SDx and SDTAM are relay modules with two static outputs. They send different signals depending on the type of fault. They may not be used together.

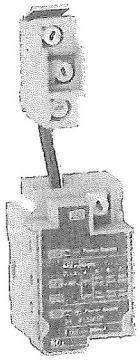
SDx module

The SDx module remotes the trip or alarm conditions of Compact NSX circuit breakers equipped with electronic protection.
The SD2 output, available on all Micrologic trip units, corresponds to the overload-trip indication.
The SD4 output, available on Micrologic 5 / 6 / 7, is assigned to:
- Micrologic 5: overload (Ir)
- Micrologic 6: overload (Ir) and ground fault (Ig)
- Micrologic Vigi 7E: overload (Ir) and earth leakage fault (IΔn).

These two outputs automatically reset when the device is closed (turned ON).
For Micrologic 5 / 6 / 7, the SD2 and SD4 outputs can be reprogrammed to be assigned to other types of tripping or alarm.

Output characteristics
It is possible to assign a function:
- latching with a time delay. Return to the initial state occurs at the end of the time delay
- permanent latching. In this case, return to the initial state takes place via the communication function.

Static outputs: 24 to 415 V AC / V DC; 80 mA max.



SDx relay module with its terminal block.

C

SDTAM module

The SDTAM module is specifically for the motor-protection Micrologic trip units 2.2 M, 2.3 M and 6.2 E-M, 6.3 E-M.
The SDTAM module, linked to the contactor controller, opens the contactor when an overload or other motor fault occurs, thus avoiding opening of the circuit breaker.

Micrologic 2 M
The SD4 output opens the contactor 400 ms before normal circuit-breaker opening in the following cases:
- overload (long-time protection for the trip class)
- phase unbalance or phase loss.

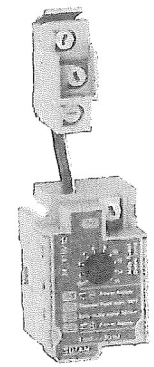
The SD2 output serves to memorise contactor opening by SDTAM.

Micrologic 6 E-M
The SD4 output opens the contactor 400 ms before normal circuit-breaker opening in the following cases:
- overload (long-time protection for the trip class)
- phase unbalance or phase loss
- locked rotor
- underload (undercurrent protection)
- long start.

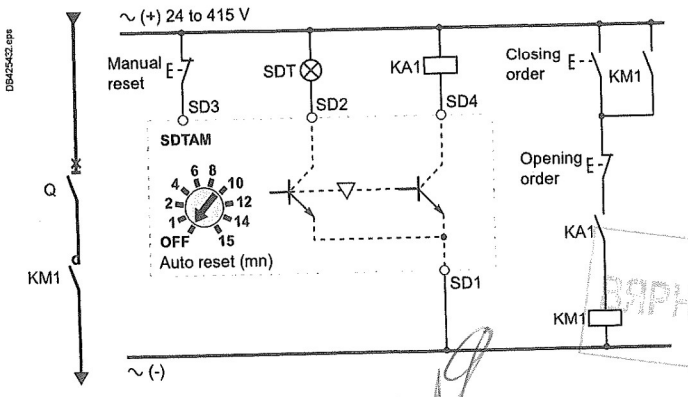
The SD2 output serves to memorise contactor opening by SDTAM.

Output characteristics
Output reset can be:
- manual by a pushbutton included in the wiring diagram
- automatic after an adjustable time delay (1 to 15 minutes) to take into account the motor-cooling time.

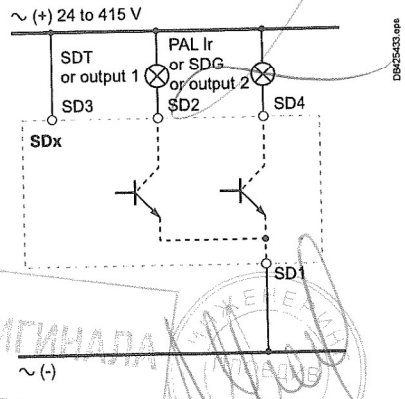
Static outputs: 24 to 415 V AC / V DC; 80 mA max.



SDTAM relay module with its terminal block.

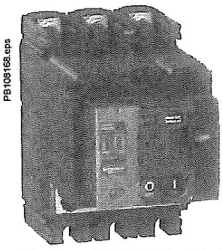


SDTAM wiring diagram with contactor control.



SDx wiring diagram.

Compact NSX accessories and auxiliaries
Motor mechanism



Compact NSX250 with motor mechanism.

When equipped with a **motor-mechanism** module, Compact NSX circuit breakers feature very high mechanical endurance as well as easy and sure operation:
- all circuit-breaker indications and information remain visible and accessible, including trip-unit settings and indications
- suitability for isolation is maintained and padlocking remains possible
- double insulation of the front face.

A specific motor mechanism is required for operation via the communication function. This **communicating motor mechanism** must be connected to the BSCM module to receive the opening and closing orders. Operation is identical to that of a standard motor mechanism.

Applications

- Local motor-driven operation, centralised operation, automatic distribution control.
- Normal/standby source changeover or switching to a replacement source to ensure availability or optimise energy costs.
- Load shedding and reconnection.
- Synchrocoupling.

Operation

The type of operation is selected using the manual/auto mode selection switch (**7**). A transparent, lead-seal cover controls access to the switch.

Automatic

When the switch is in the "auto" position, the ON/OFF (I/O) buttons and the charging lever on the mechanism are locked.
- Circuit-breaker ON and OFF controlled by two impulse-type or maintained signals.
- Automatic spring charging following voluntary tripping (by MN or MX), with standard wiring.
- Mandatory manual reset following tripping due to an electrical fault.

Manual

When the switch is in the "manual" position, the ON/OFF (I/O) buttons may be used. A microswitch linked to the manual position can remote the information.
- Circuit-breaker ON and OFF controlled by 2 pushbuttons I/O.
- Recharging of stored-energy system by pumping the lever 8 times.
- Padlocking in OFF position.

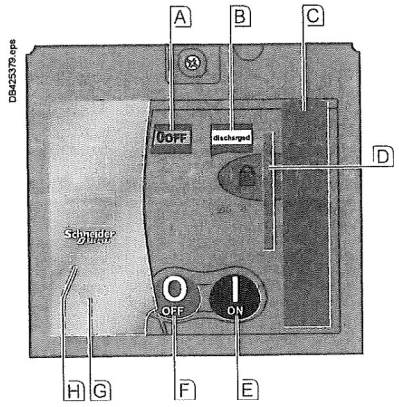
Installation and connections

All installation (fixed, plug-in/withdrawable) and connection possibilities are maintained.

Motor-mechanism module connections are made behind its front cover to integrated terminals, for cables up to 2.5 mm².

Optional accessories

- Keylock for locking in OFF position.
- Operations counter for the Compact NSX400/630, indicating the number of ON/OFF cycles. Must be installed on the front of the motor-mechanism module.



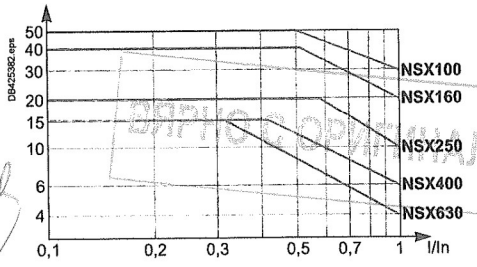
A Position indicator (positive contact indication)
B Spring status indicator (charged, discharged)
C Manual spring-charging lever
D Keylock device (optional)
Locking device (OFF position), using 1 to 3 padlocks, shackle diameter 5 to 8 mm, not supplied
E I (ON) pushbutton
F O (OFF) pushbutton
G Manual/auto mode selection switch. The position of this switch can be indicated remotely.
H Operation counter (Compact NSX400/630)

Characteristics

Motor mechanism			MT100 to MT630
Response time (ms)	opening		< 700
	closing		< 80
Operating frequency	cycles/minute max.		4
Control voltage (V)	DC		24/30 - 48/60 - 110/130 - 250
	AC 50/60 Hz		48 (50 Hz) - 110/130 - 220/240 - 380/440
Consumption [1]	DC (W)	opening	≤ 500
		closing	≤ 500
	AC (VA)	opening	≤ 500
		closing	≤ 500

[1] For NSX100 to NSX250, the inrush current is 2 In for 10 ms.

Electrical endurance



Circuit breaker + motor-mechanism module, in thousands of operations, at 440 V.

Compact NSX accessories and auxiliaries

Remote tripping

MX or MN voltage releases are used to trip the circuit breaker. They serve primarily for remote, emergency-off commands.
It is advised to test the system every six months.

MN undervoltage release

The MN release opens the circuit breaker when its supply voltage drops to a value below 35 % of its rated voltage Un.
Undervoltage tripping, combined with an emergency-off button, provides fail-safe tripping. The MN release is continuously supplied, i.e. if supply is interrupted:
- either voluntarily, by the emergency-off button,
- or accidentally, through loss of power or faulty wiring,

the release provokes opening of the circuit breaker.

Opening conditions
Circuit-breaker tripping by an MN release meets the requirements of standard IEC 60947-2.
- Automatic opening of the circuit breaker is ensured when the continuous voltage supply to the release U ≤ 0.35 x Un.
- If the supply voltage is between 0.35 and 0.7 Un, opening is possible, but not guaranteed. Above 0.7 Un, opening does not take place.

Closing conditions
If there is no supply to the MN release, it is impossible to close the circuit breaker, either manually or electrically. Closing is ensured when the voltage supply to the release U ≥ 0.85 x Un. Below this threshold, closing is not guaranteed.

Characteristics

Power supply	V AC	50/60 Hz: 24 - 48 - 100/130 - 200/240
		50 Hz: 380/415 60 Hz: 208/277
	V DC	12 - 24 - 30 - 48 - 60 - 125 -250
Operating threshold	Opening	0.35 to 0.7 Un
	Closing	0.85 Un
Operating range		0.85 to 1.1 Un
Consumption (VA or W)		Pick-up: 10 - Hold: 5
Response time (ms)		50

Time-delay unit for an MN release
A time delay unit for the MN release eliminates the risk of nuisance tripping due to a transient voltage dip. For shorter micro-outages, a system of capacitors provides temporary supply to the MN at U > 0.7 to ensure non tripping.
The correspondence between MN releases and time-delay units is shown below.

Power supply	Corresponding MN release
Unit with fixed delay 200 ms	
48 V AC	48 V DC
220 / 240 V AC	250 V DC
Unit with adjustable delay ≥ 200 ms	
48 - 60 V AC/DC	48 V DC
100 - 130 V AC/DC	125 V DC
220 - 250 V AC/DC	250 V DC

MX shunt release

The MX release opens the circuit breaker via an impulse-type (≥ 20 ms) or maintained order.

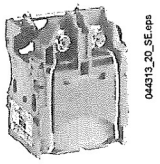
Opening conditions
When the MX release is supplied, it automatically opens the circuit breaker. Opening is ensured for a voltage U ≥ 0.7 x Un.

Characteristics

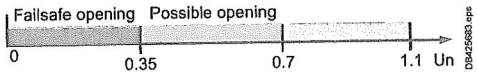
Power supply	V AC	50/60 Hz: 24 - 48 - 100/130 - 200/240
		50 Hz: 380/415 60 Hz: 208/277
	V DC	12 - 24 - 30 - 48 - 60 - 125 -250
Operating range		0.7 to 1.1 Un
Consumption (VA or W)		Pick-up: 10
Response time (ms)		50

Circuit breaker control by MN or MX

When the circuit breaker has been tripped by an MN or MX release, it must be reset before it can be reclosed.
MN or MX tripping takes priority over manual closing.
In the presence of a standing trip order, closing of the contacts, even temporary, is not possible.
Connection using wires up to 1.5 mm² to integrated terminal blocks.



MX or MN voltage release.

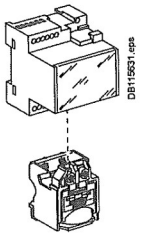


Opening conditions of the MN release.

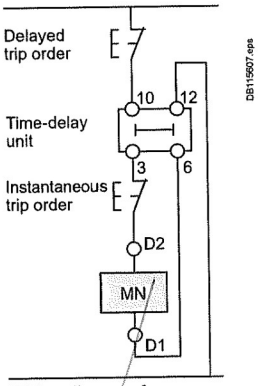
Closing conditions of the MN release.

C

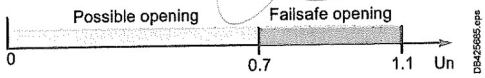
MN voltage release.



MN release with a time-delay unit.



Wiring diagram for emergency-off function with MN + time-delay unit.



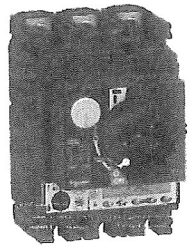
Opening conditions of the MX release.

Note: circuit breaker opening using an MN or MX release must be reserved for safety functions. This type of tripping increases wear on the opening mechanism. Repeated use reduces the mechanical endurance of the circuit breaker by 50 %.

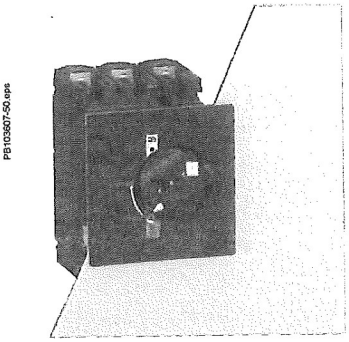
Compact NSX accessories and auxiliaries
Rotary handles

There are two types of rotary handle:
- direct rotary handle
- extended rotary handle.

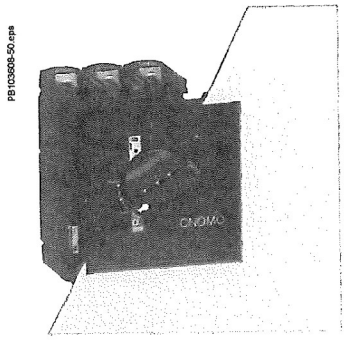
There are two models:
- standard with a black handle
- red handle and yellow front for machine-tool control.



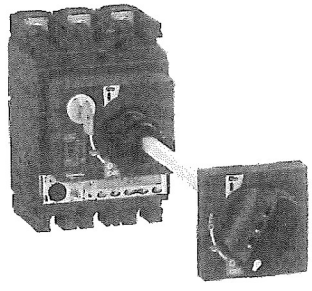
Compact NSX with a rotary handle.



Compact NSX with an MCC rotary handle.



Compact NSX with a CNOMO machine-tool rotary handle.



Compact NSX with an extended rotary handle installed at the back of a switchboard, with the keylock option and key.

Direct rotary handle

Standard handle

Degree of protection IP40, IK07.
The direct rotary handle maintains:
- visibility of and access to trip-unit settings
- suitability for isolation
- indication of the three positions O (OFF), I (ON) and tripped
- access to the "push to trip" button.

Device locking
The rotary handle facilitates circuit-breaker locking.
- Padlocking:
  - standard situation, in the OFF position, using 1 to 3 padlocks, shackle diameter 5 to 8 mm, not supplied
  - with a simple modification, in the ON and OFF positions. Locking in the ON position does not prevent free circuit-breaker tripping if a fault occurs. In this case, the handle remains the ON position after the circuit breaker tripping. Unlocking is required to go to the tripped then the OFF position.
- Keylock (and padlock)

It is possible to install a Ronis or Profalux keylock (optional) on the base of the handle to obtain the same functions as with a padlock.

Early-make or early-break contacts (optional)
Early-make and/or early-break contacts may be used with the rotary handle. It is thus possible to:
- supply an MN undervoltage release before the circuit breaker closes
- open the contactor control circuit before the circuit breaker opens.

MCC switchboard control

Control of an MCC switchboard is achieved by adding a kit to the standard handle. In addition to the standard functions, the kit offers the characteristics listed below.

Higher degree of protection IP
Degree of protection IP43, IK07.
The IP is increased by a built-in gasket.

Door locking depending on device position
- The door cannot be opened if the circuit breaker is ON or in the tripped position. For exceptional situations, door locking can be temporarily disabled with a tool to open the door when the circuit breaker is closed.
- Circuit-breaker closing is disabled if the door is open. This function can be deactivated.

Machine-tool control in compliance with CNOMO

Control of a machine-tool is achieved by adding a kit to the standard handle. In addition to the standard functions, the kit offers the characteristics listed below.

Enhanced waterproofness and mechanical protection
- Degree of protection IP54, IK08.
- Compliance with CNOMO E03.81.501N.

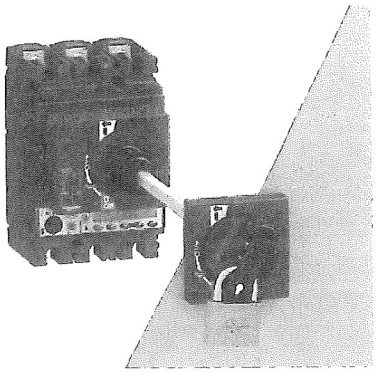
Extended rotary handle

Degree of protection IP55, IK08.
The extended rotary handle makes it possible to operate circuit breakers installed at the back of switchboards, from the switchboard front.
It maintains:
- visibility of and access to trip-unit settings
- suitability for isolation
- indication of the three positions O (OFF), I (ON) and tripped.

Mechanical door locking when device closed
A standard feature of the extended rotary handle is a locking function, built into the shaft, that disables door opening when the circuit breaker is in the ON or tripped positions.
Door locking can be temporarily disabled with a tool to open the door without opening the circuit breaker. This operation is not possible if the handle is locked by a padlock.

Voluntary disabling of mechanical door locking
A modification to the handle, that can be carried out on site, completely disables door locking, including when a padlock is installed on the handle. The modification is reversible.
When a number of extended rotary handles are installed on a door, this disabling function is the means to ensure door locking by a single device.

Extended rotary handle (cont.)


PB105127.eps

Operation when door is opened
An open door shaft operator can be used to operate the circuit breaker when door is opened. This accessory complies with UL508.

The indication of the three positions OFF (**O**), ON (**I**) and tripped (**Trip**) is visible on the circuit breaker.

Device and door padlocking
Padlocking locks the circuit-breaker handle and disables door opening:
- standard situation, in the OFF position, using 1 to 3 padlocks, shackle diameter 5 to 8 mm, not supplied
- with a simple modification, in the ON and OFF positions. Locking in the ON position does not prevent free circuit-breaker tripping if a fault occurs.

In this case, the handle remains in the ON position after the circuit breaker tripping. Unlocking is required to go to the tripped then the OFF position.
If the door controls were modified to voluntarily disable door locking, padlocking does not lock the door, but does disable handle operation of the device.

Device locking using a keylock inside the switchboard
It is possible to install a Ronis or Profalux keylock (optional) on the base of the rotary handle to lock the device in the OFF position or in either the ON or OFF positions.

Accessory for device operation with the door open
When the device is equipped with an extended rotary handle, a control accessory mounted on the shaft makes it possible to operate the device with the door open.
- The device can be padlocked in the OFF position.
- The accessory complies with UL508.

Early-make or early-break contacts (optional)
The extended rotary handle offers the same possibilities with early-make and/or early-break contacts as the standard rotary handle.

Parts of the extended rotary handles
- A unit that replaces the front cover of the circuit breaker (secured by screws).
- An assembly (handle and front plate) on the door that is always secured in the same position, whether the circuit breaker is installed vertically or horizontally.
- An extension shaft that must be adjusted to the distance. The min/max distance between the back of circuit breaker and door is:
  - 185...600 mm for Compact NSX100 to 250
  - 209...600 mm for Compact NSX400/630.

For withdrawable devices, the extended rotary handle is also available with a telescopic shaft to compensate for device disconnection. In this case, the min/max distances are:
- 248...600 mm for Compact NSX100 to 250
- 272...600 mm for Compact NSX400/630.

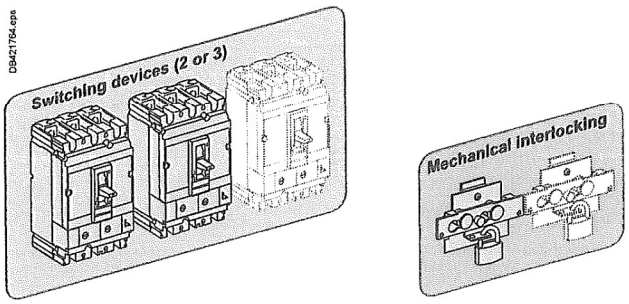
Manual source-changeover systems

An additional accessory interlocks two devices with rotary handles to create a source-changeover system. Closing of one device is possible only if the second is open.
This function is compatible with direct or extended rotary handles.
Up to three padlocks can be used to lock in the OFF or ON position.

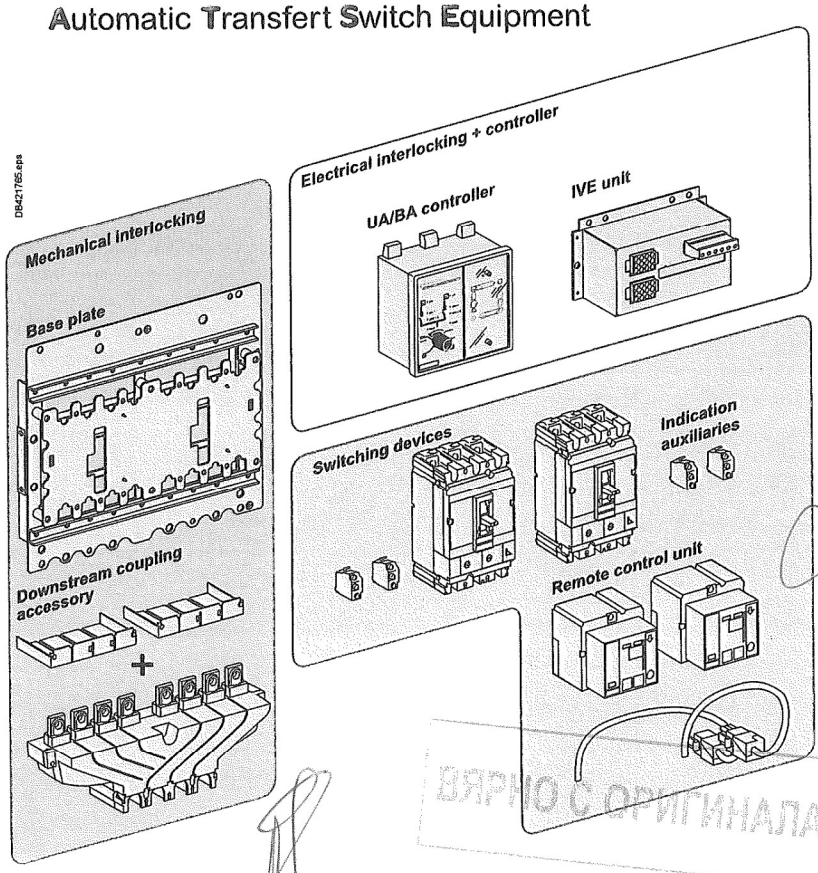
Compact NSX accessories and auxiliaries
Manual and Automatic Transfer Switch

Schneider Electric offers source change-over systems based on Compact and Masterpact devices.
They are made of up to 3 circuit breakers or switch-disconnetors linked by an electrical interlocking system that may have different configurations. Moreover, a mechanical interlocking system must be added to protect against electrical malfunctions or incorrect manual operations. In addition, a controller can be used for automatically control the source transfer.
The following pages present the different solutions for mechanical and electrical interlocking and associated controllers.

Manuel Transfert Switch Equipment



Automatic Transfert Switch Equipment



Compact NSX accessories and auxiliaries
Mechanical interlocking

Interlocking of two or three toggle-controlled devices

Interlocking system

Two devices can be interlocked using this system. Two identical interlocking systems can be used to interlock three devices installed side by side.

Authorised positions:
- one device closed (ON), the others open (OFF)
- all devices open (OFF).

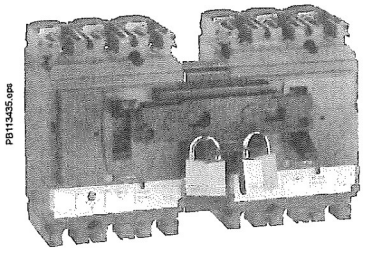
The system is locked using one or two padlocks (shackle Ø5 to 8 mm).

This system can be expanded to more than three devices.

There are two interlocking-system models:
- one for Compact INS/INV
- one for Compact NSX100 to NSX250
- one for Compact NSX400 to NSX630.

Combinations of Normal and Replacement devices

All toggle-controlled fixed or plug-in Compact NSX100 to NSX630 circuit breakers and switch-disconnectors of the same frame size can be interlocked. The devices must be either all fixed or all plug-in versions.



Interlocking of two or three toggle-controlled devices.

Interlocking of two devices by rotary handles

Interlocking system

Interlocking involves padlocking the rotary handles on two devices which may be either circuit breakers or switch-disconnectors.

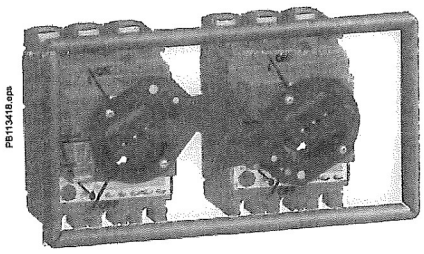
Authorised positions:
- one device closed (ON), the other open (OFF)
- both devices open (OFF).

The system is locked using up to three padlocks (shackle Ø5 to 8 mm).

There are two interlocking-system models:
- one for Compact INS/INV
- one for Compact NSX100 to NSX250
- one for Compact NSX400 to NSX630.

Combinations of Normal and Replacement devices

All rotary-handle fixed or plug-in Compact NSX100 to NSX630 circuit breakers and switch-disconnectors of the same frame size can be interlocked. The devices must be either all fixed or all plug-in versions.



Interlocking of two devices by rotary handles.

Interlocking of devices by keylocks (captive keys)

Interlocking using keylocks is very simple and makes it possible to interlock two or more devices that are physically distant or that have very different characteristics, for example medium-voltage and low-voltage devices or a Compact NSX100 to NSX630 switch-disconnector and circuit breaker.

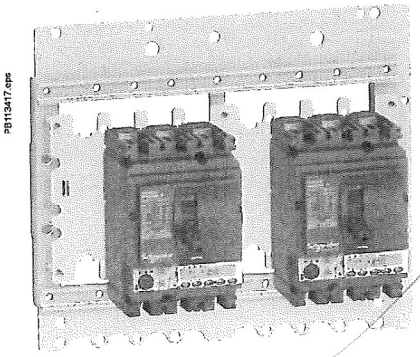
Interlocking system

Each device is equipped with an identical keylock and the key is captive on the closed (ON) device. A single key is available for all devices. It is necessary to first open (OFF position) the device with the key before the key can be withdrawwn and used to close another device.

A system of wall-mounted captive key boxes makes a large number of combinations possible between many devices.

Combinations of Normal and Replacement devices

All rotary-handle Compact NSX100 to NSX630 circuit breakers and switch-disconnectors can be interlocked between each other or with any other device equipped with the same type of keylock.



Interlocking on a base plate.

Interlocking of two devices by base plate

Interlocking system

A base plate designed for two Compact NSX devices can be installed horizontally or vertically on a mounting rail. Interlocking is carried out on the base plate by a mechanism located behind the devices. In this way, access to the device controls and trip units is not blocked.

Combinations of Normal and Replacement devices

All rotary-handle and toggle-controlled Compact NSX100 to NSX630 circuit breakers and switch-disconnectors can be interlocked. Devices must be either all fixed or all plug-in versions, with or without earth-leakage protection or measurement modules.

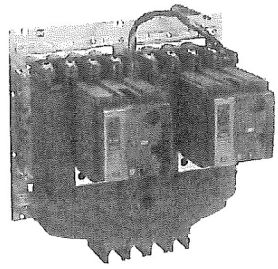
An adaptation kit is required to interlock:
- two plug-in devices
- a Compact NSX100 to NSX250 with an NSX400 to NSX630.

