EcoStruxure™
Innovation At Every Level

Pact series

EvoPact SF

Medium Voltage Distribution

Catalog 2022

SF_6 Circuit breaker up to 40.5 kV

se.com

Life Is On Schneider Electric

Same technology, same offer, simpler names

We're making it easier for you to navigate across the wide range of our world-class digital products and select the offers that are right for you and your needs with confidence.

EcoStruxure Architecture

To enable brand consistency, relevance and impact, we are reinforcing our EcoStruxure™ architecture and digital customer lifecycle tools to help ensure a seamless experience from the CAPEX to OPEX phases of each project, bridging our entire ecosystem of partners, services providers and end users.

EcoStruxure is our IoT-enabled open and interoperable system architecture and platform. EcoStruxure delivers enhanced values around safety, reliability, efficiency, sustainability and connectivity for our customers. EcoStruxure leverages advancements in IoT, mobility, sensing, cloud, analytics, and cybersecurity technologies to deliver Innovation At Every Level from Connected Products, Edge Control, Apps, and Analytics & Services: our IoT technology Levels.

Old names	New names
Ecodial	EcoStruxure Power Design
Ecoreal	EcoStruxure Power Build
Ecoreach	EcoStruxure Power Commission
MasterPact MTZ mobile App/Easergy mobile App	EcoStruxure Power Device App

Pact and **Set** Series

Featuring outstanding medium-voltage (MV) and low-voltage (LV) switchboards, motor control centers and power distribution solutions for high-performance power applications, Schneider Electric's Pact and Set Series are best-in-class solutions based on high levels of safety and an optimized footprint. Built on a modular architecture and incorporating smart connected devices for maximum safety, reliability, performance and energy efficiency, the Set Series is delivered to customers directly from our Schneider Electric plants or via a global network of licensed partner panel builders, who are trained and audited to provide quality equipment and support.

Old names	New names
HVX	Evo**Pact** HVX
LF	Evo**Pact** LF
SF	Evo**Pact** SF
Premset	Prem**Set**
Compact	Com**Pact**
Masterpact	Master**Pact**
Transferpact	Transfer**Pact**
Fupact	Fu**Pact**

Your needs

EvoPact SF answers

Continuity of service

- Low level of SF_6 pressure
- A safety membrane which, in very rare cases of an internal arc, will open in order to let the gas flow to the back of the circuit breaker
- Keeping at 0 bar of SF_6:
  - The nominal performance
  - The capacity to break once at least 80 % of the full breaking capacity
  - The capacity to withstand at least 80 % of the insulating level
- Breaking all types of current without overvoltages

Proven technology

- Long experience of Schneider Electric in manufacturing MV circuit breakers in SF_6 technology
- 800,000 EvoPact SF Circuit Breakers installed with over 25 years of experience

Ease of installation

- Comprehensive range with a large choice of versions
- Cradle versions: retrofit and new panels integration

PM1104632

The advantages of a proven technology

A new path for achieving your electrical installations

General Contents

General Presentation

Content

The advantages of a proven technology

Schneider Electric has developed a wide range of high performance and reliable devices operating faultlessly on all 5 continents.

Continuously increasing its performance, the company maintains a very high level of innovation in its offer.

Key Benefits

- Compact and simple design
- No overvoltage during breaking
- Field proven experience

Certification

PE58256

The quality system for the design and production of EvoPact SF range is certified in conformity with ISO 9001: 2008 quality assurance standard requirements.

The environmental management system adopted by Schneider Electric production sites for the production of EvoPact SF range has been assessed and judged to be in conformity with requirements in standard ISO 14001.

Safety

The breaking medium is sulfur hexafluoride (SF_6) used at low pressure.

The insulating enclosure containing the circuit breaker pole(s) is equipped with a safety membrane.

In addition, the rated characteristics, breaking the rated current under the rated voltage, are generally maintained at zero relative bars of SF_6.

Reliability

The motor-charged spring stored energy operating mechanism is a key factor of device reliability: Schneider Electric cumulates 45 years' experience with this type of mechanism, 1,200,000 of which are already in operation.

Schneider Electric's mastery of design and the testing of sealed systems guarantees sustained device performance for at least 30 years.

Increased endurance

The mechanical and electrical endurance of Schneider Electric SF_6 breaking devices are in conformity with the most demanding specifications recommended by the IEC.

These devices therefore meet requirements for even the most exposed of networks.

Environmentally-friendly

Schneider Electric devices have been designed to ensure protection of the environment:

- the materials used, both insulating and conductive, are identified and easy to separate and recycle,
- the SF_6 gas is under control from production through to the circuit-breaker's end of life. In particular it can be recovered at the end of the circuit-breaker's life and re-used after treatment in line with the new European directive,
- an end of life manual for the product details procedures for dismantling and recycling components.

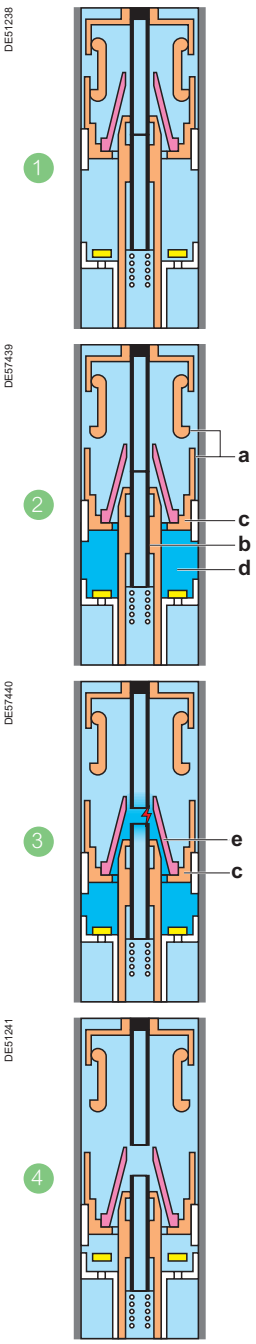
Quality Assurance

During production, each circuit breaker undergoes systematic routine tests in order to check quality and conformity:

- pole sealing check
- checking the correct mechanical operation of the device, plus its associated locking mechanisms
- checking simultaneous closing of contacts
- checking power frequency insulation level
- checking main circuit resistance
- checking auxiliary circuit insulation
- checking switching speeds
- checking the switching cycle
- measuring the switching times.

The results are recorded on the test certificate for each device which is initiated by the quality control department.

Breaking principle



Breaking principle: puffer type

EvoPact SF circuit breakers use the puffer principle with SF6 gas.

This methods cools and extinguishes the electrical arc as it passes through zero current by puffing a gas compressed by a piston attached to the moving contact. The gas is channeled by an insulating nozzle towards the tubular arcing contacts that are used as an exhaust.

This breaking technique is used for high-performance breaking applications (40.5 kV-31.5 kA) and has been used for the past 45 years.

The operating sequence in a puffer-type breaking chamber with the moving part actuated by a control mechanism is as follows:

1

The circuit breaker is closed

2

Following an opening order the main contacts separate (a) and the current is directed into the breaking circuit (b).
When the main contacts start to open the piston (c) slightly compresses the SF_6 gas in the compression chamber (d)

3

An electrical arc appears on separation of the arcing contacts. The piston (c) continues its travel downwards.
A small quantity of the gas channeled by the insulating nozzle (e) is injected towards the arc.
For low current breaking, the arc is cooled by forced ventilation.
However, for high currents the thermal expansion moves the hot gases towards cooler parts in the breaking unit.

The distance between arcing contacts becomes sufficient to allow breaking of the current when it passes through zero due to the dielectric properties of the SF_6 gas

4

The moving parts finish their movement and injection of cold gas continues until the contacts are fully open

The circuit breaker is open

Scope of application and some references

Our EvoPact SF Circuit Breaker adapts to all electrical power distribution requirements up to 40,5 kV.

Applications

EvoPact SF circuit breakers are 3-pole MV circuit breakers for indoor installation.
They are mainly used for switching and protection of networks up to 40.5 kV in primary and secondary power distribution.

The autocompression breaking technique used in these circuit breakers means that making or breaking all types of capacitive or inductive currents can be achieved without dangerous overvoltages for the switchgear connected to the network.

The EvoPact SF circuit breaker is therefore well suited to operating capacitor banks.

SF_6 Circuit Breaker is an essential component of an indoor metal-enclosed device intended for the MV section of HV/MV substations and high power MV/MV substations.

- SF_6 Circuit Breaker offers you:
  - pre-engineered and adaptable solutions tailored to your specific requirements
  - significantly reduced maintenance
  - local support centres throughout the world

- EvoPact SF Circuit Breaker gives you the advantages of:
  - continuity of service for your networks;
  - enhanced safety for your staff and operations
  - optimised investment throughout the life of your installation
  - the possibility of integrating your medium voltage switchboard in a monitoring and control system

EvoPact SF Circuit breaker is present in all power distribution markets

Energy

- Electric power stations (thermal)
- Auxiliary substations
- Source substations

Industry

- Oil & gas
- Chemical industry
- Paper mills
- Metallurgy
- Car industry
- Mining
- Cement plants…

Infrastructure

- Airports
- Ports
- Hospitals
- Water treatment…

Scope of application and some references

Power generation

Sonelgas SEC	Algeria KSA
Costa Nera SA power station	Argentina
Union Electrica	Cuba
Canal Electrical Distribution Company	Egypt
CEA Cadarache	France
EDF	France
Wind Turbines	France
Sarlux power station	Italy
Ivory Electricity Company	Ivory Coast
PowerCo	New Zealand
NIPP JEPCO	Nigeria Jordan
Skagerak Nett AS	Norway
OETC	Oman
Wind farm	Turkey
Renovation of the Tchernobyl nuclear power station	Ukraine
EVN thermal power station	Vietnam

Oil and Gas

Oil, Girassol Mpg-Elf	Angola
Oil, Repsol, Santander	Spain
Oil, Sincor (Total)	Venezuela
Raffinerie PetroVietnam	Vietnam
Petro Amazona	Ecuador
Sonatrach QuatarPetroleum	Algeria Qatar
Exxon Mobil	Netherland
OMSK refinery NURLAT refinery	Russia
TADCO, BABOIL developmen	United Arab Emirates

Infrastructure

New Islands Project	Abu Dhabi
Hamilton Hotels	Australia
Zaventem Airport	Belgium
Hospital Oswaldo Cruz, São Paulo	Brazil
Karoua Airport	Cameroon
Sanya Airport	China
Bank of China, Beijing, Jv Yanta	China
Santafe de Bogota Airport	Colombia
Libreville Airport	Gabon
Plaza Hotel, Jakarta	Indonesia
Bali Airport	Indonesia
Grand Indonesia Project	Indonesia
Milan Metro	Italy
Ivarto Hospital, CORIF	Madagascar
Slim River Hospital	Malaysia
Lamentin Airport, CCIM	Martinique
Metro of Mexico	Mexico
Central Bank of Abuja, ADEFEM	Nigeria
Alicante Airport	Spain
Girona Airport	Spain
Port of Laem Chabang	Thailand
Industrial Zone	Turkey
Danang and Quinhon Airport	Vanad, Vietnam

Industry

Water treatment, Degremont	Argentina
Agri-food, Mastellone	Argentina
Alcoa Aluminium	Australia
General Motors Holden	Australia
Rio Tinto (Mining)	Australia
Automotive, Volvo	Belgium
Water treatment, (SIAAP),	France
Cement production, Lafarge	France
Automotive, Ford	Germany
Bridgestone	Hungary
Pharmaceutical, Merck	Singapore
BD Medical	Singapore
General Motors	Thailand

Operating conditions & Standards

PE58251

Operating conditions

Normal operating conditions, according to the IEC International Standards listed below, for indoor switchgear.

- Ambient air temperature:
  - less than or equal to 40°C
  - less than or equal to 35°C on average over 24 hours
  - greater than or equal to – 25 °C
- Altitude:
  - less than or equal to 1000 m;
  - above 1000 m, a derating coefficient is applied (please consult us)
- Atmosphere: no dust, smoke or corrosive or flammable gas and vapor, or salt
- Humidity:
  - average relative humidity over a 24 hour period ≤ 95%
  - average relative humidity over a 1 month period ≤ 90%
  - average vapor pressure over a 24 hour period ≤ 2.2 kPa
  - average vapor pressure over a 1 month period ≤ 1.8 kPa

Storage conditions

In order to retain all of the functional unit's qualities when stored for prolonged periods, we recommend that the equipment is stored in its original packaging, in dry conditions, and sheltered from the sun and rain at a temperature ranging from - 40°C up to + 70°C.

PM104585

Standards

The EvoPact SF range meets the following international standards:

- IEC 62271-100: High-voltage switchgear and controlgear - Alternating current circuit-breakers
- IEC 62271-1: High-voltage switchgear and controlgear: common specifications

EvoPact SFcircuit breakers range

One range of comprehensive and proven three-pole circuit breaker units for indoor installation using SF_6 technology.

Both compact and dependable, it is ideally suited to the most demanding applications.

EvoPact SF1 and SFset circuit breakers fixed versions

PM110000

EvoPact SF2 circuit breakers fixed version

PM109997

EvoPact SF F400 circuit breakers withdrawable version

PM109998

EvoPact SF circuit breakers panorama

Circuit breakers

EvoPact SF range circuit breakers - FIXED version

PM110000

PE56504

PM109997

EvoPact SF1 fixed Side or front operating mechanism	EvoPact SFset fixed Side or front operating mechanism with integrated VIP	EvoPact SF2 fixed Front operating mechanism
Rated voltage Ur (kV, 50/60 Hz)		
12 / 17.5 / 24 / 36	12 / 17.5 / 24	24 / 36 / 40.5
Rated short-circuit breaking current (Isc)		
25 kA / from 12.5 to 25 kA	25 kA / from 12.5 to 25 kA	from 12.5 to 40 kA / from 25 to 40 kA / 31.5 kA
Rated current (Ir)		
630 A / from 400 to 1250 A	630 A / 630 A	from 630 to 3150 A / 2500 A

EvoPact SF circuit breakers panorama

(cont.)

Circuit breakers

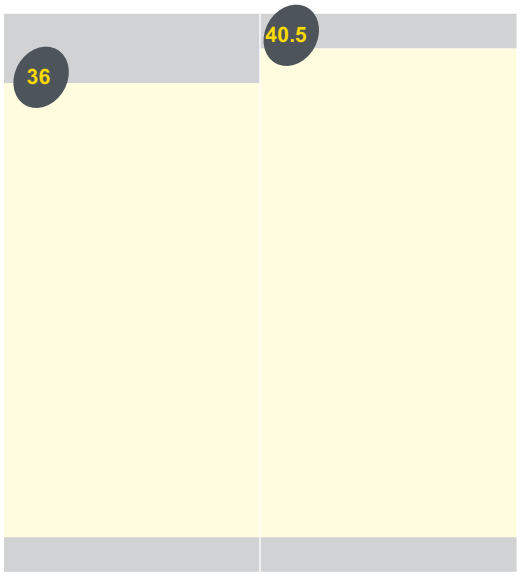
EvoPact SF range circuit breakers - WITHDRAWABLE version

PE68880-new

PM109998

EvoPact SF F400 withdrawable

Front operating mechanism



from 25 to 40 kA	31.5 kA
1250 and 2500 A	1250 A

Protection, monitoring and control

EvoPact SFset circuit breakers

PM100576

VIP400/410

- MV distribution substation incomer, feeder and bus riser protection relay
- MV/LV transformer protection

EvoPact SF1/SF2/SF F400 circuit breakers

PE90511

PowerLogic P1

Simple, reliable and effective protection relays

PowerLogic Easergy P3

The perfect fit for standard MV applications

PowerLogic P5

Enhanced safety and security for demanding MV applications

EvoPact SF1 and EvoPact SFset circuit breakers fixed version

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PM110000

EvoPact SF1 circuit breakers with a B1 side operating mechanism

PE56504

EvoPact SFset circuit breakers with a B1 side operating mechanism

Description of the device

The basic withdrawable version of the EvoPact SF circuit breaker comprises:

- 3 main independent poles, that are mechanically linked and each comprising
- a "sealed pressure system" type insulating enclosure. The sealed enclosure is filled with low pressure SF_6 gas
- a stored energy operating mechanism of manual RI type (that can be electrically operated as an option)
  This gives the device an opening and closing speed that is independent of the operator, for both electrical and manual orders.
  When equipped with an electrical operating mechanism, the circuit breaker can be remotely controlled and it is possible to carry out reclosing cycles.
- 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.

