

Medium Voltage Distribution Product catalogue for switchboard manufacturer

Catalogue
2000



Merlin Gerin

Modicon

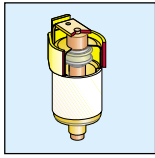
Square D

Telemecanique

Schneider
 **Electric**
We do more with electricity.

General Contents



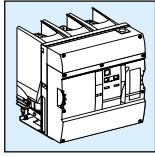
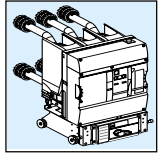


Evolis presentation

Versatility
 Performance
 Heavy duty and innovative
 Tailored to your requirements
 The commitment of a major manufacturer
 Simplicity and rapidity

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Evolis presentation

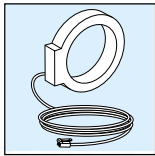
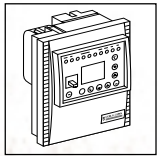


Circuit breaker

Panorama
 Full version
 Modular version
 Fitted accessories
 Dimensions

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Circuit breaker

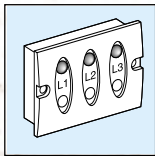
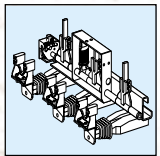


Protection, monitoring control and metering

Presentation
 Sepam 1000+
 PowerLogic
 Dimensions

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Protection, monitoring control and metering

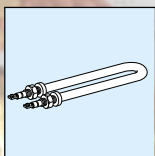
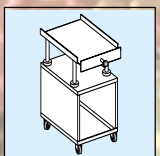


Earthing switch

Earthing
 Indication and interlocking

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Earthing switch

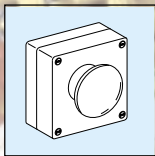
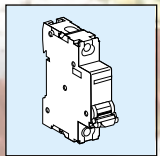


Switchboard components

Switchboard components
 Cubicle components

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Switchboard components



Control compartment components

AC and DC protection circuit
 Control and indication
 Connection

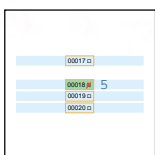
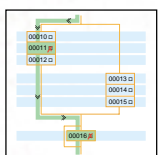
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Control compartment components

Additional technical information

Circuit breaker
 Protection, monitoring, control and metering
 Sepam 1000+

Additional technical information



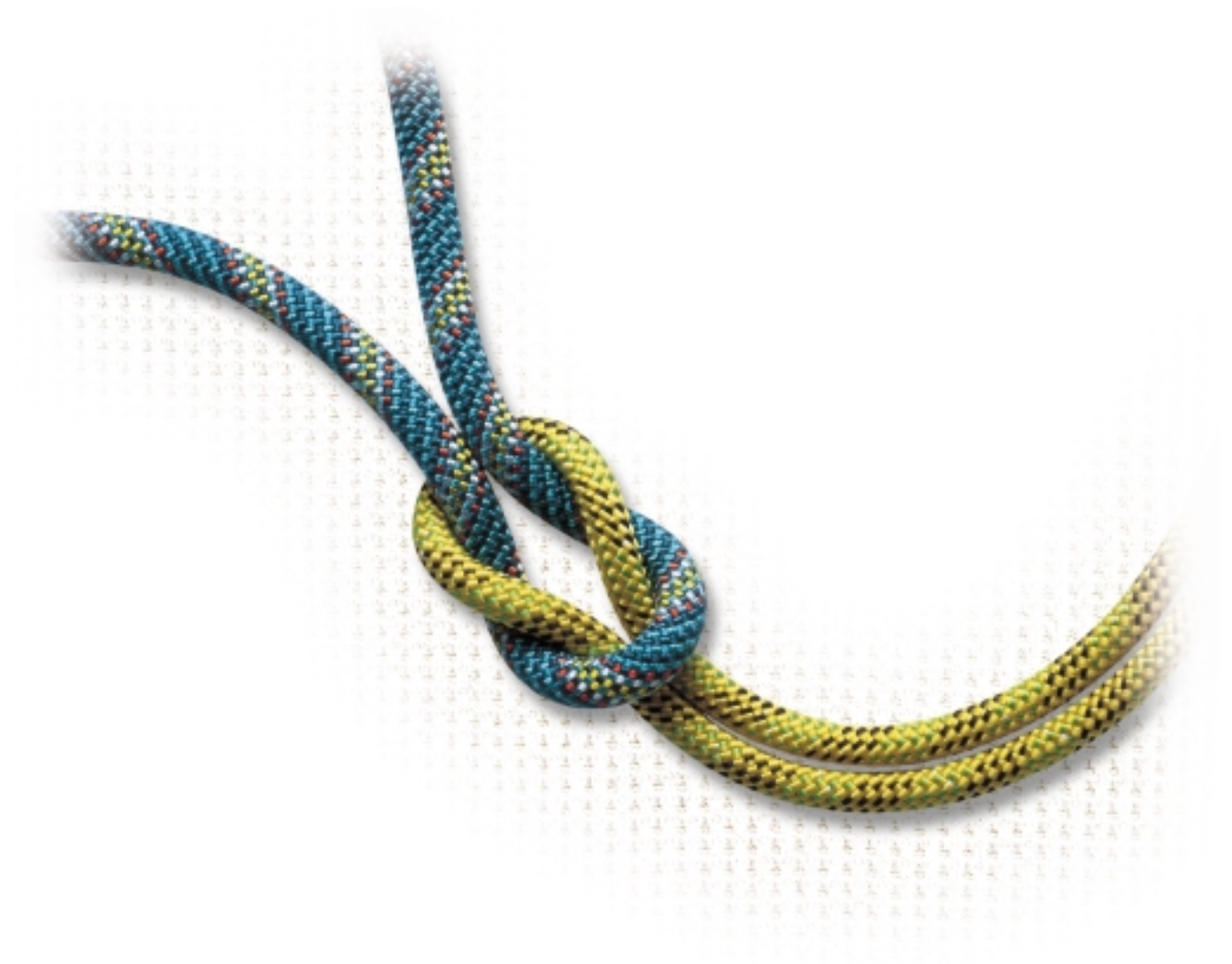
How to order

Circuit breaker
 Protection, monitoring, control and metering
 Earthing switch
 Switchboard components
 Separate accessories

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How to order

Sell



your added value.

Dear customers,

Evolis is an innovative range of medium voltage vacuum circuit breakers designed and manufactured by Schneider Electric.

Besides this new product that you are going to discover, we want to go even further in meeting your expectations. With this catalogue, we propose a comprehensive and adapted range of product for integration in your medium voltage cubicles.

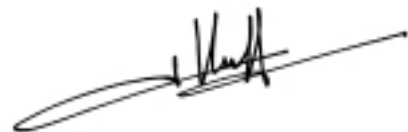
This offer has been designed to take into account your working constraints. To save you precious time, we have made product selection simpler and reduced delivery times.

You can therefore save time and concentrate on satisfying your customers by focusing on your know-how.

Let's built a lasting relationship together.

Jean Kieffer

*Senior vice president
Strategic Business Segment
Medium Voltage*

A handwritten signature in black ink, appearing to read 'Jean Kieffer', with a long horizontal stroke extending to the right.

Evolis: versatility

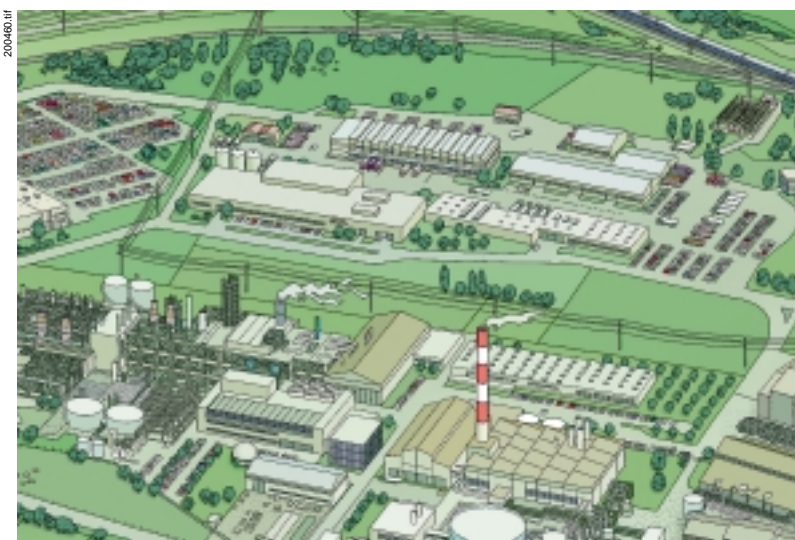
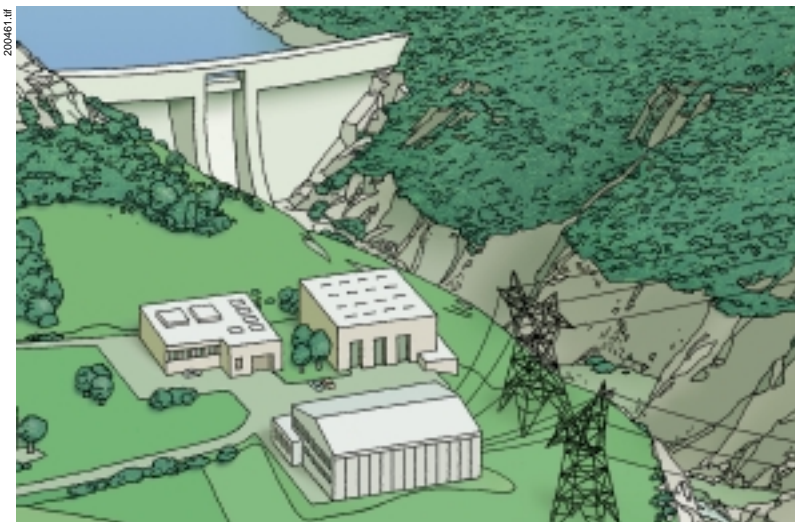
Where to use Evolis?



Evois circuit breakers are used to protect and control public or industrial medium voltage electrical distribution networks.

Evois is indoor switchgear that is particularly suited to the production and renovation of HV/MV, MV/MV and MV/LV sub-stations.

It is suitable for the protection of all types of application: cables, lines, motors, capacitors, transformers, bus sectioning of sources, etc.



2 versions adapt to your fixed or withdrawable installation:



Full version
withdrawable with cradle



Modular version
basic circuit breaker with kits delivered in separate

Evolis: performance

What does Evolis offer you?



■ The rating plates on the front of the circuit breaker also show the breaking capacity:

- yellow: 25 kA
- blue: 31.5 kA
- red: 40 kA.

The electrical characteristics are given in the circuit breaker designation

■ **3 rated voltages:**

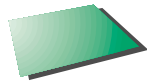
- 7.2 kV index 7,
- 12 kV index 17,
- 17.5 kV index 17.

■ **3 breaking capacities:**

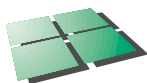
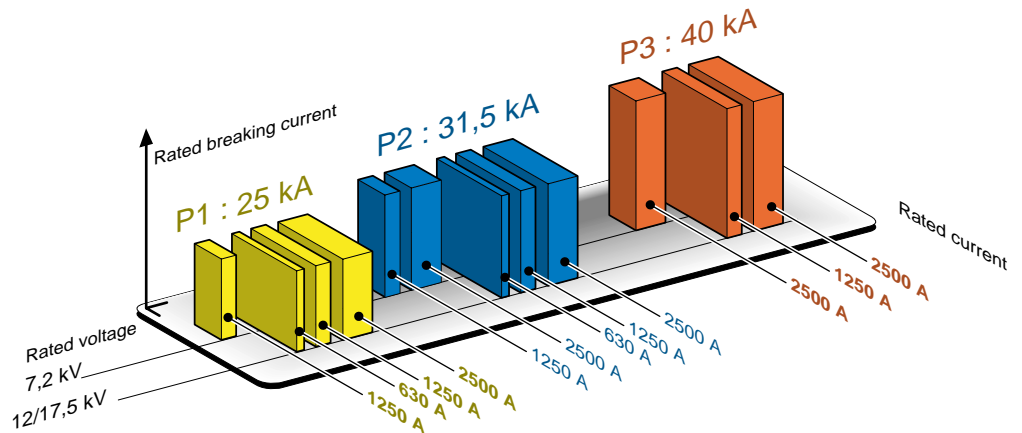
- 25 kA index P1,
- 31.5 kA index P2,
- 40 kA index P3.

■ **4 rated currents:**

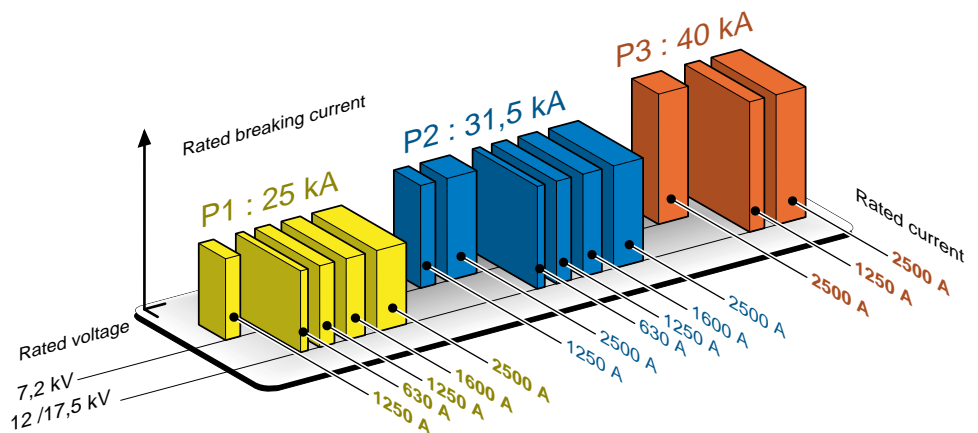
- 630, 1250, 1600, 2500 A.



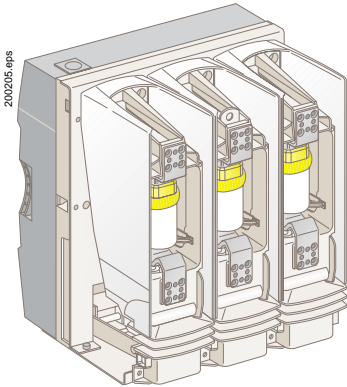
Full version



Modular version



How does Evolis eliminate faults?



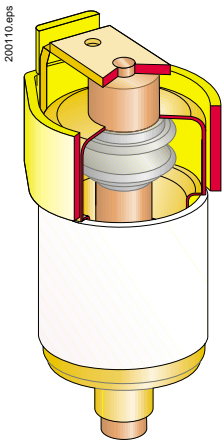
Electrical endurance

A magnetic field is applied along the axis of the vacuum interrupter contacts. This process maintains the arc in a diffuse mode even at high current values. It ensures optimum distribution of the energy over the contact surface thus avoiding localised hot spots.

■ The advantages of this technique:

- a very compact vacuum interrupter,
- low dissipation of arcing energy in the vacuum interrupter.

Evolis is in conformity with highest electrical endurance class (IEC 60 056: class E2).



Mechanical endurance

■ This magnetic field is generated by a patented external coil which surrounds the contact zone. This solution provides many advantages:

- a simplified and therefore reliable vacuum interrupter,
- heavy duty contacts which do not distort during repeated switching operations,
- considerable reduction in control mechanism energy.

■ For the first time, a low voltage device control mechanism has been integrated in a medium voltage circuit breaker. The **Masterpact** control mechanism used on Evolis provides the benefits of a system that has proven itself for over 10 years on hundreds of thousands of installations.

Evolis is in conformity with most demanding mechanical endurance class (IEC 60 056: class M2)

An integrated protection chain

The Sepam 1000⁺ protection unit integrated with Evolis together with innovative current sensors, provide you with a comprehensive metering, protection and energy management chain.

■ **A high performance and economical solution**

- Sepam 1000⁺, through its modular offer, proposes a cost effective solution adapted to every requirement,
- one single sensor reference covers the circuit breaker's full operating range.

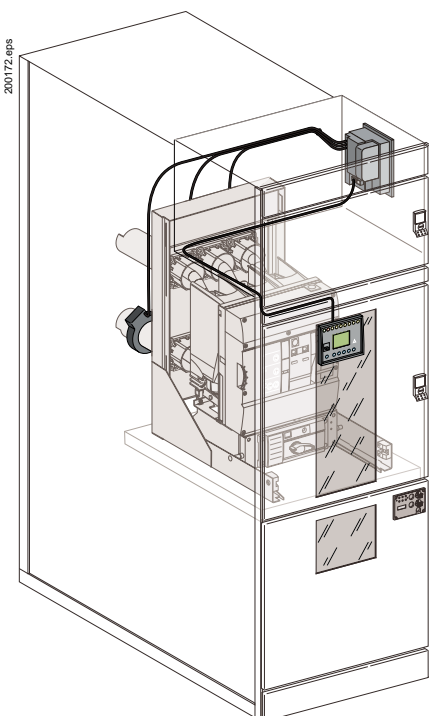
■ **Easy to control and to install**

- all components in the protection chain are catalogued and delivered quickly,
- current sensors, developed in the circuit breaker environment, are simply mounted on the busducts
- the operation of the entire protection chain with the Evolis circuit breaker has been extensively tested.

■ **The power of a multifunctional digital unit**

Sepam 1000⁺ is not a simple protection relay, it is a multifunctional unit notably providing:

- circuit breaker diagnosis functions (number and time of switching operations, rearming time, cumulated switched A²),
- direct circuit breaker control whatever release unit type,
- remote equipment operation through the Modbus communication option.



Evolis: tailored to your requirements

What does Evolis offer you?



Full version: a fully assembled and tested unit

Circuit breakers that combine simplicity of selection and richness of offer.

■ 2 versions are proposed:

- **fullversion** comprising the withdrawable circuit breaker and its cradle
- **modular version** comprising separately delivered kits.

■ "Universal" accessories can be added to either version.

E.g:

coil, contact, motor, connection, inter-locking systems, etc

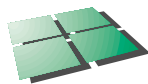
■ As standard, the circuit breaker is equipped with all the components required for **"ready to use" withdrawable installation in metal clad cubicles.**

This unit is easy to integrate in a cubicle environment, all it needs is mechanically fixing in place. An installation guide explains the required operations in detail.

■ This version provides the guarantees of a highly reliable unit, whose components function in perfect harmony. Critical points such as inter-locking systems, dielectric withstand and temperature rise have been checked thoroughly during design.

It is a system that is fully integrated and tested by the manufacturer, in conformity with IEC standards 60 298 and 60 056.





Modular version: high added value accessories

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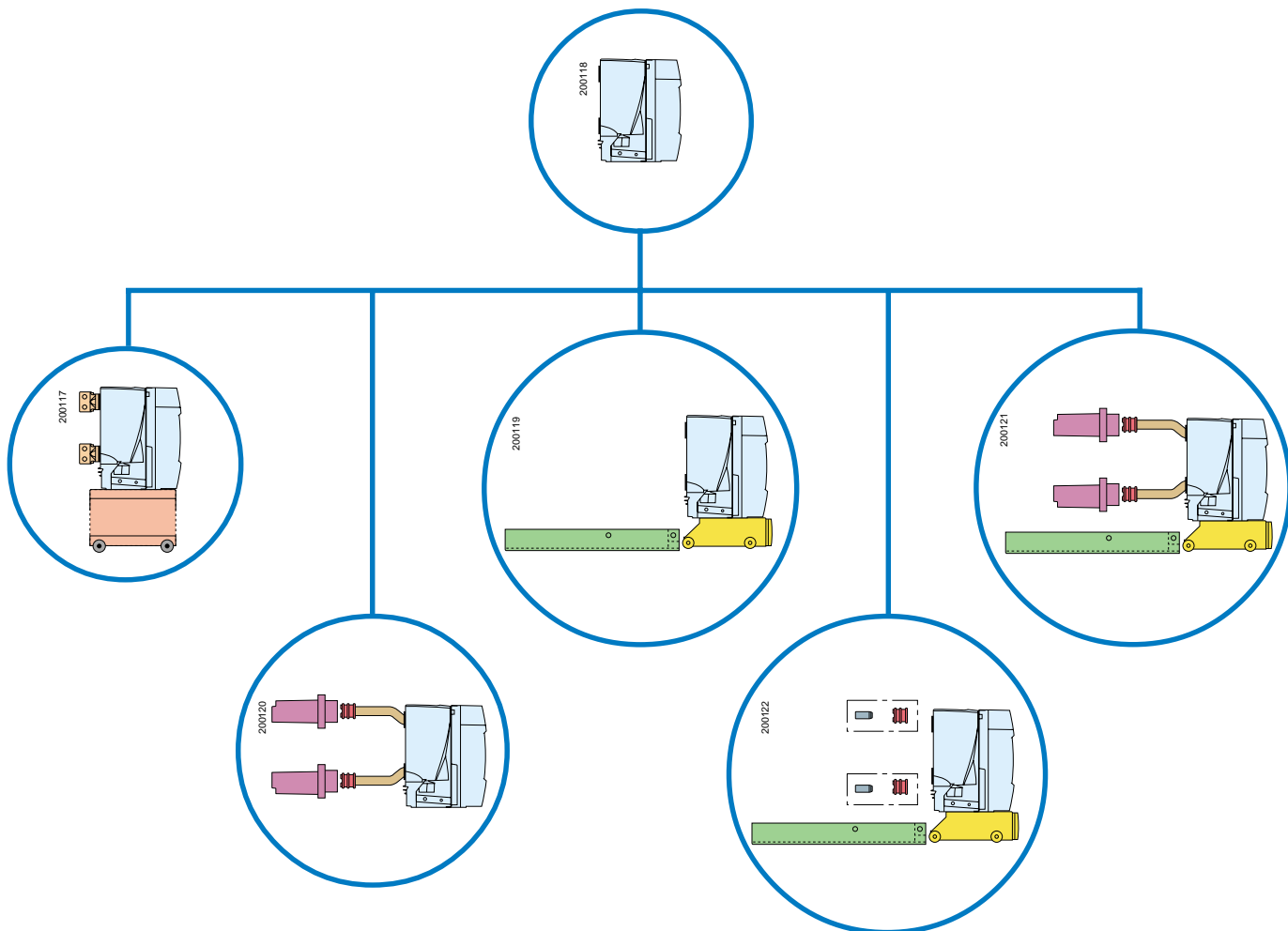
■ The circuit breaker is proposed in its **most simple configuration**. In this case it can be combined with additional functions, to satisfy various requirements.

■ This version offers maximum flexibility to adapt to constraints in existing cubicles or to operating specifications:

- retrofit: fixed and withdrawable installation,
- block-type cubicle or fenced sub-station: fixed or removable installation,
- compartmented cubicle: fixed and withdrawable installation.

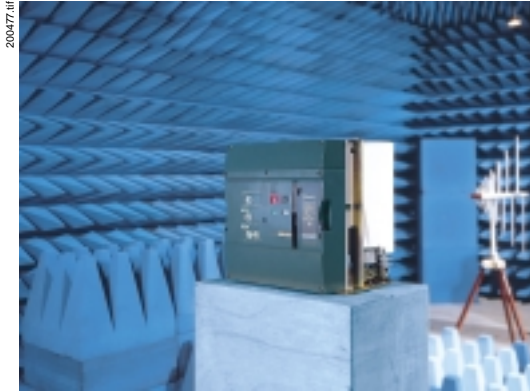
■ The panel builder chooses the components he needs for a "customised" solution tailor made to his know-how.

Build your own version...



Evolis: the commitment of a major manufacturer

What guarantees does Evolis provide?



Conformity with standards

■ Conformity with standards is a guarantee of suitability for the required function, the very basis of the contract between the supplier and the customer:

- dependability
- operator safety.

It allows specifications to be fully satisfied whilst complying with local constraints.

During its design phase, Evolis was subjected to a series of tests which confirmed excellent performance levels, beyond the standards requirements.

■ Type testing:

- dielectric tests,
- temperature rise,
- breaking capacity,
- thermal withstand,
- mechanical endurance,
- electrical endurance.

■ Specific testing:

- ageing,
- transport and storage

N.B.:

IEC 60 694: common specifications for high voltage switchgear and controlgear standards

IEC 60 056: high voltage alternating current circuit breakers

IEC 60 298: A.C metal-enclosed switchgear between 1 kV and 52 kV.

