Medium Voltage Distribution

Evolis circuit breakers 17.5 kV

vacuum breaking
fixed and withdrawable versions

Catalogue
2014

Schneider Electric

General contents

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.

PE58083

Evolis 17.5 kV fixed, frontal version

PE58084

Evolis 24 kV fixed, frontal version (*)

PE58085

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

PE58086

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

(*) The Evolis 24 kV offer is covered in a separate catalog (ref. AMTED307011EN).

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.

PE57994

Evolis 17.5 kV withdrawable, frontal version in NEX cradle

PE58001

Evolis 24 kV withdrawable, frontal version in NEX cradle (*)

PE58089

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.

PE58090

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

(*) The Evolis 24 kV offer is covered in a separate catalog (ref. AMTED307011EN).

Evolis
The very best of vacuum technology

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.

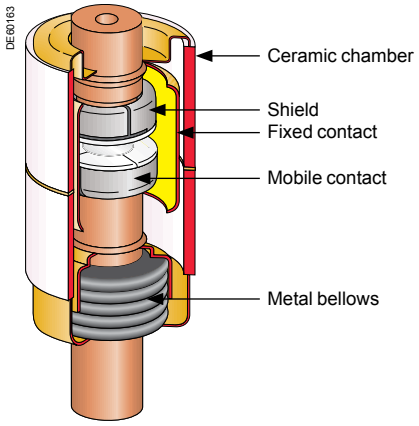


Fig. 1: vacuum interrupter components

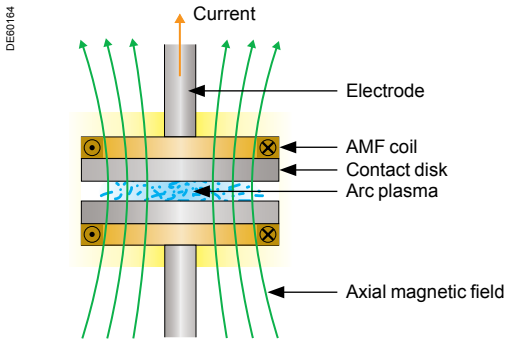


Fig. 2: cross-section of AMF contact

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.

Evolis
The very best of vacuum technology (cont.)

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.

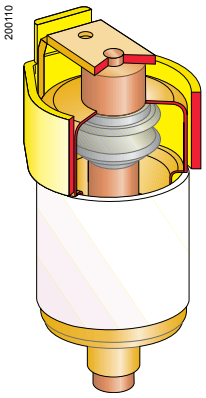


Fig. 4: 17.5 kV external coil type interrupter

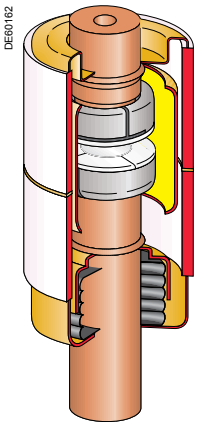


Fig. 5: 24 kV internal coil type interrupter

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 (Uarc 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.

Evolis
The very best of vacuum technology (cont.)

PE55694

Vacuum interrupter

PE55695

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).

DE55745

AFAQ ISO 9001 VERSION 2000

DE55746

AFAQ ISO 14001

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.

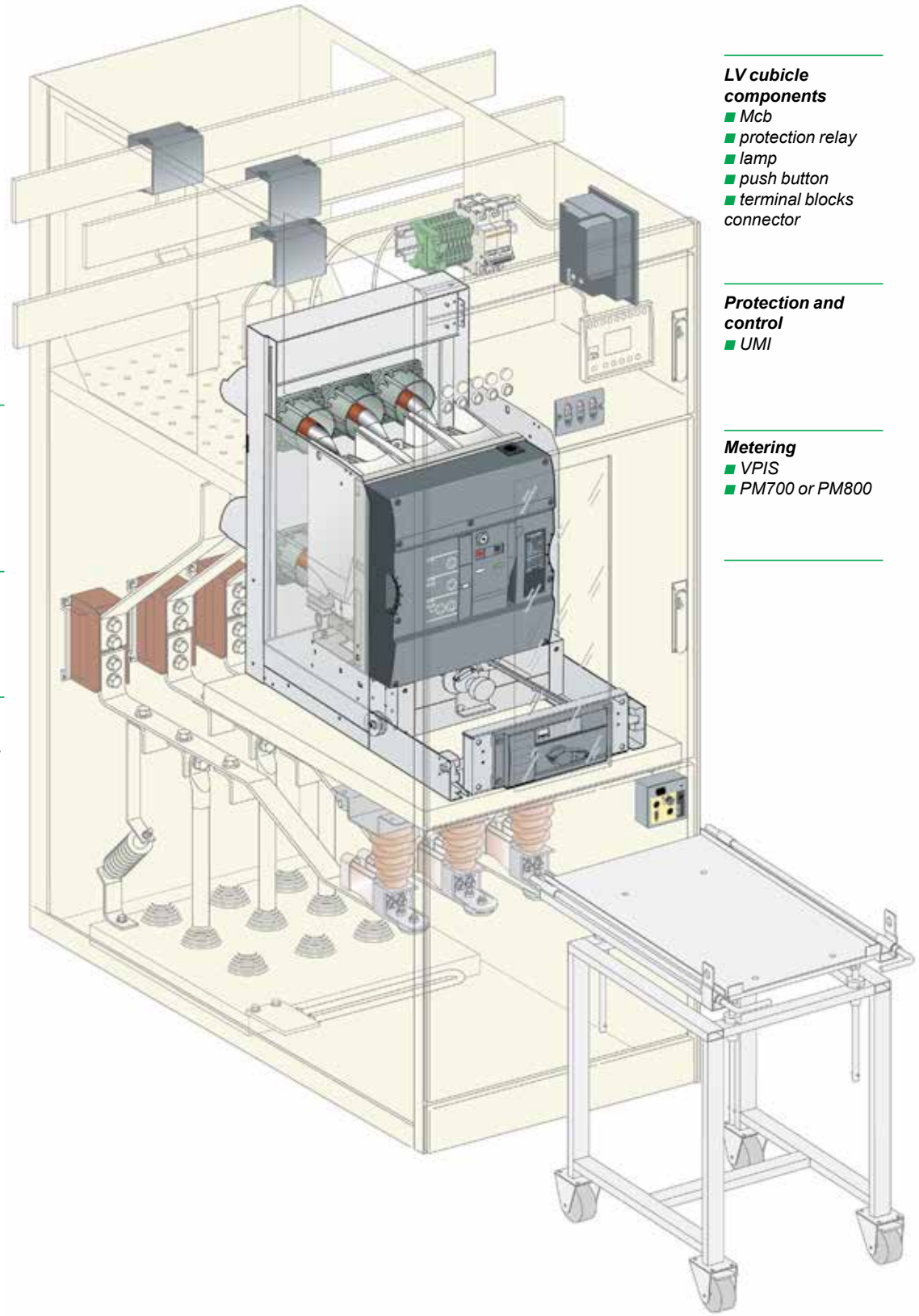
Environmental care

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.

Evolis
Extended products offer

PE58082



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*

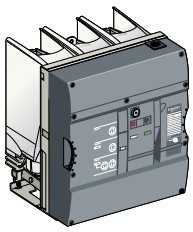
Protection and control
- *UMI*

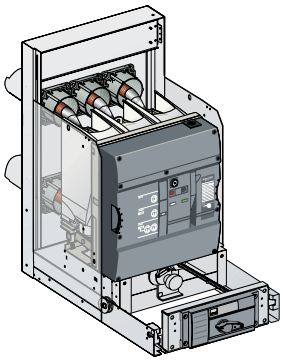
Metering
- *VPIS*
- *PM700 or PM800*

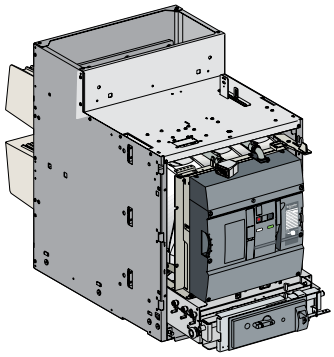
Evolis circuit breakers

Circuit breakers

Evolis from 7.2 kV to 17.5 kV



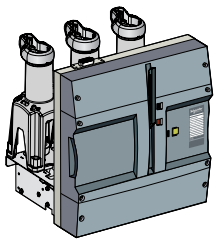


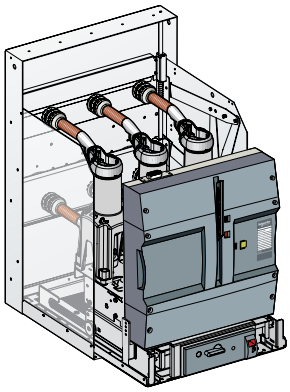


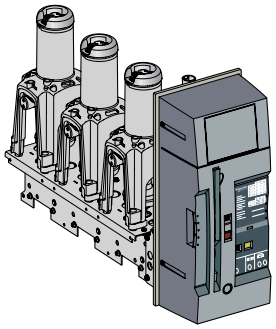
Fixed version Operating mechanism on the front	**Withdrawable version** in NEX cradle Operating mechanism on the front	**Withdrawable version** in MC cassette Operating mechanism on the front
Rated voltage Ur (kV, 50/60 Hz)		
7.2 / 12 / 17.5	7.2 / 12 / 17.5	7.2 / 12 / 17.5
Short circuit rated breaking capacity (Isc)		
from 25 to 31.5 kA	from 25 to 31.5 kA	from 25 to 31.5 kA
Rated current (Ir)		
from 630 to 2500 A	from 630 to 2500 A	from 630 to 2500 A

Evolis circuit breakers (cont.)

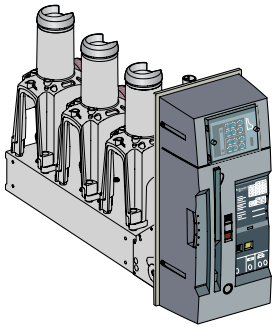
Evolis 24 kV







EVOset 24 kV



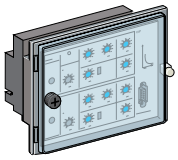
Fixed version Operating mechanism on the front	**Withdrawable version** Operating mechanism on the front	**Fixed version** Operating mechanism on the side	**Fixed version** Integrated protection system Operating mechanism on the side
Rated voltage Ur (kV, 50/60 Hz)			
24	24	24	24
Short circuit rated breaking capacity (Isc)			
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 (Ir)			
from 630 to 2500 A	from 630 to 2500 A	630 and 1250 A	630 and 1250 A

Separate catalogue

Evolis circuit breakers (cont.)

Protection, monitoring and control

Protection



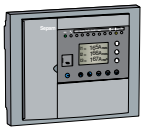
VIP30
for phase protection

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

Contents

Presentation

PE58083

Evolis circuit breaker 17.5 kV fixed 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 P2 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:

- a supporting frame equipped with rollers and ground fixing brackets for fixed installation
- circuit breaker locking in the open position by a keylock installed on the front plate of the operating mechanism
- a 18-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 from 7.2 to 17.5 kV.

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

Main characteristics


PE58083

Electrical characteristics according to IEC 62271-100

Phase to phase		mm		145			
Rated voltage	**Ur**	kV 50/60 Hz		7.2		12	
Insulation level							
- power frequency withstand	**Ud**	kV 50 Hz 1 min(1)		20		28	
- lightning impulse withstand	**Up**	kV peak		60		75	
Rated current	**Ir**	A	630	■	■	■	■
			1250	■	■	■	■
			1600 (2)	–	–	–	–
			2500 (2)	–	–	–	–
Short circuit current	**Isc**	kA		25	31.5	25	31.5
Short time withstand current	**Ik/tk**	kA/3 s		25	31.5	25	31.5
Short-circuit making current	**Ip**	kA peak	50 Hz	63	79	63	79
			60 Hz	65	82	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	< 50 ms
		Breaking	< 60 ms
		Closing	< 65 ms
Service temperature	**T**	°C	– 25 to + 40
Mechanical endurance		Class	M2
		Number of switching operations	10 000
Electrical endurance		Class	E2
Number of switching operations at full Isc value		25 kA	100
		31.5 kA	50
Capacitive current breaking capacity		Class	C1
Average relative humidity		Over 24 h	< 95%
		Over 1 month	< 90%

Switching and protection of capacitor banks

Evolis range circuit breakers are well suited for switching and protection of capacitor banks with installed power up to 2 Mvar installed in series with dampening reactor limiting inrush current to 2 kA.

Evolis is also well suited for capacitor banks system with installed power higher than 2 Mvar in conjunction with anti-harmonic filtering system.

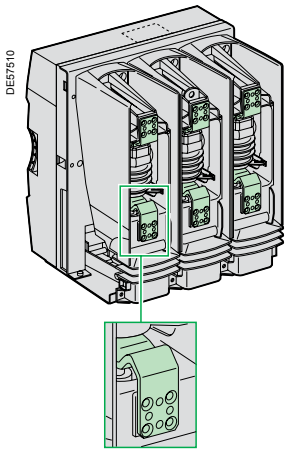
Please consult us.

Main characteristics (cont.)

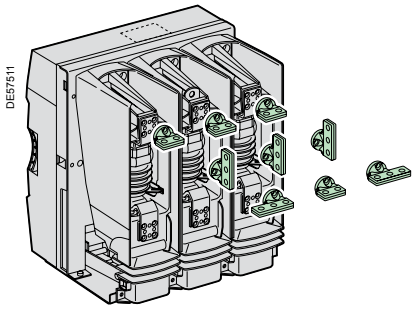
	185						**240**					
	7.2		12		17.5		7.2		12		17.5	
	20		28		38		20		28		38	
	60		75		95		60		75		95	
	■	■	■	■	■	■	–	–	–	–	–	–
	■	■	■	■	■	■	–	–	–	–	–	–
	■	■	■	■	–	–	–	–	–	–	–	–
	–	–	–	–	–	–	■	■	■	■	■	■
	25	31.5	25	31.5	25	31.5	25	31.5	25	31.5	25	31.5
	25	31.5	25	31.5	25	31.5	25	31.5	25	31.5	25	31.5
	63	79	63	79	63	79	63	79	63	79	63	79
	65	82	65	82	65	82	65	82	65	82	65	82

(1) Circuit breaker tested at Ud 42 kV 50 Hz, 1 min
(2) Class M1: 2000 operations for Ir = 1600 A and 2500 A
■ *Available*
– *Not available.*

Description of functions
MV connection



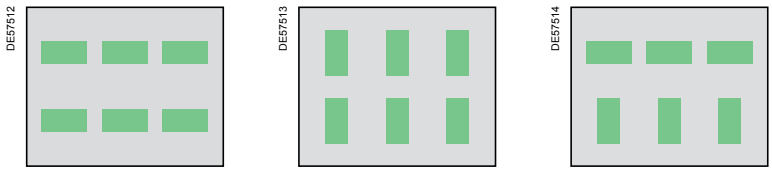
Connection terminal



3 connector sets

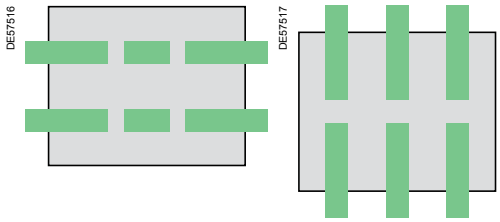
Composition
The basic circuit breaker is equipped with drilled copper connection terminals, at the top and bottom of the breaking units.
The connectors are fitted to the terminals using the corresponding bolts.
Several variants are possible.