According to its characteristics, the EvoPact SF circuit breaker is available either in frontal version or in lateral version.

Each device can be optionally equipped with:

- an electrical operating mechanism
- a support frame fitted with rollers and floor securing brackets for a fixed installation
- locking of the circuit breaker in the open position by a keylock installed on the control panel
- a pressure switch for the high performance versions
- a Harting 42-pin type LV connector.

The EvoPact SFset includes an independent protection chain

The EvoPact SFset is provided with a fully autonomous integrated protection chain (with a VIP type control unit) operating without an auxiliary power source.

The VIP protection unit exists in two models: VIP400 and VIP410.

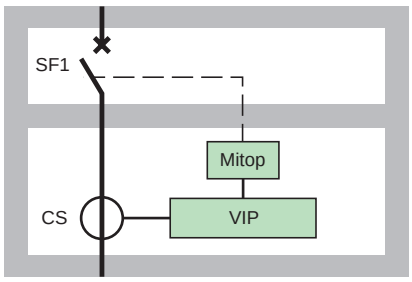
Depending on the model, the unit provides protection against phase over-currents and earthing faults.

VIP protection units are associated with functional current sensors.

Two interchangeable sensors, CSa4 and CSb4, are sufficient to cover all requirements from 0 to 630 A.

EvoPact SFset is delivered equipped and cabled with its protection chain, this simplifies panel builders' installation work.

DE57401



EvoPact SFset schematic diagram

General characteristics

EvoPact SF1

PM110000

Electrical characteristics according to IEC 62271-100

Rated voltage	Ur	kV 50/60 Hz		12	17.5			24				36			
Insulation voltage															
- power frequency withstand	Ud	kV 50 Hz 1min		28	38			50				70			
- lightning impulse withstand	Up	kV peak		75	95			125				170			
Rated current	Ir	A	400	–	–	■	–	■	■	–	–	■	–	–	–
			630	■	■	■	■	■	■	■	■	■	■	■	■
			1250	–	■	■	■	■	■	■	■	■	■	■	■
Short circuit current	Isc	kA		25	12.5	20	25	12.5	16	20	25	12.5	16	20	25
Short time withstand current	Ik/tk	kA/3 s		25	12.5	20	25	12.5	16	20	25	12.5	16	20	25
Short-circuit making current	Ip	kA peak	50 Hz	62.5	31.3	50	62.5	31.3	40	50	62.5	31.3	40	50	62.5
			60 Hz	65	32.5	52	65	32.5	41.6	52	65	32.5	41.6	52	65
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		■	■			■				■			
Phase to phase		mm	220	–	■	■	■	–	–	–	–	–	–	–	–
			250	■	■	■	■	■	■	■	■	–	–	–	–
			280	–	–	–	–	■	■	■	■	–	–	–	–
			350	–	–	–	–	–	–	–	–	■	–	■	■
			380	–	–	–	–	–	–	–	–	■	■	■	■
Operating mechanism		A1 lateral (*)		–	■	■	■	■	■	■	■	■	–	■	■
		B1 lateral (*)		–	■	■	■	■	■	■	■	■	–	■	■
		C1 frontal (*)		–	■	■	■	■	■	■	■	■	–	■	■
		For SM6 switchgear		■	–	■	–	■	■	■	–	■	■	■	■
Operating times		Opening (ms)		< 60											
		Breaking (ms)		< 75											
		Closing (ms)		< 100											
Service temperature	T	°C		- 5 to + 40 (**)											
Mechanical endurance		Class		M2											
		Number of switching operations		10,000											
Electrical endurance		Class		E2											
Capacitive current breaking capacity		Class		C2											

(*) See chapter "Dimensions"
(**) For a temperature lower than -5 °C, please consult us

■ *Available*
– *Not available*

Specific applications

Switching and protection of capacitor banks

EvoPact SF range circuit breakers are particularly well suited to switching and protection of capacitor banks; they are classed C2 according to standard IEC 62271-100.

Tests carried out according to the standard for breaking at 400 A with making and breaking cycles in case of a capacitor bank with a making current of 20 kA.

General characteristics

(cont.)

EvoPact SFset

PE56504

Electrical characteristics according to IEC 62271-100

Rated voltage	Ur	kV 50/60 Hz		12	17.5			24			
Insulation voltage											
- power frequency withstand	Ud	kV 50 Hz 1min		28	38			50			
- lightning impulse withstand	Up	kV peak		75	95			125			
Rated current	Ir	A	400	–	–	■	–	■	■	–	–
			630	■	■	■	■	■	■	■	■
			1250	–	–	–	–	–	–	–	–
Short circuit current	Isc	kA		25	12.5	20	25	12.5	16	20	25
Short time withstand current	Ik/tk	kA/3 s		25	12.5	20	25	12.5	16	20	25
Short-circuit making current	Ip	kA peak	50 Hz	62.5	31.3	50	62.5	31.3	40	50	62.5
			60 Hz	65	32.5	52	65	32.5	41.6	52	65
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		■	■			■			
Phase to phase		mm	220	–	■	■	■	–	–	–	–
			250	■	■	■	■	■	■	■	■
			280	–	–	–	–	■	■	■	■
			350	–	–	–	–	–	–	–	–
			380	–	–	–	–	–	–	–	–
Operating mechanism		A1 lateral (*)		–	■	■	■	■	■	■	■
		B1 lateral (*)		–	■	■	■	■	■	■	■
		C1 frontal (*)		–	■	■	■	■	■	■	■
		For SM6 switchgear		■	–	■	–	■	■	■	–
Operating times		Opening (ms)		< 60							
		Breaking (ms)		< 75							
		Closing (ms)		< 100							
Service temperature	T	°C		- 5 to + 40 (**)							
Mechanical endurance		Class		M2							
		Number of switching operations		10,000							
Electrical endurance		Class		E2							
Capacitive current breaking capacity		Class		C2							

(*) See chapter "Dimensions"
(**) For a temperature lower than -5 °C, please consult us

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Specific applications

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Tests carried out according to the standard for breaking at 400 A with making and breaking cycles in case of a capacitor bank with a making current of 20 kA.

Description of functions

RI stored energy operating mechanism Wiring diagram

PM109995

Manual or electrical operation of the RI stored energy operating mechanism

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

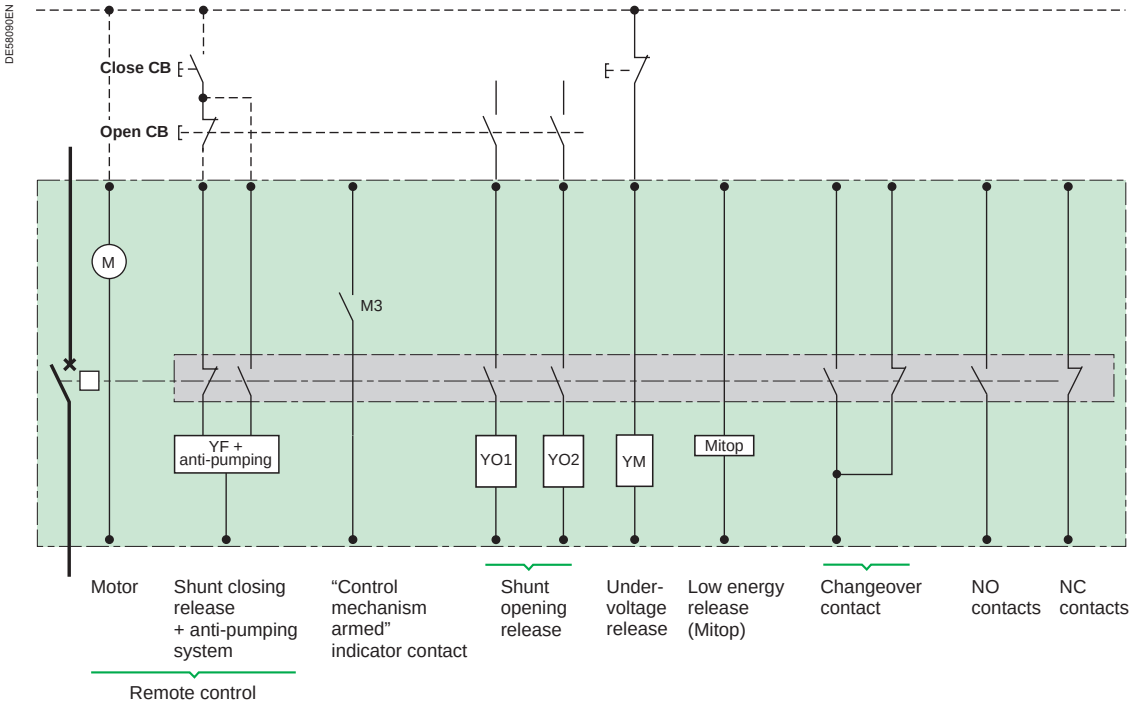
The electrical control mechanism carries out reclosing cycles and is automatically recharged by a geared motor each time after closing.

It consists of:

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

Wiring diagram (principle)

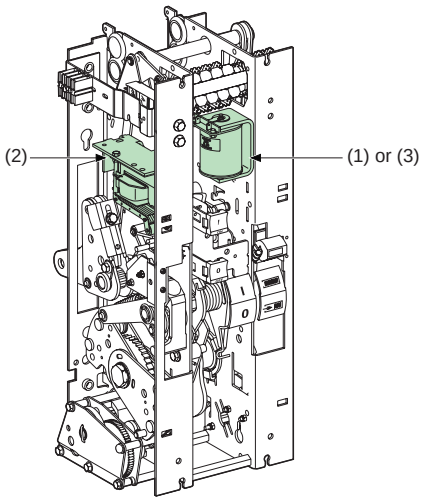
DE58090EN



Description of functions

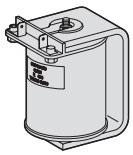
Opening circuit

DE57612EN



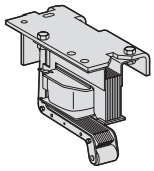
Operating mechanism

DE58092



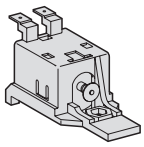
Shunt opening release (1)

DE58093



Undervoltage release (2)

DE58094



Low energy release (3)

Composition

The opening circuit can be produced using the following components:

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

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

Shunt opening release (YO1 and YO2)

Energizing this unit causes instant opening of the circuit breaker.

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

As an option, the tripping circuit monitoring (supervision) enables to ensure that the Circuit breaker is ready to open.

Undervoltage release (YM)

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

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

Low energy release (Mitop)

This specific release unit comprises a low consumption unit and is specifically used with self-powered relays.

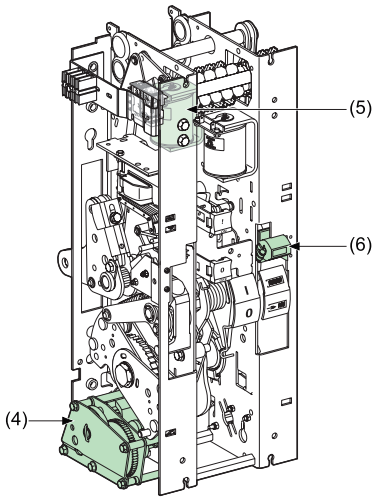
Characteristics	
Power supply	Direct current
Threshold	0.6 A < I < 3 A

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

Description of functions

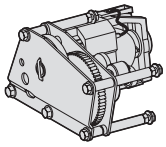
Remote control

DE57604



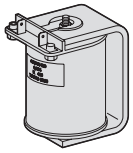
Operating mechanism

DE58096



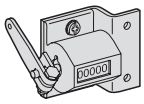
Electrical motor with gearing (4)

DE58092



Shunt closing release (5)

DE58097



Operation counter (6)

Function

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

Composition

The remote control mechanism comprises:

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

Electrical motor with gearing (M)

The electrical motor arms and re-arms the stored energy unit as soon as the circuit breaker is closed. This allows the instant closing of the device after opening.

The arming lever is only used as a back-up operating mechanism in the case of any auxiliary power supply.

The M3 contact indicates the end of arming operations.

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

Shunt closing release (YF)

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

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

The anti-pumping relay enables the guaranteeing of opening priority in the case of a permanent closing order. This therefore avoids the device being caught in a uncontrolled opening-closing loop.

Operation counter

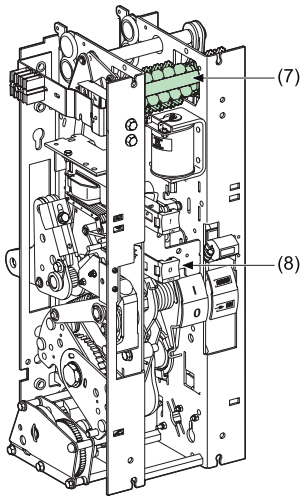
The operation counter is visible on the front panel.

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

Description of functions

Indication and locking/interlocking

DE57491

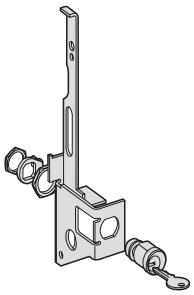


Operating mechanism

DM103526

Auxiliary contacts (7)

DE58099



Keylocking kit (8)

“Open/closed” auxiliary contacts

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

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

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

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

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

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

E.g.: a circuit breaker equipped with a remote control and a shunt trip unit has the following available contacts:
6 NC + 5 NO + 1 CHG.
With a undervoltage release instead of the shunt trip, this circuit breaker would have the following available contacts:
6 NC + 6 NO + 1 CHG.

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

Locking the circuit breaker in the “open” position

This key-operated device allows the circuit breaker to be locked in the “open” position.

The circuit breaker is locked in the open position by blocking the opening push button in the “engaged” position.

Locking is achieved using a flat or tubular captive key type keylock.

Protection, monitoring and control

VIP400 & VIP410 protection relays

PE56504

EvoPact SFset with a VIP protection unit installed on the front panel

The EvoPact SFset circuit breaker has an integrated and independent protection system

The EvoPact SFset circuit breaker comprises an EvoPact SF1 into which is integrated a protection system comprising:

- a set of current sensors installed on the lower current terminals of the pole units.
- two interchangeable sensors, CSa4 and CSb4, sufficient to cover all requirements from 0 A to 630 A
- a VIP type protection relay mounted on the control unit.
- a “Mitop” low consumption, release unit installed on the switching device.
- The unit is fully independent and functions without an auxiliary power supply.

Operating principle

The protection system is supplied power by sensors which supply:

- the “current” information, processed by the protection unit
- the electrical power required for the whole protection system to operate ;

VIP unit and Mitop release.

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

Introduction

VIP400 and VIP410 protection relays are designed for the protection and operation of MV/LV utility substations and electrical distribution networks in industrial installations.

They are suitable for typical protection applications that require current metering, phase overcurrent and earth fault protection, and thermal overload protection.

The VIP400 is a relay with a self-powered supply. It is powered by its current sensors and operates without an auxiliary power supply.

The VIP410 is a relay with a dual power supply. It is powered both by its current sensors, just like the VIP400, and also by an auxiliary power supply. The protection functions work autonomously, like those on the VIP400.

With the VIP410, the auxiliary power supply is needed for the communication, the output relays and the very sensitive earth fault protection to work. The VIP410 protection functions work even if the auxiliary power supply fails.

Applications

- MV distribution substation incomer, feeder and bus riser protection relay
- MV/LV transformer protection

- VIP 400 is a self-powered relay energised by the CTs; it does not require an auxiliary power supply to operate
- VIP410 is a dual powered relay offering self-powered functions and additional functions powered by an AC or DC auxiliary supply.

PM100576

PM100580

VIP 410: ready for Smart grids

VIP 410 includes a dual supply for communication with

- Remote communication with DMS and RTUs
- Remote alarming
- Time stamped events recorded
- Measurement of current, load history, over-current and breaking profile

VIP 410 is dedicated for intelligent MV loops with automation:

- Remote configuration
- Setting groups selectable according to the configuration of the MV loop
- Remote asset management
- Plug and play system with Easergy RTUs (R200) to integrate all the protocols (IEC60870-104, DNP3, IEC61850), and remote WEB pages.

