

Medium Voltage Distribution

Evolis circuit breakers 24 kV

vacuum breaking
fixed and withdrawable versions

Catalogue
2014



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Evolis

Circuit breakers adapted to your needs

Evolis: a range of circuit breakers that takes account of your electrical installations' requirements today and in the future.

Description

Evolis: a range of vacuum-type circuit breakers from 7.2 kV to 24 kV, combining easy selection and a comprehensive offer:

- a fixed, frontal or lateral version
- a withdrawable, frontal version with a circuit breaker and its cradle or its cassette
- a fixed, lateral version equipped with an integrated protection chain
- separately delivered accessories.

The Evolis circuit breaker is operated via a spring mechanism that gives an operating speed that is independent of the operator and that does not require an auxiliary power supply.

When the operating mechanism is motorized the circuit breaker can include telecontrol functions and carry out rapid reclosing cycles.

The various circuit breaker versions are easy to integrate in a cubicle environment. An Installation Guide details the required procedure.

Applications

Evolis is intended for use in medium voltage network applications, in new installations or renovation, for utilities companies, infrastructures, the process industry and the tertiary sector.

It provides protection for all types of applications: cables, overhead lines, motors, capacitors, transformers, source busbar sections, etc.

Evolis, a fixed, frontal or lateral version

Here the circuit breaker is in its simplest version. In this case it can be combined with additional accessories to meet various requirements.

For the fixed lateral version, the MV connection can be on the right or on the left depending on the type of circuit breaker.



Evolis 17.5 kV fixed, frontal version (*)



Evolis 24 kV fixed, frontal version



Evolis 24 kV fixed, lateral version
MV connection on the left hand side



Evolis 24 kV fixed, lateral version
MV connection on the right hand side

(*) The Evolis 17.5 kV offer is covered in a separate catalogue (ref. AMTED307010EN).

Evolis

Circuit breakers adapted to your needs

(cont.)

Evolis: a withdrawable, frontal version

In this version, the circuit breaker is equipped with arms, clusters, a rack, and cradle or cassette. The cradle and the circuit breaker can be ordered and delivered separately.



Evolis 17.5 kV withdrawable, frontal version in NEX cradle ()*



Evolis 24 kV withdrawable, frontal version in NEX cradle



Evolis HP withdrawable, frontal version in MC cassette ()*



Evolis 17.5 kV withdrawable, frontal version in MC cassette ()*

EVOset: a fixed, lateral version equipped with an integrated protection chain

The EVOset is provided with a fully autonomous integrated protection chain (with a VIP type control unit) operating without an auxiliary power source. The protection unit exists in 4 models: VIP30, VIP35, VIP300P and VIP300LL. VIP protection units are associated with functional current sensors. The circuit breaker is delivered with its factory-tested protection chain. It therefore simplifies the panel builder's installation work.



EVOset 24 kV fixed, lateral version MV connection on the right hand side

(*) The Evolis 17.5 kV offer is covered in a separate catalogue (ref. AMTED307010EN).

As a specialist in breaking technologies, Schneider Electric took naturally an interest in vacuum breaking techniques. A major R&D investment was made to develop and engineer Evolis, providing customers with the very best of vacuum technology.

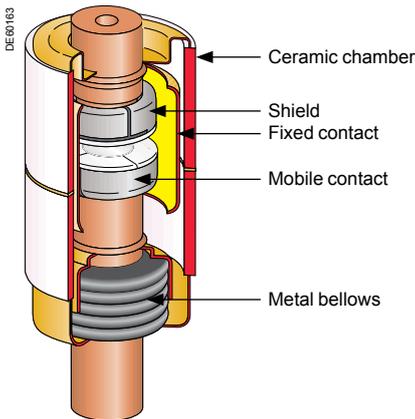


Fig. 1: vacuum interrupter components

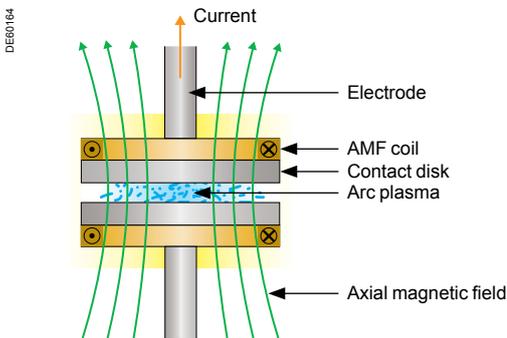


Fig. 2: cross-section of AMF contact



Fig. 3: diffuse vacuum arc AMF technology

Make-up of a vacuum interrupter

Vacuum interrupters basically have two electrical contacts (fig.1), one fixed and the other mobile, and a sealed enclosure. The latter enables a high level of vacuum to be maintained inside the interrupter (less than 10^{-2} Pa) to provide insulation between the open contacts.

The dielectric strength of the vacuum allows the contact-to-contact distance to be reduced. This short distance together with the low opening speed allow the use of a low energy control mechanism. A metal clusters provides the link between the mobile contact and the enclosure.

In order to keep the vacuum level required for the correct operation of the interrupter for 30 years, the enclosure must be perfectly sealed, and the various components have to be fully degased. This is achieved by:

- choosing materials that are specifically selected for this application (metals and ceramics)
- choosing an appropriate assembly process (vacuum, high temperature brazing)
- the use of a "getter" material to absorb the residual gas.

Current breaking in a vacuum interrupter

In vacuum breaking, the electrical arc generated on separation of the contacts is made up of a plasma of metal vapors produced by the vaporization of the contact material.

At low values of current, these vapors very quickly condense on the shield and contacts when the arc disappears, thus allowing:

- the vacuum to be re-established
- a contact-to-contact dielectric strength to be restored that is greater than
- the recovery voltage: breaking is then complete.

At high currents, the electrical arc in the vacuum switches to a concentrated mode which causes high, localized temperature rises on the contacts. The existence of these hot spots is detrimental to the quick restoring of the dielectric strength. Two techniques can be used in order to avoid this stagnation of the static concentrated arc:

- the so called RMF (Radial Magnetic Field) technique, involves rotating the arc thanks to an electromagnetic effect generated by a radial magnetic field; this therefore limits contact erosion.
- a more recent technique called AMF (Axial Magnetic Field) involves applying an axial magnetic field parallel to the axis of the two contacts (fig. 2) which allows a diffuse arc to be maintained (fig. 3) even at high current values. The arc energy is spread over the whole contact surface area, therefore causing very low levels of erosion.

■ Schneider Electric has chosen this last technique for the Evolis range.

Schneider Electric's choices for Evolis combined with its industrial expertise provides customer with a highly reliable range of circuit breakers. These products are suitable for the most demanding conditions with the guarantee of full compliance with international standards.

AMF technology

Evolis circuit breakers use AMF type vacuum interrupters. According to technical and economic optimization considerations, the axial magnetic field is generated:

- either by a coil outside of the interrupter (fig. 4), for rated voltages up to 17.5 kV
- or by a coil integrated in the interrupter contact structure (fig. 5), for the 24 kV voltage level.

In both cases the AMF vacuum interrupters feature low arc voltages (U_{arc} of around 50 V) and maximum usage of the contact surface for very low contact erosion.

The advantages provided

The above choices provide customers with the following advantages in MV circuit breaker applications:

- simple and compact vacuum interrupters
- high electrical endurance meaning that there is no need for contact wear inspection in normal network protection applications including highly disturbed overhead line feeders.

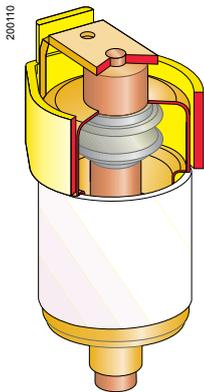


Fig. 4: 17.5 kV external coil type interrupter

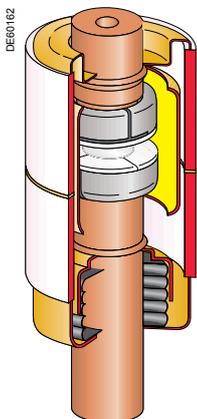


Fig. 5: 24 kV internal coil type interrupter

PEE5684



Vacuum interrupter

PEE5685



Industrial process expertise

Systematic advanced control

The main components of the circuit breaker, such as vacuum interrupter and operating mechanism, are produced by Schneider Electric. The vacuum interrupters are manufactured in an ultra-modern production unit in France. During manufacture, each circuit breaker is subjected to systematic advanced testing.

Vacuum interrupter testing

The level of vacuum in each interrupter is tested using the “magnetron discharge method”.

Using this sophisticated procedure, measurement is very precise and does not require access to the inside of the interrupter, thus not affecting the airtight seal.

Circuit breaker testing

A rigorous set of tests and measurements is carried out on each circuit breaker. The results are reported and signed off by the quality control department on each device’s test certificate to ensure product traceability.

Compliance with standards

- Evolis complies with IEC 62271-100.
- Design and production are certified to ISO 9001: 2000.
- Production sites are certified to ISO 14001 (environmental standard).

DEE5745



DEE5746



Certification

The certificate of conformity provides guarantees that the circuit breaker:

- has been subject to type tests according to EN 45001 standards procedures in accredited laboratories by independent organizations
- is in conformity with recognized international standards.

Evolis is currently being certified by external EN 45011 accredited organizations, members of the STL (Short circuit Testing Liaison):

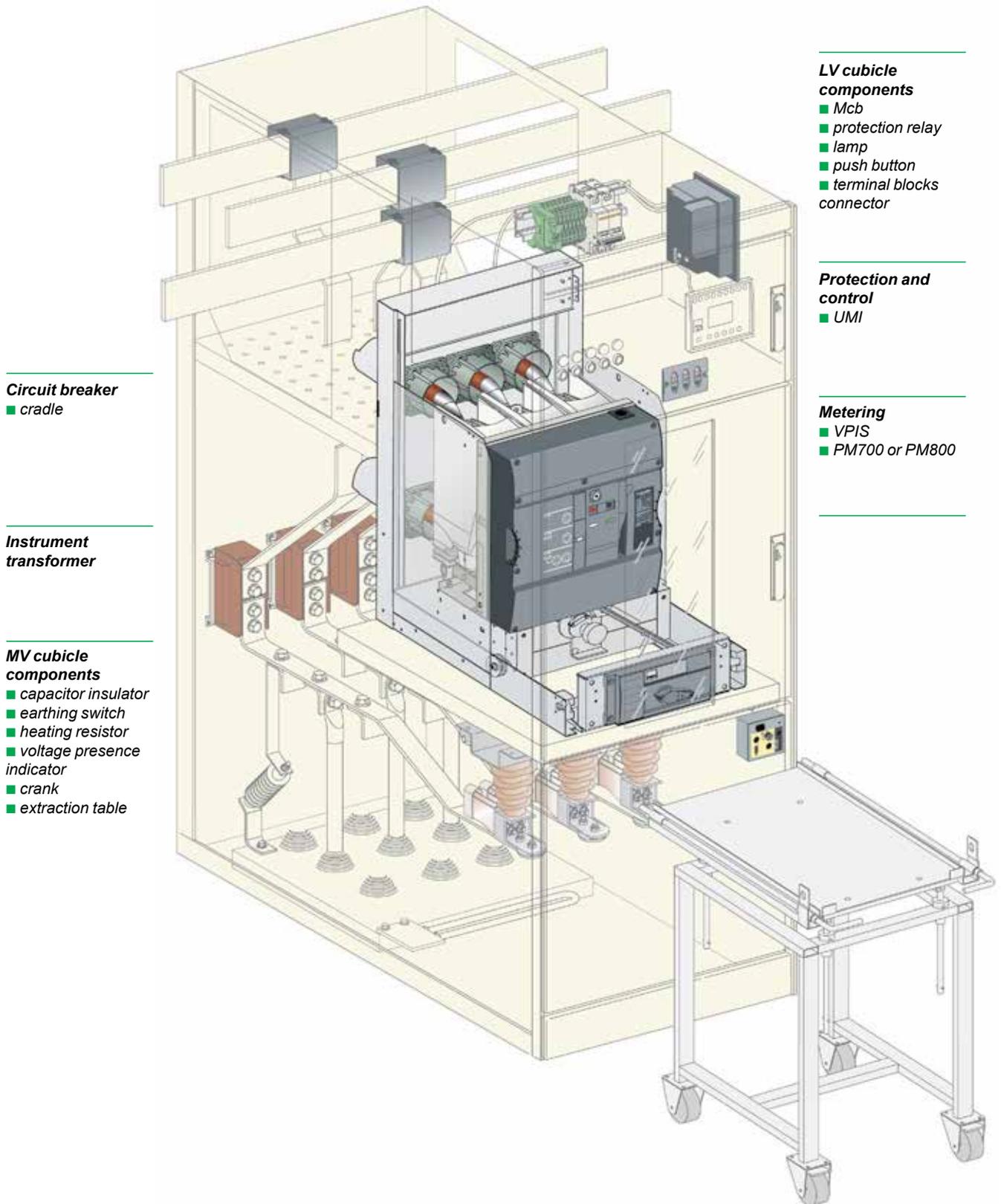
- EN 45001: general requirements for the competence of testing and calibration laboratories
- EN 45011: general requirements for bodies of operating product certification systems.

Environmental care

Product design takes account of the environmental constraints described in a “Product Environment Profile” dossier (PEP).

An end-of-service-life manual details procedures for dismantling and processing components.

PE60092



Circuit breaker
 ■ cradle

Instrument transformer

MV cubicle components
 ■ capacitor insulator
 ■ earthing switch
 ■ heating resistor
 ■ voltage presence indicator
 ■ crank
 ■ extraction table

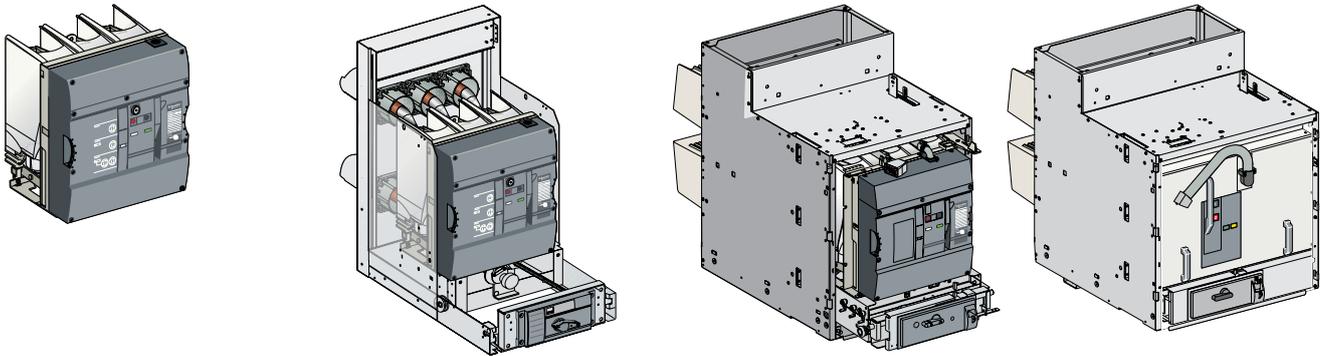
LV cubicle components
 ■ Mcb
 ■ protection relay
 ■ lamp
 ■ push button
 ■ terminal blocks connector

Protection and control
 ■ UMI

Metering
 ■ VPIS
 ■ PM700 or PM800

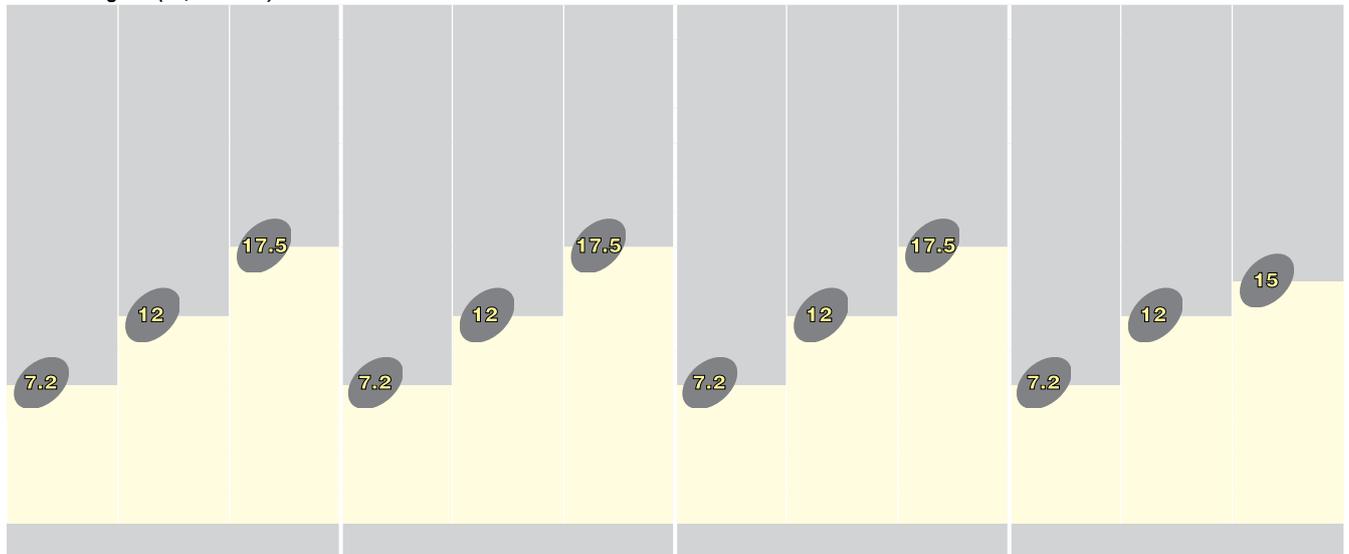
Circuit breakers

Evolis from 7.2 kV to 17.5 kV



Fixed version Operating mechanism on the front	Withdrawable version in NEX cradle Operating mechanism on the front	Withdrawable version in MC cassette Operating mechanism on the front	Withdrawable HP version in MC cassette Operating mechanism on the front
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Rated voltage U_r (kV, 50/60 Hz)



Short circuit rated breaking capacity (I_{sc})

from 25 to 40 kA	from 25 to 40 kA	from 25 to 40 kA	from 25 to 50 kA
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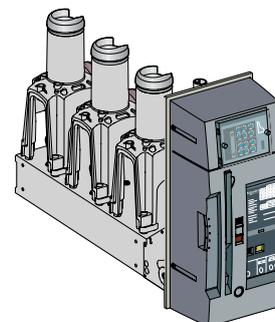
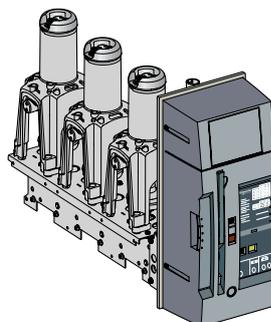
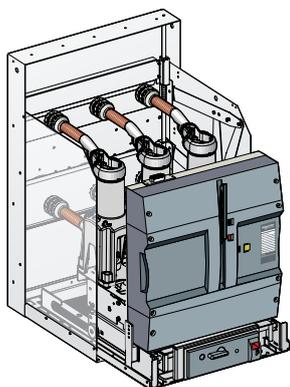
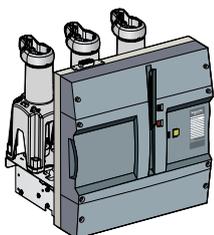
Rated current (I_r)

from 630 to 2500 A	from 630 to 2500 A	from 630 to 2500 A	from 1250 to 3150 A
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Separate catalogue

Evolis 24 kV

EVOset 24 kV



Fixed version
Operating mechanism
on the front

Withdrawable version
Operating mechanism
on the front

Fixed version
Operating mechanism
on the side

Fixed version
Integrated protection system
Operating mechanism
on the side

Rated voltage U_r (kV, 50/60 Hz)

24

24

24

24

Short circuit rated breaking capacity (I_{sc})

from 16 to 31.5 kA

from 16 to 31.5 kA

from 12.5 to 25 kA

from 12.5 to 20 kA

Rated current (I_r)

from 630 to 2500 A

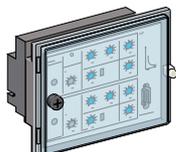
from 630 to 2500 A

630 and 1250 A

630 and 1250 A

Protection, monitoring and control

Protection



VIP30
for phase protection

VIP35
for phase and earthing
protection

VIP300P
for phase protection

VIP300LL
for phase and earthing
protection

Protection and control



Sepam series 20
for normal applications

Sepam series 40
for demanding
applications

Sepam series 80
for full applications

Metering



PM700
for basic metering

PM800
for advanced metering

CM3000, CM4000
for full metering
and power quality

Separate catalogue

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PE93004



Evolis circuit breaker 24 kV fixed, frontal version

Description of the device

The Evolis circuit breaker comprises a basic fixed version:

- 3 poles integrated in a “sealed pressure system” type insulating enclosure.
- a RI type, spring-operated stored energy control mechanism, electrifiable. This gives the device an opening and closing speed that is independent of the operator, for both electrical and manual orders. It enables reclosing cycles to be carried out
- a front panel housing the manual operating mechanism and status indicators
- upstream and downstream terminals for the power circuit connection
- a terminal block for connection of external auxiliary circuits.