Fixed connectors
Horizontal connectors (H) **Vertical connectors (V)** **Mixed connectors**



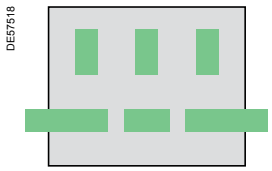
An adjustable connector enables the vertical distance to be increased to enable rotation of 90°.

Adjustable gap connectors
Extendable connectors horizontal (H) **Extendable connectors vertical (V)**



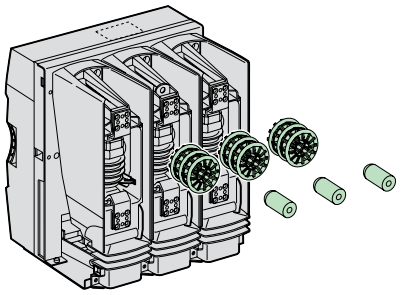
An adjustable connector enables the connection distance to be increased from 0 to 25 mm.

Mixed solution
Example

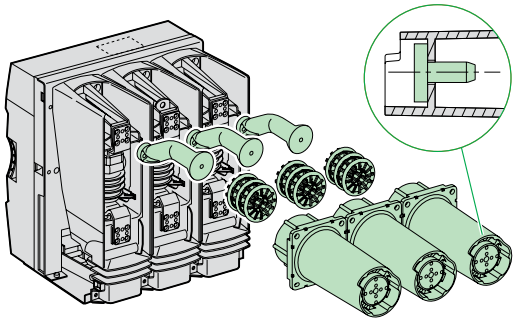


Comment:
The insulation withstand values given in the performance table, do not take account of the connectors.
With these connectors it is possible to use unplated or tin-plated copper conductors or tin-plated aluminium conductors, without any specific precautions being required.
The shape and dimensions of these conductors must be determined by the panel builder according to the dielectric withstand and temperature rise characteristics of the whole connection system.
Typical examples are provided in the Installation Guide.

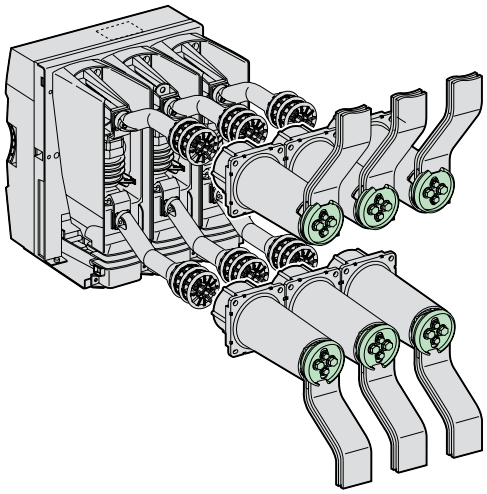
Description of functions
MV connection (cont.)



Clusters and fingers



Arms and bushings



Arms, clusters, fingers and bushings, busbars and field deflectors

Composition
Panels builders with own cubicle designs (including the racking truck) can transform a fixed device into a withdrawable device by adding the following assemblies:
- arms
- clusters
- fingers
- bushings
- field deflectors.

Cluster and finger
- The tulip type cluster has a shape which provides maximum contact surface whilst optimising heat dissipation. Moreover, in the case of short-circuit, it offers good compensation characteristics for electrodynamic forces.
- The finger is a component designed specifically for the cluster, regarding its shape, tolerances and materials. Contact between the finger and the cluster is guaranteed by type testing: 1000 racking in-out operations.

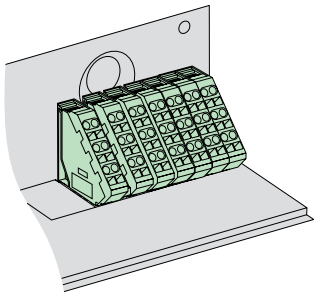
Arm and bushing
- The arms cylindrical shape optimizes dielectric strength and avoids the need for any additional insulation.
- The bushing's cylindrical shape gives it outstanding dielectric strength.
- The previously described connectors can be mounted on bushing connection terminals.

Comment:
Performance levels of the whole assembled unit must be tested by the panel builder. Installation conditions for the two units presented above are described in the Installation Guide.
For the 17.5 kV withdrawable circuit breaker, phase to phase distance 185 mm, field deflectors must be added to the bushings.

Field deflectors
For circuit breakers with a rated voltage of Ur = 17.5 kV with a phase to phase distance of 185 mm, field deflectors are used to increase the dielectric strength by 75 kV to 95 kV.

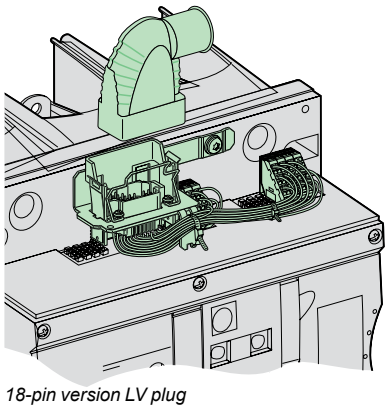
Description of functions
LV connection

DE57522



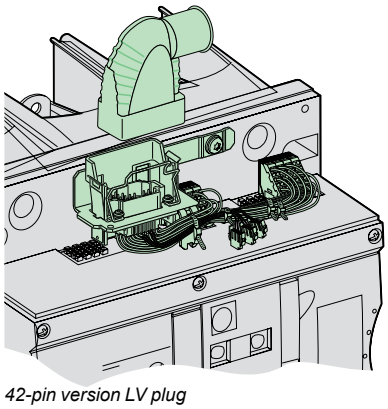
LV terminal block

DE57523



18-pin version LV plug

DE57524



42-pin version LV 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 18-pin version, enabling connection of:
■ a shunt opening release MX1
■ a remote control mechanism (electrical motor, shunt closing release XF, anti-pumping relay)
■ a "ready to close" contact PF
■ a maximum number of 4 auxiliary contacts.
(see "indication" page, "Open/closed position auxiliary contacts" chapter).

An 24-pin version, enabling connection of:
■ an opening release (shunt type MX1 or undervoltage type MN)
■ a second opening release (shunt type MX2 or undervoltage type MN)
■ a low energy release (Mitop)
■ a fault trip indicator contact SDE
■ a remote contact reset system SDE
■ a remote control mechanism (electrical motor, shunt closing release XF)
■ a "ready to close" contact PF
■ a maximum number of 11 auxiliary contacts.
(see "indication" page, "Open/closed position auxiliary contacts" chapter).

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

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
P2 stored energy operating mechanism
Wiring diagram

PE56600

Operation of the P2 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:

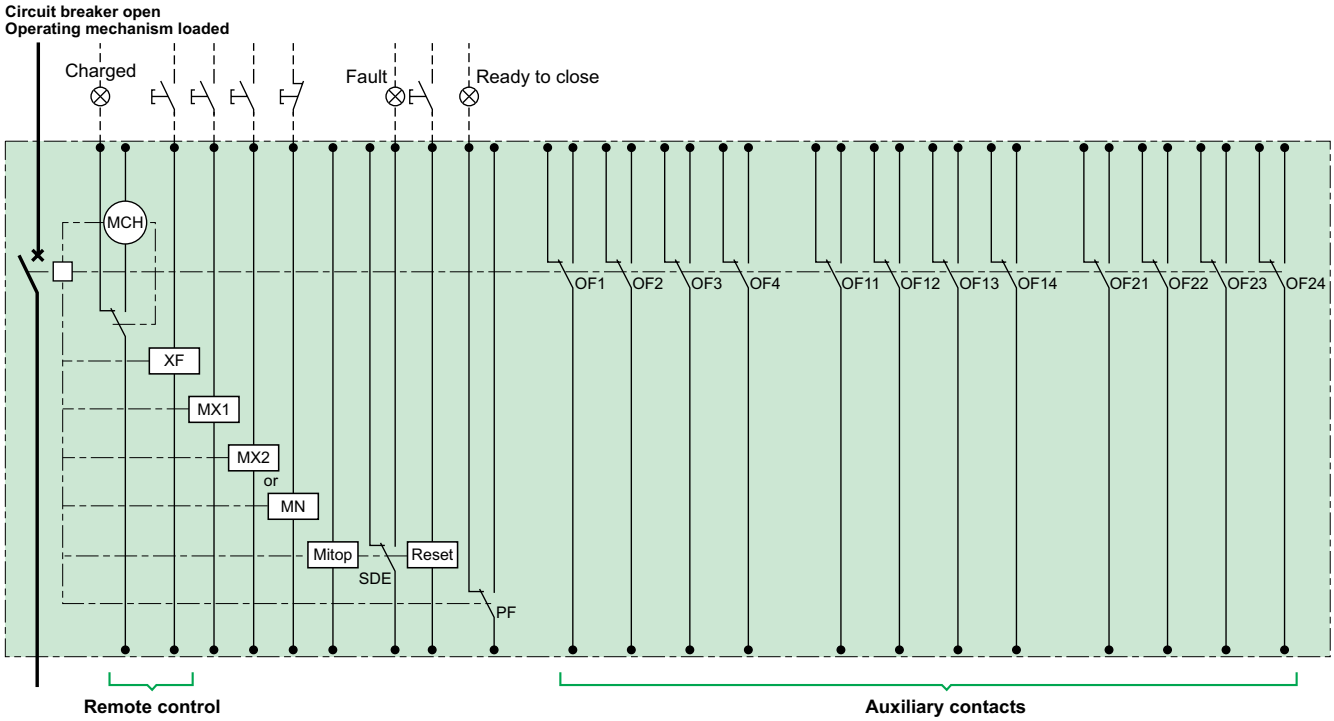
- ■ the stored energy operating mechanism which stores in springs the energy required to open and close the device
- ■ a gear motor electrical charging device with manual charging by lever (useful on loss of auxiliary supply)
- ■ manual order devices by push buttons on the front panel of the device
- ■ an electrical remote closing device containing a release with an antipumping relay
- ■ an electrical opening device containing one or more releases, for example:
  - □ shunt opening
  - □ undervoltage
  - □ Mitop, a low consumption release, used only with the Sepam 100 LA protection relay.
- ■ an operation counter
- ■ a position indication device by mechanical indicator

and 3 modules of 4 auxiliary contacts whose availability varies according to the diagram used

- ■ a device for indicating “charged” operating mechanism status by mechanical indicator and electrical contact.

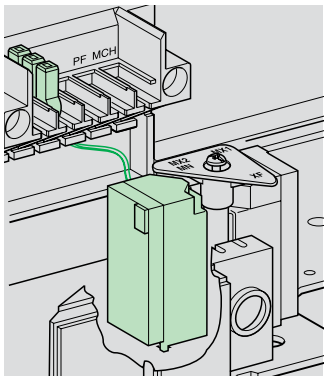
Wiring diagram (principle)

DE59408EN



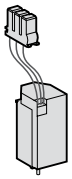
Description of functions
Opening circuit

DE58081



Circuit breaker equipped with a shunt opening release MX

DE58082



Shunt opening release (MX1 and MX2)

Composition

The opening circuit is produced using the following components:
- a shunt opening release (MX1)
- a second shunt opening release (MX2)
- undervoltage release (MN)
- time delayed undervoltage release (MNR: MN + time delay).

The time delay, placed outside the circuit breaker, can be disabled by an emergency stop button to give instant circuit breaker opening.
- low energy release (Mitop).

***Note**: see the table of the releases' combinations on the following page.*

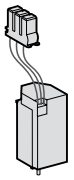
Shunt opening release (MX1 and MX2)

Energizing this release causes instant opening of the circuit breaker.
Permanent power supply to the MX unit locks the circuit breaker in the "open" position.

Characteristics		
Power supply	See "Order form" page	
Threshold	0.7 to 1.1 Ur	
Consumption (VA or W)	Triggering	200 (for 200 ms)
	Latched	4.5

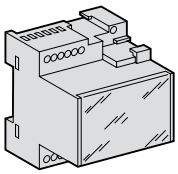
Description of functions
Opening circuit (cont.)

DE58082



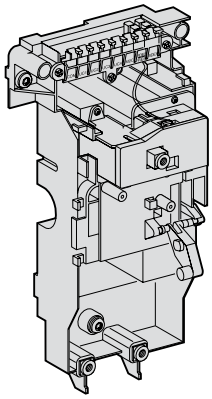
Undervoltage release (MN)

DE58083



Time delay for undervoltage release (MN)

DE58084



Low energy release (Mitop)

Undervoltage release (MN)

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 (VA or W)	Triggering	200 (for 200 ms)
	Latched	4.5

Time delay for MN

To eliminate spurious tripping of the circuit breaker when there are brief voltage drops, the MN action is controlled with a time delay.
This function is achieved by adding a time delay unit outside of the undervoltage release (MN) circuit (adjustable time delay).
This unit is placed outside the circuit breaker and can be inhibited by an emergency stop button to obtain instant circuit breaker opening.

Characteristics		
Power supply	See “Order form” page	
Threshold	Opening	0.35 to 0.7 Ur
	Closing	0.85 Ur
Consumption (VA or W)	Triggering	200 (for 200 ms)
	Latched	4.5
Time delay	0.5 s - 0.9 s - 1.5 s - 3 s	

Low energy release (Mitop)

This release includes a low consumption unit and is specifically used with the Sepam 100LA self-powered unit (“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, provided with the Mitop.
This release also includes a coil (reset) enabling remote SDE contact reset.

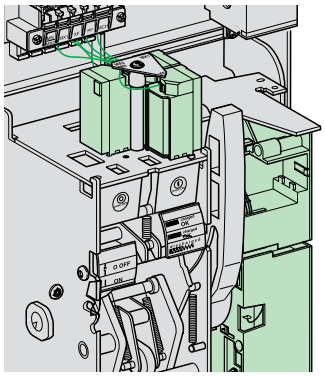
Comment:
Use of the Mitop low energy release requires adjustment of the protection relay time delay in order to ensure that the circuit breaker trips between 45-50 ms.

Releases combinations table

Shunt opening MX1	1			1	1	1		1	1
Shunt opening MX2				1				1	
Undervoltage MN		1			1		1		1
Mitop			1			1	1	1	1

Description of functions
Remote control

DE58085



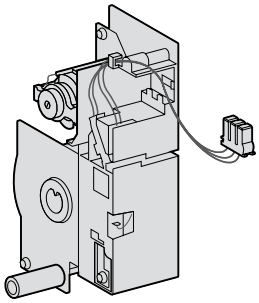
Circuit breaker equipped with remote control

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

The opening order always takes priority over the closing order.
In the event of simultaneous opening and closing orders, the mechanism discharges under no load, without moving the main contacts. The circuit breaker remains in the “open” position.
In the event of latched opening and closing orders, the mechanism carries out anti-pumping function as standard, by blocking the circuit breaker in the “open” position.
Anti-pumping function: after opening on a fault or deliberate opening via the manual or electrical mechanism, the closing order must be interrupted then reactivated to enable reclosing of the circuit breaker.

