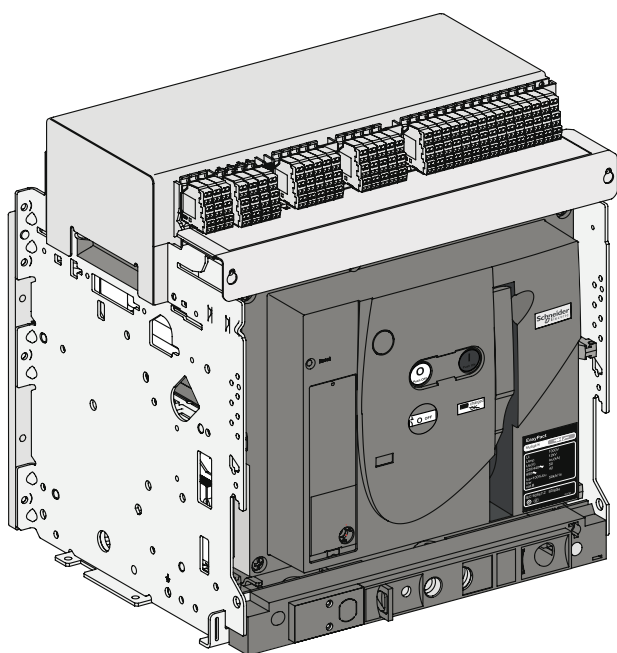


Low Voltage Products

EasyPact MVS

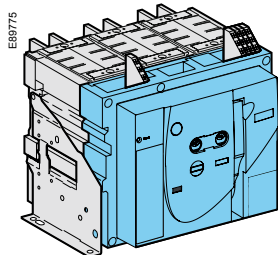
User manual

11/2014



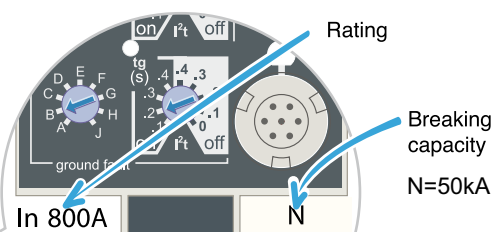
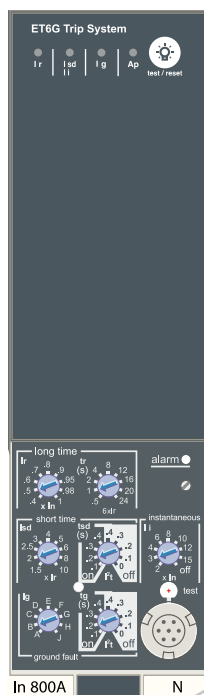
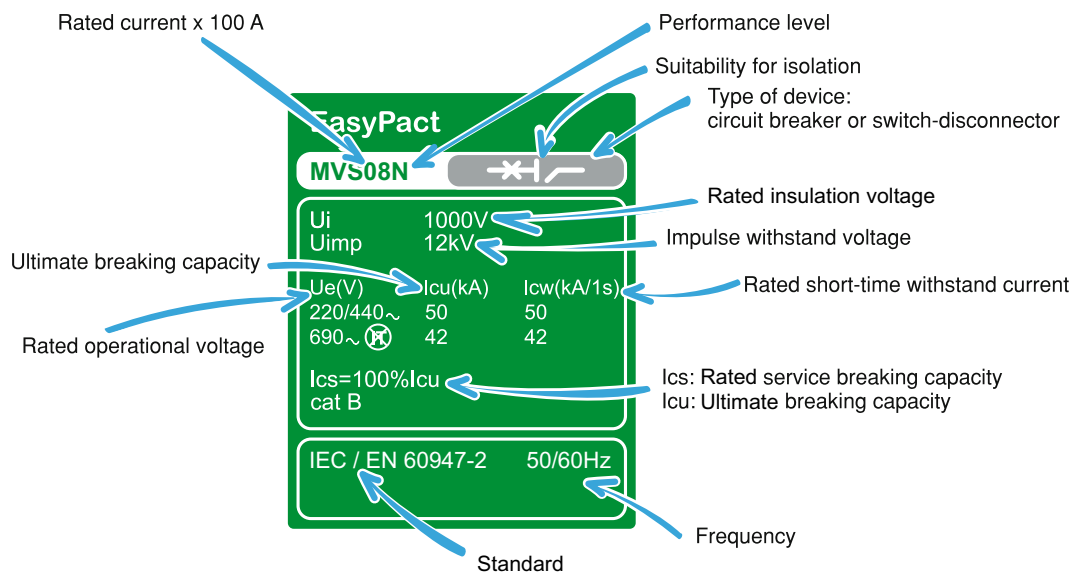
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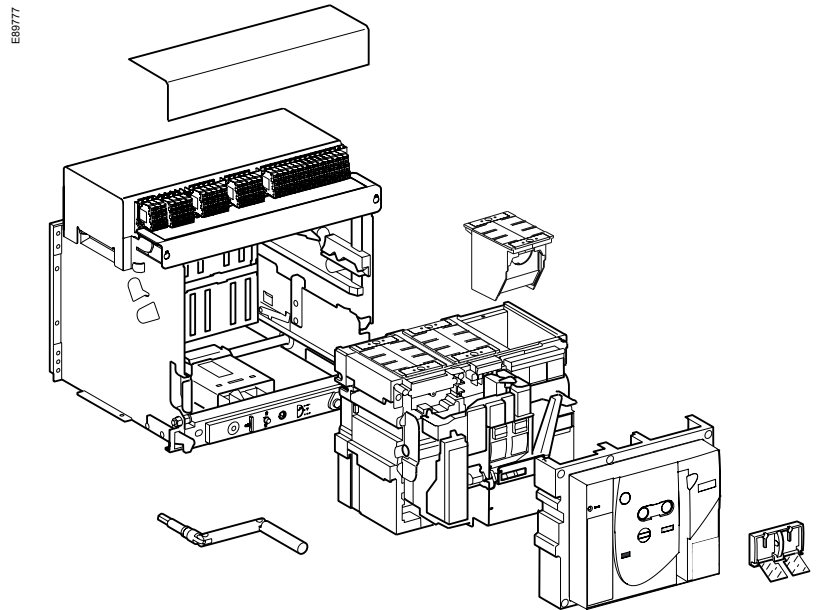
The EasyPact MVS range of circuit breakers and switch-disconnectors offer current ratings from 800 A to 4000 A.

Rating plate

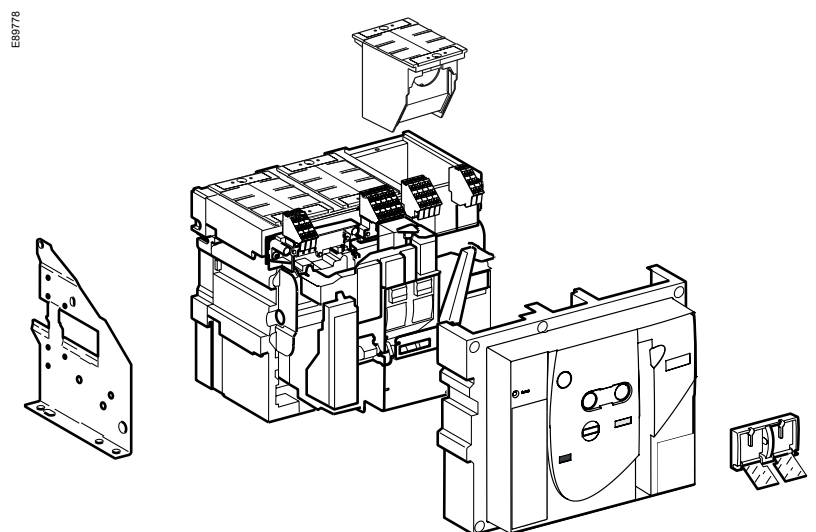


EasyPact MVS circuit breakers are available in drawout and fixed versions. The drawout version is mounted on a chassis and the fixed version is installed using fixing brackets.

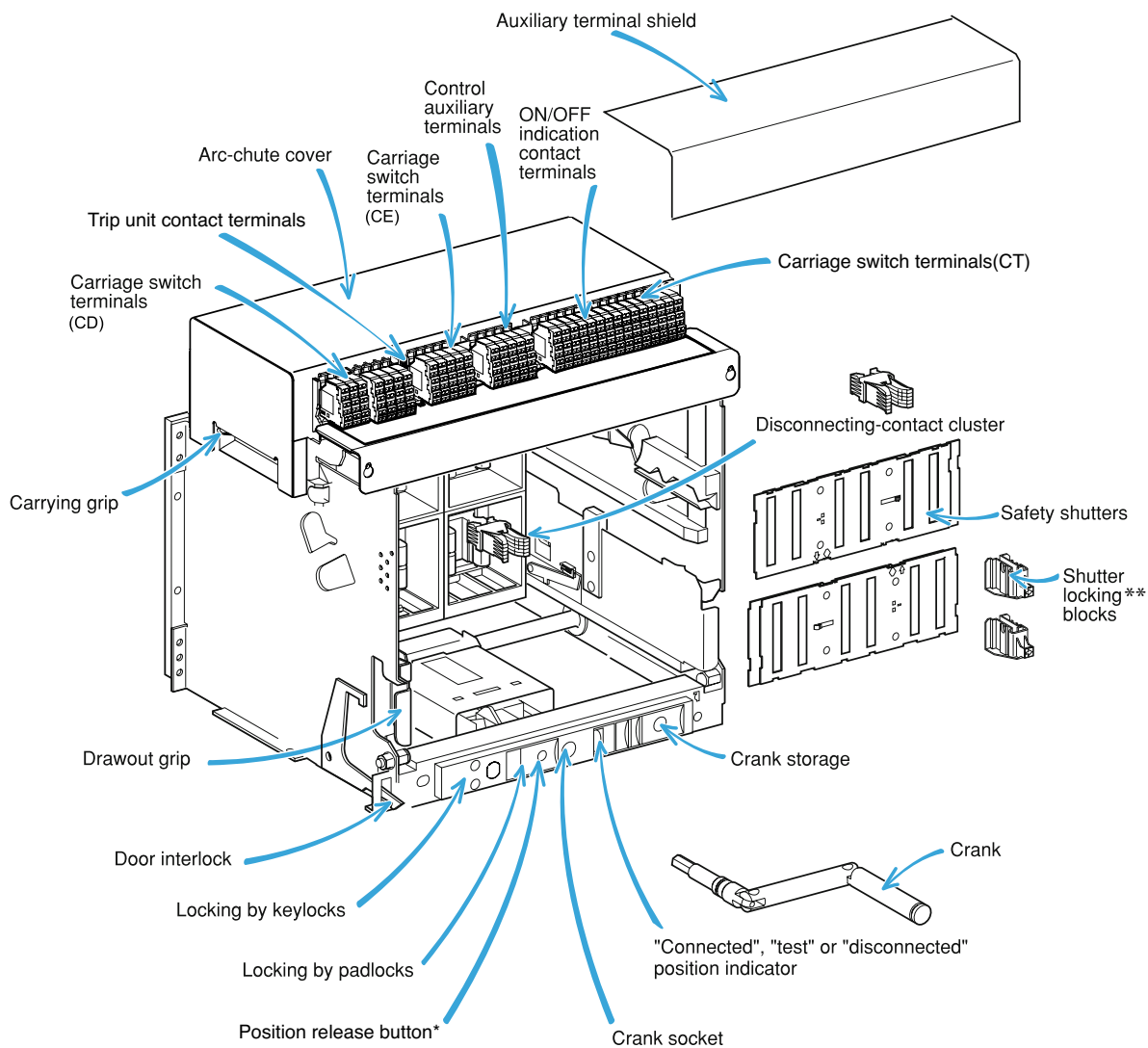
Drawout version



Fixed version



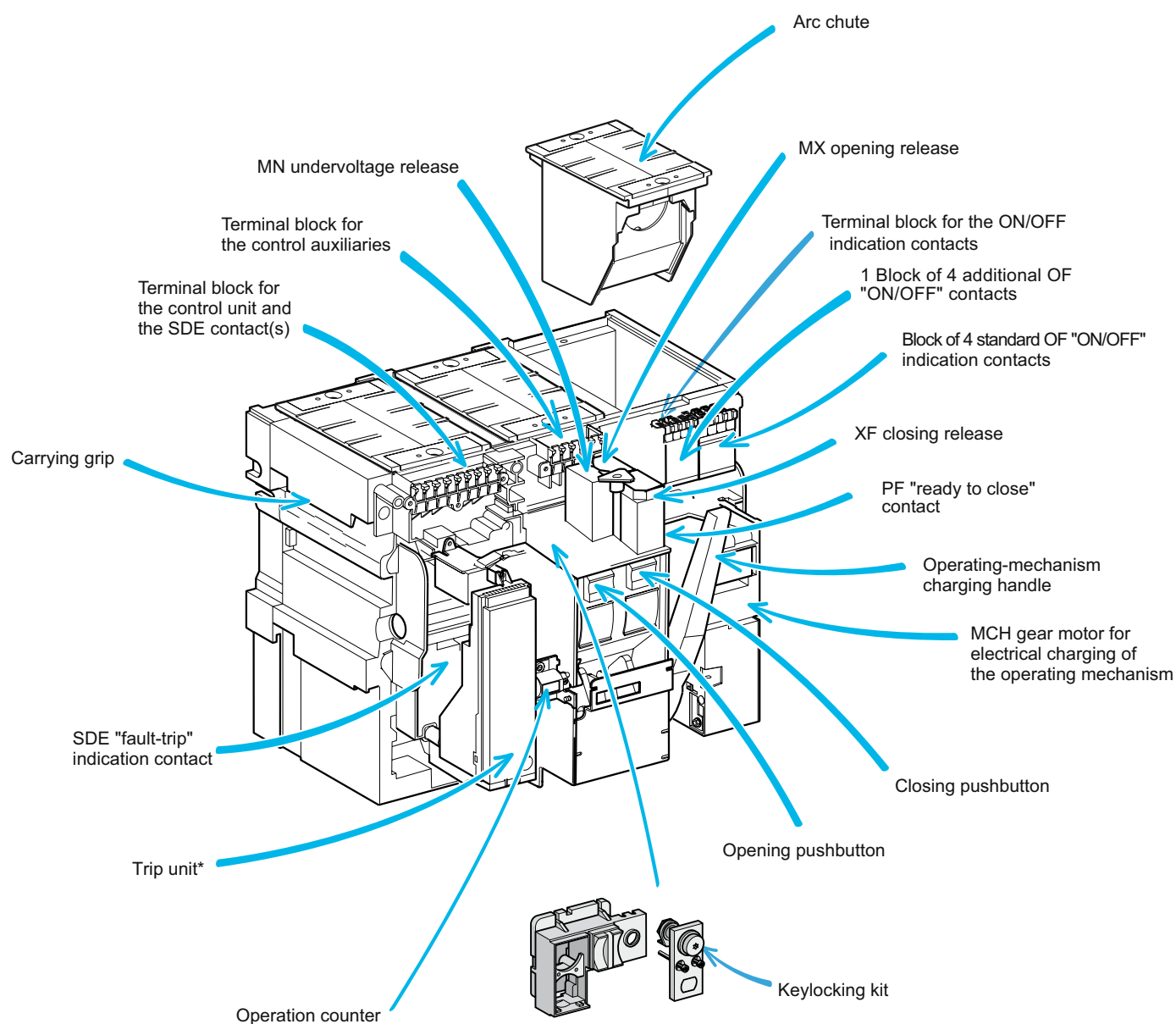
Chassis



* During racking-in or racking-out operation of circuit breaker an automatic racking lock button pops out at every distinct position - "Connected", "Test" and "Disconnected". This lock indicates that exact position of the breaker is achieved and blocks operation of the crank. Make sure that the position release button, is pushed-in before rotating the crank.

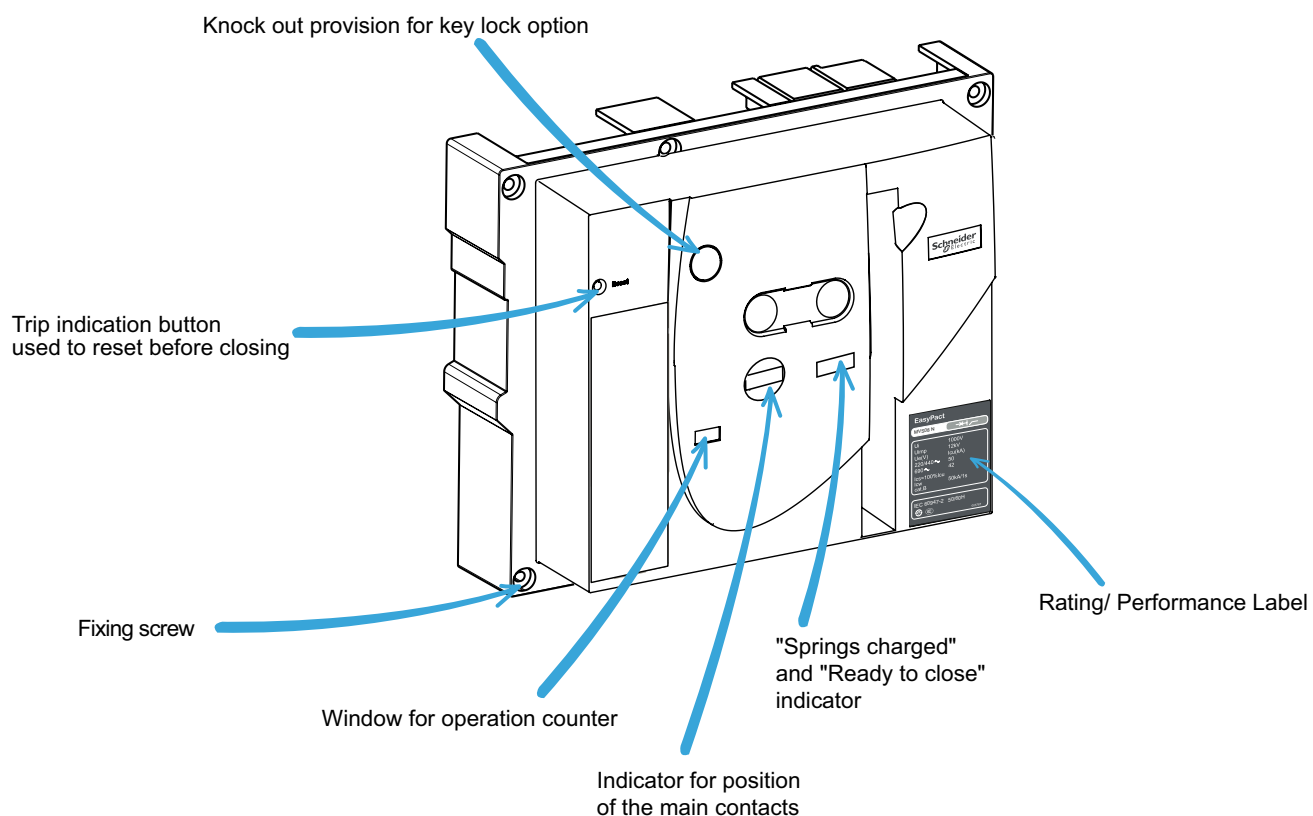
** Optional device- Not supplied as standard.

Circuit breaker / switch-disconnector



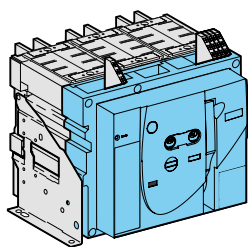
*Switch-disconnector is supplied without trip unit.

Front cover (standard)



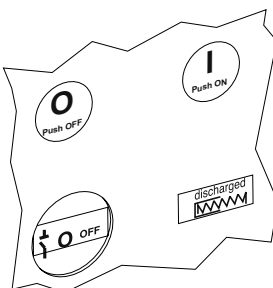
Understanding the controls and indications

EB9775



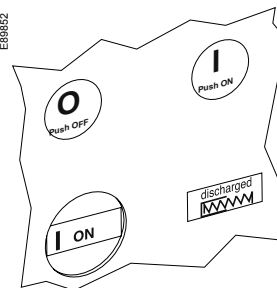
Circuit breaker open and discharged

EB9851



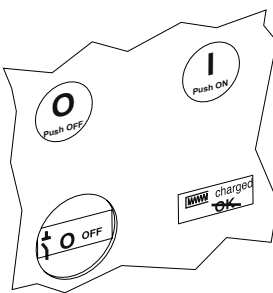
Circuit breaker closed and discharged

EB9852



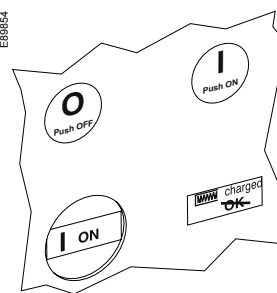
Circuit breaker open, charged and not "ready to close"

EB9853



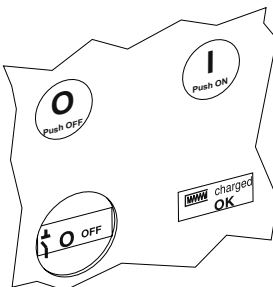
Circuit breaker closed, charged and not "ready to close"

EB9854

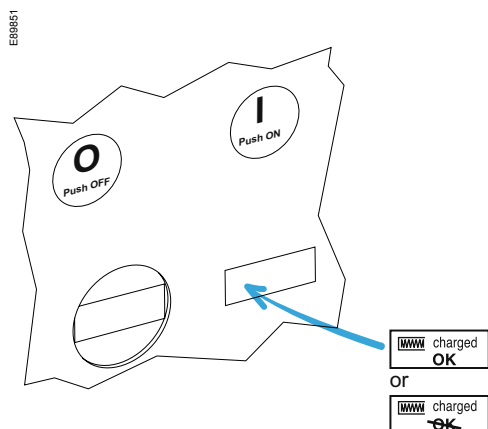


Circuit breaker open, charged and "ready to close"

EB9855

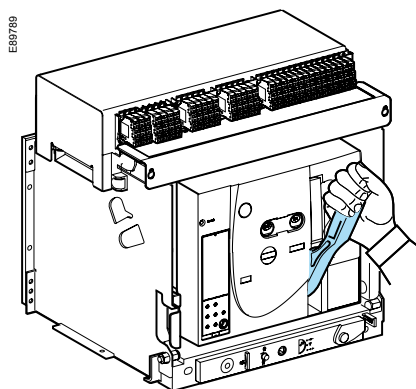


The charge status is indicated as follows.

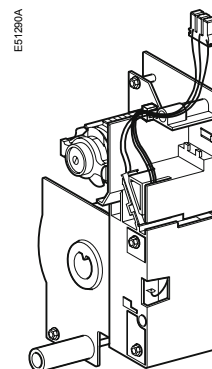


The springs in the circuit breaker operating mechanism must be charged to store the energy required to close the main contacts. The springs may be charged manually using the charging handle or the optional MCH gear motor.

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



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



Device "ready to close"

E51201A



Device not "ready to close"

E51202A



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:

1. device open (OFF)
2. springs charged
3. no opening order present.

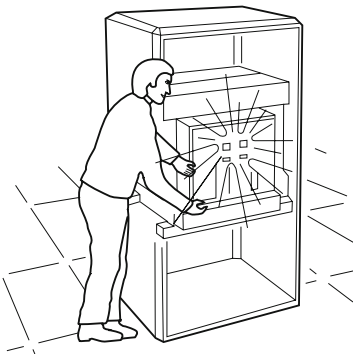
If the circuit breaker is not "ready to close" when the order is given, stop the order and start again when the circuit breaker is "ready to close".

Closing the circuit breakers

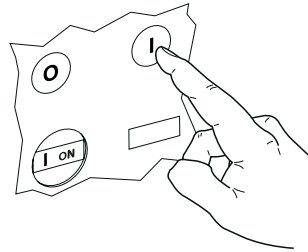
Locally (mechanical)

Press the mechanical ON pushbutton.

E51210A



E50805B



WARNING

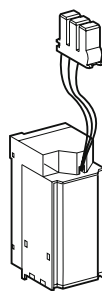
- The device should only be installed and serviced by professionals.
- Avoid installation of XF release at MX position

Failure to follow the instruction of MN-MX-XF can not keep the circuit breaker at OFF position by remote control that resulting equipment damage or risk of life.