Each device can also be fitted with the following options:

- circuit breaker locking in the open position by a keylock installed on the front plate of the operating mechanism
- a 21-pin or 42-pin Harting type LV connector.

Applications

Evolis circuit breakers are three-pole indoor MV circuit breakers. They are mainly used for operation and protection of public, industrial and tertiary distribution networks of 24 kV.

Through their compact dimensions and harmonized range, Evolis circuit breakers are positioned very favorably on the retrofit market.

Electrical characteristics according to IEC 62271-100								
Phase to phase			230			250		
Rated voltage	Ur	kV 50/60 Hz	24			24		
Insulation level								
- power frequency withstand	Ud	kV 50 Hz 1 min	50			50		
- lightning impulse withstand	Up	kV peak	125			125		
Rated current	Ir	A	630	■	■	■	■	
			1250	■	■	■	■	
			2000	–	–	■	■	
			2500	–	–	■	■	
Short circuit current	Isc	kA	16	25	16	25	31.5	
Short time withstand current	Ik/tk	kA/3 s	16	25	16	25	31.5	
Short-circuit making current	Ip	kA peak	50 Hz	40	63	40	63	79
			60 Hz	42	65	42	65	82

Common characteristics according to IEC 62271-100		
Rated switching sequence	O-3 min-CO-3 min-CO	■
	O-0.3 s-CO-3 min-CO	■
	O-0.3 s-CO-15 s-CO	■
Operating times	Opening ms	< 50
	Breaking ms	< 65
	Closing ms	< 85
Mechanical endurance	Class	M2
	Number of switching operations	10 000
Electrical endurance	Class	E2
Number of switching operations at full Isc value	16 kA	100
	25 kA	100
	31.5 kA	100
Capacitive current breaking capacity	Class	C1-C2 (for certain applications)
Service temperature		– 25°C to 40°C
Average relative humidity	over 24 h	< 95%
	over 1 month	< 90%

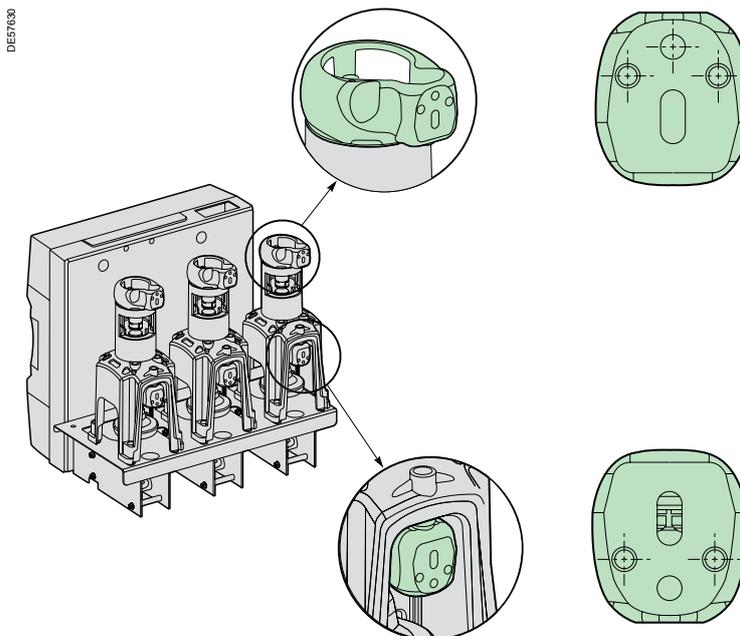
■ Available
– Not available

Composition

The basic circuit breaker is equipped with nickel plated aluminium connector terminals with drilled holes.

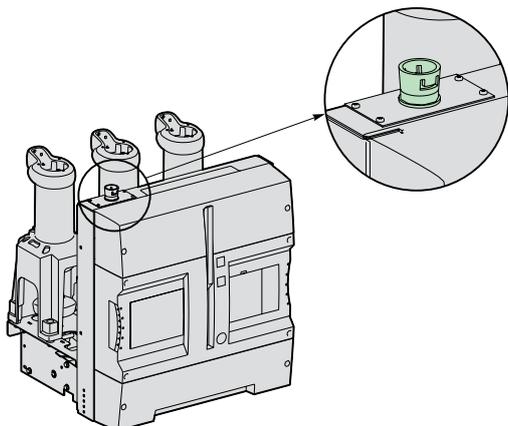
Connection

The customer connection is carried out easily from outside the circuit breaker on these vertical connection terminals.



Connection configurations that have undergone type testing are shown in the Installation Guide.

DE57631



LV connection without plug

Two connection solutions

Directly on the LV terminal block

The circuit breaker's LV wiring can be directly connected to the LV terminal block of the operating mechanism through a cable protection duct.

With LV plug

- The fixed part (male) mounted on the circuit breaker and fully connected to the operating mechanism
- The mobile part (female) compatible with the male part.

Two versions of the LV plug are available

An 21-pin version, enabling connection of:

- a shunt opening release YO1
- an electrical remote control mechanism (electrical motor, shunt closing release XF, anti-pumping relay)
- a maximum number of auxiliary contacts: 3 NC - 3 NO - 1 changeover contact. (see "indication and locking/interlocking" page, "Open/closed position auxiliary contacts" chapter).

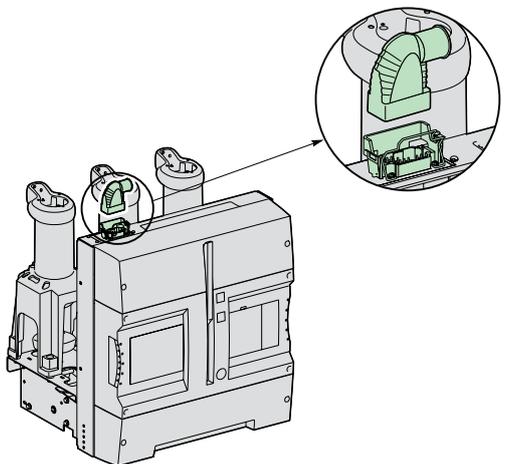
Note: see the table of the releases' combinations "Order form" page.

An 42-pin version, enabling connection of:

- an opening release (shunt type YO1 or undervoltage type YM)
- a second opening release (shunt type YO2 or undervoltage type YM or Mitop low energy release)
- an electrical remote control mechanism (electrical motor, shunt closing release YF, anti-pumping relay)
- a maximum number of auxiliary contacts: 5 NC - 6 NO - 1 changeover contact. (see "indication and locking/interlocking" page, "Open/closed position auxiliary contacts" chapter).

Note: see the table of the releases' combinations "Order form" page.

DE57632



LV connection with plug

LV wiring kit

A wiring kit with 21 or 42 wires (2 meters long) equipped with pins that can be adapted to the LV plug can be supplied for connected in to the cubicle's LV compartment.

Flexible ducting

This 525 mm long duct with a hinged LV plug, enables protection of the LV wiring that connects the circuit breaker to the cubicle's LV compartment.

Interlocking kit

For circuit breakers intended for withdrawable applications, an interlocking kit can be adapted. The kit enables the mechanical position status to be given ("connected/disconnected") of the LV plug. By adding a link between this mechanical data (by the customer) and the open/closed position of the circuit breaker, interlocking can be achieved between the LV plug and the open/closed position of the circuit breaker (required by IEC standard 62271-200).

A detailed explanation of operation is given in the Installation Guide.

Description of functions

RI stored energy operating mechanism

Wiring diagram

PEE7164



Operation of the RI stored energy operating mechanism

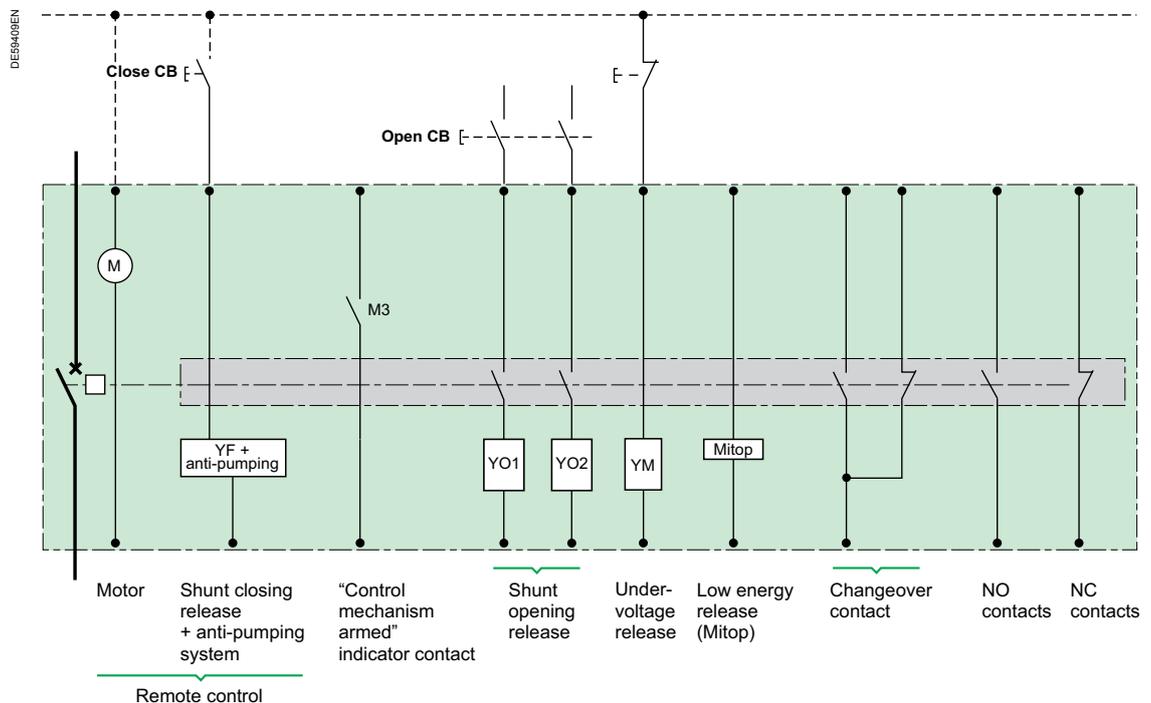
This gives the device an opening and closing speed that is independent of the operator whether the order is electrical or manual.

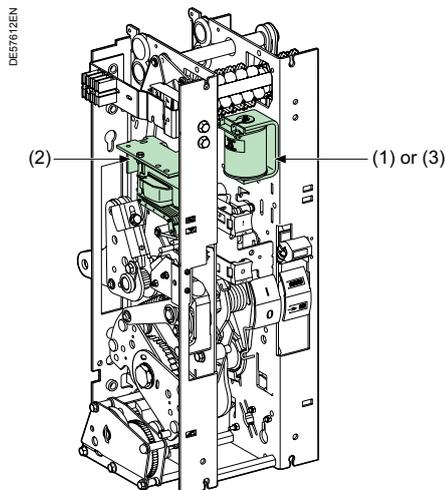
The electrical control mechanism carries out reclosing cycles and is automatically recharged by a geared motor each time after closing.

It consists of:

- the stored energy operating mechanism which stores in springs the energy required to open and close the device
- a manual lever-operated spring arming device
- a geared electrical arming device which automatically re-arms the control mechanism as soon as the circuit breaker is closed (optional)
- manual order devices by push buttons on the front panel of the device
- an electrical remote closing device containing a release with an antipumping relay
- an electrical opening order device comprising one or several release units which can be of the following type:
 - shunt opening
 - undervoltage
 - Mitop, a low consumption release, used only with the Sepam 100 LA protection relay.
- an operation counter
- an "open/closed" position indicator device with a mechanical indicator
- a device for indicating "charged" operating mechanism status by mechanical indicator and electrical contact (optional)
- a module of 14 auxiliary contacts whose availability varies according to the diagram used.

Wiring diagram (principle)

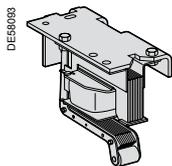




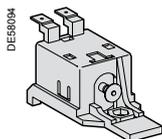
Operating mechanism



Shunt opening release (1)



Undervoltage release (2)



Low energy release (3)

Composition

The opening circuit can be produced using the following components:

- Shunt opening release (on energizing) (YO1)
- second shunt opening release (on energizing) (YO2)
- undervoltage release (YM)
- low energy release (Mitop).

Note: see the table of the releases' combinations on the "Order form" page.

Shunt opening release (YO1 and YO2)

Energizing this release causes instant opening of the circuit breaker.

Characteristics

Power supply	See "Order form" page	
Threshold	V AC	0.85 to 1.1 Ur
	V DC	0.7 to 1.1 Ur
Consumption	V AC	160 VA
	V DC	50 W

Undervoltage release (YM)

This release unit causes the systematic opening of the circuit breaker when its supply voltage drops below a value less than 35% of the rated voltage, even if this drop is slow and gradual. It can open the circuit breaker between 35% and 70% of its rated voltage. If the release unit is not supplied power, manual or electrical closing of the circuit breaker is impossible. Closing of the circuit breaker is possible when the supply voltage of the release unit reaches 85% of its rated voltage.

Characteristics

Power supply	See "Order form" page		
Threshold	Opening	0.35 to 0.7 Ur	
	Closing	0.85 Ur	
Consumption	Triggering	V AC	400 VA
		V DC	100 W
	Latched	V AC	100 VA
		V DC	10 W

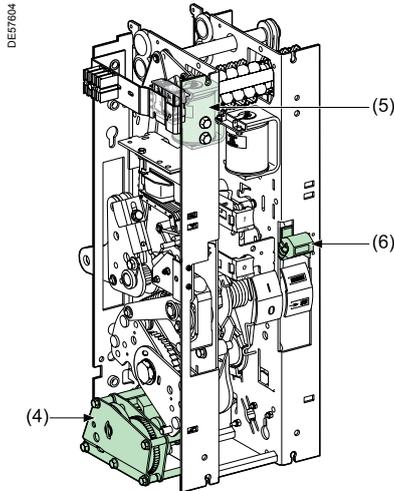
Low energy release (Mitop)

This release includes a low consumption unit and is specifically used with the Sepam 100LA self-powered relay ("REFLEX MODULE"), or the VIP relay.

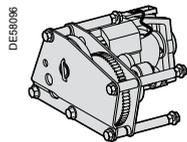
Characteristics

Power supply	Direct current
Threshold	$0.6 A < I < 3 A$

Any tripping due to the Mitop release unit is momentarily indicated by an SDE type changeover contact (option).



Operating mechanism



Electrical motor and gearing (4)



Shunt closing release (5)



Operation counter (6)

Function

Remote control enables the remote opening and closing of the circuit breaker.

Composition

The remote control mechanism comprises:

- an electrical motor with gearing
- a shunt closing release (YF) combined with an anti-pumping device
- an operation counter.

Electrical motor with gearing (M)

The electrical motor carries out the automatic rearming of the stored energy unit as soon as the circuit breaker is closed. This allows the instant reclosing of the device after opening. The arming lever is only used as a backup operating mechanism in the case of the absence of the auxiliary power supply. The M3 contact indicates the end of arming operations.

Characteristics

Power supply	See "Order form" page	
Threshold	V AC/V DC	0.85 to 1.1 Ur
Consumption	V AC	380 VA
	V DC	380 W

Shunt closing release (YF)

This release allows the remote closing of the circuit breaker when the operating mechanism is armed.

Characteristics

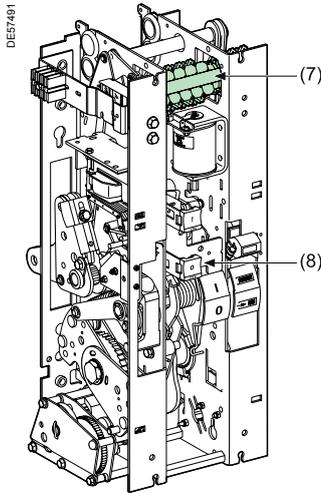
Power supply	See "Order form" page	
Threshold	V AC	0.85 to 1.1 Ur
	V DC	0.85 to 1.1 Ur
Consumption	V AC	160 VA
	V DC	50 W

The shunt closing release is combined with an anti-pumping relay that enables priority to be given to opening in the case of a permanent closing order. This thus avoids the device being caught in an uncontrolled opening-closing cycle.

Operation counter

The operation counter is visible on the front panel.

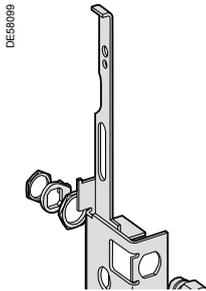
It displays the number of switching cycles (CO) that the device has carried out.



Operating mechanism



Auxiliary contacts (7)



Keylocking kit (8)

“Open/closed” auxiliary contacts

The number of contacts available depends on the options chosen on the operating mechanism.

- In the basic configuration, the circuit breaker operating mechanism comprises a total of:
 - 6 normally closed contacts (NC)
 - 7 normally open contacts (NO)
 - 1 changeover contact (CHG).

The usage mode for auxiliary contacts is given in the following table:

Options	NC contact	NO contact
Remote control	1	1
Shunt opening release (each one)	0	1
Undervoltage release	0	0
Low energy release Mitop	0	0

To know the final number of available contacts, you must deduct the total number of contacts included in the circuit breaker (6 NC + 7 NO + 1 CHG) from the number of contacts used indicated in the table above.

E.g.: a circuit breaker equipped with a remote control and a shunt release has the following contacts available:

6 NC + 5 NO + 1 CHG.

With an undervoltage release instead of a shunt release, this circuit breaker would have the following available contacts:

6 NC + 6 NO + 1 CHG.

- Using a 21-pin LV plug (for withdrawable applications) the maximum number of available contacts is:
3 NC + 3 NO + 1 CHG.

(Instead of 5 NC-6 NO-1 CHG with a 42-pin socket).