Composition
The remote control comprises:
- an electrical motor (MCH) equipped with a “spring armed” CH limit switch
- a shunt closing release (XF).

DE58086

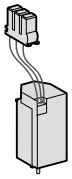


Electrical motor MCH

Electrical motor (MCH)
The electrical motor carries out the automatic rearming of the storage energy springs as soon as the circuit breaker closes. This allows instant reclosing of the device after opening. The arming lever is only used as a backup control in the case of the absence of the auxiliary power supply.
An electrical motor (MCH) equipped with a “spring armed” CH limit switch.
This contact indicates the “armed” position of the mechanism (springs armed).
Electrical motor is always inclusive of gear reducer.

Characteristics	
Power supply	See “Order form” page
Threshold	0.85 to 1.1 Ur
Consumption (VA or W)	180
Motor overcurrent	2 to 3 In for 0.1 s
Arming time	6 s maximum
Operating rate	3 cycles maximum per minute
CH contact	10 A/240 V

DE58082



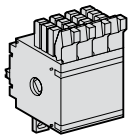
Shunt closing release XF

Shunt closing release (XF)
This release allows remote closing of the circuit breaker when the control mechanism is armed. It can be permanently or briefly supplied power.

Characteristics XF		
Power supply	See “Order form” page	
Threshold	XF	0.85 to 1.1 Ur
Consumption (VA or W)	Triggering	200 (for 200 ms)
	Latched	4.5

Description of functions
Indication

DE58087



Rotary type contacts (OC)

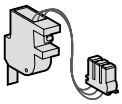
"Open/closed" auxiliary position contacts (OC)

These auxiliary contacts indicate the "open" or "closed" position of the circuit breaker.
■ Rotary type changeover contacts directly controlled by the circuit breaker mechanism.
■ Indicator contacts are proposed:
□ for standard relaying applications
□ for low level control applications with plc's or electronic circuits.
This version is compatible with Sepam series 20-40-80 units.

Characteristics			
Standard delivery			4
Maximum quantity			12
Breaking capacity (A)	Standard		Min. load: 100 mA/24 V
Cos φ: 0.3	V AC	240/380	10/6 *
CA12/DC12		480	10/6 *
		690	6
	V DC	24/48	10/6 *
		125	10/6 *
		250	3
	Low level		Min. load: 2 mA/15 V DC
	V AC	24/48	6
		240	6
		380	3
	V DC	24/48	6
		125	6
		250	3

** Standard contacts: 10 A; optional contacts: 6 A (temperature derating)*

DE58088



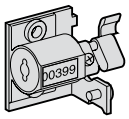
"Ready to close" PF contact

"Ready to close" PF contact

The circuit breaker is "ready to close" when shown by a mechanical indicator and a PF changeover contact.
This information simultaneously indicates that:
■ the circuit breaker is open
■ the storage energy springs are armed
■ there is no permanent closing order
■ there is no permanent opening order caused by:
□ a safety opening order (2nd MX or MN)
□ keylocking of the device in the open position.

Characteristics			
Standard delivery			0
Maximum quantity			1
Breaking capacity (A)	Standard		Min. load: 100 mA/24 V
Cos φ: 0.3	V AC	240/380	5
CA12/DC12		480	5
		690	3
	V DC	24/48	3
		125	0.3
		250	0.15
	Low level		Min. load: 2 mA/15 V DC
	V AC	24/48	3
		240	3
		380	3
	V DC	24/48	3
		125	0.3
		250	0.15

DE58089



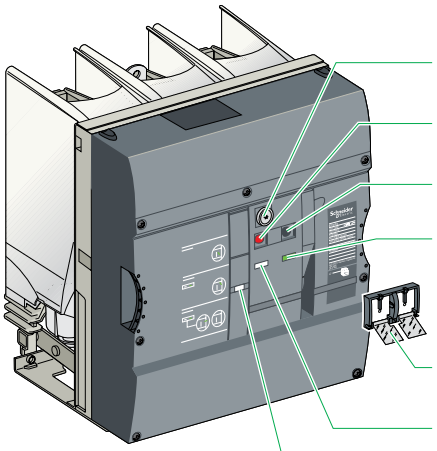
Operation counter (CDM)

Operation counter (CDM)

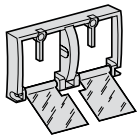
The operation counter is visible on the front panel.
It totalizes the number of switching cycles (CO) that the device has carried out.

Description of functions
Locking/interlocking

DE59417

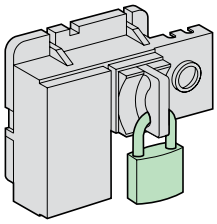


DE57535



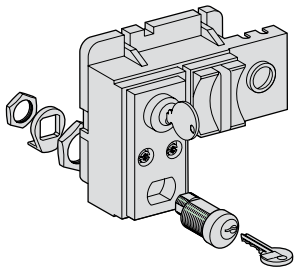
Push button padlock

DE57536



Padlocking of the circuit breaker in the “open” position

DE57537

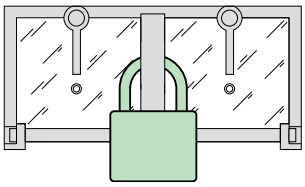


Keylocking of the circuit breaker in the “open” position

Push button padlock

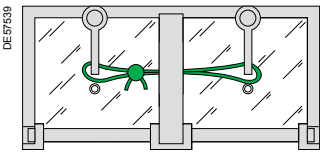
This transparent screen blocks access to the opening and closing push-buttons on the circuit breaker.
The device enables the opening or closing push button to be locked independently.
Locking is achieved either:
- by 2 screws
- by 3 padlocks, not supplied
- by a lead seal.

DE57538



Padlocking

DE57539



Lead sealing

Locking of the circuit breaker in the “open” position

The circuit breaker is locked in the “open” position by blocking the opening push button in the engaged position:
- by a padlock 1 to 3 padlocks, not supplied
- by a keylocks 1 or 2 different keylocks, not supplied

The keylocks are of captive key type, with the key free after locking, either Profalux or Ronis (right turn), and are proposed according to the options either with:
- 1 single keylock
- 1 single keylock mounted on the circuit breaker + 1 identical delivered separately for interlocking with another device
- 2 different keylocks for double locking.

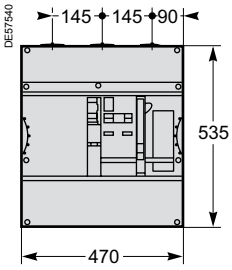
Profalux and Ronis keylocks are inter-compatible.

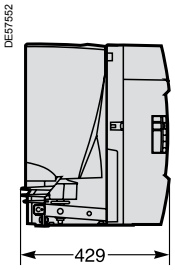
Dimensions

Device

Phase to phase distance 145 mm

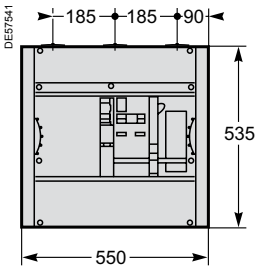
Ur	Isc	Ir	Weight
7.2 kV	25 kA	630 A	51 kg
		1250 A	
	31.5 kA	630 A	
		1250 A	
12 kV	25 kA	630 A	
		1250 A	
	31.5 kA	630 A	
		1250 A	

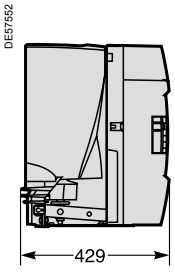




Phase to phase distance 185 mm

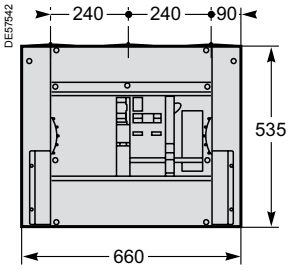
Ur	Isc	Ir	Weight
7.2 kV	25 kA	630 A	55 kg
		1250 A	
	31.5 kA	630 A	
		1250 A	
	40 kA	630 A	
		1250 A	
12 kV	25 kA	630 A	
		1250 A	
	31.5 kA	630 A	
		1250 A	
	40 kA	630 A	
		1250 A	
17.5 kV	25 kA	630 A	
		1250 A	
	31.5 kA	630 A	
		1250 A	

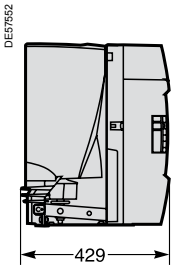




Phase to phase distance 240 mm

Ur	Isc	Ir	Weight
7.2 kV	25 kA	2500 A	79 kg
	31.5 kA	2500 A	
	40 kA	630 A	
		1250 A	
		2500 A	
12 kV	25 kA	2500 A	
	31.5 kA	2500 A	
	40 kA	630 A	
		1250 A	
		2500 A	
17.5 kV	25 kA	2500 A	
	31.5 kA	2500 A	
	40 kA	630 A	
		1250 A	
		2500 A	





Important
Detailed installation instructions are given in the “Evolis Installation Guide”. Please consult us.

Order form

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

Releases combinations table

MX1	1			1	1	1		1	1
MX2				1				1	
MN		1			1		1		1
Mitop			1			1	1	1	1

Basic fixed circuit breaker

Quantity [ ]

Rated voltage Ur (kV) [ ]

Short-circuit current Isc (kA) [ ]

Rated normal current Ir (A) [ ]

Phase to phase distance (mm) **145** [ ] **185** [ ] **240** [ ]

Colour for push buttons and indicators

Push buttons open/closed:		Red/black [■]
Indicator open/closed:	Black/white [■]	Green/red [■]
Operating mechanism charged/discharged:		Yellow/white [■]

Circuit breaker options

Opening release (see possible choices in combination table)

Shunt opening release **MX1**

24 Vac [■]	24…30 Vcc [■]	100…130 Vcc [■]	200…250 Vcc [■]
48 Vac [■]	48…60 Vcc [■]	100…120 Vac [■]	200…240 Vac [■]

Shunt opening release **MX2**

24 Vac [ ]	24…30 Vcc [ ]	100…130 Vcc [ ]	200…250 Vcc [ ]
48 Vac [ ]	48…60 Vcc [ ]	100…120 Vac [ ]	200…240 Vac [ ]

Undervoltage release **MN**

24 Vac [ ]	24…30 Vcc [ ]	100…130 Vcc [ ]	200…250 Vcc [ ]
48 Vac [ ]	48…60 Vcc [ ]	100…130 Vac [ ]	200…240 Vac [ ]

Time delay for **MN**

48…60 Vac [ ]	100...130 Vcc/ca [ ]	200…250 Vcc [ ]	200…240 Vac [ ]

Low energy release **Mitop** [ ]

Remote control

Electrical motor **MCH**

24…30 Vdc [ ]	100…125 Vdc [ ]	200…250 Vdc [ ]
48…60 Vdc/ac [ ]	100…130 Vac [ ]	200…240 Vac [ ]

Shunt closing release **XF**

24 Vac [■]	24…30 Vcc [■]	100…130 Vcc [■]	200…250 Vcc [■]
48 Vac [■]	48…60 Vcc [■]	100…130 Vac [■]	200…240 Vac [■]

Module of 4 additional auxiliary contacts O/C 1 [ ] 2 [ ]

Ready to close contact PF [ ]

LV plug

Without interlocking	18 pins [ ]	42 pins [ ]	LV terminal blocks [ ]
With interlocking	18 pins [ ]	42 pins [ ]	

Locking of the circuit breaker in the open position

By padlock [ ]

or by locks and keys		Profalux [■]	Ronis [■]
If locks	1 lock [ ]	2 identical locks [ ]	2 different locks [ ]

Push buttons padlock of O/C circuit breaker [ ]

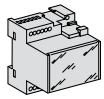
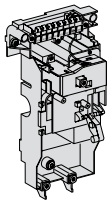
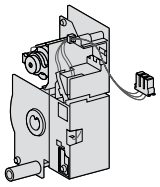
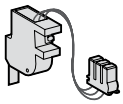
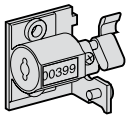
Fixed connections

Upstream and downstream fixed connections, Ir

3 fixed distance H or V	630-1250 A [ ]	630-2500 A [ ]
3 variable distance H	630-1250 A [ ]	630-2500 A [ ]
3 variable distance V	630-1250 A [ ]	630-2500 A [ ]

Offer structure
Separated components

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

Remote control and opening circuit			Ref.
MX1, MX2, XF shunt opening/closing release			
 DE58082	24…30 Vdc	24 V 50/60 Hz	**59284**
	48…60 Vdc	48 V 50/60 Hz	**59285**
	100…130 Vdc - 50/60 Hz		**59286**
	200…250 Vdc - 50/60 Hz		**59287**
Undervoltage release MN			
 DE58082	24…30 Vdc	24 V 50/60 Hz	**59288**
	48…60 Vdc	48 V 50/60 Hz	**59289**
	100…130 Vdc - 50/60 Hz		**59290**
	200…250 Vdc - 50/60 Hz		**59291**
Time delay for MN			
 DE58083	48…60 Vdc - 50/60 Hz		**33680**
	100…130 Vdc - 50/60 Hz		**33681**
	200…250 Vdc - 50/60 Hz		**33682**
Low energy release Mitop			
 DE58084			**59160**
Electrical motor MCH			
 DE58086	24…30 Vdc		**47888**
	48…60 Vdc		**47889**
	100…125 Vdc		**47890**
	200…250 Vdc		**47891**
	48…60 V - 50/60 Hz		**47889**
	100…130 V - 50/60 Hz		**47893**
	200…240 V - 50/60 Hz		**47894**
Additional auxiliary contacts O/C			
 DE58087	Module of 4 contacts		**47887**
LV terminal blocks			
 DE57544	1 terminal block		**47074**
Ready to close contact PF			
 DE58088			**47080**
Operation counter CDM			
 DE58089			**48535**

Offer structure
Separated components (cont.)

MV and LV connection accessories

Upstream and downstream fixed connections, Ir

DE57545 DE57546 DE57547

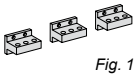


Fig. 1

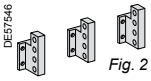


Fig. 2

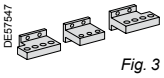


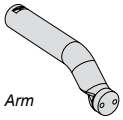
Fig. 3

		Ref.
3 fixed distance H or V *(fig. 1)*	630-1250 A	**59400**
	630-2500 A *	**59409**
3 variable distance H *(fig. 3)*	630-1250 A	**59401**
	630-2500 A *	**59410**
3 variable distance V *(fig. 2)*	630-1250 A	**59402**
	630-2500 A *	**59411**

(*) For 40 kA, you must take the 630-2500 A versions.

MV connection accessories

DE57548 DE57549 DE57550


Arm


Cluster


Finger

		Ref.
3 clusters + 3 fingers	630-1250 A	**59369**
	630-2500 A *	**59371**
3 arms	630-1250 A	**59396**
	630-2500 A *	**59397**

(*) For 40 kA, you must take the 630-2500 A versions.

