2017 Catalog

Premset

17.5 kV
Compact modular vacuum switchgear with Shielded Solid Insulation System

Medium Voltage Distribution

schneider-electric.com/premset

Life Is On Schneider Electric

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The new generation of Medium Voltage Switchgear

PM105800

Safety

A concentrate of innovation dedicated to customer safety

Reliability

A long-lasting performance securing customer service continuity

Efficiency

A smart solution entirely designed to optimize customer assets

Flexibility

A compact and modular design for all customer application

Safety

A concentrate of innovation dedicated to customer safety

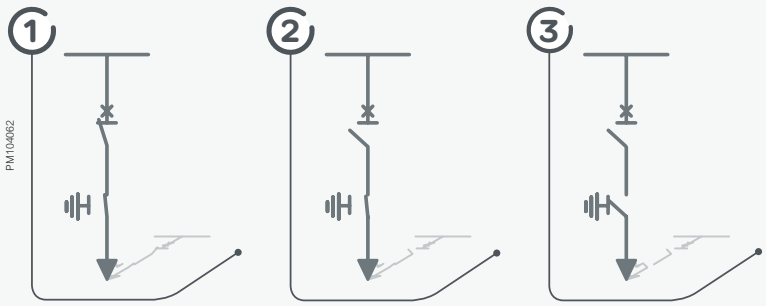
PM105801

Simple and user-friendly operation

The Premset 3-in-1 system has proven itself to be one of the most reliable and end-user friendly MV switchgear system, providing:

- Earthing in a single operation
- Intuitive mimic diagram and operation
- Direct downstream earthing
- Positively driven built-in interlocks
- Easy front access to cable test injection points

3 position scheme



Closed | Open and disconnected | Earthed

Peace of mind and safety through the SSIS technology

Extending protection to the entire switchgear assembly Premset switchgear is the first global product to offer shielded solid insulation throughout. Therefore it extends equipment service life, resulting in a lower total cost of ownership (TCO).

With no part of the main circuit exposed to free air and shielded by earthed screen, the system is accidentally touchable and significantly reduces the risk of internal arc.

The system is applicable for all network functions, including:

- Load break switches or circuit breaker
- Integrated metering units current and voltage transformers

High safety for the operator during cable testing and diagnosis

This integrated cable test feature, implemented by dedicated earthed rods, accessible from the front, without needing to enter the cable box, operate the main switches or dismantle cable terminations. This device meets IEC 62271-200 standard requirements.

Efficiency

A smart solution entirely designed to optimize customer assets

PE90822_1

The efficiency you deserve, optimal, maximum

Because the range uses the same design for every configuration, customizing your switchgears is easier than ever before. And with standardized dimensions, reduced footprint, and simple front power connections, time and money spent installing Premset is greatly reduced.

Every aspect of the system is designed with the intention of making installation and adaptations as seamless as possible, including:

- Straightforward assembly with identical busbar and cable connections for the entire range
- Easy-to-install patented universal flat power connection system
- Easy cabling since all cable connections are at a height of 700 mm
- Associating an innovative maintenance program for your total peace of mind

Intelligent, Smart grid-ready solutions

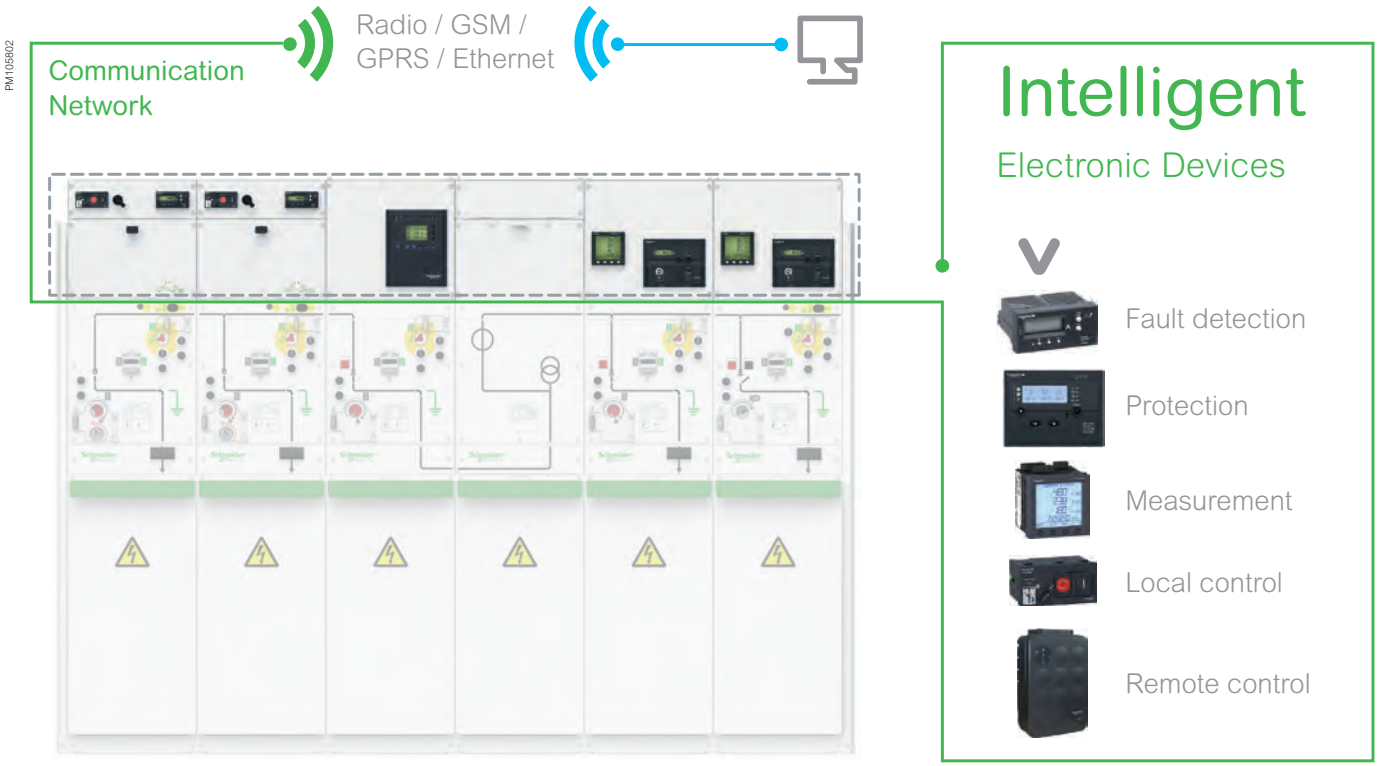
To enhance your electrical distribution networks through advanced monitoring and control, Premset architecture is designed with such features as:

- Feeder automation, with switchgear including built-in communication and local intelligence
- Load management, with integrated smart metering
- Asset management, with advanced switchgear and transformer monitoring
- Automatic Transfer System, with integrated source transfer solution to reduce power supply interruption

Architecture with distributed intelligence

The intelligent electronic devices (IEDs) used in Premset solutions allow easy integration, based on a standard communications protocol, with a plug-and-play scanning system for easy configuration.

All this adds up to a flexible system with integrated Web technology, pre-engineered and pre-tested, which you can easily upgrade as necessary. With Premset architecture, you can easily build a smarter MV distribution system.



Reliability

A long-lasting performance securing customer service continuity

Few minutes to choose it, a life time to enjoy it

Extending protection to the entire switchgear assembly, Premset is the first global product to offer shielded solid insulation throughout, enhancing long-term peace of mind.

The system is applicable for all network functions, including:

- Load break switches or circuit breakers
- Integrated metering units
- Current and voltage transformers

Intuitive operation reduces worker risk

With only two operations from line to earth – one to open and disconnect, and one to earth – the Premset range optimises operating safety, keeping all aspects as simple as possible.

Additionally, standard built-in interlocking between the main and earthing functions is keyless and positively driven, making every interaction with the unit as safe and easy as possible.

Faithfull on long term

End-of-life management is easier, because SF6-free design eliminates worries about future regulations.

- Shielded Solid Insulation System (SSIS)
- SSIS is applicable for any function such as load break switches or circuit breakers, SSIS compact metering functions, or current and voltage transformers

Flexibility

A compact and modular design for all customer application

From easy customisation to very specific needs

Whether you choice will be for ready-to-buy, easy configuration and design, with short delivery time, or whether you need a tailored-made solution to suit your specific requirements, Premset offers the answer your are expecting.

Premset range proffers a large choice of functions to meet any kind of application: switches, circuit breakers, metering functions, to adapt any substation room and cabling - simple and easy operating.

PM100021

All-in-one solution

- A unique connection interface for all elements, result of a patented design from Schneider-electric: one set of three connections for cables, that can be used in various directions (front, rear, bottom, top)
- Embedded voltage and current sensors, optimising protection and control, with integrated CT, VT around core function: no need for extra nor larger cubicle
- A universal flat power connection system, ensuring earth shield continuity (Schneider Electric patented design)
- A large choice of cable box dimensions, to adapt any substation room and cabling, with option of embedded voltage

Premset - by Schneider Electric:

The greatest innovation in Medium Voltage Switchgear in the last 10 years

Overview

Overview

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Presentation

PM100595

Shielded Solid Insulation System

Shielded Solid Insulation System

The entire main circuit is solid insulated with epoxy or EPDM, eliminating all live parts in free air:

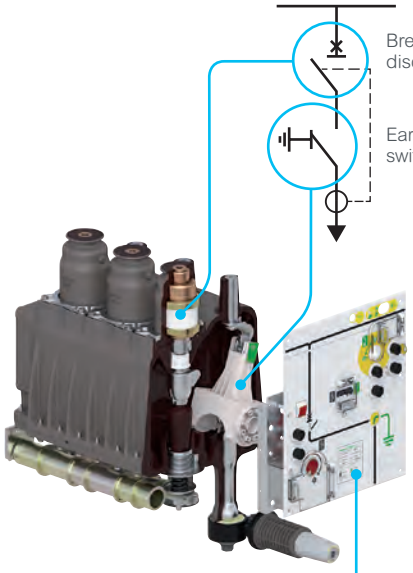
- Insensitive to harsh environments (humidity, dust, pollution)
- Drastic reduction of risk of phase-to-phase faults

The solid insulation is shielded, i.e. its surface is at earth potential everywhere (no electrical field in free air):

- System is “accidentally touchable”, in accordance with PA class of IEC 62271-201
- Extended life expectancy

All functions with shielded solid insulation have a longer life expectancy, including the M06S compact metering unit.

PM100018



Innovative single line diagram, new arrangement of main functions

The Premset single line diagram is composed of:

- Switch-disconnector using vacuum interrupters
- Earthing switch within sealed tank with air at atmospheric pressure
  - MV cables can be directly earthed, via earthing switch, without the contribution of any other device
  - The arrangement of two devices in series provides double isolation between busbars and cables
  - The system does not contain SF6 and is RoHS and REACH compliant, for your total peace of mind regarding end of life treatment and environmental concerns.

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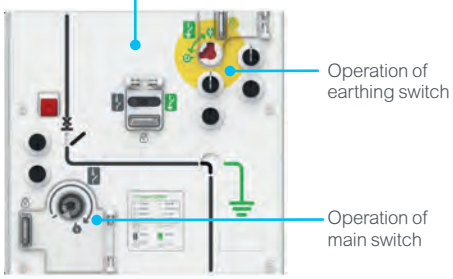


“3 in 1” integrated core units

All the necessary functions: breaking, disconnection and earthing, are embedded in a single device:

- Simple operation, with just 3 positions for all units: connected – opened & disconnected – earthed
- Intuitive mimic diagram, with two clear and reliable indicators (in accordance with IEC 62271-102)
- All interlocks between functions are built-in as standard, positively driven and without keys.

This applies to all types of circuit breakers and load-break switches.

Presentation

Consistent range of switches and circuit breakers to suit any application

The range of core units is composed of 3 switches and 5 circuit breakers:

- I06T: simple load-break switch for cable incomers or feeders
- I06H / I12H: heavy duty switch for transfer between multiple sources
- D01N and D02N: fast clearing circuit breakers for fuseless MV/LV transformer overcurrent protection
- D06N: simple circuit breaker for general protection
- D06H / D12H: O-CO-CO heavy duty circuit breaker with fast reclosing capacity for line protection.

Modular system architecture, simplifying installation and upgrading

The entire range of core units is optimized for dedicated applications, sharing:

- Same dimensions and footprint, 375 mm width in particular
- Same auxiliaries such as electrical operation devices, accessories and options
- Same easy operation and possibility of installation against a wall
- Extensive cable entry possibilities including bottom-front, bottom-rear, top-rear
- Same cable connections with type C (type "C" from EN 50181), 700 mm above floor

Also it is applicable as well to other units, such as:

- Compact metering M06S and M12S with shielded solid insulation
- Bus riser G06 and G12
- Voltage metering or Power supplier VTM, VTP, VTM-D, VTP-D

Presentation

Innovative auxiliary feature (optional)

- Live cable interlock
  - Electrical interlock helps to avoid the earthing of live cables.
- Cable test device, interlocked with earthing switch, simplifying cable testing and diagnosis:
  - Cable testing without accessing cable box or dismantling cable connections
  - Test device connection from the front of the switchboard, while cables remain earthed
  - Reliable interlocks with earthed star point
- Circuit breaker testing with dedicated device for primary injection
  - Primary test current injection without disconnectiong CTs or modifying relay setting
- Source changeover controller devices

Ready for smart grids

- D06H heavy duty circuit breaker:
  - Dedicated to line management (with fast reclosing capacity and O-CO-CO cycle)
  - Very small footprint (375 mm width)
- Built-in self-powered protection, embedding communication
- Integrated metering and power measurement functions
  - Compact metering unit with 375 mm width and shielded solid insulation
  - Integration of power measurement in incomers or feeders without additional space
- Feeder automation features:
  - Modular architecture for scalable solutions (distributed intelligence)
  - Linked by field bus using standard RJ45 Modbus protocol
  - Easy to integrate in SCADA systems via multiple protocols (IEC 61850)
  - Embedded web interface

PM100567

Architecture and components

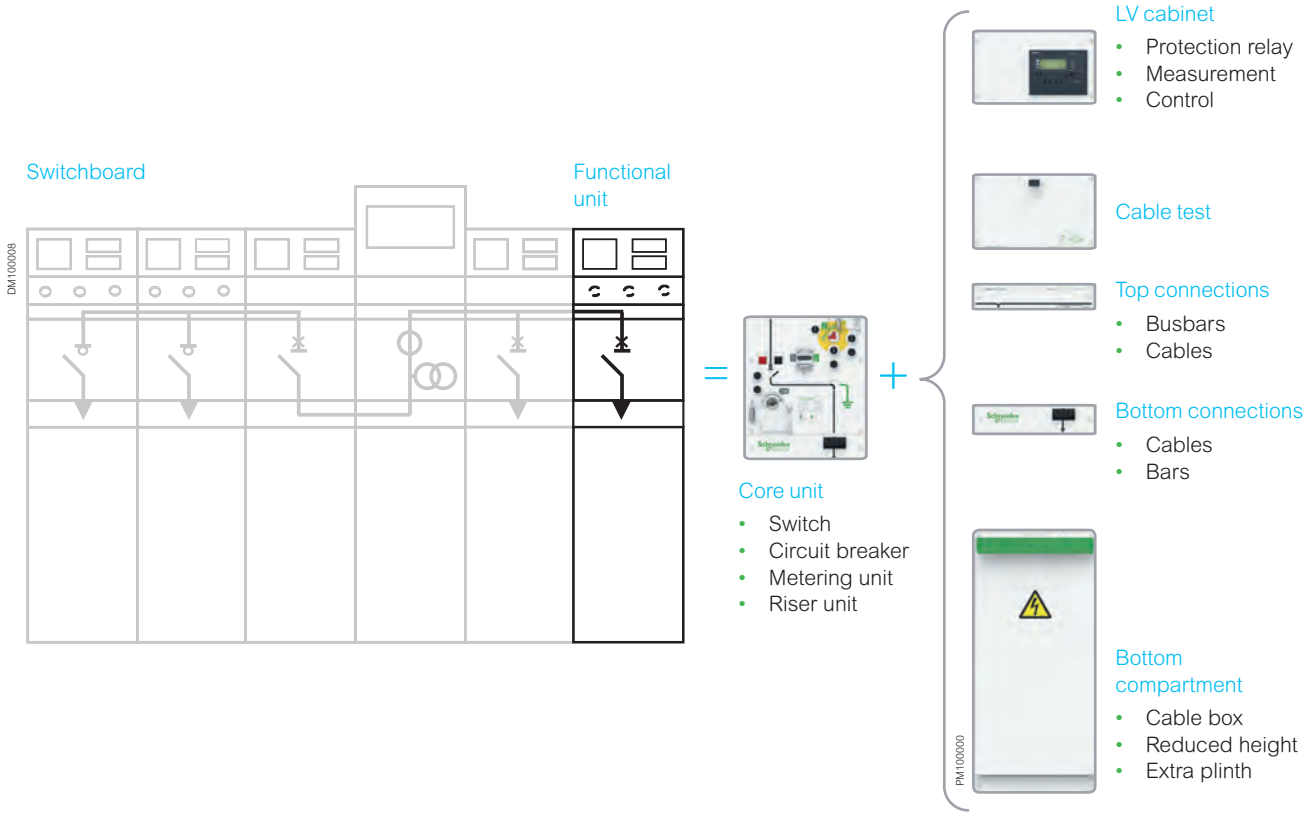
Premset switchboards are made up of functional units, each representing a type-tested assembly composed of a basic core unit and other functional blocks designed to work together in any combination.

The core units are optimized for each typical application and the assembly forms a totally insulated functional unit insensitive to the environment.

This Premset medium voltage system makes it possible to meet most of your application needs.

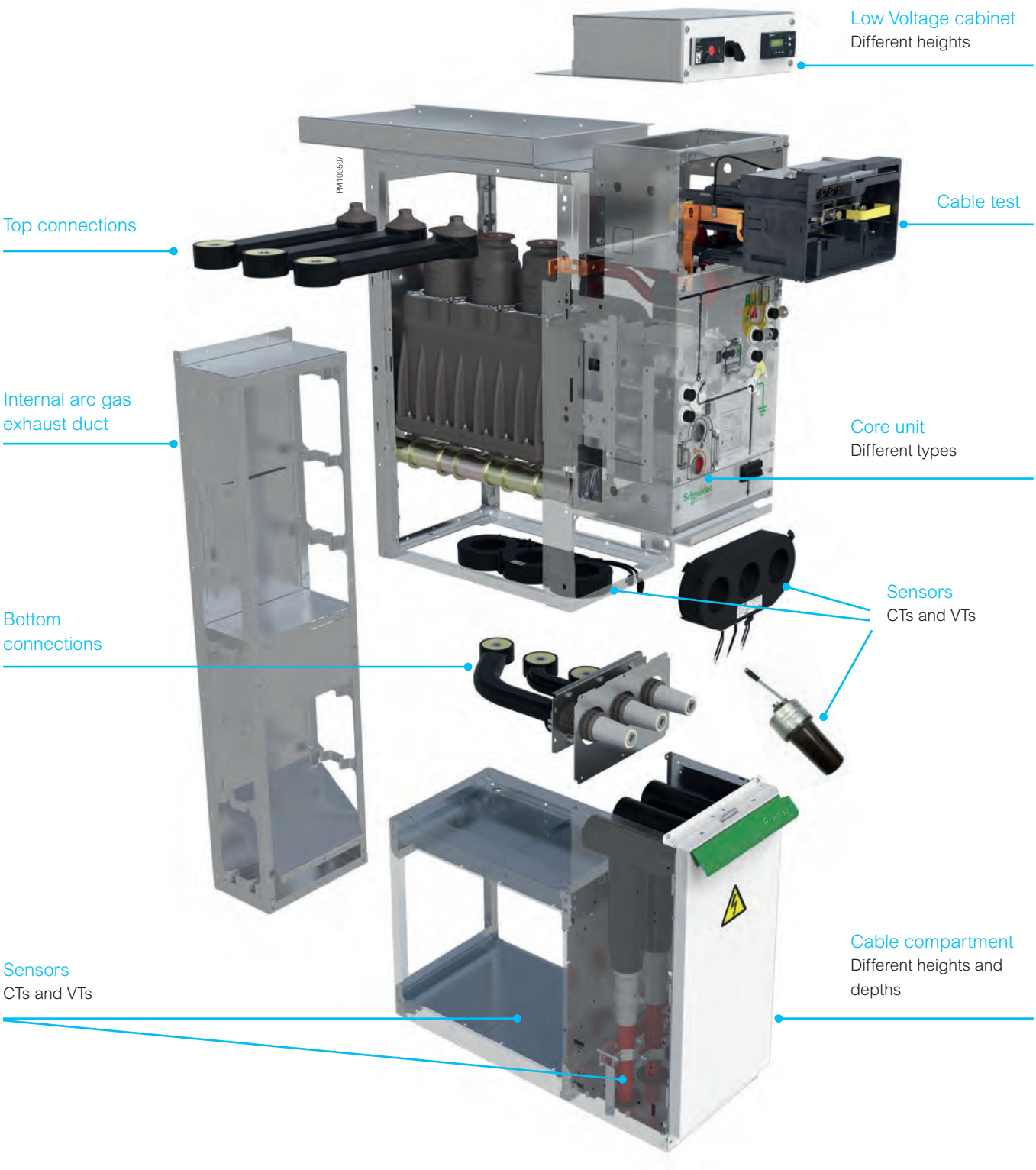
- Flexibility and simplicity in the design of functional units for any application
- Safety and reliability of type-test assemblies
- Space savings
- Freedom from environmental constraints
- Shorter delivery and the possibility of making last minute modifications
- Easy extension and upgrades

Functional unit = An assembly of functional blocks



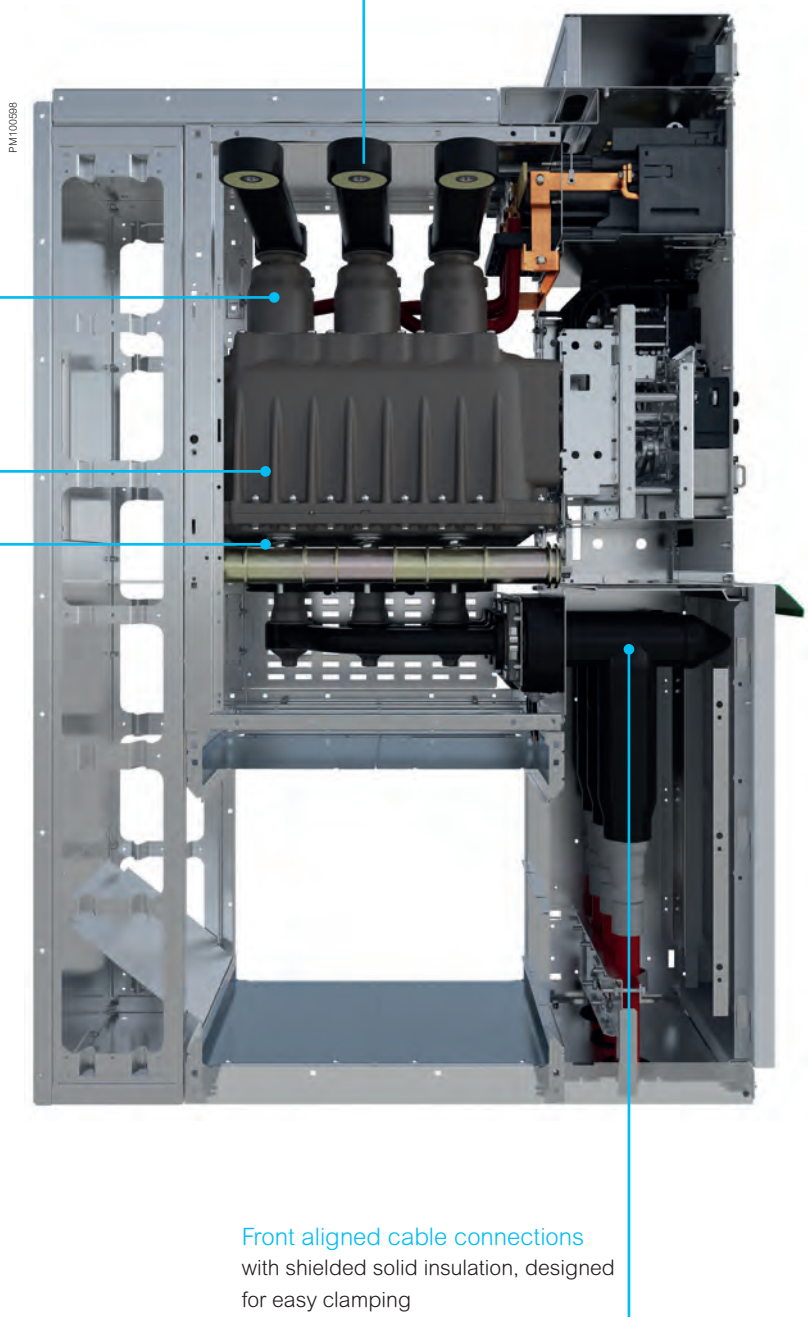
Architecture and components

Unsurpassed simplicity with mix-and-match modular architecture based on functional blocks.



Architecture and components

A big step for safety and reliability with SSIS Shielded Solid Insulation System.



Modular busbar system
with shielded solid insulation

Vacuum bottles
with shielded solid insulation for breaking and disconnection

Integrated air-insulated line earthing switch
enclosed in tank with shielded solid insulation

Built-in current sensors
for optimised protection and control, available in versions with shielded solid insulation where required

Front aligned cable connections
with shielded solid insulation, designed for easy clamping

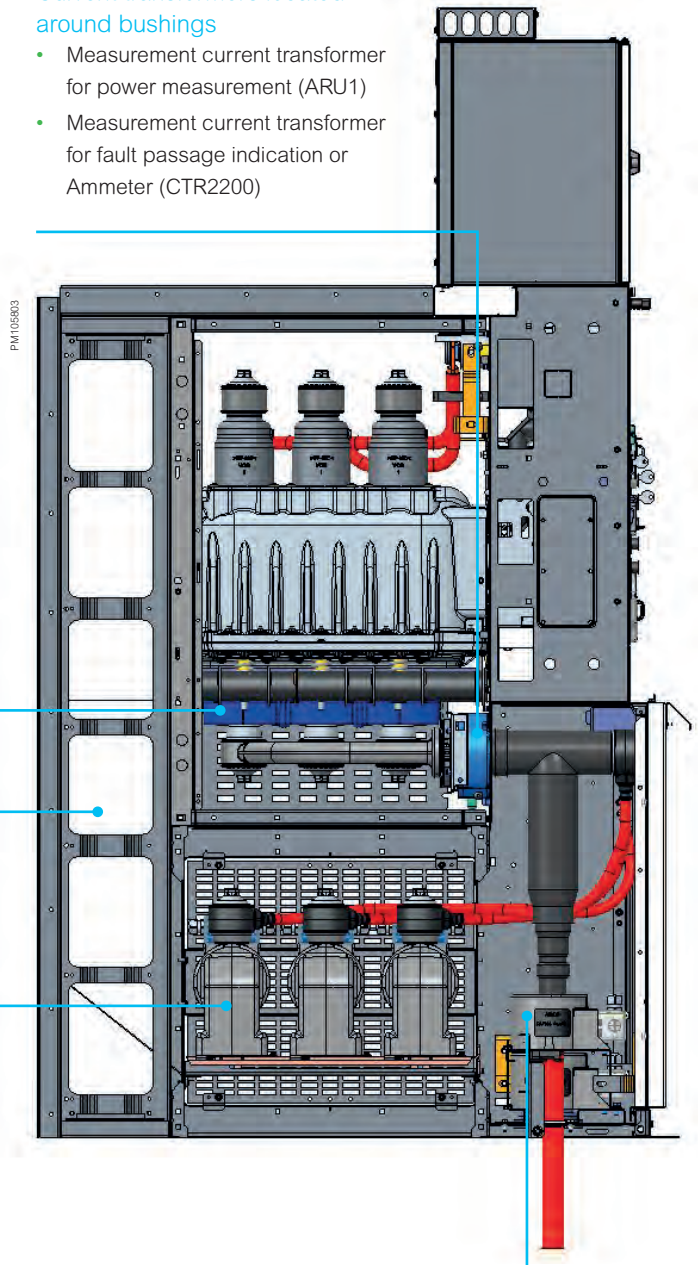
Architecture and components

Current and voltage transformers integrated in main functions.

Front bottom connection

Current transformers located around bushings

- Measurement current transformer for power measurement (ARU1)
- Measurement current transformer for fault passage indication or Ammeter (CTR2200)



Protection current transformer or sensors located under the core unit

- Dedicated current transformer (CuA, CuB) for VIP integrated self-powered protection
- Low power current transformer (TLPU1) for Sepam
- 1 A ring-type current transformer (ARU2) for Sepam, MiCOM, Easergy range, or any conventional relay

Internal arc gas exhaust duct

Upwards exhaust or downwards exhaust

Voltage transformers located behind the cables

Phase-to-earth voltage transformers (VRU1)

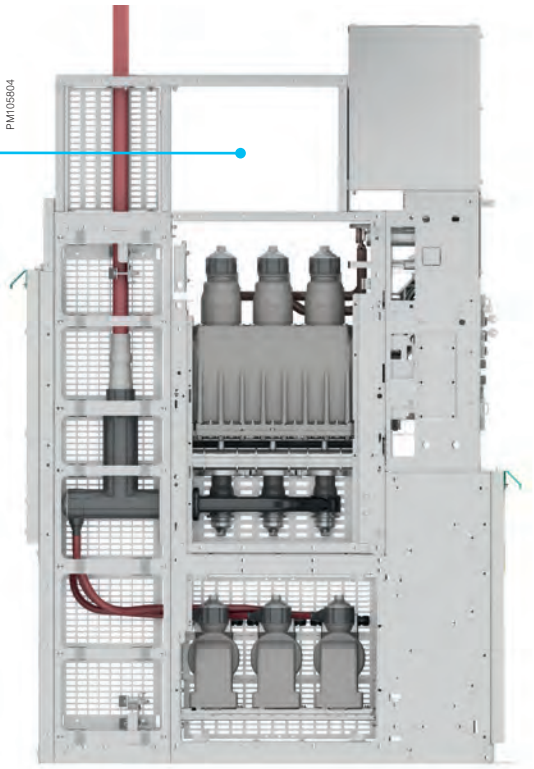
Current transformers located around cables

- Ring-type current transformer for power metering or protection (ARC6)
- Earth fault toroidal current transformer for high sensitivity earth fault protection (CSH120/200)
- Measurement current transformer for fault passage indication or Ammeter (MF1)

Architecture and components

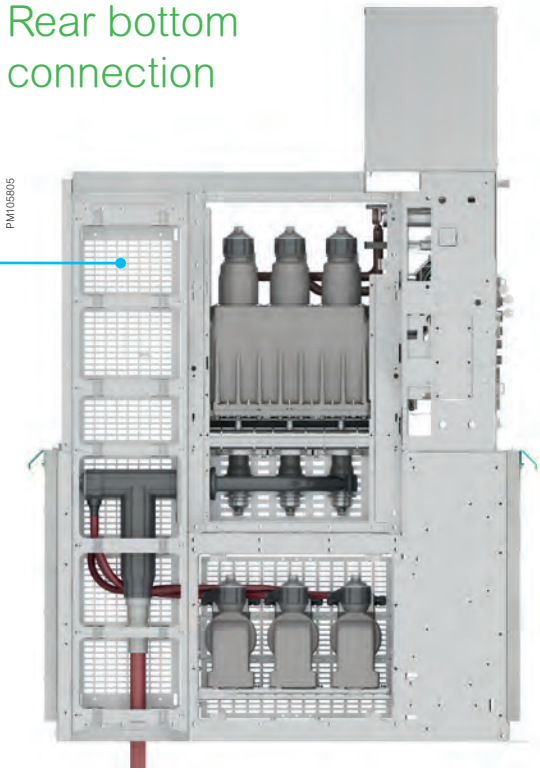
Flexible cable connection easy substation arrangement to meet all the applications.

Rear top connection



Evacuation duct conduit
Internal arc gas upwards exhaust

Rear bottom connection



Internal arc gas exhaust duct
Upwards exhaust or downwards exhaust

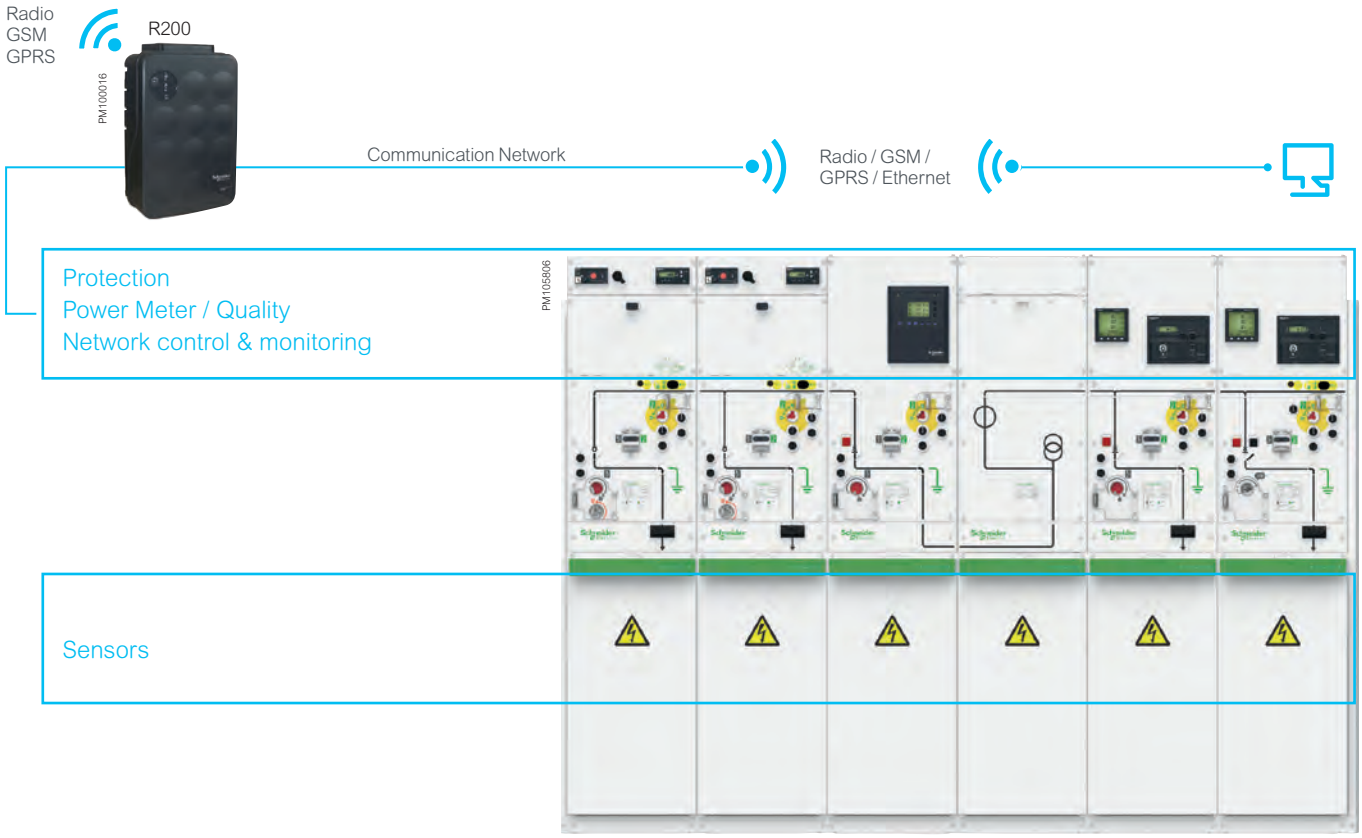
Distributed intelligence

Premset is Web-enabled to let you access information on your electrical installation via a PC with a standard Web browser.

With Premset, intelligence can be added to functional units by integrating protection, control and monitoring IEDs (Intelligent Electrical Devices).

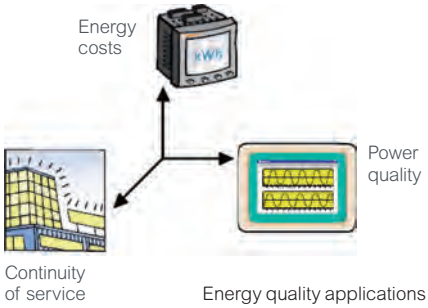
The IEDs have dedicated locations and cabling and are daisy-chained throughout the various functional units using RJ45 connectors and Modbus protocol.

A gateway can be used to connect the IEDs to supervision systems via Ethernet, TCP-IP and/or radio-frequency communication.



Distributed intelligence

DM100033



Premset switchboards are designed to integrate distributed intelligence for feeder automation, protection and energy quality applications.

LOCAL CONTROL

- Motor control: SC110
- Control panel: SC-MI20

SC-MI20

REMOTE CONTROL

- Embedded intelligent devices
- Switch controller for remote communication network : SC110
- Remote communication network (GSM /GPRS / Ethernet/Radio): R200
- Automatic Transfer System: ATS100
- Backup power supply: PS100

PS100

R200

SC110A

ATS100

PROTECTION RELAYS

- Self-powered: VIP 40 and VIP 45, VIP 400 and VIP 410
- Auxiliary powered: Sepam, MiCOM and Easergy ranges

VIP 410

Sepam

MiCOM

Easergy P5

MEASUREMENT

- Ammeter: AMP21D
- Power Meter: PM5000
- Power/Quality Meter: PM8000

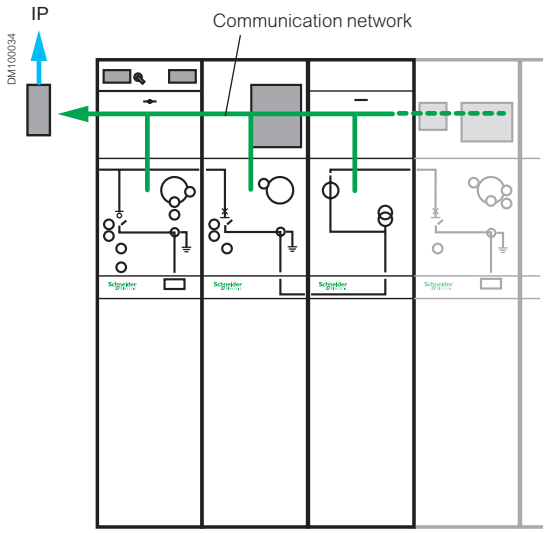
PM8000

FAULT DETECTION

- Fault Passage Indicators: Flair 21D/22D, Flair 23DM
- Voltage indicators: VPIS, VDS
- Voltage relay: VD23

Flair 23DM

Distributed intelligence

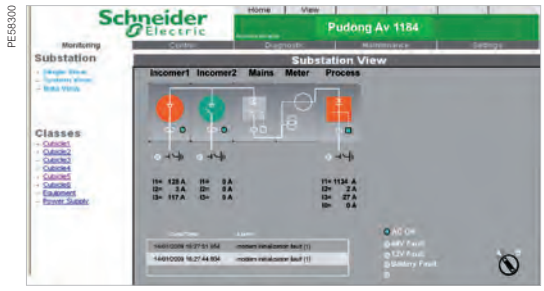


Distributed architecture for easy installation, operation and scalability

The IEDs (Intelligent Electrical Devices) used in the Premset system have been designed to optimise substation performance and compactness.

