

## ОПИС НА ДОКУМЕНТИТЕ, СЪДЪРЖАЩИ СЕ В ОФЕРТАТА

за участие в процедура за възлагане на обществена поръчка с предмет:  
Модернизация (ретрофит) на възлови разпределителни станции 20 (10) кв и изграждане на  
вериги на телемеханика, реф. № PPD 18-103

Наименование на документа	Форма на документа (оригинал или заверено копие)/ Страница № (да се попълни)
<b>1. Опис на документите, съдържащи се в заявлението за участие – оригинал по образец на Възложителя</b>	1 - 6
<b>2. Информация относно личното състояние и критериите за подбор на участника "Старт инженеринг" АД</b>	
<b>2.1. Единен европейски документ за обществени поръчки (ЕЕДОП)</b>	
2.1.1 Единен европейски документ за обществени поръчки (ЕЕДОП) на „Старт инженеринг“ АД	оригинал на CD – 1 брой, електронно подписан
2.1.2. Единен европейски документ за обществени поръчки (ЕЕДОП) на трето лице за процедурата – проектант по част Конструктивна - инж. Валентин Христов Христов	оригинал на CD – 1 брой, електронно подписан
2.2. Заверено с «вярно с оригинала» копие на Удостоверение за вписване на „Старт-Инженеринг“ АД в ЦПРС към КС в България № I-TV004471, първа група, строежи от първа до пета категория, валидно до 30.09.2019г.	7
2.3. Заверено с «вярно с оригинала» копие на Удостоверение за вписване на „Старт-Инженеринг“ АД в ЦПРС към КС в България № II-TV001121, втора група, строежи от първа до четвърта категория, валидно до 30.09.2019г.	8
2.4. Заверено с «вярно с оригинала» копие на Удостоверение за вписване на „Старт-Инженеринг“ АД в ЦПРС към КС в България № III-TV001131 трета група, строежи от първа до пета категория, валидно до 30.09.2019г	9
2.5. Заверено с «вярно с оригинала» копие на Удостоверение за вписване на „Старт-Инженеринг“ АД в ЦПРС към КС в България № IV-TV002142 четвърта група, строежи от първа до пета категория, валидно до 30.09.2019г.	10
2.6. Нотариално заверено копие на Сертификат БДС EN ISO 9001:2015 - сертификат за внедрена и прилагана система за управление на качеството в съответствие с изискванията на стандарта, с обхват проектиране, производство и монтаж на технологични съоръжения, промишлено оборудване и машини, метални конструкции, ел. табла, ел. инсталации, електрически уредби, пусково-наладъчни дейности на електрически съоръжения до и над 1000V, контролно-измервателни прибори и автоматизация, програмиране, внедряване, гаранционно и следгаранционно обслужване на системи за автоматично управление на технологични процеси /СКАДА/, отоплителни, вентилационни и охладителни инсталации, издаден на „Старт	11

инженеринг" АД от ЕМ ЕС-СЕРТ България ООД, дата на издаване 06.08.2017г., валиден до 05.08.2020г.	
2.7. Заверено с «вярно с оригинала» копие на Сертификат БДС EN ISO 14001:2015 - сертификат за внедрена и прилагана система за управление на околната среда в съответствие с изискванията на стандарта, с обхват проектиране, производство и монтаж на технологични съоръжения, промишлено оборудване и машини, метални конструкции, ел. табла, ел. инсталации, електрически уредби, пусково-наладъчни дейности на електрически съоръжения до и над 1000V, контролно-измервателни прибори и автомаатизация, програмиране, внедряване, гаранционно и следгаранционно обслужване на системи за автоматично управление на технологични процеси /СКАДА/, отоплителни, вентилационни и охладителни инсталации, издаден на „Старт инженеринг“ АД от ЕМ ЕС-СЕРТ България ООД, дата на издаване 06.08.2017г., валиден до 05.08.2020г..	12
2.8. Заверено с «вярно с оригинала» копие на Сертификат BS OHSAS 18001:2007 - сертификат за внедрена и прилагана система за управление на здравето и безопасността при работа в съответствие с изискванията на стандарта, с обхват проектиране, производство и монтаж на технологични съоръжения, промишлено оборудване и машини, метални конструкции, ел. табла, ел. инсталации, електрически уредби, пусково-наладъчни дейности на електрически съоръжения до и над 1000V, контролно-измервателни прибори и автомаатизация, програмиране, внедряване, гаранционно и следгаранционно обслужване на системи за автоматично управление на технологични процеси /СКАДА/, отоплителни, вентилационни и охладителни инсталации, издаден на „Старт инженеринг“ АД от ЕМ ЕС-СЕРТ България ООД, дата на издаване 06.08.2017г., валиден до 08.08.2019г.	13
2.9. Заверено с «вярно с оригинала» копие на Сертификат за акредитация на „Старт инженеринг“ АД съгласно БДС EN ISO/IEC 17020:2012, БСА регистрация № 232 ОКС, като Орган за контрол от вид С/издаден на 26.11.2018г., валиден до 26.11.2022г.	14-18
2.10. Заверено с «вярно с оригинала» копие на Удостоверение от НАП, териториална дирекция София-ГДО, изх.№290201800337684/12.11.2018г. за липса на задължения на „Старт инженеринг“ АД.	19
2.11. Заверено с «вярно с оригинала» копие на Удостоверение от Столична община, дирекция общински приходи, отдел ОП Сердика (оизх. № 7220009419/25.10.2018г. за липса на задължения на „Старт инженеринг“ АД по закона за местни данъци и такси.	20
2.12. Заверено с «вярно с оригинала» копие на Удостоверение по чл. 58, ал.1, т.3 от ЗОП – издадено от Изпълнителна агенция „Главна инспекция по труда“ на „Старт инженеринг“ АД – изх.№ 18046790/27.04.2018г.	21
2.13. Заверено с «вярно с оригинала» копие на Удостоверение от Агенция по вписванията, изх.№20180309090850/09.03.2018г. за „Старт инженеринг“ АД	22-27
2.14.1 Заверено с «вярно с оригинала» копие на Удостоверение от Агенция по вписванията, изх.№20180309090949/09.03.2018г. за липса на вписани обстоятелства ликвидация за „Старт инженеринг“ АД	28
2.14.2 Заверено с «вярно с оригинала» копие на Удостоверение от Агенция по вписванията, изх.№20180309091053/09.03.2018г. за липса на вписани обстоятелства несъстоятелност за „Старт инженеринг“ АД	29 - 30

2.15. Заверено с «вярно с оригинала» копие на Застраховка „Професионална отговорност за проектиране за строежи първа категория“, [300000,00][BGN]валута. Застрахователна полица, издадена от ДЗИ –Общо застраховане ЕАД на „Старт инженеринг“ АД, № 212218213000419/ 30.10.2018г., валидна до 04.11.2019г.	31 - 32
2.16. Заверено с «вярно с оригинала» копие на Застраховка „Професионална отговорност“ за строителство за строежи първа категория“, [600000,00][BGN]валута. Застрахователна полица, издадена от ДЗИ –Общо застраховане ЕАД на „Старт инженеринг“ АД, № 212218213000421/01.11.2018г., валидна до 04.11.2019г.	33 - 34
2.17. Заверено с «вярно с оригинала» копие на Застраховка „Обща гражданска отговорност на „Старт-Инженеринг“ АД като контролен орган от вида „С““. Застрахователна полица, издадена от ДЗИ –Общо застраховане ЕАД на „Старт инженеринг“ АД № 212218213000177/30.10.2018г., валидна до 04.11.2019г.	35 - 36
2.18. Списък на договори за строителство, индентично или сходно с предмета на обществената поръчка - оригинал	37 - 45
2.19. Заверено с «вярно с оригинала» копие на Удостоверение за добро изпълнение: № CD-DOC-14432/13.12.2017 г., издадено от „ЧЕЗ РАЗПРЕДЕЛЕНИЕ България“ АД	46 - 47
2.20. Заверено с «вярно с оригинала» копие на Удостоверение за добро изпълнение: № 2679/24.07.2017 г., издадено от „Метрополитен“ ЕАД, гр.София.	48 - 49
2.21. Заверено с «вярно с оригинала» копие на Удостоверение за добро изпълнение: № 2676/24.07.2017 г., издадено от „Метрополитен“ ЕАД, гр.София	50 - 51
2.22. Заверено с «вярно с оригинала» копие на Удостоверение за добро изпълнение: № 2677/24.07.2017 г., издадено от „Метрополитен“ ЕАД, гр.София	52 - 53
2.23. Заверено с «вярно с оригинала» копие на Удостоверение за добро изпълнение: № 2678/24.07.2017 г., издадено от „Метрополитен“ ЕАД, гр.София	54 - 55
2.24. Списък на персонала, служители на „Старт инженеринг“ АД, с определена професионална компетентност за изпълнението на поръчката – оригинал	56 - 58
2.25. Заверено с «вярно с оригинала» копие на Удостоверение за пълна проектантска правоспособност - №010881 на Проектант по част „Електрическа“ - инж. Людмила Симеонова Пеева-Ваклина	59
2.26. Заверено с «вярно с оригинала» копие на Удостоверение за пълна проектантска правоспособност - №01923 на трето лице за процедурата – проектант по част Конструктивна - инж. Валентин Христов Христов	60
2.27. Заверено с «вярно с оригинала» копие на Застрахователна полица, издадена от „Алианц България“ – Застрахователно акционерно дружество на Валентин Христов Христов - трето лице за процедурата – проектант по част Конструктивна - инж. Валентин Христов Христов - № 13180181760000014/13.03.2018г., валидна до 20.03.2019г.	61
2.28. Декларация за ангажираност на трето лице за процедурата – проектант по част Конструктивна - инж. Валентин Христов Христов – оригинал	62

<b>3. Техническо предложение</b>	
3.1. Предложение за изпълнение на поръчката за обособена позиция 1 – оригинал по образец на Възложителя	63-64
3.2 Приложение 1 – Срокове за изпълнение на ретрофита – оригинал по образец на Възложителя	65
3.3 Приложение 2 – Техническо предложение за оборудване – оригинал по образец на Възложителя	66-71
3.3.1 Приложение 1.1 - Техническо описание на прекъсвача, в т.ч. гарантирани параметри и съоръжаване	72-158.
3.3.2 Приложение 1.2. - Протоколи от типови изпитвания на английски или български език, проведени от независима акредитирана изпитвателна лаборатория– заверени копия (и допълнителни изпитвания, ако са проведени), с приложен списък на отделните изпитвания на български език.	159-195
3.3.3 Приложение 1.3 Сертификат/акредитация на независимата изпитвателна лаборатория, провела типовите изпитвания – заверено копие	196-206
3.3.4 Приложение 1.4 Декларация от Участника, че предложеното оборудване в процедурата отговаря на минималните технически изисквания на Възложителя, посочени в таблица 1 - оригинал	202
3.3.5 Приложение 2.1 - Последно издание на каталога на производителя	203-289
3.3.6 Приложение 2.2 - Удостоверение за одобряване на типа на токовите измервателни трансформатори, издадено по реда и при условията на Закона за измерванията – заверено копие	290-291
3.3.7 Приложение 2.3 - Протоколи от типови изпитвания на токовите измервателни трансформатори на английски или български език, проведени от независима изпитвателна лаборатория с приложени резултати от изпитванията, представени при доставка– заверено копие	292-321
3.3.8 Приложение 2.4 - Сертификат/акредитация на независимата изпитвателна лаборатория, провела типовите изпитвания – заверено копие	322-367
3.3.9 Приложение 2.5 - Декларация от Участника, че предложеното оборудване в процедурата отговаря на минималните технически изисквания на Възложителя, посочени в таблица 2 - оригинал	368
3.3.10 Приложение 3.1 - Последно издание на каталога на производителя	369-455
3.3.11 Приложение 3.2 - Удостоверение за одобряване на типа на НИТ, издадено по реда и при условията на Закона за измерванията – заверено копие	456-458
3.3.12 Приложение 3.3 - Протокол от първоначална метрологична проверка, проведена от оправомощена лаборатория, съгласно действащото в Република България законодателство в областта на измерванията (представя се при доставка за всеки НИТ) – заверено копие	459

3.3.13 Приложение 3.4 - Сертификат/акредитация на независимата изпитателна лаборатория, провела типовите изпитвания – заверено копие	460-505
3.3.14 Приложение 3.5 - Декларация от Участника, че предложеното оборудване в процедурата отговаря на минималните технически изисквания на Възложителя, посочени в таблица 3 - оригинал	506
3.3.15 Приложение 4.1 - Техническо описание на прекъсвача, в т.ч. гарантирани параметри и съоръжаване	507-593
3.3.16 Приложение 4.2 - Протоколи от типови изпитвания на английски или български език, проведени от независима акредитирана изпитвателна лаборатория– заверени копия (и допълнителни изпитвания, ако са проведени), с приложен списък на отделните изпитвания на български език.	594-624
3.3.17 Приложение 4.3 - Сертификат/акредитация на независимата изпитвателна лаборатория, провела типовите изпитвания – заверено копие	625-630
3.3.18 Приложение 4.4 - Декларация от Участника, че предложеното оборудване в процедурата отговаря на минималните технически изисквания на Възложителя, посочени в таблица 4 – оригинал	631
3.3.19 Приложение 5.1 - Последно издание на каталога на производителя	632-719
3.3.20 Приложение 5.2 - Удостоверение за одобряване на типа на токовите измервателни трансформатори, издадено по реда и при условията на Закона за измерванията – заверено копие	720-721
3.3.21 Приложение 5.3 - Протоколи от типови изпитвания на токовите измервателни трансформатори на английски или български език, проведени от независима изпитателна лаборатория с приложени резултати от изпитванията, представени при доставка– заверено копие	722-751
3.3.22 Приложение 5.4 - Сертификат/акредитация на независимата изпитателна лаборатория, провела типовите изпитвания – заверено копие	752-797
3.3.23 Приложение 5.5 - Декларация от Участника, че предложеното оборудване в процедурата отговаря на минималните технически изисквания на Възложителя, посочени в таблица 5 – оригинал	798
3.3.24 Приложение 6.1 - Последно издание на каталога на производителя	799-884
3.3.25 Приложение 6.2 - Удостоверение за одобряване на типа на НИТ, издадено по реда и при условията на Закона за измерванията – заверено копие	885-887
3.3.26 Приложение 6.3 - Протокол от първоначална метрологична проверка, проведена от оправомощена лаборатория, съгласно действащото в Република България законодателство в областта на измерванията (представя се при доставка за всеки НИТ) – заверено копие	888-926
3.3.27 Приложение 6.4 - Сертификат/акредитация на независимата изпитателна лаборатория, провела типовите изпитвания – заверено копие	927-972
3.3.28 Приложение 6.5 - Декларация от Участника, че предложеното оборудване в процедурата отговаря на минималните технически изисквания на Възложителя, посочени в таблица 6 – оригинал	973
3.3.29 Приложение 7.1 - Техническо описание, включващо гарантирани параметри, съгласно общите изисквания към обекта на поръчката - оригинал с подпис и печат на участника	974-976
3.3.30 Приложение 7.2 - Каталог на предлаганото оборудване по поръчката	977-1006
3.3.31 Приложение 7.3 - Декларация от Участника, че предложеното оборудване в процедурата отговаря на минималните технически изисквания на Възложителя, посочени в таблица 7 – оригинал	1007
3.3.32 Приложение 8.1 - Декларация от Участника, че предложеното оборудване в процедурата отговаря на минималните технически изисквания на Възложителя, посочени в таблица 8 - оригинал	1008

3.4. Декларация за приемане на условията в проекта на договор – оригинал по образец на Възложителя	1009
3.5. Декларация за срока на валидност на офертата – оригинал по образец на Възложителя	1010
<b>4. ПЛИК „ПРЕДЛАГАНИ ЦЕНОВИ ПАРАМЕТРИ“</b>	
4.1. Ценово предложение – оригинал по образец на Възложителя	1
4.1.1. Приложение № 1 - ОБОСОБЕНА ПОЗИЦИЯ № 1 – Стойностна сметка	2
4.1.1.1. Приложение № 1.1 – Цена за изготвяне на работен проект, съгласно техническото задание на възложителя и наредба № 4 от 21.05.2001 г. за обхвата и съдържанието на инвестиционните проекти, необходими за изпълнение на ретрофита по обособена позиция № 1	3 - 4
4.1.1.2. Приложение № 1.2 - Цена за осъществяване на авторски надзор по време на смр по обособена позиция № 1	5
4.1.1.3. Приложение № 1.3 - Количествено-стойностна сметка (КСС) за доставка на материали, апаратура, оборудване и съоръжения за изпълнение на модернизацията (ретрофит) на възлови разпределителни станции СР.Н. по обособена позиция № 1	6-8
4.1.1.4. Приложение № 1.4 - Количествено-стойностна сметка (КСС) за изпълнение на необходимите дейности за изпълнение на модернизацията (ретрофит) на възлови разпределителни станции СР.Н. по обособена позиция № 1	9-10
4.1.1.5. Приложение № 1.5 - Цена и доставка на резервни части по обособена позиция № 1	11
4.1.1.6. Приложение № 1.6 - Цена за изготвяне на програма и обучение на специалисти на възложителя по обособена позиция № 1	12
4.1.1.7. Приложение № 1.7 - Цена за изготвяне на екзекутивна документация по обособена позиция № 1	13

Дата 17.12.2018 г.

ПОДПИС И ПЕЧАТ:

На основание чл.36а ал.3 от ЗОП

**Председател на Съвета на директорите  
на „Старт-Инженеринг“ АД**



# КАМАРА НА СТРОИТЕЛИТЕ В БЪЛГАРИЯ

ЦЕНТРАЛЕН ПРОФЕСИОНАЛЕН РЕГИСТЪР НА СТРОИТЕЛЯ

## УДОСТОВЕРЕНИЕ

№ 1 - TV 004471

Комисията за воденето, поддържането и ползването на Централния професионален регистър на строителя, на основание чл. 19 от Закона за камарата на строителите, издава настоящото удостоверение на:

Строител: **СТАРТ ИНЖЕНЕРИНГ АД**  
Седалище и адрес на управление: **1220 София, ул. "Локомотив" № 3**  
Представляващ: **Стоил Колев Стоилов**  
ЕИК: **030217255**

В уверение на това, че с решение на комисията и протокол 0069/06.11.2008 строителят е вписан в Централния професионален регистър на строителя за изпълнение на строежи със следния обхват:

На основание чл. 5, ал. 1 от Правилника за реда за вписване и водене на Централния професионален регистър на строителя:

● **ПЪРВА ГРУПА** ● - строежи от високото строителство, прилежащата му инфраструктура, електронни съобщителни мрежи и съоръжения;

На основание чл. 5, ал. 4 от Правилника за реда за вписване и водене на Централния професионален регистър на строителя:

● **СТРОЕЖИ ОТ ПЪРВА ДО ПЕТА КАТЕГОРИЯ** ● (с изключение на тези по чл. 5, ал. 6, т. 1.1.6 и т. 1.4.4 и т. 1.5.6)  
Конкретният вид на строежите, за които се издава настоящото удостоверение, се определя в чл. 5, ал. 6 от Правилника за реда за вписване и водене на Централния професионален регистър на строителя и във връзка с чл. 137, ал. 1 от ЗУТ.

КАМАРА НА СТРОИТЕЛИТЕ В БЪЛГАРИЯ  
ЦЕНТРАЛЕН ПРОФЕСИОНАЛЕН РЕГИСТЪР



ТАЛОН № 1 - TV 11

Строител: **СТАРТ ИНЖЕНЕРИНГ АД**  
ЕИК: **030217255**  
НАСТОЯЩИЯ ТАЛОН СЕ ИЗДАВА НА ОСНОВАНИЕ НА РЕДА ЗА ВПИСВАНЕ И ВОДЕНЕ НА ЦЕНТРАЛНИЯ РЕГИСТЪР НА СТРОИТЕЛЯ И Е НЕРАЗДЕЛНА ЧАСТ ОТ УДОСТО

№ 1 - TV 004471

ВАЛИДНОСТ НА ТАЛОНА: 3

Председател на комисията

• София • 2018 •

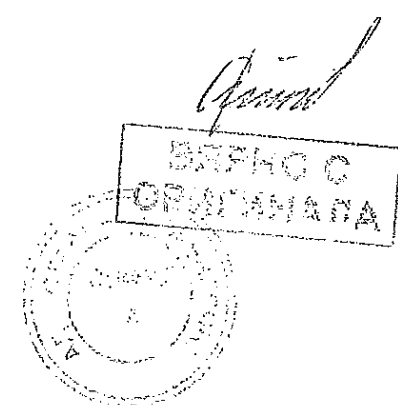
На основание чл.36а ал.3 от ЗОП

ПРЕДСЕДАТЕЛ НА КОМИСИЯ



ПРЕДСЕДАТЕЛ НА УС:

Настоящото удостоверение е невалидно без приложения талон с указан срок.



75



**КАМАРА НА СТРОИТЕЛИТЕ В БЪЛГАРИЯ**  
ЦЕНТРАЛЕН ПРОФЕСИОНАЛЕН РЕГИСТЪР НА СТРОИТЕЛЯ

**УДОСТОВЕРЕНИЕ**

№ II - TV 001121

Комисията за воденето, поддържането и ползването на Централния професионален регистър на строителя, на основание чл. 19 от Закона за камарата на строителите, издава настоящото удостоверение на:

Строител: **СТАРТ ИНЖЕНЕРИНГ АД**  
Седалище и адрес на управление: **1220 София, ул. "Локомотив" № 3**  
Представяващ: **Стоил Колев Стоилов**  
ЕИК: **030217255**

В уверение на това, че с решение на комисията и протокол 0069/06.11.2008 строителят е вписан в Централния професионален регистър на строителя за изпълнение на строежи със следния обхват:

- **ВТОРА ГРУПА** - строежи от транспортната инфраструктура;
- **СТРОЕЖИ ОТ ПЪРВА ДО ЧЕТВЪРТА КАТЕГОРИЯ**

Конкретният вид на строежите, за които се издава настоящото удостоверение, се определя в чл. 5, ал. 6 от Правилника за реда за вписване и водене на Централния професионален регистър на строителя и във връзка с чл. 137, ал. 1 от ЗУТ



На основание чл.36а ал.3 от ЗОП



ПРЕДСЕДАТЕЛ НА КОМИСИЯТА

ПРЕДСЕДАТЕЛ НА УС:

КАМАРА НА СТРОИТЕЛИТЕ В БЪЛГАРИЯ  
ЦЕНТРАЛЕН ПРОФЕСИОНАЛЕН РЕГИСТЪР НА СТРОИТЕЛЯ

ТАЛОН I

Строител: **СТАРТ ИНЖЕНЕРИНГ АД**  
ЕИК: **030217255**

НАСТОЯЩИЯТ ТАЛОН СЕ ИЗДАВА И ВОДЕНЕ НА РЕДА ЗА ВПИСВАНЕ И ВОДЕНЕ НА СТРОИТЕЛЯ И Е НЕРАЗДЕЛНА ЧАСТ НА СТРОИТЕЛЯ

№ II -  
ВАЛИДНОСТ НА  
Председател

На основание чл.36а ал.3 от ЗОП

№ София • 2018 •

Настоящото удостоверение е неважнано без приложението талон с указан срок.





**КАМАРА НА СТРОИТЕЛИТЕ В БЪЛГАРИЯ**  
ЦЕНТРАЛЕН ПРОФЕСИОНАЛЕН РЕГИСТЪР НА СТРОИТЕЛЯ

**УДОСТОВЕРЕНИЕ**

№ III - TV 001131

Комисията за воденето, поддържането и ползването на Централния професионален регистър на строителя, на основание чл. 19 от Закона за камарата на строителите, издава настоящото удостоверение на:

Строител: **СТАРТ ИНЖЕНЕРИНГ АД**  
Седалище и адрес на управление: **1220 София, ул. "Локомотив" № 3**  
Представяващ: **Стоил Колев Стоилов**  
ЕИК: **030217255**

В уверение на това, че с решение на комисията и протокол 0069/06.11.2008 строителят е вписан в Централния професионален регистър на строителя за изпълнение на строежи със следния обхват:

На основание чл. 5, ал. 1 от Правилника за реда за вписване и водене на Централния професионален регистър на строителя:

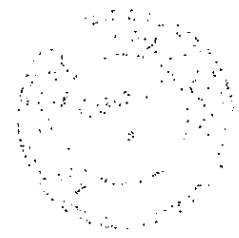
• **ТРЕТА ГРУПА** • – строежи от енергийната инфраструктура;

На основание чл. 5, ал. 4 от Правилника за реда за вписване и водене на Централния професионален регистър на строителя:

• **СТРОЕЖИ ОТ ПЪРВА ДО ПЕТА КАТЕГОРИЯ** •

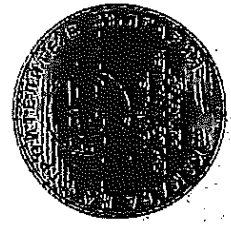
Конкретният вид на строежите, за които се издава настоящото удостоверение, се определя в чл. 5, ал. 6 от Правилника за реда за вписване и водене на Централния професионален регистър на строителя и във връзка с чл. 137, ал. 1 от ЗУТ

БЪЛГАРСКО СЪДИЩО



На основание чл.36а ал.3 от ЗОП

ПРЕДСЕДАТЕЛ НА КОМИ



ПРЕДСЕДАТЕЛ НА УО

Настоящото удостоверение е неважидно без приложения талон с указан срок.

КАМАРА НА СТРОИТЕЛИТЕ В БЪЛГАРИЯ  
ЦЕНТРАЛЕН ПРОФЕСИОНАЛЕН РЕГИСТЪР НА СТРОИТЕЛЯ

ТАЛОН № III - TV 1

Строител: **СТАРТ ИНЖЕНЕРИНГ АД**  
ЕИК: **030217255**

НАСТОЯЩИЯТ ТАЛОН СЕ ИЗДАВА НА ОСНОВ НА  
НАСТОЯЩИЯТ ВПИСВАНЕ И ВОДЕНЕ НА ЦЕНТРАЛНИЯ  
РЕГИСТЪР НА СТРОИТЕЛЯ И Е НЕРАЗДЕЛНА ЧАСТ ОТ УДОСТОВЕРЕНИЕТО

№ III - TV 00113

ВАЛИДНОСТ НА ТАЛОНА:

Председател на ком

• София • 2018 •

На основание чл.36а ал.3 от ЗОП



# КАМАРА НА СТРОИТЕЛИТЕ В БЪЛГАРИЯ

ЦЕНТРАЛЕН ПРОФЕСИОНАЛЕН РЕГИСТЪР НА СТРОИТЕЛЯ

## УДОСТОВЕРЕНИЕ

№ IV - TV 002142

Комисията за воденето, поддържането и ползването на Централния професионален регистър на строителя, на основание чл. 19 от Закона за камарата на строителите, издава настоящото удостоверение на:

**Строител: СТАРТ ИНЖЕНЕРИНГ АД**  
**Седялище и адрес на управление: 1220 София, ул. " Локомотив " № 3**  
**Представяващ: Стоил Колев Стоилов**  
**ЕИК: 030217255**

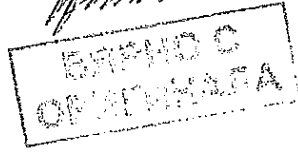
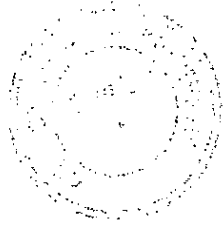
В уверение, на това, че с решение на комисията и протокол 0069/06.11.2008 строителят е вписан в Централния професионален регистър на строителя за изпълнение на строежи със следния обхват:

На основание чл. 5, ал. 1 от Правилника за реда за вписване и водене на Централния професионален регистър на строителя:  
● **ЦЕЛЪВЪРТА ГРУПА** ● - строежи от благоустройствената инфраструктура, хидротехническото строителство и опазването на околната среда;

На основание чл. 5, ал. 4 от Правилника за реда за вписване и водене на Централния професионален регистър на строителя:

● **СТРОЕЖИ ОТ ПЪРВА ДО ПЕТА КАТЕГОРИЯ** ●

Конкретният вид на строежите, за които се издава настоящото удостоверение, се определя в чл. 5, ал. 6 от Правилника за реда за вписване и водене на Централния професионален регистър на строителя и във връзка с чл. 137, ал. 1 от ЗУТ



На основание чл.36а ал.3 от ЗОП

ПРЕДСЕДАТЕЛ НА КО

ПРЕДСЕДАТЕЛ НА



Настоящото удостоверение е невалидно без приложеня талон с указан срок.

На основание чл.36а ал.3 от ЗОП

КАМАРА НА СТРОИТЕЛИТЕ В БЪЛГАРИЯ  
ЦЕНТРАЛЕН ПРОФЕСИОНАЛЕН РЕ



ТАЛОН № IV - TV 1

Строител: СТАРТ ИНЖЕНЕРИНГ АД  
ЕИК: 030217255

НАСТОЯЩИЯТ ТАЛОН СЕ ИЗДАВА НА ОСНОВАНИЕ  
ЗА РЕДА ЗА ВПИСВАНЕ И ВОДЕНЕ НА ЦЕНТРАЛНИЯ  
НА СТРОИТЕЛЯ И Е НЕРАЗДЕЛНА ЧАСТ ОТ УДОСТО

№ IV - TV 002142

ВАЛИДНОСТ НА ТАЛОНА: 3

Председател на Комисията

д/ч



София • 2016 •

10

# СЕРТИФИКАТ



ЕМ ЕС – СЕРТ БЪЛГАРИЯ ООД като орган за сертификация на системи за управление и поверителни оценки в съответствие с изискванията на ISO/IEC 17021-1, удостоверява, че

## СТАРТ ИНЖЕНЕРИНГ АД

ул. Локомотив № 3  
1220 София  
България

е внедрила и прилага система за управление на качеството в съответствие с изискванията на стандарта

## БДС EN ISO 9001:2015

с обхват

Проектиране, производство и монтаж на технологични съоръжения, промишлено оборудване и машини, метални конструкции, ел. табла, ел. инсталации, електрически уредби, пусково - наладъчни дейности на електрически съоръжения до и над 1000V, контролно измервателни прибори и автоматизация, програмиране, внедряване, гаранционно и следгаранционно обслужване на системи за автоматично управление на технологични процеси /СКАДА/, отоплителни, вентилационни и охладителни инсталации.

IAF/EA код: 17; 18; 19; 28; 34

06.08.2017

Дата на издаване

05.08.2020

Валидност до

09.08.2016

Дата на първоначална  
сертификация

K-002-2

Номер на сертификат

На основание чл.36а ал.3 от  
ЗОП

Ръководител на органа за сертификация

Този сертификат е предмет на ежегодни надзорни одити. Сертификацията е валидна за три години, при положение, че е последвана от одобрение чрез годишни надзорни одити.

За информация относно валидността на сертификатите можете да посетите [www.ms-cert-bg.com](http://www.ms-cert-bg.com)



# СЕРТИФИКАТ

EM EC – СЕРТ БЪЛГАРИЯ ООД като орган за сертификация на системи за управление, извършващ оценки в съответствие с изискванията на ISO/IEC 17021-1, удостоверява, че

## СТАРТ ИНЖЕНЕРИНГ АД

ул. Локомотив № 3  
1220 София  
България

е внедрила и прилага система за управление на околната среда в съответствие с изискванията на стандарта

## БДС EN ISO 14001:2015

с обхват

Проектиране, производство и монтаж на технологични съоръжения, промишлено оборудване и машини, метални конструкции, ел. табла, ел. инсталации, електрически уредби, пусково - наладъчни дейности на електрически съоръжения до и над 1000V, контролно измервателни прибори и автоматизация, програмиране, внедряване, гаранционно и следгаранционно обслужване на системи за автоматично управление на технологични процеси /СКАДА/, отоплителни, вентилационни и охладителни инсталации.

IAF/EA код: 17; 18; 19; 28; 34

06.08.2017

Дата на издаване

05.08.2020

Валидност до

09.08.2016

Дата на първоначална сертификация

O-003-2

Номер на сертификата

На основание чл.36а ал.3 от ЗОП

Ръководител на органа за сертификация

Този сертификат е предмет на ежегодни надзорни одити. Сертификацията е валидна за три години, при положение, че е последвана от одобрение чрез годишни надзорни одити.

За информация относно валидността на сертификатите можете да посетите [www.mscert-bg.com](http://www.mscert-bg.com)

ВЪЗМОЖНО С  
ОРИГИНАЛА



# СЕРТИФИКАТ

EM EC – СЕРТ БЪЛГАРИЯ ООД като орган за сертификация на системи за управление, извършващ оценки в съответствие с изискванията на ISO/IEC 17021-1, удостоверява, че

## СТАРТ ИНЖЕНЕРИНГ АД

ул. Локомотив № 3  
1220 София  
България

е внедрила и прилага система за управление на здравето и безопасността при работа в съответствие с изискванията на стандарта

### BS OHSAS 18001:2007

с обхват

Проектиране, производство и монтаж на технологични съоръжения, промишлено оборудване и машини, метални конструкции, ел. табла, ел. инсталации, електрически уредби, пусково - наладъчни дейности на електрически съоръжения до и над 1000V, контролно измервателни прибори и автоматизация, програмиране, внедряване, гаранционно и следгаранционно обслужване на системи за автоматично управление на технологични процеси /СКАДА/, отоплителни, вентилационни и охладителни инсталации.

IAF/EA код: 17; 18; 19; 28; 34

06.08.2017

Дата на издаване

08.08.2019

Валидност до

09.08.2016

Дата на първоначална  
сертификация

На основание чл.36а ал.3 от  
ЗОП

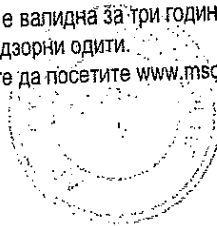
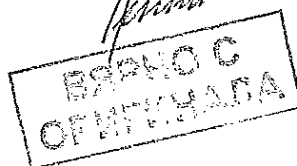
ЗБР-004-1/1

Номер на сертификат

Ръководител на органа за сертификация

Този сертификат е предмет на ежегодни надзорни одити. Сертификацията е валидна за три години, при положение, че е последвана от одобрение чрез годишни надзорни одити.

За информация относно валидността на сертификатите можете да посетите [www.ms-cert-bg.com](http://www.ms-cert-bg.com)





ИЗПЪЛНИТЕЛНА АГЕНЦИЯ  
БЪЛГАРСКА СЛУЖБА ЗА АКРЕДИТАЦИЯ

БСА рег. № 232 ОКС

От: 26.11.2018 г.  
Валиден до: 26.11.2022 г.

ДИПЛОМАТА  
ЗА АКРЕДИТАЦИЯ

„Старт инженеринг“ АД, гр. София

Орган за контрол от вид С

Адрес на управление: гр. София 1220, кв. „Военна рампа“, ул. „Локомотив“ 3

Адрес на офис: гр. София 1220, кв. „Военна рампа“, бул. „Илиянци“ 44

ЕИК: 030217255

Обхват на акредитация:

Да извършва контрол на:

Електрически уредби и съоръжения до и над 1000V;  
Трансформаторно масло;  
Електрозащитни средства;  
Изкуствено осветление;  
Вентилационни инсталации;  
Микроклимат.



**АКРЕДИТИРАН СЪГЛАСНО БДС EN ISO/IEC 17020:2012**

Заповед № А 429/26.11.2018 г. е неделима част от сериал  
общо 5 страници

Дата на първоначална акредитация: 30.11.2006г.

Дата на преакредитация: 26.11.2018г.

На основание чл.36а ал.3 от  
ЗОП

EAS

BG 2 0 1 8 0 2 9 6



**РЕПУБЛИКА БЪЛГАРИЯ**  
Изпълнителна агенция  
Българска служба за акредитация



**Страна по Многостранното споразумение  
за взаимно признаване на ЕА в тази област**

**ЗАПОВЕД**

**№ А 429**

**София, 26.11.2018 г.**

На основание чл. 10 ал. 1, т. 3, т. 4, чл. 28 ал. 1 и чл. 30, ал. 1 от Закона за националната акредитацията на органи за оценяване на съответствието и т. 6 от Процедура за акредитация BAS QR 2 във връзка с открита процедура с рег. № 265/232 ОКС/ПА/РО/08.05.2018г., доклад от оценка № 265/232 ОКС/ПА/6/В/ 11.09.2018г., анекс към доклад вх. № 265/232 ОКС/В/15.10.2018г. и становище на Комисия по акредитация № 265/232 ОКС/ПА/РО/9/В/15.11.2018г.

**ПРЕАКРЕДИТИРАМ**

**Орган за контрол от вид С  
при „Старт инженеринг“ АД, гр.София**

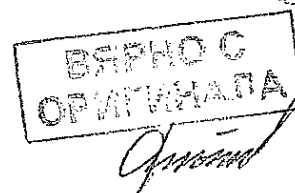
**Адрес на управление:** гр. София 1220, кв. „Военна рампа“, ул. „Локомотив“ 3  
**Адрес на офис:** гр. София 1220, кв. „Военна рампа“, бул. „Илиянци“ 44

**Да извършва контрол на:**

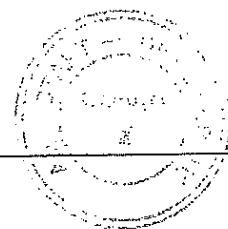
№ по ред	Област на контрол	Вид на контрола	Контролиран параметър/ характеристика:	Методи за изпитване/ измерване използвани при контрол; процедура за контрол	Нормативни актове, стандарти, спецификации, схеми за контрол
1	2	3	4	5	6
1.	Електрически уредби и съоръжения до и над 1000 V	На нови и/или в експлоатация обекти/ съоръжения	Съпротивление на защитни заземителни уредби	ПК 7.1-01, версия 5, от 10.01.2018г.	Наредба № 3 (ДВ, бр.90и91/2004г.) Наредба № 16-116 (ДВ, бр. 26/2008г.) Технически спецификации
			Съпротивление на мълниезащитни заземителни уредби	ПК 7.1-01, версия 5, от 10.01.2018г.	Наредба № 3 (ДВ, бр.90и91/2004г.) Наредба № 4 (ДВ бр. 6/2011г.) Наредба № 16-116 (ДВ, бр. 26/2008г.) Технически спецификации
2.	Електрически уредби и съоръжения до 1000 V	На нови и/или в експлоатация обекти/ съоръжения	Импеданс Zs на контура „фаза-защитен проводник“	ПК 7.1-02, версия 5, от 10.01.2018г.	Наредба № 3 (ДВ, бр.90 и91/2004г.) Наредба № 16-116 (ДВ, бр. 26/2008 г.) Технически спецификации

гр. София 1797, бул. "Г.М.Димитров" №52 А, ет.7  
Тел: +359 9766 401; Факс: (+3592) 9766 415  
e-mail: office@nab-bas.bg

15



3.	Електрически уредби и съоръжения до 1000V Защитни прекъсвачи ЗП	На нови и/или в експлоатация обекти/ съоръжения	ЗП: -Време за изключване, -Съпротивление на предпазно заземяване	ПК 7:1-03, версия 5, от 10.01.2018г.	Наредба № 3 (ДВ, бр.90 и91/2004г.) Наредба № 16-116 (ДВ, бр. 26/2008 г.) Технически спецификации
4.	Електрически уредби и съоръжения до и над 1000V: Силови кабелни линии; комплектни разпределителни уредби - КРУ и открити разпределителни уредби - ОРУ; кондензаторни уредби; акумулаторни уредби до 1000V; силови трансформатори; измервателни трансформатори; електродвигатели; синхронни генератори и компенсатори; апарати, вторични вериги и инсталации за напрежение до 1000V; прекъсвачи и разединители за напрежение над 1000V; сухи реактори; изводи и проходни изолатори; електрофилтри	На нови и/или в експлоатация обекти/ съоръжения	Съпротивление на изолацията при постоянно напрежение	БДС 16654 „Норми за изпитване на електрически машини и съоръжения“ (НИЕМС-1995)	Наредба № 3 (ДВ, бр.90 и91/2004г.) Наредба № 16-116 (ДВ, бр. 26/2008 г.) Технически спецификации
5.	Електрически уредби и съоръжения до и над 1000V: Силови кабелни линии до 20kV; комплектни разпределителни уредби - КРУ до 12kV; шинни системи до 12kV; измервателни трансформатори до 12kV; сухи реактори до 12kV; изводи и проходни изолатори до 12kV; прекъсвачи и разединители до 12kV; електро-двигатели до 10kV; апарати, вторични вериги и инсталации за напрежение до 1000V;	Нови и/или в експлоатация обекти /съоръжения	Издържано повишено напрежение, приложено на изолацията, kV	„Норми за изпитване на електрически машини и съоръжения“ (НИЕМС-1995)	Наредба № 3 (ДВ, бр.90 и91/2004г.) Наредба № 16-116 (ДВ, бр. 26/2008 г.) Технически спецификации



ВЪРНО С  
ОРИГИНАЛА

*[Signature]*



6.	Електрически уредби и съоръжения до и над 1000V: преходни съпротивления на подвижни и неподвижни контактни съединения в комплектни разпределителни уредби - КРУ и открити разпределителни уредби - ОРУ; намотки на трансформатори и електродвигатели	Нови и/или в експлоатация съоръжения	Активно съпротивление	БДС 15320 „Норми за изпитване на електрически машини и съоръжения“ (НИЕМС-1995)	Наредба № 16-116 (ДВ, бр. 26/2008 г.) „Норми за изпитване на електрически машини и съоръжения“ (НИЕМС-1995) Техническа спецификация
7.	Електрически уредби и съоръжения до и над 1000V: Силови трансформатори - сухи и запълнени с масло; двунамотъчни и тринмотъчни; еднофазни и трифазни; с и без регулиране на напрежението под товар; за ниско, средно и високо напрежение	Нови и/или в експлоатация съоръжения	Коефициент на трансформация; Съпротивление на изолацията при постоянно напрежение; Активно съпротивление на намотките; Група на свързване;	БДС 16654 БДС 15320 „Норми за изпитване на електрически машини и съоръжения“ (НИЕМС-1995)	Наредба № 16-116 (ДВ, бр. 26/2008 г.) „Норми за изпитване на електрически машини и съоръжения“ (НИЕМС-1995) Техническа спецификация
8.	Електрически уредби и съоръжения до и над 1000V	Нови и/или в експлоатация съоръжения	Пробивно напрежение на трансформаторно масло	БДС EN 60156	Наредба № 16-116 (ДВ, бр. 26/2008 г.) Техническа спецификация
9.	Електрически уредби и съоръжения до и над 1000V: Апарати за релейни защиты, електроавтоматика и телемеханика	Нови и/или в експлоатация обекти/ съоръжения	Съпротивление на изолацията; Прагове на сработване на защитните функции чрез контрол по напрежение, ток и време закъснение; Функционална проверка (правилно, неправилно действие или отказ на устройствата)	ПК 7.1-11, версия 5 от 10.01.2018г.	Наредба № 3 (ДВ, бр.90 и91/2004г.) Наредба № 16-116 (ДВ, бр. 26/2008 г.) Наредба 9, (ДВ, бр. 72/2004г.) Наръчник за релейна защита - 1981г. Технически спецификации
10.	Електрозащитни средства - диелектрични ръкавици, боти и галоши	Нови и/или в експлоатация продукти	Електрическа якост на изолацията: -Ток на утечка, -Изпитвателно напрежение.	Наредба 22, ДВ, бр. 45/2006	Наредба 22 (ДВ, бр. 45/2006г.) Техническа спецификация

ВЕРНО С  
ОРИГИНАЛА



17

*С. Димитров*

11.	Изкуствено осветление	Нови и/или в експлоатация обекти	Осветеност	Методически указания за измерване и оценка на изкуствено осветление в сгради 40-85, издателство „Стандартизация“ 1985г.	Наредба 9, (ДВ, бр. 46/1994г.) Наредба 24, (ДВ, бр. 95/2003г.) Наредба 49, (ДВ, бр. 7/1976г.) БДС EN 12464-1 Техническа спецификация
12.	Вентилационни инсталации	Нови и/или в експлоатация обекти /съоръжения	Дебит на въздуха, Скорост на въздушния поток.	БДС 12.3.018	Наредба 15, (ДВ, бр. 68/2005г.) Наредба 24, (ДВ, бр. 95/2003г.) Техническа спецификация
13.	Микроклимат	Нови и/или в експлоатация обекти/ съоръжения	Температура на въздуха, Скорост на движение на въздуха, Относителна влажност на въздуха.	Наредба № РД-07-3, ДВ, бр. 63/2014г.	Наредба № РД-07-3, ДВ, бр. 63/2014г.; Наредба № 9, (ДВ, бр. 46/1994г.) Наредба № 3, (ДВ, бр. 15/2007г.) Наредба № 26, (ДВ, бр. 103/2008г.) Наредба № 24, (ДВ, бр. 95/2003г.) Наредба № 2, (ДВ, бр. 15/2007г.) Технически спецификации

Наредба 3, ДВ бр. 90 и 91/2004г. - за устройството на електрическите уредби и електропроводните линии.  
Наредба 16 - 116, ДВ бр.26/2008г. - за техническа експлоатация на енергообзавеждането.  
Наредба 4, ДВ бр.6/2011г. - за мълниезащитата на сгради, външни съоръжения и открити пространства.  
Наредба №22 ДВ.бр.45,46/2006 - за изпитване на електрозащитни средства в експлоатация  
Наредба № 9 за техническата експлоатация на електрически централи и мрежи (ДВ, бр.72/2004г.)  
Наредба №15 за техническите правила и нормативи за проектиране, изграждане и експлоатация на обектите и съоръженията за производство, пренос и разпределение на топлинна енергия (ДВ бр. 68/2005 г.)  
Наредба №49 за изкуствено осветление на сградите (ДВ, бр.7/1976 г.)  
Наредба №24 за санитарно-хигиенните изисквания към дискотеките (ДВ, бр. 95/2003 г.)  
Наредба №9 за хигиенните изисквания при ползването на персонални компютри в обучението на учениците (ДВ, бр. 46/1994 г.)  
Наредба №2 за здравните изисквания към компютърните и интернет зали за обществено ползване (ДВ, бр.15/2007 г.)  
Наредба №3 за здравните изисквания към детските градини - ДВ бр. 15/2007 г.  
Наредба РД - 07-3 за минималните изисквания за микроклимата на работните места от 18.07.2014 г., публ. в ДВ, бр. 63 от 01.08.2014 г.  
Наредба № 26, ДВ бр. 103/2008 г. за устройството и дейността на детските ясли и детските кухни.

### НАРЕЖДАН

Да се издаде Сертификат за акредитация с рег. № 232 ОКС от 26.11.2018 г., валиден до 26.11.2022 г. с приложение настоящата заповед, неделима част от него.  
Сертификата за акредитация с приложението да се получат от Изпълнителният директор на „Старт инженеринг“ АД, гр. София, ръководителят на ОКС или друго упълномощено лице в сградата на ИА БСА.  
При получаване на издадения сертификат и приложение, акредитираното лице е длъжно да върне в ИА БСА оригиналите на сертификат за акредитация рег. № 232 ОКС от 25.01.2016г. и приложение - заповед на ИА БСА № А 59/25.01.2016г.  
Настоящата заповед да се съобщи на „Старт инженеринг“ АД, гр. София в 3 (три) - дневен срок от изд.

Ил  
Из  
Из

ка служба за акредитация"

ВАЖНО С  
ОРИГИНАЛ



НАЦИОНАЛНА АГЕНЦИЯ ЗА ПРИХОДИТЕ  
ТЕРИТОРИАЛНА ДИРЕКЦИЯ СОФИЯ - ГДО,  
СОФИЯ - ГДО  
БУЛСТАТ 1310631880249

Изх.№ 290201800337684/12.11.2018г.

## УДОСТОВЕРЕНИЕ

за наличието или липсата на задължения

Настоящото се издава на основание чл.87, ал.6 от ДОПК, в уверение на това, че:  
**СТАРТ-ИНЖЕНЕРИНГ /АД/**

*(име/наименование на задълженото лице)*

ЕГН/ЛНЧ/ Служебен № от регистъра на НАП

ЕИК по БУЛСТАТ/ЕИК по ЗТР 030217255

Адрес за  
кореспонденция

Адрес по чл.8 от  
ДОПК

обл.София - град , общ.Столична гр.СОФИЯ, ул. Локомотив №  
3

Представявано от

**СТОИЛ КОЛЕВ СТОИЛОВ**

*(трите имена на представляващия пълномощника)*

В качеството му на

**Представяващ субекта**

*(длъжност на представляващия)*

ЕГН / ЛНЧ / Служебен № от регистъра на НАП

На основание чл.36а ал.3 от ЗОП

*(в случай на упълномощаване - № и дата на пълномощното)*

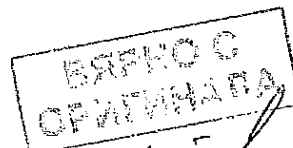
Няма задължения.

Настоящото се издава по искане вх.№ 290161801109097/12.11.2018 г.,  
за да послужи пред където е необходимо.

Удостоверението се издава по данни на ТД СОФИЯ - ГДО, СОФИЯ - ГДО, актуални  
към 12.11.2018 год.

ОРГАН ПО  
ПРИХОДИТЕ: КР

На основание чл.36а ал.3 от  
ЗОП



*Стойков*



12.11.2018

Стр. 1 от 1



СТОЛИЧНА ОБЩИНА  
ДИРЕКЦИЯ ОБЩИНСКИ ПРИХОДИ  
ОТДЕЛ ОП СЕРДИКА  
1000 гр.СОФИЯ Р-Н СЕРДИКА бул.КНЯГИНЯ МАРИЯ  
ЛУИЗА/Г. ДИМ. N: 88

Изх. № 7220009419 / 25.10.2018 г.



УДОСТОВЕРЕНИЕ ЗА ЗАДЪЛЖЕНИЯ ПО ЧЛ.87, АЛ.6 ОТ ДОПК

Настоящото се издава на основание чл. 87, ал. 6 от ДОПК, в уверение на това, че:  
**СТАРТ ИНЖЕНЕРИНГ-АД АД**

ЕИК по БУЛСТАТ 030217255

Адрес за кореспонденция  
ул. ЛОКОМОТИВ № 3, гр. СОФИЯ 1000, общ. СТОЛИЧНА, обл. СОФИЯ-град  
Адрес по чл.8 от ДОПК  
ул. ЛОКОМОТИВ № 3, гр. СОФИЯ 1000, общ. СТОЛИЧНА, обл. СОФИЯ-град

НЯМА ЗАДЪЛЖЕНИЯ ЗА МЕСТНИ ДАНЪЦИ И ТАКСА БИТОВИ ОТПАДЪЦИ КЪМ СТОЛИЧНА  
ОБЩИНА

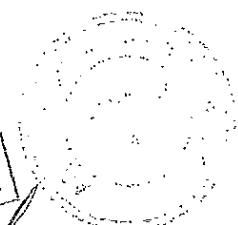
Настоящото се издава по искане Вх. № 7220009419/25.10.2018 г., за да послужи пред ТАМ КЪДЕТО  
Е НЕОБХОДИМО

Удостоверението се издава по данни на СТОЛИЧНА ОБЩИНА

На основание чл.36а ал.3 от ЗОП

Подпис  
Изд  
Началн

ВЕРНО С  
ОРИГИНАЛА



*Генерал*



УДОСТОВЕРЕНИЕ  
ПО ЧЛ. 58, АЛ. 1, Т. 3 ОТ ЗОП

18 046 791  
27.04.2018

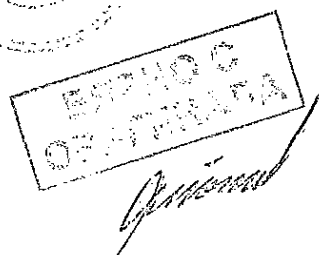
Изпълнителна агенция „Главна инспекция по труда“ удостоверява, че „СТАРТ ИНЖЕНЕРИНГ“ АД, ЕИК: 030217255, за периода по чл. 57, ал. 3, т. 2 от Закона за обществените поръчки

не е установено

да има влязло в сила наказателно постановление или съдебно решение за нарушение на обстоятелствата по чл. 54, ал. 1, т. 6 от Закона за обществените поръчки.

На основание чл.36а ал.3 от  
ЗОП

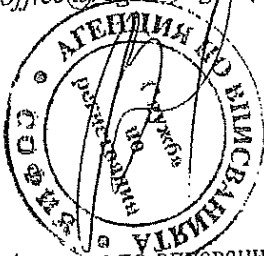
ГЕОРГИ М  
Главен се  
ИА „Главн



АГЕНЦИЯ ПО ВПИСВАНИЯТА

София 1111, ул. Елисавета Багряна №20  
www.registryagency.bg

тел.: 9486 181, факс: 9486 194  
office@registryagency.bg



УДОСТОВЕРЕНИЕ

изх. № 20180309090850 / 09.03.2018г.

Агенцията по вписванията удостоверява, че в търговския регистър и регистъра на ЮЛЩ по партидата на "СТАРТ-ИНЖЕНЕРИНГ" АД, ЕИК 030217255 в част „Вписани обстоятелства“ и част „Обявени актове“ към 09.03.2018 г. са вписани следните обстоятелства и са обявени следните актове:

Част "Вписани обстоятелства"

Раздел Обща информация

Идентификация

1. ЕИК/ПИК 030217255  
"СТАРТ-ИНЖЕНЕРИНГ" АД  
16952/1990 110

Раздел Общ статус

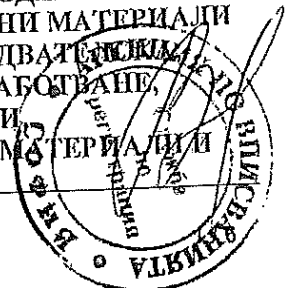
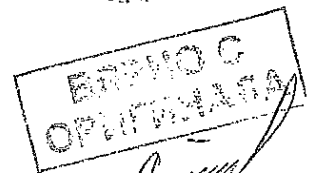
Основни обстоятелства

2. Фирма/  
Наименование СТАРТ-ИНЖЕНЕРИНГ  
3. Правна форма Акционерно дружество  
4. Изписване на  
чужд език START - ENGINEERING  
5. Седалище и  
адрес на  
управление БЪЛГАРИЯ  
гр. София 1220, Област София (столица);  
Община Столична, Район р-н Сердика  
ул. Локомотив, № 3

телефон 02 936 0373, факс 02 931 0768  
адрес на електронна поща office@starteng.com  
интернет страница www.starteng.com

6. Предмет на  
действие

СТРОИТЕЛСТВО, МОНТАЖ, ПРОЕКТИРАНЕ, РЕМОНТ,  
РЕКОНСТРУКЦИЯ И МОДЕРНИЗАЦИЯ, ПУСКОВО-НАЛАДЪЧНИ  
РАБОТИ, ПРЕДПРИЕМАЧЕСТВО, ИНЖЕНЕРИНГ, СДЕЛКИ С  
ГОТОВИ СТРОИТЕЛНИ ПРОДУКТИ И СТРОИТЕЛНИ МАТЕРИАЛИ  
В СТРАНАТА И ЗАД ГРАНИЦА; НАУЧНО-ИЗСЛЕДВАТЕЛСКА,  
ТЕХНОЛОГИЧНА И ПРИЛОЖНА ДЕЙНОСТ, РАЗРАБОТВАНЕ,  
ПРИЛАГАНЕ И ПРОИЗВОДСТВО НА ТЕХНОЛОГИИ,  
СЪОРЪЖЕНИЯ, ПРОГРАМНИ ПРОДУКТИ, НОВИ МАТЕРИАЛИ И



ТЕХНОЛОГИЧНО ОБОРУДВАНЕ; МАРКЕТИНГ, РЕКЛАМА, КОНСУЛТАЦИИ, ПОСРЕДНИЧЕСТВО, ЛИЗИНГОВА ДЕЙНОСТ, ВЪНШНА И ВЪТРЕШНА ТЪРГОВИЯ С ВСИЧКИ ВИДОВЕ СТОКИ И УСЛУГИ С ИЗКЛЮЧЕНИЕ НА ЗАБРАНЕНИТЕ ОТ ЗАКОНА; ИЗГРАЖДАНЕ И ЕКСПЛОАТАЦИЯ НА ТУРИСТИЧЕСКИ И ХОТЕЛИЕРСКИ ОБЕКТИ, СТРОИТЕЛСТВО НА ЖИЛИЩНИ, КУЛТУРНО-БИТОВИ И ДРУГИ ОБЕКТИ, ТРАНСПОРТНИ УСЛУГИ, СЕРВИЗНО ОБСЛУЖВАНЕ НА ЛЕКИ И ЛЕКОТОВАРНИ АВТОМОБИЛИ, ПРОИЗВОДСТВО, ПРЕРАБОТКА И ПЛАСМЕНТ НА СЕЛСКОСТОПАНСКИ ПРОДУКТИ, ВЪНШНОТЪРГОВСКИ И БАРТЕРНИ СДЕЛКИ И УСЛУГИ, ГАРАНЦИОННО И ИЗВЪНГАРАНЦИОННО СЕРВИЗНО ОБСЛУЖВАНЕ НА МАШИНИ, СЪОРЪЖЕНИЯ И КОМПЛЕКСНИ ОБЕКТИ, НАЕМАНЕ И ОТДАВАНЕ ПОД НАЕМ НА ДВИЖИМО И НЕДВИЖИМО ИМУЩЕСТВО; НАСОЧВАНЕ, ПОДПОМАГАНЕ И УПРАВЛЕНИЕ НА МЕСТНИ И ЧУЖДЕСТРАННИ ИНВЕСТИЦИИ В СТРОИТЕЛСТВОТО И СВЪРЗАНИТЕ С НЕГО ПРОМИШЛЕНОСТИ, ЕНЕРГЕТИКАТА, ПРОМИШЛЕНОСТТА, ТЪРГОВИЯТА, СЕЛСКОТО СТОПАНСТВО, ТУРИЗМА, УСЛУГИТЕ И ДРУГИ ДЕЙНОСТИ БЕЗ ЗАБРАНЕНИТЕ СЪС ЗАКОН; ПРОЕКТИРАНЕ, ИЗРАБОТВАНЕ, ДОСТАВКА, МОНТАЖ И КОНТРОЛ НА ВЪЗЛИ, СЪОРЪЖЕНИЯ И АПАРАТИ, ИЗИСКВАЩИ РАБОТА ПОД НАДЗОР

ба.Основна дейност по НКИД 42.99, Строителство на други съоръжения, некласифицирани другаде

10.Представители

ГЕОРГИ ЕМИЛОВ ГЕОРГИЕВ  
СТОИЛ КОЛЕВ СТОИЛОВ, ЕГ  
ЗАЕДНО И ПООТДЕЛНО

На основание чл.36а ал.3 от ЗОП

11.Начин на представляване

12.Съвет на директорите

Дата на изтичане на мандата: 18.06.2020 г.  
начинът, по който се определя мандатът: Съгласно чл. 61 ал. 1 от Устава на дружеството

СТОИЛ КОЛЕВ СТОИЛОВ, ЕГ  
ГЕОРГИ ЕМИЛОВ ГЕОРГИЕВ,  
ДИМИТЪР НИНОВ ТОДОРОВ,

На основание чл.36а ал.3 от ЗОП

31.Размер

105000 лева

31а.Акции

вид акции: ПОИМЕННИ, брой акции: 7000, номинална стойност: 15  
права за отделни класове акции: С ПРАВО НА ГЛАС  
особени условия за прехвърляне на акции:

32.Внесен капитал 105000 лева

Раздел Клонове

Клон

Фирма на клон: СТАРТ-ИНЖЕНЕРИНГ АД- КЛОН БУРГАС, ЕИК на клон: 0000

51.Седалище и адрес на управление на клон

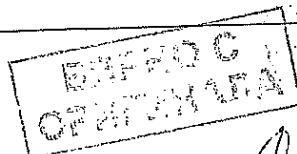
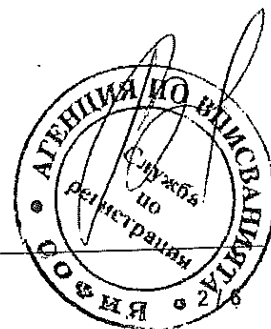
БЪЛГАРИЯ  
гр. Бургас 8000, Област Бургас;  
Община Бургас, ж.к. ПРИМОРИЕ, УЛ.ХРИСТО БОТЕВ № 33

телефон 056811484, факс 056811512  
адрес на електронна поща office@startengbg.com

СТАРТ-ИНЖЕНЕРИНГ АД- КЛОН БУРГАС

51а.Фирма/наименование на клон

51б.ЕИК на клон 0000



23

52. Предмет на дейност на клон



СТРОИТЕЛСТВО, МОНТАЖ, ПРОЕКТИРАНЕ, РЕМОНТ, РЕКОНСТРУКЦИЯ И МОДЕРНИЗАЦИЯ, ПУСКОВО-НАЛАДЪЧНИ РАБОТИ, ПРЕДПРИЕМАЧЕСТВО, ИНЖЕНЕРИНГ, ПОСРЕДНИЧЕСТВО, ВЪНШНА И ВЪТРЕШНА ТЪРГОВИЯ С ВСИЧКИ ВИДОВЕ СТОКИ И УСЛУГИ, ГАРАНЦИОННО И ИЗВЪНГАРАНЦИОННО СЕРВИЗНО ОБСЛУЖВАНЕ НА МАШИНИ, СЪОРЪЖЕНИЯ И КОМПЛЕКСНИ ОБЕКТИ, НАЕМАНЕ И ОТДАВАНЕ ПОД НАЕМ НА ДВИЖИМО И НЕДВИЖИМО ИМУЩЕСТВО И ДРУГИ ДЕЙНОСТИ, БЕЗ ЗАБРАНЕНИТЕ СЪС ЗАКОН.

52а. Основна дейност по НКИД

4521, ОБЩО СТРОИТЕЛСТВО НА СГРАДИ И СТРОИТЕЛНИ СЪОРЪЖЕНИЯ

53. Управител на клон/  
представляващ клон на ЮЛНЦ

ВАСКО ДИМИТРОВ ГРАДЕВ, На основание чл.36а ал.3 от ЗОП  
БЪЛГАРИЯ

гр. Бургас 8000, Област Бургас;  
Община Бургас, ж.к. ПРИМОРИЕ  
АЛЕКСАНДРОВСКА, № 137, вх. В, ет. 3  
Документ за самоличност

На основание чл.36а ал.3 от ЗОП

54. Обем на представителна власт

УПРАВЛЯВА И ПРЕДСТАВЛЯВА КЛОНА

Клон

Фирма на клон: СТАРТ-ИНЖЕНЕРИНГ АД- КЛОН ВАРНА, ЕИК на клон: 0014

51. Седалище и адрес на управление на клон

БЪЛГАРИЯ  
гр. Варна 9000, Област Варна;  
Община Варна, Район р-н Одесос  
ул.НЕОФИТ БОЗВЕЛИ, № 49

телефон 052613246; 052613247, факс 052613246  
адрес на електронна поща VARNA@STARTENG.COM

51а. Фирма/  
наименование на клон

СТАРТ-ИНЖЕНЕРИНГ АД- КЛОН ВАРНА

51б. ЕИК на клон

0014

52. Предмет на дейност на клон

СТРОИТЕЛСТВО, МОНТАЖ, ПРОЕКТИРАНЕ, РЕМОНТ, РЕКОНСТРУКЦИЯ И МОДЕРНИЗАЦИЯ, ПУСКОВО-НАЛАДЪЧНИ РАБОТИ, ПРЕДПРИЕМАЧЕСТВО, ИНЖЕНЕРИНГ, ПОСРЕДНИЧЕСТВО, ВЪНШНА И ВЪТРЕШНА ТЪРГОВИЯ С ВСИЧКИ ВИДОВЕ СТОКИ И УСЛУГИ, ГАРАНЦИОННО И ИЗВЪНГАРАНЦИОННО СЕРВИЗНО ОБСЛУЖВАНЕ НА МАШИНИ, СЪОРЪЖЕНИЯ И КОМПЛЕКСНИ ОБЕКТИ, НАЕМАНЕ И ОТДАВАНЕ ПОД НАЕМ НА ДВИЖИМО И НЕДВИЖИМО ИМУЩЕСТВО.

52а. Основна дейност по НКИД

4521, ОБЩО СТРОИТЕЛСТВО НА СГРАДИ И СТРОИТЕЛНИ СЪОРЪЖЕНИЯ

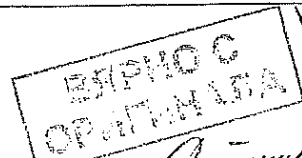
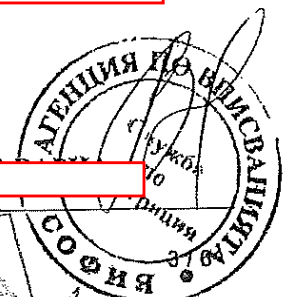
53. Управител на клон/  
представляващ клон на ЮЛНЦ

ПАНО ПАНОВ САВОВ, На основание чл.36а ал.3 от ЗОП  
БЪЛГАРИЯ

гр. Варна 9000, Област Варна;  
Община Варна, Район р-н Владислав Варненчик, ж.к.  
ВЛАДИСЛАВОВО, бл. 108, вх. В, ет. 2, ап. 8

Документ за самоличност

На основание чл.36а ал.3 от ЗОП





54.Обем на  
представителна  
власт

УПРАВЛЯВА И ПРЕДСТАВЛЯВА КЛОНА

Клон

Фирма на клон: СТАРТ-ИНЖЕНЕРИНГ АД-КЛОН ВЕЛИКО ТЪРНОВО, ЕИК на клон: 0029

51.Седалище и  
адрес на  
управление на  
клон

БЪЛГАРИЯ  
гр. Велико Търново 5000, Област Велико Търново;  
Община Велико Търново  
Димитър Благоев, № 6, вх. Г, ст. 1

телефон 062652216, факс 062652316

51а.Фирма/  
наименование на  
клон

СТАРТ-ИНЖЕНЕРИНГ АД-КЛОН ВЕЛИКО ТЪРНОВО

51б.ЕИК на клон

0029

52.Предмет на  
дейност на клон

СТРОИТЕЛСТВО, МОНТАЖ, ПРОЕКТИРАНЕ, РЕМОНТ,  
РЕКОНСТРУКЦИЯ И МОДЕРНИЗАЦИЯ, ПУСКОВО-НАЛАДЪЧНИ  
РАБОТИ, ПРЕДПРИЕМАЧЕСТВО, ИНЖЕНЕРИНГ,  
ПОСРЕДНИЧЕСТВО, ВЪНШНА И ВЪТРЕШНА ТЪРГОВИЯ С  
ВСИЧКИ ВИДОВЕ СТОКИ И УСЛУГИ, ГАРАНЦИОННО И  
ИЗВЪНГАРАНЦИОННО СЕРВИЗНО ОБСЛУЖВАНЕ НА МАШИНИ,  
СЪОРЪЖЕНИЯ И КОМПЛЕКСНИ ОБЕКТИ, НАЕМАНЕ И  
ОТДАВАНЕ ПОД НАЕМ НА ДВИЖИМО И НЕДВИЖИМО  
ИМУЩЕСТВО И ДРУГИ ДЕЙНОСТИ НЕЗАБРАНЕНИ ОТ ЗАКОНА

52а.Основна  
дейност по ШКИД

4521, ОБЩО СТРОИТЕЛСТВО НА СГРАДИ И СТРОИТЕЛНИ  
СЪОРЪЖЕНИЯ

53.Управител на  
клон/  
представяващ  
клон на ЮЛНЦ

Иван Петров Иванов, На основание чл.36а ал.3 от ЗОП  
БЪЛГАРИЯ  
гр. Велико Търново 5000, Област Велико Търново;  
Община Велико Търново  
Мария Габровска, № 6, вх. В, ст. 1

54.Обем на  
представителна  
власт

УПРАВЛЯВА И ПРЕДСТАВЛЯВА КЛОНА

### Част "Обявени актове"

#### Раздел Актуален учредителен акт

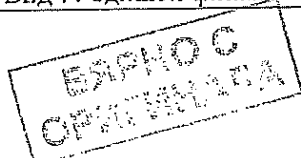
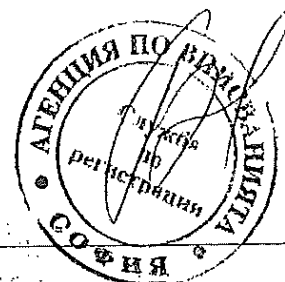
##### Актуален учредителен акт

1001.Описание на обявения акт Вид : Актуален дружествен договор/учредителен акт/устав  
Описание : Актуален дружествен договор/учредителен акт/устав  
Вид : Актуален дружествен договор/учредителен акт/устав  
Описание :

#### Раздел Обявени актове

##### Обявени актове

1001.Описание на обявения акт Вид : Годишен финансов отчет  
Описание : за 2007г.  
Вид : Годишен финансов отчет  
Описание : КОНСОЛИДИРАН  
Година : 2008  
Вид : Годишен финансов отчет  
Описание :  
Година : 2008  
Вид : Годишен финансов отчет



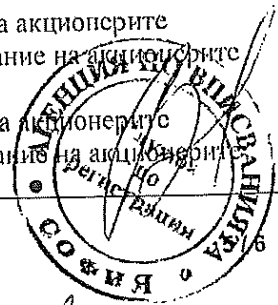
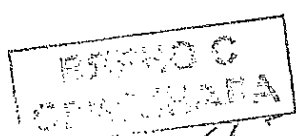
25

*Решение*

*Handwritten mark*

Описание : Годишен финансов отчет  
 Година : 2009  
 Вид : Годишен финансов отчет  
 Описание : Консолидиран отчет  
 Година : 2009  
 Вид : Годишен финансов отчет  
 Описание :  
 Година : 2010  
 Вид : Годишен финансов отчет  
 Описание : Годишен финансов отчет  
 Година : 2011  
 Вид : Годишен финансов отчет  
 Описание : Годишен финансов отчет  
 Година : 2012  
 Вид : Годишен финансов отчет  
 Описание : Доклад за дейността на "Старт Инженеринг" АД  
 Година : 2012  
 Вид : Годишен финансов отчет  
 Описание : Доклад на независимия одитор  
 Година : 2012  
 Вид : Годишен финансов отчет  
 Описание : Годишен финансов отчет  
 Година : 2013  
 Вид : Годишен финансов отчет  
 Описание : Консолидиран финансов отчет  
 Година : 2013  
 Вид : Годишен финансов отчет  
 Описание : Годишен финансов отчет  
 Година : 2014  
 Вид : Годишен финансов отчет  
 Описание : Годишен финансов отчет  
 Година : 2014  
 Вид : Годишен финансов отчет  
 Описание :  
 Година : 2015  
 Вид : Годишен финансов отчет  
 Описание : Консолидиран финансов отчет на група "Старт  
 Инженеринг" АД  
 Година : 2015  
 Вид : Годишен финансов отчет  
 Описание : Годишен финансов отчет - ДЗЗД СТАРТ ЕЛКО 2015  
 Година : 2015  
 Вид : Годишен финансов отчет  
 Описание :  
 Година : 2015  
 Вид : Годишен финансов отчет  
 Описание :  
 Година : 2015  
 Вид : Покана за свикване на общо събрание на акционерите  
 Описание : за 12.09.2008г.  
 Вид : Покана за свикване на общо събрание на акционерите  
 Описание : Покана за свикване на общо събрание на акционерите  
 Дата : 22.05.2009  
 Вид : Покана за свикване на общо събрание на акционерите  
 Описание : Покана за свикване на общо събрание на акционерите

1001. Описание на обявения акт



*Handwritten signature*

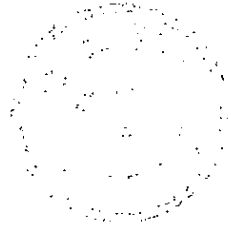
Дата : 18.06.2010  
Вид : Покана за свикване на общо събрание на акционерите  
Описание : Покана за свикване на общо събрание на акционерите  
Дата : 08.07.2011  
Вид : Покана за свикване на общо събрание на акционерите  
Описание : Покана за свикване на общо събрание на акционерите  
Дата : 29.06.2012  
Вид : Покана за свикване на общо събрание на акционерите  
Описание : Покана за свикване на общо събрание на акционерите  
Дата : 17.05.2013  
Вид : Покана за свикване на общо събрание на акционерите  
Описание : Покана за свикване на общо събрание на акционерите  
Дата : 28.07.2013  
Вид : Покана за свикване на общо събрание на акционерите  
Описание :  
Дата : 04.07.2014  
Вид : Покана за свикване на общо събрание на акционерите  
Описание : Покана за свикване на общо събрание на акционерите  
Дата : 05.06.2015  
Вид : Покана за свикване на общо събрание на акционерите  
Описание : Покана за свикване на общо събрание на акционерите  
Дата : 10.06.2016  
Вид : Покана за свикване на общо събрание на акционерите  
Описание :  
Дата : 28.06.2017  
Вид : Покана за записване на нови акции  
Описание : Покана за записване на нови акции  
1001.Описание на обявения акт Вид : Решение за увеличаване на капитала  
Описание : Решение за увеличаване на капитала  
1001.Описание на обявения акт Вид : Решение за увеличаване на капитала  
Описание : Решение за увеличаване на капитала  
1001.Описание на обявения акт Вид : Друг акт  
Описание : Списък на акционерите присъствали на ОС

1001.Описание на обявения акт  
1001.Описание на обявения акт  
1001.Описание на обявения акт

На основание чл.36а ал.3 от ЗОП

(И)

БОРИС С  
ОРИГОНАЛ



АГЕНЦИЯ ПО ВПИСВАНИЯТА

София 1111, ул. Елисавета Багряна №20  
www.registryagency.bg

тел.: 9486 181, факс: 9486 194  
office@registryagency.bg



**УДОСТОВЕРЕНИЕ**

изх. № 20180309090949 / 09.03.2018г.

Агенция по вписванията удостоверява, че в търговския регистър и регистъра на ЮЛНЦ по партидата на "СТАРТ-ИНЖЕНЕРИНГ" АД, ЕИК 030217255 в част „Вписани обстоятелства“ и част „Обявени актове“ към 09.03.2018 г. липсват следните обстоятелства и актове:

**Част "Вписани обстоятелства"**

Раздел Ликвидация

Ликвидация

Срок на ликвидацията

Ликвидатори

Представител

Продължаване на дейността

Спиране или прекратяване на производството по ликвидация

Възобновяване на ликвидацията

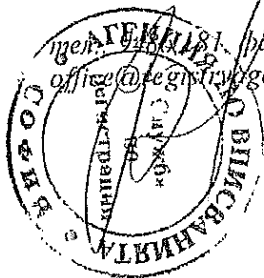
На основание чл.36а ал.3 от ЗОП

БЕЗНО С  
ОРИГИНАЛА



АГЕНЦИЯ ПО ВПИСВАНИЯТА

София 1111, ул. Елисавета Багряна №20  
www.registryagency.bg



Тел: 9486 194, факс: 9486 194  
office@registryagency.bg

**УДОСТОВЕРЕНИЕ**

изх. № 20180309091053 / 09.03.2018г.

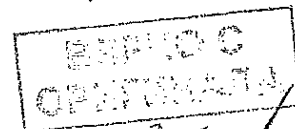
Агенция по вписванията удостоверява, че в търговския регистър и регистъра на ЮЛНЦ по партидата на "СТАРТ-ИНЖЕНЕРИНГ" АД, ЕИК 030217255 в част „Вписани обстоятелства“ и част „Обявени актове“ към 09.03.2018 г. липсват следните обстоятелства и актове:

**Част "Вписани обстоятелства"**

**Раздел Несъстоятелност**

**Данни за производството по несъстоятелност**

- Откриване на производство по несъстоятелност
- Откриване на производство по несъстоятелност / втора инстанция
- Откриване на производство по несъстоятелност / трета инстанция
- Начална дата на неплатежоспособността/свърхзадължеността
- Органи на длъжника
- Спиране на производството
- Спиране на производството / втора инстанция
- Спиране на производството / трета инстанция
- Възобновяване на производството
- Прекратяване на производството
- Отказ за утвърждаване на оздравителен план
- Прекратяване на производството / втора инстанция
- Прекратяване на производството / трета инстанция
- Ограничаване разпоредителната власт на длъжника
- Общ запор и възбрана
- Осребряване и разпределение
- Обявяване в несъстоятелност
- Възстановяване в права
- Възстановяване в права – отхвърляне на молбата
- Синдици
- Надзорни органи



На основание чл.36а ал.3 от ЗОП

ЕРМС С  
ОРБИНАТА

*Григор*



**ЗАСТРАХОВАТЕЛНА ПОЛИЦА**  
 № 212218213000419 / 30.10.2018

**ПО ЗАДЪЛЖИТЕЛНА ЗАСТРАХОВКА "ПРОФЕСИОНАЛНА ОТГОВОРНОСТ НА УЧАСТНИЦИТЕ В ПРОЕКТИРАНЕТО И СТРОИТЕЛСТВОТО"**

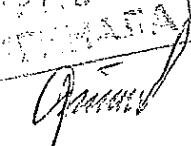
"ДЗИ - ОБЩО ЗАСТРАХОВАНЕ" ЕАД, ЕИК 121718407, АДРЕС: РЕПУБЛИКА БЪЛГАРИЯ; ГР.СОФИЯ 1000, БУЛ. "ВИТОША", 89Б, НА ОСНОВАНИЕ ПЛАТЕНА ПРЕМИЯ И СЪГЛАСНО ОБЩИТЕ УСЛОВИЯ НА ЗАДЪЛЖИТЕЛНА ЗАСТРАХОВКА "ПРОФЕСИОНАЛНА ОТГОВОРНОСТ НА УЧАСТНИЦИТЕ В ПРОЕКТИРАНЕТО И СТРОИТЕЛСТВОТО" И КЛАУЗА "ПРОФЕСИОНАЛНА ОТГОВОРНОСТ НА ПРОЕКТАНТА", ПРИЕМА ДА ЗАСТРАХОВА В РАМКИТЕ НА ЛИМИТИТЕ, СРОКОВЕТЕ И УСЛОВИЯТА НА НАСТОЯЩАТА ПОЛИЦА:

<b>ЗАСТРАХОВАЩ:</b>	Име: "СТАРТ-ИНЖЕНЕРИНГ" АД ЕИК: 030217255 Адрес: гр.София 1000, УЛ. ЛОКОМОТИВ, No 3 Представявано от:		
<b>ЗАСТРАХОВАН:</b>	Име: "СТАРТ-ИНЖЕНЕРИНГ" АД ЕИК: 030217255 Адрес: гр.София 1000, УЛ. ЛОКОМОТИВ, No 3 Представявано от:		
<b>ПРЕДМЕТ НА ЗАСТРАХОВКАТА:</b>	Професионалната отговорност на Застрахования за вреди, причинени на другите участници в строителството и/или на други трети лица, вследствие на неправомърни действия или бездействия на Застрахования, извършени при или по повод осъществяване на професионалната му дейност.		
<b>ЗАСТРАХОВАТЕЛНО ПОКРИТИЕ:</b>	Съгласно приложените Общи условия на задължителна застраховка "Професионална отговорност на участниците в проектирането и строителството" и Клауза "Професионална отговорност на проектанта".		
<b>ПРОФЕСИОНАЛНА ДЕЙНОСТ НА ЗАСТРАХОВАНИЯ:</b>	Изработване на инвестиционни проекти за обекти от първа категория и всяка по-ниска категория, съгласно действащото законодателство.		
<b>ЛИМИТИ НА ОТГОВОРНОСТ:</b>	За едно събитие: 150,000 лв Агрегатен лимит: 300,000 лв		
<b>САМОУЧАСТИЕ НА ЗАСТРАХОВАНИЯ:</b>	Не се прилага.		
<b>СРОК НА ЗАСТРАХОВКАТА:</b>	1 година		
	<b>НАЧАЛО:</b> 00:00 часа на 05.11.2018 г.	<b>КРАЙ:</b> 24:00 часа на 04.11.2019 г.	
<b>РЕТРОАКТИВНА ДАТА:</b>	05.11.2013 г.		
<b>ЗАСТРАХОВАТЕЛНА ПРЕМИЯ:</b>	330.00 лв.	Словом: триста тридесет лв.	
<b>ДАТА НА ПЛАЩАНЕ:</b>	04.11.2018 г.		
<b>ДАНЪК 2% ВЪРХУ ЗП:</b>	6.60 лв.		
<b>ОБЩА ДЪЛЖИМА СУМА:</b> <small>(ДЪЛЖИМА ЗАСТРАХОВАТЕЛНА ПРЕМИЯ + ДАНЪК 2% ВЪРХУ ЗП)</small>	336.60 лв.	Словом: триста тридесет и шест и 0.60 лв.	
<b>СПЕЦИАЛНИ ДОГОВОРЕНОСТИ:</b>	Ако след сключване на застраховката Застрахованият започне да осъществява дейност, свързана с категория строещи, за които са предвидени по-високи минимални лимити на отговорност, той е длъжен да уведоми Застрахователя съгласно ОУ на задължителна застраховка "Професионална отговорност на участниците в проектирането и строителството" и да сключи анексо за увеличаване на лимитите по застрахователния договор срещу заплащане на допълнителна премия.		

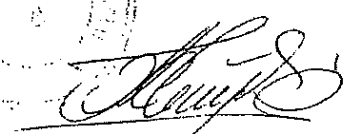
Декларирам, че ми е предоставена информацията по чл.324 и чл. 326 от КЗ преди сключване на настоящия договор и съм информиран от застрахователя за обстоятелствата по чл. 19 от ЗЗД, получил съм Общите условия, съдържащи информация съгласно ЗЗД; предоставям доброволно личните си данни, като условие за сключване на договор със застрахователя и във връзка с изпълнението на задълженията му, като страна по възникналото правоотношение; давам изричното си съгласие застрахователят да обработва предоставените от мен лични данни, да изисква и получава от трети лица мои лични данни, обработвани от тях в качеството им на администратори, да използва личните ми данни за предлагане на застрахователни услуги по директен начин и за проучване, относно предлаганите застрахователни продукти и услуги, да предоставя личните ми данни на трети лица.

Настоящата полица се издава в два еднообразни екземпляра - по един за Застрахователя и за Застрахования.

ВЪРНО С  
 ОБИТЕЛНАТА



31



Дата и място на сключване: 30.10.2018, гр.София

На основание чл.36а ал.3 от ЗОП

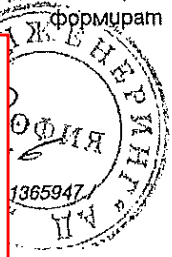
Получих, запознах се и приемам приложените Общи условия на задължителна застраховка "Професионална отговорност на участниците в проектирането и строителството" и Клауза „Професионална отговорност на проектанта“, които заедно с настоящата полица и попълненото Заявление-въпросник, формират застрахователен договор.

"ДЗИ - ОБЩО ЗАСТРАХОВАНЕ"

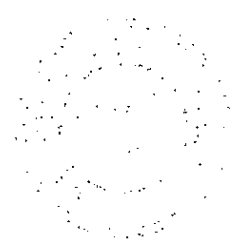
ЗАСТРАХОВАТЕЛ

На основание чл.36а ал.3 от ЗОП

/ КОРПОРЕКС БГ ЗАСТРАХОВАТЕЛЕН БРОКЕР ООД, гр.София, ул. Околовръстна 11



*[Handwritten signature]*





**ЗАСТРАХОВАТЕЛНА ПОЛИЦА**  
 № 212218213000421 / 01.11.2018

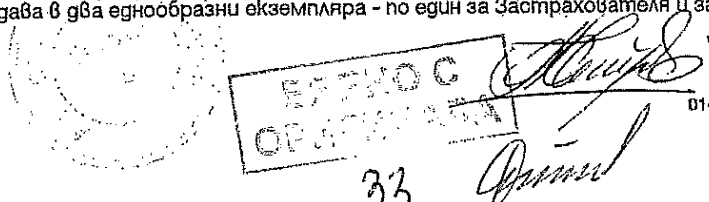
**ПО ЗАДЪЛЖИТЕЛНА ЗАСТРАХОВКА "ПРОФЕСИОНАЛНА ОТГОВОРНОСТ НА УЧАСТНИЦИТЕ В ПРОЕКТИРАНЕТО И СТРОИТЕЛСТВОТО"**

"ДЗИ - ОБЩО ЗАСТРАХОВАНЕ" ЕАД, ЕИК 121718407, АДРЕС: РЕПУБЛИКА БЪЛГАРИЯ, ГР.СОФИЯ 1000, БУЛ. "ВИТОША", 89Б, НА ОСНОВАНИЕ ПЛАТЕНА ПРЕМИЯ И СЪГЛАСНО ОБЩИТЕ УСЛОВИЯ НА ЗАДЪЛЖИТЕЛНА ЗАСТРАХОВКА "ПРОФЕСИОНАЛНА ОТГОВОРНОСТ НА УЧАСТНИЦИТЕ В ПРОЕКТИРАНЕТО И СТРОИТЕЛСТВОТО" И КЛАУЗА "ПРОФЕСИОНАЛНА ОТГОВОРНОСТ НА СТРОИТЕЛЯ", ПРИЕМА ДА ЗАСТРАХОВА В РАМКИТЕ НА ЛИМИТИТЕ, СРОКОВЕТЕ И УСЛОВИЯТА НА НАСТОЯЩАТА ПОЛИЦА:

<b>ЗАСТРАХОВАЩ:</b>	Име: "СТАРТ-ИНЖЕНЕРИНГ" АД ЕИК: 030217255 Адрес: гр.София 1000, УЛ. ЛОКОМОТИВ, No 3 Представявано от: Георги Георгиев, Стоил Стоев		
<b>ЗАСТРАХОВАН:</b>	Име: "СТАРТ-ИНЖЕНЕРИНГ" АД ЕИК: 030217255 Адрес: гр.София 1000, УЛ. ЛОКОМОТИВ, No 3 Представявано от: Георги Георгиев, Стоил Стоев		
<b>ПРЕДМЕТ НА ЗАСТРАХОВКАТА:</b>	Професионалната отговорност на Застрахования за вреди, причинени на другите участници в строителството и/или на други трети лица, вследствие на неправомерни действия или бездействия на Застрахования, извършени при или по повод осъществяване на професионалната му дейност.		
<b>ЗАСТРАХОВАТЕЛНО ПОКРИТИЕ:</b>	Съгласно приложените Общи условия на задължителна застраховка "Професионална отговорност на участниците в проектирането и строителството" и Клауза "Професионална отговорност на строителя".		
<b>ПРОФЕСИОНАЛНА ДЕЙНОСТ НА ЗАСТРАХОВАНИЯ:</b>	Цялостно изпълнение на строителство или на отделни строително-монтажни работи на обекти от първа категория и всяка по-ниска категория, съгласно действащото законодателство.		
<b>ЛИМИТИ НА ОТГОВОРНОСТ:</b>	За едно събитие: 300,000 лв	Агрегатен лимит: 600,000 лв	
<b>САМОУЧАСТИЕ НА ЗАСТРАХОВАНИЯ:</b>	Не се прилага.		
<b>СРОК НА ЗАСТРАХОВКАТА:</b>	1 година		
	<b>НАЧАЛО:</b> 00:00 часа на 05.11.2018 г.	<b>КРАЙ:</b> 24:00 часа на 04.11.2019 г.	
<b>РЕТРОАКТИВНА ДАТА:</b>	05.11.2018 г.		
<b>ЗАСТРАХОВАТЕЛНА ПРЕМИЯ:</b>	660.00 лв.	Словом: шестстотин шестдесет лв.	
<b>ДАТА НА ПЛАЩАНЕ:</b>	04.11.2018 г.		
<b>ДАНЪК 2% ВЪРХУ ЗП:</b>	13.20 лв.		
<b>ОБЩА ДЪЛЖИМА СУМА:</b> <small>(ДЪЛЖИМА ЗАСТРАХОВАТЕЛНА ПРЕМИЯ + ДАНЪК 2% ВЪРХУ ЗП)</small>	673.20 лв.	Словом: шестстотин седемдесет и три и 0.20 лв.	
<b>СПЕЦИАЛНИ ДОГОВОРНОСТИ:</b>	Ако след сключване на застраховката Застрахованият започне да осъществява дейност, свързана с категория строителство, за които са предвидени по-високи минимални лимити на отговорност, той е длъжен да уведоми Застрахователя съгласно ОУ на задължителна застраховка "Професионална отговорност на участниците в проектирането и строителството" и да сключи анекс за увеличаване на лимитите по застрахователния договор срещу заплащане на допълнителна премия.		

Декларирам, че ми е предоставена информацията по чл.324 и чл. 326 от КЗ преди сключване на настоящия договор и съм информиран от застрахователя за обстоятелствата по чл. 19 от ЗЗЛД, получил съм Общите условия, съдържащи информация съгласно ЗЗЛД; предоставям доброволно личните си данни, като условие за сключване на договор със застрахователя и във връзка с изпълнението на задълженията му, като спрана по възникналото правоотношение; давам изричното си съгласие застрахователят да обработва предоставените от мен лични данни, да изисква и получава от трети лица мои лични данни, обработвани от тях в качеството им на администратори, да използва личните ми данни за предлагане на застрахователни услуги по директен начин и за проучване, относно предлаганите застрахователни продукти и услуги, да предоставя личните ми данни на трети лица.

Настоящата полица се издава в два еднообразни екземпляра - по един за Застрахователя и за Застрахователя.



33

Дата и място на сключване: 01.11.2018, гр. София



На основание чл.36а ал.3 от ЗОП

"ДЗИ - ОБЩО ЗАСТРАХОВАНЕ"

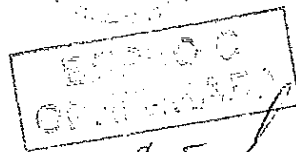
/ КОРПОРЕКС БГ ЗАСТРАХОВАНЕ

Получих, запознах се и приемам приложените Общи условия на задължителна застраховка "Професионална отговорност на участниците в проектирането и строителството" и Клауза „Професионална отговорност на строителя“, които заедно с настоящата полица и попълненото Заявление-въпросник, формират застрахователни

На основание чл.36а ал.3 от ЗОП

ЗАСТРАХОВАЩ:

ул. Околовръстен път



Handwritten signature



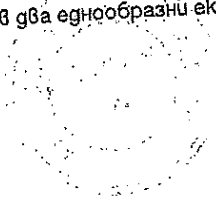
**ЗАСТРАХОВАТЕЛНА ПОЛИЦА**  
 № 212818213000177 / 30.10.2018  
**"ОБЩА ГРАЖДАНСКА ОТГОВОРНОСТ"**

"ДЗИ - ОБЩО ЗАСТРАХОВАНЕ" ЕАД, ЕИК 121718407, АДРЕС: РЕПУБЛИКА БЪЛГАРИЯ, ГР.СОФИЯ 1000, БУЛ. "ВИТОША", 89Б, НА ОСНОВАНИЕ ПЛАТЕНА ПРЕМИЯ ПРИЕМА ДА ЗАСТРАХОВА В РАМКИТЕ НА ЛИМИТИТЕ, СРОКОВЕТЕ И УСЛОВИЯТА НА НАСТОЯЩАТА ПОЛИЦА:

ЗАСТРАХОВАЩ:	Име: "СТАРТ-ИНЖЕНЕРИНГ" АД ЕИК: 030217255 Адрес: гр.София 1000, УЛ. ЛОКОМОТИВ, № 3 Представявано от:		
ЗАСТРАХОВАН:	"СТАРТ-ИНЖЕНЕРИНГ" АД ЕИК: 030217255 Адрес: гр.София 1000, УЛ. ЛОКОМОТИВ, № 3 Представявано от:		
ПРЕДМЕТ НА ЗАСТРАХОВАНЕ:	Обща гражданска отговорност Отговорността на застрахования за вредите, причинени от него на трети лица при или по повод осъществяване на застрахованата дейност, посочена в настоящата полица.		
ДЕЙНОСТ НА ЗАСТРАХОВАНИЯ:	Дейността, която Застрахования извършва, попада в следната група от икономически дейности: 056 Научноизследователска и развойна дейност и лаборатории		
ЗАСТРАХОВАНА ДЕЙНОСТ И АДРЕСИ, НА КОИТО СЕ ОСЪЩЕСТВЯВА:	Контролен орган от вида С, която се осъществява в помещенията на адрес(и): гр.Бургас, ул. Христо Ботев № 33; гр. Пловдив, ул. Чернишевски №1А		
ЗАСТРАХОВАТЕЛНО ПОКРИТИЕ:	Съгласно приложените: Общи условия на застраховка "Обща гражданска отговорност" и Клауза 02 — Непроизводствена дейност		
СПЕЦИАЛНИ ДОГОВОРНОСТИ:	Няма		
ТЕРИТОРИЯ НА ВАЛИДНОСТ:	Обща гражданска отговорност България		
ПРИЛОЖИМО ПРАВО:	Застраховката се подчинява на българското законодателство и съг.		
ЛИМИТИ НА ОТГОВОРНОСТ:	Обща гражданска отговорност Лимит за едно събитие: 50 000 лв. Агрегатен лимит: 100 000 лв.		
САМОУЧАСТИЕ НА ЗАСТРАХОВАНИЯ:	Обща гражданска отговорност Застрахованият участва в обезщетяването на всяка причинена вреда като поема за своя сметка 200 лв. от размера на всяко обезщетение		
СРОК НА ЗАСТРАХОВКАТА:	1 година		КРАЙ: 24:00 часа на 04.11.2019 г.
	НАЧАЛО: 00:00 часа на 05.11.2018 г.		
ЗАСТРАХОВАТЕЛНА ПРЕМИЯ:	630.50 лв.		Словом: шестстотин тридесет и 0.50 лв.
ДАТА НА ПЛАЩАНЕ:	04.11.2018		
ДАНЪК 2% ВЪРХУ ЗП:	12.61 лв.		
ОБЩА ДЪЛЖИМА СУМА: <small>(ДЪЛЖИМА ЗАСТРАХОВАТЕЛНА ПРЕМИЯ + ДАНЪК 2% ВЪРХУ ЗП)</small>	643.11 лв.		Словом: шестстотин четирдесет и три и 0.11 лв.

Декларирам, че ми е предоставена информацията по чл.324 и чл. 326 от КЗ преди сключване на настоящия договор и съм информиран от застрахователя за обстоятелствата по чл. 19 от ЗЗД, получил съм Общите условия, съдържащи информация съгласно ЗЗД; представям доброволно личните си данни, като условие за сключване на договор със застрахователя и във връзка с изпълнението на задълженията му, като страна по възникналото правоотношение; давам изричното си съгласие застрахователят да обработва предоставените от мен лични данни, да изисква и получава от трети лица мои лични данни, обработвани от тях в качеството им на администратори, да използва личните ми данни за предлагане на застрахователни услуги по директен начин и за проучване, относно предлаганите застрахователни продукти и услуги, да предоставя личните ми данни на трети лица.

Настоящата полица се издава в два еднообразни екземпляра - по един за Застрахователя и за Застрахования



ВЕРНО  
 СЪДЪРЖА  
 [Signature]

Дата и място на сключване: 30.10.2018, гр.София

Получих, запознах се и приемам приложените Общи условия за застраховка "Обща гражданска отговорност", Клауза 02 — Непроизводствена дейност, които заедно с настоящата полица и предложението-въпросник, формират застрахователния договор.

На основание чл.36а ал.3 от ЗОП

На основание чл.36а ал.3 от ЗОП

"ДЗИ - ОБЩО ЗАСТРАХОВАНЕ"

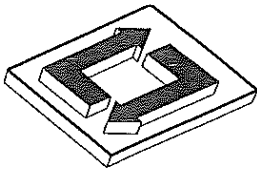
ЗАСТРАХОВАТЕЛНА КОМПАНИЯ

/ КОРПОРЕКС БГ ЗАСТРАХОВАНЕ

София, ул. Околовръстен пр.



ЕВРОПОС  
ОПТИКАЛ  
*[Handwritten signature]*



# СТАРТ ИНЖЕНЕРИНГ АД

ул. "Локомотив" № 3, София 1220, БЪЛГАРИЯ  
тел.: (+359 2) 931 6146 факс: (+359 2) 931 9966;  
e-mail: sofia@starteng.com

Списък на договори за строителство, индентично или сходно с предмета на обществена поръчка с предмет " Модернизация (ретрофит) на възлови разпределителни станции 20 (10) кV и изграждане на вериги на телемеханика, реф. № PPD 18-103 - Обособена позиция 1 /ОП 1/ - Модернизация (ретрофит /проектиране, реконструкция, доставка и монтаж на машини и съоръжения, подготовка и въвеждане в експлоатация/) на възлови разпределителни станции 20 (10) кV и изграждане на вериги на телемеханика в регион „София“ и регион „София област“ през последните 3 (три) години

№	Наименование и местонахождение на строежа	Възложител	Обем в стойностно изражение /лева/	Кратко описание на строежа	период на изпълнение
1	Възлова разпределителна станция „Кокаляне“ 20/20kV“	поръчка № 01467-2017-0043  „ЧЕЗ РАЗПРЕДЕЛЕНИЕ България“ АД  гр. София 1784 бул. „Цариградско шосе“ № 159  Телефон (02) 895 84 50  Факс (02) 895 97 70  Удостоверение за добро изпълнение: № CD-DOC-14432/13.12.2017 г., издадено от „ЧЕЗ РАЗПРЕДЕЛЕНИЕ България“ АД	363 770,61 лева	„Проектиране, доставка и монтаж на нова комплектна разпределителна уредба 20kV от модулен тип и цифрови защиты във възлова разпределителна станция „Кокаляне“ 20/20kV“ Проектиране: <ul style="list-style-type: none"><li>Изготвяне на работен проект за нова комплектна разпределителна уредба (КРУ) 20kV от модулен тип с нови цифрови защиты във възлова разпределителна станция „Кокаляне“ 20/20kV, съгласно изискванията на Възложителя;</li><li>Съгласуване на работния проект с „ЧЕЗ Разпределение България“ АД.</li></ul> Доставка на нови съоръжения и	Дата на възлагане: 28.08.2017г.;  Дата на завършване: 23.11.2017г.

				<p>оборудване, съгласно утвърдения работен проект:</p> <ul style="list-style-type: none"> <li>• Доставка на нова комплектна разпределителна уредба (КРУ) 20kV от модулен тип – 8 модула;</li> <li>• Доставка на нови цифрови защиты – 9 броя;</li> <li>• Доставка на Обемна клетка, изработена от стоманени и алуминиеви профили за монтаж на КРУ модули върху съществуваща бетонна площадка;</li> <li>• Доставка на нова самостоятелна метална конструкция с оборудване за монтаж на трансформатор „собствени нужди“ 20/0,4kV на обекта.</li> </ul> <p>Строително монтажни работи:</p> <ul style="list-style-type: none"> <li>• Разглобяване на метална конструкция, в която са монтирани комплектни разпределителни устройства 20kV от модулен тип на обекта;</li> <li>• Демонтаж на съществуващи комплектни разпределителни устройства 20kV в обекта, включително и вериги за вторична комутация към всеки модул;</li> <li>• Провеждане на</li> </ul>
--	--	--	--	--

				<p>входящ контрол при влагане на новото оборудване на обекта;</p> <ul style="list-style-type: none"> <li>• Монтаж на нова комплектна разпределителна уредба (КРУ) 20kV от модул тип върху съществуваща площадка, включително и монтаж на нови цифрови релейни защиты във всеки модул;</li> <li>• Сглобяване на метална конструкция, в която е монтирана новата комплектна разпределителна уредба (КРУ) 20kV от модул тип;</li> <li>• Монтаж на трансформатор „собствени нужди“ 20/0,4kV в нова самостоятелна метална конструкция;</li> <li>• Монтаж на нова самостоятелна метална конструкция с оборудване и трансформатор „собствени нужди“ 20/0,4kV (МТТ) върху съществуващ метален решетъчен стълб 20kV (№ 1 ВЕЛ 20kV „Плана“ в непосредствена близост до обекта;</li> </ul> <p>Наладка и настройки, включително и вериги за телемеханика (SCADA) на новомонтирани съоръжения и оборудване във</p>	
--	--	--	--	---	--

				<p>възлова разпределителна станция „Кокаляне“ 20/20kV;</p> <ul style="list-style-type: none"> <li>• Провеждане на пълни електрически измервания и изпитвания на новомонтираните съоръжения и оборудване във възлова разпределителна станция „Кокаляне“ 20/20kV, съгласно изискванията на Наредба № 3 за устройство на електрическите уредби и електропроводни линии, част осма „Предавателно-приемни изпитвания на електрически съоръжения“, раздел единадесети „Комплектни разпределителни уредби“ и издаване на протоколи от акредитирана лаборатория;</li> <li>• Провеждане на единични функционални проби на новомонтираните съоръжения и оборудване във възлова разпределителна станция „Кокаляне“ 20/20kV.</li> <li>• Въвеждане на новата комплектна разпределителна уредба (КРУ) 20kV от модулен тип в редовна експлоатация:</li> </ul>	
--	--	--	--	--	--



				<ul style="list-style-type: none"> <li>• Провеждане на комплексни 72 часови проби под напрежение и товар на новомонтираните съоръжения и оборудване във възлова разпределителна станция „Кокаляне“ 20/20kV;</li> <li>• Въвеждане в експлоатация възлова разпределителна станция „Кокаляне“ 20/20kV след успешно проведени 72 часови проби под напрежение и товар;</li> </ul> <p>Обучение на специалисти на възложителя:</p> <ul style="list-style-type: none"> <li>• Изготвяне на програма за обучение на специалисти на възложителя;</li> <li>• Обучение и сертифициране на 6 /шест/ специалиста на възложителя;</li> <li>• Предаване на възложителя на всички необходими документации и материали, включително софтуер и инструкции за работа с нова КРУ 20kV с новомонтираните цифрови защиты (на български език).</li> </ul> <p>Изготвяне на изпълнителна</p>	
--	--	--	--	---	--

				документация	
2	Тягова подстанция на Софийски метрополитен – Метростанция 12 – II метродиа метър	„Метрополитен“ ЕАД, гр.София, ул. „Княз Борис I, №121 тел.029212001, факс 029872244  Удостоверение за добро изпълнение: № 2679/24.07.2017 г., издадено от „Метрополитен“ ЕАД, гр.София,	680 300,00 лева	Проект за разширение на метро - София, II метролиния, участък от МС „Джеймс Баучер“ / МС II-11, км 10+452 / до МС II-12 с линейен пункт след нея / км 11+752  Обща стойност на договора –  7 048 288,00 лева, без ДДС , в тази част изпълнени доставки, монтаж и въвеждане в експлоатация на енергийно оборудване за:  <ul style="list-style-type: none"> <li>• подстанция в ТПС на метростанция II-12 (КРУ 10 kV) – 12 броя силови прекъсвачи 10kV;</li> <li>• оборудване в градски подстанции (КРУ 10 kV) – 2 броя силови прекъсвачи 10kV;</li> <li>• цифрови защиты за линейни присъединения 10kV – 10 броя.</li> </ul>	<i>Дата на възлагане:</i> 21.03.2014г.  <i>Дата на завършване:</i> 15.07.2016г.  <i>Разрешение за ползване:</i> № СТ-05-117/19.07.2016г.
3	Тягова подстанция на Софийски метрополитен – Метростанция 16 – I метродиа метър	„Метрополитен“ ЕАД, гр.София, ул. „Княз Борис I, №121 тел.029212001, факс 029872244  Удостоверение за добро изпълнение: № 2676/24.07.2017 г., издадено от „Метрополитен“ ЕАД, гр.София,	650 248,00 лева	Проект: „Разширение на метро - София, етап III – първи метродиа метър, ЛОТ 2; участък от МС 13 /Младост – I, км 15+450/ до МС 16 /Бизнес Парк – Младост 4, км 18+068.60/ и реконструкция на инженерната	<i>Дата на възлагане:</i> 24.06.2013г.  <i>Дата на завършване:</i> 02.04.2015г.  <i>Разрешение за ползване:</i> № СТ-05-624/08.05.2015г.

				<p>инфраструктура – първи етап, с метростанция „БИЗНЕС ПАРК“, с прилежащ метроучастък (с ВУ) от км. 17+000 до км 18+068.60</p> <p>Обща стойност на договора - 8 301 602,00 лева, без ДДС ,</p> <p>в тази част изпълнени доставки, монтаж и въвеждане в експлоатация на енергийно оборудване за:</p> <ul style="list-style-type: none"> <li>• подстанция в ТПС на метростанция I-16 (КРУ 10 kV) – 12 броя силови прекъсвачи 10kV;</li> <li>• оборудване в градски подстанции (КРУ 10 kV) – 2 броя силови прекъсвачи 10kV;</li> <li>• цифрови защиты за линейни присъединения 10kV – 10 броя.</li> </ul>	
4	<p>Тягова подстанция на Софийски метрополитен – Метростанция 20 – I метродиаметър</p>	<p>„Метрополитен“ ЕАД, гр.София, ул. „Княз Борис I, №121 тел.029212001, факс 029872244</p> <p>Удостоверение за добро изпълнение: № 2677/24.07.2017 г., издадено от „Метрополитен“ ЕАД, гр.София</p>	480 316,00 лева	<p>Проект за разширение на метро - София, етап II – първи метродиаметър, участък: бул. „Цариградско шосе“ /МС19/ - ж.к. „Дружба“ – Летище „София“ /МС23/, Обособена позиция №1: Участък от бул. „Цариградско шосе“/МС19/ км. 2+138,90 до</p>	<p>Дата на възлагане: 14.12.2012г.</p> <p>Дата на завършване: 28.02.2015г.</p> <p>Разрешение за ползване: № СТ-05-421/30.03.2015г.</p>

				<p>км.3+184,90 /края на МС20/</p> <p>Обща стойност на договора –</p> <p>7 658 843,00 лева, без ДДС ,</p> <p>в тази част изпълнени доставки, монтаж и въвеждане в експлоатация на енергийно оборудване за:</p> <ul style="list-style-type: none"> <li>• подстанция в ТПС на метростанция I-20 (КРУ 10 kV) – 12 броя силови прекъсвачи 10kV;</li> <li>• цифрови защиты за линейни присъединения 10kV – 8 броя.</li> </ul>	
5	<p><b>Тягова подстанция на Софийски метрополитен – Метростанция 21 – I метродиаметър</b></p>	<p>„Метрополитен“ ЕАД, гр.София, ул. „Княз Борис I, №121 тел.029212001, факс 029872244</p> <p><b>Удостоверение за добро изпълнение: № 2678/24.07.2017 г., издадено от „Метрополитен“ ЕАД, гр.София,</b></p>	638 510,00 лева	<p>Проект за разширение на метро - София, етап II – първи метродиаметър, участък: бул. „Цариградско шосе“ /МС19/ - ж.к. „Дружба“ – Летище „София“ /МС23/, Обособена позиция №2: Участък от км. 3+184,90 /края на МС20/ до ул. „Поручик Неделчо Бончев“ км.5+010,00 км</p> <p>Обща стойност на договора –</p> <p>8 606 687,00 лева, без ДДС ,</p> <p>в тази част изпълнени доставки, монтаж и въвеждане в</p>	<p><i>Дата на възлагане:</i> 26.11.2012г.</p> <p><i>Дата на завършване:</i> 28.02.2015г.</p> <p><i>Разрешение за ползване:</i> № СТ-05-421/30.03.2015г.</p>

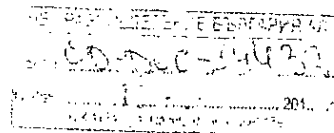
				<p>експлоатация на енергийно оборудване за:</p> <ul style="list-style-type: none"> <li>• подстанция в ТПС на метростанция I-21 (КРУ 10 kV) – 12 броя силови прекъсвачи 10kV;</li> <li>• оборудване в градски подстанции (КРУ 10 kV) – 2 броя силови прекъсвачи 10kV;</li> <li>• цифрови защиты за линейни присъединения 10kV – 10 броя.</li> </ul>	
--	--	--	--	--	--

Дата 14.12.2018 г.

ПОДПИС и ПЕЧАТ:

На основание чл.36а ал.3 от ЗОП

(Председател на Съвета на директорите на „Старт-Инженеринг“ АД)



**УДОСТОВЕРЕНИЕ**  
за добро изпълнение

„ЧЕЗ РАЗПРЕДЕЛЕНИЕ БЪЛГАРИЯ“ АД, в качеството си на Възложител, издава настоящото удостоверение за добро изпълнение на „СТАРТ-ИНЖЕНЕРИНГ“ АД, в качеството си на Изпълнител, в уверение на това, че дружеството разполага с необходимия капацитет да проектира, извършва доставки и изпълнява строително-монтажни работи, и пуско-наладъчни работи в енергетиката.

„СТАРТ-ИНЖЕНЕРИНГ“ АД изпълни в съкратени срокове и с високо качество, и в съответствие с нормативните изисквания задълженията си по Договор № 17-371 от 25.08.2017г., с предмет: „Проектиране, доставка и монтаж на нова комплектна разпределителна уредба 20kV от модулен тип и цифрови защиты във възлова разпределителна станция „Кокаляне“ 20/20kV“, поръчка № 01467-2017-0043 на обща стойност 363 770,61 лв. /триста шестдесет и три хиляди седемстотин и седемдесет лева и шестдесет и една стотинки/.  
Допълнителна информация:

- Дата на започване на работите по договора: 28.08.2017г.,
- Дата на завършване на работите по договора: 23.11.2017г.,
- Място на изпълнение: с. Кокаляне, община Столична, област София-град.

