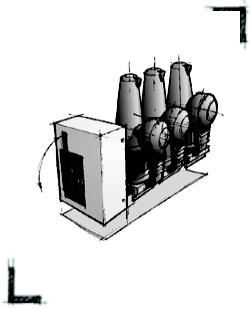
Medium Voltage Circuit Breaker

SFset with VIP 300 built-in control unit

Instruction manual

2005



SFset

a brand of Schneider Electric

Merlin Gerin

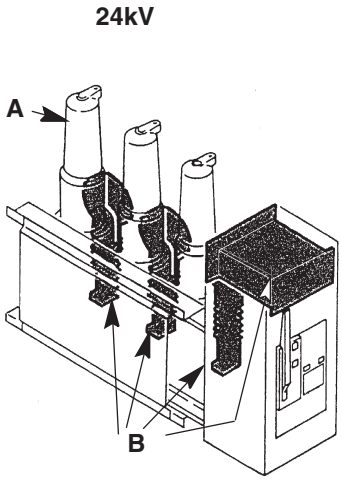
Contents

Contents

RI control SFset circuit breaker

A Circuit breaker
B Control unit

DE31001a

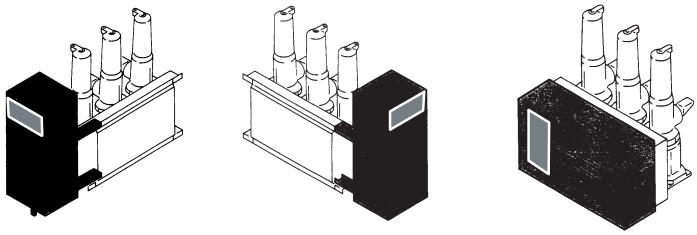


RI control

Lateral:
Position A1 and B1

Frontal:
Position C1

DE31002

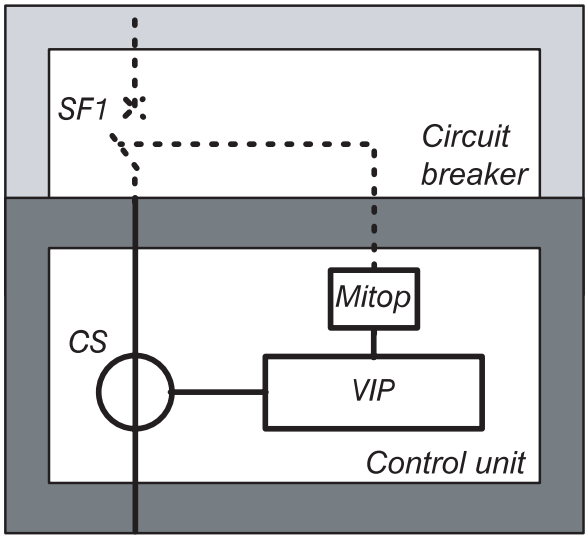


position A1 **position B1** **position C1**

Control unit

The control unit consists of:
(1) **VIP** type protective electronic relay
(2) Mitop trip
(3) Current sensors

DE31003



Handling and storage

Identification

Of the circuit breaker, the control and the auxiliaries

Consult the manual for circuit breaker SF1 no. 889146;

Of the VIP relays

The type of relay is indicated with a mark on the top left of the relay's front panel

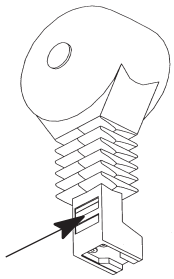
CS current sensors for 24kV

The sensors are mounted on the circuit breaker

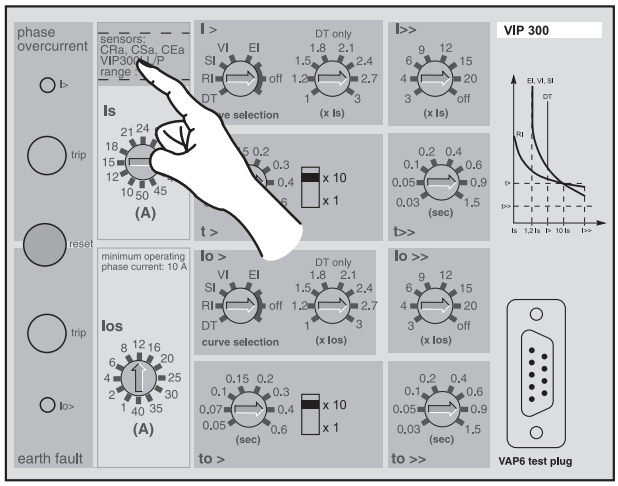
Marking:
- 24 kV: etching of the current sensors with the references **CSa or CSb.**
-

DE31004a

24 kV



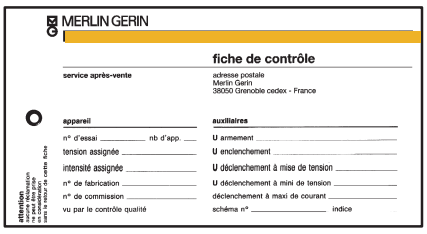
Note:
check the correspondence of the sensor and relay characteristics.



Inspection sheet

Note:
No claim may be considered unless the inspection sheet is returned.

DE331006

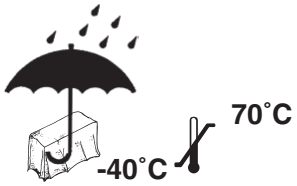


Check:
■ For the presence of the inspection sheet on the equipment.

Storage

The circuit breakers are shipped in position "O" (open) and with the control disabled.

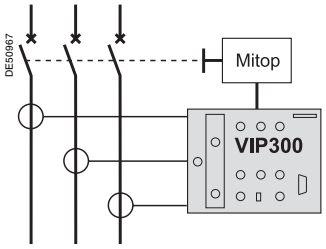
DE31007



Store the devices in a dry, ventilated place, sheltered from rain, splashes of water and chemical agents. Cover the equipment with a tarpaulin or cover to effectively protect it against dust, debris, paint, etc...

Handling

Consult the instructions for circuit breaker SF1 no. 889146.

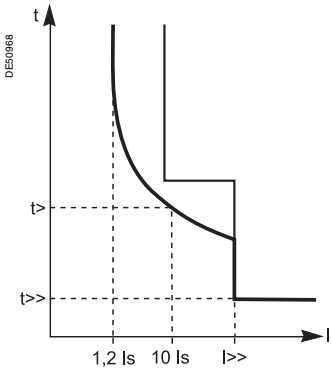


Simplified connection diagram

Self-powered protective relay

The VIP300 relay is designed for use on distribution networks. It may be used as MV/LV transformer protection, protection at the incoming point of industrial installations, and also as branch feeder protection.
The VIP300 provides protection against phase-to-phase faults and earth faults.
The selection of tripping curves and the multiple settings allow it to be used in a wide variety of discrimination plans. The VIP300 is a self-powered relay, energised by the current sensors; it does not require an auxiliary source.
It actuates a Mitop release.
The VIP300 is available in 3 models:

- ■ VIP300LLs and VIP300Ps are designed for use with the 24kV RM6, SFset and Evolis circuit breakers.
- □ VIP300LL: phase protection and earth protection
- □ VIP300P: phase protection only.



Phase and earth protection curve

Phase protection

The phase protection has two separately adjustable settings:

- ■ The low setting may be chosen with definite time or IDMT
- ■ The high setting is of the definite time type.

The IDMT curves comply with IEC standard 60255-3. They are inverse, very inverse and extremely inverse.
The low setting may also be set according to the RI curve.

Earth protection

The earth fault protection operates through residual current measurement: it uses the sum of the sensor secondary currents.
Like phase protection, earth protection has two separately adjustable settings.

Description of the equipment

The VIP300 relay is mounted in a polycarbonate injected casing that protects it against dripping water and dusty environments.
Its front panel is protected by a transparent cover fitted with a sealing joint. The cover may be lead-sealed to prevent access to the settings.
Rotating selector switches are used for setting. The phase operating current and the earth setting current are set in amperes. This means that the scale on the front panel must be adapted to the sensor used; a "setting scale label" must therefore be placed on the relay during assembly.
Connections are made on the back using fast-on clips.

Signalling

Two indicators indicate the origin of the tripping (phase or earth).
They remain in position after the breaking of the relay power supply.
Two LEDs (phase and earth) indicate that the low setting has been overrun and the time delay has been activated..

Presentation of the sensors

Sensors for the VIP300

To obtain the specified performance levels, the VIP300 relays must be used with the specified sensors. The relay/sensor assembly is an integral whole for compliance with the characteristics and in particular with:

- Operating throughout the range
- Response time
- Accuracy
- Thermal resistance on a short circuit.

The 3 sensors must be the same type.

Sensors for the VIP300LL and the VIP300P

- CRa 200/1 and CRb 1250/1 sensors for the 1998 RM6 1998 and later
- SFset circuit breaker CSa 200/1 and CSb 1250/1 sensors

The CSa and CSb sensors have respectively the same number of secondary coils as the CRa and CRb sensors.

- CEa 200/1 and CEb 1250/1 for the 24kV Evolis built-in circuit breaker, lateral version.

VIP300 sensor input range

Each VIP300 has 2 input ranges, each corresponding to a different operating range. To allow this, the input transformers have an intermediate socket on their primary winding. Each socket corresponds to a range with a different operating range..

Sensor selection

Choose the sensor to be used and the connection range on the VIP300 according to the operating current setting range required.