Remotely

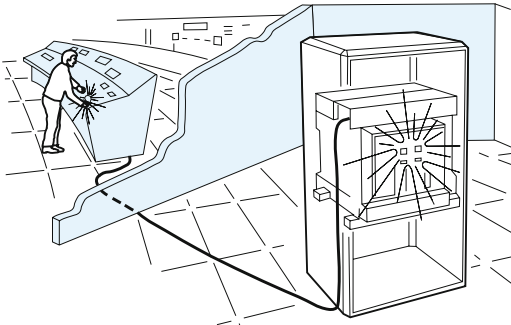
XF

E51204A



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.

E51203A



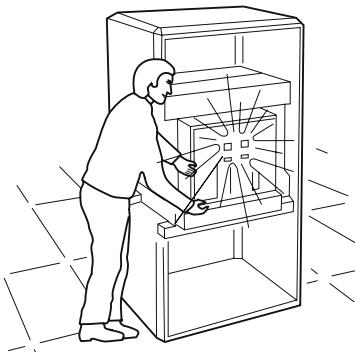
Enabling or disabling the anti-pumping function

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.

Opening the circuit breaker Resetting after a fault trip

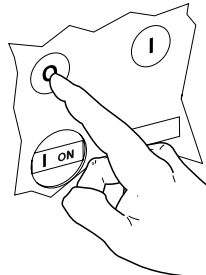
E51216A



Locally

Press the OFF pushbutton.

E08065B



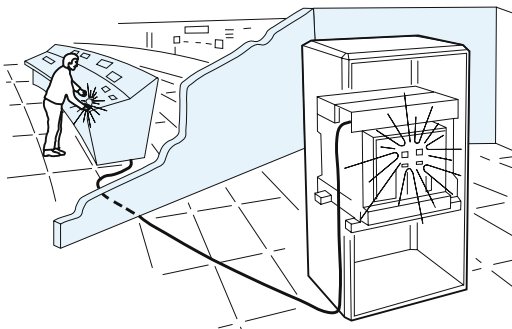
Remotely

Use one of the following solutions:

1. one MX opening releases (0.7 to 1.1 Un)
2. one MN undervoltage release (0.35 to 0.7 Un)
3. one MN undervoltage release (0.35 to 0.7 Un) with a delay unit (R or Rr).

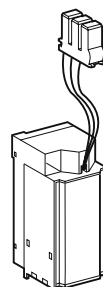
When connected to a remote control panel, these releases can be used to open the circuit breaker remotely.

E51283A



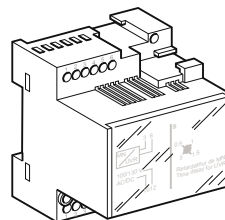
MX, MN

E51284

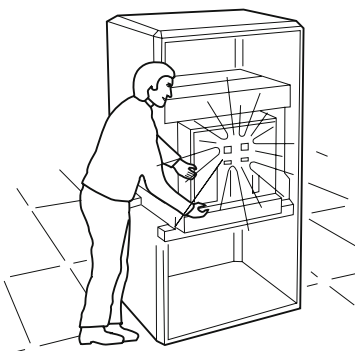


Delay unit

E51285A



E51216A



Resetting after a fault trip

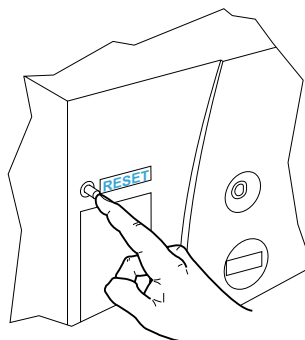
The circuit breaker signals a fault by:

1. a mechanical indicator on the front panel
2. one SDE "fault-trip" indication contacts.

Locally

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

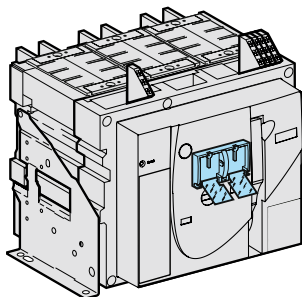
E08080



Locking the controls

Disabling circuit-breaker local closing and opening

E89775

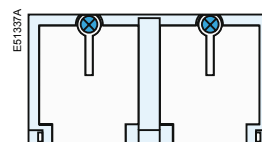
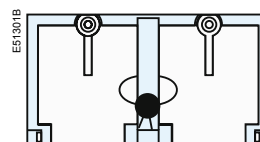
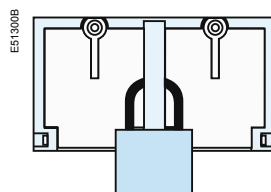


Pushbutton locking using a padlock (shackle diameter 5 to 8 mm), a lead seal or screws.

Padlock

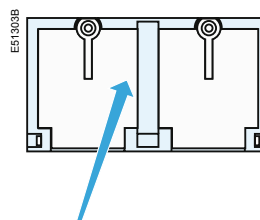
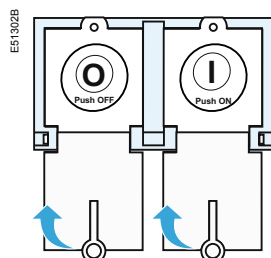
Lead seal

Screws

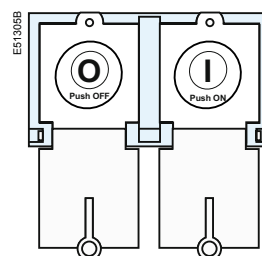
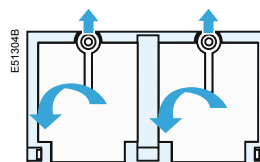
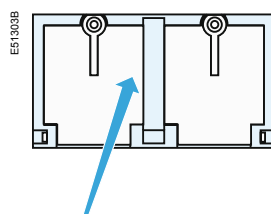


Locking

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.

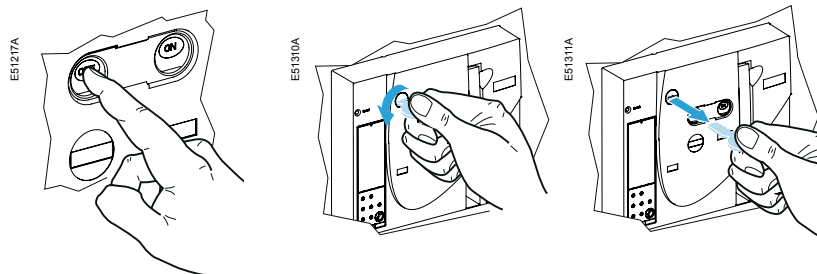
Locking the controls

Disabling local and remote closing

Locking the controls with one keylock

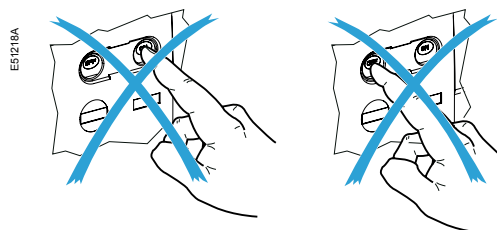
Locking

Open the circuit breaker. Turn the key, anti-clockwise. Remove the key.



Check

The controls are inoperative.

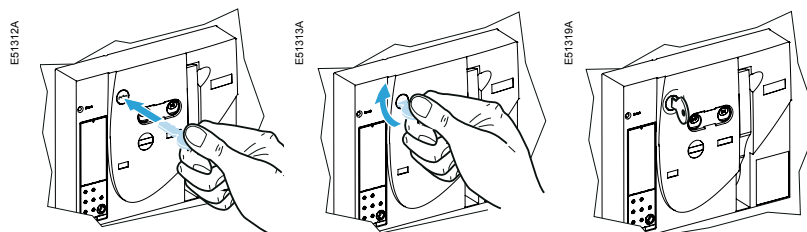


Unlocking

Insert the key.

Turn the key, clockwise.

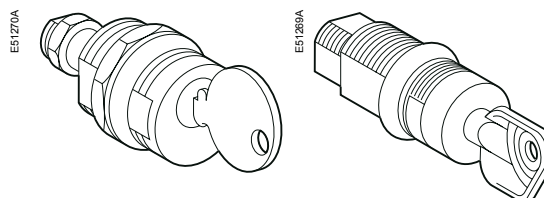
The key cannot be removed.



Two types of keylocks are available.

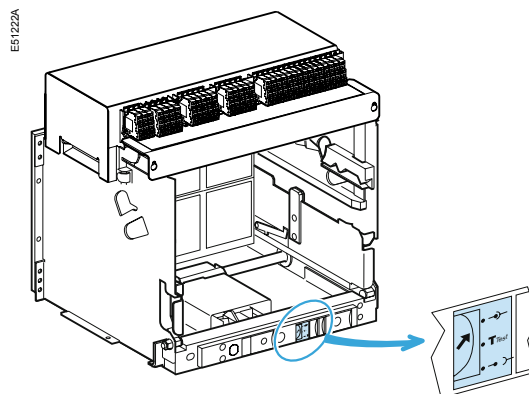
RONIS

PROFALUX

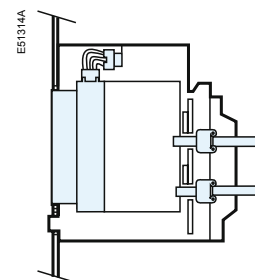
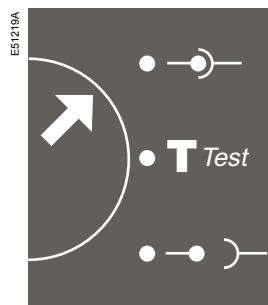


Identifying the circuit breaker positions

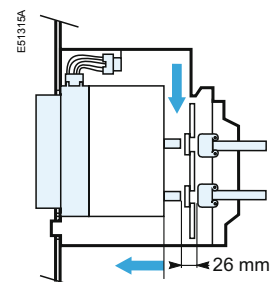
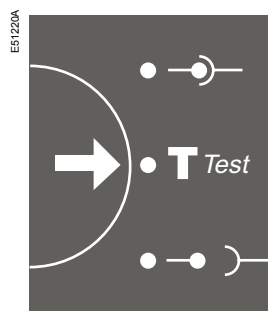
The indicator on the front signals the position of the circuit breaker in the chassis.



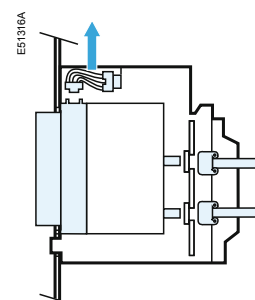
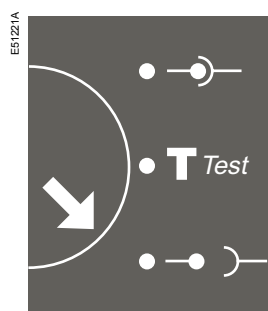
1. "connected" position



2. "test" position



3. "disconnected" position

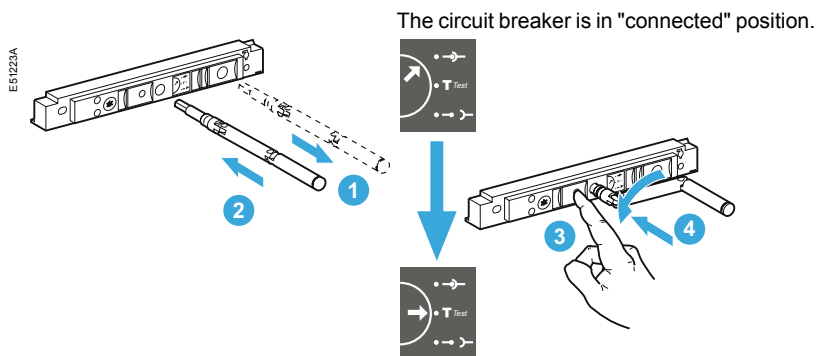


These operations require that all chassis-locking functions be disabled.

Prerequisites

To connect and disconnect EasyPact MVS, the crank must be used. The locking systems and padlocks inhibit use of the crank.

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

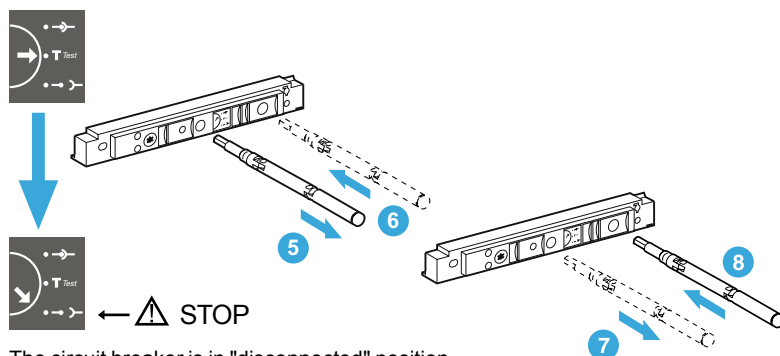


The circuit breaker is in "connected" position.

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

In "Test" position the racking interlock button pops out. This interlock blocks the rotation of crank. Push the release button to rotate the crank.

The circuit breaker is in "test" position.



The circuit breaker is in "disconnected" position.



WARNING

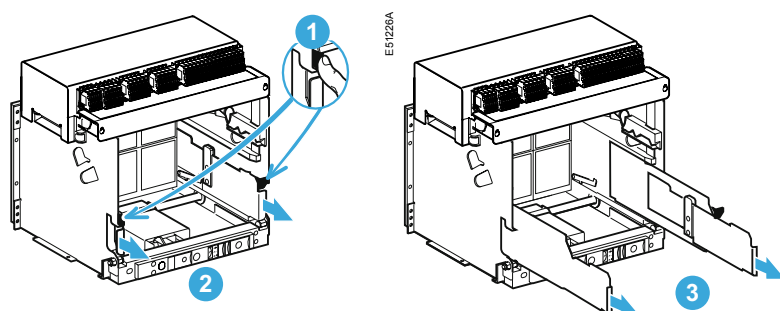
- Avoid rotation of crank anticlockwise when the device is in "disconnected" position.
 - Avoid rotation of crank clockwise when the device is in "connected" position.
- Failure to follow the instruction can result in equipment damage.

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.

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



Racking

Inserting EasyPact MVS

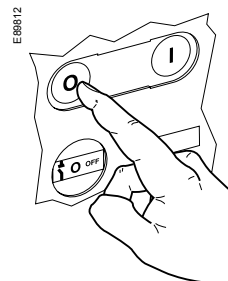
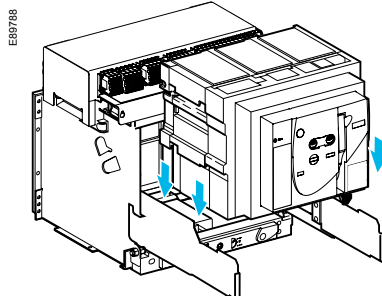
For complete information on EasyPact MVS handling and mounting, see the installation manual(s).

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

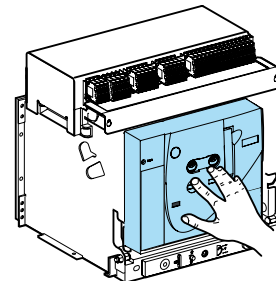
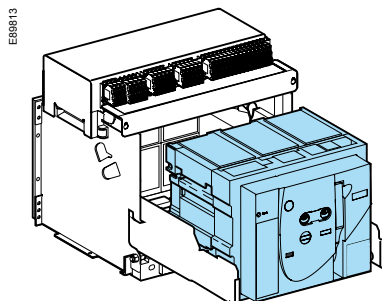
Inserting EasyPact MVS

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).

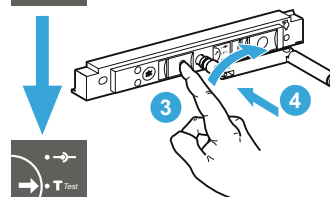
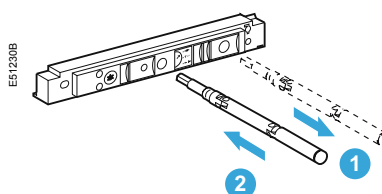


Push the circuit breaker into the chassis, taking care not to push on the ET Trip System.



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

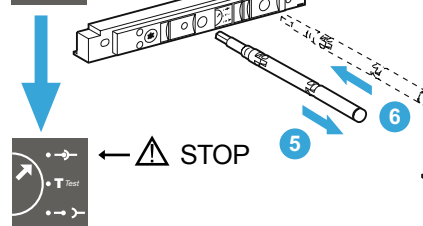
The device is in "disconnected" position



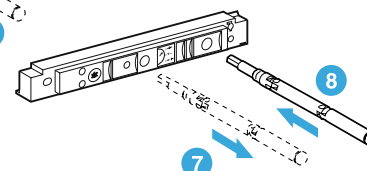
The device is in "test" position. Remove the crank or continue to "connected" position.

In "Test" position the racking interlock button pops out. This interlock blocks the rotation of crank. Push the release button to rotate the crank.

The device is in "test" position.



The device is in "connected" position.



! WARNING

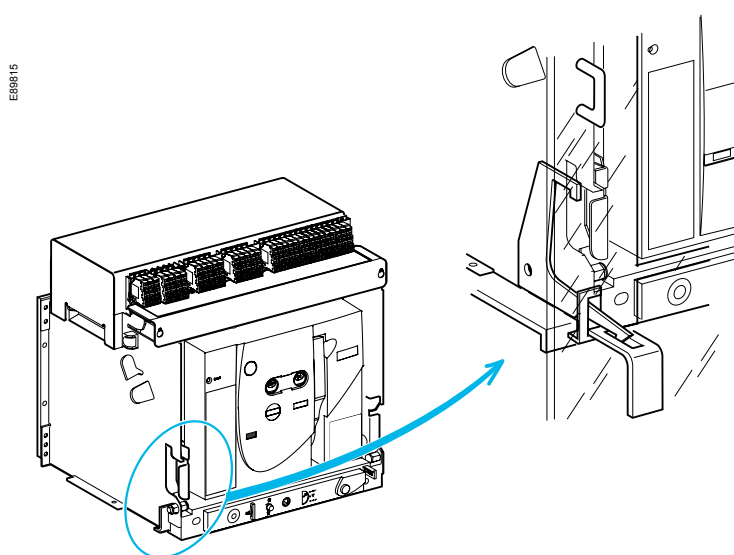
- Avoid rotation of crank anticlockwise when the device is in "disconnected" position.
 - Avoid rotation of crank clockwise when the device is in "connected" position.
- Failure to follow the instruction can result in equipment damage.

STOP

Door interlock

The locking device is installed on the left or right-hand side of the chassis:

1. when the circuit breaker is in "connected" or "test" position, the latch is lowered and the door is locked
2. when the circuit breaker is in "disconnected" position, the latch is raised and the door is unlocked.

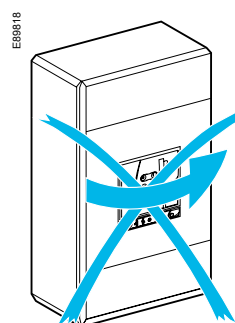
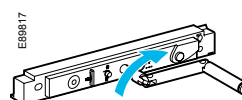
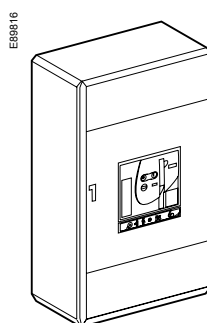


Disabling door opening

Close the door.

Put the EasyPact MVS in "test" or "connected" position.

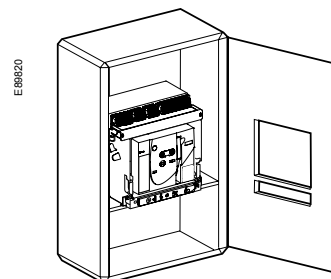
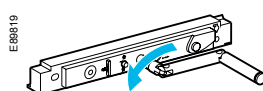
The door is locked.



Enabling door opening

Put the EasyPact MVS in "disconnected" position.

The door is unlocked.



Locking the circuit breaker in disconnected position

Padlocks and keylocks may be used together.

Combination of locking systems

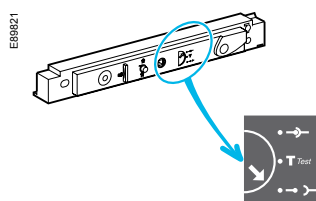
To disable local or remote opening or closing of the circuit breaker, use as needed:

1. one to three padlocks (not supplied with circuit breaker)
2. one keylock (not supplied with circuit breaker)
3. a combination of the two locking systems.

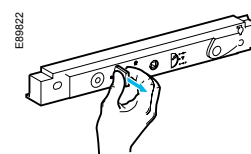
Disabling connection when the circuit breaker is in "disconnected" position, using one padlock (maximum shackle diameter 5 to 8 mm)

Locking

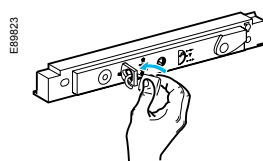
Circuit breaker in
"disconnected" position.



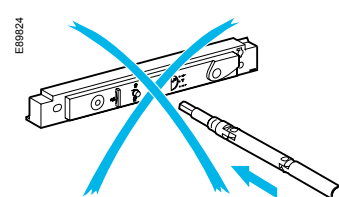
Pull out the tab.



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

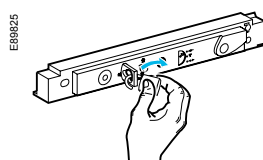


The crank cannot be inserted.

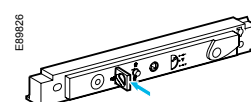


Unlocking.

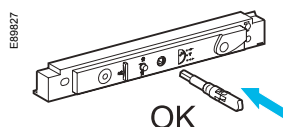
Remove the padlock.



Release the tab.



The crank can be inserted.



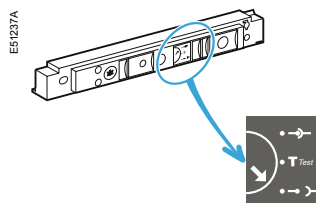
Locking the circuit breaker in disconnected position

Padlocks and keylocks may be used together.

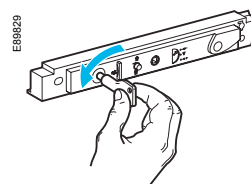
Disabling connection when the circuit breaker is in "disconnected" position, using one keylock

Locking

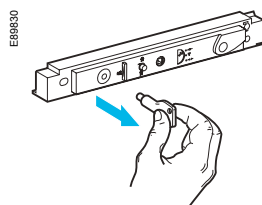
Circuit breaker in
"disconnected" position.



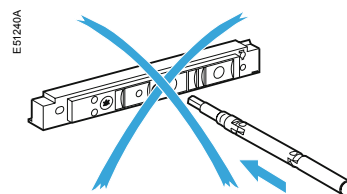
Turn the key.



Remove the key.

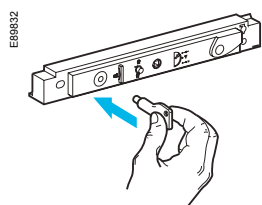


The crank cannot be inserted.

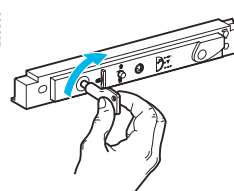


Unlocking

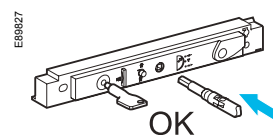
Insert the key.



Turn the key.

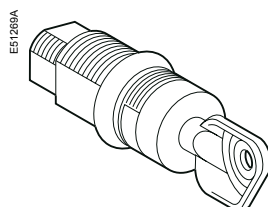


The crank can
be inserted.

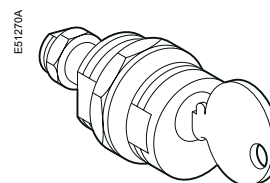


Two type of keylocks are available

PROFALUX



RONIS



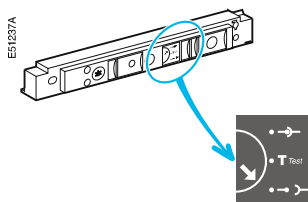
Locking the circuit breaker in all positions

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

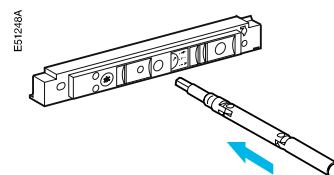
Disabling use of the crank in all positions

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.

