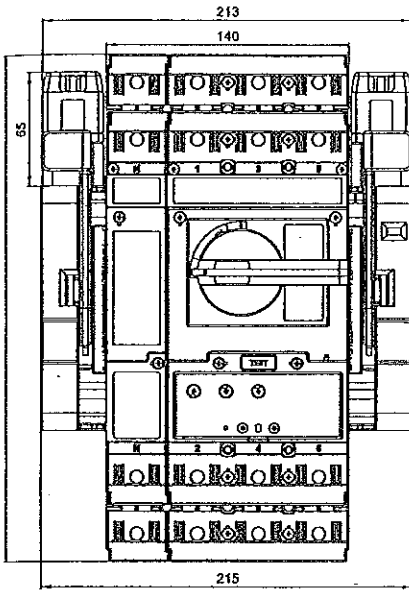
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

Withdrawable design, hand drive

Working position

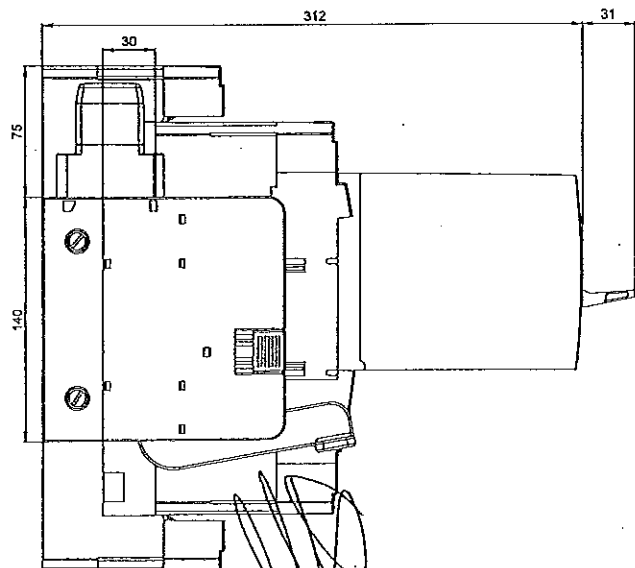
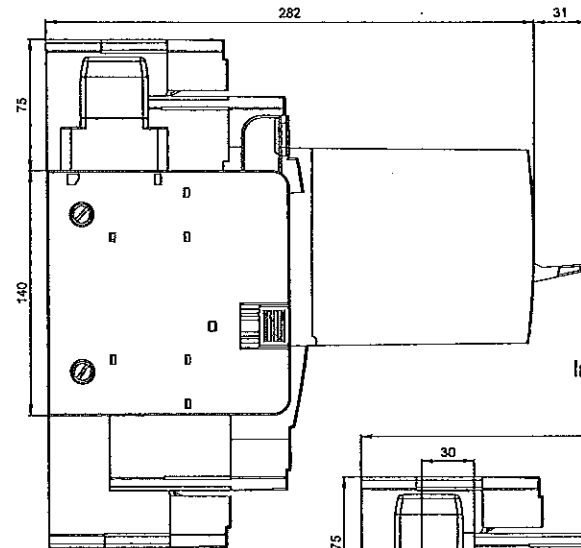
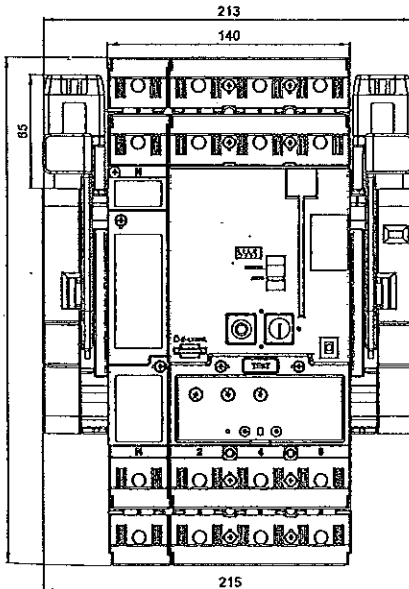
Inspection position



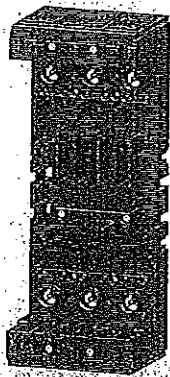
Withdrawable design, motor drive

Working position

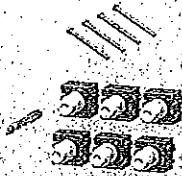
Inspection position



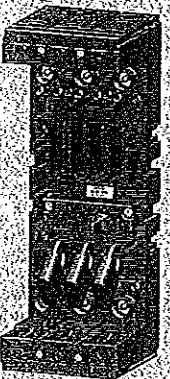
PLUG-IN DEVICE



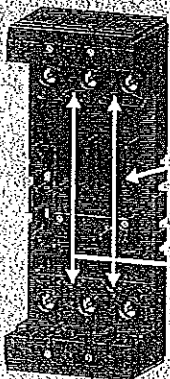
Plug-in device



Circuit breaker in plug-in design



Locking plug-in device against inserting circuit breaker



Position of cavities for switch SO-BHD-0010 in plug-in device

11, 12, 13, 14



Keying set OD-BD-KK01

Description

Plug-in design of the circuit breaker/switch-disconnector is intended for demanding industrial applications where rapid exchange of the circuit breaker along with both visual and conductive disconnection of the circuit are needed.

plug-in device includes complete accessories for assembling circuit breaker/switch-disconnector in plug-in design from the originally fixed design

- components of the plug-in device are:
 - base of the plug-in device
 - 2 connecting sets (total of 6 terminals) - for fitting onto the switching unit
 - interlocking connecting rod (ensures automatic switching off of the circuit breaker for handling - inserting and removal)
 - set of mounting bolts - for affixing circuit breaker to plug-in device (set of mounting bolts is used to fasten the plug-in device into the switchboard, that is included in delivery of switching unit)

Circuit breaker positions

Circuit breaker in plug-in design has two positions:

1. inserted (working position)
2. removed

Power circuit

- connecting set CS-BD-A011 is used for connecting with busbars or cable lugs, that is included in delivery of BD250... switching unit
- for connecting in another way, it is necessary to use connecting sets, see page E8
- connection must comply with our recommendations, see page E18

Auxiliary circuits

These are connected using 15-wire cable OD-BHD-KA01.

States of switches SO-BHD-0010 in plug-in device according to circuit breaker position

Symbol	11, 12, 13, 14 (1P+2P)
--------	------------------------

Circuit breaker position	10	20	04
Inserted	0	1	
Removed	1	0	

note: 0 - contact open, 1 - contact closed

¹⁾ - cavities 19 and 20 are only for 4-pole design

Specifications SO-BHD-0010

Type	SO-BHD-0010	
Rated operating voltage	U_c	400 V a.c. 220 V d.c.
Rated insulation voltage	U_i	500 V a.c.
Rated frequency	f_n	50/60 Hz
Rated operating current	I_n / U AC-13 I_n / U DC-15	3 A / 400 V a.c. 3.5 A / 24 V d.c., 1 A / 48 V d.c., 0.3 A / 110 V d.c., 0.15 A / 220 V d.c.
Thermal current	I_{th}	6 A
Arrangement of contacts		001
Connection cross-section	S	0.5 ÷ 1 mm ²
Degree of protection of terminals (connected switch)		IP20

For wiring diagram of terminals circuit breaker in plug-in device with accessories see page E16.

Signalling of position SO-BHD-0010

Plug-in device may be fitted with a maximum of four switches (for 4-pole design, max. 6 switches) for signalling the inserted/removed position.

Keying set OD-BD-KK01

Plug-in device and circuit breaker can be fitted with keying set which prevents inserting any other circuit breaker into the plug-in device.

Circuit breaker accessories in plug-in design

Circuit breaker in plug-in design has the same accessories as the fixed circuit breaker.

Advantages and enhanced safety for operator:

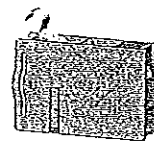
- unambiguous remote signalling of the circuit breaker position
- option to lock plug-in device with padlocks to prevent inserting of circuit breaker
- visible and conductive disconnection of the power circuit
- easy exchange of circuit breakers in case of failure
- IP20 degree of protection of all termination points
- plug-in device does not need earthing



Keying set OD-BD-KK01

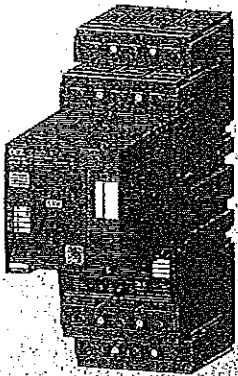


Connecting cable OD-BHD-KA01



Signalling of position SO-BHD-0010

PLUG-IN DEVICE



Circuit breaker in plug-in design with motor drive

Recommended circuit breaker manipulation

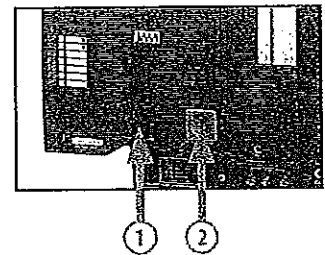
During the manipulation with circuit breaker in plug-in design with motor drive, the circuit breaker may reach the state, in which the first attempt at switching on by motor drive is unsuccessful. Switching on is executed after repeated make impulse. To avoid this effect, some of the following steps may be done:

- 1) To keep the process of manipulation with the circuit breaker, see „Recommended circuit breaker manipulation“ below
- 2) To connect OD-BHD-R... control relay into the motor drive circuit according to wiring diagram, see page E73

Recommended process of manipulation

After every manipulation with circuit breaker in plug-in design is necessary to accomplish the operations in following sequence, after repeated insertion into the plug-in device:

- 1) press the switch off button (red) on the motor drive, see fig.
- 2) press the switch on button (green) on the motor drive, see fig.

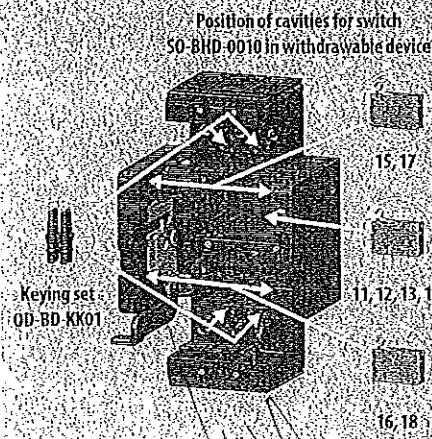
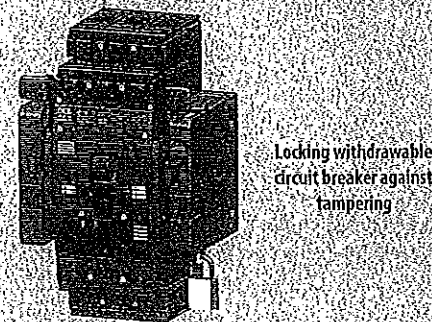
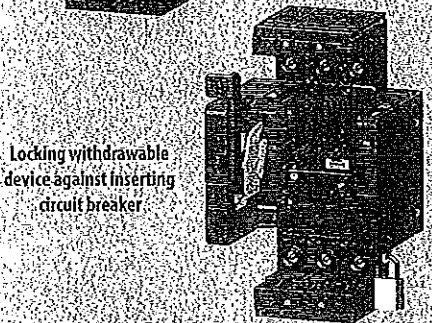
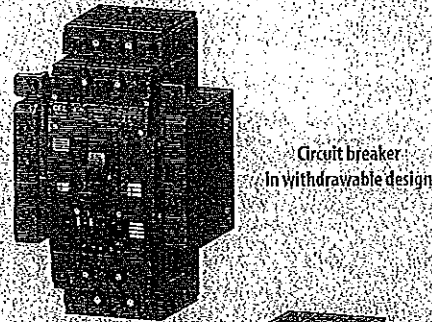
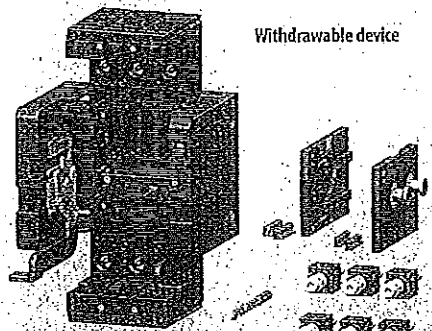


Changes in states of switches in cavities of switching unit when removing circuit breaker

State of circuit breaker before removing	Circuit breaker lever position	State of the main contacts	State of switches when removing in closed position						State of switches when removing in drawn position					
			Cavity 1		2		3 (4, 5, 6) ¹⁾		1		2		3 (4, 5, 6) ¹⁾	
			PS-BHD-1000	PS-BHD-0100	PS-BHD-1000	PS-BHD-0100	PS-BHD-1000	PS-BHD-0100	PS-BHD-1000	PS-BHD-0100	PS-BHD-1000	PS-BHD-0100	PS-BHD-1000	PS-BHD-0100
Switched on	||	1	1	0	0	1	1	0	1	0	1	0	0	1
Switched off manually or by motor drive electrically (loaded state)	⊙	0	1	0	0	1	0	1	1	0	1	0	0	1
Switched off by overcurrent release	⤵	0	0	1	1	0	0	1	0	1	1	0	0	1
Switched off from switched on state: by auxiliary release, or by TEST push button or by the switch off button on the motor drive	⤵	0	0	1	0	0	0	1	1	0	1	0	0	1

note: 0 - contact open, 1 - contact closed
¹⁾ - cavities 4, 5, 6 are only for 4-pole design

WITHDRAWABLE DEVICE



Description

Withdrawable design of the circuit breaker/switch-disconnector is intended for demanding industrial applications where rapid exchange of the circuit breaker, frequent checking and both visual and conductive disconnection of the circuit are needed.

- withdrawable device includes complete accessories for assembling circuit breaker/switch-disconnector in withdrawable design from the originally fixed design
- components of the withdrawable device are:
 - base of the withdrawable device
 - 2 movable side plates
 - 2 connecting sets (total of 6 terminals) - for fitting onto the switching unit
 - interlocking connecting rod (ensures automatic switching off of the circuit breaker for handling - inserting and withdrawing)
 - set of mounting bolts is used to fasten the withdrawable device into the switchboard, that is included in delivery of switching unit

Circuit breaker positions

Circuit breaker in withdrawable design has three positions:

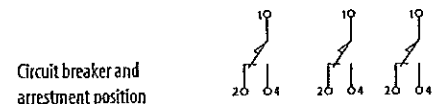
1. inserted (working position)
2. withdrawn (inspection position)
3. removed

Keying set OD-BD-KK01

Withdrawable device and circuit breaker can be fitted with keying set, which prevents inserting any other circuit breaker into the withdrawable device.

States of switches SO-BHD-0010 in withdrawable device according to circuit breaker and arrestment positions

	11, 12, 13, 14	15, 17	16, 18
Keying	11, 12, 13, 14	15, 17	16, 18



Circuit breaker and arrestment position	10	20	04
Inserted and not arrested	0 1	1 0	0 1
Inserted and arrested	0 1	1 0	1 0
Withdrawn and not arrested	1 0	0 1	0 1
Withdrawn and arrested	1 0	0 1	1 0
Removed and not arrested	1 0	1 0	0 1
Removed and arrested	1 0	1 0	1 0

note: 0 - contact open, 1 - contact closed
 - operating state is always in arrested position
 - in arrested position it is possible to lock the withdrawable device (for more information see „Advantages and enhanced safety for operator“)
 *) - cavities 19 and 20 are only for 4-pole design

Specifications SO-BHD-0010

Type	SO-BHD-0010	
Rated operating voltage	U_e	400V a.c. 220V d.c.
Rated insulation voltage	U_i	500V a.c.
Rated frequency	f	50/60 Hz
Rated operating current	I_n / U AC-13 I_n / U DC-15	3 A/400V a.c. 3.5 A/24V d.c.; 1 A/48V d.c.; 0.3 A/110V d.c.; 0.15 A/220V d.c.
Thermal current	I_t	6 A
Arrangement of contacts		001
Connection cross-section	S	0.5 - 1 mm ²
Degree of protection of terminals (connected switch)		IP20

For wiring diagram of circuit breaker in withdrawable device with accessories see page E16.

Signalling of position SO-BHD-0010

Withdrawable device can be fitted with the switches for signalling the position of the circuit breaker inserted/with-drawn/removed.

Power circuit

- connecting set CS-BD-A011 is used for connecting with busbars or cable lugs, that is included in delivery of BD250.. switching unit
- for connecting in another way, it is necessary to use connecting sets, see page E8
- connection must comply with our recommendations, see page E18

Auxiliary circuits

These are connected using 15-wire cable OD-BHD-KA01.

Circuit breaker accessories in withdrawable design
 Circuit breaker in withdrawable design has the same accessories as fixed circuit breaker.

Advantages and enhanced safety for operator:

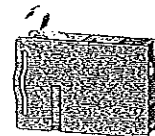
- unambiguous remote and local signalling of the circuit breaker and arrestment positions
- checking of circuit breaker and accessories function in the inspection position
- locking withdrawable device against inserting circuit breaker, locking of circuit breaker in inserted (operating position), locking of circuit breaker in withdrawn (checking) position - locking by means of padlocks
- visible and conductive disconnection of the power circuit
- easy exchange of circuit breakers in case of failure
- IP20 degree of protection of all termination points
- withdrawable device does not need earthing



Keying set OD-BD-KK01

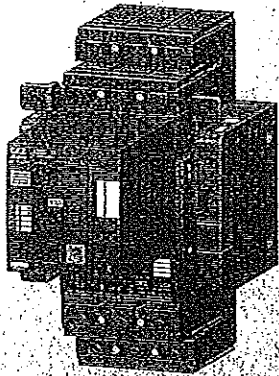


Connecting cable OD-BHD-KA01



Signalling of position SO-BHD-0010

WITHDRAWABLE DEVICE



Circuit breaker in withdrawable design with motor drive

Recommended circuit breaker manipulation

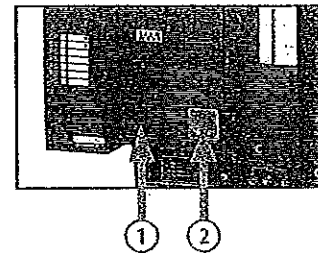
During the manipulation with circuit breaker in withdrawable design with motor drive, the circuit breaker may reach the state, in which the first attempt at switching on by motor drive is unsuccessful. Switching on is executed after repeated make impulse. To avoid this effect, some of the following steps may be done:

- 1) To keep the process of manipulation with the circuit breaker, see „Recommended circuit breaker manipulation” below
- 2) To connect OD-BHD-R... control relay into the motor drive circuit according to wiring diagram, see page E73

Recommended process of manipulation

After every manipulation with circuit breaker in withdrawable design is necessary to accomplish the operations in following sequence, after repeated insertion into the plug-in device:

- 1) press the switch off button (red) on the motor drive, see fig.
- 2) press the switch on button (green) on the motor drive, see fig.

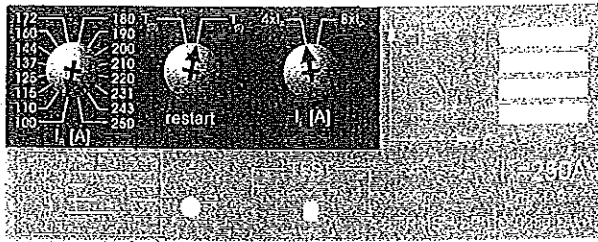


Changes in states of switches in cavities of switching unit when inserting and withdrawing circuit breaker

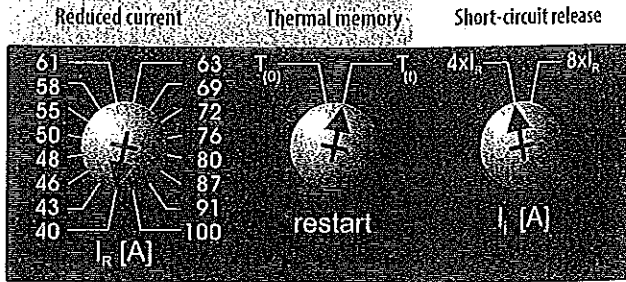
State before insertion/withdrawal			State after insertion/withdrawal											
State of circuit breaker before insertion	State of switches before insertion - withdrawn position						State of switches after insertion - inserted position							
State of circuit breaker before withdrawal	State of switches before withdrawal - inserted position						State of switches after withdrawal - withdrawn position							
Circuit breaker lever position	State of the main contacts	Cavity 1		Cavity 2		3 (4, 5, 6) ¹⁾		1		2		3 (4, 5, 6) ¹⁾		
		PS-BHD-1000	PS-BHD-0100	PS-BHD-1000	PS-BHD-0100	PS-BHD-1000	PS-BHD-0100	PS-BHD-1000	PS-BHD-0100	PS-BHD-1000	PS-BHD-0100	PS-BHD-1000	PS-BHD-0100	
switched on	⏏	1	0	0	1	1	0	1	0	1	0	0	1	
switched off manually or by motor drive electrically (loaded state)	⊙	0	1	0	0	1	0	1	1	0	1	0	0	
switched off by overcurrent release	⏚	0	0	1	1	0	0	1	0	1	1	0	0	
switched off from switched on state: by auxiliary release, or by TEST push button or by the switch off button on the motor drive	⏚	0	1	0	1	0	0	1	1	0	1	0	0	

note: 0 - contact open, 1 - contact closed
- cavities 4, 5, 6 are only for 4-pole design

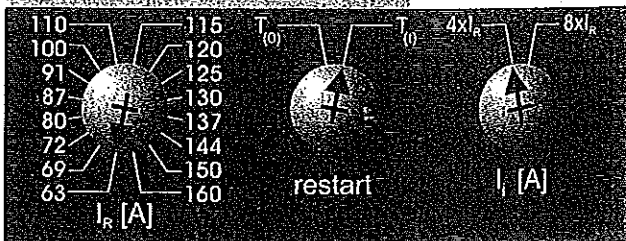
OVERCURRENT RELEASES - DTV3



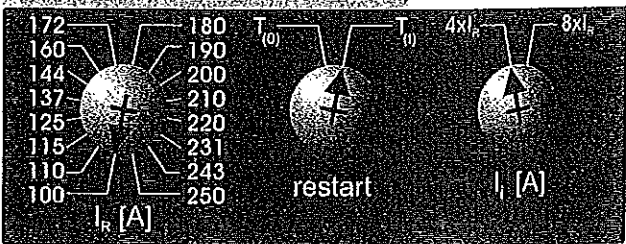
$I_n = 100 \text{ A}$
SE-BD-0100-DTV3



$I_n = 160 \text{ A}$
SE-BD-0160-DTV3



$I_n = 250 \text{ A}$
SE-BD-0250-DTV3

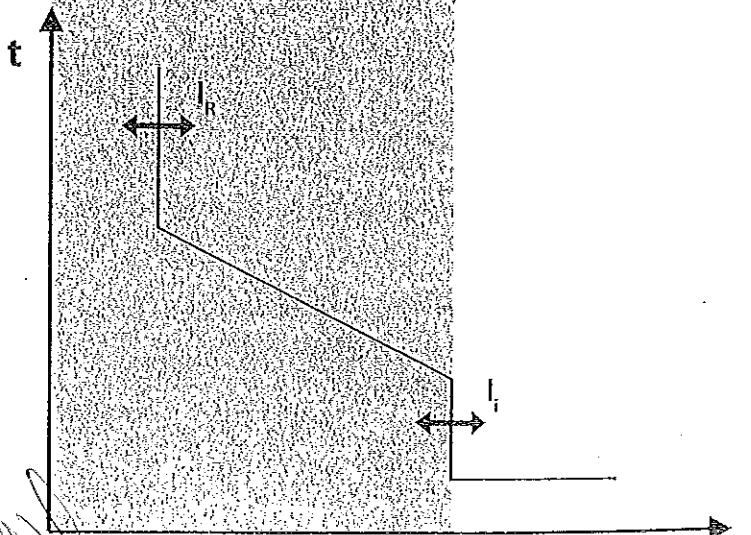


Properties

- suitable for protection of lines and distribution transon
- protects against both overcurrent and short circuit
- reduced current setting $I_R = 0.4 \div 1 I_n$
- thermal memory can be switched on/off (ON = T_{01} , OFF = T_{02})
- setting of the value of the short-circuit release I_1 in two steps, $4 I_n$ or $8 I_n$
- setting of I_R and I_1 by means of the rotary switches is stepwise
- the overcurrent release indicates operating state and value of the passing current by means of LED
- the values of parameters of the overcurrent release are set by the manufacturer to minimum

Data for the project

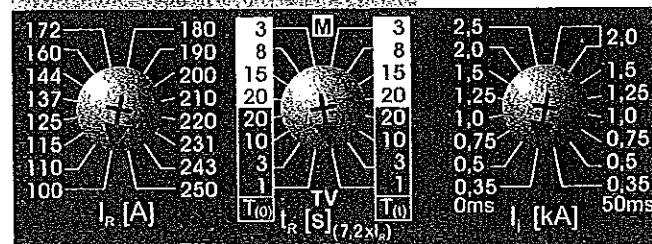
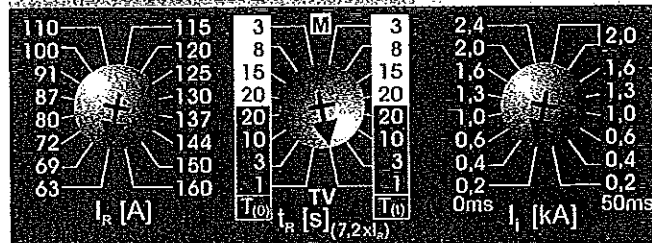
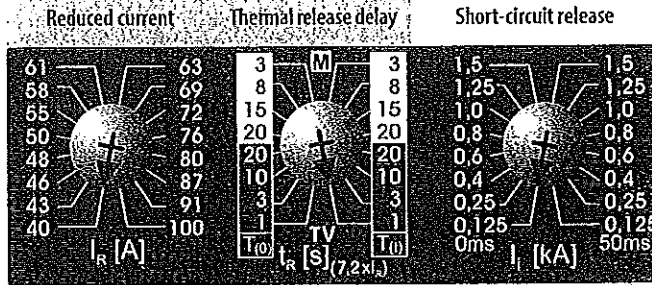
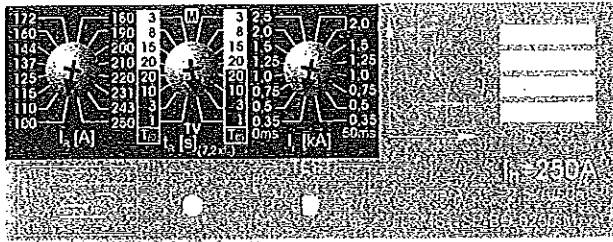
Switching unit	BD250
Overcurrent release	SE-BD
Overcurrent release setting	
Reduced current	I_R [A]
Thermal memory	T
Short-circuit release current	I_1 [A] (x I_n)



IMPORTANT

- thermal memory must be switched on in protection of transformers and lines - thus the transformer or the line will be protected against repeated overload

OVERCURRENT RELEASES - MTV8, TV mode



$I_n = 100A$
E-BD-0100-MTV8

$I_n = 160A$
E-BD-0160-MTV8

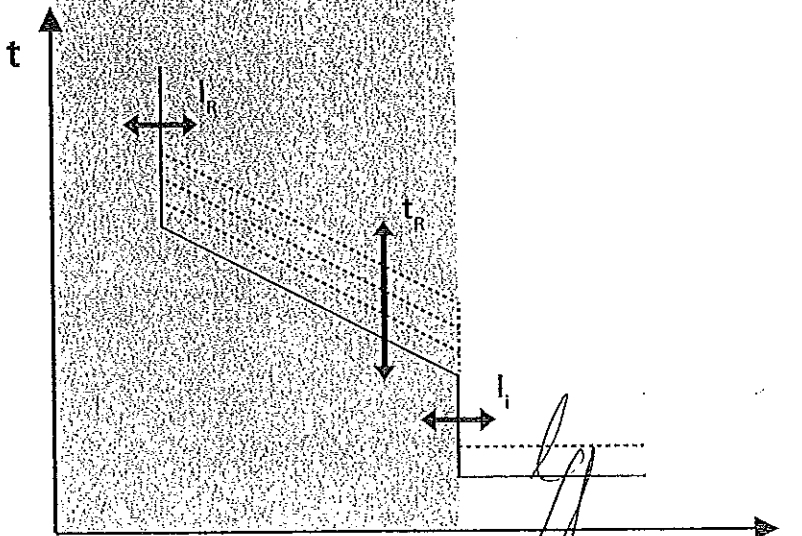
$I_n = 250A$
E-BD-0250-MTV8

Properties

- TV mode - suitable for protection of lines, distribution transformers and generators
- protects against both overcurrent and short circuit
- reduced current setting $I_k = 0.4 \div 1 I_n$
- thermal memory can be switched on/off (ON = T_{ON} , OFF = T_{OFF})
- in TV mode the undercurrent release is inactive
- setting of delay of the thermal release t_R 1 s, 3 s, 10 s and 20 s
- setting of the value of short-circuit release I_I in 8 steps and possibility of switching the short-circuit release off with a delay of 50 ms
- setting of I_k , t_R and I_I by means of the rotary switches is stepwise
- the overcurrent release indicates operating state and the value of the passing current by means of LED
- the values of parameters of the overcurrent release are set by the manufacturer to minimum

Data for the project

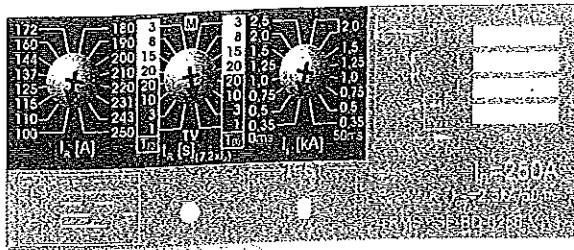
Switching unit	BD250...
Overcurrent release	SE-BD...
Overcurrent release setting	I_k ... A
Reduced current	I_R ... A
Mode	TV
Thermal memory	T
Thermal release delay	t_R ... s
Short-circuit release current	I_I ... A
Setting of short-circuit release	... ms



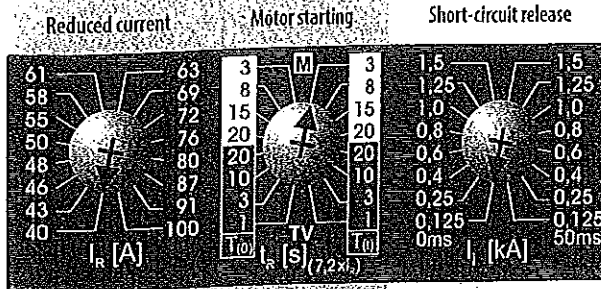
IMPORTANT

- the set value of current of the short-circuit release must correspond to the impedance loop - conditions must be fulfilled for automatic disconnection from power supply in case of failure

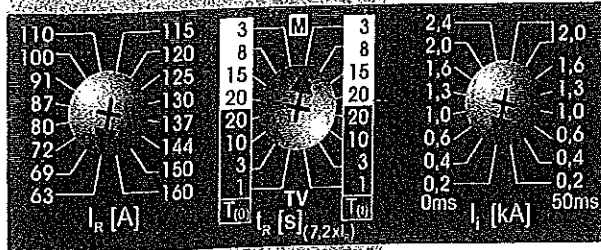
OVERCURRENT RELEASES - MTV8, M mode



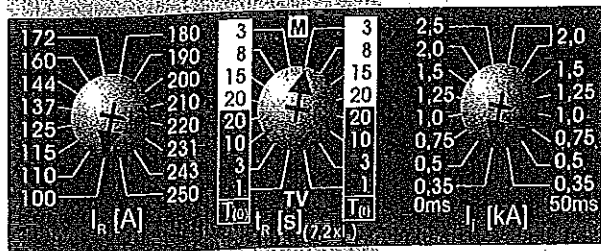
$I_n = 100\text{ A}$
SE-BD-0100-MTV8



$I_n = 160\text{ A}$
SE-BD-0160-MTV8



$I_n = 250\text{ A}$
SE-BD-0250-MTV8

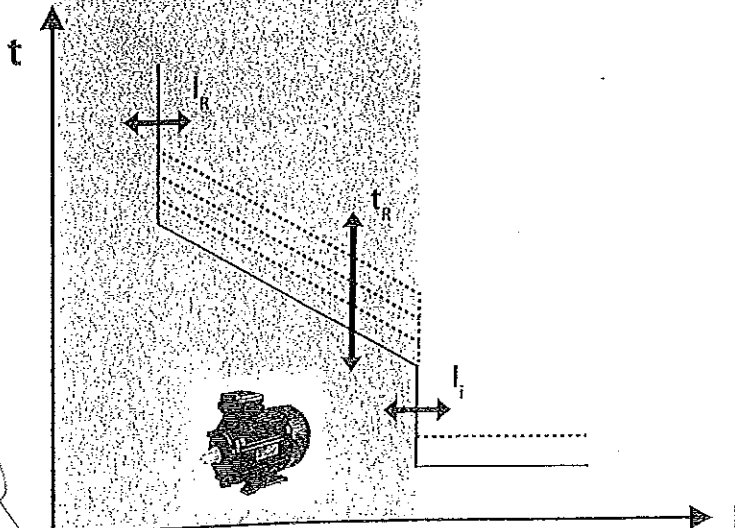


Properties

- M mode - suitable for protection of motors
- protects against both overcurrent and short circuit
- reduced current setting $I_r = 0.4 \div 1 I_n$
- thermal memory can be switched on/off (ON = T_{off} , OFF = T_{on})
- in M mode the undercurrent release is active
- setting of delay of the thermal release t_r 3 s, 8 s, 15 s and 20 s according to the motor starting class
- setting of the value of short-circuit release I_l in 8 steps a possibility of switching the short-circuit release off with a delay of 50 ms
- setting of I_r , t_r and I_l by means of the rotary switches is step
- the overcurrent release indicates operating state and th value of the passing current by means of LED
- the values of parameters of the overcurrent release are by the manufacturer to minimum

Data for the project

Switching unit	BD250
Overcurrent release	SE-BD
Overcurrent release setting	
Reduced current	I_r A
Mode	M
Thermal memory	T
Thermal release delay	t_r s
Short-circuit release current	I_l A
Setting of short-circuit release	ms

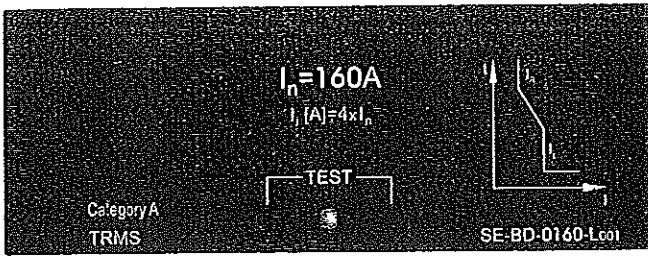


IMPORTANT

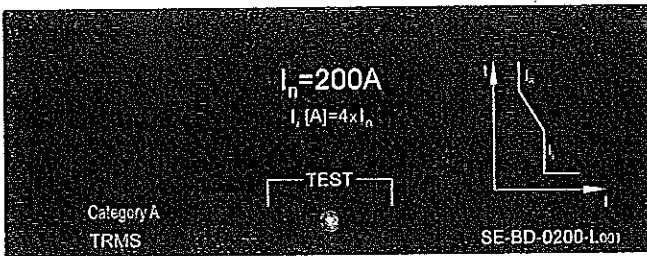
- M mode must be selected in protection of motors - the motor will be protected in phase failure
- thermal release delay t_r must correspond to the motor starting class
- in protection of motors it is suitable to set the delay of the short-circuit release at 50 ms

OVERCURRENT RELEASES - L001

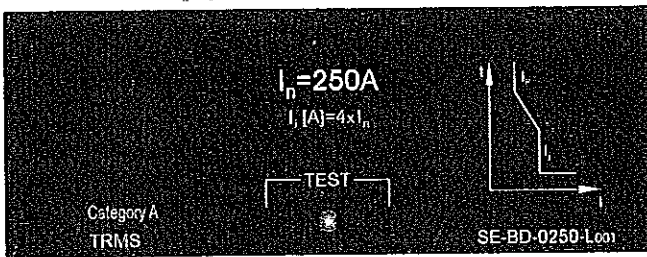
$I_n = 160 \text{ A}$
SE-BD-0160-L001



$I_n = 200 \text{ A}$
SE-BD-0200-L001



$I_n = 250 \text{ A}$
SE-BD-0250-L001

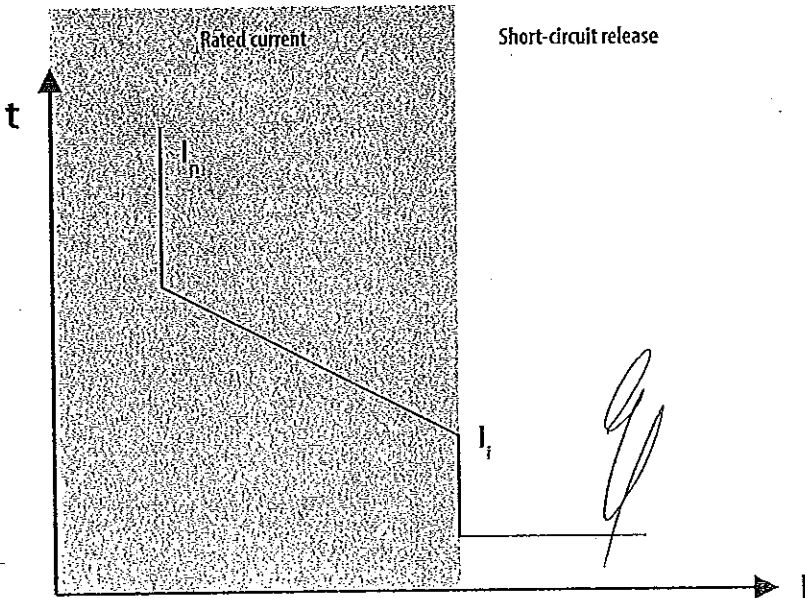


Properties

- suitable for protection of lines with low impulse currents
- protects against both overcurrent and short circuit
- reduced current cannot be set
- thermal release cannot be switched off
- short-circuit release is fixed at $4 I_n$

Data for the project

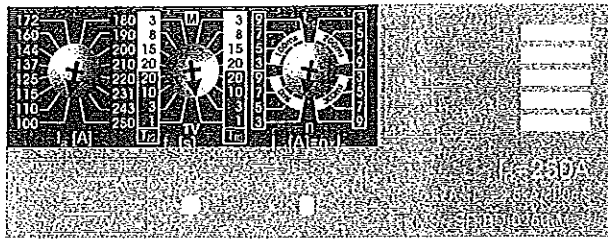
Switching unit	BD250
Overcurrent release	SE-BD
Overcurrent release values	
Rated current	I_n A
Short-circuit release current	I_i A ($4 \times I_n$)



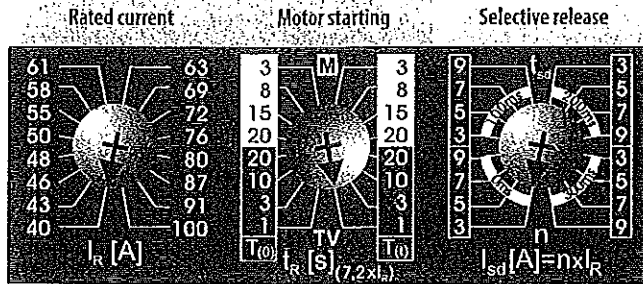
IMPORTANT

- high impulse current must not be in the circuit
- undesirable breaking would take place, because the current of the short-circuit release is fixed at $4 I_n$

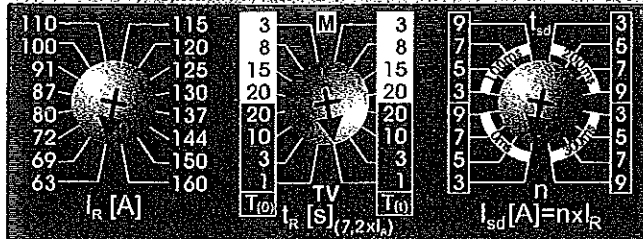
OVERCURRENT RELEASES - MTV9, TV mode



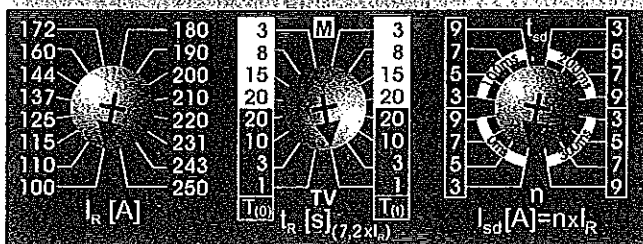
$I_n = 100\text{ A}$
SE-BD-0100-MTV9



$I_n = 160\text{ A}$
SE-BD-0160-MTV9



$I_n = 250\text{ A}$
SE-BD-0250-MTV9



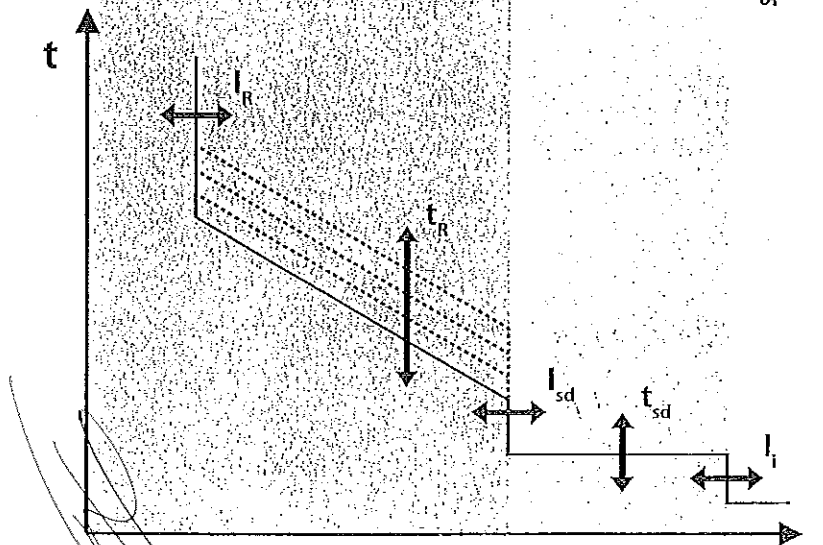
Properties

- TV mode suitable for protection of lines, distribution transformers and generators – enables setting of time selectivity
- protects against both overcurrent and short circuit
- reduced current setting $I_k = 0.4 \div 1 I_n$
- thermal memory can be switched on/off (ON == T_{OFF}, OFF == T_{ON})
- in TV mode the undercurrent release is inactive
- setting of delay of the thermal release t_R 1 s, 3 s, 10 s and
- setting of the value of selective release I_{sd} in 4 steps (independent time-delayed release)
- setting of delay of the selective release t_{sd} 0 ms, 100 ms, 200 ms or 300 ms
- setting of I_R , t_R , I_{sd} and t_{sd} by means of rotary switches is step
- the overcurrent release indicates operating state and I value of the passing current by means of LED
- the values of parameters of the overcurrent release are by the manufacturer to minimum

Data for the project

Switching unit	BD250
Overcurrent release	SE-BD
Overcurrent release setting	
Reduced current	I_k ... A
Mode	TV
Thermal memory	T
Thermal release delay	t_R ... s
Selective release value	I_{sd} ... A ($\dots \times I_n$)
Selective release delay	t_{sd} ... ms

Short-circuit release

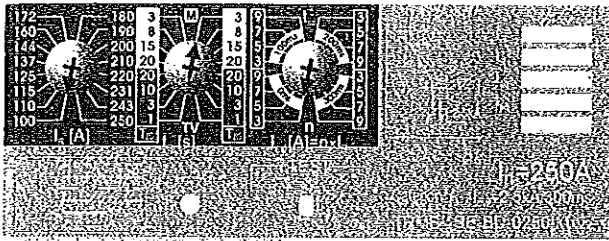


IMPORTANT

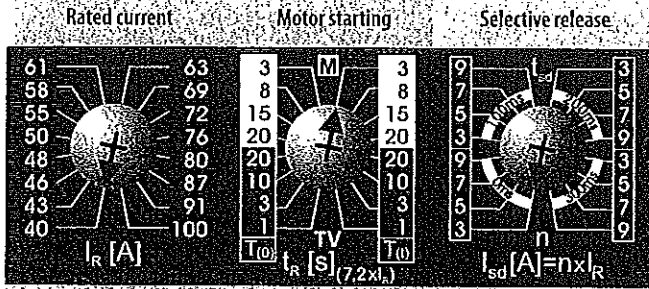
- the set value of current of the short-circuit release must correspond to the impedance loop - conditions must be fulfilled for automatic disconnection from power supply in case of failure

Qd

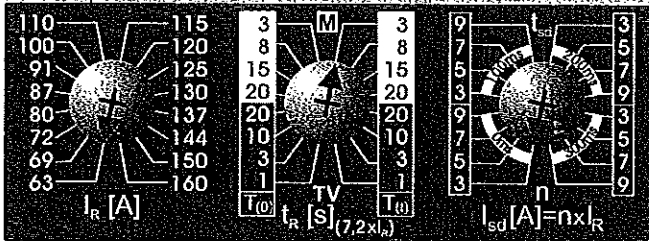
OVERCURRENT RELEASES - MTV9, M mode



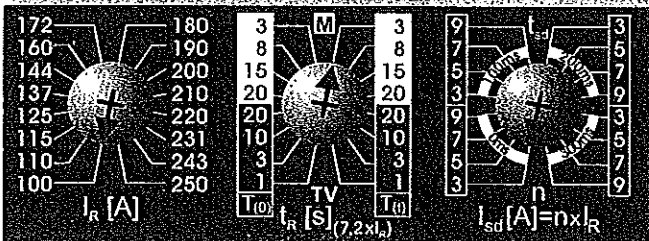
$I_n = 100\text{ A}$
E-BD-0100-MTV9



$I_n = 160\text{ A}$
E-BD-0160-MTV9



$I_n = 250\text{ A}$
E-BD-0250-MTV9



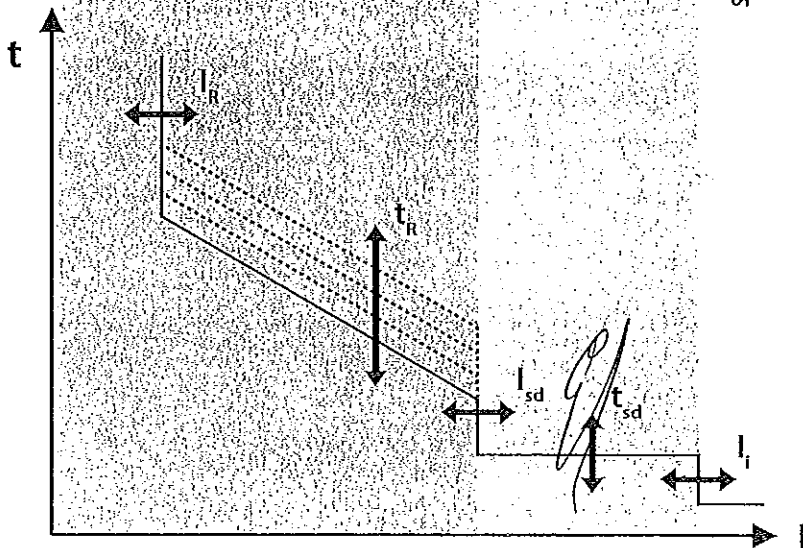
Properties

- M mode suitable for protection of motors – enables setting of time selectivity
- protects against both overcurrent and short circuit
- reduced current setting $I_R = 0.4 \div 1 I_n$
- thermal memory can be switched on/off (ON = T_{tr} , OFF = T_{tr})
- in M mode the undercurrent release is active
- setting of delay of the thermal release t_R 3 s, 8 s, 15 s and 20 s according to the motor starting class
- setting of the value of selective release I_{sd} in 4 steps (independent time-delayed release)
- setting of delay of the selective release t_{sd} 0 ms, 100 ms, 200 ms or 300 ms
- setting of I_R , t_R , I_{sd} and t_{sd} by means of rotary switches is stepwise
- the overcurrent release indicates operating state and the value of the passing current by means of LED
- the values of parameters of the overcurrent release are set by the manufacturer to minimum

Data for the project

Switching unit	BD250
Overcurrent release	SE-BD-
Overcurrent release setting	
Reduced current	I_R
Mode	M
Thermal memory	T
Thermal release delay	t_R
Selective release value	I_{sd}
Selective release delay	t_{sd}

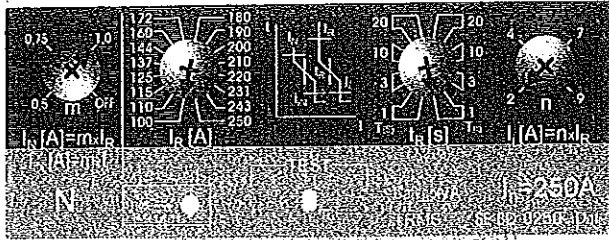
Short-circuit release



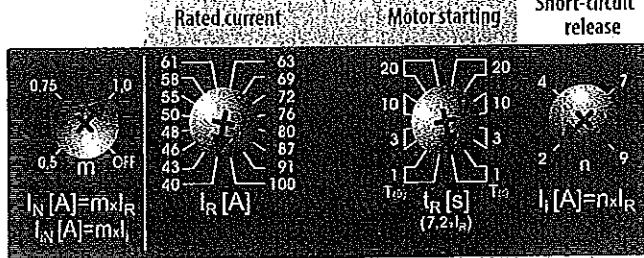
IMPORTANT

- M mode must be selected in protection of motors – the motor will be protected in phase
- failure thermal release delay t_R must correspond to the motor starting class

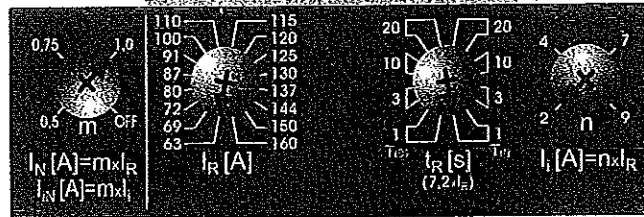
OVERCURRENT RELEASES - 4D01



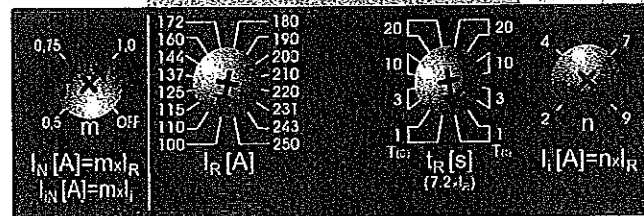
$I_n = 100A$
SE-BD-0100-4D01



$I_n = 160A$
SE-BD-0160-4D01



$I_n = 250A$
SE-BD-0250-4D01

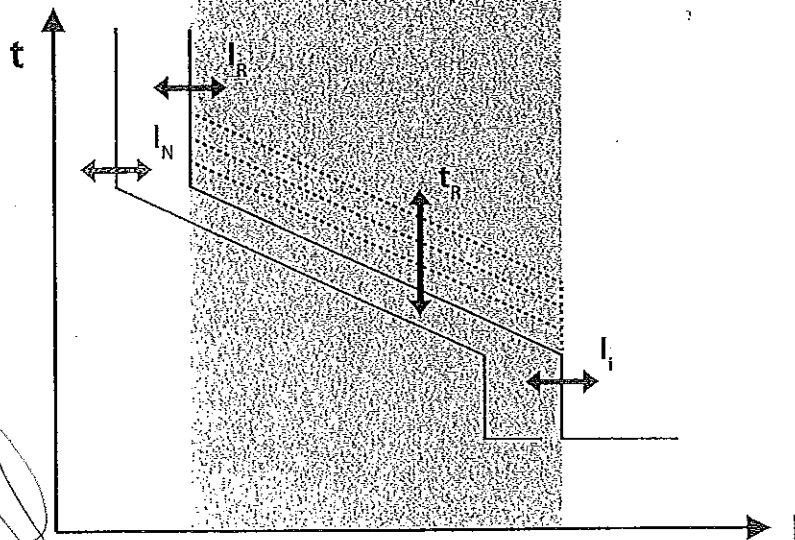


Properties

- it is appropriate for protection of lines and distribution transformers with protected „N“ conductor in TN-C-S & TN-S networks
- protects against both overcurrent and short circuit
- reduced current setting $I_R = 0.4 \div 1 I_n$
- thermal memory can be switched on/off (ON = T_{off} , OFF = T_{on})
- setting of delay of the thermal release t_R 1 s, 3 s, 10 s and
- setting of the value of the short-circuit release I_1 in 4 s ($2 \div 9 I_R$)
- setting of the value of reduced current I_R and short-circuit current I_1 in the 4th pole
- setting of I_R , t_R , I_1 and I_n by means of rotary switches is step
- the overcurrent release indicates operating state and value of the passing current by means of LED
- the values of parameters of the overcurrent release are by the manufacturer to minimum

Data for the project

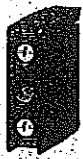
Switching unit	BD250
Overcurrent release	SE-BD
Overcurrent release setting	
Reduced current	I_R [A]
Thermal memory	T
Thermal release delay	t_R [s]
Level of reduced current in the 4th pole	I_N [A]
Level of reduced current in the 4th pole	I_1 [A]



IMPORTANT

- the set value of current of the short-circuit release must correspond to the impedance loop - conditions must be fulfilled for automatic disconnection from power supply in case of failure

WITCHES



Simple



Double



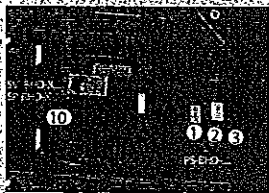
Make-and-break



Double make-and-break



Early



Cavities in BD250... switching unit

Specification

Type	PS-BHD-000	PS-BHD-000-Au
Rated operating voltage	U_n 60 ÷ 500 V a.c. 60 ÷ 500 V d.c.	5 ÷ 60 V a.c. 5 ÷ 60 V d.c.
Rated insulation voltage	U_i 500 V	500 V
Rated frequency	f_n 50/60 Hz	50/60 Hz
Rated operating current	I_n/U_n AC-15 I_n/U_n DC-13 6 A/240 V, 4 A/400 V, 2 A/500 V 0.4 A/240 V, 0.3 A/400 V, 0.2 A/500 V	AC-12, DC-12 0.004 ÷ 0.5 A/5 V, 0.004 ÷ 0.01/60 V
Thermal current	I_{th} 10 A	0.5 A
Arrangement of contacts	01, 10, 02, 11, 20	01, 10, 02, 11, 20
Connection cross-section	S 0.5 ÷ 1 mm ²	0.5 ÷ 1 mm ²
Degree of protection of terminals (connected switch)	IP20	IP20

Type	SP-BHD-000Z	PS-BHD-0010/0020	PS-BHD-0010-Au/0020-Au
Rated operating voltage	U_n 250 V a.c. -	60 ÷ 250 V a.c. 60 ÷ 250 V d.c.	5 ÷ 60 V a.c. 5 ÷ 60 V d.c.
Rated insulation voltage	U_i 250 V	250 V	250 V
Rated frequency	f_n 50/60 Hz	50/60 Hz	50/60 Hz
Rated operating current	I_n/U_n I_n/U_n 1 A/250 V a.c. -	AC-15 : 1.5 A/250 V a.c. DC-13 : 0.2 A/250 V d.c.	AC-12, DC-12 0.004 ÷ 0.5 A/5 V, 0.004 ÷ 0.01/60 V
Thermal current	I_{th} -	6 A	0.5 A
Arrangement of contacts	02, 11, 20	001/002	001/002
Connection cross-section	S 0.5 ÷ 1 mm ²	0.5 ÷ 1 mm ²	0.5 ÷ 1 mm ²
Degree of protection of terminals (connected switch)	IP20	IP20	IP20

¹⁾ - PS-BHD-....- Au is not suitable to control electromagnetic loads

Type designation, number and type of contacts according to contact arrangement

Arrangement of contacts	Type	Number of contacts	Contact type
01	PS-BHD-1000 (-Au)	1	make
20	PS-BHD-2000 (-Au)	2	make
01	PS-BHD-0100 (-Au)	1	break
02	PS-BHD-0200 (-Au)	2	break
11	PS-BHD-1100 (-Au)	1+1	break+make
001	PS-BHD-0010 (-Au)	1	make-and-break
002	PS-BHD-0020 (-Au)	2	make-and-break

Function and names of switches according to their location in cavities

Position of switch	Switch name	Switch function
Cavity 1	Signal	signals tripping of circuit breaker by overcurrent release
Cavity 2	Relative	signals tripping of circuit breaker/switch-disconnector by releases, TEST push button or by the switch off button on the motor drive
Cavity 3 (4, 5, 6) ²⁾	Auxiliary	switch signals position of circuit breaker/switch-disconnector's main contacts
Cavity 10	Early	makes/breaks in advance before making the main contact of circuit breaker/switch-disconnector

²⁾ - cavities 4, 5, 6 are only for 4-pole design

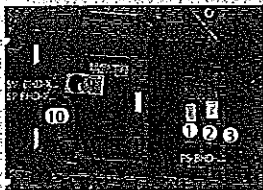
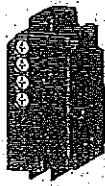
States of switches in the circuit breaker cavities

State of circuit breaker	Circuit breaker lever position	State of the main contacts	PS-BHD-1000	PS-BHD-0100	PS-BHD-1000	PS-BHD-0100	PS-BHD-1000	PS-BHD-0100	SP-BHD-0002	SP-BHD-0001	PS-BHD-2000	PS-BHD-1100	PS-BHD-0200	PS-BHD-0010	PS-BHD-0010	PS-BHD-0020	
switched on	⏏	1	1	0	0	1	0	1	0	1	1	0	1	0	0	1	0
switched off manually or by motor drive electrically (loaded state)	⏏	0	1	0	0	1	0	1	0	1	0	1	1	1	0	0	1
switched off by overcurrent release	⏏	0	0	1	1	0	0	1	0	1	0	1	1	0	1	0	0
switched off from switched on state: by auxiliary release, or by TEST push button or by the switch off button on the motor drive	⏏	0	1	0	1	0	0	1	0	1	0	1	1	1	0	1	0

State: 0 - contact open, 1 - contact closed

¹⁾ - cavities 4, 5, 6 are only for 4-pole design

SHUNT TRIPS



Cavities in BD250... switching unit

Specifications

Type	SV-BHD-X	
Rated operating voltage	U_e	24, 40, 48, 110, 230, 400, 500 V a.c. 24, 40, 48, 110, 220 V d.c.
Rated frequency	f_n	50/60 Hz
Input power at 1.1 U_e	AC DC	< 3 VA < 3 W
Characteristic		$U \geq 0.7 U_e$ the circuit breaker must trip
Time to switching off		20 ms
Loading time		∞
Connection cross-section	S	$0.5 \pm 1 \text{ mm}^2$
Degree of protection of terminals	(connected release)	IP20
Position in cavity No.		10

Type designation according to rated operating voltage

Rated operating voltage	Type
24, 40, 48 V a.c./d.c.	SV-BHD-X024
110 V a.c./d.c.	SV-BHD-X110
230, 400, 500 V a.c./220 V d.c.	SV-BHD-X230

The specific rated operating voltage of the release is set up by jumpers directly on the release. It is always set to the maximum value by default (see fig. 1).

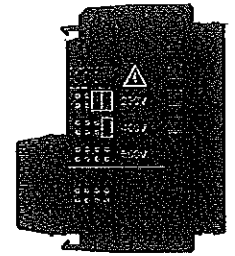
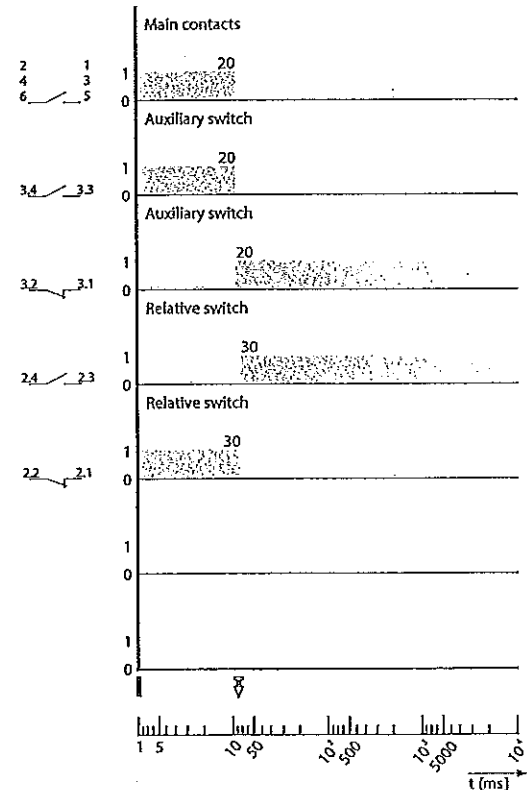
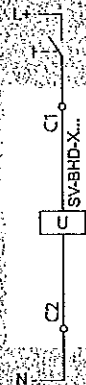


Fig. 1 - The rated operating voltage setting

Circuit breaker/switch-disconnector switching off by shunt trip



States and positions of circuit breaker/switch-disconnector lever

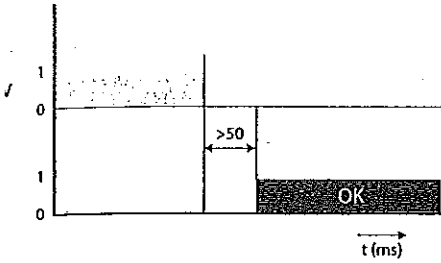
State of circuit breaker/switch-disconnector	Lever position of circuit breaker/switch-disconnector
Switched on	⏏
Switched off by releases, TEST or by switch off button on the motor drive	⏏
Switched off manually or by motor drive electrically (loaded state)	⊙

HUNT TRIPS

Specifications

Reaction time of the auxiliary releases

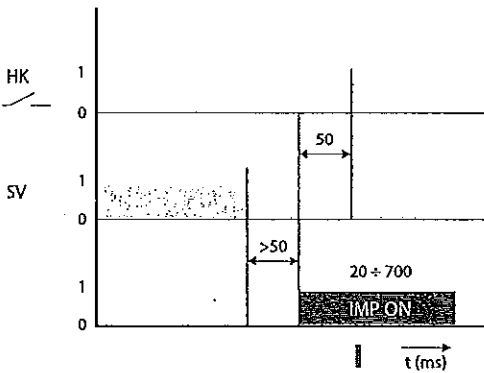
Shunt trip



Operation of motor drive and shunt trip

It is necessary to keep time delay when the control of the circuit breaker is done by motor drive and shunt trip or undervoltage release. The following time delays have to be kept between the disconnection of voltage from the shunt trip or bringing the voltage to the undervoltage release and the control pulse for switch on of the motor drive:

Shunt trip



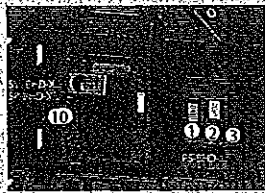
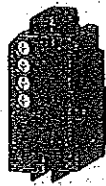
States and positions of circuit breaker/switch-disconnector lever

States of circuit breaker/switch-disconnector	Position of circuit breaker/switch-disconnector
Switched on	⏏
Switched off by releases, TEST or by switch off button on the motor drive	⏏
Switched off manually or by motor drive electrically (loaded state)	⦿

Description of graphs

Symbol	Description
HK	Main contacts
OK	Circuit breaker is ready for further handling
IMP ON	Make impulse for the motor drive
SV	Control voltage on the shunt trip
SP	Control voltage on the undervoltage release

UNDervOLTAGE RELEASES



Cavities in BD250... switching unit

Specifications

Type		SP-BHD-X...	SP-BHD-X...0001 ¹⁾
Rated operating voltage	U_e	24, 40, 48, 110, 230, 400, 500 V a.c. 24, 40, 48, 110, 220 V d.c.	24, 40, 48, 110, 230, 400, 500 V a.c. 24, 40, 48, 110, 220 V d.c.
Rated frequency	f_n	50/60 Hz	50/60 Hz
Input power at 1.1 U_e	AC DC	< 3 VA < 3 W	< 3 VA < 3 W
Characteristic ¹⁾		$U \geq 0.85 U_e$ - it is possible to switch on the circuit breaker $U \leq 0.35 U_e$ - the circuit breaker must trip	
Time to switching off		20 ms	20 ms
Loading time		∞	∞
Connection cross-section	S	$0.5 \div 1 \text{ mm}^2$	$0.5 \div 1 \text{ mm}^2$
Degree of protection of terminals	(connected release)	IP20	IP20
Position in cavity No.		10	10

Early switch			
Rated operating voltage	U_e	-	250 V a.c.
Rated frequency	f_n	-	50/60 Hz
Rated operating current	I_n / I_e	-	1 A / 250 V a.c.
Arrangement of contacts		-	10, 01
Connection cross-section	S	-	$0.5 \div 1 \text{ mm}^2$
Degree of protection of terminals	(connected release)	-	IP20

¹⁾ - tripping of the undervoltage release can be delayed using the delay unit BZ-BX-X230-A, for more detailed information see page P2
²⁾ - cannot be used in combination with motor drive MP-BD-X....

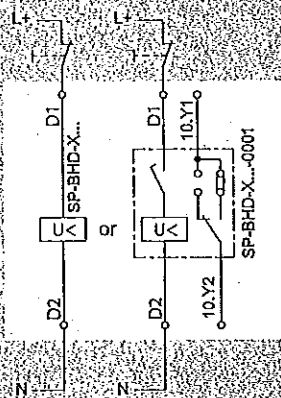
Number and type of contacts according to contact arrangement

Arrangement of contacts	Number of contacts	Contact type
01	1	break
10	1	make

Type designation according to rated operating voltage

Rated operating voltage	Type
24, 40, 48 V a.c.	SP-BHD-X02
110 V a.c./d.c.	SP-BHD-X11
230, 400, 500 a.c./220 V d.c.	SP-BHD-X23

The specific rated operating voltage of the release is set up by jumpers directly on the rele. It is always set to the maximum value by default (see fig. 1).



Circuit breaker/switch-disconnector switching off by undervoltage release

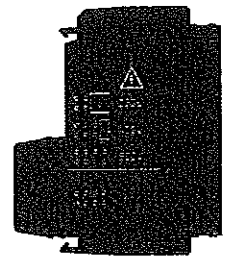
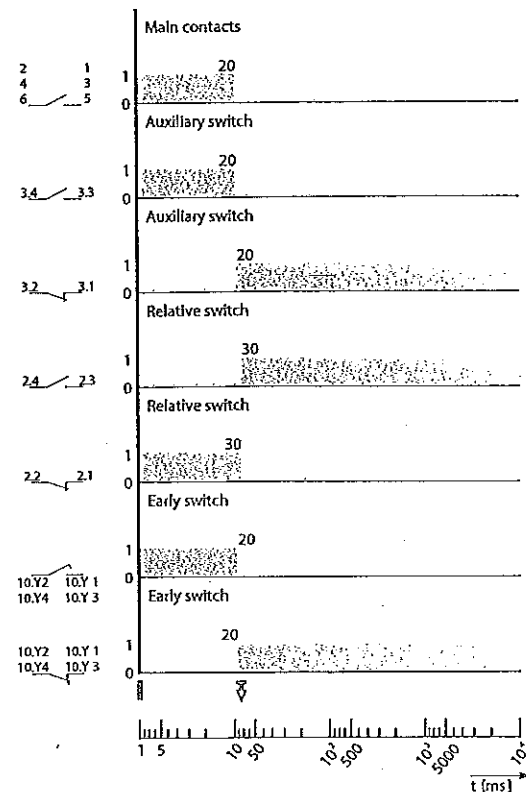
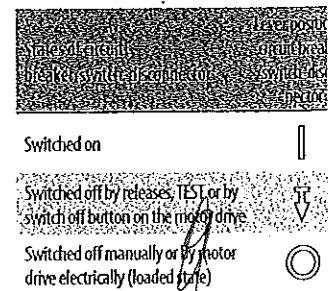


Fig. 1 - The rated operating voltage setting

States and positions of circuit breaker switch-disconnector lever

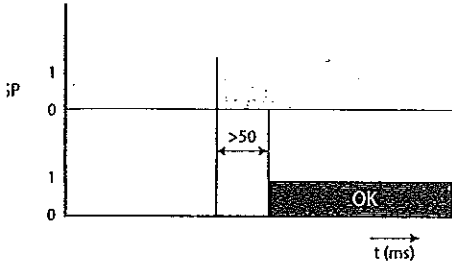


UNDervOLTAGE RELEASES

Specifications

reaction time of the auxiliary releases

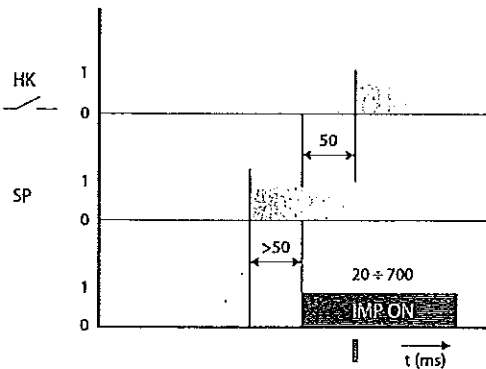
Undervoltage release



Cooperation of motor drive and undervoltage release

It is necessary to keep time delay when the control of the circuit breaker is done by motor drive and shunt trip or undervoltage release. The following time delays have to be kept between the disconnection of voltage from the shunt trip or bringing the voltage to the undervoltage release and the control impulse for switch on of the motor drive:

Undervoltage release



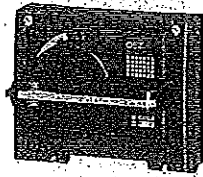
States and positions of circuit breaker/switch-disconnector lever

Switched on	⏏
Switched off by releases, TEST or by switch off button on the motor drive	⏏
Switched off manually or by motor drive electrically (loaded state)	⊙

Description of graphs

Symbol	Meaning
HK	Main contacts
OK	Circuit breaker is ready for further handling
IMP ON	Make impulse for the motor drive
SV	Control voltage on the shunt trip
SP	Control voltage on the undervoltage release

HAND DRIVES



Description

The hand drive permits controlling the circuit breaker/switch-disconnector by turning the lever, e.g. to switch machines on and off. Modular conception of the drives enables simple mounting on the switching unit (also additionally) after the cover of cavities is removed. The fixed drive can be sealed. The drive and its accessories are ordered separately according to your choice, see page E12.

- The hand drive makes possible to control the circuit breaker:
 - a) from the front panel (fig. 1)
 - Hand drive unit RP-BD-CK..
 - + Hand drive lever RP-BHD-CP..

- b) through the switchboard door (fig. 2)
 - Hand drive unit RP-BD-CK..
 - + Extension shaft RP-BHD-CH..
 - + Hand drive bearing PR-BHD-CN..
 - + Hand drive lever + RP-BHD-CP..

- The hand drive unit is fixed directly to switching unit of the circuit breaker
- The hand drive bearing is fixed to the switchboard door and it provides degree of protection IP40 or IP66.
- Hand drive lever is fixed on the hand drive unit or on the hand drive bearing.
- The extension shaft is supplied in two options, standard (length 365 mm - can be shortened) and telescopic (adjustable length 245 ÷ 410 mm).

Enhanced safety for operator:

- The hand drive unit and hand drive lever are also supplied with the possibility to lock the circuit breaker in position „switched off manually“. The unit and lever of the hand drive can be locked using three padlocks with shank diameter max. 6 mm.
- Each hand drive bearing prevents the door from opening when the circuit breaker is switched on or in a state of being switched off by releases and in the circuit breaker state „switched off manually“ and hand drive lever is locked up.
- Two circuit breakers with hand drives can be fitted also with reciprocal mechanical interlocking or mechanical parallel switching, see page E67.

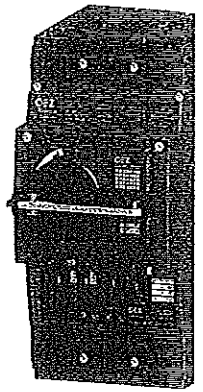


Fig. 1 - DIMENSIONS, see page E12

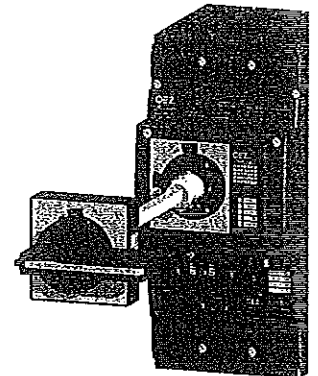
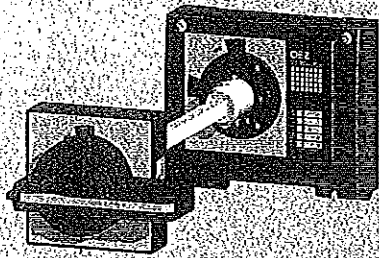
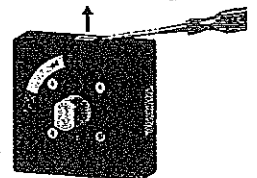


Fig. 2 - DIMENSIONS, see page E12

By a screwdriver it is possible to unlock the mechanism of the switchboard door opening with the circuit breaker switched on (for bearing RP-BHD-CN40 and RP-BHD-



Specification

Type	Description	Colour	Locking	Control	Protection	Switched on	Switched off manually	Switched off manually and padlocked	Switchboard opening with circuit breaker switched on
RP-BD-CK10	Hand drive unit	blue	no	-	-	-	-	-	-
RP-BD-CK20	Hand drive unit	blue	yes	-	-	-	-	-	-
RP-BD-CK21	Hand drive unit	yellow	yes	-	-	-	-	-	-
RP-BD-CK30	Hand drive unit - right side	blue	-	-	-	-	-	-	-
RP-BD-CK31	Hand drive unit - left side	blue	-	-	-	-	-	-	-
RP-BHD-CP10	Hand drive lever	black	no	-	-	-	-	-	-
RP-BHD-CP20	Hand drive lever	black	yes	-	-	-	-	-	-
RP-BHD-CP21	Hand drive lever	red	yes	-	-	-	-	-	-
RP-BHD-CN40	Hand drive bearing	black	-	IP40	yes	yes	yes	yes	yes
RP-BHD-CN41	Hand drive bearing	yellow	-	IP40	yes	yes	yes	yes	yes
RP-BHD-CN60	Hand drive bearing	black	-	IP66	yes	yes	yes	yes	no
RP-BHD-CN61	Hand drive bearing	yellow	-	IP66	yes	yes	yes	yes	no
RP-BHD-CH10	Extension shaft	-	-	-	-	-	-	-	-
RP-BHD-CH20	Extension shaft - telescopic	-	-	-	-	-	-	-	-

365 (shorter)
245 ÷

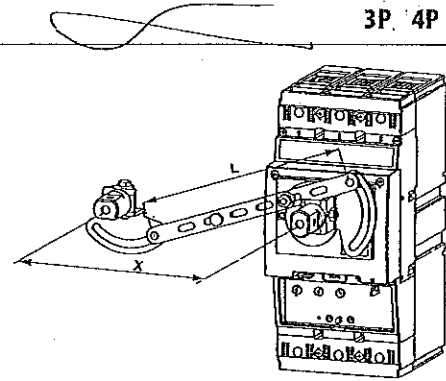
MECHANICAL INTERLOCKING AND PARALLEL SWITCHING



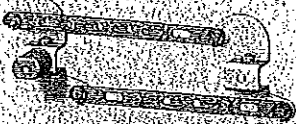
RP-BHD-CB10 Mechanical interlocking

Provides mechanical interlocking of two circuit breakers/switch-disconnectors so that they cannot both be tripped simultaneously, but only one of them at a time. Both circuit breakers may be switched off simultaneously. Interlocking can be used between two BD250 circuit breakers or between BD250 and BH630 circuit breakers. Both circuit breakers must be equipped with a hand drive (at least one with a hand drive unit and hand drive lever), see page E66.

In order to use the interlocking, it is absolutely necessary to comply with the dimensions that are shown in the figure and given in the table.



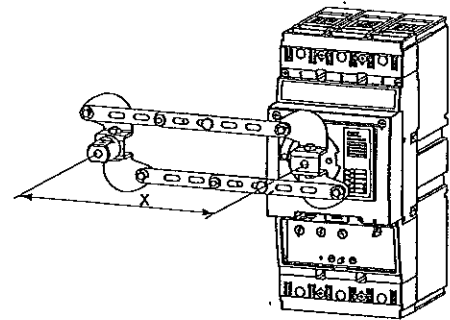
Dimension (mm)	Right switching unit							
	BD250		BD250L		BH630S		BH630	
Left switching unit								
BD250..3..	105	112	140	145.5	122.5	128.5	181	185.5
BD250..4..	105	112	140	145.5	122.5	128.5	181	185.5
BH630..3..	122.5	128.5	157.5	162.5	140	145.5	185	189
BH630..4..	122.5	128.5	157.5	162.5	140	145.5	185	189



RP-BHD-CD10 Mechanical parallel switching

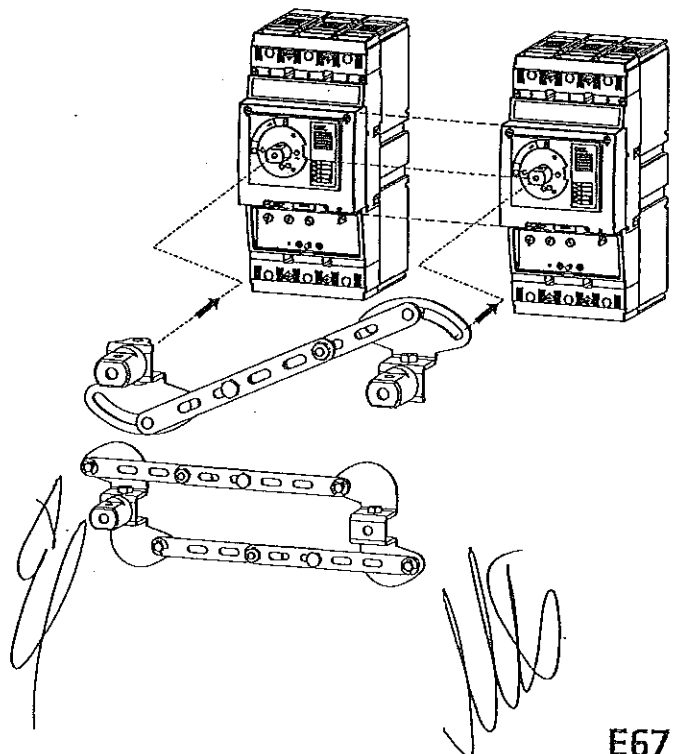
Enables for simultaneous switching of two circuit breakers/switch-disconnectors. Parallel switching can be used between two BD250 circuit breakers or between BD250 and BH630 circuit breakers. Both circuit breakers must be equipped with a hand drive unit and at least one with a hand drive lever, see page E66.

In order to use parallel switching, it is absolutely necessary to comply with the dimensions that are shown in the figure and given in the table.

