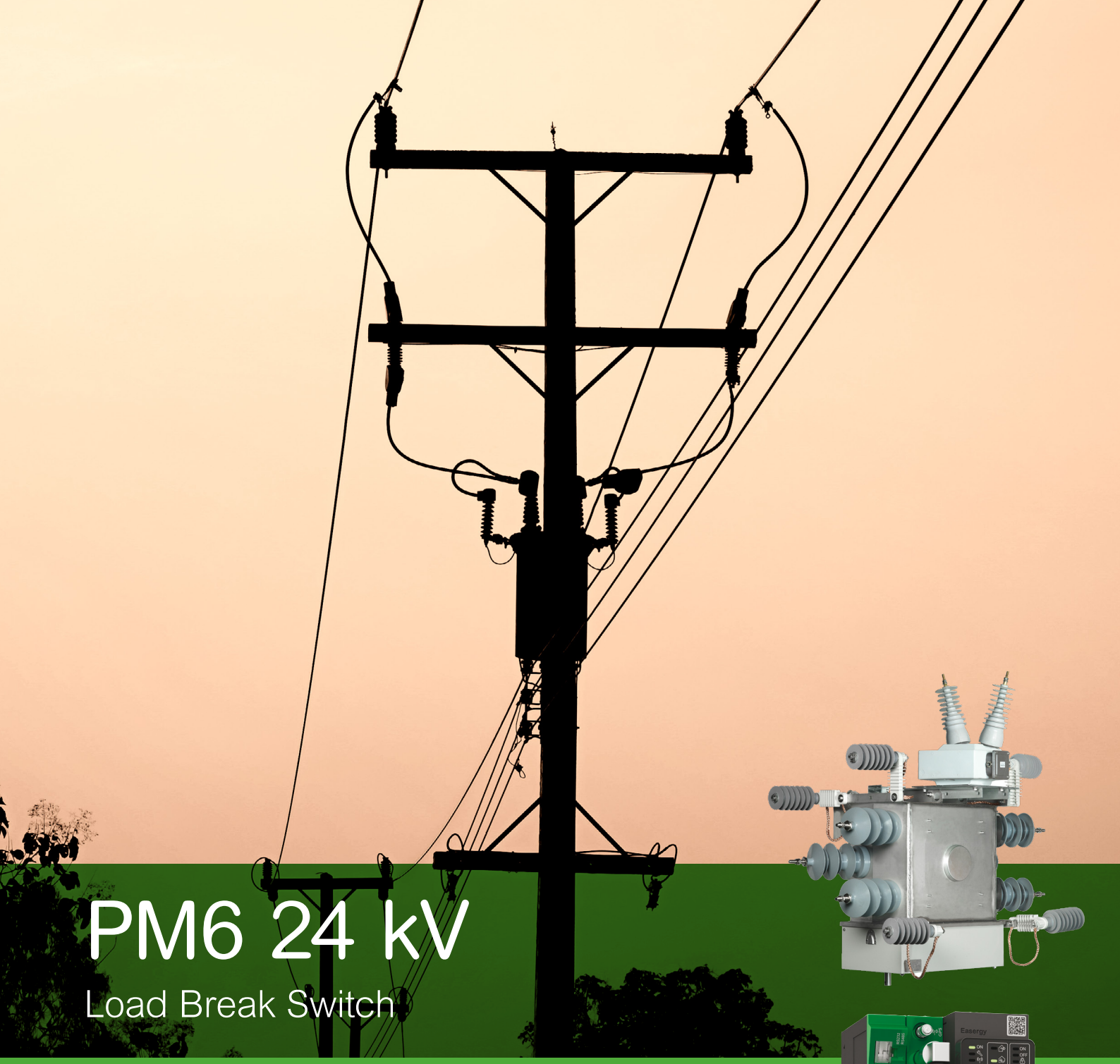


PM6 24 kV

Load Break Switch

Overhead Feeder Automation Solution

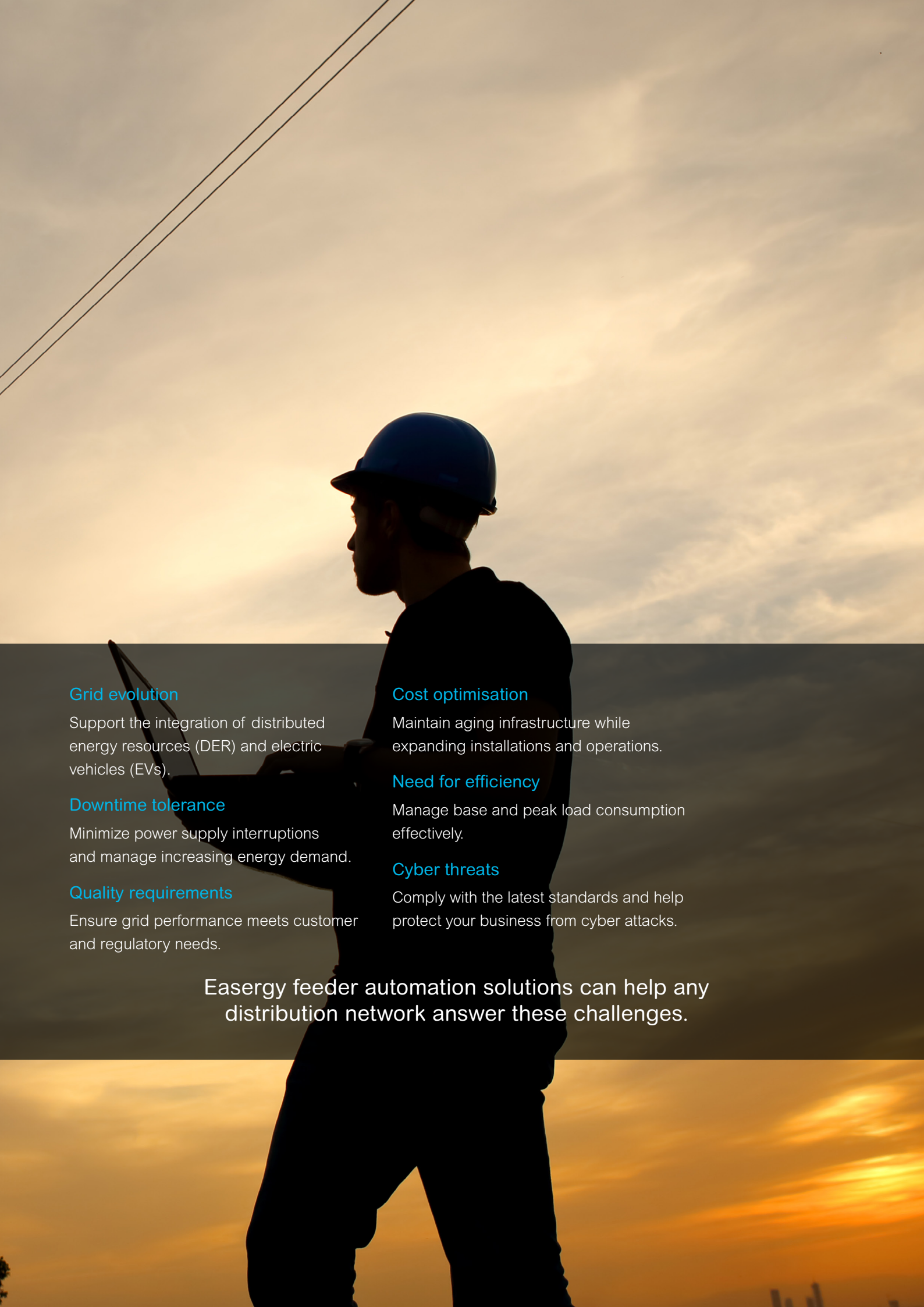
2021 Catalog

se.com

Life Is On | Schneider Electric

Answer the challenges of today. And tomorrow.

Electrical distribution networks must transition to next-generation technology in order to face the challenges of modern grid applications, such as growing energy demand, stricter CO_2 emission limits, and tight constraints on operational expenditure (OpEx).



Grid evolution

Support the integration of distributed energy resources (DER) and electric vehicles (EVs).

Downtime tolerance

Minimize power supply interruptions and manage increasing energy demand.

Quality requirements

Ensure grid performance meets customer and regulatory needs.

Cost optimisation

Maintain aging infrastructure while expanding installations and operations.

Need for efficiency

Manage base and peak load consumption effectively.

Cyber threats

Comply with the latest standards and help protect your business from cyber attacks.

Easergy feeder automation solutions can help any distribution network answer these challenges.

General Contents

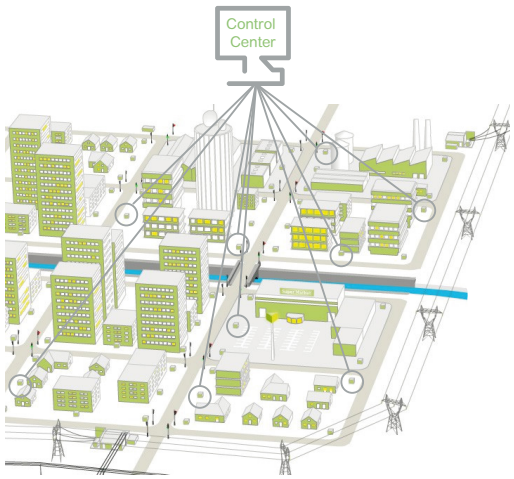
Applications

Network control application

Operating an electrical distribution grid is an increasingly complex business. The challenges posed by growing demand, integration of distributed generation resources, and aging infrastructure – to name just a few – each affect overall grid reliability and customer satisfaction.

