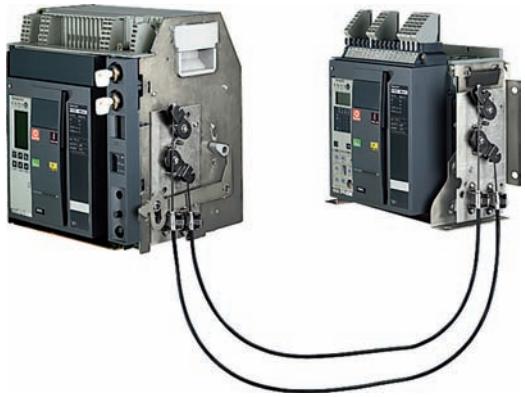
Low Voltage

Source changeover systems

Compact NSX100-630, Compact NS630b-1600, Interpact, Masterpact

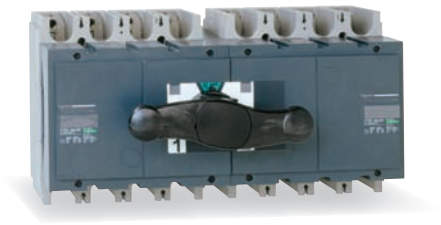
Catalogue
2012



Schneider Electric

Whatever the system, you benefit from our expertise!

> MTSE range



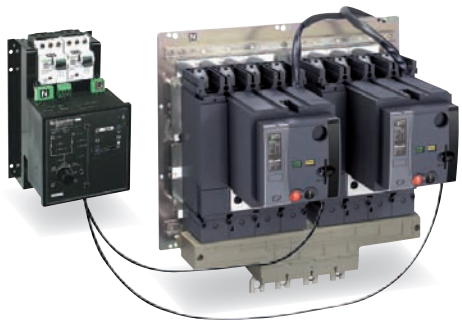
Interpact
From 40 A to 630 A

> RTSE range

Compact NSX
From 100 A to 630 A

Masterpact NT / NW
From 630 A to 6300 A

> ATSE range



UA Controller **Compact NSX**
From 100 A to 630 A

Our expertise and support come together with the source-changeover system you choose for your LV electrical installation.

With Interpact INS, Compact NSX and Masterpact NT and NW, we offer a complete range of solutions, designed around key values:

Maximum continuity of service

> Energy availability is ensured whatever the external requirements (e.g. high power demand).

> Maintenance and replacement of the sources (N or R) can be done with no interruption of service.

You can maintain a continuous level of service and customer satisfaction.

Maximum safety

For LV electrical installations where safety and continuity of service are critical for people and/or equipment such as hospitals, airports, banks, malls, etc.

Optimized energy management

> Transfer the load to a replacement source according to external requirements.

> Manage power sources according to power quality and power costs.

> Perform system regulation.

> Switch to an emergency replacement source.

You are no longer dependent on your power supply (and supplier)!

Simplicity and reliability

> **Simple installation** on LV switchboard.

> **Optimized size** of the switchboard.

> System **based on pre-tested components.**

> Compliance with **IEC 60947-6-1.**

Overview of solutions

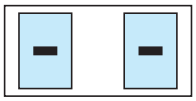
Remote-operated source-changeover systems Compact NSX100/630, Compact NS630b/1600 A

Range	Compact	
Models	NSX100 to NSX630	NS630b to NS1600
Rating (A)	100 to 630	630 to 1600
Type of device	N/H/L circuit breakers NA switch-disconnectors	N/H/L circuit breakers NA switch-disconnectors

Remote-operated source-changeover system

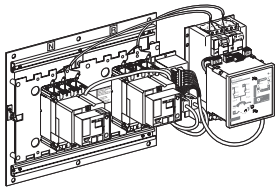
Mechanical interlocking on base plate + electrical interlocking

DB126587



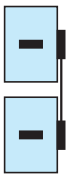
2 electrically-operated devices side-by-side combined with an electrical interlocking system.

DB101563



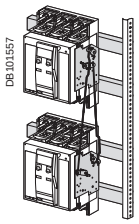
Mechanical interlocking using connecting rods + electrical interlocking

DB126585



2 electrically-operated devices one above the other combined with an electrical interlocking system.

DB101557



Mechanical interlocking using cables + electrical interlocking

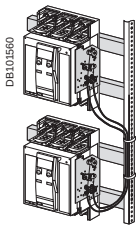
DB126581

2 electrically-operated devices one above the other combined with an electrical interlocking system.

DB126582

2 electrically-operated devices side-by-side combined with an electrical interlocking system.

DB101560



(2)

Automatic source-changeover systems

Remote-operated source-changeover system combined with an automatic-control system

DB126581

DB126582

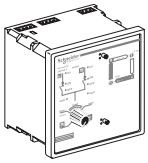
The automatic controller operates the devices depending on external parameters.