Contact characteristics			
Rated current			10 A
Breaking capacity	AC	220 V ($\cos \psi \geq 0.3$)	1 A
	DC	110/220 V ($L/R \leq 0.02$ s)	0.3 A

Operating mechanism with electrical motor

Shunt opening release combination			
1st release	Shunt opening release YO1	Undervoltage release YM	Mitop
2nd release			
Without	6NC+5NO+1CHG	6NC+6NO+1CHG	6NC+6NO+1CHG
Shunt opening release YO2	6NC+4NO+1CHG		
Undervoltage release YM	6NC+5NO+1CHG		
Mitop	6NC+5NO+1CHG	6NC+6NO+1CHG	

Locking of the circuit breaker in the “open” position

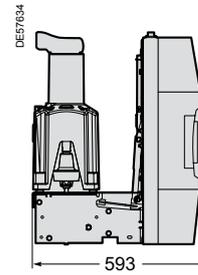
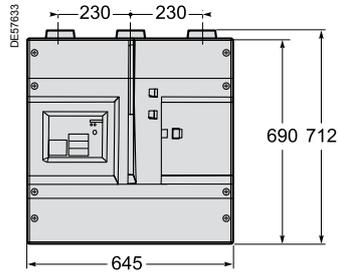
This locking system enables the fitting of a Profalux or Ronis captive key type keylock (right turn type keylock).

The keylock is not part of the kit but can be supplied as an option.

Device

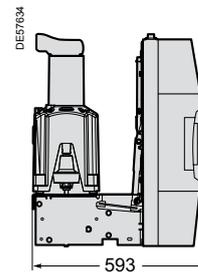
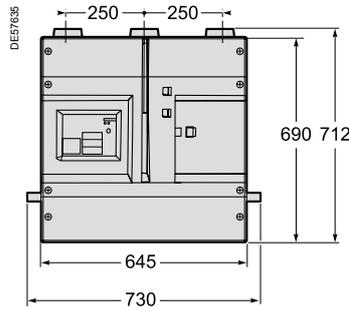
Phase to phase distance 230 mm

Ur	Isc	Ir	Weight
24 kV	16 kA	630 A	97 kg
		1250 A	
	25 kA	630 A	
		1250 A	

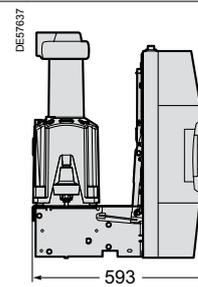
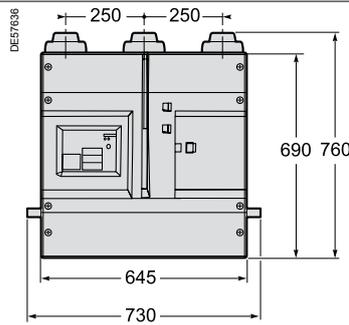


Phase to phase distance 250 mm

Ur	Isc	Ir	Weight
24 kV	16 kA	630 A	97 kg
		1250 A	
	25 kA	630 A	
		1250 A	



Ur	Isc	Ir	Weight
24 kV	16 kA	2000 A	135 kg
		2500 A	
	25 kA	2000 A	
		2500 A	
	31.5 kA	630 A	
		1250 A	
		2000 A	
		2500 A	



Important

Detailed installation instructions are given in the "Evolis Installation Guide". Please consult us.

Only one of the boxes (ticked or filled) by the needed value) have to be considered between each horizontal line.
Green box corresponds to none priced functions.

Releases combinations table

	No LV plug or 42-pin LV plug						21-pin LV plug
YO1	1		1	1	1		1
YO2			1				
YM		1		1		1	
Mitop					1	1	

Basic fixed, frontal circuit breaker

Quantity	<input type="text"/>	
Rated voltage U_r	(kV)	<input type="text" value="24"/>
Short circuit current I_{sc}	(kA)	<input type="text"/>
Rated current I_r	(A)	<input type="text"/>
Phase to phase distance (mm)	230 <input checked="" type="checkbox"/>	250 <input checked="" type="checkbox"/>
Frequency	50 Hz <input checked="" type="checkbox"/>	60 Hz <input checked="" type="checkbox"/>
Colour for push buttons and indicators		
Push buttons open/closed:		Red/black <input checked="" type="checkbox"/>
Indicator open/closed:	Black/white <input checked="" type="checkbox"/>	Green/red <input checked="" type="checkbox"/>
Operating mechanism charged/discharged:	White/yellow <input checked="" type="checkbox"/>	Charged/discharged <input checked="" type="checkbox"/>

Circuit breaker options

Opening release (see possible choices in combination table)

Shunt opening release YO1				
24 Vdc <input checked="" type="checkbox"/>	110 Vdc <input checked="" type="checkbox"/>	220 Vdc <input checked="" type="checkbox"/>	110 Vac (50 Hz) <input checked="" type="checkbox"/>	
48 Vdc <input checked="" type="checkbox"/>	125 Vdc <input checked="" type="checkbox"/>	220 Vac (50 Hz) <input checked="" type="checkbox"/>	120 Vac (60 Hz) <input checked="" type="checkbox"/>	
Shunt opening release YO2				
24 Vdc <input type="checkbox"/>	110 Vdc <input type="checkbox"/>	220 Vdc <input type="checkbox"/>	110 Vac (50 Hz) <input type="checkbox"/>	
48 Vdc <input type="checkbox"/>	125 Vdc <input type="checkbox"/>	220 Vac (50 Hz) <input type="checkbox"/>	120 Vac (60 Hz) <input type="checkbox"/>	
Undervoltage release YM				
24 Vdc <input type="checkbox"/>	110 Vdc <input type="checkbox"/>	220 Vdc <input type="checkbox"/>	110 Vac (50 Hz) <input type="checkbox"/>	
48 Vdc <input type="checkbox"/>	125 Vdc <input type="checkbox"/>	220 Vac (50 Hz) <input type="checkbox"/>	120 Vac (60 Hz) <input type="checkbox"/>	
Low energy release Mitop		Without contact <input type="checkbox"/>	With contact <input type="checkbox"/>	

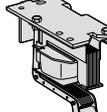
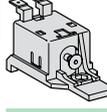
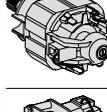
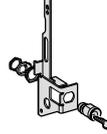
Remote control (operation counter already included)

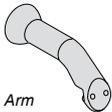
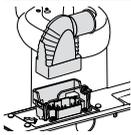
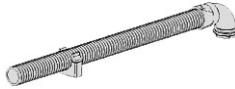
Electrical motor M	24...32 Vdc <input type="checkbox"/>	110...127 Vdc/ac <input type="checkbox"/>
	48...60 Vdc/ac <input type="checkbox"/>	220...250 Vdc/ac <input type="checkbox"/>
Shunt closing release YF		
24 Vdc <input checked="" type="checkbox"/>	110 Vdc <input checked="" type="checkbox"/>	220 Vdc <input checked="" type="checkbox"/>
48 Vdc <input checked="" type="checkbox"/>	125 Vdc <input checked="" type="checkbox"/>	220 Vac (50 Hz) <input checked="" type="checkbox"/>
		110 Vac (50 Hz) <input checked="" type="checkbox"/>
		120 Vac (60 Hz) <input checked="" type="checkbox"/>

Operation counter (already included if remote control supplied)

LV plug	21 pins <input type="checkbox"/>	42 pins <input type="checkbox"/>
Locking of the circuit breaker in the open position		
Locks and keys	Profalux <input checked="" type="checkbox"/>	Ronis <input checked="" type="checkbox"/>

The following components can be ordered separately and can be adapted or replaced by the customer.

Remote control		Ref.	
Shunt opening release YO1 or YO2			
	24 Vdc	AAA10 115	
	48 Vdc	AAA10 116	
	110 Vdc	AAA10 117	
	125-127 Vdc	AAA10 118	
	220 Vdc	AAA10 119	
	110 Vac	50 Hz	AAA10 120
	220-230 Vac	50 Hz	AAA10 121
120 Vac	60 Hz	AAA10 122	
Shunt closing release YF			
	24 Vdc	AAA10 106	
	48 Vdc	AAA10 107	
	110 Vdc	AAA10 108	
	125-127 Vdc	AAA10 109	
	220 Vdc	AAA10 110	
	110 Vac	50 Hz	AAA10 111
	220-230 Vac	50 Hz	AAA10 112
120 Vac	60 Hz	AAA10 113	
Undervoltage release YM			
	24 Vdc	AAA10 124	
	48 Vdc	AAA10 125	
	110 Vdc	AAA10 126	
	125-127 Vdc	AAA10 127	
	220 Vdc	AAA10 128	
	110 Vac	50 Hz	AAA10 129
	220-230 Vac	50 Hz	AAA10 130
120 Vac	60 Hz	AAA10 131	
Low energy release Mitop			
	Without contact	0889308A	
	With contact	0889308B	
Electrical motor			
	24...32 Vdc	AAA10 027	
	48...60 Vac/dc	AAA10 028	
	100...127 Vac/dc	AAA10 029	
	220...250 Vac/dc	AAA10 030	
	Gear reducer	AAA10 065	
Locking/interlocking		Ref.	
	Open position CB locking (without lock)	AAA10 092	
	Ronis lock	AAA10 058	
	Profalux lock	AAA10 059	
	Interlocking kit fixed CB	AAA10 033	

MV and LV connection accessories			Ref.		
MV connection accessories					
DE57639  Arm	DE57649  Cluster	DE57650  Finger	1 cluster + 1 finger	630-1250 A	AAA10 025
			1 cluster + 1 finger	630-2500 A	AAA10 026
			1 arm	630-1250 A	AAA10 022
LV connection					
DE57640 	21-pin LV plug *	LV plug support	AAA10 035		
		21-pin LV plug	AAA10 031		
	42-pin LV plug *	LV plug support	AAA10 035		
		42-pin LV plug	AAA10 032		
(*) 2 references are necessary					
LV wiring and ducting					
PE56601 	Flexible conduct for LV wiring		59099		
	LV connecting kit 21 wires		59117		
	LV connecting kit 42 wires		AAA10 087		
Circuit breaker support frame					
51222737 	- Roller base - The kit includes the roller base only - Drawings are supplied to manufacture the frame locally		59050		

The following components can only be adapted or replaced on site by staff trained by Schneider Electric

- Remote control mechanism (comprising: electrical motor, gearing, shunt closing release, anti-pumping relay, operation counter)
- Operation counter
- Low energy release (Mitop)
- Circuit breaker front cover.

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PEE8001



Evolis circuit breaker 24 kV
withdrawable, frontal version

Description of the device

The basic withdrawable version of the Evolis circuit breaker comprises:

- the circuit breaker unit with its operating mechanism:
 - three poles equipped with a vacuum interrupter
 - a RI type, spring-operated stored energy control mechanism, electrifiable.This gives the device an opening and closing speed that is independent of the operator, for both electrical and manual orders. It enables reclosing cycles to be carried out
- a front panel housing the manual operating mechanism and status indicators.
- the components enabling it to be withdrawable:
 - the circuit breaker is equipped with racking arms and contact fingers and mounted on a racking in/out drive device with a threaded shaft activated by a handle, including all of the safety interlock systems.
 - a Harting type male LV connector allows connection of the external auxiliary circuits.

Each device can optionally be fitted with:

- locking of the circuit breaker in the following positions:
 - open, by a key lock installed on the control panel
 - racked out, by a key lock installed on the drive device.
- the basic NEX cradle, comprising:
 - a metal structure and two guide rails
 - fixed connection fingers insulated by bushings
 - metal shutters to insulate from the HV part
 - safety interlocking systems.
- NEX cradle options:
 - circuit breaker racked-in or out position indicator contacts
 - a circuit breaker racked-in blocking mechanism
 - an extraction tool
 - a foolproof device for the circuit breaker rating.

Applications

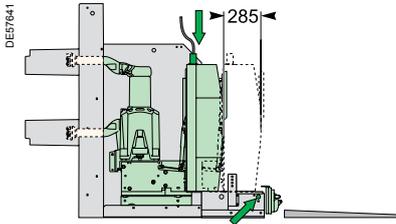
Evolis circuit breakers are three-pole indoor MV circuit breakers. They are mainly used for operation and protection of public, industrial and tertiary distribution networks of 24 kV.

Through their compact dimensions and harmonized range, Evolis circuit breakers are positioned very favorably on the retrofit market.

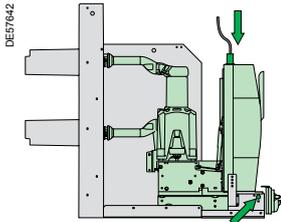
Electrical characteristics according to IEC 62271-100								
Phase to phase			230			250		
Rated voltage	Ur	kV 50/60 Hz	24			24		
Insulation level								
- power frequency withstand	Ud	kV 50 Hz 1 min	50			50		
- lightning impulse withstand	Up	kV peak	125			125		
Rated current	Ir	A	630	■	■	–	–	■
			1250	■	■	–	–	■
			2000	–	–	■	■	■
			2500	–	–	■	■	■
Short circuit current	Isc	kA	16	25	16	25	31.5	
Short time withstand current	Ik/tk	kA/3 s	16	25	16	25	31.5	
Short-circuit making current	Ip	kA peak	50 Hz	40	63	40	63	79
			60 Hz	42	65	42	65	82

Common characteristics according to IEC 62271-100		
Rated switching sequence	O-3 min-CO-3 min-CO	■
	O-0.3 s-CO-3 min-CO	■
	O-0.3 s-CO-15 s-CO	■
Operating times	Opening ms	< 50
	Breaking ms	< 65
	Closing ms	< 85
Mechanical endurance	Class	M2
	Number of switching operations	10 000
Electrical endurance	Class	E2
Number of switching operations at full Isc value	16 kA	100
	25 kA	100
	31.5 kA	100
Capacitive current breaking capacity	Class	C1-C2 (for certain applications)
Service temperature		– 25°C to 40°C
Average relative humidity	over 24 h	< 95%
	over 1 month	< 90%

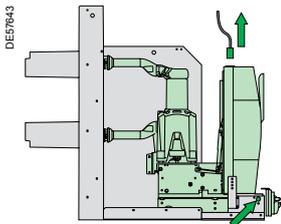
■ Available
– Not available



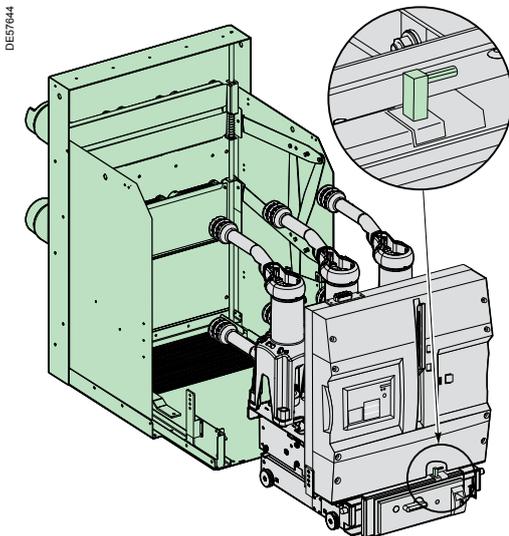
Service position



Test position



Disconnected position



Interlocking door-cubicle

Composition

The "racking in" function is carried out by:

- the racking carriage holding the circuit breaker (mobile part)
- the cradle with bushings (fixed part)
- LV plug.

Operation

The circuit breaker can be placed in 3 stable positions:

- **service position:** circuit breaker racked in and locked in position, LV plug connected
- **test position:** circuit breaker racked out and locked in position, LV plug connected
- **disconnected position:** the circuit breaker can be unlocked and extracted from the cubicle, without interlocking, LV plug disconnected.

Safety functions

A drive system using a threaded shaft gives easier racking and unracking.

Interlocking mechanisms

In conformity with IEC standards 62271-100 and 62271-200, the following interlocks are available:

- impossibility of racking in or out if the circuit breaker is not in the "open" position
- impossible to rack in the circuit breaker when the LV plug is not connected
- impossible to disconnect the LV plug if the circuit breaker is not racked-out.

Cubicle door interlocking mechanism

The carriage is equipped with a device that enables interlocking between the racking out of the circuit breaker and the cubicle door (the door must be specifically designed):

- possible to rack in the circuit breaker only if the door is closed
- possible to open the door only if the circuit breaker is racked out.

This device must be disabled if the interlocking function is not present.

Earthing is achieved throughout the operation via the racking carriage casters.

An additional earthing system can be supplied as an option.

Protective shutters placed on the cradle stops access to the racking fingers when the device is extracted (protection index: IP2X).

For maintenance purpose, it is possible to:

- padlock the shutters in the closed position
- unlock the fixed contact access mechanism and insert a screen to insulate the energized contact set. A drawing is available on request to produce this protective screen (see Installation Guide).

A foolproof device enables the cradle to be fitted perfectly to the circuit breaker relative to the cradle caliber.

This system is mounted on the cradle side. The combination corresponding to the right circuit breaker rating must be produced by the panel builder.

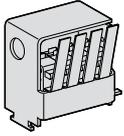
Anti-drop function

This function provides operator safety when extracting the circuit breaker.

Earthing switch

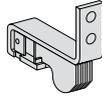
It can be fitted under the cradle, to give the appropriate interlocking between the circuit breaker and the earthing switch (see detailed description in the "Earthing switch and cubicle components" catalogue).

DE57562



Racked in/out position

DE57563



Earthing sliding device

Optional accessories

- 4 racked in/out position contacts.
- Additional earthing device (copper sliding device).
- LPCT core type sensors, mounted directly on the cradle bushings.
- Auto-discharge function:

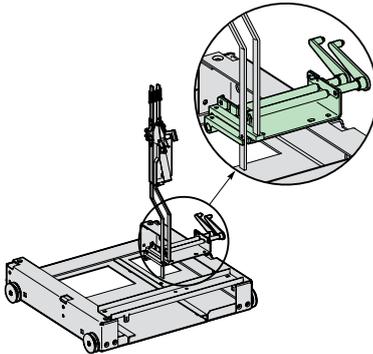
the circuit breaker operating mechanism springs are automatically discharged when the circuit breaker is extracted from the cubicle. This function avoids all risks of spurious closing of the circuit breaker.

- Test position contact.

This contact is activated when the circuit breaker is in the “test” or “service” position.

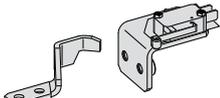
- Access ramp for the circuit breaker in the cradle.

DE57645



Auto-discharge function

DE57646

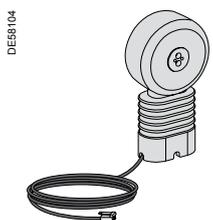


Test position contact

LPCT sensors are the best way to increase the effectiveness of the protection chain and simplify the selection.



LPCT for bushings (TLP type)



LPCT for cubicle (CLP type)

Function

LPCT type sensors (Low Power Current Transducers) provide accurate measurement for protection functions when an Evolis circuit breaker is combined with a Sepam range relay.

They comply with IEC 60044-8 standard.

Composition

Two types of LPCT are available:

- LPCT's for bushings, with LV insulation for cradle installation (TLP type)
- LPCT with MV insulation for cubicle installation (CLP type).

The sensor is supplied with 5 m of cable and connectors that allows direct connection to the Sepam unit.

Mechanical characteristics (LPCT for bushings TLP type)

Mounted directly on the Evolis withdrawable circuit breaker cradle.

The sensors are simply located on the bushings and fixed using three screws.

Each sensor covers the full operating range of the corresponding circuit breaker.

Connection to the Sepam is achieved using a shielded cable which is attached to each sensor.

Electrical characteristics:

- conformity with IEC standard 60044-8, which defines LPCT's with an output voltage
- usable for nominal currents of 25 A to 2500 A
- class 0.5 throughout the range
- current sensors give a voltage output at a ratio of 100 A/22.5 mV.