Comment: for more information, consult the IEC organisation site: www.iec.ch.

Certification

■ Certification of conformity provides guarantees that the product:

- has been subjected to type testing according to EN45001 standards procedures in accredited laboratories by independent organisations,
- is in conformity with recognized international standards.

■ Evolis is under process of certification by external EN 45011 accredited organisations, members of the STL (Short circuit Testing Liaison).

N.B.:

EN45001: general requirements for the competence of testing and calibration laboratories

EN45011: general requirements for bodies operating product certification systems.

ESEF-CERTIFELEC
STLA



Guaranteed quality

Schneider Electric integrates a functional organisation in each of its units with the main mission of checking quality and overseeing compliance with standards.

The quality system, for the design and manufacture of Evolis circuit breakers, is certified to be in conformity with the requirements of ISO 9001 and ISO 9002 quality assurance standards.

- **ISO 9001**: quality system for design/production and installation
- **ISO 9002**: quality system for production and installation
- **IQNET**: international certification network.

Systematic control

During manufacture, each circuit breaker is subjected to routine systematic testing, with the aim of checking both quality and conformity.

■ Control of vacuum interrupters

Each vacuum interrupter, sealed and airtight, is checked for the quality of the vacuum obtained. This pressure measurement is based on the proven "magnetron discharge" method.

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

■ Control of the circuit breaker

A rigorous set of tests and measurements is carried out on each circuit breaker. The results obtained are reported on and signed off by the quality control department on the test certificate for each device, thereby guaranteeing product traceability.

Respecting the environment

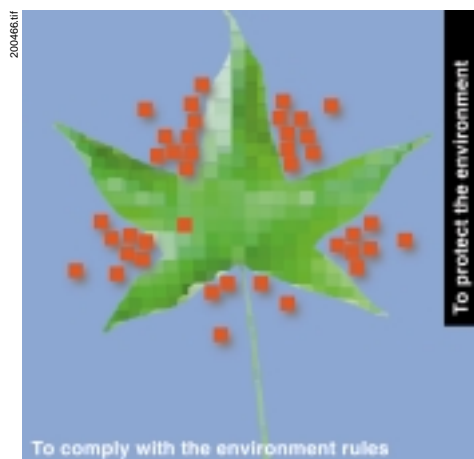
■ Schneider Electric sets itself the goal of

- actively participating in environmental protection, from a circuit breaker's design right through to its end of life,
- complying with the environmental requirements of both its customers and end users of its products.

■ For Evolis circuit breakers

- development teams integrated the product's end-of-life right from the design stage. The product is easy to dismantle, all the materials used are recyclable and non-polluting
- plastic parts are marked to identify the material,
- the circuit breakers are produced in factories which respect the environment. Our subsidiary at Aubenas, France has been awarded the ISO 14001 standard certification (environmental management system).

Comment: for more information, consult the ISO organisation site: www.ISO.CH



How Evolis makes your life easier?



Choice

Evolis circuit breakers offer a comprehensive and rational range:

- 3 operating voltages (7.2 kV - 12 kV - 17.5 kV)
- 3 breaking capacities (25 kA - 31.5 kA - 40 kA)
- 4 current ratings (630 - 1250 - 1600 - 2500 A)
- 1 common range of accessories and auxiliaries
- 2 versions: complete and modular.

Ordering and delivery

- You can order
 - the cradle before the circuit breaker,
 - a specific release unit, at the last moment, that you will easily be able to install yourself.

- Thanks to modular design and local customising, the delivery is faster.

Installation

Evolis is easy to incorporate in cubicles.

- Optimisation of volumes: one single height and depth throughout the range
- Electrical auxiliaries are interchangeable throughout the range
- Adjustable device height in the cubicle
- Variable phase to phase connection points.

Operation

Increased safety

Evolis has been designed and industrialised to provide maximum safety for operators whilst guaranteeing the simplicity and rapidity of operations.

- Protective metal shutters
- Safety interlocking systems to avoid operator errors when racking in or out
- Racking in/out possible with the door closed.

Reduced maintenance

- Contact wear diagnosis is possible through a measurement on the pole unit
- Electrical auxiliaries are easily mounted on site (all you need is a screwdriver)
- Common stock of replacement parts with the **Masterpact** circuit breaker
- Diagnosis of the circuit breaker's functional chain using Sepam 1000*.



Evolis circuit breaker



Masterpact circuit breaker

From pre-engineering to switchboard composition, a "toolkit" exists for panel builders to highlight their know-how and optimise their work around Evolis.

Tools to partner your know-how

Design guide

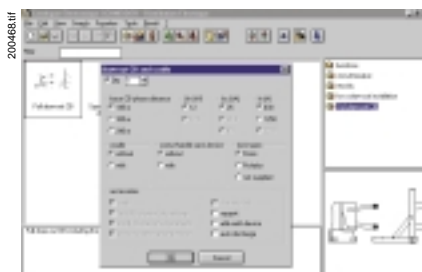
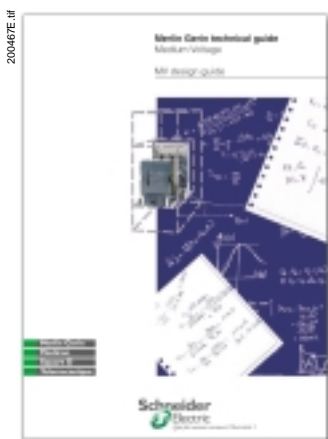
This document provides you with all the technical recommendations you require for your calculations when designing cubicles and incorporating equipment in conformity with IEC standard 60 298.

E.g.:

- defining the switchgear,
- dielectric strength,
- busbar calculation,
- temperature rise calculation,
- definition of IP protection index.

Electronic catalogue

This "electronic" selection guide will rapidly become an everyday tool. Several access points are proposed to discover the offer. It automatically provides the price of the device and an order form once you have selected your Evolis version.



Installation guide

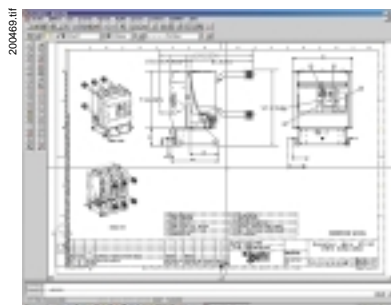
This document provides you with all the information and recommendations you need to incorporate the circuit breaker and its accessories in a cubicle.

E.g.:

- dimensions and space requirements,
- mechanical interface,
- power circuit connection,
- auxiliary connection,
- layout diagrams.

AUTOCAD library

For easier and more reliable integration of Evolis in a cubicle environment, an extensive library of dimensional drawings and electrical layout diagrams is available in AUTOCAD format (format DXF/DWG/WMF).



Internet site

Missing a certificate? Lost a technical manual?

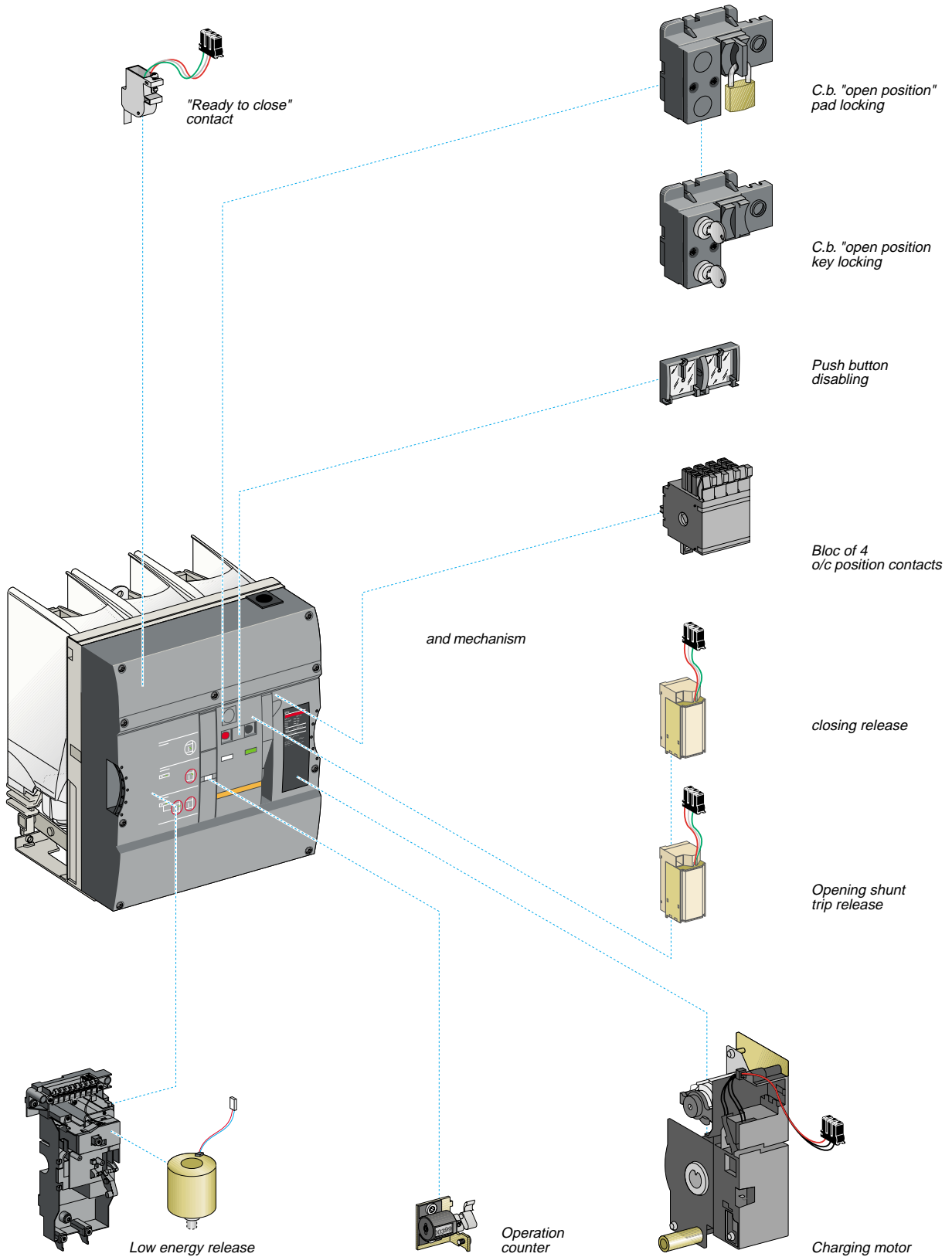
Connect up to our web site where you can download all of our technical documentation.

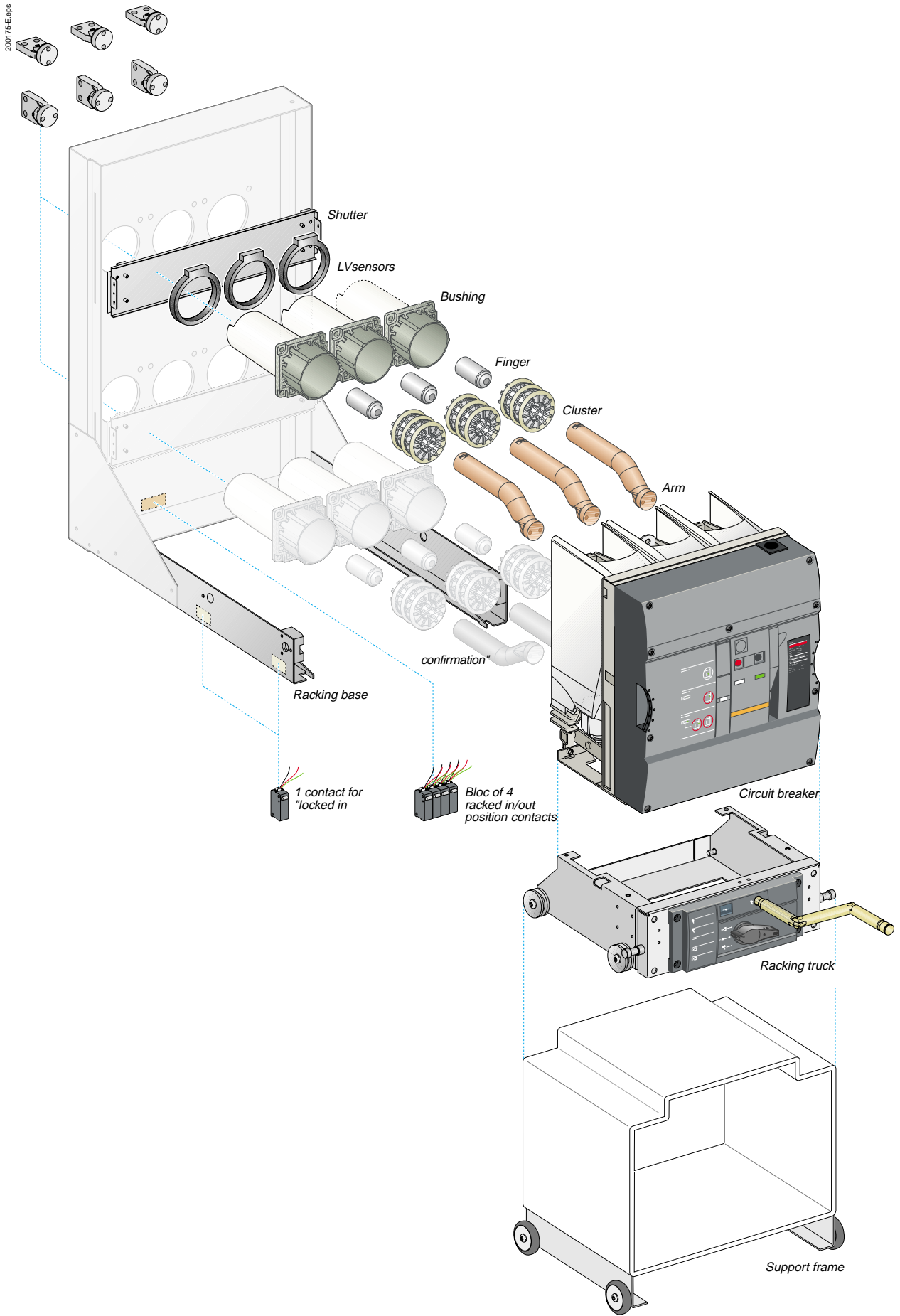


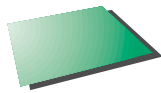
This chapter provides useful information in selecting the performance levels of your Evolis circuit breaker. It also describes all the functions associated to each versions.

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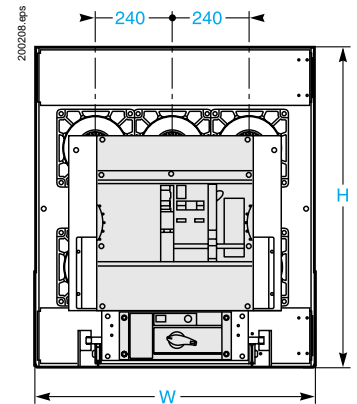
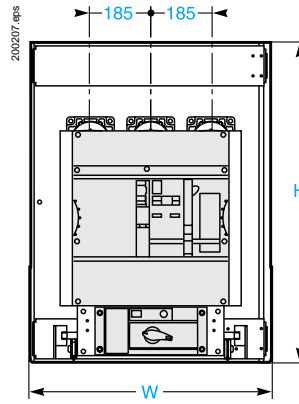
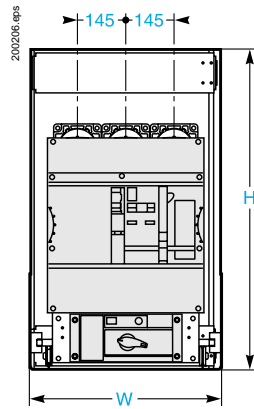
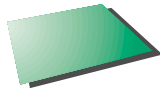
Performance tables

7P₁ 1250 to 17P₃ 2500

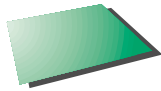
Common characteristics according to IEC 60 056			
rated frequency	fr	(Hz)	50 & 60
short-time withstand current	Ik for tk = 3 s	(kA) rms	Ik = I _{sc}
rated peak withstand current	Ip	peak (kA)	Ip = 2.5 & 2.6 Ik
rated short circuit making current		peak (kA)	= 2.5 & 2.6 I _{sc}
operating sequence			O - 3 mn - CO - 3 mn - CO O - 0.3 s - CO - 3 mn - CO O - 0.3 s - CO - 15 s - CO
operating times	opening	ms	< 50
	breaking	ms	< 60
	closing	ms	< 65
mechanical endurance	class		M2
	number of operations with maintenance		25000
electrical endurance	class		E2
	number of operations	25 kA	100
		31.5 kA	70
		40 kA	50
capacitive current breaking			C1 class

Characteristics according to IEC 60 056			7P1-1250	7P2-1250	7P2-2500	7P3-2500	17P1-630	17P1-1250
rated voltage	Ur	(kV) rms	7.2	7.2	7.2	7.2	12/17.5	12/17.5
rated insulation level	Ud	(kV) rms	20	20	20	20	38	38
	Up	(kV) peak	60	60	60	60	95	95
rated short-circuit breaking current	Isc	(kA) rms	25	31.5	31.5	40	25	25
rated normal current (-25°C,+40°C)	Ir	(A) rms	1250	1250	2500	2500	630	1250
climatic version	-25°C + 40°C		■	■	■	■	■	■

Installation and connections							
phase distance							
between poles	(mm)	145 & 185	185	240	240	145 & 185	145 & 185
between MV connections on the cradle	(mm)	145...170	185...210	240...265	240...265	145...170	145...170
		185...210				185...210	185...210
dimensions breaker and cradle (mm)	Width (W)	592 & 700	700	880	880	592 & 700	592 & 700
	Depth (D)	1140	1140	1140	1140	1140	1140
	Height (H)	960	960	960	960	960	960
mass breaker and cradle	(kg)	118 & 123	128	194	194	118 & 123	118 & 123

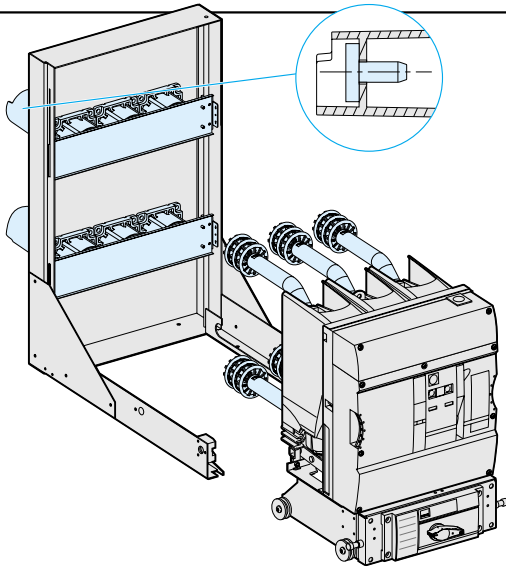


17P1-2500	17P2-630	17P2-1250	17P2-2500	17P3-1250	17P3-2500
12/17.5	12/17.5	12/17.5	12/17.5	12/17.5	12/17.5
38	38	38	38	38	38
95	95	95	95	95	95
25	31.5	31.5	31.5	40	40
2500	630	1250	2500	1250	2500
■	■	■	■	■	■
240	185	185	240	240	240
240...265	185...210	185...210	240...265	240...265	240...265
880	700	700	880	880	880
1140	1140	1140	1140	1140	1140
960	960	960	960	960	960
194	128	128	194	194	194



Power circuit

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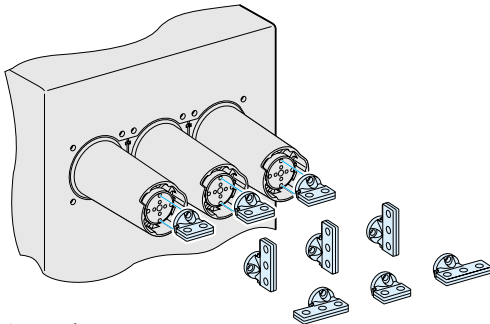


Composition

- The power circuit comprises:
 - mobile contacts made up of disconnecting clusters and arms mounted on the circuit breaker,
 - fingers located on the cradle and insulated by bushings and metal shutters.
- This unit gives perfect control of dielectric and temperature rise considerations and has been validated by testing.

Power circuit

200159.eps

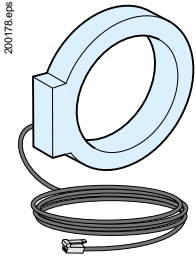
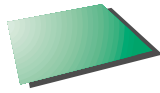


3 sets of connectors

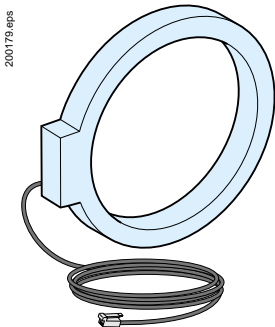
- Customer connection is easily achieved outside the cradle:
 - on vertical copper terminals integrated in the bushing,
 - through a set of connectors, also used on the basic circuit breaker unit.
- Connection variants described on page 28 are possible.

Comments:

- The dielectric withstand values shown in the performance tables are guaranteed excluding these connectors.
- The panel builder should check the overall cubicle connection configuration; typical examples are given in the installation guide.



Sensor CVv120



Sensor CVv200

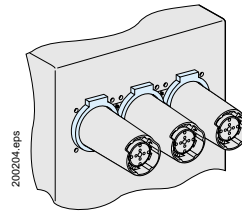
Function

These low power sensors provide accurate current measurement to the protection function when the Evolis circuit breaker is associated with the Sepam1000⁺.

Composition

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

Mechanical characteristics



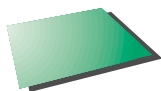
- Mounted directly on the Evolis withdrawable circuit breaker cradle. The sensors are simply located on the bushings and fixed using a screw. Each sensor covers the full operating range of the corresponding circuit breaker.
- Connection to the Sepam 1000⁺ is achieved using an armoured cable which is attached to each sensor.

Electrical characteristics

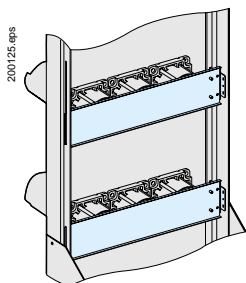
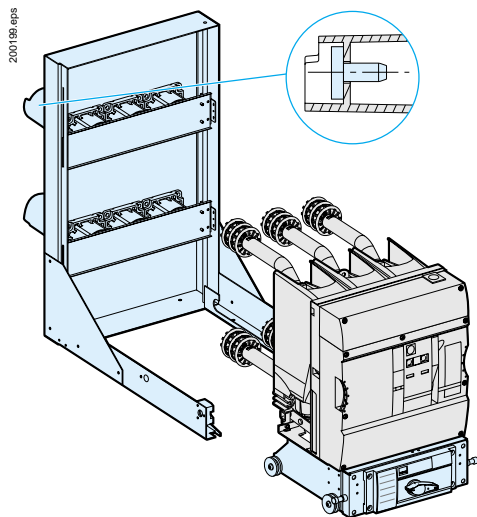
- In conformity with standard IEC 60044-8, defining voltage output current sensors
- Usable for nominal currents of 25 A to 3150 A
- Class 0.5 over the range 100 - 4000 A
- The choice of sensor is solely based on the phase to phase distance of the cradle:
 - 120 mm diameter for phase to phase distances of 145 and 185 mm,
 - 200 mm diameter for phase to phase distances of 240 mm.
- Current sensors deliver a voltage output at a ratio of 100 A / 22.5 mV.

Operation

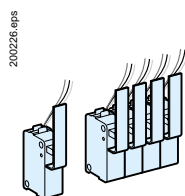
An input terminal is provided on the Sepam 1000⁺ for testing and maintenance purposes. A test cabinet interface can be ordered to check the correct operation of sensors.