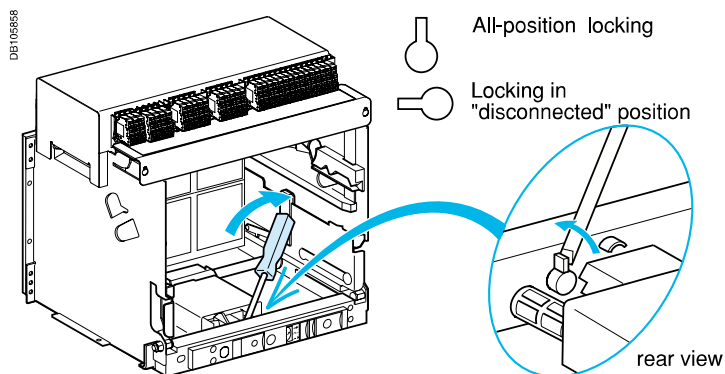
Set the circuit breaker to
"disconnected" position. Remove the
circuit breaker from the chassis.



Insert the crank.



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



Locking the safety shutters

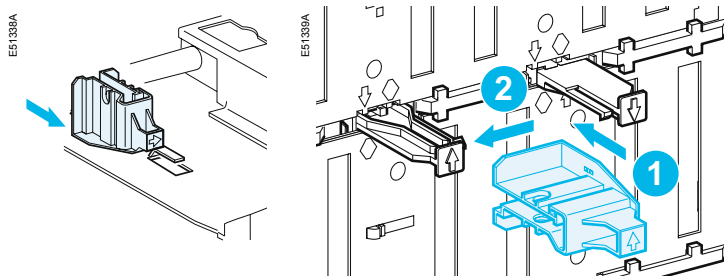
Padlocking inside the chassis

Circuit breaker is not supplied with shutter locking blocks as standard. It has to be ordered separately if required. Part number: 48591.

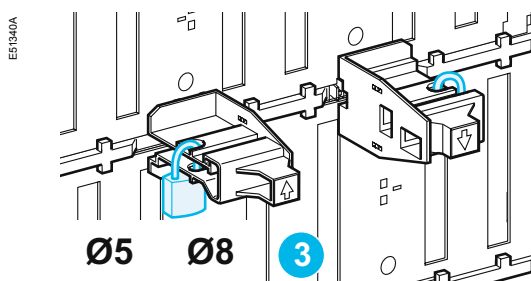
Using the shutter locking blocks

Remove the block(s) from their storage position.

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



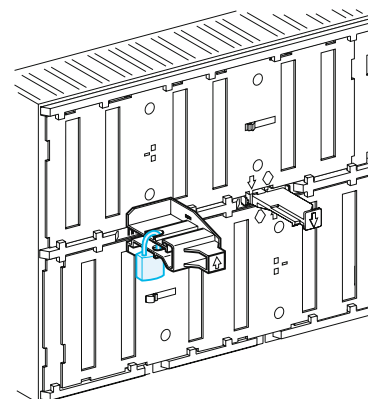
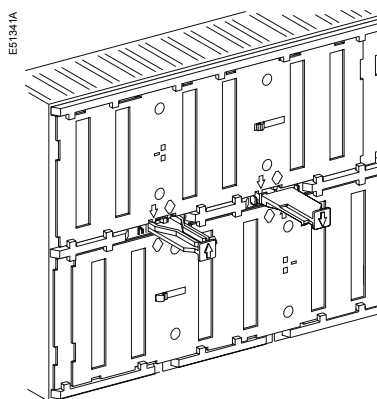
Lock the block(s) using a padlock.



Four locking possibilities

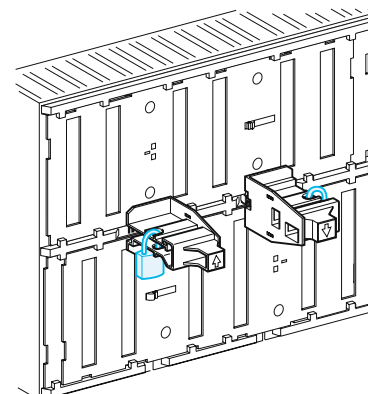
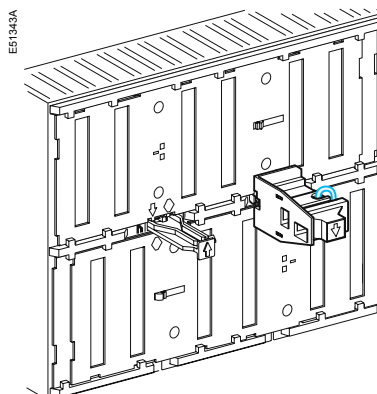
Top and bottom shutters not locked.

Top shutter locked,
Bottom shutter not locked.



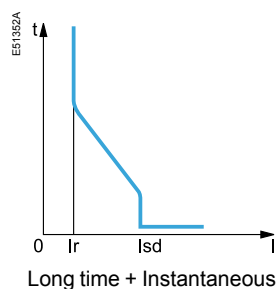
Top shutter not locked,
Bottom shutter locked.

Top and bottom shutters locked.

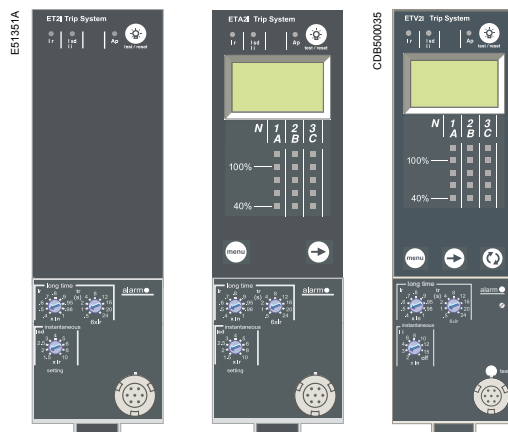


EasyPact MVS air circuit breakers are equipped with ET/ETA/ETV Trip System.

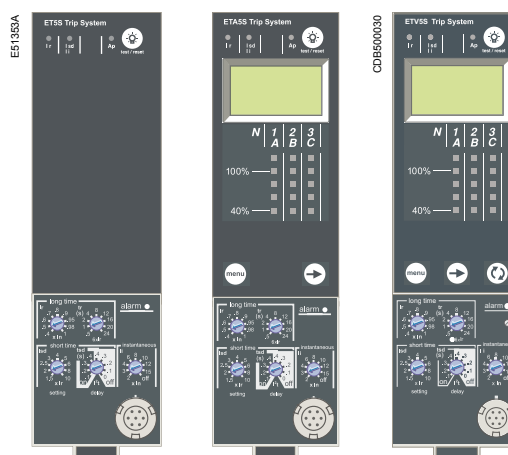
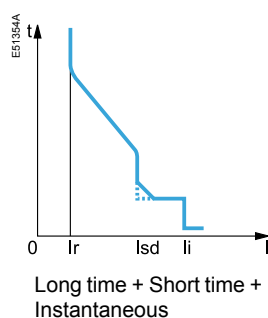
ET range of Trip Systems are designed to protect power circuits and connected loads.



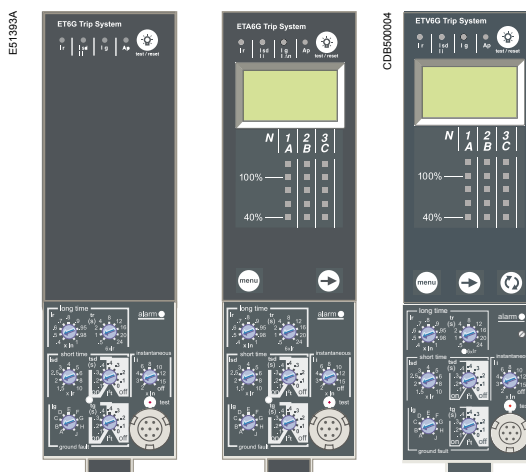
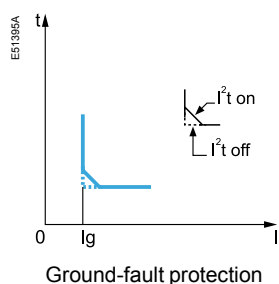
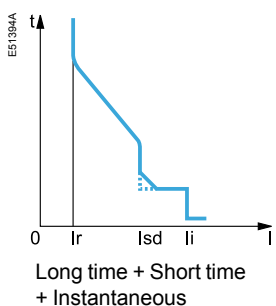
ET/ETA/ETV 2I Trip System: basic protection



ET/ETA/ETV 5S Trip System: selective protection



ET/ETA/ETV 6G Trip System: selective + ground-fault protection



- 1 top fastener
- 2 bottom fastener
- 3 protective cover
- 4 cover opening point
- 5 lead-seal fixture for protective cover
- 6 long-time rating plug
- 7 screw for long-time rating plug
- 8 connection with circuit breaker
- 9 Fault trip indications LEDs
- 10 terminal block for external connections
- 11 housing for battery
- 12 digital display
- 13 three-phase bargraph and ammeter

Adjustment dials

- 14 long-time current setting I_r
- 15 long-time tripping delay t_r
- 16 short-time pickup I_{sd}
- 17 short-time tripping delay t_{sd}
- 18 instantaneous pick-up I_{sd} (only in ET/ETA/ETV 2I)
- 19 instantaneous pick-up I_i
- 20 ground-fault pick-up I_g
- 21 ground-fault tripping delay t_g

Test

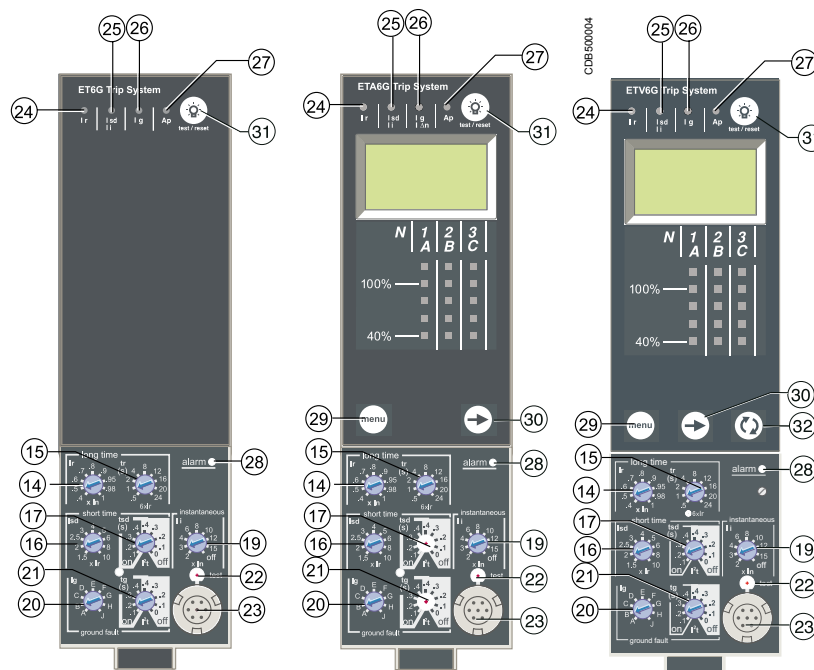
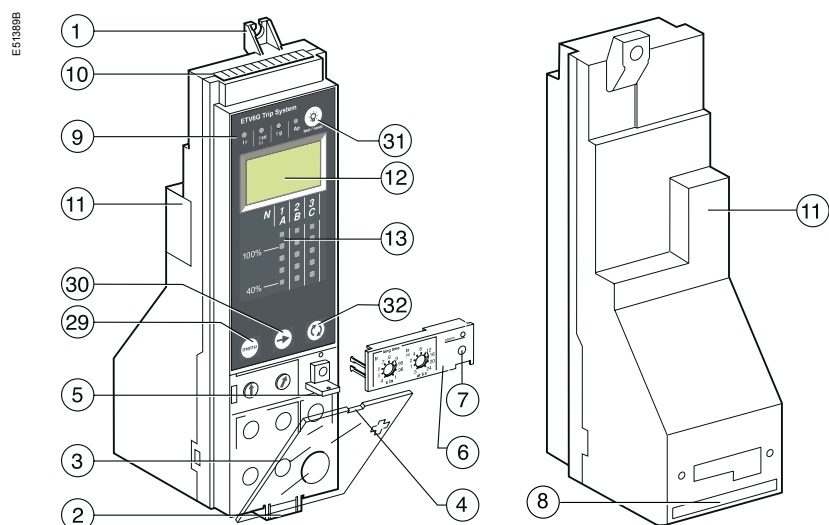
- 22 test button for ground-fault and earth-leakage protection
- 23 test connector

Indications

- 24 LED indicating long-time tripping
- 25 LED indicating short-time tripping
- 26 LED indicating ground-fault
- 27 LED indicating auto-protection tripping
- 28 LED indicating an overload alarm

Navigation

- 29 navigation button to change menus
- 30 navigation button to view menu contents
- 31 button for fault-trip reset and battery test (ETV only)
- 32 "Quick View" navigation button (ETV only)

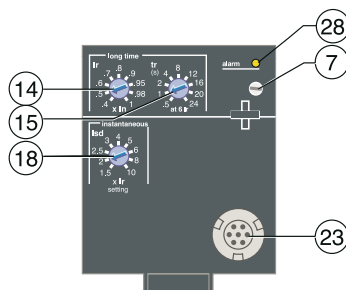


ET6G Trip System

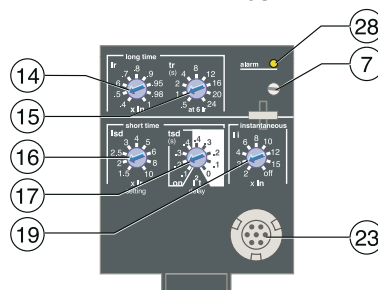
ETA6G Trip System

ETV6G Trip System

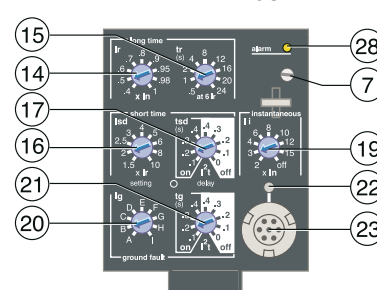
ET/ETA/ETV 2I



ET/ETA/ETV 5S



ET/ETA/ETV 6G

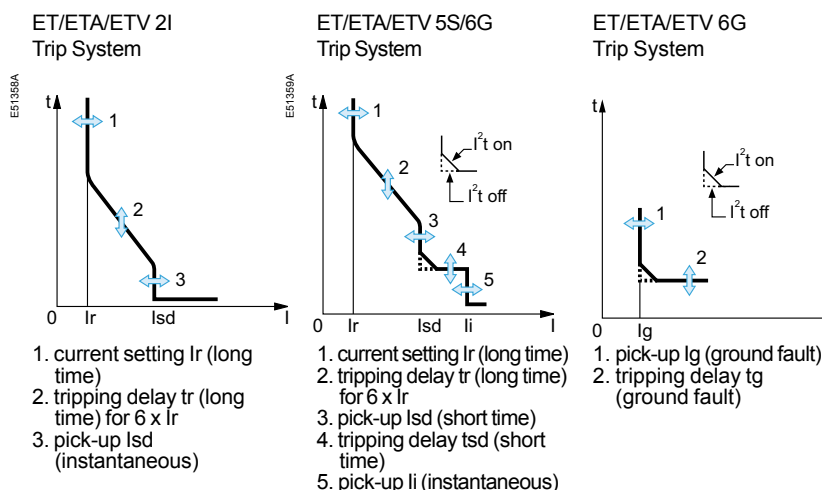


Overview of functions

Current protection

Protection settings

Depending on the type of installation, it is possible to set the tripping curve of your Trip System using the parameters presented below.



Long-time protection

The long-time protection function protects cables (phases and neutral) against overloads. This function is based on true rms measurements.

Thermal memory

The thermal memory continuously accounts for the amount of heat in the cables, both before and after tripping, whatever the value of the current (presence of an overload or not). The thermal memory optimises the long-time protection function of the circuit breaker by taking into account the temperature rise in the cables.

The thermal memory assumes a cable cooling time of approximately 20 minutes.

Long-time current setting I_r and standard tripping delay t_r

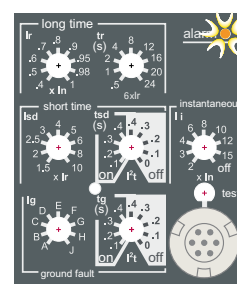
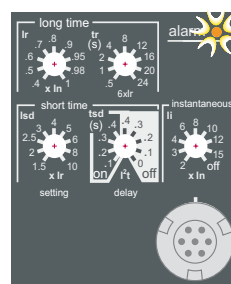
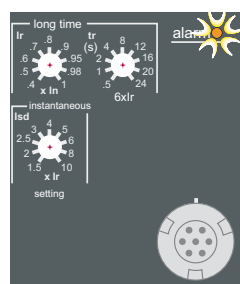
ET/ETA/ETV Trip System 2I, 5S and 6G			0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1
current setting	$I_r = I_n (*) \times \dots$										
tripping between 1.05 and 1.20 I_r											
time setting		Accuracy	0,5	1	2	4	8	12	16	20	24
time delay (s)	t_r at $1.5 \times I_r$	0 to - 30%	12.5	25	50	100	200	300	400	500	600
	t_r at $6 \times I_r$	0 to - 20%	0.7 (1)	1	2	4	8	12	16	20	24
	t_r at $7.2 \times I_r$	0 to - 20%	0.7 (2)	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6

(*) I_n : circuit breaker rating

(1) 0 to - 40%

(2) 0 to - 60%

Overload LED



This LED signals that the long-time current setting I_r has been overrun.

Zone selective interlocking (ZSI):

The short-time and ground-fault protection functions enable time discrimination by delaying the upstream devices to provide the downstream devices the time required to clear the fault. Zone selective interlocking can be used to obtain total discrimination between circuit breakers using external wiring.

For the characteristics and external wiring of the zone selective interlocking function, see the technical appendix on "Zone selective interlocking". See page no.54.

The portable test kit can be used to test the wiring between circuit breakers for the zone selective interlocking function.

Short-time protection

1. the short-time protection function protects the distribution system against independent short-circuits.
2. the short-time tripping delay can be used to ensure discrimination with a downstream circuit breaker.
3. the I²t ON and I²t OFF options enhance discrimination with downstream protection devices.
4. use of I²t curves with short-time protection:
 - a. I²t OFF selected: the protection function implements a constant time curve
 - b. I²t ON selected: the protection function implements an I²t inverse-time curve up to 10 I_r. Above 10 I_r, the time curve is constant.

Short-time pick-up I_{sd} and tripping delay tsd

ET/ETA/ETV Trip System 5S and 6G

pick-up	I _{sd} = I _r x ... accuracy ± 10%	1.5	2	2.5	3	4	5	6	8	10
time delay (ms) at 10 I _r	I ² t Off	0	0.1	0.2	0.3	0.4				
	I ² t On		0.1	0.2	0.3	0.4				
I ² t On or	tsd (max resettable time)	20	80	140	230	350				
I ² t Off	tsd (max break time)	80	140	200	320	500				

Instantaneous protection

the instantaneous-protection function protects the distribution system against solid short-circuits. Contrary to the short-time protection function, the tripping delay for instantaneous protection is not adjustable. The tripping order is sent to the circuit breaker as soon as current exceeds the set value, with a fixed time delay of 20 milliseconds.

Instantaneous pick-up I_{sd}

ET/ETA/ETV Trip System 2I

pick-up	I _{sd} = I _r x ... accuracy ± 10 %	1.5	2	2.5	3	4	5	6	8	10
time delay (ms)	tsd (max resettable time)	20								
	tsd (max break time)	80								

Instantaneous pick-up I_{li}

ET/ETA/ETV Trip System 5S and 6G

pick-up	I _{li} = I _n (*) x ... accuracy ± 10 %	2	3	4	6	8	10	12	15	OFF
time delay (ms)	tsd (max resettable time)	20								
	tsd (max break time)	50								

Refer to page no.33 on selecting the type of neutral protection.

Protection of the fourth pole on four-pole circuit breakers

Protection of the neutral conductor depends on the distribution system.

There are three possibilities.

1. Neutral unprotected
2. Neutral protection at 0.5 I_n
3. Neutral protection at I_n

Neutral protection for three-pole devices

Neutral protection is not available on three-pole devices.

Ground-fault protection on ET6G Trip System

An ground fault in the protection conductors can provoke local temperature rise at the site of the fault or in the conductors.

The purpose of the ground-fault protection function is to eliminate this type of fault.

Type	Description
Residual	1. the function determines the zero-phase sequence current, i.e. the vectorial sum of the phase and neutral currents 2. it detects faults downstream of the circuit breaker.
	1. ground-fault and neutral protection are independent and can therefore be combined. 2. ground-fault protection in 3P+N system is activated by installing a external sensor(CT) in the neutral conductor and connecting to ET Trip System.

Ground-fault pick-up I_g and tripping delay tg

The pick-up and tripping-delay values can be set independently.

ET/ETA/ETV Trip System 6G

pick-up	I _g = I _n (*) x ... accuracy ± 10 %	A	B	C	D	E	F	G	H	I
	I _n ≤ 1200 A	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
	I _n > 1200 A	500 A	640 A	720 A	800 A	880 A	960 A	1040 A	1120 A	1200 A
time delay (ms) at 10 I _n (*)	settings I ² t OFF	0	0.1	0.2	0.3	0.4				
	I ² t ON		0.1	0.2	0.3	0.4				
I ² t ON or	tg (max resettable time)	20	80	140	230	350				
I ² t OFF	tg (max break time)	80	140	200	320	500				

* I_n: circuit-breaker rating

Overview of functions Fault Indications & Testing

The auto-protection function (excessive temperature or short-circuit higher than circuit-breaker capacity) opens the circuit breaker and turns on the Ap LED.

Caution.

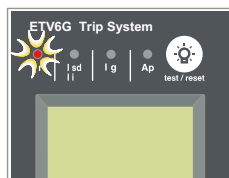
If the circuit breaker remains closed and the Ap LED remains on, contact the Schneider after-sales support department.

Caution.

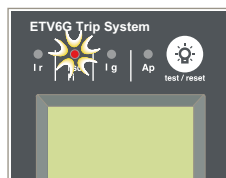
The battery maintains the fault indications.
If there are no indications, check the battery.

Fault indications

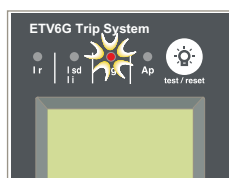
Signals tripping due to an overrun of the long-time current setting I_r .



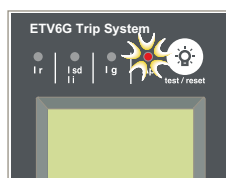
Signals tripping due to an overrun of the short-time pick-up I_{sd} or the instantaneous pick-up I_{sd} / I_i .



Signals tripping due to an overrun of the ground fault pick-up I_g



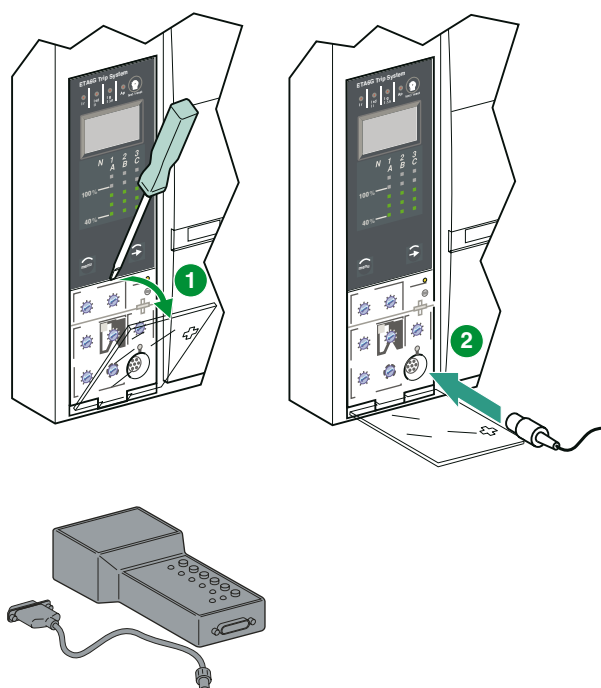
Signals tripping due to the auto-protection, Ap function of the Trip System



See the user manual of
Hand-held test kit. (HHTK)

Testing ET/ETA/ETV Trip System Using the Hand Held Test Kit (HHTK)

To test the control unit, connect the hand held test kit via the test connector.

