

Low voltage electrical distribution

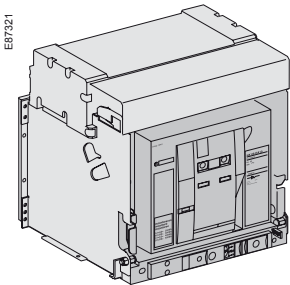
Masterpact NW

Circuit breakers and switch disconnectors
NW DC 1000 to 4000 A

User manual
09/2009



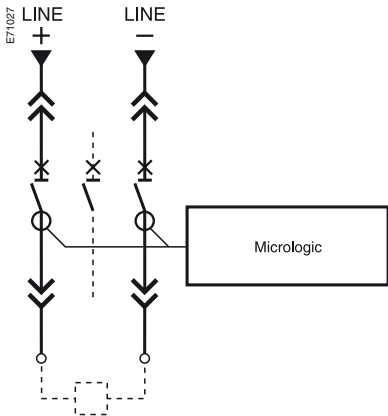
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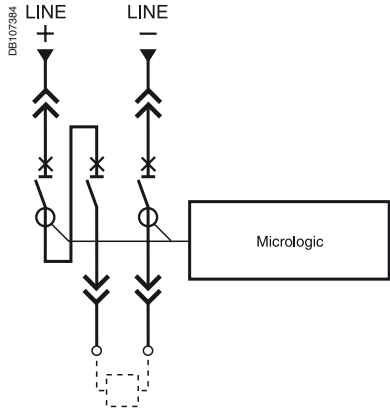
The Masterpact NW DC range of circuit breakers and switch-disconnectors offer current ratings from 1000 to 4000 A.
Different performance levels are available:
■ N: standard
■ H: high performance.

Rated current			1000, 2000 and 4000 A			
Circuit breaker type			Type N	Type H		
Operational voltage (V DC)			500 V	500 V	750 V	900 V
Breaking capacity (kA) - depends on time constant L/R - and on the operational voltage	L/R	≤ 5 ms	85 kA	100 kA	85 kA	85 kA
		≤ 15 ms	35 kA	85 kA	50 kA	35 kA
		≤ 30 ms	25 kA	50 kA	50 kA	25 kA
			Type N	Type H		
Version (pole-connection type) - depends on the type of Distribution - system and circuit breaker	Type of power system	Isolated	Version C	Version E		
		Middle-point	Version C	Version C	Version E	
		Earthed negative polarity	Version C	Version D		
			Type HA			
			500 V	900 V	900 V	
I _{cw} 1s			85 kA	85 kA	85 kA	
I _{cm}			85 kA	85 kA	85 kA	
Versions			C	D	E	

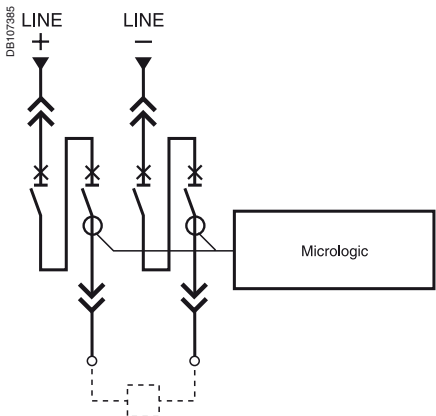
NDC-C

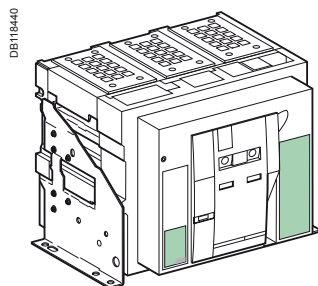


HDC-D



HDC-E





DB118440

DB118441

Masterpact
NW10 NDC-C

Rated current (x 100 A)
Performance level
Type of poles connection
Suitability for isolation
Type of device: circuit breaker or switch-disconnector

Ui 1000V Uimp 12kV
Ue (V) Icu (kA)
250/500 35/4/R 15 ms
85 (L 3.5 ms)
Impulse withstand voltage
Ultimate breaking capacity

Ics = 100% Icu
Icw 50kAs cat B
IEC 60947-2
UTE VDE BS CE JUNE AS
Rated insulation level
Rated operational voltage
Rated short-time withstand current
Frequency
Ics: rated service breaking capacity
Icu: ultimate breaking capacity

instantaneous
instantan
instantan o

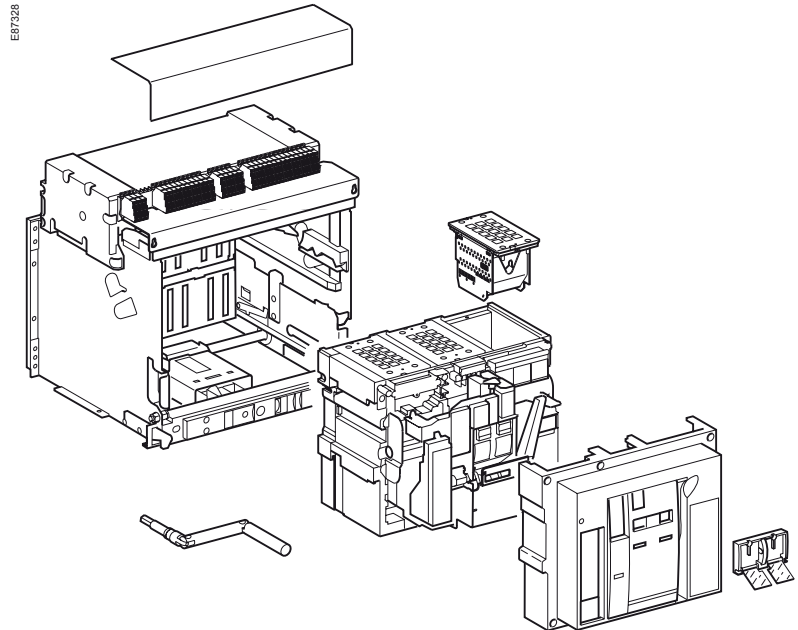
A1 = A2 = 2500A
B1 = B2 = 3300A
C1 = C2 = 4000A
D1 = D2 = 5000A
E1 = E2 = 5400A

Setting ranges for instantaneous tripping

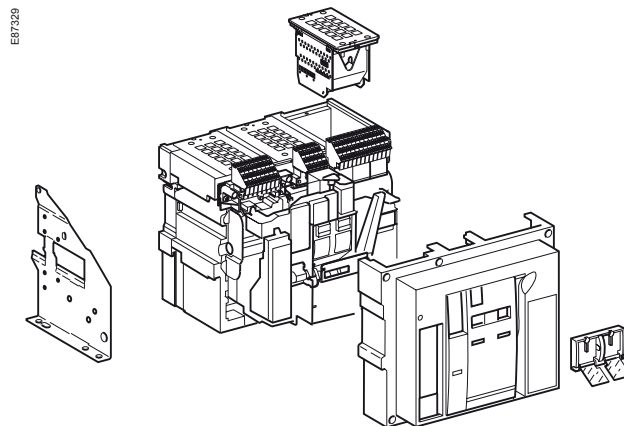
NDC-C
Type of poles connection

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.

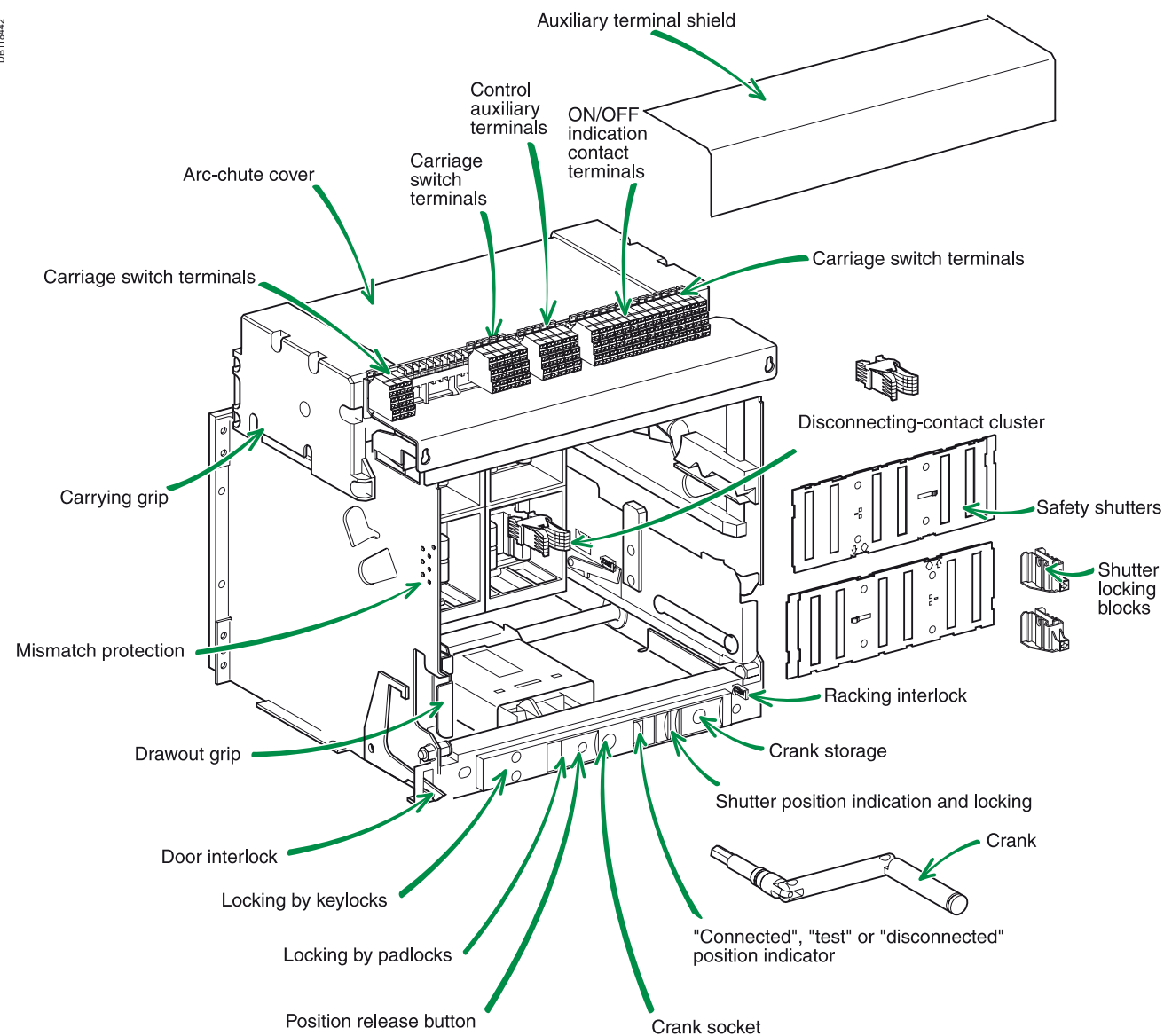
Drawout version



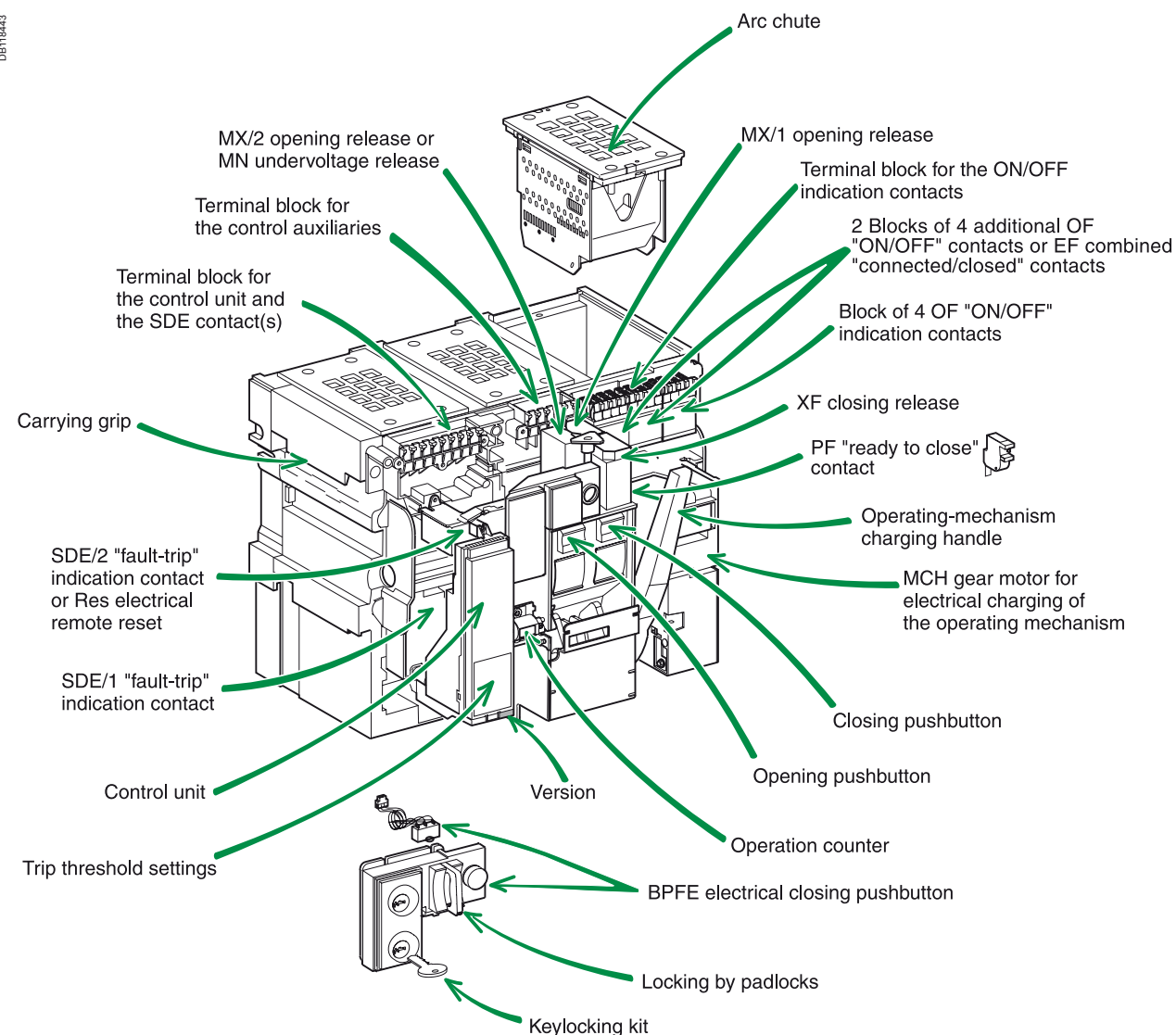
Fixed version



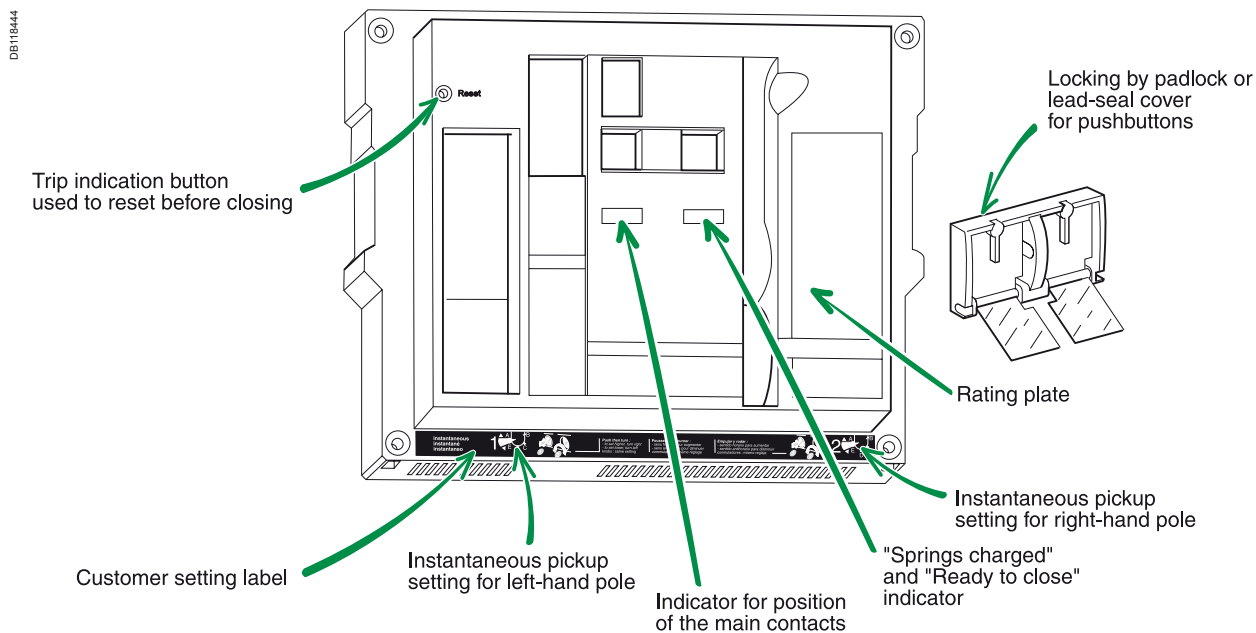
Chassis



Circuit breaker / switch-disconnector

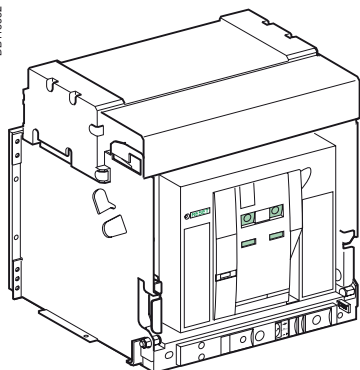


Front

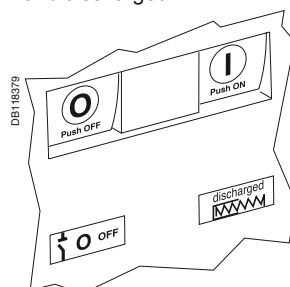


Understanding the controls and indications

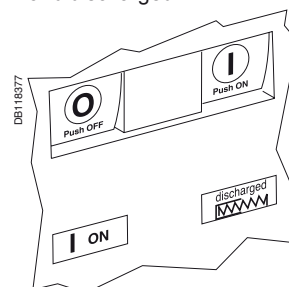
DB118332



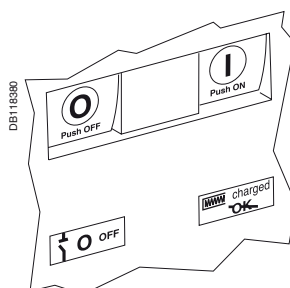
Circuit breaker open and discharged



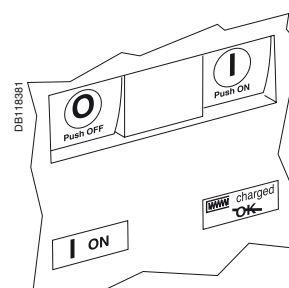
Circuit breaker closed and discharged



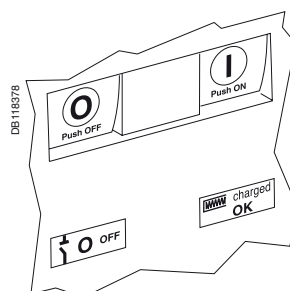
Circuit breaker open, charged and not "ready to close"