Connection to the downstream installation can be made easier using a coupling accessory.

> Transferpact
(source-changeover systems)

LVPED216028EN

Compact NSX accessories and auxiliaries
Mechanical and electrical interlocking for source-changeover systems



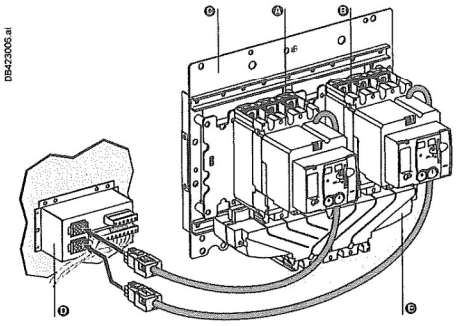
Remote-operated source-changeover system.

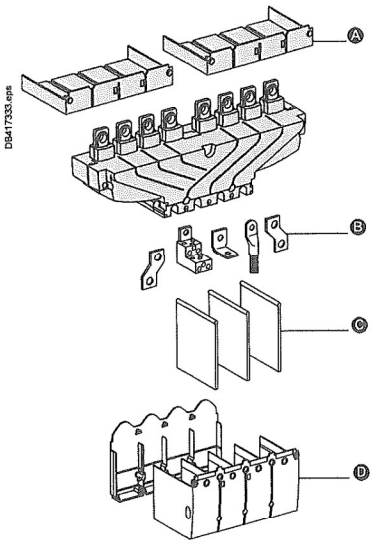
It is made up of two devices with motor mechanisms, mounted on a base plate and combined with:
- an electrical interlocking unit
- optional mechanical interlocking system.

Electrical interlocking unit (IVE)
Interlocks two devices equipped with motor mechanisms and auxiliary contacts. The IVE unit is mandatory to ensure the necessary time-delays required for safe switching.

Mechanical interlocking system
The mechanical interlocking system is strongly recommended to limit the effects of design or wiring errors and to avoid manual switching errors.

- Ⓐ Circuit breaker QS1 equipped with a motor mechanism and auxiliary contacts, connected to the N source
- Ⓑ Circuit breaker QS2 equipped with a motor mechanism and auxiliary contacts, connected to the R source
- Ⓒ Base plate with mechanical interlocking
- Ⓓ Electrical interlocking unit IVE
- Ⓔ Coupling accessory (downstream connection)





- Ⓐ Short terminal shields
- Ⓑ Terminals
- Ⓒ Interphase barriers
- Ⓓ Long terminal shields

Downstream coupling accessory

This accessory simplifies connection to bars and cables with lugs.
It may be used to couple two circuit breakers of the same size.
Pitch between outgoing terminals:
- Compact NSX100 to NSX250: 35 mm
- Compact NSX400 to NSX630: 45 mm.

For Compact NSX circuit breakers, the downstream coupling accessory can be used only with **fixed versions**.

Connection and insulation accessories

The coupling accessory can be fitted with the same connection and insulation accessories as the circuit breakers.

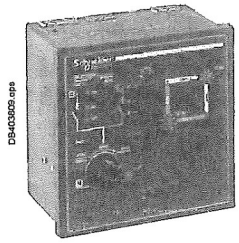
Possible uses	Downstream coupling	
	Possible mounting	Outgoing pitch (mm)
Remote-operated source-changeover systems		
NSX100 to NSX250	Ⓒ	35
NSX400 to NSX630	Ⓒ	45

Customize your circuit breaker with accessories

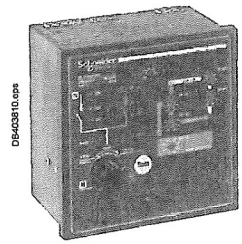
Compact NSX accessories and auxiliaries

Automatic source-changeover systems with controller

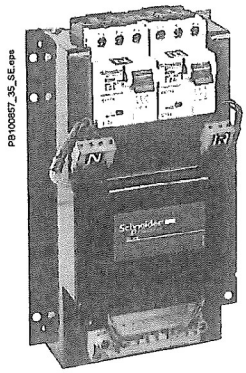
By combining a remote-operated source-changeover system with an integrated BA or UA automatic controller, it is possible to automatically control source transfer according to user-selected sequences.
These controllers can be used on source-changeover systems comprising 2 circuit breakers.
For source-changeover systems comprising 3 circuit breakers, the automatic control diagram must be prepared by the installer as a complement to diagrams provided in the "electrical diagrams" section of the catalog source-changeover systems.



BA controller.



UA controller.



Auxiliary control plate for a BA or UA controller.

Functions of the BA and UA controllers

Controller		BA	UA
Compatible circuit breakers		Compact NSX100 to 630 circuit breakers	
4-position switch			
Automatic operation		◎	◎
Forced operation on Normal source		◎	◎
Forced operation on Replacement source		◎	◎
Stop (both Normal and Replacement sources OFF)		◎	◎
Automatic operation			
Monitoring of the Normal source and automatic transfer from one source to the other		◎	◎
Engine generator set start-up control			◎
Delayed shutdown (adjustable) of engine generator set			◎
Load shedding and reconnection of non-priority loads			◎
Transfer to Replacement source if one of the Normal source phases is absent			◎
Test			
By opening the P25M circuit breaker upstream of the controller		◎	
By pressing the test button on the front of the controller			◎
Indications			
Circuit-breaker status indication on the front of the controller: ON, OFF, fault trip		◎	◎
Automatic-mode indication contact		◎	◎
Other functions			
Selection of type of Normal source (single-phase or three-phase)			◎
Voluntary transfer to Replacement source		◎	◎
Forced operation on Normal source if Replacement source is not operational			◎
Additional test contact (not part of controller) Transfer to Replacement source only if contact closed (e.g. for a UR frequency check)		◎	◎
Setting of maximum start-up time for the Replacement-source			◎
Power supply			
Control voltages [1]	220 to 240 V 50/60 Hz	◎	◎
	380 to 415 V 50/60 Hz	◎	◎
	440 V 60 Hz	◎	◎
Operating thresholds			
Undervoltage	0.35 Un ⩽ voltage ⩽ 0.7 Un	◎	◎
Phase failure	0.5 Un ⩽ voltage ⩽ 0.7 Un		◎
Voltage presence	voltage ⩾ 0.85 Un	◎	◎

Characteristics of output contacts (dry, volt-free contacts)

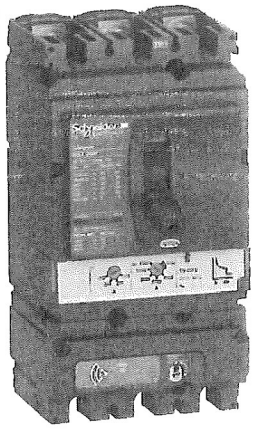
Rated thermal current (A): 8
Minimum load: 10 mA at 12 V

		AC				DC	
Utilisation category (IEC 60947-5-1)		AC12	AC13	AC14	AC15	DC12	DC13
Operational current (A)	24 V	8	7	5	6	8	2
	48 V	8	7	5	5	2	-
	110 V	8	6	4	4	0.6	-
	220/240 V	8	6	4	3	-	-
	250 V	-	-	-	-	0.4	-
	380/415 V	5	-	-	-	-	-
	440 V	4	-	-	-	-	-
	660/690 V	-	-	-	-	-	-

[1] The controller is powered by the ACP control plate. The same voltage must be used for the ACP plate, the IVE unit and the circuit-breaker operating mechanisms. If this voltage is the same as the source voltage, then the "Normal" and "Replacement" sources can be used directly for the power supply. If not, an isolation transformer must be used.

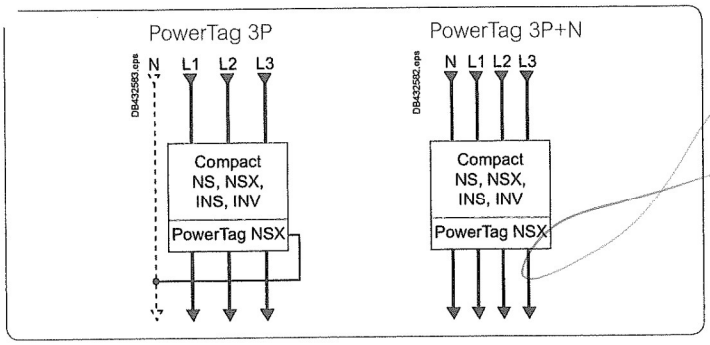
Compact NSX accessories and auxiliaries
Additional measurement module: PowerTag NSX

PowerTag NSX is a Compact NSX wireless-communication modules for 3P and 3P+N electrical networks, mounted directly on the bottom side of the circuit breaker or the Vigi add-on. PowerTag NSX provides capability to measure energy, monitor voltage loss, and trigger alarms. It then delivers useful data for monitoring and diagnosis of the associated circuit breaker through Smartlink concentrator.
In combination with PowerTag Acti9, you can take advantage of a full wireless class 1 solution to monitor energy and to be aware in case of voltage loss or alarming at any level of a distribution panel, being able to take immediately the right actions in case of electrical issue. In addition to monitoring and alarming, PowerTag solution provides a complete knowledge of real time electrical values with a rich and accurate data transfer every 5 seconds.
PowerTag energy sensors can be quickly and easily installed in new or existing panels at any time. Compared to traditional metering solutions, installation time and commissioning are much shorter with no wiring, hence an error proof high density solution and a built-in class 1 accuracy.


PowerTag NSX.

Functions
PowerTag NSX energy sensor measures the following values in accordance with the IEC 61557-12 standard:
- ■ Energy (4 quadrants):
- □ Active energy (kWh): total and partial, delivered and received.
- □ Active energy per phase (kWh): total.
- □ Reactive energy (VARh): partial, delivered and received.
- ■ Power:
- □ Active power (W): total and per phase
- □ Reactive power (VAR): total
- □ Apparent power (VA): total.
- ■ Voltages (V): phase-to-phase (U12, U23, U31) and phase-to-neutral (V1N, V2N, V3N)
- ■ Currents (A): per phase (I1, I2, I3)
- ■ Frequency
- ■ Power factor
- ■ Voltage loss alarm:
- □ PowerTag energy sensor sends a "voltage loss" alarm and the current-per-phase value before being de-energized,
- □ At "voltage loss", PowerTag adds an overload alarm if the current is higher than the rated current of the associated protective device.

Installation
The module is self-powered and is installed directly on the bottom side of the circuit breaker or Vigi add-on terminals. It communicates wirelessly to SmartLink which can concentrate data for up to 20 PowerTag in the same panel.
PowerTag NSX 3P has to be used with 3P devices, and an external neutral voltage tap is provided in case of the installation has a neutral to provide phase-to-neutral voltages, active energy per phase and power per phase. PowerTag 3P+N has to be used with 4P devices.



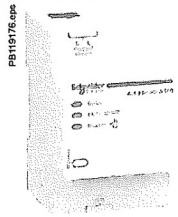
PowerTag NSX modules are compatible with Compact NSX100/160/250, Compact NSX400/630, Compact INS250-100A to 250A, Compact INS320/400/500/630, Compact INV100/160/200/250, Compact INV320/400/500/630, Compact NS100/160/250 and Compact NS400/630.
In case of retrofit, following points have to been checked:
- ☑ Clearance to be able to add PowerTag module (see dimensions in chapter E) and to respect bending radius of cables
- ■ Condition of power connectors: to be replaced if damaged
- ■ Tightening torques depending of the connector used

Compact NSX accessories and auxiliaries
Additional measurement module: PowerTag NSX

Integration in Smartlink

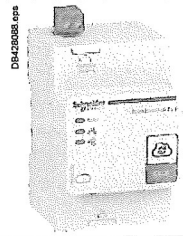
Smartlink concentrate wirelessly data from PowerTag and make them available over Ethernet:

For Commercial & Building applications

Acti9 Smartlink SI D (Monitoring)	Acti9 Smartlink SI B (Monitoring & Control)
	
A9XMWA20	A9XMZA08

For Small Business applications

Acti9 Smartlink EL D (Monitoring)



A9XELC10

Smartlink embedded web pages allow:
- to do commissioning
- to display measured values
- to set and display alarms and pre-alarms.

Refer to the concentrator catalogue for more information.

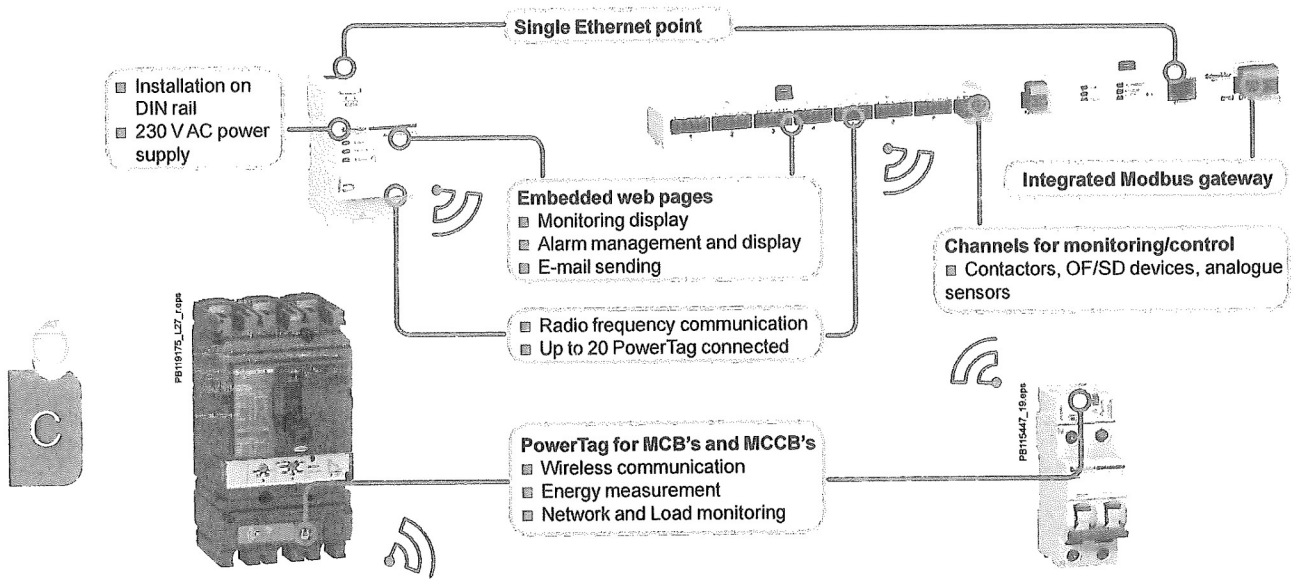
Commissioning

Commissioning can be done very easily:
- for Smatlink EL: with a smartphone
- for Smartlink SI: with embedded webpages or with Ecoreach which provides a test report for system integration with all the Modbus registers, including bits and descriptions associated

Compact NSX accessories and auxiliaries
Additional measurement module: PowerTag NSX

Metering and monitoring
Acti 9 Smartlink SI D (Ethernet)

Metering, monitoring and control
Acti 9 Smartlink SI B (Ethernet)



Technical characteristics

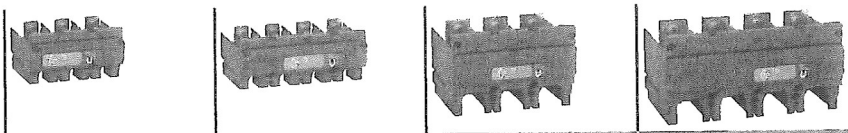
Main characteristics			
Rated voltage	Un	Phase-to-neutral	230 VAC ± 20 %
		Phase-to-phase	400 VAC ± 20 %
Frequency			50/60 Hz
Operating current	In		250 A / 630 A
Maximum operating current			1.2 x In
Saturation current			2 x In
Maximum consumption			3.7 VA
Starting current	Ist		160 mA / 400 mA
Base current	Ib		40 A / 100 A
Additional characteristics			
Operating temperature			-25 °C to +70 °C
Storage temperature			-50 °C to +85 °C
Overvoltage category		As per IEC 61010-1	Cat. IV
Measuring category		As per IEC 61010-2-30	Cat. III
Pollution degree			3
Altitude			Up to 2000 m without derating [1]
Degree of protection device			IP20
			IK07
Radio-frequency communication			
ISM band 2.4 GHz			2.4 GHz to 2.4835 GHz
Channels		As per IEEE 802.15.4	11 to 26
Isotropic Radiated Power		Equivalent (EIRP)	0 dBm
Maximum transmission time			< 5 ms
Channel occupancy		For 1 device	messages sent every 5 seconds

Characteristics of measuring functions				
Function	**Symbol**	**Performance as per IEC 61557-12**		**Measuring range (250 A / 630 A)**
		Class	**Measuring range (250 A / 630 A)**	
Active power (per phase, total)	P	1	4 to 250 A / 10 to 630 A	88 W to 416 kW / 221 W to 1048 kW
Total reactive power	Q_A	2		88 VAR to 416 kVAR / 221 VAR to 1048 kVAR
Total apparent power	S_A	2		88 VA to 416 kVA / 221 VA to 1048 kVA
Active Energy (per phase, total, partial)	E_a	1		0 to 281.10^9 kWh
Total reactive Energy	E_{rA}	2		0 to 281.10^9 kVARh
Frequency	f	1	45 to 55 Hz	45 to 65 Hz
Phase current	I	1	8 to 250 A / 20 to 630 A	160 mA to 500 A / 400 mA to 1260 A
Voltages (Line to Line)	U	0.5	Un ± 20 %	320 to 480 VAC
Power factor (arithmetic)	PF_A	1	From 0.5 inductive to 0.8 capacitive	-1 to 1

[1] Above 2000 m, please consult us.

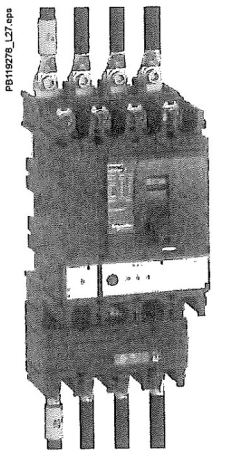
Customize your circuit breaker with accessories

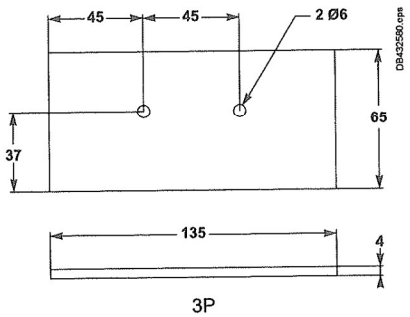
Compact NSX accessories and auxiliaries
Additional measurement module: PowerTag NSX



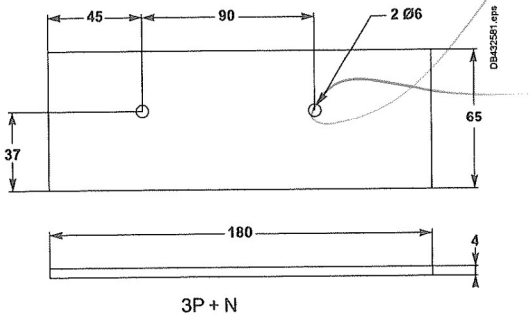
Products (AC network)		Mounting position	250 3P	250 3P+N	630 3P	630 3P+N
Compact						
Circuit breakers						
NSX100/160/250 **B/F/N/H/S/L/R** Fixed	3P	Bottom	☑	-	-	-
	4P	Bottom	-	☑	-	-
NSX400/630 **F/N/H/S/L/R** Fixed	3P	Bottom	-	-	☑	-
	4P	Bottom	-	-	-	☑
NSX100/160/250 **B/F/N/H/S/L/R** Plug-In (mounted on the base)	3P	Top / Bottom	☑	-	-	-
	4P	Top / Bottom	-	☑ [1]	-	-
NSX400/630 **F/N/H/S/L/R** Plug-In (mounted on the base)	3P	Top / Bottom	-	-	☑ [2]	-
	4P	Top / Bottom	-	-	-	☑ [1] [2]
NS100/160/250 **N/SX/H/L** Fixed	3P	Bottom	☑	-	-	-
	4P	Bottom	-	☑	-	-
NS400/630 **N/H/L** Fixed	3P	Bottom	-	-	☑	-
	4P	Bottom	-	-	-	☑
NS100/160/250 **N/SX/H/L** Plug-in	3P	Top / Bottom	☑	-	-	-
	4P	Top / Bottom	-	☑ [1]	-	-
NS400/630 **N/H/L** Plug-in	3P	Top / Bottom	-	-	☑ [2]	-
	4P	Top / Bottom	-	-	-	☑ [1] [2]
Circuit breakers equipped with Vigi block						
NSX100/160/250 **B/F/N/H/S/L/R** Fixed	3P	Bottom	☑	-	-	-
	4P	Bottom	-	☑	-	-
NSX400/630 **F/N/H/S/L/R** Fixed	3P	Bottom	-	-	☑	-
	4P	Bottom	-	-	-	☑
NSX100/160/250 **B/F/N/H/S/L/R** Plug-In (mounted on the base)	3P	Top	☑	-	-	-
NSX400/630 **F/N/H/S/L/R** Plug-In (mounted on the base)	3P	Top	-	-	☑ [2]	-
Switches						
INS250/INV - 100/160/200/250	3P	Bottom	-	☑	-	-
	4P	Top / Bottom	-	☑ [1]	-	-
INS/INV - 320/400/500/630	3P	Bottom	-	-	-	☑
	4P	Top / Bottom	-	-	-	☑ [1]

[1] neutral on the right when mounted on top side
[2] when plate mounted, need to add an intercalary wedging plate under the PowerTag module with following dimensions:



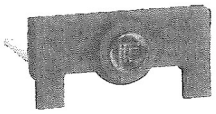


3P



3P + N

Compact NSX accessories and auxiliaries
Additional measurement and indication modules



Voltage-presence indicator.

Voltage-presence indicator

The indicator detects and indicates that circuit breaker terminals are supplied with power.

Installation
- Mounted in the long or short terminal shields, via the knockouts.
- May be positioned upstream or downstream of the circuit breaker.
- Degree of protection IP40, IK04.
- Not compatible with the motor-mechanism module.

Electrical characteristics

Operates on all networks with voltages ranging from 220 to 550 V AC.

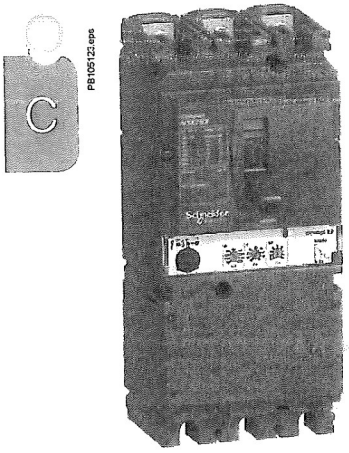
Current-transformer module

This module enables direct connection of a measurement device such as an ammeter or a power meter.

Installation
- The module is installed directly on the downstream circuit-breaker terminals.
- Degree of protection IP40, IK04.
- Class II insulation between front and the power circuits.
- Connection to 6 integrated connectors for cables up to 2.5 mm².

Electrical characteristics
- Current transformer with 5 A secondary winding.
- Class 3 for the following output-power consumptions:

Accuracy:
- 100 A rating: 1.6 VA
- 150 A rating: 3 VA
- 250 A rating: 5 VA
- 400/600 A rating: 8 VA.



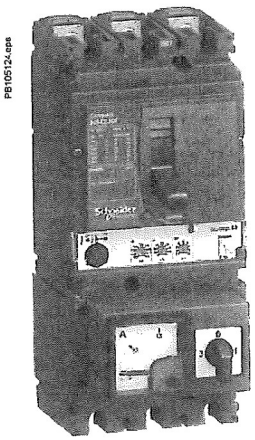
Compact NSX with current-transformer module.

Current-transformer module with voltage measurement outputs

This module enables direct connection of a digital measurement device such as a Power Meter PM700, PM800, etc. (not supplied).

Installation
- The module is installed directly on the downstream circuit-breaker terminals.
- Degree of protection IP40, IK04.
- Class II insulation between front and the power circuits.
- Built-in connectors for cables from 1.5 to 2.5 mm².

Electrical characteristics
- Rated operational voltage Ue: 530 V
- Frequencies of measured values: 50...60 Hz
- Three CTs with 5 A secondary windings for the rated primary current In :
- class 0.5 to 1 for rated power consumption values at the output:
  - 125 A, 150 A and 250 A ratings: class 1 for 1.1 VA
  - 400/600 A rating: class 0.5 for 2 VA
- Connection using a 2.5 mm2 cable up to 2.5 m long.
- Four voltage measurement outputs including protection with automatic reset.
- voltage measurement output resistance 3500 Ω ±25 %, maximum current 1 mA
- The voltage measurement outputs are intended only for measurements (1 mA max.) and may not be used to supply the display.



Compact NSX with ammeter module.

Ammeter and Imax ammeter modules

Ammeter module

Measures and displays (dial-type ammeter) the current of each phase (selection of phases by 3-position switch in front).

Imax ammeter module

Measures and displays (dial-type ammeter) the maximum current flowing in the middle phase. The Imax value can be reset on the front.

Installation
- Identical for both types of ammeter module.
- The module is installed directly on the downstream circuit-breaker terminals.
- The ammeter clips into the module in any of four 90° positions, i.e. it can be installed of devices mounted both vertically and horizontally.
- Degree of protection IP40, IK04.
- Class II insulation between front and the power circuits.

Electrical characteristics
- Ammeter module: accuracy class 4.5.
- Imax ammeter module: accuracy ±6 %.
- Maximum currents are displayed only if they last ≥ 15 minutes.

Vigi add-on Alarm

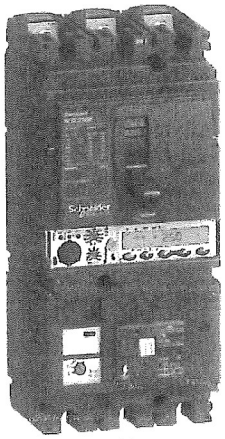
This module detects and indicates an insulation drop on a load circuit (TN-S or TT systems).
Operation is identical to that of a Vigi add-on, but without circuit-breaker tripping.
Indication by a red LED in front.
An auxiliary contact may be installed for remote insulation-drop indications.
When insulation drops below a minimum, user-set threshold, the LED goes on and the auxiliary contact switches. The fault indication cannot be cancelled except by pressing the manual reset button.

Installation

- The module is installed directly on the downstream circuit-breaker terminals.
- Degree of protection IP40, IK04.
- Double insulation of the front face.

Electrical characteristics

- Settings: 100 - 200 - 500 - 1000 mA.
- Accuracy: -50 +0 %.
- Time delay following insulation drop: 5 to 10 seconds.
- AC-system voltage: 200 to 440 V AC.

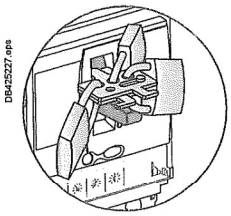


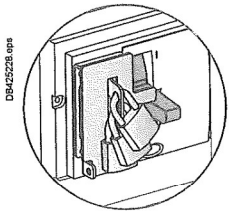
PB105125-eps

Vigi add-on Alarm.

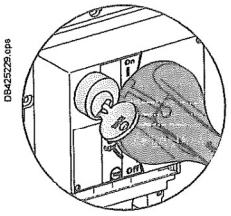
C

Compact NSX accessories and auxiliaries
Locks





Toggle locking using padlocks and an accessory:
Removable device — Fixed device attached to the case [3].

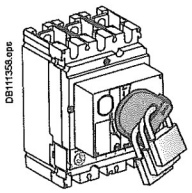


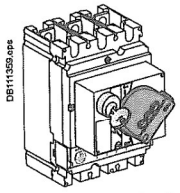
Rotary-handle locking using a keylock.

Locking in the OFF position guarantees isolation as per IEC 60947-2. Padlocking systems can receive up to three padlocks with shackle diameters ranging from 5 to 8 mm (padlocks not supplied). Certain locking systems require an additional accessory.