Common features

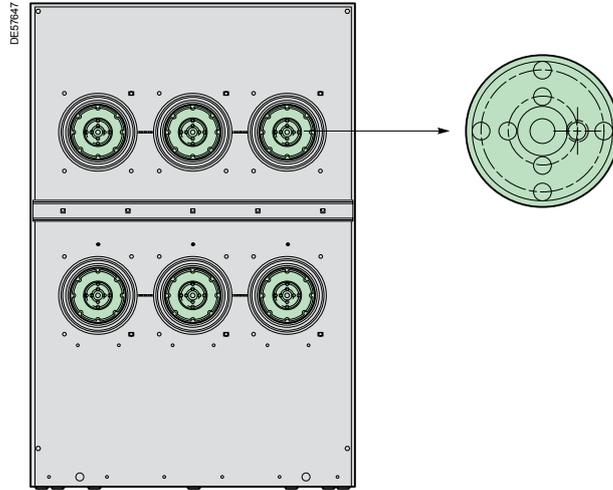
Rated primary current	100 A
Rated secondary output (at 100 A)	22.5 mV
Accuracy class for measuring	0.5
Accuracy class for protection	5P
Burden	≥ 2 kΩ
Frequency	50/60 Hz

Specific features	CLP2	CLP3	TLP160	TLP190
Assembly	In the cubicle	In the cubicle	On the bushings	On the bushings
Rated extended primary current	1250 A	2500 A	1250 A	2500 A
Accuracy limit factor	250	315	250	315
Rated short time thermal current	25 kA/3 s	31.5 kA/3 s	25 kA/3 s	31.5 kA/3 s
Rated voltage	24 kV	24 kV	24 kV ⁽¹⁾	24 kV ⁽¹⁾
Rated power frequency withstand voltage	50 kV	50 kV	50 kV	50 kV
Rated lightning impulse withstand voltage	125 kV	125 kV	125 kV	125 kV
Internal diameter			160 mm	190 mm

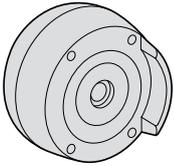
(1) Voltage applied to the cradle equipped with sensors.

MV connection

The customer connection is carried out easily from outside the cradle on copper vertical connection terminals integrated in the bushings.



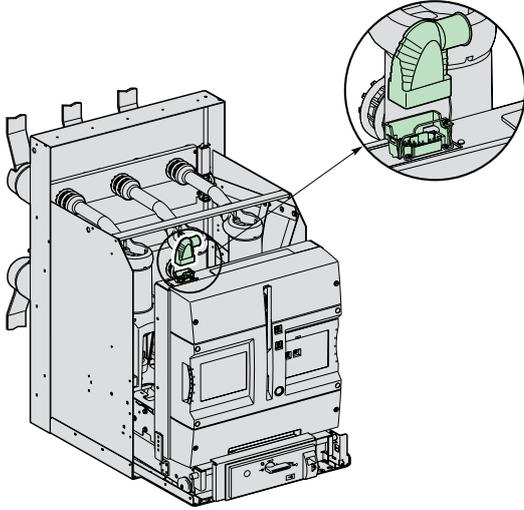
DES6108



Field deflectors

The aim of field deflectors is to improve the dielectric strength at the end of the cradle bushings. They are necessary in the case of installation in a NEX 24 kV type cubicle. For any other installation, the dielectric strength is the responsibility of the installation designer.

DE57648



Main functions

With the base circuit breaker, the LV wiring uses a LV plug unit which comprises:

- the fixed part (male) mounted on the circuit breaker and fully connected to the control mechanism
- the mobile part (female) compatible with the male part.

Two versions of the LV plug are available

An 21-pin version, enabling connection of:

- a shunt opening release YO1
- an electrical remote control mechanism (electrical motor, shunt closing release YF, anti-pumping relay)
- a maximum number of auxiliary contacts: 3 NC - 3 NO - 1 changeover contact.
(see "indication and locking/interlocking" page, "Open/closed position auxiliary contacts" chapter).

Note: see the table of the releases' combinations "Order form" page.

An 42-pin version, enabling connection of:

- an opening release (shunt type YO1 or undervoltage type YM)
- a second opening release (shunt type YO2 or undervoltage type YM or Mitop low energy release)
- an electrical remote control mechanism (electrical motor, shunt closing release YF, anti-pumping relay)
- a maximum number of auxiliary contacts: 5 NC - 6 NO - 1 changeover contact.
(see "indication and locking/interlocking" page, "Open/closed position auxiliary contacts" chapter).

Note: see the table of the releases' combinations "Order form" page.

Interlocking function

In conformity with IEC standard 62271-200, an interlocking function prohibits:

- racking in when the LV plug is not connected
- disconnection of the LV plug if the circuit breaker is in the racked-in position.

LV wiring kit

A wiring kit with 21 or 42 wires (2 meters long) equipped with pins that can be adapted to the LV plug can be supplied for connected in to the cubicle's LV compartment.

Flexible ducting

This 525 mm long duct with a hinged LV plug, enables protection of the LV wiring that connects the circuit breaker to the cubicle's LV compartment.

Description of functions

RI stored energy operating mechanism

Wiring diagram

PEE7104



Operation of the RI stored energy operating mechanism

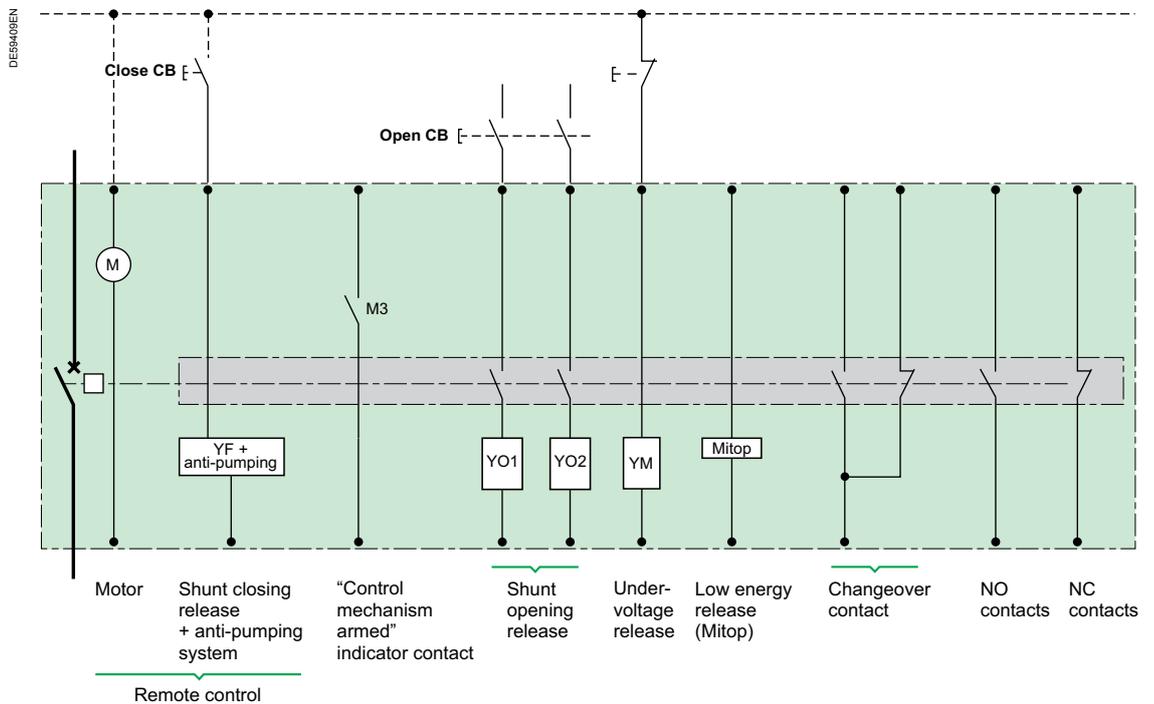
This gives the device an opening and closing speed that is independent of the operator whether the order is electrical or manual.

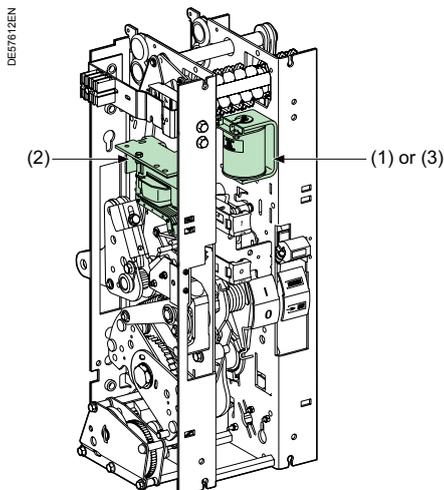
The electrical control mechanism carries out reclosing cycles and is automatically recharged by a geared motor each time after closing.

It consists of:

- the stored energy operating mechanism which stores in springs the energy required to open and close the device
- a manual lever-operated spring arming device
- a geared electrical arming device which automatically re-arms the control mechanism as soon as the circuit breaker is closed (optional)
- manual order devices by push buttons on the front panel of the device
- an electrical remote closing device containing a release with an antipumping relay
- an electrical opening order device comprising one or several release units which can be of the following type:
 - shunt opening
 - undervoltage
 - Mitop, a low consumption release, used only with the Sepam 100 LA protection relay.
- an operation counter
- an "open/closed" position indicator device with a mechanical indicator
- a device for indicating "charged" operating mechanism status by mechanical indicator and electrical contact (optional)
- a module of 14 auxiliary contacts whose availability varies according to the diagram used.

Wiring diagram (principle)

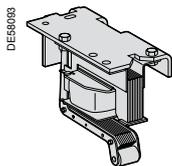




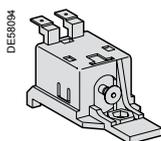
Operating mechanism



Shunt opening release (1)



Undervoltage release (2)



Low energy release (3)

Composition

The opening circuit can be produced using the following components:

- Shunt opening release (on energizing) (YO1)
- second shunt opening release (on energizing) (YO2)
- undervoltage release (YM)
- low energy release (Mitop).

Note: see the table of the releases' combinations on the "Order form" page.

Shunt opening release (YO1 and YO2)

Energizing this release causes instant opening of the circuit breaker.

Characteristics

Power supply	See "Order form" page	
Threshold	V AC	0.85 to 1.1 Ur
	V DC	0.7 to 1.1 Ur
Consumption	V AC	160 VA
	V DC	50 W

Undervoltage release (YM)

This release unit causes the systematic opening of the circuit breaker when its supply voltage drops below a value less than 35% of the rated voltage, even if this drop is slow and gradual. It can open the circuit breaker between 35% and 70% of its rated voltage. If the release unit is not supplied power, manual or electrical closing of the circuit breaker is impossible. Closing of the circuit breaker is possible when the supply voltage of the release unit reaches 85% of its rated voltage.

Characteristics

Power supply	See "Order form" page		
Threshold	Opening	0.35 to 0.7 Ur	
	Closing	0.85 Ur	
Consumption	Triggering	V AC	400 VA
		V DC	100 W
	Latched	V AC	100 VA
		V DC	10 W

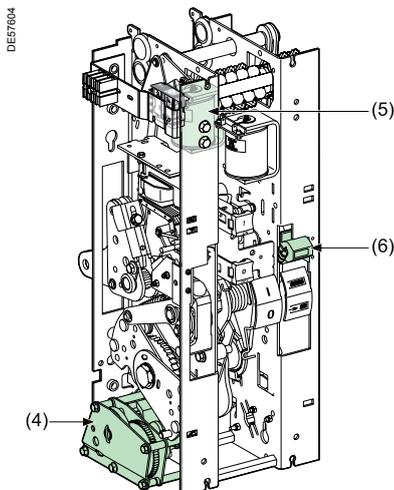
Low energy release (Mitop)

This release includes a low consumption unit and is specifically used with the Sepam 100LA self-powered relay ("REFLEX MODULE"), or the VIP relay.

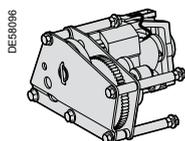
Characteristics

Power supply	Direct current
Threshold	0.6 A < I < 3 A

Any tripping due to the Mitop release unit is momentarily indicated by an SDE type changeover contact (option).



Operating mechanism



Electrical motor and gearing (4)



Shunt closing release (5)



Operation counter (6)

Function

Remote control enables the remote opening and closing of the circuit breaker.

Composition

The remote control mechanism comprises:

- an electrical motor with gearing
- a shunt closing release (YF) combined with an anti-pumping device
- an operation counter.

Electrical motor with gearing (M)

The electrical motor carries out the automatic rearming of the stored energy unit as soon as the circuit breaker is closed. This allows the instant reclosing of the device after opening. The arming lever is only used as a backup operating mechanism in the case of the absence of the auxiliary power supply. The M3 contact indicates the end of arming operations.

Characteristics

Power supply	See "Order form" page	
Threshold	V AC/V DC	0.85 to 1.1 Ur
Consumption	V AC	380 VA
	V DC	380 W

Shunt closing release (YF)

This release allows the remote closing of the circuit breaker when the operating mechanism is armed.

Characteristics

Power supply	See "Order form" page	
Threshold	V AC	0.85 to 1.1 Ur
	V DC	0.85 to 1.1 Ur
Consumption	V AC	160 VA
	V DC	50 W

The shunt closing release is combined with an anti-pumping relay that enables priority to be given to opening in the case of a permanent closing order. This thus avoids the device being caught in an uncontrolled opening-closing cycle.

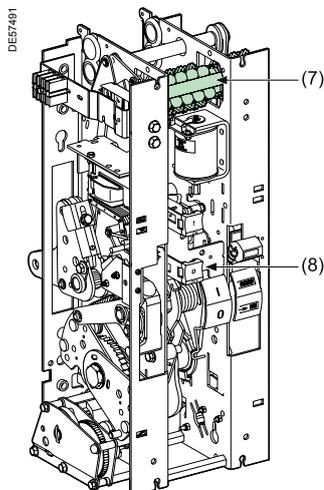
Operation counter

The operation counter is visible on the front panel.

It displays the number of switching cycles (CO) that the device has carried out.

Description of functions

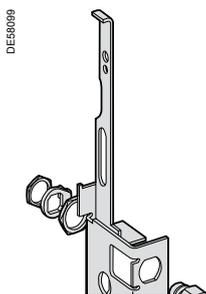
Indication and locking/interlocking



Operating mechanism



Auxiliary contacts (7)



Keylocking kit (8)

“Open/closed” auxiliary contacts

The number of contacts available depends on the options chosen on the operating mechanism.

■ In the basic configuration, the circuit breaker operating mechanism comprises a total of:

- 6 normally closed contacts (NC)
- 7 normally open contacts (NO)
- 1 changeover contact (CHG).

The usage mode for auxiliary contacts is given in the following table:

Options	NC contact	NO contact
Remote control	1	1
Shunt opening release (each one) YO1/YO2	0	1
Undervoltage release YM	0	0
Low energy release Mitop	0	0

To know the final number of available contacts, you must deduct the total number of contacts included in the circuit breaker (6 NC + 7 NO + 1 CHG) from the number of contacts used indicated in the table above.

E.g.: a circuit breaker equipped with a remote control and a shunt release has the following contacts available:

6 NC + 5 NO + 1 CHG.

With an undervoltage release instead of a shunt release, this circuit breaker would have the following available contacts:

6 NC + 6 NO + 1 CHG.

■ Using a 21-pin LV plug (for withdrawable applications) the maximum number of available contacts is:

3 NC + 3 NO + 1 CHG.

(Instead of 5 NC-6 NO-1 CHG with a 42-pin socket).

Contact characteristics

Rated current		10 A
Breaking capacity	AC	220 V ($\cos \varphi \geq 0.3$)
	DC	110/220 V ($L/R \leq 0.02$ s)
		1 A
		0.3 A

Operating mechanism with electrical motor

Shunt opening release combination

	1st release	Shunt opening release YO1	Undervoltage release YM	Mitop
2nd release				
Without		6NC + 5NO + 1CHG	6NC + 6NO + 1CHG	6NC + 6NO + 1CHG
Shunt opening release YO2		6NC + 4NO + 1CHG		
Undervoltage release YM		6NC + 5NO + 1CHG		
Mitop		6NC + 5NO + 1CHG	6NC + 6NO + 1CHG	

Locking of the circuit breaker in the “open” position

This locking system enables the fitting of a Profalux or Ronis captive key type keylock (right turn type keylock).

The keylock is not part of the kit but can be supplied as an option.

Description of functions

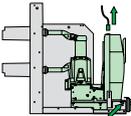
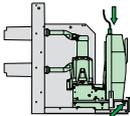
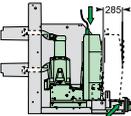
Safety functions

This table describes the safety functions available on the withdrawable version of the Evolis 24 kV circuit breaker.

How to use the table

Each of the boxes describes the functional status of each circuit breaker position and the associated parts:

- Possible status
- Possible status, impossible operation
- Impossible status

Parts	Circuit breaker positions					
		Insertion -----> <----- Extraction			Racking-in -----> <----- Racking-out	
	Removed		Disconnected	Test position		Service
1 - Cradle		Fool-proof protection (1) Anti-drop (2)				
		No opening shutters				
		Shutters padlocking possible				
2 - LV plug	Disconnected		No racking-in	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Connected	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	No unplugging		
3 - Circuit breaker	Closed			No racking-in	<input checked="" type="checkbox"/>	No racking-out
	Open				No closing	
		Open position circuit breaker locking available (3)				
4 - Switchboard door	Open			No racking-in	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Closed			No door opening (4)		
5 - Earthing switch	Open				No earthing switch closing	
	Closed			No racking-in	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

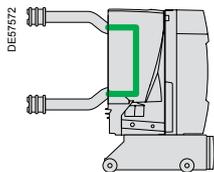
(1) This protection mechanism ensures that the performance levels of the circuit breaker correspond with those of the cradle.

(2) Device that prevents the circuit breaker from dropping when extracted from the cradle.

The device can be either unlocked manually or when the extraction rig is put in position.

(3) Option.

(4) Interlocking device to be fitted to the cubicle door. If there is no interlocking, the circuit breaker device should be inhibited.



Disconnecting truck

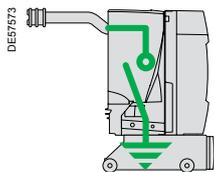
Disconnecting truck

This device allows disconnection of the upstream and downstream circuits in the cubicle. It is installed in the same location as the withdrawable circuit breaker in the cradle.

It includes a device to lock it in the in-service position.

Electrical characteristics

Rated voltage	Ur	kV	24	
Phase to phase distance		mm	230	250
Rated normal current	Ir	A	1250	2500
Short-time withstand current (3 s)	Ik	kA	25	31.5
Making capacity		kA peak	2.5 Ik (50 Hz) & 2.6 Ik (60 Hz)	



Earthing truck

Earthing truck

This device is a safety accessory used in place of the withdrawable circuit-breaker in order to earth the busbars.

Possibility of locking by padlocks in the service position.