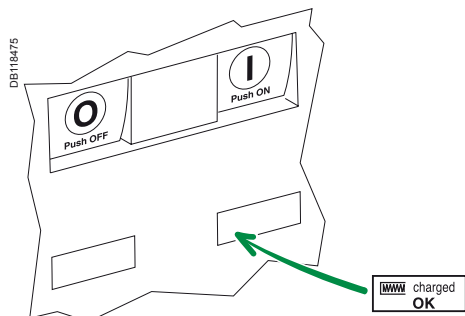
Circuit breaker closed, charged and not "ready to close"



Circuit breaker open, charged and "ready to close"

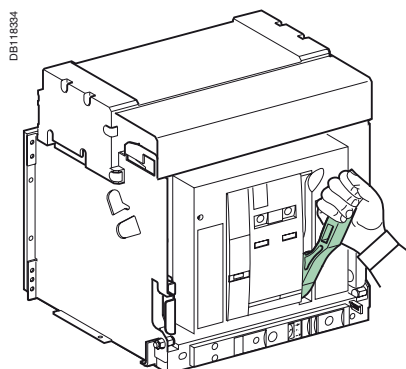


The charge status is indicated as follows.

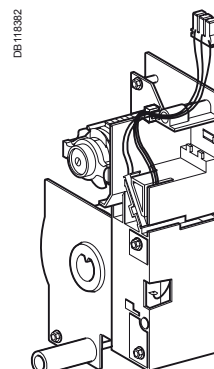


The springs in the circuit breaker operating mechanism must be charged to store the energy required to close the main contacts. The springs may be charged manually using the charging handle or the optional MCH gear motor.

Manual charging:
pull the handle down
seven times until you hear
a "click".



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



Device "ready to close"



Device not "ready to close"



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:

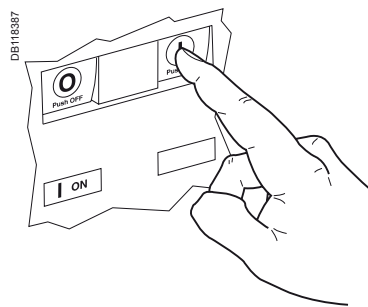
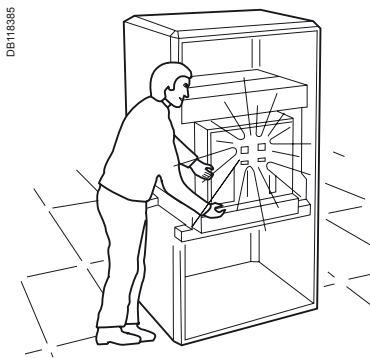
- device open (OFF)
- springs charged
- no opening order present.

If the circuit breaker is not "ready to close" when the order is given, stop the order and start again when the circuit breaker is "ready to close".

Closing the circuit breaker

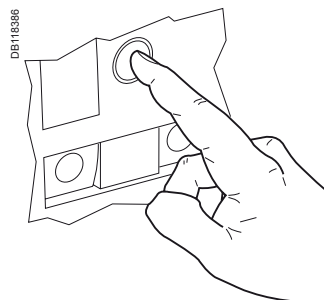
Locally (mechanical)

Press the mechanical ON pushbutton.

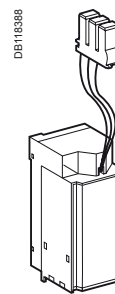


Locally (electrical)

BPFE



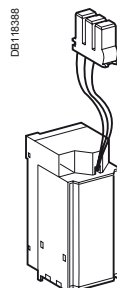
XF



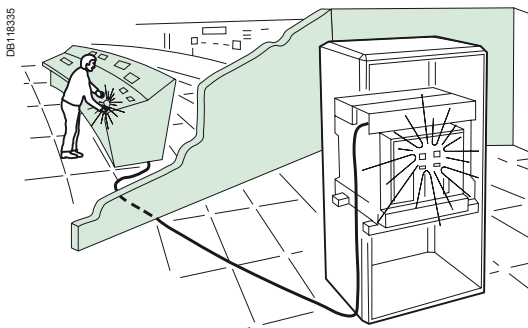
Press the electrical closing pushbutton. By adding an XF closing release, the circuit breaker can be closed remotely.

Remotely

XF



When connected to a remote control panel, the XF closing release (0.85 to 1.1 Un) can be used to close the circuit breaker remotely.

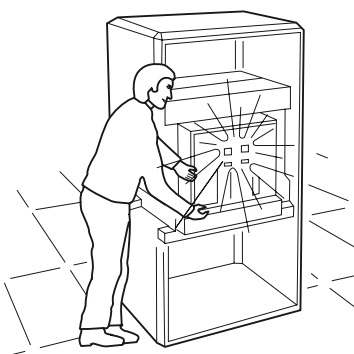


Enabling or disabling the anti-pumping function

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.

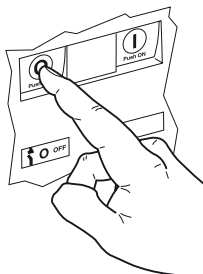
If there is a continuous closing order, after opening the circuit breaker remains open until the closing order is discontinued. A new closing order then closes the circuit breaker. This function can be disabled by wiring the closing release in series with the PF "ready to close" contact.

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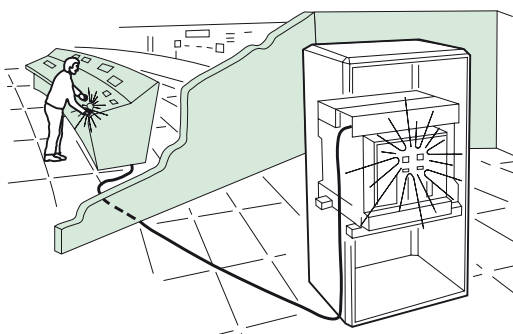


Locally
Press the OFF pushbutton.

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DB118335

**Remotely**

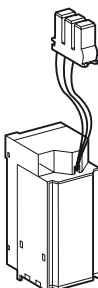
Use one of the following solutions:

- one or two MX opening releases (MX1 and MX2, 0.7 to 1.1 Un)
- one MN undervoltage release (0.35 to 0.7 Un)
- one MN undervoltage release (0.35 to 0.7 Un) with a delay unit (R or Rr).

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

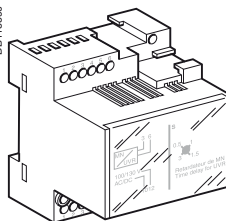
MX1, MX2, MN

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Delay unit

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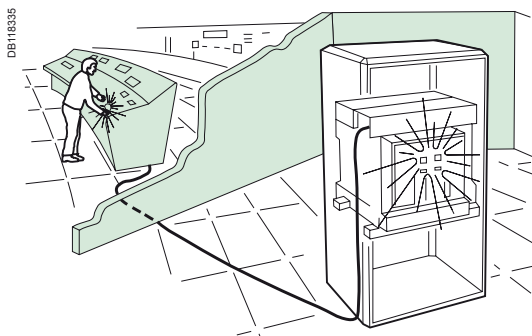
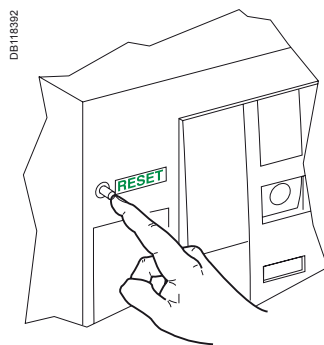
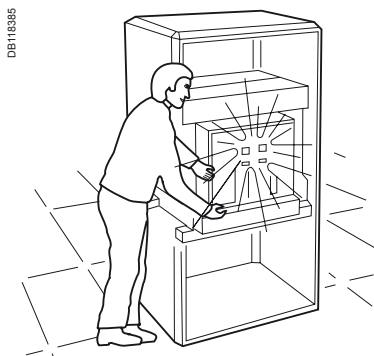


The circuit breaker signals a fault by:

- a mechanical indicator on the front
- one or two SDE "fault-trip" indication contacts (SDE/2 is optional).

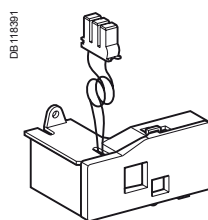
Locally

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



Remotely

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



Locking the controls

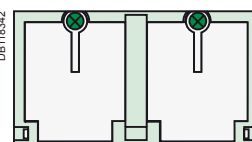
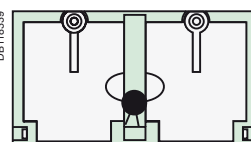
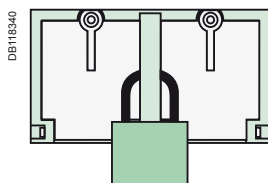
Disabling Circuit breaker
local closing and opening

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

Padlock

Lead seal

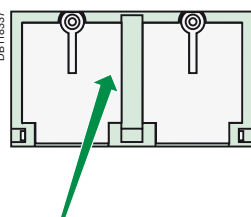
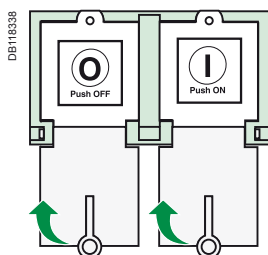
Screws



Locking

Close the covers.

Insert the padlock
shackle, lead seal
or screws.

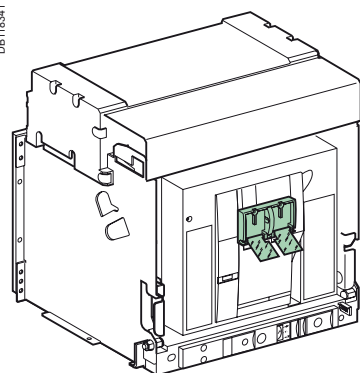
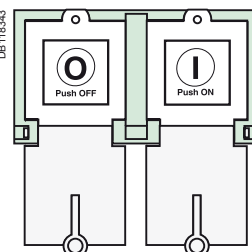
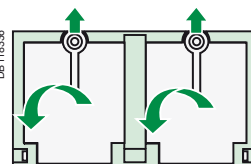
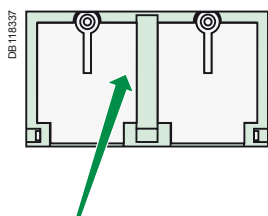


Unlocking

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 circuit breaker closing using the pushbuttons or remotely, use as needed:

- a padlock
- one or two keylocks
- a combination of the two locking systems.

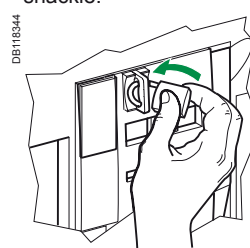
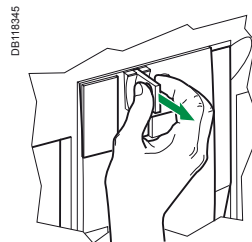
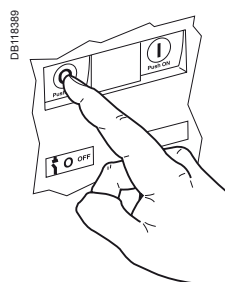
Install a padlock (maximum shackle diameter 5 to 8 mm)

Locking

Open the circuit breaker.

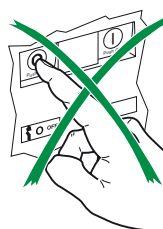
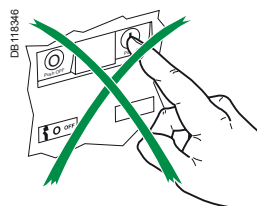
Pull out the tab.

Insert the padlock shackle.



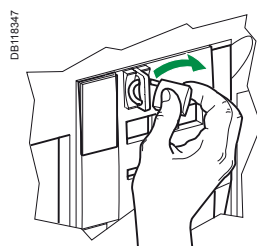
Check

The controls are inoperative.



Unlocking

Remove the padlock.



Locking the controls

Disabling local and remote closing

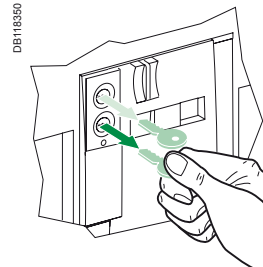
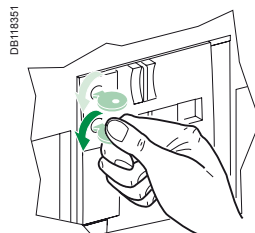
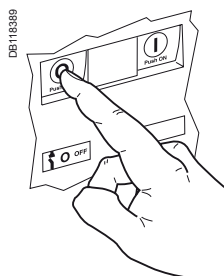
Locking the controls with one or two keylocks

Locking

Open the circuit breaker.

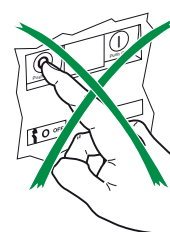
Turn the key(s).

Remove the key(s).



Check

The controls are inoperative.

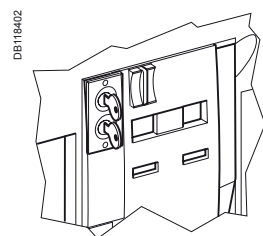
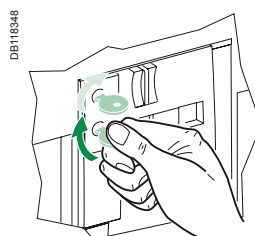
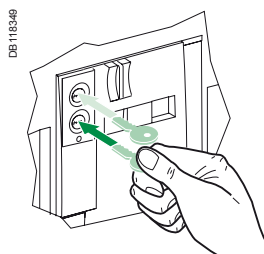


Unlocking

Insert the key(s).

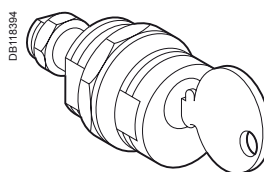
Turn the key(s).

The key(s) cannot be removed.