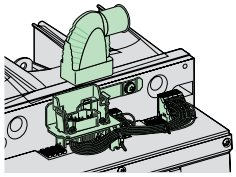
Field deflectors for bushings

DE57551

	Ref.
6 deflectors used to increase dielectric withstand from 75 to 95 kV	**59283**

LV plug

DE57523



	Ref.
Standard 18 pins WITHOUT interlocking	**59070**
Standard 18 pins WITH interlocking	**59114**
All options 42 pins WITHOUT interlocking	**59071**
All options 42 pins WITH interlocking	**59115**

LV wiring and ducting

PE56601

	Ref.
Flexible conduct for LV wiring	**59099**
LV connecting kit 42 wires	**AAA10 087**

Other circuit breaker accessories

Labels kit for push button and indicator (O/C)

DE57533

	Ref.
Circuit breaker specific labels green, red	**59100**

Various

Circuit breaker support frame

51222737

	Ref.
- Roller base -The kit includes the roller base only - Drawings are supplied to manufacture the frame locally	**59050**

Technical documentation

DE57556

	Ref.
User manual	**59069**

Services

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

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

contents

Presentation

PE57984

Evolis circuit breakers 17.5 kV withdrawable version in NEX cradle

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 P2 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 from 7.2 to 17.5 kV.

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

Main characteristics

Electrical characteristics according to IEC 62271-100

Phase to phase		mm		145					
Rated voltage	**Ur**	kV 50/60 Hz		7.2		12		17.5	
Insulation level									
- power frequency withstand	**Ud**	kV 50 Hz 1 min (1)		20		28		38	
- lightning impulse withstand	**Up**	kV peak		60		75		95	
Rated current	**Ir**	A	630	■	■	■	■	■	■
			1250	■	■	■	■	■	■
			2500 (2)	–	–	–	–	–	–
Short circuit current	**Isc**	kA		25	31.5	25	31.5	25	31.5
Short time withstand current	**Ik/tk**	kA/3 s		25	31.5	25	31.5	25	31.5
Short-circuit making current	**Ip**	kA peak	50 Hz	63	79	63	79	63	79
			60 Hz	65	82	65	82	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	< 50 ms
		Breaking	< 60 ms
		Closing	< 65 ms
Service temperature	**T**	°C	– 25 to + 40
Mechanical endurance		Class	M1(2) - M2
		Number of switching operations	2000(2) -10 000
Electrical endurance		Class	E2
Number of switching operations at full Isc value		25 kA	100
		31.5 kA	50
Capacitive current breaking capacity		Class	C1
Average relative humidity		Over 24 h	< 95%
		Over 1 month	< 90%

Switching and protection of capacitor banks

Evolis range circuit breakers are well suited for switching and protection of capacitor banks with installed power up to 2 Mvar installed in series with dampening reactor limiting inrush current to 2 kA.

Evolis is also well suited for capacitor banks system with installed power higher than 2 Mvar in conjunction with anti-harmonic filtering system.

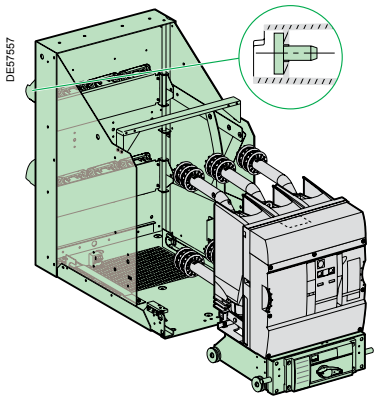
Please consult us.

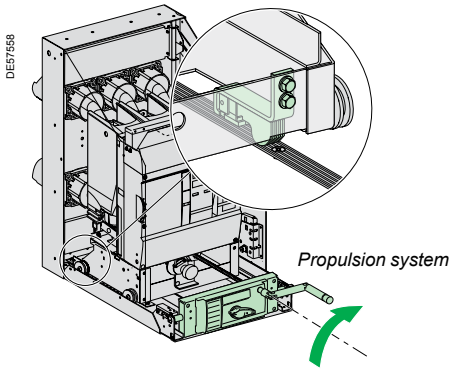
Main characteristics (cont.)

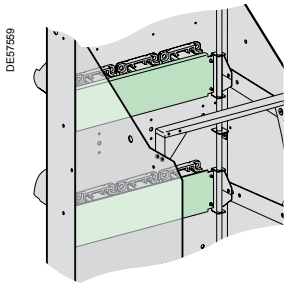
	185							**240**					
	7.2			12		17.5		7.2		12		17.5	
	20			28		38		20		28		38	
	60			75		95		60		75		95	
	■	■	–	■	■	■	■	–	–	–	–	–	–
	■	■	–	■	■	■	■	–	–	–	–	–	–
	–	–	–	–	–	–	–	■	■	■	■	■	■
	25	31.5	40(2)	25	31.5	25	31.5	25	31.5	25	31.5	25	31.5
	25	31.5	40	25	31.5	25	31.5	25	31.5	25	31.5	25	31.5
	63	79	100	63	79	63	79	63	79	63	79	63	79
	65	82	104	65	82	65	82	65	82	65	82	65	82

(1) Circuit breaker tested at Ud 42 kV 50 Hz, 1 min
(2) Class M1: 2000 operations for Ir = 2500 A
■ *Available*
– *Not available.*

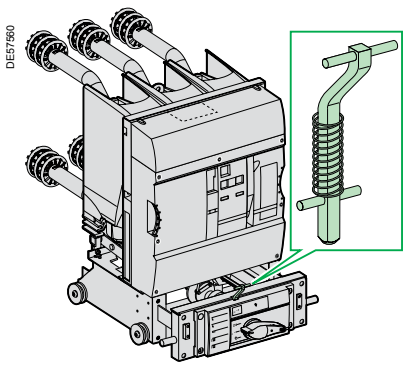
Description of functions
Racking in



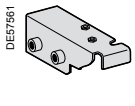




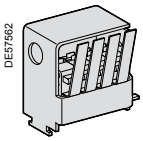
Shutters



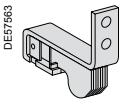
Door locking mechanism



Circuit breaker position contact locked



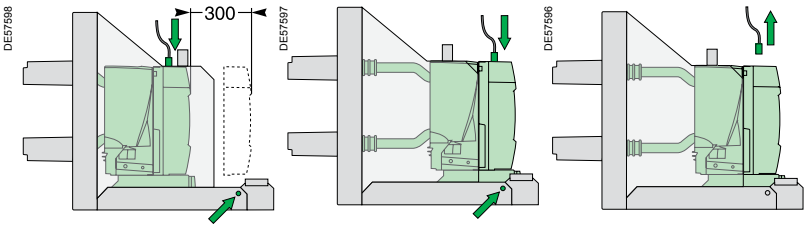
Racked in/out contacts



Earthing sliding device

Composition
The “racking in” function is carried out by:
- the racking truck supporting 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 plugs connected
- **test position:** circuit breaker racked out and locked in position; LV plug connected
- **disconnected position:** circuit breaker racked out and locked in position; LV plug disconnected. The circuit breaker can be unlocked and extracted from the cradle.



Service position *Test position* *Disconnected position*

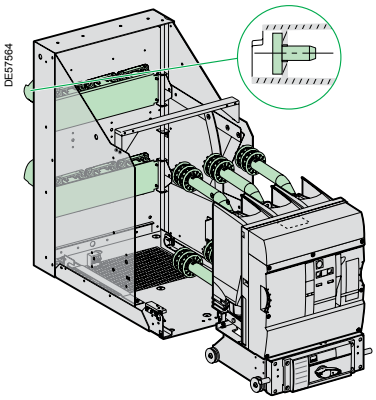
***Note:** the arrows show the “locked positions” for the circuit breaker and the LV plug.*

Functions
- A drive system combined with a threaded shaft gives easier racking in and out. The racking in mechanism can be operated with the door closed.
- An interlock stops the user from inserting the lever as long as the racking truck has not been put in the “racked in/out” position.
- An interlock between the circuit breaker status and the truck gives secure operation: racking in or out is only possible if the circuit breaker is open.
- An interlock also exists between the LV connector and the truck. It is only possible to rack in if the LV connector is connected.

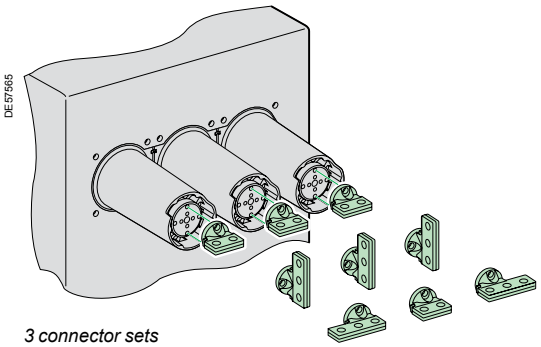
The cradle floor has all the fixing holes needed to correctly position the earthing switch control mechanism and power circuit. This makes earthing switch operation reliable and gives interlocking between the circuit breaker and the earthing switch.
- Earthing is automatic when the truck is fully racked in.
- Protective shutters stop fingers from touching the racking clusters when the device is extracted (protection index: IP2X).
- For maintenance operations, it is possible to:
  - padlock the shutters in the closed position
  - unlock the shutter mechanism to access the racking clusters.
- A foolproof device enables correct matching of the cradle and circuit breaker rating. This system is mounted on the cradle base. Part of the system must be assembled by the panel builder on the cubicle floor.

Accessories
- One set of auxiliary contacts:
  - 4 circuit breaker racked in/out position contacts
  - 1 contact showing that the circuit breaker is locked in place on the cradle.
- Cradle earthing is provided by a sliding copper contact.
- A key locking system (Ronis or Profalux) for the circuit breaker in the racked out position enables increased safety downstream of it during work. This system is associated with an earthing switch.
- Locking of the circuit breaker compartment door. This device enables the circuit breaker, full version, to only be operated when the door is closed.

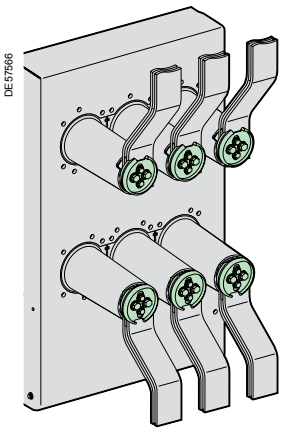
Description of functions
MV connection



Power circuit



3 connector sets



Field deflectors

Composition
The power circuit comprises:
- mobile contacts with disconnectable clusters and arms mounted on the circuit breaker
- fingers attached to the cradle and insulated by bushings and metal shutters.

This assembly provides perfect control of the dielectric strength, mechanic, the short time withstand current and the temperature rise.
All of these characteristics have been validated in tests.

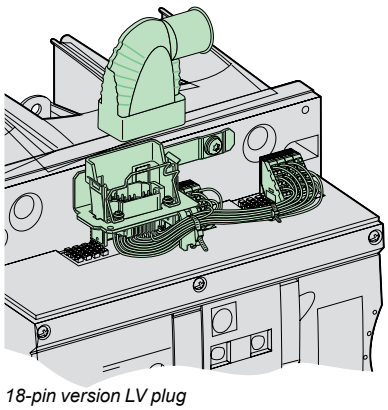
Connection
Connection is easily done from outside the cradle:
- on vertical copper terminals integrated in the bushing
- by a connector set, also used on the base circuit breaker.

Note:
The dielectric strength values given in the performance table, do not take these connectors into account.
The panel builder must check the whole cubicle connection configuration.

For circuit breakers with a rated voltage of Ur = 17.5 kV with a phase to phase distance of 185 mm, field deflectors are used to increase the dielectric strength by 75 kV to 95 kV.

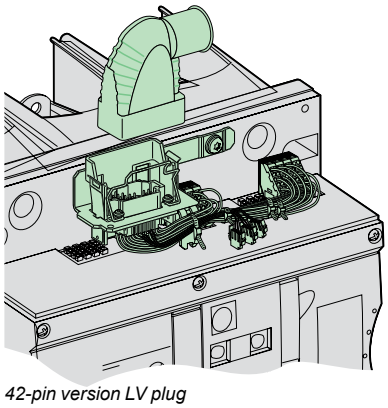
Description of functions
LV connection

DE57523



18-pin version LV plug

DE57524



42-pin version LV plug

Main functions
With the base circuit breaker, the LV wiring uses a LV plug 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 18-pin version, enabling connection of:
- a shunt opening release MX1
- a remote control mechanism (electrical motor, shunt closing release XF)
- a "ready to close" contact PF
- a maximum number of auxiliary contacts: 1 NC - 1 NO - 2 changeover contacts.

(see "indication" page, "Open/closed position auxiliary contacts" chapter).

An 42-pin version, enabling connection of:
- a shunt opening release MX1
- a second opening release (shunt type MX2 or undervoltage type MN)
- a low energy release (Mitop)
- a fault trip indicator contact SDE
- a remote contact reset system SDE
- a remote control mechanism (electrical motor, shunt closing release XF)
- a "ready to close" contact PF
- a maximum number of auxiliary contacts: 4 NC - 5 NO - 2 changeover contacts.

(see "indication" 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 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
P2 stored energy operating mechanism
Wiring diagram

PE56600

Operation of the P2 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:

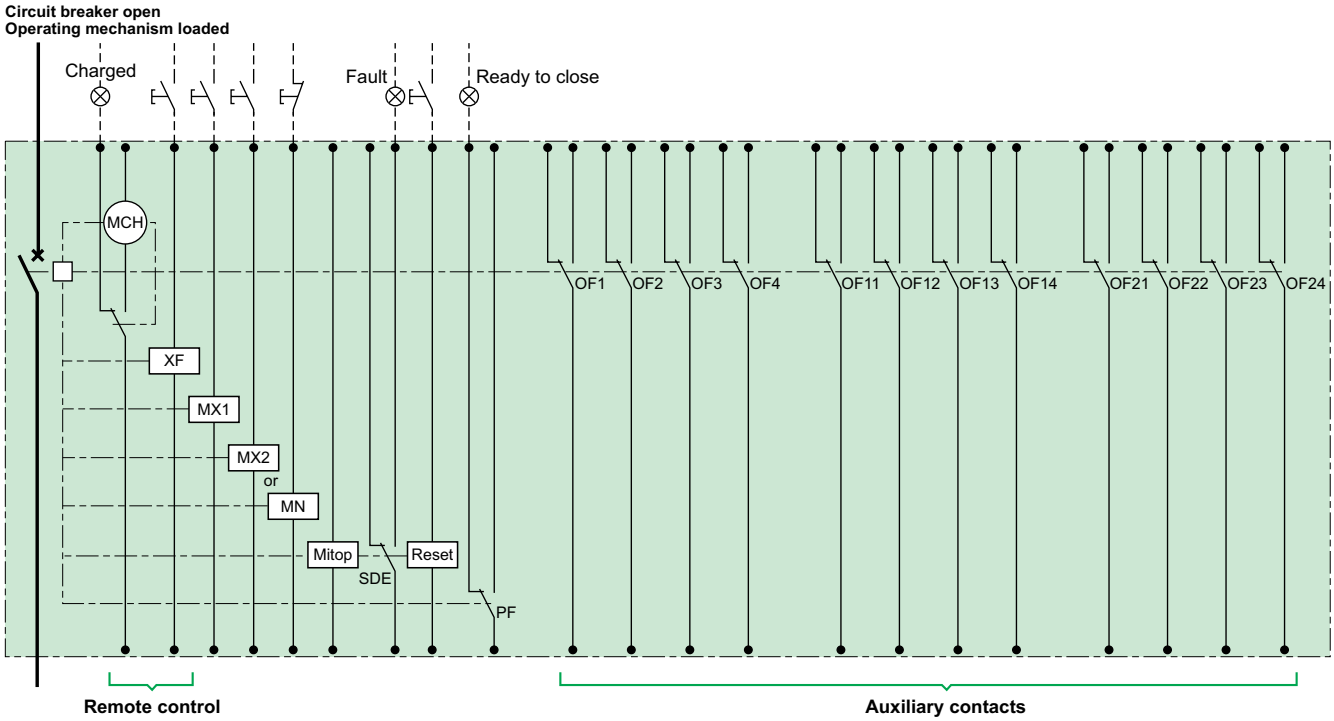
- the stored energy operating mechanism which stores in springs the energy required to open and close the device
- a gear motor electrical charging device with manual charging by lever (useful on loss of auxiliary supply)
- manual order devices by push buttons on the front panel of the device
- an electrical remote closing device containing a release with an antipumping relay
- an electrical opening device containing one or more releases, for example:
  - shunt opening
  - undervoltage
  - Mitop, a low consumption release, used only with the Sepam 100 LA protection relay.
- an operation counter
- a position indication device by mechanical indicator

and 3 modules of 4 auxiliary contacts whose availability varies according to the diagram used

- a device for indicating “charged” operating mechanism status by mechanical indicator and electrical contact.