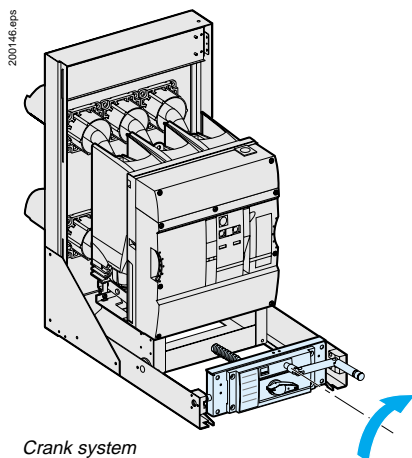
Racking in



Shutters



Auxiliary contacts



Crank system

Composition

The "racking in" function is provided by:

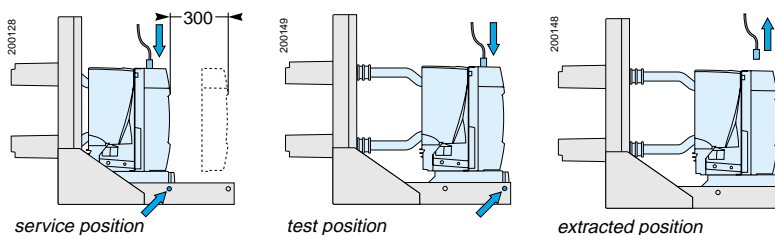
- The racking truck supporting the circuit breaker (mobile part).
- The cradle (fixed part).

Operating procedure

■ The circuit breaker moves through 3 stable states:

- service: circuit breaker racked in and locked in place; low voltage connected,
- test: circuit breaker racked out and locked in place; low voltage connected,
- extracted: the circuit breaker can be unlocked and extracted from the cubicle, with no interlocking.

3 stable states for manual operation



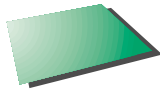
Comments: arrows indicate the "lock-in-positions" for the circuit breaker and the low voltage connector.

Functions

- Interlocking between circuit breaker control and cradle position makes operation safer: racking in or out only when the circuit breaker is open.
- Interlocking is also provided between the low voltage connector and the circuit breaker. Racking in is only possible when the low voltage connector is connected.
- Earthing is automatically achieved throughout the whole racking in operation.
- Protective shutters placed on the cradle, prevent access to the racking fingers when the device is extracted (protection index: IP2X).
- For maintenance operations, it is possible to:
 - padlock the shutters in the closed position,
 - unlock the shutters mechanism to access the racking fingers.
- A fool proof protection enables cradle and circuit breaker to be matched up. This system is mounted on the racking base. Part of it has to be assembled by the panel builder on the cubicle floor.

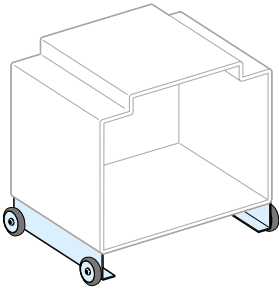
Accessories

- A set of auxiliary contacts:
 - 4 racked in/racked out position contacts,
 - 1 contact indicating that the cradle is locked in the racked in position.
- A propulsive system combined with a crank makes racking in and racking out easier. It allows the operation to be carried out with the door closed. Interlocking prevents to insert the crank until the racking base selector has been positioned to the "racked out" position.
- Additional earthing for the base can be provided by a copper brush.
- A key locking system (Ronis or Profalux) for the racked out position on the circuit breaker will provide increased safety when working downstream of the circuit breaker. This system is combined with an earthing disconnecter (refer to page 66).



Support frame

200131.eps

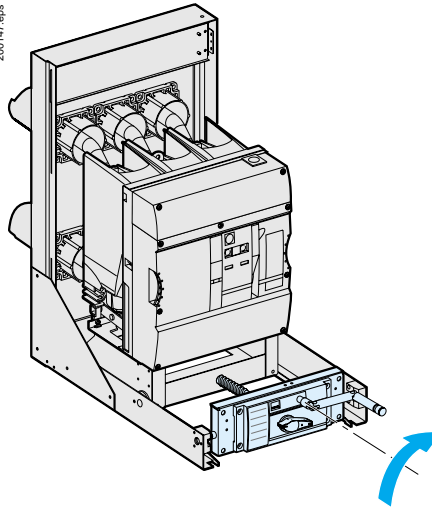


Support frame

Function

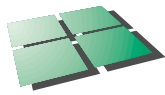
- The support frame allows:
 - A "cassette" type circuit breaker to be transformed into a "roll on the floor" type circuit breaker by adding an intermediary structure,
 - this structure can be positioned at a variable height according to your cubicle.

200147.eps



Composition

- A roller kit will be provided with a drawing to allow the panel builder to adapt the height to its need inside his cubicle.



Performance tables

7P₁ 1250 at 17P₃ 2500

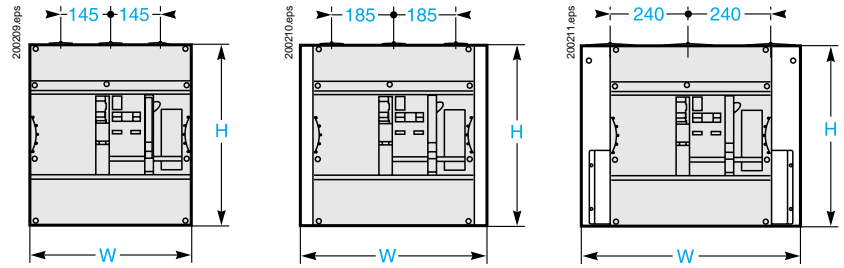
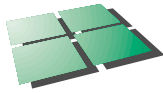
Common characteristics according to IEC 60 056

rated frequency	fr	(Hz)	50 & 60
short-time withstand current	Ik for tk = 3 s	(kA) rms	Ik = I _{sc}
rated peak withstand current	Ip	peak (kA)	Ip = 2.5 & 2.6 Ik
rated short circuit making current		peak (kA)	= 2.5 & 2.6 I _{sc}
operating sequence			O - 3 mn - CO - 3 mn - CO O - 0.3 s - CO - 3 mn - CO O - 0.3 s - CO - 15 s - CO
operating times	opening	ms	< 50
	breaking	ms	< 60
	closing	ms	< 65
mechanical endurance	class		M2
	number of operations with maintenance		25000
electrical endurance	class		E2
	number of operations	25 kA	100
		31.5 kA	70
		40 kA	50
capacitive current breaking			C1 class

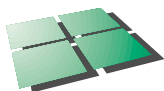
Characteristics according to IEC 60 056			7P1-1250	7P2-1250	7P2-2500	7P3-2500	17P1-630	17P1-1250
rated voltage	Ur (kV) rms		7.2	7.2	7.2	7.2	12/17.5	12/17.5
rated insulation level	Ud (kV) rms		20	20	20	20	38	38
	Up (kV) peak		60	60	60	60	95	95
rated short-circuit breaking current	Isc (kA) rms		25	31.5	31.5	40	25	25
rated normal current (-25°C,+40°C)	Ir (A) rms		1250	1250	2500	2500	630	1250
climatic version	-25°C + 40°C		■	■	■	■	■	■

Installation and connections

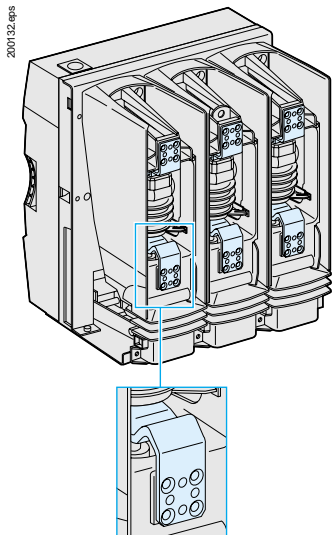
phase distance								
	without MV connections	(mm)	145 & 185	185	240	240	145 & 185	145 & 185
	with MV connections	(mm)	145...170 185...210	185...210	240...265	240...265	145...170 185...210	145...170 185...210
dimensions (mm)	Width (W)		470 & 550	550	660	660	470 & 550	470 & 550
	Depth (D)		429	429	429	429	429	429
	Height (H)		530	530	530	530	530	530
mass	(kg)		50	50	70	70	50	50



17P1-1600	17P1-2500	17P2-630	17P2-1250	17P2-1600	17P2-2500	17P3-1250	17P3-2500
12/17.5	12/17.5	12/17.5	12/17.5	12/17.5	12/17.5	12/17.5	12/17.5
38	38	38	38	38	38	38	38
95	95	95	95	95	95	95	95
25	25	31.5	31.5	31.5	31.5	40	40
1600	2500	630	1250	1600	2500	1250	2500
■	■	■	■	■	■	■	■
145 & 185	240	185	185	185	240	240	240
145...170 185...210	240...265	185...210	185...210	185...210	240...265	240...265	240...265
470 & 550	660	550	550	550	660	660	660
429	429	429	429	429	429	429	429
530	530	530	530	530	530	530	530
50	70	55	55	55	70	70	70



Connecting the power circuit



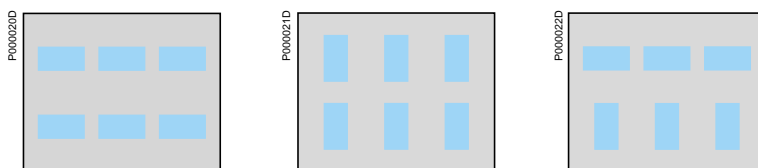
Terminal

Composition

- The basic circuit breaker unit is equipped with copper, drilled connection terminals, located at the top and bottom of the breaking poles
- Connectors are mounted on these terminals using the associated bolt work. They enable several connection variants. The same connectors can be also mounted on the bushing connection terminals (see page 22).

Fixed connectors

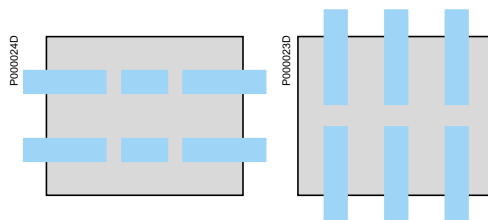
horizontal connectors (H) vertical connectors (V) mixed connectors



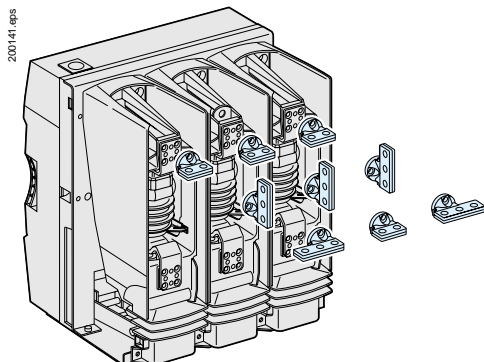
A horizontal connector becomes a vertical connector by a 90° rotation.

Variable distance connectors

horizontal spreading connectors (H) vertical spreading connectors (V)



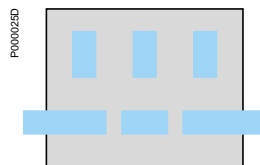
The spreading connector enables the connecting distance to be increased by 0 to 25 mm.



3 sets of connectors

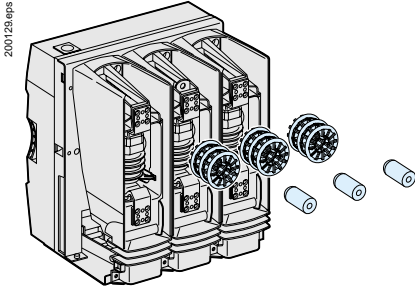
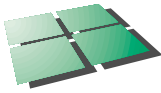
Combined solution

example



Comments:

- The dielectric withstand values shown in the performance tables are guaranteed excluding these connectors.
- These connectors may be fitted with either bare copper, tin plated copper or tin plated aluminium conductors without any particular protection.
- The dimensions and shapes of these conductors should be determined by the panel builder according to the required dielectric and temperature rise characteristics of the full connection system; typical examples are given in the installation guide.



Cluster and finger

Composition

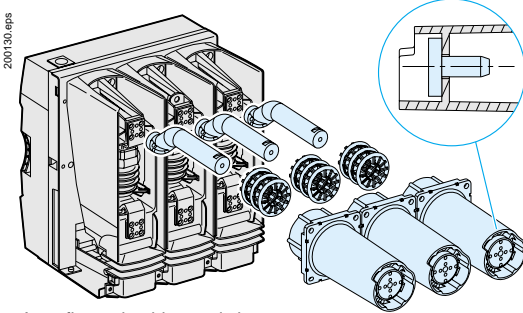
The panel builder produces the power circuit himself. He has the possibility of integrating one of these two highly technical units.

- Clusters and fingers
- Arms, clusters, fingers and bushings

Cluster and finger

■ The tulip type cluster has a shape which provides maximum contact surface whilst optimising heat dissipation. Moreover, in the case of short-circuit, it offers good compensation characteristics for electrodynamic forces. Its degrees of freedom avoid the use of an interchangeability testing tool; a simple adjustment guide is all that is required.

■ The finger is a component designed specifically for the cluster, regarding its shape, tolerances and materials. Contact between the finger and the cluster is guaranteed by type testing: 1000 racking in-out operations.



Arm, finger, bushing and cluster

Arm, cluster, finger and bushing

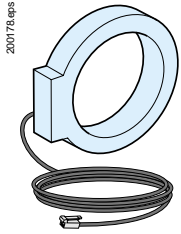
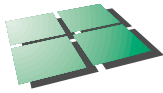
■ The choice of a cylindrical shape for the arm optimises the dielectric withstand and eliminates the need for additional insulation.

■ The cylindrical shape of the bushing provides excellent dielectric withstand.

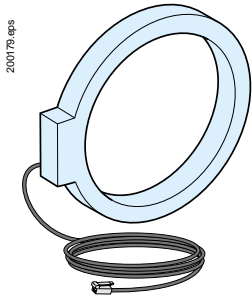
■ It includes a connection terminal that can be fitted with the connectors described on page 22.

Comment:

- Performances of the overall unit shall be controlled by the panel builder.
- Conditions of installation for both units described above are given in the installation guide.



Sensor CVv120



Sensor CVv200

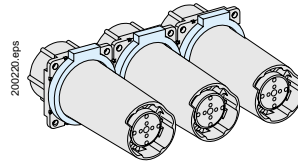
Function

These low power sensors provide accurate current measurement to the protection function when the Evolis circuit breaker is associated with the Sepam1000⁺.

Composition

The sensor is delivered with 5 m of cable and a connector that allows direct connection to the Sepam unit.

Mechanical characteristics



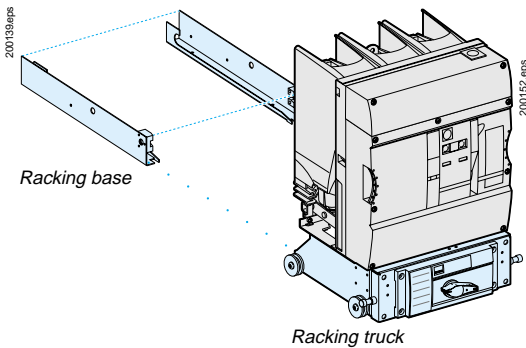
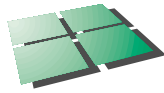
- Mounted directly on the bushings.
- The sensors are simply located on the bushings and fixed using a screw. Each sensor covers the full operating range of the corresponding circuit breaker.
- Connection to the Sepam 1000⁺ is achieved using an armoured cable which is attached to each sensor.

Electrical characteristics

- In conformity with standard IEC 60044-8, defining voltage output current sensors
- Usable for nominal currents of 25 A to 3150 A
- Class 0.5 over the range 100 - 4000 A
- The choice of sensor is solely based on the phase to phase distance of the cradle:
 - 120 mm diameter for phase to phase distances of 145 and 185 mm,
 - 200 mm diameter for phase to phase distances of 240 mm,
- Current sensors deliver a voltage output at a ratio of 100 A / 22.5 mV.

Operation

An input terminal is provided on the Sepam 1000⁺ for testing and maintenance purposes. A test cabinet interface can be ordered to check the correct operation of sensors.



Composition

The "racking in" function is provided by:

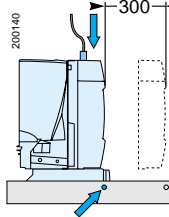
- The racking truck supporting the circuit breaker (mobile part).
- The cradle base (fixed part).

Operating procedure

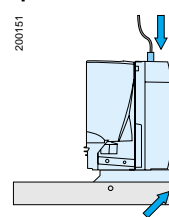
■ The circuit breaker moves through 3 stable states:

- service: circuit breaker racked in and locked in place; low voltage connected,
- test: circuit breaker racked out and locked in place; low voltage connected,
- extracted: the circuit breaker can be unlocked and extracted from the cubicle, with no interlocking.

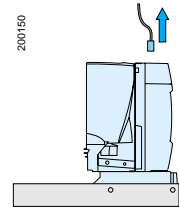
3 stable states for manual operation



service position



test position



extracted position

Comments: arrows indicate the "lock-in-positions" for the circuit breaker and the low voltage connector.

Functions

■ Interlocking between circuit breaker control and cradle position makes operation safer: racking in or out only when the circuit breaker is open.

■ Interlocking is also provided between the low voltage connector and the circuit breaker.

Racking in is only possible when the low voltage connector is connected.

■ Earthing is automatically achieved throughout the whole racking in operation.

■ A fool proof protection enables cradle and circuit breaker to be matched up.

This system is mounted on the racking base. Part of it has to be assembled by the panel builder on the cubicle floor.

Accessories

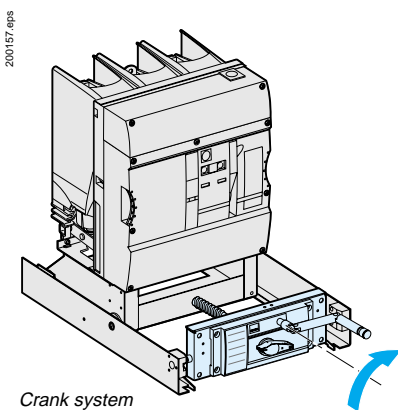
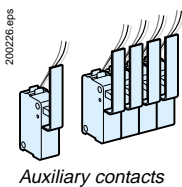
■ A set of auxiliary contacts:

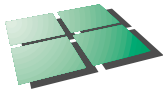
- 4 racked in/racked out position contacts,
- 1 contact indicating that the cradle is locked in the racked in position.

■ A propulsive system combined with a crank makes racking in and racking out easier. It allows the operation to be carried out with the door closed. Interlocking prevents to insert the crank until the racking base selector has been positioned to the "racked out" position.

■ Additional earthing for the base can be provided by a copper brush.

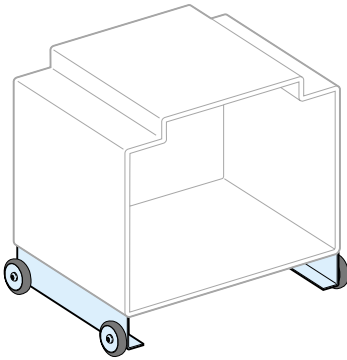
■ A key locking system (Ronis or Profalux) for the racked out position on the circuit breaker will provide increased safety when working downstream of the circuit breaker. This system is combined with an earthing disconnecter (refer to page 66).





Support frame

200131.eps



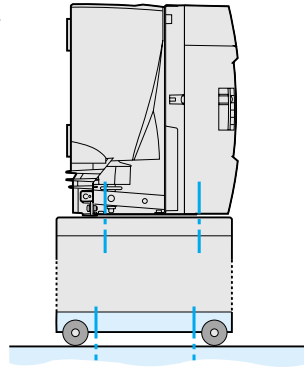
Support frame

Function

Fixed installation

- The support frame enables:
 - a fixing support to be produced for the circuit breaker. Fixing to the ground is achieved using a roller kit. A drawing enables the interface to be produced between the rolling channel and the circuit breaker,
 - the "roller" function to be provided using the integrated rollers.

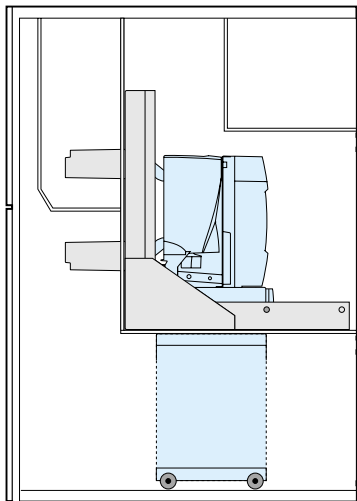
200158.eps

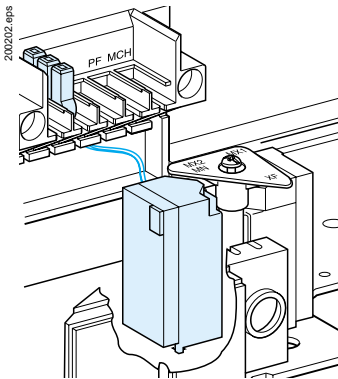


Withdrawable installation

- The support frame allows:
 - a "cassette" type circuit breaker to be transformed into a "roller" type circuit breaker by adding an intermediary structure,
 - this structure to be positioned at a variable height according to the cubicle.

200147.eps





Circuit breaker equipped with an opening release

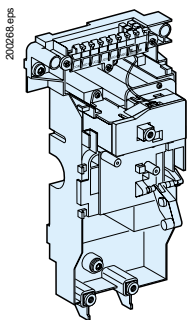
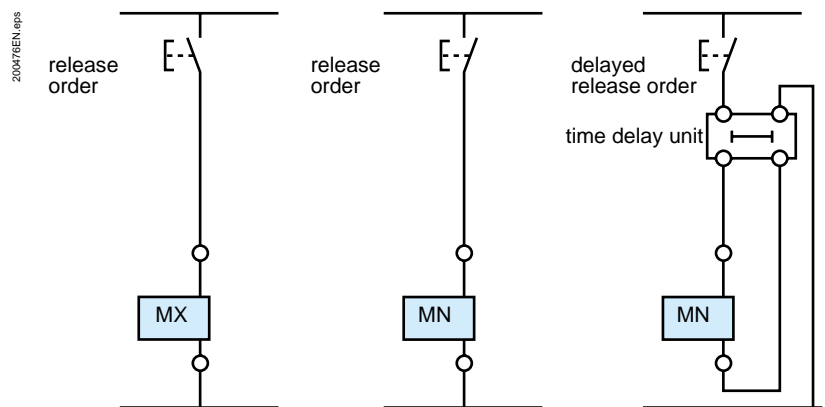
Composition

The basic circuit breaker equipment includes a shunt trip release unit (MX).

■ It may also include the following options:

- a second MX release,
- or an under voltage shunt trip release (MN),
- or an under voltage shunt trip release with time delay (MN + time delay unit),
- and a low energy release (MITOP).

Opening mechanism circuit diagram



MITOP low energy release

Low energy release (MITOP)

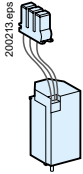
This specific coil actuates the opening mechanism of the poles to trip the circuit breaker. It comprises a low energy consumption electromagnet.

Characteristics	
supply	direct current
threshold	0.6 A < I < 3 A
response time of the circuit breaker at Un	11 ms

Any tripping caused by the Mitop release is indicated momentarily by an SDE type changeover contact. This Release Unit also includes a coil enabling the remote rearming of the SDE contact.

Comment

To use the MITOP release requires the adjustment of a time delay to be set by the protection relay in order to ensure a circuit breaker operating time of 45-50ms.

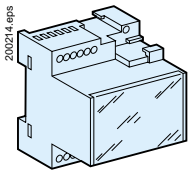


MN undervoltage release

Undervoltage shunt trip release (MN)

This release causes the instant opening of the circuit breaker when its supply voltage drops below a value of between 35 and 70% of its rated voltage. If the release is not energised, closing the circuit breaker (manually or electrically) is impossible. Any attempt to close causes no movement of the main contacts. Closing is authorised when the supply voltage of the release reaches 85% of its rated voltage.

Characteristics					
supply	V AC 50/60 Hz	24/30	48/60	100/130	200/250
	V DC	24/30	48/60	100/130	200/250
threshold	opening	0.35 to 0.7 Un			
	closing	0.85 Un			
consumption (VA or W)	20				
response time of the circuit breaker at Un	90 ms ± 5				

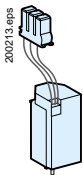


Time delay unit for MN

Time delay unit for MN

To eliminate spurious tripping of the circuit breaker during momentary voltage drops MN's action is time-delayed. This function is achieved by adding an external time delay to the MN release circuit (delay is adjustable). This unit is placed outside of the circuit breaker and can be inhibited by an emergency stop button to obtain instant opening.