Изпълнените работи по договора включват:

1. Проектиране:

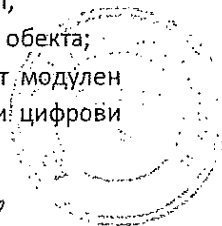
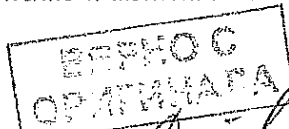
- Изготвяне на работен проект за нова комплектна разпределителна уредба (КРУ) 20kV от модулен тип с нови цифрови защиты във възлова разпределителна станция „Кокаляне“ 20/20kV, съгласно изискванията на Възложителя;
- Съгласуване на работния проект с „ЧЕЗ Разпределение България“ АД.

2. Доставка на нови съоръжения и оборудване, съгласно утвърдения работен проект:

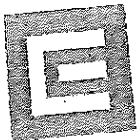
- Доставка на нова комплектна разпределителна уредба (КРУ) 20kV от модулен тип – 8 модула;
- Доставка на нови цифрови защиты – 9 броя;
- Доставка на Обемна клетка, изработена от стоманени и алуминиеви профили за монтаж на КРУ модули върху съществуваща бетонна площадка;
- Доставка на нова самостоятелна метална конструкция с оборудване за монтаж на трансформатор „собствени нужди“ 20/0,4kV на обекта.

3. Строително монтажни работи:

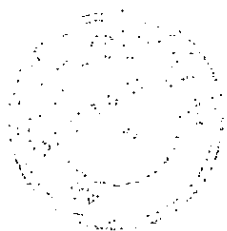
- Разглобяване на метална конструкция, в която са монтирани комплектни разпределителни устройства 20kV от модулен тип на обекта;
- Демонтаж на съществуващи комплектни разпределителни устройства 20kV в обекта, включително и вериги за вторична комутация към всеки модул;
- Провеждане на входящ контрол при влягане на новото оборудване на обекта;
- Монтаж на нова комплектна разпределителна уредба (КРУ) 20kV от модулен тип върху съществуваща площадка, включително и монтаж на нови цифрови релейни защиты във всеки модул;



46

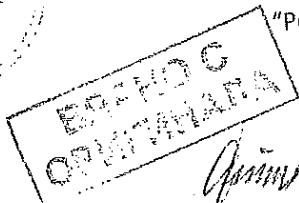


- Сглобяване на метална конструкция, в която е монтирана новата комплектна разпределителна уредба (КРУ) 20kV от модулент тип;
  - Монтаж на трансформатор „собствени нужди“ 20/0,4kV в нова самостоятелна метална конструкция;
  - Монтаж на нова самостоятелна метална конструкция с оборудване и трансформатор „собствени нужди“ 20/0,4kV (МТТ) върху съществуващ метално решетъчен стълб 20kV (№ 1 ВЕЛ 20kV „Плана“ в непосредствена близост до обекта;
4. Наладка и настройки, включително и вериги за телемеханика (SCADA) на новомонтирани съоръжения и оборудване във възлова разпределителна станция „Кокаляне“ 20/20kV;
- Провеждане на пълни електрически измервания и изпитвания на новомонтираните съоръжения и оборудване във възлова разпределителна станция „Кокаляне“ 20/20kV, съгласно изискванията на Наредба № 3 за устройство на електрическите уредби и електропроводни линии, част осма единадесети „Комплектни разпределителни уредби“, раздел от акредитирана лаборатория;
  - Провеждане на единични функционални проби на новомонтираните съоръжения и оборудване във възлова разпределителна станция „Кокаляне“ 20/20kV.
  - Въвеждане на новата комплектна разпределителна уредба (КРУ) 20kV от модулент тип в редовна експлоатация;
  - Провеждане на комплексни 72 часови проби под напрежение и товар на новомонтираните съоръжения и оборудване във възлова разпределителна станция „Кокаляне“ 20/20kV;
  - Въвеждане в експлоатация възлова разпределителна станция „Кокаляне“ 20/20kV след успешно проведени 72 часови проби под напрежение и товар;
5. Обучение на специалисти на възложителя:
- Изготвяне на програма за обучение на специалисти на възложителя;
  - Обучение и сертифициране на 6 /шест/ специалиста на възложителя;
  - Предаване на възложителя на всички необходими документи и материали, включително софтуер и инструкции за работа с нова КРУ 20kV с новомонтираните цифрови защити (на български език).
6. Изготвяне на ексекүтивна документация



Директор Дирекция:

„Реализация на инвестиции“



*Handwritten signature*

*Handwritten number 47*

На основание чл.36а ал.3 от ЗОП



СТОЛИЧНА ОБЩИНА  
"МЕТРОПОЛИТЕН" ЕАД

Изпълнителен директор - тел. +359 2 987-63-94, факс +359 2 987-22-44, e-mail: metro@metropolitan.bg  
София 1000, ул. "Княз Борис I" № 121

Изм. № 2679  
София... 24.07.2018г.

## УДОСТОВЕРЕНИЕ

„МЕТРОПОЛИТЕН“ ЕАД издава настоящото удостоверение на „Старт Инженеринг“ АД, в уверение на това, че дружеството има необходимия капацитет, даващ му възможността да участва в търгове за изпълнение на инженерингова и строително-монтажна дейност в областта на транспорта, електроенергетиката, промишлеността, системи за контрол, измерване на автоматизация на технологични процеси и микропроцесорна техника.

„Старт Инженеринг“ АД, като подизпълнител на „СТАНИЛОВ“ ЕООД е изпълнила договор за инженеринг (проектиране и строителство) с възложител „МЕТРОПОЛИТЕН“ ЕАД, както следва:

Договор	Получател	Предмет на договора	Сума (лева)
Договор със „СТАНИЛОВ“ ЕООД от 21.03.2014г. -дата на възлагане на договора: 21.03.2014г. -дата на завършване на договора: 15.07.2016г. -разрешение за ползване № СТ-05-117/19.07.2016г.	„Метрополитен“ ЕАД, гр.София, ул. „Княз Борис I, №121 тел.029212001 факс 029872244	Проект за разширение на метро - София, II метролиния, участък от МС „Джеймс Баучер“ / МС II-11, км 10+452 / до МС II-12 с линеен пункт след нея / км 11+752  Обща стойност на договора – 7 048 288,00 лева, без ДДС ,  в тази част изпълнени доставки, монтаж и въвеждане в експлоатация на енергийно оборудване за: <ul style="list-style-type: none"><li>• подстанция в ТПС на метростанция II-12 (КРУ 10 kV) – 12 броя силови прекъсвачи 10kV;</li><li>• оборудване в градски подстанции (КРУ 10 kV) – 2 броя силови прекъсвачи 10kV;</li><li>• цифрови защиты за линейни присъединения 10kV – 10 броя.</li></ul>	680 300.00

ВЕРНО С  
ОБРАЗЛОЖЕНИЕ

48



Работите по договора са изпълнени професионално и в съответствие с нормативните изисквания и изискванията на Възложителя.

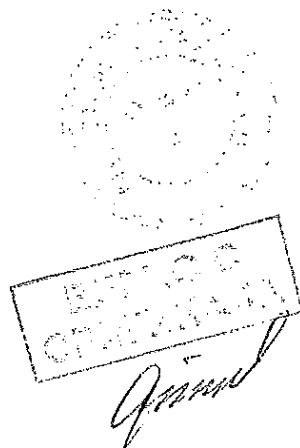
„Старт Инженеринг“ АД притежава висококвалифициран и опитен персонал, контролна и измервателна техника, машини и оборудване.

Настоящото удостоверение се издава на „Старт Инженеринг“ АД, за да послужи за участие в конкурси за предварителен подбор на фирми, одобрени за изграждане, реконструкция и въвеждане в експлоатация на системи и инсталации в енергетиката, промишлеността, транспорта и инфраструктурата.

На основание чл.36а ал.3 от  
ЗОП

С уважение,

.....  
проф. д-р инж. Стоян Бръвнаков  
Изпълнителен директор





СТОЛИЧНА ОБЩИНА  
"МЕТРОПОЛИТЕН" ЕАД

Изпълнителен директор - тел +359 2 987-63-94, факс +359 2 987-22-44, e-mail: metro@metropolitan.bg

София 1000, ул "Княз Борис I" № 121

Изх. № 2676  
София 24.07.2018

## УДОСТОВЕРЕНИЕ

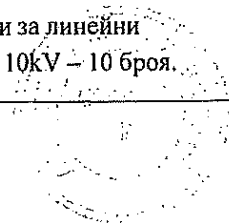
„МЕТРОПОЛИТЕН" ЕАД издава настоящото удостоверение на „Старт Инженеринг“ АД, в уверение на това, че дружеството има необходимия капацитет, даващ му възможността да участва в търгове за изпълнение на инженерингова и строително-монтажна дейност в областта на транспорта, електроенергетиката, промишлеността, системи за контрол, измерване на автоматизация на технологични процеси и микропроцесорна техника.

„Старт Инженеринг“ АД, като подизпълнител на Обединение „ГЕОМЕТРО Б.П.“ е изпълнила договор за инженеринг (проектиране и строителство) с възложител „МЕТРОПОЛИТЕН" ЕАД:

Договор	Получател	Предмет на договора	Сума (лева)
Договор от 24.06.2013г.  -дата на възлагане на договора: 24.06.2013г. -дата на завършване на договора: 02.04.2015г. -разрешение за ползване № СТ-05-624/08.05.2015г.	„Метрополитен“ ЕАД, гр.София, ул. „Княз Борис“ I, №121  тел.029212001  факс 029872244	„Разширение на метро - София, етап III – първи метродиаметър, ЛОТ 2; участък от МС 13 /Младост – 1, км 15+450/ до МС 16 /Бизнес Парк – Младост 4, км 18+068.60/ и реконструкция на инженерната инфраструктура – първи етап, с метростанция „БИЗНЕС ПАРК“, с прилежащ метроучастък (с ВУ) от км. 17+000 до км 18+068.60  Обща стойност на договора - 8 301 602,00 лева, без ДДС,  в тази част изпълнени доставки, монтаж и въвеждане в експлоатация на енергийно оборудване за:  • подстанция в ТПС на метростанция I-16 (КРУ 10 kV) – 12 броя силови прекъсвачи 10kV;  • оборудване в градски подстанции (КРУ 10 kV) – 2 броя силови прекъсвачи 10kV;  • цифрови защиты за линейни присъединения 10kV – 10 броя.	650 248,00

50

БЯЛГОС  
ОРИГИНАЛ  
Ассент



Работите по договора са изпълнени професионално и в съответствие с нормативните изисквания и изискванията на Възложителя.

„Старт Инженеринг“ АД притежава висококвалифициран и опитен персонал, контролна и измервателна техника, машини и оборудване.

Настоящото удостоверение се издава на „Старт Инженеринг“ АД, за да послужи за участие в конкурси за предварителен подбор на фирми, одобрени за изграждане, реконструкция и въвеждане в експлоатация на системи и инсталации в енергетиката, промишлеността, транспорта и инфраструктурата.

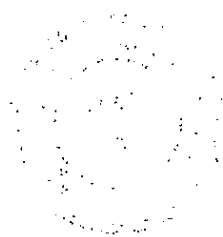
На основание чл.36а ал.3 от  
ЗОП

С уважение,

.....  
проф. д-р инж. Сто  
Изпълнителен директор



A handwritten signature in black ink, appearing to be "Stoyan".





СТОЛИЧНА ОБЩИНА  
"МЕТРОПОЛИТЕН" ЕАД

Изпълнителен директор - тел. +359 2 987-63-94, факс +359 2 987-22-44, e-mail: metro@metropolitan.bg

София 1000, ул. "Княз Борис I" № 121

Изх. № 2687  
София 24.07.2017 г.

## УДОСТОВЕРЕНИЕ

„МЕТРОПОЛИТЕН“ ЕАД издава настоящото удостоверение на „Старт Инженеринг“ АД, в уверение на това, че дружеството има необходимия капацитет, даващ му възможността да участва в търгове за изпълнение на инженерингова и строително-монтажна дейност в областта на транспорта, електроенергетиката, промишлеността, системи за контрол, измерване на автоматизация на технологични процеси и микропроцесорна техника.

„Старт Инженеринг“ АД, като подизпълнител на „СТАНИЛОВ“ ЕООД е изпълнила договор за инженеринг (проектиране и строителство) с възложител „МЕТРОПОЛИТЕН“ ЕАД:

Договор	Получател	Предмет на договора	Сума (лева)
Договор от 14.12.2012г. -дата на възлагане на договора: 14.12.2012г. -дата на завършване на договора: 28.02.2015г. -разрешение за ползване № СТ-05-421/30.03.2015г.	„Метрополитен“ ЕАД, гр.София, ул. „Княз Борис I, №121 тел.029212001 факс 029872244	Проект за разширение на метро - София, етап II – първи метродиаметър, участък: бул. „Цариградско шосе“ /МС19/ - ж.к. „Дружба“ – Летище „София“ /МС23/, Обособена позиция №1: Участък от бул. „Цариградско шосе“/МС19/ км. 2+138,90 до км.3+184,90 /края на МС20/  Обща стойност на договора – 7 658 843,00 лева, без ДДС,  в тази част изпълнени доставки, монтаж и въвеждане в експлоатация на енергийно оборудване за:  • подстанция в ТПС на метростанция I-20 (КРУ 10 kV) – 12 броя силови прекъсвачи 10kV;  • цифрови защиты за линейни присъединения 10kV – 8 броя.	480 316,00

52



*Аметан*

Работите по договора са изпълнени професионално и в съответствие с нормативните изисквания и изискванията на Възложителя.

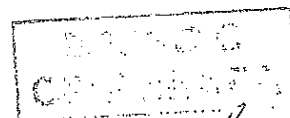
„Старт Инженеринг“ АД притежава висококвалифициран и опитен персонал, контролна и измервателна техника, машини и оборудване.

Настоящото удостоверение се издава на „Старт Инженеринг“ АД, за да послужи за участие в конкурси за предварителен подбор на фирми, одобрени за изграждане, реконструкция и въвеждане в експлоатация на системи и инсталации в енергетиката, промишлеността, транспорта и инфраструктурата.

С уважение,

.....  
проф. д-р инж. Стоян Бр  
Изпълнителен директор

На основание чл.36а ал.3 от  
ЗОП



*Стойан Бр*



СТОЛИЧНА ОБЩИНА  
"МЕТРОПОЛИТЕН" ЕАД

Изпълнителен директор - тел. +359 2 987-63-94, факс +359 2 987-22-44, e-mail: metro@metropolitan.bg

София 1000, ул. "Княз Борис I" № 121

Изх. № 2678  
София 24.07 2017

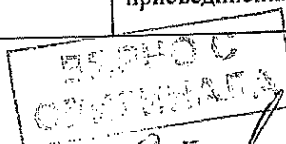
## УДОСТОВЕРЕНИЕ

„МЕТРОПОЛИТЕН“ ЕАД издава настоящото удостоверение на „Старт Инженеринг“ АД, в уверение на това, че дружеството има необходимия капацитет, даващ му възможността да участва в търгове за изпълнение на инженерингова и строително-монтажна дейност в областта на транспорта, електроенергетиката, промишлеността, системи за контрол, измерване на автоматизация на технологични процеси и микропроцесорна техника.

„Старт Инженеринг“ АД, като подизпълнител на Обединение „Метро ДРУЖБА“ ЕООД е изпълнила договор за инженеринг (проектиране и строителство) с възложител „МЕТРОПОЛИТЕН“ ЕАД:

Договор	Получател	Предмет на договора	Сума (лева)
Договор от 26.11.2012г. -дата на възлагане на договора: 26.11.2012г. -дата на завършване на договора: 28.02.2015г. -разрешение за ползване № СТ-05-421/30.03.2015г.	„Метрополитен“ ЕАД, гр.София, ул. „Княз Борис I, №121 тел.029212001 факс 029872244	Проект за разширение на метро - София, етап II – първи метродиаметър, участък: бул. „Цариградско шосе“ /МС19/ - ж.к. „Дружба“ – Летище „София“ /МС23/, Обособена позиция №2: Участък от км. 3+184,90 /края на МС20/ до ул. „Поручик Неделчо Бончев“ км.5+010,00 км  Обща стойност на договора – 8 606 687,00 лева, без ДДС,  в тази част изпълнени доставки, монтаж и въвеждане в експлоатация на енергийно оборудване за: <ul style="list-style-type: none"><li>• подстанция в ТПС на метростанция I-21 (КРУ 10 kV) – 12 броя силови прекъсвачи 10kV;</li><li>• оборудване в градски подстанции (КРУ 10 kV) – 2 броя силови прекъсвачи 10kV;</li></ul> цифрови защиты за линейни присъединения 10kV – 10 броя.	638 510,00

54



С. С. С.

Работите по договора са изпълнени професионално и в съответствие с нормативните изисквания и изискванията на Възложителя.

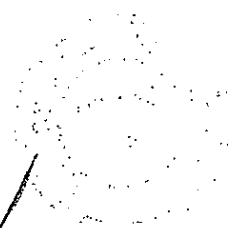
„Старт Инженеринг“ АД притежава висококвалифициран и опитен персонал, контролна и измервателна техника, машини и оборудване.

Настоящото удостоверение се издава на „Старт Инженеринг“ АД, за да послужи за участие в конкурси за предварителен подбор на фирми, одобрени за изграждане, реконструкция и въвеждане в експлоатация на системи и инсталации в енергетиката, промишлеността, транспорта и инфраструктурата.

На основание чл.36а ал.3 от  
ЗОП

С уважение,

.....  
проф. д-р инж. С  
Изпълнителен директор



**СПИСЪК НА ТЕХНИЧЕСКИТЕ ЛИЦА, С ОПРЕДЕЛЕНА ПРОФЕСИОНАЛНА КОМПЕТЕНТНОСТ ЗА ИЗПЪЛНЕНИЕТО НА ПОРЪЧКА с предмет: „Модернизация (ретрофит) на възлови разпределителни станции 20 (10) кV и изграждане на вериги на телемеханика, реф. № РРД 18-103 - Обособена позиция 1 /ОП 1/- Модернизация (ретрофит /проектиране, реконструкция, доставка и монтаж на машини и съоръжения, подготовка и въвеждане в експлоатация/) на възлови разпределителни станции 20 (10) кV и изграждане на вериги на телемеханика в регион „София“ и регион „София област“, в съответствие с изискванията на Възложителя, както следва:**

№	Имена на лицето (по документ за самоличност)	Длъжност/позиция, която ще изпълнява лицето при изпълнение на обществената поръчка	Квалификация изисквана от Възложителя
1.	инж. Георги Николаев Мешков - служител на участника «Старт инженеринг» АД	техническо лице - ръководител обект	пета квалификационна група по безопасност при работа в електрически уредби и мрежи над 1000V, съгласно ПБЗРЕУЕТЦЕМ, № 010/издадено от „Старт инженеринг“ АД на 09.06.2018г., валидно до 09.06.2020г.,  магистър, електроинженер, специалност електрически машини и апарати
2.	инж. Иван Боянов Иванов - служител на участника «Старт инженеринг» АД	техническо лице - отговорник за контрола на качеството за обекта	пета квалификационна група по безопасност при работа в електрически уредби и мрежи над 1000V, съгласно ПБЗРЕУЕТЦЕМ, № 052/издадено от „Старт инженеринг“ АД на 09.06.2018г., валидно до 09.06.2020г.,  магистър, електроинженер, специалност електроизмервателна техника
3.	инж. Божидар Тодоров Василев - служител на участника «Старт инженеринг» АД	техническо лице	пета квалификационна група по безопасност при работа в електрически уредби и мрежи над 1000V, съгласно ПБЗРЕУЕТЦЕМ, № 062/издадено от „Старт инженеринг“ АД на 09.06.2018г., валидно до 09.06.2020г.,  магистър, електроинженер, специалност електрически мрежи и



			системи
4.	инж. Стойчо Добрев Добрев - служител на участника «Старт инженеринг» АД	техническо лице	пета квалификационна група по безопасност при работа в електрически уредби и мрежи над 1000V, съгласно ПБЗРЕУЕТЦЕМ, № 057/издадено от „Старт инженеринг“ АД на 09.06.2018г., валидно до 09.06.2020г.,  магистър - електроинженер специалност ел. централи, мрежи и системи
5.	инж. Стефан Георгиев Станчев - служител на участника «Старт инженеринг» АД	техническо лице	пета квалификационна група по безопасност при работа в електрически уредби и мрежи над 1000V, съгласно ПБЗРЕУЕТЦЕМ, № 059/издадено на от „Старт инженеринг“ АД 09.06.2018г., валидно до 09.06.2020г., магистър - електроинженер специалност комуникационна техника и технологии
6.	инж. Николай Кирилов Терзийски - служител на участника «Старт инженеринг» АД	техническо лице	пета квалификационна група по безопасност при работа в електрически уредби и мрежи над 1000V, съгласно ПБЗРЕУЕТЦЕМ, № 003/издадено от „Старт инженеринг“ АД на 09.06.2018г., валидно до 09.06.2020г.,  магистър - електроинженер специалност електроенергетика и електрообзавеждане
7.	инж. Вихрен Петров Марков - служител на участника «Старт инженеринг» АД	техническо лице	пета квалификационна група по безопасност при работа в електрически уредби и мрежи над 1000V, съгласно ПБЗРЕУЕТЦЕМ, № 007/издадено от „Старт инженеринг“ АД на 09.06.2018г., валидно до 09.06.2020г.,  магистър - електроинженер специалност ел. снабдяване и ел. обзавеждане на промишлените предприятия
8.	инж. Людмила Симеонова Пеева-Ваклина - служител на участника «Старт инженеринг» АД	техническо лице - проектант по част „Електрическа“	<ul style="list-style-type: none"> <li>• Образователна степен магистър</li> <li>• Квалификация електроинженер</li> <li>• Специалност автоматизация на енергийни системи</li> <li>• Диплома № 0132240/1977 г., издадена от Висш машинно електротехнически институт – София</li> <li>• Член на камарата на инженерите в</li> </ul>

			инвестиционното проектиране (КИИП) от 39/28.09.2007 г. По части: електрическа <ul style="list-style-type: none"> <li>• Удостоверение за пълна проектантска правоспособност - №010881</li> </ul>
9.	инж. Валентин Христов Христов - <u>в качеството си на трета страна за процедурата</u>	техническо лице - проектант по част „Конструктивна“	<ul style="list-style-type: none"> <li>• Образователна степен магистър</li> <li>• Квалификация строителен инженер</li> <li>• Специалност промишлено и гражданско строителство</li> <li>• Диплома № 0061191/1988 г., издадена от Висш машинно електротехнически институт – София</li> <li>• Член на камарата на инженерите в инвестиционното проектиране (КИИП) от 09/21.08.2004 г. По части: конструктивна, организация и изпълнение на строителството</li> <li>• Удостоверение за пълна проектантска правоспособност - №01923</li> </ul>

Дата 14.12.2018 г.

ПОДПИС и ПЕЧА

На основание чл.36а ал.3 от ЗОП

(Председател на Съвета на директори

Д



# УДОСТОВЕРЕНИЕ

## ЗА ПЪЛНА ПРОЕКТАНТСКА ПРАВОСПОСОБНОСТ

Регистрационен номер № 10881

Важи за 2018 година

**ИНЖ. ЛЮДМИЛА СИМЕОНОВА ПЕЕВА-  
ВАКЛИНА**

ОБРАЗОВАТЕЛНО-КВАЛИФИКАЦИОННА СТЕПЕН

МАГИСТЪР

ПРОФЕСИОНАЛНА КВАЛИФИКАЦИЯ

ЕЛЕКТРОИНЖЕНЕР

включен в регистъра на КИИП за лицата с пълна проектантска правоспособност  
с протоколно решение на УС на КИИП 39/28.09.2007 г. по части:

ЕЛЕКТРИЧЕСКА

На основание чл.36а ал.3 от  
ЗОП

На основание чл.36а ал.3 от  
ЗОП



Пред

На основание чл.36а ал.3 от  
ЗОП



# УДОСТОВЕРЕНИЕ

ЗА ПЪЛНА ПРОЕКТАНТСКА ПРАВОСПОСОБНОСТ

Регистрационен номер № 01923

Важи за 2018 година

**ИНЖ. ВАЛЕНТИН ХРИСТОВ ХРИСТОВ**

ОБРАЗОВАТЕЛНО-КВАЛИФИКАЦИОННА СТЕПЕН

МАГИСТЪР

ПРОФЕСИОНАЛНА КВАЛИФИКАЦИЯ

СТРОИТЕЛЕН ИНЖЕНЕР

включен в регистъра на КИИП за лицата с пълна проектантска правоспособност с протоколно решение на УС на КИИП 09/21.08.2004 г. по части:

КОНСТРУКТИВНА  
ОРГАНИЗАЦИЯ И ИЗПЪЛНЕНИЕ НА СТРОИТЕЛСТВОТО

На основание чл.36а ал.3 от  
ЗОП



Председател на УС на КИИП

На основание чл.36а ал.3 от  
ЗОП

На основание чл.36а ал.3 от  
ЗОП

Allianz Bulgaria  
Insurance Co. Ltd.

# General Insurance

ФЛ

ЗАСТРАХОВАТЕЛНА ПОЛИЦА № 1318018476000004

"Алианц България" – Застрахователно Акционерно Дружество на основание предложение от Застрахования и срещу платена застрахователна премия застрахова професионалната отговорност на Застрахования по начин и условия, както следва:

ВИД ЗАСТРАХОВКА:	Професионална отговорност в проектирането и строителството
ЗАСТРАХОВАТЕЛ:	ЗАОД "Алианц България", бул. "Княз Дондуков" № 59, 1504 София ДДС № BG040638060, ЕИК : 040638060 ВАЛЕНТИН ХРИСТОВ ХРИСТОВ
ЗАСТРАХОВАН:	На основание чл.36а ал.3 от ЗОП Адрес : гр.С. СОФИЯ, п. код 1000, ХРИСТО БОТЕВ, №59, ЛД № 1760000, В, No77, Вх.А,
ДЕЙНОСТ НА ЗАСТРАХОВАНИЯ:	Проектант , Категория строежи: I
СРОК НА ЗАСТРАХОВАТЕЛНИЯ ДОГОВОР:	1 година от 00:00 часа на 21.03.2018г. до 24:00 часа на 20.03.2019 г.
РЕТРОАКТИВНА ДАТА:	21.03.2013 г.
ЗАСТРАХОВАТЕЛНО ПОКРИТИЕ:	Съгласно действащата нормативна уредба и приложимите Общи условия по застраховката
ЗАСТРАХОВАТЕЛНИ СУМИ:	150,000.00 BGN за всяко едно събитие. 300,000.00 BGN в агрегат за срока на застраховката.
САМОУЧАСТИЕ НА ЗАСТРАХОВАНИЯ:	10.00 % (десет процента), но не по-малко от 1,000.00 BGN (хиляда BGN) от всяка щета.
ЗАСТРАХОВАТЕЛНА ПРЕМИЯ:	300.00 BGN (триста BGN)
ДАНЪК ПО ЗДЗП:	6.00 BGN( шест BGN)
ОБЩА ДЪЛЖИМА СУМА:	306.00 BGN ( триста и шест BGN)
СРОК ЗА ПЛАЩАНЕ:	21.03.2018 г. 306.00 BGN в т.ч. премия 300.00 BGN и данък 6.00 BGN

Писменото предложение или искане до застрахователя за сключване на застрахователен договор и писмените отговори на застрахования и/или застрахования на поставени от застрахователя въпроси относно обстоятелства, имащи значение за естеството и размера на риска, общите условия на застраховката, приложенията, добавъците и други писмени договорености между страните (ако има такива), представляват неразделна част от настоящата полица.

С подписа си по-долу Застрахованият удостоверява, че е съгласен и приема общите условия към настоящата полица, екземпляр от които са му предадени към момента на подписване на полицата, както и че му е предоставена информацията относно Застрахователя по чл. 324 ал.1 от Кодекса за застраховане.

В случай на неплащане или непълно плащане на дължима вноска от застрахователната премия, застраховката се прекратява към 24.00 часа на 15-ия ден, считано от датата на съответния падеж, посочен в застрахователната полица.

ДАТА И МЯСТО НА ИЗДАВАНЕ : 13.03.2018 г., гр. СОФИЯ

ЗАСТРАХОВАТЕЛ: На основание чл.36а ал.3 от ЗОП

ЗАСТРАХОВА

На основание чл.36а ал.3 от ЗОП

Посредник: П Христ

СОФИЯ, п. код 1000, ХРИСТО БОТЕВ, No59, ЛД No 1760000

№ 0180563

ORIGINAL

61

Allianz 

## ДЕКЛАРАЦИЯ

Долуподписаният инж. Валентин Христов Христов, На основание чл.36а ал.3 от ЗОП  
гр. София, ПК 1000, ул. «Димитър Хаджикоцев» №: 77, в качеството си на трето лице за процедурата - Проектант по част „Конструктивна“ към участника «Старт инженеринг» АД, за участие в процедура за изпълнение на поръчка с предмет: „Модернизация (ретрофит) на възлови разпределителни станции 20 (10) кV и изграждане на вериги на телемеханика, реф. № PPD 18-103 - Обособена позиция 1 /ОП 1/ - Модернизация (ретрофит /проектиране, реконструкция, доставка и монтаж на машини и съоръжения, подготовка и въвеждане в експлоатация/) на възлови разпределителни станции 20 (10) кV и изграждане на вериги на телемеханика в регион „София“ и регион „София област“,

чиито капацитет ще се използва за доказване на съответствие с критериите, свързани с икономическото и финансовото състояние от участника „Старт Инженеринг“ АД, ЕИК 030217255, със седалище и адрес на управление в гр. София 1220, ул. Локомотив № 3, България, с настоящото

### ДЕКЛАРИРАМ, ЧЕ:

Се задължавам в качеството си на трето лице - Проектант по част „Конструктивна“ за участник „Старт инженеринг“ АД да участвам пряко в изпълнението на поръчката по проект: „Модернизация (ретрофит) на възлови разпределителни станции 20 (10) кV и изграждане на вериги на телемеханика, реф. № PPD 18-103 - Обособена позиция 1 /ОП 1/ - Модернизация (ретрофит /проектиране, реконструкция, доставка и монтаж на машини и съоръжения, подготовка и въвеждане в експлоатация/) на възлови разпределителни станции 20 (10) кV и изграждане на вериги на телемеханика в регион „София“ и регион „София област“ за цялото време на изпълнение на поръчката, включително и в случаите на удължавания на срока на изпълнение и произтичащи от приложимото законодателство изискуеми ангажименти с оглед експертното ми участие, които са заложиени в конкурсната документация.

Дата: 14/12/2018 г:

Подпи

На основание чл.36а ал.3 от ЗОП

/ и

тов /

За обособена позиция 1

Поставя се в  
комплекта на  
техническото  
предложение за  
съответната  
обособена позиция

**ПРЕДЛОЖЕНИЕ  
ЗА ИЗПЪЛНЕНИЕ НА ПОРЪЧКАТА  
ЗА ОБОСОБЕНА ПОЗИЦИЯ 1**

**ДО: „ЧЕЗ РАЗПРЕДЕЛЕНИЕ БЪЛГАРИЯ” АД,**

**ОТ: „Старт-Инженеринг” АД**

адрес: гр. София, ПК 1220, ул. „Локомотив” № 3  
тел.: 02 936146, факс: 02 9319966, e-mail: sofia@starteng.com  
Единен идентификационен код: BG 030217255,

Представявано от Стоил Колев Стоилов - Председател на Съвета на директорите на „Старт-Инженеринг” АД

Лице за контакти: Димитър Нинов Тодоров, тел.: 02 936146, факс: 02 9319966, e-mail: sofia@starteng.com

**УВАЖАЕМИ ГОСПОЖИ И ГОСПОДА,**

След като се запознахме с изискванията на възложителя за изпълнение на обществена поръчка с реф. № РРД 18-103 и предмет: „Модернизация (ретрофит) на възлови разпределителни станции 20 (10) kV и изграждане на вериги на телемеханика, аз долуподписаният Стоил Колев Стоилов обособена, за обособена позиция 1, в качеството си на представител на „Старт-Инженеринг” АД, декларирам, че:

В случай че бъдем определени за изпълнител на обществената поръчка, декларираме, че:

1. Ще изпълняваме договора съгласно техническите изисквания на възложителя, представени в т. 4 "от раздел I. на документацията за участие и съгласно Техническите спецификации и изискванията на възложителя за изпълнение на поръчката (Раздел II) от документацията за участие. Всички материали, апаратура, оборудване, съоръжения и резервни части, които ще доставим и ще влягаме при изпълнение на предмета на поръчката ще са нови, неупотребявани, придружени от декларации и/или сертификати/декларации за съответствие, съгласно изискванията на Техническите спецификации от изискванията на възложителя за изпълнение на поръчката.

2. Задължаваме се при всяка доставка на материал и/или апаратура и/или оборудване и/или съоръжение и/или резервни части, същите да бъдат придружени от изискуемите документи съгласно договора и приложенията към него.

3. Представяме изисканата информация в Техническо предложение за оборудване – Приложение 2 към настоящото Предложение за изпълнение на поръчката, като:

4.1. Представям попълнено „Гарантирано предложение” в таблиците с технически данни. Предлаганото от нас оборудване отговаря на минималните технически изисквания на Възложителя, които не съдържат графа „Гарантирано предложение” в таблиците на техническите спецификации на стоката от раздел II. „Технически спецификации и изисквания на възложителя за изпълнение на поръчката” от документацията за участие.

4.2. Представям всички изисквани данни и документи от таблиците с Изисквания към документацията и изпитанията. Запознат съм с изискването, че представените документи трябва да бъдат на български език или с превод на български език, придружени с оригиналните документи, с изключение на каталозите и протоколи от изпитания /в случай, че се изискват/ за материалите, които могат да се представят и само на английски език.

При представяне на цял каталог следва допълнително да представя и информация с номер на страница и позиция на съответен технически параметър в каталога.

4. Запознат съм, че представените от нас технически документи са доказателство за декларираните технически данни и параметри на предлаганото оборудване.

5. Заявяваме, че предлаганите от нас материали, апаратура, оборудване, съоръжения и резервни части са с технически характеристики покриващи посочените от възложителя в раздел II. „Технически спецификации и изисквания на възложителя за изпълнение на поръчката“ от документацията за участие.

6. Ще изпълняваме договора съгласно техническите изисквания на възложителя, представени в раздел II. «Технически спецификации и изисквания на възложителя за изпълнение на поръчката» от документацията за участие, които са включени като Приложение № 3 към договора за изпълнение на обществената поръчка.

7. Потвърждаваме, че доставяните от нас материали, апаратура, оборудване и съоръжения ще отговарят на посочените от възложителя стандарти или на еквивалентни. В случай, че даден материал, апаратура, оборудване и съоръжение отговаря на стандарт, еквивалентен на посочения от Възложителя в раздел II. „Технически спецификации и изисквания на възложителя за изпълнение на поръчката“ от документацията за участие, се задължаваме да го отразим в отделен документ и да представим доказателства за еквивалентността на двата стандарта заедно с настоящото предложение за изпълнение на поръчката.

8. С настоящото гарантираме, че ще изпълним сроковете за изпълнение на поръчката, определени в Приложение 1 към настоящото Техническо предложение.

9. Гарантираме, че предложеното оборудване за Комуникация на цифрови защити /ЦЗ/ и контролер с RTU отговаря на посочените в Приложение 3 минимални технически изисквания на Възложителя.

10. Предлагаме гаранционни срокове:

10.1. за новодоставеното оборудване (прекъсвачи, разединители, токови и напреженови измервателни трансформатори, вентилни отводи и друго) е 3 години (не по-кратък от 3 години, считано от деня на въвеждането на строителния обект в експлоатация).

10.2. за цифрови устройства за релейни защити и апаратура за ТМ, ТИ, С и ТК) е 5 години (не по-кратък от 5 години), считано от датата на подписване на приемо – предавателен протокол между Възложител и Изпълнител при доставка.

10.3. за строителните работи гаранционните срокове съответстват на минималните гаранционни срокове, посочени в Наредба № 2 от 31 юли 2003 г. за въвеждане в експлоатация на строежите в Република България и минималните гаранционни срокове за изпълнени строителни и монтажни работи, съоръжения и строителни обекти.

11. Задължаваме се в рамките на гаранционните срокове всички разходи по отстраняване на дефекти или замяна на дефектни материали, апаратура, оборудване, съоръжения и резервни части с нови, включително демонтаж, товарене, транспорт, разтоварване и монтаж (инсталиране) да са за наша сметка.

Участникът да представи необходимата техническа документация (включително част от каталози), даваща пълно описание, технически данни и характеристики на конкретното предлагано оборудване (съобразно техническите параметри на Таблиците на Възложителя) при подаване на офертата. При представяне на цял каталог участникът допълнително да представи информация с номер на страница и позиция на съответен технически параметър в каталога.

**Неразделна част от настоящото предложение са следните приложения:**

Приложение № 1 - Срокове за изпълнение на дейностите;

Приложение № 2 - Техническо предложение за оборудване;

На основание чл.36а ал.3 от ЗОП

Дата 17.12.2018 г.

ПОДПИС И ПЕЧАТ:

Председател на Съвета на директорите

на „Старт-Инженеринг“ АД

64



## ПРИЛОЖЕНИЕ 1

### СРОКОВЕ ЗА ИЗПЪЛНЕНИЕ НА РЕТРОФИТА

Срокът на договора за изпълнение на обществената поръчка за всяка обособена позиция е **четири календарни години (48 месеца)**, считано от датата, на която е сключен или до достигане на стойността, за която е сключен, в зависимост от това кое събитие ще настъпи първо по време. При настъпване на първото по време от тези събития, договорът ще се счита за автоматично прекратен без да е необходимо уведомление или предизвестие на която и да е от страните до другата страна.

### СРОКОВЕ ЗА ИЗПЪЛНЕНИЕ НА МОДЕРНИЗАЦИЯТА (РЕТРОФИТ) ЗА КОНКРЕТЕН ЕНЕРГИЕН ОБЕКТ ОТ СЪОТВЕТНА ОБОСОБЕНА ПОЗИЦИЯ:

**1. Изготвяне на линеен график и работен проект:**

Срокът за изготвяне на линеен график и на работен проект за конкретен енергиен обект от съответна обособена позиция е **до 10 дни**, след получаване на възлагателен протокол/ поръчка.

**2. Съгласуване на работния проект с „ЧЕЗ Разпределение България“ АД:**  
Срокът за съгласуване на работния проект за конкретен енергиен обект от съответна обособена позиция е **до 5 дни** след датата на предаването му на Възложителя.

**3. Доставка на материали, апаратура, оборудване и съоръжения, съгласно съгласувания работен проект:**  
Срокът за доставка на необходимите материали, апаратура, оборудване и съоръжения за изпълнение на съгласувания работния проект и резервните части за конкретен енергиен обект от съответна обособена позиция, включително и изработката на врати и детайли в заводски условия, е **до 60 дни** след датата на получаване на възлагателен протокол/ поръчка, по количествено – стойностни сметки към договора и изготвения проект.

**4. СМР за изпълнение на модернизация (ретрофит) на възлова станция Ср.Н., от съответна обособена позиция:**  
СМР за изпълнение на модернизация (ретрофит) на конкретен енергиен обект (възлова станция Ср.Н) от съответна обособена позиция, включително и веригите за телемеханика, вторична комутация е **до общо 20 дни** от датата на получаване на възлагателен протокол/ поръчка. СМР ще бъде възложено след съгласуван работен проект и доставени материали, апаратура, оборудване и съоръжения, необходими за изпълнението на модернизация (ретрофит).

Срокът за СМР за изпълнение на модернизацията (ретрофит) ще бъде разделен на:

- Срокът за СМР за изпълнение на модернизацията (ретрофит) на едно линейно присъединение Ср.Н. от конкретния енергиен обект по избор е **до 3 дни** от датата на получаване на възлагателен протокол/ поръчка;
- Срокът за СМР за изпълнение на модернизацията (ретрофит) в целия обем за конкретния енергиен обект е **до 17 дни** от датата на получаване на възлагателен протокол/ поръчка;

**5. Обучение на специалисти на Възложителя:**  
Срокът за изготвяне на програма за обучение на специалисти служители на Възложителя и предаването ѝ за одобрение е **до 5 дни**, считано от датата на съгласуване на работния проект от Възложителя и предаването му на Изпълнителя;  
Срокът за одобрение на програмата за обучение е **до 2 дни** след датата на предаването ѝ на Възложителя.  
Срокът за провеждане на обучението и сертифицирането на служители на Възложителя за работа и поддръжка на новоизградените съоръжения, цифрови устройства и др. е **до 10 дни**, след датата на одобрение на програмата за обучение от Възложителя.

**6. Предоставяне на екзекутивна документация:**  
Срокът за предоставяне на екзекутивни чертежи с нанесени всички изменения, настъпили в процеса на модернизацията (ретрофит) на конкретен енергиен обект от съответна обособена позиция, е **до 5 дни** след приключване на СМР в целия обем, но не по-късно от датата на провеждане на 72 часовите проби под напрежение и товар.

**7. Провеждане на 72 часови проби под напрежение и товар:**  
Провеждане на 72 часови проби под напрежение и товар и въвеждане на енергийния обект в режим на телемеханика стартират от момента на подписване на протокол от вътрешната приемателна комисия за приемане на ретрофита /модернизацията/ на конкретен енергиен обект от Обособена позиция в пълен обем.

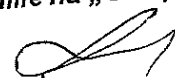
На основание чл.36а ал.3 от ЗОП

Дата 17.12.2018 г.

ПОДПИС И ПЕЧАТ:

Председател на Съвета на директорите на „Старт-Инженеринг“ АД

65



**ПРИЛОЖЕНИЕ 2**  
Техническо предложение за оборудване

Участникът следва да попълни тип/референтен номер, съгласно каталог на производител, производител и декларация, че предлаганото от него оборудване отговаря на минималните технически изисквания на Възложителя, посочени в таблиците.

**А) ТРИПОЛЮСНИ ВАКУУМНИ ПРЕКЪСВАЧИ, 24 kV, ЗА МОНТИРАНЕ НА ЗАКРИТО, ФИКСИРАН МОНТАЖ С ТЕХНИЧЕСКИ ХАРАКТЕРИСТИКИ В ТАБЛИЦА 1**

- *Технически данни за триполюсни вакуумни прекъсвачи, 24 kV, 1250 A, за монтиране на закрито, фиксирани:*

Наименование на материала		Триполюсен вакуумен прекъсвач, 24 kV/1250 A/20 kA, за монтиране на закрито, фиксиран
№	Технически параметър	Гарантирано предложение
1.	Тип/референтен номер съгласно каталога на производителя	3AE5
2.	Производител	Siemens AG

- *Технически данни за триполюсни вакуумни прекъсвачи, 24 kV, 630 A, за монтиране на закрито, фиксирани:*

Наименование на материала		Триполюсен вакуумен прекъсвач, 24 kV/630 A/20 kA, за монтиране на закрито, фиксиран
№	Технически параметър	Гарантирано предложение
1.	Тип/референтен номер съгласно каталога на производителя	3AE5
2.	Производител	Siemens AG

- *Изисквана документация, която се предоставя от Участника при подаване на офертата на хартиен носител за всяка обособена позиция:*

№	Наименование на документацията	Предоставени документи
1.	Техническо описание на прекъсвача, в т.ч. гарантирани параметри и съоръжаване	Приложение 1.1
2.	Протоколи от типови изпитвания на английски или български език, проведени от независима акредитирана изпитвателна лаборатория – заверени копия (и допълнителни изпитвания, ако са проведени), с приложен списък на отделните изпитвания на български език.	Приложение 1.2
3.	Сертификат/акредитация на независимата изпитвателна лаборатория, провела типовите изпитвания – заверено копие	Приложение 1.3
4.	Декларация от Участника, че предложеното оборудване в процедурата отговаря на минималните технически изисквания на Възложителя, посочени в таблица 1	Приложение 1.4

**Б) ТОКОВИ ТРАНСФОРМАТОРИ 24 kV ЗА МОНТИРАНЕ НА ЗАКРИТО, ФИКСИРАН МОНТАЖ С ТЕХНИЧЕСКИ ХАРАКТЕРИСТИКИ В ТАБЛИЦА 2**

- *Технически данни за триполюсни вакуумни прекъсвачи, 24 kV, 1250/5/5 A, за монтиране на закрито, фиксирани; за Токови измервателни трансформатори 24 kV, 400/5/5 A за монтиране на закрито:*

Наименование на материала		Токов измервателен трансформатор 24 kV, 1250/5/5 A за монтиране на закрито
№	Параметър	Гарантирано предложение
1.	Тип/референтен номер съгласно каталога на производителя	4MA74
2.	Производител	Siemens AG

- *Технически данни за триполюсни вакуумни прекъсвачи, 24 kV, 400/5/5 A, за монтиране на закрито, фиксирани:*

Наименование на материала		Токов измервателен трансформатор 24 kV, 400/5/5 A за монтиране на закрито
№	Параметър	Гарантирано предложение
1.	Тип/референтен номер съгласно каталога на производителя	4MA74
2.	Производител	Siemens AG

- *Изисквана документация, която се предоставя от Участника при подаване на офертата на хартиен носител за всяка обособена позиция:*

№	Наименование на документацията	Предоставени документи
1.	Точно обозначение на типа на токовите измервателни трансформатори, производителя и страната на произход и последно издание на каталога на производителя	4MA74 Siemens AG-АЛЧЕ Турция Приложение 2.1
2.	Удостоверение за одобряване на типа на токовите измервателни трансформатори, издадено по реда и при условията на Закона за измерванията	Приложение 2.2
3.	Протоколи от типови изпитвания на токовите измервателни трансформатори на английски или български език, проведени от независима изпитателна лаборатория с приложени резултати от изпитванията, представени при доставка	Приложение 2.3
4.	Сертификат/акредитация на независимата изпитателна лаборатория, провела типовите изпитвания – заверено копие	Приложение 2.4
5.	Декларация от Участника, че предложеното оборудване в процедурата отговаря на минималните технически изисквания на Възложителя, посочени в таблица 2	Приложение 2.5

**В) НАПРЕЖЕНОВИ ТРАНСФОРМАТОРИ 24 KV, ЕДНОПОЛЮСЕН, С ДВЕ ВТОРИЧНИ НАМОТКИ, ЗА МОНТИРАНЕ НА ЗАКРИТО С ТЕХНИЧЕСКИ ХАРАКТЕРИСТИКИ В ТАБЛИЦА 3**

- *Технически данни:*

Наименование на материала		Напреженов измервателен трансформатор 24 kV, еднополюсен, с две вторични намотки, за монтиране на закрито
№	Параметър	Гарантирано предложение
1.	Тип/референтен номер съгласно каталога на производителя	4MR14
2.	Производител	Siemens AG

- *Изисквана документация, която се предоставя от Участника при подаване на офертата на хартиен носител за всяка обособена позиция:*

№	Наименование на документацията	Предоставени документи
1.	Точно обозначение на типа на напреженовия трансформатор (НИТ), производителя и страна на произход и последно издание на каталога на производителя	4MR14 Siemens AG- АЛЧЕ Турция Приложение 3.1
2.	Удостоверение за одобряване на типа на НИТ, издадено по реда и при условията на Закона за измерванията	Приложение 3.2
3.	Протокол от първоначална метрологична проверка, проведена от оправомощена лаборатория, съгласно действащото в Република България законодателство в областта на измерванията (представя се при доставка за всеки НИТ)	Приложение 3.3
4.	Сертификат/акредитация на независимата изпитателна лаборатория, провела типовите изпитвания – заверено копие	Приложение 3.4
5.	Декларация от Участника, че предложеното оборудване в процедурата отговаря на минималните технически изисквания на Възложителя, посочени в таблица 3	Приложение 3.5

**Г) ТРИПОЛЮСНИ ВАКУУМНИ ПРЕКЪСВАЧИ, 12 kV, ЗА МОНТИРАНЕ НА ЗАКРИТО, ФИКСИРАН МОНТАЖ С ТЕХНИЧЕСКИ ХАРАКТЕРИСТИКИ В ТАБЛИЦА 4**

- **Технически данни за триполюсни вакуумни прекъсвачи, 12 kV, 1250 A, за монтиране на закрито, фиксирани:**

Наименование на материала		Триполюсен вакуумен прекъсвач, 12 kV/1250 A/20 kA, за монтиране на закрито, фиксиран
№	Технически параметър	Гарантирано предложение
1.	Тип/референтен номер съгласно каталога на производителя	3AE5
2.	Производител	Siemens AG

- **Технически данни за триполюсни вакуумни прекъсвачи, 12 kV, 630 A, за монтиране на закрито, фиксирани:**

Наименование на материала		Триполюсен вакуумен прекъсвач, 12 kV/630 A/20 kA, за монтиране на закрито, фиксиран
№	Технически параметър	Гарантирано предложение
1.	Тип/референтен номер съгласно каталога на производителя	3AE5
2.	Производител	Siemens AG

**Изисквана документация, която се предоставя от Участника при подаване на офертата на хартиен носител за всяка обособена позиция:**

№	Наименование на документацията	Предоставени документи
1.	Техническо описание на прекъсвача, в т.ч. гарантирани параметри и съоръжаване	Приложение 4.1
2.	Протоколи от типови изпитвания на английски или български език, проведени от независима акредитирана изпитвателна лаборатория – заверени копия (и допълнителни изпитвания, ако са проведени), с приложен списък на отделните изпитвания на български език.	Приложение 4.2
3.	Сертификат/акредитация на независимата изпитвателна лаборатория, провела типовите изпитвания – заверено копие	Приложение 4.3

№	Наименование на документацията	Предоставени документи
4.	Декларация от Участника, че предложеното оборудване в процедурата отговаря на минималните технически изисквания на Възложителя, посочени в таблица 4	Приложение 4.4

**Д) ТОКОВИ ТРАНСФОРМАТОРИ 12 KV ЗА МОНТИРАНЕ НА ЗАКРИТО, ФИКСИРАН МОНТАЖ С ТЕХНИЧЕСКИ ХАРАКТЕРИСТИКИ В ТАБЛИЦА 5**

- *Технически данни за триполюсни вакуумни прекъсвачи, 12 kV, 1250/5/5 A, за монтиране на закрито, фиксирани:*

Наименование на материала		Токов измервателен трансформатор 12 kV, 1250/5/5 A за монтиране на закрито
№	Параметър	Гарантирано предложение
1.	Тип/референтен номер съгласно каталога на производителя	4MA72
2.	Производител	Siemens AG

- *Технически данни за триполюсни вакуумни прекъсвачи, 12 kV, 400/5/5 A, за монтиране на закрито, фиксирани:*

Наименование на материала		Токов измервателен трансформатор 12 kV, 400/5/5 A за монтиране на закрито
№	Параметър	Гарантирано предложение
1.	Тип/референтен номер съгласно каталога на производителя	4MA72
2.	Производител	Siemens AG

- *Изискуема документация, която се предоставя от Участника при подаване на офертата на хартиен носител за всяка обособена позиция:*

№	Наименование на документацията	Предоставени документи
1.	Точно обозначение на типа на токовите измервателни трансформатори, производителя и страната на произход и последно издание на каталога на производителя	4MA72 Siemens AG-АЛЧЕ Турция Приложение 5.1
2.	Удостоверение за одобряване на типа на токовите измервателни трансформатори, издадено по реда и при условията на Закона за измерванията	Приложение 5.2
3.	Протоколи от типови изпитвания на токовите измервателни трансформатори на английски или български език, проведени от независима изпитателна лаборатория с приложени резултати от изпитванията, представени при доставка	Приложение 5.3
4.	Сертификат/акредитация на независимата изпитателна лаборатория, провела типовите изпитвания – заверено копие	Приложение 5.4
5.	Декларация от Участника, че предложеното оборудване в процедурата отговаря на минималните технически изисквания на Възложителя, посочени в таблица 5	Приложение 5.5

**Е) НАПРЕЖЕНОВИ ТРАНСФОРМАТОРИ 12 KV, ЕДНОПОЛЮСЕН, С ДВЕ ВТОРИЧНИ НАМОТКИ ЗА МОНТИРАНЕ НА ЗАКРИТО С ТЕХНИЧЕСКИ ХАРАКТЕРИСТИКИ В ТАБЛИЦА 6**

- *Технически данни:*

Наименование на материала		Напрежен измервателен трансформатор 12 kV, еднополюсен, с две вторични намотки, за монтиране на закрито
№	Параметър	Гарантирано предложение
1.	Тип/референтен номер съгласно каталога на производителя	4MR12
2.	Производител	Siemens AG

- Изисквана документация, която се предоставя от Участника при подаване на офертата на хартиен носител за всяка обособена позиция:

№	Наименование на документацията	Предоставени документи
1.	Точно обозначение на типа на напреженовия трансформатор (НИТ), производителя и страна на произход и последно издание на каталога на производителя	4MR12 Siemens AG- АЛЧЕ Турция Приложение 6.1
2.	Удостоверение за одобряване на типа на НИТ, издадено по реда и при условията на Закона за измерванията	Приложение 6.2
3.	Протокол от първоначална метрологична проверка, проведена от оправомощена лаборатория, съгласно действащото в Република България законодателство в областта на измерванията (представя се при доставка за всеки НИТ)	Приложение 6.3
4.	Сертификат/акредитация на независимата изпитателна лаборатория, провела типовите изпитвания – заверено копие	Приложение 6.4
5.	Декларация от Участника, че предложеното оборудване в процедурата отговаря на минималните технически изисквания на Възложителя, посочени в таблица 6	Приложение 6.5

**Ж) ПОСОЧНА ЦИФРОВА ЗАЩИТА ЗА ВЪЗДУШНИ И КАБЕЛНИ ЕЛЕКТРОПРОВОДНИ ЛИНИИ СР. Н.С ТЕХНИЧЕСКИ ХАРАКТЕРИСТИКИ В ТАБЛИЦА 7**

- Технически данни:

Название на материала		Посочна цифрова защита за въздушни и кабелни електропроводни линии Ср. Н
№	Технически параметър	Гарантирано предложение
1.	Тип/референтен номер съгласно каталога на производителя	7SJ66
2.	Производител	Siemens AG

- Изисквана документация, която се предоставя от Участника при подаване на офертата на хартиен носител за всяка обособена позиция:

№	Наименование на документацията	Предоставени документи
1.	Техническо описание, включващо гарантирани параметри, съгласно общите изисквания към обекта на поръчката - оригинал с подпис и печат на участника	Приложение 7.1
2.	Каталог на предлаганото оборудване по поръчката	Приложение 7.2
3.	Декларация от Участника, че предложеното оборудване в процедурата отговаря на минималните технически изисквания на Възложителя, посочени в таблица 7	Приложение 7.3

**З). ИЗИСКВАНИЯ КЪМ КОМУНИКАЦИЯ НА ЦЗ И КОНТРОЛЕРИ С RTU**

- Изискуема документация към комуникация на ЦЗ и контролери с RTU, които се предоставят от Участника при подаване на офертата на хартиен носител:

№	Наименование на документацията	Предоставени документи
1.	Декларация от Участника, че предложеното оборудване в процедурата отговаря на минималните технически изисквания на Възложителя, посочени в таблица 8	Приложение 8.1

Дата 17.12.2018 г.

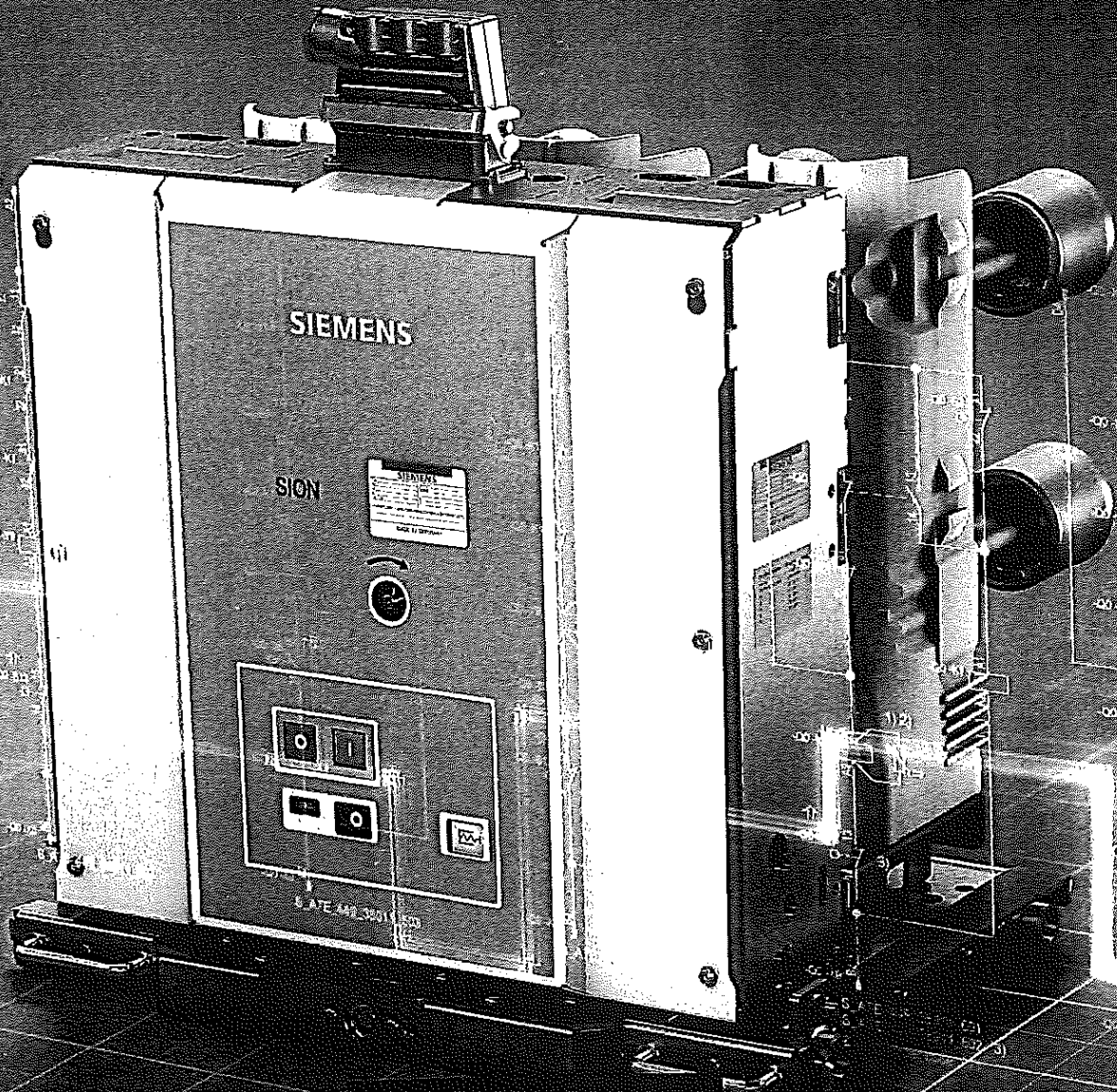
ПОДПИС и ПЕЧАТ:

На основание чл.36а ал.3 от  
ЗОП

Председател на Съвета на директорите  
на „Старт-Инженеринг“ АД

71

SIEMENS



Totally Integrated Power – SION

# SION Vacuum Circuit Breakers 3AE5 and 3AE1

Medium-Voltage Equipment

Catalog  
HG 11.02

Edition  
2018

[siemens.com/SION](http://siemens.com/SION)

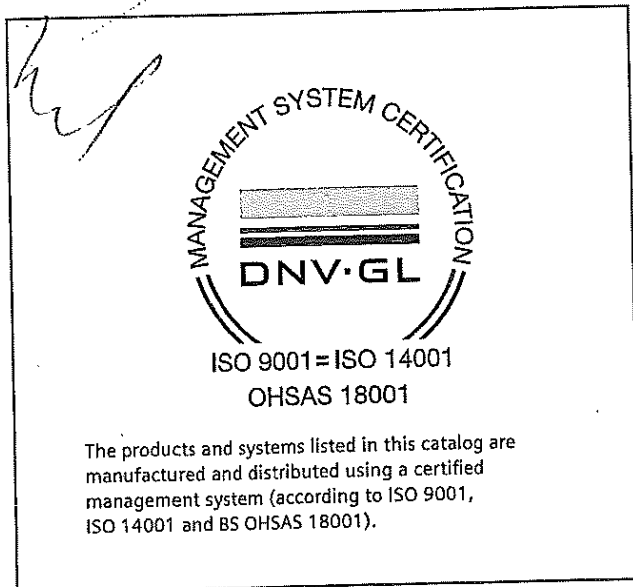
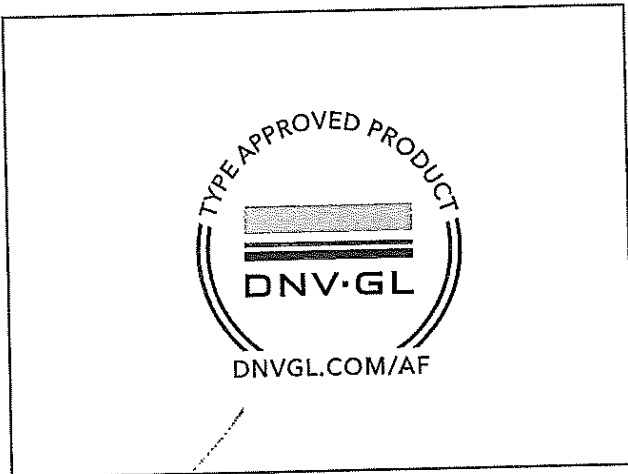




# SION Vacuum Circuit Breakers 3AE5 and 3AE1

Medium-Voltage Equipment  
Catalog HG 11.02 · 2018

Supersedes:  
Catalog HG 11.02 · 2017



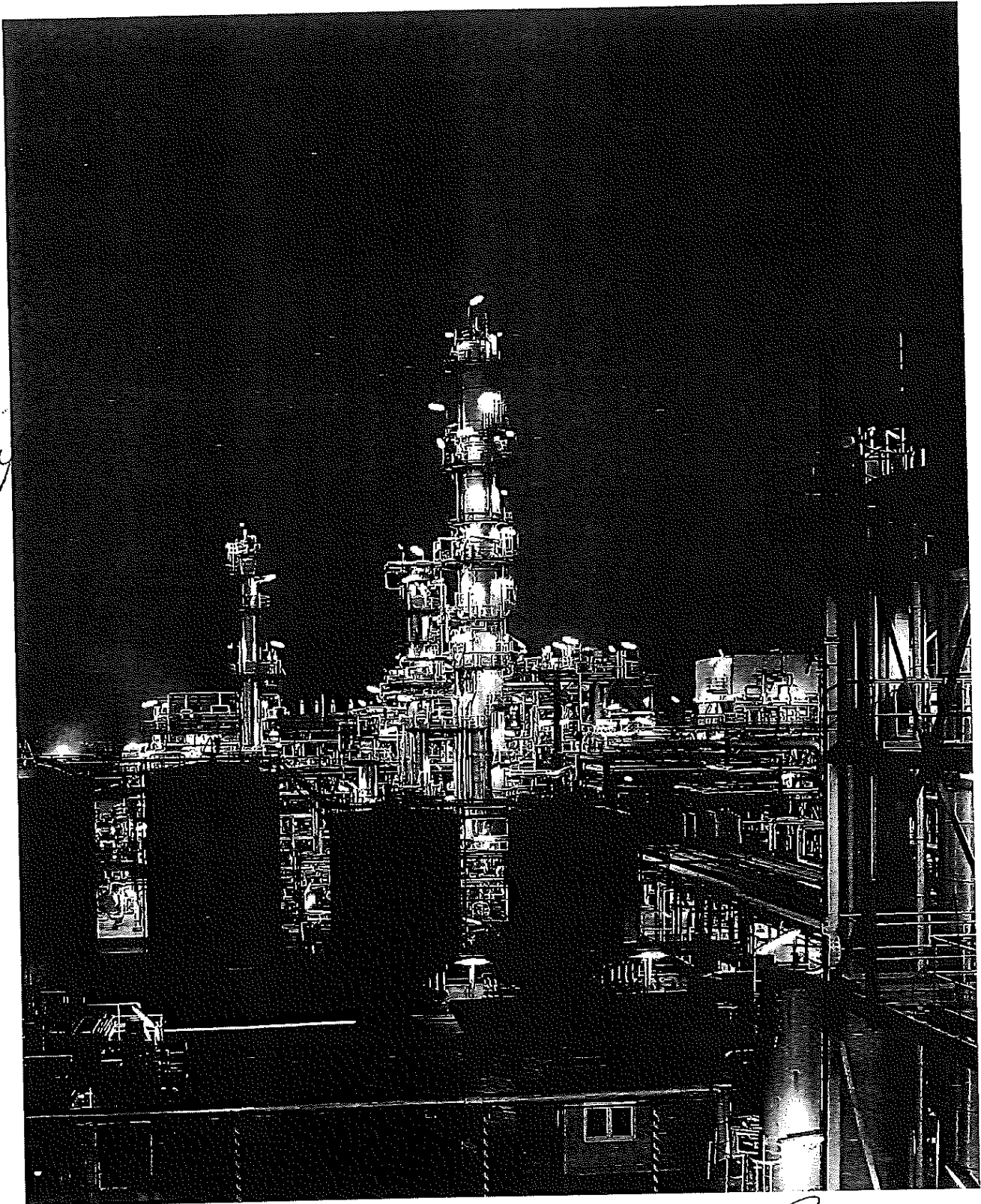
Contents	Page
<b>Description</b>	<b>5</b>
General information	6
Construction and mode of operation	8
Standards, maintenance-free design and interlocking	11
Ambient conditions, current carrying capacity and dielectric strength	12
Basic equipment, product range overview	13
<b>Device selection</b>	<b>15</b>
Article number structure	16
Configuration example	17
Circuit breaker and equipment package	18
Secondary equipment	30
Additional equipment	37
Accessories and spare parts	39
<b>Technical data</b>	<b>49</b>
Electrical data, dimensions and masses	50
Dimension drawings	66
Operating times and internal times, short-circuit protection of motors	74
Consumption data of releases	75
Circuit diagrams	76
<b>Annex</b>	<b>79</b>
Inquiry form	80
Configuration instructions	81
Configuration aid	Foldout page



*[Handwritten signature]*

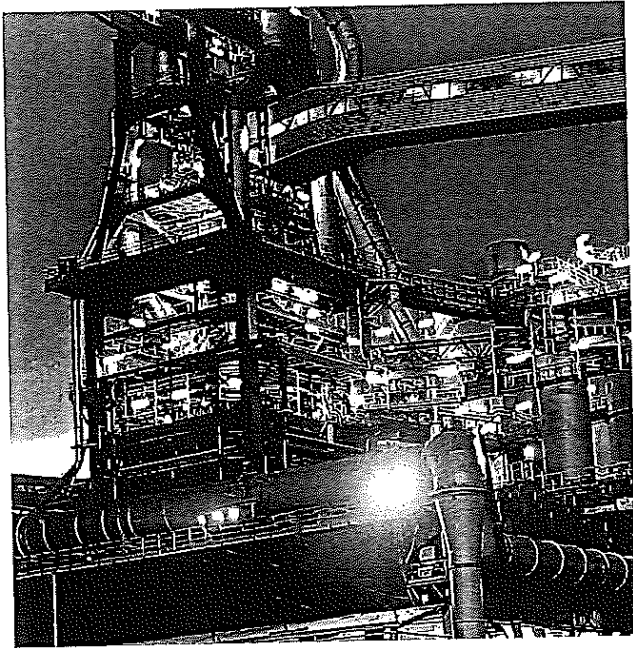
74

*[Handwritten signature]*



RH011-357J1

75



Industrial application: Refinery

Contents Page

<b>Description</b>	<b>5</b>
General information	6
<b>Construction and mode of operation</b>	
Switching medium	8
Pole assemblies	8
Operating mechanism	8
Trip-free mechanism	8
Releases	9
Closing and anti-pumping	9
Closing spring charged indication	9
Circuit breaker tripping signal	9
Interlocking	9
Low-voltage interface	9
Withdrawable module	10
Withdrawable module with make-proof earthing switch	10
<b>Standards</b>	<b>11</b>
Maintenance-free design	11
Interlocking	11
<b>Ambient and environmental conditions</b>	
Ambient conditions	12
Current carrying capacity	12
Dielectric strength	12
<b>Basic equipment</b>	<b>13</b>
Product range overview	13

1

*Handwritten signature or scribble in the bottom left corner.*

*Handwritten signature or scribble in the bottom right corner.*

# Description

General information

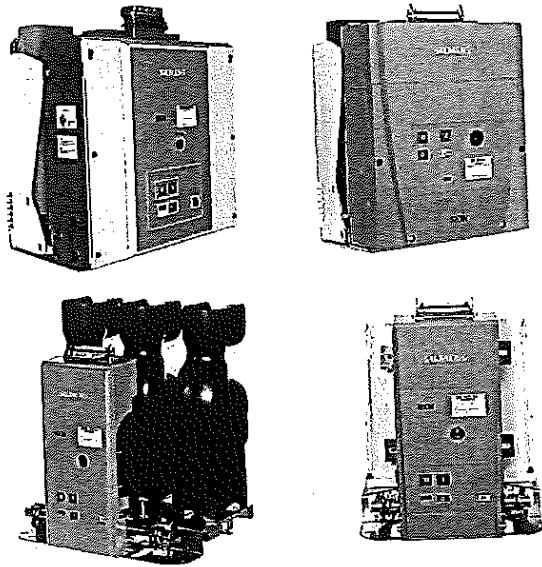
## SION Vacuum Circuit Breaker 3AE5 and 3AE1 from 7.2 kV to 24 kV – The Modular Devices

1

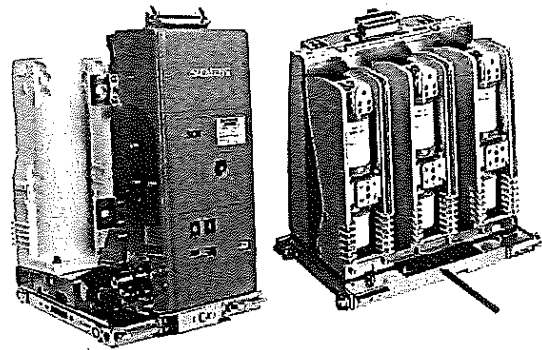
SION vacuum circuit breakers control all switching operations in medium-voltage distribution systems and are suitable for installation in all established and new air-insulated medium-voltage switchgear as well as for retrofitting existing switchgear. They are used for operation, for example, of overhead lines, cables, transformers, capacitors and motors. The optional installation accessories enable easy integration into switchgear panels, and, maximally equipped as a withdrawable module with an earthing switch, form almost the complete circuit breaker compartment inside the switchgear.

Our comprehensive range of circuit breakers offers a wide selection of pole-center distances and widths across flats as well as various equipment options for voltage levels from 7.2 kV to 24 kV. The withdrawable part, contact arms, contacts and bushings enable easy integration in all customary medium-voltage switchgear types. Identical dimensions and connection dimensions across several voltage levels reduce planning costs and the variety of panel versions. High reliability and availability are a matter of course, as are 10,000 maintenance-free operating cycles.

SION vacuum circuit breaker for fixed mounting



SION vacuum circuit breaker on withdrawable part



Thanks to a range of equipment options, SION vacuum circuit breakers can be precisely tailored to your requirements. This switching device can be mounted on a withdrawable part. Furthermore, mountable contact arms, contacts and bushings allow easy integration in your switchgear.

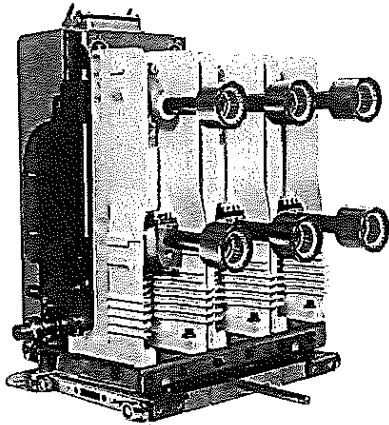
The circuit breaker mounted on a withdrawable part can be supplied both with and without contact arms and contacts.

PHOTO-385.tif

PHOTO-381.tif

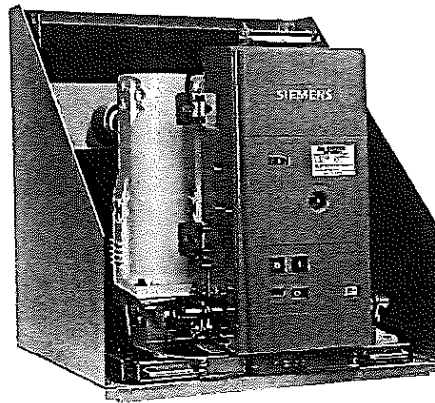
77 *[Handwritten signature]*

SION vacuum circuit breaker on withdrawable part – with contacts



The SION vacuum circuit breakers can be supplied with contact arms and contacts.

Withdrawable module with 3AE5 vacuum circuit breaker

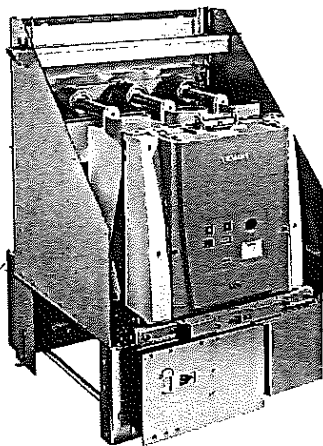


R-HG11-375.tif

R-HG11-376.tif

The withdrawable module contains all components required for the circuit breaker compartment of a switchgear panel. It consists of the circuit breaker mounted on a withdrawable part, with contact arms, fitted in a cartridge with side and rear walls. The withdrawable module is equipped with bushings, fixed contacts, shutters and the shutter mechanism. The side and rear walls form the tested connection compartment.

Withdrawable module with earthing switch



R-HG11-362.tif

The withdrawable module is also available with an earthing switch. It contains all components required for the circuit breaker compartment of a switchgear panel. It consists of the circuit breaker mounted on a withdrawable part, with contact arms, fitted in a cartridge with side and rear walls. The withdrawable module is equipped with bushings, fixed contacts, shutters and the shutter mechanism, as well as with a make-proof earthing switch. The side and rear walls form the tested connection compartment.

70

## Description

### Construction and mode of operation

1

#### Switching medium

Proven and fully developed for more than 40 years, vacuum switching technology is the principal arc-quenching element used in vacuum interrupters.

#### Pole assemblies

The pole assemblies consist of vacuum interrupters and pole shells. The vacuum interrupters are air-insulated and freely accessible. The pole assemblies are fixed on the mechanism mounting plate and supported by means of the pole shell (6). The vacuum interrupter (5) is mounted rigidly to the upper interrupter support. The lower part of the interrupter is guided into the lower interrupter support, allowing axial movement. The pole shell (6) absorbs external forces resulting from switching operations and the contact pressure.

#### Operating mechanism

The whole operating mechanism with motor (13), releases (11), indicators and actuating devices is mounted on the mechanism mounting plate (9). This compact design enables very fast operating times.

The circuit breaker operating mechanism is a stored-energy spring mechanism. The force is transmitted from the operating mechanism to the pole assemblies via operating levers. The closing spring (15) can be charged either electrically or manually, and latches in automatically when charging is complete. The closing spring (15) acts as a stored-energy mechanism.

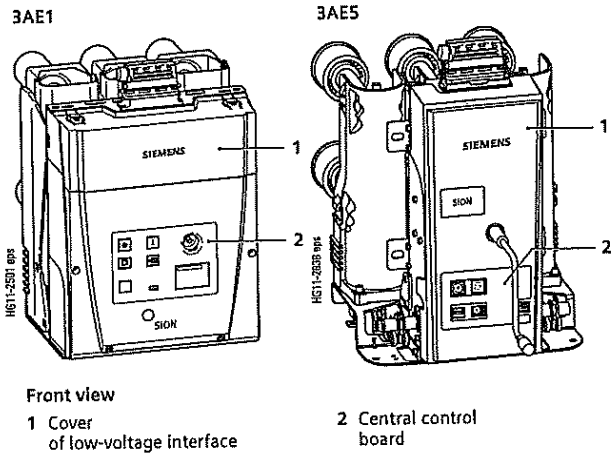
To close the breaker, the closing spring (15) can be unlatched either mechanically at the device (ON pushbutton), or electrically by remote control. The closing spring (15) charges the opening and/or contact-pressure springs (17) as the breaker closes. The now discharged closing spring (15) will be charged again automatically by the motor (13).

In this way, the stored-energy mechanism stores the OPEN – CLOSE – OPEN operating sequence that is required for an auto-reclosing operation on the system side. All stored-energy mechanisms perform the switching duties of synchronizing, rapid load transfer, and auto-reclosing.

#### Trip-free mechanism

The circuit breakers have a trip-free mechanism. In the event of an opening command being given after a closing operation has been initiated, the moving contacts return to the open position and remain there even if the closing command is sustained. However, the vacuum circuit breaker contacts are momentarily in the closed position.

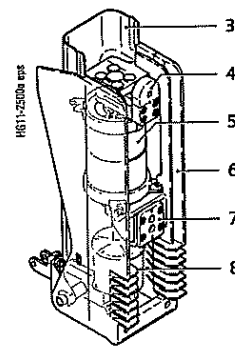
For charging the closing spring (15), the motor (13) operates in short-time duty. Therefore the voltage and power consumption might differ from the data of the motor rating plate.



Front view

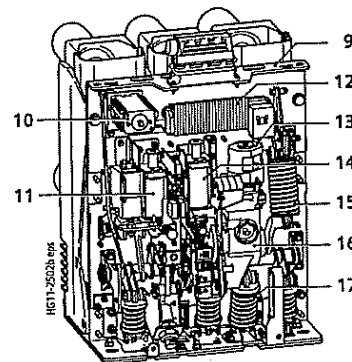
1 Cover of low-voltage interface

2 Central control board



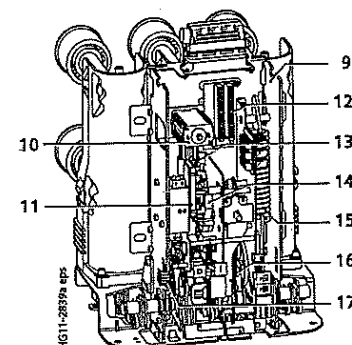
#### Pole structure

- 3 Insulating shell to the operating mechanism
- 4 Upper connection
- 5 Vacuum interrupter
- 6 Pole shell
- 7 Lower connection
- 8 Insulator



#### Operating mechanism 3AE1 without cover

- 9 Mechanism mounting plate
- 10 Auxiliary switch
- 11 1st release
- 12 Terminal strip
- 13 Motor
- 14 Closing solenoid
- 15 Closing spring
- 16 Gear
- 17 Opening spring



#### Operating mechanism 3AE5 without cover

- 9 Mechanism mounting plate
- 10 Auxiliary switch
- 11 1st release
- 12 Terminal strip
- 13 Motor
- 14 Closing solenoid
- 15 Closing spring
- 16 Gear
- 17 Opening spring

79

## Releases

A release is a device that transfers electrical commands from an external source, such as a control room, to the latching mechanism of the vacuum circuit breaker so that it can be opened or closed. The releases are designed for short-time duty up to 1 minute and are reset internally. The various types of releases available are described in detail below:

### Closing solenoid

The closing solenoid unlatches the charged closing spring of the vacuum circuit breaker, closing it by electrical means.

### Shunt releases

Shunt releases are used for automatic tripping of the circuit breaker by suitable protection relays and for deliberate tripping by electrical means. They are intended for connection to an external power supply (DC or AC voltage).

### Current-transformer-operated releases

Current-transformer-operated releases consist of a stored energy mechanism, an unlatching mechanism and an electromagnet system. They are used when there is no external source of auxiliary power (e.g. a battery). Tripping is effected by means of a protection relay (e.g. overcurrent time protection) acting on the current-transformer-operated release.

### Undervoltage releases

Undervoltage releases consist of a stored-energy mechanism, an unlatching mechanism and an electromagnet system that is permanently connected to the secondary or auxiliary voltage while the circuit breaker is closed. If the voltage falls below a predetermined value, unlatching of the release is enabled and the circuit breaker is opened via the stored-energy mechanism.

A maximum of two releases can be fitted as described on page 36. The consumption data of the releases is listed on page 87/88.

## Closing and anti-pumping

In the standard version, the circuit breakers can be closed electrically via remote. In addition, they can be mechanically closed locally by direct unlatching of the closing spring. If constant electrical signals for CLOSE and OPEN commands are present at the circuit breaker at the same time, the circuit breaker will carry out an OPEN-CLOSE-OPEN or a CLOSE-OPEN operating sequence. A new CLOSE command is given only following a brief interruption of the closing signal. This prevents continuous closing and opening (= "pumping") operations.

## Closing spring charged indication

The circuit breakers have a mechanically operated spring charged indicator. The charging status of the closing spring can also be queried electrically by means of an integrated position switch.

## Circuit breaker tripping signal

During electrical opening, the NO contact S6 makes brief contact. This is often used to operate a hazard warning system which should respond to automatic tripping of the circuit breaker. In case of local control, the NO contact S6 does not close.

The corresponding circuit diagrams can be found in the associated circuit manuals. See also page 76.

## Interlocking

### Mechanical interlocking

At the interface of the mechanical interlocking of the circuit breaker, sensors on the switchgear side can check the switch position and prevent the associated disconnecter from being operated while the circuit breaker is closed. The system also prevents the circuit breaker from being closed while the associated disconnecter is in the fault position.

Circuit breakers mounted on withdrawable parts are mechanically interlocked so that the handle for racking the withdrawable part can only be inserted while the breaker is in the OPEN position. The lock of the withdrawable part can be released by operating the pushing handles and only while the withdrawable part is in the disconnected position.

If the circuit breaker on the withdrawable part is in an intermediate position (neither in the service nor in the disconnected position), operation is prevented by the mechanical interlocking.

An optional key-operated interlock enables mechanical closing only in combination with the operated lock.

### Electrical interlocking

The auxiliary and signaling contacts which query the switch position of the circuit breaker or the position of the withdrawable part can be integrated in the switchgear interlocking concept. Furthermore, mechanical closing can also be prevented by means of an optional, electrical closing lock-out, in order to prevent impermissible switching sequences.

## Low-voltage interface

The removable cover of the SION 3AE1 and 3AE5 vacuum circuit breakers enables easy access to the low-voltage interface. All customer-side control and signaling options are concentrated here.



80



## Description

### Construction and mode of operation

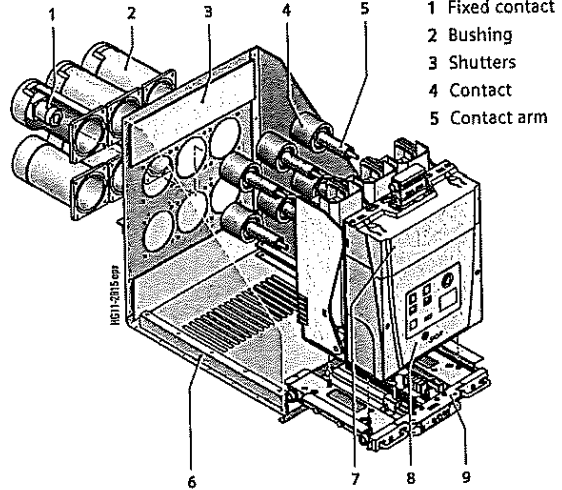
1

#### Withdrawable module

The withdrawable module contains all components required for the circuit breaker compartment of a switchgear panel. It consists of the circuit breaker mounted on a withdrawable part, with contact arms, fitted in a cartridge with side and rear walls. The withdrawable module is equipped with bushings, fixed contacts, shutters and the shutter mechanism. The side and rear walls form the tested connection compartment.

The circuit breaker on the withdrawable part is racked into the cartridge with the handle by rotating the spindle. The shutter mechanism is controlled by lateral gates, and the shutters are opened for contacting. Signals for the service and disconnected positions are transmitted to the module connector at the low-voltage interface of the vacuum circuit breaker via the position switches of the withdrawable part.

Withdrawable module 3AE1

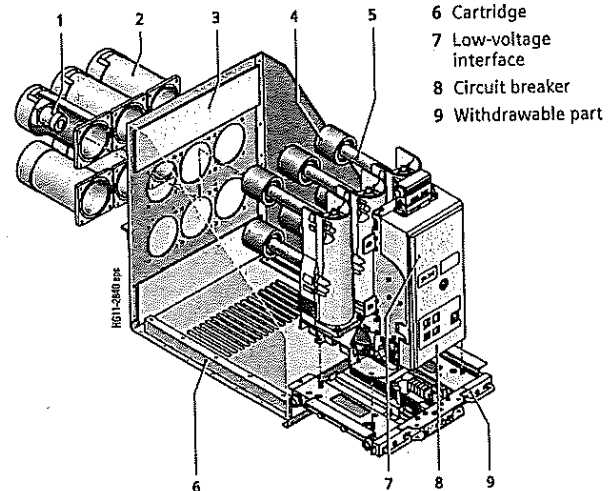


#### Withdrawable module with make-proof earthing switch

The make-proof earthing switch at the cartridge has a defined making capacity up to the values stated on the circuit breaker rating plate. It features a compact design with spring-operated mechanism and a switching angle of 90°, low torques for closing and opening, as well as low maintenance.

The make-proof earthing switch has been tested in the withdrawable module and complies with the relevant standards for the switchgear panels.

Withdrawable module 3AE5



Bl

Handwritten signature

Handwritten signature

1

**Standards**

The circuit breakers conform to the following standards:

- IEC 62271-1
- IEC 62271-100

All circuit breakers fulfill the endurance classes C2, E2, M2 and S1 according to IEC 62271-100, as well as the shortest rated operating sequence O - 0.3s - CO - 15s - CO.

3AE5 circuit breakers up to 12 kV / 31.5 kA / 1250 A comply with the DNVGL-CG-0339 classification for marine applications.

The withdrawable modules have been tested according to

- IEC 62271-200, 62271-1 and 62271-102 regarding
  - Dielectric strength
  - Temperature rise
  - Switching capacity.

For class C2, all circuit breakers comply with the following values acc. to IEC 62271-100.

Rated voltage	Line	Cable	Capacitors	Back-to-back capacitor bank	
	Rated line-charging breaking current	Rated cable-charging breaking current	Rated single-capacitor-bank breaking current	Rated back-to-back-capacitor-bank breaking current	Frequency of the inrush making current
$U_i$ kV, r.m.s.	$I_j$ A, r.m.s.	$I_c$ A, r.m.s.	$I_{cb}$ A, r.m.s.	$I_{bb}$ A, r.m.s.	$f_{in}$ Hz
7.2	10	10	400	400	4250
12	10	25	400	400	4250
17.5	10	31.5	400	400	4250
24	10	31.5	400	400	4250

Rated back-to-back-capacitor-bank inrush making current – see chapter 3: Technical data

**Maintenance-free design**

The circuit breakers are maintenance-free:

- Under normal ambient conditions according to IEC 62271-1
- Up to 10,000 operating cycles maintenance-free
  - no regreasing
  - no readjusting
- Up to 30,000 operating cycles with maintenance work for the 3AE5

The ratings are independent within their tolerances of the switching frequency or standing times without switching.

**Interlocking**

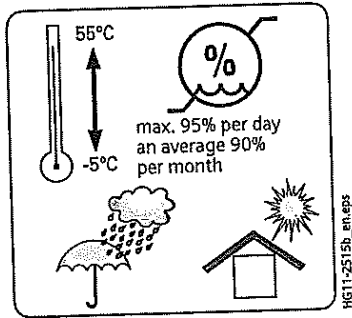
	Disconnected position	Racking	Service position	Switching state of vacuum circuit breaker	Interlocking of vacuum circuit breaker against closing (optionally with key-operated interlock)	Interlocking of withdrawable part in the switchgear panel (latching of locking handles) in disconnected position	Interlocking of racking the withdrawable part (between disconnected, test and service position)	Switching state of the earthing switch	Interlocking of the earthing switch against closing
<b>Vacuum circuit breaker</b>									
Fixed-mounted			■	OPEN	Interlockable				
			■	CLOSED					
<b>Disconnecting on withdrawable part and in withdrawable module</b>	■			CLOSED				Active	
	■			OPEN					
		■		OPEN	Active	Active			
			■	CLOSED		Active		Active	
<b>Disconnecting on withdrawable part in withdrawable module and with earthing switch</b>	■			CLOSED				Active	OPEN
	■			OPEN					OPEN
		■		OPEN	Active	Active			Active
			■	OPEN		Active		Active	Active
			■	CLOSED		Active		Active	Active
<b>Grounding on withdrawable part in withdrawable module and with earthing switch</b>	■			OPEN or CLOSED					OPEN
	■			OPEN or CLOSED				Active	OPEN

B2

**Description**

Ambient conditions, current carrying capacity and dielectric strength

1



**Ambient conditions**

The circuit breakers are designed for normal operating conditions as defined in IEC 62271-100. Condensation can occasionally occur under the ambient conditions shown opposite.

The circuit breakers are suitable for use in the following climatic classes according to IEC 60721, Part 3-3:

Climatic ambient conditions:	Class 3K4 <sup>1)</sup>
Biological ambient conditions:	Class 3B1
Mechanical ambient conditions:	Class 3M2
Chemically-active substances:	Class 3CS <sup>3)</sup>
Mechanically-active substances:	Class 3S2 <sup>2)</sup>

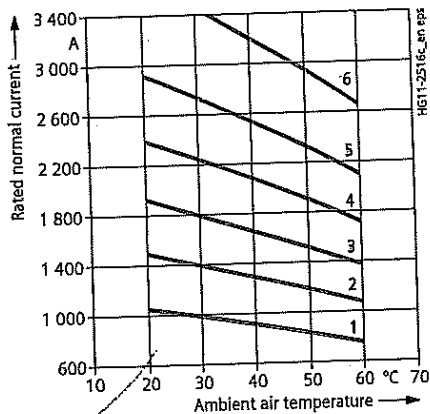
- 1) Lower temperature limit: -5 °C (with order code A40 down to -25 °C)
- 2) Restriction: Clean insulation parts
- 3) Without appearance of saline fog and simultaneous condensation

**Current carrying capacity**

The rated normal currents specified in the diagram have been defined according to IEC 62271-100 for an ambient air temperature of +40 °C and apply to open switchgear.

For enclosed switchgear, the data of the switchgear manufacturer applies.

At ambient air temperatures below +40 °C, higher normal currents can be carried (see diagram):



- Characteristics curve 1 = Rated normal current 800 A
- Characteristics curve 2 = Rated normal current 1250 A
- Characteristics curve 3 = Rated normal current 1600 A
- Characteristics curve 4 = Rated normal current 2000 A
- Characteristics curve 5 = Rated normal current 2500 A
- Characteristics curve 6 = Rated normal current 3150 A

**Dielectric strength**

The dielectric strength of air insulation decreases with increasing altitude due to lower air density. According to IEC 62271-1, the rated lightning impulse withstand voltage and the rated short-duration power-frequency withstand voltage specified in chapter "Technical data" apply to a site altitude of 1000 m above sea level. For altitudes above 1000 m, the insulation level must be corrected according to the diagram shown opposite.

The characteristics curve shown applies to both rated withstand voltages.

When selecting the devices, the following applies:

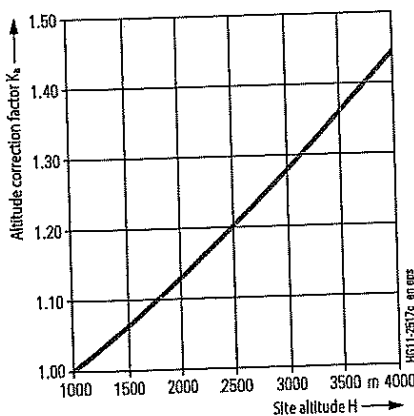
$$U \geq U_0 \times K_a$$

- $U$  Rated withstand voltage under reference atmosphere
- $U_0$  Rated withstand voltage requested for the installation location
- $K_a$  Altitude correction factor according to the diagram shown opposite

**Example**

For a requested rated lightning impulse voltage of 75 kV at an altitude of 2500 m, an insulation level of at least 90 kV under reference atmosphere is required:

$$90 \text{ kV} \geq 75 \text{ kV} \times 1.2$$



83

**Equipment**

Features	Minimum equipment	Alternative equipment	Remarks
Operating mechanism	Electrical operating mechanism	None	Also for manual operation
Closing	Closing solenoid and mechanical manual closing	None	-
1st release	Shunt release	Undervoltage release, c.-t.-operated release	For SION 3AE5, only shunt releases are possible
2nd release	None	Shunt release, undervoltage release, c.-t.-operated release	Combination of 2 undervoltage releases or 2 c.t.-operated releases is not possible for 3AE1
3rd release	None	Shunt release, c.t.-operated release	Only in combination with wide operating mechanism housing; combination of 2 undervoltage releases is not possible for 3AE5.
Varistor circuit	Standard for ≥ 60 V DC	None	For limiting switching overvoltages
Auxiliary switch	6 NO + 6 NC	12 NO + 12 NC	-
Plug connection	27-pole terminal strip f. SION 3AE1 20-pole plug connector f. SION 3AE5	24-pole plug, 64-pole plug	12 NO + 12 NC not available with 24-pole plug
Anti-pumping	Available	None	-
Circuit breaker tripping signal	None	Possible	-
Operation cycles counter	Available	None	-
Position switches for withdrawable part	5 momentary-contact position switches per position	None	-
Interlocking	Mechanical interlocking available at the withdrawable module	Mechanical interlocking for circuit breaker Electrical closing lock-out for 3AE5 Key-operated interlocking	Required for withdrawable part
Installation type	Fixed-mounted	Withdrawable part with/without contact arms and contact, fixed contacts and bushings, withdrawable module with/without make-proof earthing switch	-

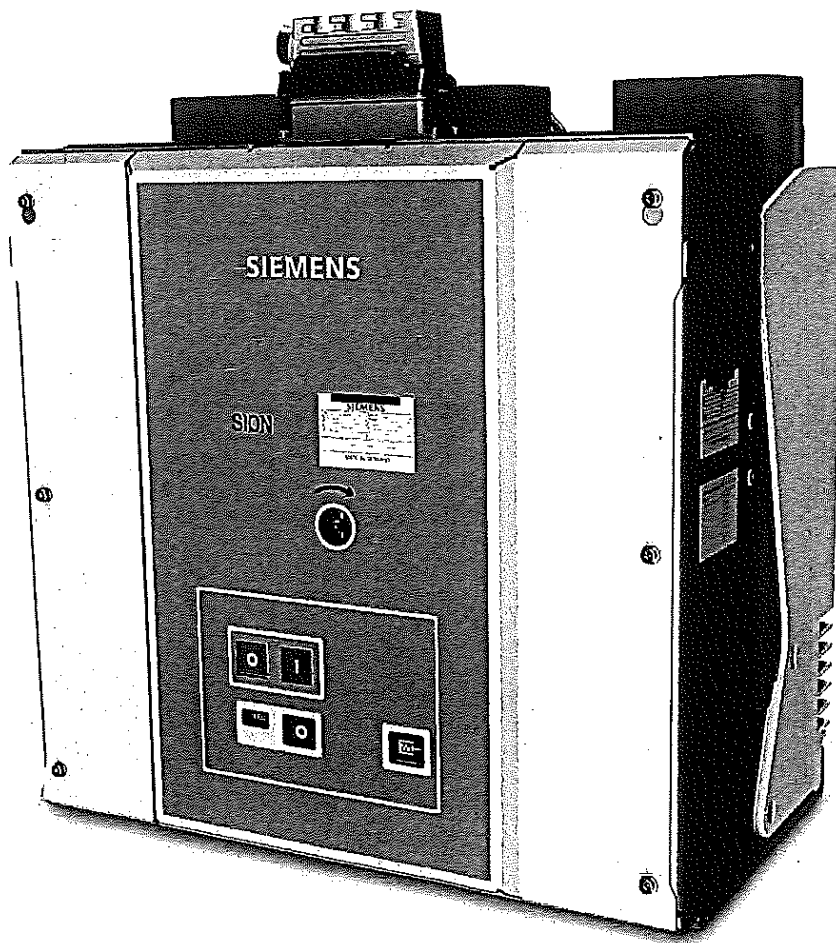


**Product range overview: Circuit breaker without installation accessories**

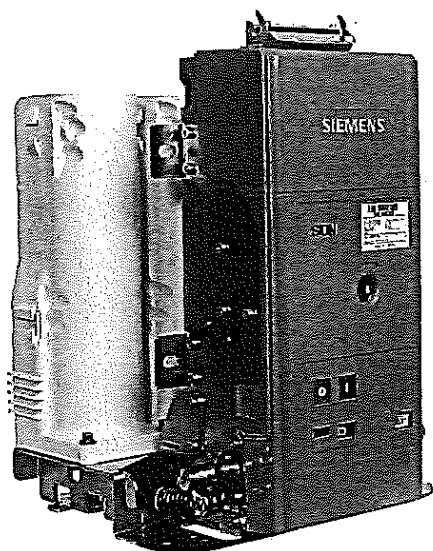
Type	Rated voltage kV	Rated short-circuit breaking current kA	Rated normal current A	Pole-center distance (in mm)										
				150				160						
				Width across flats (in mm)										
				205	275	310	205	275	310	205	275	310	310	
3AE50	7.2	16/20/25/31.5	800/1250	■	■	■	■	■	■	■	■	■	■	■
3AE50	7.2	16/20/25/31.5	1600											■
3AE50	7.2	25/31.5	2000/2500											■
3AE50	7.2	25/31.5	1250/2000											■
3AE10	7.2	40	2500/3150											■
3AE51	12	16/20/25/31.5	800/1250	■	■	■	■	■	■	■	■	■	■	■
3AE51	12	16/20/25/31.5	1600											■
3AE51	12	20/25/31.5	2000/2500											■
3AE51	12	20/25/31.5	1250/2000											■
3AE11	12	40	2500/3150											■
3AE52	17.5	16/25/31.5	800/1250	■	■	■	■	■	■	■	■	■	■	■
3AE52	17.5	16/25/31.5	1600											■
3AE52	17.5	25/31.5	2000/2500											■
3AE52	17.5	25/31.5	1250/2000/2500/3150											■
3AE12	17.5	40	2500/3150											■
3AE13/3AE53	24	16/20/25	800/1250											■
3AE13	24	16	800/1250/2000											■
3AE13	24	20/25	2000/2500											■

Note: The circuit breaker is available with various installation accessories. These versions can be configured from page 18 onwards.

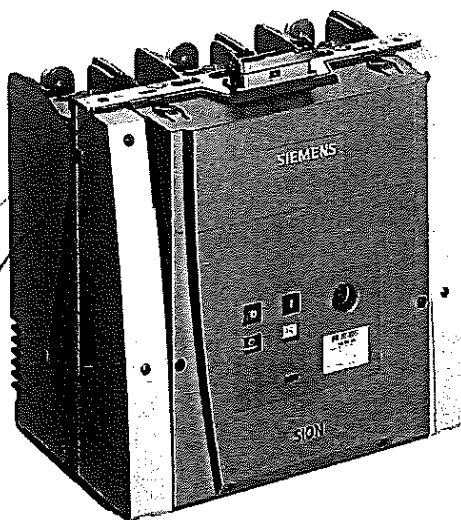
84 *[Handwritten signature]*



85 *[Handwritten signature]*



3AE5 vacuum circuit breaker as fixed-mounted version



3AE1 vacuum circuit breaker as fixed-mounted version

Contents	Page
<b>Device selection</b>	<b>15</b>
Article number structure	16
Configuration example	17
<b>Circuit breaker and equipment package</b>	
Voltage level 7.2 kV	18
Voltage level 12 kV	21
Voltage level 17.5 kV	25
Voltage level 24 kV	28
<b>Secondary equipment</b>	
Release combination	30
Operating voltage of the closing solenoid	31
Operating voltage of the 1st release	31
Operating voltage of the 2nd release	32
Circuit breaker installation accessories	33
Operating voltage of the drive motor	34
Interlocking, auxiliary switch, circuit breaker tripping signal and low-voltage interface	35
Languages of operating instructions and rating plate; AC frequency of operating voltages	36
Additional equipment	37
<b>Accessories and spare parts</b>	
Rating plate	39
Accessories catalog	39



R4611-378-01

R4611-176-01

86 

**Device selection**

Article number structure

**Article number structure**

The circuit breakers consist of a primary and a secondary part. The primary part covers the main electrical data of the circuit breaker poles. The secondary part covers the auxiliary devices which are necessary for operating and controlling the vacuum circuit breaker. The relevant data makes up the 16-digit article number.

Order codes

Individual equipment versions, marked with 9 or Z in the 9th to 16th position, are explained in more detail by a 3-digit order code. Several order codes can be added to the article number in succession and in any sequence.

Special versions (★)

In case of special versions, "-Z" is added to the article number and a descriptive order code follows.

If several special versions are required, the suffix "-Z" is listed only once. If a requested special version is not in the catalog and can therefore not be ordered via order code, it has to be identified with Y 9 9 after consultation with us. The consultation must take place directly between your sales partner and the order processing department at Siemens. Special wiring designs can also be ordered with B99.



- 1st position **Primary part**  
Superior group  
Switching devices
- 2nd position **Main group**  
Circuit breaker
- 3rd position **Subgroup**  
Circuit breaker type series
- 4th position **Circuit breaker version**
- 5th position **Rated voltage from 7.2 kV to 24 kV**
- 6th position **Pole-center distance /Width across flats**
- 7th position **Rated short-circuit breaking current from 16 kA to 40 kA**
- 8th position **Rated normal current from 800 A to 3150 A**
- 9th to 16th position **Secondary part**  
Secondary equipment, operating mechanism, releases, operating voltages and other auxiliary equipment
- Order codes**  
Groups of 3 after the article number  
Format: a n a
- Special versions (★)**  
Initiated with "-Z"  
Groups of 3 after the article number  
Format: a n n

*Handwritten signature*

*Handwritten signature*

87 *Handwritten signature*

Configuration example

To help you select the correct article number for the circuit breaker type that you require, you will find two configuration examples below. Two complete circuit breakers have been configured as examples.

On the foldout page, you can enter the Article No. determined for your circuit breaker. Based on the Article No., you can request an offer from your Siemens partner.