***BA**: Simple controller that manages the changeover function.*

***UA**: Controller that also manages engine generator sets.*

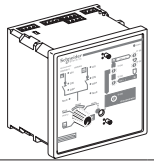
***UA150**: UA controller with a communication option.*

DB125972



BA controller

DB125963



UA and UA150 controller

(2) For source-changeover systems using cables, always respect the installation conditions specified on page A-13.

Remote-operated source-changeover systems

Mechanical interlocking Compact NSX, Compact NS or Masterpact NT/NW

Mechanical interlocking of two or three devices is used to create a remote-operated source-changeover system. A basic mechanical interlocking system enhances the reliability of system operation.

PB103832_51

Interlocking of two electrically-operated Compact NSX circuit breakers using a base plate.

Interlocking of two Compact NSX100 to 630 devices using a base plate

A base plate designed for two Compact circuit breakers can be installed horizontally or vertically on a mounting rail. Interlocking is carried out on the base plate by a mechanism located behind the breakers. Access to the circuit breaker controls and trip units is conserved. Circuit breakers must be fixed or plug-in versions, with or without earth-leakage protection or measurement modules. The base plate and the circuit breakers are supplied separately.

■ **Base plate for Compact NSX100 to 250 devices**

This base plate is intended for two Compact NSX100 to 250 devices.

■ **Base plate for Compact NSX400 to 630 devices**

This base plate is intended for two Compact NSX400 to 630 devices. It may also be used, without any modifications, to interlock a fixed Compact NSX100 to 250 with a Compact NSX400 or 630 device.

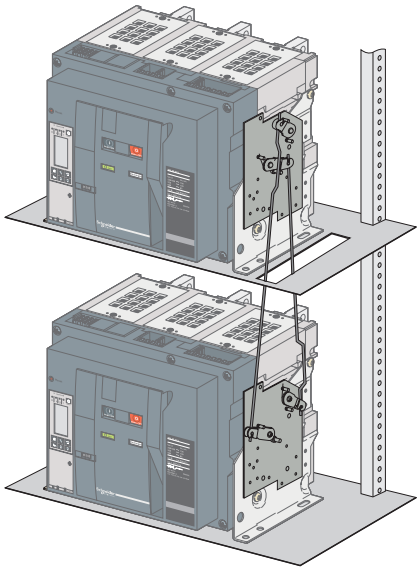
An adapter kit is required for plug-in versions of the Compact NSX100 to 250 devices.

Compact NSX100 to 250 devices, in both fixed and plug-in versions, may be equipped with spreaders.

Possible combinations of "Normal" and "Replacement" Compact NSX source circuit breakers

"Normal N"	"Replacement" R				
	NSX100	NSX160	NSX250	NSX400	NSX630
NSX100					
Ratings 12,5... 100 A	■	■	■	■	■
NSX160					
Ratings 12,5...160 A	■	■	■	■	■
NSX250					
Ratings 12,5...250 A	■	■	■	■	■
NSX400					
Ratings 160... 400 A	■	■	■	■	■
NSX630					
Ratings 250... 630 A	■	■	■	■	■

DB126268



Interlocking of two Masterpact NT or NW circuit breakers using connecting rods.

Interlocking of two Compact NS630b to 1600 or two Masterpact NT and NW devices using connecting rods

The two devices must be mounted one above the other (either 2 fixed or 2 withdrawable/drawout devices).

Combinations are possible between Compact NS630b to NS1600 devices and between Masterpact NT and Masterpact NW devices.

Installation

This function requires:

■ an adaptation fixture on the right side of each circuit breaker or switch-disconnector

■ a set of connecting rods with no-slip adjustments.

The adaptation fixtures, connecting rods and circuit breakers or switch-disconnectors are supplied separately, ready for assembly by the customer.

The maximum vertical distance between the fixing planes is 900 mm.

Possible combinations of "Normal" and "Replacement" source circuit breakers

"Normal N"	"Replacement" R			
	NS630b to NS1600	NT06 to NT16	NW08 to NW40	NW40b to NW63
NS630b to NS1600				
Ratings 250... 1600 A	■			
NT06 to NT16				
Ratings 250... 1600 A		■	■	■
NW08 to NW40				
Ratings 320... 4000 A		■	■	■
NW40b to NW63				
Ratings 4000... 6300 A		■	■	■