Characteristics					
supply	V CA 50/60 Hz		48/60	100/130	200/250
	V CC		48/60	100/130	200/250
threshold	opening	0.35 to 0.7 Un			
	closing	0.85 Un			
consumption (VA or W)	200				
response time of the circuit breaker at Un	0.5 s - 0.9 s - 1.5 s - 3 s				

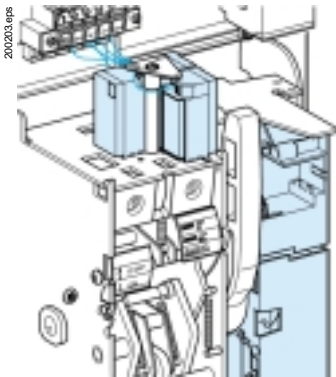


MX shunt trip release

Shunt trip release (MX)

This causes instant opening of the circuit breaker when energised. Permanent energising of the MX locks the circuit breaker in the "open" position.

Characteristics					
supply	V CA 50/60 Hz	24/30	48/60	100/130	200/250
	V CC	24/30	48/60	100/130	200/250
threshold	0.7 to 1.1 Un				
consumption (VA or W)	pickup: 200				
	latched: 4.5				
response time of the circuit breaker at Un	50 ms ± 10				

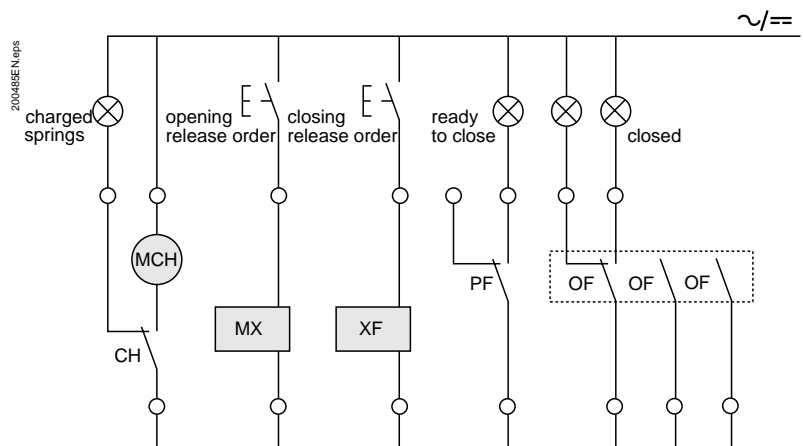


Circuit breaker equipped with remote control

Function

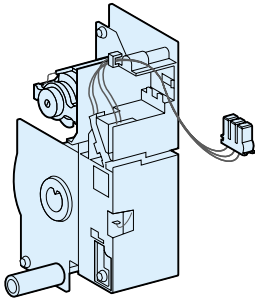
- The remote control enables remote opening and closing of the circuit breaker.
- In the case of continuous opening and closing orders, the remote control unit blocks the device in the open position as standard: **the anti-pumping function**. This function gives absolute priority to the opening order, but and also it stops closing and thus avoids the device being locked in an indefinite opening-closing cycle:
- the opening and closing coils may be fed power on a constant basis to achieve an electrical type locking: there is no self-breaking contact inside the device,
- the interlocking between the opening and closing orders, whatever their causes, is achieved as standard within the device's control mechanism.

Remote control circuit diagram



Composition

- The remote control comprises:
 - charging motor and associated mechanism (MCH) equipped with a "spring-loaded" limit switch (CH)
 - two shunt trip releases:
 - a closing release (XF)
 - an opening release (MX).
- It can be added to by:
 - a "ready to close" contact PF,
 - a second block of 4 contacts for indication of the O/C position of the device.



Charging motor and associated mechanism (MCH)

The MCH unit arms and rearms the energy storage springs as soon as the circuit breaker is closed. This enables instant reclosing of the device after opening. The arming lever is only used as back up control in the absence of an auxiliary voltage.

The MCH is equipped as standard with a CH limit switch. This contact indicates the "armed" position of the mechanism (spring armed).

Characteristics					
supply	V AC 50/60 Hz	24/30	48/60	100/130	200/240
	V DC	24/30	48/60	100/125	200/250
threshold	0.85 to 1.1 Un				
consumption (VA or W)	180				
motor overcurrent	2 to 3 In during 0.1 s				
arming tim	6 s. max.				
switching rate	3 cycles per minute max.				
mechanical endurance	10000 remote controlled opening operations for Evolis P1 and P2				
	5000 remote controlled opening operations for Evolis P3				
CH contact	10 A at 240 V				

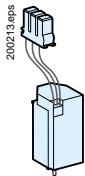
Shunt trip Release (XF) and (MX)

Closing release (XF)

This causes the remote closing of the circuit breaker when the control mechanism is armed.

Opening release (MX)

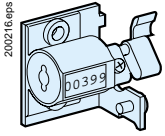
This causes the instant opening of the circuit breaker when energised and can be permanently energised or temporarily energised.



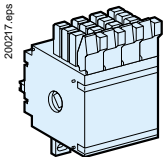
Shunt trip release XF/MX

XF characteristics					
supply	V AC 50/60 Hz	24/30	48/60	100/300	200/250
	V DC	24/30	48/60	100/130	200/250
threshold	0.85 to 1.1 Un				
consumption (VA or W)	pickup: 200				
	latched: 4.5				
response time of circuit breaker at Un	70 ms ± 10 for Evolis P1 and P2				
	80 ms ± 10 for Evolis P3				

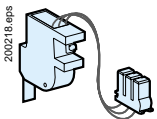
MX Characteristics					
supply	V CA 50/60 Hz	24/30	48/60	100/300	200/250
	V CC	24/30	48/60	100/130	200/250
threshold	0.7 to 1.1 Un				
consumption (VA or W)	pickup: 200				
	latched: 4.5				
response time of circuit breaker at Un	50 ms ± 10 ms				



Operation counter



Rotary type O/C position contacts



Ready to close contacts PF

Operation counter (CDM)

The operation counter is visible from the front face. It totalises the number of switching cycles that the device performs.

"Open/closed" position contacts (OF)

These contacts indicate the "open" or "closed" position of the circuit breaker.

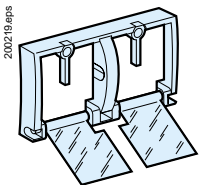
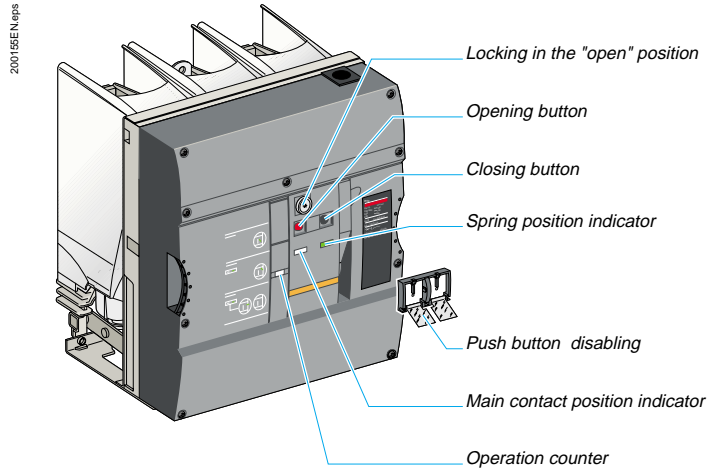
- Rotary type change over contacts directly driven by the circuit breaker mechanism.
- Indicator contacts proposed
 - in standard version for a relaying application,
 - in low level version for control of plc's or electronic circuits. This version is compatible with the Sepam 1000+ unit.

Characteristics				
delivered as standard				3
maximum quantity				11
breaking capacity (A)	standard		min. load: 10 mA/24 V	
cos φ : 0.3 AC12/DC12	V AC	240/380	6	10/6
		480	6	10/6
		690	6	6
	V DC	24/48	2.5	10/6
		125	0.5	10/6
		250	0.3	3
low level			min. load: 1 mA/4 V	
	V AC	24/48		
		240	5	10/6
		380	5	3
	V DC	24/48	5/2.5	10/6
		125	0.5	10/6
		250	0.3	3

"Ready to close" contact (PF)

- The "ready to close" position of the circuit breaker is indicated by a mechanical indicator and a changeover contact PF.
- This information simultaneously indicates that:
 - the circuit breaker is open,
 - the stored energy springs are armed,
 - there is no permanent closing order,
 - there is no permanent opening order:
 - safety opening order (2nd MX or MN)
 - device locked in the open position with a key lock.

Characteristics				
delivered as standard				0
max. quantity				1
breaking capacity (A)	standard		minimum load: 10 mA/24 V	
cos φ : 0.3 AC12/DC12	V AC	240/380	5	
		480	5	
		690	3	
	V DC	24/48	3	
		125	0.3	
		250	0.15	



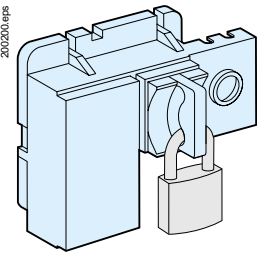
Push button disabling

Push button disabling

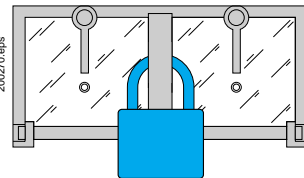
This transparent screen prevents access to the circuit breaker opening and closing push buttons.

The device enables independent locking of the opening or closing button, it is often associated with an electrical motor (MCH).

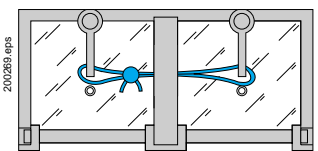
- Locking is achieved either by:
 - 2 screws,
 - 3 padlocks, not supplied,
 - sealing.



Padlocking in the circuit breaker "open" position



Padlocking



Sealing

Locking of the circuit breaker in the "open" position

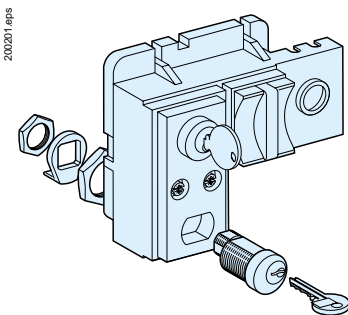
■ The circuit breaker is locked in the "open" position by blocking the opening push button in the "pushed-in position":

- using padlocks: 1 to 3 padlocks not supplied,
- using key locks: 1 or 2 different key locks supplied.

■ The key locks are of Profalux or Ronis type captive key, that becomes free once locked, and are offered according to the options, either:

- 1 single key lock,
- 1 single key lock mounted on the device + 1 identical one delivered, separately for interlocking with another device,
- 2 different key locks for double locking.

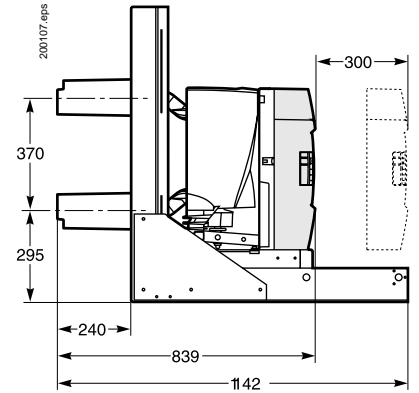
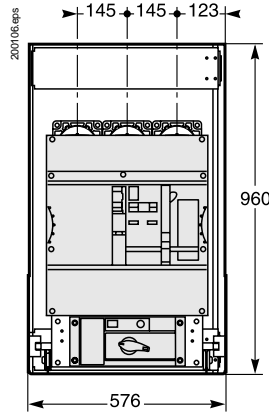
■ Profalux and Ronis key locks are inter-compatible.



Key locking in the circuit breaker "open" position

Circuit breakers:

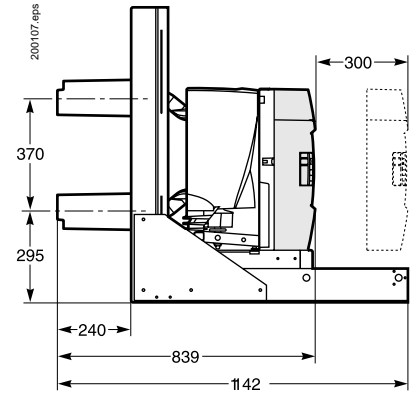
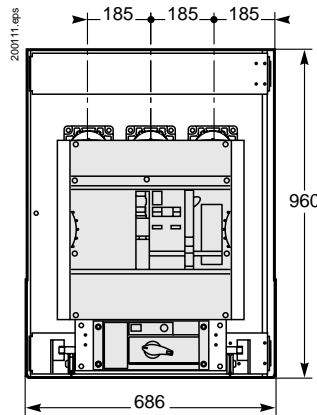
- 7 P1 - 1250
- 17 P1 - 630
- 17 P1 - 1250



Circuit breaker

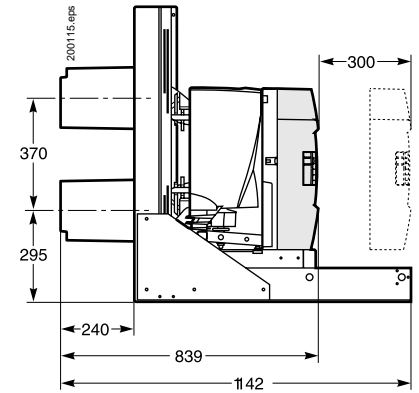
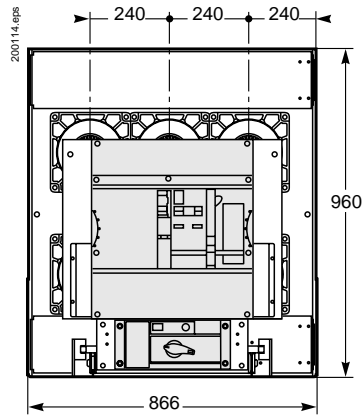
Circuit breakers:

- 7 P1 - 1250
- 7 P2 - 1250
- 17 P1 - 630
- 17 P1 - 1250
- 17 P2 - 630
- 17 P2 - 1250



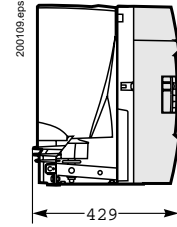
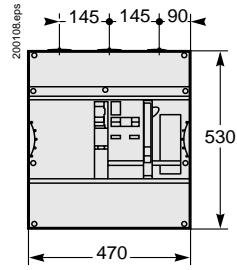
Circuit breakers:

- 7 P2 - 2500
- 7 P3 - 2500
- 17 P1 - 2500
- 17 P2 - 2500
- 17 P3 - 1250
- 17 P3 - 2500



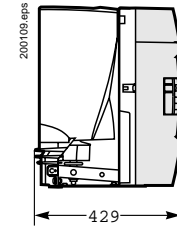
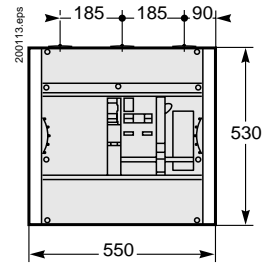
Circuit breakers:

- 7 P1 - 1250
- 17 P1 - 630
- 17 P1 - 1250
- 17 P1 - 1600



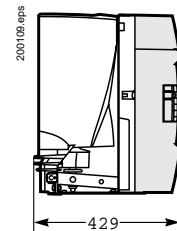
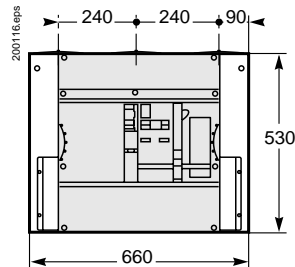
Circuit breakers:

- 7 P1 - 1250
- 7 P2 - 1250
- 17 P1 - 630
- 17 P1 - 1250
- 17 P1 - 1600
- 17 P2 - 630
- 17 P2 - 1250
- 17 P2 - 1600



Circuit breakers:

- 7 P2 - 2500
- 7 P3 - 2500
- 17 P1 - 2500
- 17 P2 - 2500
- 17 P3 - 1250
- 17 P3 - 2500

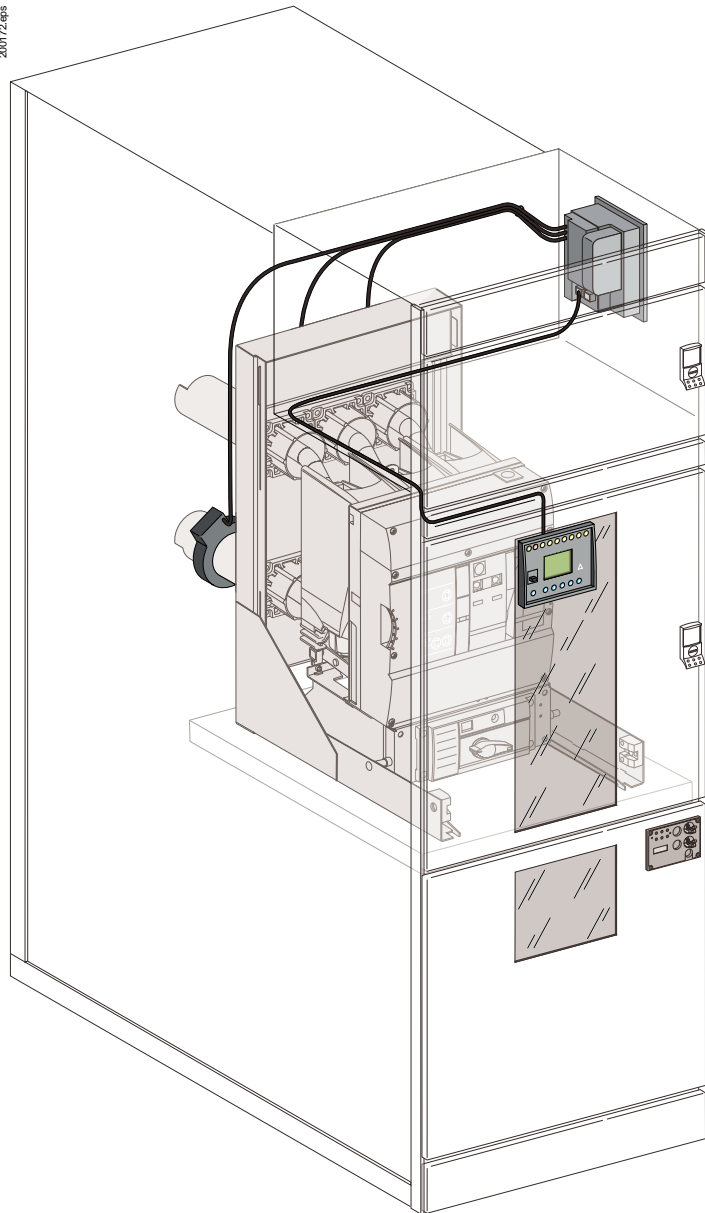




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The Sepam 1000+ protection unit combined with innovative current sensors, provides a full chain for metering, protection, monitoring and control.

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■ A high performance and economical solution

- Sepam 1000+, due to its modular offer, provides a cost-effective solution adapted to every requirement,
- one single reference of sensors covers a large range of currents, from 100 to 3150 A.

■ Easy to order and install

- all the components of the protection chain are referenced and deliverable very rapidly,
- the current sensors, developed in the circuit breaker environment are simply mounted onto the bushings,
- the functioning of the protection chain integrated in the Evolis circuit breaker has been fully tested and certified.

■ The power of a multi-functional digital unit

Sepam 1000+ is not a simple protection relay, it is a multi-functional unit notably providing:

- circuit breaker diagnosis functions (number of switching operations, operating time, charging time, cumulative breaking current),
- direct circuit breaker control whatever type of release,
- remote operation of the equipment through the Modbus communication option.

Sepam 1000+ is a range of protection and metering units that is simple and reliable, intended to operate machines and electrical distribution networks in industrial installations and utility sub-stations.



More solutions

Sepam 1000+ provides solutions adapted to each application providing an optimum cost/function ratio.

- Protection of sub-station incomers and feeders
- Protection of transformers
- Protection of motors
- Voltage protection for busbars.

More performances

Protections

- Protection against phase-to-phase and phase-to-earth short-circuits, with logic discrimination management
- Earth fault protection that is insensitive to transformer inrush current
- Detection of phase unbalance
- RMS thermal protection capable of taking account of ambient temperature and different ventilation configurations.

Communication

Fully compatible with the Modbus standard, it enables remote operation of equipment:

- Reading of all available information (measurements, logical states, settings, etc)
- Circuit breaker remote control.

Diagnosis

- Network diagnosis: trip currents, unbalance ratio, disturbance recording, etc.
- Circuit breaker diagnosis: number of switching operations, operating and charging time, cumulative A² broken, etc.
- Protection unit diagnosis: permanent self-testing, watchdog function, etc.

Monitoring and control

Circuit breaker control and indication logic programmed without auxiliary relays or additional cabling.

More modularity

- Optional modules can be easily added at any time:
 - logic inputs/outputs,
 - communication,
 - temperature sensor module,
 - analog output module.

More simplicity

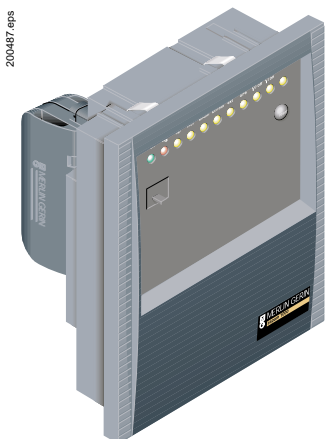
Easy cubicle installation

- Compact base unit, depth of less than 100 mm.
 - flush-mounted on the front panel,
 - or mounted inside the control compartment, the user-machine interface (UMI) can then be placed in the best position for operation purposes.
- Low power consumption limiting the size of auxiliary supply batteries.

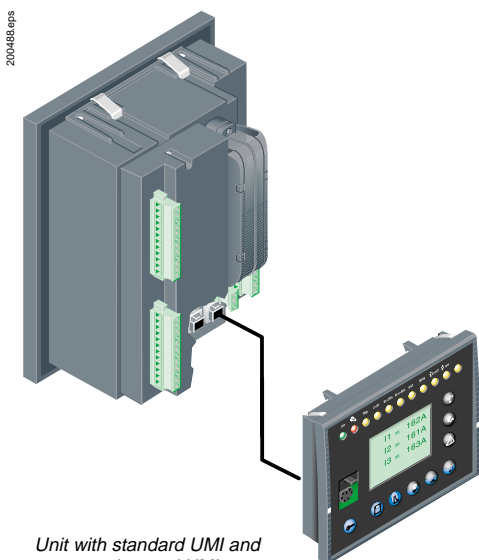
User-friendly

- All information is accessible on the advanced UMI
- Operator language of the advanced UMI can be customised
- Direct setting of real values using manufacturer's data
- Setting and operation software enabling the uploading and downloading of settings files amongst other things.

2 Sepam units are available.
They can be distinguished by their type of user-machine interface (UMI)



Unit with standard UMI



Unit with standard UMI and remote advanced UMI module



Unit with advanced UMI

With the "standard" UMI

- This unit offers a cost-effective response for:
 - installations not requiring local operation (control from a remote control and monitoring system)
 - replacement of electromechanical or analogic electronic protection devices.
- Its UMI only includes:
 - 11 signal lamps,
 - 1 "reset" key to clear faults and to reset,
 - 1 connection port for the RS232 link with the PC.

Remote advanced UMI module (DSM 303)

- Thinner and offering the functional features of the advanced UMI, it allows convenient installation on the front panel of the cubicle in the most effective position for operation.
- This module is connected to Sepam 1000+ with standard UMI using a prefabricated 2 m (CCA 772) or 4 m (CCA 774) cable.
- A mounting plate is available to mount Sepam 1000+ with standard UMI at the back of the cubicle control compartment (AMT 840).

With the "advanced" UMI

This unit is an optimum response for local operation.

- Its easy-to-read UMI includes:
 - 11 signal lamps,
 - a "graphic" LCD display, enabling display of metering values, parameter settings and alarm and operation messages,
 - a 9 key pad with 2 usage modes:
 - white keys for current operation: displaying measurements, diagnosis information and alarms
 - blue keys for parameter and protection setting: access to device parameters and protection settings. Modification protected by password
 - 1 connection port for the RS232 link with the PC.

