Low Voltage Products

Masterpact NT06-16 IEC

User manual

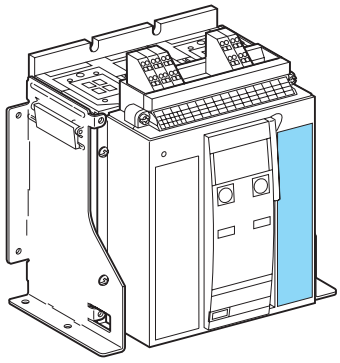
a brand of Schneider Electric

Merlin Gerin

User manual for

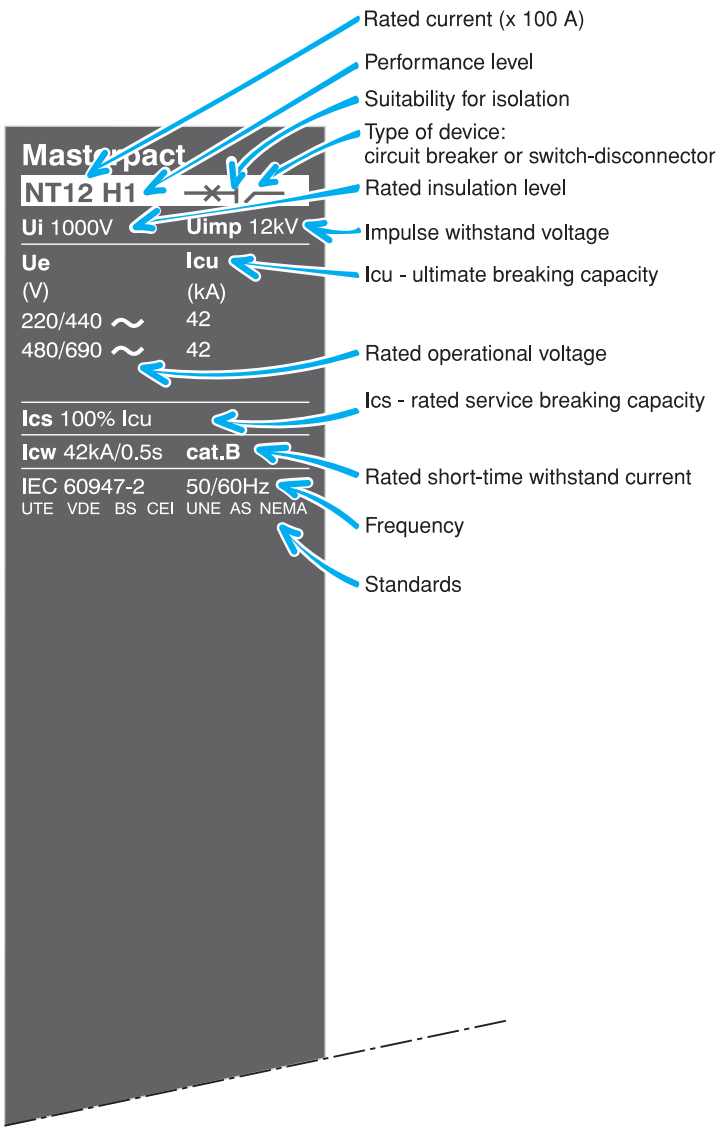
Masterpact NT06-16 IEC circuit breakers

E51299A



Rating plate

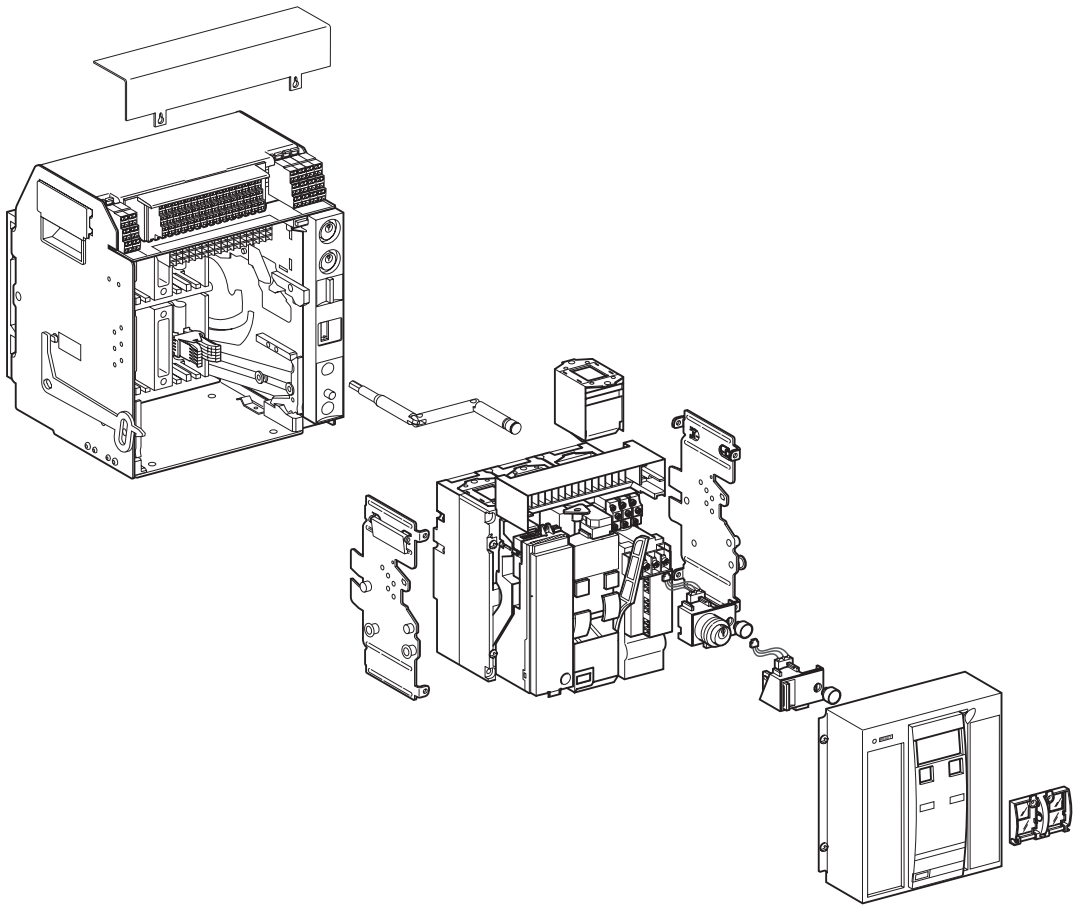
E60055A



Masterpact circuit breakers are available in drawout and fixed versions.
The drawout version is mounted on a chassis and the fixed version is installed using fixing brackets.