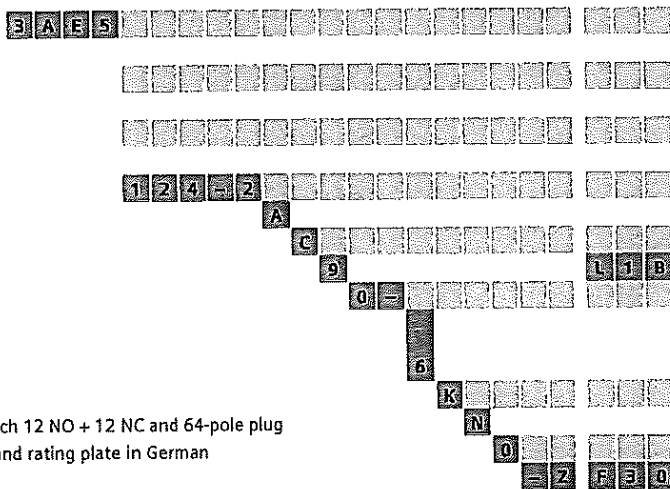
Configuration example 1: SION 3AE5 withdrawable module (vacuum circuit breaker on withdrawable part in cartridge)

Configuration example

- SION vacuum circuit breaker
- Rated voltage  $U_r = 12 \text{ kV}$ , 50/60 Hz
- Rated lightning impulse voltage  $U_p = 75 \text{ kV}$
- Rated short-circuit breaking current  $I_{sc} = 25 \text{ kA}$
- Rated normal current  $I_r = 1250 \text{ A}$
- Pole-center distance = 150 mm
- Width across flats = 310 mm
- 1st shunt release (only one shunt release)
- Operating voltage of the closing solenoid 48 V DC
- Operating voltage of the 1st release 32 V DC
- Without 2nd release

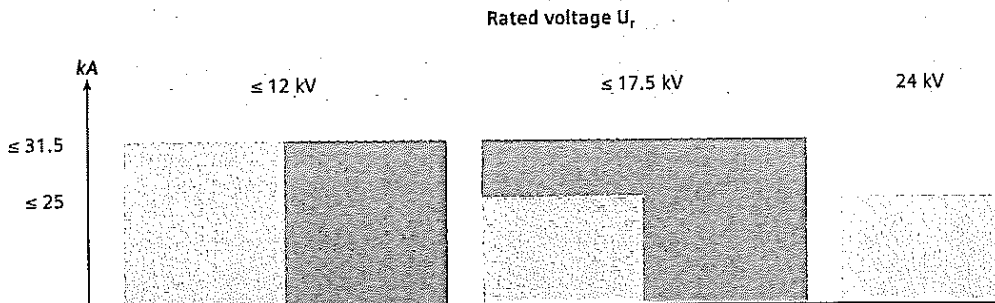
- Circuit breaker on withdrawable part, with cartridge, contact arms, contacts, fixed contacts, bushings, shutters, earthing switch with short-circuit making capacity
- Operating voltage of the drive motor 230 V AC
- With mechanical interlocking, circuit breaker tripping signal, auxiliary switch 12 NO + 12 NC and 64-pole plug
- Frequency of the operating voltage 50 Hz and DC, operating instructions and rating plate in German
- Hand crank

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16 Order codes  
Article No.: **B A E 5** [grid]



Example of an Article No.: **B A E 5 1 2 4 - 2 A C 9 0 - 6 K N 0 - Z**  
Order codes: **L 1 B + F 3 0** [grid]

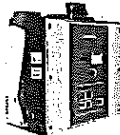
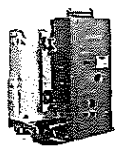
Options for the operating mechanism housing



- Narrow operating mechanism housing\*  $\leq 1600 \text{ A}$
- Wide operating mechanism housing\*\*  $> 1600 \text{ A}$

Ordering option:  
\*Wide housing orderable with D59  
\*\*Third release only possible in wide housing

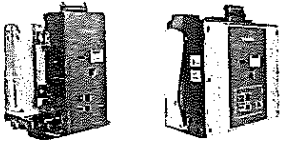
See page 37





### Device selection

Circuit breaker and equipment package



## 7.2 kV

Position: 1 2 3 4 5 6 7 - 8 9-12

13th position = Equipment package

14-16

Order codes

Article No.:

Rated voltage for 50/60 Hz $U_n$ kV	Rated lightning impulse voltage $U_p$ kV	Rated short-duration power-frequency withstand voltage $U_a$ kV	Rated short-circuit breaking current with 50% DC component $I_{sc}$ kA	Rated short-circuit making current (at 50/60 Hz) $I_m$ kA	Pole-center distance mm	Width across flats mm	Rated normal current $I_n$ A	1	2	3	4	5	6	7	8	9-12	
7.2	60	20	16	40/42	210	310	800	3	A	E	5	0	8	2	-	1	
						310	1250	3	A	E	5	0	8	2	-	2	
						310	1600	3	A	E	5	0	8	2	-	3	
						275	800	3	A	E	5	0	7	2	-	1	
						275	1250	3	A	E	5	0	7	2	-	2	
						205	800	3	A	E	5	0	6	2	-	1	
						205	1250	3	A	E	5	0	6	2	-	2	
					160	310	800	3	A	E	5	0	5	2	-	1	
					310	1250	3	A	E	5	0	5	2	-	2		
					310	1600	3	A	E	5	0	5	2	-	3		
					275	800	3	A	E	5	0	4	2	-	1		
					275	1250	3	A	E	5	0	4	2	-	2		
					205	800	3	A	E	5	0	3	2	-	1		
					205	1250	3	A	E	5	0	3	2	-	2		
					150	310	800	3	A	E	5	0	2	2	-	1	
					310	1250	3	A	E	5	0	2	2	-	2		
					310	1600	3	A	E	5	0	2	2	-	3		
					275	800	3	A	E	5	0	1	2	-	1		
					275	1250	3	A	E	5	0	1	2	-	2		
					205	800	3	A	E	5	0	0	2	-	1		
					205	1250	3	A	E	5	0	0	2	-	2		
	7.2	60	20	20	50/52	210	310	800	3	A	E	5	0	8	3	-	1
						310	1250	3	A	E	5	0	8	3	-	2	
						310	1600	3	A	E	5	0	8	3	-	3	
						275	800	3	A	E	5	0	7	3	-	1	
						275	1250	3	A	E	5	0	7	3	-	2	
						205	800	3	A	E	5	0	6	3	-	1	
						205	1250	3	A	E	5	0	6	3	-	2	
					160	310	800	3	A	E	5	0	5	3	-	1	
					310	1250	3	A	E	5	0	5	3	-	2		
					310	1600	3	A	E	5	0	5	3	-	3		
					275	800	3	A	E	5	0	4	3	-	1		
					275	1250	3	A	E	5	0	4	3	-	2		
					205	800	3	A	E	5	0	3	3	-	1		
					205	1250	3	A	E	5	0	3	3	-	2		
					150	310	800	3	A	E	5	0	2	3	-	1	
					310	1250	3	A	E	5	0	2	3	-	2		
					310	1600	3	A	E	5	0	2	3	-	3		
					275	800	3	A	E	5	0	1	3	-	1		
					275	1250	3	A	E	5	0	1	3	-	2		
					205	800	3	A	E	5	0	0	3	-	1		
					205	1250	3	A	E	5	0	0	3	-	2		
	7.2	60	20	25	63/65	210	310	800	3	A	E	5	0	8	4	-	1
						310	1250	3	A	E	5	0	8	4	-	2	

See pages 35 and 36

Orderable versions				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Circuit breaker for fixed mounting, without circuit breaker installation accessories	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On withdrawable part	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On withdrawable part with complete contact system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On withdrawable part with complete contact system and bushings*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Withdrawable module without earthing switch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Withdrawable module with earthing switch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

See pages 38 to 40

See page 41

Special version  $U_d = 32$  kV

Legend: ● With contact system  
■ Without contact system

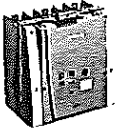
\*) Can also be ordered without withdrawable part, see page 37, 13th position

89



Device selection

Circuit breaker and equipment package



7.2 kV

Position: 1 2 3 4 5 6 7 - 8 9-12

13th position = Equipment package 14-16

Order codes

Article No.:

3 A E 1 0 8 6 - 2

Rated voltage for 50/60 Hz	Rated lightning impulse voltage	Rated short-duration power-frequency withstand voltage	Rated short-circuit breaking current with 36% DC component	Rated short-circuit making current (at 50/60 Hz)	Pole-center distance	Width across flats	Rated normal current	1	2	3	4	5	6	7	8	9-12
$U_n$	$U_p$	$U_e$	$I_n$	$I_m$	mm	mm	A									
7.2	60	20	40	100/104	210	310	1250	3	A	E	1	0	8	6	-	2
						310	2000	3	A	E	1	0	8	6	-	4
						310	2500	3	A	E	1	0	8	6	-	6
						310	3150	3	A	E	1	0	8	6	-	7

See pages 35 and 36

Orderable versions				
Circuit breaker for fixed mounting, without circuit breaker installation accessories	On withdrawable part	On withdrawable part with complete contact system *	On withdrawable part with complete contact system and bushings *	Withdrawable module without earthing switch
■	■	●	●	●
■	■	●	●	●
■	■	●	●	●
■	■	●	●	●

See pages 38 to 40

See page 41

Special version  $U_d = 32$  kV

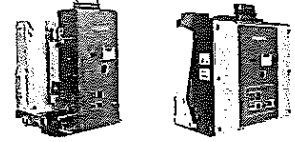
- 2 E 1 6

Legend: ● With contact system  
 ■ Without contact system

\*) Can also be ordered without withdrawable part, see page 37, 13th position

2

98



12 kV

Rated voltage for 50/60 Hz	Rated lightning impulse voltage	Rated short-duration power frequency withstand voltage	Rated short-circuit breaking current with 50% DC component	Rated short-circuit making current (at 50/60 Hz)	Pole-center distance	Width across flats	Rated normal current	Position: 1	Position: 2	Position: 3	Position: 4	Position: 5	Position: 6	Position: 7	Position: 8	Position: 9-12	13th position = Equipment package	14-16	Order codes
$U_n$	$U_p$	$U_d$	$I_{sc}$	$I_m$	mm	mm	A												
12	75	28	16	40/42	210	310	800	3	A	E	5	1	8	2	-	1			
						310	1250	3	A	E	5	1	8	2	-	2			
						310	1600	3	A	E	5	1	8	2	-	3			
						275	800	3	A	E	5	1	7	2	-	1			
						275	1250	3	A	E	5	1	7	2	-	2			
						205	800	3	A	E	5	1	6	2	-	1			
						205	1250	3	A	E	5	1	6	2	-	2			
					160	310	800	3	A	E	5	1	5	2	-	1			
						310	1250	3	A	E	5	1	5	2	-	2			
						310	1600	3	A	E	5	1	5	2	-	3			
						275	800	3	A	E	5	1	4	2	-	1			
						275	1250	3	A	E	5	1	4	2	-	2			
						205	800	3	A	E	5	1	3	2	-	1			
						205	1250	3	A	E	5	1	3	2	-	2			
					150	310	800	3	A	E	5	1	2	2	-	1			
						310	1250	3	A	E	5	1	2	2	-	2			
						310	1600	3	A	E	5	1	2	2	-	3			
						275	800	3	A	E	5	1	1	2	-	1			
						275	1250	3	A	E	5	1	1	2	-	2			
						205	800	3	A	E	5	1	0	2	-	1			
						205	1250	3	A	E	5	1	0	2	-	2			
12	75	28	20	50/52	275	310	2000	3	A	E	5	5	8	3	-	4			
						310	2500	3	A	E	5	5	8	3	-	6			
					210	310	800	3	A	E	5	1	8	3	-	1			
						310	1250	3	A	E	5	1	8	3	-	2			
						310	1600	3	A	E	5	1	8	3	-	3			
						310	2000	3	A	E	5	1	8	3	-	4			
						310	2500	3	A	E	5	1	8	3	-	6			
						275	800	3	A	E	5	1	7	3	-	1			
						275	1250	3	A	E	5	1	7	3	-	2			
						205	800	3	A	E	5	1	6	3	-	1			
						205	1250	3	A	E	5	1	6	3	-	2			
					160	310	800	3	A	E	5	1	5	3	-	1			
						310	1250	3	A	E	5	1	5	3	-	2			
						310	1600	3	A	E	5	1	5	3	-	3			
						275	800	3	A	E	5	1	4	3	-	1			
						275	1250	3	A	E	5	1	4	3	-	2			
						205	800	3	A	E	5	1	3	3	-	1			
						205	1250	3	A	E	5	1	3	3	-	2			
					150	310	800	3	A	E	5	1	2	3	-	1			
						310	1250	3	A	E	5	1	2	3	-	2			
						310	1600	3	A	E	5	1	2	3	-	3			

**Orderable versions**

- Circuit breaker for fixed mounting, without circuit breaker installation accessories
- On withdrawable part
- On withdrawable part with complete contact system \*
- On withdrawable part with complete contact system and bushings \*
- Withdrawable module without earthing switch
- Withdrawable module with earthing switch

See pages 35 and 36

See pages 38 to 40

See page 41



*[Handwritten signature]*

*[Handwritten signature]*

Special version  $U_d = 42$  kV  
 $U_B = 95$  kV

- Z E 1 3  
- Z E 9 5

Legend: ● With contact system  
■ Without contact system

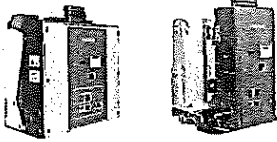
\*) Can also be ordered without withdrawable part, see page 37, 13th position

92

*[Handwritten signature]*

Device selection  
Circuit breaker and equipment package

SION Vacuum Circuit Breakers 3AE5 and 3AE1



12 kV

Position: 1 2 3 4 5 6 7 - 8 9-12 13th position = Equipment package 14-16 Order codes

Article No.: 3 A E 5 1 1 3 - 1

Rated voltage for 50/60 Hz $U_n$ kV	Rated lightning impulse voltage $U_p$ kV	Rated short-duration power-frequency withstand voltage $U_e$ kV	Rated short-circuit-breaking current with 50% DC component $I_{sc}$ kA	Rated short-circuit making current $I_{ms}$ (at 50/60 Hz) kA	Pole-center distance mm	Width across flats mm	Rated normal current $I_n$ A	1	2	3	4	5	6	7	8	9-12	13th position = Equipment package	14-16	Order codes
12	75	28	25	63/65	275	275	800	3	A	E	5	1	1	3	-	1			
					210	275	1250	3	A	E	5	1	1	3	-	2			
					160	275	800	3	A	E	5	1	0	3	-	1			
					150	275	1250	3	A	E	5	1	0	3	-	2			
					150	310	2000	3	A	E	5	5	8	4	-	4			
					150	310	2500	3	A	E	5	5	8	4	-	6			
					150	310	800	3	A	E	5	1	8	4	-	1			
					150	310	1250	3	A	E	5	1	8	4	-	2			
					150	310	1600	3	A	E	5	1	8	4	-	3			
					150	310	2000	3	A	E	5	1	8	4	-	4			
					150	310	2500	3	A	E	5	1	8	4	-	6			
					150	275	800	3	A	E	5	1	7	4	-	1			
					150	275	1250	3	A	E	5	1	7	4	-	2			
					150	205	800	3	A	E	5	1	6	4	-	1			
					150	205	1250	3	A	E	5	1	6	4	-	2			
					150	310	800	3	A	E	5	1	5	4	-	1			
					150	310	1250	3	A	E	5	1	5	4	-	2			
					150	310	1600	3	A	E	5	1	5	4	-	3			
					150	275	800	3	A	E	5	1	4	4	-	1			
					150	275	1250	3	A	E	5	1	4	4	-	2			
					150	205	800	3	A	E	5	1	3	4	-	1			
					150	205	1250	3	A	E	5	1	3	4	-	2			
					150	310	800	3	A	E	5	1	2	4	-	1			
					150	310	1250	3	A	E	5	1	2	4	-	2			
					150	310	1600	3	A	E	5	1	2	4	-	3			
					150	275	800	3	A	E	5	1	1	4	-	1			
					150	275	1250	3	A	E	5	1	1	4	-	2			
					150	205	800	3	A	E	5	1	0	4	-	1			
					150	205	1250	3	A	E	5	1	0	4	-	2			

See pages 35 and 36

**Orderable versions**

<input type="checkbox"/> Circuit breaker for fixed mounting, without circuit breaker installation accessories	<input type="checkbox"/> On withdrawable part	<input type="checkbox"/> On withdrawable part with complete contact system *	<input type="checkbox"/> On withdrawable part with complete contact system and bushings *	<input type="checkbox"/> Withdrawable module without earthing switch	<input type="checkbox"/> Withdrawable module with earthing switch
---	---	--	---	--	---

See pages 38 to 40

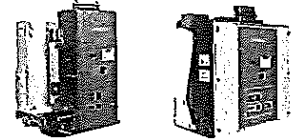
See page 41

Special version  $U_d = 42$  kV  
 $I_{sc}^{**}) = 26.3$  kA  
 $U_p = 95$  kV

Legend: ● With contact system  
■ Without contact system

\*) Can also be ordered without withdrawable part, page 37, 13th position  
\*\*) Only possible with  $I_{sc} = 25$  kA

93



12 kV

Position: 1 2 3 4 5 6 7 8 9-12

13th position = Equipment package 14-16

Order codes

Rated voltage for 50/60 Hz	Rated lightning impulse voltage	Rated short-duration power-frequency withstand voltage	Rated short-circuit breaking current with 50% DC component	Rated short-circuit making current (at 50/60 Hz)	Pole-center distance	Width across flats	Rated normal current	Article No.:	1	2	3	4	5	6	7	8	9-12	13th position = Equipment package	14-16	Order codes		
12	75	28	31.5	80/82	310	2000	3 A E 5 5 8 5 - 4															
					310	2500	3 A E 5 5 8 5 - 6															
12	75	28	31.5	80/82	210	310	800 3 A E 5 1 8 5 - 1															
						310	1250 3 A E 5 1 8 5 - 2															
						310	1600 3 A E 5 1 8 5 - 3															
						310	2000 3 A E 5 1 8 5 - 4															
						310	2500 3 A E 5 1 8 5 - 6															
						275	800 3 A E 5 1 7 5 - 1															
						275	1250 3 A E 5 1 7 5 - 2															
						205	800 3 A E 5 1 6 5 - 1															
						205	1250 3 A E 5 1 6 5 - 2															
					160	310	800 3 A E 5 1 5 5 - 1															
						310	1250 3 A E 5 1 5 5 - 2															
						310	1600 3 A E 5 1 5 5 - 3															
						275	800 3 A E 5 1 4 5 - 1															
						275	1250 3 A E 5 1 4 5 - 2															
						205	800 3 A E 5 1 3 5 - 1															
						205	1250 3 A E 5 1 3 5 - 2															
					150	310	800 3 A E 5 1 2 5 - 1															
						310	1250 3 A E 5 1 2 5 - 2															
						310	1600 3 A E 5 1 2 5 - 3															
						275	800 3 A E 5 1 1 5 - 1															
						275	1250 3 A E 5 1 1 5 - 2															
						205	800 3 A E 5 1 0 5 - 1															
						205	1250 3 A E 5 1 0 5 - 2															
Special version $U_d = 42$ kV $U_p = 95$ kV																						
Circuit breaker for installation in NXAIR World 1)																						
12	75	28	25	63/65	160	275	800 3 A E 5 5 5 4 - 1															
						275	1250 3 A E 5 5 5 4 - 2															
					210	275	1600 3 A E 5 5 6 4 - 3															
			31.5	80/82	160	275	800 3 A E 5 5 5 5 - 1															
						275	1250 3 A E 5 5 5 5 - 2															
					210	275	1250 3 A E 5 5 6 5 - 2															
						275	1600 3 A E 5 5 6 5 - 3															
						275	2500 3 A E 5 5 6 5 - 6															
Special version $U_d = 42$ kV $I_{sc}^{**}) = 26.3$ kA $U_p = 95$ kV																						

See pages 35 and 36

See pages 38 to 40

See page 41

Orderable versions				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- Z E 1 3
- Z E 9 5
- Z W 6 3
- Z W 6 3
- Z W 6 3
- Z W 6 3
- Z W 6 3
- Z W 6 3
- Z W 6 3
- Z W 6 3
- Z E 1 3
- Z E 4 6
- Z E 9 5

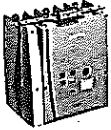


1) W63 is absolutely necessary as order code

Legend: ● With contact system  
■ Without contact system

\*) Can also be ordered without withdrawable part, see page 37, 13th position  
\*\*) Only possible with  $I_{sc} = 25$  kA

**Device selection**  
Circuit breaker and equipment package



12 kV

Position: 1 2 3 4 5 6 7 - 8 9-12      13th position = Equipment package 14-16      Order codes

Article No.: 3 A E 1 5 8 6 - 2

Rated voltage for 50/60 Hz	Rated lightning impulse voltage	Rated short-duration power-frequency withstand voltage	Rated short-circuit breaking current with 36% DC component	Rated short-circuit making current (at 50/60 Hz)	Pole-center distance	Width across flats	Rated normal current	1	2	3	4	5	6	7	-	8	9-12
$U_n$	$U_p$	$U_d$	$I_{sc}$	$I_m$	mm	mm	A										
12	75	28	40	100/104	275	310	1250	3	A	E	1	5	8	6	-	2	
						310	2000	3	A	E	1	5	8	6	-	4	
						310	2500	3	A	E	1	5	8	6	-	6	
						310	3150	3	A	E	1	5	8	6	-	7	
					210	310	1250	3	A	E	1	1	8	6	-	2	
						310	2000	3	A	E	1	1	8	6	-	4	
						310	2500	3	A	E	1	1	8	6	-	6	
						310	3150	3	A	E	1	1	8	6	-	7	

See pages 35 and 36

Orderable versions				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

See pages 38 to 40

See page 41

Circuit breaker for installation in NXAIR World <sup>1)</sup>

Special version $U_d = 42$ kV	Special version $U_d = 42$ kV	1	2	3	4	5	6	7	-	8	9-12	13	14	15	16
40	100/104	210	275	1250	3	A	E	1	5	6	6	-	2		
			275	2500	3	A	E	1	5	6	6	-	6		
			275	3150	3	A	E	1	5	6	6	-	7		

1) W63 is absolutely necessary as order code

\*) Can also be ordered without withdrawable part, see page 37, 13th position

Legend: ● With contact system  
■ Without contact system

2

95

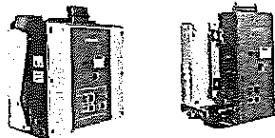




# Device selection

Circuit breaker and equipment package

## SION Vacuum Circuit Breakers 3AE5 and 3AE1



17.5 kV

Rated voltage for 50/60 Hz $U_p$ kV	Rated lightning impulse voltage $U_L$ kV	Rated short-duration power-frequency withstand voltage $U_a$ kV	Rated short-circuit breaking current with 50% DC component $I_{sc}$ kA	Rated short-circuit making current (at 50/60 Hz) $I_m$ kA	Pole-center distance mm	Width across flats mm	Rated normal current $I_n$ A	Position										13th position = Equipment package	Order codes													
								1	2	3	4	5	6	7	8	9-12	13	14-16														
																Orderable versions																
																<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circuit breaker for fixed mounting, without circuit breaker installation accessories											
																<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	On withdrawable part											
																<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	On withdrawable part with complete contact system *											
																<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	On withdrawable part with complete contact system and bushings *											
																<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Withdrawable module without earthing switch											
																<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Withdrawable module with earthing switch											
17.5	95	38	31.5	63/65	275	310	1250	3	A	E	5	6	5	5	-	2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	D	9	0**				
						310	1600	<input checked="" type="checkbox"/>	A	E	5	6	5	5	-	3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	D	9	0**			
						310	2000	<input checked="" type="checkbox"/>	A	E	5	6	5	5	-	4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	D	9	0**			
						310	2500	<input checked="" type="checkbox"/>	A	E	5	6	5	5	-	6	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	D	9	0**			
					210	310	800	<input checked="" type="checkbox"/>	A	E	5	2	8	5	-	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	D	9	0**			
						310	1250	<input checked="" type="checkbox"/>	A	E	5	2	8	5	-	2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	D	9	0**			
						310	1600	<input checked="" type="checkbox"/>	A	E	5	2	8	5	-	3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	D	9	0**			
						310	2000	<input checked="" type="checkbox"/>	A	E	5	2	8	5	-	4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	D	9	0**			
						310	2500	<input checked="" type="checkbox"/>	A	E	5	2	8	5	-	6	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	D	9	0**			
						275	800	<input checked="" type="checkbox"/>	A	E	5	2	7	5	-	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	D	9	0**			
						275	1250	<input checked="" type="checkbox"/>	A	E	5	2	7	5	-	2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	D	9	0**			
						205	800	<input checked="" type="checkbox"/>	A	E	5	2	6	5	-	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	D	9	0**			
						205	1250	<input checked="" type="checkbox"/>	A	E	5	2	6	5	-	2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	D	9	0**			
					160	310	800	<input checked="" type="checkbox"/>	A	E	5	2	5	5	-	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	D	9	0**			
						310	1250	<input checked="" type="checkbox"/>	A	E	5	2	5	5	-	2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	D	9	0**			
						310	1600	<input checked="" type="checkbox"/>	A	E	5	2	5	5	-	3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	D	9	0**			
						275	800	<input checked="" type="checkbox"/>	A	E	5	2	4	5	-	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	D	9	0**			
						275	1250	<input checked="" type="checkbox"/>	A	E	5	2	4	5	-	2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	D	9	0**			
						205	800	<input checked="" type="checkbox"/>	A	E	5	2	3	5	-	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	D	9	0**			
						205	1250	<input checked="" type="checkbox"/>	A	E	5	2	3	5	-	2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	D	9	0**			
					150	310	800	<input checked="" type="checkbox"/>	A	E	5	2	2	5	-	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	D	9	0**			
						310	1250	<input checked="" type="checkbox"/>	A	E	5	2	2	5	-	2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	D	9	0**			
						310	1600	<input checked="" type="checkbox"/>	A	E	5	2	2	5	-	3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	D	9	0**			
						275	800	<input checked="" type="checkbox"/>	A	E	5	2	1	5	-	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	D	9	0**			
						275	1250	<input checked="" type="checkbox"/>	A	E	5	2	1	5	-	2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	D	9	0**			
						205	800	<input checked="" type="checkbox"/>	A	E	5	2	0	5	-	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	D	9	0**			
						205	1250	<input checked="" type="checkbox"/>	A	E	5	2	0	5	-	2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	D	9	0**			
																	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	W	6	3			
						17.5	95	38	25	63/65	160	275	800	<input checked="" type="checkbox"/>	A	E	5	6	2	4	-	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	W	6	3	
												275	1250	<input checked="" type="checkbox"/>	A	E	5	6	2	4	-	2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	W	6	3	
											210	275	800	<input checked="" type="checkbox"/>	A	E	5	6	6	4	-	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	W	6	3	
												275	1250	<input checked="" type="checkbox"/>	A	E	5	6	6	4	-	2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	W	6	3	
											210	275	1600	<input checked="" type="checkbox"/>	A	E	5	6	6	4	-	3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	W	6	3	
						31.5	80/82	160	275	800	<input checked="" type="checkbox"/>	A	E	5	6	2	5	-	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	W	6	3		
												275	1250	<input checked="" type="checkbox"/>	A	E	5	6	2	5	-	2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	W	6	3	
											210	275	1250	<input checked="" type="checkbox"/>	A	E	5	6	6	5	-	2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	W	6	3	
												275	1600	<input checked="" type="checkbox"/>	A	E	5	6	6	5	-	3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	W	6	3	
												275	2500	<input checked="" type="checkbox"/>	A	E	5	6	6	5	-	6	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	W	6	3	

2

Circuit breaker for installation in NXAIR World 1)

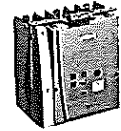
1) W63 is absolutely necessary as order code

\*) Can also be ordered without withdrawable part, see page 37, 13th position

\*\*\*) As a difference, other insulating shells are also possible, see page 37

Legend: ● With contact system  
■ Without contact system

47



17.5 kV

Position: 1 2 3 4 5 6 7 - 8 9-12 13th position = Equipment package 14-16 Order codes

Rated voltage for 50/60 Hz	Rated lightning impulse voltage	Rated short-duration power-frequency withstand voltage	Rated short-circuit breaking current with 36% DC component	Rated short-circuit making current (at 50/60 Hz)	Pole-center distance	Width across flats	Rated normal current	Article No.	Orderable versions	Order codes			
$U_n$	$U_p$	$U_d$	$I_{sc}$	$I_{ms}$	mm	mm	A	3 A E 1 6 5 6 - 2	Circuit breaker for fixed mounting, without circuit breaker installation accessories On withdrawable part On withdrawable part with complete contact system * On withdrawable part with complete contact system and bushings * Withdrawable module without earthing switch Withdrawable module with earthing switch	- Z D 9 0** - Z D 9 0** - Z D 9 0** - Z D 9 0** - Z D 9 0** - Z D 9 0** - Z D 9 0** - Z D 9 0** - Z D 9 0** - Z W 6 3 - Z W 6 3 - Z W 6 3			
17.5	95	38	40	100/104	275	310	1250	3 A E 1 6 5 6 - 2	See pages 35 and 36				
						310	2000	3 A E 1 6 5 6 - 4					
						310	2500	3 A E 1 6 5 6 - 6					
						310	3150	3 A E 1 6 5 6 - 7					
					210	310	1250	3 A E 1 2 8 6 - 2					
						310	2000	3 A E 1 2 8 6 - 4					
						310	2500	3 A E 1 2 8 6 - 6					
						310	3150	3 A E 1 2 8 6 - 7					
Circuit breaker for installation in NXAIR World 1)													
						40	100/104	210	275	1250	3 A E 1 6 6 6 - 2		
									275	2500	3 A E 1 6 6 6 - 6		
									275	3150	3 A E 1 6 6 6 - 7		



Legend: ● With contact system ■ Without contact system

1) W63 is absolutely necessary as order code  
 \*) Can also be ordered without withdrawable part, see page 37, 13th position  
 \*\*) As a difference, other insulating shells are also possible, see page 37

9 6



Device selection

SION Vacuum Circuit Breakers 3AE5 and 3AE1

Circuit breaker and equipment package



24 kV

Position: 1 2 3 4 5 6 7 - 8 9-12

13th position = Equipment package 14-16

Order codes

Article No.:

3 A E 5 3 2 2 - 1

Rated voltage for 50/60 Hz $U_n$ kV	Rated lightning impulse voltage $U_p$ kV	Rated short-duration power-frequency withstand voltage $U_d$ kV	Rated short-circuit breaking current with 50% DC component $I_{sc}$ kA	Rated short-circuit making current (at 50/60 Hz) $I_{ms}$ kA	Pole-center distance mm	Width across flats mm	Rated normal current $I_n$ A	1	2	3	4	5	6	7	-	8	9-12
24	125	50	16	40/42	210	310	800	3	A	E	5	3	2	2	-	1	
						310	1250	3	A	E	5	3	2	2	-	2	
						275	310	800	3	A	E	5	3	5	2	-	1
24	125	50	20	50/52	210	310	800	3	A	E	5	3	5	2	-	2	
						310	1250	3	A	E	5	3	2	3	-	2	
						275	310	800	3	A	E	5	3	5	3	-	1
24	125	50	25	63/65	210	310	800	3	A	E	5	3	5	3	-	2	
						310	1250	3	A	E	5	3	2	4	-	2	
						275	310	800	3	A	E	5	3	5	4	-	1
					210	310	1250	3	A	E	5	3	5	4	-	2	

See pages 35 and 36

Orderable versions					
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

See pages 38 to 40

See page 41

Special version  $U_d = 55$  kV

Special version  $U_d = 65$  kV

- Z E 5 5<sup>1)</sup>

- Z E 6 5<sup>2)</sup>

Circuit breaker for Installation in NXAIR World <sup>3)</sup>

24	125	50	25	63/65	210	310	800	3	A	E	5	7	1	4	-	1	
						310	1000	3	A	E	5	7	1	4	-	0	
						310	1250	3	A	E	5	7	1	4	-	2	

- Z W 6 3

- Z W 6 3

- Z W 6 3

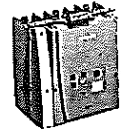
- Z E 5 5<sup>1)</sup>

- 1) With special version E55 (selection is possible if 13th position is 0, 1, 2, 3 and 5)
- 2) With special version E65 (selection is possible if 13th position is 0 and 1)
- 3) W63 is absolutely necessary as order code

Legend: ● With contact system  
■ Without contact system

\*) Can also be ordered without withdrawable part, see page 37, 13th position

99



24 kV

Position: 1 2 3 4 5 6 7 - 8 9-12

13th position = Equipment package 14-16

Order codes

Article No.:

Rated voltage for 50/60 Hz $U_n$ kV	Rated lightning impulse voltage $U_p$ kV	Rated short-duration power-frequency withstand voltage $U_d$ kV	Rated short-circuit breaking current with 36% DC component $I_{sc}$ kA	Rated short-circuit making current (at 50/60 Hz) $I_{mj}$ kA	Pole-center distance mm	Width across flats mm	Rated normal current $I_n$ A										
24	125	50	16	40/42	210	310	800	3	A	E	1	3	2	2	-	1	
						310	1250	3	A	E	1	3	2	2	-	2	
						310	2000	3	A	E	1	3	2	2	-	4	
						275	800	3	A	E	1	3	5	2	-	1	
						310	1250	3	A	E	1	3	5	2	-	2	
						310	2000	3	A	E	1	3	5	2	-	4	
24	125	50	20	50/52	210	310	800	3	A	E	1	3	2	3	-	1	
						310	1250	3	A	E	1	3	2	3	-	2	
						310	2000	3	A	E	1	3	2	3	-	4	
						310	2500	3	A	E	1	3	2	3	-	6	
						275	800	3	A	E	1	3	5	3	-	1	
						310	1250	3	A	E	1	3	5	3	-	2	
24	125	50	25	63/65	210	310	800	3	A	E	1	3	2	4	-	1	
						310	1250	3	A	E	1	3	2	4	-	2	
						310	2000	3	A	E	1	3	2	4	-	4	
						310	2500	3	A	E	1	3	2	4	-	6	
						275	800	3	A	E	1	3	5	4	-	1	
						310	1250	3	A	E	1	3	5	4	-	2	
24	125	50	25	63/65	210	310	2000	3	A	E	1	3	5	4	-	4	
						310	2500	3	A	E	1	3	5	4	-	6	
						275	800	3	A	E	1	3	5	4	-	1	
						310	2500	3	A	E	1	3	5	4	-	6	

See pages 35 and 36

Orderable versions

Orderable versions											
Circuit breaker for fixed mounting, without circuit breaker installation accessories	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On withdrawable part	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On withdrawable part with complete contact system *	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On withdrawable part with complete contact system and bushings *	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Withdrawable module without earthing switch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Withdrawable module with earthing switch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

See pages 38 to 40

See page 41



Special version  $U_d = 55$  kV  
Special version  $U_d = 65$  kV

Circuit breaker for installation in NXAIR World <sup>3)</sup>

24	125	50	25	63/65	210	310	1250	3	A	E	1	7	1	4	-	2		
						275	310	2000	3	A	E	1	7	4	4	-	4	
						310	2500	3	A	E	1	7	4	4	-	6		

Special version  $U_d = 55$  kV

- Z E 5 <sup>5)</sup>  
- Z E 6 <sup>5)</sup>

- Z W 6 3  
- Z W 6 3  
- Z W 6 3  
- Z E 5 <sup>5)</sup>

- 1) With special version E55 (selection is possible if 13th position is 0, 1, 2, 3 and 5)
- 2) With special version E65 (selection is possible if 13th position is 0 and 1)
- 3) W63 is absolutely necessary as order code

Legend: ● With contact system  
■ Without contact system

\*) Can also be ordered without withdrawable part, see page 37, 13th position

100

Device selection  
Secondary equipment

SION Vacuum Circuit Breakers 3AE5 and 3AE1

9th position Release combination <sup>1)</sup> Article No.: 3AE112-131516 Order codes

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16

1st shunt release	2nd shunt release	3rd shunt release	Undervoltage release	Current-transformer-operated release 0.5 A <sup>2)</sup>	Current-transformer-operated release 1.0 A	Current-transformer-operated release with tripping pulse 0.1 I <sub>ws</sub> (20 Ω)	
I	II	III		II	II	II	A
I	II	III					B
I	II	III		II			C
I	II	III	II		II		G
I	II	III	II	III			H
I	II	III	II	III	III	III	F
I	II	III	II	III	III	III	S
I	II	III	II	III	III	III	T
I	II	III	II	III	III	III	T
I	II	III	II	III	III	III	U
I	II	III	II	III	III	III	V
I	II	III	II	III	III	III	V
I	II	III	II	III	III	III	E
I	II	III	II	III	III	III	N
I	II	III	II	III	III	III	P
I	II	III	II	III	III	III	Q
I	II	III	II	III	III	III	J
I	II	III	II	III	III	III	L
I	II	III	II	III	III	III	M

See page 36 See page 36 See page 38 See page 39 See page 40 See page 41

Not for 3AE1 - Z F 1 5

Not for 3AE1

Not for 3AE1

Not for 3AE1 - Z A 4 6

Not for 3AE1 - Z A 4 5

Not for 3AE1

Not for 3AE1

Not for 3AE1 - Z A 4 6

Not for 3AE1 - Z A 4 5

Not for 3AE5

Not for 3AE5

Not for 3AE5

Not for 3AE5

Not for 3AE5

Not for 3AE5

Not for 3AE5

Not for 3AE5

Not for 3AE5

Not for 3AE5

2

I = position of first release II = position of second release III = position of third release

1) Operating voltage is selected at positions 11 + 12 + order code for 3rd release

2) Special version with 5 A c.t.-operated release: for all circuit breakers (except for retrofit) with 0.5 A c.t.-operated release can be ordered with order code A49

Operating voltage of the 3rd release

Standard voltages	Special voltages
24 V DC	
48 V DC	
60 V DC	
110 V DC	
220 V DC	
100 V AC 50/60 Hz <sup>3)</sup>	
110 V AC 50/60 Hz <sup>3)</sup>	
230 V AC 50/60 Hz <sup>3)</sup>	
	30 V DC
	32 V DC
	120 V DC
	125 V DC
	127 V DC
	240 V DC
	120 V AC 50/60 Hz <sup>3)</sup>
	125 V AC 50/60 Hz <sup>3)</sup>
	240 V AC 50/60 Hz <sup>3)</sup>

B/S	- Z J 8 0
B/S	- Z J 8 3
B/S	- Z J 8 4
B/S	- Z J 8 5
B/S	- Z J 8 9
B/S	- Z J 9 2
B/S	- Z J 9 3
B/S	- Z J 9 7
B/S	- Z J 8 1
B/S	- Z J 8 2
B/S	- Z J 8 6
B/S	- Z J 8 7
B/S	- Z J 8 8
B/S	- Z J 9 0
B/S	- Z J 9 5
B/S	- Z J 9 6
B/S	- Z J 9 8

- Z A 4 9

3) The AC frequency 50 or 60 Hz is selected at the 16th position of the article number together with the language (see page 40)

102

10th position Operating voltage of the closing solenoid		Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16	Order codes
		Article No.:	
<b>Standard voltages</b>	<b>Special voltages</b>	<b>B</b>	See page 38
24 V DC		<b>C</b>	See page 39
48 V DC		<b>D</b>	See page 40
60 V DC		<b>E</b>	See page 41
110 V DC		<b>F</b>	
220 V DC		<b>H</b>	
100 V AC 50/60 Hz <sup>1)</sup>		<b>J</b>	
110 V AC 50/60 Hz <sup>1)</sup>		<b>K</b>	
230 V AC 50/60 Hz <sup>1)</sup>		<b>M</b>	
	30 V DC	<b>N</b>	
	32 V DC	<b>P</b>	
	120 V DC	<b>Q</b>	
	125 V DC	<b>R</b>	
	127 V DC	<b>S</b>	
	240 V DC	<b>U</b>	
	120 V AC 50/60 Hz <sup>1)</sup>	<b>V</b>	
	125 V AC 50/60 Hz <sup>1)</sup>	<b>W</b>	
	240 V AC 50/60 Hz <sup>1)</sup>		

2

**11th position  
Operating voltage of the 1st release**

Standard voltages	Special voltages
C.t.-operated release	
24 V DC	
48 V DC	
60 V DC	
110 V DC	
220 V DC	
100 V AC 50/60 Hz <sup>1)</sup>	
110 V AC 50/60 Hz <sup>1)</sup>	
230 V AC 50/60 Hz <sup>1)</sup>	
	30 V DC
	32 V DC
	120 V DC
	125 V DC
	127 V DC
	240 V DC
	120 V AC 50/60 Hz <sup>1)</sup>
	125 V AC 50/60 Hz <sup>1)</sup>
	240 V AC 50/60 Hz <sup>1)</sup>

0	Not for 3AE5	
1		L 1 A
2		L 1 B
3		L 1 C
4		L 1 D
5		L 1 E
6		L 1 F
7		L 1 K
8		L 1
9		L 1 M

1) The AC frequency 50 or 60 Hz is selected at the 16th position of the article number together with the language (see page 40)

*1107* 

**12th position**

**Operating voltage of the 2nd release**

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16 Order codes

Article No.: 3 A E 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

Standard voltages	Special voltages		Order codes
None or c.t.-operated release		0	
24 V DC		1	
48 V DC		2	
60 V DC		3	
110 V DC		4	
220 V DC		5	
100 V AC 50/60 Hz <sup>1)</sup>		6	
110 V AC 50/60 Hz <sup>1)</sup>		7	
230 V AC 50/60 Hz <sup>1)</sup>		8	
	30 V DC	9	M 1 A
	32 V DC	9	M 1 B
	120 V DC	9	M 1 C
	125 V DC	9	M 1 D
	127 V DC	9	M 1 E
	240 V DC	9	M 1 F
	120 V AC 50/60 Hz <sup>1)</sup>	9	M 1 K
	125 V AC 50/60 Hz <sup>1)</sup>	9	M 1 L
	240 V AC 50/60 Hz <sup>1)</sup>	9	M 1 M

See page 38  
See page 39  
See page 40  
See page 41

2

<sup>1)</sup> The AC frequency 50 or 60 Hz is selected at the 16th position of the article number together with the language (see page 40)

*[Handwritten signature]*

*[Handwritten signature]*

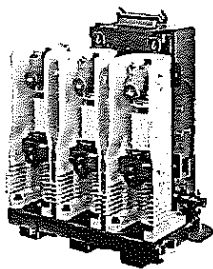
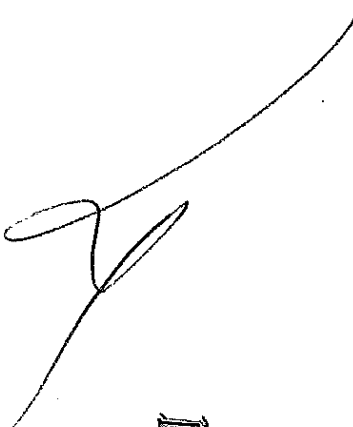
103 *[Handwritten signature]*

13th position	Position:	1	2	3	4	5	6	7	-	8	9	10	11	12	-	13	14	15	16	Order codes	
<b>Circuit breaker installation accessories</b>	Article No.:	3	A	E																	
<b>Options</b>																					
<b>Circuit breaker for fixed mounting</b>																					
Without circuit breaker installation accessories, circuit breaker for fixed mounting																				0	
<b>Circuit breaker prepared for separate mounting of withdrawable part</b>																					
Without withdrawable part, with contact arms, contacts <sup>1)</sup> , wiring of withdrawable part (loose delivery)																				2	- Z M 2 2
Without withdrawable part, with contact arms, contacts <sup>1)</sup> , fixed contacts, bushings, wiring of withdrawable part (supplied loose)																				3	- Z M 2 3
<b>Circuit breaker on withdrawable part</b>																					
On withdrawable part																					1
On withdrawable part, with contact arms, contacts <sup>1)</sup>																					2
On withdrawable part, with contact arms, contacts <sup>1)</sup> , fixed contacts, bushings																					3
<b>Withdrawable module</b>																					
Circuit breaker on withdrawable part, with cartridge, contact arms, contacts <sup>1)</sup> , fixed contacts, bushings, shutters																					5
Circuit breaker on withdrawable part, with cartridge, contact arms, contacts <sup>1)</sup> , fixed contacts, bushings, shutters, earthing switch with short-circuit making capacity																					6

2

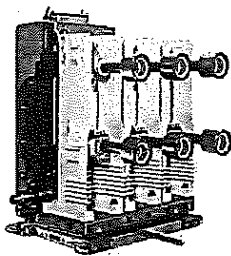
1) Special version: Contact with 13 contact fingers (only up to 1250 A and 31.5 kA) can be ordered with order code Z-M13

Not for 3AE5

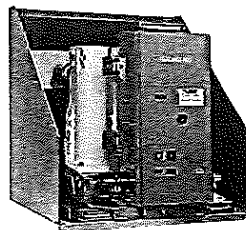


R-HGT1-376-01F

Example: Circuit breaker for fixed mounting

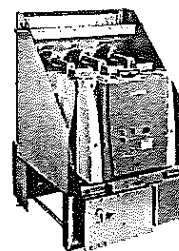


Example: Circuit breaker on withdrawable part with contact arms and contacts



R-HGT1-375-01F

Example: Circuit breaker with withdrawable module



R-HGT1-376-01F

R-HGT1-352-01F

Example: Circuit breaker with withdrawable module and earthing switch

104



# Device selection

## Secondary equipment

SION Vacuum Circuit Breakers 3AE5 and 3AE1

14th position

Operating voltage of the drive motor

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16      Order codes

Article No.: 3 A E

**Standard voltages**

**Special voltages**

- 24 V DC <sup>1)</sup>
- 48 V DC
- 60 V DC
- 110 V DC
- 220 V DC
- 100 V AC 50/60 Hz <sup>1) 2)</sup>
- 110 V AC 50/60 Hz <sup>1) 2)</sup>
- 230 V AC 50/60 Hz <sup>2)</sup>

- 30 V DC <sup>1)</sup>
- 32 V DC <sup>1)</sup>
- 120 V DC
- 125 V DC
- 127 V DC
- 240 V DC
- 120 V AC 50/60 Hz <sup>2)</sup>
- 125 V AC 50/60 Hz <sup>2)</sup>
- 240 V AC 50/60 Hz <sup>2)</sup>

- B
- C
- D
- E
- F
- H
- J
- K
- M
- N
- P
- Q
- R
- S
- U
- V
- W

S. page 39

S. page 40

S. page 41

2

1) Does not apply to a rated short-circuit breaking current of 40 kA  
 2) The AC frequency 50 or 60 Hz is selected at the 16th position of the article number together with the language (see page 40)

205

15th position

Interlocking, auxiliary switch, circuit breaker tripping signal and low-voltage interface

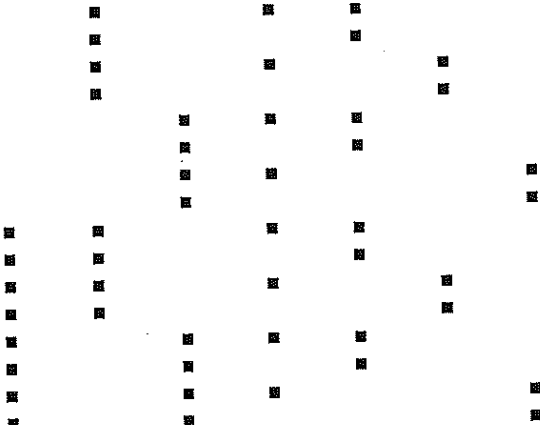
Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16  
Article No.:

	Auxiliary switch			Low-voltage interface		
Mechanical interlocking	6 NO + 6 NC	12 NO + 12 NC	Circuit-breaker tripping signal	27-pole terminal strip 0 (for 3AE1)	20-pole connector strip (for 3AE5)	24-pole plug
						64-pole plug

See page 40

See page 41

If 0 - 6 is selected at the 13th position, circuit breaker / withdrawable module



Same as for N, but with 9 NO + 9 NC

Not for 3AE5

- |  |   |  |     |   |   |   |  |
|--|---|--|-----|---|---|---|--|
| 0  | B |  |     |   |   |   |  |
| 0  | D |  |     |   |   |   |  |
| 0  | E |  |     |   |   |   |  |
| 0  | H |  |     |   |   |   |  |
| 0  | K |  |     |   |   |   |  |
| 0  | M |  |     |   |   |   |  |
| 0  | R |  |     |   |   |   |  |
| 0  | Q |  |     |   |   |   |  |
|  | A |  |     |   |   |   |  |
|  | C |  |     |   |   |   |  |
| 0  | E |  |     |   |   |   |  |
| 0  | G |  |     |   |   |   |  |
|  | J |  |     |   |   |   |  |
|  | L |  |     |   |   |   |  |
|  | N |  |     |   |   |   |  |
|  | P |  |     |   |   |   |  |
| 0  | U |  | - Z | W | 6 | 3 |  |
| 0 - only for circuit-breaker in fixed-mounted design (if 0 at 13th position) |   |  |     |   |   |   |  |

**2**

*Handwritten mark*

### Device selection

Secondary equipment

#### 16th position

Languages of operating instructions and rating plate; AC frequency of operating voltages <sup>1)</sup>

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16  
Article No.: **3AE**

Language selection				Frequency selection	
German	English	French	Spanish	50 Hz DC or AC	60 Hz

See page 41



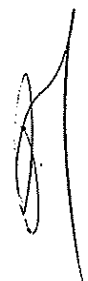
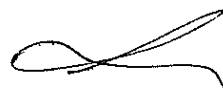
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

- Special versions
- Portuguese, 50 Hz or DC
  - Portuguese, 60 Hz
  - Italian, DC or AC 50 Hz
  - Russian, DC or AC 50 Hz
  - Russian, 60 Hz
  - Polish, DC or AC 50 Hz
  - Other languages on request

0	
<input checked="" type="checkbox"/> 1	
<input type="checkbox"/> 2	
<input checked="" type="checkbox"/> 3	
<input type="checkbox"/> 4	
<input checked="" type="checkbox"/> 5	
<input type="checkbox"/> 6	
<input checked="" type="checkbox"/> 7	
<input type="checkbox"/> 8	
<input checked="" type="checkbox"/> 9	R 1 C
<input type="checkbox"/> 9	R 1 D
<input checked="" type="checkbox"/> 9	R 1 F
<input type="checkbox"/> 9	R 1 G
<input checked="" type="checkbox"/> 9	R 1 H
<input type="checkbox"/> 9	R 1 K

1) AC voltage refers to the low-voltage equipment

107



Additional equipment	Position:																Order codes		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16			
	3	A	E																
Options																			
Wire ends with marking at the plug connector																	-	Z	A 0 5
Wiring cables halogen-free and flame-retardant																	-	Z	A 1 0
"Destination end marking at wire ends + wire end ferrules pulled out without plug (must be ordered with B01 to B08)"																	-	Z	A 1 1
Wiring cables tinned																	-	Z	A 1 2
Flat connector with insulating sleeve																	-	Z	A 1 3
gold-plated auxiliary switch 12 NO + 12 NC and 64-pole plug																	-	Z	A 2 1
Anti-condensation heating for 110 V AC, 50 W																	-	Z	A 2 9
Anti-condensation heating for 230 V AC, 50 W																	-	Z	A 3 0
Version free of silicone emissions																	-	Z	A 3 1
Circuit breaker for operation at ambient air temperatures down to -25 °C																	-	Z	A 4 0
Electrical closing lockout not together with key-operated interlock																	-	Z	A 4 7
C.t.-operated release 5 A																	-	Z	A 4 9
Additional rating plate, supplied loose																	-	Z	B 0 0
Cable harness 800 mm, pulled out																	-	Z	B 0 1
Cable harness 500 mm, pulled out																	-	Z	B 0 2
Cable harness 2000 mm, pulled out																	-	Z	B 0 3
Cable harness 1200 mm, pulled out																	-	Z	B 0 4
Cable harness 1500 mm, pulled out																	-	Z	B 0 5
Cable harness 2500 mm, pulled out (not with 24 V DC control voltage)																	-	Z	B 0 6
Cable harness 3000 mm, pulled out (not with 24 V DC control voltage)																	-	Z	B 0 7
Cable harness 3500 mm, pulled out (not with 24 V DC control voltage)																	-	Z	B 0 8
Cable harness of withdrawable part																	-	Z	B 1 3
Sleeve housing PG21/PG29 at pulled out cable harness (B01-B08) for all versions except 13th position = 7																	-	Z	B 1 6
Without upper part of plug																	-	Z	B 2 3
Without supplementary equipment																	-	Z	B 2 4
Close-open solenoids with thermo switch (only valid for 60 V/110 V/220 V DC)																	-	Z	B 4 7
Cable harness with double insulation for ship-building industry																	-	Z	B 5 8
Special circuit diagram																	-	Z	B 9 9
For aggressive ambient conditions: Gold-plated contacts, tinned pole side, ...																	-	Z	D 2 0
Withdrawable part with 220 mm racking path																	-	Z	D 2 2
Withdrawable part with 200 mm racking path																	-	Z	D 2 3
Withdrawable part with 180 mm racking path																	-	Z	D 2 4
IP plate																	-	Z	D 5 5
Shaft cover																	-	Z	D 5 6
Wide operating mechanism box <sup>1)</sup>																	-	Z	D 5 9
Long insulating shell (standard)																	-	Z	D 9 0
Insulating shell (shortened version, for 24 kV)																	-	Z	D 9 1
Insulating shell, width across flats 275 mm for GT system																	-	Z	D 9 2
Insulating shell for Minis system																	-	Z	D 9 3
Insulating shell to contact arm side (completely shortened)																	-	Z	D 9 4
Insulating shell to contact arm side (special version for NXAIR World and 3AE5)																	-	Z	D 9 5
Rated short-duration power-frequency withstand voltage 42 kV (at 12 kV)																	-	Z	E 1 3



On request

<sup>1)</sup> For further options, see page 17

208

**Device selection**  
Additional equipment

Additional equipment	Position:																Order codes										
	1	2	3	4	5	6	7	-	8	9	10	11	12	-	13	14	15	16									
Options	Article No.:																										
	Circuit breaker 13th position = 0, 1, 2, 3		Withdrawable module 13th position = 5, 6		3AE1		3AE5																				
Rated short-duration power-frequency withstand voltage 32 kV (at 7.2 kV)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	E	1	6
Rated short-circuit breaking current $I_{sc} = 26.3$ kA (only possible with 7.2 kV, 25 kA and 12 kV, 25 kA)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	E	4	6
Rated short-duration power-frequency withstand voltage 55 kV (at 24 kV)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	E	5	5
Rated short-duration power-frequency withstand voltage 65 kV (at 24 kV) <sup>1)</sup>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	E	6	5
Rated lightning impulse voltage 95 kV (at 12 kV)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	E	9	5
Routine test certificate enclosed with stamp and passport	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	F	1	9
Routine test certificate enclosed	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	F	2	0
Routine test certificate with stamp and signature	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	F	2	1
Routine test certificate (to orderer)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	F	2	3
"Hand crank (for manual charging of the closing spring) (scope of supply: one hand crank per circuit breaker)"	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	F	3	0
Hand crank, long (scope of supply: one hand crank per circuit breaker)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	F	3	1
"Handle for withdrawable part (for racking the circuit breaker on the withdrawable part) (scope of supply: one handle per circuit breaker). Only required when a withdrawable part is ordered"	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	F	3	2
Handle for earthing switch (for operation of the earthing switch on the withdrawable part) (scope of supply: one handle per circuit breaker). Only required when a withdrawable part with earthing switch is ordered	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	F	3	4
Rated operating sequence O - 0.3 s - CO - 3 min - CO	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	F	3	8
Guide rails for cartridge	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	D	3	5
Break time $Y1 \leq 60$ ms at rated voltage	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	G	2	2
Closing time $T_{Close} < 55$ ms	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	G	2	3
Key-operated interlock (for circuit breakers with mechanical interlocking and without A47)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	J	6	0
SION plug interlock	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	J	6	3
Circuit breaker and withdrawable part for switchgear "MALu 12-24"; only relevant ratings; only with 2 at the 13th position; requires insulating shell D93 at 17.5 kV	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	J	6	4
Contact with 13 contact fingers (up to 1250 A and 31.5 kA), (selection via 13th position)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	M	1	3
Frequent operation with up to 30,000 operating cycles. For $\geq 2000$ A at $\leq 31.5$ kA and $\leq 12$ kV or 31.5 kA at 17.5 kV	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	M	3	0
Warranty 24 months	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	W	7	0
Warranty 36 months	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	W	7	1
Warranty 60 months	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	W	7	2
Additional 84-month warranty	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	W	7	3
Operating instructions and special labels for USA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	Y	4	0
Other not listed special design (only after consultation with Order Processing at Switchgear Factory Berlin). Specifications additionally in clear text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	Z	Y	9	9

1) AC voltage refers to the secondary side and not to the primary part of the circuit breaker



**Ordering information for accessories and spare parts**

The article numbers in the spare part overviews are valid for currently manufactured vacuum circuit breakers. When mounting parts or spare parts are being ordered for an existing vacuum circuit breaker, always quote the type designation, serial number and the year of manufacture of the circuit breaker to be sure to get the correct parts.

**Retrofitting**

When releases / solenoids are retrofitted, the article numbers of the mounting parts must also be specified. For other additional equipment, the required mounting parts are included in the scope of supply.

Spare parts may only be replaced by qualified personnel.

**Accessories for the plug connector**

Included in the scope of supply of the basic equipment for 3AE vacuum circuit breakers:

For 24-pole plug connector

- Lower part of plug
- Crimp sockets according to number of contacts
- Upper part of plug with screwed contacts (no crimp sockets required)

For 64-pole plug connector

- Lower part of plug
- Upper part of plug
- Crimp sockets according to number of contacts

**Rating plate**



**Note:**

The following 3 details are necessary for any query regarding spare parts, subsequent deliveries, etc.:

- Type designation
- Serial No.
- Year of manufacture

Designation	Description	Feature	Article No.
Handles	Hand crank for circuit breaker		3AX15 30-4B
	Long hand crank for circuit breaker		3AX14 30-2B
	Handle for withdrawable part		3AX14 30-2C
	Handle for earthing switch (for modules up to 31.5 kA)		3AX14 30-2D
	Handle for earthing switch (for 40 kA modules)		3AX14 30-3D
Lubricants	180 g of Klüber-Isoflex Topas L32N		3AX11 33-3H
	1 kg of Klüber-Isoflex Topas L32N		3AX11 33-3E
	1 kg Molykote grease		3AX11 33-2L
	1 kg Vaseline, Atlantic		3AX11 33-4A
Closing solenoid	Used as closing solenoid or 1st shunt release		
	For 3AE1	24 V DC	3AY15 10-5K
	For 3AE1	30/32 V DC	3AY15 10-5M
	For 3AE1	48 V DC	3AY15 10-5C
	For 3AE1	60 V DC	3AY15 10-5D
	For 3AE1	100/124 V DC	3AY15 10-5E
	For 3AE1	125/144 V DC	3AY15 10-5I
	For 3AE1	220/250 V DC	3AY15 10-5F
	For 3AE1	100/125 V AC, 50/60 Hz	3AY15 10-5E
	For 3AE1	230/240 V AC, 50/60 Hz	3AY15 10-5F

110

**Device selection**  
Accessories and spare parts

Position: 1-9

Designation	Description	Feature	Article No.
Closing solenoid (continued)	For 3AE5	24 – 32 V DC	3AY14 10-0B
	For 3AE5	48 V DC	3AY14 10-0C
	For 3AE5	60 V DC	3AY14 10-0D
	For 3AE5	110 – 127 V DC	3AY14 10-0E
	For 3AE5	220 – 240 V DC	3AY14 10-0F
	For 3AE5	100/125 V AC, 50/60 Hz	3AY14 10-0J
	For 3AE5	230/240 V AC, 50/60 Hz	3AY14 10-0K
2nd and 3rd Shunt release	For 3AE1 and 3AE5	24 – 32 V DC	3AX11 01-2B
	For 3AE1 and 3AE5	48 – 60 V DC	3AX11 01-2C
	For 3AE1 and 3AE5	110 – 127 V DC	3AX11 01-2E
	For 3AE1 and 3AE5	220 – 240 V DC	3AX11 01-2F
	For 3AE1 and 3AE5	100 – 125 V AC, 50 Hz	3AX11 01-2G
	For 3AE1 and 3AE5	230 – 240 V AC, 50 Hz	3AX11 01-2J
	For 3AE1 and 3AE5	100 – 125 V AC, 60 Hz	3AX11 01-3G
	For 3AE1 and 3AE5	230 – 240 V AC, 60 Hz	3AX11 01-3J
Current-transformer- operated release	For rated normal current 0.5 A	For 3AE1 and 3AE5	3AX11 02-2A
	For rated normal current 1 A	For 3AE1 and 3AE5	3AX11 02-2B
	For tripping impulse $\geq 0.1$ Ws, 20 $\Omega$ for 75J45 protection relay	For 3AE1 and 3AE5	3AX11 04-2B
	For rated normal current 5 A incl. rectifier	For 3AE1	3AX14 02-2D
Mounting parts	For rated normal current 5 A incl. rectifier	For 3AE5	3AX14 02-2E
	For 2nd shunt release / c.t.-operated release	for 3AE1	3AX14 11-2A
	For 2nd and 3rd release	for 3AE5	3AX14 11-5A
Undervoltage release	For 3AE1 and 3AE5	24 V DC	3AX11 03-2B
	For 3AE1 and 3AE5	30/32 V DC	3AX11 03-2L
	For 3AE1 and 3AE5	48 V DC	3AX11 03-2C
	For 3AE1 and 3AE5	60 V DC	3AX11 03-2D
	For 3AE1 and 3AE5	110 V DC	3AX11 03-2E
	For 3AE1 and 3AE5	120/127 V DC	3AX11 03-2N
	For 3AE1 and 3AE5	220 V DC	3AX11 03-2F
	For 3AE1 and 3AE5	240 V DC	3AX11 03-2P
	For 3AE1 and 3AE5	100 V AC, 50 Hz	3AX11 03-2G
	For 3AE1 and 3AE5	110/125 V AC, 50 Hz	3AX11 03-2H
	For 3AE1 and 3AE5	230 V AC, 50 Hz	3AX11 03-2J
	For 3AE1 and 3AE5	240 V AC, 50 Hz	3AX11 03-2M
	For 3AE1 and 3AE5	100 V AC, 60 Hz	3AX11 03-3G
	For 3AE1 and 3AE5	110/125 V AC, 60 Hz	3AX11 03-3H
	For 3AE1 and 3AE5	230 V AC, 60 Hz	3AX11 03-3J
	For 3AE1 and 3AE5	240 V AC, 60 Hz	3AX11 03-3M
	Mounting parts	For 3AE1	
For 3AE5			3AX14 13-5A
Drive motor	For 3AE1	24/30/32 V DC	3AY17 11-2B
	For 3AE1	48 V DC	3AY17 11-2C
	For 3AE1	60 V DC	3AY17 11-2D
	For 3AE1	100/110/125 V DC/AC	3AY17 11-2E
	For 3AE1	220 - 240 V DC	3AY17 11-2F
		230 - 240 V AC	
	For 3AE5	24/30/32 V DC	3AY14 11-1B
	For 3AE5	48/60 V DC	3AY14 11-1C
	For 3AE5	110 – 127 V DC	3AY14 11-1E
		100 – 125 V AC	
	220 – 240 V DC	3AY14 11-1F	
	220 – 240 V AC		

2

*[Handwritten signature]*

*[Handwritten signature]*

*[Handwritten mark]*

			Position:	1-9
Designation	Description	Feature	Article No.	
Auxiliary contactor	Type 3RH11 22 For anti-pumping	For 3AE1	24 V DC	SWB: 55656
		For 3AE1	30/32 V DC	SWB: 55658
		For 3AE1	48 V DC	SWB: 55659
		For 3AE1	60 V DC	SWB: 55660
		For 3AE1	110 V DC	SWB: 55661
		For 3AE1	120/127 V DC	SWB: 55662
		For 3AE1	220 V DC	SWB: 55663
		For 3AE1	240/250 V DC	SWB: 55665
		For 3AE1	110 V AC, 50/60 Hz	SWB: 55666
		For 3AE1	120 V AC, 50/60 Hz	SWB: 55667
		For 3AE1	125 V AC, 50/60 Hz	SWB: 55668
		For 3AE1	230 V AC, 50/60 Hz	SWB: 55669
		For 3AE1	240 V AC, 50/60 Hz	SWB: 55670
Electronic module	For 3AE5		24 – 60 V DC	3AY14 20-1B
			110 – 240 V DC	3AY14 20-1E
			100 – 240 V AC	
Position switches	Type SE4 without mounting accessories Used for:	Quantity		3AX42 06-0A
		- Electrical anti-pumping (-S3)	1	
		- Electrical interlocking (-S12)	1	
		- Motor control (-S21, -S22)	2	
		- Closing spring charged (-S4)	1	
		- Circuit breaker tripping signal (-S6)	1	
		- Electrical closing lock-out (-S5)	1	
		- Withdrawable part (-S1.0 to -S1.9)	10	
		- Key-operated interlock	1	
		Auxiliary switches (-S1)	6 NO + 6 NC 12 NO + 12 NC	
				3SV92 74-2AA0
Mechanical interlocking		for 3AE1		3AX14 20-2A
		For 3AE1	≤ 12 kV ≤ 25 kA ≤ 1250 A	3AX14 20-2B
Key-operated interlocking	Mounting kit	For 3AE1		3AX14 37-3A
		For 3AE1	≤ 12 kV ≤ 25 kA ≤ 1250 A	3AX14 37-3B
		for 3AE5		3AX14 37-4A
Accessories for Plug connection	Crimp pins (for conductor cross-section 1.5 mm) Crimp pins (for lower part of plug) Crimp sockets (for upper part of plug) Crimping pliers Disassembly tool Plug connection, complete  Plug connection (lower part) Plug connection (upper part) Plug connection (lower part) Plug connection (upper part)	For 3AE1 and 3AE5	24-pole	3AX11 34-3A
		For 3AE1 and 3AE5	64-pole	3AX11 34-4B
		For 3AE1 and 3AE5	64-pole	3AX11 34-4C
		For 3AE1 and 3AE5		3AX11 34-4D
		For 3AE1 and 3AE5		3AX11 34-4G
		For 3AE1 and 3AE5	24-pole	3AX11 34-7A
		For 3AE1 and 3AE5	64-pole	3AX11 34-6A
		For 3AE1 and 3AE5	24-pole	3AX11 34-5D
		For 3AE1 and 3AE5	24-pole	3AX11 34-5C
		For 3AE1 and 3AE5	64-pole	3AX11 34-5B
For 3AE1 and 3AE5	64-pole	3AX11 34-5A		
Electrical closing lock-out		For 3AE1 and 3AE5	24 V DC	3AX14 05-2B
		For 3AE1 and 3AE5	30/32 V DC	3AX14 05-2K
		For 3AE1 and 3AE5	48 V DC	3AX14 05-2C
		For 3AE1 and 3AE5	60 V DC	3AX14 05-2D
		For 3AE1 and 3AE5	100/127 V DC	3AX14 05-2E
		For 3AE1 and 3AE5	220/240 V DC	3AX14 05-2F
		For 3AE1 and 3AE5	100 V AC, 50/60 Hz	3AX14 05-2G
		For 3AE1 and 3AE5	100/125 V AC, 50/60 Hz	3AX14 05-2H
		For 3AE1 and 3AE5	220/240 V AC, 50/60 Hz	3AX14 05-2I
		For 3AE1 and 3AE5		3AX14 15-2A
Mounting parts	For electrical closing lock-out	For 3AE1		3AX14 15-2L
		For 3AE1	≤ 12 kV ≤ 25 kA ≤ 1250 A	3AX14 15-2L
		For 3AE5		3AX14 15-3A
		For 3AE1		3AX14 16-2A
	Circuit breaker tripping signal	For 3AE1		

2

*[Handwritten signature]*

119

*[Handwritten signature]*



**Device selection**  
Accessories and spare parts

SION Vacuum Circuit Breakers 3AE5 and 3AE1

			Position:	1-9	
Designation	Description	Feature	Article No.		
<b>Bushing complete</b>	Pole-center distance: 150/160 mm	for 7.2 to 17.5 kV, 800 to 1600 A, up to 31.5 kA	3AX14 52-2A		
	Pole-center distance: 210 mm	for 7.2 to 17.5 kV, 800 to 1600 A, up to 31.5 kA	3AX14 52-2B		
	Pole-center distance: 210 mm	for 7.2 to 17.5 kV, 2000 to 2500 A, up to 31.5 kA	3AX14 52-2C		
	Pole-center distance: 210 mm	for 24 kV, 800 to 1250 A, up to 25 kA	3AX14 52-2D		
	Pole-center distance: 210 mm	for 24 kV, 2000 to 2500 A, up to 25 kA	3AX14 52-2E		
	Pole-center distance: 275 mm	for 24 kV, 800 to 1250 A, up to 25 kA	3AX14 52-2F		
	Pole-center distance: 275 mm	for 24 kV, 2000 to 2500 A, up to 25 kA	3AX14 52-2G		
	Pole-center distance: 210/275 mm	for 7.2 to 17.5 kV, 1250 to 3150 A, 40 kA	3AX14 52-2H		
<b>Top cover for SION 3AE1</b>	Top cover 150/160 mm pole-center distance	13th position = 0	3AX14 70-1A		
		13th position - 1 - 6	3AX14 70-1B		
		13th position - 1 - 6 with preparation for key-operated interlock (J60)	3AX14 70-1C		
	Top cover 210 mm pole-center distance	13th position = 0 (neutral)	3AX14 70-1E		
		13th position - 1 - 6 (neutral)	3AX14 70-1F		
		13th position = 0	3AX14 70-2A		
		13th position - 1 - 6	3AX14 70-2B		
		13th position - 1 - 6 with preparation for key-operated interlock (J60)	3AX14 70-2C		
		13th position = 0 (neutral)	3AX14 70-2E		
	Top cover 275 mm pole-center distance	13th position - 1 - 6 (neutral)	3AX14 70-2F		
		13th position = 0	3AX14 70-3A		
		13th position - 1 - 6	3AX14 70-3B		
		13th position - 1 - 6 with preparation for key-operated interlock (J60)	3AX14 70-3C		
		13th position = 0 (neutral)	3AX14 70-3E		
	<b>Top cover for SION 3AE5</b>	Side cover 210 mm pole-center distance	13th position - 1 - 6 (neutral)	3AX14 70-3F	
		Side cover 275 mm pole-center distance		3AX14 70-3S	
		Cover of low-voltage interface		3AX14 70-0H	
		Plastic cover, standard		3AX14 70-5A	
		Plastic cover, neutral		3AX14 70-5B	
		Metal cover, PCD 150 mm	For 3AE5	3AX14 70-5C	
Metal cover, PCD 160 mm		For 3AE5	3AX14 70-5D		
Metal cover, PCD 210 mm		For 3AE5	3AX14 70-5E		
Metal cover, PCD 275 mm		For 3AE5	3AX14 70-5F		
<b>Insulating shell towards contact arm side, for standard circuit breakers only for additional screening in case of narrow installation</b>		Standard version, width across flats 310 mm	For 3AE1 7.2 to 17.5 kV ( $\leq 31.5$ kA)	3AX14 38-2A	
	Standard version, width across flats 310 mm (Minis)	For 3AE1 7.2 to 17.5 kV ( $\leq 31.5$ kA)	3AX14 38-4H		
	Standard version, width across flats 310 mm	For 3AE1 7.2 to 17.5 kV (40 kA)	3AX14 38-2E		
	Standard version, width across flats 275 mm	For 3AE1 7.2 to 17.5 kV	3AX14 38-2C		
	Standard version, width across flats 205 mm	For 3AE1 7.2 to 17.5 kV	3AX14 38-2D		
	Standard version, width across flats 205 mm (Minis)	For 3AE1 7.2 up to 17.5 kV ( $\leq 31.5$ kA)	3AX14 38-4K		
	Standard version, width across flats 310 mm	For 3AE1 24 kV	3AX14 38-2B		
	Standard version, width across flats 310 mm	For 3AE1 24 kV	3AX14 38-3B		
	Standard version, width across flats 310 mm	For 3AE5 7.2 to 12 kV ( $\leq 25$ kA $\leq 1250$ A)	3AX14 38-5A		
	Shortened version, width across flats 310 mm	For 3AE5 7.2 to 12 kV ( $\leq 25$ kA $\leq 1250$ A)	3AX14 38-6A		
	Shortened version, width across flats 310 mm (Minis)	For 3AE5 7.2 to 12 kV ( $\leq 25$ kA $\leq 1250$ A)	3AX14 38-7A		
	Standard version, width across flats 275 mm	For 3AE5 7.2 to 12 kV ( $\leq 25$ kA $\leq 1250$ A)	3AX14 38-5C		
	Shortened version, width across flats 275 mm	For 3AE5 7.2 to 12 kV ( $\leq 25$ kA $\leq 1250$ A)	3AX14 38-6C		
	Standard version, width across flats 205 mm	For 3AE5 7.2 to 12 kV ( $\leq 25$ kA $\leq 1250$ A)	3AX14 38-5D		
	Shortened version, width across flats 205 mm	For 3AE5 7.2 to 12 kV ( $\leq 25$ kA $\leq 1250$ A)	3AX14 38-6D		
	Shortened version, width across flats 205 mm (Minis)	For 3AE5 7.2 to 12 kV ( $\leq 25$ kA $\leq 1250$ A)	3AX14 38-7D		
	Standard version, width across flats 310 mm	For 3AE5 7.2 to 12 kV (31.5 kA $\leq 1600$ A)/17.5 kV (25 kA)	3AX14 38-5K		
	Shortened version, width across flats 310 mm (Minis)	For 3AE5 7.2 to 12 kV (31.5 kA $\leq 1600$ A)/17.5 kV (25 kA)	3AX14 38-7K		
	Shortened version, width across flats 310 mm	For 3AE5 7.2 to 12 kV (31.5 kA $\leq 1600$ A)/17.5 kV (25 kA)	3AX14 38-6K		
	Standard version, width across flats 275 mm	For 3AE5 7.2 to 12 kV (31.5 kA $\leq 1600$ A)/17.5 kV (25 kA)	3AX14 38-5H		
	Shortened version, width across flats 275 mm	For 3AE5 7.2 to 12 kV (31.5 kA $\leq 1600$ A)/17.5 kV (25 kA)	3AX14 38-6H		
	Standard version, width across flats 205 mm	For 3AE5 7.2 to 12 kV (31.5 kA $\leq 1600$ A)/17.5 kV (25 kA)	3AX14 38-5J		



113

			Position:	1-9
Designation	Description	Feature	Article No.	
	Shortened version, width across flats 205 mm	For 3AE5 7.2 to 12 kV (31.5 kA ≤ 1600 A)/17.5 kV (25 kA)	3AX14 38-6J	
	Shortened version, width across flats 205 mm (Minis)	For 3AE5 7.2 to 12 kV (31.5 kA ≤ 1600 A)/17.5 kV (25 kA)	3AX14 38-7H	
Insulating shell towards contact arm side, for standard circuit breakers only for additional screening in case of narrow installation (continued)	Shortened version, width across flats 205 mm (Ritter)	For 3AE5 7.2 to 12 kV (≤ 31.5 kA ≤ 1600 A)/17.5 kV (25 kA)	3AX14 38-5N	
	Standard version (top)	For 3AE5 24 kV	3AX14 38-4B	
	Standard version (bottom)	For 3AE5 24 kV	3AX14 38-5B	
	Standard version for NXAIR	For 3AE5 7.2 to 12 kV (≤ 25 kA ≤ 1250A)	3AX14 38-5F	
	Shortened version for NXAIR	For 3AE5 7.2 to 12 kV (≤ 25 kA ≤ 1250A)	3AX14 38-6F	
	Special version for NXAIR (for D95)	For 3AE5 7.2 to 12 kV (≤ 25 kA ≤ 1250A)	3AX14 38-5Q	
	Standard version for NXAIR	For 3AE5 7.2 to 12 kV (31.5 kA ≤ 1600 A)/17.5 kV (25 kA)	3AX14 38-6M	
	Shortened version for NXAIR	For 3AE5 7.2 to 12 kV (31.5 kA ≤ 1600 A)/17.5 kV (25 kA)	3AX14 38-5M	
	Special version for NXAIR (for D95)	For 3AE5 7.2 to 12 kV (31.5 kA ≤ 1600 A)/17.5 kV (25 kA)	3AX14 38-5P	
	Shortened version for NXAIR (top)	For 3AE5 24 kV	3AX14 38-6B	
Shortened version for NXAIR (bottom)	For 3AE5 24 kV	3AX14 38-8B		
Gate for cartridge	Shortened version		3AX14 52-2B	
Contact system	26 contact fingers	For 3AE1 and 3AE5 7.2/12/24 kV, 800 to 1250 A	3AX14 42-2A	
	26 contact fingers	For 3AE1 and 3AE5 17.5 kV, 800 to 1250 A	3AX14 42-2B	
	26 contact fingers	For 3AE1 and 3AE5 7.2/12/24 kV, up to 3150 A	3AX14 42-2C	
	26 contact fingers	For 3AE1 and 3AE5 17.5 kV, up to 3150 A	3AX14 42-2D	
	13 contact fingers	For 3AE1 and 3AE5 7.2/12/24 kV, 800 to 1250 A	3AX14 42-2E	
	13 contact fingers	For 3AE1 and 3AE5 17.5 kV, 800 to 1250 A	3AX14 42-2F	
Contact arm, complete with contact system	Width across flats: all Contact fingers: 26	For 3AE1 7.2/12 kV, up to 31.5 kA, up to 1250 A	3AX14 43-2A	
	Width across flats: all Contact fingers: 26	For 3AE1 7.2/12 kV, up to 31.5 kA, up to 2500 A	3AX14 43-2B	
	Width across flats: all Contact fingers: 26	For 3AE1 17.5 kV, up to 31.5 kA, up to 1250 A	3AX14 43-2C	
	Width across flats: all Contact fingers: 26	For 3AE1 17.5 kV, up to 31.5 kA, up to 2500 A	3AX14 43-2D	
	Width across flats: all Contact fingers: 26	For 3AE1 24 kV, up to 25 kA, up to 1250 A	3AX14 43-2E	
	Width across flats: all Contact fingers: 26	For 3AE1 24 kV, up to 25 kA, up to 2500 A	3AX14 43-2F	
	Width across flats: all Contact fingers: 26	For 3AE1 7.2/12 kV, 40 kA, up to 1250 A	3AX14 43-2G	
	Width across flats: all Contact fingers: 26	For 3AE1 7.2/12 kV, 40 kA, up to 3150 A	3AX14 43-2H	
	Width across flats: all Contact fingers: 26	For 3AE1 17.5 kV, 40 kA, up to 1250 A	3AX14 43-2J	
	Width across flats: all Contact fingers: 26	For 3AE1 17.5 kV, 40 kA, up to 3150 A	3AX14 43-2K	
	Width across flats: all Contact fingers: 13	For 3AE1 7.2/12 kV, up to 31.5 kA, up to 1250 A	3AX14 43-2L	
	Width across flats: all Contact fingers: 13	For 3AE1 17.5 kV, up to 31.5 kA, up to 1250 A	3AX14 43-2M	
	Width across flats: all Contact fingers: 13	For 3AE1 and 3AE5 24 kV, up to 25 kA, up to 1250 A	3AX14 43-2N	
	Width across flats: all Contact fingers: 26	For 3AE5 7.2/12 kV, up to 31.5 kA, up to 1600 A	3AX14 43-2P	
	Width across flats: all Contact fingers: 26	For 3AE5 17.5 kV, up to 25 kA, up to 1600 A	3AX14 43-2Q	
	Width across flats: all Contact fingers: 13	For 3AE5 7.2/12 kV, up to 31.5 kA, up to 1250 A	3AX14 43-2R	
	Width across flats: all Contact fingers: 13	For 3AE5 17.5 kV, up to 25 kA, up to 1250 A	3AX14 43-2S	
	Width across flats: 205 mm Contact fingers: 26	For 3AE1 (Minis) 7.2/12 kV, up to 31.5 kA, up to 1250 A	3AX14 43-4A	
	Width across flats: 310 mm Contact fingers: 26	For 3AE1 (Minis) 7.2/12 kV, up to 31.5 kA, up to 2500 A	3AX14 43-4B	
	Width across flats: 205 mm Contact fingers: 26	For 3AE1 (Minis) 17.5 kV, up to 31.5 kA, up to 1250 A	3AX14 43-4C	
	Width across flats: 310 mm Contact fingers: 26	For 3AE1 (Minis) 17.5 kV, up to 31.5 kA, up to 2500 A	3AX14 43-4D	
	Width across flats: 310 mm Contact fingers: 26	For 3AE1 (Minis) 7.2/12 kV, up to 31.5 kA, up to 1250 A	3AX14 43-4T	
	Width across flats: 310 mm Contact fingers: 26	For 3AE1 (Minis) 17.5 kV, up to 31.5 kA, up to 1250 A	3AX14 43-4U	
	Width across flats: 310 mm Contact fingers: 26	For 3AE1 (Minis) 7.2/12 kV, 40 kA, up to 1250 A	3AX14 43-4G	
	Width across flats: 310 mm Contact fingers: 26	For 3AE1 (Minis) 7.2/12 kV, 40 kA, up to 3150 A	3AX14 43-4H	
	Width across flats: 310 mm Contact fingers: 26	For 3AE1 (Minis) 17.5 kV, 40 kA, up to 1250 A	3AX14 43-4J	
	Width across flats: 310 mm Contact fingers: 26	For 3AE1 (Minis) 17.5 kV, 40 kA, up to 3150 A	3AX14 43-4K	
	Width across flats: 205 mm Contact fingers: 13	For 3AE1 (Minis) 7.2/12 kV, up to 31.5 kA, up to 1250 A	3AX14 43-4L	
	Width across flats: 205 mm Contact fingers: 13	For 3AE1 (Minis) 17.5 kV, up to 31.5 kA, up to 1250 A	3AX14 43-4M	

2

*[Handwritten signature]*

114

*[Handwritten signature]*

**Device selection**  
Accessories and spare parts

Position: 1-9

Designation	Description	Feature	Article No.
Contact arm, complete with contact system (continued)	Width across flats: 310 mm Contact fingers: 13 For 3AE1 (Minis)	7.2/12 kV, up to 31.5 kA, up to 1250 A	3AX14 43-4V
	Width across flats: 310 mm Contact fingers: 13 For 3AE1 (Minis)	17.5 kV, up to 31.5 kA, up to 1250 A	3AX14 43-4W
	Width across flats: 205 mm Contact fingers: 26 For 3AE5 (Minis)	7.2/12 kV, up to 31.5 kA, up to 1250 A	3AX14 43-5A
	Width across flats: 205 mm Contact fingers: 26 For 3AE5 (Minis)	17.5 kV, up to 25 kA, up to 1250 A	3AX14 43-5B
	Width across flats: 205 mm Contact fingers: 13 For 3AE5 (Minis)	7.2/12 kV, up to 31.5 kA, up to 1250 A	3AX14 43-5C
	Width across flats: 205 mm Contact fingers: 13 For 3AE5 (Minis)	17.5 kV, up to 25 kA, up to 1250 A	3AX14 43-5D
	Width across flats: 310 mm Contact fingers: 26 For 3AE5 (Minis)	7.2/12 kV, up to 31.5 kA, up to 1600 A	3AX14 43-5G
	Width across flats: 310 mm Contact fingers: 26 For 3AE5 (Minis)	17.5 kV, up to 25 kA, up to 1600 A	3AX14 43-5H
	Width across flats: 310 mm Contact fingers: 13 For 3AE5 (Minis)	7.2/12 kV, up to 31.5 kA, up to 1600 A	3AX14 43-5J
	Width across flats: 310 mm Contact fingers: 13 For 3AE5 (Minis)	17.5 kV, up to 25 kA, up to 1600 A	3AX14 43-5K
Fixed contact	For 3AE1 and 3AE5	7.2/12/17.5 kV, up to 31.5 kA, up to 1250 A	3AX14 44-2A
	For 3AE1 and 3AE5	7.2/12/17.5 kV, up to 31.5 kA, up to 2500 A	3AX14 44-2B
	For 3AE1 and 3AE5	7.2/12/17.5 kV, 40 kA, up to 3150 A	3AX14 44-2D
	For 3AE1 and 3AE5	24 kV, up to 25 kA, up to 2500 A	3AX14 44-2C
Conductor bars (1 set each) for earthing switch connection	For 3AE1 and 3AE5		
	150/210 mm pole-center distance, 275 mm width across flats	7.2/12/17.5 kV, up to 31.5 kA, up to 1250 A	3AX14 55-2A
	150 mm pole-center distance, 310 mm width across flats	7.2/12/17.5 kV, up to 31.5 kA, up to 1250 A	3AX14 55-2A
	210 mm pole-center distance, 310 mm width across flats	7.2/12/17.5 kV, up to 31.5 kA, up to 1250 A	3AX14 55-2B
	210 mm pole-center distance, 310 mm width across flats	7.2/12/17.5 kV, up to 31.5 kA, up to 2500 A	3AX14 55-2C
	210 mm pole-center distance, 310 mm width across flats	7.2/12/17.5 kV, 40 kA, up to 3150 A	3AX14 55-2D
	210 mm pole-center distance, 310 mm width across flats	24 kV, up to 25 kA, up to 2150 A	3AX14 55-2E
	275 mm pole-center distance, 310 mm width across flats	24 kV, up to 25 kA, up to 2150 A	3AX14 55-2F
Metal protection plate (IP plate)	150 mm pole-center distance and $I_{sc} \leq 25$ kA	For 3AE5	3AX14 56-0A
	160 mm pole-center distance and $I_{sc} \leq 25$ kA	For 3AE5	3AX14 56-0B
	210 mm pole-center distance	For 3AE5	3AX14 56-0C
	275 mm pole-center distance	For 3AE5	3AX14 56-0D
	150 mm pole-center distance and $I_{sc} = 31.5$ kA	For 3AE5	3AX14 56-1A
	160 mm pole-center distance and $I_{sc} = 31.5$ kA	For 3AE5	3AX14 56-1B
Shaft cover	150/160 mm pole-center distance	For 3AE5	3AX14 66-0A
	150 mm pole-center distance (Ritter)	For 3AE5	3AX14 66-0C
	210 mm pole-center distance	For 3AE5	3AX14 66-0B
	275 mm pole-center distance	For 3AE5	3AX14 66-0D
PG-cable gland		For 3AE1 and 3AE5	3AX14 58-0A
Protection against condensed water	Anti-condensation heating for 230 V AC, 50 W	For 3AE1	3AX14 57-3A
	Anti-condensation heating for 110 V AC, 50 W	For 3AE1	3AX14 57-3B
	Anti-condensation heating for 230 V AC, 50 W	For 3AE5	3AX14 57-5A
	Anti-condensation heating for 110 V AC, 50 W	For 3AE5	3AX14 57-5B

2

*[Handwritten signature]*

*[Handwritten signature]*

*[Handwritten marks]*

Designation	Description					Travel/ feature	Position:	
	Rated voltage for 50/60 Hz $U_r$ kV	Rated short-circuit breaking current with 36% DC component $I_k$ kA	Pole-center distance mm	Width across flats mm	Rated normal current $I_n$ A		1-9 Article No.	10 Language code <sup>2)</sup>
Withdrawable part	≤ 17.5		150/160			180/without cable harness	3AX71 12-2E	■
	≤ 17.5		150/160			180/with cable harness for 3AE1	3AX71 12-3E	■
	≤ 17.5		150/160			180/with cable harness for 3AE5	3AX71 12-4E	■
	≤ 17.5		150/160			200 / without cable harness	3AX71 12-2G	■
	≤ 17.5		150/160			200 / with cable harness for 3AE1	3AX71 12-3G	■
	≤ 17.5		150/160			200 / with cable harness for 3AE5	3AX71 12-4G	■
	≤ 17.5		150/160			220/without cable harness	3AX71 12-2A	■
	≤ 17.5		150/160			220/with cable harness for 3AE1	3AX71 12-3A	■
	≤ 17.5		150/160			220/with cable harness for 3AE5	3AX71 12-4A	■
	≤ 17.5		200			200 / without cable harness	3AX71 12-2H	■
	≤ 17.5		200			200 / with cable harness for 3AE1	3AX71 12-3H	■
	≤ 17.5		210			180/without cable harness	3AX71 12-2F	■
	≤ 17.5		210			180/with cable harness for 3AE1	3AX71 12-3F	■
	≤ 17.5		210			180/with cable harness for 3AE5	3AX71 12-4F	■
	≤ 17.5		210			200 / with cable harness for 3AE5	3AX71 12-4H	■
	≤ 17.5		210			220/without cable harness	3AX71 12-2B	■
	≤ 17.5		210			220/with cable harness for 3AE1	3AX71 12-3B	■
	≤ 17.5		210			220/with cable harness for 3AE5	3AX71 12-4B	■
	24		210			260/without cable harness	3AX71 12-2C	■
	24		210			260/with cable harness for 3AE1	3AX71 12-3C	■
	24		210			260 / with cable harness for 3AE5	3AX71 12-4C	■
	24		275			260/without cable harness	3AX71 12-2D	■
	24		275			260/with cable harness for 3AE1	3AX71 12-3D	■
	24		275			260 / with cable harness for 3AE5	3AX71 12-4D	■
Cartridge without earthing switch	≤ 17.5	≤ 31.5	150	275	≤ 1250		3AX71 11-5A	■
	≤ 17.5	≤ 31.5	150	310	≤ 1250		3AX71 11-5B	■
	≤ 17.5	≤ 31.5	210	275	≤ 1250		3AX71 11-5C	■
	≤ 17.5	≤ 31.5	210	310	≤ 1250		3AX71 11-5D	■
	≤ 17.5	≤ 31.5	210	310	> 1250		3AX71 11-5G	■
	≤ 17.5	40	210	310	All $I_n$		3AX71 11-5H	■
	24	≤ 25	210	310	≤ 1250		3AX71 11-5E	■
	24	≤ 25	275	310	≤ 1250		3AX71 11-5F	■
	24	≤ 25	210	310	> 1250		3AX71 11-5J	■
24	≤ 25	275	310	> 1250		3AX71 11-5K	■	

2

*[Handwritten signature]*

*[Handwritten signature]*

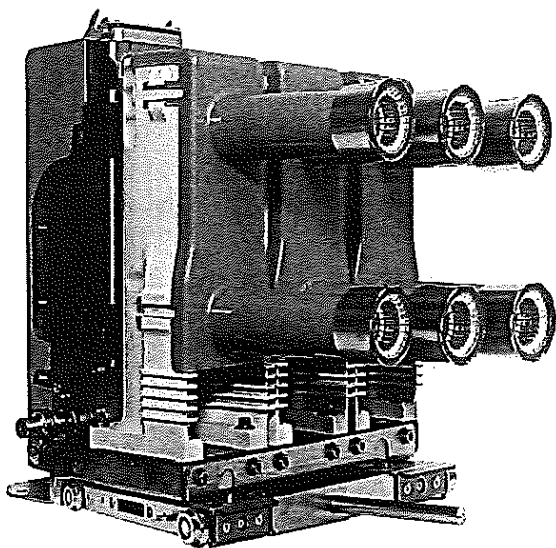
2

Designation	Description					Travell/feature	Position:	
	Rated voltage $U_r$ kV	Rated short-circuit breaking current with 36% DC compo- nent $I_{sc}$ kA	Pole-center distance mm	Width across flats mm	Rated normal current $I_n$ A		1-9 Article No.	10 Language code <sup>*)</sup>
Cartridge with earthing switch	≤ 17.5	≤ 31.5	150	275	≤ 1250	with partition	3AX71 11-6A	■
	≤ 17.5	≤ 31.5	150	310	≤ 1250	with partition	3AX71 11-6B	■
	≤ 17.5	≤ 31.5	210	275	≤ 1250	without partition	3AX71 11-6C	■
	≤ 17.5	≤ 31.5	210	310	≤ 1250	without partition	3AX71 11-6D	■
	≤ 17.5	≤ 31.5	210	310	> 1250	without partition	3AX71 11-6G	■
	≤ 17.5	40	210	310	All $I_n$	without partition	3AX71 11-6H	■
	24	≤ 25	210	310	≤ 1250	with partition	3AX71 11-6E	■
	24	≤ 25	275	310	≤ 1250	with partition	3AX71 11-6J	■
	24	≤ 25	210	310	> 1250	without partition	3AX71 11-6F	■
	24	≤ 25	275	310	> 1250	without partition	3AX71 11-6K	■

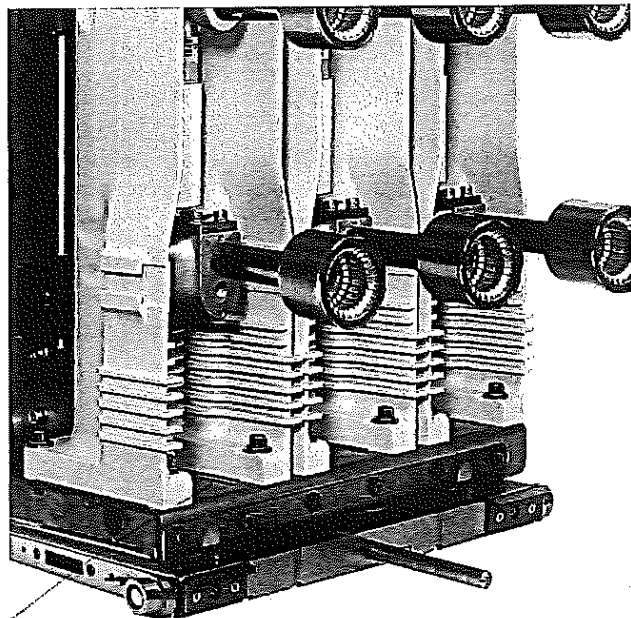
\*) The language of the rating plate is stated in the table. The individual code has to be added to the article number.

- A German
- B English
- C French
- D Spanish
- E Italian
- F Russian
- G Portuguese
- H Polish
- Z Open with Z = ...

117



SION vacuum circuit breaker on withdrawable part, with contacts



SION vacuum circuit breaker on withdrawable part, with contacts

Contents	Page
<b>Technical data</b>	<b>49</b>

<b>Electrical data, dimensions and masses</b>	
Voltage level 7.2 kV	50
Operating cycle diagrams for 7.2 kV	53
Voltage level 12 kV	54
Operating cycle diagrams for 12 kV	58
Voltage level 17.5 kV	59
Operating cycle diagrams for 17.5 kV	62
Voltage level 24 kV	63
Operating cycle diagrams for 24 kV	65

<b>Dimension drawings</b>	
Voltage level 7.2 to 24 kV	66

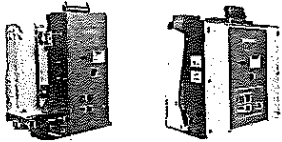
<b>Operating times and internal times</b>	74
<b>Short-circuit protection of motors</b>	74
<b>Consumption data of releases</b>	74

<b>Circuit diagrams</b>	
Circuit diagrams for 3AE5 and 3AE1	76

118

Technical data

Electrical data, dimensions and masses for 3AE5



Article No.	7.2 kV 50/60 Hz		Rated normal current		Width across flats		Pole-center distance		Rated switching sequence: O - 0.3 s - CO - 15 s - CO		Rated short-circuit duration		Rated short-circuit breaking current		DC component in % of the rated short-circuit breaking current		Asymmetric breaking current		Rated short-circuit making current (at 50/60 Hz)		Rated back-to-back-capacitor-bank inrush making current		Rated lightning impulse voltage		Rated short-duration power-frequency with- stand voltage		Voltage drop ΔU between connections (acc. to IEC 62271-1 at 100 A DC)		Minimum creepage distance Interrupters		Minimum creepage distance Phase-to-earth		Minimum clearance Phase-to-phase		Minimum clearance Phase-to-earth		Mass (1) (fixed-mounted circuit breaker/withdrawable module)		Detailed dimension drawing (must be explicitly requested)		Operating cycle diagram no. (see page 58)	
	$I_n$	$I_{n1}$	mm	mm	s	$I_{sc}$	%	kA	kA	$I_m$	$I_p$	kV	kV	mV	mm	mm	mm	mm	mm	kg																						
3AE5 002-1...	800	205	150	■	3	16	50	17.9	40/42	▲	60	20	3	93	245	93	97	49/-	A7E44202010	1																						
3AE5 002-2...	1250	205	150	■	3	16	50	17.9	40/42	▲	60	20	3	93	245	93	97	49/-	A7E44202010	1																						
3AE5 003-1...	800	205	150	■	3	20	50	22.4	50/52	▲	60	20	3	93	245	93	97	49/-	A7E44202010	2																						
3AE5 003-2...	1250	205	150	■	3	20	50	22.4	50/52	▲	60	20	3	93	245	93	97	49/-	A7E44202010	2																						
3AE5 004-1...	800	205	150	■	3	25	50	28	63/65	▲	60	20	3	93	245	93	97	49/-	A7E44202010	3a																						
3AE5 004-2...	1250	205	150	■	3	25	50	28	63/65	▲	60	20	3	93	245	93	97	49/-	A7E44202010	3a																						
3AE5 005-1...	800	205	150	■	3	31.5	50	35.4	80/82	20	60	20	2.5	90	255	98	97	53.5/-	A7E44202010	4a																						
3AE5 005-2...	1250	205	150	■	3	31.5	50	35.4	80/82	20	60	20	2.5	90	255	98	97	53.5/-	A7E44202010	4a																						
3AE5 012-1...	800	275	150	■	3	16	50	17.9	40/42	▲	60	20	3	93	245	93	97	49/85	A7E44202011	1																						
3AE5 012-2...	1250	275	150	■	3	16	50	17.9	40/42	▲	60	20	3	93	245	93	97	49/85	A7E44202011	1																						
3AE5 013-1...	800	275	150	■	3	20	50	22.4	50/52	▲	60	20	3	93	245	93	97	49/85	A7E44202011	2																						
3AE5 013-2...	1250	275	150	■	3	20	50	22.4	50/52	▲	60	20	3	93	245	93	97	49/85	A7E44202011	2																						
3AE5 014-1...	800	275	150	■	3	25	50	28	63/65	▲	60	20	3	93	245	93	97	49/85	A7E44202011	3a																						
3AE5 014-2...	1250	275	150	■	3	25	50	28	63/65	▲	60	20	3	93	245	93	97	49/85	A7E44202011	3a																						
3AE5 015-1...	800	275	150	■	3	31.5	50	35.4	80/82	20	60	20	2.5	90	255	98	122	53.5/89.5	A7E44202011	4a																						
3AE5 015-2...	1250	275	150	■	3	31.5	50	35.4	80/82	20	60	20	2.5	90	255	98	122	53.5/89.5	A7E44202011	4a																						
3AE5 022-1...	800	310	150	■	3	16	50	17.9	40/42	▲	60	20	3	93	245	93	97	49/85	A7E44202012	1																						
3AE5 022-2...	1250	310	150	■	3	16	50	17.9	40/42	▲	60	20	3	93	245	93	97	49/85	A7E44202012	1																						
3AE5 022-3...	1600	310	150	■	3	16	50	17.9	40/42	20	60	20	2.5	90	255	98	122	59.5/95.5	A7E44202011	1a																						
3AE5 023-1...	800	310	150	■	3	20	50	22.4	50/52	▲	60	20	3	93	245	93	97	49/85	A7E44202012	2																						
3AE5 023-2...	1250	310	150	■	3	20	50	22.4	50/52	▲	60	20	3	93	245	93	97	49/85	A7E44202012	2																						
3AE5 023-3...	1600	310	150	■	3	20	50	22.4	50/52	20	60	20	2.5	90	255	98	122	59.5/95.5	A7E44202012	2a																						
3AE5 024-1...	800	310	150	■	3	25	50	28	63/65	▲	60	20	3	93	245	93	97	49/85	A7E44202012	3a																						
3AE5 024-2...	1250	310	150	■	3	25	50	28	63/65	▲	60	20	3	93	245	93	97	49/85	A7E44202012	3a																						
3AE5 024-3...	1600	310	150	■	3	25	50	28	63/65	20	60	20	2.5	90	255	98	122	59.5/95.5	A7E44202012	3b																						
3AE5 025-1...	800	310	150	■	3	31.5	50	35.4	80/82	20	60	20	2.5	90	255	98	122	53.5/89.5	A7E44202012	4a																						
3AE5 025-2...	1250	310	150	■	3	31.5	50	35.4	80/82	20	60	20	2.5	90	255	98	122	53.5/89.5	A7E44202012	4a																						
3AE5 025-3...	1600	310	150	■	3	31.5	50	35.4	80/82	20	60	20	2.5	90	255	98	122	59.5/95.5	A7E44202012	4a																						

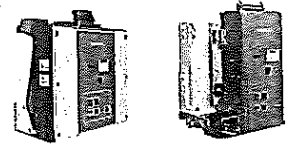
▲ On request

■ Standard information on rating plate

1) The mass of the fixed-mounted circuit breaker, fitted on the withdrawable part, increases by the values specified in the dimension drawing of the withdrawable part (page 83)

Note: Dimension drawings from page 79





Article No.	7,2 kV 50/60 Hz																			Operating cycle diagram no. (see page 58)
	Rated normal current $I_n$ A	Width across flats mm	Pole-center distance mm	Rated switching sequence: D-0.3 s-CO-15 s-CO	Rated short-circuit duration $t_s$ s	Rated short-circuit breaking current $I_{sc}$ kA	DC component in % of the rated short-circuit breaking current	Asymmetric breaking current kA	Rated short-circuit making current (at 50/60 Hz) $I_{ms}$ kA	Rated back-to-back-capacitor-bank inrush making current $I_{bi}$ kA peak	Rated lightning impulse voltage $U_p$ kV	Rated short-duration power-frequency with- stand voltage $U_d$ kV	Voltage drop $\Delta U$ between connections (acc. to IEC 62271-1 at 100 A DC) mV	Minimum creepage distance Interrupters mm	Minimum creepage distance Phase-to-earth mm	Minimum clearance Phase-to-phase mm	Minimum clearance Phase-to-earth mm	Mass <sup>1)</sup> (fixed-mounted circuit breaker/withdrawable module) kg	Detailed dimension drawing (must be explicitly requested)	
3AE5 032-1...	800	205	160	■	3	16	50	17.9	40/42	▲	60	20	3	93	245	93	129	49/-	A7E44202016	1
3AE5 032-2...	1250	205	160	■	3	16	50	17.9	40/42	▲	60	20	3	93	245	93	129	49/-	A7E44202016	1
3AE5 033-1...	800	205	160	■	3	20	50	22.4	50/52	▲	60	20	3	93	245	93	129	49/-	A7E44202016	2
3AE5 033-2...	1250	205	160	■	3	20	50	22.4	50/52	▲	60	20	3	93	245	93	129	49/-	A7E44202016	2
3AE5 034-1...	800	205	160	■	3	25	50	28	63/65	▲	60	20	3	93	245	93	129	49/-	A7E44202016	3a
3AE5 034-2...	1250	205	160	■	3	25	50	28	63/65	▲	60	20	3	93	245	93	129	49/-	A7E44202016	3a
3AE5 035-1...	800	205	160	■	3	31.5	50	35.4	80/82	20	60	20	2.5	90	255	98	122	53.5/-	A7E44202016	4a
3AE5 035-2...	1250	205	160	■	3	31.5	50	35.4	80/82	20	60	20	2.5	90	255	98	122	53.5/-	A7E44202016	4a
3AE5 042-1...	800	275	160	■	3	16	50	17.9	40/42	▲	60	20	3	93	245	93	129	49/-	A7E44202017	1
3AE5 042-2...	1250	275	160	■	3	16	50	17.9	40/42	▲	60	20	3	93	245	93	129	49/-	A7E44202017	1
3AE5 043-1...	800	275	160	■	3	20	50	22.4	50/52	▲	60	20	3	93	245	93	129	49/-	A7E44202017	2
3AE5 043-2...	1250	275	160	■	3	20	50	22.4	50/52	▲	60	20	3	93	245	93	129	49/-	A7E44202017	2
3AE5 044-1...	800	275	160	■	3	25	50	28	63/65	▲	60	20	3	93	245	93	129	49/-	A7E44202017	3a
3AE5 044-2...	1250	275	160	■	3	25	50	28	63/65	▲	60	20	3	93	245	93	129	49/-	A7E44202017	3a
3AE5 045-1...	800	275	160	■	3	31.5	50	35.4	80/82	20	60	20	2.5	90	255	98	122	53.5/-	A7E44202017	4a
3AE5 045-2...	1250	275	160	■	3	31.5	50	35.4	80/82	20	60	20	2.5	90	255	98	122	53.5/-	A7E44202017	4a
3AE5 052-1...	800	310	160	■	3	16	50	17.9	40/42	▲	60	20	3	93	245	93	129	49/-	A7E44202018	1
3AE5 052-2...	1250	310	160	■	3	16	50	17.9	40/42	▲	60	20	3	93	245	93	129	49/-	A7E44202018	1
3AE5 052-3...	1600	310	160	■	3	16	50	17.9	40/42	20	60	20	2.5	90	255	98	122	59.5/-	A7E44202018	1a
3AE5 053-1...	800	310	160	■	3	20	50	22.4	50/52	▲	60	20	3	93	245	93	129	49/-	A7E44202018	2
3AE5 053-2...	1250	310	160	■	3	20	50	22.4	50/52	▲	60	20	3	93	245	93	129	49/-	A7E44202018	2
3AE5 053-3...	1600	310	160	■	3	20	50	22.4	50/52	20	60	20	2.5	90	255	98	122	59.5/-	A7E44202018	2a
3AE5 054-1...	800	310	160	■	3	25	50	28	63/65	▲	60	20	3	93	245	93	129	49/-	A7E44202018	3a
3AE5 054-2...	1250	310	160	■	3	25	50	28	63/65	▲	60	20	3	93	245	93	129	49/-	A7E44202018	3a
3AE5 054-3...	1600	310	160	■	3	25	50	28	63/65	20	60	20	2.5	90	255	98	122	59.5/-	A7E44202018	3b
3AE5 055-1...	800	310	160	■	3	31.5	50	35.4	80/82	20	60	20	2.5	90	255	98	122	53.5/-	A7E44202018	4a
3AE5 055-2...	1250	310	160	■	3	31.5	50	35.4	80/82	20	60	20	2.5	90	255	98	122	53.5/-	A7E44202018	4a
3AE5 055-3...	1600	310	160	■	3	31.5	50	35.4	80/82	20	60	20	2.5	90	255	98	122	59.5/-	A7E44202018	4a



▲ On request

■ Standard information on rating plate

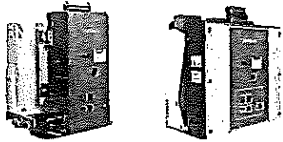
1) The mass of the fixed-mounted circuit breaker, fitted on the withdrawable part, increases by the values specified in the dimension drawing of the withdrawable part (page 83)



Technical data

SION Vacuum Circuit Breakers 3AE5 and 3AE1

Electrical data, dimensions and masses for 3AE5



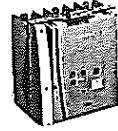
Article No.	7.2 kV 50/60 Hz		Rated normal current $I_n$ A	Width across flats mm	Pole-center distance mm	Rated switching sequence: O - 0.3 s - CO - 1.5 s - CO	Rated short-circuit duration $t_r$ s	Rated short-circuit breaking current $I_{cs}$ kA	DC component in % of the rated short-circuit breaking current	Asymmetric breaking current kA	Rated short-circuit making current (at 50/60 Hz) $I_m$ kA	Rated back-to-back-capacitor-bank inrush making current $I_{in}$ kA peak	Rated lightning impulse voltage $U_p$ kV	Rated short-duration power-frequency with- stand voltage $U_s$ kV	Voltage drop $\Delta U$ between connections (acc. to IEC 62271-1 at 100 A DC) mV	Minimum creepage distance interrupters mm	Minimum creepage distance Phase-to-earth mm	Minimum clearance Phase-to-phase mm	Minimum clearance Phase-to-earth mm	Mass <sup>1)</sup> (fixed-mounted circuit breaker/withdrawable module) kg	Detailed dimension drawing (must be explicitly requested)	Operating cycle diagram no. (see page 56)
	Rated normal current	Width across flats																				
3AE5 062-1...	800	205	210	■	3	16	50	17.9	40/42	▲	60	20	3	93	245	93	129	51.5/1.5	A7E44202022	1		
3AE5 062-2...	1250	205	210	■	3	16	50	17.9	40/42	▲	60	20	3	93	245	93	129	51.5/1.5	A7E44202022	1		
3AE5 063-1...	800	205	210	■	3	20	50	22.4	50/52	▲	60	20	3	93	245	93	129	51.5/-	A7E44202022	2		
3AE5 063-2...	1250	205	210	■	3	20	50	22.4	50/52	▲	60	20	3	93	245	93	129	51.5/-	A7E44202022	2		
3AE5 064-1...	800	205	210	■	3	25	50	28	63/65	▲	60	20	3	93	245	93	129	51.5/-	A7E44202022	3a		
3AE5 064-2...	1250	205	210	■	3	25	50	28	63/65	▲	60	20	3	93	245	93	129	51.5/-	A7E44202022	3a		
3AE5 065-1...	800	205	210	■	3	31.5	50	35.4	80/82	20	60	20	2.5	90	255	98	122	56.5/-	A7E44202022	4a		
3AE5 065-2...	1250	205	210	■	3	31.5	50	35.4	80/82	20	60	20	2.5	90	255	98	122	56.5/-	A7E44202022	4a		
3AE5 072-1...	800	275	210	■	3	16	50	17.9	40/42	▲	60	20	3	93	245	93	129	51.5/1.5	A7E44202023	1		
3AE5 072-2...	1250	275	210	■	3	16	50	17.9	40/42	▲	60	20	3	93	245	93	129	51.5/1.5	A7E44202023	1		
3AE5 073-1...	800	275	210	■	3	20	50	22.4	50/52	▲	60	20	3	93	245	93	129	51.5/1.5	A7E44202023	2		
3AE5 073-2...	1250	275	210	■	3	20	50	22.4	50/52	▲	60	20	3	93	245	93	129	51.5/1.5	A7E44202023	2		
3AE5 074-1...	800	275	210	■	3	25	50	28	63/65	▲	60	20	3	93	245	93	129	51.5/1.5	A7E44202023	3a		
3AE5 074-2...	1250	275	210	■	3	25	50	28	63/65	▲	60	20	3	93	245	93	129	51.5/1.5	A7E44202023	3a		
3AE5 075-1...	800	275	210	■	3	31.5	50	35.4	80/82	20	60	20	2.5	90	255	98	122	56.5/6.5	A7E44202023	4a		
3AE5 075-2...	1250	275	210	■	3	31.5	50	35.4	80/82	20	60	20	2.5	90	255	98	122	56.5/6.5	A7E44202023	4a		
3AE5 082-1...	800	310	210	■	3	16	50	17.9	40/42	▲	60	20	3	93	245	93	129	51.5/1.5	A7E44202024	1		
3AE5 082-2...	1250	310	210	■	3	16	50	17.9	40/42	▲	60	20	3	93	245	93	129	51.5/1.5	A7E44202024	1		
3AE5 082-3...	1600	310	210	■	3	16	50	17.9	40/42	20	60	20	2.5	90	255	98	122	62.5/102.5	A7E44202024	1a		
3AE5 083-1...	800	310	210	■	3	20	50	22.4	50/52	▲	60	20	3	93	245	93	129	51.5/1.5	A7E44202024	2		
3AE5 083-2...	1250	310	210	■	3	20	50	22.4	50/52	▲	60	20	3	93	245	93	129	51.5/1.5	A7E44202024	2		
3AE5 083-3...	1600	310	210	■	3	20	50	22.4	50/52	20	60	20	2.5	90	255	98	122	62.5/102.5	A7E44202024	2a		
3AE5 084-1...	800	310	210	■	3	25	50	28	63/65	▲	60	20	3	93	245	93	129	51.5/1.5	A7E44202024	3a		
3AE5 084-2...	1250	310	210	■	3	25	50	28	63/65	▲	60	20	3	93	245	93	129	51.5/1.5	A7E44202024	3a		
3AE5 084-3...	1600	310	210	■	3	25	50	28	63/65	20	60	20	2.5	90	255	98	122	62.5/102.5	A7E44202024	3b		
3AE5 084-4...	2000	310	210	■	3	25	50	30.6	63/65	20	60	20	1.8	130	240	125	138	100	A7E10907000	3c		
3AE5 084-6...	2500	310	210	■	3	25	50	30.6	63/65	20	60	20	1.8	130	240	125	138	100	A7E10907000	3c		
3AE5 085-1...	800	310	210	■	3	31.5	50	35.4	80/82	20	60	20	2.5	90	255	98	122	56.5/6.5	A7E44202024	4a		

▲ On request

■ Standard information on rating plate

1) The mass of the fixed-mounted circuit breaker, fitted on the withdrawable part, increases by the values specified in the dimension drawing of the withdrawable part (page 83)

121



Article No.	7.2 kV 50/60 Hz		Rated normal current		Width across flats		Pole-center distance		Rated switching sequence: O - 0.3 s - CO - 15 s - CO		Rated short-circuit duration		Rated short-circuit breaking current		DC component in % of the rated short-circuit breaking current		Asymmetric breaking current		Rated short-circuit making current (at 50/60 Hz)		Rated back-to-back-capacitor-bank inrush making current		Rated lightning impulse voltage		Rated short-duration power-frequency with- stand voltage		Voltage drop ΔU between connections (acc. to IEC 62271-1 at 100 A DC)		Minimum creepage distance interrupters		Minimum creepage distance Phase-to-earth		Minimum clearance Phase-to-phase		Minimum clearance Phase-to-earth		Mass 1) (fixed-mounted circuit breaker/withdrawable module)		Detailed dimension drawing (must be explicitly requested)		Operating cycle diagram no. (see page 58)	
	$I_r$ A	$I_n$ mm	$I_n$ mm	$I_{sc}$ s	$I_{sc}$ kA	$I_{sc}$ %	$I_{sc}$ kA	$I_{sc}$ kA	$I_{sc}$ kA	$I_{sc}$ kA	$I_{sc}$ kA	$I_{sc}$ kA	$I_{sc}$ kV	$I_{sc}$ kV	$I_{sc}$ mV	$I_{sc}$ mm	$I_{sc}$ mm	$I_{sc}$ mm	$I_{sc}$ mm	$I_{sc}$ mm	$I_{sc}$ kg	$I_{sc}$	$I_{sc}$	$I_{sc}$	$I_{sc}$	$I_{sc}$	$I_{sc}$	$I_{sc}$	$I_{sc}$	$I_{sc}$	$I_{sc}$	$I_{sc}$	$I_{sc}$	$I_{sc}$	$I_{sc}$	$I_{sc}$						
3AE5 085-2...	1250	310	210	■	3	31.5	50	35.4	80/82	20	60	20	2.5	90	255	98	122	56.5/65	A7E44202024	4a																						
3AE5 085-3...	1600	310	210	■	3	31.5	50	35.4	80/82	20	60	20	2.5	90	255	98	122	62.5/102.5	A7E44202024	4a																						
3AE5 085-4...	2000	310	210	■	3	31.5	50	38.5	80/82	20	60	20	1.8	130	240	125	138	100	A7E10907000	4b																						
3AE5 085-6...	2500	310	210	■	3	31.5	50	38.5	80/82	20	60	20	1.8	130	240	125	138	100	A7E10907000	4b																						
3AE1 086-2...	1250	310	210	■	3	40	36	44.9	100/104	10	60	20	1.7	145	155	169	140	120/160	A7E44202070	5																						
3AE1 086-4...	2000	310	210	■	3	40	36	44.9	100/104	10	60	20	1.0	145	249	149	140	160/210	A7E44202071	5																						
3AE1 086-6...	2500	310	210	■	3	40	36	44.9	100/104	10	60	20	1.0	145	249	149	140	160/210	A7E44202071	5																						
3AE1 086-7...	3150	310	210	■	3	40	36	44.9	100/104	10	60	20	1.0	145	249	149	140	160/210	A7E44202071	5																						

▲ On request

■ Standard information on rating plate

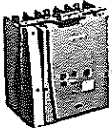
1) The mass of the fixed-mounted circuit breaker, fitted on the withdrawable part, increases by the values specified in the dimension drawing of the withdrawable part (page 83)

Note: Dimension drawings from page 79

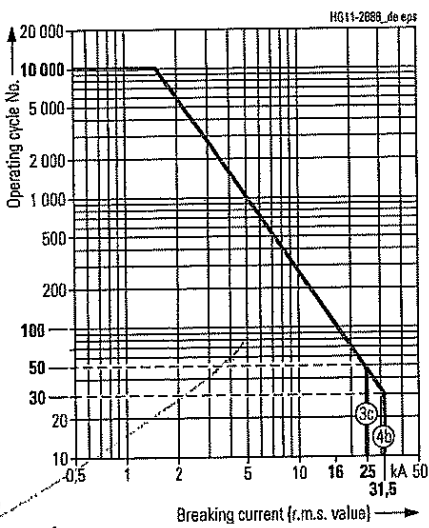
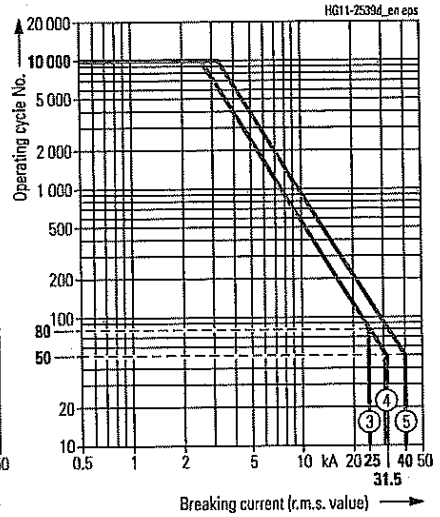
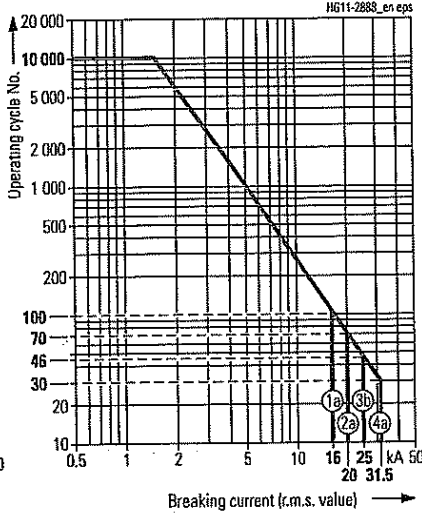
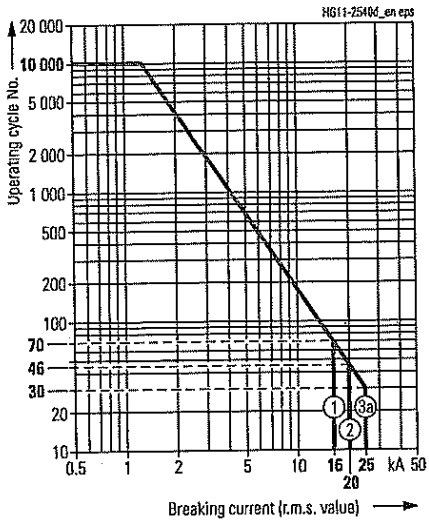
3

Technical data

Electrical data, dimensions and masses for 3AE1



Operating cycle diagrams for 7.2 kV



The permissible number of electrical operating cycles is shown as a function of the breaking current (r.m.s. value). All SION vacuum circuit breakers fulfill the endurance classes E2, M2 and C2 according to IEC 62271-100. The curve shape beyond the parameters defined in IEC 62271-100 is based on average usage data. The number of operating cycles that can actually be reached can be different depending on the respective application.