Remote-operated source-changeover systems

General characteristics
Compact NSX

Range			Compact NSX	
Types of devices			NSX100 to NSX250	NSX400 to NSX630
Types of circuit breakers			N / H / L	N / H / L
Switch-disconnector version			NA	NA
Mixing possibilities			all devices NS100 to NS250 N/H/L/NA fixed or plug-in	all devices NS100 to NS630 N/H/L/NA fixed or plug-in
Electrical characteristics				
Rating			15 to 250 A	15 to 630 A
Insulating voltage Ui (V AC)			750	750
Positive break indication			■	■
Number of poles (N and R devices must have the same number of poles)			3, 4	
Electrical durability			See page A-14	
Operating temperature			-25 °C to +70 °C (50 °C for 440 V - 60 Hz)	
Control characteristics				
Control voltage		AC	48 V - 50 Hz 110/130, 220/240, 380/440 V - 50/60 Hz	48 V - 50 Hz 110/130, 220/240, 380/440 V - 50/60 Hz
		DC	24-250 V	24-250 V
Maximum consumption		AC	500 VA	500 VA
		DC	500 W	500 W
Minimum switching time			800 ms	800 ms
Interlocking				
Mechanical (see page A-10)				
Electrical	by diagram (without IVE)		■	■
	with IVE unit		■	■
	auxiliary contacts used by circuit breaker		1 OF + 1 SDE	1 OF + 1 SDE
Protection and measurement				
Overload protection		long time	■	■
Short-circuit protection		short time	■	■
		instantaneous	■	■
Earth-fault protection				■
Zone selective interlocking (ZSI)				■
Earth-leakage protection	by Vigi module		■	■
	by control unit			
	by add-on Vigirex relay		■	■
Current measurements Voltage, frequency, power measurements, etc.				
Indication and control auxiliaries				
Available auxiliary indication contacts			OF + SD (+ SDV)	3 OF + SD (+ SDV)
Voltage releases	MX shunt		■	■
	MN undervoltage		■	■
Voltage presence indicator			■	■
Voltage transformer			■	■
Ammeter module			■	■
Insulation monitoring module			■	■
Source-changeover controller				
With permanent replacement source			■ BA controller	
With standby generator set			■ UA controller	
Remote communication via bus				
Device status indications				
Device remote control				
Transmission of settings			■	■
Indication and identification of protection status and alarms			■	■
Transmission of measurements			■	■
Installation and connection				
Fixed front connected				
Fixed rear connected			■ (long rear connections)	■ (long rear connections)
Withdrawable, plug-in or drawout			■ (plug-in on base)	■ (plug-in on base)
Installation and connection accessories				
Downstream coupling accessory			■	■
Bare-cable connectors			■	■
Terminal extensions			■	■
Terminal shields and inter-phase barriers				■
Locking	by padlock		■	■
	by keylock		■	■
Front panel escutcheons			■	■

Remote-operated source-changeover systems
Electrical interlocking

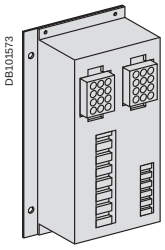
Electrical interlocking is used with a mechanical interlocking system.
An automatic controller may be added to take into account information from the distribution system.

Moreover, the relays controlling the “normal” and “replacement” circuit breakers must be mechanically and/or electrically interlocked to prevent them from giving simultaneous closing commands.

Electrical interlocking is carried out by an electrical control device.
For Compact NSX up to 630 A, electrical interlocking is implemented by the IVE unit integrating control circuits and an external terminal block in accordance with the pages C-2 to C-5 of the chapter “Electric diagrams” of this catalogue.
The integrated control circuits implement the time delays required for correct source transfer.
For Compact NS630b to 1600 and Masterpact, this function can be implemented in one of two ways:
- using the IVE unit
- by an electrician based on the diagrams in accordance with the pages C-9 to C-19 of the chapter “Electric diagrams” of this catalogue.

Characteristics of the IVE unit
- external connection terminal block:
  - inputs: circuit breaker control signals
  - outputs: status of the SDE contacts on the “Normal” and “Replacement” source circuit breakers
- 2 connectors for the two “Normal” and “Replacement” source circuit breakers:
  - inputs:
    - status of the OF contacts on each circuit breaker (ON or OFF)
    - status of the SDE contacts on the “Normal” and “Replacement” source circuit breakers
  - outputs: power supply for operating mechanisms
- control voltage:
  - 24 to 250 V DC
  - 48 to 415 V 50/60 Hz - 440 V 60 Hz.

The IVE unit control voltage must be same as that of the circuit breaker operating mechanisms.



IVE unit.

Necessary equipment
For Compact NSX100 to 630, each circuit breaker must be equipped with:
- a motor mechanism
- an OF contact
- an SDE contact.

The components are supplied ready for assembly and the circuit breakers prewired. The prewiring must not be modified.

For Compact NS630b to 1600, each circuit breaker must be equipped with:
- a motor mechanism
- an available OF contact
- a CE connected-position contact (carriage switch) on withdrawable circuit breakers
- an SDE contact.

For Masterpact NT and NW, each circuit breaker must be equipped with:
- a remote-operation system made up of:
  - MCH gear motor
  - MX or MN opening release
  - XF closing release
  - PF “ready to close” contact
- an available OF contact
- one to three CE connected-position contacts (carriage switches) on drawout circuit breakers (depending on the installation).