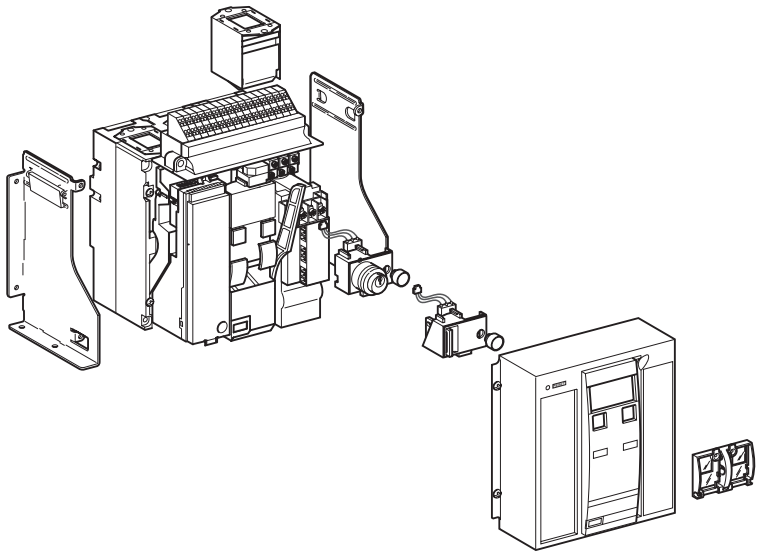
Drawout version

E51321A



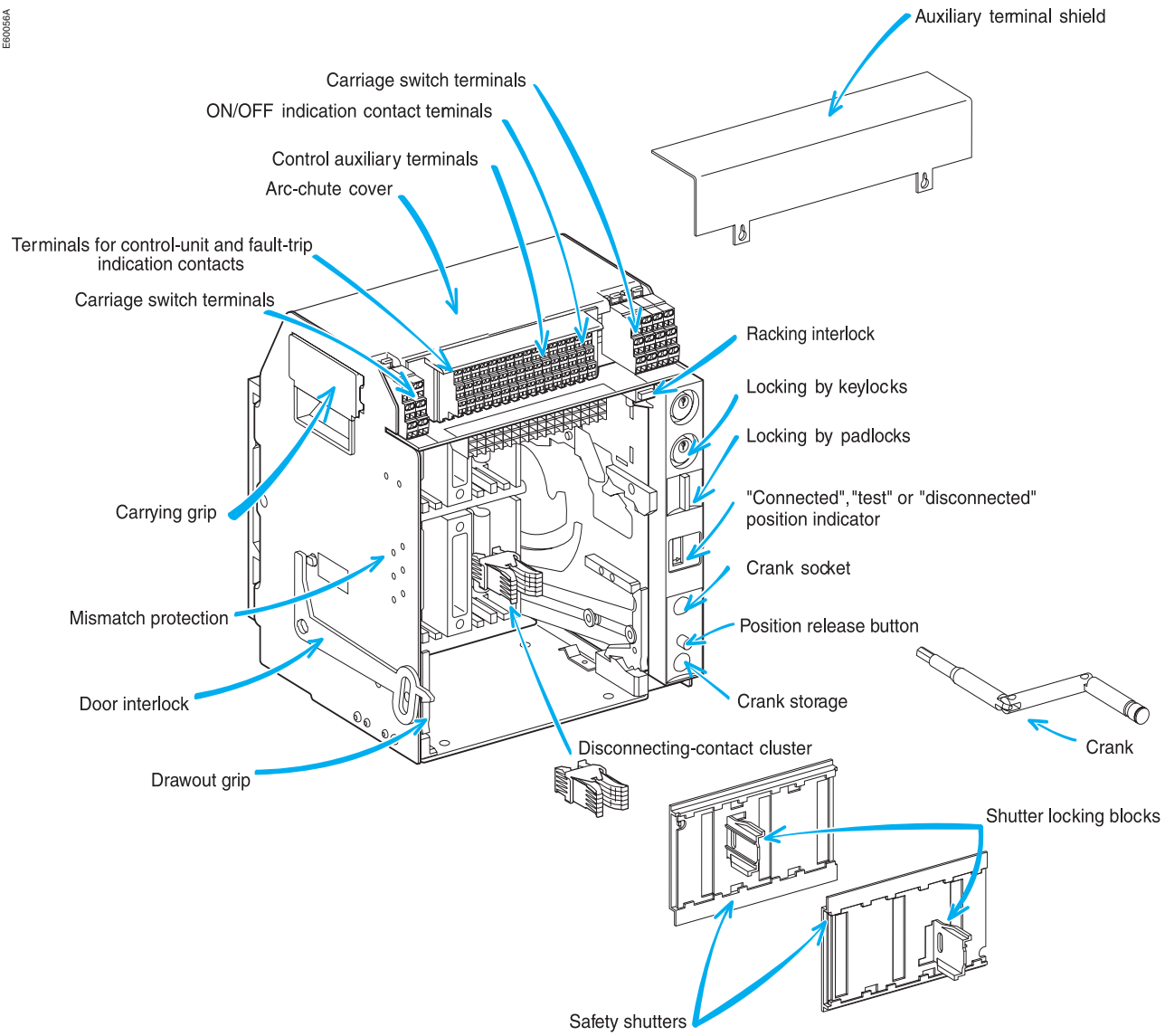
Fixed version

E51322A



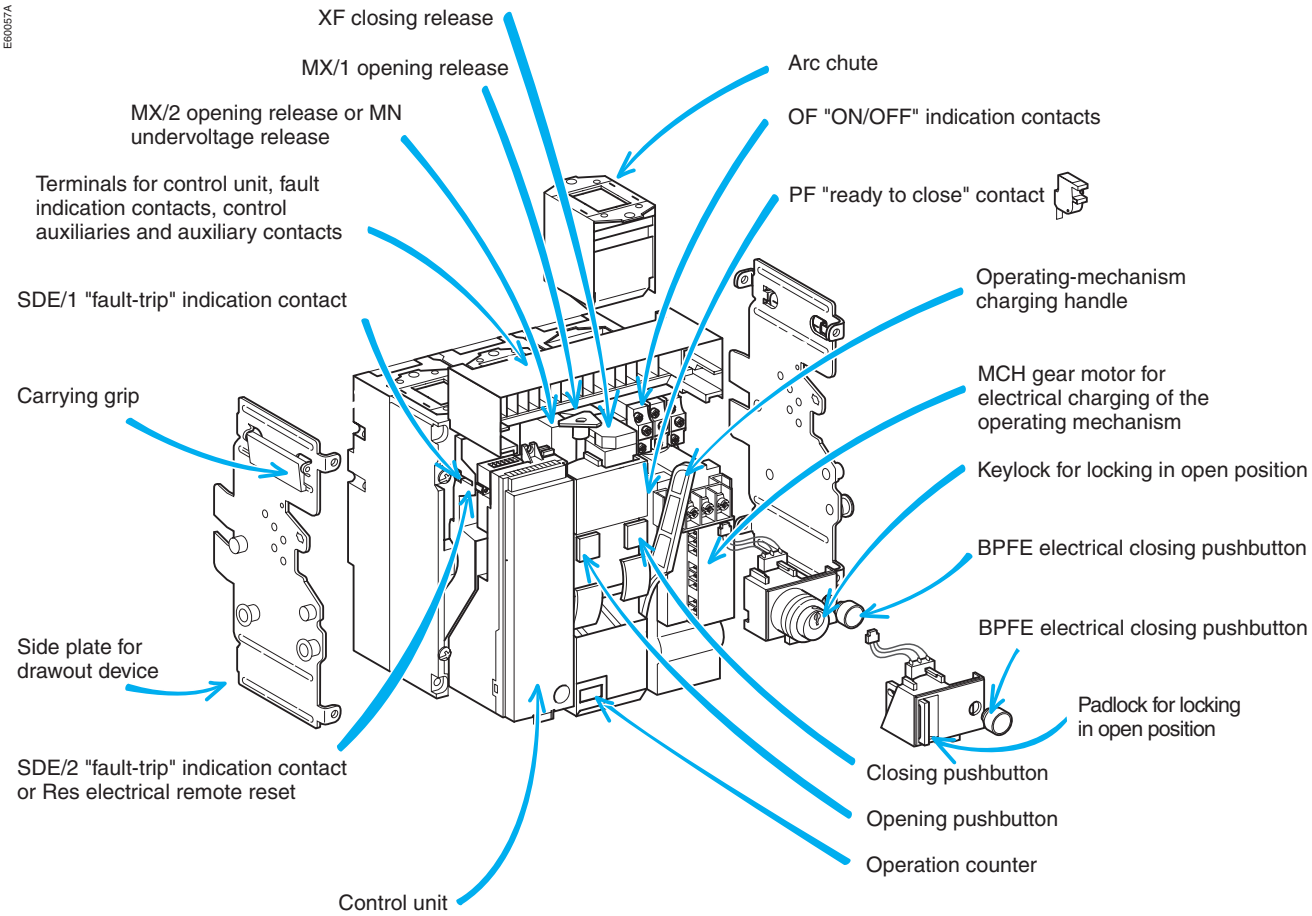
Chassis

E60056A



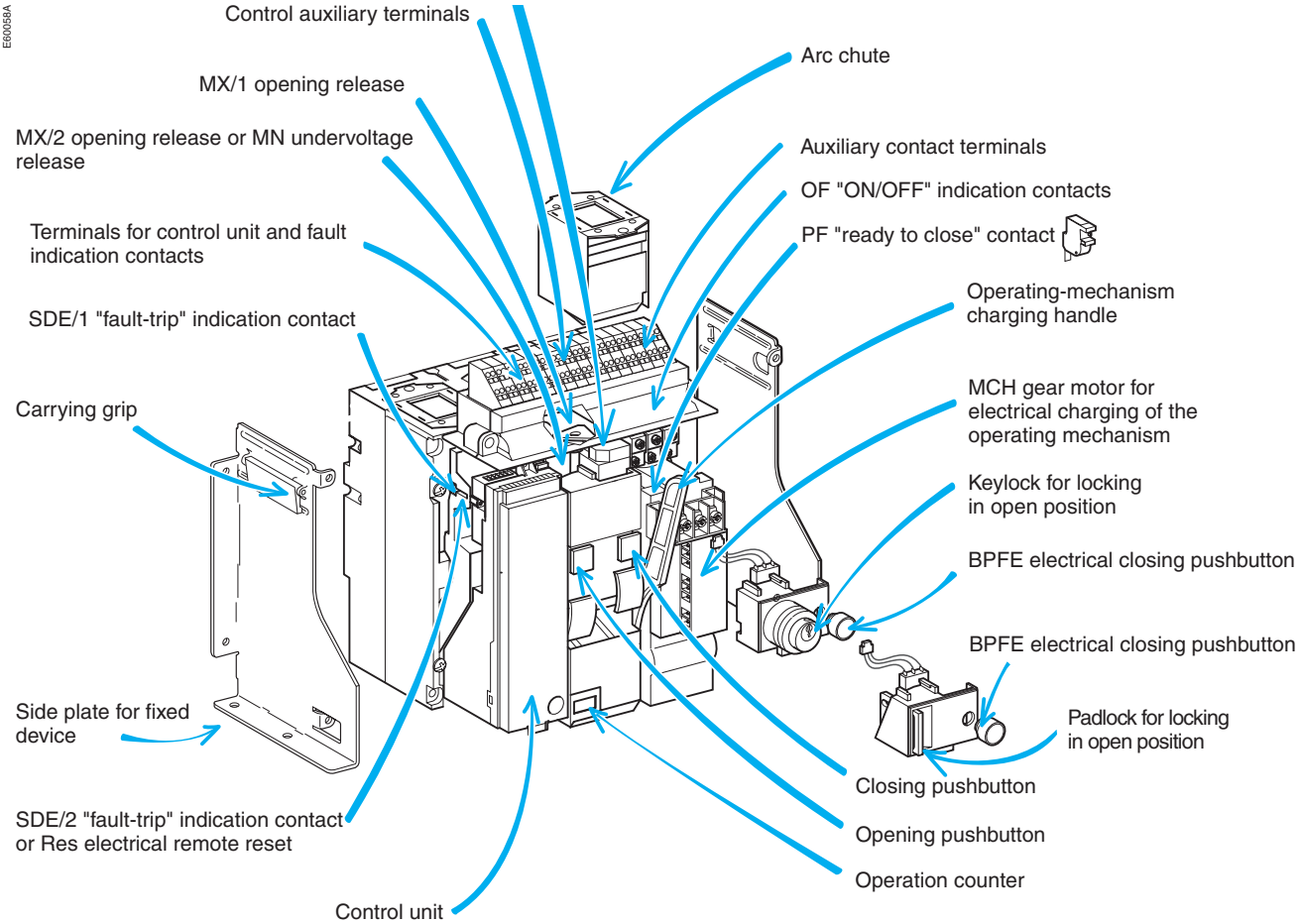
Drawout circuit breaker / switch-disconnector

E60057A



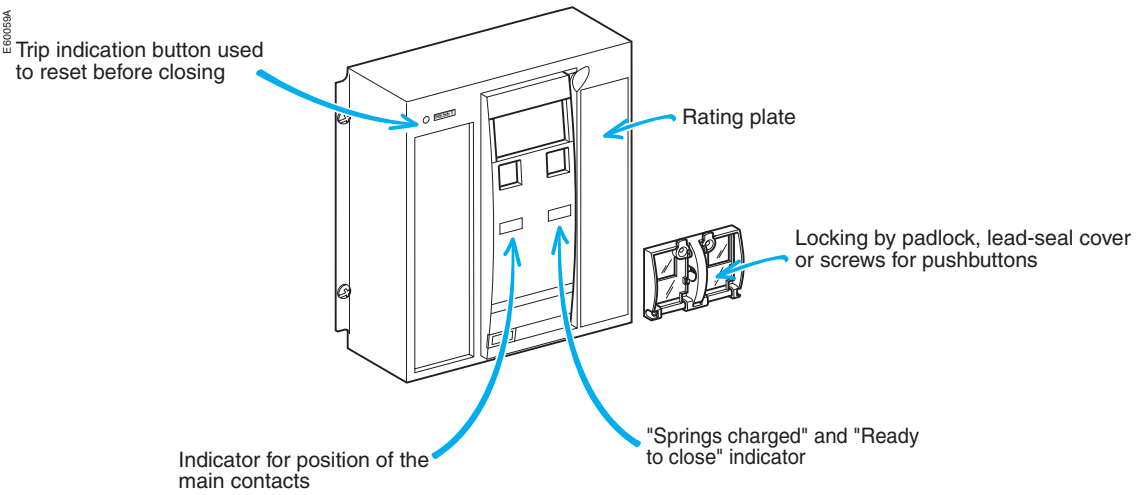
Fixed circuit breaker / switch-disconnector

E60058A



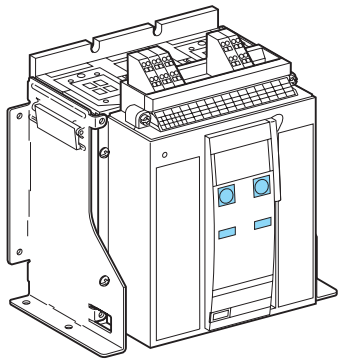
Front

E60059A



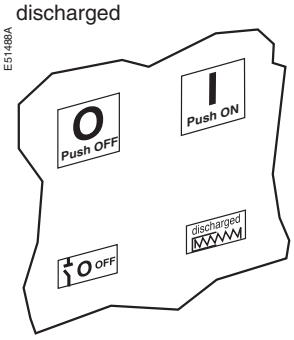
Understanding the controls and indications

E51344A



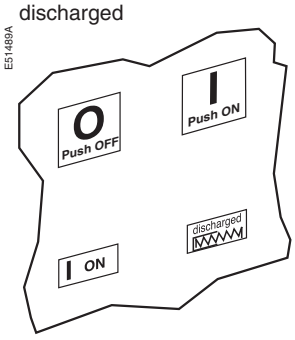
Circuit breaker open and discharged

E51488A



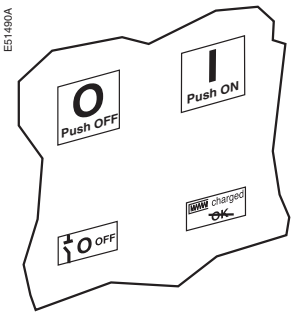
Circuit breaker closed and discharged

E51489A



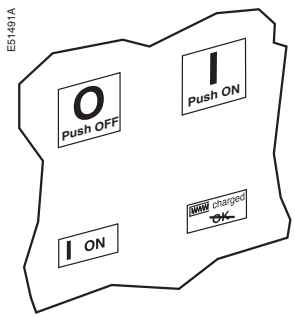
Circuit breaker open, charged and not "ready to close"

E51490A



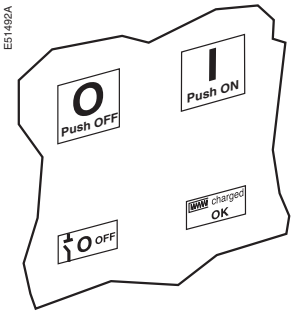
Circuit breaker closed and charged

E51491A



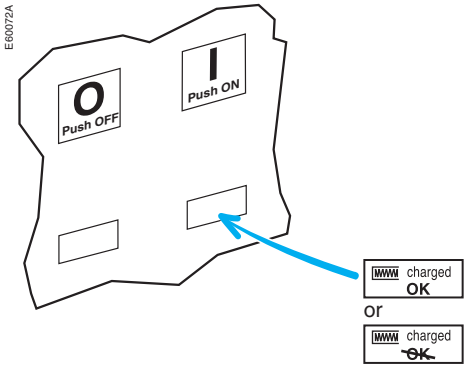
Circuit breaker open, charged and "ready to close"

E51492A



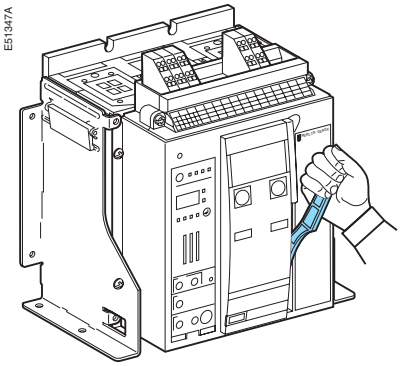
Charging the circuit breaker

The charge status is indicated as follows.

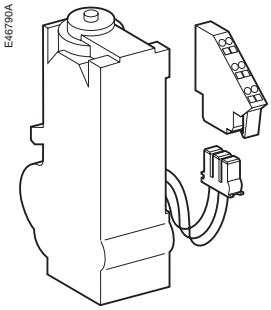


The springs in the circuit breaker operating mechanism must be charged to store the energy required to close the main contacts. The springs may be charged manually using the charging handle or automatically by the optional MCH gear motor.

Manual charging.
Pull the handle down seven times until you hear a "clack".



Automatic charging.
If the MCH gear motor is installed, the spring is automatically recharged after each closing.



Closing the circuit breaker

Device "ready to close"

E51291A

Device not "ready to close"

E51292A

Closing conditions

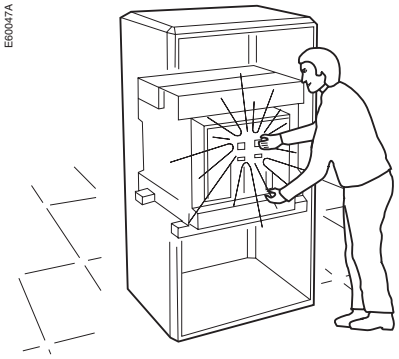
Closing (i.e. turning the circuit ON) is possible only if the circuit breaker is "ready to close".
The prerequisites are the following:
- device open (OFF)
- springs charged
- no opening order present.

The circuit breaker will not close unless it is "ready to close" when the order is given.

Closing the circuit breaker

Locally (mechanical)
Press the mechanical ON pushbutton.

E60047A



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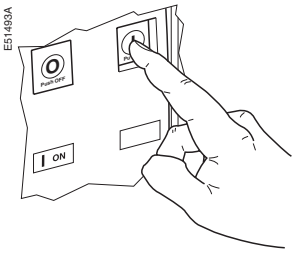
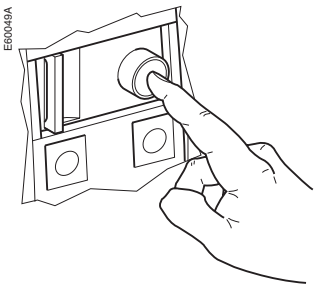


Locally (electrical)

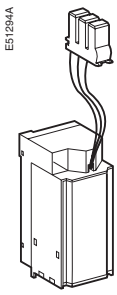
BPFE

E60049A



XF

E51294A

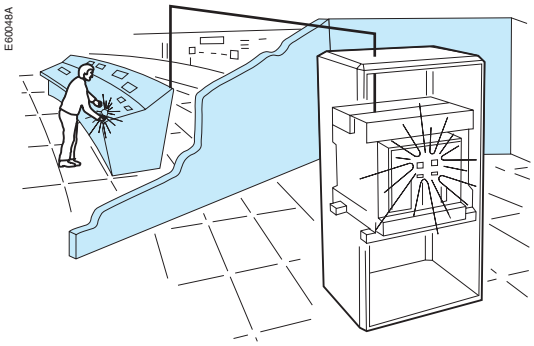


Press the electrical closing pushbutton. By adding an XF closing release, the circuit breaker can be closed locally.

Remotely

XF

E60048A



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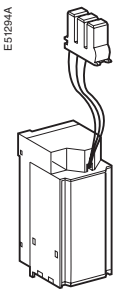


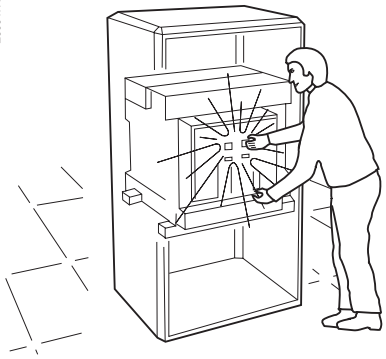
When connected to a remote control panel, the XF closing release can be used to close the circuit breaker remotely.

Anti-pumping function

The purpose of the mechanical anti-pumping function is to ensure that a circuit breaker receiving simultaneous opening and closing orders does not open and close indefinitely.
If there is a continuous closing order, after opening the circuit breaker remains open until the closing order is discontinued. A new closing order is required to close the circuit breaker. A new order is not required if the closing release is wired in series with the PF "ready to close" contact.