General characteristics

Supply voltage

	range
48 to 250 VDC and 110 to 240 VAC	-20/+10%
24 VDC	-20/+50%

Operating conditions according to IEC 60 068

from -25°C to +70°C

Operating language

English/French
English/Spanish
English/Italian
English/Swedish
English/Polish
English/local language

5 applications are available

Functions	ANSI Code	Type of Sepam sub-station				
		transformer	motor	busbars		
		S20	T20	M20	B21	B22
Protection						
phase overcurrent	50/51	■	■	■		
earth fault (or neutral)	50N/51N	■	■	■		
unbalance/negative sequence	46	■	■	■		
thermal overload	49 RMS		■	■		
phase undercurrent	37			■		
excessive starting time, locked rotor	48/51LR			■		
starts per hour	66			■		
undervoltage	27D/47				■	■
remanent undervoltage	27R				■	■
phase-to-phase undervoltage	27				■	■
phase-to-neutral undervoltage	27S				■	■
phase to phase overvoltage	59				■	■
neutral voltage displacement	59N				■	■
overfrequency	81H				■	■
underfrequency	81L				■	■
rate of change of frequency	81R					■
recloser (4 cycles)	79	□				
thermostat / Buchholz			□			
temperature monitoring ⁽²⁾	38/49T		□	□		
Metering						
phase current I1, I2, I3 RMS		■	■	■		
residual current I _o		■	■	■		
average current I1, I2, I3		■	■	■		
peak demand phase current IM1, IM2, IM3		■	■	■		
phase-to-phase voltage U21, U32, U13					■	■
phase-to-neutral voltage V1, V2, V3					■	■
residual voltage V _o					■	■
positive sequence voltage rotation direction					■	■
frequency					■	■
temperature measurement ⁽²⁾			□	□		
Network diagnosis						
tripping current I1, I2, I3, I _o		■	■	■		
unbalance ratio / negative sequence current		■	■	■		
running hours counter			■	■		
thermal capacity used			■	■		
remaining operating time before overload tripping			■	■		
waiting time after overload tripping			■	■		
starting current and time				■		
start inhibit time delay, number of starts before inhibition				■		
disturbance recording		■	■	■	■	■
Switchgear diagnosis						
cumulative breaking square current		■	■	■		
trip circuit supervision		□	□	□	□	□
number of operations		□	□	□		
operating time		□	□	□		
charging time		□	□	□		
Self-diagnosis						
watchdog		■	■	■	■	■
output relay test ⁽³⁾		□	□	□	□	□
Control and monitoring						
circuit breaker / contactor control		□	□	□	□	□
logic discrimination		□	□	□		
4 addressable logical outputs		■	■	■	■	■
Additional modules						
8 temperature sensor inputs			□	□		
1 low-level analog output		□	□	□	□	□
4 inputs/4 outputs or 10 inputs/4 outputs		□	□	□	□	□
RS485 communication interface		□	□	□	□	□

■ basic,

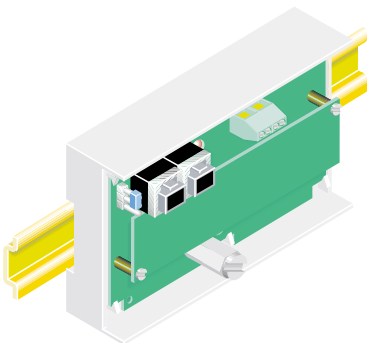
□ according to parameter settings and input/output module options

⁽²⁾ with temperature sensor inputs option,⁽³⁾ with advanced UMI option.

Metering

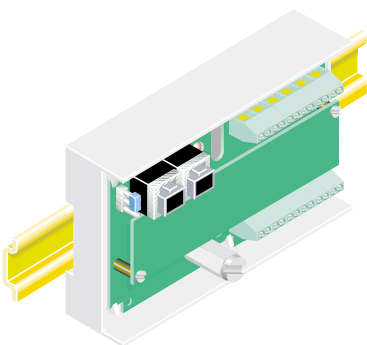
- Display of operational measurements on the UMI display.
- This information can be obtained remotely:
 - by adding the **analog output MSA 141** together with the factory-built cables
 - by adding the communication function.

2010456.eps



Analog output

2010455.eps



Temperature sensor input

Protection

Phase overcurrent (ANSI 50/51)

4 three-phase protection functions against phase-to-phase short circuits, set independently.

- Adjustable timer hold, for detection of restriking faults.
- Switching function between 2 sets of settings.

Earth fault (ANSI 50N/51N or 50G/51G)

4 protection functions against earth faults, set independently.

- Adjustable timer hold, for detection of restriking faults.
- 2nd harmonic restraint, for stability on transformer energizing.
- Switching function between 2 sets of settings.

Unbalance / negative sequence (ANSI 46)

Protection against phase unbalance.

Thermal overload (ANSI 49)

■ 2 protection functions against thermal damage due to an overload, to take account of:

- changes in ventilation mode of transformers,
- the thermal withstand of motors with locked rotor.
- The calculation of equipment heat rise takes account of:
 - RMS value of currents,
 - negative sequence current,
 - ambient temperature,
 - heating and cooling curves.
- Each function includes 2 thresholds:
 - 1 adjustable threshold for tripping,
 - 1 adjustable threshold for alarm.

Phase undercurrent (ANSI 37)

Protection of pump motors against working with no load, pump not primed.

Excessive starting time / locked rotor (ANSI 48/51LR)

- Control of the duration of motor starting.
- Detection of locked rotor in steady state.

Start per hour (ANSI 66)

Inhibition of motor starting in the case of too frequent starts, to avoid temperature rise.

Recloser (ANSI 79)

Automatic control to reclose a circuit breaker after tripping on a spurious fault on a line (4 reclosing cycles can be set).

Thermostat, Buchholz

Protection of transformers against internal faults detected by integrated devices.

Temperature monitoring (ANSI 38/49T)

Protection of transformers and motors equipped with temperature sensors.

1 alarm threshold and 1 tripping threshold on each of 8 temperatures measured by sensors.

- This protection requires the **8 temperature sensor inputs MET 148 module**
- The module is connected to the Sepam unit by a cable of length 0.6 m, 2 m, or 4 m (CCA 770 - CCA 772 - CCA 774).

Overvoltage (ANSI 59) and Undervoltage (ANSI 27)

2 protection functions against variations in phase-to-phase voltage, to monitor quality of power supply. Can be used for automatic functions (transfer, load shedding).

Phase-to-neutral undervoltage (ANSI 27S)

Detection of the phase concerned by an earth fault on an isolated network.

Positive sequence undervoltage (ANSI 27D/47)

- Protection of motors against incorrect operation due to insufficient or unbalanced voltage.
- Detection of phase rotation.

Remanent undervoltage (ANSI 27R)

Control of the disappearance of remanent voltage provided by rotating machine after circuit opening.

Neutral voltage displacement (ANSI 59N)

2 protection functions against earth faults on isolated network, by measurement of neutral voltage displacement.

Overfrequency (ANSI 81H) and underfrequency (ANSI 81L)

Detection of variances with respect to the rated frequency, to monitor the quality of supply.

Rate of change of frequency (ANSI 81R)

Detection of loss of mains by calculation of the frequency variation speed.

Used in substations with generator that can be run in parallel with the mains.

Setting ranges

Functions	Settings	Time delays
Phase overcurrent ⁽¹⁾		
rated current (I _n)	1 A to 6250 A	
curve	DT and 16 IDMT curves (IEC, IEEE, IAC)	
definite time	0.3 to 24 I _n	Inst; 0.05 s to 300 s
IDMT	0.3 to 2.4 I _n	0.1 s to 12.5 s at 10 I _s
Earth fault ⁽¹⁾		
		type of sensor
rated current (I _{no})	1 A to 6 250 A	
curve	DT and 16 IDMT curves (IEC, IEEE, IAC)	
definite time	0.1 to 15 I _{no}	Σ 3I ph Inst; 0.05 s at 300 s
	0.2 to 30 A	CSH 120/200 2 A rating
	2 to 300 A	CSH 120/200 20 A rating
	0.1 to 15 I _{no}	CT 1 A/ 5 A with CSH 30 or core balance CT ⁽²⁾
IDMT	0.1 to 1 I _{no}	Σ 3I ph 0.1 s to 12.5 s at 10 I _{so}
	0.2 to 2 A	CSH 120/200 2 A rating
	2 to 20 A	CSH 120/200 20 A rating
	0.1 to 1 I _{no}	CT 1 A/ 5 A with CSH 30 or core balance CT ⁽²⁾
Unbalance/Negative sequence		
definite time	0.1 to 5 I _b	0.1 s to 300 s
IDMT	0.1 to 0.5 I _b	0.1 s to 1 s
Thermal overload		
		rate 1 rate 2
negative sequence factor	0 - 2.25 - 4.5 - 9	
time constant	heat rise	T1: 5 to 120 min
	cooling	T2: 5 to 600 min
alarm; tripping	50 to 300% of rated thermal capacity used	T1: 5 to 120 min
cold curve change factor	0 to 100%	T2: 5 to 600 min
rate change condition	by I _s setting 0.25 to 8 I _b (motor)	
	by logic input I26 (transformer)	
max. equipment temperature	60 to 200°C	
Phase undercurrent		
	0.15 to 1 I _b	0.05 s to 300 s
Excessive starting time / locked rotor		
	0.5 I _b to 5 I _b	ST start time 0.5 s to 300 s
		LT time delay 0.05 s to 300 s
Starts per hour		
	1 to 60 starts per period	period
	1 to 60 successive starts	T time delay between starts 1 to 90 min
Temperature (sensors)		
2 thresholds / sensor	0 to 180°C (or 32 to 356°F)	
Phase-to-phase overvoltage		
2 thresholds	50 to 150% Unp	0.05 s to 300 s
Phase-to-phase undervoltage		
2 thresholds	5 to 100% Unp	0.05 s to 300 s
Phase-to-neutral undervoltage		
1 threshold	5 to 100% Vnp	0.05 s to 300 s
Positive sequence undervoltage		
2 thresholds	30 to 100% Vnp (Unp/√3)	0.05 s to 300 s
Remanent undervoltage		
1 threshold	5 to 100% Unp	0.05 s to 300 s
Neutral voltage displacement		
1 threshold	2 to 80% Unp	0.05 s to 300 s
Overfrequency		
1 threshold	50 to 53 Hz or 60 to 63 Hz	0 s to 300 s
Underfrequency		
2 thresholds	45 to 50 Hz or 55 to 60 Hz	0 s to 300 s
Rate of change of frequency		
1 threshold	0.1 to 10 Hz/s	Inst; 0.15 s to 300 s

Reminder:

The current I_n, the rated voltage Unp and the current I_{no} are general settings that are set when commissioning Sepam 1000⁺.

They are expressed in terms of values at the primary of metering transformers.

I_n is the rated current of current sensors (CT rating) (adjustable from 1 A to 6250 A).

Unp is the rated phase to phase voltage of the voltage sensor primary (adjustable from 220 V to 250 kV).

I_{no} is the rating of the residual current sensors.

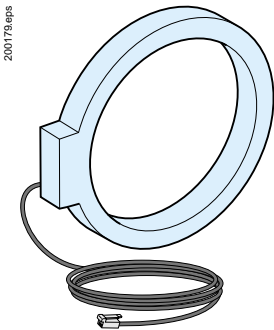
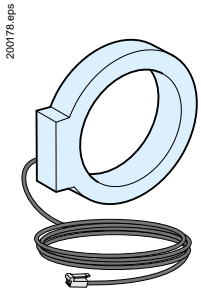
I_b is the current corresponding to the equipment's rated power, adjustable from 0.4 to 1.3 I_n.

The setting of current, voltage and frequency values is carried out by directly inputting the value; (resolution: 1A, 1V, 0.1 Hz, 1°C or F).

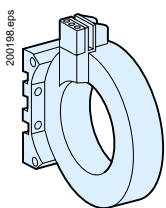
⁽¹⁾ adjustable timerhold DT or IDMT, according to tripping curve.

⁽²⁾ with adapter core balance CT ACE 990 for core balance CT with a ratio of n between 50 and 1500 turns.

2 types of sensors are specially designed for Sepam 1000⁺ and Evolis: innovative and economical low power current transducers to measure phase currents, and zero sequence core balance CT's to measure residual current.



Low power current sensors



Zero sequence core balance CT's

Low power current sensors

Function

These low power sensors provide accurate current measurement to the protection function when the Evolis circuit breaker is associated with Sepam 1000⁺.

Composition

Each sensor is delivered with 5 m of cable and a connector that allows direct connection to the CCA670 connector on the Sepam unit.

Mechanical characteristics

- Mounted directly on the Evolis withdrawable circuit breaker cradle. The sensors are simply located on the bushings and fixed using a screw. Each sensor covers the full operating range of the corresponding circuit breaker.
- Connection to Sepam 1000⁺ is achieved using an armoured cable which is attached to each sensor.

Electrical characteristics

- In conformity with IEC standard 60044-8, defining voltage output current sensors
- Usable for nominal currents of 100 A to 3150 A
- Class 0.5
- The choice of sensor is based solely on the phase-to-phase distance of the cradle:
 - diameter 120 mm CVv120 for phase-to-phase distances of 145 and 185 mm,
 - diameter 200 mm CVv200 for phase-to-phase distance of 240 mm.
- Current sensors are voltage output measurement adapters with a ratio of 100 A / 22.5 mV.

Operation

An input terminal is available on the Sepam 1000⁺ unit for testing and maintenance operations. An injection adaptor (ACE 917) can be ordered to check the correct operation of protection functions with a standard injection box.

Zero sequence core balance CT's

These enable direct measurement of residual current.

Electrical characteristics

- Maximum permissible current: 20 kA/1 s
- Transformation ratio: 1/470
- Accuracy: $\pm 5\%$ @ 20°C
- Rating of 2 A input: adjustable threshold from 0.2 A to 30 A
- Rating of 20 A input: adjustable threshold from 2 A to 300 A.

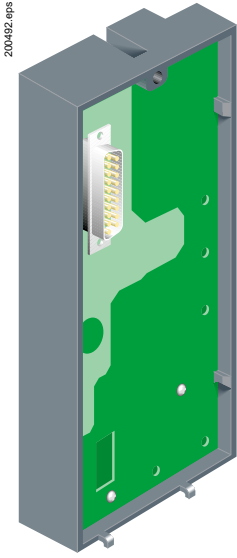
Mechanical characteristics

- Mounted on the Medium Voltage cables
- Several versions are available according to the internal diameter:
 - 120 mm CSH 120,
 - 200 mm CSH 200.
- An adapter is available to connect core balance CT's with ratios of between 50 and 1500 turns or current transformers to be supplied by the panel builder.

Other compatible sensors

■ Sepam 1000⁺ S,T or M type also functions with 1 A/5 A current sensors to be provided by the panel builder. Connection is carried out using a CCA 630 connector which can be unplugged when energised.

■ Sepam 1000⁺ B type functions with voltage transformers (primary voltage from 220 V to 250 kV), to be provided by the panel builder. Connection is carried out using a CCT 640 connector which can be unplugged when energised.



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Additional input/output module

Composition

- The basic Sepam 1000⁺ unit has 4 relay outputs.
 - The extension of input/output resources for Sepam 1000⁺ uses an additional module, available in 2 versions:
 - 4 logic inputs/4 relay outputs: MES 108,
 - 10 logic inputs/4 relay outputs: MES 114.
- This module is installed on the rear panel of the basic unit.

Functions

The availability of the following functions depends on the type of Sepam 1000⁺ unit and on its logic input/output resources.

Circuit breaker control

- Opening, closing and inhibit closing (ANSI 69) of circuit breaker equipped with undervoltage release coil or shunt trip coil according to information:
 - from the protection functions and the recloser,
 - from remote control system,
 - from switchgear diagnosis functions.

Logic discrimination (SSL) (ANSI 68)

Quick and selective tripping of phase overcurrent protection and earth fault protection by logical blocking of the upstream protection by the downstream protection.

A safeguard device ensures the functioning of the protection device in the case of failure of the blocking link.

Latching / acknowledgement (ANSI 86)

Latching of output relays can be set. The latched closing orders are stored in memory and must be acknowledged before the device is put back in service.

Annunciation (ANSI 30)

- Alarms are detected and indicated:
 - by lights on the front panel,
 - by messages on the display,
 - by relay outputs according to parameter settings,
 - remotely by the communication interface.

Watchdog

Output relay testing

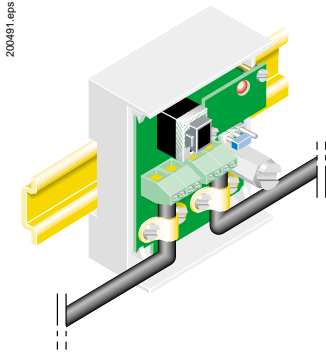
Characteristics

Logic inputs

- Independent inputs, free of voltage.
- DC input voltage: 24 to 250 Vdc.
- Consumption: 3 mA typically.

Relay outputs

- AC or DC voltage: 24 to 220 Vdc and 100 Vac at 240 Vac.
- 3 control outputs: continuous rating 8 A.
- 5 indication outputs: continuous rating 2 A.



Communication interface

Function

Via the remote control and monitoring system, this allows the remote operation of equipment, with a Modbus protocol.

Remote monitoring by reading data

- Metering
- Value of protection settings
- Status of protections and Sepam 1000+ functions
- Status of logic inputs
- Time tagged events
- Disturbance recordings.

Remote control

- Opening and closing of the switchgear from the supervisor workstation
- Activating of Sepam 1000+ functions
- Two modes are available:
 - "direct" or,
 - "select before operate".

Remote setting of protections

Characteristics

Type of transmission	asynchronous serial
Protocol	Modbus slave
Rate	4800, 9600, 19200, 38400 bauds
Electrical interface	2-wire or 4-wire differential, standard EIA RS 485
Maximum distance	250 m
Number of bus supplied Sepam units on one line	25
Number of masters	1
Response time	less than 15 ms

Setting up the Modbus network

■ Sepam 1000+ is connected to the communication network via a communication interface:

- ACE 949-2, for connection to a RS 485 2-wire bus,
- ACE 959, for connection to a RS 485 4-wire bus.

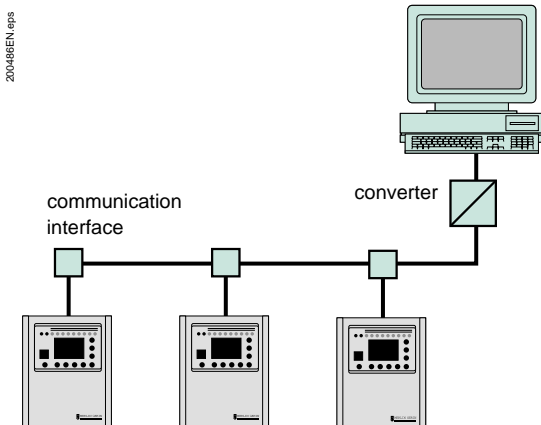
The 3 m long prefabricated cable (CCA612) necessary to connect the remote communication interface to the Sepam base unit is included.

A 12 Vdc or 24 Vdc power supply is required to supply the communication interfaces.

■ RS 485 2-wire converters are available for signal conversion, line polarization and 12 Vdc supply of the Sepam communication interfaces:

- ACE 909-2, RS 485 / RS 232 converter,
- ACE 919, RS 485 / RS 485 converter.

■ Cabling between these elements must be provided with a shielded cable which is not supplied.



Network example



SFT 2841:
phase overcurrent protection setting screen

Expert User Machine Interface Software

The SFT2841 software gives access to all Sepam 1000⁺ functions, with all the user friendliness and comfort offered by a Windows type environment.

Operation

- 2 modes are available:
 - not connected to Sepam 1000⁺ for initial preparation of parameters and protection settings,
 - connected to Sepam 1000⁺, to get optimum use of its resources and have all the functions available in disconnected mode and additional local operation functions.

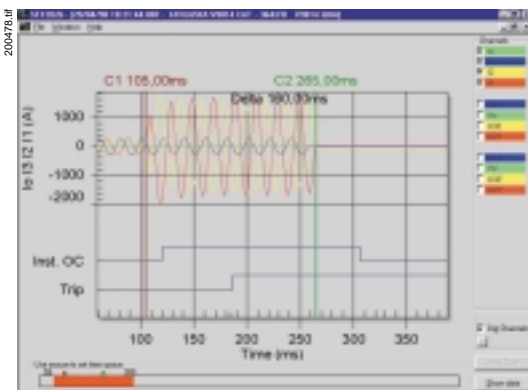
Parameter and protection settings

The creation of files containing all parameters and protection settings for Sepam 1000⁺ is possible without being connected to the unit.

- Amongst other things the software enables:
 - the full setting of Sepam 1000⁺ and adjustment of protection functions,
 - customising of the control logic,
 - customising of identification labels for signal lamps,
 - management of parameters and settings files: saving, comparison, printing.

Local operation

- Connected to Sepam 1000⁺, the software enables access to the following information:
 - all metering and diagnosis values,
 - parameters and protection settings,
 - past history of alarms with time of occurrence,
 - logical states of inputs, outputs and signal lamps.
- And the following operations:
 - uploading and downloading of parameters and settings files,
 - recovery and saving of disturbance recordings,
 - acknowledgement of active alarms and resetting of Sepam 1000⁺ after tripping.



SFT 2826:
Display of a disturbance record

Disturbance records display software

The SFT 2826 software allows display, analysis and printing of disturbance records made by Sepam units.

Implementation

- **Required configuration:**
 - Microsoft Windows 95/98/NT4.0,
 - PC compatible computer with Pentium 133 MHz processor or greater,
 - 32 Mb of RAM and 4 Mb on hard disk.
- **Available in kit form comprising:**
 - 1 CD-ROM including:
 - The SFT 2841 expert UMI software,
 - The SFT 2826 disturbance records display software,
 - 1 RS232 PC / Sepam 1000⁺ connection cord.

The Power Meter can replace analogue metering devices.
It calculates electrical magnitudes: average values, harmonic distortion rates, etc. The information it provides allows a reduction in both energy and maintenance costs. It can be integrated in the "PowerLogic system".



Function

In addition to its metering functions, the Power Meter range has advanced functions such as:

- Power quality
Harmonic distortion level in both current and voltage terms.
- Memorisation of minimum and maximum values
Used for define preventive maintenance.
- Alarm/relay functions
The PM-650 has on-board alarms. These alarms are triggered when a voltage, current, frequency and phase threshold is exceeded. Moreover, they can also trigger a relay.
- Event logging
When an alarm appears, the event is logged into the memory (non volatile). These events are called up on the PC screen.
- Data recording
This data is saved to the local memory and can then be read on a PC. The user can select the metering data acquisition frequency.

Characteristics

Economical metering

- One single device replaces a large number of analogue metering instruments.
- Class 0.2 accuracy for voltage current metering acquisition.
- Accuracy of RMS values for metering of voltage and current harmonic distortion up to the 31st harmonic.
- Harmonic distortion rate reading for voltage and current in each phase to give an indication as a percentage of the quality of the waveform.
- Neutral current monitoring to detect overloading.
- High speed sampling to monitor, for example current demand peaks.
- Load monitoring for preventive maintenance.
- Reallocation of energy costs.
- Remote input of data provided by the devices through the RS-485 communication port and a PC.

Easy installation

- It is possible to separate the metering device and the optional screen for very flexible installation.
- Easy to incorporate in the energy management system.
- Compact dimensions 114 x 114.

Standard sensors

- Connection to conventional CT's.
- Does not require PT up to 600 V.

Communication options

- Modbus communication.
- Power impulse output.

Two-line LCD screen

- Back to back or next to the central device, connected using a cable of maximum length 15 metres.
- Possible to use as a portable setting tool for Power Meter.
- Simultaneous display of phase 1.2.3. measurements.

Conformity with standards

- Conformity with standards UL, NOM, and CSA
- CE marking
- Tested according to standard IEC 1000
- In conformity with FCC (class A)
- Vibration and temperature tests.

Additional function

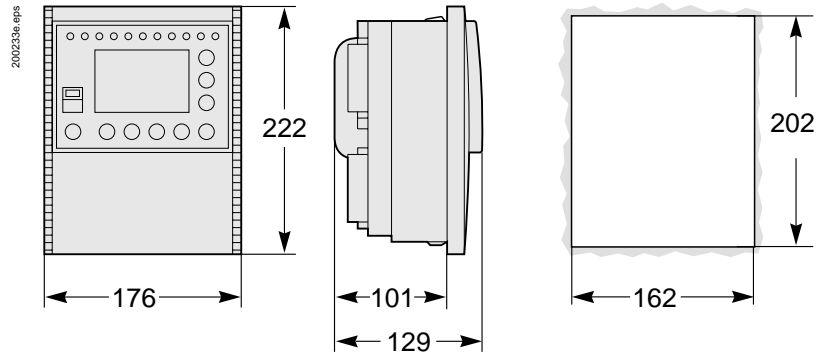
- Other multi-functional metering devices in the Power Logic range propose among others:
 - magnitudes and angles of the 31 harmonics,
 - detection and recording of voltage and current peaks,
 - wave form capture...