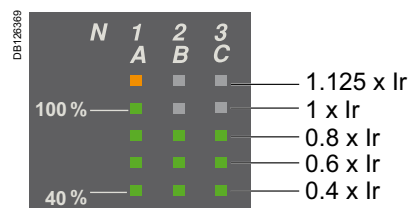


Measurement and display possibilities

- ETA measures instantaneous currents and stores the maximum values in maximeters.
- In addition to the values measured by ETA, ETV trip unit measures both current and voltage.

ETA and ETV measurements can be displayed on:

- the digital screen of trip unit
- In addition, a bargraph on the front of the control unit continuously displays the currents measured on phases 1, 2 and 3 as a percentage of the long-time current setting I_r .



The following table indicates ETA and ETV measurement and display possibilities.

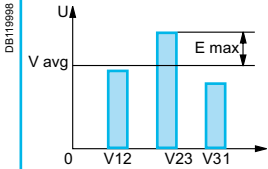
Measurements	ETA	ETV
Instantaneous currents I_1 , I_2 , I_3 , I_N , I_g	■	■
Current maximeters I_{1max} , I_{2max} , I_{3max} , I_{Nmax} , I_{gmax}	■	■
Demand current $\overline{I_1}$, $\overline{I_2}$, $\overline{I_3}$, $\overline{I_N}$ ⁽¹⁾		■
Demand current maximeters (peak demand) $\overline{I_1 max}$, $\overline{I_2 max}$, $\overline{I_3 max}$, $\overline{I_N max}$ ⁽¹⁾		■
Phase-to-phase voltages V_{12} , V_{23} , V_{31} (3-wire and 4-wire systems)		■
Phase-to-neutral voltages V_{1N} , V_{2N} , V_{3N} (4-wire systems) ⁽²⁾		■
Average voltage V_{avg}		■
Voltage unbalance V_{unbal}		■

⁽¹⁾ The display of the Neutral current (I_N) is available with ETV when the parameter "type of network" has been set to 4 Wire 4CT (44). See page 50.

⁽²⁾ Important: for 3-pole circuit breakers used on 4-wire systems (3ph + N), terminal VN on the trip unit must always be connected to the neutral. If this is not done, the phase-to neutral voltage measurements can be erroneous.

Note: If no information is displayed on the screen, see: "Digital display" in the technical appendix.

Measurement definitions

Measurements	Definition
Instantaneous current	The rms value of the instantaneous time current.
Neutral current	Available with a 4-pole breaker
Current maximeter	Maximum value of the instantaneous time current (refreshed every 500 ms) since trip unit installation or last reset.
Demand current ⁽¹⁾	Mean of all instantaneous time current values over a given user-adjustable time interval (e.g. 10 min).
Voltage	The rms value of the voltage.
Average voltage	Average of the 3 phase-to-phase voltages V12, V23 and V31: $V_{avg} = \frac{V_{12} + V_{23} + V_{31}}{3}$
Voltage unbalance	Voltage unbalance on the most unbalanced phase, displayed as a percentage of Vavg.  ETV measures the maximum difference between the instantaneous time voltage of each phase and Vavg, and calculates the voltage unbalance: $V_{unbal} = \frac{ E_{max} }{V_{avg}}$

⁽¹⁾ For details on how demand is calculated, see "Calculating demand values" in the technical appendix page 57.

ETV trip unit let you access "Trip history" information that can be used to analyze the types of fault and thereby taking preventive measures to increase the overall availability of your installation.

Trip history

The trip history displays the list of the last 10 trips.

For each trip, the following indications are recorded and displayed:

- the tripping cause: Ir, Isd, Ii, Ig or Auto-protection (Ap) trips

List of trip causes:

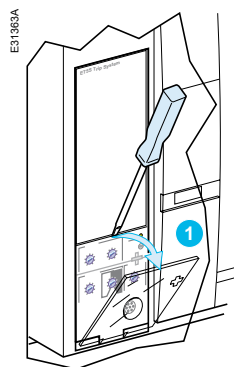
- overloads (Ir)
- short-circuits (Isd or Ii)
- ground faults (Ig)
- auto-protection (Ap).

The trip history display is presented on page 48.

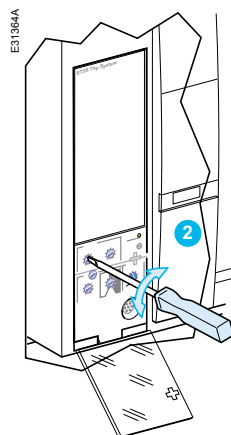
Setting procedure

Setting procedure for ET Trip System

Using the adjustment dials



Open the protective cover.



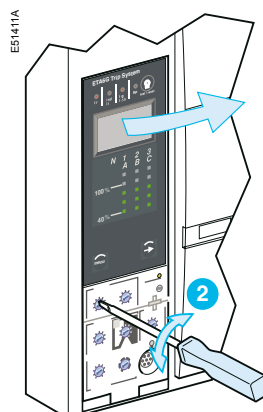
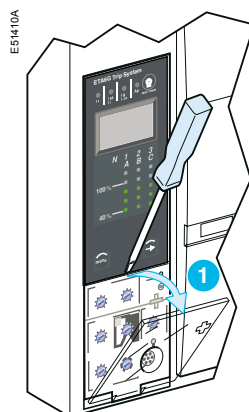
Select the desired setting.



Close the protective cover and, if necessary, install a lead seal to protect the settings.

Setting procedure for ETA/ETV Trip System

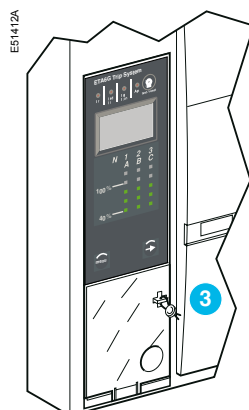
1. Open the protective cover.



2. Select the desired setting.

The set value is automatically displayed on the digital screen in absolute value with the relevant units.

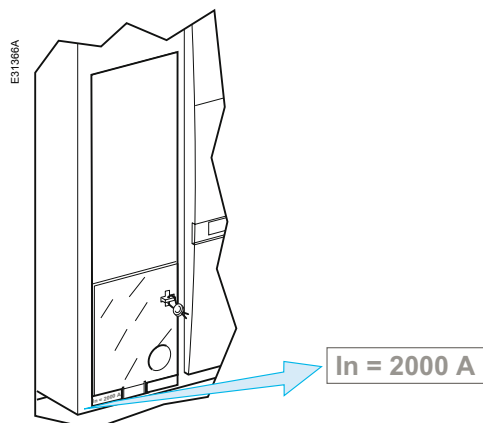
- Current in amperes (A and kA);
- Tripping delays in seconds.



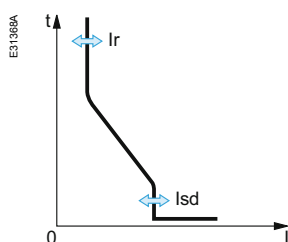
3. If no information is displayed, see the "Digital display". (page 55) If no further action is taken, after a few seconds, the display returns to the main menu for current measurements.

4. Close the protective cover and, if necessary, install a lead seal to protect the settings.

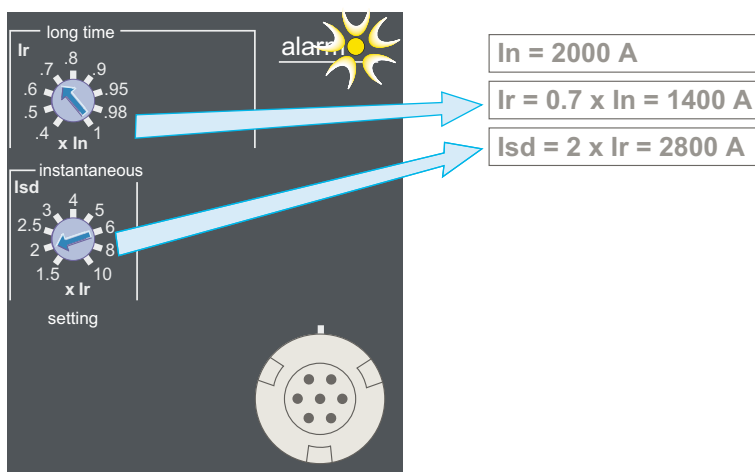
The rating of the circuit breaker in this example is 2000 A.



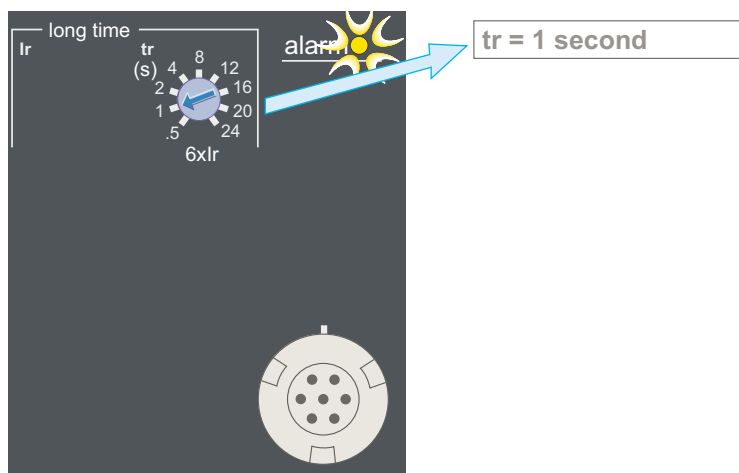
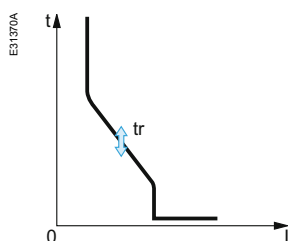
See pages 23 and 24 for information on the available settings.



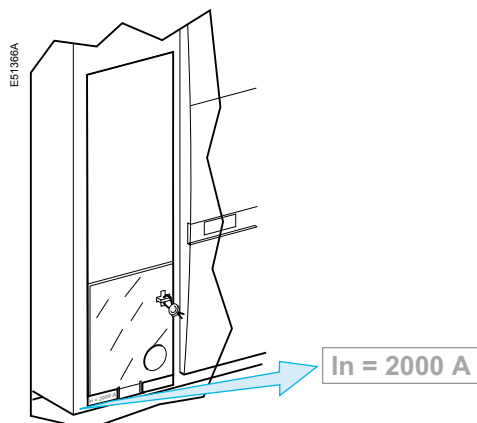
Set the threshold values



Set the tripping delay

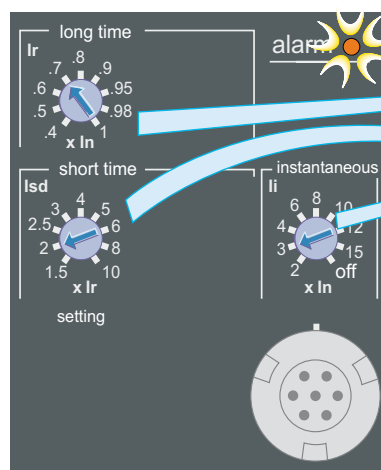
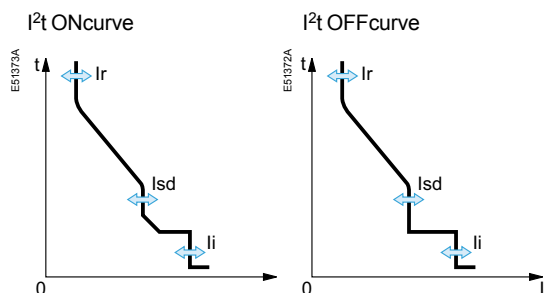


The rating of the circuit breaker in this example is 2000 A.



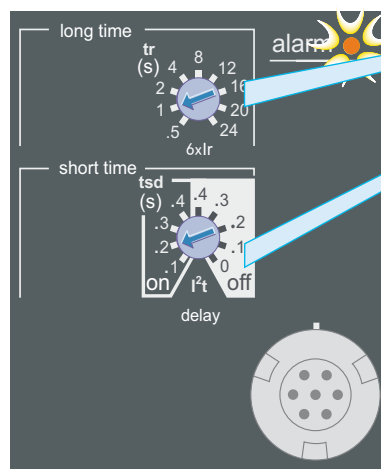
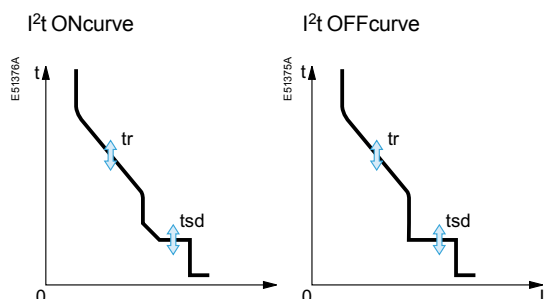
See pages 23 and 24 for information on the available settings.

Set the threshold values



$I_n = 2000 \text{ A}$
$I_r = 0.7 \times I_n = 1400 \text{ A}$
$I_{sd} = 2 \times I_r = 2800 \text{ A}$
$I_i = 3 \times I_n = 6000 \text{ A}$

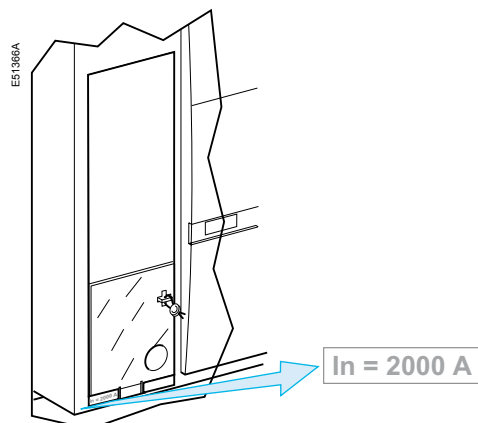
Set the tripping delay



$t_r = 1 \text{ second}$
$t_{sd} = 0.2 \text{ seconds}$



The rating of the circuit breaker in this example is 2000 A.



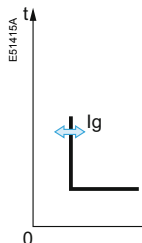
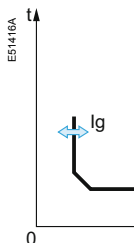
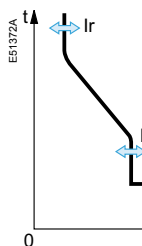
See pages 23 and 24 for information on the available settings.

Thresholds

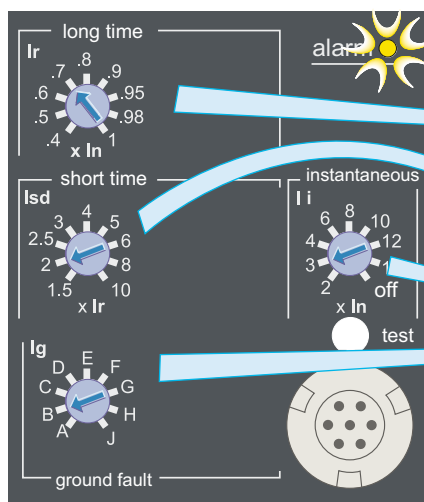
I^2t ON curve



I^2t OFF curve



Set the threshold values



$I_n = 2000 \text{ A}$

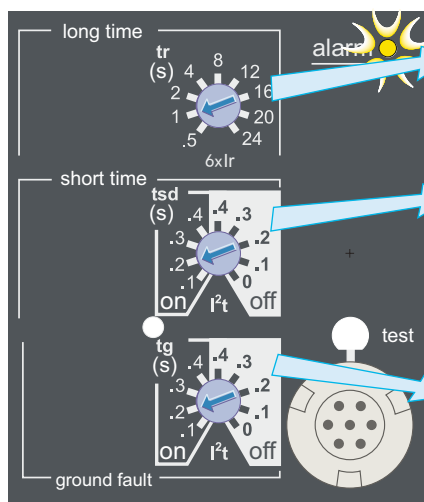
$I_r = 0.7 \times I_n = 1400 \text{ A}$

$I_{sd} = 2 \times I_r = 2800 \text{ A}$

$I_{li} = 3 \times I_n = 6000 \text{ A}$

$B \rightarrow I_g = 640 \text{ A}$

Set the tripping delay



$t_r = 1 \text{ s}$

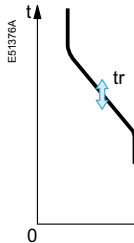
$t_{sd} = 0.2 \text{ s}$

I^2t on I^2t off

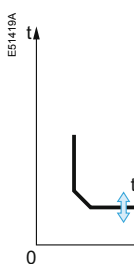
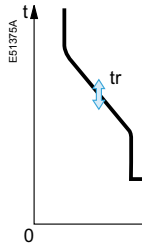
$t_g = 0.2 \text{ s}$

Tripping delays

I^2t ON curve



I^2t OFF curve

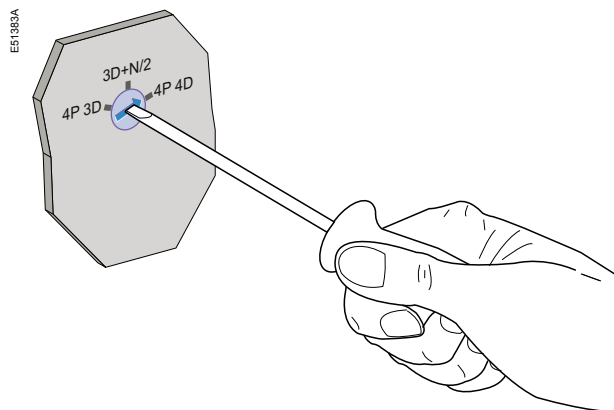


Selecting the type of neutral protection

On four-pole circuit breakers, it is possible to select the type of neutral protection for the fourth pole using the three-position dial on the circuit breaker:

1. neutral unprotected (4P 3D);
2. neutral protection at $0.5 I_n$ (3D + N/2);
3. neutral protection at I_n (4P 4D).

The factory default setting is 3D+N/2.



Caution!

With the 4P 3D setting, the current in the neutral must not exceed the rated current of the circuit breaker.

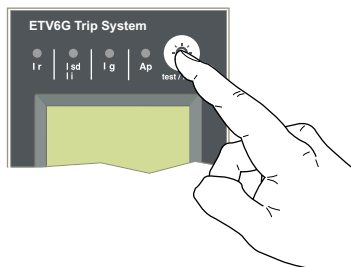
Type of neutral	Description.
Neutral unprotected	The distribution system does not require protection of the neutral conductor.
Neutral protection at $0.5 I_n$	The cross-sectional area of the neutral conductor at $0.5 I_n$ is half that of the phase conductors. ■ the long-time current setting I_r for the neutral is equal to half the setting value ■ the short-time pick-up I_{sd} (5S/6G) for the neutral is equal to half the setting value ■ the instantaneous pick-up I_{sd} (2I) for the neutral is equal to half the setting value ■ the instantaneous pick-up I_i (5S/6G) for the neutral is equal to the setting value.
Neutral protection at I_n	The cross-sectional area of the neutral conductor is equal at I_n to that of the phase conductors. ■ the long-time current setting I_r for the neutral is equal to the setting value ■ the short-time pick-up I_{sd} (5S/6G) for the neutral is equal to the setting value ■ the instantaneous pick-up I_{sd} (2I) and I_i (5S/6G) for the neutral are equal to the setting value.

Resetting the fault indications and checking battery status

The procedure for resetting the circuit breaker following a fault trip is presented in Page No.10.

Resetting the fault indications

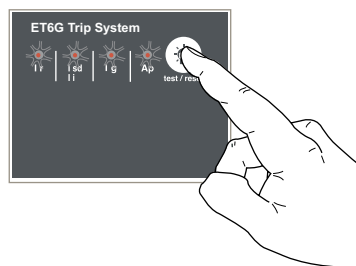
- determine why the circuit breaker tripped.
The fault indication is maintained until it is reset on the control unit.
- press the fault-trip reset button.



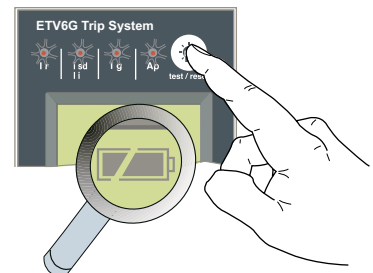
- check the parameter settings of the control unit.

Checking the battery

ET Trip System



ETA/ETV Trip System



Press the battery-test button (same as the fault-trip reset button) to check the battery status by the luminance of trip indicator light.

ET Trip System

If trip indicators became dim or no luminance, the battery should be changed.

ETA/ETV Trip System

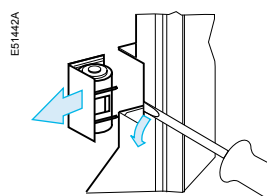
- Battery fully charged
- Battery half charged
- Change the battery

If the battery needs to be changed, order a new battery with the Schneider catalogue number 33593.

1. lithium battery
2. 1.2 AA, 3.6 V, 850 mA/h
3. SAFT LS3 SONNENSCHIN TEL-S

Changing the control-unit battery

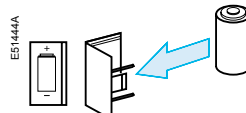
1. Remove the battery cover.



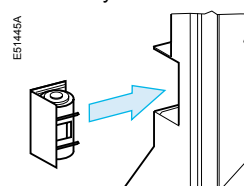
2. Remove the battery.



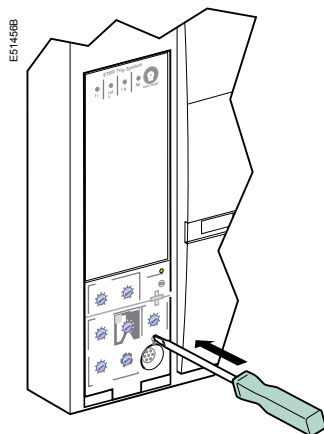
3. Insert a new battery.
Check the polarity.



4. Put the cover back in place.
Press the battery-test button to check the new battery.



Charge and close the circuit breaker.
Using a screw driver, press the test button for ground-fault
protection. The circuit breaker should open.



If the circuit breaker does not open, contact the Schneider after-sales
support department.

Symbols used:



Briefly press a key.



Press and hold a key.

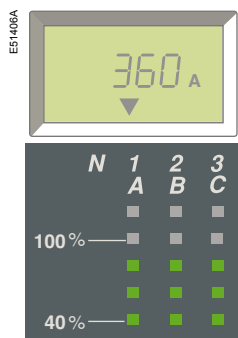
It is possible at any time to stop consulting a current measurement, a maximum current value recorded by the maximeter or the setting values. After a few seconds, the ETA Trip System automatically returns to the main menu displaying the current value of the most heavily loaded phase.

The protection setting can be displayed directly on the digital display.

Three menus may be accessed on ETA Trip System, providing the following information:

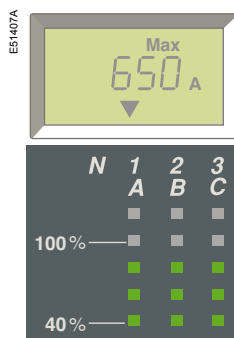
- phase current measurements I1, I2, I3, neutral IN, ground-fault current Ig on the ETA6G trip system.
- maximeter current values for phases I1, I2, I3, neutral IN, the maximum ground-fault current Ig on the ETA6G Trip System.
- protection settings and tripping delays.

1. Measurements



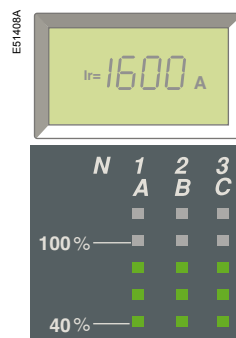
Press the "menu" button to access the maximum current values measured by the maximeter.