Protection, monitoring and control

VIP400 & VIP410 protection relays

Easy to use

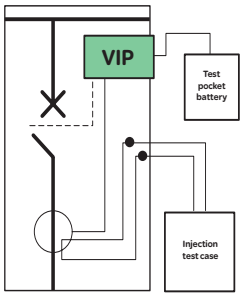
Front panel keypad and display

- used to set the protections and the operating parameters.
- displays the network currents and the fault messages.
- the settings are protected by a password and by a sealable cover.
- the setting does not require a PC.
- the LCD is backlit if the VIP410 auxiliary power is present.
- 4 fault indicators: OC, EF, thermal, external
- 3 status led: watch dog, aux power supply, communication

Time tagged events records

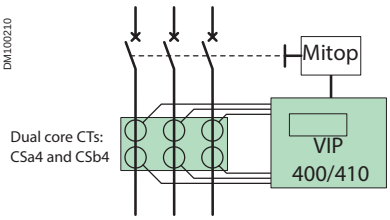
Each time VIP400, 410 trips the CB, it records the origin of the event, the tripping currents, the date and the time. These data can be read on the front panel or by communication. It provides the operator with an help to analyze a fault on the network.

DM100208



Tests of protection system and circuit breaker

DM100210



Dual core CTs : for power and measurement

Main features

VIP400: Self-powered protection relay

This version is energised by the current transformers (CTs).
It does not require an auxiliary power supply to operate.

- Overcurrent and earth fault protections
- Thermal overload protection
- Current measurement functions

VIP410: Dual powered protection relay

- Offers the same self-powered functions as the VIP 400
- In addition, the VIP410 has an AC or DC auxiliary supply to power certain additional functions that cannot be self-powered:
- sensitive earth fault protection convenient to all earthing systems
- external tripping input
- cold load pick-up
- 2 setting groups selectable by communication
- communication (Modbus RS485 port)
- signalling relays
- If the auxiliary power fails during an MV short-circuit, the protection functions are maintained operational

Other features

- Designed for circuit breakers up to 630 A
- Complete pre-tested solution that eliminates complicated CT selection
- Complies with MV protection relay standard IEC 60255
- No PC or specific tool required for setting or commissioning
- Self-powered by dual core CTs: CSa4/CSb4
- Environment: -40°C / +70°C

Primary injection test

A primary injection circuit may be permanently installed (option) through the CTs, inside the cubicle, to test the physical integrity of the complete protection system including the CTs

- The test is carried out without disconnecting the CTs and the VIP relay displays the injected current during testing
- If required, a temporary VIP test mode can be activated to test the tripping of the circuit breaker by pressing a test pushbutton.

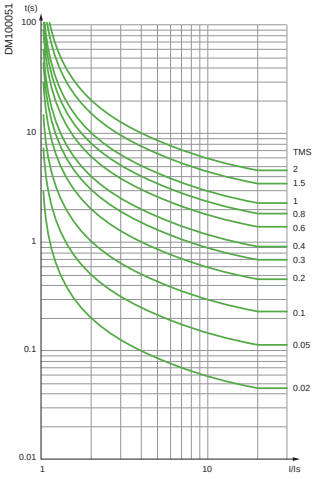
Test with the Pocket Battery module

- This accessory can be connected on the VIP relay front plate to energise the relay to carry out a quick test even though the relay is not powered.
- This test allows testing the circuit breaker.

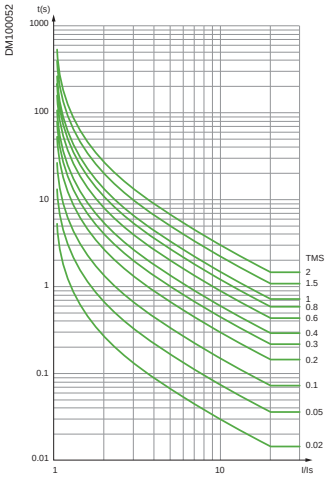
Protection, monitoring and control

VIP400 & VIP410 tripping curves

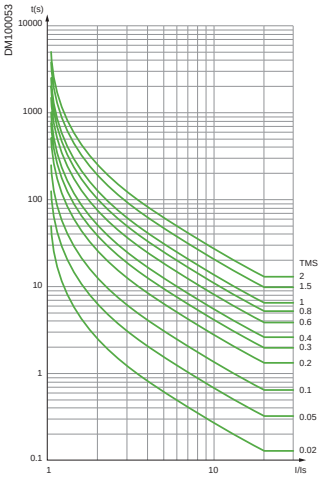
VIP400 & VIP410



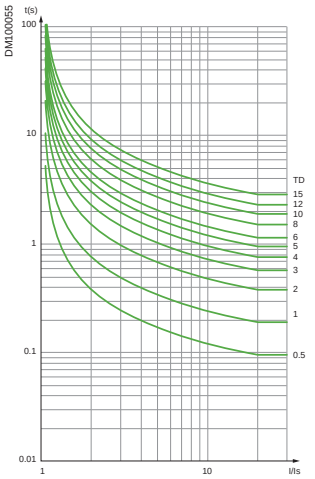
IEC Standard Inverse Time Curve
(IEC/SIT or IEC/A)



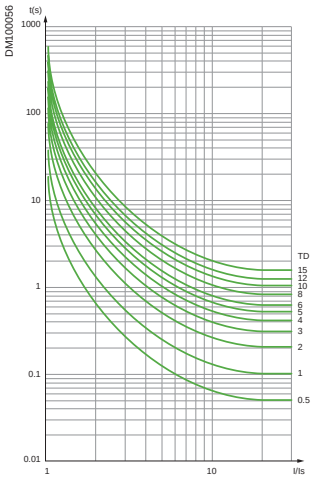
IEC Very Inverse Time Curve
(IEC/VIT or IEC/B)



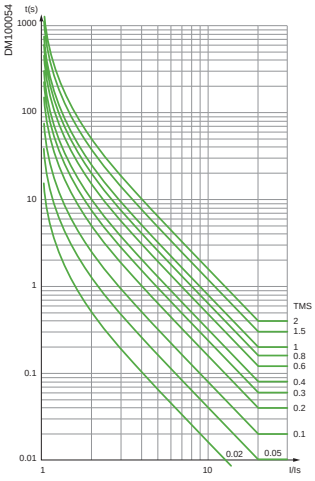
IEC Long Time Inverse Curve
(IEC/LTI)



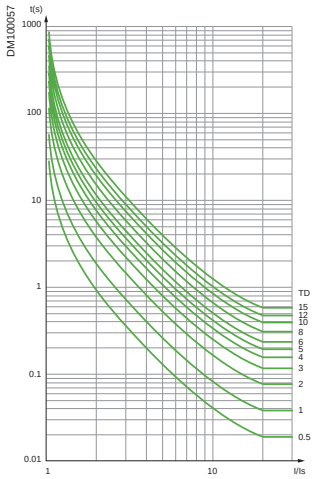
IEEE Moderately Inverse Curve
(IEEE/MI or IEC/D)



IEEE Very Inverse Curve
(IEEE/VI or IEC/E)



IEC Extremely Inverse Time Curve
(IEC/EIT or IEC/C)



IEEE Extremely Inverse Curve
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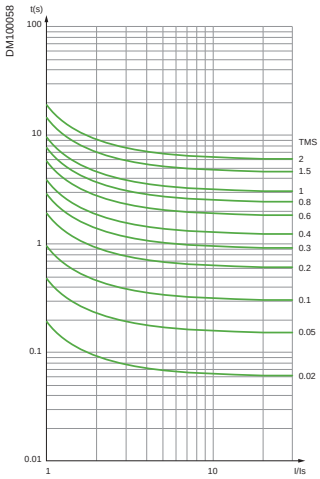


RI Curve

Protection, monitoring and control

Current sensors for VIP400 & 410

PE55773

Cs type current sensors

CSa4 and CSb4 current sensors for the VIP400 & 410

In order to achieve the specified performance levels, the VIP400 & 410 protection unit must be used with the specified sensors. The combination of the unit/sensor is essential in order to comply with characteristics and in particular with:

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

Two interchangeable sensors, CSa4 and CSb4, suffice to cover all requirements from up to 630 A.

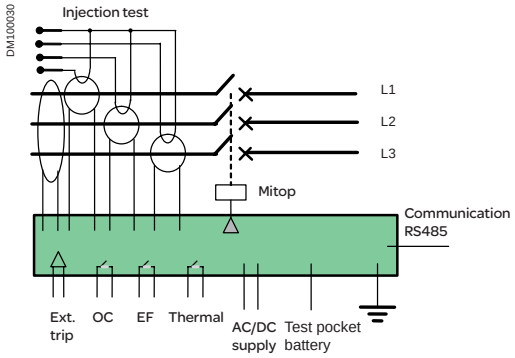
Sensor selection	Service current (Is)
CSa4	up to 200 A
CSb4	up to 630 A

Connection

Connection diagrams

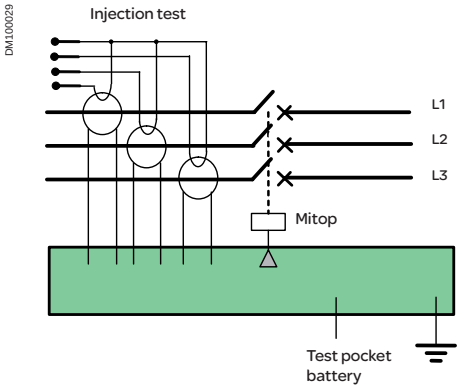
VIP 410

DM100030



VIP 400

DM100029



High sensitivity sensors

VIP integrated protection system

The VIP integrated protection system is composed of sensors, a processing unit and an actuator, designed together to provide the highest level of reliability and sensitivity from 0,2A to 20 In for VIP 400/410

Sensors

The sensors are made up of three single phase CTs, providing both measurement and power outputs.

- The measurement sensor is based on Low Power Current Transformer (LPCT) technology, ensuring excellent accuracy :
  - 5P30 for protection
  - class 1 for measurement.
- The power supply sensor ensures calibrated self-powering of the relay even for currents of just a few Amperes
- The protection sensors are located on the lower EvoPact SFset connections. The connection between all these elements, sensors and relay, is prefabricated and protected against external aggression, providing a higher level of reliability.

Actuators

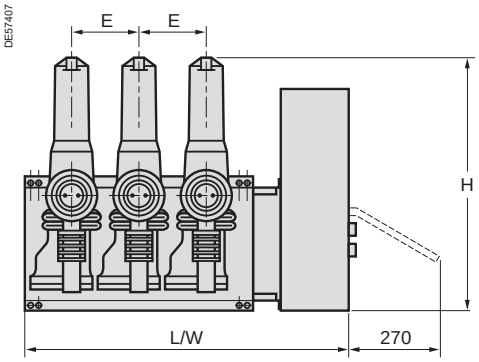
- The actuator is a dedicated low power tripping coil (Mitop) specificallydesigned to operate with the sensors and the processing unit with a minimum energy.
- The integrity of the Mitop circuit is continuously supervised (Trip Circuit Supervision function).

Dimensions

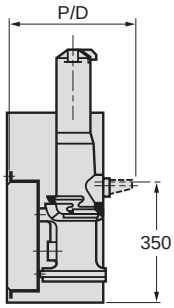
Basic fixed unit

Operating mechanism on the right hand side (A1)

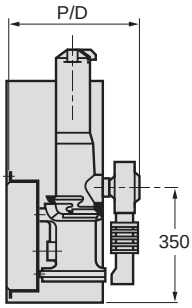
EvoPact SF1, EvoPact SFset



EvoPact SF1

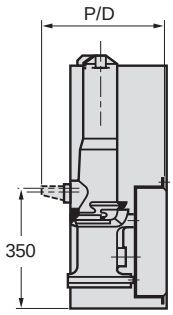


EvoPact SFset

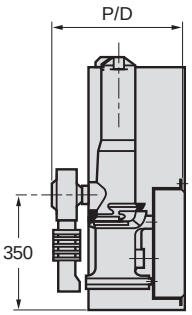


Operating mechanism on the left hand side (B1)

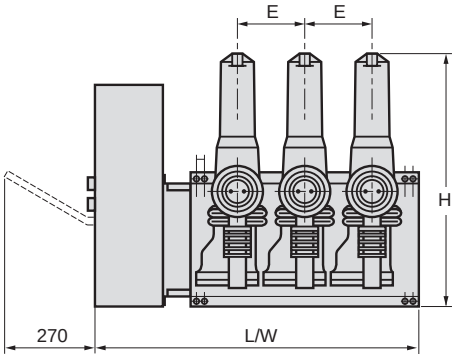
EvoPact SF1



EvoPact SFset

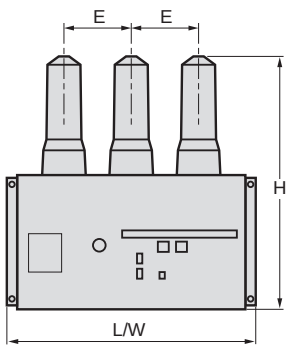


EvoPact SF1, EvoPact SFset

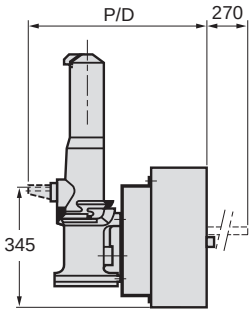


Operating mechanism on the front (C1)

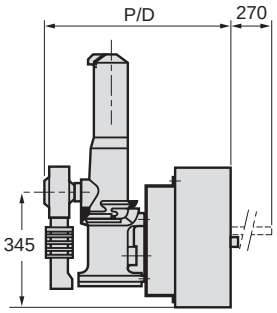
EvoPact SF1, EvoPact SFset



EvoPact SF1



EvoPact SFset



Dimensions and weights

Rated voltage (kV)	EvoPact SF1 Dimensions (mm) H	W	D	E	Weight (kg)	EvoPact SFset Dimensions (mm) H	W	D	E	Weight (kg)
Operating mechanism on the right or left										
17.5	750	993	290	220	78	750	993	420	220	88
24	750	1143	290	280	80	750	1143	420	280	90
36	750	1560	365	380	88					
Operating mechanism on the front										
17.5	745	766	490	220	78	745	766	620	220	88
24	745	886	490	280	80	745	886	620	280	90
36	745	927	559	350	85					
36	745	1260	565	380	88					

For EvoPact SF circuit breakers with SM6, consult us.

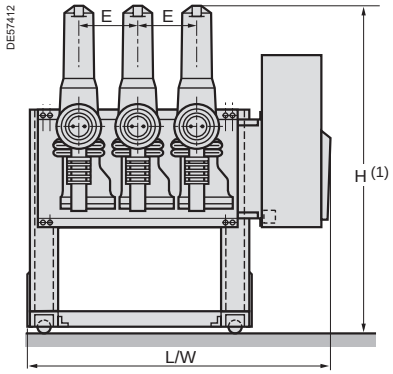
Dimensions

(cont.)