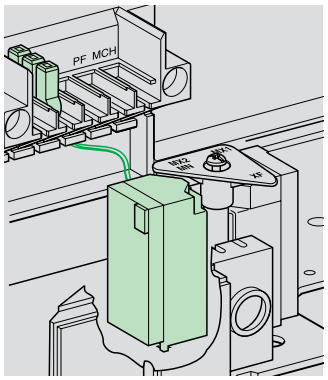
Wiring diagram (principle)

DE59408EN



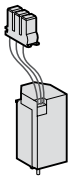
Description of functions
Opening circuit

DE58081



Circuit breaker equipped with a shunt opening release MX

DE58082



Shunt opening release (MX1 and MX2)

Composition

The opening circuit is produced using the following components:
- a shunt opening release (MX1)
- a second shunt opening release (MX2)
- undervoltage release (MN)
- time delayed undervoltage release (MNR: MN + time delay).

The time delay, placed outside the circuit breaker, can be disabled by an emergency stop button to give instant circuit breaker opening.
- low energy release (Mitop).

***Note**: see the table of the releases' combinations on the following page.*

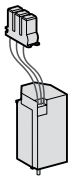
Shunt opening release (MX1 and MX2)

Energizing this release causes instant opening of the circuit breaker.
Permanent power supply to the MX unit locks the circuit breaker in the "open" position.

Characteristics		
Power supply	See "Order form" page	
Threshold	0.7 to 1.1 Ur	
Consumption (VA or W)	Triggering	200 (for 200 ms)
	Latched	4.5

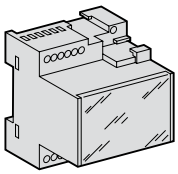
Description of functions
Opening circuit (cont.)

DE58082



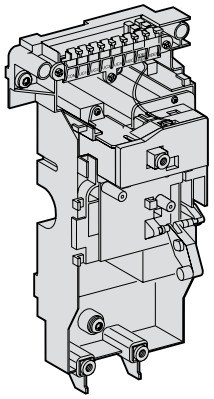
Undervoltage release (MN)

DE58083



Time delay for undervoltage release (MN)

DE58084



Low energy release (Mitop)

Undervoltage release (MN)

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 (VA or W)	Triggering	200 (for 200 ms)
	Latched	4.5

Time delay for MN

To eliminate spurious tripping of the circuit breaker when there are brief voltage drops, the MN action is controlled with a time delay.
This function is achieved by adding a time delay unit outside of the undervoltage release (MN) circuit (adjustable time delay).
This unit is placed outside the circuit breaker and can be inhibited by an emergency stop button to obtain instant circuit breaker opening.

Characteristics		
Power supply	See “Order form” page	
Threshold	Opening	0.35 to 0.7 Ur
	Closing	0.85 Ur
Consumption (VA or W)	Triggering	200 (for 200 ms)
	Latched	4.5
Time delay	0.5 s - 0.9 s - 1.5 s - 3 s	

Low energy release (Mitop)

This release includes a low consumption unit and is specifically used with the Sepam 100LA self-powered unit (“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, provided with the Mitop.
This release also includes a coil (reset) enabling remote SDE contact reset.

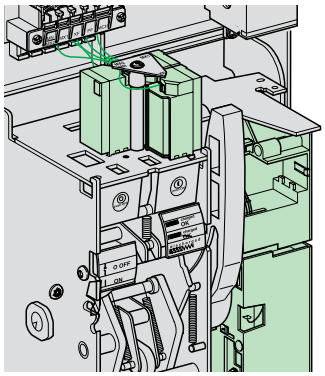
Comment:
Use of the Mitop low energy release requires adjustment of the protection relay time delay in order to ensure that the circuit breaker trips between 45-50 ms.

Releases combinations table

Shunt opening MX1	1	1	1	1	1	1
Shunt opening MX2		1			1	
Undervoltage MN			1			1
Mitop				1	1	1

Description of functions
Remote control

DE58085



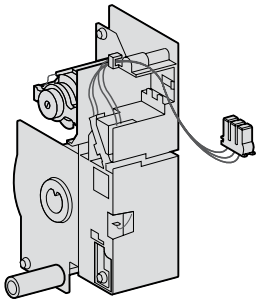
Circuit breaker equipped with remote control

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

The opening order always takes priority over the closing order.
In the event of simultaneous opening and closing orders, the mechanism discharges under no load, without moving the main contacts. The circuit breaker remains in the “open” position.
In the event of latched opening and closing orders, the mechanism carries out anti-pumping function as standard, by blocking the circuit breaker in the “open” position.
Anti-pumping function: after opening on a fault or deliberate opening via the manual or electrical mechanism, the closing order must be interrupted then reactivated to enable reclosing of the circuit breaker.

Composition
The remote control comprises:
- an electrical motor (MCH) equipped with a “spring armed” CH limit switch
- a shunt closing release (XF).

DE58086

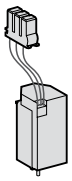


Electrical motor MCH

Electrical motor (MCH)
The electrical motor carries out the automatic rearming of the storage energy springs as soon as the circuit breaker closes. This allows instant reclosing of the device after opening. The arming lever is only used as a backup control in the case of the absence of the auxiliary power supply.
An electrical motor (MCH) equipped with a “spring armed” CH limit switch.
This contact indicates the “armed” position of the mechanism (springs armed).

Characteristics	
Power supply	See “Order form” page
Threshold	0.85 to 1.1 Ur
Consumption (VA or W)	180
Motor overcurrent	2 to 3 In for 0.1 s
Arming time	6 s maximum
Operating rate	3 cycles maximum per minute
CH contact	10 A/240 V

DE58082



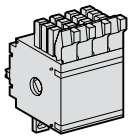
Shunt closing release XF

Shunt closing release (XF)
This release allows remote closing of the circuit breaker when the control mechanism is armed. It can be permanently or briefly supplied power.

Characteristics XF		
Power supply	See “Order form” page	
Threshold	XF	0.85 to 1.1 Ur
Consumption (VA or W)	Triggering	200 (for 200 ms)
	Latched	4.5

Description of functions
Indication

DE58087



Rotary type contacts (OC)

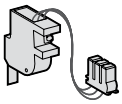
"Open/closed" auxiliary position contacts (OC)

These auxiliary contacts indicate the "open" or "closed" position of the circuit breaker.
■ Rotary type changeover contacts directly controlled by the circuit breaker mechanism.
■ Indicator contacts are proposed:
□ for standard relaying applications
□ for low level control applications with plc's or electronic circuits.
This version is compatible with Sepam series 20-40-80 units.

Characteristics			
Standard delivery			4
Maximum quantity			12
Breaking capacity (A)	Standard		Min. load: 100 mA/24 V
Cos φ: 0.3	V AC	240/380	10/6 *
CA12/DC12		480	10/6 *
		690	6
	V DC	24/48	10/6 *
		125	10/6 *
		250	3
	Low level		Min. load: 2 mA/15 V DC
	V AC	24/48	6
		240	6
		380	3
	V DC	24/48	6
		125	6
		250	3

** Standard contacts: 10 A; optional contacts: 6 A (temperature derating)*

DE58088



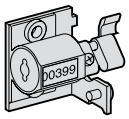
"Ready to close" PF contact

"Ready to close" PF contact

The circuit breaker is "ready to close" when shown by a mechanical indicator and a PF changeover contact.
This information simultaneously indicates that:
■ the circuit breaker is open
■ the storage energy springs are armed
■ there is no permanent closing order
■ there is no permanent opening order caused by:
□ a safety opening order (2nd MX or MN)
□ keylocking of the device in the open position.

Characteristics			
Standard delivery			0
Maximum quantity			1
Breaking capacity (A)	Standard		Min. load: 100 mA/24 V
Cos φ: 0.3	V AC	240/380	5
CA12/DC12		480	5
		690	3
	V DC	24/48	3
		125	0.3
		250	0.15
	Low level		Min. load: 2 mA/15 V DC
	V AC	24/48	3
		240	3
		380	3
	V DC	24/48	3
		125	0.3
		250	0.15

DE58089



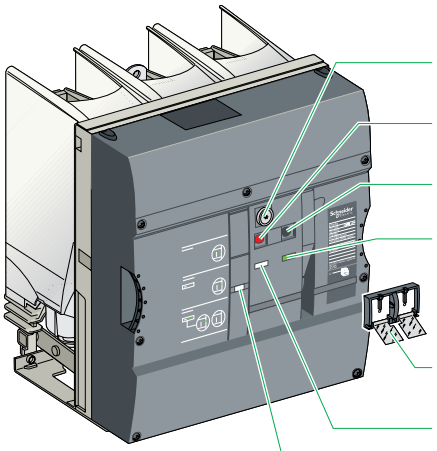
Operation counter (CDM)

Operation counter (CDM)

The operation counter is visible on the front panel.
It totalizes the number of switching cycles (CO) that the device has carried out.

Description of functions
Locking/interlocking

DE59417



Locking the circuit breaker in the open position

Opening button

Closing button

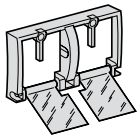
Control mechanism status (charged or discharged)

Push button padlock

Circuit breaker position indicator

Operation counter

DE57535

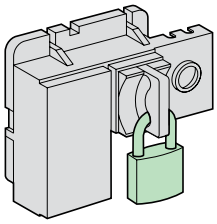


Push button padlock

Push button padlock

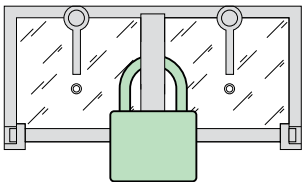
This transparent screen blocks access to the opening and closing push-buttons on the circuit breaker.
The device enables the opening or closing push button to be locked independently.
Locking is achieved either:
- by 2 screws
- by 3 padlocks, not supplied
- by a lead seal.

DE57536



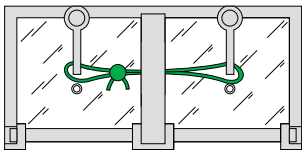
Padlocking of the circuit breaker in the "open" position

DE57538



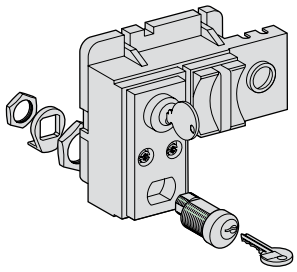
Padlocking

DE57539



Lead sealing

DE57537



Keylocking of the circuit breaker in the "open" position

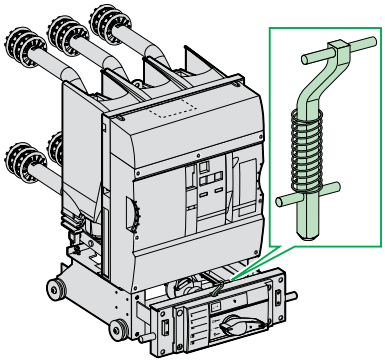
Locking of the circuit breaker in the "open" position

The circuit breaker is locked in the "open" position by blocking the opening push button in the engaged position:
- by a padlock 1 to 3 padlocks, not supplied
- by a keylocks 1 or 2 different keylocks, not supplied

The keylocks are of captive key type, with the key free after locking, either Profalux or Ronis (right turn), and are proposed according to the options either with:
- 1 single keylock
- 1 single keylock mounted on the circuit breaker + 1 identical delivered separately for interlocking with another device
- 2 different keylocks for double locking.

Profalux and Ronis keylocks are inter-compatible.

DE57560



Cubicle door interlocking mechanism

Cubicle door interlocking mechanism

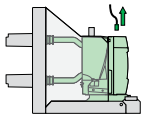
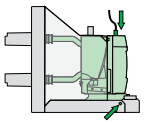
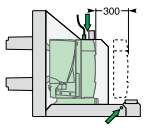
This device enables the circuit breaker to only be operated when the door is closed, for the withdrawable version with a cradle.

Description of functions
Safety functions

This table describes the safety functions available on the withdrawable version of the Evolis 17.5 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:

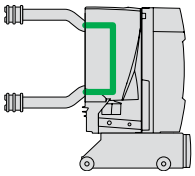
- Possible status
- Possible status, impossible operation
- Impossible status

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 door closing			
	Connected				No unplugging		
3 - Circuit breaker	Closed				No racking-in		No racking-out
	Open					No closing	
		Open position circuit breaker locking available					
4 - Switchboard door	Open				No racking-in		
	Closed				No door opening (3)		
5 - Earthing switch	Open					No earthing switch closing	
	Closed				No racking-in		

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

Description of functions
Service trucks

DE57572



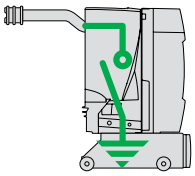
Disconnecting truck

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	7.2 to 17.5		
Phase distance		mm	145	185	240
Rated normal current	**Ir**	A	1250	1250	2500
Short-time withstand current (3 s)	**Ik**	kA	25	31.5	40
Making capacity		kA peak	2.5 Ik (50 Hz) & 2.6 Ik (60 Hz)		

DE57573



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.