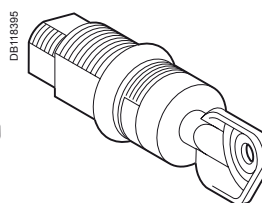


Four types of keylocks are available

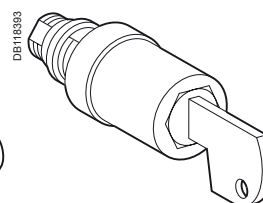
RONIS



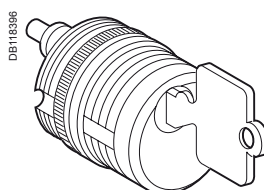
PROFALUX



CASTELL

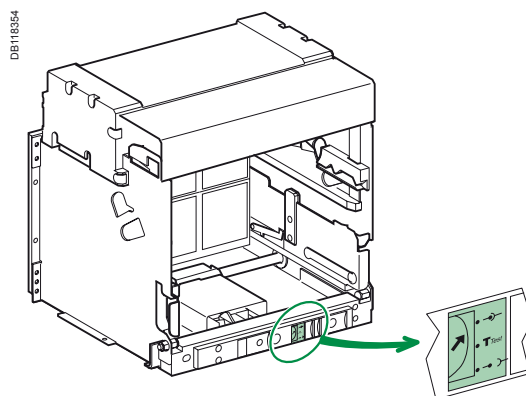


KIRK

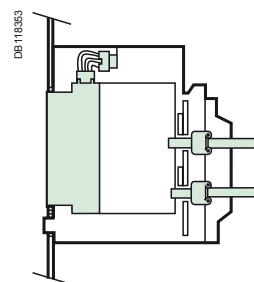
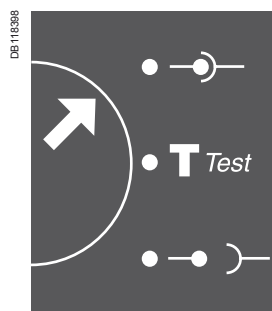


Identifying the circuit breaker positions

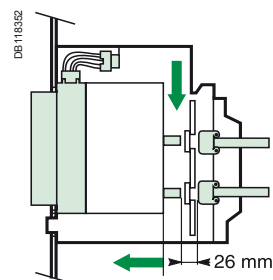
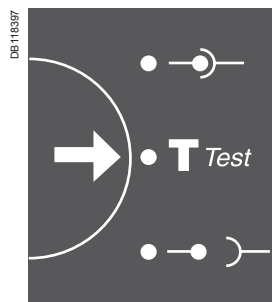
The indicator on the front signals the position of the circuit breaker in the chassis.



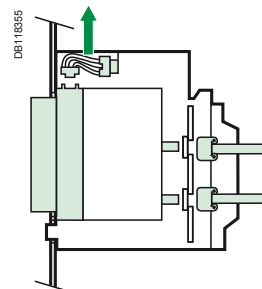
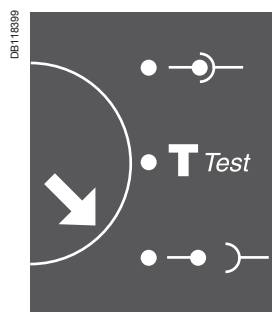
■ "connected" position



■ "test" position



■ "disconnected" position

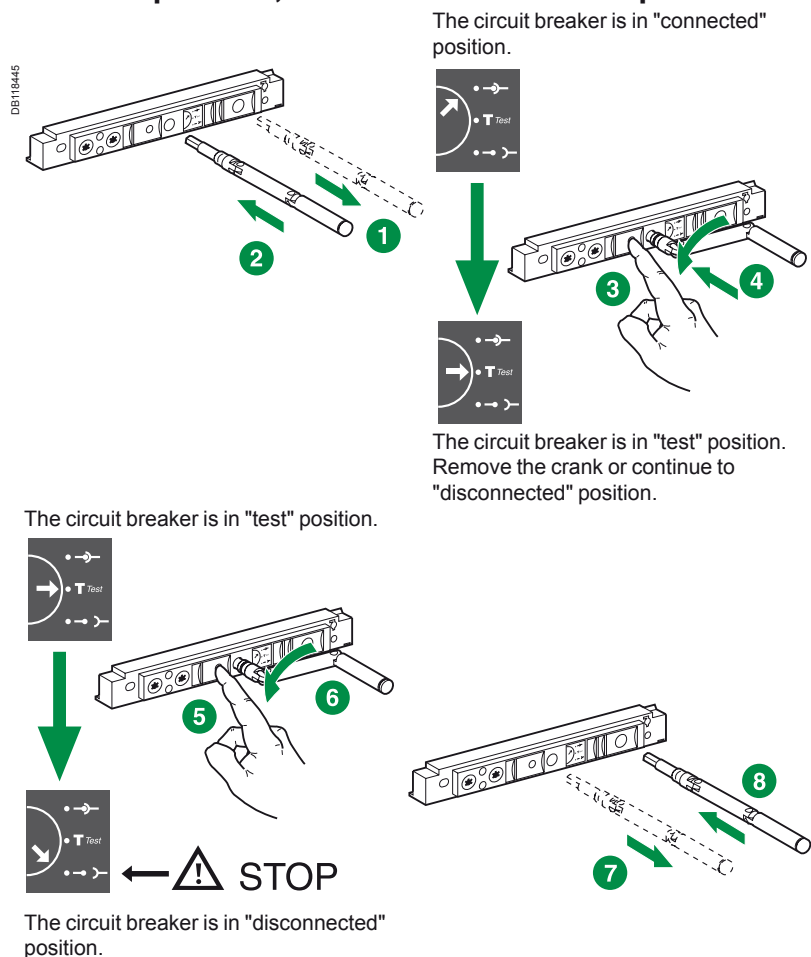


These operations require that all chassis-locking functions be disabled (see page 21).

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

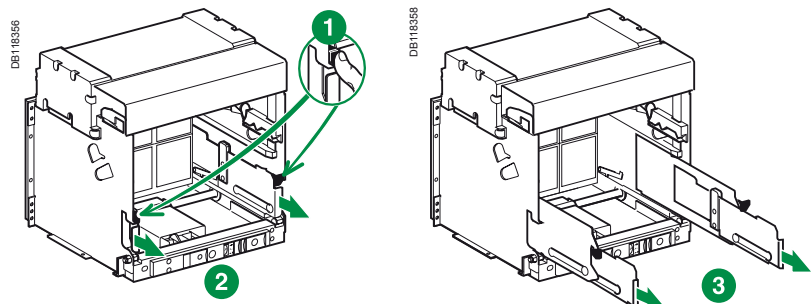


Caution. The right-hand rail cannot be removed if the crank has not been removed or if the circuit breaker is not fully disconnected.

Removing the rails

Press the release tabs and pull the rails out.

To put the rails back in, press the release tabs and push the rails in.



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

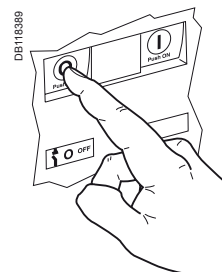
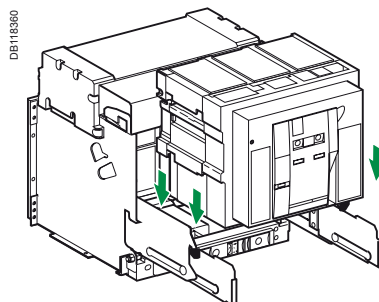
Before mounting the circuit breaker, make sure it matches the chassis.

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.

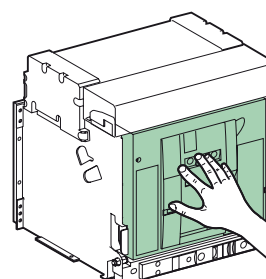
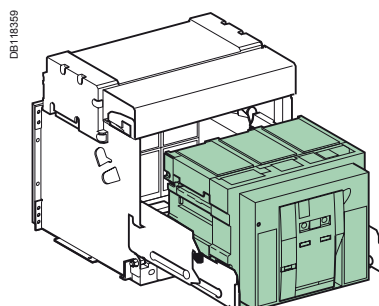
Inserting Masterpact

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).

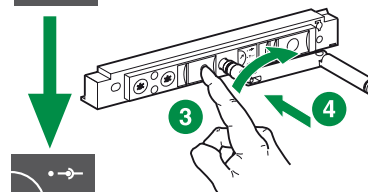
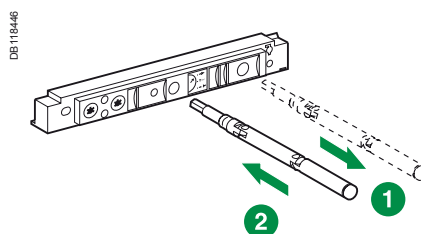


Push the circuit breaker into the chassis, taking care not to push on the control unit.



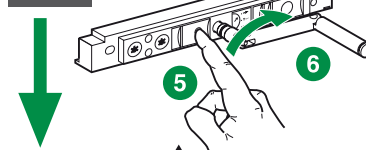
Racking the circuit breaker from the "disconnected" to "test" position, then to "connected" position

The device is in "disconnected" position

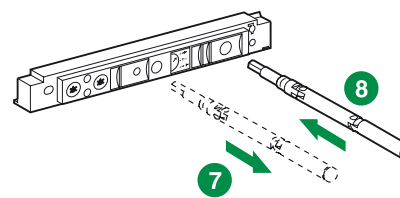


The device is in "test" position. Remove the crank or continue to "connected" position.

The device is in "test" position.



The device is in "connected" position.



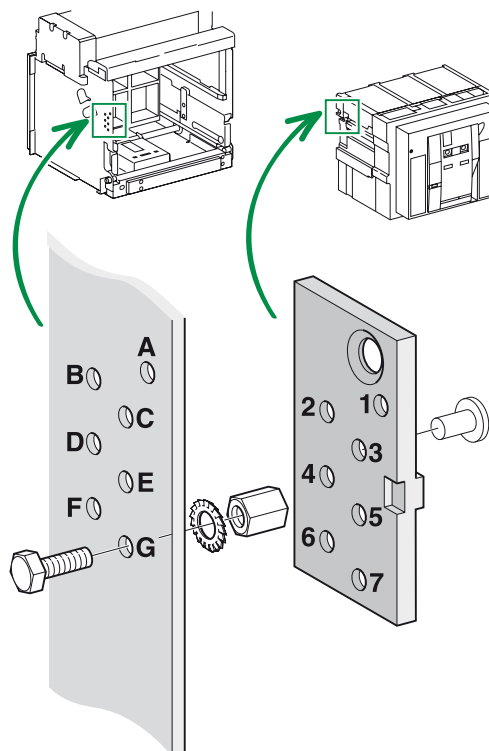
Matching a Masterpact circuit breaker with its chassis

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 only a circuit breaker with compatible characteristics (rating, breaking capacity, version) can be inserted in a chassis.

The possible combinations are listed below.

DB118382



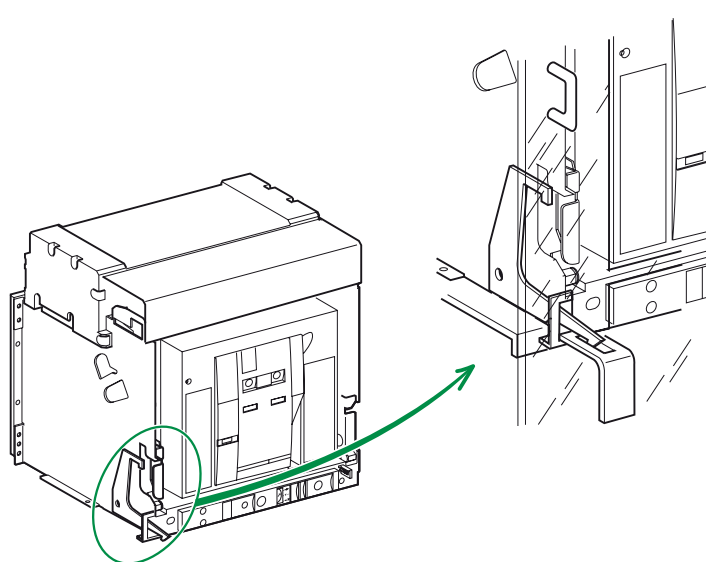
			
ABCD	567	BCDE	167
ABCE	467	BCDF	157
ABCF	457	BCDG	147
ABCG	456	BCEF	146
ABDE	367	BCEG	137
ABDF	357	BDEF	136
ABDG	356	BDEG	135
ABEF	347	BDFG	134
ABEG	346	CDEF	127
ABFG	345	CDEG	126
ACDE	267	CEFG	124
ACDF	257	DEFG	123
ACDG	256		
ACEF	247		
ACEG	246		
ACFG	245		
ADEF	237		
ADEG	236		
ADFG	235		
A EFG	234		

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.

DB118366



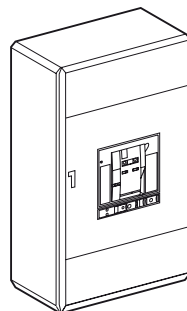
Disabling door opening

Close the door.

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

The door is locked.

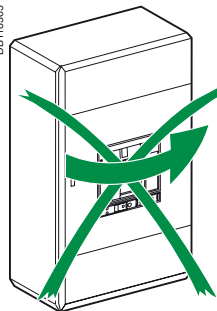
DB118401



DB118363



DB118365



Enabling door opening

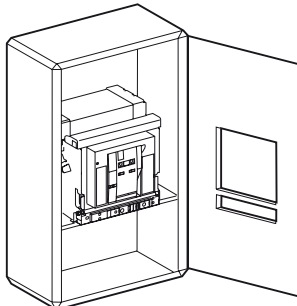
Put the Masterpact in
"disconnected" position.

The door is unlocked.

DB118364



DB118400



Locking the circuit breaker in position

Padlocks and keylocks may be used together.

Combination of locking systems

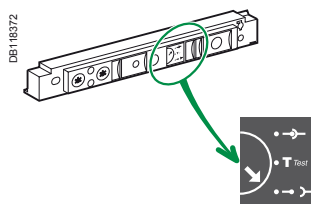
To disable local or remote opening or closing of the circuit breaker, use as needed:

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

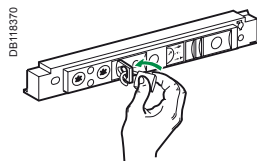
Disabling connection when the circuit breaker is in "disconnected" position, using one to three padlocks (maximum shackle diameter 5 to 8 mm)

Locking

Circuit breaker in "disconnected"
position.

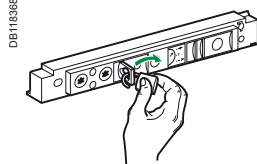


Insert the shackle (max. diameter
5 to 8 mm) of the padlock(s).

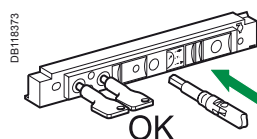


Unlocking

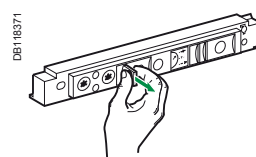
Remove the padlock(s).



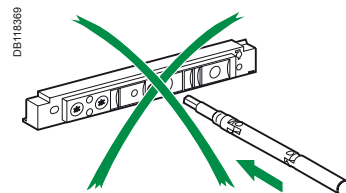
The crank can be inserted.



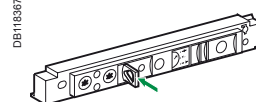
Pull out the tab.



The crank cannot be inserted.



Release the tab.



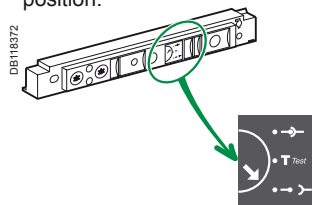
Locking the circuit breaker in position

Padlocks and keylocks may be used together.

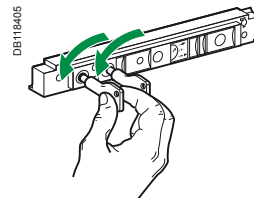
Disabling connection when the circuit breaker is in "disconnected" position, using one or two keylocks.

Locking

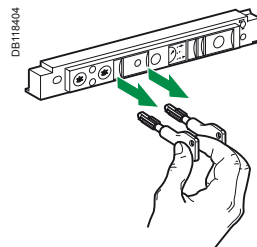
Circuit breaker in "disconnected"
position.



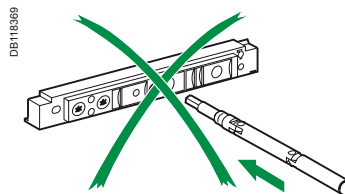
Turn the key(s).



Remove the key(s).

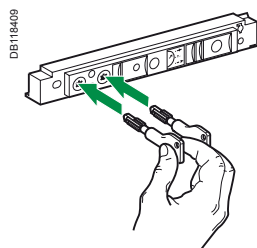


The crank cannot be inserted.

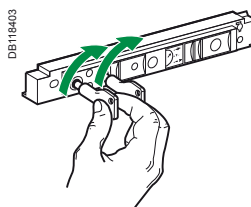


Unlocking

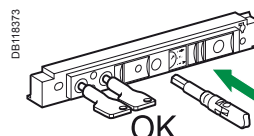
Insert the key(s).



Turn the key(s).

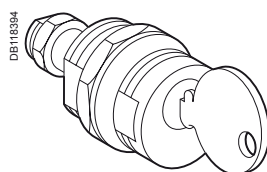


The crank can be inserted.