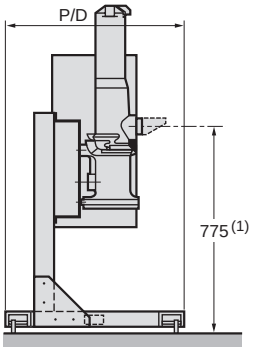
Fixed unit with support frame

Operating mechanism on the right hand side (A1)

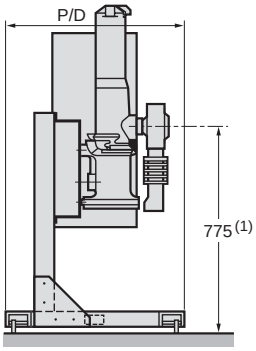
EvoPact SF1, SFset



EvoPact SF1

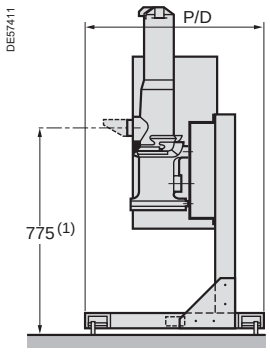


EvoPact SFset

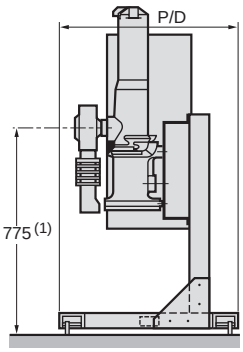


Operating mechanism on the left hand side (B1)

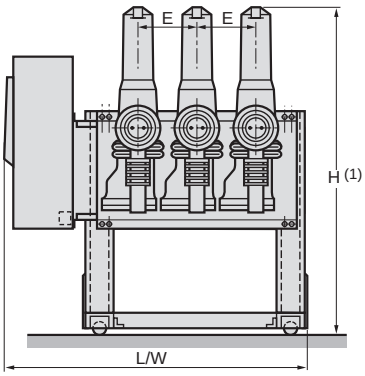
EvoPact SF1



EvoPact SFset

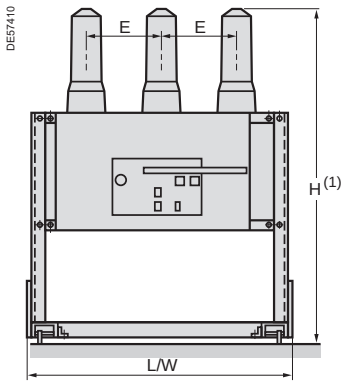


EvoPact SF1, SFset

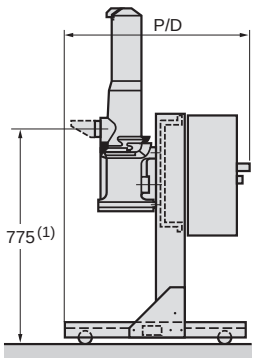


Operating mechanism on the front (C1)

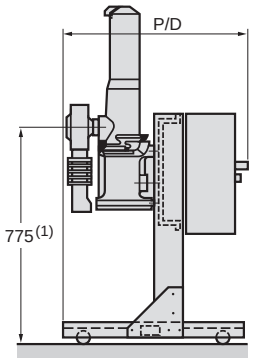
EvoPact SF1, SFset



EvoPact SF1



EvoPact SFset



Dimensions and weights

Rated voltage (kV)	EvoPact SF1 Dimensions (mm) H	W	D	E	Weight (kg)	EvoPact SFset Dimensions (mm) H	W	D	E	Weight (kg)
Operating mechanism on the right or left hand side										
17.5	1175	1065	600	220	103	1175	1065	600	220	103
24	1175	1215	600	280	105	1175	1215	600	280	105
36	1175	632	600	380	113					
Operating mechanism on the front										
17.5	1175	853	600	220	103	1175	853	649	220	103
24	1175	973	600	280	105	1175	973	649	280	105
36	1175	1347	600	380	113					

(1) Additional holes, provided on the fixed support frame allow the device to be positioned 215 mm lower.

Dimensions

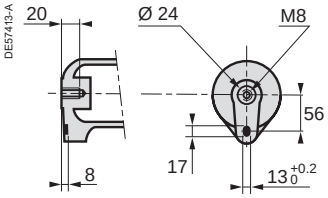
(cont.)

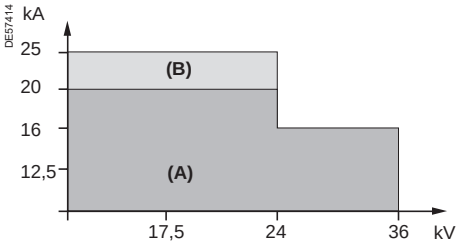
Connection

Top

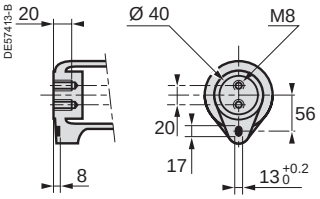
Ir ≤ 630 A

EvoPact SF1, SFset (A)



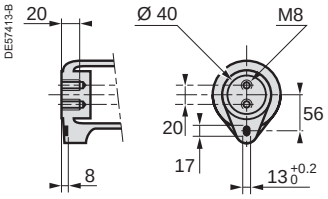


EvoPact SF1, SFset (B)



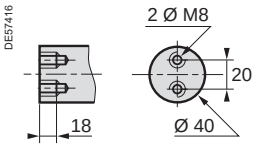
Ir = 1250 A

EvoPact SF1

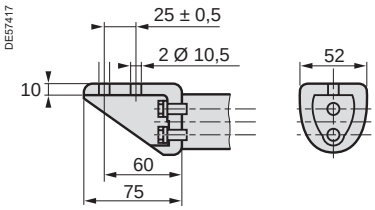


Bottom

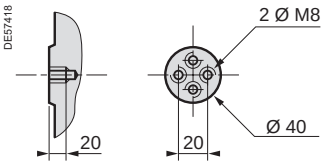
EvoPact SF1, insulation ≤ 125 kV impulse



EvoPact SF1, insulation ≤ 170 kV impulse



EvoPact SFset



Note: *recommended connection screw M8 class 8.8.*
Tightening torque: 28 Nm *with contact washer.*

EvoPact SF2 circuit breakers fixed version

Contents

Presentation

PE56501

Description of the device

The basic fixed version of the EvoPact SF circuit breaker comprises:

- 3 main independent poles, that are mechanically linked and each comprising
- a “sealed pressure system” type insulating enclosure. The sealed enclosure is filled with low pressure SF_6 gas
- a GMH stored energy electrical operating mechanism.
  This gives the device an opening and closing speed that is independent of the operator, for both electrical and manual orders.

The circuit breaker can be remotely controlled and it is possible to carry out reclosing cycles.

- 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.

The EvoPact SF circuit breaker is only available with a frontal operating mechanism.

Each device can be optionally equipped with:

- a support frame fitted with rollers and floor securing brackets for a fixed installation
- locking of the circuit breaker in the open position by a keylock installed on the control panel
- a pressure switch for the high performance versions
- a Harting 42-pin type LV connector.

General characteristics

Electrical characteristics according to IEC 62271-100

				EvoPact SF2							
Rated voltage	Ur	kV 50/60 Hz		24				36			40.5
Insulation voltage											
- power frequency withstand	Ud	kV 50 Hz 1min		50				70			85
- lightning impulse withstand	Up	kV peak		125				170			185
Rated current	Ir	A	630	–	–	■	■	–	■	■	–
			1250	–	–	■	■	–	■	■	–
			2500	■	■	■	■	■	■	■	■
			3150	–	–	–	■	–	–	■	–
Short circuit current	Isc	kA		12.5	25	31.5	40	25	31.5	40	31.5
Short time withstand current	Ik/tk	kA/3 s		12.5	25	31.5	40	25	31.5	40	31.5
Short-circuit making current	Ip	kA peak	50 Hz	31.3	63	79	100	62.5	79	100	78.8
			60 Hz	32.5	65	82	104	65	82	104	81.9
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		■	■	■	–	■	–	–	–
Phase to phase		mm	300	■	■	■	■		–	–	–
			400	–	–	–	–	■	■	■	–
			457	–	–	–	–	–	–	–	■
Operating mechanism		Frontal		■				■			■
Operating times		Opening (ms)		< 70							
		Breaking (ms)		< 85							
		Closing (ms)		< 90							
Service temperature	T	°C		–25 to +40							
Mechanical endurance		Class		M2							
		Number of switching operations		10,000							
Electrical endurance		Class		E2							
Capacitive current breaking capacity		Class		C2							

■ *Available*
– Not available

Specific applications

Switching and protection of capacitor banks

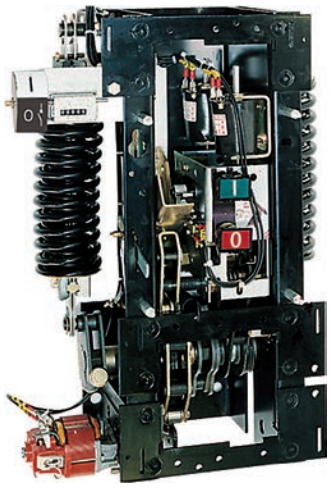
EvoPact SF range circuit breakers are particularly well suited to switching and protection of capacitor banks; they are classed C2 according to standard IEC 62271-100.

Tests carried out according to the standard for breaking at 400 A with making and breaking cycles in case of a capacitor bank with a making current of 20 kA.

Description of functions

GMH stored energy operating mechanism - Wiring diagram

PM104630



Operation of the electrical GMH stored energy mechanism

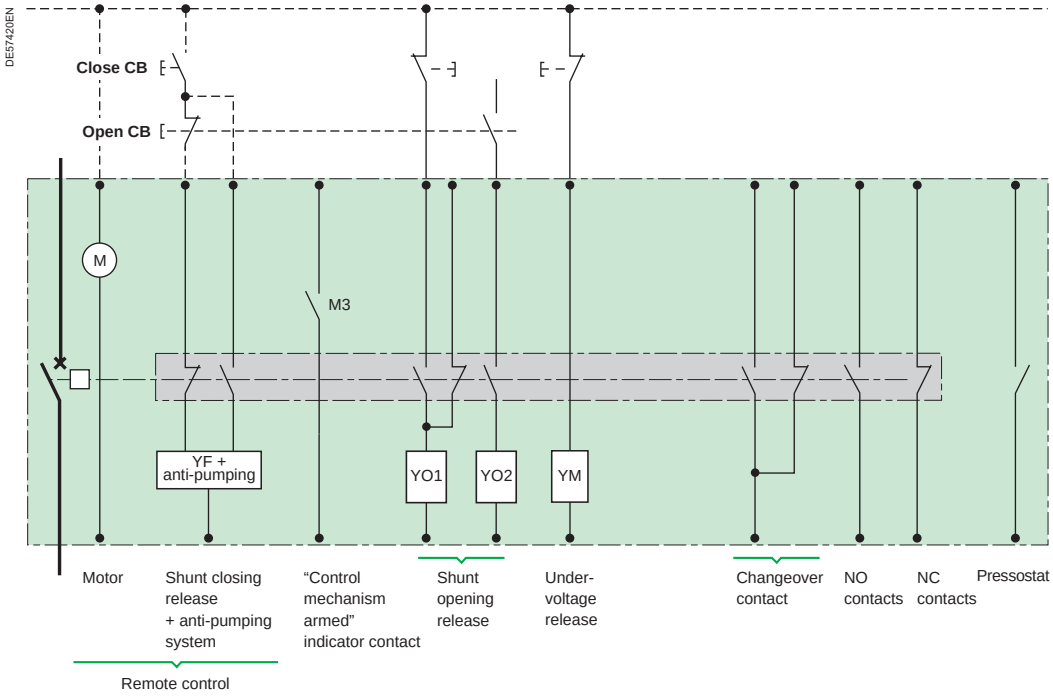
This gives the device an opening and closing speed that is independent of the operator whether the order is electrical or manual.

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

It consists of:

- the stored energy operating mechanism which stores in springs the energy required to open and close the device
- a manual lever arming device for the springs
- an electrical arming device with a motor to automatically rearm the control mechanism as soon as the circuit breaker is closed (optional)
- manual push-button controls on the front face of the circuit breaker (red and black)
- an electrical remote-closing device comprising a release and an anti-pumping relay.
- an electrical opening device comprising one or several releases of the following type:
  - shunt opening
  - undervoltage.
- an operation counter
- an open/closed position indicator with a mechanical indicator (black and white)
- an “armed” control mechanism status indicator with a mechanical indicator and an electrical contact (optional)
- a block of 14 auxiliary contacts, available according to the wiring layout used
- a pressure switch contact activated by a drop in gas pressure (optional: single or double threshold pressure switch).

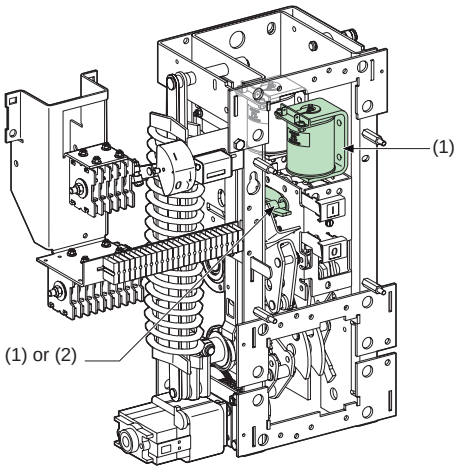
Wiring diagram (principle)



Description of functions

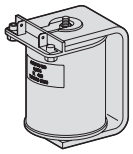
Opening circuit

DE57421EN



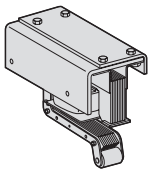
Operating mechanism

DE58092



Shunt opening release (1)

DE57390



Undervoltage release (2)

Composition

The opening circuit can be produced using the following components:

- a shunt opening release (on energizing) (YO1)
- a second shunt opening release (on energizing) (YO2)
- undervoltage release (YM).

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

Shunt opening release (YO1 and YO2)

Energizing this unit causes instant opening of the circuit breaker.

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

Undervoltage release (YM)

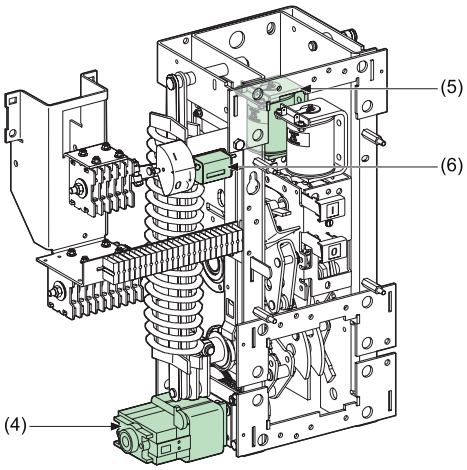
This release unit causes the systematic opening of the circuit breaker when its supply voltage drops below a value less than 35% of the rated voltage, even if this drop is slow and gradual. It can open the circuit breaker between 35% and 70% of its rated voltage. If the release unit is not supplied power,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

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

Description of functions

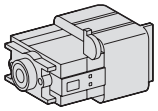
Remote control

DE57422



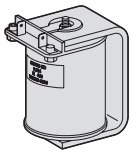
Operating mechanism

DE57392



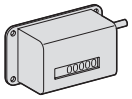
Electrical motor (4)

DE58092



Shunt closing release (5)

DE57393



Operation counter (6)

Function

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

Composition

The remote control mechanism comprises:

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

Electrical motor (M)

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

The M3 contact indicates the end of arming operations.

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

Shunt closing release (YF)

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

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

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

Operation counter

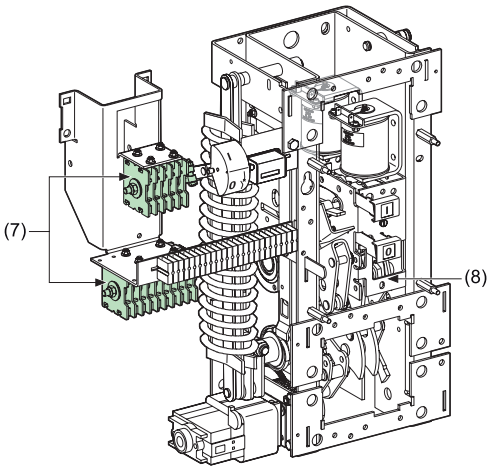
The operation counter is visible on the front panel.

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

Description of functions

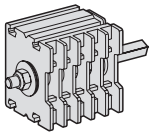
Indication and locking/interlocking

DE57423



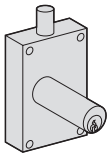
Operating mechanism

DE57394



Auxiliary contacts (7)

DE57395



Keylocking kit (8)

“Open/closed” auxiliary contacts

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

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

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

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

Options		
	NC contact	**NO contact**
Shunt opening release (each one)	0	1
Undervoltage release	0	0

In order to know the final number of available contacts, you must deduct the total number of contacts included in the circuit breaker (5 NC + 5 NO + 1 CHG), the number of contacts used given in the table above.

E.g.: a circuit breaker equipped with a remote control and a shunt trip unit has the following available contacts:
5 NC + 4 NO + 1 CHG.
With a undervoltage release instead of the shunt trip, this circuit breaker would have the following available contacts:
5 NC + 5 NO + 1 CHG.

Shunt opening release combination			
1st release / **2nd release**	**Shunt opening release YO1**	**Undervoltage release YM**	**Mitop**
Without	5NC + 4NO + 1CHG	5NC + 5NO + 1CHG	5NC + 5NO + 1CHG
Shunt opening release YO2	5NC + 3NO + 1CHG	5NC + 4NO + 1CHG	5NC + 4NO + 1CHG
Undervoltage release YM	5NC + 4NO + 1CHG		5NC + 5NO + 1CHG

Locking the circuit breaker in the “open” position

This key-operated device allows the circuit breaker to be locked in the “open” position.