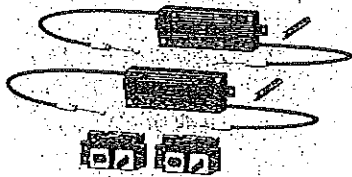


Dimension (mm)	Right switching unit							
	BD250		BD250L		BH630S		BH630	
Left switching unit								
BD250..3..	105 ^{*)}	164.5 ^{*)}	122.5 ^{*)}	164.5 ^{*)}	122.5 ^{*)}	164.5 ^{*)}	X	X
BD250..4..	105 ^{*)}	164.5 ^{*)}	122.5 ^{*)}	164.5 ^{*)}	122.5 ^{*)}	164.5 ^{*)}	X	X
BH630..3..	122.5 ^{*)}	164.5 ^{*)}	140 ^{*)}	164.5 ^{*)}	140 ^{*)}	164.5 ^{*)}	X	X
BH630..4..	122.5 ^{*)}	164.5 ^{*)}	140 ^{*)}	164.5 ^{*)}	140 ^{*)}	164.5 ^{*)}	X	X

^{*)} - Switching unit BH630..4.. (4-pole design) can only be on the left side



MECHANICAL INTERLOCKING



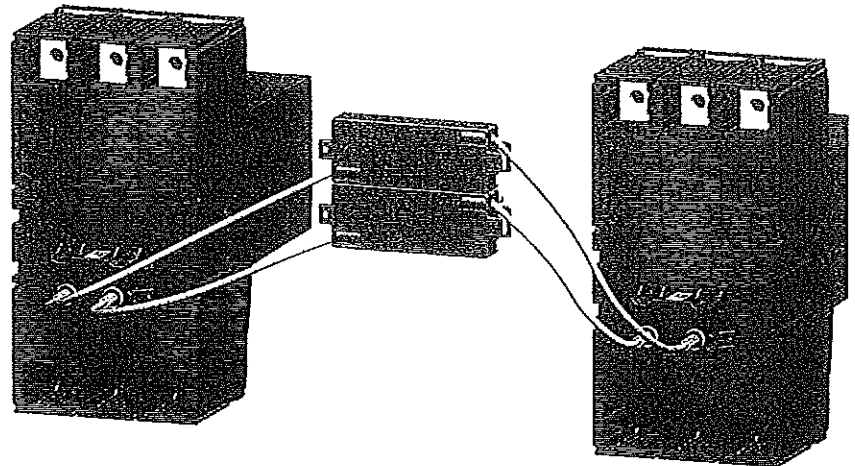
Mechanical interlocking

MB-BD-PV05

MB-BHD-PV03

- Provides mechanical interlocking of two circuit breakers/switch-disconnectors so that they cannot both be tripped simultaneously, but only one of them at a time. Both circuit breakers may be switched off simultaneously.
- Mechanical interlocking MB-BD-PV05 is intended for two BD250 circuit breakers. Interlocking MB-BHD-PV03 is intended for one BD250 circuit breaker and one BH630.
- Circuit breakers may be in fixed, plug-in and withdrawable designs.

Type of circuit breaker	BD250	BD250
	BD250	BH630
Type of mechanical interlocking	MB-BD-PV05	MB-BHD



Circuit breaker placement in switchboard

Detailed information can be found in the Instructions for use, which you may download from our website www.oez.com.

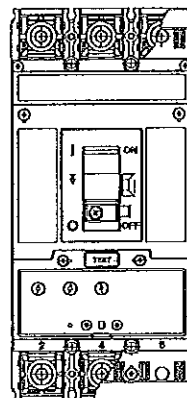
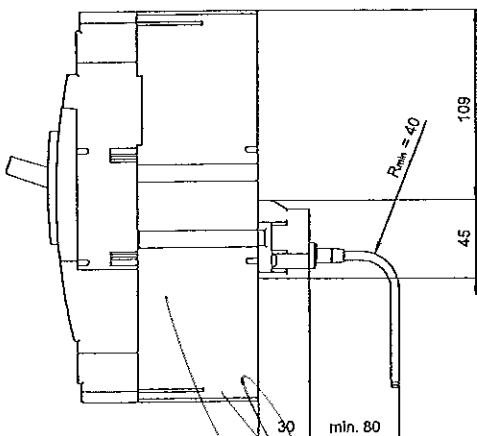
Recommended circuit breaker manipulation

During the manipulation with circuit breaker with mechanical interlocking and motor drive, the circuit breaker may reach the state, in which the first attempt at switching on by motor drive is unsuccessful. Switching on is executed after repeated make impulse. To avoid this effect, some of the following steps may be done:

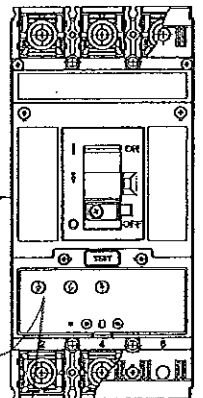
- 1) To keep the process of manipulation with the circuit breaker, see „Recommended circuit breaker manipulation“ below
- 2) To connect OD-BHD-R... control relay into the motor drive circuit according to wiring diagram, see page E74

Recommended process of manipulation

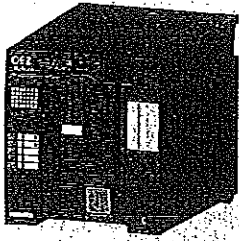
- 1) Shunt trip/undervoltage release must be used to off the circuit breaker. Circuit breaker switching cannot be made by motor drive
- 2) Circuit breaker can be stored and switched on the second circuit breaker is in switch-off mode. breaker status indicator on motor drive is in „0“ p Between storing and switching on the circuit breaker it is necessary to keep the time interval min. 1 Switch „S“ must be disconnected.
- 3) In case of infringement of these principles, the switching on of circuit breaker is unsuccessful.



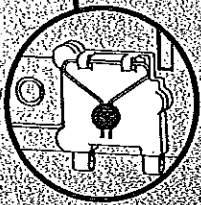
0 + 700



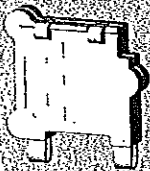
OTOR DRIVES



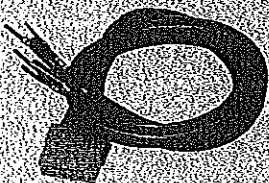
DIMENSIONS: see page E30



Cover of switch on button OD-BHD-KT01



Connecting cable OD-BHD-KA02



Description

- It is used for remote control of the circuit breaker (switch OFF/ON).
- Simple mounting on the circuit breaker after the circuit breaker cover of cavities is removed.
- Usage in industrial applications e.g. switching of stand by units etc. or wherever the automatic operation of electric devices is needed.
- In order to speed up the circuit breaker's switch off (e.g. safety STOP button) the undervoltage release or shunt trip can be used.
- On the motor drive front panel there is a change-over switch to select the drive modes AUTO/MANUAL:
 - AUTO mode – remote control. The circuit breaker is controlled by buttons for remote switch off/on, furthermore in this position mechanical control can be used on the front panel of the motor drive
 - MANUAL mode – manual control. Control voltage is not needed. The circuit breaker can be switched on using the green switch on button and switched off using the red switch off button on the front part of the drive cover. Electric switch on is blocked. Electric switch off is functional. The accumulation of energy can be done by means of hinged lever.
- Possibility to indicate remotely the state of the AUTO/MANUAL switch.
- Switch S (external switch – has to be bought separately) enables the choice of automatic accumulation of energy (circuit breaker loading).
 - automatic accumulation of energy is on (S switch switched on): after tripping of the circuit breaker by the overcurrent release, by auxiliary release, or by TEST push button or by the switch off button on the motor drive motor drive immediately accumulates energy (circuit breaker loading), motor drive is then ready to switch on the circuit breaker

- automatic accumulation of energy is switched off (S switch open): after tripping of the circuit breaker by the overcurrent release, by auxiliary release, or by TEST push button or by the switch off button on the motor drive both motor drive and circuit breaker stay in position „switched off by releases“. In this position motor drive waits for the impulse from switch S. When the impulse is brought in the motor drive accumulates energy (turn on the circuit breaker) and after this loading the motor drive is ready to switch on the circuit breaker. It is not possible to switch on the circuit breaker when motor drive is not loaded.

- Front panel state indicating device of the stored energy signals the state of motor drive storage devices. The state can be signalled from a distance.
- The drive may be furnished with an electromechanical counter of cycles.
 - internal design on the motor drive cover
 - external design OD-BHD-PP01 for mounting on the switchboard's door or inside the switchboard by means of metal holder, that is part of the delivery
- Motor drive can be sealed by means of bolt sealing insert (OD-BD-VP01).
- Drive can be locked in off position by up to three padlocks (shank diameter max. 4.3 mm).
- Switch on button can be covered and sealed (OD-BHD-KT01).
- Drive is connected by multi-pole connector with cavities (in order to connect cables special tongs have to be used).
- Drive can be furnished with cable (OD-BHD-KA02), that has on one side connector to the motor drive and on the other side free terminals for connection to etc. switchboard's terminal block.

Specifications

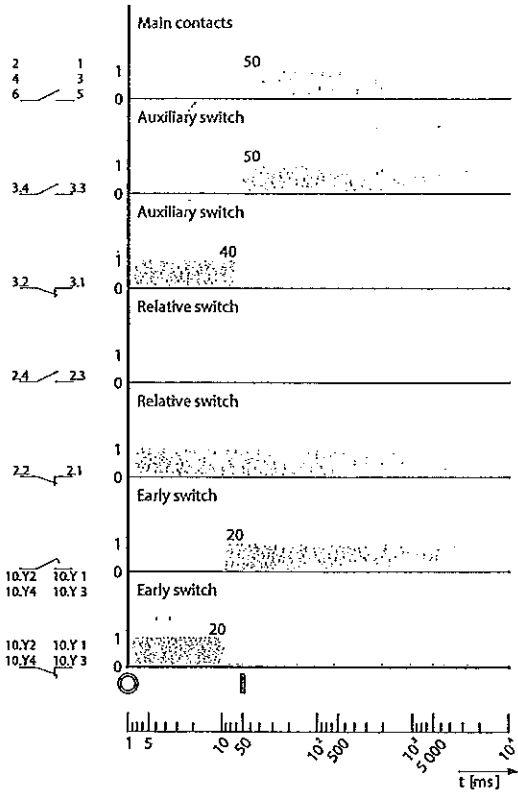
Type		MB-BD-X	MB-BD-X-1
Operating voltage	U_c	24, 48, 110, 230 V a.c. 24, 48, 110, 220 V d.c.	
Rated frequency	f	50/60 Hz	
Control impulse length for storage		400 ms + ∞ ¹⁾	
Control impulse length for switching on for switching off		20 ms – 700 ms 400 ms + ∞ ¹⁾	
Time to switching on		< 50 ms	
Time to switching off		800 ms	
Frequency of cycles ON/OFF		3 cycles/min	
Frequency of cycles - instant successive ON/OFF		10 cycles	
Mechanical endurance		30 000 cycles	
Input power	AC DC	100 VA 100 W	
Protection	24, 48, 110 V a.c.; 230 V a.c. 24, 48, 110 V d.c.; 220 V d.c.	LPN-4C-1; LPN-2C-1 LPN-DC-4C-1; LPN-DC-2C-1	
Rated operating current of the change-over switch AUTO/MANUAL	I _{1/U}	5 A/250 V a.c. 0.5 A/250 V d.c.	
Type		OD-BHD-KA02	
Number of conductors		12	
Conductor cross-section	S	0.35 mm ²	
Conductor lengths		0.6 m	

¹⁾ - for sequence of control impulses, see page E72

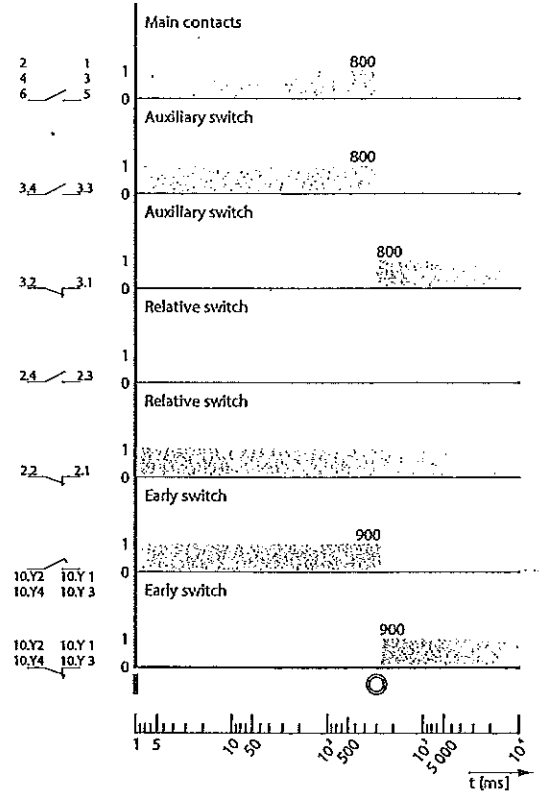
MOTOR DRIVES

Specifications

Circuit breaker switching on by motor drive - electrically by ON push button

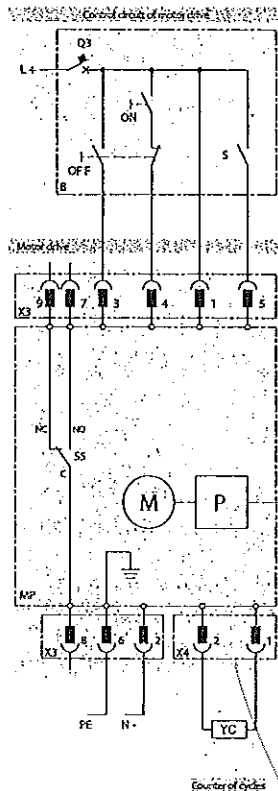


Circuit breaker switching off by motor drive - electrically by OFF push button

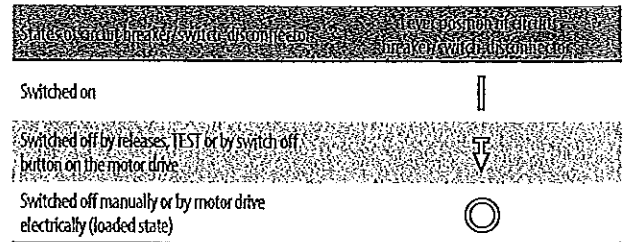


Diagram

Circuit breaker switching on and off by motor drive - electrically by ON and OFF push button



States and positions of circuit breaker/switch-disconnector lever



Wiring diagram description

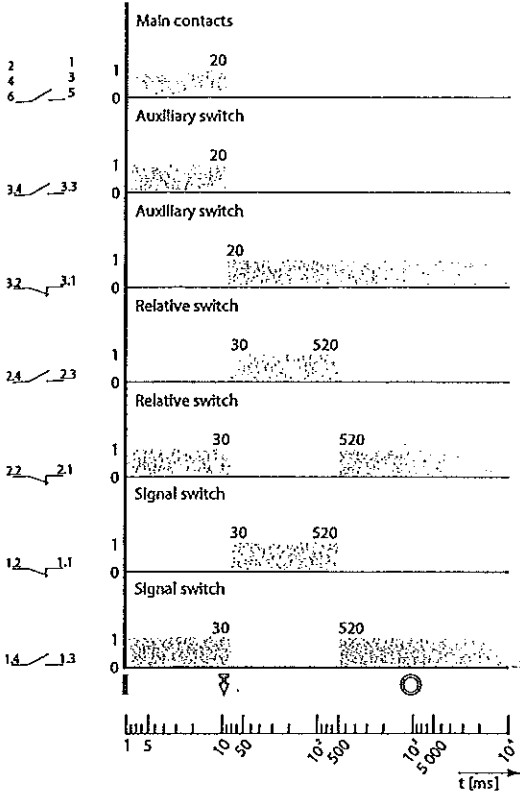
Symbol	Description
MP	motor drive MP-BD-X...
M	motor
P	storage device
X3	connector for connection of control circuits
X4	connector for external counter of cycles
SS*)	switch to indicate AUTO (NO-C)/MANUAL (NC-C) modes
YC	external counter of cycles OD-BHD-PP01
B	recommended wiring of the control circuits (not included in motor drive order)
ON	switch off button
OFF	switch off button
S	switch for energy storage (switched on = automatic storage, may be continuously switched on)
Q3	motor drive circuit breaker - see page E68

*) for custom production it is possible to make the design with signalling of storage device state

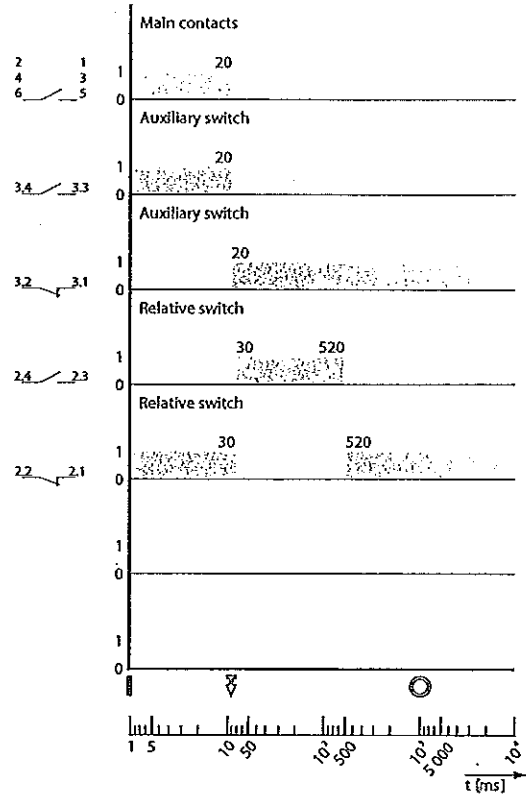
MOTOR DRIVES

Specifications

Switching off of the circuit breaker with motor drive by overcurrent release (S switch in switched on state-automatic storage)

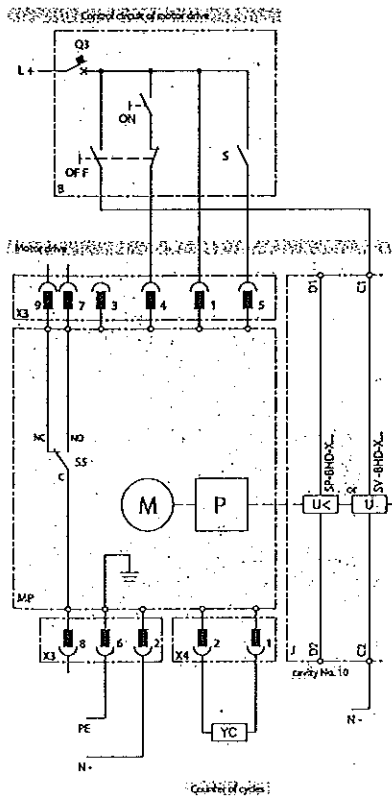


Switching off of the circuit breaker with motor drive by shunt trip or undervoltage release (switch s in switched on state-automatic storage)

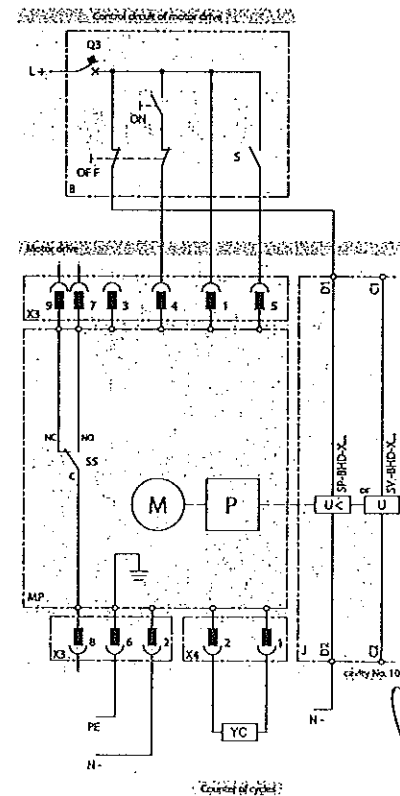


Diagram

Circuit breaker switching on by motor drive (electrically by ON push button) and tripping by shunt trip



Circuit breaker switching on by motor drive (electrically by ON push button) and tripping by undervoltage release

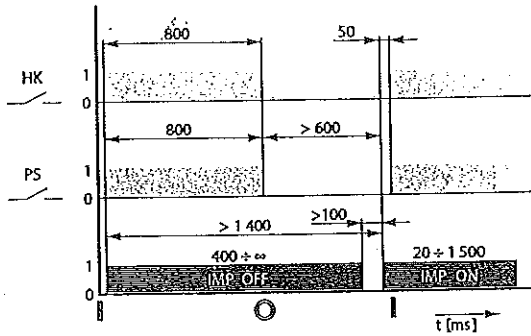


MOTOR DRIVES

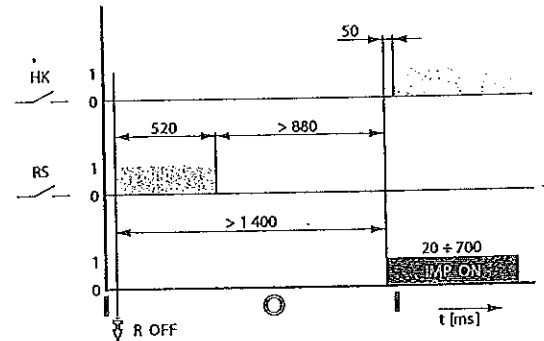
Specifications

Recommended control impulses

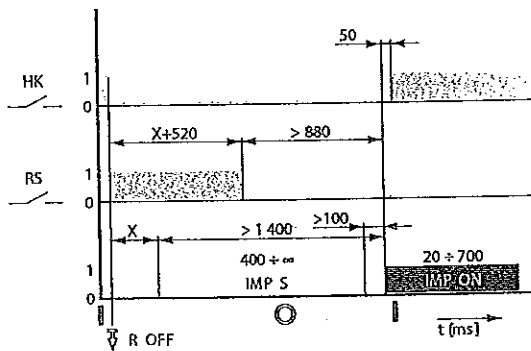
Circuit breaker switching on and off by motor drive
 - S switch permanently switched on (automatic storage) or open



Circuit breaker switching off by overcurrent or auxiliary release and switching on by motor drive - S switch permanently switched on (automatic storage)



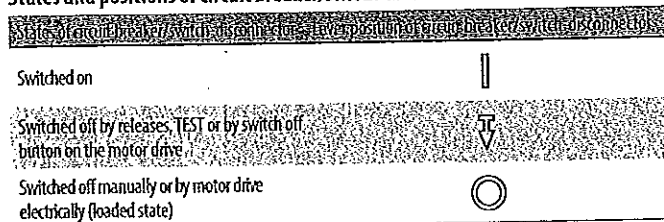
Circuit breaker switching off by overcurrent or auxiliary release and switching on by motor drive - S switch switched on only for storing up



Description of graphs

Symbol	Description
HK	main contacts
PS	auxiliary switch
RS	relative switch
R OFF	circuit breaker closing instant by release of circuit breaker
IMP S	impulse to store up motor drive energy (generated by S switch)
IMP ON	make impulse for the motor drive
IMP OFF	break impulse for the motor drive
X	random segment of time

States and positions of circuit breaker/switch-disconnector lever



[Handwritten signature]

[Handwritten signature]

MOTOR DRIVES

Diagram

Recommended wiring diagram of connecting the circuit breaker and control circuits in withdrawable/plug-in design with motor drive

Connecting with control relays

Operating voltage U_e 24 V a.c./d.c., 48 V a.c./d.c., 110 ÷ 230 V a.c., 110 V d.c.

Switching off by motor drive

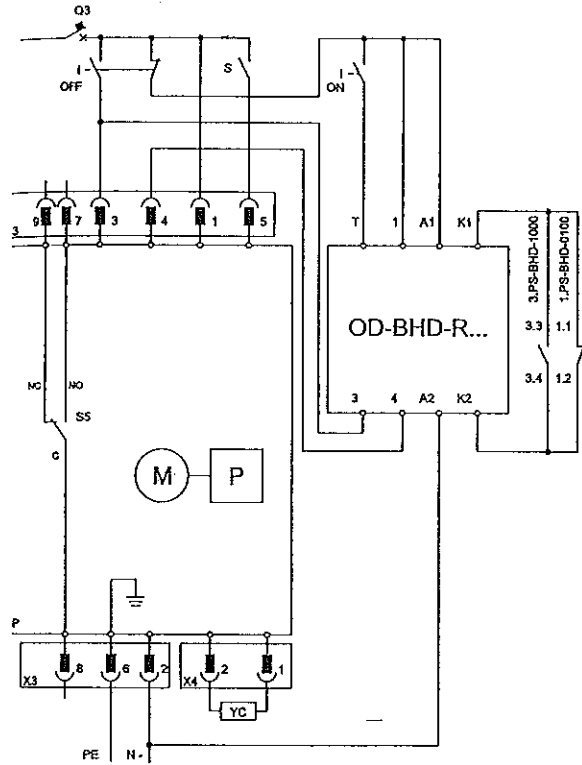


Diagram description

Symbol	Description
MP	motor drive - U_e of drive must be the same as U_e of control relay
M	motor
P	storage device
X3	connector for connection of control circuits
X4	connector for external counter of cycles
S5	switch to indicate AUTO (NO-C) / MANUAL (NC-C) modes
YC	external counter of cycles OD-BHD-PP01 (not included in motor drive order)
OFF	switch off button
S	switch for energy storage
Q3	motor drive circuit breaker for 24 V a.c. LPN-4C-1 for 48 V a.c. LPN-4C-1 for 110 V a.c. LPN-4C-1 for 230 V a.c. LPN-2C-1 for 24 V d.c. LPN-DC-4C-1 for 48 V d.c. LPN-DC-4C-1 for 110 V d.c. LPN-DC-4C-1 for 220 V d.c. LPN-DC-2C-1
OD-BHD-R...	control relay for 24 V a.c./d.c. OD-BHD-RX01 for 48 V a.c./d.c. OD-BHD-RX02 for 110 ÷ 230 V a.c. OD-BHD-RA03 for 110 V d.c. OD-BHD-RD04
3.PS-BHD-1000	auxiliary switch
1.PS-BHD-0100	signal switch

- impulse on T terminal reacts to trailing edge

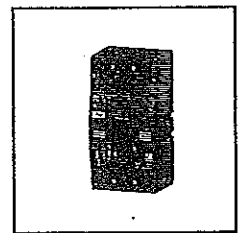
[Handwritten signature]

[Handwritten signature]

8



MOULDED CASE CIRCUIT BREAKERS BH630N, BH630S



[Handwritten signature]

[Handwritten mark]

[Handwritten signature]

MOTOR DRIVES

Diagram

Recommended wiring diagram of connecting the circuit breakers control circuits with mechanical interlocking and motor drive (applicable for any circuit breaker)

- connecting with control relays
- operating voltage U_c 24 V a.c./d.c., 48 V a.c./d.c., 110 ÷ 230 V a.c., 110 V d.c.

Switching off is possible only by undervoltage release or shunt trip

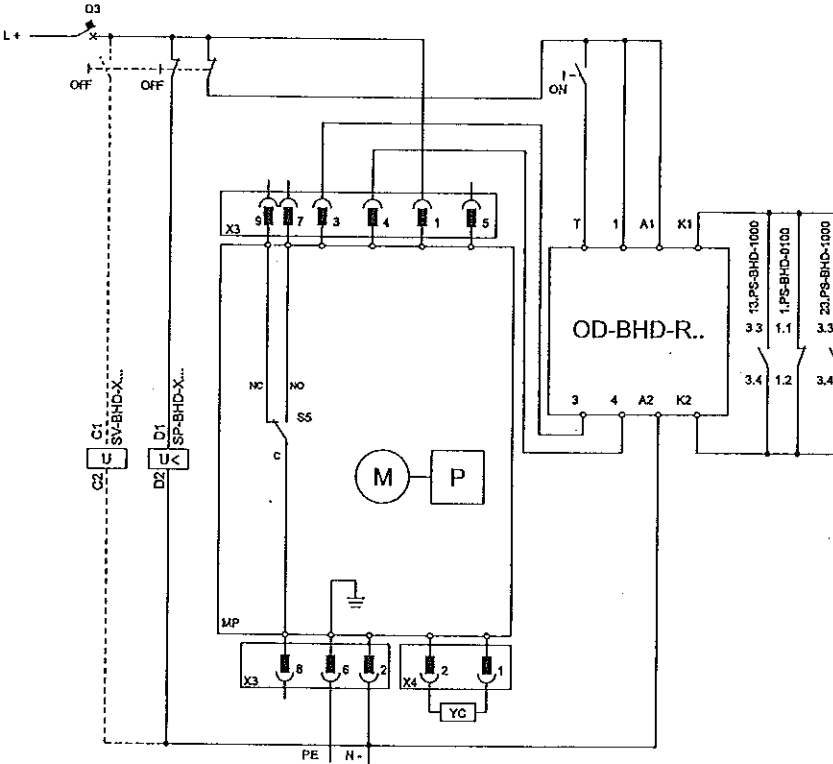


Diagram description

Symbol	Designation
MP	motor drive - U_c of drive must be the same as U_c of control relay
M	motor
P	storage device
X3	connector for connection of control circuits
X4	connector for external counter of cycles
SS	switch to indicate AUTO (NO-C) / MANUAL (NC-C) modes
YC	external counter of cycles OD-BHD-PP01
OFF	switch off button
Q3	motor drive circuit breaker for 24 V a.c. LPN-4C-1 for 48 V a.c. LPN-4C-1 for 110 V a.c. LPN-4C-11 for 230 V a.c. LPN-2C-1 for 24 V d.c. LPN-DC-4C-1 for 48 V d.c. LPN-DC-4C-1 for 110 V d.c. LPN-DC-4C-1 for 220 V d.c. LPN-DC-2C-1
OD-BHD-R..	control relay for 24 V a.c./d.c. OD-BHD-RX01 for 48 V a.c./d.c. OD-BHD-RX02 for 110 ÷ 230 V a.c. OD-BHD-RA03 for 110 V d.c. OD-BHD-RD04
1.PS-BHD-0100	signal switch
13.PS-BHD-1000	switch inserted in cavity 1 (first circuit breaker) - auxiliary switch
23.PS-BHD-1000	switch inserted in cavity 3 (second circuit breaker) - auxiliary switch
UV-BHD-X...	undervoltage release - U_c of release must be the same as U_c of control relay
SV-BHD-X...	shunt trip - U_c of release must be the same as U_c of control relay

- impulse on T terminal reacts to trailing edge

COMMERCIAL INFORMATION

<input type="checkbox"/> Switching units, plug-in device, withdrawable device.....	F4
<input type="checkbox"/> Overcurrent releases, switch-disconnector unit.....	F6
<input type="checkbox"/> Residual current monitor.....	F7
<input type="checkbox"/> Current transformers for residual current monitor.....	F7
<input type="checkbox"/> Connecting sets.....	F8
<input type="checkbox"/> Mounting sets.....	F10
<input type="checkbox"/> Switches.....	F11
<input type="checkbox"/> Shunt trips.....	F11
<input type="checkbox"/> Undervoltage releases.....	F11
<input type="checkbox"/> Delay unit.....	F11
<input type="checkbox"/> Hand drives.....	F12
<input type="checkbox"/> Mechanical interlocking and parallel switching.....	F12
<input type="checkbox"/> Motor drives.....	F12
<input type="checkbox"/> Control relay.....	F12
<input type="checkbox"/> Accessories.....	F14

TECHNICAL INFORMATION

<input type="checkbox"/> Circuit breakers, switch-disconnectors	
- specifications.....	F15
- diagram.....	F16
- connecting, mounting.....	F18
- deionization spaces.....	F22
- dimensions.....	F24
<input type="checkbox"/> Plug-in device - description, specifications, diagram.....	F48
<input type="checkbox"/> Withdrawable device - description, specifications, diagram.....	F50
<input type="checkbox"/> Overcurrent releases	
DTV3 - distribution	
- description, specifications.....	F52
MTV8 - motor	
- description, specifications.....	F53
L001 - lines	
- description, specifications.....	F55
MTV9 - motor with adjustable timing selectivity	
- description, specifications.....	F56
4D01 - distribution with N-pole protection	
- description, specifications.....	F58
<input type="checkbox"/> Connecting sets - specifications.....	F19
<input type="checkbox"/> Switches - specifications, diagram.....	F59
<input type="checkbox"/> Shunt trips - specifications.....	F60
<input type="checkbox"/> Undervoltage releases	
- specifications.....	F62
<input type="checkbox"/> Hand drives - description, specifications.....	F64
<input type="checkbox"/> Mechanical interlocking and parallel switching	
- description, specifications, dimensions.....	F65
<input type="checkbox"/> Motor drives - description, specifications, diagram.....	F67

By

SUMMARY OF MODELS AND ACCESSORIES

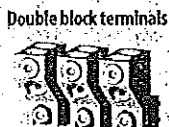
CONNECTING SETS



CS-BH-T011



CS-BH-B011, CS-BH-B012



Double block terminals
CS-BH-B021, CS-BH-B022



Block terminals
CS-BH-B031, CS-BH-B032



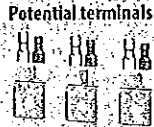
Block terminals
CS-BH-B014



Rear connection
CS-BH-A021

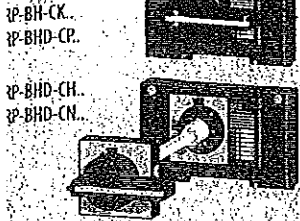


Front connection
CS-BH-A011



Potential terminals
CS-BH-PS01

HAND DRIVES



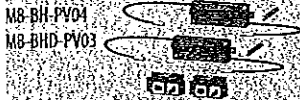
Mechanical parallel switching



Mechanical interlocking



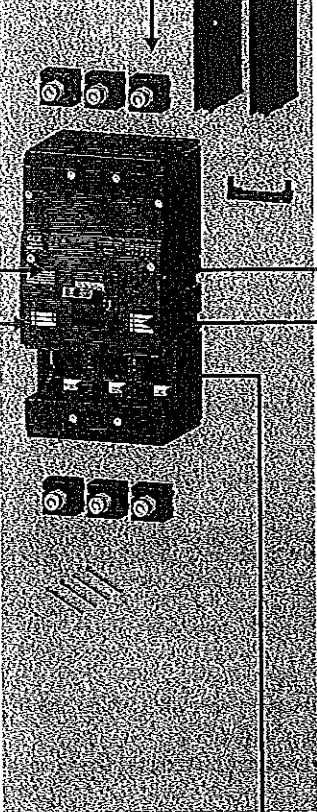
Mechanical blocking with Bowden cable



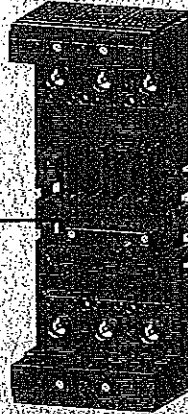
MOTOR DRIVES



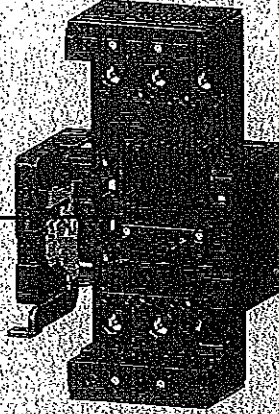
SWITCHING UNIT
BH630SE305
BH630NE305



PLUG-IN DEVICE
Z0-BH-0630-300



WITHDRAWABLE DEVICE
ZV-BH-0630-300



SWITCHES PS-BHD

Simple



Double



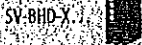
Make-and-break



Early



SHUNT TRIP



UNDERVOLTAGE RELEASE



OVERCURRENT RELEASES



SE-BH-11001



SE-BH-07A3



SE-BH-11V8



SE-BH-11V9

SWITCH-DISCONNECTOR UNIT

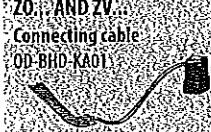


SP-BH-0630-V001



SE-BH-0630-11D01

ACCESSORIES TO Z0... AND ZV...



Signalling of position



Keying set



ACCESSORIES

Lever with locking



OD-BH-UP01

Sealing insert



OD-BH-VP01

Additional cover for overcurrent release



OD-BH-VP02

Terminal cover



OD-BH-KS02

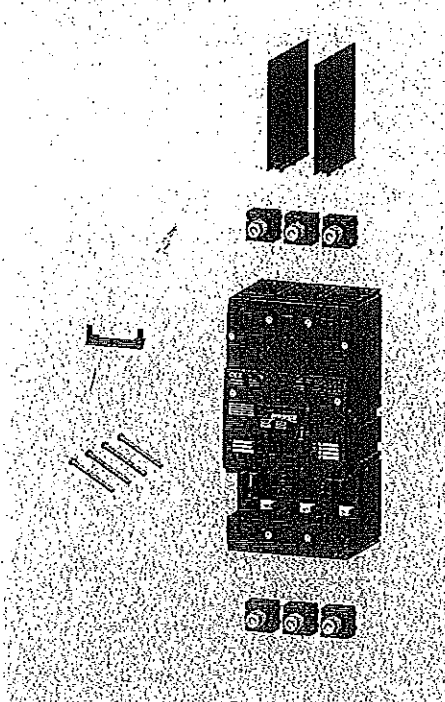
Insulating barriers



OD-BHD-KS02

SWITCHING UNITS

3P



Type	Product code	[kA]	[kA]	Weight (kg)	Package (pc)
BH630NE305	14412	630	36	5.3	1
BH630SE305	14413	630	65	5.3	1

- TECHNICAL INFORMATION, see page F15

- the method of power circuit connection must observe recommendations, see page F18 as well as deionization space, see page F2

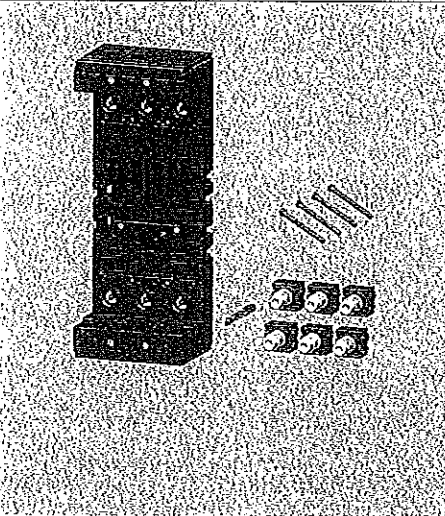
- Switching unit: includes - 2 CS-BH-A011 connecting sets - for connecting busbars or cable lugs¹⁾
- insulating barriers OD-BHD-KS02
- mounting bolts set OD-BH-MS01 (4x M5x35)
- conductor holder OD-BH-DV01

must be fitted with - by overcurrent release SE-BH-....-.... (circuit breaker)
or switch-disconnector unit SE-BH-0630-V001 (switch-disconnector)

¹⁾ - for connecting in another way, it is necessary to use CS-BH-... connecting sets, see page F8

PLUG-IN DEVICE

3P



Type	Product code	Name	Weight (kg)	Package (pc)
Z0-BH-0630-300	14556	Plug-in device	2.61	1

- TECHNICAL INFORMATION, see page F48

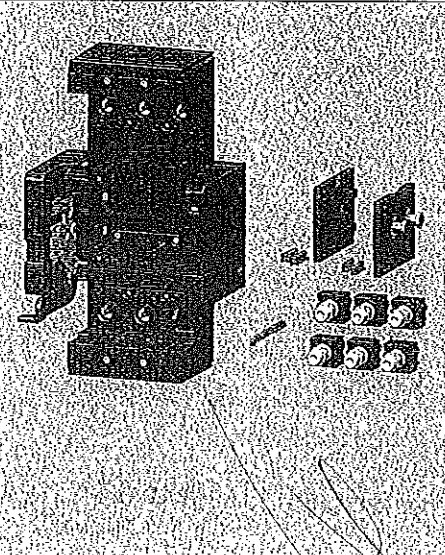
- Plug-in device: includes - complete accessories for assembly circuit breakers/switch-disconnectors in plug-in design
- mounting bolts set (4x M5x45) for affixing switching unit to plug-in device

must be fitted with - switching unit BH630..305

- for connecting plug-in device with busbars or cable lugs, connecting sets CS-BH-A011 can be used, that are included the package of the BH630..305 switching unit - for connecting in another way, it is necessary to use CS-BH-... connecti sets, see page F8

WITHDRAWABLE DEVICE

3P



Type	Product code	Name	Weight (kg)	Package (pc)
ZV-BH-0630-300	14553	Withdrawable device	3.664	1

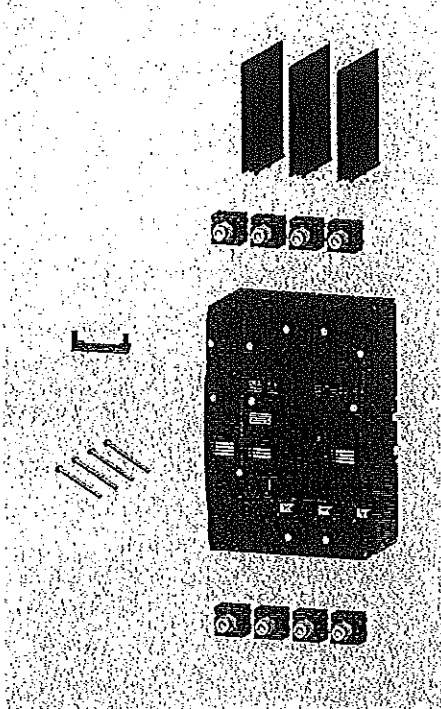
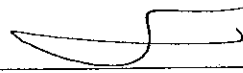
- TECHNICAL INFORMATION, see page F50

- Withdrawable device: includes - complete accessories for assembly circuit breakers/switch-disconnectors in withdrawable design

must be fitted with - switching unit BH630..305

- for connecting withdrawable device with busbars or cable lugs, connecting sets CS-BH-A011 can be used, that are included in the package of the BH630..305 switching unit - for connecting in another way, it is necessary to use CS-BH-... connecti sets, see page F8

SWITCHING UNITS



Type	Product code	I _N (A)	I _B (kA)	Function	Weight (kg)	Package (pc)
BH630NE405	19583	630	36	3P + N - conductor switching	6.65	1
BH630SE405	19585	630	65	3P + N - conductor switching	6.65	1
BH630NE406	19584	630	36	4P - conductor protection	7	1
BH630SE406	19586	630	65	4P - conductor protection	7	1

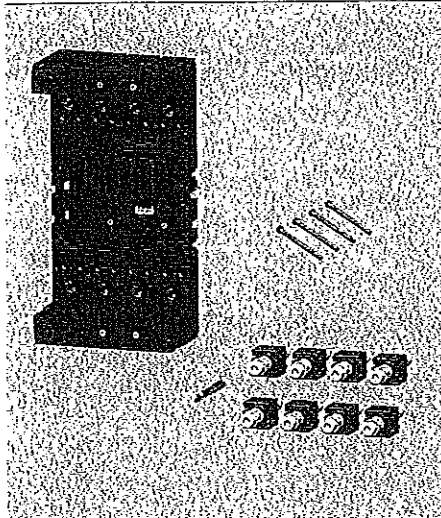
- TECHNICAL INFORMATION, see page F15
 - the method of power circuit connection must observe recommendations, see page F18 as well as deionization space, see page F22

- Switching unit: includes - 2 connecting sets - for connecting busbars or cable lugs¹⁾
 - insulating barriers
 - mounting bolts set OD-BH-MS01 (4x M4x35)
 - conductor holder OD-BH-DV01

must be fitted with - by overcurrent release SE-BH-..... (circuit breaker)
 or switch-disconnector unit SE-BH-0630-V001 (switch-disconnector)

¹⁾ - for connecting in another way, it is necessary to use CS-BH-... connecting sets, see page F8

PLUG-IN DEVICE



Type	Product code	Name	Weight (kg)	Package (pc)
Z0-BH-0630-400	20649	Plug-in device	3.4	1

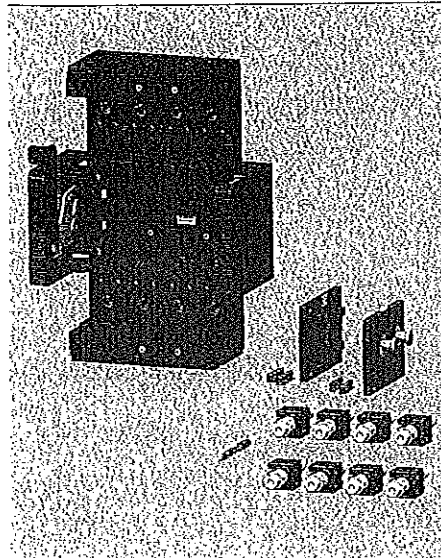
- TECHNICAL INFORMATION, see page F48

- Plug-in device: includes - complete accessories for assembly circuit breakers/switch-disconnectors in plug-in design
 - mounting bolts set (4x M4x45) - for affixing switching unit to plug-in device

must be fitted with - switching unit BH630..405 or BH630..406

- for connecting plug-in device with busbars or cable lugs, connecting sets can be used, that are included in the package of the BH630..40... switching unit - for connecting in another way, it is necessary to use CS-BH-... connecting sets, see page F8

WITHDRAWABLE DEVICE



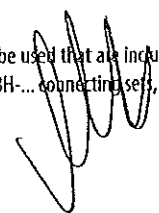
Type	Product code	Name	Weight (kg)	Package (pc)
ZV-BH-0630-400	20650	Withdrawable device	4.5	1

- TECHNICAL INFORMATION, see page F50

- Withdrawable device: includes - complete accessories for assembly circuit breakers/switch-disconnectors in withdrawable design

must be fitted with - switching unit BH630..405 or BH630..406

- for connecting withdrawable device with busbars or cable lugs, connecting sets can be used that are included with the BH630..40... switching unit - for connecting in another way, it is necessary to use CS-BH-... connecting sets, see page F8



OVERCURRENT RELEASES

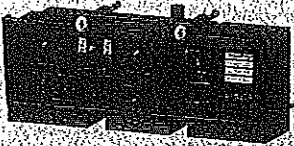


DTV3 - characteristic D - distribution

- protection lines and transformers

I _n (A)	Type	Product code	Description	Weight (kg)	Package (pc)
250	SE-BH-0250-DTV3	25300	I _n setting = 100 ÷ 250 A	0.345	1
400	SE-BH-0400-DTV3	25200	I _n setting = 160 ÷ 400 A	0.345	1
630	SE-BH-0630-DTV3	25100	I _n setting = 250 ÷ 630 A	0.345	1

- TECHNICAL INFORMATION, see page F52

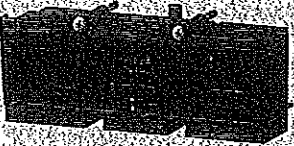


MTV8 - characteristic M - motor

- direct protection for motors and generators
- possibility of protection lines and transformers

I _n (A)	Type	Product code	Description	Weight (kg)	Package (pc)
250	SE-BH-0250-MTV8	25310	I _n setting = 100 ÷ 250 A	0.345	1
400	SE-BH-0400-MTV8	25210	I _n setting = 160 ÷ 400 A	0.345	1
630	SE-BH-0630-MTV8	25110	I _n setting = 250 ÷ 630 A	0.345	1

- TECHNICAL INFORMATION, see page F53



L001 - characteristic L - lines

- protection lines with low starting currents
- without I_n setting

I _n (A)	Type	Product code	Description	Weight (kg)	Package (pc)
250	SE-BH-0250-L001	20614	Without I _n setting	0.345	1
315	SE-BH-0315-L001	20615	Without I _n setting	0.345	1
400	SE-BH-0400-L001	20616	Without I _n setting	0.345	1
500	SE-BH-0500-L001	20617	Without I _n setting	0.345	1
630	SE-BH-0630-L001	20618	Without I _n setting	0.345	1

- TECHNICAL INFORMATION, see page F55



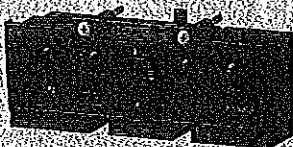
MTV9 - characteristic M - motor with adjustable timing selectivity

- direct protection for motors and generators
- possibility of protection lines and transformers
- enables setting delay of independent release to 0, 100, 200 or 300 ms

I _n (A)	Type	Product code	Description	Weight (kg)	Package (pc)
250	SE-BH-0250-MTV9	19566	I _n setting = 100 ÷ 250 A	0.345	1
400	SE-BH-0400-MTV9	19567	I _n setting = 160 ÷ 400 A	0.345	1
630	SE-BH-0630-MTV9	19568	I _n setting = 250 ÷ 630 A	0.345	1

- TECHNICAL INFORMATION, see page F56

OVERCURRENT RELEASES



4D01 - characteristic D - distribution with N-pole protection

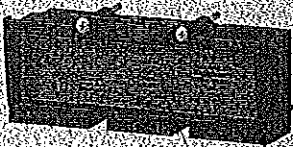
- protection lines and transformers in TN-C-S and TN-S networks

I _n (A)	Type	Product code	Description	Weight (kg)	Package (pc)
250	SE-BH-0250-4D01	33426	I _n setting = 100 ÷ 250 A	0.355	1
400	SE-BH-0400-4D01	33427	I _n setting = 160 ÷ 400 A	0.355	1
630	SE-BH-0630-4D01	33428	I _n setting = 250 ÷ 630 A	0.355	1

- TECHNICAL INFORMATION, see page F58

- intended for BH630...406 switching unit

SWITCH-DISCONNECTOR UNIT

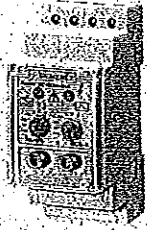


I _n (A)	V _U (V)	Product code	Description	Weight (kg)	Package (pc)
630		25120	Switch-disconnector unit	0.295	1

- TECHNICAL INFORMATION, see page F15

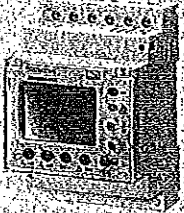
Handwritten signature

RESIDUAL CURRENT MONITOR



Type	Product code	Description	Weight (kg)	Package (set)
SSV8000-6KK	42658	Analogue design, $I_{\Delta n}$ and $t_{\Delta n}$ setting	0.18	1

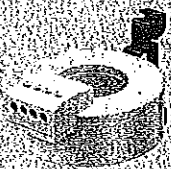
- TECHNICAL INFORMATION, see page P4



Type	Product code	Description	Weight (kg)	Package (set)
SSV8001-6KK	42659	Digital design, $I_{\Delta n}$ and $t_{\Delta n}$ setting	0.26	1
SSV8200-6KK	42660	Digital design, $I_{\Delta n}$ and $t_{\Delta n}$ setting, 4 channels	0.26	1

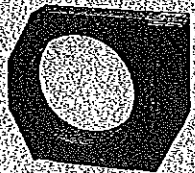
- TECHNICAL INFORMATION, see page P4

CURRENT TRANSFORMERS FOR RESIDUAL CURRENT MONITOR



Type	Product code	Description	Weight (kg)	Package (set)
SSV8700-0KK	42661	Internal diameter 20 mm, including holder on „U“ rail according to EN 60715 wide 35 mm	0.09	1
SSV8701-0KK	42662	Internal diameter 30 mm, including holder on „U“ rail according to EN 60715 wide 35 mm	0.11	1

- TECHNICAL INFORMATION, see page P4



Type	Product code	Description	Weight (kg)	Package (set)
SSV8702-0KK	42663	Internal diameter 35 mm, including holder on the panel	0.2	1
SSV8703-0KK	42664	Internal diameter 70 mm, including holder on the panel	0.31	1
SSV8704-0KK	42665	Internal diameter 105 mm, including holder on the panel	0.6	1
SSV8705-0KK	42666	Internal diameter 140 mm, including holder on the panel	1.35	1
SSV8706-0KK	42667	Internal diameter 210 mm, including holder on the panel	1.25	1

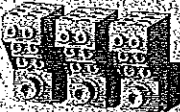
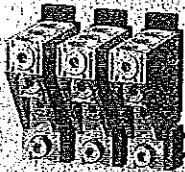
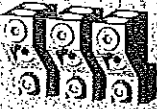
- TECHNICAL INFORMATION, see page P4



Type	Product code	Description	Weight (kg)	Package (set)
SSV8 900-1KK	42668	Holder on „U“ rail according to EN 60715 wide 35 mm, for current transformers with internal diameter up to and including 105 mm	0.01	2

- TECHNICAL INFORMATION, see page P4

CONNECTING SETS



3 terminals

Type	Product code	Description	S (mm)	Method of connection	Weight (kg)	Package (set)
CS-BH-T011	24820	Clamp terminals	35 ÷ 240	Cu cables, flexibars	0.433	1

- TECHNICAL INFORMATION, see page F19

CS-BH-B011	24761	Block terminals	150 ÷ 240	Cu/Al cables	0.279	1
CS-BH-B012	24762	Block terminals	25 ÷ 150	Cu/Al cables	0.302	1

- TECHNICAL INFORMATION, see page F19

CS-BH-B021	24781	Double block terminals	2x (150 ÷ 240)	Cu/Al cables	0.721	1
CS-BH-B022	15816	Double block terminals	2x (25 ÷ 150)	Cu/Al cables	0.750	1

- TECHNICAL INFORMATION, see page F19

- using the OD-BH-KS03 cover the degree of protection IP20 is fulfilled

CS-BH-B031	36604	Block terminals	3x (150 ÷ 240)	Cu/Al cables	0.9	1
CS-BH-B032	42691	Block terminals	3x (25 ÷ 150)	Cu/Al cables	0.9	1

- TECHNICAL INFORMATION, see page F19

- using the OD-BH-KS03 cover the degree of protection IP20 is fulfilled

- conductor cross-section for potential terminal is 1.5 ÷ 6 mm²

CS-BH-A021	24780	Rear connection		Cu/Al busbars, cable lugs	0.567	1
------------	-------	-----------------	--	---------------------------	-------	---

- TECHNICAL INFORMATION, see page F19

CS-BH-B014	20121	Block terminals for 6 cables	6x (6 ÷ 35)	Cu/Al cables	0.3	1
------------	-------	------------------------------	-------------	--------------	-----	---

- TECHNICAL INFORMATION, see page F19

- using the OD-BH-KS03 cover the degree of protection IP20 is fulfilled

CS-BH-A011	24760	Front connection		Cu/Al busbars, cable lugs, flexibars	0.186	1
------------	-------	------------------	--	--------------------------------------	-------	---

- TECHNICAL INFORMATION, see page F19

- included in every supply of switching units

CS-BH-PS01	13683	Potential terminals	15 ÷ 25/4 ÷ 6	Cu flexible conductor	0.021	1
------------	-------	---------------------	---------------	-----------------------	-------	---

- TECHNICAL INFORMATION, see page F19

1 terminal

Type	Product code	Description	S (mm)	Method of connection	Weight (kg)	Package (set)
CS-BH-T411	19589	Clamp terminal	35 ÷ 240	Cu cables, flexibars	0.148	1

- TECHNICAL INFORMATION, see page F19

CS-BH-B411	19593	Block terminal	150 ÷ 240	Cu/Al cables	0.093	1
CS-BH-B412	19588	Block terminal	25 ÷ 150	Cu/Al cables	0.101	1

- TECHNICAL INFORMATION, see page F19

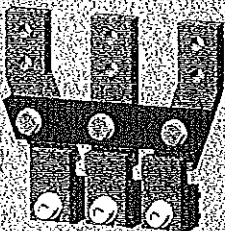
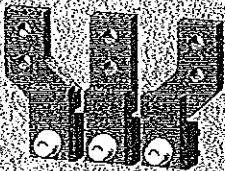
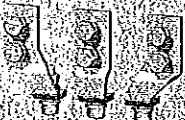
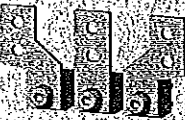
CS-BH-B421	19590	Double block terminal	2x (150 ÷ 240)	Cu/Al cables	0.24	1
CS-BH-B422	19591	Double block terminal	2x (25 ÷ 150)	Cu/Al cables	0.25	1

- TECHNICAL INFORMATION, see page F19

*1 - set includes three terminals

CONNECTING SETS

3P



1 terminal

Type	Product code	Description	Method of connection	Weight (kg)	Package (pcs)
CS-BH-B431	36605	Block terminals	3x(150 ÷ 240) Cu/Al cables	0.3	1
CS-BH-B432	42692	Block terminals	3x(25 ÷ 150) Cu/Al cables	0.3	1

- TECHNICAL INFORMATION, see page F19
 - conductor cross-section for potential terminal is 1.5 ÷ 6 mm²

CS-BH-B414	21169	Block terminal - for 6 cables	6x(6 ÷ 35) Cu/Al cables	0.1	1
------------	-------	----------------------------------	-------------------------	-----	---

- TECHNICAL INFORMATION, see page F19

CS-BH-A421	19592	Rear connection	Cu/Al busbars, cable lugs	0.189	1
------------	-------	-----------------	---------------------------	-------	---

- TECHNICAL INFORMATION, see page F19

CS-BH-PS41	36032	Potential terminal	15 ÷ 25/4 ÷ 6	0.005	1
------------	-------	--------------------	---------------	-------	---

- TECHNICAL INFORMATION, see page F19

3 terminals

Type	Product code	Description	Method of connection	Weight (kg)	Package (pcs)
CS-BH-A037	24783	Reduction for BA...*37-50 front connection	Cu/Al busbars, cable lugs, flexbars	0.47	1

- TECHNICAL INFORMATION, see page F19

CS-BH-A039	24782	Reduction for BA...*39-50 and J2UX50 - front connection	Cu/Al busbars, cable lugs, flexbars	0.628	1
------------	-------	------------------------------------------------------------	----------------------------------------	-------	---

- TECHNICAL INFORMATION, see page F19
 - for total replacement of BA...*39-50 or J2UX50 circuit breaker with front connection OD-BHD-MS39 connecting set is necessary

CS-BH-Z039	18202	Reduction for BA...*39 a J2UX rear connection	Cu/Al busbars, cable lugs	0.954	1
------------	-------	--------------------------------------------------	---------------------------	-------	---

- TECHNICAL INFORMATION, see page F19
 - for total replacement of BA...*39 or J2UX circuit breaker with rear connection OD-BH-MZ39 and CS-BH-A021 connecting sets are necessary

CS-BH-JX75	14562	Reduction for BA...*39-75 and J2UX75 front connection, withdrawable design	Cu/Al busbars, flexbars, cable lugs	1.924	1
------------	-------	-------------------------------------------------------------------------------	----------------------------------------	-------	---

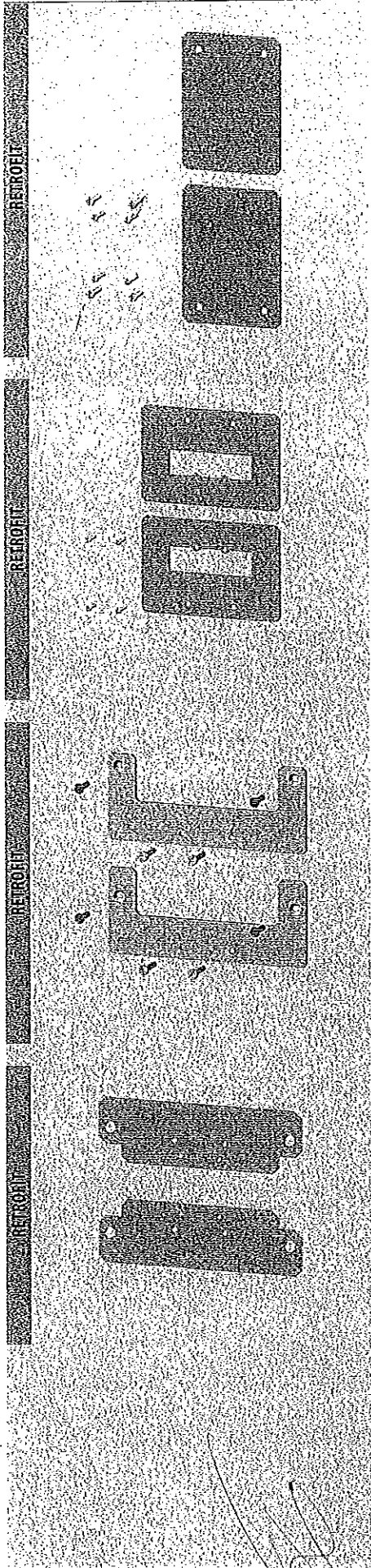
- TECHNICAL INFORMATION, see page F19
 - for total replacement of BA...*39-75 or J2UX75T circuit breakers with front connection in withdrawable design OD-BHD-MS75 connecting set and Z0-BH-0630-300 plug-in device or ZV-BH-0630-300 withdrawable device are necessary

CS-BH-JT75	14561	Reduction for J2UX75T - front connection, withdrawable design	Cu/Al busbars, flexbars, cable lugs	2.64	1
------------	-------	------------------------------------------------------------------	----------------------------------------	------	---

- TECHNICAL INFORMATION, see page F19
 - for total replacement of J2UX75T circuit breaker with front connection in withdrawable design OD-BHD-MS75 connecting set and Z0-BH-0630-300 plug-in device or ZV-BH-0630-300 withdrawable device are necessary

RETROFIT - sets, which enable replacement of older circuit breakers by a new circuit breakers without switchboard reconstruction

MOUNTING SETS



Type	Product Code	Description	Weight (kg)	Package (set)
OD-BHD-MS39	24741	Reduction for BA...*39-50 and J2UX50 - front connection	0.7	1

- DIMENSIONS see page F27
 - for total replacement of BA ... *39-50 or J2UX50 circuit breaker with front connection 2 connecting sets CS-BH-A039 are necessary

OD-BH-MZ39	18204	Reduction for BA...*39 and J2UX - rear connection	1.195	1
------------	-------	---------------------------------------------------	-------	---

- DIMENSIONS see page F27
 - for total replacement of BA... *39 or J2UX circuit breaker with rear connection also 2 connecting sets CS-BH-Z039 and CS-BH-A021 are necessary

OD-BH-MT75	33331	Reduction for J2UX75T - front connection, withdrawable design		1
------------	-------	---------------------------------------------------------------	--	---

- DIMENSIONS see page F33, F37
 - for total replacement of J2UX75T circuit breaker with front connection in withdrawable design 2 connecting sets CS-BH-JT7 and ZO-BH-0630-300 plug-in device or ZV-BH-0630-300 withdrawable device are necessary

OD-BHD-MS75	14563	Reduction for BA... *39-75 a J2UX75 - front connection withdrawable design	0.446	1
-------------	-------	----------------------------------------------------------------------------	-------	---

- DIMENSIONS see page F33, F37
 - for total replacement of BA... *39-75 or J2UX75 circuit breaker with front connection in withdrawable design 2 connecting sets CS-BH-JT7 and ZO-BH-0630-300 plug-in device or ZV-BH-0630-300 withdrawable device are necessary

¹⁾ - one set provides for replacing one circuit breaker (set includes coupling elements necessary to assemble circuit breaker and mounting set) - sets, which enable replacement of older circuit breakers by a new circuit breakers without switchboard reconstruct

AUXILIARY SWITCHES

3P 4P



Single make contacts

Type	Product code	Operating voltage	Contacts	Weight (kg)	Package (pcs)
PS-BHD-1000	24700	60 ÷ 500 V a.c./d.c.		0.012	1
PS-BHD-1000-Au	24702	5 ÷ 60 V a.c./d.c.		0.012	1

Single break contacts

Type	Product code	Operating voltage	Contacts	Weight (kg)	Package (pcs)
PS-BHD-0100	24701	60 ÷ 500 V a.c./d.c.		0.013	1
PS-BHD-0100-Au	24703	5 ÷ 60 V a.c./d.c.		0.013	1

Double

Type	Product code	Operating voltage	Contacts	Weight (kg)	Package (pcs)
PS-BHD-0200	13690	60 ÷ 500 V a.c./d.c.		0.026	1
PS-BHD-0200-Au	13693	5 ÷ 60 V a.c./d.c.		0.026	1
PS-BHD-1100	13691	60 ÷ 500 V a.c./d.c.		0.025	1
PS-BHD-1100-Au	13694	5 ÷ 60 V a.c./d.c.		0.025	1
PS-BHD-2000	13689	60 ÷ 500 V a.c./d.c.		0.024	1
PS-BHD-2000-Au	13692	5 ÷ 60 V a.c./d.c.		0.024	1

Make-and-break

Type	Product code	Operating voltage	Contacts	Weight (kg)	Package (pcs)
PS-BHD-0010	18021	60 ÷ 250 V a.c./d.c.		0.013	1
PS-BHD-0010-Au	18022	5 ÷ 60 V a.c./d.c.		0.013	1
PS-BHD-0020	35 893	60 ÷ 250 V a.c./d.c.		0.026	1
PS-BHD-0020-Au	37467	5 ÷ 60 V a.c./d.c.		0.026	1

Early

Type	Product code	Description	Contacts	Weight (kg)	Package (pcs)
SP-BHD-0002	16169	Early switch		0.045	1

- TECHNICAL INFORMATION for all switch, see page F59

3P 4P

SHUNT TRIPS



Type	Product code	Operating voltage	Weight (kg)	Package (pcs)
SV-BHD-X024	24650	24, 40, 48 V a.c./d.c.	0.14	1
SV-BHD-X110	24630	110 V a.c./d.c.	0.14	1
SV-BHD-X230	24620	230, 400, 500 V a.c./220 V d.c.	0.14	1

- TECHNICAL INFORMATION, see page F60

3P 4P

UNDERVOLTAGE RELEASES

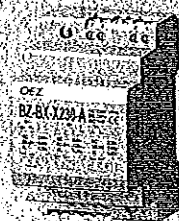


Type	Product code	Operating voltage	Description	Weight (kg)	Package (pcs)
SP-BHD-X024	24450	24, 40, 48 V a.c./d.c.		0.11	1
SP-BHD-X110	24430	110 V a.c./d.c.		0.11	1
SP-BHD-X230	24420	230, 400, 500 V a.c./220 V d.c.		0.11	1
SP-BHD-X024-0001 ¹⁾	24550	24, 40, 48 V a.c./d.c.	with early contact	0.12	1
SP-BHD-X110-0001 ¹⁾	24530	110 V a.c./d.c.	- with early contact	0.12	1
SP-BHD-X230-0001 ¹⁾	24520	230, 400, 500 V a.c./220 V d.c.	with early contact	0.12	1

- TECHNICAL INFORMATION, see page F62

¹⁾ - cannot be used in combination with motor drive MP-BH-X...

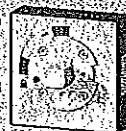
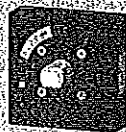
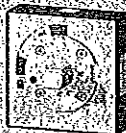
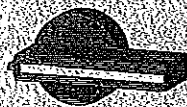
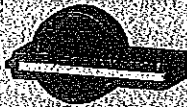
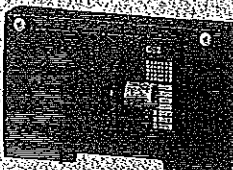
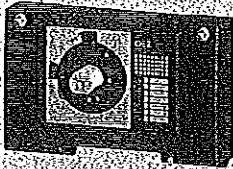
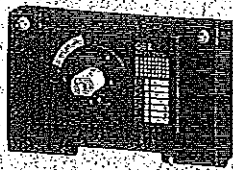
DELAY UNIT



Type	Product code	Description	Weight (kg)	Package (pcs)
BZ-BX-X230-A	36696	- enables to delay the undervoltage release tripping of circuit breaker Modeion	0.12	1

- TECHNICAL INFORMATION, see page P2

HAND DRIVES



Type	Product code	Name, description	Weight (kg)	Package (pcs)
RP-BH-CK10	13653	Hand drive unit - without locking	0.223	1
RP-BH-CK20	13654	Hand drive unit - with locking	0.223	1

- TECHNICAL INFORMATION, see page F64

Hand drive unit must be fitted with:

- for controlling on switch unit - with the black hand drive lever RP-BHD-CP10 or RP-BHD-CP20
- for controlling through the switchboard door - with the extension shaft RP-BHD-CH..
 - with the hand drive bearing RP-BHD-CN..
 - with the hand drive lever RP-BHD-CP..

RP-BH-CK21	13655	Hand drive unit - yellow label - with locking	0.223	1
------------	-------	-----------------------------------------------	-------	---

- TECHNICAL INFORMATION, see page F64

Hand drive unit must be fitted with:

- for controlling on switch unit - with the red hand drive lever RP-BHD-CP21
- for controlling through the switchboard door - with the extension shaft RP-BHD-CH..
 - with the hand drive bearing RP-BHD-CN..
 - with the hand drive lever RP-BHD-CP..

RP-BH-CK30	37252	Hand drive unit for right side control	0.512	1
------------	-------	----------------------------------------	-------	---

RP-BH-CK31	37253	Hand drive unit for left side control	0.512	1
------------	-------	---------------------------------------	-------	---

- TECHNICAL INFORMATION, see page F64

RP-BHD-CP10	13655	Hand drive lever - black - without locking	0.075	1
-------------	-------	--------------------------------------------	-------	---

RP-BHD-CP20	13656	Hand drive lever - black - with locking	0.075	1
-------------	-------	-----------------------------------------	-------	---

- TECHNICAL INFORMATION, see page F64

RP-BHD-CP21	13657	Hand drive lever - red - with locking	0.075	1
-------------	-------	---------------------------------------	-------	---

- TECHNICAL INFORMATION, see page F64

RP-BHD-CN40	37246	Hand drive bearing - degree of protection IP40	0.14	1
-------------	-------	------------------------------------------------	------	---

- TECHNICAL INFORMATION, see page F64

- is used in combination with the black lever of RP-BHD-CP10, RP-BHD-CP20 hand drives

RP-BHD-CN41	37247	Hand drive bearing - yellow label - degree of protection IP40	0.14	1
-------------	-------	---------------------------------------------------------------	------	---

- TECHNICAL INFORMATION, see page F64

- is used in combination with the red lever of RP-BHD-CP21 hand drive

RP-BHD-CN60	37248	Hand drive bearing - degree of protection IP66	0.14	1
-------------	-------	------------------------------------------------	------	---

- TECHNICAL INFORMATION, see page F64

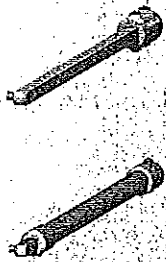
- is used in combination with the black lever of RP-BHD-CP10, RP-BHD-CP20 hand drives

RP-BHD-CN61	37249	Hand drive bearing - yellow label - degree of protection IP66	0.14	1
-------------	-------	---------------------------------------------------------------	------	---

- TECHNICAL INFORMATION, see page F64

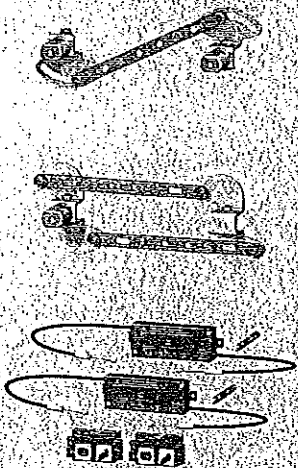
- is used in combination with the red lever of RP-BHD-CP21 hand drive

HAND DRIVES



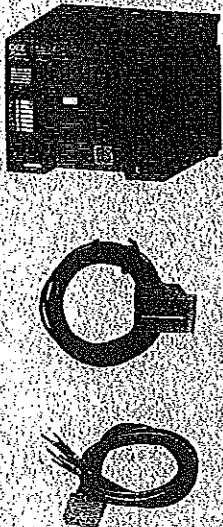
Type	Product code	Name - description	Weight (kg)	Package (pc)
RP-BHD-CH10	13658	Extension shaft - length 365 mm, can be shortened	0.205	1
- TECHNICAL INFORMATION, see page F64				
RP-BHD-CH20	13659	Extension shaft - telescopic, length 245 ÷ 410 mm	0.255	1
- TECHNICAL INFORMATION, see page F64				

MECHANICAL INTERLOCKING AND PARALLEL SWITCHING



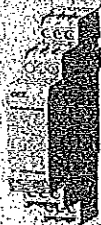
Type	Product code	Name - description	Weight (kg)	Package (pc)
RP-BHD-CB10	18290	Mechanical interlocking - for fixed design	0.16	1
- TECHNICAL INFORMATION, see page F65				
- mechanical interlocking must be fitted with: 2 hand drive units RP-BH-CK. 2 hand drive levers RP-BHD-CP.				
RP-BHD-CD10	18289	Mechanical parallel switching - for fixed design	0.23	1
- TECHNICAL INFORMATION, see page F65				
- mechanical parallel switching must be fitted with: 2 hand drive units RP-BH-CK. with the hand drive lever RP-BHD-CP.				
MB-BH-PV04	19611	Mechanical blocking with Bowden cable - for two circuit breakers BH630	0.448	1
MB-BHD-PV03	19613	Mechanical blocking with Bowden cable - for one BD250 and one BH630 circuit breaker	0.448	1
- TECHNICAL INFORMATION, see page F66				
- mechanical blocking with Bowden cable is intended for fixed, plug-in and withdrawable design				

MOTOR DRIVES



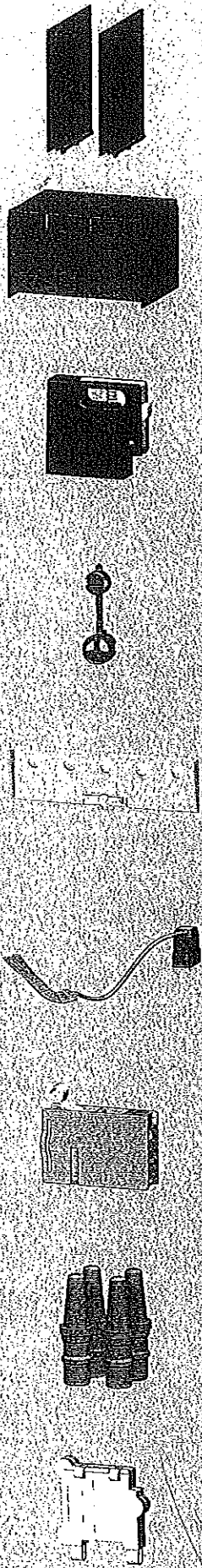
Type	Product code	Name - description	Operating voltage	Weight (kg)	Package (pc)
MP-BH-X024 ⁰	20590	Motor drive	24V a.c./d.c.	1.691	1
MP-BH-X048 ⁰	19792	Motor drive	48V a.c./d.c.	1.691	1
MP-BH-X110	13539	Motor drive	110V a.c./d.c.	1.691	1
MP-BH-X230	13536	Motor drive	230V a.c./220V d.c.	1.691	1
MP-BH-X024-P ⁰	20591	Motor drive	24V a.c./d.c.	1.708	1
MP-BH-X048-P ⁰	19793	Motor drive - with counter of cycles	48V a.c./d.c.	1.708	1
MP-BH-X110-P	13687	Motor drive - with counter of cycles	110V a.c./d.c.	1.708	1
MP-BH-X230-P	13540	Motor drive - with counter of cycles	230V a.c./220V d.c.	1.708	1
- TECHNICAL INFORMATION, see page F67					
- motor drive cannot be used in combination with SP-BHD-X...0001					
⁰ - custom production					
OD-BHD-PP01	13688	Counter of cycles - cable length 1.1 m		0.08	1
- DIMENSIONS see page F67					
- upon agreement with the manufacturer, different conductor lengths can be supplied					
OD-BHD-KA02	13809	Extension cable - to motor drive, 12 wires, length 0.6 m		0.1	1
- TECHNICAL INFORMATION, see page F67					
- upon agreement with the manufacturer, different conductor lengths can be supplied					

CONTROL RELAY



Type	Product code	Name - description	Weight (kg)	Package (pc)
OD-BHD-RX01	37425	24V a.c./d.c.	0.06	1
OD-BHD-RX02	37426	48V a.c./d.c.	0.06	1
OD-BHD-RA03	37427	110 ÷ 230V a.c.	0.06	1
OD-BHD-RD04	37428	110V d.c.	0.06	1
- TECHNICAL INFORMATION, see page P3				

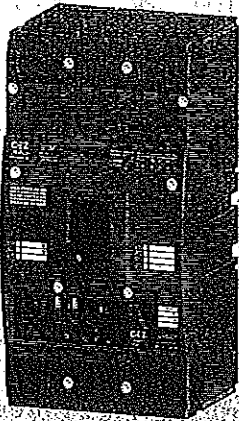
ACCESSORIES



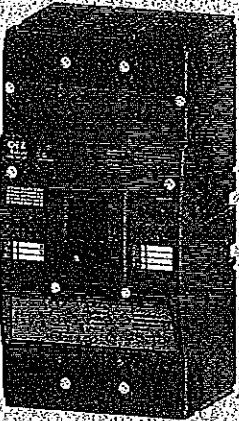
Type	Product code	Name - description	Weight (kg)	Package (pcs)
OD-BHD-KS02	24740	Insulating barriers - set (two pieces), for 3P and 4P design	0.077	1
OD-BHD-KS42	19575	Insulating barrier - one piece, for 4P design	0.039	1
- included with each switching unit order - in case circuit breaker/switch-disconnector connection is reversed (supply to terminals 2, 4, 6) it is necessary in most cases to install these barriers also on the lower side - for more detailed information see page F22				
OD-BH-KS03	13531	Terminal cover - degree of protection IP20, for 3P design	0.144	1
OD-BH-KS43	19587	Terminal cover - degree of protection IP20, for 4P design	0.209	1
- increases degree of protection of connection point to IP20 when using B021, B022, B031, B032 a B014 block type terminals - intended for fixed, plug-in and withdrawable design				
OD-BH-UP01	13532	Lever with locking	0.013	1
- enables to lock the circuit breaker in „switched off manually“ position (loaded) - locking is possible using padlock with shank diameter 4 + 6 mm				
OD-BH-VP01	15330	Bolt sealing insert	0.001	2
- enables sealing for: <ul style="list-style-type: none"> - cover of cavities - terminal cover - overcurrent release - hand drive unit - motor drive 				
OD-BH-VP02	18216	Additional cover for overcurrent release	0.1	1
- enables sealing for overcurrent releases such as circuit breakers in the main meter switchboard				
OD-BHD-KA01	14555	Connecting cable - to connect the circuit breaker/switch-disconnector accessories in the plug-in/withdrawable design - 15 wires (if is possible for plug-in design and fixed design)	0.12	1
SO-BHD-0010	14560	Signalling of position - signals circuit breaker position in the plug-in or withdrawable device.	0.018	1
- TECHNICAL INFORMATION, see page F48, F50				
OD-BH-KK01	14554	Keying set - prevents inserting in the plug-in or withdrawable devices beyond the switching unit	0.005	1
- TECHNICAL INFORMATION, see page F48, F50				
OD-BHD-KT01	14642	Cover of switch on button - for motor drive, cover can be sealed	0.002	1
- TECHNICAL INFORMATION, see page F67				

Handwritten signature

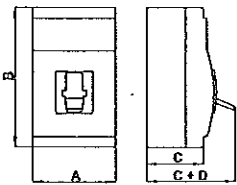
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS



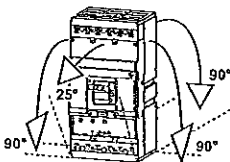
Circuit breaker



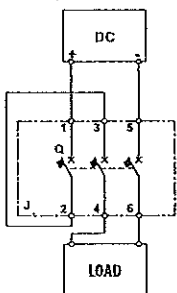
Switch-disconnector



Dimensions



Installation positions - fixed, plug-in and withdrawable design



Connection of switch-disconnector for DC circuits

Specifications

	CIRCUIT BREAKER		SWITCH-DISCONNECTOR	
Type	BH630N/BH630S			
Dimensions A x B x C + D (3P/4P design)	140/185x275x105+49mm		140/185x275x105+49mm	
Weight (3P/4P design)	5.4/7.4 kg		5.4 kg	
Standards	EN 60947-2 IEC 60947-2		EN 60947-3 IEC 60947-3	
Approval marks				
Number of poles	3, 4		3, 4	
Rated current	I_n	250, 315, 400, 500, 630 A	-	
Rated normal current	I_b	630 A	630 A	
Rated operating current	I_c	630 A	630 A	
Rated operating voltage	U_c	max. 690 V a.c.	max. 690 V a.c. max. 440 V d.c.	
Rated frequency	f_n	50/60 Hz	50/60 Hz	
Rated impulse withstand voltage	U_{imp}	8 kV	8 kV	
Rated insulation voltage	U_i	690 V	690 V	
Utilization category (selectivity)		690 V a.c.	A	
Utilization category (switching mode)		690 V a.c. 440 V d.c.	AC-23B DC-23B	
Rated short-time withstand current at $U_c = 690$ V a.c.	I_{cs} / t	8 kA/50 ms, 7 kA/300 ms, 6.5 kA/1 s	7.5 kA/5 s	
Series		NORMAL BH630N	SUPERIOR BH630S	
Rated short-circuit ultimate breaking capacity (rms) ¹⁾	I_{cu}	60 kA 36 kA 20 kA 15 kA	100 kA 65 kA 35 kA 20 kA	
Rated short-circuit service breaking capacity (rms)	I_{cs}	40 kA 18 kA 10 kA 8 kA	75 kA 36 kA 20 kA 15 kA	
Rated short-circuit making capacity (peak value)	I_{cm} / U_c	75 kA	140 kA 415 V a.c.	
Switching off time at I_n			20 ms	
Losses per 1 pole fixed/withdrawable design			75 W/85 W 75 W/85 W	
Mechanical endurance			20 000 cycles 20 000 cycles	
Electrical endurance			5 000 cycles 5 000 cycles	
Switching frequency			120 cycles/hr 120 cycles/hr	
Control force			110 N 110 N	
Degree of protection from front side of the device			IP40 IP40	
Degree of protection of terminals			IP20 IP20	
Operating conditions				
Reference ambient temperature			40 °C 40 °C	
Ambient temperature range			-40 ~ +55 °C -40 ~ +55 °C	
Working environment			dry and tropical climate dry and tropical climate	
Climatic resistance			EN 60068 EN 60068	
Pollution degree			3 3	
Max. sea level			2 000 m 2 000 m	
Seismic resistance			3g (8 ÷ 50) Hz 3g (8 ÷ 50) Hz	
Design modifications				
Front/rear connection			•/• •/•	
Plug-in design 3P/4P			•/• •/•	
Withdrawable design 3P/4P			•/• •/•	
Accessories				
Switches - auxiliary/relative/signal/early			•/•/•/• •/•/•/•	
Shunt trip			• •	
Undervoltage release/with early switch			•/• •/•	
Front hand drive/with adjustable level			•/• •/•	
Mechanical interlocking-with Bowden cable/for hand drive			•/• •/•	
Motor drive/with counter of cycles			•/• •/•	
Lever with locking			• •	
Bolt sealing insert/additional cover for overcurrent release			•/• •/•	