Grid operators face these challenges in order to boost efficiency, help protect their customers and avoid regulatory scrutiny, but it's not easy. Deployment of network controls that require large capital expenditures is problematic.

DM101314



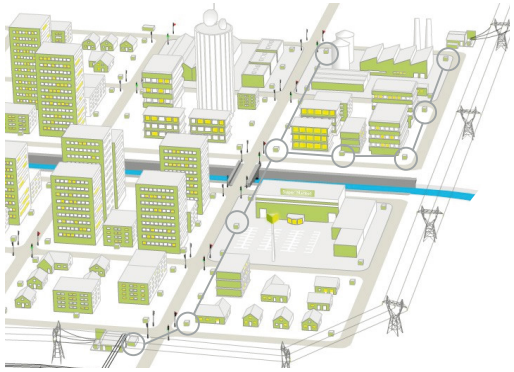
Classical remote control and monitoring

Therefore, an efficient control and monitoring solution should improve power availability, voltage management and asset management.

Classical remote control and monitoring

- Scada/DMS or OMS integration for remote control and monitoring
- Real-time load monitoring
- MV Fault detection signalization for centralized network reconfiguration
- Decentralized automation such as sectionalized or auto source transfer
- MV voltage measurement according to EN50160 for Volt/Var optimization support
- Asset management

DM101315



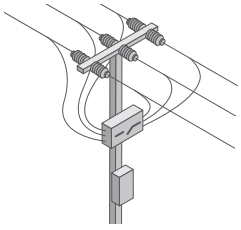
Decentralized network management (FDIR)

Decentralized network management

- High speed fault detection, isolation and restoration
- Open automation scheme based on IEC 61131-3
- Flexible and more efficient peer-to-peer communication based on DNP3
- Can be associated with remote control system

Load Break Switch controller

DM103464



- Load break switch monitoring and control
- MV current fault detection
- MV broken conductor detection
- Volt Var optimization support

500 000

EcoStruxureTM has been deployed in almost 500 000 sites with the support of 20 000+ developers, 650 000 service providers and partners, 3 000 utilities, and connects over 2 million assets under management.

EcoStruxure™ ready

Efficient asset management

Greater efficiency with **predictive** maintenance helping to reduce downtime.

24/7 connectivity

Real-time data **everywhere anytime** to make better informed decisions.

Increase uptime

Proven design and experience combined with fast **embedded arc detection** to enhance people's safety and equipment's protection

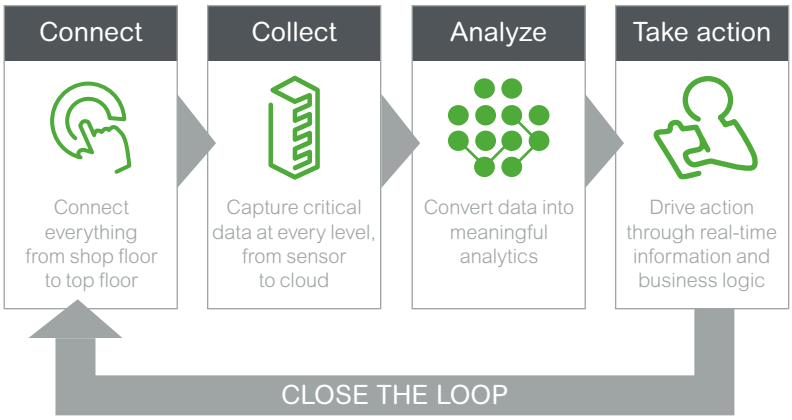
EcoStruxure™ is our open, interoperable, IoT-enabled system architecture and platform. EcoStruxure delivers enhanced value around safety, reliability, efficiency, sustainability, and connectivity for our customers. EcoStruxure leverages advancements in IoT, mobility, sensing, cloud, analytics, and cybersecurity to deliver Innovation at Every Level. This includes Connected Products, Edge Control, and Apps, Analytics & Services which are supported by Customer Lifecycle Software.

Turn data into action

EcoStruxure™ architecture lets customers maximize the value of data.

Specifically, it helps them:

- Translate data into actionable intelligence and better business decisions
- Take informed decisions to secure uptime and operational efficiency thanks to real-time control platforms
- Get visibility to their electrical distribution by measuring, collecting, aggregating and communicating data



EcoStruxure™ Architecture

Quality and Environment

Assurance

PM6 24 kV with bird protection system

The compatibility with bird protection systems and its compact design make the PM6 fit properly in the environment.

Certified quality ISO 9001:2015

At Schneider Electric, customer satisfaction is the Number One priority for everybody

- We undertake to find the ideal solution for each of our customers
- We are enthusiastic about our customers; our thinking and actions are clearly customer-oriented
- We encourage and empower our staff to always meet quality requirements
- Each Schneider Electric production site has an established functional organization which ensures, monitors and continuously improves quality in line with norms and standards.

The Quality Management System for development, production, sales and servicing of PM6 has been certified in conformity with the requirements in accordance with ISO 9001:2015

Protected environment ISO 14001:2015

Schneider Electric's environmental policy has the following aims for all production sites:

- Reduction of the environmental footprint of our products and solutions over their entire service life by optimizing the consumption of resources and energy and by developing recycling solutions
- Provision of services which both meet environmental requirements and help our customers optimize their energy consumption
- Minimization of the environmental burden caused by our factories and plants by reducing the consumption of natural resources, avoidance of waste and emission and the utilization of the latest technologies
- Integration of all our members of staff, suppliers and partners in a process of continuous improvement together with our customers, to meet the company's requirements even better

The Environmental Management System for development, production, sales and servicing of PM6 has been certified in conformity with the requirements in accordance with ISO 14001:2015

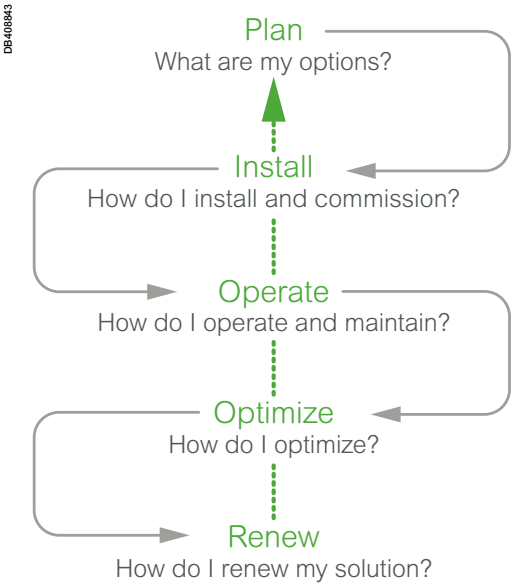
Schneider Electric Services

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 straightforward: get professional expertise.

Life Cycle Services



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.se.com/b2b/en/services/

Plan

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

- **Technical feasibility studies:** Design solution in your environment
- **Preliminary design:** Accelerate turnaround time to reach a final solution design

Install

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

- **Project management:** Complete your projects on time and within budget
- **Commissioning:** Ensure your actual performance versus design, through on-site testing and commissioning, and tools and procedures

Operate

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

- **Asset operation solutions:** Provide the information you need to increase safety, enhance installation performance, and optimize asset maintenance and investment
- **Advantage service plans:** Customize service plans that cover preventive, predictive and corrective maintenance
- **On-site maintenance services:** Deliver 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:** Build necessary skills and competencies to properly and safely operate your installations

Optimize

Schneider Electric proposes recommendations for improved safety, availability, reliability and quality.

- **MP4 electrical assessment:** Define an improvement and risk management program

Renew

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

We offer to take full responsibility for the end-of-life processing of old electrical equipments.

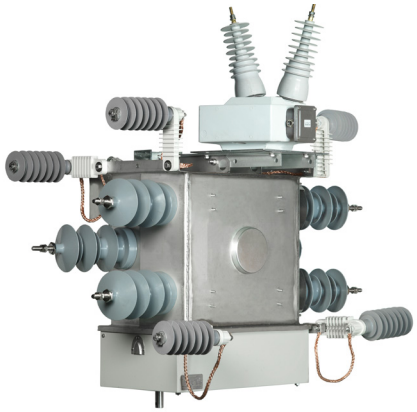
- **ECOFIT™:** Keep up to date and improve performances of your electrical installations (LV, MV, protection relays, etc.)
- **MV product end of life:** Recycle and recover outdated equipment with end-of-life services

PM6 Range

General description
Presentation

PM6 24 kV is a load break switch-disconnector designed to be mounted on all types of poles and in heavy polluted areas. It can be installed in rural and semi-urban overhead distribution networks up to 24 kV. PM6 up to 36 kV and 52 kV are also available (see dedicated catalogue).