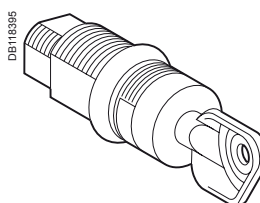


Four types of keylocks are available

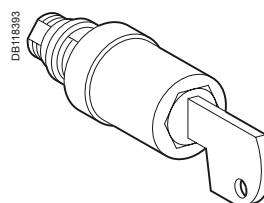
RONIS



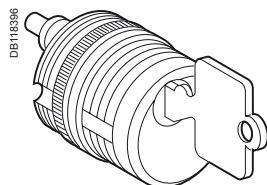
PROFALUX



CASTELL



KIRK



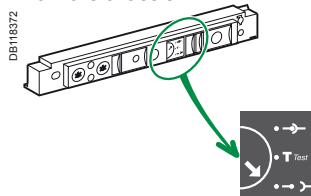
Locking the circuit breaker in position

For this operation, the circuit breaker must be removed from the chassis.

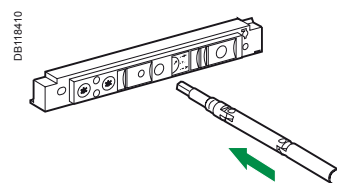
Disabling use of the crank in all positions

It is possible to modify the padlock and keylock locking function. Instead of locking only in "disconnected" position, it is possible to lock the circuit breaker in all positions.

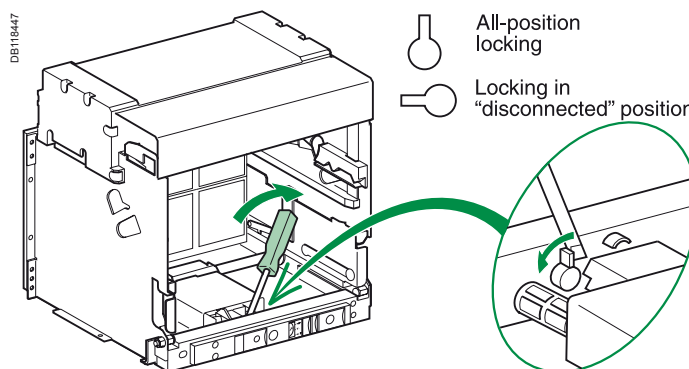
Set the circuit breaker to "disconnected" position. Remove the circuit breaker from the chassis.



Insert the crank.

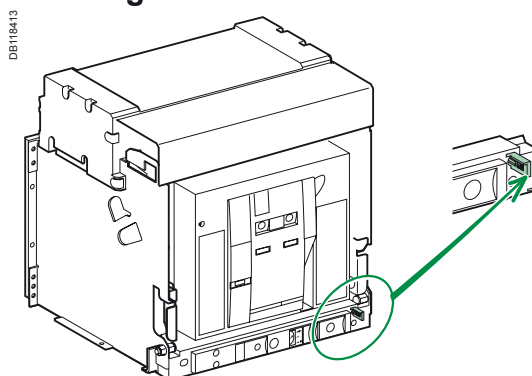


Turn the catch to the right. The circuit breaker can now be locked in all positions.

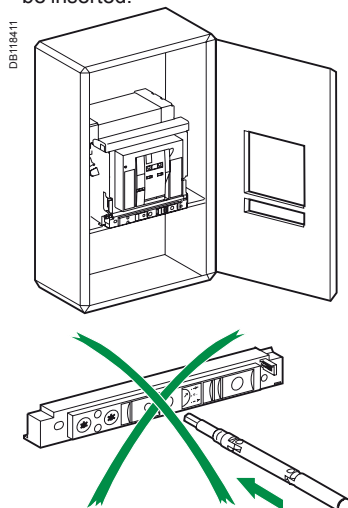


It is possible to enable or disable insertion of the crank.

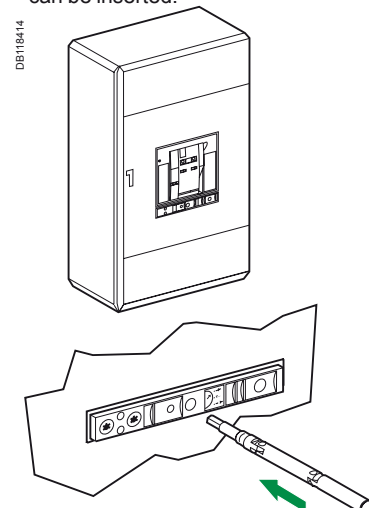
Locking the circuit breaker when the door is open



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



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



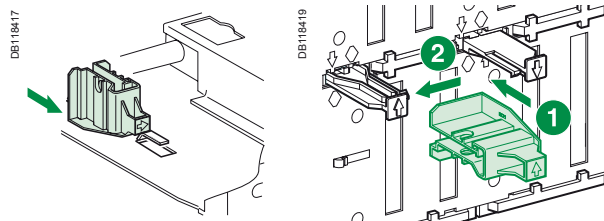
Locking the safety shutters

Padlocking inside the chassis

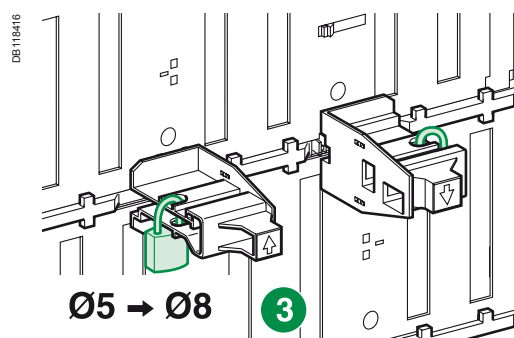
Using the shutter locking blocks

Remove the block(s) from their storage position.

Position the block(s) on the guide(s).



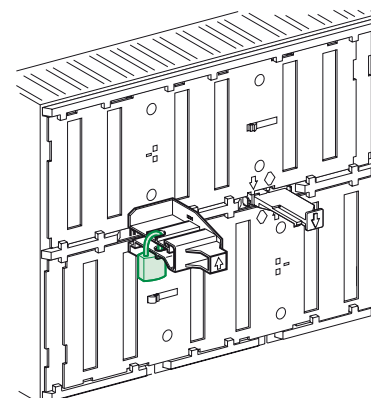
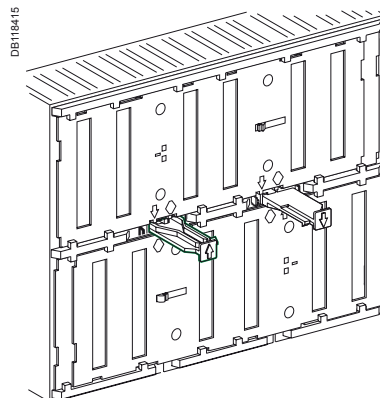
Lock the block(s) using a padlock.



Four locking possibilities

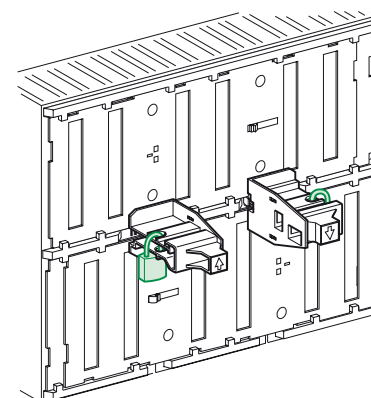
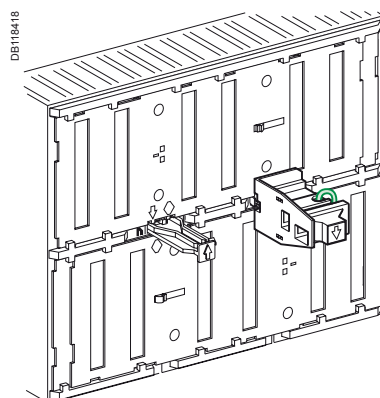
Top and bottom shutters not locked.

Top shutter locked,
Bottom shutter not locked.



Top shutter not locked,
Bottom shutter locked.

Top and bottom shutters locked.

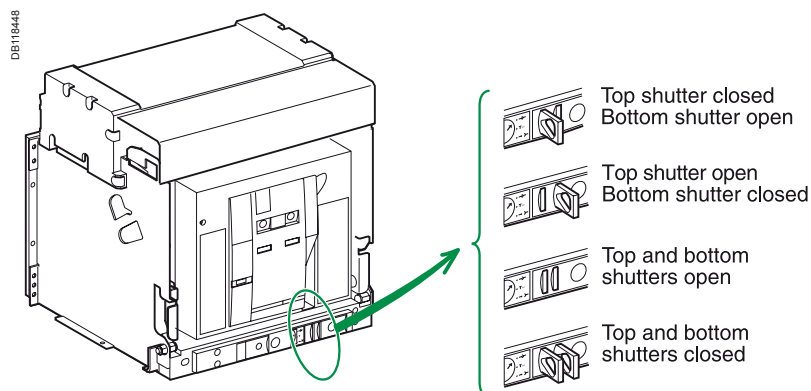


Locking the safety shutters

Padlocking or position indication on the front

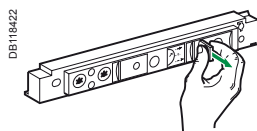
This system offers two functions:

- padlocking of the top or bottom shutters
- indication of the position of each shutter:
 - shutter open
 - shutter closed.

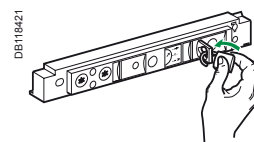


Locking

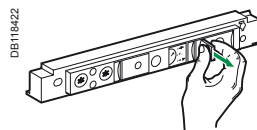
Pull out the left-hand tab to lock the top shutter.



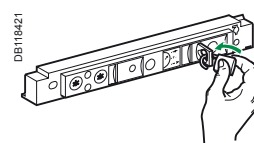
Insert a padlock (shackle 5 to 8 mm).



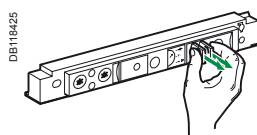
Pull out the right-hand tab to lock the bottom shutter.



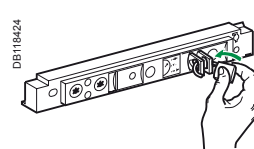
Insert a padlock (shackle 5 to 8 mm).



Pull out both tabs to lock both shutters.

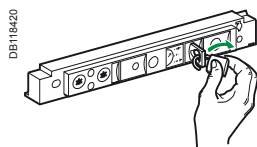


Insert a padlock (shackle 5 to 8 mm).

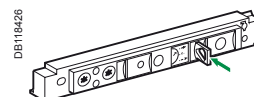


Unlocking

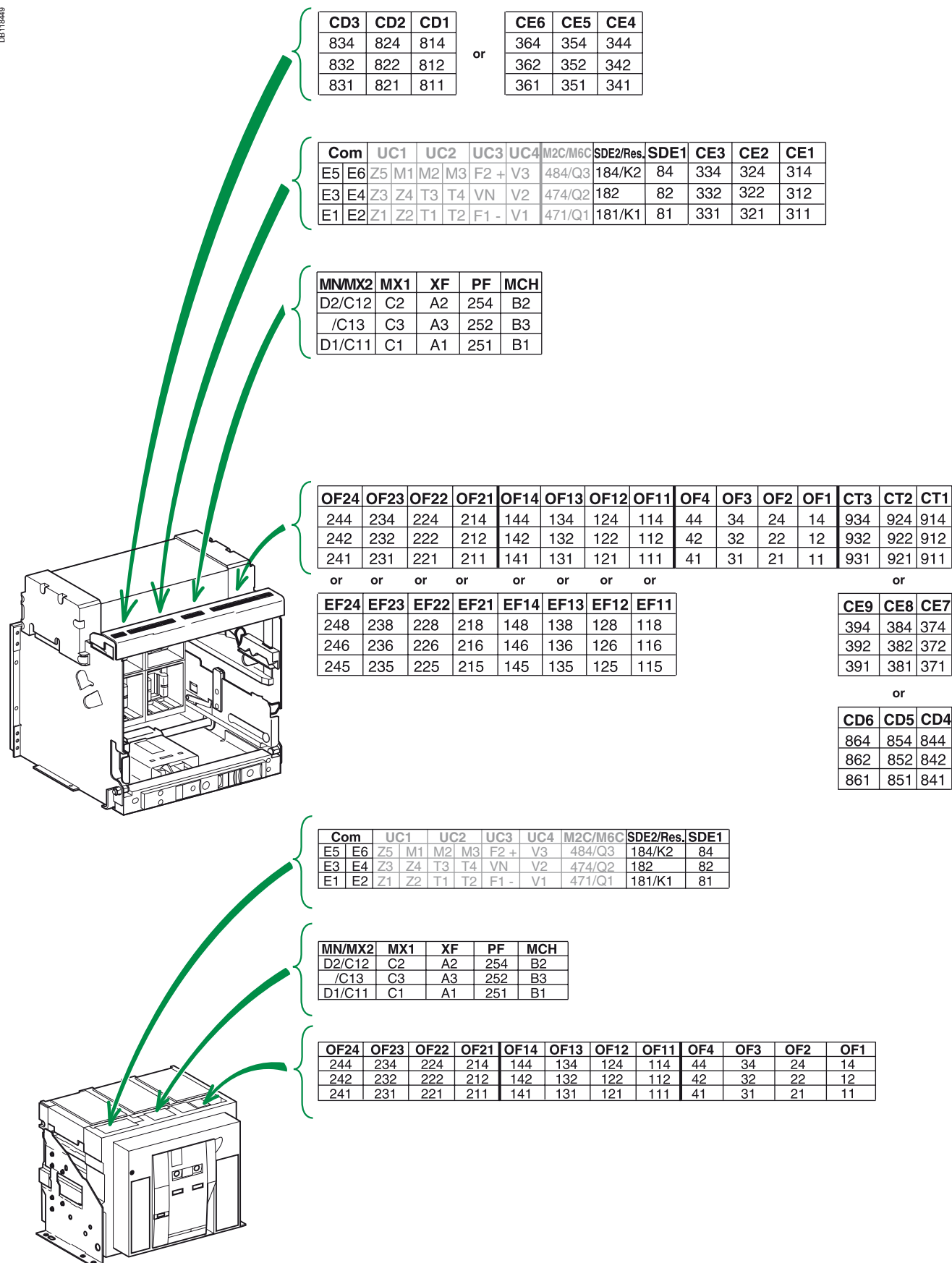
Remove the padlock.



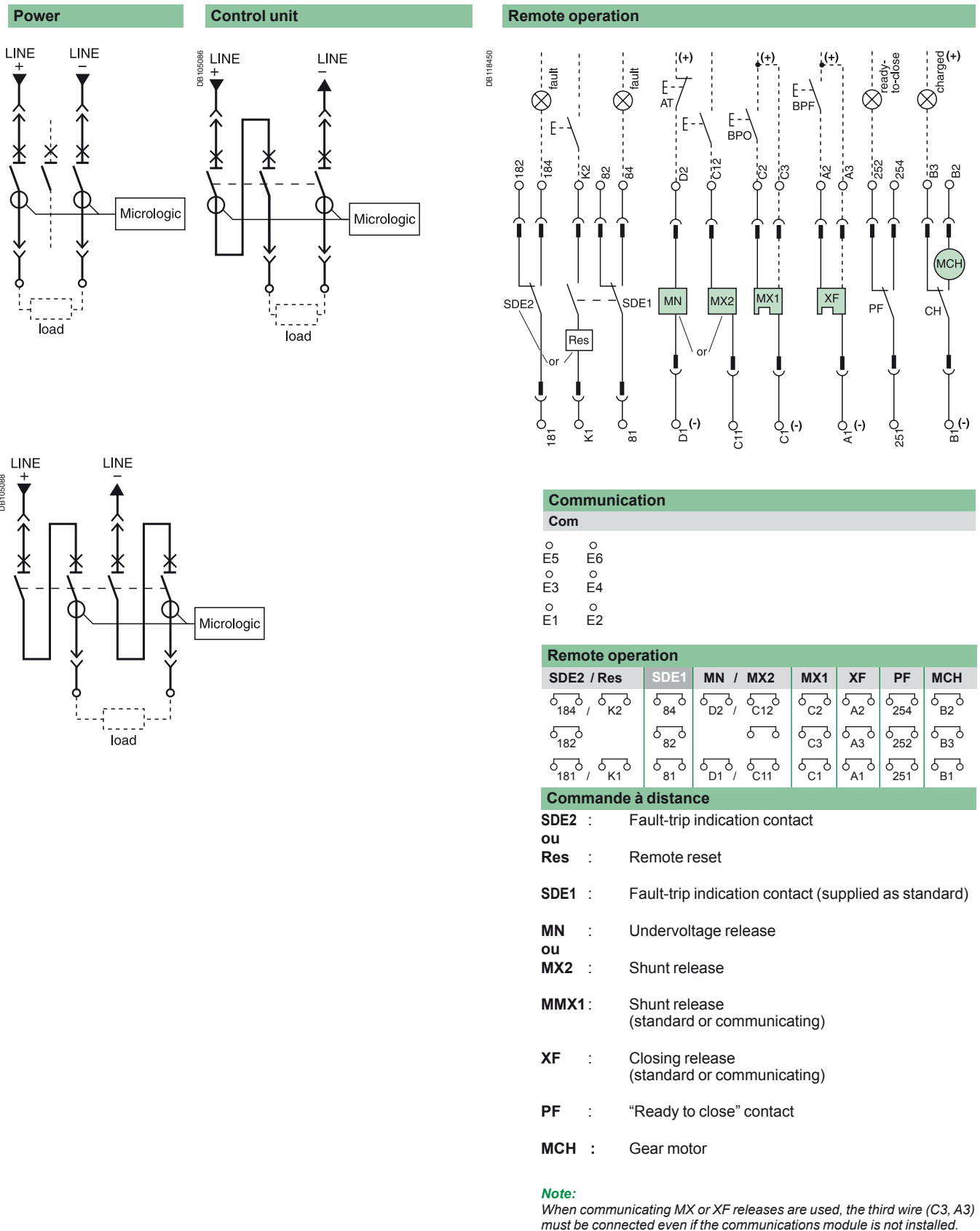
Release the tab(s).



