

Three types of connection are available:

- vertical or horizontal rear connection
- front connection
- mixed connection.

The solutions presented are similar in principle for all Masterpact NT and NW fixed and drawout devices.

Rear connection

Horizontal



Vertical



Simply turn a horizontal rear connector 90° to make it a vertical connector. For the 6300 A circuit breaker, only vertical connection is available.

Front connection

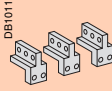
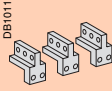
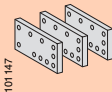
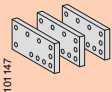
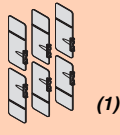
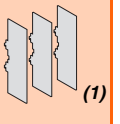
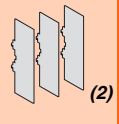
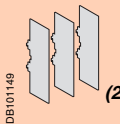
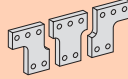
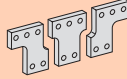
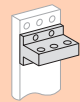
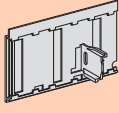
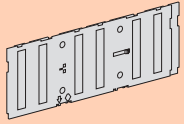
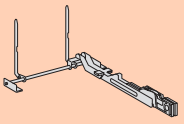
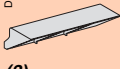
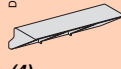


Front connection is available for NW fixed and drawout versions up to 3200 A.

Mixed connection



Note: Masterpact circuit breakers can be connected indifferently with bare-copper, tinned-copper and tinned-aluminium conductors, requiring no particular treatment.

Type of accessory	Masterpact NT06 to NT16				Masterpact NW08 to NW63			
	Fixed Front connection	Rear connection	Drawout Front connection	Rear connection	Fixed Front connection	Rear connection	Drawout Front connection	Rear connection
Vertical connection adapters								
Cable lug adapters								
Interphase barriers								
Spreaders								
Disconnectable front-connection adapter								
Safety shutters with padlocking				<i>standard</i>				<i>standard</i>
Shutter position indication and locking								
Arc chute screen								

(1) Mandatory for voltages > 500 V.

(2) Except for an NW40 equipped for horizontal rear connection, and for fixed NW40b-NW63.

(3) Mandatory for 1000 V and for fixed NT front-connection versions with vertical-connection adapters oriented towards the front.

(4) Mandatory for 1000 V.

Masterpact M replacement kit

A set of connection parts is available to allow replacement of a Masterpact M08 to M32 circuit breaker by a Masterpact NW without modifying the busbars (please consult us).

Mounting on a switchboard backplate using special brackets

Masterpact NT and NW fixed front-connected circuit breakers can be installed on a backplate without any additional accessories.

Masterpact NW circuit breakers require a set of special brackets.



PB100790-32

Vertical-connection adapters (option)

Mounted on front-connected devices or chassis, the adapters facilitate connection to a set of vertical busbars.



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Cable-lug adapters (option)

Cable-lug adapters are used in conjunction with vertical-connection adapters. They can be used to connect a number of cables fitted with lugs. To ensure adequate mechanical strength, the connectors must be secured together via spacers (**catalogue number 07251**).



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Interphase barriers (option)

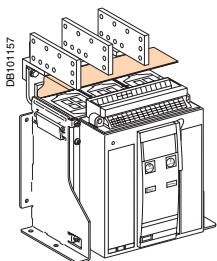
These barriers are flexible insulated partitions used to reinforce isolation of connection points in installations with busbars, whether insulated or not. For Masterpact NT/NW devices, they are installed vertically between rear connection terminals. They are mandatory for NT devices at voltages > 500 V.



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Spreaders (option)

Mounted on the front or rear connectors, spreaders are used to increase the distance between bars in certain installation configurations.



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Arc chute screen (option)

For fixed Masterpact NT front-connection versions and with vertical-connection adapters oriented towards the front, an arc chute screen must be installed to respect safety clearances.

For Masterpact NT 1000 V, an arc chute screen must be installed to respect safety clearances.



Disconnectable front-connection adapter (option)

Mounted on a fixed front-connected device, the adapter simplifies replacement of a fixed device by enabling fast disconnection from the front.



Safety shutters (standard)

Mounted on the chassis, the safety shutters automatically block access to the disconnecting contact cluster when the device is in the disconnected or test positions (degree of protection IP 20). When the device is removed from its chassis, no live parts are accessible.

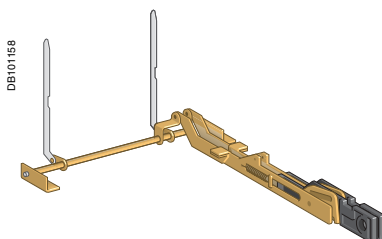
The shutter-locking system is made up of a moving block that can be padlocked (padlock not supplied). The block:

- prevents connection of the device
- locks the shutters in the closed position.

For Masterpact NW08 to NW63

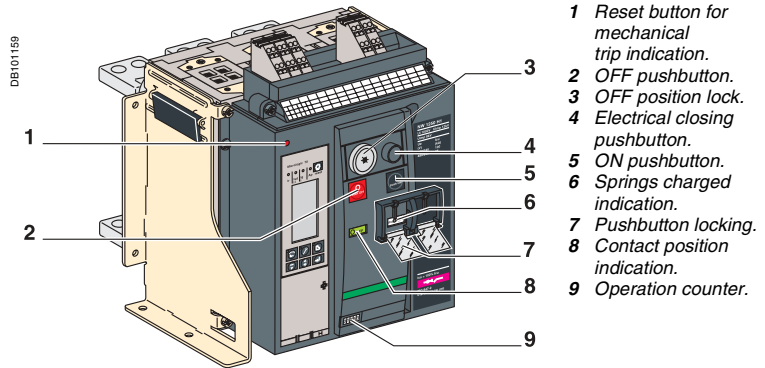
A support at the back of the chassis is used to store the blocks when they are not used:

- 2 blocks for NW08 to NW40
- 4 blocks for NW40b to NW63.



Shutter position indication and locking on front face (option)

This option located on the chassis front plate indicates that the shutters are closed. It is possible to independently or separately padlock the two shutters using one to three padlocks (not supplied).



Access to pushbuttons protected by transparent cover.



Pushbutton locking using a padlock.



OFF position locking using a padlock.



OFF position locking using a keylock.

Pushbutton locking

The transparent cover blocks access to the pushbuttons used to open and close the device.

It is possible to independently lock the opening button and the closing button.

The locking device is often combined with a remote operating mechanism.

The pushbuttons may be locked using either:

- three padlocks (not supplied)
- lead seal
- two screws.