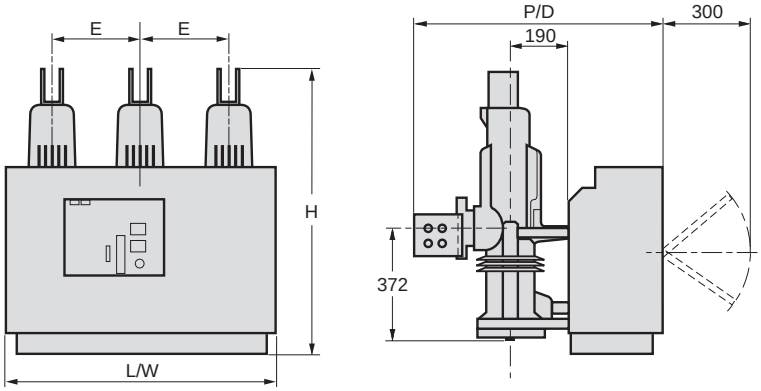
The circuit breaker is locked in the open position by blocking the opening push button in the “engaged” position.

Locking is achieved using a flat or tubular captive key type keylock.

Dimensions

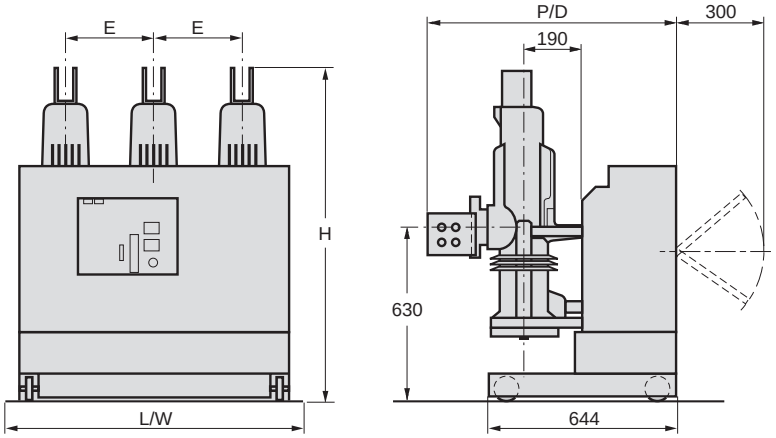
Basic fixed unit

DE57424



Fixed unit with a support frame

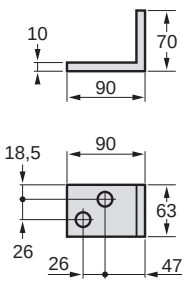
DE57425



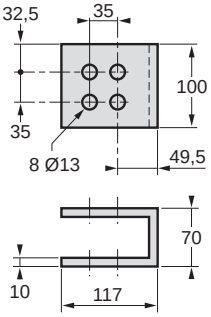
Connection

630, 1250 A (24-36 kV)

DE57426

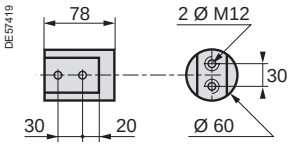


2500, 3150 A (24-36 kV)



2000, 2500 A (40.5 kV)

DE57419



Dimensions and weights

Rated current (A)	Rated voltage (kV)	Basic fixed unit Dimensions (mm) H	L	P	E	Weight (kg)	Fixed unit with support frame Dimensions (mm) H	L	P	E	Weight (kg)
630, 1250	24	825	910	750	300	159	1030	910	750	300	179
	36	825	1110	750	400	212	1030	1110	750	400	239
	40.5	825	1224	750	457	242	1030	1224	750	457	272
2500, 3150	24	942	910	777	300	174	1147	910	777	300	194
	36	942	1110	777	400	227	1147	1110	777	400	254
	40.5	942	1224	777	457	242	1147	1224	777	457	272

Notes

EvoPact SF F400 circuit breakers withdrawable version

Contents

Presentation

PE56502

Device description

The basic withdrawable version of the EvoPact SF circuit breaker comprises:

- The circuit breaker unit with its control mechanism:
  - 3 main independent poles, that are mechanically linked and each comprising
  - a “sealed pressure system” type insulating enclosure. The sealed enclosure is filled with low pressure SF_6 gas
  - a GMH stored energy electrical operating mechanism
  - This gives the device an closing and opening speed that is independent of the operator, whether the control order is electrical or manual. When remotely controlled, the circuit breaker allows reclosing cycles to be performed
  - a front face with status indicators
- Racking components:
  - the circuit breaker is equipped with racking arms and clusters. It is mounted on a racking/unracking unit with a threaded shaft actuated by a crank which includes all of the safety interlocking systems
  - a Harting type male LV connector for external auxiliary circuits
  - a circuit breaker control mechanism spring discharge system
  - a circuit breaker racking-in blocking mechanism

The EvoPact SF circuit breaker is only available with front controls.

Each device can be fitted with the following options:

- Position locking of the circuit breaker:
  - open, by a keylock installed on the control panel
  - racked out, by a keylock installed on the racking device
- The M1 and M2 basic cradles comprising:
  - a metal structure and one guide rail
  - fixed connector fingers insulated by bushings
  - metal insulating shutters for the MV part
  - safety interlocking systems
  - Harting type female LV connector
  - indicator contacts for circuit breaker racked-in or racked-out positions (4 NO + 4NC)
  - an equipped door
  - a foolproofing system for the circuit breaker rating.

General characteristics

Electrical characteristics according to IEC 62271-100

				EvoPact SF F400				
Rated voltage	Ur	kV 50/60 Hz		36			40,5	
Insulation voltage								
- power frequency withstand	Ud	kV 50 Hz 1min		70			85	85
- lightning impulse withstand	Up	kV peak		170			185	185
Rated current	Ir	A	1250	■	■	■	■	■
			2500	–	■	■	–	–
Short circuit current	Isc	kA		25	31.5	40	25	31.5
Short time withstand current	Ik/tk	kA/3 s		25	31.5	40	25	31.5
Short-circuit making current	Ip	kA peak	50 Hz	62.5	79	100	62.5	79
			60 Hz	65	82	104	65	82
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		■	–	–	–	–
Phase to phase		mm	300	■	■	■	■	■
Operating mechanism		Frontal		■	■	■	■	■
Operating times		Opening (ms)		< 70				
		Breaking (ms)		< 85				
		Closing (ms)		< 90				
Service temperature	T	°C		–25 to +40				
Mechanical endurance		Class		M2				
		Number of switching operations		10,000				
Electrical endurance		Class		E2				
Capacitive current breaking capacity		Class		C2				

■ *Available*
– *Not available*

Specific applications

Switching and protection of capacitor banks

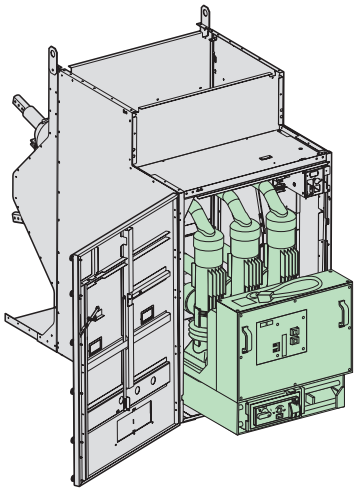
EvoPact SF range circuit breakers are particularly well suited to switching and protection of capacitor banks; they are classed C2 according to standard IEC 62271-100.

Tests carried out according to the standard for breaking at 400 A with making and breaking cycles in case of a capacitor bank with a making current of 20 kA.

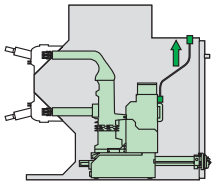
Description of functions

Racking-in

DE57396

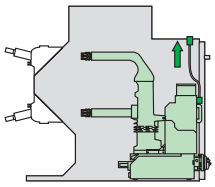


DE57430



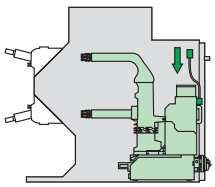
Service position

DE57429



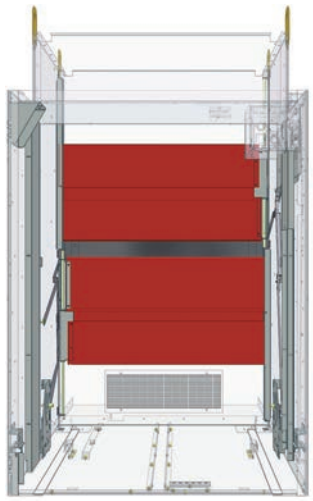
Test position

DE57428



disconnected position

PE50198



Protective shutters

Overall composition

The “racking-in/racking-out” function is achieved by:

- the EvoPact SF F400 withdrawable Circuit Breaker (CB) with its LV connector (moving part)
- the M1 or M2 cradles with their bushings (fixed part).

Switching the circuit breaker

The withdrawable circuit breaker can be moved between three stable positions:

- **service position:** the circuit breaker racked-in and locked in position, the LV connector is connected
- **test position:** the circuit breaker is racked-out and locked in position, the LV connector is connected
- **disconnected position:** the circuit breaker is racked-out and locked in position, the LV connector is disconnected.

EvoPact SF F400 circuit breaker safety functions

A racking system with a threaded shaft makes it easier to rack-in and rack-out.

Test position contact
This is activated when the CB is in the “test” or “service” positions.
Earthing is achieved throughout the operation through the racking carriage wheels.

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

- prohibiting racking-in or racking-out if the CB is not in the open position
- prohibiting racking-in of the CB if the LV connector is not connected
- prohibiting disconnecting of the LV connector if the CB is not racked-out.

Interlocking with the cubicle door
The racking base is equipped with a device that allows interlocking between racking-out of the circuit breaker and the cubicle door.

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

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

M1 and M2 cradles safety features

The M1 or M2 cradles are fitted with the EvoPact SF F400 circuit breaker and comprise the following safety features for racking-in.

A metal structure with one guide rail
The rail guides the circuit breaker during racking-in/racking-out operations.

Fixed connector fingers, insulated by bushings
The three ends of the cicuit breaker, with their racking clusters, make the contact with these three fingers.

Metal insulating shutters for the MV part
Protective shutters mounted on the structure stop fingers from accessing the racking mechanism 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 locked position
- unlock the fixed contact access mechanism.

A control spring discharge system
The springs of the circuit breaker mechanism are automatically discharged when it is extracted from the cradle. This function avoids any risk of nuisance closing of the circuit breaker.

Foolproofing system
This allows the circuit breaker rating to be matched to the cradle rating.
This system is mounted on the cradle side. The panel builder must ensure that the right circuit breaker rating is being used.

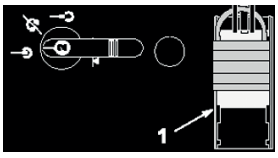
Description of functions

Racking-in
(cont.)

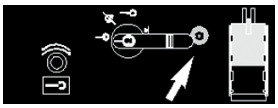
PE50201

PE50202

PE50204



PE50205



Locking/interlocking functions

Possibilities for padlocking

For further operator safety it is possible to use a padlock:

- on the connector to lock the selector
- on the shutter protecting the mechanical opening pushbutton
- on the shutter opening mechanism in the circuit breaker compartment
- on the rotary voltage transformer switching mechanism.

A mechanism to prohibit racking-in of the moving part

A mechanism associated with a padlock or a keylock prohibits the racking-in of the moving part. Locking is either achieved via:

- 1 to 3 padlocks, not supplied
- 1 keylock (optional).

A blocking system for the circuit breaker opening order, when it is closed

This device can also be used as an additional way of prohibiting racking-in and out. A transparent shutter blocks access to the opening and closing pushbutton. The device allows independent locking of the opening or closing button. It is often associated with an electrical motor (M). Locking is achieved by a padlock (not supplied) mounted on the shutter protecting the mechanical opening pushbutton.

A system to prohibit disconnection of the moving part

This keylocking system prohibits disconnection of the moving part. It may be used for a circuit breaker or for a racking base.

Optional accessories

- a self-adhesive front plate shows circuit breaker racking-in and racking-out operations. It is systematically delivered when the circuit breaker is ordered
with the cassette or can be ordered separately.
- 4 “racked-in/racked-out” position contacts.
- 1 position contact for the cassette locked in the “racked-in/racked-out” position.
- a keylocking system (flat or tubular) for the circuit breaker in the “racked-in” or “racked-out” position.

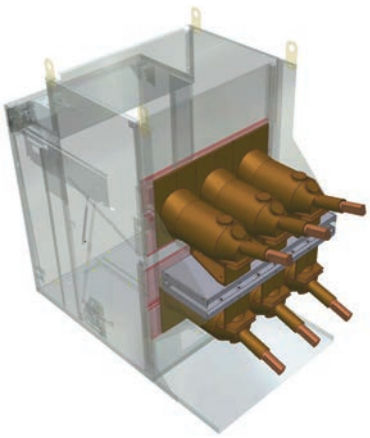
Description of functions

MV and LV connection

MV Connection

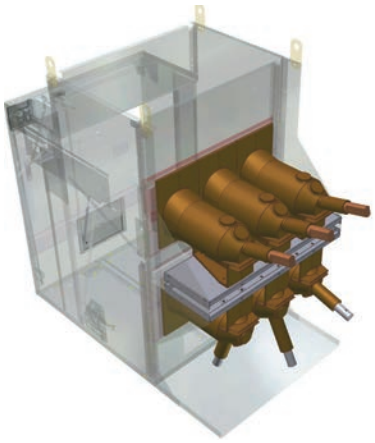
The customer connection is easily carried out from the back of M1 and M2 cradles using the upper and lower bushings.

PE50194



MV connection with M1 cradle

PE50195



MV connection with M2 cradle

LV connection

With the withdrawable circuit breaker, LV wiring uses an LV connector with:

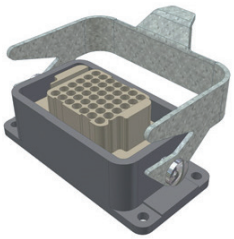
- the moving part (male Harting socket) at the end of a flexible cable, entirely connected to the control mechanism terminal via a bellow
- the fixed part (female Harting socket) compatible with the male part mounted
  on the top inside part of the cassette.

Interlocking function

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

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

PE50197

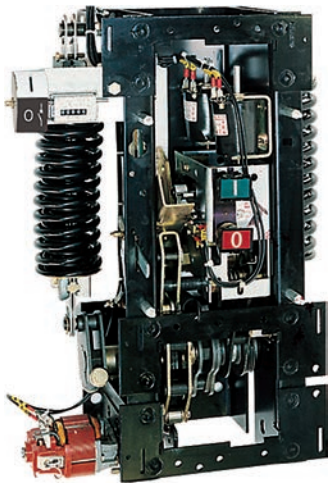


LV plug connection

Description of functions

GMH stored energy operating mechanism Wiring diagram

PM104630



Operation of the electrical GMH stored energy mechanism

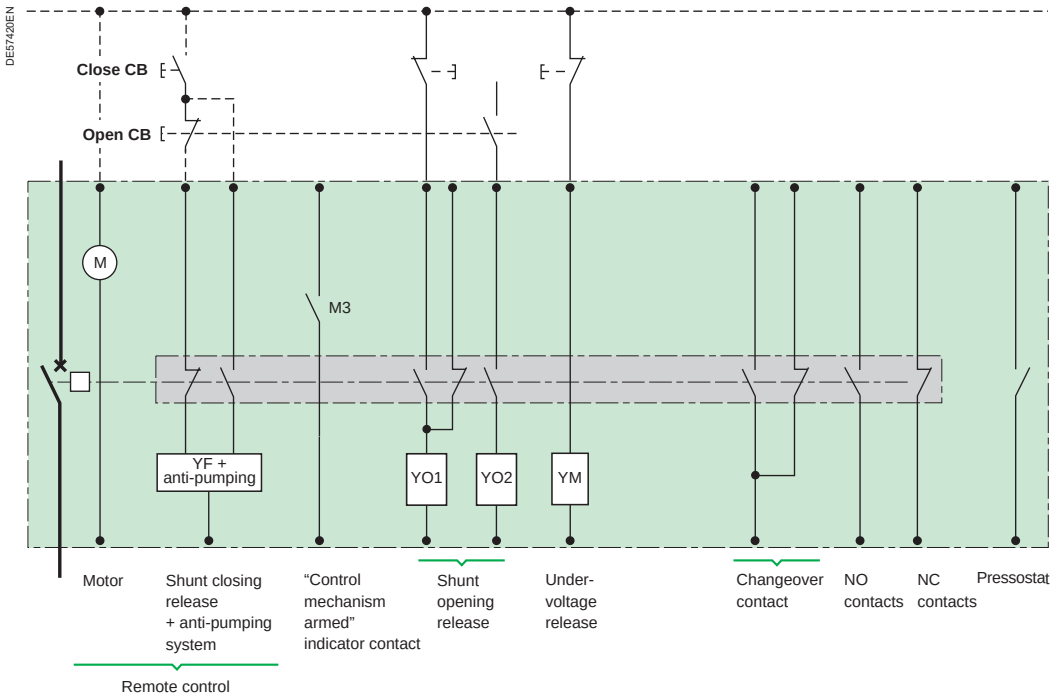
This gives the device an opening and closing speed that is independent of the operator whether the order is electrical or manual.