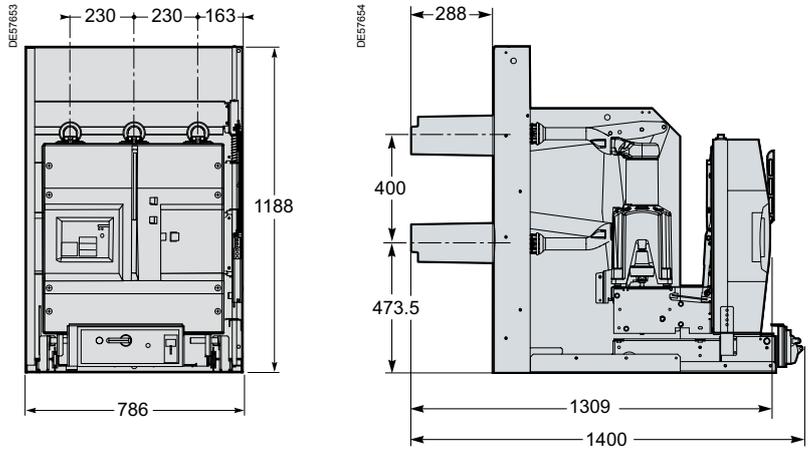
Electrical characteristics

Rated voltage	Ur	kV rms	24	
Phase to phase distance		mm	230	250
Short-time withstand current (3 s)	Ik	kA	25	31.5
Making capacity		kA peak	2.5 Ik (50 Hz) & 2.6 Ik (60 Hz)	

Device

Phase to phase distance 230 mm

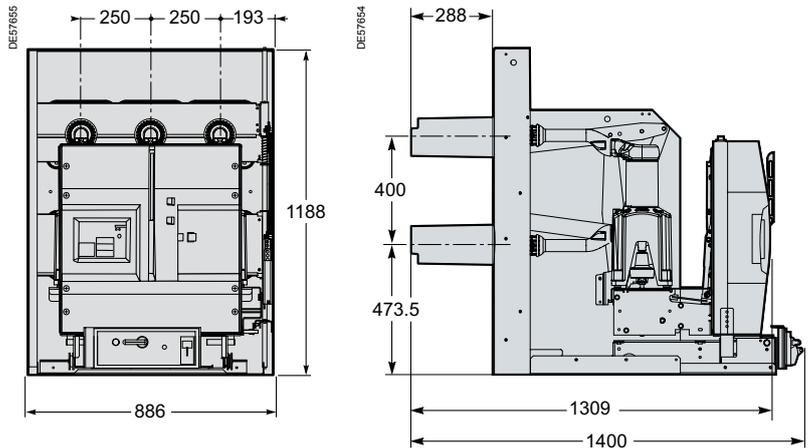
Ur	Isc	Ir	Weight *
24 kV	16 kA	630 A	145 + 125 kg
		1250 A	
	25 kA	630 A	
		1250 A	



Phase to phase distance 250 mm

Ur	Isc	Ir	Weight *	
24 kV	16 kA	1250 A	206 + 148 kg	
		2500 A		
	25 kA	1250 A		
		2500 A		
	31.5 kA	630 A		1250 A
				2000 A
				2500 A
				2500 A

(*) Circuit breaker + cradle



Important

Detailed installation instructions are given in the "Evolis Installation Guide". Please consult us.

Only one of the boxes (ticked or filled) by the needed value) have to be considered between each horizontal line.

Green box corresponds to none priced functions.

Releases combinations table

	No LV plug or 42-pin LV plug					21-pin LV plug
YO1	1	1	1	1	1	1
YO2		1				
YM		1		1	1	
Mitop						

Basic withdrawable, frontal circuit breaker

Quantity	<input type="text"/>	
Rated voltage U_r	(kV)	<input type="text" value="24"/>
Short circuit current I_{sc}	(kA)	<input type="text"/>
Rated current I_r	(A)	<input type="text"/>
Phase to phase distance (mm)	230 <input checked="" type="checkbox"/>	250 <input checked="" type="checkbox"/>
Frequency	50 Hz <input checked="" type="checkbox"/>	60 Hz <input checked="" type="checkbox"/>
Colour for push buttons and indicators		
Push buttons open/closed:		Red/black <input checked="" type="checkbox"/>
Indicator open/closed:	Black/white <input checked="" type="checkbox"/>	Green/red <input checked="" type="checkbox"/>
Operating mechanism charged/discharged:	White/yellow <input checked="" type="checkbox"/>	Charged/discharged <input checked="" type="checkbox"/>

Circuit breaker options

Opening release (see possible choices in combination table)

Shunt opening release YO1			
24 Vdc <input checked="" type="checkbox"/>	110 Vdc <input checked="" type="checkbox"/>	220 Vdc <input checked="" type="checkbox"/>	110 Vac (50 Hz) <input checked="" type="checkbox"/>
48 Vdc <input checked="" type="checkbox"/>	125 Vdc <input checked="" type="checkbox"/>	220 Vac (50 Hz) <input checked="" type="checkbox"/>	120 Vac (60 Hz) <input checked="" type="checkbox"/>
Shunt opening release YO2			
24 Vdc <input type="checkbox"/>	110 Vdc <input type="checkbox"/>	220 Vdc <input type="checkbox"/>	110 Vac (50 Hz) <input type="checkbox"/>
48 Vdc <input type="checkbox"/>	125 Vdc <input type="checkbox"/>	220 Vac (50 Hz) <input type="checkbox"/>	120 Vac (60 Hz) <input type="checkbox"/>
Undervoltage release YM			
24 Vdc <input type="checkbox"/>	110 Vdc <input type="checkbox"/>	220 Vdc <input type="checkbox"/>	110 Vac (50 Hz) <input type="checkbox"/>
48 Vdc <input type="checkbox"/>	125 Vdc <input type="checkbox"/>	220 Vac (50 Hz) <input type="checkbox"/>	120 Vac (60 Hz) <input type="checkbox"/>
Low energy release Mitop		Without contact <input type="checkbox"/>	With contact <input type="checkbox"/>

Remote control (operation counter already included)

Electrical motor M	24...32 Vdc <input type="checkbox"/>	110...127 Vdc/ac <input type="checkbox"/>
	48...60 Vdc/ac <input type="checkbox"/>	220...250 Vdc/ac <input type="checkbox"/>
Shunt closing release YF		
24 Vdc <input checked="" type="checkbox"/>	110 Vdc <input checked="" type="checkbox"/>	220 Vdc <input checked="" type="checkbox"/>
48 Vdc <input checked="" type="checkbox"/>	125 Vdc <input checked="" type="checkbox"/>	220 Vac (50 Hz) <input checked="" type="checkbox"/>

Operation counter (already included if remote control supplied)	<input type="checkbox"/>
LV plug	42 pins (instead of 21) <input type="checkbox"/>
Operating shaft	<input type="checkbox"/>
Open position CB locking device (without lock)	<input type="checkbox"/>
Locking of the circuit breaker in the open position	
Locks and keys	Profalux <input checked="" type="checkbox"/> Ronis <input checked="" type="checkbox"/>
Discharge of the circuit breaker control mechanism springs	<input type="checkbox"/>
Earthing sliding contact	<input type="checkbox"/>

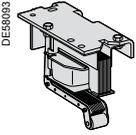
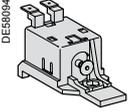
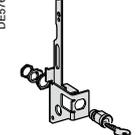
Cradle

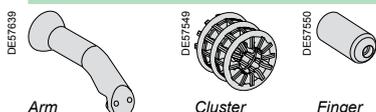
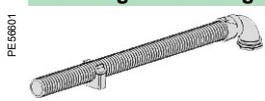
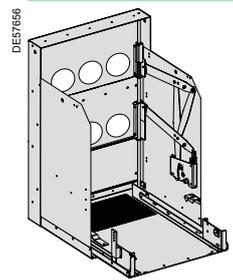
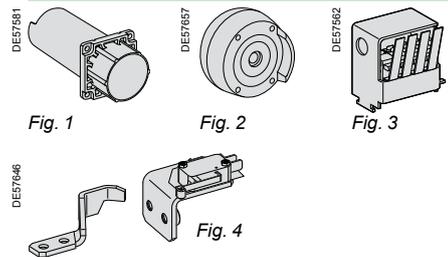
Rated current	Up to 1250 A and 25 kA <input checked="" type="checkbox"/>	Above 1250 A or 25 kA <input checked="" type="checkbox"/>
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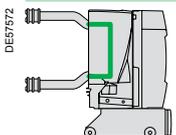
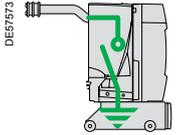
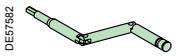
Cradle accessories

Rack in/rack out position contact (4 AC)	<input type="checkbox"/>
LPCT-TLP	Up to 1250 A and 25 kA <input type="checkbox"/> Above 1250 A or 25 kA <input type="checkbox"/>
Test position contact	<input type="checkbox"/>
This contact is activated when the circuit breaker is in the "test" or "service" position	
6 field deflectors	630-2500 A <input type="checkbox"/> 2500 A <input type="checkbox"/>

The following components can be ordered separately and can be adapted or replaced by the customer.

Remote control		Ref.	
Shunt opening release YO1 or YO2			
	24 Vdc	AAA10 115	
	48 Vdc	AAA10 116	
	110 Vdc	AAA10 117	
	125-127 Vdc	AAA10 118	
	220 Vdc	AAA10 119	
	110 Vac	50 Hz	AAA10 120
	220-230 Vac	50 Hz	AAA10 121
120 Vac	60 Hz	AAA10 122	
Shunt closing release YF			
	24 Vdc	AAA10 106	
	48 Vdc	AAA10 107	
	110 Vdc	AAA10 108	
	125-127 Vdc	AAA10 109	
	220 Vdc	AAA10 110	
	110 Vac	50 Hz	AAA10 111
	220-230 Vac	50 Hz	AAA10 112
120 Vac	60 Hz	AAA10 113	
Undervoltage release YM			
	24 Vdc	AAA10 124	
	48 Vdc	AAA10 125	
	110 Vdc	AAA10 126	
	125-127 Vdc	AAA10 127	
	220 Vdc	AAA10 128	
	110 Vac	50 Hz	AAA10 129
	220-230 Vac	50 Hz	AAA10 130
120 Vac	60 Hz	AAA10 131	
Low energy release Mitop			
	Without contact	0889308A	
	With contact	0889308B	
Electrical motor			
	24...32 Vdc	AAA10 027	
	48...60 Vac/dc	AAA10 028	
	100...127 Vac/dc	AAA10 029	
	220...250 Vac/dc	AAA10 030	
	Gear reducer	AAA10 065	
Locking/interlocking		Ref.	
	Open position CB locking device (without lock)	AAA10 092	
	Ronis lock	AAA10 058	
	Profalux lock	AAA10 059	

MV and LV connection accessories			Ref.
MV connection accessories			
	1 cluster + 1 finger	630-1250 A	AAA10 025
	1 cluster + 1 finger	630-2500 A	AAA10 026
	1 arm	630-1250 A	AAA10 022
LV connection			
	21-pin LV plug *	LV plug support	AAA10 035
		21-pin plug	AAA10 031
	42-pin LV plug *	LV plug support	AAA10 035
		42-pin plug	AAA10 032
(*) 2 references are necessary			
LV wiring and ducting			
	Flexible conduct for LV wiring		59099
	LV connecting kit 21 wires		59117
	LV connecting kit 42 wires		AAA10 087
Earthing sliding device			Ref.
	Earthing sliding contact on C.B.		59456
Cradle			Ref.
Cradle without bushings			
	Cradle with 230 mm phase distance		AAA10 015
	Cradle with 250 mm phase distance		AAA10 017
Cradle accessories			
	Bushing kit for cradle (fig. 1)	630-1250 A	AAA10 016
		2500 A	AAA10 018
	6 field deflectors for cradle bushings (fig. 2)	630-1250 A	AAA10 020
		2500 A	AAA10 021
	4 racked in/out position contacts (fig. 3) (to be installed in the cradle)		59173
	Test position contact. This contact is activated when the circuit breaker is in the "test" or "service" position (fig. 4)		AAA10 024
	LPCT toroidal sensor	TLP 160 (up to 1250 A)	AAA10 094
		TLP 190 (above)	AAA10 095

Various				Ref.	
Disconnecting truck					
	Phase to phase distance Ur				
	230 mm	24 kV	1250 A	25 kA	AAA10 061
	250 mm	24 kV	2500 A	31.5 kA	AAA10 062
Earthing truck					
	Phase to phase distance Ur				
	230 mm	24 kV	1250 A	25 kA	AAA10 063
	250 mm	24 kV	2500 A	31.5 kA	AAA10 064
Rack-in/rack-out operation					
	Operating shaft			59449	
Technical documentation					
	User manual			AAA10093	

The following components can only be adapted or replaced on site by staff trained by Schneider Electric

- Remote control mechanism (comprising: electrical motor, gearing, shunt closing release, anti-pumping relay, operation counter)
- Operation counter
- Low energy release (Mitop)
- Interlocking between the “open” circuit breaker position and the LV plug
- Racking truck
- Auto-discharge device
- Circuit breaker front cover.

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*Evolis 24 kV fixed, lateral version
MV connection on the right hand side*



*Evolis 24 kV fixed, lateral version
MV connection on the left hand side*

Description of the device

The Evolis circuit breaker comprises a basic fixed version:

- 3 poles integrated in a “sealed pressure system” type insulating enclosure
- a RI type, spring-operated stored energy control mechanism, electrifiable. This gives the device an opening and closing speed that is independent of the operator, for both electrical and manual orders. It enables reclosing cycles to be carried out
- a lateral panel housing the manual operating mechanism and status indicators
- upstream and downstream terminals for the power circuit connection
- a terminal block for connection of external auxiliary circuits.

Each device can also be fitted with the following options:

- circuit breaker locking in the open position by a keylock installed on the front plate of the operating mechanism.

Applications

Evolis circuit breakers are three-pole indoor MV circuit breakers. They are mainly used for operation and protection of public, industrial and tertiary distribution networks of 24 kV.

Through their compact dimensions and harmonized range, Evolis circuit breakers are positioned very favorably on the retrofit market.

Electrical characteristics according to IEC 62271-100										
Phase to phase			250				300			
Rated voltage	Ur	kV 50/60 Hz	24				24			
Insulation level										
- power frequency withstand	Ud	kV 50 Hz 1 min	50				50			
- lightning impulse withstand	Up	kV peak	125				125			
Rated current										
	Ir	630 A	MV connection on the:							
			Right	■	■	■	■	■	■	■
		Left	■	■	■	■	–	■	–	–
		1250 A	Right	■	■	■	■	–	■	■
Left	■		■	■	■	–	–	■	–	
Short circuit current	Isc	kA	12.5	16	20	25	12.5	16	20	25
Short time withstand current	Ik/tk	kA/3 s	12.5	16	20	25	12.5	16	20	25
Short-circuit making current	Ip	kA peak 50 Hz	31	40	50	63	31	40	50	63
		60 Hz	33	42	52	65	33	42	52	65

Common characteristics according to IEC 62271-100		
Rated switching sequence	O-3 min-CO-3 min-CO	■
	O-0.3 s-CO-3 min-CO	■
	O-0.3 s-CO-15 s-CO	■
Operating times	Opening ms	< 50
	Breaking ms	< 60
	Closing ms	< 85
Mechanical endurance	Class	M2
	Number of switching operations	10 000
Electrical endurance	Class	E2
Number of switching operations at full Isc value	12.5 kA	100
	16 kA	100
	20 kA	100
	25 kA	100
Capacitive current breaking capacity	Class	C1-C2 (for certain applications)
Service temperature		– 25°C to 40°C
Average relative humidity	over 24 h	< 95%
	over 1 month	< 90%

■ Available
– Not available

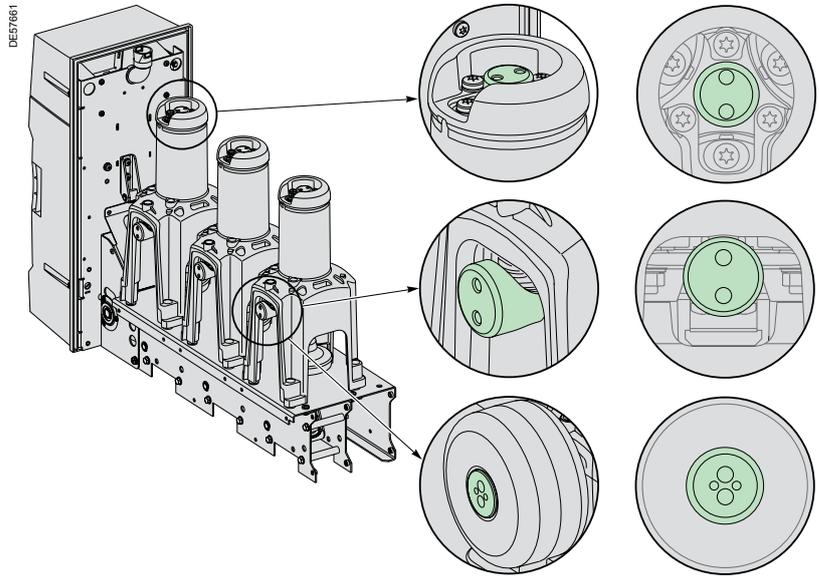
Description of functions

MV and LV connection

MV connection

The base circuit breaker is equipped with copper connection terminals with drilled holes.

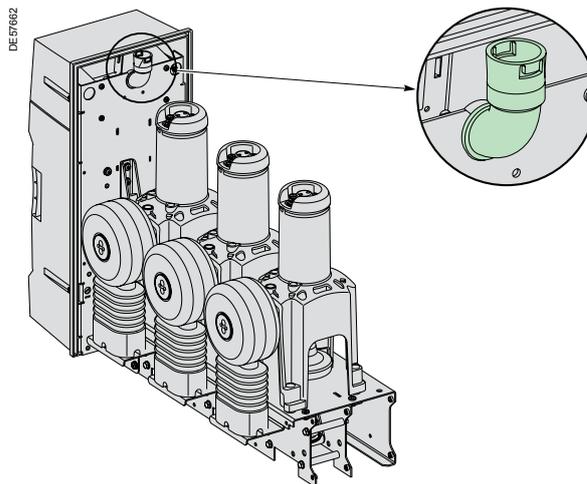
The customer connection is carried out easily from outside the circuit breaker on these connection terminals.



Connection configurations that have undergone type testing are shown in the Installation Guide.

LV connection

The circuit breaker's LV wiring must be directly connected to the terminal on the control mechanism via a protection sheath.



Description of functions

RI stored energy operating mechanism

Wiring diagram

PEE7104



Operation of the RI stored energy operating mechanism

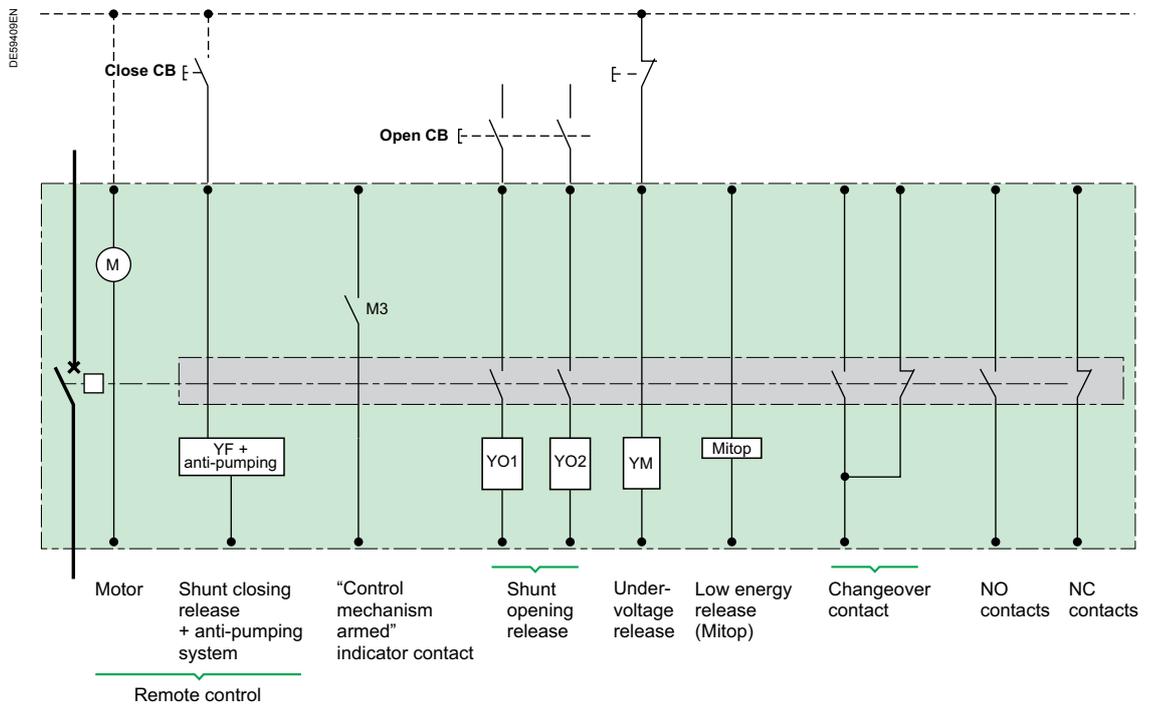
This gives the device an opening and closing speed that is independent of the operator whether the order is electrical or manual.