QVEVRT45



Reference standards

PM6 is manufactured and tested in conformity with the latest revision of international standards:

- **IEC62271-103**: Switches for rated voltage above 1 kV up to and including 52 kV
- **IEC 62271-102**: Alternating current disconnectors and earthing switches
- **IEC 62271-1**: High-voltage switchgear and control gear: common specifications

Other standards:

- IEC60529, IEC 62271-200, IEC 60815, IEC 62271-214

Benefits

Safe

IEC 62271-102 specifies higher withstand test levels across the isolating distance between poles than for phase-to-ground isolation. For safety reasons, disconnectors must be designed in such a way that dangerous leakage currents cannot flow from the terminals on one side to either terminal on the other side when in the open position. PM6 guarantees this safety prescription.

Effective disconnection according to IEC 62271-102. Additional disconnectors are not necessary to guarantee the isolation distance thanks to its reliable position indicating device (**kinematic chain**). This feature gives the equipment its characteristics as a disconnector switch.

A **relieve valve** fitted to the switch´s sealed enclosure avoids any explosion. If an internal arc occurs, the gas is released by this valve.

Guarantee the safety of the operator even if an internal arc fault occurs at the maximum fault capacity. Internal arc tested at an approach distance of 3m.

Free of maintenance

The PM6 is maintenance and lubrication free it´s entire life (30 years).
All sensitive components like motors, voltage transformer, electronic components etc. which may need to be fully dismantled in the event of an external incident are placed outside of the SF6 tank.

Low internal SF6 pressure (0,132 MPa) and SF6 leakage less than 0.1% per year.
The enclosure is sealed for life and meets “pressurized sealed system” criteria (IEC 62271-200). Thus, periodic check-ups are not necessary.

Durable

The breaking device is made up of a robust **stainless steel enclosure** without additional protective coatings and **minimum welding lines** (ISO3834-2), to give a smooth, **self-cleaning and highly resistant to corrosion** aerated surface.

ISO3834-2

Quality requirements for fusion welding of metallic materials

Upgradable

PLUG & PLAY DESIGN

Live line installation

General characteristics
Operation

Mechanism

The basic mechanism involves an opening-closing system (passing through a neutral point), activated by a spring for **switching operations to take place independently of the operator switching speed** (Tumbler system).

The kinematic chain provides unambiguous switch position indication. This is assured thanks to a device directly connected to the switch operating shaft. **This device, and the position indicator, easily visible from the ground, comply with IEC 62271-102 standard**.

The electrical control mechanism comprises a 48 V DC (24 V DC optional) motor for the electrical opening and closing operations, operated either from the control cubicle HMI or from a remote-control center. The motor operation time takes < 3,5 seconds from the command signal initiation.

Manual operation

According to requirements and market preferences Schneider Electric can offer two variants of manual control.
In both cases, the operating cantilever for the manual operation do not exceed 250N according to IEC 62271-102.

Hookstick system

No need for manual control settings when being installed.

The switch can be locked at open or close position. When it is locked, an indication sign ( ) is shown. Also, its auxiliary contact provides lock out of local and remote electrical operations.

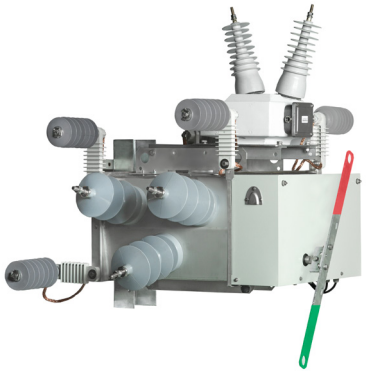
Transmission system

Easy to activate and safer for the operator.

The manual control system comprises a transmission shaft going to the base of the pole and an operating lever which can be mechanically padlocked in one of the three positions:

LOCKED OPEN - REMOTE CONTROL - LOCKED CLOSED

QVEHZT



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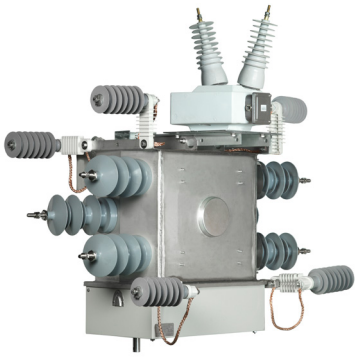


QVEHZTB

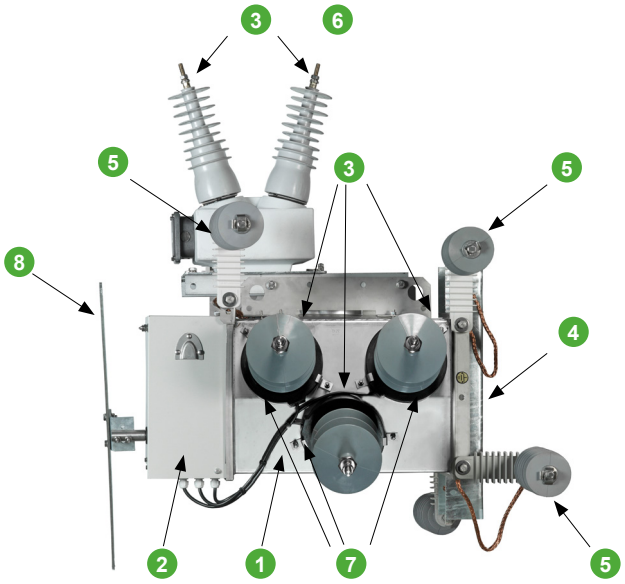
Open - Locked - Internal gas pressure OK

PE56845EN

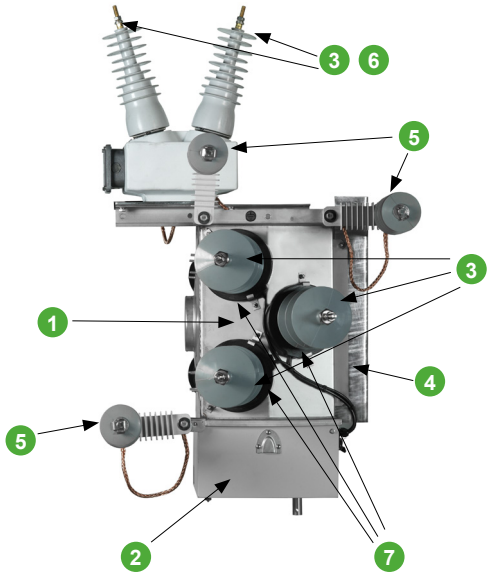
The padlock is not supplied

General characteristics
Components

Hookstick system



Transmission system



Components:

1. PM6 switch-disconnector.
2. Electric or manual mechanism
3. Line connections
4. Support frame
5. Surge arresters
6. Voltage transformer
7. Current transformers
8. Manual command hook stick

Compact design

Lightning arresters can be placed directly on the switch. Thus, no extra support frame is needed.

The optional voltage transformer can be installed above the PM6 keeping dimensions small.

General characteristics

Electrical characteristics

		PM6
Rated voltage (kV rms)		24 kV
Rated current in continuous (A)		630 A
Insulation level	To earth kV rms, 50 Hz/1 min	50 kV
	Between poles kV rms, 50 Hz/1 min	60 kV
	To earth Impulse wave kV, 1.2/50 µs	125 kV
	Between poles Impulse wave kV, 1.2/50 µs	145 kV
Breaking capacity (A)	Mainly active load	630 A
	Close loop	630 A
	Cable charging	31,5 A
	Line charging	10 A
Earth fault breaking current	A (peak value)	75 A
	Cable & Line charging	43A
Making capacity	kA (peak value)	41,6 kA
Short time withstand current	kA (rms value)	16 kA / 1s
	kA (peak value)	41,6 kA
Internal arc	kA / s	16 kA / 0,5 s
Mechanical strength	Class	M2
	Rated opening/close operations	5000
Electrical endurance	Class	E3
	Full load operations	100
	Short-circuit making operations	5
Capacitive switching	Class	C2
Protection index	Switch enclosure	IP65
Temperature	Minimum	-30ºC
	Maximum	+40ºC
Height of installation	m.a.s.l (m)	1000m
Rated filling pressure (abs)	MPa - Bar	0,132 - 1,32
SF6 / CO2e	Kg - ton	0,99 - 22,5
Insulator	Material	Silicone rubber
Creepage distance	Class - mm	E - 780mm
Humidity	% at ºC	95% at 40 ºC
Motor operation time	Seconds	< 3,5 s

BEST IN CLASS FEATURES

Internal arc tested at an approach distance of 3m
Class E3 - highest category 62271-103
Mechanical strength Class M2

Whatever manual control system is chosen, electrical and functional characteristics are the same for the whole PM6 range

Easergy T300P
Remote Terminal Unit

The new benchmark in distribution network automation

One modern Feeder RTU to answer your evolving challenges and prepare your business for the future.

Easergy T300

IEC 62443-4-2 compliant, Easergy T300 has been designed with a cyber security package. This shall help reduce exposure to cyber threats and improved operational security. It includes important features such as password management, firmware signature, port hardening, and secured communication compliant to the latest international standards.