They can be used to build a robust distributed architecture suited to harsh environments.

- Modular architecture for scalable solutions from local control up to complex feeder automation, optimising cost and performance by letting you choose only what you need
- Each IED is fully integrated in a functional unit with a dedicated location and cabling
- Pre-engineered, pre-tested and cost effective, the system includes the necessary sensors, switchgear interfaces, power supplies, communication solutions and HMIs
- Easy integration based on field bus communication between IEDs with a plug and play system that scans and configures the system
- The field bus uses standard RJ45 Modbus protocol open to third-part devices
- Each IED has a compatible XML description file based on CIM (Common Information Model) / IEC 61850 standard. This allows easy configuration to communicate with any RTU (Remote Teminal Unit) or SCADA (Supervisory Control And Data Acquisition) system.



Ready for smart grids

In the 80s and 90s, RTUs (Remote Terminal Units) were mainly used in feeder automation applications to improve energy availability and reduce the number and duration of outages. Today RTUs have evolved to integrate functions such as automatic meter reading and load management.

Ready for the future, the Premset system R200 RTU has downloadable firmware to keep pace with these and other evolving possibilities of smart grids.

Web technology

Premset integrates Web technologies so that access to information on your electrical installation is as easy as opening a Web page.

All you need is a standard Web browser and a PC connected via:

- Your local area network
- A pluggable connection to the Premset switchboard
- A mobile network access (3G, 4G, GPRS).

Distributed intelligence

PM100576

VIP 400/410

VIP self-powered protection relay

For higher MV network availability

VIP relays are self-powered while Sepam relays require an auxiliary power supply.

Self-powered protection relays increase the availability of the MV network and are suited to most applications.

- Insensitive to voltage drop due to faults
- Not dependent on UPS systems
- Less dependent on the external environment (EMC, LV overvoltages) because they require no external connections.

In addition, the VIP 410 offers enhanced sensitivity to low earth-fault currents and provides additional diagnostics with time-stamped logs thanks to a dual power supply and a communication port.

PM100573

VIP 40/45

Circuit breaker

For improved MV/LV transformer protection

With the VIP 40/45, Premset circuit breakers provide MV/LV transformers superior protection compared to traditional MV switch-fuse solutions - at an equivalent lifetime cost.

The main advantages are:

- Better discrimination with other MV and LV protection devices
- Improved protection performance for inrush current, overloads, low magnitude phase-faults and earth-faults
- Greater harsh climate withstand.
- Fast clearing time, to limit the consequences of internal arcing in the transformer.

EMS58355

Flair FPI

Auto-adapting Fault Passage Indicator

With remote communication for higher power network availability

The Flair range offers cost-effective auto-adapting fault passage indicators (FPI) that can be fully integrated in the cubicle.

In addition to the Flair 21D /22D self-powered FPIs, the range includes the Flair 23DM, a powerful IED with a communication port.

- The Flair 23DM is linked to the voltage presence indication system (VPIS) to confirm faults by undervoltage instead of current measurement, thereby avoiding transient faults
- The Flair 23DM provides an integrated output voltage relay for automatic transfer switch (ATS100) or other applications
- Phase fault and standard earth fault detection are maintained even if the power supply is lost. The auxiliary power supply is only needed for communication and the voltage presence relay
- The communication port provides the current values, records diagnostic information (voltage drops, transient fault indications) and makes it possible to modify settings remotely.

Distributed intelligence

PE88030

Sepam range

PM105840

MiCOM range

PM104085

Easergy P5

Full range of protection relays

Schneider Electric is a trusted, global provider of protection relays and control solutions as well as a leader in electical distribution innovation.

Our ranges of protection relays represents the outcome of more than 100 years of manufacturing and power system experience.

Sepam range

Sepam series digital protection relays take full advantage of Schneider Electric's experience in electrical network protection to meet your needs needs with effective protection of life and property.

MiCOM range

MiCOM protection provides the user with a choice of cost-optimized solutions for specific protection requirements within the distribution network. The MiCOM relay series offers comprehensive protective function solutions for all power supply systems, as well as for various functional and hardware project.

Easergy P5: a fusion of new ideas and proven expertise

Easergy P5 combines fresh thinking on modern electrical challenges with a strong heritage from two popular protection relay ranges: Sepam and MiCOM.

Easergy P5's modern, digital features provide a unique combination of services designed to boost operational efficiency and safety for the user.

Product selection, configuration, and ordering have been made easy with the latest online tools. The asset database provides a management platform, which stores and organizes all information securely and is quickly accessible. Easergy SmartApp provides simple access to key functions and settings for nonexpert users and enables quick access to all information and documentation.

PM105808

Simplify your Easergy P5 daily operation via the Easergy P5 SmartApp!

Easergy P5 provides access to an extended warranty program when users register their product using the QR code and follow a simple process with the mySchneider mobile app.

Distributed intelligence

Backup power supply

PM100592

PS100

Backup power supplies (UPSs or batteries) are now common in industrial and commercial premises. However, they often represent a weak link in the power supply chain and their failure can have serious consequences.

Given the harsh environment and critical nature of substations, the Premset system includes the PS100, a dedicated solution with a high insulation level designed to provide 24 hours of backup power to electronic devices.

Maintenance is easy with:

- Just one battery to replace
- End-of-life alarm possible via Modbus communication

Easergy R200 and ATS100

PE57570p

R200

DM1031001

ATS100

The power and experience of Easergy FRTUs embedded in Cubicles for cost effective remote control and monitoring of MV substations:

- **Easergy R200** is a Remote Terminal Unit (RTU) that integrates all the functions for remote supervision and control of an MV switchboard cubicle.
- **The ATS100** drives automatic transfer from the normal MV source to the backup source in order to keep supplying the MV substation in case of failure of the normal source. ATS100 can drive either Load Break Switch or Circuit Breaker.

Easergy TH110 wireless thermal sensor *

PM105623

TH110

The power connections in the Medium Voltage products are one of the most critical points of the substations. Loose and faulty connections cause an increase of resistance in localized points that will lead to thermal runaway until the complete failure of the connections

Easergy TH110 is part of the new generation of wireless smart sensors ensuring the continuous thermal monitoring of all the critical connections made on field allowing to:

- **Prevent** unscheduled downtimes
- **Increase** operators and equipments safety
- **Optimize** maintenance with predictive information

* Please consult us for availability

Building your solution

Building your solution

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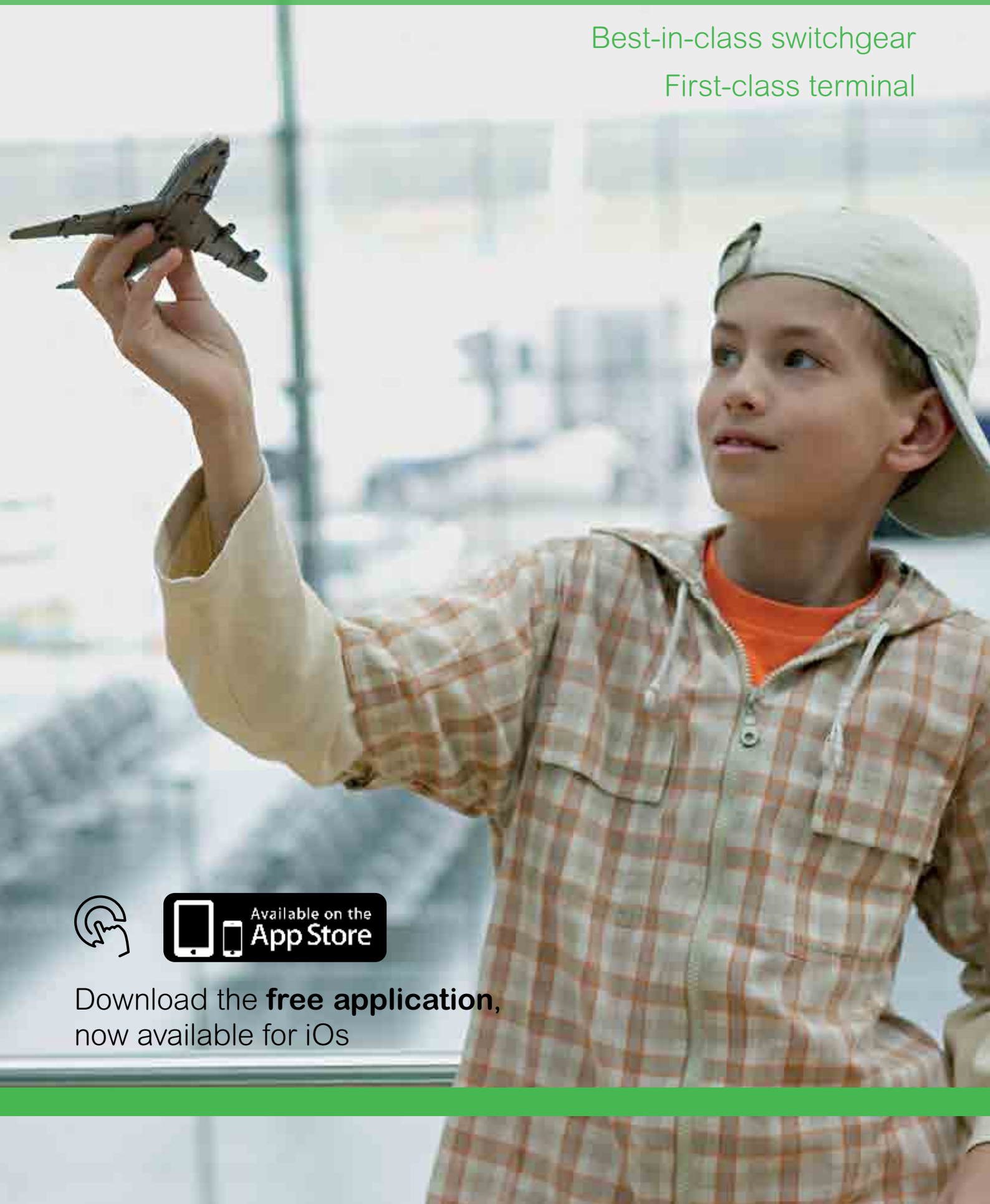
Premset all-in-one

Best-in-class switchgear

First-class terminal



Available on the App Store

Download the **free application**, now available for iOs

Main applications

Why Premset?

Premset switchboards are modular, compact, smart, with optimized safety and insensitivity to harsh environments.

For these reasons, they offer very high reliability and efficiency for a wide range of applications.

PM104064

PE5813

PM104063

PM104065

Typical applications

Premset applications can be found in all Medium Voltage secondary distribution substations.

Buildings and industry

- MV/MV consumer substation direct connection
- MV/LV consumer substation double feeder
- MV/LV consumer substation loop connection
- MV/LV consumer substation radial connection
- MV/LV consumer substation with MV backup
- MV private network
- MV/LV substation.

Distribution networks

- MV/MV switching substation
- MV/LV distribution substation
- MV/LV Ring Main Unit
- MV distributed generation.

Premset advanced communication possibilities open the way to applications such as:

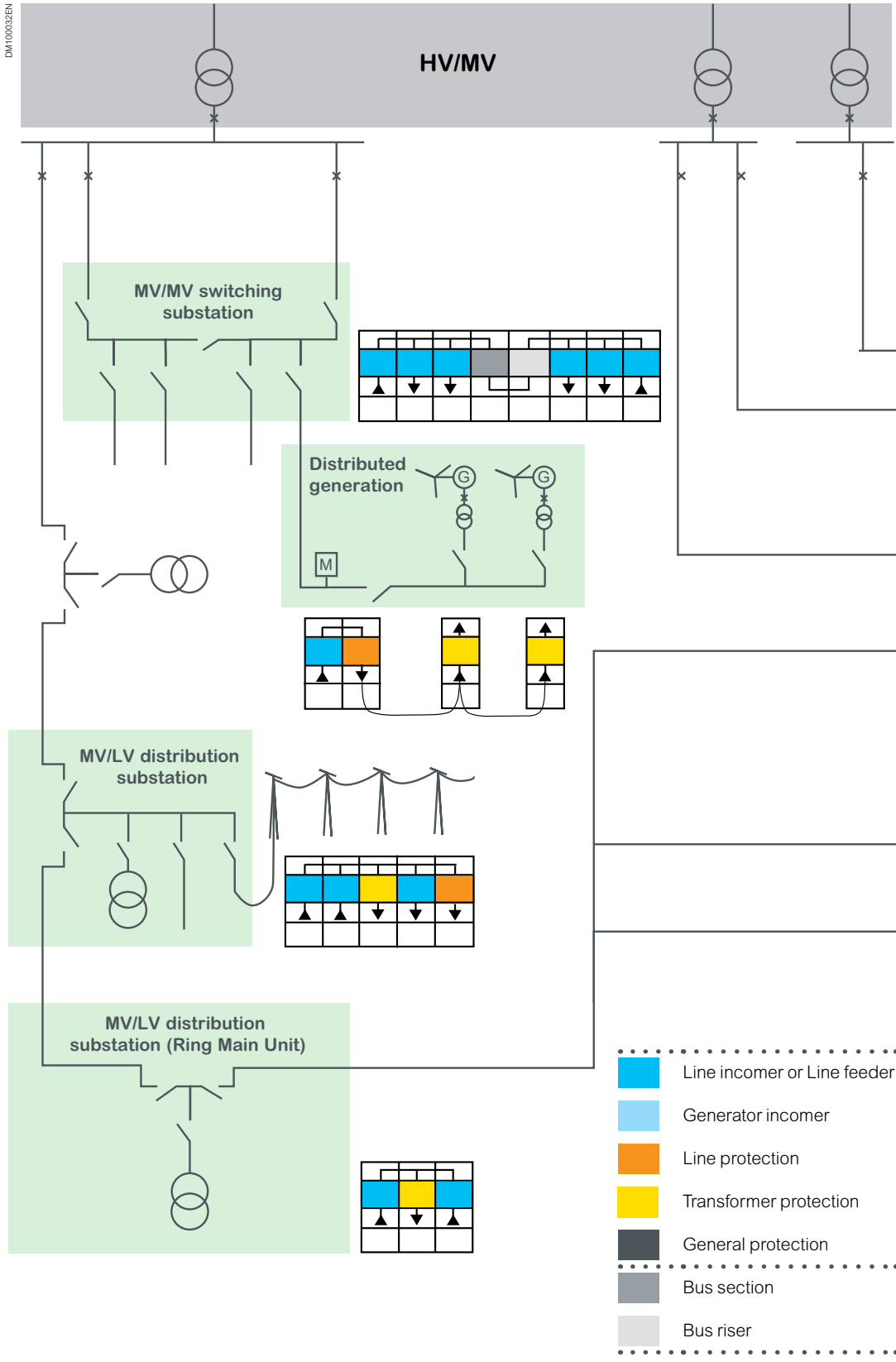
- Local control up to complex feeder automation
- MV Automatic Transfer System (ATS)
- RTU with new Smart Grid functions for load management.

PM105149

Main applications

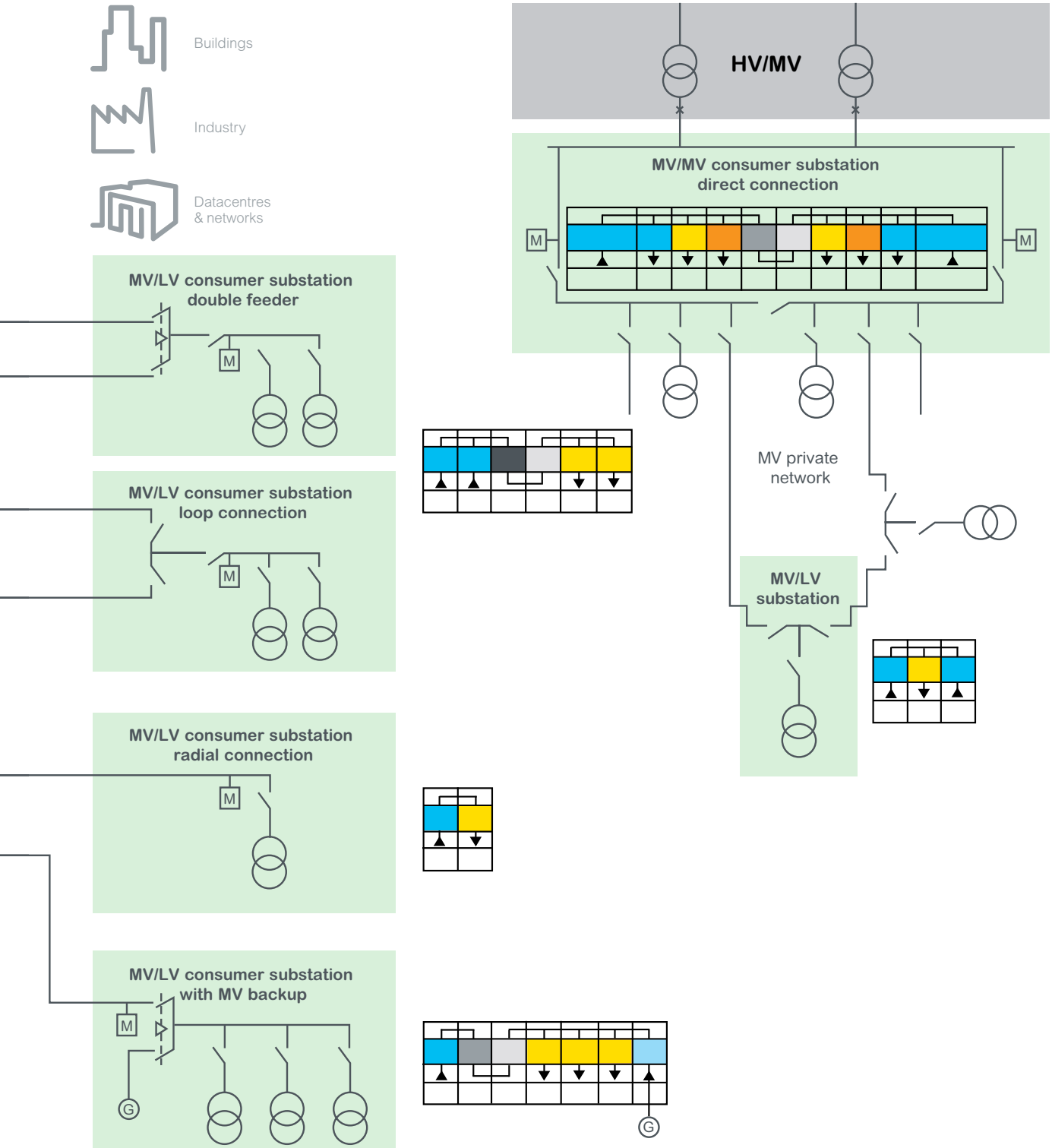
Distribution network selection chart

Energy &
infrastructure

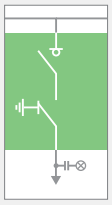
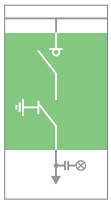
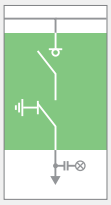
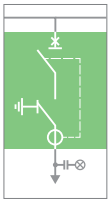
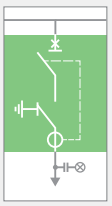


Main applications

Buildings & Industry selection chart



Incomer and feeder functions

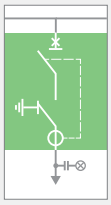
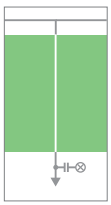
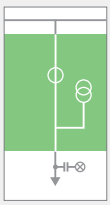
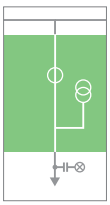
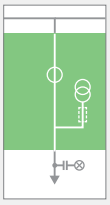
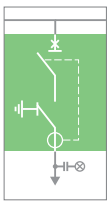
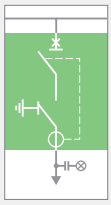
Function			Line incomer/ Line feeder				
Core unit type			**I06T**	**I06H**	**I12H**	**D06N**	**D06H**
Typical application of protection			Line incomer or line feeder			General protection	Line protection Generator protect.
Core unit			Disconnecting switch with lever-operated CIT mechanism and integrated earthing switch	Disconnecting switch with stored-energy OCO mechanism and integrated earthing switch	Disconnecting switch with stored-energy OCO mechanism and integrated earthing switch	Disconnecting circuit breaker with latching CI1 mechanism and integrated earthing switch	Disconnecting circuit breaker with stored-energy OCO mechanism and integrated earthing switch
Dimension: width (mm)			375	375	750	375	375
Single-line diagram							
See details ▶		Page	48	50	52	56	58
Earthing switch		71	●	●	●	●	●
Cable testing device		124	o	o	o	o	o
Live cable interlock		105	o	o	o	o	o
Protection *							
VIP 40/45	Self-powered	93					
VIP 400	Self-powered	95				o	o
VIP 410	Dual powered	95				o	o
Easergy P5	Auxiliary powered	98				o	o
Sepam	Auxiliary powered	98				o	o
MiCOM	Auxiliary powered	98				o	o
FPI (2) - Flair 21/22D/23DM *		100	o	o			
Integrated measurement *							
AMP21D	Ammeter	107	o	o			
PM5000	Power Meter	108	o	o	o	o	o
PM8000	Power/Quality Meter	109	o	o	o	o	o
Control							
Electrical operation		110	o	o	o	o	o
Additional opening coil (MX or MN)		75		o	o	o (1)	o (1)
Auxiliary contacts		76	o	o	o	o	o
Voltage indication *							
VPIS or VDS	Voltage indication	103	●	●	●	●	●
VD23	Voltage relay	104	o	o	o	o	o
Metering current transformers *							
ARU1	Ring CTs	81	o	o	o	o	o
ARC6	Ring CTs	82	o	o	o	o	o
ARC5	Ring CTs	82					
ARM3 / AD12	Block CTs	84					
ARPJ3 / AD13	Block CTs	84					
Metering voltage transformers *							
Phase-to-earth	VRU1	Screened VTs	83	o	o	o	o	o
	VDF11/VDF21	DIN VTs	86					
	VRQ2	Block VTs	87					
Phase-to-phase	VRU2	Auxiliary power	83					
	VDC11/VDC21	DIN VTs	86					
	VRC2	Block VTs	87					
VT protection - Fuses							

* Only one option possible ● Standard offer o Option (1) Optional possible only wih VIP relay (2) FPI: Fault Passage Indicator

Incomer & feeder / Transformer protection functions

Line incomer/ Line feeder

Transformer protection

D12H	G06	M06S	M06A	M12A	D01N	D02N
Line protection Generator protect.	Line incomer or line feeder				Transformer protection	
Disconnecting circuit breaker with stored-energy OCO mechanism and integrated earthing switch	Direct connection to busbars	Solid-insulated earth-screened metering unit	Air-insulated metering unit	Air-insulated metering unit	Disconnecting circuit breaker with latching CI1 mechanism and integrated earthing switch	Disconnecting circuit breaker with latching CI1 mechanism and integrated earthing switch
750	375	375	750	750	375	375
						
43	44	45	46	46	40	40
●					●	●
○					○	○
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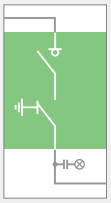
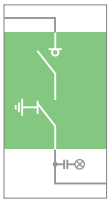
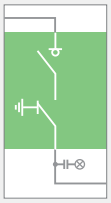
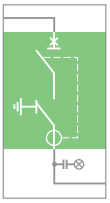
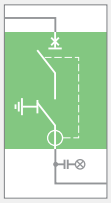
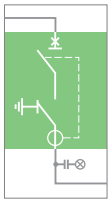
			○	○		

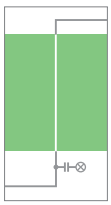
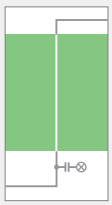
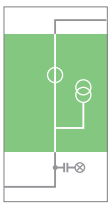
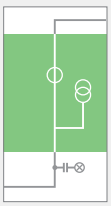
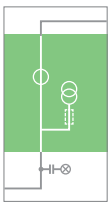
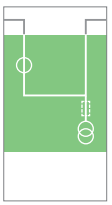
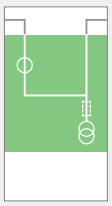
Bus section functions

Function			Bus section					
Core unit type			**I06T**	**I06H**	**I12H**	**D06N**	**D06H**	**D12H**
Typical application of protection			Bus section					
Core unit			Disconnecting switch with lever-operated CIT mechanism and integrated earthing switch	Disconnecting switch with stored-energy OCO mechanism and integrated earthing switch	Disconnecting switch with stored-energy OCO mechanism and integrated earthing switch	Disconnecting circuit breaker with latching CI1 mechanism and integrated earthing switch	Disconnecting CB with stored-energy OCO mechanism and integrated earthing switch	Disconnecting CB with stored-energy OCO mechanism and integrated earthing switch
Dimension: width (mm)			375	375	750	375	375	750
Single-line diagram								
See details ▶		Page	48	50	52	56	58	60
Earthing switch		71	●	●	●	●	●	●
Cable testing device		124						
Live cable interlock		105						
Protection *								
VIP 40/45	Self-powered	93						
VIP 400	Self-powered	95				o	o	
VIP 410	Dual powered	95				o	o	
Easergy P5	Auxiliary powered	98				o	o	o
Sepam	Auxiliary powered	98				o	o	o
MiCOM	Auxiliary powered	98				o	o	o
FPI [2] - Flair 21/22D/23DM *		100				o	o	o
Integrated measurement *								
AMP21D	Ammeter	107						
PM5000	Power Meter	108	o	o	o	o	o	o
PM8000	Power/Quality Meter	109	o	o	o	o	o	o
Control								
Electrical operation		110	o	o	o	o	o	o
Controller and accessories			o	o	o	o	o	o
Additional opening coil (MX or MN)		75		o	o	o [1]	o [1]	
Auxiliary contacts		76	o	o	o	o	o	o
Voltage indication *								
VPIS or VDS	Voltage indication	103	o	o	o	o	o	o
VD23	Voltage relay	104	o	o	o	o	o	o
Metering current transformers *								
ARU1	Ring CTs	81						
ARC6	Ring CTs	82						
ARC5	Ring CTs	82						
ARM3 / AD12	Block CTs	84						
ARPJ3 / AD13	Block CTs	84						
Metering voltage transformers *								
Phase-to-earth VRU1	Screened VTs	83						
Phase-to-earth VDF11/VDF21	DIN VTs	86						
Phase-to-earth VRQ2	Block VTs	87						
Phase-to-phase VRU2	Auxiliary power	83						
Phase-to-phase VDC11/VDC21	DIN VTs	86						
Phase-to-phase VRC2	Block VTs	87						
VT protection - Fuses								

* Only one option possible ● Standard offer o Option [1] Optional possible only wih VIP relay [2] FPI: Fault Passage Indicator

Bus riser
+ Metering & measurement functions

Bus riser | Metering & measurement

G12	G06	M06S	M12S	M06A	M12A	M06A	M12A
Bus riser		Metering & measurement					
SSIS bus riser	SSIS bus riser	SSIS metering unit	SSIS metering unit	Air-insulated metering unit	Air-insulated metering unit	Air-insulated metering unit	Air-insulated metering unit
375	375	375	375	750	750	750	750
							
62	66	63	63	64	64	64	64
		o	o	o	o	o	o
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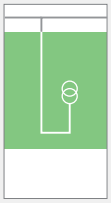
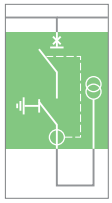
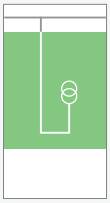
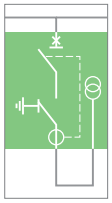
o	o	o	o	o	o	o	o
		o	o				
				o		o	
					o		o
		o	o				
				o	o	o	o
				o	o	o	o
				o	o	o	o
				o	o	o	o
				o	o	o	o

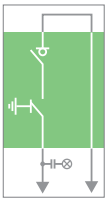
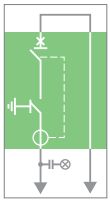
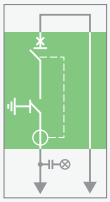
Metering & measurement functions + Special functions

Function			Metering & measurement		Special functions	
Core unit type			**VTM**	**VTM-D**	**VTP**	**VTP-D**
Typical application of protection			Metering & measurement		Special functions	
Core unit			Metering voltage transformer: three SSIS(2) phase-to-earth VTs	Metering voltage transformer: three SSIS(2)phase-to-earth VTs, with D01N circuit-breaker	Auxiliary power supply, voltage transformer: one SSIS phase-to-phase VT	Auxiliary power supply, voltage transformer: one SSIS phase-to-phase VT, with D01N circuit breaker protection
Dimension: width (mm)			375	375	375	375
Single-line diagram						
See details ▶		Page	65	66	68	69
Earthing switch		71		●		●
Cable testing device		124				
Live cable interlock		105				
Protection *						
VIP 40/45	Self-powered	93		●		●
VIP 400	Self-powered	95				
VIP 410	Dual powered	95				
Easergy P5	Auxiliary powered	98				
Sepam	Auxiliary powered	98				
MiCOM	Auxiliary powered	98				
FPI (3) - Flair 21/22D/23DM *		100				
Integrated measurement *						
AMP21D	Ammeter	107				
PM5000	Power Meter	108				
PM8000	Power/Quality Meter	109				
Control						
Electrical operation		110		o		o
Controller and accessories				o		
Additional opening coil (MX or MN)		75		o		
Auxiliary contacts		76		o		o
Voltage indication *						
VPIS or VDS	Voltage indication	103				
VD23	Voltage relay	104				
Metering current transformers *						
ARU1	Ring CTs	81				
ARC6	Ring CTs	82				
ARC5	Ring CTs	82				
ARM3 / AD12	Block CTs	84				
ARPJ3 / AD13	Block CTs	84				
Metering voltage transformers *						
Phase-to-earth VRU1	Screened VTs	83	●	●		
Phase-to-earth VDF11/VDF21	DIN VTs	86				
Phase-to-earth VRQ2	Block VTs	87				
Phase-to-phase VRU2	Auxiliary power	83			●	●
Phase-to-phase VDC11/VDC21	DIN VTs	86				
Phase-to-phase VRC2	Block VTs	87				
VT protection - Fuses						

* Only one option possible ● Standard offer o Option (1) Optional possible only wih VIP relay (2) Shielded Solid Insulation System (3) FPI: Fault Passage Indicator

Special functions

Special functions

ES-B	I06T cable in/out	I06H cable in/out	D01/02/06N cable in/out	D06H cable in/out
Special functions				
Dedicated to busbar earthing	Disconnecting switch with lever-operated CIT mechanism and integrated earthing switch	Disconnecting switch with stored-energy OCO mechanism and integrated earthing switch	Disconnecting circuit breaker with latching CI1 mechanism and integrated earthing switch	Disconnecting circuit breaker with stored-energy OCO mechanism and integrated earthing switch
375	375	375	375	375
				
71	48	50	54	58
	●	●	●	●
	o	o	o	o
	o	o	o	o
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	o	o	o	o

General characteristics

General characteristics

Characteristics	40
Standards	41
Internal arc fault withstand	42
Operating conditions	44

Characteristics

Main electrical characteristics

Voltage							
Rated voltage	U_r		kV	7.2	12		17.5
Rated frequence	**fr**		Hz	50/60			
Insulation level							
Rated short-duration power-frequence withstand voltage	U_d						
- phase to phase, phase to earth, open contact gap				20	28	42	38
- across the isolating distance				23	32	48	45
Rated lightning impulse withstand voltage	U_p						
- phase to phase, phase to earth, open contact gap				60	75	75 (1)	95
- across the isolating distance				70	85	85 (1)	110
Current							
Rated normal current for the busbar	I_r		up to A	1250			
Rated short-time withstand current	I_k	for switchgear with tk=1 s	up to kA	25			
		for switchgear with tk=3 s	up to kA	25			
		for switchgear with tk=4 s	up to kA	20			
Rated short-circuit breaking current Isc							
Circuit breaker: D01N, D02N,D06N, D06H, D12H			up to kA	25			
Internal arc withstand							
A-FLR			kA/1s	21			
A-FLR			kA/1s	25 (2)			

(1) Higher values of the rated lightning impulse withstand voltage available with -95 kV for phase-to-phase, phase-to-earth, open contact gap as well as -110 kV across the isolating distance

(2) except M06A, M12A

(3) LSC1 for bus riser and metering functions

Dimensions

Uniform dimensions for the entire system

- Width: 375 mm for all 630 A switch, circuit breaker and metering units with shielded solid insulation
- 1250 A switch, circuit breaker and air insulation metering units: 750 mm wide, but still fully compatible with the rest of the system
- Depth: 910 mm (1135mm for cable front connection with arc control design, 1208 mm for cable rear connection with arc control design)
- Cable connections: 700 mm high front-aligned connections (500 mm with low-height bottom compartment)
- Height: 1350 to 2195 mm, depending on LV cabinet (can be reduced to a minimum of 1350 mm with low-height bottom compartment

Standards

IEC standards

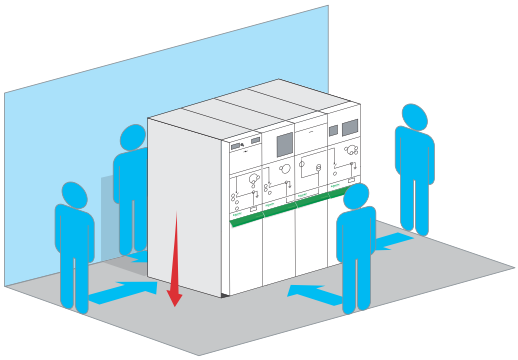
Premset units meet all the following recommendations, and standards:

- IEC 62271-1:
  High voltage switchgear and controlgear - Part 1: Common specifications
- IEC 62271-200:
  Part 200: A.C. metal-enclosed switchgear and controlgear for rated voltage above 1 kV and up to and including 52 kV
- IEC 62271-103:
  Part 103: Switches for rated voltages above 1 kV and less than 52 kV
- IEC 62271-100:
  Part 100: High-voltage alternating current circuit breakers
- IEC 62271-102:
  Part 102: High-voltage alternating current disconnectors and earthing switches
- IEC 62271-206:
  Part 206: High-voltage prefabricated switchgear and controlgear assemblies - Voltage presence indicating systems
- IEC 60529:
  Degrees of protection provided by enclosures (IP Code)
- IEC 60044-8:
  Instrument transformers - Part 8: Low Power Current Transducers
- IEC 61869-2:
  Instrument transformers – Part 2: Current transformers
- IEC 61869-3:
  Instrument transformers – Part 3: Voltage transformers
- IEC 60255:
  Measuring relays and protection equipment
- IEC 62271-210:
  Part 210: Seismic qualification for metal enclosed switchgear up to 52 kV

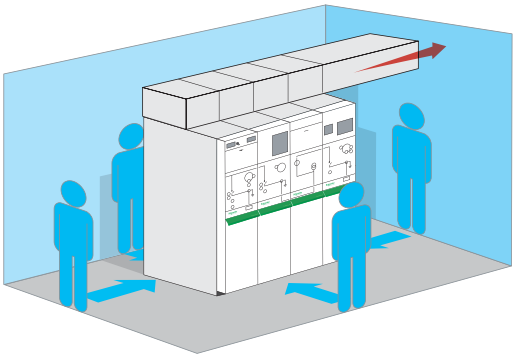
Internal arc fault withstand

Standard IEC 62271-200 defines internal arc classifications to characterise the performance level for protection of persons against effects of internal arcing fault. It also defines the testing procedure and acceptance criteria.

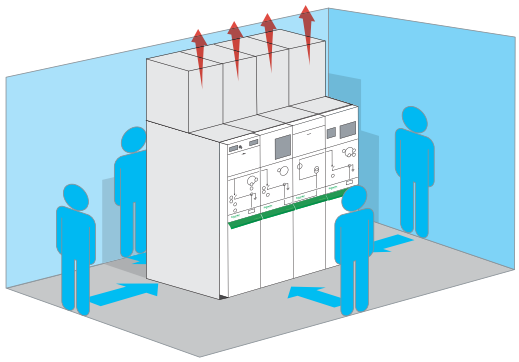
The aim of this classification is to show that an operator situated around the switchboard would be protected against the effects of an internal fault.



Downwards exhaust



Upwards exhaust,gas releases outside room



Top exhaust, gas releases inside room [3]

Standard version

Qualified for neutral networks with arc extinction coil earthing system

The effect of low phase-to-earth internal faults has been type-tested for the standard version of Premset.

Premset is IAC qualified for earth fault current of 100 A (IAe). It has successfully passed all the tests in every compartment, in accordance with the latest edition of the IEC 62271-200 standard (edition 2). This demonstrates the ability of standard Premset to withstand internal arcing for tuned (Petersen coil) neutral networks without any specific precautions.

Arc-control version, 21 kA 1s or 25 kA 1s [1] class A-FLR [2]

Four-sided internal arc protection

The effect of high internal faults, up to 25 kA 1s, has been type-tested on a special version of Premset designed for arc control with two options for gas exhausting (upwards exhaust or downwards exhaust).

Premset has successfully passed all the type tests of standard IEC 62271-200 (5 acceptance criteria).

The thermal and mechanical forces that an internal arc can produce are absorbed by the enclosure.

Operators safety is improved, whatever the installation layout:

- Access to all four sides when not installed against a wall
- Front or lateral access when installed against a rear wall

[1] Except M06A, M12A

[2] IAC (internal arc classification): classification code refers to different types of accessibility according to standard IEC 62271-200.
Class A-FLR:
- A: access restricted to authorised personnel only
- F: access to the front side
- L: access to the lateral side
- R: access to the rear side

[3] Please consult us for availability

Internal arc fault withstand

Drastically reduced risk of internal arc fault

Premset shielded solid insulation technology provides phase-per-phase insulation and screening, and thereby make phase-to-phase fault impossible by design : this have been proven by tests. For all networks earthed through an impedance, this is of great advantage, as the phase-to-earth fault is limited to a low value, drastically mitigating the effects of the internal arc.

Premset arc controlled version has been successfully type-tested in accordance with the edition 2 of the IEC 62271-200 standard, 25kA-1s, A-FLR. Thus all types of earthing systems are covered, including solidly grounded and isolated ones.