• available, - unavailable, + being prepared

¹⁾ - in case circuit breaker connection is reversed (input terminals 2, 4, 6, output terminals 1, 3, 5) I_{cu} does not change

- protection of Modeion switch-disconnectors, see page R

CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Diagram

Circuit breaker with accessories (3-pole design)

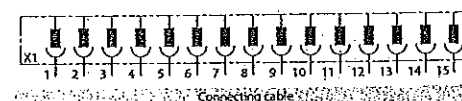
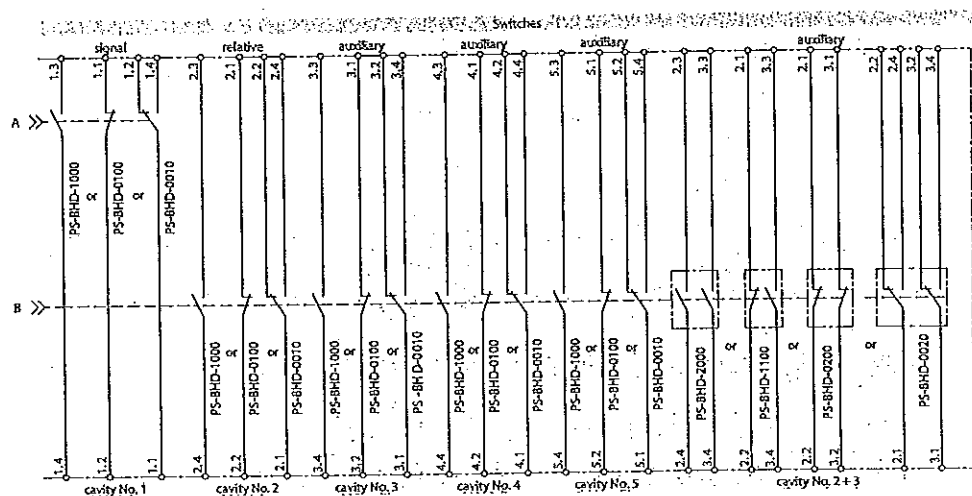
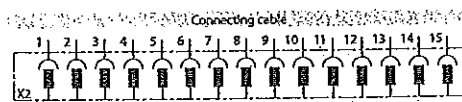
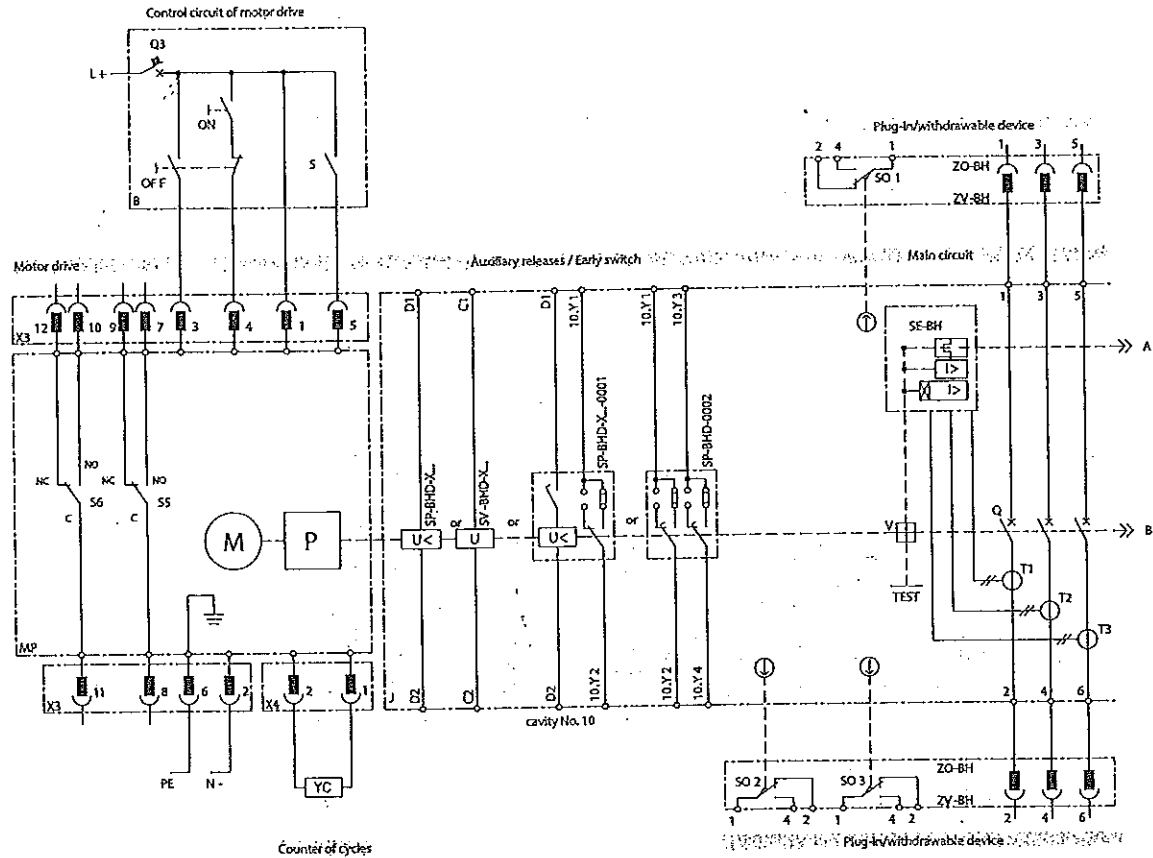


Diagram description (3P and 4P design)

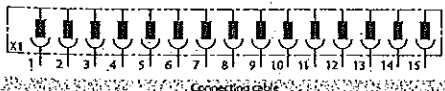
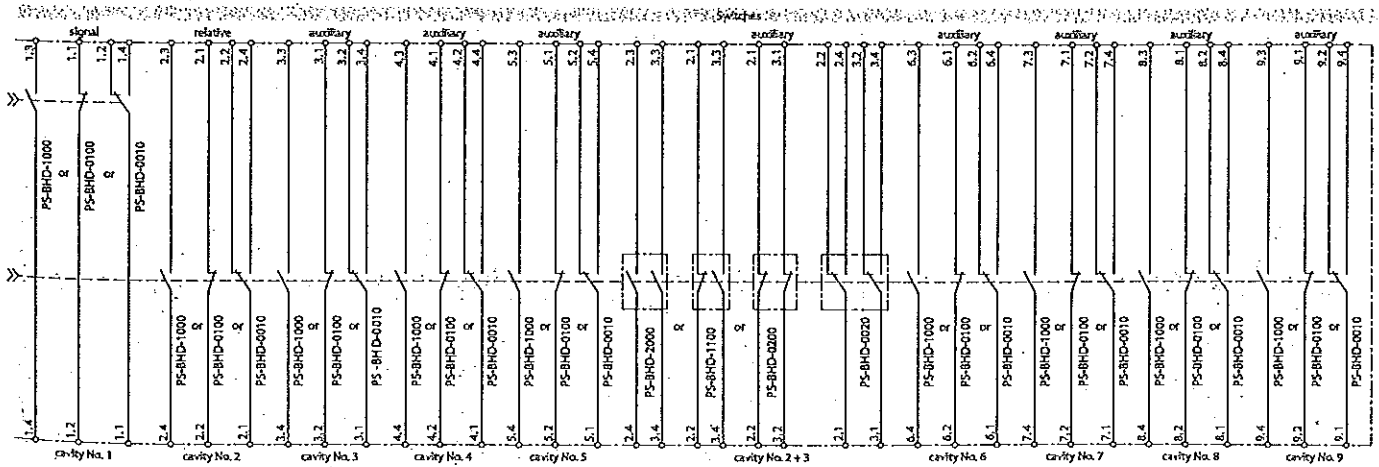
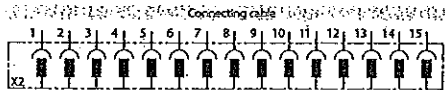
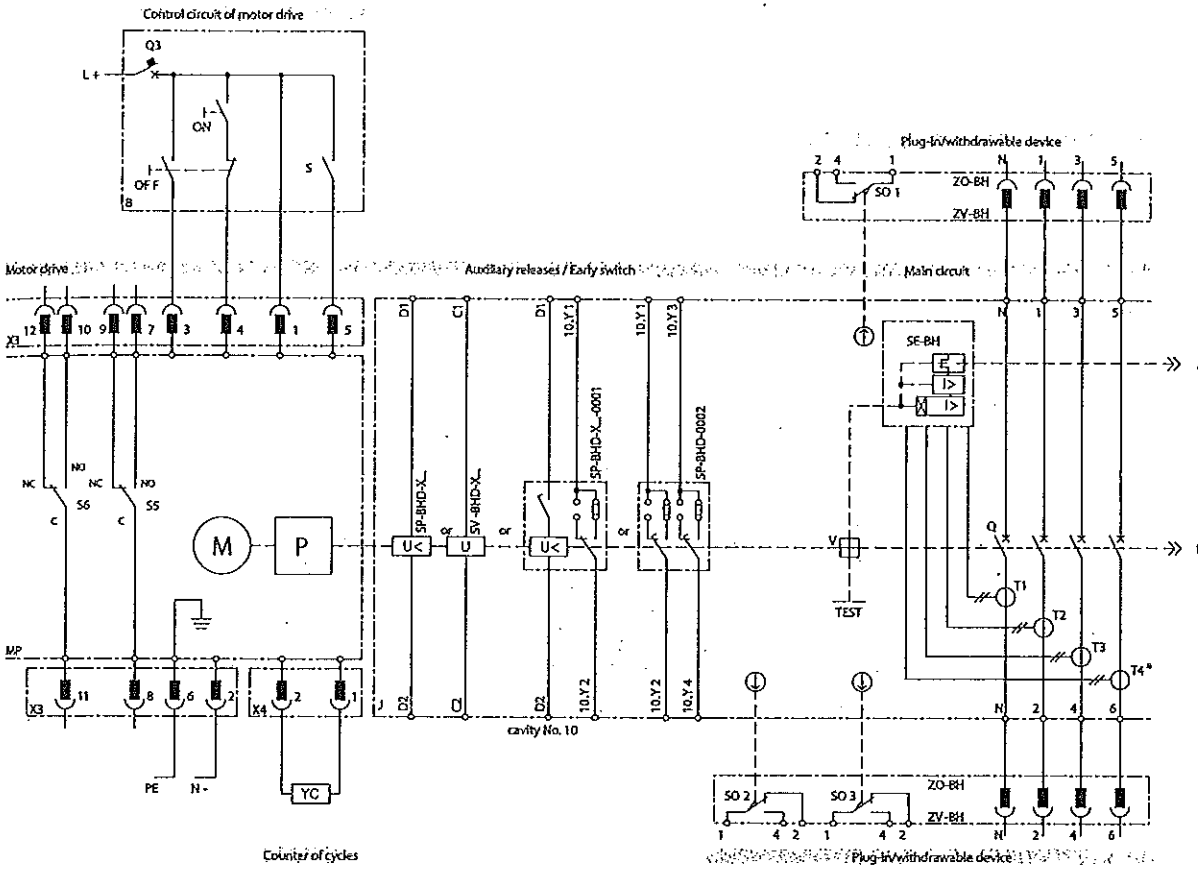
- MP motor drive - MP-BH-X
- M motor
- P storage device
- X3 connector for connection of control circuit
- X4 connector for external counter of cycle switch to indicate AUTO AUTO (NO-C) / MANUAL (NC)
- S6 switch to indicate full storage (ready to switch on: NO-C)
- YC external counter of cycles - OD-BHD-F
- B recommended wiring of the control circuit - It is not a part of motor drive
- ON switch on button
- OFF switch off button
- S switch for energy storage (switched on = automatic storage, switch may be continuously switched on)
- Q3 motor drive circuit breaker - see page switching unit - BH630
- J main contacts
- Q, T1, T2, T3, T4¹⁾ current transformers
- V trip-free mechanism
- SE-BH circuit breaker - overcurrent release
- SE-BH switch-disconnector - switch-disconnector unit - SE-BH-0630-V001
- TEST push button to test release
- ZO-BH plug-in device - ZO-BH-0630
- ZV-BH withdrawable device - ZV-BH-0630
- X1, X2 connecting cable - OD-BHD-KA01
- SO1, SO2, SO3 contacts signalling circuit breaker / switch-disconnector position in plug-in or withdrawable device SO-BHD-001
- for more detailed information see page F48, F50
- SP-BHD-X undervoltage release
- SV-BHD-X shunt trip
- SP-BHD-X-0001 undervoltage release with early contact
- SP-BHD-0002 early contact

¹⁾ - only for 4-pole design of BH630...406 switching unit

CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Diagram

Circuit breaker with accessories (4-pole design)



[Handwritten signature]

[Handwritten signature]

CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Connecting and installation

Power circuit

■ connected with Cu/Al busbars or cables, and possibly cables with cable lugs

■ connection sets are produced to provide greater connecting options, see page F7

■ generally, conductors from the supply are connected to input terminals 1, 3, 5, (N) and conductors from the load to terminals 2, 4, 6, (N); however, it is possible to reverse the connection (exchanging input and output terminals without limiting rated short-circuit ultimate breaking capacity I_{sc})

■ in case of reversed connection, in the majority of cases, circuit breaker/switch-disconnector must be fitted with OD-BHD-KSO2 insulating barriers also on the side of terminals 2, 4, 6, for more detailed information see page F22

■ we recommend painting the connecting busbars

■ input and output conductors/busbars must be mechanically reinforced in order to avoid transferring electrodynamic forces to the circuit breaker/switch-disconnector during short-circuiting

■ the method of connecting the power circuit must observe the deionization space of the circuit breaker see page F23

Auxiliary circuits

■ switches, shunt trips or undervoltage releases are connected using flexible Cu conductors with cross-section 0.5 ÷ 1 mm² directly to terminals on these devices

■ motor drive and auxiliary circuits of the plug-in or withdrawable design are connected using a connector

Recommended min. cross-sections of cables, busbars and flexibars for fixed, plug-in and withdrawable designs

I _n (In/A)	Cables (mm ²)		Busbars W x H (mm)	
	Cu	Al	Cu	Al
100	35	50	20 x 2	25 x 2
125	50	70	25 x 2	25 x 3
160	70	95	25 x 3	32 x 3
200	95	120	25 x 4	25 x 5
250	120	150	25 x 5	32 x 5
315	150	185	32 x 5	32 x 6
400	185	240	32 x 6	32 x 8
500	2x 120	2x 185	32 x 8	32 x 12
630	2x 185 ¹⁾	2x 240 ²⁾	32 x 12 ³⁾	32 x 16 ³⁾

- it is necessary to follow the relevant valid standards when cables are designed

¹⁾ connection of withdrawable and plug-in design by 2x 240 mm² Cu

²⁾ withdrawable and plug-in design can not be connected by Al

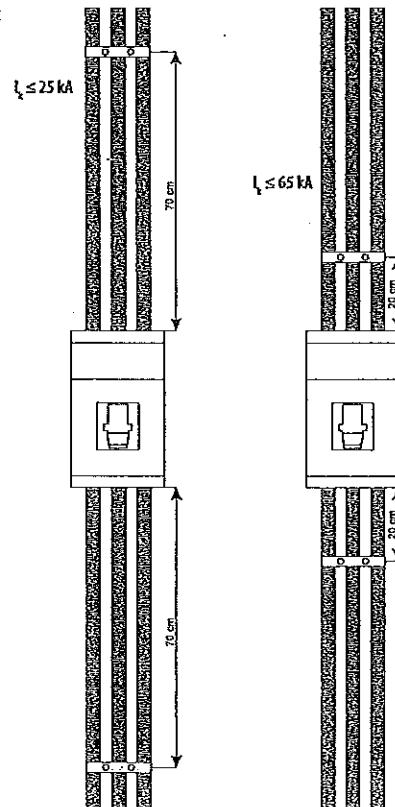
³⁾ connection of withdrawable and plug-in design by min. 32 x 16 Cu

Maximum circuit breaker/switch-disconnector loads in accordance with ambient temperature

Circuit breaker/switch-disconnector BH630 - connection by Cu cable 2x 185 mm² per pole

50°C	60°C	60°C	70°C
630 A	620 A	580 A	540 A

Mechanical reinforcement of conductors for BH630



RCUIT BREAKERS, SWITCH-DISCONNECTORS

Connecting and installation

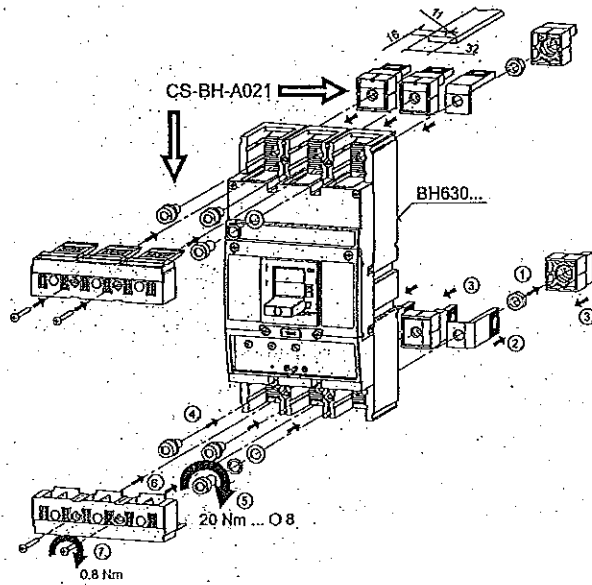
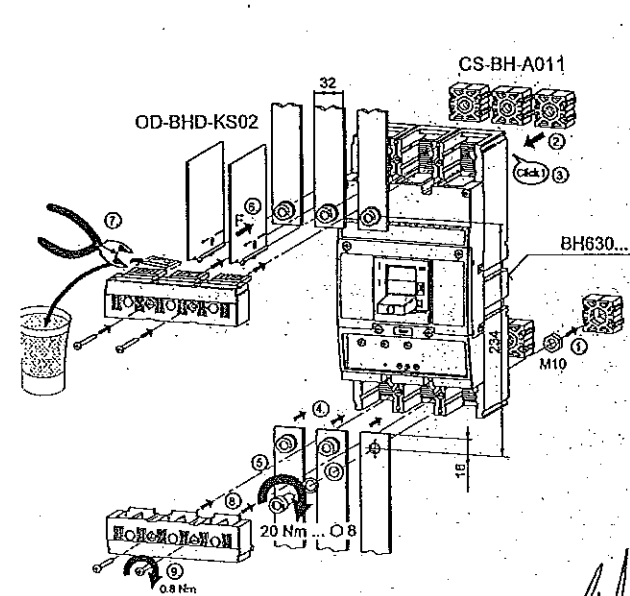
Connecting set specifications

Type	I _n (A)	Cable ranges of connection cross-sections (mm ²)					Dimensions (mm)	Dimensional drawing (P.14)
		type of cable	flat stranded	rectro solid	round stranded	round solid		
S-BH-A011	630						32 x ...	
S-BH-A411	630						32 x ...	page F26/F40
S-BH-A021	630						32 x ...	page F26/F40
S-BH-A421	630						32 x ...	page F26/F40
S-BH-T011	400		35 ÷ 240 Cu	35 ÷ 240 Cu	35 ÷ 240 Cu	35 ÷ 240 Cu		
S-BH-T411	400		35 ÷ 240 Cu	35 ÷ 240 Cu	35 ÷ 240 Cu	35 ÷ 240 Cu		
S-BH-B011	400		150 ÷ 240 Cu/Al	120 ÷ 240 Cu/Al	150 ÷ 240 Cu/Al	120 ÷ 240 Cu/Al		
S-BH-B411	400		150 ÷ 240 Cu/Al	120 ÷ 240 Cu/Al	150 ÷ 240 Cu/Al	120 ÷ 240 Cu/Al		
S-BH-B012	315		25 ÷ 150 Cu/Al	16 ÷ 150 Cu/Al	25 ÷ 150 Cu/Al	16 ÷ 150 Cu/Al		
S-BH-B412	315		25 ÷ 150 Cu/Al	16 ÷ 150 Cu/Al	25 ÷ 150 Cu/Al	16 ÷ 150 Cu/Al		
S-BH-B021	630		2x (150 ÷ 240) Cu/Al	2x (120 ÷ 240) Cu/Al	2x (150 ÷ 240) Cu/Al	2x (120 ÷ 240) Cu/Al		page F24/F38
S-BH-B421	630		2x (150 ÷ 240) Cu/Al	2x (120 ÷ 240) Cu/Al	2x (150 ÷ 240) Cu/Al	2x (120 ÷ 240) Cu/Al		page F24/F38
S-BH-B022	500		2x (25 ÷ 150) Cu/Al	2x (16 ÷ 150) Cu/Al	2x (25 ÷ 150) Cu/Al	2x (16 ÷ 150) Cu/Al		page F24/F38
S-BH-B422	500		2x (25 ÷ 150) Cu/Al	2x (16 ÷ 150) Cu/Al	2x (25 ÷ 150) Cu/Al	2x (16 ÷ 150) Cu/Al		page F24/F38
S-BH-B014	250		6x (6 ÷ 35) Cu/Al	6x (6 ÷ 35) Cu/Al	6x (6 ÷ 35) Cu/Al	6x (6 ÷ 35) Cu/Al		page F25/F39
S-BH-B414	250		6x (6 ÷ 35) Cu/Al	6x (6 ÷ 35) Cu/Al	6x (6 ÷ 35) Cu/Al	6x (6 ÷ 35) Cu/Al		page F25/F39
S-BH-B031	630		3x (150 ÷ 240) Cu/Al	3x (120 ÷ 240) Cu/Al	3x (150 ÷ 240) Cu/Al	3x (120 ÷ 240) Cu/Al		page F25/F39
S-BH-B431	630		3x (150 ÷ 240) Cu/Al	3x (120 ÷ 240) Cu/Al	3x (150 ÷ 240) Cu/Al	3x (120 ÷ 240) Cu/Al		page F25/F39
S-BH-B032	630		3x (25 ÷ 150) Cu/Al	3x (16 ÷ 150) Cu/Al	3x (25 ÷ 150) Cu/Al	3x (16 ÷ 150) Cu/Al		page F26/F40
S-BH-B432	630		3x (25 ÷ 150) Cu/Al	3x (16 ÷ 150) Cu/Al	3x (25 ÷ 150) Cu/Al	3x (16 ÷ 150) Cu/Al		page F26/F40
S-BH-A037	400		RETROFIT - reduction for circuit breaker BA...*37 with front connection page F27					page F27
S-BH-A039	630		RETROFIT - reduction for circuit breaker BA...*39 with front connection page F27					page F27
S-BH-Z039	630		RETROFIT - reduction for circuit breaker BA...*39 with rear connection page F27					page F27
S-BH-JX75	630		RETROFIT - reduction for circuit breaker BA...39-75 a J2UX75 with front connection in withdrawable design page F33, F37					page F33, F37
S-BH-JT75	630		RETROFIT - reduction for circuit breaker J2UX75T with front connection in withdrawable design page F33, F37					page F33, F37
S-BH-PS01	10/16		1,5 ÷ 2,5/4 ÷ 6 Cu flexible conductor					
S-BH-PS41	10/16		1,5 ÷ 2,5/4 ÷ 6 Cu flexible conductor					

RETROFIT - sets, which enable replacement of older circuit breakers by a new circuit breakers without switchboard reconstruction

Front connection - Cu/Al busbars

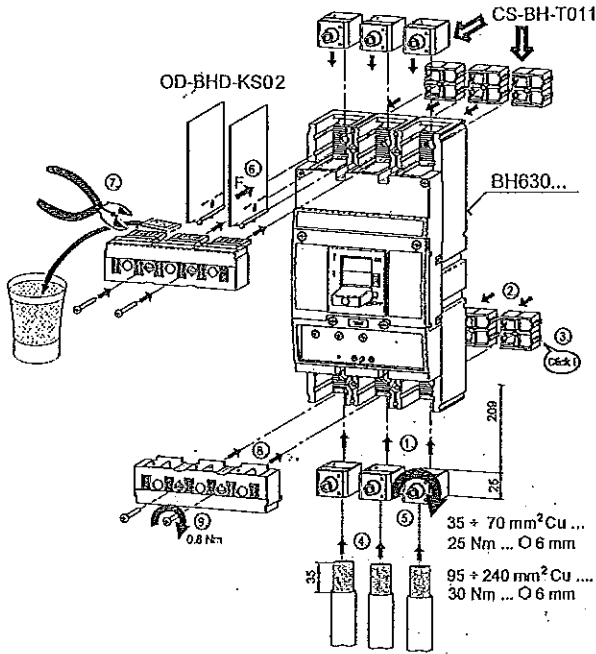
Rear connection - Cu/Al busbars



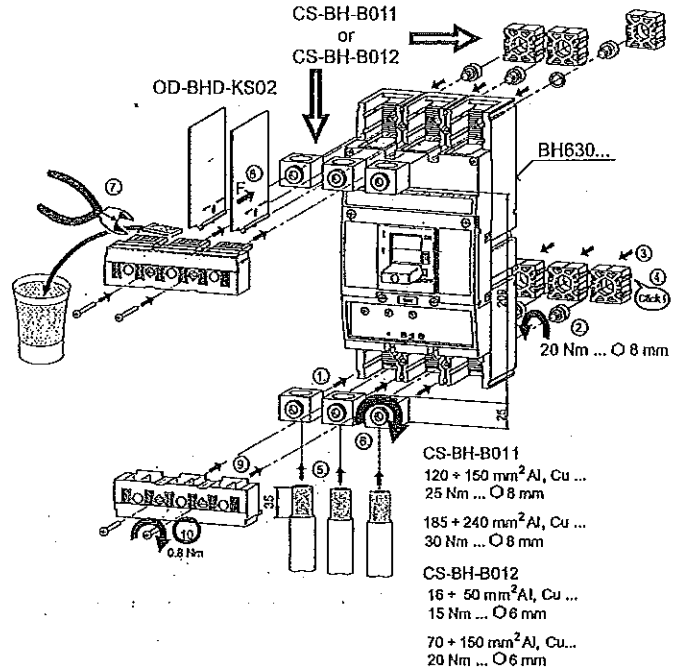
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Connecting and installation

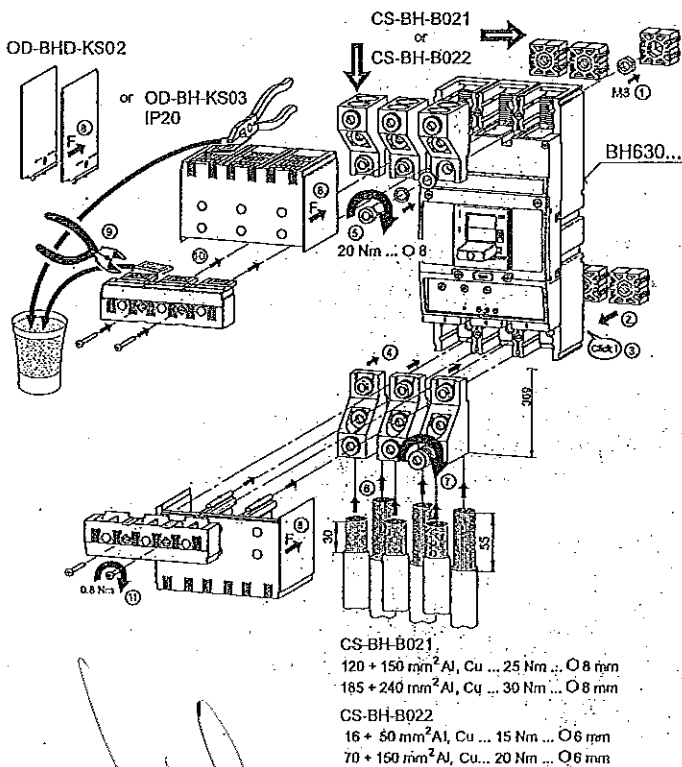
Front connection - Cu cables



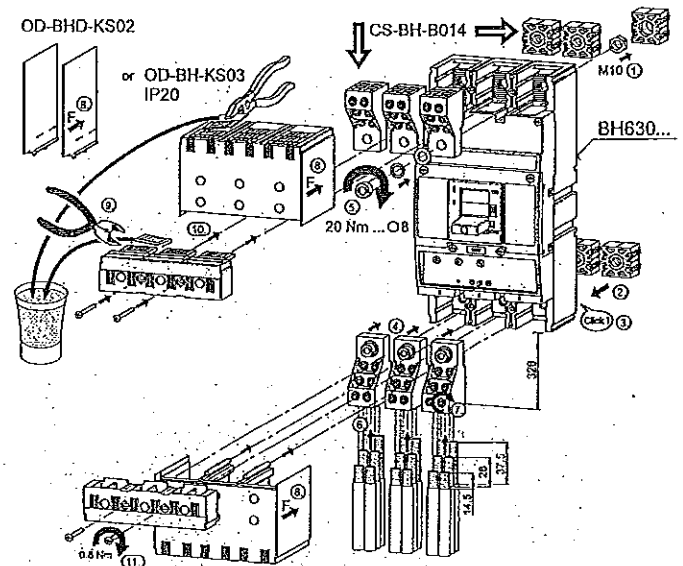
Front connection - Cu/Al cables



Front connection - 2 Cu/Al cables



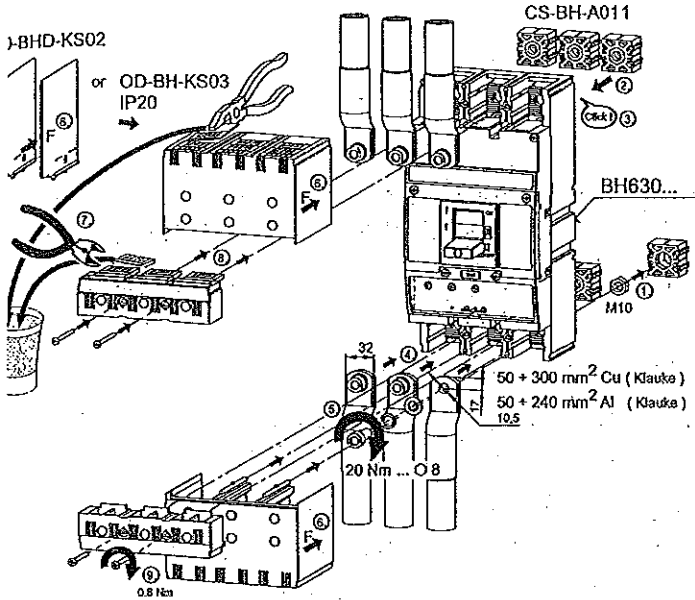
Front connection - 6 Cu/Al cables



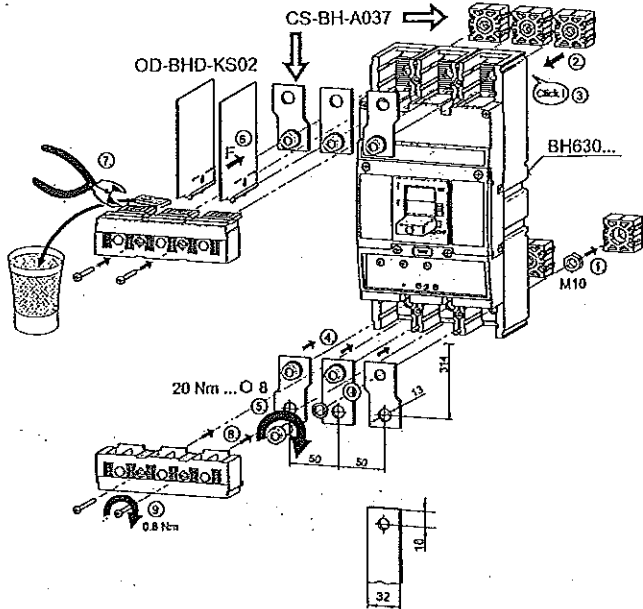
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Connecting and installation

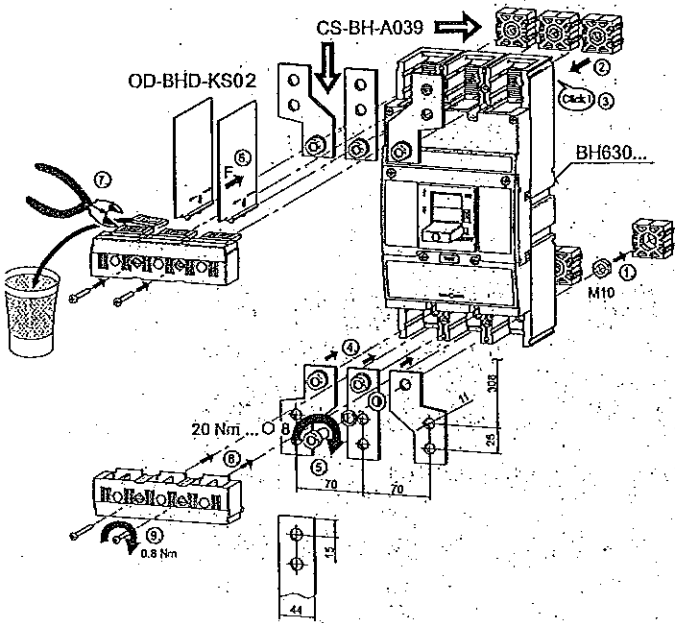
Front connection - cable lugs



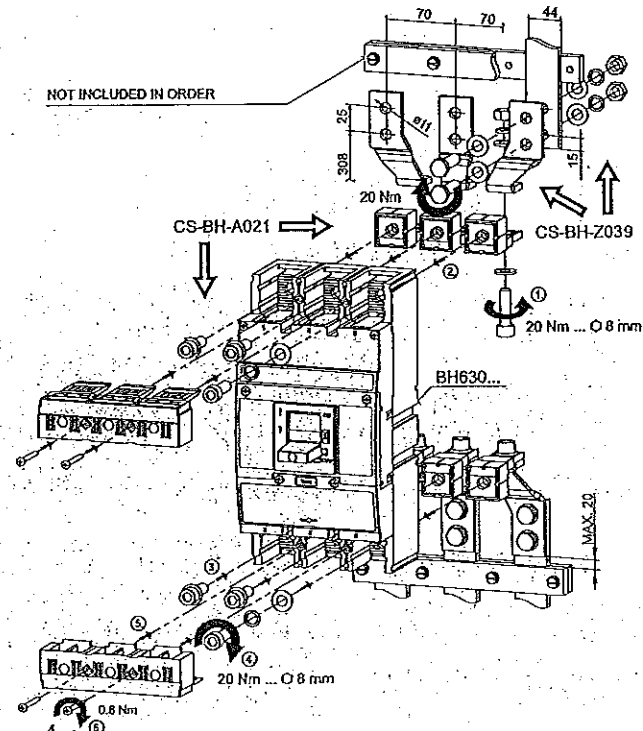
Front connection - reduction BH to BA...37



Front connection - reduction BH to J2UX and BA...39



Rear connection - reduction BH to J2UX and BA...39 with rear connection



CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Deionization spaces

USE OF INSULATING BARRIERS AND TERMINAL COVERS WITH CIRCUIT BREAKERS AND SWITCH-DISCONNECTORS

■ FIXED DESIGN

- front connection

- terminals 1, 3, 5
(upper side)

a) if $U_e \geq 415 \text{ V a.c.}$, it is necessary to use OD-BHD-KS02 insulating barriers or a OD-BHD-KS03 terminal cover

b) if insulated conductors are not used for connecting power circuit to terminals 1, 3, 5, flexibars or rear connection, it is necessary to use OD-BHD-KS02 insulating barriers or a OD-BHD-KS03 terminal cover

- terminals 2, 4, 6
(lower side)

only in case that circuit breaker/switch-disconnector is connected to the source using terminals 2, 4, 6 and furthermore:

a) if $U_e \geq 415 \text{ V a.c.}$, it is necessary to use OD-BHD-KS02 insulating barriers or a OD-BHD-KS03 terminal cover

b) if insulated conductors are not used for connecting power circuit to terminals 2, 4, 6, flexibars or rear connection, it is necessary to use OD-BHD-KS02 insulating barriers or a OD-BHD-KS03 terminal cover

- rear connection

- insulating barriers and terminal covers need not be used

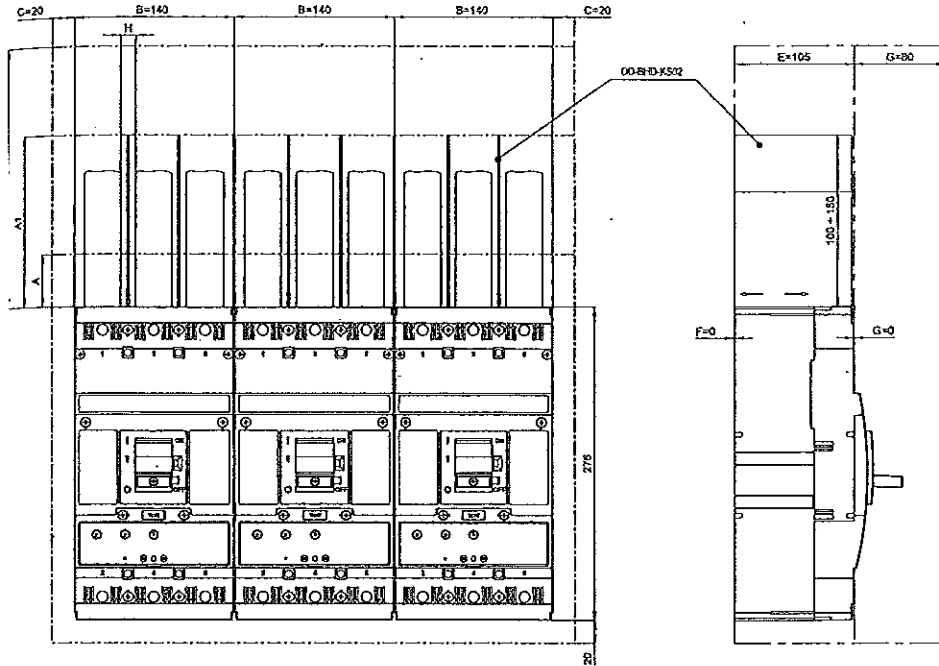
■ PLUG-IN AND WITHDRAWABLE DEVICE

- insulating barriers and terminal covers need not be used

CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

3P 4P

clearance spaces



A...minimum distance between the circuit breaker/switch-disconnector and uninsulated earthed wall (applicable for connection using insulated conductors, cables, flexibars or with rear connection)

A1...minimum insulation length of bare conductors (using OD-BHD-KS02 insulating barriers from 100 mm to max. 150 mm, or by adding additional insulation for the conductors with barriers to obtain at least A1 value)

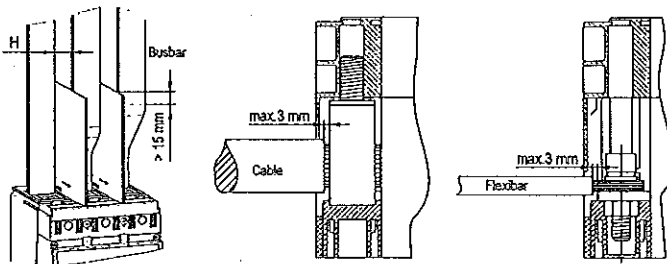
A2...minimum distance:

- between the circuit breaker/switch-disconnector and uninsulated earthed wall (applicable for uninsulated conductors and busbars)
- between the circuit breaker/switch-disconnector and busbar
- between two circuit breakers/switch-disconnectors situated vertically above one another
- between uninsulated connections of two circuit breakers/switch-disconnectors above one another

C, D, E, F, G...minimum distance between the circuit breaker/switch-disconnector and uninsulated earthed wall

H...minimum distance between uninsulated conductors

■ minimum distance of circuit breakers without using of uninsulated barriers is 50 mm



I _{sc} [kA]	I _{sc} [kA]	I _{sc} [kA]		I _{sc} [kA]		I _{sc} [kA]		I _{sc} [kA]	
		50	75	100	150	200	250	300	350
< 80	≥ 13	A [mm]	50	50	50	50	50	50	50
		A1 [mm]	150	200	100	200	150	250	150
		A2 [mm]	250	300	200	300	250	350	250
	≥ 30	A [mm]	50	50	50	50	50	50	50
		A1 [mm]	100	150	100	150	150	150	150
		A2 [mm]	150	200	150	200	200	200	200
≥ 80	≥ 13	A [mm]	50	50	50	50	50	50	50
		A1 [mm]	100	150	100	150	150	150	150
		A2 [mm]	150	200	150	200	200	200	200

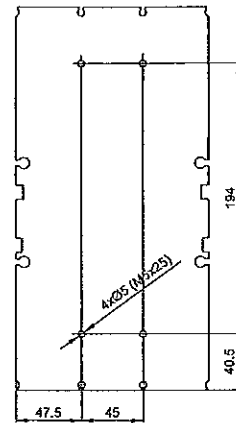
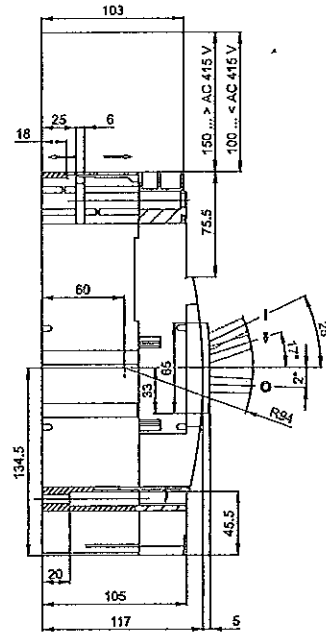
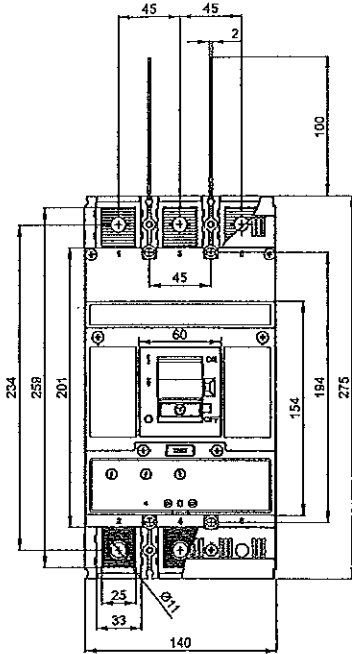
I_{sc} - max. short-circuit current in the protected circuit (rms)

CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

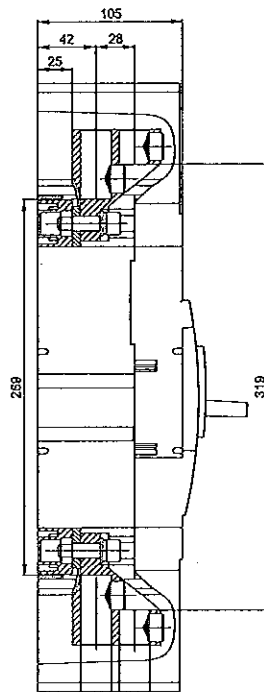
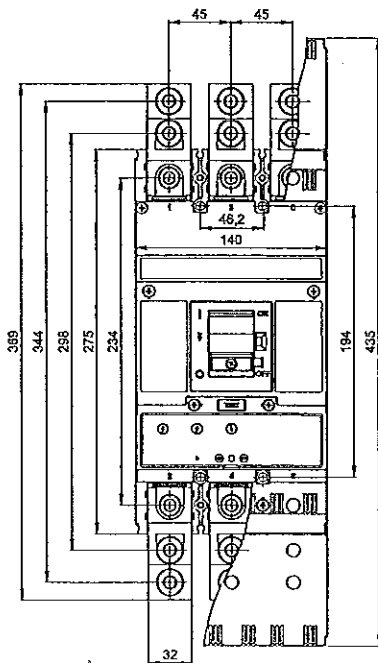
Dimensions

Fixed design, front connection

Drilling diagram



Fixed design, front connection (CS-BH-B021, CS-BH-B022 connecting sets)

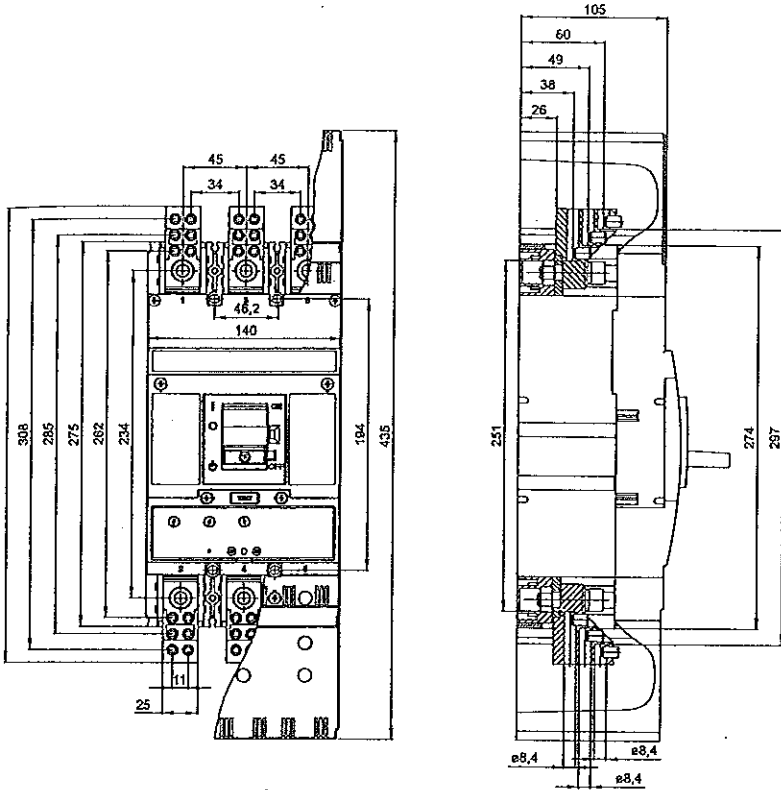


Ø22	Ø22 CS-BH-B021
Ø18	Ø18 CS-BH-B022

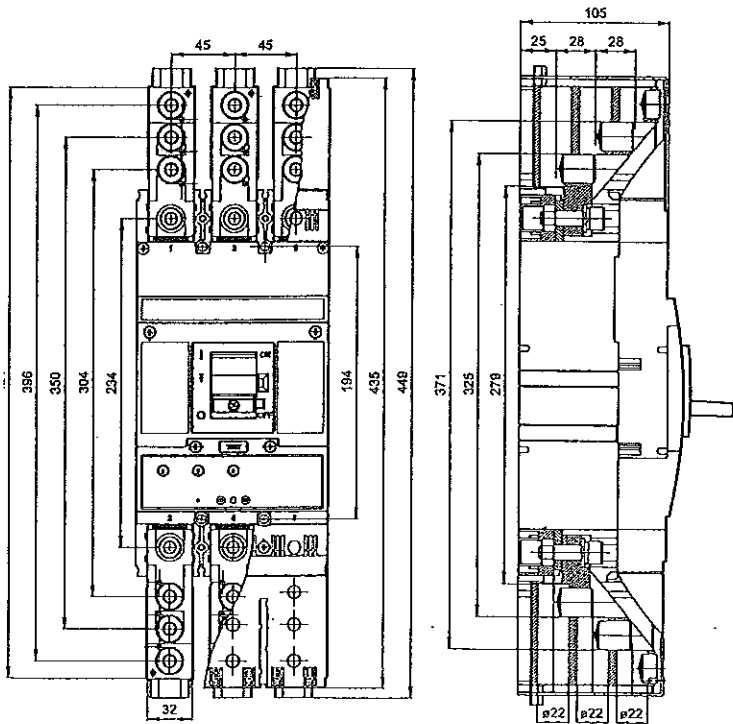
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

Standard design, front connection (CS-BH-B014 connecting set)



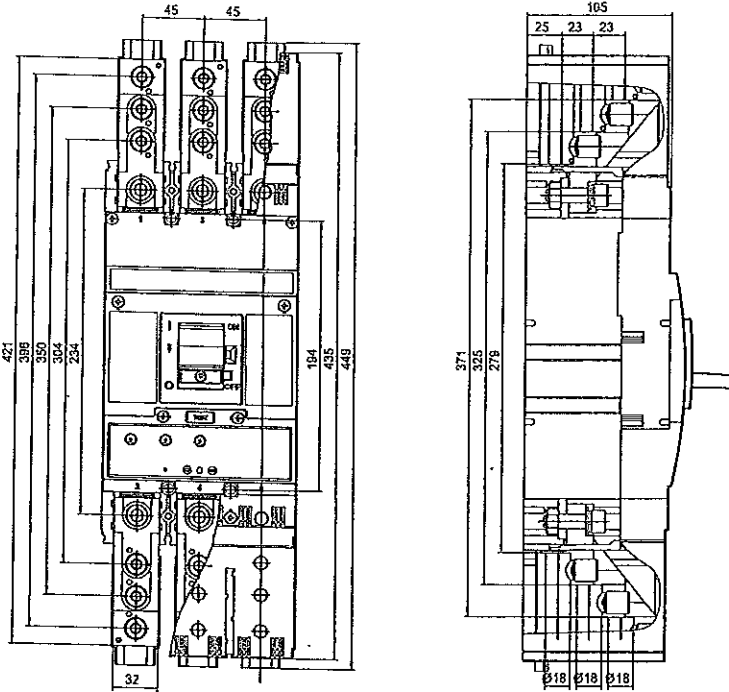
Standard design, front connection (CS-BH-B031 connecting set)



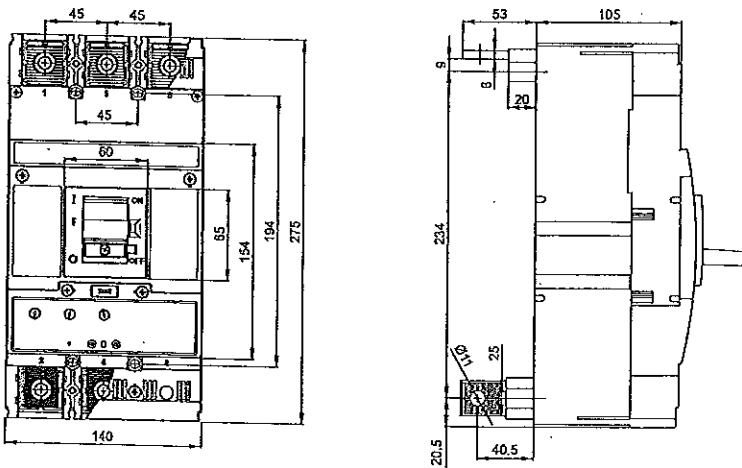
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

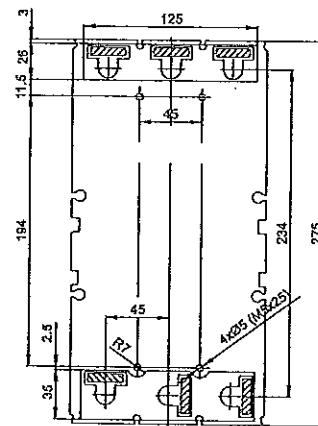
Fixed design, front connection (CS-BH-B032 connecting set)



Fixed design, rear connection (CS-BH-A021 connecting set)



Drilling diagram



CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

Fixed design, front connection

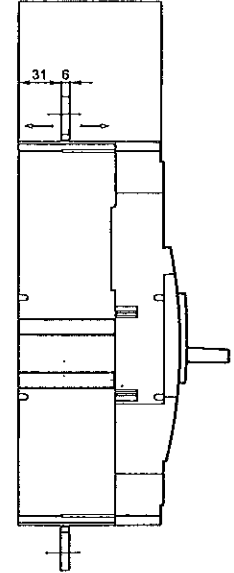
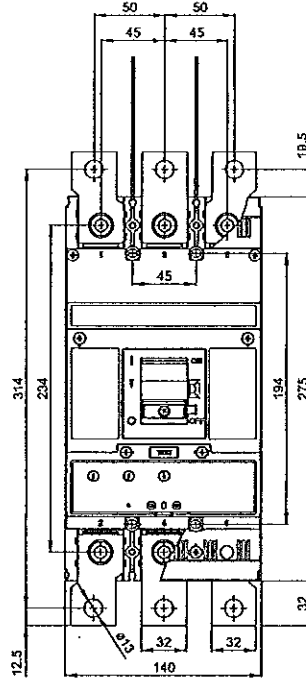
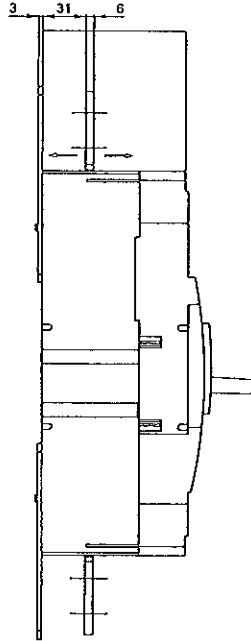
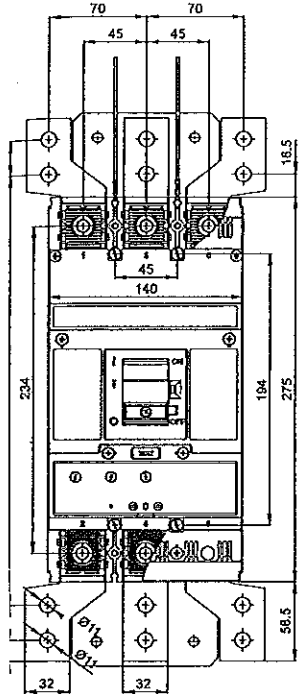
(S-BH-A039 connecting set, OD-BHD-MS39 mounting set)

RETROFIT

Fixed design, front connection

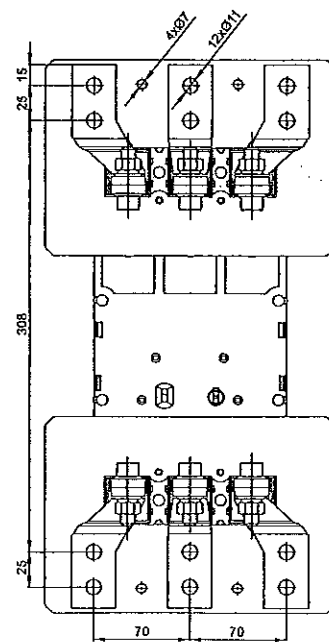
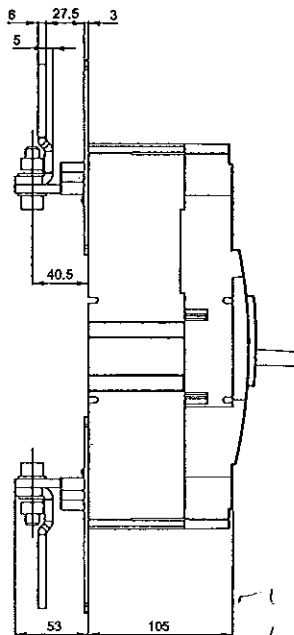
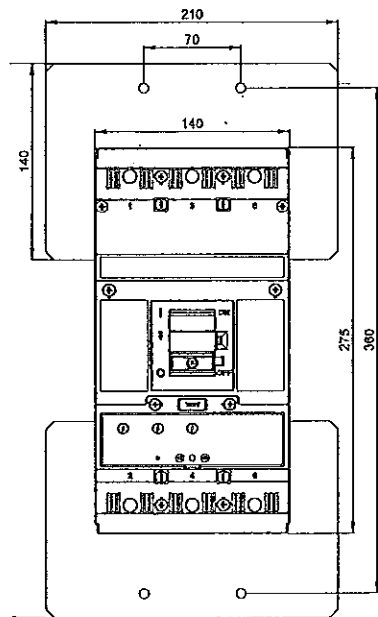
(CS-BH-A037 connecting set)

RETROFIT



Fixed design, rear connection (CS-BH-Z039 connecting set, OD-BH-MZ39 mounting set)

RETROFIT



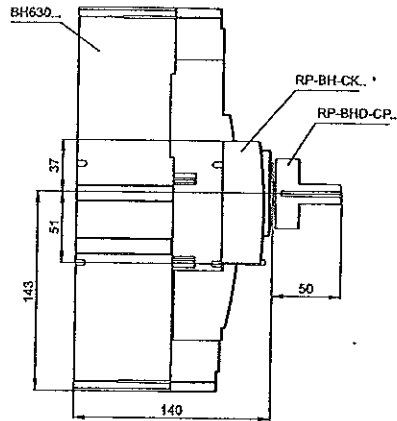
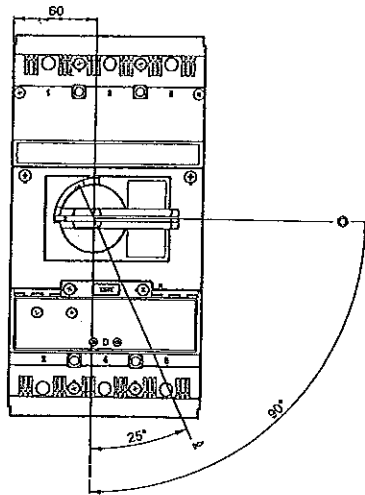
[Handwritten signature]

[Handwritten signature]

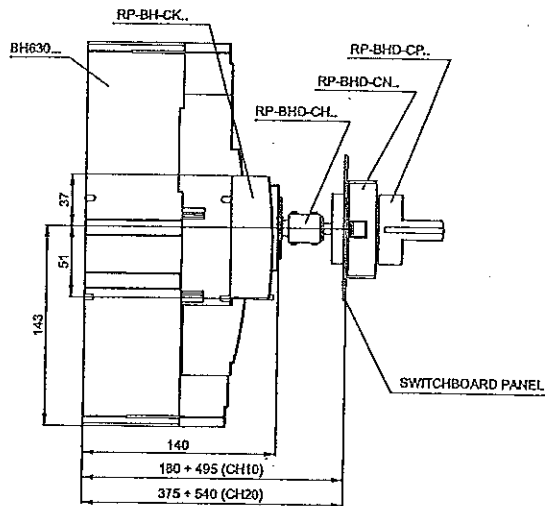
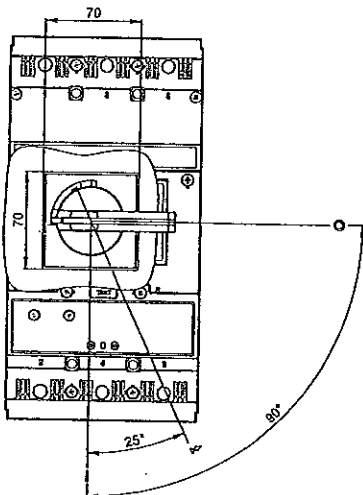
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

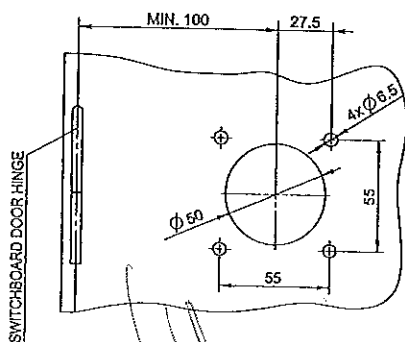
Fixed design, hand drive



Fixed design, hand drive - front, with adjustable lever



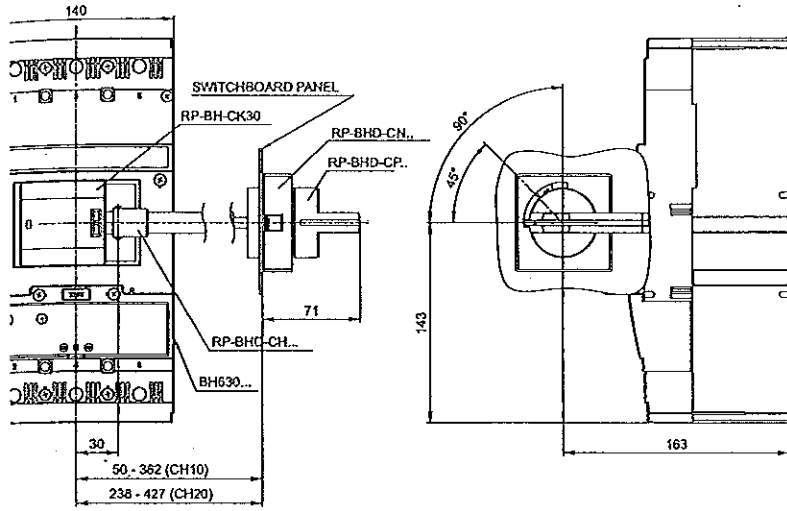
Switchboard door modification



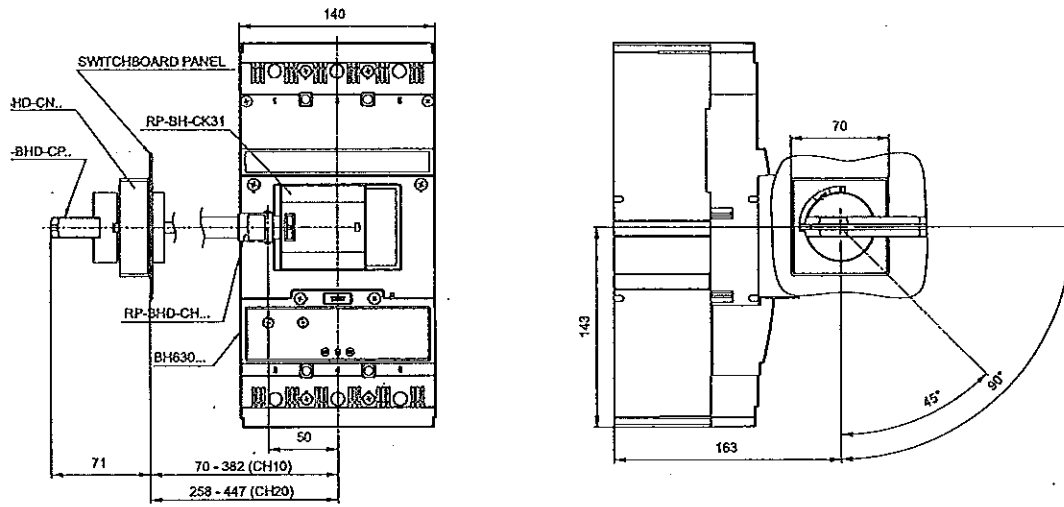
RCUIT BREAKERS, SWITCH-DISCONNECTORS

ensions

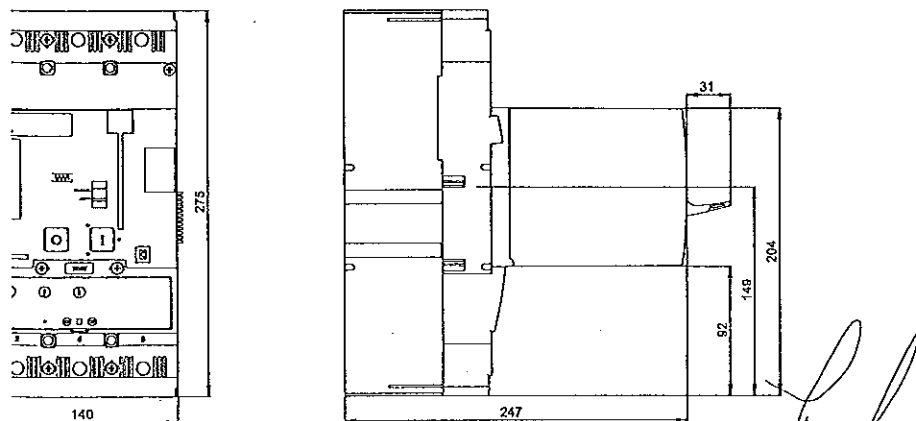
nd design, hand drive - control on right side, with adjustable lever



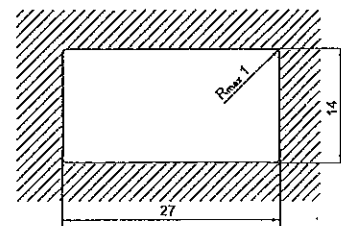
nd design, hand drive - control on left side, with adjustable lever



nd design, MP-BH-X... motor drive



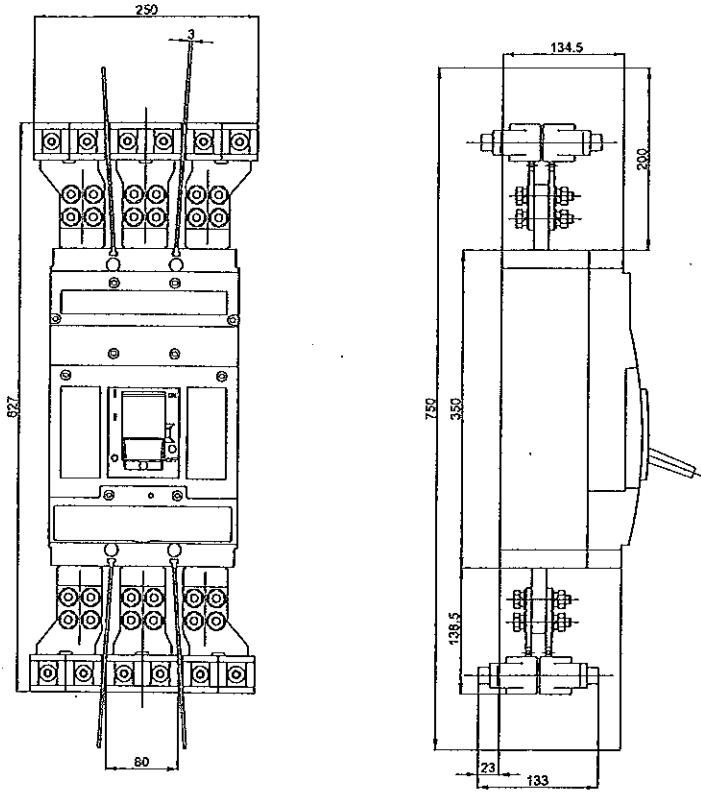
Opening dimensions in switchboard door for external counter of cycles



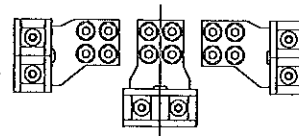
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

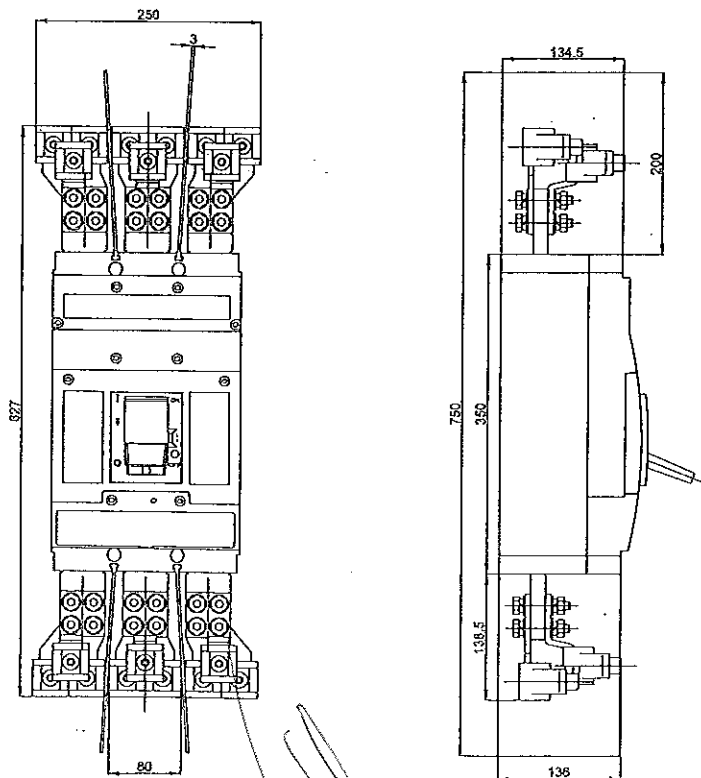
Fixed design, clamp terminals (CS-BL-W010 connecting sets) - combination of two sets arranged vertically can not be applied for BL1000SE305 switching unit



Another possibility of connection



Fixed design, clamp terminals (CS-BL-W010 and CS-BL-W011 connecting sets) - combination of two sets arranged vertically can not be applied for BL1000SE305 switching unit

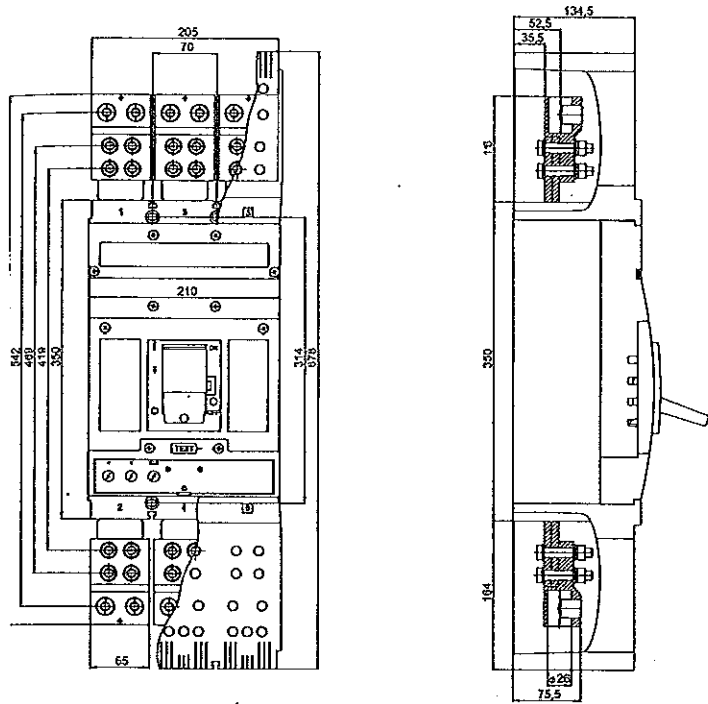


CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

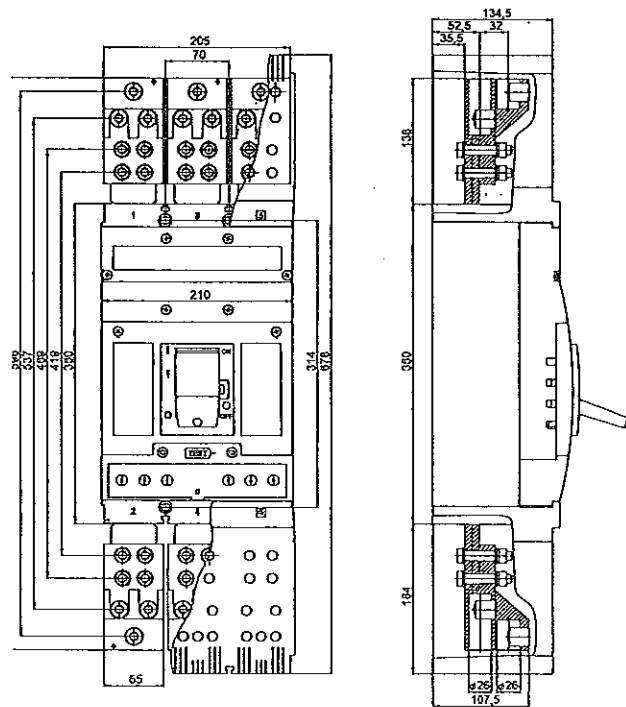
3P

Dimensions

Fixed design, block terminals (CS-BL-B002)



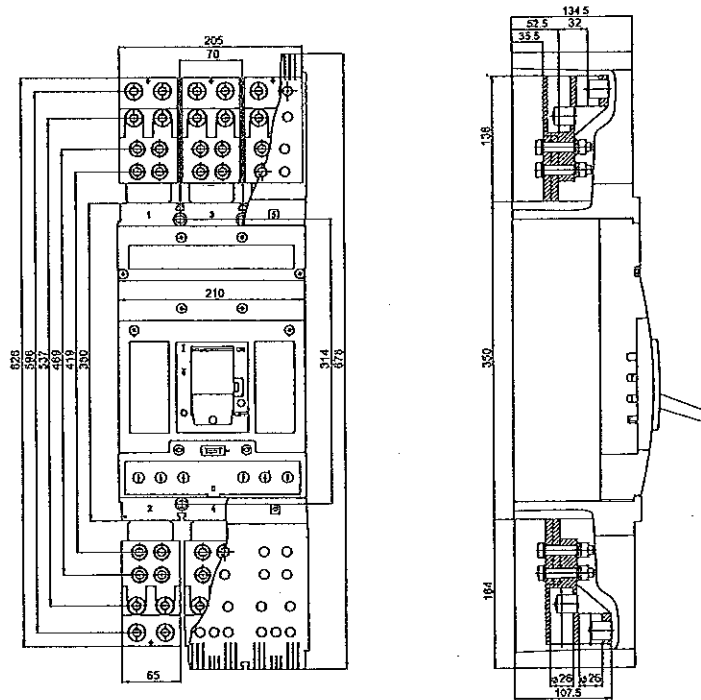
Fixed design, block terminals (CS-BL-B003)



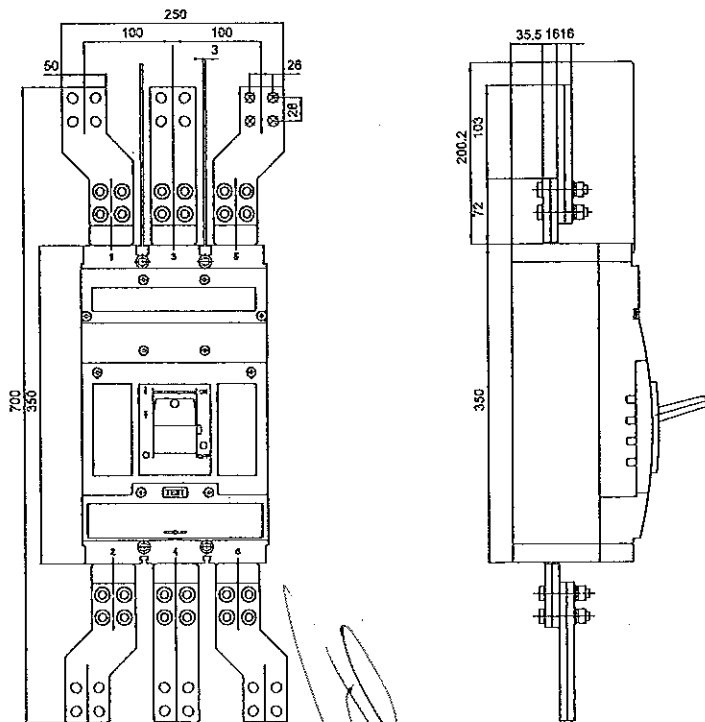
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

Fixed design, block terminals (CS-BL-B004)



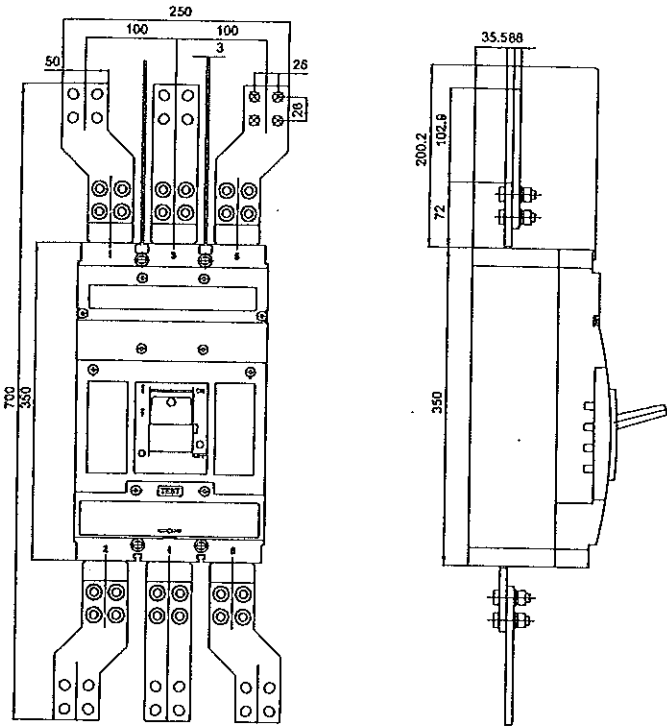
Fixed design, CS-BL-A015 front connection



CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

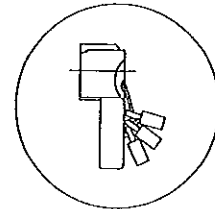
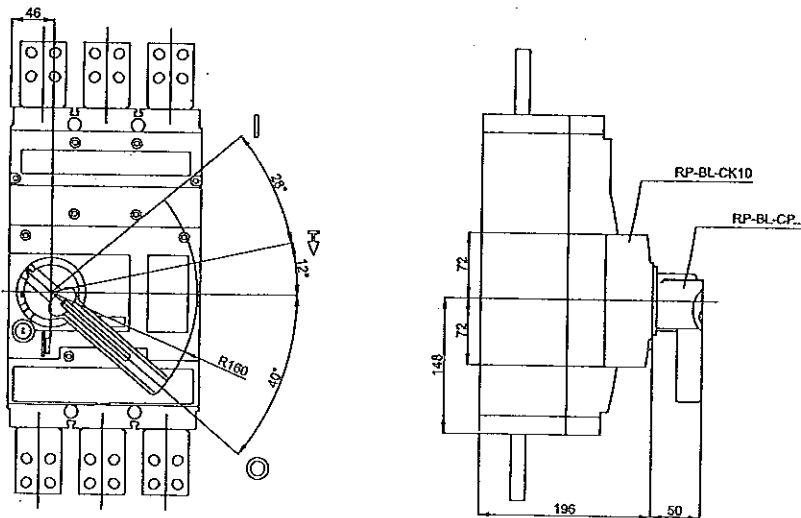
Dimensions

Fixed design, CS-BL-A016 front connection



Fixed design, front hand drive

Hand drive lever - with locking (RP-BL-CP10, RP-BL-CP11)

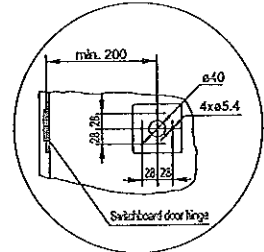
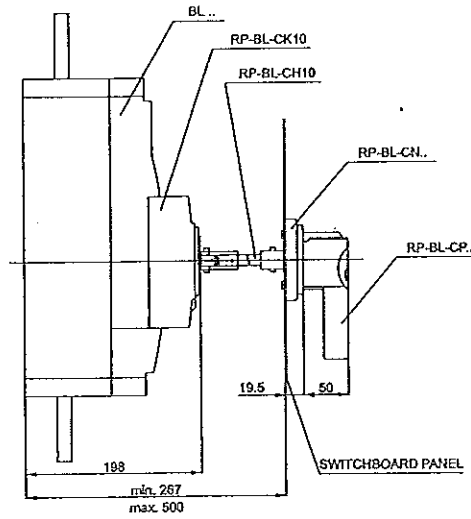
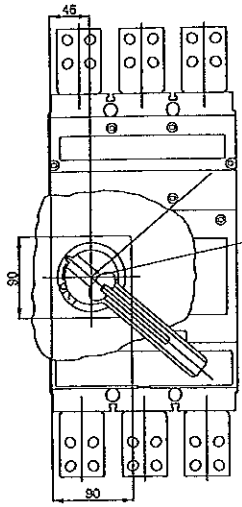


CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

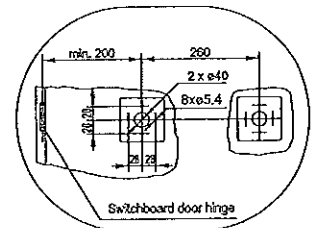
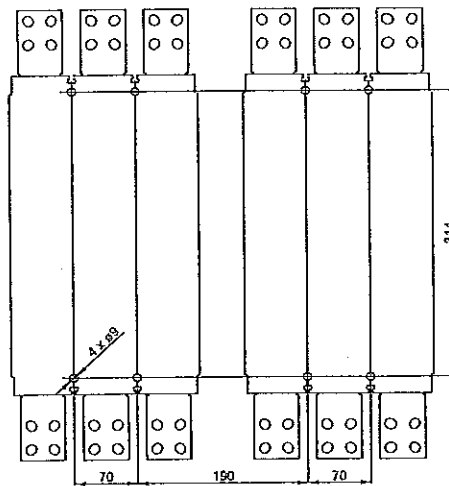
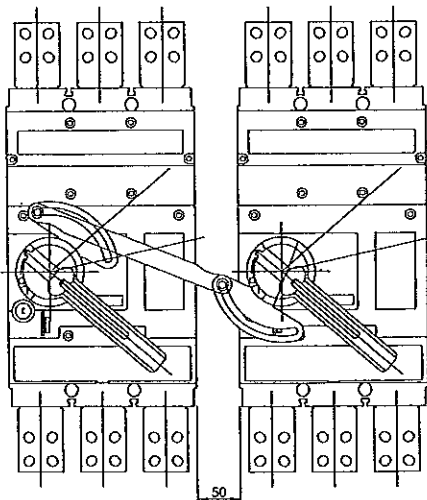
Fixed design, front hand drive, adjustable lever

Switchboard door modification



RP-BL-CB10 mechanical interlocking

Switchboard door modification



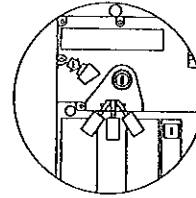
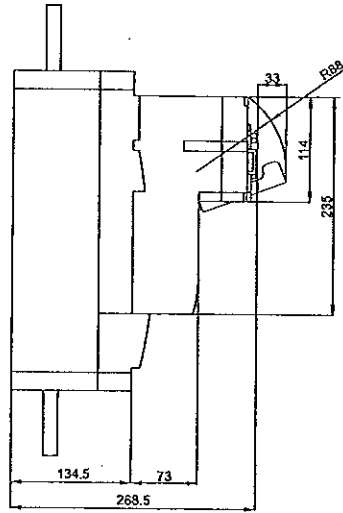
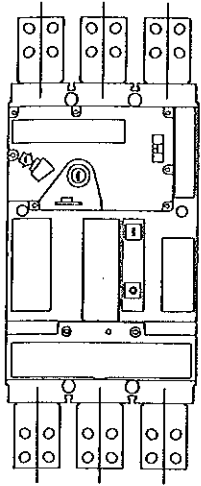
Handwritten signature

CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

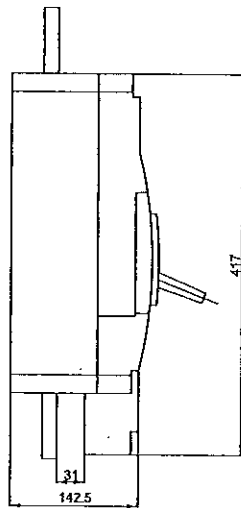
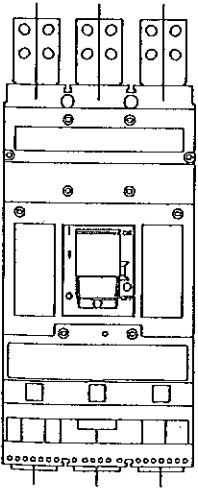
Dimensions

Fixed design, MP-BL-X... motor drive

Locking using three padlocks



Fixed design, SB-BL-0002 signalling unit



A large, stylized handwritten signature or mark in the bottom right area of the page.