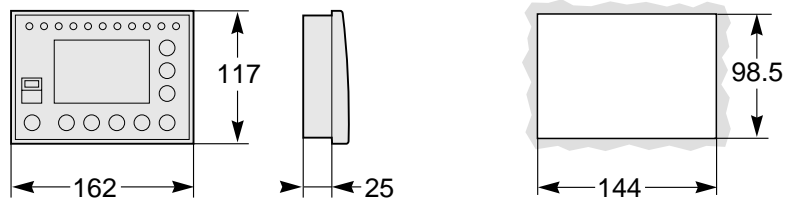
The optional Power Meter display takes the same space as a conventional analogue metering device and can be connected to the Power Meter module using a communications cable.

For more information, please contact us.

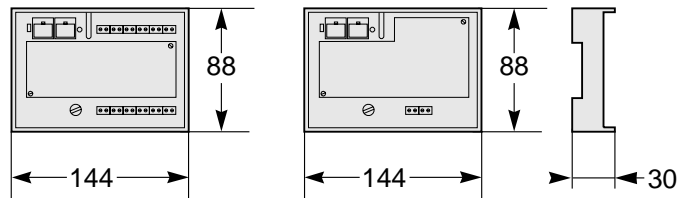
Sepam unit with connectors and additional inputs/outputs module



Remote advanced UMI module



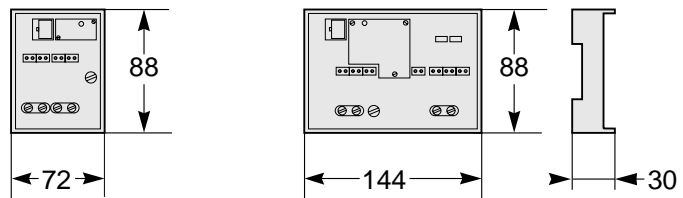
Remote additional modules



8 temperature sensor inputs

Analog output module

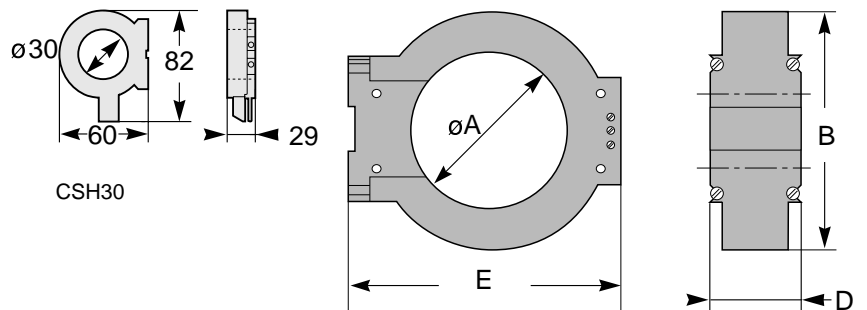
Communication interfaces



RS485 2-wire interface

RS485 4-wire interface

Zero sequence core balance CT



CSH30

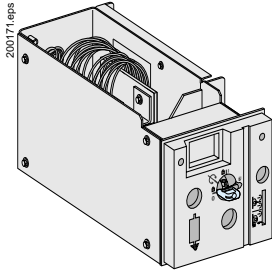
CSH120/CSH200

dimensions (mm)	A	B	D	E
CSH 120	120	164	44	190
CSH 200	200	256	46	274

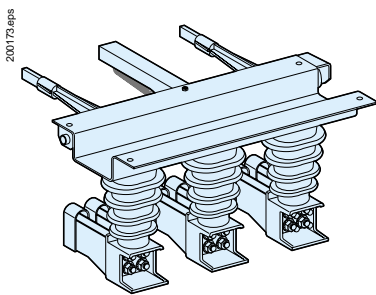
Protection, monitoring control and metering



Earthing	58
Indication and interlocking	59



Operating mechanism



Power circuit unit

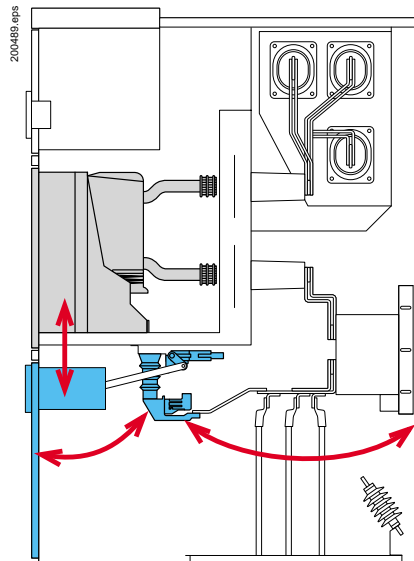
Function

This device is used to earth and short circuit the cable ends before work is performed on the cable compartment.

Composition

- The earthing switch includes:
 - an operating mechanism box to be mounted on the front face of the cubicle,
 - a power circuit unit with a fast acting closing mechanism independent of the operator.

- The link between the 2 devices will have a length depending of the depth of the cubicle. A drawing will define this rod to be manufactured and installed by the panel builder.

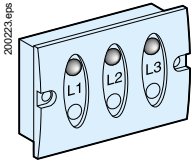


- Mechanical interlock with the circuit breaker to prevent:
 - to draw in the circuit breaker if the earthing switch is closed,
 - to close the earthing switch if the circuit breaker is not opened and drawn out,
 - this interlock is realised with Profalux or Ronis key,
 - a drawing is showing the mechanical link to be manufactured and installed by the panel builder.

- Mechanical interlock with the front and rear plate of the cable compartment to prevent access to the cables under voltage:
 - a drawing is showing the mechanical link to be manufactured and installed by the panel builder.

Characteristics according to IEC 60 129

Ur	kV	12	17.5	17.5
Ik for tk = 1 s	kA		50	50
Ik for tk = 3 s	kA	31.5	31.5	31.5
phase distance	mm	160	200	240
rated short circuit making current		2.5 Ik	2.5 Ik	2.5 Ik



Voltage Presence Indicator unit

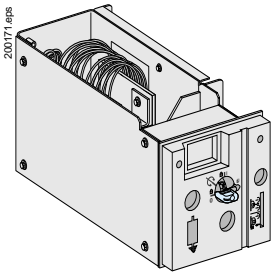
Voltage Presence Indicator System

- This system combined with the Iso-capacitors integrated as standard in the earthing system provides an indication of the voltage in the phases of the main circuit.
- It is mounted on the front of the earthing operating mechanism.
- It is available for two voltage ranges, in conformity with standard IEC 61 958:
 - 3.2 to 7.2 kV
 - 7.2 to 17.5 kV.

Open/closed contacts

A series of 6 auxiliary contacts indicates the open/closed position of the earthing switch.

Characteristics			
delivered as standard		4	
maximum quantity		11	
breaking capacity (A) cos φ : 0.3	V AC	240	15
		380	10
		480	10
		600	6
		V DC	
		125	
		250	3
		500	0.5



Key locking

Mechanical earthing switch locking

This function enables the earthing switch to be locked in its open or closed position by adding 1 or 2 key locks.

- Several configurations are available:
 - locked closed by 1 key lock + locked open by 1 key lock,
 - locked closed by 2 key locks,
 - locked open by 2 key locks.

A mechanical adaptation kit is delivered to fit the various key locks which are not supplied.

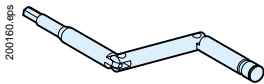
Electromechanical interlocking of the earthing switch

This function is achieved using a coil which blocks switching operation when it is not supplied power. When energised it releases the earthing switch which can then be closed.

The system is available in several versions according to the supply voltage: 24 VDC - 48 VDC - 110 VDC - 220 VDC.

Earthing switch operating lever

This is identical to the one supplied for the circuit breaker racking truck. It allows the earthing switch to be operated.

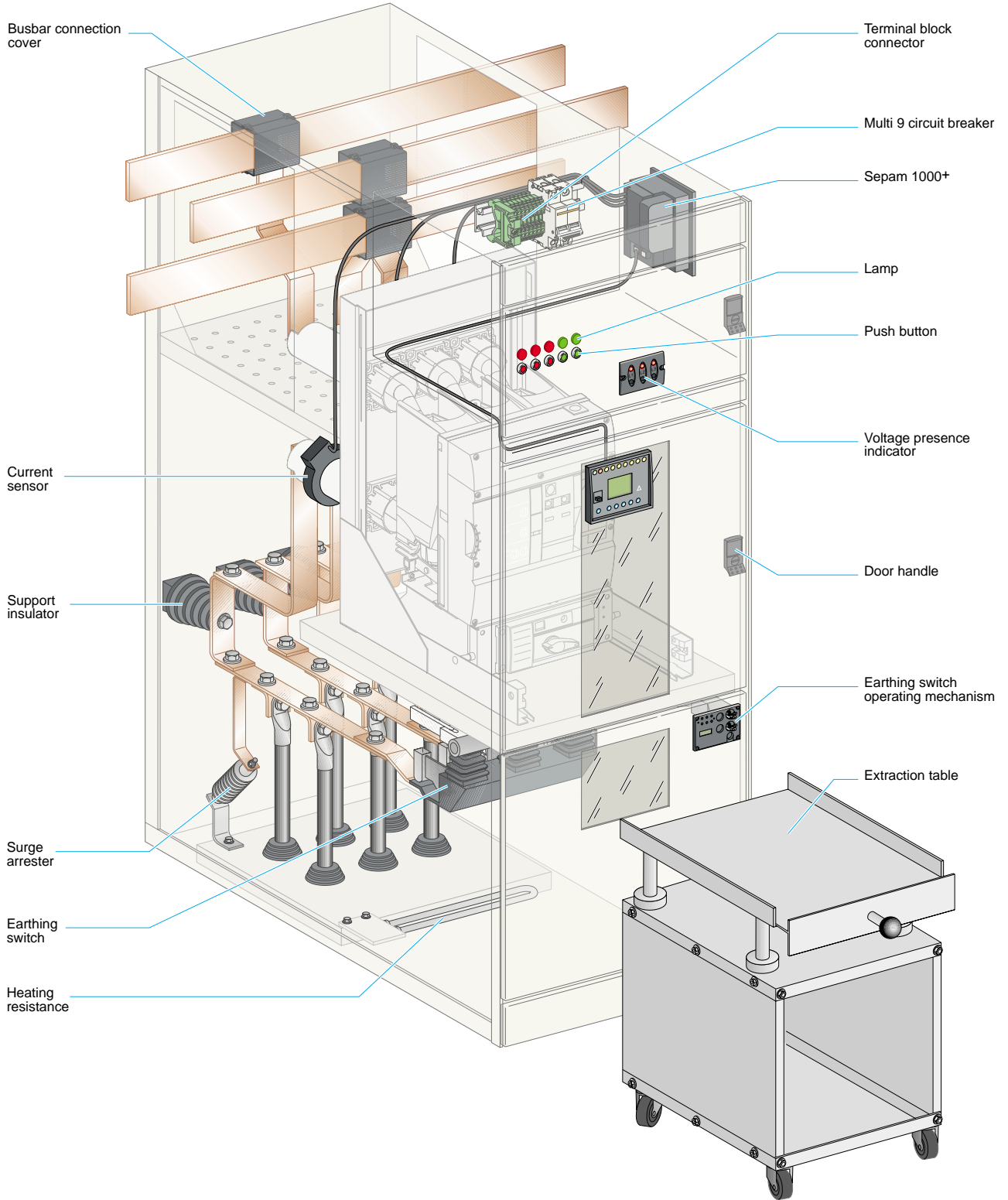


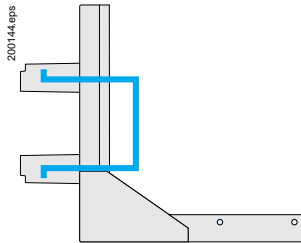
Operating lever



Switchboard components	62
Panorama	62
Operation	63
Cubicle components	65
Indication, support, heating	65
Protection	66

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Fixed coupling link

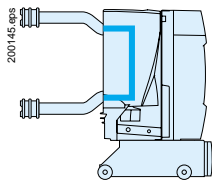
Fixed coupling link

Allows a standard incomer/feeder cubicle to be transformed into a busbar riser cubicle by short circuiting the top and bottom terminals of the cradle.

- This offer is exclusively available in the form of drawings proposed in the installation manual.
- This unit comprises 1 bridge/phase and is easily installable by the operator on the cradle bushing fingers.

Electrical characteristics

Ir	A	1250	2500
Ik	kA	31.5	40



Drawout coupling link

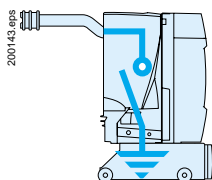
Drawout coupling link

Enables bridging in an existing cubicle of the upstream and downstream circuit in the cubicle. It is installed in place of the withdrawable circuit breaker in the cradle.

- It includes:
 - a device to lock in the racked-in position using padlocks.
 - an auxiliary PAF contact delivered separately for installation on the cradle: it indicates that the truck is well mechanically racked in.

Electrical characteristics

Ik	kA	25	31.5	40
tk	S	3	3	3
Ir	A	1250	1250	3150
phase distance	mm	145	185	240



Busbar earthing truck

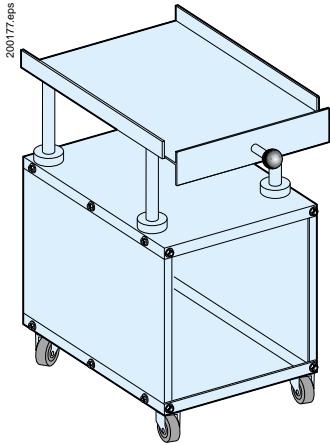
Busbar earthing truck

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

- Possibility of locking by padlocks in the draw-in position.

Electrical characteristics

Ur	kV	17.5	17.5	17.5
Ik	kA	25	31.5	40
tk	S	3	3	3
phase distance	mm	145	185	240

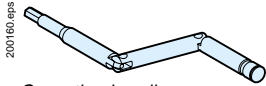


Extraction table

Extraction table

Enables the circuit breaker to be taken out of the cubicle and to handle it during maintenance operations or during cubicle manufacturing.

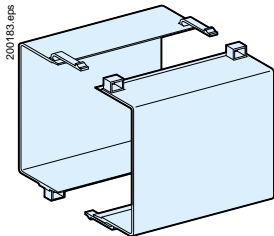
- A height adjustment device using screw/bolts allows the height to be adjusted to - 20 mm/ + 200 mm.
- A latching device is provided between the extraction table and the cradle.



Operating handle

Operating handle

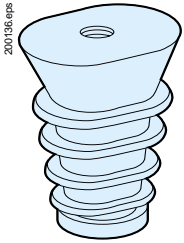
This enables all operations to be carried out on the circuit breaker racking truck as well as on the earthing switch.



Busbar connection cover

Busbar connection cover

This set of 3 insulating covers enables improved dielectric withstand at the busbar connections in the cubicle.



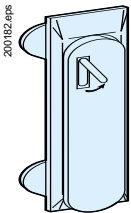
Capacitive divider insulator

Capacitive divider insulator set

- This Voltage Presence Indicator System (VPIS) includes:
 - the insulators themselves providing mechanical support and insulation up to 17.5 kV; these insulators also integrate capacitors capable of supplying a voltage potential signal,
 - a voltage indication unit with light to indicate the voltage presence on the front panel covering 2 voltage ranges:
 - 3.2 to 7.2 kV
 - 7.2 to 17.5 kV

Support insulator

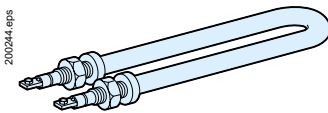
- This enables mechanical support and voltage insulation at 12 and 17.5 kV
- Application for busbar and cable fixing and support.



Door handle

Door handle

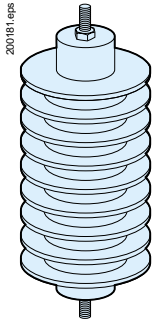
- Enables the front panel door of the cubicle to be closed.
- Several versions are available:
- with triangular key lock,
 - with Ronis or Profalux type key lock.



Heating element

Heating element

- This can be used for 2 reasons:
 - heating the cubicle when the ambient temperature is too low,
 - avoiding the formation of condensation.
- Delivered with its support and without a thermostat.
- Power: 150 W at 220 V.



Surge arresters

Silicone rubber housed metal-oxide surge arresters are intended for over voltage protection of distribution networks: they offer ad-hoc protection against overvoltage from various origins (lighting, switching...).

The **VARISIL** range could be associated to the various voltage covered by Evolis circuit breakers.

■ Our recommendation when using with Evolis:

- Ur = 7.2 kV : HD 09,
- Ur = 12 kV : HD 12,
- Ur = 17.5 kV : HD 18,

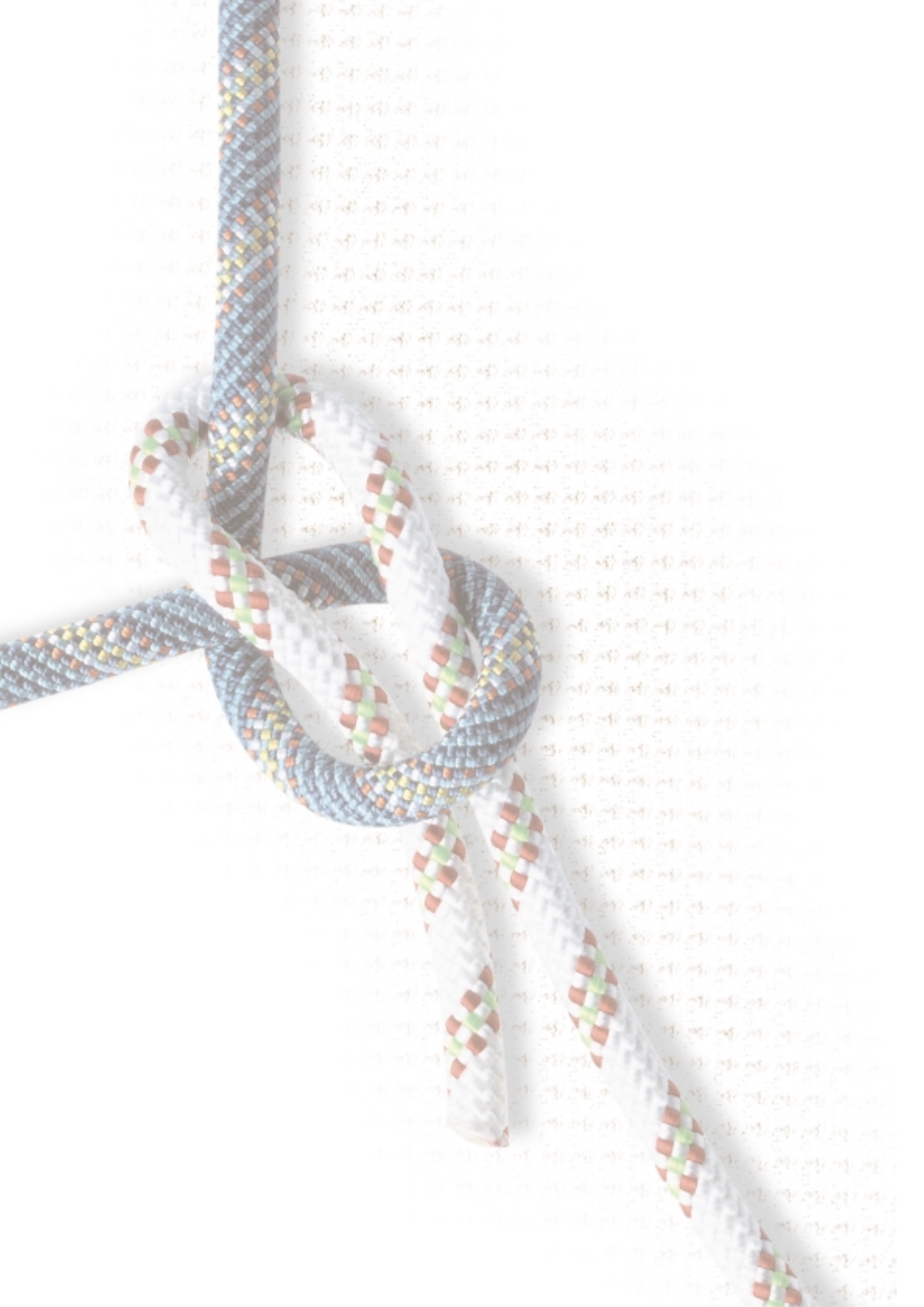
Common characteristics according to IEC 60 099-4

rated discharge current	In (with 8/20 wave)	(kA peak)	10
line discharge class			I
short time withstand current, twice	(with 4/10 wave)	(kA peak)	100
rectangular withstand current, duration 2000 μs		(A peak)(withstand 18 times min.)	300
short circuit withstand		(kA RMS - for 0.2 s)	31.5

Characteristics according to IEC 60 099-4

		HD06	HD09	HD12	HD15	HD18	HD24	HD30	HD36	HD42
rated voltage	Ur (kA RMS)	6	9	12	15	18	24	30	36	42
maximum continuous service voltage	Uc (kV RMS)	5	8	10	12	15	20	24	28.8	33.6
rated residual voltage	In (10 kA)	18	28	42	45	56	72	89	106	120
rated creepage distance	(mm)	380	380	380	380	610	610	910	910	910
mass - option "no"	(kg)	1.5	1.6	1.8	1.8	2.5	2.7	3.5	3.6	3.6





Control compartment components

In this chapter we propose an overview of our offer dedicated to low voltage switchgear.

You can obtain all information required to place an order using the reference documentation.

AC/DC Protection circuit	70
Multi 9 circuit breaker	70
Control and indication	72
Harmony push button and indicator lights	72
Connection	74
Terminal blocks, junction blocks	74



1 pole

Function

Control and protection of circuits against overloads and short-circuits for AC and DC applications.

Description

Technical data

- c Ratings: 6 to 63 A set at 30°C.
- c Voltage rating: 230/400 V AC and 48 V DC.

Electrical characteristics

Ratings (A)	Type	Voltage (V) AC	Break.Cap. (A)
6 to 63	1P	230/400	3000 to 10000
	2,3	400	3000 to 10000

Ratings (A)	Type	Voltage (V) DC	Break.Cap. (A)
1 to 32	1, 2, 3	48	up to 15000



2 poles

- c Number of operating cycles (O-C): 20 000.
- c Tripping curves:
 - v B curve: the magnetic trip units operate between 3 and 5 In
 - v C curve: the magnetic trip units operate between 5 and 10 In.
- c Tropicalisation: treatment 2 (relative humidity 95% at 55°C).
- c Connection: tunnel terminals for cables up to 25 mm².

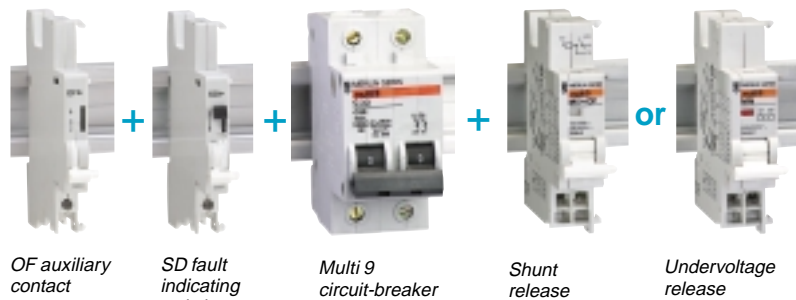
Electrical auxiliaries

The electrical auxiliaries enable the remote tripping or indication of the **Multi 9** circuit-breakers:

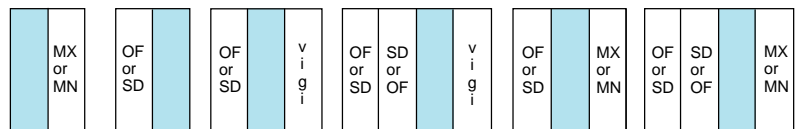
- c On the left of the circuit breaker for the indication auxiliaries.
- c On the right of the circuit breaker for the trip units.



3 poles



c Combining the auxiliaries



c Remote tripping of Multi 9 circuit breaker

This can be carried out with an MX shunt release or MN undervoltage release fixed on the right of the circuit breaker.

For more information please refer to ART documentation...