Device locking in the OFF position

The circuit breaker is locked in the OFF position by physically maintaining the opening pushbutton pressed down:

- using padlocks (one to three padlocks, not supplied)
- using keylocks (one or two different keylocks, supplied).

Keys may be removed only when locking is effective (Profalux or Ronis type locks).

The keylocks are available in any of the following configurations:

- one keylock
- one keylock mounted on the device + one identical keylock supplied separately for interlocking with another device
- two different key locks for double locking.

Profalux and Ronis keylocks are compatible with each other.

A locking kit (without locks) is available for installation of one or two keylocks (Ronis, Profalux, Kirk or Castell).

Accessory-compatibility

For Masterpact NT: 3 padlocks or 1 keylock

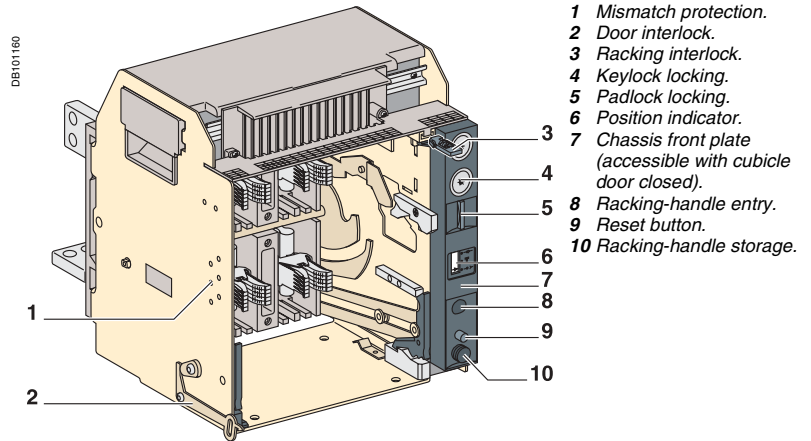
For Masterpact NW: 3 padlocks and/or 2 keylocks

Cable-type door interlock

This option prevents door opening when the circuit breaker is closed and prevents circuit breaker closing when the door is open.

For this, a special plate associated with a lock and a cable is mounted on the right side of the circuit breaker.

With this interlock installed, the source changeover function cannot be implemented.



"Disconnected" position locking by padlocks.



"Disconnected" position locking by keylocks.

"Disconnected" position locking

Mounted on the chassis and accessible with the door closed, these devices lock the circuit breaker in the "disconnected" position in two manners:

- using padlocks (standard), up to three padlocks (not supplied)
- using keylocks (optional), one or two different keylocks are available.

Profalux and Ronis keylocks are available in different options:

- one keylock
- two different keylocks for double locking
- one (or two) keylocks mounted on the device + one (or two) identical keylocks supplied separately for interlocking with another device.

A locking kit (without locks) is available for installation of one or two keylocks (Ronis, Profalux, Kirk or Castell).

"Connected", "disconnected" and "test" position locking

The "connected", "disconnected" and "test" positions are shown by an indicator. The exact position is obtained when the racking handle blocks. A release button is used to free it.

On request, the "disconnected" position locking system may be modified to lock the circuit breaker in any of the three positions, "connected", "disconnected" and "test".

Door interlock catch

Mounted on the right or left-hand side of the chassis, this device inhibits opening of the cubicle door when the circuit breaker is in "connected" or "test" position. If the breaker is put in the "connected" position with the door open, the door may be closed without having to disconnect the circuit breaker.



Door interlock.

Racking interlock

This device prevents insertion of the racking handle when the cubicle door is open.

Cable-type door interlock

This option is identical for fixed and drawout versions.

Racking interlock between crank and OFF pushbutton

This option makes it necessary to press the OFF pushbutton in order to insert the racking handle and holds the device open until the handle is removed.

Automatic spring discharge before breaker removal

This option discharges the springs before the breaker is removed from the chassis.

Mismatch protection

Mismatch protection ensures that a circuit breaker is installed only in a chassis with compatible characteristics. It is made up of two parts (one on the chassis and one on the circuit breaker) offering twenty different combinations that the user may select.



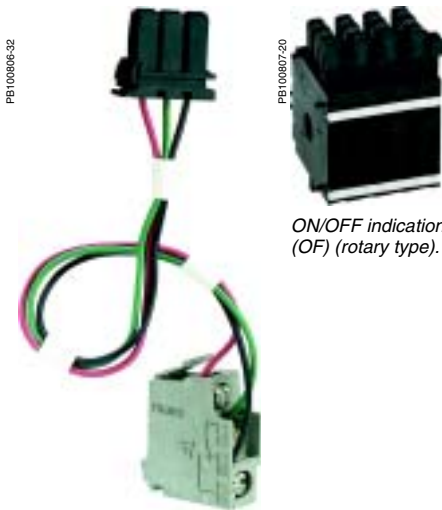
Racking interlock.



Mismatch protection.

Indication contacts are available:

- in the standard version for relay applications
 - in a low-level version for control of PLCs and electronic circuits.
- M2C and M6C contacts may be programmed via the Micrologic P and H control units.



ON/OFF indication contacts (OF) (rotary type).

ON/OFF indication contacts (OF) (microswitch type).



Additional "fault-trip" indication contacts (SDE).



Combined contacts.

ON/OFF indication contacts (OF)

Two types of contacts indicate the ON or OFF position of the circuit breaker:

- microswitch type changeover contacts for Masterpact NT
- rotary type changeover contacts directly driven by the mechanism for Masterpact NW. These contacts trip when the minimum isolation distance between the main circuit-breaker contacts is reached.

OF		NT	NW
Supplied as standard		4	4
Maximum number		4	12
Breaking capacity (A)	Standard	Minimum load: 100 mA/24 V	
p.f.: 0.3	V AC	240/380	6
AC12/DC12		480	6
		690	6
	V DC	24/48	2.5
		125	0.5
		250	0.3
	Low-level	Minimum load: 2 mA/15 V	
	V AC	24/48	5
		240	5
		380	5
	V DC	24/48	5/2.5
		125	0.5
		250	0.3
			3

(1) Standard contacts: 10 A; optional contacts: 6 A.

"Fault-trip" indication contacts (SDE)

Circuit-breaker tripping due to a fault is signalled by:

- a red mechanical fault indicator (reset)
- one changeover contact (SDE).

Following tripping, the mechanical indicator must be reset before the circuit breaker may be closed. One SDE is supplied as standard. An optimal SDE may be added. This latter is incompatible with the electrical reset after fault-trip option (Res).