Three gas exhausting options

- **Downwards exhaust**
  21 kA 1s or 25 kA 1s
  (details information see "Civil engineering, & gas exhaust": p 140)
- **Upwards exhaust, gas releases outside room**
  21 kA 1s or 25 kA 1s A-FLR
  (for installation details, see p 139)
- **Upwards exhaust, gas releases inside** room [1]
  up to 25 kA 1s

Installation against a wall

For detailed civil engineering information, please refer to page 138.

Note: When 500 mm height of cable connection is selected, 16 kA/1 s IAC is max reached.

[1] Please consult us for availability

Operating conditions

PM100567b

Indoor Premset

Partition class and loss of service continuity category

- Partition class: PM (1)
- Loss of service continuity category: LSC2 (2) (3)

Protection index

- All external faces of the switchgear: **IP3X** / **IP41** (available as option) / **IP32 - IP42** (please consult us for availability)
- Between compartments: **IP2X**
- Main circuit and all HV parts: IP67 (except air insulated metering cubicle: **M06A**, **M12A**).

Mechanical impact strength

IK07 for standard version.

Seismic

Seismic withstand type test in accordance with standard IEC62271-210

Flooding

- Service continuity reached for **96 hours** of flooding for all MV functions (except air insulated metering M06A, M12A)
- After flooding, accessories, auxiliaries and relays may require maintenance or replacement

Environmental characteristics

Altitude	• Up to 3000 m, no particular precautions except screened cable connections • Over 3000m, please consult us
Temperature (indoor version)	• Storage : from –40°C° to +80 C° • Operation: from –25°C to +40°C (normal conditions) IEC 60721 - level 3K6 • Operation: from +40°C to + 55°C (consult us for special precautions)
Condensation / humidity	IEC 60721: level 3K6 & 3Z7
Chemical / pollution	IEC 60721: level 3C2
Dust	IEC 60721: level 3S2
Fire and extinguishability	Test at 850°C according to IEC 60695-2-10 /-11 /-12

UL version Premset

Consult us for UL Premset version

Outdoor version

Consult us for specific outdoor IP54 version

(1) PM class according to IEC 62271-200: metallic partitioning between compartments.
(2) LSC2 (loss of service continuity) according to IEC 62271-200: this category offers the possibility of keeping other compartments energised when opening a main compartment.
(3) or LSC1 for metering and bus riser functions

Notes

Core units

Core units

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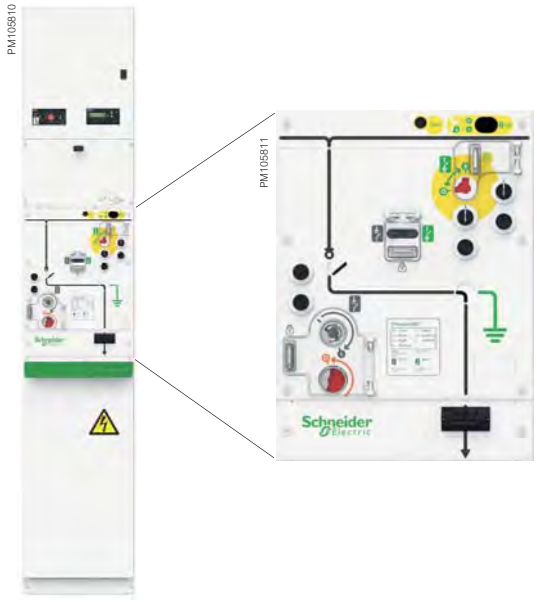
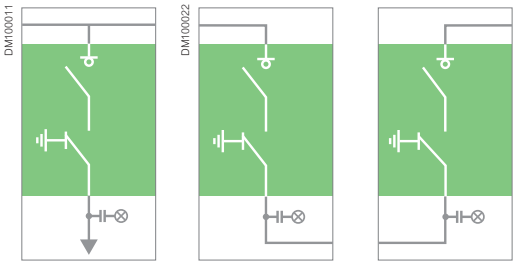
Disconnecting switch

I06T - General purpose

The I06T uses vacuum and SSIS technology:

- Compact solution, only 375 mm width
- Rated current is 630 A





Basic equipment

'3 in 1'' core unit	• Vacuum disconnecting load-break switch providing both load breaking and disconnection function • Earthing switch use air technology in sealed-for-life tank at atmospheric pressure
Mechanism	• Operating load switch with anti-reflex lever-operated mechanism (CIT type), independent of operator action • Operating earthing switch with anti-reflex lever-operation mechanism, indepent of operator action • Full failsafe interlocking between the main switch and earthing switch
Three-phase busbars for top connection (630 A)	
Bottom connection	• C-type bushing for dry type cable connection or • Three phase bottom busbar for bus coupling
Voltage presence indicator	
Cable box	With 700 mm length cable connection & 290 mm deep door
Standard built-in padlocking facility	For main switch, earthing switch and operation selector (shackle diameter <9 mm)

Accessories

Operation accessory options

- Visibility of earthing contacts
- Electrical operation
- Auxiliary contacts on switch and earthing switch
- Voltage present/absent contact
- Local/remote control switch
- Auxiliary power shut down switch
- Operation counter

Connection options

- 1250 A three-phase upper busbars when cable connection
- Rear cable entry (top or bottom) connection
- Deeper cable box door (500 mm)
- Compact cable box with 500 mm length cable connection
- Enlarged low-voltage cabinet
- Raising plinth (260 mm or 520 mm)

Locking options

- Key-type interlocking
  - main switch in open-disconnected position (1 or 2 keylocks)
  - earthing switch in cable earthed position (1 or 2 keylocks)
  - earthing switch in 'line' position (1 or 2 keylocks)
- Interlocking between cable box door and main switch & earthing switch for front cable connection
- Live cable interlocking

Disconnecting switch

I06T - General purpose

Technical characteristics

Rated voltage	**U_r**		**(kV)**	**7.2**		**12**		**17,5**	
Rated current	I_r		A	630					
Rated short-time withstand current and duration	I_k	for switchgear with tk=1 s	up to kA	21	25	21	25	21	25
		for switchgear with tk=3 s		21	25	21	25	21	25
		for switchgear with tk=4 s		20	-	20	-	20	-
Rated making capacity of main switch and earhing switches	I_{ma}	when fr=50 Hz	kA peak	52	62	52	62	52	62
		when fr=60 Hz	kA peak	54	65	54	65	54	65
No-load mechanical endurance of main switch	M1 class (IEC 62271-103)	Number of operation cycles		1000					
Electrical endurance of main switch	E3 class (IEC 62271-103)	Number of operation cycles		100					
Making capacity endurance of main switch	E3 class (IEC 62271-103)	Number of operation cycles		5					
No-load mechanical endurance of earthing switch	M0 class (IEC 62271-102)	Number of operation cycles		1000					
Making capacity endurance of earthing switch	E2 class (IEC 62271-102)	Number of operation cycles		5					

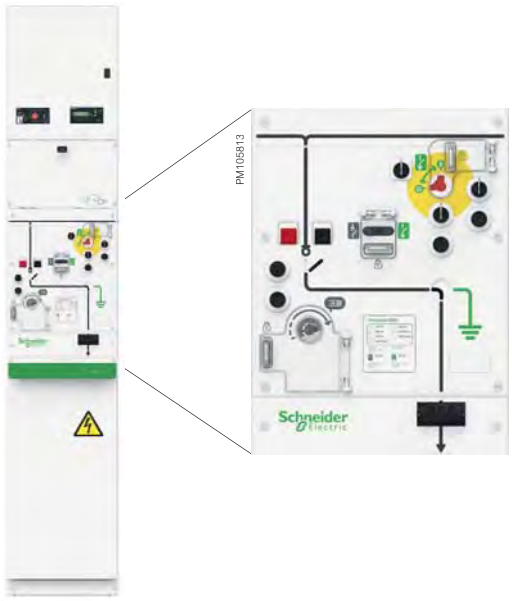
Disconnecting switch

I06H - Heavy-duty

The I06H uses vacuum and SSIS technology:

- Compact solution, only 375 mm width
- Rated current is 630 A

PM105812



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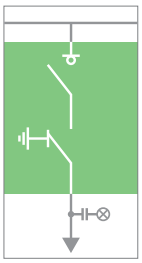

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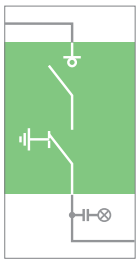

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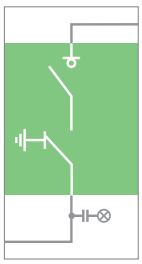


Basic equipment

'3 in 1'' core unit	• Vacuum disconnecting circuit breaker providing both breaking and disconnection function • Three phase bottom busbar for outgoing
Mechanism	• Operating load switch with stored energy type operating mechanism (OCO type) with pushbutton opening and closing and spring charging using a lever • Heavy-duty operating cycle (O-0.3 s-CO-15 s-CO) • Anti-reflex lever-operated mechanism for earthing switch, independent of operator action • Full failsafe interlocking between the main switch and earthing switch
Three-phase busbars for top connection (630 A)	
Bottom connection	• C-type bushing for dry type cable connection or • three phase bottom busbar for bus coupling
Voltage presence indicator	
Cable box	With 700 mm length cable connection & 290 mm deep door
Standard built-in padlocking facility	For main switch, earthing switch and operation selector (shackle diameter <9 mm)

Accessories

Operation accessory options

- Visibility of earthing contacts
- Electrical operation
- Auxiliary contacts on switch and earthing switch
- Voltage present/absent contact
- Local/remote control switch
- Auxiliary power shut down switch
- Operation counter
- Pushbutton protection cover

Connection options

- 1250 A three-phase upper busbars when cable connection
- Rear cable entry (top or bottom) connection
- Deeper cable box door (500 mm)
- Compact cable box with 500 mm length cable connection
- Enlarged low-voltage control cabinet
- Raising plinth (260 mm or 520 mm)

Locking options

- Key-type interlocking
  - main switch in open-disconnected position (1 or 2 keylocks)
  - earthing switch in cable earthed position (1 or 2 keylocks)
  - earthing switch in 'line' position (1 or 2 keylocks)
- Interlocking between cable box door and main switch & earthing switch for front cable connection
- Live cable interlocking

Disconnecting switch

I06H - Heavy-duty

Technical characteristics

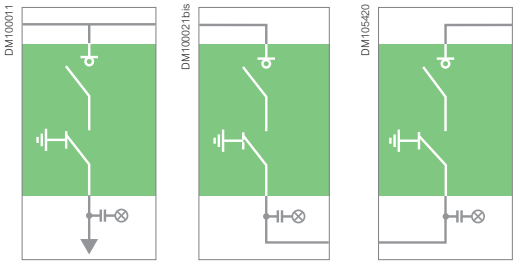
Rated voltage	**Ur**		**(kV)**	**7.2**		**12**		**17,5**	
Rated current	Ir		A	630					
Rated short-time withstand current and duration	Ik	for switchgear with tk=1 s	up to kA	21	25	21	25	21	25
		for switchgear with tk=3 s		21	25	21	25	21	25
		for switchgear with tk=4 s		20	-	20	-	20	-
Rated making capacity of main switch and earhing switches	Ima	when fr=50 Hz	kA peak	52	62	52	62	52	62
		when fr=60 Hz	kA peak	54	65	54	65	54	65
No-load mechanical endurance of main switch	M1 class (IEC 62271-103)	Number of operation cycles		5000					
Electrical endurance of main switch	E3 class (IEC 62271-103)	Number of operation cycles		100					
Making capacity endurance of main switch	E3 class (IEC 62271-103)	Number of operation cycles		5					
No-load mechanical endurance of earthing switch	M0 class (IEC 62271-102)	Number of operation cycles		1000					
Making capacity endurance of earthing switch	E2 class (IEC 62271-102)	Number of operation cycles		5					

Disconnecting switch

I12H - Heavy-duty

The I12H uses vacuum and SSIS technology:

- Compact solution, only 750 mm width
- Rated current is 1250 A



Basic equipment

'3 in 1'' core unit	• Vacuum disconnecting load-break switch providing both load breaking breaking and disconnection function • Earthing switch use air technology in sealed-for-life tank at atmospheric pressure
Mechanism	• Operating load switch with stored energy type operating mechanism (OCO type) with pushbutton opening and closing and spring charging using a lever • Heavy-duty operating cycle (O-0.3 s-CO-15 s-CO) • Anti-reflex lever-operated mechanism for earthing switch, independent of operator action • Full failsafe interlocking between the main switch and earthing switch
Three-phase busbars for top connection (1250 A)	
Bottom connection	• C-type bushing for dry type cable connection or • Three phase bottom busbar for bus coupling
Voltage presence indicator	
Cable box	With 700 mm length cable connection & 290 mm deep door
Standard built-in padlocking facility	For main switch, earthing switch and operation selector (shackle diameter <9 mm)

Accessories

Operation accessory options

- Visibility of earthing contacts
- Electrical operation
- Auxiliary contacts on switch and earthing switch
- Voltage present/absent contact
- Local/remote control switch
- Auxiliary power shut down switch
- Operation counter
- Pushbutton protection cover

Connection options

- Rear cable entry (top or bottom) connection
- Deeper cable box door (450 mm 1250A)
- Enlarged low-voltage control cabinet
- Raising plinth (260 mm or 520 mm)

Locking options

- Key-type interlocking
  - main switch in open-disconnected position (1 or 2 keylocks)
  - earthing switch in cable earthed position (1 or 2 keylocks)
  - earthing switch in 'line' position (1 or 2 keylocks)
- Interlocking between cable box door and main switch & earthing switch for front cable connection
- Live cable interlocking

Disconnecting switch

I12H - Heavy-duty

Technical characteristics

Rated voltage	**U_r**		**(kV)**	**7.2**		**12**		**17,5**	
Rated current	I_r		A	1250					
Rated short-time withstand current and duration	I_k	for switchgear with tk=1 s	up to kA	21	25	21	25	21	25
		for switchgear with tk=3 s		21	25	21	25	21	25
		for switchgear with tk=4 s		20	-	20	-	20	-
Rated making capacity of main switch and earhing switches	I_{ma}	when fr=50 Hz	kA peak	52	62	52	62	52	62
		when fr=60 Hz	kA peak	54	65	54	65	54	65
No-load mechanical endurance of main switch	M1 class (IEC 62271-103)	Number of operation cycles		5000					
Electrical endurance of main switch	E3 class (IEC 62271-103)	Number of operation cycles		100					
Making capacity endurance of main switch	E3 class (IEC 62271-103)	Number of operation cycles		5					
No-load mechanical endurance of earthing switch	M0 class (IEC 62271-102)	Number of operation cycles		1000					
Making capacity endurance of earthing switch	E2 class (IEC 62271-102)	Number of operation cycles		5					

Disconnecting circuit breaker

D01N, D02N - MV/LV transformer protection

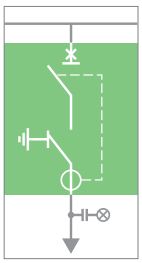
The D01N, D02N use vacuum and SSIS technology:

- The smallest VCB in the world, only 375mm width
- Rated current is 100 A / 200 A, dedicated design for transformer protection
- With self power relay optimise performance, fast clearing time of transformer short-circuit < 60s

PM105816

PM105817

DM100013



Basic equipment

'3 in 1'' core unit	• Vacuum disconnecting circuit breaker providing both breaking and disconnection function • Earthing switch use air technology in sealed-for-life tank at atmospheric pressure
Mechanism	• Operating circuit breaker with CI1 type operating mechanism featuring pushbutton opening and antireflex lever-operated closing • Both operation speed is independent of operator action • Full failsafe interlocking between the circuit breaker and earthing switch
Three-phase busbars for top connection (630 A)	
Bottom connection	C-type bushing for dry type cable connection
Voltage presence indicator	
Cable box	With 700 mm length cable connection & 290 mm deep door
Standard built-in padlocking facility	For main switch, earthing switch and operation selector (shackle diameter <9 mm)

Accessories

Operation accessory options

- Visibility of earthing contacts
- Electrical operation
- Auxiliary contacts on switch and earthing switch
- Voltage present/absent contact
- Local/remote control switch
- Auxiliary power shut down switch
- Operation counter
- Additional opening coil (1)
- Pushbutton protection cover

Connection options

- 1250 A three-phase upper busbars
- Rear cable entry (top or bottom) connection
- Deeper cable box door (500 mm)
- Compact cable box with 500 mm length cable connection
- Enlarged low-voltage control cabinet
- Raising plinth (260 mm or 520 mm)

Locking options

- Key-type interlocking
  - main switch in open-disconnected position (1 or 2 keylocks)
  - earthing switch in cable earthed position (1 or 2 keylocks)
  - earthing switch in 'line' position (1 or 2 keylocks)
- Interlocking between cable box door and main switch & earthing switch for front cable connection
- Live cable interlocking

Protection relay and current transformers options

Protection relay

- VIP 45 / 410
- Sepam
- MiCOM
- Easergy P5

Protection current transformer

- CuA
- TLPU1
- ARU2
- ARC6

Protection voltage transformer

- VRU1
- LPVT

(1) only with VIP relay

Disconnecting circuit breaker

D01N, D02N - MV/LV transformer protection

Technical characteristics

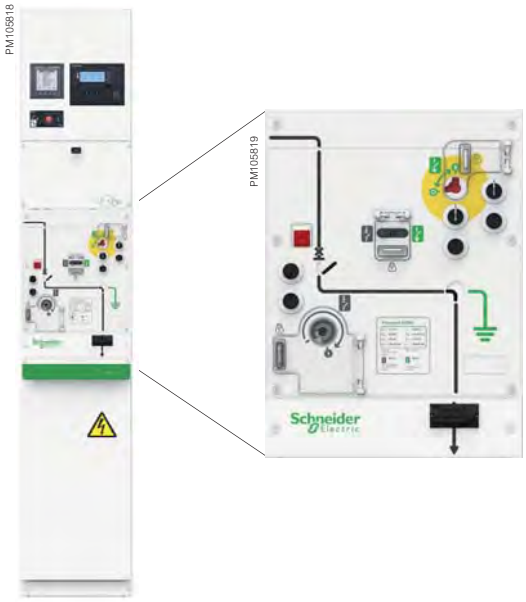
Rated voltage	**U_r**		**(kV)**	**7.2**		**12**		**17,5**	
Rated current	I_r		A	100 (D01N); 200 (D02N)					
Rated short-time withstand current and duration	I_k	for switchgear with tk=1 s	up to kA	21	25	21	25	21	25
		for switchgear with tk=3 s		21	25	21	25	21	25
		for switchgear with tk=4 s		20	-	20	-	20	-
Short-circuit breaking capacity	I_{sc}		up to kA	21	25	21	25	21	25
Rated making capacity of main switch and earhing switches	I_{ma}	when fr=50 Hz	kA peak	52	62	52	62	52	62
		when fr=60 Hz	kA peak	54	65	54	65	54	65
Capacitive breaking capacity	(IEC 62271-100)	Capacitive breaking class		Line charging current 10A, class C2 Cable charging current 25A, class C2					
No-load mechanical endurance of circuit breaker	M1 class (IEC 62271-100)	Number of operation cycles		2000					
Electrical endurance of circuit breaker	E2 class (IEC 62271-100)			25 kA					
Operating sequence (when electrical operation on circuit breaker)				CO-15s-CO					
Maximum number of operation at 100% Isc				5					
Total clearing time at Isc		Fault detection to arc extinguishing	ms	<60					
No-load mechanical endurance of earthing switch	M0 class (IEC 62271-102)	Number of operation cycles		1000					
Making capacity endurance of earthing switch	E2 class (IEC 62271-102)	Number of operation cycles		5					

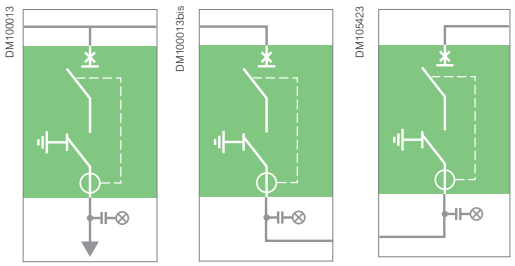
Disconnecting circuit breaker

D06N - General protection

The D06N uses vacuum and SSIS technology:

- The smallest VCB in the world, only 375mm width
- Rated current is 630 A
- With self power relay optimise performance, and it is also open to all of auxilairy power relay





Basic equipment

'3 in 1'' core unit	• Vacuum disconnecting load-break switch providing both load breaking breaking and disconnection function • Earthing switch use air technology in sealed-for-life tank at atmospheric pressure
Mechanism	• CI1 type operating mechanism featuring pushbutton opening and antireflex lever-operated closing • Both operation speed is independent of operator action • Full failsafe interlocking between the circuit breaker and earthing switch
Three-phase busbars for top connection (630 A)	
Bottom connection	• C-type bushing for dry type cable connection or • Three phase bottom busbar for bus coupling
Voltage presence indicator	
Cable box	With 700 mm length cable connection & 290 mm deep door
Standard built-in padlocking facility	For main switch, earthing switch and operation selector (shackle diameter <9 mm)

Accessories

Operation accessory options

- Visibility of earthing contacts
- Electrical operation
- Auxiliary contacts on switch and earthing switch
- Voltage present/absent contact
- Local/remote control switch
- Operation counter
- Additional opening coil (1)
- Pushbutton protection cover

Connection options

- 1250A three-phase upper busbars when cable connection
- Rear cable entry (top or bottom) connection
- Deeper cable box door (500 mm)
- Compact cable box with 500 mm length cable connection
- Enlarged low-voltage control cabinet
- Raising plinth (260 mm or 520 mm)

Locking options

- Key-type interlocking
  - main switch in open-disconnected position (1 or 2 keylocks)
  - earthing switch in cable earthed position (1 or 2 keylocks)
  - earthing switch in 'line' position (1 or 2 keylocks)
- Interlocking between cable box door and main switch & earthing switch for front cable connection
- Live cable interlocking

Protection relay and current transformers options

Protection relay

- VIP 400 / 410
- Sepam
- MiCOM
- Easergy P5

Protection current transformer

- CuB
- TLPU1
- ARU2
- ARC6

Protection voltage transformer

- VRU1
- LPVT

(1) only with VIP relay

Disconnecting circuit breaker

D06N - General protection

Technical characteristics

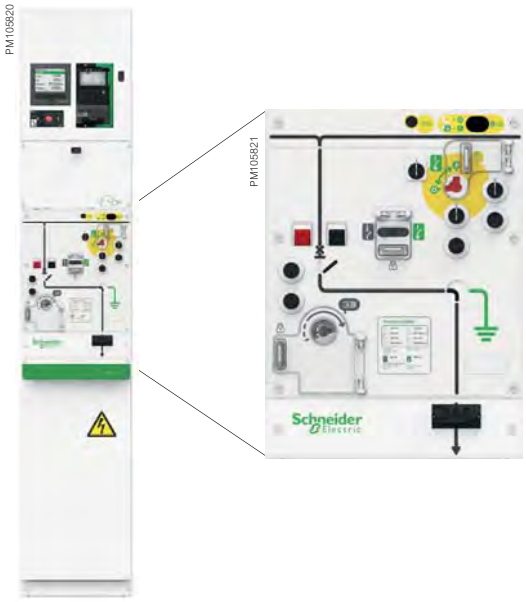
Rated voltage	**U_r**		**(kV)**	**7.2**		**12**		**17,5**	
Rated current	I_r		A	630					
Rated short-time withstand current and duration	I_k	for switchgear with tk=1 s	up to kA	21	25	21	25	21	25
		for switchgear with tk=3 s		21	25	21	25	21	25
		for switchgear with tk=4 s		20	-	20	-	20	-
Short-circuit breaking capacity	I_{sc}		up to kA	21	25	21	25	21	25
Rated making capacity of main switch and earhing switches	I_{ma}	when fr=50 Hz	kA peak	52	62	52	62	52	62
		when fr=60 Hz	kA peak	54	65	54	65	54	65
Capacitive breaking capacity	(IEC 62271-100)	Capacitive breaking class		Line charging current 10A, class C2 Cable charging current 25A, class C2					
No-load mechanical endurance of circuit breaker	M1 class (IEC 62271-100)	Number of operation cycles		2000					
Electrical endurance of circuit breaker	E2 class (IEC 62271-100)			25 kA					
Operating sequence (when electrical operation on circuit breaker)				CO-15s-CO					
Maximum number of operation at 100% Isc				30					
Total clearing time at Isc		Fault detection to arc extinguishing	ms	<100					
No-load mechanical endurance of earthing switch	M0 class (IEC 62271-102)	Number of operation cycles		1000					
Making capacity endurance of earthing switch	E2 class (IEC 62271-102)	Number of operation cycles		5					

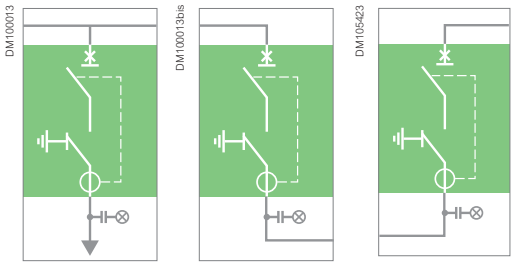
Disconnecting circuit breaker

D06H - Heavy duty line protection

The D06H uses vacuum and SSIS technology:

- The smallest VCB in the world, only 375mm width
- Rated current is 630 A
- With fast reclose function operating mechanism which could be motorised, it use for line protection and generator protection





Basic equipment

'3 in 1'' core unit	• Vacuum disconnecting load-break switch providing both load breaking breaking and disconnection function • Earthing switch use air technology in sealed-for-life tank at atmospheric pressure
Mechanism	• Operating circuit breaker with stored energy type operating mechanism (O-CO-CO) with pushbutton opening and closing and spring charging using a lever, independent of operator action • Heavy duty operating cycle (O-0.3 s-CO-15 s-CO) • Anti-reflex lever-operated mechanism for earthing switch, independent of operator action • Full failsafe interlocking between the circuit breaker and earthing switch
Three-phase busbars for top connection (630 A)	
Bottom connection	• C-type bushing for dry type cable connection or • Three phase bottom busbar for bus coupling
Voltage presence indicator	
Cable box	With 700 mm length cable connection & 290 mm deep door
Standard built-in padlocking facility	For main switch, earthing switch and operation selector (shackle diameter <9 mm)

Accessories

Operation accessory options

- Visibility of earthing contacts
- Electrical operation
- Auxiliary contacts on switch and earthing switch
- Voltage present/absent contact
- Local/remote control switch
- Operation counter
- Additional opening coil (1)
- Pushbutton protection cover

Connection options

- 1250 A three-phase upper busbars when cable connection
- Rear cable entry (top or bottom) connection
- Deeper cable box door (500 mm)
- Compact cable box with 500 mm length cable connection
- Enlarged low-voltage control cabinet
- Raising plinth (260 mm or 520 mm)

Locking options

- Key-type interlocking
  - main switch in open-disconnected position (1 or 2 keylocks)
  - earthing switch in cable earthed position (1 or 2 keylocks)
  - earthing switch in 'line' position (1 or 2 keylocks)
- Interlocking between cable box door and main switch & earthing switch for front cable connection
- Live cable interlocking

Protection relay and current transformers options

Protection relay

- VIP 45 / 400 /410
- Sepam 20, 40, 60, 80
- MiCOM
- Easergy P5

Protection current transformer

- CuA or CuB
- TLPU1
- ARU2
- ARC6

Protection voltage transformer

- VRU1
- LPVT

(1) only with VIP relay

Disconnecting circuit breaker

D06H - Heavy duty line protection

Technical characteristics

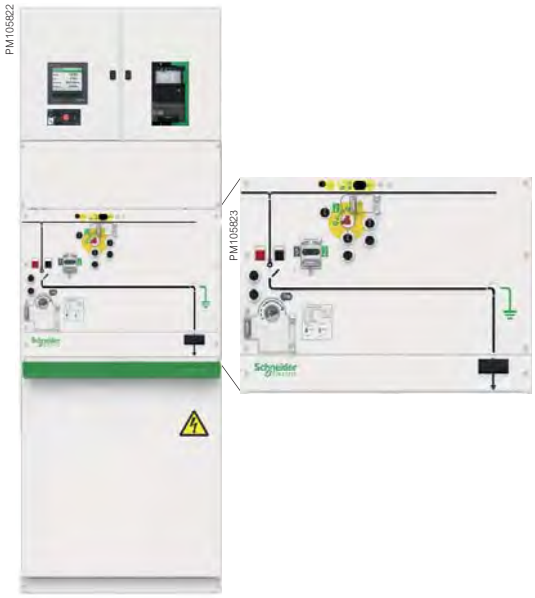
Rated voltage	**U_r**		**(kV)**	**7.2**		**12**		**17,5**	
Rated current	I_r		A	630					
Rated short-time withstand current and duration	I_k	for switchgear with tk=1 s	up to kA	21	25	21	25	21	25
		for switchgear with tk=3 s		21	25	21	25	21	25
		for switchgear with tk=4 s		20	-	20	-	20	-
Short-circuit breaking capacity	I_{sc}		up to kA	21	25	21	25	21	25
Rated making capacity of main switch and earhing switches	I_{ma}	when fr=50 Hz	kA peak	52	62	52	62	52	62
		when fr=60 Hz	kA peak	54	65	54	65	54	65
Capacitive breaking capacity	(IEC 62271-100)	Capacitive breaking class		Line charging current 10A, class C2 Cable charging current 25A, class C2 Single capacitor bank: class BC2					
No-load mechanical endurance of circuit breaker	M2 class (IEC 62271-100)	Number of operation cycles		10000					
Electrical endurance of circuit breaker	E2 class (IEC 62271-100)			25 kA, reclosing duty					
Operating sequence (when electrical operation on circuit breaker)				O - 0.3s - CO-15s - CO					
Maximum number of operation at 100% Isc				50					
Total clearing time at Isc		Fault detection to arc extinguishing	ms	<100					
No-load mechanical endurance of earthing switch	M0 class (IEC 62271-102)	Number of operation cycles		1000					
Making capacity endurance of earthing switch	E2 class (IEC 62271-102)	Number of operation cycles		5					

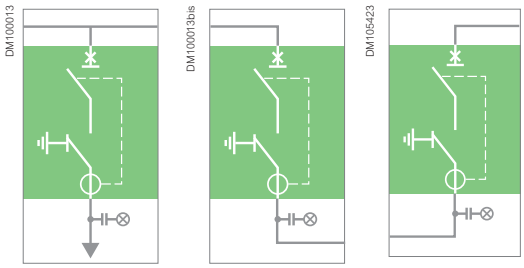
Disconnecting circuit breaker

D12H - Heavy duty line protection

The D12H uses vacuum and SSIS technology :

- 750mm width
- Rated current is 1250 A
- With fast reclose function operating mechanism which could be motorised, it use for line protection and generator protection
- With Sepam auxiliary power relay, and it is also open to the other kind of auxilairy power relay





Basic equipment

'3 in 1'' core unit	• Vacuum disconnecting load-break switch providing both load breaking breaking and disconnection function • Earthing switch use air technology in sealed-for-life tank at atmospheric pressure
Mechanism	• Operating circuit breaker with stored energy type operating mechanism (O-CO-CO) with pushbutton opening and closing and spring charging using a lever, independent of operator action • Heavy duty operating cycle (O-0.3 s-CO-15 s-CO) • Anti-reflex lever-operated mechanism for earthing switch, independent of operator action • Full failsafe interlocking between the circuit breaker and earthing switch
Three-phase busbars for top connection (1250 A)	
Bottom connection	• C-type bushing for dry type cable connection or • Three phase bottom busbar for bus coupling
Voltage presence indicator	
Cable box	With 700 mm length cable connection & 290 mm deep door
Standard built-in padlocking facility	For main switch, earthing switch and operation selector (shackle diameter <9 mm)

Accessories

Operation accessory options

- Visibility of earthing contacts
- Electrical operation
- Auxiliary contacts on switch and earthing switch
- Voltage present/absent contact
- Local/remote control switch
- Operation counter
- Pushbutton protection cover

Connection options

- Rear cable entry (top or bottom) connection
- Deeper cable box door (450 mm)
- Enlarged low-voltage control cabinet
- Raising plinth (260 mm or 520 mm)

Locking options

- Key-type interlocking
  - main switch in open-disconnected position (1 or 2 keylocks)
  - earthing switch in cable earthed position (1 or 2 keylocks)
  - earthing switch in 'line' position (1 or 2 keylocks)
- Interlocking between cable box door and main switch & earthing switch for front cable connection
- Live cable interlocking

Protection relay and current transformers options

Protection relay

- Sepam
- MiCOM
- Easergy p5

Protection current transformer

- ARU2

Protection voltage transformer

- VRU1
- LPVT

Disconnecting circuit breaker

D12H - Heavy duty line protection

Technical characteristics

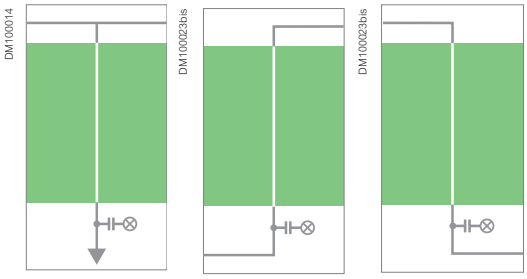
Rated voltage	**U_r**		**(kV)**	**7.2**		**12**		**17,5**	
Rated current	I_r		A	1250					
Rated short-time withstand current and duration	I_k	for switchgear with tk=1 s	up to kA	21	25	21	25	21	25
		for switchgear with tk=3 s		21	25	21	25	21	25
		for switchgear with tk=4 s		20	-	20	-	20	-
Short-circuit breaking capacity	I_{sc}		up to kA	21	25	21	25	21	25
Rated making capacity of main switch and earhing switches	I_{ma}	when fr=50 Hz	kA peak	52	62	52	62	52	62
		when fr=60 Hz	kA peak	54	65	54	65	54	65
Capacitive breaking capacity	(IEC 62271-100)	Capacitive breaking class		Line charging current 10A, class C2 Cable charging current 25A, class C2 Single capacitor bank: class BC2					
No-load mechanical endurance of circuit breaker	M2 class (IEC 62271-100)	Number of operation cycles		10000					
Electrical endurance of circuit breaker	E2 class (IEC 62271-100)			25 kA, reclosing duty					
Operating sequence (when electrical operation on circuit breaker)				O - 0.3s - CO-15s - CO					
Maximum number of operation at 100% Isc				50					
Total clearing time at Isc		Fault detection to arc extinguishing	ms	<100					
No-load mechanical endurance of earthing switch	M0 class (IEC 62271-102)	Number of operation cycles		1000					
Making capacity endurance of earthing switch	E2 class (IEC 62271-102)	Number of operation cycles		5					

Bus Riser

G06, G12

The G06 and G12 core unit is a simple bus riser

- G06 can be used in various functional units: direct cable incomer, bus riser. G12 is only bus riser
- 375 mm width



G06 G06 / G12 G06 / G12

Basic equipment

Three-phase busbars for top connection (630 A for G06, 1250 A for G12)

Bottom connection	• C-type bushing for dry type cable connection for G06 • Three phase bottom busbar for bus coupling
Voltage presence indicator	
Cable box	With 700 mm length cable connection & 290 mm deep door

Accessories

Connection options

- 1250A three-phase upper busbars when cable connection (only for G06)
- Rear cable entry (top or bottom) connection (only for G06)
- Deeper cable box door (500 mm)
- Compact cable box with 500 mm length cable connection (only for G06)
- Enlarged low-voltage control cabinet
- Raising plinth (260 mm or 520 mm)

Technical characteristics

Rated voltage	**U_r**		**(kV)**	**7.2**		**12**		**17,5**	
Rated current	I_r		A	630 (G06), 1250 (G12)					
Rated short-time withstand current and duration	I_k	for switchgear with tk=1 s	up to kA	21	25	21	25	21	25
		for switchgear with tk=3 s		21	25	21	25	21	25
		for switchgear with tk=4 s		20	-	20	-	20	-

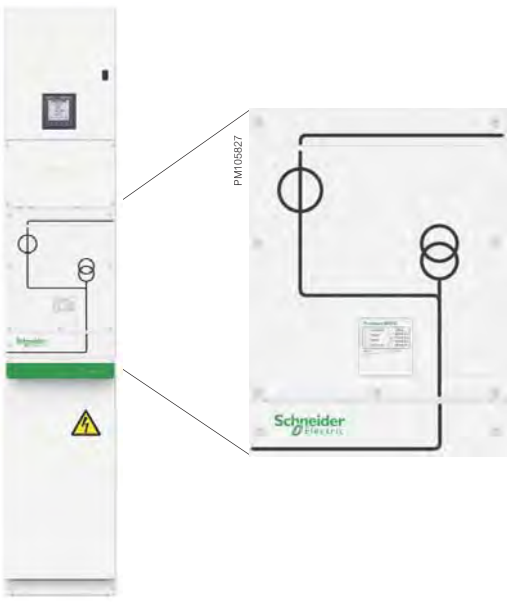
Metering

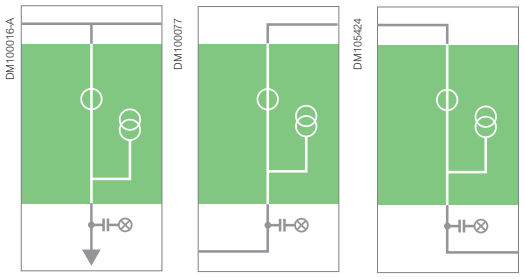
M06S, M12S - SSIS compact metering

The M06S and M12S core unit is a compact metering unit, insensitive to harsh environments thanks to SSIS design.