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

It consists of:

- the stored energy operating mechanism which stores in springs the energy required to open and close the device
- a manual lever arming device for the springs
- an electrical arming device with a motor to automatically rearm the control mechanism as soon as the circuit breaker is closed (optional)
- manual push-button controls on the front face of the circuit breaker (red and black)
- an electrical remote-closing device comprising a release and an anti-pumping relay.
- an electrical opening device comprising one or several releases of the following type:
  - shunt opening
  - undervoltage.
- an operation counter
- an open/closed position indicator with a mechanical indicator (black and white)
- an “armed” control mechanism status indicator with a mechanical indicator and an electrical contact (optional)
- a block of 14 auxiliary contacts, available according to the wiring layout used
- a pressure switch contact activated by a drop in gas pressure (optional: single or double threshold pressure switch).

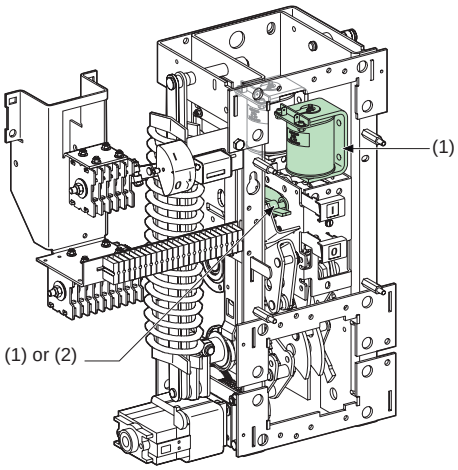
Wiring diagram (principle)



Description of functions

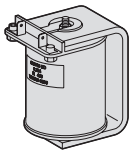
Opening circuit

DE57421EN



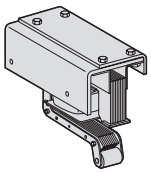
Operating mechanism

DE58092



Shunt opening release (1)

DE57390



Undervoltage release (2)

Composition

The opening circuit can be produced using the following components:

- a shunt opening release (on energizing) (YO1)
- a second shunt opening release (on energizing) (YO2)
- undervoltage release (YM).

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

Shunt opening release (YO1 and YO2)

Energizing this unit causes instant opening of the circuit breaker.

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

Undervoltage release (YM)

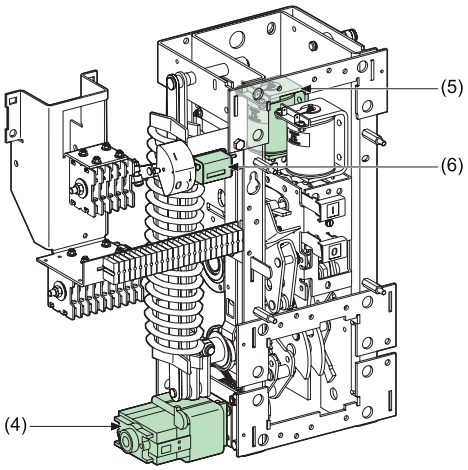
This release unit causes the systematic opening of the circuit breaker when its supply voltage drops below a value less than 35% of the rated voltage, even if this drop is slow and gradual. It can open the circuit breaker between 35% and 70% of its rated voltage. If the release unit is not supplied power,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

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

Description of functions

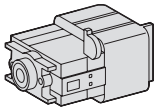
Remote control

DE57422



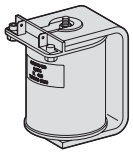
Operating mechanism

DE57392



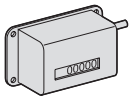
Electrical motor (4)

DE58092



Shunt closing release (5)

DE57393



Operation counter (6)

Function

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

Composition

The remote control mechanism comprises:

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

Electrical motor (M)

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

The M3 contact indicates the end of arming operations.

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

Shunt closing release (YF)

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

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

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

Operation counter

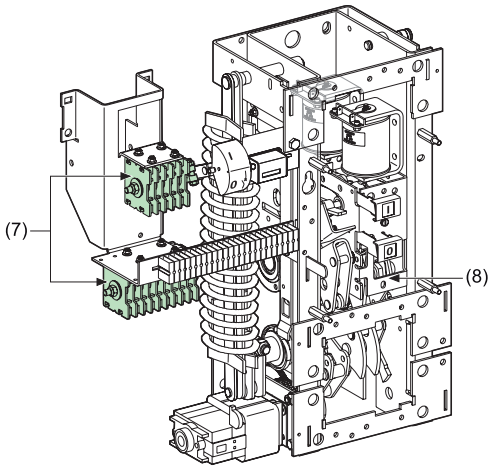
The operation counter is visible on the front panel.

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

Description of functions

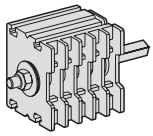
Indication and locking/interlocking

DE57423



Operating mechanism

DE57394



Auxiliary contacts (7)

“Open/closed” auxiliary contacts

The number of contacts available depends on the options chosen on the operating mechanism.
In the basic configuration, the circuit breaker’s operating mechanism comprises a total of:

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

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

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

In order to know the final number of available contacts, you must deduct the total number of contacts included in the circuit breaker (5 NC + 5 NO + 1 CHG), the number of contacts used given in the table above.

E.g.: a circuit breaker equipped with a remote control and a shunt trip unit has the following available contacts:
5 NC + 4 NO + 1 CHG.
With a undervoltage release instead of the shunt trip, this circuit breaker would have the following available contacts:
5 NC + 5 NO + 1 CHG.

Shunt opening release combination			
1st release / **2nd release**	**Shunt opening release YO1**	**Undervoltage release YM**	**Mitop**
Without	5NC + 4NO + 1CHG	5NC + 5NO + 1CHG	
Shunt opening release YO2	5NC + 3NO + 1CHG	5NC + 4NO + 1CHG	5NC + 4NO + 1CHG
Undervoltage release YM	5NC + 4NO + 1CHG		5NC + 5NO + 1CHG
Mitop	5NC + 4NO + 1CHG	5NC + 5NO + 1CHG	

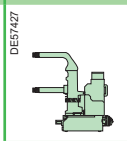
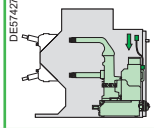
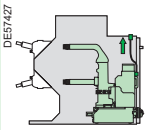
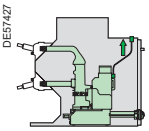
Description of functions

Safety functions

This table describes the safety functions available on the EvoPact SF circuit breaker withdrawable version.

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)				
		No opening shutters					
		Shutters padlocking possible					
2 - LV plug	Disconnected			No door closing			
	Connected				No unplugging (4)		
3 - Circuit breaker	Closed		Auto-discharge function (2)		No racking-in		No racking-out
	Open					No closing	
		Open position circuit breaker locking available (2)					
4 - Switchboard door	Open				No racking-in		
	Closed				No door opening (3)		

(1) This protection mechanism ensures that the performance levels of the circuit breaker correspond with those of the cradle
(2) Option
(3) Interlocking device to be fitted to the cubicle door
(4) Because the door is closed

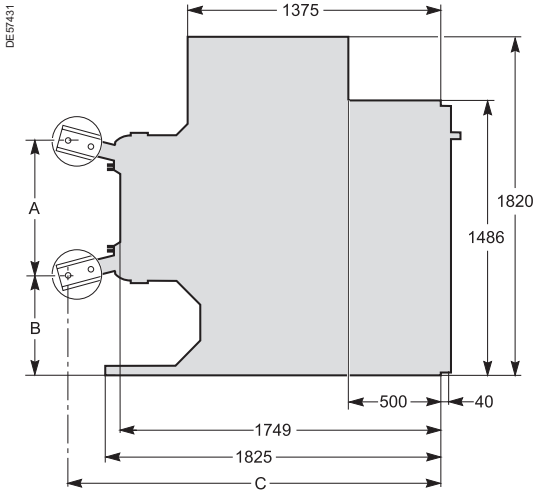
Dimensions

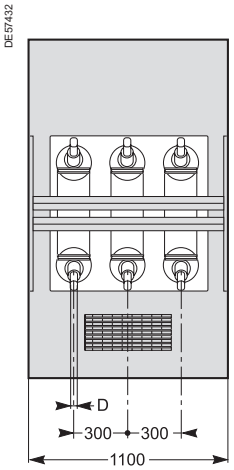
Basic withdrawable unit

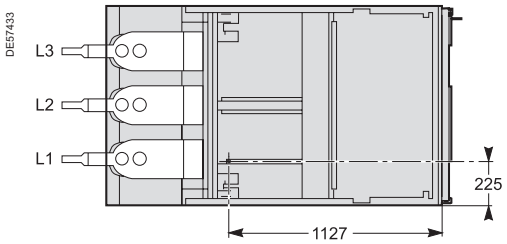
EvoPact SF F400/M1

Dimensions and weights

		< 31.5 kA	≥ 31.5 kA
Dimensions (mm)	A	738	752
	B	540	533
	C	2030	2030
	D	36	40
Weight (kg)		750	850



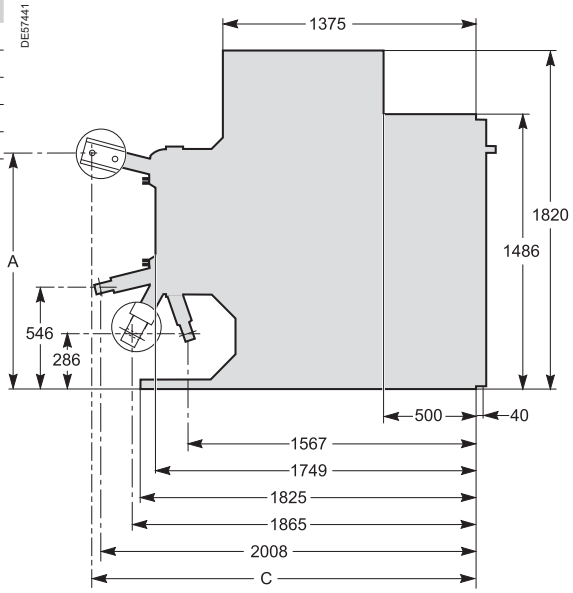


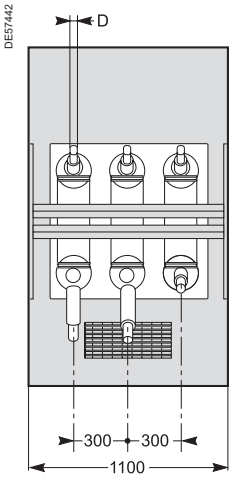


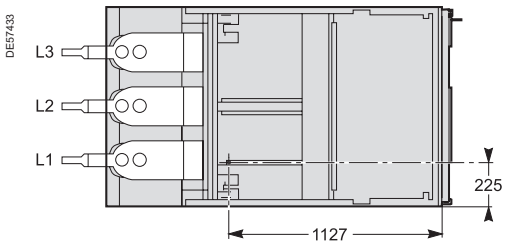
EvoPact SF F400/M2

Dimensions and weights

		< 31.5 kA	≥ 31.5 kA
Dimensions (mm)	A	1278	1285
	C	2030	2030
	D	36	40
Weight (kg)		750	850







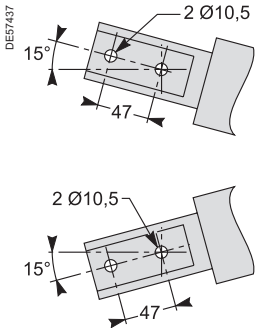
Dimensions

(cont.)

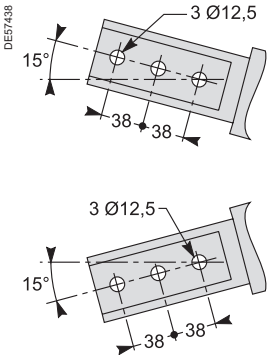
Connection

EvoPact SF F400/M1

1250 A



2500 A



EvoPact SF F400/M2

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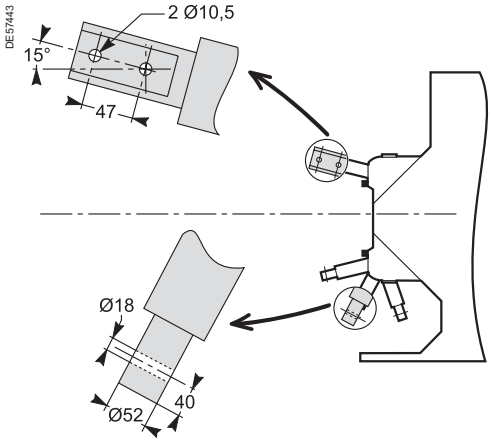

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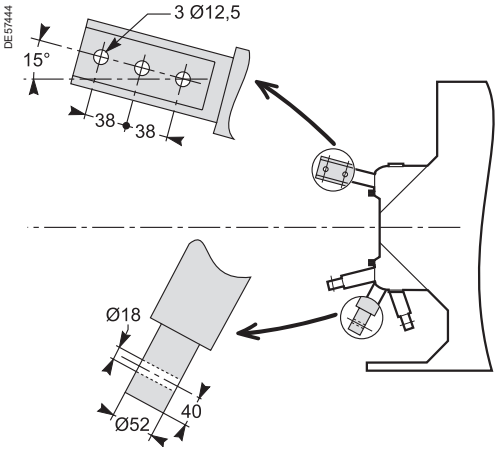
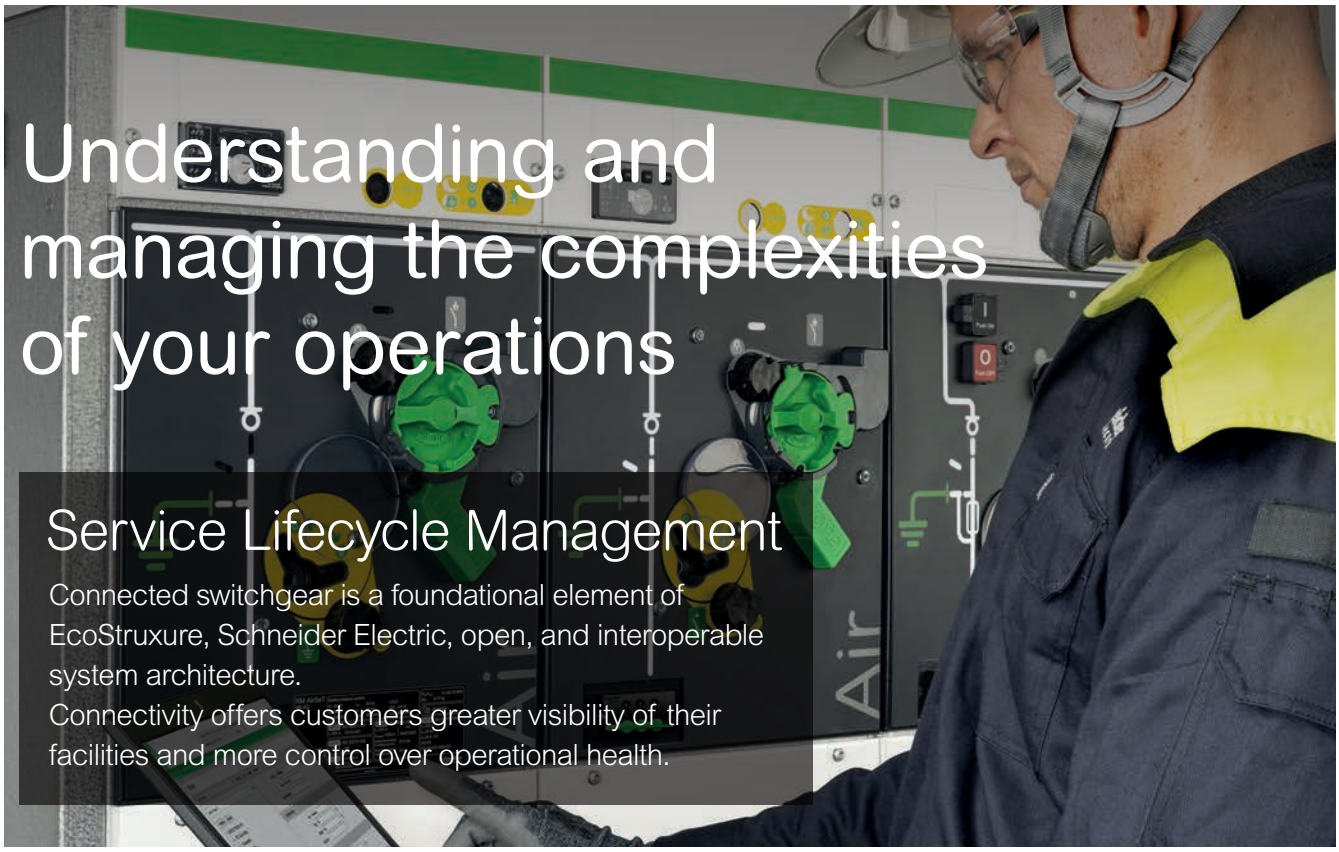


Services

Contents

Schneider Electric Services

Peace of mind througout your installation life cycle



Understanding and managing the complexities of your operations

Service Lifecycle Management

Connected switchgear is a foundational element of EcoStruxure, Schneider Electric, open, and interoperable system architecture.
Connectivity offers customers greater visibility of their facilities and more control over operational health.