Associated controllers
Controller selection

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 to diagrams provided in the “electrical diagrams” section of this catalogue.

DB403809

BA controller.

DB403810

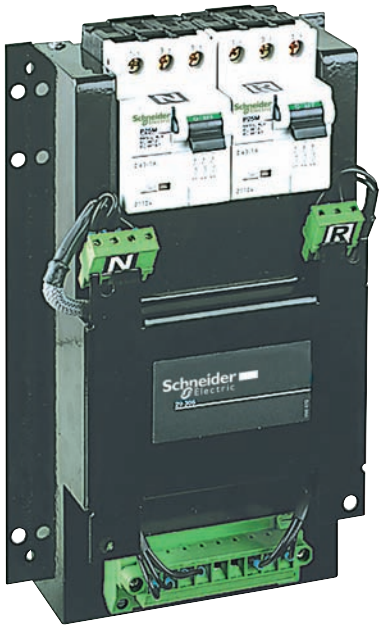
UA controller.

Controller		BA	UA
Compatible circuit breakers		All Compact NS, Compact NSX and Masterpact 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		■	■
Generator set startup control			■
Delayed shutdown (adjustable) of generator set			■
Load shedding and reconnection of non-priority circuits			■
Transfer to the “Replacement” source if one of the phases of the “Normal” phase is absent			■
Test			
By opening the P25M circuit breaker supplying 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 indicating contact		■	■
Other functions			
Selection of type of “Normal” source (single-phase or three-phase) (1)			■
Voluntary transfer to “Replacement” source (e.g. energy management commands)		■	■
During peak-tariff periods (energy management commands) forced operation on “Normal” sourceif “Replacement” source not operational			■
Additional contact (not part of controller). Transfer to “Replacement” source only if contact is closed. (e.g. used to test the frequency of UR).		■	■
Setting of maximum startup time for the replacement source			■
Options			
Communication option			
Power supply			
Control voltages (2)	110 V	■	■
	220 to 240 V 50/60 Hz	■	■
	380 to 415 V 50/60 Hz and 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	■	■
IP degree of protection (EN 60529) and IK degree of protection against external mechanical impacts (EN 50102)			
Front	IP40	■	■
Side	IP30	■	■
Connectors	IP20	■	■
Front	IK07	■	■
Characteristics of output contacts (dry, volt-free contacts)			
Rated thermal current (A)	8		
Minimum load	10 mA at 12 V		
Output contacts:			
Position of the Auto/Stop switch		■	■
Load shedding and reconnection order			■
Generator set start order.			■

		AC				DC	
Utilisation category (IEC 947-5-1)		AC12	AC13	AC14	AC15	DC12	DC13
Operational current (A)	24 V	8	7	5	5	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) For example, 220 V single-phase or 220 V three-phase.
(2) 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.

PB100857_SE



ACP control plate.

ACP control plate

The control plate provides in a single unit:

- protection for the BA or UA controller with two highly limiting P25M circuit breakers (infinite breaking capacity) for power drawn from the AC source
- control of circuit-breaker ON and OFF functions via two relay contactors
- connection of the circuit breakers to the BA or UA controller via a built-in terminal block.

Control voltages

- 110 V 50/60 Hz.
- 220 to 240 V 50/60 Hz.
- 380 to 415 V 50/60 Hz and 440 V 60 Hz.

The same voltage must be used for the ACP control plate, the controller and the circuit breaker operating mechanisms.

Installation

Connection between the ACP control plate and the IVE unit may use:

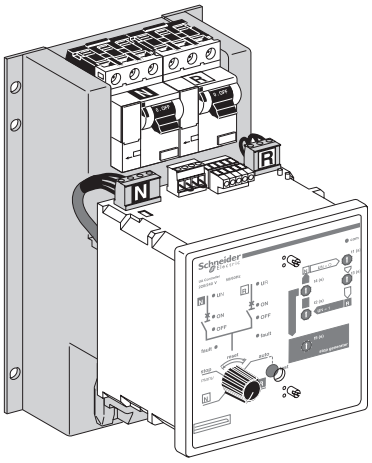
- wiring done by the installer
- prefabricated wiring (optional).