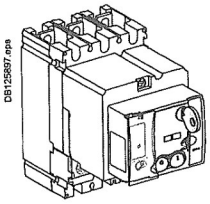
Control device		Function	Means	Required accessories
Toggle		Lock in OFF position	Padlock	Removable device
		Lock in OFF or ON position	Padlock	Fixed device
Direct rotary handle	Standard	Lock in ■ OFF position ■ OFF or ON position [1]	Padlock	-
			Keylock	Locking device + keylock
	MCC	Lock in ■ OFF position ■ OFF or ON position [1]	Padlock	-
	CNOMO	Lock in ■ OFF position ■ OFF or ON position [1]	Padlock	-
Extended rotary handle		Lock in ■ OFF position ■ OFF or ON position [1] with door opening prevented [2]	Padlock	-
		Lock in OFF position	Padlock	UL508 control accessory
		■ OFF or ON position [1] inside the switchboard	Keylock	Locking device + keylock
Motor mechanism		Lock in OFF position remote operation disabled	Padlock	-
			Keylock	Locking device + keylock
Withdrawable circuit breaker		Lock in ■ disconnected position	Padlock	-
			Keylock	Locking device + keylock
		■ connected position	Keylock	Locking device + keylock

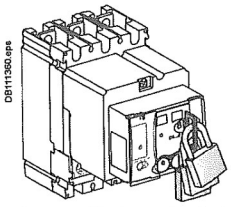
[1] Following a simple modification of the mechanism.
[2] Unless door locking has been voluntarily disabled.
[3] Only for 3P-4P.



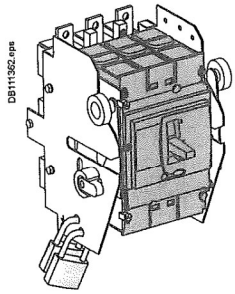


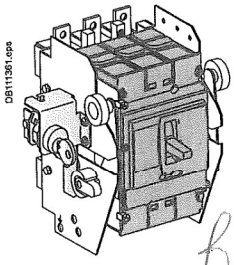
Rotary-handle locking using a padlock or a keylock.





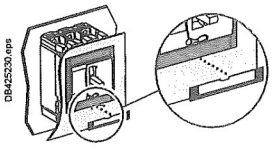
Motor-mechanism locking using a padlock or a keylock.



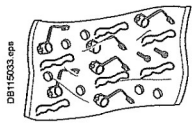


Chassis locking in the connected position.

Compact NSX accessories and auxiliaries
Sealing accessories



Identification accessories.



Sealing accessories.

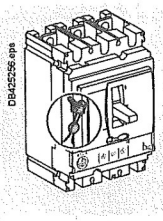
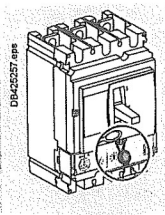
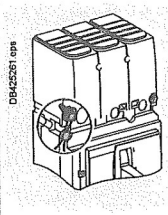
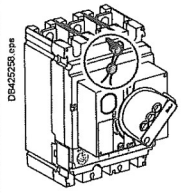
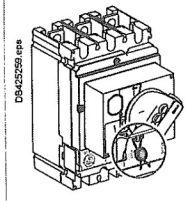
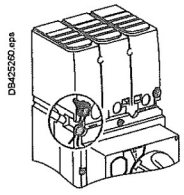
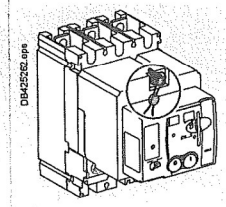
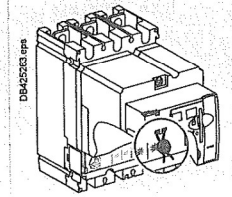
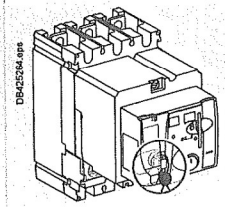
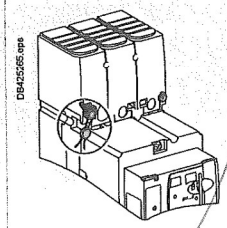
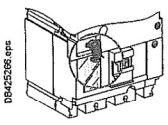
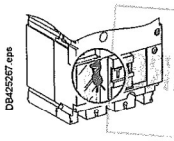
Outgoing-circuit identification

Compact NSX100 to 630 can be equipped with label holders supplied in sets of ten (cat. no. LV429226).
They are compatible with escutcheons.

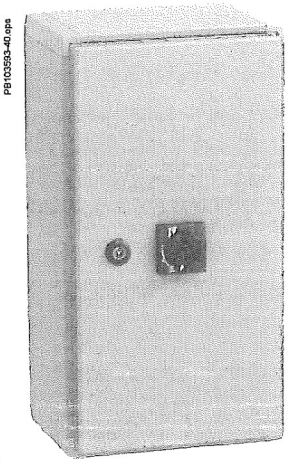
Sealing accessories

Sealing accessories are available. Each bag of accessories contains all the parts required for the types of sealing indicated below.
A bag contains:
- 6 sealing accessories
- 6 lead seals
- 0.5 m of wire
- 2 screws.

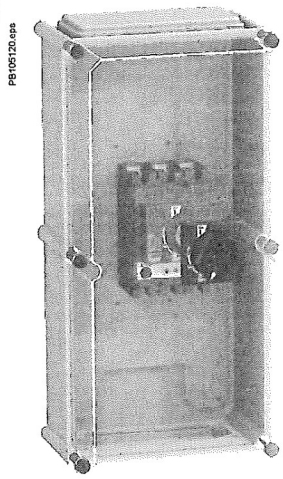
Types of seals and corresponding functions

Toggle control				
Rotary handle				
Motor mechanism				
Types of seals	**Front-cover fixing screw**	**Trip-unit transparent cover**	**Motor-mechanism transparent cover**	**Terminal-shield fixing screw**
Protected operations	■ front removal ■ access to auxiliaries ■ trip-unit removal.	■ modification of settings ■ access to test connector.	■ access to manual/auto mode selection switch: depending on its position, manual [1] or automatic operation is not possible. **[1]** In this case, local operation is not possible.	■ access to power connections (protection against direct contact).
Access to Vigi add-on settings				
Types of seals	**Vigi add-on fixing device**	**Protection cover for settings**		
Protected operations	■ removal of the Vigi add-on.	■ modification of settings.		

Compact NSX accessories and auxiliaries
Individual enclosures



IP55 metal enclosure.



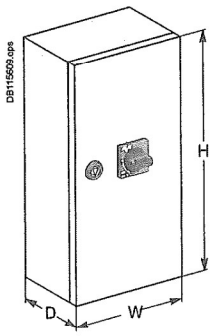
IP55 insulating enclosure.

Individual enclosures are available for Compact NSX/Compact NSX Vigi add-on devices with two, three or four poles.
All fixed, front connections are possible, except right-angle, 45°, double-L and edgewise terminal extensions.
All spreaders may be installed in the enclosures intended for Compact NSX/ Compact NSX Vigi add-on 250 to 630 devices, except the 70 mm spreaders for NSX400/630.

Two models of enclosures
- ▣ IP55 metal individual enclosure, with:
- □ metal enclosure
- □ door with keylock and cut-out for rotary handle
- □ extended rotary handle, IP55, IK08, black or red/yellow
- □ device mounting plate
- □ removable plate (without holes) for cable entry through bottom.
- ▣ IP55 insulating individual enclosure, with:
- □ polyester insulating enclosure
- □ transparent cover, screwed, neoprene gasket, with cut-out for extended rotary handle
- □ extended rotary handle, IP55, IK08, black or red/yellow
- □ device mounting plate
- □ 2 removable plates (without holes) for cable entry through bottom and/or top.

Dimensions (H x W x D in mm)

▣ Metal enclosures:	
□ Compact NSX100/160	450 x 350 x 250
□ Compact NSX250 and Compact NSX100 to 250 Vigi add-on	650 x 350 x 250
□ Compact NSX400	650 x 350 x 250
□ Compact NSX630 and Compact NSX400/630 Vigi add-on	850 x 600 x 250
▣ Insulating enclosures:	
□ Compact NSX100/160	360 x 270 x 235
□ Compact NSX250 and Compact NSX100/160 Vigi add-on	540 x 270 x 235
□ Compact NSX400/630	720 x 360 x 235
□ Compact NSX250/630 Vigi add-on	720 x 360 x 235



IP30 or IP40 escutcheons for fixed devices

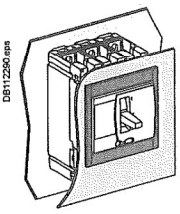
Escutcheons are an optional feature mounted on the switchboard door. They increase the degree of protection to IP40, IK07. Protection collars maintain the degree of protection, whatever the position of the device (connected, disconnected).

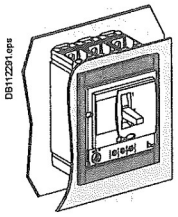
IP30

The three types are glued to the cut-out in the front door of the switchboard:
- ▪ escutcheon for all control types (toggle, rotary handle or motor mechanism)
- □ without access to the trip unit
- □ with access to the trip unit
- ▪ for Vigi add-on, can be combined with the above.

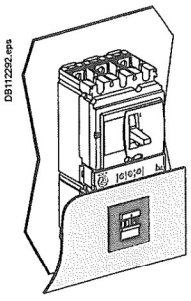
IP40

The four types, with a gasket, are screwed to the door cut-out:
- ▪ three escutcheons identical to the previous, but IP40
- ▪ a wide model for Vigi and ammeter modules that can be combined with the above.

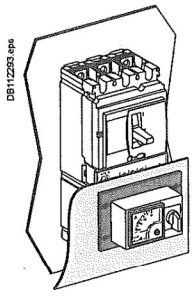




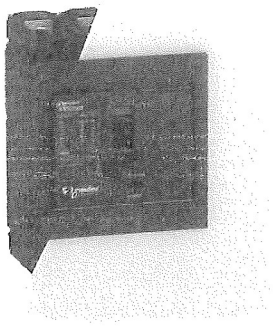
Escutcheon for toggle without and with access to the trip unit.



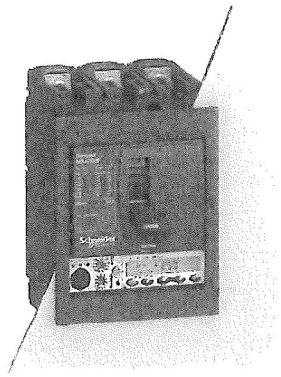
Escutcheon for Vigi add-on.



Wide escutcheon for ammeter.

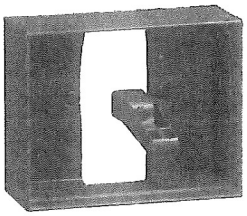


IP30 escutcheon.

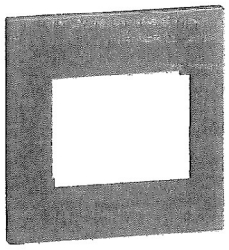


IP30 escutcheon with access to the trip unit.

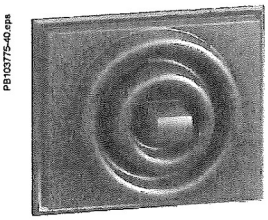
Compact NSX accessories and auxiliaries
Escutcheons and protection collars



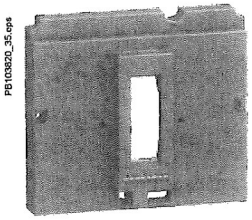
Escutcheon with collar for toggle.



Escutcheon for Vigi add-on.



Toggle cover.

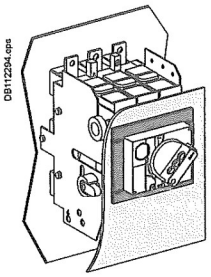


NS retrofit front cover.

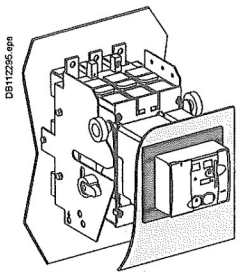
IP40 escutcheons for withdrawable devices

IP40 for withdrawable devices

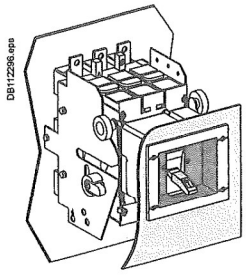
The two types, with a gasket, are screwed to the door cut-out:
- for rotary handle or motor mechanism: standard IP40 escutcheon
- for toggle with extension: standard escutcheon + collar for withdrawal.



Standard escutcheon with rotary handle.



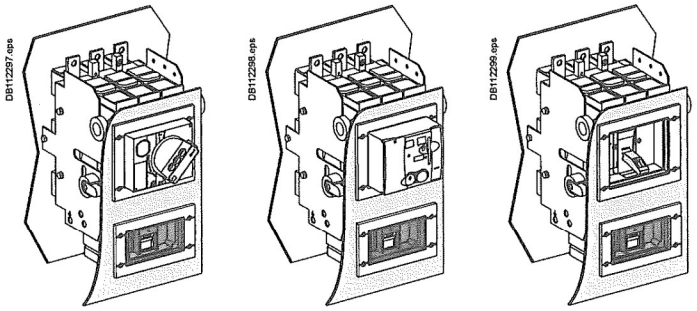
Standard escutcheon for motor mechanism.



Standard escutcheon with collar for withdrawal, for toggle.

IP40 for Vigi add-on on withdrawable devices

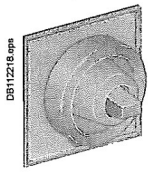
The two types, with a gasket, are screwed to the door cut-out:
- for rotary handle or motor mechanism: standard IP40 escutcheon
- for toggle: standard escutcheon + collar for withdrawal.



Escutcheon for Vigi add-on, with escutcheons for the three types of control.

IP43 toggle cover

Available only for devices with toggles. Fits over toggle and front cover of the device.
- Mounted on the front of the circuit breaker.
- Degree of protection IP43, IK07.



Toggle cover.

Retrofit front covers

These replacement front covers make it possible to install NSX devices in existing switchboards containing NS devices by installing the NS-type retrofit covers on the NSX devices.
- NS100 to 250 cover.
- NS400/630 cover.

Smart Panel integration

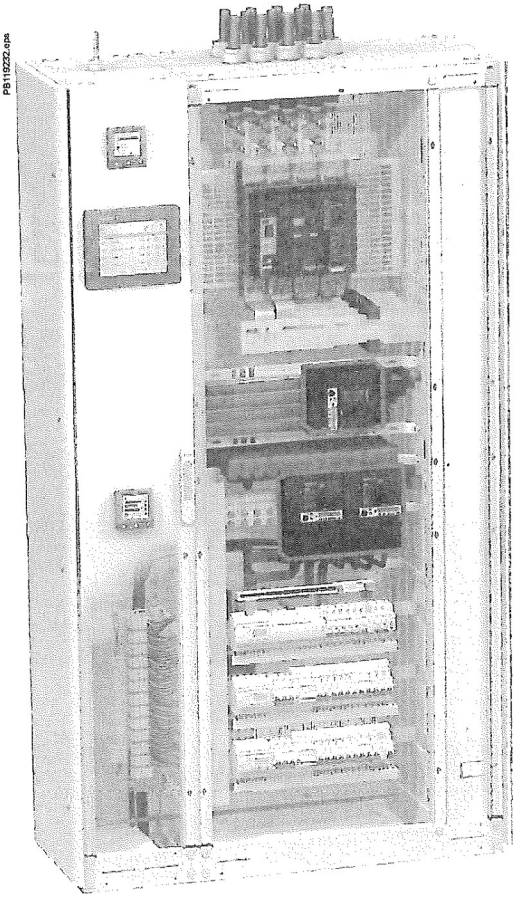
D

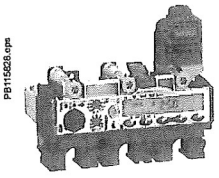
827

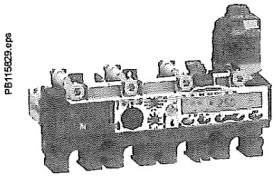
Enerlin'x functions
Communication wiring system

Smart Panels
Enerlin'X

Get circuit breaker status and electrical values
Available information and functions





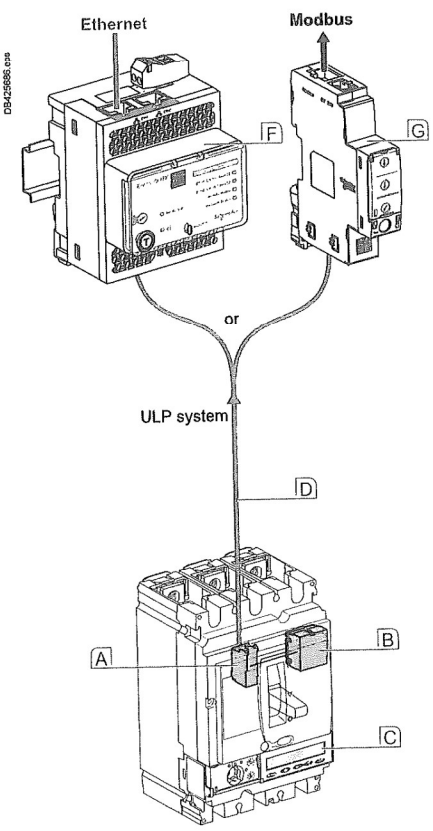


Micrologic trip units for 3 poles, 4 poles Compact circuit breakers

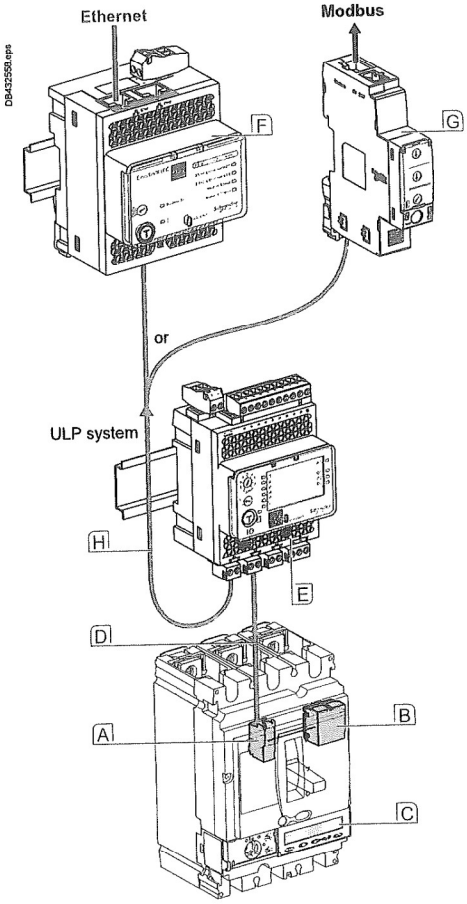
Available functions	Micrologic type	
Status indications		
ON/OFF (O/F)	A	E
Fault-trip SDE	A	E
Connected / disconnected / test position CE/CD/CT (I/O module only)	A	E
Controls		
Open	A	E
Close	A	E
Measurements		
Instantaneous measurement information	A	E
Averaged measurement information		E
Maximeter / minimeter	A	E
Energy metering		E
Demand for current and power		E
Power quality		E
Operating assistance		
Protection and alarm settings	A	E
Histories	A	E
Time stamped event tables	A	E
Maintenance indicators	A	E

All Compact circuit breakers are equipped with a Micrologic trip unit. This adjustable unit is mainly designed for tripping the circuit breaker in case of necessity and monitoring the downstream circuit Alarms may be programmed for remote indications.
Electrical measurements, operation data for predictive maintenance, are provided for local display or distant monitoring.

Fixed Compact NSX circuit breaker



Drawout Compact NSX circuit breaker



- A Internal terminal block for communication via NSX cord
- B BSCM module
- C Micrologic trip unit
- D NSX cord
- E I/O module
- F IFE interface module
- G IFM module
- H ULP cable

D

ULP system
is a fast communication link dedicated to circuit breaker monitoring and control. Based on a RS485 physical liaison with cable segments up to 5 meters, it is well adapted to severe environment. A choice of 6 pre-connectorized cables with different length is provided.

IFE interface
ULP to Ethernet interface module
Provides and IP address to any circuit breaker fitted with an ULP port. The IFE interface makes all available data from the circuit breaker accessible from an Ethernet compatible display (FDM128), a PC with common browser or IFE switchboard server which generates its own web pages.

IFM
ULP to Modbus Interface module
Makes all available data of a circuit breaker fitted with an ULP port accessible via a Modbus network. IFM acts as a Modbus slave, accessible from a Modbus master (IFE switchboard server, Acti 9 Smartlink Ethernet or Com'X).

I/O
I/O application module
I/O is dedicated to circuit breaker with ULP liaison. It provides the monitoring and control of any application around the circuit breaker (lighting or load control, cooling system, pulse metering acquisition...).

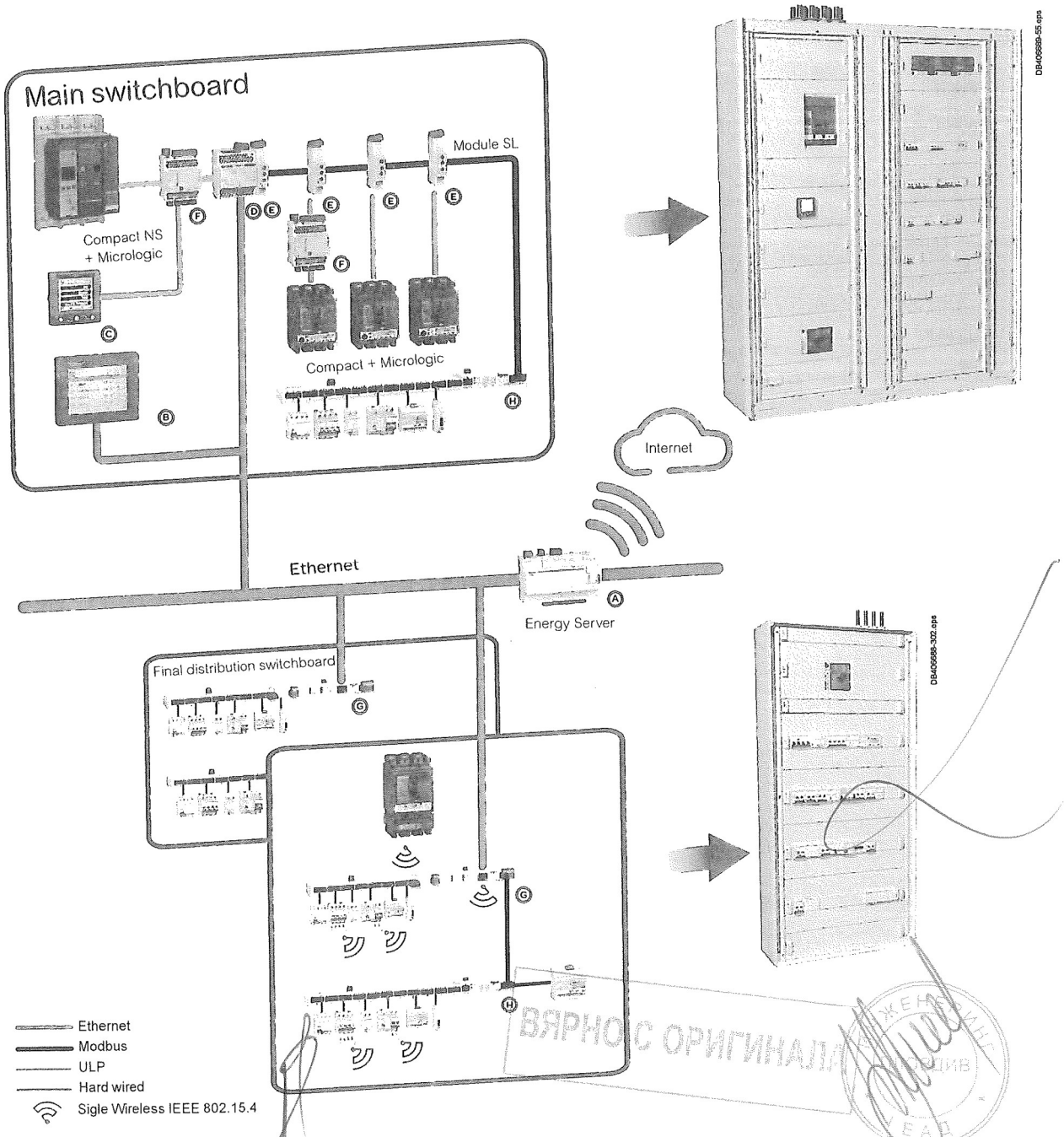
Enerlin'X digital system

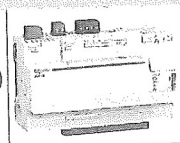
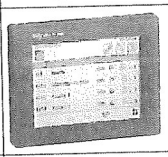
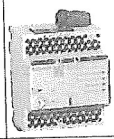
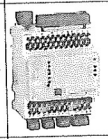
Overview

Enerlin'X communication system provides access to status, electrical values and devices control using Ethernet and Modbus SL communication protocols.

Ethernet has become the universal link between switchboards, computers and communication devices inside the building. The large amount of information which can be transferred makes the connection of Enerlin'X digital system to hosted web services of Schneider Electric a reality. More advantages are offered to integrators thanks to configuration web pages available remotely or on the local Ethernet network.

Modbus SL is the most widely used communication protocol in industrial networks. It operates in master-slave mode. The devices (slaves) communicate one after the other with a gateway (master).



Enerlin'X digital devices and displays		Name	Function	Port (to device)	Port (to server)	Inputs	Outputs	Cial. Ref.
Ⓐ		Com'X 210	Energy data logger + Ethernet Gateway	Ethernet Modbus Master, Zigbee (to wireless meters)	Ethernet cable + WiFi	64 devices: 6 binary 2 analog 32 Modbus devices + other Ethernet devices (Modbus TCP)	-	EBX210
		Com'X 510 24 V DC + PoE	Energy server + Ethernet Gateway				-	EBX510
Ⓑ		FDM128	Ethernet LCD colour touch screen	-	Ethernet		-	LV434128
Ⓒ		FDM121	LCD display for circuit breaker	ULP	-	1 circuit breaker	-	TRV00121
Ⓓ		IFE Switchboard server	Switchboard server	Modbus Master & ULP	Ethernet	20 circuit breakers	-	LV434002
		IFE interface	Ethernet interface for circuit breakers	ULP	Ethernet	1 circuit breaker	-	LV434001
Ⓔ		IFM	Modbus interface for circuit breaker	ULP	Modbus Slave	1 circuit breaker	-	LV434000
Ⓕ		I/O	Input/Output application module for circuit breaker	ULP	ULP	6 binary 1 analog (PT100 sensor)	3	LV434063
Ⓖ		Acti 9 Smartlink SI B Ethernet wireless	Ethernet server for I/O and Modbus slave devices	Modbus Master & Wireless to PowerTag	Ethernet	14 binary 2 analog	7	A9XMZA08
Ⓗ		Acti 9 Smartlink Modbus slave	Modbus interface with Input/Output functions	-	Modbus Slave	22 binary	11	A9XMSB11

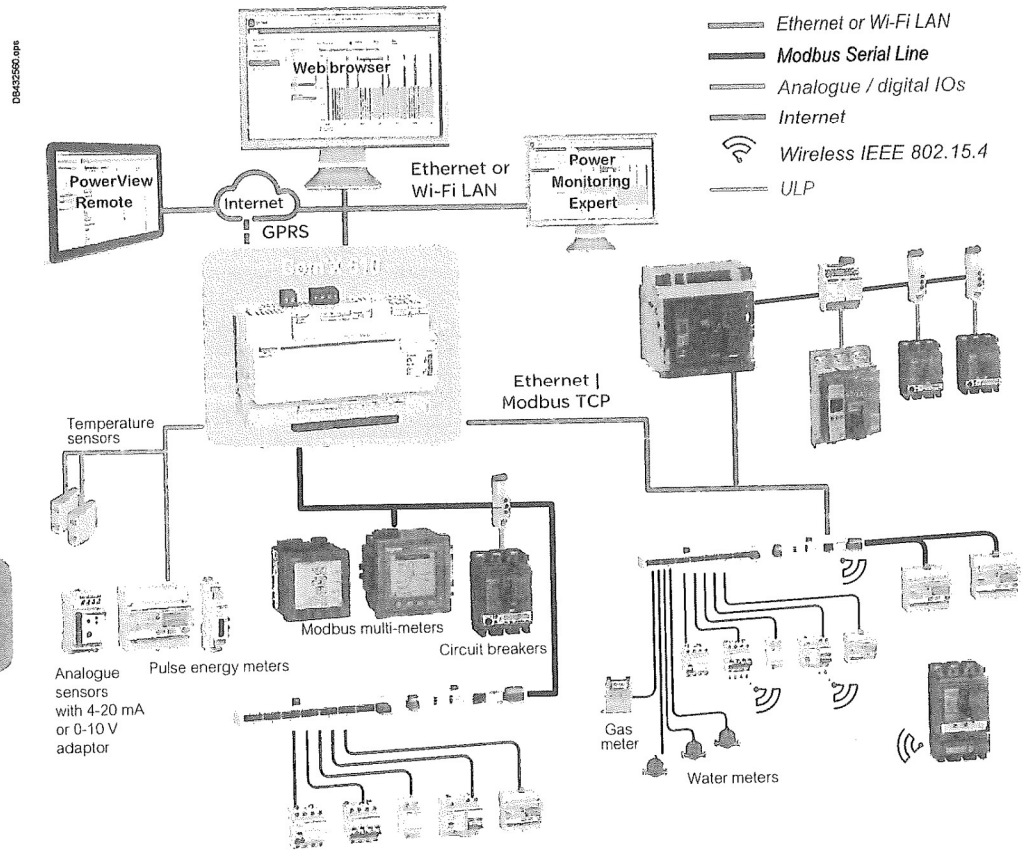
Ethernet Gateway or Interface: routes an internal traffic (ULP or other protocole) to the Internet, the outgoing messages are coded with Modbus TCPIP protocol.