DB110449

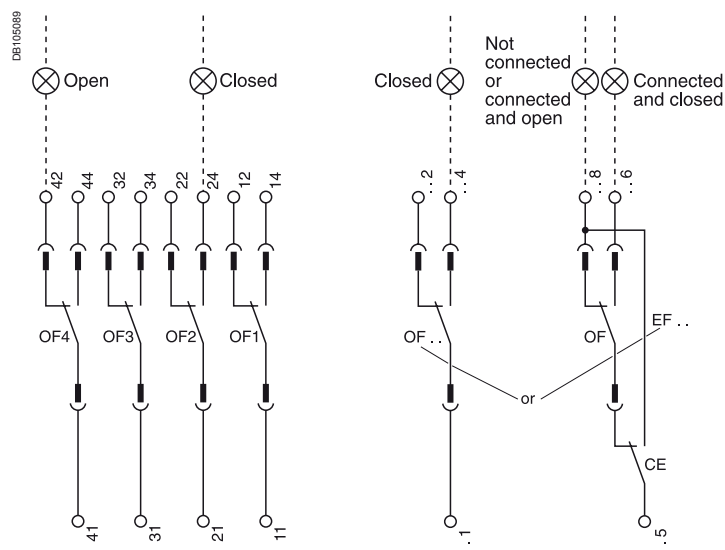


The diagram is shown with circuits de-energised, all devices open, connected and charged and relays in normal position.

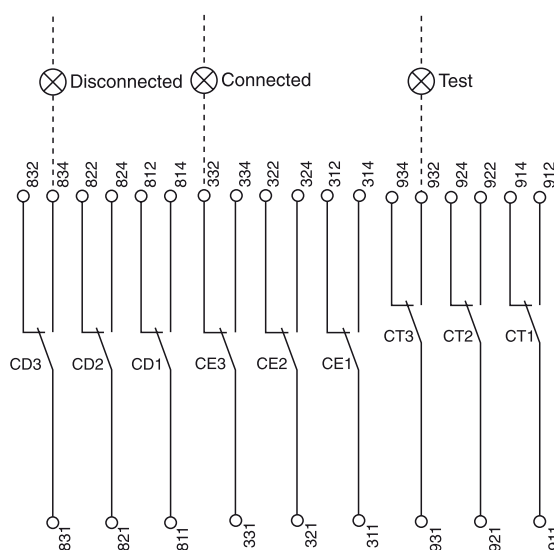


Interconnected connections (only one wire per connection point).

Indication contacts



Chassis contacts



Indication contacts

OF4	OF3	OF2	OF1	OF24	OF23	OF22	OF21	OF14	OF13	OF12	OF11
44	34	24	14	244	234	224	214	144	134	124	114
42	32	22	12	242	232	222	212	142	132	122	112
41	31	21	11	241	231	221	211	141	131	121	111
or				EF24	EF23	EF22	EF21	EF14	EF13	EF12	EF11
or				248	238	228	218	148	138	128	118
or				246	236	226	216	146	136	126	116
or				245	235	225	215	145	135	125	115

Chassis contacts

CD3	CD2	CD1	CE3	CE2	CE1	CT3	CT2	CT1
834	824	814	334	324	314	934	924	914
832	822	812	332	322	312	932	922	912
831	821	811	331	321	311	931	921	911
or			CE6	CE5	CE4	or		
or			364	354	344	or		
or			362	352	342	or		
or			361	351	341	or		
or			CE9	CE8	CE7	or		
or			394	384	374	or		
or			392	382	372	or		
or			391	381	371	or		

Indication contacts

OF4 ON/OFF	OF 24 or	ON/OFF indication contacts
OF3 indication	EF 24	Combined "connected/closed" indication contacts
OF2 contacts	OF 23 or	
OF1	EF 23	
	OF 22 or	
	EF 22	
	OF 21 or	
	EF 21	
	OF 14 or	
	EF 14	
	OF 13 or	
	EF 13	
	OF 12 or	
	EF 12	
	OF 11 or	
	EF 11	

Chassis contacts

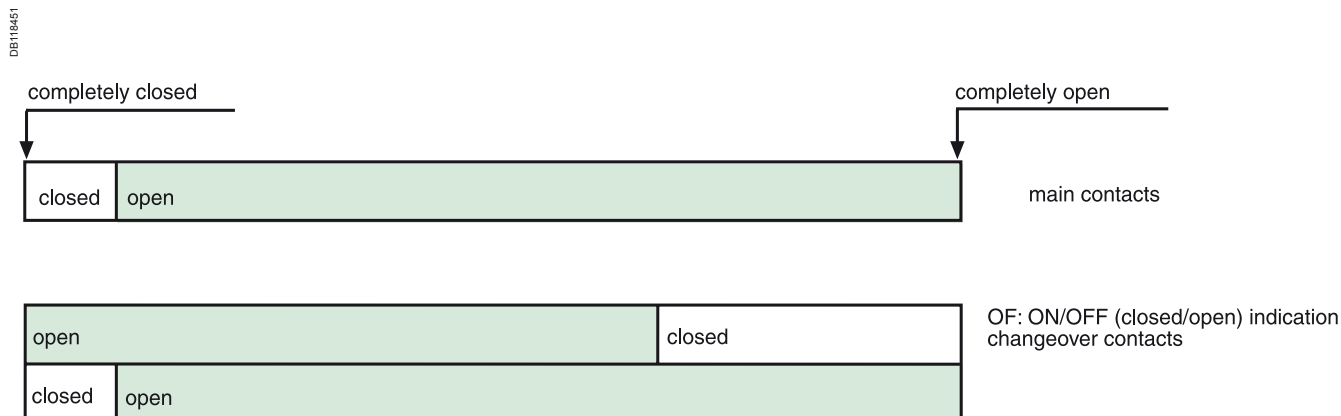
CD3 Disconnected	CE3 Connected	CT3 Test position
CD2 position	CE2 position	CT2 contacts
CD1 contacts	CE1 contacts	CT1
or		
CE6 Connected	CE9 Connected	
CE5 position	CE8 position	
CE4 contacts	CE7 contacts	
or		
CD6 Disconnected	CD5 position	
CD4 contacts		

Key:

	Drawout device only
	SDE1, OF1, OF2, OF3, OF4 supplied as standard
	Interconnected connections (only one wire per connection point)

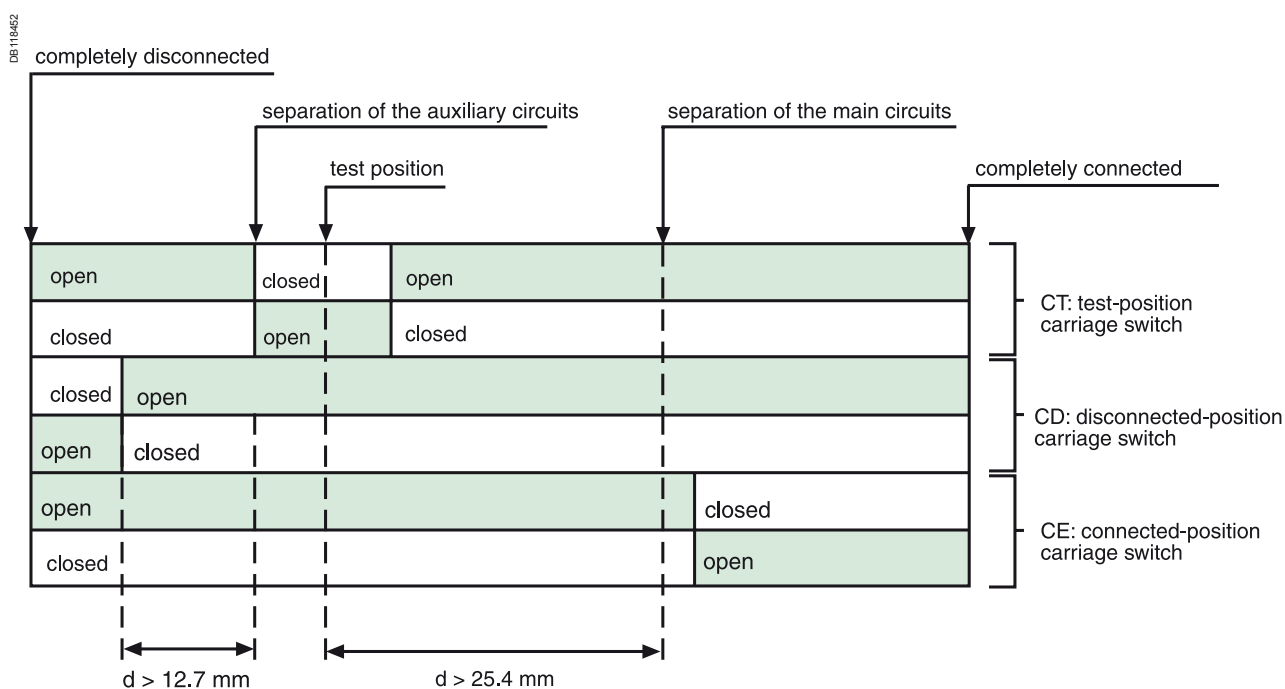
The ON/OFF indication contacts signal the status of the device main contacts.

Circuit breaker



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

Chassis



All Masterpact NW DC circuit breakers are equipped with Micrologic control units.

Micrologic DC1.0

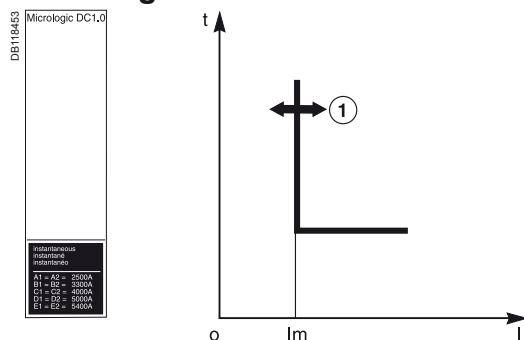
Type of protection

1= instantaneous

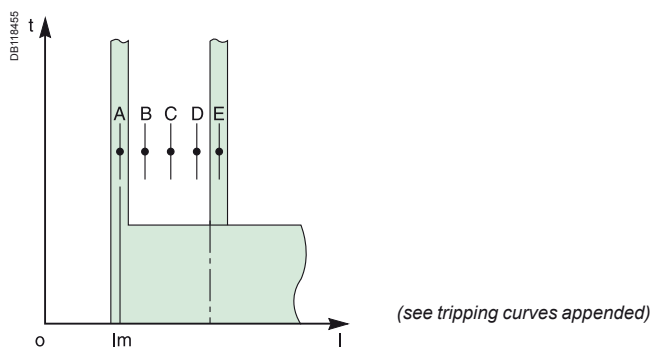
Control unit version

Identification of the different control unit generations (0 for the first generation).

Micrologic DC1.0



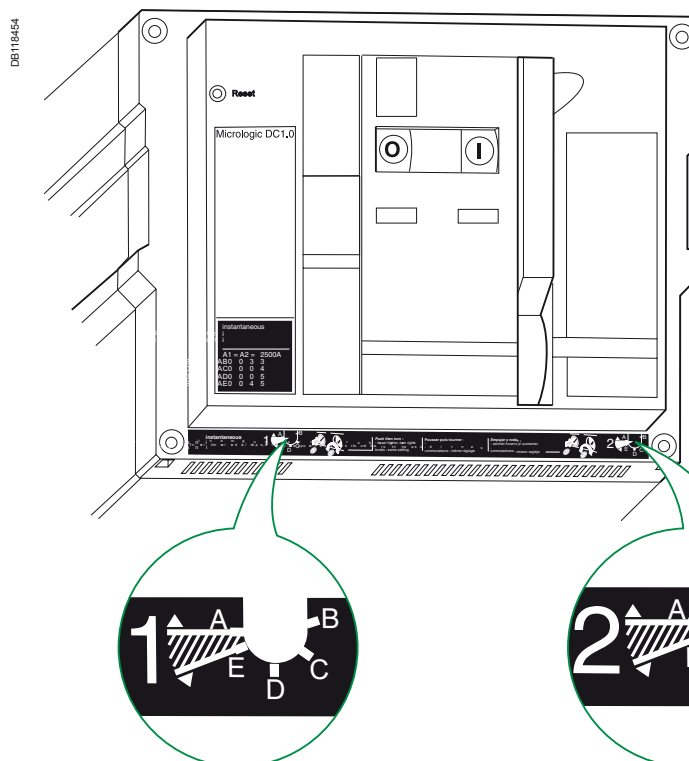
- This control unit is designed to protect power circuits and load devices.
 - It is associated with sensors with instantaneous thresholds that can be adjusted on the front of the control unit.
- Three sensor versions provide different threshold ranges:
- 1250 to 2500 A
 - 2500 to 5400 A
 - 5000 to 11000 A.
- The instantaneous protection has no time delay settings.
 - No overload protection (thermal relay type) is provided on the DC range.



- Settings are accessible in front, behind the door of the cubicle. Both sensors must have the same settings.

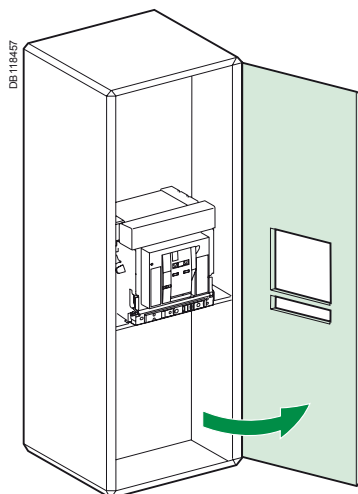
E87335

instantaneous
instantané
instantáneo
A1 = A2 = 2500A
B1 = B2 = 3300A
C1 = C2 = 4000A
D1 = D2 = 5000A
E1 = E2 = 5400A



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

Making the settings

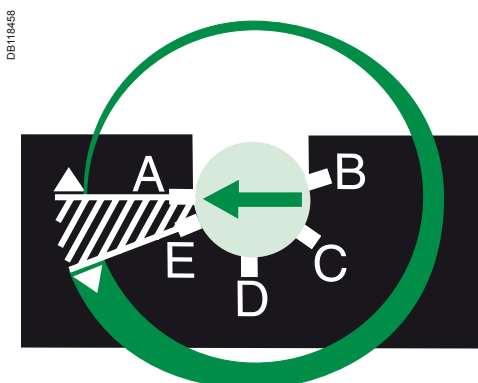
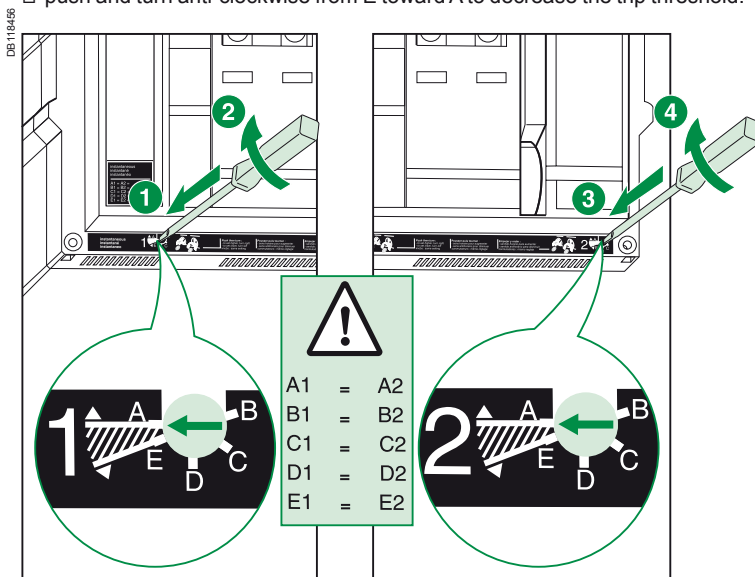


Open the door of the cubicle.

■ Follow the instructions indicated on the setting label.