How to improve site safety

Electrical Safety Training	• Detect any knowledge gaps and attend appropriate e-learning, practical and hands-on electrical safety training courses.
Electrical Distribution Consulting Services	• Our consulting services portfolio offers asset health analysis for your site and recommends preventive actions.

How to improve protection your new installation

Service Plans	• Knowing your installation with the right service plan.
Maintenance Services	• A complete solution to maintain your equipment. Helping ensure service continuity and peace of mind at every step.

How to modernize aging infrastructure

Digitized Modernization	• Modernize your electrical distribution switchgear with pre-engineered retrofit service solutions.
SF_6 Recovery Services	• Peace-of-mind for your transition to SF_6-free medium voltage switchgear.
Spare Parts Management	• Spare part availability and reduced downtime.

All pictures of the catalogue illustrate the product in an environment close to reality. They were taken off-line. For live operation the P.P.E. (personal protective equipment) must be used in accordance with the regulations of the place of installation.

Find more information here

ProDiag Breaker

Diagnosis of MV and LV Circuit Breakers

PM104628

What is ProDiag Breaker?

ProDiag Breaker is a Schneider Electric diagnosis tool.

ProDiag Breaker compares the mechanical and electrical parameters measured during the full operation of circuit breakers with the data collected from our production facilities. This allows detecting possible failure in advance. It measures, records and displays on a screen the key electrical parameters in MV and LV circuit breakers, relating to opening, closing and springloading operations.

All this data is automatically compared with the criteria for the circuit breaker designated in the software, which indicates which values are within the acceptable range, which are on the limit and which are outside it.

Two tests are always performed on each circuit breakers, one at minimum voltage and one at nominal voltage. A written report is generated and provided by Schneider Electric so that the customer can use it as a tool to define the necessary corrective action (maintenance, repair or replacement).

ProDiag Breaker is part is part of ProDiag preventive maintenance plan

Evaluation of circuit breakers using ProDiag Breaker includes:

- Evaluation of the operating mechanism.
- Measurement and comparison of the actual contact resistance with that specified by the manufacturer.
- Measurement and comparison of the insulation resistance.
- Evaluation of the general circuit breaker conditions based on the captured data.

Moreover, analysis of the ProDiag Breaker time/ travel curve combined with the current curve of the coil and phase contact detects possible faults, such as:

- Worn out latches and operating mechanisms.
- Faulty coils.
- Mechanical wear and tear and hardening of lubricating grease.
- Defective shock absorbers.
- Defective simultaneous contact operation (opening/closing).

Some maintenance programmes involve dismantling the circuit breaker mechanism to check its condition. ProDiag Breaker using signals captured from the circuit breaker operation, reduces maintenance costs compared with programs which check the circuit breakers manually.

Where can ProDiag Breaker reduce costs?

- ProDiag Breaker significantly reduces the time taken to identify potential faults in a circuit breaker, using operational analysis rather than inspection and mechanical re-sets.
- The software analyses the captured data and identifi es the specifi c problem area.
- A device's normal operating life is increased by timely diagnostics of when and what repairs are necessary.
- The tool comprises both hardware and software, resulting in a highly efficient predictive maintenance program.

ProDiag Breaker Objectives

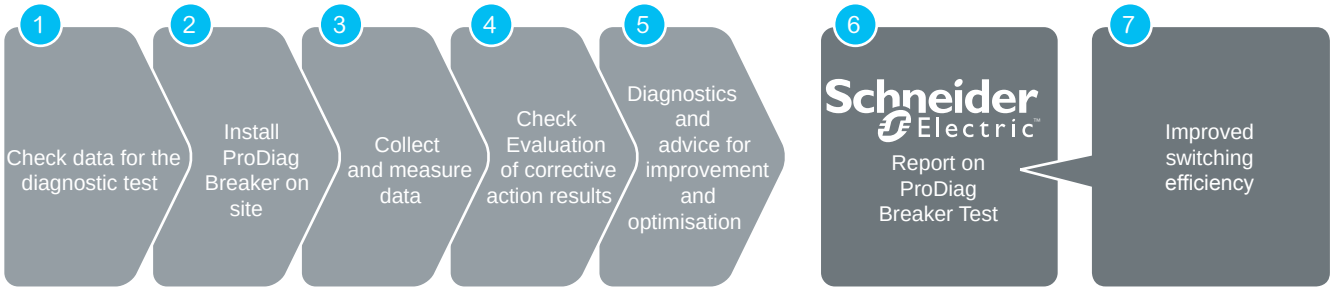
Your priority is to enhance the reliability of your installation:

- to ensure its continuity of service,
- to minimize the time for maintenance & repair
- to perform maintenance
- only on the equipment requiring it and only when necessary (conditional preventive maintenance).

Results

ProDiag Breaker provides a report of the complete nature of the circuit breaker, detailing: closing / opening time, contact simultaneity, bounce and resistance, mechanical closing and opening forces.

This report enables any required maintenance to be targeted and time in order to optimize the customer's maintenance plan.

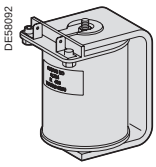


Separated components

For EvoPact SF1-SFset ranges with RI arrangement

The following components can be ordered separately and can be adapted or replaced by the customer.
These references are available through SPEED intranet site

Auxiliaries

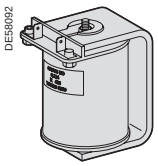


Shunt opening release			Y01 & Y02	
	24 Vdc		type 1 arrangement A1 & C1	SPK0040SF1
			type 1 arrangement B1	SPK0039SF1
			type 2	887191HM
	30 Vdc		type 1 arrangement A1 & C1	SPK0039SF1
			type 1 arrangement B1	889705BL
			type 2	SPK0003SFS
	32 Vdc		type 1 arrangement A1 & C1	SPK0039SF1
			type 1 arrangement B1	889705BL
			type 2	SPK0003SFS
	48 Vdc		type 1 arrangement A1 & C1	889705BK
			type 1 arrangement B1	889705BJ
			type 2	SPK0002SFS
	60 Vdc		type 1 arrangement A1 & C1	889705BJ
			type 1 arrangement B1	889705BH
			type 2	SPK0001SFS
	110 Vdc		type 1 arrangement A1 & C1	SPK0034SF1
			type 1 arrangement B1	SPK0034SF1
			type 2	887191HF
	120 Vdc		type 1 arrangement A1 & C1	SPK0034SF1
			type 1 arrangement B1	889705BE
			type 2	887191HE
	125 Vdc		type 1 arrangement A1 & C1	SPK0034SF1
			type 1 arrangement B1	889705BE
			type 2	887191HE
	220 Vdc		arrangement A1 & C1	SPK0032SF1
			arrangement B1	SPK0032SF1
			type 2	887191HC
	48 Vac	50 Hz	type 1 arrangement A1 & C1	SPK0042SF1
			type 1 arrangement B1	SPK0041SF1
			type 2	887191HP
	110 Vac	50 Hz	type 1 arrangement A1 & C1	SPK0039SF1
			type 1 arrangement B1	889705BL
			type 2	SPK0003SFS
	120 Vac	50 Hz	type 1 arrangement A1 & C1	889705BL
			type 1 arrangement B1	889705BL
			type 2	887191HK
	220 Vac	50 Hz	type 1 arrangement A1 & C1	889705BJ
			type 1 arrangement B1	889705BH
			type 2	SPK0001SFS
	230 Vac	50 Hz	type 1 arrangement A1 & C1	889705BH
			type 1 arrangement B1	889705BH
			type 2	SPK0001SFS
	120 Vac	60 Hz	type 1 arrangement A1 & C1	SPK0040SF1
			type 1 arrangement B1	889705BL
			type 2	SPK0003SFS
	230 Vac	60 Hz	type 1 arrangement A1 & C1	889705BK
			type 1 arrangement B1	889705BH
			type 2	SPK0001SFS
	240 Vac	60 Hz	type 1 arrangement A1 & C1	889705BK
			type 1 arrangement B1	889705BH
			type 2	SPK0001SFS

Separated components

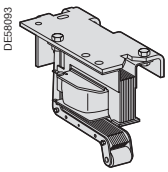
For EvoPact SF1-SFset ranges with RI arrangement

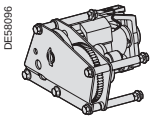
Shunt closing release			YF	
	24 Vdc		Anti pumping Relay	MV261207
			type 1 arrangement A1, B1, C1	SPK0030SF1
			type 2	887191HM
	30 Vdc		Anti pumping Relay	MV261208
			type 1 arrangement A1, B1, C1	889705AL
			type 2	SPK0003SFS
	32 Vdc		Anti pumping Relay	MV261209
			type 1 arrangement A1, B1, C1	889705AL
			type 2	SPK0003SFS
	48 Vdc		Anti pumping Relay	MV261209
			type 1 arrangement A1, B1, C1	SPK0028SF1
			type 2	SPK0002SFS
	60 Vdc		Anti pumping Relay	MV261210
			type 1 arrangement A1, B1, C1	889705AH
			type 2	SPK0001SFS
	110 Vdc		Anti pumping Relay	MV261211
			type 1 arrangement A1, B1, C1	SPK0026SF1
			type 2	887191HF
	125 Vdc		Anti pumping Relay	MV261212
			type 1 arrangement A1, B1, C1	SPK0025SF1
			type 2	887191HE
	220 Vdc		Anti pumping Relay	MV261213
			type 1 arrangement A1, B1, C1	SPK0012SF1
			type 2	887191HC
	48 Vac	50 Hz	Anti pumping Relay	MV261215
			type 1 arrangement A1 & C1	889705AQ
			type 1 arrangement B1	889705AP
			type 2	887191HP
	110 Vac	50 Hz	Anti pumping Relay	MV261216
			type 1 arrangement A1 & C1	SPK0030SF1
			type 1 arrangement B1	889705AL
			type 2	SPK0003SFS
	120 Vac	50 Hz	Anti pumping Relay	MV261216
			type 1 arrangement A1 & C1	SPK0030SF1
			type 1 arrangement B1	889705AL
			type 2	887191HK
	220 Vac	50 Hz	Anti pumping Relay	MV261218
			type 1 arrangement A1 & C1	SPK0028SF1
			type 1 arrangement B1	889705AH
			type 2	SPK0001SFS
	230 Vac	50 Hz	Anti pumping Relay	MV261218
			type 1 arrangement A1 & C1	SPK0028SF1
			type 1 arrangement B1	889705AH
			type 2	SPK0001SFS
	120 Vac	60 Hz	Anti pumping Relay	MV261216
			type 1 arrangement A1 & C1	SPK0030SF1
			type 1 arrangement B1	889705AL
			type 2	SPK0003SFS
	230 Vac	60 Hz	Anti pumping Relay	MV261218
			type 1 arrangement A1 & C1	SPK0028SF1
			type 1 arrangement B1	SPK0028SF1
			type 2	SPK0001SFS
	240 Vac	60 Hz	Anti pumping Relay	MV261218
			type 1 arrangement A1 & C1	SPK0028SF1
			type 1 arrangement B1	SPK0028SF1
			type 2	SPK0001SFS
Zelio (RXM) relay adaptation kit for RI				MV261246

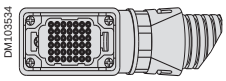

DE58092

Separated components

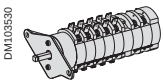
For EvoPact SF1-SFset ranges with RI arrangement

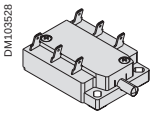
Undervoltage release			YM	
 DE58093	24 Vdc		arrangement B1/C1	889772AB
			arrangement A1	SPK0007SFS
	30 Vdc		arrangement B1/C1	889772AC
			arrangement A1	SPK0008SFS
	48 Vdc		arrangement B1/C1	889772AE
			arrangement A1	SPK0009SFS
	60 Vdc		arrangement B1/C1	889772AF
			arrangement A1	SPK0019SF1
	110 Vdc		arrangement B1/C1	889772AH
			arrangement A1	SPK0010SFS
	125 Vdc		arrangement B1/C1	889772AJ
			arrangement A1	SPK0011SFS
	220 Vdc		arrangement B1/C1	889772AM
			arrangement A1	889772CM
	48 Vac	50 Hz	arrangement B1/C1	889773AQ
	110 Vac	50 Hz	positon B1/C1	889773AU
			arrangement A1	889773CU
	220 Vac	50 Hz	arrangement B1/C1	889773AX
			arrangement A1	889773CX
	120 Vac	60 Hz	arrangement B1/C1	889773AU
			arrangement A1	889773CU
	240 Vac	60 Hz	arrangement B1/C1	889773AX
			arrangement A1	889773CX

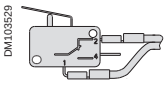
Electrical motor & Gear reducer		
 DE58096	24 to 32 Vdc	51072122A1
	48 to 60 Vac/dc	51072122B1
	110 to 127 Vac/dc	51072122C1
	220 to 250 Vac/dc	51072122D1

LV connection			
 DM103534	Male plug & lead	arrangement A1	MV261073
		arrangement B1	MV261069
		arrangement C1	MV261075

Contacts

Auxiliary contacts		
 DM103530	8NO + 8NC	MV261239

End of charging		
 DM103528	contact M1, M2, M3	AAV85908

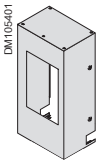
micro switch SE & SQ		
 DM103529	contact SE & SQ	730734A

Separated components

For EvoPact SF1-SFset ranges with RI arrangement

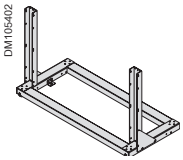
Accessories

Cover


DM105401

arrangement A1/B1	888559D
arrangement C1	888559A
arrangement C1 PP350	889973A
arrangement SFset A1	888559C
arrangement SFset B1	888559B

CB support frame

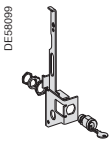

DM105402

PP220 arrangement A1/B1 - H 550 mm	888613A
PP220 arrangement C1 - H 550 mm	888613G
PP220 arrangement A1/B1 - H 775 mm	888613B
PP220 arrangement C1 - H 775 mm	888613H
PP280 arrangement A1/B1 - H 550 mm	888613C
PP280 arrangement C1 - H 550 mm	888613J
PP280 arrangement A1/B1 - H 775 mm	888613D
PP280 arrangement C1 - H 775 mm	888613K
PP380 arrangement A1/B1 - H 550 mm	888613E
PP380 arrangement C1 - H 550 mm	888613L
PP380 arrangement A1/B1 - H 775 mm	888613F
PP380 arrangement C1 - H 775 mm	888613M


DM105403

Wheel	879585

Locking, interlocking


DE58099

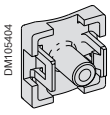
Open arrangement circuit-breaker locking (without lock)	888516A
Flat key type	AAV86887
Tubular key type	AAV86892

Accessories for protection relay

Test VAP 6 (for VIP 300 series)	03143843FA
Pocket battery module (for VIP 400 series)	LV434206

Indicator

Push buttons (open / closed)


DM105404

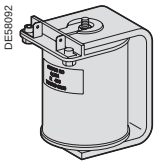
IEC	Red	888408
	Black	888407
ANSI	Green-red O/C	0732826B

Separated components

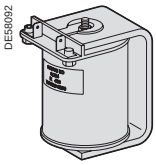
For EvoPact SF1-SF2 ranges with GMH mechanism

The following components can be ordered separately and can be adapted or replaced by the customer.
These references are available through SPEED intranet site