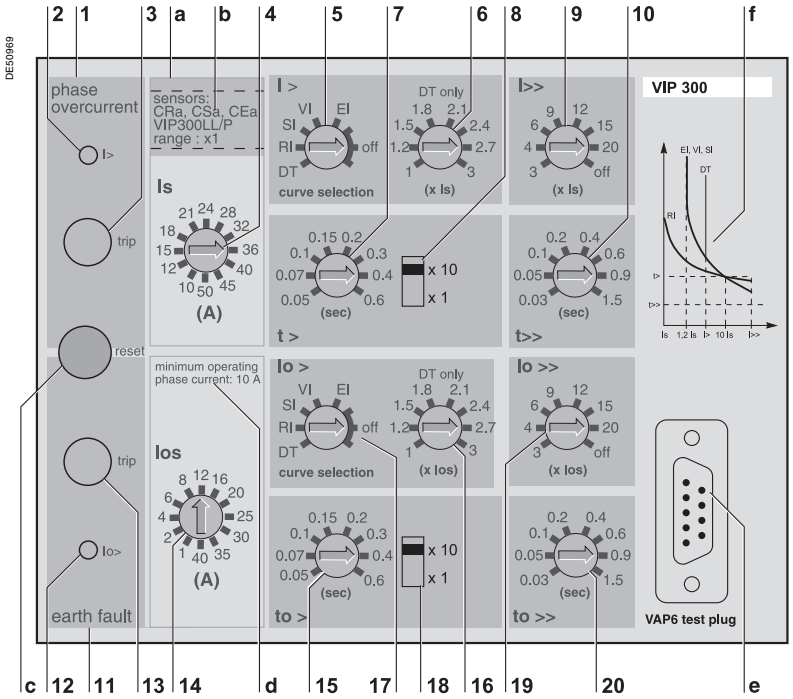
VIP300LL/VIP300P sensors	Range	Operating current setting range
CRa, CSa, CEa 200/1	x 1	10 A - 50 A
	x 4	40 A - 200 A
CRb, CSb, CEb, 1250/1	x 1	63 A - 312 A
	x 4	250 A - 1250 A

For a given operating range, the bottom of the operating current setting range is the relay's activation current.

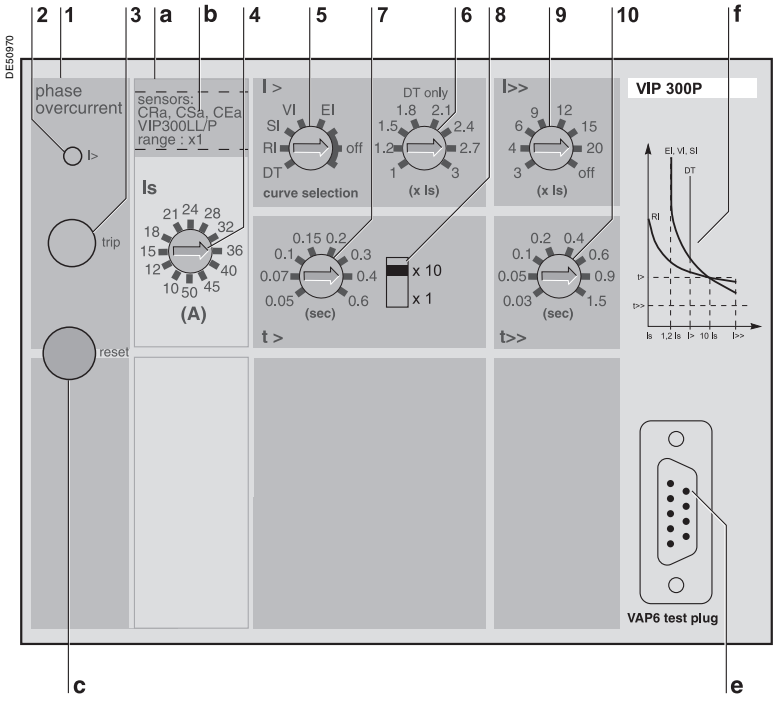
Phase protection
1. *phase setting zone*
2. *setting overrun indicator*
3. *phase trip indicator*
4. *Is phase operating current*
5. *low setting curve type selection*
6. *I> low setting*
7. *t> low setting time delay*
8. *multiplying factor (low setting)*
9. *I>> high setting*
10. *t>> high setting time delay*

Earth protection
11. *earth setting zone*
12. *setting overrun indicator*
13. *earth trip indicator*
14. *Ios earth setting current*
15. *to> low setting time delay*
16. *Io> low setting*
17. *low setting curve type selection*
18. *multiplying factor (low setting)*
19. *Io>> high setting*
20. *to>> high setting time delay*

Others functions
a. *setting scale label*
b. *sensor and range information*
c. *indicator reset*
d. *activation current*
e. *VAP6 test socket*
f. *VIP300LL: tripping curves*

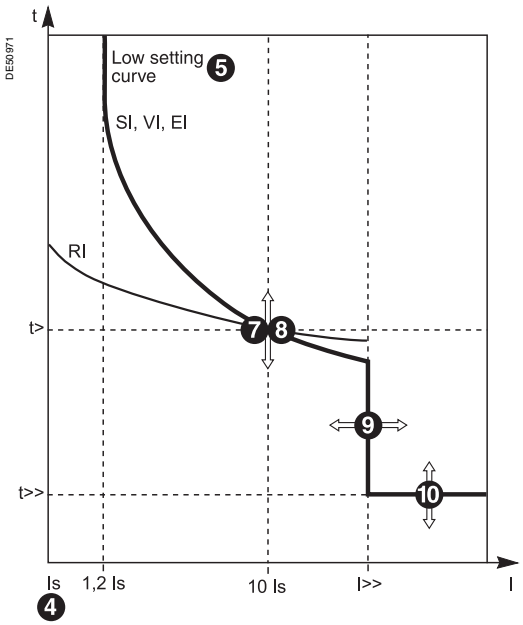


VIP300LL front panel.

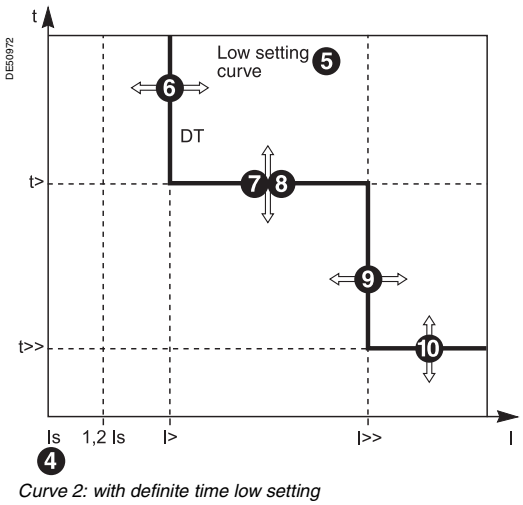


VIP300P front panel.

*See also **c: indicator reset push button***



Curve 1: with IDMT low setting



Curve 2: with definite time low setting

VIP300LL and VIP300P phase protection

■ **1: phase protection setting zone**
The settings relating to the phase protection are grouped together in the upper half of the front panel.

■ **2: setting overrun indicator**
When this red indicator light is flashing it indicates that the phase protection low setting time delay has been activated. In this case, if the current is not reduced, the relay will be tripped.
For IDMT curves (SI, VI, EI) it lights up if the current is more than 1.2 times greater than the Is operating current.
For the IDMT curve (RI) it lights up if the current is greater than the Is setting.
For the definite time curve it lights up when the low setting is overrun.

■ **3: trip indicator**
This is usually black and turns yellow to indicate that the phase protection has given a tripping order. It maintains its state even when the relay is no longer energised.

■ **4: Is operating current selection**
The operating current setting range depends on the sensor and the range used. The switch's setting scale must be adapted to the sensor and the range by means of the setting scale label.

■ **5: low setting curve type selection**
□ DT: constant time
□ SI: inverse time
□ VI: very inverse time
□ EI: extremely inverse time
□ RI: specific curve
□ off: the low setting is inhibited.

■ **6: I> low setting selection**
The setting is set as a multiple of the operating current. This setting is only active for the definite time setting (switch 5 on DT).
If the tripping curve is chosen with IDMT (switch 5 on RI, SI, VI, EI) the switch is disabled.

■ **7: t> low setting time delay**
If the tripping curve is of the definite time type (DT) this switch sets the low setting time delay.
If the curve is of the IDMT type (RI, SI, VI, EI) the value displayed is the tripping time for a phase current equal to 10 times the operating current.

■ **8: low setting time delay multiplying factor**
In the x10 position the time delay displayed on switch 7 is multiplied by 10.

■ **9: I>> high setting**
The high setting is chosen as a multiple of the operating current.
In the "off" position the high setting is inhibited.

■ **10: t>> high setting time delay**
The time is directly set in s.

Setting the phase protection

The numbers given on the curves opposite are those of the phase protection setting switches (see the front panel diagram).

Set:
■ The Is operating current (4)
■ The type of I> low setting curve (5)
□ IDMT time: RI, SI, VI, EI
□ Definite time: DT
■ The I> low setting (6). This setting is only active if the low setting curve chosen is of the DT definite time type (curve 2). For the others choices: SI, VI, EI, RI (curve 1), the switch is inoperative
■ The t> low setting time delay (7) and (8)
■ The I>> high setting (9)
■ The t>> high setting time delay (10).

For the cases opposite, the setting overrun indicator only lights up if the phase current is greater than the activation current. See also ***c: indicator reset push button.***

VIP300LL earth protection

The setting principle is the same as for phase protection.

■ **11: earth protection setting zone**

The settings relating to the earth protection are grouped together in the lower half of the front panel.

■ **12: setting overrun indicator**

When this indicator light is flashing it indicates that the earth protection low setting time delay has been activated. In this case, if the current is not reduced the relay will be tripped.

For IDMT curves (SI, VI, EI) it lights up if the current is 1.2 times more than the Ios setting current.

For the IDMT curve (RI) it lights up if the current is greater than the Ios setting.

For the definite time curve (DT) it lights up when the low setting is overrun.