2. Maximeter



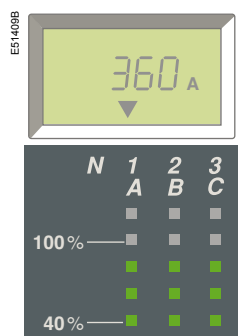
Press the "menu" button to access the protection settings and tripping delays.

3. Settings



Press the "menu" button to return to the current measurements.

4. The system returns to the main "Measurements" menu.



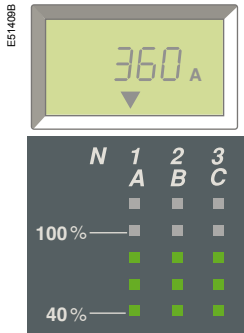
Measuring phase currents

Current values may be read in the "Measurements" menu, which is also the main menu.

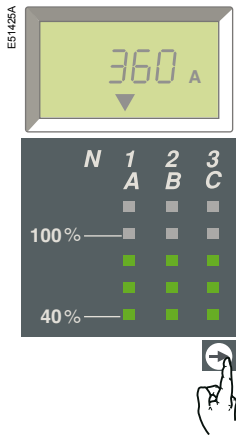
If no particular action is taken, the system displays the current value of the most heavily loaded phase.

"Measurements" menu

Phase 1 is the most heavily loaded.

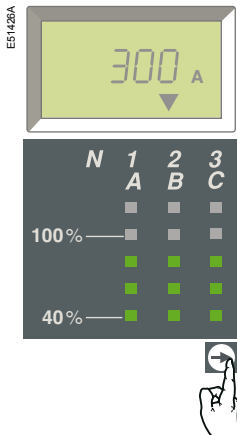


Display of current I1



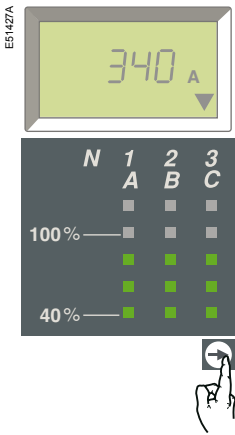
Press the "arrow" button to go on to current I2.

Display of current I2



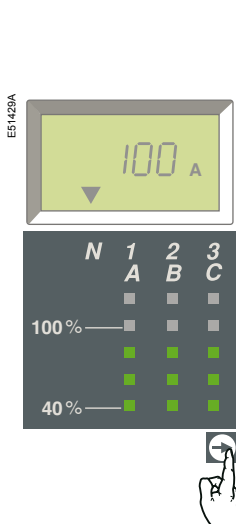
Press the "arrow" button to go on to current I3.

Display of current I3



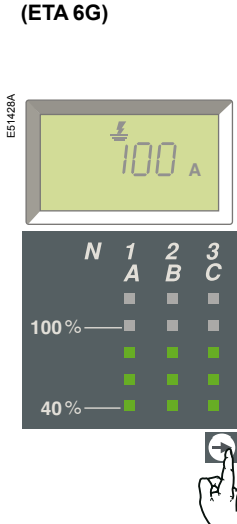
Press the "arrow" button to go on to current IN if the neutral is protected.

Display of current IN



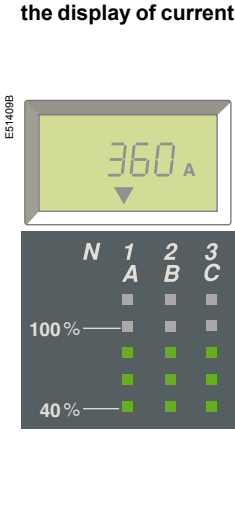
Press the "arrow" button to go on to the groundfault current Ig

Display of current Ig (ETA 6G)



Press the "arrow" button to return to current I1

The system returns to the display of current I1

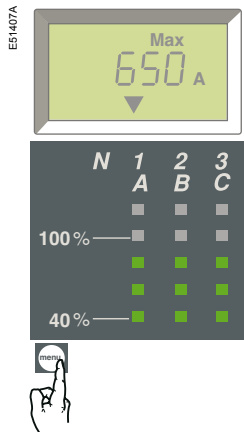


Resetting the maximum current values

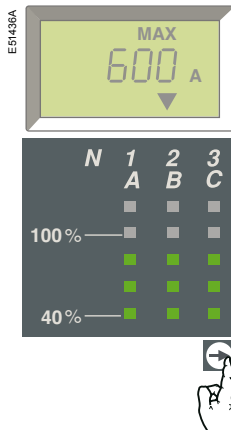
Maximum current values can be reset using the "Maximeter" menu.

If no particular action is taken, the system returns to the main menu.

"Maximeter" menu.

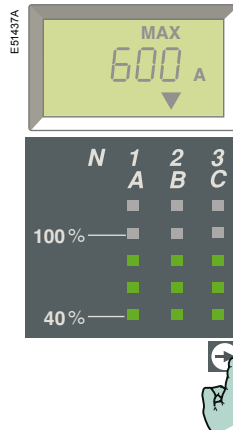


Select the maximum current value to be reset (e.g. I2 max.).



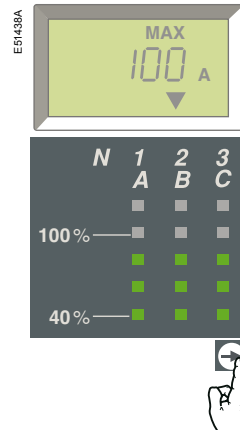
Press the "arrow" button as many times as required to select I2 max.

Reset.



Press and hold the "arrow" button down for three to four seconds. The current value flashes during the reset, then changes to the present value (the new maximum).

Select another value to reset or return to the main menu.



Press the "arrow" button as many times as required to select another maximum value to reset or return to the main menu.

Viewing the settings of ETA Trip System

ETA Trip System				
Long-time current setting Ir	21	5S	6G	 Select the "Settings" menu. The Ir value is the first displayed. 
Long-time tripping delay tr				 Press the "arrow" button to go on to the tr value. 
Short-time pick-up Isd				 Press the "arrow" button to go on to the short-time Isd value. 
Short-time tripping delay tsd				 Press the "arrow" button to go on to the tsd value. 
Instantaneous pick-up Isd				 Press the "arrow" button to go on to the instantaneous Isd value. 
Instantaneous pick-up li				 Or the instantaneous li value. 
Ground-fault pick-up Ig				 Press the "arrow" button to go on to the Ig value. 
Ground-fault tripping delay tg				 Or Press the "arrow" button to go on to the tg value. 
				 Press the "arrow" button to return to the beginning of the menu. 

Definitions

- ETV has two display modes: Tree Navigation and Quick View modes.

Tree Navigation mode

- Tree Navigation is a manual scroll mode using the menu  and  buttons on a ETV trip unit.

- Two navigation trees are provided for each trip unit:
 - a "Display tree" to view the main values and settings of the control unit
 - a "Setting tree" to modify the settings.

You can enter the "Setting tree" from any screen of the "Display tree" by pressing the  and  buttons simultaneously.

- Each tree is divided up into several branches. Use the  button to scroll through the different branches of a tree. When on the last branch, pressing the  button returns you to the instantaneous I1 current screen of the Display tree.

- Each branch provides access to values or settings that depend on the type of for example:
measurements (instantaneous current, demand current, maximum instantaneous, current, voltage, etc.)

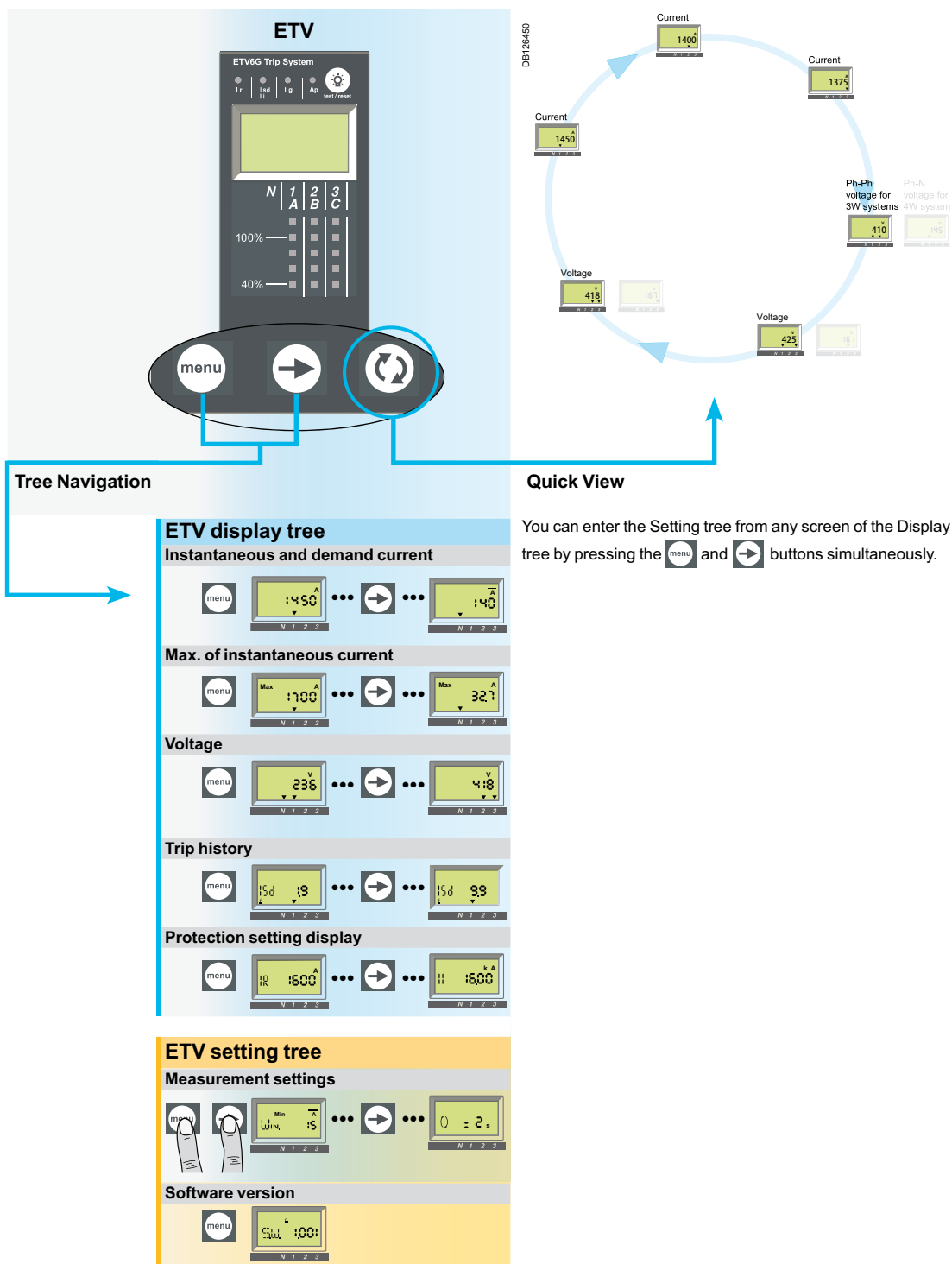
- trip history
 - protection setting display

- Use the  button to scroll through the different screens of a given branch. Press the  button at any time to proceed to the next branch.

- All the screens of the ETV navigation trees are detailed on page 46.

Quick View mode

- ETV also offers a Quick View display mode.
- This mode can be used to let the display automatically scroll through up to 10 screens.
- An override function is available to allow manual scrolling.
- Quick View is the factory-set display mode for ETV. You can easily switch between Quick View and Tree Navigation modes by briefly pressing the  button.
- You can modify the Quick View screens defined in the default configuration and the screen display time.



Quick View allows the operator to quickly view the most important electrical measurements (currents & voltages) without having to touch the control unit keypad.

The screens automatically scroll in a circular manner so that the operator can view all the main electrical measurements one after another. The current bargraph and overload LED remain visible at all times in Quick View mode.

Quick View screen descriptions

Quick View can be used to display the screens defined in:

- the factory configuration
- a custom configuration.

Screens defined in the factory configuration

ETV trip control units come with a factory Quick View configuration including the following 6 screens, scrolled in the indicated order:

1. Current of phase 1/A
2. Current of phase 2/B
3. Current of phase 3/C
4. Voltage: phase-to-neutral (V1N) or phase-to-phase (V12)
5. Voltage: phase-to-neutral (V2N) or phase-to-phase (V23)
6. Voltage: phase-to-neutral (V3N) or phase-to-phase (V31)

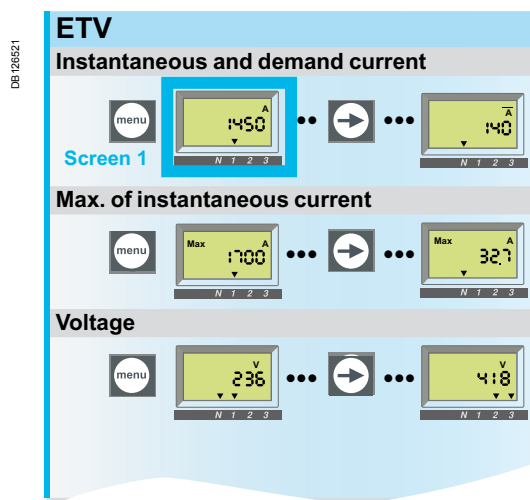
Each screen is displayed for 2 s before being replaced by the next in the list. This duration can be adjusted from 1 s to 9 s in 1 s steps (see "Measurement settings - Quick View display duration" on page 50).



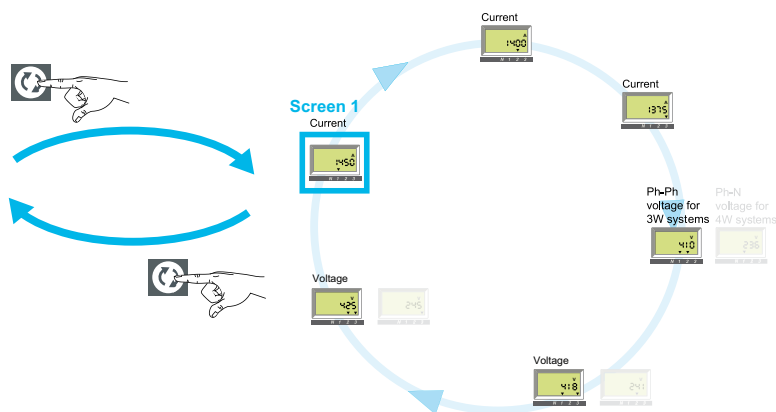
Activating / Deactivating Quick View

- When energised for the first time, ETV automatically activates Quick View and scrolls through the factory-configured screens.
- Press the  button briefly (<1 s) to activate the classical tree navigation mode. Press again briefly (<1 s) to return to Quick View mode.
- In the Navigation mode, the first screen displayed is the instantaneous current of the heavily loaded phase.
- In Quick View mode, the first screen displayed is screen1, It shows the instantaneous current of Phase 1.

Tree Navigation Mode



Quick View Mode



Manual control of Quick View scrolling

Automatic scrolling of Quick View screens can be stopped, for example to display a screen for more than 2 seconds in order note measurements.



Press briefly
(< 1 s)

Stops scrolling and displays the present screen for 20 s if no other action is taken.



Press briefly
(< 1 s)

Displays the next screen for 20 s if no other action is taken.

Returning to automatic scrolling

After a period of 20 s with no action, automatic scrolling is automatically reactivated.

Events causing the interruption of automatic scrolling

Automatic scrolling of Quick View screens is also interrupted by the following events:

- tripping (interrupted until the trip is reset by pressing the  button)
- change in a protection setting
- battery test (while the test button is pressed).

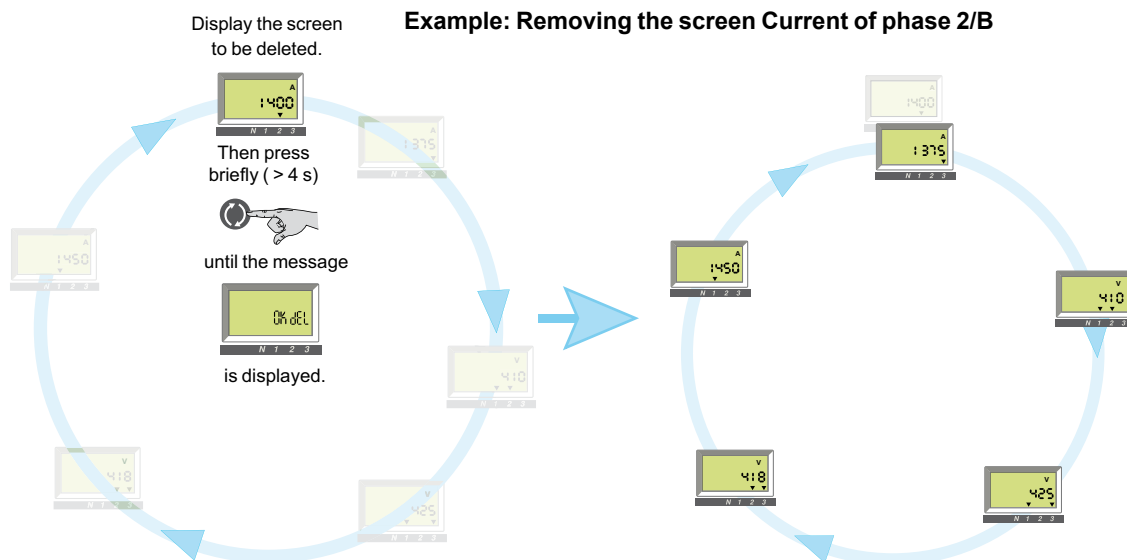
Custom Quick View configuration

- The Quick View factory configuration includes the 6 screens presented on the page 42.
- It is possible to change some or all of the screens of the factory configuration.
- Quick View can scroll through up to 10 screens.
- If all Quick View screens are removed, pressing the  button briefly will have no effect. The display remains in Tree Navigation mode.

Removing a screen

To remove a screen from Quick View:

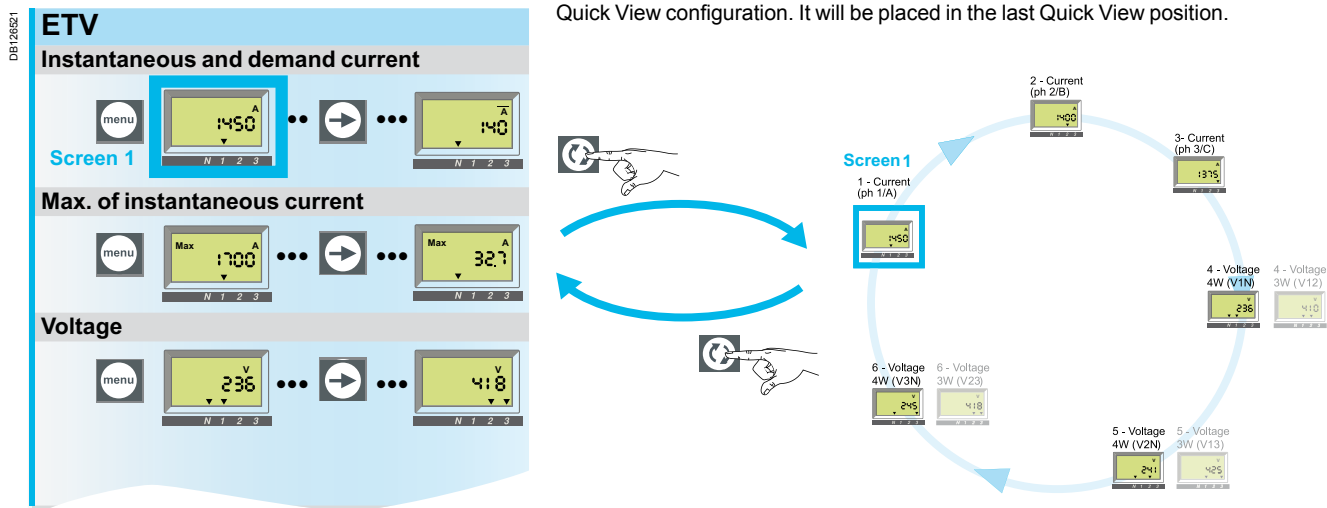
- make sure you are in manual control of the quick view mode, and if necessary, press the  button briefly (< 1 s) to activate automatic scrolling and then press the  button briefly (<1s) to activate the manual control of the quick view mode.
- when the screen to be removed appears, press and hold the  button (> 4s)
- when the message "OK dEL" is displayed, the screen has been removed.



Adding a screen

To add a screen (selected from the navigation tree):

- access Tree Navigation mode by briefly pressing the  button (< 1 s)
- in this mode, display the screen you want to add using the  and  buttons, as described in "Tree Navigation" on page 45.
- when the selected screen is displayed, press and hold the  button (> 4 s)
- when the message "OK Add" is displayed, the screen has been added to the Quick View configuration. It will be placed in the last Quick View position.



- if you try to add a screen to an existing configuration that already has 10 screens, the message "QV full" will be displayed.

Tree Navigation mode Presentation

Tree Navigation

- The classical navigation trees presented in the "ETV menu display" on page 46 provide access to all the screens of ETV trip units.
- The different screens are accessible using the  and  buttons and are organised in branches corresponding to a given type of information.

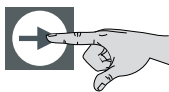
The following branches are available, in the indicated order:

Branch (type of information)	ETV
Display tree	
Instantaneous and demand current	■
Maximeters for instantaneous current	■
Voltage	■
Protection setting display	■
Setting tree	
Measurement settings	■
Software version	■

Navigating with the keypad buttons



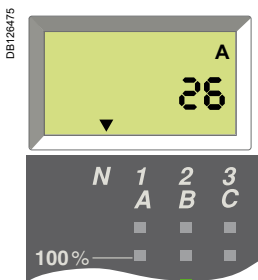
Press briefly
(< 1 s)
(symbol: a white hand)



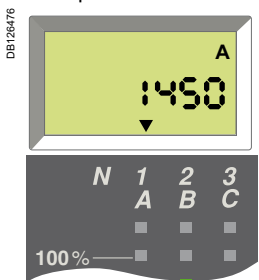
Press and hold
(> 4 s)
(symbol: a grey hand)

Screen information

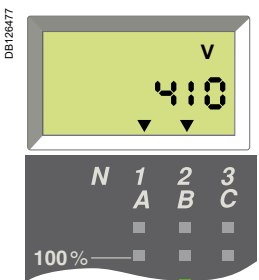
The positions of the downward arrows (one, two or three arrows) under the information displayed on the screen indicate the phases concerned, as shown for example in the screens below.



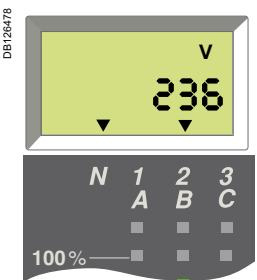
26A current in the neutral (arrow above the N).



1450A current in phase 1/A (arrow above 1/A).



410V phase-to-phase voltage between phases 1/A and 2/B (arrows above 1/A and 2/B).

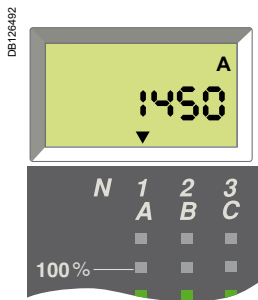


236V phase-to-neutral voltage between phase 2/B and neutral (arrows above N and 2/B).

If no particular action is taken, the system displays the instantaneous current of the most heavily loaded phase.

Default screen

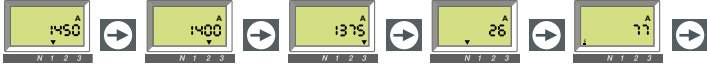
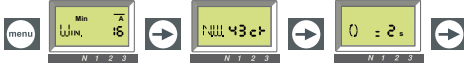
Example: Phase 1 is the most heavily loaded.



Tree Navigation mode

ETV menu display

The figures below show all the screens of the ETV navigation trees with all details concerning screen content and navigation between the various branches and screens of the trees.