Evolve with the grid: Manage bidirectional and intermittent power flow

- Detect overcurrent faults including grid with interconnected distributed energy resource units
- Detect broken conductors and voltage loss

Increase availability: Improve SAIDI and optimize MV and LV networks

- Detect medium-voltage (MV) faults by current and voltage measurements to reduce outage time.
- Reconfigure the network automatically after a MV fault (in centralized, semicentralized or decentralized approaches)

Maintain quality: deliver MV stability

- Accommodate demand growth
- Measure MV voltage accurately for Volt-Var optimization

Manage costs: Reduce installation, operation, and maintenance expenditures

- Optimize investment with modular automation solutions
- Enable remote and local operation and asset management including firmware update
- Save cost on spare parts, training, and operation of personnel by using a single platform for multiple applications

Deliver efficiency: Optimize networks to manage growing consumption

- Reduce both technical and non-technical losses
- Manage load shedding and peak shaving

Improve Cybersecurity: Defend against malicious software and unauthorized access

- Compliant with IEC 62443, IEC 62351 and IEEE 1686
- SCADA communication and Wi-Fi Access security features

PM109239

Environmental information with Green Premium™ ecolabel

Green Premium™

An industry leading portfolio of offers delivering sustainable value

Green Premium™

More than 75% of our product sales offer superior transparency on the material content, regulatory information and environmental impact of our products:

- RoHS compliance
- REACh substance information
- Industry leading # of PEP's*
- Circularity instructions

Discover what we mean by green
Check your products!

The Green Premium program stands for our commitment to deliver customer valued sustainable performance. It has been upgraded with recognized environmental claims and extended to cover all offers including Products, Services and Solutions.

CO_2 and P&L impact through… Resource Performance

Green Premium brings improved resource efficiency throughout an asset's lifecycle. This includes efficient use of energy and natural resources, along with the minimization of CO_2 emissions.

Cost of ownership optimization through… Circular Performance

We're helping our customers optimize the total cost of ownership of their assets. To do this, we provide IoT-enabled solutions, as well as upgrade, repair, retrofit, and remanufacture services.

Peace of mind through… Well-being Performance

Green Premium products are RoHS and REACh compliant. We're going beyond regulatory compliance with step-by-step substitution of certain materials and substances from our products.

Improved sales through… Differentiation

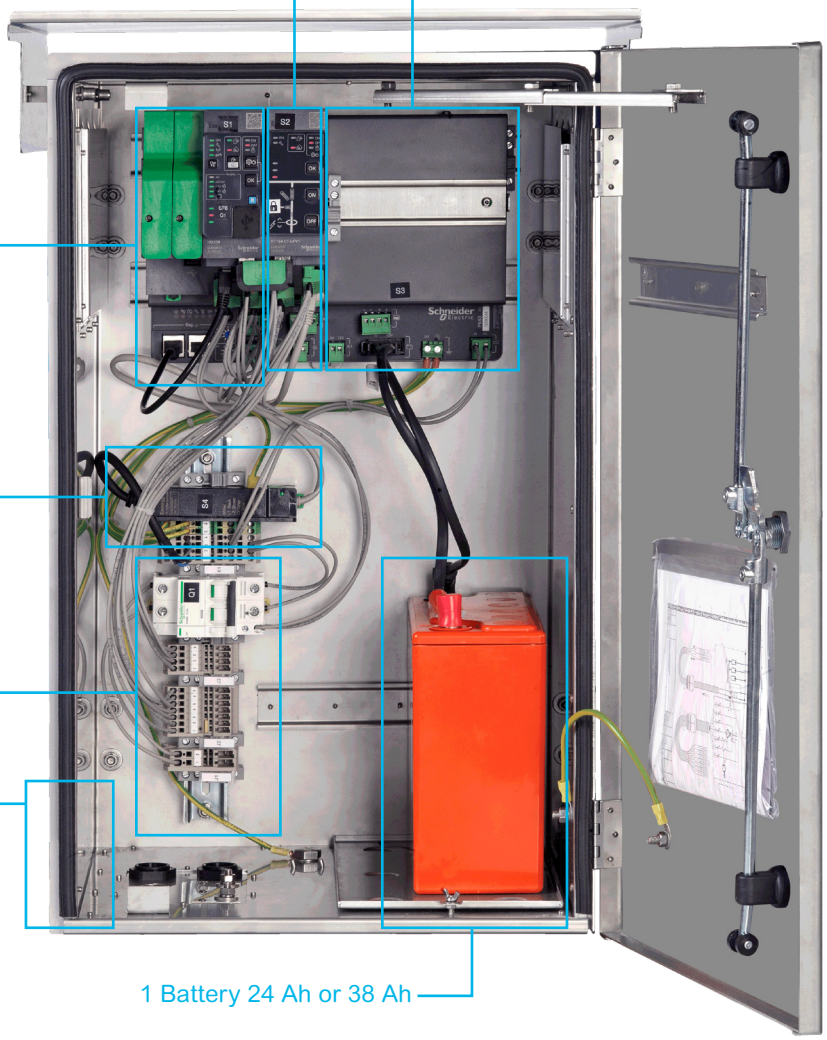
Green Premium delivers strong value propositions through third-party labels and services. By collaborating with third-party organizations we can support our customers in meeting their sustainability goals such as green building certifications.

*PEP: Product Environmental Profile (i.e. Environmental Product Declaration)

Control Box Module Easergy T300P

Easergy SC150
MV swtichgear controller

Easergy PS50
Backup power supply with battery management



Easergy HU250
Head unit communication

1 AC Breaker

Terminal switch connector

Opened door contact (optional)

1 Battery 24 Ah or 38 Ah

Enclosure

Protection index: IP 45 and IK09 (Consult us for another protection index)
According to the Standards:

- IEC 60259:1989
- IEC 62262:2002

Dimensions

- Basic enclosure: H658 x W400 x D350
- Material: Stainless steel AISI 316
- Mounting

PM104385

The modules, with their supported applications, are:

Easergy HU250 – Head Unit communication gateway

- Flexible communication gateway to control center and other customer IT applications
  - Standard and security-focused protocols: IEC 101/104, DNP3, IEC 61850, Modbus
  - Open peer-to-peer communication to support self-healing application
  - Flexible communication media (Ethernet, USB, GPRS, 2G, 3G, 4G)
- Flexible local communication (Ethernet, Wi-Fi, ZigBee, RS232)
- Cybersecurity management according to IEC 62443-4-2
- Open to third-party devices with many protocol capabilities
- Built-in webserver for commissioning and maintenance with local and remote access, compatible with PC, tablet and smartphone devices
- Embedded IEC 601131-3 PLC for automation design

PM104382

Easergy SC150 – Switch controller

- Control and monitoring of all switchgear types
- Advanced Fault Passage Indicator (FPI) algorithms:
  - Phase-phase and phase-ground detection ANSI 50/51, 50N/51N
  - Directional phase-phase and phase-ground detection ANSI 67/67N
  - Broken conductor detection (one phase lost) ANSI 47
- MV Voltage monitoring ANSI 27, 59, 59N
- MV Current monitoring ANSI 37
- Direction overpower/reverse power detection ANSI 32P
- Large current and voltage measurement capabilities: standard CT for current, LPVT, VT and from capacitor divider and voltage presence indicator (VDS, VPIS) for voltage
- Power measurement according to IEC 61557-12
- Power quality according to IEC 61000-4-30
- Specific application automation: sectionalizer
- Disturbance recording

PM104366

Easergy PS50 – Power Supply

- PS50 is specially designed for MV distribution equipment with a harsh environment. PS50 is a backup power supply with full battery management to operate the substation during the power outage:
  - Switch control: 48 Vdc or 24 Vdc
  - Telecom devices: 12 Vdc - 18 W
  - Easergy T300P IEDs: 12 Vdc - 36 W
  - HU250 and SC150 modules are compatible with other power supplies (contact us)

Product overview
Lifecycle tools

Easergy T300 offers several tools for the different stages of the lifecycle of the product.

Access is possible locally and remotely. Local access can be made by Wi-Fi or cable.

Easergy T300 is supplied with a standard configuration or a dedicated customer configuration.

Choose from ready-to-use solutions, tailored integrations, or retrofits. All Easergy T300 modules offer DIN rail mounting for flexible RTUs integration design.

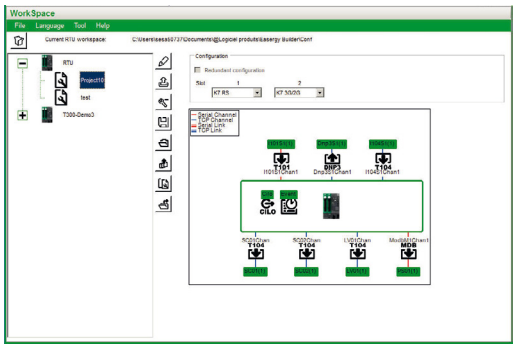
Commissioning and maintenance do not require special tools, only a web browser on a PC, tablet or smartphone.

Embedded web server for commissioning, exploitation and maintenance

The operations from the web server, according to the defined level of access, are:

- View the status of the substation: substation view diagram, system view, events log file, measure log file, alarms
- Modify settings: Fault Passage Indicator, automation, communication
- Upload and download firmware and configuration data base
- Modify security access features

EM100100



Easergy Builder

Esergy Builder for engineering teams

Easergy Builder is the advanced configuration tool of the Easergy T300 RTU, reserved for the expert engineering team. The basic use of Easergy T300 does not require advanced modifications of t he Easergy T300 configuration. The web server is sufficient for the user to personalize the system and change basic settings.