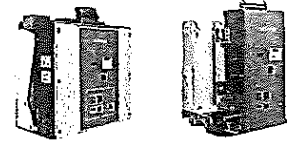
3

Handwritten scribble or signature.

Handwritten signature.

Handwritten signature.

123



Article No.	12 kV 50/60 Hz		Rated normal current $I_n$ A	Width across flats mm	Pole-center distance mm	Rated switching sequence: O - 0.3 s - CO - 15 s - CO	Rated short-circuit duration $t_p$ s	Rated short-circuit breaking current $I_{br}$ kA	DC component in % of the rated short-circuit breaking current	Asymmetric breaking current kA	Rated short-circuit making current (at 50/60 Hz) $I_{ms}$ kA	Rated back-to-back-capacitor-bank inrush making current $I_{b, peak}$ kA	Rated lightning impulse voltage $U_l$ kV	Rated short-duration power-frequency with- stand voltage $U_w$ kV	Voltage drop $\Delta U$ between connections (acc. to IEC 62271-1 at 100 A DC) mV	Minimum creepage distance Interrupters mm	Minimum creepage distance Phase-to-earth mm	Minimum clearance Phase-to-phase mm	Minimum clearance Phase-to-earth mm	Mass <sup>1)</sup> (fixed-mounted circuit breaker/withdrawable module) kg	Detailed dimension drawing (must be explicitly requested)	Operating cycle diagram no. (see page 67)
	mm	mm																				
3AE5 102-1...	800	205	150	■	3	16	50	17.9	40/42	▲	75	28	3	93	245	93	129	49/-	A7E44202010	6		
3AE5 102-2...	1250	205	150	■	3	16	50	17.9	40/42	▲	75	28	3	93	245	93	129	49/-	A7E44202010	6		
3AE5 103-1...	800	205	150	■	3	20	50	22.4	50/52	▲	75	28	3	93	245	93	129	49/-	A7E44202010	7		
3AE5 103-2...	1250	205	150	■	3	20	50	22.4	50/52	▲	75	28	3	93	245	93	129	49/-	A7E44202010	7		
3AE5 104-1...	800	205	150	■	3	25	50	28	63/65	▲	75	28	3	93	245	93	129	49/-	A7E44202010	8a		
3AE5 104-2...	1250	205	150	■	3	25	50	28	63/65	▲	75	28	3	93	245	93	129	49/-	A7E44202010	8a		
3AE5 105-1...	800	205	150	■	3	31.5	50	35.4	80/82	20	75	28	2.5	90	255	98	122	53.5/-	A7E44202010	9a		
3AE5 105-2...	1250	205	150	■	3	31.5	50	35.4	80/82	20	75	28	2.5	90	255	98	122	53.5/-	A7E44202010	9a		
3AE5 112-1...	800	275	150	■	3	16	50	17.9	40/42	▲	75	28	3	93	245	93	129	49/85	A7E44202011	6		
3AE5 112-2...	1250	275	150	■	3	16	50	17.9	40/42	▲	75	28	3	93	245	93	129	49/85	A7E44202011	6		
3AE5 113-1...	800	275	150	■	3	20	50	22.4	50/52	▲	75	28	3	93	245	93	129	49/85	A7E44202011	7		
3AE5 113-2...	1250	275	150	■	3	20	50	22.4	50/52	▲	75	28	3	93	245	93	129	49/85	A7E44202011	7		
3AE5 114-1...	800	275	150	■	3	25	50	28	63/65	▲	75	28	3	93	245	93	129	49/85	A7E44202011	8a		
3AE5 114-2...	1250	275	150	■	3	25	50	28	63/65	▲	75	28	3	93	245	93	129	49/85	A7E44202011	8a		
3AE5 115-1...	800	275	150	■	3	31.5	50	35.4	80/82	20	75	28	2.5	90	255	98	122	53.5/85	A7E44202011	9a		
3AE5 115-2...	1250	275	150	■	3	31.5	50	35.4	80/82	20	75	28	2.5	90	255	98	122	53.5/85	A7E44202011	9a		
3AE5 122-1...	800	310	150	■	3	16	50	17.9	40/42	▲	75	28	3	93	245	93	129	49/85	A7E44202012	6		
3AE5 122-2...	1250	310	150	■	3	16	50	17.9	40/42	▲	75	28	3	93	245	93	129	49/85	A7E44202012	6		
3AE5 122-3...	1600	310	150	■	3	16	50	17.9	40/42	20	75	28	2.5	90	255	98	122	59.5/85	A7E44202012	6a		
3AE5 123-1...	800	310	150	■	3	20	50	22.4	50/52	▲	75	28	3	93	245	93	129	49/85	A7E44202012	7		
3AE5 123-2...	1250	310	150	■	3	20	50	22.4	50/52	▲	75	28	3	93	245	93	129	49/85	A7E44202012	7		
3AE5 123-3...	1600	310	150	■	3	20	50	22.4	50/52	20	75	28	2.5	90	255	98	122	59.5/85	A7E44202012	7a		
3AE5 124-1...	800	310	150	■	3	25	50	28	63/65	▲	75	28	3	93	245	93	129	49/85	A7E44202012	8a		
3AE5 124-2...	1250	310	150	■	3	25	50	28	63/65	▲	75	28	3	93	245	93	129	49/85	A7E44202012	8a		
3AE5 124-3...	1600	310	150	■	3	25	50	28	63/65	20	75	28	2.5	90	255	98	122	59.5/85	A7E44202012	8b		

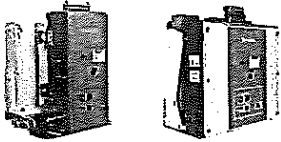
▲ On request      ■ Standard information on rating plate      1) The mass of the fixed-mounted circuit breaker, fitted on the withdrawable part, increases by the values specified in the dimension drawing of the withdrawable part (page 83)

3

124

Technical data

Electrical data, dimensions and masses for 3AE5



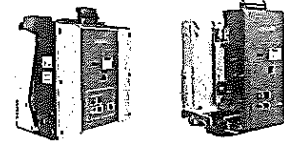
Article No.	12 kV 50/60 Hz		Rated normal current		Width across flats		Pole-center distance		Rated switching sequence: O-0.3 s-CO-15 s-CO		Rated short-circuit duration		Rated short-circuit breaking current		DC component in % of the rated short-circuit breaking current		Asymmetric breaking current		Rated short-circuit making current (at 50/60 Hz)		Rated back-to-back-capacitor-bank rush-making current		Rated lightning impulse voltage		Rated short-duration power-frequency with- stand voltage		Voltage drop ΔU between connections (acc. to IEC 62271-1 at 100 A DC)		Minimum creepage distance Interruption		Minimum creepage distance Phase-to-earth		Minimum clearance Phase-to-phase		Minimum clearance Phase-to-earth		Mass 1) (fixed-mounted circuit breaker/withdrawable module)		Detailed dimension drawing (must be explicitly requested)		Operating cycle diagram no. (see page 67)	
	I <sub>n</sub>	I <sub>th</sub>	A	mm	mm	mm	mm	s	kA	kA	%	kA	kA	kA	kA	kA	kV	kV	mV	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg	kg						
3AE5 125-1...	800	310	150	■	3	31.5	50	35.4	80/82	20	75	28	2.5	90	255	98	122	53.5/51	A7E44202012	9a																						
3AE5 125-2...	1250	310	150	■	3	31.5	50	35.4	80/82	20	75	28	2.5	90	255	98	122	53.5/51	A7E44202012	9a																						
3AE5 125-3...	1600	310	150	■	3	31.5	50	35.4	80/82	20	75	28	2.5	90	255	98	122	59.5/55	A7E44202012	9a																						
3AE5 132-1...	800	205	160	■	3	16	50	17.9	40/42	▲	75	28	3	93	245	93	129	49/-	A7E44202016	6																						
3AE5 132-2...	1250	205	160	■	3	16	50	17.9	40/42	▲	75	28	3	93	245	93	129	49/-	A7E44202016	6																						
3AE5 133-1...	800	205	160	■	3	20	50	22.4	50/52	▲	75	28	3	93	245	93	129	49/-	A7E44202016	7																						
3AE5 133-2...	1250	205	160	■	3	20	50	22.4	50/52	▲	75	28	3	93	245	93	129	49/-	A7E44202016	7																						
3AE5 134-1...	800	205	160	■	3	25	50	28	63/65	▲	75	28	3	93	245	93	129	49/-	A7E44202016	8a																						
3AE5 134-2...	1250	205	160	■	3	25	50	28	63/65	▲	75	28	3	93	245	93	129	49/-	A7E44202016	8a																						
3AE5 135-1...	800	205	160	■	3	31.5	50	35.4	80/82	20	75	28	2.5	90	255	98	122	53.5/-	A7E44202016	9a																						
3AE5 135-2...	1250	205	160	■	3	31.5	50	35.4	80/82	20	75	28	2.5	90	255	98	122	53.5/-	A7E44202016	9a																						
3AE5 142-1...	800	275	160	■	3	16	50	17.9	40/42	▲	75	28	3	93	245	93	129	49/-	A7E44202017	6																						
3AE5 142-2...	1250	275	160	■	3	16	50	17.9	40/42	▲	75	28	3	93	245	93	129	49/-	A7E44202017	6																						
3AE5 143-1...	800	275	160	■	3	20	50	22.4	50/52	▲	75	28	3	93	245	93	129	49/-	A7E44202017	7																						
3AE5 143-2...	1250	275	160	■	3	20	50	22.4	50/52	▲	75	28	3	93	245	93	129	49/-	A7E44202017	7																						
3AE5 144-1...	800	275	160	■	3	25	50	28	63/65	▲	75	28	3	93	245	93	129	49/-	A7E44202017	8a																						
3AE5 144-2...	1250	275	160	■	3	25	50	28	63/65	▲	75	28	3	93	245	93	129	49/-	A7E44202017	8a																						
3AE5 145-1...	800	275	160	■	3	31.5	50	35.4	80/82	20	75	28	2.5	90	255	98	122	53.5/-	A7E44202017	9a																						
3AE5 145-2...	1250	275	160	■	3	31.5	50	35.4	80/82	20	75	28	2.5	90	255	98	122	53.5/-	A7E44202017	9a																						
3AE5 152-1...	800	310	160	■	3	16	50	17.9	40/42	▲	75	28	3	93	245	93	129	49/-	A7E44202018	6																						
3AE5 152-2...	1250	310	160	■	3	16	50	17.9	40/42	▲	75	28	3	93	245	93	129	49/-	A7E44202018	6																						
3AE5 152-3...	1600	310	160	■	3	16	50	17.9	40/42	20	75	28	2.5	90	255	98	122	59.5/-	A7E44202018	6a																						
3AE5 153-1...	800	310	160	■	3	20	50	22.4	50/52	▲	75	28	3	93	245	93	129	49/-	A7E44202018	7																						
3AE5 153-2...	1250	310	160	■	3	20	50	22.4	50/52	▲	75	28	3	93	245	93	129	49/-	A7E44202018	7																						
3AE5 153-3...	1600	310	160	■	3	20	50	22.4	50/52	20	75	28	2.5	90	255	98	122	59.5/-	A7E44202018	7a																						

▲ On request

■ Standard information on rating plate

1) The mass of the fixed-mounted circuit breaker, fitted on the withdrawable part, increases by the values specified in the dimension drawing of the withdrawable part (page 83)

125



Article No.	12 kV 50/60 Hz		Rated normal current	Width across flats	Pole-center distance	Rated switching sequence: O - 0.3 s - CO - 15 s - CO	Rated short-circuit duration	Rated short-circuit breaking current	DC component in % of the rated short-circuit breaking current	Asymmetric breaking current	Rated short-circuit making current (at 50/60 Hz)	Rated back-to-back-capacitor-bank inrush making current	Rated lightning impulse voltage	Rated short-circuit power-frequency with- stand voltage	Voltage drop ΔU between connections (acc. to IEC 62271-1 at 100 A DC)	Minimum creepage distance Interruption	Minimum creepage distance Phase-to-earth	Minimum clearance Phase-to-phase	Minimum clearance Phase-to-earth	Mass 1)	Detailed dimension drawing (must be explicitly requested)	Operating cycle diagram no. (see page 67)
	I <sub>n</sub>	A	mm	mm	s	kA	%	kA	kA	I <sub>ms</sub>	kA	U <sub>p</sub>	kV	U <sub>d</sub>	kV	mm	mm	mm	mm	kg		
3AE5 154-1...	800	310	160	■	3	25	50	28	63/65	▲	75	28	3	93	245	93	129	49/-	A7E44202018	8a		
3AE5 154-2...	1250	310	160	■	3	25	50	28	63/65	▲	75	28	3	93	245	93	129	49/-	A7E44202018	8a		
3AE5 154-3...	1600	310	160	■	3	25	50	28	63/65	20	75	28	2.5	90	255	98	122	59.5/-	A7E44202018	8b		
3AE5 155-1...	800	310	160	■	3	31.5	50	35.4	80/82	20	75	28	2.5	90	255	98	122	53.5/-	A7E44202018	9a		
3AE5 155-2...	1250	310	160	■	3	31.5	50	35.4	80/82	20	75	28	2.5	90	255	98	122	53.5/-	A7E44202018	9a		
3AE5 155-3...	1600	310	160	■	3	31.5	50	35.4	80/82	20	75	28	2.5	90	255	98	122	59.5/-	A7E44202018	9a		
3AE5 162-1...	800	205	210	■	3	16	50	17.9	40/42	▲	75	28	3	93	245	93	129	51.5/-	A7E44202022	6		
3AE5 162-2...	1250	205	210	■	3	16	50	17.9	40/42	▲	75	28	3	93	245	93	129	51.5/-	A7E44202022	6		
3AE5 163-1...	800	205	210	■	3	20	50	22.4	50/52	▲	75	28	3	93	245	93	129	51.5/-	A7E44202022	7		
3AE5 163-2...	1250	205	210	■	3	20	50	22.4	50/52	▲	75	28	3	93	245	93	129	51.5/-	A7E44202022	7		
3AE5 164-1...	800	205	210	■	3	25	50	28	63/65	▲	75	28	3	93	245	93	129	49/-	A7E44202022	8a		
3AE5 164-2...	1250	205	210	■	3	25	50	28	63/65	▲	75	28	3	93	245	93	129	49/-	A7E44202022	8a		
3AE5 165-1...	800	205	210	■	3	31.5	50	35.4	80/82	20	75	28	2.5	90	255	98	122	56.5/-	A7E44202022	9a		
3AE5 165-2...	1250	205	210	■	3	31.5	50	35.4	80/82	20	75	28	2.5	90	255	98	122	56.5/-	A7E44202022	9a		
3AE5 172-1...	800	275	210	■	3	16	50	17.9	40/42	▲	75	28	3	93	245	93	129	51.5/1.5	A7E44202023	6		
3AE5 172-2...	1250	275	210	■	3	16	50	17.9	40/42	▲	75	28	3	93	245	93	129	51.5/1.5	A7E44202023	6		
3AE5 173-1...	800	275	210	■	3	20	50	22.4	50/52	▲	75	28	3	93	245	93	129	51.5/1.5	A7E44202023	7		
3AE5 173-2...	1250	275	210	■	3	20	50	22.4	50/52	▲	75	28	3	93	245	93	129	51.5/1.5	A7E44202023	7		
3AE5 174-1...	800	275	210	■	3	25	50	28	63/65	▲	75	28	3	93	245	93	129	51.5/1.5	A7E44202023	8a		
3AE5 174-2...	1250	275	210	■	3	25	50	28	63/65	▲	75	28	3	93	245	93	129	51.5/1.5	A7E44202023	8a		
3AE5 175-1...	800	275	210	■	3	31.5	50	35.4	80/82	20	75	28	2.5	90	255	98	122	56.5/1.5	A7E44202023	9a		
3AE5 175-2...	1250	275	210	■	3	31.5	50	35.4	80/82	20	75	28	2.5	90	255	98	122	56.5/1.5	A7E44202023	9a		
3AE5 182-1...	800	310	210	■	3	16	50	17.9	40/42	▲	75	28	3	93	245	93	129	51.5/1.5	A7E44202024	6		
3AE5 182-2...	1250	310	210	■	3	16	50	17.9	40/42	▲	75	28	3	93	245	93	129	51.5/1.5	A7E44202024	6		
3AE5 182-3...	1600	310	210	■	3	16	50	17.9	40/42	20	75	28	2.5	90	255	98	122	62.5/1.025	A7E44202024	6a		

▲ On request

■ Standard information on rating plate

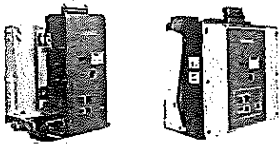
1) The mass of the fixed-mounted circuit breaker, fitted on the withdrawable part, increases by the values specified in the dimension drawing of the withdrawable part (page 83)

3

126

Technical data

Electrical data, dimensions and masses for 3AE5



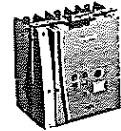
Article No.	12 kV 50/60 Hz		Rated normal current $I_n$ A	Width across flats mm	Pole-center distance mm	Rated switching sequence: O-0.3 s-CO-15 s-CO	Rated short-circuit duration $t_{sc}$ s	Rated short-circuit breaking current $I_{sc}$ kA	DC component in % of the rated short-circuit breaking current	Asymmetric breaking current kA	Rated short-circuit making current (at 50/60 Hz) $I_{ms}$ kA	Rated back-to-back-capacitor-bank inrush making current $I_{in}$ kA peak	Rated lightning impulse voltage $U_p$ kV	Rated short-circuit power-frequency with- stand voltage $U_d$ kV	Voltage drop $\Delta U$ between connections (acc. to IEC 62271-1 at 100 A DC) mV	Minimum creepage distance Interrupters mm	Minimum creepage distance Phase-to-earth mm	Minimum clearance Phase-to-phase mm	Minimum clearance Phase-to-earth mm	Mass <sup>1)</sup> (fixed-mounted circuit breaker/withdrawable module) kg	Detailed dimension drawing (must be explicitly requested)	Operating cycle diagram no. (see page 67)
	3	4																				
3AE5 183-1...	800	310	210	■	3	20	50	22.4	50/52	▲	75	28	3	93	245	93	129	51.591.5	A7E44202024	7		
3AE5 183-2...	1250	310	210	■	3	20	50	22.4	50/52	▲	75	28	3	93	245	93	129	51.591.5	A7E44202024	7		
3AE5 183-3...	1600	310	210	■	3	20	50	22.4	50/52	20	75	28	2.5	90	255	98	122	62.5102.5	A7E44202024	7a		
3AE5 183-4...	2000	310	210	■	3	20	50	24.5	50/52	20	75	28	1.8	130	240	125	138	100	A7E10907000	7b		
3AE5 183-6...	2500	310	210	■	3	20	50	24.5	50/52	20	75	28	1.8	130	240	125	138	100	A7E10907000	7b		
3AE5 184-1...	800	310	210	■	3	25	50	28	63/65	▲	75	28	3	93	245	93	129	51.591.5	A7E44202024	8a		
3AE5 184-2...	1250	310	210	■	3	25	50	28	63/65	▲	75	28	3	93	245	93	129	51.591.5	A7E44202024	8a		
3AE5 184-3...	1600	310	210	■	3	25	50	28	63/65	20	75	28	2.5	90	255	98	122	62.5102.5	A7E44202024	8b		
3AE5 184-4...	2000	310	210	■	3	25	50	30.6	63/65	20	75	28	1.8	130	240	125	138	100	A7E10907000	8c		
3AE5 184-6...	2500	310	210	■	3	25	50	30.6	63/65	20	75	28	1.8	130	240	125	138	100	A7E10907000	8c		
3AE5 185-1...	800	310	210	■	3	31.5	50	35.4	80/82	20	75	28	2.5	90	255	98	122	56.596.5	A7E44202024	9a		
3AE5 185-2...	1250	310	210	■	3	31.5	50	35.4	80/82	20	75	28	2.5	90	255	98	122	56.596.5	A7E44202024	9a		
3AE5 185-3...	1600	310	210	■	3	31.5	50	35.4	80/82	20	75	28	2.5	90	255	98	122	62.5102.5	A7E44202024	9a		
3AE5 185-4...	2000	310	210	■	3	31.5	50	38.6	80/82	20	75	28	1.8	130	240	125	138	100	A7E10907000	9b		
3AE5 185-6...	2500	310	210	■	3	31.5	50	38.6	80/82	20	75	28	1.8	130	240	125	138	100	A7E10907000	9b		
3AE5 554-1...	800	275	160	■	3	25	50	44.9	63/65	▲	75	28	3	93	245	93	129	491-	A7E44202024	8a		
3AE5 554-2...	1250	275	160	■	3	25	50	44.9	63/65	▲	75	28	3	93	245	93	129	491-	A7E44202024	8a		
3AE5 555-1...	800	275	160	■	3	31.5	50	35.4	80/82	20	75	28	2.5	90	255	130	135	66.51-	A7E44202038	9a		
3AE5 555-2...	1250	275	160	■	3	31.5	50	35.4	80/82	20	75	28	2.5	90	255	130	135	66.51-	A7E44202038	9a		
3AE5 564-3...	1600	275	210	■	3	25	50	28.0	63/65	20	75	28	2.5	90	255	98	122	74.51-	A7E44202040	8b		
3AE5 565-2...	1250	275	210	■	3	31.5	50	35.4	80/82	20	75	28	2.5	90	255	130	135	69.51-	A7E44202040	9a		
3AE5 565-3...	1600	275	210	■	3	31.5	50	35.4	80/82	20	75	28	2.5	90	255	130	135	74.51-	A7E44202040	9a		
3AE5 565-6...	2500	275	210	■	3	31.5	50	38.5	80/82	20	75	28	1.8	130	240	125	138	110	A7E10907005	9b		
3AE5 583-4...	2000	310	275	■	3	20	50	24.5	50/52	20	75	28	1.8	130	240	190	138	105	A7E10907000	7b		
3AE5 583-6...	2500	310	275	■	3	20	50	24.5	50/52	20	75	28	1.8	130	240	190	138	105	A7E10907000	7b		
3AE5 584-4...	2000	310	275	■	3	25	50	30.6	63/65	20	75	28	1.8	130	240	190	138	105	A7E10907000	8c		
3AE5 584-6...	2500	310	275	■	3	25	50	30.6	63/65	20	75	28	1.8	130	240	190	138	105	A7E10907000	8c		
3AE5 585-2...	1250	310	275	■	3	31.5	50	38.6	80/82	20	75	28	2.0	130	240	225	143	105	A7E10907000	9b		
3AE5 585-4...	2000	310	275	■	3	31.5	50	38.6	80/82	20	75	28	1.8	130	240	225	138	105	A7E10907000	9b		
3AE5 585-6...	2500	310	275	■	3	31.5	50	38.6	80/82	20	75	28	1.8	130	240	225	138	105	A7E10907000	9b		

▲ On request

■ Standard information on rating plate

1) The mass of the fixed-mounted circuit breaker, fitted on the withdrawable part, increases by the values specified in the dimension drawing of the withdrawable part (page 83)

174



Article No.	12 kV 50/60 Hz		Rated normal current		Width across flats		Pole-center distance		Rated switching sequence: O - 0.3 s - CO - 15 s - CO		Rated short-circuit duration		Rated short-circuit breaking current		DC component in % of the rated short-circuit breaking current		Asymmetric breaking current		Rated short-circuit making current (at 50/60 Hz)		Rated back-to-back-capacitor-bank inrush making current		Rated lightning impulse voltage		Rated short-duration power-frequency with- stand voltage		Voltage drop ΔU between connections (acc. to IEC 62271-1 at 100 A DC)		Minimum creepage distance interrupters		Minimum creepage distance Phase-to-earth		Minimum clearance Phase-to-phase		Minimum clearance Phase-to-earth		Mass <sup>1)</sup> (fixed-mounted circuit breaker/withdrawable module)		Detailed dimension drawing (must be explicitly requested)		Operating cycle diagram no. (see page 67)			
	$I_n$	A	mm	mm	s	kA	%	kA	kA	kA	kA	kA	kV	kV	mV	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg								
3AE1 186-2...	1250	310	210	■	3	40	36	44.9	100/104	10	75	28	1.7	145	155	169	140	120/160	A7E44202070	10																								
3AE1 186-4...	2000	310	210	■	3	40	36	44.9	100/104	10	75	28	1.0	145	249	149	140	160/210	A7E44202071	10																								
3AE1 186-6...	2500	310	210	■	3	40	36	44.9	100/104	10	75	28	1.0	145	249	149	140	160/210	A7E44202071	10																								
3AE1 186-7...	3150	310	210	■	3	40	36	44.9	100/104	10	75	28	1.0	145	249	149	140	160/210	A7E44202071	10																								
3AE1 566-2...	1250	275	210	■	3	40	36	44.9	100/104	10	75	28	1.7	145	155	169	140	120/-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
3AE1 566-6...	2500	275	210	■	3	40	36	44.9	100/104	10	75	28	1.0	145	249	149	140	160/-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
3AE1 566-7...	3150	275	210	■	3	40	36	44.9	100/104	10	75	28	1.0	145	249	149	140	160/-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
3AE1 586-2...	1250	310	275	■	3	40	36	44.9	100/104	10	75	28	1.7	145	155	234	140	125/165	A7E44202068	10																								
3AE1 586-4...	2000	310	275	■	3	40	36	44.9	100/104	10	75	28	1.0	145	155	214	140	165/205	A7E44202069	10																								
3AE1 586-6...	2500	310	275	■	3	40	36	44.9	100/104	10	75	28	1.0	145	155	214	140	165/205	A7E44202069	10																								
3AE1 586-7...	3150	310	275	■	3	40	36	44.9	100/104	10	75	28	1.0	145	155	214	140	165/205	A7E44202069	10																								

▲ On request

■ Standard information on rating plate

1) The mass of the fixed-mounted circuit breaker, fitted on the withdrawable part, increases by the values specified in the dimension drawing of the withdrawable part (page 83)

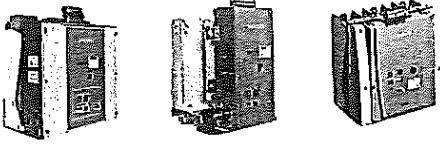
3

17 B

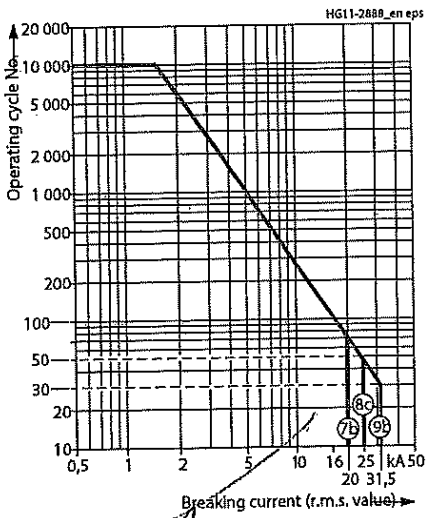
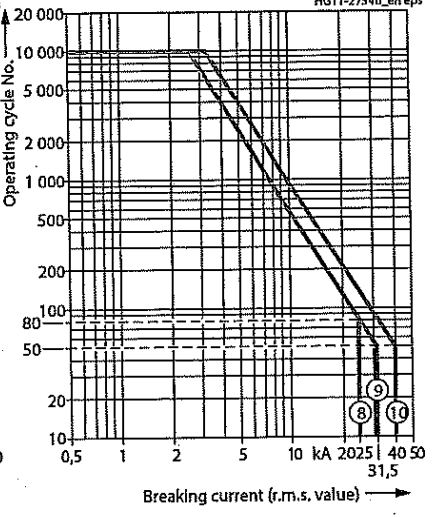
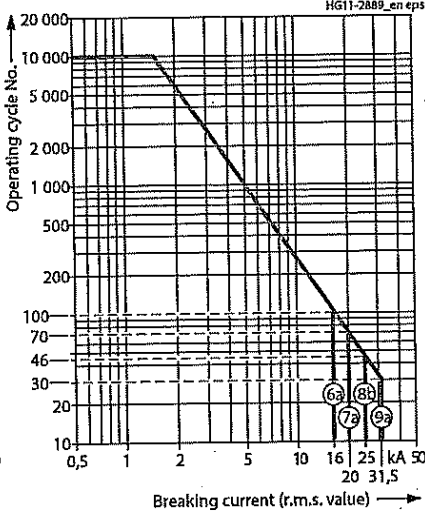
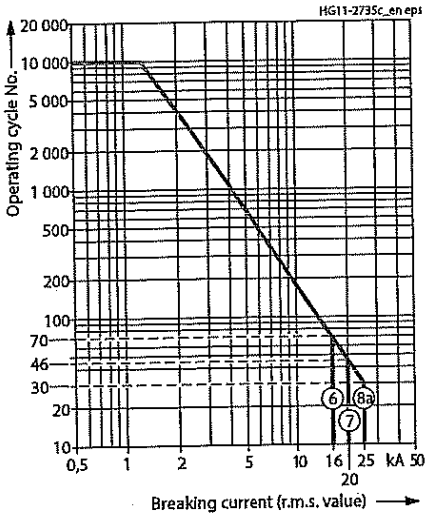


Technical data

Electrical data, dimensions and masses for 3AE5 and 3AE1



Operating cycle diagrams for 12 kV



The permissible number of electrical operating cycles is shown as a function of the breaking current (r.m.s. value). All SION vacuum circuit breakers fulfill the endurance classes E2, M2 and C2 according to IEC 62271-100. The curve shape beyond the parameters defined in IEC 62271-100 is based on average usage data. The number of operating cycles that can actually be reached can be different depending on the respective application.

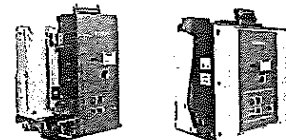
3

*[Handwritten signature]*

*[Handwritten signature]*

129

*[Handwritten signature]*



Article No.	17.5 kV 50/60 Hz		Rated normal current	Width across flats	Pole-center distance	Rated switching sequence: O - 0.3 s - CO - 15 s - CO	Rated short-circuit duration	Rated short-circuit breaking current	DC component in % of the rated short-circuit breaking current	Asymmetric breaking current	Rated short-circuit making current (at 50/60 Hz)	Rated back-to-back-capacitor-bank inrush making current	Rated lightning impulse voltage	Rated short-duration power-frequency with- stand voltage	Voltage drop ΔU between connections (acc. to IEC 62271-1 at 100 A DC)	Minimum creepage distance interrupters	Minimum creepage distance Phase-to-earth	Minimum clearance Phase-to-phase	Minimum clearance Phase-to-earth	Mass <sup>1)</sup> (fixed-mounted circuit breaker/withdrawable module)	Detailed dimension drawing (must be explicitly requested)	Operating cycle diagram no. (see page 75)
	$I_n$	A	mm	mm	s	kA	%	kA	kA	$I_m$	$I_{peak}$	kV	kV	mV	mm	mm	mm	mm	kg			
3AE5 202-1...	800	205	150	■	3	16	50	17.9	40/42	20	95	38	2.5	240	255	130	135	54/-	A7E44202010	12a		
3AE5 202-2...	1250	205	150	■	3	16	50	17.9	40/42	20	95	38	2.5	240	255	130	135	54/-	A7E44202010	12a		
3AE5 204-1...	800	205	150	■	3	25	50	28	63/65	20	95	38	2.5	240	255	130	135	54/-	A7E44202010	13a		
3AE5 204-2...	1250	205	150	■	3	25	50	28	63/65	20	95	38	2.5	240	255	130	135	54/-	A7E44202010	13a		
3AE5 205-1...	800	205	150	■	3	31.5	50	38.6	80/82	20	95	38	2.0	130	240	150	143	83	A7E10907000	14b		
3AE5 205-2...	1250	205	150	■	3	31.5	50	38.6	80/82	20	95	38	2.0	130	240	150	143	83	A7E10907000	14b		
3AE5 212-1...	800	275	150	■	3	16	50	17.9	40/42	20	95	38	2.5	240	255	130	135	54/94	A7E44202011	12a		
3AE5 212-2...	1250	275	150	■	3	16	50	17.9	40/42	20	95	38	2.5	240	255	130	135	54/94	A7E44202011	12a		
3AE5 214-1...	800	275	150	■	3	25	50	28	63/65	20	95	38	2.5	240	255	130	135	54/94	A7E44202011	13a		
3AE5 214-2...	1250	275	150	■	3	25	50	28	63/65	20	95	38	2.5	240	255	130	135	54/94	A7E44202011	13a		
3AE5 215-1...	800	275	150	■	3	31.5	50	38.6	80/82	20	95	38	2.0	130	240	150	143	83	A7E10907000	14b		
3AE5 215-2...	1250	275	150	■	3	31.5	50	38.6	80/82	20	95	38	2.0	130	240	150	143	83	A7E10907000	14b		
3AE5 222-1...	800	310	150	■	3	16	50	17.9	40/42	20	95	38	2.5	240	255	130	135	54/94	A7E44202012	12a		
3AE5 222-2...	1250	310	150	■	3	16	50	17.9	40/42	20	95	38	2.5	240	255	130	135	54/94	A7E44202012	12a		
3AE5 222-3...	1600	310	150	■	3	16	50	17.9	40/42	20	95	38	2.5	240	255	130	135	60/100	A7E44202012	12a		
3AE5 224-1...	800	310	150	■	3	25	50	28	63/65	20	95	38	2.5	240	255	130	135	54/94	A7E44202012	13a		
3AE5 224-2...	1250	310	150	■	3	25	50	28	63/65	20	95	38	2.5	240	255	130	135	54/94	A7E44202012	13a		
3AE5 224-3...	1600	310	150	■	3	25	50	28	63/65	20	95	38	2.5	240	255	130	135	60/100	A7E44202012	13a		
3AE5 225-1...	800	310	150	■	3	31.5	50	38.6	80/82	20	95	38	2.0	130	240	150	143	83	A7E10907000	14b		
3AE5 225-2...	1250	310	150	■	3	31.5	50	38.6	80/82	20	95	38	2.0	130	240	150	143	83	A7E10907000	14b		
3AE5 225-3...	1600	310	150	■	3	31.5	50	38.6	80/82	20	95	38	2.0	130	240	150	143	83	A7E10907000	14b		
3AE5 232-1...	800	205	160	■	3	16	50	17.9	40/42	20	95	38	2.5	240	255	130	135	54/-	A7E44202016	12a		
3AE5 232-2...	1250	205	160	■	3	16	50	17.9	40/42	20	95	38	2.5	240	255	130	135	54/-	A7E44202016	12a		
3AE5 234-1...	800	205	160	■	3	25	50	28	63/65	20	95	38	2.5	240	255	130	135	54/-	A7E44202016	13a		
3AE5 234-2...	1250	205	160	■	3	25	50	28	63/65	20	95	38	2.5	240	255	130	135	54/-	A7E44202016	13a		
3AE5 235-1...	800	205	160	■	3	31.5	50	38.6	80/82	20	95	38	2.0	130	240	160	143	83	A7E10907000	14b		
3AE5 235-2...	1250	205	160	■	3	31.5	50	38.6	80/82	20	95	38	2.0	130	240	160	143	83	A7E10907000	14b		

■ Standard information on rating plate

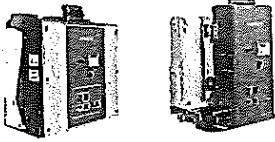
1) The mass of the fixed-mounted circuit breaker, fitted on the withdrawable part, increases by the values specified in the dimension drawing of the withdrawable part (page 83)

3

Handwritten signature and initials.

Technical data

Electrical data, dimensions and masses for 3AE5

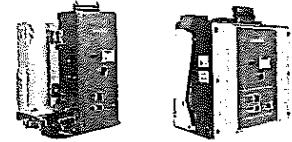


Article No.	17.5 kV 50/60 Hz		Rated normal current	Width across flats	Pole-center distance	Rated switching sequence: D-0.3 s-CO-15 s-CO	Rated short-circuit duration	Rated short-circuit breaking current	DC component in % of the rated short-circuit breaking current	Asymmetric breaking current	Rated short-circuit making current (at 50/60 Hz)	Rated back-to-back-capacitor-bank inrush making current	Rated lightning impulse voltage	Rated short-duration power-frequency with- stand voltage	Voltage drop ΔU between connections (acc. to IEC 62271-1 at 100 A DC)	Minimum creepage distance Interrupters	Minimum creepage distance Phase-to-earth	Minimum clearance Phase-to-phase	Minimum clearance Phase-to-earth	Mass <sup>1)</sup> (fixed-mounted circuit breaker/withdrawable module)	Detailed dimension drawing (must be explicitly requested)	Operating cycle diagram no. (see page 75)
	$I_n$	A	mm	mm	s	kA	%	kA	kA	$I_{ms}$	kA	$I_{peak}$	kV	kV	mV	mm	mm	mm	mm	kg		
3AE5 242-1...	800	275	160	■	3	16	50	17.9	40/42	20	95	38	2.5	240	255	130	135	54/-	A7E44202017	12a		
3AE5 242-2...	1250	275	160	■	3	16	50	17.9	40/42	20	95	38	2.5	240	255	130	135	54/-	A7E44202017	12a		
3AE5 244-1...	800	275	160	■	3	25	50	28	63/65	20	95	38	2.5	240	255	130	135	54/-	A7E44202017	13a		
3AE5 244-2...	1250	275	160	■	3	25	50	28	63/65	20	95	38	2.5	240	255	130	135	54/-	A7E44202017	13a		
3AE5 245-1...	800	275	160	■	3	31.5	50	38.6	80/82	20	95	38	2.0	130	240	160	143	83	A7E10907000	14b		
3AE5 245-2...	1250	275	160	■	3	31.5	50	38.6	80/82	20	95	38	2.0	130	240	160	143	83	A7E10907000	14b		
3AE5 252-1...	800	310	160	■	3	16	50	17.9	40/42	20	95	38	2.5	240	255	130	135	54/-	A7E44202018	12a		
3AE5 252-2...	1250	310	160	■	3	16	50	17.9	40/42	20	95	38	2.5	240	255	130	135	54/-	A7E44202018	12a		
3AE5 252-3...	1600	310	160	■	3	16	50	17.9	40/42	20	95	38	2.5	240	255	130	135	60/-	A7E44202018	12a		
3AE5 254-1...	800	310	160	■	3	25	50	28	63/65	20	95	38	2.5	240	255	130	135	54/-	A7E44202018	13a		
3AE5 254-2...	1250	310	160	■	3	25	50	28	63/65	20	95	38	2.5	240	255	130	135	54/-	A7E44202018	13a		
3AE5 254-3...	1600	310	160	■	3	25	50	28	63/65	20	95	38	2.5	240	255	130	135	60/-	A7E44202018	13a		
3AE5 255-1...	800	310	160	■	3	31.5	50	38.6	80/82	20	95	38	2.0	130	240	160	143	83	A7E10907000	14b		
3AE5 255-2...	1250	310	160	■	3	31.5	50	38.6	80/82	20	95	38	2.0	130	240	160	143	83	A7E10907000	14b		
3AE5 255-3...	1600	310	160	■	3	31.5	50	38.5	80/82	20	95	38	2.0	130	240	160	143	83	A7E10907000	14b		
3AE5 262-1...	800	205	210	■	3	16	50	17.9	40/42	20	95	38	2.5	240	255	130	135	57/-	A7E44202022	12a		
3AE5 262-2...	1250	205	210	■	3	16	50	17.9	40/42	20	95	38	2.5	240	255	130	135	57/-	A7E44202022	12a		
3AE5 264-1...	800	205	210	■	3	25	50	28	63/65	20	95	38	2.5	240	255	130	135	57/-	A7E44202022	13a		
3AE5 264-2...	1250	205	210	■	3	25	50	28	63/65	20	95	38	2.5	240	255	130	135	57/-	A7E44202022	13a		
3AE5 265-1...	800	205	210	■	3	31.5	50	38.6	80/82	20	95	38	2.0	130	240	210	143	88	A7E10907000	14b		
3AE5 265-2...	1250	205	210	■	3	31.5	50	38.6	80/82	20	95	38	2.0	130	240	210	143	88	A7E10907000	14b		
3AE5 272-1...	800	275	210	■	3	16	50	17.9	40/42	20	95	38	2.5	240	255	130	135	57/97	A7E44202023	12a		
3AE5 272-2...	1250	275	210	■	3	16	50	17.9	40/42	20	95	38	2.5	240	255	130	135	57/97	A7E44202023	12a		
3AE5 274-1...	800	275	210	■	3	25	50	28	63/65	20	95	38	2.5	240	255	130	135	57/97	A7E44202023	13a		
3AE5 274-2...	1250	275	210	■	3	25	50	28	63/65	20	95	38	2.5	240	255	130	135	57/97	A7E44202023	13a		
3AE5 275-1...	800	275	210	■	3	31.5	50	38.6	80/82	20	95	38	2.0	130	240	210	143	88	A7E10907000	14b		
3AE5 275-2...	1250	275	210	■	3	31.5	50	38.6	80/82	20	95	38	2.0	130	240	210	143	88	A7E10907000	14b		

■ Standard information on rating plate

1) The mass of the fixed-mounted circuit breaker, fitted on the withdrawable part, increases by the values specified in the dimension drawing of the withdrawable part (page 83)

138



Article No.	17.5 kV and NXAIR 50/60 Hz		Rated normal current	Width across flats	Pole-center distance	Rated switching sequence: O - 0.3 s - CO - 15 s - CO	Rated short-circuit duration	Rated short-circuit breaking current	DC component in % of the rated short-circuit breaking current	Asymmetric breaking current	Rated short-circuit making current (at 50/60 Hz)	Rated back-to-back-capacitor-bank inrush making current	Rated lightning impulse voltage	Rated short-duration power-frequency with- stand voltage	Voltage drop ΔU between connections (acc. to IEC 62271-1 at 100 A DC)	Minimum creepage distance Interrupters	Minimum creepage distance Phase-to-earth	Minimum clearance Phase-to-phase	Minimum clearance Phase-to-earth	Mass <sup>1)</sup>	Fixed-mounted circuit breaker/withdrawable module(s)	Detailed dimension drawing (must be explicitly requested)	Operating cycle diagram no. (see page 75)
	I <sub>n</sub>	A	mm	mm	s	kA	%	kA	kA	kA	kA	kV	kV	mV	mm	mm	mm	mm	kg				
3AE5 282-1...	800	310	210	■	3	16	50	17.9	40/42	20	95	38	2.5	240	255	130	135	57/97	A7E44202024	12a			
3AE5 282-2...	1250	310	210	■	3	16	50	17.9	40/42	20	95	38	2.5	240	255	130	135	57/97	A7E44202024	12a			
3AE5 282-3...	1600	310	210	■	3	16	50	17.9	40/42	20	95	38	2.5	240	255	130	135	63/103	A7E44202024	12a			
3AE5 284-1...	800	310	210	■	3	25	50	28	63/65	20	95	38	2.5	240	255	130	135	57/97	A7E44202024	13a			
3AE5 284-2...	1250	310	210	■	3	25	50	28	63/65	20	95	38	2.5	240	255	130	135	57/97	A7E44202024	13a			
3AE5 284-3...	1600	310	210	■	3	25	50	28	63/65	20	95	38	2.5	240	255	130	135	63/103	A7E44202024	13a			
3AE5 284-4...	2000	310	210	■	3	25	50	30.6	63/65	20	95	38	1.8	130	240	196	138	100	A7E10907000	13b			
3AE5 284-6...	2500	310	210	■	3	25	50	30.6	63/65	20	95	38	1.8	130	240	196	138	100	A7E10907000	13b			
3AE5 285-1...	800	310	210	■	3	31.5	50	38.6	80/82	20	95	38	2.0	130	240	210	143	88	A7E10907000	14b			
3AE5 285-2...	1250	310	210	■	3	31.5	50	38.6	80/82	20	95	38	2.0	130	240	210	143	88	A7E10907000	14b			
3AE5 285-3...	1600	310	210	■	3	31.5	50	38.6	80/82	20	95	38	2.0	130	240	210	143	88	A7E10907000	14b			
3AE5 285-4...	2000	310	210	■	3	31.5	50	38.6	80/82	20	95	38	1.8	130	240	196	138	105	A7E10907000	14a			
3AE5 285-6...	2500	310	210	■	3	31.5	50	38.6	80/82	20	95	38	1.8	130	240	196	138	105	A7E10907000	14a			
3AE5 624-1...	800	275	160	■	3	25	50	28	63/65	20	95	38	2.5	240	255	130	135	67/-	A7E44202038	13a			
3AE5 624-2...	1250	275	160	■	3	25	50	28	63/65	20	95	38	2.5	240	255	130	135	67/-	A7E44202038	13a			
3AE5 625-1...	800	275	160	■	3	31.5	50	35.4	80/82	20	95	38	2	130	240	160	143	85	A7E10907005	14b			
3AE5 625-2...	1250	275	160	■	3	31.5	50	35.4	80/82	20	95	38	2	130	240	160	143	85	A7E10907005	14b			
3AE5 654-4...	2000	310	275	■	3	25	50	30.6	63/65	20	95	38	1.8	130	240	261	138	105	A7E10907000	13b			
3AE5 654-6...	2500	310	275	■	3	25	50	30.6	63/665	20	95	38	1.8	130	240	261	138	105	A7E10907000	13b			
3AE5 655-2...	1250	310	275	■	3	31.5	50	38.6	80/82	20	95	38	2.0	130	240	275	143	96	A7E10907000	14b			
3AE5 655-3...	1600	310	275	■	3	31.5	50	38.6	80/82	20	95	38	2.0	130	240	275	143	96	A7E10907000	14b			
3AE5 655-4...	2000	310	275	■	3	31.5	50	38.6	80/82	20	95	38	1.8	130	240	261	138	105	A7E10907000	14a			
3AE5 655-6...	2500	310	275	■	3	31.5	50	38.6	80/82	20	95	38	1.8	130	240	261	138	108	A7E10907000	14a			
3AE5 664-2...	1250	275	210	■	3	25	50	28	63/65	20	95	38	2.5	240	255	130	135	70/-	A7E44202040	13a			
3AE5 664-3...	1600	275	210	■	3	25	50	28	63/65	20	95	38	2.5	240	255	130	135	75/-	A7E44202040	13a			
3AE5 665-2...	1250	275	210	■	3	31.5	50	35.4	80/82	20	95	38	2	130	240	196	143	91	A7E10907005	14b			
3AE5 665-3...	1600	275	210	■	3	31.5	50	35.4	80/82	20	95	38	2	130	240	196	138	84	A7E10907005	14b			
3AE5 665-6...	2500	275	210	■	3	31.5	50	38.5	80/82	20	95	38	1.8	130	240	196	138	110	A7E10907005	14a			

■ Standard information on rating plate

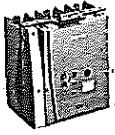
1) The mass of the fixed-mounted circuit breaker, fitted on the withdrawable part, increases by the values specified in the dimension drawing of the withdrawable part (page 83)

3

132

Technical data

Electrical data, dimensions and masses for 3AE1



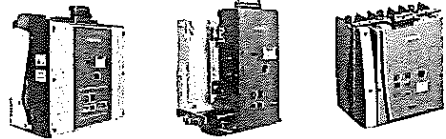
Article No.	17.5 kV 50/60 Hz		Rated normal current	Width across flats	Pole-center distance	Rated switching sequence: O - 0.3 s - CO - 15 s - CO	Rated short-circuit duration	Rated short-circuit breaking current	DC component in % of the rated short-circuit breaking current	Asymmetric breaking current	Rated short-circuit making current (at 50/60 Hz)	Rated back-to-back-capacitor-bank inrush making current	Rated lightning impulse voltage	Rated short-duration power-frequency with- stand voltage	Voltage drop ΔU between connections (acc. to IEC 62271-1 at 100 A DC)	Minimum creepage distance interrupters	Minimum creepage distance Phase-to-earth	Minimum clearance Phase-to-phase	Minimum clearance Phase-to-earth	Mass <sup>1)</sup>	Detailed dimension drawing (must be explicitly requested)	Operating cycle diagram no. (see page 75)
	I <sub>n</sub>	A	mm	mm	s	kA	%	kA	kA	I <sub>m</sub> peak	kV	kV	mV	mm	mm	mm	mm	kg				
3AE1 286-2...	1250	310	210	■	3	40	36	44.9	100/104	10	95	38	1.7	145	249	169	140	120/160	A7E44202070	15		
3AE1 286-4...	2000	310	210	■	3	40	36	44.9	100/104	10	95	38	1.0	145	249	149	140	160/210	A7E44202071	15		
3AE1 286-6...	2500	310	210	■	3	40	36	44.9	100/104	10	95	38	1.0	145	249	149	140	160/210	A7E44202071	15		
3AE1 286-7...	3150	310	210	■	3	40	36	44.9	100/104	10	95	38	1.0	145	249	149	140	160/210	A7E44202071	15		
3AE1 666-2...	1250	275	210	■	3	40	36	44.9	100/104	10	95	38	1.7	145	249	169	140	120/-	-	15		
3AE1 666-6...	2500	275	210	■	3	40	36	44.9	100/104	10	95	38	1.0	145	249	149	140	160/-	-	15		
3AE1 666-7...	3150	275	210	■	3	40	36	44.9	100/104	10	95	38	1.0	145	249	149	140	160/-	-	15		
3AE1 656-2...	1250	310	275	■	3	40	36	44.9	100/104	10	95	38	1.7	145	155	234	140	125/165	A7E44202068	15		
3AE1 656-4...	2000	310	275	■	3	40	36	44.9	100/104	10	95	38	1.0	145	155	214	140	165/205	A7E44202069	15		
3AE1 656-6...	2500	310	275	■	3	40	36	44.9	100/104	10	95	38	1.0	145	155	214	140	165/205	A7E44202069	15		
3AE1 656-7...	3150	310	275	■	3	40	36	44.9	100/104	10	95	38	1.0	145	155	214	140	165/205	A7E44202069	15		

■ Standard information on rating plate

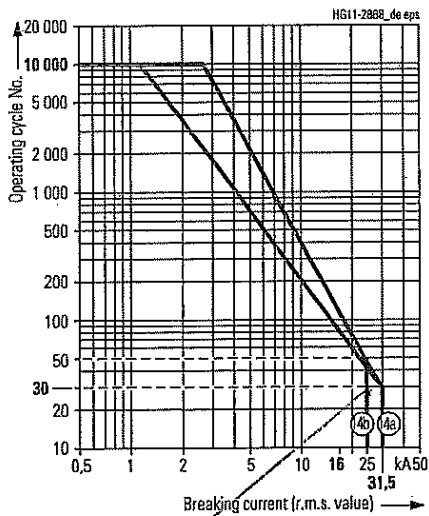
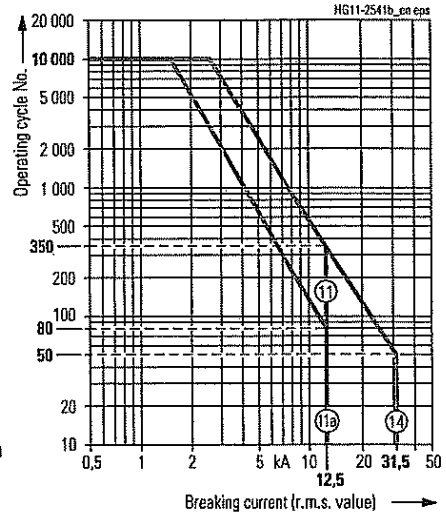
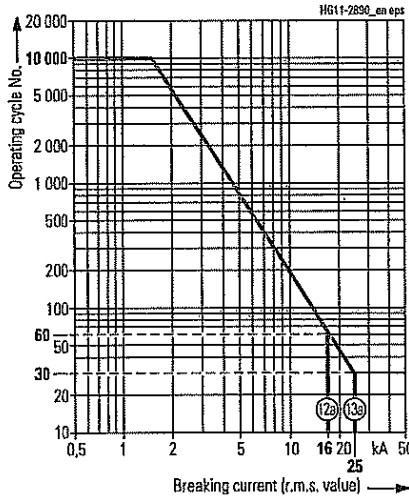
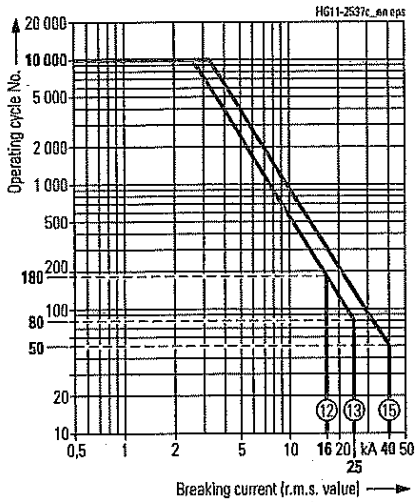
1) The mass of the fixed-mounted circuit breaker, fitted on the withdrawable part, increases by the values specified in the dimension drawing of the withdrawable part (page 83)

3

133



Operating cycle diagrams for 17.5 kV



The permissible number of electrical operating cycles is shown as a function of the breaking current (r.m.s. value). All SION vacuum circuit breakers fulfill the endurance classes E2, M2 and C2 according to IEC 62271-100. The curve shape beyond the parameters defined in IEC 62271-100 is based on average usage data. The number of operating cycles that can actually be reached can be different depending on the respective application.

3

134

Technical data

Electrical data, dimensions and masses for 3AE5



Article no.	24 kV 50/60 Hz		Rated normal current	Width across flats	Pole-center distance	Rated switching sequence: O-0.3 s-CO-15 s-CO	Rated short-circuit duration	Rated short-circuit breaking current	DC component in % of the rated short-circuit breaking current	Asymmetric breaking current	Rated short-circuit making current (at 50/60 Hz)	Rated back-to-back-capacitor-bank inrush making current	Rated lightning impulse voltage	Rated short-duration power frequency with- stand voltage	Voltage drop ΔU between connections (acc. to IEC 62271-1 at 100 A DC)	Minimum creepage distance interrupters	Minimum creepage distance Phase-to-earth	Minimum clearance Phase-to-phase	Minimum clearance Phase-to-earth	Mass <sup>1)</sup>	Detailed dimension drawing (must be explicitly requested)	Operating cycle diagram no. (see page 78)
	I <sub>n</sub>	A	mm	mm	s	kA	%	kA	kA	kA	kV	kV	mV	mm	mm	mm	mm	kg				
3AE5 321-1...	800	310	210	■	3	12.5	50	14.9	31/33	▲	125	50	3	240	250	180	185	65/105	A7E10950000	16a		
3AE5 321-2...	1250	310	210	■	3	12.5	50	14.9	31/33	▲	125	50	3	240	250	180	185	65/105	A7E10950000	16a		
3AE5 322-1...	800	310	210	■	3	16	50	17.9	40/42	▲	125	50	3	240	250	180	185	65/105	A7E10950000	17a		
3AE5 322-2...	1250	310	210	■	3	16	50	17.9	40/42	▲	125	50	3	240	250	180	185	65/105	A7E10950000	17a		
3AE5 323-1...	800	310	210	■	3	20	50	22.4	50/52	▲	125	50	3	240	250	180	185	65/105	A7E10950000	18a		
3AE5 323-2...	1250	310	210	■	3	20	50	22.4	50/52	▲	125	50	3	240	250	180	185	65/105	A7E10950000	18a		
3AE5 324-1...	800	310	210	■	3	25	50	28	63/65	▲	125	50	3	240	250	180	185	65/105	A7E10950000	19a		
3AE5 324-2...	1250	310	210	■	3	25	50	28	63/65	▲	125	50	3	240	250	180	185	65/105	A7E10950000	19a		
3AE5 352-1...	800	310	275	■	3	16	50	17.9	40/42	▲	125	50	3	240	250	180	185	68/108	A7E10950000	17a		
3AE5 352-2...	1250	310	275	■	3	16	50	17.9	40/42	▲	125	50	3	240	250	245	185	68/108	A7E10950000	17a		
3AE5 353-1...	800	310	275	■	3	20	50	22.4	50/52	▲	125	50	3	240	250	245	185	68/108	A7E10950000	18a		
3AE5 353-2...	1250	310	275	■	3	20	50	22.4	50/52	▲	125	50	3	240	250	245	185	68/108	A7E10950000	18a		
3AE5 354-1...	800	310	275	■	3	25	50	28	63/65	▲	125	50	3	240	250	245	185	68/108	A7E10950000	19a		
3AE5 354-2...	1250	310	275	■	3	25	50	28	63/65	▲	125	50	3	240	250	245	185	68/108	A7E10950000	19a		
3AE5 714-1...	800	310	210	■	3	25	50	28	63/65	▲	125	50	3	240	250	180	185	65/105	A7E10950000	19a		
3AE5 714-0...	1000	310	210	■	3	25	50	28	63/65	▲	125	50	3	240	250	180	185	65/105	A7E10950000	19a		
3AE5 714-2...	1250	310	210	■	3	25	50	28	63/65	▲	125	50	3	240	250	180	185	65/105	A7E10950000	19a		

▲ On request

■ Standard information on rating plate

1) The mass of the fixed-mounted circuit breaker, fitted on the withdrawable part, increases by the values specified in the dimension drawing of the withdrawable part (page 83)

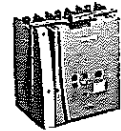
3

Handwritten mark resembling '24'.

Handwritten signature.

Handwritten mark resembling '135'.

Handwritten signature.



Article No.	24 kV 50/60 Hz		Rated normal current $I_n$ A	Width across flats mm	Pole-center distance mm	Rated switching sequence: O - 0.3 s - CO - 15 s - CO	Rated short-circuit duration $t_{sc}$ s	Rated short-circuit breaking current $I_{sc}$ kA	DC component in % of the rated short-circuit breaking current	Asymmetric breaking current kA	Rated short-circuit making current (at 50/60 Hz) $I_{ms}$ kA	Rated back-to-back-capacitor-bank inrush making current $I_{bi}$ kA peak	Rated lightning impulse voltage $U_p$ kV	Rated short-duration power-frequency with- stand voltage $U_d$ kV	Voltage drop $\Delta U$ between connections (acc. to IEC 62271-1 at 100 A DC) mV	Minimum creepage distance Inter-rupters mm	Minimum creepage distance Phase-to-earth mm	Minimum clearance Phase-to-phase mm	Minimum clearance Phase-to-earth mm	Mass <sup>1)</sup> (fixed-mounted circuit breaker/withdrawable module) kg	Detailed dimension drawing (must be explicitly requested)	Operating cycle diagram no. (see page 78)
	Rated normal current $I_n$ A	Width across flats mm																				
3AE1 321-1...	800	310	210	■	3	12.5	36	14.9	31/33	10	125	50	2.6	200	350	200	210	120/160	A7E44202050	16		
3AE1 321-2...	1250	310	210	■	3	12.5	36	14.9	31/33	10	125	50	2.6	200	350	200	210	120/160	A7E44202050	16		
3AE1 322-1...	800	310	210	■	3	16	36	17.9	40/42	10	125	50	2.6	200	350	200	210	120/160	A7E44202050	17		
3AE1 322-2...	1250	310	210	■	3	16	36	17.9	40/42	10	125	50	2.6	200	350	200	210	120/160	A7E44202050	17		
3AE1 322-4...	2000	310	210	■	3	16	36	17.9	40/42	10	125	50	2.0	200	340	200	205	140/180	A7E44202051	17		
3AE1 323-1...	800	310	210	■	3	20	36	22.4	50/52	10	125	50	2.6	200	350	200	210	120/160	A7E44202050	18		
3AE1 323-2...	1250	310	210	■	3	20	36	22.4	50/52	10	125	50	2.6	200	350	200	210	120/160	A7E44202050	18		
3AE1 323-4...	2000	310	210	■	3	20	36	22.4	50/52	10	125	50	2.0	200	340	200	205	140/180	A7E44202051	18		
3AE1 323-6...	2500	310	210	■	3	20	36	22.4	50/52	10	125	50	2.0	200	340	200	205	140/180	A7E44202051	18		
3AE1 324-1...	800	310	210	■	3	25	36	28	63/65	10	125	50	2.6	200	350	200	210	120/160	A7E44202050	19		
3AE1 324-2...	1250	310	210	■	3	25	36	28	63/65	10	125	50	2.6	200	350	200	210	120/160	A7E44202050	19		
3AE1 324-4...	2000	310	210	■	3	25	36	28	63/65	10	125	50	2.0	200	340	200	205	140/180	A7E44202051	19		
3AE1 324-6...	2500	310	210	■	3	25	36	28	63/65	10	125	50	2.0	200	340	200	205	140/180	A7E44202051	19		
3AE1 352-1...	800	310	275	■	3	16	36	17.9	40/42	10	125	50	2.6	200	350	265	210	130/180	A7E44202052	17		
3AE1 352-2...	1250	310	275	■	3	16	36	17.9	40/42	10	125	50	2.6	200	350	265	210	130/180	A7E44202052	17		
3AE1 352-4...	2000	310	275	■	3	16	36	17.9	40/42	10	125	50	2.0	200	340	265	205	150/200	A7E44202053	17		
3AE1 353-1...	800	310	275	■	3	20	36	22.4	50/52	10	125	50	2.6	200	350	265	210	130/180	A7E44202052	18		
3AE1 353-2...	1250	310	275	■	3	20	36	22.4	50/52	10	125	50	2.6	200	350	265	210	130/180	A7E44202052	18		
3AE1 353-4...	2000	310	275	■	3	20	36	22.4	50/52	10	125	50	2.0	200	340	265	205	150/200	A7E44202053	18		
3AE1 353-6...	2500	310	275	■	3	20	36	22.4	50/52	10	125	50	2.0	200	340	265	205	150/200	A7E44202053	18		

■ Standard information on rating plate

1) The mass of the fixed-mounted circuit breaker, fitted on the withdrawable part, increases by the values specified in the dimension drawing of the withdrawable part (page 83)

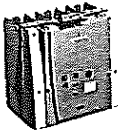
3

176



**Technical data**

Electrical data, dimensions and masses for 3AE1



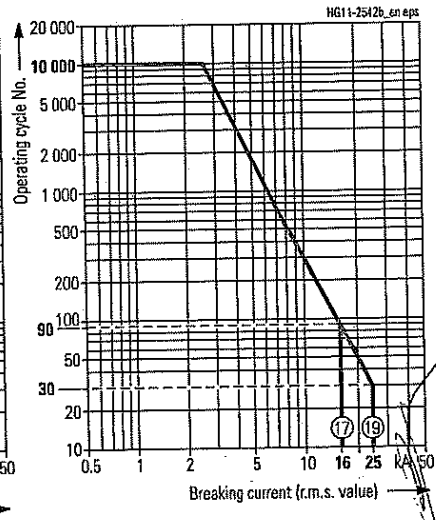
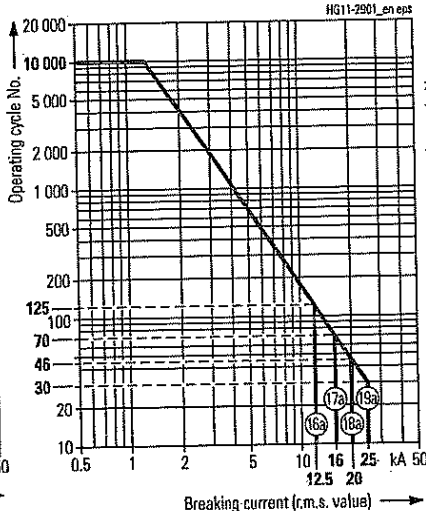
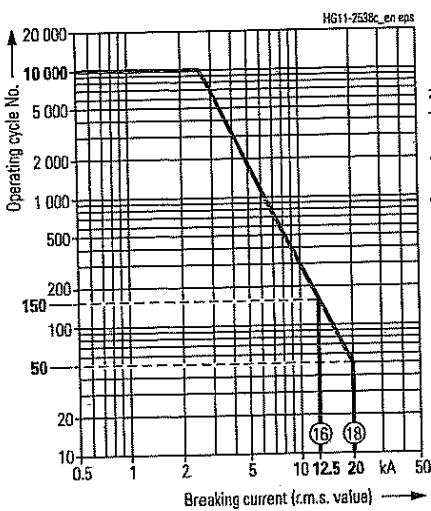
Article No.	24 kV 50/60 Hz		Rated normal current	Width across flats	Pole-center distance	Rated switching sequence: O - 0.3 s - CO - 15 s - CO	Rated short-circuit duration	Rated short-circuit breaking current	DC component in % of the rated short-circuit breaking current	Asymmetric breaking current	Rated short-circuit making current (at 50/60 Hz)	Rated back-to-back-capacitor-bank inrush making current	Rated lightning impulse voltage	Rated short-duration power-frequency withstand voltage	Voltage drop ΔU between connections (acc. to IEC 62271-1 at 100 A DC)	Minimum creepage distance Interruption	Minimum creepage distance Phase-to-earth	Minimum clearance Phase-to-phase	Minimum clearance Phase-to-earth	Mass <sup>1)</sup> (fixed-mounted circuit breaker/withdrawable module)	Detailed dimension drawing (must be explicitly requested)	Operating cycle diagram No. (see below)
	$I_n$	$I_{ns}$	A	mm	mm		s	$I_{sc}$	%	kA	$I_m$	$I_{in}$	$U_p$	$U_d$	mV	mm	mm	mm	mm	kg		
3AE1 354-1...			800	310	275	■	3	25	36	28	63/65	10	125	50	2.6	200	350	265	210	130/180	A7E44202052	19
3AE1 354-2...			1250	310	275	■	3	25	36	28	63/65	10	125	50	2.6	200	350	265	210	130/180	A7E44202052	19
3AE1 354-4...			2000	310	275	■	3	25	36	28	63/65	10	125	50	2.0	200	340	265	205	150/200	A7E44202053	19
3AE1 354-6...			2500	310	275	■	3	25	36	28	63/65	10	125	50	2.0	200	340	265	205	150/200	A7E44202053	19
3AE1 714-2...			1250	320	210	■	3	25	36	28	63/65	10	125	50	2.6	200	350	200	210	120/-	-	19
3AE1 744-4...			2000	320	275	■	3	25	36	28	63/65	10	125	50	2.0	200	340	200	205	150/-	-	19
3AE1 744-6...			2500	320	275	■	3	25	36	44.9	63/65	10	125	50	2.0	200	340	200	205	150/-	-	19

■ Standard information on rating plate

1) The mass of the fixed-mounted circuit breaker, fitted on the withdrawable part, increases by the values specified in the dimension drawing of the withdrawable part (page 83)

3

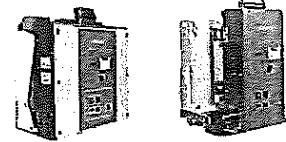
**Operating cycle diagrams for 24 kV**



The permissible number of electrical operating cycles is shown as a function of the breaking current (r.m.s. value). All SION vacuum circuit breakers fulfill the endurance classes E2, M2 and C2 according to IEC 62271-100.

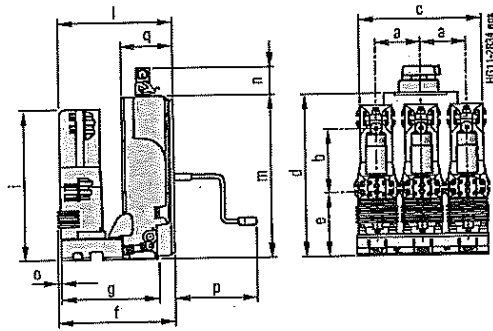
The curve shape beyond the parameters defined in IEC 62271-100 is based on average usage data. The number of operating cycles that can actually be reached can be different depending on the respective application.

137



Dimension drawings for 7.2 to 24 kV

Vacuum circuit breaker without contact arm



Voltage level	Pole-center distance a mm	Width across flats b mm	c mm	d mm	e mm	f mm	g mm	i mm	l mm	m mm	n mm	o mm	p mm	q mm
7.2 kV	150	205	445	540	217.5	380	329	500.5 <sup>1)2)</sup>	371	540	105	8	305	169
	150	275	445	540	217.5	380	329	500.5 <sup>1)2)</sup>	371	540	105	8	305	169
	150	310	445	540	237.5	380	329	500.5 <sup>1)2)</sup>	371	540	105	8	305	169
	160	205	465	540	217.5	380	329	500.5 <sup>1)2)</sup>	371	540	105	8	305	169
	160	275	465	540	217.5	380	329	500.5 <sup>1)2)</sup>	371	540	105	8	305	169
	160	310	465	540	237.5	380	329	500.5 <sup>1)2)</sup>	371	540	105	8	305	169
	210	205	565	540	217.5	380	329	500.5 <sup>1)</sup>	371	540	105	8	305	169
	210	275	565	540	217.5	380	329	500.5 <sup>1)</sup>	371	540	105	8	305	169
	210	310	565	540	237.5	380	329	500.5 <sup>1)</sup>	371	540	105	8 <sup>3)</sup>	305	169
12 kV	150	205	445	540	217.5	380	329	500.5 <sup>1)2)</sup>	371	540	105	8	305	169
	150	275	445	540	217.5	380	329	500.5 <sup>1)2)</sup>	371	540	105	8	305	169
	150	310	445	540	237.5	380	329	500.5 <sup>1)2)</sup>	371	540	105	8	305	169
	160	205	465	540	217.5	380	329	500.5 <sup>1)2)</sup>	371	540	105	8	305	169
	160	275	465	540	217.5	380	329	500.5 <sup>1)2)</sup>	371	540	105	8	305	169
	160	310	465	540	237.5	380	329	500.5 <sup>1)2)</sup>	371	540	105	8	305	169
	210	205	565	540	217.5	380	329	500.5 <sup>1)</sup>	371	540	105	8	305	169
	210	275	565	540	217.5	380	329	500.5 <sup>1)</sup>	371	540	105	8	305	169
	210	310	565	540	237.5	380	329	500.5 <sup>1)</sup>	371	540	105	8	305	169
17.5 kV	150	205	445	540	217.5	380	329	540	371	540	105	8	305	169
	150	275	445	540	217.5	380	329	540	371	540	105	8	305	169
	150	310	445	540	237.5	380	329	540	371	540	105	8	305	169
	160	205	465	540	217.5	380	329	540	371	540	105	8	305	169
	160	275	465	540	217.5	380	329	540	371	540	105	8	305	169
	160	310	465	540	237.5	380	329	540	371	540	105	8	305	169
	210	205	565	540	217.5	380	329	540	371	540	105	8	305	169
	210	275	565	540	217.5	380	329	540	371	540	105	8	305	169
	210	310	565	540	237.5	380	329	540	371	540	105	8	305	169
24 kV	210	310	570	540	283	459	399	667	421	540	105	7	305	169
	275	310	695	540	283	459	399	667	421	540	105	7	305	169

Note: Small deviations of the dimensions are permissible

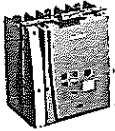
- 1) At  $I_{sc} = 31.5$  kA or at  $I_n = 1600$  A  $\rightarrow$  540 mm
- 2) At  $I_{sc} = 31.5$  kA  $\rightarrow$  552 mm
- 3) At  $I_n > 1600$  A  $\rightarrow$  30 mm

3

13B

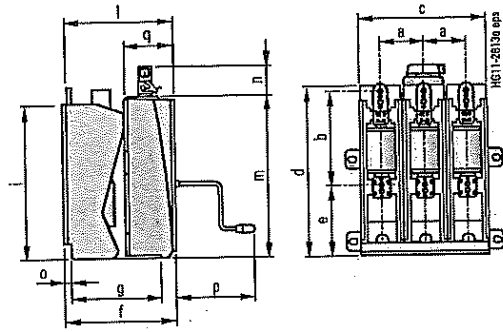
**Technical data**

Dimension drawings for voltage levels 7.2 kV to 24 kV for 3AE1



**Dimension drawings for 7.2 to 24 kV**

Vacuum circuit breaker without contact arm



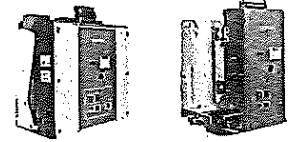
Voltage level	Pole-center distance a mm	Width across flats b mm	c mm	d mm	e mm	f mm	g mm	i mm	l mm	m mm	n mm	o mm	p mm	q mm
7.2 kV	210	310	565	540 <sup>5)</sup>	237.5	380 <sup>1)</sup>	300 <sup>2)</sup>	523 <sup>3)</sup>	371 <sup>4)</sup>	540	105	30 <sup>8)</sup>	279	165
	210	275	565	540 <sup>5)</sup>	217.5	380	300 <sup>4)</sup>	523 <sup>3)</sup>	371 <sup>4)</sup>	540	105	30	279	165
12 kV	210	310	565	540 <sup>5)</sup>	237.5	380 <sup>1)</sup>	300 <sup>2)</sup>	523 <sup>3)</sup>	371 <sup>4)</sup>	540	105	30 <sup>8)</sup>	279	165
	210	275	565	562	217.5	380	310	517.5	371	540	105	30	279	165
17.5 kV	210	310	565	562	237.5	380 <sup>1)</sup>	310 <sup>2)</sup>	517.5 <sup>3)</sup>	371 <sup>4)</sup>	540	105	30 <sup>8)</sup>	279	165
	210	310	570	739	283	469	360	739	421	540	105	58	279	165
24 kV	275	310	700	739	283	469	360	739	421	540	105	58	279	165

Note: Small deviations of the dimensions are permissible

- 1) At  $I_{sc} = 40 \text{ kA} \rightarrow 450 \text{ mm}$
- 2) At  $I_{sc} = 40 \text{ kA} \rightarrow 350 \text{ mm}$
- 3) At  $I_{sc} = 40 \text{ kA} \rightarrow 610 \text{ mm}$
- 4) At  $I_{sc} = 40 \text{ kA} \rightarrow 420 \text{ mm}$
- 5) At  $I_n > 1250 \text{ A}$  or at  $I_{sc} = 31.5 \text{ kA} \rightarrow 562 \text{ mm}$
- 6) At  $I_n > 1250 \text{ A}$  or at  $I_{sc} = 31.5 \text{ kA} \rightarrow 310 \text{ mm}$
- 7) At  $I_n > 1250 \text{ A}$  or at  $I_{sc} = 31.5 \text{ kA} \rightarrow 518 \text{ mm}$
- 8) At  $I_{sc} = 40 \text{ kA} \rightarrow 50 \text{ mm}$

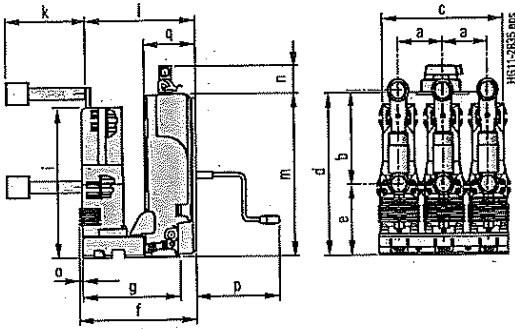
3

039



Dimension drawings for 7.2 to 24 kV

Vacuum circuit breaker with contact arm



Voltage level	Pole-center distance a mm	Width across flats b mm	c mm	d mm	e mm	f mm	g mm	i mm	k mm	l mm	m mm	n mm	o mm	p mm	q mm
7.2 kV	150	205	445	540	217.5	380	329	500.5 <sup>1)2)</sup>	274	371	540	105	8	305	169
	150	275	445	540	217.5	380	329	500.5 <sup>1)2)</sup>	274	371	540	105	8	305	169
	150	310	445	540	237.5	380	329	500.5 <sup>1)2)</sup>	274	371	540	105	8	305	169
	160	205	465	540	217.5	380	329	500.5 <sup>1)2)</sup>	274	371	540	105	8	305	169
	160	275	465	540	217.5	380	329	500.5 <sup>1)2)</sup>	274	371	540	105	8	305	169
	160	310	465	540	237.5	380	329	500.5 <sup>1)2)</sup>	274	371	540	105	8	305	169
	210	205	565	540	217.5	380	329	500.5 <sup>1)</sup>	274	371	540	105	8	305	169
	210	275	565	540	217.5	380	329	500.5 <sup>1)</sup>	274	371	540	105	8	305	169
	210	310	565	540	237.5	380	329	500.5 <sup>1)</sup>	274	371	540	105	8 <sup>3)</sup>	305	169
12 kV	150	205	445	540	217.5	380	329	500.5 <sup>1)2)</sup>	274	371	540	105	8	305	169
	150	275	445	540	217.5	380	329	500.5 <sup>1)2)</sup>	274	371	540	105	8	305	169
	150	310	445	540	237.5	380	329	500.5 <sup>1)2)</sup>	274	371	540	105	8	305	169
	160	205	465	540	217.5	380	329	500.5 <sup>1)2)</sup>	274	371	540	105	8	305	169
	160	275	465	540	217.5	380	329	500.5 <sup>1)2)</sup>	274	371	540	105	8	305	169
	160	310	465	540	237.5	380	329	500.5 <sup>1)2)</sup>	274	371	540	105	8	305	169
	210	205	565	540	217.5	380	329	500.5 <sup>1)</sup>	274	371	540	105	8	305	169
	210	275	565	540	217.5	380	329	500.5 <sup>1)</sup>	274	371	540	105	8	305	169
	210	310	565	540	237.5	380	329	500.5 <sup>1)</sup>	274	371	540	105	8	305	169
17.5 kV	275	310	695	540	237.5	380	329	500.5 <sup>1)</sup>	274	371	540	105	30	305	169
	150	205	445	540	217.5	380	329	540	274	371	540	105	8	305	169
	150	275	445	540	217.5	380	329	540	274	371	540	105	8	305	169
	150	310	445	540	237.5	380	329	540	274	371	540	105	8	305	169
	160	205	465	540	217.5	380	329	540	274	371	540	105	8	305	169
	160	275	465	540	217.5	380	329	540	274	371	540	105	8	305	169
	160	310	465	540	237.5	380	329	540	274	371	540	105	8	305	169
	210	205	565	540	217.5	380	329	540	274	371	540	105	8	305	169
	210	275	565	540	217.5	380	329	540	274	371	540	105	8	305	169
24 kV	210	310	565	540	237.5	380	329	540	274	371	540	105	8	305	169
	210	310	695	540	237.5	380	329	540	274	371	540	105	30	305	169
	275	310	695	540	237.5	380	329	540	274	371	540	105	30	305	169

Note: Small deviations of the dimensions are permissible

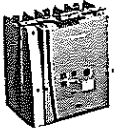
- 1) At  $I_{sc} = 31.5 \text{ kA}$  or at  $I_n = 1600 \text{ A} \rightarrow 540 \text{ mm}$
- 2) At  $I_{sc} = 31.5 \text{ kA} \rightarrow 552 \text{ mm}$
- 3) At  $I_n > 1600 \text{ A} \rightarrow 30 \text{ mm}$

3

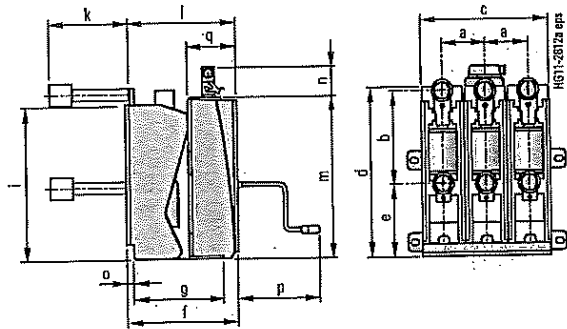
140

**Technical data**

Dimension drawings for voltage levels 7.2 kV to 24 kV for 3AE1



Dimension drawings for 7.2 to 24 kV  
Vacuum circuit breaker with contact arm



Voltage level	Pole-center distance a mm	Width across flats b mm	c mm	d mm	e mm	f mm	g mm	i mm	k mm	l mm	m mm	n mm	o mm	p mm	q mm
7.2 kV	210	310	565	540 <sup>5)</sup>	237.5	380 <sup>1)</sup>	300 <sup>2)</sup>	523 <sup>3) 7)</sup>	274	371 <sup>4)</sup>	540	105	30 <sup>8)</sup>	279	165
12 kV	210	275	565	540 <sup>5)</sup>	217.5	380	300 <sup>6)</sup>	523 <sup>7)</sup>	274	371	540	105	30	279	165
	210	310	565	540 <sup>5)</sup>	237.5	380 <sup>1)</sup>	300 <sup>2)</sup>	523 <sup>3) 7)</sup>	274	371 <sup>4)</sup>	540	105	30 <sup>8)</sup>	279	165
17.5 kV	210	275	565	562	217.5	380	310	517.5	274	371	540	105	30	279	165
	210	310	565	562	237.5	380 <sup>1)</sup>	310 <sup>2)</sup>	517.5 <sup>3)</sup>	274	371 <sup>4)</sup>	540	105	30 <sup>8)</sup>	279	165
24 kV	210	310	570	739	283	469	360	739	324	421	540	105	58	279	165
	275	310	700	739	283	469	360	739	324	421	540	105	58	279	165

Note: Small deviations of the dimensions are permissible

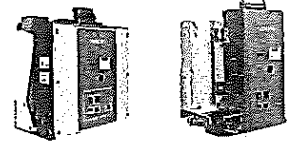
- 1) At  $I_{sc} = 40 \text{ kA} \rightarrow 450 \text{ mm}$
- 2) At  $I_{sc} = 40 \text{ kA} \rightarrow 350 \text{ mm}$
- 3) At  $I_{sc} = 40 \text{ kA} \rightarrow 610 \text{ mm}$
- 4) At  $I_{sc} = 40 \text{ kA} \rightarrow 420 \text{ mm}$
- 5) At  $I_n > 1250 \text{ A}$  or at  $I_{sc} = 31.5 \text{ kA} \rightarrow 562 \text{ mm}$
- 6) At  $I_n > 1250 \text{ A}$  or at  $I_{sc} = 31.5 \text{ kA} \rightarrow 310 \text{ mm}$
- 7) At  $I_n > 1250 \text{ A}$  or at  $I_{sc} = 31.5 \text{ kA} \rightarrow 518 \text{ mm}$
- 8) At  $I_{sc} = 40 \text{ kA} \rightarrow 50 \text{ mm}$

**3**

Handwritten signature or mark.

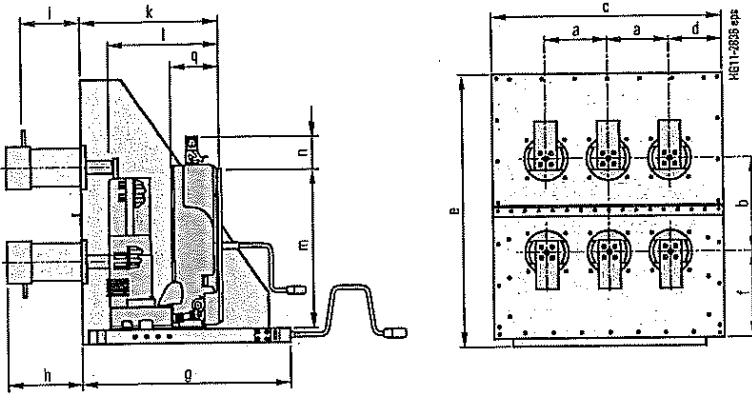
Handwritten signature or mark.

Handwritten signature or mark.



Dimension drawings for 7.2 to 24 kV

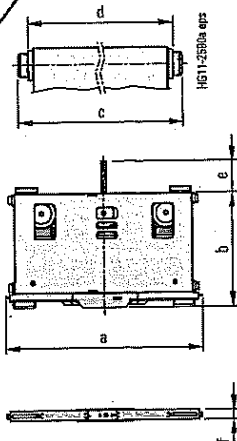
Cartridge without earthing switch



Voltage level	Pole-center distance a mm	Width across flats b mm	c mm	d mm	e mm	f mm	g mm	h mm	i mm	k mm	l mm	m mm	n mm	q mm
7.2 kV	150	275	594	147	850	266.5	710	263	224	476	371	540	105	169
	150	310	594	147	905	286.5	710	263	224	476	371	540	105	169
	210	275	794	187	850	266.5	710	263	224	476	371	540	105	169
	210	310	794	187	905	286.5	710	263	224	476	371	540	105	169
12 kV	150	275	594	147	850	266.5	710	263	224	476	371	540	105	169
	150	310	594	147	905	286.5	710	263	224	476	371	540	105	169
	210	275	794	187	850	266.5	710	263	224	476	371	540	105	169
	210	310	794	187	905	286.5	710	263	224	476	371	540	105	169
	275	310	994	222	905	286.5	710	263	224	476	371	540	105	169
17.5 kV	150	205	594	147	850	266.5	710	263	224	476	371	540	105	169
	150	275	594	147	905	286.5	710	263	224	476	371	540	105	169
	210	205	794	187	850	266.5	710	263	224	476	371	540	105	169
	210	275	794	187	905	286.5	710	263	224	476	371	540	105	169
24 kV	275	310	994	222	905	286.5	710	263	224	476	371	540	105	169
	210	310	794	187	1040.5	332	810	323	274	537	421	540	105	169
	275	310	994	222	1040.5	332	810	323	274	537	421	540	105	169

Note: Small deviations of the dimensions are permissible

Withdrawable part



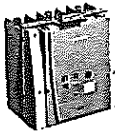
Voltage level	Pole-center distance mm	a mm	b mm	c mm	d mm	e mm	f mm	Mass
7.2 kV	150	529	424	500	470	107	42	approx. 15 kg
	160	529	424	500	470	107	42	approx. 15 kg
	210	679	424	650	620	107	42	approx. 20 kg
12 kV	150	529	424	500	470	107	42	approx. 15 kg
	160	529	424	500	470	107	42	approx. 15 kg
	210	679	424	650	620	107	42	approx. 20 kg
17.5 kV	150	529	424	500	470	107	42	approx. 15 kg
	160	529	424	500	470	107	42	approx. 15 kg
	210	679	424	650	620	107	42	approx. 20 kg
24 kV	210	679	424	650	620	107	42	approx. 20 kg
	275	879	424	850	820	107	42	approx. 25 kg

3

149

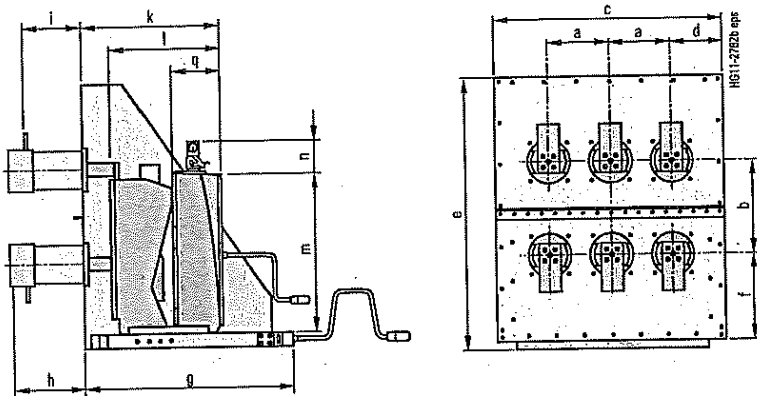
**Technical data**

Dimension drawings for voltage levels 7.2 kV to 24 kV for 3AE1



**Dimension drawings for 7.2 to 24 kV**

Cartridge without earthing switch



Voltage level	Pole-center distance a mm	Width across flats b mm	c mm	d mm	e mm	f mm	g mm	h mm	h' mm	i mm	i' mm	k mm	l mm	m mm	n mm	q mm
7.2 kV	210	310	794	187	905	286.5	710 <sup>1)</sup>	263	323	224	274	476 <sup>2)</sup>	371 <sup>3)</sup>	540	105	165
	210	275	794	187	850	286.5	710	263	-	224	-	476	371	540	105	165
12 kV	210	310	794	187	905	286.5	710 <sup>1)</sup>	263	323	224	274	476 <sup>2)</sup>	371 <sup>3)</sup>	540	105	165
	210	275	794	187	850	286.5	710	263	-	224	-	476	371	540	105	165
17.5 kV	210	310	794	187	905	286.5	710 <sup>1)</sup>	263	323	224	274	476 <sup>2)</sup>	371 <sup>3)</sup>	540	105	165
	210	275	794	187	850	286.5	710	263	-	224	-	476	371	540	105	165
24 kV	210	310	794	187	1040.5	332	810	323	323	274	323	537	421	540	105	165
	275	310	994	222	1040.5	332	810	323	323	274	323	537	421	540	105	165

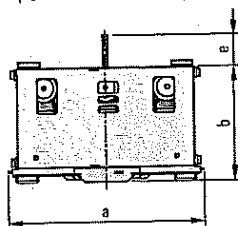
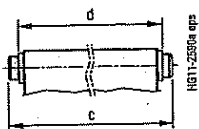
h/i = up to  $I_r = 1250$  A  
 h'/i' = at  $I_r = 2000$  A, 2500 A and 3150 A

Note: Small deviations of the dimensions are permissible

- 1) At  $I_{sc} = 40$  kA → 760 mm
- 2) At  $I_{sc} = 40$  kA → 526 mm
- 3) At  $I_{sc} = 40$  kA → 420 mm

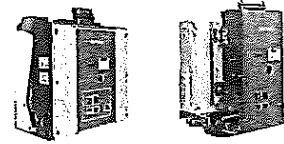
3

Withdrawable part



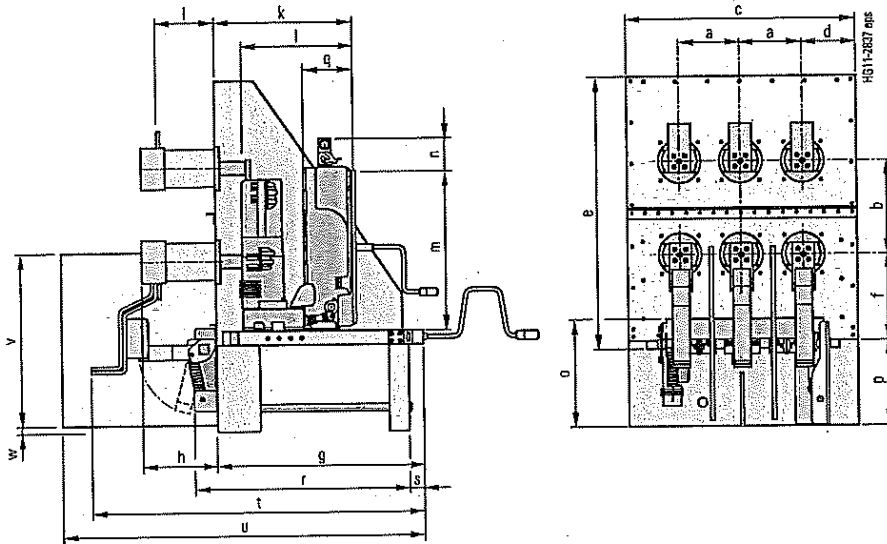
Voltage level	Pole-center distance mm	a mm	b mm	c mm	d mm	e mm	f mm	Mass
7.2 kV	210	679	424	650	620	107	42	approx. 20 kg
12 kV	210	679	424	650	620	107	42	approx. 20 kg
17.5 kV	210	679	424	650	620	107	42	approx. 20 kg
24 kV	210	679	424	650	620	107	42	approx. 20 kg
	275	879	424	850	820	107	42	approx. 25 kg

143



Dimension drawings for 7.2 to 24 kV

Cartridge with earthing switch



Voltage level	Pole-center distance a mm	Width across flats b mm	c mm	d mm	e mm	f mm	g mm	h mm	i mm	k mm	l mm	m mm	n mm
7.2 kV	150	275	594	147	850	266.5	710	263	224	476	371	540	105
	150	310	594	147	905	286.5	710	263	224	476	371	540	105
	210	275	794	187	850	266.5	710	263	224	476	371	540	105
	210	310	794	187	905	286.5	710	263	224	476	371	540	105
12 kV	150	275	594	147	850	266.5	710	263	224	476	371	540	105
	150	310	594	147	905	286.5	710	263	224	476	371	540	105
	210	275	794	187	850	266.5	710	263	224	476	371	540	105
	210	310	794	187	905	286.5	710	263	224	476	371	540	105
	275	310	994	222	905	286.5	710	263	224	476	371	540	105
17.5 kV	150	275	594	147	850	266.5	710	263	224	476	371	540	105
	150	310	594	147	905	286.5	710	263	224	476	371	540	105
	210	275	794	187	850	266.5	710	263	224	476	371	540	105
	210	310	794	187	905	286.5	710	263	224	476	371	540	105
24 kV	275	310	994	222	905	286.5	710	263	224	476	371	540	105
	210	310	794	187	1040.5	332	810	323	274	537	421	540	105
	275	310	994	222	1040.5	332	810	323	274	537	421	540	105

Voltage level	o mm	p mm	q mm	r mm	s mm	t mm	u mm	v mm	w mm
7.2 kV	359	287	169	803	64	1142	1233	575	25
	363	287	169	803	64	1142	1233	575	25
	359	287	169	803	65	1143	1234	-	-
	359	287	169	803	65	1142	1234	-	-
12 kV	359	287	169	803	64	1142	1233	575	25
	363	287	169	803	64	1142	1233	575	25
	359	287	169	803	65	1143	1234	-	-
	359	287	169	803	65	1143	1234	-	-
17.5 kV	-	-	-	803	-	-	-	-	-
	359	287	169	803	64	1142	1233	575	25
	363	287	169	803	64	1142	1233	575	25
	359	287	169	803	65	1143	1234	-	-
24 kV	359	287	169	803	65	1143	1234	-	-
	-	-	-	803	-	-	-	-	-
24 kV	359	287	169	902	64	1243	1433	575	10
	359	287	169	902	65	1243	1433	-	-

Note: Small deviations of the dimensions are permissible

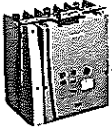
3

144



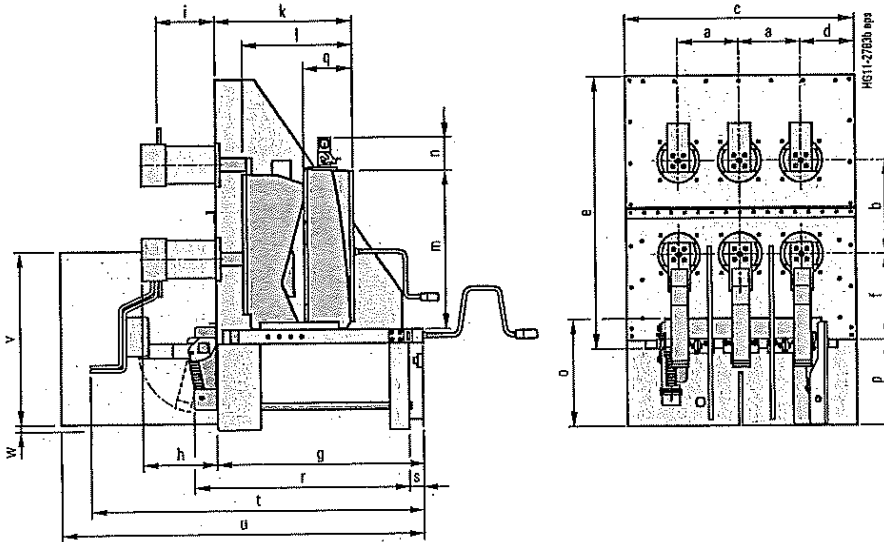
Technical data

Dimension drawings for voltage levels 7.2 kV to 24 kV for 3AE1



Dimension drawings for 7.2 to 24 kV

Cartridge with earthing switch



Voltage level	Pole-center distance a mm	Width across flats b mm	c mm	d mm	e mm	f mm	g mm	h mm	h' mm	i mm	i' mm	k mm	l mm	m mm	n mm
7.2 kV	210	310	794	187	905	286.5	710 <sup>1)</sup>	263	323	224	274	476 <sup>2)</sup>	371 <sup>3)</sup>	540	105
	210	275	794	187	850	266.5	710	263	-	224	-	476	371	540	105
12 kV	210	310	794	187	905	286.5	710 <sup>1)</sup>	263	323	224	274	476 <sup>2)</sup>	371 <sup>3)</sup>	540	105
	210	275	794	187	850	266.5	710	263	-	224	-	476	371	540	105
17.5 kV	210	310	794	187	905	286.5	710 <sup>1)</sup>	263	323	224	274	476 <sup>2)</sup>	371 <sup>3)</sup>	540	105
	210	310	794	187	905	286.5	710 <sup>1)</sup>	263	323	224	274	476 <sup>2)</sup>	371 <sup>3)</sup>	540	105
24 kV	210	310	794	187	1040.5	332	810	323	323	274	323	537	421	540	105
	275	310	994	222	1040.5	332	810	323	323	274	323	537	421	540	105

Voltage level	o mm	p mm	q mm	r mm	s mm	t mm	u mm	v mm	w mm
7.2 kV	359	287	165	803	65	1142	1234	-	-
12 kV	359	287	165	803	65	1143	1234	-	-
	359	287	165	803	65	1143	1234	-	-
17.5 kV	359	287	165	803	65	1143	1234	-	-
	359	287	165	803	65	1143	1234	-	-
24 kV	359	287	165	902	64	1243	1433	575	10
	359	287	165	902	65	1243	1433	-	-

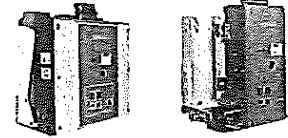
h/i = up to  $I_r = 1250$  A  
 h'/i' = at  $I_r = 2000$  A, 2500 A and 3150 A

Note: Small deviations of the dimensions are permissible

- 1) At  $I_{sc} = 40$  kA → 760 mm
- 2) At  $I_{sc} = 40$  kA → 526 mm
- 3) At  $I_{sc} = 40$  kA → 420 mm

3

145



**Operating times and internal times for 3AE5**

Operating times at rated voltage of the secondary circuit	Equipment of circuit breaker	Circuit breaker operating time
Closing time	—	≤ 60 ms
Opening time	1st shunt release	≤ 30 ms
	2nd and 3rd release	≤ 45 ms
Arcing time	—	< 15 ms
Break time	1st shunt release	≤ 45 ms
	2nd and 3rd release	≤ 60 ms
CLOSE/OPEN contact time	1st shunt release	≤ 60 ms
	2nd and 3rd release	≤ 75 ms
Minimum command duration	Closing solenoid	45 ms
	1st shunt release	40 ms
	2nd and 3rd release	20 ms
Pulse time for circuit breaker tripping signal	1st shunt release	> 10 ms
	2nd and 3rd release	> 6 ms
Charging time for electrical operation	—	< 15 s
Synchronism error between the poles	—	≤ 2 ms

**Motor short-circuit protection (fuse protection of drive motors) for 3AE5**

Rated voltage of the motor V	Operating voltage		Power consumption of the motor W/VA	Smallest possible rated current <sup>1)</sup> of the miniature circuit breaker with C-characteristic A
	max. V	min. V		
24 DC	26	20	140	6
48 DC	53	41	140	3
60 DC	66	51	150	3
110 DC	121	93	280	3
220 DC	242	187	260	1.2
110 AC	121	93	280	3
230 AC	244	187	260	1.2

1) The inrush current in the drive motor can be neglected due to its very short presence.

**Consumption data of releases for 3AE5**

Release	Power consumption		Tripping ranges	
	Operation at		Tripping voltage at DC	Tripping voltage or tripping current at AC 50/60 Hz
	DC approx. W	AC 50/60 Hz approx. VA		
Closing solenoid 3AY14 10	300 – 370	300 – 370	85 to 110 % U	85 to 110 % U
1st shunt release (without stored-energy mechanism) 3AY14 10	300	300	70 to 110 % U	85 to 110 % U
2nd and 3rd shunt release (with stored-energy mechanism) 3AX11 01	70	50	70 to 110 % U	85 to 110 % U
Undervoltage release 3AX11 03	20	20	35 to 0 % U	35 to 0 % U
Current-transformer-operated release 3AX (rated normal current 0.5 A, 1 A or 5 A)	—	10 <sup>2)</sup>	—	90 to 110 % I <sub>n</sub>
Current-transformer-operated release 3AX11 04 (tripping pulse ≥ 0.1 Ws)	—	—	—	—

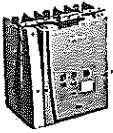
2) Consumption at pickup current (90 % of the rated normal current) and open armature.

3

146

**Technical data**

Operating times and internal times, short-circuit protection of motors, consumption data of the releases



**Operating times and internal times for 3AE1**

Operating times at rated voltage of the secondary circuit	Equipment of circuit breaker	Circuit breaker operating time
Closing time	-	< 60 ms
Opening time	1st shunt release	< 60 ms
	2nd release	< 45 ms
Arcing time	-	< 15 ms
Break time	1st shunt release	< 75 ms
	2nd release	< 60 ms
CLOSE / OPEN contact time	1st shunt release	< 75 ms
	2nd release	< 60 ms
Minimum command duration	Closing solenoid	45 ms
	1st shunt release	40 ms
	2nd release	20 ms
Pulse time for circuit breaker tripping signal	1st shunt release	> 15 ms
	2nd release	> 10 ms
Charging time for electrical operation	-	< 15 s
Synchronism error between the poles	-	≤ 2 ms

**Motor short-circuit protection (fuse protection of drive motors) for 3AE1**

Rated voltage of the motor V	Operating voltage		Power consumption of the motor W/VA	Smallest possible rated current <sup>1)</sup> of the miniature circuit breaker with C-characteristic A
	max. V	min. V		
24 DC <sup>2)</sup>	26	20	520 – 590	8
48 DC	53	41	470 – 600	6
60 DC	66	51	520 – 610	4
110 DC	121	93	650 – 740	4
220 DC	242	187	610 – 900	1.6
110 AC	121	93	670 – 740 VA	2
230 AC	244	187	620 – 960 VA	1.6

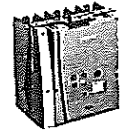
- 1) The inrush current in the drive motor can be neglected due to its very short presence.  
 2) Does not apply to a rated short-circuit breaking current of 40 kA

**Consumption data of releases for 3AE1**

Release	Power consumption		Tripping ranges	
	Operation at		Tripping voltage at DC	Tripping voltage or tripping current at AC 50/60 Hz
	DC approx. W	AC 50/60 Hz approx. VA		
Closing solenoid 3AY15 10	140 – 210	140 – 210	85 to 110 % U	85 to 110 % U
1st shunt release (without stored-energy mechanism) 3AY15 10	140	140	70 to 110 % U	85 to 110 % U
2nd shunt release (with stored-energy mechanism) 3AX11 01	70	50	70 to 110 % U	85 to 110 % U
Undervoltage release 3AX11 03	20	20	35 to 0 % U	35 to 0 % U
Current-transformer-operated release 3AX (rated normal current 0.5 A, 1 A or 5 A)	-	10 <sup>2)</sup>	-	90 to 110 % I <sub>n</sub>
Current-transformer-operated release 3AX11 04 (tripping pulse ≥ 0.1 Ws)	-	-	-	-

2) Consumption at pickup current (90 % of the rated normal current) and open armature.

062



---

**Circuit diagrams for 3AE5 and 3AE1 can be found at the Siemens Industry Online Support (SIOS):**

<http://support.industry.siemens.com/>

Circuit manual 3AE5 (64-pole): SA7E449 99009 021

Circuit manual 3AE5 (24-pole): SA7E449 99009 022

Circuit manual 3AE5 (20-pole): SA7E449 99009 013

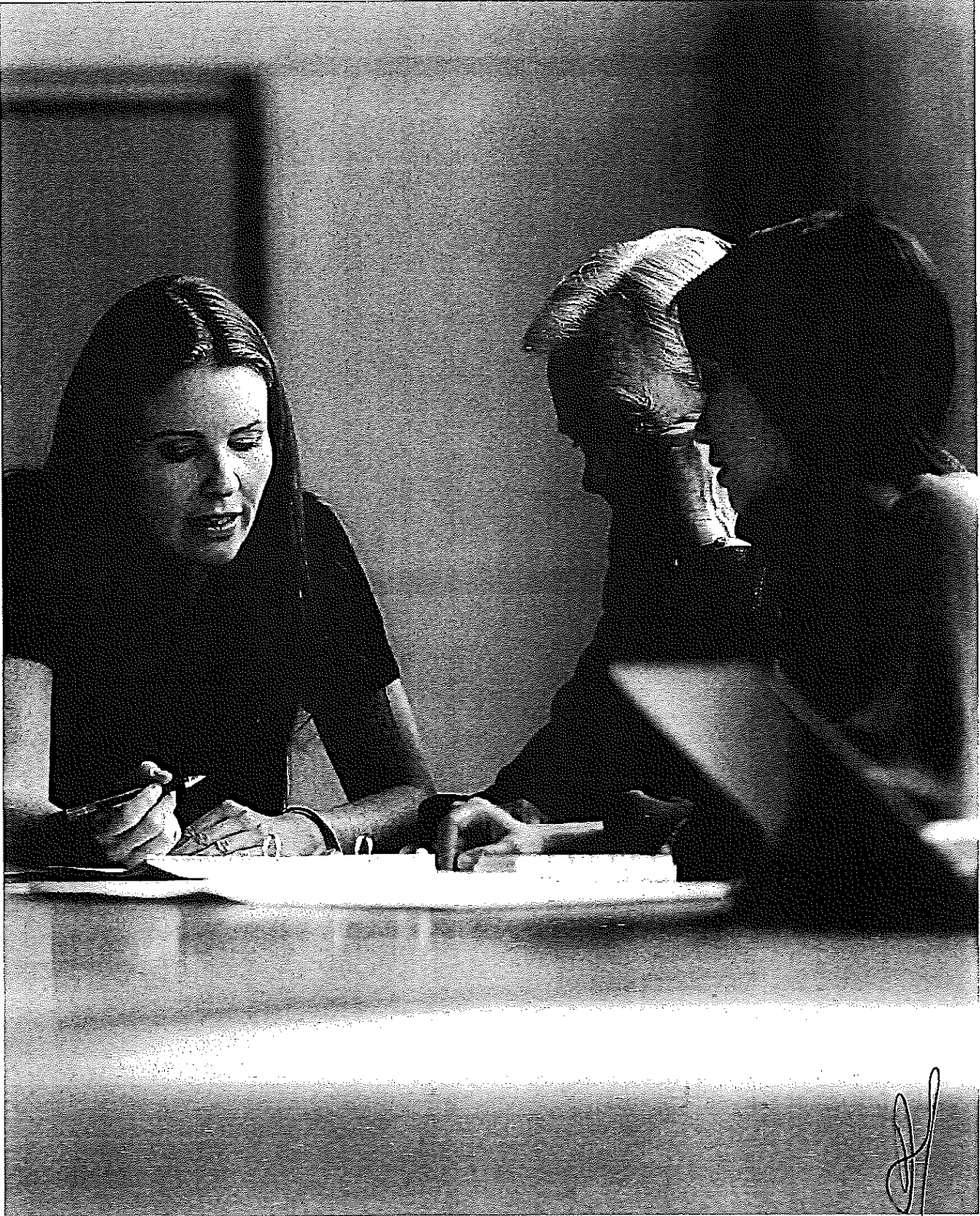
Circuit manual 3AE1 (64-pole): SA7E449 99007 001

Circuit manual 3AE1 (24-pole): SA7E449 99007 002

Circuit manual 3AE1 (27-pole): SA7E449 99007 003

14B

*Handwritten signature*



3

149

*Handwritten signature*

SION Vacuum Circuit Breakers 3AE5 and 3AE1



3

150 

*Handwritten signature*



*Handwritten signature*

151

*Handwritten signature*



Switchgear Factory in Berlin, Germany

Contents	Page
<b>Annex</b>	<b>79</b>
Inquiry form	80
Configuration instructions	81
Configuration aid	Foldout page





**Appendix**  
Inquiry form

Please copy, fill in and return to your Siemens partner.