Remote indication

c OF auxiliary contact

Fixed on the left of the circuit breaker or another auxiliary contact, it enables the indication or control according to the "open" or "closed" position of the circuit breaker.

c SD fault indicating switch

Fixed on the left of the circuit-breaker, it enables the indication or control according to the "fault tripped" position of the circuit-breaker.

Visualisation of the fault on the front face by mechanical indicator.

c Connection: screw clamp terminals for:

v 2 x 1.5 mm² cables or 1 x 2.5 mm² cable.

Technical data of the auxiliaries

Voltage (V AC or DC)	Breaking Capacity (cos ϕ = 0.6) (A)
380-415 V AC	3
220-240 V AC	6
250 V DC	0.4
125 V DC	1
48 V DC	2
24 V DC	6

Accessories**Padlocking facility**

Enables the locking of the single or two-pole Multi 9 control toggle, in the "open" or "closed" position (by an 8 mm max. padlock, not supplied).

Single or double dividable mounting plate

Possibility to lock the mounting plate by an 8 mm ϕ padlock (not supplied), with the circuit breaker in the isolated position.

Comb busbars

c Current permissible at 40°C:

v 100 A with a central supply point,

v 125 A with two supply points.

c Rated insulation voltage: 500 V (according to IEC 664).

c Short-circuit withstand compatible with the Multi 9 breaking capacity.

c Connection:

v the supply is possible:

- by 16 mm² semi-rigid cable directly in the device enclosure

- by 25 mm² semi-rigid cable using the specific connector.

Terminal shields

c Degree of protection: IP 305.

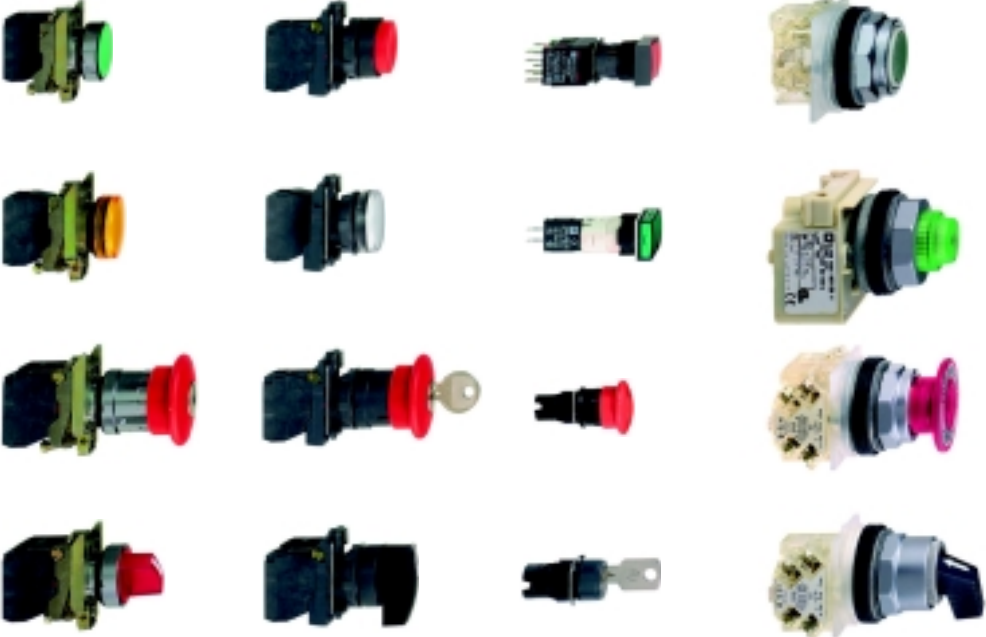
Sealable terminal shield

Enables to install the entire multi 9 on a panel: terminal shield composed of a base with a symmetrical rail and a cover to be screwed (sealable combination).


Passage of the wiring by punched out openings on the sides and the base.

For more information please refer to ART documentation...

Harmony Push Buttons and Indicator Lights





Applications				
				
Specific Features	Modular product With metal collar chrome plated or black Rounded head	Plastic collar Rounded or square head	Plastic collar Rounded, square or rectangular head	Metal collar chrome plated Hexagonal head
Mounting Hole	Ø 22		Ø 16	Ø 30
Range description	Push Buttons Emergency stop buttons Rotary buttons Luminous buttons Indicator lights			
Connection	By screw terminals By connector By adaptor for printed circuit board		By faston cable terminal By pins for printed circuit board	By captive screw terminals
Protection Index according to IEC 529 and NFC 20-010	IP 65 IP 66 (capped push button heads)		IP 65	
Type of device	Harmony style 4 XB4	Harmony style 5 XB5	Harmony style 6 XB6	Harmony style 9 XB6








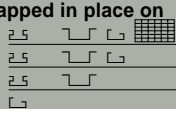
For more information please refer to ART documentation

		Digital displays	Profil front panels	
				
Non adaptable product Plastic collar Rounded head		Compact, low consumption Rounded head	LED 7 segments + decimal point	Aluminium front panel for mounting in control and indication units Ø 22
Ø 22 and Ø 25		Ø 8 and Ø 12	Ø 22	–
Push buttons Emergency stop buttons Rotary buttons Indicator lights		LED indicator lights	Displays to be made up: body + 1 digit head	3 sizes of front panel for mounting of 4, 8 or 12 control and indication units Ø 22
By captive screw terminals		Clip connector 2.8 x 0.5 or screw connector	By connector	–
IP 40	IP 54	IP 40 IP 65 (with seal)	IP 65	IP 65
Harmony style 7 XB7 "Series E" XB7 "Series P"		XVL-A	ZA2-VA	KT●

Control compartment
components

For more information, please refer to ART documentation...

Applications (connection)	"Screw-screw"									"Spring-spring"	
											
Nominal cross-section (mm²)	2.5 to16	2.5/4	35	70	150	4	6	10 and 35	2.5	4	
Number of poles	1	1	1	1	1	25 or 10	2 or 3	1	1 or 2	1	
Snapped in place on 	-	-	-	-	-	●	●	●	-	-	
Snapped in place on 15 mm rail	-	●	-	-	-	-	-	-	-	-	
References	AB1-VV					DB6-CD	DB6-DD	DB6-ED/FD	AB1-RR		

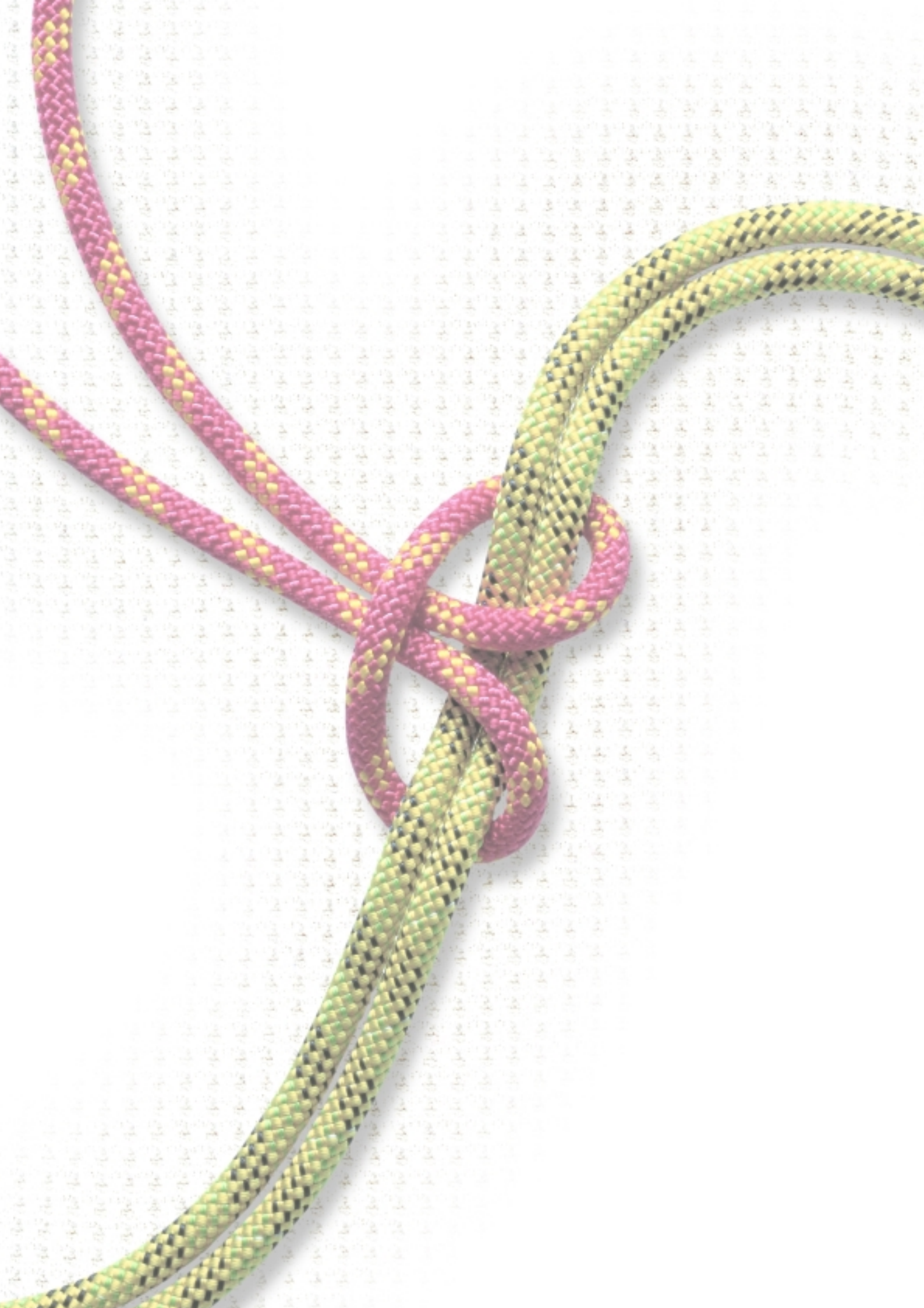
Applications (connection + functions)	Trifunctional with protection conductor		Screw-clips	For supported diode		For supported fuse		
				Fixed	Removable	Fixed	Removable	
								
Nominal cross-section (mm²)	2.5	2.5	4	4	4	10	4	4
Number of poles	1 neutral disconnectable 1 link V/V 2 links V/V		1	2	1	1	1	1
Snapped in place on 	-	-	-	-	-	-	-	-
Display	-	●	-	-	●	●	●	●
"Screw-screw" "Spring-spring"	● -	● -	● -	● -	● -	● -	● -	- ●
References	AB1-TRS	AB1-TRP/TRN	AB1-FV/FC	AB1-D11	AB1-SF/SV	AB1-FU	AB1-SF	AB1-RRSF

For more information, please refer to ART documentation ...

"Bolt-bolt"		"Bolt-connector"		"Screw-screw" conductor : protection type			neutral type protection		"Screw-screw" for conductor		
95, 185 and 240		95, 150 and 240		2.5-4			4 to 35		4 to 16		
1		1		1			1		1		
-		-		-			-		-		
●		●		-			●		-		
●		●		-			-		●		
-		-		●			-		-		
AB1-BB		AB1-BC		AB1-TP			AB1-NEN		AB1-RRTP		
For 3-wire proximity detectors		Disconnectable		Staged	Withdrawable			Not withdrawable	Marking accessories		
Without PE	With PE	Blade type	Fuse type		From side		From front				
2.5		2.5		4	2,5			2,5	1,5	2,5	
3		4		1	5			10	10	For flat, 20 pole cable	
-		-		-	-			-	-	-	
●		-		●	-			-	●	●	
-		●		-	-			-	-	-	
-		-		-	●			-	-	-	
●		-		●	-			-	-	-	
●		●		●	-			-	-	-	
-		-		-	-			-	-	-	
AB1-DDP 235U●●		AB1-DDP 235T●●		AB1-SC	AB1-FUSE	AB1-ET	AB1-BD		AB1-DV/DVM	AB1-BCP	
									AB1-BV	AB1-B/R AB1-G/S	

Control compartment components

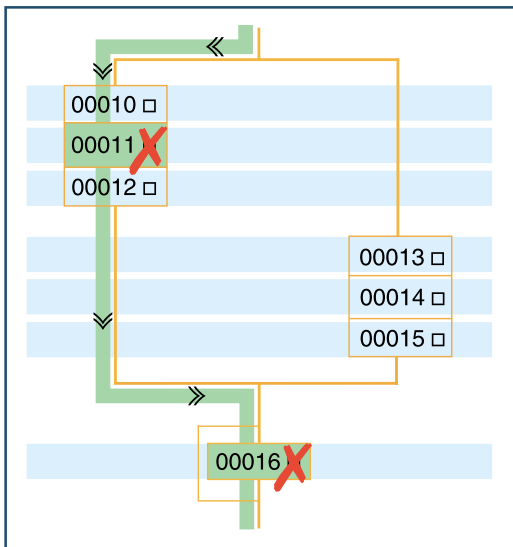
For more information, please refer to ART documentation ...



How to order - User Guide	78
Circuit breaker	79
Full version	79
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Protection, monitoring control and metering	86
Earthing switch	91
Switchboard components	93
Separate accessories	95

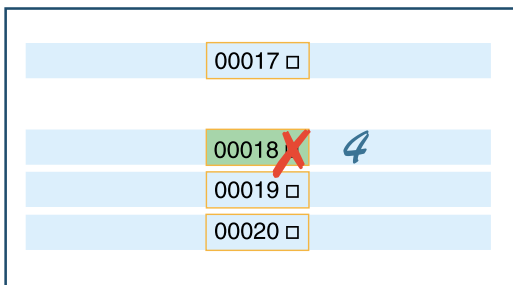
How to read the order forms

Case of mandatory combined products



- 1 Follow your needed path
- 2 Select only one bloc when blocs are adjacents
- 3 If necessary you can select this bloc as an option

Case of loose or separate accessories products

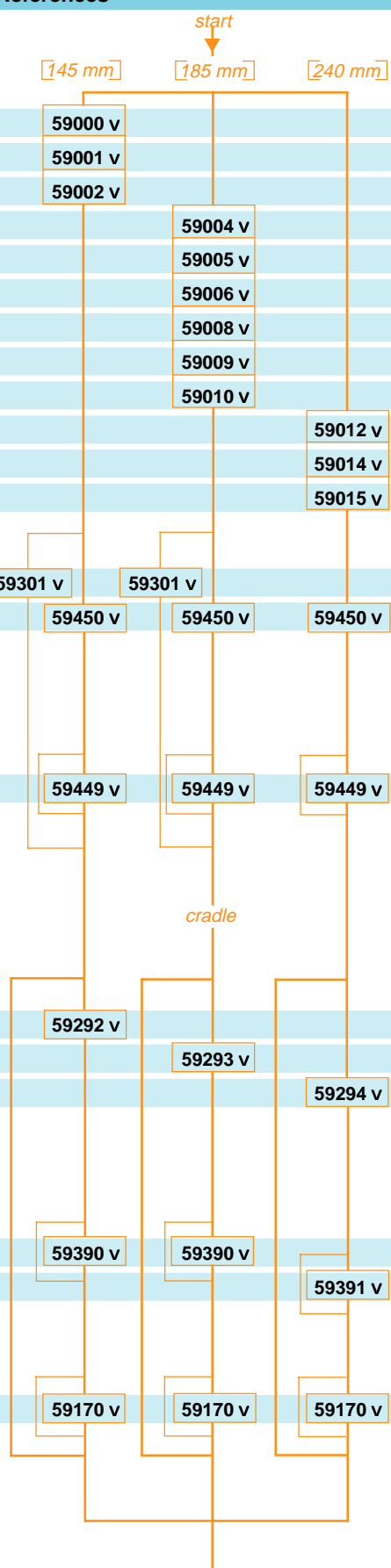


- 1 Select the blocs you wish
- 2 Specify for each the quantity requested

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Mounted by Panel Builder

page & Function	Designation	References	Price	Lead Time
p.20/21 Withdrawable circuit breaker	kV kA A Evolis			
Composed of: - 1 bloc of 4 O/C position contacts, - 1 racking truck, - 6 arms with clusters.	<i>phase distance</i>			
	7.2 25 1250 7P1.1250	59000 v		
	12 25 630 17P1.630	59001 v		
	12 25 1250 17P1.1250	59002 v		
	7.2 25 1250 7P1.1250	59004 v		
	17.5 25 630 17P1.630	59005 v		
	17.5 25 1250 17P1.1250	59006 v		
	7.2 31.5 1250 7P2.1250	59008 v		
	17.5 31.5 630 17P2.630	59009 v		
	17.5 31.5 1250 17P2.1250	59010 v		
	7.2 31.5 2500 7P2.2500	59012 v		
	17.5 25 2500 17P1.2500	59014 v		
	17.5 31.5 2500 17P2.2500	59015 v		
p.24 Type of racking				
manual	59301 v	59301 v		
screw / shaft	59450 v	59450 v	59450 v	
p.24 Operating shaft (1 per switchboard)	operating shaft	59449 v	59449 v	59449 v
p.24 Cradle, phase distance				
1 cradle / 145 mm	59292 v			
1 cradle / 185 mm		59293 v		
1 cradle / 240 mm			59294 v	
p.23 Low powered CTs for Sepam 1000+				
3 CVV120 25-3150 A	59390 v	59390 v		
3 CVV200 25-3150 A			59391 v	
p.24 Draw in/out position signaling	4 AC + 1 AC PAF	59170 v	59170 v	59170 v



Mounted by Schneider Electric

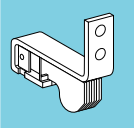
Mounted by Panel Builder

page & Function	Designation	References	Price	Lead Time
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p.24 Additional earthing device

Composed of:
- 1 CB sliding contact,
- 1 cubicle copper bar.

200280



earthing sliding contact

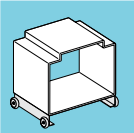
options

59451 v

p.25 CB footing

Composed of:
- a roller kit,
- a drawing.

200191



support

59050 v

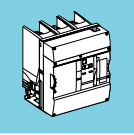
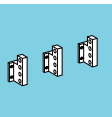
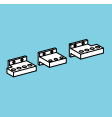
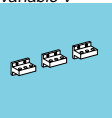


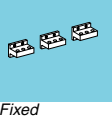


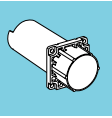
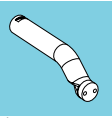
p.24 Adaptation kit in case of application with SE earthing switch

see drawings in the "installation guide"

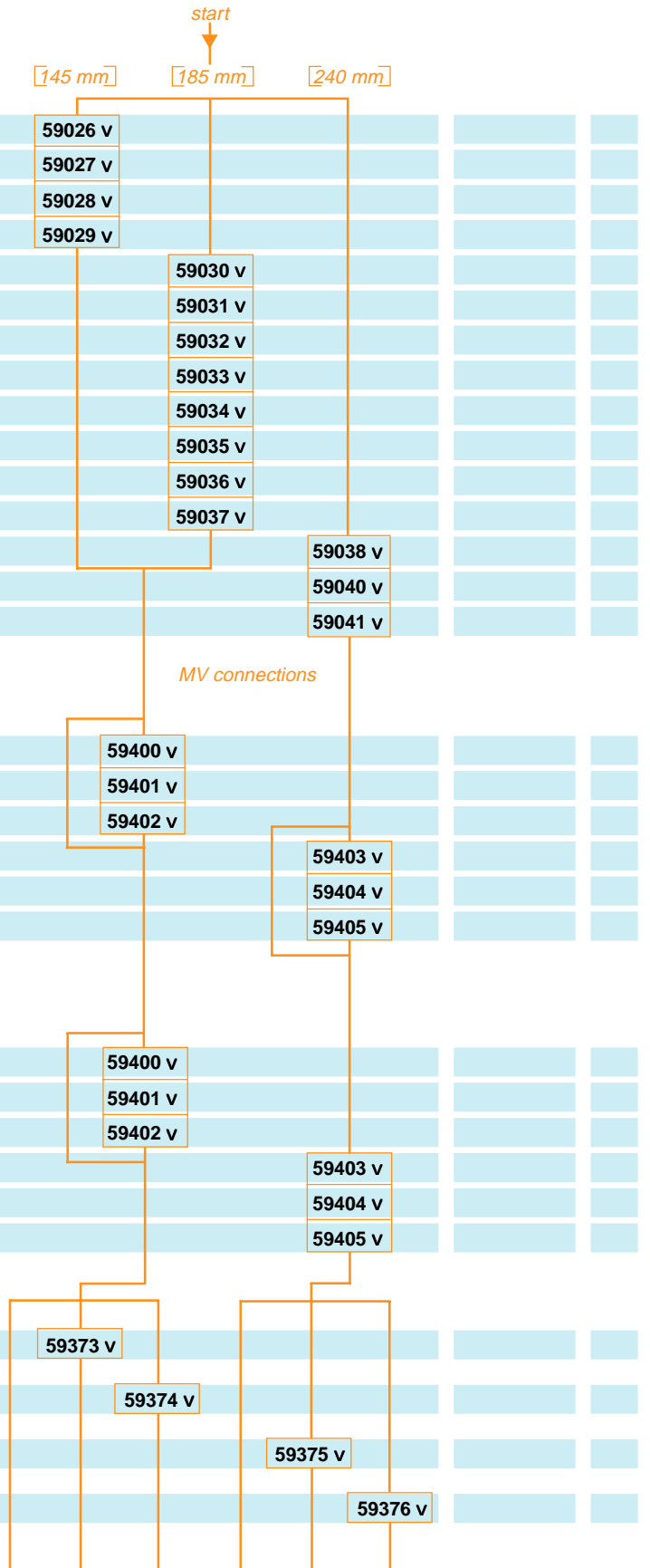
fitted accessories are mandatory

Mounted by Schneider Electric

Mounted by Panel Builder

page & Function	Designation	References	Price	Lead Time
p.26/27 Basic breaker	kV kA A Evolis			
Composed of: 1 bloc of 4 O/C position contacts.	<i>phase distance</i>			
	7.2 25 1250 7P1.1250	59026 v		
	12 25 630 17P1.630	59027 v		
	12 25 1250 17P1.1250	59028 v		
	12 25 1600 17P1.1600	59029 v		
	7.2 25 1250 7P1.1250	59030 v		
	17.5 25 630 17P1.630	59031 v		
	17.5 25 1250 17P1.1250	59032 v		
	17.5 25 1600 17P1.1600	59033 v		
	7.2 31,5 1250 7P2.1250	59034 v		
	17.5 31.5 630 17P2.630	59035 v		
	17.5 31.5 1250 17P2.1250	59036 v		
	17.5 31.5 1600 17P2.1600	59037 v		
	7.2 31.5 2500 7P2.2500	59038 v		
	17.5 25 2500 17P1.2500	59040 v		
	17.5 31.5 2500 17P2.2500	59041 v		
p.28 Type of upstream fixed connection to be mounted on basic CB or bushings				
 Variable V*	3 fixed distance H or V 630-1600A	59400 v		
 Variable H*	3 variable distance H 630-1600A	59401 v		
	3 variable distance V 630-1600A	59402 v		
 Fixed	3 fixed distance H or V 1250-2500A	59403 v		
	3 variable distance H 1250-2500A	59404 v		
	3 variable distance V 1250-2500A	59405 v		
p.28 Type of downstream fixed connection to be mounted on basic CB or bushings				
 Variable V*	3 fixed distance H or V 630-1600A	59400 v		
 Variable H*	3 variable distance H 630-1600A	59401 v		
	3 variable distance V 630-1600A	59402 v		
 Fixed	3 fixed distance H or V 1250-2500A	59403 v		
	3 variable distance H 1250-2500A	59404 v		
	3 variable distance V 1250-2500A	59405 v		
p.29 Type of withdrawable connections				
 1 cluster	6 clusters/fingers 630-1250A	59373 v		
 1 finger	6 bushings/arms&clusters 630-1250A	59374 v		
 1 bushing	6 clusters/fingers 1250-2500A	59375 v		
 1 arm	6 bushings/arms&clusters 1250-2500A	59376 v		