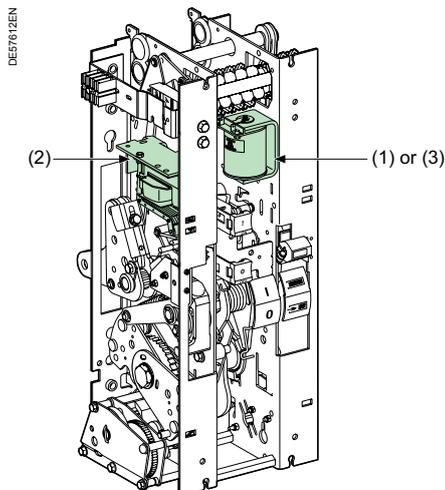
The electrical control mechanism carries out reclosing cycles and is automatically recharged by a geared motor each time after closing.

It consists of:

- the stored energy operating mechanism which stores in springs the energy required to open and close the device
- a manual lever-operated spring arming device
- a geared electrical arming device which automatically re-arms the control mechanism as soon as the circuit breaker is closed (optional)
- manual order devices by push buttons on the front panel of the device
- an electrical remote closing device containing a release with an antipumping relay
- an electrical opening order device comprising one or several release units which can be of the following type:
 - shunt opening
 - undervoltage
 - Mitop, a low consumption release, used only with the Sepam 100 LA protection relay.
- an operation counter
- an "open/closed" position indicator device with a mechanical indicator
- a device for indicating "charged" operating mechanism status by mechanical indicator and electrical contact (optional)
- a module of 14 auxiliary contacts whose availability varies according to the diagram used.

Wiring diagram (principle)

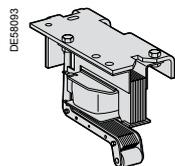




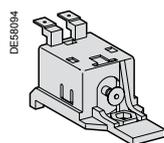
Operating mechanism



Shunt opening release (1)



Undervoltage release (2)



Low energy release (3)

Composition

In its basic version, the circuit breaker includes a shunt opening release (YO1).
The opening circuit can be produced using the following components:

- second shunt opening release (on energizing) (YO2)
- undervoltage release (YM)
- low energy release (Mitop).

Note: see the table of the releases' combinations on the "Order form" page.

Shunt opening release (YO1 and YO2)

Energizing this release causes instant opening of the circuit breaker.

Characteristics

Power supply	See "Order form" page	
Threshold	V AC	0.85 to 1.1 Ur
	V DC	0.7 to 1.1 Ur
Consumption	V AC	160 VA
	V DC	50 W

Undervoltage release (YM)

This release unit causes the systematic opening of the circuit breaker when its supply voltage drops below a value less than 35% of the rated voltage, even if this drop is slow and gradual. It can open the circuit breaker between 35% and 70% of its rated voltage. If the release unit is not supplied power, manual or electrical closing of the circuit breaker is impossible. Closing of the circuit breaker is possible when the supply voltage of the release unit reaches 85% of its rated voltage.

Characteristics

Power supply	See "Order form" page		
Threshold	Opening	0.35 to 0.7 Ur	
	Closing	0.85 Ur	
Consumption	Triggering	V AC	400 VA
		V DC	100 W
	Latched	V AC	100 VA
		V DC	10 W

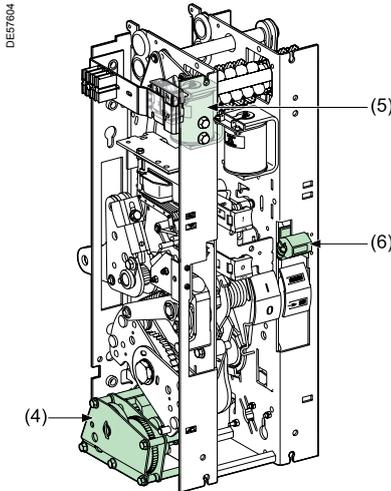
Low energy release (Mitop)

This release includes a low consumption unit and is specifically used with the Sepam 100LA self-powered relay ("REFLEX MODULE"), or the VIP relay.

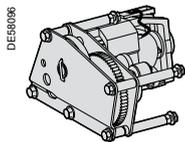
Characteristics

Power supply	Direct current
Threshold	0.6 A < I < 3 A

Any tripping due to the Mitop release unit is momentarily indicated by an SDE type changeover contact (option).



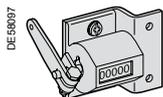
Operating mechanism



Electrical motor and gearing (4)



Shunt closing release (5)



Operation counter (6)

Function

Remote control enables the remote opening and closing of the circuit breaker.

Composition

The remote control mechanism comprises:

- an electrical motor with gearing
- a shunt closing release (YF) combined with an anti-pumping device
- an operation counter.

Electrical motor with gearing (M)

The electrical motor carries out the automatic rearming of the stored energy unit as soon as the circuit breaker is closed. This allows the instant reclosing of the device after opening. The arming lever is only used as a backup operating mechanism in the case of the absence of the auxiliary power supply. The M3 contact indicates the end of arming operations.

Characteristics

Power supply	See "Order form" page	
Threshold	V AC/V DC	0.85 to 1.1 Ur
Consumption	V AC	380 VA
	V DC	380 W

Shunt closing release (YF)

This release allows the remote closing of the circuit breaker when the operating mechanism is armed.

Characteristics

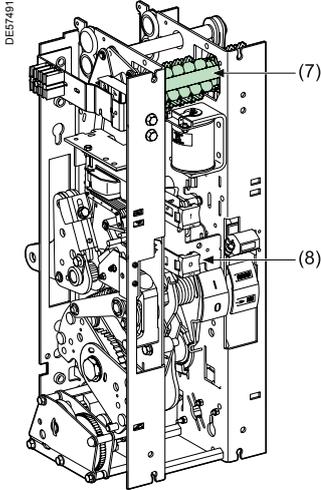
Power supply	See "Order form" page	
Threshold	V AC	0.85 to 1.1 Ur
	V DC	0.85 to 1.1 Ur
Consumption	V AC	160 VA
	V DC	50 W

The shunt closing release is combined with an anti-pumping relay that enables priority to be given to opening in the case of a permanent closing order. This thus avoids the device being caught in an uncontrolled opening-closing cycle.

Operation counter

The operation counter is visible on the front panel.

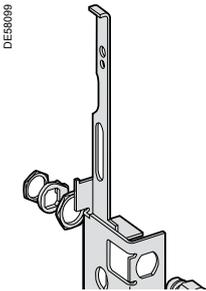
It displays the number of switching cycles (CO) that the device has carried out.



Operating mechanism



Auxiliary contacts (7)



Keylocking kit (8)

“Open/closed” auxiliary contacts

The number of contacts available depends on the options chosen on the operating mechanism.

In the basic configuration, the circuit breaker’s operating mechanism comprises a total of:

- 6 normally closed contacts (NC)
- 7 normally open contacts (NO)
- 1 changeover contact (CHG).

The usage procedure for auxiliary contacts is given in the following table:

Options	NC contact	NO contact
Remote control	1	1
Shunt opening release (each one) YO1/YO2	0	1
Undervoltage release YM	0	0
Low energy release (Mitop)	0	0

To know the final number of available contacts, you must deduct the total number of contacts included in the circuit breaker (6 NC + 7 NO + 1 CHG), the number of contacts used given in the table above.

E.g.: a circuit breaker equipped with a remote control and a shunt trip unit has the following available contacts:

6 NC + 5 NO + 1 CHG.

With a undervoltage release instead of the shunt trip, this circuit breaker would have the following available contacts:

6 NC + 6 NO + 1 CHG.

Contact characteristics

Rated current		10 A
Breaking capacity	AC	220 V (cos φ ≥ 0.3)
	DC	110/220 V (L/R ≤ 0.02 s)

Operating mechanism with electrical motor

Shunt opening release combination

	1st release	Shunt opening release YO1	Undervoltage release YM	Mitop
2nd release				
Without		6NC + 5NO + 1CHG	6NC + 6NO + 1CHG	6NC + 6NO + 1CHG
Shunt opening release YO2		6NC + 4NO + 1CHG		
Undervoltage release YM		6NC + 5NO + 1CHG		
Mitop		6NC + 5NO + 1CHG	6NC + 6NO + 1CHG	

Locking of the circuit breaker in the “open” position

This locking system enables the fitting of a Profalux or Ronis captive key type keylock (right turn type keylock).

The keylock is not part of the kit but can be supplied as an option.

Push buttons padlock

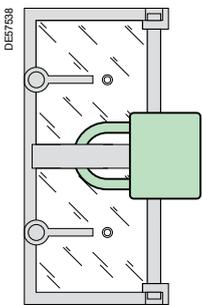
This transparent screen blocks access to the opening and closing push-buttons on the circuit breaker.

The device enables the opening or closing push button to be locked independently.

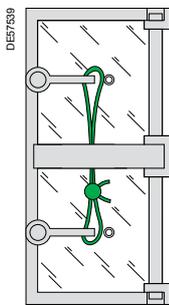
It is often associated with an electrical motor.

Locking is achieved either:

- by 2 screws
- by 3 padlocks, not supplied
- by a lead seal.



Padlocking



Lead sealing

Device

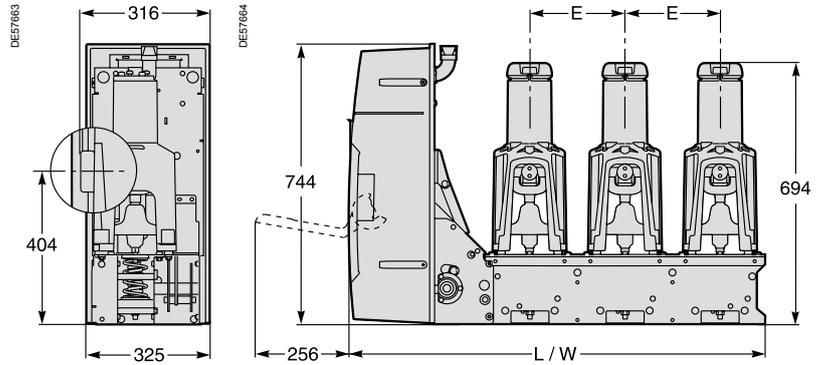
MV connection on the right hand side

Phase to phase distance E = 250 mm, L = 1095

Ur	Isc	Ir	Weight
24 kV	12.5 kA	630 A	90 kg
		1250 A	
	16 kA	630 A	
		1250 A	
	20 kA	630 A	
		1250 A	
	25 kA	630 A	
		1250 A	

Phase to phase distance E = 300 mm, L = 1195

Ur	Isc	Ir	Weight
24 kV	12.5 kA	630 A	90 kg
		1250 A	
	16 kA	630 A	
		1250 A	
	20 kA	630 A	
		1250 A	
	25 kA	630 A	
		1250 A	



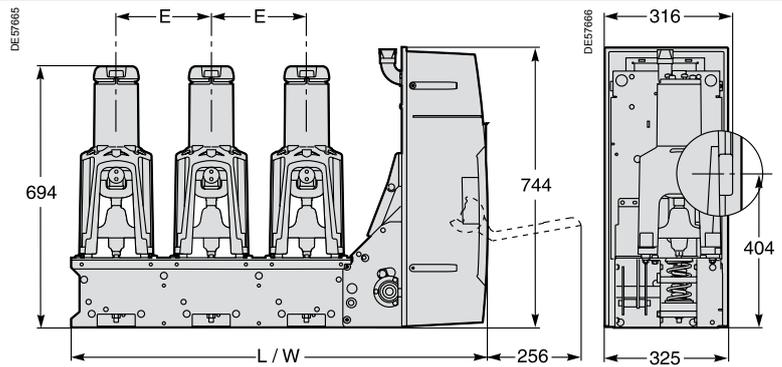
MV connection on the left hand side

Phase to phase distance E = 250 mm, L = 1095

Ur	Isc	Ir	Weight
24 kV	12.5 kA	630 A	90 kg
		1250 A	
	16 kA	630 A	
		1250 A	
	20 kA	630 A	
		1250 A	
	25 kA	630 A	
		1250 A	

Phase to phase distance E = 300 mm, L = 1195

Ur	Isc	Ir	Weight
24 kV	16 kA	630 A	90 kg
	20 kA	1250 A	



Important

Detailed installation instructions are given in the "Evolis Installation Guide". Please consult us.

Only one of the boxes (ticked or filled by the needed value) have to be considered between each horizontal line.

Green box corresponds to none priced functions.

Releases combinations table

YO1	<input checked="" type="checkbox"/>				
YO2	<input checked="" type="checkbox"/>				
YM	<input checked="" type="checkbox"/>				
Mitop	<input checked="" type="checkbox"/>				

Basic fixed, lateral circuit breaker

Quantity	<input type="text"/>	
Rated voltage U_r	(kV)	<input type="text" value="24"/>
Short circuit current I_{sc}	(kA)	<input type="text"/>
Rated current I_r	(A)	<input type="text"/>
MV connection	On the left <input checked="" type="checkbox"/>	On the right <input checked="" type="checkbox"/>
Phase to phase distance (mm)	250 <input checked="" type="checkbox"/>	300 <input checked="" type="checkbox"/>
Frequency	50 Hz <input checked="" type="checkbox"/>	60 Hz <input checked="" type="checkbox"/>
Colour for push buttons and indicators		
Push buttons open/closed:		Red/black <input checked="" type="checkbox"/>
Indicator open/closed:	Black/white <input checked="" type="checkbox"/>	Green/red <input checked="" type="checkbox"/>
Operating mechanism charged/discharged:	White/yellow <input checked="" type="checkbox"/>	Charged/discharged <input checked="" type="checkbox"/>

Circuit breaker options

Opening release (see possible choices in combination table)

Shunt opening release YO1

24 Vdc <input checked="" type="checkbox"/>	110 Vdc <input checked="" type="checkbox"/>	220 Vdc <input checked="" type="checkbox"/>	110 Vac (50 Hz) <input checked="" type="checkbox"/>
48 Vdc <input checked="" type="checkbox"/>	125 Vdc <input checked="" type="checkbox"/>	220 Vac (50 Hz) <input checked="" type="checkbox"/>	120 Vac (60 Hz) <input checked="" type="checkbox"/>

Shunt opening release YO2

24 Vdc <input type="checkbox"/>	110 Vdc <input type="checkbox"/>	220 Vdc <input type="checkbox"/>	110 Vac (50 Hz) <input type="checkbox"/>
48 Vdc <input type="checkbox"/>	125 Vdc <input type="checkbox"/>	220 Vac (50 Hz) <input type="checkbox"/>	120 Vac (60 Hz) <input type="checkbox"/>

Undervoltage release YM

24 Vdc <input type="checkbox"/>	110 Vdc <input type="checkbox"/>	220 Vdc <input type="checkbox"/>	110 Vac (50 Hz) <input type="checkbox"/>
48 Vdc <input type="checkbox"/>	125 Vdc <input type="checkbox"/>	220 Vac (50 Hz) <input type="checkbox"/>	120 Vac (60 Hz) <input type="checkbox"/>

Low energy release Mitop	Without contact <input type="checkbox"/>	With contact <input type="checkbox"/>
---------------------------------	--	---------------------------------------

Remote control (operation counter already included)

Electrical motor M	24...32 Vdc <input type="checkbox"/>	110...127 Vdc/ac <input type="checkbox"/>
	48...60 Vdc/ac <input type="checkbox"/>	220...250 Vdc/ac <input type="checkbox"/>

Shunt closing release YF

24 Vdc <input checked="" type="checkbox"/>	110 Vdc <input checked="" type="checkbox"/>	220 Vdc <input checked="" type="checkbox"/>	110 Vac (50 Hz) <input checked="" type="checkbox"/>
48 Vdc <input checked="" type="checkbox"/>	125 Vdc <input checked="" type="checkbox"/>	220 Vac (50 Hz) <input checked="" type="checkbox"/>	120 Vac (60 Hz) <input checked="" type="checkbox"/>

Operation counter (already included if remote control supplied)	<input type="checkbox"/>
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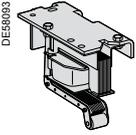
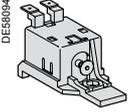
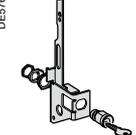
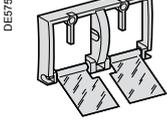
Open position CB locking device (without lock)	<input type="checkbox"/>
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Locking of the circuit breaker in the open position

Locks and keys	Profalux <input checked="" type="checkbox"/>	Ronis <input checked="" type="checkbox"/>
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Push buttons padlock	<input type="checkbox"/>
----------------------	--------------------------

The following components can be ordered separately and can be adapted or replaced by the customer.

Remote control		Ref.	
Shunt opening release YO1 or YO2			
	24 Vdc	AAA10 115	
	48 Vdc	AAA10 116	
	110 Vdc	AAA10 117	
	125-127 Vdc	AAA10 118	
	220 Vdc	AAA10 119	
	110 Vac	50 Hz	AAA10 120
	220-230 Vac	50 Hz	AAA10 121
120 Vac	60 Hz	AAA10 122	
Shunt closing release YF			
	24 Vdc	AAA10 106	
	48 Vdc	AAA10 107	
	110 Vdc	AAA10 108	
	125-127 Vdc	AAA10 109	
	220 Vdc	AAA10 110	
	110 Vac	50 Hz	AAA10 111
	220-230 Vac	50 Hz	AAA10 112
120 Vac	60 Hz	AAA10 113	
Undervoltage release YM			
	24 Vdc	AAA10 124	
	48 Vdc	AAA10 125	
	110 Vdc	AAA10 126	
	125-127 Vdc	AAA10 127	
	220 Vdc	AAA10 128	
	110 Vac	50 Hz	AAA10 129
	220-230 Vac	50 Hz	AAA10 130
120 Vac	60 Hz	AAA10 131	
Low energy release Mitop			
	Without contact	0889308A	
	With contact	0889308B	
Electrical motor			
	24...32 Vdc	AAA10 027	
	48...60 Vac/dc	AAA10 028	
	100...127 Vac/dc	AAA10 029	
	220...250 Vac/dc	AAA10 030	
	Gear reducer	AAA10 065	
Locking/interlocking		Ref.	
	Open position circuit breaker locking device (without lock) (fig. 1)	AAA10 092	
	Ronis lock	AAA10 058	
	Profalux lock	AAA10 059	
	Push buttons padlock (fig. 2)	48536	
			
Fig. 1	Fig. 2		

The following components can only be adapted or replaced on site by staff trained by Schneider Electric

- Remote control mechanism (comprising: electrical motor, gearing, shunt closing release, anti-pumping relay, operation counter)
- Operation counter
- Low energy release (Mitop)
- Circuit breaker front cover.