■ **13: trip indicator**

This is usually black and becomes yellow to indicate that the earth protection has been tripped. It maintains its state when the relay is no longer energised after the opening of the circuit breaker.

■ **14: Ios setting current selection**

Only the maximum residual current may pass through the network without the protection being activated.

The Ios current setting range depends on the sensor and the range used: the switch's setting scale must be adapted to the sensor and the range by means of the setting scale label.

■ **15: to> low setting time delay**

If the tripping curve is of the definite time type (DT) this switch sets the low setting time delay.

If the curve is of the IDMT type (RI, SI, VI, EI) the value displayed is the tripping time for an earth current equal to 10 times the operating current.

■ **16: Io> low setting selection**

The setting is set as a multiple of the setting current. This setting is only active for the definite time setting (switch 17 on DT).

If the tripping curve chosen is of the IDMT type (switch 17 on RI, SI, VI, EI) the switch is disabled.

■ **17: low setting curve type selection**

□ DT: constant time
□ SI: inverse time
□ VI: very inverse time
□ EI: extremely inverse time
□ RI: specific curve
□ off: the low setting is inhibited.

■ **18: low setting time delay multiplying factor**

In the x10 position the time delay displayed on switch 15 is multiplied by 10.

■ **19: Io>> high setting**

The high setting is chosen as a multiple of the Ios setting current.

In the "off" position the high setting is inhibited.

■ **20: t>> high setting time delay**

The time delay is directly set in s.

Setting the earth protection

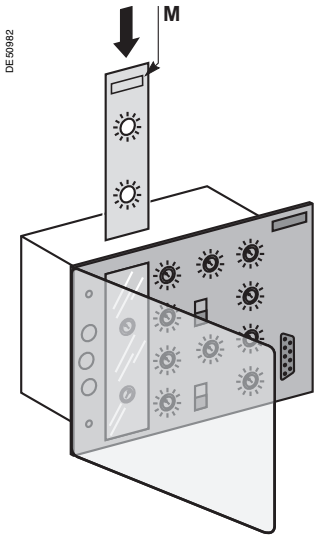
The principle is the same as for phase protection.

Set:

■ The Ios setting current (14)
■ The type of Io> low setting curve (17)
□ IDMT: RI, SI, VI, EI
□ Definite time: DT
■ The Io> low setting (16). This setting is only active if the low setting curve chosen is of the DT definite time type. For the others choices: SI, VI, EI, RI (curve 1),
□ the switch is inoperative
■ The to> low setting time delay (15) and (18)
■ The Io>> high setting (19)
■ The to>> high setting time delay (20).

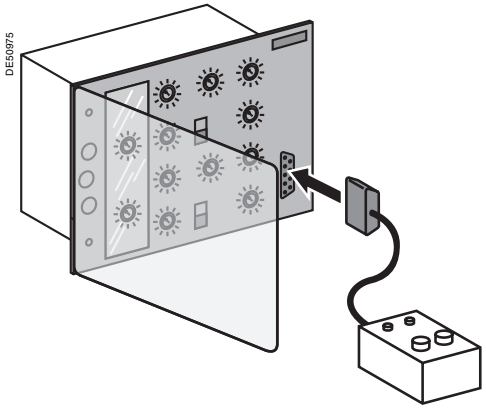
Operating

The operating of the high setting is independent of the operating of the low setting. The tripping order results from the "or logic" between the two settings.



Inserting of the setting scale label

Activation current: the VIP300 does not function below the activation current. This means that if the earth protection settings are lower than the activation current, they will only be effective in the presence of a phase current equal or greater than the activation current.



Testing of the VIP300 with the VAP6

Other VIP300LL and VIP300P functions

■ a: setting scale label

This must be mounted on the VIP300 on its assembly on the circuit breaker.
The label shows the scale marks for the phase operating current and earth protection setting current switches. It slides in from above behind the transparent part of the front panel.
A set of labels is delivered with each VIP300. Use the label that is appropriate to:
□ the type of sensor used
□ the VIP300 model
□ the range used.
There is a label for each sensor and they are printed front and back for each of the 2 ranges. It is therefore possible to turn the label over if the VIP300's range is changed during the installation's lifetime.

■ b: sensor and range information

This information is written on the setting scale label.
When the label is in place in its housing, the information is concealed by an opaque zone. It cannot be seen by the operator.

■ c: indicator reset push button

This button can be accessed when the transparent cover is closed.
Pushing on this button triggers 2 actions:
□ it resets (black position) the 2 phase and earth trip indicators (if the relay is no longer energised the resetting of the indicators is possible for around a further 48 hours; after this time they can be reset after connecting the VAP6)
□ it lights up the 2 red indicators (around 3s). This indicates that:
- the relay is energised (the indicator lights up if the current is greater than the activation current)
- the relay self-tests have returned the correct results.
If one of these two conditions is not met the indicator will not light up.
This function allows a summary diagnostic test of the relay.

■ d: activation current

The activation current is the phase current necessary for the relay to be energised and operational. It is shown on each setting scale label.
The indication given on the label is the effective three-phrase activation current value. In any case, the activation current corresponds to the operating current setting's smallest value.

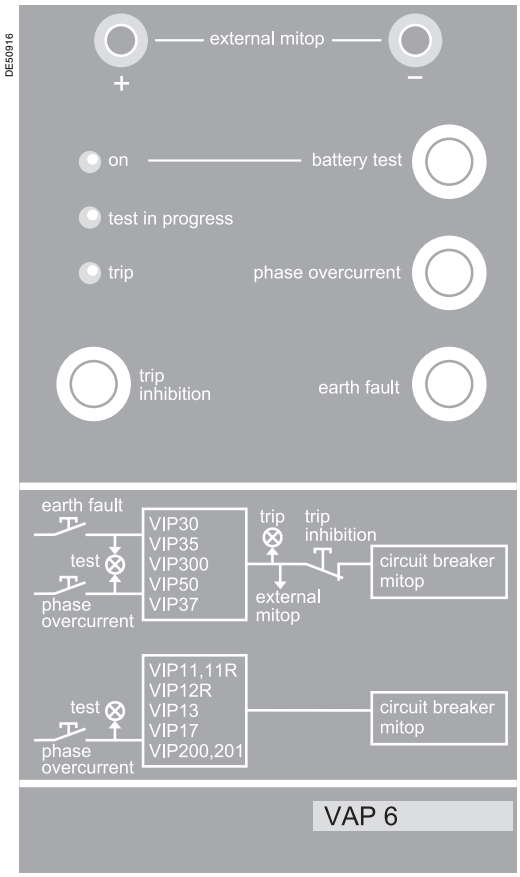
■ e: VAP6 test socket

This socket is designed for the exclusive connecting of the VAP6 unit, used to test the relay in a quick and easy way.
This operation may be carried out when the relay is running as the VAP6 and the VIP300 allow the test to be performed while inhibiting the tripping of the circuit breaker.

■ f: tripping curves

□ VIP300LL/VIP300P.

Presentation of the VAP6 testing unit



Front panel of the VAP6

The VAP6 is energised by batteries. This means that the parts of the VIP300 that operate alternately are not checked by this method (input and power supply circuits).

The VAP6 is a portable unit that connects to the VIP300 to carry out a simplified test. This test may be performed in the following circumstances:
- The VIP300 is already energised by the sensors
- The VIP300 is not energised; in this case the VAP6's batteries supply power to the relay.

The test consists of:
- Launching the self-test sequence from the VIP300's central unit
- Injecting a stimulus to simulate a phase fault
- Injecting a stimulus to simulate an earth fault
- Checking for tripping.

Push buttons

- **Battery test**: if the batteries are functioning correctly the "on" indicator lights up when the button is pressed.
- **Phase overcurrent**: this sends the phase protection test stimulus. The stimulus is equivalent to 20 times the Is operating current.
- **Earth fault**: this sends the earth protection test stimulus. The stimulus is equivalent to 20 times the Ios earth setting current.
- **Trip inhibition** : press the "trip inhibition" button if the VIP300 test needs to be performed without tripping the circuit breaker. The circuit breaker will be inhibited for as long as you keep pressing the "trip inhibition" button, even if the tripping order results from a real fault.

Indicators

- **On**: indicates that the batteries are operating. It also lights up when a battery test is carried out by pressing "battery test".
- **Test in progress**: confirms sending of the test stimulus on the VIP300.
- **Trip**: used for testing other relays from the VIP range. Do not take into account for VIP300 testing (lights up briefly when the VIP300 sends a tripping order, whether or not the circuit breaker is inhibited).

"External mitop" output

This may be used to connect a secondary mitop intended, for example, to stop a stopwatch during diagnostic tests. This mitop is tripped at the same time as the circuit breaker's mitop. It is not inhibited by pressing the "trip inhibition" button.

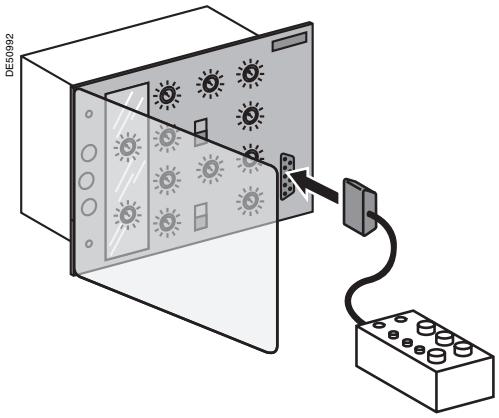
Batteries

The batteries are usually not in use and are automatically activated when the VAP6 is connected to the VIP300.
They are activated in the following cases:
- Press the "battery test" push button
- Direct connection to a VIP3X or VIP5X relay
- Connection to the adaptor cord intended for the testing of VIP1X or VIP2X relays.

To install or change batteries, open up the unit by removing the 4 screws from its lower panel. Make sure that they are inserted the right way round.