Server (Switchboard, Energy): routes the internal traffic to the Internet. Other complementary functions such as data logging and storage. Provides devices status and energy trends on internal web pages...

Smart Panel integration

Com'X 510
Energy server

Main functions



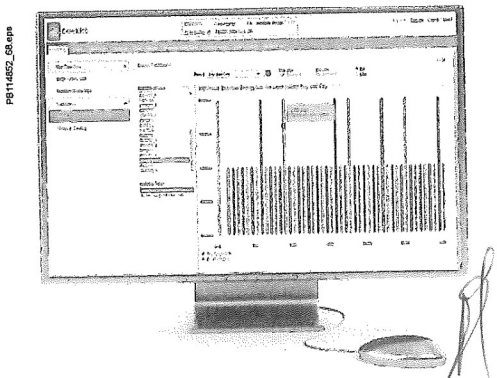
Data collector
Collects and stores energy data from up to 64 field devices, connected to either:
- ethernet TCP/IP field network
- modbus Serial line network (up to 32 devices)
- embedded digital and analogue inputs.

"Field devices" consist of :
- PowerLogic meters for power and energy monitoring
- Masterpact, Powerpact, or Compact circuit-breakers for protection and monitoring
- Acti 9 protection devices, meters, remote controlled switches, etc
- water, Air, Gas, Electricity, and Steam consumption meters, from specialized manufacturers, delivering pulses as per standard (see table at end of this document)
- environmental sensors such as temperatures, humidity, and CO_2 levels in a building, providing analogue information.

Data logging and storage capabilities include:
- data logging period: configurable from every minute to once a week
- data storage duration: up to 2 years, depending on quanitity of collected data
- able to set time and send reset instructions to field devices.

Embedded energy management software
The Com'X provides the end-user with immediate visibility into energy consumption throughout the site. As soon as the Com'X is connected to the Local Area Network (LAN), several web pages are accessible via any standard web browser, (without plug-in or additional components).

These web pages display real-time data as it is collected, in easy to understand tabular and summary formats. In addition, users can get simple analysis of historical data in bar graph or trending formats.



Energy dashboard comparing accumulated over time energy values (partial screen)

Life Is On Schneider Electric

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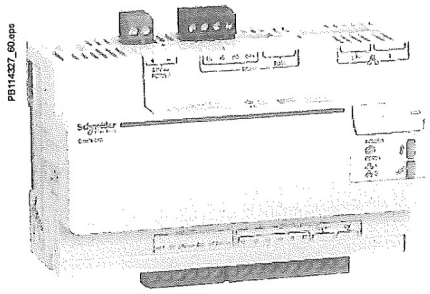
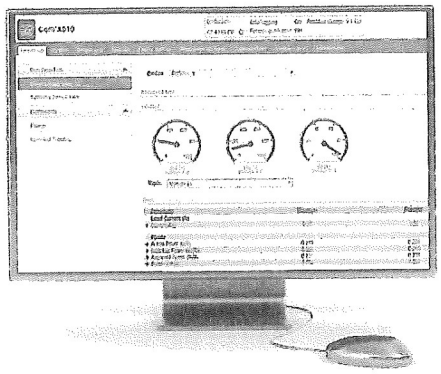
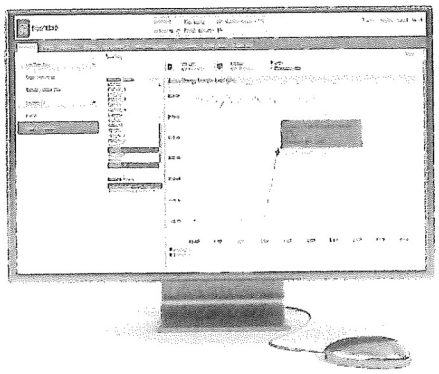


Energy Server Com'X 510 data logger



Raw data and measurements from one field device (partial screen)



Historical trending comparing multiple devices or multiple topics (partial screen)

Additional functions

Data publisher

Batches of collected data can also be periodically transmitted to an Internet server, as:

- XML files, for processing by StruXureware™ web services, such as EcoStruxure™ Facility Advisor
- CSV files for viewing in Excel or transformed or uploading to programs such as StruXureware™ EcoStruxure™ Power Monitoring Expert or any compatible software.

Data publishing function supports 4 transfer protocols over Ethernet or Wi-Fi:

- HTTP
- HTTPS
- FTP
- SMTP.

Gateway

If selected by the user, the Com'X510 can make data from connected devices available in real time:

- in Modbus TCP/IP format over Ethernet or Wi-Fi
- for requests by energy management software
- gateway to Zigbee device data by external Modbus TCP/IP clients.

Modbus packets can be sent from managing software to field devices through Modbus serial line or Modbus TCP/IP over Ethernet.

D

Com'X 510 Commercial reference numbers	
Com'X 510 energy server 24 V DC power supplied UL rated	**EBX510**
Com'X Wi-Fi USB interface	**EBXA-USB-WiFi**
Com'X GPRS interface SIM card	**EBXA-GPRS-SIM**
Com'X GPRS interface	**EBXA-GPRS**
Com'X External GPRS antenna	**EBXA-ANT-5M**
Com'X Zigbee USB interface	**EBXA-USB-Zigbee**

Please see your Schneider Electric representative for complete ordering information.

FDM128 Ethernet switchboard display

Micrologic measurement capabilities come into full play with the FDM128 switchboard display. It connects to Ethernet communication via RJ45 port and displays Micrologic information. The result is a true integrated unit combining a circuit breaker and a Power Meter. Additional operating assistance functions can also be displayed.

FDM128

The FDM128 is an intelligent Ethernet display. It collects the data from up to 8 devices via Ethernet network.
The FDM128 switchboard display unit can be connected to a Micrologic COM option (BCM ULP via IFE). It uses the sensors and processing capacity of the Micrologic control unit. It is easy to use and requires no special software or settings.
The FDM128 is a large display, but requires very little depth. The anti-glare graphic screen is backlit for very easy reading even under poor ambient lighting and at sharp angles.

Display of Micrologic measurements and trips

The FDM128 is intended to display Micrologic A/E measurements, trips and operating information. It cannot be used to modify the protection settings.
Measurements may be easily accessed via a menu.
Trips are automatically displayed.
A pop-up window displays the time-stamped description of the trip.

Status indications

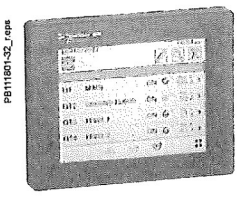
When the circuit breaker is equipped with the Breaker Status Command Module (BSCM) and NSX cord, the FDM128 display can also be used to view circuit breaker status conditions:
- O/F: ON/OFF
- SDE: Fault-trip indication (overload, short-circuit, ground fault)
- CE, CD cradle management with I/O application module.

Remote control

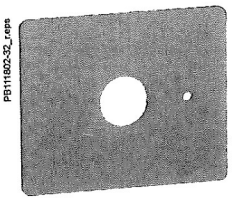
When the circuit breaker is equipped with the BSCM, NSX cord and Communicating Motor Mechanism (MTc), the FDM128 display can also be used to control (open/close) the circuit breaker.

Main characteristics

- 115.2 x 86.4 mm with 5.7" QVGA display 320 x 240 pixels.
- Color TFT LCD, LED backlight.
- Wide viewing angle: vertical ±80°, horizontal ±70°.
- High resolution: excellent reading of graphic symbols.
- Operating temperature range -10 °C to +55 °C.
- CE / UL / CSA marking (pending).
- 24 V DC power supply, with tolerances 24 V (limit 20.4 - 28.8 V DC).
- Consumption ≤ 6.8 W.



FDM128 display.



Surface mount accessory.

Mounting

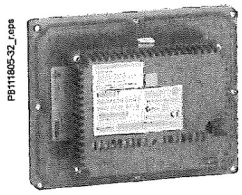
The FDM128 is easily installed in a switchboard.
- Standard door hole Ø 22 mm.

The FDM128 degree of protection is IP65 in front and IP54.

Connection

The FDM128 is equipped with:
- a 24 V DC terminal block:
  - power supply range of 24 V DC (limit 20.4 - 28.8 V DC). The FDM128 display unit has a 2-point screw connector on the rear panel of the module for this purpose.
- One RJ45 Ethernet jacks.

The Micrologic connects to the internal communication terminal block on the Masterpact via the breaker ULP cord and Ethernet connection through IFE.



FDM128 Ethernet switchboard display

Navigation

Touch screen is used for intuitive and fast navigation.
The user can select the display language (Chinese, English, French, German, Italian, Portuguese, Spanish, etc.).

Screens

Main menu

- Quick view
- Alarms
- Metering
- Maintenance
- Control

When not in use, the screen is automatically shifted to low back-lighting.

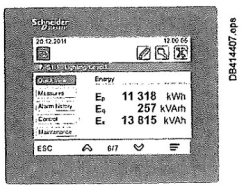
Fast access to essential information

- "Quick view" provides access to five screens that display a summary of essential operating information (I, U, f, P, E, THD, circuit breaker On / Off).

Access to detailed information

- "Metering" can be used to display the measurement data (I, U-V, f, P, Q, S, E, THD, PF) with the corresponding min/max values.
- Alarms displays the trip history.
- Services provides access to the operation counters, energy and maximeter reset function, maintenance indicators, identification of modules connected to the internal bus and FDM128 internal settings (language, contrast, etc.).

Product identification.



Metering: meter.

Services.

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Smart Panel integration

FDM121 switchboard display

Micrologic measurement capabilities come into full play with the FDM121 switchboard display. It connects to COM option (BCM ULP) via a breaker ULP cord and displays Micrologic information. The result is a true integrated unit combining a circuit breaker and a Power Meter. Additional operating assistance functions can also be displayed.

FDM121

An FDM121 switchboard display unit can be connected to a ULP IMU using a prefabricated cord to display all measurements, alarms, histories and event tables, maintenance indicators, management of installed devices on a screen. The result is a veritable 96 x 96 mm Power Meter.
The FMD121 display unit requires a 24 V DC power supply.
The FDM121 is a switchboard display unit that can be integrated in the Compact NSX100 to 630 A, Powerpact H/J/L/P/R, compact NS or Masterpact systems. It uses the sensors and processing capacity of the Micrologic trip unit. It is easy to use and requires no special software or settings. It is immediately operational when connected to the Compact NSX by a simple cord.
Also, it provides monitoring and control with the use of the I/O application module, the motor mecanism module, or the Breaker Status module.
The FDM121 is a large display, but requires very little depth. The anti-glare graphic screen is backlit for very easy reading even under poor ambient lighting and at sharp angles.

Display of Micrologic measurements and alarms

The FDM121 is intended to display Micrologic 5 / 6 measurements, alarms and operating information. It cannot be used to modify the protection settings.
Measurements may be easily accessed via a menu. All user-defined alarms are automatically displayed. The display mode depends on the priority level selected during alarm set-up:
- high priority: a pop-up window displays the time-stamped description of the alarm and the orange LED flashes
- medium priority: the orange "Alarm" LED goes steady on
- low priority: no display on the screen.

All faults resulting in a trip automatically produce a high-priority alarm, without any special settings required. In all cases, the alarm history is updated. Micrologic saves the information in its non-volatile memory in the event of an FDM121 power failure.

Status indications and remote control

When the circuit breaker is equipped with the Breaker Status Module, the FDM121 display can also be used to view circuit breaker status conditions:
- O/F: ON/OFF
- SD: trip indication
- SDE: Fault-trip indication (overload, short-circuit, ground fault).

When the circuit breaker system is equipped with the I/O Application module, the FDM121 can monitor and control:
- craddle management
- circuit breaker operation
- light and load control
- custom application.

When the circuit breaker system is equipped with the motor mechanism module, the FDM121 offers remote closing and opening control.

Main characteristics

- 96 x 96 x 30 mm screen requiring 10 mm behind the door (or 20 mm when the 24 V power supply connector is used).
- White backlighting.
- Wide viewing angle: vertical ±60°, horizontal ±30°.
- High resolution: excellent reading of graphic symbols.
- Alarm LED: flashing orange for alarm pick-up, steady orange after operator reset if alarm condition persists.
- Operating temperature range -10 °C to +55 °C.
- CE / UL / CSA marking (pending).
- 24 V DC power supply, with tolerances 24 V -20 % (19.2 V) to 24 V +10 % (26.4 V).

When the FDM121 is connected to the communication network, the 24 V DC can be supplied by the communication system wiring system.
- Consumption 40 mA.

Mounting

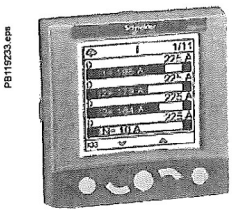
The FDM121 is easily installed in a switchboard.
- Standard door cut-out 92 x 92 mm.
- Attached using clips.

To avoid a cut-out in the door, an accessory is available for surface mounting by drilling only two 22 mm diameter holes.
The FDM121 degree of protection is IP54 in front. IP54 is maintained after switchboard mounting by using the supplied gasket during installation.

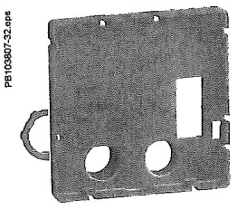
Connection

The FDM121 is equipped with:
- a 24 V DC terminal block:
  - plug-in type with 2 wire inputs per point for easy daisy-chaining
  - power supply range of 24 V DC -20 % (19.2 V) to 24 V DC +10 % (26.4 V).

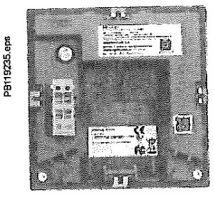
A 24 V DC type auxiliary power supply must be connected to a single point on the ULP system. The FDM121 display unit has a 2-point screw connector on the rear panel of the module for this purpose. The ULP module to which the auxiliary power supply is connected distributes the supply via the ULP cable to all the ULP modules connected to the system and therefore also to Micrologic.



FDM121 display.

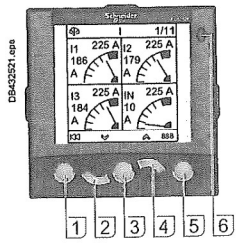


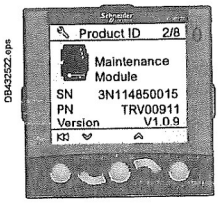
Surface mount accessory.



Connection with FDM121 display unit.

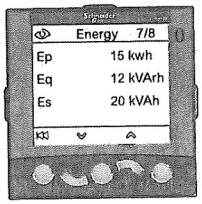
FDM121 switchboard display



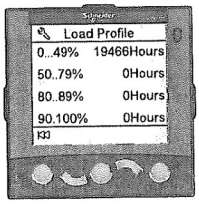


Product identification.

Metering: sub-menu.



Metering: meter.



Services.

- two RJ45 jacks.

The Micrologic connects to the internal communication terminal block on the Compact NSX via the NSX cord. Connection to one of the RJ45 connectors on the FDM121 automatically establishes communication between the Micrologic and the FDM121 and supplies power to the Micrologic measurement functions.
When the second connector is not used, it must be fitted with a line terminator.

Navigation

Five buttons are used for intuitive and fast navigation.
The "Context" button may be used to select the type of display (digital, bargraph, analogue).
The user can select the display language (Chinese, English, French, German, Italian, Portuguese, Spanish, etc.).

Screens

Main menu
When powered up, the FDM121 screen automatically displays the ON/OFF status of the device.

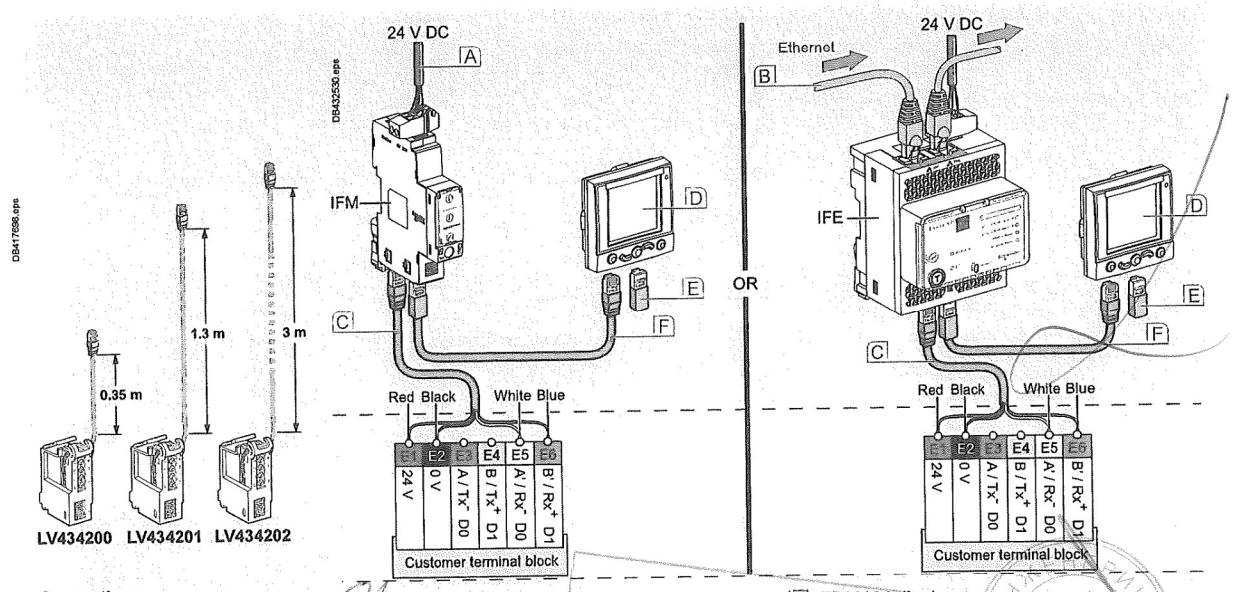
Quick view | Alarms | Metering | Services | Control

When not in use, the screen is not backlit. Backlighting can be activated by pressing one of the buttons. It goes off after 3 minutes.

Fast access to essential information
- "Quick view" provides access to five screens that display a summary of essential operating information (I, U, f, P, E, THD, circuit breaker On / Off).

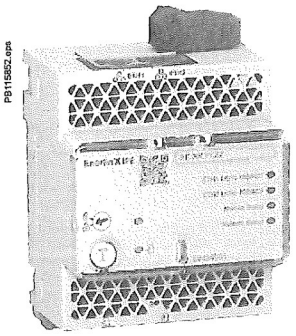
Access to detailed information
- "Metering" can be used to display the measurement data (I, U-V, f, P, Q, S, E, THD, PF) with the corresponding min/max values.
- Alarms displays active alarms and the alarm history.
- Services provides access to the operation counters, energy and maximeter reset
- function, maintenance indicators, identification of modules connected to the internal bus and FDM121 internal settings (language, contrast, etc.).

Communication components and FDM121 connections

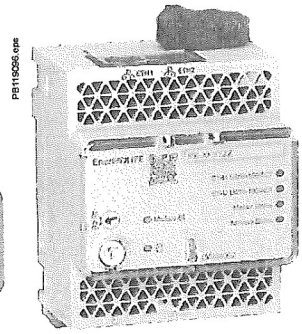


Connections
- Compact NSX is connected to the ULP devices (FDM121 display, IFM, IFE or I/O) unit via the NSX cord.
- cord available in three lengths: 0.35 m, 1.3 m and 3 m.
- ULP lengths up to 10 m possible using extensions.

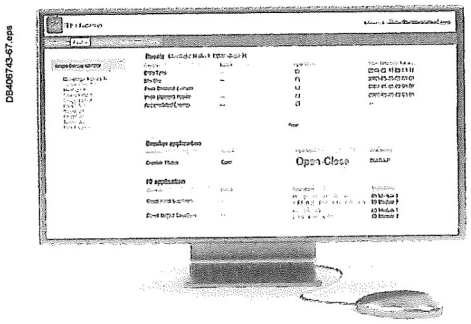
IFE interface
IFE switchboard server



IFE interface, ref.: LV434001



IFE switchboard server, ref.: LV434002



Description

The IFE interface and IFE switchboard server enable LV circuit breakers as Masterpact NT/NW, Compact NSX or Powerpact to be connected to an Ethernet network.

IFE interface: ref. LV434001

Provides an Ethernet access to a single LV circuit breaker.

Function

Interface - one circuit breaker is connected to the IFE interface via its ULP port.

IFE switchboard server: ref. LV434002

Provides an Ethernet access up to 20 LV circuit breakers.

Functions

- Interface - one circuit breaker is connected to the IFE interface via its ULP port.
- Server: several circuit breakers on a Modbus network are connected via the IFE switchboard server master Modbus port.
- Collects and provides web pages from multiple IP devices (other IFE LV434002, Smartlink Ethernet, PM5000 Ethernet...).

IFE interface, IFE switchboard server features

- Dual 10/100 Mbps Ethernet port for simple daisy chain connection.
- Device profile web service for discovery of the IFE interface, IFE switchboard server on the LAN.
- ULP compliant for localization of the IFE interface in the switchboard.
- Ethernet interface for Compact, Masterpact and Powerpact circuit breakers.
- Gateway for Modbus-SL connected devices (IFE switchboard server only).
- Embedded set-up web pages.
- Embedded monitoring web pages.
- Embedded control web pages.
- Built-in e-mail alarm notification.
- Automatic recovering of Smartlink I/O configurations, allowing contextual I/O status display on web pages (IFE switchboard server only).

Mounting

The IFE interface, IFE switchboard server are DIN rail mounting devices.
A stacking accessory enables the user to connect several IFMs (ULP to Modbus interfaces) to an IFE switchboard server without additional wiring.

24 V DC power supply

The IFE interface, IFE switchboard server must always be supplied with 24 V DC.
The IFMs stacked to an IFE switchboard server are supplied by the IFE switchboard server, thus it is not necessary to supply them separately. It is recommended to use an UL listed and recognized limited voltage/limited current or a class 2 power supply with a 24 V DC, 3 A maximum.

IFE interface, IFE switchboard server firmware update

The firmware can be updated using:

- FTP
- customer engineering tool
- Ecoreach software.

Required circuit breaker communication modules

The connection to IFE interface or IFE switchboard server requires a communication module embedded into the circuit breaker:

- Compact NS, Powerpact P, Powerpact R: BCM ULP communication module
- Compact NSX: NSX cord and/or BSCM module
- Masterpact NT/NW or Compact NS, Powerpact P, Powerpact R (Fixed electrically operated): BCM ULP communication module
- drawout Masterpact NT/NW or a withdrawable Compact NS, Powerpact P, Powerpact R: BCM ULP and its respective I/O (Input/Output) application module.

All connection configurations for Masterpact NT/NW, Compact NS, Powerpact P, Powerpact R require the breaker ULP cord. The insulated NSX cord is mandatory for system voltages greater than 480 V AC. When the second ULP RJ45 connector is not used, it must be closed with an ULP terminator (TRV00880).

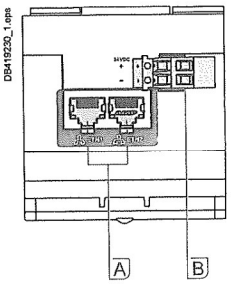
General characteristics

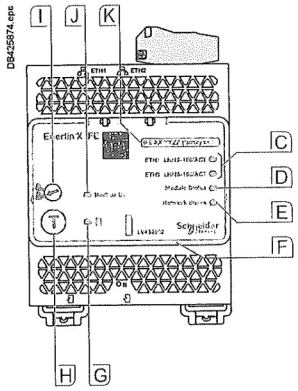
Environmental characteristics	
Conforming to standards	UL 508, UL 60950, IEC 60950, 60947-6-2
Certification	cULus, GOST, FCC, CE
Ambient temperature	-20 to +70°C (-4 to +158 °F)
Relative humidity	5–85 %
Level of pollution	Level 3
Flame resistance	ULV0
Mechanical characteristics	
Shock resistance	1000 m/s2
Resistance to sinusoidal vibrations	5 Hz < f < 8.4 Hz
Electrical characteristics	
Resistance to electromagnetic discharge	Conforming to IEC/EN 61000-4-3
Immunity to radiated fields	10 V/m
Immunity to surges	Conforming to IEC/EN 61000-4-5
Consumption	120 mA at 24 V input
Physical characteristics	
Dimensions	72 x 105 x 71 mm (2.83 x 4.13 x 2.79 in.)
Mounting	DIN rail
Weight	182.5 g (0.41 lb)
Degree of protection of the installed I/O application module	On the front panel (wall mounted enclosure): IP4x Connectors: IP2x Other parts: IP3x
Connections	Screw type terminal blocks
Technical characteristics - 24 V DC power supply	
Power supply type	Regulated switch type
Rated power	72 W
Input voltage	100–120 V AC for single phase 200–500 V AC phase-to-phase
PFC filter	With IEC 61000-3-2
Output voltage	24 V DC
Power supply out current	3 A

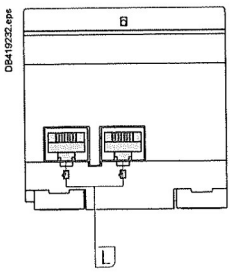
Note: it is recommended to use an UL listed/UL listed recognized limited voltage/Limited current or a class 2 power supply with a 24 V DC, 3 A maximum.