SDE		NT/NW
Supplied as standard		1
Maximum number		2
Breaking capacity (A)	Standard	Minimum load: 100 mA/24 V
p.f.: 0.3	V AC	240/380
AC12/DC12		480
		690
	V DC	24/48
		125
		250
	Low-level	Minimum load: 2 mA/15 V
	V AC	24/48
		240
		380
	V DC	24/48
		125
		250
		0.15

Combined "connected/closed" contacts (EF)

The contact combines the "device connected" and the "device closed" information to produce the "circuit closed" information. Supplied as an option for Masterpact NW, it is mounted in place of the connector of an additional OF contact.

EF		NW
Maximum number		8
Breaking capacity (A)	Standard	Minimum load: 100 mA/24 V
p.f.: 0.3	V AC	240/380
AC12/DC12		480
		690
	V DC	24/48
		125
		250
	Low-level	Minimum load: 2 mA/15 V
	V AC	24/48
		240
		380
	V DC	24/48
		125
		250
		0.3



CCE, CD and CT "connected/disconnected/test" position carriage switches.



M2C programmable contacts: circuit-breaker internal relay with two contacts.



M6C programmable contacts: circuit-breaker external relay with six independent changeover contacts controlled from the circuit breaker via a three-wire connection. (maximum length is 10 meters).

"Connected", "disconnected" and "test" position carriage switches

Three series of optional auxiliary contacts are available for the chassis:

- changeover contacts to indicate the "connected" position (CE)
- changeover contacts to indicate the "disconnected" position (CD). This position is indicated when the required clearance for isolation of the power and auxiliary circuits is reached
- changeover contacts to indicate the "test" position (CT). In this position, the power circuits are disconnected and the auxiliary circuits are connected.

Additional actuators

A set of additional actuators may be installed on the chassis to change the functions of the carriage switches.

		NT			NW		
Contacts		CE/CD/CT			CE/CD/CT		
Maximum number	Standard	3	2	1	3	3	3
	with additional actuators				9	0	0
					6	3	0
					6	0	3
Breaking capacity (A)	Standard	Minimum load: 100 mA/24 V					
p.f.: 0.3	V AC	240	8		8		
AC12/DC12		380	8		8		
		480	8		8		
		690	6		6		
	V DC	24/48	2.5		2.5		
		125	0.8		0.8		
		250	0.3		0.3		
	Low-level	Minimum load: 2 mA/15 V					
	V AC	24/48	5		5		
		240	5		5		
		380	5		5		
	V DC	24/48	2.5		2.5		
		125	0.8		0.8		
		250	0.3		0.3		

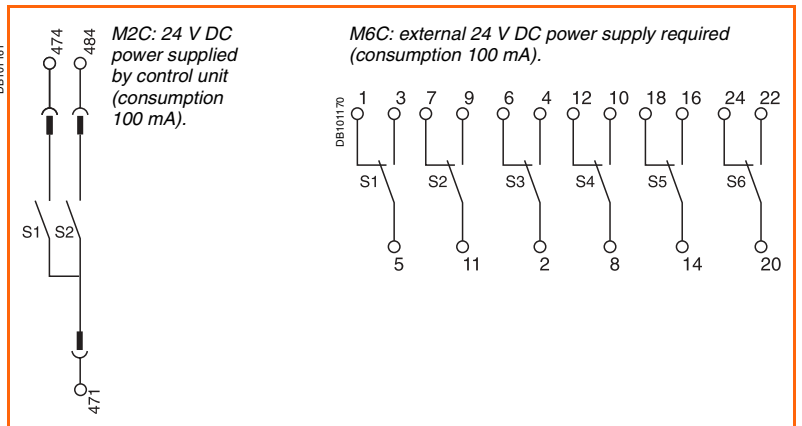
M2C / M6C programmable contacts

These contacts, used with the Micrologic P and H control units, may be programmed via the control unit keypad or via a supervisory station with the COM communication option. They require an external power supply module.

They indicate:

- the type of fault
- instantaneous or delayed threshold overruns.
- They may be programmed:
 - with instantaneous return to the initial state
 - without return to the initial state
 - with return to the initial state following a delay.

Characteristics		M2C/M6C	
Minimum load		100 mA/24 V	
Breaking capacity (A)	V AC	240	5
p.f.: 0.7		380	3
	V DC	24	1.8
		48	1.5
		125	0.4
		250	0.15



Two solutions are available for remote operation of Masterpact devices:

- a point-to-point solution
- a bus solution with the COM communication option.



Note: an opening order always takes priority over a closing order.

If opening and closing orders occur simultaneously, the mechanism discharges without any movement of the main contacts. The circuit breaker remains in the open position (OFF).

In the event of maintained opening and closing orders, the standard mechanism provides an anti-pumping function by blocking the main contacts in open position.

Anti-pumping function. After fault tripping or intentional opening using the manual or electrical controls, the closing order must first be discontinued, then reactivated to close the circuit breaker.

When the automatic reset after fault trip (RAR) option is installed, to avoid pumping following a fault trip, the automatic control system must take into account the information supplied by the circuit breaker before issuing a new closing order or blocking the circuit breaker in the open position (information on the type of fault, e.g. overload, short-time fault, earth fault, earth leakage, short-circuit, etc.).

Note: MX communicating releases are of the impulse type only and cannot be used to lock a circuit breaker in OFF position. For locking in OFF position, use the remote tripping function (2nd MX or MN).

When MX or XF communicating releases are used, the third wire (C3, A3) must be connected even if the communication module is not installed. When the control voltage (C3-C1 or A3-A1) is applied to the MX or XF releases, it is necessary to wait 1.5 seconds before issuing an order. Consequently, it is advised to use standard MX or XF releases for applications such as source-changeover systems.

The remote ON / OFF function is used to remotely open and close the circuit breaker. It is made up of:

- an electric motor (MCH) equipped with a "springs charged" limit switch contact (CH)
- two voltage releases:
 - a closing release (XF)
 - an opening release (MX).

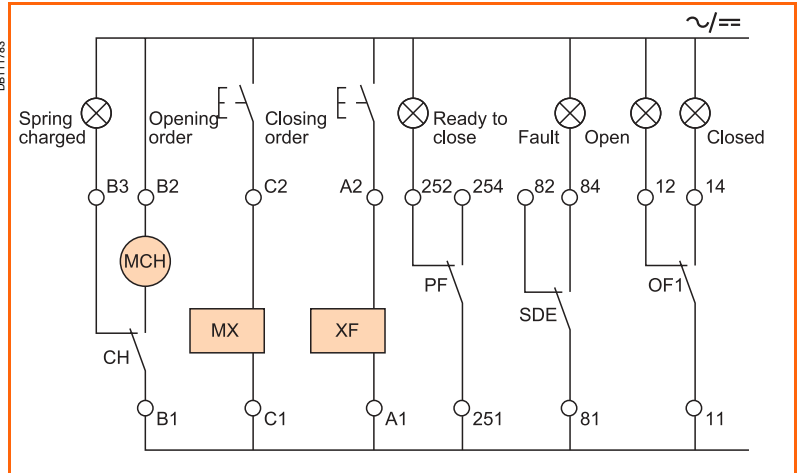
Optionally, other functions may be added:

- a "ready to close" contact (PF)
- an electrical closing pushbutton (BPFE)
- remote reset following a fault.