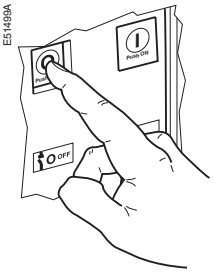
Opening the circuit breaker

E60047A



Locally
Press the OFF pushbutton.

E51499A



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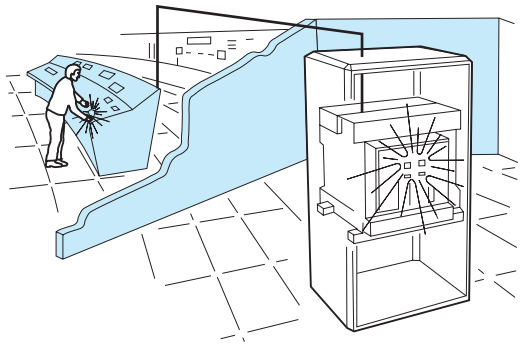
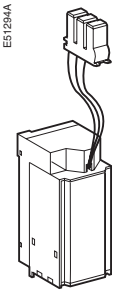


Remotely
Use one of the following solutions:
- one or two MX opening releases (MX1 and MX2)
- one MN undervoltage release
- one MN undervoltage release with a delay unit.

When connected to a remote control panel, these releases can be used to open the circuit breaker remotely.

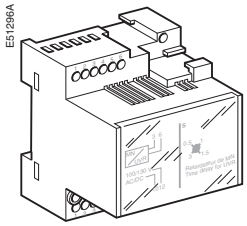
MX1, MX2, MN

E512944A



Delay unit

E512966A



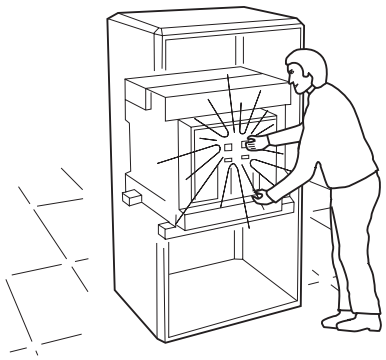
Resetting after a fault trip

The circuit breaker signals a fault trip by:
- a mechanical indicator on the front
- one or two SDE "fault-trip" indication contacts (SDE/2 is optional).

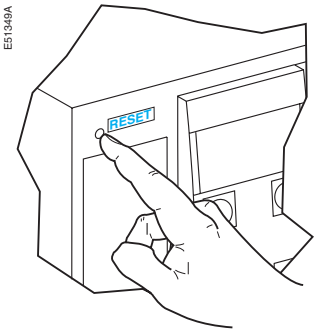
Locally

If the circuit breaker is not equipped with the automatic reset option, reset it manually.

E60047A



E51349A



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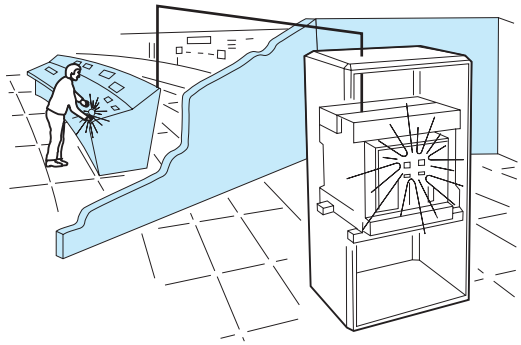
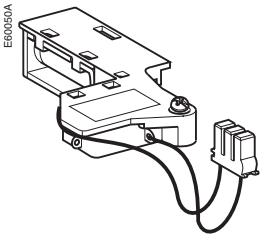


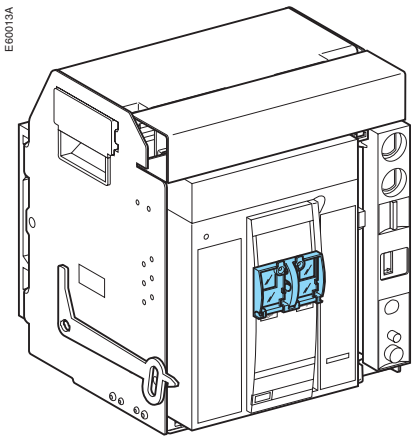
Remotely

Use the Res electrical remote reset option (not compatible with an SDE/2).

E60050A

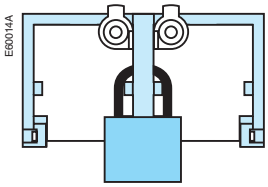


Locking the controls
Disabling circuit-breaker local closing and opening

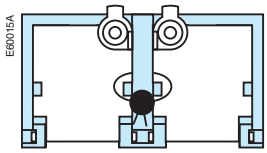


Pushbutton locking using a padlock (shackle diameter 5 to 8 mm), a lead seal or screws.

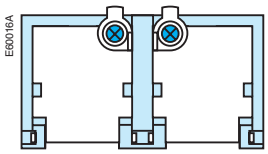
Padlock.



Lead seal.

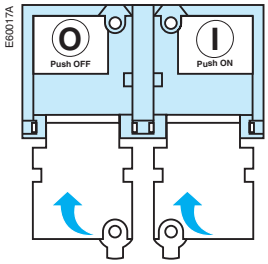


Screws.

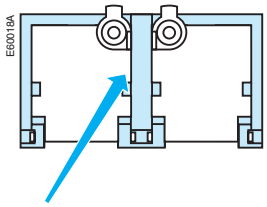


Locking

Close the covers.

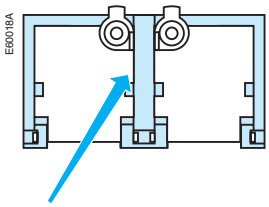


Insert the padlock shackle, lead seal or screws.

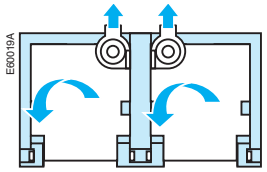


Unlocking

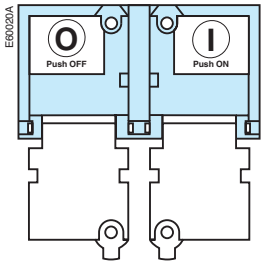
Remove the padlock, lead seal or screws.



Lift the covers and swing them down.



The pushbuttons are no longer locked.

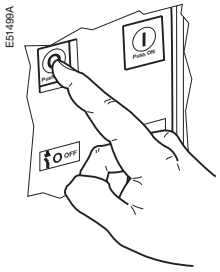


Locking the controls
Disabling local and remote closing

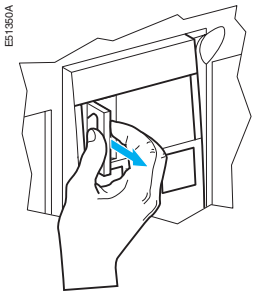
Combination of locking systems
To disable local and remote circuit-breaker closing, use as needed one to three padlocks or a keylock.

Install one to three padlocks (maximum shackle diameter 5 to 8 mm)

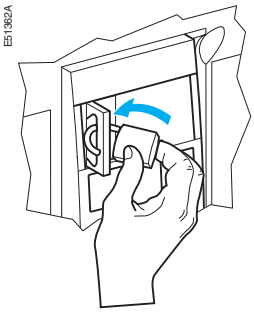
Locking
Open the circuit breaker.



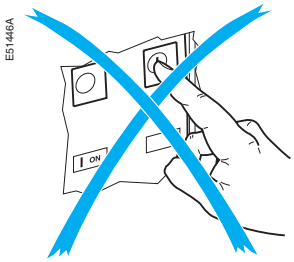
Pull out the tab.



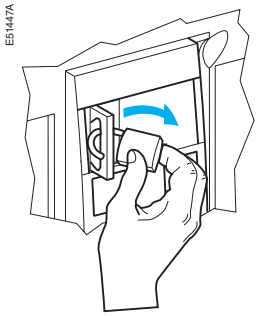
Insert the padlock shackle.



Check
The closing control is inoperative.

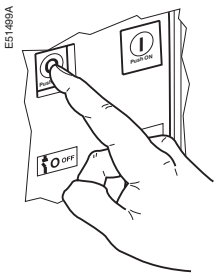


Unlocking
Remove the padlock.

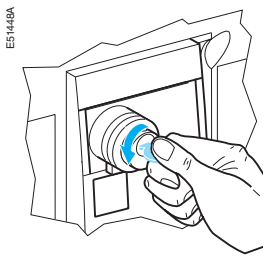


Locking the controls with a keylock

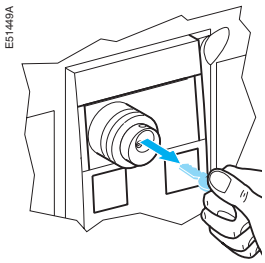
Locking
Open the circuit breaker.



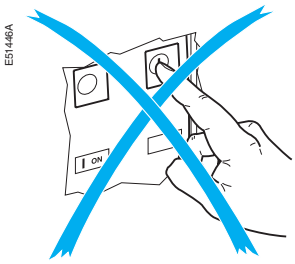
Turn the key.



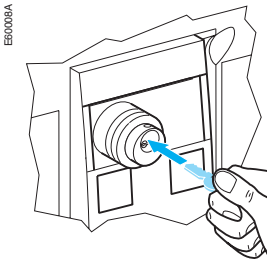
Remove the key.



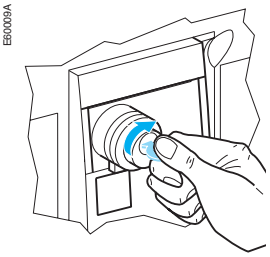
Check
The closing control is inoperative.



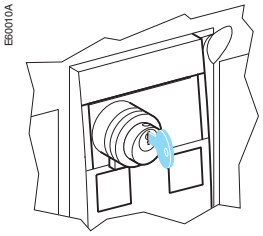
Unlocking
Insert the key.



Turn the key.

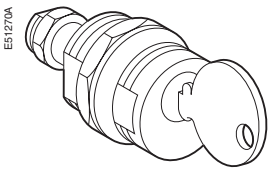


The key cannot be removed.

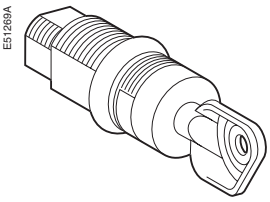


Three types of keylocks are available

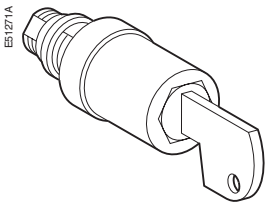
RONIS



PROFALUX

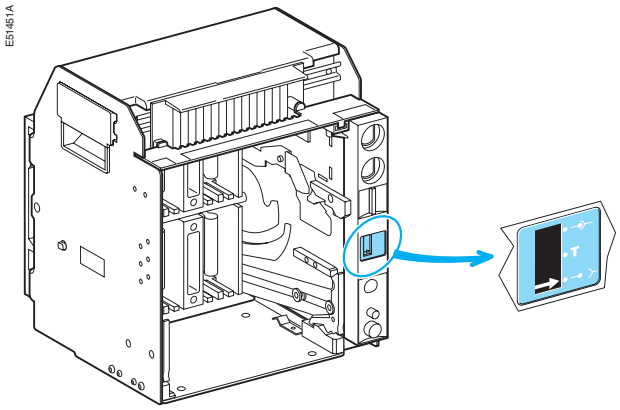


CASTELL

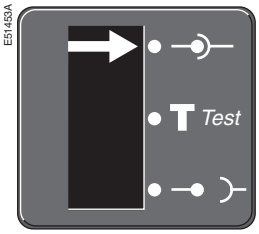


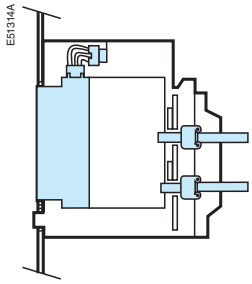
Identifying the circuit breaker positions

The indicator on the front signals the position of the circuit breaker in the chassis.

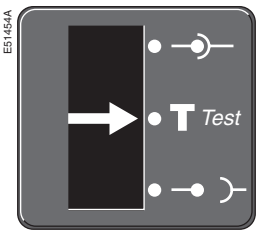


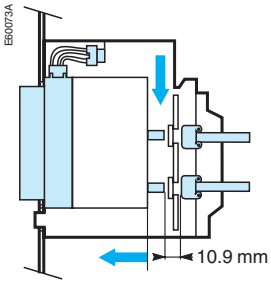
■ "connected" position



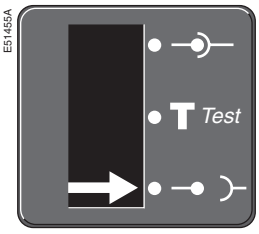


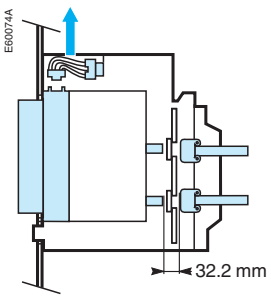
■ "test" position





■ "disconnected" position





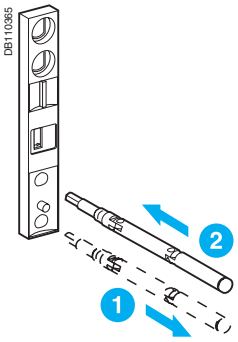
Racking

These operations require that all chassis-locking functions be disabled (see page 22).

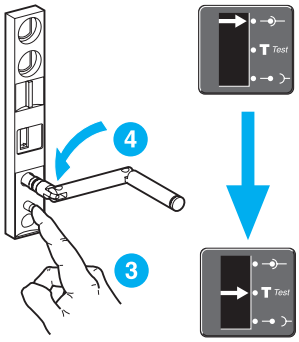
Prerequisites

To connect and disconnect Masterpact, the crank must be used. The locking systems, padlocks and the racking interlock all inhibit use of the crank.

Withdrawing the circuit breaker from the "connected" to "test" position, then to "disconnected" position

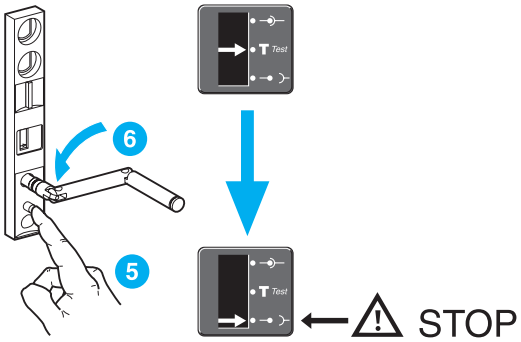


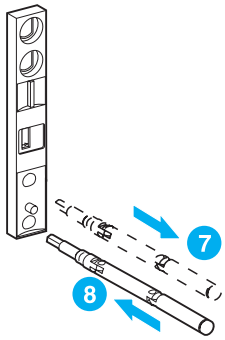
The circuit breaker is in "connected" position.