- A cost-effective alternative to traditional air-insulated metering units
- Fully compatible with the Premset system
- M06S could be used in wide of applications: tariff metering, metered incomer, feeders and risers, cable with VT incomer and feeder
- Easy to disconnect VT from front of cubicle
- Compact soluton, only 375 mm width

PM105826





M06S M06S / M12S M06S / M12S

Basic equipment

Three-phase busbar riser with shielded solid insulation

Three ring-type current transformer with shielded solide insulation (ARC5)

Three phase to earth voltage transformer	• With shielded solid insulation (VRU1), located in front compartment to provide easy access for maintenance and esay disconnection for commissioning

Three-phase busbars for top connection

Bottom connection	• C-type bushing for dry type cable connection (only M06S) • Three phase bottom busbar for bus coupling

Voltage presence indicator

Cable box	With 700 mm length cable connection & 290 mm deep door

Accessories

Connection options

- 1250 A three-phase upper busbars when cable connection (only for M06S)
- Rear cable entry (top or bottom) connection (only for M06S)
- Deeper cable box door (500 mm)
- Compact cable box with 500 mm length cable connection (only for M06S)
- Enlarged low-voltage control cabinet
- Raising plinth (260 mm or 520 mm)

Locking options

- Keylocking of front panel to prevent access to voltage transformer when busbar/ cable energized

PM100579

Technical characteristics

Rated voltage	**U_r**		**(kV)**	**7.2**		**12**		**17,5**	
Rated current	I_r		A	630 (M06S), 1250 (M12S)					
Rated short-time withstand current and duration	I_k	for switchgear with tk=1 s	up to kA	21	25	21	25	21	25
		for switchgear with tk=3 s		21	25	21	25	21	25
		for switchgear with tk=4 s		20	-	20	-	20	-

Metering

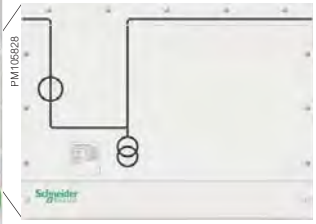
M06A, M12A - Air-insulated metering

The M06A, M12A core unit is a traditional air-insulated metering unit

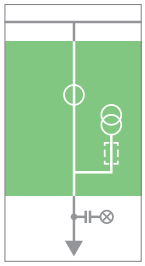
- Designed for easy adaptation to any type of conventional block CT or VT
- Bare copper primary circuit in totally closed IP3X metal housing
- Wide choice of arrangement, including metered incomer, feeder, busbar metering and risers
- Compatible with Premset connection system
- 750 mm width

PM105833

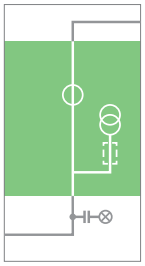
PM105828



DM100017-A



DM100017-B



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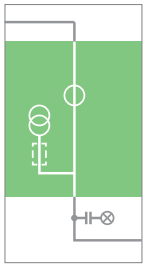

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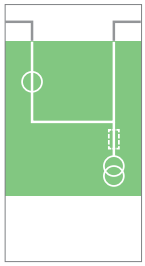


Basic equipment

Three-phase busbar riser: bare copper bar	
Two or three block-type current transformer	
Two or three phase to phase or phase to earth voltage transformer	
Three-phase busbars for top connection	
Bottom connection	• Connection pads for dry type cable or • Three phase bottom busbar for bus coupling
Voltage presence indicator for metering incomer or feeder	
Cable box	With 700 mm length cable connection & 290 mm deep door

Accessories

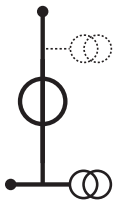
Connection options

- 1250 A three-phase upper busbars for cable connection (only for M06A)
- Fuses for voltage transformer: length 360 mm, diameter 45 mm
- Enlarged low-voltage control cabinet
- Raising plinth (260 mm or 520 mm)

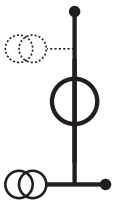
Locking options

- Keylocking of front panel to prevent access to voltage transformer when busbar/ cable energized

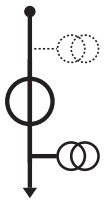
Choice of arrangements



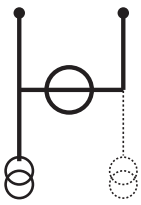
Bus riser metering



Bus riser metering



Metered feeder / incomer



Busbars metering

Technical characteristics

Rated voltage	**U_r**		**(kV)**	**7.2**		**12**		**17,5**	
Rated current	I_r		A	630 (M06A), 1250 (M12A)					
Rated short-time withstand current and duration	I_k	for switchgear with tk=1 s	up to kA	21	25	21	25	21	25
		for switchgear with tk=3 s		21	25	21	25	21	25
		for switchgear with tk=4 s		20	-	20	-	20	-
Internal arc proof, type tested				A-FLR: 21kA 1 s					

Metering

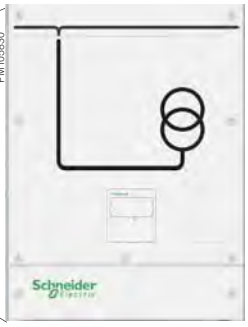
VTM - Voltage transformer

The VTM core units are voltage transformer units.

- Three phase to earth voltage transformer with shielded solid insulation (VRU1)
- VTM directly connected to the busbars, dedicated to voltage metering.
- It is compact, only 375 mm width
- It is insensitive to harsh environments thanks to SSIS design
- Easy to disconnect VT from front of cubicle

PM105829

PM105830



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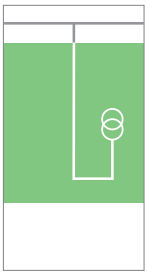


Basic equipment

Three-phase busbar riser with shielded solid insulation

Three phase to earth voltage transformer with shielded solid insulation (VRU1)

Three-phase busbars for top connection (630 A)

Cable box With 700 mm high & 290 mm deep door

Front panel which access to voltage transformer

Accessories

Connection options

- 1250A three-phase upper busbars
- Deeper cable box door (500 mm)
- Compact cable box with 500 mm high
- Enlarged low-voltage control cabinet
- Raising plinth (260 mm or 520 mm)

Locking options

- Keylocking of front panel to prevent access to voltage transformer when the busbar is energized

Technical characteristics

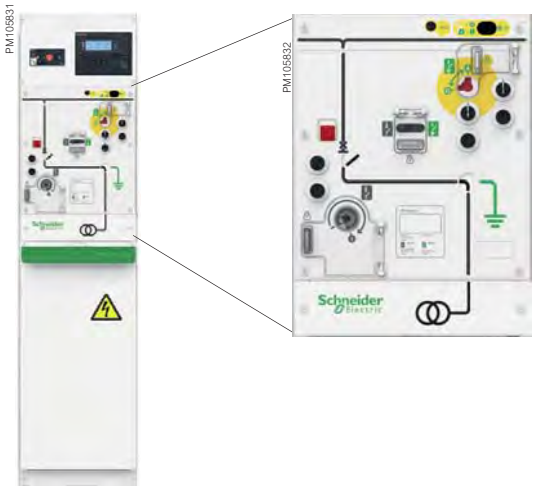
Rated voltage	U_r		**(kV)**	**7.2**		**12**		**17,5**	
Rated current	I_r		A	630					
Rated short-time withstand current and duration	I_k	for switchgear with tk=1 s	up to kA	21	25	21	25	21	25
		for switchgear with tk=3 s		21	25	21	25	21	25
		for switchgear with tk=4 s		20	-	20	-	20	-

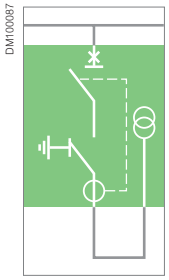
Metering

VTM-D - Voltage transformer with circuit-breaker protection

The VTM-D dedicated core unit including a D01N circuit breaker protect three phase to earth screened voltage transformer (VRU1).

- Directly connected to the busbars , dedicated to voltage metering.
- Very compact solution, only 375 mm width
- It is insensitive to harsh environments thanks to SSIS design





Basic equipment

100 A disconnecting circuit breaker	With associated earthing switch (see D01, page 54)
Three-phase busbars for top connection (630 A)	
Cable box	With 700 mm high & 290 mm deep door

Accessories

Operation accessory options

Refer to accessories of D01N core unit, page 54

Metering

VTM-D - Voltage transformer with circuit-breaker protection

Technical characteristics

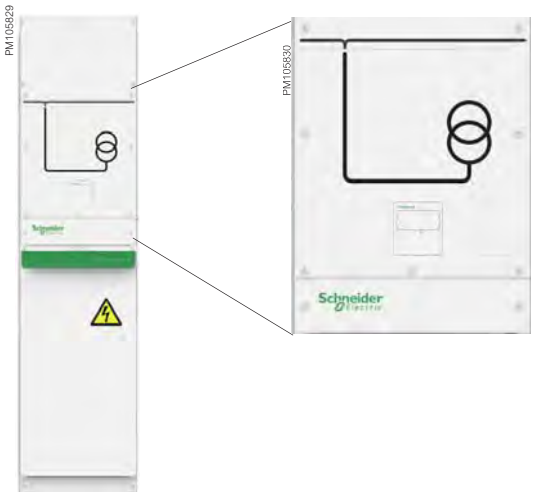
Rated voltage	**U_r**		**(kV)**	**7.2**		**12**		**17,5**	
Rated current	I_r		A rms	100					
Rated short-time withstand current and duration	I_k	for switchgear with tk=1 s	up to kA	21	25	21	25	21	25
		for switchgear with tk=3 s		21	25	21	25	21	25
		for switchgear with tk=4 s		20	-	20	-	20	-
Short-circuit breaking capacity	I_{sc}		up to kA	21	25	21	25	21	25
Rated making capacity of main switch and earhing switches	I_{ma}	when fr=50 Hz	kA peak	52	62	52	62	52	62
		when fr=60 Hz	kA peak	54	65	54	65	54	65
No-load mechanical endurance of circuit breaker	M1 class (IEC 62271-100)	Number of operation cycles		2000					
Electrical endurance of circuit breaker	E2 class (IEC 62271-100)			25kA					
Operating sequence (when electrical operation on circuit breaker)				CO-15s-CO					
Maximum number of operation at 100% Isc				5					
Total clearing time at Isc	Fault detection to arc extinguishing		ms	<60					
No-load mechanical endurance of earthing switch	M0 class (IEC 62271-102)	Number of operation cycles		1000					
Making capacity endurance of earthing switch	E2 class (IEC 62271-102)	Number of operation cycles		5					

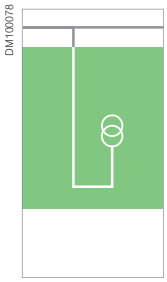
Special functions

VTP - Auxiliary power supply

The VTP core units are voltage transformer units.

- VTP directly connected to the busbars and dedicated to auxiliary power supply
- It is compact, only 375 mm width
- It is insensitive to harsh environments thanks to SSIS design
- Easy to disconnect VT from front of cubicle





Basic equipment

Three phase busbar riser	With shielded solid insulation
Screened voltage transformer	One VRU2 phase-to-phase screened voltage transformer, dedicated to auxiliary power supply (see page 83)
Three-phase busbars for top busbar connection (630 A)	
Cable box	With 700 mm high

Accessories

Connection options

- 1250A three-phase upper busbars
- Deeper cable box door (500 mm)
- Compact cable box with 500 mm high
- Enlarged low-voltage control cabinet
- Raising plinth (260 mm or 520 mm)

Technical characteristics

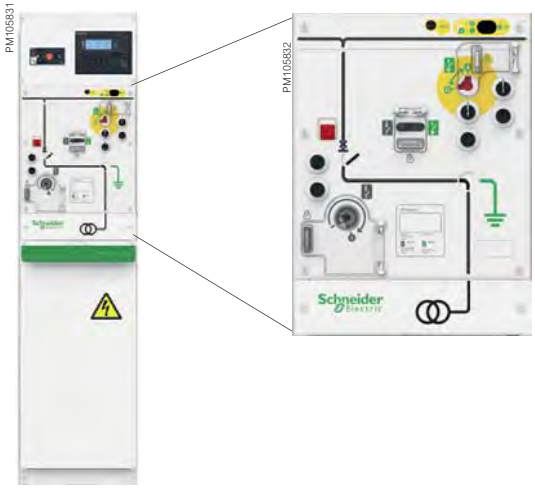
Rated voltage	**U_r**		**(kV)**	**7.2**		**12**		**17,5**	
Rated current	I_r		A	630					
Rated short-time withstand current and duration	I_k	for switchgear with tk=1 s	up to kA	21	25	21	25	21	25
		for switchgear with tk=3 s		21	25	21	25	21	25
		for switchgear with tk=4 s		20	-	20	-	20	-

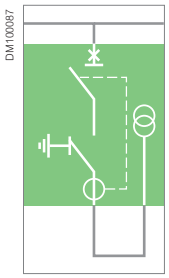
Special functions

VTP -D - Auxiliary power supply with circuit-breaker protection

The VTP-D dedicated core unit is a D01N circuit breaker protect the phase to phase screened voltage transformer (VRU2).

- Directly connected to the busbars , dedicated to auxiliary power supply
- 375 mm width
- it is insensitive to harsh environments thanks to SSIS design





Basic equipment

SSIS design (Shielded Solid Insulation System), composed of:

100 A disconnecting circuit breaker	With associated earthing switch (see D01, page 54)
Three-phase busbars for top busbar connection (630 A)	
Cable box	With 700 mm high & 290 mm deep door
Screened voltage transformer	One VRU2 phase-to-phase screened voltage transformer, dedicated to auxiliary power supply (see page 83)

Accessories

Operation accessory options

Refer to accessories of D01N core unit, page 54.

Special functions

VTP -D - Auxiliary power supply with circuit-breaker protection

Technical characteristics

Rated voltage	**U_r**		**(kV)**	**7.2**		**12**		**17,5**	
Rated current	I_r		A rms	100					
Rated short-time withstand current and duration	I_k	for switchgear with tk=1 s	up to kA	21	25	21	25	21	25
		for switchgear with tk=3 s		21	25	21	25	21	25
		for switchgear with tk=4 s		20	-	20	-	20	-
Short-circuit breaking capacity	I_{sc}		up to kA	21	25	21	25	21	25
Rated making capacity of main switch and earhing switches	I_{ma}	when fr=50 Hz	kA peak	52	62	52	62	52	62
		when fr=60 Hz	kA peak	54	65	54	65	54	65
No-load mechanical endurance of circuit breaker	M1 class (IEC 62271-100)	Number of operation cycles		2000					
Electrical endurance of circuit breaker	E2 class (IEC 62271-100)			25 kA					
Operating sequence (when electrical operation on circuit breaker)				CO-15s-CO					
Maximum number of operation at 100% Isc				5					
Total clearing time at Isc	Fault detection to arc extinguishing		ms	<60					
No-load mechanical endurance of earthing switch	M0 class (IEC 62271-102)	Number of operation cycles		1000					
Making capacity endurance of earthing switch	E2 class (IEC 62271-102)	Number of operation cycles		5					

Special functions

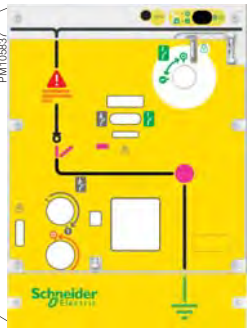
ES-B - Busbar earthing switch

The ES-B core unit is dedicated to busbar earthing:

- The main application is coupled busbars (2 incomers + 1 bus coupler system) but it can also be used for any application requiring busbar earthing prior to accessing the busbars

PM105836

PM109837



DM100015

Basic equipment

Earthing switch air technology	Earthing switch use air technology in sealed-for-life tank at atmospheric pressure with shielded solid insulation, totally SF6 free solution.
Mechanism	Operating load switch with anti-reflex lever-operated mechanism (CIT type), independent of operator action
Three-phase busbars for top busbar connection (630 A)	
Cable box	With 700 mm high & 290 mm deep door
Standard built-in padlocking facility	for earthing switch (shackle diameter <9 mm)

Accessories

Connection options

- 1250 A three-phase upper busbars
- Compact cable box with 500 mm high
- Deeper cable box door (500 mm)
- Enlarged low-voltage control cabinet
- Raising plinth (260 mm or 520 mm)

Locking options

- Optional keylocking facilities with flat or tubular key types
  - 1 or 2 keylocks for locking the ES-B fonction in "open" position

Auxiliary switches

- Auxiliary contacts on earthing switch

Technical characteristics

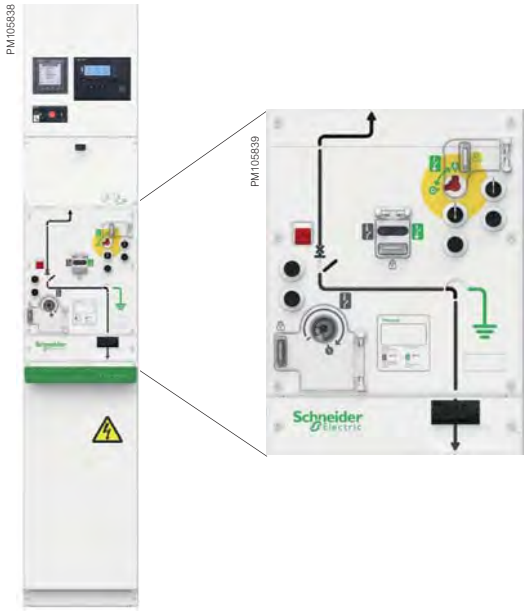
Rated voltage	**U_r**		**(kV)**	**7.2**		**12**		**17,5**	
Rated current	I_r		A rms	630					
Rated short-time withstand current and duration	I_k	for switchgear with tk=1 s	up to kA	21	25	21	25	21	25
		for switchgear with tk=3 s		21	25	21	25	21	25
		for switchgear with tk=4 s		20	-	20	-	20	-
No-load mechanical endurance of circuit breaker	M1 class (IEC 62271-100)	Number of operation cycles		1000					
Making capacity endurance of earthing switch	E2 class (IEC 62271-102)	Number of operation cycles		5					

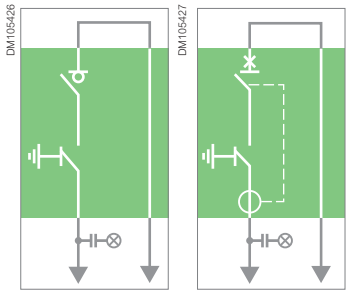
Special functions

Cable in/out function

The Cable In/Out function uses vacuum and SSIS technology

- Compact solution, only 375 mm width
- Rated current is 630 A
- It is stand alone solution, the application could be for one transformer protection
- The core unit could be I06T, I06H, D01N, D02N, D06N or D06H





Basic equipment

'3 in 1'' core unit	For details refer to I06T or I06H or D01N or D02N or D06N or D06H page.
Top connection	C-type bushing for dry type cable connection (1 cable/phase)
Bottom connection	C-type bushing for dry type cable connection (1 cable/phase)
Voltage presence indicator (only for front cable)	
Front cable box	With 700 mm length cable connection & 290 mm deep door
Rear cable box	290 mm Depth
Standard built-in padlocking facility	For main switch, earthing switch and operation selector (shackle diameter <9 mm)

Only standard design (without arc control version)

Accessories

Operation accessory options

Refer to I06T or I06H or D01N or D02N orD06N or D06H, pages 48, 54, 58.

Locking options

- Key-type interlocking
  - main switch in open-disconnected position (1 or 2 keylocks)
  - earthing switch in cable earthed position (1 or 2 keylocks)
  - earthing switch in 'line' position (1 or 2 keylocks)
- Interlocking between cable box door and main switch & earthing switch for front cable connection
- Live cable interlocking (only for front cable)

Other options

- Fault passage indicators for front cable
- Cable test device (only for front cable)
- Visibility of earthing contacts

Note: the cubicle is non-IAC version

Operating mechanisms

Introduction

Three spring charge store energy operating mechanisms meet all the needs of the various core units of the Premset range.

They provide user-friendly operation over the entire life of your switchgear.

They share the same range of auxiliairies for electrical operation and remote indications.

PM100511

CIT mechanism
in I06T unit

PM100009

CI1 mechanism
in D02N unit

PM100600

OCO mechanism
in D06H unit

A rational range of operating mechanisms

Units	CIT	CI1	OCO
	Type of operating mechanism		
I06T	●		
I06H			●
I12H			●
D01N,D02N,D06N		●	
D06H			●
D12H			●
VTM-D,VTP-D		●	
ES-B	●		

Three operating mechanisms have been designed together with the core units to optimize performance and ensure user-friendly operation.
They are totally integrated within the core units and will operate over the total life expectancy of the switchgear.
Periodic checkup of the mechanism can be done to ensure the performance depending on the environmental conditions.

All three mechanisms share the same features:

- Intuitive operation principles
- Position indications and easy-to-read mimic diagrams
- Range of auxiliary including motor-mechanism, opening coils (MX, MN), closing coils (XF) and auxiliary switches
- Range of accessories including padlocking and keylock devices
- Earthing switch mechanism, fully interlocked with the main device

Specific care has been taken to reinforce the harsh environment withstanding on mechanism and auxiliaries as well:

- Specific care has been taken to select the mechanism parts plating and tested accordingly in harsh environment
- Tripping and operating coil are encased in a sealed core, so protected against condensation and droping water
- Motor is encased in a protection aluminium cover
- Auxiliary switches are sealed-type, waterproof

Operating mechanisms
Introduction

PM100511

CIT mechanism in I06T unit

Double-function operating mechanism CIT

- **Switch function**
  independent-operation opening or closing by lever or motor
- **Earthing-switch function**: Independent-operation opening or closing by lever operating energy is provided by a compressed spring which causes the contacts to open or close when released
- **Auxiliary contacts**
  - switch 1 or 2 block (2NO+2NC/block)
  - earthing switch 1 or 2 block (1NO+1NC/block) (1)
- **Motor option**
- **Operation counter**

PM100009

CI1 mechanism in D02N unit

Double-function operating mechanism CI1

- **Circuit breaker function**
  - independent-operation closing by lever or motor
  - operating energy is provided by a compressed spring which causes the contacts to open or close when released
  - independent-operation opening or closing by push button (O) or trip unit
- **Earthing-switch function**: independent-operation opening or closing by lever. Operating energy is provided by a compressed spring which causes the contacts to open or close when released
- **Auxiliary contacts**
  - switch 1 or 2 blocks (2NO+2NC/block)
  - earthing switch 1 or 2 blocks (1NO+1NC/block) (1)
- **Motor option**
- **opening releases**
  - low Energy shunt trip (Mitop) with SDE contact
  - open release (MX)
  - undervolatge release (MN)
- **operation counte**r

PM100600

OCO mechanism in D06H unit

Double-function operating mechanism OCO

- **Switch or circuit breaker function**
  - independent-operation closing by two steps:
    1. operating mechanism recharging by lever or motor
    2. stored energy released by push-button (I) or trip unit
  - independent-operation opening by push button (O) or trip units
- **Earthing-switch function**: independent-operation opening or closing by lever. Operating energy is provided by a compressed spring which causes the contacts to open or close when released
- **Auxiliary contacts**
  - switch 1 or 2 blocks (2NO+2NC/block)
  - earthing switch 1 or 2 blocks (1NO+1NC/block) (1)
- **Motor option**
- **Closing releases**
- **Opening releases**
  - low energy shunt trip (Mitop) with SDE contact
  - open release (MX)
  - undervolatge release (MN)
- **Operation counter**

(1) When motor is selected, only 1 block earthing switch auxiliary contact is available

Operating mechanisms

Accessories

PM100582

Motor mechanism (MCH)

The MCH electrical motor mechanism is used to charge the main springs that store the operating energy for the core unit mechanism.

- on the CIT mechanism, it allows electrical opening and closing of the core unit.
- on the CI1 mechanism, it allows electrical charging and closing of the core unit.
- on the OCO mechanism, it allows electrical charging of the core unit

The motor mechanism is equipped with a “spring charged” limit switch that stops spring charging when the springs are fully charged. This contact is also used to indicate the “spring charged” status.

Characteristics

Power supply		• 24-30VDC • 48-60VDC/AC • 100-130VDC/AC • 200-250VDC/AC
Threshold		0.85 to 1.1 Un
Consumption (VA or W)		180
Motor overcurrent		2 to 3 In for 0.1 s

PM100002

Shunt closing release (XF) and opening release (MX)

XF shunt closing release: This release, dedicated to the OCO mechanism, allows electrical closing as soon as the springs are charged.

MX shunt trip release: This release, dedicated to the CI1 or OCO mechanisms, allows electrical opening of the core unit. It can lock the unit in open position as long as the remote order is maintained.

Characteristics

Power supply		• 24-30VDC • 48-60VDC/AC • 100-130VDC/AC • 200-250VDC/AC
Threshold	XF	0.85 to 1.1 Un *
	MX	0.7 to 1.1 Un
Consumption (VA or W)	Triggering	250
	Latched	2.5

* please consult us when you need more than 1.1Un

PM100001

Undervoltage release (MN)

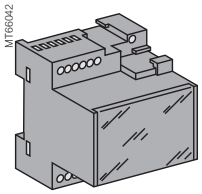
This release allows the electrical opening of the core unit in the event of an undervoltage. It can be used also for positive opening and locking in case of an emergency caused by a voltage drop, loss of auxiliary power. It can be associated with a time delay unit.

Characteristics

Power supply		• 24-30VDC • 48-60VDC/AC • 100-130VDC/AC • 200-250VDC/AC
Threshold	Opening	0.35 to 0.7 Un
	Closing	0.85 Un
Consumption (VA or W)	Triggering	250
	Latched	2.5

Operating mechanisms

Accessories



Time delay for MN

To eliminate spurious tripping of the circuit breaker when there are brief voltage drops, the MN action is controlled with a time delay.

This function is achieved by adding a time delay unit outside of the undervoltage release (MN) circuit (adjustable time delay).

This unit is placed outside the circuit breaker and can be inhibited by an emergency stop button to obtain instant circuit breaker opening.

Characteristics

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

Rotary type contacts (OC)

"On/Off" auxiliary position contacts

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

- Rotary type changeover contacts directly controlled by the circuit breaker mechanism.
- Indication contacts are proposed:
  - for standard relaying applications
  - for low level control applications with PLCs or electronic circuits

This version is compatible with Sepam series 20, series 40 and series 80 units.

Characteristics

Breaking capacity (A)	**Standard**		**Minimum load: 100 mA/24 V**
Cos φ: 0.3 Utilisation category: AC12/DC12	V AC	240/380	10/6 (1)
		480	10/6 (1)
		690	6
	V DC	24/48	10/6 (1)
		125	10/6 (1)
		250	3

(1) Standard contacts: 10 A
Optional contacts: 6 A (temperature derating)

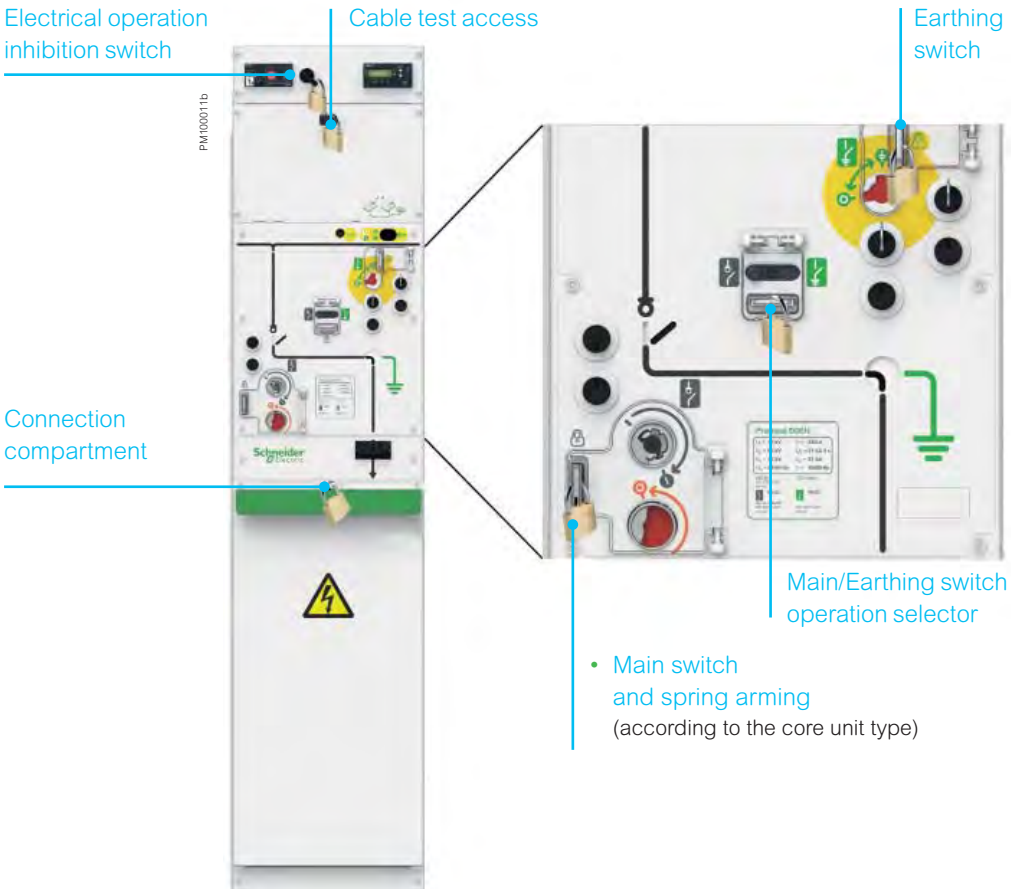
Operating mechanisms

Padlocking and keylocking

It is also possible to padlock the push button cover (option).

Padlocking

Current cubicle design provides the possibility to padlock the following devices:



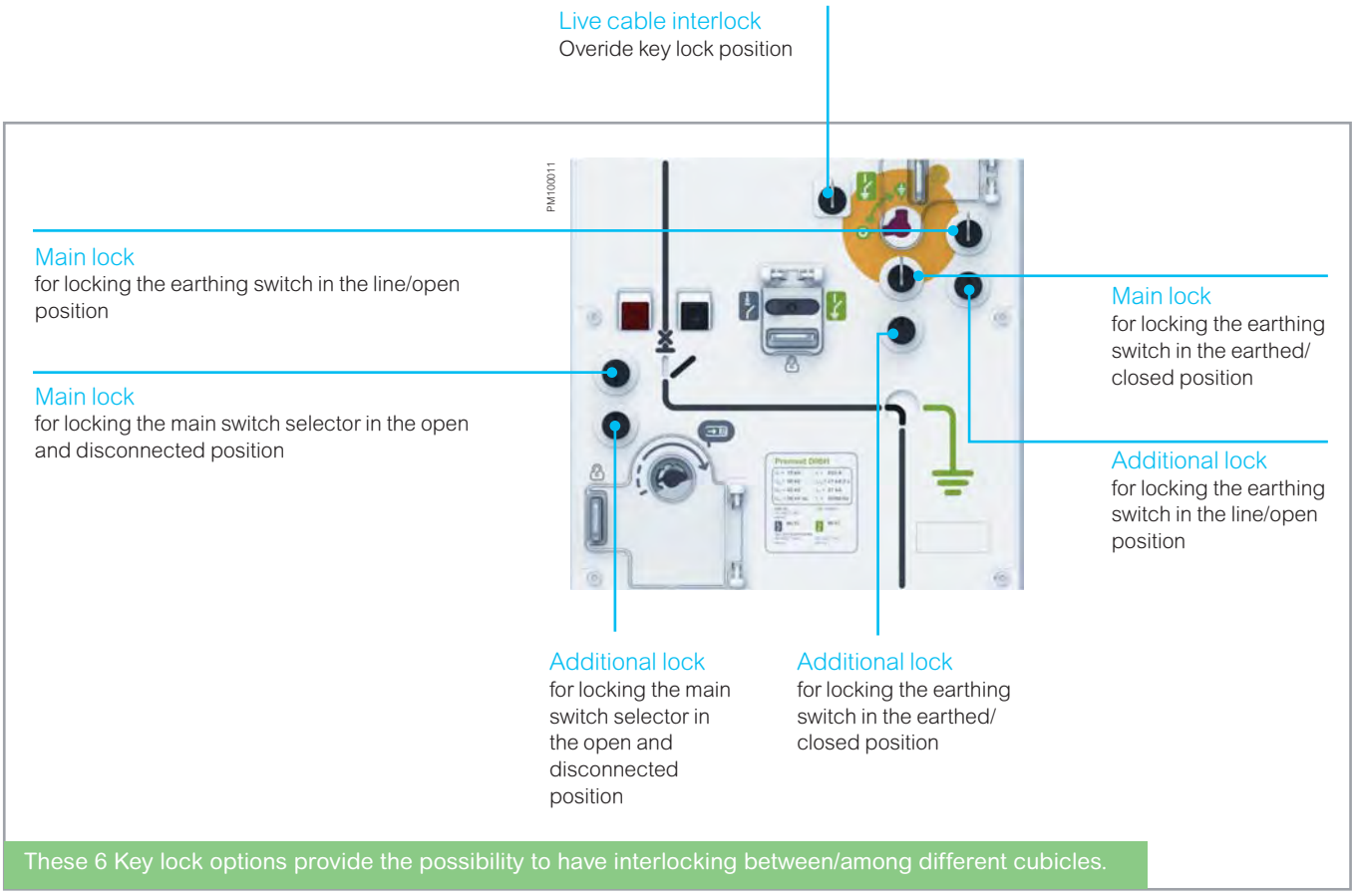
Operating mechanisms

Padlocking and keylocking

The key lock configuration can be modified after commissioning.

Keylocking (optional)

Up to 7 key lockings available as an option on the switching device.



These 6 Key lock options provide the possibility to have interlocking between/among different cubicles.

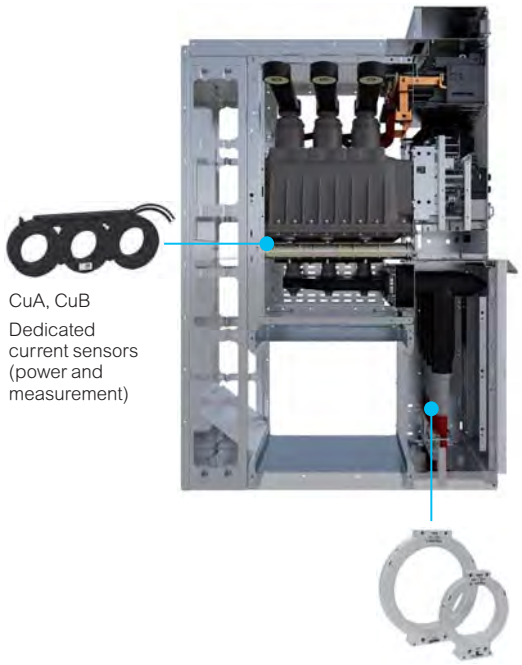
SSIS Current and voltage

Transformer for Premset

Synthesis table by unit

	Current sensors									Voltage sensors	
	Protection sensors			Zero sequence	FPI & Ammeter		Metering CT			Screened	
	Under core unit			Cable	Bushing	Cable	Bushing	Cable	Rising CT	Busbar or cable	Busbar
Unit type	CuA CuB	TLPU1	ARU2	CSH120 CSH200	CTR2200	MF1	ARU1	ARC6	ARC5	VRU1	VRU2
I06T					●	●	●	●		●	
I06H					●	●	●	●		●	
I12H							●			●	
D01N	●	●	●	●	●	●	●	●		●	
D02N	●	●	●	●	●	●	●	●		●	
D06N	●	●	●	●	●	●	●	●		●	
D06H	●	●	●	●	●	●	●	●		●	
D12H			●	●			●	●		●	
M06S									●	●	
M12S									●	●	
VTM										●	
VTM-D										●	
VTP											●
VTP-D											●

DM100035



CuA, CuB

Dedicated current sensors (power and measurement)

CSH120/200

Optional zero sequence sensor for high sensitive earthing fault protection

CuA, CuB

The sensors are dedicated design for Premset self power protection system which includes sensors, VIP relay and an actuator.

The sensors are made up of one block of three CTs , it provides protection function and the measurement function, also it provide power for an actuator.

The sensors are located under the core unit:

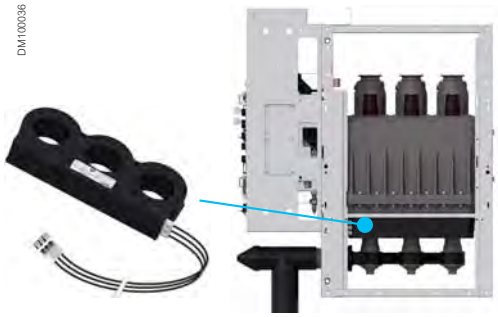
- Characteristics according to IEC 60044-8
- Double secondary winding for measurement and protection
- Frequency 50-60Hz

Characteristics

Highest voltage for equipement	Um	0.72 kV
Power frequency withstand voltage		3 kV - 1 min
Rated short-time withstand current	Ith (kA)	25
Withstand time	t (s)	3
Rated primary current	Ipr	CuA: 0-200 A, CuB:0- 630 A
Secondary voltage	Us	22.5 mV at rated primary current
Rated burden		> 2 kΩ
Measurement	Accuracy class	Cl 1.0
Protection		5P30

SSIS Current and voltage

Transformer for Premset



CSH120/200

- For Sepam or third party protection relays, if the sensitive earth fault protection is required, an earth fault toroidal CT of the CSH120 or CSH200 type around the cables should be installed.
- CSH120 and CSH200 core balance CT's, provide more sensitive protection by the direct measurement of earth fault currents.
- CSH120 - 120mm internal diameter
- CSH200 - 200mm internal diameter

TLPU1 (LPCT)

Low Power Current Transfomers (TLPU1) use optimised technology that offers a number of advantages in Premset cubicles.

- **Simpler selection:** a single sensor can be used for both measurement or protection over the entire range of operating currents
- **Easy and safe installation:** the LPCT output is plugged directly into the Sepam relay with no risk of overvoltage when disconnecting
- **Flexibility of use:** easy adaptation to changes in power levels and/or protection settings during MV system design or service life
- **High accuracy** up to the short-time circuit current with low saturation
- **Compact design:** small size and weight allow easy integration in Premset cubicles
- Comply to **IEC 60044-8**
- One **secondary winding** for measurement or protection
- Frequency 50-60Hz

Characteristics

Highest voltage for equipement	Um	0.72 kV
Power frequency withstand voltage		3 kV - 1 min
Rated short-time withstand current	Ith (kA)	25
Withstand time	t (s)	3
Rated primary current	Ipr	100 A
Secondary voltage	Us	22.5 mV
Rated burden		> 2 kΩ
Measurement	Accuracy class	0.5 up to Ipr 630 A
Protection		5P250

New LPVT options *

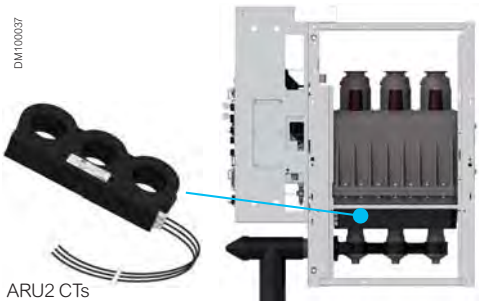
Premset can now be specified with compact high accuracy Low Power Voltage Transformer. The innovative sensors are ideal for the new generation of electronic protection devices and monitor energy consume:

- Up to Class 0.5 accuracy levels for metering
- Linear wide spectrum voltage range with no ferro resonance characteristics
- Low power consumption and reduced size -ideal for new or retrofit solutions
- Excellent harmonic performance for Power Quality monitoring
- Increased quality and safety under over-voltage, open circuit, or short circuit conditions
- Easy to install, operate and test
- Comply to IEC 60044-7

* please consult us for availability

SSIS Current and voltage

Transformer for Premset



ARU2

A standard ring type current transformer of the ARU2 type (1A, 5P20 class) can be located under the core unit.