Display tree branches	Screens
Default display (instantaneous current of the most heavily loaded phase 1.)	
Instantaneous and demand currents	I1 I2 I3 IN Ig (ETV6G)  I1 I2 I3 IN 
Instantaneous current maximeters (To reset current maximeters, see page 47.)	I1 I2 I3 IN Ig (ETV6G) 
Voltages (3-wire systems)	V12 V23 V31 
Voltages (4-wire systems)	V1N V2N V3N V12 V23 V31 
Trip history (See details on page 48)	The trip history displays the list of the last 10 trips.
Protection settings display (See details on page 49)	The protection settings displayed depend on the model of the ETV trip unit.
Setting tree branches	Screens
Measurement settings (See details on page 50)	
Software version	

Tree Navigation mode

Resetting current maximeters

Resetting the maximum current values

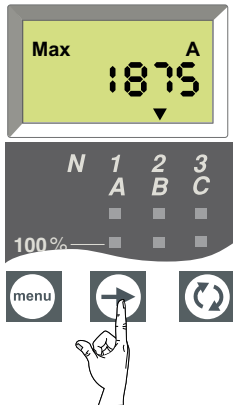
Reset of the corresponding memory register.

DB127834



Select the maximum current value to be reset (e.g. I2 max.)

DB128493



Press the "Arrow" button as many times as required to access the I2 max. screen.

Reset

DB128494



Press and hold the "Arrow" button for 3 to 4 seconds. The old value flashes during reset, then changes to the present value (the new maximum).

Select another value of current to reset or return to the main menu

DB128495



Press the "Arrow" button as many times as required to select another maximum value to reset or return to the main menu.

Tree Navigation mode

Displaying the trip history

Introduction

The trip history displays the list of the last 10 trips.
For each trip, the following indications are recorded and displayed:

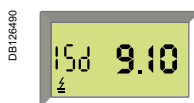
- the tripping cause: Ir, Isd, li, Ig or Auto-protection (Ap) trips

Example 1: Display for the first (most recent) trip of the five trips recorded in the trip history.



Ir: tripping cause.
1: symbol indicating trip history display
1: trip number (1 being the most recent)
5: total number of trips recorded.

Example 2: Display for the ninth trip of the ten trips recorded in the trip history.



li: tripping cause.
1: symbol indicating trip history display
9: trip number (1 being the most recent)
10: total number of trips recorded.

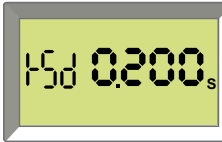
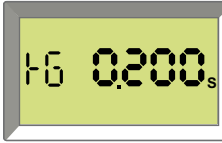
List of trip screens for the various causes

Cause	Comment	Screen display
Ir trip	Long-time protection	
Isd trip	Short-time protection	
li ⁽¹⁾ trip	Instantaneous protection	
Ig trip	Ground-fault protection	
Ap trip	Auto-protection	

⁽¹⁾ Instantaneous protection trips (li) are indicated on the trip history screen in the same way as short-time protection trips (Isd). Both are caused by short-circuits.

Tree Navigation mode

Viewing the settings of ETV Trip system

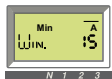
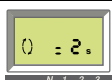
ETV Trip System				
Long-time current setting Ir	2I	5S	6G	 Select the "Settings" menu. The Ir value is displayed first. 
Long-time tripping delay tr				 Press the "arrow" button to go on to the tr value. 
Short-time pick-up Isd				 Press the "arrow" button to go on to the short-time Isd value. 
Short-time tripping delay tsd				 Press the "arrow" button to go on to the tsd value. 
Instantaneous pick-up Isd				 Press the "arrow" button to go on to the instantaneous Isd value. Or 
Instantaneous pick-up li				 the instantaneous li value. 
Ground-fault pick-up Ig				 Press the "arrow" button to go on to the Ig value. or 
Ground-fault tripping delay tg				 Press the "arrow" button to go on to the tg value. Or 
				 Press the "arrow" button to return to the beginning of the menu. 

Set-up parameters

ETV has this type of set-up parameters:

- measurement settings

The parameters are displayed in the order indicated in the table below.

Parameters	Definition	Format (X = digit)	Default value (units)	Default screen ⁽¹⁾	Possible values
Measurement settings					
Interval (window) for demand current calculation	Period of time over which the demand current is calculated.	XX	15 (minutes)		5 to 60 (in 1 minute steps)
Type of network (3-wire or 4-wire) and number of circuit breaker poles (CTs).	■ Setting 43 = 4-wire (3ph+N) and 3-pole CB (3 CTs) ⁽²⁾ ■ Setting 44 = 4-wire (3ph+N) and 4-pole CB (4 CTs) or 3-pole CB (3 CTs) + external CT ■ Setting 33 = 3-wire (3ph) and 3-pole CB (3 CTs) ⁽³⁾	XX	43		43 44 33
Quick View display duration	Duration of display of each screen in Quick View mode	()	2 (s)		1 to 9

⁽¹⁾ Note that all the default screens include a closed padlock icon .  This means the value is protected. You must open the padlock  to modify the settings and close the padlock after your modification in order to protect the new value. The procedure is described on the next page.

⁽²⁾ **Important:** for 3-pole circuit breakers used on 4-wire systems (3ph + N), terminal VN on the ETV trip unit must always be connected to the neutral. If this is not done, the phase-to-neutral voltage measurements can be erroneous.

⁽³⁾ **Important:** for 3-pole circuit breakers used on 3-wire systems (neutral not distributed), always set this value to 33 (see below) to avoid indications of a meaningless phase-to-neutral voltage.

Tree Navigation mode

ETV set-up

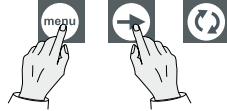
General procedure to set ETV parameters

The parameters on the navigation tree:

- measurement settings

The following describes the general procedure to modify the settings.

Accessing the first screen of the settings branch



Simultaneously press and hold (four seconds) the "menu" and "arrow" buttons to access the first settings screen. The present value is displayed. A closed padlock icon indicates that the setting is locked.

Unlocking and accessing the setting to be changed (flashing)



Press the "Quick View" button to open the padlock. The setting to be changed (or the first digit) will flash, indicating that it is ready to be modified.

Selecting the new setting



Press the "Quick View" button to select the new setting. The possible settings are scrolled in a loop. Each press increments to the next setting or choices in the loop.

Confirming and locking the new setting



Press the "arrow" button to confirm the new setting. It stops flashing and a closed padlock is displayed.

For a two-digit setting, this operation sets the first digit and the second digit flashes to indicate it is ready to be modified. Proceed as above to change it, then press the "menu" button to validate the new two-digit setting. It stops flashing, and a closed padlock is displayed.

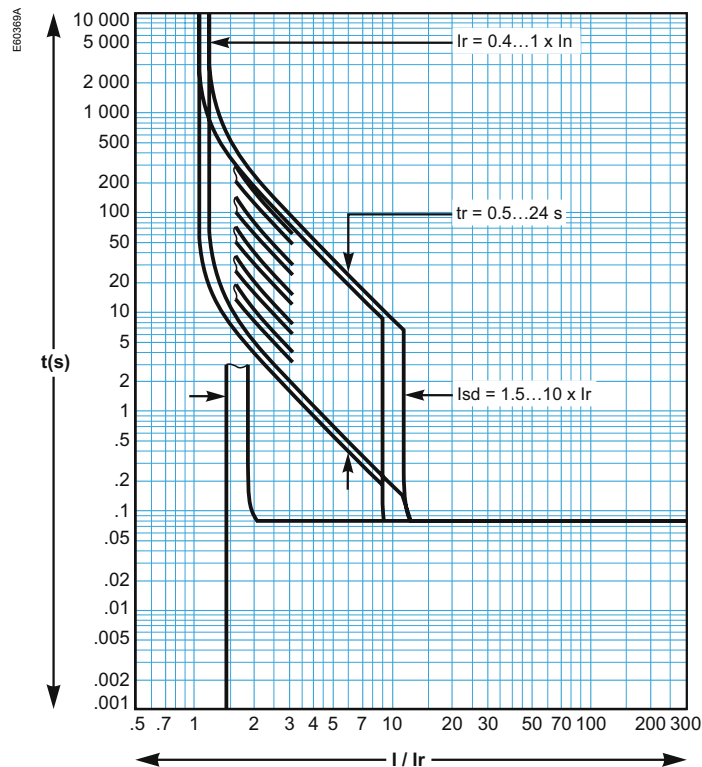


To go to the next branch (measurement settings), press the "menu" button.

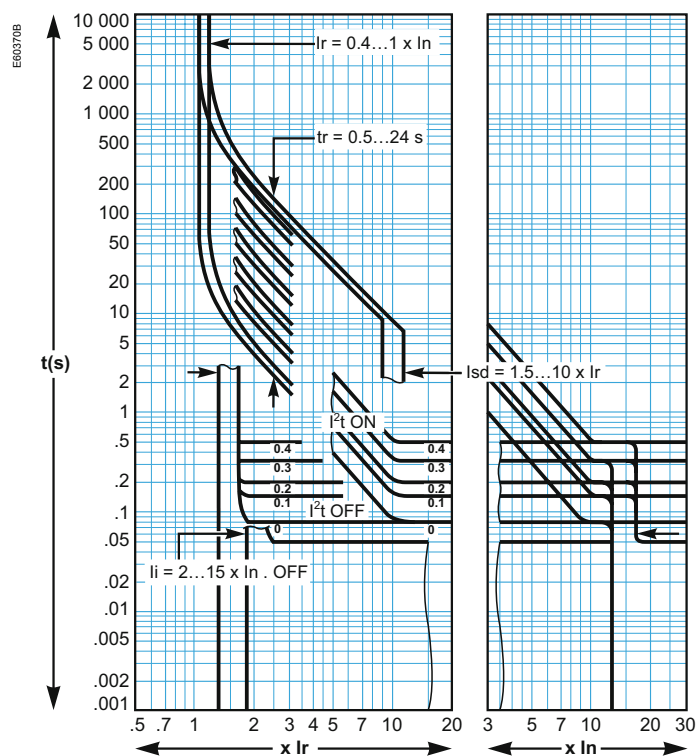
Note: Within a given branch, the various parameters are organised in a loop. You must scroll through all the parameters of the branch using the "arrow" button to return to the same parameter. To proceed to the next set-up branch (or exit the last branch), press the "menu" button.

Tripping curves

Long-time and instantaneous protection (ET/ETA/ETV 2I Trip System)

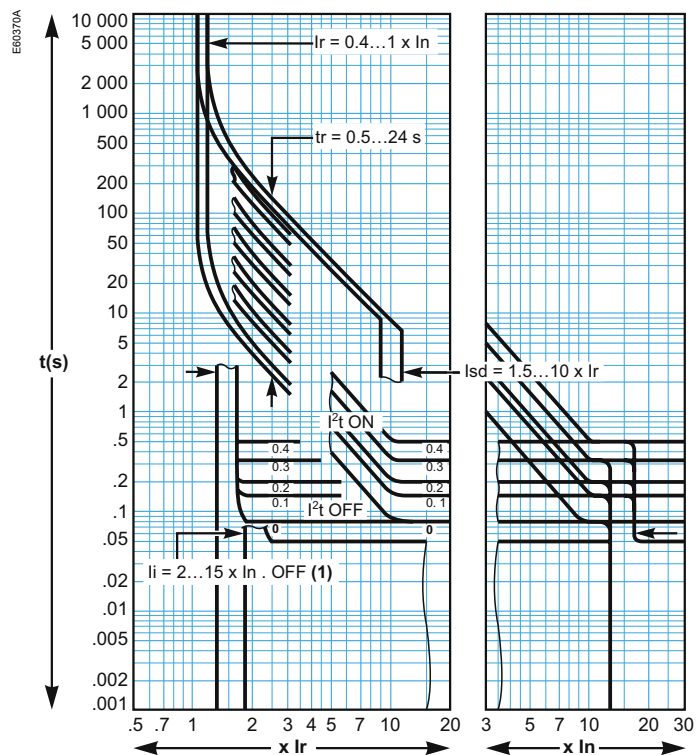


Long-time, short-time and instantaneous protection (ET/ETA/ETV 5S Trip System)

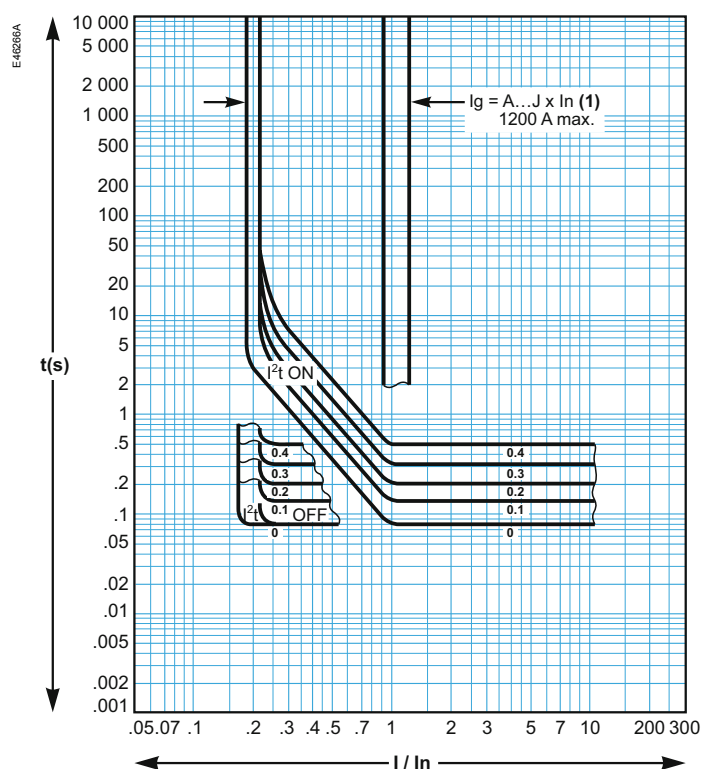


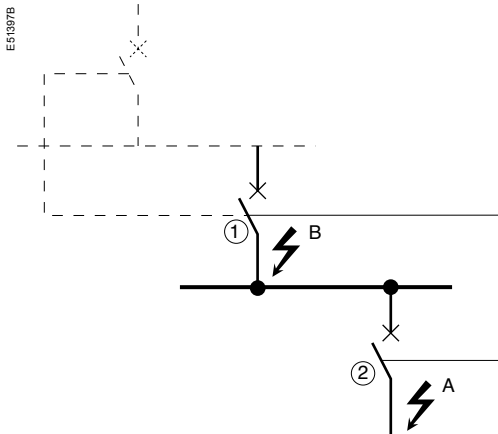
Tripping curves

Long-time, short-time and instantaneous protection (ET/ETA/ETV 6G Trip System)



Ground-fault protection (ET/ETA/ETV 6G Trip System)





Operating principle

- A fault occurs at point A.
Downstream device no. 2 clears the fault and sends a signal to upstream device no. 1, which maintains the short-time tripping delay t_{sd} or the ground-fault tripping delay t_g to which it is set.
- A fault occurs at point B.
Upstream device no. 1 detects the fault. In the absence of a signal from a downstream device, the set time delay is not taken into account and the device trips according to the zero setting. If it is connected to a device further upstream, it sends a signal to that device, which delays tripping according to its t_{sd} or t_g setting.

Note :

On device no. 1, the t_{sd} and t_g tripping delays must not be set to zero because this would make discrimination impossible.

Connections between control units

A logic signal (0 or 5 volts) can be used for zone selective interlocking between the upstream and downstream circuit breakers.

- ETA 5S, 6G
- ETV 5S, 6G

An interface is available for connection to previous generations of trip units.

Caution.

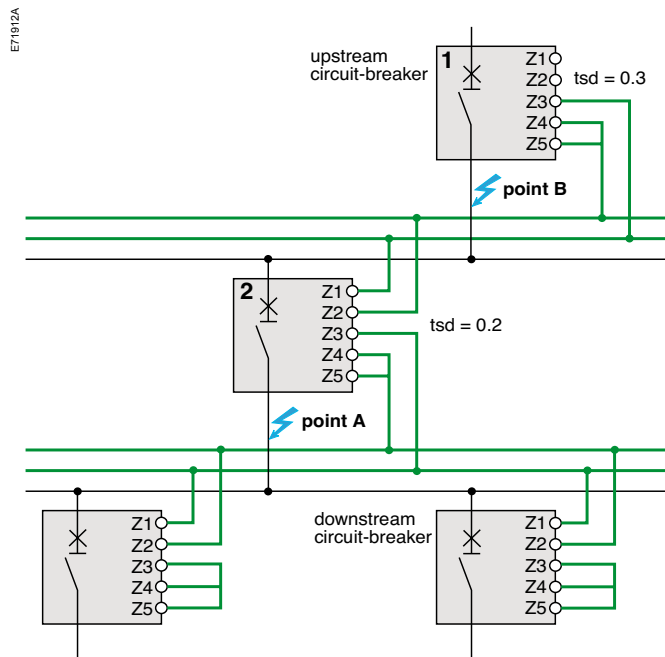
If the protection function is not used on circuit breakers equipped for ZSI protection, a jumper must be installed to short terminals Z3, Z4 and Z5.

If the jumper is not installed, the short-time and ground-fault tripping delays are set to zero, whatever the position of the adjustment dial.

Terminals Z1 to Z5 correspond to the identical indications on the circuit-breaker terminal blocks.

Wiring

- maximum impedance: $2.7 \Omega / 300 \text{ m}$
- capacity of connectors: 0.4 to 2.5 mm^2
- wires: single or multicore
- maximum length: 3000 metres
- limits to device interconnection:
 - the common ZSI - OUT (Z1) and the output ZSI - OUT (Z2) can be connected to a maximum of 10 inputs;
 - a maximum of 100 devices may be connected to the common ZSI - IN (Z3) and to an input ZSI - IN CR (Z4) or GF (Z5).



Test

The portable test kit may be used to check the wiring and operation of the zone selective interlocking between a number of circuit breakers.

For information on connecting an external power supply, see the electrical diagrams in the circuit-breaker catalogue.

PB101026-32A



External power supply.

■ The display operates without an external power supply.
The digital display goes off if the current drops below $0.2 \times I_n$ (I_n = rated current).
An optional 24 V DC external power supply may be used to maintain the display of currents even when the current drops below $0.2 \times I_n$.

■ Display back-lighting is disabled in the following situations:

- current less than $1 \times I_n$ on one phase;
- current less than $0.4 \times I_n$ on two phases;
- current less than $0.2 \times I_n$ on three phases.

■ The maximeter does not operate for currents under $0.2 \times I_n$.

■ The display back-lighting and the maximeter may be maintained, whatever the current, by adding a 24 V DC external power supply. Even if an external power supply is installed, the long-time, short-time, instantaneous and earth protection functions will not use it.

External power supply characteristics

- Input voltage:
 - 11 0/130, 200/240, 380/415 V AC (+10 % -15 %)
 - 24/30, 48/60, 100/125 V DC (+20 % -20 %).
- Output voltage: 24 V DC ± 5 %, 1 A.
- Ripple < 1 %.
- Dielectric withstand : 3.5 kV rms between input/output, for 1 minute.
- Overvoltage category: as per IEC 60947-1 cat. 4.

Thermal memory

The thermal memory is a means to simulate temperature rise and cooling caused by changes in the flow of current in the conductors.

These changes may be caused by:

1. repetitive motor starting;
2. loads fluctuating near the protection settings;
3. repeated circuit-breaker closing on a fault.

Control units without a thermal memory (contrary to bimetal strip thermal protection) do not react to the above types of overloads because they do not last long enough to cause tripping.

However, each overload produces a temperature rise and the cumulative effect can lead to dangerous overheating.

Trip System with a thermal memory record the temperature rise caused by each overload. Even very short overloads produce a temperature rise that is stored in the memory. This information stored in the thermal memory reduces the tripping time.

ET/ETA/ETV Trip System and thermal memory

All ET/ETA/ETV Trip System are equipped as standard with a thermal memory.

1. for all protection functions, prior to tripping, the temperature-rise and cooling time constants are equal and depend on the tripping delay in question:
 - a. if the tripping delay is short, the time constant is low;
 - b. if the tripping delay is long, the time constant is high.

2. for long-time protection, following tripping, the cooling curve is simulated by the ET/ETA/ETV Trip System.

Closing of the circuit breaker prior to the end of the time constant (approximately 20 minutes) reduces the tripping time indicated in the tripping curves.

Short-time protection and intermittent faults

For the short-time protection function, intermittent currents that do not provoke tripping are stored in the ET/ETA/ETV Trip System memory.

This information is equivalent to the long-time thermal memory and reduces the tripping delay for the short-time protection.

Following a trip, the short-time tsd tripping delay is reduced to the value of the minimum setting for 20 seconds.

Ground-fault protection and intermittent faults

The ground-fault protection implements the same function as the short-time protection.

Calculating demand values (ETV Trip System)

The ETV trip unit calculates and displays:

- the demand values of phase and neutral currents.
- The maximum (peak) demand current is stored in the memory. All demand values are updated once every minute.

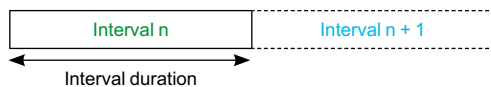
Definition

The demand value of a quantity is its average value over a given period of time. The demand value should not be confused with the instantaneous value or the average (or mean) value, which often refers to the average (or mean) of the instantaneous values of the 3 phases.

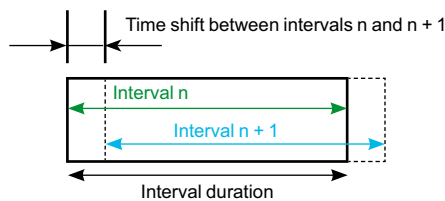
Calculation interval

The time interval (or window) over which the average is calculated can be of 2 types:

- fixed window
- sliding window.



Fixed window



Sliding window

Fixed window

At the end of a fixed metering window:

- the demand value over the window is calculated and updated
- the new demand value is initialised over a new window, **starting from the end of the last window**.

Sliding window

At the end of a sliding window:

- the demand value over the window is calculated and updated
- the new demand value is initialised over a new window, **starting from a given time after the start of the last window** (always less than the duration of the window). The sliding window method is used by ETV control units.
- The duration of the sliding window can be set for current demand from 5 to 60 minutes in 1 minute steps (see Measurement settings). The default setting is 15 minutes.
- The time shift between intervals is equal to 1 minute.

Calculation method

Quadratic demand (thermal image)

The quadratic demand calculation model represents the conductor heat rise (thermal image).

The heat rise created by the current $I(t)$ over the time interval T is identical to that created by a constant current I_{th} over the same interval. This current I_{th} represents the thermal effect of the current $I(t)$ over the interval T .

Calculation of the demand value according to the thermal model must be always be performed on a sliding window.

Note: The thermal demand value is similar to an rms value.

ETV control units use the quadratic model to calculate demand current.