Installation of the BA and UA controllers

The BA and UA controllers may be installed in one of two manners:

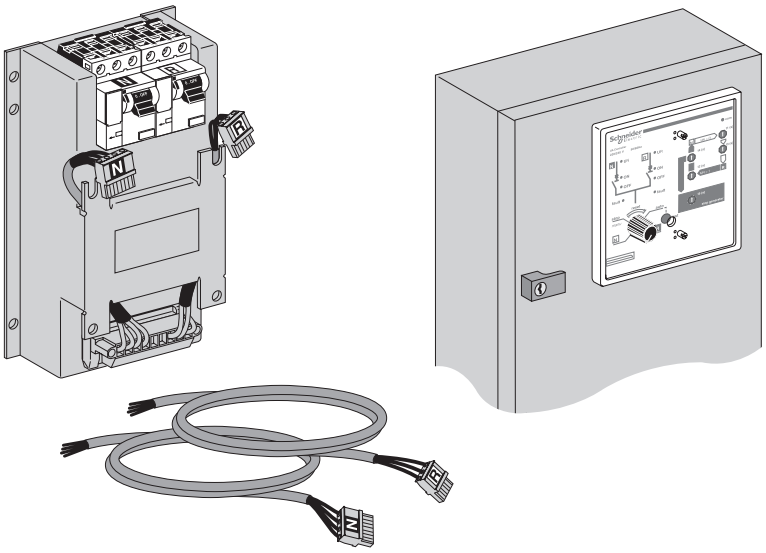
- directly mounted on the ACP control plate
- mounted on the front panel of the switchboard
- if the length of the connection between the controller and the control plate (ACP) is less than or equal to 1 m, the connecting cable **ref. 29368** can be ordered as an optional extra. Cables longer than 1 m, but not longer than 2 m will be the responsibility of the installer.

DB126269



Mounting on the ACP control plate.

DB126270



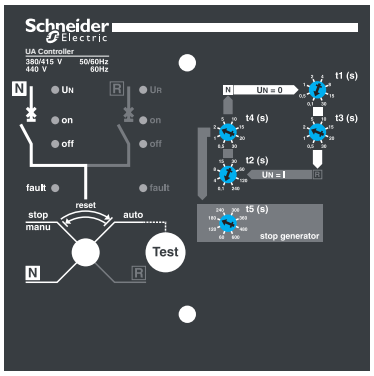
Mounting on the front panel of the switchboard.

Associated controllers
UA controller

The UA controller is used to create a source-changeover system integrating the following automatic functions:
■ transfer from one source to another depending on the presence of voltage UN on the “Normal” source
■ startup of an engine generator set
■ shedding and reconnection of non-priority circuits
■ transfer to the “Replacement” source if one of the phases on the “Normal” source fails.
The UA controller can control Compact NS, Compact NSX and Masterpact NT/NW devices.

DB403842

DB403837



Front of the UA controller.

Operating modes
A four-position switch may be used to select:
■ automatic operation
■ forced operation on the “Normal” source
■ forced operation on the “Replacement” source
■ stop (both “Normal” and “Replacement” sources off, then manual operation).

Setting the time delays
Time delays are set on the front of the controller.
t1. delay between detection that the “Normal” source has failed and the transmission of the order to open the “Normal” source circuit breaker (adjustable from 0.1 to 30 seconds).
t2. delay between detection that the “Normal” source has returned and the transmission of the order to open the “Replacement” source circuit breaker (adjustable from 0.1 to 240 seconds).
t3. delay following opening of QN with load shedding and before closing of QR (adjustable from 0.5 to 30 seconds).
t4. delay following opening of QR with load reconnection and before closing of QN (adjustable from 0.5 to 30 seconds).
t5. delay for confirmation that UN is present before shutting down the engine generator set (adjustable from 60 to 600 seconds).
t6. delay before startup of the engine generator set (120 or 180 seconds).

Commands and indications
Circuit breaker status indications on the front of the controller:
■ ON, OFF, fault.
A built-in terminal block may be used to connect the following input/output signals:
■ inputs:
□ voluntary order to transfer to source R (e.g. for special tariffs, etc.)
□ additional control contact (not part of the controller). Transfer to the “Replacement” source takes place only if the contact is closed (e.g. used to test the frequency of UR, etc.)
■ outputs:
□ control of an engine generator set (ON / OFF)
□ shedding of non-priority circuits
□ indication of operation in automatic mode via changeover contacts.

Distribution-system settings
Three switches are used to:
■ select the type of “Normal” source, whether single-phase or three-phase (e.g. 240 V single-phase or 240 V three-phase)
■ select whether to remain (or not) on the “Normal” source if the “Replacement” source is not operational during operation on special tariffs
■ select the maximum permissible startup time for the engine generator set during operation on special tariffs (120 or 180 seconds).

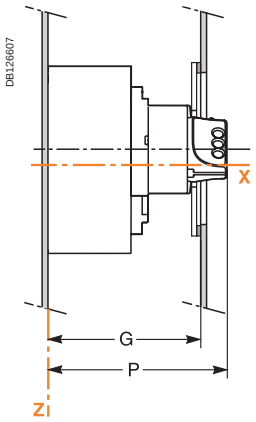
Test
A pushbutton on the front of the controller may be used to test transfer from the “Normal” source to the “Replacement” source, then the return to the “Normal” source. The test lasts approximately three minutes.