- Characteristics according to IEC 61869-2
- One secondary winding for protection
- Frequency 50-60Hz

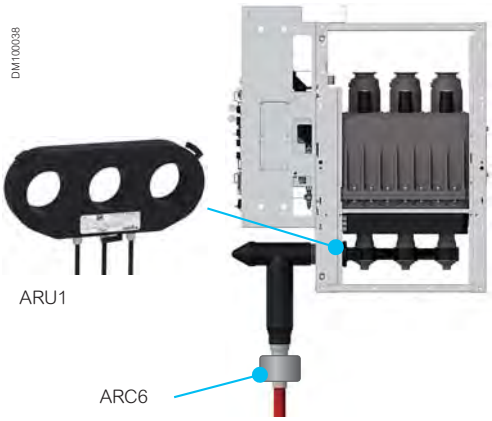
Characteristics		D01N,D02N,D06N,D06H				D12H		
Rated primary and secondary current	Ipr/Isr(A)	100/1	200/1	400/1	600/1	800/1	1000/1	1250/1
Rated short-time current	Ith (kA)	25	25			25		
Withstand time	t (s)	3 s	3 s			3 s		
Protection	Rated burden	1.5 VA	2.5 VA			5 VA		
	Accuracy class	5P-20						

Note: Please consult us for the availability of the other current ratios and performances

Three different types of current transformers (ARU1, ARC6 and ARC5) are used for tariff metering on Premset switchboards.

They are all designed for easy installation and long service life.

Compliance with standard IEC 61896-2 and 50/60 Hz frequency for all current transformers.



ARU1

The ARU1 is a block comprising three ring-type current transformer.

The ARU1 is located around bushing, for all of switchgear units: I06T, I06H, D01N, D02N, D06N, D06H, I12H and D12H

Characteristics		I06H, I06T, D01N, D02N, D06N, D06H, G06				I12H, D12H					
Rated primary and secondary current	Ipr/Isr(A)	100/1	200/1	400/1	600/1	300/5	400/5	600/5	800/5	1000/5	1250/5
Rated short-time current	Ith (kA)	25				25					
Withstand time	t (s)	3 s				3 s					
Measurement	Rated burden	2.5 VA				5 VA					
	Accuracy class	Cl 0.5 s				Cl 0.2 s Fs≤5					

Note: Please consult us for the availability of the other current ratios and performances

SSIS Current and voltage

Transformer for Premset

PE90925

ARC6

The ARC6 is a ring-type current transformer.

The ARC6 is located around cable, for all of switchgear units: I06T, I06H, D01N, D02N, D06N, D06H and D12H. (1)

The ARC6 offers higher accuracy than ARU1 when primary current less 630A.

The ARC6 only installed on single-core screened cable, with deeper cable compartment door.

* please consult us for availability

Characteristics *							
Rated primary and secondary current	Ipr/Isr(A)	100/5	150/5	200/5	300/5	400/5	600/5
Rated short-time current	Ith (kA)	25			25		
Withstand time	t (s)	3 s			3 s		
Measurement	Rated burden	5 VA			15 VA		
	Accuracy class	Cl 0.2s FS ≤5					

* Except for D12H

Note: Please consult us for the availability of the other current ratios and performances

PE98382

ARC5

The ARC5 is a ring-type current transformer used in the M06S, M12S metering core unit.

- Compact dimensions for easy installation on a Premset bus riser.
- Cost-effective compared to standard MV CT block or DIN solutions

Characteristics		M06S				M12S		
Rated primary and secondary current	Ipr/Isr(A)	100/5	200/5	400/5	600/5	800/5	1000/5	1205/5
Rated short-time current	Ith (kA)	25				25		
Withstand time	t (s)	3 s				3 s		
Measurement	Rated burden	5 VA				5 VA		
	Accuracy class	Cl 0.2s FS ≤5						

Note: Please consult us for the availability of the other current ratios and performances

SSIS Current and voltage

Transformer for Premset

Different types of voltage transformers are used for tariff metering on Premset switchboards. They are all designed for easy installation and long service life. Compliance with standard IEC 61869-3 and 50/60 Hz frequency for all voltage transformers.

By using Phase-Earth VTs connected between phase and earth in a NOT solid earthed neutral system is the most favourable case for ferroresonance to occur. In order to face ferroresonance issues it is always advisable to use the following solutions (mandatory one of the two):

- The usage of a dumping resistor connected to the open delta terminals of the residual voltage secondary circuit will help to dump ferroresonance.
- The usage of VTs working at lower induction level to avoid that over voltages could initiate ferroresonance.

The offer of lower induction VTs is available on request depending on the neutral system status, please contact us

PE58411

VRU1

The VRU1 is a phase-to-earth screened voltage transformer used in SSIS M06S, M12S, VTM and VTM-D metering core units. VRU1 is also uses for incomer or feeder cubicle (I06T,I06H,I12H, D01N,D02N,D06N, D06H, D12H) for embedded metering, installed behide cable

- Compact dimensions and design for easy installation in Premset core units
- Easy front access for disconnection for commissioning
- SSIS design for insensitivity to harsh environments

Characteristics

Rated voltage	kV	7.2			12			17.5		
Primary voltage	kV	6/√3	6.6/√3	6/√3	10/√3	11/√3	10/√3	11/√3	13.8/√3	15/√3
Rated insulation and lighting impulse voltage	kV	20/60	20/60	32/60	28/75	28/75	42/75	38/95	38/95	38/95
1st secondary voltage	V	100√3	110√3	100√3	100√3	110√3	100√3	110√3	110√3	100√3
Rated burden and accuracy class		10 VA Cl 0.2								
2nd secondary voltage	V	100/3	110/3	100/3	100/3	110/3	100/3	110/3	110/3	100/3
Rated burden and accuracy class		30 VA 3P								

Note: Please consult us for the availability of the other current ratios and performances

PE58412

VRU2 for auxiliary power supply

The VRU2 is a phase-to-phase screened voltage transformer used in VTP and VTP-D auxiliary power supply functions.

- Compact dimensions and screened design for easy installation in Premset core units, insensitivity to harsh environments.
- Designed to withstand power frequency tests (no need for disconnection during commissioning)
- Power: 300 VA continuous, 500 VA for 1 minute

Characteristics

Rated voltage	**kV**	**7.2**			**12**			**17.5**	
Primary voltage	kV	6	6.6	6	10	11	10	13.8	15
Rated insulation and lighting impulse voltage	kV	20/60	20/60	32/60	28/75	28/75	42/75	38/95	38/95
1st secondary voltage	V	230							
Rated burden and accuracy class		30 VA cl 3							

AIS Current and voltage

Transformer for Premset

Synthesis table by unit

Current sensors								
Unit type	Metering CT				Block DIN		Block	
	Block CT				Phase-Earth	Phase-Phase	Phase-Earth	Phase-Phase
	AD12	AD13	ARM3	ARJP3	VDF11/21	VDC11/21	VRQ2	VRC2
M06A	●		●		●	●	●	●
M12A		●		●	●	●	●	●

Three different types of current transformers are used for tariff metering on Premset switchboards. They are all designed for easy installation and long service life.

Compliance with standard IEC 61896-2 and 50/60 Hz frequency for all current transformers.

AD12

AD13

AD12 and AD13

AD12 and AD13 are the medium voltage current transformer used in the M06A and M12A air-insulated metering core unit.

- Widely used type of current transformer with overall dimensions in accordance with DIN 42600 Teil 8 standard 12 kV size
- High accuracy over the entire measurement range.
- Single primary winding
- One secondary winding for metering(1)

AD12 characteristics						
Rated primary and secondary current	Ipr/Isr (A)	50/5	100/5	200/5	400/5	600/5
Rated short-time withstand current	Ith (kA)	25				
Withstand time	t (s)	1				
Measurement	Rated burden (min-max)	2.5 - 10 VA	2.5 - 15 VA			
	Accuracy class	Cl 0.2s Fs<5				

AD13 characteristics				
Rated primary and secondary current	Ipr/Isr (A)	800/5	1000/5	1200/5
Rated short-time withstand current	Ith (kA)	25		
Withstand time	t (s)	1		
Measurement	Rated burden (min-max)	2.5 - 15 VA		
	Accuracy class	Cl 0.2 s Fs<5		

Note: Please consult us for the availability of the other current ratios and performances

AIS Current and voltage

Transformer for Premset

PE58383

ARM3

The ARM3 is a block type medium voltage current transformer used in the M06A and M12A air-insulated metering core unit.

- Standard type of current transformer for Schneider Electric applications.
- High accuracy over the entire measurement range.
- Single primary winding
- One secondary winding for metering(1)

Characteristics

Rated primary and secondary current	Ipr/Isr (A)	50/5	100/5	200/5	400/5	600/5
Rated short-time withstand current	Ith (kA)	25				
Withstand time	t (s)	1				
Measurement	Rated burden (min-max)	2.5 - 15 VA				
	Accuracy class	Cl 0.2 s Fs<5				

Note: Please consult us for the availability of the other current ratios and performances

PE58389

ARJP3

The ARJP3 is a block type medium voltage current transformer used in 12A air-insulated metering core unit.

- Standard type of current transformer for Schneider Electric applications
- High accuracy over the entire measurement range
- Single primary winding
- One secondary winding for metering and one for protection

Characteristics

Rated primary and secondary current	Ipr/Isr (A)	800/5-5	1000/5-5	1200/5-5
Rated short-time withstand current	Ith (kA)	25		
Withstand time	t (s)	1		
Measurement	Rated burden & accuracy class	30 VA Cl 0.5		
	Rated burden & accuracy class	10 VA 5P20		

Note: Please consult us for the availability of the other current ratios and performances

AIS Current and voltage

Transformer for Premset

Different types of voltage transformers are used for tariff metering on Premset switchboards. They are all designed for easy installation and long service life.

Compliance with standard IEC61896-3 and 50/60 Hz frequency for all voltage transformers.

By using Phase-Earth VTs connected between phase and earth in a NOT solid earthed neutral system is the most favourable case for ferroresonance to occur.

In order to face ferroresonance issues it is always advisable to use the following solutions (mandatory one of the two):

- The usage of a dumping resistor connected to the open delta terminals of the residual voltage secondary circuit will help to dump ferroresonance.
- The usage of VTs working at lower induction level to avoid that over voltages could initiate ferroresonance.

The offer of lower induction VTs is available on request depending on the neutral system status, please contact us

PM103042

VDF11

PE58401

VDF21

VDF11 and VDF21

VDF11 and VDF21 phase-to-earth voltage transformers are used in the M06A and M12A air-insulated metering unit. Widely used type of voltage transformer with overall dimensions in accordance with DIN 42600 Teil 9 standard 17.5 kV size

Easy to adapt to local practices or specifications.

Characteristics		VDF11				VDF21
Rated voltage	kV	**7.2**		**12**		**17.5**
Primary voltage	kV	3/√3 to 6.6/√3	6/√3	6/√3 to 11/√3	10/√3	10/ √3 to 15/ √3
Rated insulation and lighting impulse voltage	V	20/60	32/60	28/75	42/75	38/95
1st secondary voltage	V	100/√3 or 110/√3	100/√3	100/√3 or 110/√3	100/√3	100/ √3 or 110/√3
Rated burden and accuracy class		5 VA to 10 VA class 0.2, or 5 VA to 20 VA class 0.5				
2nd secondary voltage	V	100/3 or 110/3	100/3	100/3 or 110/3	100/3	100/3 or 110/3
Rated burden and accuracy class		30 VA 3P				

Note: Please consult us for the availability of the other current ratios and performances

PE58446

VDC11

PE58398

VDC21

VDC11 and VDC21

VDC11 and VDC21 phase-to-phase voltage transformers are used in the M06A and M12A air-insulated metering unit.

- Widely used type of voltage transformer with overall dimensions in accordance with DIN 42600 Teil 9 standard 17.5 kV size
- Easy to adapt to local practices or specifications

Characteristics		VDC11				VDC21
Rated voltage	kV	**7.2**		**12**		**17.5**
Primary voltage	kV	3 to 6.6	6	6 to 11	10	10 to 15
Rated insulation and lighting impulse voltage	V	20/60	32/60	28/75	42/75	38/95
1st secondary voltage	V	100 or 110	100	100 or 110	100	100 or 110
Thermal power an accuracy class		5VA to 10VA class 0.2, or 5VA to 20VA class 0.5				

Note: Please consult us for the availability of the other current ratios and performances

AIS Current and voltage

Transformer for Premset

PE59408

VRQ2

VRQ2

VRQ2 phase-to-earth voltage transformers are used in the M06A and M12A air-insulated metering unit.

- Standard type of voltage transformer for Schneider Electric applications, VRQ2 and VRC2 already used in SM6 and RM6 metering cubicles.

Characteristics

Rated voltage	kV	**7.2**		**12**		**17.5**
Primary voltage	kV	3/√3 to 6.6/√3	6/√3	6/√3 to 11/√3	10/√3	10/√3 to 15/√3
Rated insulation and lighting impulse voltage	V	20/60	32/60	28/75	42/75	38/95
1st secondary voltage	V	100/√3 or 110/√3	100/√3	100/√3 or 110/√3	100/√3	100/√3 or 110/√3
Rated burden and accuracy class		5 VA to 30 VA class 0.2, or 5 VA to 50 VA class 0.5				
2nd secondary voltage	V	100/3 or 110/3	100/3	100/3 or 110/3	100/3	100/3 or 110/3
Rated burden and accuracy class		30 VA 3P				

Note: Please consult us for the availability of the other current ratios and performances

PE59403

VRC2

VRC2

VRC2 phase-to-earth voltage transformers are used in the M06A and M12A air-insulated metering unit.

- Standard type of voltage transformer for Schneider Electric applications, VRC2 or already used in SM6 and RM6 metering cubicles

Characteristics

Rated voltage	kV	**7.2**		**12**		**17.5**
Primary voltage	kV	3 to 6.6	6	6 to 11	10	10 to 15
Rated insulation and lighting impulse voltage	V	20/60	32/60	28/75	42/75	38/95
1st secondary voltage	V	100 or 110	100	100 or 110	100	100 or 110
Rated burden and accuracy class		5VA to 30VA class 0.2, or 5VA to 50VA class 0.5				

Note: Please consult us for the availability of the other current ratios and performances

Protection, monitoring and control

Protection, monitoring and control

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Protection
Selection guide

PM100573

VIP 40 and VIP 45

PM100576

VIP 400 and VIP 410

VIP self-powered integrated protection

Optimised performance for Premset

- Integrated protection relay
  - complete engineered and pre-tested protection system: dedicated CT and low power actuator (Mitop)
  - savings on space and cabling time
- Self-powered protection
- Optimised for Premset: core unit switchgear and protection designed to work together in an optimum manner:
  - optimisation of the breaking time
- Simple protection, easy to implement
- Perfectly adapted to dedicated applications.

VIP 40 and VIP 45: designed for D01N and D02N transformer protection circuit breakers

- MV/LV 100 A (D01N) or 200 A (D02N) transformer protection
- Dedicated protection curve to protect against overloads, short-circuits and earth faults with straight-forward settings
- Fast clearing time or transformer short-circuits (< 60 ms): no fuse needed.

VIP 400 and VIP 410: designed for D06N and D06H general protection circuit breakers

- Substation protection (incomers, feeders, bus risers) using D06N (standard duty) or D06H (heavy duty) 630 A circuit breakers
- MV/LV transformer protection instead of VIP 40 and VIP 45 if more functions are required
- DT (Definite Time) and standard IDMT (Inverse Definite Minimum Time) tripping curves
- Switchgear diagnostics
- Multi-language display
- VIP 410 includes a dual supply (self-powered plus auxiliary) for communication and high sensitivity earth fault protection.

High sensitivity sensors

A VIP integrated protection system is composed of sensors, a processing unit and an actuator, designed together to provide the highest level of reliability and sensitivity from 0.2 A to 20 In for VIP 400 and VIP 410 and 5 A to 20 In for VIP 40 and VIP 45 (see page 93).

Protection

Selection guide

PE88030

Sepam series

Sepam series

Protection relays of the Sepam series are also available and have the following characteristics:

- External auxiliary power
- Open range
- From basic to more sophisticated protection
- Standard CTs and trip actuators (see page 79).

PM105840

MiCOM series

MiCOM series

MiCOM protection provides the user with a choice of cost-optimised solutions for specific protection requirements within the distribution network.

The MiCOM relay series offers comprehensive protective function solutions for all power supply systems as well as for various functional and hardware project stages.

PM104085

Easergy P5 series

Easergy P5 series: a fusion of new ideas and proven expertise

Easergy P5 relays provide best-in-class protection for all types of installations, together with new smart grid features and a lower total cost of ownership.

Fast delivery and multivendor interoperability make the range that much simpler to integrate into your electrical network. Furthermore, a unique combination of modern features and proven components make it the right choice for forward-looking network operators.

Easergy protection relays bring new benefits in addition to compliance with the latest international standards:

- Enhanced safety and security
- Outstanding ease of use
- Greater efficiency
- Optimised total cost of ownership

The Easergy P5 series includes a variety of models:

	P5 (20TE) **Current or voltage**	**P5** (30TE) * **Current and Voltage**
Feeder	P5F20	P5F30 With directional
Voltage	P5V20	
Motor	P5M20	P5M30
Generator		P5G30

* Please consult us for availability

Protection
Selection guide

		VIP series				Sepam / MiCOM series		Easergy series
		Integrated self-powered protection optimised for Premset				General		
		Transformer protection		General protection				
		VIP 40	VIP 45	VIP 400	VIP 410	Sepam	MiCOM	P5
Protection functions								
Phase overcurrent (ANSI 50-51)		●	●	●	●	●	●	●
Earth fault phase (ANSI 51N)	Standard (sum of current method)		●	●	●	●	●	●
	High sensitivity (earth fault CTs)				●	●	●	●
Thermal overload (ANSI 49)				●	●	●	●	●
Cold load pick-up					●	●	●	●
Other protection functions [1]						●	●	●
Measurement functions								
Phase current		●	●	●	●	●	●	●
Earth current			●	●	●	●	●	●
Phase peak demand current		●	●	●	●	●	●	●
Load history	Cumulative time			●	●	●	●	●
Control and monitoring functions								
Trip indication	Local (with origin of the fault)	●	●	●	●	●	●	●
	Remote (one contact)	●	●	●	●	●	●	●
	Output relays				● [2]	●	●	●
Trip circuit supervision (ANSI 74TC)		●	●	●	●	●	●	●
Time-tagged events	Local on display (5 last trips)			●	●	●	●	●
	Remote, via communication				●	●	●	●
External tripping input					●	●	●	●
Overcurrent and breaking profile	Number of phase and earth trips [3]			●	●	●	●	●
Serial communication port	Modbus RS485				●	●	●	●
Digital inputs/outputs for control functions						●	●	●
Power supply								
Type of supply	Self-powered or auxiliary	Self	Self	Self	Dual [4]	Auxiliary	Auxiliary	Auxiliary
	Minimum 3 phase load currents to activate the VIP	4 A	4 A	7 A [5]	–			

(1) See Sepam user guide.

(2) Signalling relays: (use of output relays may be change):
O1 = phase fault (I>, I>>, I>>>)
O2 = earth fault (Io>, Io>>)
O3 = thermal overload alarm.

(3) The number of trips is displayed in 4 levels:
For D01 and D02: < 200 A, < 2 kA, < 8 kA, > 8 kA
For D06 and D06H: < 630 A, < 10 kA, < 20 kA, > 20 kA.

(4) The protection is self-powered. Auxiliary power is used only for communication and high sensitivity earth fault protection.

(5) 14 A with 630 A CBs.

Protection

VIP 40 and VIP 45

Schneider Electric recommends circuit breakers for transformer protection instead of fuses.

They offer the following advantages:

- Easy to set
- Better discrimination with other MV and LV protection devices
- Improved protection performance for inrush currents, overloads, low magnitude phase faults and earth faults
- Greater harsh climate withstand
- Reduced maintenance and spare parts
- Availability of additional functions such as measurement, diagnostics and remote monitoring

And with the recent development of low cost circuit breakers and self-powered relays, life time costs are now equivalent to those of traditional MV switch fuse solutions

PM100574

Application

- Entry level MV/LV transformer protection
- Dependent-time phase overcurrent tripping curve dedicated to MV/LV transformer protection
- Definite-time earth fault protection
- Phase current and peak demand current measurement

Main features

Self-powered operation

- Energised by the CTs: no auxiliary power needed

Complete pre-tested protection system

- Functional block ready to be integrated

Designed for Premset to protect transformers

- Designed for D02N 200 A and D01N 100 A circuit breakers to replace fuse-switch solutions
- Setting is as simple as fuse selection
- Maximum setting possibilities consistent with circuit breaker characteristics

Phase overcurrent protection

- Tripping curve optimised for MV/LV transformer protection
- Protection against overloads and secondary and primary short-circuits
- Second harmonic restraint filtering
- Only one setting (I>)
- Discrimination with LV circuit breakers or LV fuses
- Compliant with TFL (Time Fuse Link) operating criteria

Earth fault protection

- Definite-time tripping curve
- Settings: Io> (phase current sum method) and to >
- Second harmonic restraint element

Measurement

- Load current on each phase
- Peak demand current.

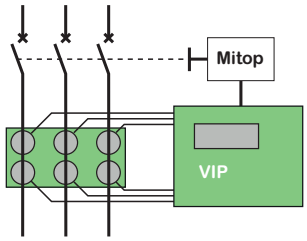
Front panel and settings

- Current measurements displayed on a 3 digit LCD
- Settings with 3 dials (I>, Io>, to>) protected by a lead-sealable cover
- Trip indication powered by dedicated integrated battery with reset by pushbutton or automatically

Protection

VIP 40 and VIP 45

DM100009



Dual core CTs
in a block under
the core unit

Dual core CTs: for power and for measurement

Other features

- Complete pre-tested solution that eliminates complicated CT selection
- Complies with MV protection relay standard IEC 60255
- No PC or specific tool required for setting or commissioning
- Maximum setting possibilities consistent with circuit breaker features
- Self-powered by dual core CTs: CuA
- Environment: -40°C / +70°C.

Primary injection test

- A primary injection circuit may be permanently installed (option) through the CTs, inside the Premset cubicle, to test the physical integrity of the complete protection system including the CTs
- The test is carried out without disconnecting the CTs and the VIP 40 and VIP 45 displays the injected current during testing
- If required, a temporary VIP 40 and VIP 45 test mode can be activated to test the tripping of the circuit breaker by pressing a test pushbutton.

Test with the Pocket Battery module

- This accessory can be connected on the VIP 40 and VIP 45 front plate to energise the relay to carry out a quick test even when the relay is not powered (the temporary “VIP 40/45 test mode” can be activated for the circuit breaker).

PB103790

Pocket battery

Pocket battery for VIP

This unit is used to power the VIP 40, VIP 45, VIP 400 and VIP 410 units, making it possible to operate and test the protection system.
It can also be used to power Schneider Electric LV circuit breakers.

Protection

VIP 400 and VIP 410

- VIP 400 is a self-powered relay energised by the CTs; it does not require an auxiliary power supply to operate
- VIP 410 is a dual powered relay offering self-powered functions and additional functions powered by an AC or DC auxiliary supply

PM100580

Applications

- MV distribution substation incomer or feeder protection relay
- MV/LV transformer protection.

VIP 410 ready for smart grids

Dual supply for communication with:

- DMS and RTUs
- Remote alarming
- Time stamped events
- Measurements of current, load history, overcurrent and breaking profile

Dedicated to intelligent MV loops with automation:

- Remote configuration
- Setting groups selectable according to the configuration of the MV loop
- Remote asset management
- Plug and play system with Easergy RTUs (R200) to integrate all protocols (IEC 60870-104, DNP3, IEC 61850) and remote Web pages

Main features

VIP 400: Self-powered protection relay

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

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

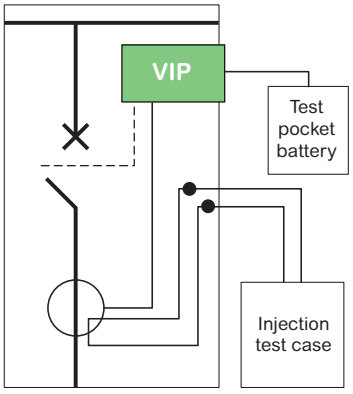
VIP 410: Dual powered protection relay

- Offers the same self-powered functions as the VIP 400
- In addition, the VIP 410 has an AC or DC auxiliary supply to power certain
  - Additional functions that cannot be self-powered
  - Sensitive earth fault protection
  - External tripping input
  - Cold load pick-up
  - Communication (Modbus RS485 port)
  - Signalling
- If the auxiliary power fails during an MV short-circuit, the protection functions are maintained

Protection

VIP 400 and VIP 410

DM100040



Tests of protection system and circuit breaker

Other features

- Designed for Premset D02N 200 A and D06N 630 A circuit breakers
- Complete pre-tested solution that eliminates complicated CT selection
- Complies with MV protection relay standard IEC 60255
- No PC or specific tool required for setting or commissioning
- Self-powered by dual core CTs
- Environment: -40°C / +70°C.

Primary injection test

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

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

Test with the Pocket Battery module

- This accessory can be connected on the VIP relay front plate to energise the relay to carry out a quick test even though the relay is not powered. This module also makes it possible to test the circuit breaker.

PB103790

Pocket battery

Pocket battery for VIP

This unit is used to power the VIP 40, VIP 45, VIP 400 and VIP 410 units, making it possible to operate and test the protection system.
It can also be used to power Schneider Electric LV circuit breakers.

Protection

VIP integrated system

The VIP series is an integrated protection system:

- Dedicated sensors located under the core unit provide protection and measurement outputs
- Optional additional earth fault sensors are available
- Actuators are low power tripping coils (Mitop).

High sensitivity sensors

VIP integrated protection system

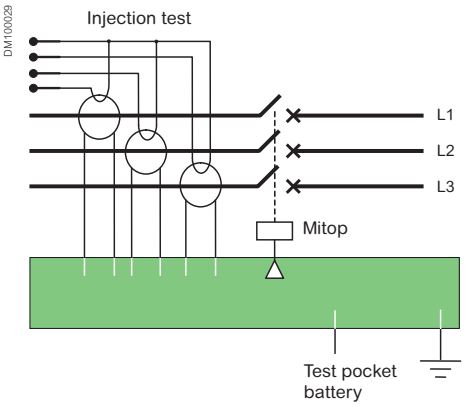
The VIP integrated protection system is composed of sensors, a processing unit and an actuator, designed together to provide the highest level of reliability and sensitivity from 0.2 A to 20 In for VIP 400 and VIP 410 and 5 A to 20 In for VIP 40 and VIP 45.

Actuators

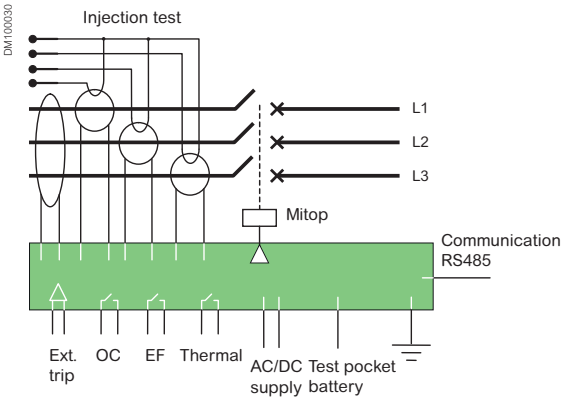
- The actuator is a dedicated low power tripping coil (Mitop) specifically designed to operate with the sensors and the processing unit with minimum energy.
- The integrity of the Mitop circuit is continuously supervised (Trip Circuit Supervision function).

Connection diagrams

VIP 40, VIP45 & VIP 400



VIP 410



Protection

Protection relay selection

Sepam, MiCOM and Easergy

Function		Sepam series 20/40	MiCOM series 20	Easergy P5
		 PE90511	 PE90366	New  PM104085
Feeder	Phase and earth-fault	●	●	●
	With directional	● (1)	●	
	With line differential		●	
	With distance			
Voltage	Voltage and frequency	● (1)	●	●
Transformer	Phase and earth-fault	●	●	●
	With transformer differential			
Motor	Phase and earth-fault	●	●	●
	With voltage	● (1)	●	
	With machine differential			
Generator	Phase and earth-fault	●		
	With directional	● (1)		
	With machine differential			
Busbar	With busbar differential			
Capacitor bank				
Sensors		• CT (1 or 5 A) or LPCT • VT	• CT (1 or 5 A) • VT	• CT (1 or 5A) • VT
Display		• Standard UMI • Remote UM	Standard UMI	Standard UMI
Other characteristics			Withdrawable hardware	Withdrawable hardware
Input/Output (up to)		10/8	12/11	10/8
I/O terminals		• Screw type • Ring lug	Ring lug	Screw type
Temp. sensors (up to)		8 or 16 (1)	10 (motor)	8
Communication protocol		• Modbus RTU • IEC 60870-5-103 • DNP3 • Modbus TCP/IP • IEC 61850 (1) (2) • RSTP	• Modbus RTU • IEC 60870-5-103 • DNP3	• Modbus RTU • Modbus TCP/IP • IEC 61850
Logic equations		Comprehensive logic equations (1)	Basic logic equations	Matrix
Standards		IEC, EAC, CE, UL, CSA	IEC, EAC, CE, UL, CSA	• Cyber security (IEC 62351) • IEC, CE, UL, CSA, EAC

(1) Sepam 40 series

(2) Without GOOSE message

Protection

Protection relay selection

Easergy Sepam and Easergy MiCOM

Function		Easergy Sepam series 60	Easergy Sepam series 80	Easergy Micom series 30
		 PE90488	 PE90512	 PE90622
Feeder	Phase and earth-fault	•	•	•
	With directional	•	•	•
	With line differential			•
	With distance			•
Voltage	Voltage and frequency	•	•	•
Transformer	Phase and earth-fault	•	•	•
	With transformer differential		•	•
Motor	Phase and earth-fault	•	•	•
	With voltage	•	•	•
	With machine differential		•	
Generator	Phase and earth-fault	•	•	
	With directional	•	•	
	With machine differential		•	
Busbar	With busbar differential			
Capacitor bank		•	•	
Sensors		• CT (1 or 5 A) or LPCT • VT	• CT (1 or 5 A) or LPCT • VT	• CT (1 or 5 A) • VT
Display		• Standard UMI • Remote UM • Mimic based UMI	• Standard UMI • Remote UM • Mimic based UMI	• Standard UMI • Remote UMI • Mimic based UMI
Other characteristics		Removable S/W cartridge	Removable S/W cartridge	• Bay controller • High firmware/hardware variability
Input/Output (up to)		28/16	42/23	80/45
I/O terminals		• Screw type • Ring lug	• Screw type • Ring lug	• Screw type • Ring lug
Temp. sensors (up to)		8 to 16	8 to 16	10
Communication protocol		• Modbus RTU • IEC 60870-5-103 • DNP3 • Modbus TCP/IP • IEC 61850 with GOOSE • RSTP	• Modbus RTU • IEC 60870-5-103 • DNP3 • Modbus TCP/IP • IEC 61850 with GOOSE • RSTP	• Modbus RTU • IEC 60870-5-101/103 • DNP3 • IEC 61850 with GOOSE • RSTP/SHP/DHP • PRP
Logic equations		Comprehensive logic equations	Control logic by ladder diagram	Comprehensive logic equations
Standards		UL, CSA, EAC, ATEX	IEC 61508-SIL2, UL, CSA, EAC, ATEX	IEC, EAC, ATEX

Fault passage indicators

Flair 21D, 22D and 23DM

Flair 21D, 22D, 23DM is a family of DIN format fault passage indicators.

They are small in size, self-powered and adapt automatically to the network.

These devices use cutting-edge technology to detect earth faults on underground MV networks with isolated, resistor-earthed or directly earthed neutral and overcurrents on all networks.

- Self-powered, the fault current passage detection and indication system operates continuously
- Adjustment-free, they are immediately operational (numerous manual adjustments are however possible)
- Compact, their DIN format easily fits in MV cubicles
- Smart, they offer an ammeter/digital maximeter function
- Comprehensive, the Flair 23DM version incorporates a highly sophisticated voltage presence/absence relay function with RJ45 Modbus communication.

Applications and main features

The Flair range increases your power availability by providing indicators suitable for fault locating and MV network load management.

- Indication of phase-phase and phase-earth faults
- Display of settings
- Indication of the faulty phase
- Display of the load current including peak demand and frequency
- Fault passage indication and voltage detection combination (Flair 23DM)
- RJ45 communication (Flair 23DM only).

These fault passage indicators are reliable and easy to use.

- Automatic setting on the site
- Fault indication with LED or outdoor lamp
- 15-year battery life for Flair 22D
- More accurate fault detection if Flair 22D or 23DM is connected to voltage presence indication system (VPIS) voltage output
- Can be factory-mounted in Premset cubicles or added on the site
- Easy on-site addition without removing MV cables using split-type current sensor.

Fault detection functions

Overcurrent detection

- Automatic mode for adjustment-free calibration of detection thresholds
- Manual mode for special override settings:
  - Flair 21D: 4 detection thresholds from 200 A to 800 A, in 200 A increments, selectable via microswitches
  - Flair 22D and Flair 23DM: 8 detection thresholds from 100 A to 800 A, in 50 A increments, configurable via the front panel keypad.
- Fault acknowledge time:
  - Flair 21D: 60 ms
  - Flair 22D and Flair 23DM (configurable via the front panel keypad)
    - from 40 to 100 ms in 20 ms increments
    - from 100 to 300 ms in 50 ms increments.

Earth fault detection

The detector checks the 3 phases for current variations (di/dt).
A time delay of 70 s is applied for fault confirmation by the upstream protective device.

- Automatic mode for adjustment-free calibration of detection thresholds
- Manual mode for special override settings:
  - Flair 21D: 6 detection thresholds from 40 to 160 A, via microswitches
  - Flair 22D and Flair 23DM (configurable via the front panel keypad):
    - Type A from 20 to 200 A, in 10 A increments
    - Type B from 5 to 30 A in 5 A increments and 30 to 200 A in 10 A.

Inrush function: prevents unnecessary detection in the event of load switch-on.
Incorporates a 3 s time delay for fault filtering at network power up.
The Inrush function can be disabled via configuration on Flair 22D and 23DM.

Fault passage indicators

Flair 21D, 22D and 23DM

- Earth fault sensitivity as low as 5 A
- Display of settings and faulty phase
- Automatic reset

PE57783

Flair 21D

PE57784

Flair 22D

EMS58365

Flair 23DM

Fault indication function

Signalling

As soon as a fault is confirmed, the indication device is activated.

- Fault indication via a red LED on the front panel
- Indication of the faulty phase (earth fault) on LCD display
- Optional remoting of indication to external flashing lamp
- Activation of a contact for retransmission to the SCADA system

Indication reset

- Automatic resetting upon load current recovery or on voltage return if VPIS-VO option present (configurable time on Flair22D, Flair23DM)
- Manual reset via front panel button
- Reset via external Reset input
- Reset by time delay: fixed (4 hr) for Flair 21D and adjustable using front panel keypad (1 hr to 24 hr) for Flair 22D and Flair 23DM.
- Reset via the communication (Flair 23DM)

Fault passage indicators

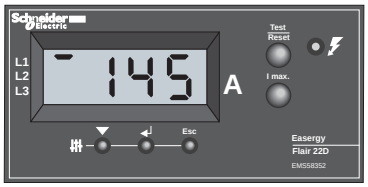
Flair 21D, 22D and 23DM

Sensors

The Flair 21D, 22D, 23DM range uses an integrated detection system composed of indicators and dedicated CTs.

Integrated sensors are normally placed around the bushings. Split CTs can be placed around cables for retrofit purposes.

DE58715



Clear, comprehensive display

Display principle

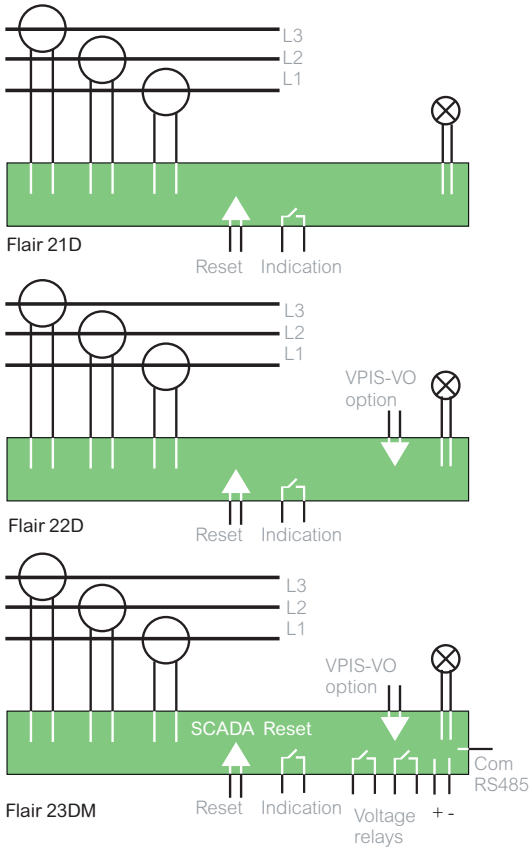
- The load current is displayed continuously
- When a fault is detected, the faulty phase is indicated
- Use the buttons on the front panel to scroll through settings and measurements.

		Flair 21D	Flair 22D	Flair 23DM
Power supply	Self-powered	●	●	●
	Dual-powered		● (1)	●
Detection	Overcurrent	●	●	●
	Earth-fault	●	●	●
Display (4 digit LCD)	Ammeter	●	●	●
	Maximeter	●	●	●
Options	SCADA interface (relay)	●	●	●
	External lamp	●	●	●
	External reset		●	●
	Extended setting (keypad)		●	●
Communication	2-voltage output relays			●
	Serial communication port			●

(1) By lithium battery

Connection diagrams

DM1000048



Characteristics per product

Model	Description
Fault passage indicator with single power supply (self-powered)	
Flair 21D	• Detector with autonomous power supply • External indicator lamp output powered by battery (BVP)
Fault passage indicator with dual power supply	
Flair 22D	• Detector with autonomous power supply and lithium battery • External indicator lamp output powered by the Flair (BVE) • Interface with VPIS-VO possible to confirm the fault by voltage absence • Service life: 15 years
Fault passage indicator with dual power supply and voltage presence/absence	
Flair 23DM	• Detector with 24-48 Vdc external and autonomous power supply • External indicator lamp output powered by the Flair (BVE) • Voltage presence and absence detector (same as for VD23) • Interface with VPIS-VO needed for the voltage presence • Communication on an RS485 serial link with Modbus protocol with access to states and measurements and remote parameter-setting
Standard applications	
Flair 21D	Maintenance-free, adjustment-free fault detector
Flair 22D	Fault detector for networks with very low load current (< 2 A) with possibility of manual adjustments.
Flair 23DM	• Adapted to Feeder Automation. Forwarding of current measurement, fault passage indication and voltage outage information to the SCADA via a serial communication port. • Combination fault passage indicator and voltage detector, ideal for use with an Automatic Transfer System.