IFE interface, IFE switchboard server web page description

Monitoring web page	
Real time data	■
Device logging	■
Control web page	
Single device control	■
Diagnostics web page	
Statistics	■
Device information	■
IMU information	■
Read device registers	■
Communication check	■
Maintenance web page	
Maintenance log	■
Maintenance counters	■
Setup web page	
Device localization/name	■
Ethernet configuration (dual port)	■
IP configuration	■
Modbus TCP/IP filtering	■
Serial port	■
Date and time	■
E-mail server configuration	■
Alarms to be e-mailed	■
Device list	■
Device logging	■
Device log export	■
SNMP parameters	■
Documentation links	■
Preferences	■
Advanced services control	■
User accounts	■
Web page access	■

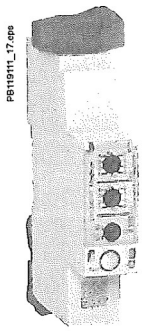






A Ethernet 1 and Ethernet 2 communication port.
B 24 Vdc power supply terminal block.
C Ethernet communication LEDs:
yellow: 10 Mb
green: 100 Mb.
D Module status LED:
steady off: no power
steady green: device operational
steady red: major fault
flashing green: standby
flashing red: minor fault
flashing green/red: self-test.
E Network status LED:
steady off: no power/no valid IP address
steady green: connected, valid IP address
steady orange: default IP address
steady red: duplicated IP address
flashing green/red: self-test.
F Sealable transparent cover.
G ULP status LED.
H Test button (accessible closed cover).
I Locking pad.
J Modbus traffic status LED (LV434002 only).
K Device name label.
L ULP ports.

IFM Modbus interface



IFM Modbus communication interface.
Ref.: LV434000.

Function

A IFM - Modbus communication interface - is required for connection of a Masterpact or Compact to a Modbus network as long as this circuit breaker is provided with a ULP (Universal Logic Plug) port. The port is available on respectively a BCM ULP or BSCM embedded module.
The IFM is defined as an IMU (Intelligent Modular Unit) in the ULP connection System documentation.

Once connected, the circuit breaker is considered as a slave by the Modbus master. Its electrical values, alarm status, open/close signals car be monitored or controlled by a Programmable Logic Controller or any other system.

Characteristics

ULP port

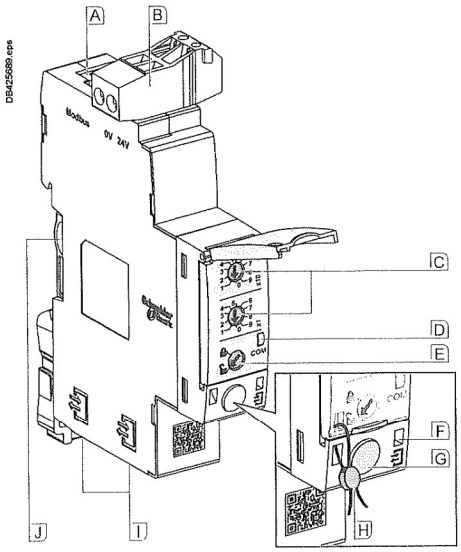
2 RJ45 sockets, internal parallel wiring.
- Connection of a single circuit breaker (eventually via its I/O application module).
- A ULP line terminator or an FDM121 display unit must be connected to the second RJ45 ULP socket.

The RJ45 sockets deliver a 24 VDC supply fed from the Modbus socket.
Built-in test function, for checking the correct connection to the circuit breaker and FDM121 display unit.

Modbus slave port

- Top socket for screw-clamp connector, providing terminals for:
  - 24 VDC input supply (0 V, +24 V)
  - Modbus line (D1, D2, Gnd).
- Lateral socket, for Din-rail stackable connector.

Both top and lateral sockets are internally parallel wired.
- Multiple IFM can be stacked, thus sharing a common power supply and Modbus line without individual wiring.
- On the front face:
  - Modbus address setting (1 to 99): 2 coded rotary switches
  - Modbus locking pad: enables or disable the circuit breaker remote control and modification of IFM parameters.
- Self adjusting communication format (Baud rate, parity).



- A Modbus Serial RJ45 port.
- B 0-24 V DC power supply.
- C Modbus address switches.
- D Modbus traffic LED.
- E Modbus locking pad.
- F ULP activity LED.
- G Test button.
- H Mechanical lock and locking seal.
- I ULP RJ45 connectors.
- J Stacking accessory connection.

Catalogue numbers

IFM Modbus communication interface

Type	Set of	Cat. no.
IFM -Modbus communication interface module	-	**LV434000**
Connector modbus adaptor		**LV434211**
Stacking accessories if more than 1 IFM	10	**TRV00217**
ULP line terminator	-	**TRV00880**
2-wire RS 485 isolated repeater module (Modbus network outside the switchboard)	-	**TRV00211**

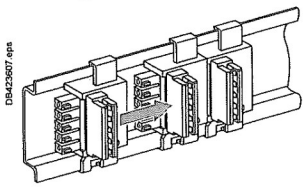
Technical characteristics

IFM Modbus communication interface

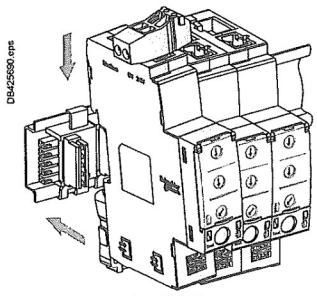
Dimensions		18 x 72 x 96 mm
Maximum number of stacked IFM		12
Degree of protection of the installed module	Part projecting beyond the escutcheon	IP4x
	Other module parts	IP3x
	Connectors	IP2x
Operating temperature		-25...+70°C
Power supply voltage		24 V DC -20 %/+10 % (19.2...26.4 V DC)
Consumption	Typical	21 mA/24 V DC at 20°C
	Maximum	30 mA/19.2 V DC at 60°C
Certification		
CE		IEC/EN 60947-1
UL		UL 508 - Industrial Control Equipment
CSA		No. 142-M1987 - Process Control Equipment CAN/CSA C22.2 No. 0-M91 - General requirements - Canadian Electrical Code Part CAN/CSA C22.2 No. 14-05 - Industrial Control Equipment

Simplified IFM installation

Staking IFM

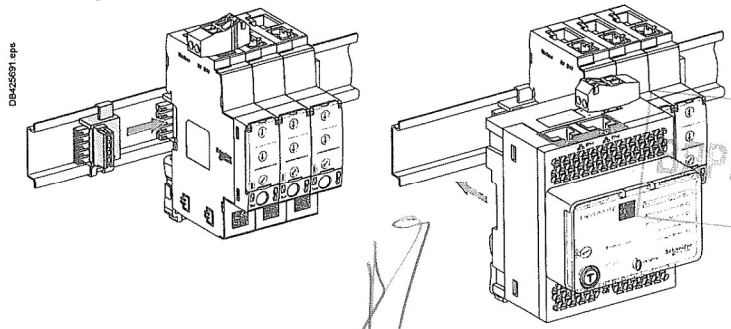


Stacking accessories

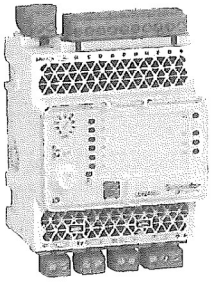


Up to 12 stacked IFM

Stacking an IFE interface + gateway with IFMs



Components
I/O Application module



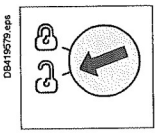
I/O application module description

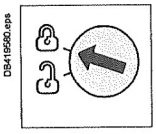
Description
The I/O input/output application module for LV breaker is one of the components of ULP architecture. Built in functionalities and applications enhance control and monitoring needs.
ULP system architecture including I/O modules can be built without any restrictions using a wide range of circuit breakers:
- Masterpact MTZ1/MTZ2/MTZ3,
- Compact NS1600b-3200,
- Compact NS630b-1600,
- Compact NSX100-630 A.

The I/O application module is compliant with the ULP system specifications.
Two I/O application modules can be connected in the same ULP architecture.

I/O input/output interface for LV breaker resources
The I/O application module resources are the following:
- 6 digital inputs that are self powered for either NO and NC dry contact or pulse counter,
- 3 digital outputs that are bistable relay (5 A maximum),
- 1 analog input for Pt100 temperature sensor.

D





Pre-defined applications
Pre-defined applications improve the IMU approach (Intelligent Modular Unit) in a simple way.
A 9-position rotary switch on the front of the I/O module allows to select the pre-defined applications. Each position is assigned to a pre-defined application except position 9 which allows the user to define a specific application by means of the customer engineering tool. The switch is set in factory to the pre-defined application 1.

For each application the input/output assignment and the wiring diagram are pre-defined. No additional setting with the customer engineering tool is required. The I/O and other resources not assigned to the pre-defined applications are free for user specific applications.

User applications
The user applications with the corresponding resources are defined by means of Ecoreach engineering tool. They use the resources not assigned to the predefined applications. User applications may be required for:
- Protection improvement,
- Circuit breaker control,
- Motor control,
- Energy management,
- Monitoring.

24 Vdc power supply
The I/O module can be supplied with a 24 Vdc AD power supply or with any other 24 Vdc power supply having the same characteristics.

Mounting
The I/O is a DIN rail mounting device.

Setting locking pad
The setting locking pad on the front panel of the I/O enables the setting of the I/O by Ecoreach engineering tool.

General characteristics

Environmental characteristics	
Conforming to standards	UL 508, UL 60950, IEC 60950, IEC 60947-6-2
Certification	cULus, GOST, FCC, CE
Ambient temperature	-20 to +70 °C (-4 to +158 °F)
Relative humidity	5 - 85 %
Level of pollution	Level 3
Flame resistance	ULV0
Mechanical characteristics	
Shock resistance	1000 m/s^2
Resistance to sinusoidal vibrations	5 Hz < f < 8.4 Hz
Electrical characteristics	
Resistance to electromagnetic discharge	Conforming to IEC/EN 61000-4-3
Immunity to radiated fields	10 V/m
Immunity to surges	Conforming to IEC/EN 61000-4-5
Consumption	165 mA
Physical characteristics	
Dimensions	71.7 x 116 x 70.6 mm
Mounting	DIN rail
Weight	229.5 g (0.51 lb)
Degree of protection of the installed I/O application module	On the front panel (wall mounted enclosure): IP4x I/O parts: IP3x Connectors: IP2x
Connections	Screw type terminal blocks

Digital inputs

Digital input type	Self powered digital input with current limitations as per IEC 61131-2 type 2 standards (7 mA)
Input limit values at state 1 (close)	19.8 - 25.2 V DC, 6.1 - 8.8 mA
Input limit values at state 0 (open)	0 - 19.8 V DC, 0 mA
Maximum cable length	10 m (33 ft)

Note: for a length greater than 10 m (33 ft) and up to 300 m (1.000 ft), it is mandatory to use a shielded twisted cable. The shield cable is connected to the I/O functional ground of the I/O application module.

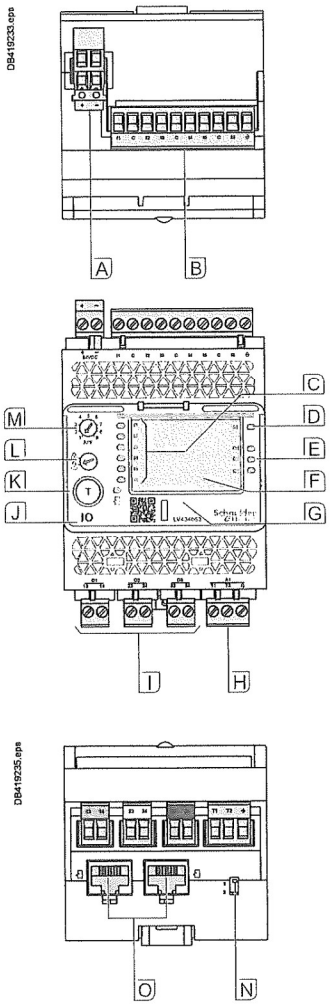
Digital outputs

Digital output type	Bistable relay
Rated load	5 A at 250 Vac
Rated carry current	5 A
Maximum switching voltage	380 Vac, 125 Vdc
Maximum switch current	5 A
Maximum switching power	1250 VA, 150 W
Minimum permissible load	10 mA at 5 V DC
Contact resistance	30 mΩ
Maximum operating frequency	18000 operations/hr (Mechanical) 1800 operations/hr (Electrical)
Digital output relay protection by an external fuse	External fuse of 5 A or less
Maximum cable length	10 m (33 ft)

Analog inputs

I/O application module analog input can be connected to a Pt100 temperature sensor.

Range	-30 to 200 °C	-22 to 392 °F
Accuracy	±2 °C from -30 to 20 °C ±1 °C from 20 to 140 °C ±2 °C from 140 to 200 °C	±3.6 °F from -22 to 68 °F ±1.8 °F from 68 to 284 °F ±3.6 °F from 284 to 392 °F
Refresh interval	5 s	5 s



A 24 Vdc power supply terminal block.
B Digital input terminal block: 6 inputs, 3 commons and 1 shield.
C 6 input status LEDs.
D Analog input status LED.
E 3 output status LEDs.
F I/O application module identification labels.
G Sealable transparent cover.
H Analog input terminal block.
I Digital output terminal blocks.
J ULP status LED.
K Test/reset button (accessible with cover closed).
L Setting locking pad.
M Application rotary switch: 1 to 9.
N Switch for I/O addressing (I/O 1 or I/O 2).
O ULP connectors.

D

Customer engineering tool: Ecoreach software

Key Features

Build

I want to test & deliver a "ready to commission" panel

- Device Discovery
- Switchboard setting & testing
- Communication Test & Reports
- Save my project & reports

Commission

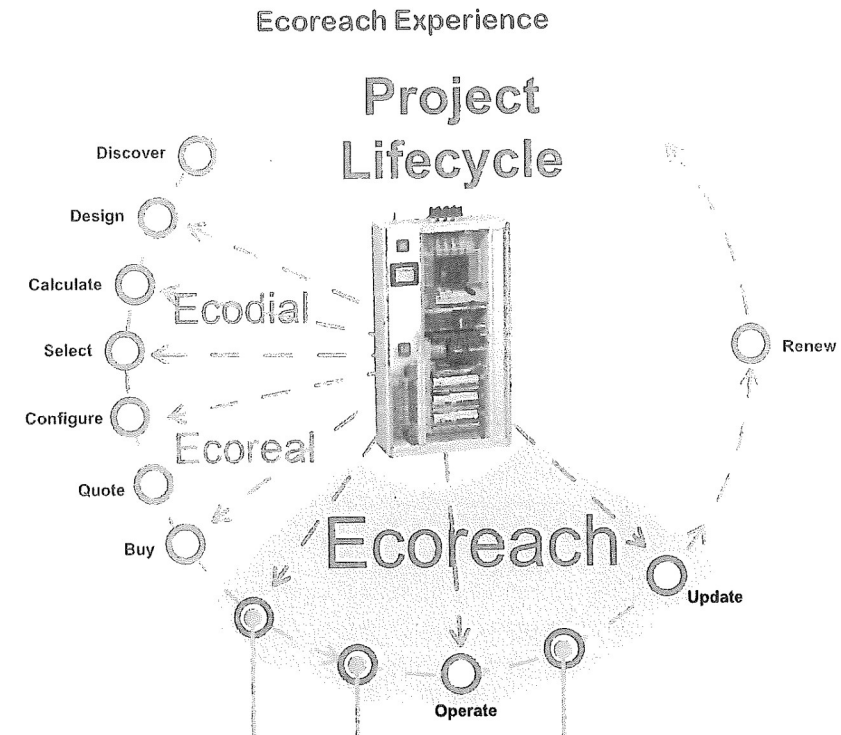
I want to "shorten" my commissioning time

- Device Discovery
- Multi Device Configuration
- Communication Test & Reports
- Save my project & reports

Maintain

I want to ensure "continuity" of services in "safe conditions"

- Settings consistency check
- Firmware upgrade
- Standard Diagnostic data
- Save my project & reports

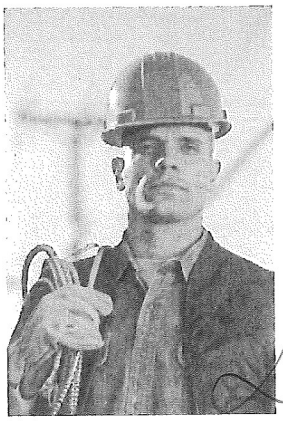


Panel builders

Simple & easy software to set up and test a panelboard with smart phones

Electrical contractors & system integrator

Shorten commissioning time and speed up SAT delivery with easy-to-use software



Facility managers

Software to track installation changes & diagnostic features for preventive maintenance

Customer engineering tool: Ecoreach software

Operation and Maintenance

- Devices monitoring and control.
- Measurement parameter logs.
- Log reports.
- Download of current devices settings, compare with previous settings saved in Ecoreach.
- Firmware upgrade and compatibility matrix.

Compatibility

Devices

Configuration of below devices through the range of Enerlin'X interfaces devices.

- Circuit breakers: Masterpact MTZ, Compact NSX ranges.
- Circuit breakers and control components: Acti 9 range.

Ecoreach software for PC

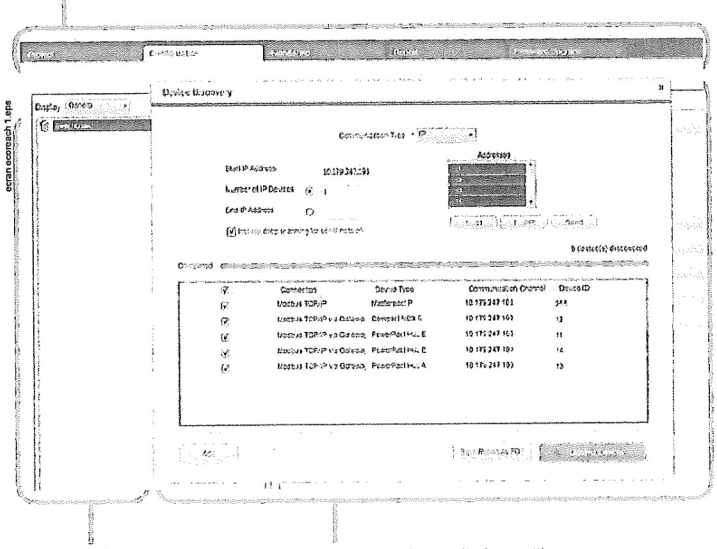
- Compatible with Windows XP pro, Windows Seven.

Catalogue numbers

Project design, commission, operation & maintenance software	
Ecoreach electrical asset management software	CR_ECOREACH_TS

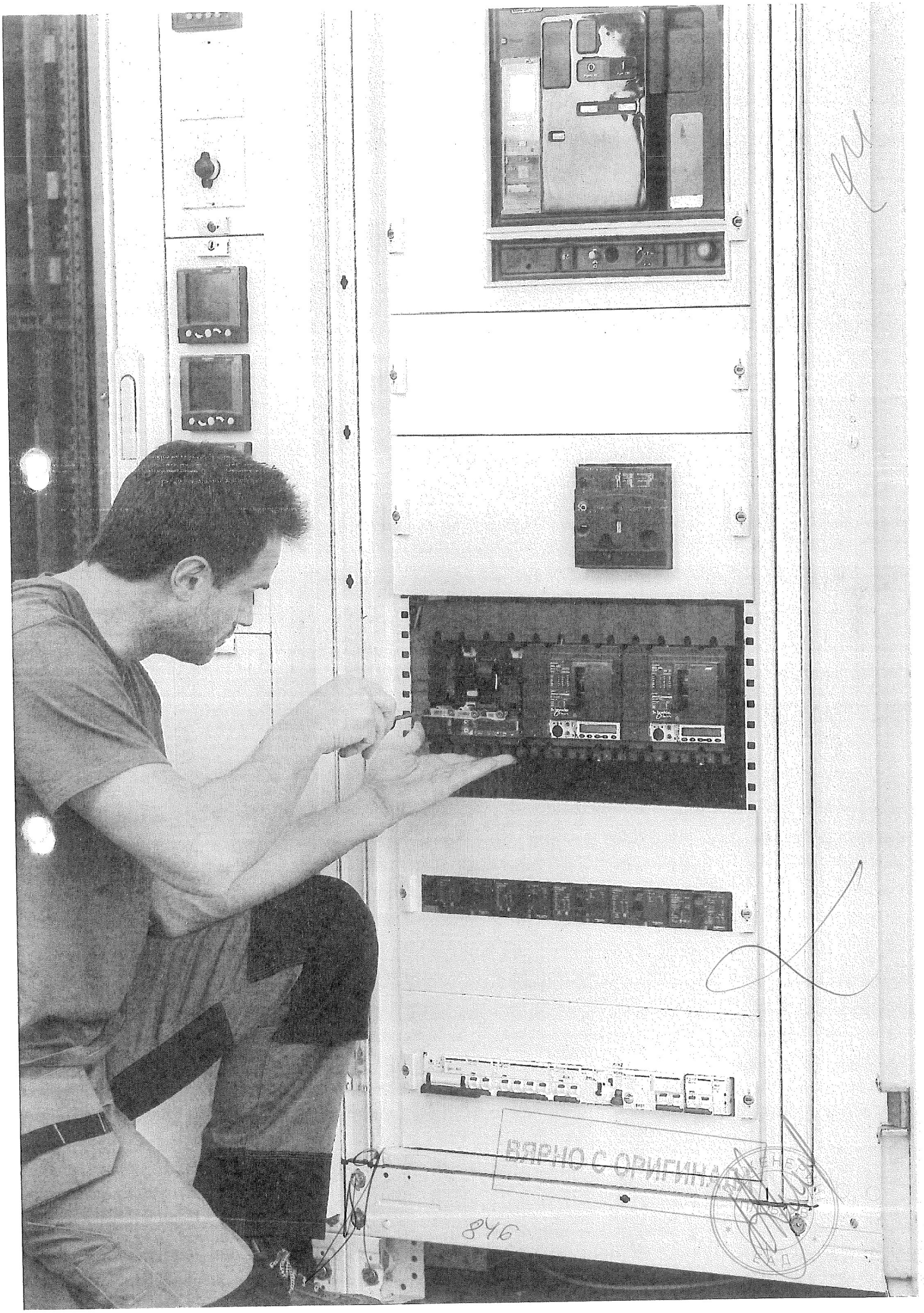
Example of Ecoreach win

Browsing tabs



Smart Panels architecture

Contextual window, for monitoring, settings...


ВЯРНО С ОРИГИНАЛА

Switchboard integration

E

Switchboard integration

E

Switchboard integration

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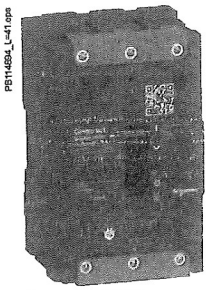
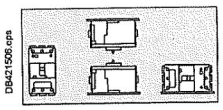
Compact NSX & NSXm
Operating and installation conditions

Compact NSXm may be mounted vertically, horizontally or flat on their back or on their side without any derating of characteristics.



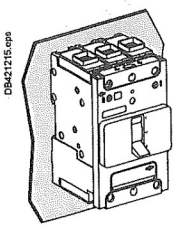
Compact NSXm.



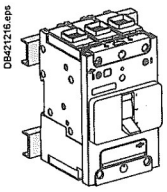
Fixed device installation positions.

Fixed circuit breakers

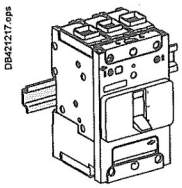
Compact NSXm may be mounted vertically, horizontally or flat on their back or on their side without any derating of characteristics.
These devices can be mounted on a DIN rail using the integrated DIN rail mounting feature.
For backplate mounting, the devices are supplied with two mounting screws (M4), washers and nuts. These mounting screws can be inserted through mounting holes molded into the device case and threaded into the mounting enclosure, rails or plate.



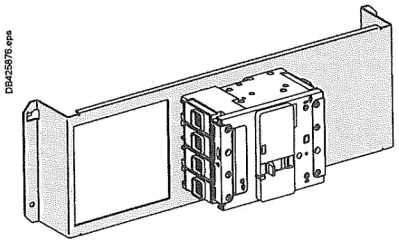
Mounting on a backplate.



Mounting on rails.



Mounting on DIN rail.



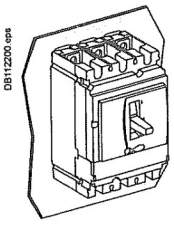
Mounting on a Prisma mounting plate.

Compact NSX circuit breakers may be installed horizontally, vertically or flat on their back, without derating performance levels.
There are three installation versions:
- fixed
- plug-in (on a base)
- withdrawable (on a chassis).

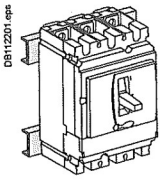
For the last two, components must be added (base, chassis) to the fixed version.
Many connection components are shared by the three versions.

Fixed circuit breakers

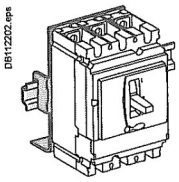
Fixed circuit breakers are designed for standard connection using bars or cables with lugs. Bare-cable connectors are available for connection to bare copper or aluminium cables.
For connection of large cables, a number of solutions with spreaders may be used for both cables with lugs or bare cables.



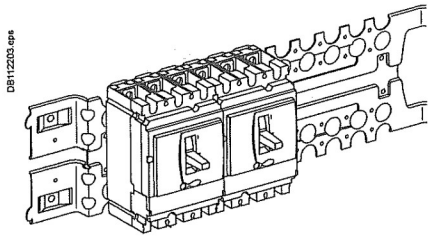
Mounting on a backplate.



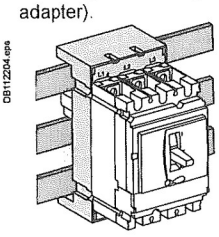
Mounting on rails.



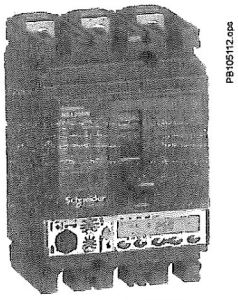
Mounting on DIN rail (with adapter).



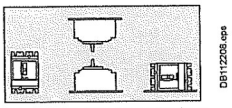
Mounting on a Prisma mounting plate.



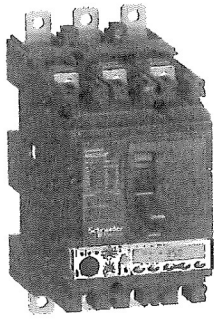
Mounting on busbars with an adapter.



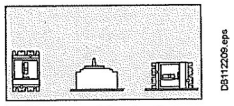
Fixed Compact NSX250.



Fixed device installation positions.



Plug-in Compact NSX250.



Withdrawable device installation positions.

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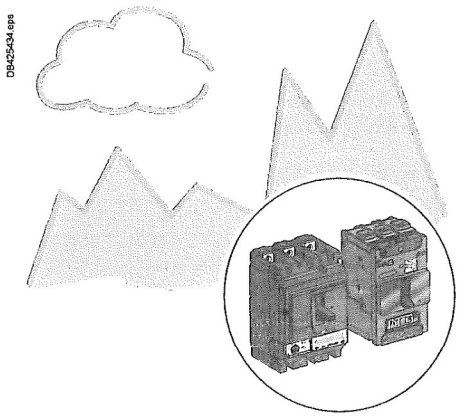
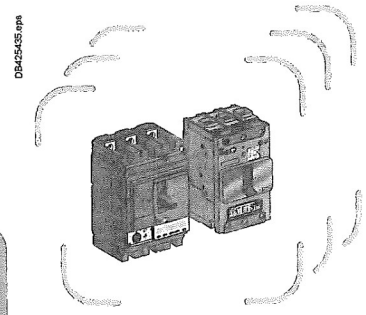
Compact NSX & NSXm
Operating and installation conditions



Altitude derating

Altitude does not significantly affect the characteristics of Compact NSX and NSXm circuit breakers up to 2000 m. Above this altitude, it is necessary to take into account the decrease in the dielectric strength and cooling capacity of air.
The following table gives the corrections to be applied for altitudes above 2000 m. The breaking capacities remain unchanged.