The circuit breaker is in "test" position. Remove the crank or continue to "disconnected" position.

The circuit breaker is in "test" position.





The circuit breaker is in "disconnected" position.

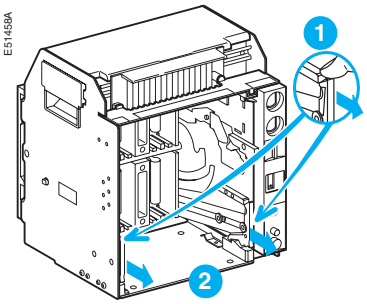
Racking

For complete information on Masterpact handling and mounting, see the installation manual(s).

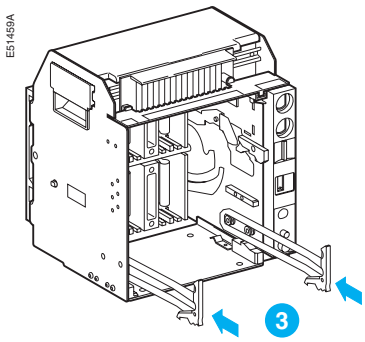
Before mounting the circuit breaker, make sure it matches the chassis.

Removing the rails

Press the release tabs and pull the rails out.

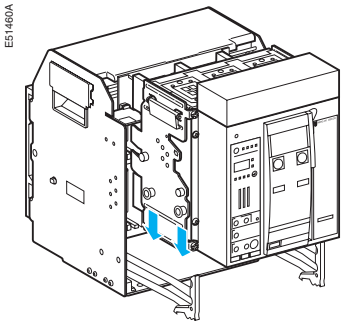


Press the release tabs to push the rails in.

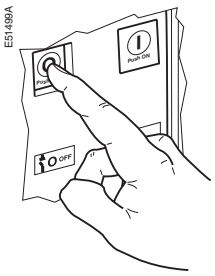


Inserting Masterpact

Position the circuit breaker on the rails. Check that it rests on all four supports.

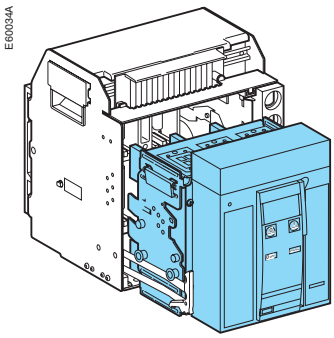


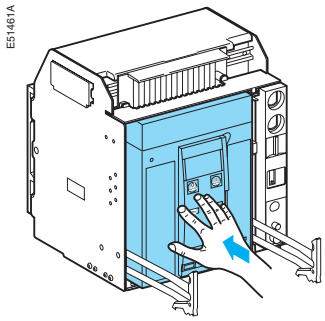
Open the circuit breaker (in any case, it opens automatically during connection).

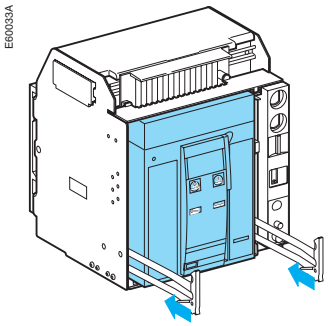


If you cannot insert the circuit breaker in the chassis, check that the mismatch protection on the chassis corresponds to that on the circuit breaker.

Push the circuit breaker into the chassis, taking care not to push on the control unit.

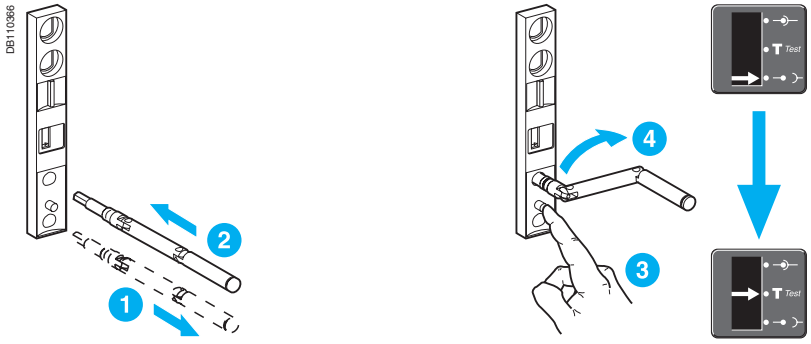






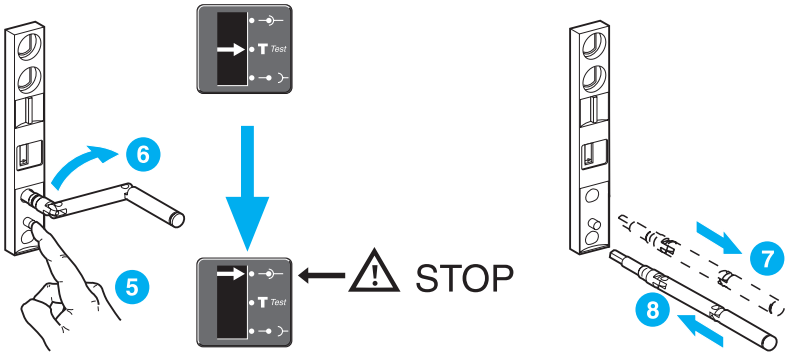
Racking the circuit breaker from the "disconnected" to "test" position, then to "connected" position

The device is in "disconnected" position.



The device is in "test" position. Remove the crank or continue to "connected" position.

The device is in "test" position.



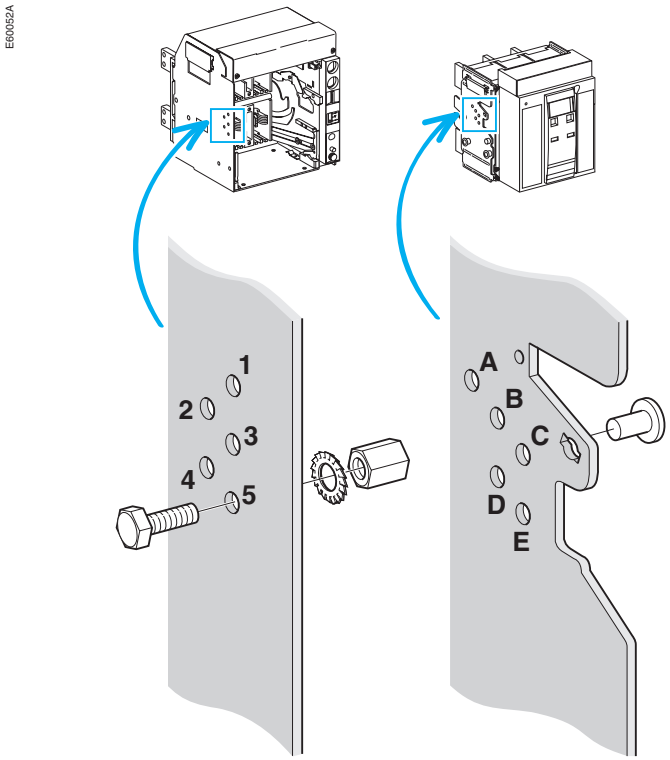
The device is in "connected" position.

Matching a Masterpact circuit breaker with its chassis

To set up a mismatch-prevention combination for the circuit breaker and the chassis, see the mismatch-prevention installation manual.

The mismatch protection ensures that a circuit breaker is installed only in a chassis with compatible characteristics.

The possible combinations are listed below.

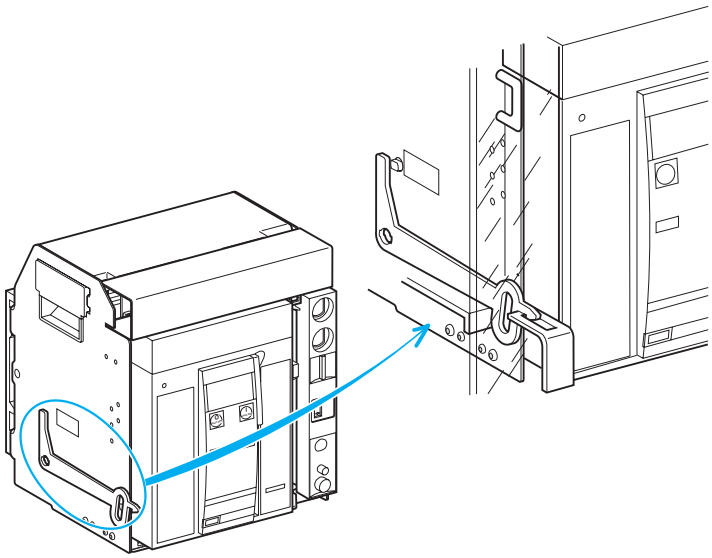


A B C	4 5	B C D	1 5
A B D	3 5	B C E	1 4
A B E	3 4	B C	1 4 5
A B	3 4 5	B D E	1 3
A C D	2 5	B D	1 3 5
A C E	2 4	B E	1 3 4
A C	2 4 5	C D E	1 2
A D E	2 3	C D	1 2 5
A D	2 3 5	C E	1 2 4
A E	2 3 4	D E	1 2 3

Locking the switchboard door

The locking device is installed on the left or right-hand side of the chassis.
■ when the circuit breaker is in "connected" or "test" position, the latch is lowered and the door is locked
■ when the circuit breaker is in "disconnected" position, the latch is raised and the door is unlocked.

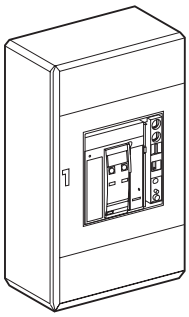
E51464A



Disabling door opening

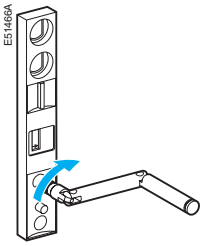
Close the door.

E51465A



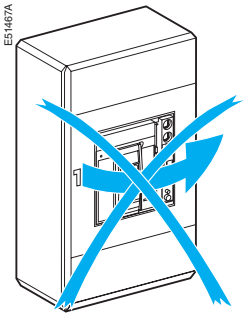
Put the Masterpact in "test" or "connected" position.

E51466A



The door is locked.

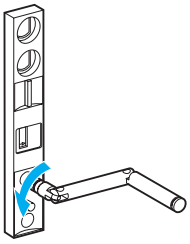
E51467A



Enabling door opening

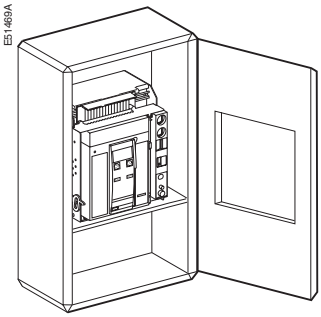
Put the Masterpact in "disconnected" position.

E51468A



The door is unlocked.

E51469A



Locking the circuit breaker in position

Padlocks and keylocks may be used together.

If specified when ordering the chassis, this locking function may be adapted to operate in all positions ("connected", "test" and "disconnected"), instead of in "disconnected" position alone.

Combination of locking systems

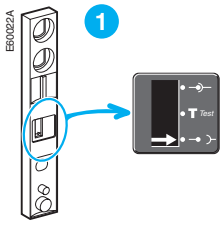
To disable connection of the circuit breaker in "disconnected" position in the chassis, use as needed:

- one to three padlocks
- one or two keylocks
- a combination of the two locking systems.

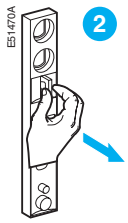
Disabling connection when the circuit breaker is in "disconnected" position, using one to three padlocks (maximum shackle diameter 5 to 8 mm)

Locking

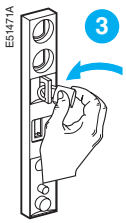
Circuit breaker in "disconnected" position.



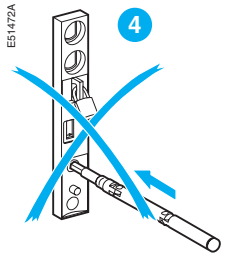
Pull out the tab.



Insert the shackle (max. diameter 5 to 8 mm) of the padlock(s).

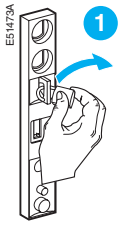


The crank cannot be inserted.

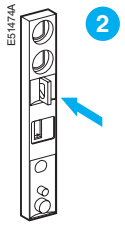


Unlocking

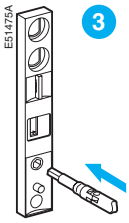
Remove the padlock(s).



Release the tab.



The crank can be inserted.



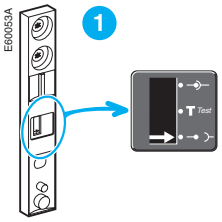
Locking the circuit breaker in position

Padlocks and keylocks may be used together.

Disabling connection when the circuit breaker is in "disconnected" position, using one or two keylocks.

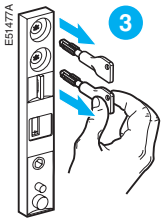
Locking

Circuit breaker in "disconnected" position.

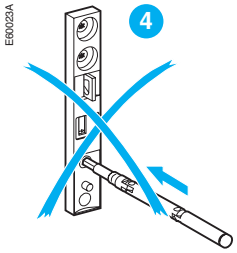


Turn the key(s).

Remove the key(s).

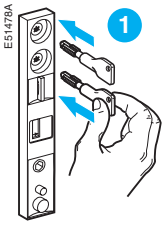


The crank cannot be inserted.



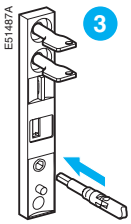
Unlocking

Insert the key(s).



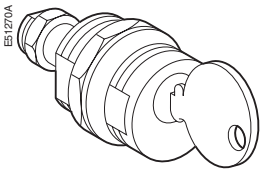
Turn the key(s).

The crank can be inserted.