Inquiry concerning

SION vacuum circuit breaker from 7.2 kV to 24 kV

Please

- Submit an offer
- Call us
- Visit us

Your address

Company \_\_\_\_\_

Department \_\_\_\_\_

Name \_\_\_\_\_

Street \_\_\_\_\_

Postal code/city \_\_\_\_\_

Country \_\_\_\_\_

Phone \_\_\_\_\_

Fax \_\_\_\_\_

Email \_\_\_\_\_

**4** Siemens AG

Department \_\_\_\_\_

Name \_\_\_\_\_

Street \_\_\_\_\_

Postal code/city \_\_\_\_\_

Country \_\_\_\_\_

Fax \_\_\_\_\_

**Technical data**

				Other values
Rated voltage	<input type="checkbox"/> 7.2 kV <input type="checkbox"/> 24 kV	<input type="checkbox"/> 12 kV	<input type="checkbox"/> 17.5 kV	<input type="checkbox"/> ___ kV
Rated lightning impulse withstand voltage	<input type="checkbox"/> 60 kV <input type="checkbox"/> 125 kV	<input type="checkbox"/> 75 kV	<input type="checkbox"/> 95 kV	<input type="checkbox"/> ___ kV
Rated short-duration power-frequency withstand voltage	<input type="checkbox"/> 20 kV <input type="checkbox"/> 42 kV	<input type="checkbox"/> 28 kV <input type="checkbox"/> 50 kV	<input type="checkbox"/> 38 kV <input type="checkbox"/> 55 kV	<input type="checkbox"/> ___ kV
Rated short-circuit breaking current	<input type="checkbox"/> 12.5 kA <input type="checkbox"/> 25 kA	<input type="checkbox"/> 16 kA <input type="checkbox"/> 31.5 kA	<input type="checkbox"/> 20 kA <input type="checkbox"/> 40 kA	<input type="checkbox"/> ___ kA
Rated normal current	<input type="checkbox"/> 800 A <input type="checkbox"/> 2500 A	<input type="checkbox"/> 1250 A <input type="checkbox"/> 3150 A	<input type="checkbox"/> 2000 A	<input type="checkbox"/> ___ A
Pole-center distance	<input type="checkbox"/> 150 mm	<input type="checkbox"/> 160 mm	<input type="checkbox"/> 210 mm	<input type="checkbox"/> 275 mm
Width across flats	<input type="checkbox"/> 205 mm	<input type="checkbox"/> 275 mm	<input type="checkbox"/> 310 mm	

**Secondary equipment**

For possible combinations, see pages 35 to 40

Circuit breaker installation equipment  Fixed mounting

Withdrawable part, contact arms  
 Withdrawable part, contact arms, bushings  
 Withdrawable module with earthing switch  
 Withdrawable module without earthing switch  
 Retrofit

Drive motor  DC \_\_\_ V  AC \_\_\_ V, \_\_\_ Hz

Closing solenoid  DC \_\_\_ V  AC \_\_\_ V, \_\_\_ Hz

1st shunt release  DC \_\_\_ V  AC \_\_\_ V, \_\_\_ Hz

2nd shunt release  DC \_\_\_ V  AC \_\_\_ V, \_\_\_ Hz

C.t.-operated release

Undervoltage release  DC \_\_\_ V  AC \_\_\_ V, \_\_\_ Hz

Auxiliary switch  6 NO + 6 NC  12 NO + 12 NC

Low-voltage connection  20-pole plug connector or 27-pole terminal strip  24-pole plug  64-pole plug

Mechanical interlocking

Circuit breaker tripping signal

Electrical closing lock-out

Operating instructions  German  English  French  Spanish

**Application and other requirements**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Please check off  Please fill in

153

**You prefer to configure your SION vacuum circuit breaker on your own?**  
Please follow the steps for configuration and enter the article number in the configuration aid.

## Instruction for configuration of the SION vacuum circuit breaker

1st step: Definition of the circuit breaker and equipment package (see pages 18 to 34)

Please specify the following ratings:	Possible options:
Rated voltage ( $U_r$ )	$U_r$ : 7.2 kV to 24 kV
Rated lightning impulse voltage ( $U_p$ )	$U_p$ : 60 kV to 125 kV
Rated short-duration power-frequency withstand voltage ( $U_d$ )	$U_d$ : 20 kV, 28 kV, 32 kV, 42 kV, 55 kV, 65 kV
Rated short-circuit breaking current ( $I_{sc}$ )	$I_{sc}$ : 16 kA to 40 kA
Rated normal current ( $I_r$ )	$I_r$ : 800 A to 3150 A
Pole-center distance	150 mm to 275 mm
Width across flats	205 mm to 310 mm

These ratings define the positions 5 to 8 of the article number.

2nd step: Definition of the secondary equipment (see pages 35 to 40)

Please specify the following equipment features:	Possible options:
Release combination (position 9)	Shunt release, current-transformer-operated release and undervoltage release
Closing solenoid (position 10)	Operating voltages from 24 V DC to 240 V AC
Operating voltage of the releases (positions 11/12)	Operating voltages from 24 V DC to 240 V AC
Installation accessories (position 13)	Fixed mounting, with withdrawable part, with contact, fixed contact, bushing, cartridge, with/without earthing switch
Drive motor (position 14)	Operating voltages from 24 V DC to 240 V AC
Number of auxiliary contacts (position 15)	6 NO + 6 NC, 12 NO + 12 NC
Design of the secondary connection (position 15)	20-pole plug connector or 27-pole terminal strip, 24-pole plug, 64-pole plug
Mechanical interlocking, circuit breaker tripping signal (position 15)	With or without
Language of the documentation (position 16)	English, German, French, Spanish, Russian, further languages on request
Frequency of the operating voltage of the secondary equipment at AC (position 16)	DC or AC 50 Hz; 60 Hz

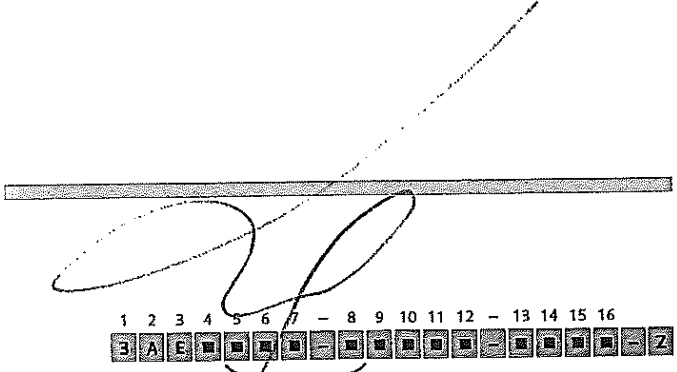
These equipment features define the positions 9 to 16 of the article number.

3rd step: Do you have any further requirements concerning the equipment? (Please refer to page 41)  
Your Siemens sales partner will be pleased to support you.

154 



For configuration of your  
SION vacuum circuit breaker

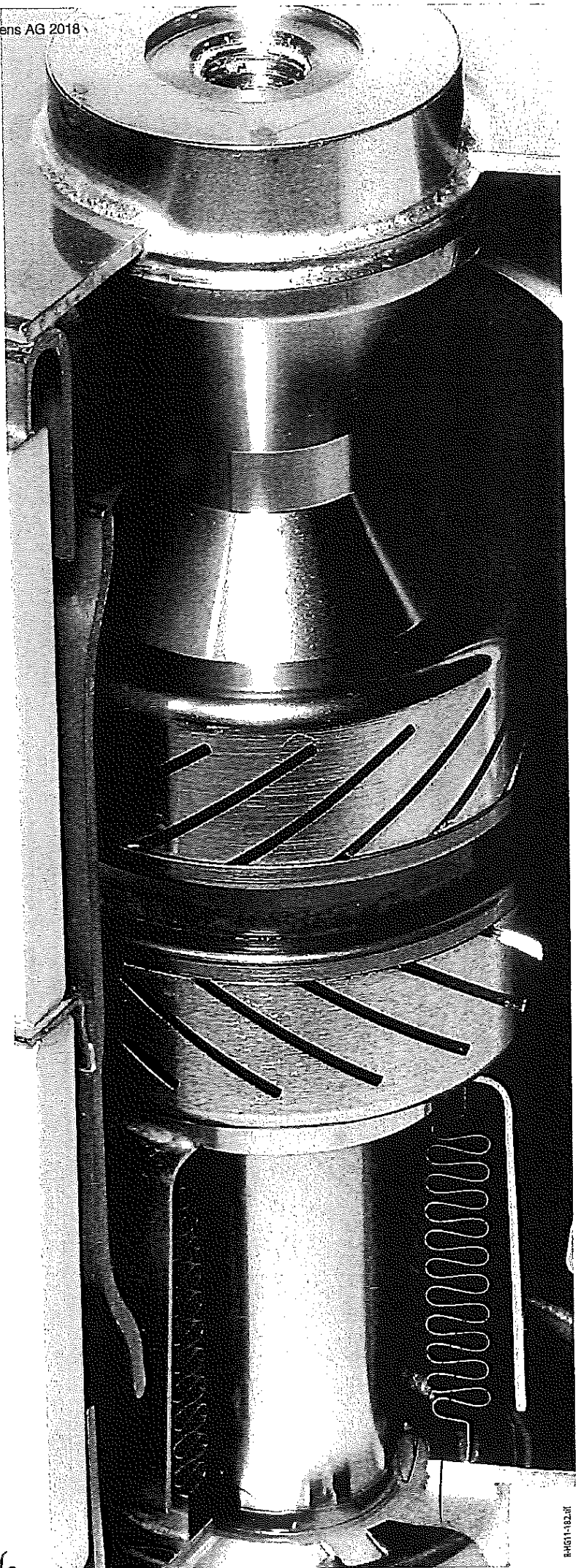


- 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
- 3 A E □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □
- See page 18 to See page 34
- See page 35
- See page 35
- See page 36
- See page 36
- See pages 37+38
- See page 38
- See page 39
- See page 40
- See page 41

3 A E	-	-	-	-
+	+	+	+	+
+	+	+	+	+
3 A E	-	-	-	-
+	+	+	+	+
+	+	+	+	+
3 A E	-	-	-	-
+	+	+	+	+
+	+	+	+	+
3 A E	-	-	-	-
+	+	+	+	+
+	+	+	+	+
3 A E	-	-	-	-
+	+	+	+	+
+	+	+	+	+



255



*Handwritten signature or scribble.*

*Handwritten signature or scribble.*

156

## Get more information

[www.siemens.com/lowvoltage](http://www.siemens.com/lowvoltage)

Siemens AG  
Energy Management  
Low Voltage & Products  
Postfach 10 09 53  
93009 Regensburg  
Germany

© Siemens AG 2018  
Subject to change without prior notice  
Article No. EMLP-C10162-00-7600  
KG 0418 .5 WÜ 82 En / Dispo 18301  
Printed in Germany

The information provided in this catalog contains merely general descriptions or characteristics of performance which in case of actual use do not always apply as described or which may change as a result of further development of the products. An obligation to provide the respective characteristics shall only exist if expressly agreed in the terms of contract. Availability and technical specifications are subject to change without notice.

All product designations may be trademarks or product names of Siemens AG or supplier companies whose use by third parties for their own purposes could violate the rights of the owners.

## Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For additional information on industrial security measures that may be implemented, please visit <https://www.siemens.com/industrialsecurity>.

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends that product updates are applied as soon as they are available and that the latest product versions are used. Use of product versions that are no longer supported, and failure to apply the latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under <https://www.siemens.com/industrialsecurity>.

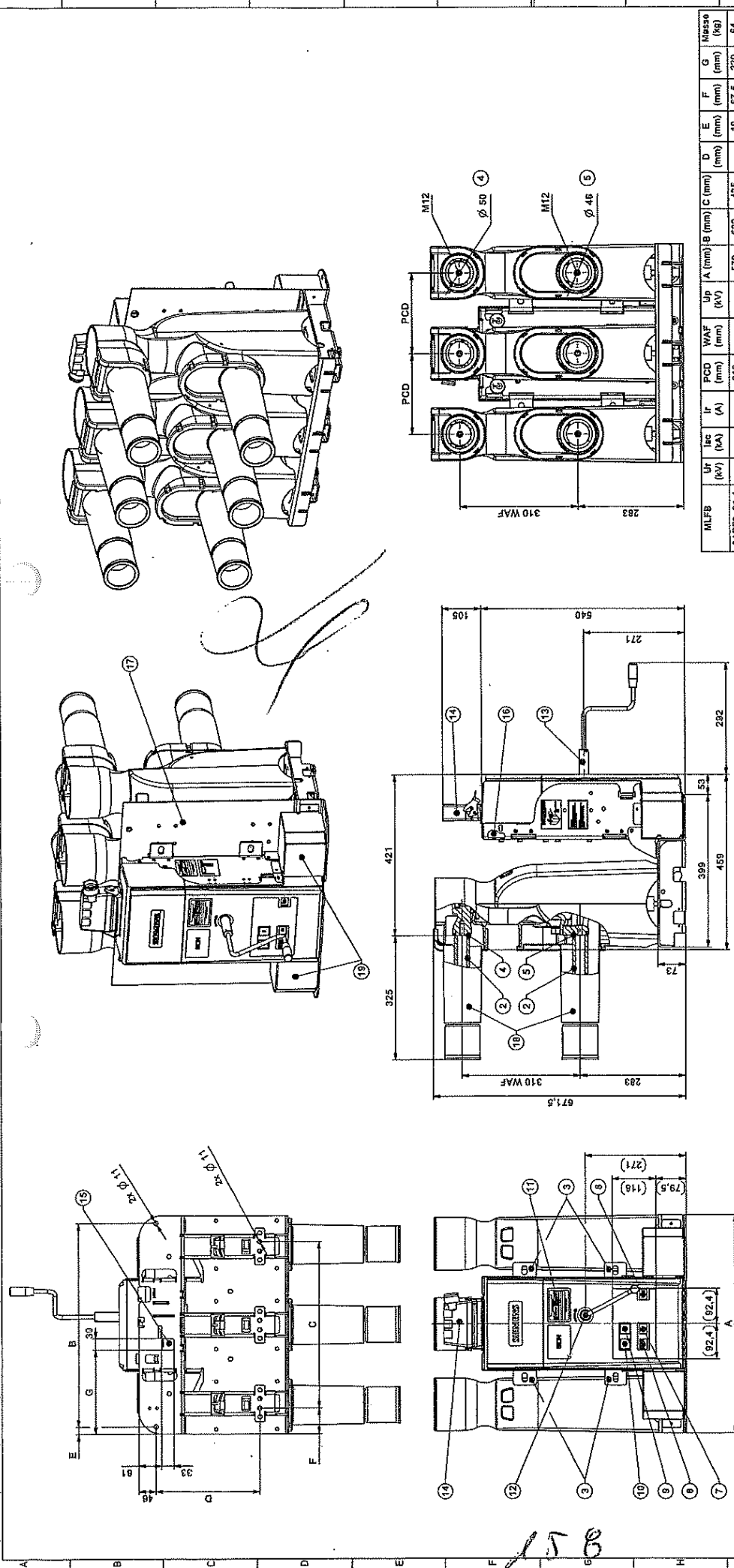


[www.siemens.com/INDUSTRIALSECURITY](http://www.siemens.com/INDUSTRIALSECURITY)



157

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16



Text zum Maßbild / Legend to drawing  
 IM S. ATE 109 05000 001 B1.1 Sheet 1

MLFB	U <sub>n</sub> (kV)	I <sub>n</sub> (A)	I <sub>r</sub> (A)	PCD (mm)	WAF (mm)	U <sub>n</sub> (kV)	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	Masse (kg)
3AE53 21-1	12.5	1250	1600	210	275	125	570	532	435	276	19	67.5	230	64
3AE53 51-1	12.5	1250	1600	210	275	125	695	535	325	276	30	165	282.5	67
3AE53 21-2	12.5	1250	1600	210	275	125	570	532	435	276	19	67.5	230	64
3AE53 51-2	12.5	1250	1600	210	275	125	695	535	325	276	30	165	282.5	67
3AE53 21-3	12.5	1250	1600	210	275	125	570	532	435	276	19	67.5	230	64
3AE53 51-3	12.5	1250	1600	210	275	125	695	535	325	276	30	165	282.5	67
3AE53 22-1	16	1250	1600	210	275	125	570	532	435	276	19	67.5	230	64
3AE53 52-1	16	1250	1600	210	275	125	695	535	325	276	30	165	282.5	67
3AE53 22-2	16	1250	1600	210	275	125	570	532	435	276	19	67.5	230	64
3AE53 52-2	16	1250	1600	210	275	125	695	535	325	276	30	165	282.5	67
3AE53 22-3	16	1250	1600	210	275	125	570	532	435	276	19	67.5	230	64
3AE53 52-3	16	1250	1600	210	275	125	695	535	325	276	30	165	282.5	67
3AE53 23-1	20	1250	1600	210	275	125	570	532	435	276	19	67.5	230	64
3AE53 53-1	20	1250	1600	210	275	125	695	535	325	276	30	165	282.5	67
3AE53 23-2	20	1250	1600	210	275	125	570	532	435	276	19	67.5	230	64
3AE53 53-2	20	1250	1600	210	275	125	695	535	325	276	30	165	282.5	67
3AE53 23-3	20	1250	1600	210	275	125	570	532	435	276	19	67.5	230	64
3AE53 53-3	20	1250	1600	210	275	125	695	535	325	276	30	165	282.5	67
3AE53 24-1	25	1250	1600	210	275	125	570	532	435	276	19	67.5	230	64
3AE53 54-1	25	1250	1600	210	275	125	695	535	325	276	30	165	282.5	67
3AE53 24-2	25	1250	1600	210	275	125	570	532	435	276	19	67.5	230	64
3AE53 54-2	25	1250	1600	210	275	125	695	535	325	276	30	165	282.5	67
3AE53 24-3	25	1250	1600	210	275	125	570	532	435	276	19	67.5	230	64
3AE53 54-3	25	1250	1600	210	275	125	695	535	325	276	30	165	282.5	67

1. Öffnung für aufsteckbare Handkurbel / Opening for detachable hand crank
2. Handkurbel (auf Bestellung) / Hand crank (per order)
3. 24/64-polige Steckverbinder (Höhe 91/105 mm) einschließlich 24/64-Pole Gehäuse mit seitlichem Kabelausgang / 24/64-pole connector (height 91/105 mm) including hood with side-entry
4. Öffnung für mechanische Abfrage und Verriegelung / Opening for mechanical interrogation and interlocking
5. Öffnungen für Kranhaken: 4x Langloch 20x40 / Openings for crane hooks: 4x Longhole 20x40
6. IP-Platte (auf Bestellung) / IP Plate (per order)
7. Trennschale (auf Bestellung) / Trennschale (per order)
8. Wellenabdeckung (auf Bestellung) / Wellenabdeckung (per order)
9. Shaft cover (per order)
10. M12 Erdungsschraube / M12 earth-terminal screw
11. Kontaktermine (auf Bestellung) / Contact arms (per order)
12. Schalterverriegelung mit feststehenden Füßen (per order) / Switch interlocking with fixing lugs (per order)
13. Unterterminalbereich / Lower terminal area
14. Anschlagfläche unten / Lower terminal area
15. Schaltschleifer / Operation cycle counter
16. Schaltstellungsanzeige / Position indicating device
17. Anzeige "Gespannt" / Indication "Charged"
18. Druckknopf "EIN" / Pushbutton "ON"
19. Druckknopf "AUS" / Pushbutton "OFF"
20. Leittafel / Railing plate

Allgemeine Angaben / General data:

1. Bemessung der Stromleiter nach DIN 43 670/671 / Dimension of bus bars according to DIN 43 670/671

2. Geringe Abweichungen der angegebenen Maße zulässig / Minor deviations from shown dimensions permitted

SIEMENS

IM S. ATE 109 05000 001

1+

# Prüffeld der Schaltwerke

## Test Document

Report No.: 15-085-ME

Copy No.: 0

Contents: 20 Sheets

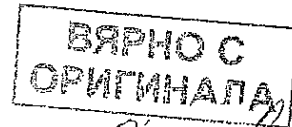
**Test object:** Three-pole air insulated withdrawable module with three-pole vacuum circuit-breaker  
**Designation:** 3AX7111-5 with 3AE5324-2 with vacuum interrupters VSS12-1-31-A5  
Rated voltage: 24 kV      Rated normal current: 1250 A      Rated frequency: 50 Hz  
Rated short-circuit breaking current: 25 kA  
**Manufacturer:** Siemens AG, EM MS O SD BLN MF, Berlin  
**Client:** Siemens AG, EM MS R&D OC, Berlin  
**Testing station:** Prüffeld der Schaltwerke, Berlin  
**Date of test:** October 22 - 23, 2015

**Applied test specifications:**

IEC 62271-1, Edition 1.1, 2011-08  
IEC 62271-100, Edition 2.1, 2012-09  
IEC 62271-200, Edition 2.0, 2011-10

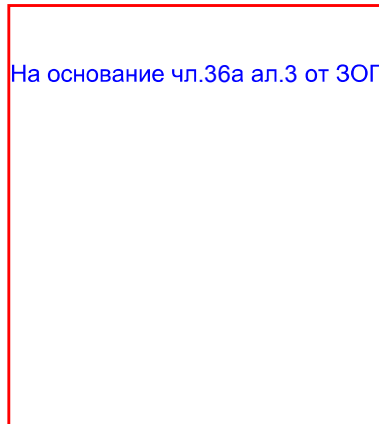
**Tests performed:**

Temperature-rise test with 1250 A at 50 Hz



**Test results:**

The test object has passed the tests stated above without any objection. The results obtained and the performances proved of the test object comply with the requirements of the specifications mentioned above.



Berlin, February 08, 2016

The test results relate only to the items tested.  
The authenticity of this document is guaranteed by the intactness of the seal label and seal ribbon.  
Without a written permission of Prüffeld der Schaltwerke it is not allowed to make reproduction in extracts of this document. Copying the cover sheet accompanied by sheet 2 is an exception.



Notes

1. The testing station of the Siemens switchgear factory (Prüffeld der Schaltwerke), Siemens AG, Berlin, has been approved by the DAkkS (German accreditation body) for rendering the following testing services:

- mechanical tests,
- temperature rise tests,
- environment tests,
- dielectric tests and
- power tests (e.g. switching capacity, load switching, short-time current tests, etc.)

on high-voltage switchgear and controlgear and on power engineering equipment.

The approval was given under registration no. D-PL-11055-10. Testing services beyond the scope certified cannot be regarded as testing services of an approved testing station. No test documents will be made out for them.

2. In the Prüffeld der Schaltwerke, Siemens AG, Berlin, all tests will be carried out according to EN ISO/IEC 17025 and the pertinent international and national test specifications. Moreover, all criteria specified by the accreditation authority will be taken into account in the tests.
3. The Prüffeld der Schaltwerke, Siemens AG, Berlin, points out that its accreditation or its test documents do not imply that the accreditation authority or another authority have acknowledged the product tested.
4. Test documents or parts thereof may not be used or released by the purchaser for advertising purposes if the accreditation authority considers their use as misleading. Reproduction in extracts of the test documents is acceptable only on condition of the prior consent of the Prüffeld der Schaltwerke, Siemens AG, Berlin. Copying the cover sheet and sheet 2 is an exception.  
If test documents or extracts thereof are to be used for advertising purpose or publication, the agreement of the Prüffeld der Schaltwerke, Siemens AG, Berlin, must be obtained in due time before utilization. If necessary, the Prüffeld der Schaltwerke, Siemens AG, Berlin, will obtain the accreditation authority's consent.
5. If reference is to be made in one way or other to the utilization of the Prüffeld der Schaltwerke, Siemens AG, Berlin, as approved testing laboratory, this shall be worded as follows:  
"Testing by the Testing Station of Siemens Schaltwerke Berlin, which is accredited by the DAkkS (German accreditation body) for tests on high-voltage switchgear and controlgear and power engineering equipment under registration No. D-PL-11055-10".
6. The Prüffeld der Schaltwerke applies the internal procedure PSW-IA 020 for determining the uncertainties of measurement. As long as no explicit statements are made, the uncertainties required by the relevant standards have been complied with.
7. The Prüffeld der Schaltwerke is an independent Test Laboratory in accordance with the standard EN ISO/IEC 17025. During testing and evaluation the head of the Laboratory and the personnel are released from orders of the upper management and accordingly there is no possibility for external influence of the Laboratory, whether commercial or otherwise.

Different type of documents

A Type Test Certificate...

is issued for type tests which have successfully been carried out in full compliance with the relevant specifications or standards valid at the time of the test. For these tests the equipment under test must be clearly identified by technical description, drawings and additional specifications.

A Test Document...

is issued for parts of type tests which have successfully been carried out in full compliance with the relevant specifications or standards valid at the time of test. For these tests the equipment under test must be clearly identified by technical description, drawings and additional specifications.

A Test Report...

is issued for all other tests which have been carried out according to specifications, standards and/or clients instructions. Similarly, this test report contains all test results, details of the conditions under which the tests were carried out, also details relating to the behaviour of the equipment during test, and its condition after the tests.

A Test Confirmation...

is issued immediately after the tests. It confirms that the tests have been conducted and is valid only until publishing the detailed results in an entire document.

Addresses

Testing station: Prüffeld der Schaltwerke  
Siemens AG  
EM MS R&D OC TD  
Nonnendammallee 104  
13629 Berlin  
Germany


Client: Siemens AG  
EM MS R&D OC  
Nonnendammallee 104  
13629 Berlin  
Germany

Manufacturer:

ВЯРНО С  
ЩАПА

На основание чл.36а ал.3 от  
ЗОП

АНЖЕЛЕРМИ



160



### Technical Data of Test Object Withdrawable Module

**Test object:** Three-pole air insulated withdrawable module  
**Designation:** 3AX7111-5  
**Manufacturer:** Siemens AG, EM MS O SD BLN MF, Berlin  
**Serial No.:** Withdrawable part and withdrawable cartridge: 3AE5R/00005721  
**Year of manufacture:** 2015  
**Drawing No.:** Drawings and part lists - see sheet 7

**Ratings assigned by the manufacturer:**

Rated voltage	24 kV
Rated normal current	1250 A
Rated frequency	50/60 Hz
Rated lightning impulse withstand voltage	125 kV
Rated switching impulse withstand voltage	- kV
Rated power-frequency withstand voltage	65 kV
Rated peak withstand current	65 kA
Rated short-time withstand current	25 kA
Rated duration of short-circuit	3 s
Insulating medium	air
Rated filling pressure for insulation	- MPa abs. at 20 °C
Minimum functional pressure for insulation	- MPa abs. at 20 °C

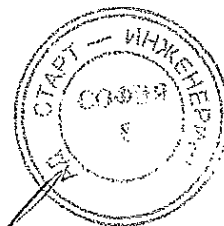
**Further data:**

Pole centre distance	210 mm
Width across flats	310 mm

**Essential characteristics:**

-

ВЕРНО С  
ОРИГИНАЛА



### Technical Data of Test Object Circuit-Breaker

**Test object:** Three-pole vacuum circuit-breaker  
**Designation:** 3AE5324-2 with vacuum interrupters VSS 12-1-31-A5  
**Manufacturer:** Siemens AG, EM MS O SD BLN MF, Berlin  
**Serial No.:** S 3AE5/00005721  
**Year of manufacture:** 2015  
**Drawing No.:** Drawings and parts lists - see sheet 8 and 9

**Ratings assigned by the manufacturer:**

Rated voltage	24 kV
Rated normal current	1250 A
Rated frequency	50/60 Hz
Rated lightning impulse withstand voltage	125 kV
Rated switching impulse withstand voltage	- kV
Rated power-frequency withstand voltage	65 kV
Rated peak withstand current	65 kA
Rated short-time withstand current	25 kA
Rated duration of short-circuit	3 s
Rated short-circuit breaking current	25 kA
DC component of the rated short-circuit breaking current (Valid for a minimum opening time of XX ms, a relay-time of 10 ms and a time constant of 45 ms)	50 %
Rated short-circuit making current	65 kA
Rated transient recovery voltage	41.2 kV
Rate of rise of transient recovery voltage	0.47 kV/µs
First-pole-to-clear factor	1.5
Rated operating sequence	O - 0.3 s - CO - 15 s - CO
Arc extinguishing medium	Vacuum
Rated filling pressure for interruption	- MPa abs. at 20 °C
Minimum functional pressure for interruption	- MPa abs. at 20 °C
Insulating medium	Air
Rated filling pressure for insulation	- MPa abs. at 20 °C
Minimum functional pressure for insulation	- MPa abs. at 20 °C
Driving mechanism (type)	Spring, charged by motor
Number of poles	3
Number of units per pole	1
Rated opening time	< 60 ms
Rated closing time	< 60 ms
Rated supply voltage of opening device	110 V
Rated supply voltage of closing device	110 V
Rated supply voltage of auxiliary circuits	110 V
Rated frequency of supply voltage	- Hz
Rated line /cable-charging breaking current	10 / 31,5 A
Rated single capacitor bank breaking current	400 A
Classification of circuit-breaker	Class M2, E2, C2, S1

**Further data:**

Serial number of vacuum interrupter in pole L1 / L2 / L3  
 Pole centre distance  
 Width across flats

S000103 / S000195 / S000105  
 210 mm  
 310 mm

**Essential characteristics:**

-



# Test Document

Report No.: 15-054-MS-1

Copy No.: 0

Contents: 114 Sheets

**Test object:** Three-pole vacuum circuit-breaker  
**Designation:** 3AE5324-2 with vacuum interrupters VSS12-1-31-A5  
Rated voltage: 24 kV      Rated normal current: 1250 A      Rated frequency: 50/60 Hz  
Rated short-circuit breaking current: 25 kA  
**Manufacturer:** Siemens AG, EM MS O SD BLN MF, Berlin  
**Client:** Siemens AG, EM MS R&D OC, Berlin  
**Testing station:** Prüffeld der Schaltwerke, Berlin  
**Date of test:** August 27 - 31, 2015  
**Applied test specifications:**  
IEC 62271-1, Edition 1.1, 2011-08  
IEC 62271-100, Edition 2.1, 2012-09

**Tests performed:**

Short-circuit tests for a rated current of 25 kA at a rated voltage of 24 kV and a rated frequency of 50 Hz for class S1 in test-duties:

T100s : 25.0 kA up to 25.1 kA at 25.6 kV up to 25.8 kV for breaking tests  
65.6 kA up to 66.3 kA at 24.6 kV up to 24.7 kV for making tests  
T100a : 25.1 kA up to 25.5 kA at 25.6 kV up to 26.6 kV and up to 43% dc-component  
T60 : 15.2 kA up to 15.5 kA at 26.5 kV up to 26.6 kV  
T30 : 8.0 kA up to 8.1 kA at 25.6 kV up to 26.7 kV  
T10 : 2.4 kA at 26.7 kV up to 26.9 kV  
Single-phase fault test: 25.4 kA at 15.2 kV in pole L1  
Double-earth fault test: 22.1 kA at 24.2 kV in pole L1

**Test results:**

The test object has passed the above indicated tests without any objection. The proved performance and the results obtained comply with the requirements mentioned above.

На основании чл.36а ал.3 от ЗОП



Head of t

Berlin, Oktober 05, 2015

The test results relate only to the items tested.  
The authenticity of this document is guaranteed by the integrity of the seal label and seal ribbon. Without a written permission of Prüffeld der Schaltwerke it is not allowed to make reproduction in extracts of this document. Copying the cover sheet accompanied by sheet 2 and the sheets mentioned here is an exception.

## Documents and Addresses

### Accreditation

The Prüffeld der Schaltwerke, Berlin has been approved by the DAkkS (German accreditation body) according to EN ISO/IEC 17025 for tests in the field of high-voltage switchgear and controlgear and power engineering equipment (Registration-No D-PL-11055-10-01).

Under reference to EN ISO/IEC 17025 the Prüffeld der Schaltwerke states the following:

- The accreditation of the Prüffeld der Schaltwerke or any of its test reports by themselves in no way constitute or imply product approval by DAkkS or any other body.
- If someone refers to a test in an accredited Prüffeld der Schaltwerke this reference shall include the accreditation body, i.e. DAkkS, the relevant scope of the accreditation and the appropriate registration number.

### PSW-Documents

#### A Certificate

is issued for type tests which have successfully been carried out in full compliance with the relevant specifications or standards valid at the time of the test. For these tests the equipment under test must be clearly identified by technical description, drawings and additional specifications.

#### A Test Document

is issued for parts of type tests which have successfully been carried out in full compliance with the relevant specifications or standards valid at the time of test. For these tests the equipment under test must be clearly identified by technical description, drawings and additional specifications.

#### A Test Report

is issued for all other tests which have been carried out according to specifications, standards and/or clients instructions. Similarly, this test report contains all test results, details of the conditions under which the tests were carried out, also details relating to the behaviour of the equipment during test, and its condition after the tests.

#### A Test Confirmation

is issued immediately after the tests. It confirms that the tests have been conducted and is valid only until publishing the detailed results in an entire document.

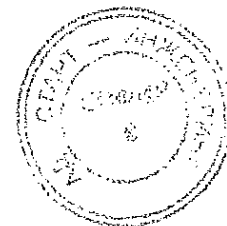
### Addresses

Testing Station: Prüffeld der Schaltwerke, Berlin  
Siemens AG  
EM MS R&D OC TD  
Nonnendammallee 104  
13629 Berlin  
Germany

Manufacturer: Siemens AG  
EM MS O SD BLN MF  
Nonnendammallee 104  
13629 Berlin  
Germany

Client: Siemens AG  
EM MS R&D OC  
Nonnendammallee 104  
13629 Berlin  
Germany

На основании чл.36а ал.3 от  
ЗОП



**Technical Data of Test Object  
Circuit-Breaker**

**Test object:** Three-pole vacuum circuit-breaker  
**Designation:** 3AE5324-2 with vacuum interrupters VSS12-1-31-A5  
**Manufacturer:** Siemens AG, EM MS O SD BLN MF, Berlin  
**Serial No.:** S 3AE5/00004949  
**Year of manufacture:** 2015  
**Drawing No.:** Drawings and parts lists - see sheet 6

**Ratings assigned by the manufacturer:**

Rated voltage	24 kV
Rated normal current	1250 A
Rated frequency	50/60 Hz
Rated lightning impulse withstand voltage	125 kV
Rated switching impulse withstand voltage	- kV
Rated power-frequency withstand voltage	65 kV
Rated peak withstand current	65 kA
Rated short-time withstand current	25 kA
Rated duration of short-circuit	3 s
Rated short-circuit breaking current	25 kA
DC component of the rated short-circuit breaking current	50 %
(Valid for a minimum opening time of 21 ms, a relay-time of 10 ms and a time constant of 45 ms)	
Rated short-circuit making current	65 kA
Rated transient recovery voltage	41.2 kV
Rate of rise of transient recovery voltage	0.47 kV/μs
First-pole-to-clear factor	1.5
Rated operating sequence	O - 0.3 s - CO - 15 s - CO
Arc extinguishing medium	Vacuum
Rated filling pressure for interruption	- MPa abs. at 20 °C
Minimum functional pressure for interruption	- MPa abs. at 20 °C
Insulating medium	Air
Rated filling pressure for insulation	- MPa abs. at 20 °C
Minimum functional pressure for insulation	- MPa abs. at 20 °C
Driving mechanism (type)	Spring, charged by motor
Number of poles	3
Number of units per pole	1
Rated opening time	< 60 ms
Rated closing time	< 60 ms
Rated supply voltage of opening device	110 V d.c.
Rated supply voltage of closing device	110 V d.c.
Rated supply voltage of auxiliary circuits	110 V d.c.
Rated frequency of supply voltage	- Hz
Rated line /cable-charging breaking current	10 / 31.5 A
Rated single capacitor bank breaking current	400 A
Classification of circuit-breaker	Class M2, E2, C2, S1

**Further data:**

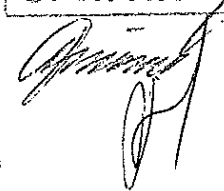
Serial number of vacuum interrupter in pole L1 / L2 / L3  
 Pole centre distance  
 Width across flats

S 990122 / S 000147 / S 000152

210 mm  
 310 mm

**ВЯРНО С  
ОРИГИНАЛА**

165 



# Test Report

Report No.: 15-054-MS-2

Copy No.: 0

Contents: 60 Sheets

Test object: Three-pole vacuum circuit-breaker  
Designation: 3AE5324-2 with vacuum interrupters VSS12-1-31-A5  
Rated voltage: 24 kV Rated normal current: 1250 A Rated frequency: 50/60 Hz  
Rated short-circuit breaking current: 25 kA  
Manufacturer: Siemens AG, EM MS O SD BLN MF, Berlin  
Client: Siemens AG, EM MS R&D OC, Berlin  
Testing station: Prüffeld der Schaltwerke, Berlin  
Date of test: August 27 - 31, 2015

Applied test specifications:

IEC 62271-1, Edition 1.1, 2011-08

IEC 62271-100, Edition 2.1, 2012-09

Client instruction based on 17A/1093/CD, 2015-04

Tests performed:

Short-circuit tests for a rated current of 25 kA at a rated voltage of 24 kV and a rated frequency of 50 Hz for class S1 in test-duties:

Tests for demonstrating the performance of the circuit-breaker for  $k_{pp} = 1.3$  by additional single-phase fault tests

Single-phase fault test under symmetrical fault conditions for the third-pole-to-clear:  
25.4 kA at 15.2 kV in pole L1

Single-phase fault test under symmetrical fault conditions for the second-pole-to-clear:  
25.4 kA at 18.4 kV in pole L3

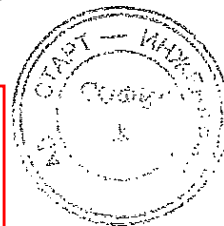
Single-phase fault test under asymmetrical fault conditions for the second and third-pole-to-clear:  
25.0 kA at 17.8 kV and 53% dc-component in pole L3

Test results:

The test object has passed the above indicated tests without any objection. The proved performance and the results obtained comply with the requirements mentioned above.



На основание чл.36а ал.3 от ЗОП



ВЯРНО С  
ОРИГИНАЛА

Berlin, October 05, 2015

The test results relate only to the items tested.

The authenticity of this document is guaranteed by the integrity of the seal label and seal ribbon. Without a written permission of Prüffeld der Schaltwerke it is not allowed to make reproduction in extracts of this document. Copying the cover sheet accompanied by sheet 2 and the sheets mentioned here is an exception.

## Documents and Addresses

### Accreditation

The Prüffeld der Schaltwerke, Berlin has been approved by the DAkkS (German accreditation body) according to EN ISO/IEC 17025 for tests in the field of high-voltage switchgear and controlgear and power engineering equipment (Registration-No. D-PL-11055-10-01).

Under reference to EN ISO/IEC 17025 the Prüffeld der Schaltwerke states the following:

- The accreditation of the Prüffeld der Schaltwerke or any of its test reports by themselves in no way constitute or imply product approval by DAkkS or any other body.
- If someone refers to a test in an accredited Prüffeld der Schaltwerke this reference shall include the accreditation body, i.e. DAkkS, the relevant scope of the accreditation and the appropriate registration number.

### PSW-Documents

#### A Certificate

is issued for type tests which have successfully been carried out in full compliance with the relevant specifications or standards valid at the time of the test. For these tests the equipment under test must be clearly identified by technical description, drawings and additional specifications.

#### A Test Document

is issued for parts of type tests which have successfully been carried out in full compliance with the relevant specifications or standards valid at the time of test. For these tests the equipment under test must be clearly identified by technical description, drawings and additional specifications.

#### A Test Report

is issued for all other tests which have been carried out according to specifications, standards and/or clients instructions. Similarly, this test report contains all test results, details of the conditions under which the tests were carried out, also details relating to the behaviour of the equipment during test, and its condition after the tests.

#### A Test Confirmation

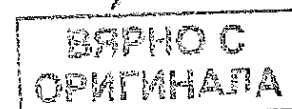
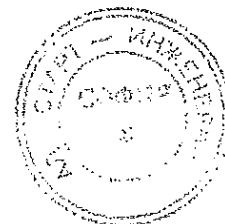
is issued immediately after the tests. It confirms that the tests have been conducted and is valid only until publishing the detailed results in an entire document.

### Addresses

Testing Station: Prüffeld der Schaltwerke, Berlin  
Siemens AG  
IC LMV MS R&D OC TD  
Nonnendammallee 104  
13629 Berlin  
Germany

Manufacturer: Siemens AG  
EM MS O SD BLN MF  
Nonnendammallee 104  
13629 Berlin  
Germany

Client: Siemens AG  
EM MS R&D OC  
Nonnendammallee 104  
13629 Berlin  
Germany



### Technical Data of Test Object Circuit-Breaker

**Test object:** Three-pole vacuum circuit-breaker  
**Designation:** 3AE5324-2 with vacuum interrupters VSS12-1-31-A5  
**Manufacturer:** Siemens AG, EM MS O SD BLN MF, Berlin  
**Serial No.:** S 3AE5/00004949  
**Year of manufacture:** 2015  
**Drawing No.:** Drawings and parts lists - see sheet 6

**Ratings assigned by the manufacturer:**

Rated voltage	24 kV
Rated normal current	1250 A
Rated frequency	50/60 Hz
Rated lightning impulse withstand voltage	125 kV
Rated switching impulse withstand voltage	- kV
Rated power-frequency withstand voltage	65 kV
Rated peak withstand current	65 kA
Rated short-time withstand current	25 kA
Rated duration of short-circuit	3 s
Rated short-circuit breaking current	25 kA
DC component of the rated short-circuit breaking current	50 %
<small>(Valid for a minimum opening time of 21 ms, a relay-time of 10 ms and a time constant of 45 ms)</small>	
Rated short-circuit making current	65 kA
Rated transient recovery voltage	41.2 kV
Rate of rise of transient recovery voltage	0.47 kV/μs
First-pole-to-clear factor	1.5
Rated operating sequence	O - 0.3 s - CO - 15 s - CO
Arc extinguishing medium	Vacuum
Rated filling pressure for interruption	- MPa abs. at 20 °C
Minimum functional pressure for interruption	- MPa abs. at 20 °C
Insulating medium	Air
Rated filling pressure for insulation	- MPa abs. at 20 °C
Minimum functional pressure for insulation	- MPa abs. at 20 °C
Driving mechanism (type)	Spring, charged by motor
Number of poles	3
Number of units per pole	1
Rated opening time	< 60 ms
Rated closing time	< 60 ms
Rated supply voltage of opening device	110 V d.c.
Rated supply voltage of closing device	110 V d.c.
Rated supply voltage of auxiliary circuits	110 V d.c.
Rated frequency of supply voltage	- Hz
Rated line /cable-charging breaking current	10 / 31.5 A
Rated single capacitor bank breaking current	400 A
Classification of circuit-breaker	Class M2, E2, C2, S1

**Further data:**

Serial number of vacuum interrupter in pole L1 / L2 / L3  
 Pole centre distance  
 Width across flats

S 990122 / S 000147 / S 000152  
 210 mm  
 310 mm

ВЕРНО С  
ОРИГИНАЛА

**Essential characteristics:**



# Test Document

Report No.: 15-055-MS

Copy No.: 0

Contents: 46 Sheets

Test object: Three-pole vacuum circuit-breaker  
Designation: 3AE5324-2 with vacuum interrupters VSS12-1-31-A5  
Rated voltage: 24 kV      Rated normal current: 1250 A      Rated frequency: 50/60 Hz  
Rated short-circuit breaking current: 25 kA  
Manufacturer: Siemens AG, EM MS O SD BLN MF, Berlin  
Client: Siemens AG, EM MS R&D OC, Berlin  
Testing station: Prüffeld der Schaltwerke, Berlin  
Date of test: August 18 - 20, 2015

Applied test specifications:

IEC 62271-1, Edition 1.1, 2011-08  
IEC 62271-100, Edition 2.1, 2012-09

Tests performed:

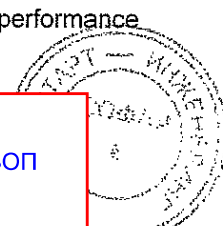
Short-circuit tests for a rated current of 25 kA at a rated voltage of 24 kV and a rated frequency of 50 Hz in test-duty:  
STC: Short-time withstand current: 25 kA - 3 s; peak withstand current: 65 kA

Test results:

The test object has passed the above indicated tests without any objection. The proved performance and the results obtained comply with the requirements mentioned above.



На основании чл.36а ал.3 от ЗОП



ВЯРНО С  
ОРИГИНАЛА

Berlin, October 05, 2015

The test results relate only to the items tested.

The authenticity of this document is guaranteed by the integrity of the seal label and seal ribbon. Without a written permission of Prüffeld der Schaltwerke it is not allowed to make reproduction in extracts of this document. Copying the cover sheet accompanied by sheet 2 and the sheets mentioned here is an exception.

02DE1310

0129

## Documents and Addresses

### Accreditation

The Prüffeld der Schaltwerke, Berlin has been approved by the DAkkS (German accreditation body) according to EN ISO/IEC 17025 for tests in the field of high-voltage switchgear and controlgear and power engineering equipment (Registration-No D-PL-11055-10-01).

Under reference to EN ISO/IEC 17025 the Prüffeld der Schaltwerke states the following:

- The accreditation of the Prüffeld der Schaltwerke or any of its test reports by themselves in no way constitute or imply product approval by DAkkS or any other body.
- If someone refers to a test in an accredited Prüffeld der Schaltwerke this reference shall include the accreditation body, i.e. DAkkS, the relevant scope of the accreditation and the appropriate registration number.

### PSW-Documents

#### A Certificate

is issued for type tests which have successfully been carried out in full compliance with the relevant specifications or standards valid at the time of the test. For these tests the equipment under test must be clearly identified by technical description, drawings and additional specifications.

#### A Test Document

is issued for parts of type tests which have successfully been carried out in full compliance with the relevant specifications or standards valid at the time of test. For these tests the equipment under test must be clearly identified by technical description, drawings and additional specifications.

#### A Test Report

is issued for all other tests which have been carried out according to specifications, standards and/or clients instructions. Similarly, this test report contains all test results, details of the conditions under which the tests were carried out, also details relating to the behaviour of the equipment during test, and its condition after the tests.

#### A Test Confirmation

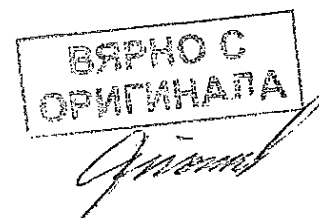
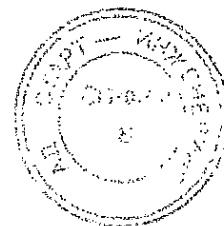
is issued immediately after the tests. It confirms that the tests have been conducted and is valid only until publishing the detailed results in an entire document.

### Addresses

Testing Station: Prüffeld der Schaltwerke, Berlin  
Siemens AG  
EM MS R&D OC TD  
Nonnendammallee 104  
13629 Berlin  
Germany

Manufacturer: Siemens AG  
EM MS O SD BLN MF  
Nonnendammallee 104  
13629 Berlin  
Germany

Client: Siemens AG  
EM MS R&D OC  
Nonnendammallee 104  
13629 Berlin  
Germany



**Technical Data of Test Object  
Circuit-Breaker**

**Test object:** Three-pole vacuum circuit-breaker  
**Designation:** 3AE5324-2 with vacuum interrupters VSS12-1-31-A5  
**Manufacturer:** Siemens AG, EM MS O SD BLN MF, Berlin  
**Serial No.:** S 3AE5/00004949  
**Year of manufacture:** 2015  
**Drawing No.:** Drawings and parts lists - see sheet 6

**Ratings assigned by the manufacturer:**

Rated voltage	24 kV
Rated normal current	1250 A
Rated frequency	50/60 Hz
Rated lightning impulse withstand voltage	125 kV
Rated switching impulse withstand voltage	- kV
Rated power-frequency withstand voltage	65 kV
Rated peak withstand current	65 kA
Rated short-time withstand current	25 kA
Rated duration of short-circuit	3 s
Rated short-circuit breaking current	25 kA
DC component of the rated short-circuit breaking current (Valid for a minimum opening time of 21 ms, a relay-time of 10 ms and a time constant of 45 ms)	50 %
Rated short-circuit making current	65 kA
Rated transient recovery voltage	41.2 kV
Rate of rise of transient recovery voltage	0.47 kV/μs
First-pole-to-clear factor	1.5
Rated operating sequence	O - 0.3 s - CO - 15 s - CO
Arc extinguishing medium	Vacuum
Rated filling pressure for interruption	- MPa abs. at 20 °C
Minimum functional pressure for interruption	- MPa abs. at 20 °C
Insulating medium	Air
Rated filling pressure for insulation	- MPa abs. at 20 °C
Minimum functional pressure for insulation	- MPa abs. at 20 °C
Driving mechanism (type)	Spring, charged by motor
Number of poles	3
Number of units per pole	1
Rated opening time	< 60 ms
Rated closing time	< 60 ms
Rated supply voltage of opening device	110 V d.c.
Rated supply voltage of closing device	110 V d.c.
Rated supply voltage of auxiliary circuits	110 V d.c.
Rated frequency of supply voltage	- Hz
Rated line /cable-charging breaking current	10 / 31.5 A
Rated single capacitor bank breaking current	400 A
Classification of circuit-breaker	Class M2, E2, C2, S1

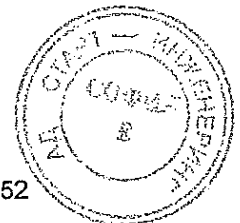
**Further data:**

Serial number of vacuum interrupter in pole L1 / L2 / L3  
 Pole centre distance  
 Width across flats

S 990122 / S 000147 / S 000152  
 210 mm  
 310 mm

**Essential characteristics:**

-



*[Handwritten signature]*

*171*

# Test Document

Report No.: 15-070-MH

Copy No.: 0

Contents: 19 Sheets

**Test object:** Three-pole vacuum circuit-breaker  
**Designation:** 3AE5324-2 with vacuum interrupters VSS12-1-31-A5  
Rated voltage: 24 kV      Rated normal current: 1250 A      Rated frequency: 50/60 Hz  
Rated short-circuit breaking current: 25 kA  
**Manufacturer:** Siemens AG, EM MS O SD BLN MF, Berlin  
**Client:** Siemens AG, EM MS R&D OC, Berlin  
**Testing station:** Prüffeld der Schaltwerke, Berlin  
**Date of test:** August 19, 2015

**Applied test specifications:**

IEC 62271-1, Edition 1.1, 2011-08

DIN EN 62271-1/A1 (VDE 0671-1/A1), 2012-04

IEC 62271-100, Edition 2.1, 2012-09

DIN EN 62271-100 (VDE 0671-100), 2013-08

**Tests performed:**

Dielectric tests, including:

Lightning impulse withstand voltage: 125 kV

Short-duration power-frequency withstand voltage: 50 kV

**Test results:**

The test object has passed the above indicated tests without any objection. The proved performance and the results obtained comply with the requirements mentioned above.



На основание чл.36а ал.3 от ЗОП



ВЯРНО С  
ОРИГИНАЛА  
*[Signature]*

Head of Hig

Berlin, October 08, 2015  
Rev.: June 29, 2016

The test results relate only to the items tested.

The authenticity of this document is guaranteed by the integrity of the seal label and seal ribbon. Without a written permission of Prüffeld der Schaltwerke it is not allowed to make reproduction in extracts of this document. Copying the cover sheet accompanied by sheet 2 and the sheets mentioned here is an exception.

02DE1310

127 *[Signature]*

## Documents and Addresses

### Accreditation

The Prüffeld der Schaltwerke, Berlin has been approved by the DAkkS (German accreditation body) according to EN ISO/IEC 17025 for tests in the field of high-voltage switchgear and controlgear and power engineering equipment (Registration-No D-PL-11055-10-01).

Under reference to EN ISO/IEC 17025 the Prüffeld der Schaltwerke states the following:

- The accreditation of the Prüffeld der Schaltwerke or any of its test reports by themselves in no way constitute or imply product approval by DAkkS or any other body.
- If someone refers to a test in an accredited Prüffeld der Schaltwerke this reference shall include the accreditation body, i.e. DAkkS, the relevant scope of the accreditation and the appropriate registration number.

### PSW-Documents

#### A Certificate

is issued for type tests which have successfully been carried out in full compliance with the relevant specifications or standards valid at the time of the test. For these tests the equipment under test must be clearly identified by technical description, drawings and additional specifications.

#### A Test Document

is issued for parts of type tests which have successfully been carried out in full compliance with the relevant specifications or standards valid at the time of test. For these tests the equipment under test must be clearly identified by technical description, drawings and additional specifications.

#### A Test Report

is issued for all other tests which have been carried out according to specifications, standards and/or clients instructions. Similarly, this test report contains all test results, details of the conditions under which the tests were carried out, also details relating to the behaviour of the equipment during test, and its condition after the tests.

#### A Test Confirmation

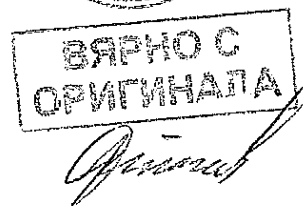
is issued immediately after the tests. It confirms that the tests have been conducted and is valid only until publishing the detailed results in an entire document.

### Addresses

Testing Station: Prüffeld der Schaltwerke, Berlin  
Siemens AG  
EM MS R&D OC TD  
Nonnendammallee 104  
13629 Berlin  
Germany

Manufacturer: Siemens AG  
EM MS O SD BLN MF  
Nonnendammallee 104  
13629 Berlin  
Germany

Client: Siemens AG  
EM MS R&D OC  
Nonnendammallee 104  
13629 Berlin  
Germany



**Technical Data of Test Object  
Circuit-Breaker**

**Test object:** Three-pole vacuum circuit-breaker  
**Designation:** 3AE5324-2 with vacuum interrupters VSS12-1-31-A5  
**Manufacturer:** Siemens AG, EM MS O SD BLN MF, Berlin  
**Serial No.:** S3AE5/00004953  
**Year of manufacture:** 2015  
**Drawing No.:** Drawings and parts lists - see sheet 6

**Ratings assigned by the manufacturer:**

Rated voltage	24 kV
Rated normal current	1250 A
Rated frequency	50/60 Hz
Rated lightning impulse withstand voltage	125 kV
Rated switching impulse withstand voltage	- kV
Rated power-frequency withstand voltage	50 kV
Rated peak withstand current	65 kA
Rated short-time withstand current	25 kA
Rated duration of short-circuit	3 s
Rated short-circuit breaking current	25 kA
DC component of the rated short-circuit breaking current (Valid for a minimum opening time of 21 ms, a relay-time of 10 ms and a time constant of 45 ms)	50 %
Rated short-circuit making current	65 kA
Rated transient recovery voltage	41.2 kV
Rate of rise of transient recovery voltage	0.47 kV/μs
First-pole-to-clear factor	1.5
Rated operating sequence	O - 0.3 s - CO - 15 min - CO
Arc extinguishing medium	Vacuum
Rated filling pressure for interruption	- MPa abs. at 20 °C
Minimum functional pressure for interruption	- MPa abs. at 20 °C
Insulating medium	Air
Rated filling pressure for insulation	- MPa abs. at 20 °C
Minimum functional pressure for insulation	- MPa abs. at 20 °C
Driving mechanism (type)	Spring, charged by motor
Number of poles	3
Number of units per pole	1
Rated opening time	< 60 ms
Rated closing time	< 60 ms
Rated supply voltage of opening device	110 V d.c.
Rated supply voltage of closing device	110 V d.c.
Rated supply voltage of auxiliary circuits	110 V d.c.
Rated frequency of supply voltage	- Hz
Rated line /cable-charging breaking current	10/ 31.5 A
Rated single capacitor bank breaking current	400 A
Classification of circuit-breaker	Class M2, E2, C2, S1

**Further data:**

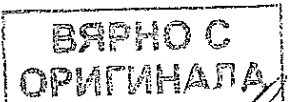
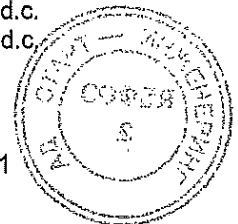
Serial number of vacuum interrupter in pole L1 / L2 / L3  
 Pole centre distance  
 Width across flats

S000132 / S000151 / S990114

210 mm  
 310 mm

**Essential characteristics:**

-



174

# Test Document

Report No.: 15-072-MM

Copy No.: 0

Contents: 19 Sheets

**Test object:** Three-pole vacuum circuit-breaker  
**Designation:** 3AE5354-2 with vacuum interrupters VSS12-1-31-A5  
Rated voltage: 24 kV      Rated normal current: 1250 A      Rated frequency: 50/60 Hz  
Rated short-circuit breaking current: 25 kA  
**Manufacturer:** Siemens AG, EM MS O SD BLN MF, Berlin  
**Client:** Siemens AG, EM MS R&D OC, Berlin  
**Testing station:** Prüffeld der Schaltwerke, Berlin  
**Date of test:** August 18 - September 11, 2015

**Applied test specifications:**

IEC 62271-1, Edition 1.1, 2011-08	DIN EN 62271-1/A1 (VDE 0671-1/A1), 2012-04
IEC 62271-100, Edition 2.1, 2012-09	DIN EN 62271-100 (VDE 0671-100), 2013-08
IEC 60068-2-1, Edition 6.0, 2007-03	DIN EN 60068-2-1 (VDE 0468-2-1), 2008-01
IEC 60068-2-2, Edition 5.0, 2007-07	DIN EN 60068-2-2 (VDE 0468-2-2), 2008-01

**Tests performed:**

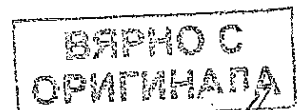
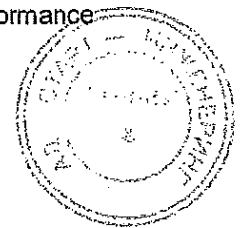
- Low and high temperature Test (-25°C/+40°C)
- Voltage Test as a Condition Check

**Test results:**

The test object has passed the above indicated tests without any objection. The proved performance and the results obtained comply with the requirements mentioned above.



На основание чл.36а ал.3 от ЗОП



Berlin, October 09, 2015

The test results relate only to the items tested.  
The authenticity of this document is guaranteed by the integrity of the seal label and seal ribbon. Without a written permission of Prüffeld der Schaltwerke it is not allowed to make reproduction in extracts of this document. Copying the cover sheet accompanied by sheet 2 and the sheets mentioned here is an exception.

Handwritten numbers '175' and a signature.

## Documents and Addresses

### Accreditation

The Prüffeld der Schaltwerke, Berlin has been approved by the DAkkS (German accreditation body) according to EN ISO/IEC 17025 for tests in the field of high-voltage switchgear and controlgear and power engineering equipment (Registration-No D-PL-11055-10-01).

Under reference to EN ISO/IEC 17025 the Prüffeld der Schaltwerke states the following:

- The accreditation of the Prüffeld der Schaltwerke or any of its test reports by themselves in no way constitute or imply product approval by DAkkS or any other body.
- If someone refers to a test in an accredited Prüffeld der Schaltwerke this reference shall include the accreditation body, i.e. DAkkS, the relevant scope of the accreditation and the appropriate registration number.

### PSW-Documents

#### A Certificate

is issued for type tests which have successfully been carried out in full compliance with the relevant specifications or standards valid at the time of the test. For these tests the equipment under test must be clearly identified by technical description, drawings and additional specifications.

#### A Test Document

is issued for parts of type tests which have successfully been carried out in full compliance with the relevant specifications or standards valid at the time of test. For these tests the equipment under test must be clearly identified by technical description, drawings and additional specifications.

#### A Test Report

is issued for all other tests which have been carried out according to specifications, standards and/or clients instructions. Similarly, this test report contains all test results, details of the conditions under which the tests were carried out, also details relating to the behaviour of the equipment during test, and its condition after the tests.

#### A Test Confirmation

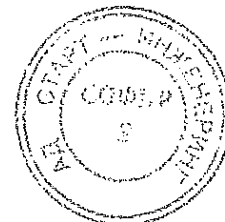
is issued immediately after the tests. It confirms that the tests have been conducted and is valid only until publishing the detailed results in an entire document.

### Addresses

Testing Station: Prüffeld der Schaltwerke, Berlin  
Siemens AG  
EM MS R&D OC TD  
Nonnendammallee 104  
13629 Berlin  
Germany

Manufacturer: Siemens AG  
EM MS O SD BLN MF  
Nonnendammallee 104  
13629 Berlin  
Germany

Client: Siemens AG  
EM MS R&D OC  
Nonnendammallee 104  
13629 Berlin  
Germany





### Technical Data of Test Object Circuit-Breaker

**Test object:** Three-pole vacuum circuit-breaker  
**Designation:** 3AE5354-2 with vacuum interrupters VSS12-1-31-A5  
**Manufacturer:** Siemens AG, EM MS O SD BLN MF, Berlin  
**Serial No.:** S3AE5/00004954  
**Year of manufacture:** 2015  
**Drawing No.:** Drawings and parts lists - see sheet 6

**Ratings assigned by the manufacturer:**

Rated voltage	24 kV
Rated normal current	1250 A
Rated frequency	50/60 Hz
Rated lightning impulse withstand voltage	125 kV
Rated switching impulse withstand voltage	- kV
Rated power-frequency withstand voltage	50 kV
Rated peak withstand current	63/65 kA
Rated short-time withstand current	25 kA
Rated duration of short-circuit	3 s
Rated short-circuit breaking current	25 kA
DC component of the rated short-circuit breaking current <small>(Valid for a minimum opening time of 21 ms, a relay-time of 10 ms and a time constant of 45 ms)</small>	50 %
Rated short-circuit making current	63/65 kA
Rated transient recovery voltage	41.2 kV
Rate of rise of transient recovery voltage	0.47 kV/μs
First-pole-to-clear factor	1.5
Rated operating sequence	O - 0.3s - CO - 15s - CO
Arc extinguishing medium	Vacuum
Rated filling pressure for interruption	- MPa abs. at 20 °C
Minimum functional pressure for interruption	- MPa abs. at 20 °C
Insulating medium	Air
Rated filling pressure for insulation	- MPa abs. at 20 °C
Minimum functional pressure for insulation	- MPa abs. at 20 °C
Driving mechanism (type)	Spring, charged by motor
Number of poles	3
Number of units per pole	1
Rated opening time	< 60 ms
Rated closing time	< 60 ms
Rated supply voltage of opening device	110 V d.c.
Rated supply voltage of closing device	110 V d.c.
Rated supply voltage of auxiliary circuits	110 V d.c.
Rated frequency of supply voltage	- Hz
Rated line /cable-charging breaking current	- / 31.5 A
Rated single capacitor bank breaking current	400 A
Classification of circuit-breaker	Class M2, E2, C2, S1

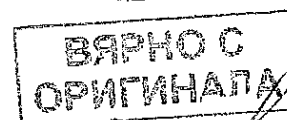
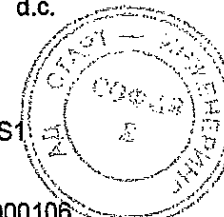
**Further data:**

Serial number of vacuum interrupter in pole L1 / L2 / L3  
 Pole centre distance  
 Width across flats

S 000155 / S 000109 / S 000106  
 275 mm  
 310 mm

**Essential characteristics:**

-



177 *[Signature]*

# Test Document

Report No.: 15-073-MM

Copy No.: 0

Contents: 24 Sheets

**Test object:** Three-pole vacuum circuit-breaker  
**Designation:** 3AE5354-2 with vacuum interrupters VSS12-1-31-A5  
Rated voltage: 24 kV      Rated normal current: 1250 A      Rated frequency: 50/60 Hz  
Rated short-circuit breaking current: 25 kA  
**Manufacturer:** Siemens AG, EM MS O SD BLN MF, Berlin  
**Client:** Siemens AG, EM MS R&D OC, Berlin  
**Testing station:** Prüffeld der Schaltwerke, Berlin  
**Date of test:** August 26 - September 11, 2015  
**Applied test specifications:**  
IEC 62271-1, Edition 1.1, 2011-08      DIN EN 62271-1/A1 (VDE 0671-1/A1), 2012-04  
IEC 62271-100, Edition 2.1, 2012-09      DIN EN 62271-100 (VDE 0671-100), 2013-08

*W*  
**Tests performed:**

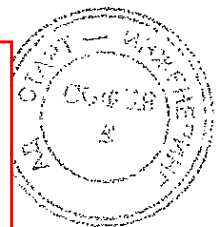
- Extended mechanical endurance test (M2, 10 000 operation cycles)
- Voltage Test as a Condition Check

**Test results:**

The test object has passed the above indicated tests without any objection. The proved performance and the results obtained comply with the requirements mentioned above.



*W*  
На основании чл.36а ал.3 от ЗОП



Berlin, October 09, 2015

The test results relate only to the items tested.

The authenticity of this document is guaranteed by the integrity of the seal label and seal ribbon. Without a written permission of Prüffeld der Schaltwerke it is not allowed to make reproduction in extracts of this document. Copying the cover sheet accompanied by sheet 2 and the sheets mentioned here is an exception.

02DE1310

178

## Documents and Addresses

### Accreditation

The Prüffeld der Schaltwerke, Berlin has been approved by the DAkkS (German accreditation body) according to EN ISO/IEC 17025 for tests in the field of high-voltage switchgear and controlgear and power engineering equipment (Registration-No D-PL-11055-10-01).

Under reference to EN ISO/IEC 17025 the Prüffeld der Schaltwerke states the following:

- The accreditation of the Prüffeld der Schaltwerke or any of its test reports by themselves in no way constitute or imply product approval by DAkkS or any other body.
- If someone refers to a test in an accredited Prüffeld der Schaltwerke this reference shall include the accreditation body, i.e. DAkkS, the relevant scope of the accreditation and the appropriate registration number.

### PSW-Documents

#### A Certificate

is issued for type tests which have successfully been carried out in full compliance with the relevant specifications or standards valid at the time of the test. For these tests the equipment under test must be clearly identified by technical description, drawings and additional specifications.

#### A Test Document

is issued for parts of type tests which have successfully been carried out in full compliance with the relevant specifications or standards valid at the time of test. For these tests the equipment under test must be clearly identified by technical description, drawings and additional specifications.

#### A Test Report

is issued for all other tests which have been carried out according to specifications, standards and/or clients instructions. Similarly, this test report contains all test results, details of the conditions under which the tests were carried out, also details relating to the behaviour of the equipment during test, and its condition after the tests.

#### A Test Confirmation

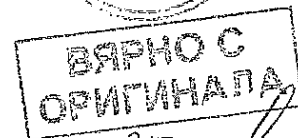
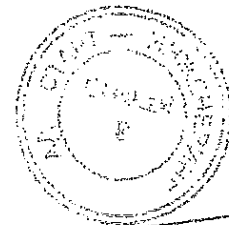
is issued immediately after the tests. It confirms that the tests have been conducted and is valid only until publishing the detailed results in an entire document.

### Addresses

Testing Station: Prüffeld der Schaltwerke, Berlin  
Siemens AG  
EM MS R&D OC TD  
Nonnendammallee 104  
13629 Berlin  
Germany

Manufacturer: Siemens AG  
EM MS O SD BLN MF  
Nonnendammallee 104  
13629 Berlin  
Germany

Client: Siemens AG  
EM MS R&D OC  
Nonnendammallee 104  
13629 Berlin  
Germany



**Technical Data of Test Object  
Circuit-Breaker**

**Test object:** Three-pole vacuum circuit-breaker  
**Designation:** 3AE5354-2 with vacuum interrupters VSS12-1-31-A5  
**Manufacturer:** Siemens AG, EM MS O SD BLN MF, Berlin  
**Serial No.:** S3AE5/00004954  
**Year of manufacture:** 2015  
**Drawing No.:** Drawings and parts lists - see sheet 6

**Ratings assigned by the manufacturer:**

Rated voltage	24 kV
Rated normal current	1250 A
Rated frequency	50/60 Hz
Rated lightning impulse withstand voltage	125 kV
Rated switching impulse withstand voltage	- kV
Rated power-frequency withstand voltage	50 kV
Rated peak withstand current	63/65 kA
Rated short-time withstand current	25 kA
Rated duration of short-circuit	3 s
Rated short-circuit breaking current	25 kA
DC component of the rated short-circuit breaking current	50 %
<small>(Valid for a minimum opening time of 21 ms, a relay-time of 10 ms and a time constant of 45 ms)</small>	
Rated short-circuit making current	63/65 kA
Rated transient recovery voltage	41.2 kV
Rate of rise of transient recovery voltage	0.47 kV/μs
First-pole-to-clear factor	1.5
Rated operating sequence	O - 0.3s - CO - 15s - CO
Arc extinguishing medium	Vacuum
Rated filling pressure for interruption	- MPa abs. at 20 °C
Minimum functional pressure for interruption	- MPa abs. at 20 °C
Insulating medium	Air
Rated filling pressure for insulation	- MPa abs. at 20 °C
Minimum functional pressure for insulation	- MPa abs. at 20 °C
Driving mechanism (type)	Spring, charged by motor
Number of poles	3
Number of units per pole	1
Rated opening time	< 60 ms
Rated closing time	< 60 ms
Rated supply voltage of opening device	110 V d.c.
Rated supply voltage of closing device	110 V d.c.
Rated supply voltage of auxiliary circuits	110 V d.c.
Rated frequency of supply voltage	- Hz
Rated line /cable-charging breaking current	- / 31.5 A
Rated single capacitor bank breaking current	400 A
Classification of circuit-breaker	Class M2, E2, C2, S1

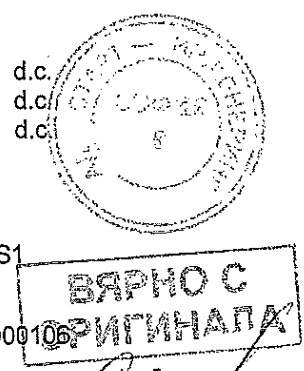
**Further data:**

Serial number of vacuum interrupter in pole L1 / L2 / L3      S 000155 / S 000109 / S 000105  
 Pole centre distance      275 mm  
 Width across flats      310 mm

**Essential characteristics:**

-

180



# Test Document

Report No.: 15-075-ME

Copy No.: 0

Contents: 18 Sheets

**Test object:** Three-pole vacuum circuit-breaker  
**Designation:** 3AE5324-2 with vacuum interrupters VSA 12-1-31 A5  
Rated voltage: 24 kV      Rated normal current: 1250 A      Rated frequency: 50/60 Hz  
Rated short-circuit breaking current: 25 kA  
**Manufacturer:** Siemens AG, EM MS O SD BLN MF, Berlin  
**Client:** Siemens AG, EM MS R&D OC 4 2, Berlin  
**Testing station:** Prüffeld der Schaltwerke, Berlin  
**Date of test:** August 26th - September 01th, 2015  
**Applied test specifications:**  
IEC 62271-1, Edition 1.1, 2011-08      DIN EN 62271-1/A1 (VDE 0671-1/A1), 2012-04  
IEC 62271-100, Edition 2.1, 2012-09      DIN EN 62271-100 (VDE 0671-100), 2013-08

 **Tests performed:**

Temperature-rise test with 1250 A at 50 Hz  
(Terminal connection: copper bar, painted, 60mm x 10mm)

**Test results:**

The test object has passed the above indicated tests without any objection. The proved performance and the results obtained comply with the requirements mentioned above.



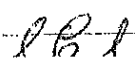

 На основание чл.36а ал.3 от ЗОП



Berlin, November 05, 2015

The test results relate only to the items tested.  
The authenticity of this document is guaranteed by the integrity of the seal label and seal ribbon. Without a written permission of Prüffeld der Schaltwerke it is not allowed to make reproduction in extracts of this document. Copying the cover sheet accompanied by sheet 2 and the sheets mentioned here is an exception.

02DE1310

## Documents and Addresses

### Accreditation

The Prüffeld der Schaltwerke, Berlin has been approved by the DAkkS (German accreditation body) according to EN ISO/IEC 17025 for tests in the field of high-voltage switchgear and controlgear and power engineering equipment (Registration-No D-PL-11055-10-01).

Under reference to EN ISO/IEC 17025 the Prüffeld der Schaltwerke states the following:

- The accreditation of the Prüffeld der Schaltwerke or any of its test reports by themselves in no way constitute or imply product approval by DAkkS or any other body.
- If someone refers to a test in an accredited Prüffeld der Schaltwerke this reference shall include the accreditation body, i.e. DAkkS, the relevant scope of the accreditation and the appropriate registration number.

### PSW-Documents

#### A Type Test Certificate

is issued for type tests which have successfully been carried out in full compliance with the relevant specifications or standards valid at the time of the test. For these tests the equipment under test must be clearly identified by technical description, drawings and additional specifications.

#### A Test Document

is issued for parts of type tests which have successfully been carried out in full compliance with the relevant specifications or standards valid at the time of test. For these tests the equipment under test must be clearly identified by technical description, drawings and additional specifications.

#### A Test Report

is issued for all other tests which have been carried out according to specifications, standards and/or clients instructions. Similarly, this test report contains all test results, details of the conditions under which the tests were carried out, also details relating to the behaviour of the equipment during test, and its condition after the tests.

#### A Test Confirmation

is issued immediately after the tests. It confirms that the tests have been conducted and is valid only until publishing the detailed results in an entire document.

### Addresses

Testing Station: Prüffeld der Schaltwerke, Berlin  
Siemens AG  
EM MS R&D OC TD  
Nonnendammallee 104  
13629 Berlin  
Germany

Manufacturer: Siemens AG  
EM MS O SD BLN MF  
Nonnendammallee 104  
13629 Berlin  
Germany

Client: Siemens AG  
EM MS R&D OC  
Nonnendammallee 104  
13629 Berlin  
Germany

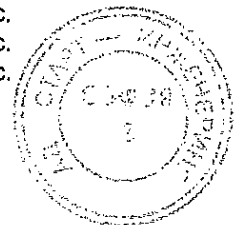


**Technical Data of Test Object  
Circuit-Breaker**

**Test object:** Three-pole vacuum circuit-breaker  
**Designation:** 3AE5324-2 with vacuum interrupters VSS12-1-31-A5  
**Manufacturer:** Siemens AG, EM MS O SD BLN MF, Berlin  
**Serial No.:** 3AE5/00004952  
**Year of manufacture:** 2015  
**Drawing No.:** Drawings and parts lists - see sheet 6 and 7

**Ratings assigned by the manufacturer:**

Rated voltage	24 kV
Rated normal current	1250 A
Rated frequency	50/60 Hz
Rated lightning impulse withstand voltage	125 kV
Rated switching impulse withstand voltage	- kV
Rated power-frequency withstand voltage	65 kV
Rated peak withstand current	65 kA
Rated short-time withstand current	25 kA
Rated duration of short-circuit	3 s
Rated short-circuit breaking current	25 kA
DC component of the rated short-circuit breaking current (Valid for a minimum opening time of 21 ms, a relay-time of 10 ms and a time constant of 45 ms)	50 %
Rated short-circuit making current	65 kA
Rated transient recovery voltage	41.2 kV
Rate of rise of transient recovery voltage	0.47 kV/μs
First-pole-to-clear factor	1.5
Rated operating sequence	O - 0.3 s - CO - 3 min - CO
Arc extinguishing medium	Vacuum
Rated filling pressure for interruption	- MPa abs. at 20 °C
Minimum functional pressure for interruption	- MPa abs. at 20 °C
Insulating medium	Air
Rated filling pressure for insulation	- MPa abs. at 20 °C
Minimum functional pressure for insulation	- MPa abs. at 20 °C
Driving mechanism (type)	Spring, charged by motor
Number of poles	3
Number of units per pole	1
Rated opening time	< 60 ms
Rated closing time	< 60 ms
Rated supply voltage of opening device	110 V d.c.
Rated supply voltage of closing device	110 V d.c.
Rated supply voltage of auxiliary circuits	110 V d.c.
Rated frequency of supply voltage	- Hz
Rated line /cable-charging breaking current	10 / 31.5 A
Rated single capacitor bank breaking current	400 A
Classification of circuit-breaker	Class M2, E2, C2, S1



**Further data:**

Serial number of vacuum interrupter in pole L1 / L2 / L3  
 Pole centre distance  
 Width across flats

S000197 / S000158 / S000149  
 210 mm  
 310 mm

**ВЯРНО С  
ОРИГИНАЛА**

**Essential characteristics:**

-

*[Handwritten signatures and marks]*

Тестов документ  
за вакуумен мощностен прекъсвач 3AE5353-1  
(24kV, 20kA, 800A)

вакуумен мощностен прекъсвач 3AE е типowo тестван в съответствие с

IEC 62271-1 версия 1.1, 2011-08

IEC 62271-100, версия 2.1, 2012-09 и съответните хармонизиращи документи

за вакуумен мощностен прекъсвач 3AE5353-1 долупосочените тестове са валидни

Изпитания	Стойност	Документ
Диелектрични изпитание на изолацията	$U_p = 125kV$ $U_d = 50kV$	15-070-MH
Изпитание за температурна устойчивост	$I_r = 800 A$	15-075-ME
Изпитания за механична устойчивост при температура на околната среда, ниска и висока температура	10.000 Цикъла -25/ +55 °C	15-073-MM 17-086-MM
Изпитания за устойчивост на върхов и ток на късо съединение	$I_{sc} = 20kA/3s$ $I_{ma} = 50kA$	15-055-MS
Изпитания за термична и динамична устойчивост	$I_{sc} = 20kA$ $I_{ma} = 50kA$	15-054-MS-1

Блоebaум /подпис, не се чете/

Хайнрих /подпис, не се чете/

EM MS O SD GF D

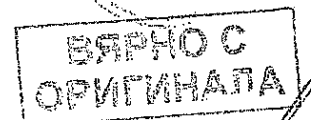
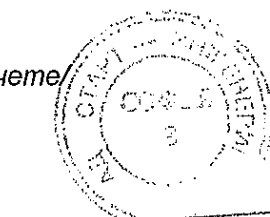
EM LP PRM MV

Берлин, 11 Юли 2017

Siemens AG  
Направление Енергиен Мениджмънт; Мениджър: Ралф Кристиан  
Средно напрежение & Системи; Мениджър: Стефан Мей

Нонендамеле 104  
13629 Берлин  
Германия

Тел. +49 (30) 386 0



Siemens Aktiengesellschaft: Председател на борда: Герхард Хром; Борд: Джо Кезер, Председател;  
Роланд Буш, Лиза Дейвис, Клаус Хелмрих, Янина Кугел, Седрик Найке, Михаел Сен, Ралф П. Томас  
Седалище: Берлин и Мюнхен, Германия; Регистрация: Берлин Шарлотенбург, HRB 12300, Мюнхен, HRB 6684  
WEEE-Per.-№. DE 23691322



**SIEMENS**

**Енергиен мениджмънт  
SOT 11628c**

Тестов документ  
за вакуумен мощностен прекъсвач 3AE5353-1  
(24kV, 20kA, 800A)

Ако се провежда изпитване с вакуумен прекъсвач с различен поръчков номер, валидността на документа за изпитване се дава чрез следните изявления:

Изброените тестови документи за посочения вакуумен прекъсвач са валидни поради сходен дизайн на вакуумните прекъсвачи и предвид, че конструкцията на пътя на основния ток и механичният задвижващ механизъм са почти еднакви.

Блоebaум /подпис, не се чете/

Хайнрих /подпис, не се чете/

EM MS O SD GF D

EM LP PRM MV

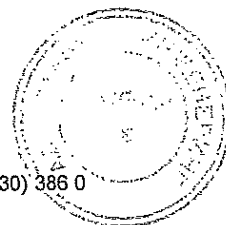
Берлин, 11 Юли 2017

**Siemens AG**

Направление Енергиен Мениджмънт; Мениджър: Ралф Кристиан  
Средно напрежение & Системи; Мениджър: Стефан Мей

Нонендамеле 104  
13629 Берлин  
Германия

Тел. +49 (30) 386 0



Siemens Aktiengesellschaft: Председател на борда: Герхард Хром; Борд: Джо Кезер, Председател;  
Роланд Буш, Лиза Дейвис, Клаус Хелмрих, Янина Кугел, Седрик Найке, Михаел Сен, Ралф П. Томас  
Седалище: Берлин и Мюнхен, Германия; Регистрация: Берлин Шарлотенбург, HRB 12300, Мюнхен, HRB 6684  
WEEE-Per.-№. DE 23691322

**ВЯРНО С  
ОРИГИНАЛА**

# SIEMENS

Енергиен мениджмънт  
SOT 11628c

Тестов документ  
за вакуумен мощностен прекъсвач ЗАЕ5353-1  
(24kV, 20kA, 800A)

В допълнение към типовите изпитания в съответствие с IEC 62271-1 и IEC 62271-100 са извършени следните тестове:

Изпитания	Документ
Изпитания за еднофазно и двуфазно земно късо съединение	15-054-MS-1
Изпитания с капацитивен ток	15-065-MS
Изпитания за термична и динамична устойчивост без фаза	16-085-MS
Тест за електрическа устойчивост, клас E2	15-096-MS

Блоebaум /подпис, не се четет/

Хайнрих /подпис, не се четет/

EM MS O SD GF D

EM LP PRM MV

Берлин, 11 Юли 2017

Siemens AG  
Направление Енергиен Мениджмънт; Мениджър: Ралф Кристиан  
Средно напрежение & Системи; Мениджър: Стефан Мей

Нонендамеле 104  
13629 Берлин  
Германия

Тел. +49 (30) 386 0



**ВЯРНО С  
ОРИГИНАЛА**

Siemens Aktiengesellschaft: Председател на борда: Герхард Хром; Борд: Джо Кезер, Председател;  
Роланд Буш, Лиза Дейвис, Клаус Хелмрих, Янина Кугел, Седрик Найке, Михаел Сен, Ралф П. Томас  
Седалище: Берлин и Мюнхен, Германия; Регистрация: Берлин Шарлотенбург, HRB 12300, Мюнхен, HRB 6684  
WEEE-Per.-№. DE 23691322

186

## Summary of type tests for Vacuum Circuit-Breaker 3AE5353-1 (24 kV, 20 kA, 800 A)

The vacuum circuit-breakers of type 3AE5 were type tested in accordance with

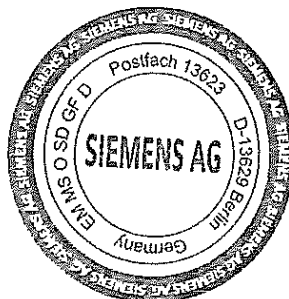
IEC Publication 62271-1, Edition 1.1, 2011-08,  
IEC Publication 62271-100, Edition 2.1, 2012-09 and the relevant harmonisation documents.

For vacuum circuit-breaker 3AE5353-1 the following test documents are valid:

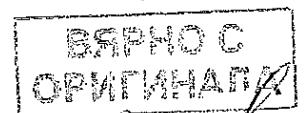
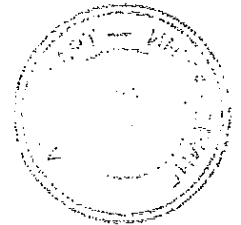
Type Tests	Rated Values	Test Documents
Dielectric tests	$U_p = 125 \text{ kV}$ $U_d = 50 \text{ kV}$	15-070-MH
Temperature-rise tests	$I_r = 800 \text{ A}$	15-075-ME
Mechanical operation test at ambient temperature, Low and high temperature tests	10.000 op. Cycles -25 / 40 °C	15-073-MM 15-072-MM
Short-time withstand current and peak withstand current tests	$I_{sc} = 20 \text{ kA/3s}$ $I_{ma} = 50 \text{ kA}$	15-055-MS
Short-circuit making and breaking tests	$I_{sc} = 20 \text{ kA}$ $I_{ma} = 50 \text{ kA}$	15-054-MS-1

Siemens Aktiengesellschaft

sgd. Mr. Blöbaum  
EM MS O SD GF D



sgd. Dr. Heinrich  
EM LP PRM MV



Berlin, July 11, 2017

Siemens AG  
Energy Management Division; Leitung: Ralf Christian  
Medium Voltage & Systems; Leitung: Stephan May

Nonnendammallee 104  
13629 Berlin  
Deutschland

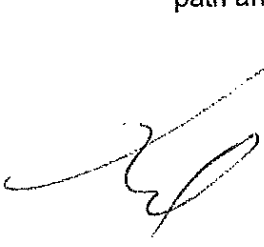
Tel.: +49 (30) 386 0

Siemens Aktiengesellschaft; Vorsitzender des Aufsichtsrats: Gerhard Cromme; Vorstand: Joe Kaeser, Vorsitzender, Roland Busch, Lisa Davis, Klaus Helmrich, Janina Kugel, Cedrik Nelke, Michael Sen, Ralf P. Thomas  
Sitz der Gesellschaft: Berlin und München, Deutschland; Registergericht: Berlin Charlottenburg, HRB 12300, München, HRB 6684  
WEEE-Reg.-Nr. DE 2369 1322

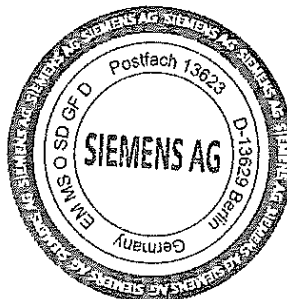
## Summary of type tests for Vacuum Circuit-Breaker 3AE5353-1 (24 kV, 20 kA, 800 A)

If a test is carried out with a vacuum circuit-breaker with different order number, the validity of the test document is given by the following statements:

The listed test documents for the mentioned vacuum circuit-breaker are valid in respect to familiar design of the vacuum circuit-breakers, as the construction of the main current path and mechanical driving mechanism is nearly identical.

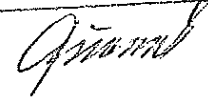
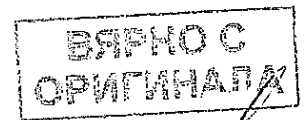


Siemens Aktiengesellschaft



sgd. Mr. Blöbaum  
EM MS O SD GF D

sgd. Dr. Heinrich  
EM LP PRM MV



Berlin, July 11, 2017

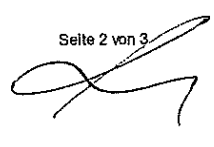

Siemens AG  
Energy Management Division; Leitung: Ralf Christian  
Medium Voltage & Systems; Leitung: Stephan May

Nonnendammallee 104  
13629 Berlin  
Deutschland

Tel.: +49 (30) 386 0

Siemens Aktiengesellschaft: Vorsitzender des Aufsichtsrats: Gerhard Cromme; Vorstand: Joe Kaeser, Vorsitzender; Roland Busch, Lisa Davis, Klaus Helmrich, Janina Kugel, Cedrik Nelke, Michael Sen, Ralf P. Thomas  
Sitz der Gesellschaft: Berlin und München, Deutschland; Registergericht: Berlin Charlottenburg, HRB 12300, München, HRB 6684  
WEEE-Reg.-Nr. DE 23691322

188



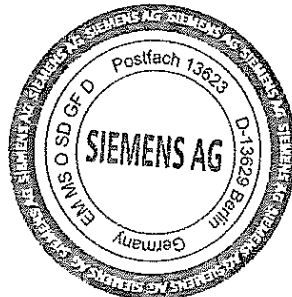
**Summary of type tests  
for Vacuum Circuit-Breaker  
3AE5353-1  
(24 kV, 20 kA, 800 A)**

In addition to the type tests in accordance with IEC 62271-1 and IEC 62271-100 the following tests were carried out:

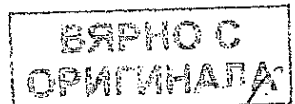
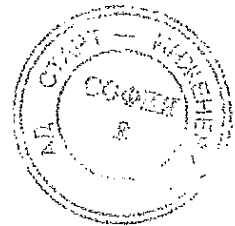
Type Tests	Test Documents
Single-phase and double earth fault tests	15-054-MS-1
Capacitive current switching tests: - cable-charging current breaking tests - line-charging current breaking tests - single capacitor bank switching tests	15-065-MS
Out-of-phase making and breaking tests	16-085-MS
Electrical endurance test on class E2	15-096-MS

Siemens Aktiengesellschaft

sgd. Mr. Blöbaum  
EM MS O SD GF D



sgd. Dr. Heinrich  
EM LP PRM MV



*[Handwritten signature]*

Berlin, July 11, 2017

Siemens AG  
Energy Management Division; Leitung: Ralf Christian  
Medium Voltage & Systems; Leitung: Stephan May

Nonnendammallee 104  
13629 Berlin  
Deutschland

Tel.: +49 (30) 386 0

Siemens Aktiengesellschaft: Vorsitzender des Aufsichtsrats: Gerhard Cromme; Vorstand: Joe Kaeser, Vorsitzender; Roland Busch, Lisa Davis, Klaus Helmrich, Janina Kugel, Cedrik Nelke, Michael Sen, Ralf P. Thomas  
Sitz der Gesellschaft: Berlin und München, Deutschland; Registergericht: Berlin Charlottenburg, HRB 12300, München HRB 6684  
WEEE-Reg.-Nr. DE 23691322

189

*[Handwritten signatures]*

Тестов документ  
за вакуумен мощностен прекъсвач 3AE5353-2  
(24kV, 20kA, 1250A )

вакуумен мощностен прекъсвач 3AE е типово тестван в съответствие с

IEC 62271-1 версия 1.1,2011-08  
IEC 62271-100, версия 2.1, 2012-09 и съответните хармонизирани документи

за вакуумен мощностен прекъсвач 3AE5353-2 долупосочените тестове са валидни

Изпитания	Стойност	Документ
Диелектрични изпитание на изолацията	$U_p = 125kV$ $U_d = 50kV$	15-070-MH
Изпитание за температурна устойчивост	$I_r = 800 A$	15-075-ME
Изпитания за механична устойчивост при температура на околната среда, ниска и висока температура	10.000 Цикъла -25/ +55 °C	15-073-MM 17-086-MM
Изпитания за устойчивост на върхов и ток на късо съединение	$I_{sc} = 20kA/3s$ $I_{ma} = 50kA$	15-055-MS
Изпитания за термична и динамична устойчивост	$I_{sc} = 20kA$ $I_{ma} = 50kA$	15-054-MS-1

Блоebaум /подпис, не се чете/

Хайнрих /подпис, не се чете/

EM MS O SD GF D

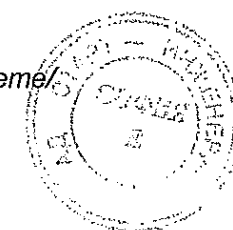
EM LP PRM MV

Берлин, 11 Юли 2017

Siemens AG  
Направление Енергиен Мениджмънт; Мениджър: Ралф Кристиан  
Средно напрежение & Системи; Мениджър: Стефан Мей

Нонендамеле 104  
13629 Берлин  
Германия

Тел. +49 (30) 386-0



**ВЯРНО С  
ОРИГИНАЛА**

Siemens Aktiengesellschaft: Председател на борда: Герхард Хром; Борд: Джо Кезер, Председател;  
Роланд Буш, Лиза Дейвис, Клаус Хелмрих, Янина Кугел, Седрик Найке, Михаел Сен, Ралф П. Томас  
Седалище: Берлин и Мюнхен, Германия; Регистрация: Берлин Шарлотенбург, HRB 12300, Мюнхен, HRB 6684  
WEEE-Reg.-№. DE 23691322

**SIEMENS**

**Енергиен мениджмънт  
SOT 11631d**

**Тестов документ  
за вакуумен мощностен прекъсвач 3AE5353-2  
(24kV, 20kA, 1250A )**

Ако се провежда изпитване с вакуумен прекъсвач с различен поръчков номер, валидността на документа за изпитване се дава чрез следните изявления:

Изброените тестови документи за посочения вакуумен прекъсвач са валидни поради сходен дизайн на вакуумните прекъсвачи и предвид, че конструкцията на пътя на основния ток и механичният задвижващ механизъм са почти еднакви.

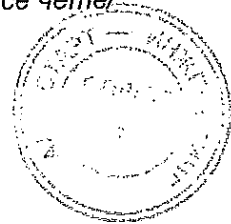
*Блоebaум /подпис, не се чете/*

EM MS O SD GF D

Берлин, 11 Юли 2017

*Хайнрих /подпис, не се чете/*

EM LP PRM MV



**Siemens AG**  
Направление Енергиен Мениджмънт; Мениджър: Ралф Кристиан  
Средно напрежение & Системи; Мениджър: Стефан Мей

Нонендамеле 104  
13629 Берлин  
Германия

Тел. +49 (30) 386 0

**ВАРНО С  
ОРИГИНАЛА**

Siemens Aktiengesellschaft: Председател на борда: Герхард Хром; Борд: Джо Кезер, Председател;  
Роланд Буш, Лиза Дейвис, Клаус Хелмрих, Янина Кугел, Седрик Найке, Михаел Сен, Ралф П. Томас  
Седалище: Берлин и Мюнхен, Германия; Регистрация: Берлин Шарлотенбург, HRB 12300, Мюнхен, HRB 6684  
WEEE-Reg.-№. DE 23691322

# SIEMENS

Енергиен мениджмънт  
SOT 11631d

Тестов документ  
за вакуумен мощностен прекъсвач 3AE5353-2  
(24kV, 20kA, 1250A)

В допълнение към типовите изпитания в съответствие с IEC 62271-1 и IEC 62271-100 са извършени следните тестове:

Изпитания	Документ
Изпитания за еднофазно и двуфазно земно късо съединение	15-054-MS-1
Изпитания с капацитивен ток	15-065-MS
Изпитания за термична и динамична устойчивост без фаза	16-085-MS
Тест за електрическа устойчивост, клас E2	15-096-MS

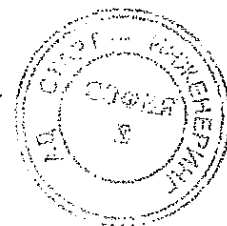
Блоebaум /подпис, не се чете/

EM MS O SD GF D

Берлин, 11 Юли 2017

Хайнрих /подпис, не се чете/

EM LP PRM MV



ВЯРНО С  
ОРИГИНАЛА

Siemens AG

Направление Енергиен Мениджмънт; Мениджър: Ралф Кристиан  
Средно напрежение & Системи; Мениджър: Стефан Мей

Нонендамеле 104  
13629 Берлин  
Германия

Тел. +49 (30) 386 0

Siemens Aktiengesellschaft: Председател на борда: Герхард Хром; Борд: Джо Кезер, Председател;  
Роланд Буш, Лиза Дейвис, Клаус Хелмрих, Янина Кугел, Седрик Найке, Михаел Сен, Ралф П. Томас  
Седалище: Берлин и Мюнхен, Германия; Регистрация: Берлин Шарлотенбург, HRB 12300, Мюнхен, HRB 6684  
WEEE-Per.-№. DE 23691322



## Summary of type tests for Vacuum Circuit-Breaker 3AE5353-2 (24 kV, 20 kA, 1250 A)

The vacuum circuit-breakers of type 3AE5 were type tested in accordance with

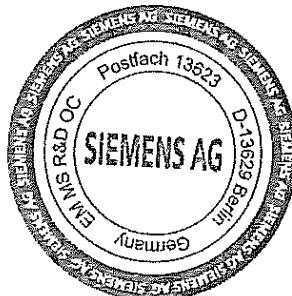
IEC Publication 62271-1, Edition 1.1, 2011-08,  
IEC Publication 62271-100, Edition 2.1, 2012-09 and the relevant harmonisation documents.

For vacuum circuit-breaker 3AE5353-2 the following test documents are valid:

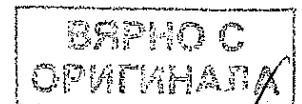
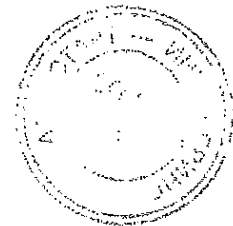
Type Tests	Rated Values	Test Documents
Dielectric tests	U <sub>p</sub> = 125 kV U <sub>d</sub> = 50 kV	15-070-MH
Temperature-rise tests	I <sub>r</sub> = 1250 A	15-075-ME
Mechanical operation test at ambient temperature, Low and high temperature tests	10.000 op. Cycles -25 / 55 °C	15-073-MM 17-086-MM
Short-time withstand current and peak withstand current tests	I <sub>sc</sub> = 20 kA/3s I <sub>ma</sub> = 50 kA	15-055-MS
Short-circuit making and breaking tests	I <sub>sc</sub> = 20 kA I <sub>ma</sub> = 50 kA	15-054-MS-1

Siemens Aktiengesellschaft

sgd. Dr. Freundt  
EM MS R&D OC



sgd. Mr. Röhling  
EM MS R&D OC 1



Berlin, September 28, 2017

Siemens AG  
Energy Management Division; Leitung: Ralf Christian  
Medium Voltage & Systems; Leitung: Stephan May

Nonnendammallee 104  
13629 Berlin  
Deutschland

Tel.: +49 (30) 386 0

Siemens Aktiengesellschaft; Vorsitzender des Aufsichtsrats: Gerhard Cromme; Vorstand: Joe Kaeser, Vorsitzender, Roland Busch, Lisa Davis, Klaus Helmrich, Janina Kugel, Cedrik Nelke, Michael Sen, Ralf P. Thomas  
Sitz der Gesellschaft: Berlin und München, Deutschland; Registergericht: Berlin Charlottenburg, HRB 12300, München, HRB 6684  
WEEE-Reg.-Nr. DE 23691322

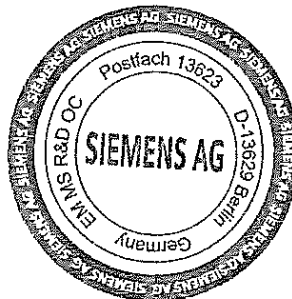
## Summary of type tests for Vacuum Circuit-Breaker 3AE5353-2 (24 kV, 20 kA, 1250 A)

If a test is carried out with a vacuum circuit-breaker with different order number, the validity of the test document is given by the following statements:

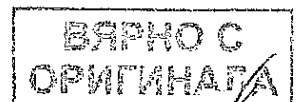
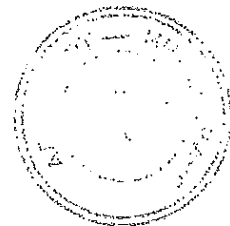
The listed test documents for the mentioned vacuum circuit-breaker are valid in respect to familiar design of the vacuum circuit-breakers, as the construction of the main current path and mechanical driving mechanism is nearly identical.

Siemens Aktiengesellschaft

sgd. Dr. Freundt  
EM MS R&D OC



sgd. Mr. Röhling  
EM MS R&D OC 1



Berlin, September 28, 2017

Siemens AG  
Energy Management Division; Leitung: Ralf Christian  
Medium Voltage & Systems; Leitung: Stephan May

Nonnendammallee 104  
13629 Berlin  
Deutschland

Tel.: +49 (30) 386 0

Siemens Aktiengesellschaft; Vorsitzender des Aufsichtsrats: Gerhard Cromme; Vorstand: Joe Kaeser, Vorsitzender, Roland Busch, Lisa Davis, Klaus Helmrich, Janina Kugel, Cedrik Nelke, Michael Sen, Ralf P. Thomas  
Sitz der Gesellschaft: Berlin und München, Deutschland; Registergericht: Berlin Charlottenburg, HRB 12300, München, HRB 6684  
WEEE-Reg.-Nr. DE 23691322

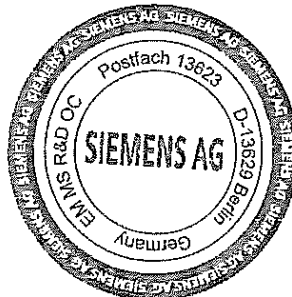
**Summary of type tests  
for Vacuum Circuit-Breaker  
3AE5353-2  
(24 kV, 20 kA, 1250 A)**

In addition to the type tests in accordance with IEC 62271-1 and IEC 62271-100 the following tests were carried out:

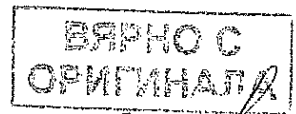
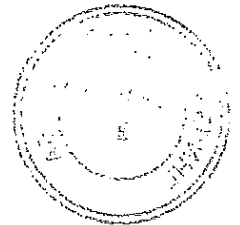
Type Tests	Test Documents
Single-phase and double earth fault tests	15-054-MS-1
Capacitive current switching tests: - cable-charging current breaking tests - line-charging current breaking tests - single capacitor bank switching tests	15-065-MS
Out-of-phase making and breaking tests	16-085-MS
Electrical endurance test on class E2	15-096-MS

Siemens Aktiengesellschaft

sgd. Dr. Freundt  
EM MS R&D OC



sgd. Mr. Röhling  
EM MS R&D OC 1



Berlin, September 28, 2017

**Siemens AG**  
Energy Management Division; Leitung: Ralf Christian  
Medium Voltage & Systems; Leitung: Stephan May

Nonnendammallee 104  
13629 Berlin  
Deutschland

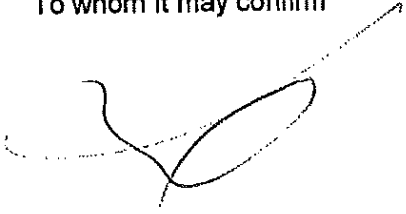
Tel.: +49 (30) 386 0

Siemens Aktiengesellschaft; Vorsitzender des Aufsichtsrats: Gerhard Cromme; Vorstand: Joe Kaeser, Vorsitzender; Roland Busch, Lisa Davis, Klaus Helmrich, Janina Kugel, Cedrik Neike, Michael Sen, Ralf P. Thomas  
Sitz der Gesellschaft: Berlin und München, Deutschland; Registergericht: Berlin Charlottenburg, HRB 12300, München, HRB 6684  
WEEE-Reg.-Nr. DE 23691322

195

Siemens AG, EM LP PRM MV, Nonnendammallee 104, 13629 Berlin

To whom it may confirm



Name	Bernhard Boés
Department	EM LP PRM MV
Mobile	+49 (173) 3825152
E-mail	Bernhard.Boes@siemens.com
Our reference	S0958E
Date	December 10, 2018

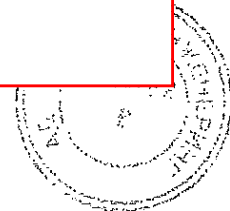
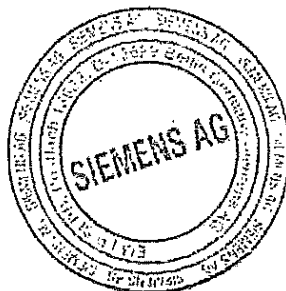
## Confirmation of validity of design of 3AE51

We herewith confirm that three-pole Siemens vacuum circuit breaker type SION 3AE51 for Ratings up to 12 kV – 20 kA – 800 and 1250 A equipped with Siemens vacuum interrupters type VSA12-0-25 is able to interrupt 1 200 operations at short-circuit breaking current up to 5 kA or alternative 10 000 operations at load current.  
The tests were carried out based on the class E2 procedure.

Siemens Aktiengesellschaft

На основание чл.36а ал.3 от  
ЗОП

На основание чл.36а ал.3 от  
ЗОП



ВЯРНО С  
ОРИГИНАЛА

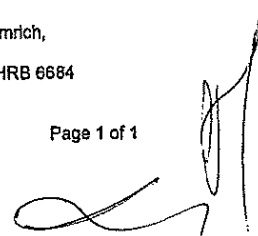
**Siemens AG**  
Energy Management Division; Management: Ralf Christian  
Low Voltage & Products; Management: Andreas Matthe

Nonnendammallee 104  
13629 Berlin  
Germany

Tel.: +49 (30) 386 0

Siemens Aktiengesellschaft: Chairman of the Supervisory Board: Gerhard Cromme;  
Managing Board: Joe Kaeser, Chairman, President and Chief Executive Officer, Roland Busch, Lisa Davis, Klaus Helmrich,  
Janina Kugel, Siegfried Russwurm, Ralf P. Thomas  
Registered offices: Berlin and Munich, Germany; Commercial registries: Berlin Charlottenburg, HRB 12300, Munich, HRB 6684  
WEEE-Reg.-No. DE 23691322

296



Siemens AG, EM LP PRM MV, Nonnendammallee 104, 13629 Berlin

To whom it may confirm

Name: Bernhard Boës  
Department: EM LP PRM MV  
Mobile: +49 (173) 3825152  
E-mail: Bernhard.Boes@siemens.com  
Our reference: S0959E  
Date: December 10, 2018

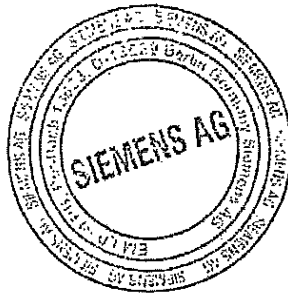
### Confirmation of validity of design of 3AE53

We herewith confirm that three-pole Siemens vacuum circuit breaker type SION 3AE53 for Ratings up to 24 kV – 20 kA – 800 and 1250 A equipped with Siemens vacuum interrupters type VSS12-1-31-A5 is able to interrupt 1 200 operations at short-circuit breaking current up to 5 kA or alternative 10 000 operations at load current.  
The tests were carried out based on the class E2 procedure.

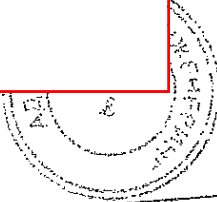


Siemens Aktiengesellschaft

На основание чл.36а ал.3 от ЗОП



На основание чл.36а ал.3 от ЗОП



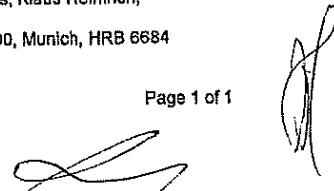
БЯРНО С  
ОРИГИНАЛА

Siemens AG  
Energy Management Division; Management: Ralf Christian  
Low Voltage & Products; Management: Andreas Matthe

Nonnendammallee 104  
13629 Berlin  
Germany

Tel.: +49 (30) 386 0

Siemens Aktiengesellschaft: Chairman of the Supervisory Board: Gerhard Cromme;  
Managing Board: Joe Kaeser, Chairman, President and Chief Executive Officer; Roland Busch, Lisa Davis, Klaus Helmrich, Janina Kugel, Siegfried Russwurm, Ralf P. Thomas  
Registered offices: Berlin and Munich, Germany; Commercial registries: Berlin Charlottenburg, HRB 12300, Munich, HRB 6684  
WEEE-Reg.-No. DE 23691322



## Deutsche Akkreditierungsstelle GmbH

Entrusted according to Section 8 subsection 1 AkkStelleG in connection with Section 1 subsection 1 AkkStelleGBV

Signatory to the Multilateral Agreements of EA, ILAC and IAF for Mutual Recognition

# Accreditation



The Deutsche Akkreditierungsstelle GmbH attests that the testing laboratory

**PEHLA - Gesellschaft für elektrische Hochleistungsprüfungen**  
**Hallenweg 40, 68219 Mannheim**

**Standort:**

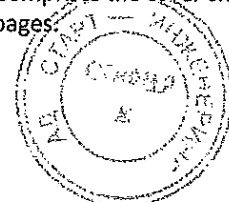
**PEHLA - Gesellschaft für Elektrische Hochleistungsprüfungen**  
**PEHLA-Prüffeld Berlin-Siemensstadt**  
**Nonnendammallee 104, 13629 Berlin**

is competent under the terms of DIN EN ISO/IEC 17025:2005 to carry out tests in the following fields:

**High-Voltage Switchgear and Controlgear**  
**Power Engineering Equipment**

The accreditation certificate shall only apply in connection with the notice of accreditation of 2016-02-26 with the accreditation number D-PL-12072-04 and is valid until 2021-02-25. It comprises the cover sheet, the reverse side of the cover sheet and the following annex with a total of 12 pages

Registration number of the certificate: **D-PL-12072-04-00**



На основании чл.36а ал.3 от ЗОП

Frankfurt am Main,  
2016-02-26

Ralf Egner  
Head of Division

Translation Issued:  
2016-03-04

This document is a translation. The definitive version is the original German accreditation certificate.

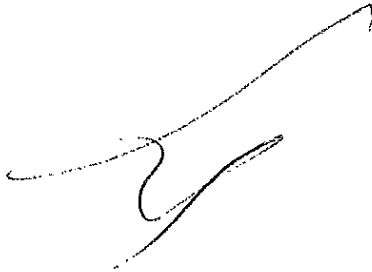
See notes overleaf.

# Deutsche Akkreditierungsstelle GmbH

Office Berlin  
Spittelmarkt 10  
10117 Berlin

Office Frankfurt am Main  
Europa-Allee 52  
60327 Frankfurt am Main

Office Braunschweig  
Bundesallee 100  
38116 Braunschweig



The publication of extracts of the accreditation certificate is subject to the prior written approval by Deutsche Akkreditierungsstelle GmbH (DAkKS). Exempted is the unchanged form of separate disseminations of the cover sheet by the conformity assessment body mentioned overleaf.

No impression shall be made that the accreditation also extends to fields beyond the scope of accreditation attested by DAkKS.

The accreditation was granted pursuant to the Act on the Accreditation Body (AkkStelleG) of 31 July 2009 (Federal Law Gazette I p. 2625) and the Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products (Official Journal of the European Union L 218 of 9 July 2008, p. 30). DAkKS is a signatory to the Multilateral Agreements for Mutual Recognition of the European co-operation for Accreditation (EA), International Accreditation Forum (IAF) and International Laboratory Accreditation Cooperation (ILAC). The signatories to these agreements recognise each other's accreditations.