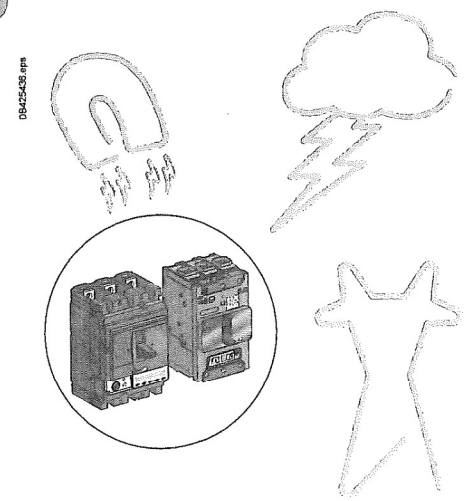
Altitude (m)		2000	3000	4000	5000
Impulse withstand voltage (kV)		8	7.1	6.4	5.6
Insulation voltage (V)	Ui	800	710	635 [1]	560
for ELCB [3]	Ui	500	445	400	350
Maximum operational voltage (V)	Ue	690	690	635 [1]	560
for ELCB [3]	Ue	440	440	400	350
Average current capacity (A) at 40 °C	In x	1.0	0.98 [2]	0.96	0.94



Vibrations

Compact NSX and NSXm devices resist mechanical vibrations.
They meet IEC 60068-2-6:
- 2.0 to 13.2 Hz and amplitude ±1 mm
- 13.2 to 100 Hz acceleration ±0.7 g.

Excessive vibration may cause tripping, breaks in connections or damage to mechanical parts.



Electromagnetic disturbances

Compact NSX and NSXm devices are protected against:
- overvoltages caused by circuit switching
- overvoltages caused by an atmospheric disturbances or by a distribution-system outage (e.g. failure of a lighting system)
- devices emitting radio waves (radios, walkie-talkies, radar, etc.)
- electrostatic discharges produced directly by users.

Compact NSX and NSXm devices have successfully passed the electromagnetic-compatibility tests (EMC) defined by the international standards listed page A-15.
These tests ensure that:
- no nuisance tripping occurs
- tripping times are respected.

[1] 640 for Compact NSX.
[2] 0.99 for Compact NSX.
[3] Earth Leakage Circuit Breaker.

Protection degree

Protection degree of the product, according to IEC 60529, depends of its configuration:

Colours	Definition
	IP54/65: side / front extended rotary handle
	IP40: front cover, side, back, long terminal shield, direct rotary handle
	IP20: power connection cover
	may be IP20 or less depending of the kind of power connections and cable size used

Power supply from the top or bottom

Compact NSXm circuit breakers can be supplied from either the top or the bottom, even when equipped with a Micrologic Vigi 4.1 with integrated earth leakage protection, without any reduction in performance. This capability facilitates connection when installed in a switchboard.
All connection and insulation accessories can be used on circuit breakers supplied either from the top or bottom.

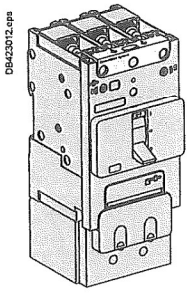
Power supply from the top or bottom [1]

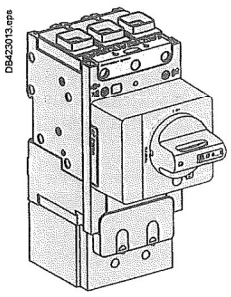
Compact NSX circuit breakers can be supplied from either the top or the bottom, even when equipped with a Vigi add-on, without any reduction in performance. This capability facilitates connection when installed in a switchboard.
All connection and insulation accessories can be used on circuit breakers supplied either from the top or bottom.
[1] All R, HB1, and HB2 circuit breakers are restricted for use as line-load connection. They can not have power fed into the bottom of the circuit breaker. They will be marked with Line and Load markings.

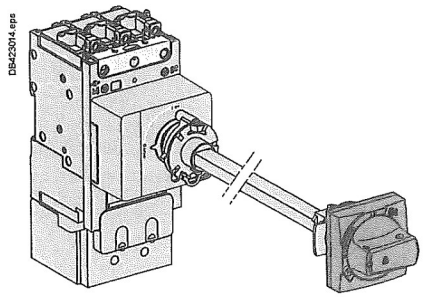
Weight

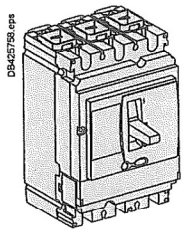
The table below presents the weights (in kg) of the circuit breakers and the main accessories, which must be summed to obtain the total weight of complete configurations. The values are valid for all performance categories.

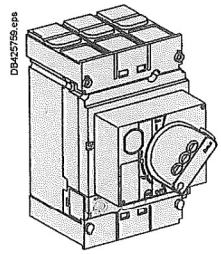
Type of device		Circuit breakers	Base	Chassis	Vigi add-on	Visu module	Motor mech.
NSX100	3P/2D	1.79	0.8	2.2	0.87	2	1.2
	3P/3D	2.05	0.8	2.2	0.87	2	1.2
	4P/4D	2.4	1.05	2.2	1.13	2.2	1.2
NSX160	3P/2D	1.85	0.8	2.2	0.87	2	1.2
	3P/3D	2.2	0.8	2.2	0.87	2	1.2
	4P/4D	2.58	1.05	2.2	1.13	2.2	1.2
NSX250	3P/2D	1.94	0.8	2.2	0.87	2	1.2
	3P/3D	2.4	0.8	2.2	0.87	2	1.2
	4P/4D	2.78	1.05	2.2	1.13	2.2	1.2
NSX400/630	3P/3D	6.19	2.4	2.2	2.8	4.6	2.8
	4P/4D	8.13	2.8	2.2	3	4.9	2.8

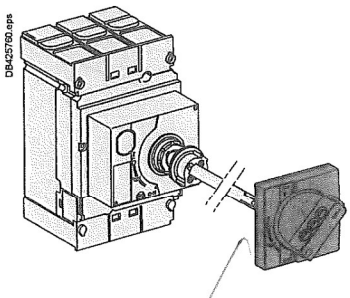












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Derating and correction factor depending of temperature

The overload protection is calibrated at 40 °C in the lab. This means that when the ambient temperature is less or greater than 40 °C, the Ir protection pick-up is slightly modified.

Choosing the right rating depending of the temperature:

Over the reference temperature of 40 °C, the circuit breaker has to be derated following the table below:

Temperature derating for thermal-magnetic (TM-D) NSXm at In

Temperature °C						
40	45	50	55	60	65	70
Rating (A) In						
16	16	15	15	14	14	13
25	24	24	23	23	22	21
32	31	30	30	29	28	27
40	39	38	37	36	34	33
50	49	48	46	45	44	42
63	61	60	58	56	54	53
80	77	73	70	67	64	60
100	96	94	90	87	83	80
125	120	117	113	109	104	100
160	155	149	144	139	133	126

Temperature derating for NSXm with Micrologic Vigi 4.1 at In

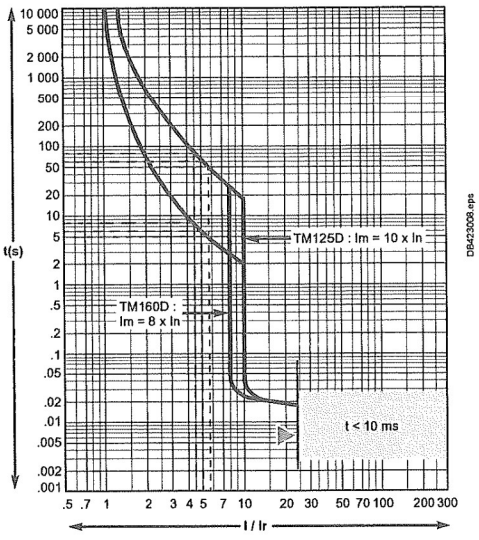
Temperature °C						
40	45	50	55	60	65	70
Rating (A) In						
25	25	25	25	25	25	25
50	50	50	50	50	50	50
100	100	100	100	100	100	100
160	155	150	145	140	135	130

Doing the setting or calculating the tripping time for a given temperature:

After having determine the corrected ratio I/In, the tripping time at 40 °C is defined with the tripping curves (see pages H-2 to H-3).
To obtain the right setting or the tripping time at a different temperature, the ratio I/In has to be corrected with the correction factor below:

Correction factor table for thermal magnetic (TM-D) NSXm to determine setting or tripping time at In

Rating (A) In	Temperature °C												
	10	15	20	25	30	35	40	45	50	55	60	65	70
16	1.16	1.13	1.11	1.08	1.05	1.03	1.00	0.97	0.94	0.91	0.88	0.85	0.81
25	1.13	1.11	1.09	1.07	1.05	1.02	1.00	0.98	0.95	0.93	0.90	0.88	0.85
32	1.14	1.11	1.09	1.07	1.05	1.02	1.00	0.98	0.95	0.93	0.90	0.87	0.84
40	1.15	1.12	1.10	1.08	1.05	1.03	1.00	0.97	0.95	0.92	0.89	0.86	0.83
50	1.13	1.11	1.09	1.07	1.05	1.02	1.00	0.98	0.95	0.93	0.90	0.87	0.85
63	1.14	1.12	1.10	1.07	1.05	1.02	1.00	0.97	0.95	0.92	0.89	0.86	0.83
80	1.21	1.18	1.14	1.11	1.07	1.04	1.00	0.96	0.92	0.88	0.83	0.80	0.75
100	1.18	1.16	1.12	1.10	1.06	1.04	1.00	0.96	0.94	0.90	0.87	0.83	0.80
125	1.17	1.14	1.11	1.08	1.06	1.03	1.00	0.96	0.93	0.90	0.87	0.84	0.80
160	1.17	1.15	1.12	1.09	1.06	1.03	1.00	0.97	0.93	0.90	0.87	0.83	0.79



Doing the right setting depending of the temperature:
Example: What is the setting to obtain a real Ir of 105 A, taking into account the temperature, for a Compact NSXm 125 A?
The necessary dial setting, in amperes, is shown below.
- At 40 °C, Ir = 105 / 1 = 105 A
- At 20 °C, Ir = 105 / 1.11 = 95 A
- At 60 °C, Ir = 105 / 0.87 = 121 A.

Calculating the tripping time at Ir = In for a given temperature:
Example: What is the tripping time of a Compact NSXm 100A at Ir = In for an overload of 500 A?
- At 40 °C, I/Ir = 5, tripping time is between 6 and 60 seconds
- At 20 °C, I/Ir = 5 / 1.12 = 4.46, tripping time is between 8 and 80 seconds
- At 60 °C, I/Ir = 5 / 0.87 = 5.75, tripping time is between 5 and 50 seconds

For Ir = 0.7 to 0.9 In, additional correction factor need to be applied - please consult us.

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Compact NSXm
Safety clearances and minimum distances

General rules

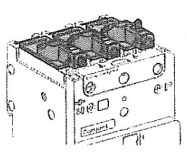
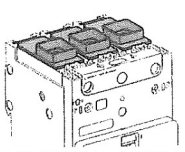
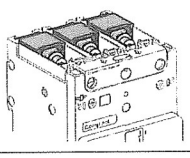
When installing a circuit breaker, minimum distances (safety clearances) must be maintained between the device and panels, bars and other protection devices installed nearby. These distances, which depend on the ultimate breaking capacity, are defined by tests carried out in accordance with standard IEC 60947-2.
If installation conformity is not checked by type tests, it is also necessary to:
- use insulated bars for circuit-breaker connections
- segregate the busbars using insulating screens.

For Compact NSXm devices, terminal shields and interphase barriers are recommended and may be mandatory depending on the kind of power connections of the device and type of installation.

Power connections

The table below indicates the rules to be respected for Compact NSXm devices to ensure insulation of live parts for the various types of connection.
Connection accessories such as crimp lugs, power distribution connectors, and spreaders are supplied with interphase barriers.
Long terminal shields provide a degree of protection of IP40 (ingress) and IK07 (mechanical impact).

Compact NSXm: rules to be respected to ensure insulation of live parts

	EverLink connector with or without control wire terminal	Mechanical lug connector	Compression lug / busbar connector
	 DB421518.eps	 DB418827.eps	 DB421519.eps

Insulation accessory options per conductor type

Type of conductor		No insulating accessory	Interphase barriers	Long terminal shield	No insulating accessory	Interphase barriers	Long terminal shield	No insulating accessory	Interphase barriers	Long terminal shield
Cables	 DB419248.eps	Possible	-	-	Possible	Possible	Possible	-	-	-
Insulated bars	 DB419249.eps	-	-	-	-	-	-	Possible [2]	Possible	Possible
Cables + crimp lugs	 DB419250.eps	-	-	-	-	-	-	Forbidden	Mandatory [3]	Possible [1]
Cables + crimp lugs with heat-shrinkable sheath	 DB419251.eps							Possible [2]	Possible	Possible
Extension terminals: spreader	 DB419252.eps	-	-	-	-	-	-	Forbidden	Mandatory [4]	-

[1] Instead of phase barriers.
[2] Safety air clearance of 8 mm has to be respected between live parts.
[3] When > 5 mm clearance between devices Interphase barriers are mandatory otherwise for < 5 mm Long terminal shields are mandatory.
[4] When > 5 mm clearance between devices Interphase barriers are mandatory otherwise > 5 mm clearance between devices is forbidden.
Note: For uninsulated bar connections, please consult us.

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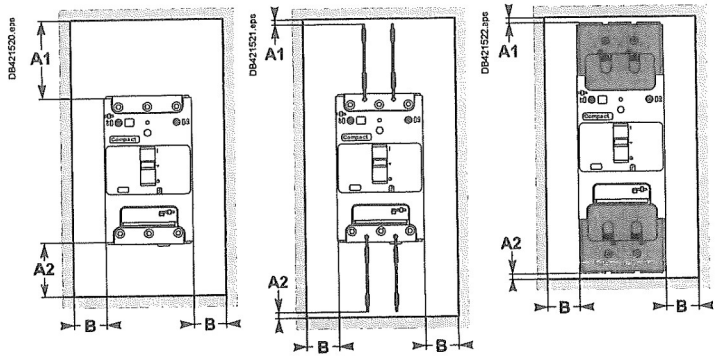
IEC standard

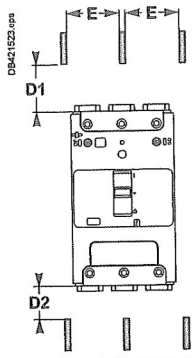
Minimum safety clearances



Operating voltage	Clearance (mm)						
	Between devices	Between device and sheet metal					
		Painted sheet metal			Bare sheet metal		
U ≤ 690 V		A1	A2	B	A1	A2	B
for devices equipped with:							
no accessories	0	30 mm	5 mm	0	40 mm	5 mm	5 mm
interphase barriers [1]	0	0	0	0	0	0	5 mm
long terminal shields	0	0	0	0	0	0	5 mm

[1] 20 mm clearance when using spreaders and 5mm clearance when using crimp lugs between devices is mandatory.

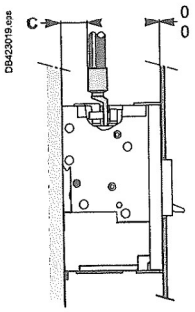
Minimum safety clearances to bare busbars



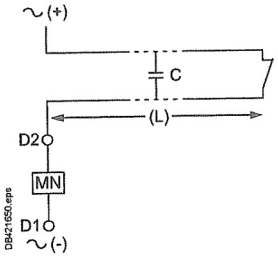
Operating voltage	Clearances to live bare busbars [2]			
	Spacing E ≤ 60 mm		Spacing E > 60 mm	
	D1	D2	D1	D2
U ≤ 690 V	200 mm	100 mm	120 mm	60 mm

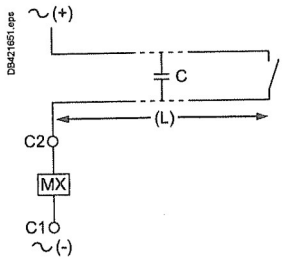
[2] These clearances can be reduced for special installations as long as the configuration is checked by tests.

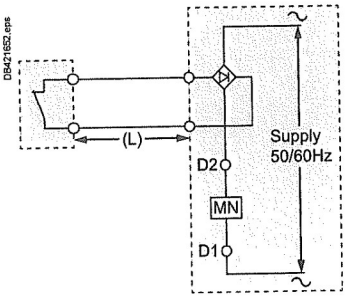
Compression lug safety clearance



An insulating screen or long terminal shield is required if C < 8 mm.







Shunt trip (MX) and undervoltage release (MN)

Recommended maximum cable lengths

In certain circumstances, high cable capacitance due to an excessive cable length could prevent an undervoltage release MN from dropping out resulting in safety issues. In case of a shunt trip MX, an untimely trip may occur due to capacitive current leak.
To avoid these dysfunction due to cable capacitance C, the maximum cable length (L) is defined by the following table for a 1.5 mm² cable.

Power supply voltage (Un)	Maximum cable length undervoltage trip (MN) [1]	Shunt trip (MX) [1]
24 V AC	1 243 m	3 653 m
24 V DC	unlimited	> 3653 m
48 V AC	583 m	1 667 m
48 V DC	unlimited	> 1667 m
110...130 V AC	126 m	913 m
110...130 V DC	unlimited	> 913 m
208-240 V AC	109 m	160 m
250 V DC	unlimited	> 160 m
277 V AC	98 m	120 m
380-415 V AC	86 m	80 m
440-480 V AC	56 m	67 m

[1] Make sure auxiliaries supply voltage is within working range (0.85 Un mini...1.1 Un maxi).

If a longer cable length is required, several solutions are possible to counteract excessive cable capacitance:
- use DC operated auxiliaries
- use lower control voltage (make sure auxiliaries supply voltage is within working range: 0.85 Un minimum...1.1 Un maximum)
- if high voltage and long control cables are required for an AC undervoltage release (MN), add a rectifier bridge (ref LV426899 – DIN rail compatible) in the control circuit. It will prevent drop out problems but increase operating time.

Electrical characteristics of MN/MX

Characteristics			AC	DC
Rated voltage (V)			24, 48, 110...130, 208...240, 277, 380...415, 440...480	24, 48, 125, 250
Power requirements	MX	Pickup (< 50 ms)	< 6 VA	< 10 W
		Seal-in	< 4 VA	< 1 W
	MN		< 7 VA	< 2 W
Clearing time (ms)			< 50	< 50
Operating range			up to 1.1 Un	

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Compact NSXm thermal power loss values are used to calculate total temperature rise in the switchboard in which the circuit breakers are installed.

The values indicated in the tables below are typical values for a device at full rated load and 50/60 Hz.

Power loss per pole (P/pole) in Watts (W)
The value indicated is the power loss at In, 50/60 Hz, for a three-pole or four-pole circuit breaker. Measurement and calculation of power loss are carried out in compliance with the recommendations of Annex G of standard IEC 60947-2.

Resistance per pole (R/pole) in milliohms (mΩ)
The value of the resistance per pole is provided as a general indication for a new device.
The value of the contact resistance is determined on the basis of the measured voltage drop, in accordance with the manufacturer's test procedure.
Note: this measurement is not sufficient to determine the quality of the contacts, i.e. the capacity of the circuit breaker to carry its rated current.

Calculation of total power loss
Total power loss at full rated load and 50/60 Hz is equal to power losses per pole multiplied by the number of poles (3 or 4).

Compact NSXm with TM-D

Rating (A)	R total / pole (mΩ)	P / Pole (W)
16	8.87	2.3
25	4.50	2.8
32	3.10	3.3
40	2.30	3.8
50	1.85	4.6
63	1.44	5.7
80	0.90	5.8
100	0.75	7.5
125	0.59	9.3
160	0.53	13.7

Compact NSXm with Micrologic Vigi 4.1

Rating (A)	R total / pole (mΩ)	P / Pole (W)
25	2.44	1.5
50	0.48	1.2
100	0.48	4.8
160	0.48	12.3

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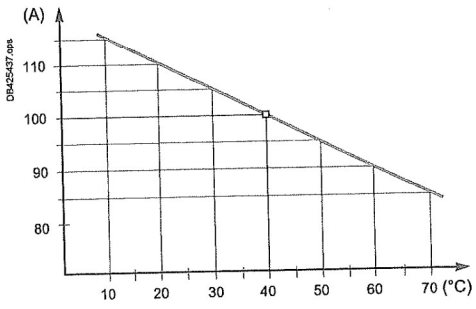
Compact NSX temperature derating
Equipped with thermal-magnetic trip units

When thermal-magnetic trip units are used at ambient temperatures other than 40 °C, the Ir pick-up is modified.



Temperature derating curve for Compact NSX100.

Derating and correction factor depending of temperature

The overload protection is calibrated at 40 °C in the lab. This means that when the ambient temperature is less or greater than 40 °C, the Ir protection pick-up is slightly modified.

Choosing the right rating depending of the temperature:

Over the reference temperature of 40 °C, the circuit breaker has to be derated following the table below:

Temperature derating for thermal-magnetic (TM-D) NSX at In

Temperature °C						
40	45	50	55	60	65	70
Rating (A) In						
16	15.6	15.2	14.8	14.5	14	13.8
25	24.5	24	23.5	23	22	21
32	31.3	30.5	30	29.5	29	28.5
40	39	38	37	36	35	34
50	49	48	47	46	45	44
63	61.5	60	58	57	55	54
80	78	76	74	72	70	68
100	97.5	95	92.5	90	87.5	85
125	122	119	116	113	109	106
160	156	152	148	144	140	136
200	195	190	185	180	175	170
250	244	238	231	225	219	213

Doing the setting or calculating the tripping time for a given temperature:

After having determine the corrected ratio I/In, the tripping time at 40 °C is defined with the tripping curves (see pages H-5 to H-7).
To obtain the right setting or the tripping time at a different temperature, the ratio I/In has to be corrected with the correction factor below:

Correction factor table for thermal magnetic (TM-D) NSX to determine setting or tripping time at In

Rating (A) In	Temperature °C												
	10	15	20	25	30	35	40	45	50	55	60	65	70
16	1.15	1.17	1.13	1.13	1.06	1.04	1.00	0.98	0.95	0.93	0.91	0.88	0.86
25	1.15	1.12	1.10	1.08	1.05	1.02	1.00	0.98	0.96	0.94	0.92	0.88	0.84
32	1.15	1.13	1.10	1.07	1.05	1.03	1.00	0.98	0.95	0.94	0.92	0.91	0.89
40	1.15	1.13	1.10	1.08	1.05	1.03	1.00	0.98	0.95	0.93	0.9	0.88	0.85
50	1.15	1.12	1.10	1.08	1.05	1.02	1.00	0.98	0.96	0.94	0.92	0.90	0.88
63	1.14	1.13	1.10	1.08	1.05	1.03	1.00	0.98	0.95	0.92	0.90	0.87	0.86
80	1.15	1.13	1.10	1.08	1.05	1.03	1.00	0.98	0.95	0.93	0.90	0.88	0.85
100	1.15	1.13	1.10	1.08	1.05	1.03	1.00	0.98	0.95	0.93	0.90	0.88	0.85
125	1.15	1.128	1.10	1.07	1.05	1.02	1.00	0.98	0.95	0.93	0.90	0.87	0.85
160	1.15	1.125	1.10	1.08	1.05	1.03	1.00	0.98	0.95	0.93	0.90	0.88	0.85
200	1.15	1.125	1.10	1.08	1.05	1.03	1.00	0.98	0.95	0.93	0.90	0.88	0.85
250	1.15	1.124	1.11	1.08	1.05	1.02	1.00	1.63	0.95	0.92	0.90	0.88	0.85

For Ir = 0.7 to 0.9 In, additional correction factor need to be applied - please consult us.

Compact NSX temperature derating
Equipped with thermal-magnetic trip units

Example 1. What is the tripping time of a Compact NSX100 equipped with a TM100D trip unit set to 100 A, for an overload I = 500 A?
The overload I/Ir is calculated as a function of the temperature. Use the above values and the curve on page H-6 (shown on the left) to determine the corresponding time.
- At 40 °C, Ir = 100 A, I/Ir = 5 and the tripping time is between 6 and 60 seconds.
- At 20 °C, Ir = 110 A, I/Ir = 4.54 and the tripping time is between 8 and 80 seconds.
- At 60 °C, Ir = 90 A, I/Ir = 5.55 and the tripping time is between 5 and 50 seconds.

Example 2. What is the setting to obtain a real Ir of 210 A, taking into account the temperature, for a Compact NSX250 equipped with a TM250D trip unit?
The necessary dial setting, in amperes, is shown below.
- At 40 °C, Ir = (210/250) x 250 A = 210 A
- At 20 °C, Ir = (210/277) x 250 A = 189.5 A
- At 60 °C, Ir = (210/225) x 250 A = 233 A

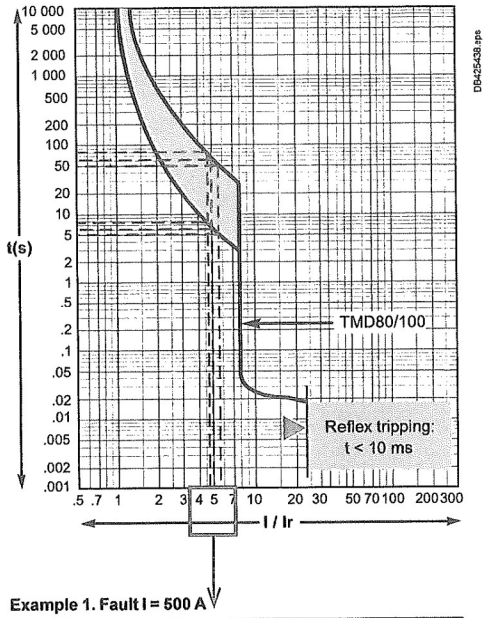
Additional derating coefficient for an add-on module

The values indicated in the previous tables are valid for **fixed** circuit breakers equipped with one of the following modules:
- Vigi add-on
- Vigi add-on Alarm
- ammeter module
- current-transformer module.

They also apply for **plug-in or withdrawable** circuit breakers equipped with:
- ammeter module
- current-transformer module.

However, for **plug-in or withdrawable** circuit breakers equipped with a Vigi add-on or a Vigi add-on Alarm, the coefficient 0.84 must be applied.
The table below sums up the situation for add-on modules.

Type of device	Circuit breaker	TM-D trip-unit rating	Vigi add-on or Vigi add-on Alarm	Ammeter or current transformer module
Fixed	NSX100	16 to 100	1	1
	NSX160 to 250	125 to 160		
	NSX250	200 to 250		
Plug-in or withdrawable	NSX100	16 to 100		
	NSX160	125 to 160		
	NSX250	200 to 250	0.84	



Example 1. Fault I = 500 A

I/Ir	4.5	5	5.5
T°C	20 °C	40 °C	60 °C
t min.	8 s	6 s	5 s
t max.	80 s	60 s	50 s

Thermal-protection curve with minimum and maximum values.

E

Compact NSX temperature derating
Equipped with electronic trip units

Changes in temperature do not affect measurements by electronic trip units.
- The built-in CT sensors with Rogowski toroids measure the current.
- The control electronics compare the value of the current to the settings defined for 40 °C.

Because temperature has no effect on the toroid measurements, the tripping thresholds do not need to be modified.
However, the temperature rise caused by the flow of current and the ambient temperature increase the temperature of the device. To avoid reaching the thermal withstand level of the equipment, it is necessary to limit the current flowing through the device, i.e. the maximum Ir setting as a function of the temperature.

Compact NSX100/160/250

The table below indicates the maximum long-time (LT) protection setting Ir (A) depending on the ambient temperature.

Type of device	Rating (A)	Temperature (°C) 40	45	50	55	60	65	70
NSX100/160								
Fixed, plug-in or withdrawable	100	no derating						
	160	no derating						
NSX250 + Micrologic 2.2/5.2/6.2								
Fixed	250	250	250	250	245	237	230	225
Plug-in or withdr.	250	250	245	237	230	225	220	215
NSX250 + Micrologic Vigi 4.2/7.2								
Fixed	250	250	250	245	237	230	225	218
Plug-in or withdr.	250	225	220	215	210	205	198	190

Compact NSX400 and 630

The table below indicates the maximum long-time (LT) protection setting Ir (A) depending on the ambient temperature.