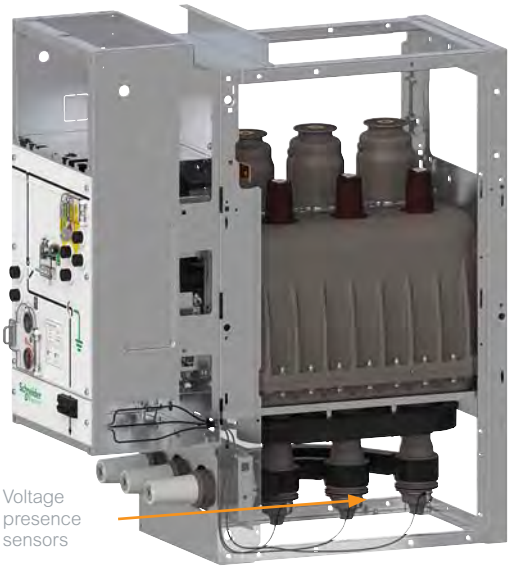
Voltage indicator and relay

VPIS and VDS

PE56366

VPIS

PM100033



Voltage presence sensors on busbars or cables

PE56830

Phase concordance unit

Voltage presence indicators

A voltage presence indicating device can be integrated in all the functional units, either on the cable or busbar side. It can be used to check whether or not a voltage is present across the cables.

Two devices are available:

- VPIS:
  Voltage Presence Indicator System, as defined by standard IEC 62271-206
- VDS:
  Voltage Detecting System, as defined by standard IEC 61243-5.

The VPIS can be fitted with a voltage output (VPIS-VO) dedicated to various voltage detection applications such as automatic transfer switches, voltage absence or presence contacts, live-cable earthing switch lockout.

Voltage sensors

A voltage sensor is integrated in all the functional units. It provides a signal with an accuracy of 5% to the VPIS through a 30 pF capacitive divider.

The sensor is integrated in the tightening cap used to fix the busbar or cable connections. The voltage can be detected either on the cable side or the busbar side.

Phase concordance unit

This unit is used to check phase concordance.

Voltage indicator and relay

VD23 voltage relay

The VD23 is a voltage detecting system for automatic transfer system or interlock applications.

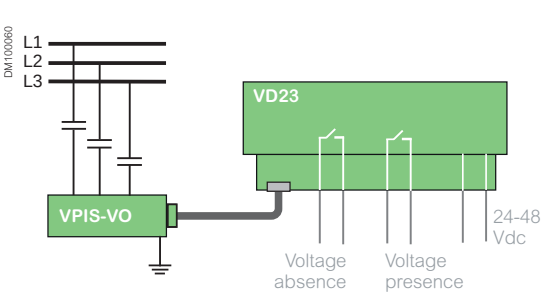
Various combinations:

- Presence or absence voltage relay
- Zero sequence voltage relay
- Phase-to-neutral or phase-to-phase voltage
- Phase selection.

Easy to install:

- Compact 96 x 48 mm DIN format
- Terminal connection for VPIS-VO
- No need for HV transformer
- Hot installation
- Auto-adaptation of nominal voltage.
- Optional communication port and fault detector (Flair 23DM)

VD23



Features

The VD23 is a compact voltage relay for 3 kV to 36 kV, 50/60 Hz medium voltage networks. It is associated with a capacitive divider and a VPIS-VO.

- 2 output relays based on 2 functional modes:
  - R1 = Voltage presence (typically used for automatic transfer switching)
  - R2 = Voltage absence (typically used for interlocking of earthing switch).
- Thresholds can be set as a percent of phase-to-neutral voltage (V), phase-to-phase voltage (U) or residual voltage (VO)
- All combinations of voltage conditions are possible:
  - 3 phases and residual: V1+V2+V3+VO
  - 3 phases: V1+V2+V3 or U12+U13+U23
  - Single phase: Vo, V1, V2, V3, U12, U13 or U23
- Output is a tripping order via two output relays with a normal or inverse active position
- Signalling and tripping outputs may be set with a delay.

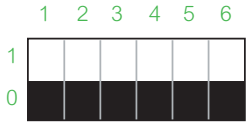
Display principle

- Voltage value (% of Un) of L1, L2 and L3 shown on the display
- Voltage presence/absence indication via LED
- Settings by front pushbuttons and LCD
  thresholds, delays and smart parameters
  display of all settings on LCD.
- Auto-adaptation of the nominal system voltage
- Check on voltage status.

Advanced settings

All the combinations can be set with microswitches on the rear of the device. The use of two relays provides safety backup operation for each combination

6 microswitches:



1. Ph-N voltage(V) / Ph-Ph voltage(U)
2. Direct / inverse action on output relays
3. Phase 1 used / not used
4. Phase 2 used / not used
5. Phase 3 used / not used
6. Residual voltage used / not used

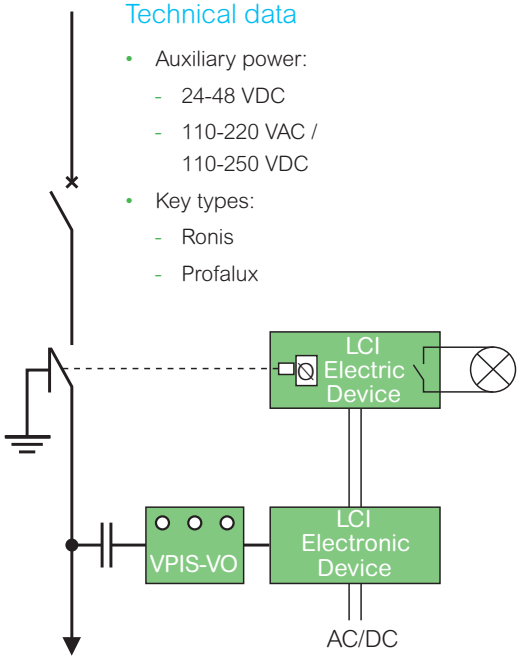
Wiring (with VPIS-VO)

All the combinations can be set with microswitches on the rear of the device. The use of two relays provides safety backup operation for each combination.

Live cable interlock

Functions

DM100024



Technical data

- Auxiliary power:
  - 24-48 VDC
  - 110-220 VAC / 110-250 VDC
- Key types:
  - Ronis
  - Profalux

The “live cable interlock” function is an electrical interlock helping to prevent the operator from closing the earthing switch on live cables.

Even if all the earthing switches integrated in Premset core units have full making capacity performance, it may be useful to avoid creating intempestive faults by inadvertently earthing live cables.

Principle

The system is composed of:

- A mechanical locking assembly acting directly on the line / earth selector, including an override key that can be used to bypass the locking device
- An undervoltage coil for high failsafe operation of the mechanical lockout system (see MN, page 75)
- A dedicated electronic auxiliary-powered voltage relay (ESL) fitted with an auxiliary contact for remote indication of “locked” position
- A VPIS indicator on the cable side, with a voltage output (VPIS-VO), to detect and send the voltage signal to the relay.

Operation

- Normal case : the system is powered by auxiliary power. It is then impossible to move the selector from “line” to “earth”, as long as voltage is detected on the cable by the VPIS.

In case of auxiliary power loss, cables live or not, a failsafe features blocks the system so the selector cannot be operated.
Override is possible only by unlocking the system with key or when auxiliary power is restored.

Technical data

Auxiliary power	• 24-48 VDC: ESL100 A • 110-220 VAC / 110-250 VDC: ESL100 E
Key types	• Tubular • Flat
Undervoltage coil	

Thermal monitoring

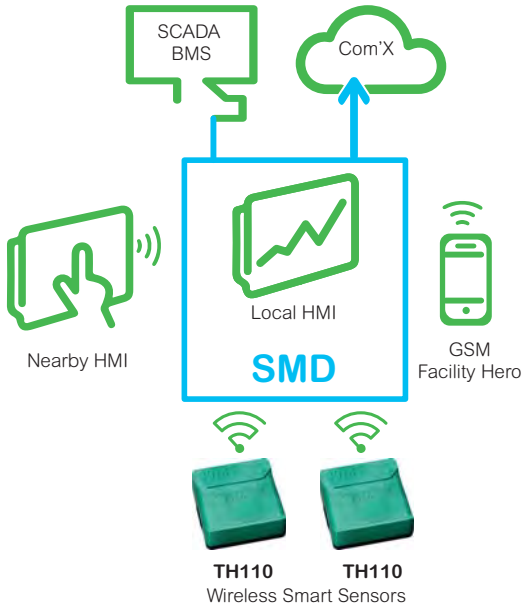
Easergy T110: wireless thermal sensors *

* Please consult us for availability

Key benefits

- Battery free
- Wireless communications
- High performances
- In contact measuring point
- Easy installation
- Compact footprint
- Remote monitoring and alarming

DM105320



Continuous thermal monitoring

The power connections in the Medium Voltage products are one of the most critical points of the substations especially for those made on site like:

- MV Cable connections
- Bus bar connections
- Withdrawable CB connections

Loose and faulty connections cause an increase of resistance in localized points that will lead to thermal runaway until the complete failure of the connections.

Preventive maintenance can be complicated in severe operating conditions also due to limited accessibility and visibility of the contacts.

The continuous thermal monitoring is the most appropriate way to early detect a compromised connection.

Easergy TH110 thermal sensor

Easergy TH110 is part of the new generation of wireless smart sensors ensuring the continuous thermal monitoring of all the critical connections made on field allowing to:

- Prevent unscheduled downtimes
- Increase operators and equipments safety
- Optimize maintenance with predictive information

Thanks to its very compact footprint and its wireless communication, Easergy TH110 allows an easy and widespread installation in every possible critical points without impacting the performance of the MV Switchgears.

By using Zigbee Green Power communication protocol, Easergy Th110 ensure a reliable and robust communication that can be used to create interoperable solutions evolving in the Industrial Internet of Things (IIoT) age.

Easergy TH110 is self powered by the network current and it can ensure high performances providing accurate thermal monitoring being in direct contact with the measured point.

Substation monitoring device

Easergy TH110 is connected to the Substation Monitoring Device (SMD) that harvest the data for local signaling, data analyses and nearby display.

Specific monitoring algorithms allow to detect drifts from the threshold based on the specific installation characteristics also in regards of the variable loads or abnormal behaviors coming from phases comparison.

The remote monitoring and alarming ensure full peace of mind thanks to remote connection for SCADA or Services, access to Cloud-based Apps and digital services and alarming through SMS or Facility Hero mobile App.

Characteristics	
Power supply	Self powered. Energy harvested from power circuit.
Minimum activation current	5 A
Accuracy	+/- 1°C
Range	-25 °C / +115°C
Wireless communication	ZigBee Green Power 2,4 GHz
Dimension - Weight	31 x 31 x 13 mm - 15 g

Integrated measurement

AMP 21D ammeter

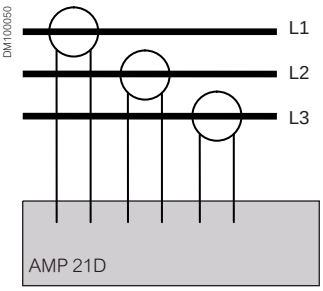
- Traditionally, three analogue dial-type ammeters were installed on MV feeders with a costly and bulky TC to power them . These devices had poor accuracy (cl. 1.5) and no maximeters to provide feedback on the maximum load
- Now, with the AMP 21D digital ammeter, all feeders can be equipped with small CTs that provide accurate measurements and a maximeter function, all at a lower price
- The AMP 21D is self-powered to display currents continuously
- Its compact DIN format easily fits in Premset MV cubicles
- Versatile, it displays phase current and maximum current

PE57786

AMP 21D

Connection diagram

DM100050



Functions

The Easergy Amp 21D is an ammeter dedicated to the display of the load current on Medium Voltage networks.

It is particularly suited to network load management applications.

- Display of the 3 phase currents: I1 , I2 , I3 (range: 3 A to 800 A)
- Display of the 3 phase current maximums: M1, M2 , M3 (range: 3 A to 800 A)

Display principle

- Load currents are displayed by default, with continuous scrolling of L1, then L2, then L3.
- The maximeter is displayed by pressing a dedicated pushbutton, with continuous scrolling of maximum currents M1, then M2, then M3.
- The maximums are reset by pressing a combination of two pushbuttons

Design

Small enclosure

- DIN format: 93 x 45 mm
- Secured, extraction-proof mounting
- Terminal connections

Technical data

Frequency			50 Hz and 60 Hz
Load current		Minimum current	3 A
Measurement	Range	Phase current	3 to 800 A
		Accuracy (I < 630 A)	±3%, ±2 A
	Reset of maximeter	Manual from device	Yes
Power supply	Self powered	From the current sensors	I load > 3 A
	Battery		No
	Auxiliary supply		No
Display	Display • Current per phase • Maximeter current per phase	4 digits LCD • Yes (resolution 1 A) • Yes	
Sensors	Phase CTs	3 ring or split core CT(1)	
Other	Test	Yes	

(1) CT selection refer to page 79

Integrated measurement

PM5000 series Power Meter

PowerLogic PM5000 series help you:

- Reduce energy costs
- Simplify installation
- Improve continuity of service for optimal management of your electrical installation and higher productivity

PB111776

PM5000 series Power Meter

Applications and main features

The PowerLogic PM5000 power meter is the ideal fit for cost management applications. It provides the measurement capabilities needed to allocate energy usage, perform tenant metering and sub-billing, pin-point energy savings, optimize equipment efficiency and utilization, and perform a high level assessment of the power quality of the electrical network.

In a single 96 x 96 mm unit, with a graphical display, (plus optional remote display) all three phases, neutral and ground can be monitored simultaneously.

Highly accurate devices with 3rd party certification.

The Power Meter series 5000 is available in multiple versions including:

- PM5100, basic version with pulse output, class 0.5S accuracy
- PM5110, RS485 port with Modbus communication, class 0.5S accuracy
- PM5340, multi-tariff, data logging, Ethernet communication, class 0.5S accuracy
- PM5560, multi-tariff, data logging, WAGES metering, Gateway, class 0.2S accuracy, simultaneous communication via Modbus TCP and BACnet/IP

Characteristics

- * High-accuracy energy metering: IEC 62053-22 Class 0.5S or Class 0.2S
- Multiple communication options: RS485, Ethernet or both
- Dual Ethernet ports (PM5560 models) to daisy chain meters together - less wiring, simpler installation
- Ethernet-to-serial gateway functionality (PM5560)
- Protocol options include Modbus RTU, Modbus TCP and BACnet/IP
- Data logging (PM5340, PM5560 models)
- Multiple tariffs (PM5340, PM5560 models)
- Complete WAGES monitoring with 4 Digital Inputs & 2 Digital Outputs
- Onboard web pages (PM5560 models) for viewing real-time and logged information
- Bright, anti-glare graphical display with intuitive menu-driven navigation

Integrated measurement

PM8000 series Power Quality Meter

PowerLogic PM8000 series:

Compact, high-performance meters for cost and network management applications on feeders and critical loads.

- Detailed PQ compliance reporting, and expert-level root-cause analytics.
- Power monitoring, logging, and forecasting to help ensure your electrical system stays within safe operating tolerances, avoiding the risk of overloads, unbalances, or high peak demand

PB113683

PM8000 series Power Quality Meter

Applications and main features

The PowerLogic PM8000 series meter is a highly accurate, extremely reliable power and energy meter with unmatched flexibility and usability. The meter combines accurate 3-phase energy and power measurements with data logging, power quality analysis, alarming and I/O capabilities not typically available in such a compact meter.

The PM8000 series meters are compliant with stringent international standards that guarantee their metering accuracy and power quality measurements. Ideal for industrial and critical power installations that are responsible for maintaining the operation and profitability of a facility.

The PM8000 series is available in the versions:

- **PM8240**, panel mount, integrated display
- **PM8244**, DIN rail mount, remote display

Characteristics

- High-accuracy energy metering: IEC 62053-22 Class 0.2S
- Time synchronization
- Multi-tariff support
- WAGES metering support
- PQ compliance monitoring: IEC 61000-4-30 class S, IEC 62586, EN 50160, IEEE 519
- PQ analysis capabilities: Dip & swell detection, waveform capture, disturbance direction detection, trending & forecasting
- Protocols: ION, Modbus, DNP3, IEC 61850
- Ports: RS-485, dual-port Ethernet, Ethernet-to-serial gateway
- Graphical, color display
- Onboard, customizable web pages
- Modular I/O extension modules.

Control

SC110: electrical operation auxiliaries

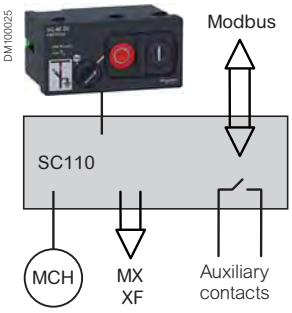
The SC110 is an intelligent electronic device designed to control and monitor all the components involved in the remote control of core units.

It integrates all the necessary functions for reliable remote control:

- Electrical interlocking
- Remote control supervision
- Front panel interface for local operation
- Built-in Modbus communication and "Plug and play" design makes the SC110 and the remote control facility:
  - easy to use
  - easy to upgrade.

SC110A 3 RJ45 Modbus plugs

SC-MI control panel



The SC110 is installed in the Low Voltage cabinet of the functional unit. It controls and monitors all the devices needed for electrical operation: MCH, MX, XF, auxiliary contacts.

SC110 universal intelligent controller

SC110 is a compact device with digital inputs and outputs to monitor all the components associated with the electrical operation of the core unit: MCH, MX, XF, auxiliary contacts.

It can be associated with a control panel (SC-MI).

Switchgear control functions

- Coil and motor operation
- Information on core unit status: main switch, earthing switch, lever insertion
- Built-in electrical interlocks: anti-pumping and anti-reflex functions
- External interlocking feature
- Lockout of electrical operation after tripping (option)
- Modbus communication for remote control via data transmission

Switchgear monitoring

- Diagnosis information: motor consumption
- Core unit auxiliary contacts status
- Logging of time-stamped events
- Modbus communication for remote indication of monitoring information

SC110 types	SC110-A	SC110-E
24-60 Vdc	●	
110 Vdc/Vac - 240Vac/250Vdc		●
Network communication	●	●

SC-MI control panels	SC-MI 10	SC-MI 20
On/Off pushbuttons	●	●
Remote/local switch		●

Control

Architecture of feeder automation

Schneider Electric offers you a complete solution, including:

- The Easergy R200 telecontrol interface
- Premset switchgear that can be easily adapted for telecontrol
- The SCADA and DMS system

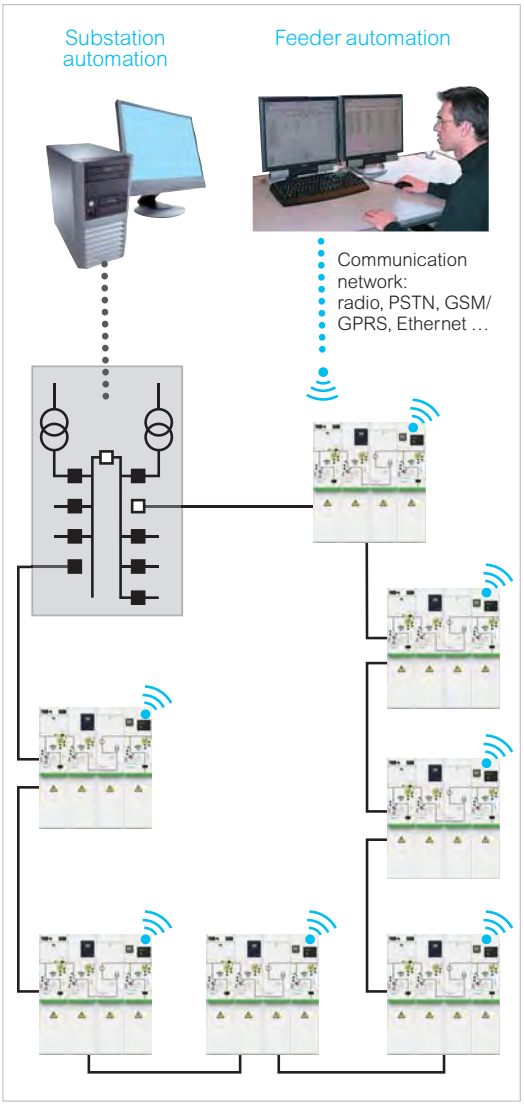
Premset range, more than ready

Premset switchgear is suited to telecontrol thanks to options such as:

- LV control cabinet including an R200 RTU
- Motorised operating mechanism
- Auxiliary fault and position indication contacts
- Current sensors for fault detection

Continuity of service supervised by an overall telecontrol solution

DM100007



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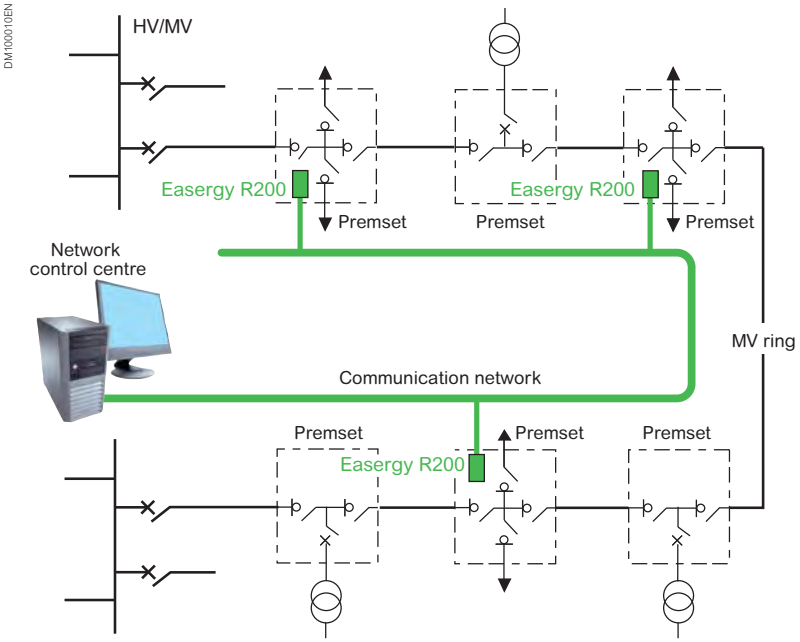
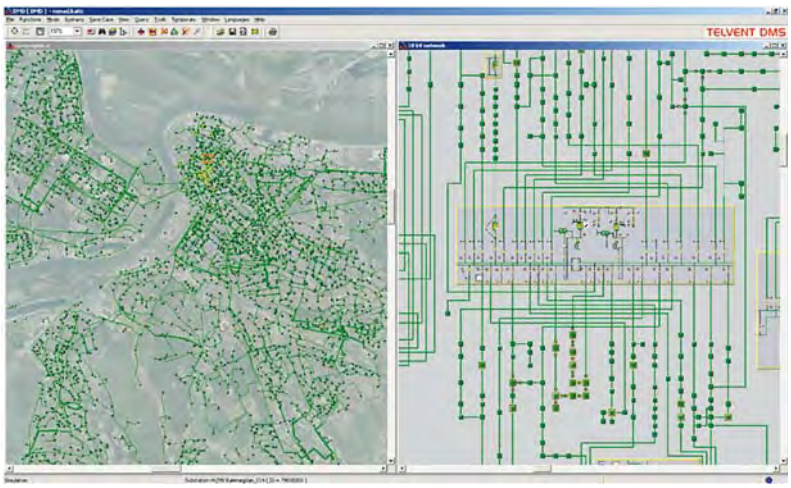


PE58301



Telvent DMS system

Control

Easergy R200: control unit

Easergy R200 is a Remote Terminal Unit (RTU) intended for typical remote management applications in the Energy industry and for MV infrastructures in general.

PE57570p

Easergy R200: an interface designed for telecontrol of MV networks

The Easergy R200 “plug and play” RTU integrates all the functional units necessary for remote supervision and control of an MV switchboard cubicle:

- Transmission of switch open/close orders
- Exchanges with the control centre.

Easergy R200 is of proven reliability and availability, ready to ensure switchgear operation at any time. It is simple to set up and to operate.

Communication

Easergy R200 can manage both “serial type” and IP protocols.

It is thus possible to mix serial and IP transmission media in a given application. Communication possibilities are continuously evolving to keep pace with your needs:

- IEC 870-5-101 and IEC 870-5-104 protocols
- DNP3 serial and TCP protocols
- Modbus serial and TCP protocols
- Other proprietary protocols

An extensive choice of integrated modems and interfaces:

- RS232/485 serial interface
- GSM/GPRS modem
- 3G Modem
- Voice modem (PSTN)
- FSK radio modem
- FFSK radio modem
- Ethernet port

Local control in SCADA

Easergy R200 incorporates a Web data server in HTML page form for data configuration and monitoring. All that is needed to log on is a PC with a Web browser.

Remote access is possible via GSM, GPRS, Ethernet or PSTN transmission networks and can be implemented in parallel from the remote control centre.

Thanks to this remote access and its capability to send e-mails and SMSs, the R200 offers you a cost-effective solution to monitor your MV substation without a SCADA system.

The embedded Web server allows local monitoring of the substation.

Control

Easergy R200: control unit

Built-in solutions for protecting, monitoring and controlling your installation.

Energy availability

- Measurement
- Remote fault detection
- Remote control and protection devices.

Easy to use

- Compact design with built-in devices - no engineering required
- Scalable with “just enough” dedicated solutions from monitoring to remote control
- Robust devices designed for harsh environments
- Easy and safe plug and play connection
- Open to standard protocols, ensuring easy SCADA connection

R200

PE57570p

Premset

PM100016_Former_???

Control

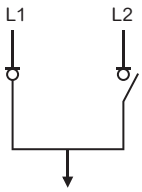
ATS100: automatic transfert system

An MV power supply interruption is unacceptable, especially in critical applications.

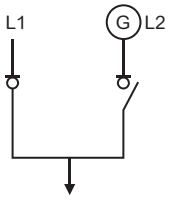
The Premset system therefore proposes an automatic source transfer solution.

DM1031001

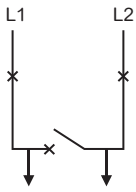
ATS100



ATS100-ACO:
2 line incomers



ATS100-GEN:
1 line and
1 generator incomers



ATS100-BTA :
2 line incomers
with bus tie

Source transfer

The ATS100 drives automatic transfer from the normal MV source to the back-up source in order to keep supplying the MV substation in case of failure of the normal source. ATS100 can drive either Load Break Switch or Circuit Breaker.

There are 3 types of ATS100 depending of single line diagram and sources.

ATS100-ACO: 2 line incomers

L1 and L2 can be either normal or backup source. Upon loss of Normal source, Backup source will automatically supply the substation. When Normal source recover there are 3 possibilities depending of the configuration :

- Self-return : The Normal source will automatically supply the substation
- No-return : Only a manual operation will be possible for Line to supply again the substation.
- Auto-return : The Normal source will automatically supply the substation only in case of loss of the back-up sources.

ATS100-GEN (*): 1 line and 1 generator incomers

L1 and L2 can be either Line or Generator source. Only the Line can be the Normal source. Upon loss of it, Generator source will automatically be started and the supply the substation. When Line source recover there are 3 possibilities depending of the configuration:

- Self-return : The Line source will automatically supply the substation and generator will be shut down
- No-return : Only a manual operation will be possible for Line to supply again the substation
- Auto-return : The Line source will automatically supply the substation only in case of loss of the generator sources

ATS100-BTA : 2 line incomers with bus tie

Normal situation is L1 and L2 closed and Bus Tie open. In case of loss of one of the lines, the bus tie is automatically closed to recover the supply of the substation. When both lines are back, depending of the configuration, the Normal situation is automatically recovered or not.

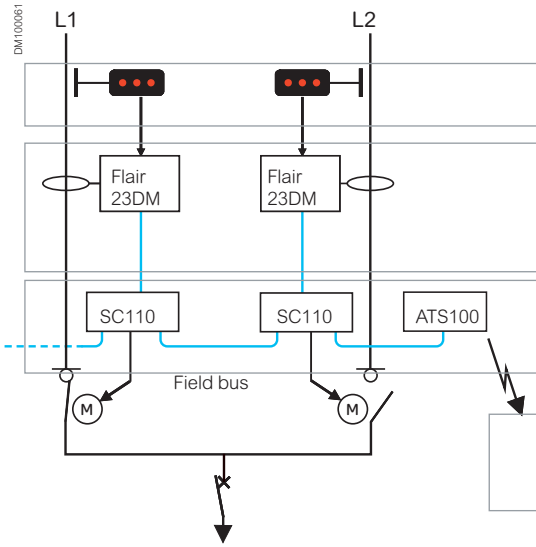
* Please consult us for availability

Control

ATS100: automatic transfert system

Characteristics	
Switch response time	0.5s to 3s
Parallel coupling	Coonfigurable to avoid black-out when restoring normal situation
Load shedding	Configurable to adapt load to the capacity of the generator or to restart loads in sequence after black-out.
Time delay before changing source	Configurable up to 120s
Time delay before recovering normal situation	Configurable up to 30mn
Remote communication	Ethernet, GSM, GPRS, or 3G communication with: • IEC 870-5-101 and IEC 870-5-104 protocols • DNP3 serial and TCP protocols • Modbus serial and TCP protocols
WebServer	Easergy ATS100 incorporates a Web data server in HTML page form for data configuration and monitoring. All that is needed to log on is a PC with a Web browser.

Typical diagram



2 VPIS-VOs	**Voltage sensor:** dedicated version of VPIS with Voltage Output signal.
2 Flair 23DMs	**Voltage detector + Fault Passage Indicator:** a relay is activated when a loss of voltage is detected from the VPIS voltage output signal. If a fault current is detected, the Automatic Transfer System is locked out in order to avoid closing the healthy line on the fault.
1 ATS100 + switch or CB function	Based on inputs coming from the Flair 23DMs, the decision is made to switch from one line to the other.
SCADA, BMS	• Communication facilities may be added • Communication to SCADA or BMS (optional) • Web Server: configuration, diagnostics, alarms, logs

Control

PS100: high-availability power supply

Backup solution for MV switchgear power needs in the event of micro outages and power interruptions.

- Easy maintenance with only one battery
- Remote battery monitoring
- High level of insulation to protect the electronic devices in harsh MV environments
- End-of-life alarm possible via Modbus communication
- Compliant with standards IEC 60 255-5 (10 kV level).

PM100592

PS100

PS100 backup power supply for MV substations

Applications

The power supply unit supplies backup operating power for:

- MV switchgear motor mechanisms and circuit breaker coils
- Transmission equipment (e.g. radio)
- Control units such as RTU (R200) or Automatic Transfer System (ATS100)
- Protection relays, Fault Passage Indicators and other electronic devices

High availabilty power supply

A battery provides uninterrupted operation of the whole substation in the event of loss of the main supply. The backup power supply unit:

- Includes a regulated and temperature-compensated charger
- Stops the battery before deep discharge
- Carries out a battery check every 12 hours
- Measures battery ageing
- Forwards monitoring information via a Modbus communication port and output relays

PS100 benefits

Only one battery

Traditional backup power supplies require a set of 2 or 4 batteries to produce 24 V or 48 V, with complicated replacement and adjustment of the battery pack.

The PS100 needs only one battery, simplifying replacement.

The battery is a standard sealed lead-acid 12 V battery with a 10-years service. It can be purchased easily, anywhere in the world.

Improved availability of MV substations

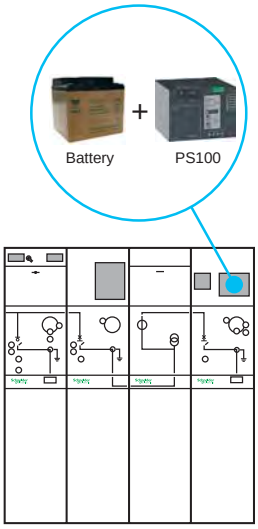
The PS100 is designed to ride through power network interruptions of up to 48 hours. It is associated with a battery selected to meet the required backup time. For example, a 38 Ah battery provides 12 hours of backup time to a Premset switchboard including 4 Sepam units.

The PS100 protects and optimises the battery with state-of-the-art monitoring. A Modbus communication port forwards monitoring data to allow optimised maintenance operations.

Control

PS100: high-availability power supply

DM100006



Additional energy backup

The PS100 stops supplying power and reserves an “additional energy backup” to restart the installation after an extended power interruption.

The “additional energy backup” can be enabled with a local pushbutton to provide energy for restarting the protection relays and operating the MV switchgear.

Withstands severe substation environments

The PS100 includes 10 kV insulation, electronic protection against overvoltage and overloads, and automatic restart after a fault.

Main features	
DIN rail mounting for easy integration in any LV cabinet	
2 power supply outputs	• 12 Vdc - 18 W continuous - 100 W 20 s (for modem, radio, RTU) • 48 Vdc or 24 Vdc - 300 W /1 minute (for switchgear operating mechanism motors) and 90 W / continuous for protection relays, electronic devices
RJ45 Modbus communication port	
2 output relays (AC supply ON, Battery ON)	
Diagnosis with LEDs	
1 sealed lead-acid 12 V battery with a 10-years service life (from 24 Ah to 40 Ah)	
Power supply paralleling available with a 2nd PS100	
-40°C to +70°C operating temperature	

Range	
PS100-48V	48 Vdc power supply and battery charger
PS100-24V	24 Vdc power supply and battery charger
Bat24AH	24 Ah long life battery
Bat38AH	38 Ah long life battery

Connections

Connections

Busbar and cable arrangements	120
Cable connections	121
Network cable testing and diagnosis device	124
Schneider Electric services	126
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Busbar and cable arrangements

- SSIS connections with shielded solid insulation, eliminating all electric fields in open air.
- Flat and smooth interface between connections, allowing flexibility and misalignment in any direction: easier floor installation
- Only one cable connection set, used everywhere: many possibilities for cable entry arrangements

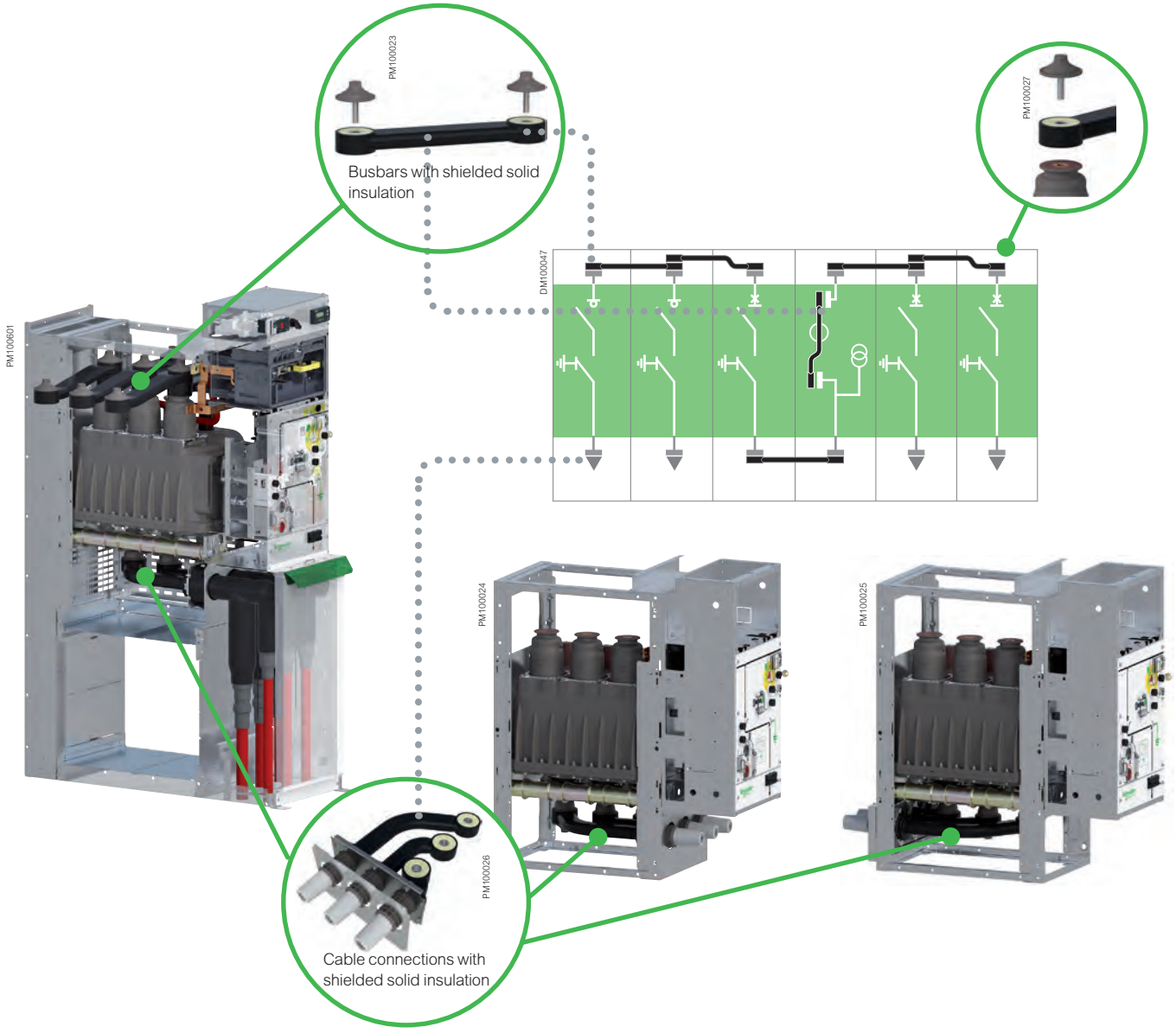
Universal system of power connections

The Premset system is based on a set of common elements, used throughout the system:

- 2 types of bar elements, used to make up the busbar system as well as risers and downstream connections between cubicles.
- One set of 3 connections for cables, used in various directions: front, rear, bottom, top…

The connection interface between these elements is always the same (Schneider Electric patented design), allowing a wide variety of arrangements.

For example, the set of cable connections can be fitted in different directions to implement various cable entry arrangements: front bottom, top rear, bottom rear, direct connection to busbars, cable in cable out.



Cable connections

- Only one type of bushing to simplify installation, but various arrangements of connections to fit any application.
- Large choice of cable box and bottom compartment dimensions.

PM100000

LV cabinet

Cable test

Top connection

Core unit

Bottom connection

Bottom compartment

D06H

Bottom compartment

The bottom compartment is the lower part of Premset cubicles. It has been designed separately from the rest of the cubicle to offer different versions.

It comes in two different heights to match the space required for cable bending and switchgear installation:

- Standard height, for cable connections at a height of 700 mm.
- Low-height version for cable connections at a height of 500 mm, allowing installation of switchgear in rooms with low ceilings (total height of switchgear as low as 1350 mm, depending on LV cabinet dimensions).
- For higher installations, raising plinths can be fitted as accessories, with two different heights.