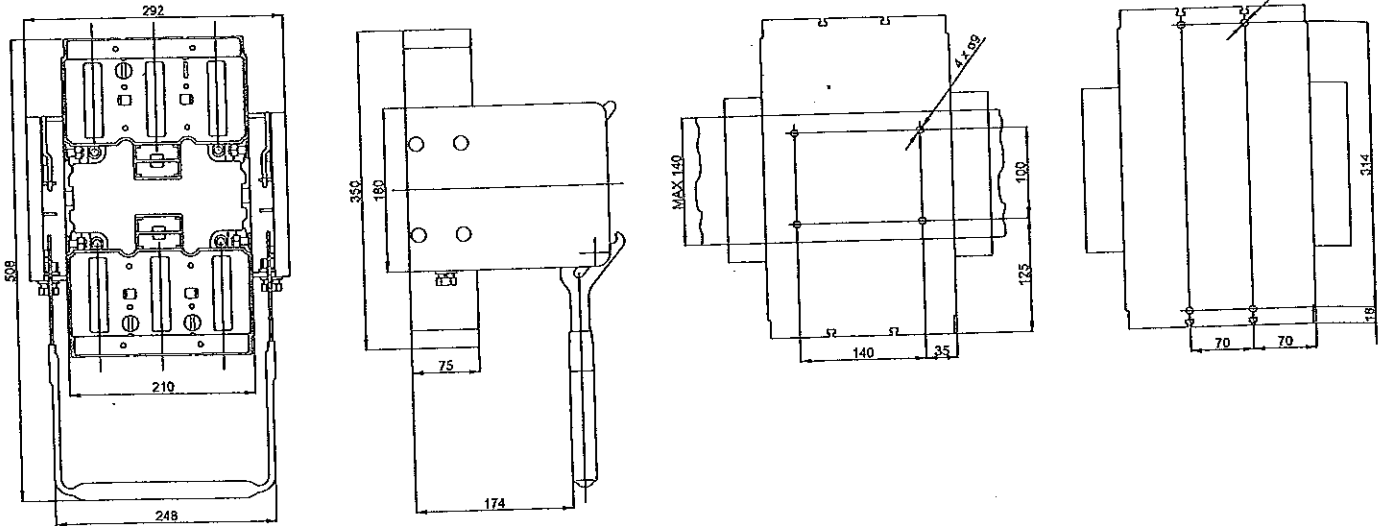
A large, stylized handwritten signature or mark in the bottom right area of the page.

CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

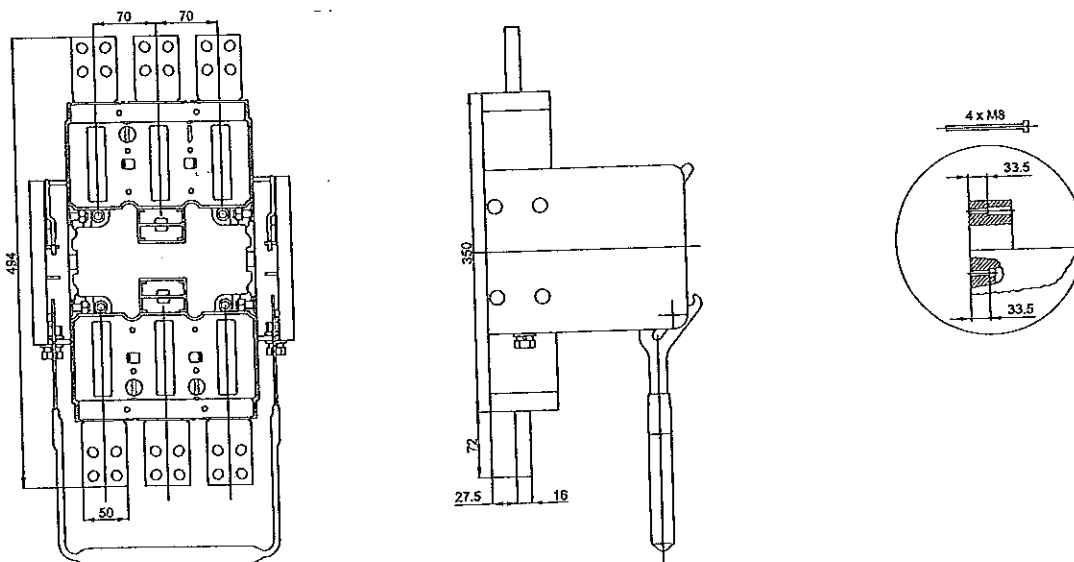
Dimensions

ZV-BL-1600-300 withdrawable device

Drilling diagram



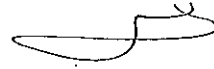
Withdrawable device, front connection (CS-BL-A010 connecting sets)



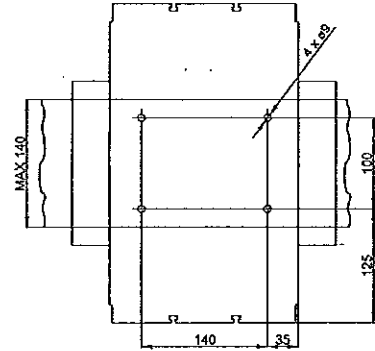
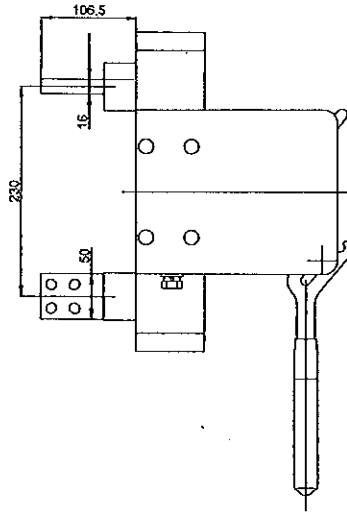
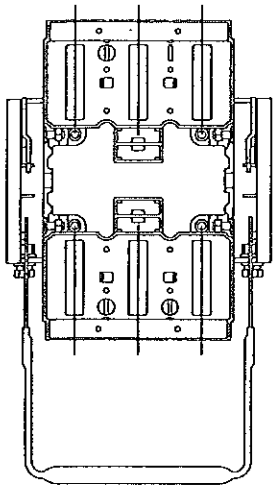
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

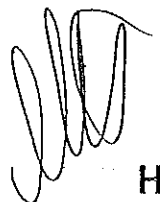
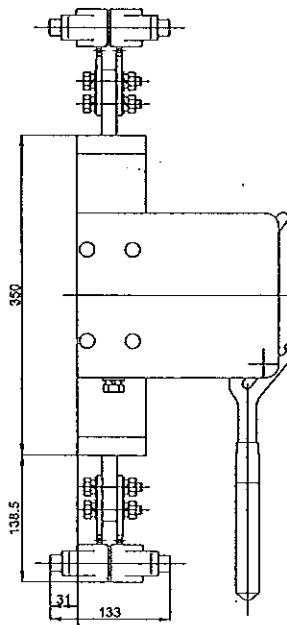
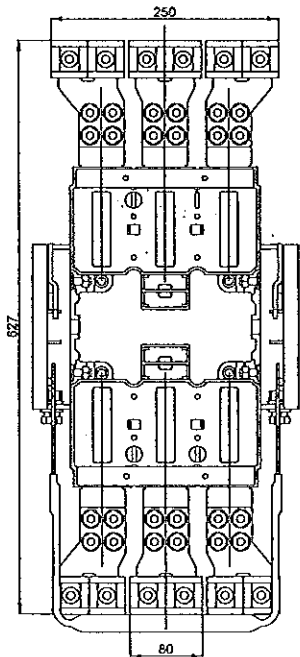
Withdrawable device, rear connection (CS-BL-A021 connecting set)



Drilling diagram



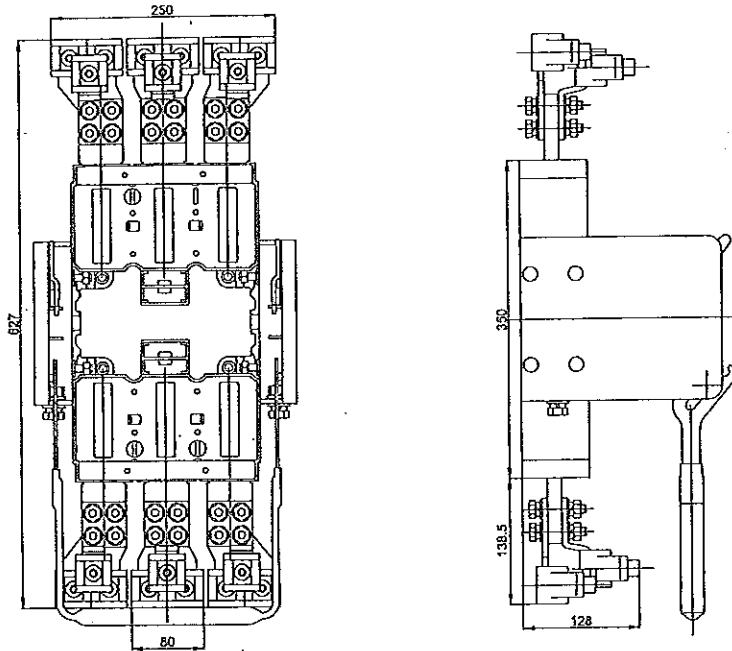
Withdrawable device, clamp terminals (CS-BL-W010 connecting set)



CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

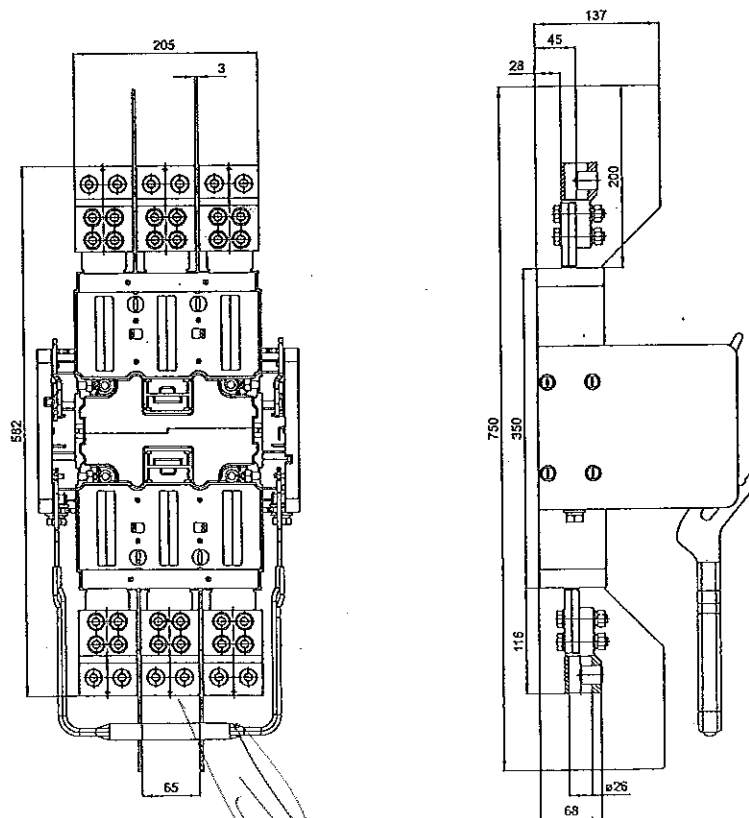
Dimensions

Withdrawable device, clamp terminals (CS-BL-W010 and CS-BL-W011 connecting sets)



Withdrawable device, block terminals

Working position



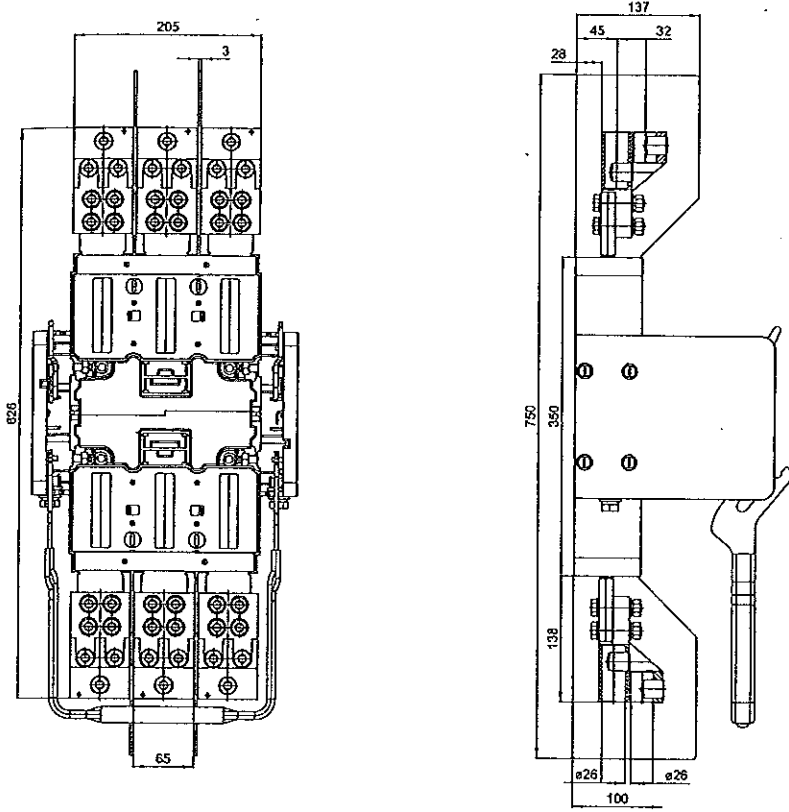
CP

CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

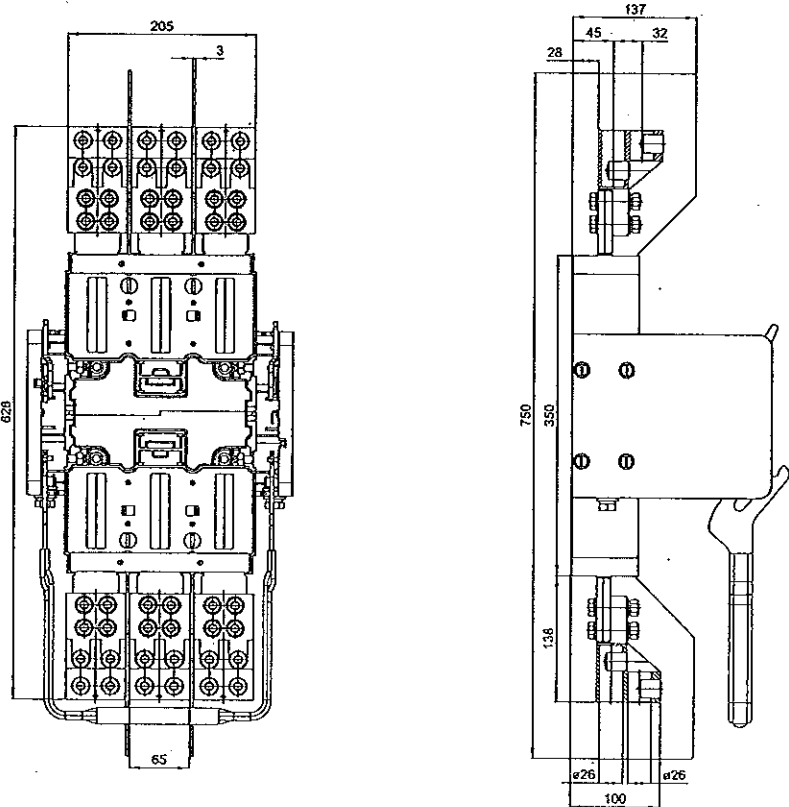
3P

Dimensions

(Withdrawable device, block terminals (CS-BL-B003))



(Withdrawable device, block terminals (CS-BL-B004))



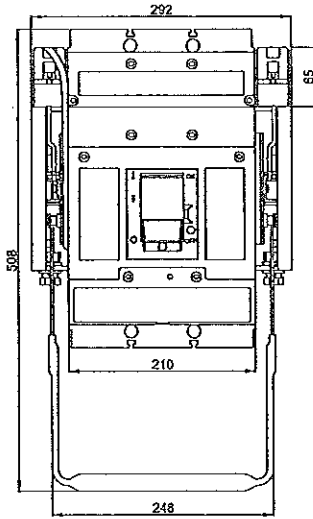
[Handwritten signature]

[Handwritten signature]

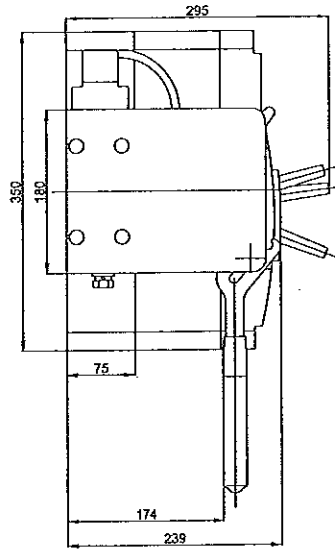
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

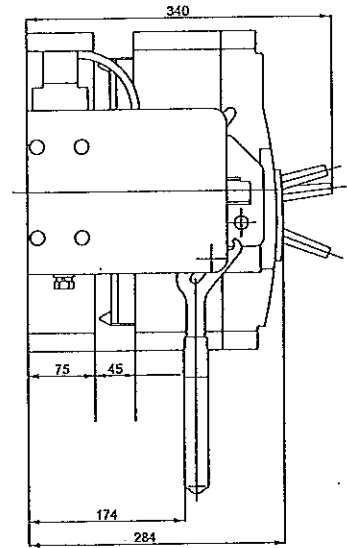
Withdrawable design



Working position



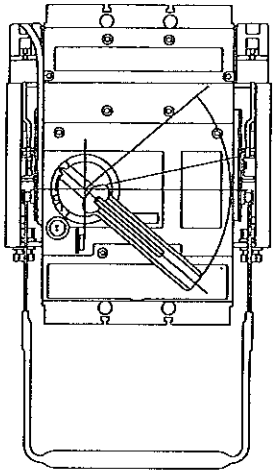
Inspection position



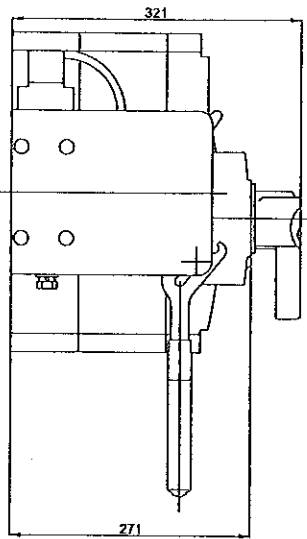
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

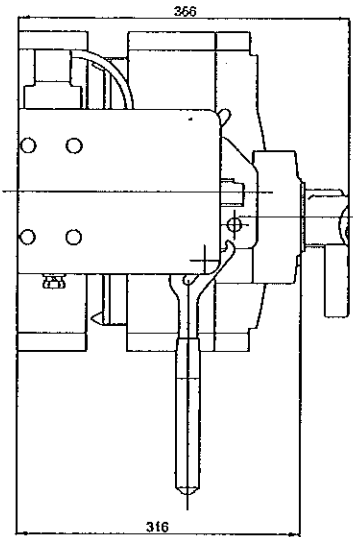
Withdrawable design, hand drive



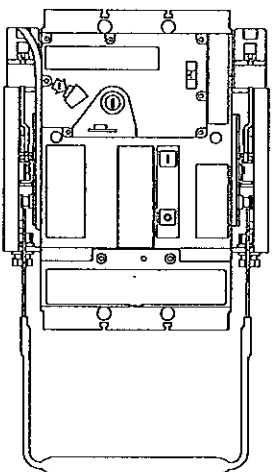
Working position



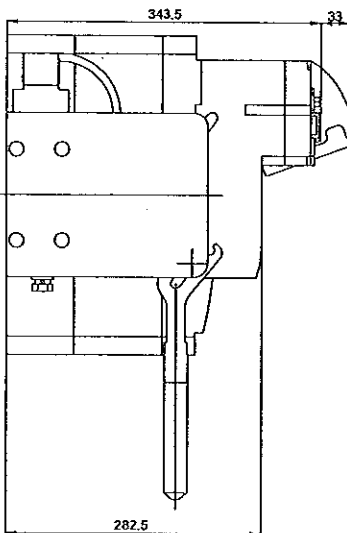
Inspection position



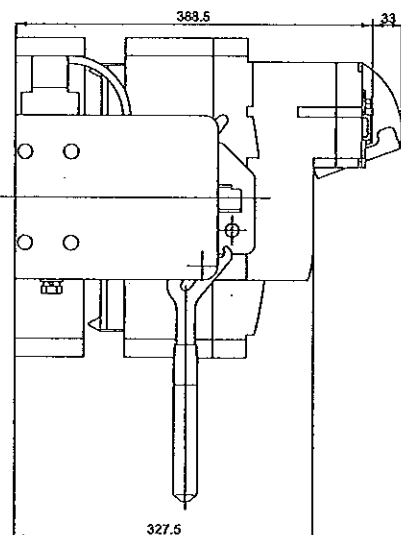
Withdrawable design, MP-BL-X230 motor drive



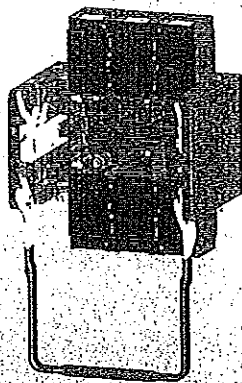
Working position



Inspection position



WITHDRAWABLE DEVICE

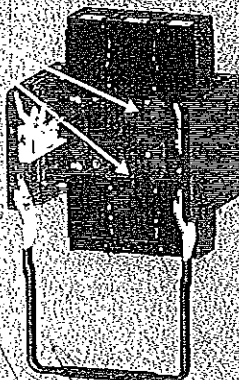


Withdrawable device
ZV-BL-1600-300



Circuit breaker in withdrawable design

Signalling of position
SO-BL-0010



Description

Withdrawable design of the circuit breaker/switch-disconnector is intended for demanding industrial applications where rapid exchange of the circuit breaker, frequent checking and both visual and conductive disconnection of the circuit are needed.

- withdrawable device must be fitted with connecting the sets:
 - 2 sets CS-BL-A010 - pro front connection
 - or 2 sets CS-BL-A020 - for rear connection

- OD-BL-MS02 set of mounting bolts is used to fasten the withdrawable device into the switchboard, see page H10

Circuit breaker positions

Circuit breaker in withdrawable design has three positions:

- inserted (working position)
- withdrawn (inspection position)
- removed

Power circuit

- connecting set CS-BL-A010 is used for connecting with busbars or cable lugs (front connection) or CS-BL-A020 connecting set (rear connection)
- for connection using cables, it is necessary in addition to a connection set CS-BL-A010 or CS-BL-A020 to use connection sets, see page H7
- the method of power circuit connection must observe recommendations, see page H12, as well as deionization space, see page H16

Auxiliary circuits

These are connected using 15-wire cable OD-BL-KA01.

Circuit breaker accessories in withdrawable design

Circuit breaker in withdrawable design has the same accessories as fixed circuit breaker.

Signalling of position SO-BL-0010

Withdrawable device can be fitted with up to four switches for signalling the position of the circuit breaker inserted, see table.

Advantages and enhanced safety for operator:

- remote signalling of circuit breaker's inserted position (position of locking is not signalled)
- checking of circuit breaker and accessories function in the inspection position
- locking withdrawable device against inserting circuit breaker, locking of circuit breaker in withdrawn (checking) position -- locking by means of padlocks
- visible and conductive disconnection of the power circuit
- easy exchange of circuit breakers in case of failure



Auxiliary circuits
OD-BL-KA01



Signalling of position
SO-BL-0010

States of switches SO-BL-0010 in withdrawable device according to circuit breaker and arrestment positions

Circuit breaker position	States of switches
--------------------------	--------------------



Inserted (arrested and not arrested)	0 1
Other positions	1 0

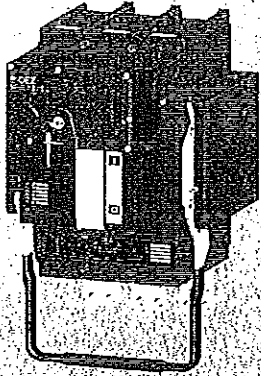
note: 0 - contact open, 1 - contact closed

Specifications SO-BL-0010

Type		SO-BL-0010
Rated operating voltage	U_e	230 V a.c. 220 V d.c.
Rated frequency	f	50/60 Hz
Rated operating current	I_n	AC-13 6 A/230 V a.c. DC-15 3.5 A/24 V d.c., 1 A/48 V d.c., 0.3 A/110 V d.c., 0.15 A/220 V d.c.
Arrangement of contacts		001
Connection cross-section	S	0.5 ÷ 1 mm ²
Degree of protection of terminals (connected switch)		IP20

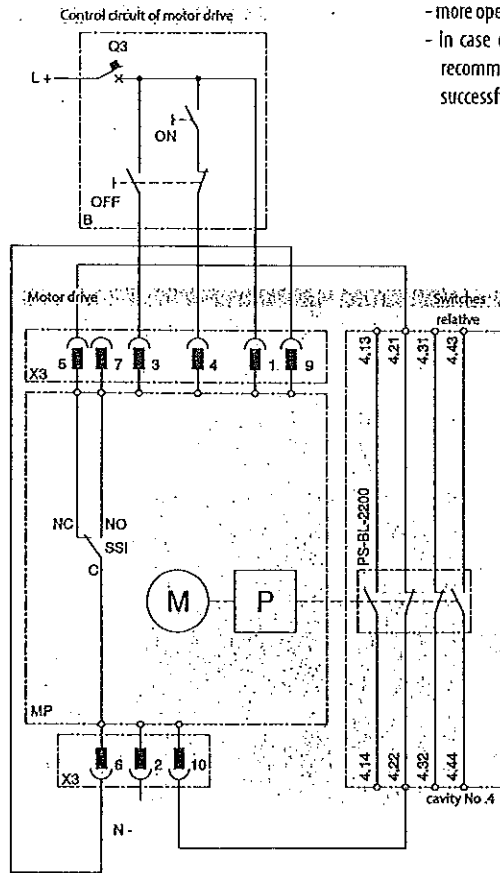
For wiring diagram of circuit breaker in withdrawable device with accessories, see page H12

WITHDRAWABLE DEVICE



Circuit breaker in withdrawable design with motor drive

Recommended connection of circuit breaker in withdrawable design with motor drive



Inserting and withdrawing the circuit breaker with motor drive - each time before inserting or withdrawing the circuit breaker we recommend at first to run the AUTO/MANUAL switch on the motor drive to the MANUAL position - more operating information can be found in the operating instructions - In case of infringement of this procedure or failing to follow the recommended wiring could mean that the circuit breaker will not successfully switch on at the first attempt

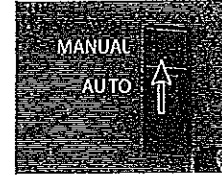


Diagram description

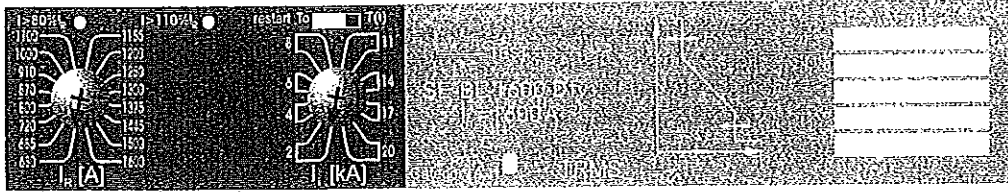
Symbol	Description
MP	motor drive MP-BL-X...
M	motor
P	storage device
X3	connector for connection of control circuits
SSI	switch to indicate MANUAL (NO-C)/AUTO (NC-C)
B	recommended wiring of the control circuits (not included in motor drive order)
ON	switch on button
OFF	switch off button
Q3	motor drive circuit breaker for 110V a.c. LPN-4C-1 for 230V a.c. LPN-2C-1 for 110V d.c. LPN-DC-4C-1 for 220V d.c. LPN-DC-2C-1

Changes in states of switches in cavities of switching unit when inserting and withdrawing circuit breaker

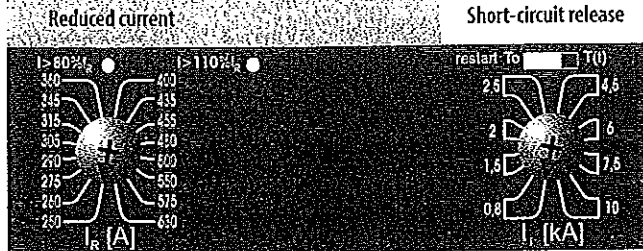
State of circuit breaker before insertion		State of switches before insertion - withdrawn position				State of switches after insertion - inserted position			
State of circuit breaker before withdrawal		State of switches before withdrawal - inserted position				State of switches after withdrawal - withdrawn position			
		Cavity 1, 2		3, 4		1, 2		3, 4	
Circuit breaker lever position	State of the main contacts	PS-BL-2200		PS-BL-2200		PS-BL-2200		PS-BL-2200	
Switched on		1	0	1	0	0	1	0	1
Switched off manually or by motor drive electrically (loaded state)		0	1	1	0	0	1	1	0
Switched off from switched on state by the releases or TEST push button		0	1	0	1	0	1	0	0

note: 0 - contact open, 1 - contact closed

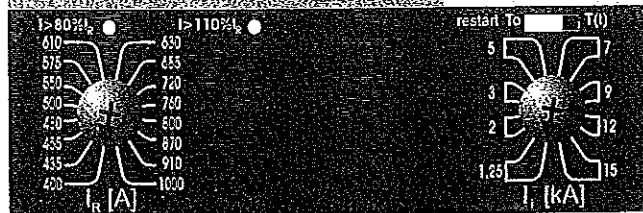
OVERCURRENT RELEASES - DTV3



$I_n = 630\text{ A}$
SE-BL-0630-DTV3



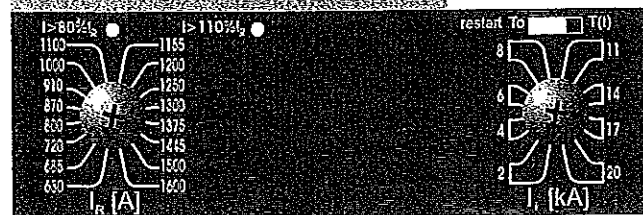
$I_n = 1000\text{ A}$
SE-BL-1000-DTV3



$I_n = 1250\text{ A}$
SE-BL-1250-DTV3



$I_n = 1600\text{ A}$
SE-BL-1600-DTV3

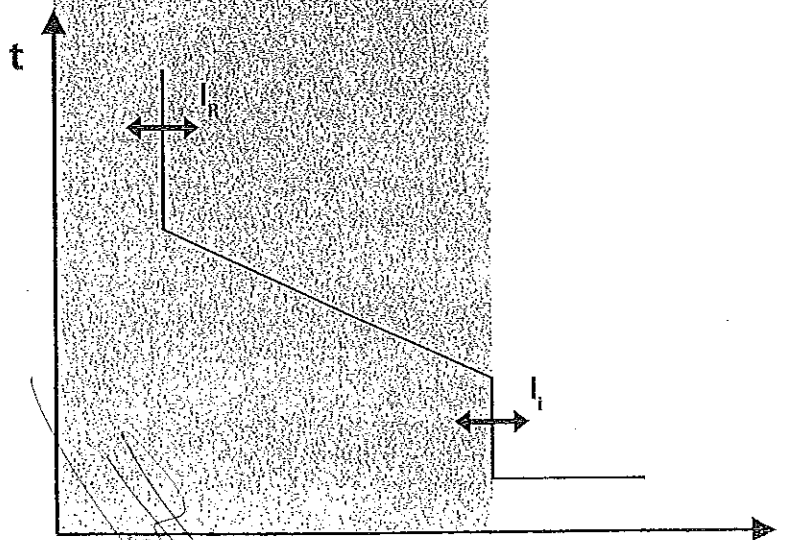


Properties

- suitable for protection of lines and distribution transformers
- protects against both overcurrent and short circuit
- reduced current setting $I_r = 0.4 \div 1 I_n$
- thermal memory can be switched on/off (ON = T_{kv} , OFF = T_{kv})
- setting of the value of the short-circuit release I_l in 8 steps
- setting of I_r and I_l by means of the rotary switches is stepwise
- the overcurrent release indicates the value of the passing current by means of LED
- the values of parameters of the overcurrent release are set by the manufacturer to minimum

Data for the project

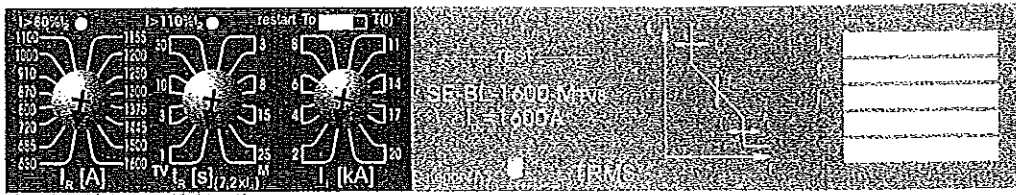
Switching unit	BL1600
Overcurrent release	SE-BL
Overcurrent release setting	
Reduced current	I_r A
Thermal memory	T
Short-circuit release current	I_l A



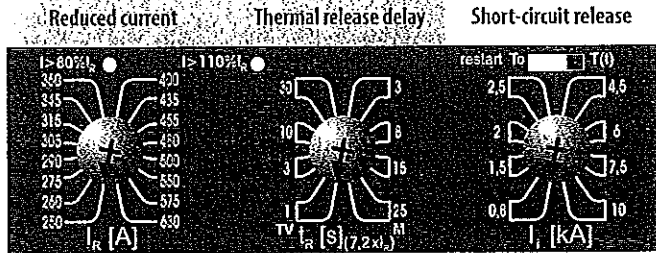
IMPORTANT

- thermal memory must be switched on in protection of transformers and lines - thus the transformer or the line will be protected against repeated overload

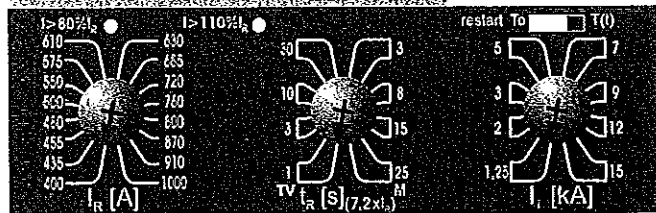
CURRENT RELEASES - MTV8, TV mode



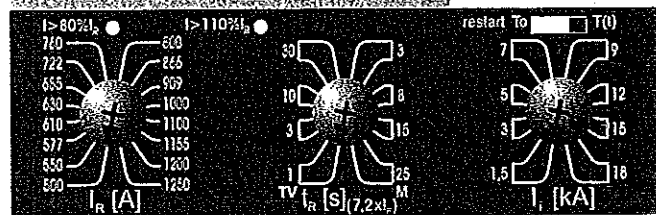
630 A
30-MTV8



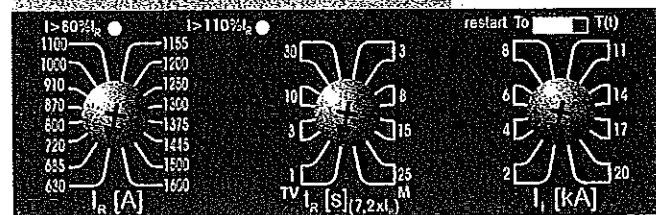
1000 A
00-MTV8



1250 A
150-MTV8



1600 A
500-MTV8

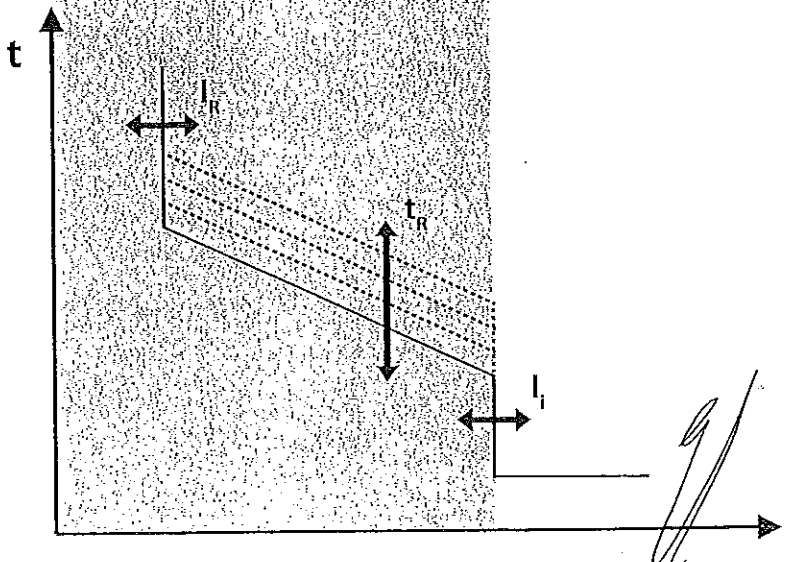


Properties

- TV mode - suitable for protection of lines, distribution transformers and generators
- protects against both overcurrent and short circuit
- reduced current setting $I_r = 0.4 \div 1 I_n$
- thermal memory can be switched on/off (ON = T_{tr} , OFF = T_{tr})
- in TV mode the undercurrent release is inactive
- setting of delay of the thermal release t_r 1 s, 3 s, 10 s and 30 s
- setting of the value of the short-circuit release I_i in 8 steps
- setting of I_r , t_r and I_i by means of the rotary switches is stepwise
- the overcurrent release indicates the value of the passing current by means of LED
- the values of parameters of the overcurrent release are set by the manufacturer to minimum

Data for the project

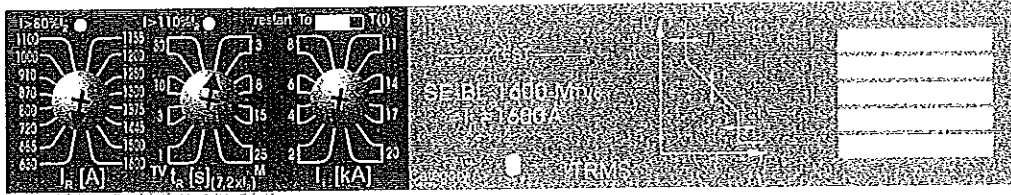
Switching unit	BL1600
Overcurrent release	SE-BL
Overcurrent release setting	I_r A
Reduced current	TV
Mode	T
Thermal memory	t_r s
Thermal release delay	I_i A
Short-circuit release current	



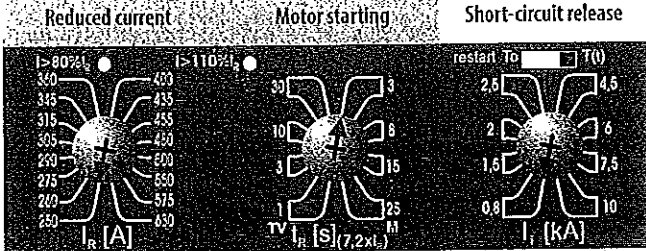
IMPORTANT

- the set value of current of the short-circuit release must correspond to the impedance loop - conditions must be fulfilled for automatic disconnection from power supply in case of failure

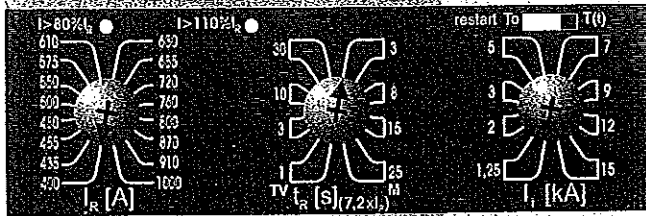
OVERCURRENT RELEASES - MTV8, M mode



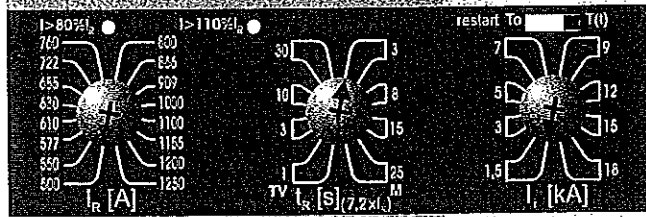
$I_n = 630$ A
SE-BL-0630-MTV8



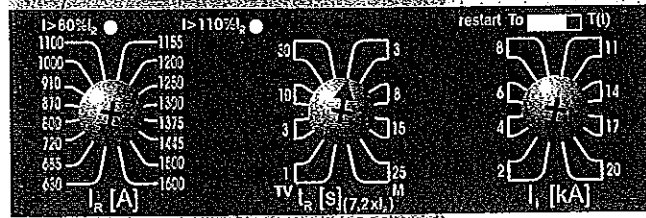
$I_n = 1000$ A
SE-BL-1000-MTV8



$I_n = 1250$ A
SE-BL-1250-MTV8



$I_n = 1600$ A
SE-BL-1600-MTV8

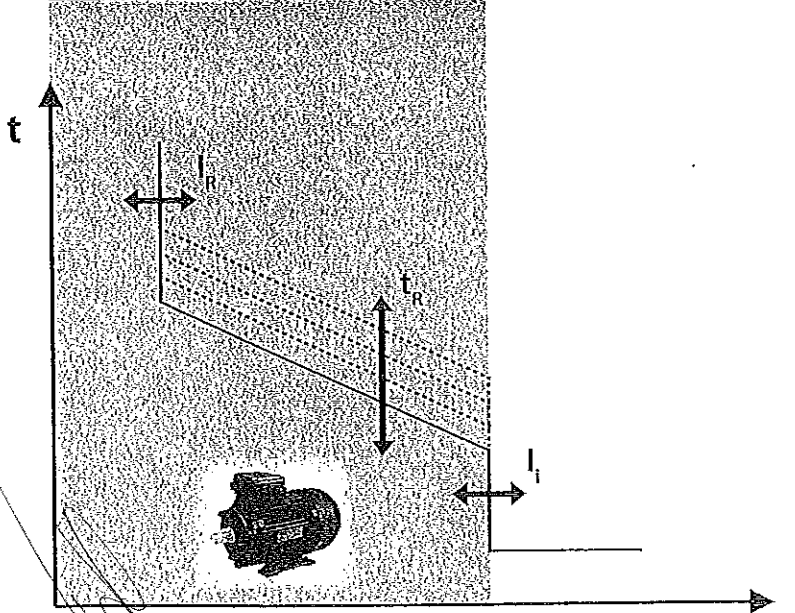


Properties

- M mode - suitable for protection of motors
- protects against both overcurrent and short circuit
- reduced current setting $I_R = 0.4 \div 1 I_n$
- thermal memory can be switched on/off (ON = T_{OFF} , OFF = T_{ON})
- in M mode the undercurrent release is active
- setting of delay of the thermal release t_R 3 s, 8 s, 15 s and 25 s according to the motor starting class
- setting of the value of the short-circuit release I_I in 8 steps
- setting of I_R , t_R and I_I by means of the rotary switches is stepwise
- the overcurrent release indicates the value of the passing current by means of LED
- the values of parameters of the overcurrent release are set by the manufacturer to minimum

Data for the project

Switching unit	BL1600
Overcurrent release	SE-BL
Overcurrent release setting	
Reduced current	I_R A
Mode	M
Thermal memory	T
Thermal release delay	t_R s
Short-circuit release current	I_I A



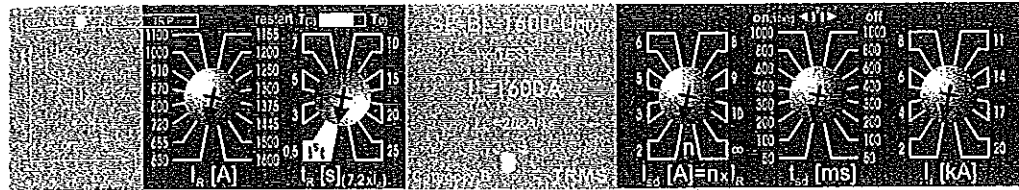
IMPORTANT

- M mode must be selected in protection of motors - the motor will be protected in phase failure
- thermal release delay t_R must correspond to the motor starting class

Cy

VERCURRENT RELEASES - U001

3P



I_n = 600 A
SE-BL-600-U001

Rated current **Motor starting** **Selective release** **Short-circuit release**

I_n = 1000 A
SE-BL-1000-U001

I_n = 1250 A
SE-BL-1250-U001

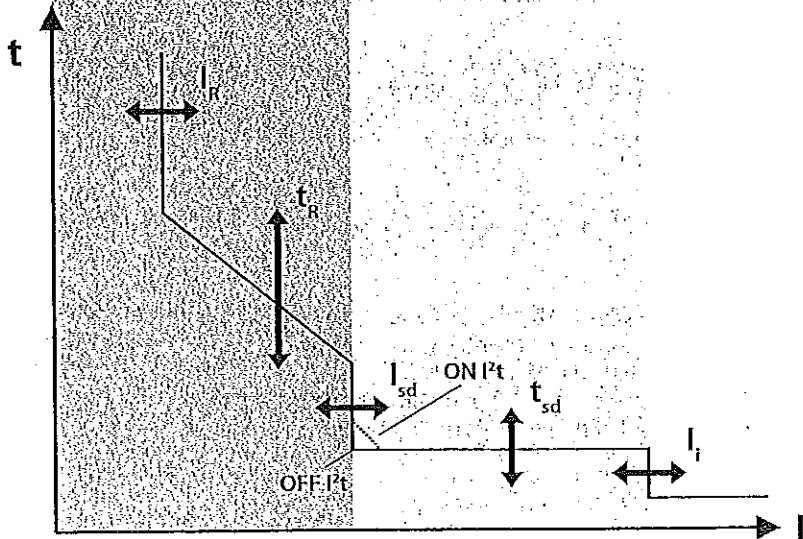
I_n = 1600 A
SE-BL-1600-U001

Properties

- it is designed for demanding applications with a complicated load and required high selectivity with fuses or circuit breakers
- protects against both overcurrent and short circuit
- reduced current setting $I_R = 0.4 \div 1 I_n$
- thermal memory can be switched on/off (ON = T_{OFF} , OFF = T_{ON})
- setting of the value of selective release t_{sd} in 8 steps, possibility of setting of gradient of characteristic of the thermal release Pt (adaptation of time-current characteristic of the fuse)
- setting of the value of selective release I_{sd} in 8 steps (independent time-delayed release)
- setting of delay of the selective release t_{sd} to 1000 ms including possibility of setting of a gradient of characteristic of the short-circuit release (adaptation of the time-current characteristic of the fuse)
- setting of the value of the short-circuit release I_i in 8 steps
- setting of I_R , t_R , I_{sd} , t_{sd} and I_i by means of rotary switches is stepwise
- the overcurrent release indicates operating state and the value of the passing current by means of LED
- the values of parameters of the overcurrent release are set by the manufacturer to minimum

Data for the project

Switching unit	BL1600
Overcurrent release	SE-BL-1600
Overcurrent release setting	
Reduced current	I_R A
Thermal memory	T
Setting of the gradient of characteristic of the thermal release	Pt
Thermal release delay	t_R s
Selective release value	I_{sd} A (n x I _n)
Selective release delay	t_{sd} ms
Setting of the gradient of characteristic of the short-circuit release	Pt
Short-circuit release value	I_i A

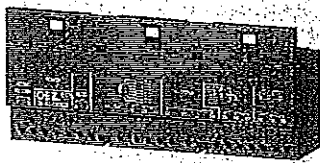


IMPORTANT

■ to achieve as high selectivity as possible, use the possibility of setting of the current and delay including gradient of the time-current characteristic of the independent (short-circuit) time-delayed release.

For selectivity solution, use the calculation program S4chr.

SIGNALLING UNITS



SB-BL-0002



DIMENSIONS see page H23

Description

- the SB-BL-0002 signalling unit is a modular accessory for the BL1000S and BL1600S circuit breakers and collaborates with the electronic releases SE-BL-...-DTV3, SE-BL-...-MTV8 and SE-BL-...-U001
- it is intended for applications in automated-control systems
- the unit signals reaching a certain current value in a circuit and the tripping of the circuit breaker by releases (dependent, independent, undercurrent)
 - user has an option to set up (by steps, using a rotary switch) an amount of current he wishes to indicate if it has been reached
 - can be set 70; 80; 90; 100; 120; 140; 160 or 180 % I_n (for more details see table)
- local indication regarding the state of the circuit breaker and the protected circuitry is carried out by LED indicators on the front panel of the unit
- the information on the state of the circuit breaker is transferred from the release to the signalling unit by means of optical coupling

- remote indication on the state of the circuit breaker and the protected circuitry is ensured by a relay, the make and break contacts of which are pulled into the terminal strip on the unit

- relays to indicate tripping of dependent or undercurrent and independent releases have storage - they do not change their state after disconnection from supply voltage
- after the storage relay is activated by tripping of a release, it is necessary to reset the relay using the front panel RESET switch or by an external push button remotely - reset is functional in case the supply voltage is connected to the signalling block

- supply voltage values are given in the table
- the main power supply and the reset circuit are not concurrently conformable with conditions for safe separation of the circuits
- the external RESET push button must be connected using a screened cable or a twisted wire with maximum resistance of the loop 100 Ohm

The signalling unit will not work without power supply!

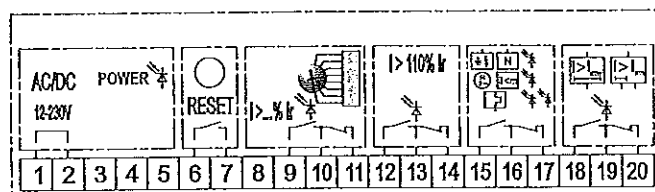
Specifications

		SB-BL-0002
Rated operating voltage	U_n	12 ÷ 230 V a.c./d.c.
Short-circuit protection	tube fuse	T1,6 A
Rated frequency	f_n	50/60 Hz
Current consumption (rms) max. at U_n	12 V a.c./d.c.	370 mA
	24 V a.c./d.c.	170 mA
	48 V a.c./d.c.	100 mA
	110 V a.c./d.c.	60 mA
	230 V a.c./220 V d.c.	50 mA
Rated operating current (of relay contact)	I_n , AC-1	8 A/230 V a.c.
	I_n , DC-1	0.25 A/220 V d.c., 8 A/30 V d.c.
Connection cross-section	S	0.5 + 1 mm ²

Power circuit status indication

Signalling	Relay contacts	LED
< 70 % I_n	-	+
Reaching		
110 % I_n	+	+
70; 80; 90; 100; 120; 140; 160; 180	-	+
Settings	+	+
Tripping by release		
By dependent/undercurrent		+/-
Independent		+

Connection



- 1,2 - supply
- 6,7 - external RESET push button
- 9,10,11 - relay contacts indicating preset I_n
- 12,13,14 - relay contacts indicating reaching 110 % I_n
- 15,16,17 - relay contacts indicating tripping by dependent or undercurrent releases
- 18,19,20 - relay contacts indicating tripping by independent release (instantaneous or delayed ones)

LIARY SWITCHES

3P

Specifications

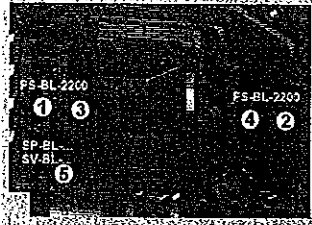
TYPE	PS-BL-2200	PS-BL-2200-Au
Rated operating voltage U_n	60 ÷ 500 V a.c. 60 ÷ 240 V d.c.	5 ÷ 60 V a.c. 5 ÷ 60 V d.c.
Rated insulation voltage U_i	500 V	500 V
Rated frequency f_n	50/60 Hz	50/60 Hz
Rated operating current I_n	AC-15: 6 A/60V ÷ 240V, 3 A/400V, 1.5 A/500V DC-13: 1 A/60V, 0.7 A/110V, 0.3 A/240V	AC-12, DC-12: 0.004 ÷ 0.5 A/5V, 0.004 ÷ 0.01/60V
Thermal current I_a	6 A	0.5 A
Arrangement of contacts	22	22
Connection cross-section S	0.5 ÷ 1 mm ²	0.5 ÷ 1 mm ²
Degree of protection of terminals (connected switch)	IP20	IP20

1) PS-BL-...-Au is not suitable to control electromagnetic loads

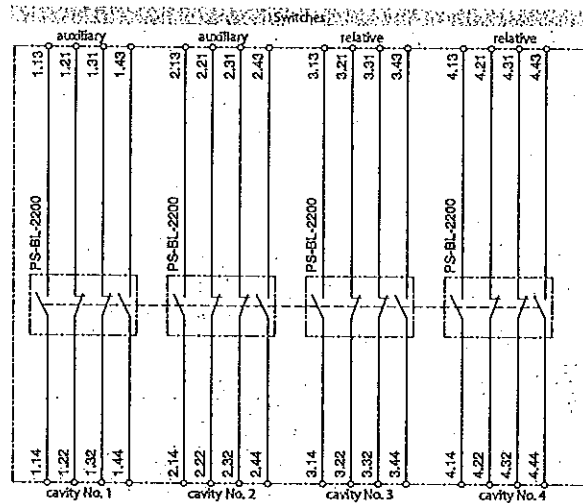
Arrangement of contacts	Number of contacts	Contact type
22	2+2	break + make

Names and functions of switches according to their location in cavities

Position of switch	Switch name	Switch function
Cavity 3, 4	Relative switch	to indicate tripping of the circuit breaker by releases, TEST push button or by motor
Cavity 1, 2	Auxiliary switch	signals position of circuit breaker/switch-disconnector's main contacts



Cavities in switching unit
BL1000SE305
BL1600SE305

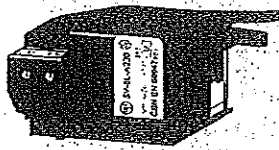


States of switches in the circuit breaker cavities

State of circuit breaker	Circuit breaker lever position	State of the main contacts	PS-BL-2200	PS-BL-2200			
Switched on	⌋	1	1	0	0	1	1
Switched off manually or by motor drive electrically (loaded state)	⊙	0	0	1	1	0	1
Switched off from switched on state, by the releases by TEST push button	∇	0	1	1	0	0	0

note: 0 - contact open, 1 - contact closed

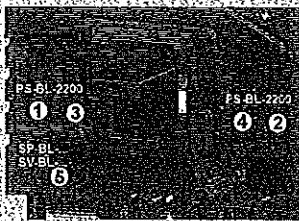
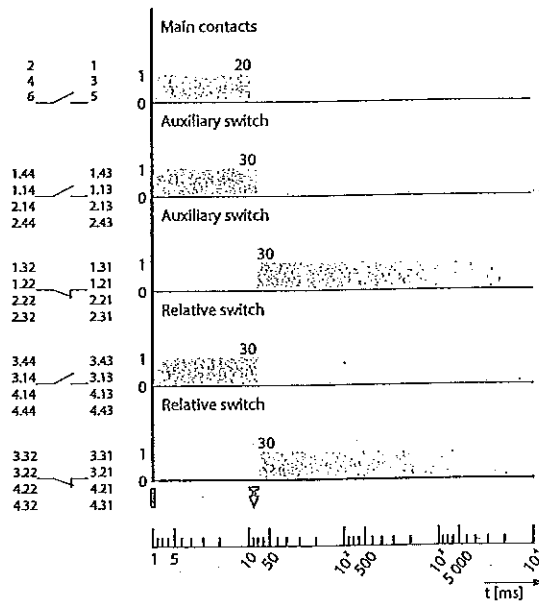
SHUNT TRIPS



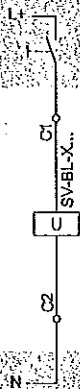
Specifications

Type	SV-BL-X	
Rated operating voltage	U_e	24, 48, 110, 230, 400, 500 V a.c. 24, 48, 110, 220 V d.c.
Rated frequency	f_n	50/60 Hz
Input power at 1.1 U_e		< 2,5 VA < 2 W
Characteristic		$U \geq 0,7 U_e$ the circuit breaker must trip
Time to switching off		20 ms
Loading time		∞
Connection cross-section	S	0,5 ÷ 1 mm ²
Degree of protection of terminals (connected release)		IP20
Position in cavity No.		5

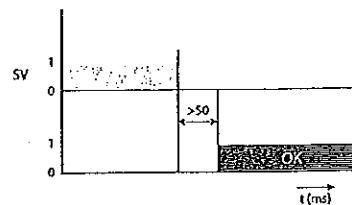
Circuit breaker/switch-disconnector switching off by shunt trip



Cavities in switching unit:
BL1000SE30S
BL1600SE30S

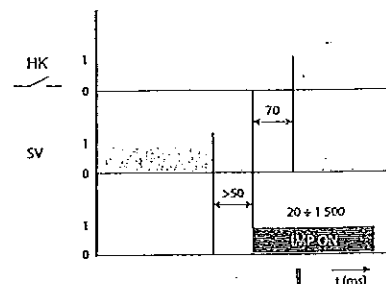


Reaction time of the shunt trip



Cooperation of motor drive and shunt trip

It is necessary to keep time delay when the control of the circuit breaker is done by motor drive and shunt trip at once. The following time delays have to be kept between the disconnection of voltage from the shunt trip and the control impulse for switch on of the motor drive:



States and positions of circuit breaker/switch-disconnector lever

States of circuit breaker/switch-disconnector	Lever position of circuit breaker/switch-disconnector
Switched on	
Switched off by releases or by TEST push button	
Switched off manually or by motor drive electrically (loaded state)	

Description of graphs

Symbol	Description
HK	Main contacts
OK	Circuit breaker is ready for further handling
IMP ON	Make impulse for the motor drive
SV	Control voltage on the shunt trip

Handwritten signature

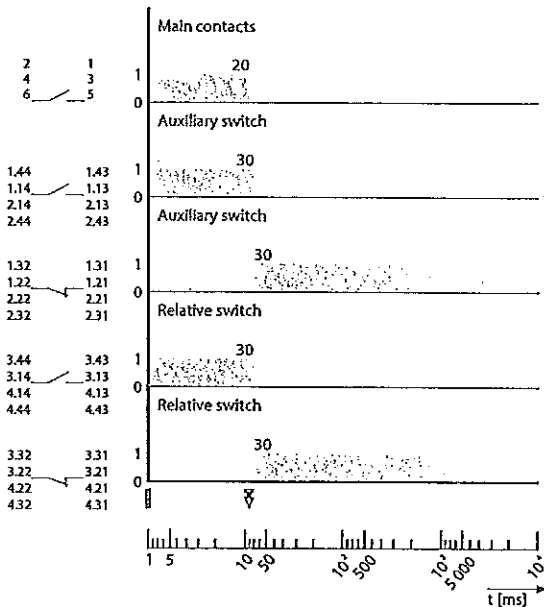
VOLTAGE RELEASES

Specifications

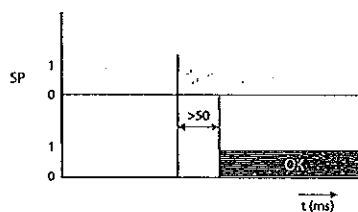
Type	SP-BL-X	
Rated operating voltage	U_n	24, 48, 110, 230, 400, 500 V a.c. 24, 48, 110, 220 V d.c.
Rated frequency	f_n	50/60 Hz
Input power at 1.1 U_n		< 2.5 VA < 2 W
Characteristic ¹⁾		$U \geq 0.85 U_n$ it is possible to switch on the circuit breaker $U \leq 0.35 U_n$ the circuit breaker must trip
Time to switching off		20 ms
Loading time		∞
Connection cross-section	S	0.5 + 1 mm ²
Degree of protection of terminals (connected release)		IP20
Position in cavity No.		5

¹⁾ - tripping of the undervoltage release can be delayed using the delay unit BZ-BX-X230-A, see page P2

Circuit breaker/switch-disconnector switching off by undervoltage release

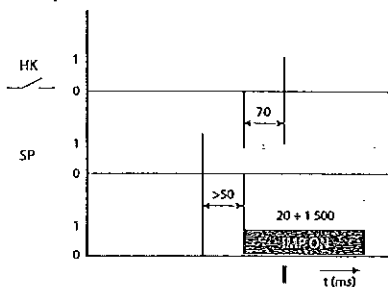


Reaction time of the undervoltage release



Cooperation of motor drive and undervoltage release

It is necessary to keep time delay when the control of the circuit breaker is done by motor drive and undervoltage release at once. The following time delays have to be kept between bringing the voltage to the undervoltage release and the control impulse for switch on of the motor drive:

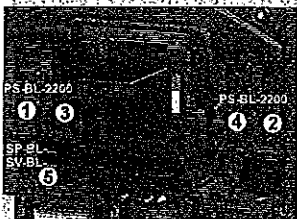
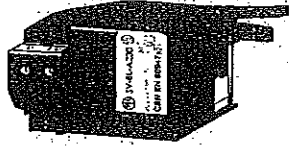


States and positions of circuit breaker/switch-disconnector lever

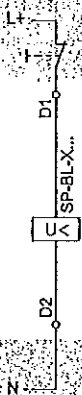
States in circuit breaker/switch-disconnector	
Switched on	
Switched off by releases or by TEST push button	
Switched off manually or by motor drive electrically (loaded state)	

Description of graphs

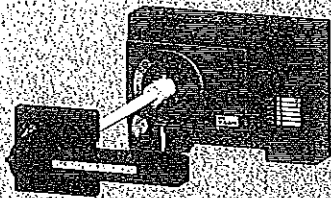
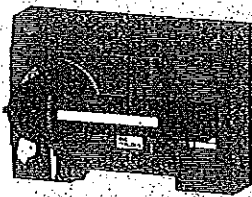
Symbol	Description
HK	Main contacts
OK	Circuit breaker is ready for further handling
IMP ON	Make impulse for the motor drive
SP	Control voltage on the undervoltage release



Cavities in switching unit
BL1000SE305
BL1600SE305



HAND DRIVES



Description

The hand drive is the accessory of the circuit breaker/switch-disconnector which enable circuit breakers BL800S and BL1600S to be controlled locally by applying rotary movement on the lever, e.g. for switching electrical equipment on and off. Modular conception of the drives enables simple mounting on the circuit breaker after the circuit breaker cover of cavities is removed. The drive and its accessories are ordered separately according to your choice, see page H9.

- The hand drive enables to control the circuit breaker through the front panel or through the switchboard door, the outlet for the operating shaft has the IP44 or IP66 degree of protection for bearings.
- Hand drive control lever can be fitted with an extension shaft which makes possible to control the circuit breaker also in deeper switchboards.
- In order to enhance safety for the operator of the electrical equipment, the mechanism of the drive is furnished with locking system preventing the switchboard door from opening when the circuit breaker is in closed position.
- When the circuit breaker is in position for manual open, the drive handle can be locked up using the built-in cylinder type lock (FAB) and as many as three padlocks with shank diameter up to 6+8 mm.
- When the drive lever is in position manual open, it is possible to remove the handle.
- The circuit breaker with hand drives can be fitted with mechanical interlocking system, see page H41.

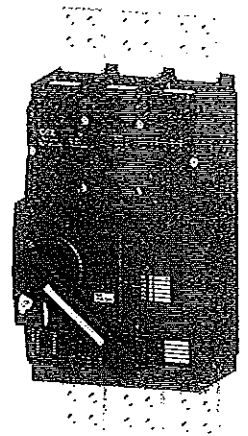


Fig. 1 - DIMENSIONS see page H21

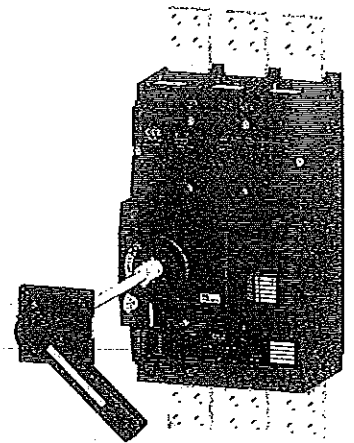
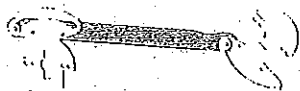


Fig. 2 - DIMENSIONS see page H22

Specification

Type	Description	Color	Locking system (with the circuit breaker in closed state)	Degree of protection	Switched handle (with the circuit breaker in closed state)	Mounting
RP-BL-CK10	Hand drive unit	-	yes	-	-	-
RP-BL-CP10	Hand drive lever	black	yes	-	-	-
RP-BL-CP11	Hand drive lever	red	yes	-	-	-
RP-BL-CN10	Hand drive bearing	-	-	IP44	yes	-
RP-BL-CN20	Hand drive bearing	-	-	IP66	yes	-
RP-BL-CH10	Extension shaft	-	-	-	-	365

MECHANICAL INTERLOCKING



RP-BL-CB10 Mechanical interlocking

- Provides mechanical interlocking of two circuit breakers so that they cannot both be tripped simultaneously, but only one of them at a time.
- Interlocking can be used between two BL1000S or BL1600S circuit breakers or between a BL1000S and BL1600S circuit breaker.

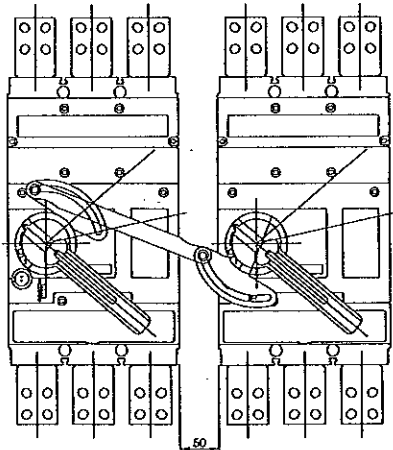
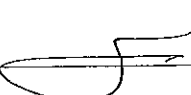


Fig. 1



breaker. Both circuit breakers must be equipped with a hand drive (at least one with a hand drive unit and hand drive lever) see page H40. In order to use the interlocking, it is absolutely necessary to comply with the dimensions that are shown in Fig. 1 and 2.

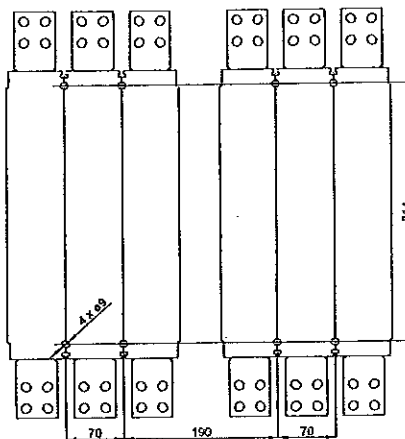


Fig. 2

MB-BL-PP07 Mechanical blocking with Bowden cable

- Provides mechanical interlocking of two circuit breakers so that they cannot both be tripped simultaneously, but only one of them at a time.
- Interlocking can be used between two BL1000S or BL1600S circuit breakers or between a BL1000S and BL1600S circuit breaker. For interlocking, circuit breakers can be equipped

with a hand or motor drive. In order to use the interlocking, it is absolutely necessary to comply with the dimensions that are shown on page H42. Mechanical interlocking allows to be switched on of the first circuit breaker and loaded position of the second circuit breaker.

Type of mechanical interlocking	Combination of circuit breaker with dimensions
---------------------------------	------------------------------------------------

MB-BL-PP07	fixed - fixed
MB-BL-PV08	fixed - withdrawable
MB-BL-VV06	withdrawable - withdrawable

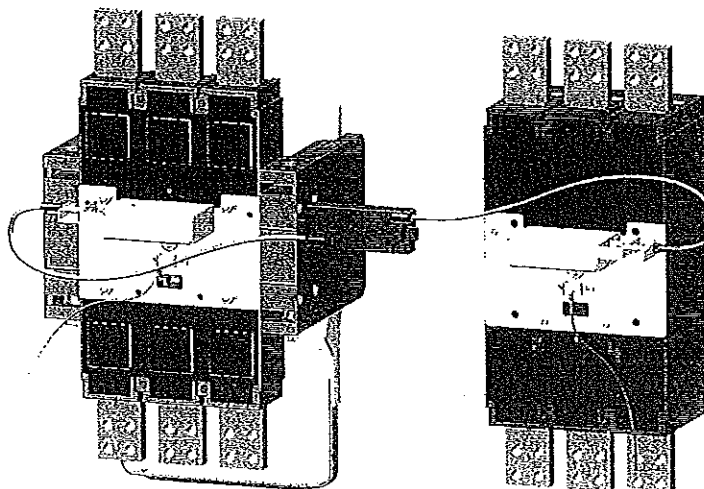
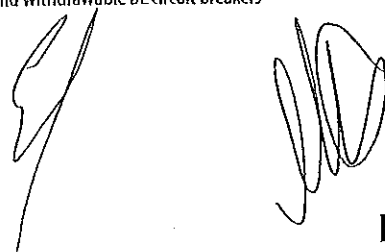
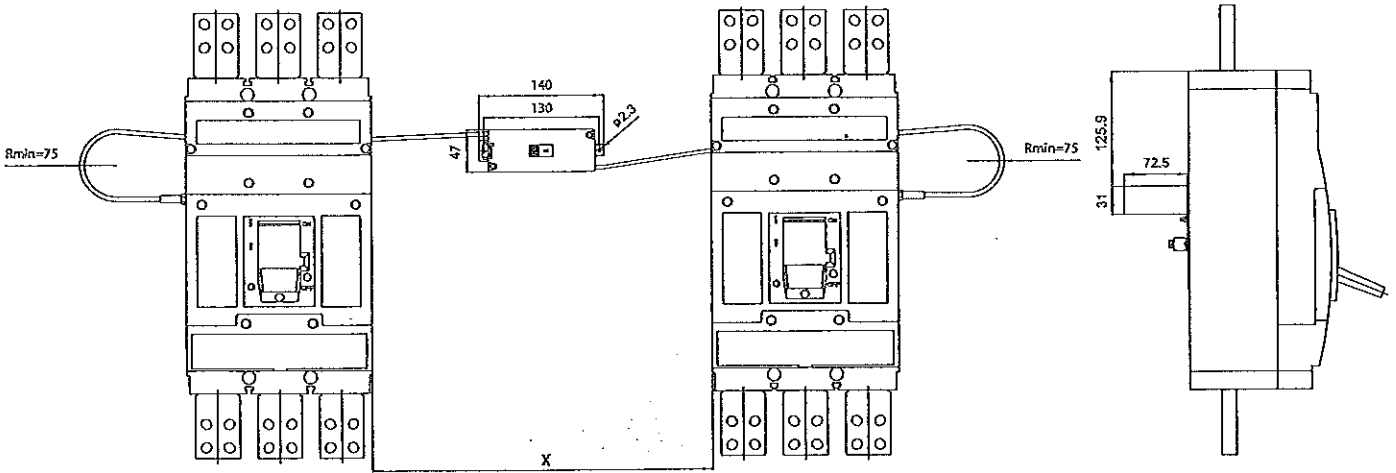


Fig. 3 - Mechanical blocking with Bowden cable between fixed and withdrawable BL circuit breakers



MECHANICAL INTERLOCKING

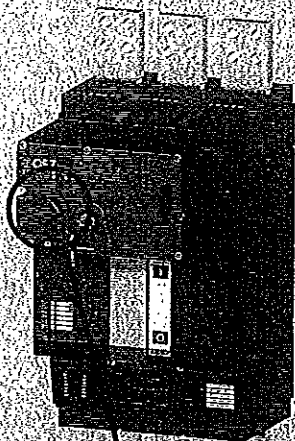
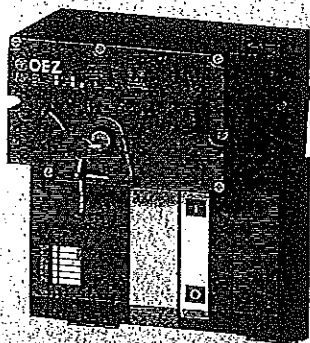
Mechanical interlocking - option for locating the circuit breaker/switch-disconnector



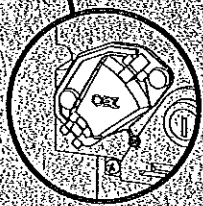
Combination of circuit breakers	Distance between the circuit breakers (mm)	
fixed - fixed	0	or 100 ÷ 1450
fixed - withdrawable	0	or 50 ÷ 1400
withdrawable - withdrawable	0	or 50 ÷ 1350

¹⁾ - TECHNICAL INFORMATION, see Instruction for use

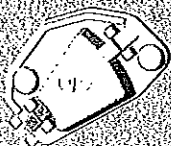
MOTOR DRIVES



DIMENSIONS, see page H23



Cover of switch on button OD-BL-KT01



Description

- It is used for remote control of the circuit breaker (switch off/on).
- Simple mounting on the circuit breaker after the circuit breaker cover of cavities is removed.
- Usage in industrial applications e.g. switching of stand by units, synchronization of two sources or wherever the automated and unmanned operation of electric devices is needed.
- In order to speed up the circuit breaker's switch off (e.g. safety STOP button) the undervoltage release or shunt trip can be used.
- On the motor drive front panel there is a change-over switch to select the drive modes AUTO/MANUAL:
 - mode AUTO – remote control. The circuit breaker is controlled by buttons for electric switch off/on. The circuit breaker can be switched off by TEST button on the overcurrent release.
 - mode MANUAL – manual control. Control voltage is not needed. The circuit breaker can be switched on using the green button on the motor drive front panel and switched off using the red button on the overcurrent release. Electric switch on is blocked. Electric switch off is functional. The accumulation of energy can be done by means of hinged lever.
 - possibility of remote signalling of the state of the switch AUTO/MANUAL.

- The presence of control voltage U_c is signalled by green LED
- If the circuit breaker is not stored by motor drive until 30 s., e.g. due to undervoltage, extremely low temperature, mechanical or electrical failure, the LED diode on the front panel is shining in red. During the lighting of the red LED, the drive is disconnected electronically, and cannot be remotely controlled. In order to restore remote control it is necessary to disconnect the drive for 30 s. At tripping of the circuit breaker by the overcurrent release, by auxiliary releases, or by TEST push button (in drive mode AUTO), the motor drive automatically accumulates energy (circuit breaker loading), motor drive is then ready to switch on the circuit breaker
- Drive can be locked in off position by lamellar lock (it is part of the drive with two keys) or by up to three padlocks (shank diameter max. $4 \div 7$ mm).
- Drive can be furnished with the counter of cycles.
- Switch on button can be covered and sealed (OD-BL-KT01).
- The transparent part of front panel enables to determine the state of circuit breaker according to the lever position.
- Drive can be connected by terminal block with screws or by means of multi-pole connector with cavities (in order to connect cables special tongs have to be used).

Specifications

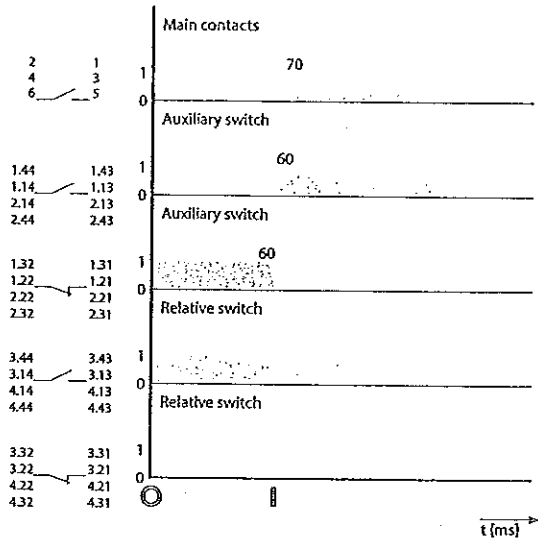
AVDS	MP-BL-X	MP-BL-X-P
Operating voltage	U_c	110, 230 V a.c. 110, 220 V d.c.
Rated frequency	f_n	50/60 Hz
Control impulse length for switching on		$>20 \div 1500$ ms ¹⁾
Control impulse length for switching off		>20 ms + ∞ ¹⁾
Time to switching on		<70 ms
Time to storage (loading) of motor drive at	U_c : 230 V a.c. 220 V d.c.	14 s 18 s
Time to switch-off of circuit breaker U_c : 230 V a.c. 220 V d.c.		10 s 12 s
Frequency of cycles ON/OFF		2 cycles/min
Frequency of cycles - Instant successive ON/OFF		8 cycles
Mechanical endurance		10 000 cycles
Input power	AC DC	200 VA 200 W
Protection	110 V a.c., 230 V a.c. 110 V d.c., 220 V d.c.	LPN-4C-1; LPN-2C-1 LPN-DC-4C-1; LPN-DC-2C-1
Rated operating current of the change-over switch AUTO/MANUAL	I_c / U_c	6 A/250 V a.c.