Technical characteristics

- 3 x 9V 6LR61 batteries
- Weight: 0.45 kg
- Dimensions: 93 x 157 x 45.



If you continue to press the "phase overcurrent" button after tripping, the VIP300 will recommence its time delay/tripping cycle; this is normal behaviour.
In this case:
- *The VAP6's red "trip" indicator will light up briefly on each tripping*
- *The VIP300's red "I>" indicator may remain unlit or flash quickly and irregularly, depending on the time delay setting.*

VAP6 test sequence

This test may be carried out whether or not there is current present in the sensors. During testing operations, all the VIP300's settings are active; the relay must behave according to its settings. During the test, the relay is always operational and will give a tripping order in the case of a fault, unless the "trip inhibition" button is pressed.

- Connect the VAP6 to the "VAP test plug" socket. The batteries will then be activated and the "on" indicator will be lit.
- Press the VIP300's reset button:
  - if the 2 "trip" indicators were yellow, they will become black
  - the VIP300's 2 red I> and Io> indicators light up for around 3s to indicate that the VIP300's central unit has correctly performed its self-tests.
- Press the "trip inhibition" button if the test needs to be carried out without tripping the circuit breaker.

Make sure you continue pressing the "trip inhibition" button while the stimulus is being sent.

- Press "phase overcurrent" to send the phase protection test stimulus:
  - keep pressing the button throughout the duration of the stimulus (this stimulus corresponds to around 20 times the Is operating current)
  - the VAP6's "test in progress" indicator will light up to confirm the sending of the stimulus on the VIP300 relay
  - the VIP300's "I>" red indicator will flash throughout the time delay time
  - the VIP300's "trip" phase trip indicator will then become yellow
  - the circuit breaker will be tripped if it is not inhibited.
- Press "earth fault" for a diagnostic test of the earth protection. The stimulus injected is equal to 20 times the Ios setting current. Follow the same process as for the phase protection test.
- Disconnect the VAP6.

To save the batteries, don't leave it connected to the relay unnecessarily.

Technical characteristics

Phase protection		**Accuracy**	
I> low setting		±5 % or 0/+2 A	(1)
t> low setting time delay	definite time	±2 % or ±20 ms	(2) (8)
	IDMT	Class 5, IEC 60255-3 or 0/+20 ms	(2) (8)
I> high setting		±5 %	
t>> high setting time delay		±2 % or ±20 ms	(2)
% of pick-up		95 %	
Storage time		20 ms	
Earth protection			
Io> low setting		±5 % or 0/+2 A	(3) (4) (5)
to> lower threshold timing	definite time	±2 % or ±20 ms	
	IDMT	Class 5, IEC 60255-3 or 0/+25 ms	(2) (5) (8)
Io>> high setting		±5 %	
to>> high setting time delay		±2 % or ±20 ms	(2) (8)
% of pick-up		95 %	
Storage time		20 ms	

General characteristics	**Value**	
Constant thermal resistance	240 A	with CSa sensor
	1500 A	with CSb sensor
1 second thermal resistance	25 kA/1 s	with CSa, CSb sensor
Operating frequency	50 Hz ±10 %, 60 Hz ±10 %	
Operating temperature	–25 °C at +70 °C	
Storage temperature	–40 °C at +85 °C	
Weight	1.7 kg	

Activation current	**Range**	**Value**	
VIP300LL/VIP300P + CSa sensor	x1	10 A	(7)
	x4	40 A	
VIP300LL/VIP300P + CSb sensor	x1	63 A	
	x4	250 A	

Climatic resistance	**Standard**	**Severity**
Low temperature operation	IEC 60068-2-1	–25 °C, 16 hr
Low temperature storage	IEC 60068-2-1	–40 °C, 96 hr
High temperature operation	IEC 60068-2-2	+70 °C, 16 hr
High temperature storage	IEC 60068-2-2	+85 °C, 96 hr
Rapid temperature variations	IEC 60068-2-14	–25 °C at +70 °C, 5 cycles
Operation in damp heat	IEC 60068-2-3	56 days, 93 % RH
Saline mist resistance	IEC 60068-2-52	Severity 1

Technical characteristics

Mechanical resistance	Standard	Severity
Vibration resistance	IEC 60255-21-1	Class 2
Shock and jolt resistance	IEC 60255-21-2	Class 2
Seismic resistance	IEC 60255-21-3	Class 2
Enclosure protection factor	EN 60529	IP54 (cover closed)
Fire resistance	IEC 60695-2-1	650 °C
Electrical resistance	**Standard**	**Severity**
Sensor input isolation	IEC 60255-5	2kV rms, 50Hz, 1 min
1,2/50 µs shock wave resistance	IECl 60255-5	5 kV (6)
1 MHz oscillating wave resistance	IEC 60255-22-1	2,5 kV cm (6)
		1 kV dm
Rapid transient burst resistance	IEC 60255-22-4	4 kVcm and dm, 5 kHz burst (6)
1,2/50(8-20 µs) hybrid wave resistance	IEC 61000-4-5	2 kV, 42 ohms (6)
Electrostatic discharge resistance	IEC 60255-22-2	8 kV in air, 6kV on contact
HF electromagnetic field resistance	IEC 60255-22-3	30 V/m not modulated, 27 to 1000 MHz
	EN 50082-2	10 V/m mod., ampl., 80 to 1000 MHz
	EN 50082-2	10 V/m mod., impuls., 900 MHz

(1) *Value given for a three-phase VIP300 power supply. In the case of single-phase operation, the accuracy is ±10% or 0/+5A. For the low setting, this does not generally correspond to a real operating scenario. However, it may arise during a single-phase injection test.*
Errors are due mainly to the non-linearity of the VIP300's sensors and input transformers for low currents; this inaccuracy is accentuated if the relay is only energised by one phase.
(2) *The accuracy is indicated for a fault, with a sinusoidal current, that arises when the relay is already energised by the current passing through the circuit breaker. In the case of tripping owing to a fault, the tripping time may be extended to:*

- *+30 ms at 15 Is*
- *+20 ms from 2 Is to 10 Is*
- *+10 ms for over 10 Is.*

(3) *Generally speaking, the earth protection time and setting accuracies are indicated when the VIP300 is energised by a current at least equal to the activation current. The measuring of a setting for single-phase earth protection is not therefore significant if the setting is below the activation current.*
(4) *Value given for a three-phase VIP300 power supply. In the case of a single-phase test, the accuracy is ±10% or 0/+5A.*
For the low setting, this case may occur during a single-phase earth protection test, without power supplied by the other phases.
(5) *Under the following specific conditions:*

- *VIP300LL*
- *With CSa sensor*
- *Wiring to the x1 range*
- *If Ios < 8 A*
- *If three-phase phase current < 20 A*

The setting and time delay characteristics are:

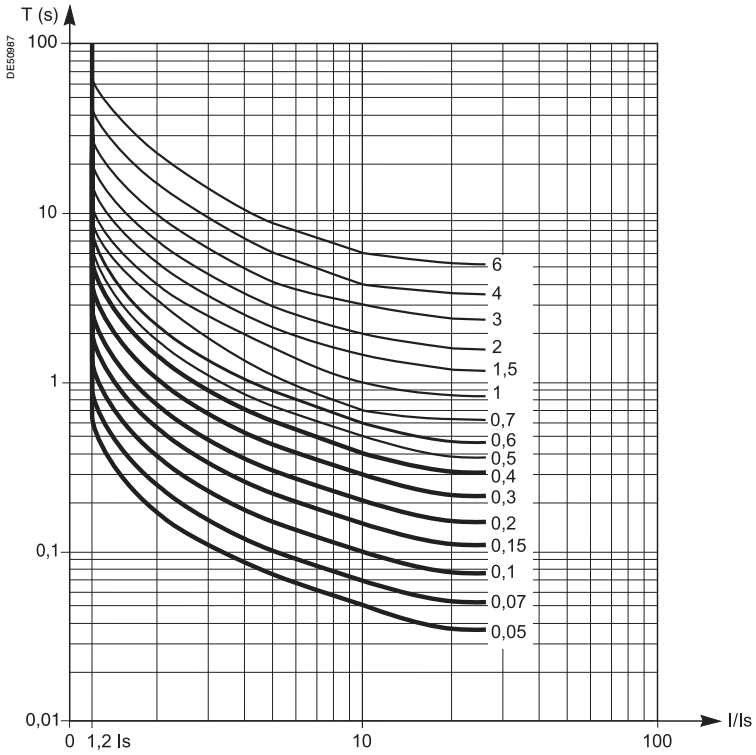
- *Low settings: ±10 % or 0/+4 A*
- *Unspecified class*

(6) *Not applicable to the test socket.*
(7) *Accuracy ±10% or ±1.5A.*
The value indicates the activation current guaranteed for three-phase operation.
(8) *The tripping times indicated do not include the mitop response time. Its tripping time depends on its mechanical load (unladen, its tripping time is less than 5 ms).*

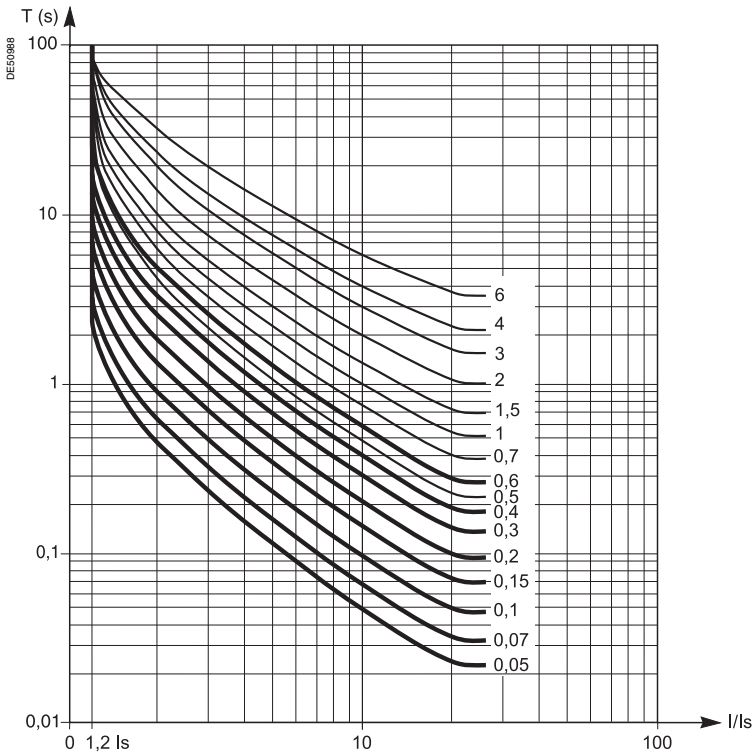
Technical characteristics
IDMT tripping curves

The curves in this section indicate the IDMT low setting tripping times for the 16 t> (or to>) time delay settings.
The phase protection and earth protection curves are the same.
The figures given on the right of the curves correspond to the position of the t> (or to>) time delay switch.