Auxiliaries



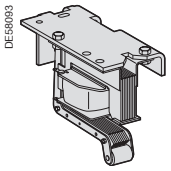
Shunt opening release		Y01 & Y02
24 Vdc		9015608M1
30 Vdc		9015608L1
48 Vdc		9015608J1
60 Vdc		9015608H1
110 Vdc		9015608E1
125 Vdc		9015608E1
220 Vdc		9015608B1
48 Vac	50 Hz	9015608N1
110 Vac	50 Hz	9015608K1
220 Vac	50 Hz	9015608H1
120 Vac	60 Hz	9015608L1
240 Vac	60 Hz	9015608H1



Shunt closing release		YF	
24 Vdc		Anti pumping Relay	MV261207
		Closing release	9015616M1
30 Vdc		Anti pumping Relay	MV261208
		Closing release	9015616L1
48 Vdc		Anti pumping Relay	MV261209
		Closing release	9015616J1
60 Vdc		Anti pumping Relay	MV261210
		Closing release	9015616H1
110 Vdc		Anti pumping Relay	MV261211
		Closing release	9015616F1
125 Vdc		Anti pumping Relay	MV261212
		Closing release	9015616E1
220 Vdc		Anti pumping Relay	MV261213
		Closing release	9015616B1
110 Vac	50 Hz	Anti pumping Relay	MV261216
		Closing release	9015616L1
220 Vac	50 Hz	Anti pumping Relay	MV261218
		Closing release	9015616H1
120 Vac	60 Hz	Anti pumping Relay	MV261216
		Closing release	9015616M1
240 Vac	60 Hz	Anti pumping Relay	MV261217
		Closing release	9015616J1
Zelio (RXM) relay adaptation kit for GMH			MV261247

Separated components

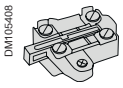
For EvoPact SF1-SF2 ranges with GMH mechanism

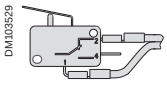
Undervoltage release		YM
 DE58093	24 Vdc	9015612A1
	30 Vdc	889772BC
	48 Vdc	9015612B1
	60 Vdc	9015612C1
	110 Vdc	9015612Q1
	125 Vdc	9015612D1
	220 Vdc	9015612F1
	48 Vac 50 Hz	SPK0002SF2
	110 Vac 50 Hz	9015612J1
	220 Vac 50 Hz	9015612L1
	120 Vac 60 Hz	9015612J1
	240 Vac 60 Hz	9015612L1

Electrical motor & Gear reducer		
 DM105405	24 to 32 Vdc	9011042A1
	48 to 60 Vac/dc	9011042B1
	110 to 127 Vac/dc	9011042C1
	220 to 250 Vac/dc	9011042D1
	380 Vac	9011042F1
	Gear reducer	9011147C1

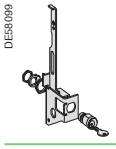
Contacts

Auxiliary contacts		
 DM105406 DM105407	5 contacts	0877942K1
	9 contacts	0877942C1

End of charging		
 DM105408	contact M1, M2, M3	9010107B1

micro switch SE & SQ		
 DM103529	contact SE & SQ	730734A

Accessories

Locking, interlocking		
 DE58099	Open position circuit-breaker locking (without lock)	887647A
	Flat key type	AAV86887
	Tubular key type	AAV86892

Order form

Contents

EvoPact SF1 lateral / frontal fixed
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.

Basic fixed circuit breaker

					Quantity
Rated voltage Ur					(kV)
Impulse voltage Up					(kVbil)
Short-circuit current Isc					(kA)
Rated current Ir					(A)
Frequency	50 Hz				60 Hz
Operating mechanism position	A1		B1		C1

Color for push buttons and indicators

Push buttons open/close:
IEC Red/Black | IEC Red/Green | ANSI Red/Green | ANSI Red/Black

Indicator open/close:
IEC Black/White | ANSI Red/Green

Operating mechanism charged/discharged:
IEC White/Yellow | ANSI Charged/Discharged

Circuit breaker options

1st opening release (see possible choices in combination table below)

Shunt opening release YO1

24 Vdc	60 Vdc	220 Vdc	220 Vac (50 Hz)
30 Vdc	110 Vdc	48 Vac (50 Hz)	120 Vac (60 Hz)
48 Vdc	125 Vdc	110 Vac (50 Hz)	240 Vac (60 Hz)

Undervoltage release YM

24 Vdc	60 Vdc	220 Vdc	220 Vac (50 Hz)
30 Vdc	110 Vdc	48 Vac (50 Hz)	120 Vac (60 Hz)
48 Vdc	125 Vdc	110 Vac (50 Hz)	240 Vac (60 Hz)
Mitop		Without contact	With contact

2nd opening release (see possible choices in combination table below)

Shunt opening release YO2

24 Vdc	60 Vdc	220 Vdc	220 Vac (50 Hz)
30 Vdc	110 Vdc	48 Vac (50 Hz)	120 Vac (60 Hz)
48 Vdc	125 Vdc	110 Vac (50 Hz)	240 Vac (60 Hz)

Undervoltage release YM

24 Vdc	60 Vdc	220 Vdc	220 Vac (50 Hz)
30 Vdc	110 Vdc	48 Vac (50 Hz)	120 Vac (60 Hz)
48 Vdc	125 Vdc	110 Vac (50 Hz)	240 Vac (60 Hz)
Mitop		Without contact	With contact

Remote control

Electrical motor M

24…32 Vdc	110…127 Vdc/ac
48…60 Vdc/ac	220…250 Vdc/ac

Shunt closing release YF

24 Vdc	60 Vdc	220 Vdc	220 Vac (50 Hz)
30 Vdc	110 Vdc	48 Vac (50 Hz)	120 Vac (60 Hz)
48 Vdc	125 Vdc	110 Vac (50 Hz)	240 Vac (60 Hz)

Low voltage wiring connection	Male plug (1.2 m)	Female socket (2 m)
Locking C.B. in open position	Flat	Tubular
Support frame	Low (560 mm)	High (775 mm)
Leaflets language	French	English
Pressure switch		

EvoPact SFset lateral / frontal fixed
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.

Basic fixed circuit breaker

					Quantity
Rated voltage Ur					(kV)
Impulse voltage Up					(kVbil)
Short-circuit current Isc					(kA)
Rated current Ir					(A)
Frequency	50 Hz			60 Hz	
Operating mechanism position	A1		B1	C1	

Color for push buttons and indicators

Push buttons open/close:
IEC Red/Black | IEC Red/Green | ANSI Red/Green | ANSI Red/Black

Indicator open/close:
IEC Black/White | ANSI Red/Green

Operating mechanism charged/discharged:
IEC White/Yellow | ANSI Charged/Discharged

Control unit and sensors

VIP 400 (not available for all electrical characteristics)	CSa4 200A CSb4 630A
VIP410A	CSa4 200A
VIP410E	CSb4 630A

Circuit breaker options

2nd opening release (see possible choices in combination table below)

Shunt opening release YO2

24 Vdc	60 Vdc	220 Vdc	220 Vac (50 Hz)
30 Vdc	110 Vdc	48 Vac (50 Hz)	120 Vac (60 Hz)
48 Vdc	125 Vdc	110 Vac (50 Hz)	240 Vac (60 Hz)

Undervoltage release YM

24 Vdc	60 Vdc	220 Vdc	220 Vac (50 Hz)
30 Vdc	110 Vdc	48 Vac (50 Hz)	120 Vac (60 Hz)
48 Vdc	125 Vdc	110 Vac (50 Hz)	240 Vac (60 Hz)

Remote control

Electrical motor M

24…32 Vdc	110…127 Vdc/ac
48…60 Vdc/ac	220…250 Vdc/ac

Shunt closing release YF

24 Vdc	60 Vdc	220 Vdc	220 Vac (50 Hz)
30 Vdc	110 Vdc	48 Vac (50 Hz)	120 Vac (60 Hz)
48 Vdc	125 Vdc	110 Vac (50 Hz)	240 Vac (60 Hz)

Low voltage wiring connection	Male plug (1.2 m)	Female socket (2 m)
Locking C.B. in open position	Flat	Tubular
Support frame	Low (560 mm)	High (775 mm)
Pocket battery		
Leaflets language	French	English
Pressure switch		

EvoPact SF2 fixed
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.

Basic fixed circuit breaker

Quantity

Rated voltage Ur		(kV)
Impulse voltage Up		(kVbil)
Short-circuit current Isc		(kA)
Rated current Ir		(A)
Frequency	50 Hz	60 Hz

Color for push buttons and indicators

Push buttons open/close:
IEC Red/Black | IEC Red/Green | ANSI Red/Green

Indicator open/close:
IEC Black/White | ANSI Red/Green

Operating mechanism charged/discharged:
IEC White/Yellow | IEC Black/White | ANSI Charged/Discharged

Circuit breaker options

1st opening release (see possible choices in combination table below)

Shunt opening release YO1

24 Vdc	60 Vdc	220 Vdc	250 Vac (50 Hz)
32 Vdc	100-109 Vdc	110 Vac (50 Hz)	120 Vac (60 Hz)
48 Vdc	100-127 Vdc	220 Vac (50 Hz)	240 Vac (60 Hz)

Undervoltage release YM

24 Vdc	60 Vdc	220 Vdc	220 Vac (50 Hz)
32 Vdc	110 Vdc	48 Vac (50 Hz)	120 Vac (60 Hz)
48 Vdc	125 Vdc	110 Vac (50 Hz)	240 Vac (60 Hz)

Mitop: Without contact | With contact

2nd opening release (see possible choices in combination table below)

Shunt opening release YO2

24 Vdc	60 Vdc	220 Vdc	250 Vac (50 Hz)
32 Vdc	100-109 Vdc	110 Vac (50 Hz)	120 Vac (60 Hz)
48 Vdc	100-127 Vdc	220 Vac (50 Hz)	240 Vac (60 Hz)

Undervoltage release YM

24 Vdc	60 Vdc	220 Vdc	220 Vac (50 Hz)
32 Vdc	110 Vdc	48 Vac (50 Hz)	120 Vac (60 Hz)
48 Vdc	125 Vdc	110 Vac (50 Hz)	240 Vac (60 Hz)

Mitop: Without contact | With contact

Remote control

Electrical motor M: 24…32 Vdc | 110…127 Vdc/ac | 48…60 Vdc/ac | 220…250 Vdc/ac

Shunt closing release YF

24 Vdc	60 Vdc	220 Vdc	220 Vac (50 Hz)
32 Vdc	110 Vdc	48 Vac (50 Hz)	120 Vac (60 Hz)
48 Vdc	125 Vdc	110 Vac (50 Hz)	240 Vac (60 Hz)

Low voltage wiring connection	Male plug (1.2 m)	Female socket (2 m)
Locking C.B. in open position	Flat	Tubular
Pressure switch		
Support frame		
Leaflets language	French	English
Pressure switch		

Releases combinations table

Shunt opening releases YO1/YO2	1			2	1	1
Undervoltage release YM		1			1	
Mitop			1			1

EvoPact SF F400 withdrawable
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.

Basic withdrawable circuit breaker

Quantity

Rated voltage Ur	(kV)
Impulse voltage Up	(kVbil)
Short-circuit current Isc	(kA)
Rated current Ir	(A)
Frequency	50 Hz ☐ 60 Hz ☐
Pressure switch	☐

Color for push buttons and indicators

Push buttons open/close:
IEC Red/Black ☐ IEC Red/Green ☐ ANSI Red/Green ☐

Indicator open/close:
IEC Black/White ☐ ANSI Red/Green ☐

Operating mechanism charged/discharged:
IEC White/Yellow ☐ IEC Black/White ☐ ANSI Charged/Discharged ☐

Circuit breaker options

1st opening release (see possible choices in combination table below)

Shunt opening release YO1

24 Vdc ☐	60 Vdc ☐	220 Vdc ☐	220 Vac (50 Hz) ☐
30 Vdc ☐	110 Vdc ☐	48 Vac (50 Hz) ☐	120 Vac (60 Hz) ☐
48 Vdc ☐	125 Vdc ☐	110 Vac (50 Hz) ☐	240 Vac (60 Hz) ☐

2nd opening release (see possible choices in combination table below)

Shunt opening release YO2

24 Vdc ☐	60 Vdc ☐	220 Vdc ☐	220 Vac (50 Hz) ☐
30 Vdc ☐	110 Vdc ☐	48 Vac (50 Hz) ☐	120 Vac (60 Hz) ☐
48 Vdc ☐	125 Vdc ☐	110 Vac (50 Hz) ☐	240 Vac (60 Hz) ☐

Undervoltage release YM

24 Vdc ☐	60 Vdc ☐	220 Vdc ☐	220 Vac (50 Hz) ☐
30 Vdc ☐	110 Vdc ☐	48 Vac (50 Hz) ☐	120 Vac (60 Hz) ☐
48 Vdc ☐	125 Vdc ☐	110 Vac (50 Hz) ☐	240 Vac (60 Hz) ☐

Mitop (not available with sismic version)
Without contact ☐ With contact ☐

Remote control

Electrical motor M
24…32 Vdc ☐ 110…127 Vdc/ac ☐
48…60 Vdc/ac ☐ 220…250 Vdc/ac ☐

Shunt closing release YF

24 Vdc ☐	60 Vdc ☐	220 Vdc ☐	220 Vac (50 Hz) ☐
30 Vdc ☐	110 Vdc ☐	48 Vac (50 Hz) ☐	120 Vac (60 Hz) ☐
48 Vdc ☐	125 Vdc ☐	110 Vac (50 Hz) ☐	240 Vac (60 Hz) ☐

Leaflets language	French ☐	English ☐

M1/M2 cradles

Cradle type	M1 ☐	M2 ☐
Rated short-circuit current Isc		⩽ 40 kA ☐
Rated current Ir	1250 A ☐	2500 A ☐

M1/M2 cradles accessories

Racked-in/out position contact	4 NO, 4 NC ☐
Extra handle	Quantity

Releases combinations table

Shunt opening releases YO1/YO2	1		2	1	1		2
Undervoltage release YM		1		1		1	1
Mitop					1	1	

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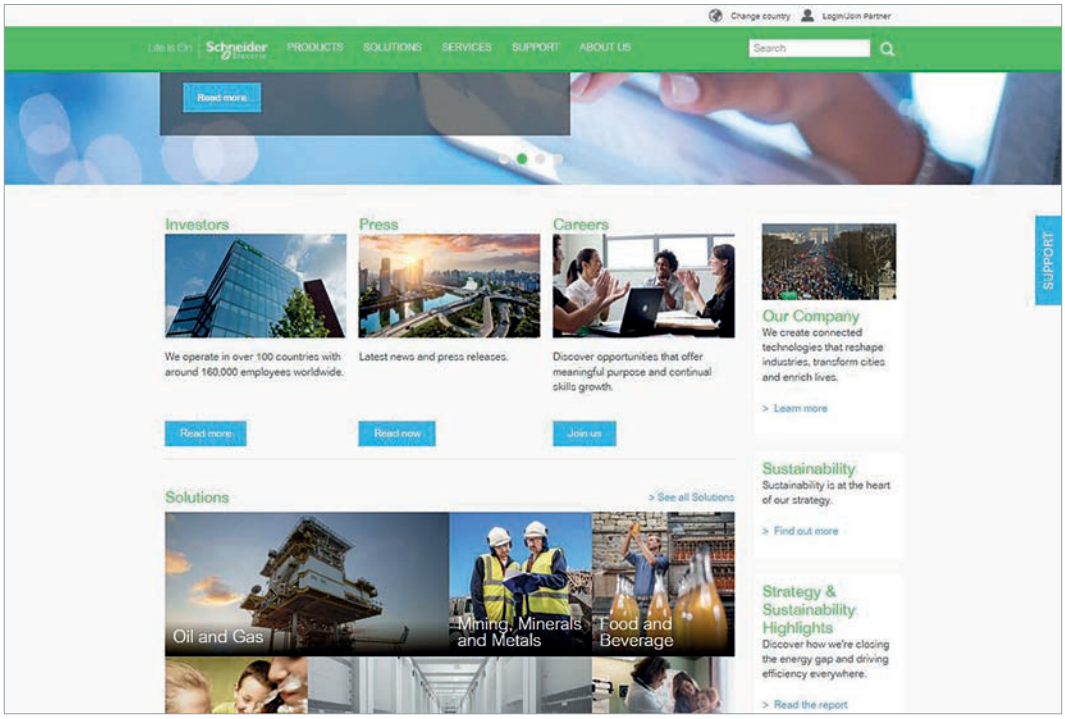

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