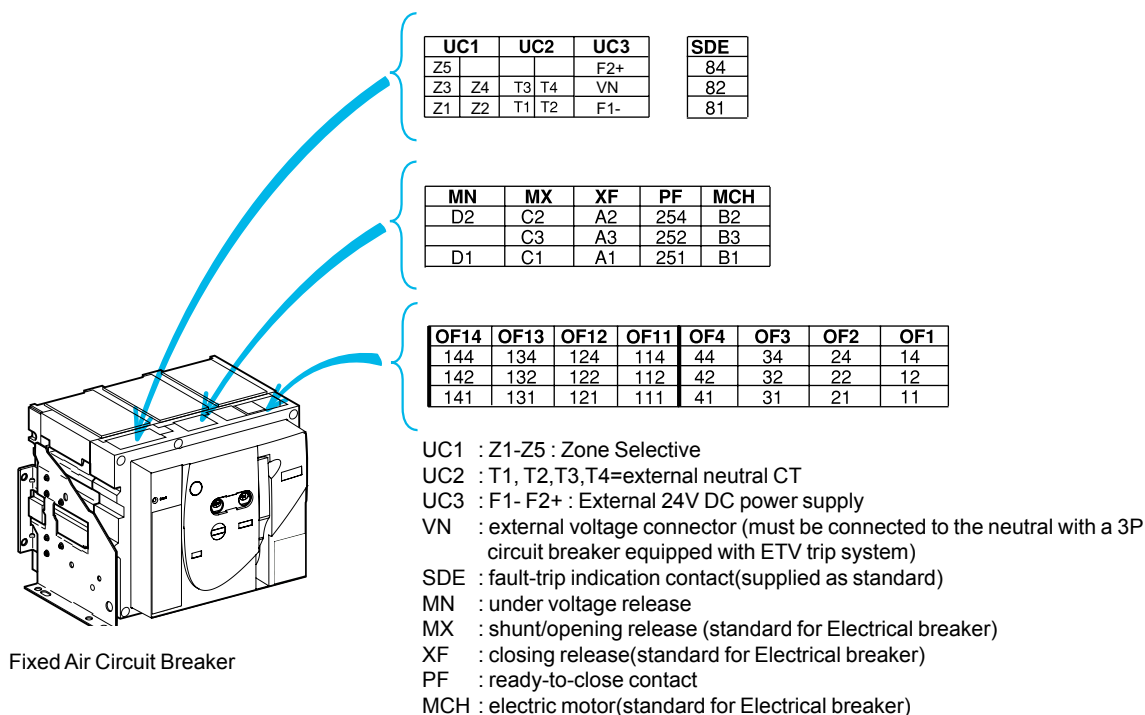
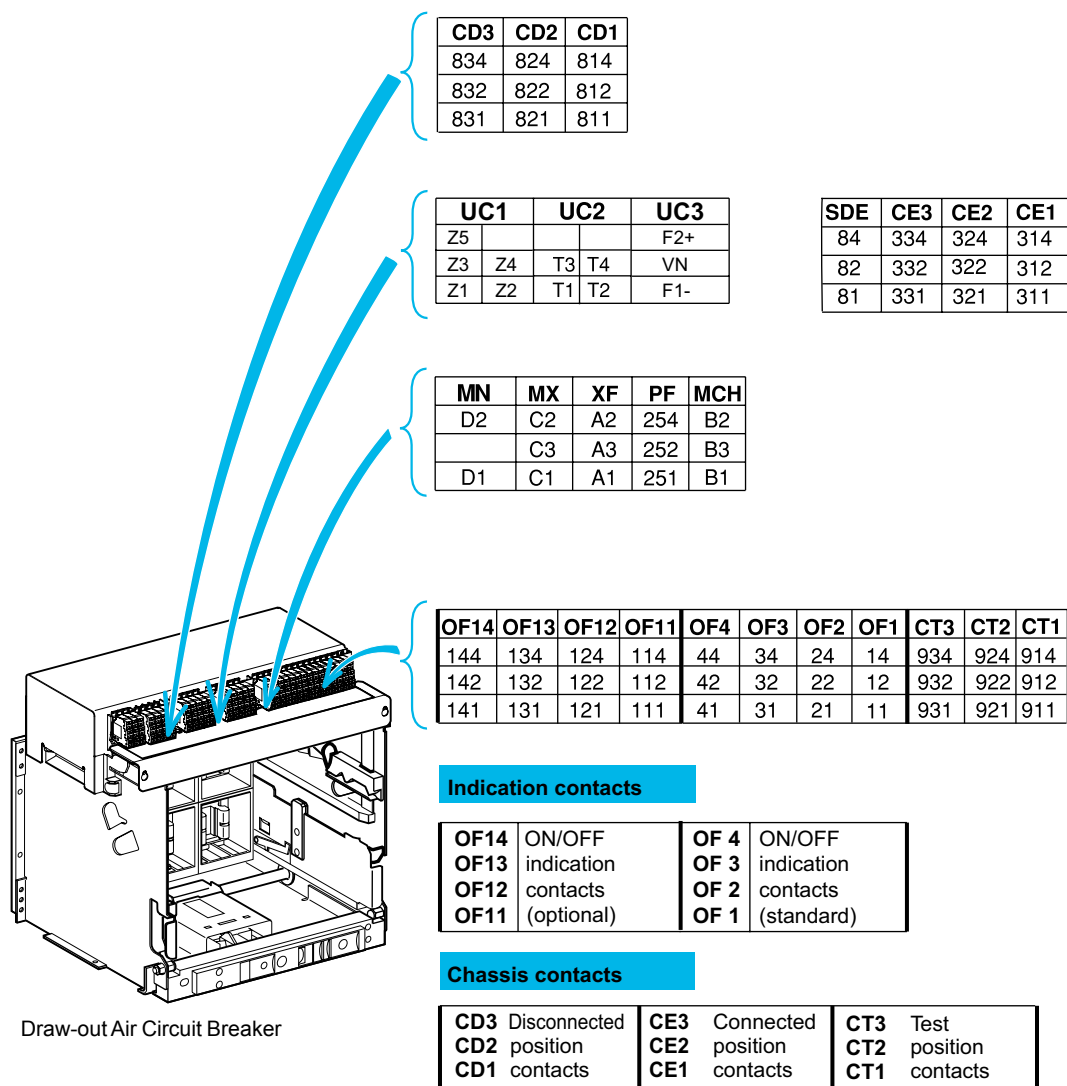
Peak demand values

The ETV trip unit calculates:

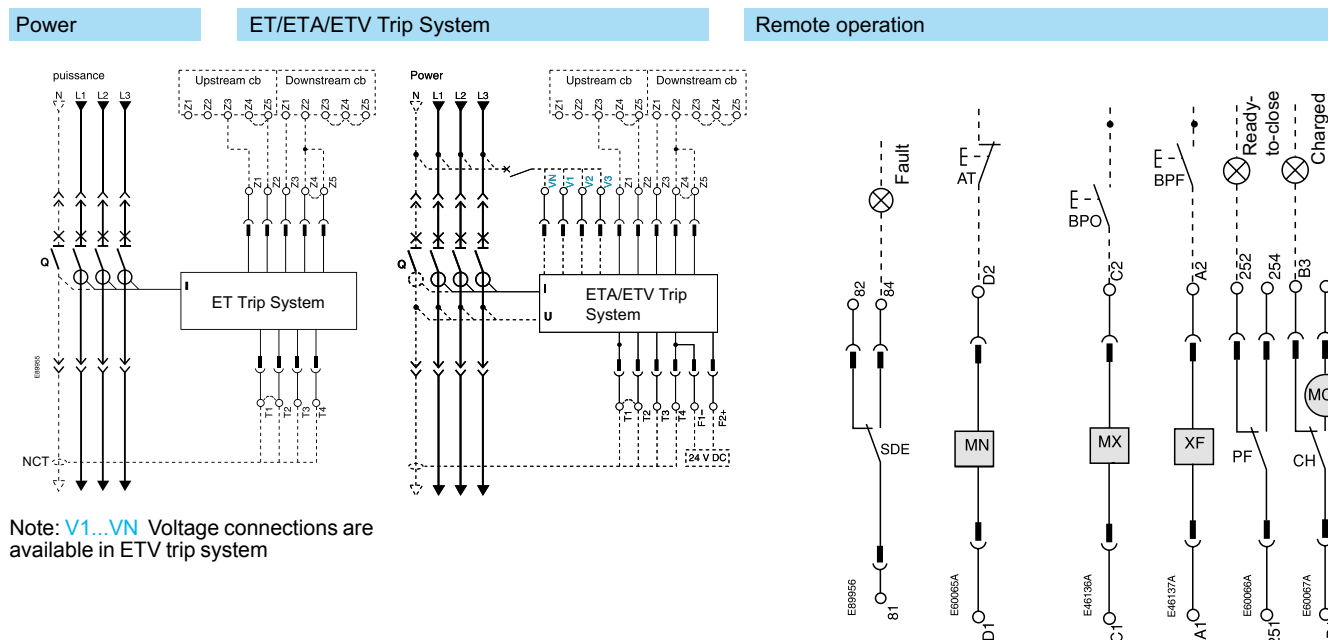
- the maximum (peak) demand values of phase and neutral currents since the last reset
- The peak demand values can be reset via the control unit (see page 47).

Identification of the connection terminals

Layout of terminal blocks



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

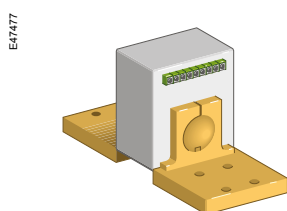


ET Trip System	
UC1	UC2
○ Z5	
○ ○ Z3 Z4	○ ○ T3 T4
○ ○ Z1 Z2	○ ○ T1 T2

ETA/ETV Trip System		
UC1	UC2	UC3
○ Z5		○ F2+
○ ○ Z3 Z4	○ ○ T3 T4	○ VN
○ ○ Z1 Z2	○ ○ T1 T2	○ F1-

Remote operation					
SDE	MN	MX	XF	PF	MCH
○ 84	○ D2	○ C2	○ A2	○ 254	○ B2
○ 82				○ 252	○ B3
○ 81	○ D1	○ C1	○ A1	○ 251	○ B1

ET/ETA/ETV Trip System		Remote operation	
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)	UC2 : T1, T2, T3, T4=external neutral UC3 : F2+, F1-: external 24 V DC power supply VN : external voltage connector (must be connected to the neutral with a 3P circuit breaker equipped with ETV trip system)	SDE: Fault-trip indication contact (supplied as standard) MN: Undervoltage release MX: Opening release (standard for Electrical breaker) XF: Closing release (standard for Electrical breaker) PF: "Ready to close"contact MCH: Gear motor (standard for Electrical breaker)	



External sensor(CT)

External sensors (Neutral CT)

External sensor for earth-fault protection

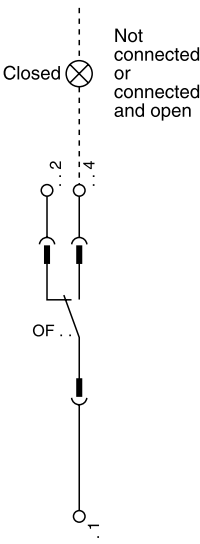
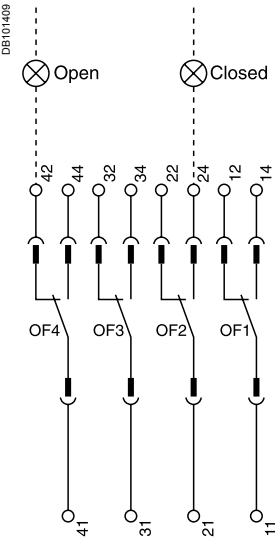
The sensors, used with the 3P circuit breakers, are installed on the neutral conductor for:

1. residual type earth-fault protection (with ET/ETA/ETV 6G Trip System)

The rating of the sensor (CT) must be compatible with the rating of the circuit breaker:

- MVS08 to MVS 20: CT 400/2000; UV number: 34035
- MVS25 to MVS 40: CT 1000/4000; UV number: 34036

Indication contacts



Indication contacts

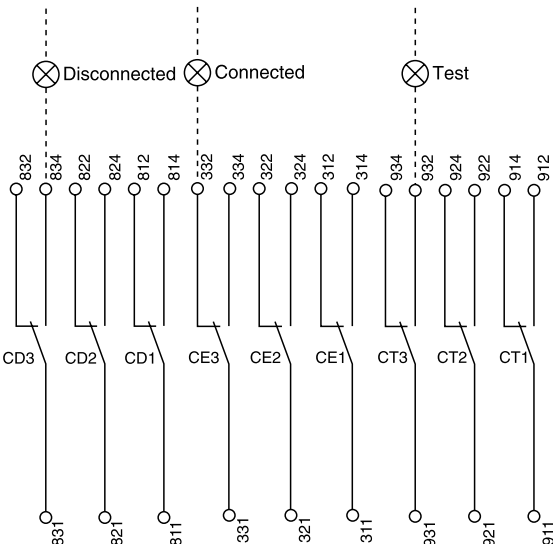
OF4	OF3	OF2	OF1
44	34	24	14
42	32	22	12
41	31	21	11

standard

OF14	OF13	OF12	OF11
144	134	124	114
142	132	122	112
141	131	121	111

optional

Chassis contacts



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

optional

Indication contacts

OF4	ON/OFF
OF3	indication
OF2	contacts
OF1	(standard)

OF 14	ON/OFF
OF 13	indication
OF 12	contacts
OF 11	(optional)

Chassis contacts

CD3	Disconnected	CE3	Connected	CT3	Test-position
CD2	position	CE2	position	CT2	contacts
CD1	contacts	CE1	contacts	CT1	

Key:

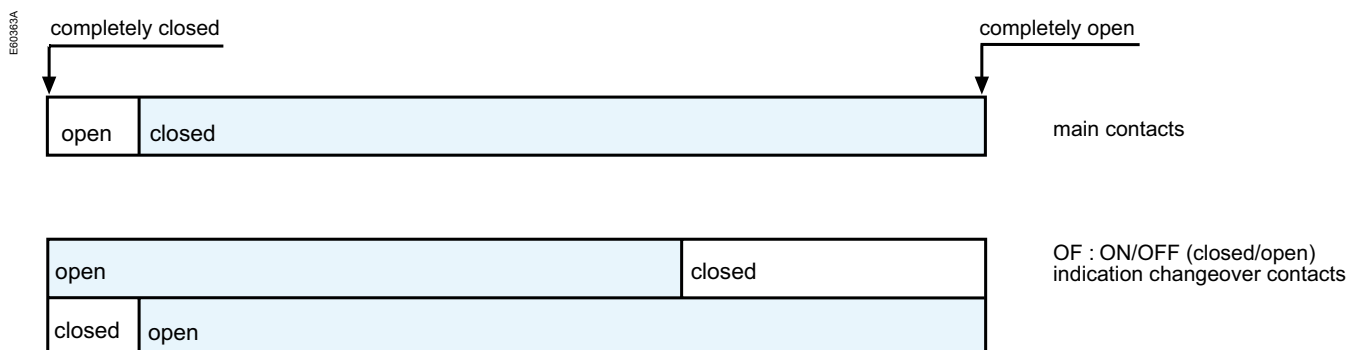
Draw out device only

SDE, OF1, OF2, OF3, OF4 supplied as standard

Interconnected connections
(only one wire per connection point)

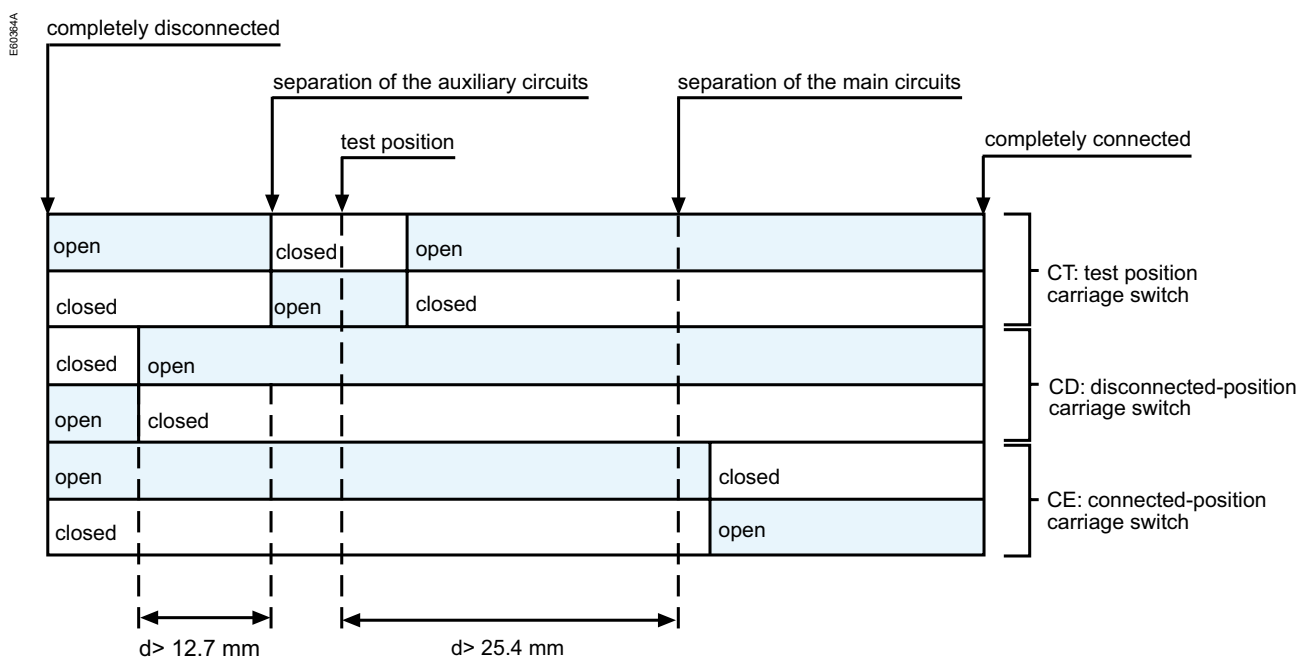
The ON/OFF indication contacts signal the status of the device main contacts.

Circuit breaker

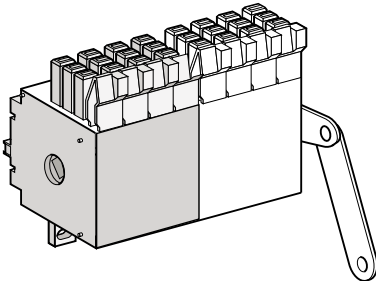


The carriage switches indicate the "connected", "test" and "disconnected" positions.

Chassis



E51331A



ON/OFF indication contacts(OF)

- | | | |
|---|--|--|
| <ol style="list-style-type: none"> 1. standard equipment:
4 OF per device. | <ol style="list-style-type: none"> 1. OF contacts indicate the position of main contacts 2. they trip when the minimum isolation distance between the main contacts is reached | <ol style="list-style-type: none"> 1. 4 changeover contacts 2. rated current: 10 A 3. breaking capacity 50/60 Hz for AC power (AC12 as per IEC60947-5-1):
a. 240/380 V: 10 A (rms)
b. 480 V: 10 A (rms) 4. breaking capacity for DC power (DC12 as per IEC60947-5-1):250 V:3A. |
|---|--|--|

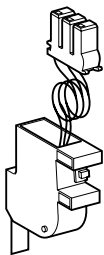
Optional ON/OFF indication contacts(OF)

- | | | |
|--|--|--|
| <ol style="list-style-type: none"> 1. optional equipment, one block of 4 OF contacts per device 2. connection cables not included, see below: one block of 4 OF contacts:47887 3.connection cables:
a. for fixed device:47074
b. for drawout device:47849 | <ol style="list-style-type: none"> 1. OF contacts indicate the position of the main contacts 2. they trip when the minimum isolation distance between the main contacts is reached | <ol style="list-style-type: none"> 1. changeover contacts 2. rated current: 6 A 3. breaking capacity 50/60 Hz for AC power (AC12 as per IEC60947-5-1):
a. 240/380 V: 6A (rms)
b. 480 V: 6A (rms) 4. breaking capacity for DC power (DC12 IEC60947-5-1):250 V:3A. |
|--|--|--|

"Fault-trip" indication contact(SDE)

- | | | |
|--|--|---|
| <ol style="list-style-type: none"> 1. standard equipment on circuit breakers, one SDE contact per device 2. not available for switch-disconnector versions | <ol style="list-style-type: none"> 1. the contact provides a remote indication of device opening due to an electrical fault | <ol style="list-style-type: none"> 1. changeover contacts 2. rated current: 5 A 3. breaking capacity 50/60 Hz for AC power (AC12 as per IEC60947-5-1):
a. 240/380V:5A(rms)
b. 480 V: 5A (rms) 4. breaking capacity for DC power (DC12 as per IEC60947-5-1):
a. 48 V: 3A
b. 125 V: 0.3 A
c. 250 V: 0.15 A. |
|--|--|---|

E51332A



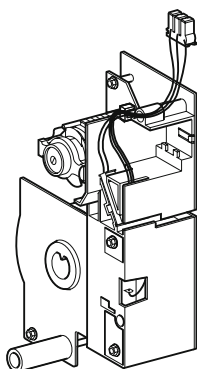
"Ready to close" contact(PF)

- | | | |
|--|---|--|
| <ol style="list-style-type: none"> 1. optional equipment, one PF contact per device 2. connections cables not included one PF Contact :47080 3. connection cables:
a. for fixed device:47074
b. for drawout device: 47849 | <ol style="list-style-type: none"> 1. the contact indicates that the device may be closed because all the following are valid:
a. circuit breaker is open
b. spring mechanism is charged
c. a maintained closing order is not present
d. a maintained opening order is not present | <ol style="list-style-type: none"> 1. change over contact 2. rated current: 5 A 3. breaking capacity 50/60 Hz for AC power (AC12 as per IEC60947-5-1):
a. 240/380 V: 5 A (rms)
b. 480 V: 5A (rms) 4. breaking capacity for DC power (DC12 as per IEC60947-5-1):
a. 48 V: 3A
b.125 V: 0.3 A
c. 250 V: 0.15 A. |
|--|---|--|

"Springs charged" limit switch contact (CH)

- | | | |
|--|--|--|
| <ol style="list-style-type: none"> 1. standard equipment, one CH contact per device | <ol style="list-style-type: none"> 1. the contact indicates the "charged" status of the operating mechanism (springs charged) | <ol style="list-style-type: none"> 1. changeover contact 2. rated current: 10 A 3. breaking capacity 50/60 Hz for AC power (AC12 as per 60947-5-1):
a. 240 V: 10 A(rms) |
|--|--|--|

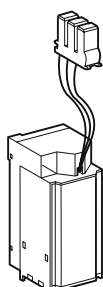
E51290A



Gear motor (MCH)

- optional equipment, one MCH gear motor per device
- connection cables not included, see below:
 - 24/30V DC : 47888
 - 48/60V DC : 47889
 - 100/130V DC: 47890
 - 200/250V DC: 47891
 - 100/130V AC: 47893
 - 200/240V AC: 47894
 - 380/415V AC: 47896
- connection cables:
 - for fixed device: 47074
 - for drawout device: 47849
- the gear motor automatically charges and recharges the spring mechanism
- charging time: 4 seconds max.
- consumption:
 - 180 VA AC
 - 180 W DC
- in rush current: 2 to 3 In for 0.1 second
- operating rate: maximum 3 cycles per minute.

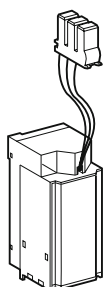
E51294A



Opening release (MX)

- optional equipment, 1 MX per device.
- connections cables not included, see below.
 - 24/30 V AC/DC: 33659
 - 48/60 V AC/DC: 33660
 - 100/130 V AC/DC: 33661
 - 200/250 V AC/DC: 33662
 - 380/480 V AC/DC: 33664
- connection cables:
 - for fixed device: 47074
 - for drawout device: 47849
- the MX release instantaneously opens the circuit breaker when energised
- the coil to be fixed at the defined location only
- device response time: 50ms ±10
- operating threshold: 0.7 to 1.1xUn
- the supply can be maintained
- consumption:
 - pick-up: 200VA/200W
 - hold: 4.5 VA/4.5W.

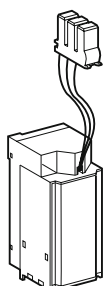
E51294A



Closing release (XF)

- optional equipment, 1 XF per device.
- connections cables not included, see below.
 - 24/30 V AC/DC: 33659
 - 48/60 V AC/DC: 33660
 - 100/130 V AC/DC: MVS15511
 - 200/250 V AC/DC: MVS15512
 - 380/480 V AC/DC: MVS15513
- connection cables:
 - for fixed device: 47074
 - for drawout device: 47849
- the XF release instantaneously closes the circuit breaker when energised, if the device is "ready to close".
- the coil to be fixed at the defined location only.
- device response time: 70ms+10/-15
- operating threshold: 0.85 to 1.1xUn
- the supply can be maintained
- consumption:
 - pick-up: 200VA/200W
 - hold: 4.5 VA/4.5W.