SI curve

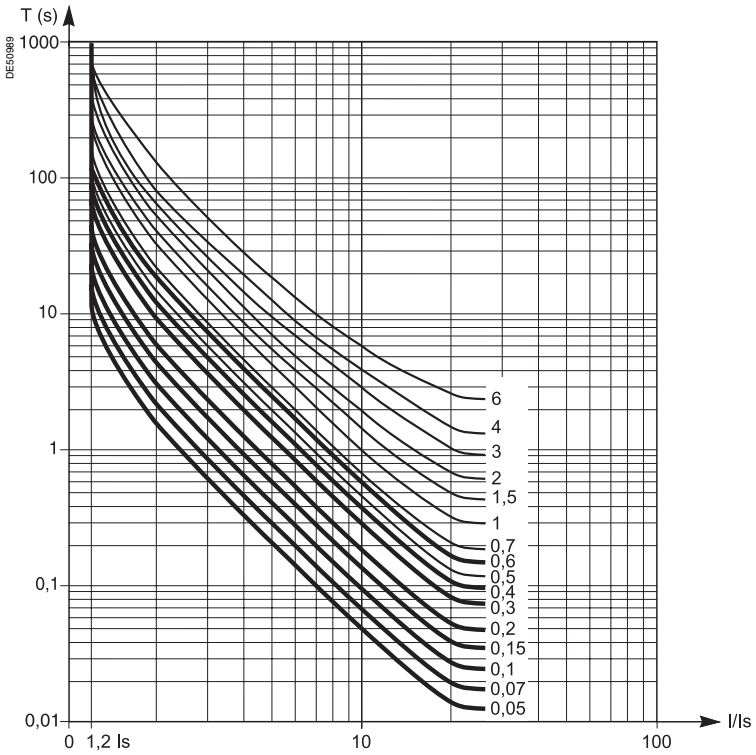


VI curve

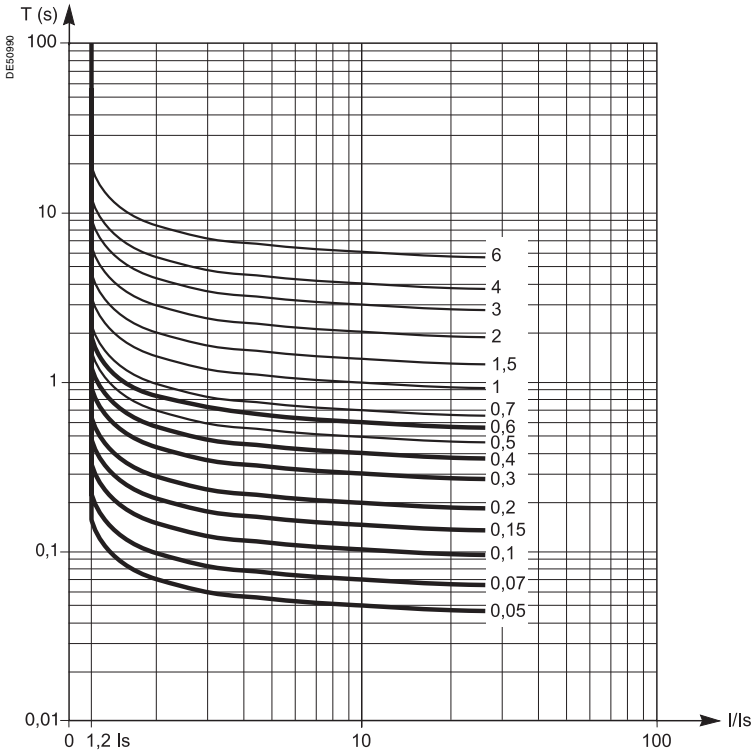


Technical characteristics
IDMT tripping curves

EI curve

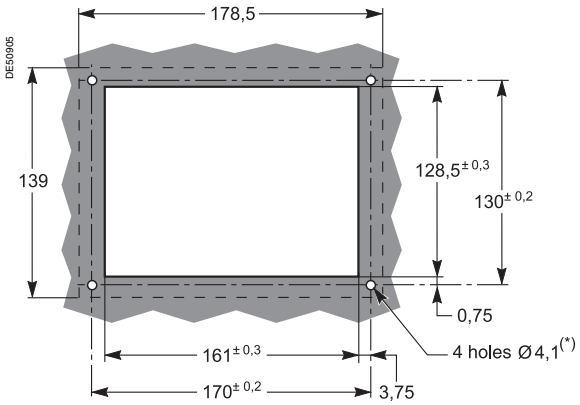


RI curve



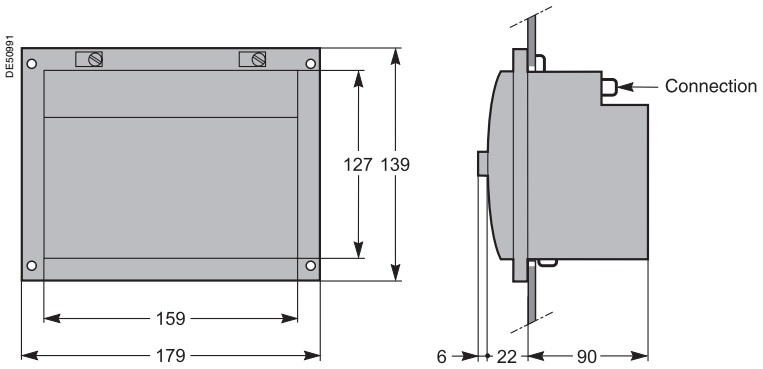
Dimensions

The VIP300 is mounted in a rectangular cut-out in a metal plate a maximum of 3 mm thick.

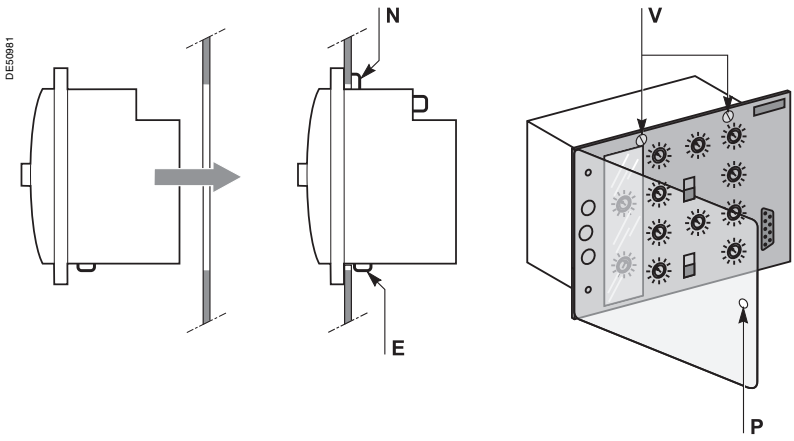


VIP300 drilling plan

(*) Use of the 4 holes to secure the VIPs is required only for the 24kV SFset and Evolis circuit breakers.

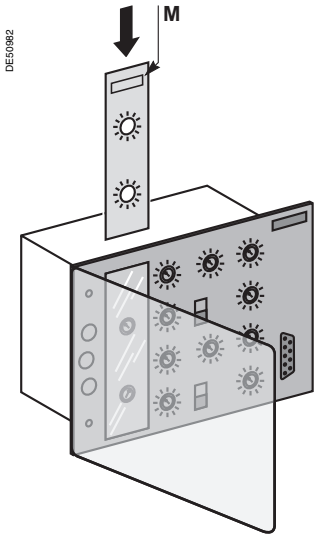


Assembling the VIP300



The moving of the latch into a vertical position may be achieved by unscrewing each of the screws (V) beforehand before tightening them.

- Insert the VIP300 into the cut-out and make sure that the unit's 2 lower lugs (E) are positioned on the edge of the cut-out in the metal plate.
- Tighten the screws (V) in the 2 securing locks accessible via the front panel after opening the transparent cover.
- After tightening, check that each lock's latch (N) (visible at the back) is in a vertical position and supported against the metal mounting plate.
- The hole (P) may be used to lead-seal the relay after the inserting of the setting scale and setting label.