Easergy Builder is used by expert engineering teams to modify or design new databases off line:

- Configure new communication channels
- Integrate new third part IEDs
- Design new databases

Easergy HU250
Head Unit Communication
General description

Local operator front panel (HMI)

The HU250 gives general information

Local / remote control and status

- Local position: the remote switch control from the remote access is locked
- Remote position: the local switch control from local access (SC150 HMI, Wi-Fi) is locked
- A button on the HU250 enables changing the control status between local and remote. This button can be replaced by an external device

Easergy T300P status

- HU250 heartbeat status
- T300P equipment status
- Wi-Fi status
- Communication status with modules

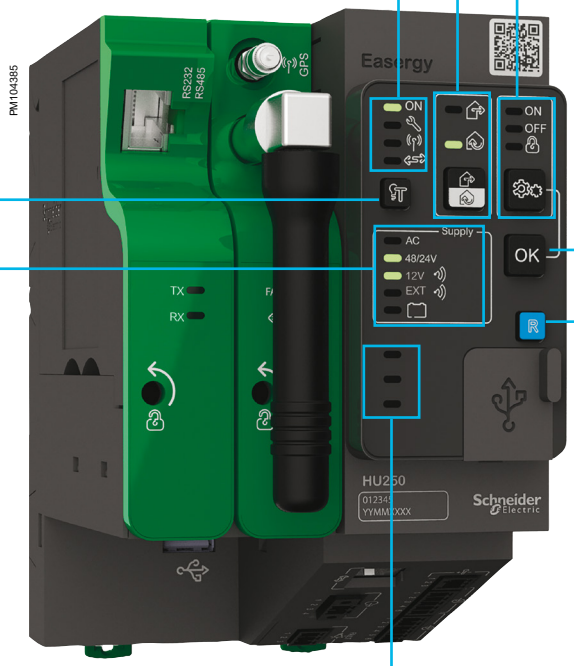
LEDs test button

The test button forces all LEDs on Easergy T300 and the external light indicator to ON in order to control the led.

Power supply status

The HU250 displays the power supply status, transmitted by the power supply via Modbus.

- AC supply ON/OFF
- Voltage output for switchgear motor ON/OFF
- Voltage output for electronics modules ON/OFF
- Voltage output for transmission devices ON/OFF
- Battery status



Automation status and control

The button with validation allows the operator to locally enable/disable the automation for all modules. The operator must simultaneously press the automation and the OK button.

- Automation status LEDs: ON / OFF
- Automation locked status
- Automation status and control

OK button

Reset button

The reset button enables cancelling of all fault current indications on all modules and the automation locked

Free configurable LEDs

Three free LEDs, configurable for multi-purpose status

Easergy HU250
Head Unit Communication
General description (cont.)

Configurable communication ports

Wi-Fi hotspot with security for local connection

Easergy T300P incorporates an embedded Wi-Fi hotspot for local connection to:

- Embedded web server via a laptop, tablet or smart phone
- Easergy Builder

Flexible communication ports

These communications ports can accommodate modem boxes. These modem boxes can be added on site and make for very flexible updating during the product lifecycle. The modems boxes available are:

- RS232/485 modem box for WAN or LAN communication
- 2G/3G modem box for WAN communication
- 4G European and US standard modem box with GPS clocks for accurate time synchronization

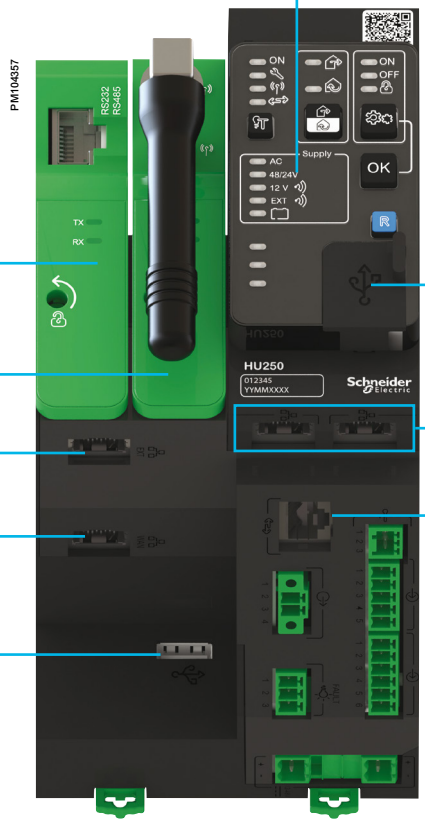
Ethernet ports

These ports can accommodate one of the following options:

- WAN communication
- LAN communication for third-party IEDs

USB port

One USB host port for multi-purpose use



USB port

One mini USB port dedicated for maintenance

Dedicated dual Ethernet port for Easergy T300P modules

This Dual Ethernet port daisy-chain is dedicated for communication between Easergy T300P modules and connection to a laptop with Easergy Builder or an internet browser for connection to a web server.

Serial RS485 Modbus port

This port is used for the connection to the Easergy communication power supply and can be used for third-party Modbus IEDs

Wi-Fi management with security

- Wi-Fi activity: Enable / Disable
- Activation mode: From SCADA, Web, HMI Local / Remote button
- SSID visibility: Enable / Disable
- SSID value
- Passphrase value
- Disconnection: Automatic disconnection by timeout

Easergy HU250
Head Unit Communication

Protocols and communication architecture

HU250 can communicate with peers (SCADA or other devices) on one or N communication channels.

- Each communication channel can have its own channel type and protocol adapted to different usage (DMS, AMM, local automation, etc.)
- Communication channels can be created with Easergy Builder
- The T300P is delivered with default communication channels adapted to standard usage

Protocols

Easergy T300P communicates with remote SCADA or between substations using open protocols. Easergy HU250 may also be used as data concentrators for slave devices.

Easergy HU250 can manage several communication channels and protocols at the same time.

IEC 60870-5-104 slave and master and IEC 60870-5-101 slave

- UDP (IEC 60870-5-101 only), TCP and Serial (RS232/485)
- Supports secure authentication according to IEC 62351-5
- Redundant connections (IEC 60870-5-104 only (3)) with several Master IPs

For more information on the IEC 60870-5 protocol, visit www.iec.ch.

DNP3 slave and master

- Supports secure authentication according to IEC 62351-5
- UDP, TCP (including dual end point) and Serial (RS232/485)

For more information on the DNP3 protocol, visit www.dnp.org.

Modbus slave and master

- TCP and Serial (RS232/485)

For more information on the Modbus protocol, visit www.modbus.org.

IEC 61850 master and slave

- IEC 61850-8-1 ed 2 client and server
- Goose message between IED and HU250

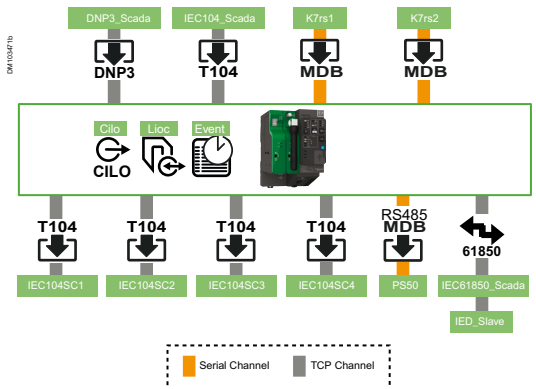
For more information the IEC 61850 protocol, visit www.iec.ch.

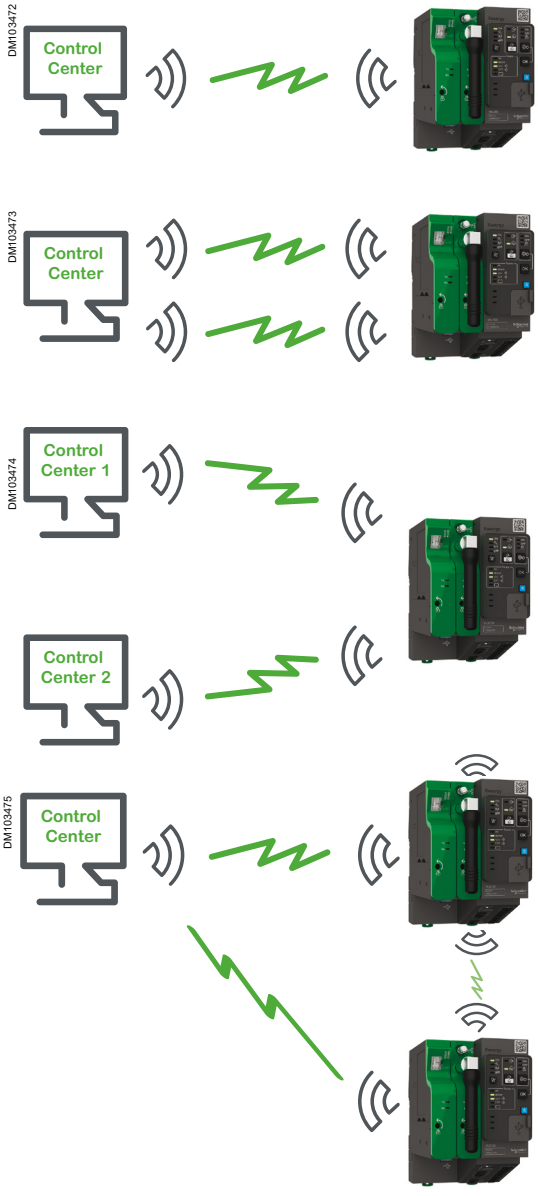
Others protocols

- SFTP for secure file transfer
- HTTPS for secure web server connection
- SNTP for time synchronization
- SNMP client

Easergy HU250
Head Unit Communication
Protocols and communication architecture

Example of Easergy T300P communication channel





Channels

The ports used to communicate are configured as communication channels. A channel can support one or more protocols according to the compatibilities with the physical layers.