Type of device	Rating (A)	Temperature (°C) 40	45	50	55	60	65	70
NSX400 + Micrologic 2.3/5.3/6.3								
Fixed	400	400	400	400	390	380	370	360
Plug-in/withdr.	400	400	390	380	370	360	350	340
NSX400 + Micrologic Vigi 4.3/ 7.3								
Fixed	400	400	400	390	380	370	360	350
Plug-in/withdr.	400	400	390	380	370	360	350	340
NSX630 + Micrologic 2.3/5.3/6.3								
Fixed	630	630	615	600	585	570	550	535
Plug-in/withdr.	630	570	550	535	520	505	490	475
NSX630 + Micrologic Vigi 4.3/7.3								
Fixed	630	570	555	540	530	515	500	485
Plug-in/withdr.	630	480	470	457	445	435	420	405

Example. A fixed Compact NSX400 equipped with a Micrologic can have a maximum Ir setting of:
- 400 A up to 50 °C
- 380 A up to 60 °C.

Compact NSX temperature derating
Equipped with electronic trip units

Additional derating coefficient for an add-on module

For **fixed** or **plug-in / withdrawable** circuit breakers, the addition of a:
- Vigi add-on
- Vigi add-on Alarm
- ammeter module
- current-transformer module

can modify the derating values. Apply the coefficients shown below.

Derating of a Compact NSX equipped with a Micrologic trip unit

Type of device	Circuit breaker	Micrologic type	Vigi add-on or Vigi add-on Alarm	Coupling busbar	Current transformer
Fixed	NSX100	2.2/5.2/6.2	1	1	1
		4.2/7.2	-	1	
	NSX160	2.2/5.2/6.2	1	1	
		4.2/7.2	-	1	
	NSX250	2.2/5.2/6.2	1	1	
		4.2/7.2	-	0.95	
Plug-in or withdrawable	NSX100	2.2/5.2/6.2	1	-	
		4.2/7.2	-		
	NSX160	2.2/5.2/6.2	1		
		4.2/7.2	-		
	NSX250	2.2/5.2/6.2	0.86		
		4.2/7.2	-		
Fixed	NSX400	2.3/5.3/6.3	0.97	1	1
		4.3/7.3	-	0.97	
	NSX630	2.3/5.3/6.3	0.9	1	
		4.3/7.3	-	0.9	
Plug-in or withdrawable	NSX400	2.3/5.3/6.3	0.97	-	
		4.3/7.3	-		
	NSX630	2.3/5.3/6.3	0.9		
		4.3/7.3	-		

Note:
- Coupling busbar is forbidden with Vigi add-on.
- Current transformer is forbidden with Vigi add-on and coupling busbar.
- Coupling busbar is forbidden with withdrawable installation.
- To provide the Visu function, Compact NSX circuit breakers, with or without a Vigi add-on, are combined with INV switch-disconnectors. Tripping values for the selected combination are indicated in the Compact INS/INV catalogue.

E

Compact NSX installation in switchboards
Safety clearances and minimum distances

General rules

When installing a circuit breaker, minimum distances (safety clearances) must be maintained between the device and panels, bars and other protection devices installed nearby. These distances, which depend on the ultimate breaking capacity, are defined by tests carried out in accordance with standard IEC 60947-2.
If installation conformity is not checked by type tests, it is also necessary to:
- use insulated bars for circuit-breaker connections
- segregate the busbars using insulating screens.

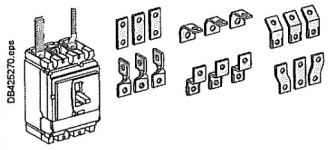
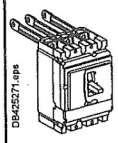
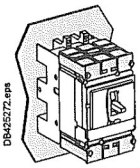
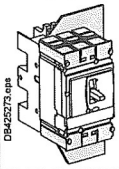
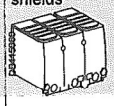
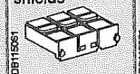
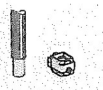
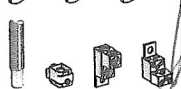
For Compact NSX100 to 630 devices, terminal shields and interphase barriers are recommended and may be mandatory depending on the operating voltage of the device and type of installation (fixed, withdrawable, etc.).

Power connections

The table below indicates the rules to be respected for Compact NSX100 to 630 devices to ensure insulation of live parts for the various types of connection.
- fixed devices with front connection (FC) or rear connection (RC)
- plug-in or withdrawable devices.

Connection accessories such as crimp lugs, bare-cable connectors, terminal extensions (straight, right-angle, double-L and 45°) and spreaders are supplied with interphase barriers.
Long terminal shields provide a degree of protection of IP40 (ingress) and IK07 (mechanical impact).

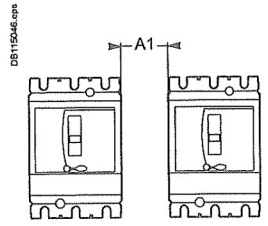
Compact NSX100 to 630: rules to be respected to ensure insulation of live parts

Type of connection		Fixed, front connection			Fixed, rear connection	Plug-in or withdrawable	
						On backplate 	Through panel 
Possible, recommended or mandatory accessories: With:		No insulating accessory	Interphase barriers 	Long terminal shields 	Short terminal shields 	Short terminal shields 	Short terminal shields 
operating voltage	type of conductor						
< 500 V	Insulated bars 	Possible	Possible	Possible	Recommended	Recommended	Mandatory
	Extension terminals Cables + crimp lugs 	No	Mandatory (supplied)	Possible (instead of ph. barriers)	Recommended	Recommended	Mandatory
	Bare cables + connectors 	Possible for cable connectors NSX100 to 250	Possible for cable connectors NSX100 to 250	Possible for cable connectors NSX100 to 250	Recommended	Recommended	Mandatory
		No	Mandatory [1] (supplied)	Possible [1] (instead of ph. barriers)			
≥ 500 V	Insulated bars 	No	No	Mandatory (use of short terminal shield possible)	Mandatory [2]	Mandatory [2]	Mandatory [2]
	Extension terminals Cables + crimp lugs 	No	No	Mandatory	Mandatory [2]	Mandatory [2]	Mandatory [2]
	Bare cables + connectors 	No	No	Mandatory	Mandatory [2]	Mandatory [2]	Mandatory [2]

[1] Long terminal shields, mandatory if the device is fixed through the door, whatever the voltage.
[2] LV433693 (3P) or LV433694 (4P) Short Terminal Shield are mandatory for R/HB1/HB2 400 A and 630 A performance.

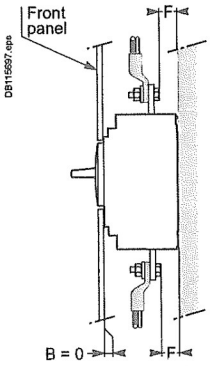
Safety clearance

Minimum distance between two adjacent circuit breakers



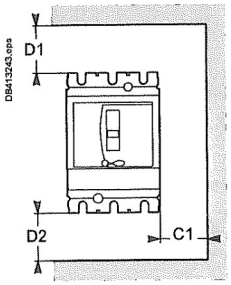
Bare or painted sheetmetal

Minimum distance between circuit breaker and front or rear panels

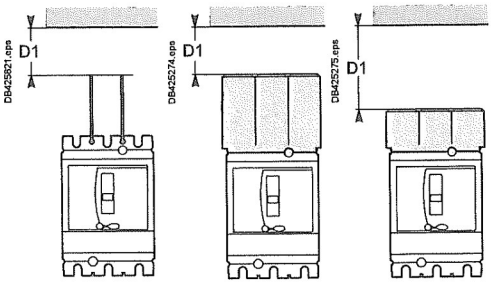


Note: if F < 8 mm: an insulating screen or long terminal shield is mandatory (see page C-23).

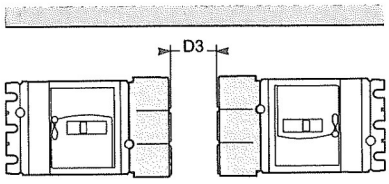
Minimum distance between circuit breaker and top, bottom or side panels



Devices without accessories.



Devices with interphase barriers or long or short terminal shields.



Short terminal shield rear connected.

Minimum safety clearances for Compact NSX100 to 630

Operating voltage	Clearance (mm)							
	Between devices	Between device and sheetmetal						
		Painted sheet metal			Bare sheet metal			
	A1	C1	D1	D2	C1	D1	D2	D3
U ≤ 440 V								
for devices equipped with:								
■ no accessories	0	0	30	30	5	40	40	-
■ short terminal shields	0	0	30	30	5	40	40	50
■ interphase barriers	0	0	0	0	5	0	0	-
■ long terminal shields	0	0	0	0	0	0	0	-
440 V < U ≤ 500 V								
for devices equipped with:								
■ short terminal shields	0	0	30	30	10	40	40	50
■ interphase barriers [1]	0	0	0	0	20	10	10	-
■ long terminal shields [2]	0	0	0	0	10	10	10	-
U > 500 V								
for devices equipped with:								
■ short terminal shields	0	10	50	50	20	100	100	50
■ long terminal shields	0	10	30	30	20	40	40	-

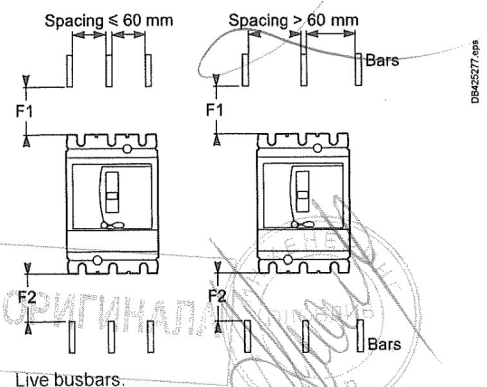
[1] Only for NSX100 to 250.
[2] For all cases.

Clearances with respect to live bare busbars

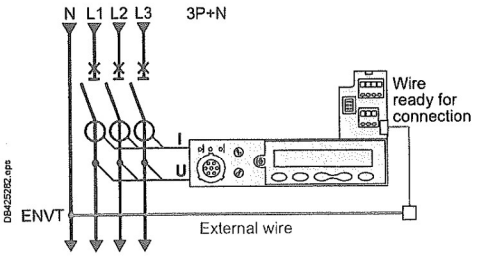
Minimum clearances for Compact NSX100 to 630

Operating voltage	Clearances with respect to live bare busbars			
	spacing ≤ 60 mm		spacing > 60 mm	
	F1	F2	F1	F2
U < 440 V	350	350	80	80
440 V ≤ U ≤ 500 V	350	350	120	120
U > 500 V	prohibited: insulating screen required between device and busbars			

These clearances can be reduced for special installations as long as the configuration is checked by tests.



Live busbars.



External neutral voltage tap (ENVT).

Remote tripping by MN or MX release

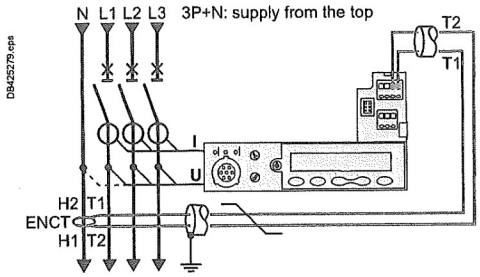
Power consumption is approximately:
- 30 VA for pick-up of the MN and MX releases
- 300 VA to 500 VA for the motor mechanism.

The table below indicates the maximum permissible cable length for different supply voltages and cable cross-sectional areas.

Recommended maximum cable lengths (in metres)

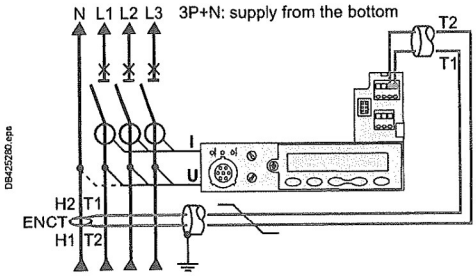
Power supply voltage (V DC)		12 V		24 V		48 V	
Cable cross-section (mm²)		1.5	2.5	1.5	2.5	1.5	2.5
MN	U source 100 %	15	–	160	–	640	–
	U source 85 %	7	–	40	–	160	–
MX	U source 100 %	60	–	240	–	960	–
	U source 85 %	30	–	120	–	480	–
Motor mechanism	U source 100 %	–	–	10	16	65	110
	U source 85 %	–	–	2	4	17	28

Note: the indicated length is that of each of the two wires.



External neutral voltage tap (ENVT)

This connection is required for accurate power measurements on 3-pole circuit breakers equipped with Micrologic 5 / 6 E trip units in installations with a distributed neutral. It can be used to measure phase-neutral voltages and calculate power using the 3 wattmeter method.
Compact NSX 3-pole circuit breakers come with a wire installed on the device for the connection to the ENVT.
This wire is equipped with a connector for connection to an external wire with the following characteristics:
- cross-sectional area of 1 mm² to 2.5 mm²
- maximum length of 10 metres.

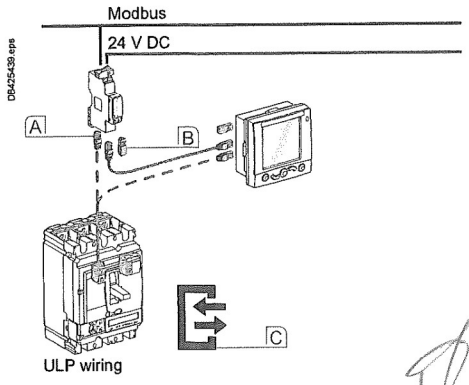


External neutral current transformer (ENCT).

External neutral current transformer (ENCT)

This connection is required to protect the neutral on 3-pole circuit breakers equipped with Micrologic 5 / 6 A or E trip units in installations with a distributed neutral. For Micrologic 6 A or E, it is required for type G ground-fault protection.
The ENCT is connected in the same way for fixed, plug-in or withdrawable devices:
- fixed devices are connected via terminals T1 and T2 of the internal terminal block.
- plug-in and withdrawable devices are not connected via the auxiliary terminals.

The wires must be connected/disconnected inside the device via terminals T1 and T2.
The ENCT must be connected to the Micrologic trip unit by a shielded twisted pair.
The shielding should be connected to the switchboard earth only at the CT end, no more than 30 cm from the CT.
- the power connections of the CT to the neutral (H2 and H1) must be made in the same way for power supply from the top or the bottom (see figure). Make sure they are not reversed for devices with power supply from the bottom.
- cross-sectional area of 0.4 mm² to 1.5 mm²
- maximum length of 10 metres.



ULP connection system.
A RJ45
B Line terminator
C ULP symbol

ULP connection system between Micrologic, FDM121 switchboard display and Modbus interface

The ULP (Universal Logic Plug) wiring system used by Compact NSX for connections through to the Modbus network requires neither tools nor settings.
The prefabricated cords are sued for both data transfer and distribution of 24 V DC power. Connectors on each component are identified by ULP (Universal Logic Plug) symbols, ensuring total compatibility between each component.

Available cords

All connections are made with prefabricated cords:
- NSX cord for connection of the internal terminal block to the Modbus interface or the FDM121 display via an RJ45 connector. The cord is available in three lengths, 0.35 m, 1.3 m and 3 m
- ULP cords with RJ45 connectors at each end for the other connections between components. The cord is available in six lengths, 0.3 m, 0.6 m, 1 m, 2 m, 3 m and 5 m. For greater distances, two cords can be interconnected using the RJ45 female/female accessory.

Maximum length of 10 m between 2 modules and 30 m in all.
A line terminator must be fitted to all components with an unused RJ45 connector.

External 24 V DC power-supply module (AD)

The external power-supply module makes it possible:
- to use the display even if the circuit breaker is open or not supplied (for the exact conditions of use, see the "electrical diagrams" part of this catalogue)
- to display fault currents after tripping
- to modify settings when the circuit breaker is open (OFF position)

An external 24 V DC power supply is required for installation with communication, whatever the type of trip unit.
This module is not designed to power on 24 V DC voltage releases and electric motor mechanism.
This module powers both the control unit and the M2C programmable contacts.
We recommended using the AD power supply due to its low stray primary secondary capacitance. Good operation of the Micrologic control unit in noisy environment is not guaranteed with other power supplies.
If the COM option is used, a second dedicated power supply shall be used.

Characteristics
- Power supply AC-to-DC or DC-to-DC
- Output voltage: 24 V DC ±5 %.
- Output current: 1 A.
- DIN rail or platine Fixing with Acti9 form factor
- Conducted emissions power line: class B per EN 61000-6-3.

Wiring (see page E-89)

Micrologic 5 / 6 / 7 not using the Communication function
The external 24 V DC supply is connected via the circuit breaker terminal block.
Use of a 24 V DC battery provides backup power for approximate 3 hours (100 mA) in the event of an interruption in the external supply.

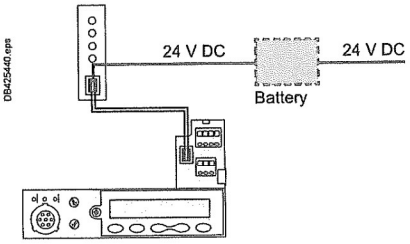
Micrologic 5 / 6 / 7 using the Communication function
The external 24 V DC supply is connected via the Modbus interface using a five-pin connector, including two for the power supply. Stacking accessories (see page D-2) can be used to supply a number of interfaces by fast clip-on connection.
The 24 V DC power is distributed downstream by the ULP (Universal Logic Plug) communication cords with RJ45 connectors. This system ensures both data transfer and power distribution to the connected modules.

Recommendations for 24 V DC wiring
- Do not connect the positive terminal to earth.
- Do not connect the negative terminal to earth.
- The maximum length for each conductor (+/-) is ten metres.
- For connection distances greater than ten metres, the plus and minus conductors of the 24 V DC supply must be twisted to improve EMC.
- The 24 V DC conductors must cross the power cables perpendicularly. If this is difficult or impossible, the plus and minus conductors must be twisted.

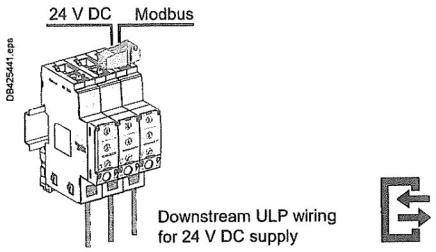
Modbus (see page E-89)

Each Compact NSX circuit breaker equipped with Micrologic 5 / 6 / 7 and an FDM121 display is connected to the Modbus network via the Modbus interface module.
Connection of all the circuit breakers and other Modbus devices in the switchboard to a Modbus bus is made much easier by using a Modbus RJ45 junction block installed in the switchboard.

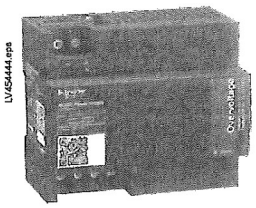
Recommendations for Modbus wiring
- The shielding may be earthed.
- The conductors must be twisted to improve immunity (EMC).
- The Modbus conductors must cross the power cables perpendicularly.



Power supply, without the Communication function, via the terminal block with a backup battery.



Supply, with the Communication function, via the Modbus interface.



External 24 V DC power supply module (AD)

24 V DC Universal Phaseo™ ABL8 power supplies

The Universal Phaseo ABL8 RPS 24050 and ABL8 RPS 24030 power supplies can be connected phaseto-
neutral or phase-to-phase.
They deliver a voltage that is precise to 3%, whatever the load and whatever the value of the AC
supply, within the ranges 85 to 132 V AC and 170 to 550 V AC.
The Universal Phaseo ABL8 powers:
- Circuit breaker communication module and interface

Characteristics
- Power supply AC-to-DC,
- Network frequency: 50/60 Hz (±5 %).
- Output voltage: 24 V DC ±3%.
- Output current: 3 or 5 A
- DIN rail or platine Fixing
- Conducted emissions power line: class B per EN 61000-6-3.

To assist cooling there must be sufficient clearance around the Universal range Phaseo power supplies:
- 50 mm above and below
- 10 mm on the side.

	ABL8RPS○○○○	Module AD
Over Voltage Category	Cat I per VDE 0106-1	Cat IV per IEC 62477-1 (AC model) Cat III per IEC 62477-1 (DC model) Cat III per UL 61010-1
Degree of pollution as per IEC 60664-1	2	3
Input supply voltage AC	100...120 V AC and 200...500 V AC	110/130 or 200/240 V AC
Input supply voltage DC	N/A	24/30 or 48/60 or 100/125 V DC
Dielectric Input/Output	4 kV rms -1 mn.	3 kV rms - 1 mn. (110/130 V AC and 200/240 V AC model) 3 kV rms - 1 mn. (110/125 V DC model) 2 kV rms - 1 mn. (24/30 V DC and 48/60 V DC model)
Input/Ground	3.5 kV rms -1 mn.	3 kV rms - 1 mn.
Ouput /Ground	0,5 kV rms - 1 mn.	1.5 kV rms - 1 mn.
Temperature	▪ 50 °C ▪ 60 °C with 80 % of the rated current maximum	70°C
Output current	3 A (ABL8RPS24030) 5 A (ABL8RPS24050)	1 A
Inrush current for 2 ms	< 30 A	< 20 A
Ripple	200 mV peak-peak	200 mV peak-peak
Output voltage limits	24 to 28.8 V DC	22.8 to 25.2 V DC
Protection degree	IP20	IP4x front face / IP2x terminals / IP3x other

Note: For the applications requiring an over voltage category higher than 2, a surge arrester shall be associated to ABL8 RPS power supplies. The iQuick20prd type 2 surge arrester is recommended.

Compact NSX power loss/ resistance
Equipped with thermal-magnetic trip units

Compact NSX thermal power loss values are used to calculate total temperature rise in the switchboard in which the circuit breakers are installed.

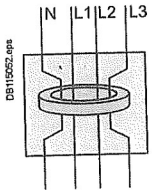
The values indicated in the tables below are typical values for a device at full rated load and 50/60 Hz.

Power loss per pole (P/pole) in Watts (W)
The value indicated is the power loss at I_N, 50/60 Hz, for a three-pole or four-pole circuit breaker. Measurement and calculation of power loss are carried out in compliance with the recommendations of Annex G of standard IEC 60947-2.

Resistance per pole (R/pole) in milliohms (mΩ)
The value of the resistance per pole is provided as a general indication for a new device.
The value of the contact resistance must be determined on the basis of the measured voltage drop, in accordance with the manufacturer's test procedure (ABT instruction document no. 1 - BEE - 02.2 -A).
Note: this measurement is not sufficient to determine the quality of the contacts, i.e. the capacity of the circuit breaker to carry its rated current.

Additional power loss
Additional power loss is equal to the sum of the power dissipated by the following:
- Vigi add-on: note that the deviation of the N and L3 bars required to pass through the toroid results in higher power losses compared to those of the L1 and L2 bars (diagram opposite). When calculating total power loss, use L1, L2, L3 for a 3P device and N, L1, L2, L3 for a 4P device
- disconnecting contacts (plug-in and withdrawable devices)
- ammeter module
- transformer module.

Calculation of total power loss
Total power loss at full rated load and 50/60 Hz is equal to the sum of the device and additional power losses per pole multiplied by the number of poles (2, 3 or 4).
If a Vigi is installed, it is necessary to differentiate between N and L3 on one hand and L1 and L2 on the other.



With a Vigi add-on, the deviation of the N and L3 bars required to pass through the toroid results in higher power losses compared to those of the L1 and L2 bars.

Compact NSX100 to 250 equipped with TM-D and TM-G trip units

Type of device		Fixed device		Additional power / pole				
3/4 poles	Rat. (A)	R/pole	P/pole	Vigi add-on (N, L3)	Vigi add-on (L1, L2)	Plug-in / withdr.	Ammeter module	Transfo. module
NSX100	16	11.42	2.92	0	0	0	0	0
	25	6.42	4.01	0	0	0.1	0	0
	32	3.94	4.03	0.06	0.03	0.15	0.1	0.1
	40	3.42	5.47	0.10	0.05	0.2	0.1	0.1
	50	1.64	4.11	0.15	0.08	0.3	0.1	0.1
	63	2.17	8.61	0.3	0.15	0.4	0.1	0.1
	80	1.37	8.77	0.4	0.2	0.6	0.1	0.1
	100	0.88	8.8	0.7	0.35	1	0.2	0.2
NSX160	80	1.26	8.06	0.4	0.2	0.6	0.1	0.1
	100	0.77	7.7	0.7	0.35	1	0.2	0.2
	125	0.69	10.78	1.1	0.55	1.6	0.3	0.3
	160	0.55	13.95	1.8	0.9	2.6	0.5	0.5
NSX250	125	0.61	9.45	1.1	0.55	1.6	0.3	0.3
	160	0.46	11.78	1.8	0.9	2.6	0.5	0.5
	200	0.39	15.4	2.8	1.4	4	0.8	0.8
	250	0.3	18.75	4.4	2.2	6.3	1.3	1.3

Compact NSX100 to 630 equipped with MA/1.3-M trip units

Type of device		Fixed device		Additional power / pole				
3 poles	Rat. (A)	R/pole	P/pole	Vigi add-on (N, L3)	Vigi add-on (L1, L2)	Plug-in / withdr.	Ammeter module	Transfo. module
NSX100	2.5	148.42	0.93	0	0	0	0	0
	6.3	99.02	3.93	0	0	0	0	0
	12.5	4.05	0.63	0	0	0	0	0
	25	1.66	1.04	0	0	0.1	0	0
	50	0.67	1.66	0.2	0.1	0.3	0.1	0.1
	100	0.52	5.2	0.7	0.35	1	0.2	0.2
NSX160	150	0.38	8.55	1.35	0.68	2.6	0.45	0.45
NSX250	220	0.3	14.52	2.9	1.45	4.89	0.97	0.97
NSX400	320	0.12	12.29	3.2	1.6	6.14	1.54	1.54
NSX630	500	0.1	25	13.99	7	15	3.75	3.75

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Compact NSX power loss/ resistance
Equipped with electronic trip units

The values indicated in the table below are typical values for a device at full rated load and 50/60 Hz. The definitions and information are the same as that for circuit breakers equipped with thermal-magnetic trip units.

Compact NSX100 to 630 equipped with Micrologic trip units

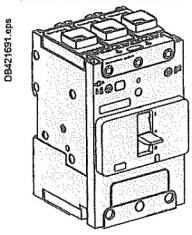
Type of device 3/4 poles	Rating (A)	Fixed device R/pole (mΩ)		P/Pole (w)		Additionnal power (W)/ pole Vigi add-on (N/L3)	Vigi add-on (L1/L2)	Plug-In	Transfo Module
NSX + Micrologic 2.2/5.2/6.2									
NSX100	<40 A	0.84		1.3		0.1	0.06	0.2	0.1
	40 A ≤ 100 A	0.47		4.7		0.7	0.35	1	0.2
NSX160	<40 A	0.73		1.2		0.4	0.2	0.6	0.1
	40 A ≤ 160 A	0.36		9.2		1.8	0.9	2.6	0.5
NSX250	<40 A	0.27		2.7		1.1	0.55	1.6	0.2
	40 A ≤ 250 A	0.28		17.6		4.4	2.2	6.3	1.3
NSX + Micrologic 2.3/5.3/6.3									
NSX400	<400 A	0.12		19.2		3.2	1.6	9.6	2.4
NSX630	<630 A	0.1		39.7		6.5	3.25	19.49	5.95
NSX + Micrologic add-on 4.2/7.2		N/L1/L3	L2	N/L1/L3	L2				
NSX100	<100 A	0.58	0.49	5.8	4.9	-	-	1	0.2
NSX160	<160 A	0.48	0.39	12.3	10.0	-	-	2.6	0.5
NSX250	<250 A	0.4	0.33	25	20.6	-	-	6.3	1.3
NSX + Micrologic add-on 4.3/7.3									
NSX400	<400 A	0.16	0.14	25.6	22.4	-	-	9.6	2.4
NSX630 [1]	<630 A	0.14	0.12	55.6	47.6	-	-	19.49	5.95

Power loss/resistance values presented above are not contractual.
[1] The power loss values for Vigi add-on and withdrawable circuit breakers are given for 570 A.