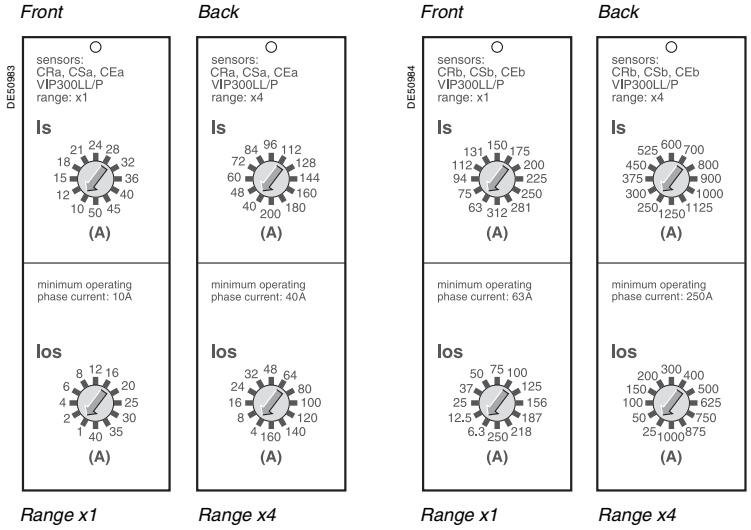
Inserting the setting scale label

■ Put the setting scale label into position by sliding it behind the transparent part of the front panel.
■ Check that the information given on the top of the label (M) matches:
□ the sensor used
□ the VIP300 model
□ the rating used.
This information is concealed when the label is in place.
■ Check that it has been lowered as far down as possible into its housing.
■ To remove the label, use the hole in its upper part, using the end of a pencil or screwdriver if necessary.

Setting scale label selection

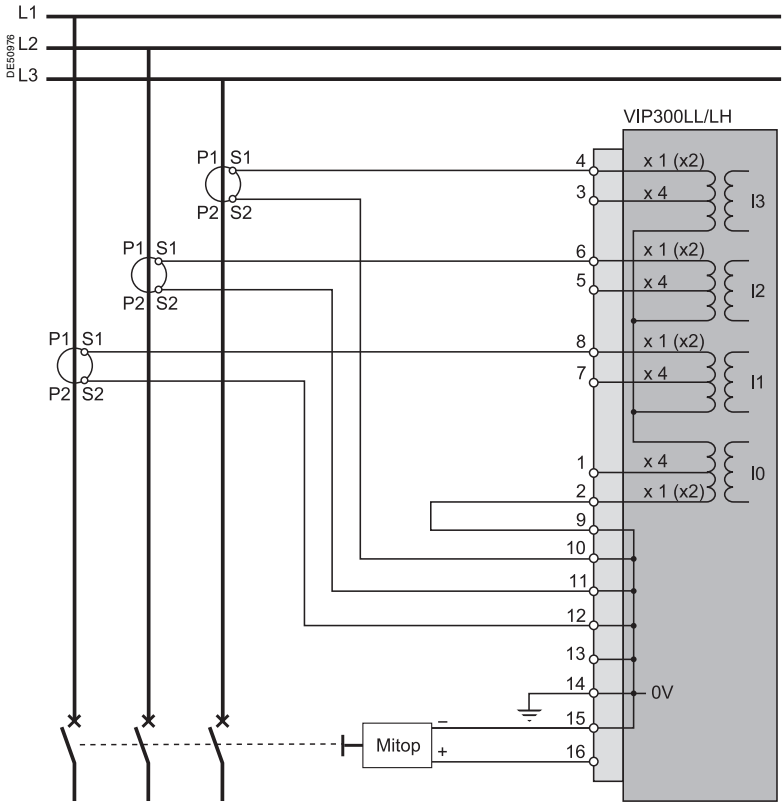
Setting scale label for VIP300LL and VIP300P with CSa sensors.

Setting scale label for VIP300LL and VIP300P with CSb sensors.

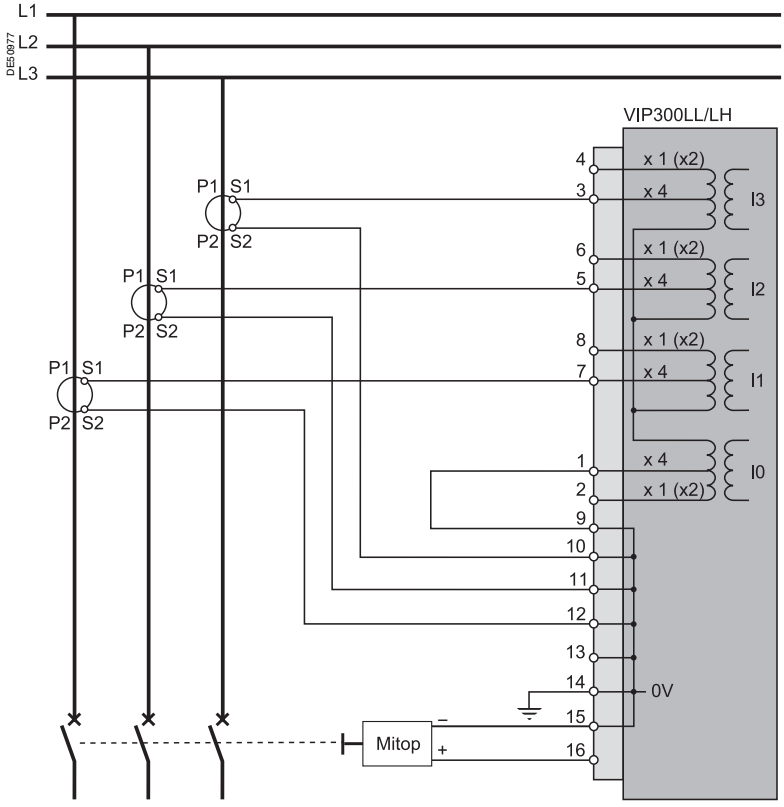


As standard, the VIP300LL is connected to the back of the product using 6.35 mm fast-on clips.

Wiring to x1 (or x2) range

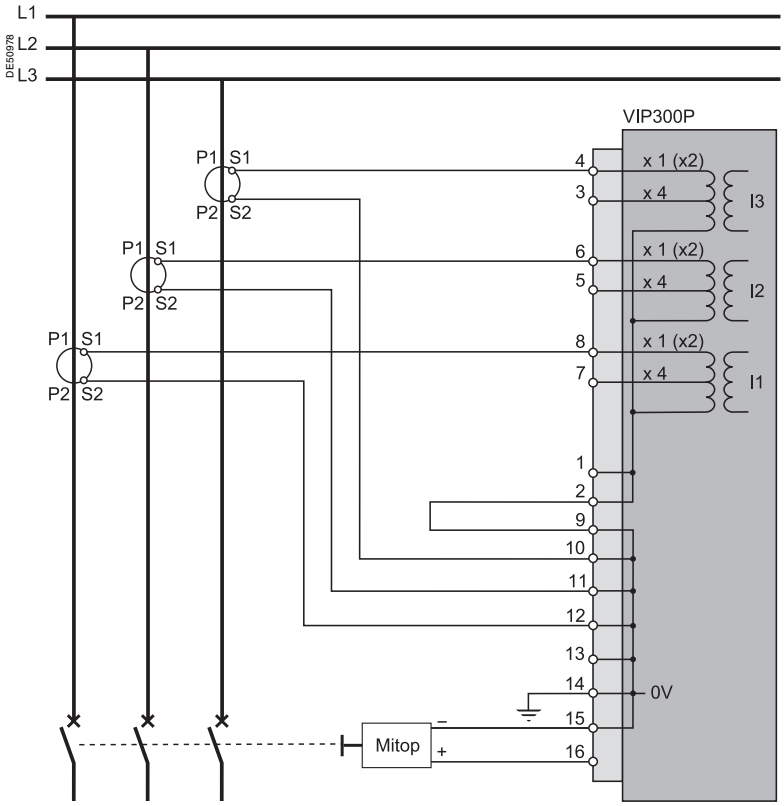


Wiring to x4 range

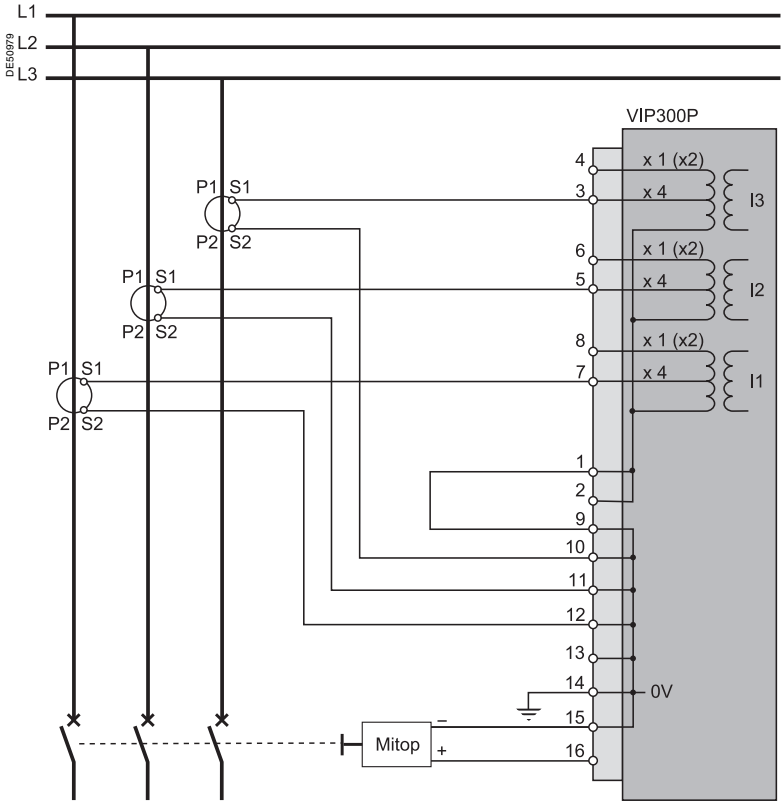


As standard, the VIP300P is connected to the back of the product using 6.35 mm fast-on clips.

Wiring to x1 (or x2) range



Wiring to x4 range



Visual inspections

Compliance of relay, number of sensors, sensor type.
Compliance of wiring diagram and marking on relays.
Checking of wires (connection marking).
Checking, using an ohmmeter, the continuity of the circuits between each CS secondary (S2) and the chassis.