The possible channels are:

- Serial (RS232/RS485)
- TCP (Called, Calling or Both) or UDP

For TCP and UDP channels, a remote IP list can be created to limit access to identified peers.

Channel association - Links

Some control centers or IEDs support double channels. The functionality can be different for each protocol. The links are associations of two channels and they are used to identify a double channel. Two modes of channels switching are possible:

- AutoSwitch: used with slave protocols. When the active channel stops receiving, it switches to the other channel, which becomes active
- SwitchByMaster: used with the master protocol, the HU250 controls the channel switching. A periodic switching between channels can be defined in order to verify channel state TIME_FORCE_SWITCH

One communication channel to one control center

In this case we have one transmission media and one protocol for communicating with only one control center.

Two redundant physical channels to one control center

In this case we have two transmission media (2 channels) and one protocol for communicating with one control center.

The two channels can be grouped to create a redundant physical link with autoswitch mode.

The channel where some data are received is considered active. The HU250 always sends data on the active channel.

Two communication channels to two control centers

Two communication channels can be used for communicating with two control centers. In this case, each channel works separately.

Control center and peer-to-peer communication

Communication channels can be configured for peer-to-peer communication between multiple Easergy T300 devices.

Application: Self-healing automation between two or more remote substations. Available on project, consult us.

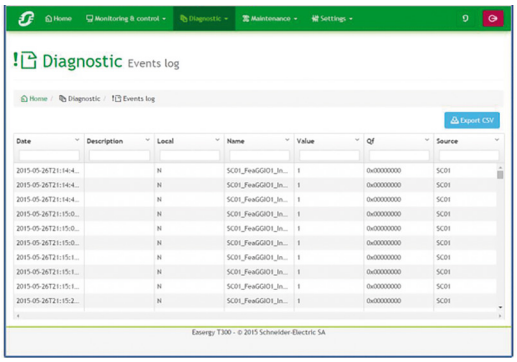
Easergy HU250
Head Unit Communication
Time synchro & sequence of events

Time synchronization

Proper time-stamping of events and alarms requires that correct time information is provided to the Easergy T300P. The Easergy T300P time synchronization is managed by Easergy HU250. Time synchronization can be achieved in numerous ways, depending on the overall system architecture and the required precision.

- **Protocol:** Most data-transmission protocols allow slave devices to synchronize from a control. The time accuracy depends on the implementation and the communication media
- **SNTP or NTP:** Ethernet communication networks provide SNTP clocks to synchronize devices. Easergy HU250 can manage a list of SNTP servers: The time accuracy depends on network topology
- **GPS clock:** synchronization with 4G modem GPS option.

EM100062EN



Web server view of SOE

Sequences Of Events (SOE)

The Sequence Of Events (SOE) records all data changes in log files. Each Easergy T300P has its own SOE management. The recording mode for each variable can be configured from the HU250 via Easergy Builder.

- Up to 4 log files can be configured
  - These logs can be defined from Easergy Builder
  - The names of these logs are configurable
  - Any data from the dabase can be assigned to a log file
- The logs files may be downloaded locally from the web server and remotely by SFTP
- SOE time accuracy
- Time resolution: 1 ms
- Discrimination between 2 events: 1 ms
- Event storage capacity
  - Up to 500 000 events can be stored by Easergy T300P
  - The size of logs files is configurable

For all logs, when the storage capacity is reached, the most recent event clears the oldest from the list.

Easergy HU250
Head Unit Communication
Cyber security

Cybersecurity features implemented in Easergy T300 help to mitigate cyber threats according to IEC 62443 standard.

Cybersecurity requirements are designed to meet the international cybersecurity standards and support the security systems necessary to fulfill NERC and IEC 62351 requirements.

Easergy T300 includes as standard and without external devices, the following cybersecurity features according to IEC62443-4-2:

- Software integrity with firmware signature on all modules
- Secure communication between Easergy T300 and associated webserver tool with local or remote connections using HTTPS, SSH, SFTP
- User identification and authentication according to IEC 62351-8
- User access management according to IEC 62351-8
- Communication authentication according to IEC62351-5 when using DNP3 and IEC60870-5-104 protocols
- Port hardening management
- IP communication filter
- Security events log storage and transmission according to Syslog protocol

Cybersecurity log

Easergy T300 supports advanced logging and monitoring features for Cybersecurity implementations. Logs are protected against unauthorized access, modification and deletion and are preserved in the security events log.

Port Hardening

All HU250 physical ports (ETH, LAN, USB, WAN...) not used by the application can be disabled one by one by configuration from the Web server.

The same rule applies to SC150 and LV150 modules on which the unused LAN ports can be disabled.

At least one of the Ethernet port of HU250 module must be enabled to give the possibility to connect the unit.

Firewall

For each network interface (LAN, WAN, WIFI, PPP), the firewall can be configured :

- To block TCP ports
- To block an IP address (black list)
- To allow an IP address (white list)

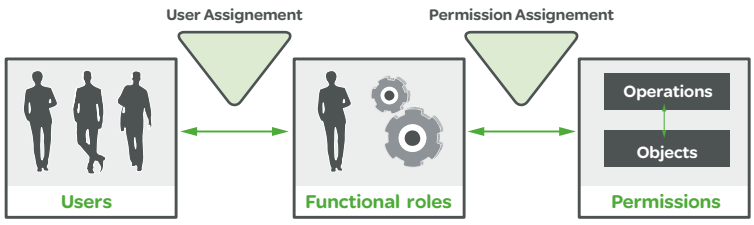
Local and remote control access (RBAC)

The device uses Role-Based-Access-Control (RBAC) to provide defined levels of access for users. RBAC is predefined according to IEC 62351-8.

Easergy T300 is provided with a pre-defined RBAC. It can be customized with the Cybersecurity manager tool CAE or T300 Web server..

DM103476

Role	Right								
	DATA BASE	FIRMWARE	WEB Services	BUILDER	TOOLS	LOG & SOE	SECURITY	DATA	RESET
VIEWER			●					●	
OPERATOR	●		●			●		●	
ENGINEER	●	●	●	●	●	●		●	●
INSTALLER	●	●	●	●	●	●		●	●
SECADM			●				●		



RBAC Role structure

Easergy HU250
Head Unit Communication
Configuration tools

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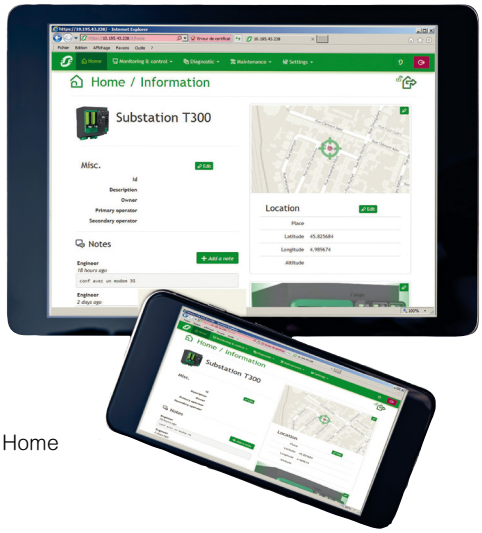


Home

Firmware upgrade

HU250 firmware can be easily upgraded locally or remotely using a free FTP server for exemple (e.g., Filezilla).

The firmware is sent to the unit by processing a file transfer to a specific folder of the HU250 tree.

The transfer via FTP server can be made locally via an Ethernet port on the unit or remotely via Wi-Fi or LAN access.

If an issue occurs during installation of the firmware, or if the firmware installed is found to be corrupt, the system aborts the update and automatically reactive the previous firmware version.

DNS server

HU250 includes a Wi-Fi DNS server. The access to the web server can be made simply by entering the T300P default address in the browser: https://T300P.

T300P Web Server - Commissioning, operation and maintenance

HU250 includes an embedded Web Server as HMI interface and local supervision of the substation for the user.