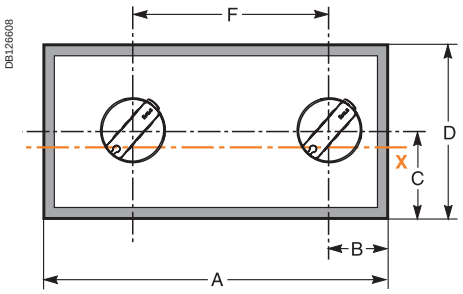
COM communications option
Using the internal bus protocol, this option may be used to remote the following information:
■ circuit breaker status (ON, OFF, fault trip)
■ presence of the “Normal” and “Replacement” voltages
■ presence of an order for forced operation (e.g. special tariffs)
■ settings and configuration information
■ status of non-priority circuits (loads shed or not)
■ position of the switch (stop, auto, forced operation on the “Normal” source, forced operation on the “Replacement” source).

Manual source-changeover systems
Interlocking of direct rotary handles

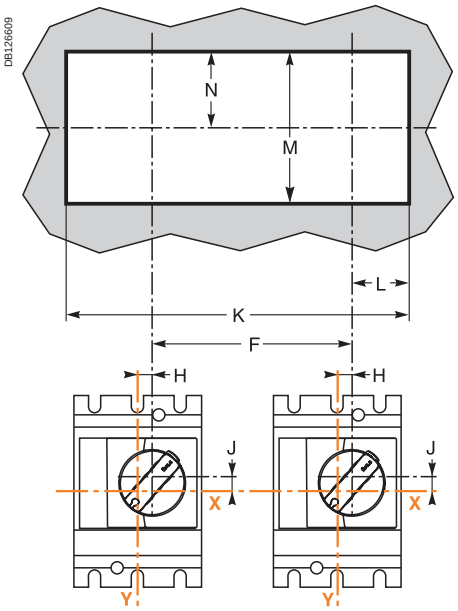
Compact NSX100 to 630

Dimensions





Front-panel cutout

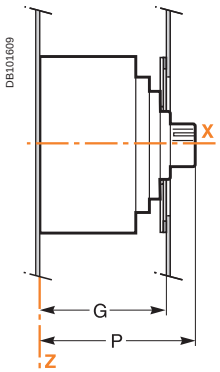


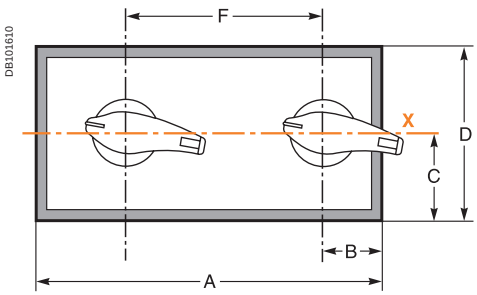
Dimensions (mm)

	A	B	C	D	F	G	H	J	K	L	M	N	P
NSX100/160/250	325	90	87.5	175	156	133	9.25	9	295	75.5	150	75	155
NSX400/630	416	115	100	200	210	157	5	24.6	386	100	175	74.5	179

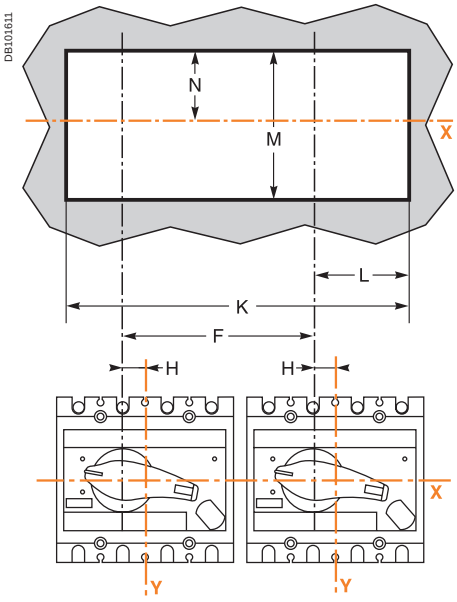
Interpact INS/INV250 - 100 to 250 / Interpact INS/INV320/400/500/630

Dimensions





Front-panel cutout



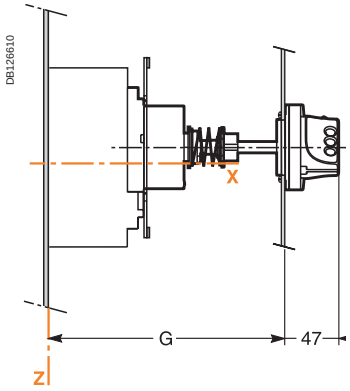
Dimensions (mm)