The up-to-date state of membership can be retrieved from the following websites:

EA: [www.european-accreditation.org](http://www.european-accreditation.org)

ILAC: [www.ilac.org](http://www.ilac.org)

IAF: [www.iaf.nu](http://www.iaf.nu)



ВЯРНО С  
ОРИГИНАЛА



# Deutsche Akkreditierungsstelle GmbH (Германски акредитационен орган ГмбХ)

Упълномощен в съответствие с Подраздел 1 на Раздел 8 на AkkStelleG във връзка с  
Подраздел 1 на Раздел 1 на AkkStelleG

Подписал Многостранните споразумения на EA, ILAF и IAF за взаимно признаване

## Акредитация

Deutsche Akkreditierungsstelle GmbH (Германски акредитационен орган ГмбХ) удостоверява,  
че изпитвателната лаборатория

**PEHLA – Gesellschaft für Elektrische Hochleistungsprüfungen GbR**  
Hallenweg 40, 68219 Mannheim  
(ПЕХЛА – Гезелшафт фюр Електрише Хохлайщрунгспрюфунген ГБР  
Халенвег 40, 68219 Манхайм)

Метсоположение:

PEHLA – Gesellschaft für Elektrische Hochleistungsprüfungen GbR (ПЕХЛА – Гезелшафт  
фюр Електрише Хохлайщрунгспрюфунген ГБР)  
PEHLA-Prüffeld Berlin-Siemensstadt (ПЕХЛА-Прюфелд Берлин-Сименсцат)  
Нонендамалее 104, 13629 Берлин

е компетентна по условията на DIN EN ISO/IEC 17025:2005 да извършва изпитания в  
следните области:

**Комутационна апаратура и управляваща апаратура за високо напрежение  
Енергетично оборудване**

Акредитационният сертификат важи във връзка с известието за акредитация от 26.02.2016 г.  
с акредитационен номер D-PL-12072-04 и е валиден до 25.02.2021 г. Той се състои от  
заглавния лист, обратната страна на заглавния лист и следващия анекс с общо 12 страници.

Регистрационен номер на сертификата: **D-PL-12072-04-00**

Франкфурт на Майн, 26.02.2016 г.

*/подпис – не се четат/*  
инж. Ралф Егнер  
Ръководител отделение

Този документ е превод. Определящата версия е оригиналният германски акредитационен сертификат.

Вж. забележките на обратната страна на листа.



**ВЯРНО С  
ОРИГИНАЛА**

100 *Li*



# Deutsche Akkreditierungsstelle GmbH (Германски акредитационен орган ГмбХ)

Офис Берлин  
Шпителмаркт 10  
10117 Берлин

Офис Франкфурт на Майн  
Еуропа алее 52  
60327 Франкфурт на Майн

Офис Брауншвайг  
Бундесалее 100  
38116 Брауншвайг

Публикуването на извадки от акредитационния сертификат подлежи на предварително писмено одобрение от Deutsche Akkreditierungsstelle GmbH (DAkkS). Изключение е непроменената форма на отделни разпространения на заглавния лист от споменатия на обратната страна на листа орган за оценка на съответствието.

Не трябва да се създава впечатление, че акредитацията е разширена до области извън обхвата на акредитацията, удостоверен от DAkkS.

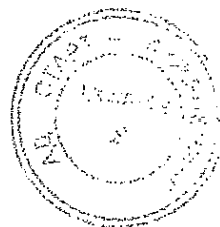
Акредитацията е дадена съгласно Закона за акредитационния орган (AkkStelleG) от 31 юли 2009 г. (Вестник за федерални закони I стр. 2625) и РЕГЛАМЕНТ (ЕО) № 765/2008 на Европейския парламент и на Съвета от 9 юли 2008 г. за определяне на изискванията за акредитация и надзор на пазара във връзка с предлагането на пазара на продукти (Официален вестник на Европейския съюз L 218 от 9 юли 2008 г., стр. 30). DAkkS е подписал Многостранното споразумение за взаимно признаване на европейското сътрудничество за акредитация (EA), Международния акредитационен форум (IAF) и Международното сътрудничество за акредитиране на лаборатории (ILAC). Подписалите тези споразумения признават взаимно своите акредитации.

Текущото състояние на членството може да бъде намерено на следните уебсайтове:

EA: [www.european-accreditation.org](http://www.european-accreditation.org)

ILAC: [www.ilac.org](http://www.ilac.org)

IAF: [www.iaf.nu](http://www.iaf.nu)



ВЯРНО С  
ОРИГИНАЛА

## ДЕКЛАРАЦИЯ

**че предложеното оборудване в процедурата отговаря на минималните технически изисквания на Възложителя**

Аз, долуподписаният Стоил Колев Стоилов, в качеството ми на представляващ „Старт-Инженеринг“ АД, участник в открита процедура за възлагане на обществена поръчка с реф. № PPD18-103 и предмет: „Модернизация (ретрофит) на възлови разпределителни станции 20 (10) kV и изграждане на вериги на телемеханика“,

### ДЕКЛАРИРАМ ЧЕ:

1. Предложеното от нас оборудване в процедурата за позиция „Триполюсен вакуумен прекъсвач, 24 kV/630 A/20 kA, за монтиране на закрито, фиксиран“ отговаря на минималните технически изисквания на Възложителя, посочени в таблица 1.
2. Доставяните от нас материали, апаратура, оборудване и съоръжения отговарят на посочените от възложителя в документацията за участие стандарти за изпълнение на поръчката.
3. Предложените от нас материали, апаратура, оборудване и съоръжения са с технически характеристики и показатели, които съответстват на техническите характеристики и показатели, посочени от възложителя за изпълнение на поръчката в документацията за участие.

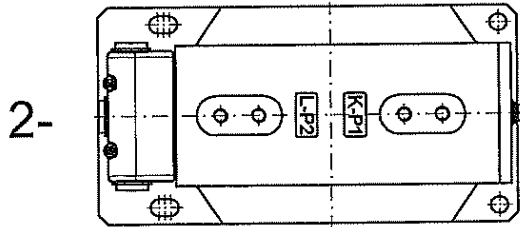
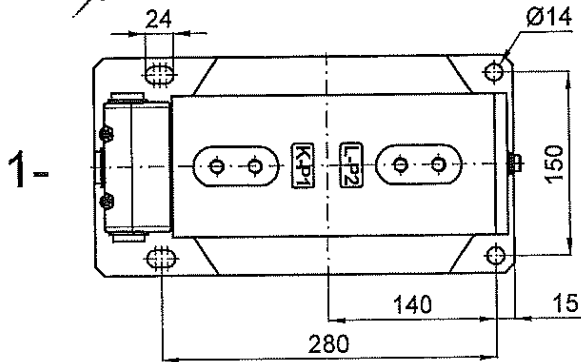
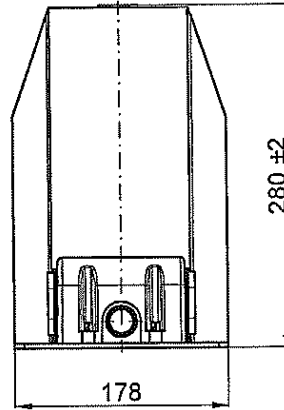
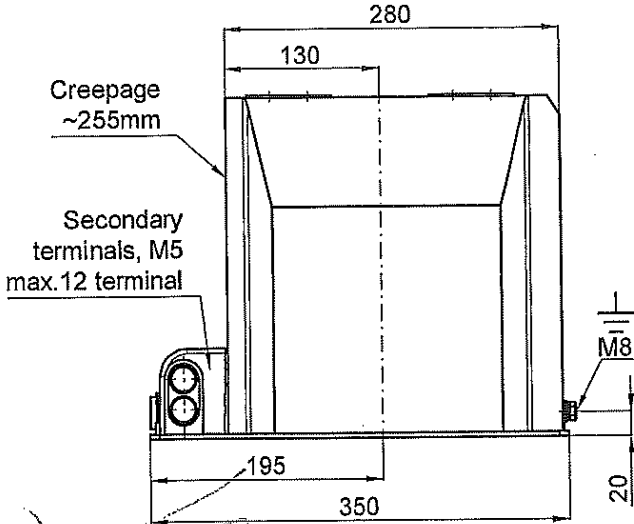
Информиран съм, че Възложителят (включително чрез неговия помощен орган, а именно назначената за провеждане на поръчката оценителна комисия) ще обработва и съхранява личните ми данни, посочени в настоящата декларация, за целите на провеждане на обществената поръчка, като за целта ще предприеме всички необходими според действащата нормативна уредба мерки за защита на личните ми данни.

Дата 17.12.2018 г.

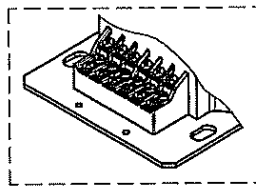
ПОДПИС И ПЕЧАТ:

На основание чл.36а ал.3 от ЗОП

Председател на Съвета на директорите  
на „Старт-Инженеринг“ АД

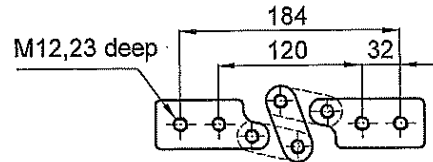


Screw	Tightening Torque Nm
M5	4
M8	16-20
M12	60-70

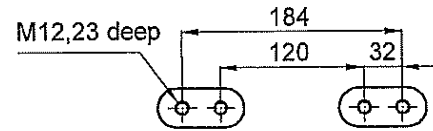


Secondary terminal's detail

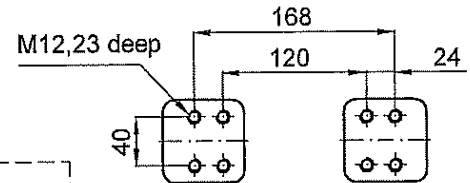
PRIMARY CONNECTION TERMINALS



$I_n \leq 2 \times 600A$




up to 600A (Brass)  
600A <  $I_n$  < 1500A (ECu)

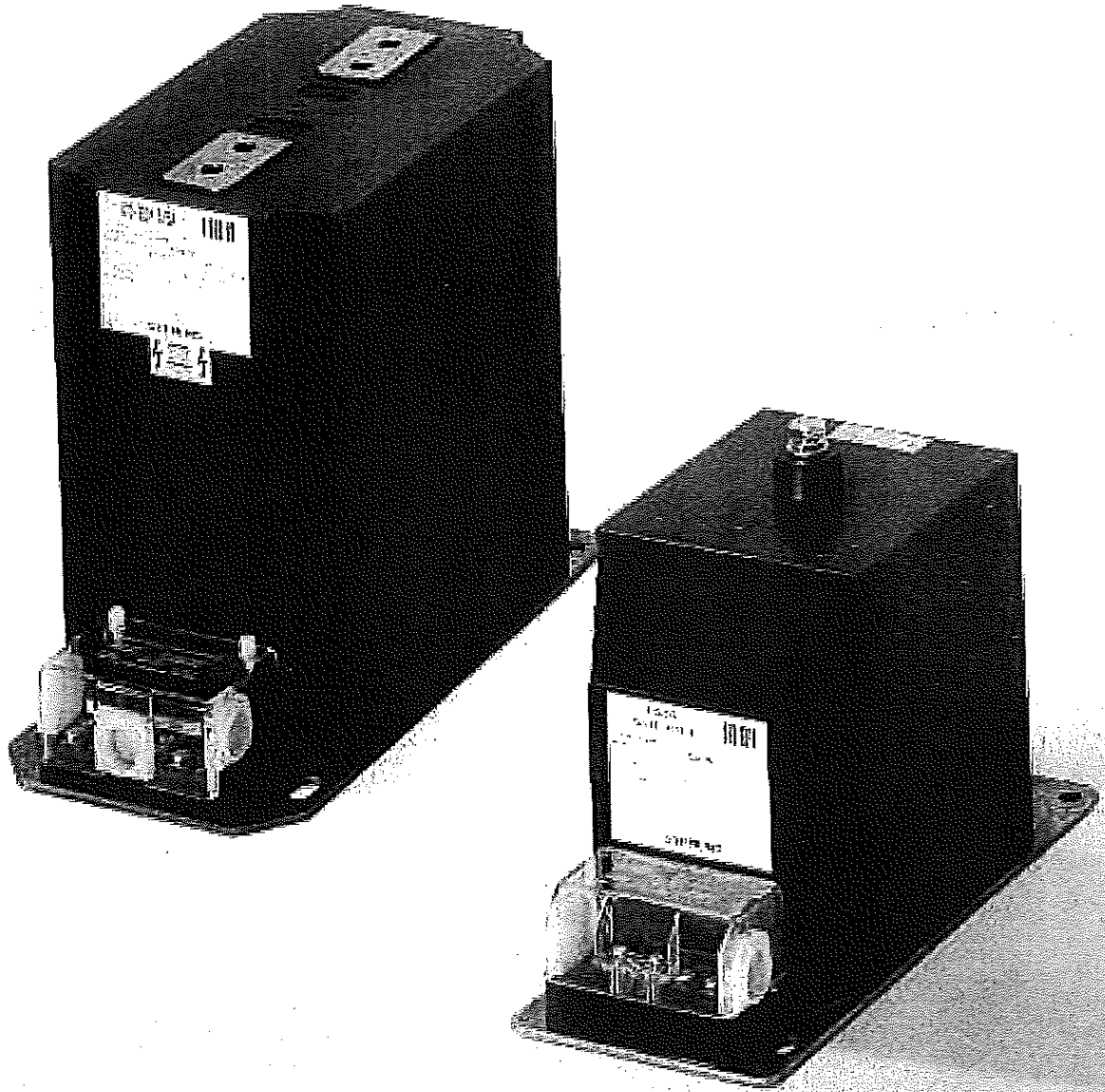


$1500A \leq I_n \leq 4000A$

DEĞİŞİKLİK  
TEKNİK BÜRO  
Tarih 01 / 06 / 2016

ALCE 029 R00 All rights reserved by ALCE Elektrik San. ve Tic. A.Ş. ALCE reserves the right to change dimensions without prior notice.

QTY	DESCRIPTION	POS	DIMENSIONS	WEIGHT	PART OR DIN NO.	MATERIAL
	NO	DATE	NAME	MODIFICATION		
	L	01-03-16	Arzu	Design was changed.		
	TOLERANS DIN ISO 2768-1 (c)				4MA74	
	SCALE -/-				CURRENT TRANSFORMER SIEMENS	
	REPLACES THE DRAWING NO.				PLATE CODE	3012375
					BOX CODE	3009583
					416	
					DR'N	
					CH'D	
					APP'D	
					C.C	MT
	 OG Ölçü Trafo					



## 4M Protective and Measuring Transformers

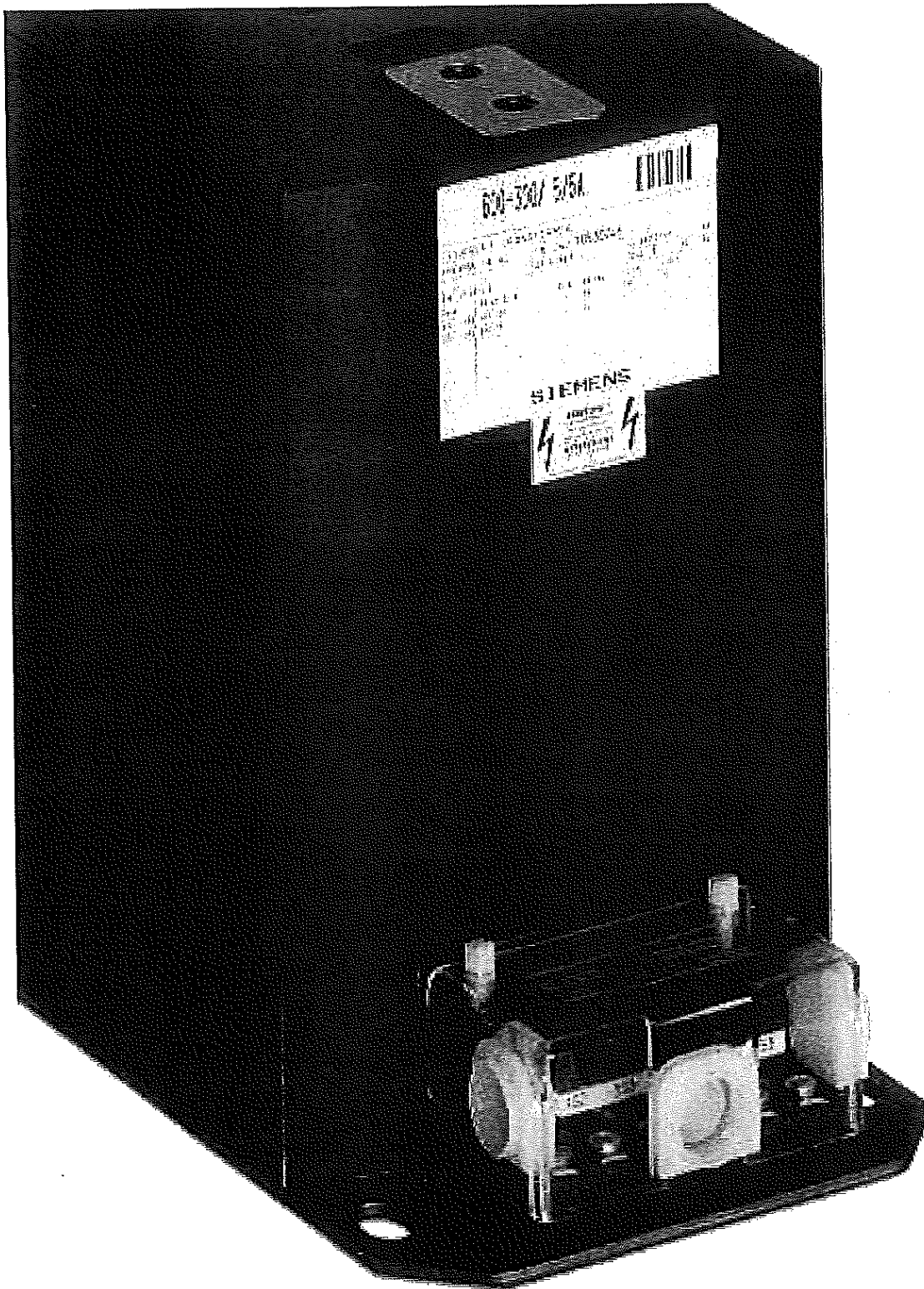
Medium-Voltage Equipment  
Selection and Ordering Data

Catalog HG 24 · 2009

Answers for energy.

**SIEMENS**

*Handwritten signature*

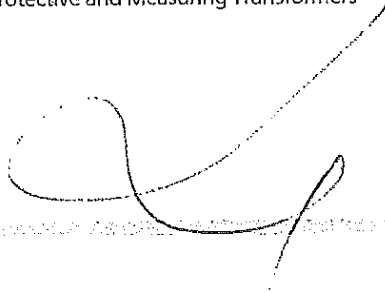


*Handwritten signature*

R-MG24-050.0ff

205

*Handwritten signature*

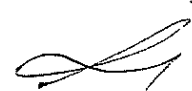


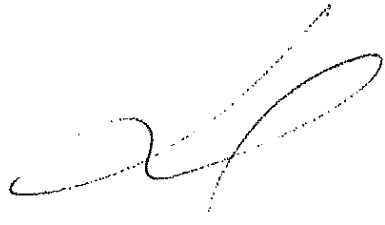
# 4M Protective and Measuring Transformers

Medium-Voltage Equipment  
Catalog HG 24 · 2009

Invalid: Catalog HG 24 · 1994

Contents	Page	
<b>Description</b>	<b>5</b>	<b>1</b>
General	6	
Construction and mode of operation	7	
Current transformers	8	
Voltage transformers	12	
Ambient conditions and dielectric strength	14	
Partial discharge measurement and standards	15	
<b>Equipment Selection</b>	<b>17</b>	<b>2</b>
Ordering data and configuration example	18	
Product overview of current transformers	19	
Selection of current transformers	20	
Product overview of voltage transformers	62	
Selection of voltage transformers	63	
<b>Technical Data</b>	<b>69</b>	<b>3</b>
Current transformers	70	
Voltage transformers	78	
<b>Annex</b>	<b>83</b>	<b>4</b>
Inquiry form	84	
Configuration instructions	85	
Configuration aid	Foldout page	

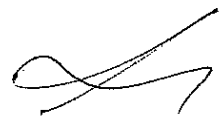


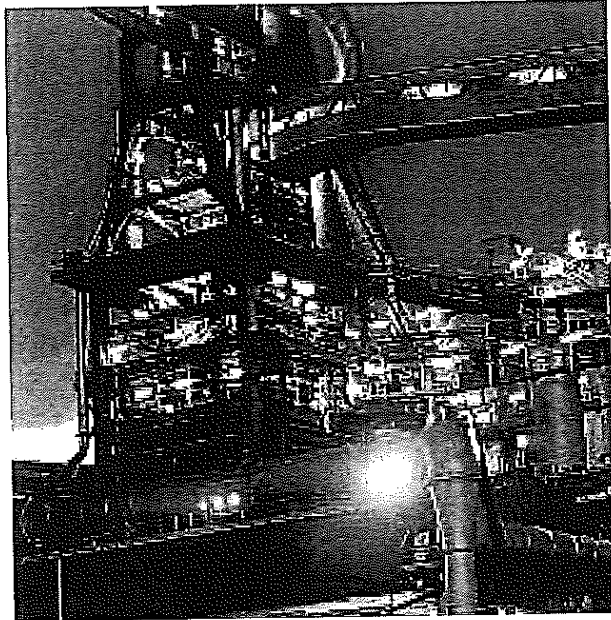
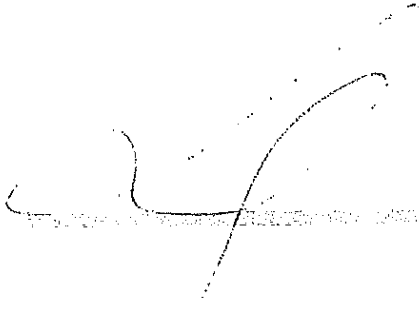


© Siemens AG 2009. Alle Rechte vorbehalten. Siemens AG, München, Deutschland. Siemens AG, Österreich. Siemens AG, Schweiz. Siemens AG, Tschechien. Siemens AG, Ungarn. Siemens AG, Polen. Siemens AG, Slowakei. Siemens AG, Italien. Siemens AG, Spanien. Siemens AG, Portugal. Siemens AG, Griechenland. Siemens AG, Türkei. Siemens AG, Indien. Siemens AG, China. Siemens AG, Japan. Siemens AG, Korea. Siemens AG, Australien. Siemens AG, Neuseeland. Siemens AG, Südamerika. Siemens AG, Afrika. Siemens AG, Ozeanien. Siemens AG, Russland. Siemens AG, Ukraine. Siemens AG, Belarus. Siemens AG, Litauen. Siemens AG, Letland. Siemens AG, Estland. Siemens AG, Polen. Siemens AG, Tschechien. Siemens AG, Ungarn. Siemens AG, Slowakei. Siemens AG, Italien. Siemens AG, Spanien. Siemens AG, Portugal. Siemens AG, Griechenland. Siemens AG, Türkei. Siemens AG, Indien. Siemens AG, China. Siemens AG, Japan. Siemens AG, Korea. Siemens AG, Australien. Siemens AG, Neuseeland. Siemens AG, Südamerika. Siemens AG, Afrika. Siemens AG, Ozeanien. Siemens AG, Russland. Siemens AG, Ukraine. Siemens AG, Belarus. Siemens AG, Litauen. Siemens AG, Letland. Siemens AG, Estland.



RF11-214-01





Industrial application: Refinery

Contents	Page
<b>Description</b>	<b>5</b>
General	6
Construction and mode of operation:	
Types of construction	7
Approvals/Certifications	7
Current transformers:	
Glossary of terms	8
Measuring current transformers	9
Protective current transformers	9
Multi-ratio current transformers	9
Performance in the event of overcurrent	10
Operation and earthing	10
Voltage detecting system	11
Voltage transformers:	
Glossary of terms	12
Multi-ratio	13
Operation and earthing	13
Relaxation oscillations	13
Ambient conditions	14
Dielectric strength	14
Partial discharge measurement	15
Standards	15

1

108



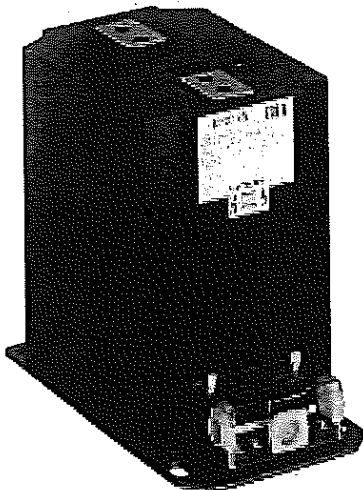
## Protective and Measuring Transformers – The Adaptable

1

The task of instrument transformers is to transform high currents and voltages proportionally and in-phase into small current or voltage values for measuring or protection purposes. So they are used either to measure and record the transmitted power or to feed protection devices

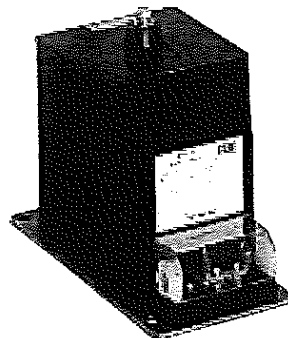
with evaluable signals, which enable the protection device to e.g. trip a switching device depending on the situation. Furthermore, they isolate the connected measuring or protection equipment electrically from live parts of the switchgear.

Current transformer



R-HG24-051.tif

Voltage transformer



R-HG24-052.tif

Current transformers can be regarded as transformers working in short-circuit, with the full normal current flowing through their primary side. Devices connected on the secondary side are series-connected. Current transformers can have several secondary windings with magnetically separated cores of the same or different characteristics. They can, for example, be equipped with two measuring cores of different accuracy class, or with measuring and protection cores with different accuracy limit factors.

Due to the risk of overvoltages, current transformers must not be operated with open secondary terminals, but only in short circuit or with the burden of the measuring equipment.

Voltage transformers contain only one magnet core and are normally designed with one single secondary winding. If necessary, earthed (single-phase) voltage transformers are provided with an additional residual voltage winding (earth-fault winding) beside the secondary winding (measuring winding).

In contrast to current transformers, voltage transformers must never be short-circuited on the secondary side. The earth-side terminal of the primary winding is effectively earthed in the terminal box, and must not be removed in operation.



**Types of construction**

Protective and measuring transformers are designed in different types of construction for the multiple installation requirements and operating conditions they are subjected to. They are electrical devices which convert primary electrical values – currents or voltages – into proportional and in-phase values that are adequate for the connected devices such as measuring instruments, meters, protection relays and similar. A distinction is made here between current and voltage transformers.

The following transformer types are available for selection in this catalog:

Current transformers

- Indoor support-type current transformer in block-type design
- Indoor support-type current transformer in single-turn design (e.g. bar-primary transformer)
- Indoor bushing-type current transformer in single-turn design
- Indoor bar-primary bushing-type current transformer
- Outdoor support-type current transformer

Voltage transformers

- Earthed (single-phase) or ungrounded (double-phase) indoor transformers in different sizes
- Earthed (single-phase) or ungrounded (double-phase) outdoor transformers in different sizes

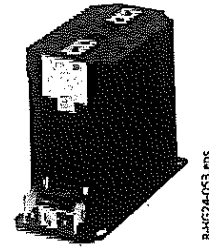
*The transformers offered in the selection are only a part of the possible variations. If the transformer required is not shown, please clarify the feasibility with the responsible sales partner or the order processing department in the Switchgear Factory Berlin. The same applies to transformers according to the ANSI standard.*

**Approvals/Certifications**

In Germany, instrument transformers may only be used for commercial purposes, such as billing metering of electricity, if they have been approved once (type approval) by the Physikalisch-Technische Bundesanstalt (PTB) (Federal Physical-Technical Institute), and if every transformer is calibrated by an officially recognised inspecting authority.

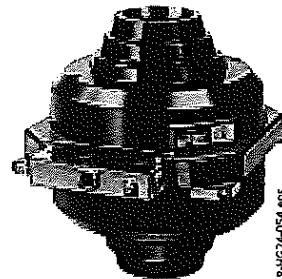
Calibration is done by a calibration office, or by the transformer manufacturer on behalf of a calibration office. The test is documented by means of a test mark as well as a calibration certificate.

The calibration costs are charged in accordance with the official scale of fees.



R-HG24-053.eps

Example for transformer in block-type design



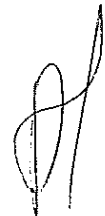
R-HG24-054.eps

Example for bushing-type transformer

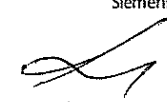


R-HG24-055.tif

Example for outdoor transformer



210



## Description

### Current transformers

1

#### Current transformers

Current transformers can be regarded as transformers operating in short circuit, which carry the full rated current on the primary side. The devices on the secondary side are series-connected. They can have several secondary windings with mechanically separated cores of the same or different characteristics. Thus, current transformers can be designed e.g. with two measuring cores of different accuracy class, or with measuring or protection cores with different accuracy limit factors.

Due to the risk of overvoltages, current transformers must not be operated with open secondary terminals, but only in short circuit or with the burden of the measuring equipment.

#### Glossary of terms

##### Rated current $I_N$ (r.m.s. value in A)

The rated primary ( $I_{PN}$ ) and secondary ( $I_{SN}$ ) current is the current that characterises the transformer, or the current it is designed for. Both values are given on the transformer rating plate. The rated primary current ( $I_{PN}$ ) depends on the power system and is defined by the system operator.

Usual values for primary currents (in A):

10; 12.5; 15; 20; 25; 30; 40; 50; 60; 75

and their decimal multiples (preferred values are underlined).

Usual values for secondary currents: 1 and 5 A.

For technical reasons, but above all for economical reasons, 1 A is recommended as secondary current, especially if there are long measuring leads.

##### Rated continuous thermal current $I_D$ (thermal strength)

The value of the current which can be permitted to flow continuously in the primary winding, the secondary winding being connected to the rated burden, without the temperature rise exceeding the values specified.

$I_D$  is often equal to  $I_N$ , but it can also be defined as a multiple thereof.

##### Rated short-time thermal current $I_{th}$

The r.m.s. value of the primary current, flowing in case of short circuit, which a current transformer will withstand for 1 or 3 seconds without suffering harmful effects, the secondary winding being short-circuited.

##### Rated dynamic current $I_{dyn}$

The peak value of the primary current which a transformer will withstand, without being damaged electrically or mechanically by the resulting electromagnetic forces, the secondary winding being short-circuited.

##### Rated transformation ratio $K_N$

The ratio of the rated primary current to the rated secondary current. It is expressed as an unreduced fraction, e.g. 500 A/1 A.

##### Rated output $S_N$

The value of the apparent power (in VA at a specified power factor), for which the current transformer has to keep the accuracy class at the rated secondary current and with rated burden. Thus, the rated output describes the capacity of a current transformer to "drive" the secondary current within the error limits by means of a burden.

Current transformers can feature the following preferred rated outputs: 2.5 VA; 5 VA; 10 VA; 15 VA; 30 VA.

##### Rated burden $Z_N$

The burden is the apparent resistance of the devices connected on the secondary side (including all connection leads), for which the current transformer has to keep the stipulated class limits. The burden is normally expressed as apparent power in VA.

##### Current error $F_i$

The current error of a current transformer is (in %):

$$F_i = 100 \cdot \frac{K_N \cdot I_{sec} - I_{prim}}{I_{prim}}$$

$K_N$  Rated transformation ratio  
 $I_{prim}$  Actual primary current  
 $I_{sec}$  Actual secondary current

##### Phase displacement $d_i$

The difference in phase between the primary and secondary current vectors, the direction of the vectors being so chosen that the angle is zero for a perfect transformer.

The phase displacement is said to be positive when the secondary current vector leads the primary current vector. It is usually expressed in minutes.

Limits of current error and phase displacement according to IEC 60044-1

Accuracy class	± current error in percent				+ phase displacement in minutes			
	at rated current $I_N$				at rated current $I_N$			
	120 %	100 %	20 %	5 %	120 %	100 %	20 %	5 %
Measuring current transformers								
0.2	0.2	0.2	0.35	0.75	10	10	15	30
0.5	0.5	0.5	0.75	1.5	30	30	45	80
1	1	1	1.5	3	60	60	90	100
Protective current transformers								
5P	-	1	-	-	-	60	-	-
10P	-	3	-	-	-	-	-	-

1

**Measuring current transformers**

Current transformers provided for the connection of measuring instruments, meters and similar devices (e.g. 10 VA Cl. 0.5 FS5).

Rated instrument limit primary current

The value of the primary current at rated burden and a composite error of 10 %.

Instrument security factor n

The ratio of rated instrument limit primary current to the rated primary current

Note:

In the event of short-circuit currents flowing through the primary winding of a current transformer, the thermal stress to the measuring instruments supplied by the current transformer is smallest when the value of the rated instrument security factor is small.

Accuracy class

The limit of the percentage current error at rated current  $I_N$  (see table).

Generally, current transformers are used for a measuring range of 5 % to 120 % of the rated primary current.

**Special designs**

Extended current ratings

Current transformers with ext. 200 % can be continuously operated at  $2 \times I_N$ , and keep the error limits of their class in the range up to 200 % of the rated primary current.

**Protective current transformers**

Current transformers intended to supply protection relays (e.g. 15 VA Cl. 10 P 10).

Accuracy class (identification P)

The limit of the percentage current error for the rated accuracy limit primary current.

Rated accuracy limit primary current

The value of primary current up to which the transformer will comply with the requirements for composite error.

Accuracy limit factor

The ratio of the rated accuracy limit primary current to the rated primary current.

**Multi-ratio current transformers**

If the ratio of current transformers has to be variable, e.g. for planned switchgear extensions, it is possible to use multi-ratio current transformers.

Primary multi-ratio

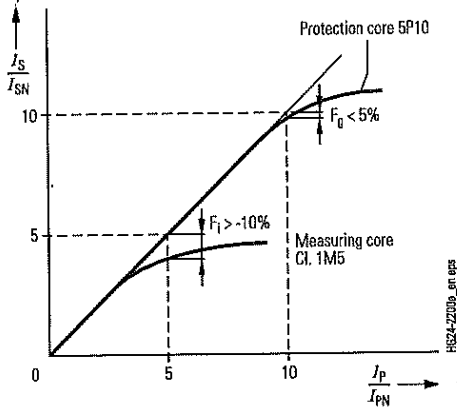
Only possible for wound-primary transformers (transformers with several primary turns) with a ratio of 1:2 (e.g. 2 x 600 A/1 A). Reconnection is made by re-arrangement of copper lugs in the primary connection area. Ratings, instrument security factors as well as the secondary internal resistance remain constant during reconnection.

Secondary multi-ratio

In single-turn and wound-primary transformers, this can be implemented by taps of the secondary windings (e.g. 2000–1000 A/1 A).

Ratings or instrument security factors change almost linearly with the ratio. If not stated otherwise, the specified rated data is always referred to the lower current value.

212 



Overcurrent performance of current transformers when loaded with rated burden

- $F_i$  Current error
- $F_g$  Composite error

**Performance in the event of overcurrent**

In the event of an overcurrent, the rated secondary current increases proportionally with the rated primary current up to the rated instrument limit primary current.

The ratio of the rated instrument limit primary current to the rated primary current provides the instrument security factor assigned to the core. In accordance with this factor, the rated instrument limit primary current is subjected to specific error limits.

The measuring and protection cores place different demands on these error limits.

For measuring cores, the current error  $F_i$  is  $> -10\%$  in order to protect the supplied measuring devices, meters, etc. safely in case of overcurrent.

In protection cores, the composite error  $F_g$  is max. 5% (5P) or 10% (10P) in order to ensure the desired protection tripping.

The specified limits are only fulfilled at the rated burden of the transformer. If the operating burden differs from the rated burden of the transformer, the instrument security factor changes as follows:

$$n' = n \cdot \frac{Z_N + S_E}{S + S_E}$$

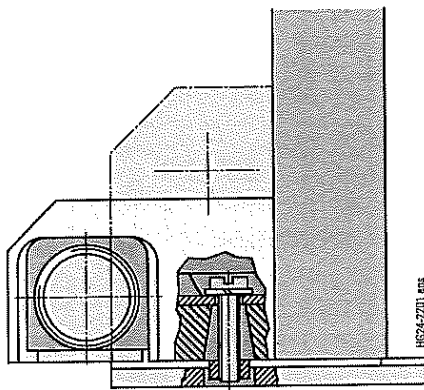
- $n'$  Actual instrument security factor
- $n$  Rated instrument security factor
- $Z_N$  Rated burden in VA
- $S_E$  Internal power consumption of the transformer in VA (approx. 5% to 20% of  $Z_N$ )
- $S$  Actually connected burden in VA

**Operation and earthing**

The secondary circuits of current transformers must never be open during operation, as dangerously high voltages can occur, especially at high currents and cores with high ratings.

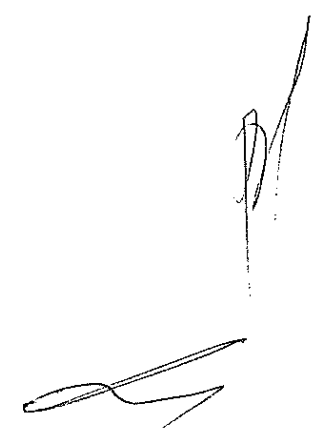
All metal parts of a transformer that are not live, but accessible, must be earthed. Therefore, the transformers have earth connection points identified with the earthing symbol. Also, one terminal of the secondary winding (for current transformers, normally k or 1s, etc.) must be earthed.

For earthing the secondary windings, a thread is provided under each secondary terminal. The earth connection required is made by fitting a special screw.



Earthing of the secondary winding, for example, in a 4MA7 current transformer

203



**Capacitively coupled voltage detecting system**

The guidelines for every medium-voltage switchgear of the new generation state that doors and covers can only be opened when there is no risk of electric shock. The movable single-pole voltage testers used up to now are not suitable for this. Therefore, every medium-voltage switchgear is offered with a system including a fixed-mounted capacitive voltage divider.

The capacitive voltage detecting system consists of a capacitive divider which divides the voltage  $U$  between the phase L and earth into the partial voltages  $U_1$  and  $U_2$ , and of an indicator applied to  $U_2$ . The indicator contains a glow lamp that flashes when voltage is applied.

**Indication range:**

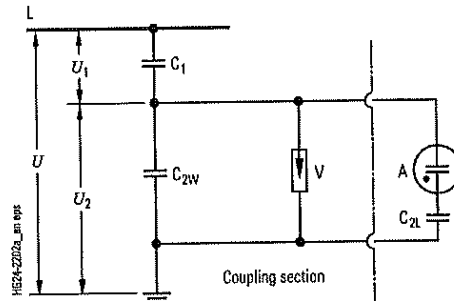
At  $0.01 \times U_N$ , no indication,  
as of  $0.40 \times U_N$ , secure indication.

On request, support-type current transformers type 4MA7 can be delivered with capacitive layers for the voltage detecting system – then they contain a coupling electrode. This electrode is cast in a firm and protected way, and lead out at the secondary terminals with the designation CK. These current transformers are routine-tested additionally for compliance with the requested capacitance values ( $C_1$  and  $C_{2W}$ ). These values are documented on an additional label.

To ensure protection against electric shock even in the most improbable case that the current transformer punctures with the high-voltage capacitor (while an operator is touching the test sockets), a surge arrester is connected in parallel to this arrangement inside the transformer. If the high voltage is exceeded, it responds within nanoseconds, limiting the voltage at the test socket to harmless values.

**Important for the ordering selection**

When ordering transformers with capacitive layers it is necessary to state the actual operating voltage  $U_N$  (rated voltage), e.g.  $U_m = 24 \text{ kV}$ ,  $U_N = 15 \text{ kV}$ .



**Voltage detecting system**

- A Indicator
- $C_1$  High-voltage capacitance (transformer)
- $C_{2W}$  Low-voltage capacitance (transformer)
- $C_{2L}$  Low-voltage capacitance (lead)
- L High-voltage phase
- $U$  Voltage between phase and earth
- $U_1$  Partial voltage at  $C_1$
- $U_2$  Partial voltage at  $C_2$  and A
- V Surge arrester



214

**Description**  
Voltage transformers

1

**Voltage transformers**

Voltage transformers have only one magnet core, and are normally designed with one single secondary winding. If necessary, earthed (single-phase) voltage transformers are equipped with an additional residual voltage winding (earth-fault winding) beside the secondary winding (measuring winding).

In contrast to current transformers, voltage transformers must never be short-circuited on the secondary side. The earth-side terminal of the primary winding is effectively earthed in the terminal box, and must not be removed during operation.

**Glossary of terms**

Highest voltage for equipment  $U_m$

The highest r.m.s. phase-to-phase voltage (in kV) for which a transformer is designed in respect of its insulation.

Rated voltage  $U_N$

The voltage values (primary  $U_{pN}$  or secondary  $U_{sN}$ ) stated on the rating plate of a transformer. If the voltage transformers are connected between phase and earth in three-phase systems, this phase-to-neutral voltage is considered the rated voltage. Except for the residual voltage winding, it is expressed as  $U/\sqrt{3}$ , with  $U$  being the phase-to-phase voltage.

$U_m$ kV	Rated primary voltage kV	Rated secondary voltage V
up to 52	3,3 3,6 4,8 5 6 6,6 7,2 10 11 13,8 15 17,5 20 22 30 33 35 40 45 or the values divided by $\sqrt{3}$	100 110 120 or the values divided by $\sqrt{3}$

Rated transformation ratio  $K_N$

The ratio of the rated primary voltage to the rated secondary voltage. It is expressed as unreduced fraction, e.g.

$10000/\sqrt{3} \text{ V} / 100/\sqrt{3} \text{ V}$  (single-phase)  
 $10000 \text{ V} / 100 \text{ V}$  (double-phase).

Voltage error  $F_U$

The voltage error expressed in percent is defined by the formula:

$$F_U = 100 \cdot \frac{K_N \cdot U_{sec} - U_{prim}}{U_{prim}}$$

$U_{prim}$  Actual primary voltage  
 $U_{sec}$  Actual secondary voltage under measuring conditions when  $U_{prim}$  is applied

Phase displacement

The difference in phase between the primary voltage and the secondary voltage vectors, the direction of the vectors being so chosen that the angle is zero for a perfect transformer. The phase displacement is said to be positive when the secondary voltage vector leads the primary voltage vector. It is usually expressed in minutes.

Limits for voltage error and phase displacement according to IEC 60044-1

The voltage error and phase displacement at rated frequency shall not exceed the values given in the table at any voltage between 80 % and 120 % of rated voltage and with burdens of between 25 % and 100 % of rated burden at a power factor of 0.8 lagging.

Accuracy class	$\pm$ voltage error %	$\pm$ phase displacement Minutes
0.2	0.2	10
0.5	0.5	20
1	1	40

Rated output  $S_N$

The value of the apparent power (in VA at a specified power factor) which the transformer is intended to supply to the secondary circuit at the rated secondary voltage and with rated burden connected to it.

Preferred values:

Accuracy class	Rated output VA						
0.2	10	15	30	50	—	—	—
0.5	10	15	30	50	75	100	—
1	—	—	30	50	75	100	200

Thermal limiting output  $S_{th}$

The value of the apparent power referred to rated voltage which can be taken from a secondary winding, at rated primary voltage applied, without exceeding the limits of temperature rise.

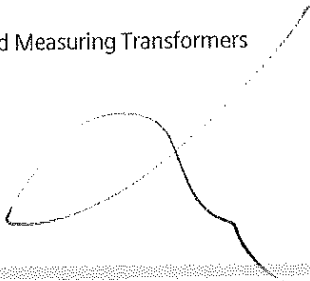
Thermal limiting output of the residual voltage winding

As the residual voltage winding is connected in broken delta, it is only stressed in case of fault. Therefore, the thermal limiting output of the residual voltage winding is referred to a stress duration of e.g. 8 h, and is expressed in VA.

Rated voltage factor

The multiplying factor to be applied to the rated primary voltage to determine the maximum voltage at which a transformer must comply with the relevant thermal requirements for a specified time and with the relevant accuracy requirements.

215



**Multi-ratio**

Voltage transformers for different rated primary voltages can only be reconnected on the secondary side for reasons of insulation.

**Operation and earthing**

In contrast to current transformers, voltage transformers must never be short-circuited on the secondary side. The earth-side primary terminal of earthed voltage transformers is insulated for a test voltage of 2 kV. It is connected to the earthed base plate in the terminal box.

Attention

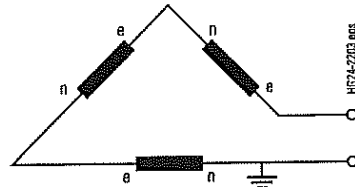
*This connection must not be opened during operation.*

*Residual voltage windings connected in broken delta may only be earthed together at one point.*

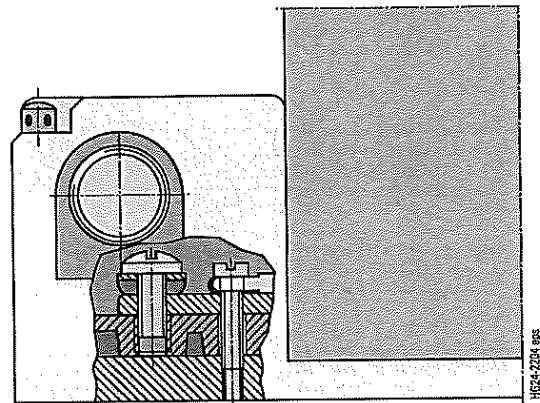
*For earthing the secondary windings, a thread is provided under each secondary terminal. The earth connection required is established by fitting a special screw.*

**Relaxation oscillations**

When single-phase voltage transformers are used in isolated systems, damping of the e-n windings connected in broken delta is recommended in order to avoid the possible destruction of the voltage transformers by relaxation oscillations.



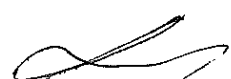
Connection and earthing of the e-n or da-dn winding



Earthing of the secondary winding, for example, in a 4MR voltage transformer



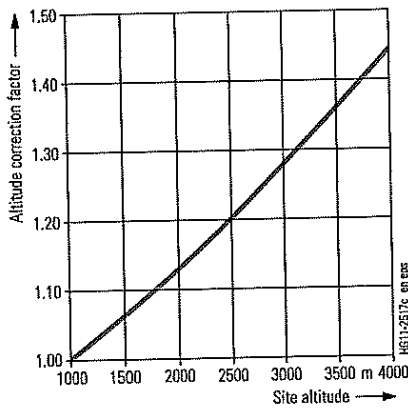
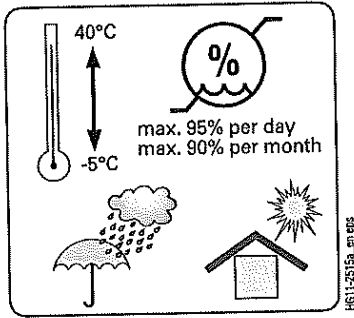
216





**Description**

Ambient conditions and dielectric strength



Highest voltage for equipment $U_m$	Rated short-duration power-frequency withstand voltage	Rated lightning impulse withstand voltage
kV	kV	V
7.2	20	60
12	28	75
17.5	38	95
24	50	125
36	70	170
52	95	250

**Ambient conditions**

The transformers are designed for the normal operating conditions defined in the standards.

The conditions shown opposite apply to indoor transformers. All indoor transformers are suitable for use with high air humidity and occasional condensation (e.g. in tropical areas).

As for outdoor transformers, the following conditions apply:

Minimum temperature

Outdoor transformers class 25 -25 °C

Outdoor transformers class 40 -40 °C

Relative air humidity

Outdoor transformers up to 100 %

**Dielectric strength**

The dielectric strength of air insulation decreases with increasing altitude due to low air density. According to IEC 62271-1, the values of the rated lightning impulse withstand voltage and the rated short-duration power-frequency withstand voltage specified, among others, in the chapter "Technical Data" apply to a site altitude of 1000 m above sea level. For an altitude above 1000 m, the insulation level must be corrected according to the opposite diagram.

The characteristic shown applies to both rated withstand voltages.

To select the devices, the following applies:

$$U \geq U_0 \times K_a$$

- $U$  Rated withstand voltage under reference atmosphere
- $U_0$  Rated withstand voltage requested for the place of installation
- $K_a$  Altitude correction factor according to the opposite diagram

Example

For a requested rated lightning impulse withstand voltage of 75 kV at an altitude of 2500 m, an insulation level of 90 kV under reference atmosphere is required as a minimum:

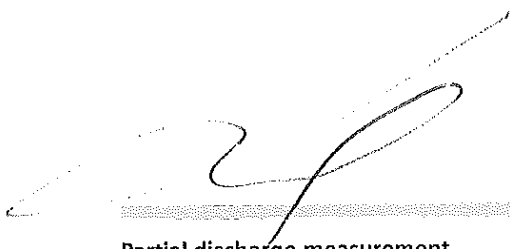
$$90 \text{ kV} \geq 75 \text{ kV} \times 1.2$$

Test voltages and insulation level for instrument transformers

Proper operation of the transformers is proved by the following tests:

- Impulse test (type test)
- Separate source withstand voltage test (routine test)
- Induced voltage withstand test (routine test)
- Partial discharge measurement (routine test)

All transformers correspond to insulation class E, i.e. the maximum temperature rise is 120 °C.



**Partial discharge measurement**

Apart from the tests mentioned on page 14, partial discharge measurements are required for current and voltage transformers to test the insulation. A partial discharge is to be understood as any small, brief electrical discharge appearing on or in a test object when voltage is applied. The discharges appear as soon as the partial discharge inception voltage of the insulating medium is exceeded at any point.

Relatively high field strengths appear at sharp edges and peaks of metal parts, or also on bubbles and gas inclusions in solid or liquid insulating materials.

Partial discharges act like HF emitters, producing a mixture of the most different frequencies. The partial discharge measurement enables an assessment about the homogeneity of the insulating material. Partial discharge measurements are performed as a routine test on inductive transformers with solid insulation as of  $U_m = 3.6 \text{ kV}$ .



Type of earthing	Type of transformer	Pre-stressing voltage	Measuring voltage	Permissible partial discharge level
		$\geq 10 \text{ s}$	$\geq 1 \text{ min}$	Apparent load
Systems with isolated or impedance earthed neutral	Current transformers and earthed voltage transformers	$1.3 U_m$	$1.1 U_m$ $1.1 \frac{U_m}{\sqrt{3}}$	250 pC 50 pC
	Unearthed voltage transformers	$1.3 U_m$	$1.1 U_m$	50 pC
Systems with solidly earthed neutral	Current transformers and earthed voltage transformers	$0.8 \times 1.3 U_m$	$1.1 \frac{U_m}{\sqrt{3}}$	50 pC
	Unearthed voltage transformers	$1.3 U_m$	$1.1 U_m$	50 pC

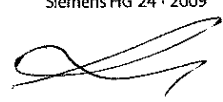
**Standards**

Protective and measuring transformers conform to the following standards:

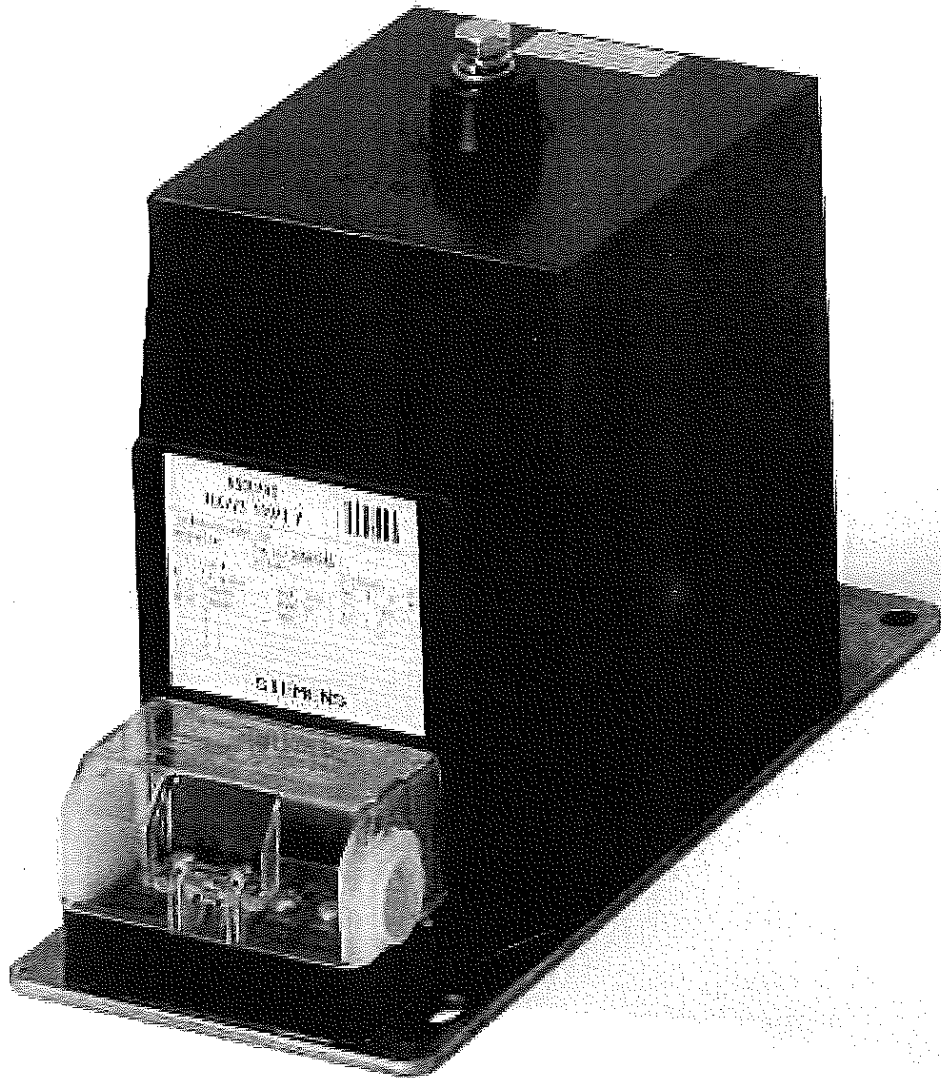
- VDE 0414 "Stipulations for instrument transformers"
- VDE 0111 "Insulation co-ordination for equipment in three-phase systems above 1 kV"
- IEC 60044-1
- IEC 60044-2
- ANSI 1675 (IEEE)
- DIN 42600



210



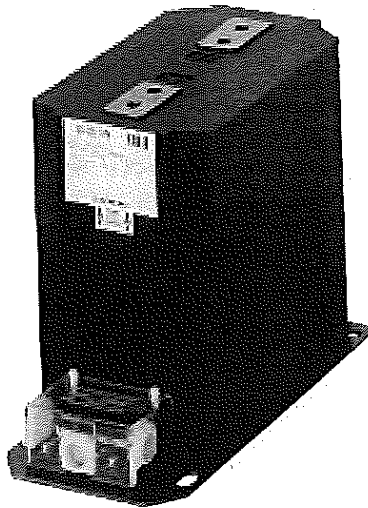
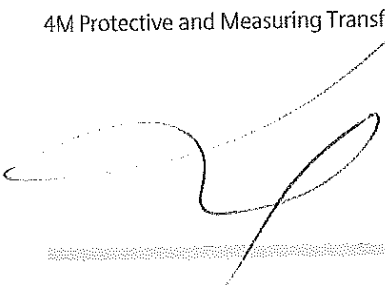
*[Handwritten signature]*



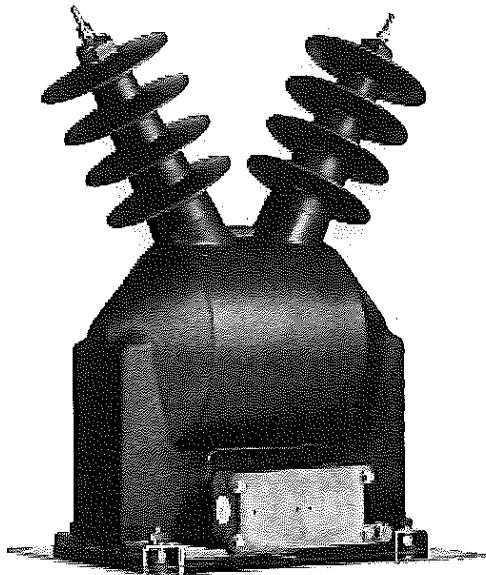
*[Handwritten signature]*  
R-HG24-057.01

219

*[Handwritten signature]*



4MA74 current transformer



4MS6 outdoor voltage transformer

R-HG24-053.eps

R-HG24-058.eps

Contents	Page
<b>Equipment Selection</b>	<b>17</b>
Ordering data and configuration example	18
Product overview of current transformers	19
4MA7 indoor support-type current transformer, block-type design	20
4MB1 indoor support-type current transformer, single-turn design	41
4MC2 indoor bushing-type current transformer, single-turn design	44
4MC3 indoor bar-primary bushing-type current transformer	47
4ME2 outdoor support-type current transformer	53
4ME3 outdoor support-type current transformer	58
Product overview of voltage transformers	62
4MR1 indoor voltage transformer, block-type design, single-phase, small	63
4MR2 indoor voltage transformer, block-type design, double-phase, small	63
4MR5 indoor voltage transformer, block-type design, single-phase, large	63
4MR6 indoor voltage transformer, block-type design, double-phase, large	63
4MS3 outdoor voltage transformer, single-phase, small	63
4MS4 outdoor voltage transformer, double-phase, small	63
4MS5 outdoor voltage transformer, single-phase, large	63
4MS6 outdoor voltage transformer, double-phase, large	63



# Equipment Selection

Ordering data and configuration example

## Order number structure

Protective and measuring transformers are described by a 12 or 16-digit order number. The first five characters describe the type, design and application of the transformer (primary part), and the positions 6 to 12 or 6 to 16 identify the core data of the transformer.

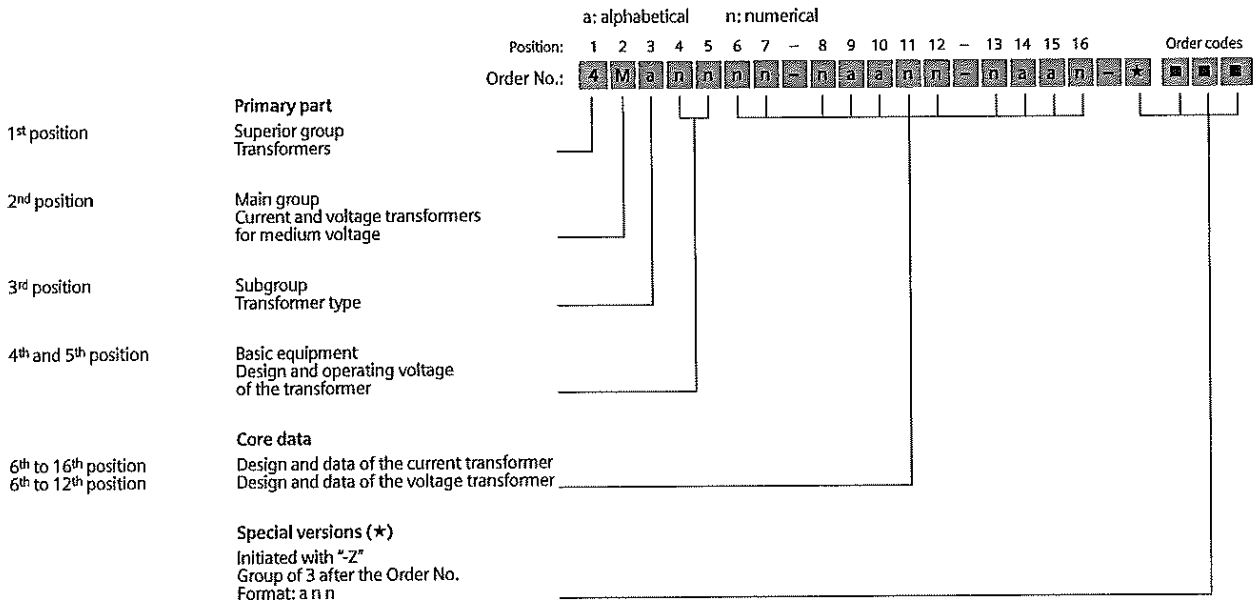
*The transformers offered in the selection are only a part of the possible variations. If the transformer required is not shown, please clarify the feasibility with the responsible sales partner or the order processing department at the Switchgear Factory Berlin. The same applies to transformers according to the ANSI standard.*

## Order codes

Individual equipment versions, marked with 9 or Z in the 9th to 16th position, are explained more in detail by a 3-digit order code. Several order codes can be added to the order number in succession and in any sequence.

### Built-on components and special versions (★)

For built-on components and special versions, "Z" is added to the order number and a descriptive order code follows. If several built-on components and special versions are required, the suffix "Z" is listed only once. If a requested special version is not in the catalog and can therefore not be ordered via order code, it has to be identified with Y 9 9 after consultation. The agreement hereto is made directly between your responsible sales partner and the order processing department in the Switchgear Factory Berlin.



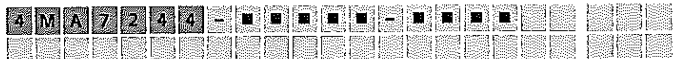
## Configuration example

At the end of each of the following pages with selection data you will find a configuration example to make the order number structure more clear.

Starting from the last selection of the basic type, this example is continued, so that at the end of the equipment selection a completely configured and orderable transformer results for every product group.

*On the foldout page we offer a configuring aid. Here you can fill in the order number you have determined for your transformer.*

Example for Order No.:  
Order codes:



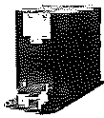
221



Current transformer,  
type of construction according to IEC 1)

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16 Order codes  
Order No.: 4 M A 7 Selection from page 20ff

Illustration	Type of design	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
--------------	----------------	---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----



R-HG24-056.eps

Indoor support-type current transformer, block-type design, small type according to DIN 42600, cast-resin insulated, operating voltage up to 12 kV, 24 kV or 36 kV

4 M A 7 Selection from page 20ff



R-HG24-060.eps

Indoor support-type current transformer, single-turn design, cast-resin insulated, operating voltage up to 12 kV or 24 kV

4 M B 1 Selection from page 41ff



R-HG24-061.eps

Indoor bushing-type current transformer, single-turn design, cast-resin insulated, operating voltage up to 12 kV, 24 kV or 36 kV

4 M C 2 Selection from page 44ff



R-HG24-054.eps

Indoor bar-primary bushing-type current transformer, cast-resin insulated, operating voltage up to 12 kV, 24 kV or 36 kV

4 M C 3 Selection from page 47ff



R-HG24-062.eps

Outdoor support-type current transformer, cast-resin insulated, operating voltage up to 12 kV, 24 kV or 36 kV

4 M E 2 Selection from page 53ff



R-HG24-071.eps

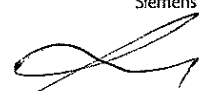
Outdoor support-type current transformer, top-assembly type, operating voltage up to 12 kV, 24 kV, 36 kV and 52 kV

4 M E 3 Selection from page 58ff

2

1) Transformers according to ANSI standard on request

Example for Order No.: 4 M A 7 Selection from page 20ff  
Order codes:



# Equipment Selection

## 4MA7 indoor support-type current transformer, block-type design



### 4MA7 indoor support-type current transformer, block-type design

5th position

Operating voltage (maximum value)

Operating voltage	Rated lightning impulse withstand voltage	Rated short-duration power-frequency withstand voltage	Position: 1	Position: 2	Position: 3	Position: 4	Position: 5	Position: 6	Position: 7
$U_m$	$U_p$	$U_d$	Order No.:						
kV	kV	kV							
12	75	28	4	M	A	7	2		
17.5	95	38	4	M	A	7	2		
24	125	50	4	M	A	7	4		
36	170	70	4	M	A	7	6		

See page 21  
See page 21  
See page 22 to page 29  
See page 40  
See page 40  
See page 40

Z F J B

6th/7th position

Rated short-time thermal current

Rated short-time thermal current	Remark	Position: 6	Position: 7
$I_{th}$			
kA			
8		3	3
12.5		4	0
16		4	4
20		4	8
25		5	4
31.5		5	7
40	Not for $U_m = 36$ kV	6	3
50	Not for $U_m = 24$ kV and $U_m = 36$ kV	6	7
63		7	1

#### Configuration example

Indoor support-type current transformer, block-type design  
 Maximum operating voltage  $U_m = 12$  kV  
 Rated lightning impulse withstand voltage  $U_p = 75$  kV  
 Rated short-duration power-frequency withstand voltage  $U_d = 28$  kV  
 Rated short-time thermal current  $I_{th} = 16$  kA

Example for Order No.:  
Order codes:

4	M	A	7	2	4	4	-												
---	---	---	---	---	---	---	---	--	--	--	--	--	--	--	--	--	--	--	--

123



8th/9th position  
 Rated primary current

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16 Order codes  
 Order No.: 4 M A 7

Rated primary current $I_{PN}$ A	Rated primary current, with primary multi-ratio $I_{PN}$ A	Rated short-time thermal current $I_{th}$								
		8 kA	12.5 kA	16 kA	20 kA	25 kA	31.5 kA	40 kA	50 kA	63 kA
20		■	■	■						
25		■	■	■	■					
30		■	■	■	■	■				
40		■	■	■	■	■	■			
50		■	■	■	■	■	■	■		
60		■	■	■	■	■	■	■	■	
75		■	■	■	■	■	■	■	■	■
100		■	■	■	■	■	■	■	■	■
125		■	■	■	■	■	■	■	■	■
150		■	■	■	■	■	■	■	■	■
200		■	■	■	■	■	■	■	■	■
250		■	■	■	■	■	■	■	■	■
300		■	■	■	■	■	■	■	■	■
400		■	■	■	■	■	■	■	■	■
500		■	■	■	■	■	■	■	■	■
600		■	■	■	■	■	■	■	■	■
750		■	■	■	■	■	■	■	■	■
800				■						
1000		■	■	■	■	■	■	■	■	■
1200		■	■	■	■	■	■	■	■	■
1250		■	■	■	■	■	■	■	■	■
1500		■	■	■	■	■	■	■	■	■
2000		■	■	■	■	■	■	■	■	■
2500		■	■	■	■	■	■	■	■	■
2x 20										
2x 25		■	■	■	■					
2x 30		■	■	■	■	■				
2x 40		■	■	■	■	■	■			
2x 50		■	■	■	■	■	■	■		
2x 60		■	■	■	■	■	■	■	■	
2x 75		■	■	■	■	■	■	■	■	■
2x 100		■	■	■	■	■	■	■	■	■
2x 125		■	■	■	■	■	■	■	■	■
2x 150		■	■	■	■	■	■	■	■	■
2x 200		■	■	■	■	■	■	■	■	■
2x 250		■	■	■	■	■	■	■	■	■
2x 300		■	■	■	■	■	■	■	■	■
2x 400		■	■	■	■	■	■	■	■	■
2x 500		■	■	■	■	■	■	■	■	■
2x 600		■	■	■	■	■	■	■	■	■

See page 22 to page 39  
 See page 40  
 See page 40  
 See page 40

■ Feasible (other combinations on request)

- Page 22
- Page 24
- Page 26
- Page 28
- Page 30
- Page 32
- Page 34
- Page 36
- Page 38

**Configuration example**  
 Indoor support-type current transformer, block-type design  
 ( $U_m = 12$  kV,  $U_p = 75$  kV,  $U_d = 28$  kV,  $I_{th} = 16$  kA)  
 Rated primary current  $I_{PN} = 100$  A

4 M A 7 2 4 4 0 M  
 Example for Order No.: 4 M A 7 2 4 4 0 M  
 Order codes:

224



# Equipment Selection

4MA7 indoor support-type current transformer, block-type design



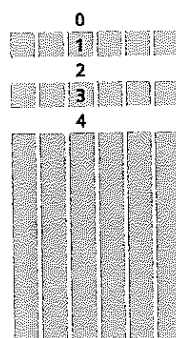
## 8 kA

10<sup>th</sup> to 14<sup>th</sup> position

Core versions

At rated primary current $I_{PN}$	Thermal strength
100 A 125 A 150 A 200 A 250 A	100 x $I_{PN}$
300 A 400 A 500 A 600 A 750 A	150 x $I_{PN}$
1000 A 1200 A 1250 A 1500 A 2000 A 2500 A	200 x $I_{PN}$
60 A 75 A	300 x $I_{PN}$
40 A 50 A	400 x $I_{PN}$
30 A	
20 A 25 A	

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16  
 Order No.: 4 M A 7 2 3 3 - 0 M Order codes



1 <sup>st</sup> core			2 <sup>nd</sup> core			Thermal strength								
Class	Factor	VA rating	Class	Factor	VA rating	1000 x $I_{PN}$	800 x $I_{PN}$	600 x $I_{PN}$	500 x $I_{PN}$	400 x $I_{PN}$	300 x $I_{PN}$	200 x $I_{PN}$	150 x $I_{PN}$	100 x $I_{PN}$
0.2	FS10	10				■	■	■	■	■	■	■	■	■
		15				■	■	■	■	■	■	■	■	■
		30				■	■	■	■	■	■	■	■	■
0.5	FS5	10				■	■	■	■	■	■	■	■	■
		15				■	■	■	■	■	■	■	■	■
		30				■	■	■	■	■	■	■	■	■
1	FS5	10				■	■	■	■	■	■	■	■	■
		15				■	■	■	■	■	■	■	■	■
		30				■	■	■	■	■	■	■	■	■
5P	10	5				■	■	■	■	■	■	■	■	■
		10				■	■	■	■	■	■	■	■	■
		15				■	■	■	■	■	■	■	■	■
10P	10	5				■	■	■	■	■	■	■	■	■
		10				■	■	■	■	■	■	■	■	■
		15				■	■	■	■	■	■	■	■	■
0.5	FS5	5	5P	10	5	■	■	■	■	■	■	■	■	■
		10				■	■	■	■	■	■	■	■	■
		15				■	■	■	■	■	■	■	■	■
0.5	FS5	5	10P	10	5	■	■	■	■	■	■	■	■	■
		10				■	■	■	■	■	■	■	■	■
		15				■	■	■	■	■	■	■	■	■
1	FS5	5	5P	10	5	■	■	■	■	■	■	■	■	■
		10				■	■	■	■	■	■	■	■	■
		15				■	■	■	■	■	■	■	■	■
1	FS5	5	10P	10	5	■	■	■	■	■	■	■	■	■
		10				■	■	■	■	■	■	■	■	■
		15				■	■	■	■	■	■	■	■	■
					15									
					30									

0  
1  
2  
3  
4

C 2 - 0 A  
C 3 - 0 A  
E 2 - 0 A  
E 3 - 0 A  
E 4 - 0 A  
H 2 - 0 A  
H 3 - 0 A  
H 4 - 0 A  
L 1 - 0 A  
L 2 - 0 A  
L 3 - 0 A  
L 4 - 0 A  
Q 1 - 0 A  
Q 2 - 0 A  
Q 3 - 0 A  
Q 4 - 0 A  
E 1 - 1 L  
E 2 - 2 L  
E 3 - 3 L  
E 4 - 4 L  
E 1 - 1 Q  
E 2 - 2 Q  
E 3 - 3 Q  
E 4 - 4 Q  
H 1 - 1 L  
H 2 - 2 L  
H 3 - 3 L  
H 4 - 4 L  
H 1 - 1 Q  
H 2 - 2 Q  
H 3 - 3 Q  
H 4 - 4 Q

■ Feasible (other combinations on request)

### Configuration example

Indoor support-type current transformer, block-type design

( $U_m = 12$  kV,  $I_{th} = 8$  kA,  $I_{PN} = 100$  A)

Thermal strength 100 x  $I_{PN}$

1<sup>st</sup> core class 5P; instrument security factor 10; rating 30 VA

2<sup>nd</sup> core without

4 M A 7 2 3 3 - 0 M

Example for Order No.:

4 M A 7 2 3 3 - 0 M L 4 0 - 0 A

Order codes:

225



### 8 kA – with primary multi-ratio

10<sup>th</sup> to 14<sup>th</sup> position

Core versions

At rated primary current $I_{PN}$	Thermal strength
2x 100 A 2x 125 A 2x 150 A 2x 200 A 2x 250 A	100 x $I_{PN}$
2x 300 A 2x 400 A 2x 500 A 2x 600 A	150 x $I_{PN}$
2x 60 A 2x 75 A	200 x $I_{PN}$
2x 40 A 2x 50 A	300 x $I_{PN}$
2x 30 A	400 x $I_{PN}$
2x 20 A 2x 25 A	

Position:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Order codes
Order No.:	4	M	A	7	2	3	3	-	3	M	H	3	0	-	4	Q	

Class	1 <sup>st</sup> core			2 <sup>nd</sup> core			Thermal strength									
	Factor	VA rating		Class	Factor	VA rating	1000 x $I_{PN}$	800 x $I_{PN}$	600 x $I_{PN}$	500 x $I_{PN}$	400 x $I_{PN}$	300 x $I_{PN}$	200 x $I_{PN}$	150 x $I_{PN}$	100 x $I_{PN}$	
0.2	FS10	10					■	■	■	■	■	■	■	■	■	■
		15					■	■	■	■	■	■	■	■	■	■
		30					■	■	■	■	■	■	■	■	■	■
0.5	FS5	10					■	■	■	■	■	■	■	■	■	■
		15					■	■	■	■	■	■	■	■	■	■
		30					■	■	■	■	■	■	■	■	■	■
1	FS5	10					■	■	■	■	■	■	■	■	■	■
		15					■	■	■	■	■	■	■	■	■	■
		30					■	■	■	■	■	■	■	■	■	■
5P	10	5					■	■	■	■	■	■	■	■	■	■
		10					■	■	■	■	■	■	■	■	■	■
		15					■	■	■	■	■	■	■	■	■	■
10P	10	5					■	■	■	■	■	■	■	■	■	■
		10					■	■	■	■	■	■	■	■	■	■
		15					■	■	■	■	■	■	■	■	■	■
0.5	FS5	5	5P	10	5		■	■	■	■	■	■	■	■	■	■
		10					■	■	■	■	■	■	■	■	■	■
		15					■	■	■	■	■	■	■	■	■	■
0.5	FS5	5	10P	10	5		■	■	■	■	■	■	■	■	■	■
		10					■	■	■	■	■	■	■	■	■	■
		15					■	■	■	■	■	■	■	■	■	■
1	FS5	5	5P	10	5		■	■	■	■	■	■	■	■	■	■
		10					■	■	■	■	■	■	■	■	■	■
		15					■	■	■	■	■	■	■	■	■	■
1	FS5	5	10P	10	5		■	■	■	■	■	■	■	■	■	■
		10					■	■	■	■	■	■	■	■	■	■
		15					■	■	■	■	■	■	■	■	■	■

■ Feasible (other combinations on request) □ Not for 2x 40 A

**Configuration example**  
 Indoor support-type current transformer, block-type design  
 ( $U_m = 12$  kV,  $I_{th} = 8$  kA,  $I_{PN} = 2x 100$  A)  
 Thermal strength 100 x  $I_{PN}$   
 1<sup>st</sup> core class 1; instrument security factor FS5; rating 15 VA  
 2<sup>nd</sup> core class 10P; accuracy limit factor 10; rating 30 VA

4	M	A	7	2	3	3	-	3	M	H	3	0	-	4	Q
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Example for Order No.:	4	M	A	7	2	3	3	-	3	M	H	3	0	-	4	Q
Order codes:																

0				
1				
2				
3				
4				
C 2	-	0	A	
C 3	-	0	A	
E 2	-	0	A	
E 3	-	0	A	
E 4	-	0	A	
H 2	-	0	A	
H 3	-	0	A	
H 4	-	0	A	
L 1	-	0	A	
L 2	-	0	A	
L 3	-	0	A	
L 4	-	0	A	
Q 1	-	0	A	
Q 2	-	0	A	
Q 3	-	0	A	
Q 4	-	0	A	
E 1	-	1	L	
E 2	-	2	L	
E 3	-	3	L	
E 4	-	4	L	
E 1	-	1	Q	
E 2	-	2	Q	
E 3	-	3	Q	
E 4	-	4	Q	
H 1	-	1	L	
H 2	-	2	L	
H 2	-	3	L	
H 3	-	3	L	
H 3	-	4	L	
H 4	-	4	L	
H 1	-	1	Q	
H 2	-	2	Q	
H 2	-	3	Q	
H 3	-	3	Q	
H 3	-	4	Q	
H 4	-	4	Q	

2

226

# Equipment Selection

4MA7 indoor support-type current transformer, block-type design

4M Protective and Measuring Transformers



## 12.5 kA

10<sup>th</sup> to 14<sup>th</sup> position

Core versions

At rated primary current $I_{PN}$	Thermal strength
125 A 150 A 200 A 250 A 300 A	100 x $I_{PN}$
400 A 500 A 600 A 750 A 1000 A	150 x $I_{PN}$
1200 A 1250 A 1500 A 2000 A 2500 A	200 x $I_{PN}$
100 A	300 x $I_{PN}$
75 A	400 x $I_{PN}$
50 A 60 A	500 x $I_{PN}$
40 A	800 x $I_{PN}$
25 A 30 A	
20 A	

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16  
 Order No.: 4 M A 7 2 4 0 - 0 M Q 1 1 - 0 A

Order codes

s.p. 40  
 s.p. 40  
 s.p. 40

0  
 1  
 2  
 3  
 4  
 5  
 7

2

1st core			2nd core			Thermal strength								
Class	Factor	VA rating	Class	Factor	VA rating	1000 x $I_{PN}$	800 x $I_{PN}$	600 x $I_{PN}$	500 x $I_{PN}$	400 x $I_{PN}$	300 x $I_{PN}$	200 x $I_{PN}$	150 x $I_{PN}$	100 x $I_{PN}$
0.2	FS10	10												
		15												
		30												
0.5	FS5	10												
		15												
		30												
1	FS5	10												
		15												
		30												
5P	10	5												
		10												
		15												
10P	10	5												
		10												
		15												
0.5	FS5	5	5P	10	5									
		10												
		15												
		30												
0.5	FS5	5	10P	10	5									
		10												
		15												
		30												
1	FS5	5	5P	10	5									
		10												
		10												
		15												
		15												
1	FS5	5	10P	10	5									
		10												
		10												
		15												
		15												

■ Feasible (other combinations on request)

### Configuration example

Indoor support-type current transformer, block-type design

( $U_m = 12$  kV,  $I_m = 12.5$  kA,  $I_{PN} = 100$  A)

Thermal strength 150 x  $I_{PN}$

1<sup>st</sup> core class 10P; instrument security factor 10; rating 5 VA

2<sup>nd</sup> core without

4 M A 7 2 4 0 - 0 M

1  
 Q 1 - 0 A

Example for Order No.:

4 M A 7 2 4 0 - 0 M Q 1 1 - 0 A

Order codes:

227



12.5 kA – with primary multi-ratio

10<sup>th</sup> to 14<sup>th</sup> position

Core versions

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16 Order codes

At rated primary current $I_{PN}$	Thermal strength
2x 125 A 2x 150 A 2x 200 A 2x 250 A	100 x $I_{PN}$
2x 300 A 2x 400 A 2x 500 A 2x 600 A	150 x $I_{PN}$
2x 100 A	200 x $I_{PN}$
2x 75 A	300 x $I_{PN}$
2x 50 A 2x 60 A	400 x $I_{PN}$
2x 40 A	500 x $I_{PN}$
2x 25 A 2x 30 A	800 x $I_{PN}$
2x 20 A	

1 <sup>st</sup> core			2 <sup>nd</sup> core			Thermal strength								
Class	Factor	VA rating	Class	Factor	VA rating	1000 x $I_{PN}$	800 x $I_{PN}$	600 x $I_{PN}$	500 x $I_{PN}$	400 x $I_{PN}$	300 x $I_{PN}$	200 x $I_{PN}$	150 x $I_{PN}$	100 x $I_{PN}$
0.2	FS10	10												
		15												
0.5	FS5	10												
		15												
		30												
1	FS5	10												
		15												
		30												
5P	10	5												
		10												
		15												
		30												
10P	10	5												
		10												
		15												
		30												
0.5	FS5	5	5P	10	5									
		10			10									
		15			15									
		30			30									
0.5	FS5	5	10P	10	5									
		10			10									
		15			15									
		30			30									
1	FS5	5	5P	10	5									
		10			10									
		10			15									
		15			15									
		15			30									
		30			30									
	FS5	5	10P	10	5									
		10			10									
		10			15									
		15			15									
		15			30									
		30			30									

■ Feasible (other combinations on request)

Configuration example

Indoor support-type current transformer, block-type design

( $U_m = 12$  kV,  $I_{th} = 12.5$  kA,  $I_{PN} = 2x 100$  A)

Thermal strength  $150 \times I_{PN}$

1<sup>st</sup> core class 0.5; instrument security factor FS5; rating 15 VA

2<sup>nd</sup> core class 10P; accuracy limit factor 10; rating 15 VA

4 M A 7

2 4 0 - 3 M

1

Example for Order No.:

Order codes:

4 M A 7 2 4 0 - 3 M E 3 1 - 3 Q

0  
1  
2  
3  
4  
5  
7

C 2 - 0 A  
C 3 - 0 A  
E 2 - 0 A  
E 3 - 0 A  
E 4 - 0 A  
H 2 - 0 A  
H 3 - 0 A  
H 4 - 0 A  
L 1 - 0 A  
L 2 - 0 A  
L 3 - 0 A  
L 4 - 0 A  
Q 1 - 0 A  
Q 2 - 0 A  
Q 3 - 0 A  
Q 4 - 0 A  
E 1 - 1 L  
E 2 - 2 L  
E 3 - 3 L  
E 4 - 4 L  
E 1 - 1 Q  
E 2 - 2 Q  
E 3 - 3 Q  
E 4 - 4 Q  
H 1 - 1 L  
H 2 - 2 L  
H 2 - 3 L  
H 3 - 3 L  
H 3 - 4 L  
H 4 - 4 L  
H 1 - 1 Q  
H 2 - 2 Q  
H 2 - 3 Q  
H 3 - 3 Q  
H 3 - 4 Q  
H 4 - 4 Q

2

228

# Equipment Selection

4MA7 indoor support-type current transformer, block-type design



## 16 kA

10<sup>th</sup> to 14<sup>th</sup> position

Core versions

At rated primary current $I_{PN}$	Thermal strength
200 A 250 A 300 A 400 A 500 A 600 A 750 A 800 A	100 x $I_{PN}$
1000 A 1200 A 1250 A 1500 A 2000 A 2500 A	150 x $I_{PN}$
125 A 150 A	200 x $I_{PN}$
100 A	300 x $I_{PN}$
60 A 75 A	400 x $I_{PN}$
40 A 50 A	600 x $I_{PN}$
30 A	800 x $I_{PN}$
25 A	1000 x $I_{PN}$
20 A	

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16  
 Order No.: 4 M A 7 2 4 4 - 0 M

1 <sup>st</sup> core			2 <sup>nd</sup> core			Thermal strength								
Class	Factor	VA rating	Class	Factor	VA rating	1000 x $I_{PN}$	800 x $I_{PN}$	600 x $I_{PN}$	500 x $I_{PN}$	400 x $I_{PN}$	300 x $I_{PN}$	200 x $I_{PN}$	150 x $I_{PN}$	100 x $I_{PN}$
0.2	FS10	10												
		15												
0.5	FS5	10				■	■	■						
		15					■	■						
		30												
1	FS5	10				■	■	■						
		15				■	■	■						
		30												
5P	10	5				■	■	■						
		10												
		15												
		30												
10P	10	5				■	■	■						
		10				■	■	■						
		15												
		30												
0.5	FS5	5	5P	10	5	■	■	■						
		10			10									
		15			15									
		30			30									
0.5	FS5	5	10P	10	5	■	■	■						
		10			10									
		15			15									
		30			30									
1	FS5	5	5P	10	5	■	■	■						
		10			10									
		10			15									
		15			15									
		15			30									
		30			30									
1	FS5	5	10P	10	5	■	■	■						
		10			10									
		10			15									
		15			15									
		15			30									
		30			30									

■ Feasible (other combinations on request)

**Configuration example**  
 Indoor support-type current transformer, block-type design  
 ( $U_m = 12$  kV,  $I_{th} = 16$  kA,  $I_{PN} = 100$  A)  
 Thermal strength 200 x  $I_{PN}$   
 1<sup>st</sup> core class 0.5; instrument security factor FS5; rating 10 VA  
 2<sup>nd</sup> core class 5P; accuracy limit factor 10; rating 10 VA

Order codes

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16

Order No.: 4 M A 7 2 4 4 - 0 M

0  
1  
2  
3  
4  
6  
7  
8

C 2 - 0 A  
C 3 - 0 A  
E 2 - 0 A  
E 3 - 0 A  
E 4 - 0 A  
H 2 - 0 A  
H 3 - 0 A  
H 4 - 0 A  
L 1 - 0 A  
L 2 - 0 A  
L 3 - 0 A  
L 4 - 0 A  
Q 1 - 0 A  
Q 2 - 0 A  
Q 3 - 0 A  
Q 4 - 0 A  
E 1 - 1 L  
E 2 - 2 L  
E 3 - 3 L  
E 4 - 4 L  
E 1 - 1 Q  
E 2 - 2 Q  
E 3 - 3 Q  
E 4 - 4 Q  
H 1 - 1 L  
H 2 - 2 L  
H 3 - 3 L  
H 4 - 4 L  
H 1 - 1 Q  
H 2 - 2 Q  
H 3 - 3 Q  
H 4 - 4 Q

Example for Order No.: 4 M A 7 2 4 4 - 0 M E 2 2 - 2 L

Order codes:

229



# Equipment Selection

4MA7 indoor support-type current transformer, block-type design



## 20 kA

10<sup>th</sup> to 14<sup>th</sup> position

Core versions

At rated primary current $I_{PN}$	Thermal strength
200 A 250 A 300 A 400 A 500 A 600 A 750 A	100 x $I_{PN}$
1000 A 1200 A 1250 A 1500 A 2000 A 2500 A	150 x $I_{PN}$
150 A	200 x $I_{PN}$
100 A 125 A	300 x $I_{PN}$
75 A	400 x $I_{PN}$
50 A 60 A	500 x $I_{PN}$
40 A	800 x $I_{PN}$
30 A	1000 x $I_{PN}$
25 A	

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16 Order codes

Order No.: 4 M A 7 2 4 B - 0 M

0	1	2	3	4	5	7	8
C 2 - 0 A	C 3 - 0 A	E 2 - 0 A	E 3 - 0 A	E 4 - 0 A	H 2 - 0 A	H 3 - 0 A	H 4 - 0 A
L 1 - 0 A	L 2 - 0 A	L 3 - 0 A	L 4 - 0 A	Q 1 - 0 A	Q 2 - 0 A	Q 3 - 0 A	Q 4 - 0 A
E 1 - 1 L	E 2 - 2 L	E 3 - 3 L	E 4 - 4 L	E 1 - 1 Q	E 2 - 2 Q	E 3 - 3 Q	E 4 - 4 Q
H 1 - 1 L	H 2 - 2 L	H 2 - 3 L	H 3 - 3 L	H 3 - 4 L	H 4 - 4 L	H 1 - 1 Q	H 2 - 2 Q
H 2 - 3 Q	H 3 - 3 Q	H 3 - 4 Q	H 4 - 4 Q				

Class	1 <sup>st</sup> core			2 <sup>nd</sup> core			Thermal strength										
	Factor	VA rating		Class	Factor	VA rating	1000 x $I_{PN}$	800 x $I_{PN}$	600 x $I_{PN}$	500 x $I_{PN}$	400 x $I_{PN}$	300 x $I_{PN}$	200 x $I_{PN}$	150 x $I_{PN}$	100 x $I_{PN}$		
0.2	FS10	10															
		15															
		30															
0.5	FS5	10															
		15															
		30															
1	FS5	10															
		15															
		30															
5P	10	5															
		10															
		15															
10P	10	5															
		10															
		15															
0.5	FS5	5	5P	10	5												
		10			10												
		15			15												
0.5	FS5	5	10P	10	5												
		10			10												
		15			15												
1	FS5	5	5P	10	5												
		10			10												
		15			15												
1	FS5	5	10P	10	5												
		10			10												
		15			15												

■ Feasible (other combinations on request)

### Configuration example

Indoor support-type current transformer, block-type design

( $U_m = 12$  kV,  $I_{th} = 20$  kA,  $I_{PN} = 100$  A)

Thermal strength 200 x  $I_{PN}$

1<sup>st</sup> core class 1; instrument security factor FS5; rating 10 VA

2<sup>nd</sup> core class 5P; accuracy limit factor 10; rating 15 VA

Example for Order No.: 4 M A 7 2 4 B - 0 M H 2 2 - 3 L

Order codes: [Grid of order code boxes]

231

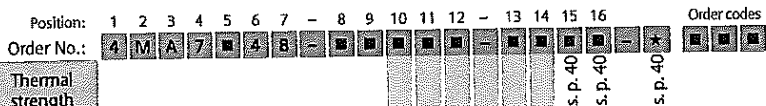


### 20 kA – with primary multi-ratio

10<sup>th</sup> to 14<sup>th</sup> position

Core versions

At rated primary current $I_{PN}$	Thermal strength
2x 200 A 2x 250 A 2x 300 A 2x 400 A	100 x $I_{PN}$
2x 500 A 2x 600 A	150 x $I_{PN}$
2x 150 A	200 x $I_{PN}$
2x 100 A 2x 125 A	300 x $I_{PN}$
2x 75 A	400 x $I_{PN}$
2x 50 A 2x 60 A	500 x $I_{PN}$
2x 40 A	800 x $I_{PN}$
2x 30 A	1000 x $I_{PN}$
2x 25 A	



Class	1 <sup>st</sup> core			2 <sup>nd</sup> core			Thermal strength										
	Factor	VA rating		Class	Factor	VA rating	1000 x $I_{PN}$	800 x $I_{PN}$	600 x $I_{PN}$	500 x $I_{PN}$	400 x $I_{PN}$	300 x $I_{PN}$	200 x $I_{PN}$	150 x $I_{PN}$	100 x $I_{PN}$		
0.2	FS10	10															
		15															
		30															
0.5	FS5	10															
		15															
		30															
1	FS5	10															
		15															
		30															
5P	10	5															
		10															
		15															
10P	10	5															
		10															
		15															
0.5	FS5	5	5P	10	5												
		10															
		15															
0.5	FS5	5	10P	10	5												
		10															
		15															
1	FS5	5	5P	10	5												
		10															
		15															
1	FS5	5	10P	10	5												
		10															
		15															

■ Feasible (other combinations on request)

**Configuration example**

Indoor support-type current transformer, block-type design  
 ( $U_m = 12$  kV,  $I_{th} = 20$  kA,  $I_{PN} = 2 \times 100$  A)  
 Thermal strength  $200 \times I_{PN}$   
 1<sup>st</sup> core class 1; instrument security factor F55; rating 5 VA  
 2<sup>nd</sup> core class 10P; accuracy limit factor 10; rating 5 VA



Example for Order No.:



Order codes:

2

232



# Equipment Selection

4MA7 indoor support-type current transformer, block-type design

4M Protective and Measuring Transformers



## 25 kA

10<sup>th</sup> to 14<sup>th</sup> position

Core versions

At rated primary current $I_{PN}$	Thermal strength
250 A 300 A 400 A 500 A 600 A 750 A	100 x $I_{PN}$
1000 A 1200 A 1250 A 1500 A 2000 A 2500 A	150 x $I_{PN}$
200 A	200 x $I_{PN}$
125 A 150 A	300 x $I_{PN}$
100 A	400 x $I_{PN}$
75 A	500 x $I_{PN}$
50 A 60 A	800 x $I_{PN}$
40 A	

Position:	1	2	3	4	5	6	7	-	8	9	10	11	12	-	13	14	15	16	Order codes
Order No.:	4	M	A	7	2	5	4	-	0	M	Q	3	3	-	0	A			
																	s.p. 40	s.p. 40	s.p. 40

Class	1 <sup>st</sup> core			2 <sup>nd</sup> core			Thermal strength															
	Factor	VA rating		Class	Factor	VA rating	1000 x $I_{PN}$	800 x $I_{PN}$	600 x $I_{PN}$	500 x $I_{PN}$	400 x $I_{PN}$	300 x $I_{PN}$	200 x $I_{PN}$	150 x $I_{PN}$	100 x $I_{PN}$							
0.2	FS10	10																				
		15																				
		30																				
0.5	FS5	10																				
		15																				
		30																				
1	FS5	10																				
		15																				
		30																				
5P	10	5																				
		10																				
		15																				
10P	10	5																				
		10																				
		15																				
0.5	FS5	5	5P	10	5																	
		10																				
		15																				
0.5	FS5	5	10P	10	5																	
		10																				
		15																				
1	FS5	5	5P	10	5																	
		10																				
		15																				
1	FS5	5	10P	10	5																	
		10																				
		15																				

■ Feasible (other combinations on request)

### Configuration example

Indoor support-type current transformer, block-type design  
 ( $U_m = 12$  kV,  $I_{th} = 25$  kA,  $I_{PN} = 100$  A)  
 Thermal strength  $300 \times I_{PN}$   
 1<sup>st</sup> core class 10P; instrument security factor 10; rating 15 VA  
 2<sup>nd</sup> core without

4 M A 7 2 5 4 - 0 M

Example for Order No.: 4 M A 7 2 5 4 - 0 M Q 3 3 - 0 A

233



31.5 kA – with primary multi-ratio

10<sup>th</sup> to 14<sup>th</sup> position

Core versions

At rated primary current $I_{PN}$	Thermal strength
2x 300 A 2x 400 A 2x 500 A 2x 600 A	100 x $I_{PN}$
250 A 300 A	150 x $I_{PN}$
200 A	200 x $I_{PN}$
125 A 150 A	300 x $I_{PN}$
100 A	400 x $I_{PN}$
75 A	500 x $I_{PN}$
60 A	600 x $I_{PN}$
50 A	800 x $I_{PN}$
40 A	1000 x $I_{PN}$

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16 Order codes

Order No.: 4 M A 7 2 5 7 - 3 M 4 1 4 - 1 Q

Class	1 <sup>st</sup> core			2 <sup>nd</sup> core			Thermal strength									
	Factor	VA rating		Class	Factor	VA rating	1000 x $I_{PN}$	800 x $I_{PN}$	600 x $I_{PN}$	500 x $I_{PN}$	400 x $I_{PN}$	300 x $I_{PN}$	200 x $I_{PN}$	150 x $I_{PN}$	100 x $I_{PN}$	
0.2	FS10	10														
		15														
		30														
0.5	FS5	10														
		15														
		30														
1	FS5	10														
		15														
		30														
5P	10	5														
		10														
		15														
10P	10	5														
		10														
		15														
0.5	FS5	5	5P	10	5											
		10			10											
		15			15											
0.5	FS5	5	10P	10	5											
		10			10											
		15			15											
1	FS5	5	5P	10	5											
		10			10											
		15			15											
1	FS5	5	10P	10	5											
		10			10											
		15			15											

■ Feasible (other combinations on request)

Configuration example

Indoor support-type current transformer, block-type design

( $U_m = 12$  kV,  $I_{th} = 31.5$  kA,  $I_{PN} = 2 \times 100$  A)

Thermal strength 400 x  $I_{PN}$

1<sup>st</sup> core class 0.5; instrument security factor FS5; rating 5 VA

2<sup>nd</sup> core class 10P; accuracy limit factor 10; rating 5 VA

4 M A 7

2 5 7 - 3 M

4

E 1 4 - 1 Q

Example for Order No.:

4 M A 7 2 5 7 - 3 M E 1 4 - 1 Q

Order codes:

Order codes: [grid of boxes]



236

# Equipment Selection

4MA7 indoor support-type current transformer, block-type design



## 40 kA

10<sup>th</sup> to 14<sup>th</sup> position

Core versions

At rated primary current $I_{PN}$	Thermal strength
400 A 500 A 600 A 750 A 1000 A 1200 A 1250 A 1500 A 2000 A 2500 A	100 x $I_{PN}$
300 A	150 x $I_{PN}$
200 A 250 A	200 x $I_{PN}$
150 A	300 x $I_{PN}$
100 A 125 A	400 x $I_{PN}$
75 A	600 x $I_{PN}$
60 A	800 x $I_{PN}$
50 A	1000 x $I_{PN}$

Position: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16  
 Order No.: 4 M A 7 2 6 3 - 0 M

s.p. 40  
s.p. 40  
s.p. 40

0
1
2
3
4
6
7
B

C 2 - 0 A
C 3 - 0 A
E 2 - 0 A
E 3 - 0 A
E 4 - 0 A
H 2 - 0 A
H 3 - 0 A
H 4 - 0 A
L 1 - 0 A
L 2 - 0 A
L 3 - 0 A
L 4 - 0 A
Q 1 - 0 A
Q 2 - 0 A
Q 3 - 0 A
Q 4 - 0 A
E 1 - 1 L
E 2 - 2 L
E 3 - 3 L
E 4 - 4 L
E 1 - 1 Q
E 2 - 2 Q
E 3 - 3 Q
E 4 - 4 Q
H 1 - 1 L
H 2 - 2 L
H 2 - 3 L
H 3 - 3 L
H 3 - 4 L
H 4 - 4 L
H 1 - 1 Q
H 2 - 2 Q
H 2 - 3 Q
H 3 - 3 Q
H 3 - 4 Q
H 4 - 4 Q

Class	1 <sup>st</sup> core			2 <sup>nd</sup> core			Thermal strength									
	Factor	VA rating		Class	Factor	VA rating	1000 x $I_{PN}$	800 x $I_{PN}$	600 x $I_{PN}$	500 x $I_{PN}$	400 x $I_{PN}$	300 x $I_{PN}$	200 x $I_{PN}$	150 x $I_{PN}$	100 x $I_{PN}$	
0.2	FS10	10														
		15														
0.5	FS5	10														
		15														
		30														
1	FS5	10														
		15														
		30														
5P	10	5														
		10														
		15														
		30														
10P	10	5														
		10														
		15														
		30														
0.5	FS5	5	5P	10	5											
		10			10											
		15			15											
		30			30											
0.5	FS5	5	10P	10	5											
		10			10											
		15			15											
		30			30											
1	FS5	5	5P	10	5											
		10			10											
		10			15											
		15			15											
		15			30											
		30			30											
1	FS5	5	10P	10	5											
		10			10											
		10			15											
		15			15											
		15			30											
		30			30											

■ Feasible (other combinations on request)

### Configuration example

Indoor support-type current transformer, block-type design

( $U_m = 12$  kV,  $I_{th} = 40$  kA,  $I_{PN} = 100$  A)

Thermal strength 400 x  $I_{PN}$

1<sup>st</sup> core class 1; instrument security factor FS5; rating 5 VA

2<sup>nd</sup> core class 5P; accuracy limit factor 10; rating 5 VA

4 M A 7 2 6 3 - 0 M

Example for Order No.:

4 M A 7 2 6 3 - 0 M E 1 4 - 1 L

Order codes:

237



### 40 kA – with primary multi-ratio

10<sup>th</sup> to 14<sup>th</sup> position

Core versions

At rated primary current $I_{PN}$		Thermal strength
2x 400 A	2x 500 A	100 x $I_{PN}$
2x 300 A		150 x $I_{PN}$
2x 200 A	2x 250 A	200 x $I_{PN}$
2x 150 A		300 x $I_{PN}$
2x 100 A	2x 125 A	400 x $I_{PN}$
2x 75 A		600 x $I_{PN}$
2x 60 A		800 x $I_{PN}$
2x 50 A		1000 x $I_{PN}$

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16  
 Order No.: 4 M A 7 2 6 3 - 3 M C 2 4 - 0 A s.p. 40 s.p. 40 s.p. 40

1 <sup>st</sup> core			2 <sup>nd</sup> core			Thermal strength								
Class	Factor	VA rating	Class	Factor	VA rating	1000 x $I_{PN}$	800 x $I_{PN}$	600 x $I_{PN}$	500 x $I_{PN}$	400 x $I_{PN}$	300 x $I_{PN}$	200 x $I_{PN}$	150 x $I_{PN}$	100 x $I_{PN}$
0.2	FS10	10												
		15												
		30												
0.5	FS5	10												
		15												
		30												
1	FS5	10												
		15												
		30												
5P	10	5												
		10												
		15												
10P	10	5												
		10												
		15												
0.5	FS5	5	5P	10	5									
		10												
		15												
		30												
0.5	FS5	5	10P	10	5									
		10												
		15												
		30												
1	FS5	5	5P	10	5									
		10												
		15												
		30												
1	FS5	5	10P	10	5									
		10												
		15												
		30												

■ Feasible (other combinations on request)

**Configuration example**

Indoor support-type current transformer, block-type design

( $U_m = 12$  kV,  $I_{th} = 40$  kA,  $I_{PN} = 2 \times 100$  A)

Thermal strength  $400 \times I_{PN}$

1<sup>st</sup> core class 0.2; instrument security factor FS10; rating 10 VA

2<sup>nd</sup> core without

4 M A 7

2 6 3 - 3 M

C 2 - 0 A

Example for Order No.:

4 M A 7 2 6 3 - 3 M C 2 4 - 0 A s.p. 40 s.p. 40 s.p. 40

Order codes:

C 2 - 0 A

2

23B

# Equipment Selection

4MA7 indoor support-type current transformer, block-type design

4M Protective and Measuring Transformers



## 50 kA

10<sup>th</sup> to 14<sup>th</sup> position

Core versions

At rated primary current $I_{PN}$		Thermal strength
500 A	600 A	100 x $I_{PN}$
750 A	1000 A	150 x $I_{PN}$
1200 A	1250 A	200 x $I_{PN}$
1500 A	2000 A	300 x $I_{PN}$
400 A		400 x $I_{PN}$
250 A	300 A	500 x $I_{PN}$
200 A		800 x $I_{PN}$
125 A	150 A	1000 x $I_{PN}$
100 A		
75 A		
60 A		

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16  
 Order No.: 4 M A 7 2 6 7 - 0 M E 1 5 - 1 L

Class	1 <sup>st</sup> core		2 <sup>nd</sup> core		Thermal strength									
	Factor	VA rating	Class	Factor	VA rating	1000 x $I_{PN}$	800 x $I_{PN}$	600 x $I_{PN}$	500 x $I_{PN}$	400 x $I_{PN}$	300 x $I_{PN}$	200 x $I_{PN}$	150 x $I_{PN}$	100 x $I_{PN}$
0.2	FS10	10												
		15												
		30												
0.5	FS5	10												
		15												
		30												
1	FS5	10												
		15												
		30												
5P	10	5												
		10												
		15												
10P	10	5												
		10												
		15												
0.5	FS5	5	5P	10	5									
		10												
		15												
0.5	FS5	5	10P	10	5									
		10												
		15												
1	FS5	5	5P	10	5									
		10												
		15												
1	FS5	5	10P	10	5									
		10												
		15												
1	FS5	5												
		10												
		15												
1	FS5	5												
		10												
		15												
1	FS5	5												
		10												
		15												
1	FS5	5												
		10												
		15												

■ Feasible (other combinations on request)

### Configuration example

Indoor support-type current transformer, block-type design

( $U_m = 12$  kV,  $I_{th} = 50$  kA,  $I_{PN} = 100$  A)

Thermal strength 500 x  $I_{PN}$

1<sup>st</sup> core class 0.5; instrument security factor FS5; rating 5 VA

2<sup>nd</sup> core class 5P; accuracy limit factor 10; rating 5 VA

4 M A 7 2 6 7 - 0 M

Example for Order No.:

4 M A 7 2 6 7 - 0 M E 1 5 - 1 L

Order codes:

4 M A 7 2 6 7 - 0 M E 1 5 - 1 L

0

1

2

3

4

5

7

8

C 2 - 0 A

C 3 - 0 A

E 2 - 0 A

E 3 - 0 A

E 4 - 0 A

H 2 - 0 A

H 3 - 0 A

H 4 - 0 A

L 1 - 0 A

L 2 - 0 A

L 3 - 0 A

L 4 - 0 A

Q 1 - 0 A

Q 2 - 0 A

Q 3 - 0 A

Q 4 - 0 A

E 1 - 1 L

E 2 - 2 L

E 3 - 3 L

E 4 - 4 L

E 1 - 1 Q

E 2 - 2 Q

E 3 - 3 Q

E 4 - 4 Q

H 1 - 1 L

H 2 - 2 L

H 3 - 3 L

H 4 - 4 L

H 1 - 1 Q

H 2 - 2 Q

H 3 - 3 Q

H 4 - 4 Q

H 1 - 1 Q

H 2 - 2 Q

H 3 - 3 Q

H 4 - 4 Q

E 1 - 1 L

E 2 - 2 L

E 3 - 3 L

E 4 - 4 L

E 1 - 1 Q

E 2 - 2 Q

E 3 - 3 Q

E 4 - 4 Q

239



50 kA – with primary multi-ratio

10<sup>th</sup> to 14<sup>th</sup> position

Core versions

At rated primary current $I_{PN}$	Thermal strength
2x 500 A 2x 600 A	100 x $I_{PN}$
2x 400 A	150 x $I_{PN}$
2x 250 A 2x 300 A	200 x $I_{PN}$
2x 200 A	300 x $I_{PN}$
2x 125 A 2x 150 A	400 x $I_{PN}$
2x 100 A	500 x $I_{PN}$
2x 75 A	800 x $I_{PN}$
2x 50 A 2x 60 A	1000 x $I_{PN}$

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16  
Order No.: 4 M A 7 2 6 7 - 3 M 5

1 <sup>st</sup> core			2 <sup>nd</sup> core			Thermal strength								
Class	Factor	VA rating	Class	Factor	VA rating	1000 x $I_{PN}$	800 x $I_{PN}$	600 x $I_{PN}$	500 x $I_{PN}$	400 x $I_{PN}$	300 x $I_{PN}$	200 x $I_{PN}$	150 x $I_{PN}$	100 x $I_{PN}$
0.2	FS10	10												
		15												
0.5	FS5	10												
		15												
1	FS5	10												
		15												
5P	10	5												
		10												
10P	10	5												
		10												
0.5	FS5	5	5P	10	5									
		10												
0.5	FS5	5	10P	10	5									
		10												
1	FS5	5	5P	10	5									
		10												
1	FS5	10												
		15												
1	FS5	15												
		30												

■ Feasible (other combinations on request)

Configuration example

Indoor support-type current transformer, block-type design

( $U_m = 12$  kV,  $I_{th} = 50$  kA,  $I_{PN} = 2 \times 100$  A)

Thermal strength 500 x  $I_{PN}$

1<sup>st</sup> core class 0.5; instrument security factor FS5; rating 5 VA

2<sup>nd</sup> core class 5P; accuracy limit factor 10; rating 5 VA

4 M A 7

2 6 7 - 3 M

5

Example for Order No.:

4 M A 7 2 6 7 - 3 M E 1 5 - 1 L

Order codes:

Order codes

10 11 12 - 13 14 15 16

s. p. 40  
s. p. 40  
s. p. 40

0  
1  
2  
3  
4  
5  
7  
8

C 2 - 0 A  
C 3 - 0 A  
E 2 - 0 A  
E 3 - 0 A  
E 4 - 0 A  
H 2 - 0 A  
H 3 - 0 A  
H 4 - 0 A  
L 1 - 0 A  
L 2 - 0 A  
L 3 - 0 A  
L 4 - 0 A  
Q 1 - 0 A  
Q 2 - 0 A  
Q 3 - 0 A  
Q 4 - 0 A  
E 1 - 1 L  
E 2 - 2 L  
E 3 - 3 L  
E 4 - 4 L  
E 1 - 1 Q  
E 2 - 2 Q  
E 3 - 3 Q  
E 4 - 4 Q  
H 1 - 1 L  
H 2 - 2 L  
H 2 - 3 L  
H 3 - 3 L  
H 3 - 4 L  
H 4 - 4 L  
H 1 - 1 Q  
H 2 - 2 Q  
H 2 - 3 Q  
H 3 - 3 Q  
H 3 - 4 Q  
H 4 - 4 Q

2

240

# Equipment Selection

4MA7 indoor support-type current transformer, block-type design



## 63 kA

10<sup>th</sup> to 14<sup>th</sup> position

Core versions

At rated primary current $I_{PN}$						Thermal strength	
750 A	1000 A	1200 A	1250 A	1500 A	2000 A	2500 A	$100 \times I_{PN}$
500 A	600 A						$150 \times I_{PN}$
400 A							$200 \times I_{PN}$
250 A	300 A						$300 \times I_{PN}$
200 A							$400 \times I_{PN}$
125 A	150 A						$500 \times I_{PN}$
100 A							$800 \times I_{PN}$
75 A							$1000 \times I_{PN}$

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16  
 Order No.: 4 M A 7 2 7 1 - 0 M

Order codes: s.p. 40 s.p. 40 s.p. 40

0
1
2
3
4
5
7
8

Class	1 <sup>st</sup> core			2 <sup>nd</sup> core			Thermal strength								
	Factor	VA rating		Class	Factor	VA rating	$1000 \times I_{PN}$	$800 \times I_{PN}$	$600 \times I_{PN}$	$500 \times I_{PN}$	$400 \times I_{PN}$	$300 \times I_{PN}$	$200 \times I_{PN}$	$150 \times I_{PN}$	$100 \times I_{PN}$
0.2	FS10	10													
		15													
0.5	FS5	10													
		15													
		30													
1	FS5	10													
		15													
		30													
5P	10	5													
		10													
		15													
		30													
10P	10	5													
		10													
		15													
		30													
0.5	FS5	5	5P	10	5										
		10			10										
		15			15										
		30			30										
0.5	FS5	5	10P	10	5										
		10			10										
		15			15										
		30			30										
1	FS5	5	5P	10	5										
		10			10										
		10			15										
		15			15										
		15			30										
		30			30										
1	FS5	5	10P	10	5										
		10			10										
		10			15										
		15			15										
		15			30										
		30			30										

■ Feasible (other combinations on request)

### Configuration example

Indoor support-type current transformer, block-type design

( $U_m = 12$  kV,  $I_{th} = 63$  kA,  $I_{PN} = 100$  A)

Thermal strength  $800 \times I_{PN}$

1<sup>st</sup> core class 0.5; instrument security factor FS5; rating 15 VA

2<sup>nd</sup> core without

4 M A 7 2 7 1 - 0 M

C 2 - 0 A
C 3 - 0 A
E 2 - 0 A
E 3 - 0 A
E 4 - 0 A
H 2 - 0 A
H 3 - 0 A
H 4 - 0 A
L 1 - 0 A
L 2 - 0 A
L 3 - 0 A
L 4 - 0 A
Q 1 - 0 A
Q 2 - 0 A
Q 3 - 0 A
Q 4 - 0 A
E 1 - 1 L
E 2 - 2 L
E 3 - 3 L
E 4 - 4 L
E 1 - 1 Q
E 2 - 2 Q
E 3 - 3 Q
E 4 - 4 Q
H 1 - 1 L
H 2 - 2 L
H 3 - 3 L
H 3 - 4 L
H 4 - 4 L
H 1 - 1 Q
H 2 - 2 Q
H 2 - 3 Q
H 3 - 3 Q
H 3 - 4 Q
H 4 - 4 Q

Example for Order No.: 4 M A 7 2 7 1 - 0 M E 3 7 - 0 A

Order codes:

241



### 63 kA – with primary multi-ratio

10<sup>th</sup> to 14<sup>th</sup> position

Core versions

At rated primary current $I_{PN}$	Thermal strength
2x 500 A 2x 600 A	150 x $I_{PN}$
2x 400 A	200 x $I_{PN}$
2x 250 A 2x 300 A	300 x $I_{PN}$
2x 200 A	400 x $I_{PN}$
2x 125 A 2x 150 A	500 x $I_{PN}$
2x 100 A	800 x $I_{PN}$
2x 75 A	1000 x $I_{PN}$

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16  
 Order No.: 4 M A 7 2 7 1 - 3 M E 1 7 - 1 Q

Class	1 <sup>st</sup> core			2 <sup>nd</sup> core			Thermal strength								
	Factor	VA rating	Class	Factor	VA rating	Class	1000 x $I_{PN}$	800 x $I_{PN}$	600 x $I_{PN}$	500 x $I_{PN}$	400 x $I_{PN}$	300 x $I_{PN}$	200 x $I_{PN}$	150 x $I_{PN}$	100 x $I_{PN}$
0.2	FS10	10	10	5P	5	10	■	■	■	■	■	■	■	■	■
		15			■		■	■	■	■	■	■	■		
		30			■		■	■	■	■	■	■	■		
0.5	FS5	10	10	10P	5	10	■	■	■	■	■	■	■	■	■
		15			■		■	■	■	■	■	■	■	■	
		30			■		■	■	■	■	■	■	■	■	
1	FS5	10	10	10P	5	10	■	■	■	■	■	■	■	■	■
		15			■		■	■	■	■	■	■	■	■	
		30			■		■	■	■	■	■	■	■	■	
5P	10	5	10	10P	5	10	■	■	■	■	■	■	■	■	■
		10			■		■	■	■	■	■	■	■	■	
		15			□		■	■	■	■	■	■	■	■	
10P	10	5	10	10P	5	10	■	■	■	■	■	■	■	■	■
		10			■		■	■	■	■	■	■	■	■	
		15			■		■	■	■	■	■	■	■	■	
0.5	FS5	5	10	10P	5	10	■	■	■	■	■	■	■	■	■
		10			■		■	■	■	■	■	■	■	■	
		15			■		■	■	■	■	■	■	■	■	
1	FS5	5	10	10P	5	10	■	■	■	■	■	■	■	■	■
		10			■		■	■	■	■	■	■	■	■	
		15			■		■	■	■	■	■	■	■	■	
1	FS5	5	10	10P	5	10	■	■	■	■	■	■	■	■	■
		10			■		■	■	■	■	■	■	■	■	
		15			■		■	■	■	■	■	■	■	■	
1	FS5	5	10	10P	5	10	■	■	■	■	■	■	■	■	■
		10			■		■	■	■	■	■	■	■	■	
		15			■		■	■	■	■	■	■	■	■	
1	FS5	5	10	10P	5	10	■	■	■	■	■	■	■	■	■
		10			■		■	■	■	■	■	■	■	■	
		15			■		■	■	■	■	■	■	■	■	
1	FS5	5	10	10P	5	10	■	■	■	■	■	■	■	■	■
		10			■		■	■	■	■	■	■	■	■	
		15			■		■	■	■	■	■	■	■	■	
1	FS5	5	10	10P	5	10	■	■	■	■	■	■	■	■	■
		10			■		■	■	■	■	■	■	■	■	
		15			■		■	■	■	■	■	■	■	■	
1	FS5	5	10	10P	5	10	■	■	■	■	■	■	■	■	■
		10			■		■	■	■	■	■	■	■	■	
		15			■		■	■	■	■	■	■	■	■	
1	FS5	5	10	10P	5	10	■	■	■	■	■	■	■	■	■
		10			■		■	■	■	■	■	■	■	■	
		15			■		■	■	■	■	■	■	■	■	
1	FS5	5	10	10P	5	10	■	■	■	■	■	■	■	■	■
		10			■		■	■	■	■	■	■	■	■	
		15			■		■	■	■	■	■	■	■	■	

■ Feasible (other combinations on request) □ Not for 2x 125 A

**Configuration example**  
 Indoor support-type current transformer, block-type design  
 ( $U_m = 12$  kV,  $I_{th} = 63$  kA,  $I_{PN} = 2x 100$  A)  
 Thermal strength 800 x  $I_{PN}$   
 1<sup>st</sup> core class 0.5; instrument security factor FS5; rating 5 VA  
 2<sup>nd</sup> core class 10P; accuracy limit factor 10; rating 5 VA

4 M A 7 2 7 1 - 3 M E 1 7 - 1 Q

Example for Order No.: 4 M A 7 2 7 1 - 3 M E 1 7 - 1 Q

Order codes: [grid]

2

*[Handwritten signature]*

*[Handwritten signature]*

242



# Equipment Selection

## 4MA7 indoor support-type current transformer, block-type design



### 15<sup>th</sup> position

#### Rated secondary current

Rated current for 1 <sup>st</sup> core	Rated current for 2 <sup>nd</sup> core
1 A	Without 2 <sup>nd</sup> core
5 A	Without 2 <sup>nd</sup> core
1 A	1 A
5 A	5 A
1 A	5 A
5 A	1 A

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16  
 Order No.: 4 M A 7 2 7 1 - 3 M E 1 7 - 1 Q E 1 - Z

Order codes
0 A A
0 A B
C
D
E
F
0
1
2
6

### 16<sup>th</sup> position

#### Additional features

##### Options

- 50 Hz, VDE marking
  - 50 Hz, IEC marking
  - 50 Hz, VDE marking with approval 1)
  - 60 Hz, IEC marking
- Further not listed special versions (only after consultation with the order processing department in the Switchgear Factory Berlin). Information additionally in clear text.