V*: vertical, H*: horizontal



Mounted by Schneider Electric

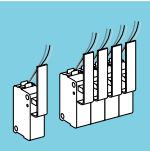
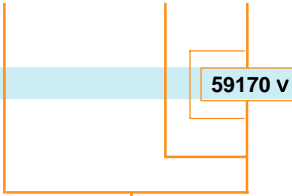
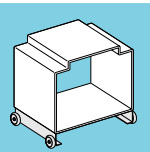
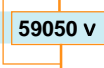
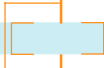
Mounted by Panel Builder

page & Function	Designation	References	Price	Lead Time
p.30 Low powered CTs for Sepam 1000+				
200186 	3 CVV 120 25-3150 A	59390 v		
	3 CVV 200 25-3150 A	59391 v		
<i>fixed & d/o options</i>				
p.31 LV terminal blocks				
200272 	fixed CB terminal blocks	59081 v		
p.31 Type of racking				
200185 	manual	59301 v		
	screw / shaft mandatory for 240 mm phase distance	59450 v		
p.31 Operating shaft (1 per switchboard)				
200295 	operating shaft	59449 v		
p.31 Additional earthing device				
200280 	earthing sliding contact	59451 v		
p.31 Racking base				
200186 	racking base	59300 v		

cradle

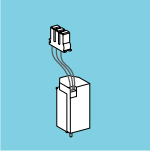
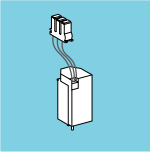
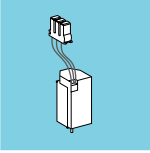
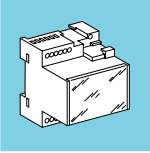
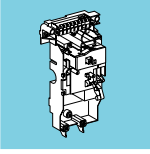
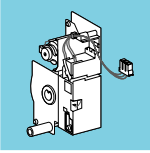
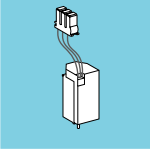
Mounted by Schneider Electric

Mounted by Panel Builder

page & Function	Designation	References	Price	Lead Time
<p>p.31 Draw in/out position signaling</p>  <p>200227</p>	4 AC + 1 AC PAF	 <p>59170 v</p>		
<p>p.32 CB footing</p> <p>composed of:</p> <ul style="list-style-type: none"> - a roller kit, - a drawing.  <p>200191</p>	support	<p>others</p>  <p>59050 v</p>		
<p>p.31 Adaptation kit in case of application with SE earthing switch</p> <p>see drawings in the "installation guide"</p>		 <p>fitted accessories are mandatory</p>		

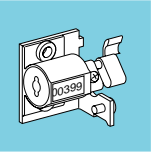
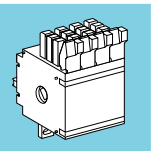
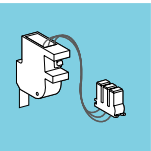
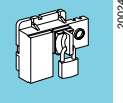
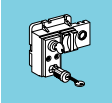
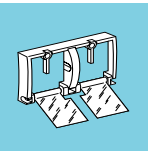
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page & Function	Designation	References	Price	Lead Time
<i>remote control</i>				
<i>start</i>				
<p>p.34 MX opening shunt trip voltage</p> 	24...30V DC 50/60 Hz	59133 v		
	48...60V DC 50/60 Hz	59134 v		
	100...130V DC 50/60 Hz	59135 v		
	200...250V DC 50/60 Hz	59136 v		
<p>p.34 Additional MX opening shunt trip voltage</p> 	24...30V DC 50/60 Hz	59137 v		
	48...60V DC 50/60 Hz	59138 v		
	100...130V DC 50/60 Hz	59139 v		
	200...250V DC 50/60 Hz	59140 v		
<p>p.34 MN undervoltage shunt trip voltage</p> 	24...30V DC 50/60 Hz	59150 v		
	48...60V DC 50/60 Hz	59151 v		
	100...130V DC 50/60 Hz	59152 v		
	200...250V DC 50/60 Hz	59153 v		
<p>p.34 Time delay unit for MN, MN time setting</p> 	48...60V DC 50/60 Hz	33680 v		
	100...130V DC 50/60 Hz	33681 v		
	200...250V DC 50/60 Hz	33682 v		
<p>p.33 MITOP low energy release</p> 	mitop 200-250 V AC 50/60 Hz	59160 v		
<p>p.36 MCH motor voltage</p> 	24...30V DC	59162 v		
	48...60V DC 50/60 Hz	59163 v		
	100...125V DC	59164 v		
	200...250V DC	59165 v		
	100...130V AC 50/60 Hz	59166 v		
	200...240V AC 50/60 Hz	59167 v		
<p>p.36 XF closing coil release</p> 	24...30V DC 50/60 Hz	59145 v		
	48...60V DC 50/60 Hz	59146 v		
	100...130V DC 50/60 Hz	59147 v		
	200...250V DC 50/60 Hz	59148 v		

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page & Function	Designation	References	Price	Lead Time
p.37 Operation counter				
200252 	operation counter	59085 v		
p.37 Additional auxiliary contacts				
200253 	4 AC "silver"	59090 v		
p.37 Indication of CB ready to close PF				
200254 	1 AC PF	59091 v		
p.38 Open position CB interlocking				
200248 	for lock & key	59336 v		
200249 	for padlock supplied by client	59337 v		
p.38 Lock & key configuration				
	with one lock RONIS	59338 v		
	with 2 idem locks RONIS	59339 v		
	with 2 differents locks RONIS	59341 v		
	with one lock PROFALUX	59340 v		
	with 2 idem locks PROFALUX	59343 v		
	with 2 differents locks PROFALUX	59342 v		
p.38 Padlocking of O/C push button				
200255 	for padlock supplied by client	59344 v		

signaling

interlocking systems

end

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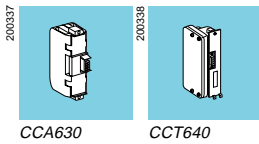
page & Function	Designation	References	Price	Lead Time
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p.47 Application type

Substation	S20	59620 v		
Transformer	T20	59621 v		
Motor	M20	59622 v		
Busbar	B21		59624 v	
Busbar	B22		59625 v	

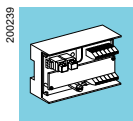
p.50 Line sensors type

1A/5A CT current connector	CCA630	59630 v	59630 v		
LPCTcurrent input connector	CCA670	59631 v	59631 v		
VT voltage input connector	CCT640			59632 v	



p.48 8 inputs temperature module

8 temperature sensors module	MET148		59640 v		
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p.46 Remote modules cord

L = 0.6 m	CCA770		59660 v		
L = 2 m	CCA772		59661 v		
L = 4 m	CCA774		59662 v		

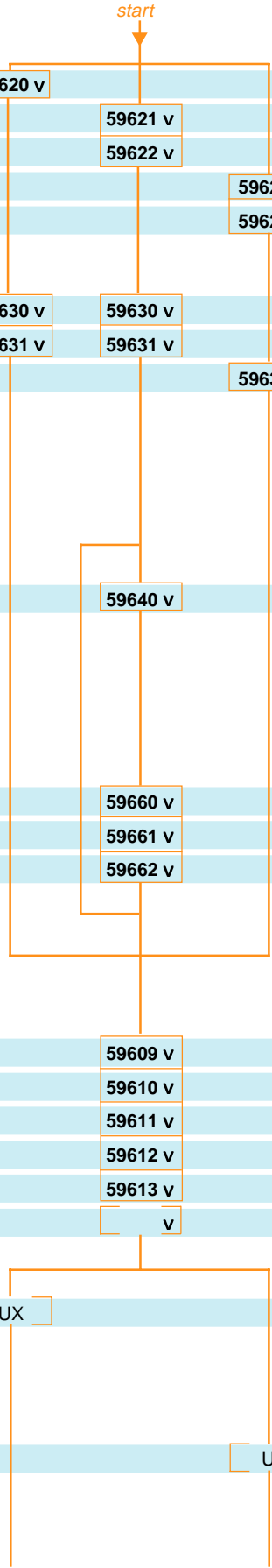
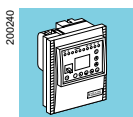
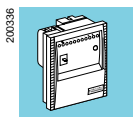


p.46 Operating language

English / French			59609 v		
English / Italian			59610 v		
English / Spanish			59611 v		
English / Polish			59612 v		
English / Swedish			59613 v		
English / Local			v		






p.46 User Machine Interface

Basic UMI		UX			
Advanced UMI				UD	







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page & Function	Designation	References	Price	Lead Time
p.46 Remote advanced UMI module				
 200338	DSM303	59608 v		
p.46 Remote modules cord				
L = 0.6 m	CCA770	59660 v		
L = 2 m	CCA772	59661 v		
L = 4 m	CCA774	59662 v		
 200339				
p.46 Mounting accessorie				
Mounting plate	AMT840	59670 v		
 200340				
p.46 Power supply				
Sepam/basic				
UMI/24V/70°C	S10 UX xxx J xx xAT	59602 v		
UMI/48-250V/70°C	S10 UX xxx J xx xUT	59603 v		
Sepam/advanced				
UMI/24V/70°C	S10 UD xxx J xx xAT		59606 v	
UMI/48-250V/70°C	S10 UD xxx J xx xUT		59607 v	
p.46 Power supply connector				
Screw type connector	CCA620		59668 v	
Ring lug connector	CCA622		59669 v	
p.51 Input/Output module				
4 inputs + 4 outputs module	MES108		59645 v	
10 inputs + 4 outputs module	MES114		59646 v	
 200243  200341				
p.52 Communication interface				
RS485 network interface				
2 wires	ACE949-2		59642 v	
4 wires	ACE959		59643 v	
p.52 Communication Cord				
L = 3 m	CCA612		59663 v	

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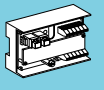

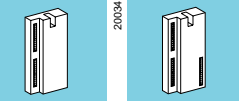
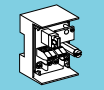
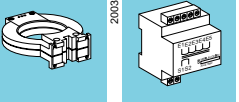
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page & Function	Designation	References	Price	Lead Time
p.51 Analog output module				
200342 	MSA141		59647 v	
p.51 Remote modules cord				
L = 0.6 m	CCA720		59660 v	
L = 2 m	CCA772		59661 v	
L = 4 m	CCA774		59662 v	
200339 				
p.50 Core balance				
Residual current sensor d=120	CSH120		59635 v	
Residual current sensor d=200	CSH200		59636 v	
Interposing ring CT for I _o	CSH30		59634 v	
Core balance CT interface	ACE990		59672 v	
200342 				
200344 				



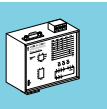

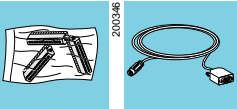
Mounted by Schneider Electric

Mounted by Panel Builder

page & Function	Designation	References	Price	Lead Time
p.51 8 inputs temperature module				
8 temperature sensors module	MET148	59640 v		
				
p.51 Remote modules cord				
L = 0.6 m	CCA770	59660 v		
L = 2 m	CCA772	59661 v		
L = 4 m	CCA774	59662 v		
				
p.51 Analog output module				
	MSA141	59647 v		
p.51 Input/Output module				
4 inputs + 4 outputs module	MES108	59645 v		
10 inputs + 4 outputs module	MES114	59646 v		
				
p.52 Communication interface				
RS485 network interface 2 wires	ACE949-2	59642 v		
4 wires	ACE959	59643 v		
				
p.52 Communication Cord				
L = 3 m	CCA612	59663 v		
p.50 Core balance				
Residual current sensor d=120	CSH120	59635 v		
Residual current sensor d=200	CSH200	59636 v		
Interposing ring CT for I _o	CSH30	59634 v		
Core balance CT interface	ACE990	59672 v		
				
p.46 Mounting accessory				
Mounting plate	AMT840	59670 v		

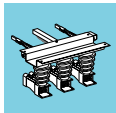
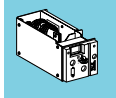
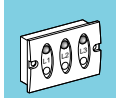

Mounted by Schneider Electric

Mounted by Panel Builder

page & Function	Designation	References	Price	Lead Time
p.52 Communication accessories				
	RS485/RS232 converter ACE909-2		59648 v	
	RS485/RS485 interface (AC) ACE919 AC		59649 v	
	RS485/RS485 interface (DC) ACE919 DC		59650 v	
200345 	p.53 Configuration software			
	PC configuration software kit kit SFT2841		59671 v	
200351 	Connectors			
	2 sets of spare connectors KIT 2640		59676 v	
	PC connection cord CCA783		59664 v	
	LPCT test plug CCA613		59666 v	
	LPCT injection adaptor ACE917		59667 v	
	User's manual in French PCRED399040FR		59674 v	
	User's manual in English PCRED399040EN		59675 v	
200352 				

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
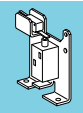

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page & Function	Designation	References	Price	Lead Time
Cubicle functions				
	incomer or feeder			
	busbar metering			
	d/o bus section			
	d/o CB or truck with ES			
	d/o CB or truck without ES			
	direct incomer without ES			
	with ES			
	without ES			
<i>start</i>				
<i>Earthing switch and VPIS</i>				
p.58 Earthing switch (ES):				
Power circuit				
	12kV 160mm 31.5kA-3s	59490 v	59490 v	
	17.5kV 200mm 31.5kA-3s & 50kA-1s	59491 v	59491 v	
	17.5kV 240mm 31.5kA-3s & 50kA-1s (phase distance in mm)	59492 v		
3 insulators mounted on a support				
	160 mm	59487 v	59487 v	59487 v
	200 mm	59488 v	59488 v	59488 v
	240 mm	59489 v	59489 v	59489 v
p.58 Operating mechanism				
	box with mechanism	59496 v	59496 v	
	box with voltage indication	59497 v	59497 v	59497 v
p.59 Voltage indication				
	3.2 - 7.2 kV	59498 v	59498 v	59498 v
	7.2 - 17.5 kV	59499 v	59499 v	59499 v
p.59 Auxiliary contact				
	6 AC (3NO 3NC)	59502 v	59502 v	
p.59 Interlocking for O/C position (without locks)				
	for 1 lock O & 1 lock C	59506 v	59506 v	
	for 2 locks O	59508 v	59508 v	
	for 2 locks C	59509 v	59508 v	
p.59 Electromagnetic interlocking for E.S O/C position				
	24V DC	59513 v	59513 v	
	48V DC	59514 v	59514 v	
	110V DC	59515 v	59515 v	
	220V DC	59516 v	59516 v	

Order form: earthing switch (ES) voltage presence indicator system (VPIS) d/o circuit breaker interlocking

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page & Function	Designation	References	Price	Lead Time
<i>Circuit breaker interlocking</i>				
<p>p.59 d/o CB position locking</p> 	d/o CB interlocking	59521 v	59521 v	
	<p>p.59 Electromagnetic interlocking for CB O/C position</p> 			
<p>24V DC</p> <p>48V DC</p> <p>110V DC</p> <p>220V DC</p>		59526 v	59526 v	
		59527 v	59527 v	
		59528 v	59528 v	
		59529 v	59529 v	
<p>p.59 Interlocking by lock (lock not supplied)</p>				
	Ronis / Profalux keylock	59523 v	59523 v	
<p>p.59 Operating shaft = 1 per switchboard</p> 				
	switchboard accessories			
<i>End</i>				

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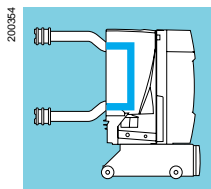
page & Function	Designation	References	Price	Lead Time
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p.63 Fixed coupling link

go to installation notice: drawings

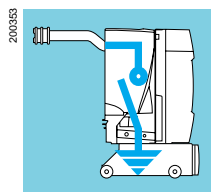
switchboard components

p.63 Withdrawable coupling link: phase-distance, Ith, Ir



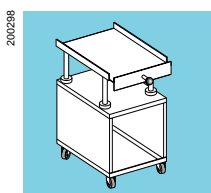
145 mm	25 kA	1250 A	59440 v		
185 mm	31.5 kA	1250 A	59441 v		
240 mm	40 kA	3150 A	59442 v		

p.63 Busbar earthing truck



145 mm	17.5 kV	25 kA	3 s	59470 v		
185 mm	17.5 kV	31.5 kA	3 s	59471 v		
240 mm	17.5 kV	40 kA	3 s	59472 v		

p.64 CB extraction table

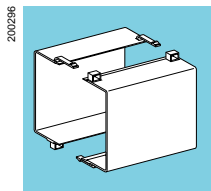


upper table + complete device drawing	59084 v		
complete extraction table	59132 v		

p.64 Operation shaft common to earthing switch & CB racking

operating shaft	59449 v		
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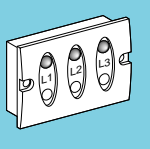
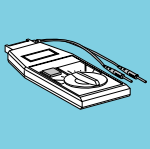

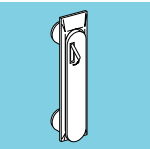
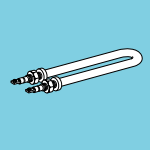
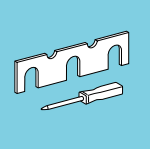
p.64 Busbar connection



busbar cover	59420 v		
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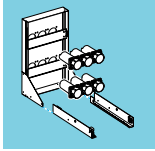

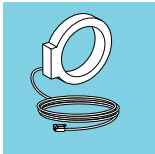
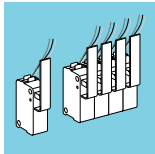
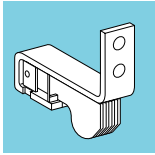
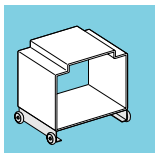
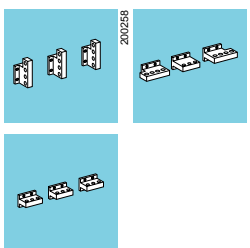
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page & Function	Designation	References	Price	Lead Time
p.59 Voltage indication				
	box 3.2 - 7.2 kV	<i>cubicle components</i> ↓ 59498 v		
	box 7.2 - 17.5 kV	59499 v		
Phase comparator				
	phase comparator	59448 v		
p.65 Voltage indicator insulator				
	3 voltage insulators	59430 v		
p.65 Insulator support				
	3 standard insulators	59431 v		
p.65 Cubicle compartement handles				
	handles	59270 v		
	handle with key	59271 v		
p.65 Heating resistor				
	heating resistance	59280 v		
jig for CB/cradle changeability & wiring tool & set for arm fixation				
	jig mandatory	59310 v		
	for each partner & wiring tool & fixation set			

tools for partners

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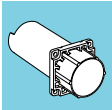
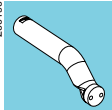

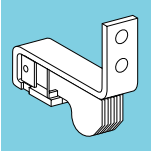
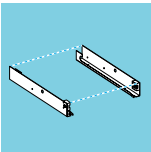
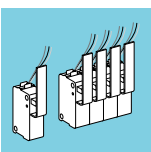
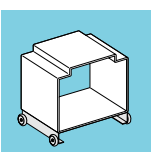
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page & Function	Designation	References	Price	Lead Time
p.24 Cradle, phase distance				
	cradle / 145 mm	59292 v		
	cradle / 185 mm	59293 v		
	cradle / 240 mm	59294 v		
<i>for full CB version</i> 				
p.30 Low powered CTs for Sepam 1000+ mounted on lower cradle bushings				
	3 CVV120 25-3150 A	59390 v		
	3 CVV200 25-3150 A	59391 v		
p.24 Draw in/out position signaling				
	4 AC + 1 AC PAF	59170 v		
p.24 Additional earthing device				
	earthing sliding contact	59451 v		
p.32 CB footing				
	support	59050 v		
p.28 Type of fixed connection (3 units), Ir to be mounted on basic CB or bushings				
	fixed distance H or V 630-1600 A	59400 v		
	variable distance H 630-1600 A	59401 v		
	variable distance V 630-1600 A	59402 v		
	fixed distance H or V 1250-2500 A	59403 v		
	variable distance H 1250-2500 A	59404 v		
	variable distance V 1250-2500 A	59405 v		

V*: vertical, H*: horizontal

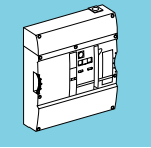
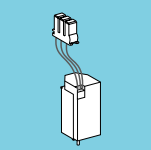
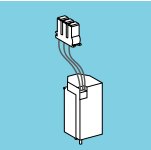
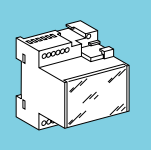
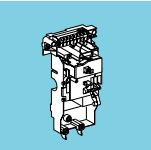
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page & Function	Designation	References	Price	Lead Time
<i>for modular CB version</i>				
p.29 Type of withdrawable connections				
 1 cluster	3 clusters/fingers 630-1250A		59369 v	
	3 clusters/fingers 1250-2500A		59371 v	
 1 finger	3 bushings/arms&clusters 630-1250A		59370 v	
	3 bushings/arms&clusters 1250-2500A		59372 v	
 1 bushing	3 arms 630-1250A		59396 v	
	3 arms 1250-2500A		59397 v	
 1 arm	3 bushings without fingers 630-1250A		59406 v	
	3 bushings without fingers 1250-2500A		59407 v	
p.30 Low powered CTs for Sepam 1000+				
	3 CVV120 25-3150 A		59390 v	
	3 CVV200 25-3150 A		59391 v	
p.24 Additional earthing device				
	earthing sliding contact		59451 v	
p.31 Racking base				
	racking base		59300 v	
p.31 Draw in/out position signaling				
	4 AC + 1 AC PAF		59170 v	
p.32 CB footing				
	support		59050 v	

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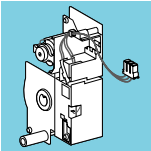
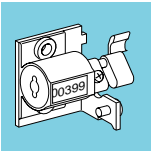
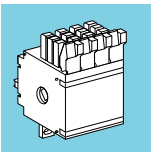
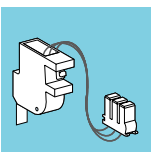
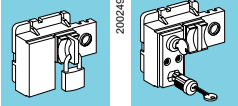
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page & Function	Designation	References	Price	Lead Time
Loose CB cover				
200299 	loose CB cover	59078 v		
User manual				
	User manual	59077 v		
Unit LV terminal block for drawout installation				
	1 drawout CB terminal block	47849 v		
Unit LV terminal block for fixed installation				
	1 fixed CB terminal block	47074 v		
p.34 MX1, MX2, XF coil voltage				
200250 	24...30V DC 50/60 Hz	59141 v		
	48...60V DC 50/60 Hz	59142 v		
	100...130V DC 50/60 Hz	59143 v		
	200...250V DC 50/60 Hz	59144 v		
p.34 MN undervoltage shunt trip voltage				
200250 	24...30V DC 50/60 Hz	33668 v		
	48...60V DC 50/60 Hz	33669 v		
	100...130V DC 50/60 Hz	33670 v		
	200...250V DC 50/60 Hz	33671 v		
p.34 MN time setting (0.5 - 0.9 - 1.5 - 3s) voltage				
200271 	48...60V DC 50/60 Hz	33680 v		
	100...130V DC 50/60 Hz	33681 v		
	200...250V DC 50/60 Hz	33682 v		
p.33 MITOP				
200280 	mitop 200-250 V AC 50/60 Hz	59160 v		

↓
for CB mechanism

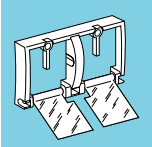
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page & Function	Designation	References	Price	Lead Time
p.36 MCH motor voltage				
	24...30V DC	47888 v		
	48...60V DC	47889 v		
	100...125V DC	47890 v		
	200...250V DC	47891 v		
	48...60V DC 50/60 Hz	47889 v		
	100...130V DC 50/60 Hz	47893 v		
	200...240V DC 50/60 Hz	47894 v		
p.37 CDM operating counter				
	operation counter	48535 v		
p.37 Additional auxiliary contacts				
	4 AC "sliver"	47887 v		
p.37 Indication of CB ready to close PF				
	1 AC PF	47080 v		
p.38 Open position CB interlocking				
	for lock & key	48541 v		
	for padlock supplied by client	48539 v		
p.38 RONIS lock & key configuration				
	with one lock	41940 v		
	with 2 idem locks	41950 v		
	with 2 different locks	59341 v		
p.38 PROFALUX lock & key configuration				
	with one lock	42888 v		
	with 2 idem locks	42878 v		
	with 2 different locks	59342 v		

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page & Function	Designation	References	Price	Lead Time
p.39 Padlocking of O/C push button				
	for padlock supplied by client	48536 v		
	3 MV connectors shield, Ir			
	630-1250 A	59435 v		
	2500 A	59436 v		
Labels kit for Push Button & indicator (O/C)				
	ANSI labels green red	59100 v		

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As standards, specifications and design change from time to time, always ask for confirmation of the information given in this publication.