¹⁾ - for sequence of control impulses, see page H46

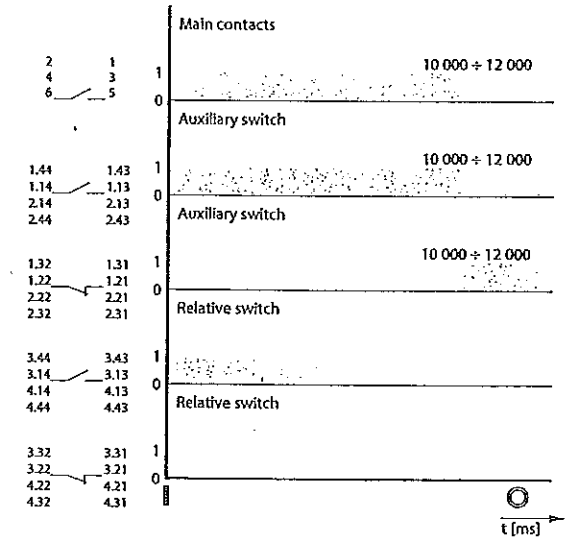
MOTOR DRIVES

Specifications

Circuit breaker switching on by motor drive - electrically by ON push button

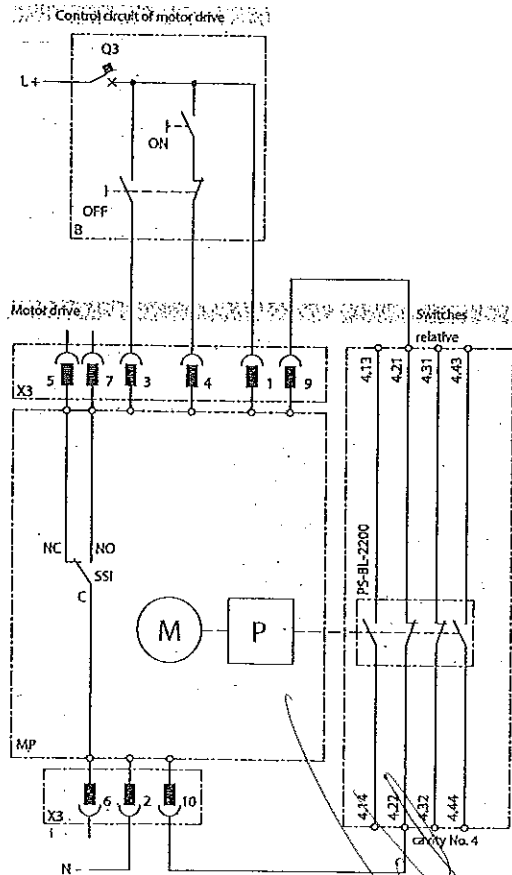


Circuit breaker switching off by motor drive - electrically by OFF push button



Diagram

Circuit breaker switching on and off by motor drive - electrically by ON and OFF push button



States and positions of circuit breaker/switch-disconnector lever

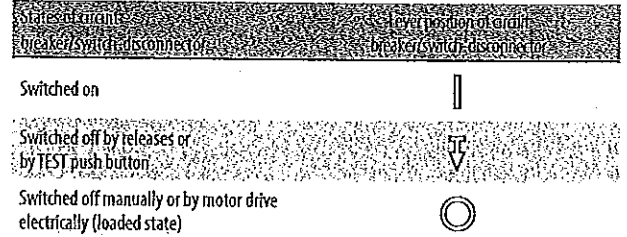


Diagram description

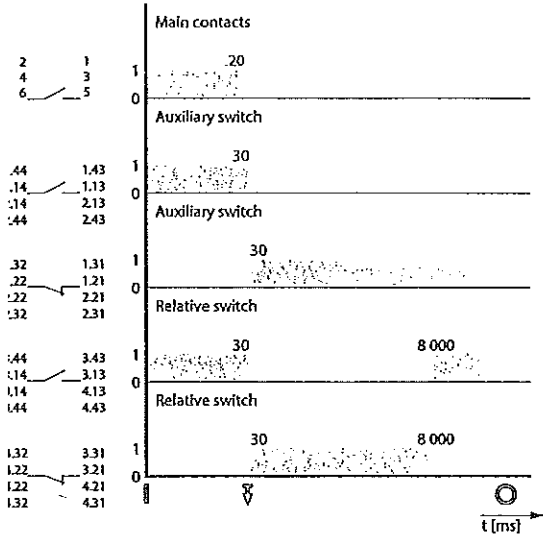
Symbol	Description
MP	motor drive MP-BL-X...
M	motor
P	storage device
X3	connector for connection of control circuits
SSI	switch to indicate MANUAL (NO-C)/AUTO (NC-C)
B	recommended wiring of the control circuits - It is not a part of motor drive
ON	switch on button
OFF	switch off button
Q3	motor drive circuit breaker - see page H43

Handwritten signature

MOTOR DRIVES

Specifications

Switching off of the circuit breaker with motor drive by shunt trip or undervoltage release



States and positions of circuit breaker/switch-disconnector lever

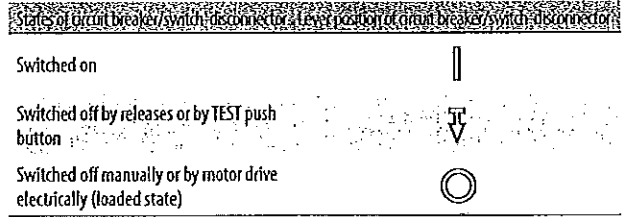
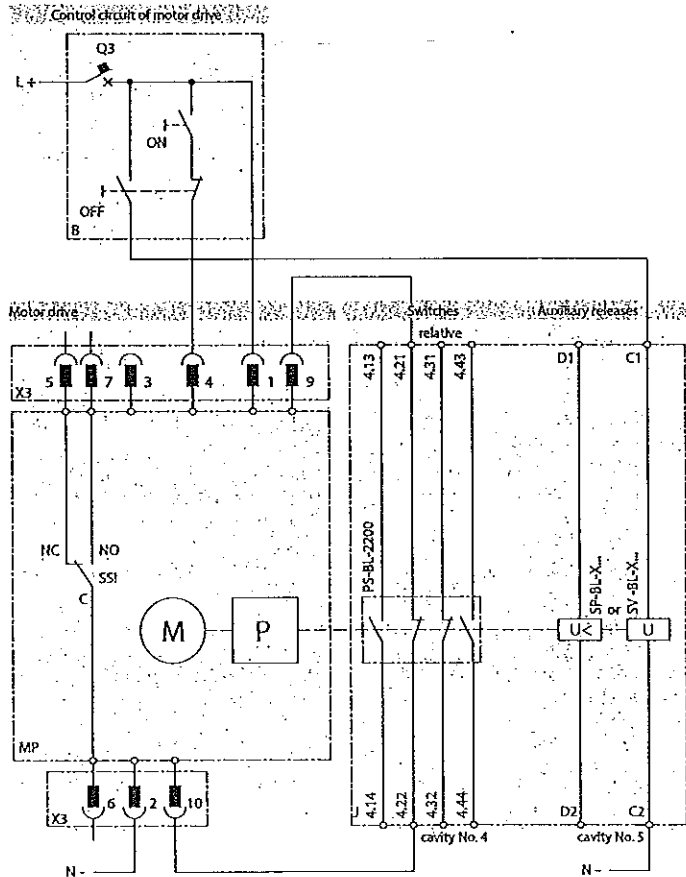


Diagram description

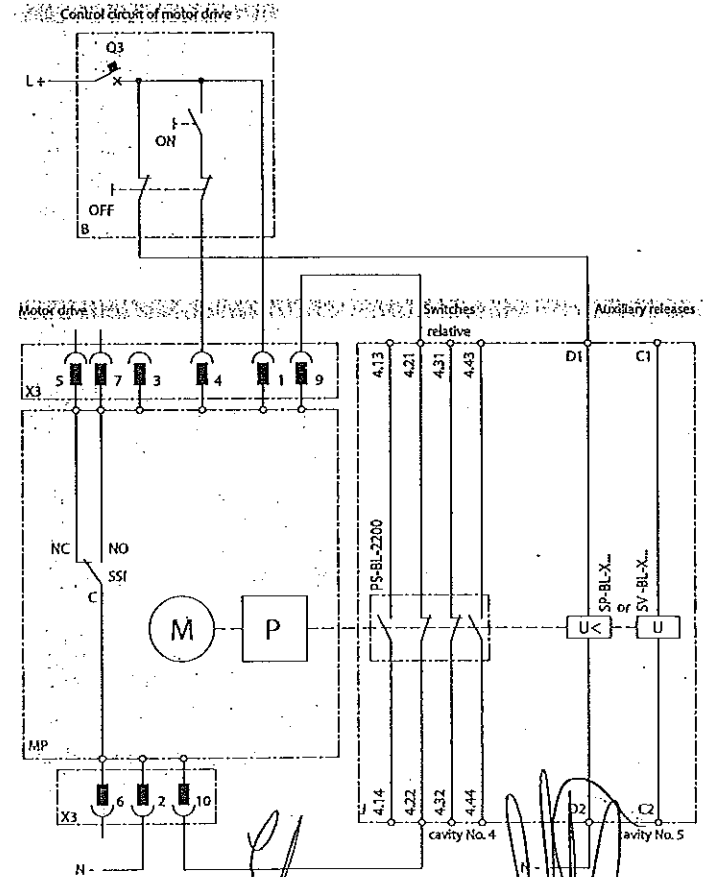
Symbol	Description
MP	motor drive MP-BL-X...
M	motor
P	storage device
X3	connector for connection of control circuits
SSI	switch to indicate MANUAL (NO-C)/AUTO (NC-C)
B	recommended wiring of the control circuits - not included in motor drive order
ON	switch on button
OFF	switch off button
Q3	motor drive circuit breaker - see page H43

Diagram

Circuit breaker switching on by motor drive (electrically by ON push button) and tripping by shunt trip



Circuit breaker switching on by motor drive (electrically by ON push button) and tripping by undervoltage release

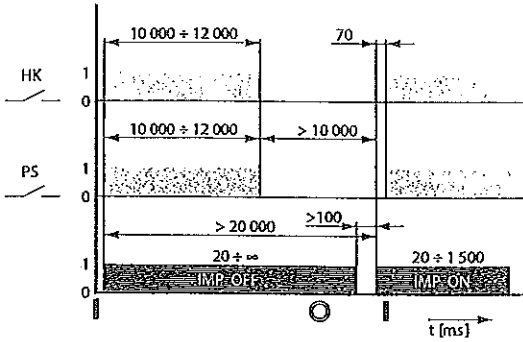


MOTOR DRIVES

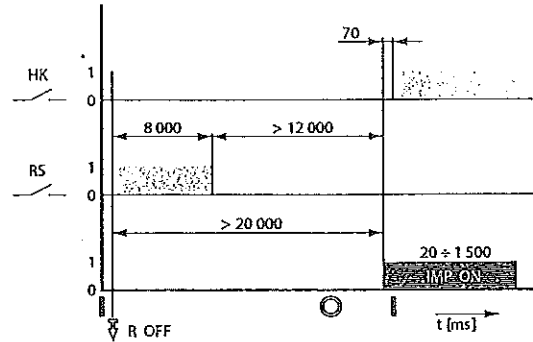
Specifications

Recommended control impulses

Circuit breaker switching on and off by motor drive



Circuit breaker switching off by overcurrent release, shunt trip or undervoltage release and switching on by motor drive



States and positions of circuit breaker/switch-disconnector lever

States of circuit breaker/switch-disconnector	Position of circuit breaker/switch-disconnector
Switched on	
Switched off by releases or by TEST push button	
Switched off manually or by motor drive electrically (loaded state)	

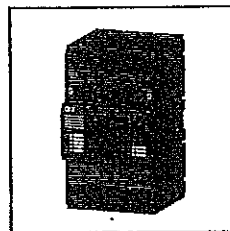
Description of graphs

Symbol	Description
HK	main contacts
PS	auxiliary switch
RS	relative switch
R OFF	circuit breaker closing instant by release
IMP ON	make impulse for the motor drive
IMP OFF	break impulse for the motor drive

Cy

[Handwritten mark]

OTHER ACCESSORIES OF MOULDED CASE CIRCUIT BREAKERS



[Handwritten mark]

[Handwritten mark]

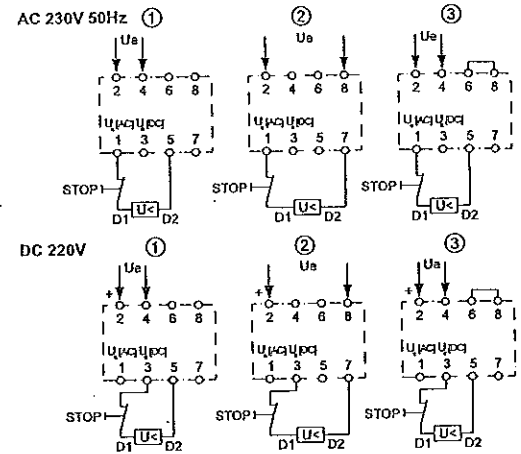
DELAY UNIT



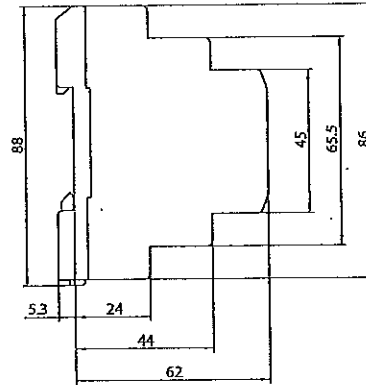
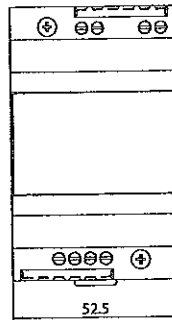
Type	Product code	Description	Weight (kg)	Package (pc)
BZ-BX-X230-A	36696	enables to delay the undervoltage release tripping of circuit breakers	0,12	1

- the delay can be set up at three levels (according to wiring)

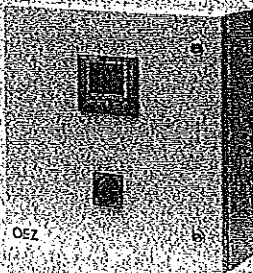
Circuit breaker	Delay (s)		
	1st level	2nd level	3rd level
BC160	1.0	2.0	3.2
BD250, BH630	0.6	1.2	1.9
BL1000, BL1600	0.5	1.0	1.5



BZ-BX-X230-A



AUTOMATIC STANDBY UNIT MODI



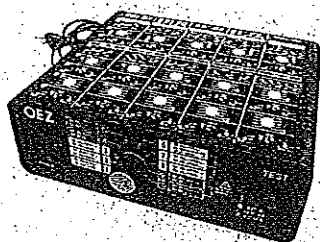
Type	Description	Weight (kg)	Package (pc)
MODI ZA...	<ul style="list-style-type: none"> - enables safe control of switching of two power supplies to one or two loads with exclusion of parallel operation of the power supplies - enables various adaptations according to the customer's requirements - for backup operation with a transformer or generator - from 16 to 6 300 A 	10	1

- for circuit breakers and switch-disconnectors Modeion and Arion WL
- for detail information see catalogue Automatic standby unit MODI ZA

Type	Description	Weight (kg)	Package (pc)
MODI ZB...	<ul style="list-style-type: none"> - enables safe control of two power supplies to one load with exclusion of parallel operation of the power supplies - for backup operation, in particular with a generator - from 40 to 630 A 	10	1

- for Modeion circuit breakers
- for detail information see catalogue Automatic standby unit MODI ZB

TESTER OF OVERCURRENT RELEASES OF CIRCUIT BREAKERS



Type	Product code	Description	Weight (kg)	Package code
ZES4	17273	Tester of overcurrent releases of circuit breakers BD250.., BH630.., BL1000S and BL1600S	3.75	1

- service device for checking the functionality of electronic overcurrent releases and switching units for Modeion circuit breakers
- tests:
 - overcurrent releases
 - functionality of switching unit tripping mechanism
 - current transformers
- tests overcurrent releases: L001, DTV3, MTV8, MTV9, U001
- tests switching units for circuit breakers: BD250N, BD250S, BH630N, BH630S, BL1000S, BL1600S

Tester must be connected to an external power supply. Power supply voltage of tester is 230V a.c.

For more detailed information and documentation contact our technical support No.: +420 465 672 191 or visit our websites www.oez.com

CONTROL RELAYS FOR BD250 AND BH630



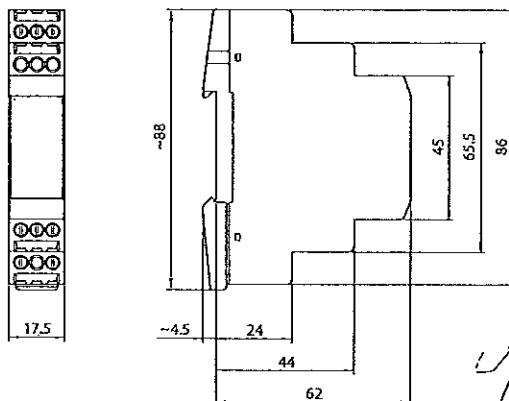
Type	Product code	Specifications	Weight (kg)	Package code
OD-BHD-RX01	37425	24V a.c./d.c.	0.06	1
OD-BHD-RX02	37426	48V a.c./d.c.	0.06	1
OD-BHD-RA03	37427	110 ÷ 230V a.c.	0.06	1
OD-BHD-RD04	37428	110V d.c.	0.06	1

- control relay is suitable for control of the circuit breaker with motor drive in withdrawable/plug-in device or in combination with mechanical interlocking by Bowden, see page E72, E73, F70, F71

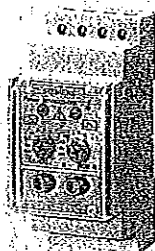
Specifications

Type		OD-BHD-R
Standards		EN 61812-1
Approval marks		CE
Control circuit		
Rated operating voltage	U_c	24V a.c./d.c., 48V a.c./d.c., 110 ÷ 230V a.c./d.c., 110V d.c.
Rated frequency		50 Hz
Consumption at U_c	at 24 ÷ 230V a.c. at 24 ÷ 230V d.c.	1.2VA ÷ 2.6VA 1.4W ÷ 1.7W
Mechanical endurance		30 000 cycles
Electrical endurance		30 000 cycles
Connection		0.2 ÷ 2.5 mm ²
Torque		0.5 Nm
Control impulse		
Min. excitation time		15 ms
Max. excitation time		unlimited
Other data		
Mounting on „U“ rail according to EN 60715 - type		TH 35
Degree of protection		IP20
Ambient temperature		-20 ÷ +50 °C
Working position		arbitrary
Seismic resistance		3g / 8 ÷ 50 Hz

OD-BHD-R...



RESIDUAL CURRENT MONITOR



SSV8000-6KK



SSV8001-6KK, SSV8200-6KK

Specifications

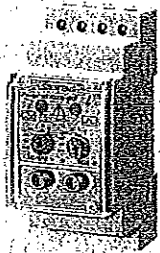
Type designation	SSV8 000-6KK	SSV8 001-6KK	SSV8 200-6KK
Dimensions - number of modules	2	3	3
Weight	0.17 kg	0.24 kg	0.24 kg
Standards	EN 62020 IEC 62020	EN 62020 IEC 62020	EN 62020 IEC 62020
Approval marks	CE	CE	CE
Number of independent circuits	1	1	4
Rated residual current	0.03 ÷ 5 A	0.03 ÷ 30 A	0.03 ÷ 30 A
Maximum inactivity time	0.02 ÷ 5 s	0.02 ÷ 10 s	0.02 ÷ 10 s
Type	A (up to $I_{\Delta n} = 3 A$) AC ($I_{\Delta n}$ from 3 to 5 A)	A (up to $I_{\Delta n} = 3 A$) AC ($I_{\Delta n}$ from 3 to 30 A)	A (up to $I_{\Delta n} = 3 A$) AC ($I_{\Delta n}$ from 3 to 30 A)
Rated voltage	230 V a.c.	230 V a.c.	230 V a.c.
Rated operating voltage	164 ÷ 284 V a.c.	164 ÷ 284 V a.c.	164 ÷ 284 V a.c.
Rated frequency	50 Hz	50 Hz	50 Hz
Electrical endurance	10 x 10 ⁶ cycles	10 x 10 ⁶ cycles	10 x 10 ⁶ cycles
Degree of protection from front side of the device	IP41	IP41	IP41
Degree of protection of terminals	IP20	IP20	IP20
Method of mounting	„U“ rail 35 mm	„U“ rail 35 mm	„U“ rail 35 mm
Ambient temperature range	-10 ÷ 50 °C	-10 ÷ 50 °C	-10 ÷ 50 °C
Max. sea level	2 000 m	2 000 m	2 000 m
Relative humidity	5 ÷ 95 %	5 ÷ 95 %	5 ÷ 95 %
Connection cross-section	0.2 ÷ 2 mm ²	0.2 ÷ 2 mm ²	0.2 ÷ 2 mm ²
External remote trip/reset	-/•	•/•	•/•
Internal diameter of the transformer	30 ÷ 210 mm	30 ÷ 210 mm	30 ÷ 210 mm
Local signalling of reach of relative low value of $I_{\Delta n}$ (ALARM)	•	•	•
Remote signalling of reach of relative low value of $I_{\Delta n}$ (ALARM)	-	•	•
Local signalling of power supply/ALARM/failure/value of $I_{\Delta n}$	•/•/•/•	•/•/•/•	•/•/•/•
Display	-	•	•
Sealing of setting/control panel	•	•	•
Control circuit - outputs			
Rated operating voltage	230 V a.c.	230 V a.c.	230 V a.c.
Rated current	6 A	6 A	6 A
Max. switched power - AC1	2 500 VA	2 500 VA	2 500 VA
Rated frequency	50 Hz	50 Hz	50 Hz
Number of control contacts	1 CO	2 CO	4 NO
Control circuit - inputs			
Rated voltage	-	110 ÷ 230 V a.c./d.c.	230 V a.c.
Rated operating voltage	-	110 ÷ 284 V a.c./d.c.	230 ÷ 284 V a.c.
Input power	-	0.7 W	0.7 W

• available, - unavailable, + being prepared

Total max. switching off time

	Maximum inactivity time - adjusted value							
	70 ms	100 ms	200 ms	300 ms	400 ms	500 ms	700 ms	900 ms
1x $I_{\Delta n}$	< 60 ms	< 135 ms	< 240 ms	< 340 ms	< 440 ms	< 540 ms	< 790 ms	< 1 050 ms
2x $I_{\Delta n}$	< 60 ms	< 130 ms	< 230 ms	< 330 ms	< 435 ms	< 540 ms	< 780 ms	< 1 040 ms

RESIDUAL CURRENT MONITOR – ANALOG



SSV8000-6KK

Description

- designed for monitoring of leakage current (residual/ /fault current) and protection against fire e.g. due to worsened insulation or sneak currents
- possibility of setting of residual current $I_{\Delta n}$ and setting of limit time of inactivity of $I_{\Delta n}$ (see parameters) by means of rotary switches

Local signalling

- first LED signals functionality of the relay and current transformer:
 - LED is lighting - the relay is in order
 - LED does not light - the relay is not supplied
 - LED is flashing - interrupted connection between the relay and the transformer, or broken secondary winding
- the second LED signals value of the passing current:
 - LED is lighting - signalling reach of 100 % residual current
 - LED is flashing - flashing period increases with increasing residual current

- mounting on „U” rail
- measurement by means of external summation current transformer
- circuit breaker switching off by means of shunt trip or undervoltage release

Remote signalling:

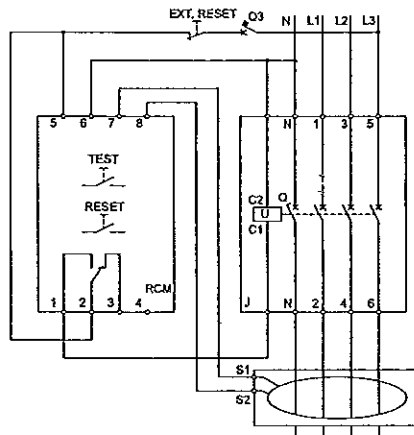
- by means of make-and-break contact (CO)
- serves for signalling of reach of the set value of $I_{\Delta n}$ and/or for circuit breaker switching off via undervoltage release or shunt trip

Control

- the TEST push-button serves for testing of the function of both the relay and circuit breaker - disconnects the circuit
- if the relay trips (switches the circuit breaker off) it is necessary to reset it by the „RESET” push-button, or interrupt its supply and thus perform the remote reset
- setting can be sealed

Wiring diagram

Wiring diagram with shunt trip



Wiring diagram with undervoltage release

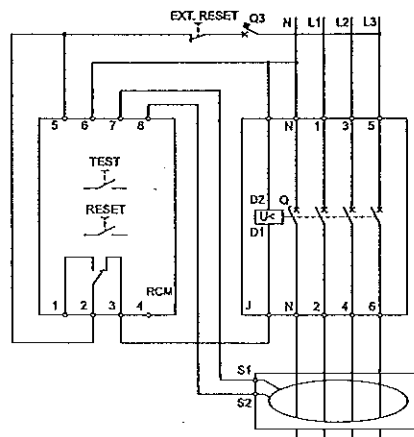
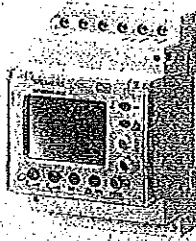


Diagram description

Symbol	Description
J	circuit breaker
RCM	residual current monitor
TEST	test push-button of the relay
RESET	local reset push button
EXT. STOP/RESET	remote reset push-button or STOP push-button ¹⁾
S1, S2	current transformer terminals
Q3	protection of relay LPN-2C-1

¹⁾ only in combination with an undervoltage release

RESIDUAL CURRENT MONITOR - DIGITAL



SSV8001-6KK

Description

- designed for monitoring of leakage current (residual/fault current) and protection against fire e.g. due to worsened insulation or sneak currents
- possibility of setting of residual current $I_{\Delta n}$ and setting of maximum inactivity time $I_{\Delta t}$ by means of push-buttons and the display (see table)
- presentation of cause of trip and of current value of residual current on the display

- mounting on „U“ rail
- measurement by means of external transformer
- circuit breaker switching off by means of shunt trip or undervoltage release
- possibility of setting of characteristic S - selective

Local signalling

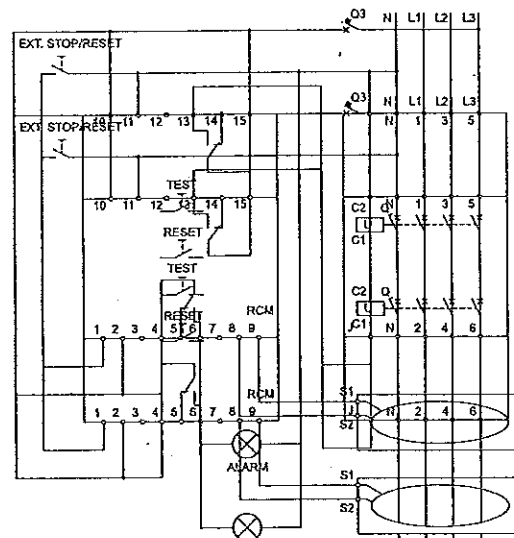
- the first LED signals functionality of the relay and trip in reach of the set residual current:
LED gives a green light - the relay is supplied
LED gives a red light - signalling of reach of 100 % residual current
- the second LED signals reach of relative low set value:
LED gives a yellow light - signalling of reach of the set value

Remote signalling

- by means of make-and-break contact (CO)
- serves for signalling of reach of the set value of $I_{\Delta n}$ and/or for circuit breaker switching off via undervoltage release or shunt trip
- possibility of remote switching off by applying voltage $110 \div 230$ V a.c./d.c. on potential free terminals number 1 and 2
- the TEST push-button serves for testing of the function of both the relay and circuit breaker - disconnects the circuit
- if the relay trips (switches the circuit breaker off) it is necessary to reset it by the "RESET" push-button, or interrupt its supply and thus perform the remote reset
- setting can be sealed

Wiring diagram

Wiring diagram with shunt trip



Wiring diagram with undervoltage release

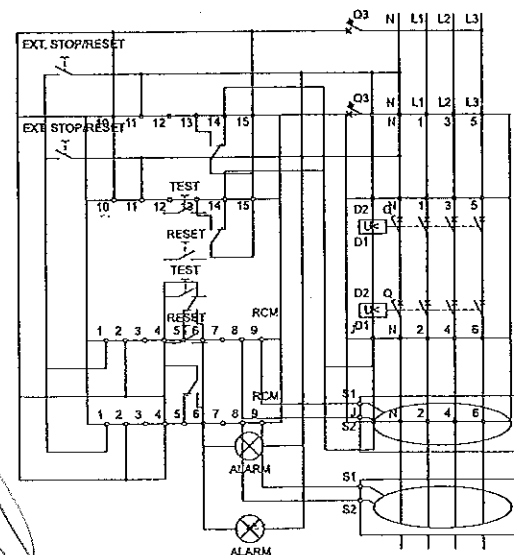
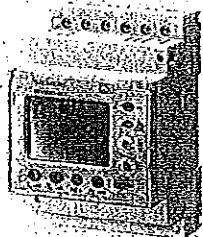


Diagram description

Symbol	Description
J	circuit breaker
RCM	residual current monitor
TEST	test push-button of the relay
RESET	local reset push-button
EXT. STOP/RESET	remote reset push-button or STOP push-button
S1, S2	current transformer terminals
ALARM	signalling of reach of the set value of $I_{\Delta n}$
O3	protection of relay U/N-2C-1

RESIDUAL CURRENT MONITOR - DIGITAL, 4-CHANNEL



55V8200-6KK

Description

- designed for monitoring of leakage current (residual/fault current) and protection against fire e.g. due to worsened insulation or sneak currents
- possibility of setting of residual current $I_{\Delta n}$ and setting of maximum inactivity time $I_{\Delta t}$ by means of push-buttons and the display (see table)
- presentation of cause of trip and of current value of residual current on the display

Local signalling

- the first LED signals functionality of the relay and trip in reach of the set residual current:
LED gives a green light - the relay is supplied
LED gives a red light - signalling of reach of 100 % residual current
- the second LED signals reach of relative low set value:
LED gives a yellow light - signalling of reach of the set value

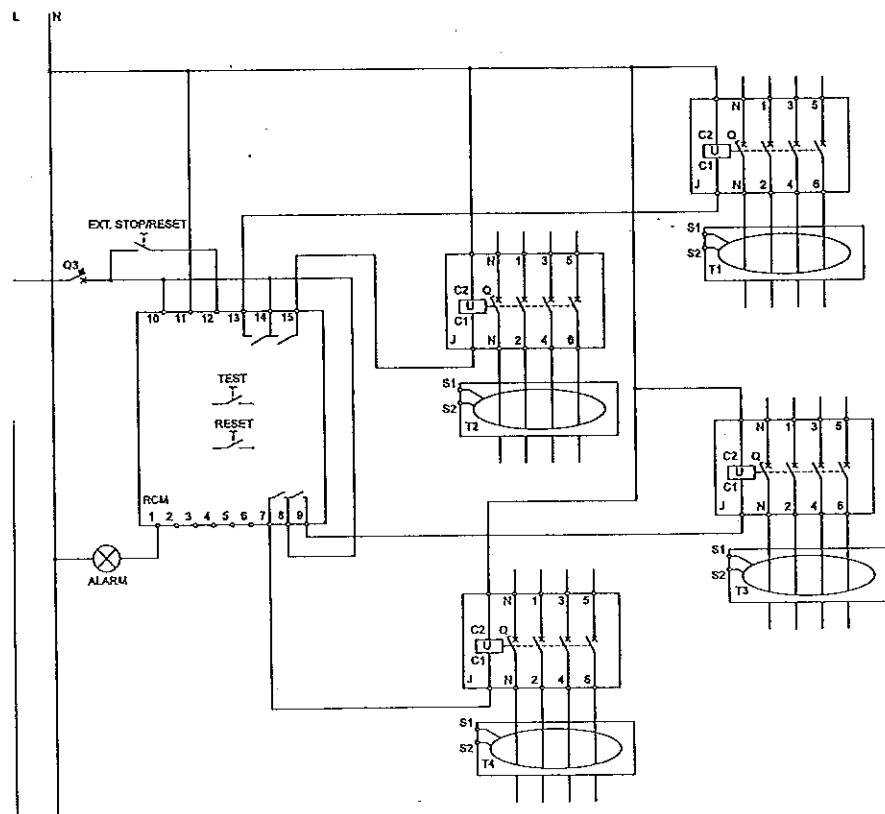
- mounting on „U“ rail
- measurement by means of an external transformer; it is possible to connect up to 4 transformers
- circuit breaker switching off by shunt trip
- possibility of setting of characteristic S -- selective

Remote signalling

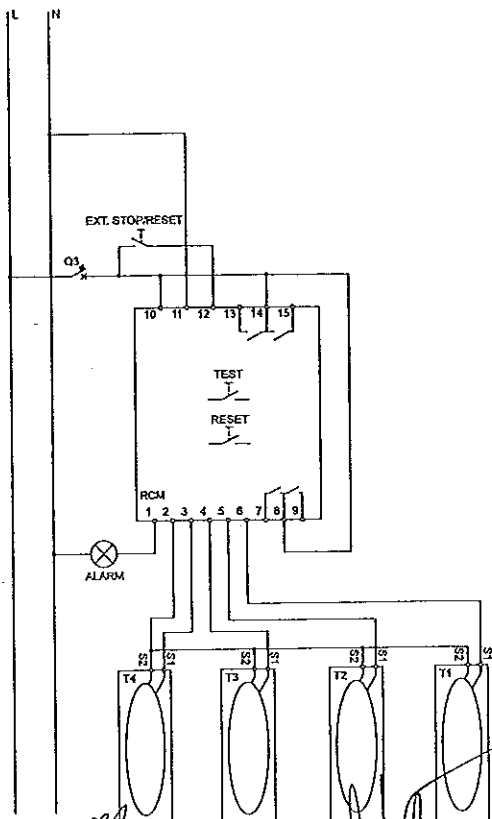
- by means of make-and-break contact (CO)
- serves for signalling of reach of the set value of $I_{\Delta n}$ and/or for circuit breaker switching off via undervoltage release or shunt trip
- possibility of remote switching off by applying voltage 110 ÷ 230V a.c./d.c. on potential free terminal number 12
- the TEST push-button serves for testing of the function of both the relay and circuit breaker - disconnects the circuit
- if the relay trips (switches the circuit breaker off) it is necessary to reset it by the „RESET“ push-button, or interrupt its supply and thus perform the remote reset
- setting can be sealed

Wiring diagram

Wiring diagram with shunt trip connecting of circuit breakers



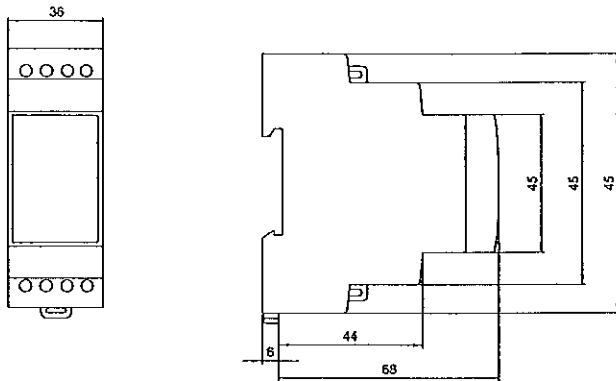
- connecting of current transformers



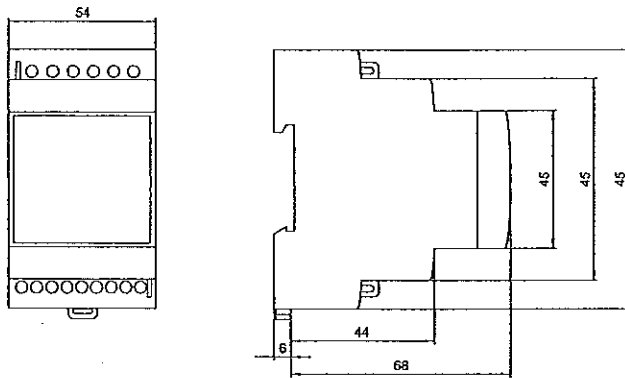
RESIDUAL CURRENT MONITOR

Dimensions

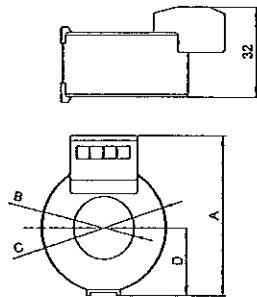
Residual current monitor 5SV8000-6KK



Residual current monitor 5SV8001-6KK, 5SV8200-6KK

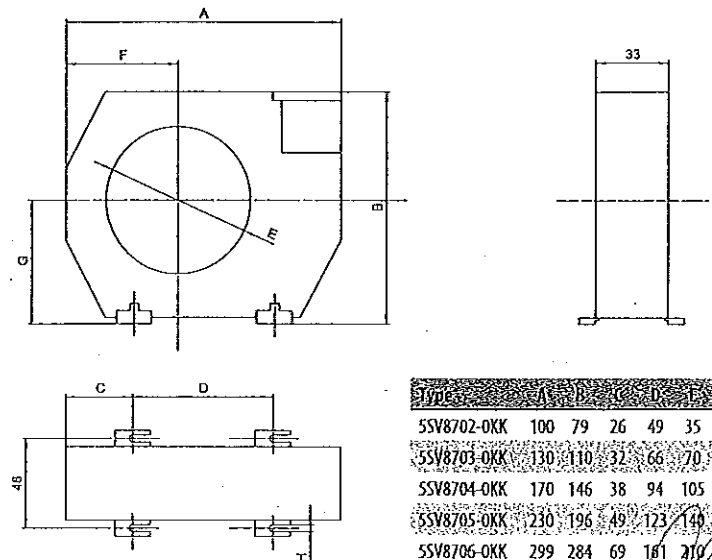


Measuring current transformers 5SV8700-0KK, 5SV8701-0KK



Type	A	B	C	D
5SV8700-0KK	60	20	46	24
5SV8701-0KK	70	30	59	30

Measuring current transformers 5SV87...-0KK



Type	A	B	C	D	E	F	G
5SV8702-0KK	100	79	26	49	35	35	43
5SV8703-0KK	130	110	32	66	70	52	57
5SV8704-0KK	170	146	38	94	105	72	73
5SV8705-0KK	230	196	49	123	140	97	98
5SV8706-0KK	299	284	69	161	210	141	142

SPARE PARTS OF CIRCUIT BREAKERS AND SWITCH-DISCONNECTORS MODEION



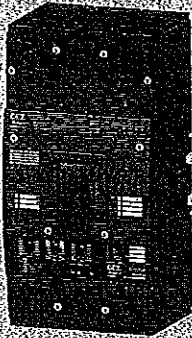
Spare parts for BC160N

Type	Product code	Name description	Weight (kg)	Package
OD-BC-SP01	34456	Control lever	0.002	1
OD-BC-DV01	20606	Conductor holder	0.001	1
OD-BC-MS01	20607	Set of screws M3x30, 2 pcs	0.005	1
CS-BC-T411	33656	Connecting terminal	0.094	1
CS-BC-T412	33657	Connecting terminal	0.095	1
OD-BC-KS01	20624	Terminal cover, upper or lower terminals, 3P design, 1 pc	0.01	1
OD-BC-KS41	33659	Terminal cover, upper or lower terminals, 4P design, 1 pc	0.015	1
OD-BC-KON2	37798	Connector and sockets for MP-BC-X...-B	0.02	1



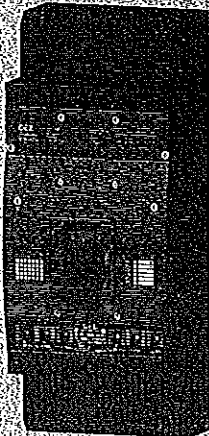
Spare parts for BD250N, BD250S

Type	Product code	Name description	Weight (kg)	Package
OD-BD-SP01	34457	Control lever	0.007	1
OD-BD-DV01	15329	Conductor holder	0.002	1
OD-BD-MS01	14419	Set of screws M4x35, 4 pcs	0.018	1
OD-BD-KS01	24720	Terminal cover, upper or lower terminals, 3P design, 4 pc	0.1	1
OD-BD-KS44	35896	Terminal cover, lower terminals, 4P design, 1 pc	0.1	1
OD-BD-KS45	35897	Terminal cover, upper terminals, 4P design, 1 pc	0.1	1
OD-BHD-JUMP	34460	Jumper for auxiliary releases	0.001	1
OD-BHD-KON2	34461	Connector and sockets for MP-BD, BH	0.004	1
OD-BX-KON1	34462	Connector and sockets for OD-xx-KA01	0.017	1



Spare parts for BH630N, BH630S

Type	Product code	Name description	Weight (kg)	Package
OD-BH-SP01	34458	Control lever	0.012	1
OD-BH-DV01	15331	Conductor holder	0.002	1
OD-BH-MS01	14420	Set of screws M5x25, 4 pcs	0.03	1
OD-BH-KS01	24730	Terminal cover, upper or lower terminals, 3P design, 1 pc	0.15	1
OD-BH-KS44	35894	Terminal cover, lower terminals, 4P design, 1 pc	0.2	1
OD-BH-KS45	35895	Terminal cover, upper terminals, 4P design, 1 pc	0.2	1
OD-BHD-JUMP	34460	Jumper for auxiliary releases	0.001	1
OD-BHD-KON2	34461	Connector and sockets for MP, BD, BH	0.004	1
OD-BX-KON1	34462	Connector and sockets for OD-xx-KA01	0.017	1



Spare parts for BL1000S, BL1600S

Type	Product code	Name description	Weight (kg)	Package
OD-BL-SP01	34459	Control lever	0.03	1
OD-BL-MS01	14854	Set of screws M8x80, 4 pcs	0.144	1
OD-BL-KON2	34463	Connector and sockets for MP-BL-X...	0.004	1
OD-BX-KON1	34462	Connector and sockets for OD-xx-KA01	0.017	1

[Handwritten signature]

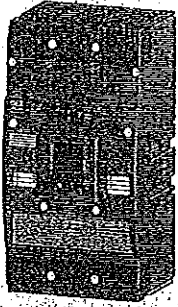
[Handwritten signature]

NOTES

Grid area for notes.

07

IE USAGE OF SWITCH-DISCONNECTORS AT GIVEN OVERCURRENT PROTECTION



Particular designs of Modeion switch-disconnectors can be used together with the assigned device (circuit breaker, fuse-link) at the spot of electrical circuit where the value of

initial peak short-circuit current I_k is lower or max equal to the related value from the table:

Backup protective device	Type of Modeion switch-disconnector				
	I_n - kA/400 V a.c.				
	BC	BD	BH	BL1000	BL1600
BC160 (all overcurrent releases types)	25	25	25	25	25
BD250 (all overcurrent releases types)	18	18	36 ¹⁾ , 65 ²⁾	36 ¹⁾ , 65 ²⁾	36 ¹⁾ , 65 ²⁾
BH630 (all overcurrent releases types)	—	—	36 ¹⁾ , 65 ²⁾	36 ¹⁾ , 65 ²⁾	36 ¹⁾ , 65 ²⁾
BL1000 (all overcurrent releases types)	—	—	—	50	50
BL1600 (all overcurrent releases types)	—	—	—	—	50
PN, PLN, PHN gG max. $I_n = 125 A^3)$	100	• ³⁾	• ³⁾	• ³⁾	• ³⁾
PN, PLN, PHN gG max. $I_n = 224 A^3)$	—	65	• ³⁾	• ³⁾	• ³⁾
PN, PHN gG max. $I_n = 500 A^3)$	—	—	65	• ³⁾	• ³⁾
PN, PHN gG max. $I_n = 630 A^3)$	—	—	—	65	65

Notes:

¹⁾ Additional values in table 1) are related to the back-up circuit breaker of design N.

²⁾ Additional values in table 2) are related to the back-up circuit breaker of design S.

³⁾ Max value of initial peak short-circuit current that enables the usage of switch-disconnector with backup fuse-links of lower rated currents (see ³⁾) is determined on the basis of equality of their limited current I_{lim} .

- I_n rated current of backup fuse-link has to be min by one degree lower than I_n rated current of the switch-disconnector.

- Given values are valid for voltage 400 V a.c.

NOTES

Grid area for notes

[Handwritten signature]

[Handwritten signature]

GLOSSARY OF TERMS

Precise wording of definitions and texts relating to a given term are detailed in the respective standards, see Name.

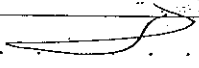
Term	Symbol	Explanation
Rated operating voltage 0947-1; 4.3.1.1	U_e	Voltage fixed by the manufacturer. Several pertinent tests relate to its determination, as may also the utilization category. Along with the rated (operating) current, it determines the device's utilization. The highest value of rated operating voltage may in no case be greater than the value of the rated insulation voltage U_i .
Rated insulation voltage 0947-1; 4.3.1.2	U_i	Voltage measure to which are related tests of dielectric strength and creepage distance.
Rated current 0947-2; 4.3.2.3	I_n	Current value of particular circuit breaker that can be handled uninterruptedly. The highest current valued tripping the circuit breaker in conformity with a specifically stated tripping characteristic.
Reduced rated current	I_R	Specifically established, reduced value of I_n current for a regulated time-dependent (thermal) release and that the circuit breaker can handle continuously. Maximum setting is at value equal to I_n . Changing I_R moves the release's tripping characteristic along the current axis. $I_r = k \times I_n$ holds where $k \leq 1$
Tripping time at a given I_r multiple	t_R	Time after which circuit breaker will trip, if a current flows through it that is equal to the given multiple of I_R . Changing t_R moves the tripping characteristic along the time axis.
Minimum current of independent instantaneous (active) release	I_{sd}	Minimum current value that causes tripping of the time-independent delayed release.
Time delay of time-independent delayed release	t_{sd}	If a current flows through the circuit breaker equal to at least I_{sd} but not reaching I_n , the circuit breaker will trip with time delay t_{sd} . Total switching off time is influenced by the tripping of the circuit breaker itself and is about $10 \div 20$ ms longer.
Minimum current of independent instantaneous (short-circuit) release	I_i	Minimum current value that causes tripping of the time-independent instantaneous release.
Rated operating current 0947-1; 4.3.2.3	I_e	Rated operating current of device (switch-disconnector) is fixed by the manufacturer with consideration for the rated operating voltage, rated frequency, rated operation, utilization category and type of protective cover, if that comes into consideration.
Rated normal current 0947-1; 4.3.2.4	I_u	Current value set by the manufacturer and which the device can handle in continuous operation, i.e. during a period longer than 8 hours (weeks, months, or longer).
Rated short-circuit ultimate breaking capacity 0947-2; 2.15.1; 4.3.5.2.1	I_{cu}	Value of ultimate short-circuit breaking capacity expressed as the rms value of the alternating component of the assumed short-circuit current that the circuit breaker must be able to manage in the mode: 1x switching off of the short-circuit and a following 1x make-break sequence. After testing, the circuit breaker need not be able to conduct the rated current uninterruptedly. I_{cu} is set for the rated operating voltage at the rated frequency and at the established power factor for alternating current or at the time constant for direct current. Must fulfil the condition: $I_{cu} \geq I_k''$
Rated short-circuit service breaking capacity 0947-2; 2.15.2; 4.3.5.2.2	I_{cs}	Value of the operating short-circuit breaking capacity expressed as the rms value of the alternating component of the assumed short-circuit current that the circuit breaker must be able to manage in the mode: 1x switching off of the short-circuit and a following 2x make-break sequence. May also be expressed as a percentage of I_{cu} . After testing, the circuit breaker must be able uninterruptedly to conduct the rated current and to switch off the overcurrent. Temperature increase of the main terminals may be greater. I_{cs} is set for the rated operating voltage at the rated frequency and at the established power factor for alternating current or at the time constant for direct current. Permitted: $I_{cs} \geq I_k''$
Rated short-time withstand current 60947-1; 4.3.6.1 60947-2; 4.3.5.4 60947-3; 4.3.6.1	I_{cw}	Value of short-time withstand current specified by the manufacturer that the device is able to handle without damage during a designated time period (short-time delay). In case of alternating current, it is the rms value of the alternating component of the assumed short-circuit current I_k .

GLOSSARY OF TERMS

Note: Precise wording of definitions and texts relating to a given term are detailed in the respective standards, see Name.

Name	Symbol	Explanation
Rated short-circuit making capacity EN 60947-1; 4.3.6.2 EN 60947-2; 4.3.5.1 EN 60947-3; 4.3.6.2	I_{cm}	Value of short-circuit making capacity specified by the manufacturer for the rated operating voltage at the rated frequency and at the established power factor for alternating current or at the time constant for direct current. It is expressed as the maximum assumed peak current. Must fulfil the condition: $I_{cm} \geq i_p$
Initial peak short-circuit current EN 60909-0; 1.3.5	i_k^*	Short-circuit current value at the moment of its arising at a given point in the electrical distribution expressed as the rms value of the alternating symmetrical component of the assumed short-circuit current.
Surge short-circuit current EN 60909-0; 1.3.8	i_p	Maximum possible momentary value of the assumed short-circuit current. (Corresponds to the moment the short arises, as a result of which there occurs the peak value of the short-circuit current.)
Prospective short-circuit current EN 60947-1; 2.5.5 EN 60909-0; 1.3.3	I_p	Short-circuit current value, which would flow through the circuit if the protection device were replaced and a short-circuit were experienced by conductors with negligible impedance. (In a three-phase distribution, it is assumed that the short-circuit is simultaneous in all phases.)
Rated impulse withstand voltage EN 60947-1; 4.3.1.3	U_{imp}	Peak value of the voltage impulse of the prescribed form and polarity which the device is able to withstand without failure at the established conditions and pertinent to which is the value of the separating air distance. U_{imp} of the device must be equal to or higher than the value established for momentary overvoltage at the point in the circuit (overvoltage category) where the device is used.
Overvoltage category EN 60947-1; 2.5.60		Numerically defined level of momentary overvoltage, i.e. overvoltage having its origin in atmospheric or switching. Standard EN 60664-1 establishes for electrical equipment the overvoltage categories: Overvoltage category IV - service entrance, outside lead Overvoltage category III - fixed wiring Overvoltage category II - appliances Overvoltage category I - light-current appliances
Rated frequency EN 60947-1; 4.3.3	f_n	Frequency of the supply network for which the device is proposed and that corresponds to its other characteristics values.
Utilization category (circuit breakers – time selectivity) EN 60947-2; 4.4		Utilization category of circuit breaker establishes whether or not the circuit breaker specifically is intended for providing selectivity by means of intentional time delay (timing selectivity) with other protective devices connected in series on the load side in short-circuiting conditions. Utilization category: A - circuit breakers are not specifically intended for providing timing selectivity B - circuit breakers are specifically intended for providing timing selectivity
Utilization category (switch-disconnectors – switching mode) EN 60947-3; 4.4		Utilization category defines the assumed use of switch devices (switch-disconnectors). Characterized by values of current and voltage, expressed as multiples of rated operating current and rated operating voltage, and further by power factors or time constants of the circuit. Utilization category: AC-21B (DC-21B) - infrequent switching of resistive loads, including moderate overloading AC-22B (DC-21B) - infrequent switching of mixed resistive and inductive loads, including moderate overloading AC-23B (DC-23B) - infrequent switching of motor loads or other highly inductive loads
Pollution degree EN 60947-1; 2.5.58; 6.1.3.2		Pollution degree relates to the conditions of the surrounding environment for which the device is intended. Pollution degree: 1 - No contamination will occur, or only dry, non-conducting contamination. 2 - Normally occurs only non-conducting contamination, but sometimes there may occur temporary conductivity due to condensation. 3 - There occurs conductive contamination or dry non-conducting contamination that with the effect of condensation will become conductive. 4 - Contamination generates continuous conductivity, by means of, for example, conductive dust, rain or snow.

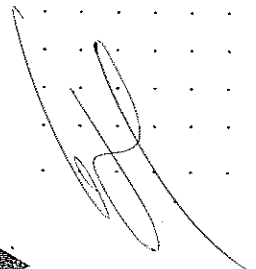
NOTE

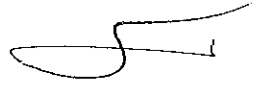


NOTE

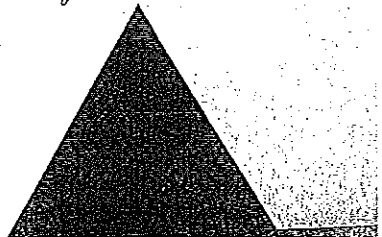
K

<





▶ OEZ s.r.o.
Šedivská 339
561 51 Letohrad
Czech Republic
tel.: +420 465 672 111
+420 465 672 101
fax: +420 465 672 398
+420 465 672 151
e-mail: oeztrade.cz@oez.com
www.oez.com

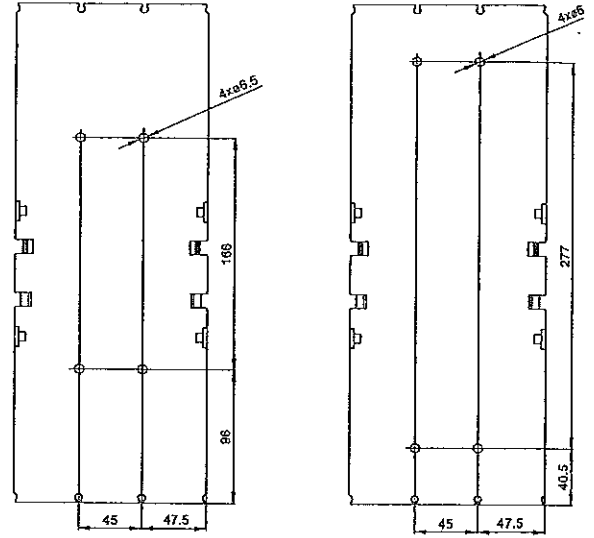
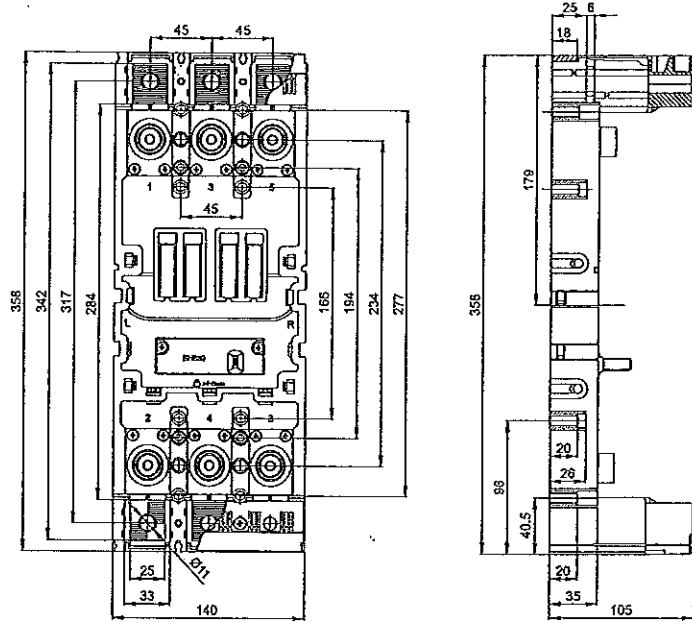


CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

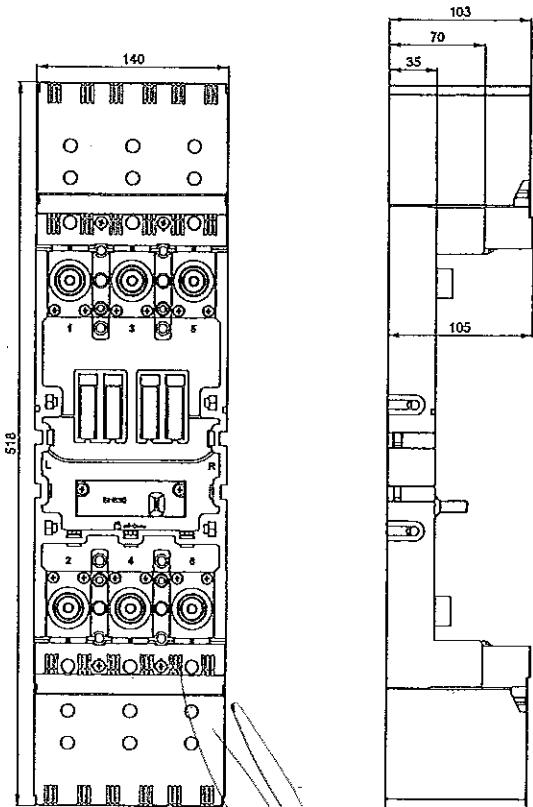
Dimensions

Plug-in device

Drilling diagram



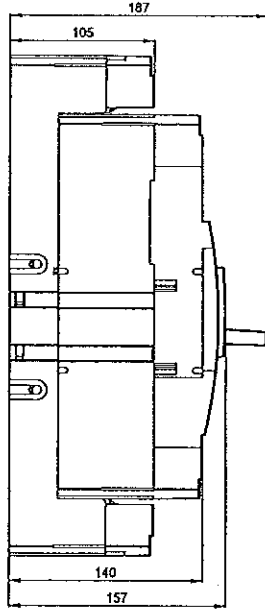
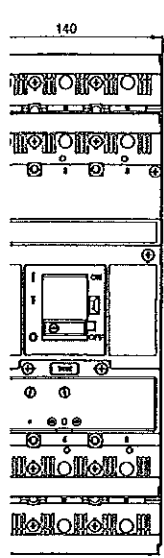
Plug-in device, OD-BH-KS03 terminal cover



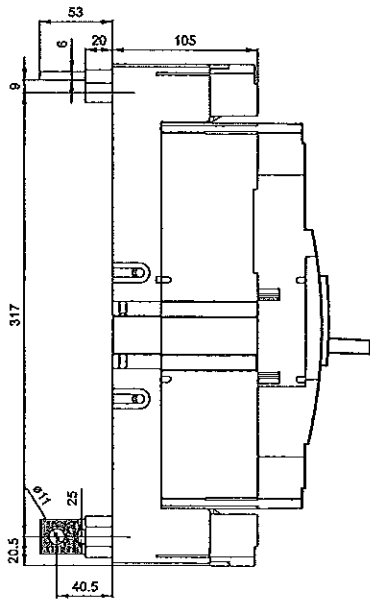
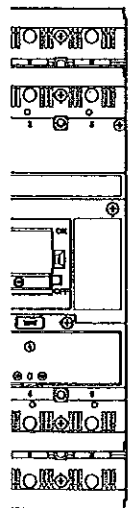
JIT BREAKERS, SWITCH-DISCONNECTORS

ions

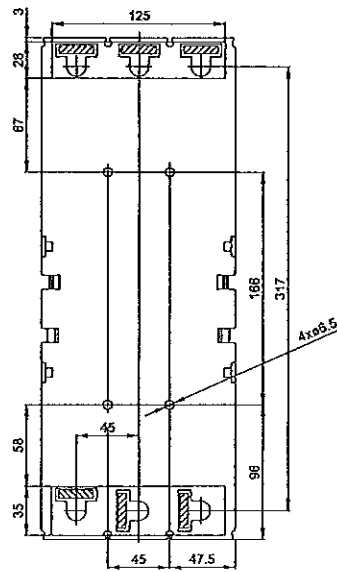
esign



esign, rear connection (CS-BH-A021 connecting set)



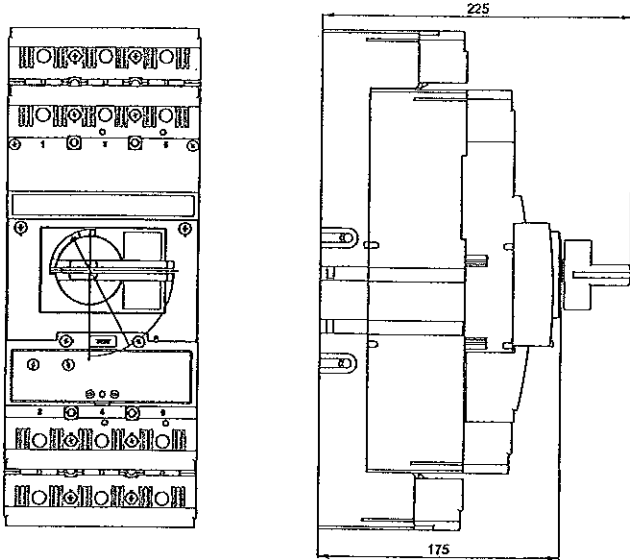
Drilling diagram



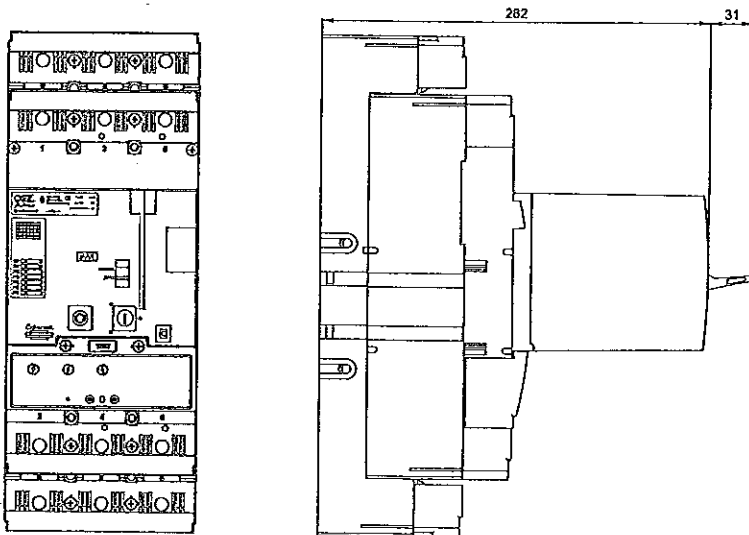
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

Plug-in design, hand drive



Plug-in design, motor drive



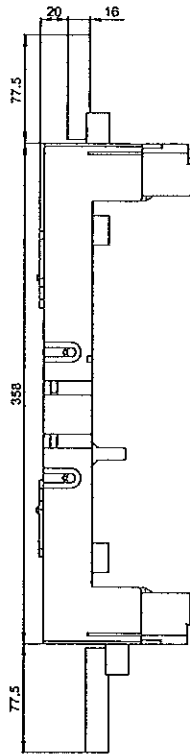
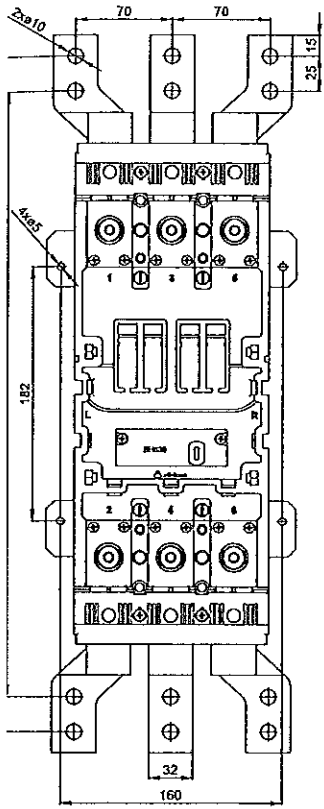
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

3P

Dimensions

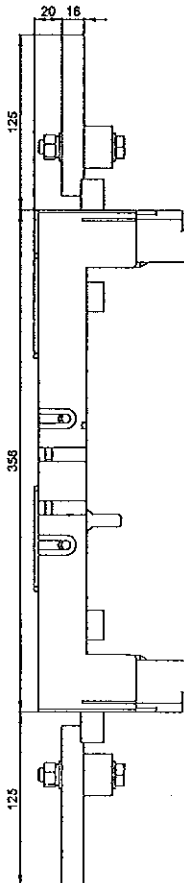
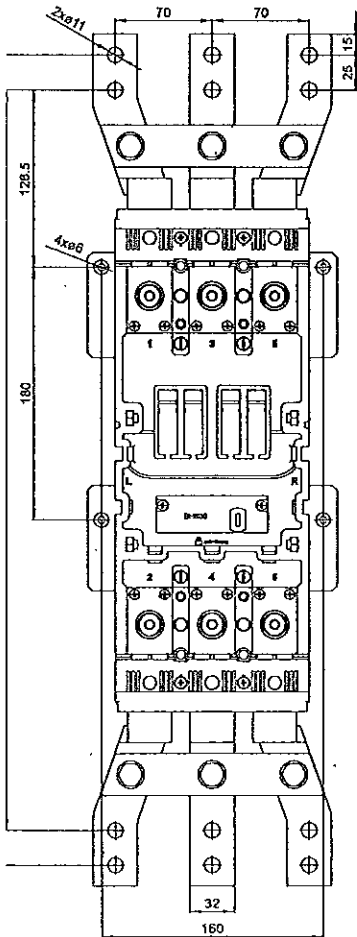
in device (CS-BH-JX75 connecting set, OD-BHD-MS75 connecting set)

RETROFIT



in device (CS-BH-JT75 connecting set, OD-BH-MT75 mounting set)

RETROFIT



Handwritten signature

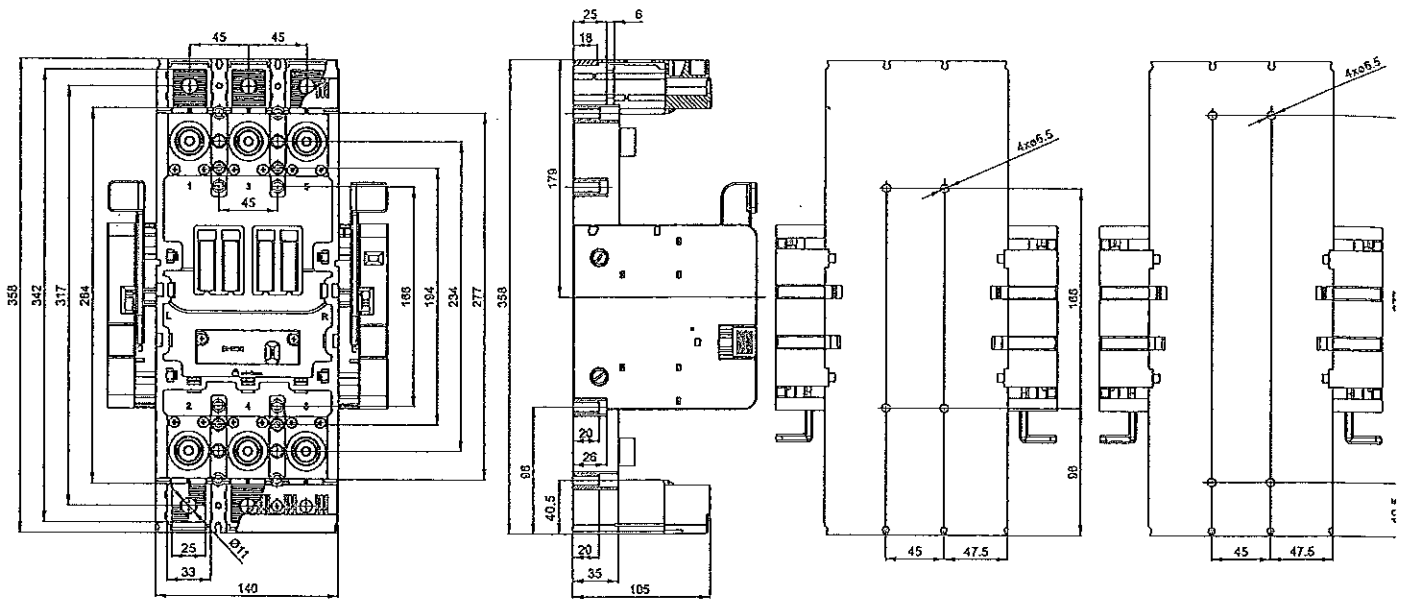
Handwritten signature

CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

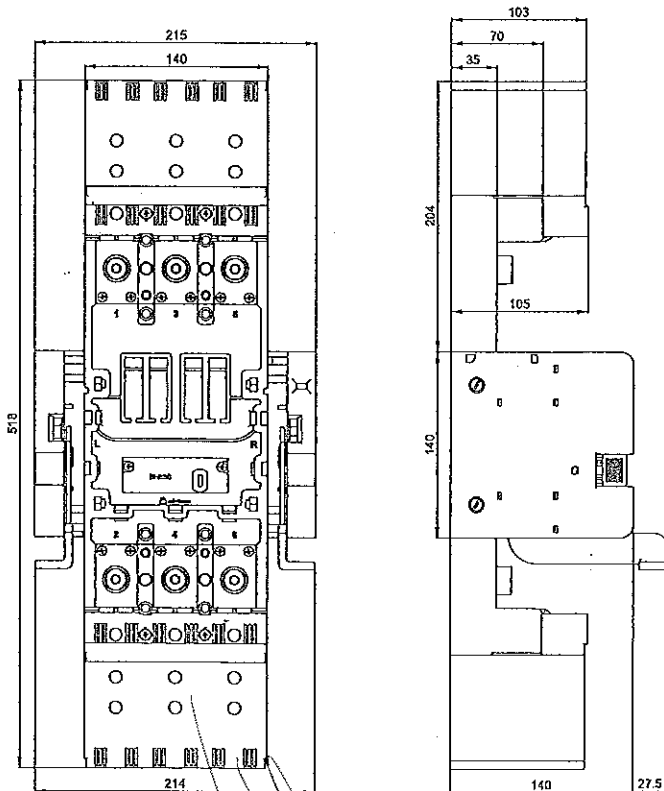
Dimensions

Withdrawable device

Drilling diagram



Withdrawable device, OD-BH-KS03 terminal cover



CP

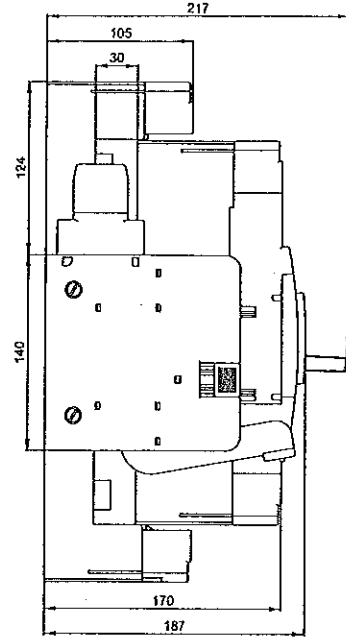
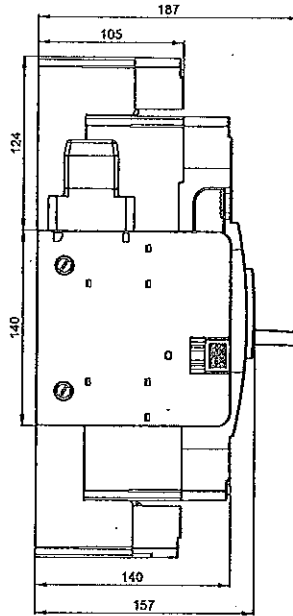
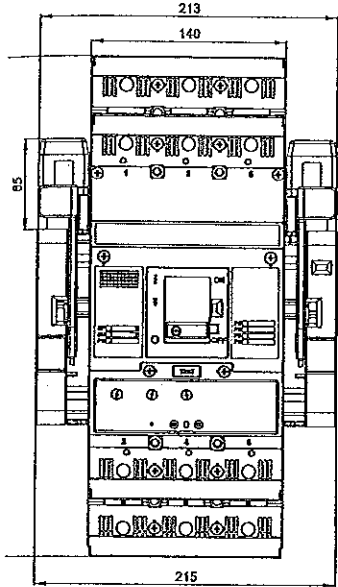
RCUIT BREAKERS, SWITCH-DISCONNECTORS

mensions

hdrawable design

Working position

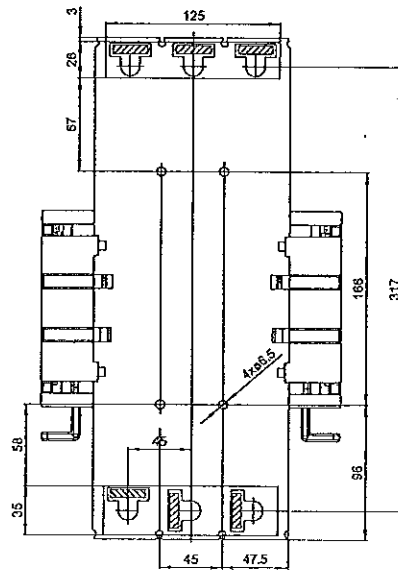
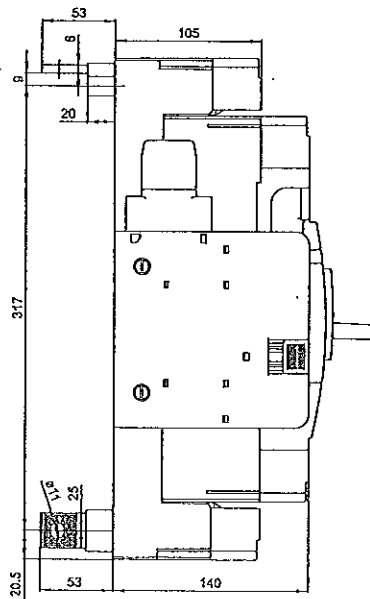
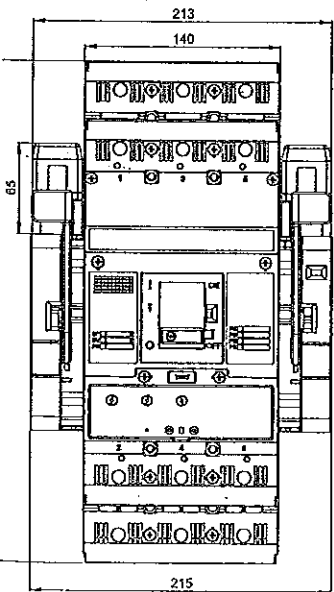
Inspection position



hdrawable design, rear connection (CS-BH-A021 connecting set)

Working position

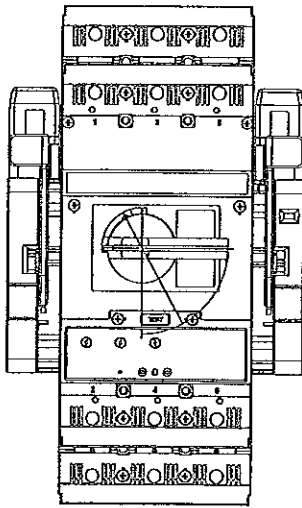
Inspection position



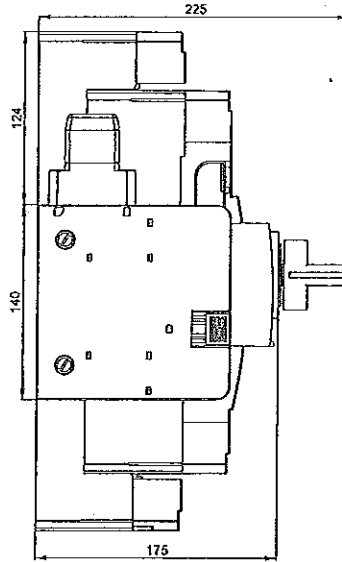
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

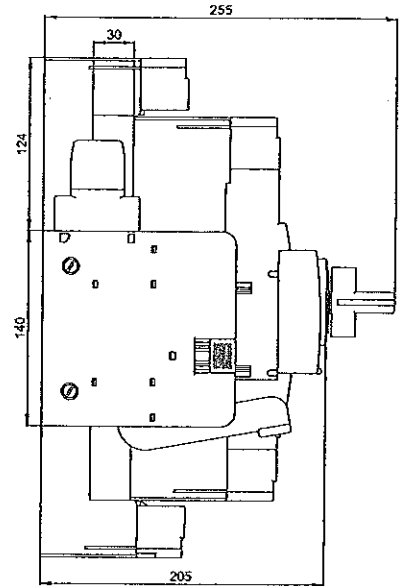
Withdrawable design, hand drive



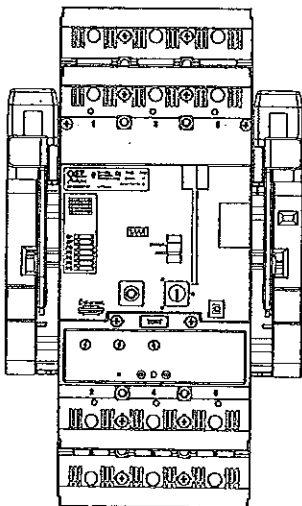
Working position



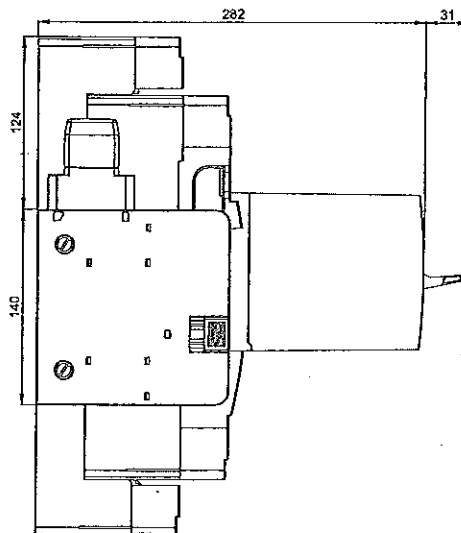
Inspection position



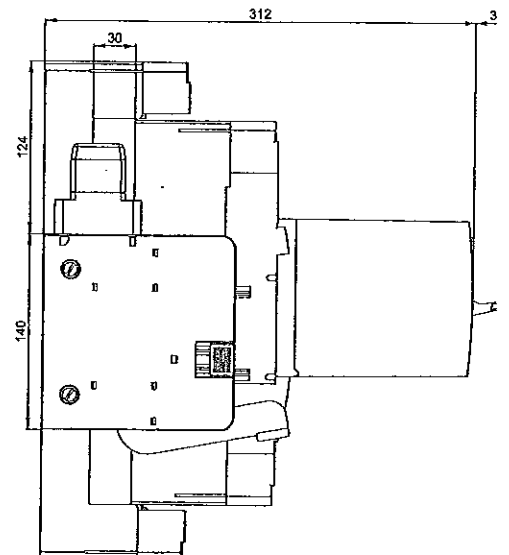
Withdrawable design, motor drive



Working position



Inspection position



A large, handwritten scribble or signature in the bottom left corner of the page.

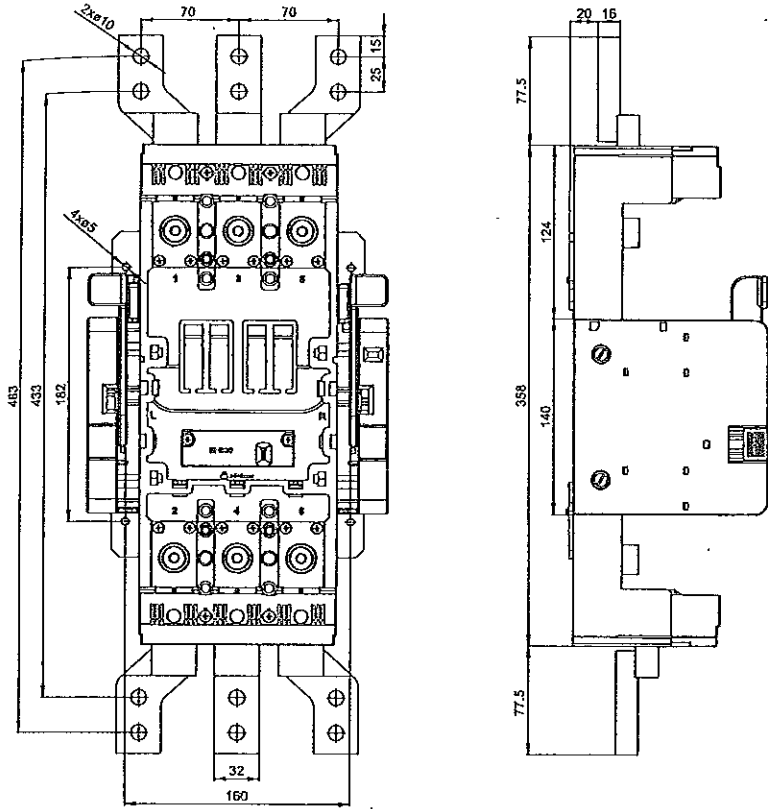
A smaller handwritten signature or scribble in the bottom right corner of the page.

CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

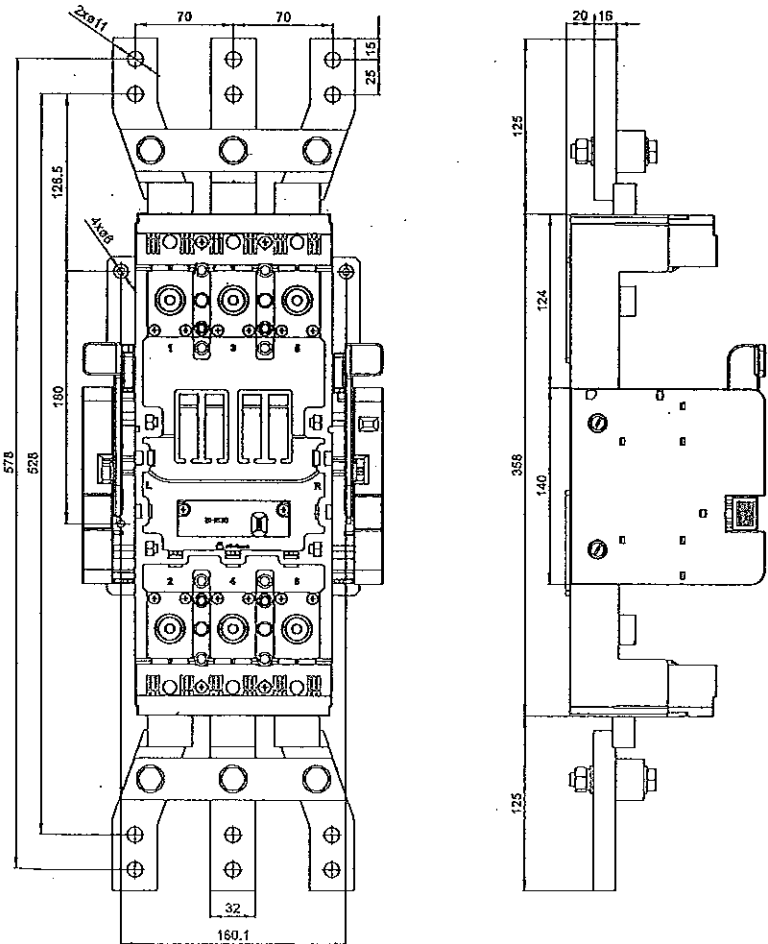
Withdrawable device (CS-BH-JT75 connecting set, OD-BH-MT75 mounting set)

RETROFIT



Withdrawable device (CS-BH-JX75 connecting set, OD-BHD-MS75 connecting set)

RETROFIT



Handwritten signature

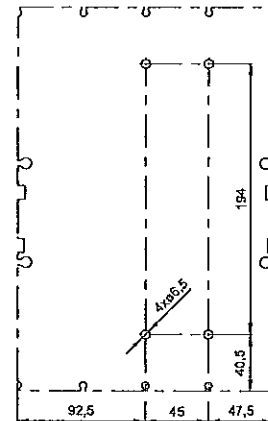
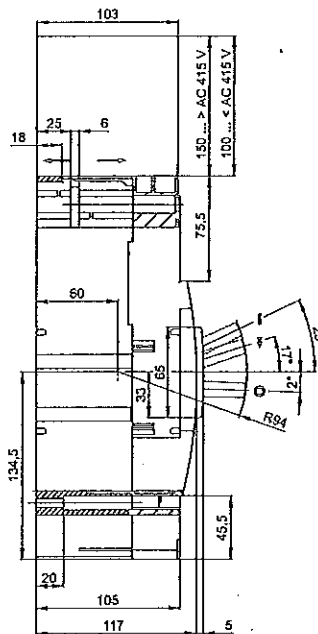
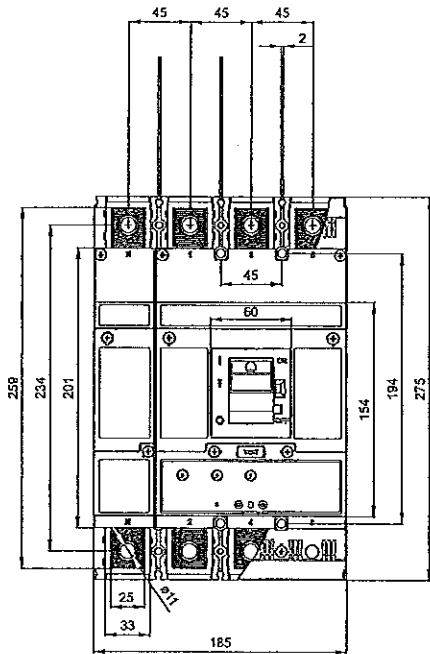
Handwritten signature

CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

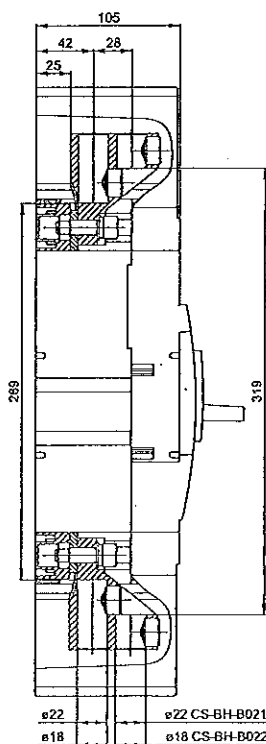
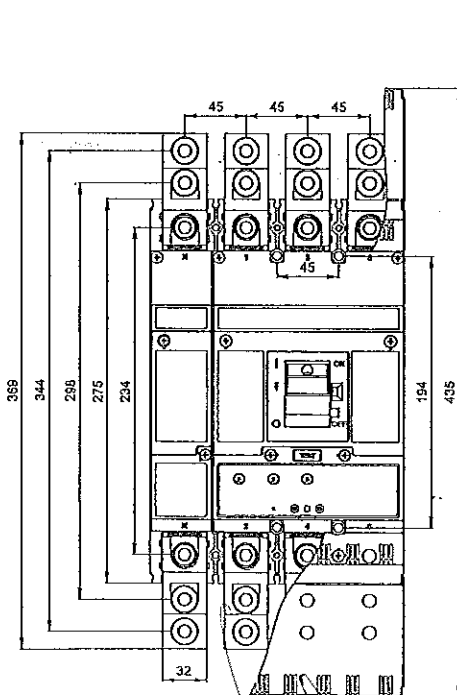
Dimensions

Fixed design, front connection

Drilling diagram



Fixed design, front connection (CS-BH-B021 + CS-BH-B421, CS-BH-B022 + CS-BH-B422 connecting sets)

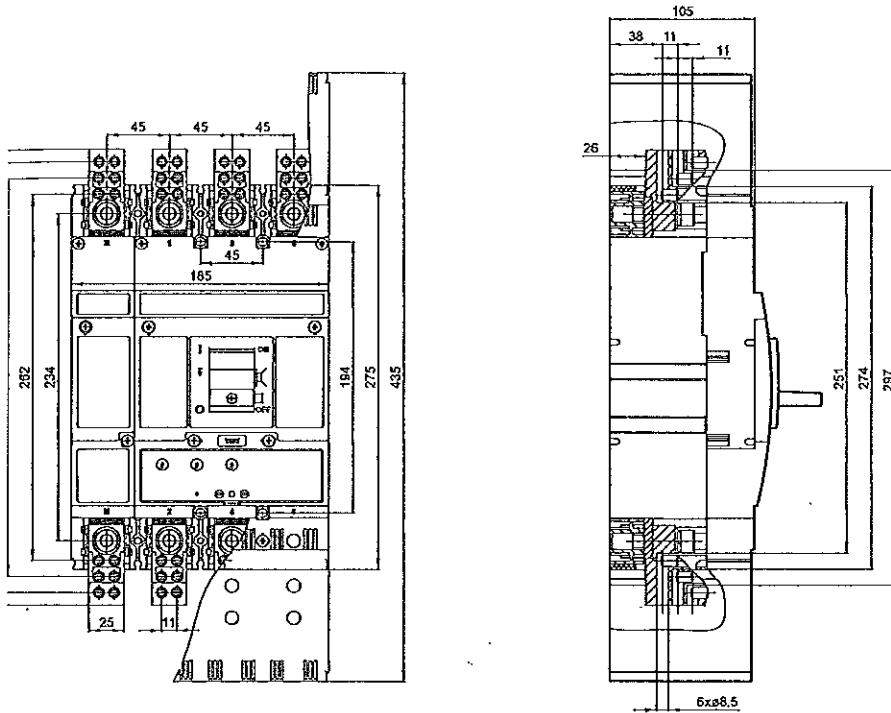


[Handwritten signature]

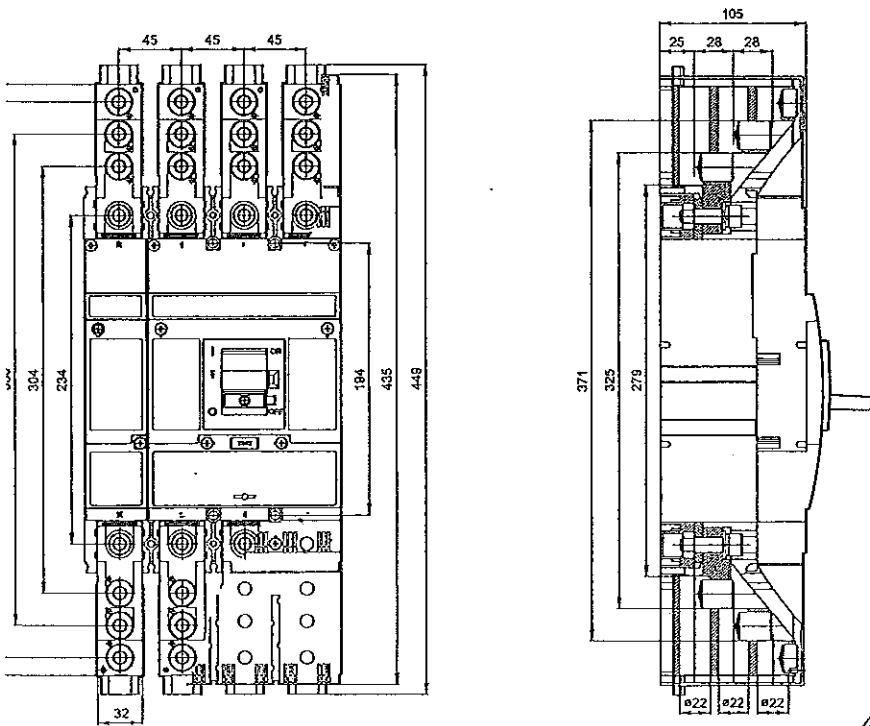
JIT BREAKERS, SWITCH-DISCONNECTORS

sions

sign, front connection (CS-BH-B014 + CS-BH-B414 connecting sets)



sign, front connection (CS-BH-B031 + CS-BH-B431 connecting sets)



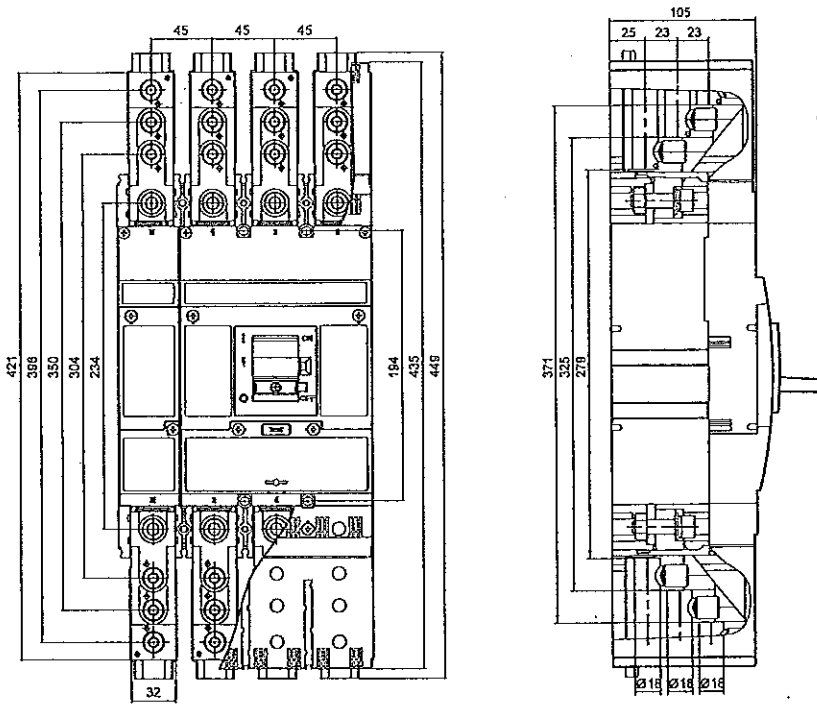
Handwritten signature

Handwritten signature

CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

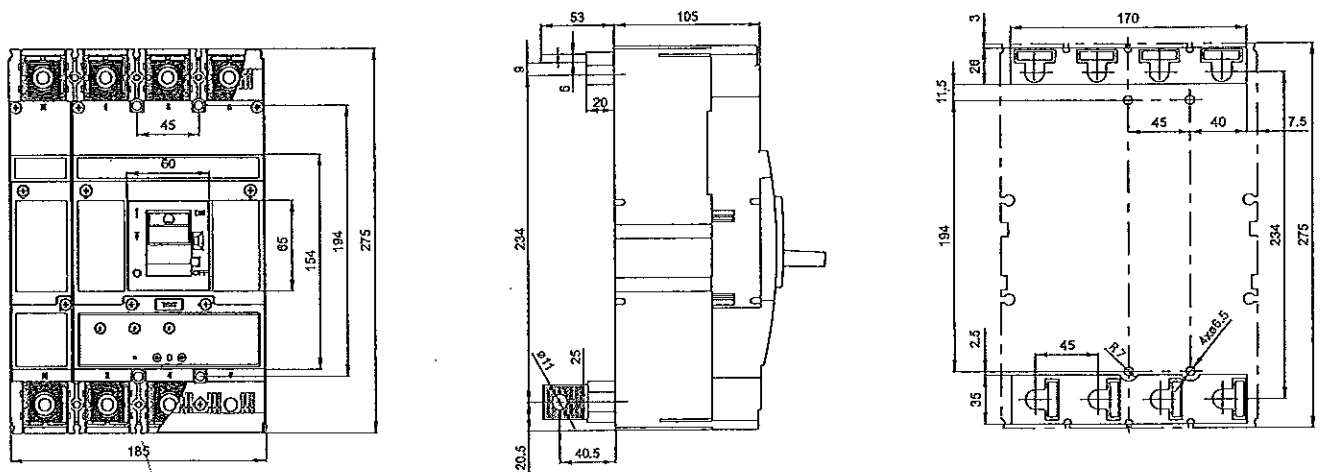
Dimensions

Fixed design, front connection (CS-BH-B032 + CS-BH-B432 connecting sets)



Fixed design, rear connection (CS-BH-A021 + CS-BH-A421 connecting sets)

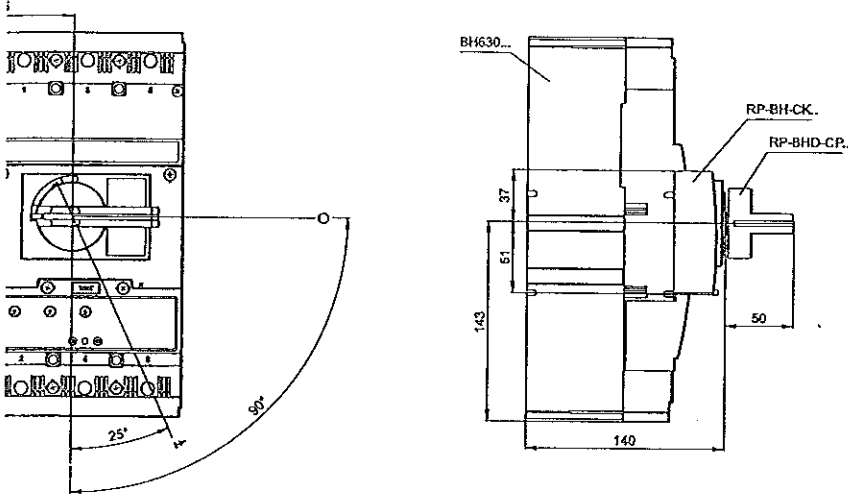
Drilling diagram



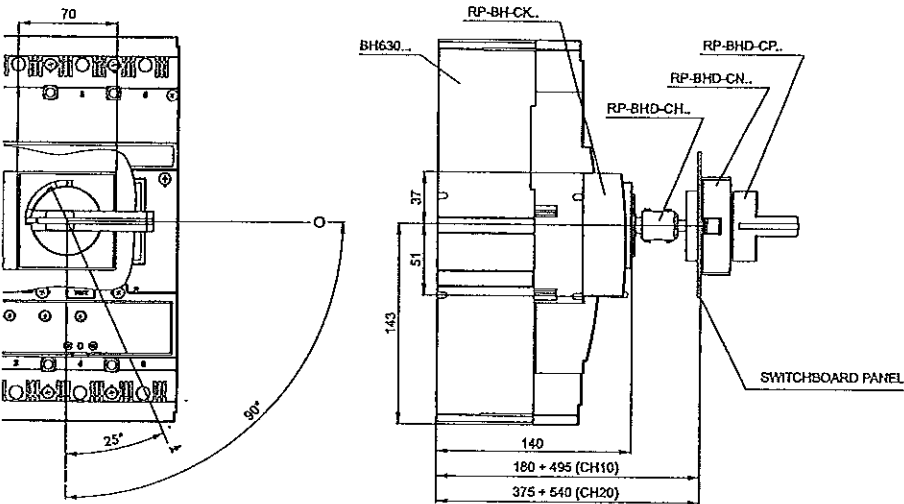
IT BREAKERS, SWITCH-DISCONNECTORS

ions

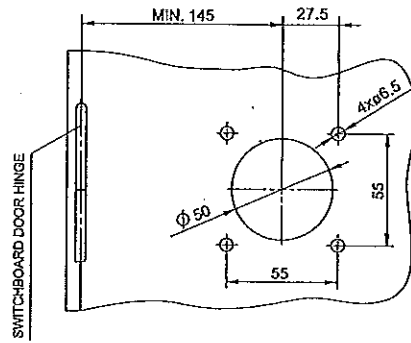
ign, hand drive



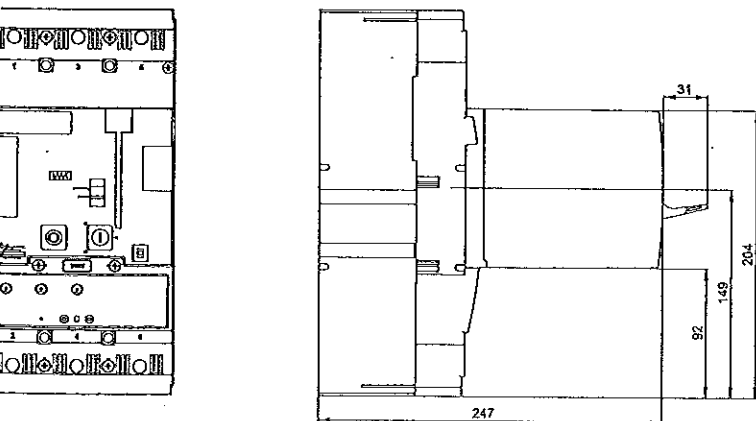
gn, hand drive - front, with adjustable lever



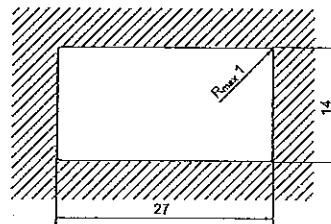
Switchboard door modification



gn, motor drive



Opening dimensions in switchboard door for external counter of cycles

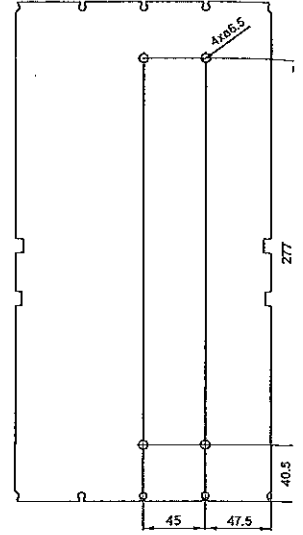
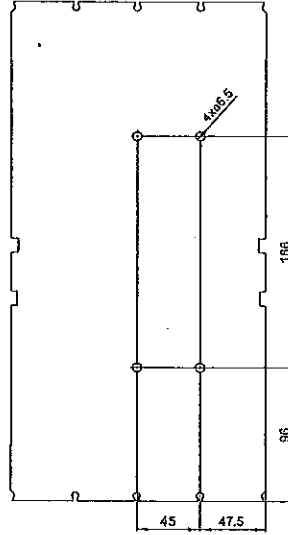
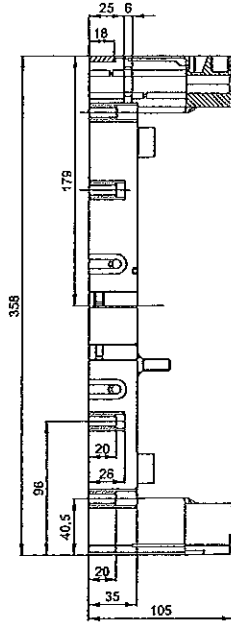
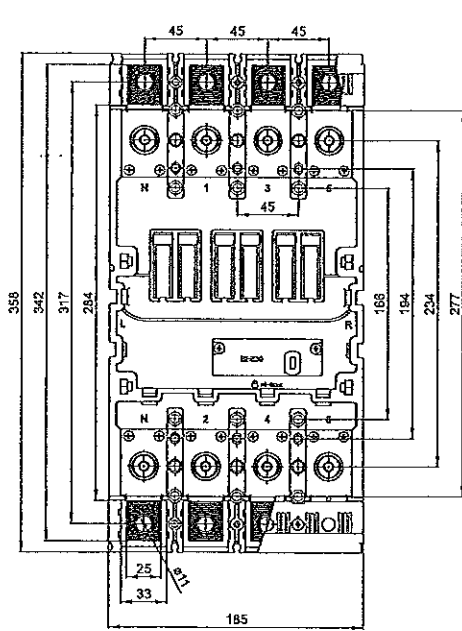


CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

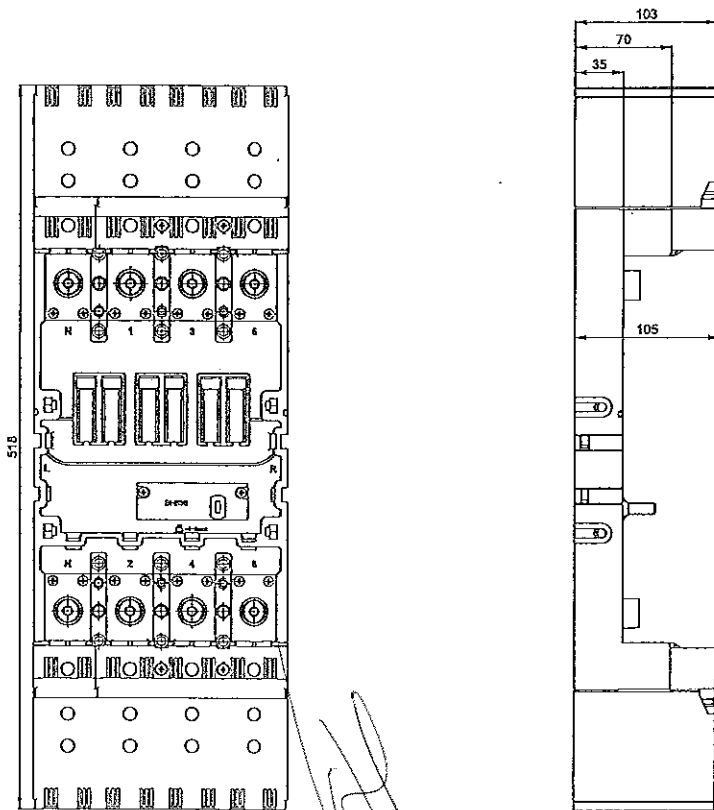
Dimensions

Plug-in device

Drilling diagram



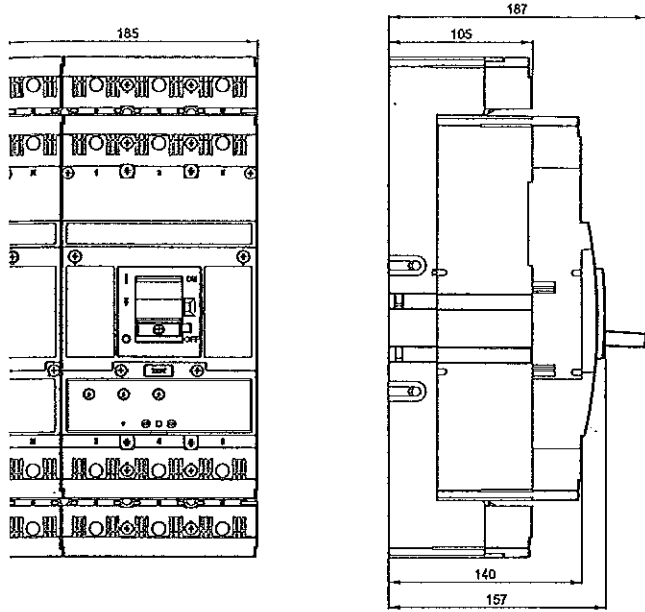
Plug-in device, OD-BH-KS43 terminal cover



CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

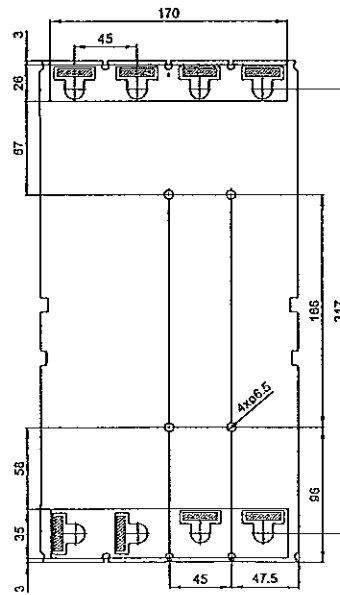
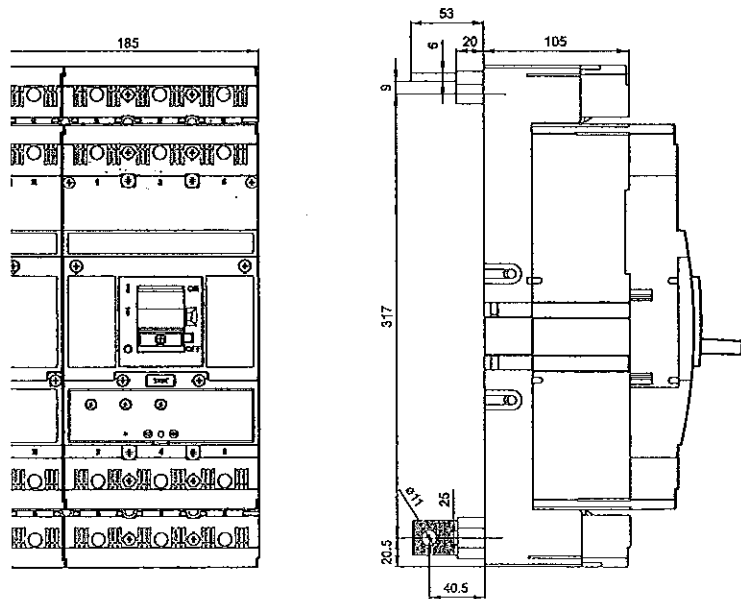
Dimensions

in design



in design, rear connection (CS-BH-A021 + CS-BH-A421 connecting sets)

Drilling diagram



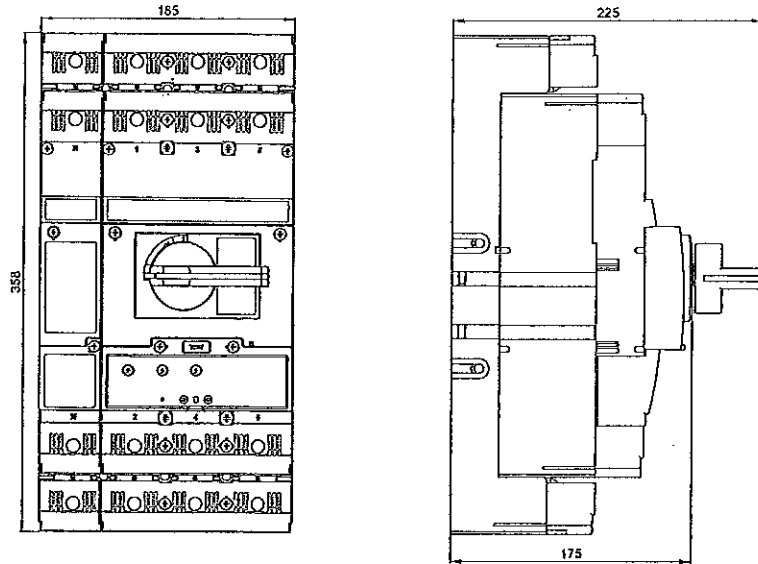
Handwritten signature

Handwritten signature

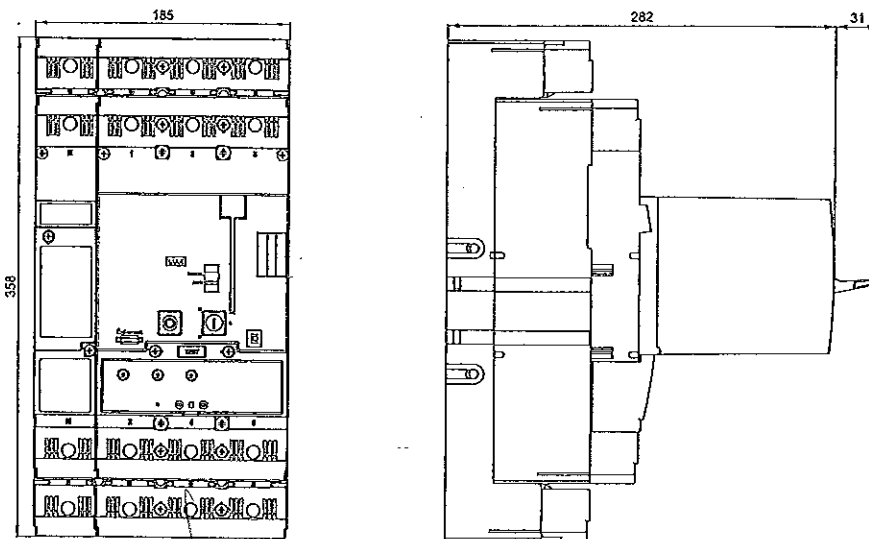
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

Plug-in design, hand drive



Plug-in design, motor drive



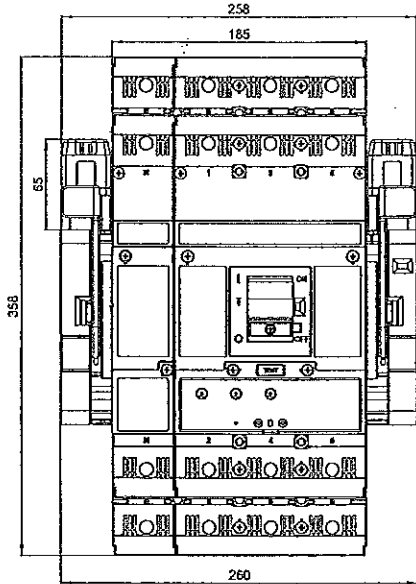
Handwritten signature

Handwritten signature

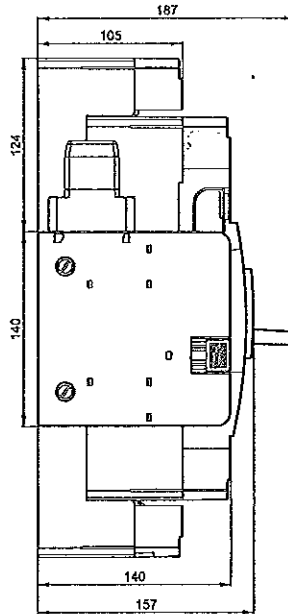
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

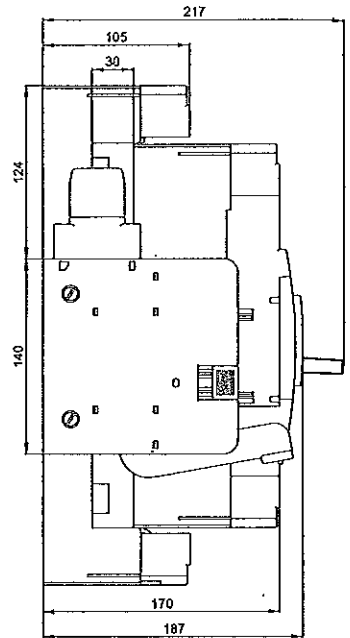
Withdrawable design



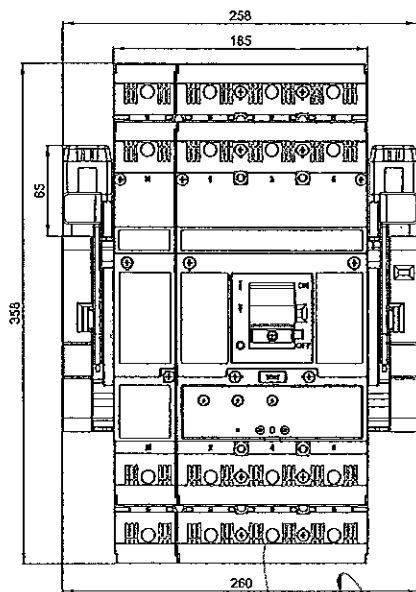
Working position



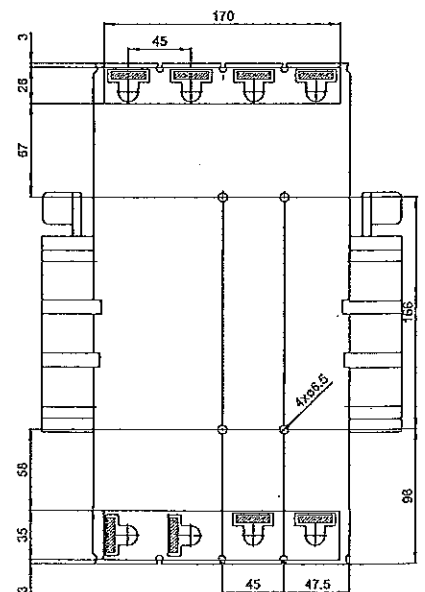
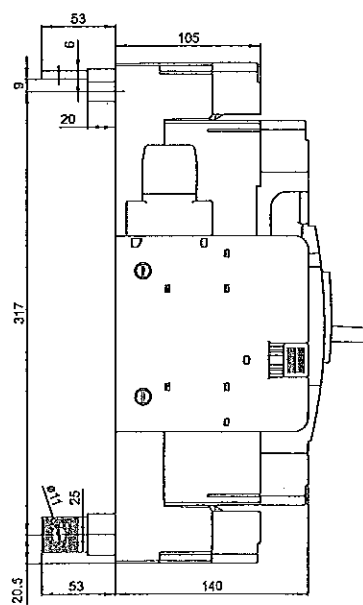
Inspection position



Withdrawable design, rear connection (CS-BH-A021 + CS-BH-A421 connecting sets)



Drilling diagram



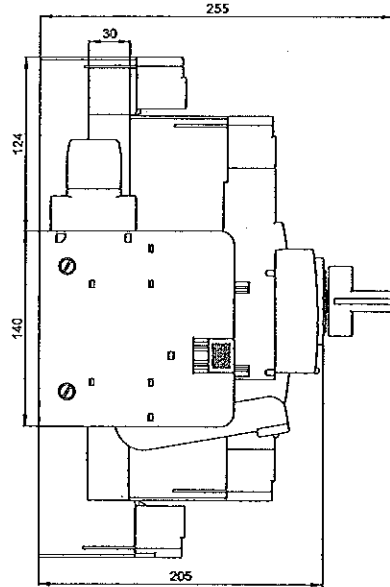
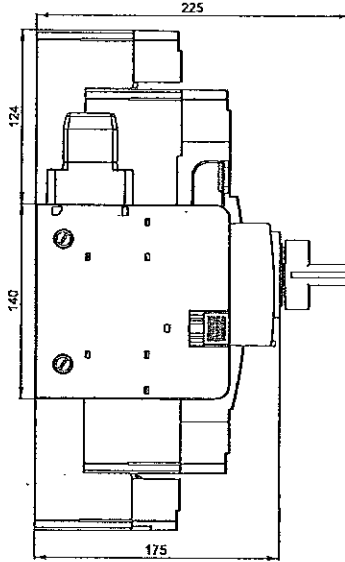
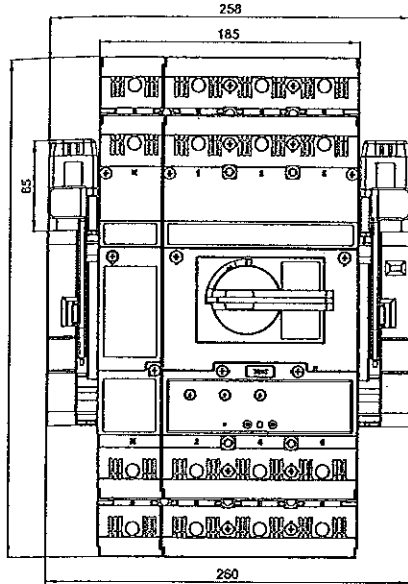
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

Withdrawable design, hand drive

Working position

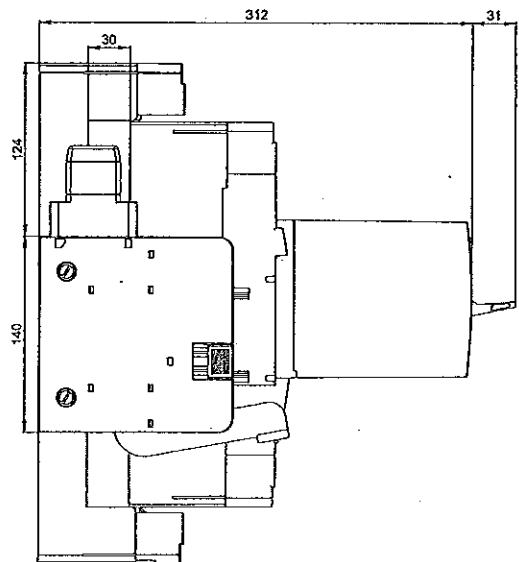
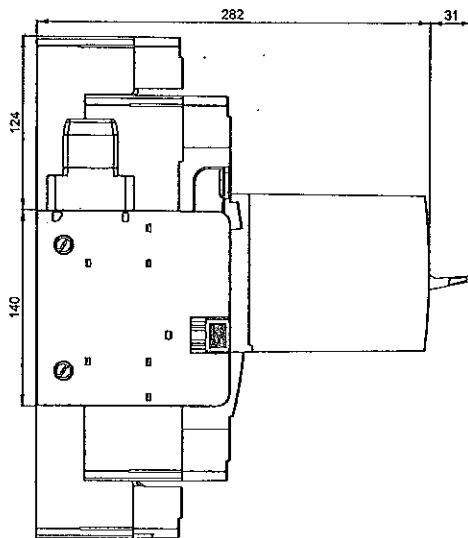
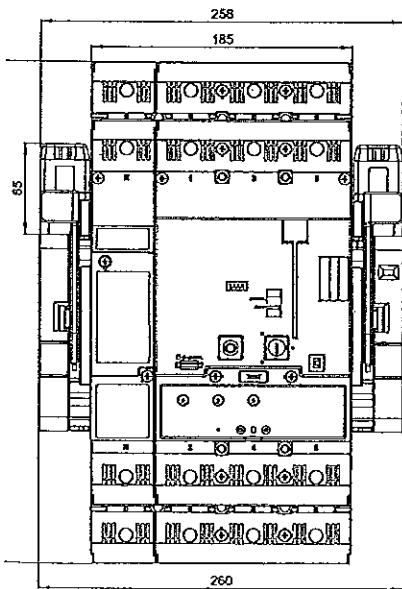
Inspection position



Withdrawable design, motor drive

Working position

Inspection position



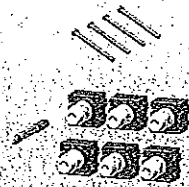
[Handwritten mark]

[Handwritten signature]

PLUG-IN DEVICE



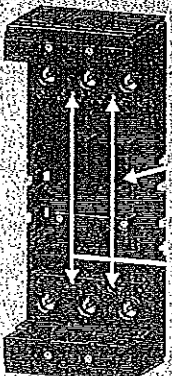
Plug-in device



Circuit breaker in plug-in design

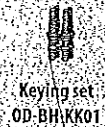


Locking plug-in device against inserting circuit breaker



Position of cavities for switch SO-BHD-0010 in plug-in device

11, 12/13, 14



Keying set OD-BH-KK01

Description

Plug-in design of the circuit breaker/switch-disconnector is intended for demanding industrial applications where rapid exchange of the circuit breaker along with both visual and conductive disconnection of the circuit are needed.

- plug-in device includes complete accessories for assembling circuit breaker/switch-disconnector in plug-in design from the originally fixed design
- components of the plug-in device are:
 - base of the plug-in device
 - 2 connecting sets - for fitting onto the switching unit
 - interlocking connecting rod (ensures automatic switching off of the circuit breaker for handling - inserting and removal)
 - set of mounting bolts - for affixing circuit breaker to plug-in device (set of mounting bolts is used to fasten the plug-in device into the switchboard, that is included in delivery of switching unit)

Circuit breaker positions

Circuit breaker in plug-in design has two positions:

1. inserted (working position)
2. removed

Power circuit

- connecting set CS-BH-A011 is used for connecting with bus-bars or cable lugs, that is included in delivery of switching unit
- for connecting in another way, it is necessary to use connecting sets, see page F8
- connection must comply with our recommendations, see page F18

Auxiliary circuits

These are connected using 15-wire connecting cable OD-BHD-KA01.

States of switches SO-BHD-0010 in plug-in device according to circuit breaker position

Cavity	11	12	13	14	19	20
Circuit breaker position						
Inserted	0	1				
Removed	1	0				

note: 0 - contact open, 1 - contact closed

19 - cavities 19 and 20 are only for 4-pole design

Specifications SO-BHD-0010

type	SO-BHD-0010	
Rated operating voltage	U_c	400 V a.c. 220 V d.c.
Rated insulation voltage	U_i	500 V a.c.
Rated frequency	f_n	50/60 Hz
Rated operating current	I_n / I_c AC-13 I_n / I_c DC-15	3 A/400 V a.c. 3.5 A/24 V d.c., 1 A/48 V d.c., 0.3 A/110 V d.c., 0.15 A/220 V d.c.
Thermal current	I_{th}	6 A
Arrangement of contacts		001
Connection cross-section	S	0.5 ÷ 1 mm ²
Degree of protection of terminals (connected switch)		IP20

For wiring diagram of circuit breaker in plug-in device with accessories see page F16.

Signalling of position SO-BHD-0010

Plug-in device may be fitted with a maximum of four switches (for 4-pole design, max. 6 switches) for signalling the inserted/removed position.

Keying set OD-BH-KK01

Plug-in device and circuit breaker can be fitted with keying set, which prevents inserting any other circuit breaker into the plug-in device.

Circuit breaker accessories in plug-in design

Circuit breaker in plug-in design has the same accessories as the fixed circuit breaker.

Advantages and enhanced safety for operator:

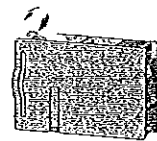
- unambiguous remote signalling of the circuit breaker position
- option to lock plug-in device with padlocks to prevent inserting of circuit breaker
- visible and conductive disconnection of the power circuit
- easy exchange of circuit breakers in case of failure
- IP20 degree of protection of all termination points
- plug-in device does not need earthing



Keying set OD-BH-KK01

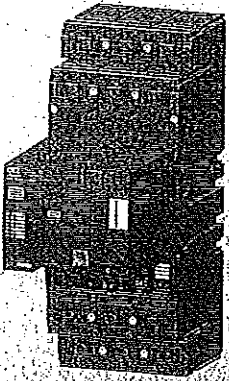


Connecting cable OD-BHD-KA01



Signalling of position SO-BHD-0010

LUG-IN DEVICE



Circuit breaker in plug-in design with motor drive

Recommended circuit breaker manipulation

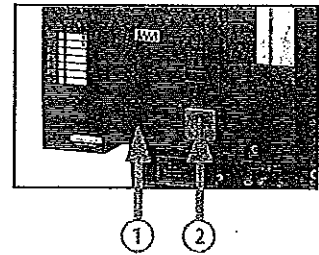
During the manipulation with circuit breaker in plug-in design with motor drive, the circuit breaker may reach the state, in which the first attempt at switching on by motor drive is unsuccessful. Switching on is executed after repeated make impulse. To avoid this effect, some of the following steps may be done:

- 1) To keep the process of manipulation with the circuit breaker, see „Recommended circuit breaker manipulation“ below
- 2) To connect OD-BHD-R... control relay into the motor drive circuit according to wiring diagram, see page F71

Recommended process of manipulation

After every manipulation with circuit breaker in plug-in design is necessary to accomplish the operations in following sequence, after repeated insertion into the plug-in device:

- 1) press the switch off button (red) on the motor drive, see fig.
- 2) press the switch on button (green) on the motor drive, see fig.

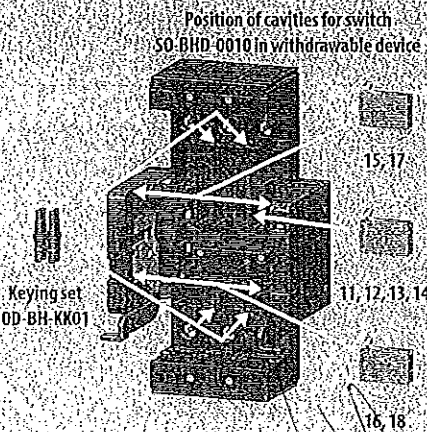
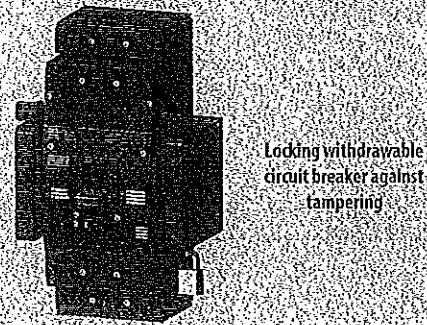
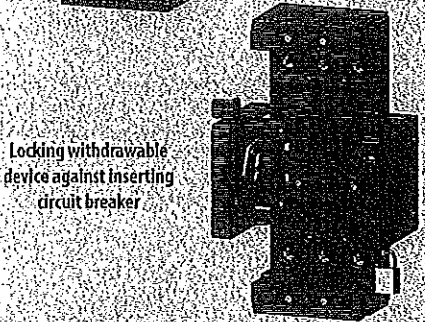
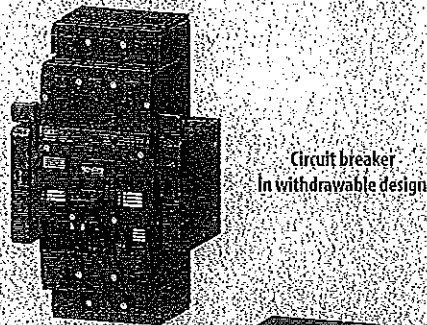
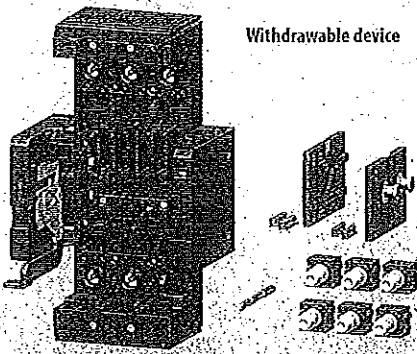


States in states of switches in cavities of switching unit when removing circuit breaker

Circuit breaker lever position	State of the main contacts	State of switches before removing inserted position						State of switches after removing removed position					
		Cavity 1		2		3,4,5 (6,7,8,9)		1		2		3,4,5 (6,7,8,9)	
		PS-BHD-1000	PS-BHD-0100	PS-BHD-1000	PS-BHD-0100	PS-BHD-1000	PS-BHD-0100	PS-BHD-1000	PS-BHD-0100	PS-BHD-1000	PS-BHD-0100	PS-BHD-1000	PS-BHD-0100
Switched on		1	0	0	1	1	0	1	0	1	0	0	1
Switched off manually or by motor drive electrically (fed state)		1	0	0	1	0	1	1	0	1	0	0	1
Switched off by overcurrent release		0	1	1	0	0	1	0	1	1	0	0	1
Switched off from switched on state: by auxiliary release, 'TEST' push button or by the switch off button on motor drive		1	0	1	0	0	1	1	0	1	0	0	1

0 - contact open, 1 - contact closed
Cavities 6, 7, 8, 9 are only for 4-pole design

WITHDRAWABLE DEVICE



Description

Withdrawable design of the circuit breaker/switch-disconnector is intended for demanding industrial applications where rapid exchange of the circuit breaker, frequent checking and both visual and conductive disconnection of the circuit are needed.

- withdrawable device includes complete accessories for assembling circuit breaker/switch-disconnector in withdrawable design from the originally fixed design
- components of the withdrawable device are:
 - base of the withdrawable device
 - 2 movable side plates
 - 2 connecting sets - for fitting onto the switching unit
 - interlocking connecting rod (ensures automatic switching off of the circuit breaker for handling – inserting and withdrawing)
 - set of mounting bolts is used to fasten the withdrawable device into the switchboard, that is included in delivery of switching unit

Circuit breaker positions

Circuit breaker in withdrawable design has three positions:

1. inserted (working position)
2. withdrawn (inspection position)
3. removed

Keying set OD-BH-KK01

Withdrawable device and circuit breaker can be fitted with keying set, which prevents inserting any other circuit breaker into the withdrawable device.

States of switches SO-BHD-0010 in withdrawable device according to circuit breaker and arrestment positions

Circuit breaker and arrestment position	11, 12, 13, 14		15, 17, 16, 18		19, 20	
	20	04	20	04	20	04
Inserted and not arrested	0	1	1	0	0	1
Inserted and arrested	0	1	1	0	1	0
Withdrawn and not arrested	1	0	0	1	0	1
Withdrawn and arrested	1	0	0	1	1	0
Removed and not arrested	1	0	1	0	0	0
Removed and arrested	1	0	1	0	1	0

note: 0 - contact open, 1 - contact closed
 - operating state is always in arrested position
 - in arrested position it is possible to lock the withdrawable device (for more information see „Advantages and enhanced safety for operator“)
 *) - cavities 19 and 20 are only for 4-pole design

Specifications SO-BHD-0010

Type		SO-BHD-0010
Rated operating voltage	U_c	400 V a.c. 220 V d.c.
Rated insulation voltage	U_i	500 V a.c.
Rated frequency	f	50/60 Hz
Rated operating current	I_n	AC-13: 3 A/400 V a.c. DC-15: 3.5 A/24 V d.c., 1 A/48 V d.c., 0.3 A/110 V d.c., 0.15 A/220 V d.c.
Thermal current	I_{th}	6 A
Arrangement of contacts		001
Connection cross-section	S	0.5 ÷ 1 mm ²
Degree of protection of terminals (connected switch)		IP20

For wiring diagram of circuit breaker in withdrawable device with accessories see page F16.

Signalling of position SO-BHD-0010

Withdrawable device can be fitted with the switches for signalling the position of the circuit breaker inserted/with-drawn/removed.

Power circuit

- connecting set CS-BH-A011 is used for connecting with bus-bars or cable lugs, that is included in delivery of switching unit
- for connecting in another way, it is necessary to use connecting sets, see page F8
- connection must comply with our recommendations, see page F18

Auxiliary circuits

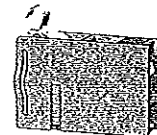
These are connected using 15-wire cable OD-BHD-KA01.

Circuit breaker accessories in withdrawable design

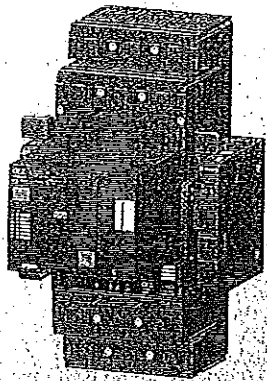
Circuit breaker in withdrawable design has the same accessories as fixed circuit breaker.

Advantages and enhanced safety for operator:

- unambiguous remote and local signalling of the circuit breaker and arrestment positions
- checking of circuit breaker and accessories function in the inspection position
- locking withdrawable device against inserting circuit breaker, locking of circuit breaker in inserted (operating) position, locking of circuit breaker in withdrawn (checking) position - locking by means of padlocks
- visible and conductive disconnection of the power circuit
- easy exchange of circuit breakers in case of failure
- IP20 degree of protection of all termination points
- withdrawable device does not need earthing



WITHDRAWABLE DEVICE



Circuit breaker in withdrawable design with motor drive

Recommended circuit breaker manipulation

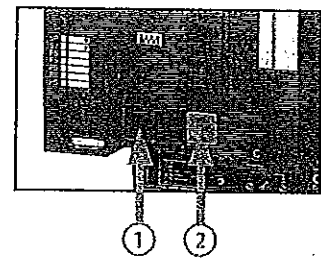
During the manipulation with circuit breaker in withdrawable design with motor drive, the circuit breaker may reach the state, in which the first attempt at switching on by motor drive is unsuccessful. Switching on is executed after repeated make impulse. To avoid this effect, some of the following steps may be done:

- 1) To keep the process of manipulation with the circuit breaker, see „Recommended circuit breaker manipulation“ below
- 2) To connect OD-BHD-R... control relay into the motor drive circuit according to wiring diagram, see page F71

Recommended process of manipulation

After every manipulation with circuit breaker in withdrawable design is necessary to accomplish the operations in following sequence, after repeated insertion into the plug-in device:

- 1) press the switch off button (red) on the motor drive, see fig.
- 2) press the switch on button (green) on the motor drive, see fig.

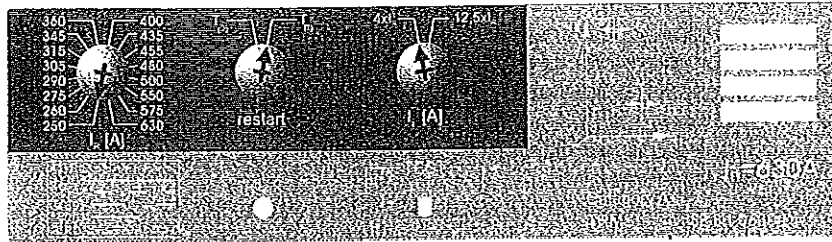


States in states of switches in cavities of switching unit when inserting and withdrawing circuit breaker

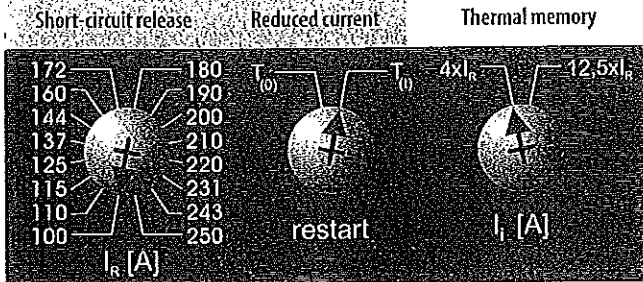
State of circuit breaker before insertion		State of switches before insertion - withdrawn position						State of switches after insertion - inserted position									
		State of switches before withdrawal - inserted position						State of switches after withdrawal - withdrawn position									
of circuit breaker before withdrawal		Cavity		1		2		3,4,5 (6,7,8,9) ¹⁾		1		2		3,4,5 (6,7,8,9) ¹⁾			
Circuit breaker lever position		PS-BHD-1000		PS-BHD-0100		PS-BHD-1000		PS-BHD-0100		PS-BHD-1000		PS-BHD-0100		PS-BHD-1000		PS-BHD-0100	
State of the main contacts		40 30		20 10		40 30		20 10		40 30		20 10		40 30		20 10	
switched on	||	1	0	0	1	1	0	1	0	1	0	0	1	0	0	1	
switched off manually or by motor drive electrically (switched state)	⊙	1	0	0	1	0	1	1	0	1	0	1	0	0	1		
switched off by overcurrent release	∇	0	1	1	0	0	1	0	1	0	1	0	0	0	1		
switched off from switched on state: by auxiliary release, TEST push button or by the switch off button on motor drive	∇	1	0	1	0	0	1	1	0	1	0	1	0	0	1		

¹⁾ - contact open, 1 - contact closed
ties 6, 7, 8, 9 are only for 4-pole design

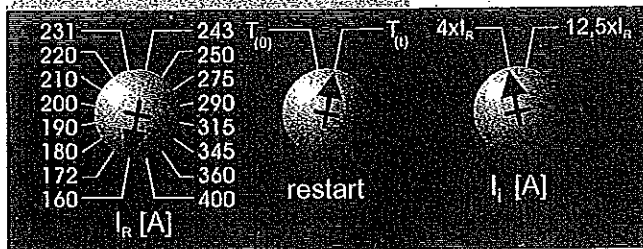
OVERCURRENT RELEASES - DTV3



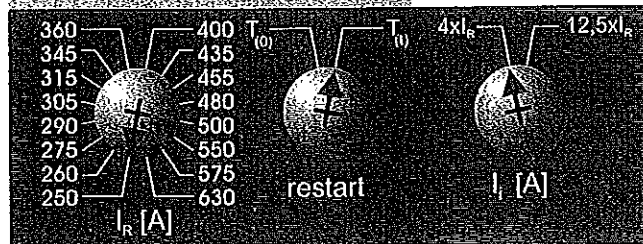
$I_n = 250\text{ A}$
SE-BH-0250-DTV3



$I_n = 400\text{ A}$
SE-BH-0400-DTV3



$I_n = 630\text{ A}$
SE-BH-0630-DTV3

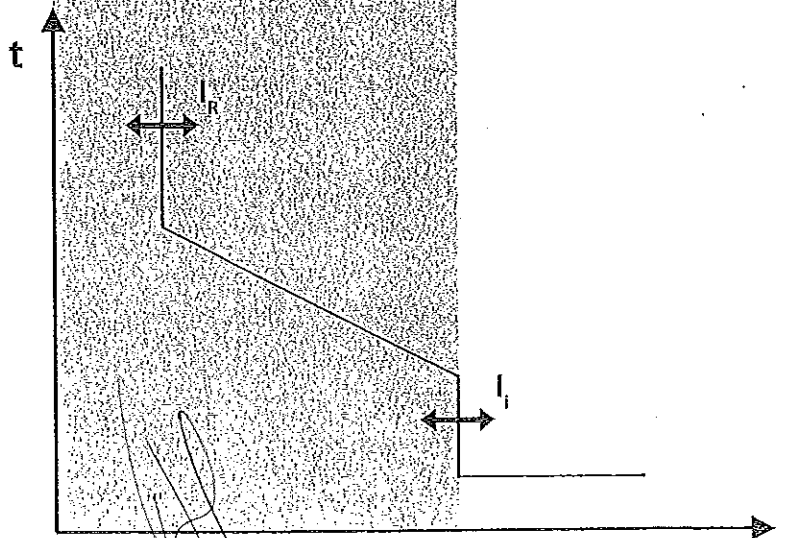


Properties

- suitable for protection of lines and distribution transformers
- protects against both overcurrent and short circuit
- reduced current setting $I_k = 0,4 \div 1 I_n$
- thermal memory can be switched on/off (ON = $T_{(0)}$, OFF = $T_{(1)}$)
- setting of short-circuit release I_r in two steps, $4 I_r$ or $12,5 I_r$
- setting of I_k and I_l by means of the rotary switches is stepwise
- the overcurrent release indicates operating state and the value of the passing current by means of LED
- the values of parameters of the overcurrent release are set by the manufacturer to minimum

Data for the project

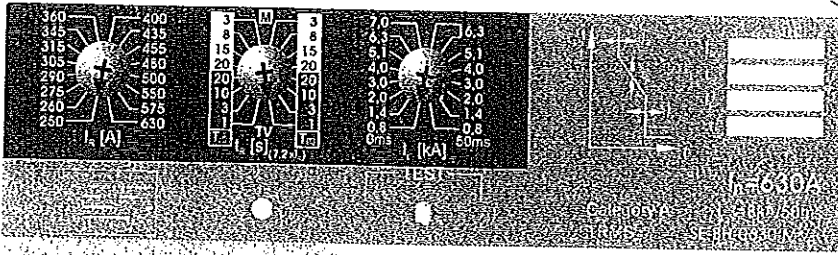
Switching unit	BH630
Overcurrent release	SE-BH
Overcurrent release setting	
Reduced current	I_k [A]
Thermal memory	T
Short-circuit release current	I_r [A] ($\dots \times I_n$)



IMPORTANT

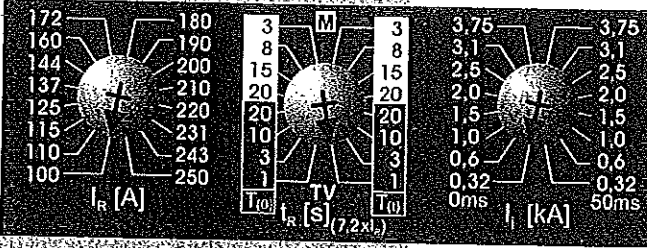
- thermal memory must be switched on in protection of transformers and lines - thus the transformer or the line will be protected against repeated overload

OVERCURRENT RELEASES - MTV8, TV mode

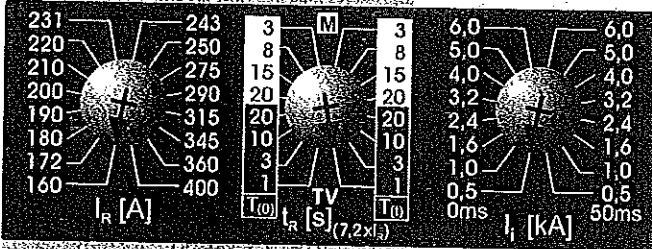


Reduced current Thermal release delay Short-circuit release

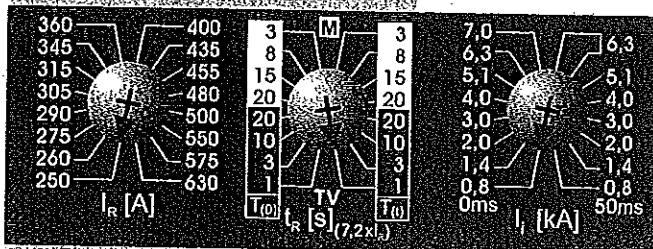
$I_n = 250 \text{ A}$
IH-0250-MTV8



$I_n = 400 \text{ A}$
IH-0400-MTV8



$I_n = 630 \text{ A}$
I-0630-MTV8

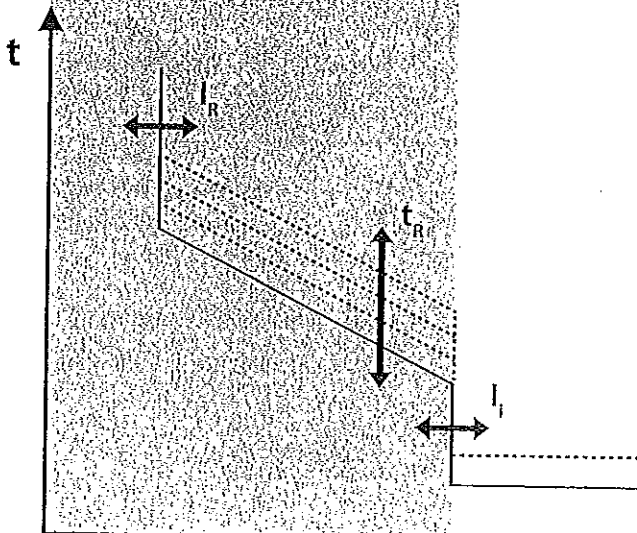


Properties

- TV mode - suitable for protection of lines, distribution transformers and generators
- protects against both overcurrent and short circuit
- reduced current setting $I_R = 0.4 \div 1 I_n$
- thermal memory can be switched on/off (ON = T_{OFF} , OFF = T_{ON})
- in TV mode the undercurrent release is inactive
- setting of delay of the thermal release t_R 1 s, 3 s, 10 s and 20 s
- setting of the value of short-circuit release I_I in 8 steps and possibility of switching the short-circuit release off with a delay of 50 ms
- setting of I_R , t_R and I_I by means of the rotary switches is stepwise
- the overcurrent release indicates operating state and the value of the passing current by means of LED
- the values of parameters of the overcurrent release are set by the manufacturer to minimum

Data for the project

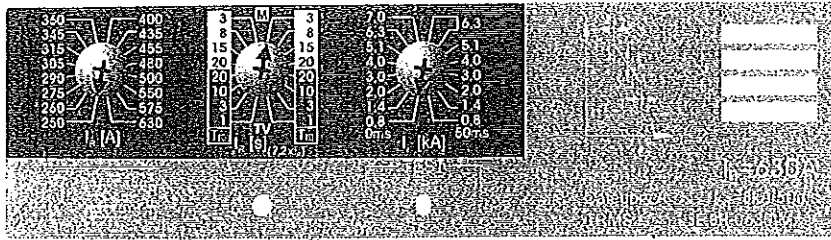
Switching unit	BH630
Overcurrent release	SE-BH
Overcurrent release setting	
Reduced current	I_R [A]
Mode	TV
Thermal memory	T
Thermal release delay	t_R [s]
Short-circuit release current	I_I [kA]
Setting of short-circuit release	[ms]



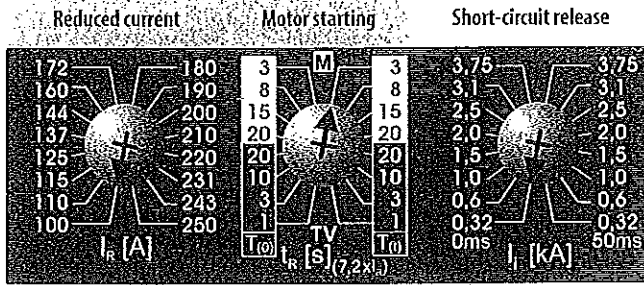
IMPORTANT

- the set value of current of the short-circuit release must correspond to the impedance loop - conditions must be fulfilled for automatic disconnection from power supply in case of failure

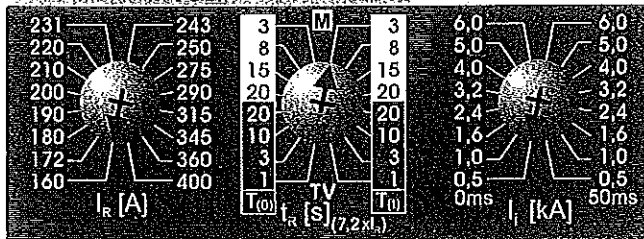
OVERCURRENT RELEASES - MTV8, M mode



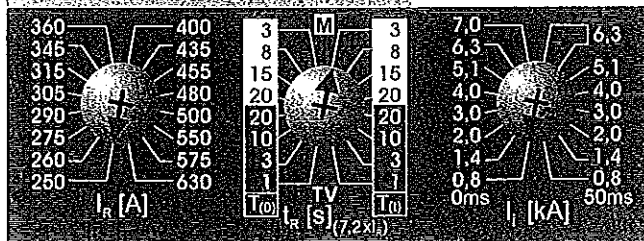
$I_n = 250\text{ A}$
SE-BH-0250-MTV8



$I_n = 400\text{ A}$
SE-BH-0400-MTV8



$I_n = 630\text{ A}$
SE-BH-0630-MTV8

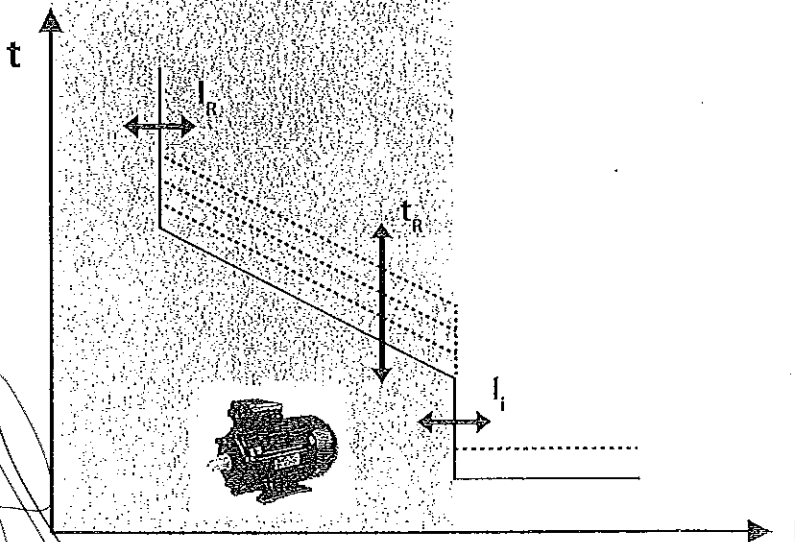


Properties

- M mode - suitable for protection of motors
- protects against both overcurrent and short circuit
- reduced current setting $I_R = 0.4 \div 1 I_n$
- thermal memory can be switched on/off (ON = T_{OFF} , OFF = T_{ON})
- in M mode the undercurrent release is active
- setting of delay of the thermal release t_R 3 s, 8 s, 15 s and 20 s according to the motor starting class
- setting of the value of short-circuit release I_I in 8 steps and possibility of switching the short-circuit release off with a delay of 50 ms
- setting of I_R , t_R and I_I by means of the rotary switches is stepwise
- the overcurrent release indicates operating state and the value of the passing current by means of LED
- the values of parameters of the overcurrent release are set by the manufacturer to minimum

Data for the project

Switching unit	BH630
Overcurrent release	SE-BH-...
Overcurrent release setting	
Reduced current	I_R [A]
Mode	M
Thermal memory	T
Thermal release delay	t_R [s]
Short-circuit release current	I_I [kA]
Setting of short-circuit release	[ms]



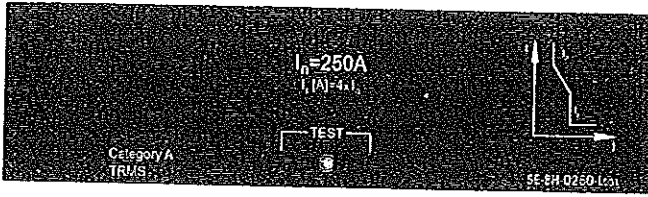
IMPORTANT

- M mode must be selected in protection of motors - the motor will be protected in phase failure
- thermal release delay t_R must correspond to the motor starting class
- in protection of motors it is suitable to set the delay of the short-circuit release at 50 ms

VERCURRENT RELEASES - L001

3P 4P

$I_n = 250\text{ A}$
BH-0250-L001

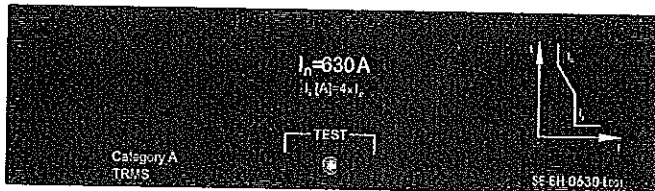


$I_n = 315\text{ A}$
BH-0315-L001

$I_n = 400\text{ A}$
BH-0400-L001

$I_n = 500\text{ A}$
BH-0500-L001

$I_n = 630\text{ A}$
BH-0630-L001

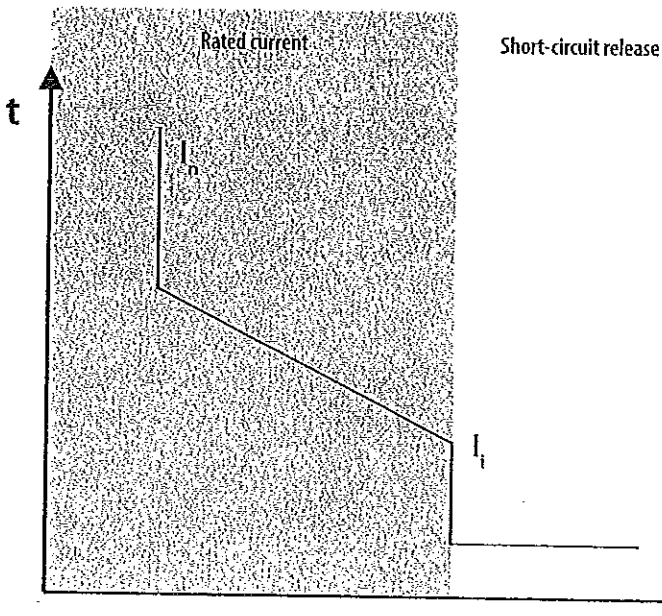


Properties

- suitable for protection of lines with low impulse currents
- protects against both overcurrent and short circuit
- reduced current cannot be set
- thermal release cannot be switched off
- short-circuit release is fixed at $4 I_n$

Data for the project

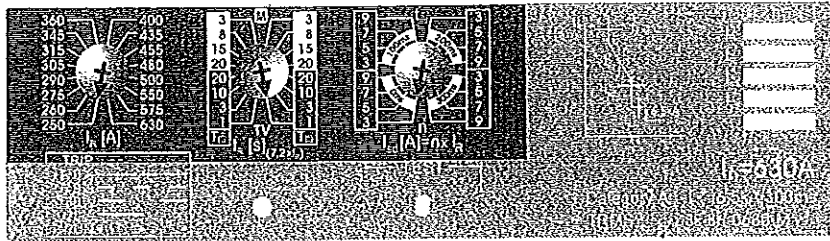
Switching unit	BH630
Overcurrent release	SE-BH
Overcurrent release values	
Rated current	I_n
Short-circuit release current	$I_1 = 4 \times I_n$



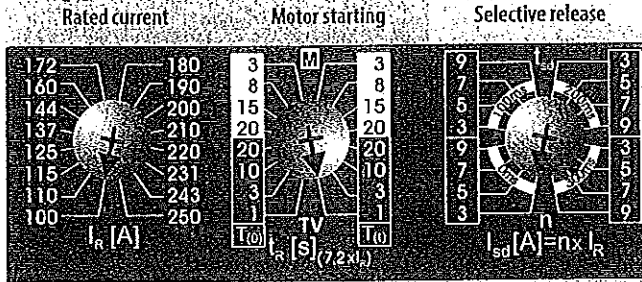
IMPORTANT

- high impulse current must not be in the circuit
- undesirable breaking would take place, because the current of the short-circuit release is fixed at $4 I_n$

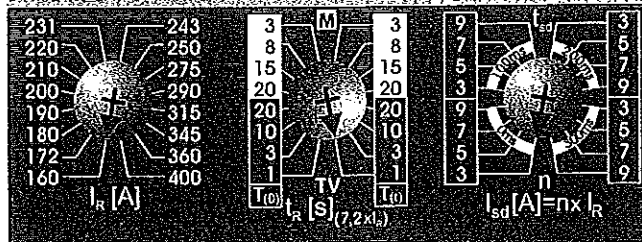
OVERCURRENT RELEASES - MTV9, TV mode



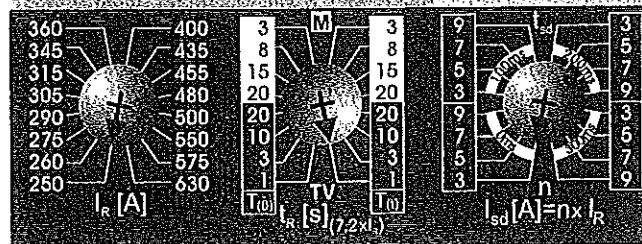
$I_n = 250 A$
SE-BH-0250-MTV9



$I_n = 400 A$
SE-BH-0400-MTV9



$I_n = 630 A$
SE-BH-0630-MTV9



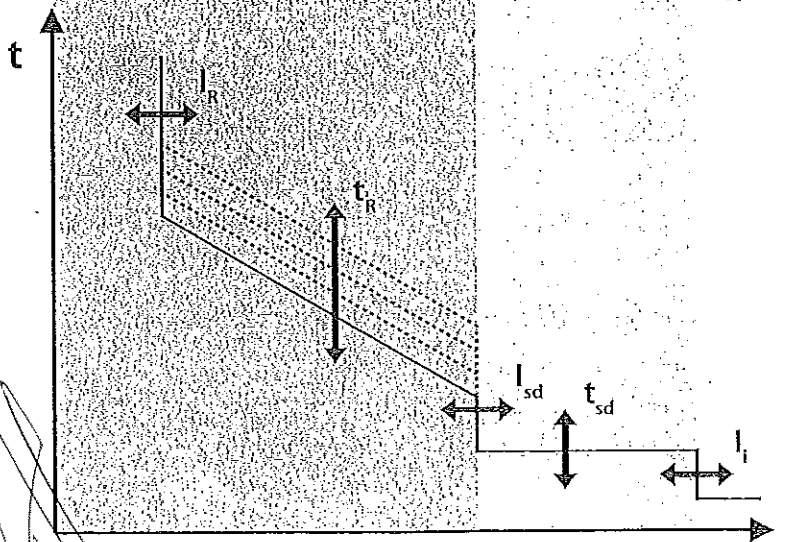
Properties

- TV mode suitable for protection of lines, distribution transformers and generators -- enables setting of time selectivity
- protects against both overcurrent and short circuit
- reduced current setting $I_R = 0.4 \div 1 I_n$
- thermal memory can be switched on/off (ON = T_{ON} , OFF = T_{OFF})
- in TV mode the undercurrent release is inactive
- setting of delay of the thermal release t_r 1 s, 3 s, 10 s and 20
- setting of the value of selective release I_{sd} in 4 steps (independent time-delayed release)
- setting of delay of the selective release t_{sd} 0 ms, 100 ms, 200 ms or 300 ms
- setting of I_R , t_r , I_{sd} and t_{sd} by means of rotary switches is stepwis
- the overcurrent release indicates operating state and the value of the passing current by means of LED
- the values of parameters of the overcurrent release are set the manufacturer to minimum

Data for the project

Switching unit	BH630
Overcurrent release	SE-BH
Overcurrent release setting	
Reduced current	I_R ... A
Mode	TV
Thermal memory	T
Thermal release delay	t_r ... s
Selective release value	I_{sd} ... A (... x I_n)
Selective release delay	t_{sd} ... ms

Short-circuit release



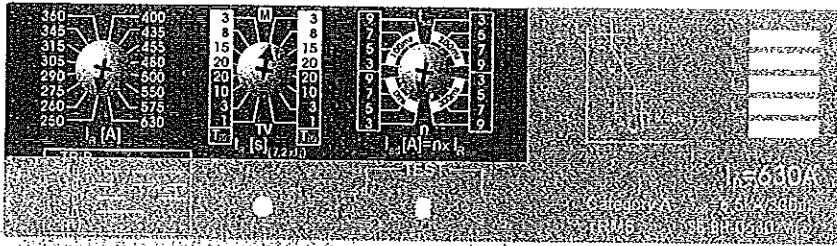
IMPORTANT

- the set value of current of the short-circuit release must correspond to the impedance loop - conditions must be fulfilled for automatic disconnection from power supply in case of failure