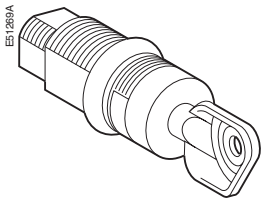


Three types of keylocks are available

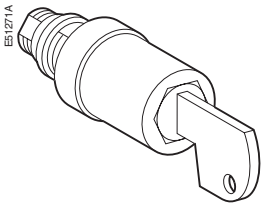
RONIS



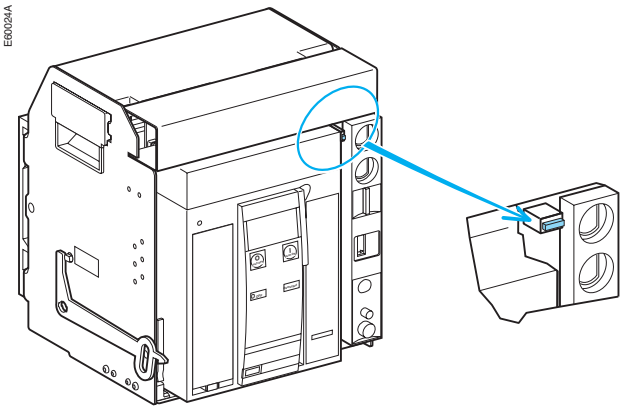
PROFALUX



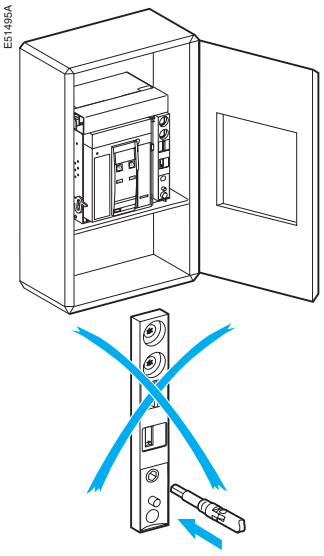
CASTELL



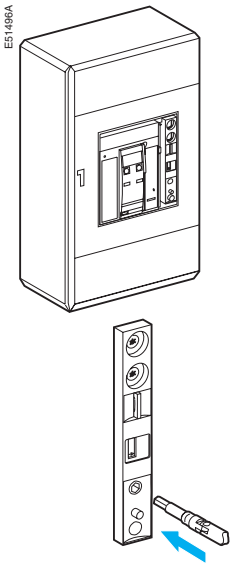
Locking the circuit breaker when the door is open



When the door is open, the crank cannot be inserted.



When the door is closed, the crank can be inserted.

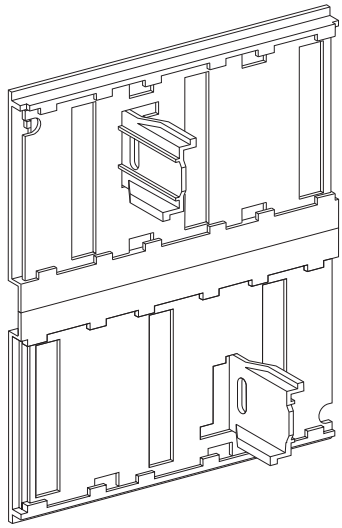


Locking the safety shutters
Padlocking inside the chassis

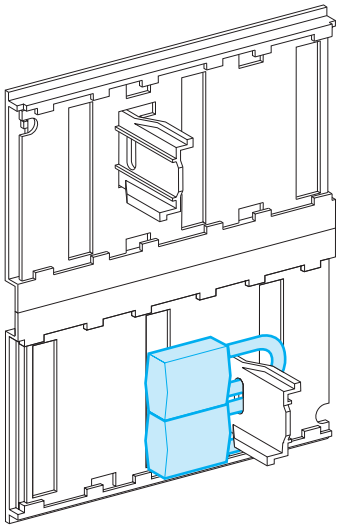
Four locking possibilities: using one or two padlocks (maximum shackle diameter 5 to 8 mm) for each shutter

Top and bottom shutters not locked.

E60025A

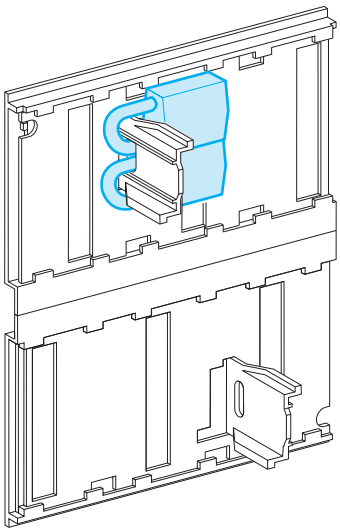


Top shutter not locked.
Bottom shutter locked.

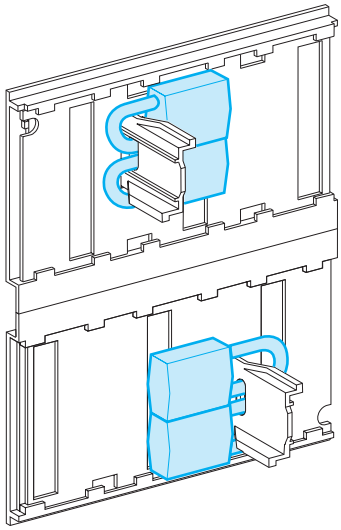


Top shutter locked.
Bottom shutter not locked.

E60026A



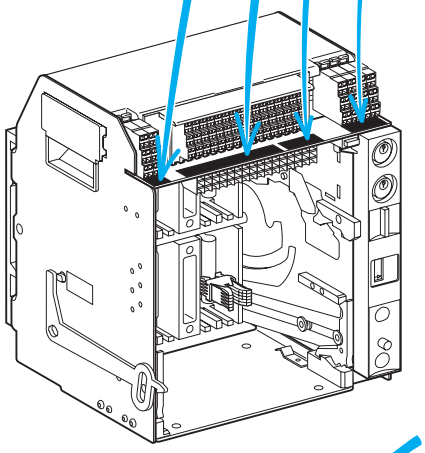
Top and bottom shutters locked.



Identification of the connection terminals

Layout of terminal blocks

E60044A

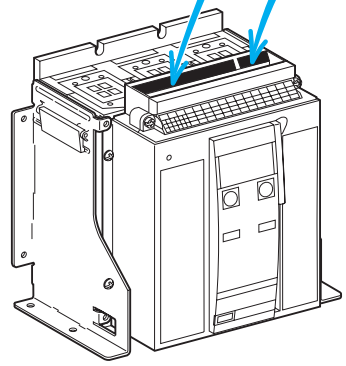


CD2	CD1
824	814
822	812
821	811

Com		UC1		UC2		UC3	M2C/UC4	SDE2/Res	SDE1	MN/MX2	MX1	XF	PF	MCH
E5	E6	Z5	M1	M2	M3	F2	484/V3	184/K2	84	D2/C12	C2	A2	254	B2
E3	E4	Z3	Z4	T3	T4	VN	474/V2	182	82	C13	C3	A3	252	B3
E1	E2	Z1	Z2	T1	T2	F1	471/V1	181/K1	81	D1/C11	C1	A1	251	B1

OF4	OF3	OF2	OF1
44	34	24	14
42	32	22	12
41	31	21	11

CE3	CE2	CE1	CT1
334	324	314	914
332	322	312	912
331	321	311	911



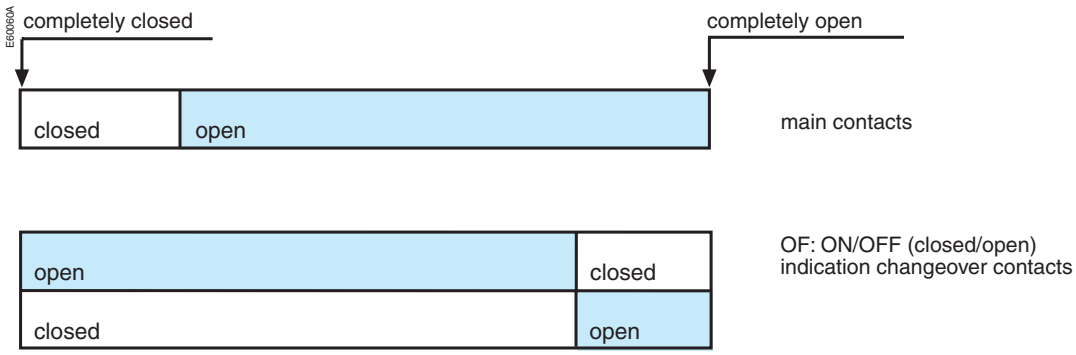
Com		UC1		UC2		UC3	M2C/UC4	SDE2/Res	SDE1	MN/MX2	MX1	XF	PF	MCH
E5	E6	Z5	M1	M2	M3	F2	484/V3	184/K2	84	D2/C12	C2	A2	254	B2
E3	E4	Z3	Z4	T3	T4	VN	474/V2	182	82	C13	C3	A3	252	B3
E1	E2	Z1	Z2	T1	T2	F1	471/V1	181/K1	81	D1/C11	C1	A1	251	B1

OF4	OF3	OF2	OF1
44	34	24	14
42	32	22	12
41	31	21	11

Operation

The ON/OFF indication contacts signal the status of the device main contacts.

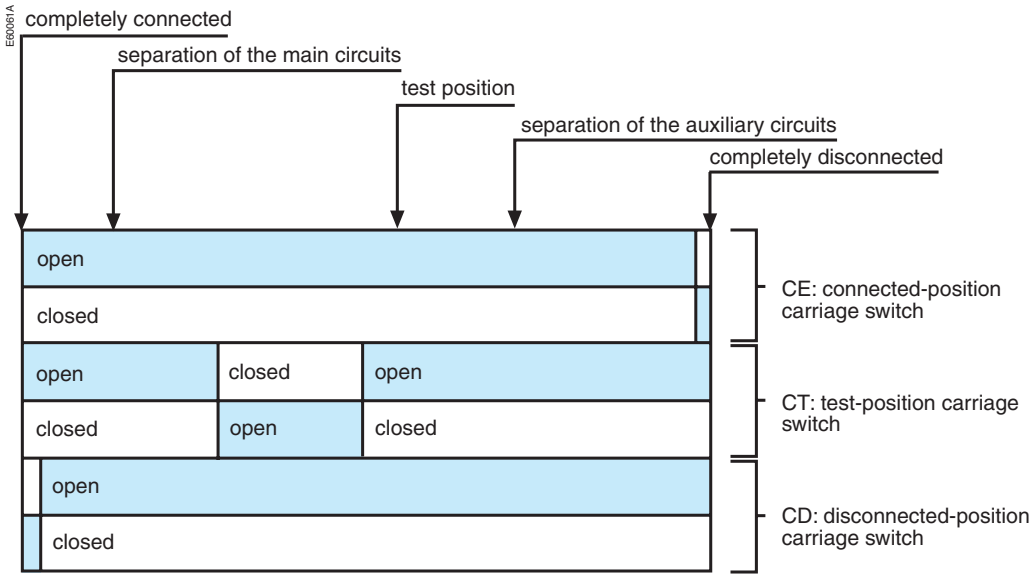
Circuit breaker



The carriage switches indicate the "connected", "test" and "disconnected" positions.

Chassis

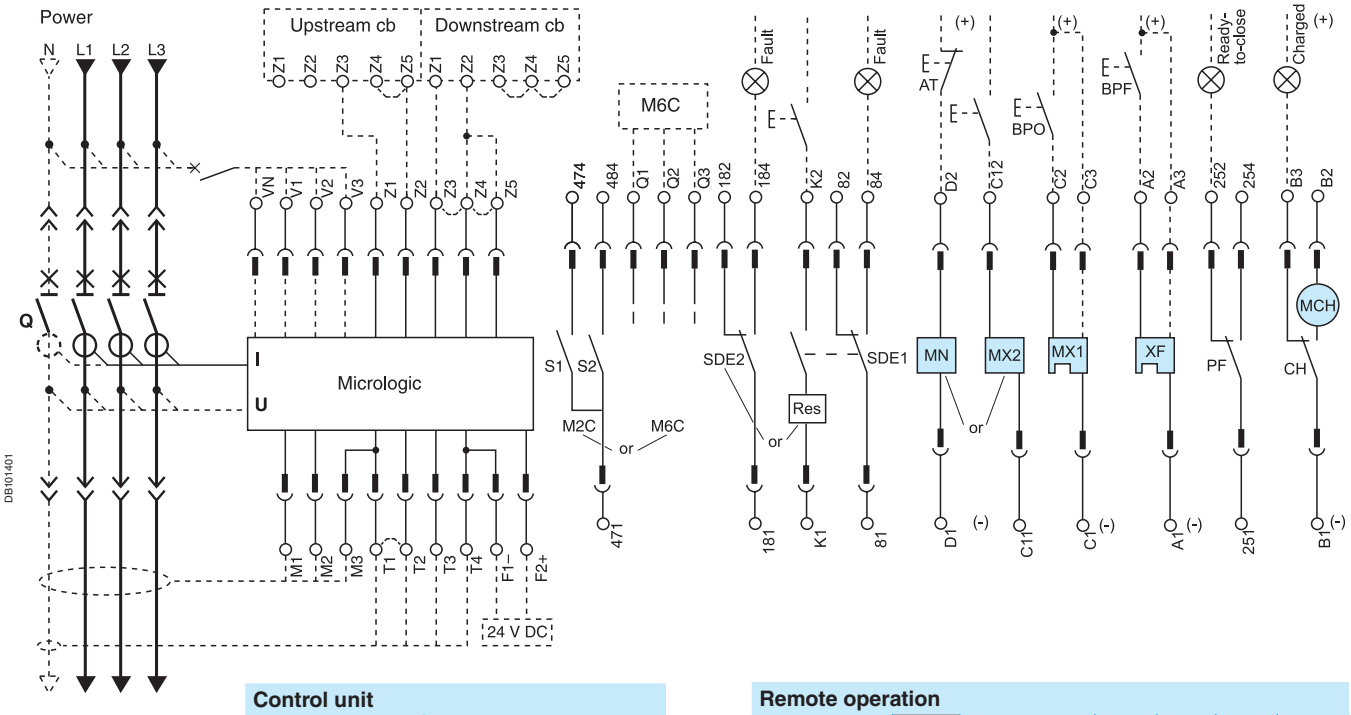
For information on the separation distance of the main circuits in the "test" and "disconnected" positions, see page 16.



Electrical diagrams
Fixed and drawout devices

The diagram is shown with circuits de-energised, all devices open, connected and charged and relays in normal position.