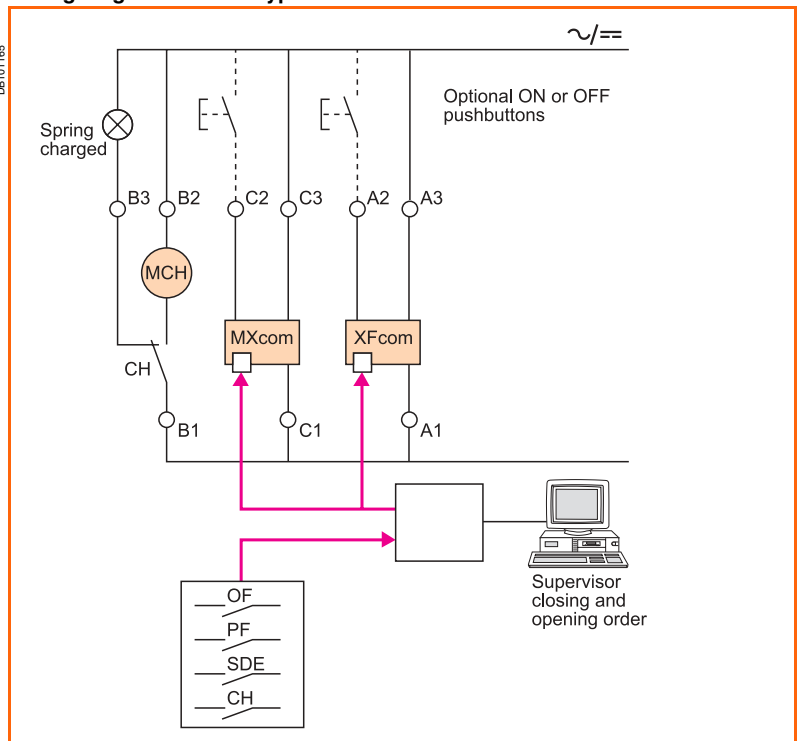
A remote-operation function is generally combined with:

- device ON / OFF indication (OF)
- "fault-trip" indication (SDE).

Wiring diagram of a point-to-point remote ON / OFF function



Wiring diagram of a bus-type remote ON / OFF function



PB100797-23



Electric motor (MCH) for Masterpact NT.

PB100808-32



Electric motor (MCH) for Masterpact NW.

Electric motor (MCH)

The electric motor automatically charges and recharges the spring mechanism when the circuit breaker is closed. Instantaneous reclosing of the breaker is thus possible following opening. The spring-mechanism charging handle is used only as a backup if auxiliary power is absent.

The electric motor (MCH) is equipped as standard with a limit switch contact (CH) that signals the "charged" position of the mechanism (springs charged).

Characteristics

Power supply	V AC 50/60 Hz	48/60 - 100/130 - 200/240 - 277 - 380/415 - 400/440 - 480
	V DC	24/30 - 48/60 - 100/125 - 200/250
Operating threshold	0.85 to 1.1 Un	
Consumption (VA or W)	180	
Motor overcurrent	2 to 3 In for 0.1 s	
Charging time	maximum 3 s for Masterpact NT	
	maximum 4 s for Masterpact NW	
Operating frequency	maximum 3 cycles per minute	
CH contact	10 A at 240 V	

Voltage releases (XF and MX)

Their supply can be maintained or automatically disconnected.

Closing release (XF)

The XF release remotely closes the circuit breaker if the spring mechanism is charged.

Opening release (MX)

The MX release instantaneously opens the circuit breaker when energised. It locks the circuit breaker in OFF position if the order is maintained (except for MX "communicating" releases).

Note: whether the operating order is maintained or automatically disconnected (pulse-type), XF or MX "communicating" releases ("bus" solution with "COM" communication option) always have an impulse-type action (see diagram).

Characteristics

		XF	MX
Power supply	V AC 50/60 Hz	24 - 48 - 100/130 - 200/250 - 277 - 380/480	
	V DC	12 - 24/30 - 48/60 - 100/130 - 200/250	
Operating threshold		0.85 to 1.1 Un	0.7 to 1.1 Un
Consumption (VA or W)		Hold: 4.5	Hold: 4.5
		Pick-up: 200 (200 ms)	Pick-up: 200 (200 ms)
Circuit-breaker response time at Un		55 ms ±10 (Masterpact NT)	50 ms ±10
		70 ms ±10 (NW ≤ 4000A)	
		80 ms ±10 (NW > 4000A)	

"Ready to close" contact (PF)

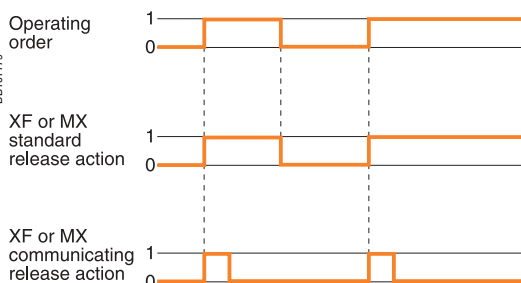
The "ready to close" position of the circuit breaker is indicated by a mechanical indicator and a PF changeover contact. This signal indicates that all the following are valid:

- the circuit breaker is in the OFF position
- the spring mechanism is charged
- a maintained opening order is not present:
- MX energised
- fault trip
- remote tripping (second MX or MN)
- device not completely racked in
- device locked in OFF position
- device interlocked with a second device.

Characteristics

Characteristics		NT/NW	
Maximum number		1	
Breaking capacity (A)	Standard	Minimum load: 100 mA/24 V	
p.f.: 0.3 AC12/DC12	V AC	240/380	5
		480	5
		690	3
	V DC	24/48	3
		125	0.3
		250	0.15
Low-level	V AC	Minimum load: 2 mA/15 V	
	V DC	24/48	3
		125	0.3
		250	0.15

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XF and MX voltage releases.

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"Ready to close" contacts (PF).