■ Set the adjustment knobs to the desired values (the two settings must be the same):

- ☐ push and turn clockwise from A toward E to increase the trip threshold
- ☐ push and turn anti-clockwise from E toward A to decrease the trip threshold.



Im thresholds

Settings indicated on dials: A, B, C, D or E.

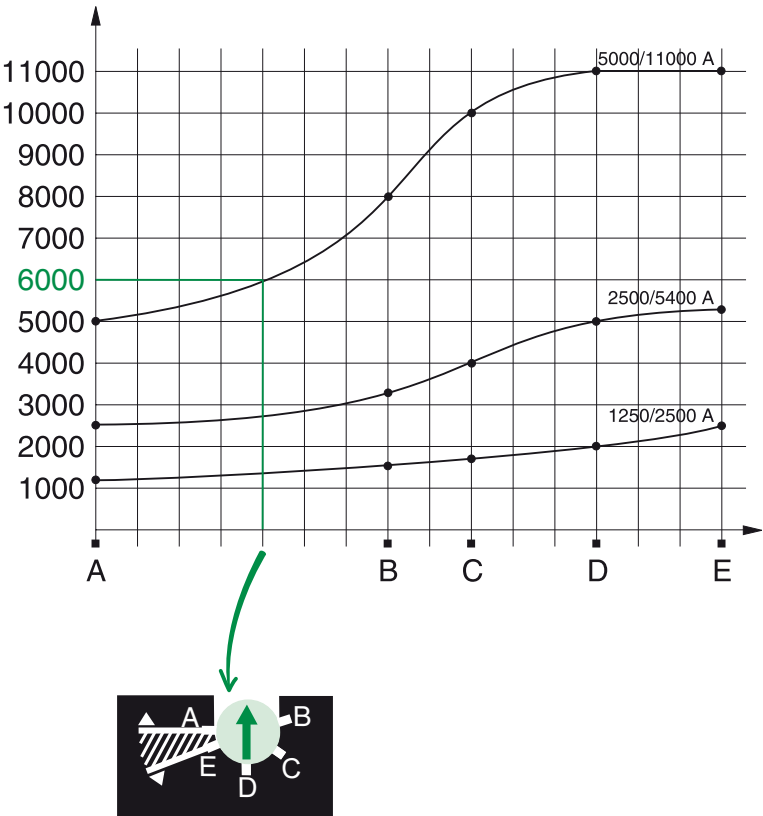
Sensor version	Minimum				Maximum
	Settings A1 and A2	Settings B1 and B2	Settings C1 and C2	Settings D1 and D2	Settings E1 and E2
1250/2500	1250 A	1500 A	1600 A	2000 A	2500 A
2500/5400	2500 A	3300 A	4000 A	5000 A	5400 A
5000/11000	5000 A	8000 A	10000 A	11000 A	11000 A
Tolerances	± 8 %	± 10 %	± 10 %	± 10 %	± 10 %

instantaneous
instantané
instantané 5000A

A1 = A2 = 5000A
B1 = B2 = 8000A
C1 = C2 = 10000A
D1 = D2 = 11000A
E1 = E2 = 11000A

E.g. Trip threshold set to 8000 A.

Intermediate values can also be set.
Eleven other settings are available (not indicated on the adjustment knobs).



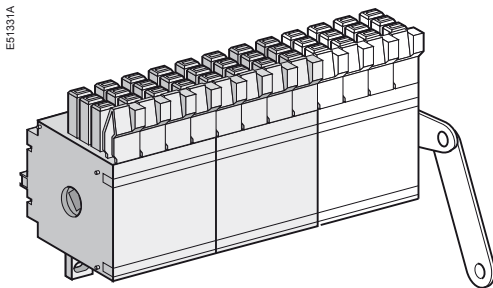
E.g. Trip threshold set to 6000 A.

ON/OFF indication contacts (OF)

- Standard equipment, 4 OF per device
- OF contacts indicate the position of main contacts
- They trip when the minimum isolation distance between the main contacts is reached
- 4 changeover contacts
- Rated current: 10 A
- Breaking capacity 50/60 Hz for AC power (AC12 as per 947-5-1):
 - 480 V: 10 A (rms)
 - 600 V: 6 A (rms)
- Breaking capacity for DC power (DC12 as per 947-5-1):
 - 250 V: 3 A.

Additional ON/OFF indication contacts (OF)

- Optional equipment, two blocks of 4 OF contacts per device
- Connection cables not included, see below: one block of 4 OF contacts
- Connection cables: 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
- Changeover contacts.
- Rated current: 10 A
- Breaking capacity 50/60 Hz for AC power (AC12 as per 947-5-1):
 - 480 V: 10 A (rms)
 - 600 V: 6 A (rms)
- Breaking capacity for DC power (DC12 as per 947-5-1):
 - 250 V: 3 A.



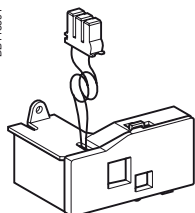
Combined "connected/closed" contacts (EF)

- Optional equipment, 8 EF contacts per device
- Each contact is mounted in place of the connector of an additional OF contact.
- One EF contact
- The contact combines the "device connected" and the "device closed" information to produce the "circuit closed" information
- Changeover contacts
- Rated current: 10 A
- Breaking capacity 50/60 Hz for AC power (AC12 as per 947-5-1):
 - 240 V: 10 A (rms)
 - 380 V: 10 A (rms)
 - 480 V: 10 A (rms)
 - 600 V: 6 A (rms)
- Breaking capacity for DC power (DC12 as per 947-5-1):
 - 48 V: 2.5 A
 - 130 V: 0.8 A
 - 250 V: 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
- Rated current: 10 A
- Breaking capacity 50/60 Hz for AC power (AC12 as per 947-5-1):
 - 240 V: 10 A (rms)
 - 380 V: 5 A (rms)
 - 480 V: 5 A (rms)
 - 600 V: 3 A (rms)
- Breaking capacity for DC power (DC12 as per 947-5-1):
 - 48 V: 3 A
 - 125 V: 0.3 A
 - 250 V: 0.15 A.

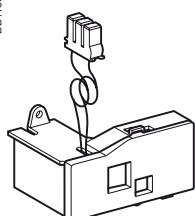
DB118391



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
- Connection cables not included, see below:
 - one SDE/2 contact
 - Connection cables:
 - for fixed device
 - for drawout device
- The contact remotely indicates device opening due to an electrical fault
- Changeover contact.
 - Rated current: 10 A
 - Breaking capacity 50/60 Hz for AC power (AC12 as per 947-5-1):
 - 240 V: 10 A (rms)
 - 380 V: 5 A (rms)
 - 480 V: 5 A (rms)
 - 600 V: 3 A (rms)
 - Breaking capacity for DC power (DC12 as per 947-5-1):
 - 48 V: 3 A
 - 125 V: 0.3 A
 - 250 V: 0.15 A.

DB118391



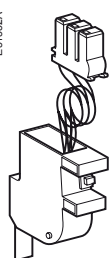
Electrical reset after fault trip (Res)

- Optional equipment, one Res per device
- Not compatible with the SDE/2 option
- Connection cables not included, see below:
 - 110/130 V AC
 - 220/240 V AC
 - Connection cables:
 - 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)

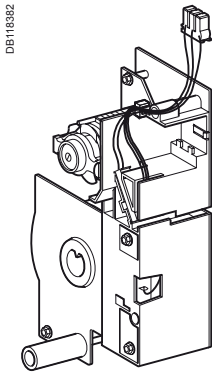
- Standard equipment, one CH contact per device
- The contact indicates the "charged" status of the operating mechanism (springs charged)
- Changeover contact
 - Rated current: 10 A
 - Breaking capacity 50/60 Hz for AC power (AC12 as per 947-5-1):
 - 240 V: 10 A (rms)
 - 380 V: 5 A (rms)
 - 480 V: 5 A (rms)
 - 600 V: 3 A (rms)
 - Breaking capacity for DC power (DC12 as per 947-5-1):
 - 48 V: 3 A
 - 125 V: 0.3 A
 - 250 V: 0.25 A.

E51332A



"Ready to close" contact (PF)

- Optional equipment, one PF contact per device
- Connection cables not included, see below:
 - one PF contact
 - Connection cables:
 - 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
 - Rated current: 10 A
 - Breaking capacity 50/60 Hz for AC power (AC12 as per 947-5-1):
 - 240 V: 10 A (rms)
 - 380 V: 5 A (rms)
 - Breaking capacity for DC power (DC12 as per 947-5-1):
 - 48 V: 3 A
 - 125 V: 0.3 A
 - 250 V: 0.15 A.

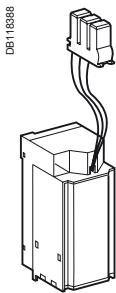


Gear motor (MCH)

- Optional equipment, one MCH gear motor per device
- Connection cables not included, see below:
 - 100/130 V AC
 - 200/240 V AC
 - 277 V AC
 - 380/415 V AC
 - 400/440 V AC
 - 480 V AC
 - 24/30 V DC
 - 48/60 V DC
 - 100/125 V DC
 - 200/250 V DC
- Connection cables:
 - for fixed device
 - for drawout device

- The gear motor automatically charges and recharges the spring mechanism

- Charging time: 4 seconds max.
- Consumption:
 - 180 VAAC
 - 180 W DC
- Inrush current: 2 to 3 In for 0.1 second
- Operating rate: maximum 3 cycles per minute.

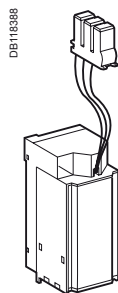


Opening releases MX/1 and MX/2, closing release XF

- 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
- Connection cables not included, see below:
 - standard version:
 - 12 V AC
 - 50/60 Hz / DC
 - 24/30 V AC
 - 50/60 Hz / DC
 - 48/60 V AC
 - 50/60 Hz / DC
 - 100/130 V AC
 - 50/60 Hz / DC
 - 200/250 V AC
 - 50/60 Hz / DC
 - 277 V AC
 - 50/60 Hz / DC
 - 380/480 V AC
 - 50/60 Hz / DC.
 - communicating version (with COM option):
 - 12 V AC
 - 50/60 Hz / DC
 - 24/30 V AC
 - 50/60 Hz / DC
 - 48/60 V AC
 - 50/60 Hz / DC
 - 100/130 V AC
 - 50/60 Hz / DC
 - 200/250 V AC
 - 50/60 Hz / DC
 - 240/277 V AC
 - 50/60 Hz / DC
 - 380/480 V AC
 - 50/60 Hz / DC

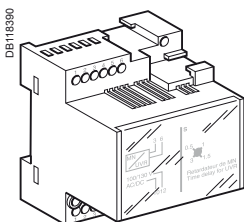
- Connection cables:
 - for fixed device
 - for drawout device
- The MX release instantaneously opens the circuit breaker when energised
- The XF release instantaneously closes the circuit breaker when energised, if the device is "ready to close"

- Device response time:
 - MX: 50 ms ± 10
 - XF: 70 ms +10 / -15
- Operating threshold:
 - MX: 0.7 to 1.1 x Un
 - XF: 0.85 to 1.1 x Un
- The supply can be maintained
- Consumption:
 - pick-up (80 ms): 200 VA
 - hold: 4.5 VA.



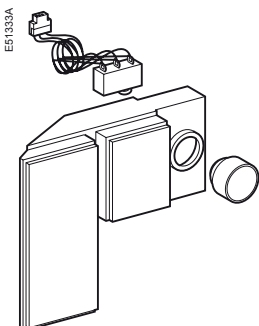
Instantaneous undervoltage releases (MN)

- Optional equipment, 1 MN per device
- Not compatible with the MX/2 opening release
- Connection cables not included, see below:
 - 24/30 V AC
 - 50/60 Hz / DC
 - 48/60 V AC
 - 50/60 Hz / DC
 - 100/130 V AC
 - 50/60 Hz / DC
 - 200/250 V AC
 - 50/60 Hz / DC
 - 380/480 V AC
 - 50/60 Hz / DC
- Connection cables:
 - for fixed device
 - for drawout device
- The MN release instantaneously opens the circuit breaker when its supply voltage drops.
- Device response time: 90 ms $\pm$ 5
- Operating threshold:
 - opening: 0.35 to 0.7 x U_n
 - closing: 0.85 x U_n
- Consumption:
 - pick-up (80 ms): 200 VA
 - hold: 4.5 VA.



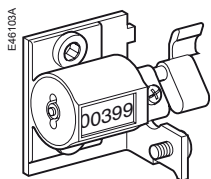
Delay unit for MN releases

- Optional equipment, 1 MN with delay unit per device
- Delay-unit (must be ordered in addition to the MN):
 - 48/60 V AC
 - 50/60 Hz / DC
 - 100/130 V AC
 - 50/60 Hz / DC
 - 200/250 V AC
 - 50/60 Hz / DC
 - 380/480 V AC
 - 50/60 Hz / DC
- The unit delays operation of the MN release to eliminate circuit breaker nuisance tripping during short voltage clips
- The unit is wired in series with the MN and must be installed outside the circuit breaker
- Device response time: 0.5, 1, 1.5, 3 seconds
- Operating threshold:
 - opening: 0.35 to 0.7 x U_n
 - closing: 0.85 x U_n
- Consumption:
 - pick-up (80 ms): 200 VA
 - hold: 4.5 VA.



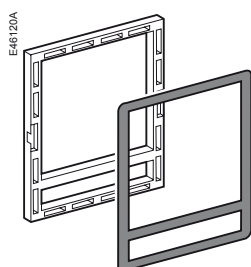
Electrical closing pushbutton (BPFE)

- Optional equipment, 1 BPFE per device
- Connection cables not included, see below
- Connection cables:
 - for fixed device
 - for drawout device
- Located on the front of the device, 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.



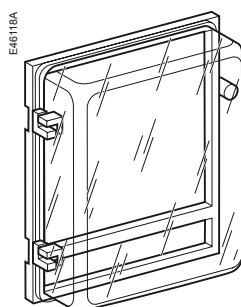
Operation counter (CDM)

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



Escutcheon (CDP)

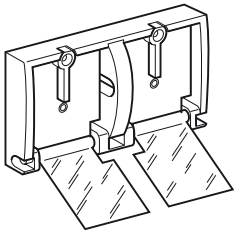
- Optional equipment, one CDP per device
- For fixed device, for drawout device
- The CDP increases the degree of protection to IP40 and IK07 (fixed and drawout devices).



Transparent cover (CP)

- Optional equipment, one CP per device equipped with a CDP
- For fixed and drawout devices
- Mounted with a CDP, the CP increases the degree of protection to IP55 and IK10 (fixed and drawout devices).

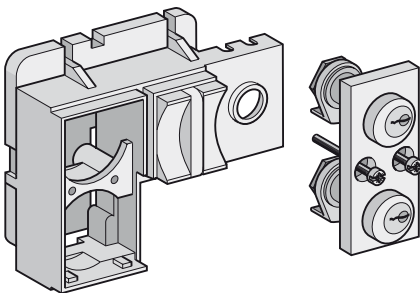
E44238A



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.

E46579A



Device locking in the OFF position using a padlock

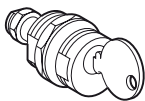
- Optional equipment, one locking system per device
- The unit inhibits local or remote closing of the device
- Up to three padlocks may be used for locking.

Device OFF position locking kit for keylocks

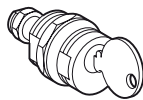
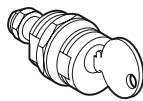
- Optional equipment, one locking kit per device
- Locks not included:
 - for Profalux or Ronis keylocks
 - for Castell keylocks
 - for Kirk keylocks
- The kit inhibits local or remote closing of the device.

Ronis

E51286A

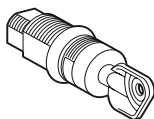


E51273A

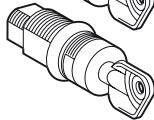
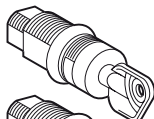


Profalux

E51287A



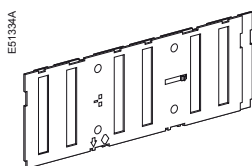
E51274A



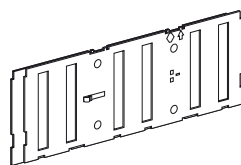
Keylocks required for the device locking kit

- One or two keylocks per locking kit
- Ronis:
 - 1 keylock
 - 2 keylocks:
- Profalux:
 - 1 keylock
 - 2 keylocks.

Top shutter closed.



Bottom shutter closed.

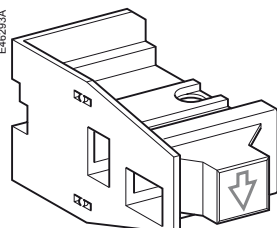


Safety shutters

- Optional equipment
- Set of shutters for top and bottom:
 - NW08/NW40: 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

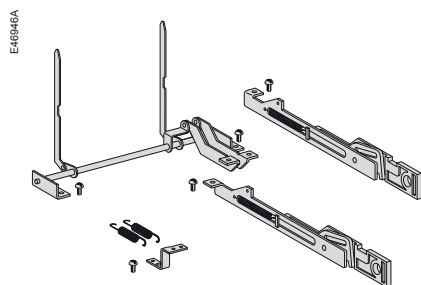
- IP20.