1) Only for class 0.2 and 0.5

### Special versions

##### Options

- With routine test certificate in German/English
- With capacitive layer for voltage detecting system
  - 6 kV
  - 10 kV
  - 15 kV
- Differential earth-fault balance in protection core
- Other special versions on request

9
- Z A 1 0
- Z C 0 6
- Z C 1 0
- Z C 1 5
- Z D 1 0

### Configuration example

Indoor support-type current transformer, block-type design  
 Maximum operating voltage  $U_m = 12 \text{ kV}$   
 Rated lightning impulse withstand voltage  $U_p = 75 \text{ kV}$   
 Rated short-duration power-frequency withstand voltage  $U_d = 28 \text{ kV}$   
 Rated short-time thermal current  $I_{th} = 63 \text{ kA}$   
 Rated primary current  $I_{PN} = 2 \times 100 \text{ A}$   
 Thermal strength  $800 \times I_{PN}$   
 1<sup>st</sup> core class 0.5; instrument security factor F55; rating 5 VA  
 2<sup>nd</sup> core class 10P; accuracy limit factor 10; rating 5 VA  
 Rated secondary current 1<sup>st</sup> core 1 A; 2<sup>nd</sup> core 5 A  
 Power frequency 50 Hz; marking according to IEC  
 With routine test certificate in German/English  
 With capacitive layer for voltage detecting system 10 kV

4 M A 7

2

7 1 -

3 M

7

E 1

- 1 Q

E

1

- Z

A 1 0

- Z

C 1 0

Example for Order No.:

Order codes:

4 M A 7 2 7 1 - 3 M E 1 7 - 1 Q E 1 - Z  
 A 1 0 + C 1 0





### 4MB1 indoor support-type current transformer, single-turn design

5<sup>th</sup> position

Operating voltage (maximum value)

Operating voltage	Rated lightning impulse withstand voltage	Rated short-duration power-frequency withstand voltage	Position: 1 2 3 4 5 6 7 8 9 10 11 12 - 13 14 15 16
$U_m$ kV	$U_p$ kV	$U_d$ kV	Order No.:
12	75	28	4 M B 1 2
17.5	95	38	4 M B 1 3
24	128	50	4 M B 1 4

See page 42  
See page 42  
See page 42  
See page 42  
See page 43  
See page 43

6<sup>th</sup>/7<sup>th</sup> position

Rated short-time thermal current

Rated short-time thermal current	Position: 1 2 3 4 5 6 7 8 9 10 11 12 - 13 14 15 16
$I_{th}$ kA	Order No.:
150	7 8
200	8 2
250	8 4
300	8 5
500	8 8

8<sup>th</sup>/9<sup>th</sup> position

Rated primary current

Rated primary current	Remark	Rated short-time thermal current					Position: 1 2 3 4 5 6 7 8 9 10 11 12 - 13 14 15 16
		150 kA	200 kA	250 kA	300 kA	500 kA	
$I_{N1}$ A							
1500		■					1 D
2000			■				1 F
2500				■			1 G
3000					■		1 H
4000						■	1 J
5000	Only 4MB13					■	1 K
6000	Only 4MB13					■	1 L

■ Feasible (other combinations on request)

Configuration example

Indoor support-type current transformer, single-turn design  
 Maximum operating voltage  $U_m = 24$  kV  
 Rated lightning impulse withstand voltage  $U_p = 125$  kV  
 Rated short-duration power-frequency withstand voltage  $U_d = 50$  kV  
 Rated short-time thermal current  $I_{th} = 300$  kA  
 Rated primary current  $I_{N1} = 3000$  A

Example for Order No.: 4 M B 1 4 B 5 - 1 H  
 Order codes: [grid]

2

244

# Equipment Selection

## 4MB1 indoor support-type current transformer, single-turn design



10<sup>th</sup> to 14<sup>th</sup> position

Core versions

At rated primary current $I_{PN}$	Thermal strength
-----------------------------------	------------------

1500 A 2000 A 2500 A 3000 A 4000 A  
5000 A 6000 A

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16 Order codes

Order No.: 4 M B 1 1 4 B 5 - 1 H

$100 \times I_{PN}$

See page 43  
See page 43  
See page 43

0				
C 3	-	0	A	
C 4	-	0	A	
F 3	-	0	A	
F 4	-	0	A	
F 6	-	0	A	
J 3	-	0	A	
J 4	-	0	A	
J 6	-	0	A	
L 4	-	0	A	
L 6	-	0	A	
Q 4	-	0	A	
Q 6	-	0	A	
F 3	-	3	L	
F 4	-	4	L	
F 6	-	6	L	
J 3	-	3	L	
J 4	-	4	L	
J 6	-	6	L	
F 3	-	3	Q	
F 4	-	4	Q	
F 6	-	6	Q	
J 3	-	3	Q	
J 4	-	4	Q	
J 6	-	6	Q	

2

1 <sup>st</sup> core			2 <sup>nd</sup> core			Rated primary current $I_{PN}$						
Class	Factor	VA rating	Class	Factor	VA rating	1500 A	2000 A	2500 A	3000 A	4000 A	5000 A	6000 A
0.2	FS10	15				■	■	■	■	■	■	■
		30				■	■	■	■	■	■	■
0.5	FS10	15				■	■	■	■	■	■	■
		30				■	■	■	■	■	■	■
		60				■	■	■	■	■	■	■
1	FS10	15				■	■	■	■	■	■	■
		30				■	■	■	■	■	■	■
		60				■	■	■	■	■	■	■
5P	10	30				■	■	■	■	■	■	■
		60				■	■	■	■	■	■	■
10P	10	30				■	■	■	■	■	■	■
		60				■	■	■	■	■	■	■
0.5	FS10	15	5P	10	15	■	■	■	■	■	■	■
		30			30	■	■	■	■	■	■	■
		60			60	■	■	■	■	■	■	■
1	FS10	15	5P	10	15	■	■	■	■	■	■	■
		30			30	■	■	■	■	■	■	■
		60			60	■	■	■	■	■	■	■
0.5	FS10	15	10P	10	15	■	■	■	■	■	■	■
		30			30	■	■	■	■	■	■	■
		60			60	■	■	■	■	■	■	■
1	FS10	15	10P	10	15	■	■	■	■	■	■	■
		30			30	■	■	■	■	■	■	■
		60			60	■	■	■	■	■	■	■

■ Feasible (other combinations on request)

**Configuration example**

Indoor support-type current transformer, single-turn design

( $U_m = 24$  kV,  $I_{th} = 300$  kA,  $I_{PN} = 3000$  A)

Thermal strength  $100 \times I_{PN}$

1<sup>st</sup> core class 0.5; instrument security factor FS10; rating 30 VA

2<sup>nd</sup> core class 5P; accuracy limit factor 10; rating 30 VA

4 M B 1

4 B 5 - 1 H

0

F 4 - 4 L

Example for Order No.:

4 M B 1 4 B 5 - 1 H F 4 0 - 4 L

Order codes:

245

*[Handwritten signature]*



15<sup>th</sup> position

Rated secondary current

Rated current for 1 <sup>st</sup> core	Rated current for 2 <sup>nd</sup> core
1 A	Without 2 <sup>nd</sup> core
5 A	Without 2 <sup>nd</sup> core
1 A	1 A
5 A	5 A
1 A	5 A
5 A	1 A

Position: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 Order codes

Order No.: 4 M B 1 4 B 5 - 1 H F 4 0 - 4 L D 6

0 A A  
0 A B  
C  
D  
E  
F

0  
1  
2  
6

16<sup>th</sup> position

Additional features

Options

- 50 Hz, VDE marking
  - 50 Hz, IEC marking
  - 50 Hz, VDE marking with approval <sup>1)</sup>
  - 60 Hz, IEC marking
- Further not listed special versions (only after consultation with the order processing department in the Switchgear Factory Berlin). Information additionally in clear text.

1) Only for class 0.2 and 0.5

Special versions

Options

With routine test certificate in German/English  
Other special versions on request

Configuration example

Indoor support-type current transformer, single-turn design  
Maximum operating voltage  $U_m = 24$  kV  
Rated lightning impulse withstand voltage  $U_p = 125$  kV  
Rated short-duration power-frequency withstand voltage  $U_d = 50$  kV  
Rated short-time thermal current  $I_{th} = 300$  kA  
Rated primary current  $I_{PN} = 3000$  A  
Thermal strength  $100 \times I_{PN}$   
1<sup>st</sup> core class 0.5; instrument security factor FS10; rating 30 VA  
2<sup>nd</sup> core class 5P; accuracy limit factor 10; rating 30 VA  
Rated secondary current 1<sup>st</sup> core 5 A; 2<sup>nd</sup> core 5 A  
Power frequency 60 Hz; marking according to IEC

4 M B 1

4 B 5 - 1 H

0

F 4 - 4 L D 6

Example for Order No.:

Order codes:

4 M B 1 4 B 5 - 1 H F 4 0 - 4 L D 6

2

*[Handwritten signature]*

*[Handwritten signature]*

*[Handwritten signature]*

# Equipment Selection

## 4MC2 indoor bushing-type current transformer, single-turn design



### 4MC2 indoor bushing-type current transformer, single-turn design

5<sup>th</sup> position

Operating voltage (maximum value)

Operating voltage	Rated lightning impulse withstand voltage	Rated short-duration power-frequency withstand voltage
$U_m$ kV	$U_p$ kV	$U_d$ kV
12	75	28
24	125	50
36	170	70

Position:  
Order No.:

1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16 Order codes

4	M	C	2															
										See page 45								
										See page 45								
										See page 45								
										See page 45								
										See page 45								
										See page 45								
										See page 46								
										See page 46								
										See page 46								

2

6<sup>th</sup> to 9<sup>th</sup> position  
Rated short-time thermal current/  
Rated primary current

Rated short-time thermal current	Rated primary current
$I_{th}$ kA	$I_{PN}$ A
15	150
20	200
30	300
40	400
50	500
60	600
80	800
100	1000
120	1200
150	1500
200	2000
250	2500
300	3000

4	3	-	0	P
4	8	-	0	Q
5	6	-	0	S
6	3	-	0	T
6	7	-	0	U
7	0	-	0	V
7	3	-	0	X
7	5	-	1	A
7	6	-	1	B
7	8	-	1	D
8	2	-	1	F
8	4	-	1	G
8	5	-	1	H

Configuration example  
Indoor bushing-type current transformer, single-turn design  
Maximum operating voltage  $U_m = 36$  kV  
Rated lightning impulse withstand voltage  $U_p = 170$  kV  
Rated short-duration power-frequency withstand voltage  $U_d = 70$  kV  
Rated short-time thermal current  $I_{th} = 50$  kA  
Rated primary current  $I_{PN} = 500$  A

4	M	C	2															

Example for Order No.: 4 M C 2 6 6 7 - 0 U

247





10<sup>th</sup> to 14<sup>th</sup> position

Core versions

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16 Order codes

Order No.: 4 M C 2 6 6 7 - 0 U H 4 0 - 4 Q

At rated primary current $I_{PN}$	Thermal strength
-----------------------------------	------------------

150 A 200 A 300 A 400 A 500 A 600 A 800 A  
1000 A 1200 A 1500 A 2000 A 2500 A 3000 A  
100 x  $I_{PN}$

See page 46  
See page 46  
See page 46

1 <sup>st</sup> core			2 <sup>nd</sup> core			Rated primary current $I_{PN}$				
Class	Factor	VA rating	Class	Factor	VA rating	150 A	200 A	300-600 A	800-1500 A	2000-3000 A
0.2	FS10	10				■	■	■	■	■
		15				■	■	■	■	■
0.5	FS5	15				■	■	■	■	■
		30				■	■	■	■	■
0.5	FS10	15				■	■	■	■	■
1	FS5	15				■	■	■	■	■
		30				■	■	■	■	■
1	FS10	15				■	■	■	■	■
10P	10	15				■	■	■	■	■
		30				■	■	■	■	■
		60				■	■	■	■	■
0.2	FS10	10	10P	10	30	■	■	■	■	■
		15			30	■	■	■	■	■
0.5	FS5	15	10P	10	15	■	■	■	■	■
		15			30	■	■	■	■	■
		30			30	■	■	■	■	■
		60			60	■	■	■	■	■
0.5	FS10	15	10P	10	15	■	■	■	■	■
		15			30	■	■	■	■	■
		30			30	■	■	■	■	■
		60			60	■	■	■	■	■
1	FS5	15	10P	10	15	■	■	■	■	■
		15			30	■	■	■	■	■
		30			30	■	■	■	■	■
		60			60	■	■	■	■	■
	FS10	15	10P	10	15	■	■	■	■	■
		15			30	■	■	■	■	■

■ Feasible (other combinations on request)

0				
C 2 - 0 A				
C 3 - 0 A				
E 3 - 0 A				
F 4 - 0 A				
F 3 - 0 A				
H 3 - 0 A				
H 4 - 0 A				
J 3 - 0 A				
Q 3 - 0 A				
Q 4 - 0 A				
Q 6 - 0 A				
C 2 - 4 Q				
C 3 - 4 Q				
E 3 - 3 Q				
E 3 - 4 Q				
E 4 - 4 Q				
E 4 - 6 Q				
F 3 - 3 Q				
F 3 - 4 Q				
H 3 - 3 Q				
H 3 - 4 Q				
H 4 - 4 Q				
H 4 - 6 Q				
J 3 - 3 Q				
J 3 - 4 Q				

2

Configuration example

Indoor bushing-type current transformer, single-turn design  
( $U_m = 36$  kV,  $I_{th} = 50$  kA,  $I_{PN} = 500$  A)  
Thermal strength  $100 \times I_{PN}$   
1<sup>st</sup> core class 1; instrument security factor FS5; rating 30 VA  
2<sup>nd</sup> core class 10P; accuracy limit factor 10; rating 30 VA

4 M C 2 6 6 7 - 0 U

0				
H 4 - 4 Q				

Example for Order No.:

Order codes:

4 M C 2 6 6 7 - 0 U H 4 0 - 4 Q

24B

## Equipment Selection

4MC2 indoor bushing-type current transformer, single-turn design

4M Protective and Measuring Transformers



### 15<sup>th</sup> position

Rated secondary current

Rated current for 1 <sup>st</sup> core	Rated current for 2 <sup>nd</sup> core
1 A	Without 2 <sup>nd</sup> core
5 A	Without 2 <sup>nd</sup> core
1 A	1 A
5 A	5 A
1 A	5 A
5 A	1 A

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16 Order codes

Order No.: 4 M C 2 6 6 7 - 0 U H 4 0 - 4 Q F 0

0 A A  
0 A B  
C  
D  
E  
F

### 16<sup>th</sup> position

Additional features

Options

- 50 Hz, VDE marking
- 50 Hz, IEC marking
- 50 Hz, VDE marking with approval <sup>1)</sup>
- 60 Hz, IEC marking

Further not listed special versions (only after consultation with the order processing department in the Switchgear Factory Berlin). Information additionally in clear text.

1) Only for class 0.2 and 0.5

### Special versions

Options

- With routine test certificate in German/English
- Other special versions on request

0  
1  
2  
6  
9  
- Z A 1 0

### Configuration example

Indoor bushing-type current transformer, single-turn design  
 Maximum operating voltage  $U_m = 36 \text{ kV}$   
 Rated lightning impulse withstand voltage  $U_p = 170 \text{ kV}$   
 Rated short-duration power-frequency withstand voltage  $U_d = 70 \text{ kV}$   
 Rated short-time thermal current  $I_{th} = 50 \text{ kA}$   
 Rated primary current  $I_{PN} = 500 \text{ A}$   
 Thermal strength  $100 \times I_{PN}$   
 1<sup>st</sup> core class 1; instrument security factor F55; rating 30 VA  
 2<sup>nd</sup> core class 10P; accuracy limit factor 10; rating 30 VA  
 Rated secondary current 1<sup>st</sup> core 5 A; 2<sup>nd</sup> core 1 A  
 Power frequency 50 Hz; marking according to VDE

4 M C 2

6 6 7 - 0 U

H 4 0

- 4 Q F

0

Example for Order No.: 4 M C 2 6 6 7 - 0 U H 4 0 - 4 Q F 0  
 Order codes: 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0



### 4MC3 indoor bar-primary bushing-type current transformer

5th position

Operating voltage (maximum value)

Position: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16      Order codes

Operating voltage	Rated lightning impulse withstand voltage	Rated short-duration power-frequency withstand voltage	Order No.:
$U_m$ kV	$U_p$ kV	$U_d$ kV	
12	75	28	4 M C 3 2
24	125	50	4 M C 3 4
36	170	70	4 M C 3 6

See page 48  
See page 48  
See page 48  
See page 48  
See page 49  
See page 49  
See page 49

6th to 9th position  
Rated short-time thermal current/  
Rated primary current

Rated short-time thermal current	Rated primary current	Order No.:
$I_{th}$ kA	$I_{PN}$ A	
200	2000	8 2 - 1 F
250	2500	8 4 - 1 G
300	3000	8 5 - 1 H
400	4000	8 7 - 1 J
500	5000	8 8 - 1 K
600	6000	7 0 - 1 L
800	8000	7 2 - 1 N
1000	10000	7 3 - 1 P

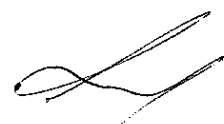
#### Configuration example

- Indoor bar-primary bushing-type current transformer
- Maximum operating voltage  $U_m = 12$  kV
- Rated lightning impulse withstand voltage  $U_p = 75$  kV
- Rated short-duration power-frequency withstand voltage  $U_d = 28$  kV
- Rated short-time thermal current  $I_{th} = 400$  kA
- Rated primary current  $I_{PN} = 4000$  A

Example for Order No.: 4 M C 3 2 8 7 - 1 J  
Order codes: [grid]

2

250





# Equipment Selection

4MC3 indoor bar-primary bushing-type current transformer



10<sup>th</sup> to 14<sup>th</sup> position

Core versions

At rated primary current $I_{PN}$	Thermal strength
2000 A 2500 A 3000 A 4000 A 5000 A 6000 A 8000 A 10000 A	100 x $I_{PN}$

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16  
Order No.: 4 M C 3 2 8 7 - 1 J

See page 49  
See page 49  
See page 49

1 <sup>st</sup> core			2 <sup>nd</sup> core			3 <sup>rd</sup> core			4 <sup>th</sup> core			Rated primary current $I_m$
Class	Factor	VA rating	Class	Factor	VA rating	Class	Factor	VA rating	Class	Factor	VA rating	
0.2	FS10	15										2000-3000 A
		30										4000-6000 A
0.5	FS10	15										8000-10000 A
		30										
1	FS10	30										
		60										
10P	10	30										
		60										
10P	20	60										
		100										
0.5	FS10	15	10P	10	30							
		15			60							
		15	10P	20	60							
		30			60							
1	FS10	60	10P	20	100							
10P	10	60										
10P	20	60										
		100										
0.5	FS10	15	10P	10	30	10P	10	60				
1	FS10	30	10P	20	60	10P	20	100				
0.2	FS10	15	0.2	FS10	30	10P	10	30				
0.5	FS10	15			30			30				
0.2	FS10	30	1	FS10	60	10P	10	60	10P	20	100	
0.5	FS10	30			60			60			100	
1	FS10	30			60			60			100	
0.2	FS10	30	1	FS10	60	10P	10	60	10P	20	100	
0.5	FS10	30			60			60			100	
1	FS10	30			60			60			100	

■ Feasible (other combinations on request)

### Configuration example

Indoor bar-primary bushing-type current transformer

( $U_m = 12$  kV,  $I_{th} = 400$  kA,  $I_{PN} = 4000$  A)

Thermal strength 100 x  $I_{PN}$

1<sup>st</sup> core class 0.5; instrument security factor FS10; rating 15 VA

2<sup>nd</sup> core class 0.2; instrument security factor FS10; rating 30 VA

3<sup>rd</sup> core class 10P; accuracy limit factor 10; rating 30 VA

4 M C 3 2 8 7 - 1 J

Example for Order No.:

Order codes:

4 M C 3 2 8 7 - 1 J Y 0 0 - 0 D

0				
C 3	-	0	A	
C 4	-	0	A	
F 3	-	0	A	
F 4	-	0	A	
J 4	-	0	A	
J 6	-	0	A	
Q 4	-	0	A	
Q 6	-	0	A	
S 6	-	0	A	
S 8	-	0	A	
F 3	-	4	Q	
F 3	-	6	Q	
F 3	-	6	S	
F 4	-	6	S	
J 6	-	8	S	
Q 6	-	8	S	
S 6	-	8	S	
S 8	-	8	S	
Y 0	-	0	A	
Y 0	-	0	B	
Y 0	-	0	C	
Y 0	-	0	D	
Y 0	-	1	A	
Y 0	-	1	B	
Y 0	-	1	C	
Y 0	-	1	D	
Y 0	-	1	E	
Y 0	-	1	F	

251



15<sup>th</sup> position  
Rated secondary current

Rated current for 1 <sup>st</sup> core	Rated current for 2 <sup>nd</sup> core	Rated current for 3 <sup>rd</sup> core	Rated current for 4 <sup>th</sup> core
1 A	Without	Without	Without
5 A	Without	Without	Without
1 A	1 A	Without	Without
5 A	5 A	Without	Without
1 A	5 A	Without	Without
5 A	1 A	Without	Without
1 A	1 A	1 A	Without
5 A	5 A	5 A	Without
1 A	1 A	1 A	1 A
5 A	5 A	5 A	5 A

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16  
Order No.: 4 M C 3 2 8 7 - 1 J Y 0 0 - 0 D G 1 - Z A 4 2

Order codes

0 A A

0 A B

C

D

E

F

G

H

J

K

0

1

2

6

2

16<sup>th</sup> position  
Additional features

Options

- 50 Hz, VDE marking
- 50 Hz, IEC marking
- 50 Hz, VDE marking with approval <sup>1)</sup>
- 60 Hz, IEC marking
- Further not listed special versions (only after consultation with the order processing department in the Switchgear Factory Berlin). Information additionally in clear text.

1) Only for class 0.2 and 0.5

Special versions

Options

- With routine test certificate in German/English
  - Size (for specification see the following pages)
- 11
- 12
- 21
- 22
- 31
- 32
- 41
- 42
- 51
- 52
- 61
- 62
- 72
- 73

Other special versions on request

Configuration example

Indoor bar-primary bushing-type current transformer

Maximum operating voltage  $U_m = 12$  kV

Rated lightning impulse withstand voltage  $U_p = 75$  kV

Rated short-duration power-frequency withstand voltage  $U_d = 28$  kV

Rated short-time thermal current  $I_{th} = 400$  kA

Rated primary current  $I_{PN} = 4000$  A

Thermal strength  $100 \times I_{PN}$

1<sup>st</sup> core class 0.5; instrument security factor FS10; rating 15 VA

2<sup>nd</sup> core class 0.2; instrument security factor FS10; rating 30 VA

3<sup>rd</sup> core class 10P; accuracy limit factor 10; rating 30 VA

Rated secondary current 1<sup>st</sup> core 1 A; 2<sup>nd</sup> core 1 A; 3<sup>rd</sup> core 1 A

Power frequency 50 Hz; marking according to IEC

Size 42

4 M C 3

2

8 7 - 1 J

0

Y 0 - 0 D

G

1

- Z

A

4

2

Example for Order No.: 4 M C 3 2 8 7 - 1 J Y 0 0 - 0 D G 1 - Z A 4 2  
Order codes: A 4 2

157

# Equipment Selection

4MC3 indoor bar-primary bushing-type current transformer



## Size specification for 4MC32 transformers <sup>1)</sup>

10 <sup>th</sup> to 14 <sup>th</sup> position of Order No.	6 <sup>th</sup> to 9 <sup>th</sup> position of Order No.							
	82-1F	84-1G	85-1H	87-1J	88-1K	90-1L	92-1N	93-1P
C30-0A	11, 12, 21, 22, 31, 32	11, 12, 21, 22, 31, 32	11, 12, 21, 22, 31, 32, 41, 42	11, 12, 21, 22, 31, 32, 41, 42, 51, 52	11, 12, 21, 22, 31, 32, 41, 42, 51, 52	21, 22, 31, 32, 41, 42, 51, 52, 61, 62	31, 32, 41, 42, 51, 52, 61, 62, 72, 73	41, 42, 51, 52, 61, 62, 72, 73
C40-0A								
F30-0A								
F40-0A								
J40-0A								
J60-0A								
Q40-0A								
Q60-0A								
S60-0A								
S80-0A	11, 12, 21, 22, 31, 32	11, 12, 21, 22, 31, 32	11, 12, 21, 22, 31, 32, 41, 42	11, 12, 21, 22, 31, 32, 41, 42, 51, 52	12, 21, 22, 31, 32, 41, 42, 51, 52	22, 31, 32, 41, 42, 51, 52, 61, 62, 72, 73	31, 32, 41, 42, 51, 52, 61, 62, 72, 73	41, 42, 51, 52, 61, 62, 72, 73
F30-4Q	11, 12, 21, 22, 31, 32	11, 12, 21, 22, 31, 32	11, 12, 21, 22, 31, 32, 41, 42	11, 12, 21, 22, 31, 32, 41, 42, 51, 52	11, 12, 21, 22, 31, 32, 41, 42, 51, 52	22, 31, 32, 41, 42, 51, 52, 61, 62, 72, 73	32, 41, 51, 52, 61, 62, 72, 73	51, 52, 61, 62, 72, 73
F30-6Q	11, 12, 21, 22, 31, 32	11, 12, 21, 22, 31, 32	11, 12, 21, 22, 31, 32, 41, 42	11, 12, 21, 22, 31, 32, 41, 42, 51, 52	12, 21, 22, 31, 32, 41, 42, 51, 52	22, 31, 32, 41, 42, 51, 52, 61, 62, 72, 73	32, 41, 51, 52, 61, 62, 72, 73	42, 51, 52, 61, 62, 72, 73
F30-6S	11, 12, 21, 22, 31, 32	11, 12, 21, 22, 31, 32	11, 12, 21, 22, 31, 32, 41, 42	11, 12, 21, 22, 31, 32, 41, 42, 51, 52	12, 21, 22, 31, 32, 41, 42, 51, 52	22, 31, 32, 41, 42, 51, 52, 61, 62	42, 51, 52, 61, 62, 72, 73	42, 51, 52, 61, 62, 72, 73
F40-6S								
J60-8S	12, 21, 22, 31, 32	12, 21, 22, 31, 32	12, 21, 22, 31, 32, 41, 42	12, 21, 22, 31, 32, 41, 42, 51, 52	21, 22, 31, 32, 41, 42, 51, 52	21, 22, 31, 32, 41, 42, 51, 52, 61, 62	31, 32, 41, 42, 51, 52, 61, 62, 72, 73	42, 51, 52, 61, 62, 72, 73
Q60-8S	12, 21, 22, 31, 32	12, 21, 22, 31, 32	12, 21, 22, 31, 32, 41, 42	12, 21, 22, 31, 32, 41, 42, 51, 52	21, 22, 31, 32, 41, 42, 51, 52	21, 22, 31, 32, 41, 42, 51, 52, 61, 62	32, 41, 42, 51, 52, 61, 62, 72, 73	42, 51, 52, 61, 62, 72, 73
S60-8S	12, 21, 22, 31, 32	12, 21, 22, 31, 32	21, 22, 31, 32, 41, 42	12, 21, 22, 31, 32, 41, 42, 51, 52	21, 22, 31, 32, 41, 42, 51, 52	21, 22, 31, 32, 41, 42, 51, 52, 61, 62	32, 41, 42, 51, 52, 61, 62, 72, 73	42, 51, 52, 61, 62, 72, 73
S80-8S	21, 22, 32	12, 21, 22, 32	21, 22, 31, 32, 41, 42	21, 22, 31, 32, 41, 42, 51, 52	21, 22, 31, 32, 41, 42, 51, 52	22, 31, 32, 41, 42, 51, 52, 61, 62	41, 42, 51, 52, 61, 62, 72, 73	42, 51, 52, 61, 62, 72, 73
Y00-0A	11, 12, 21, 22, 31, 32	11, 12, 21, 22, 31, 32	12, 21, 22, 31, 32, 41, 42	12, 21, 22, 31, 32, 41, 42, 51, 52	22, 31, 32, 41, 42, 51, 52	32, 41, 42, 51, 52, 61, 62	52, 61, 62, 72, 73	52, 61, 62, 72, 73
Y00-0B	21, 22, 32	21, 22, 32	22, 31, 32, 41, 42	22, 31, 32, 41, 42, 51, 52	22, 31, 32, 41, 42, 52	22, 41, 42, 51, 52, 61, 62	42, 51, 52, 61, 62, 72, 73	52, 61, 62, 72, 73
Y00-0C	11, 12, 21, 22, 31, 32	11, 12, 21, 22, 31, 32	12, 21, 22, 31, 32, 41, 42	12, 21, 22, 31, 32, 41, 42, 51, 52	12, 22, 31, 32, 41, 42, 51, 52	22, 31, 32, 41, 42, 51, 52	52, 61, 62, 72, 73	52, 61, 62, 72, 73
Y00-0D								
Y00-1A	12, 22, 32	22, 32	22, 32, 42	22, 32, 42, 52	42, 52	52, 62	73	73
Y00-1B								
Y00-1C								
Y00-1D	22, 32	22, 32	22, 32, 42	41, 52	52	52, 62	73	73
Y00-1E								
Y00-1F								

1) Selection for transformers with rated secondary current 1 A. Sizes for 5 A on request

253



Size specification for 4MC34 transformers <sup>1)</sup>

10 <sup>th</sup> to 14 <sup>th</sup> position of Order No.	6 <sup>th</sup> to 9 <sup>th</sup> position of Order No.							
	82-1F	84-1G	85-1H	87-1J	88-1K	90-1L	92-1N	93-1P
C30-0A	11, 12	11, 12	12, 21	11, 12	21, 22	21, 22	31, 32	41, 42
C40-0A	21, 22	21, 22	22, 31	21, 22	31, 32	31, 32	41, 42	51, 52
F30-0A	31, 32	31, 32	32, 41	31, 32	41, 42	41, 42	51, 52	61, 62
F40-0A			42	41, 42	51, 52	51, 52	61, 62	72, 73
J40-0A				51, 52		61, 62	72, 73	
J60-0A								
Q40-0A								
Q60-0A								
S60-0A								
S80-0A	11, 12 21, 22 31, 32	11, 12 21, 22 31, 32	12, 21 22, 31 32, 41 42	11, 12 21, 22 31, 32 41, 42 51, 52	21, 22 31, 32 41, 42 51, 52	22, 31 32, 41 42, 51 52, 61 62, 72 73	31, 32 41, 42 51, 52 62, 72 73	41, 42 51, 52 62, 72 73
F30-4Q	11, 12 21, 22 31, 32	11, 12 21, 22 31, 32	11, 12 21, 22 31, 32 41, 42	11, 12 21, 22 31, 32 41, 42 51, 52	21, 22 31, 32 41, 42 51, 52	22, 31 32, 41 42, 51 52, 62 72, 73	32, 42 51, 52 62, 72 73	51, 52 62, 72 73
F30-6Q	11, 12 21, 22 31, 32	11, 12 21, 22 31, 32	11, 12 21, 22 31, 32 41, 42	11, 12 21, 22 31, 32 41, 42 51, 52	21, 22 31, 32 41, 42 51, 52	22, 31 32, 41 42, 51 52, 62 72, 73	32, 42 51, 52 62, 72 73	42, 51 52, 62 72, 73
F30-6S	11, 12	11, 12	11, 12	12, 21	21, 22	22, 32	42, 51	42, 51
F40-6S	21, 22	21, 22	21, 22	22, 31	31, 32	41, 42	52, 62	52, 62
	31, 32	31, 32	31, 32	32, 41	41, 42	51, 52	72, 73	72, 73
			41, 42	42, 51	51, 52	61, 62		
J60-8S	12, 21 22, 31 32	12, 21 22, 31 32	12, 21 22, 31 32, 41 42	12, 21 22, 31 32, 41 42, 51 52	21, 22 31, 32 41, 42 51, 52	21, 22 31, 32 41, 42 51, 52 61, 62	31, 32 41, 42 51, 52 61, 62 72, 73	42, 52 62, 72 73
Q60-8S	12, 21 22, 31 32	12, 21 22, 31 32	12, 21 22, 31 32, 41 42	12, 21 22, 31 32, 41 42, 51 52	21, 22 31, 32 41, 42 51, 52	22, 32 41, 42 51, 52 61, 62	32, 41 42, 51 52, 62 72, 73	42, 52 62, 72 73
S60-8S	21, 22 31, 32	21, 22 31, 32	21, 22 31, 32 41, 42	21, 22 31, 32 41, 42 51, 52	21, 22 31, 32 41, 42 51, 52	22, 32 41, 42 52, 61 62	42, 51 52, 62 72, 73	42, 52 62, 72 73
S80-8S	21, 22 32	21, 22 32	21, 22 31, 32 41, 42	21, 22 32, 41 42, 51 52	21, 22 32, 41 42, 51 52	22, 32 41, 42 51, 52 62	41, 42 51, 52 62, 72 73	42, 52 62, 72 73
Y00-0A	11, 12 21, 22 31, 32	11, 12 21, 22 31, 32	11, 12 21, 22 31, 32 41, 42	11, 12 21, 22 31, 32 41, 42 51, 52	21, 22 31, 32 41, 42 51, 52	22, 32 42, 51 52, 61 62	22, 32 42, 51 52, 61 62, 72 73	42, 52 62, 72 73
Y00-0B	22, 32	21, 22 32	22, 32 41, 42	22, 32 42, 51 52	22, 32 42, 52	22, 42 52, 62	42, 52 62, 72 73	52, 62 72, 73
Y00-0C	11, 12	11, 12	11, 12	12, 21	22, 32	22, 32	52, 62	52, 62
Y00-0D	21, 22	21, 22	21, 22	22, 31	41, 42	42, 51	72, 73	72, 73
	31, 32	31, 32	31, 32	32, 41	41, 42	51, 52		
			41, 42	42, 51				
Y00-1A	12, 22	22, 32	22, 32	22, 32	42, 52	52, 62	73	73
Y00-1B	32		42	42, 52				
Y00-1C								
Y00-1D	22, 32	22, 32	22, 32	41, 52	52	52, 62	73	73
Y00-1E			42					
Y00-1F								

2

1) Selection for transformers with rated secondary current 1 A. Sizes for 5 A on request

054



# Equipment Selection

4MC3 indoor bar-primary bushing-type current transformer

4M Protective and Measuring Transformers



## Size specification for 4MC36 transformers <sup>1)</sup>

10 <sup>th</sup> to 14 <sup>th</sup> position of Order No.	6 <sup>th</sup> to 9 <sup>th</sup> position of Order No.							
	82-1F	84-1G	85-1H	87-1J	88-1K	90-1L	92-1N	93-1P
C30-0A	11, 12	11, 12	11, 12	11, 12	11, 12	21, 22	31, 32	41, 42
C40-0A	21, 22	21, 22	21, 22	21, 22	21, 22	31, 32	41, 42	51, 52
F30-0A	31, 32	31, 32	31, 32	31, 32	31, 41	41, 42	51, 52	61, 62
F40-0A			41, 42	41, 42	42, 51	51, 52	61, 62	72, 73
J40-0A				51, 52	52	61, 62	72, 73	
J60-0A								
Q40-0A								
Q60-0A	11, 12	11, 12	11, 12	21, 22	21, 22	21, 22	31, 32	41, 42
S60-0A	21, 22	21, 22	21, 22	31, 32	31, 32	31, 32	41, 42	51, 52
	31, 32	31, 32	31, 32	41, 42	41, 42	41, 42	51, 52	61, 62
		41, 42	41, 42	51, 52	51, 52	61, 62	72, 73	82, 83
S80-0A	12, 21	11, 12	11, 12	21, 22	21, 22	22, 31	41, 42	41, 42
	22, 31	21, 22	21, 22	31, 32	31, 32	32, 41	51, 52	51, 52
	32	31, 32	31, 32	41, 42	41, 42	42, 51	62, 72	62, 72
		41, 42	41, 42	51, 52	51, 52	52, 61	73	73
F30-4Q	11, 12	11, 12	12, 21	21, 22	21, 22	22, 31	42, 52	52, 62
	21, 22	21, 22	22, 31	31, 32	31, 32	32, 41	62, 72	72, 73
	31, 32	31, 32	32, 41	41, 42	41, 42	42, 51	73	
			42	51, 52	51, 52	52, 62		
F30-6Q	12, 21	12, 21	12, 21	21, 22	21, 22	22, 31	42, 52	52, 62
	22, 31	22, 31	22, 31	31, 32	31, 32	32, 41	62, 72	72, 73
	32	32	32, 41	41, 42	41, 42	42, 51	73	
			42	51, 52	51, 52	52, 62		
F30-6S	12, 21	12, 21	12, 21	21, 22	21, 22	22, 32	42, 52	52, 62
	22, 31	22, 31	22, 31	31, 32	31, 32	32, 41	62, 72	72, 73
	32	32	32, 41	41, 42	41, 42	42, 51	73	
			42	51, 52	51, 52	52, 61		
F40-6S	12, 21	12, 21	21, 22	21, 22	21, 22	21, 22	41, 42	42, 52
	22, 31	22, 31	31, 32	31, 32	31, 32	32, 41	51, 52	62, 72
	32	32	41, 42	41, 42	41, 42	42, 51	62, 72	73
			41, 42	51, 52	51, 52	52, 61	73	
J60-8S	12, 21	12, 21	21, 22	21, 22	21, 22	21, 22	41, 42	42, 52
	22, 31	22, 31	31, 32	31, 32	31, 32	31, 32	51, 52	62, 72
	32	32	41, 42	41, 42	41, 42	41, 42	61, 62	73
			41, 42	51, 52	51, 52	51, 52	61, 62	
Q60-8S	21, 22	12, 21	21, 22	21, 22	22, 32	22, 32	42, 51	42, 52
	31, 32	22, 31	32, 41	32, 41	41, 42	41, 42	52	62, 72
		32	42	42, 51	51, 52	51, 52	61, 62	73
			42	52				
S60-8S	21, 22	21, 22	21, 22	21, 22	22, 32	22, 41	42, 52	52, 62
	32	32	32, 41	32, 41	41, 42	42, 51	62, 72	72, 73
			42	42, 51	51, 52	52, 61	73	
			42	52		62		
S80-8S	21, 22	31, 32	21, 22	21, 22	22, 32	22, 32	42, 52	52, 62
	32	42	32, 41	32, 41	41, 42	41, 42	62, 72	72, 73
			42	42, 51	51, 52	51, 52	73	
			42	52		62		
Y00-0A	11, 12	11, 12	21, 22	21, 22	22, 32	22, 42	52	52, 62
	21, 22	21, 22	31, 32	31, 32	41, 42	52, 61	62	72, 73
	31, 32	31, 32	41, 42	42, 51	51, 52	62		
			41, 42	52				
Y00-0B	22, 32	22, 32	22, 32	22, 42	42, 52	42, 52	52	73
				52		62		
Y00-0C	11, 12	11, 12	21, 22	21, 22	22, 32	22, 52	73	73
Y00-0D	21, 22	21, 22	31, 32	32, 41	41, 42	62		
	31, 32	31, 32	41, 42	42, 51	51, 52			
			41, 42	52				
Y00-1A	22, 32	22, 32	22, 32	42, 52	52	-	73	73
Y00-1B								
Y00-1C								
Y00-1D	22	22	22, 42	52	-	-	73	73
Y00-1E								
Y00-1F								

1) Selection for transformers with rated secondary current 1 A. Sizes for 5 A on request

255





### 4ME2 outdoor support-type current transformer

5<sup>th</sup> position Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16 Order codes  
 Operating voltage (maximum value) Order No.: 4 M E 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2

Operating voltage	Rated lightning impulse withstand voltage	Rated short-duration power-frequency withstand voltage	
$U_m$ KV	$U_p$ KV	$U_d$ KV	
12	75	28	4 M E 2 2
24	125	50	4 M E 2 4
36	170	70	4 M E 2 6

See page 55  
See page 55  
See page 55  
See page 55  
See page 56  
See page 56

6<sup>th</sup> to 9<sup>th</sup> position  
Rated short-time thermal current/  
Rated primary current

Rated short-time thermal current	Rated primary current	Rated primary current, with primary multi-ratio		Thermal strength		
		$I_{PN}$ A	$I_{PN}$ A	$300 \times I_{PN}$	$200 \times I_{PN}$	
$I_{th}$ kA	$I_{PN}$ A	$I_{PN}$ A				
0.5		2x 5				0 0 - 3 A
0.6		2x 10				0 1 - 3 B
1		2x 5				0 3 - 3 A
1.5		2x 15				0 7 - 3 D
2.5		2x 25				1 6 - 3 F
3		2x 15				1 7 - 3 D
5		2x 25				2 5 - 3 F
5		2x 50				2 5 - 3 J
7.5		2x 75				3 2 - 3 L
10		2x 50				3 6 - 3 J
10		2x 100				3 6 - 3 M
15		2x 75				4 3 - 3 L
15		2x 150				4 3 - 3 P
20		2x 100				4 8 - 3 M
20		2x 200				4 8 - 3 Q
25		2x 250				5 4 - 3 R
30		2x 150				5 6 - 3 P
30		2x 300				5 6 - 3 S
40		2x 200				6 3 - 3 Q
40		2x 400				6 3 - 3 T
50		2x 250				6 7 - 3 R
50		2x 500				6 7 - 3 U
60		2x 300				7 0 - 3 S
60		2x 600				7 0 - 3 V

6<sup>th</sup> to 9<sup>th</sup> position continued on page 54

**Configuration example**

Outdoor support-type current transformer  
 Maximum operating voltage  $U_m = 24$  kV  
 Rated lightning impulse withstand voltage  $U_p = 125$  kV  
 Rated short-duration power-frequency withstand voltage  $U_d = 50$  kV  
 Rated short-time thermal current  $I_{th} = 15$  kA  
 Rated primary current  $I_{PN} = 2 \times 75$  A

Example for Order No.: 4 M E 2 4 4 3 - 3 L  
 Order codes: [grid]

2

256

# Equipment Selection

## 4ME2 outdoor support-type current transformer



6<sup>th</sup> to 9<sup>th</sup> position (continued)  
 Rated short-time thermal current/  
 Rated primary current

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16 Order codes  
 Order No.: 4 M E 2 4 7 5 - 1 A

Rated short-time thermal current $I_{th}$ kA	Rated primary current $I_{PN}$ A	Rated primary current, with primary multi-ratio $I_{PN}$ A	Thermal strength			10	11	12	13	14	15	16	
			$300 \times I_{PN}$	$200 \times I_{PN}$	$100 \times I_{PN}$								
0.5	5												0 0 - 0 A
0.6	10												0 1 - 0 B
1	5												0 3 - 0 A
1.5	15												0 7 - 0 D
2	10												1 3 - 0 B
2	20												1 3 - 0 E
3	15												1 7 - 0 D
3	30												1 7 - 0 G
4	20												2 2 - 0 E
4	40												2 2 - 0 H
5	50												2 5 - 0 J
6	30												2 6 - 0 G
6	60												2 6 - 0 K
7.5	75												3 2 - 0 L
8	40												3 3 - 0 H
10	50												3 6 - 0 J
10	100												3 6 - 0 M
12	60												3 8 - 0 K
15	75												4 3 - 0 L
15	150												4 3 - 0 P
20	100												4 8 - 0 M
20	200												4 8 - 0 Q
25	250												5 3 - 0 R
30	150												5 6 - 0 P
30	300												5 6 - 0 S
40	200												6 3 - 0 Q
40	400												6 3 - 0 T
50	250												6 7 - 0 R
50	500												6 7 - 0 U
60	300												7 0 - 0 S
60	600												7 0 - 0 V
80	400												7 3 - 0 T
80	800												7 3 - 0 X
100	500												7 5 - 0 U
100	1000												7 5 - 1 A
120	600												7 6 - 0 V
120	1200												7 6 - 1 B

See page 55  
 See page 55  
 See page 55  
 See page 55  
 See page 56  
 See page 56  
 See page 56

2

Configuration example  
 Outdoor support-type current transformer  
 ( $U_m = 24$  kV,  $U_p = 125$  kV,  $U_d = 50$  kV)  
 Rated short-time thermal current  $I_{th} = 100$  kA  
 Rated primary current  $I_{PN} = 1000$  A

Example for Order No.: 4 M E 2 4 7 5 - 1 A  
 Order codes: [grid]

257



10<sup>th</sup> to 14<sup>th</sup> position  
Core versions

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16  
Order No.: 4 M E 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2

At rated primary current $I_{PN}$		Thermal strength
0.5 0.6 1.5 2 2.5 3 4 5 6 7.5 10 15 20 25 30 40 50 60 80 100 120		100 x $I_{PN}$
1 2 3 4 5 6 8 10 12 15 20 30 40 50 60 80 100 120		200 x $I_{PN}$
0.5 0.6 1.5 2 2.5 3 4 5 6 7.5 10 15 20 25 30 40 50 60 80 100 120		300 x $I_{PN}$

0	See page 56
2	See page 56
3	See page 56

1 <sup>st</sup> core			2 <sup>nd</sup> core			3 <sup>rd</sup> core			Rated primary current $I_{PN}$		
Class	Factor	VA rating	Class	Factor	VA rating	Class	Factor	VA rating	300 x $I_{PN}$	200 x $I_{PN}$	100 x $I_{PN}$
0.2	FS10	5							■	■	■
		10							■	■	■
		15							■	■	■
		30							■	■	■
0.5	F55	10							■	■	■
		15							■	■	■
		30							■	■	■
1	F55	15							■	■	■
		30							■	■	■
5P	10	15							■	■	■
		30							■	■	■
		60							■	■	■
10P	10	15							■	■	■
		30							■	■	■
		60							■	■	■
0.2	FS10	10	5P	10	30				■	■	■
		15			30				■	■	■
		30			60				■	■	■
0.5	F55	10	5P	10	30				■	■	■
		15			30				■	■	■
		30			30				■	■	■
		60			60				■	■	■
1	F55	15	5P	10	30				■	■	■
		30			30				■	■	■
		60			60				■	■	■
1	F55	15	10P	10	30				■	■	■
		30			30				■	■	■
		60			60				■	■	■
0.2	FS10	15	0.5	F55	15	5P	10	15	■	■	■
		30			30			30	■	■	■
0.5	F55	15	5P	10	15	5P	10	15	■	■	■
		30			30			30	■	■	■

■ Feasible (other combinations on request)

Configuration example  
Outdoor support-type current transformer  
( $U_m = 24$  kV,  $I_{th} = 100$  kA,  $I_{PN} = 1000$  A)  
Thermal strength 300 x  $I_{PN}$   
1<sup>st</sup> core class 10P; instrument security factor 10; rating 60 VA  
2<sup>nd</sup> core without  
3<sup>rd</sup> core without

4 M E 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2

C 1 - 0 A	
C 2 - 0 A	
C 3 - 0 A	
C 4 - 0 A	
E 2 - 0 A	
E 3 - 0 A	
E 4 - 0 A	
H 3 - 0 A	
H 4 - 0 A	
L 3 - 0 A	
L 4 - 0 A	
L 6 - 0 A	
Q 3 - 0 A	
Q 4 - 0 A	
Q 6 - 0 A	
C 2 - 4 L	
C 3 - 4 L	
C 4 - 6 L	
E 2 - 4 L	
E 3 - 4 L	
E 4 - 4 L	
E 4 - 6 L	
H 3 - 4 L	
H 4 - 4 L	
H 4 - 6 L	
H 3 - 4 Q	
H 4 - 4 Q	
H 4 - 6 Q	
Y 0 - 0 E	
Y 0 - 0 F	
Y 0 - 0 G	
Y 0 - 0 H	

Example for Order No.: 4 M E 2 4 7 S - 1 A Q 6 3 - 0 A

2

258



# Equipment Selection

## 4ME2 outdoor support-type current transformer



### 15<sup>th</sup> position Rated secondary current

Rated current for 1 <sup>st</sup> core	Rated current for 2 <sup>nd</sup> core	Rated current for 3 <sup>rd</sup> core
1 A	Without	Without
5 A	Without	Without
1 A	1 A	Without
5 A	5 A	Without
1 A	5 A	Without
5 A	1 A	Without
1 A	1 A	1 A
5 A	5 A	5 A

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16  
Order No.: 4 M E 2

### 16<sup>th</sup> position Additional features

**Options**

- 50 Hz, VDE marking
  - 50 Hz, IEC marking
  - 50 Hz, VDE marking with approval <sup>1)</sup>
  - 60 Hz, IEC marking
- Further not listed special versions (only after consultation with the order processing department in the Switchgear Factory Berlin). Information additionally in clear text.

1) Only for class 0.2 and 0.5

### Special versions

**Options**

- With routine test certificate in German/English
  - Size (for specification see the following page)
- |   |
|---|
| 0 |
| 1 |
| 2 |
| 3 |

Other special versions on request

### Configuration example

Outdoor support-type current transformer  
 Maximum operating voltage  $U_m = 24$  kV  
 Rated lightning impulse withstand voltage  $U_p = 125$  kV  
 Rated short-duration power-frequency withstand voltage  $U_d = 50$  kV  
 Rated short-time thermal current  $I_{th} = 100$  kA  
 Rated primary current  $I_{PN} = 1000$  A  
 Thermal strength  $300 \times I_{PN}$   
 1<sup>st</sup> core class 10P; instrument security factor 10; rating 60 VA  
 2<sup>nd</sup> core without  
 3<sup>rd</sup> core without  
 Rated secondary current 1<sup>st</sup> core 5 A; 2<sup>nd</sup> core without; 3<sup>rd</sup> core without  
 Power frequency 50 Hz; marking according to IEC  
 Size 1

4 M E 2

4

7 5 - 1 A

3

Q 6

- 0 A

B

1

- Z

A 0 1

Example for Order No.: 4 M E 2 4 7 5 - 1 A Q 6 3 - 0 A B 1 - Z A 0 1  
 Order codes: A 0 1

059





Size specification for 4ME2 transformers

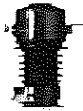
Order No.	Up to 12 kV			At 24 kV		At 36 kV
	with rated short-time thermal current					
	100 x I <sub>PN</sub>	200 x I <sub>PN</sub>	300 x I <sub>PN</sub>	100 x I <sub>PN</sub>	200 x I <sub>PN</sub>	100 x I <sub>PN</sub>
... C1-0A ...	1	1	1	1	1	1
... C2-0A ...	1	1	1	1	1	1
... C3-0A ...	1	1	1	1	1	1
... C4-0A ...	1	1	1	1	1	1
... E2-0A ...	1	1	1	1	1	1
... E3-0A ...	1	1	1	1	1	1
... E4-0A ...	1	1	1	1	1	1
... H3-0A ...	1	1	1	1	1	1
... H4-0A ...	1	1	1	1	1	1
... L3-0A ...	1	1	1	1	1	1
... L4-0A ...	1	1	2	1	1	1
... L6-0A ...	2	2	2	1	2	1
... Q3-0A ...	1	1	1	1	1	1
... Q4-0A ...	1	1	2	1	1	1
... Q6-0A ...	2	2	2	1	2	2
... C2-4L ...	1	2	2	1	2	2
... C3-4L ...	1	1	2	1	2	2
... C4-6L ...	2	2	2	2	2	2
... E2-4L ...	1	1	2	1	2	2
... E3-4L ...	1	1	2	2	2	1
... E4-4L ...	1	2	2	2	2	1
... E4-6L ...	2	2	2	2	2	2
... H3-4L ...	1	2	2	1	2	2
... H4-4L ...	1	2	2	1	2	2
... H4-6L ...	2	2	2	2	2	2
... H3-4Q ...	1	2	2	1	2	2
... H4-4Q ...	1	2	2	1	2	2
... H4-6Q ...	2	2	2	2	2	2
... Y0-0E ...	2	2	2	1	2	2
... Y0-0F ...	2	2	2	2	2	2
... Y0-0G ...	2	2	2	2	2	2
... Y0-0H ...	2	2	2	2	2	2

2

160

# Equipment Selection

4ME3 outdoor support-type current transformer



## 4ME3 outdoor support-type current transformer

5<sup>th</sup> position  
 Operating voltage (maximum value) Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16 Order codes  
 Order No.: 4 M E 3 2 4 M E 3 4 4 M E 3 6 4 M E 3 B

Operating voltage	Rated lightning impulse withstand voltage	Rated short-duration power-frequency withstand voltage
$U_m$ kV	$U_p$ kV	$U_d$ kV
12	75	28
24	125	50
36	170	70
52	250	95

See page 60  
 See page 60  
 See page 60  
 See page 60  
 See page 61  
 See page 61  
 See page 61

2

6<sup>th</sup> to 9<sup>th</sup> position  
 Rated short-time thermal current/  
 Rated primary current

Rated short-time thermal current	Rated primary current	Rated primary current, with primary multiratio	Thermal strength		
			$300 \times I_{PN}$	$200 \times I_{PN}$	$100 \times I_{PN}$
$I_{th}$ kA	$I_{PN}$ A	$I_{PN}$ A			
0.5		2x 5			0 0 - 3 A
0.6		2x 10			0 1 - 3 B
1		2x 5			0 3 - 3 A
1.5		2x 15			0 7 - 3 D
2.5		2x 25			1 6 - 3 F
3		2x 15			1 7 - 3 D
5		2x 25			2 5 - 3 F
5		2x 50			2 5 - 3 J
7.5		2x 75			3 2 - 3 L
10		2x 50			3 6 - 3 J
10		2x 100			3 6 - 3 M
15		2x 75			4 3 - 3 L
15		2x 150			4 3 - 3 P
20		2x 100			4 8 - 3 M
20		2x 200			4 8 - 3 Q
25		2x 250			5 4 - 3 R
30		2x 150			5 6 - 3 P
30		2x 300			5 6 - 3 S
40		2x 200			6 3 - 3 Q
40		2x 400			6 3 - 3 T
50		2x 250			6 7 - 3 R
50		2x 500			6 7 - 3 U
60		2x 300			7 0 - 3 S
60		2x 600			7 0 - 3 V

6<sup>th</sup> to 9<sup>th</sup> position continued on page 59

### Configuration example

Outdoor support-type current transformer  
 Maximum operating voltage  $U_m = 52$  kV  
 Rated lightning impulse withstand voltage  $U_p = 250$  kV  
 Rated short-duration power-frequency withstand voltage  $U_d = 95$  kV  
 Rated short-time thermal current  $I_{th} = 25$  kA  
 Rated primary current  $I_{PN} = 2x 250$  A

Example for Order No.: 4 M E 3 B 5 4 - 3 R  
 Order codes:

762





6<sup>th</sup> to 9<sup>th</sup> position (continued)  
Rated short-time thermal current/  
Rated primary current

Position:  
Order No.:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Order codes	
4	M	E	3														

Rated short-time thermal current $I_{th}$ kA	Rated primary current $I_{PN}$ A	Rated primary current, with primary multiratio $I_{PN}$ A	Thermal strength		
			$300 \times I_{PN}$	$200 \times I_{PN}$	$100 \times I_{PN}$

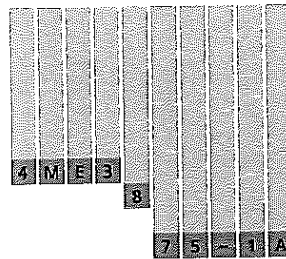
0.5	5							0 0 - 0 A
0.6	10							0 1 - 0 B
1	5							0 3 - 0 A
1.5	15							0 7 - 0 D
2	10							1 3 - 0 B
2	20							1 3 - 0 E
3	15							1 7 - 0 D
3	30							1 7 - 0 G
4	20							2 2 - 0 E
4	40							2 2 - 0 H
5	50							2 5 - 0 J
6	30							2 6 - 0 G
6	60							2 6 - 0 K
7.5	75							3 2 - 0 L
8	40							3 3 - 0 H
10	50							3 6 - 0 J
10	100							3 6 - 0 M
12	60							3 8 - 0 K
15	75							4 3 - 0 L
15	150							4 3 - 0 P
20	100							4 8 - 0 M
20	200							4 8 - 0 Q
25	250							5 3 - 0 R
30	150							5 6 - 0 P
30	300							5 6 - 0 S
40	200							6 3 - 0 Q
40	400							6 3 - 0 T
50	250							6 7 - 0 R
50	500							6 7 - 0 U
60	300							7 0 - 0 S
60	600							7 0 - 0 V
80	400							7 3 - 0 T
80	800							7 3 - 0 X
100	500							7 5 - 0 U
100	1000							7 5 - 1 A
120	600							7 6 - 0 V
120	1200							7 6 - 1 B
150	1500							7 8 - 1 D
200	2000							8 2 - 1 F
250	2500							8 4 - 1 G
300	3000							8 5 - 1 H

See page 60  
See page 60  
See page 60  
See page 60  
See page 61  
See page 61  
See page 61

2

Configuration example

Outdoor support-type current transformer  
( $U_m = 52$  kV,  $U_p = 250$  kV,  $U_d = 95$  kV)  
Rated short-time thermal current  $I_{th} = 100$  kA  
Rated primary current  $I_{PN} = 1000$  A



Example for Order No.: 4 M E 3 8 7 5 - 1 A  
Order codes:

762





15<sup>th</sup> position  
Rated secondary current

Rated current for 1 <sup>st</sup> core	Rated current for 2 <sup>nd</sup> core	Rated current for 3 <sup>rd</sup> core
1 A	Without	Without
5 A	Without	Without
1 A	1 A	Without
5 A	5 A	Without
1 A	5 A	Without
5 A	1 A	Without
1 A	1 A	1 A
5 A	5 A	5 A

16<sup>th</sup> position  
Additional features

Options

- 50 Hz, VDE marking
  - 50 Hz, IEC marking
  - 50 Hz, VDE marking with approval <sup>1)</sup>
  - 60 Hz, IEC marking
- Further not listed special versions (only after consultation with the order processing department in the Switchgear Factory Berlin). Information additionally in clear text.

1) Only for class 0.2 and 0.5

Special versions

Optionen

- With routine test certificate in German/English
- Other special versions on request

Configuration example

Outdoor support-type current transformer  
 Maximum operating voltage  $U_m = 52$  kV  
 Rated lightning impulse withstand voltage  $U_p = 250$  kV  
 Rated short-duration power-frequency withstand voltage  $U_d = 95$  kV  
 Rated short-time thermal current  $I_{th} = 100$  kA  
 Rated primary current  $I_{PN} = 1000$  A  
 Thermal strength  $300 \times I_{PN}$   
 1<sup>st</sup> core class 10P; instrument security factor 10; rating 60 VA  
 2<sup>nd</sup> core without  
 3<sup>rd</sup> core without  
 Rated secondary current 1<sup>st</sup> core 5 A; 2<sup>nd</sup> core without; 3<sup>rd</sup> core without  
 Power frequency 50 Hz; marking according to IEC

Example for Order No.:  
Order codes:

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16

Order No.: 4 M E 3 8 7 5 - 1 A Q 6 3 - 0 A B 1

Order codes:

0 A A  
0 A B  
C  
D  
E  
F  
G  
H

0  
1  
2  
6  
9

- Z A 1 0

4 M E 3 8 7 5 - 1 A Q 6 3 - 0 A B 1

2



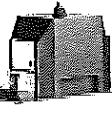





264

# Equipment Selection

Product overview of voltage transformers

Voltage transformers,  
type of construction according to IEC 1)

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16 Order codes  
Order No.: 4 M R 1

Illustration	Type of design	Order No.
	R-HG24-058.eps Indoor voltage transformer, block-type design, small type of construction according to DIN 42600, single-phase cast-resin insulated, operating voltage up to 12 kV or 24 kV	4 M R 1 Selection from page 63ff
	R-HG24-059.eps Indoor voltage transformer, block-type design, small type of construction according to DIN 42600, double-phase cast-resin insulated, operating voltage up to 12 kV or 24 kV	4 M R 2 Selection from page 63ff
	R-HG24-060.eps Indoor voltage transformer, block-type design, large type of construction according to DIN 42600, single-phase cast-resin insulated, operating voltage up to 12 kV, 24 kV or 36 kV	4 M R 5 Selection from page 63ff
	R-HG24-064.eps Indoor voltage transformer, block-type design, large type of construction according to DIN 42600, double-phase cast-resin insulated, operating voltage up to 12 kV, 24 kV or 36 kV	4 M R 6 Selection from page 63ff
	R-HG24-065.eps Outdoor voltage transformer, small type of construction, single-phase cast-resin insulated, operating voltage up to 12 kV, 24 kV, 36 kV or 52 kV	4 M S 3 Selection from page 63ff
	R-HG24-065.eps Outdoor voltage transformer, small type of construction, double-phase cast-resin insulated, operating voltage up to 12 kV, 24 kV, 36 kV or 52 kV	4 M S 4 Selection from page 63ff
	R-HG24-066.eps Outdoor voltage transformer, large type of construction, single-phase cast-resin insulated, operating voltage up to 12 kV, 24 kV or 36 kV	4 M S 5 Selection from page 63ff
	R-HG24-067.eps Outdoor voltage transformer, large type of construction, double-phase cast-resin insulated, operating voltage up to 12 kV, 24 kV or 36 kV	4 M S 6 Selection from page 63ff

1) Transformers according to ANSI standard on request

Example for Order No.: 4 M S 3  
Order codes:

265



Maximum operating voltage  $U_{max} = 52 \text{ kV}$   
12 kV

50/60 Hz

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12

Order codes

Order No.:

Maximum operating voltage $U_{max}$ kV	Rated lightning impulse withstand voltage $U_p$ kV	Rated short-duration power-frequency withstand voltage $U_d$ kV	Rated primary voltage $U_{prim}$ kV	Type 4MR1 - single-phase	Type 4MR2 - double-phase	Type 4MR5 - single-phase	Type 4MR6 - double-phase	Type 4MS3 - single-phase	Type 4MS4 - double-phase	Type 4MS5 - single-phase	Type 4MS6 - double-phase
12	75	28	$3.3\sqrt{3}$	■	■						
			3.3		■		■				
			$3.6\sqrt{3}$	■		■					
			3.6		■		■				
			$4.8\sqrt{3}$	■		■					
			4.8		■		■				
			$5\sqrt{3}$	■		■		■			
			5		■		■		■		■
			$6\sqrt{3}$	■		■		■			
			6		■		■		■		■
			$6.6\sqrt{3}$	■		■		■			
			6.6		■		■		■		■
			$7.2\sqrt{3}$	■		■		■			
			7.2		■		■		■		
			$10\sqrt{3}$	■		■		■			
			10		■		■		■		■
			$11\sqrt{3}$	■		■		■			
			11		■		■		■		■
			$6-10\sqrt{3}$			■					
			6-10			■					
			Others	■	■	■	■				

Order No. 4 M S 3 2 1 7 -

See page 65  
See page 65  
See page 66  
See page 66  
See page 67

See page 67

Example for Order No.: 4 M S 3 2 1 7 -

Order codes:

2

Configuration example  
Voltage transformer  
Outdoor design, single-phase  
Rated primary voltage  $U_{prim} = 6.6\sqrt{3} \text{ kV}$

266



# Equipment Selection

## Voltage transformers



24 kV

50/60 Hz

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12

Order codes

Maximum operating voltage $U_{max}$ kV	Rated lightning impulse withstand voltage $U_p$ kV	Rated short-duration power-frequency withstand voltage $U_d$ kV	Rated primary voltage $U_{prim}$ kV	Type 4MR1 - single-phase	Type 4MR2 - double-phase	Type 4MR5 - single-phase	Type 4MR6 - double-phase	Type 4MS3 - single-phase	Type 4MS4 - double-phase	Type 4MS5 - single-phase	Type 4MS6 - double-phase
24	125	50	13.8/√3	■	■	■	■	■	■	■	■
			13.8								
			15 /√3	■		■	■	■	■	■	■
			15	■		■	■	■	■	■	■
			17.5/√3	■		■	■	■	■	■	■
			17.5	■		■	■	■	■	■	■
			20 /√3	■		■	■	■	■	■	■
			20	■		■	■	■	■	■	■
			22 /√3	■		■	■	■	■	■	■
			22	■		■	■	■	■	■	■
			10-20 /√3	■		■	■	■	■	■	■
			10-20	■		■	■	■	■	■	■
			15-20 /√3	■		■	■	■	■	■	■
			15-20	■		■	■	■	■	■	■
			Others	■		■	■	■	■	■	■

Order No.: 4 M S 3 4 4 2 - - - - -

See page 65  
See page 65  
See page 66  
See page 66  
See page 67

See page 67

36 kV

50/60 Hz

$U_{max}$ kV	$U_p$ kV	$U_d$ kV	$U_{prim}$ kV	4MR1	4MR2	4MR5	4MR6	4MS3	4MS4	4MS5	4MS6
36	170	70	20 /√3			■					
			20			■					
			22 /√3			■					
			22			■					
			25 /√3			■	■		■		
			25			■	■		■	■	
			30 /√3			■	■	■	■	■	
			30			■	■	■	■	■	
			33 /√3			■	■	■	■	■	
			33			■	■	■	■	■	
			35 /√3			■	■	■	■	■	
			35			■	■	■	■	■	
			20-30 /√3			■	■		■	■	
			20-30			■	■		■	■	
			Others			■	■		■	■	

Example for Order No.: 4 M S 3 4 4 2 - - - - -  
Order codes:

**Configuration example**

Voltage transformer

Outdoor design, single-phase

Rated primary voltage  $U_{prim} = 20\sqrt{3}$  kV

267



**52 kV**  
50/60 Hz

Position: 1 2 3 4 5 6 7 8 9 10 11 12  
Order No.: 4 M S B 4 8 - 0 B

Maximum operating voltage	Rated lightning impulse withstand voltage	Rated short-duration power-frequency withstand voltage	Rated primary voltage	Type 4MR1 – single-phase	Type 4MR2 – double-phase	Type 4MR5 – single-phase	Type 4MR6 – double-phase	Type 4MS3 – single-phase	Type 4MS4 – double-phase	Type 4MS5 – single-phase	Type 4MS6 – double-phase
$U_{max}$	$U_p$	$U_d$	$U_{prim}$								
kV	kV	kV	kV								
52	250	95	$33\sqrt{3}$	■							
			$35\sqrt{3}$		■						
			$40\sqrt{3}$			■					
			$45\sqrt{3}$				■				


8th position  
Auxiliary residual voltage winding

Voltage	4MR1	4MR2	4MR5	4MR6	4MS3	4MS4	4MS5	4MS6
Without auxiliary winding	■	■	■	■	■	■	■	■
100/3	■	■	■	■	■	■	■	■
110/3	■	■	■	■	■	■	■	■
120/3	■	■	■	■	■	■	■	■

	8	4	7
	8	4	8
	8	5	0
	8	5	1

9th position  
Rated secondary voltage

Voltage	4MR1	4MR2	4MR5	4MR6	4MS3	4MS4	4MS5	4MS6
$100\sqrt{3}$	■							
100		■						
$110\sqrt{3}$	■							
110		■						
$120\sqrt{3}$	■							
120		■						


Configuration example  
Voltage transformer  
Outdoor design, single-phase  
Rated primary voltage with multi-ratio  $U_{prim} = 35\sqrt{3}$  kV  
Without auxiliary residual voltage winding  
Rated secondary voltage  $U_{sec} = 110$  V

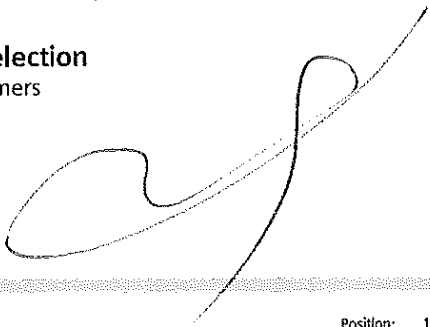
Example for Order No.: 4 M S B 4 8 - 0 B  
Order codes:

2

268

# Equipment Selection

## Voltage transformers



10<sup>th</sup>/11<sup>th</sup> position

Rated output of measuring winding and accuracy class

Position: 1 2 3 4 5 6 7 - 8 9 10 11 12

Order codes

Voltage level $U_{max}$ KV	Class %	Rated output $S_N$ VA	Type 4MR1 — single-phase	Type 4MR2 — double-phase	Type 4MR5 — single-phase	Type 4MR6 — double-phase	Type 4MS3 — single-phase	Type 4MS4 — double-phase	Type 4MS5 — single-phase	Type 4MS6 — double-phase
12	0.2	20	■	■						
	0.2	30			■	■	■	■	■	■
	0.5	50	■	■						
	0.5	90						■		■
	0.5	100			■	■	■		■	
	1	100			■	■				
	1	180						■		■
24	1	200			■	■	■		■	
	0.2	20	■	■						
	0.2	25						■		■
	0.2	30						■		■
	0.2	45			■	■				
	0.5	50	■	■						
	0.5	75						■		■
	0.5	100			■	■	■		■	
	1	100			■	■				
	1	150						■		■
36	1	200			■	■	■		■	
	0.2	25						■		■
	0.2	50			■	■				
	0.2	60						■		■
	0.5	75						■		■
	0.5	100			■	■			■	
	0.5	150						■		■
	1	150						■		■
	1	200			■	■			■	
	1	400			■	■			■	
52	0.2	60						■		■
	0.5	180						■		■
	1	400						■		■

See page 67

See page 67

2



**Configuration example**  
 Voltage transformer  
 Outdoor design, single-phase  
 Rated output of measuring winding 180 VA  
 Accuracy class 0.5

4 M S 3 B 4 R - D B

Example for Order No.:

4 M S 3 B 4 R - D B S 2

Order codes:





12<sup>th</sup> position

Additional features

Options	Position: 1 2 3 4 5 6 7 - 8 9 10 11 12												Order codes				
	4MR1	4MR2	4MR5	4MR6	4MS3	4MS4	4MS5	4MS6									
50 Hz, VDE marking	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>									
50 Hz, IEC marking	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>									
50 Hz, VDE marking with approval 1)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>									
60 Hz, IEC marking	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>									
Other features on request	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>									

1) Only for class 0.2 and 0.5

Additional equipment

Options	Position: 1 2 3 4 5 6 7 - 8 9 10 11 12												Order codes				
	Type 4MR1 - single-phase	Type 4MR2 - double-phase	Type 4MR5 - single-phase	Type 4MR6 - double-phase	Type 4MS3 - single-phase	Type 4MS4 - double-phase	Type 4MS5 - single-phase	Type 4MS6 - double-phase									
With routine test certificate in German/English	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>									

2

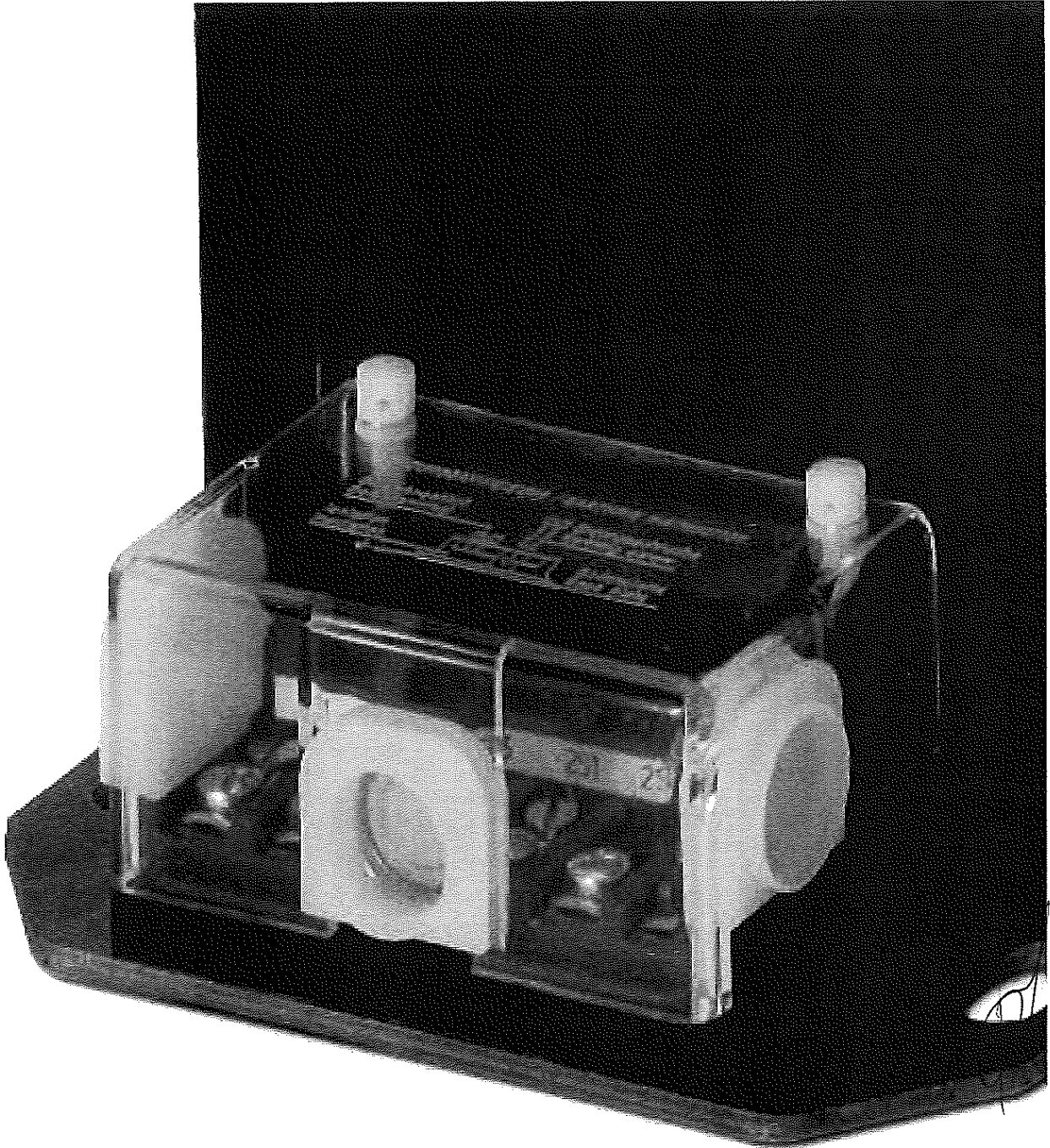
Configuration example

Voltage transformer  
Outdoor design, single-phase, cast-resin insulated  
Rated primary voltage with multi-ratio  $U_{prim} = 35/\sqrt{3}$  kV  
Without auxiliary residual voltage winding  
Rated secondary voltage  $U_{sec} = 110$  V  
Rated output of measuring winding 180 VA  
Accuracy class 0.5  
Additional features 50 Hz, IEC marking  
With routine test certificate in German/English

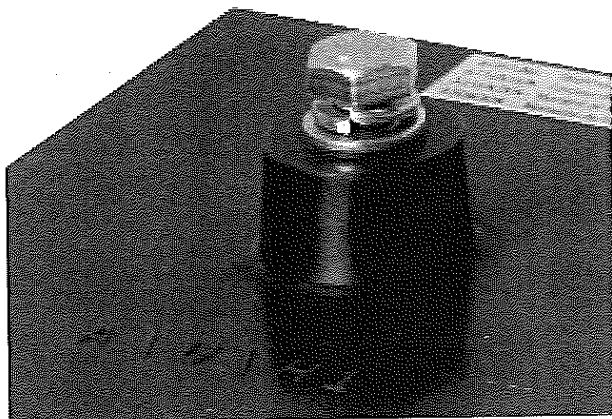
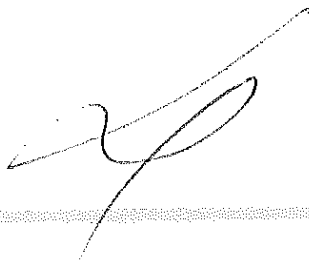
Order No.: 4 M S 3 B 4 B - D B S 2 1 - Z A 1 0

Order codes: A 1 0

270



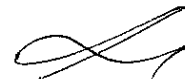
271



R4HG11-069.tif

Primary connection terminal of 4MR12 voltage transformer

Contents	Page
<b>Technical Data</b>	<b>69</b>
Current transformers:	
Electrical data, dimensions and weights	70
Dimension drawings	72
Terminal designations	77
Voltage transformers:	
Electrical data, dimensions and weights	78
Dimension drawings	79
Terminal designations	82



# Technical Data

Electrical data, dimensions and weights of current transformers

Order No.	Operating voltage (maximum value) $U_m$ kV	Rated short-duration power-frequency withstand voltage $U_d$ kV	Rated lightning impulse withstand voltage $U_p$ kV	Rated frequency Hz	Rated primary current $I_{PN}$ A	Multi-ratio	Secondary current $I_{SN}$ kA	Maximum rated continuous thermal current $\times I_{PN}$	Rated short-time thermal current (minimum $100 \times I_{PN}$ ) $I_{th}$ kA	Rated dynamic current ( $I_{dyn} 2.5 \times I_{th}$ ) $I_{dyn}$ kA	Number of cores maximum	Short-time load (mechanical) N	Weight kg	Catalog dimension drawing
4MA72	12	28	75	50/60	20 to 2500	2 x 20 to 2 x 600	1/5	1.2	80	120	-	5000	20	1
4MA72...ZF18	17.5	38	95	50/60	20 to 2500	2 x 20 to 2 x 600	1/5	1.2	80	120	-	5000	20	1
4MA74	24	50	125	50/60	20 to 2500	2 x 20 to 2 x 600	1/5	1.2	80	120	-	5000	25	2
4MA76	36	70	170	50/60	20 to 2000	2 x 20 to 2 x 600	1/5	1.2	80	120	-	5000	35	3
4MB12	12	28	75	50/60	1500 to 4000	only possible on secondary side	1/5	1.2	$100 \times I_{PN}$	practically unlimited	3	3000	19 or 26	4
4MB13	12	28	75	50/60	1500 to 6000	only possible on secondary side	1/5	1.2	$100 \times I_{PN}$	practically unlimited	3	3000	34	4
4MB14	24 <sup>1)</sup>	50 <sup>1)</sup>	125 <sup>1)</sup>	50/60	1500 to 4000	only possible on secondary side	1/5	1.2	$100 \times I_{PN}$	practically unlimited	3	3000	26	4
4MC22	12	28	75	50/60	150 to 3000	only possible on secondary side	1/5	1.2	$100 \times I_{PN}$	practically unlimited	3	5000	12 to 48	5
4MC24	24	50	125	50/60	150 to 3000	only possible on secondary side	1/5	1.2	$100 \times I_{PN}$	practically unlimited	3	5000	28 to 48	5
4MC26	36	70	170	50/60	150 to 3000	only possible on secondary side	1/5	1.2	$100 \times I_{PN}$	practically unlimited	3	5000	35 to 48	5
4MC32	12	28	75	50/60	2000 to 10000	only possible on secondary side	1/5	1.2	$100 \times I_{PN}$	practically unlimited	4	5000	32 to 150	6
4MC34	24	50	125	50/60	2000 to 10000	only possible on secondary side	1/5	1.2	$100 \times I_{PN}$	practically unlimited	4	5000	32 to 150	7
4MC36	36	70	170	50/60	2000 to 10000	only possible on secondary side	1/5	1.2	$100 \times I_{PN}$	practically unlimited	4	5000	32 to 150	8
4ME22	12	28	75	50/60	5 to 1200	2 x 5 to 2 x 600	1/5	1.2	80	$2.5 \times I_{th}$	3	2400	22	9/10
4ME24	24	50	125	50/60	5 to 1200	2 x 5 to 2 x 600	1/5	1.2	80	$2.5 \times I_{th}$	3	2400	22	9/10
4ME26	36	70	170	50/60	5 to 1200	2 x 5 to 2 x 600	1/5	1.2	80	$2.5 \times I_{th}$	3	2000	22	11/12
4ME32	12	28	75	50/60	5 to 3000	2 x 5 to 2 x 600	1/5	1.2	80	$2.5 \times I_{th}$	3	5000	65	13
4ME34	24	50	125	50/60	5 to 3000	2 x 5 to 2 x 600	1/5	1.2	80	$2.5 \times I_{th}$	3	5000	65	13
4ME36	36	70	170	50/60	5 to 3000	2 x 5 to 2 x 600	1/5	1.2	80	$2.5 \times I_{th}$	3	5000	65	14
4ME38	52	95	250	50/60	5 to 3000	2 x 5 to 2 x 600	1/5	1.2	80	$2.5 \times I_{th}$	3	5000	65	15

1) Also possible on request:  $U_m = 17.5$ ,  $U_d = 38$  kV and  $U_p = 75$  kV

3

273

Size specification for 4MC2 transformers

10 <sup>th</sup> to 14 <sup>th</sup> position of Order No.	6 <sup>th</sup> to 9 <sup>th</sup> position of Order No.												
	43-0P	48-0Q	56-0S	63-0T	67-0U	70-0V	73-0X	75-1A	76-1B	78-1D	82-1F	84-1G	85-1H
Sizes of 4MC22 transformers													
C20-0A	1	0	0	0	0	0	0	0	0	0	0	0	21
C30-0A	2	0	0	0	0	0	0	0	0	0	0	0	21
E30-0A	1	0	0	0	0	0	0	0	0	0	0	0	21
E40-0A	2	0	0	0	0	0	0	0	0	0	0	0	21
H30-0A	0	0	0	0	0	0	0	0	0	0	0	0	21
H40-0A	1	2	2	2	2	2	2	2	2	2	2	2	21
Q30-0A	2	1	0	0	0	0	0	0	0	0	0	0	21
Q40-0A	2	1	1	1	0	0	0	0	0	0	0	0	21
Q60-0A	21	3	2	1	1	0	0	0	1	1	1	1	21
C20-4Q	3	2	1	0	0	0	0	0	0	0	0	0	21
C30-4Q	3	2	1	1	0	0	0	0	0	0	0	0	21
E30-3Q	3	2	1	0	0	0	0	0	0	0	0	0	21
E30-4Q	3	2	1	0	0	0	0	0	0	0	0	0	21
E40-4Q	3	2	1	0	0	0	0	0	0	0	0	0	21
E40-6Q	-	21	3	2	2	1	1	1	1	2	2	2	21
H30-3Q	1	1	0	0	0	0	0	0	0	0	0	0	21
H30-4Q	2	2	1	0	0	0	0	0	0	0	0	0	21
H40-4Q	2	2	1	0	0	0	0	0	0	0	0	0	21
H40-6Q	-	21	2	2	1	1	1	1	1	2	2	2	21
Sizes of 4MC24 transformers													
C20-0A	1	1	1	1	1	1	1	1	1	1	1	11	11
C30-0A	1	1	1	1	1	1	1	1	1	1	1	11	11
E30-0A	1	1	1	1	1	1	1	1	1	1	1	11	11
E40-0A	1	1	1	1	1	1	1	1	1	1	1	11	11
H30-0A	1	1	1	1	1	1	1	1	1	1	1	11	11
H40-0A	1	1	1	1	1	1	1	1	1	1	1	11	11
Q30-0A	1	1	1	1	1	1	1	1	1	1	1	11	11
Q40-0A	1	1	1	1	1	1	1	1	1	1	1	11	11
Q60-0A	11	2	1	1	1	1	1	1	1	1	1	11	11
C20-4Q	2	1	1	1	1	1	1	1	1	1	1	11	11
C30-4Q	2	1	1	1	1	1	1	1	1	1	1	11	11
E30-3Q	2	2	1	1	1	1	1	1	1	1	1	11	11
E30-4Q	2	2	1	1	1	1	1	1	1	1	1	11	11
E40-4Q	2	2	1	1	1	1	1	1	1	1	1	11	11
E40-6Q	-	11	2	1	1	1	1	1	1	1	1	11	11
H30-3Q	1	1	1	1	1	1	1	1	1	1	1	11	11
H30-4Q	1	1	1	1	1	1	1	1	1	1	1	11	11
H40-4Q	2	1	1	1	1	1	1	1	1	1	1	11	11
H40-6Q	-	11	2	1	1	1	1	1	1	1	1	11	11
Sizes of 4MC26 transformers													
C20-0A	1	1	1	1	1	1	1	1	1	1	01	01	01
C30-0A	1	1	1	1	1	1	1	1	1	1	01	01	01
E30-0A	1	1	1	1	1	1	1	1	1	1	01	01	01
E40-0A	1	1	1	1	1	1	1	1	1	1	01	01	01
H30-0A	1	1	1	1	1	1	1	1	1	1	01	01	01
H40-0A	1	1	1	1	1	1	1	1	1	1	01	01	01
Q30-0A	1	1	1	1	1	1	1	1	1	1	01	01	01
Q40-0A	1	1	1	1	1	1	1	1	1	1	01	01	01
Q60-0A	-	01	1	1	1	1	1	1	1	1	01	01	01
C20-4Q	01	1	1	1	1	1	1	1	1	1	01	01	01
C30-4Q	01	1	1	1	1	1	1	1	1	1	01	01	01
E30-3Q	01	1	1	1	1	1	1	1	1	1	01	01	01
E30-4Q	01	1	1	1	1	1	1	1	1	1	01	01	01
E40-4Q	01	1	1	1	1	1	1	1	1	1	01	01	01
E40-6Q	-	-	1	1	1	1	1	1	1	1	01	01	01
H30-3Q	1	1	1	1	1	1	1	1	1	1	01	01	01
H30-4Q	1	1	1	1	1	1	1	1	1	1	01	01	01
H40-4Q	01	1	1	1	1	1	1	1	1	1	01	01	01
H40-6Q	-	-	1	1	1	1	1	1	1	1	01	01	01

3

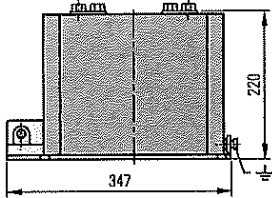
274



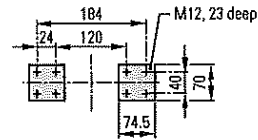
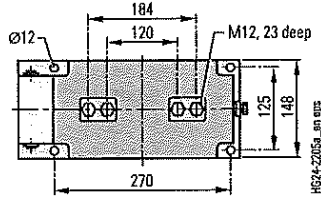
# Technical Data

Electrical data, dimensions and weights of current transformers

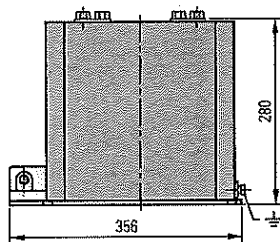
## Dimension drawings for current transformers



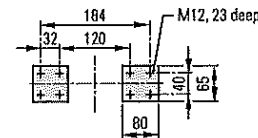
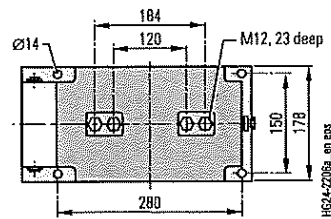
Dimension drawing 1



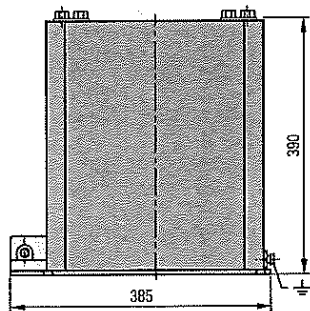
Primary connection  $\geq 1500$  A



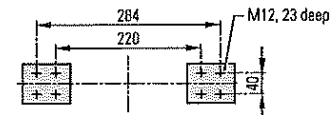
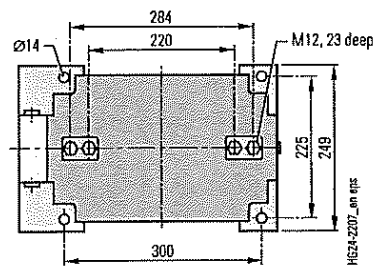
Dimension drawing 2



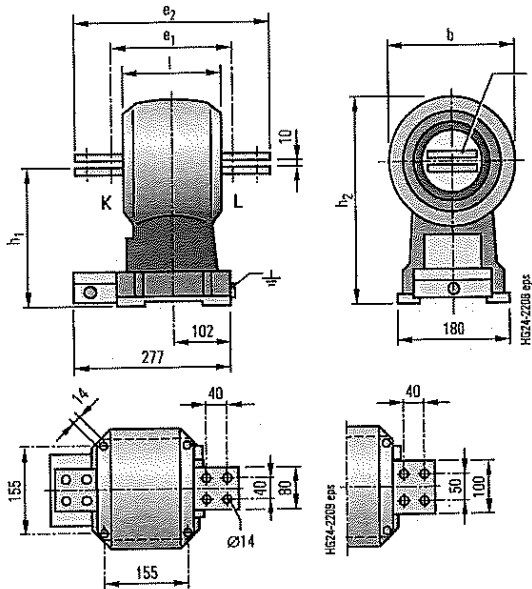
3



Dimension drawing 3



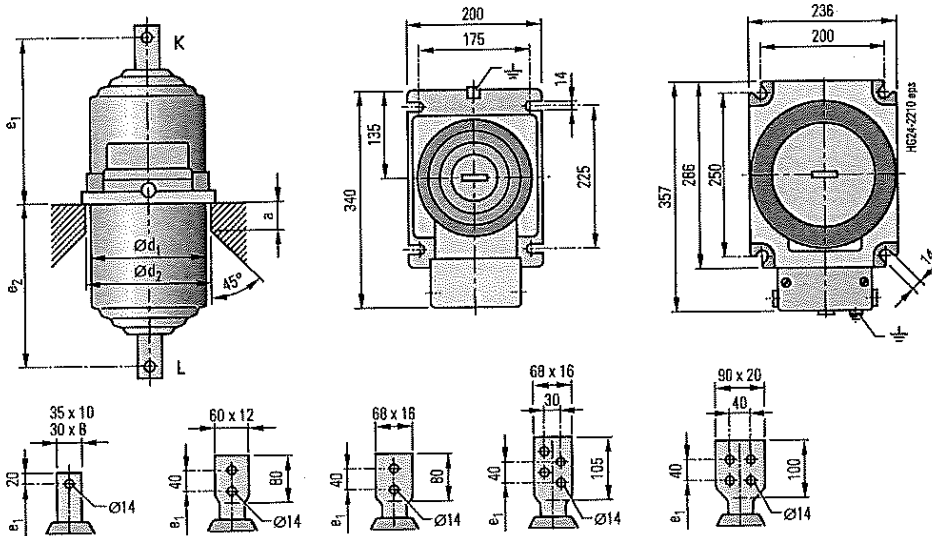
275



Type	b	e <sub>1</sub>	e <sub>2</sub>	h <sub>1</sub>	h <sub>2</sub>	l
4MB12, size 1	214	210	350	235	342	176
4MB12, size 2	260	230	350	295	425	196
4MB13	273	-	-	288	425	300
4MB14	260	230	350	295	425	196

Current ratings	Bars
Up to 1500 A	2 x 50 x 10
1500 A to 2500 A	2 x 80 x 10
2500 A to 3000 A	2 x 80 x 10 or 3 x 80 x 10
3000 A to 4000 A	3 x 80 x 10 or 3 x 100 x 10

Dimension drawing 4



Dimension drawing 5

Type	Size	a	d <sub>1</sub>	d <sub>2</sub>	e <sub>1</sub>			e <sub>2</sub>			Weight approx. kg
					up to 1500 A mm	2000 A mm	up to 3000 A <sup>1)</sup> mm	up to 1500 A mm	2000 A mm	up to 3000 A <sup>1)</sup> mm	
4MC22	0	50	180	185	190	195	215	150	155	175	12 to 18
	1	60	180	185	190	195	215	210	215	235	16 to 22
	2	115	180	185	255	260	280	270	275	295	28 to 32
	3	195	180	185	315	320	340	330	335	355	35 to 40
4MC24	21	150	230	235	280	285	315	290	295	325	40 to 48
	1	60	180	185	255	260	280	270	275	295	28 to 32
4MC24	2	140	180	185	315	320	340	330	335	355	35 to 40
	11	100	230	235	280	285	315	290	295	325	40 to 48
	1	60	180	185	315	320	340	330	335	355	35 to 40
4MC26	01	50	230	253	280	285	315	290	295	325	40 to 48

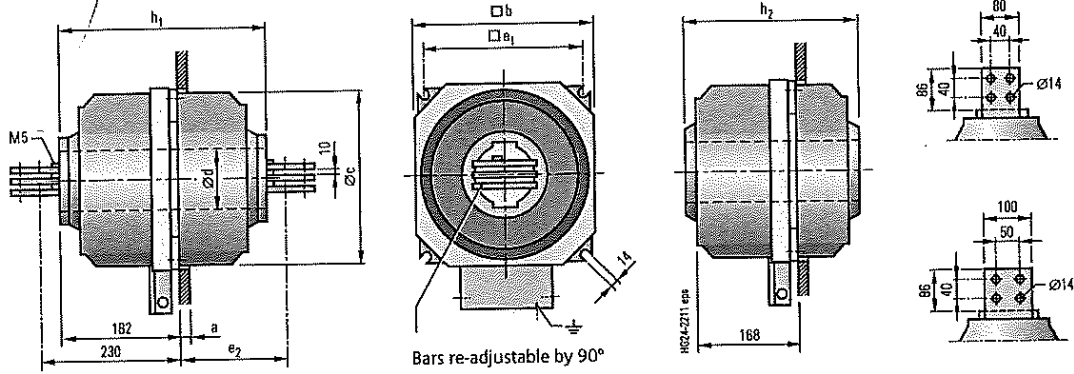
1) Design for rated primary current 3000 A only available in size 21, 11 or 01

3

276

# Technical Data

Electrical data, dimensions and weights of current transformers



Dimension drawing 6

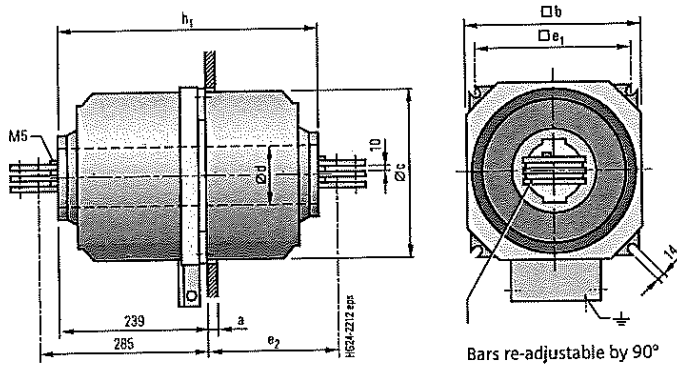
Size	a <sub>max</sub>	b	Øc	Ød	e <sub>1</sub>	e <sub>2</sub>	h <sub>1</sub>	h <sub>2</sub>
11	10	295	278	115	255	175	313	285
12	60	295	278	115	255	250	288	360
21	10	370	356	115	325	175	313	285
22	60	370	356	115	325	250	288	360
31	10	370	356	155	325	-	-	285
32	60	370	356	155	325	-	-	360
41	10	440	440	205	490	-	-	285
42	60	440	440	205	490	-	-	360
51	10	530	530	297	490	-	-	285
52	60	530	530	297	490	-	-	360
61	10	530	530	310	490	-	-	-
62	60	530	530	310	490	-	-	-
72	10	650	650	380	600	-	-	-
73	60	650	650	380	600	-	-	-

### Conductor bars

Normal designs

- 2000 A: 2 bars, 80 x 10 mm
- 2500 A: 2 bars, 100 x 10 mm
- 3000 A: 3 bars, 80 x 10 mm
- 4000 A: 3 bars, 100 x 10 mm

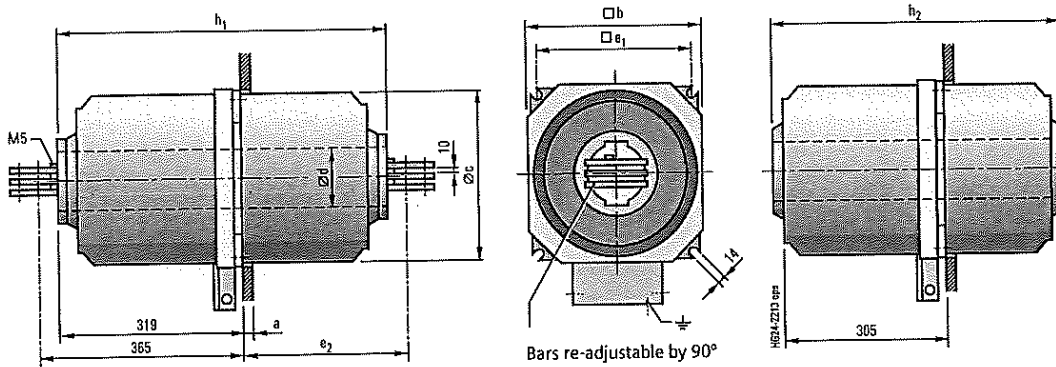
3



Dimension drawing 7

Size	a <sub>max</sub>	b	Øc	Ød	e <sub>1</sub>	e <sub>2</sub>	h <sub>1</sub>	h <sub>2</sub>
11	10	295	278	115	255	230	427	399
12	60	295	278	115	255	305	502	474
21	10	370	356	115	325	230	427	399
22	60	370	356	115	325	305	50	474
31	10	370	356	155	325	-	-	399
32	60	370	356	155	325	-	-	474
41	10	440	440	205	490	-	-	399
42	60	440	440	205	490	-	-	474
51	10	530	530	297	490	-	-	399
52	60	530	530	297	490	-	-	474
61	10	530	530	310	490	-	-	399
62	60	530	530	310	490	-	-	474
72	10	650	650	380	600	-	-	-
73	60	650	650	380	600	-	-	-

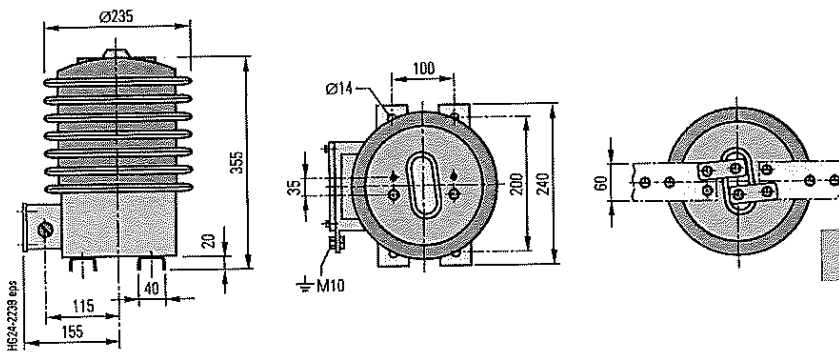
177



Dimension drawing 8

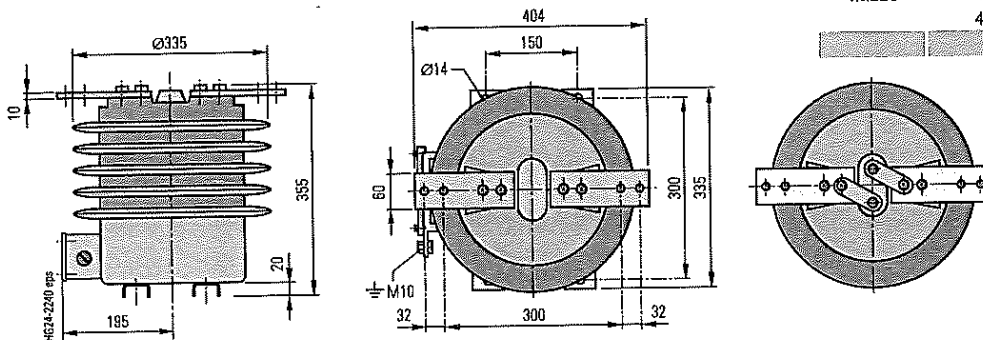
Size	a <sub>max</sub>	b	Øc	Ød	e <sub>1</sub>	e <sub>2</sub>	h <sub>1</sub>	h <sub>2</sub>
11	10	295	278	115	255	175	313	285
12	60	295	278	115	255	250	288	360
21	10	370	356	115	325	175	313	285
22	60	370	356	115	325	250	288	360
31	10	370	356	155	325	-	-	285
32	60	370	356	155	325	-	-	360
41	10	440	440	205	490	-	-	285
42	60	440	440	205	490	-	-	360
51	10	530	530	297	490	-	-	285
52	60	530	530	297	490	-	-	360
61	10	530	530	310	490	-	-	-
62	60	530	530	310	490	-	-	-
72	10	650	650	380	600	-	-	-
73	60	650	650	380	600	-	-	-

3



Dimension drawing 9

Type	Arching distance	Creepage distance
4ME22	229	486
	310	400
4ME24	229	486
	440	1010
4ME26	405	945
	440	1010

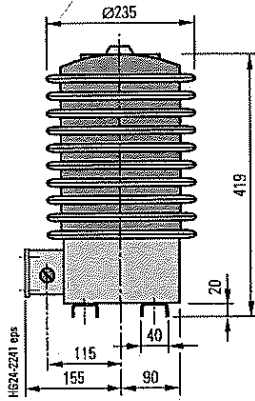


Dimension drawing 10

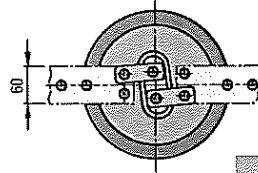
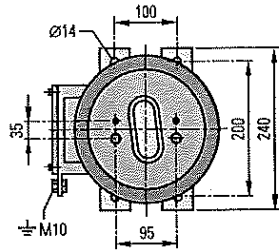
178

# Technical Data

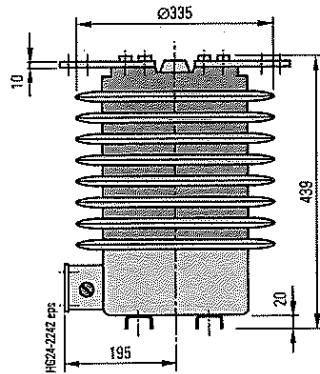
Electrical data, dimensions and weights of current transformers



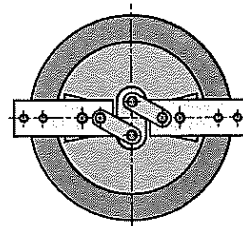
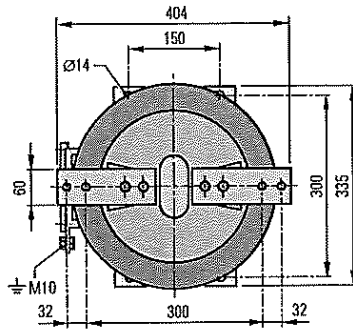
Dimension drawing 11



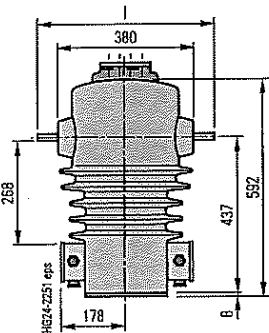
Type	Arcing distance	Creepage distance
4ME22	229	486
	310	400
4ME24	229	486
	440	1010
4ME26	405	945
	440	1010