Electrical closing pushbutton (BPFE)

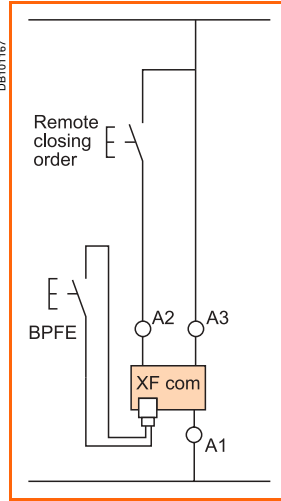
Located on the front panel, this pushbutton carries out electrical closing of the circuit breaker. It is generally associated with the transparent cover that protects access to the closing pushbutton.

Electrical closing via the BPFE pushbutton takes into account all the safety functions that are part of the control/monitoring system of the installation.

The BPFE connects to the closing release (XF com) in place of the COM module.

The COM module is incompatible with this option.

Different types of voltage exist and the XF electromagnet is compulsory if the BPFE option is selected .

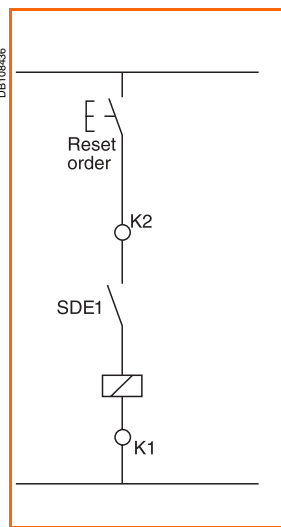


Remote reset after fault trip

Electrical reset after fault trip (Res)

Following tripping, this function resets the "fault trip" indication contacts (SDE) and the mechanical indicator and enables circuit breaker closing.

Power supply: 110 / 130 V AC and 200 / 240 V AC.



Automatic reset after fault trip (RAR)

Following tripping, a reset of the mechanical indicator (reset button) is no longer required to enable circuit-breaker closing. The mechanical (reset button) and electrical (SDE) indications remain in fault position until the reset button is pressed.



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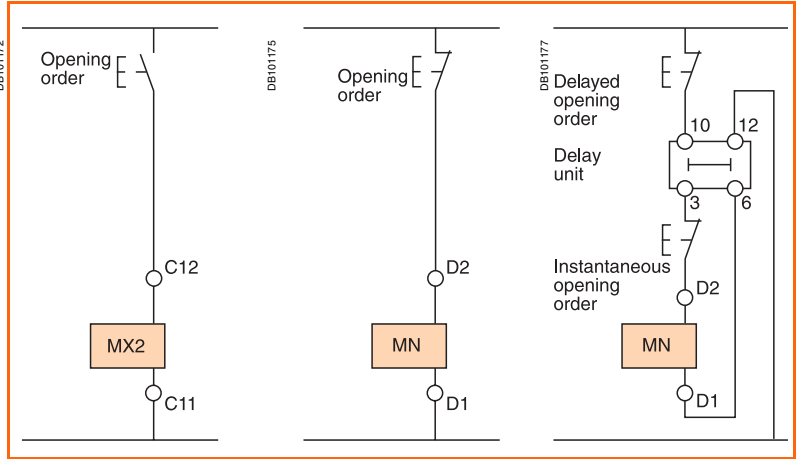
MX or MN voltage release.

This function opens the circuit breaker via an electrical order. It is made up of:

- a shunt release (second MX)
- or an undervoltage release (MN)
- or a delayed undervoltage release (MN + delay unit).

These releases (2nd MX or MN) cannot be operated by the communication bus. The delay unit, installed outside the circuit breaker, may be disabled by an emergency OFF button to obtain instantaneous opening of the circuit breaker.

Wiring diagram for the remote-tripping function



Voltage releases (second MX)

When energised, the MX voltage release instantaneously opens the circuit breaker. A continuous supply of power to the second MX locks the circuit breaker in the OFF position.

Characteristics		
Power supply	V AC 50/60Hz	24 - 48 - 100/130 - 200/250 - 277- 380/480
	V DC	12 - 24/30 - 48/60 - 100/130 - 200/250
Operating threshold		0.7 to 1.1 Un
Permanent locking function		0.85 to 1.1 Un
Consumption (VA or W)	Pick-up: 200 (200 ms)	Hold: 4.5
Circuit-breaker response time at Un	50 ms ±10	

Instantaneous voltage releases (MN)

The MN release instantaneously opens the circuit breaker when its supply voltage drops to a value between 35 % and 70 % of its rated voltage. If there is no supply on the release, it is impossible to close the circuit breaker, either manually or electrically. Any attempt to close the circuit breaker has no effect on the main contacts. Circuit-breaker closing is enabled again when the supply voltage of the release returns to 85 % of its rated value.

Characteristics		
Power supply	V AC 50/60 Hz	24 - 48 - 100/130 - 200/250 - 380/480
	V DC	24/30 - 48/60 - 100/130 - 200/250
Operating threshold	Opening	0.35 to 0.7 Un
	Closing	0.85 Un
Consumption (VA or W)	Pick-up: 200 (200 ms)	Hold: 4.5
MN consumption with delay unit (VA or W)	Pick-up: 200 (200 ms)	Hold: 4.5
Circuit-breaker response time at Un		40 ms ±5 for NT
		90 ms ±5 for NW

MN delay units

To eliminate circuit-breaker nuisance tripping during short voltage dips, operation of the MN release can be delayed. This function is achieved by adding an external delay unit in the MN voltage-release circuit. Two versions are available, adjustable and non-adjustable.

Characteristics		
Power supply	Non-adjustable	100/130 - 200/250
	Adjustable	48/60 - 100/130 - 200/250 - 380/480
Operating threshold	Opening	0.35 to 0.7 Un
	Closing	0.85 Un
Delay unit consumption	Pick-up: 200 (200 ms)	Hold: 4.5
Circuit-breaker response time at Un	Non-adjustable	0.25 s
	Adjustable	0.5 s - 0.9 s - 1.5 s - 3 s

PB100821-68



Auxiliary terminal shield (CB)

Optional equipment mounted on the chassis, the shield prevents access to the terminal block of the electrical auxiliaries.

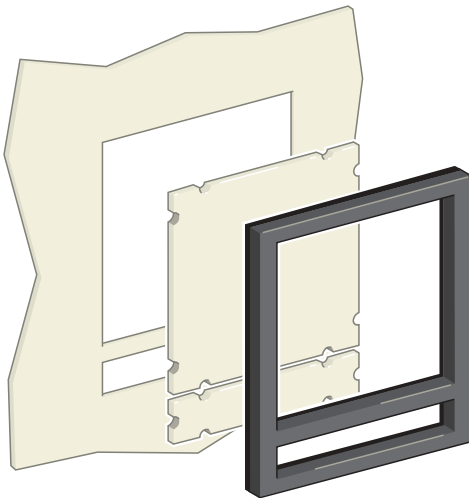
PB100822-32



Operation counter (CDM)

The operation counter sums the number of operating cycles and is visible on the front panel. It is compatible with manual and electrical control functions.