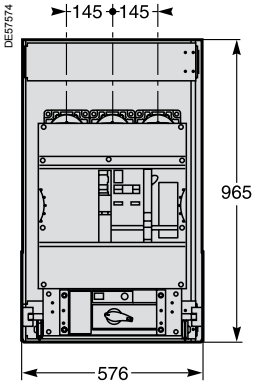
Electrical characteristics					
Rated voltage	**Ur**	kV rms	12	17.5	17.5
Phase distance		mm	145	185	240
Short-time withstand current (3 s)	**Ik**	kA	25	31.5	40
Making capacity		kA peak	2.5 Ik (50 Hz) & 2.6 Ik (60 Hz)		

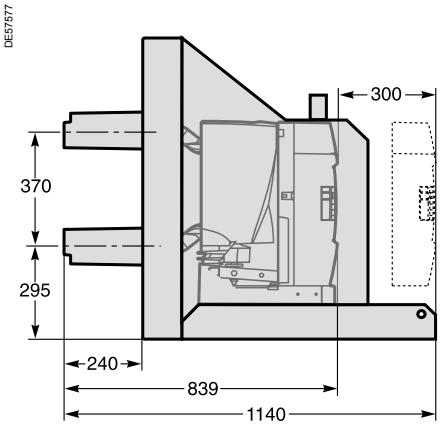
Dimensions

Device

Phase to phase distance 145 mm

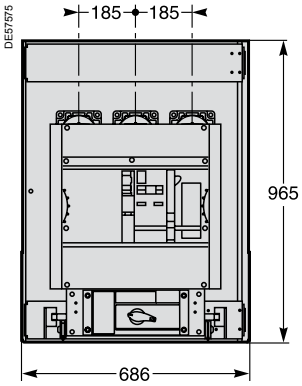
Ur	Isc	Ir	Weight
7.2 kV	25 kA	630 A	165 kg
		1250 A	
	31.5 kA	630 A	
		1250 A	
12 kV	25 kA	630 A	
		1250 A	
	31.5 kA	630 A	
		1250 A	
17.5 kV	25 kA	630 A	
		1250 A	
	31.5 kA	630 A	
		1250 A	

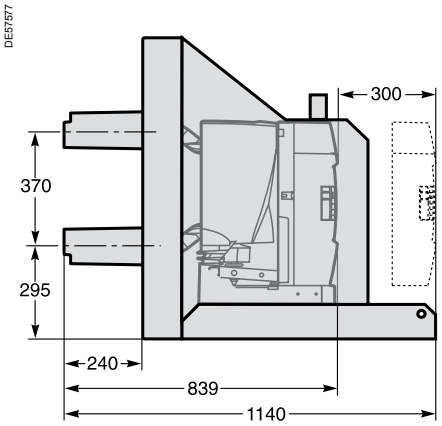




Phase to phase distance 185 mm

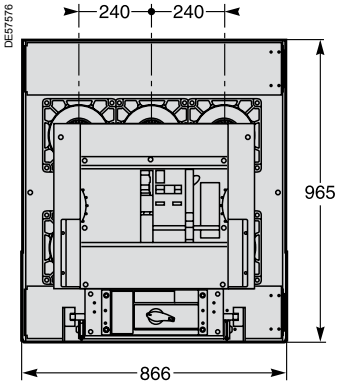
Ur	Isc	Ir	Weight
7.2 kV	25 kA	630 A	174 kg
		1250 A	
	31.5 kA	630 A	
		1250 A	
12 kV	25 kA	630 A	
		1250 A	
	31.5 kA	630 A	
		1250 A	
17.5 kV	25 kA	630 A	
		1250 A	
	31.5 kA	630 A	
		1250 A	

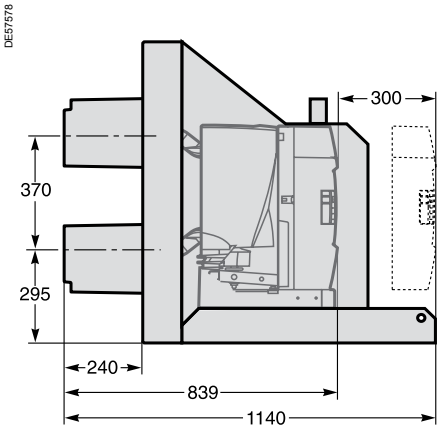




Phase to phase distance 240 mm

Ur	Isc	Ir	Weight
7.2 kV	25 kA	2500 A	272 kg
	31.5 kA	2500 A	
12 kV	25 kA	2500 A	
	31.5 kA	2500 A	
17.5 kV	25 kA	2500 A	
	31.5 kA	2500 A	





Important
Detailed installation instructions are given in the “Evolis Installation Guide”. Please consult us.

Order form

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

Releases combinations table

MX1	1	1	1	1	1	1
MX2		1			1	
MN			1			1
Mitop				1	1	1

Basic withdrawable circuit breaker

Quantity [ ]

Rated voltage Ur **(kV)** [ ]

Short-circuit current Isc **(kA)** [ ]

Rated current Ir **(A)** [ ]

Phase to phase distance (mm) **145** [ ] **185** [ ] **240** [ ]

Colour for push buttons and indicators

Push buttons open/closed:		Red/black [ ]
Indicator open/closed:	Black/white [ ]	Green/red [ ]
Operating mechanism charged/discharged:		Yellow/white [ ]

Circuit breaker options

Opening release (see possible choices in combination table)

Shunt opening release **MX1**

24 Vac [ ]	24…30 Vcc [ ]	100…130 Vcc [ ]	200…250 Vcc [ ]
48 Vac [ ]	48…60 Vcc [ ]	100…120 Vac [ ]	200…240 Vac [ ]

Shunt opening release **MX2**

24 Vac [ ]	24…30 Vcc [ ]	100…130 Vcc [ ]	200…250 Vcc [ ]
48 Vac [ ]	48…60 Vcc [ ]	100…120 Vac [ ]	200…240 Vac [ ]

Undervoltage release **MN**

24 Vac [ ]	24…30 Vcc [ ]	100…130 Vcc [ ]	200…250 Vcc [ ]
48 Vac [ ]	48…60 Vcc [ ]	100…130 Vac [ ]	200…240 Vac [ ]

Time delay for **MN**

48…60 Vac [ ]	100...130 Vcc/ca [ ]	200…250 Vcc [ ]	200…240 Vac [ ]

Low energy release **Mitop** [ ]

Remote control

Electrical motor **MCH**

24…30 Vdc [ ]	100…125 Vdc [ ]	200…250 Vdc [ ]
48…60 Vdc/ac [ ]	100…130 Vac [ ]	200…240 Vac [ ]

Shunt closing release **XF**

24 Vac [ ]	24…30 Vcc [ ]	100…130 Vcc [ ]	200…250 Vcc [ ]
48 Vac [ ]	48…60 Vcc [ ]	100…130 Vac [ ]	200…240 Vac [ ]

Module of 4 additional auxiliary contacts O/C 1 [ ] 2 [ ]

Ready to close contact PF [ ]

LV plug with interlocking 42-pin LV plug (instead of 18) [ ]

Operating shaft Quantity (one mini per switchboard) [ ]

Locking of the circuit breaker in the open position

By padlock [ ]

or by locks and keys Profalux [ ] Ronis [ ]

If locks 1 lock [ ] 2 identical locks [ ] 2 different locks [ ]

Push buttons padlock of O/C circuit breaker [ ]

Cradle

Quantity [ ]

Phase to phase distance (mm) **145** [ ] **185** [ ] **240** [ ]

Bushings (6 per cradle) 630-1250 A [ ] 630-2500 A [ ]

Cradle accessories

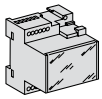
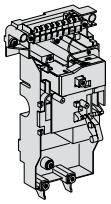
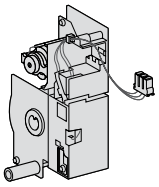
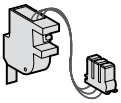
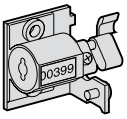
Block of four position indication contacts: CB racked in/racked out [ ]

One “CB ready to operate” indication contact [ ]

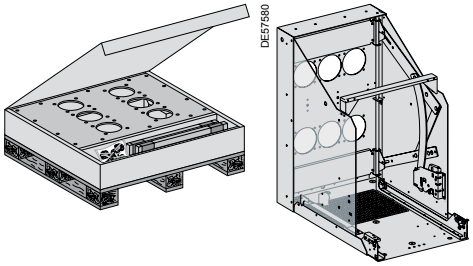
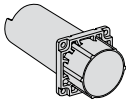
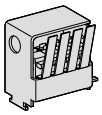
Field deflectors for bushings [ ]

Offer structure
Separated components

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

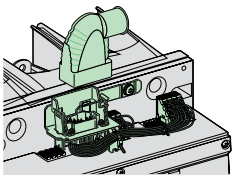
Remote control and opening circuit			Ref.
MX1, MX2, XF shunt opening/closing release			
 DE58082	24…30 Vdc	24 V 50/60 Hz	**59284**
	48…60 Vdc	48 V 50/60 Hz	**59285**
	100…130 Vdc - 50/60 Hz		**59286**
	200…250 Vdc - 50/60 Hz		**59287**
Undervoltage release MN			
 DE58082	24…30 Vdc	24 V 50/60 Hz	**59288**
	48…60 Vdc	48 V 50/60 Hz	**59289**
	100…130 Vdc - 50/60 Hz		**59290**
	200…250 Vdc - 50/60 Hz		**59291**
Time delay for MN			
 DE58083	48…60 Vdc - 50/60 Hz		**33680**
	100…130 Vdc - 50/60 Hz		**33681**
	200…250 Vdc - 50/60 Hz		**33682**
Low energy release Mitop			
 DE58084			**59160**
Electrical motor MCH			
 DE58086	24…30 Vdc		**47888**
	48…60 Vdc		**47889**
	100…125 Vdc		**47890**
	200…250 Vdc		**47891**
	48…60 V - 50/60 Hz		**47889**
	100…130 V - 50/60 Hz		**47893**
	200…240 V - 50/60 Hz		**47894**
Additional auxiliary contacts O/C			
 DE58087	Module of 4 contacts		**47887**
LV terminal blocks			
 DE57544	1 terminal block		**47074**
Ready to close contact PF			
 DE58088			**47080**
Operation counter CDM			
 DE58089			**48535**

Offer structure
Separated components (cont.)

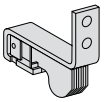
Cradle		Ref.
Cradle without bushings (delivered in kit)		
DE59419 DE57580 	Phase to phase distance 145 mm	**59316**
	Phase to phase distance 185 mm	**59317**
	Phase to phase distance 240 mm	**59318**
Bushings		
DE57581 	1 full bushing 630-1250 A	**59382**
	1 full bushing 630-2500 A	**59383**
	(you need at least 6 bushings per cradle)	
Field deflectors for bushings		
DE57551 	6 deflectors used to increase dielectric withstand from 75 to 95 kV	**59283**
Indication of the "CB racked in/racked out" position		
DE57562 	Module of 4 contacts	**59173**
Indication of "CB ready to operate"		
DE57561 	C.B. "ready to be operated" PAF (1 AC) (indicates that the C.B. is locked in place in the cradle)	**59174**
Racking base		
	2 rails	**59299**

Offer structure
Separated components (cont.)

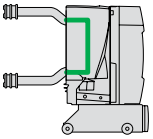
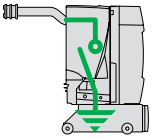
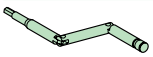
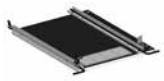
MV and LV connection accessories

		Ref.
LV plug		
DE57523 	Standard 18 pins WITH interlocking	**59114**
	Standard 42 pins WITH interlocking	**59115**
LV wiring and ducting		
PE56601 	Flexible conduct for LV wiring	**59099**
	LV connecting kit 42 wires	**AAA10 087**

Other accessories

		Ref.
Earthing device		
DE57563 	Earthing sliding contact on C.B.	**59456**
Labels kit for push button and indicator (O/C)		
DE57553 	Circuit breaker specific labels green, red.	**59100**

Various

					Ref.
Disconnecting truck					
DE57572 	**Phase to phase distance**	**Ur**	**Ir**	**Ith**	
	145 mm	7.2-17.5 kV	1250 A	25 kA	**59476**
	185 mm	7.2-17.5 kV	1250 A	31.5 kA	**59477**
	240 mm	7.2-17.5 kV	2500 A	40 kA	**59478**
Earthing truck					
DE57573 	**Phase to phase distance**	**Ur**	**Ir**	**Ith**	
	145 mm	7.2-17.5 kV	1250 A	31.5 kA	**59012**
	185 mm	7.2-17.5 kV	1250 A	31.5 kA	**59474**
	240 mm	7.2-17.5 kV	2500 A	40 kA	**59475**
Rack-in/rack-out operation					
DE57582 	Operating shaft				**59449**
Technical documentation					
DE57556 	User manual				**59069**
Circuit breaker extraction table					
51306830 	CB extraction table				**59130**

Services

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

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

Contents

Presentation

PE58089

Evolis circuit breaker 17,5 kV withdrawable version in MC cassette

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 P2 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 MC cassette, 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
□ a female Harting type LV connector.
■ MC cassette options:
□ circuit breaker racked-in or out position indicator contacts
□ a circuit breaker operating mechanism spring discharge system
□ a circuit breaker racked-in blocking mechanism
□ an extraction tool
□ an equipped door
□ 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 from 7.2 to 17.5 kV.

Main characteristics

Electrical characteristics according to IEC 62271-100

Phase to phase		mm		145			
Cassette type				MC1			
Rated voltage	**Ur**	kV 50/60 Hz		7.2		12	
Insulation level							
- power frequency withstand	**Ud**	kV 50 Hz 1 min(1)		20		28	
- lightning impulse withstand	**Up**	kV peak		60		75	
Rated current	**Ir**	A	630	■	■	■	■
			1250	■	■	■	■
			2500	–	–	–	–
Short circuit current	**Isc**	kA		25	31.5	25	31.5
Short time withstand current	**Ik/tk**	kA/3 s		25	31.5	25	31.5
Short-circuit making current	**Ip**	kA peak	50 Hz	63	79	63	79
			60 Hz	65	82	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	< 50 ms
		Breaking	< 60 ms
		Closing	< 65 ms
Service temperature	**T**	°C	– 25 to + 40
Mechanical endurance		Class	M1(2) - M2
		Number of switching operations	2000(2) - 10 000
Electrical endurance		Class	E2
Number of switching operations at full Isc value		25 kA	100
		31.5 kA	50
		40 kA	30
Capacitive current breaking capacity		Class	C1
Average relative humidity		Over 24 h	< 95%
		Over 1 month	< 90%

Switching and protection of capacitor banks

Evolis range circuit breakers are well suited for switching and protection of capacitor banks with installed power up to 2 Mvar installed in series with dampening reactor limiting inrush current to 2 kA.

Evolis is also well suited for capacitor banks system with installed power higher than 2 Mvar in conjunction with anti-harmonic filtering system.

Please consult us.

Main characteristics (cont.)