Power | **Control unit** | **Remote operation**



Control unit

Com		UC1		UC2		UC3	UC4 / M2C / M6C		
E5	E6	Z5	M1	M2	M3	F2+	V3	484	Q3
E3	E4	Z3	Z4	T3	T4	VN	V2	474	Q2
E1	E2	Z1	Z2	T1	T2	F1 –	V1	471	Q1

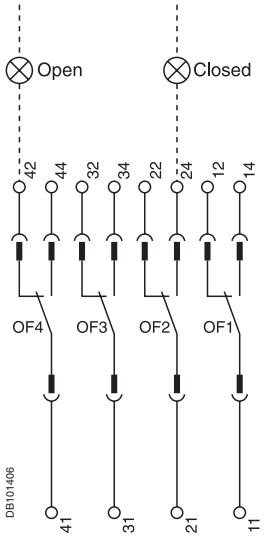
Remote operation

SDE2 / Res		SDE1	MN / MX2		MX1	XF	PF	MCH
184	K2	84	D2	C12	C2	A2	254	B2
182		82			C3	A3	252	B3
181	K1	81	D1	C11	C1	A1	251	B1

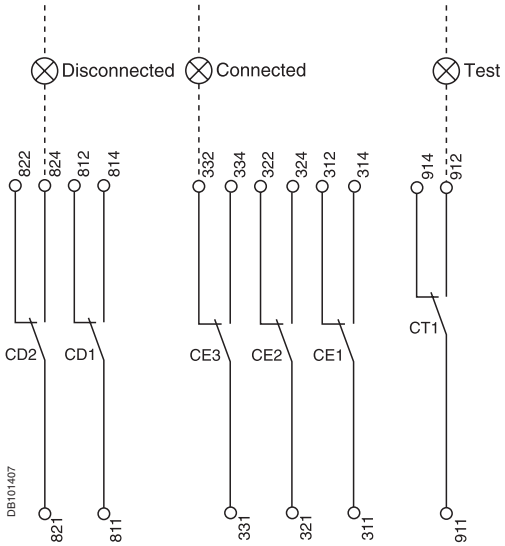
A	P	H	Control unit	Remote operation
—	—	—	**Com**: E1-E6 communication	**SDE2**: Fault-trip indication contact **or** **Res**: Remote reset
—	—	—	**UC1**: Z1-Z5 zone selective interlocking; Z1 = ZSI OUT SOURCE Z2 = ZSI OUT; Z3 = ZSI IN SOURCE Z4 = ZSI IN ST (short time) Z5 = ZSI IN GF (earth fault) M1 = Vigi module input (Micrologic 7)	**SDE1**: Fault-trip indication contact (supplied as standard)
—	—	—		**MN**: Undervoltage release **or** **MX2**: Shunt release
—	—	—	**UC2**: T1, T2, T3, T4 = external neutral; M2, M3 = Vigi module input (Micrologic 7)	**MX1**: Shunt release (standard or communicating)
—	—	—	**UC3**: F2+, F1– external 24 V DC power supply VN external voltage connector	**XF**: Closing release (standard or communicating)
	—	—		**PF**: "Ready to close" contact
	—	—	**UC4**: V1, V2, V3 optional external voltage connector **or**	**MCH**: Gear motor (*)
	—	—	**M2C**: 2 programmable contacts (internal relay); ext. 24 V DC power supply required **or**	***Note:*** *When communicating MX or XF releases are used, the third wire (C3, A3) must be connected even if the communications module is not installed.*
	—	—	**M6C**: 6 programmable contacts (external relay); ext. 24 V DC power supply required.	

***A**: Digital ammeter*
***P**: A + power meter + programmable protection*
***H**: P + harmonics*

Indication contacts



Chassis contacts



Indication contacts

OF4	OF3	OF2	OF1
44	34	24	14
42	32	22	12
41	31	21	11

Chassis contacts

CD2	CD1	CE3	CE2	CE1	CT1
824	814	334	324	314	914
822	812	332	322	312	912
821	811	331	321	311	911

Indication contacts

OF4 / OF3 / OF2 / OF1: ON/OFF indication contacts

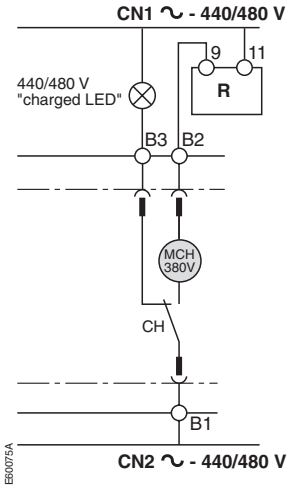
Chassis contacts

CD2-CD1: Disconnected-position

CE3-CE2-CE1: Connected-position

CT1: Test-position contacts

(*) 440/480 V AC gear motor for charging
(380 V motor + additional resistor)



Key:

Drawout device only

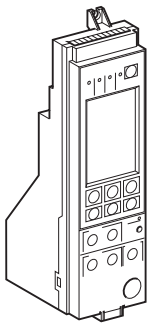
XXX *SDE1, OF1, OF2, OF3, OF4 supplied as standard*

Interconnected connections (only one wire per connection point)

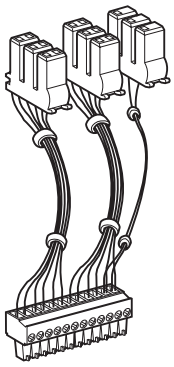
Micrologic control units

For more in-depth information, see the control-unit user manual.

E46108A



E51239A



Micrologic control units

■ standard equipment, one per device
■ long-time rating plug and connectors not included, see below:
Micrologic 2.0
Micrologic 5.0
Micrologic 2.0A
Micrologic 5.0A
Micrologic 6.0A
Micrologic 7.0A
Micrologic 5.0P
Micrologic 6.0P
Micrologic 7.0P
Micrologic 5.0H
Micrologic 6.0H
Micrologic 7.0H
■ connectors for A, P, H:
□ for fixed device
□ for drawout device.

■ depending on the model, control units offer in addition:
□ fault indications
□ measurement of electrical parameters (current, voltage, power, etc.)
□ harmonic analysis
□ communication.

Long-time rating plugs

■ standard equipment, one per control unit
■ setting options:
□ standard 0.4 to 1 x Ir setting
□ low 0.4 to 0.8 x Ir setting
□ high 0.8 to 1 x Ir setting
□ off (no long-time protection).

■ the plugs determine the setting range for the long-time protection.

M2C and M6C programmable contacts

■ optional equipment, used with Micrologic P and H control units
■ connectors not included, see below:
□ 2 M2C contacts
□ 6 M6C contacts
■ connectors:
□ for fixed device
□ for drawout device.

■ contacts can be programmed using the keypad on the control unit or via the COM option
■ they indicate:
□ the type of fault
□ instantaneous or delayed threshold overruns.

■ M2C: 2 contacts (5 A - 240 V)
■ M6C: 6 contacts (5 A - 240 V).
■ permissible load on each of the M6C relay outputs at cos φ = 0.7
□ 240 V AC: 5 A
□ 380 V AC: 3 A
□ 24 V DC: 1.8 A
□ 48 V DC: 1.5 A
□ 125 V DC: 0.4 A
□ 250 V DC: 0.15 A
■ M2C: 24 V DC ± 5 % power from control unit
■ M6C: 24 V DC ±5 % external supply
■ maximum consumption: 100 mA.

Indication contacts

ON/OFF indication contacts (OF)

■ standard equipment, 4 OF per device
□ standard
□ low level
■ connectors:
□ for fixed device
□ for drawout device.

■ OF contacts indicate the position of the main contacts
■ they trip when the minimum isolation distance between the main contacts is reached.

■ 4 changeover contacts
■ breaking capacity at cos φ = 0.3 (AC12 / DC12 as per 947-5-1)
□ standard, minimum current 10 mA / 24 V

V AC	240/380	6 A (rms)
	480	6 A (rms)
	690	6 A (rms)
V DC	24/48	2.5
	125	0.5
	250	0.3

□ low level, minimum current 1 mA / 4 V

V AC	24/48	5 A (rms)
	240	5 A (rms)
	380	5 A (rms)
V DC	24/48	5 / 2.5 A
	125	0.5 A
	250	0.3 A

"Fault-trip" indication contact (SDE/1)

■ standard equipment on circuit breakers, one SDE/1 contact per device
■ not available for switch-disconnector versions.

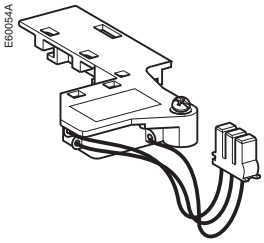
■ the contact provides a remote indication of device opening due to an electrical fault.

■ changeover contact
■ breaking capacity at cos φ = 0.3 (AC12 / DC12 as per 947-5-1)
□ standard, minimum current 10 mA / 24 V

V AC	240/380	5 A (rms)
	480	5 A (rms)
	690	3 A (rms)
V DC	24/48	3 A
	125	0.3 A
	250	0.15 A

□ low level, minimum current 1 mA / 4 V

V AC	24/48	3 A (rms)
	240	3 A (rms)
	380	3 A (rms)
V DC	24/48	3 A
	125	0.3 A
	250	0.15 A



Additional "fault-trip" indication contact (SDE/2)

■ optional equipment for circuit breakers, one additional SDE/2 contact per device
■ not available for switch-disconnector versions
■ not compatible with the Res option
■ connectors not included, see below:
□ standard
□ low level
■ connectors:
□ for fixed device
□ for drawout device.

■ the contact remotely indicates device opening due to an electrical fault.

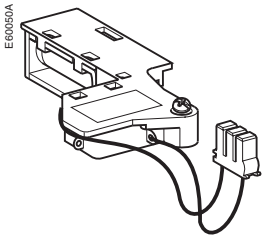
■ changeover contact
■ breaking capacity at cos φ = 0.3 (AC12 / DC12 as per 947-5-1)
□ standard, minimum current 10 mA / 24 V

V AC	240/380	5 A (rms)
	480	5 A (rms)
	690	3 A (rms)
V DC	24/48	3 A
	125	0.3 A
	250	0.15 A

□ low level, minimum current 1 mA / 4 V

V AC	24/48	3 A (rms)
	240	3 A (rms)
	380	3 A (rms)
V DC	24/48	3 A
	125	0.3 A
	250	0.15 A

Indication contacts


E60050A

Electrical reset after fault trip (Res)

■ optional equipment, one Res per device
■ not compatible with the SDE/2 option
■ connectors not included, see below:
□ 110/130 V AC
□ 220/240 V AC
■ connectors:
□ for fixed device
□ for drawout device.

■ the contact remotely resets the device following tripping due to an electrical fault.

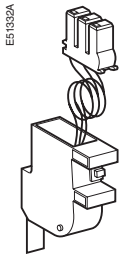
"Springs charged" limit switch contact (CH)

■ equipment included with MCH gear motor, one CH contact per device.

■ the contact indicates the "charged" status of the operating mechanism (springs charged).

■ changeover contact
■ breaking capacity 50/60 Hz for AC power (AC12 / DC12 as per 947-5-1):

V AC	240	10A(rms)
	380	6 A (rms)
	480	6 A (rms)
	690	3 A (rms)
V DC	24/48	3 A
	125	0.5 A
	250	0.25 A


E51339A

"Ready to close" contact (PF)

■ optional equipment, one PF contact per device
■ connectors not included, see below:
□ standard
□ low level
■ connectors:
□ for fixed device
□ for drawout device.

■ the contact indicates that the device may be closed because all the following are valid:
□ circuit breaker is open
□ spring mechanism is charged
□ a maintained closing order is not present
□ a maintained opening order is not present.

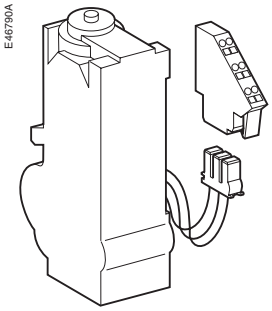
■ changeover contact
■ breaking capacity at cos φ = 0.3 (AC12 / DC12 as per 947-5-1)
□ standard, minimum current 10 mA / 24 V

V AC	240/380	5 A (rms)
	480	5 A (rms)
	690	3 A (rms)
V DC	24/48	3 A
	125	0.3 A
	250	0.15 A

□ low level, minimum current 1 mA / 4 V

V AC	24/48	3 A (rms)
	240	3 A (rms)
	380	3 A (rms)
V DC	24/48	3 A
	125	0.3 A
	250	0.15 A

Auxiliaries for remote operation

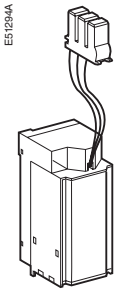

E46790A

Gear motor (MCH)

■ optional equipment, one MCH gear motor per device
■ connectors not included, see below:
□ AC 50 / 60 Hz:
48/60
100/130
200/240
277/415
440/480
□ DC
24/30
48/60
100/125
200/250
■ connectors:
□ for fixed device
□ for drawout device.

■ the gear motor automatically charges the spring mechanism.

■ power supply:
□ V AC 50/60 Hz: 48/60 100/130 - 200/240 - 277 400/440 - 480
□ V DC: 24/30 - 48/60 100/125 - 200/250
■ operating threshold:
0.85 to 1.1 Un
■ consumption:
180 VA or W
■ inrush current:
2 to 3 In for 0.1 second
■ charging time:
3 seconds max.
■ operating rate:
maximum 3 cycles per minute
■ CH contact: see page 32.


E51294A

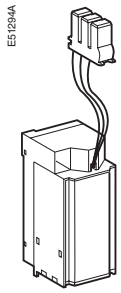
Opening releases MX/1 and MX/2, closing release XF

■ optional equipment, 1 or 2 MX releases per device, 1 XF per device
■ the function (MX or XF) is determined by where the coil is installed
■ connectors not included, see below
V AC 50/60 Hz, V DC:
□ standard version:
12 DC
24/30 AC/DC
48/60 AC/DC
100/130 AC/DC
200/250 AC/DC
240/277 AC
380/480 AC
□ communicating version (with COM option):
12 DC
24/30 AC/DC
48/60 AC/DC
100/130 AC/DC
200/250 AC/DC
240/277 AC
380/480 AC
■ connectors:
□ for fixed device
□ for drawout device.

■ the MX release instantaneously opens the circuit breaker when energised
■ the XF release instantaneously closes the circuit breaker when energised, if the device is "ready to close".

■ power supply:
□ V AC 50 / 60 Hz:
24 48 - 100/130 - 200/250 240/277 - 380/480
□ V DC: 12 - 24/30 48/60 - 100/130 200/250
■ operating threshold:
□ XF: 0.85 to 1.1 Un
□ MX: 0.7 to 1.1 Un
■ consumption:
□ pick-up: 200 VA or W (80 ms)
□ hold: 4.5 VA or W
■ circuit-breaker response time at Un:
□ XF: 55 ms ± 10
□ MX: 50 ms ± 10.