DB101173



Escutcheon (CDP)

Optional equipment mounted on the door of the cubicle, the escutcheon increases the degree of protection to IP 40 (circuit breaker installed free standing: IP30) . It is available in fixed and drawout versions.

Blanking plate (OP) for escutcheon

Used with the escutcheon, this option closes off the door cut-out of a cubicle not yet equipped with a device. It may be used with the escutcheon for both fixed and drawout devices.

Transparent cover (CP) for escutcheon

Optional equipment mounted on the escutcheon, the cover is hinged and secured by a screw. It increases the degree of protection to IP54, IK10. It adapts to drawout devices.

Escutcheon (CDP) with blanking plate.

PB100776-42



Transparent cover (CP) for escutcheon.



Manual source-changeover system

This is the most simple type. It is controlled manually by an operator and consequently the time required to switch from the normal to the replacement source can vary.

A manual source-changeover system is made up of two or three mechanically interlocked manually-operated circuit breakers or switch-disconnectors.

Remote-operated source-changeover system

This is the most commonly employed system for devices with high ratings (above 400 A). No human intervention is required. Transfer from the normal to the replacement source is controlled electrically.

A remote-controlled source-changeover system is made up of two or three circuit breakers or switch-disconnectors linked by an electrical interlocking system that may have different configurations. In addition, a mechanical interlocking system protects against electrical malfunctions or incorrect manual operations.

Automatic source-changeover systems

An automatic controller may be added to a remote-operated source-changeover system for automatic source control according to programmable operating modes. This solution ensures optimum energy management:

- transfer to a replacement source according to external requirements
- management of power sources
- regulation
- emergency source replacement, etc.

The automatic controller may be fitted with an option for communication with a supervisor.

Communication option

The communication option must not be used to control the opening or closing of source-changeover system circuit breakers. It should be used only to transmit measurement data or circuit-breaker status.

The eco COM option is perfectly suited to these equipments.



Service sector:

- hospital operating rooms
- safety systems for tall buildings
- computer rooms (banks, insurance companies, etc.)
- lighting systems in shopping centres.



Industry:

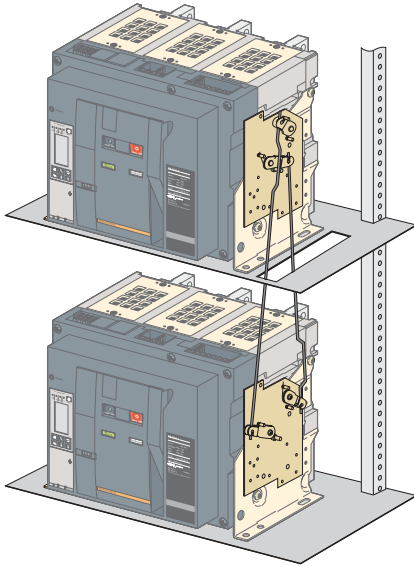
- assembly lines
- propulsion systems on ships
- essential auxiliaries in thermal power stations...



Infrastructure:

- port and railway installations
- runway lighting systems
- control systems for military installations...

DB101572



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

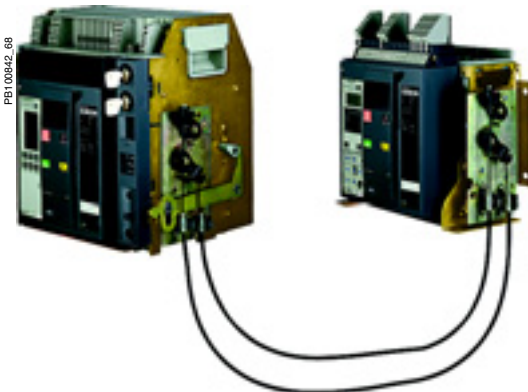
This function requires:

- 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		■	■	■



Interlocking of two Masterpact circuit breakers using cables.

Interlocking of two Masterpact NT/NW or up to three Masterpact NW devices using cables

For cable interlocking, the circuit breakers may be mounted one above the other or side-by-side.

The interlocked devices may be fixed or drawout, three-pole or four-pole, and have different ratings and sizes.

Interlocking between two devices (Masterpact NT and NW)

This function requires:

- an adaptation fixture on the right side of each device
- a set of cables with no-slip adjustments.

The maximum distance between the fixing planes (vertical or horizontal) is 2000 mm.

Interlocking between three devices (Masterpact NW only)

This function requires:

- a specific adaptation fixture for each type of interlocking, installed on the right side of each device
- two or three sets of cables with no-slip adjustments.

The maximum distance between the fixing planes (vertical or horizontal) is 1000 mm.

Installation

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

Installation conditions for cable interlocking systems:

- cable length: 2.5 m
- radius of curvature: 100 mm
- maximum number of curves: 3.

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

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

All combinations of two Masterpact NT and Masterpact NW devices are possible, whatever the rating or size of the devices.

Possible combinations of three device

	NT06 to NT16	NW08 to NW40	NW40b to NW63
NT06 to NT16			
Ratings 250... 1600 A			
NW08 to NW40			
Ratings 320... 4000 A		■	■
NW40b to NW63			
Ratings 4000... 6300 A		■	■

Only Masterpact NW may be used for three-device combinations.

Types of mechanical interlocking and combinations

See catalogue "Source changeover systems", réf. ABTED201149EN.

Electrical interlocking is used with the mechanical interlocking system. It electrically interlocks the two circuit breakers and implements the time delays required for proper operation of the system. An automatic controller may be added to take into account information from the distribution system.

Electrical interlocking is carried out by an electrical control device.

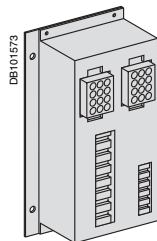
For Masterpact, this function can be implemented in one of two ways:

- using the IVE unit
- by an electrician based on the diagrams presented in the “Electrical diagrams” part 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 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).