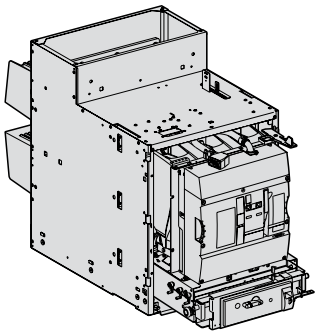
185								**240**								
MC2								MC3								
7.2			12			17.5		7.2			12			17.5		
20			28			38		20			28			38		
60			75			95		60			75			95		
–	■	■	–	■	■	■	■	–	–	■	–	–	■	–	–	–
–	■	■	–	■	■	■	■	–	–	■	–	–	■	–	–	■
–	–	–	–	–	–	–	–	■	■	■	■	■	■	■	■	■
25	31.5	40(2)	25	31.5	40(2)	25	31.5	25	31.5	40(2)	25	31.5	40(2)	25	31.5	40(2)
25	31.5	40	25	31.5	40	25	31.5	25	31.5	40	25	31.5	40	25	31.5	40
63	79	100	63	79	100	63	79	63	79	100	63	79	100	63	79	100
65	82	104	65	82	104	65	82	65	82	104	65	82	104	65	82	104

(1) Circuit breaker tested at Ud 42 kV 50 Hz, 1 min
(2) Class M1: 2000 operations for Isc = 40 kA

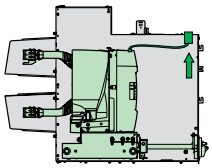
■ *Available*
– Not available.

Description of functions
Racking in

DE57579

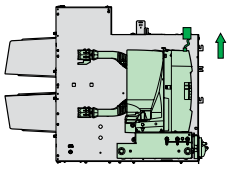


DE57584



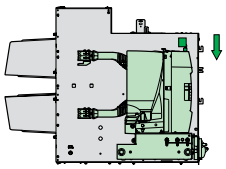
Operating position

DE57585



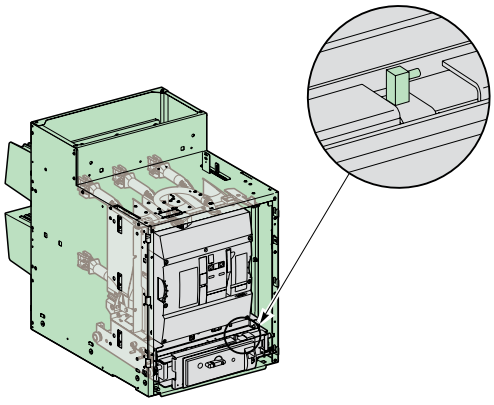
Test position

DE57586



Disconnected position

DE57587



Interlocking door-cubicle

Assembly components
The “racking-in/out” function is achieved by:
- the withdrawable circuit breaker with its LV connector (mobile part)
- the cassette with its bushings (fixed part).

Circuit breaker operation
The withdrawable circuit breaker can be placed in 3 stable positions:
- **service position:** circuit breaker racked in and locked in position; LV plugs connected
- **test position:** circuit breaker racked out and locked in position; LV plug connected
- **disconnected position:** circuit breaker extracted and locked in this position, LV plug disconnected.

Circuit breaker safety functions
A drive system using a threaded shaft gives easier racking and unracking.

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

Earthing is achieved throughout the operation via the racking carriage casters. An addition earthing system can be supplied as an option.

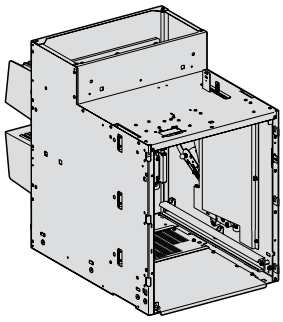
Interlocking mechanisms
In conformity with IEC standards 62271-100 and 62271-200, the following interlocks are available:
- impossibility of racking in or out is the circuit breaker is not in the “open” position
- impossible to rack in the circuit breaker when the LV plug is not connected
- impossible 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:
- 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.

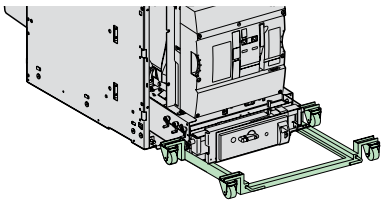
This device must be disabled if the interlocking function is not present.

Description of functions
Racking in (cont.)

DE57588

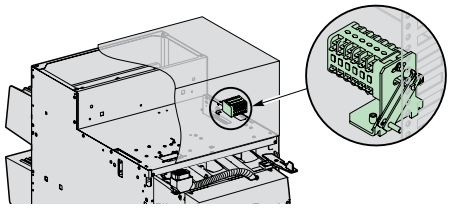


DE57589



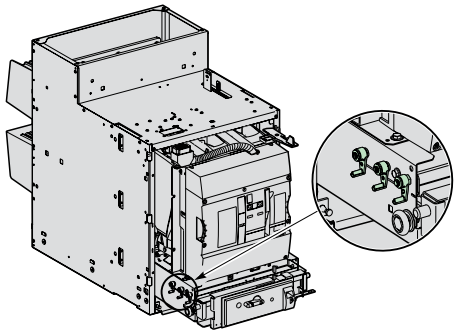
Extraction tool

DE57590



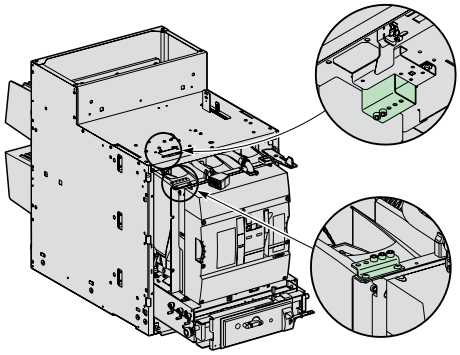
Indication contacts

DE57591



Discharge of the circuit breaker operating mechanism on extraction

DE57592



Cassette/circuit breaker foolproofing device

MC cassette safety functions

The MC cassette is designed to receive the Evolis circuit breaker and comprises the following components ensuring safety when racking-in *(see details in the Installation Guide ref. 07897536EN)*.

Metal structure with two guide rails
The rails guide the Evolis circuit breaker during racking-in/out operations.

Fixed connection fingers insulated by bushings
The three ends of the circuit breaker, fitted with racking clusters, provide the contact with these three fingers.

Metal shutters to insulate from the MV part
Three shutters mounted on the structure stop access to the racking fingers when the circuit breaker is extracted (protection index: IP2X).

Safety interlocking systems
When carrying out maintenance operations, it is possible to:
- padlock the shutters in the closed position
- unlock the access mechanism to the fixed contacts.

Anti-drop function
This function ensures operator safety during circuit breaker extraction.

Compulsory MC cassette accessories

Female Harting low voltage connector
A connector with a cable can either be delivered with the circuit breaker, with the circuit breaker plus the cassette, or separately.

Panel with circuit breaker operation pictograms
A self-adhesive panel shows racking-in and out operations for the circuit breaker. This is systematically delivered when the circuit breaker is ordered either with the cassette or as a separate order.

Racking handle
The handle is used for circuit breaker racking-in/out operations and for earthing switch opening and closing operations.

Extraction tool
- A standard tool allows the breaking device to be extracted from each cassette version, whatever the installation height, up to 800 mm from the ground.
- A simplified extraction tool can be manufactured locally according to the installation height.

MC cassette options

Circuit breaker racked-in or racked-out position indicator contacts
6 contacts (3 NO + 3 NC) or 12 contacts (6 NO + 6 NC)

Operating mechanism spring discharge system
Circuit breaker operating mechanism springs are automatically discharged when it is extracted from the cubicle. This function avoids any risk of unwanted circuit breaker closing.

Mechanical circuit breaker racked-in lock
This option is included when the earthing switch is installed. However, it can be delivered separately if the earthing circuit breaker is not required: it takes the space and volume of the earthing switch operating mechanism.

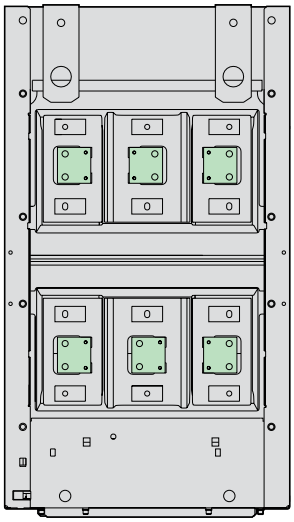
Equipped MV access door
Possibility of delivering a fully equipped, painted door (RAL 9001) available with or without the manual circuit breaker closing mechanism.
Possibility of producing the door locally (drawings and accessories available).

Foolproofing device
This enables foolproofing of the circuit breaker rating relative to the cassette rating. This system is mounted on the cassette side. The corresponding combining of the right circuit breaker rating must be carried out by the panel builder.

Description of functions
MV and LV connection

MV connection
The customer connection is easily made at the rear of the cassette on the connection terminals integrated in the bushings *(see drilling details in the "Installation Guide" ref. 07897536EN).*

DE57893

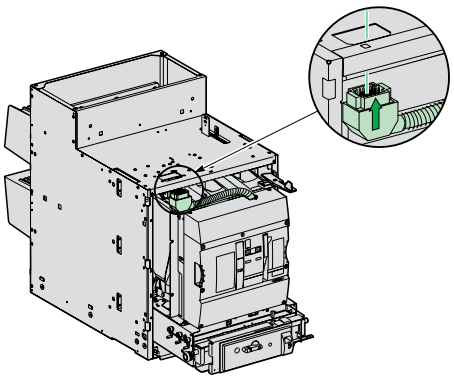


MV connection

LV connection
With the withdrawable circuit breaker, the LV cabling has an LV connector with:
- a mobile part (male Harting connector) at the end of a flexible cable, fully connected to the operating mechanism terminal by a sleeve
- a fixed part (female Harting connector) compatible with the male part mounted at the top, inside the cassette.

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.

DE57894



LV plug connection

Description of functions
P2 stored energy operating mechanism
Wiring diagram

PE56600

Operation of the P2 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:

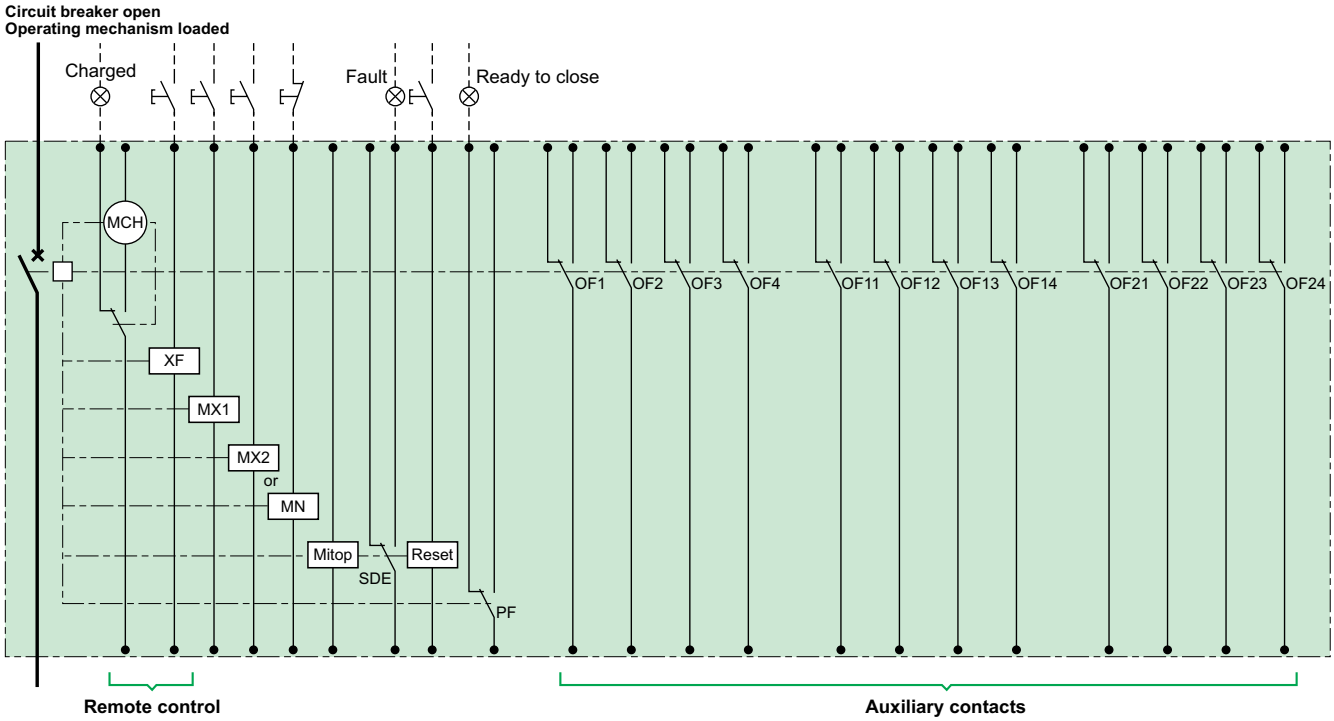
- ■ the stored energy operating mechanism which stores in springs the energy required to open and close the device
- ■ a gear motor electrical charging device with manual charging by lever (useful on loss of auxiliary supply)
- ■ manual order devices by push buttons on the front panel of the device
- ■ an electrical remote closing device containing a release with an antipumping relay
- ■ an electrical opening device containing one or more releases, for example:
  - □ shunt opening
  - □ undervoltage
  - □ Mitop, a low consumption release, used only with the Sepam 100 LA protection relay.
- ■ an operation counter
- ■ a position indication device by mechanical indicator

and 3 modules of 4 auxiliary contacts whose availability varies according to the diagram used

- ■ a device for indicating “charged” operating mechanism status by mechanical indicator and electrical contact.

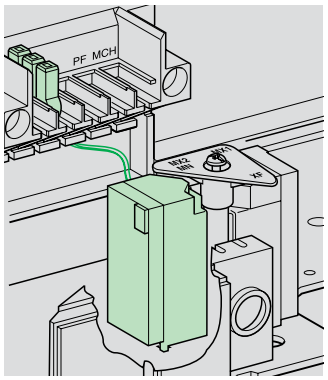
Wiring diagram (principle)

DE59408EN



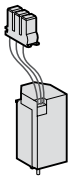
Description of functions
Opening circuit

DE58081



Circuit breaker equipped with a shunt opening release MX

DE58082



Shunt opening release (MX1 and MX2)

Composition

The opening circuit is produced using the following components:
- a shunt opening release (MX1)
- a second shunt opening release (MX2)
- undervoltage release (MN)
- time delayed undervoltage release (MNR: MN + time delay).

The time delay, placed outside the circuit breaker, can be disabled by an emergency stop button to give instant circuit breaker opening.
- low energy release (Mitop).

***Note**: see the table of the releases' combinations on the following page.*

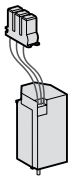
Shunt opening release (MX1 and MX2)

Energizing this release causes instant opening of the circuit breaker.
Permanent power supply to the MX unit locks the circuit breaker in the "open" position.

Characteristics		
Power supply	See "Order form" page	
Threshold	0.7 to 1.1 Ur	
Consumption (VA or W)	Triggering	200 (for 200 ms)
	Latched	4.5

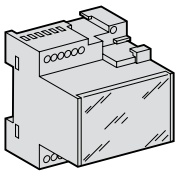
Description of functions
Opening circuit (cont.)