Tests using the VAP6

Checking of quasi-instantaneous tripping.
Implement the following settings:

With CSa sensors

Phase setting

IS	I>	DT only	t>	I>>	t>>	Io>	DT only	to>	Io>>	to>>
18A strip 10-50 A x1 range	DT	1	0.1x10	3	0.03	off	1	0.1x10	off	0.03
72A strip 40-200 A x4 range	DT	1	0.1x10	3	0.03	off	1	0.1x10	off	0.03

Homopolar setting (only on VIP300LL)

IS	I>	DT only	t>	I>>	t>>	Io>	DT only	to>	Io>>	to>>
25A strip 1-40 A x1 range	off	1	0.1x10	off	0.03	DT	1	0.1x10	3	0.03
48A strip 4-160 A x4 range	off	1	0.1x10	off	0.03	DT	1	0.1x10	3	0.03

1st test (VIP300LL and VIP300P):
Connect the VAP6 pocket console to the relay's test plug socket.
Press the VAP6's phase push button:
Warning: ***the circuit breaker will instantly trip.***
Check that:
on the relay the I> phase indicator is flashing,
the trip electromagnetic indicator has become yellow,
on the VAP6 the "trip" and "test in progress" indicators are flashing.

2nd test (VIP300LL only):
Press the VAP6's homopolar push button:
Warning: ***the circuit breaker will instantly trip.***
Check that:
on the relay the homopolar indicator (Io>) lights up and goes out,
the trip electromagnetic indicator has become yellow,
on the VAP6 the "trip" and "test in progress" indicators are flashing.

With CSb sensors

Phase setting

IS	I>	DT only	t>	I>>	t>>	Io>	DT only	to>	Io>>	to>>
63A strip 63-312 A x1 range	DT	1	0.1x10	3	0.03	off	1	0.1x10	off	0.03
250A strip 250-1250 A x4 range	DT	1	0.1x10	3	0.03	off	1	0.1x10	off	0.03

Homopolar setting (only on VIP300LL)

IS	I>	DT only	t>	I>>	t>>	Io>	DT only	to>	Io>>	to>>
75A strip 6.3-250 A x1 range	off	1	0.1x10	off	0.03	DT	1	0.1x10	3	0.03
300A plate 25-1000 A x4 range	off	1	0.1x10	off	0.03	DT	1	0.1x10	3	0.03

1st test (VIP300LL and VIP300P):
Connect the VAP6 pocket console to the relay's test plug socket.
Press the VAP6's homopolar push button:
Warning: ***The circuit breaker will instantly trip.***

Check that:
on the relay the I> phase indicator is flashing,
the trip electromagnetic indicator has become yellow,
on the VAP6 the "trip" and "test in progress" indicators are flashing.

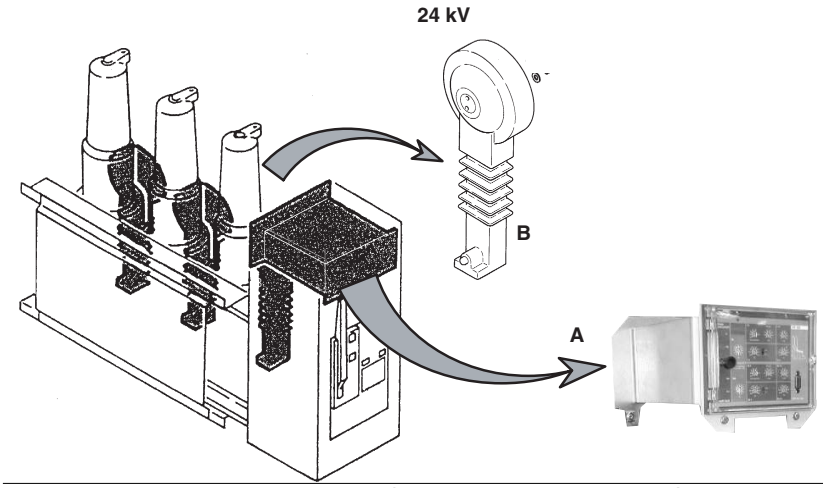
2nd test (VIP300LL only):
Press the VAP6's homopolar push button:
Warning: ***The circuit breaker will instantly trip.***

Check that:
on the relay the homopolar indicator (Io>) lights up and goes out,
the trip electromagnetic indicator has become yellow,
on the VAP6 the "trip" and "test in progress" indicators are flashing.

Press the VIP300's "RESET" button
Check that the I> and Io> indicators (VIP300LL only) light up for around 3 s and the trip electromagnetic indicator has become black.

Location of prevention

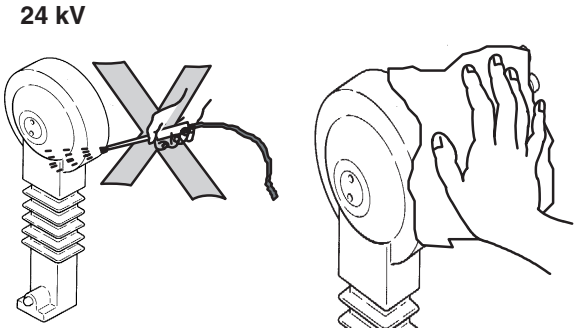
DE31015a



Description	Operations	Supplies	Tools
VIP relay			
A VIP 300	Inspection test		VAP 5
Sensor			
24 kV	Dust removal	Cloth	
C CSa - CSb type sensor	Checking of connections		

Maintenance of current sensors

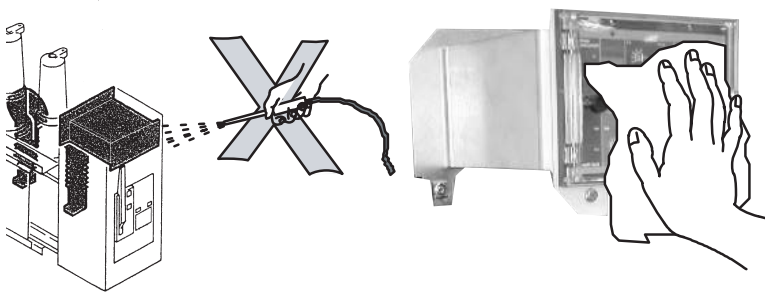
DE31016a



■ You are reminded of the dangers of high pressure cleaning processes.■ Clean with a dry cloth.

Maintenance of relays

DE31017

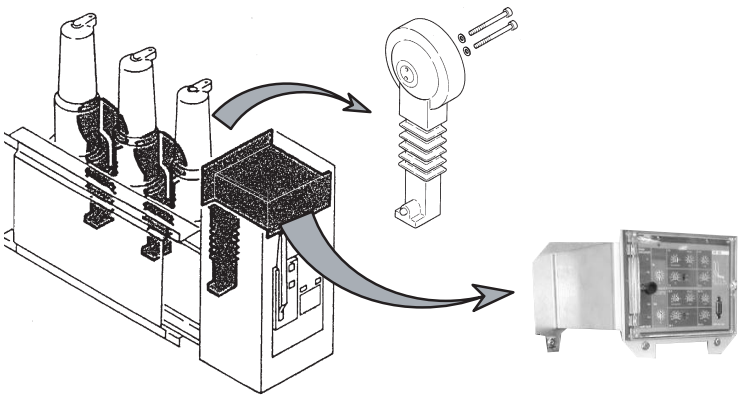


■ You are reminded of the dangers of high pressure cleaning processes.■ Clean with a dry cloth.

Spare units

Location and identification

DE31018aa

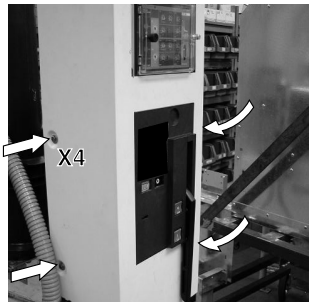


Description	Necessary tools	Observations
VIP relay		
A VIP 300	Wrench 10	Setting to be implemented by the operator
Sensor		
24 kV	Wrench 13	
C CSa - CSb type sensor	BTR wrench 5	

Changing a relay

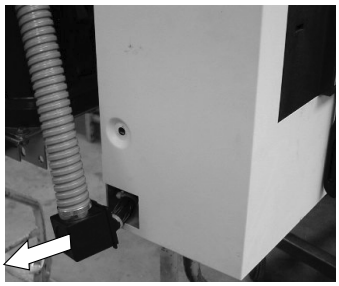
Example of dismantling on a circuit breaker with an RI control in position A1

DE31027a



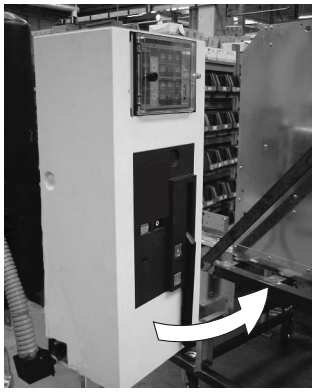
Unscrew and remove the securing screws.

DE31028



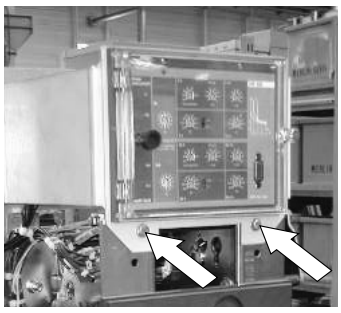
Take out the LV plug.

DE31020a



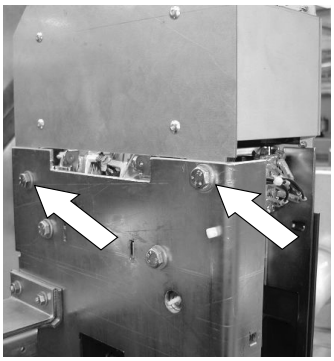
Remove the cover.