Auxiliaries for remote operation

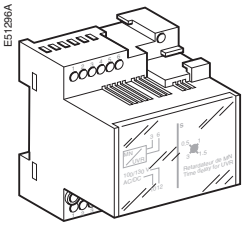


Instantaneous undervoltage releases (MN)

■ optional equipment, 1 MN per device
■ not compatible with the MX/2 opening release
■ connectors not included, see below
V AC 50/60 Hz, V DC:
24/30 AC/DC
48/60 AC/DC
100/130 AC/D
200/250 AC/DC
380/480 AC
■ connectors:
□ for fixed device
□ for drawout device.

■ the MN release instantaneously opens the circuit breaker when its supply voltage drops.

■ power supply:
□ V AC 50/60 Hz: 24/48 100/130 - 200/250 240/277 - 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:
□ pick-up: 200 VA or W (80 ms)
□ hold: 4.5 VA or W
■ circuit-breaker response time at Un:
40 ms ± 10.

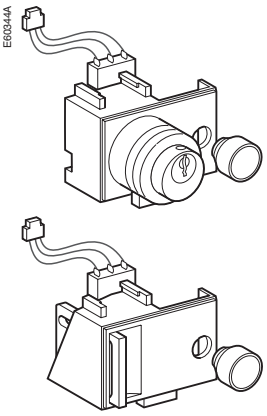


Delay unit for MN releases

■ optional equipment, 1 MN with delay unit per device
■ delay-unit
V AC 50/60 Hz, V DC:
□ non adjustable:
100/130 AC/DC
200/250 AC/DC
□ adjustable:
48/60 AC/DC
100/130 AC/DC
200/250 AC/DC
380/480 AC/DC.

■ the unit delays operation of the MN release to eliminate circuit-breaker nuisance tripping during short voltage dips
■ the unit is wired in series with the MN and must be installed outside the circuit breaker.

■ power supply V AC 50/60 Hz, V DC:
□ 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
■ consumption:
□ pick-up: 200 VA or W (80 ms)
□ hold: 4.5 VA or W
■ circuit-breaker response time at Un:
□ non adjustable:
0.25 second
□ adjustable: 0.5 - 0.9 - 1.5 - 3 seconds.



Electrical closing pushbutton (BPFE)

■ optional equipment, 1 BPFE per device.

■ located on the padlock or keylock locking system, this pushbutton carries out electrical closing of the circuit breaker via the XF release, taking into account all the safety functions that are part of the control/monitoring system of the installation
■ it connects to the input of the COM option.

Wiring of control auxiliaries

Under pick-up conditions, the level of consumption is approximately 150 to 200 VA. Consequently, for low supply voltages (12, 24, 48 V), cables must not exceed a maximum length determined by the supply voltage and the cross-section of the cables.

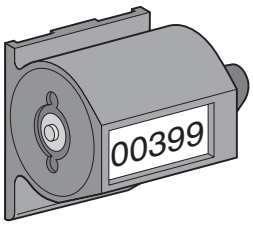
Indicative values for maximum cable lengths (in meters)

		12 V		24 V		48 V	
		2.5 mm²	1.5 mm²	2.5 mm²	1.5 mm²	2.5 mm²	1.5 mm²
MN	100% source voltage	—	—	58	36	280	165
	85% source voltage	—	—	16	10	75	45
MX / XF	100% source voltage	21	12	115	70	550	330
	85% source voltage	10	6	75	44	350	210

***Note**. The indicated length is that for each of the two supply wires.*

Device mechanical accessories

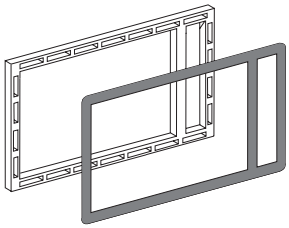
E47341A



Operation counter (CDM)

- optional equipment, one CDM per device.
- the operation counter sums the number of operating cycles.

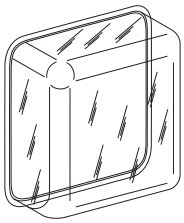
E60499A



Escutcheon (CDP)

- optional equipment, one CDP per device
  - for fixed device
  - for drawout device.
- the CDP increases the degree of protection to IP 40 and IK 07 (fixed and drawout devices).

E60497A



Transparent cover (CCP)

- optional equipment, one CCP per device equipped with a CDP
- for drawout devices.
- mounted with a CDP, the CCP increases the degree of protection to IP 54 and IK 10 (fixed and drawout devices).

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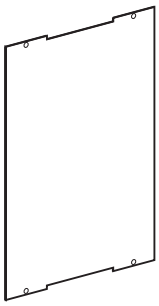
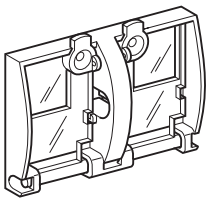


Blanking plate (OP)

- optional equipment, one OP per device.
- 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.

E60347A

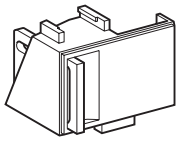


Transparent cover for pushbutton locking using a padlock, lead seal or screws

■ optional equipment, one locking cover per device.

■ the transparent cover blocks access (together or separately) to the pushbuttons used to open and close the device
■ locking requires a padlock, a lead seal or two screws.

E60346A

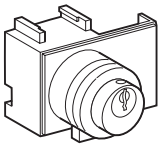


Device locking in the OFF position using a padlock

■ optional equipment, one locking system per device.

■ the unit inhibits local or remote closing of the device
■ up to three padlocks may be used for locking.

E60348A



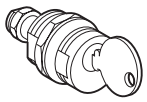
Device OFF position locking kit for keylocks

■ optional equipment: one locking kit (without keylock) per device
□ for Profalux keylo
□ for Ronis keylock
□ for Kirk keylocks
□ for Castell keyloc.
■ optional equipment, one locking system per device.

■ the kit inhibits local or remote closing of the device.

Ronis

E51286A

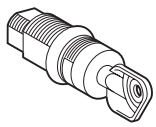


Keylocks required for the device OFF position locking kit

■ one or two keylocks per locking kit
□ Ronis:
1 keylock
□ Profalux:
1 keylock.

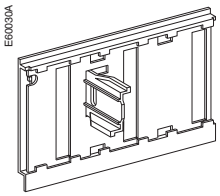
Profalux

E51287A

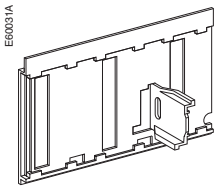


Chassis accessories

Top shutter closed



Bottom shutter closed



Safety shutters

■ optional equipment
■ (set of shutters for top and bottom) drawout, front/rear connection:
□ 3 poles
□ 4 poles.

■ 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.

■ IP 20 for chassis connections
■ IP 40 for the disconnecting contact cluster.

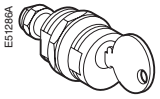
If specified when ordering the chassis, this locking function may be adapted to operate in all positions ("connected", "test" and "disconnected"), instead of in "disconnected" position alone.

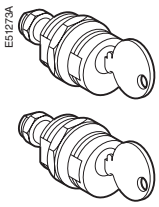
Circuit breaker locking in "disconnected" position

■ optional equipment, one locking system per device
■ keylocks not included:
□ for Profalux keylocks
□ for Ronis keylocks
□ for Castell keylocks
□ for Kirk keylocks.

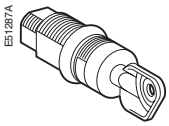
■ mounted on the chassis and accessible with the door closed, this system locks the circuit breaker in "disconnected" position using one or two keylocks.

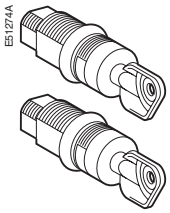
Ronis





Profalux



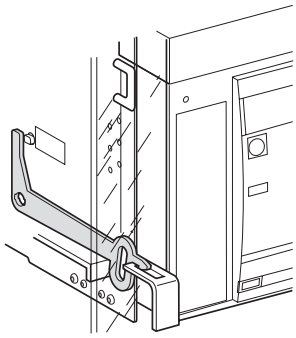


Keylocks required with the "disconnected" position locking system

■ one or two keylocks per locking system
□ Ronis:
1 keylock
1 keylock + one identical keyloc
2 different key locks
□ Profalux:
1 keyl
1 keylock + one identical keylock
2 different key locks.

Chassis accessories

E60011A



Door interlock

■ optional equipment, one door interlock per chassis.

■ this device inhibits opening of the cubicle door when the circuit breaker is in "connected" or "test" position.

■ it may be mounted on the left or right-hand side of the chassis.

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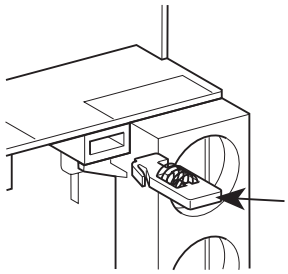

Racking interlock

■ optional equipment, one racking interlock per chassis.

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

■ it is mounted on the right-hand side of the chassis.

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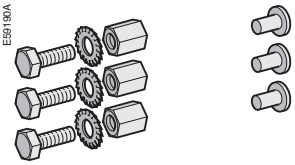

Mismatch protection

■ optional equipment, one mismatch protection device per chassis.

■ mismatch protection offers twenty different combinations that the user may select to ensure that only a compatible circuit breaker is mounted on a given chassis.

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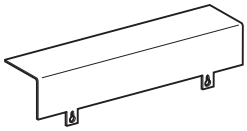
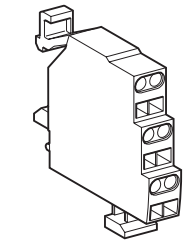


Auxiliary terminal shield (CB)

■ optional equipment, one CB shield per chassis:
3 poles
4 poles.

■ the shield prevents access to the terminal block of the electrical auxiliaries.

E48095A



"Connected", "disconnected" and "test" position carriage switches (CE, CD, CT)

■ optional equipment, one to six carriage switches
■ standard configuration, 0 to 3 CE, 0 to 2 CD, 0 to 1 CT.
□ standard
□ low level.

■ the carriage switches indicate the three positions:
CE: connected position
CD: disconnected position (when the minimum isolation distance between the main contacts and the auxiliary contacts is reached)
CT: test position.

■ changeover contact
■ breaking capacity at cos φ = 0.3 (AC12 / DC12 as per 947-5-1)
□ standard, minimum current 10 mA / 24 V

V AC	240	8 A (rms)
	380	8 A (rms)
	480	8 A (rms)
	690	6 A (rms)
V DC	24/48	2.5 A
	125	0.8 A
	250	0.3 A

□ low level, minimum current 1 mA / 4 V

V AC	24/48	5 A (rms)
	240	5 A (rms)
	380	5 A (rms)
V DC	24/48	2.5 A
	125	0.8 A
	250	0.3 A

Initial tests
Procedure

These operations must be carried out in particular before using a Masterpact device for the first time.

A general check of the circuit breaker takes only a few minutes and avoids any risk of mistakes due to errors or negligence.
A general check must be carried out:
- prior to initial use
- following an extended period during which the circuit breaker is not used.

A check must be carried out with the entire switchboard de-energised.
In switchboards with compartments, only those compartments that may be accessed by the operators must be de-energised.

Electrical tests

Insulation and dielectric-withstand tests must be carried out immediately after delivery of the switchboard. These tests are precisely defined by international standards and must be directed and carried out by a qualified expert.

Prior to running the tests, it is absolutely necessary to:
- disconnect all the electrical auxiliaries of the circuit breaker (MCH, MX, XF, MN, Res electrical remote reset)
- remove the long-time rating plug on the 7.0 A, 5.0 P, 6.0 P, 7.0 P, 5.0 H, 6.0 H, 7.0 H control units. Removal of the rating plug disconnects the voltage measurement input.

Switchboard inspection

Check that the circuit breakers are installed in a clean environment, free of any installation scrap or items (tools, electrical wires, broken parts or shreds, metal objects, etc.).

Conformity with the installation diagram

Check that the devices conform with the installation diagram:
- breaking capacities indicated on the rating plates
- identification of the control unit (type, rating)
- presence of any optional functions (remote ON/OFF with motor mechanism, auxiliaries, measurement and indication modules, etc.)
- protection settings (long time, short time, instantaneous, earth fault)
- identification of the protected circuit marked on the front of each circuit breaker.

Condition of connections and auxiliaries

Check device mounting in the switchboard and the tightness of power connections.
Check that all auxiliaries and accessories are correctly installed:
- electrical auxiliaries
- terminal blocks
- connections of auxiliary circuits.

Operation

Check the mechanical operation of the circuit breakers:
- opening of contacts
- closing of contacts.

Check on the control unit

Check the control unit of each circuit breaker using the respective user manuals.

What to do when the circuit breaker trips

Note the fault

Faults are signalled locally and remotely by the indicators and auxiliary contacts installed on circuit breakers (depending on each configuration). See page 12 in this manual and the user manual of the control unit for information on the fault indications available with your circuit breaker.

Identify the cause of tripping

A circuit must never be reclosed (locally or remotely) before the cause of the fault has been identified and cleared.

A fault may have a number of causes:

- depending on the type of control unit, fault diagnostics are available. See the user manual for the control unit.
- depending on the type of fault and the criticality of the loads, a number of precautionary measures must be taken, in particular the insulation and dielectric tests on a part of or the entire installation. These checks and test must be directed and carried out by qualified personnel.

Inspect the circuit breaker following a short-circuit

- check the arc chutes (see page 43)
- check the contacts (see page 43)
- check the tightness of connections (see the device installation manual)
- check the disconnecting-contact clusters (see page 43).

Reset the circuit breaker

The circuit breaker can be reset locally or remotely. See page 12 in this manual for information on how the circuit breaker can be reset.

Recommended maintenance program

Recommended program for devices used under normal operating conditions:
Ambient temperature: -5 °C / +70 °C
Normal atmosphere

Periodic inspections required

Interval	Operation	Procedure
each year	■ open and close the device locally and remotely, successively using the various auxiliaries	□ see pages 10 and 11
	■ test the operating sequences	□ see pages 10 and 11
	■ test the control unit using the mini test kit	□ see the user manual of the control unit
every two years or when the control-unit maintenance indicator reaches 100	■ check the arc chutes	□ see page 43
	■ check the main contacts	□ see page 43
	■ check the tightness of connections	□ see the device installation manual

Parts requiring replacement, depending on the number of operating cycles

The following parts must be replaced periodically to lengthen the service life of the device (maximum number of operating cycles).