DE58082



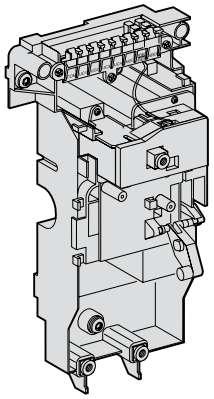
Undervoltage release (MN)

DE58083



Time delay for undervoltage release (MN)

DE58084



Low energy release (Mitop)

Undervoltage release (MN)

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 (VA or W)	Triggering	200 (for 200 ms)
	Latched	4.5

Time delay for MN

To eliminate spurious tripping of the circuit breaker when there are brief voltage drops, the MN action is controlled with a time delay.
This function is achieved by adding a time delay unit outside of the undervoltage release (MN) circuit (adjustable time delay).
This unit is placed outside the circuit breaker and can be inhibited by an emergency stop button to obtain instant circuit breaker opening.

Characteristics		
Power supply	See “Order form” page	
Threshold	Opening	0.35 to 0.7 Ur
	Closing	0.85 Ur
Consumption (VA or W)	Triggering	200 (for 200 ms)
	Latched	4.5
Time delay	0.5 s - 0.9 s - 1.5 s - 3 s	

Low energy release (Mitop)

This release includes a low consumption unit and is specifically used with the Sepam 100LA self-powered unit (“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, provided with the Mitop.
This release also includes a coil (reset) enabling remote SDE contact reset.

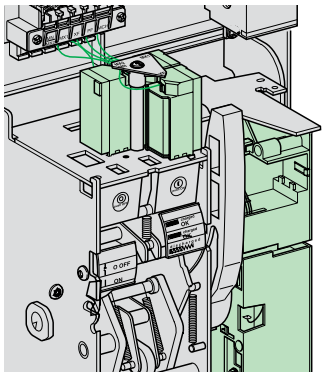
Comment:
Use of the Mitop low energy release requires adjustment of the protection relay time delay in order to ensure that the circuit breaker trips between 45-50 ms.

Releases combinations table

Shunt opening MX1	1	1	1	1	1	1
Shunt opening MX2		1			1	
Undervoltage MN			1			1
Mitop				1	1	1

Description of functions
Remote control

DE58085



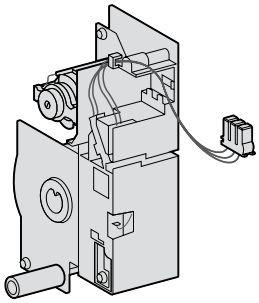
Circuit breaker equipped with remote control

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

The opening order always takes priority over the closing order.
In the event of simultaneous opening and closing orders, the mechanism discharges under no load, without moving the main contacts. The circuit breaker remains in the “open” position.
In the event of latched opening and closing orders, the mechanism carries out anti-pumping function as standard, by blocking the circuit breaker in the “open” position.
Anti-pumping function: after opening on a fault or deliberate opening via the manual or electrical mechanism, the closing order must be interrupted then reactivated to enable reclosing of the circuit breaker.

Composition
The remote control comprises:
- an electrical motor (MCH) equipped with a “spring armed” CH limit switch
- a shunt closing release (XF).

DE58086

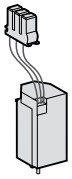


Electrical motor MCH

Electrical motor (MCH)
The electrical motor carries out the automatic rearming of the storage energy springs as soon as the circuit breaker closes. This allows instant reclosing of the device after opening. The arming lever is only used as a backup control in the case of the absence of the auxiliary power supply.
An electrical motor (MCH) equipped with a “spring armed” CH limit switch.
This contact indicates the “armed” position of the mechanism (springs armed).

Characteristics	
Power supply	See “Order form” page
Threshold	0.85 to 1.1 Ur
Consumption (VA or W)	180
Motor overcurrent	2 to 3 In for 0.1 s
Arming time	6 s maximum
Operating rate	3 cycles maximum per minute
CH contact	10 A/240 V

DE58082



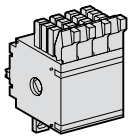
Shunt closing release XF

Shunt closing release (XF)
This release allows remote closing of the circuit breaker when the control mechanism is armed. It can be permanently or briefly supplied power.

Characteristics XF		
Power supply	See “Order form” page	
Threshold	XF	0.85 to 1.1 Ur
Consumption (VA or W)	Triggering	200 (for 200 ms)
	Latched	4.5

Description of functions
Indication

DE58087



Rotary type contacts (OC)

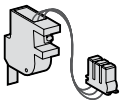
“Open/closed” auxiliary position contacts (OC)

These auxiliary contacts indicate the “open” or “closed” position of the circuit breaker.
■ Rotary type changeover contacts directly controlled by the circuit breaker mechanism.
■ Indicator contacts are proposed:
□ for standard relaying applications
□ for low level control applications with plc’s or electronic circuits.
This version is compatible with Sepam series 20-40-80 units.

Characteristics			
Standard delivery			4
Maximum quantity			12
Breaking capacity (A)	Standard		Min. load: 100 mA/24 V
Cos φ: 0.3	V AC	240/380	10/6 *
CA12/DC12		480	10/6 *
		690	6
	V DC	24/48	10/6 *
		125	10/6 *
		250	3
	Low level		Min. load: 2 mA/15 V DC
	V AC	24/48	6
		240	6
		380	3
	V DC	24/48	6
		125	6
		250	3

** Standard contacts: 10 A; optional contacts: 6 A (temperature derating)*

DE58088



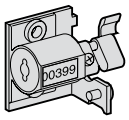
“Ready to close” PF contact

“Ready to close” PF contact

The circuit breaker is “ready to close” when shown by a mechanical indicator and a PF changeover contact.
This information simultaneously indicates that:
■ the circuit breaker is open
■ the storage energy springs are armed
■ there is no permanent closing order
■ there is no permanent opening order caused by:
□ a safety opening order (2nd MX or MN)
□ keylocking of the device in the open position.

Characteristics			
Standard delivery			0
Maximum quantity			1
Breaking capacity (A)	Standard		Min. load: 100 mA/24 V
Cos φ: 0.3	V AC	240/380	5
CA12/DC12		480	5
		690	3
	V DC	24/48	3
		125	0.3
		250	0.15
	Low level		Min. load: 2 mA/15 V DC
	V AC	24/48	3
		240	3
		380	3
	V DC	24/48	3
		125	0.3
		250	0.15

DE58089



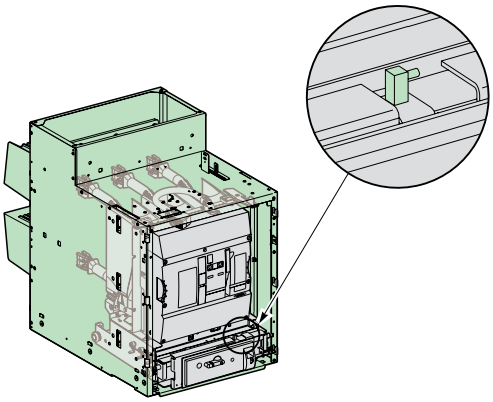
Operation counter (CDM)

Operation counter (CDM)

The operation counter is visible on the front panel.
It totalizes the number of switching cycles (CO) that the device has carried out.

Description of functions
Interlocking

DE57587



Cubicle door interlocking mechanism

Cubicle door interlocking mechanism

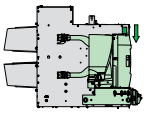
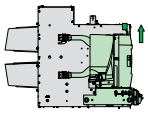
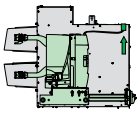
This device enables the circuit breaker to only be operated when the door is closed, for the withdrawable version with a cradle.

Description of functions
Safety functions

This table describes the safety functions available on the withdrawable version of the Evolis 17.5 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 - Cassette			Fool-proof protection (1) / Anti-drop (2)				
		No opening shutters					
		Shutters padlocking possible					
2 - LV plug	Disconnected			No door closing			
	Connected				No unplugging		
3 - Circuit breaker	Closed				No racking-in		No racking-out
	Open					No closing	
		Open position circuit breaker locking available					
4 - Switchboard door	Open				No racking-in		
	Closed				No door opening (3)		
5 - Earthing switch	Open					No earthing switch closing	
	Closed				No racking-in		

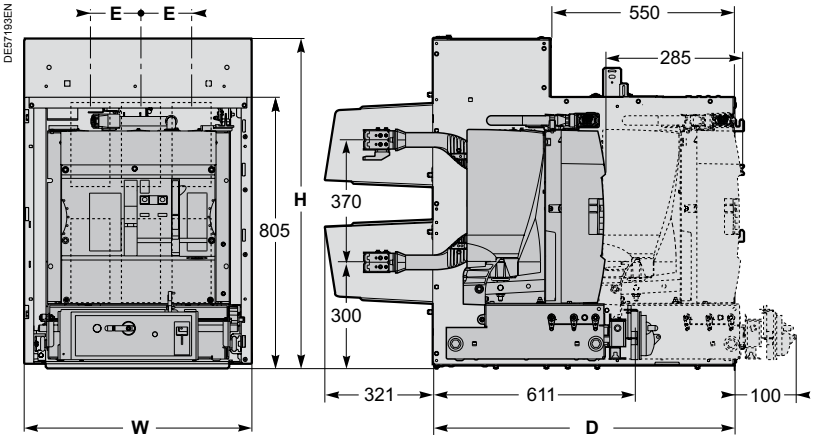
(1) This protection mechanism ensures that the performance levels of the circuit breaker correspond with those of the cassette.
(2) *Device that prevents the circuit breaker from dropping when extracted from the cassette.*
The device can be either unlocked manually or when the extraction rig is put in position.
(3) *Interlocking device to be fitted to the cubicle door. If there is no interlocking, the circuit breaker device should be inhibited.*

Dimensions

Device

Basic withdrawable

Cassette		MC1	MC2	MC3
Phase to phase (mm)	E	145	185	240
Dimensions (mm)	W	556	686	886
	H	980	980	980
	D	1223	1223	1223
Weight (kg)		222	255	326



Order form

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

Releases combinations table

MX1	1	1	1	1	1	1
MX2		1			1	
MN			1			1
Mitop				1	1	1

Basic withdrawable circuit breaker

Quantity

Rated voltage Ur (kV)

Short-circuit current Isc (kA)

Rated current Ir (A)

Phase to phase distance (mm) 145 ☐ 185 ☐ 240 ☐

Colour for push buttons and indicators

Push buttons open/closed: Red/black
Indicator open/closed: Black/white Green/red
Operating mechanism charged/discharged: Yellow/white

Circuit breaker options

Opening release (see possible choices in combination table)

Shunt opening release **MX1**

24 Vac 24…30 Vcc 100…130 Vcc 200…250 Vcc
48 Vac 48…60 Vcc 100…120 Vac 200…240 Vac

Shunt opening release **MX2**

24 Vac 24…30 Vcc 100…130 Vcc 200…250 Vcc
48 Vac 48…60 Vcc 100…120 Vac 200…240 Vac

Undervoltage release **MN**

24 Vac 24…30 Vcc 100…130 Vcc 200…250 Vcc
48 Vac 48…60 Vcc 100…130 Vac 200…240 Vac

Time delay for **MN**

48…60 Vac 100...130 Vcc/ca 200…250 Vcc 200…240 Vac

Low energy release **Mitop**

Remote control

Electrical motor **MCH**

24…30 Vdc 100…125 Vdc 200…250 Vdc
48…60 Vdc/ac 100…130 Vac 200…240 Vac

Shunt closing release **XF**

24 Vac 24…30 Vcc 100…130 Vcc 200…250 Vcc
48 Vac 48…60 Vcc 100…130 Vac 200…240 Vac

Module of 4 additional auxiliary contacts O/C 1 2
Ready to close contact PF
LV plug 42-pin LV plug (instead of 18)
Operating shaft Quantity (one mini per switchboard)

MC cassette

Quantity

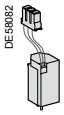
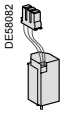
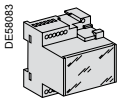
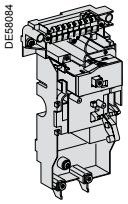
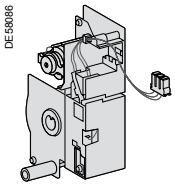
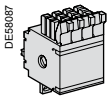
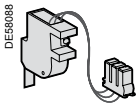
MC cassette type MC1 MC2 MC3
Short-circuit current Isc ≤ 31.5 kA
Rated current Ir 1250 A 2500 A

MC cassette accessories

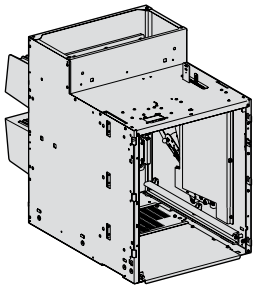
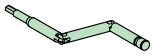
Racked in/out position contact 3 NO, 3 NC 6 NO, 6 NC
Pictogram of the circuit breaker of the earthing sw.
Discharge of the circuit breaker control mechanism springs
Extraction table Quantity
Extra handle Quantity
Door with handle, windows and pictogram
MC1 MC2 MC3
Door accessories (local manufacture)**: handle, windows and pictogram**
with cover plate for MC1 MC2 MC3

Offer structure
Separated components

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

Remote control and opening circuit			Ref.
MX1, MX2, XF shunt opening/closing release			
 DE58082	24…30 Vdc	24 V 50/60 Hz	**59284**
	48…60 Vdc	48 V 50/60 Hz	**59285**
	100…130 Vdc - 50/60 Hz		**59286**
	200…250 Vdc - 50/60 Hz		**59287**
Undervoltage release MN			
 DE58082	24…30 Vdc	24 V 50/60 Hz	**59288**
	48…60 Vdc	48 V 50/60 Hz	**59289**
	100…130 Vdc - 50/60 Hz		**59290**
	200…250 Vdc - 50/60 Hz		**59291**
Time delay for MN			
 DE58083	48…60 Vdc - 50/60 Hz		**33680**
	100…130 Vdc - 50/60 Hz		**33681**
	200…250 Vdc - 50/60 Hz		**33682**
Low energy release Mitop			
 DE58084			**59160**
Electrical motor MCH			
 DE58086	24…30 Vdc		**47888**
	48…60 Vdc		**47889**
	100…125 Vdc		**47890**
	200…250 Vdc		**47891**
	48…60 V - 50/60 Hz		**47889**
	100…130 V - 50/60 Hz		**47893**
	200…240 V - 50/60 Hz		**47894**
Additional auxiliary contacts O/C			
 DE58087	Module of 4 contacts		**47887**
LV terminal blocks			
 DE57544	1 terminal block		**47074**
Ready to close contact PF			
 DE58088			**47080**

Offer structure
Separated components (cont.)

Accessories		Ref.
MC cassette		
DE57588 	MC1	**51237324FR**
	MC2	**51237324FQ**
	MC3 (Ir up to 1250 A)	**51237324FW**
	MC3 (Ir > 1250 A)	**51237324FS**
Indication of the "CB racked in/racked out" position		
	Module of 6 contacts	**AAA12951FA**
	Module of 12 contacts	**AAA12951FB**
Rack-in/rack-out operation		
DE57582 	Operating shaft	**03405140FO**

Services

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

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

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