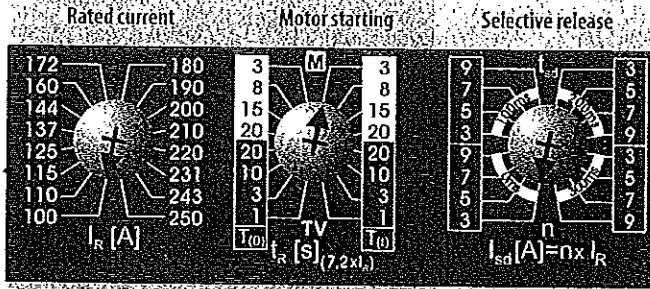
ay

OVERCURRENT RELEASES - MTV9, M mode

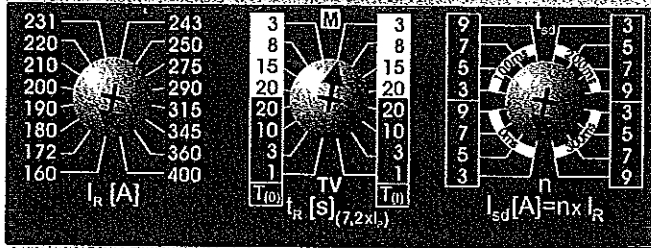
3P 4P



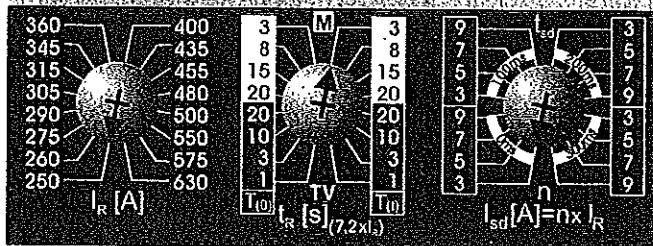
$I_n = 250\text{ A}$
SE-BH-0250-MTV9



$I_n = 400\text{ A}$
SE-BH-0400-MTV9



$I_n = 630\text{ A}$
SE-BH-0630-MTV9



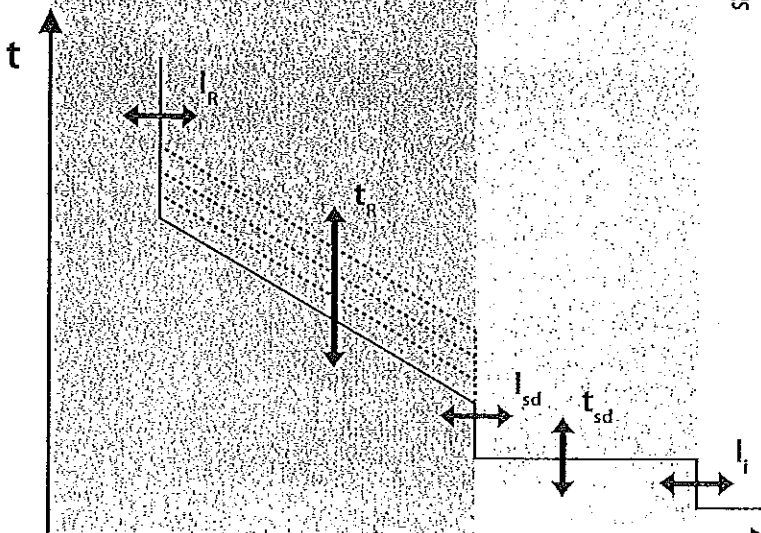
Properties

- M mode suitable for protection of motors – enables setting of time selectivity
- protects against both overcurrent and short circuit
- reduced current setting $I_r = 0.4 \div 1 I_n$
- thermal memory can be switched on/off (ON = T_{tr} , OFF = T_{tr})
- in M mode the undercurrent release is active
- setting of delay of the thermal release t_r 3 s, 8 s, 15 s and 20 s according to the motor starting class
- setting of the value of selective release I_{sd} in 4 steps (independent time-delayed release)
- setting of delay of the selective release t_{sd} 0 ms, 100 ms, 200 ms or 300 ms
- setting of I_r , t_r , I_{sd} and t_{sd} by means of rotary switches is stepwise
- the overcurrent release indicates operating state and the value of the passing current by means of LED
- the values of parameters of the overcurrent release are set by the manufacturer to minimum

Data for the project

Switching unit	BH630
Overcurrent release	SE-BH
Overcurrent release setting	
Reduced current	I_r A
Mode	M
Thermal memory	T
Thermal release delay	t_r s
Selective release value	I_{sd} A ($n \times I_r$)
Selective release delay	t_{sd} ms

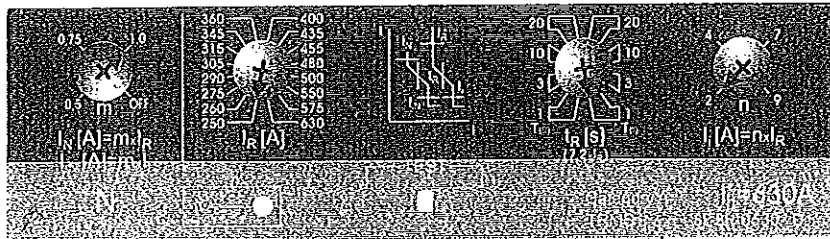
Short-circuit release



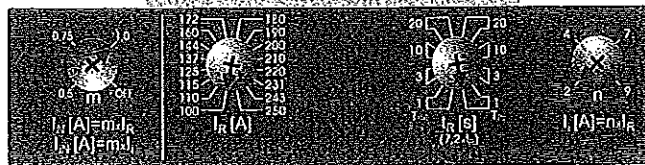
IMPORTANT

- M mode must be selected in protection of motors – the motor will be protected in phase failure
- thermal release delay t_r must correspond to the motor starting class

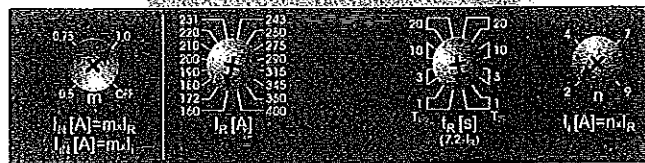
OVERCURRENT RELEASES - 4D01



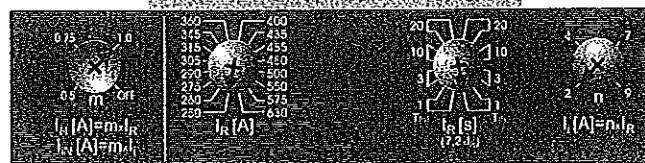
$I_n = 250$ A
SE-BH-0250-4D01



$I_n = 400$ A
SE-BH-0400-4D01



$I_n = 630$ A
SE-BH-0630-4D01

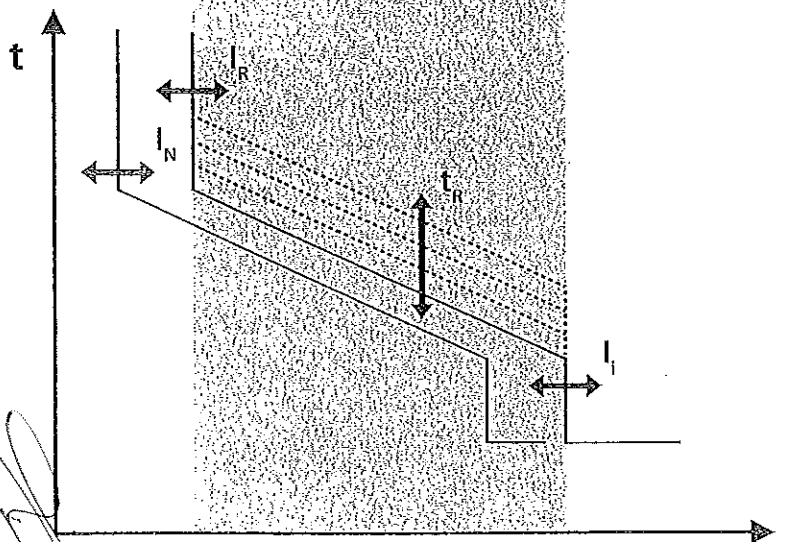


Properties

- it is appropriate for protection of lines and distribution transformers with protected „N“ conductor in TN-C-S and TN-S networks
- protects against both overcurrent and short circuit
- reduced current setting $I_R = 0.4 \div 1 I_n$
- thermal memory can be switched on/off (ON = T_{OFF} OFF = T_{ON})
- setting of delay of the thermal release t_r 1 s, 3 s, 10 s and 20
- setting of the value of the short-circuit release I_1 in 4 steps (2 ÷ 9) I_n
- setting of the value of reduced current I_R and short-circuit current I_1 in the 4th pole
- setting of I_R , t_r , I_n and I_1 by means of rotary switches is stepwis
- the overcurrent release indicates operating state and the value of the passing current by means of LED
- the values of parameters of the overcurrent release are set the manufacturer to minimum

Data for the project

Switching unit	BH630
Overcurrent release	SE-BH
Overcurrent release setting	
Reduced current	I_R A
Thermal memory	T
Thermal release delay	t_r s
Level of reduced current in the 4th pole	I_R A (x I_n)
Level of reduced current in the 4th pole	I_1 A (x I_n)



IMPORTANT

- the set value of current of the short-circuit release must correspond to the impedance loop - conditions must be fulfilled for automatic disconnection from power supply in case of failure

MITCHES



Simple



Double



Make-and-break



Double make-and-break



Early



Cavities in BH630... switching unit

Specifications

TYPE		PS-BHD-100	PS-BHD-100(-Au) ¹⁾
Rated operating voltage	U_e	60 ÷ 500 V a.c.	5 ÷ 60 V a.c.
	U_c	60 ÷ 500 V d.c.	5 ÷ 60 V d.c.
Rated insulation voltage	U_i	500 V	500 V
Rated frequency	f_n	50/60 Hz	50/60 Hz
Rated operating current	I_n / I_c AC-15	6 A/240 V, 4 A/400 V, 2 A/500 V	AC-12, DC-12 0.004 ÷ 0.5 A/5 V,
	I_n / I_c DC-13	0.4 A/240 V, 0.3 A/400 V, 0.2 A/500 V	0.004 ÷ 0.01/60 V
Thermal current	I_{th}	10 A	0.5 A
Arrangement of contacts		01, 10, 02, 11, 20	01, 10, 02, 11, 20
Connection cross-section	S	0.5 ÷ 1 mm ²	0.5 ÷ 1 mm ²
Degree of protection of terminals (connected switch)		IP20	IP20

Type		SP-BHD-0002	PS-BHD-0010/0020	PS-BHD-0010(-Au)/0020(-Au)
Rated operating voltage	U_e	250 V a.c.	60 ÷ 250 V a.c.	5 ÷ 60 V a.c.
	U_c	-	60 ÷ 250 V d.c.	5 ÷ 60 V d.c.
Rated insulation voltage	U_i	250 V	250 V	250 V
Rated frequency	f_n	50/60 Hz	50/60 Hz	50/60 Hz
Rated operating current	I_n / I_c AC-15	1 A/250 V a.c.	AC-15 1.5 A/250 V a.c.	AC-12, DC-12 0.004 ÷ 0.5 A/5 V,
	I_n / I_c DC-13	-	DC-13 0.2 A/250 V d.c.	0.004 ÷ 0.01/60 V
Thermal current	I_{th}	-	6 A	0.5 A
Arrangement of contacts		02, 11, 20	001/002	001/002
Connection cross-section	S	0.5 ÷ 1 mm ²	0.5 ÷ 1 mm ²	0.5 ÷ 1 mm ²
Degree of protection of terminals (connected switch)		IP20	IP20	IP20

¹⁾ - PS-BHD-...-Au is not suitable to control electromagnetic loads

Type designation, number and type of contacts according to contact arrangement

Arrangement of contacts	Type	Number of contacts	Contact types
01	PS-BHD-1000 (-Au)	1	make
20	PS-BHD-2000 (-Au)	2	make
01	PS-BHD-0100 (-Au)	1	break
02	PS-BHD-0200 (-Au)	2	break
11	PS-BHD-1100 (-Au)	1+1	break+make
001	PS-BHD-0010 (-Au)	1	make-and-break
002	PS-BHD-0020 (-Au)	2	make-and-break

Function and names of switches according to their location in cavities

Position of switch	Switch name	Switch function
Cavity 1	Signal	signals tripping of circuit breaker by overcurrent release
Cavity 2	Relative	signals tripping of circuit breaker/switch-disconnector by releases, TEST push button or by switch off button on the motor drive
Cavity 3, 4, 5 (6, 7, 8, 9) ^{a)}	Auxiliary	signals position of circuit breaker/switch-disconnector's main contacts
Cavity 10	Early	makes/breaks in advance before making the main contact of circuit breaker/switch-disconnector

^{a)} - cavities 6, 7, 8, 9 are only for 4-pole design

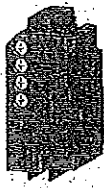
Positions of switches in the circuit breaker cavities

Circuit breaker lever position	State of the main contacts	Circuit breaker position														
		PS-BHD-1000	PS-BHD-0100	PS-BHD-1000	PS-BHD-0100	PS-BHD-1000	PS-BHD-0100	SP-BHD-0002	SP-BHD-X-0001	PS-BHD-2000	PS-BHD-1100	PS-BHD-0200	PS-BHD-0010	PS-BHD-0010	PS-BHD-0010	
Switched on	⏏	1	1	0	0	1	1	0	1	0	1	1	0	0	1	0
Switched off manually or by motor drive (loaded state)	⏏	0	1	0	0	1	0	1	0	0	1	0	1	1	1	0
Switched off by overcurrent release	⏏	0	0	1	1	0	0	1	0	1	0	1	1	0	1	0
Switched off from switched on state: by auxiliary release, or by TEST push button or by the switch off button on the motor drive	⏏	0	1	0	1	0	0	1	0	0	1	0	1	1	1	0

- contact open, 1 - contact closed

^{a)} - cavities 6, 7, 8, 9 are only for 4-pole design

SHUNT TRIPS



Cavities in BH630... switching unit

Specifications

Type		SV-BHD-X
Rated operating voltage	U_e	24, 40, 48, 110, 230, 400, 500 V a.c. 24, 40, 48, 110, 220 V d.c.
Rated frequency	f_n	50/60 Hz
Input power at 1.1 U_e	AC DC	< 3 VA < 3 W
Characteristic		$U \geq 0.7 U_e$, the circuit breaker must trip
Time to switching off		20 ms
Loading time		∞
Connection cross-section	S	$0.5 \pm 1 \text{ mm}^2$
Degree of protection of terminals (connected release)		IP20
Position in cavity No.		10

Type designation according to rated operating voltage

U_e	Type
24, 40, 48 V a.c./d.c.	SV-BHD-X024
110 V a.c./d.c.	SV-BHD-X110
230, 400, 500 V a.c./220 V d.c.	SV-BHD-X230

The specific rated operating voltage of the release is set up by jumpers directly on the release. It is always set to the maximum value by default (see fig. 1).

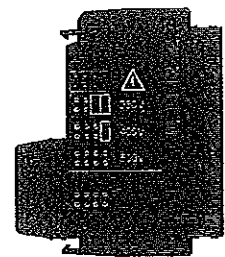
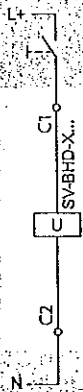
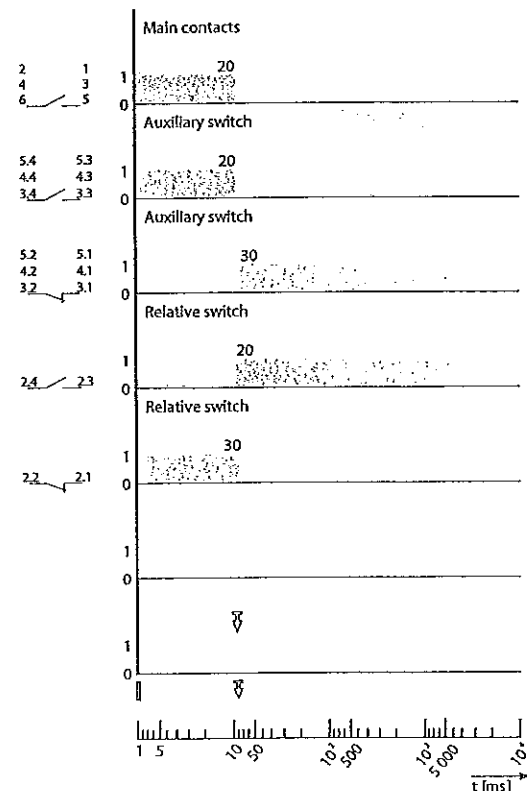


Fig. 1 - The rated operating voltage setting



Circuit breaker/switch-disconnector switching off by shunt trip



States and positions of circuit breaker/switch-disconnector lever

States of circuit breaker/switch-disconnector	Position of circuit breaker/switch-disconnector lever
Switched on	↑
Switched off by releases, TEST or by switch off button of the motor drive	↙
Switched off manually or by motor drive electrically (loaded state)	○

Switched on

Switched off by releases, TEST or by switch off button of the motor drive

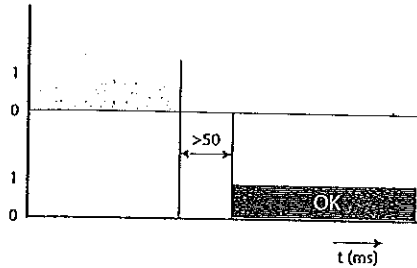
Switched off manually or by motor drive electrically (loaded state)

IUNT TRIPS

Specifications

Operation time of the auxiliary releases

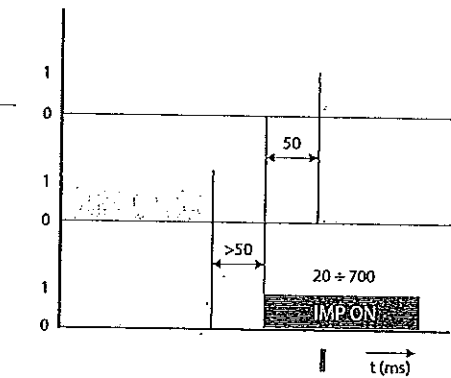
Shunt trip



Coordination of motor drive and shunt trip

It is necessary to keep time delay when the control of the circuit breaker is by motor drive and shunt trip or undervoltage release. The following delays have to be kept between the disconnection of voltage from the shunt trip or bringing the voltage to the undervoltage release and the control pulse for switch on of the motor drive:

Shunt trip



States and positions of circuit breaker/switch-disconnector lever

Operational	Tripped position (ready for further handling)
Switch-disconnector	Breaker/switch-disconnector
Switched on	II
Switched off by releases, TEST or by switch off on the motor drive	⏏
Switched off manually or by motor drive (loaded state)	⊙

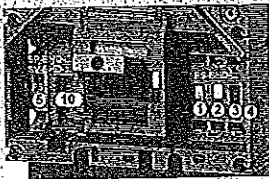
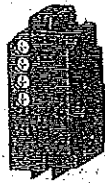
Description of graphs

Symbol	Description
HK	Main contacts
OK	Circuit breaker is ready for further handling
IMP ON	Make impulse for the motor drive
SV	Control voltage on the shunt trip
SP	Control voltage on the undervoltage release

[Handwritten signature]

[Handwritten signature]

UNDervOLTAGE RELEASES



Cavities in BH630... switching unit

Specifications

Type		SP-BHD-X...	SP-BHD-X...-0001 ¹⁾
Rated operating voltage	U_e	24, 40, 48, 110, 230, 400, 500 V a.c. 24, 40, 48, 110, 220 V d.c.	24, 40, 48, 110, 230, 400, 500 24, 40, 48, 110, 220 V d.c.
Rated frequency	f_n	50/60 Hz	50/60 Hz
Input power at 1.1 U_e	AC DC	< 3 VA < 3 W	< 3 VA < 3 W
Characteristic ²⁾		$U \geq 0.85 U_e$ - it is possible to switch on the circuit breaker $U \leq 0.35 U_e$ - the circuit breaker must trip	
Time to switching off		20 ms	20 ms
Loading time		∞	∞
Connection cross-section	S	$0.5 \div 1 \text{ mm}^2$	$0.5 \div 1 \text{ mm}^2$
Degree of protection of terminals (connected release)		IP20	IP20
Position in cavity No.		10	10

Early switch			
Rated operating voltage	U_e	-	250 V a.c.
Rated frequency	f_n	-	50/60 Hz
Rated operating current	I_n / U_e	-	1 A/250 V a.c.
Arrangement of contacts		-	10, 01
Connection cross-section	S	-	$0.5 \div 1 \text{ mm}^2$
Degree of protection of terminals (connected switch)		-	IP20

¹⁾ - tripping of the undervoltage release can be delayed using the delay unit BZ-BX-X230-A, for more detailed information see page 34
²⁾ - cannot be used in combination with motor drive MP-BH-X....

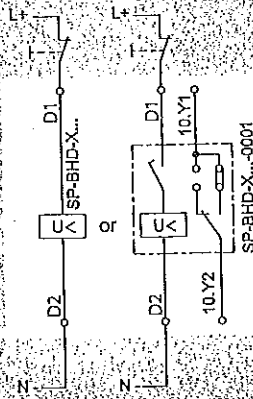
Number and type of contacts according to contact arrangement

Arrangement of contacts	Number of contacts	Contact type
01	1	break
10	1	make

Type designation according to rated operating voltage

Rated operating voltage	Type
24, 40, 48 V a.c.	SP-BH
110 V a.c./d.c.	SP-BF
230, 400, 500 a.c./220 V d.c.	SP-BF

The specific rated operating voltage release is set up by jumpers directly on the PCB. It is always set to the maximum value (see fig. 1).



Circuit breaker/switch-disconnector switching off by shunt trip

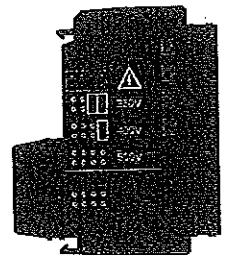
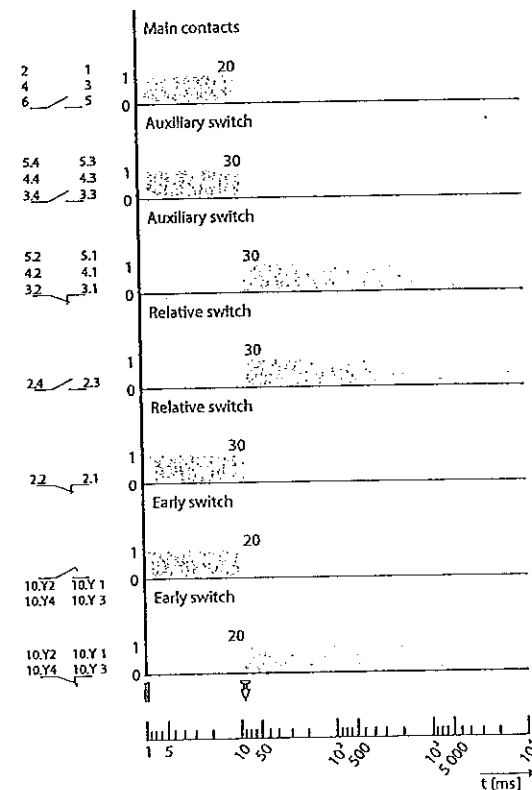


Fig. 1 - The rated operating voltage

States and positions of circuit breaker/switch-disconnector lever



Switched on

Switched off by releases, TEST or by switch-off button on the motor drive

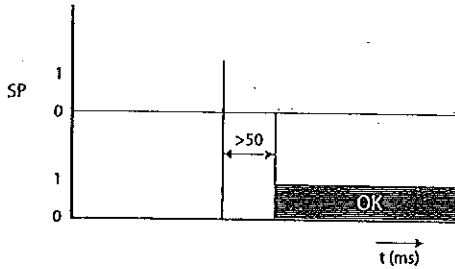
Switched off manually or by motor drive electrically (loaded state)

UNDERVOLTAGE RELEASES

Specifications

Reaction time of the auxiliary releases

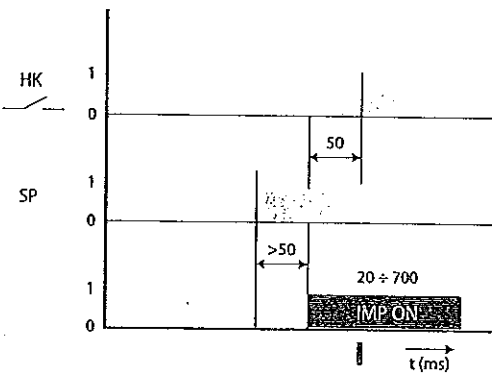
Undervoltage release



Cooperation of motor drive and undervoltage release

It is necessary to keep time delay when the control of the circuit breaker is done by motor drive and shunt trip or undervoltage release. The following time delays have to be kept between the disconnection of voltage from the shunt trip or bringing the voltage to the undervoltage release and the control impulse for switch on of the motor drive:

Undervoltage release



States and positions of circuit breaker/switch-disconnector lever

States of circuit breaker/switch-disconnector	Position of circuit breaker/switch-disconnector
Switched on	
Switched off by releases, TEST or by switch off button on the motor drive	
Switched off manually or by motor drive electrically (loaded state)	

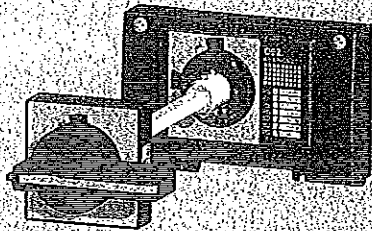
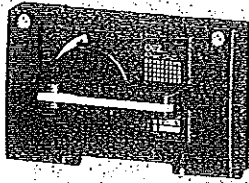
Description of graphs

Symbol	Description
HK	Main contacts
OK	Circuit breaker is ready for further handling
IMP ON	Make impulse for the motor drive
SV	Control voltage on the shunt trip
SP	Control voltage on the undervoltage release

[Handwritten signatures and marks]

F63

HAND DRIVES



Description

The hand drive permits controlling the circuit breaker /switch-disconnector by turning the lever, e.g. to switch machines on and off. Modular conception of the drives enables simple mounting on the switching unit (also additionally) after the cover of cavities is removed. The fixed drive can be sealed. The drive and its accessories are ordered separately according to your choice, see page F12.

■ The hand drive makes possible to control the circuit breaker:

- a) from the front panel (fig. 1)
Hand drive unit RP-BH-CK.,
+ Hand drive lever RP-BHD-CP.

- b) through the switchboard door (fig. 2)
Hand drive unit RP-BH-CK.,
+ Extension shaft RP-BHD-CH.,
+ Hand drive bearing PR-BHD-CN.,
+ Hand drive lever + RP-BHD-CP.

- The hand drive unit is fixed directly to switching unit of the circuit breaker.
- The hand drive bearing is fixed to the switchboard door and it provides degree of protection IP40 or IP66.
- Hand drive lever is fixed on the hand drive unit or on the hand drive bearing.
- The extension shaft is supplied in two options, standard (length 365 mm - can be shortened) and telescopic (adjustable length 245 ÷ 410 mm).

Enhanced safety for operator:

- The hand drive unit and hand drive lever are also supplied with the possibility to lock the circuit breaker in position „switched off manually“. The unit and lever of the hand drive can be locked using three padlocks with shank diameter max. 6 mm.
- Each hand drive bearing prevents the door from opening when the circuit breaker is switched on or in a state of being switched off by releases and in the circuit breaker state „switched off manually“ and hand drive lever is locked up.
- Two circuit breakers with hand drives can be fitted also with reciprocal mechanical interlocking or mechanical parallel switching, see page F65.

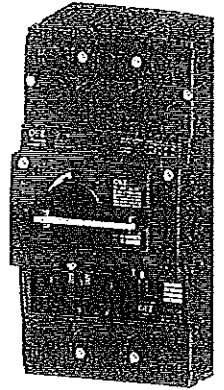


Fig. 1 - DIMENSIONS see page

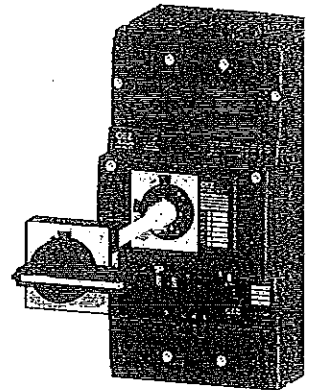
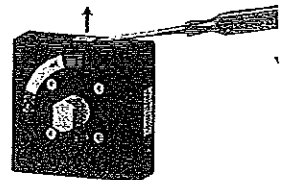


Fig. 2 - DIMENSIONS see page

By a screwdriver it is possible to unlock the mechanism blocking the switchboard door opening with the circuit breaker switched on (for bearing RP-BHD-CN40 and RP-BHD-CN41



Specifications

Type	Description	Color	Locking with the drive	Degrees of protection	switched on	switched off manually and locked	switchboard door opening with the circuit breakers switched on	Length (mm)
RP-BH-CK10	Hand drive unit	blue	no	-	-	-	-	-
RP-BH-CK20	Hand drive unit	blue	yes	-	-	-	-	-
RP-BH-CK21	Hand drive unit	yellow	yes	-	-	-	-	-
RP-BH-CK30	Hand drive unit - right side	blue	-	-	-	-	-	-
RP-BH-CK31	Hand drive unit - left side	blue	-	-	-	-	-	-
RP-BHD-CP10	Hand drive lever	black	no	-	-	-	-	-
RP-BHD-CP20	Hand drive lever	black	yes	-	-	-	-	-
RP-BHD-CP21	Hand drive lever	red	yes	-	-	-	-	-
RP-BHD-CN40	Hand drive bearing	black	-	IP40	yes	yes	yes	-
RP-BHD-CN41	Hand drive bearing	yellow	-	IP40	yes	yes	yes	-
RP-BHD-CN60	Hand drive bearing	black	-	IP66	yes	yes	no	-
RP-BHD-CN61	Hand drive bearing	yellow	-	IP66	yes	yes	no	-
RP-BHD-CH10	Extension shaft	-	-	-	-	-	-	365 (can be shortened)
RP-BHD-CH20	Extension shaft - telescopic	-	-	-	-	-	-	245 ÷ 410

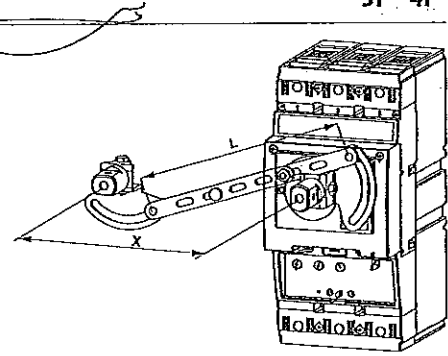
MECHANICAL INTERLOCKING AND PARALLEL SWITCHING



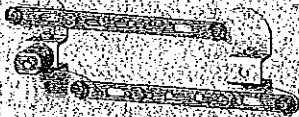
RP-BHD-CB10 Mechanical interlocking

Provides mechanical interlocking of two circuit breakers/switch-disconnectors so that they cannot both be tripped simultaneously, but only one of them at a time. Both circuit breakers may be switched off simultaneously. Interlocking can be used between two BH630 circuit breakers or between BH630 and BD250 circuit breakers. Both circuit breakers must be equipped with a hand drive (at least one with a hand drive unit and hand drive lever), see page F63.

In order to use the interlocking, it is absolutely necessary to comply with the dimensions that are shown in the figure and given in the table.

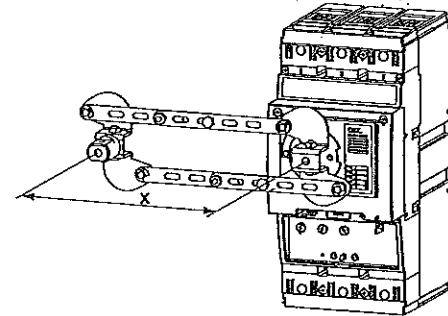


Dimension (mm)		Right switching unit							
		BD250		BD250.4		BH630		BH630.4	
Left switching unit	BD250.3..	105	112	140	145.5	122.5	128.5	181	185.5
	BD250.4..	105	112	140	145.5	122.5	128.5	181	185.5
	BH630.3..	122.5	128.5	157.5	162.5	140	145.5	185	189
	BH630.4..	122.5	128.5	157.5	162.5	140	145.5	185	189



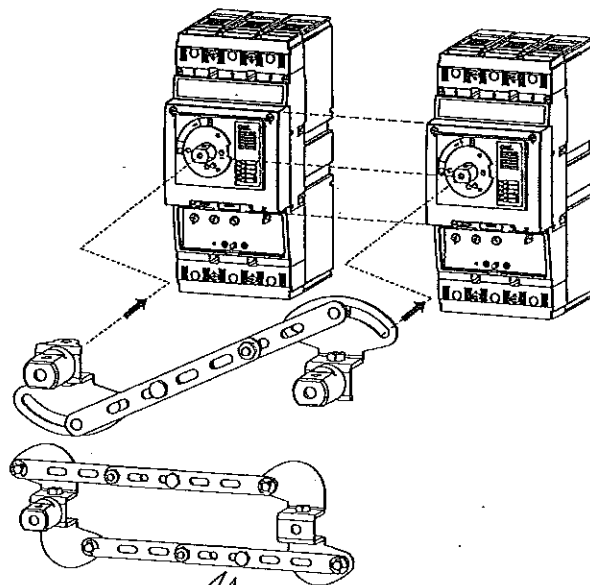
RP-BHD-CD10 Mechanical parallel switching

Enables for simultaneous switching of two circuit breakers/switch-disconnectors. Parallel switching can be used between two BH630(1) circuit breakers or between BH630 and BD250 circuit breakers. Both circuit breakers must be equipped with a hand drive unit and at least one with a hand drive lever, see page F63. In order to use parallel switching, it is absolutely necessary to comply with the dimensions that are shown in the figure and given in the table.

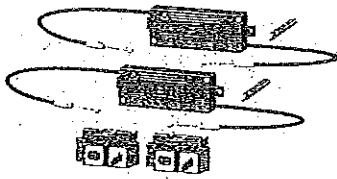


Dimension (mm)		Right switching unit							
		BD250		BD250.4		BH630		BH630.4	
Left switching unit	BD250.3..	105 ^{*)}	164.5 ^{*)}	122.5 ^{*)}	164.5 ^{*)}	122.5 ^{*)}	164.5 ^{*)}	x	x
	BD250.4..	105 ^{*)}	164.5 ^{*)}	122.5 ^{*)}	164.5 ^{*)}	122.5 ^{*)}	164.5 ^{*)}	x	x
	BH630.3..	122.5 ^{*)}	164.5 ^{*)}	140 ^{*)}	164.5 ^{*)}	140 ^{*)}	164.5 ^{*)}	x	x
	BH630.4..	122.5 ^{*)}	164.5 ^{*)}	140 ^{*)}	164.5 ^{*)}	140 ^{*)}	164.5 ^{*)}	x	x

^{*)} - Switching unit BH630.4.. (4-pole design) can only be on the left side



MECHANICAL INTERLOCKING



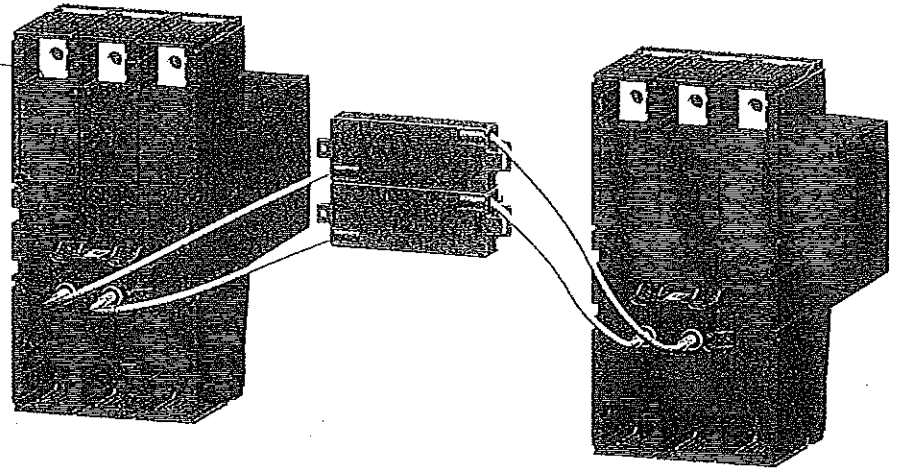
Mechanical interlocking

MB-BH-PV04

MB-BHD-PV03

- Provides mechanical interlocking of two circuit breakers/switch-disconnectors so that they cannot both be tripped simultaneously, but only one of them at a time. Both circuit breakers may be switched off simultaneously.
- Mechanical interlocking MB-BH-PV04 is intended for two BH630 circuit breakers. Interlocking MB-BHD-PV03 is intended for one BH630 circuit breaker and one BD250.
- Circuit breakers may be in fixed, plug-in and withdrawable designs.

Type of circuit breakers	BH630	BD250
	BH630	BH630
Type of mechanical interlocking	MB-BH-PV04	MB-BHD-PV03



Circuit breaker placement in switchboard

Detailed information can be found in the instructions for use, which you may download from our website www.oez.com.

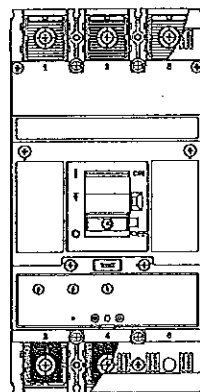
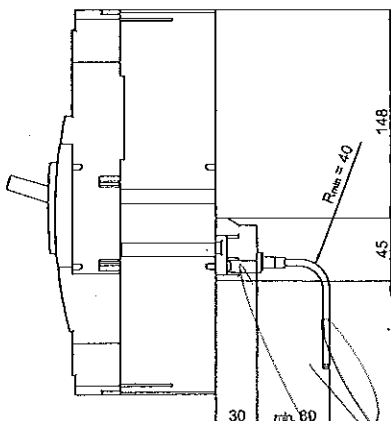
Recommended circuit breaker manipulation

During the manipulation with circuit breaker with mechanical interlocking and motor drive, the circuit breaker may reach the state, in which the first attempt at switching on by motor drive is unsuccessful. Switching on is executed after repeated make impulse. To avoid this effect, some of the following steps may be done:

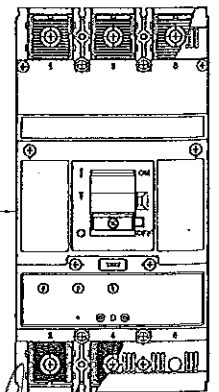
- 1) To keep the process of manipulation with the circuit breaker, see „Recommended circuit breaker manipulation“ below
- 2) To connect OD-BHD-R... control relay into the motor drive circuit according to wiring diagram, see page F72

Recommended process of manipulation

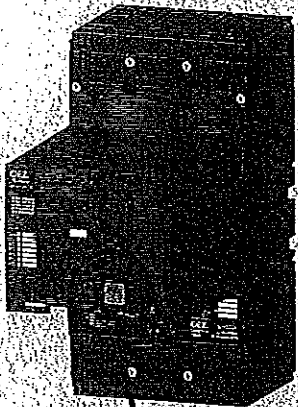
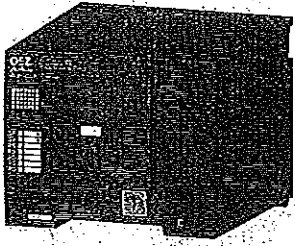
- 1) Shunt trip/undervoltage release must be used to switch off the circuit breaker. Circuit breaker switching off cannot be made by motor drive
- 2) Circuit breaker can be stored and switched on only if the second circuit breaker is in switch-off mode. Circuit breaker status indicator on motor drive is in „0“ position. Between storing and switching on the circuit breaker, it is necessary to keep the time interval min. 100 ms. Switch „S“ must be disconnected.
- 3) In case of infringement of these principles, the first switching on of circuit breaker is unsuccessful.



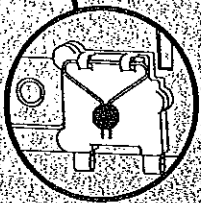
0-700



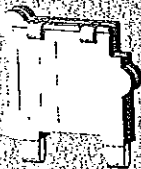
MOTOR DRIVES



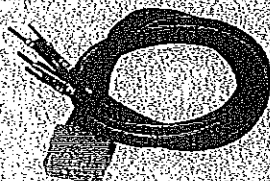
DIMENSIONS; see page F29



Cover of switch on button OD-BHD-KT01



Connecting cable OD-BHD-KA02



Description

- It is used for remote control of the circuit breaker (switch OFF/ON).
- Simple mounting on the circuit breaker after the circuit breaker cover or cavities is removed.
- Usage in industrial applications e.g. switching of stand by units etc. or wherever the automatic operation of electric devices is needed.
- In order to speed up the circuit breaker's switch off (e.g. safety STOP button) the undervoltage release or shunt trip can be used.
- On the motor drive front panel there is a change-over switch to select the drive modes AUTO/MANUAL:
 - AUTO mode – remote control. The circuit breaker is controlled by buttons for remote switch off/on, furthermore in this position mechanical control can be used on the front panel of the motor drive
 - MANUAL mode – manual control. Control voltage is not needed. The circuit breaker can be switched on using the green switch on button and switched off using the red switch off button on the front part of the drive cover. Electric switch on is blocked. Electric switch off is functional. The accumulation of energy can be done by means of hinged lever.
- Possibility to indicate remotely the state of the AUTO/MANUAL switch.
- Switch S (external switch -- has to be bought separately) enables the choice of automatic accumulation of energy (circuit breaker loading).
 - automatic accumulation of energy is on (S switch switched on): after tripping of the circuit breaker by the overcurrent release, by auxiliary release, or by TEST push button or by the switch off button on the motor drive motor drive immediately accumulates energy (circuit breaker loading), motor drive is then ready to switch on the circuit breaker

- automatic accumulation of energy is switched off (S switch open): after tripping of the circuit breaker by the overcurrent release, by auxiliary release, or by TEST push button or by the switch off button on the motor drive both motor drive and circuit breaker stay in position „switched off by releases“. In this position motor drive waits for the impulse from switch S. When the impulse is brought in the motor drive accumulates energy (turn on the circuit breaker) and after this loading the motor drive is ready to switch on the circuit breaker. It is not possible to switch on the circuit breaker when motor drive is not loaded

- Front panel state indicating device of the stored energy signals the state of motor drive storage devices. The state can be signalled from a distance.
- The drive may be furnished with an electromechanical counter of cycles:
 - internal design on the motor drive cover
 - external design OD-BHD-PP01 for mounting on the switchboard's door or inside the switchboard by means of metal holder, that is part of the delivery
- Motor drive can be sealed by means of bolt sealing insert (OD-BH-VP01).
- Drive can be locked in off position by up to three padlocks (shank diameter max. 4.3 mm).
- Switch on button can be covered and sealed (OD-BHD-KT01).
- Drive is connected by multi-pole connector with cavities (in order to connect cables special tongs have to be used).
- Drive can be furnished with cable (OD-BHD-KA02) that has on one side connector to the motor drive and on the other side free terminals for connection to etc. switchboard's terminal block.

Specifications

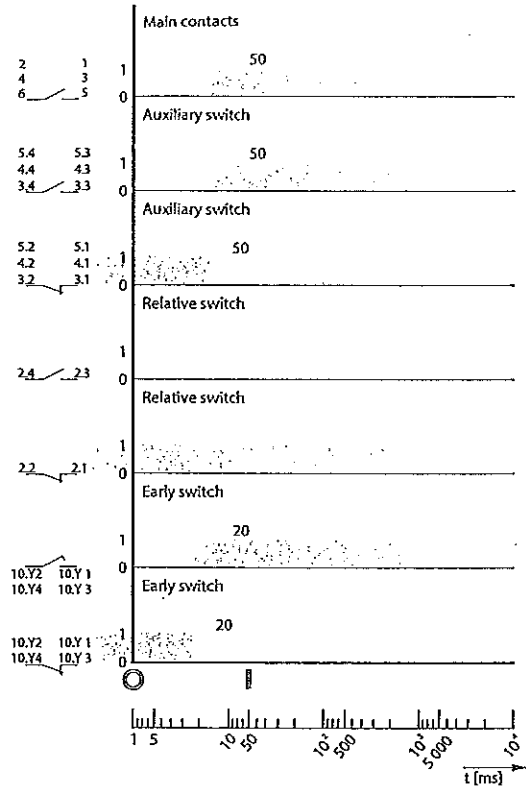
Type	MP-BH-X	MP-BH-X	P
Operating voltage	U _i	24, 48, 110, 230 V a.c. 24, 48, 110, 220 V d.c.	
Rated frequency	f _r	50/60 Hz	
Control impulse length for storage		400 ms ÷ ∞ ¹⁾	
Control impulse length for switching on for switching off		20 ÷ 700 ms ¹⁾ 400 ms ÷ ∞ ¹⁾	
Time to switching on		< 60 ms	
Time to switching off		900 ms	
Frequency of cycles ON/OFF		3 cycles/min	
Frequency of cycles - instant successive ON/OFF		10 cycles	
Mechanical endurance		20 000 cycles	
Input power	AC DC	100 VA 100 W	
Protection	24, 48, 110 V a.c.; 230 V a.c. 24, 48, 110 V d.c.; 220 V d.c.	LPN-4C-1; LPN-2C-1 LPN-DC-4C-1; LPN-DC-2C-1	
Rated operating current of the change-over switch AUTO/MANUAL	I _U	5 A/250 V a.c. 0.5 A/250 V d.c.	
Type		OD-BHD-KA02	
Number of conductors		12	
Conductor cross-section	S	0.35 mm ²	
Conductor lengths		0.6 m	

¹⁾ - for sequence of control impulses, see page F70

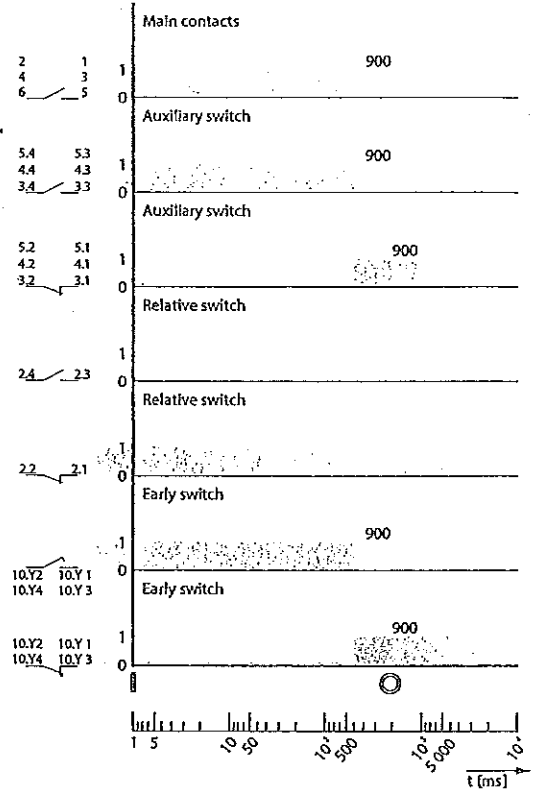
MOTOR DRIVES

Specifications

Circuit breaker switching on by motor drive - electrically by ON push button

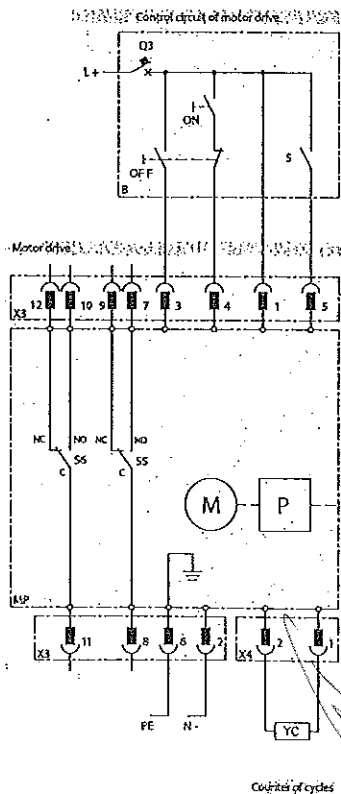


Circuit breaker switching off by motor drive - electrically by OFF push button



Diagram

Circuit breaker switching on and off by motor drive - electrically by ON and OFF push button



States and positions of circuit breaker/switch-disconnector lever

States and positions of circuit breaker/switch-disconnector lever	lever position
Switched on	↑
Switched off by releases, TEST or by switch off button on the motor drive	↓
Switched off manually or by motor drive electrically (loaded state)	○

Wiring diagram description

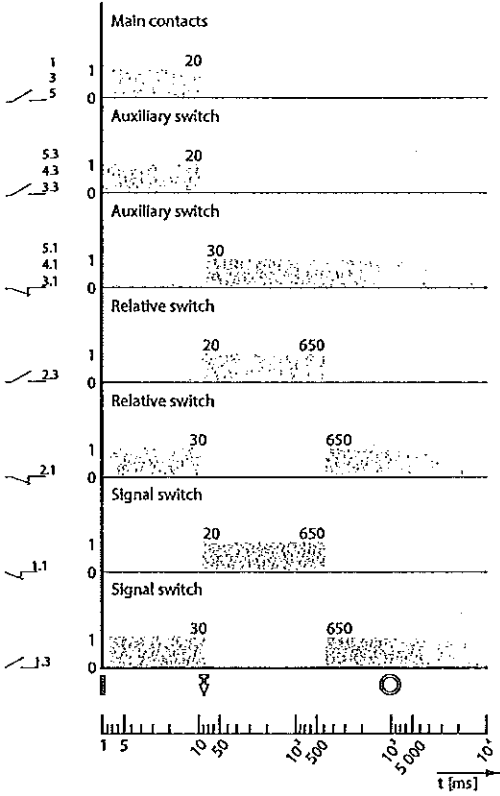
Symbol	Description
MP	motor drive MP-BH-X...
M	motor
P	storage device
X3	connector for connection of control circuits
X4	connector for external counter of cycles
S5	switch to indicate AUTO (NO-C)/MANUAL modes (NC-C)
S6	switch to indicate full storage (ready to switch on: NO-C)
YC	external counter of cycles OD-BH0-PP01
B	recommended wiring of the control circuits (not included in motor drive order)
ON	switch on button
OFF	switch off button
S	switch for energy storage (switched on = automatic storage, may be continuously switched on)
Q3	motor drive circuit breaker - see page F66

OTOR DRIVES

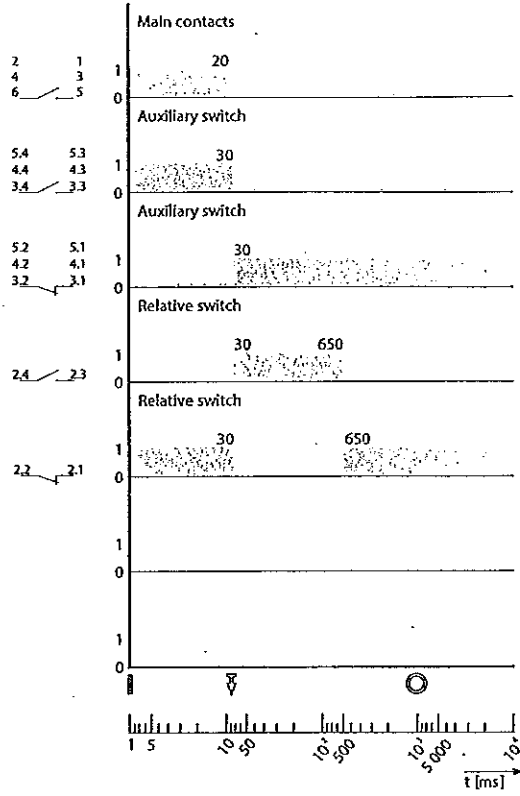
3P 4P

Specifications

Switching off of the circuit breaker with motor drive by overcurrent release with switch in switched on state-automatic storage

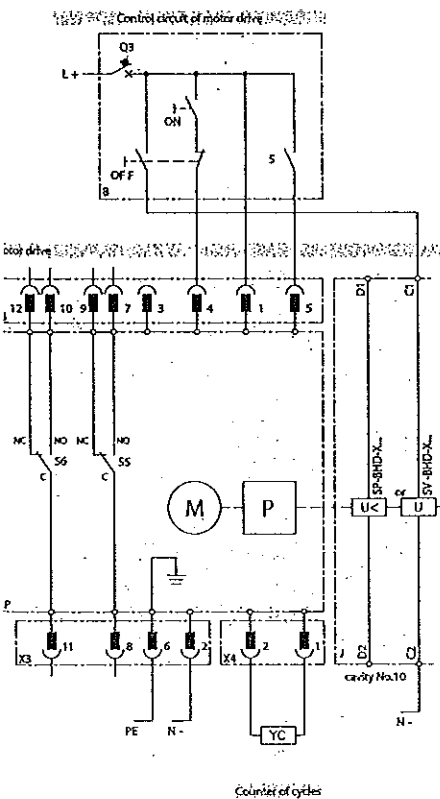


Switching off of the circuit breaker with motor drive by shunt trip or undervoltage release (switch S in switched on state-automatic storage)

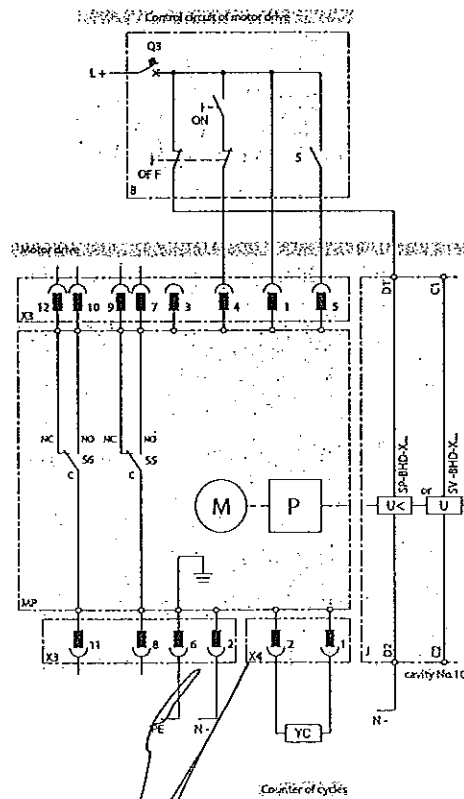


Diagram

Circuit breaker switching on by motor drive (electrically by ON push button) and tripping by shunt trip



Circuit breaker switching on by motor drive (electrically by ON push button) and tripping by undervoltage release



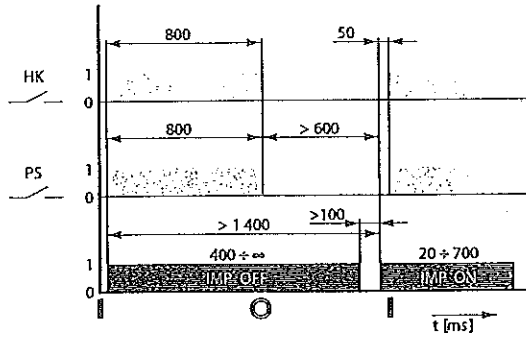
MOTOR DRIVE

Specifications

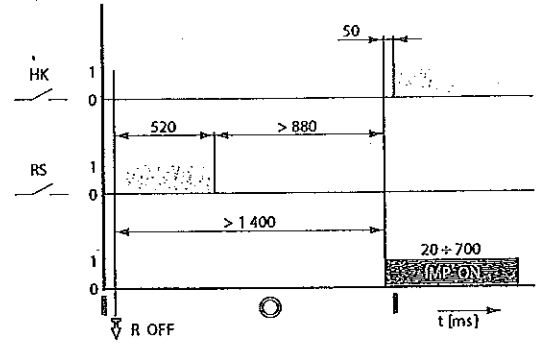
Recommended control impulses

Circuit breaker switching on and off by motor drive

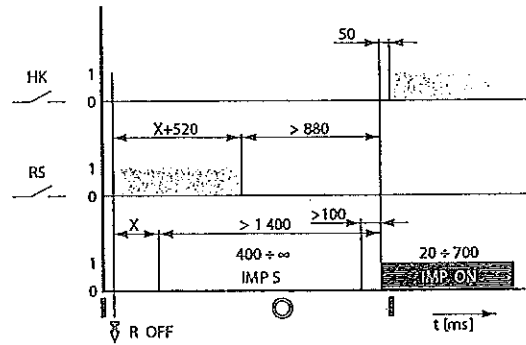
- S switch permanently switched on (automatic storage) or open



Circuit breaker switching off by overcurrent or auxiliary release and switching on by motor drive - S switch permanently switched on (automatic storage)



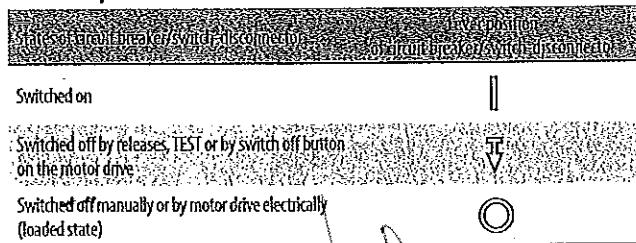
Circuit breaker switching off by overcurrent or auxiliary release and switching on by motor drive - S switch switched on only for storing up



Description of graphs

Symbol	Description
HK	main contacts
PS	auxiliary switch
RS	relative switch
R OFF	circuit breaker closing instant by release of circuit breaker
IMP S	impulse to store up motor drive energy (generated by S switch)
IMP ON	make impulse for the motor drive
IMP OFF	break impulse for the motor drive
X	random segment of time

States and positions of circuit breaker/switch-disconnector lever



MOTOR DRIVES

gram

- Recommended wiring diagram of connecting the circuit breaker
- Control circuits in withdrawable/plug-in design with motor drive
- Connecting with control relays
- Rating voltage U_e 24 V a.c./d.c., 48 V a.c./d.c., 110 ÷ 230 V a.c., 110 V d.c.
- Switching off by motor drive

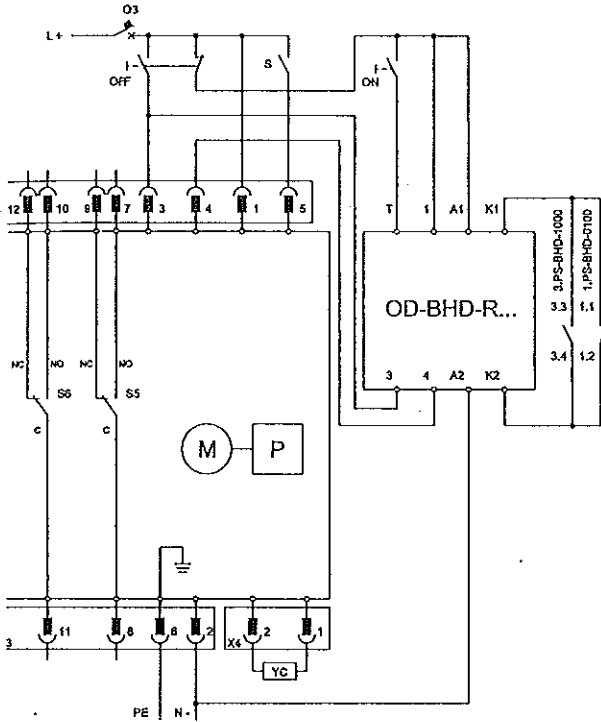


Diagram description

Symbol	Description
MP	motor drive - U _e of drive must be the same as U _e of control relay
M	motor
P	storage device
X3	connector for connection of control circuits
X4	connector for external counter of cycles
S6	switch to indicate AUTO (NO-C) / MANUAL modes
YC	external counter of cycles OD-BHD-PP01 (not included in motor drive order)
OFF	switch off button
S	switch for energy storage
Q3	motor drive circuit breaker for 24 V a.c. LPN-4C-1 for 48 V a.c. LPN-4C-1 for 110 V a.c. LPN-4C-1 for 230 V a.c. LPN-2C-1 for 24 V d.c. LPN-DC-4C-1 for 48 V d.c. LPN-DC-4C-1 for 110 V d.c. LPN-DC-4C-1
OD-BHD-R...	control relay for 24 V a.c./d.c. OD-BHD-RX01 for 48 V a.c./d.c. OD-BHD-RX02 for 110 ÷ 230 V a.c. OD-BHD-RA03 for 110 V d.c. OD-BHD-RD04
3.PS-BHD-1000	auxiliary switch
1.PS-BHD-0100	signal switch

- Impulse on T terminal reacts to trailing edge

Handwritten signature

Handwritten signature

MOTOR DRIVES

Diagram

Recommended wiring diagram of connecting the circuit breakers control circuits with mechanical interlocking and motor drive (applicable for any circuit breaker)

- connecting with control relays
- operating voltage U_c 24 V a.c./d.c., 48 V a.c./d.c., 110 ÷ 230 V a.c., 110 V d.c.

Switching off is possible only by undervoltage release or shunt trip

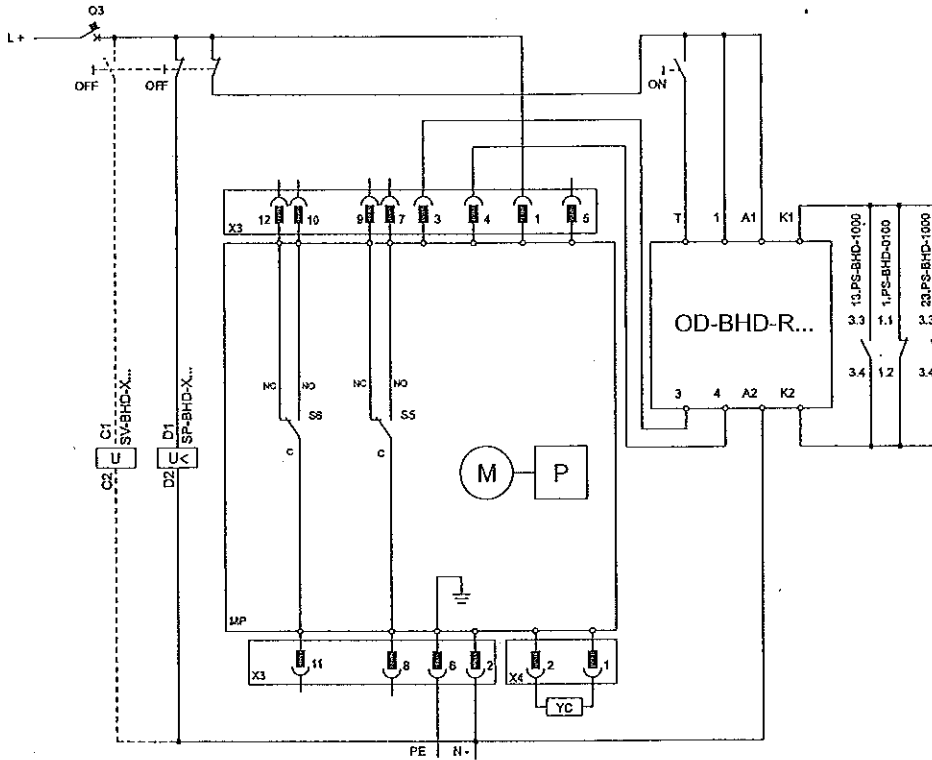


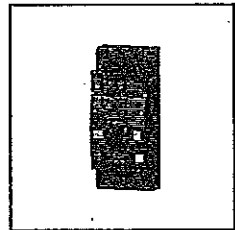
Diagram description

Symbol	Description
MP	motor drive - U_c of drive must be the same as U_c of control relay
M	motor
P	storage device
X3	connector for connection of control circuits
X4	connector for external counter of cycles
S5	switch to indicate AUTO (NO-C) / MANUAL modes
YC	external counter of cycles OD-BHD-PP01
S6	switch to indicate full storage (ready to switch on: NO-C)
OFF	switch off button
Q3	motor drive circuit breaker for 24 V a.c.: LPN-4C-1 for 48 V a.c.: LPN-4C-1 for 110 V a.c.: LPN-4C-1 for 230 V a.c.: LPN-2C-1 for 24 V d.c.: LPN-DC-4C-1 for 48 V d.c.: LPN-DC-4C-1 for 110 V d.c.: LPN-DC-4C-1
OD-BHD-R...	control relay for 24 V a.c./d.c. OD-BHD-RX01 for 48 V a.c./d.c. OD-BHD-RX02 for 110 ÷ 230 V a.c. OD-BHD-RA03 for 110 V d.c. OD-BHD-RD04
1.PS-BHD-0100	signal switch
13.PS-BHD-1000	switch inserted in cavity 3 (first circuit breaker) - auxiliary switch
23.PS-BHD-1000	switch inserted in cavity 3 (second circuit breaker) auxiliary switch
SP-BHD-X...	undervoltage release - U_c of release must be the same as U_c of control relay
SV-BHD-X...	shunt trip - U_c of release must be the same as U_c of control relay

- Impulse on T terminal reacts to trailing edge



MOULDED CASE CIRCUIT BREAKERS BL1000S



COMMERCIAL INFORMATION

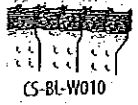
- Switching units, withdrawable deviceG4
- Overcurrent releasesG5
- Signalling unitsG5
- Residual current monitorH6
- Current transformers for residual current monitorH6
- Connecting setsH7
- Auxiliary switchesH8
- Shunt tripsH8
- Undervoltage releasesH8
- Delay unitH9
- Hand drivesH9
- Mechanical interlockingH9
- Motor drivesH8
- AccessoriesH10

TECHNICAL INFORMATION

- Circuit breakers, switch-disconnectors**
 - specificationsG6
 - diagramH12
 - connecting, mountingH13
 - defolization spacesH16
 - dimensionsH17
- Withdrawable device**
 - description, specifications, diagramH30
- Overcurrent releases**
 - DTV3 - distribution**
 - description, specificationsG7
 - MTV8 - motor**
 - description, specificationsG8
 - U001 - universal**
 - description, specificationsG10
- Signalling units**
 - description, specifications, diagramH36
- Connecting sets**
 - specificationsH13
- Auxiliary switches**
 - specificationsH37
- Shunt trips**
 - specificationsH38
- Undervoltage releases**
 - specificationsH39
- Hand drives**
 - description, specificationsH40
- Mechanical interlocking**
 - description, specifications, dimensionsH41
- Motor drives**
 - description, specifications, diagramH43

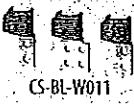
PRIMARY OF MODELS AND ACCESSORIES

CONNECTING SETS
Clamp terminals



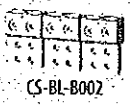
CS-BL-W010

Clamp terminals



CS-BL-W011

Block terminals



CS-BL-B002

Block terminals



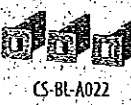
CS-BL-B003

Block terminals



CS-BL-B004

Rear connection



CS-BL-A022

Front connection



CS-BL-A010

Rear connection

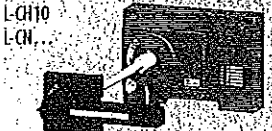


CS-BL-A020

TRIP DRIVES



L-CK10
L-CP...



L-CH10
L-CN...

Mechanical Interlocking



CB10



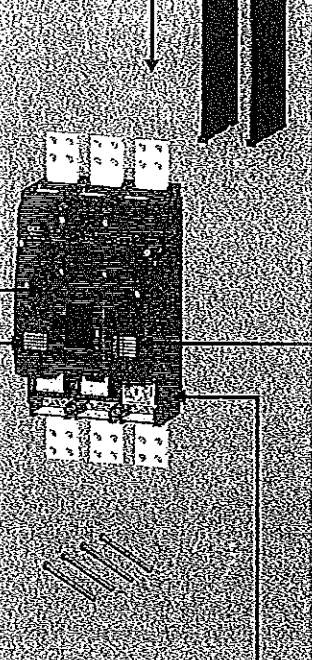
Mechanical interlocking with open cable

TRIP DRIVES



BL-X

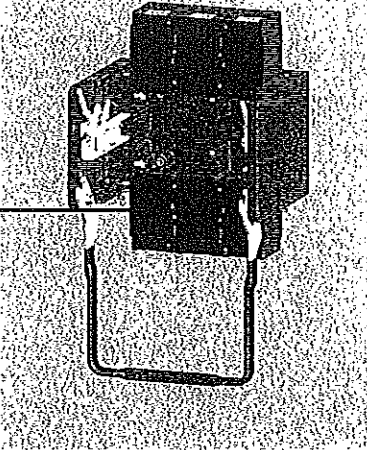
SWITCHING UNIT
BL1000SE30S



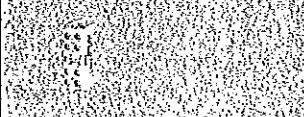
SWITCHING UNIT
WITHDRAWABLE DESIGN
BL1000SE320



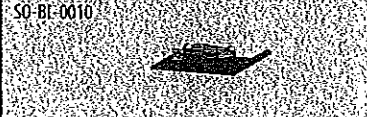
WITHDRAWABLE DEVICE
ZY-BL-1600-300



SWITCHES PS-BL...



Signalling of position
SO-BL-0010



TRIP



SV-BL-X

OVERVOLTAGE RELEASE

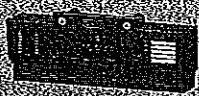


SP-BL-X

OVERCURRENT RELEASES



SE-BL-1000-DIV3

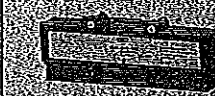


SE-BL-1000-AMLV3



SE-BL-1000-0001

SWITCH-DISCONNECTOR UNIT



SE-BL-11000-V001

SIGNALLING UNITS



SB-BL-0007

ACCESSORIES

Lever with locking



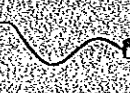
OD-BL-UP01

Sealing insert



OD-BL-VP01

Extension cable



OD-BL-KA01

Terminal cover



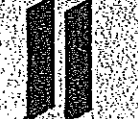
OD-BL-KS09

Terminal cover



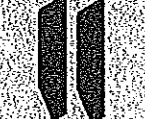
OD-BL-KS04

Insulating barriers



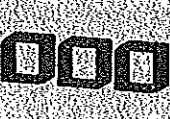
OD-BL-KS02

Insulating barriers



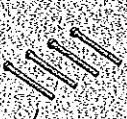
OD-BL-KS08

Insulating grommets



OD-BL-KS03

Mounting bolts



OD-BL-MS02

Terminal cover



OD-BL-KS01

SWITCHING UNITS

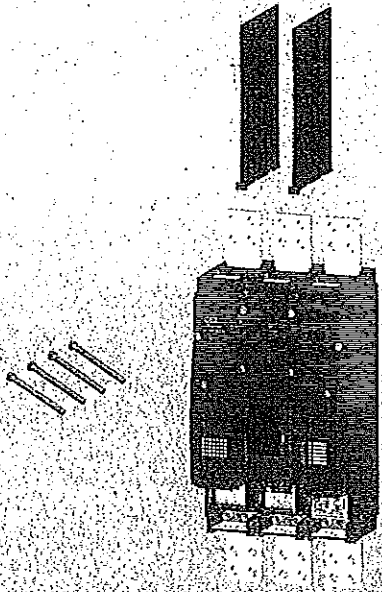
Fixed design

Type	Product code	I (A)	I (KA)	Weight (kg)	Package (pc)
BL1000SE305	19381	1000	65	20	1

- TECHNICAL INFORMATION, see page G6
 - the method of power circuit connection must observe recommendations, see page H13 as well as deionization space, see page H16

- Switching unit: includes
 - insulating barriers OD-BL-KS02
 - mounting bolts set OD-BL-MS01 (4x M8x80)
 - connecting sets for front connection - busbars connection

must be fitted with - by overcurrent release SE-BL-J..... (circuit breaker)
 or switch-disconnector unit SE-BL-J1000-V001 (switch-disconnector)



Withdrawable design

Type	Product code	I (A)	I (KA)	Weight (kg)	Package (pc)
BL1000SE320	19382	1000	65	23	1

- TECHNICAL INFORMATION, see page G6
 - Switching unit must be fitted with: - by overcurrent release SE-BL-J..... (circuit breaker)
 or switch-disconnector unit SE-BL-J1000-V001 (switch-disconnector)

- withdrawable device ZV-BL-1600-300



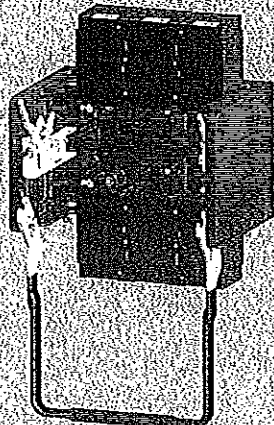
WITHDRAWABLE DEVICE

Type	Product code	Name	Weight (kg)	Package (pc)
ZV-BL-1600-300	21010	Withdrawable device	14	1

- TECHNICAL INFORMATION, see page H30
 - the method of power circuit connection must observe recommendations, see page H30 as well as deionization space, see page H16

- Withdrawable device: must be fitted with - 2 connection sets CS-BL-A010 (front connection)
 or CS-BL-A020 (rear connection)

we recommend fitting with - mounting bolts set OD-BL-MS02 (4x M8x60)

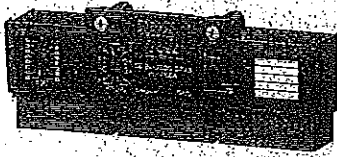


Handwritten signature

Handwritten mark

OVERCURRENT RELEASES

3P

**DTV3 - characteristic D - distribution**

- protection lines and transformers

Setting (A)	Type	Product code	Description	Weight (kg)	Package (pcs)
315	SE-BL-J315-DTV3	22111	I _n setting = 125 ÷ 315 A	0.5	1
630	SE-BL-J630-DTV3	22211	I _n setting = 250 ÷ 630 A	0.5	1
800	SE-BL-J800-DTV3	22311	I _n setting = 315 ÷ 800 A	0.5	1
1000	SE-BL-J1000-DTV3	19383	I _n setting = 400 ÷ 1000 A	0.5	1

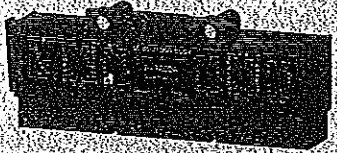
- TECHNICAL INFORMATION, see page G7

**MTV8 - characteristic M - motor**

- direct protection for motors and generators
- possibility of protection lines and transformers

Setting (A)	Type	Product code	Description	Weight (kg)	Package (pcs)
315	SE-BL-J315-MTV8	22101	I _n setting = 125 ÷ 315 A	0.5	1
630	SE-BL-J630-MTV8	22201	I _n setting = 250 ÷ 630 A	0.5	1
800	SE-BL-J800-MTV8	22301	I _n setting = 315 ÷ 800 A	0.5	1
1000	SE-BL-J1000-MTV8	19384	I _n setting = 400 ÷ 1000 A	0.5	1

- TECHNICAL INFORMATION, see page G8

**U001 - characteristic U - universal**

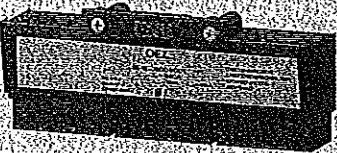
- protection complicated loads or those not specified in advance

Setting (A)	Type	Product code	Description	Weight (kg)	Package (pcs)
315	SE-BL-J315-U001	20527	I _n setting = 125 ÷ 315 A	0.5	1
630	SE-BL-J630-U001	20526	I _n setting = 250 ÷ 630 A	0.5	1
800	SE-BL-J800-U001	20525	I _n setting = 315 ÷ 800 A	0.5	1
1000	SE-BL-J1000-U001	20524	I _n setting = 400 ÷ 1000 A	0.5	1

- TECHNICAL INFORMATION, see page G10

WITCH-DISCONNECTOR UNIT

3P



Setting (A)	Type	Product code	Description	Weight (kg)	Package (pcs)
1000	SE-BL-J1000-V001	19385	Switch-disconnector unit	0.4	1

- TECHNICAL INFORMATION, see page G6

IGNALLING UNIT

3P



Type	Product code	Description	Weight (kg)	Package (pcs)
SB-BL-0002	13765	for overcurrent releases DTV3, MTV8 and U001	0,67	1

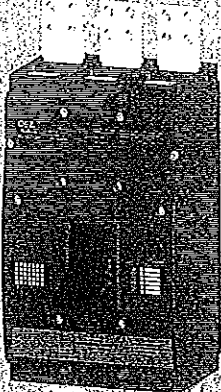
- TECHNICAL INFORMATION, see page H36

- for connecting of circuit breaker with signalling unit CS-BL-B*** block terminals cannot be used

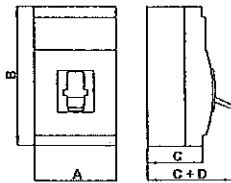
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS



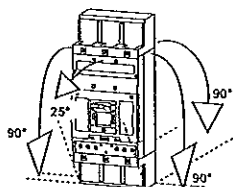
Circuit breaker



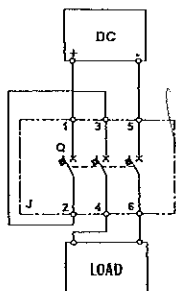
Switch-disconnector



Dimensions



Mounting



Connection of switch-disconnector for DC circuits

Specification

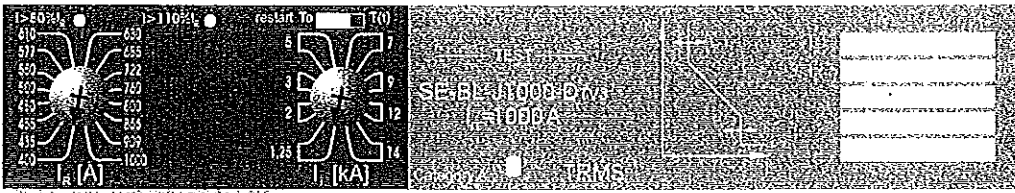
Specification	CIRCUIT BREAKERS	SWITCH-DISCONNECTORS
Type	BL1000S	
Series	SUPERIOR	
Dimensions A x B x C + D	210x350x135+63mm	210x350x135+63mm
Weight	20 kg	20 kg
Standards	EN 60947-2 IEC 60947-2	EN 60947-3 IEC 60947-3
Approval marks		
Number of poles	3	3
Rated current	315, 630, 800, 1000 A	-
Rated normal current	1000 A	1000 A
Rated operating current	-	1000 A
Rated operating voltage	max. 690 V a.c.	max. 690 V a.c. max. 440 V d.c.
Rated frequency	50/60 Hz	50/60 Hz
Rated impulse withstand voltage	8 kV	8 kV
Rated insulation voltage	690 V	690 V
Utilization category (selectivity)	690 V a.c.	AC-23B
Utilization category (switching mode) at I _n = 1000 A	690 V a.c.	AC-23B
	440 V d.c.	DC-23B
Rated short-time withstand current at U _n = 690 V a.c.	I _{st} /t	15 kA/1 s
Rated short-circuit ultimate breaking capacity (rms) ¹⁾	I _{cu} /U _e	85 kA/230 V a.c. 65 kA/415 V a.c. 45 kA/500 V a.c. 20 kA/690 V a.c.
Switching off time at I _n		30 ms
Rated short-circuit service breaking capacity (rms)	I _{cs} /U _e	45 kA/230 V a.c. 36 kA/415 V a.c. 30 kA/500 V a.c. 20 kA/690 V a.c.
Rated short-circuit making capacity	I _{cm} /U _e	140 kA/415 V a.c.
		30 kA/415 V a.c. 30 kA/440 V d.c.
Losses per 1 pole fixed/withdrawable design		100 W/139 W
Mechanical endurance		10 000 cycles
Electrical endurance		4 000 cycles
Switching frequency		120 cycles/hr
Control force		230 N
Degree of protection from front side of the device		IP40
Degree of protection of terminals		IP20
Operating condition		
Reference ambient temperature		40 °C
Ambient temperature range		-40 + +55 °C
Working environment		dry and tropical climate
Climatic resistance		EN 60068
Pollution degree		3
Max. sea level		2 000 m
Seismic resistance		3g (8 + 50) Hz
Design modification		
Front/rear connection	•/•	•/•
Plug-in design	-	-
Withdrawable design	•	•
Accessories		
Switches - auxiliary/relative/signal/early	•/•/-/-	•/•/-/-
Shunt trip	•	•
Undervoltage release/with early switch	•/-	•/-
Front hand drive/with adjustable lever	•/•	•/•
Mechanical interlocking - with Bowden cable/for hand drive	•/•	•/•
Motor drive/with counter of cycles	•/•	•/•
Lever with locking	•	•
Boft sealing insert/additional cover for overcurrent release	•/-	•/-

• available, - unavailable

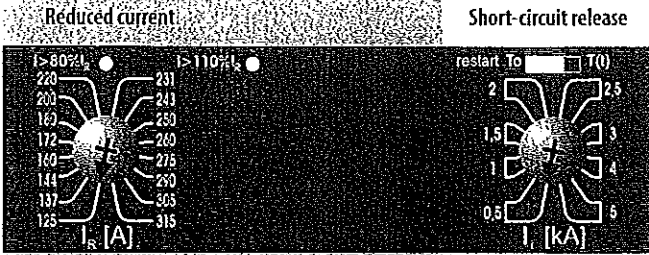
¹⁾ - in case circuit breaker connection is reversed (input terminals 2, 4, 6, output terminals 1, 3, 5) I_{cs} does not change