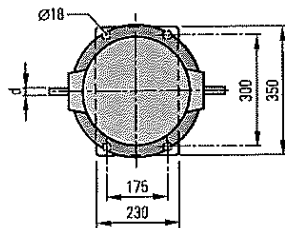
Dimension drawing 12



3

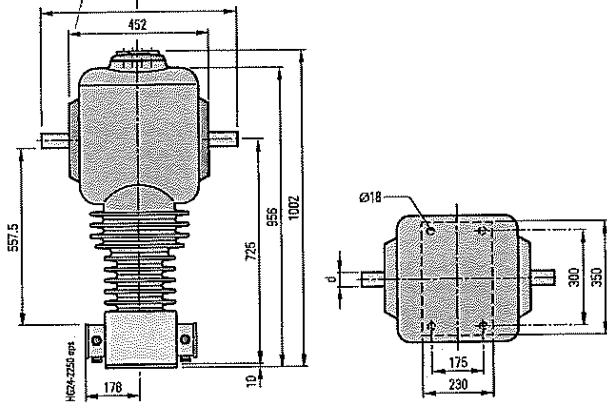


Dimension drawing 13



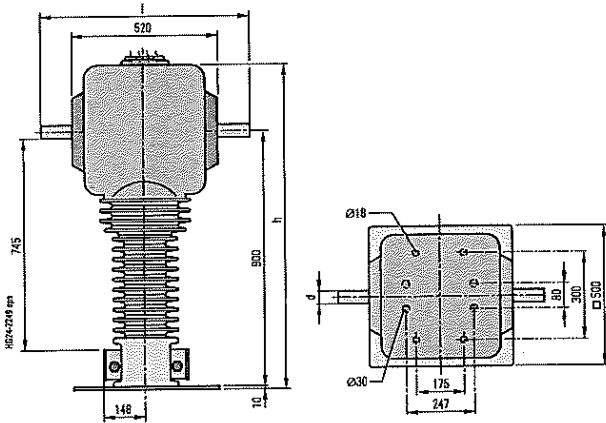
$I_{PN}$	d	l	Arcing distance	Creepage distance
Up to 600 A	20	500	268	665
600 to 1250 A	30	560	268	665
1250 to 2000 A	42	600	268	665
2000 to 3000 A	48	620	268	665

179



Dimension drawing 14

$I_{RN}$	d	l	Arcing distance	Creepage distance
Up to 600 A	20	572	557.5	1290
600 to 1250 A	30	632	557.5	1290
1250 to 2000 A	42	672	557.5	1290
2000 to 3000 A	48	692	557.5	1290



Dimension drawing 15  
Terminal designations of current transformers

$I_{RN}$	d	l	h	Arcing distance	Creepage distance
500 A	30	700	1125	745	1823
Up to 1250 A	30	700	1188	745	1823
1250 to 2000 A	42	740	1188	745	1823
2000 to 3000 A	45	760	1188	745	1823
2x 600 A	30	700	1217	745	1823

3

Transformer design	Designation of connection terminals		Example for rated current data
	acc. to VDE	acc. to IEC	
1 primary winding			100/1 A
1 secondary winding			
2 equivalent primary windings			2 x 100/1 A
1 secondary winding			
1 primary winding	with primary multi-ratio		1000-800 ... 200/1 A
1 secondary winding with tapings			
1 primary winding	with secondary multi-ratio, highest rated current at I1 or S4		100/1/1 A
2 or more secondary windings on separate cores			

180

# Technical Data

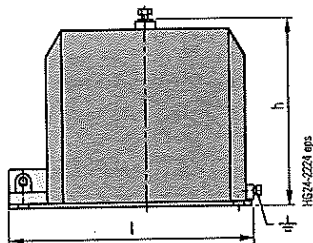
Electrical data, dimensions and weights of voltage transformers

Order No.	Operating voltage (maximum value) $U_m$ kV	Rated short-duration power-frequency withstand voltage $U_d$ kV	Rated lightning impulse withstand voltage $U_i$ kV	Rated frequency Hz	Maximum rated primary voltage $U_{PN}$ kV	Multi-ratio $U_{SN}$ kV	Thermal limiting output $S_{th}$ VA	Rated voltage factor (8h)	Rated thermal limiting output of the residual voltage winding VA/A	Short-time load (mechanical) N	Weight kg	Catalog dimension drawing
4MR12	12	28	75	50/60	$11.5\sqrt{3}$	$100\sqrt{3}; 110\sqrt{3}; 120\sqrt{3}$	350	1.9	230/4	-	18	16
4MR14	24	50	125	50/60	$22\sqrt{3}$	$100\sqrt{3}; 110\sqrt{3}; 120\sqrt{3}$	500	1.9	230/4	-	28	16
4MR22	12	28	75	50/60	11.5	100; 110; 120	400	-	-	-	18	17
4MR24	24	50	125	50/60	22	100; 110; 120	400	-	-	-	30	17
4MR52	12	28	75	50/60	$11.5\sqrt{3}$	$100\sqrt{3}; 110\sqrt{3}; 120\sqrt{3}$	600	1.9	350/6	-	25	18
4MR54	24	50	125	50/60	$22\sqrt{3}$	$100\sqrt{3}; 110\sqrt{3}; 120\sqrt{3}$	600	1.9	350/6	-	35	18
4MR56	36	70	170	50/60	$35\sqrt{3}$	$100\sqrt{3}; 110\sqrt{3}; 120\sqrt{3}$	800	1.9	350/6	-	60	18
4MR62	12	28	75	50/60	11.5	100; 110; 120	600	-	-	-	25	19
4MR64	24	50	125	50/60	22	100; 110; 120	600	-	-	-	35	19
4MR66	36	70	170	50/60	35	100; 110; 120	800	-	-	-	70	19
4MS32	12	28	75	50/60	$12\sqrt{3}$	$100\sqrt{3}; 110\sqrt{3}; 120\sqrt{3}$	400	1.9	230/4	1000	72	20
4MS34	24	50	125	50/60	$22\sqrt{3}$	$100\sqrt{3}; 110\sqrt{3}; 120\sqrt{3}$	400	1.9	230/4	1000	75	20
4MS36	12	28	75	50/60	$35\sqrt{3}$	$100\sqrt{3}; 110\sqrt{3}; 120\sqrt{3}$	400	1.9	230/4	1000	79	20
4MS38	52	70	250	50/60	$50\sqrt{3}$	$100\sqrt{3}; 110\sqrt{3}; 120\sqrt{3}$	800	1.9	500/9	1000	79	20
4MS42	12	28	75	50/60	12	100; 110; 120	500	-	-	1000	73	21
4MS44	24	50	125	50/60	22	100; 110; 120	500	-	-	1000	76	21
4MS46	12	28	75	50/60	35	100; 110; 120	900	-	-	1000	82	21
4MS52	12	28	75	50/60	$12\sqrt{3}$	$100\sqrt{3}; 110\sqrt{3}; 120\sqrt{3}$	400	1.9	230/4	1000	35.5	22
4MS54	24	50	125	50/60	$22\sqrt{3}$	$100\sqrt{3}; 110\sqrt{3}; 120\sqrt{3}$	400	1.9	230/4	1000	35.5	22
4MS56	36	28	75	50/60	$35\sqrt{3}$	$100\sqrt{3}; 110\sqrt{3}; 120\sqrt{3}$	400	1.9	230/4	1000	51	23
4MS62	12	28	75	50/60	12	100; 110; 120	500	-	-	1000	37	24
4MS64	24	50	125	50/60	22	100; 110; 120	500	-	-	1000	37	24
4MS66	36	28	75	50/60	35	100; 110; 120	500	-	-	1000	57	25

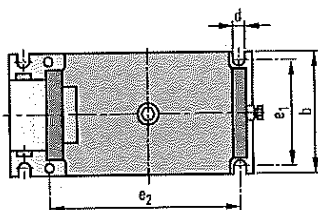
3

2 RB 1

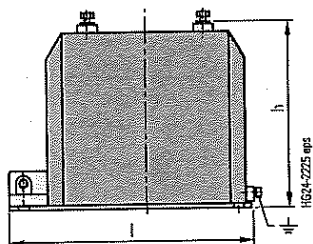
Dimension drawings for voltage transformers



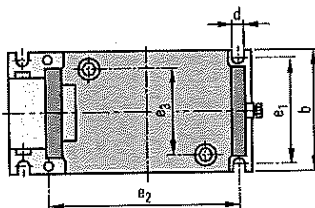
Dimension drawing 16



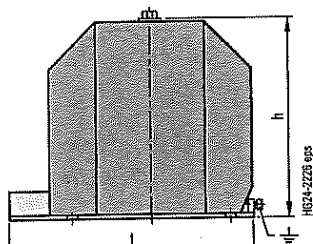
Type	b	h	l	e <sub>1</sub>	e <sub>2</sub>	d
4MR12	148	220	335	125	270	11
4MR14	178	280	357	150	280	14



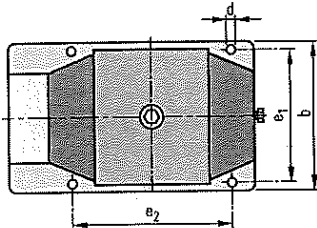
Dimension drawing 17



Type	b	h	l	e <sub>1</sub>	e <sub>2</sub>	e <sub>3</sub>	d
4MR12	148	220	335	125	270	110	11
4MR14	178	280	357	150	280	130	14

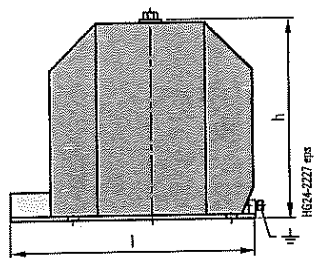


Dimension drawing 18

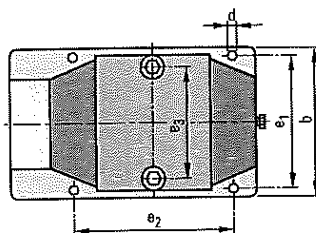


Type	b	h	l	e <sub>1</sub>	e <sub>2</sub>	d
4MR52	200	240	342	175	225	11
4MR54	225	300	370	200	250	14
4MR54 1)	200	300	324	175	225	14
4MR56	249	390	395	225	300	14

1) Design on request



Dimension drawing 19



Type	b	h	l	e <sub>1</sub>	e <sub>2</sub>	e <sub>3</sub>	d
4MR62	200	240	342	175	225	150	11
4MR64	225	300	370	200	250	210	14
4MR64 1)	200	260	324	175	225	155	14
4MR66	249	390	395	225	300	320	14

1) Design on request

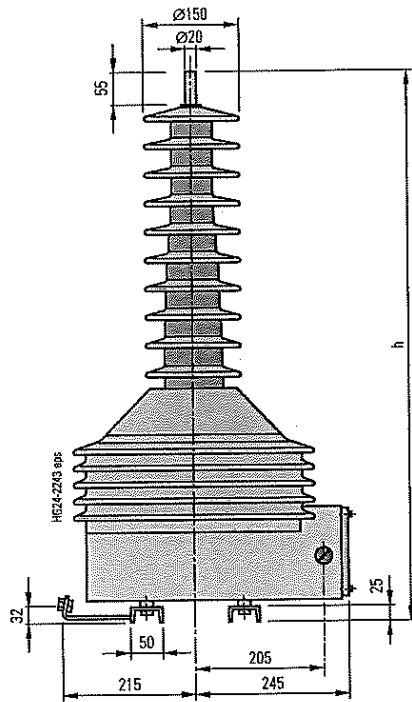
3

7 R 7



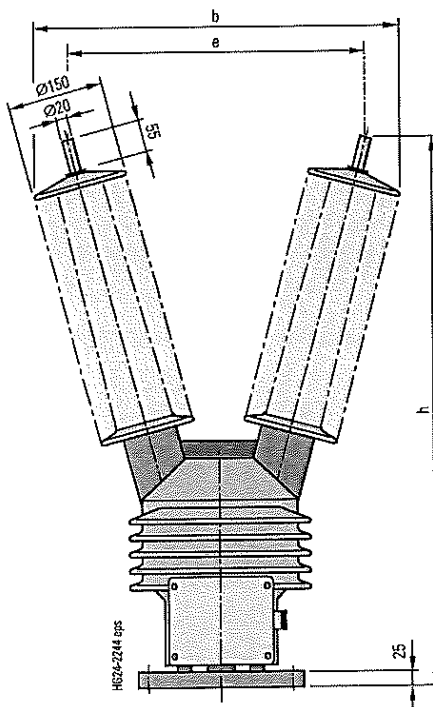
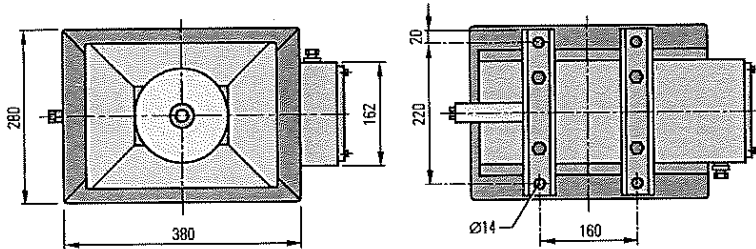
# Technical Data

Electrical data, dimensions and weights of voltage transformers



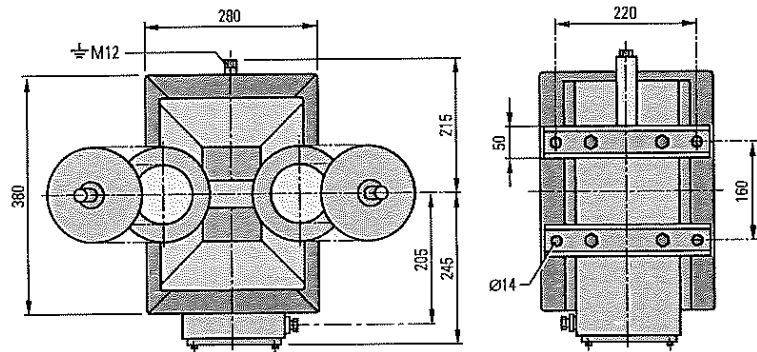
Dimension drawing 20

Type	h	Arcing distance	Creepage distance	Number of sheds
4MS32	520	420	790	2
4MS34	655	550	1055	5
4MS36	880	760	1615	10
4MS38	880	760	1615	10



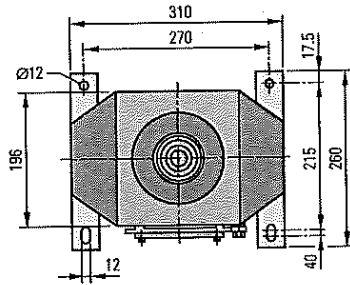
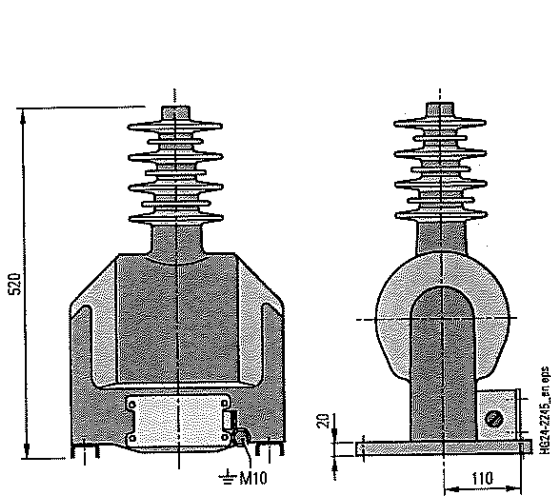
Dimension drawing 21

Type	h	b	e	Arcing distance	Creepage distance	Number of sheds
4MS42	515	375	270	420	760	2 x 2
4MS44	645	445	340	550	1035	2 x 5
4MS46	865	560	455	760	1595	2 x 10

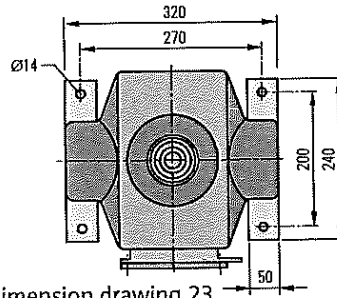
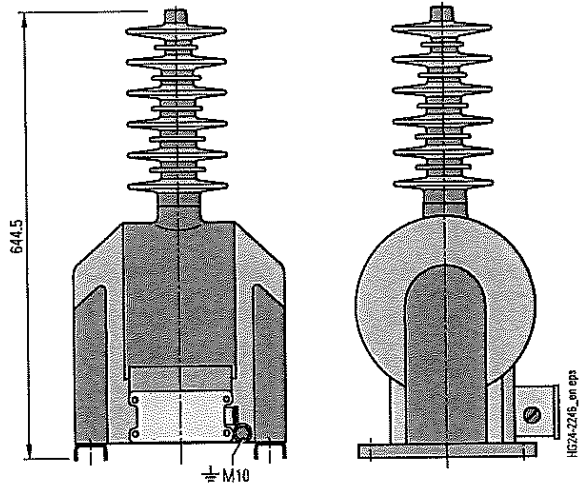


3

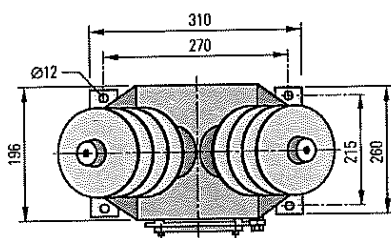
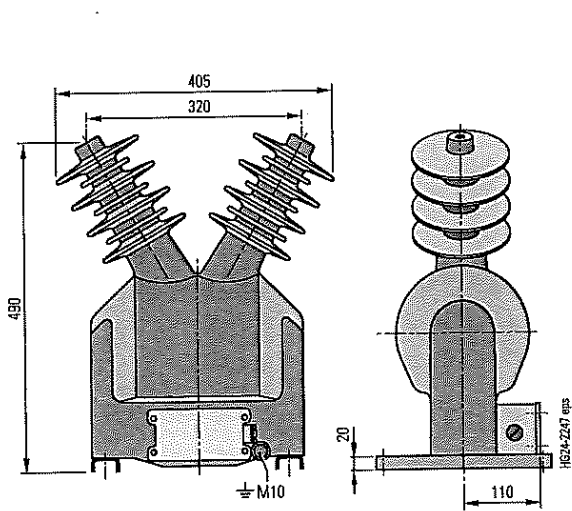
7. B. 3



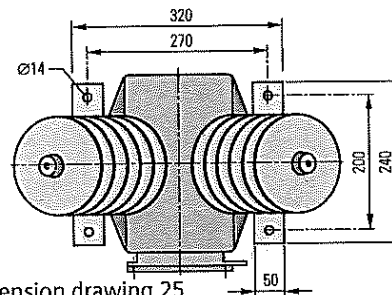
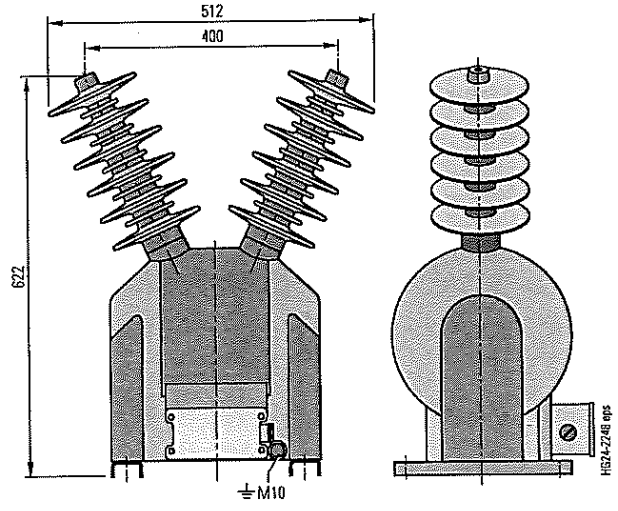
Dimension drawing 22



Dimension drawing 23



Dimension drawing 24



Dimension drawing 25

# Technical Data

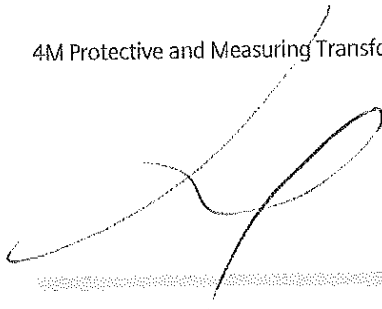
Electrical data, dimensions and weights of voltage transformers

## Terminal designations of the voltage transformers

Transformer design	Designation of the connection terminals		Example for low-voltage data
	acc. to VDE	acc. to IEC	
Unearthed 1 secondary winding			10000/100 V
Unearthed 1 secondary winding with tapings	<p>highest rated voltage at u1 or a1</p>		5000-10000/100 V
Earthed 1 measuring winding 1 auxiliary residual voltage winding			10000 $\sqrt{3}$ /100 $\sqrt{3}$ /100/3 V

3

125

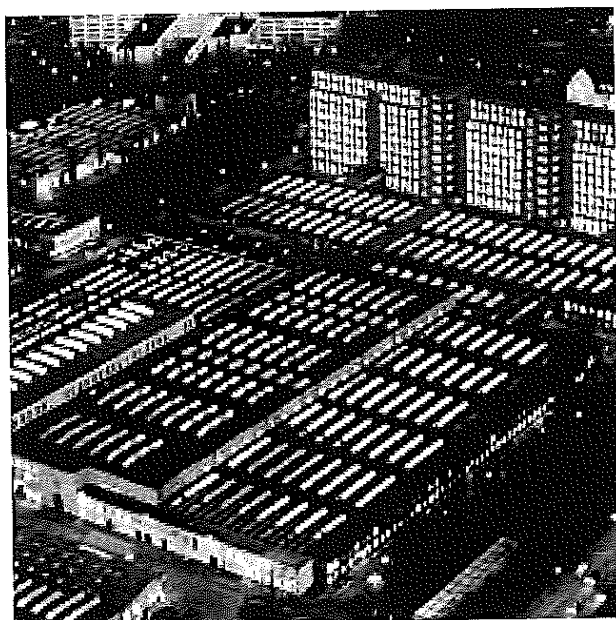


Contents	Page
<b>Annex</b>	<b>83</b>
Inquiry form	84
Configuration instructions	85
Configuration aid	Foldout page



R-HG11-181.dfr

Brandenburg Gate, Berlin, Germany



R-HG11-180.dfr

Switchgear Factory Berlin, Germany



Please copy, fill in and return to your Siemens partner.

**Inquiry concerning**

- 4MA7 current transformer
- 4MB1 current transformer
- 4MC2 current transformer
- 4MC3 current transformer
- 4ME2 current transformer
- 4ME3 current transformer
- 4MR voltage transformer
- 4MS voltage transformer

Please

- Submit an offer
- Call us
- Visit us

**Your address**

\_\_\_\_\_  
Company

\_\_\_\_\_  
Dept.

\_\_\_\_\_  
Name

\_\_\_\_\_  
Street

\_\_\_\_\_  
Postal code/city

\_\_\_\_\_  
Phone

\_\_\_\_\_  
Fax

\_\_\_\_\_  
E-mail

**Siemens AG**

\_\_\_\_\_  
Dept.

\_\_\_\_\_  
Name

\_\_\_\_\_  
Street

\_\_\_\_\_  
Postal code/city

\_\_\_\_\_  
Fax

**Technical data of current transformer**

				Other values
Operating voltage	<input type="checkbox"/> 12 kV <input type="checkbox"/> 36 kV	<input type="checkbox"/> 17.5 kV <input type="checkbox"/> 52 kV	<input type="checkbox"/> 24 kV	<input type="checkbox"/> ___ kV
Rated lightning impulse withstand voltage	<input type="checkbox"/> 75 kV <input type="checkbox"/> 170 kV	<input type="checkbox"/> 95 kV <input type="checkbox"/> 250 kV	<input type="checkbox"/> 125 kV	<input type="checkbox"/> ___ kV
Rated short-duration power-frequency withstand voltage	<input type="checkbox"/> 28 kV <input type="checkbox"/> 70 kV	<input type="checkbox"/> 38 kV <input type="checkbox"/> 95 kV	<input type="checkbox"/> 50 kV	<input type="checkbox"/> ___ kV
Rated primary current	<input type="checkbox"/> ___ A	<input type="checkbox"/> 2x ___ A		
Secondary current	<input type="checkbox"/> 1 A	<input type="checkbox"/> 5 A		
Thermal strength	<input type="checkbox"/> 100 x I <sub>PN</sub> <input type="checkbox"/> 300 x I <sub>PN</sub> <input type="checkbox"/> 600 x I <sub>PN</sub>	<input type="checkbox"/> 150 x I <sub>PN</sub> <input type="checkbox"/> 400 x I <sub>PN</sub> <input type="checkbox"/> 800 x I <sub>PN</sub>	<input type="checkbox"/> 200 x I <sub>PN</sub> <input type="checkbox"/> 500 x I <sub>PN</sub> <input type="checkbox"/> 1000 x I <sub>PN</sub>	<input type="checkbox"/> ___ x I <sub>PN</sub>
1 <sup>st</sup> core	<input type="checkbox"/> Protection core	<input type="checkbox"/> ___ Class	<input type="checkbox"/> ___ Factor	<input type="checkbox"/> ___ VA
	<input type="checkbox"/> Measuring core	<input type="checkbox"/> ___ Class	<input type="checkbox"/> ___ Factor	<input type="checkbox"/> ___ VA
2 <sup>nd</sup> core	<input type="checkbox"/> Protection core	<input type="checkbox"/> ___ Class	<input type="checkbox"/> ___ Factor	<input type="checkbox"/> ___ VA
	<input type="checkbox"/> Measuring core	<input type="checkbox"/> ___ Class	<input type="checkbox"/> ___ Factor	<input type="checkbox"/> ___ VA
3 <sup>rd</sup> core	<input type="checkbox"/> Protection core	<input type="checkbox"/> ___ Class	<input type="checkbox"/> ___ Factor	<input type="checkbox"/> ___ VA
	<input type="checkbox"/> Measuring core	<input type="checkbox"/> ___ Class	<input type="checkbox"/> ___ Factor	<input type="checkbox"/> ___ VA

**Technical data of voltage transformer**

				Other values
Maximum operating voltage	<input type="checkbox"/> 12 kV <input type="checkbox"/> 36 kV	<input type="checkbox"/> 24 kV <input type="checkbox"/> 52 kV		<input type="checkbox"/> ___ kV
Rated lightning impulse withstand voltage	<input type="checkbox"/> 75 kV <input type="checkbox"/> 170 kV	<input type="checkbox"/> 95 kV <input type="checkbox"/> 250 kV	<input type="checkbox"/> 125 kV	<input type="checkbox"/> ___ kV
Rated short-duration power-frequency withstand voltage	<input type="checkbox"/> 28 kV <input type="checkbox"/> 70 kV	<input type="checkbox"/> 38 kV <input type="checkbox"/> 95 kV	<input type="checkbox"/> 50 kV	<input type="checkbox"/> ___ kV
Rated primary voltage	<input type="checkbox"/> ___ kV	<input type="checkbox"/> ___ N $\sqrt{3}$		
Rated secondary voltage	<input type="checkbox"/> 100 V <input type="checkbox"/> 100 $\sqrt{3}$ V	<input type="checkbox"/> 110 V <input type="checkbox"/> 110 $\sqrt{3}$ V	<input type="checkbox"/> 120 V <input type="checkbox"/> 120 $\sqrt{3}$ V	<input type="checkbox"/> ___ V <input type="checkbox"/> ___ N $\sqrt{3}$ V
Auxiliary residual voltage winding	<input type="checkbox"/> Without	<input type="checkbox"/> 100/3 V	<input type="checkbox"/> 110/3 V	<input type="checkbox"/> 120/3 V
Rated output of the measuring winding	<input type="checkbox"/> Class 0.2	<input type="checkbox"/> Class 0.5	<input type="checkbox"/> Class 1	
	<input type="checkbox"/> 20 VA	<input type="checkbox"/> 50 VA	<input type="checkbox"/> 100 VA	<input type="checkbox"/> ___ VA

**Application and other requirements**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Please check off

\_\_\_ Please fill in



You prefer to configure your instrument transformer on your own?  
Please follow the steps for configuration and enter the order number in the configuration aid.

For configuration of your  
4M protective and measuring transformers

Instruction for configuration of the 4M protective and measuring transformers



1<sup>st</sup> step: Definition of the current transformer

Please specify the following ratings:	Possible options:
Transformer design	Block-type transformer, bushing-type transformer, outdoor transformer, etc.
Operating voltage ( $U_n$ )	$U_n$ : 12 kV to 52 kV
Rated lightning impulse withstand voltage ( $U_L$ )	$U_L$ : 75 kV to 250 kV
Rated short-duration power-frequency withstand voltage ( $U_d$ )	$U_d$ : 28 kV to 95 kV
Rated primary current ( $I_{pn}$ )	$I_{pn}$ : 20 A to 10000 A
Secondary current ( $I_{sc}$ )	$I_{sc}$ : 1 A or 5 A
Thermal strength	100 x $I_{pn}$ to 1000 $I_{pn}$
Core data	Quantity, type, class, factor and rating of cores

These ratings define the positions 3 to 15 of the order number of the current transformer.

2<sup>nd</sup> step: Definition of the voltage transformer

Please specify the following ratings:	Possible options:
Transformer design	Block-type transformer, outdoor transformer
Number of phases	Single-phase or double-phase
Operating voltage ( $U_n$ )	$U_n$ : 12 kV to 52 kV
Rated lightning impulse withstand voltage ( $U_L$ )	$U_L$ : 75 kV to 250 kV
Rated short-duration power-frequency withstand voltage ( $U_d$ )	$U_d$ : 28 kV to 95 kV
Rated primary voltage ( $U_{pn}$ )	$U_{pn}$ : 3.3 kV to 45 kV or values divided by $\sqrt{3}$
Rated secondary voltage ( $U_{ps}$ )	$U_{ps}$ : 100 V, 110 V, 120 V or values divided by $\sqrt{3}$
Rated output of the measuring winding	25 VA, class 0.2 up to 400 VA, class 1

These ratings define the positions 3 to 11 of the order number of the voltage transformer.

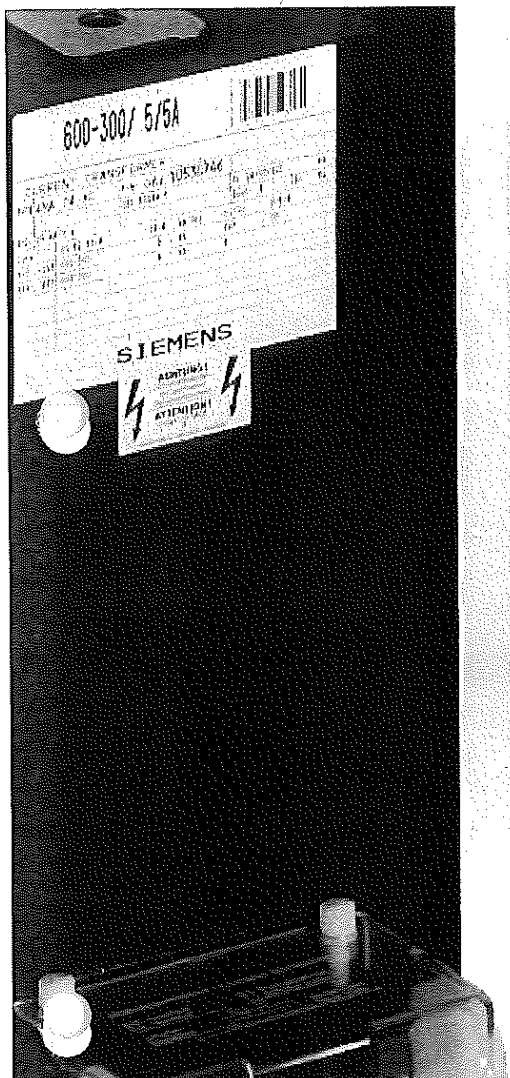
3<sup>rd</sup> step: Do you have any further requirements concerning the equipment?

Should you still need more options than the possible equipment like terminal designations according to VDE or IEC, selection of sizes, routine test certificate, etc., please contact your responsible sales partner.

4 M	-	-		
	+	+	+	+
4 M	-	-		
	+	+	+	+
4 M	-	-		
	+	+	+	+
4 M	-	-		
	+	+	+	+
4 M	-	-		
	+	+	+	+
4 M	-	-		
	+	+	+	+
4 M	-	-		
	+	+	+	+

1 2 2





Published by and copyright © 2009:  
Siemens AG  
Energy Sector  
Freyeslebenstrasse 1  
91058 Erlangen, Germany

Siemens AG  
Energy Sector  
Power Distribution Division  
Medium Voltage  
Nonnendammallee 104  
13623 Berlin, Germany

For more information, please contact our  
Customer Support Center.  
Phone: +49 180 524 70 00  
Fax: +49 180 524 24 71  
(Charges depending on provider)  
E-mail: support.energy@siemens.com

Order No. E50001-K1524-A101-A3-7600  
Printed in Germany  
Dispo 31 601, c4bs 7460  
KG 05.09 2.0 88 En  
610115477 480488

Printed on elementary chlorine-free bleached paper.

All rights reserved.  
If not stated otherwise on the individual pages of this  
catalog, we reserve the right to include modifications,  
especially regarding the stated values, dimensions and weights.  
Drawings are not binding.  
All product designations used are trademarks or product  
names of Siemens AG or other suppliers.  
If not stated otherwise, all dimensions in this  
catalog are given in mm.

Subject to change without prior notice.  
The information in this document contains general  
descriptions of the technical options available, which  
may not apply in all cases. The required technical  
options should therefore be specified in the contract.

Responsible for  
Technical contents:  
Siemens AG, E D M V C I L M  
Berlin

General editing:  
Siemens AG, E CC MCC G  
Erlangen

[www.siemens.com/energy](http://www.siemens.com/energy)



РЕПУБЛИКА БЪЛГАРИЯ  
Български институт по метрология  
REPUBLIC OF BULGARIA  
Bulgarian Institute of Metrology



ДОПЪЛНЕНИЕ № 17.01.5109.1

КЪМ УДОСТОВЕРЕНИЕ  
ЗА ОДОБРЕН ТИП СРЕДСТВО ЗА ИЗМЕРВАНЕ № 16.11.5109  
*Measuring Instrument Type-approval Certificate-Revision 1*

Издадено на  
производител:  
*Issued to manufacturer:*

SIEMENS AG - Germany  
Wittelsbacherplatz 2, D-80333 Munich, Germany

На основание на:  
*In Accordance with:*

Чл. 32, ал.1 от Закона за измерванията

Относно:  
*In Respect of:*

измервателни токови трансформатори тип 4МАхх

Технически и  
метрологични  
характеристики:  
*Technical and metrological  
characteristics:*

приложение, неразделна част от настоящото  
удостоверение за одобрен тип средство за измерване

Срок на валидност:  
*Valid until:*

15.11.2026 г.

Средството за измерване е  
вписано в регистъра на  
одобрените за използване  
типове средства за  
измерване под №:  
*Reference №:*

5109



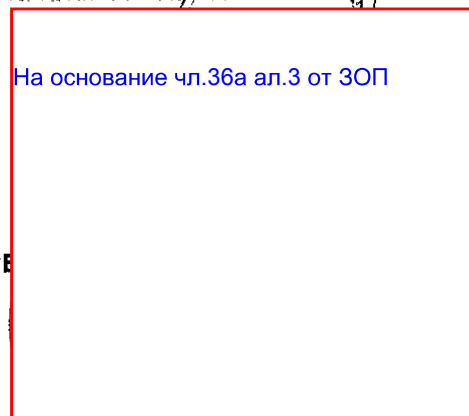
Дата на издаване на  
допълнението към  
удостоверението за  
одобрен тип:  
*Date:*

05.01.2017 г.

ВЯРНО С  
ОРИГИНАЛА

На основание чл.36а ал.3 от ЗОП

И.Д. ПРЕ





Издадено на производител: SIEMENS AG - Germany  
Wittelsbacherplatz 2, D-80333 Munich, Germany

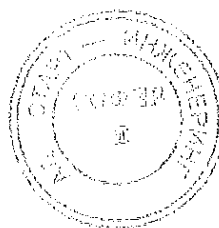
Относно: измервателни токови трансформатори тип 4MAxx

Описание на допълнение № 17.01.5109.1 към удостоверение за одобрен тип № 16.11.5109:

Към т.2 Технически и метрологични характеристики се добавя към **Мощност, VA/клас на точност**: от 5 до 15/0,2S; 0,2

Таблицата от т.2 Технически и метрологични характеристики добива вида:

Характеристика	Трансформатор тип 4MAxx		
	4MA72	4MA74	4MA76
Максимално работно напрежение, кV	до 12	до 24	до 36
Номинален първичен ток, А	до 4000		
Номинален вторичен ток, А	1 и 5		
Честота, Hz	50		
Клас на точност			
- измервателна намотка	0,2S; 0,2; 0,5S; 0,5; 1		
- защитна намотка	5P10; 10P10		
Мощност, VA/клас на точност	от 5 до 15/0,2S; 0,2 от 5 до 30/0,5S; 0,5; 1 от 5 до 30/5P10; 10P10		



ВЯРНО С  
ОРИГИНАЛА

Independent, accredited test laboratory · Registration with STLA and LOVAG

# TYPE TEST REPORT

NO. 1416.0077.3.032

Siemens Sanayi ve Tic. A. Ş.  
Power Transmission and Distribution (PTD)  
Yakacik Yolu No: 111  
81430 Kartal-ISTANBUL (TURKEY)

CLIENT

ALCE Elektrik Sanayi ve Ticaret A. Ş.

MANUFACTURER

Block-type current transformer

TEST OBJECT

4MA74

TYPE

03/00811

MANUFACTURING NO.

Rated primary current	1250 A	RATED CHARACTERISTICS GIVEN BY THE CLIENT
Rated secondary current	5 - 5 A	
Rated frequency	50 - 60 Hz	
Rated output	15 - 15 VA	
Accuracy class	0,5F55 - 5P10	
Highest voltage for equipment	24 kV	
Rated power-frequency withstand voltage	50 kV	
Rated lightning impulse withstand voltage	125 kV	
Rated short-time thermal current ( $I_{th}$ ) 3 s	31.5 kA	
Rated dynamic current ( $I_{dyn}$ )	80 kA	

IEC 60044-1: 1996-12, mod. + am1: 2000-07  
STL Guide to the Interpretation of IEC 60044-1 1<sup>st</sup> Edition 1996-12

NORMATIVE DOCUMENT

- Impulse tests on the primary winding
- Determination of errors
- Short-time current test
- Temperature-rise test

RANGE OF TESTS PERFORMED

24 February to 7 March 2003

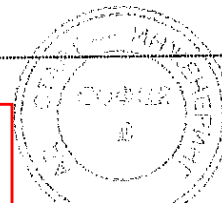
DATE OF TEST

The test object has PASSED the above-mentioned type tests performed at 50 Hz.

TEST RESULT

На основание чл.36а ал.3 от ЗОП

На основание чл.36а ал.3 от ЗОП



Independent test laboratory, accredited by Deutsche Akkreditierungsstelle Technik (DATech) e.V. in the fields of h.v. apparatus and switchgear, power cables and power cable accessories, hv apparatus and switchgear, installation equipment and switching and control equipment



DAT - P - 019/92

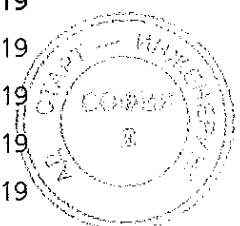
292

**Contents**

**Sheet**

<b>1. Present at the test.....</b>	<b>4</b>
<b>2. Test performed.....</b>	<b>4</b>
<b>3. Identity of the test object.....</b>	<b>5</b>
3.1 Technical data and characteristics.....	5
3.2 Identity documents.....	5
<b>4. Impulse test on the primary winding.....</b>	<b>6</b>
4.1 Test laboratory.....	6
4.2 Normative document.....	6
4.3 Required test parameters.....	6
4.4 Test arrangement.....	6
4.5 Test and measuring circuits.....	7
4.6 Test results.....	8
4.7 Routine tests after the lightning impulse test.....	9
<b>5. Determination of errors.....</b>	<b>10</b>
5.1 Test laboratory.....	10
5.2 Normative document.....	10
5.3 Required test parameters.....	10
5.4 Test arrangement.....	10
5.5 Test and measuring circuits.....	11
5.6 Test results.....	12
<b>6. Short-time current tests.....</b>	<b>13</b>
6.1 Dynamic test and thermal short-time current test.....	13
6.1.1 Test laboratory.....	13
6.1.2 Normative document.....	13
6.1.3 Required test parameters.....	13
6.1.4 Test arrangement.....	13
6.1.5 Test and measuring circuits.....	14
6.1.6 Test results.....	15
6.2 Determination of errors after the short-time current test.....	16
6.3 Routine test after the short-time current test.....	18
<b>7. Temperature-rise test.....</b>	<b>19</b>
7.1 Test laboratory.....	19
7.2 Normative document.....	19
7.3 Required test parameters.....	19
7.4 Test arrangement.....	19
7.5 Test and measuring circuits.....	19
7.6 Test results.....	21

*[Handwritten signature]*



*[Handwritten signature]*

193

*[Handwritten signature]*

TYPE TEST REPORT NO. 14160077.3.032

SHEET 3

8.	Evaluation of all tests.....	23
9.	Appendices.....	24
9.1	Photos.....	24
9.2	Oscillograms.....	25
9.3	Drawing.....	30

This test document consists of 30 sheets.

Distribution

Copies Nos. 1 and 2 in English:

Copy No: 1

ALCE Elektrik Sanayi ve Ticaret A. Ş.



*[Handwritten signature]*

The test results relate only to the object tested.  
This document is confidential its transfer to third parties as well as its reproduction in extracts require the consent of the client

294

*[Handwritten signature]*

TYPE TEST REPORT NO. 1416.0077.3.032

SHEET 4

1. Present at the test

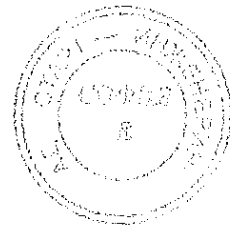
---

Mr.	Moritz	IPH test engineer in charge
Mrs.	Hauschild	IPH test engineer
Mr.	Vogler	IPH test engineer
Mr.	Wittwer	IPH test engineer
Mr.	Çiftçioğlu	ALCE Elektrik Sanayi ve Ticaret A. Ş.

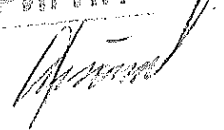
2. Test performed

---

- Lightning impulse test on the primary winding
- Determination of errors
- Short-time current test
- Temperature-rise test

ВЯРНО С  
ОРИГИНАЛА



TYPE TEST REPORT NO. 1416.0077.3.032

SHEET 5

### 3. Identity of the test object

#### 3.1 Technical data and characteristics

The technical data and characteristics of the test object are defined by the following parameters and specified by the client.

Test object:	Block-type current transformer		
Type:	4MA74		
Manufacturer:	ALCE Elektrik Sanayi ve Ticaret A.Ş.		
Serial No.:	03/00811		
Year of manufacture:	2003		
Data:	Rated primary current ( $I_n$ )		1250 A
	Rated continuous thermal current ( $I_{cont}$ )		$1.2 \times I_n$
	Rated secondary current	core 1	5 A
		core 2	5 A
	Rated frequency		50 - 60 Hz
	Rated output	core 1	15 VA
		core 2	15 VA
	Accuracy class	core 1	0.5F5
		core 2	5P10
	Rated dynamic current ( $I_{dyn}$ )		80 kA
	Rated short-time thermal current ( $I_{th}$ )		31.5 kA
	Duration of short-circuit		3 s
	Rated insulation level		
	Highest voltage for equipment ( $U_m$ )		24 kV
	Rated power-frequency withstand voltage		50 kV
	Rated lightning impulse withstand voltage (list 2)		125 kV
	Insulating material class		E
Characteristics:	Winding material	Primary winding	Cu
		Secondary winding, core 1	Cu
		Secondary winding, core 2	Cu
	Cross-section of windings	Primary winding	690 mm <sup>2</sup>
		Secondary winding, core 1	2.55 mm <sup>2</sup>
		Secondary winding, core 2	2.54 mm <sup>2</sup>

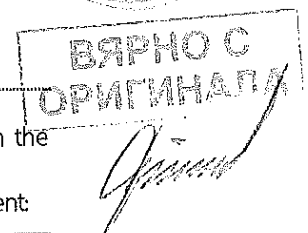
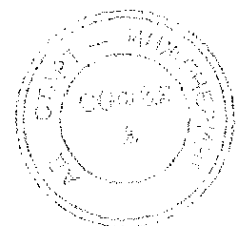
#### 3.2 Identity documents

The manufacturer confirms that the test object has been manufactured in compliance with the drawings given in this document. IPH did not verify this compliance in detail.

The identity of the test object is fixed by the following drawings and data submitted by the client:

Name of drawing	Drawing No.	Date of drawing	Author	Notes
4MA74 BLOCK-TYPE CURRENT TRANSFORMER	416	06.02.03	ALCE	Sheet 30

Entry of test object at IPH: 13 February 2003



TYPE TEST REPORT NO. 1416.0077.3.032

SHEET 6

**4. Impulse test on the primary winding**

**4.1 Test laboratory**

High-voltage test laboratory, high-voltage hall 2

**4.2 Normative document**

IEC 60044-1: 1996-12, mod. + am1: 2000-07, Sub-clause 7.3.2

**4.3 Required test parameters**

Lightning impulse voltage 1.2/50 $\mu$ s	125 kV	Peak value
Polarity		Positive and negative
Impulse sequence	1 impulse	Full wave at approx. 50 % of test voltage (reference impulse)
	15 impulses	Full wave at 100 % of test voltage
Atmospheric correction		Without

**4.4 Test arrangement**

The test voltage was applied between the connected terminals of primary winding and earth. The fastening screws, the core and the terminals of the secondary windings were earthed.



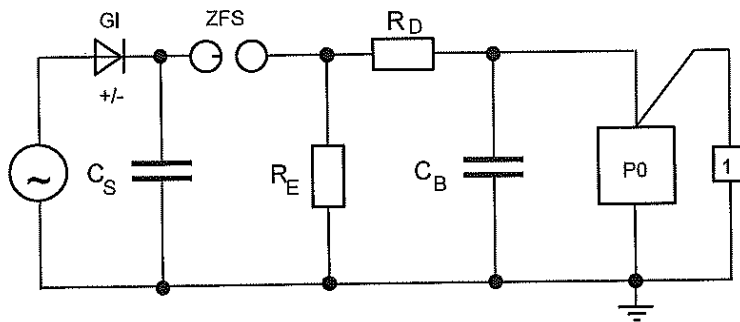
*[Handwritten signature]*

*[Handwritten signature]*

4.5 Test and measuring circuits

Technical data of test circuit

Impulse circuit:	Number of stages	n	=	2
	Impulse capacitance	$C_S$	=	70 nF
	Loading capacitance	$C_B$	=	1.5 nF
	Damping resistance	$R_D$	=	122 $\Omega$
	Discharge resistance	$R_E$	=	1100 $\Omega$

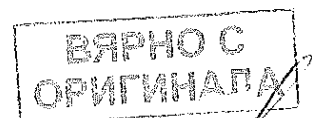
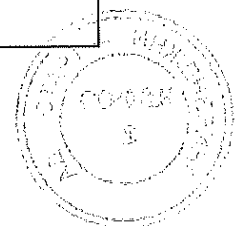


GI	Rectifier	$R_D$	Damping resistance
$C_S$	Impulse capacitance	$C_B$	Loading capacitance
ZFS	Spark gap	PO	Test object
$R_E$	Discharge resistance	1	Voltage measurement

Figure 1: Test and measuring circuit for the lightning impulse voltage withstand test

Technical data of measuring circuit

Measuring point	Measured quantity	Measuring sensor/device	Technical parameters
1	Test voltage	R divider of SMR 10/770 type (TURD) with digital measuring instrument of DMI 551 type (Haefely) and LC 574 AL digital oscilloscope type (LeCroy)	Ratio 472.4

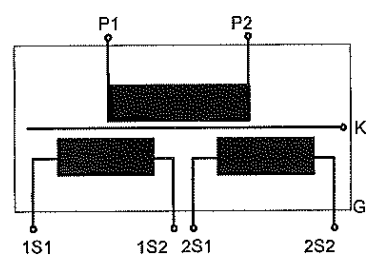


298 *[Handwritten signature]*



4.6 Test results

Front time of lightning impulse wave: 0.90  $\mu$ s  
 Tail time of lightning impulse wave: 56.0  $\mu$ s  
 Air temperature: 18.0  $^{\circ}$ C  
 Air pressure: 1001 mbar  
 Air humidity (relative): 50 %  
 Atmospheric correction of test voltage: Without

Circuit diagram of the test object			Test voltage	Impulse	Result
					
Test No.:	Voltage applied to	Earthed	kV		No. of impulses/ disruptive discharges
1003 0233 to 1003 0248	P1 and P2	1S1-1S2, 2S1-2S2 K, G	+62.5 +125	50 % FW impulse 100 % FW impulse	1/0 <sup>1)</sup> 15/0 <sup>1)</sup>
1003 0249 to 1003 0264	P1 and P2	1S1-1S2, 2S1-2S2 K, G	-62.5 -125	50 % FW impulse 100 % FW impulse	1/0 <sup>1)</sup> 15/0 <sup>1)</sup>


Notes:

1) The Appendices include only the oscillograms of the reference impulse and of each first and last 100 % full wave (FW) impulse.



ВЯРНО С  
ОРИГИНАЛА



199 

TYPE TEST REPORT NO. 1416.0077.3.032

SHEET 9

**4.7 Routine tests after the lightning impulse test**

The routine tests to Sub-clause 6.2 of the normative document are part of the type test – lightning impulse test – and serve to assess the latter.

**Results**

Test	Test parameters	Test results	
Power-frequency withstand test on the primary winding	Test voltage: 50 kV Test frequency: 50 Hz Duration of test: 60 s	No disruptive discharge	ok.
Partial discharge measurement	Procedure A Prestress duration: 60 s Measuring voltage (points 1 to 3): $1.2 \times U_m = 28.8 \text{ kV}$ $U_m = 24.0 \text{ kV}$ $1.2 \times U_m / \sqrt{3} = 16.6 \text{ kV}$ Measuring time: 30 s	Partial discharge < 2.5 pC < 50 pC Partial discharge < 2 pC < 50 pC Partial discharge < 2 pC < 20 pC	ok.
Power-frequency withstand test on the secondary windings	Test voltage: 3 kV Test frequency: 50 Hz Duration of test: 60 s	No disruptive discharge	ok.
Intertum overvoltage test	Procedure A Test current (primary): 1250 A Test voltage (secondary 1): 373 V Test voltage (secondary 2): 1093 V Test frequency: 50 Hz Duration of test: 60 s	No disruptive discharge	ok.

**Notes:**

The routine tests did not show anything that could have indicated a damage done to the test object during the previous lightning impulse test.



**ВЯРНО С  
ОРИГИНАЛА**

*[Handwritten signature]*

TYPE TEST REPORT NO. 1418.0077.3.032

SHEET 10

**5. Determination of errors**

**5.1 Test laboratory**

Low-voltage test laboratory, test room 3

**5.2 Normative document**

IEC 60044-1: 1996-12, mod. + am1: 2000-07, Sub-clauses 11.4 and 12.4

**5.3 Required test parameters**

Protective current transformer: The current errors shall be determined at 100 % of rated current and 100 % of rated burden.

Measuring current transformer: The current errors shall be determined at 5 %, 20 %, 100 % and 120 % of rated current and 25 % and 100 % of rated burden.

For a burden less than 5 VA a power factor of  $\cos \beta = 1$  shall be used, otherwise a power factor of  $\cos \beta = 0.8$  shall be applied.

The test frequency shall equal the rated frequency and be 50 Hz.

Maximum permissible error limits of current transformers for measuring and protecting purposes:

Accuracy class	Current error at percentage of rated current				Phase displacement at percentage of rated current			
	%				Minutes			
	5	20	100	120	5	20	100	120
0.5	1.5	0.75	0.5	0.5	90	45	30	30
5P	1				60			

**5.4 Test arrangement**

To IEC 60044-1: 1996, mod. + am1: 2000, Sub-clauses 11.4 and 12.4

After it had been demagnetised, the test object was connected via a matching transformer to an instrument transformer measuring device including a measurement standard transformer. An oscillographic null detector was used for the visual check of the comparison. The test object was subjected to the prescribed test conditions by connection of a standard burden.

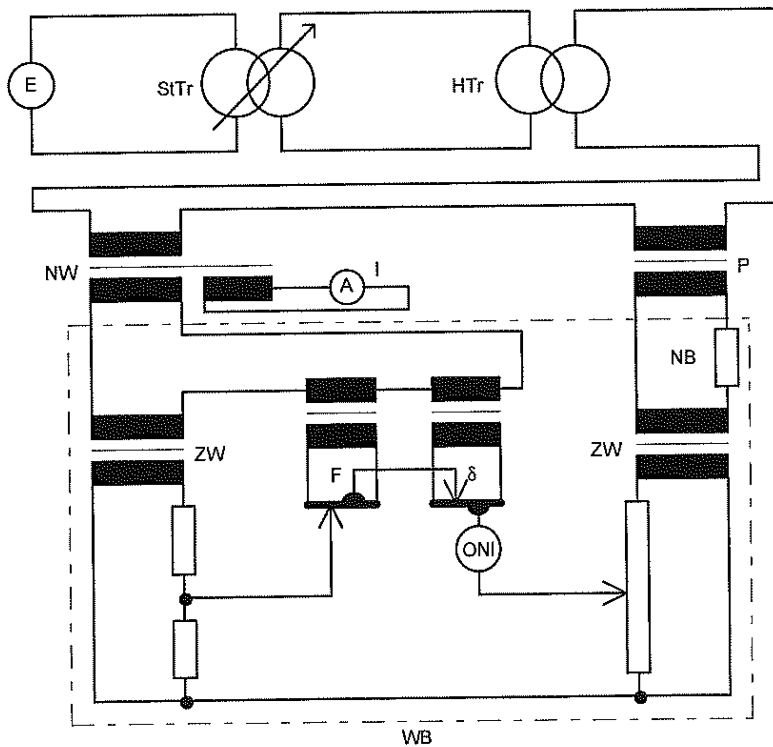
ВЯРНО С  
ОРИГИНАЛА

301

5.5 Test and measuring circuits

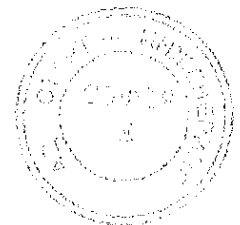
Technical data of test and measuring circuits

Device	Type	Technical data
Standard current transformer NW	ITN 0.5a (TuR Dresden)	Ratio 5 A ... 3 kA / 5 and 5 A, resp. Class 0.1, 15 VA
Standard burden of current transformer NB	(AEG)	50 Hz, 1.25 ... 90 VA $\beta = 0.8/1, 1 ... 2 A$
Instrument transformer measuring bridge I	Hohle type (AEG)	$16 \frac{2}{3}$ , 50 and 60 Hz
Matching transformer to the bridge ZW	Hohle type (AEG)	Matching transformer for 1, 2, 5, 10 A
Null detector ONI	OIK (MWB)	20 mm/ $\mu V$



- E Power supply
- StTr Adjusting transformer
- HTr High-current transformer

Figure 2: Test and measuring circuit for the determination of errors



ВЕРНО С  
ОРИГИНАЛА

*[Handwritten signature]*

5.6 Test results

Rated current: 1250 A  
 Transformation ratio: 1250 A/5 A  
 Burden: 15 VA,  $\cos \beta = 0.8$

At percentage of rated current	Errors		Permissible error for accuracy class 0.5	
	Current error	Phase displacement	Current error	Phase displacement
	%	Minutes	%	Minutes
120 %	0.11	-0.8	$\pm 0.5$	$\pm 30$
100 %	0.10	-0.9	$\pm 0.5$	$\pm 30$
20 %	-0.23	3.0	$\pm 0.75$	$\pm 45$
5 %	-0.78	9.3	$\pm 1.5$	$\pm 90$

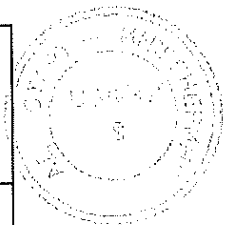
Rated current: 1250 A  
 Transformation ratio: 1250 A/5 A  
 Burden: 3.75 VA,  $\cos \beta = 1$

At percentage of rated current	Errors		Permissible errors for accuracy class 0.5	
	Current error	Phase displacement	Current error	Phase displacement
	%	Minutes	%	Minutes
120 %	0.33	4.0	$\pm 0.5$	$\pm 30$
100 %	0.32	4.2	$\pm 0.5$	$\pm 30$
20 %	0.18	9.9	$\pm 0.75$	$\pm 45$
5 %	-0.08	21.3	$\pm 1.5$	$\pm 90$

Rated current: 1250 A  
 Transformation ratio: 1250 A/5 A  
 Burden: 15 VA,  $\cos \beta = 0.8$

At percentage of rated current	Errors		Permissible error for accuracy class 5P	
	Current error	Phase displacement	Current error	Phase displacement
	%	Minutes	%	Minutes
100 %	-0.15	0.8	$\pm 1$	$\pm 60$

The measured current error and phase displacement values are within the limits permissible for accuracy class 0.5 for measuring current transformers and class 5P for protective current transformers.



ВЕРНО С  
ОРИГИНАЛОМ

*[Handwritten signature]*

*[Handwritten marks]*

6. Short-time current tests

6.1 Dynamic test and thermal short-time current test

6.1.1 Test laboratory

High-power test laboratory, high current test bay

6.1.2 Normative document

IEC 60044-1: 1996-12, mod. + am1: 2000-07, Sub-clause 7.1

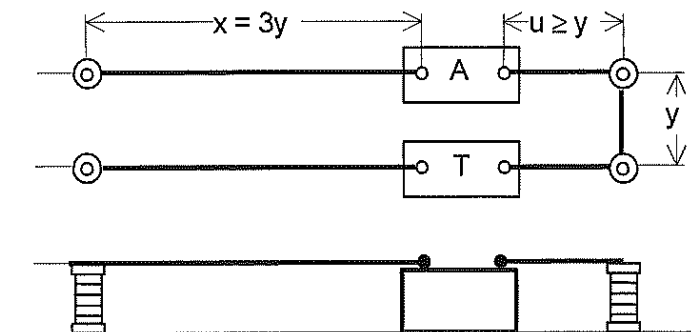
6.1.3 Required test parameters

Short-circuit current	31.5 kA
Peak current	80 kA
Duration of short-circuit	3 s
Joule integral	$2977 \times 10^6 \text{ A}^2\text{s}$

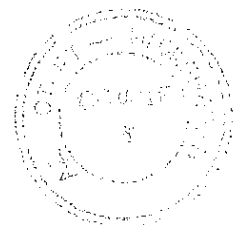
6.1.4 Test arrangement

The test was carried out single-phase in accordance with the STL guide to the interpretation of IEC 60044-1. A second current transformer of the same type was set up in the return conductor. The pole centres distance was to the manufacturer's instructions. The distance  $x$  was 690 mm, the distances  $u$  and  $y$  were 230 mm. The test object was connected by copper bars of 80 mm x 10 mm. The secondary windings were short-circuited by flexible copper conductors of 10-mm<sup>2</sup> cross-section.

See Figures 9 and 10, Sheet 24.



- A Auxillary current transformer
- T Test object
- y Minimum pole centre distance declared by the client



ВЯРНО С  
ОРИГИНАЛА

*[Handwritten signature]*

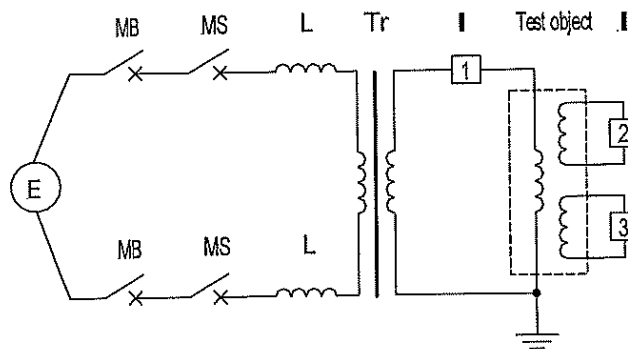
Figure 3: Test arrangement for the short-time current tests

*[Handwritten signature]*

6.1.5 Test and measuring circuits

Technical data of the test circuit

Test requirement	Short-time current tests	
Test No.	103 0801 and 103 0802	
Number of phases (Test circuit)	1	
Number of poles/phases (Test object)	1	
Power frequency Hz	50	
Power factor cos φ	c 0.15	
Earthing conditions	Grid	Not earthed
	Short-circuit transformer	Not earthed
	Short-circuit point	Earthed
Short-circuit power of the test circuit	150 MVA	
Current measurement	Rogowski measuring device	

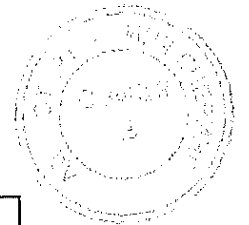


- E Power supply
- MB Master breaker
- MS Making switch
- L Current limiting reactor
- Tr Short-circuit transformer
- I Current measurement
- 1 - 3 Measuring points


Figure 4: Test circuit

Technical data of the measuring circuits

Test No.	Measuring point	Symbol in oscillograms	Measuring quantity	Measuring sensor/device
103 0801 and 103 0802	1	i	Short-circuit current primary winding	Rogowski measuring device
	2	i1 sek	Short-circuit current secondary winding 1	Rogowski measuring device
	3	i2 sek	Short-circuit current secondary winding 2	Rogowski measuring device
Recording instrument: BE256 transient recorder				



ВАРНО С  
ОРИГИНАЛА



TYPE TEST REPORT NO. 1416/0077.3.032

SHEET 15

6.1.6 Test results

Test object:	Current transformer, Serial No. 03/00811
Condition of test object before test:	Prestressed
Connection of test object:	See Sheet 13
Short-circuit point:	Secondary windings
Ambient temperature:	15 °C

Test values:

Test No.	103 ..	0801	0802
Peak current primary winding	kA	81.7	52.6
Short-circuit current, primary winding	r.m.s. value kA	30.3	32.6
Short-circuit current, secondary winding 1	r.m.s. value A	195	166
Short-circuit current, secondary winding 2	r.m.s. value A	211	-
Short-circuit duration	ms	205	3010
Joule integral 10 <sup>6</sup>	A <sup>2</sup> s	-	3199
Short-circuit current 3 s	kA	-	32.7
Note		1)	2)

Notes:

- 1) Test with dynamic current
- 2) Test with short-time thermal current

Condition of test object after test:

The current transformer did not show any visible damage. See Figure 10, Sheet. 24.



*[Handwritten signature]*

*[Handwritten signature]*



**6.2 Determination of errors after the short-time current test**

Rated current: 1250 A

Transformation ratio: 1250 A/5 A

Burden: 15 VA,  $\cos \beta = 0.8$

At percentage of rated current	Difference between the errors measured before and after the short-time current test		Permissible errors for accuracy class 0.5	
	Current error	Phase displacement	Current error	Phase displacement
	%	Minutes	%	Minutes
120 %	0.01	0.4	$\pm 0.25$	$\pm 15$
100 %	0.01	0.4	$\pm 0.25$	$\pm 15$
20 %	0.00	0.3	$\pm 0.375$	$\pm 22.5$
5 %	-0.03	1.4	$\pm 0.75$	$\pm 45$

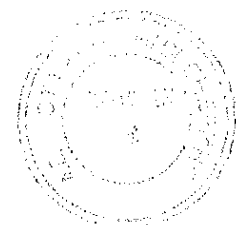
Rated current: 1250 A

Transformation ratio: 1250 A/5 A

Burden: 3.75 VA,  $\cos \beta = 1$

At percentage of rated current	Difference between the errors measured before and after the short-time current test		Permissible errors for accuracy class 0.5	
	Current error	Phase displacement	Current error	Phase displacement
	%	Minutes	%	Minutes
120 %	0.00	0.4	$\pm 0.25$	$\pm 15$
100 %	0.00	0.3	$\pm 0.25$	$\pm 15$
20 %	0.00	0.6	$\pm 0.375$	$\pm 22.5$
5 %	0.01	-0.1	$\pm 0.75$	$\pm 45$

The measured differences of current error and phase displacement are within the limits permissible for accuracy class 0.5. The test object is able to comply with the requirements of accuracy class 0.5 after the short-time current test.



**ВЯРНО С  
ОРИГИНАЛА**

*[Handwritten signature]*

*[Handwritten signature]*

Determination of errors after the short-time current test (continued)

Rated current: 1250 A

Transformation ratio: 1250 A/5 A

Burden: 15 VA,  $\cos \beta = 0.8$

At percentage of rated current	Difference between the errors measured before and after the short-time current test		Permissible error for accuracy class 5P	
	Current error	Phase displacement	Current error	Phase displacement
	%	Minutes	%	Minutes
100 %	0.0	-0.2	$\pm 0.5$	$\pm 30$

The measured differences of current error and phase displacement are within the limits permissible for accuracy class 5P. The test object is able to comply with the requirements of accuracy class 5P after the short-time current test.



ВЯРНО С  
ОРИГИНАЛА

*[Handwritten signature]*

*[Handwritten signature]*

**6.3 Routine test after the short-time current test**

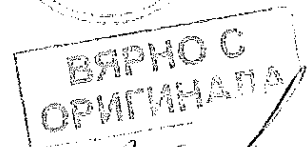
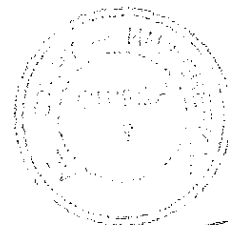
The dielectric routine tests to Sub-clause 6.2 of the normative document are part of the type test – short-time current test – and serve to assess the latter.

**Results**

Test	Test parameters	Test results	
Power-frequency withstand test on the primary winding	Test voltage: 45 kV Test frequency: 50 Hz Duration of test: 60 s	No disruptive discharge	ok
Partial discharge measurement	Procedure A Prestress duration: 60 s Measuring voltage (points 1 to 3): $1.2 \times U_m = 28.8 \text{ kV}$ $U_m = 24.0 \text{ kV}$ $1.2 \times U_m / \sqrt{3} = 16.6 \text{ kV}$ Measuring time: 30 s	Partial discharge < 2 pC < 50 pC Partial discharge < 2 pC < 50 pC Partial discharge < 2 pC < 20 pC	ok
Power-frequency withstand test on the secondary windings	Test voltage: 2.7 kV Test frequency: 50 Hz Duration of test: 60 s	No disruptive discharge	ok
Interturn overvoltage test	Procedure A Test current (primary): 1250 A Test voltage (secondary 1): 373 V Test voltage (secondary 2): 1093 V Test frequency: 50 Hz Duration of test: 60 s	No disruptive discharge	ok

**Notes:**

The routine tests did not show anything that could have indicated a damage done to the test object during the previous short-time current test.




**7. Temperature-rise test**

**7.1 Test laboratory**

Low-voltage test laboratory, test room 3

**7.2 Normative document**

IEC 60044-1: 1996-12, mod. + am1: 2000-07, Sub-clause 7.2

**7.3 Required test parameters**

Test current            1500 A  
Test frequency        50 Hz

**7.4 Test arrangement**

To IEC 60044-1: 1996, mod. + am1: 2000, Sub-clause 7.2

The current transformer was tested in a single-phase outdoor current circuit. Both cores were subjected to their rated burden with a power factor  $\cos \beta = 1$ .

**7.5 Test and measuring circuits**

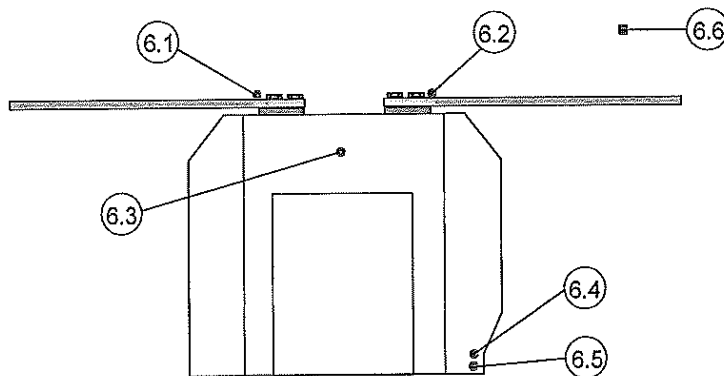


Figure 5: Arrangement of temperature measuring points

ВЯРНО С  
ОРИГИНАЛА

Test and measuring circuits (continued)

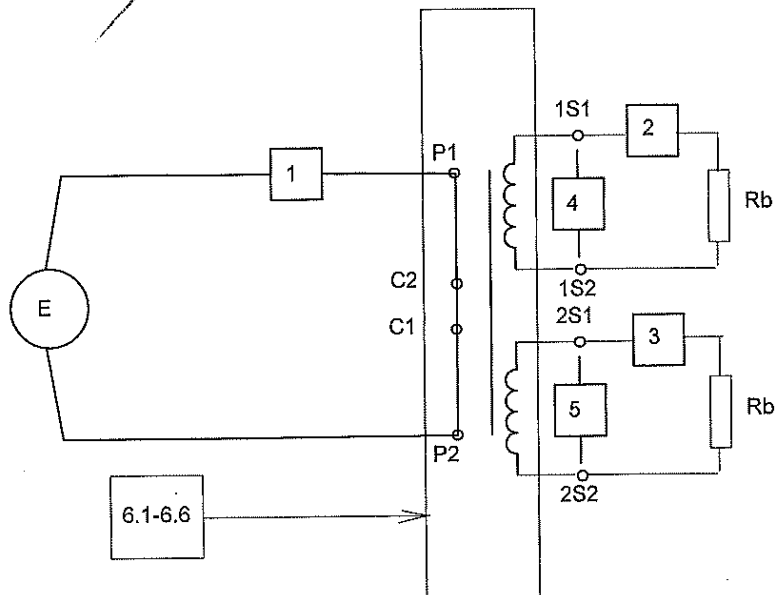


Figure 6: Circuit for the temperature-rise test

Technical data of measuring circuits

Measuring point	Measured quantity	Measuring sensor/device
1	Test current	Current transformer, digital display device
2 and 3	Secondary current	Digital display device
4 and 5	Winding resistance	Milliohmmeeter PM 04
6.1 to 6.6	Temperature	Therm 5500-3, CoCo thermocouples

ВЯРНО С  
ОРИГИНАЛА

**7.6 Test results**

The test current was 1500 A (50 Hz). This is equivalent to the rated primary continuous thermal current of the current transformer.

Meas. point	Designation of the part	Material	Permissible temperature-rise limit	Measured final temperature at $\Delta T \leq 1K/h$	Final temperature rise (related to average ambient air temperature)
			K	°C	K
6.1	Current bar	Cu	80	59.3	42.6
6.2	Current bar	Cu	80	61.1	44.4
6.3	Transformer case	Insulating material	-	45.6	-
6.4	5-A winding 1	Cu wire	75	84.1	67.4
6.5	5-A winding 2	Cu wire	75	83.4	66.7
6.6	Ambient air	Air	-	16.7	-

Determination of the current transformer's winding temperature rise.

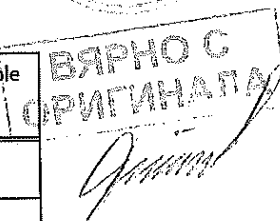
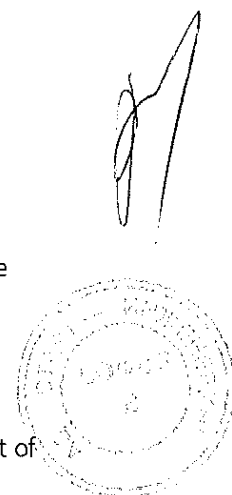
The current transformer was tested at rated burden. The temperature rise  $\theta$  of the current transformer winding was determined on the basis of the rise of winding resistance from the cold state to the steady state of temperature rise of the complete assembly using the following formula given by DIN VDE 0532 Teil 2, Sub-clause 3.3 (transformers and reactors).

$$\theta_w = \frac{R_w}{R_k} (235 + \theta_k) - 235$$

- Where:
- $R_k$  Cold resistance of the winding at 18.5 °C
  - $R_w$  Warm resistance of the winding at 16.7 °C of ambient air temperature
  - $\theta_k$  Cold temperature of winding
  - $\theta_w$  Final temperature of the winding

The hot resistance of the secondary winding was calculated on the basis of the measurement of the cooling curve.

	$R_k$ mΩ	$R_w$ mΩ	$R_w/R_k$	$\theta_w$ °C	$\theta$ K	Permissible K
Core 1/5 A	136.3	171.6	1.26	84.1	67.4	75
Core 2/5 A	192.8	242.2	1.26	83.4	66.7	75




TYPE TEST REPORT NO. 1416.0077.3.032

SHEET 22

Test results (continued)

Graphic representation of resistance variation (core 1)

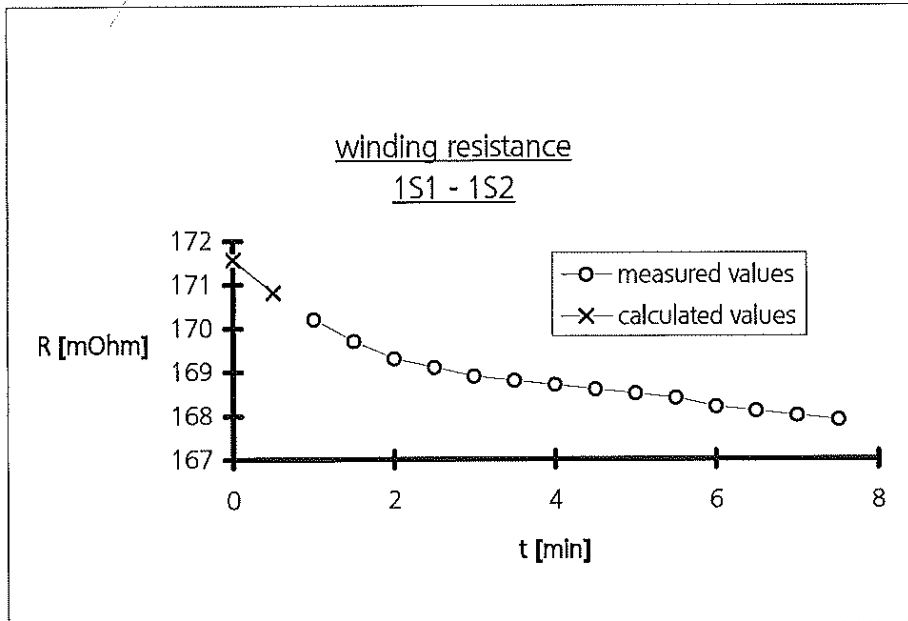


Figure 7: Cooling curve of core 1

Graphic representation of resistance variation (core 2)

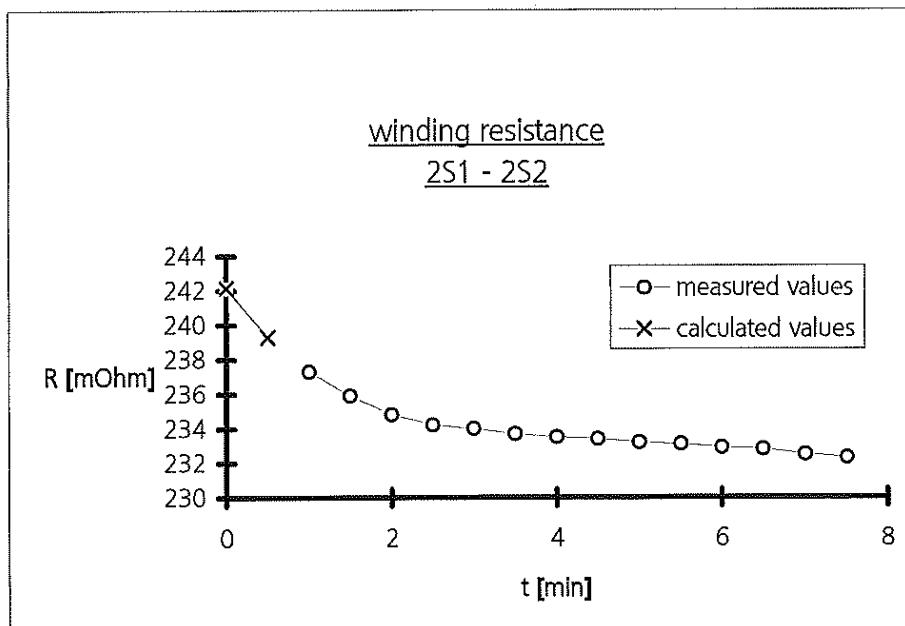


Figure 8: Cooling curve of core 2

Stamp: ВЕРНО С ОРИГИНАЛА  
Signature: [Handwritten Signature]

[Handwritten Signature]

**8. Evaluation of all tests**

• **Lightning impulse test**

During the test at 125-kV lightning impulse voltage, no disruptive discharge occurred. The recorded voltage curve did not present any significant variation between recordings at reference impulse and at full impulse level.

The routine tests have successfully been repeated.

The requirements specified by IEC 60044-1: 1996, Sub-clause 7.3.2 have been met

The current transformer has PASSED the type test – impulse voltage test.

• **Determination of errors**

The measured current error and phase displacement values are within the limits permissible for accuracy class 0.5 for measuring current transformers and class 5P for protective current transformers.

The requirements specified by IEC 60044-1: 1996, Sub-clauses 11.4 and 12.4 have been met.

The current transformer has PASSED the type test – determination of errors.

• **Short-time current test**

The current transformer is capable of properly carrying its rated dynamic current of 80 kA and its rated short-time thermal current of 31.5 kA for a duration of short-circuit of 3 s.

- After test, the current transformer was not visibly damaged.
- The errors determined after test did not differ from those recorded before test by more than half the limits of error appropriate to its accuracy class.
- During the dielectric tests done after the short-time current test, no disruptive discharge occurred. The partial discharge magnitude was below the permissible limit of 50 pC at  $1.2 \times U_m$ .
- The visual inspection of the insulation of the primary winding was not necessary as the current density in the primary winding, related to the rated short-time thermal current, does not exceed 180 A/mm<sup>2</sup>.

The requirements specified by IEC 60044-1: 1996-12, Sub-clause 7.1 have been met.

The current transformer has PASSED the type test – short-time current test

• **Temperature-rise test**

Subjected to its rated primary continuous thermal current of 1500 A, the test object reaches a maximum final temperature rise of 67.4 K in the secondary windings. The final winding temperature-rise limit of 75 K permissible for the class of insulation "E" was not exceeded.

The requirements specified by IEC 60044-1: 1996, Sub-clause 7.2 have been met.

The current transformer has PASSED the type test – temperature-rise test.



*Handwritten signature*

*Handwritten signature*



9. Appendices

9.1 Photos

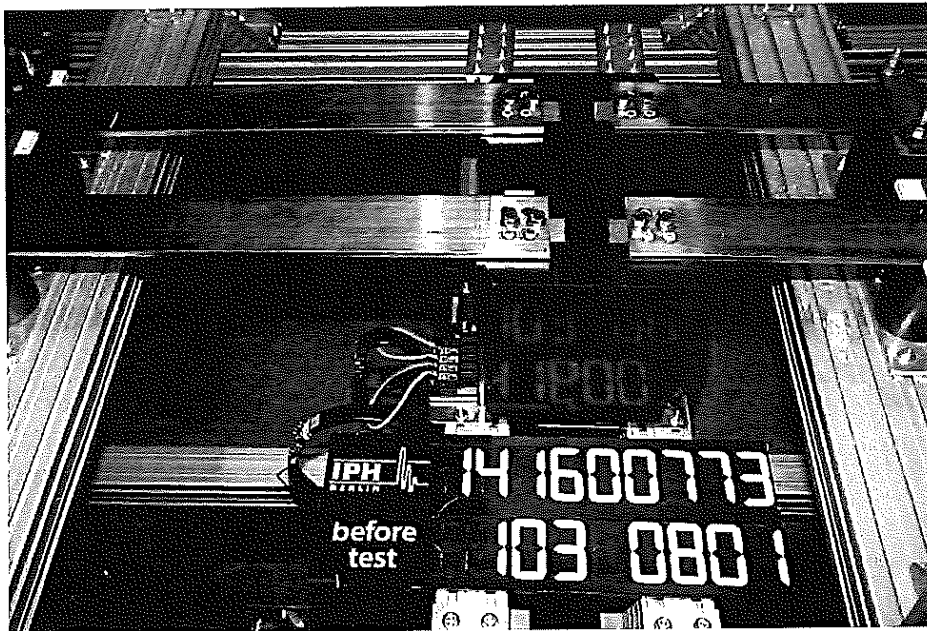


Figure 9: Test arrangement for the short-time current test

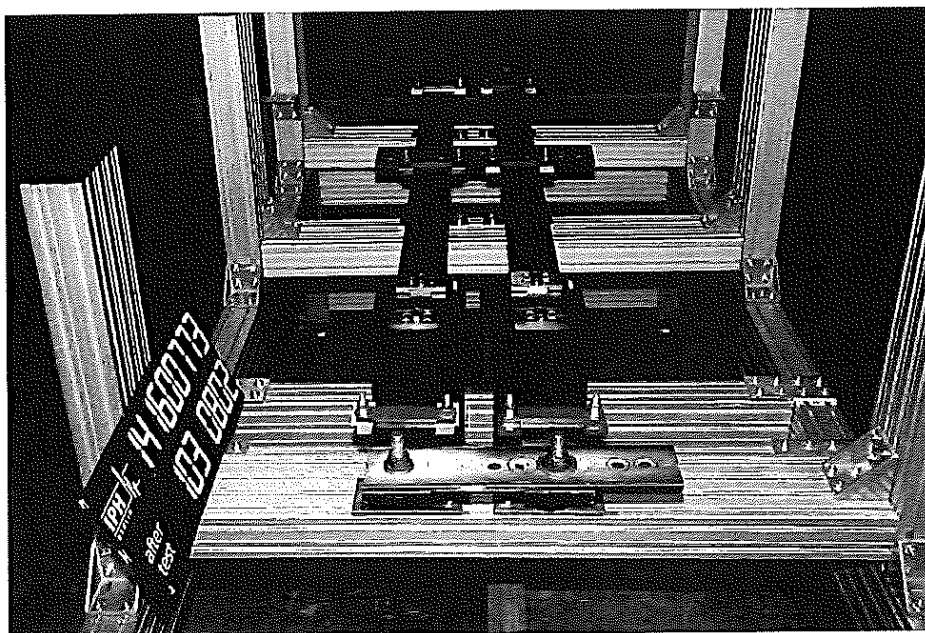
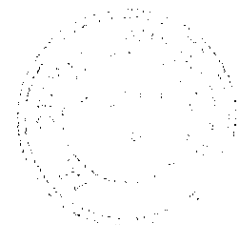


Figure 10: Test object after the short-time withstand current test



ВЯРНО С  
ОРИГИНАЛА

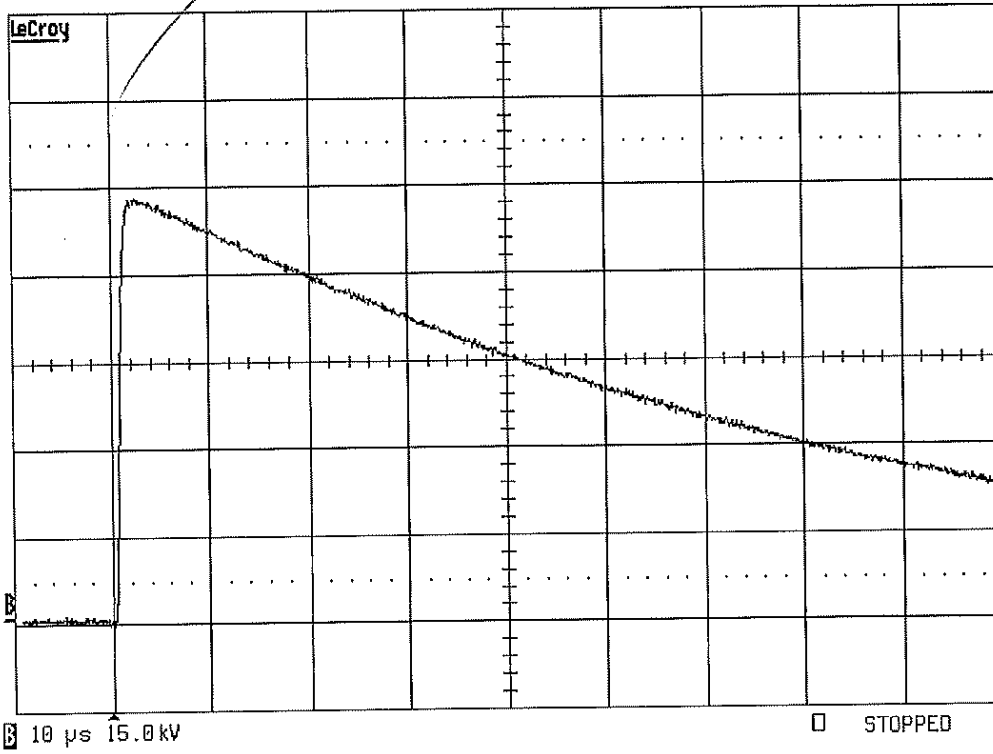
*[Handwritten signature]*

315

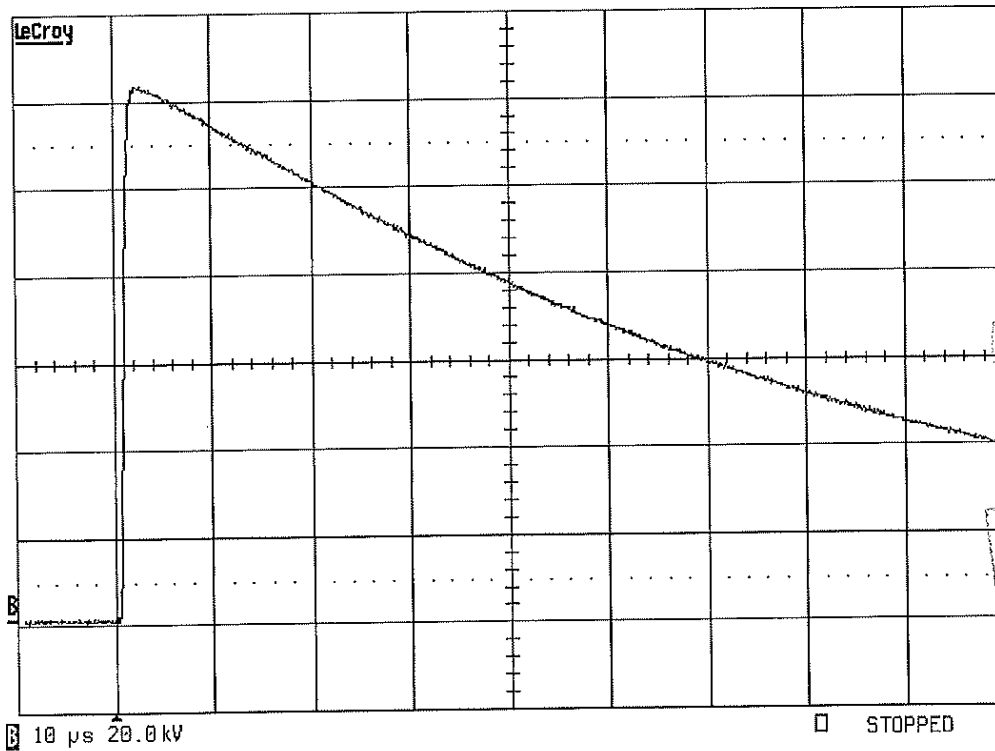
*[Handwritten signature]*

9.2 Oscillograms

- Impulse tests on the primary winding



Test No. 1003 0233



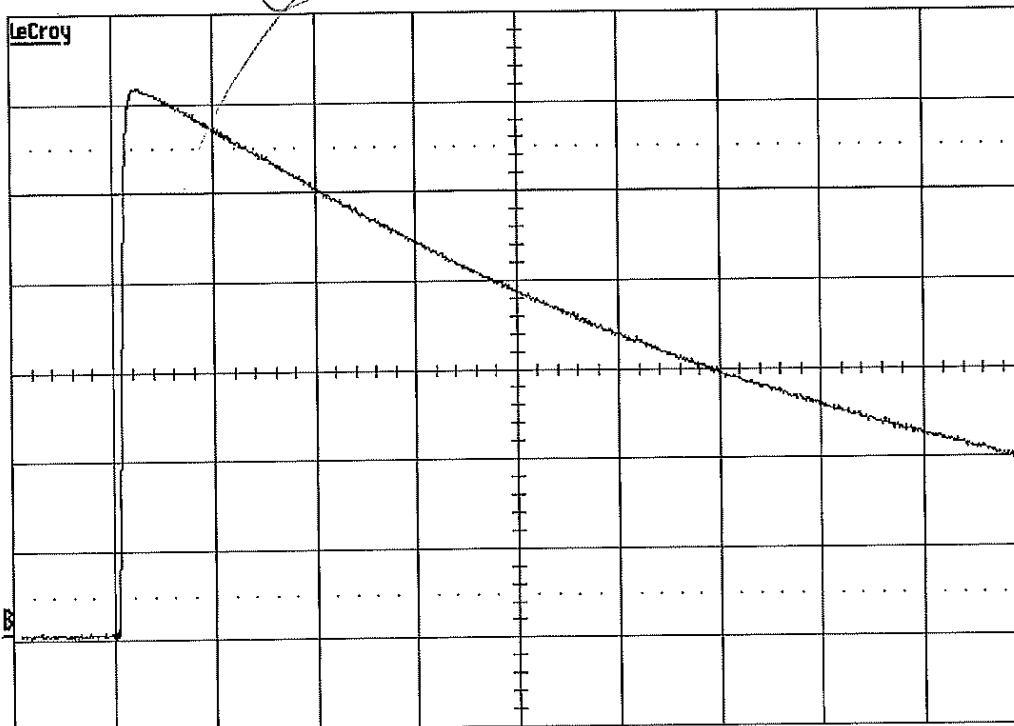
Test No. 1003 0234

ВЯРНО С  
ОРИГИНАЛА

*[Handwritten signature]*

TYPE TEST REPORT NO. 1416.0077.3.032

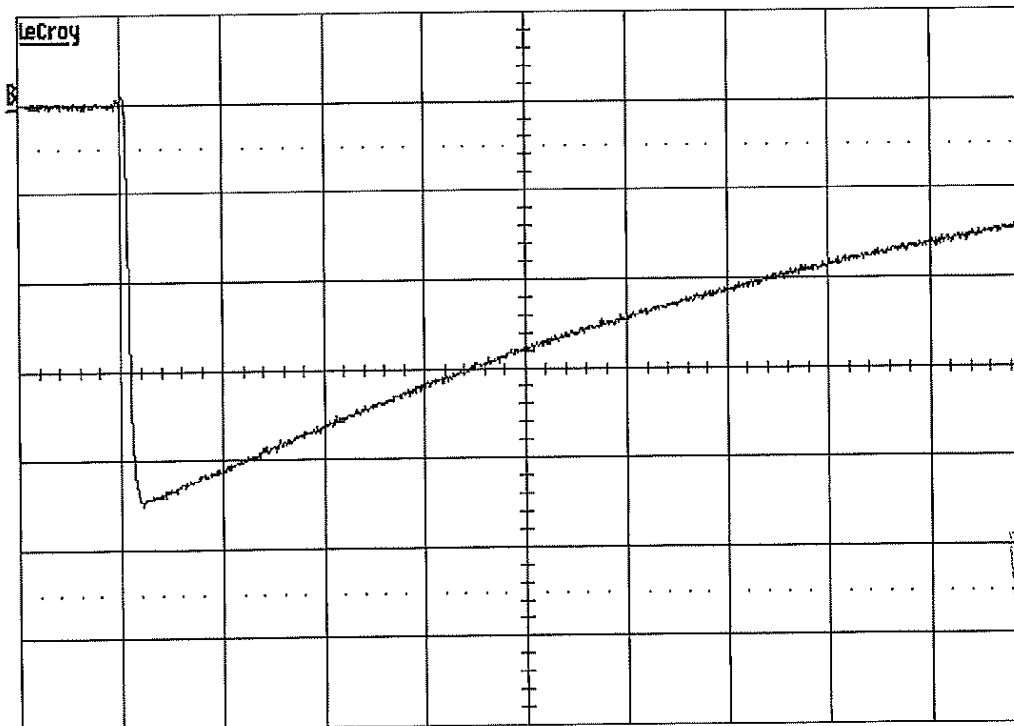
SHEET 26



10  $\mu$ s 20.0 kV

STOPPED

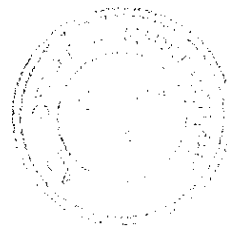
Test No. 1003 0248



10  $\mu$ s 15.0 kV

STOPPED

Test No. 1003 0249

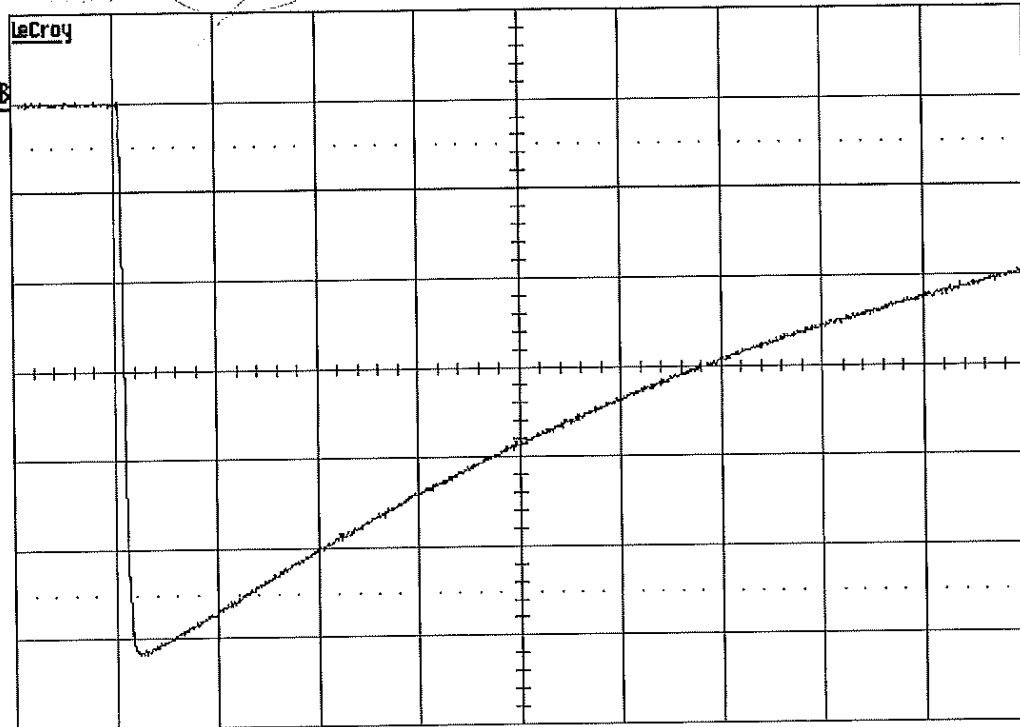


ВЯРНО С  
ОРИГИНАЛА

*Handwritten signature*

517

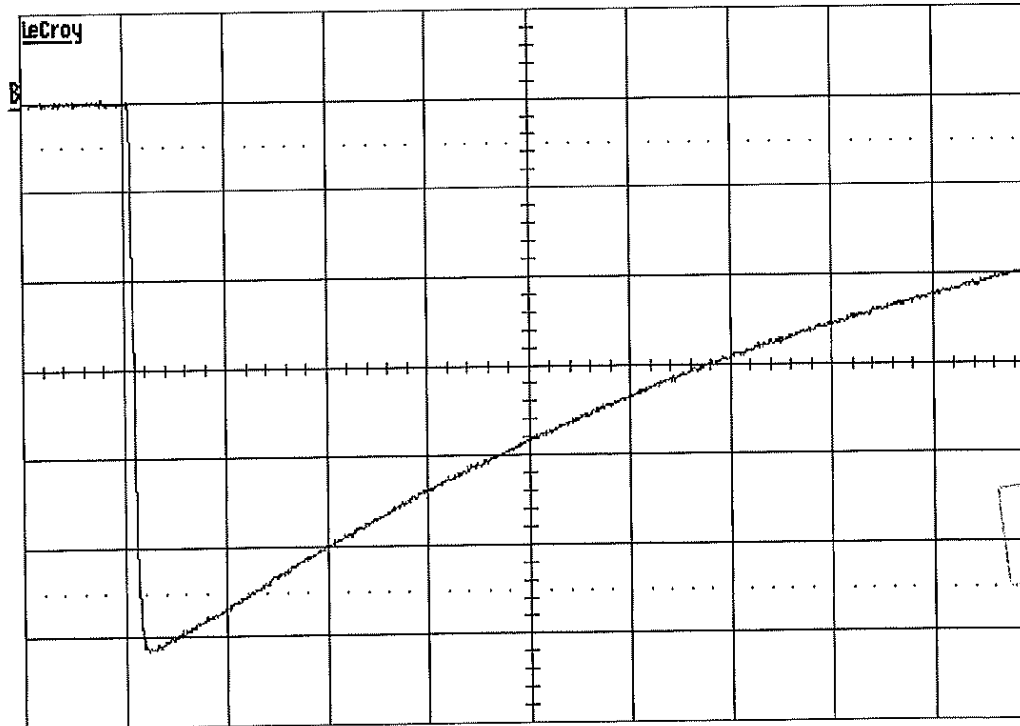
*Handwritten signature*



10  $\mu$ s 20.0 kV

STOPPED

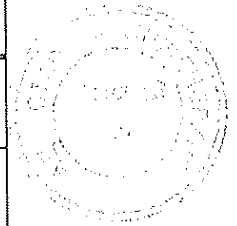
Test No. 1003 0250



10  $\mu$ s 20.0 kV

STOPPED

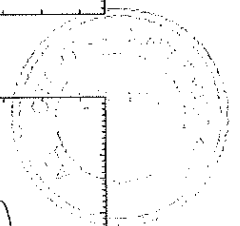
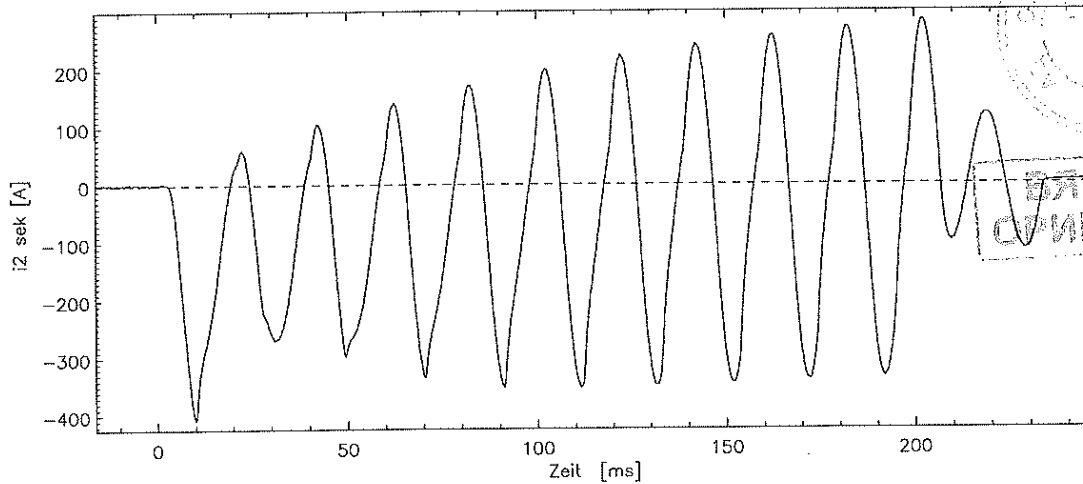
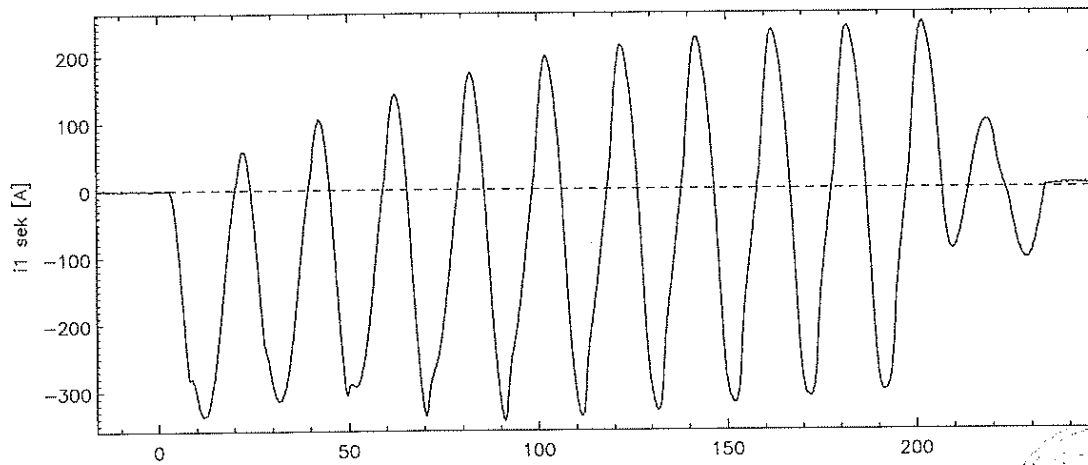
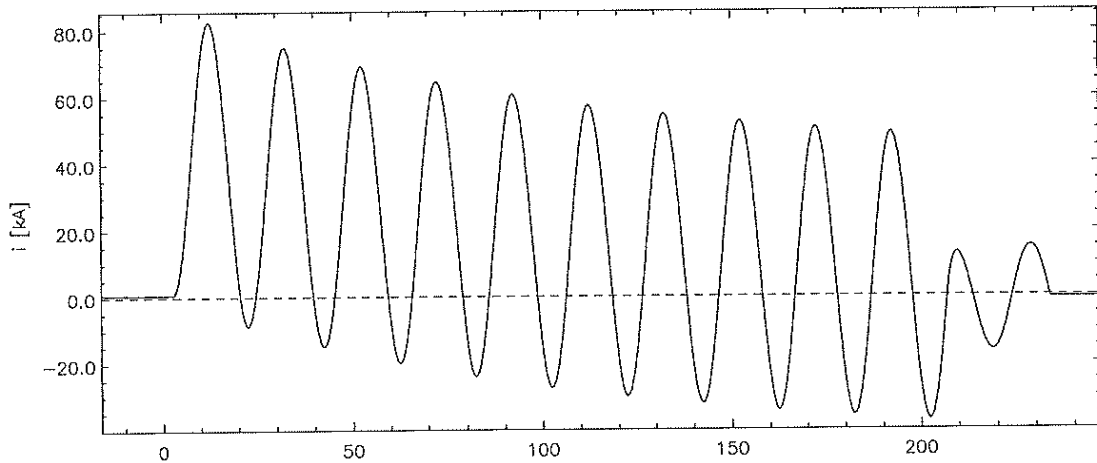
Test No. 1003 0264



ВЯРНО С  
ОРИГИНАЛА

• Short-circuit test

Osz.-Nr. 1030801  
Osc.-No.

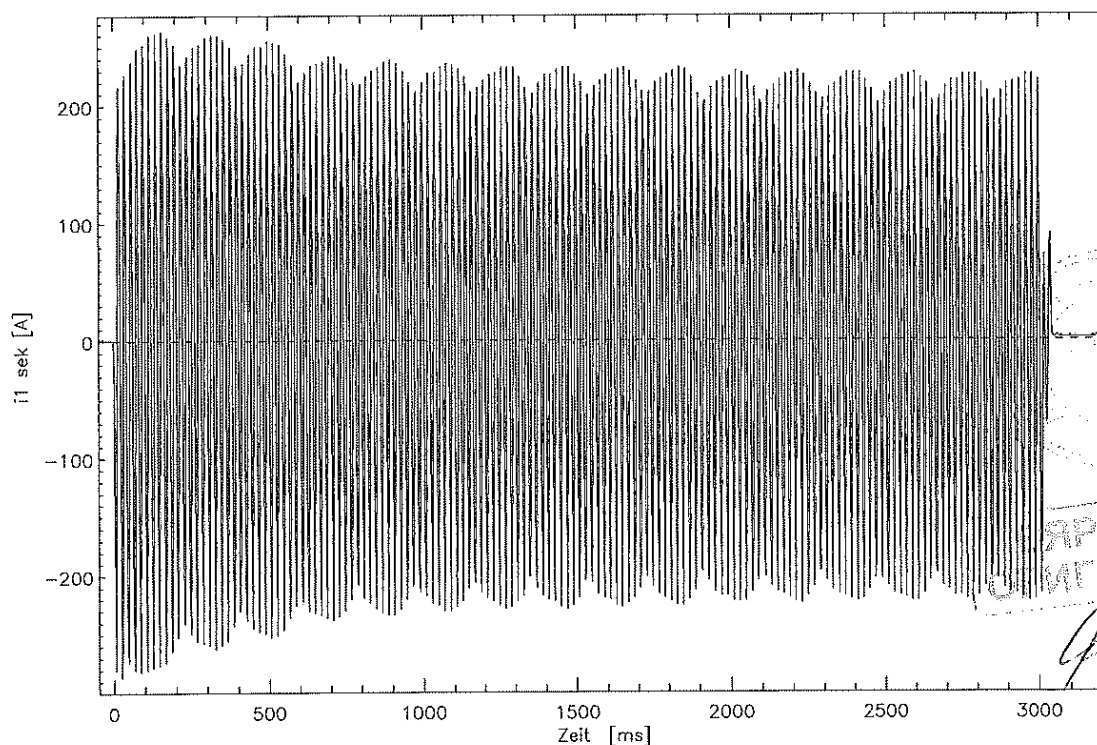
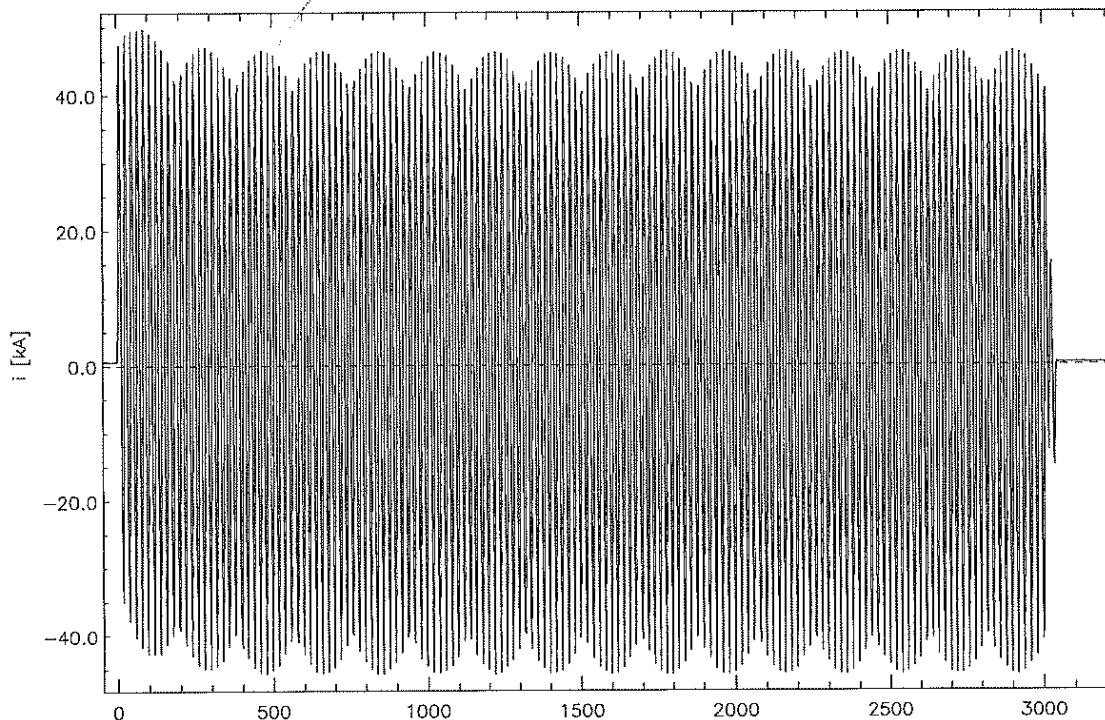


ВЯНО С  
ОФИЦИАЛА

*[Handwritten signature]*

*[Handwritten signature]*

Osz.-Nr. 1030802  
Osc.-No.



020

9.3 Drawing

TYPE : 4MA74 Nr:    
 Um : 24/50/125kV  
 Ratio : 1250/5-5A  
 lcont : 1,2xin  
 1.Core : 0,5FS5 15VA  
 2.Core : 5P10 15VA  
 lth : 31.5kA (3sec.)  
 ldyn : 2,5x1th  
 Copper cross-section  
 Primary winding : 3,36mm<sup>2</sup>  
 1.Secondary winding : 2,55mm<sup>2</sup>  
 2.Secondary winding : 2,54mm<sup>2</sup>

**PRIMARY CONNECTION TERMINALS**  
 2x300 < In <= 2x600A  
 200 < In <= 1500A  
 1500 < In <= 2500A

QTY	DESCRIPTION	POS	DIMENSIONS	WEIGHT	PART OR DIN NO.	Epoxy-resin
	NO. DATE NAME MODIFICATION					
	TOLERANCES DIN 7168 SCALE 9 REPLACES THE DRAWING NO.					
	<b>4MA74</b> BLOCK TYPE CURRENT TRANSFORMER REPLACES THE DRAWING NO.					На основании чл.36а ал.3 от ЗОП
C.C					DR CH AP INF	