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EVOset 24 kV fixed, lateral version
MV connection on the right hand side

Description of the device

The Evolis circuit breaker comprises a basic fixed version:

- 3 poles integrated in a "sealed pressure system" type insulating enclosure
- a RI type, spring-operated stored energy control mechanism, electrifiable. This gives the device an opening and closing speed that is independent of the operator, for both electrical and manual orders. It enables reclosing cycles to be carried out
- a lateral panel housing the manual operating mechanism and status indicators
- upstream and downstream terminals for the power circuit connection
- a terminal block for connection of external auxiliary circuits
- an independent protection chain.

Each device can also be fitted with the following options:

- circuit breaker locking in the open position by a keylock installed on the front plate of the operating mechanism.

Applications

Evolis circuit breakers are three-pole indoor MV circuit breakers. They are mainly used for operation and protection of public, industrial and tertiary distribution networks of 24 kV.

Through their compact dimensions and harmonized range, Evolis circuit breakers are positioned very favorably on the retrofit market.

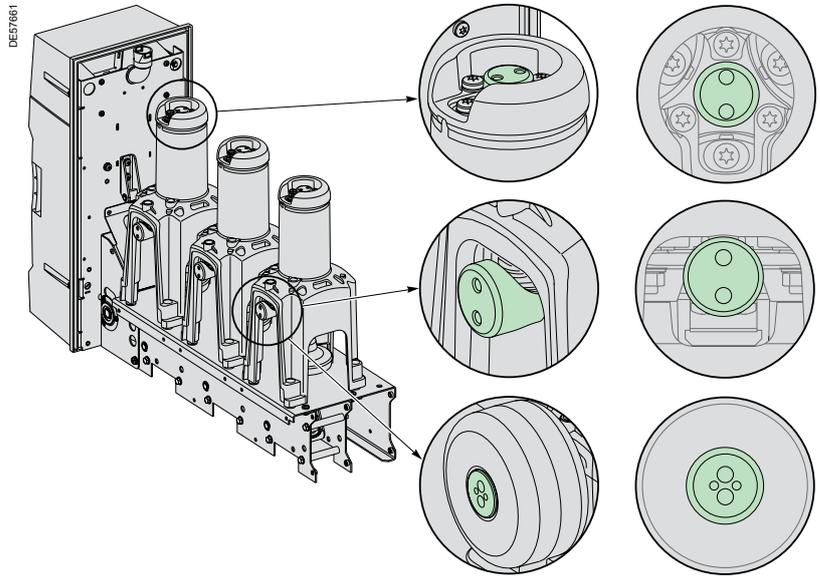
Electrical characteristics according to IEC 62271-100									
Phase to phase			250			300			
Rated voltage	Ur	kV 50/60 Hz	24			24			
Insulation level									
- power frequency withstand	Ud	kV 50 Hz 1 min	50			50			
- lightning impulse withstand	Up	kV peak	125			125			
Rated current									
	Ir	630 A	MV connection on the:						
			Right	■	■	■	■	■	■
		Left	–	–	–	–	–	–	
		1250 A	Right	■	■	■	■	■	■
Left	–		–	–	–	–	–		
Short circuit current	Isc	kA	12.5	16	20	12.5	16	20	
Short time withstand current	Ik/tk	kA/3 s	12.5	16	20	12.5	16	20	
Short-circuit making current	Ip	kA peak 50 Hz	31	40	50	31	40	50	
		60 Hz	32.5	41.5	52	32.5	41.5	52	

Common characteristics according to IEC 62271-100		
Rated switching sequence	O-3 min-CO-3 min-CO	■
	O-0.3 s-CO-3 min-CO	■
	O-0.3 s-CO-15 s-CO	■
Operating times	Opening ms	< 50
	Breaking ms	< 60
	Closing ms	< 85
Mechanical endurance	Class	M2
	Number of switching operations	10 000
Electrical endurance	Class	E2
Number of switching operations at full Isc value	12.5 kA	100
	16 kA	100
	20 kA	100
Capacitive current breaking capacity	Class	C1-C2 (for certain applications)
Service temperature		– 25°C to 40°C
Average relative humidity	over 24 h	< 95%
	over 1 month	< 90%

■ Available
– Not available

MV connection

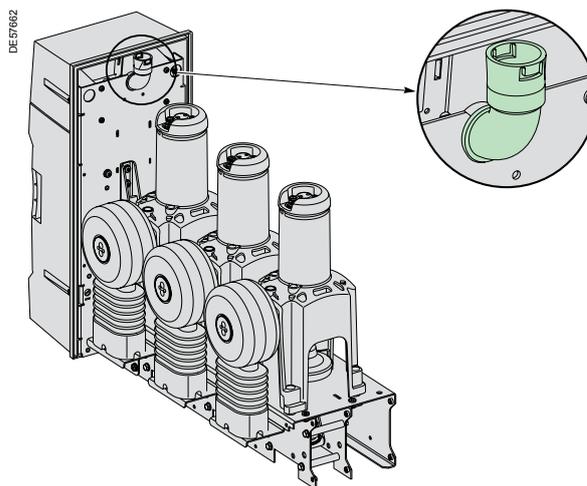
The base circuit breaker is equipped with copper connection terminals with drilled holes.
The customer connection is carried out easily from outside the circuit breaker on these connection terminals.



Connection configurations that have undergone type testing are shown in the Installation Guide.

LV connection

The circuit breaker's LV wiring must be directly connected to the terminal on the control mechanism via a protection sheath.



Description of functions

RI stored energy operating mechanism

Wiring diagram

PEE7104



Operation of the RI stored energy operating mechanism

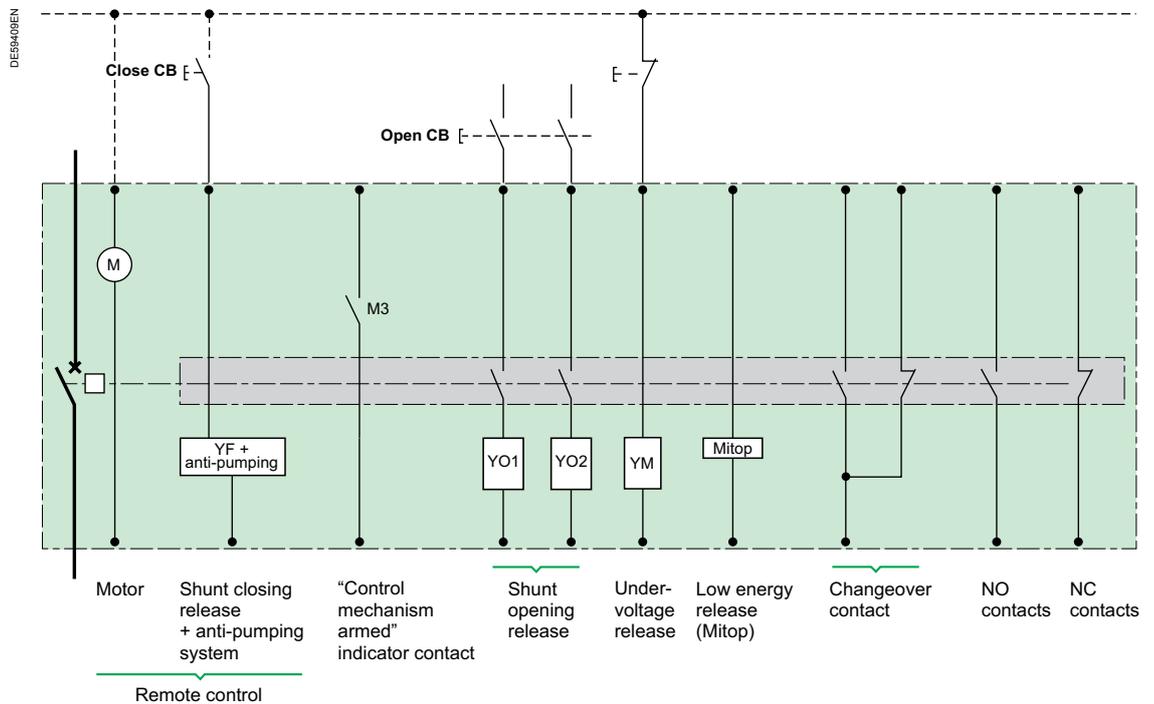
This gives the device an opening and closing speed that is independent of the operator whether the order is electrical or manual.

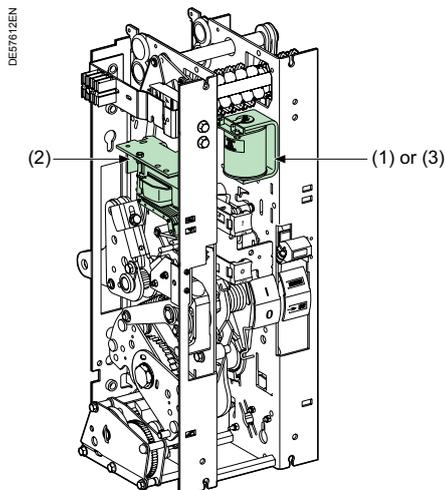
The electrical control mechanism carries out reclosing cycles and is automatically recharged by a geared motor each time after closing.

It consists of:

- the stored energy operating mechanism which stores in springs the energy required to open and close the device
- a manual lever-operated spring arming device
- a geared electrical arming device which automatically re-arms the control mechanism as soon as the circuit breaker is closed (optional)
- manual order devices by push buttons on the front panel of the device
- an electrical remote closing device containing a release with an antipumping relay
- an electrical opening order device comprising one or several release units which can be of the following type:
 - shunt opening
 - undervoltage
 - Mitop, a low consumption release, used only with the Sepam 100 LA protection relay.
- an operation counter
- an "open/closed" position indicator device with a mechanical indicator
- a device for indicating "charged" operating mechanism status by mechanical indicator and electrical contact (optional)
- a module of 14 auxiliary contacts whose availability varies according to the diagram used..

Wiring diagram (principle)

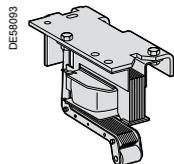




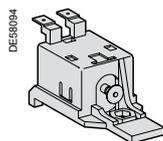
Operating mechanism



Shunt opening release (1)



Undervoltage release (2)



Low energy release (3)

Composition

In its basic version, the circuit breaker includes a low energy release (Mitop).

In addition, the opening circuit can be produced using the following components:

■ shunt opening release (YO1)

■ undervoltage release (YM).

An external power supply is necessary in this case.

Note: see the table of the releases' combinations on the "Order form" page.

Shunt opening release (YO1 and YO2)

Energizing this release causes instant opening of the circuit breaker.

Characteristics

Power supply	See "Order form" page	
Threshold	V AC	0.85 to 1.1 Ur
	V DC	0.7 to 1.1 Ur
Consumption	V AC	160 VA
	V DC	50 W

Undervoltage release (YM)

This release unit causes the systematic opening of the circuit breaker when its supply voltage drops below a value less than 35% of the rated voltage, even if this drop is slow and gradual. It can open the circuit breaker between 35% and 70% of its rated voltage. If the release unit is not supplied power, manual or electrical closing of the circuit breaker is impossible. Closing of the circuit breaker is possible when the supply voltage of the release unit reaches 85% of its rated voltage.

Characteristics

Power supply	See "Order form" page		
Threshold	Opening	0.35 to 0.7 Ur	
	Closing	0.85 Ur	
Consumption	Triggering	V AC	400 VA
		V DC	100 W
	Latched	V AC	100 VA
		V DC	10 W

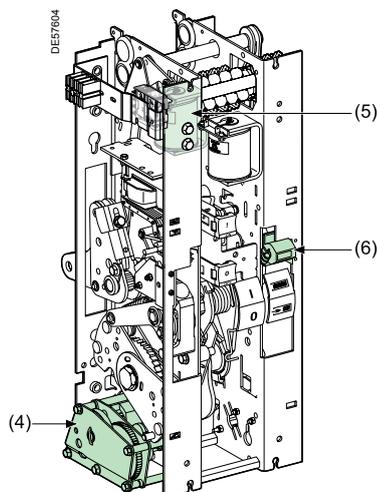
Low energy release (Mitop)

This release includes a low consumption unit and is specifically used with the Sepam 100LA self-powered relay ("REFLEX MODULE"), or the VIP relay.

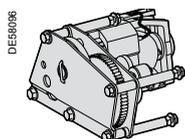
Characteristics

Power supply	Direct current
Threshold	$0.6 A < I < 3 A$

Any tripping due to the Mitop release unit is momentarily indicated by an SDE type changeover contact (option)..



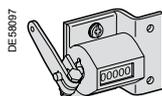
Operating mechanism



Electrical motor and gearing (4)



Shunt closing release (5)



Operation counter (6)

Function

Remote control enables the remote opening and closing of the circuit breaker.

Composition

The remote control mechanism comprises:

- an electrical motor with gearing
- a shunt closing release (YF) combined with an anti-pumping device
- an operation counter.

Electrical motor with gearing (M)

The electrical motor carries out the automatic rearming of the stored energy unit as soon as the circuit breaker is closed. This allows the instant reclosing of the device after opening. The arming lever is only used as a backup operating mechanism in the case of the absence of the auxiliary power supply.

The M3 contact indicates the end of arming operations.

Characteristics

Power supply	See "Order form" page	
Threshold	V AC/V DC	0.85 to 1.1 Ur
Consumption	V AC	380 VA
	V DC	380 W

Shunt closing release (YF)

This release allows the remote closing of the circuit breaker when the operating mechanism is armed.

Characteristics

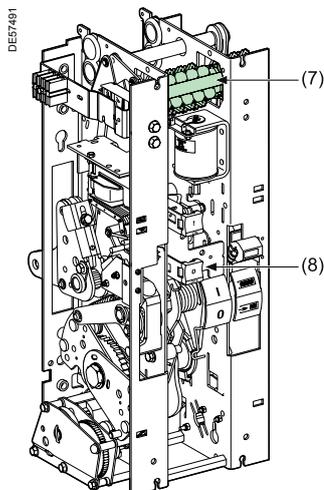
Power supply	See "Order form" page	
Threshold	V AC	0.85 to 1.1 Ur
	V DC	0.85 to 1.1 Ur
Consumption	V AC	160 VA
	V DC	50 W

The shunt closing release is combined with an anti-pumping relay that enables priority to be given to opening in the case of a permanent closing order. This thus avoids the device being caught in an uncontrolled opening-closing cycle.

Operation counter

The operation counter is visible on the front panel.

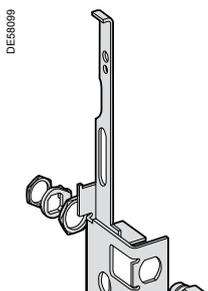
It displays the number of switching cycles (CO) that the device has carried out.



Operating mechanism



Auxiliary contacts (7)



Keylocking kit (8)

“Open/closed” auxiliary contacts

The number of contacts available depends on the options chosen on the operating mechanism.

In the basic configuration, the circuit breaker’s operating mechanism comprises a total of:

- 6 normally closed contacts (NC)
- 7 normally open contacts (NO)
- 1 changeover contact (CHG).

The usage procedure for auxiliary contacts is given in the following table:

Options	NC contact	NO contact
Remote control	1	1
Shunt opening release (each one) YO1/YO2	0	1
Undervoltage release YM	0	0
Low energy release (Mitop)	0	0

To know the final number of available contacts, you must deduct the total number of contacts included in the circuit breaker (6 NC + 7 NO + 1 CHG), the number of contacts used given in the table above.

E.g.: a circuit breaker equipped with a remote control and a shunt trip unit has the following available contacts:

6 NC + 5 NO + 1 CHG.

With a undervoltage release instead of the shunt trip, this circuit breaker would have the following available contacts:

6 NC + 6 NO + 1 CHG.

Contact characteristics

Rated current		10 A
Breaking capacity	AC	220 V ($\cos \varphi \geq 0.3$)
	DC	110/220 V ($L/R \leq 0.02$ s)

Operating mechanism with electrical motor

Shunt opening release combination				
	1st release	Shunt opening release YO1	Undervoltage release YM	Mitop
2nd release				
Without		6NC + 5NO + 1CHG	6NC + 6NO + 1CHG	6NC + 6NO + 1CHG
Shunt opening release YO2		6NC + 4NO + 1CHG		
Undervoltage release YM		6NC + 5NO + 1CHG		
Mitop		6NC + 5NO + 1CHG	6NC + 6NO + 1CHG	

Locking of the circuit breaker in the “open” position

This locking system enables the fitting of a Profalux or Ronis captive key type keylock (right turn type keylock).

The keylock is not part of the kit but can be supplied as an option.

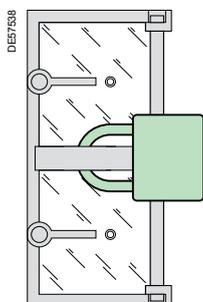
Push buttons padlock

This transparent screen blocks access to the opening and closing push-buttons on the circuit breaker.

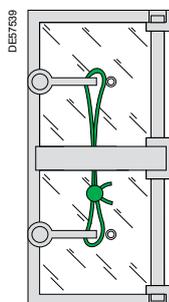
The device enables the opening or closing push button to be locked independently. It is often associated with an electrical motor.

Locking is achieved either:

- by 2 screws
- by 3 padlocks, not supplied
- by a lead seal.



Padlocking



Lead sealing

Protection, monitoring and control

EVOset: integrated protection chain by a VIP relay



EVOset with a VIP protection unit installed on the front panel



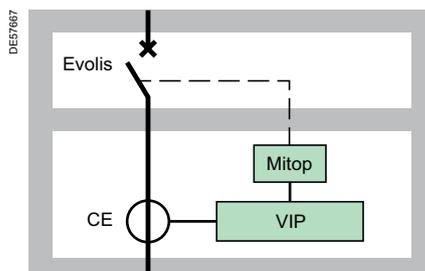
VIP300LL protection unit

The EVOset circuit breaker has an independent protection chain

The EVOset circuit breaker comprises an Evolis circuit breaker into which is integrated a protection chain comprising:

- a set of current sensors installed on the lower current terminals of the circuit breaker: type CEC, CEa or CEB
- a VIP protection relay mounted on the control unit: of type VIP30, VIP35, VIP300P or VIP300LL
- a "Mitop" low energy release installed on the circuit breaker operating mechanism.

The unit is fully independent and functions without an auxiliary power supply.



EVOset schematic diagram

Independent protection chain operating principle

The protection chain is supplied with power by sensors which supply:

- the "current" information", processed by the VIP protection unit
- the electrical power required for the whole protection chain to operate: VIP relay and Mitop release.

All settings are visible and accessible from the front of the device.

To achieve the indicated performance levels, the VIP relay must be used with the specified sensors. The combination of the unit/sensor is essential in order to comply with the indicated characteristics and in particular with:

- operation throughout the whole range
- trip times
- precision
- short circuit thermal withstand.

The sensors on each of the phases must be of the same type.

Hardware description for the VIP relay

The VIP relay is mounted in an injected polycarbonate casing which protects it against run off water and dusty atmospheres.

The front face is protected by a transparent cover with a seal.

This cover can be sealed to prohibit access to settings.

Settings are made with rotary switches. The phase service current and the earthing current limit are set directly in Amps. Therefore, the graduation on the front face must be adapted to the rating used on the sensor; this is achieved by a "graduation plate" must be positioned on the relay when fitted.

Connection is carried out at the rear of the relay using fast-on clips.

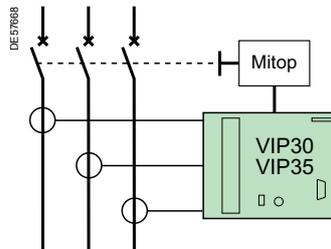
Protection, monitoring and control

VIP30 and VIP35 protection units

Use

Independent protection units VIP30 and VIP35 are intended for use on distribution networks, mainly in MV/LV substations where they provide upstream protection of the transformer.