Basic configuration, operation and diagnosis are carried out by connecting a laptop, tablet or smartphone to the T300P Web Server. This web server can be accessed:

- Locally via ETH port
  (laptop directly connected to one of the T300P Ethernet ports)
- Locally via Wi-Fi access
- Remotely via LAN network
- Remotely via 2G, 3G, Ethernet
- The menu on the home page enables the user to select the language
- The web data server's HTML format pages includes different pages and subpages:
  - **Home page:** local map, GPS coordinates, photos and notes to identify the substation
  - **Monitoring and control page:** physical view of the system, data view including display of status and analogs, control of commands and set points
  - **Diagnostic page:** to consult and export.csv file (events log, cybersecurity log, system log, protocol traces and disturbance records)
  - **Maintenance page:** user settings, clock synchronization, IP configuration settings, device status, software version update, configuration download
  - **Settings page:** setting per module (HU250, SC150, etc.). These settings per module include the configuration of functional parameters for communication, protocol, switch control, measurement and detection, etc.

Operation and control

Alongside operation and control of the network from the SCADA system, it is possible to operate the equipment locally or remotely using data pages:

- Displaying status and measurement
- Issuing commands: switches, automation system on/off, MV fault detector reset and other digital outputs, which is made more secure by a selection and confirmation process
- Consultation of archived data
  - On-screen consultation of archive logs
  - Extraction of logs on a PC as a .csv file for analysis

Easergy SC150
Switch Controller Unit
General description

All advanced functions for MV line and switchgear management in a compact box

- Switchgear control and monitor
- Advanced fault detection
- Power measurement
- Power quality
- Sectionalizer automation
- Embedded operator HMI
- Disturbance recording

The SC150 supports the following functions related to one MV cubicle:

- MV switchgear control and monitor
- MV current and voltage measurement
- Fault passage detection and indication
- Local automation
- Power measurement and power quality

MV switchgear control and monitor

The SC150 is compatible with any form of MV switchgear:

- Local and remote control with remote or local operating mode
- Motor mechanism voltage control: 12 Vdc to 220 Vdc and 120 Vac to 220 Vac
- Dummy control simulation available remotely or locally

PM104382

SC150

MV current and voltage measurement

- SC150 is compatible with standard current sensors according to IEC 60044-1
- Current measurement is acquired by 3 phase CTs

Voltage measurement or indication using from different types of sensors:

- LPVT (Low Power VTs) according to IEC 60044-7
- Standard MV/LV VTs according to IEC 60044-2
- Capacitor divider mounted in the MV bushing

MV Network Monitoring

Automation systems

Sectionalizer (SEC): Automatic control for opening the MV switch following detection of a number of fault currents in the source substation reset cycle.

This automation is factory predefined but configurable on site (setting).

Easergy SC150 Switch Controller Unit

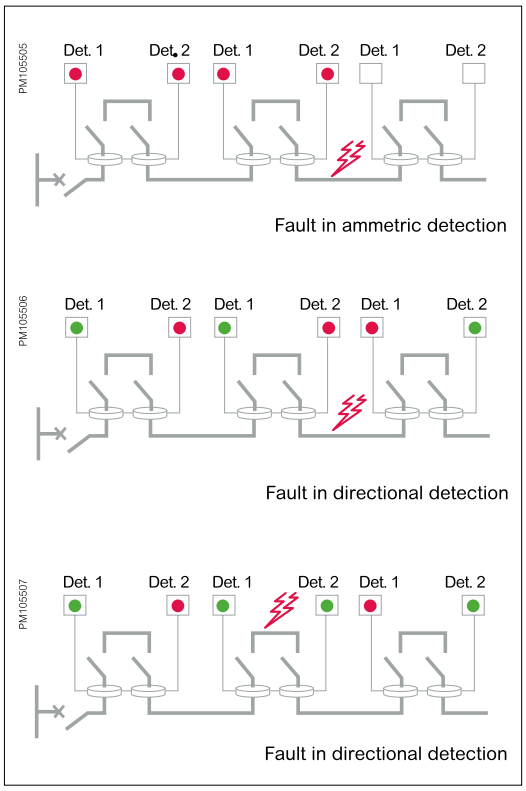
General description

Inrush filter

A filter for detecting transformer inrush current can be enabled on the T300 to help prevent spurious fault currents being detected on the MV network.

A current peak may occur on power-up of the MV network due to energization of the transformers and saturation of the phase CTs installed on the network. These current peaks may activate the fault current detectors falsely by tripping the configured thresholds.

To avoid this phenomenon, an algorithm is used to discriminate fault currents from transformer inrush currents on network power-up.



Post fault recording

Each SC150 has a disturbance recording application in order to understand what has happened on the grid after a network outage. All voltage and current measured, power quality events and events can be recorded with an accurate time tagging.

The disturbance file (COMTRADE file according to IEC 60255-24) can be displayed with disturbance viewer as Wavewin - Schneider tool. Files can be transferred locally using a PC connected to the Web server.

MV Network Monitoring

Fault Passage Indicator (FPI)

The fault current detections are compatible with all existing ground neutral systems with or without presence of distributed generation. The detection is based on international standards of ANSI codes:

- Phase overcurrent fault detection (ANSI 50/51)
- Ground (earth) fault detection (ANSI 50N/51N)
- Broken conductor detection/Negative sequence overvoltage (ANSI 47)
- Directional phase overcurrent fault detection (ANSI 67)
- Directional ground (earth) fault detection (ANSI 67N)

Three ammetric fault detection instances and two directional fault detection instances, each with their specific settings and detection mode, can operate separately or simultaneously.

Each instance includes 2 groups of settings. These 2 groups correspond to 2 sets of thresholds and time delays that are typically linked to 2 upstream protection settings.

The fault current detection is indicated:

- By two LEDs on each SC150 module
- By a flashing light outside the station
- Remotely to the SCADA system via the communication protocol

Voltage and power monitoring

MV Voltage monitoring enables the Easergy T300 to detect voltage anomalies on the MV Network. Some standard detections help to detect these anomalies:

- ANSI 27 (Undervoltage detection): detects a voltage drop or an abnormally low voltage on each phase of the MV network (ie unbalance network).
- ANSI 32P (Directional active overpower): based on active overpower detection and reverse active power detection, this function can detect overload or abnormal power flow on the network. It allows to detect distributed generation injection on the network.
- ANSI 59 (Overvoltage detection): detects overvoltages on each phase.
- ANSI 59N (Neutral overvoltage detection): detection of abnormal voltages or insulation faults by measuring the residual voltage.
- ANSI 47 (Negative Sequence Overvoltage Detection): detection of unbalance condition resulting from significant negative sequence voltage component in case of broken phase conductor anomaly.

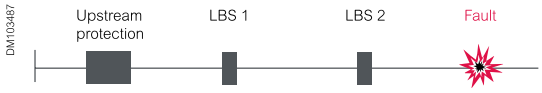
MV Power measurements and power quality

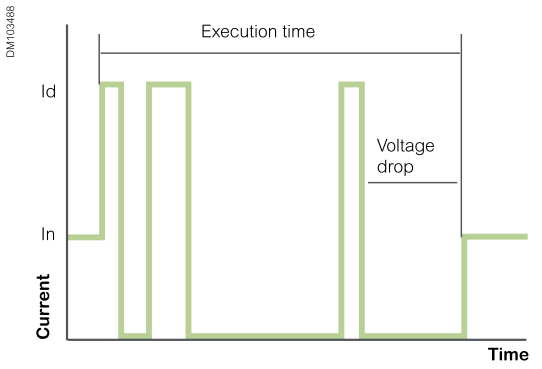
Advanced power measurement and power quality are available on each SC150 in accordance with EN50160 directive:

- Power measurements according to the principles of IEC 61557-12
- Voltage power quality according to the principles of IEC 61000-4-30.

Easergy SC150 Switchgear Controller Unit

MV Network management





Characteristics

Setting groups	2 groups
Automation indication	• Automation on • Automation off • Automation locked

Sectionalizer setting

Sectionalizer active	Enable / Disable
Number of reclose cycles before opening	1 to 4
Maximum execution time after fault detection	20 s to 5 min in 1 s step
Enable lockout on switch operation failure	Enable / Disable
Direction mode	Forward, backward, both

Sectionalizer automation

Sectionalizer automation is used on an MV overhead line or an underground to overhead line. It requires a circuit breaker-recloser at the head of the line. The role of this automation function is to command the opening of the MV switch managed by the SC150 after a defined number of fault current have been detected during successive unsuccessful reclose cycles of the upstream recloser. The sectionalizer automation function therefore converts a switch into a sectionalizing switch.
The disconnection logic is used to isolate the section exhibiting the abnormal operation condition by opening the switch during the voltage sag of the reclose cycle.
Sectionalizer automation can be enabled individually on each SC150 module on the Easergy T300.
The automation function is enabled or disabled globally on the Easergy T300 (for all SC150 modules) either remotely from the SCADA system or locally:

- By pressing the "ON" button on the front of the HU250 module
- Via the Web server

Operation

In normal operating conditions the MV network is energized and the switch is closed.
The automation function sends an open command to the MV switch if:

- Automation is enabled on the channel
- The switch is closed
- The number of detected fault currents reaches the number configured (Reclose cycles number)
- The voltage is absent

The automation cycle is reset at the end of the **Primary CB recloser maximum operation time.**
The detected fault currents counter is reset at the end of this time delay.
Automation remains inactive if the number of detected fault currents counted during this time period does not reach the value defined by setting.
The voltage source used to detect the absence of the MV network during the cycle can be acquired and defined in different ways :

- By voltage measurement sensors
- By digital input
- By the AC power supply (in this case, the T300 must be powered by a low voltage source from the MV line on which the switch is installed)

Blocking Automation

Certain conditions can block the automation function. The automation blocking conditions are associated with any action that makes it impossible to operate the MV switch, namely::

- If the T300 is in local mode and the "Enable local mode to block automation" option is enabled by configuration
- If the switch interlock digital input is enabled and the "External input mode for open commands" blocking option is enabled by configuration
- If the switch position is unknown at the time of the command and the "Block if switch position is unknown or same as command" option is enabled by configuration.