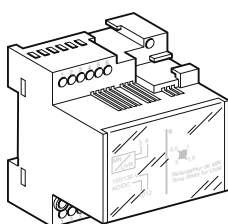
E51294A



Instantaneous undervoltage releases (MN)

- optional equipment, 1 MN per device
- connection cables not included, see below:
 - 24/30 V AC/DC: 33668
 - 48/60 V AC/DC: 33669
 - 100/130 V AC/DC: 33670
 - 200/250 V AC/DC: 33671
 - 380/480 V AC/DC: 33673
- connection cables:
 - for fixed device: 47074
 - for drawout device: 47849
- the MN release instantaneously opens the circuit breaker when its supply voltage drops below threshold values
- device response time: 90 ms±5
- operating threshold:
 - opening: 0.35 to 0.7 xUn
 - closing: 0.85xUn
- consumption:
 - pick-up: 200VA/200W
 - hold: 4.5 VA/4.5W

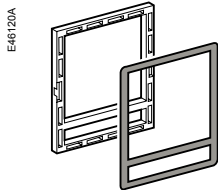
E51294A



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/DC
 - 100/130V AC/DC
 - 200/250V AC/DC
 - 380/480V 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
- device response time (adjustable type): 0.5s-0.9s-1.5s-3s
- operating threshold:
 - opening: 0.35 to 0.7 x Un
 - closing: 0.85xUn
- consumption:
 - pick-up: 200VA/200W
 - hold: 4.5 VA/4.5W

MN delay unit(1part)	R (non-adjustable)	Rr(adjustable)
AC50/60Hz	48/60VAC/DC	33680
DC	100/130 V AC/DC	33681
	200/250 V AC/DC	33682
	380/480 V AC/DC	33683

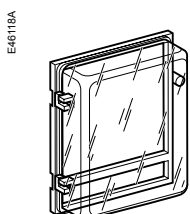


Escutcheon(CDP)

standard equipment, one Escutcheon per device

- a. for fixed device:48601
- b. for drawout device:48603

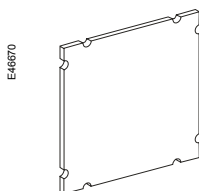
1. the Escutcheon increases the degree of protection to IP 40 and IK 07 (fixed and drawout devices).



Transparent cover(CP)

optional equipment, one Transparent cover per device equipped with a Escutcheon (only for drawout devices:48604)

1. mounted with a Escutcheon, the Transparent cover increases the degree of protection to IP 55 and IK 10 (only for drawout devices).

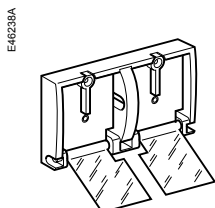


Blankingplate

Blanking plate(OP) for escutcheon

optional equipment, one Blanking plate per device equipped with a Escutcheon (only for drawout devices:48605)

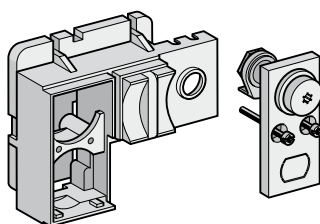
1. Used with the Escutcheon, this option closes off the door cut-out of a cubicle not yet equipped with a device.



Transparent cover for pushbutton locking(VBP)

1. optional equipment, one locking cover per device:48536

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

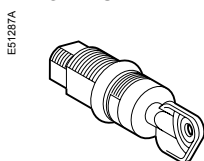


Device OFF position locking kit for keylocks(VSPO)

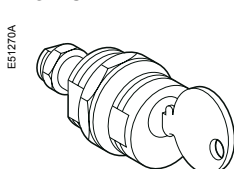
1. optional equipment,
2. one locking kit per device. (key locks not included. Common for Ronis/ Profalux type keylocks)
3. part number: 64925

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

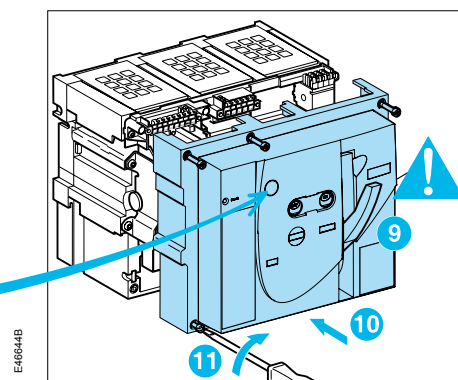
PROFALUX



RONIS



Note: Knock-out provision available in the front cover for fixing key-lock.

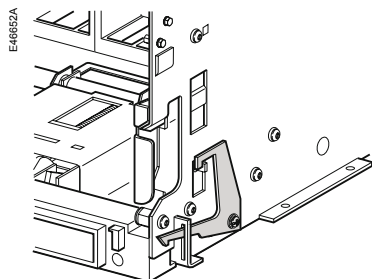


Keylocks required for the device locking kit

1. a. one key lock for locking kit.
b. part number:
i). Profalux:42888
ii). Ronis:41940

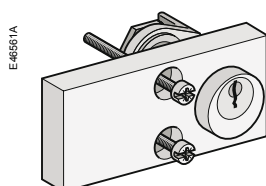
2. a. two keylocks* with same profile.
b. part number:
i). Profalux:42878
ii). Ronis:41950

* one keylock mounted on the device
+one keylock supplied separately for interlocking another device.



Door interlock(VPEC)

1. optional equipment, one door interlock per chassis
2. part number: 47914
1. this device inhibits opening of the cubicle door when the circuit breaker is in "connected" or "test" position
1. it may be mounted on the left or right-hand side of the chassis.

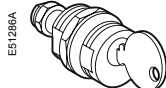
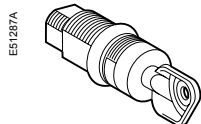


Circuit breaker locking in "disconnected" position(VSPD)

1. optional equipment, one locking kit per device for Profalux or Ronis keylocks(not included)
2. part number: 48564
3. key locks to be ordered separately.
1. mounted on the chassis and accessible with the door closed, this system locks the circuit breaker in "disconnected" position using one keylock
2. the "disconnected" position locking system may be modified to lock the circuit breaker in all three positions.

Profalux

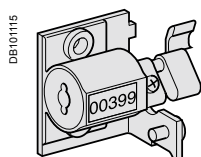
Ronis



Keylocks required with the "disconnected" position locking system

1. a. one lock for locking system
 - b. part number:
 - i). Profalux: 42888
 - ii). Ronis: 41940
2. a. two keylocks with same profile.
 - b. part number:
 - i). Profalux: 42878
 - ii). Ronis: 41950

* one keylock mounted on the device
+one keylock supplied separately for interlocking another device.

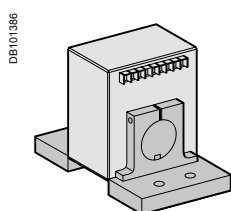


Operation counter(CDM)

1. optional equipment, per device

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

This option is compulsory for all the source-changeover systems.
2. part number : 48535



External neutral sensors (TCE)

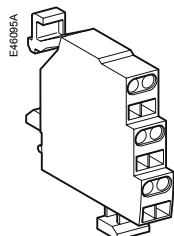
External sensor for earth-fault protection

The sensors, used with the 3P circuit breakers, are installed on the neutral conductor for:

1. residual type earth-fault protection (with ET/ETA/ETV 6G Trip System)

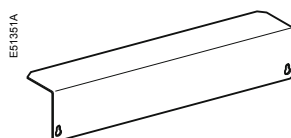
The rating of the sensor (CT) must be compatible with the rating of the circuit breaker:

 - a. MVS08 to MVS 20: CT 400/2000; UV number: 34035
 - b. MVS25 to MVS 40: CT 1000/4000; UV number: 34036



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

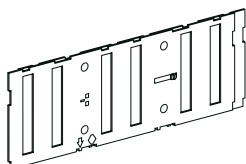
- optional equipment, one to nine carriage switches
Standard configuration, 0 to 3 CE, 0 to 3 CD, 0 to 3 CT
- part number (connection cables not included)
 - 1 carriage switch 33170
- the carriage switches indicate the three positions:
 - CE: connected position
 - CD: disconnected position (when the minimum isolation distance between the main contacts and the auxiliary contacts is reached)
 - CT: test position (in this position, the power circuits are disconnected and the auxiliary circuits are connected)
- function defined based on the location in chassis.
- changeover contact
- rated current: 8 A
- breaking capacity
 - 50/60 Hz for AC power (AC12 as per IEC60947-5-1): 240 V: 8 A (rms) 380 V/415 V: 8 A (rms)
- breaking capacity for DC power (DC12 as per IEC60947-5-1): 125 V: 0.8 A.



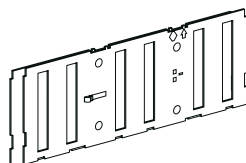
Auxiliary terminal shield(CB)

- optional equipment, one shield per chassis
- part number:
 - 3 pole: 64942
 - 4 pole: 48596
- the shield prevents access to the terminal block of the electrical auxiliaries.

E51334A Top shutter closed

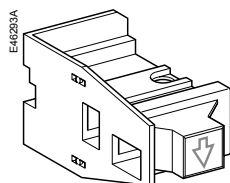


Bottom shutter closed



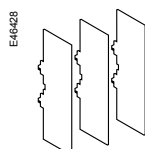
Safety shutters(VO)

- standard equipment
- set of shutters for top and bottom:
 - MVS08/MVS40
 - 3 poles
 - 4 poles
 - part number:
 - 3 poles: 48721
 - 4 poles: 48723
- 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:
- blocks for MVS08 to MVS40
- part number: 48591
- the block may be padlocked. It:
 - prevents connection of the device
 - locks the shutters in the closed position.



Interphase barriers (EIP)

- optional equipment
- for rear connected
 - fixed (3 pole & 4 pole): 48599
 - draw-out (3 pole & 4 pole): 48600
- flexible insulated partitions used to reinforce isolation of connection points in installations with busbars.
- they are installed vertically between rear connection terminals

These operations must be carried out in particular before using a EasyPact MVS 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:

1. prior to initial use
2. 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,).

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:

1. breaking capacities indicated on the rating plates
2. identification of the ET/ETA/ETV Trip System (type, rating)
3. presence of any optional functions (remote ON/OFF with motor mechanism, auxiliaries, etc.)
4. protection settings (long time, short time, instantaneous, earth fault)
5. 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:

1. electrical auxiliaries*
2. terminal blocks
3. connections of auxiliary circuits.

Operation

Check the mechanical operation of the circuit breakers:

1. opening of contacts
2. closing of contacts.

Check on the ET/ETA/ETV Trip System

Check the ET/ETA/ETV Trip System of each circuit breaker using this user manual (from page 21 to page 28).

** Make sure that XF (closing coil) & MX (opening coil) are installed at the right locations.
Avoid installation of XF release at MX position. Failure to follow the instruction of
MN-MX-XF can not keep the circuit breaker at OFF position by remote control that
resulting equipment damage or risk of life.*

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 10 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.

1. depending on the type of trip system, fault diagnostics are available. See page 25 of this manual for details on the type of fault indications.
2. 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

1. check the arc chutes (see page 70).
2. check the contacts (see page 70).
3. check the disconnecting-contact clusters (see page 71).
4. check the tightness of connections (50 N.m see the device installation manual)

Reset the circuit breaker

The circuit breaker can be reset locally.

See page 10 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 / +60°C Normal atmosphere

Periodic inspections required

Interval	Operations	Procedure
each year	1. open and close the device locally and remotely, successively using the various auxiliaries 2. test the operating sequences 3. test ET/ETA/ETV Trip System using the mini test kit	see pages 9 and 10 see page 7 see page 25
every two years	1. check the arc chutes 2. check the main contacts 3. check the disconnecting-contact clusters 4. check the tightness of connections(50 N.m)	see page 70 see page 70 see page 71 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	1. user	see page 70.
main contacts	1. inspection: user 2. replacement: Schneider After Sales Support	see page 70.
MCH gear motor	1. user	see page 8.
mechanical interlocks	1. user	see Mechanical interlocking manual.
connecting-rod springs	1. Schneider After Sales Support	
MX/MN/XF	1. user	see pages 9, 10.

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

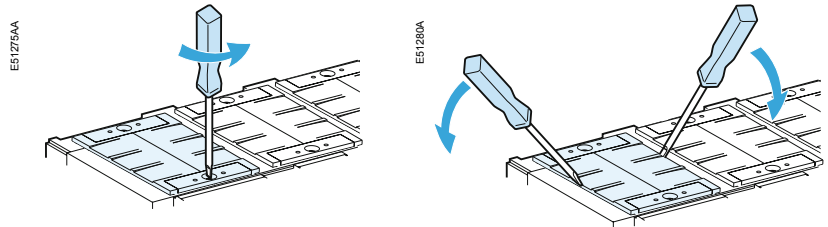
Type of circuit breaker	Maximum service life	Service life of various parts*			
		Arc chutes	Main contacts	Connecting-rod springs, MCH	MX/XF releases
MVS 08-16	20000	6000	6000	10000	10000
MVS 20-40	20000	5000	5000	10000	10000

* the service life of arc chutes & main contacts are at an operational voltage of 440V AC.

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

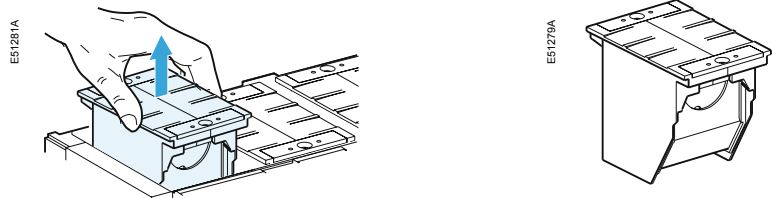
Arc chutes

1. remove the 2 fixing screws:



2. check the arc chutes:
chamber not cracked separators not corroded.

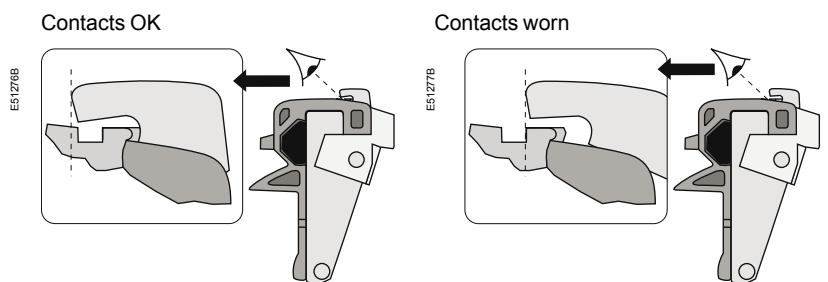
If necessary, replace the arc chutes.



Wear of main contacts

1. remove the arc chutes
2. close the device and check the contacts

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

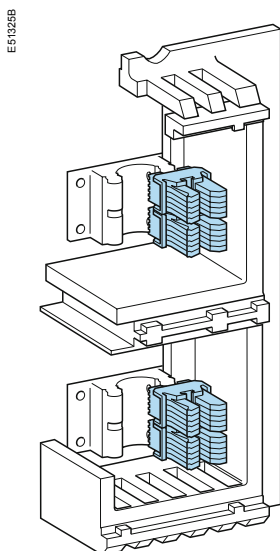


Disconnecting-contact clusters

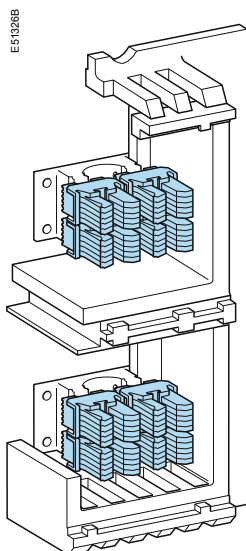
1. grease the contacts using the grease, supplied by Schneider Electric
2. check the contacts as follows:
 - a. open the circuit breaker
 - b. de-energise the busbars
 - c. disconnect the circuit breaker
 - d. remove the circuit breaker
 - e. check the contact fingers (no sign of copper should be visible)
 Replace any worn clusters.
3. the position of the clusters must correspond to the table below.

Rating Type	MVS08	MVS10	MVS12	MVS16	MVS20	MVS25	MVS32	MVS40
N	layout n°2	layout n°2	layout n°2	layout n°2	layout n°2	layout n°3	layout n°4	layout n°5
H	layout n°2	layout n°2	layout n°2	layout n°2	layout n°2	layout n°2	layout n°4	layout n°5
NA	layout n°2	layout n°2	layout n°2	layout n°2	layout n°2	layout n°3	layout n°4	layout n°5
HA	layout n°2	layout n°2	layout n°2	layout n°2	layout n°2	layout n°2	layout n°4	layout n°5

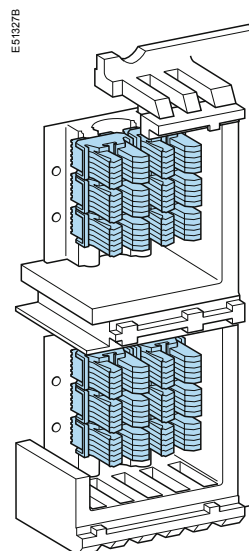
layout n°2



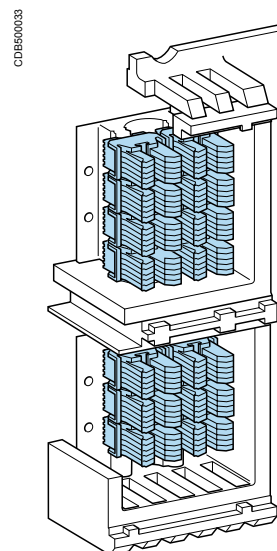
layout n°3



layout n°4



layout n°5



Electrical accessories

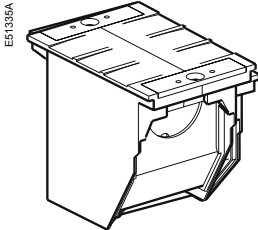
The electrical accessories that may require replacement are the following:

1. MCH gear motor
2. MX opening release
3. XF closing release
4. MN under voltage release.

See page 63 in the "Auxiliaries for remote operation" section for their characteristics and part numbers.

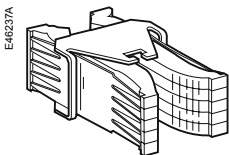
Arc chutes

1. arc chute: MVS08-40
part number: MVS21807
1. 3 or 4 chutes per circuit breaker



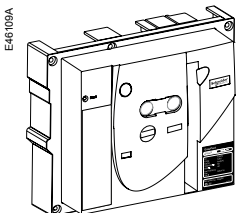
Disconnecting-contact clusters for standard MVS

1. cluster :
part number: 33166
1. number per circuit
breaker, see table page 71.



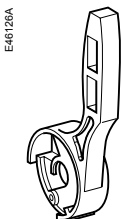
Front cover with knock-out provision for key lock(standard)

1. front cover for 3-or 4
poles devices.
part number: MVS21808
1. one per device.



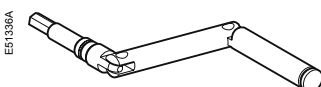
Charging handle

1. Manual operating
spring charging handle.
part number: 47940
1. one handle per device.



Crank

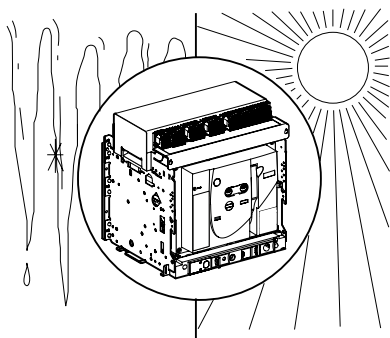
1. crank per device.
part number: 47944
1. one per device.



Problem	Problem	Problem
circuit breaker cannot be closed locally or remotely	1. circuit breaker padlocked or keylocked in the "open" position 2. circuit breaker interlocked mechanically in a source changeover system 3. circuit breaker not completely connected 4. the reset button signalling a fault trip has not been reset 5. stored energy mechanism not charged 6. MX opening shunt release permanently supplied with power 7. MN under voltage release not supplied with power 8. XF closing release continuously supplied with power, but circuit breaker not "ready to close" (XF not wired in series with PF contact)	a. disable the locking function a. check the position of the other circuit breaker in the changeover system b. modify the situation to release the interlock a. terminate racking in (connection) of the circuit breaker a. clear the fault b. push the reset button on the front of the circuit breaker a. charge the mechanism manually b. 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) a. there is an opening order. Determine the origin of the order. The order must be cancelled before the circuit breaker can be closed a. there is an opening order. Determine the origin of the order. b. check the voltage and the supply circuit ($U > 0.85 U_n$). If the problem persists, replace the release a. 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"
circuit breaker cannot be closed remotely but can be closed locally using the closing pushbutton on breaker	1. closing order not executed by the XF closing release	a. 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	1. MN undervoltage release supply voltage too low 2. load-shedding order sent to the MX opening release by another device 3. unnecessary opening order from the MX opening release	a. check the voltage and the supply circuit ($U > 0.85 U_n$) a. check the overall load on the distribution system b. if necessary, modify the settings of devices in the installation a. determine the origin of the order
unexpected tripping with activation of the reset button signalling a fault trip	1. overload 2. earth fault 3. short-circuit detected by Trip unit	a. determine and clear the causes of the fault b. 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	1. thermal memory 2. transient over current when closing 3. closing on a short-circuit	a. refer to page no.23-24 of this user manual. b. press the reset button a. modify the distribution system or the Trip unit settings. b. check the condition of the circuit breaker before putting it back into service c. press the reset button a. clear the fault b. check the condition of the circuit breaker before putting it back into service c. press the reset button

Problem	Probable causes	Solutions
circuit breaker cannot be opened remotely, but can be opened locally	1. opening order not executed by the MX opening release	check the voltage and the supply circuit (0.7-1.1Un). If the problem persists, replace the MX release
	2. opening order not executed by the MN undervoltage release	drop in voltage insufficient or residual voltage ($U < 0.35U_n$) across the terminals of the undervoltage release. If the problem persists, replace the MN release
circuit breaker can not be opened locally	1. operating mechanism malfunction or welded contacts	contact a Schneider service centre
circuit breaker can not be reset locally	1. insufficient supply voltage for the MCH gear motor	check the voltage and the supply circuit (0.85 - 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	1. reset button not pushed-in completely	push the reset button in completely
impossible to insert the crank in connected, test or disconnected position	1. a padlock or keylock is present on the chassis or a door interlock is present	disable the locking function
impossible to turn the crank	1. the position release button has not been pressed	press the position release button
circuit breaker cannot be removed from chassis	1. circuit breaker not in disconnected position	turn the crank until the circuit breaker is in disconnected position and the position release button is popped-out.
	2. the rails are not completely out	pull the rails all the way out
circuit breaker cannot be connected (racked in)	1. the safety shutters are locked	remove the lock(s)
	2. the disconnecting-contact clusters are incorrectly positioned	reposition the clusters
	3. chassis locked in disconnected position	disable the chassis locking function
	4. the position release button has not been pressed, preventing rotation of the crank	press the position release button
	5. 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	1. the circuit breaker is not in the right position	check the circuit breaker position by making sure the position release button is popped-out.
	2. the crank is still in the chassis	remove the crank and store it
circuit breaker cannot be locked in connected, test or disconnected position	1. check that locking in any position is enabled	contact a Schneider service centre
	2. the circuit breaker is not in the right position	check the circuit breaker position by making sure the position release button is popped-out.
	3. the crank is still in the chassis	remove the crank and store it
the crank cannot be inserted to connect or disconnected the circuit breaker	1. the rails are not completely in	push the rails all the way in
the right-hand rail (chassis alone) or the circuit breaker cannot be drawn out	1. the crank is still in the chassis	remove the crank and store it

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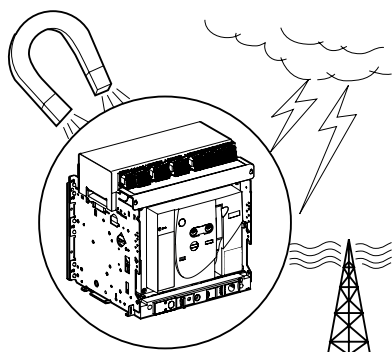


Ambient temperature

EasyPact MVS devices can operate under the following temperature conditions:

1. the electrical and mechanical characteristics are stipulated for an ambient temperature of -5°C to $+60^{\circ}\text{C}$
2. circuit-breaker closing is guaranteed down to -35°C
3. EasyPact MVS (without Trip System) can be stored in an ambient temperature of -40°C to $+85^{\circ}\text{C}$
4. the Trip System can be stored in an ambient temperature of -25°C to $+85^{\circ}\text{C}$.

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Electromagnetic disturbances

EasyPact MVS devices are protected against:

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

EasyPact MVS devices have successfully passed the electromagnetic-compatibility tests (EMC) defined by the following international standards:

IEC 60947-2, appendix F

The above tests guarantee that:

1. no nuisance tripping occurs
2. tripping times are respected.

Cleaning

1. non-metallic parts:
never use solvent, soap or any other cleaning product. Clean with a dry cloth only
2. 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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