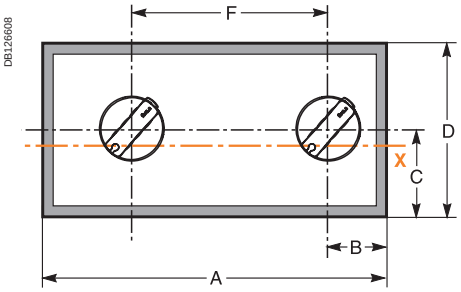
Type	A	B	C	D	F	G	H	K	L	M	N	P
INS/INV250 - 100/160/200/250	325	90	87.5	175	156	106	17.5	295	75.5	150	75	131
INS/INV320/400/500/630	416	115	100	200	210	130	22.5	386	100	175	74.5	160.4

Note: X and Y are the symmetry planes for a 3-pole device.

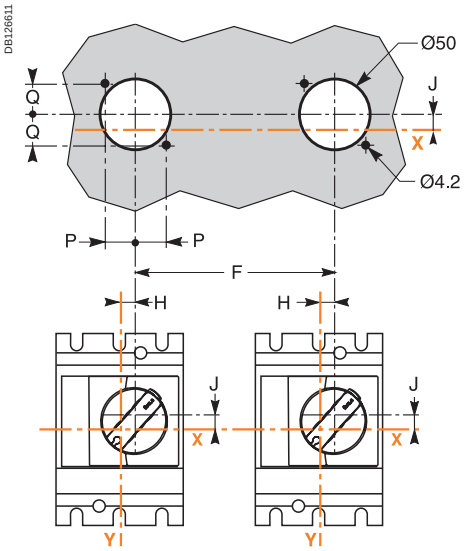
Compact NSX100 to 630

Dimensions





Front-panel cutout

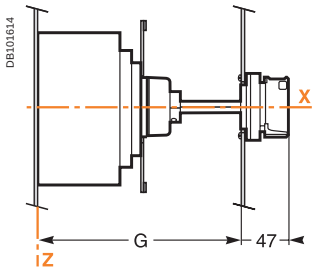


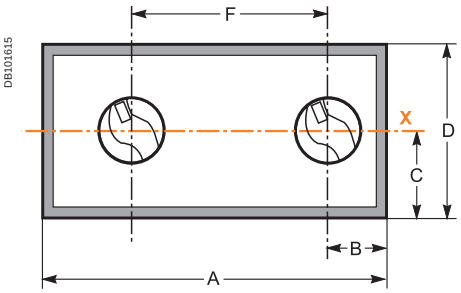
Dimensions (mm)

Type	A	B	C	D	F	G min	G max	H	J	P	Q
NSX100/160/250	325	90	87.5	175	156	171	600	9.25	9	25.5	25.5
NSX400/630	416	115	100	200	210	195	600	5	24.6	30.8	30.8

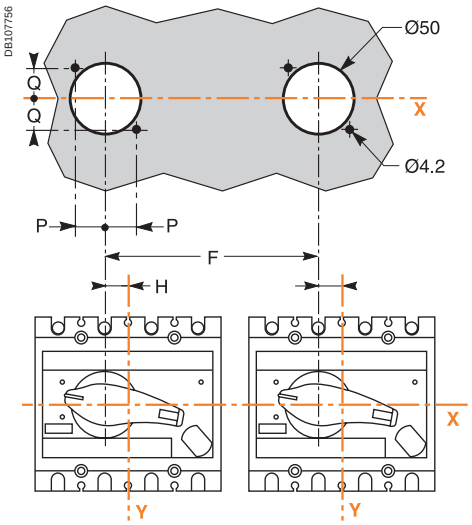
Interpact INS40/63/80/100/125/160 / Interpact INS/INV250 - 100 to 250 / Interpact INS/INV320/400/500/630

Dimensions





Front-panel cutout



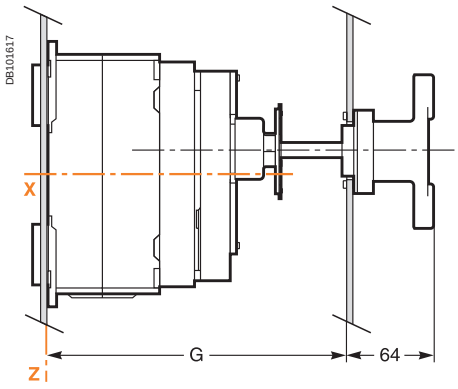
Dimensions (mm)