Part	Intervening entity	Description or procedure
arc chutes	■ user	□ see page 43
main contacts	■ inspection: user ■ replacement: Schneider After Sales Support	□ see page 43
MCH gear motor	■ user	□ see page 9
mechanical interlocks	■ user	
connecting-rod springs	■ Schneider After Sales Support	
MX/MN/XF	■ user	□ see pages 10 and 11

Part replacement must be programmed on the basis of the data below, listing the service life of the various parts in numbers of O/C cycles at the rated current.

Number of O/C cycles at the rated current

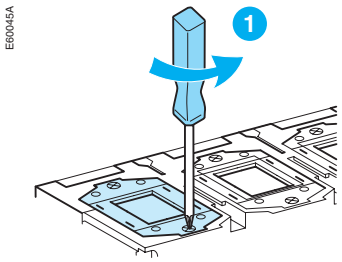
Type of circuit breaker	Maximum service life in mechanical durability	Maximum service life in electrical durability	
			MX / XF / MN releases
NT08 to 16 type H1/H2	12500	440 V: 6000 690 V: 3000	12500
NT08 to 10 type L1	12500	440 V: 3000 690 V: 2000	12500

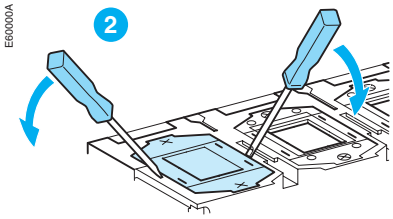
Maintenance operations

Before undertaking any maintenance work, de-energise the installation and fit locks or warnings in compliance with all applicable safety standards.

Arc chutes

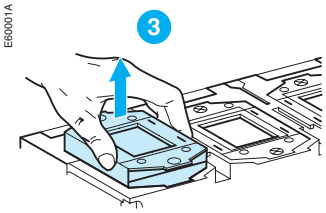
■ remove the fixing screws

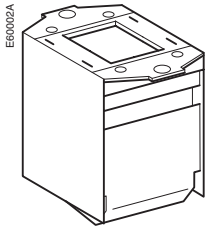




■ check the arc chutes:
□ chamber intact
□ separators not corroded.

If necessary, replace the arc chutes.





■ refit the arc chutes and secure with a tightening torque of 1.5 Nm.

If the control unit has a maintenance indicator, there is no need to systematically check the contacts.

If the contacts are worn, have the concerned poles replaced by the Schneider service centre.

Wear of main contacts

■ remove the arc chutes
■ visually check the contacts.
If necessary, contact Schneider After-sales support.

Disconnecting-contact clusters

■ grease the contacts using the grease recommended on page 44, supplied by Schneider Electric
■ check the contacts as follows:
□ open the circuit breaker
□ de-energise the busbars
□ disconnect the circuit breaker
□ remove the circuit breaker
□ check the contact fingers (no sign of copper should be visible).
Replace any worn clusters.

Ordering replacement parts

Electrical accessories

The electrical accessories that may require replacement are the following:
- ■ MCH gear motor
- ■ MX opening release(s)
- ■ XF closing release
- ■ MN undervoltage release.

See pages 33 and 34 in the "Auxiliaries for remote operation" section for their characteristics.

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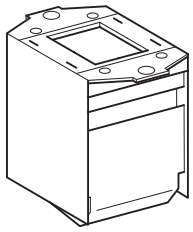

Arc chutes

- ■ 1 arc chute:
  - □ type H1
  - □ type L1.
- ■ one chute per pole.

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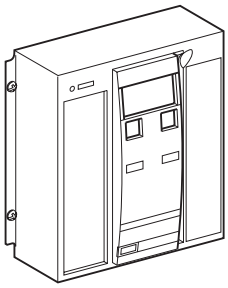

Front

■ 1 per 3- or 4-pole device.

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Charging handle

■ 1 per device.

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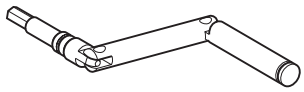

Crank

■ 1 per device.

Support for MX / XF / MN releases

■ 1 per device.

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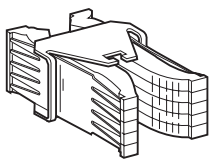


Disconnecting-contact clusters

■ 1 cluster.

Grease for disconnecting-contact clusters

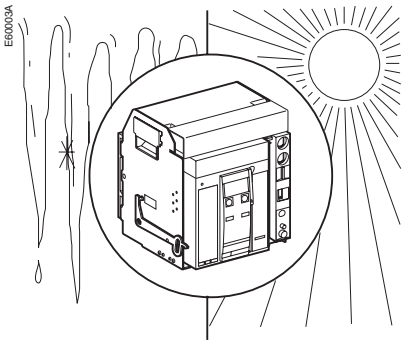
■ 1 can.

Troubleshooting and solutions

Problem	Probable causes	Solutions
circuit breaker cannot be closed locally or remotely	■ circuit breaker padlocked or keylocked in the "open" position	□ disable the locking fonction
	■ circuit breaker interlocked mechanically in a source changeover system	□ check the position of the other circuit breaker in the changeover system □ modify the situation to release the interlock
	■ circuit breaker not completely connected	□ terminate racking in (connection) of the circuit breaker
	■ the reset button signalling a fault trip has not been reset	□ clear the fault □ push the reset button on the front of the circuit breaker
	■ stored energy mechanism not charged	□ charge the mechanism manually □ if it is equipped with a an MCH gear motor, check the supply of power to the motor. If the problem persists, replace the gear motor (MCH)
	■ MX opening shunt release permanently supplied with power	□ there is an opening order. Determine the origin of the order. The order must be cancelled before the circuit breaker can be closed
	■ MN undervoltage release not supplied with power	□ there is an opening order. Determine the origin of the order. □ check the voltage and the supply circuit (U > 0.85 Un). If the problem persists, replace the release
	■ XF closing release continuously supplied with power, but circuit breaker not "ready to close" (XF not wired in series with PF contact)	□ cut the supply of power to the XF closing release, then send the closing order again via the XF, but only if the circuit breaker is "ready to close"
	■ permanent trip order in the presence of a Micrologic P or H control unit with minimum voltage and minimum frequency protection in Trip mode and the control unit powered	□ Disable these protection functions on the Micrologic P or H control unit
circuit breaker cannot be closed remotely but can be opened locally using the closing pushbutton	■ closing order not executed by the XF closing release	□ check the voltage and the supply circuit (0.85 - 1.1 Un). If the problem persists, replace the XF release
unexpected tripping without activation of the reset button signalling a fault trip	■ MN undervoltage release supply voltage too low	□ check the voltage and the supply circuit (U > 0.85 Un)
	■ load-shedding order sent to the MX opening release by another device	□ check the overall load on the distribution system □ if necessary, modify the settings of devices in the installation
	■ unnecessary opening order from the MX opening release	□ determine the origin of the order
unexpected tripping with activation of the reset button signalling a fault trip	a fault is present : ■ overload ■ earth fault ■ short-circuit detected by the control unit	□ determine and clear the causes of the fault □ check the condition of the circuit breaker before putting it back into service
instantaneous opening after each attempt to close the circuit breaker with activation of the reset button signalling a fault trip	■ thermal memory	□ see the user manual of the control unit □ press the reset button
	■ transient overcurrent when closing	□ modify the distribution system or the control-unit settings □ check the condition of the circuit breaker before putting it back into service □ press the reset button
	■ closing on a short-circuit	□ clear the fault □ check the condition of the circuit breaker before putting it back into service □ press the reset button

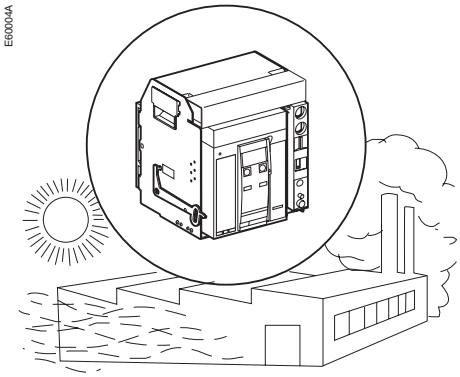
Problem	Probable causes	Solutions
circuit breaker cannot be opened remotely, but can be opened locally	■ opening order not executed by the MX opening release	□ check the voltage and the supply circuit (0.7 - 1.1 Un). If the problem persists, replace the MX release
	■ opening order not executed by the MN undervoltage release	□ drop in voltage insufficient or residual voltage (> 0.35 Un) across the terminals of the undervoltage release. If the problem persists, replace the MN release
circuit breaker cannot be opened locally	■ operating mechanism malfunction or welded contacts	□ contact a Schneider service centre
circuit breaker cannot be reset locally but not remotely	■ insufficient supply voltage for the MCH gear motor	□ check the voltage and the supply circuit (0.7 - 1.1 Un). If the problem persists, replace the MCH release
nuisance tripping of the circuit breaker with activation of the reset button signalling a fault trip	■ reset button not pushed-in completely	□ push the reset button in completely
impossible to insert the crank in connected, test or disconnected position	■ a padlock or keylock is present on the chassis or a door interlock is present	□ disable the locking function
impossible to turn the crank	■ the reset button has not been pressed	□ press the reset button
circuit breaker cannot be removed from chassis	■ circuit breaker not in disconnected position	□ turn the crank until the circuit breaker is in disconnected position and the reset button out
	■ the rails are not completely out	□ pull the rails all the way out
circuit breaker cannot be connected (racked in)	■ chassis/circuit breaker mismatch protection	□ check that the chassis corresponds with the circuit breaker
	■ the safety shutters are locked	□ remove the lock(s)
	■ the disconnecting-contact clusters are incorrectly positioned	□ reposition the clusters
	■ chassis locked in disconnected position	□ disable the chassis locking function
	■ the reset button has not been pressed, preventing rotation of the crank	□ press the reset button
	■ the circuit breaker has not been sufficiently inserted in the chassis	□ insert the circuit breaker completely so that it is engaged in the racking mechanism
circuit breaker cannot be locked in disconnected position	■ the circuit breaker is not in the right position	□ check the circuit breaker position by making sure the resett button is out
	■ the cranck is still in the chassis	□ remove the crank and store it
circuit breaker cannot be locked in connected, test or disconnected position	■ check that locking in any position is enabled	□ contact a Schneider service centre
	■ the circuit breaker is not in the right position	□ check the circuit breaker position by making sure the rese button is out
	■ the cranck is still in the chassis	□ remove the crank and store it

Checking Masterpact operating conditions


E60003A

Ambient temperature

Masterpact NT devices can operate under the following temperature conditions:
- the electrical and mechanical characteristics are stipulated for an ambient temperature of -5 °C to +70 °C
- circuit-breaker closing is guaranteed down to -35 °C
- Masterpact NW (without the control unit) can be stored in an ambient temperature of -40 °C to +85 °C
- the control unit can be stored in an ambient temperature of -25 °C to +85 °C.

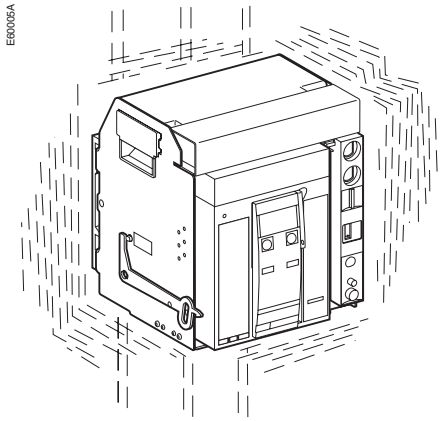

E60004A

Extreme atmospheric conditions

Masterpact NT devices have successfully passed the tests defined by the following standards for extreme atmospheric conditions:
- IEC 68-2-1: dry cold at -55 °C
- IEC 68-2-2: dry heat at +85 °C
- IEC 68-2-30: damp heat (temperature +55 °C, relative humidity 95%)
- IEC 68-2-52 level 2: salt mist.

Masterpact NT devices can operate in the industrial environments defined by standard IEC 947 (pollution degree up to 4).

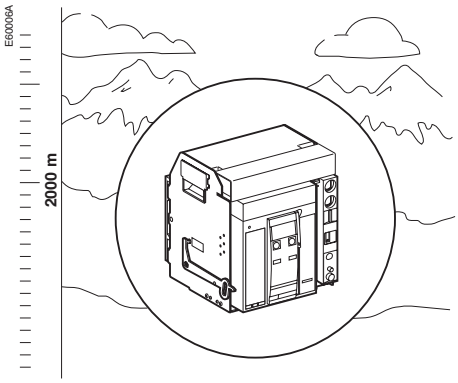
It is nonetheless advised to check that the devices are installed in suitably cooled switchboards without excessive dust.


E60005A

Vibrations

Masterpact NT devices resist electromagnetic or mechanical vibrations.
Tests are carried out in compliance with standard IEC 68-2-6 for the levels required by merchant-marine inspection organisations (Veritas, Lloyd's, etc.):
- 2 to 13.2 Hz: amplitude ±1 mm
- 13.2 to 100 Hz: constant acceleration 0.7 g.

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

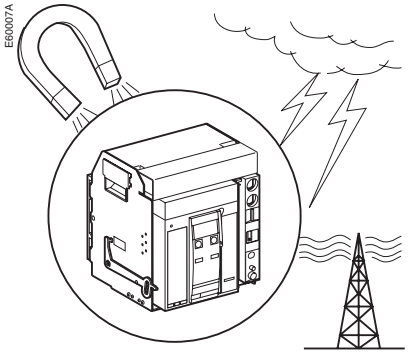


Altitude

Masterpact NT devices are designed for operation at altitudes under 2000 metres.

At altitudes higher than 2000 metres, the modifications in the ambient air (electrical resistance, cooling capacity) lower the following characteristics.

altitude (m)	2000	3000	4000	5000
dielectric withstand voltage (V)	3500	3150	2500	2100
rated insulation level (V)	1000	900	700	600
rated operational voltage (V)	690	590	520	460
rated current (A) at 40 °C	1 x In	0.99 x In	0.96 x In	0.94 x In



Electromagnetic disturbances

Masterpact NT devices are protected against:
- overvoltages caused by devices that generate electromagnetic disturbances
- overvoltages caused by an atmospheric disturbance 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 by users.

Masterpact NT devices have successfully passed the electromagnetic-compatibility tests (EMC) defined by the following international standards:
- IEC 947-2, appendix F
- IEC 947-2, appendix B (trip units with earth-leakage function).

The above tests guarantee that:
- no nuisance tripping occurs
- tripping times are respected.

Cleaning

□ non-metallic parts:
never use solvent, soap or any other cleaning product. Clean with a dry cloth only
□ metal parts:
clean with a dry cloth whenever possible. If solvent, soap or any other cleaning product must be used, make sure that it does not come into contact with non-metallic parts.

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