Shutter locking blocks

- Optional equipment: 2 blocks for NW08 to NW40
- 2 blocks

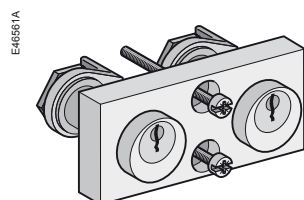
- The block may be padlocked. It:
 - prevents connection of the device
 - locks the shutters in the closed position
 - holds the shutter in the open position.



Shutter position indication and locking on front

- Optional equipment
- NW08/NW40: 3 and 4 poles

- This option located on the front of the chassis:
 - indicates that the shutters are closed
 - can be used to independently or simultaneously padlock the two shutters (top and bottom).

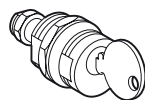
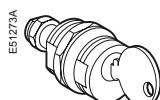
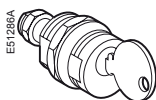


Circuit breaker locking in "disconnected" position

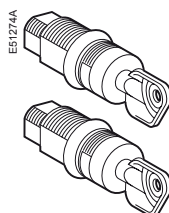
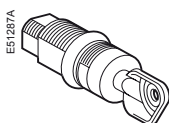
- Optional equipment, one locking system per device
- Keylocks not included: for Profalux or Ronis keylocks for Castell keylocks for Kirk keylocks

- Mounted on the chassis and accessible with the door closed, this system locks the circuit breaker in "disconnected" position using one or two keylocks
- The "disconnected" position locking system may be modified to lock the circuit breaker in all three positions.

Ronis



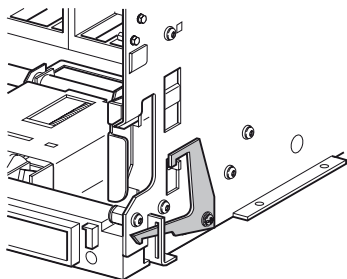
Profalux



Keylocks required with the "disconnected" position locking system

- One or two keylocks per locking system
- Ronis: 1 keylock 2 keylocks
- Profalux: 1 keylock 2 keylocks.

E46852A



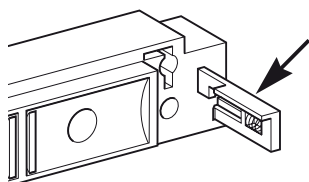
Door interlock

■ 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.

E46124A



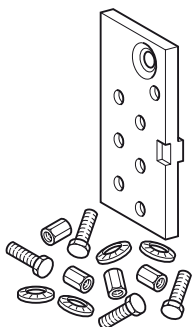
Racking interlock

■ 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.

E46111A

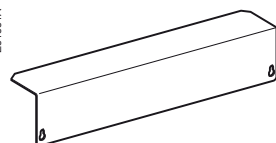


Mismatch protection

■ 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.

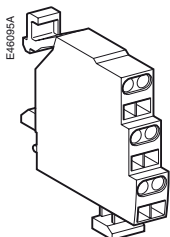
E51351A



Auxiliary terminal shield (CB)

■ Optional equipment, one CB shield per chassis
■ NW08/NW40
3 poles
4 poles

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



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

- Optional equipment, one to nine carriage switches
- Standard configuration, 0 to 3 CE, 0 to 3 CD, 0 to 3 CT
- Other configurations (by ordering additional actuators):
 - 0 to 9 CE, 0 CD, 0 CT
 - 0 to 6 CE, 0 to 3 CD, 0 CT
 - 0 to 6 CE, 0 CD, 0 to 3 CT
- Connection cables not included, see below:
 - 1 carriage switch
 - 1 set of actuators for additional carriage switches
- Connection cables (per carriage switch)
- 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
- Rated current: 10 A
- Breaking capacity 50/60 Hz for AC power (AC12 as per 947-5-1):
 - 240 V: 10 A (rms)
 - 380 V: 5 A (rms)
- Breaking capacity for DC power (DC12 as per 947-5-1):
 - 250 V: 0.3 A.

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).

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 rating and version on the front of the circuit breaker
- presence of any optional functions (remote ON/OFF with motor mechanism, auxiliaries)
- protection settings (instantaneous trip settings)
- 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 the instantaneous pickup settings

(See pages 30 to 32).

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.

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 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 45)
- Check the contacts (see page 45)
- Check the tightness of connections (see the device installation manual)
- Check the disconnecting-contact clusters (see page 47).

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 program for devices used under normal operating conditions:
Ambient temperature: -5° C / +60°C.
Normal atmosphere.

Periodic inspections required

Interval	Operation	Procedure
Each year	■ Open and close the device locally and remotely, successively using the various auxiliaries ■ Test the operating sequences	□ see pages 10 and 11 □ see pages 10 and 11
Every two years	■ Check the arc chutes ■ Check the main contacts ■ Check the tightness of connections ■ Check the disconnecting-contact clusters	□ see page 45 □ see page 45 □ see the device installation manual □ see page 47

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 45
Main contacts	■ Inspection: user ■ Replacement: Schneider After Sales Support	□ see page 45
MCH gear motor	■ User	□ see page 46
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.

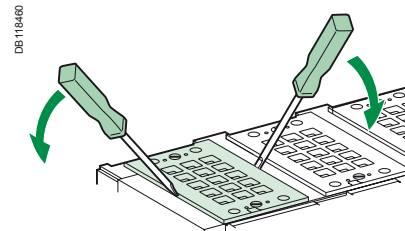
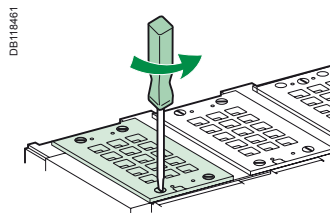
Number of O/C cycles at the rated current

Type of circuit breaker	Maximum service life	Service life of various parts			
		Arc chutes	Main contacts	Connecting-rod springs MCH	MX / XF releases
U = 500 V DC					
NW10 N/H DC	20000	8500	8500	10000	12500
NW20 N/H DC	20000	5000	8500	10000	12500
NW40 N/H DC	20000	2000	4000	10000	12500
U = 900 V DC					
NW10 N/H DC	20000	2000	2000	10000	12500
NW20 N/H DC	20000	2000	2000	10000	12500
NW40 N/H DC	20000	1000	2000	10000	12500

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

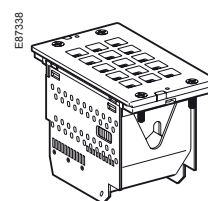
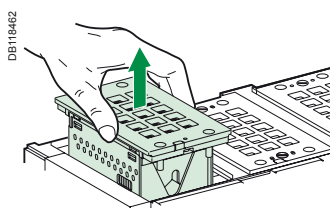
Arc chutes

- Remove the 4 fixing screws:



- Check the arc chutes:
 - ☐ chamber not cracked
 - ☐ separators not corroded
 - ☐ Teflon screens not damaged.

If necessary, replace the arc chutes.



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

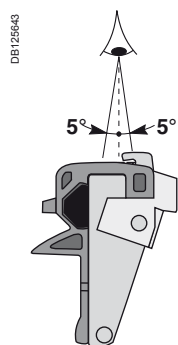
If the contacts are worn, have the concerned poles replaced by the Schneider Service centre.

Wear of main contacts

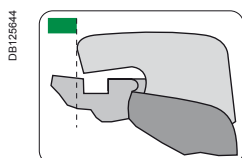
- Remove the arc chutes.
- Close the device and check the contacts.

Note: It is normal to see variations of the wear indication between the poles of a single device that is new or used. A new device does not have a pole in the indication area of contacts worn.

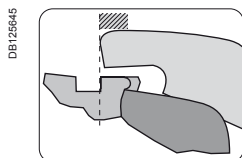
Type A



Contacts OK

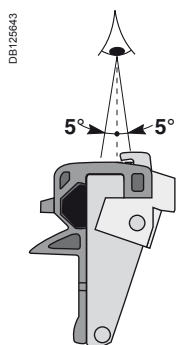


Contacts worn

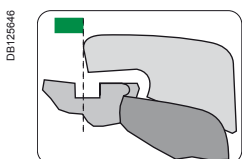


NW	08-40	NA, HA, H1, H2, HA10, H10, NAVY CEI
NW	08-20	N1 CEI
NW	20-40	H3 CEI
NW	10-40	NDC, HDC
NW	08-20	N UL
NW	08-30	H UL
NW	08-40	H2, H3 ANSI
NW	40	EARTHING SWITCH

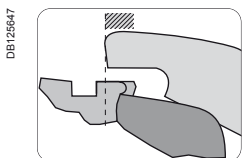
Type B



Contacts OK

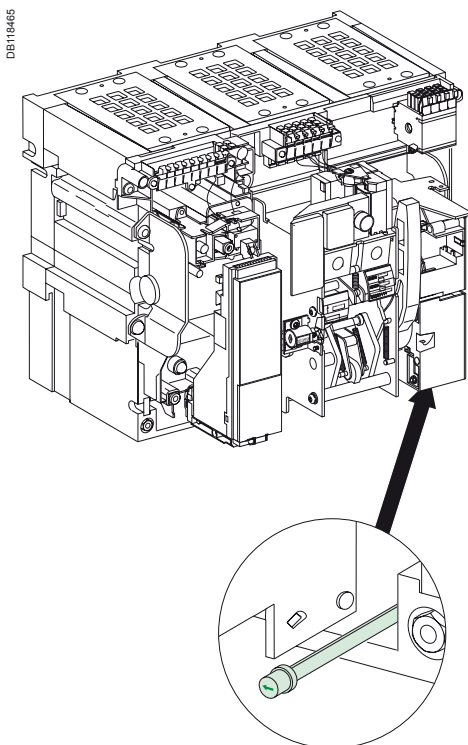


Contacts worn

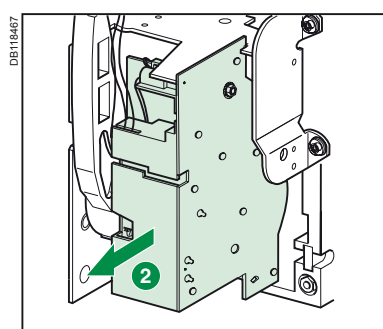
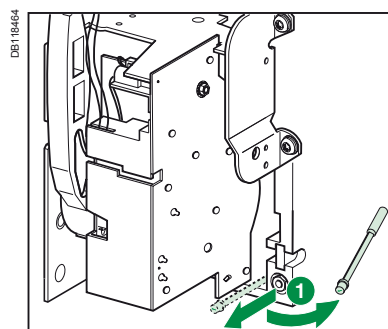


NW	40b-63	H1, H2, NA, HACEI
NW	08-20	L1 CEI
NW	50-60	L UL
NW	08-60	L1 ANSI
NW	08-40	H1 ANSI
NW	10-40	HADC

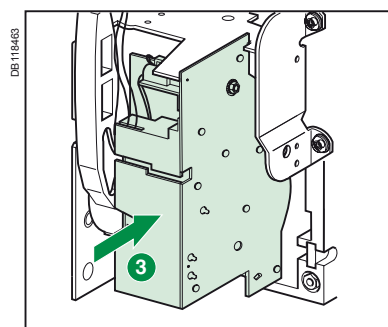
MCH



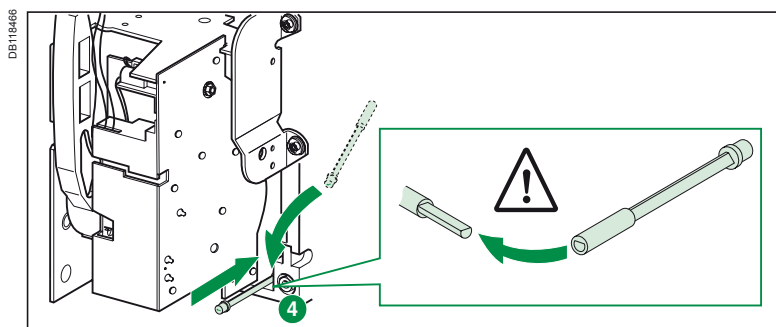
- Remove the setting knob before dismantling the MCH motor mechanism



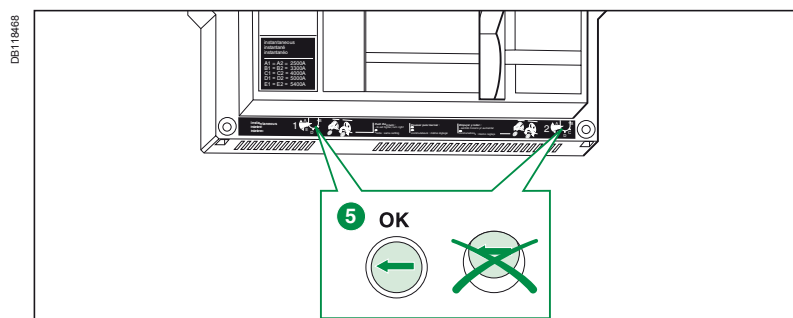
- Refit the MCH motor mechanism



- Refit the setting knob after replacing the MCH motor mechanism



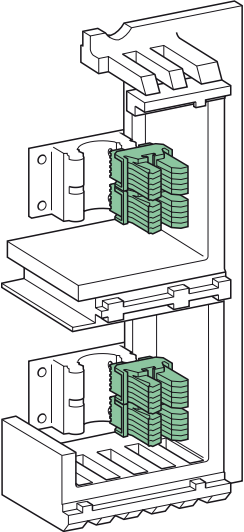
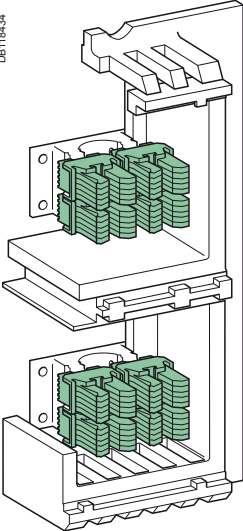
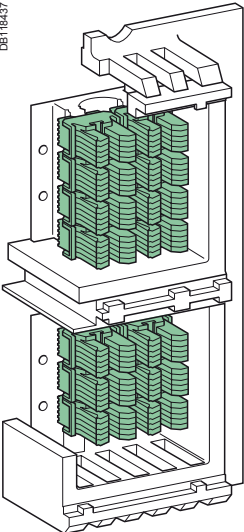
- Replace the front, check that the two setting knobs are positioned correctly.



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

Disconnecting-contact clusters

- Grease the clusters using the grease listed on page 48, supplied by Schneider Electric
- Remove the clusters:
 - 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
- The position of the clusters must correspond to the table below.

NW10 DC	NW20 DC	NW40 DC
4 clusters/pole	8 clusters/pole	14 clusters/pole
 DB118435	 DB118434	 DB118437

Electrical accessories

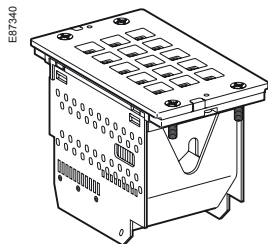
The electrical accessories that may require replacement are the following:

- MCH gear motor
- MX opening release(s)
- XF closing release
- MN undervoltage release.

See pages 35 and 36 in the "Auxiliaries for remote operation" section for their characteristics.

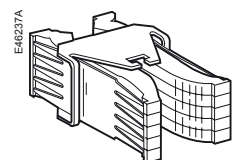
Arc chutes

- 1 arc chute:
NW type DC.



Disconnecting-contact clusters

- 1 cluster
- Number per circuit breaker,
see table page 47.

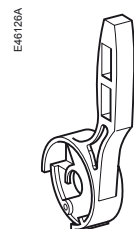


Grease for disconnecting-contact clusters

- 1 can

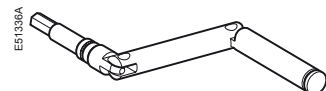
Charging handle

- 1 handle per device.



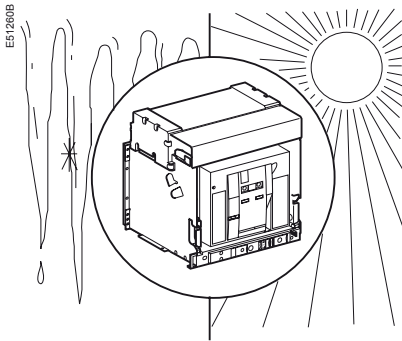
Crank

- 1 crank per device.