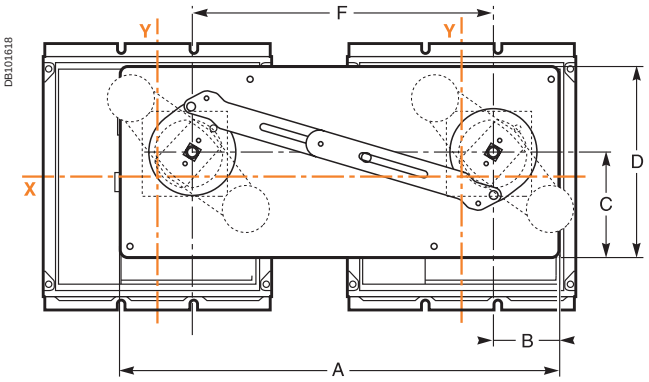
Type	A	B	C	D	F	G min	G max	H	P	Q
INS40/63/80	325	90	87.5	175	156	155	396	0	25.5	25.5
INS100/125/160	325	90	87.5	175	156	200	441	0	25.5	25.5
INS/INV250 - 100/160/200/250	325	90	87.5	175	156	185	600	17.5	25.5	25.5
INS320/400/500/630	416	115	100	200	210	204	600	22.5	30.8	30.8

Manual source-changeover systems
Interlocking of extended rotary handles

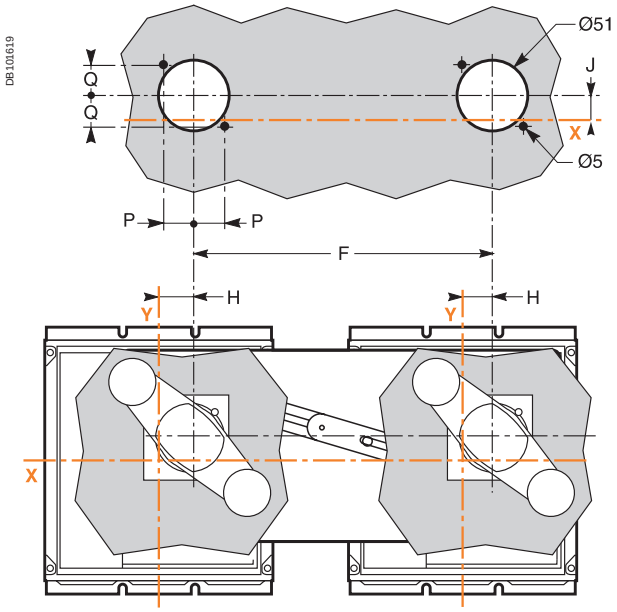
Compact NS630b to 1600

Dimensions





Front-panel cutout



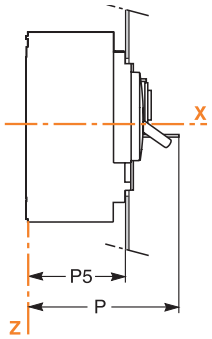
Dimensions (mm)

Type	A	B	C	D	F	G min	G max	H	J	P	Q	R
NS630b/800/1000/1200/1600	411	63.5	98	175	280	218	605	25	24	25.5	25.5	64

Compact NSX100 to 630

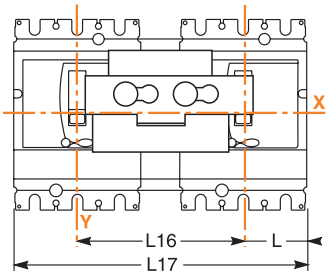
Dimensions

DB126612



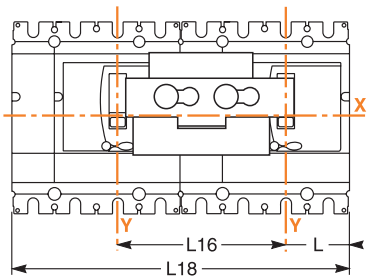
3 poles

DB126613



4 poles

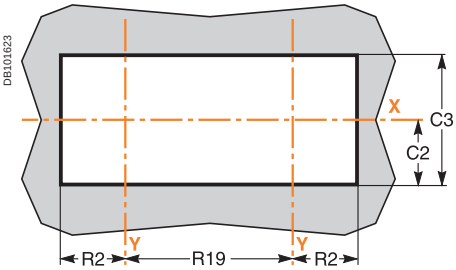
DB126614



Front-panel cutout

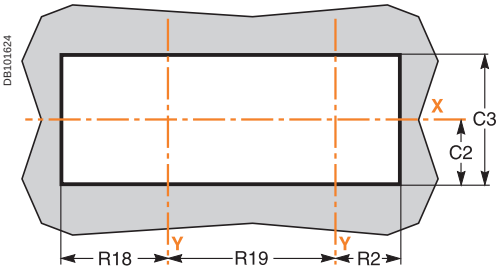
3 poles on left

DB101623



4 poles on left

DB101624



Dimensions (mm)

Type	C2	C3	L	L16	L17	L18	R2	R18	R19	P5	P
NSX100/160/250	54	108	52.5	140	245	280	54	89	140	83	120
NSX400/630	92.5	182	70	185	325	370	71.5	116.5	185	107	150