These are independent relays that do not require any auxiliary power supply; they are powered by the current sensors. The relays directly actuate the "Mitop" release.



Simplified connection arrangement

The associated current sensors of type CEc give a setting range of (Is) 8 A to 200 A for the service current.

VIP30 relay

This provides protection against phase-to-phase faults.

The protection curve is similar to a fuse curve.

Phase protection is achieved using an inverse definite time threshold from 1.2 times the service current (Is).

VIP35 relay

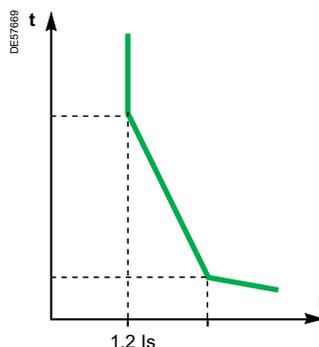
This provides protection against phase-to-phase faults and against earthing faults:

- the phase protection is identical to the VIP30
- the earthing fault protection functions with the measurement of residual current calculated from the sum of the sensor secondary currents.

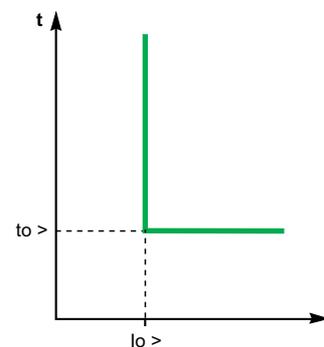
This measurement is made by a CSH30 core balance CT mounted at the back of the VIP casing.

Earthing protection is definite time; its threshold and time delay can be adjusted.

Trip curves



VIP30/VIP35: phase protection curve

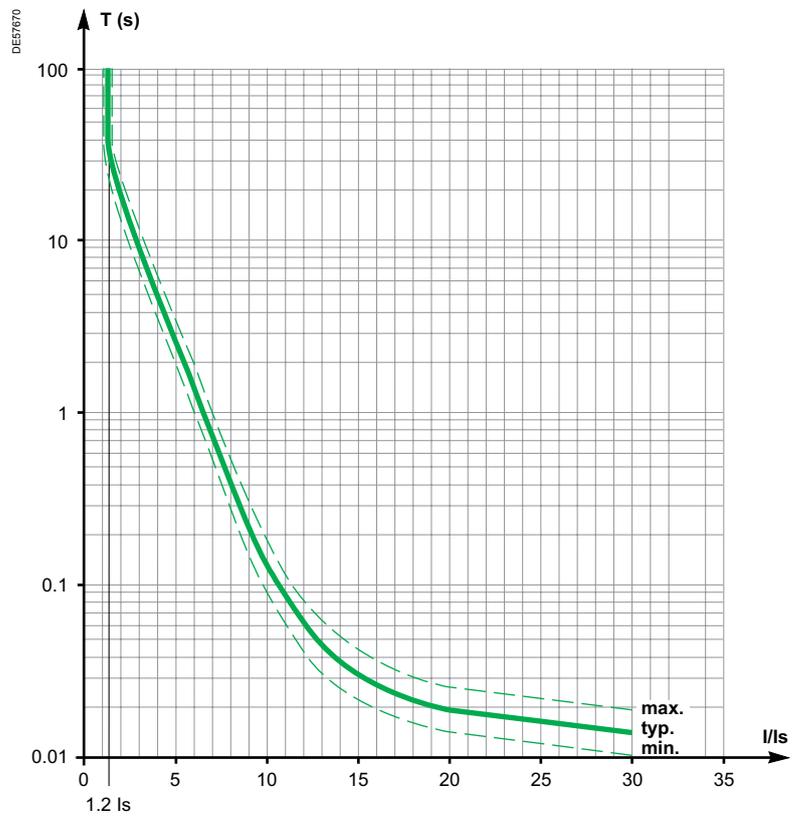


VIP35: earth protection curve

Protection, monitoring and control

VIP30 and VIP35 protection units (cont.)

Phase protection trip curve: VIP30 and VIP35



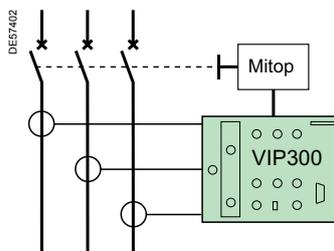
Protection, monitoring and control

VIP300P and VIP300LL protection units

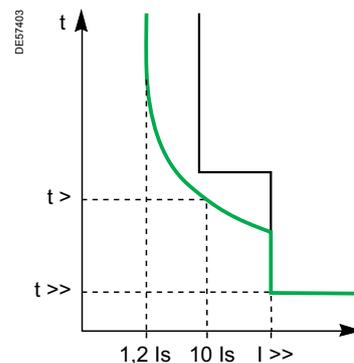
Use

Self powered protection units VIP300P and 300LL are intended for use on distribution networks. They can be used to protect MV/LV transformers, to protect the incoming of the industrial installation, but also to protect feeders.

These are self powered relays that do not require any auxiliary power supply; they are powered by the current sensors. The relays directly actuate the "Mitop" release.



Simplified connection arrangement



Phase and earthing protection curve

The associated current sensors of type **CEa** and **CEb** give a setting range for the service current (I_s) of 10 A to 1250 A.

VIP300P relay

This provides protection against phase-to-phase faults

Phase protection has two independently adjustable thresholds:

- the lower threshold can be chosen to be either definite time or inverse definite time. It can be executed according to the RI curve.
- the higher threshold is definite time.

The inverse definite time curves are in conformity with standard IEC 60255-3.

They are either of type inverse (SI), very inverse (VI) and extremely inverse (EI).

VIP300LL relay

This provides protection against phase-to-phase faults and against earthing faults:

- the phase protection is identical to the VIP300P
 - earthing fault protection functions with the measurement of residual current: this is carried out based on the sum of secondary currents in the sensors.
- As for phase protection, earthing protection has two independently adjustable thresholds.

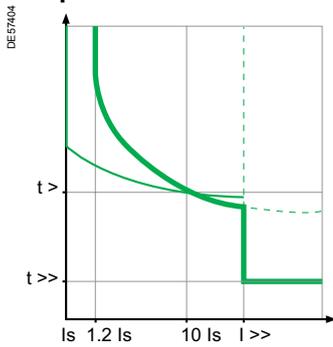
Indication

Two indicators show the origin of tripping (phase or earth).

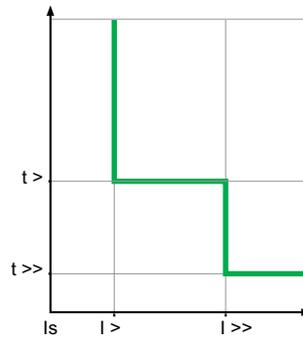
They stay in position after breaking the relay power supply.

Two LED indicator lights (phase and earth) show that the lower threshold has been exceeded and that the time delay has been started.

Trip curves

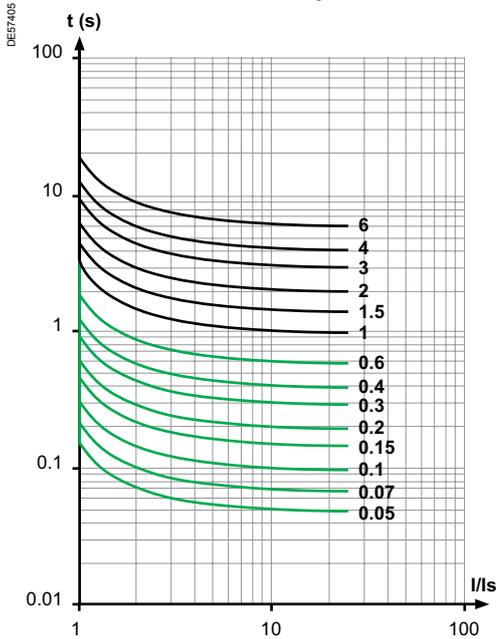


With an inverse definite time lower threshold

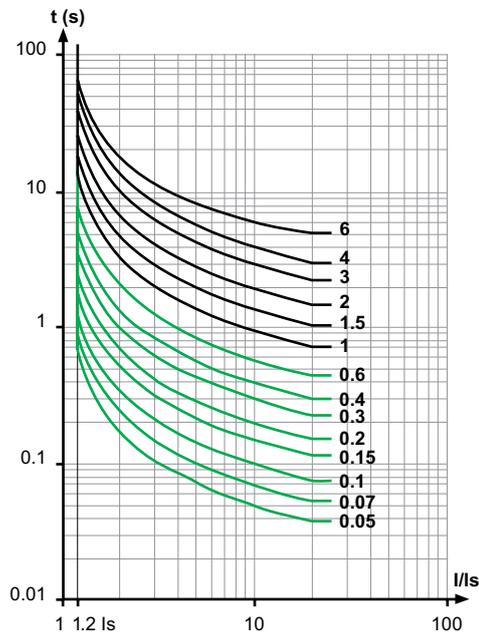


With a definite time lower threshold

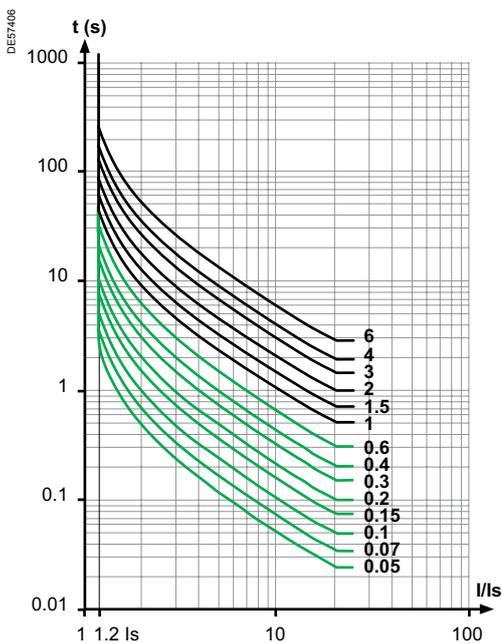
Inverse definite time trip curves



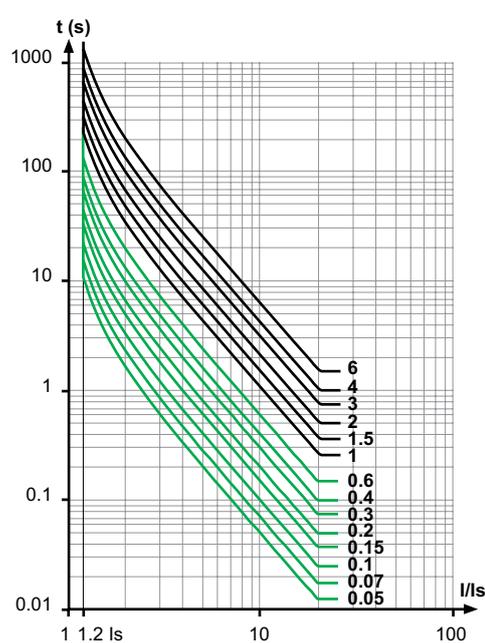
RI curve



SI curve



VI curve



EI curve

Protection, monitoring and control

Current sensors and test unit for VIP relays

PE59595



CE type current sensors

Current sensors for VIP relays

In order to achieve the specified performance levels, the protection relays must be used with the specified sensors. The relay/sensor pairing is indissociable in order to comply with characteristics and in particular:

- operation throughout the whole range
- response time
- precision
- short circuit thermal withstand.

Sensors choice	Relay	Service current (Is)
CEc	VIP30/VIP35	8 A to 200 A
CEa	VIP300P/VIP300LL	10 A to 200 A
CEb	VIP300P/VIP300LL	63 A to 1250 A

VAP6 test unit for VIP relays

VIP type protection units have a “test” socket to connect a VAP6 test unit. This portable unit with its own power supply enables the correct functioning of the protection relay to be checked.

PE59614



VAP6 test unit

Device

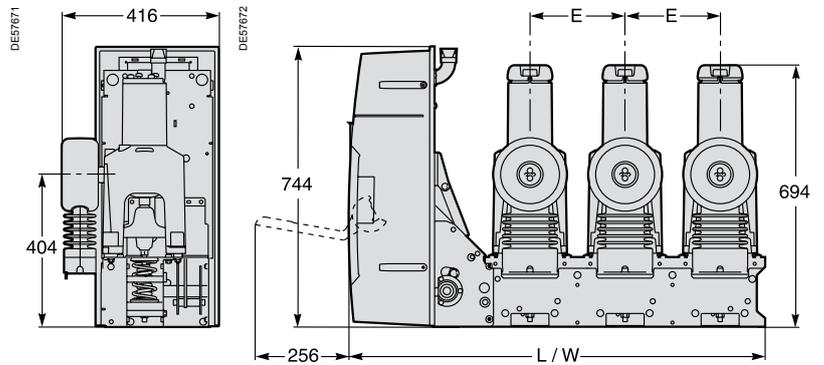
MV connection on the right hand side

Phase to phase distance E = 250 mm, L = 1095

Ur	Isc	Ir	Weight
24 kV	12.5 kA	630 A	120 kg
		1250 A	
	16 kA	630 A	
		1250 A	
	20 kA	630 A	
		1250 A	

Phase to phase distance E = 300 mm, L = 1195

Ur	Isc	Ir	Weight
24 kV	12.5 kA	630 A	120 kg
		1250 A	
	16 kA	630 A	
		1250 A	
	20 kA	630 A	
		1250 A	



Important

Detailed installation instructions are given in the "Evolis Installation Guide". Please consult us.

Only one of the boxes (ticked or filled by the needed value) have to be considered between each horizontal line.

Green box corresponds to none priced functions.

Releases combinations table

Mitop	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
YO1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
YM	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Basic fixed, lateral circuit breaker Quantity

Rated voltage Ur	(kV)	<input type="text" value="24"/>
Short circuit current Isc	(kA)	<input type="text"/>
Rated current Ir	(A)	<input type="text"/>
Phase to phase distance (mm)	250 <input checked="" type="checkbox"/>	300 <input checked="" type="checkbox"/>
Frequency	50 Hz <input checked="" type="checkbox"/>	60 Hz <input checked="" type="checkbox"/>
Colour for push buttons and indicators		
Push buttons open/closed:		Red/black <input checked="" type="checkbox"/>
Indicator open/closed:	Black/white <input checked="" type="checkbox"/>	Green/red <input checked="" type="checkbox"/>
Operating mechanism charged/discharged:	White/yellow <input checked="" type="checkbox"/>	Charged/discharged <input checked="" type="checkbox"/>

Circuit breaker options

VIP protection relay

VIP30 <input checked="" type="checkbox"/>	VIP35 <input type="checkbox"/>		
Service current	8-80 A <input checked="" type="checkbox"/>	20-200 A <input checked="" type="checkbox"/>	
VIP300P <input type="checkbox"/>	VIP300LL <input type="checkbox"/>		
Service current	10-50 A <input checked="" type="checkbox"/>	40-200 A <input checked="" type="checkbox"/>	
	63-312 A <input checked="" type="checkbox"/>	250-1250 A <input checked="" type="checkbox"/>	
VAP6 test unit for VIP relays			<input type="checkbox"/>

Opening release (see possible choices in combination table)

Shunt opening release YO1

24 Vdc <input type="checkbox"/>	110 Vdc <input type="checkbox"/>	220 Vdc <input type="checkbox"/>	110 Vac (50 Hz) <input type="checkbox"/>
48 Vdc <input type="checkbox"/>	125 Vdc <input type="checkbox"/>	220 Vac (50 Hz) <input type="checkbox"/>	120 Vac (60 Hz) <input type="checkbox"/>

Undervoltage release YM

24 Vdc <input type="checkbox"/>	110 Vdc <input type="checkbox"/>	220 Vdc <input type="checkbox"/>	110 Vac (50 Hz) <input type="checkbox"/>
48 Vdc <input type="checkbox"/>	125 Vdc <input type="checkbox"/>	220 Vac (50 Hz) <input type="checkbox"/>	120 Vac (60 Hz) <input type="checkbox"/>

Low energy release **Mitop** Without contact With contact

Remote control (operation counter already included)

Electrical motor M	24...32 Vdc <input type="checkbox"/>	110...127 Vdc/ac <input type="checkbox"/>
	48...60 Vdc/ac <input type="checkbox"/>	220...250 Vdc/ac <input type="checkbox"/>
Shunt closing release YF		
24 Vdc <input checked="" type="checkbox"/>	110 Vdc <input checked="" type="checkbox"/>	220 Vdc <input checked="" type="checkbox"/>
48 Vdc <input checked="" type="checkbox"/>	125 Vdc <input checked="" type="checkbox"/>	220 Vac (50 Hz) <input checked="" type="checkbox"/>
		110 Vac (50 Hz) <input checked="" type="checkbox"/>
		120 Vac (60 Hz) <input checked="" type="checkbox"/>

Operation counter (already included if remote control supplied)

Open position CB locking device (without lock)

Locking of the circuit breaker in the open position

Locks and keys	Profalux <input checked="" type="checkbox"/>	Ronis <input checked="" type="checkbox"/>
Push buttons padlock		<input type="checkbox"/>

The following components can be ordered separately and can be adapted or replaced by the customer.

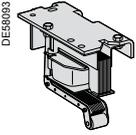
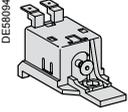
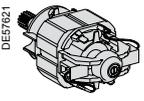
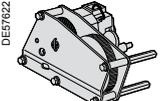
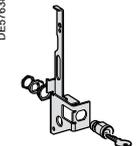
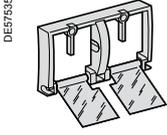
Remote control		Ref.	
Shunt opening release YO1 or YO2			
	24 Vdc	AAA10 115	
	48 Vdc	AAA10 116	
	110 Vdc	AAA10 117	
	125-127 Vdc	AAA10 118	
	220 Vdc	AAA10 119	
	110 Vac	50 Hz	AAA10 120
	220-230 Vac	50 Hz	AAA10 121
120 Vac	60 Hz	AAA10 122	
Shunt closing release YF			
	24 Vdc	AAA10 106	
	48 Vdc	AAA10 107	
	110 Vdc	AAA10 108	
	125-127 Vdc	AAA10 109	
	220 Vdc	AAA10 110	
	110 Vac	50 Hz	AAA10 111
	220-230 Vac	50 Hz	AAA10 112
120 Vac	60 Hz	AAA10 113	
Undervoltage release YM			
	24 Vdc	AAA10 124	
	48 Vdc	AAA10 125	
	110 Vdc	AAA10 126	
	125-127 Vdc	AAA10 127	
	220 Vdc	AAA10 128	
	110 Vac	50 Hz	AAA10 129
	220-230 Vac	50 Hz	AAA10 130
120 Vac	60 Hz	AAA10 131	
Low energy release Mitop			
	Without contact	0889308A	
	With contact	0889308B	
Electrical motor			
	24...32 Vdc	AAA10 027	
	48...60 Vac/dc	AAA10 028	
	100...127 Vac/dc	AAA10 029	
	220...250 Vac/dc	AAA10 030	
	Gear reducer	AAA10 065	
Locking/interlocking		Ref.	
	Open position CB locking device (without lock) (fig. 1)	AAA10 092	
	Ronis lock	AAA10 058	
	Profalux lock	AAA10 059	
	Push buttons padlock (fig. 2)	48536	
			

Fig. 1

Fig. 2

The following components can only be adapted or replaced on site by staff trained by Schneider Electric

- Remote control mechanism (comprising: electrical motor, gearing, shunt closing release, anti-pumping relay, operation counter)
- Operation counter
- Low energy release (Mitop)
- Circuit breaker front cover.

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