Compact NSXm dimensions and mounting

Circuit breaker and switch-disconnector

Circuit breaker



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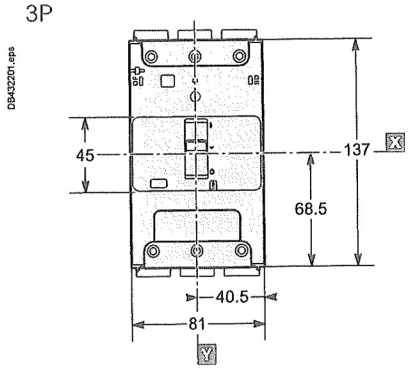

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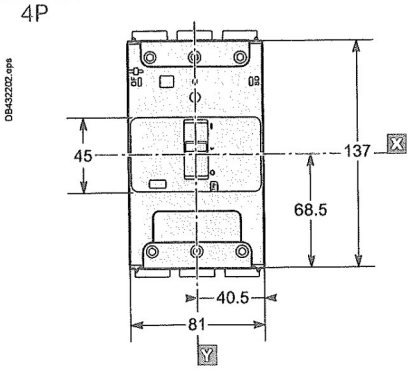
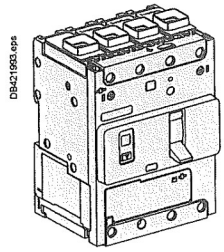


Circuit breaker with Micrologic Vigi 4.1



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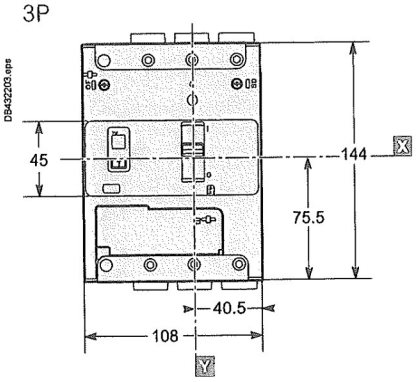

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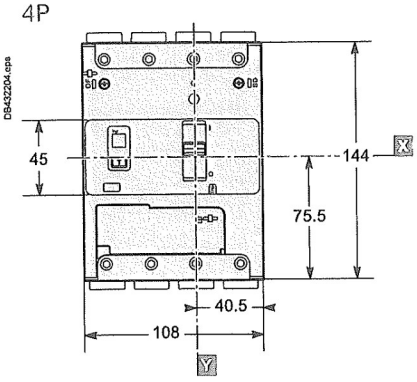
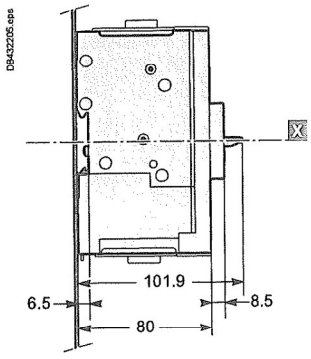
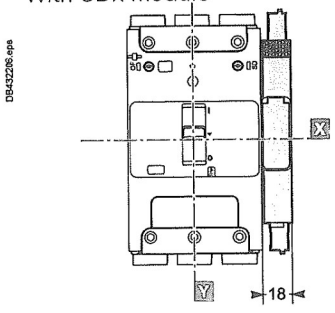


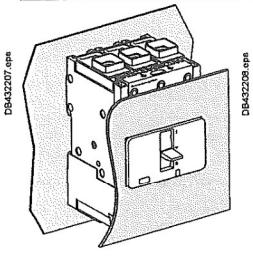
Side view

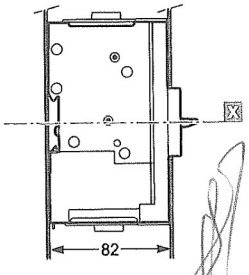


With SDx module



Front-panel cutouts





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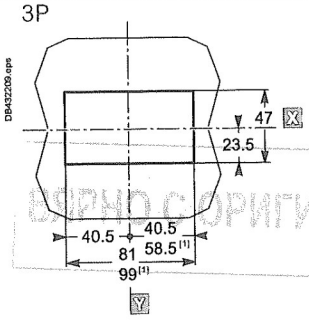

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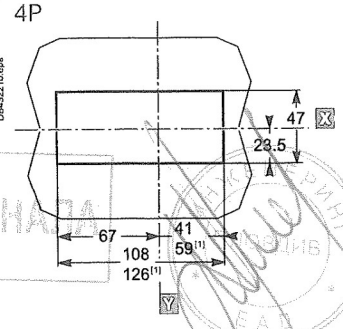


[1] With SDx module.

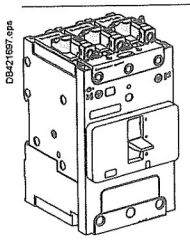
Switchboard integration

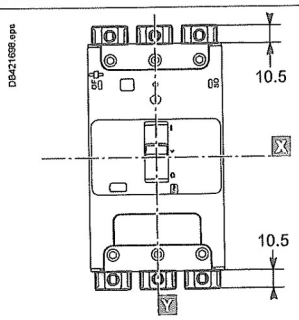
Compact NSXm dimensions and mounting

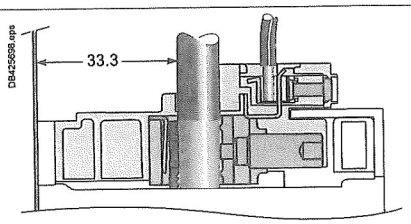
Circuit breaker and switch-disconnector

Connectors

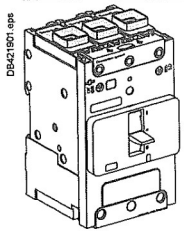
EverLink with control wire terminal connector

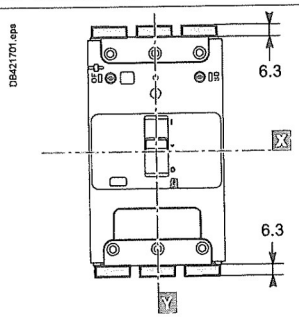


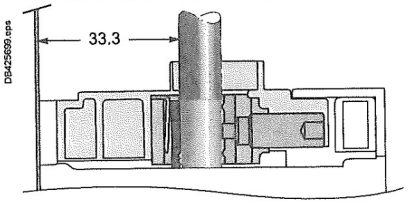




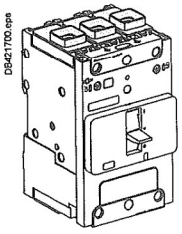
EverLink without control wire terminal connector

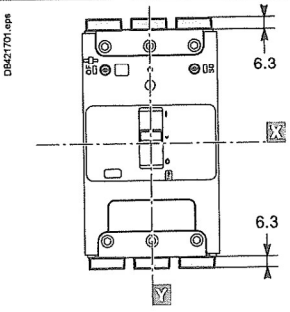


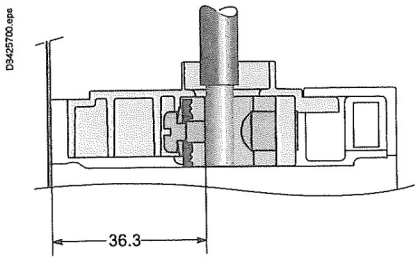




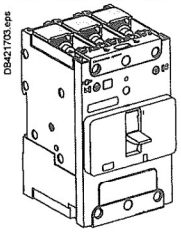
Mechanical lug connector

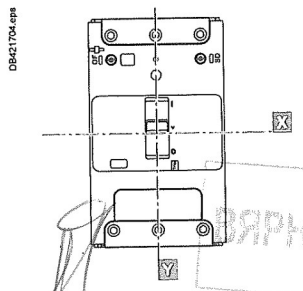


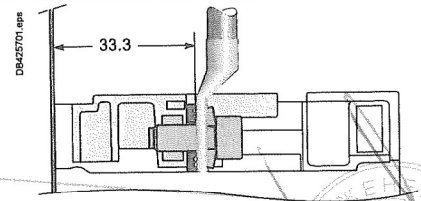




Compression lug / busbar connector



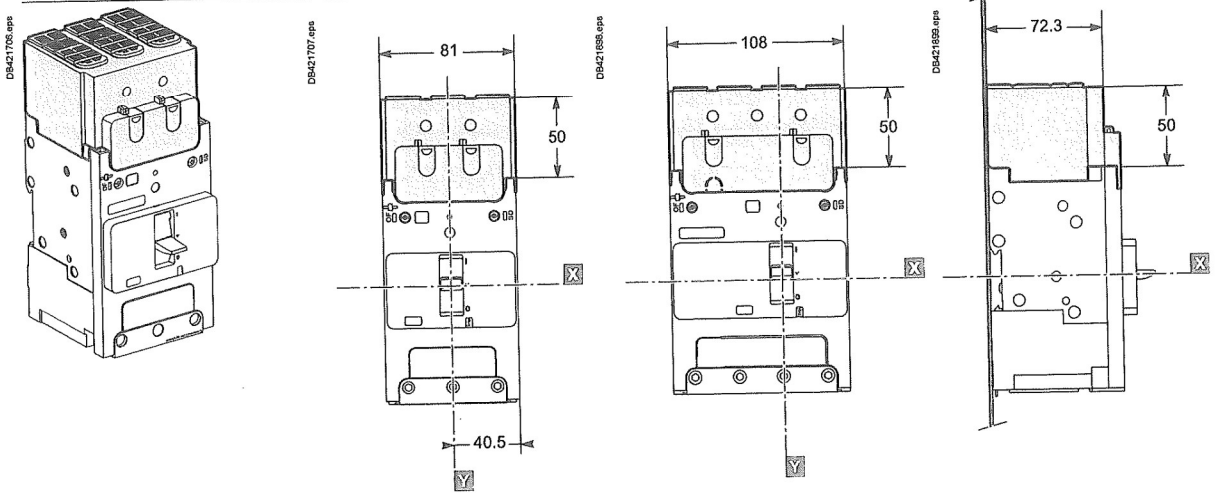




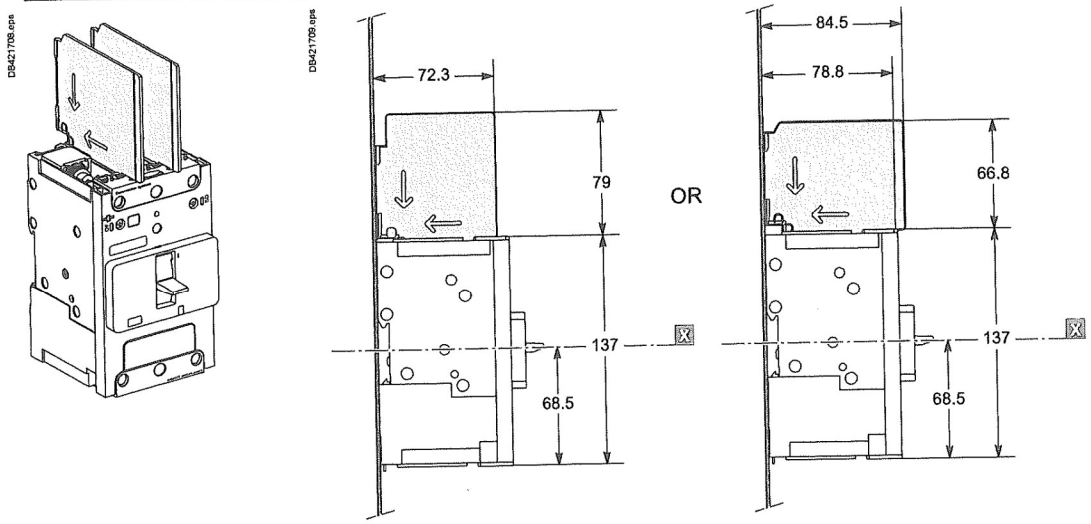
Compact NSXm dimensions and mounting
Circuit breaker and switch-disconnector

Insulation of live parts

Long terminal shields



Interphase barriers



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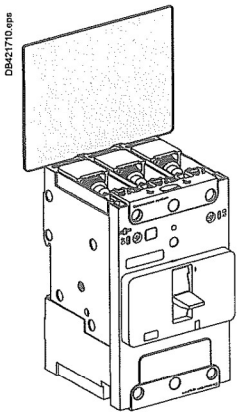
Compact NSXm dimensions and mounting
Circuit breaker and switch-disconnector

Rear insulating screens



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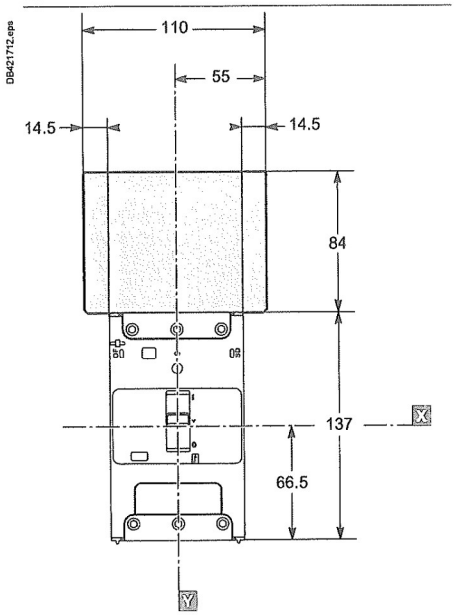

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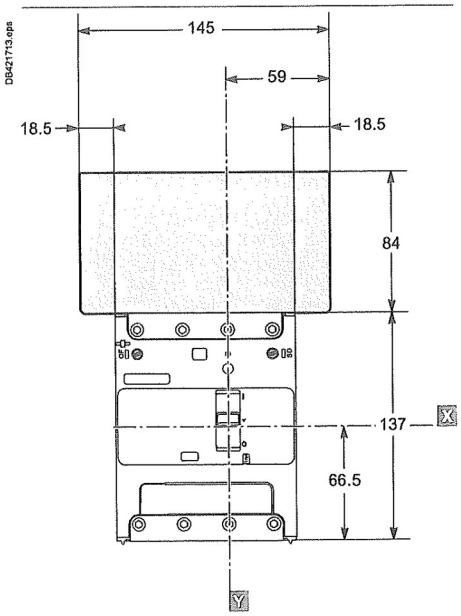

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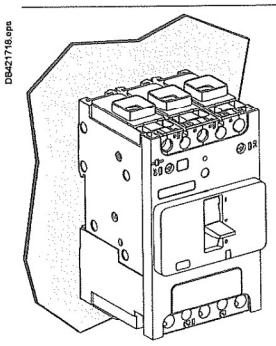
Mounting on backplate

3P/4P



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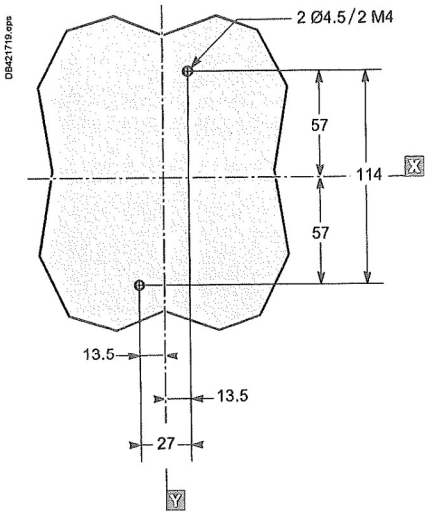
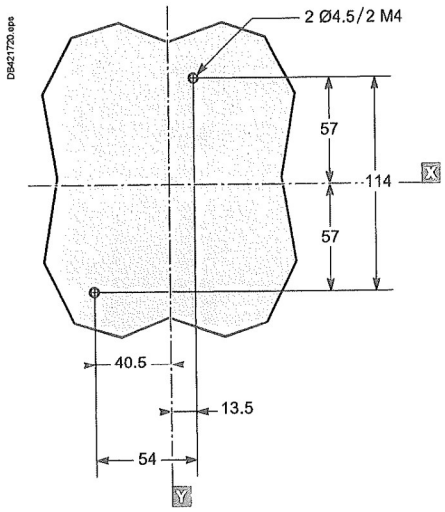
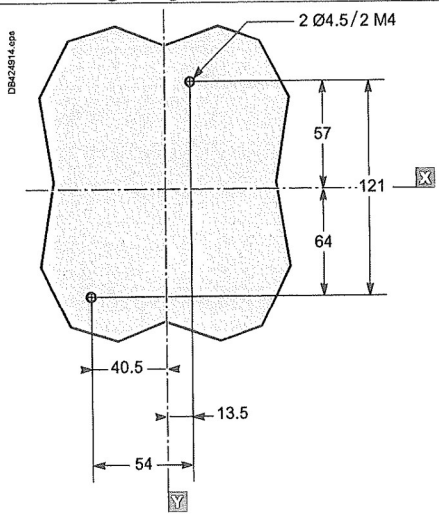


4P

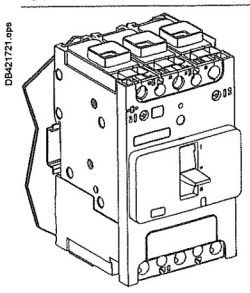


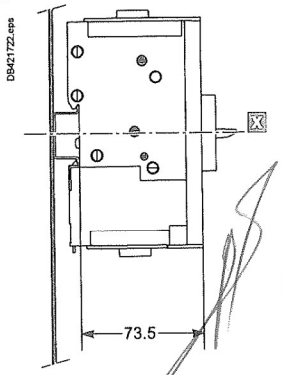
3P/4P Circuit breaker with Micrologic Vigi 4.1



Mounting on DIN rail

3P





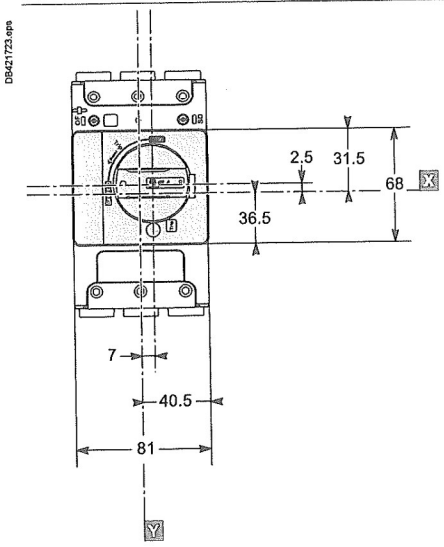
Switchboard integration

Compact NSXm dimensions and mounting

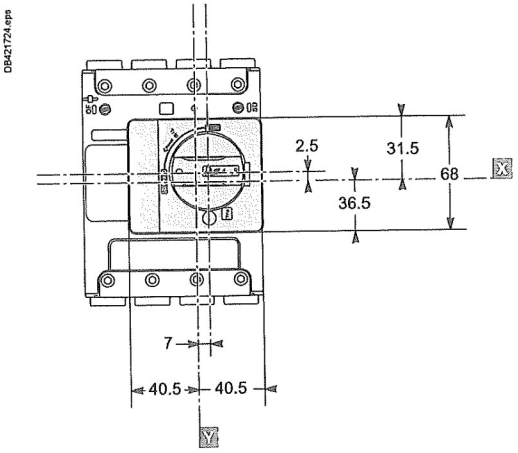
Circuit breaker and switch-disconnector

Direct rotary handle

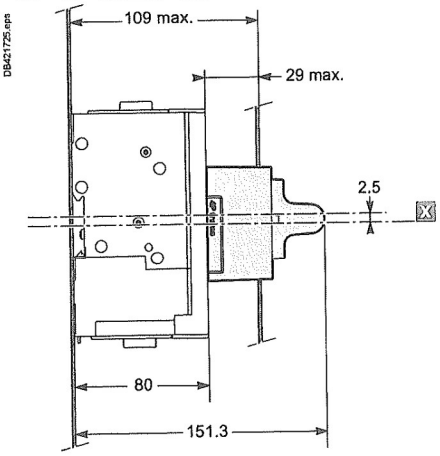
3P



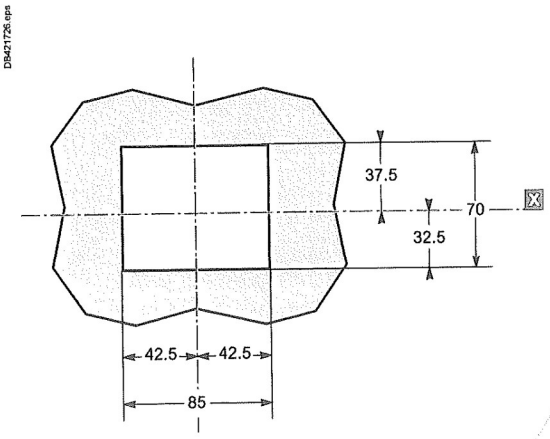
4P



Side view



Door cutout for 3P/4P



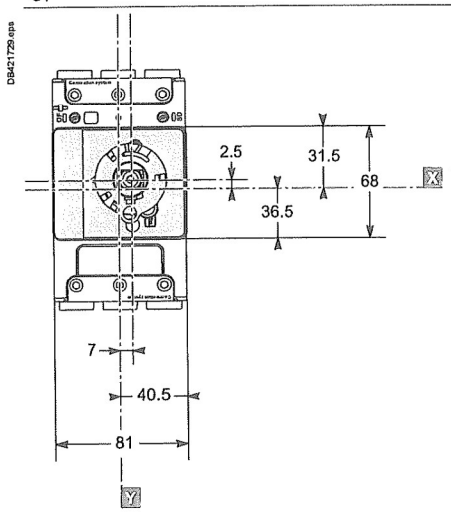
E

Compact NSXm dimensions and mounting

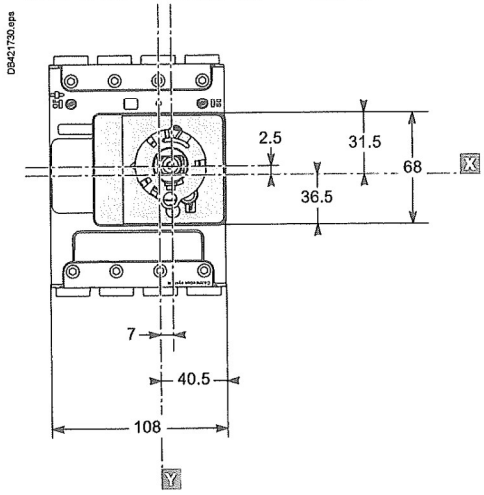
Circuit breaker and switch-disconnector

Extended rotary handle

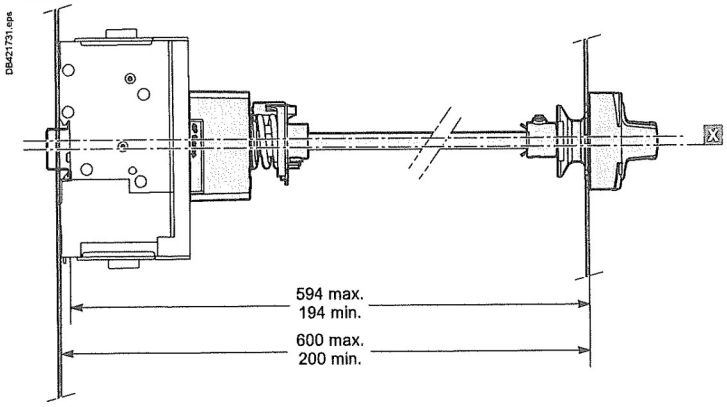
3P



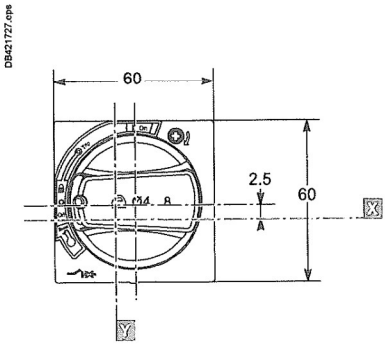
4P

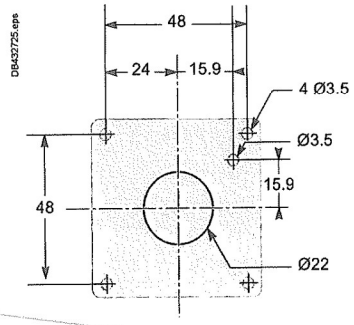


3P/4P



Dimensions and front-panel cutout





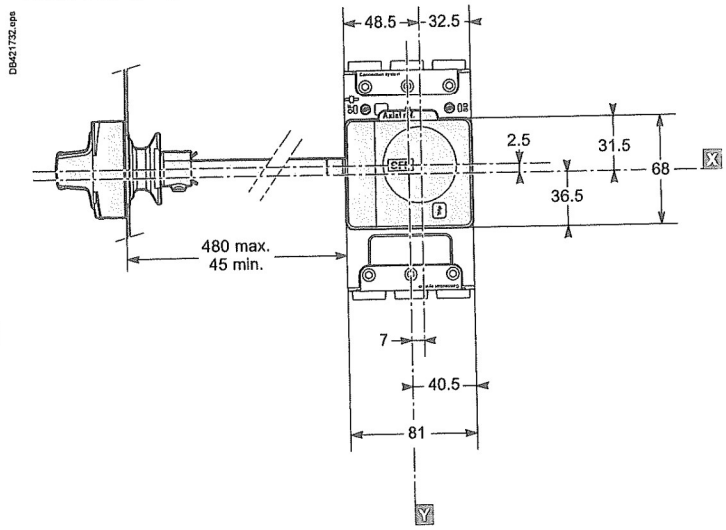
Switchboard integration

Compact NSXm dimensions and mounting

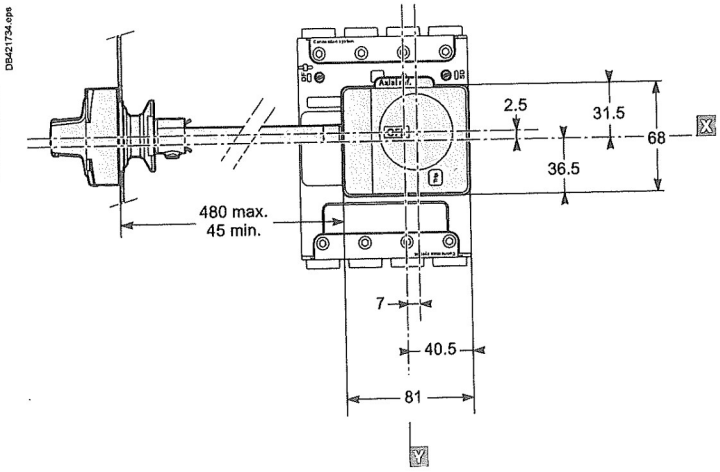
Circuit breaker and switch-disconnector

Side rotary handle

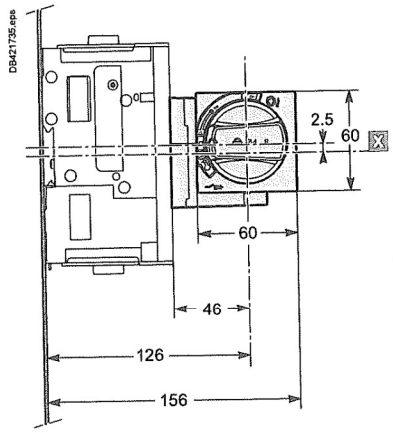
3P - Extended



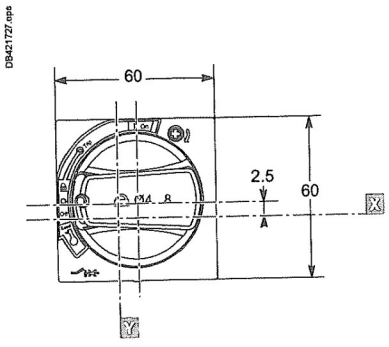
4P - Extended

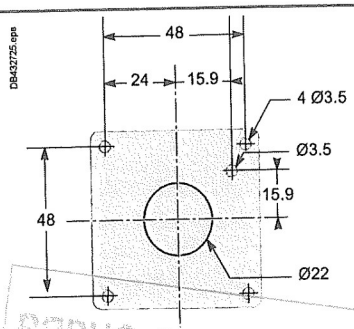


4P - Direct



Dimensions side rotary handle cutout





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