Problem	Probable causes	Solutions
Circuit breaker cannot be closed locally or remotely	■ Circuit breaker padlocked or keylocked in the "open" position ■ Circuit breaker interlocked mechanically in a source changeover system ■ Circuit breaker not completely connected ■ The reset button signalling a fault trip has not been reset ■ Stored energy mechanism not charged ■ MX opening shunt release permanently supplied with power ■ MN undervoltage release not supplied with power. ■ XF closing release continuously supplied with power, but circuit breaker not "ready to close" (XF not wired in series with PF contact) ■ 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 the locking function □ check the position of the other circuit breaker in the changeover system □ modify the situation to release the interlock □ terminate racking in (connection) of the circuit breaker □ clear the fault □ push the reset button on the front of the circuit breaker □ 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) □ there is an opening order. Determine the origin of the order. The order must be cancelled before the circuit breaker can be closed. □ there is an opening order. Determine the origin of the order. □ check the voltage and the supply circuit ($U > 0.85 U_n$). - If the problem persists, replace the release. □ 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" □ 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 ($0.85 - 1.1 U_n$). - 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 ■ Load-shedding order sent to the MX opening release by another device ■ Unnecessary opening order from the MX opening release	□ check the voltage and the supply circuit ($U > 0.85 U_n$) □ check the overall load on the distribution system □ if necessary, modify the settings of devices in the installation □ 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 ■ Transient overcurrent when closing ■ Closing on a short-circuit	□ see the user manual of the control unit □ press the reset button □ 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 □ clear the fault □ check the condition of the circuit breaker before putting it back into service □ press the reset button

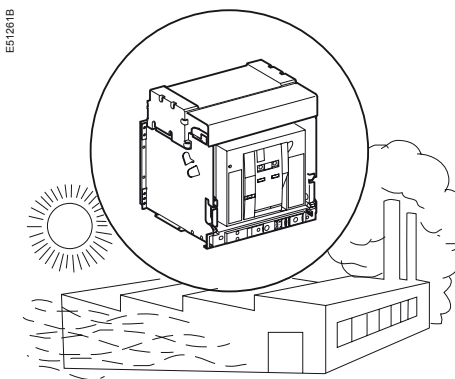
Problem	Probable causes	Solutions
Circuit breaker cannot be closed remotely, but can be opened locally	■ Opening order not executed by the MX opening release ■ Opening order not executed by the MN undervoltage release	□ check the voltage and the supply circuit (0.7 - 1.1 Un) If the problem persists, replace the MX release □ drop in voltage insufficient or residual voltage (> 0.35 Un) across the terminals of 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 can be reset locally but not remotely	■ Insufficient supply voltage for the MCH gear motor	□ check the voltage and the supply circuit (U > 0.85 Un)). If the problem persists, replace the MCH gear motor
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 ■ The rails are not completely out	□ turn the crank until the circuit breaker is in disconnected position and the reset button out □ pull the rails all the way out
Circuit breaker cannot be connected (racked in)	■ Chassis/circuit breaker mismatch protection ■ The safety shutters are locked ■ The disconnecting-contact clusters are incorrectly positioned ■ Chassis locked in disconnected position ■ The reset button has not been pressed, preventing rotation of the crank ■ The circuit breaker has not been sufficiently inserted in the chassis	□ check that the chassis corresponds with the circuit breaker □ remove the lock(s) □ reposition the clusters □ disable the chassis locking function □ press the reset button □ 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 the crank is still in the chassis	□ check the circuit breaker position by making sure the reset button is out 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 ■ The circuit breaker is not in the right position ■ The crank is still in the chassis	□ contact a Schneider service centre □ check the circuit breaker position by making sure the reset button is out □ remove the crank and store it
The crank cannot be inserted to connect or disconnect	■ The rails are not completely in the circuit breaker	□ push the rails all the way in
The right-hand rail (chassis alone) or the circuit breaker cannot be drawn out	■ The crank is still in the chassis	□ remove the crank and store it



Ambient temperature

Masterpact NW DC devices can operate under the following temperature conditions:

- The electrical and mechanical characteristics are stipulated for an ambient temperature of -5°C to $+70^{\circ}\text{C}$
- Circuit breaker closing is guaranteed down to -35°C
- Masterpact NW DC can be stored in an ambient temperature of -35°C to $+85^{\circ}\text{C}$
- The control unit can be stored in an ambient temperature of -25°C to $+85^{\circ}\text{C}$.



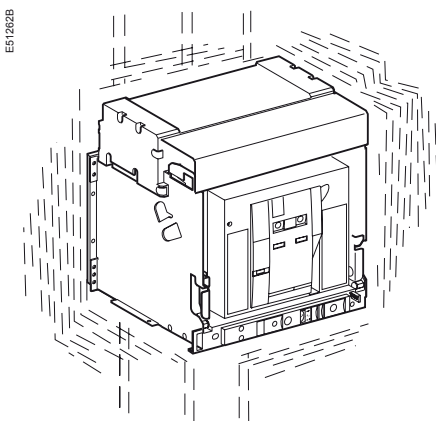
Extreme atmospheric conditions

Masterpact NW DC 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 $+85^{\circ}\text{C}$
- IEC 68-2-30: damp heat (temperature $+55^{\circ}\text{C}$, relative humidity 95%)
- IEC 68-2-52 level 2: salt mist.

Masterpact NW DC 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



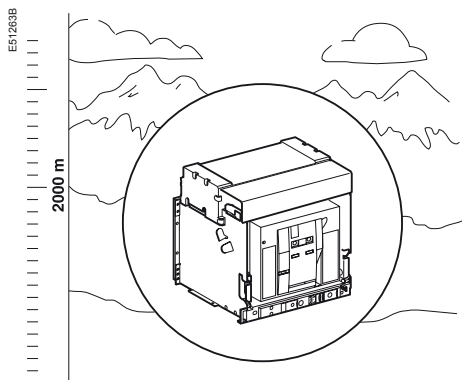
Vibrations

Masterpact NW DC 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 $\pm 1\text{ mm}$
- 13.2 to 100 Hz: constant acceleration 0.7 g.

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

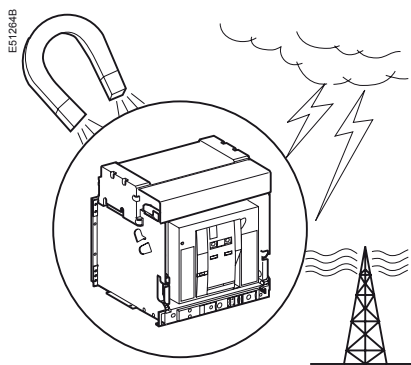


Altitude

Masterpact NW DC 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 resistance voltage (V)	3500	3150	2500	2100
Average insulation level (V)	1000	900	700	600
Maximum utilisation voltage (V)	690	590	520	460
Average thermal current (A) at 40 °C	1 x In	0.99 x In	0.96 x In	0.94 x In



Electromagnetic disturbances

Masterpact NW DC devices are protected against:

- overvoltages caused by devices that generate electromagnetic disturbances
- overvoltages caused by an atmospheric disturbances or by a distribution-system outage (e.g. failure of a lighting system)
- devices emitting radio waves (radios, walkie-talkies, radar, etc.)
- electrostatic discharges produced by users.

Masterpact NW DC devices have successfully passed the electromagnetic-compatibility tests (EMC) defined by the following international standards:

- IEC 947-2, appendix F.

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:

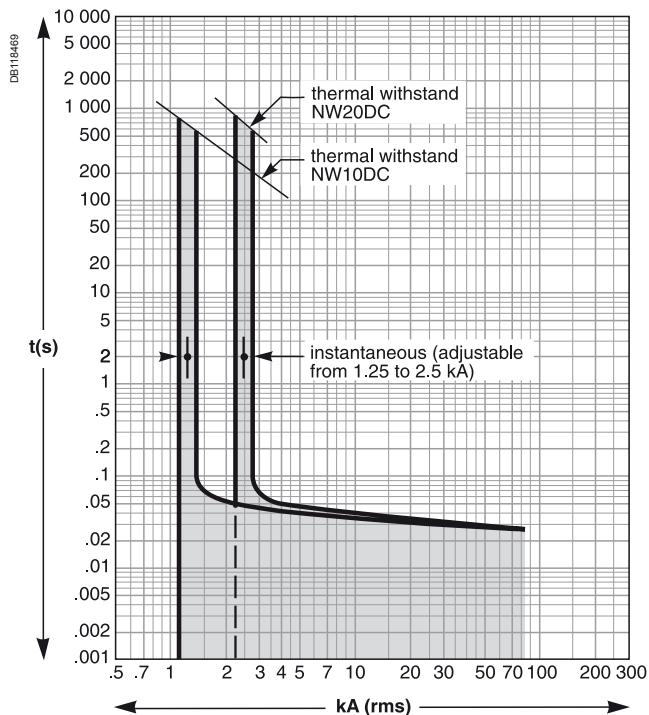
clean with a dry cloth whenever possible. If solvent, soap or any other cleaning product must be used, make sure that it does not come into contact with non-metallic parts.

Tripping curves

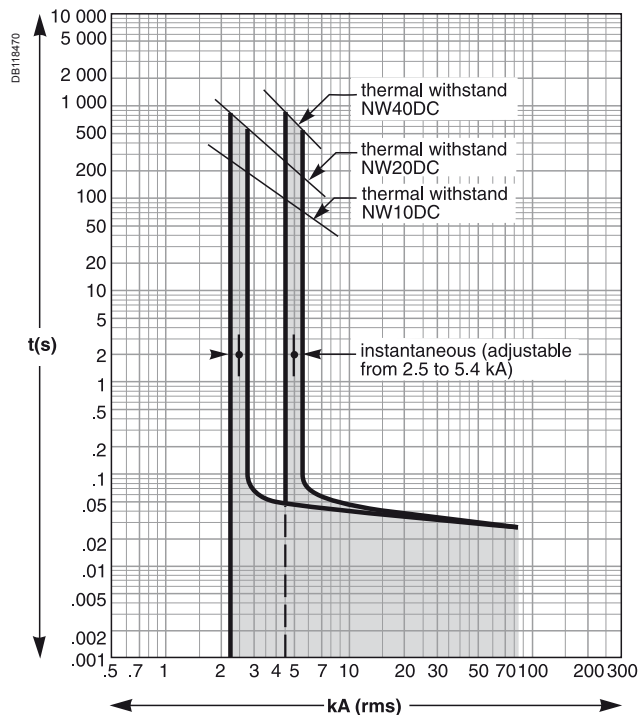
$U = 500 \text{ V DC}, L/R = 15 \text{ ms}$

Micrologic DC1.0 instantaneous protection

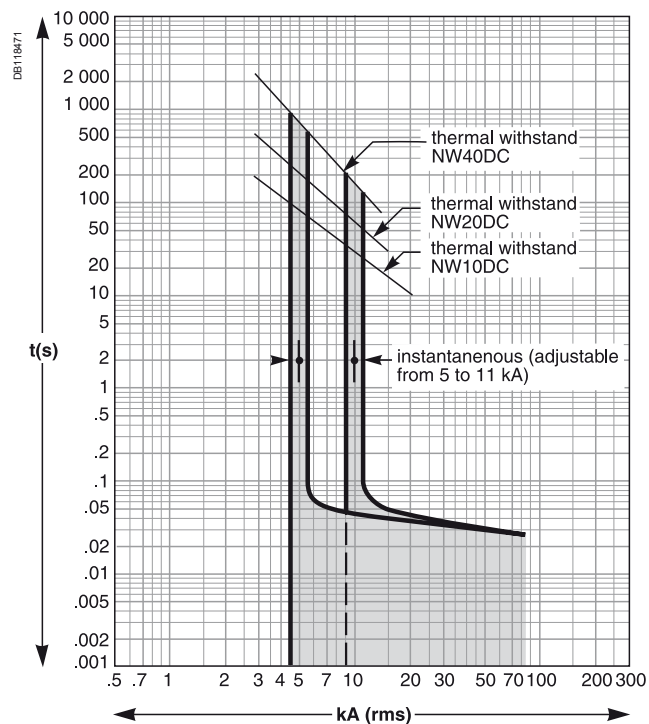
1250 - 2500 A sensors



2500 - 5400 A sensors



5000 - 11000 A sensors

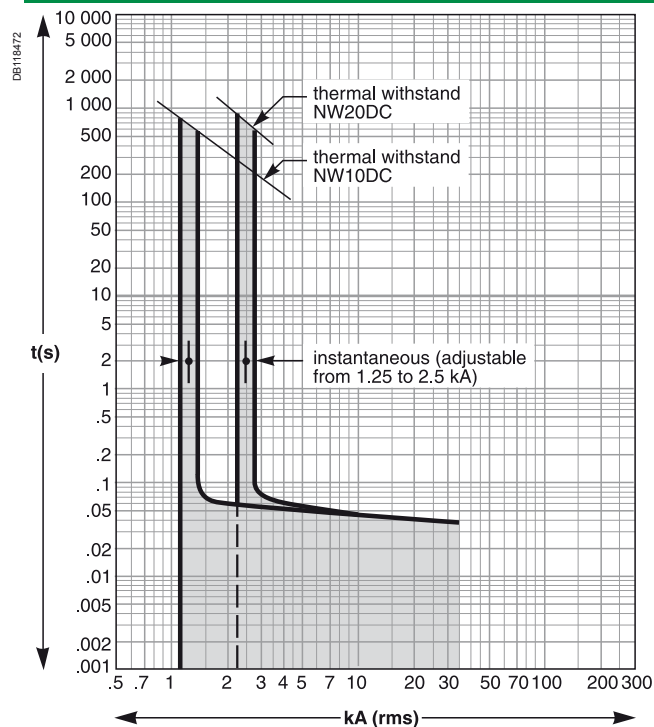


Tripping curves

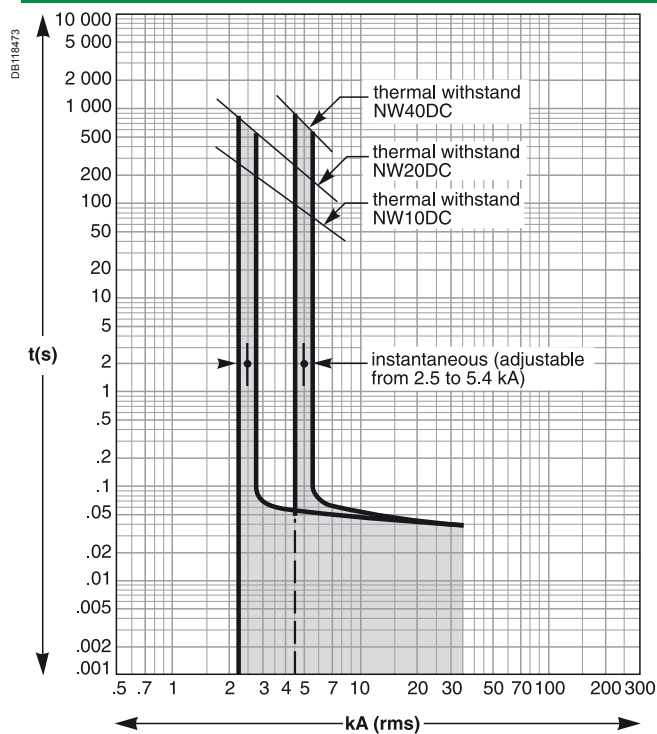
$U = 900 \text{ V DC}, L/R = 15 \text{ ms}$

Micrologic DC1.0 instantaneous protection

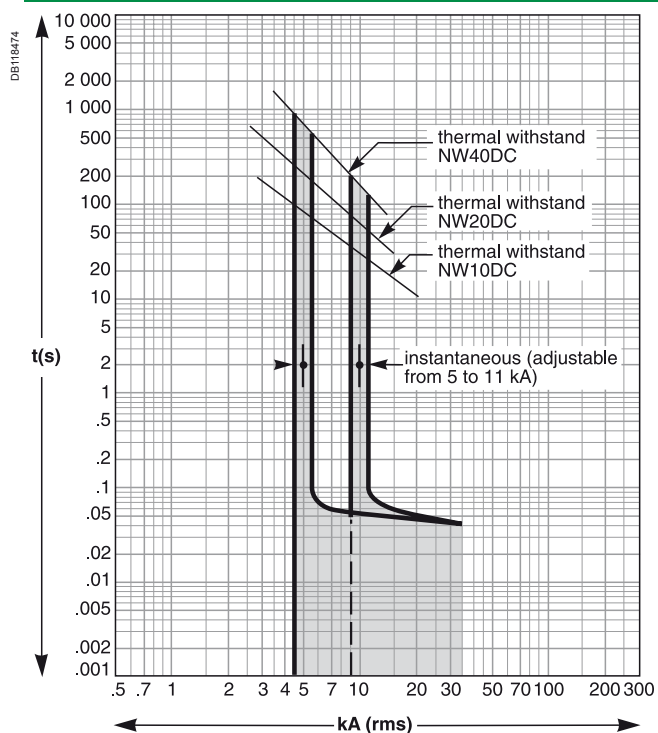
1250 - 2500 A sensors



2500 - 5400 A sensors



5000 - 11000 A sensors



Notes

Schneider Electric Industries SAS

35, rue Joseph Monier
CS 30323
F - 92506 Rueil Malmaison Cedex

RCS Nanterre 954 503 439
Capital social 896 313 776 €
www.schneider-electric.com

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