Compact NS, Masterpact NT and NW

Types of mechanical interlocking	Possible combinations	Typical electrical diagrams	Diagram no.								
2 devices											
	<table border="1"> <thead> <tr> <th>QN</th> <th>QR</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>0</td> </tr> <tr> <td>0</td> <td>1</td> </tr> </tbody> </table>	QN	QR	0	0	1	0	0	1	Masterpact NT and NW: <ul style="list-style-type: none"> ■ electrical interlocking with lockout after fault: <ul style="list-style-type: none"> <input type="checkbox"/> permanent replacement source (without IVE) 51201139 <input type="checkbox"/> with EPO by MX (without IVE) 51201140 <input type="checkbox"/> with EPO by MN (without IVE) 51201141 <input type="checkbox"/> permanent replacement source (with IVE) 51201142 <input type="checkbox"/> with EPO by MX (with IVE) 51201143 <input type="checkbox"/> with EPO by MN (with IVE) 51201144 ■ automatic control without lockout after fault: <ul style="list-style-type: none"> <input type="checkbox"/> permanent replacement source (without IVE) 51156226 <input type="checkbox"/> engine generator set (without IVE) 51156227 ■ automatic control with lockout after fault: <ul style="list-style-type: none"> <input type="checkbox"/> permanent replacement source (with IVE) 51156904 <input type="checkbox"/> engine generator set (with IVE) 51156905 ■ BA/UA controller (with IVE) 51156903 	
QN	QR										
0	0										
1	0										
0	1										

Masterpact NW only

Types of mechanical interlocking	Possible combinations	Typical electrical diagrams	Diagram no.																					
3 devices: 2 "Normal" sources and 1 "Replacement" source																								
	<table border="1"> <thead> <tr> <th>QN1</th> <th>QN2</th> <th>QR</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> </tr> <tr> <td>0</td> <td>0</td> <td>1</td> </tr> </tbody> </table>	QN1	QN2	QR	0	0	0	1	1	0	0	0	1	<ul style="list-style-type: none"> ■ electrical interlocking: <ul style="list-style-type: none"> <input type="checkbox"/> without lockout after fault 51156906 <input type="checkbox"/> with lockout after fault 51156907 										
QN1	QN2	QR																						
0	0	0																						
1	1	0																						
0	0	1																						
3 devices: 2 "Normal" sources and 1 "Replacement" source with source selection																								
	<table border="1"> <thead> <tr> <th>QN1</th> <th>QN2</th> <th>QR</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>0</td> <td>0</td> <td>1</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> </tr> </tbody> </table>	QN1	QN2	QR	0	0	0	1	0	0	0	0	1	1	1	0	0	1	0	<ul style="list-style-type: none"> ■ automatic control with engine generator set: <ul style="list-style-type: none"> <input type="checkbox"/> without lockout after fault (with MN) 51156908 <input type="checkbox"/> with lockout after fault (with MN) 51156909 				
QN1	QN2	QR																						
0	0	0																						
1	0	0																						
0	0	1																						
1	1	0																						
0	1	0																						
3 devices: 3 sources, only one device																								
	<table border="1"> <thead> <tr> <th>QS1</th> <th>QS2</th> <th>QS3</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>0</td> <td>0</td> <td>1</td> </tr> </tbody> </table>	QS1	QS2	QS3	0	0	0	1	0	0	0	1	0	0	0	1	<ul style="list-style-type: none"> ■ electrical interlocking: <ul style="list-style-type: none"> <input type="checkbox"/> without lockout after fault 51156910 <input type="checkbox"/> with lockout after fault 51156911 							
QS1	QS2	QS3																						
0	0	0																						
1	0	0																						
0	1	0																						
0	0	1																						
3 devices: 2 sources + 1 coupling																								
	<table border="1"> <thead> <tr> <th>QS1</th> <th>QC</th> <th>QS2</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>0</td> <td>0</td> <td>1</td> </tr> </tbody> </table> <p>(1) possible by forcing operation</p>	QS1	QC	QS2	0	0	0	1	0	1	1	1	0	0	1	1	1	0	0	0	0	1	<ul style="list-style-type: none"> ■ electrical interlocking: <ul style="list-style-type: none"> <input type="checkbox"/> without lockout after fault 51156912 <input type="checkbox"/> with lockout after fault 51156913 ■ automatic control with lockout after fault 51156914 	
QS1	QC	QS2																						
0	0	0																						
1	0	1																						
1	1	0																						
0	1	1																						
1	0	0																						
0	0	1																						

"Lockout after fault" option. This option makes it necessary to manually reset the device following fault tripping.

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 this catalogue.



BA controller.



UA controller.

Controller		BA	UA					
Compatible circuit breakers		All 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" source if "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.				■				
Utilisation category (IEC 947-5-1)		AC		DC				
		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 auxiliaries 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.

Perfectly integrated in the Compact and Masterpact ranges, Display modules are designed for use with Micrologic control units to provide instant and highly intuitive access to all the information provided by the circuit breakers, including device status, current, voltage and power values, etc.



DMB300 display module: basic and harmonic measurements.



DMC300 display module: measurements, harmonic analysis, diagnosis.

DMB300 and DMC300 display modules use the power and communications capabilities of the Micrologic control units to centralise the display of electrical values, status conditions and alarms of one or more Compact or Masterpact circuit breakers.

The mounting and cabling system for the display modules ensures fast, easy and reliable installation.

Start-up is immediate with no configuration or programming required.

Display modules are high-performance devices combining:

- simple and easy-to-read dials
- powerful and accurate digital processing.

Their small size and extensive communications capabilities make for easy and flexible installation and operation.

Display modules	DMB300	DMC300
Associated circuit breakers		
Type	Compact or Masterpact equipped with Micrologic control units	
Number	1 to 4	1 to 16
Display		
Screen type	Black and white	Colour, touch screen
Screen size	240 x 64 pixels	5", 320 x 240 pixels
Entry	5 buttons	Touch screen
Information displayed		
Currents (per phase)		
Currents I1, I2, I3, IN	A P H	A P H
Maximum current	A P H	A P H
Earth-fault and earth-leakage currents	A P H	A P H
Demand current	P H	P H
Maximum demand current	P H	P H
Total harmonic distortion (THD)	H	H
Maximum total harmonic distortion	H	H
Amplitudes of individual harmonics		H
Voltages		
Phase-to-phase voltages (U ₁₋₂ , U ₂₋₃ , U ₃₋₁)	P H	P H
Minimum/maximum phase-to-phase voltages	P H	P H
Phase-to-neutral voltages (V _{1-N} , V _{2-N} , V _{3-N})	P H	P H
Minimum/maximum phase-to-neutral voltages		P H
Frequency	P H	P H
Voltage imbalance (% per phase)	P H	P H
Total harmonic distortion (% per phase)	H	H
Maximum total harmonic distortion (% per phase)	H	H
Amplitudes of individual harmonics	H	H
Power		
Active (P), reactive (Q) and apparent (S) power	P H	P H
Power factor and cosφ	P H	P H
Maximum power (P, Q, S)	P H	P H
Demand power (P, Q, S)	P H	P H
Maximum demand power	P H	P H
Metering		
Active, reactive and apparent energy	P H	P H
On-line help		
	On-line help is available for each type of information supplied by the module	
Circuit-breaker diagnostics		
Identification of control units	A P H	A P H
Reading of protections	A P H	A P H
Circuit-breaker status	A P H	A P H
Type of trip	A P H	A P H
Current alarms	P H	P H
Maintenance indicator		P H
Installation diagnosis		
Indication of faulty devices		A P H
Fault log		A P H
Installation and start-up		
Mounting	Mounted through door, without tools, using 6 spring-clips supplied with the mod.	
Connection	Prefabricated wiring systems	