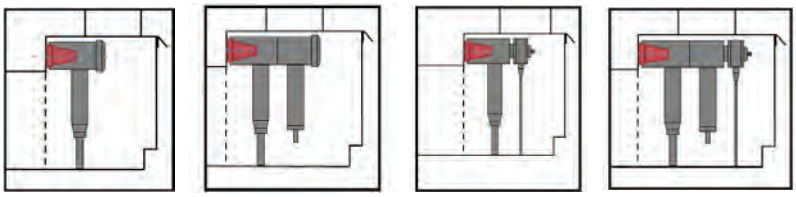
Cable connections

- Cable boxes are available in 2 different depths to meet the needs of various types of installations: number of cables, type of connections, bending radius of cables, surge arresters.
  Cable boxes can be interlocked with main and earthing switches (see core unit pages) and can be fitted with two transparent windows (not compatible with internal arc performance).
- Cable bushings are standardised Type "C" (EN50181), M16 screw type bushings as defined by standard IEC 60137, in order to simplify the choice and installation of connections.
- Cable connections are always horizontally aligned, 700 or 500 mm high depending on height of the bottom compartment (please refer to dimension drawings in the technical appendix).

Compatible cable connections

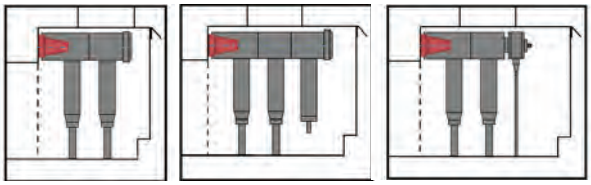
- 1 cable per phase

DM105430



- 2 cables per phase

DM105431



Cable connections

Compatible cable connections except for I12H and D12H

Check the cables that you are using are compatible with the recommendations supplied in the catalog.
Otherwise use other compatible cables with these recommendations.

					2 cables / phase (2 c/p)			
Supplier	**Performance**	**Cr. section (mm²)**	**Reference**	**Type**	**2 c/p**	**+ Surge arrester**	**+ VRU1**	**+ Surge arrester + VRU1**
Euromold (Nexans)	Up to 12 kV, 630 A	25-300	400LB	**E**	●			
		35-300	400TB	**T**	●		● [2]	
		35-300	430TB	**T**	●			
		185-630	440TB	**T**	●		● [2]	
		35-300	400TB + 400PB-XSA	**T + S**		● [2]		● [2]
		35-300	430TB + 300SA	**T + S**		● [2]		
		185-630	440TB + 400 PB-XSA	**T + S**		● [2]		● [2]
	Up to 17,5 kV, 630 A	25-300	K400LB	**E**	●		● [2]	
		35-300	K400TB	**T**	●			
		35-300	K430TB	**T**	●		● [2]	
		185-630	K440TB	**T**	●			
		35-300	K400TB + K400PB-XSA	**T + S**		● [2]		● [2]
		35-300	K430TB + 300SA	**T + S**		● [2]		
		185-630	K440 TB + K400 PB-XSA	**T + S**		● [2]		● [2]
NKT Cables GmbH	Up to 12 kV, 630 A	25-300	CB12-630	**T**	●			
			CB12-630 + CSA12	**T + S**		● [2]		
	Up to 17,5 kV, 630 A	25-300	CB24-630	**T**	●			
			CB24-630 + CSA24	**T + S**		● [2]		
Südkabel	Up to 12 kV, 630 A	50-300	SET12	**T**	●			
		185-500	SEHDT13	**T**	● [3]		● [2]	
		185-500	SEHDT13 + MUT13	**T + S**		● [2]		● [2]
	Up to 17,5 kV, 630 A	25-240	SET24	**T**	●			
		185-630	SEHDT23	**T**	● [3]		● [2]	
		185-630	SEHDT23 + MUT23	**T + S**		● [2]		● [2]
Tyco / Raychem (insulated adapter)	Up to 12 kV, 630 A	25-50	RICS-5113	**T**	●			
		70-150	RICS-5123	**T**	●			
		185-240	RICS-5133	**T**	●			
		300	RICS-5143	**T**	●			
		185-240	RICS-5139	**T + S**		●		
		300	RICS-5149	**T + S**		●		
	Up to 17,5 kV, 630 A	25-70	RICS-5123	**T**	●			
		95-185	RICS-5133	**T**	●			
		240-300	RICS-5143	**T**	●			
		95-185	RICS-5139	**T + S**		●		
		240-300	RICS-5149	**T + S**		●		
3M	Up to 12 kV, 630 A	50-240	93-EE 705-6	**T**	●			
		300-400	93-EE 715-6	**T**	●		● [2]	
		300-400	93-EE 715-6 + MUT23	**T + S**		● [2]		● [2]
	Up to 17,5kV, 630 A	25-240	93-EE 705-6	**T**	●			
		300-400	93-EE 715-6	**T**	●			
		300-400	93-EE 715-6 + MUT23	**T + S**		● [2]		● [2]

(1) For 2 cables/phase, 2 cables/phase + Surge arrester, 2 cables/phase + VRU1, please consult Schneider Electric
(2) Need deeper cable (500mm) compartment door
(3) Need deeper cable (500mm) compartment door for internal arc with standard version

E: Elbow connector
T: T connector
T + S = T connector + surge arrester

Cable connections

Compatible cable connections for I12H and D12H

Check the cables that you are using are compatible with the recommendations supplied in the catalog.
Otherwise use other compatible cables with these recommendations.

					4 cables / phase (4 c/p)			
Supplier	**Performance**	**Cr. section (mm²)**	**Reference**	**Type**	**4 c/p**	**+ Surge arrester**	**+ VRU1**	**+ Surge arrester + VRU1**
Euromold (Nexans)	Up to 12 kV, 630 A	25-300	400LB	**E**				
		35-300	400TB + 400TB	**T**	●		● [2]	
		35-300	430TB + 430TB	**T**	●			
		185-630	440TB + 440TB	**T**	●		● [2]	
		35-300	400TB + 400TB + 400PB-XSA	**T + S**		● [2]		● [2]
		35-300	430TB + 430TB + 300SA	**T + S**		● [2]		
		185-630	440TB + 440TB + 400 PB-XSA	**T + S**		● [2]		● [2]
	Up to 17,5 kV, 630 A	25-300	K400LB+K400LB	**E**	●			
		35-300	K400TB+K400TB	**T**	●		● [2]	
		35-300	K430TBK430TB	**T**	●			
		185-630	K440TB+K440TB	**T**	●		● [2]	
		35-300	K400TB+K400TB + K400PB-XSA	**T + S**		● [2]		● [2]
		35-300	K430TB+K430TB + 300SA	**T + S**		● [2]		
		185-630	K440 TB+K440 TB + K400 PB-XSA	**T + S**		● [2]		● [2]
NKT Cables GmbH	Up to 12 kV, 630 A	25-300	CB12-630+CB12-630	**T**	●			
			CB12-630+CB12-630 + CSA12	**T + S**		● [2]		
	Up to 17,5 kV, 630 A	25-300	CB24-630+CB24-630	**T**	●			
			CB24-630 +CB24-630 + CSA24	**T + S**		● [2]		
Südkabel	Up to 12 kV, 630 A	50-300	SET12+SET12	**T**	●			
		185-500	SEHDT13+SEHDT13	**T**	● [3]		● [2]	
		185-500	SEHDT13 +SEHDT13 + MUT13	**T + S**		● [2]		● [2]
	Up to 17,5 kV, 630 A	25-240	SET24+SET24	**T**	●			
		185-630	SEHDT23+SEHDT23	**T**	● [3]		● [2]	
		185-630	SEHDT23+SEHDT23 + MUT23	**T + S**		● [2]		● [2]
Tyco / Raychem (insulated adapter)	Up to 12 kV, 630 A	25-50	RICS-5113 + RICS-5113	**T**	●			
		70-150	RICS-5123 + RICS-5123	**T**	●			
		185-240	RICS-5133 + RICS-5133	**T**	●			
		300	RICS-5143 + RICS-5143	**T**	●			
		185-240	RICS-5133 + RICS-5139	**T + S**		●		
		300	RICS-5143 + RICS-5149	**T + S**		●		
	Up to 17,5 kV, 630 A	25-70	RICS-5123 + RICS-5123	**T**	●			
		95-185	RICS-5133 + RICS-5133	**T**	●			
		240-300	RICS-5143 + RICS-5143	**T**	●			
		95-185	RICS-5133 + RICS-5139	**T + S**		●		
		240-300	RICS-5143 + RICS-5149	**T + S**		●		
3M	Up to 12 kV, 630 A	50-240	93-EE 705-6 + 93-EE 705-6	**T**	●			
		300-400	93-EE 715-6 + 93-EE 715-6	**T**	●		● [2]	
		300-400	93-EE 715-6 + 93-EE 715-6 + MUT23	**T + S**		● [2]		● [2]
	Up to 17,5kV, 630 A	25-240	93-EE 705-6	**T**	●			
		300-400	93-EE 715-6	**T**	●		● [2]	
		300-400	93-EE 715-6 + 93-EE 715-6 + MUT23	**T + S**		● [2]		● [2]

(1) For more or less than 2 cables/phase, please consult Schneider Electric
(2) Need deeper cable compartment door: 500mm (450mm for I12H and D12H)
(3) Need deeper cable compartment door 500mm (450mm for I12H and D12H) for internal arc withstand version

E: Elbow connector
T: T connector
T + S = T connector + surge arrester

Network cable testing and diagnosis device

Premset offers an original primary circuit arrangement allowing direct access to cable conductors without operating the main switches or dismantling the cables connections.

Combined with a dedicated cable test device, it provides high operator safety during cable testing and diagnosis.

Cable testing and cable diagnosis

Medium voltage cable testing is a demanding task that leaves no room for error

- Work is carried out on the main circuit with a high-voltage test bench
- Earthing is removed during testing
- Access to the main circuit for test connections may require access to the cable box and dismantling of cable termination insulation
- Procedures must be followed strictly to ensure the safety of personnel
- Cable connections must be properly reassembled to restore full insulation

PM102715

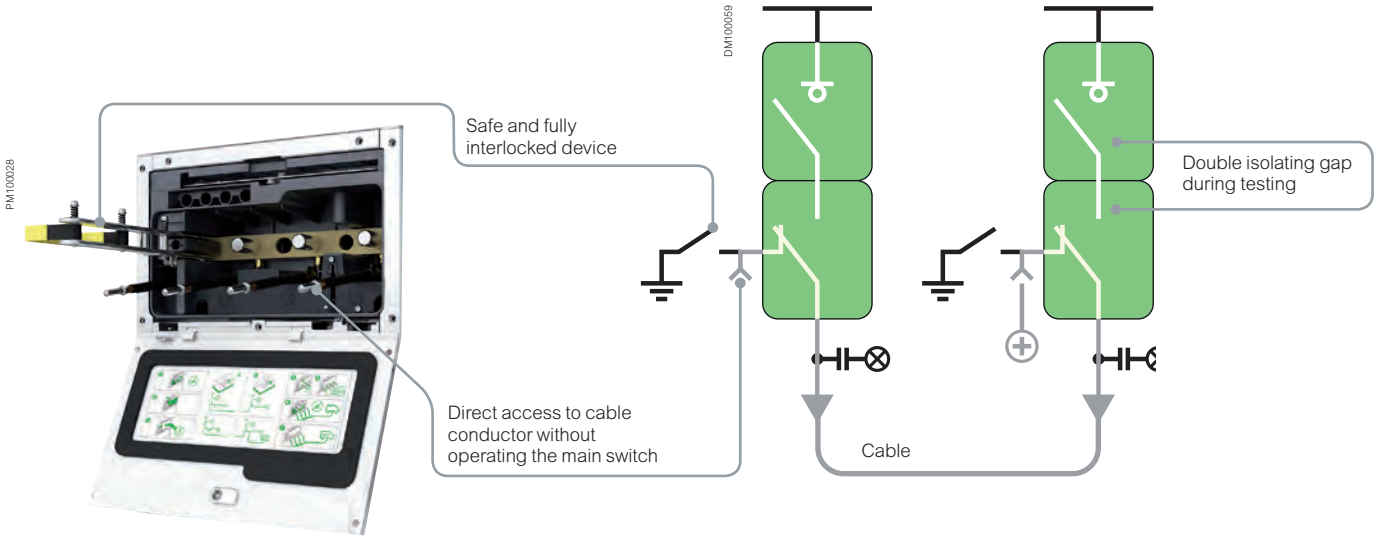
Intuitive and easy cable access with Premset

Premset switchboards can be fitted with a dedicated cable testing device that greatly increases safety during cable testing

- Cable testing can be carried out without accessing the cable box (cables remain connected) and without touching the cable terminations
- The test device can be connected from the front of the switchboard, prior to removing the earth link
- Earth link removal is the last operation to be carried out, using a special earthing bar disconnection system, without any operation of the main switching device or main earthing switch
- Earth link removal featuring full failsafe interlocking, i.e. the earth link can be opened only if the main earthing switch is closed (cable earthed) and the main earthing switch can be opened only if the earthing link is closed
- Test bench connections are delivered separately. They can also be adapted locally to any specific test set.

Network cable testing and diagnosis device

The cable testing device can be used on both ends of cable to be tested, in order to isolate completely the cable section from the network.



Technical characteristics

Cable testing device can be used for various testing and diagnosis purposes:

- DC tests up to 36 kV DC x 15 min
- Very low frequency testing from 0.1 Hz up to 20 kV x 30 min (sinusoidal signal), and 28 kV x 30 min for cos2 signal.
- 50/60 Hz dielectric tests up to 14 kV x 1 min
- Tan Delta diagnosis: power dissipation 18 kV.
- Performance characteristics have been validated in accordance with standard IEC 62271-200, edition 2

Schneider Electric Services

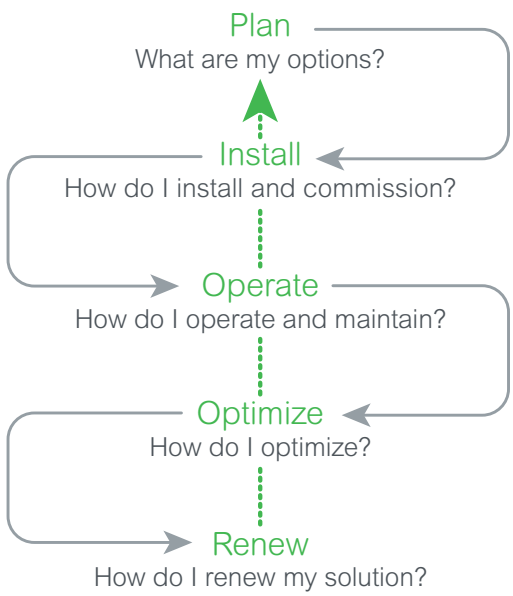
Peace of mind throughout your installation life cycle

How can you cut costs and improve performance at the same time?

When it comes to your electrical distribution infrastructure, the answer is straight-forward - get professional expertise.

Life cycle services

DM408843



Plan

Schneider Electric helps you to plan the full design and execution of your solution, looking at securing your process and optimizing your time:

- **Technical feasibility studies:**
  Accompany customer to design solution in his given environment
- **Preliminary design:**
  Accelerate turnround time to come to a final solution design

Install

Schneider Electric will help you to install efficient, reliable and safe solutions based on your plans.

- **Project management:**
  Designed to help you complete your projects on time and within budget
- **Commissioning:**
  Ensures your actual performance versus design, through on site testing & commissioning, tools & procedures

Operate

Schneider Electric helps you maximize your installation uptime and control your capital expenditures through its service offering.

- **Asset operation solutions:**
  The information you need to increase safety, enhance installation performance, and optimize asset maintenance and investment
- **Advantage service plans:**
  Customized service plans which cover preventive, predictive and corrective maintenance
- **On site maintenance services:**
  Extensive knowledge and experience in electrical distribution maintenance
- **Spare parts management:**
  Ensure spare parts availability and optimized maintenance budget of your spare parts
- **Technical training:**
  To build up necessary skills and competencies. in order to properly operate your installations in safety

Optimize

Schneider Electric provides recommendations for improved safety, availability, reliability & quality.

- **MP4 electrical assessment:**
  Define improvement & risk management program

Schneider Electric Services

Peace of mind throughout your installation life cycle

When it comes to your electrical distribution installation, we can help you:

- Increase productivity, reliability, and safety
- Mitigate risk and limit downtime
- Keep equipment up to date and extend lifespan
- Cut cost and increase savings
- Improve your return on investment

CONTACT US!

www.schneider-electric.com/electricaldistributionservices

Renew

Schneider Electric extends the life of your system while providing upgrades.

Schneider Electric offers to take full responsibility for the end-of-life processing of old electrical equipments.

- **ECOFIT™:**
  Keep up to date & improve performance of your electrical installations (LV, MV, Protection Relays)
- **MV product end of life:**
  Recycle & recover outdated equipment with end of life services

Facility Hero

Preventive & predictive maintenance using QR codes

What is Facility Hero?

Facility Hero is a smart maintenance log book that can be accessed from any smartphone, tablet, or computer. This 100% collaborative, connected system keeps maintenance technicians in the field in constant contact with their maintenance community: manager, customer, contractors and peers for fast and effective interventions.

Accessible by anyone, anywhere, anytime

Facility Hero works on 3G, 4G, and Wi-fi networks and can also be used offline. Simply download the application right to your smartphone or tablet, set up an account, and get started.

The right information, fast

- Overall view of equipment (status, tasks, the week's reminders)
- Full maintenance logs (breakdowns, maintenance reports)
- Fast access to history equipment maintenance logs via the QR code on the equipment
- Rich maintenance reports including voice memos, notes, photos, and measurements

The right decision and the right action at the right time

- Quickly add a new piece of equipment
- Access periodic reading measurements, recent malfunctions
- Locate equipment by GPS in real time
- Monitor equipment remotely and in real time

Manage your maintenance teams and interventions effectively

- Real-time work orders sharing, and reporting with selected users
- Get inspection reports by mail and share them in just two clicks
- Monitor all regular operations such as scheduling, and incomplete or upcoming tasks

Facility Hero

Preventive & predictive maintenance using QR codes

FACILITY HERO
THE SMART LOGBOOK

FACILITY HERO BENEFITS

Enhance the efficiency of maintenance operations and insure your uptime:

- Access automatically to the maintenance recommendations of your equipments by flashing the QR codes
- Cloud Logbook to organise and follow your maintenance
- Remote alarming

Facility Hero

New improve the efficiency on maintenance!

- Access automatically to your Premset equipment maintenance planning by flashing the QR code
- Find the QR codes on your products or on the catalogue product data sheet MV product end of life:
  Recycle & recover outdated equipment with end of life services

> Download the free version of Facility Hero:

> Access to the maintenance of your equipement:

Circuit breaker function

Switch function

Metering & other functions

Technical appendix

Technical appendix

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Dimensions

Unit type	Height (mm)	Width (mm)	Depth (1) (mm)	Weight (2) (kg)	Weight with packing (kg)
I06T	1550	375	910	200	275
I06H	1550	375	910	200	275
D01N	1550	375	910	200	275
D02N	1550	375	910	200	275
D06N	1550	375	910	200	275
D06H	1550	375	910	200	275
E-SB	1550	375	910	200	275
G06	1550	375	910	100	175
M06S	1550	375	910	250	275
M06A	1550	750	910	350	425
VTM	1550	375	910	150	225
VTP	1550	375	910	150	225
VTM-D	1550	375	910	250	325
VTP-D	1550	375	910	250	325
VTM-C	1550	375	910	150	225
VTM-F	1550	375	910	150	225
VTF	1550	375	910	150	225
I12H	1550	750	910	500	650
D12H	1995	750	910	500	650
M12S	1550	375	910	250	275
M12A	1550	750	910	450	425
G12	1550	375	910	100	175

(1) With arc control design, when it is front cable connection, the depth: 1135 mm, when it is rear cable connection, the depth : 1208 mm

(2) With arc control design, when it is front cable connection, the weight increases 20 kg, when it is rear cable connection, the weight increases 50 kg

Floor preparation

Units may be installed on ordinary concrete floors, with or without trenches depending on the type and cross-section of cables.

Required civil works are identical for all units.

Fixing of units

With each other

The units are simply bolted together to form the MV switchboard (bolts supplied).

To the floor

- For switchboards comprising up to three units, the four corners of the switchboard must be fixed to the floor using:
  - bolts (not supplied) screwed into nuts set into the floor using a sealing pistol
  - threaded rods grouted into the ground
- For switchboards comprising more than three units, the number and position of fixing points depends on local criteria (earthquake withstand capacities).

Dimensions

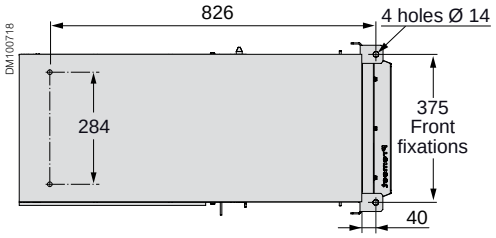
Fixing the Switchboard on the floor

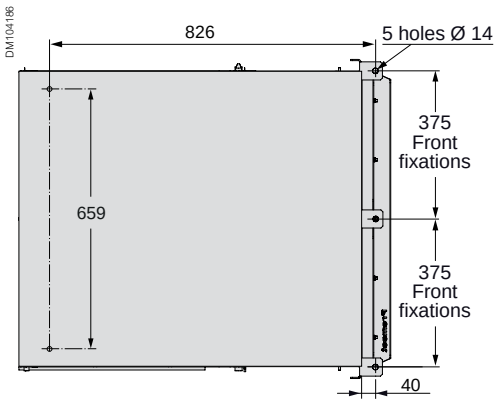
- Use spit drills to fix the cubicles on the floor
- Fix each cubicle using the 2 holes at the rear bottom corners and the 2 ground fixing brackets at the front

Nota: the rear brackets are not required except for seismic constraints

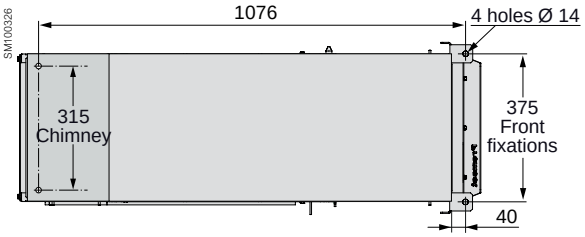
Front cable connection

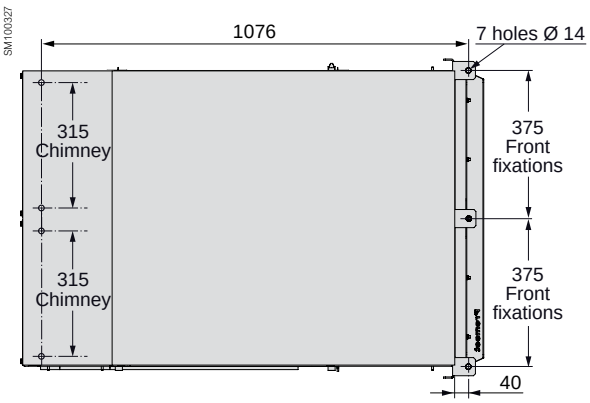
Fixing without internal arc exhausting





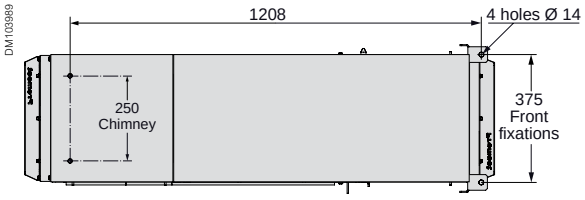
Fixing with internal arc exhausting

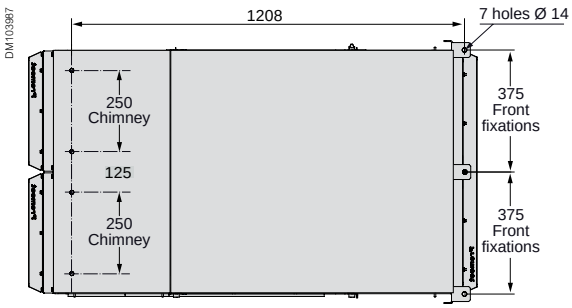




All dimensions in mm.

Rear cable connection





All dimensions in mm.

Dimensions

For non internal arc application

Front cable connection

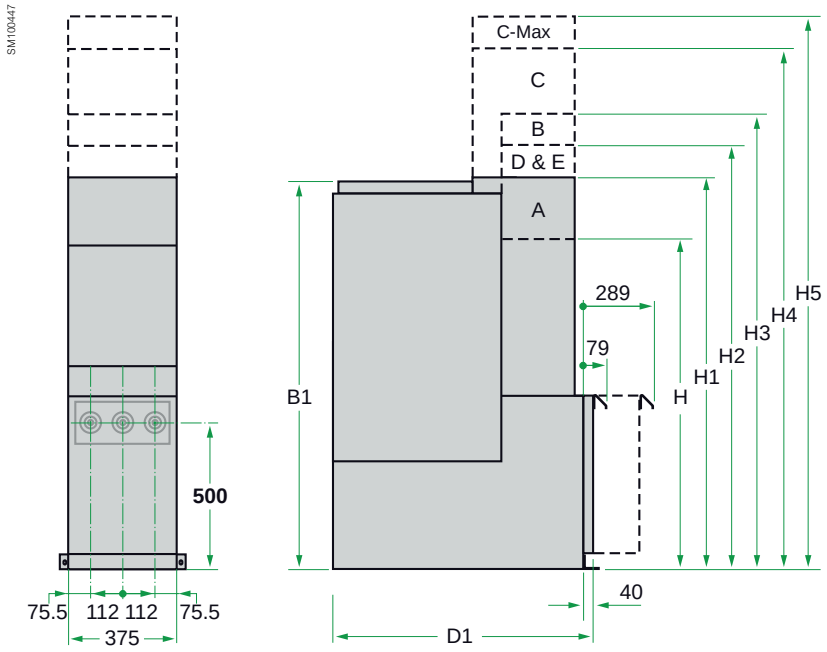
375 mm wide cubicle, 630 A

Cable termination height: 500 mm

All dimensions in mm.

H	LV cabinet A	1127
H1	LV cabinet A (when no cable testing device)	1350
H2	LV cabinet D & E	1461
H3	LV cabinet B	1573
H4	LV cabinet C	1795
H5	LV cabinet C-Max	2045
B1	Non internal arc	1336
D1	Without internal arc exhausting	910

Note:
Dimensions are the same for bar-connected cubicles.



375 mm wide cubicle, 630 A

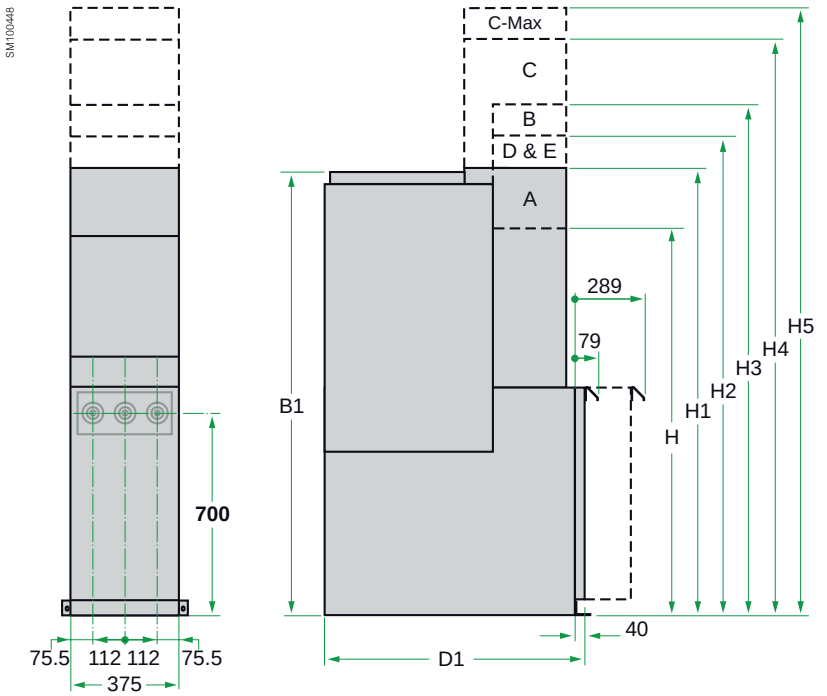
Cable termination height: 700 mm

(For I12H and D12H: 750 mm wide cubicle)

All dimensions in mm.

H	LV cabinet A	1327
H1	LV cabinet A (when no cable testing device)	1550
H2	LV cabinet D & E	1661
H3	LV cabinet B	1773
H4	LV cabinet C	1995
H5	LV cabinet C-Max	2245
B1	Non internal arc	1536
D1	Without internal arc exhausting	910

Note:
Dimensions are the same for bar-connected cubicles.



Dimensions

For internal arc application

Front cable connection

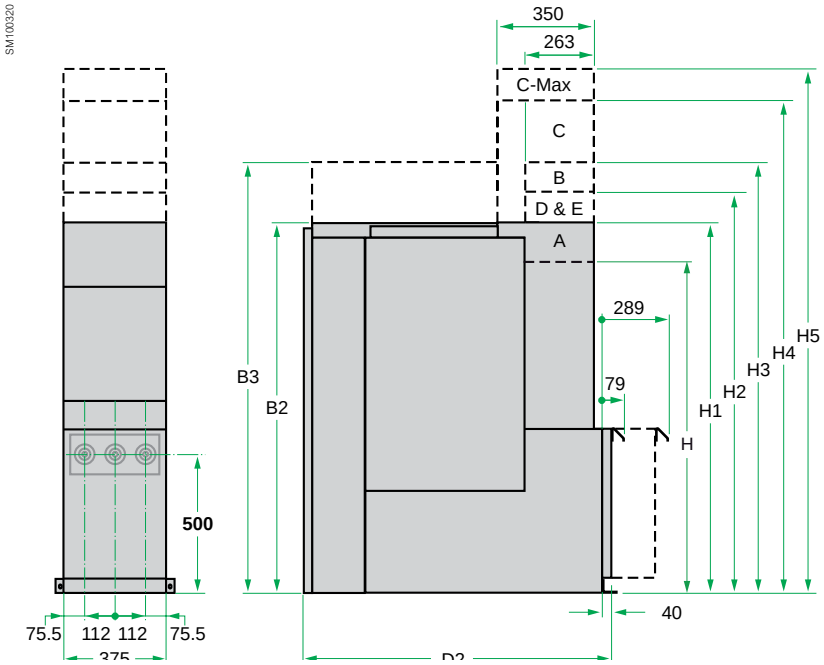
375 mm wide cubicle, 630 A

Cable termination height: 500 mm

All dimensions in mm.

H	LV cabinet A	1127
H1	LV cabinet A (when no cable testing device)	1350
H2	LV cabinet D & E	1461
H3	LV cabinet B	1573
H4	LV cabinet C	1795
H5	LV cabinet C-Max	2045
B2	Internal arc bottom exhaust	1349
B3	Internal arc top exhaust	1664
D2	With internal arc exhausting	1135

Note:
Dimensions are the same for bar-connected cubicles.



375 mm wide cubicle, 630 A

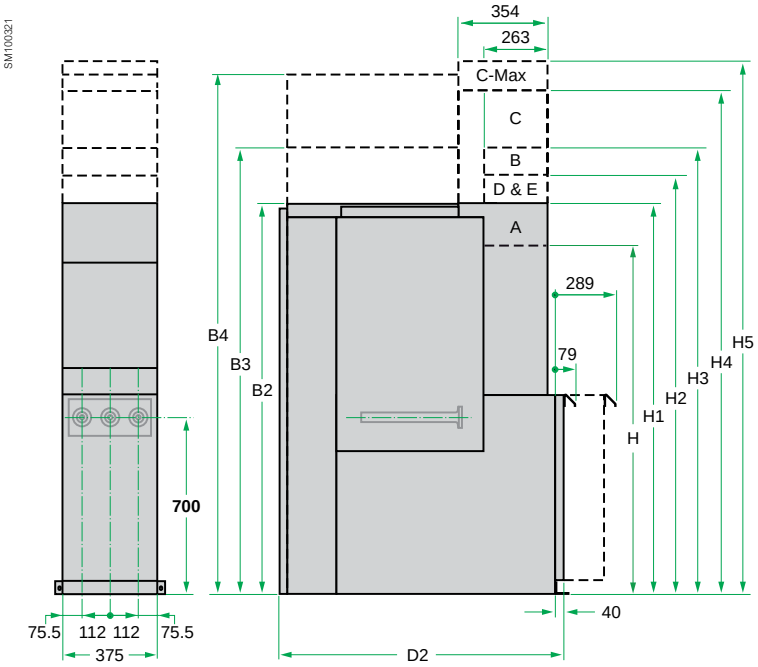
Cable termination height: 700 mm

(For I12H and D12H: 750 mm wide cubicle)

All dimensions in mm.

H	LV cabinet A	1327
H1	LV cabinet A (when no cable testing device)	1550
H2	LV cabinet D & E	1661
H3	LV cabinet B	1773
H4	LV cabinet C	1995
H5	LV cabinet C-Max	2245
B2	Internal arc bottom exhaust	1549
B3	Internal arc top exhaust	1864
D2	With internal arc exhausting	1135

Note:
Dimensions are the same for bar-connected cubicles.



Dimensions

For internal arc application

Rear cable connection

375 mm wide cubicle, 630 A

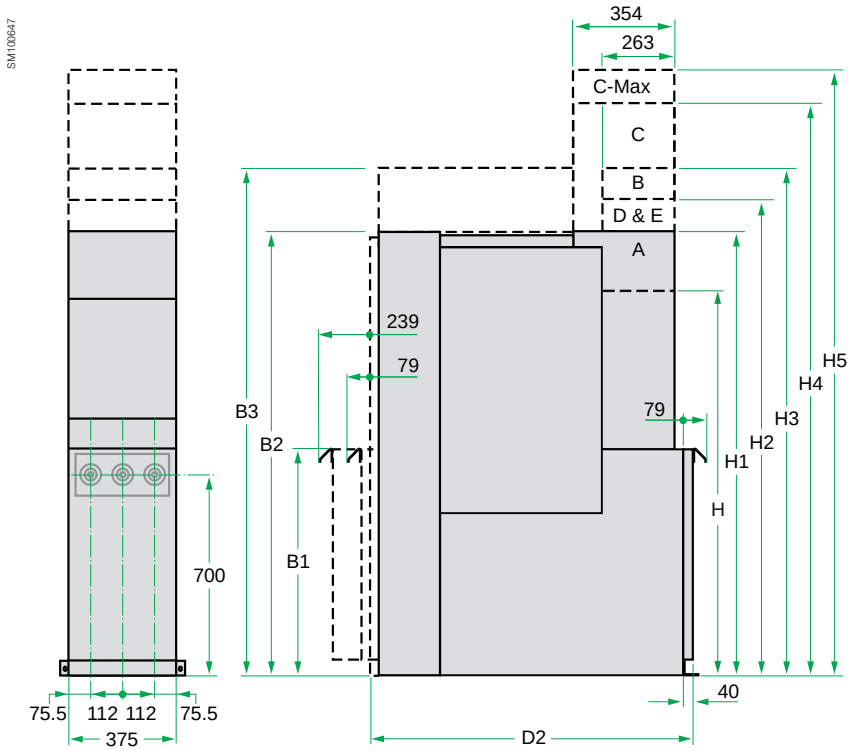
Cable termination height: 700 mm

(For I12H and D12H: 750 mm wide cubicle)

All dimensions in mm.

H1	LV cabinet A (when no cable testing device)	1550
H2	LV cabinet D & E	1661
H3	LV cabinet B	1773
H4	LV cabinet C	1995
H5	LV cabinet C-Max	2245
B1	Door top entry Door bottom entry	1332 792
B2	Internal arc bottom exhaust	1549
B3	Internal arc top exhaust	1864
D2	With internal arc exhausting	1262

Note:
Dimensions are the same for bar-connected cubicles.



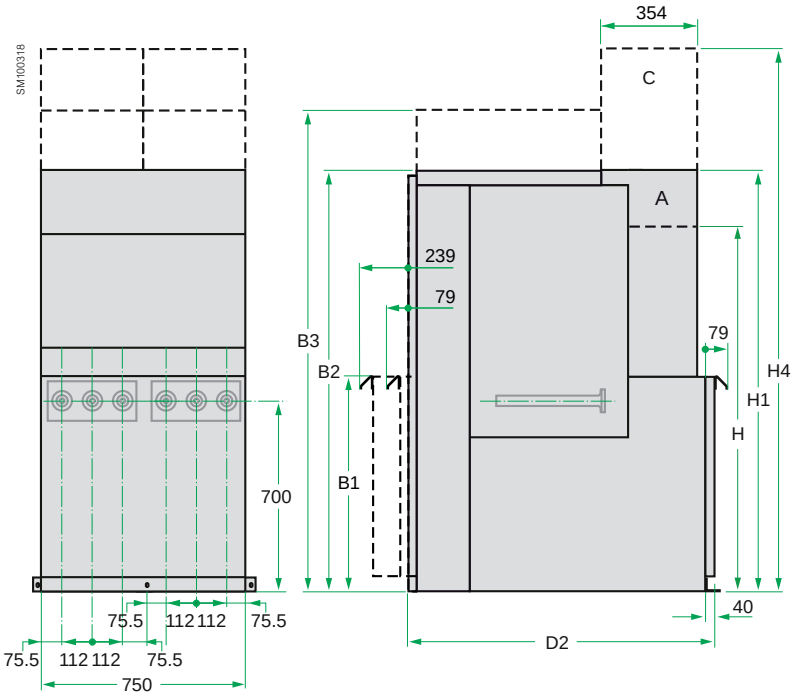
750 mm Wide Cubicle, 1250 A

Cable termination height: 700 mm

All dimensions in mm.

H	LV cabinet A	1327
H1	LV cabinet A (when no cable testing device)	1550
H4	LV cabinet C	1995
B2	Internal arc bottom exhaust	1549
B3	Internal arc top exhaust	1864
D2	With internal arc exhausting	1262

Note:
Dimensions are the same for bar-connected cubicles.