DE31019



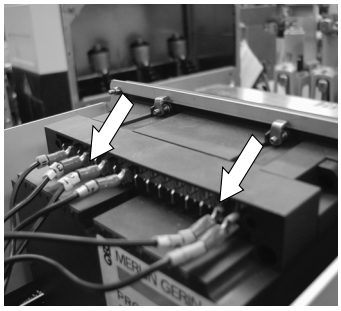
Unscrew and remove the securing screws and nuts.

DE31021



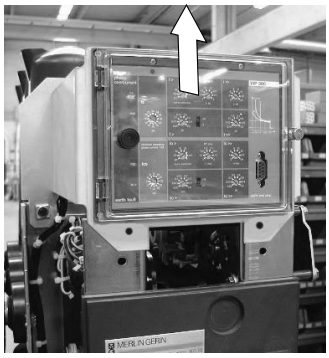
Unscrew the 2 securing screws on the back of the relay mounting.

DE31022



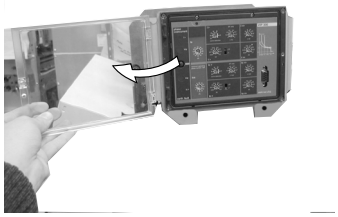
Mark and disconnect the wires from the relay.

DE310023



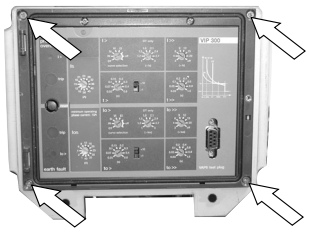
Remove the mounting/relay assembly.

DE31029

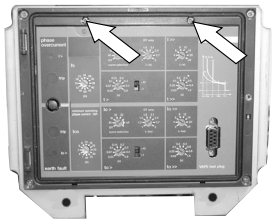


Open the relay's protective hinged panel.

DE31030

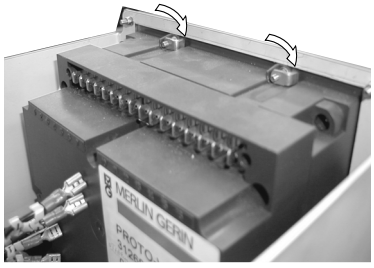


Unscrew the securing screws and remove them.



Loosen the 2 screws without completely unscrewing the 2 latches behind them.

DE31035



Turn the latches to the side.

DE31031

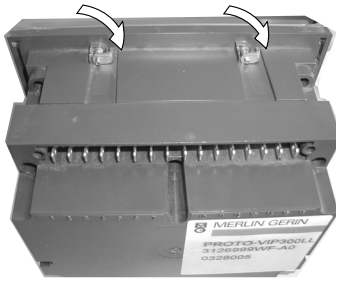
Take out the VIP300 relay.

Refitting

DE31033

Remove the new relay's protective hinged panel.

DE31036

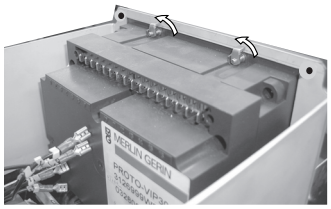


Turn the new relay's latches to the side.

DE31035

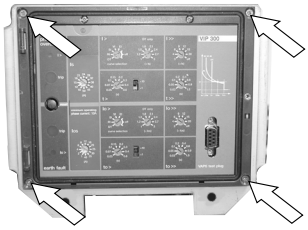
Fit the new VIP300 relay.

DE31037



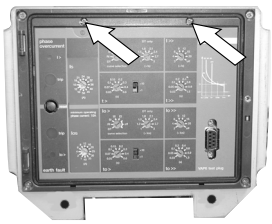
Turn the latches into a vertical position.

DE31030



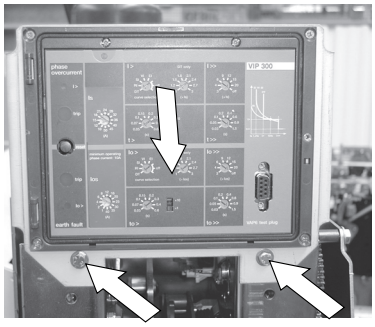
Screw the securing screws.

DE31034



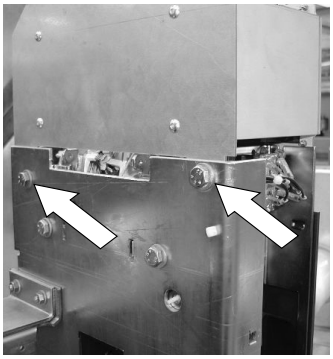
Tighten the 2 screws on the 2 latches.

DE31038



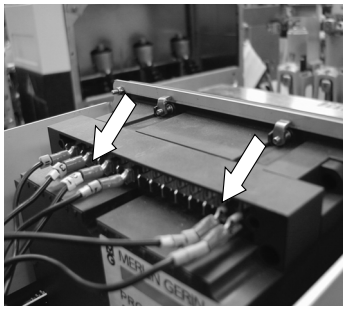
To make installation easier, it is preferable to pre-mount the 2 front screws. Put the mounting/relay assembly into place then tighten the screws.

DE31021



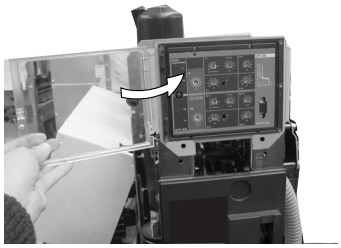
Screw the 2 securing screws on the back of the mounting.

DE31022



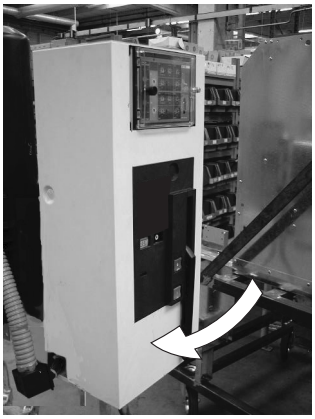
Connect the wires to the relay.

DE31039a



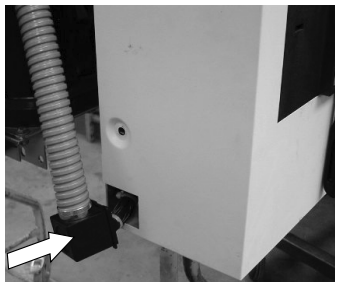
Attach the relay's protective cover.

DE31040a



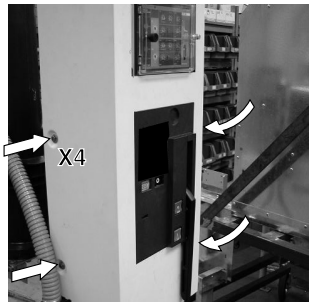
Put the cover in place. Remember to pass the control reset lever in front of the cover.

DE31041



Plug in the LV plug.

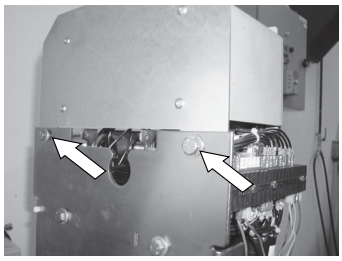
DE31027a



Insert and tighten the securing screws

Dismantling and refitting on a circuit breaker with a RI control in position B1

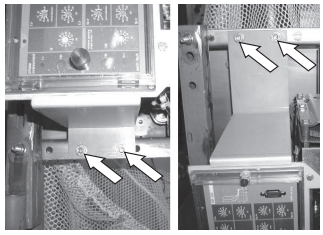
DE31042



The dismantling and refitting of the relay is the same as for a circuit breaker with a RI control in position A1, except that the screws on the back of the mounting/relay are aligned.

Dismantling and refitting on a circuit breaker with a RI control in position C1

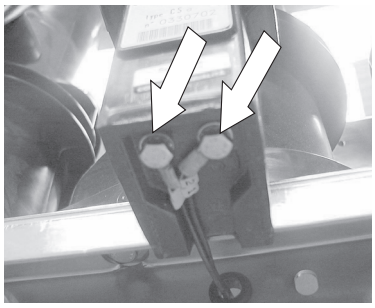
DE31043



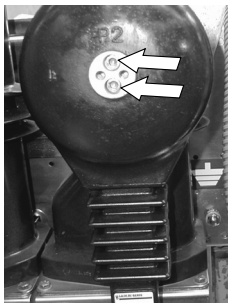
The dismantling and refitting of the relay is the same as for a circuit breaker with a RI control in position A1, except that the screws on the back of the mounting/relay are located at the top and bottom.

Changing a 24kV CSa or CSb current sensor

DE31045



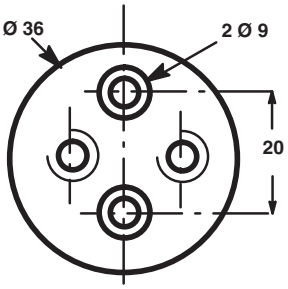
Mark and disconnect the wires underneath the cover.



Unscrew and remove the 2 CHc M8 securing screws.
Remove the sensor.

Refitting

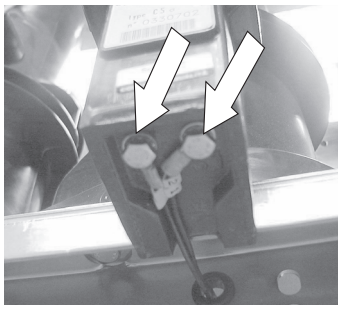
DE31024



- Input feeder or output feeder.
- Two holes Ø9 for 2 CHc M8 screws.

Torque that must be applied: **28 Nm**.

DE31045



Reconnect the wires in line with the marking.

Note: the protection will only function properly if the wires are correctly reconnected.

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