Associated Micrologic control unit

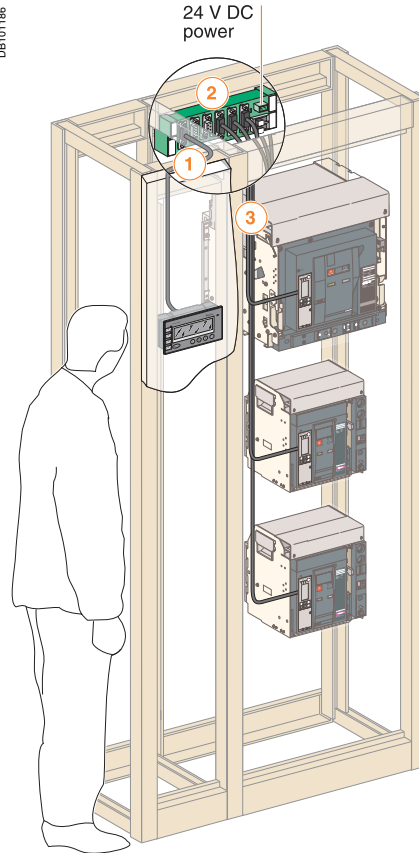
A = Micrologic A
P = Micrologic P
H = Micrologic H

Wiring system

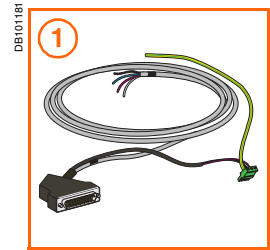
The wiring system is designed for low-voltage power switchboards. Installation requires no tools or special skills.

The prefabricated wiring ensures both data transmission (ModBus protocol) and 24 V DC power distribution for the display module and the communications modules on the Micrologic control units.

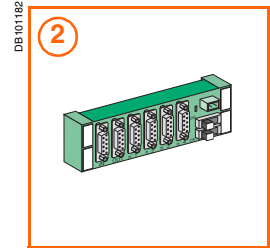
Connection of DMB300 display module



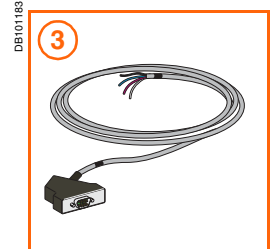
Masterpact circuit breakers equipped with Micrologic control units and the ModBus COM option.



CDM 303:
Connection cable between display module and junction block.



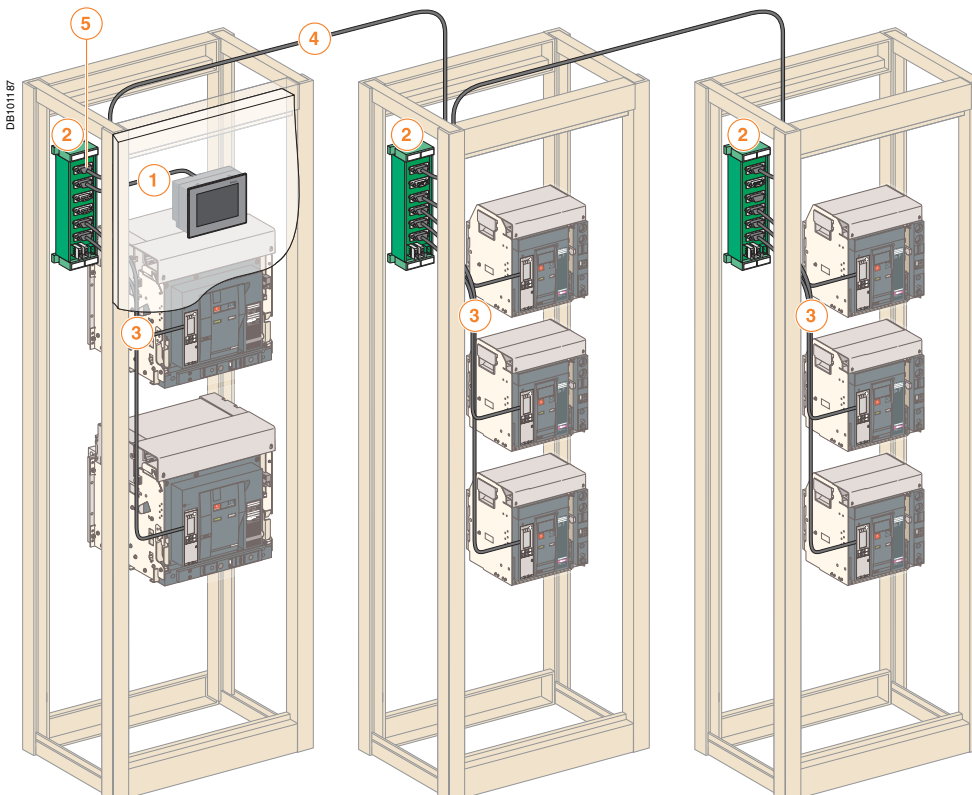
CJB 306 junction block.



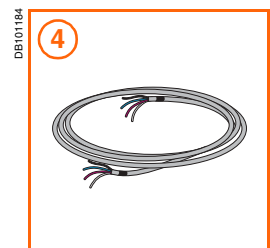
CCP 303:
Connection cable between Masterpact or Compact and junction block.

Connection of DMC300 display module

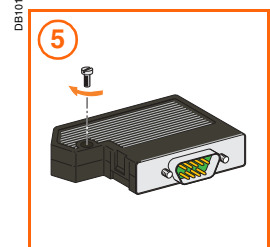
Maximum distance between module and circuit breaker: 1200 m.



Masterpact circuit breakers equipped with Micrologic control units and the ModBus eco COM option.



CCR 301:
Roll of RS 485 cable (2 RS 485 wires + 2 power supply wires).



CSD 309:
SubD 9-pin connector for colour-coded connection of wires to screw terminals.