- protection of Modeion switch-disconnectors, see page 8

OVERCURRENT RELEASES - DTV3



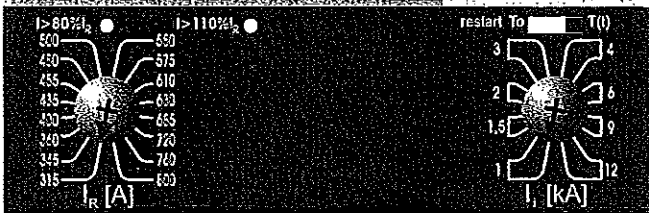
$I_n = 315 A$
-BL-J315-DTV3



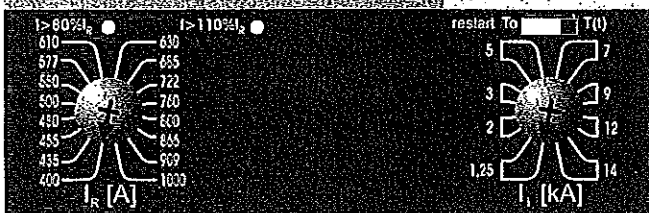
$I_n = 630 A$
-BL-J630-DTV3



$I_n = 800 A$
-BL-J800-DTV3



$I_n = 1000 A$
-BL-J1000-DTV3

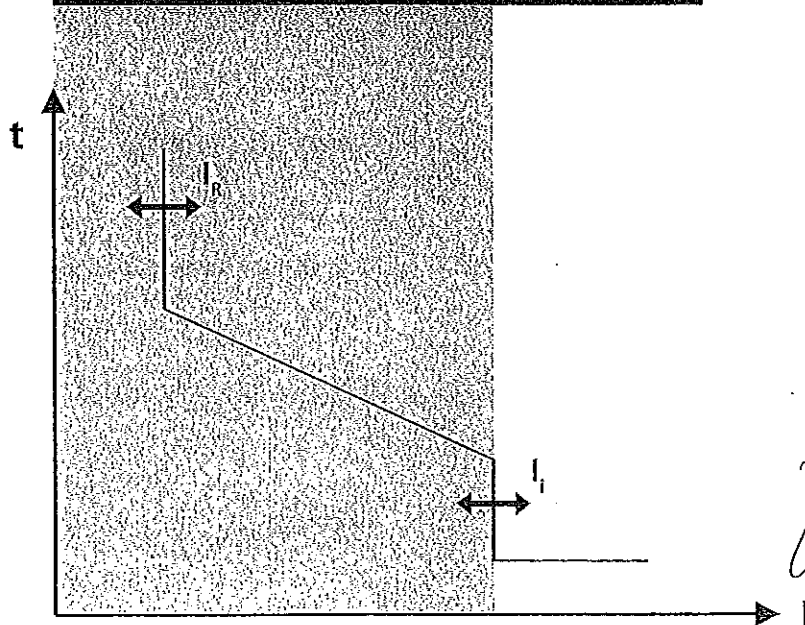


Properties

- suitable for protection of lines and distribution transformers
- protects against both overcurrent and short circuit
- reduced current setting $I_R = 0.4 \div 1 I_n$
- thermal memory can be switched on/off (ON = T_{ON} , OFF = T_{OFF})
- setting of the value of the short-circuit release I_1 in 8 steps
- setting of I_R and I_1 by means of the rotary switches is stepwise
- the overcurrent release indicates the value of the passing current by means of LED
- the values of parameters of the overcurrent release are set by the manufacturer to minimum

Data for the project

Switching unit	BL1000
Overcurrent release	SE-BL-J
Overcurrent release setting	
Reduced current	I_R A
Thermal memory	T
Short-circuit release current	I_1 A

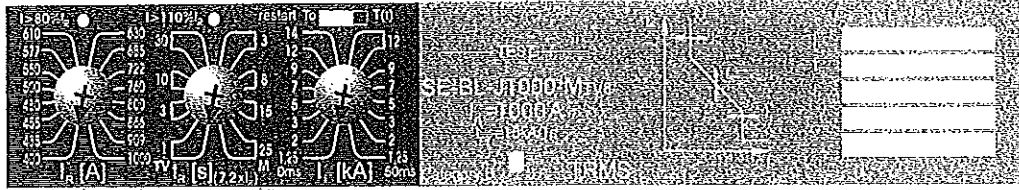


IMPORTANT

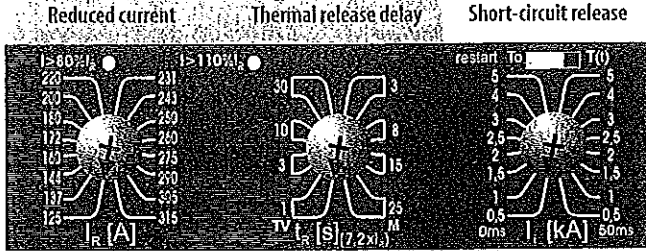
- thermal memory must be switched on in protection of transformers and lines - thus the transformer or the line will be protected against repeated overload

[Handwritten signature]
G7

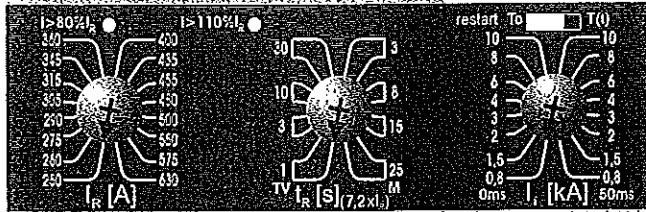
OVERCURRENT RELEASES- MTV8, TV mode



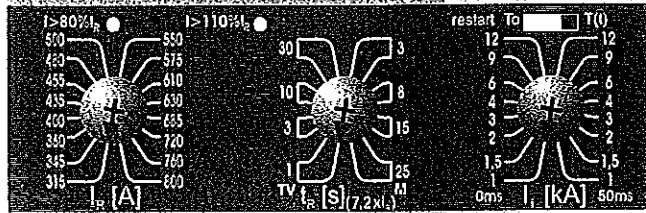
$I_n = 315 \text{ A}$
SE-BL-J315-MTV8



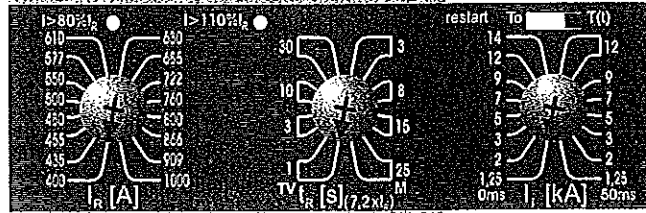
$I_n = 630 \text{ A}$
SE-BL-J630-MTV8



$I_n = 800 \text{ A}$
SE-BL-J800-MTV8



$I_n = 1000 \text{ A}$
SE-BL-J1000-MTV8

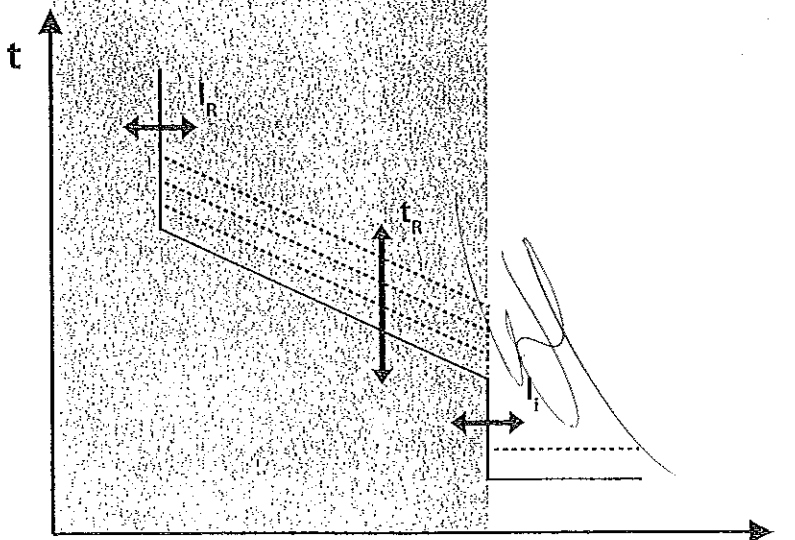


Properties

- TV mode - suitable for protection of lines, distribution transformers and generators
- protects against both overcurrent and short circuit
- reduced current setting $I_r = 0.4 \div 1 I_n$
- thermal memory can be switched on/off (ON = T_{on} , OFF = T_{off})
- in TV mode the undercurrent release is inactive
- setting of delay of the thermal release t_R 1 s, 3 s, 10 s and 30
- setting of the value of short-circuit release I_i in 8 steps and possibility of switching the short-circuit release off with a delay of 50 ms
- setting of I_r , t_R and I_i by means of the rotary switches is stepwise
- the overcurrent release indicates the value of the passing current by means of LEO
- the values of parameters of the overcurrent release are set by the manufacturer to minimum

Data for the project

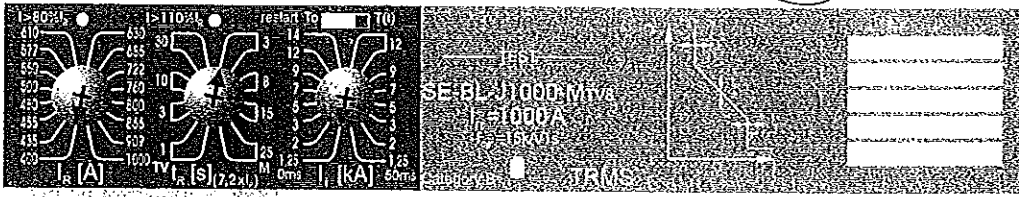
Switching unit	BL1000
Overcurrent release	SE-BL-J
Overcurrent release setting	
Reduced current	I_r [A]
Mode	TV
Thermal memory	T
Thermal release delay	t_R [s]
Short-circuit release current	I_i [kA]
Setting of short-circuit release	[ms]



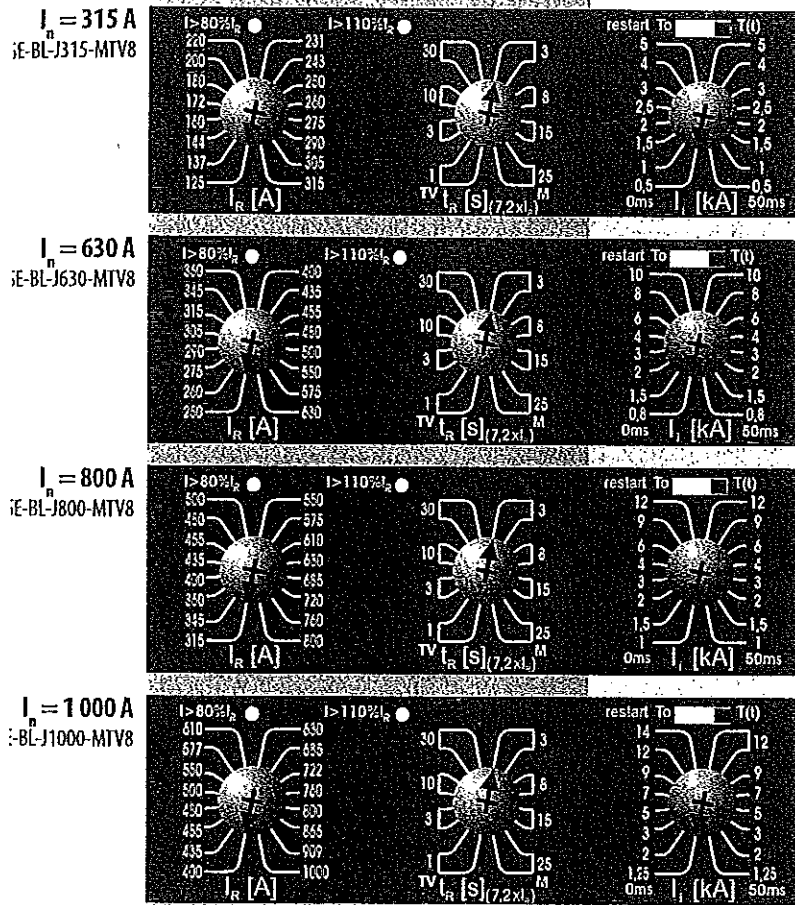
IMPORTANT

- the set value of current of the short-circuit release must correspond to the impedance loop - conditions must be fulfilled for automatic disconnection from power supply in case of failure

OVERCURRENT RELEASES - MTV8, M mode



Reduced current Motor starting Short-circuit release

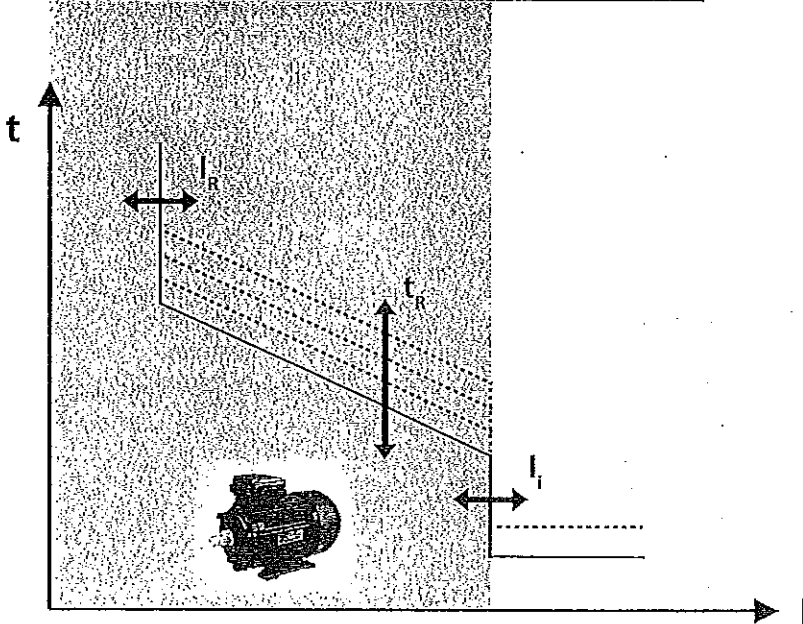


Properties

- M mode - suitable for protection of motors
- protects against both overcurrent and short circuit
- reduced current setting $I_R = 0.4 \div 1 I_n$
- thermal memory can be switched on/off (ON = T_{OFF} OFF = T_{OFF})
- in M mode the undercurrent release is active
- setting of delay of the thermal release t_R 3 s, 8 s, 15 s and 25 s according to the motor starting class
- setting of the value of short-circuit release I_i in 8 steps and possibility of switching the short-circuit release off with a delay of 50 ms
- setting of I_R , t_R and I_i by means of the rotary switches is stepwise
- the overcurrent release indicates the value of the passing current by means of LED
- the values of parameters of the overcurrent release are set by the manufacturer to minimum

Data for the project

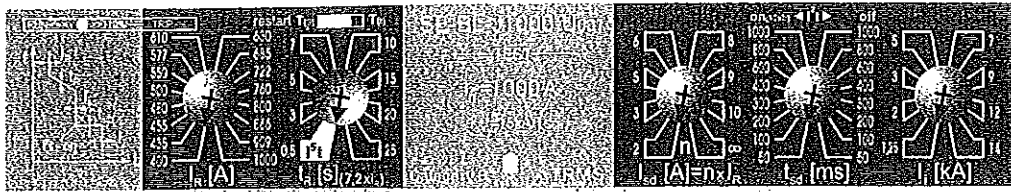
Switching unit	BL1000
Overcurrent release	SE-BL-J
Overcurrent release setting	
Reduced current	I_R A
Mode	M
Thermal memory	T
Thermal release delay	t_R s
Short-circuit release current	I_i A
Setting of short-circuit release	ms



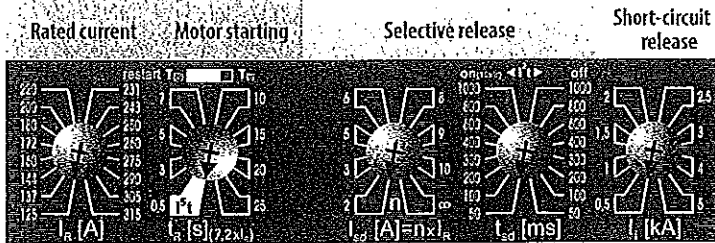
IMPORTANT

- M mode must be selected in protection of motors - the motor will be protected in phase failure
- thermal release delay t_R must correspond to the motor starting class
- in protection of motors it is suitable to set the delay of the short-circuit release at 50 ms

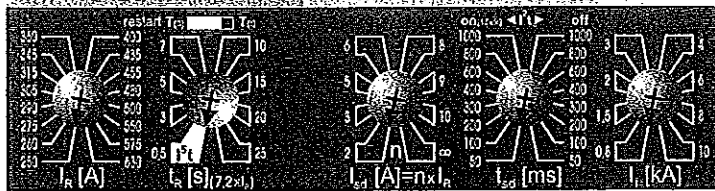
OVERCURRENT RELEASES - U001



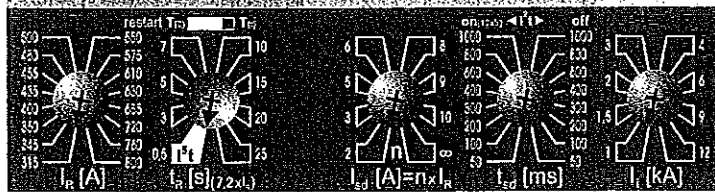
$I_n = 315 \text{ A}$
SE-BL-J315-U001



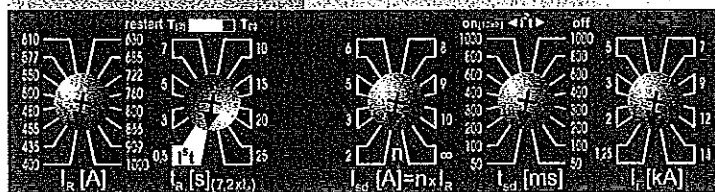
$I_n = 630 \text{ A}$
SE-BL-J630-U001



$I_n = 800 \text{ A}$
SE-BL-J800-U001



$I_n = 1000 \text{ A}$
SE-BL-J1000-U001



Properties

- it is designed for demanding applications with a complicated load and required high selectivity with fuses or circuit breaker
- protects against both overcurrent and short circuit
- reduced current setting $I_R = 0.4 \div 1 I_n$
- thermal memory can be switched on/off (ON = T_{tr} , OFF = T_{tr})
- setting of the value of selective release I_{sd} in 8 steps, possibility of setting of gradient of characteristic of the thermal release I^2t (adaptation of time-current characteristic of the fuse)
- setting of the value of selective release t_{sd} in 8 steps (independent time-delayed release)
- setting of delay of the selective release t_{sd} 50 to 1000 ms including possibility of setting of a gradient of characteristic of the short-circuit release (adaptation of the time-current characteristic of the fuse)
- setting of the value of the short-circuit release I_i in 8 steps
- setting of I_R , t_r , I_{sd} , t_{sd} and I_i by means of rotary switches is stepwise
- the overcurrent release indicates operating state and the value of the passing current by means of LED
- the values of parameters of the overcurrent release are set by the manufacturer to minimum

Data for the project

Switching unit

Overcurrent release

Overcurrent release setting

Reduced current

Thermal memory

Setting of the gradient of characteristic of the thermal release

Thermal release delay

Selective release value

Selective release delay

Setting of the gradient of characteristic of the short-circuit release

Short-circuit release value

BL1000

SE-BL-J

I_R A

T_{tr} s

I^2t A²s

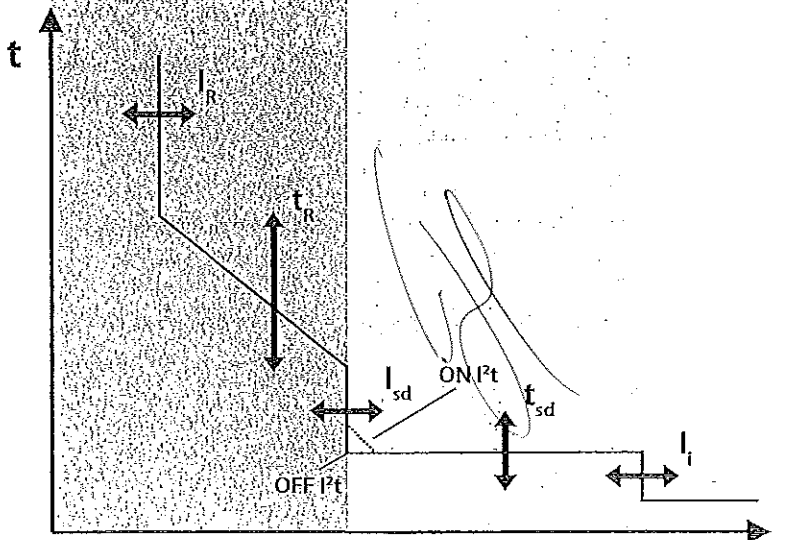
t_r s

I_{sd} A ($\times I_n$)

t_{sd} ms

I^2t A²s

I_i A



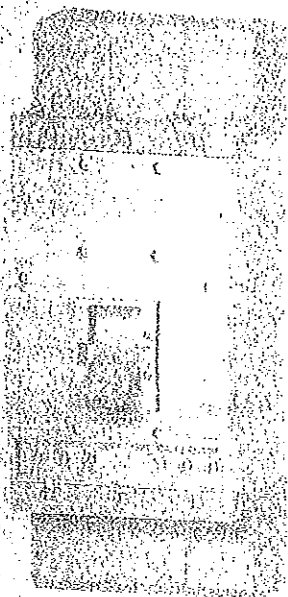
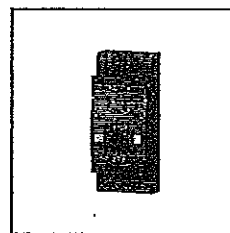
IMPORTANT

- to achieve as high selectivity as possible, use the possibility of setting of the current and delay including gradient of the time-current characteristic of the independent (short-circuit) time-delayed release.

For selectivity solution, use the calculation program Sichr.

Handwritten mark

MOULDED CASE CIRCUIT BREAKERS BL1600S



Handwritten mark

Handwritten signature

COMMERCIAL INFORMATION

<input type="checkbox"/> Switching units, withdrawable device	H4
<input type="checkbox"/> Overcurrent releases	H5
<input type="checkbox"/> Signalling units	H5
<input type="checkbox"/> Residual current monitor	H6
<input type="checkbox"/> Current transformers for residual current monitor	H6
<input type="checkbox"/> Connecting sets	H7
<input type="checkbox"/> Auxiliary switches	H8
<input type="checkbox"/> Shunt trips	H8
<input type="checkbox"/> Undervoltage releases	H8
<input type="checkbox"/> Delay unit	H9
<input type="checkbox"/> Hand drives	H9
<input type="checkbox"/> Mechanical interlocking	H9
<input type="checkbox"/> Motor drives	H9
<input type="checkbox"/> Accessories	H10

TECHNICAL INFORMATION

<input type="checkbox"/> Circuit breakers, switch-disconnectors	
- specifications	H11
- diagram	H12
- connecting, mounting	H13
- delonization spaces	H16
- dimensions	H17
<input type="checkbox"/> Withdrawable device	
- description, specifications, diagram	H30
<input type="checkbox"/> Overcurrent releases	
DTV3 - distribution	
- description, specifications	H30
MTV8 - motor	
- description, specifications	H31
U001 - universal	
- description, specifications	H33
<input type="checkbox"/> Signalling units	
- description, specifications, diagram	H36
<input type="checkbox"/> Connecting sets	
- specifications	H13
<input type="checkbox"/> Auxiliary switches	
- specifications	H37
<input type="checkbox"/> Shunt trips	
- specifications	H38
<input type="checkbox"/> Undervoltage releases	
- specifications	H39
<input type="checkbox"/> Hand drives	
- description, specifications	H40
<input type="checkbox"/> Mechanical interlocking	
- description, specifications, dimensions	H41
<input type="checkbox"/> Motor drives	
- description, specifications, diagram	H43

Handwritten signature

SUMMARY OF MODELS AND ACCESSORIES

CONNECTING SETS

Clamp terminals



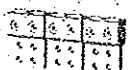
CS-BL-W010

Clamp terminals



CS-BL-W011

Block terminals



CS-BL-B002

Block terminals



CS-BL-B003

Block terminals



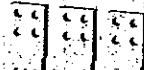
CS-BL-B004

Rear connection



CS-BL-A021

Front connection



CS-BL-A010

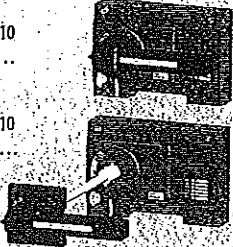
Rear connection



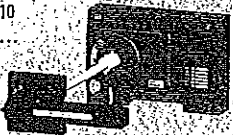
CS-BL-A020

HAND DRIVES

P-BL-CK10
P-BL-CP...

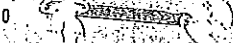


P-BL-CH10
P-BL-CN...



Mechanical interlocking

L-BL-CB10



Mechanical locking with widened cable

IB-BL...

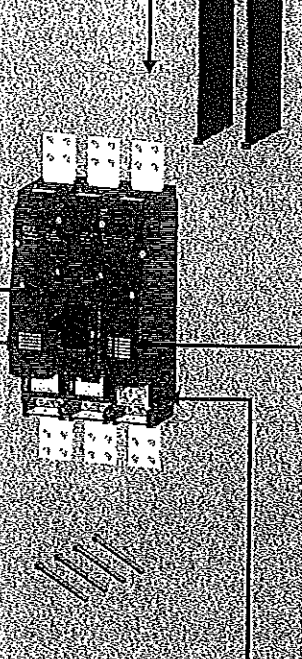


MOTOR DRIVES

IP-BL-X



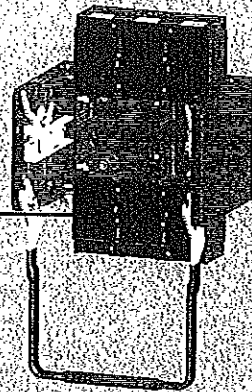
SWITCHING UNIT
BL1600SE30S



SWITCHING UNIT
- WITHDRAWABLE DESIGN
BL1600SE320



WITHDRAWABLE DEVICE
ZV-BL-1600-300



SWITCHES PS-BL



Signalling of position
SO-BL-0010



HUNT TRIP

SV-BL-X



UNDERVOLTAGE RELEASE

SP-BL-X



OVERCURRENT RELEASES



SF-BL-DIV3



SF-BL-MIV3



SF-BL-1001

SWITCH-DISCONNECTOR UNIT



SE-BL-1600-V001

SIGNALLING UNITS



SB-BL-0002

ACCESSORIES

Lever with locking



OD-BL-UP01

Sealing insert



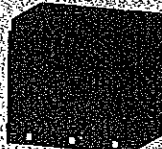
OD-BL-VP01

Extension cable



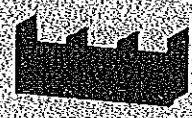
OD-BL-KA01

Terminal cover



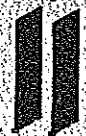
OD-BL-KS09

Terminal cover



OD-BL-KS04

Insulating barriers



OD-BL-KS02

Insulating barriers



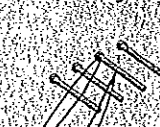
OD-BL-KS08

Insulating grommets



OD-BL-KS03

Mounting bolts



OD-BL-MS02

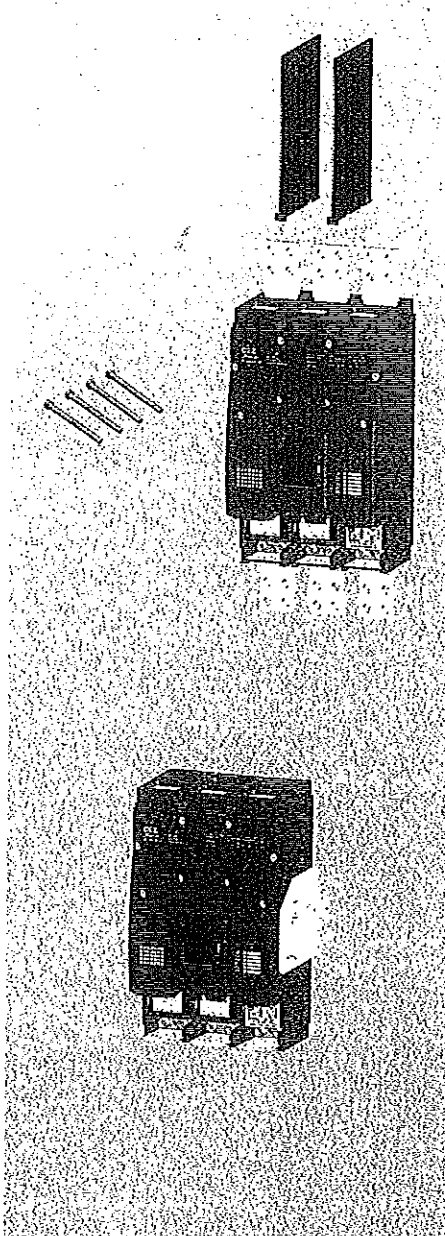
Terminal cover



OD-BL-KS01

SWITCHING UNITS

3P



Fixed design

Type	Product code	I _n (A)	I _e (kA)	Weight (kg)	Package (pcs)
BL1600SE305	14410	1600	65	22	1

- TECHNICAL INFORMATION, see page H10
- the method of power circuit connection must observe recommendations, see page H13 as well as deionization space see page H16

- Switching unit: includes
 - insulating barriers OD-BL-KS02
 - mounting bolts set OD-BL-MS01 (4x M8x80)
 - connecting sets for front connection - busbars connection

must be fitted with - by overcurrent release SE-BL-..... (circuit breaker)
or switch-disconnector unit SE-BL-1600-V001 (switch-disconnector)

Withdrawable design

Type	Product code	I _n (A)	I _e (kA)	Weight (kg)	Package (pcs)
BL1600SE320	21000	1600	65	23	1

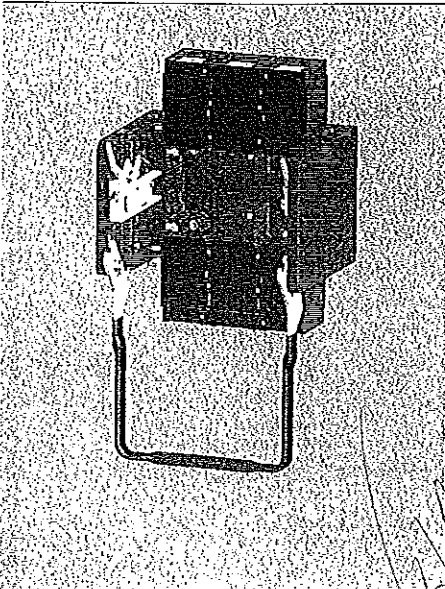
- TECHNICAL INFORMATION, see page H11

- Switching unit must be fitted with: - by overcurrent release SE-BL-..... (circuit breaker)
or switch-disconnector unit SE-BL-1600-V001 (switch-disconnector)

- withdrawable device ZV-BL-1600-300

WITHDRAWABLE DEVICE

3P



Type	Product code	Name	Weight (kg)	Package (pcs)
ZV-BL-1600-300	21010	Withdrawable device	14.3	1

- TECHNICAL INFORMATION, see page H28
- the method of power circuit connection must observe recommendations, see page H30 as well as deionization space, see page H16

- Withdrawable device must be fitted with - 2 connection sets CS-BL-A010 (front connection)
or CS-BL-A020 (rear connection)

we recommend fitting with - mounting bolts set OD-BL-MS02 (4x M8x60)

OVERCURRENT RELEASES

3P

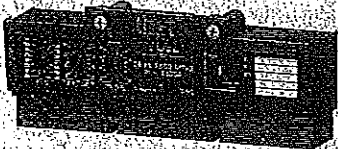


DTV3 - characteristic D - distribution

- protection lines and transformers

I _n (A)	Type	Product code	Description	Weight (kg)	Package (pcs)
630	SE-BL-0630-DTV3	20070	I _n setting = 250 ÷ 630 A	0.5	1
1000	SE-BL-1000-DTV3	20080	I _n setting = 400 ÷ 1000 A	0.5	1
1250	SE-BL-1250-DTV3	19388	I _n setting = 500 ÷ 1250 A	0.5	1
1600	SE-BL-1600-DTV3	20090	I _n setting = 630 ÷ 1600 A	0.5	1

- TECHNICAL INFORMATION, see page H32

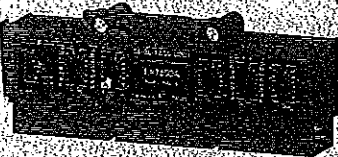


MTV8 - characteristic M - motor

- direct protection for motors and generators
- possibility of protection lines and transformers

I _n (A)	Type	Product code	Description	Weight (kg)	Package (pcs)
630	SE-BL-0630-MTV8	20071	I _n setting = 250 ÷ 630 A	0.5	1
1000	SE-BL-1000-MTV8	20081	I _n setting = 400 ÷ 1000 A	0.5	1
1250	SE-BL-1250-MTV8	19389	I _n setting = 500 ÷ 1250 A	0.5	1
1600	SE-BL-1600-MTV8	20091	I _n setting = 630 ÷ 1600 A	0.5	1

- TECHNICAL INFORMATION, see page H33



U001 - characteristic U - universal

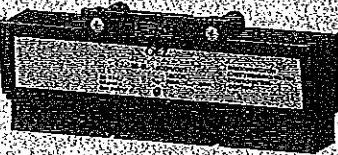
- protection complicated loads or those not specified in advance

I _n (A)	Type	Product code	Description	Weight (kg)	Package (pcs)
630	SE-BL-0630-U001	20523	I _n setting = 250 ÷ 630 A	0.59	1
1000	SE-BL-1000-U001	20364	I _n setting = 400 ÷ 1000 A	0.59	1
1250	SE-BL-1250-U001	20521	I _n setting = 500 ÷ 1250 A	0.59	1
1600	SE-BL-1600-U001	20363	I _n setting = 630 ÷ 1600 A	0.59	1

- TECHNICAL INFORMATION, see page H35

WITCH-DISCONNECTOR UNIT

3P

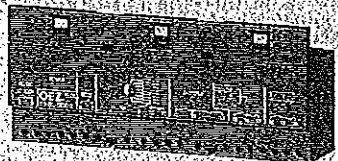


I _n (A)	Type	Product code	Name	Weight (kg)	Package (pcs)
1600	SE-BL-1600-V001	20400	Switch-disconnector unit	0.4	1

- TECHNICAL INFORMATION, see page H11

SIGNALLING UNITS

3P



Type	Product code	Description	Weight (kg)	Package (pcs)
SB-BL-0002	13765	- for overcurrent releases DTV3, MTV8 and U001	0.67	1

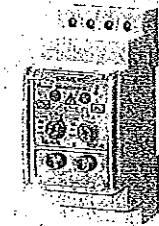
- TECHNICAL INFORMATION, see page H36

- for connecting of circuit breaker with signalling unit CS-BL-B*** block terminals cannot be used

[Handwritten signatures and marks]

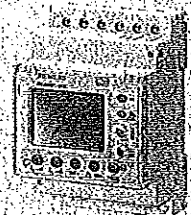
RESIDUAL CURRENT MONITOR

3P 4P



Type	Product code	Description	Weight (kg)	Package (set)
55V8000-6KK	42658	Analogue design, $I_{\Delta n}$ and $t_{\Delta n}$ setting	0.18	1

- TECHNICAL INFORMATION, see page P4

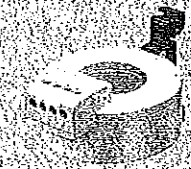


Type	Product code	Description	Weight (kg)	Package (set)
55V8001-6KK	42659	Digital design, $I_{\Delta n}$ and $t_{\Delta n}$ setting	0.26	1
55V8200-6KK	42660	Digital design, $I_{\Delta n}$ and $t_{\Delta n}$ setting, 4 channels	0.26	1

- TECHNICAL INFORMATION, see page P4

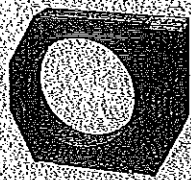
CURRENT TRANSFORMERS FOR RESIDUAL CURRENT MONITOR

3P 4P



Type	Product code	Description	Weight (kg)	Package (set)
55V8700-0KK	42661	Internal diameter 20 mm, including holder on „U“ rail according to EN 60715 wide 35 mm	0.09	1
55V8701-0KK	42662	Internal diameter 30 mm, including holder on „U“ rail according to EN 60715 wide 35 mm	0.11	1

- TECHNICAL INFORMATION, see page P4



Type	Product code	Description	Weight (kg)	Package (set)
55V8702-0KK	42663	Internal diameter 35 mm, including holder on the panel	0.2	1
55V8703-0KK	42664	Internal diameter 70 mm, including holder on the panel	0.31	1
55V8704-0KK	42665	Internal diameter 105 mm, including holder on the panel	0.6	1
55V8705-0KK	42666	Internal diameter 140 mm, including holder on the panel	1.35	1
55V8706-0KK	42667	Internal diameter 210 mm, including holder on the panel	1.25	1

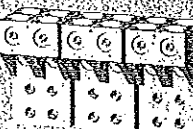
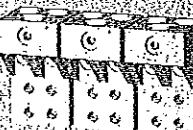
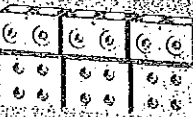
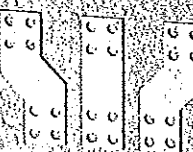
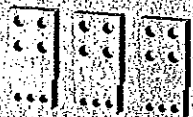
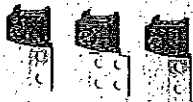
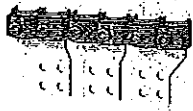
- TECHNICAL INFORMATION, see page P4



Type	Product code	Description	Weight (kg)	Package (set)
55V8 900-1KK	42668	Holder on „U“ rail according to EN 60715 wide 35 mm for current transformers with internal diameter up to and including 105 mm	0.01	2

- TECHNICAL INFORMATION, see page P4

CONNECTING SETS



Type	Product code	Description	Terminal (mm ²)	Method of connection	Weight (kg)	Package (set)
CS-BL-W010	20710	Clamp terminals double	2x(70 ÷ 240)	Cu/Al cables	1.47	1

- TECHNICAL INFORMATION, see page H13
 - for connection four 70 ÷ 240 mm² cables per pole, it is possible to use two CS-BL-W010 connecting sets, see page H19 (not for BL1000SE30S switching unit)
 - conductor cross-section for potential terminal is 2.5 mm²

CS-BL-W011	20930	Clamp terminals	70 ÷ 240	Cu/Al cables	0.663	1
------------	-------	-----------------	----------	--------------	-------	---

- TECHNICAL INFORMATION, see page H13
 - for connection three 70 ÷ 240 mm² cables per pole, it is possible to combine CS-BL-W011 connecting set with CS-BL-W010 connecting set, see page H16, H19 (not for BL1000SE30S switching unit)

CS-BL-A022	20611	Rear connection - up to 1 000 A for fixed design		Cu/Al busbars	1.43	1
------------	-------	--------------------------------------------------	--	---------------	------	---

- TECHNICAL INFORMATION, see page H13

CS-BL-A021	20610	Rear connection - up to 1 600 A for fixed design		Cu/Al busbars	2.76	1
------------	-------	--------------------------------------------------	--	---------------	------	---

- TECHNICAL INFORMATION, see page H13

CS-BL-A010	21050	Front connection - for withdrawable design		Cu/Al busbars	2.73	1
------------	-------	--------------------------------------------	--	---------------	------	---

- TECHNICAL INFORMATION, see page H13

CS-BL-A020	21070	Rear connection - for withdrawable design		Cu/Al busbars	3.42	1
------------	-------	-------------------------------------------	--	---------------	------	---

- TECHNICAL INFORMATION, see page H13

CS-BL-A015	41469	Front connection - for fixed design, for BL1600		Cu/Al busbars	4.5	1
------------	-------	-------------------------------------------------	--	---------------	-----	---

- TECHNICAL INFORMATION, see page H13

CS-BL-A016	41470	Front connection - for fixed design, for BL1000		Cu/Al busbars	3.00	1
------------	-------	-------------------------------------------------	--	---------------	------	---

- TECHNICAL INFORMATION, see page H13

CS-BL-B002	20116	Block terminal for 2 cables	150 - 300	Cu/Al cables	1.00	1
------------	-------	-----------------------------	-----------	--------------	------	---

- TECHNICAL INFORMATION, see page H13
 - conductor cross-section for potential terminal is 1.5 ÷ 6 mm²
 - it is necessary to use insulating barriers
 - using the OD-BD-KS09 cover the degree of protection IP20 is fulfilled without the need to apply insulating barriers

CS-BL-B003	20117	Block terminal for 3 cables	150 - 300	Cu/Al cables	2.00	1
------------	-------	-----------------------------	-----------	--------------	------	---

- TECHNICAL INFORMATION, see page H13
 - conductor cross-section for potential terminal is 1.5 ÷ 6 mm²
 - it is necessary to use insulating barriers
 - using the OD-BD-KS09 cover the degree of protection IP20 is fulfilled without the need to apply insulating barriers

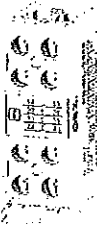
CS-BL-B004	20118	Block terminal for 4 cables	150 - 300	Cu/Al cables	1.80	1
------------	-------	-----------------------------	-----------	--------------	------	---

- TECHNICAL INFORMATION, see page H13
 - conductor cross-section for potential terminal is 1.5 ÷ 6 mm²
 - it is necessary to use insulating barriers
 - using the OD-BD-KS09 cover the degree of protection IP20 is fulfilled without the need to apply insulating barriers

¹⁾ - one set provides for connecting one side of the circuit breaker (set includes three terminals with necessary coupling elements)

AUXILIARY SWITCHES

3P

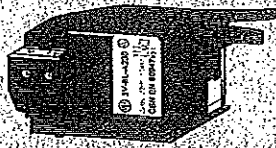


Type	Product code	Operating voltage	Contacts	Weight (kg)	Package (pcs)
PS-BL-2200	20510	60 ÷ 500 V a.c./60 ÷ 240 V d.c.		0.041	1
PS-BL-2200-Au	12808	5 ÷ 60 V a.c./d.c.		0.041	1

- TECHNICAL INFORMATION, see page H37

SHUNT TRIPS

3P

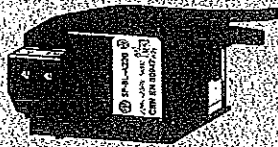


Type	Product code	Operating voltage	Weight (kg)	Package (pcs)
SV-BL-X024	16162	24 V a.c./d.c.	0.22	1
SV-BL-X048	16161	48 V a.c./d.c.	0.22	1
SV-BL-X110	16160	110 V a.c./d.c.	0.22	1
SV-BL-X230	16159	230 V a.c./220 V d.c.	0.22	1
SV-BL-X400	16158	400 V a.c.	0.22	1
SV-BL-X500	16157	500 V a.c.	0.22	1

- TECHNICAL INFORMATION, see page H38

UNDERVOLTAGE RELEASES

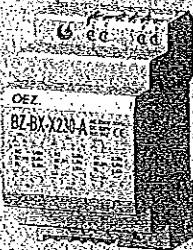
3P



Type	Product code	Operating voltage	Weight (kg)	Package (pcs)
SP-BL-X024	16168	24 V a.c./d.c.	0.22	1
SP-BL-X048	16167	48 V a.c./d.c.	0.22	1
SP-BL-X110	16166	110 V a.c./d.c.	0.22	1
SP-BL-X230	16165	230 V a.c./220 V d.c.	0.22	1
SP-BL-X400	16164	400 V a.c.	0.22	1
SP-BL-X500	16163	500 V a.c.	0.22	1

- TECHNICAL INFORMATION, see page H39

DELAY UNIT



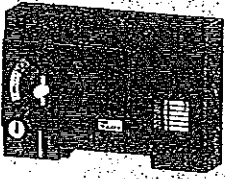
Type	Product code	Description	Weight (kg)	Package (pcs)
BZ-BX-X230-A	36696	- Enables to delay the undervoltage release tripping of circuit breakers Modelon	0.12	1

- the delay can be set up at three levels (according to wiring)

- TECHNICAL INFORMATION, see page P2

HAND DRIVES

3P



Type	Product code	Name - description	Weight (kg)	Packages (pcs)
RP-BL-CK10	20850	Hand drive unit - with locking	0.23	1
RP-BL-CK52	20678	Hand drive unit, 2 pcs, with the same lock and key	0.46	1
RP-BL-CK53	20679	Hand drive unit, 3 pcs, with the same lock and key	0.69	1
RP-BL-CK54	20680	Hand drive unit, 4 pcs, with the same lock and key	0.92	1
RP-BL-CK55	20681	Hand drive unit, 5 pcs, with the same lock and key	1.15	1

- TECHNICAL INFORMATION, see page H40

Hand drive unit must be fitted with: for controlling on switch unit - with the black hand drive lever RP-BL-CP
 for controlling through the switchboard door - with the extension shaft RP-BL-CH10
 - with the hand drive bearing RP-BL-CN.
 - with the hand drive lever RP-BL-CP.



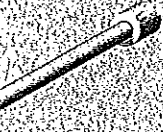
RP-BL-CP10	20865	Hand drive lever - black - with locking	0.261	1
RP-BL-CP11	20867	Hand drive lever - red - with locking	0.261	1

- TECHNICAL INFORMATION, see page H40



RP-BL-CN10	20870	Hand drive bearing - degree of protection IP44	1.1	1
------------	-------	------------------------------------------------	-----	---

- TECHNICAL INFORMATION, see page H40



RP-BL-CN20	19103	Hand drive bearing - degree of protection IP66	1.1	1
------------	-------	------------------------------------------------	-----	---

- TECHNICAL INFORMATION, see page H40

RP-BL-CH10	20875	Extension shaft - length 365 mm	0.352	1
------------	-------	---------------------------------	-------	---

- TECHNICAL INFORMATION, see page H40

MECHANICAL INTERLOCKING

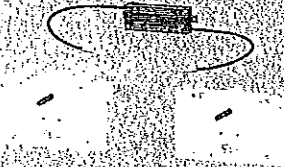
3P



For hand drive

Type	Product code	Name - description	Weight (kg)	Packages (pcs)
RP-BL-CB10	20880	For circuit breakers/switch-disconnectors in fixed design	0.12	1

- TECHNICAL INFORMATION, see page H41
 - Both circuit breakers must be equipped with a hand drive (at least one with a hand drive unit and hand drive lever)



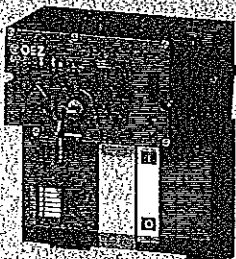
With Bowden cable

Type	Product code	Name - description	Weight (kg)	Packages (pcs)
MB-BL-PP07	19807	For circuit breakers/switch-disconnectors in fixed design	0.4	1
MB-BL-PV08	20529	For one fixed and one withdrawable circuit breaker/switch-disconnector	0.4	1
MB-BL-VV06	20528	For circuit breakers/switch-disconnectors in withdrawable design	0.4	1

- TECHNICAL INFORMATION, see page H43

MOTOR DRIVES

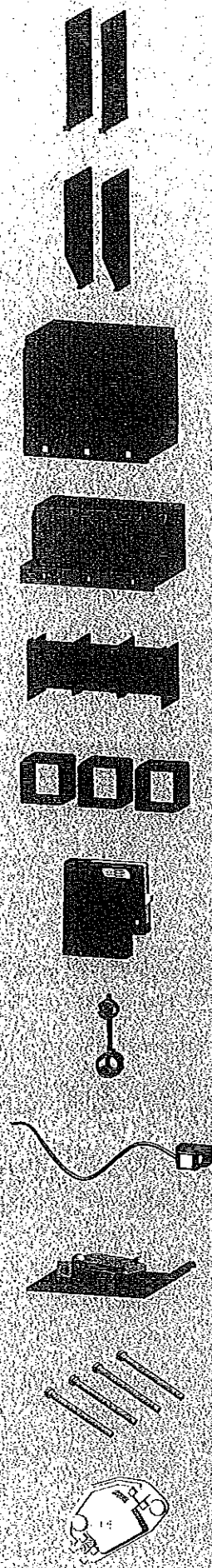
3P



Type	Product code	Name - description	Supply voltage (V a.c./d.c)	Weight (kg)	Packages (pcs)
MP-BL-X110	11601	Motor drive	110V a.c./d.c	4.35	1
MP-BL-X230	11600	Motor drive	230V a.c./220V d.c	4.35	1
MP-BL-X110-P	11604	Motor drive - with counter of cycles	110V a.c./d.c	4.4	1
MP-BL-X230-P	11605	Motor drive - with counter of cycles	230V a.c./220V d.c	4.4	1

- TECHNICAL INFORMATION, see page H43

ACCESSORIES



Type	Product code	Name - description	Weight (kg)	Package (pcs)
OD-BL-KS02	20910	Insulating barriers - for switching unit in fixed design - in case of reversed connection (supply to terminals 2, 4, 6), must be installed also on lower side - included with each switching unit order in fixed design	0.264	1
OD-BL-KS08	20569	Insulating barriers - for withdrawable device - must always be installed on withdrawable device when clamp or block type terminals are used for its connection	0.142	1
OD-BL-KS09	39893	Terminal cover - degree of protection IP20 - increases degree of protection of connection point to IP20 when using CS-BL-B002, CS-BL-B003, CS-BL-B004 block type terminals - it is intended for fixed design	0.7	1
OD-BL-KS01	20810	Terminal cover - for circuit breaker/switch-disconnector in fixed design with rear connection - increases degree of protection of connection point to IP20	0.287	1
OD-BL-KS04	20940	Terminal cover - for withdrawable device with front connection - intended for withdrawable device with front connection - we recommend its installation on both sides of withdrawable device for increasing safety in servicing electrical device	0.168	1
OD-BL-KS03	20920	Insulating grommets - for rear connection - are intended for fixed design of switching unit and withdrawable device with rear connection - insulate connecting sets of rear connection from switchboard structure - we recommend installing on all connecting sets with rear connection - set (3 pieces)	0.1	1
OD-BL-UP01	13621	Lever with locking - enables to lock the lever of circuit breaker in „switched off manually“ position (loaded) - locking is possible using up to three padlocks with max. shank diameter 4 ÷ 6 mm	0.041	1
OD-BL-VP01	13924	Bolt sealing insert enables sealing for: - overcurrent release - cover of cavities	0.003	2
OD-BL-KA01	21030	Connecting cable - for connecting circuit breaker accessories in withdrawable design - 15 wires	0.12	1
SO-BL-0010	21020	Signalling of position - signals circuit breaker/switch-disconnector position in withdrawable design - TECHNICAL INFORMATION, see page H28	0.02	1
OD-BL-M502	14855	Mounting bolts set - for withdrawable device - bolts M8x60	0.144	1
OD-BL-KT01	14643	Cover of switch on button - for motor drive, cover can be sealed - TECHNICAL INFORMATION, see page H43	0.019	1

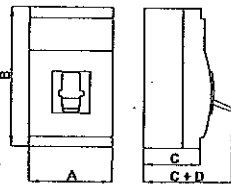
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS



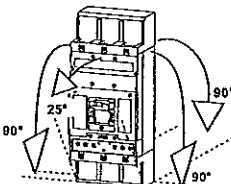
Circuit breaker



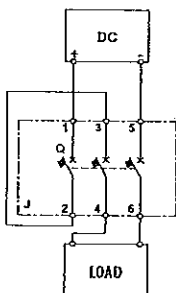
Switch-disconnector



Dimensions



Mounting



Connection of switch-disconnector for DC circuits

Specifications

Type	CIRCUIT BREAKERS	SWITCH-DISCONNECTORS
Series	SUPERIOR	
Dimensions A x B x C + D	210 x 350 x 135 + 63 mm	210 x 350 x 135 + 63 mm
Weight	22 kg	22 kg
Standards	EN 60947-2 IEC 60947-2	EN 60947-3 IEC 60947-3
Approval marks		
Number of poles	3	3
Rated current	I_n 630, 1 000, 1 250, 1 600 A	-
Rated normal current	I_n 1 600 A	1 600 A
Rated operating current	I_{op} -	1 600 A
Rated operating voltage	U_e max. 690 V a.c. ^{a)}	max. 690 V a.c. ^{a)} max. 440 V d.c. ^{a)}
Rated frequency	f_n 50/60 Hz	50/60 Hz
Rated impulse withstand voltage	U_{imp} 8 kV	8 kV
Rated insulation voltage	U_i 690 V	690 V
Utilization category (selectivity)	690 V a.c. A, B	-
Utilization category (switching mode)	690 V a.c. 440 V d.c.	AC-23B DC-23B
Rated short-time withstand current at $U_e = 690$ V a.c.	I_{cs} / t 20 kA/1 s	20 kA/1 s
Rated short-circuit ultimate breaking capacity (rms) ^{b)}	I_{cu} / U_e 85 kA/230 V a.c. 65 kA/415 V a.c. 45 kA/500 V a.c. 20 kA/690 V a.c.	-
Switching off time at I_{cs}	t_{cs} 30 ms	-
Rated short-circuit service breaking capacity (rms)	I_{sc} / U_e 45 kA/230 V a.c. 36 kA/415 V a.c. 30 kA/500 V a.c. 20 kA/690 V a.c.	-
Rated short-circuit making capacity	I_{cm} / U_e 140 kA/415 V a.c.	40 kA/415 V a.c. 40 kA/440 V d.c.
Losses per 1 pole fixed/withdrawable design	120 W/300 W	120 W/300 W
Mechanical endurance	10 000 cycles	10 000 cycles
Electrical endurance	4 000 cycles	4 000 cycles
Switching frequency	120 cycles/hr	120 cycles/hr
Control force	230 N	230 N
Degree of protection from front side of the device	IP40	IP40
Degree of protection of terminals	IP20	IP20
Operating conditions		
Reference ambient temperature	40 °C	40 °C
Ambient temperature range	-40 ... +55 °C	-40 ... +55 °C
Working environment	dry and tropical climate	dry and tropical climate
Climatic resistance	EN 60068	EN 60068
Pollution degree	3	3
Max. sea level	2 000 m	2 000 m
Seismic resistance	3g (8 + 50) Hz	3g (8 + 50) Hz
Design modifications		
Front/rear connection	•/•	•/•
Plug-in design	-	-
Withdrawable design	•	•
Accessories		
Switches - auxiliary/relative/signal/early	•/•/-/-	•/•/-/-
Shunt trip	•	•
Undervoltage release/with early switch	•/-	•/-
Front hand drive/with adjustable lever	•/•	•/•
Mechanical interlocking - with Bowden cable/for hand drive	•/•	•/•
Motor drive/with counter of cycles	•/•	•/•
Lever with locking	•	•
Bolt sealing insert/additional cover for overcurrent release	•/-	•/-

• available, - unavailable

^{a)} - in case circuit breaker connection is reversed (input terminals 2, 4, 6, output terminals 1, 3, 5) I_{cs} does not change

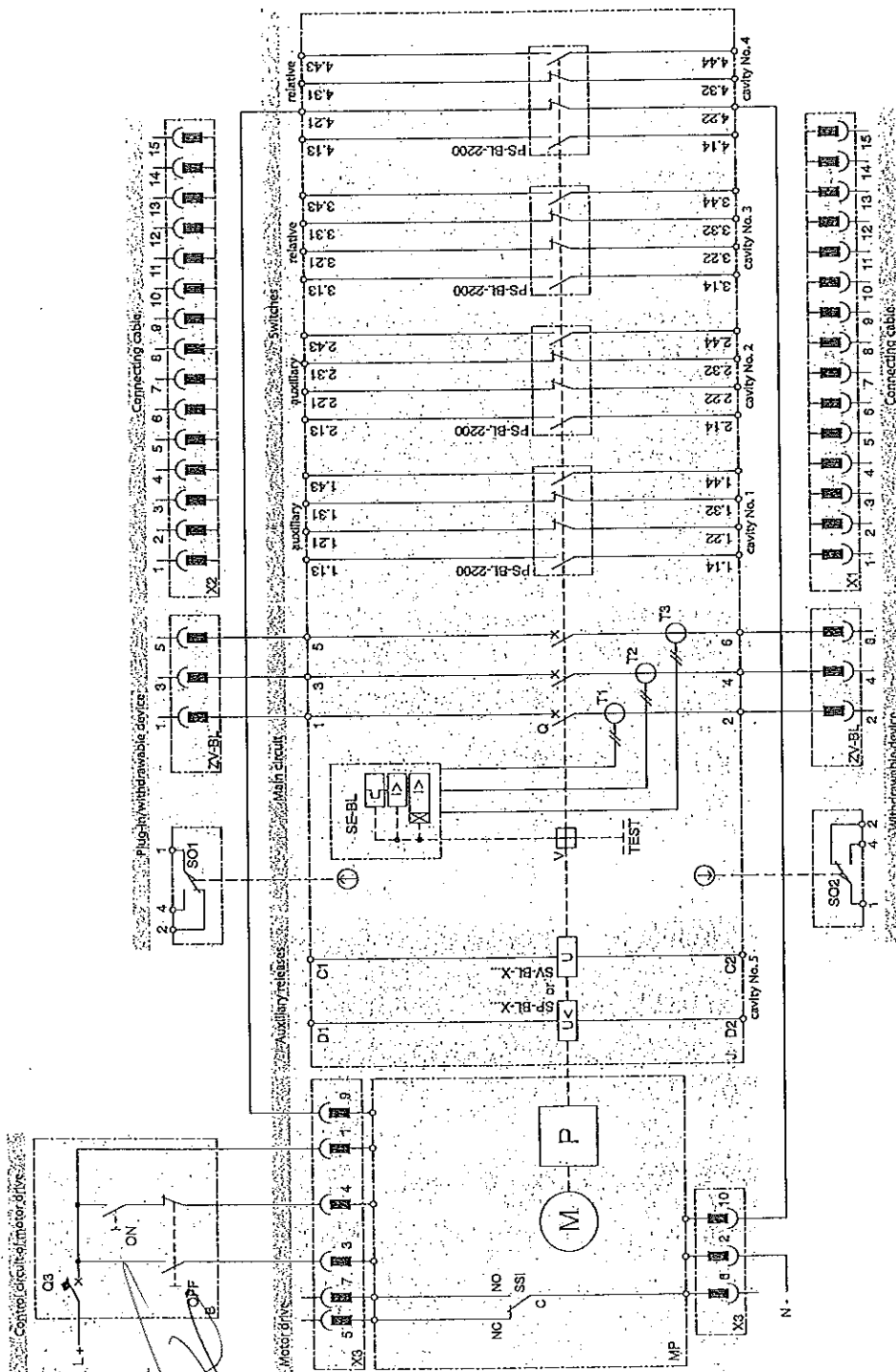
^{b)} - in IT networks up to 500 V a.c.

- protection of Modelion switch-disconnectors, see page R

CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Diagram

Circuit breaker with accessories



- MP motor drive - MP-BE-X
- M motor
- P storage device
- X3 connector for connection of control circuits
- SS1 switch to indicate MANUAL (NO-C)/AUTO (NC-C)
- B recommended wiring of the control circuits
- ON it is not a part of motor drive
- OFF switch off button
- C3 motor drive circuit breaker; see page H45
- switching unit - BL1000SE50S, BL1600SE50S
- main contacts
- current transformers
- trip-free mechanism
- overcurrent release - SE-BL-... SE-BL-... (EST)
- push button to test release
- withdrawable device - ZV-BL-1600-300
- connecting cable for withdrawable device - OP-BL-KA01
- contacts signalling circuit breaker/switch-disconnector position
- in withdrawable device - SO-BL-0010 - for more detailed information see page H30
- SP-BL-X undervoltage release
- SV-BL-X shunt trip

CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Connecting and installation

Power circuit

connected with Cu/Al busbars or cables, and possibly cables with cable lugs

connection sets are produced to provide greater connecting options see page H7

generally, conductors from the supply are connected to input terminals 1, 3, 5 and conductors from the load to terminals 2, 4, 6; however, it is possible to reverse the connection (exchanging input and output terminals without affecting rated short-circuit ultimate breaking capacity I_{sc})

In case of reversed connection, circuit breaker/switch-disconnector must be fitted with ODBL-02 insulating barriers also on the side of terminals 2, 4, 6, for more detailed information see page H16

We recommend painting the connecting busbars

input and output conductors/busbars must be mechanically reinforced to avoid transferring electrodynamic force to the circuit breaker/switch-disconnector during short-circuiting

the method of connecting the power circuit must observe the delonization space of the circuit breaker/switch-disconnector, see page H16

Auxiliary circuits

switches, shunt trips or undervoltage releases are connected using flexible Cu conductors with cross-section $0.5 \div 1 \text{ mm}^2$ directly to terminals on these devices

motor drive and auxiliary circuits of the plug-in or withdrawable design are connected using a connector

Recommended min. cross-section of cables and busbars (flexibars) for fixed and withdrawable design

I _n (A)	Cables (mm ²)		Busbars (x x H (mm))	
	Cu	Al	Cu	Al
250	120	150		
400	185	240		
500	2x 150	2 x 185		
630	2x 185	2 x 240		
800	2x 240	3 x 240	50 x 10; 2x 50 x 5	2x 50 x 8
1 000	2x 240	3 x 240	2x 50 x 6	2x 50 x 10
1 300	3x 240	4 x 240	2x 50 x 10	
1 500 (1 450) ¹⁾	4x 240			
1 600 (1 450) ²⁾			2x 50 x 10 ³⁾	

¹⁾ withdrawable device connected by 2x 50 x 10 mm Cu busbar can be loaded with max. 1 450 A. For 1 600 A loading, the withdrawable device must be connected with 2x 50 x 12 mm busbar.

- it is necessary to follow the relevant valid standards when cables are designed

Maximum circuit breaker/switch-disconnector loads in accordance with ambient temperature

Circuit breaker/switch-disconnector BL1000S

- connection by Cu busbars 2x 50 x 6 mm per pole

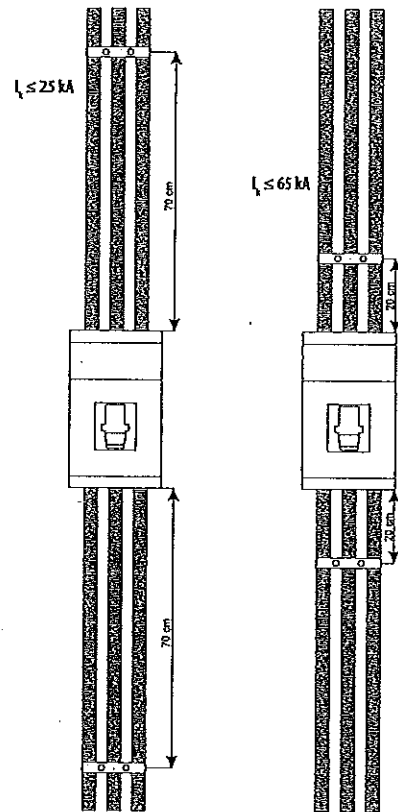
1 000 A	1 000 A	940 A	870 A	800 A
---------	---------	-------	-------	-------

Circuit breaker/switch-disconnector BL1600S

- connection by Cu busbars 2x 50 x 10 mm per pole

1 400 A	1 300 A	1 200 A	1 100 A	1 000 A
---------	---------	---------	---------	---------

Mechanical reinforcement of conductors for BL1000, BL1600



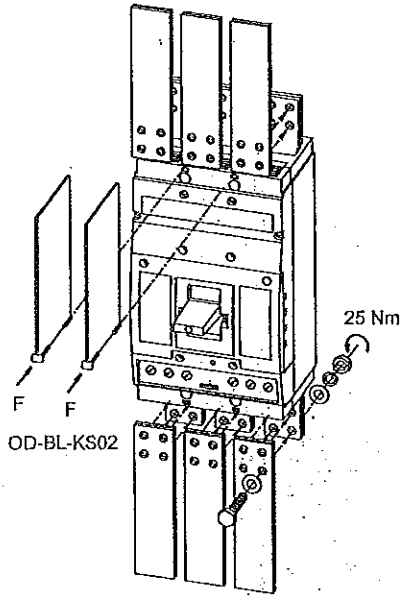
Connecting set specification

Type	I _n (A)	Cables (name of conductor and cross-section in mm ²)					Dimensions (height x width) (mm)	Dimensions (height x width) (mm)
		type of cable	flexible stranded	flexible solid	round stranded	round solid		
CS-BL-W010	800		2x (70 ÷ 240) Cu/Al	2x (95 ÷ 300) Cu/Al	2x (50 ÷ 185) Cu/Al	2x (70 ÷ 240) Cu/Al		page H18, H25
CS-BL-W011	500		70 ÷ 240 Cu/Al	95 ÷ 300 Cu/Al	50 ÷ 185 Cu/Al	70 ÷ 240 Cu/Al		page H18, H26
CS-BL-B002	1 000		2x (150 ÷ 300) Cu/Al	2x (150 ÷ 300) Cu/Al	2x (150 ÷ 300) Cu/Al	2x (150 ÷ 300) Cu/Al		page H19
CS-BL-B003	1 500		3x (150 ÷ 300) Cu/Al	3x (150 ÷ 300) Cu/Al	3x (150 ÷ 300) Cu/Al	3x (150 ÷ 300) Cu/Al		page H19, H26
CS-BL-B004	1 600		4x (150 ÷ 300) Cu/Al	4x (150 ÷ 300) Cu/Al	4x (150 ÷ 300) Cu/Al	4x (150 ÷ 300) Cu/Al		page H20, H27
CS-BL-A022	1 000					50 x ...		page H17/H27
CS-BL-A021	1 600					50 x ...		page H17
CS-BL-A010	1 600					50 x ...		page H24
CS-BL-A020	1 600					50 x ...		page H25
CS-BL-A015	1 600					50 x ...		page H20
CS-BL-A016	1 600					50 x ...		page H21

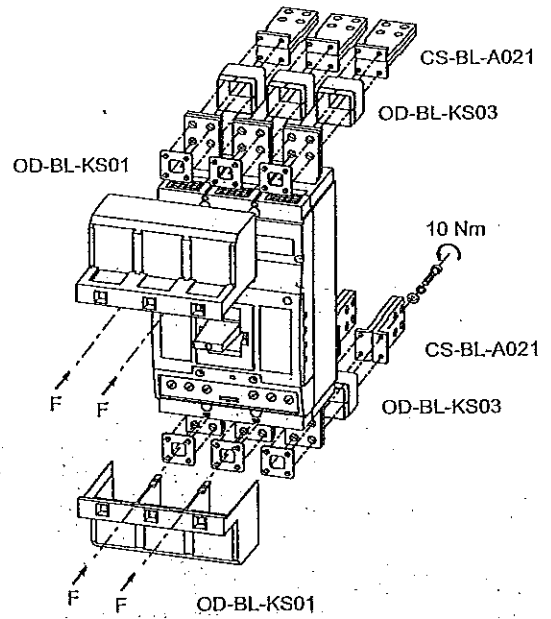
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Connecting and installation

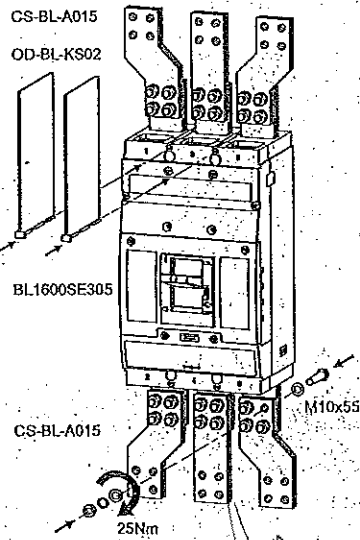
Front connection - busbars



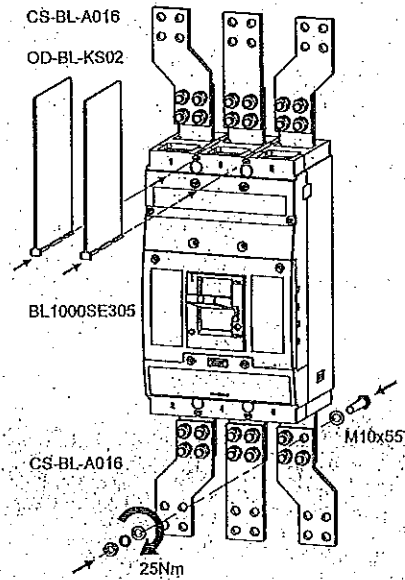
Rear connection



Front connection - busbars



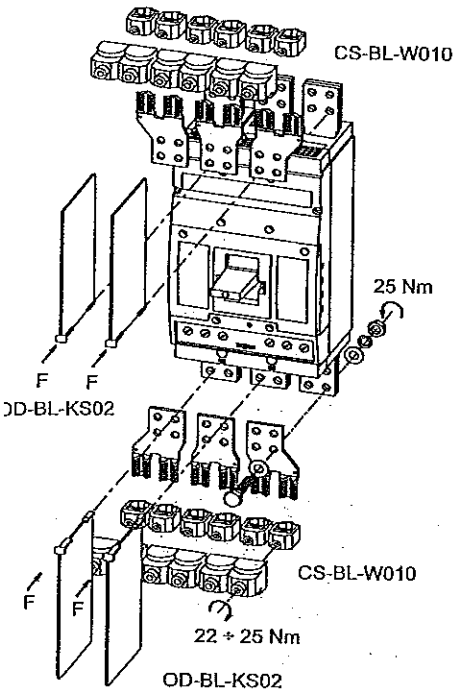
Front connection - busbars



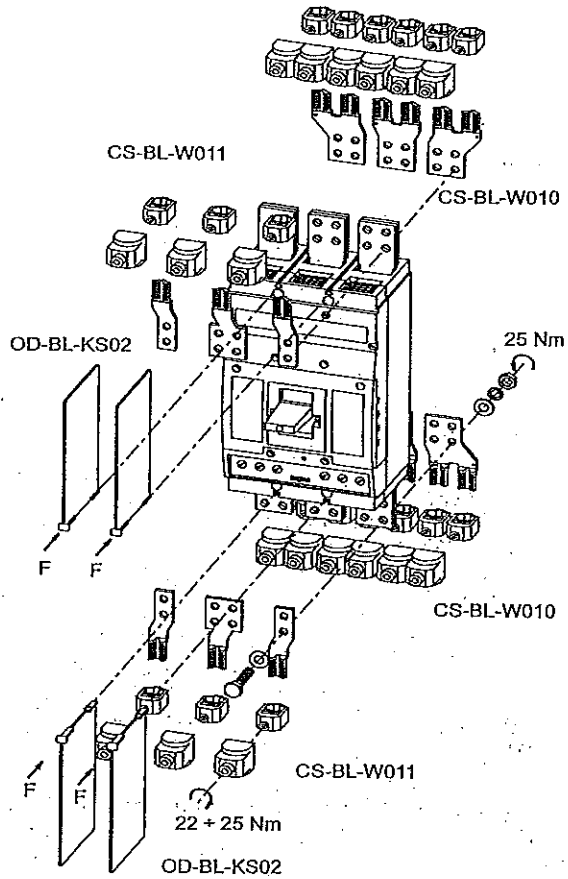
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Connecting and installation

Front connection - 2 Cu, Al cables

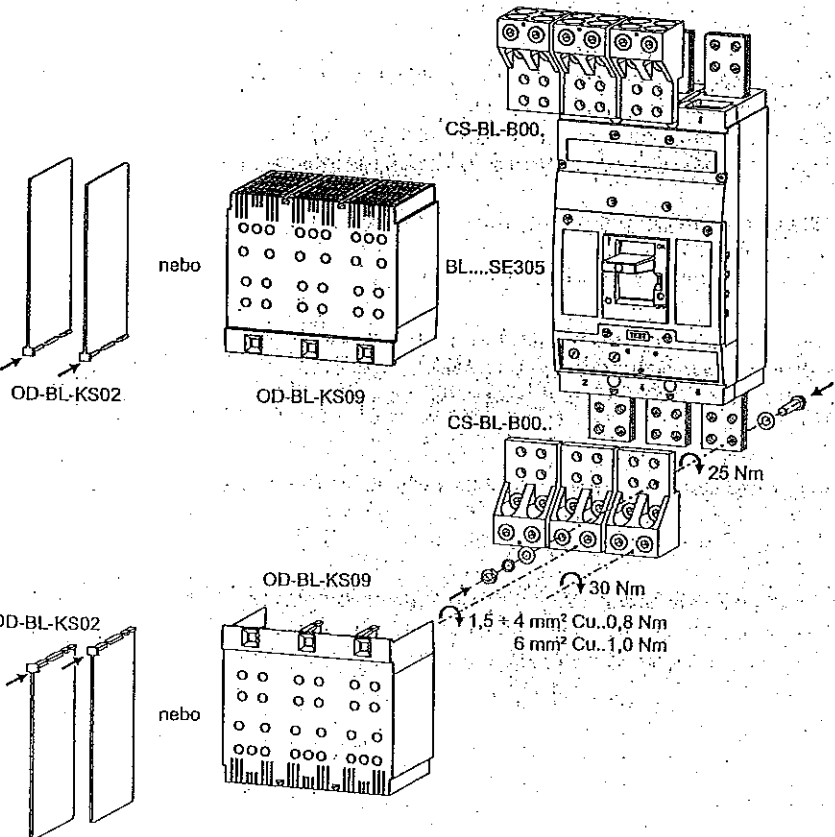


Front connection - 3 Cu, Al cables (not for BL1000SE305 switching unit)



Front connection - cables

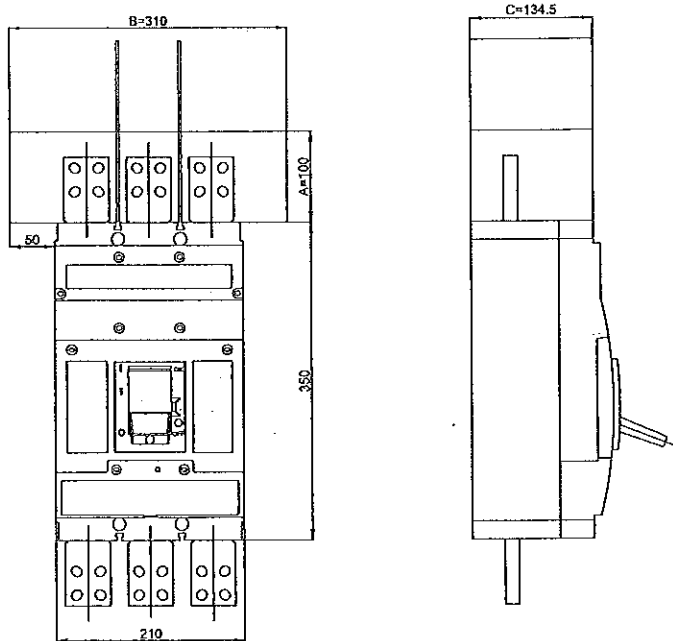
- Cu/Al cables - connecting sets CS-BL-B002
- Cu/Al cables - connecting sets CS-BL-B003
- Cu/Al cables - connecting sets CS-BL-B004



CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Deionization spaces

A, B, C - minimum deionization space free of earthed metal parts



Applicable for operational voltage $U_e \leq 690$ V a.c./d.c. (DC only for switch-disconnector)

USE OF INSULATING BARRIERS AND TERMINAL COVERS WITH CIRCUIT BREAKERS AND SWITCH-DISCONNECTORS

■ FIXED DESIGN

- front connection
 - terminals 1, 3, 5 (upper side)
 - OD-BL-KS02 insulating barriers must always be installed on circuit breaker/switch-disconnector
 - terminals 2, 4, 6 (lower side)
 - a) if circuit breaker/switch-disconnector is connected to the supply using terminals 2, 4, 6, OD-BL-KS02 insulating barriers must always be installed on it
 - b) if circuit breaker/switch-disconnector is connected on lower side using clamp or block type terminals, OD-BL-KS02 insulating barriers must always be installed on it
- rear connection
 - terminals 1, 3, 5 (upper side)
 - OD-BL-KS01 insulating cover or OD-BL-KS02 insulating barriers must always be installed on circuit breaker/switch-disconnector
 - we recommend installing OD-BL-KS03 insulating grommets with all sets for rear connection
 - terminals 2, 4, 6 (lower side)
 - if circuit breaker/switch-disconnector is connected to the supply using terminals 2, 4, 6, OD-BL-KS01 insulation cover must always be installed on it
 - we recommend installing OD-BL-KS03 insulating grommets with all sets for rear connection

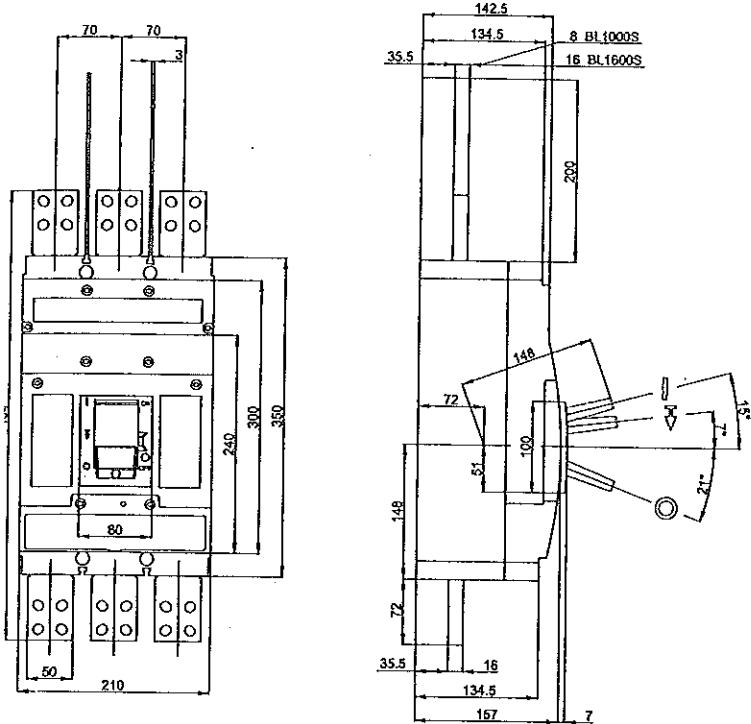
■ WITHDRAWABLE DESIGN

- front connection
 - terminals 1, 3, 5 (upper side)
 - withdrawable device is connected on upper side using clamp or block type terminals, OD-BL-KS08 insulating barriers must always be installed — in all other cases, we recommend installing OD-BL-KS04 insulating cover on upper side of the device
 - terminals 2, 4, 6 (lower side)
 - if withdrawable device is connected on lower side using clamp or block type terminals, OD-BL-KS08 insulating barriers must always be installed — in all other cases, we recommend installing OD-BL-KS04 insulating cover on lower side of withdrawable device

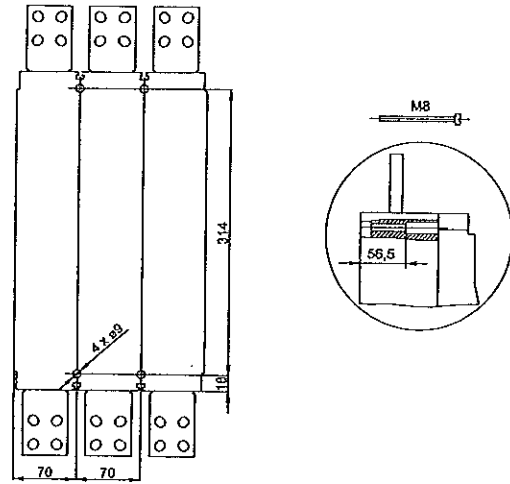
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

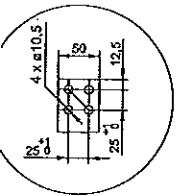
Standard design, front connection



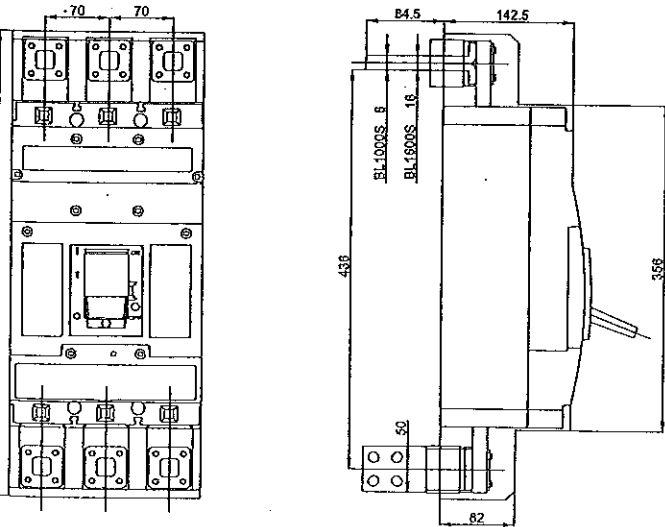
Drilling diagram



Connecting busbar modification



Standard design, rear connection (CS-BL-A021, CS-BL-A022 connecting sets)



Openings for insulation grommets