Civil engineering

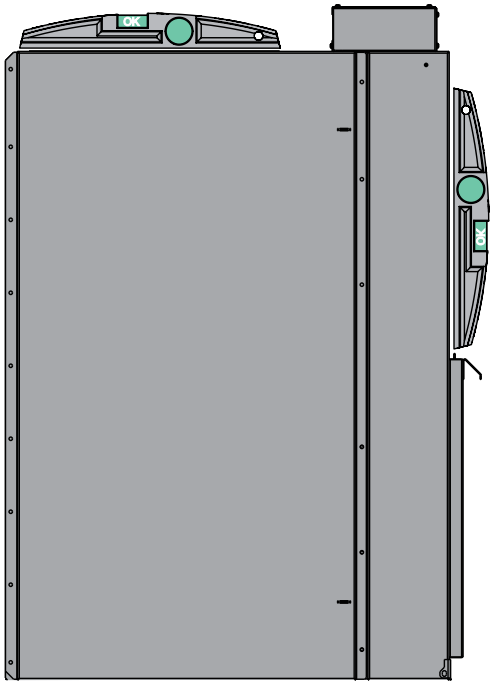
Ground preparation

To ensure the internal arc performance, ground implementation must comply with following requirements:

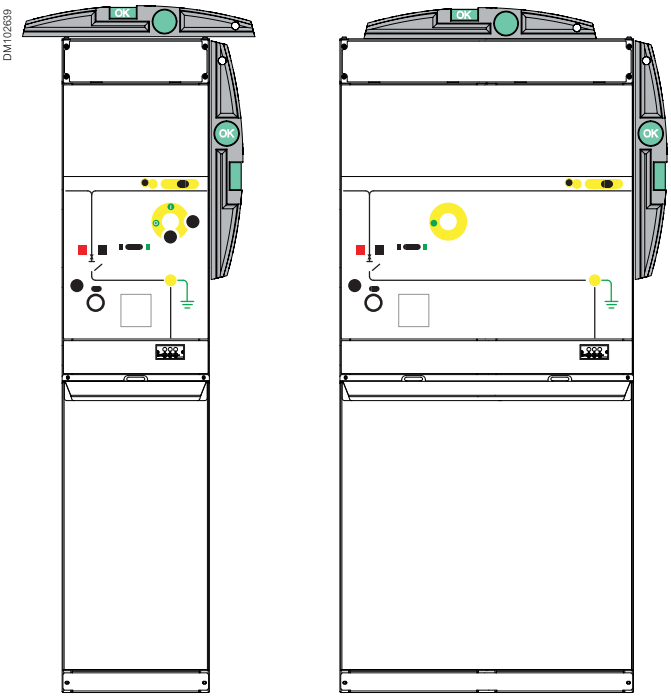
- Floor flatness tolerance is within 7mm per 2m

Failure to follow these instructions can result in equipment damage, not maintain the internal arc performance.

SM100375



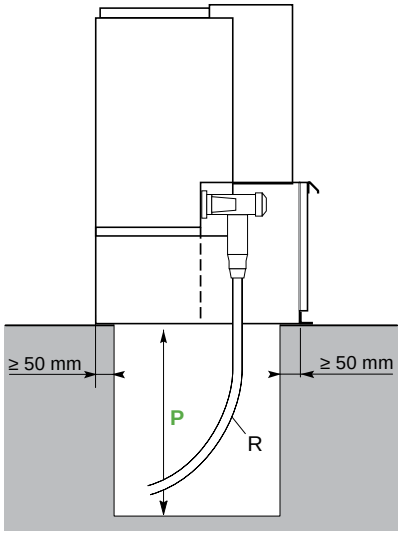
DM102639



Civil engineering

Standard design

DM100049



Trench depth **P** for Premset without plinth.

Cable connection and cable trench

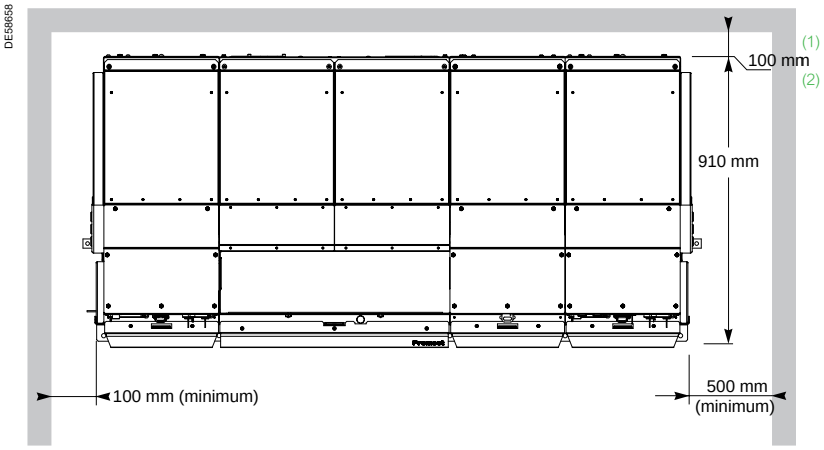
Cable insulation	Cable	Cross-section (mm^2)	Bending radius R (mm)	Cable trench depth P (mm)
Dry insulation	Single-core	≤ 150	500	400
		185 to 300	600	520
	Three-core	≤ 150	550	660
		185	650	770
Paper impregnated non-draining type	Single-core	≤ 150	500	580
		185 to 300	675	800
	Three-core	≤ 95	635	750
		150 to 300	835	970

Note: trench depths can be reduced and sometimes eliminated by adding a plinth.

Position of cubicles in a substation

Installation of a switchboard with standard design

DE58658



(1) 500 mm is recommended for ease of installation and maintenance.
(2) 500 mm is requested if there is M06A, M12A, D12H and I12H.

Civil engineering

Arc control design (upwards exhaust)

Front cable connection

For cable connection and cable trench request please consult “Standard design”

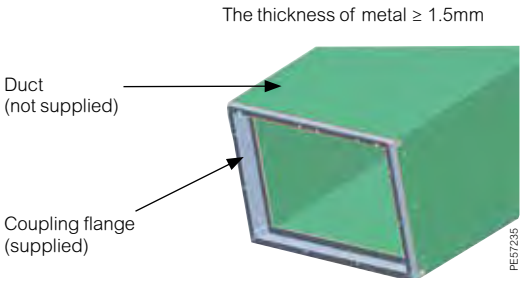
Evacuation duct conduit

To enable the evacuation of gases by the top, users must install a conduit fixed to the coupling flange at right or left of the switchboard. For IP3X protection performance, a flap must be installed with this coupling flange on the lateral side of the cubicle duct.

The end of the duct must block water, dust, moisture, animals, from entering and at the same time enable the evacuation of gases into a dedicated area through a device situated at the outer and of the duct (not supplied).

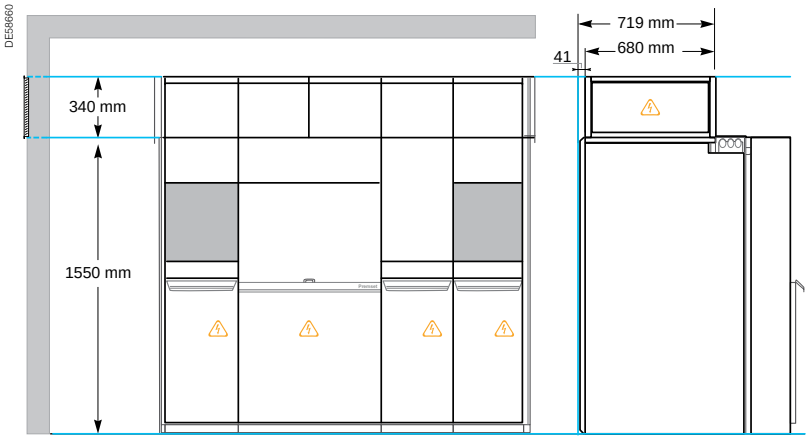
Evacuation duct conduit example

The evacuation duct must be made of metal sheet of sufficient thickness to withstand pressure and hot gases.



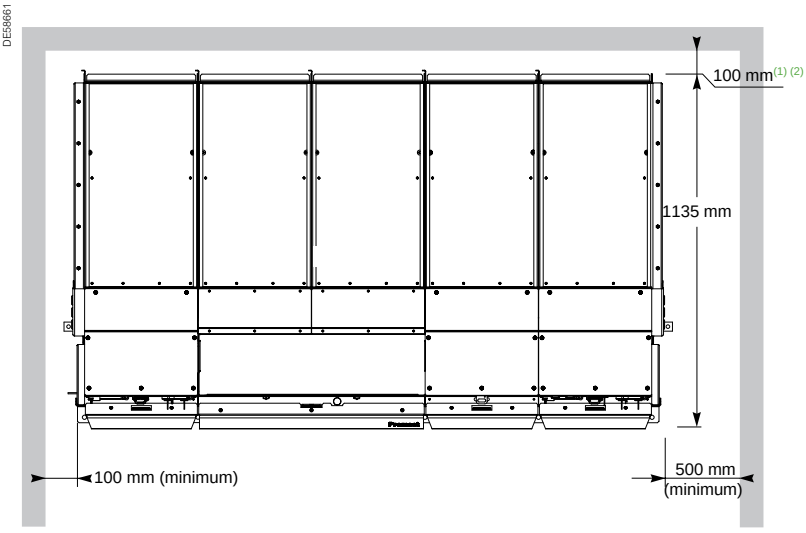
Installation of a switchboard

With arc control design: A-FLR with upwards exhaust left side (ceiling height ≥ 2500mm)



Position of cubicle in a substation

With arc control design: A-FLR with upwards exhaust



(1) 500 mm is recommended for ease of installation and maintenance.
(2) 500 mm is requested if there is M06A, M12A, D12H and I12H

Note:
evacuation duct must be manufactured in accordance with the architecture of the building from switchboard to outside

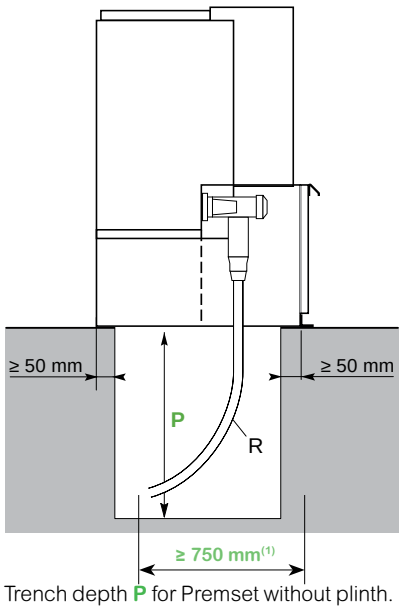
Civil engineering

Arc control design (downwards exhaust)

Front cable connection

Trench Depth for MV Cables

DM100049



Trench depth **P** for Premset without plinth.

(1) Only required when internal arc withstand downwards exhaust.

Cable connection and cable trench

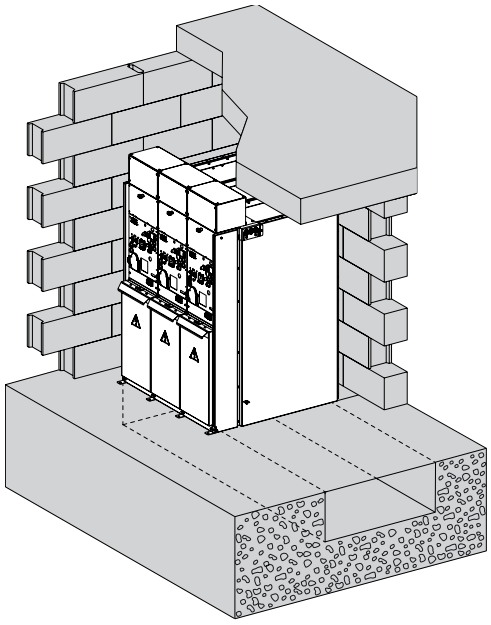
Cable insulation	Cable	Cross-section (mm^2)	Bending radius R (mm)	Cable trench depth P (mm)
Dry insulation	Single-core	⩽ 150	500	550
		185 to 300	600	550
	Three-core	⩽ 150	550	660
		185	650	770
Paper impregnated non-draining type	Single-core	⩽ 150	500	580
		185 to 300	675	800
	Three-core	⩽ 95	635	750
		150 to 300	835	970

Note: trench depths can be reduced and sometimes eliminated by adding a plinth.

The civil engineering preparation need consider minimum 0.5 m^3 gas expansion.

Layout of a downwards exhaust internal arc switchboard

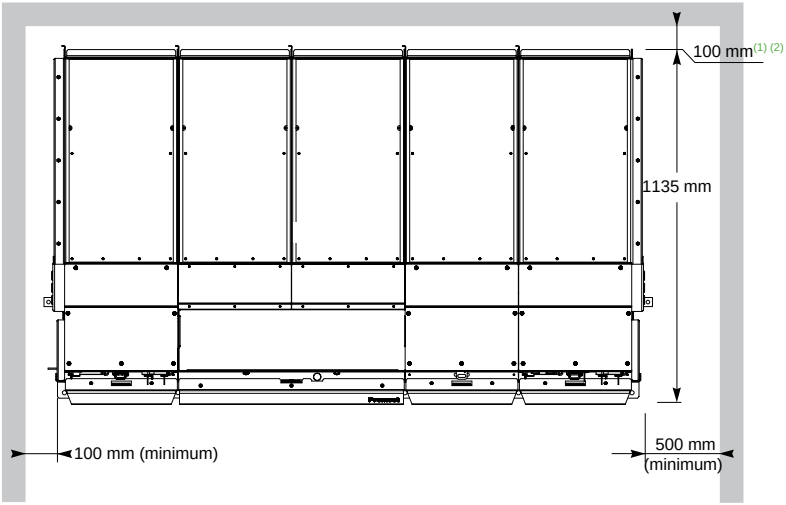
DM100064



Position of cubicle in a substation

Installation of a switchboard with arc control design: A-FLR with downwards exhaust

DE58661



(1) 500 mm is recommended for ease of installation and maintenance.
(2) 500 mm is requested if there is M06A, M12A, D12H and I12H

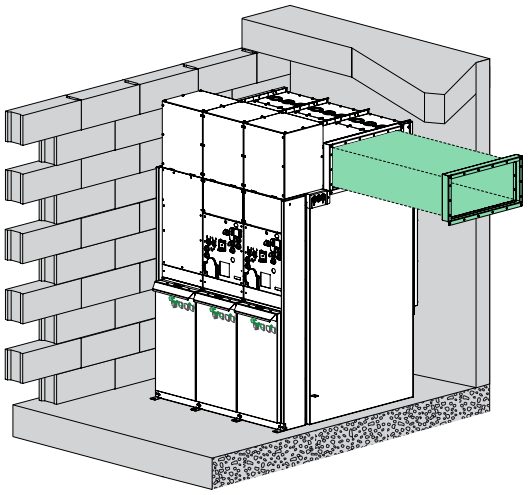
Civil engineering

Arc control design

Rear cable connection

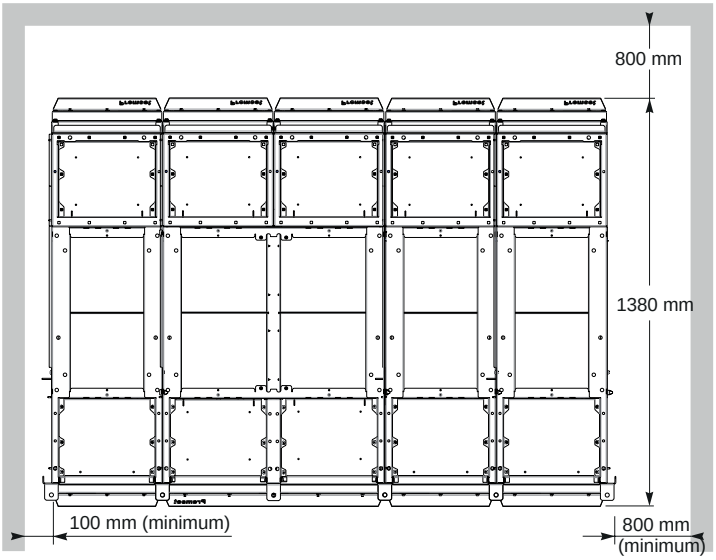
Layout of cable top entry and top exhaust internal arc classified switchboard

DM103924



Top exhaust

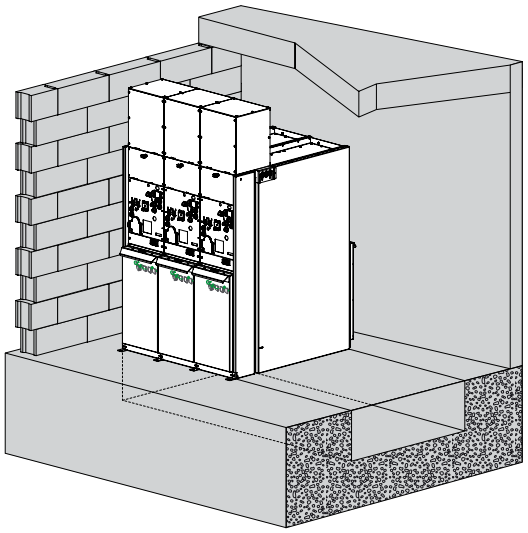
DM103988



100 mm is the minimum distance from the wall to ensure proper operation of the switchboard.

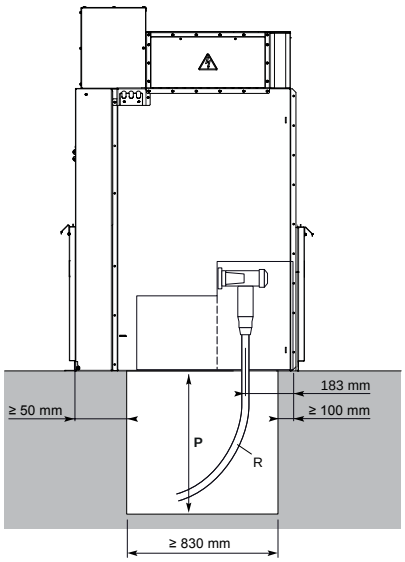
Trench depth for MV cables

SM100626



Bottom exhaust

DM103990

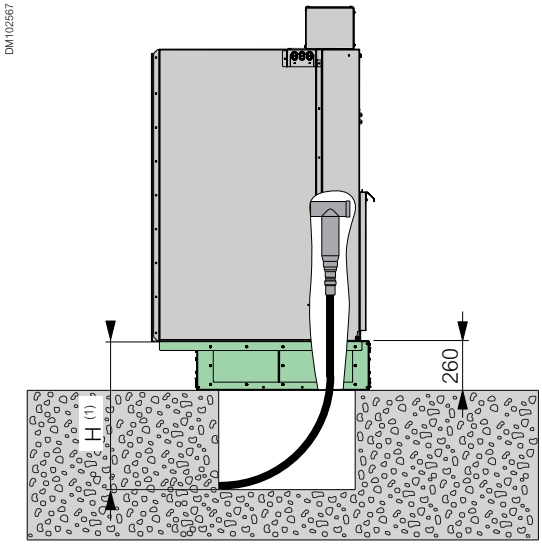


100 mm is the minimum distance from the wall to ensure proper operation of the switchboard.

Civil engineering

Raising plinths

Raising plinth 260 mm



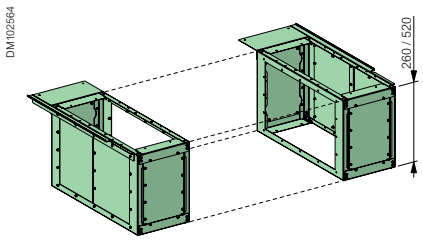
(1) for downward exhaust, the minimum distance of cable trench and raising plinth (H) is 550 mm

If the trench depth is too small to take into account the proper bending of cables, the switchboard can be fitted with optional raising plinth.

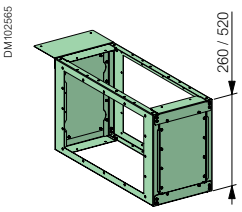
These plinths exist in two different heights, 260 mm or 520 mm, which moreover can be stacked together in order to reach a total height of 780 mm.

The cell is to be assembled on the plinth prior to fix the whole on the floor.

Types of raising plinths

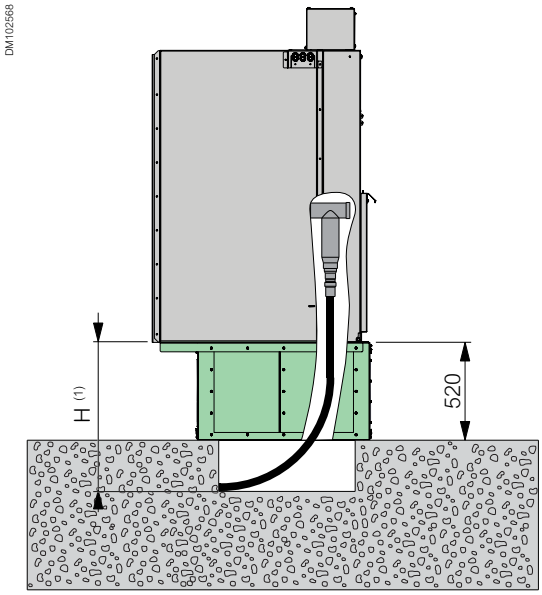


Right and left panel raising plinth



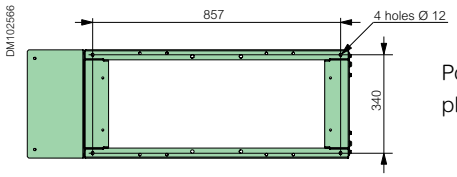
Middle panel raising plinth: use 2 plinths for 1 cubicle 1250 A

Raising plinth 520 mm

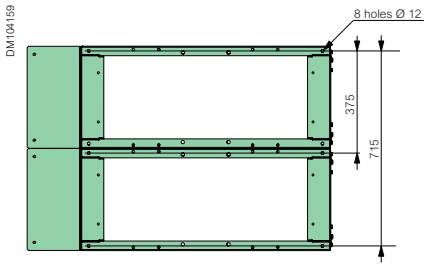


(1) for downward exhaust, the minimum distance of cable trench and raising plinth (H) is 770 mm

Fixing the raising plinth to the floor



Position of holes to fix the raising plinth on the floor



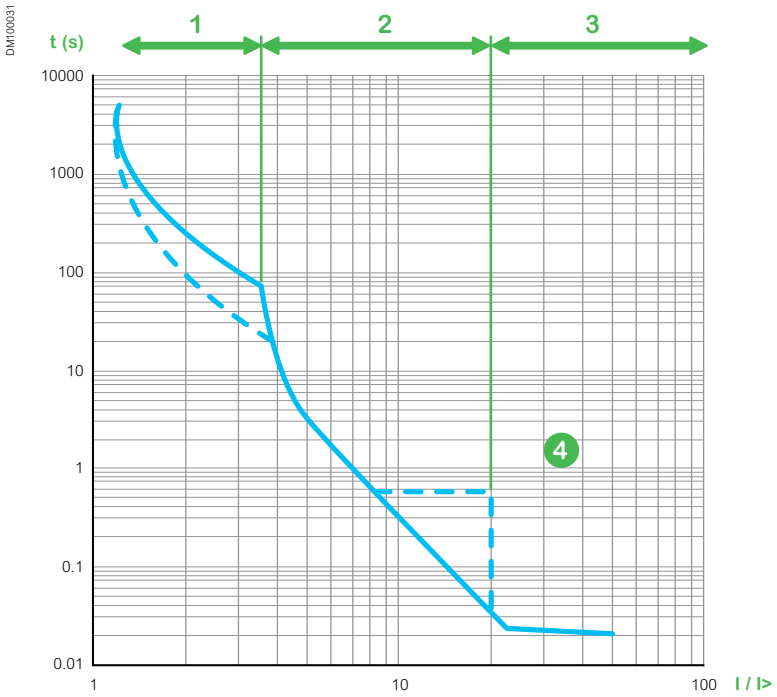
2 raising plinths will be used to assemble a 750 mm wide cubicle

Note: for rear connection raising plinths availability, please consult us

VIP tripping curves

VIP 40 and VIP 45 tripping curve

Phase overcurrent protection (ANSI 50-51)

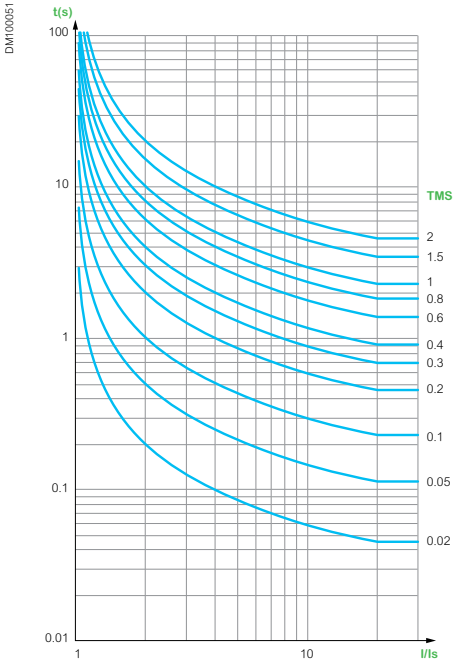


1. Overload
2. Secondary short-circuit
3. Primary short-circuit
4. Activation of discrimination with a Low Voltage circuit breaker

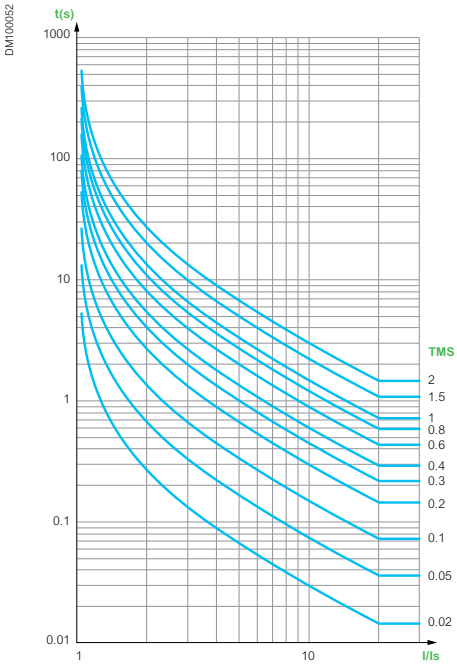
VIP tripping curves

VIP 400 and VIP 410 tripping curves

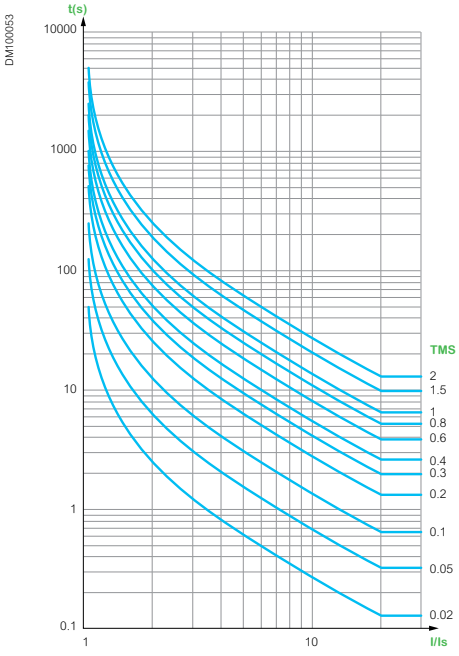
IEC Standard Inverse Time Curve (IEC/SIT or IEC/A)



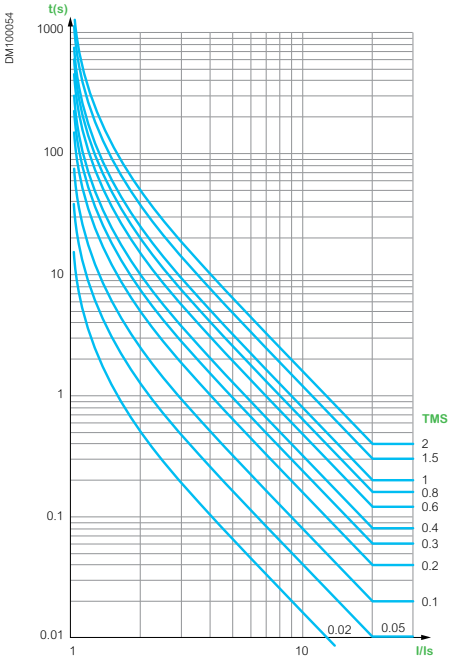
IEC Very Inverse Time Curve (IEC/VIT or IEC/B)



IEC Long Time Inverse Curve (IEC/LTI)



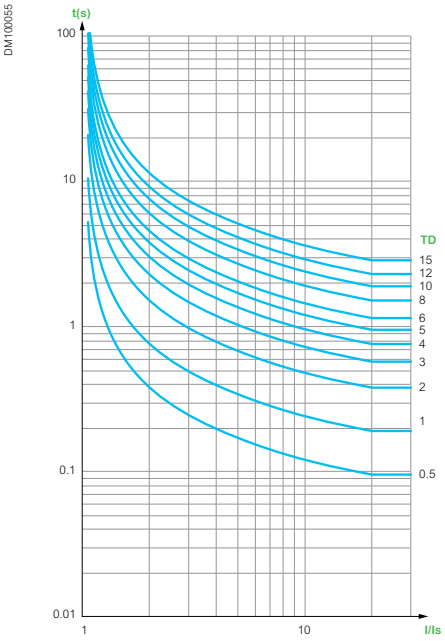
IEC Extremely Inverse Time Curve (IEC/EIT or IEC/C)



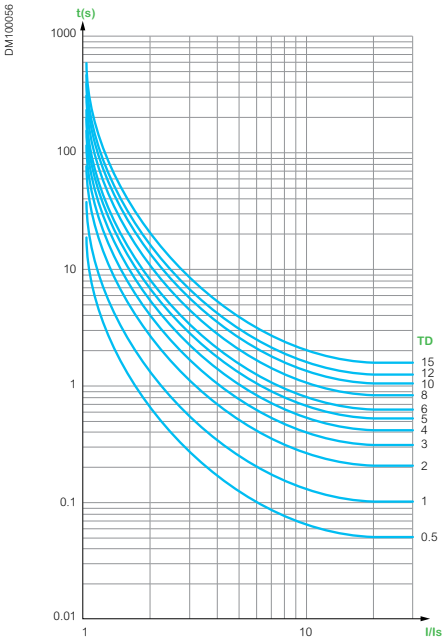
VIP tripping curves

VIP 400 and VIP 410 tripping curves

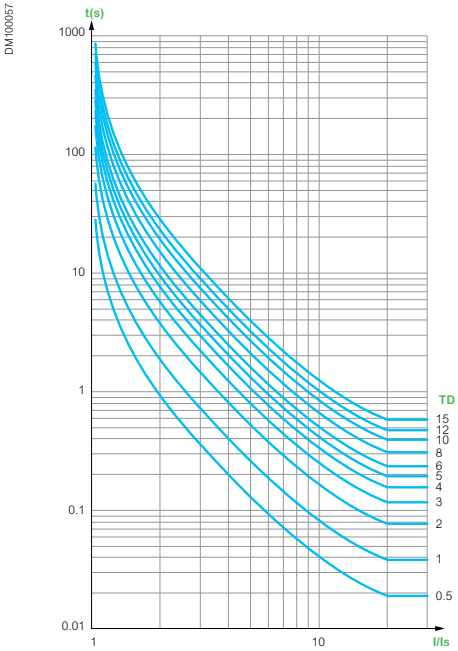
IEEE Moderately Inverse Curve (IEEE/MI or IEC/D)



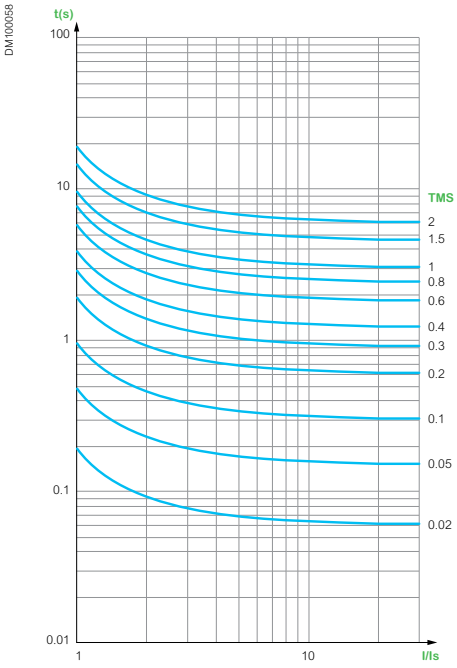
IEEE Very Inverse Curve (IEEE/VI or IEC/E)



IEEE Extremely Inverse Curve (IEEE/EI or IEC/F)



RI Curve



Order form

Premset (indoor) standard offer

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

Switchboard technical characteristics

Rated voltage	Ur	7.2 kV ☐		12 kV ☐		17.5 kV ☐	
Service voltage	(kV)	☐					
Rated short-time withstand current and duration	(Ik,tk)	21 kA 1 s ☐		21kA 3 s ☐		25 kA 1 s ☐	25 kA 3 s ☐
Service current	(A)	630 A ☐					
Auxiliary voltage supply	(Ik,tk)	24V dc ☐		48V dc ☐		110V dc ☐	220V dc ☐
Busbar current	(A)	630 A ☐		1250 A ☐			
Internal arc withstand A-FLR		21 kA 1s ☐		25 kA 1 s ☐			

Accessories supplied with switchboard:

- User manual: operation manual and installation guide
- Side plate
- Switchboard earthing connection (1 set)
- Operating handle

Switchboard arrangement

Cubicle type	1	2	3	4	5	6	7	8	9	10
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Cubicle type	11	12	13	14	15	16	17	18	19	20
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Switchboard accessories

Type	Options	Qty
Phase concordance unit		☐
Pocket battery for VIP		☐

Basic unit including:

- MV stand alone Premset for indoor installation
- earthing switch with making performance
- VPIS Voltage Presence Indication
- 1 x set of busbars
- C type M16 bolted bushings. Front bottom connections.
- 700mm for cable connection
- Interlock between switch, circuit breaker & earthing switch and door
- Internal arc withstand downwards exhaust
- Low voltage cabinet type C

Order form

Premset (indoor) standard offer

Incomer or feeder - Circuit breaker

Type	Rating	Mech Type & Operation	Protection Relay		Protection CT				Qty
D02N	200A	CI1 Motorized	Sepam T20	☐	TLPU1	☐	Cable testing		☐
			Sepam T40	☐	ARU2: 100/1	☐	ARU2: 200/1	☐	
					CSH120	☒			
D06N	630A	CI1 Motorized	Sepam S20	☐	TLPU1	☐	Cable testing	☐	☐
			Sepam S40	☐	ARU2: 400/1	☐	ARU2: 600/1	☐	
					CSH120	☒			
D06H	630A	OCO Motorized	Sepam T20	☐	TLPU1	☐	Cable testing	☐	☐
			Sepam T40	☐	ARU2: 100/1	☐	ARU2: 200/1	☐	
			Sepam S20	☐	ARU2: 400/1	☐	ARU2: 600/1	☐	
			Sepam S40	☐	CSH120	☒			
					VRU1: 6√3 kV/100√3 V 7.2-20-60 Kv	☐	VRU1: 6.6√3 kV/110√3 V 7.2-20-60 Kv	☐	
					VRU1: 10√3 kV/100√3 V 12-28-75 kV	☐	VRU1: 11√3 kV/110√3 V 12-28-75 kV	☐	
			VRU1: 11√3 kV/110√3 V 17.5-38-95 kV	☐	VRU1: 13.8√3 kV/100√3 V 17.5-38-95 kV	☐	VRU1: 15√3 kV/100√3 V 17.5-38-95 kV	☐	
D02N	200A	CI1 Manual	VIP45	☐	motorisation	☐	Cable testing	☐	☐
			VIP410	☐	CSH120 when VIP410 only	☐			
D06N	630A	CI1 Manual	VIP400	☐	motorisation	☐	Cable testing	☐	☐
			VIP410	☐	SCH120 when VIP410 only	☐			
D06H	630A	OCO Motorized	VIP410	☐	C CSH120 uB	☒	Cable testing	☐	☐

Incomer or feeder - Switch

Type	Rating	Mech Type & Operation	Options				Qty
I06T	630 A	CIT Motorized	Motorisation + Flair 23DM	☐	Cable testing	☐	☐

Order form

Premset (indoor) standard offer

Incomer or feeder - Direct cable connection

Type	Rating	Mech Type & Operation	Options						Qty
G06	630 A	N/A							
M06S	630 A	N/A	ARC5: 100/5		VRU1: 6√3 kV/100√3 V 7.2-20-60 Kv		VRU1: 6.6√3 kV/110√3 V 7.2-20-60 Kv		
			ARC5: 200/5		VRU1: 10√3 kV/100√3 V 12-28-75 kV		VRU1: 11√3 kV/110√3 V 12-28-75 kV		
			ARC5: 400/5		VRU1: 13.8√3 kV/100√3 V 17.5-38-95 kV		VRU1: 15√3 kV/100√3 V 17.5-38-95 kV		
			ARC5: 600/5				VRU1: 11√3 kV/110√3 V 17.5-38-95 kV		
			Power meter PM850						

Bus section - Switch or circuit breaker

Type	Rating	Mech Type & Operation	Protection Relay		Protection CT				Qty
D06N	630 A	CI1 Motorised	SEPAM S20		TLPU1				
			SEPAM S40		ARU2: 400/1		ARU2: 600/1		
			Busbar		to right		to left		
D06H	630 A	OCO Motorised	SEPAM S20		TLPU1				
			SEPAM S40		ARU2: 400/1		ARU2: 600/1		
			Busbar		to right		to left		
D06N	630 A	CI1 Manual	VIP400		Motorisation				
			VIP410						
			Busbar		to right		to left		
I06T	630 A	CI1 Manual			Motorisation				
			Busbar		to right		to left		
D06H	630 A	OCO Motorized	VIP410	X					
			Busbar		to right		to left		

Order form

Premset (indoor) standard offer

Bus riser

Type	Rating	Operation	Options						Qty
G06	630 A	N/A	Busbar		to right			to left	
M06S	630 A	N/A	ARC5: 100/5		VRU1: 6√3kV/100√3V 7.2-20-60 Kv		VRU1: 6.6√3kV/110√3V 7.2-20-60 Kv		
			ARC5: 200/5		VRU1: 10√3kV/100√3V 12-28-75 kV		VRU1: 11√3kV/110√3V 12-28-75 kV		
			ARC5: 400/5		VRU1: 13.8√3kV/100√3V 17.5-38-95 kV		VRU1: 15√3kV/100√3V 17.5-38-95 kV		
			ARC5: 600/5				VRU1: 11√3kV/110√3V 17.5-38-95 kV		
			Power meter PM850						
			Busbar		to right			to left	

Voltage measurement

Type	Rating	Operation	Options			Qty
VTM	630 A	N/A	VRU1: 6√3 kV/100√3 V 7.2-20-60 Kv		VRU1: 6.6√3 kV/110√3 V 7.2-20-60 Kv	
			VRU1: 10√3 kV/100√3 V 12-28-75 kV		VRU1: 11√3 kV/110√3 V 12-28-75 kV	
			VRU1: < 13.8√3 kV/100√3 V 17.5-38-95 kV		VRU1: 15√3 kV/100√3 V 17.5-38-95 kV	
					VRU1: 11√3 kV/110√3 V 17.5-38-95 kV	

Notes

Notes

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www.schneider-electric.com

SAS capital social 928 298 512 €
954 503 439 RCS Nanterre

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