Easergy SC150 Switchgear Controller Unit

General description

Local operator front panel (HMI)

Display of information by coloured LEDs

- Module status
- Alarm status
- Local/remote status (information provided by the HU250 module)
- Automation status: ON/OFF and lock status

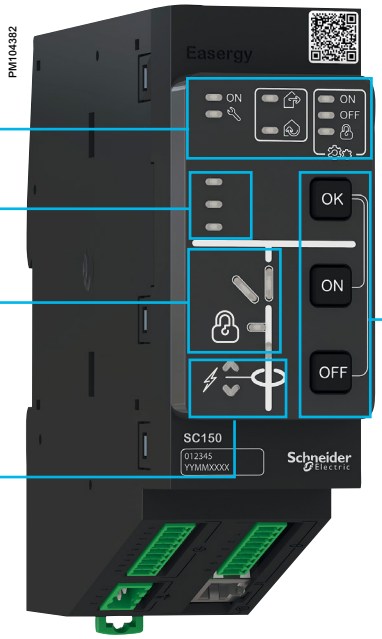
3 customisable LEDs

Switch status

- Main switch position (open, closed, intermediate)
- Lock switch position

Overcurrent detection and voltage indications

- Overcurrent detection status with direction
- Voltage presence status



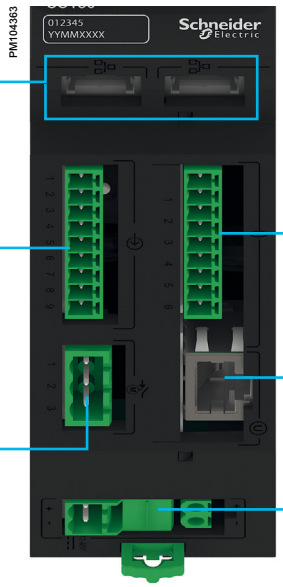
Local operator switch control

The local switch control is allowed when the operating mode on the HU250 is set to local:

- In Local mode: the command from the operator cabinet is confirmed, any order from the remote control center is locked
- In Remote mode: local commands are not permitted, orders from the remote control center are validated
- Switch control: the operator must press the OFF or ON buttons and the OK button.
- The local control can be enabled/disabled by configuration

Automation system activation

The automation system is activated and deactivated globally by pressing the control and validation buttons at the same time on the HU250.



Daisy chain LAN

- Internal Ethernet LAN for Easergy T300P modules
- Ethernet 10/100 Base

Switchgear status

- 8 singles or duals Wet input (0 V Common)
- compliant to IEC 61131 -2

Switchgear control

2 digital outputs configurable

Current acquisition

Current inputs with standard CT

Voltage acquisition

3 phase acquisition through RJ45 interface and accessory sensors

Daisy chain power supply

12-48 Vdc

Easergy SC150 Switchgear Controller Unit

MV Power monitoring

Utilities are coming under increasing pressure from both customers and regulatory bodies to review the quality of power they are providing (EN50160).

This requires monitoring of their networks for various indices such as number of and duration of outages, dip/swell voltages and system harmonics.

The SC150 offers many high performance capabilities to meter and monitor the MV network with the same current and voltage sensors without the need to add an expensive specialized device.

Easergy T300 has a large capacity of storage for SCADA transmission and/or local consultation. All recorded measurements are consultable via the web server locally or remotely with trends and diagram or table. The measurement log can be also downloaded in Excel format.

Power measurement and Power quality

Measured and metered values

	Base	PM	Power quality
Instantaneous RMS values			
Current: true rms	• 3 phase and residual • 3 phase average		% unbalanced
Voltage: true rms	• 3 phase and residual • 3 phase average		% unbalanced
Frequency		●	
Active, reactive, apparent power (total & per phase)		Signed	
Power factor (Total & per phase)		Signed	
Overcurrent pick-up	●		
Last current demand value before fault detection or switch opening	●		
Last voltage demand value before fault detection	●		
Last voltage value before broken conductor fault detection	●		
Energy values			
Active, reactive, apparent energy		Signed	
Configurable accumulation mode		●	
Demand values			
Voltage & current.	●	●	
Active, reactive, apparent power		●	
Synchronization of the measurement window		●	
Demand windows calculation mode		●	
Power quality measurement			
Harmonic distortion – current and voltage (up to H40)			●
Individual harmonics – current and voltage (up to H40)			●
Voltage dip and swell events			●
Events			●
Voltage and current unbalance			●
Data recording			
Average current rms Min/max : 1 day, 7 days, 1 month, 1 year		●	
Demand values at 3 months		●	
Event logs	●		
Alarms	●		
Counter	●	●	

Easergy PS50 Power Supply

General description

Power supply and battery

- Battery charging and monitoring for long battery life
  - Temperature-compensated charger
  - Charging current limitation
- Prevention against serious discharge
  - Protection against deep discharge
  - Protection against over voltage
- Battery availability check
  - Periodic battery test
  - Battery status indication
  - Capacity indication

PM104366

PS50

Easergy PS50 Power supply

The power supply provides backup operating power for long power supply interruptions for:

- MV switchgear motor mechanisms and circuit breaker coils
- Transmission devices (e.g., radio)
- Electronic modules of T300
- Third-party devices such

Designed for severe environments:

The Easergy PS50 is ideal for isolated sites that are regularly struck by lightning.

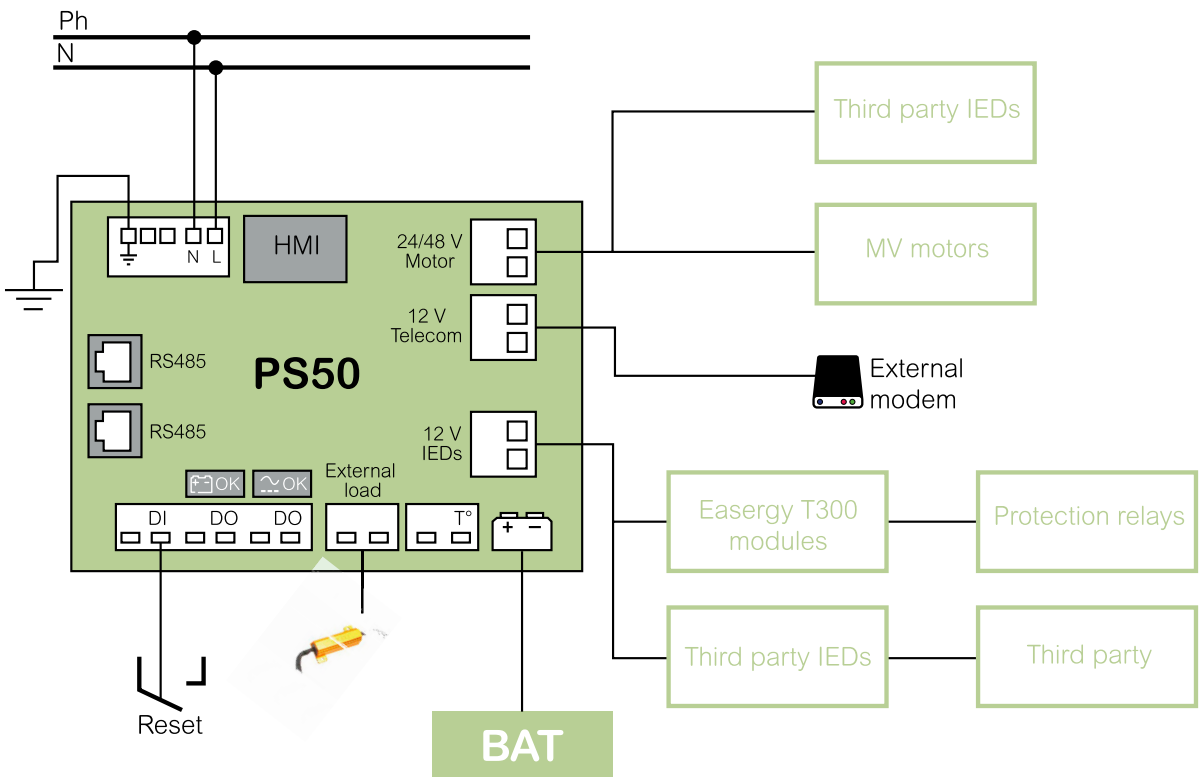
- 10 kV insulation and 20 kV surge
- Prevented against neutral cutout
- High temperature range: -40° C to 70° C

And easy maintenance:

- Only an unique battery for easy maintenance and robust lifespan (> 10 years)

In order to extend the battery autonomy in a long power interruption situation, PS50 can enter a sleep mode. The backup energy thus saved can help provide an additional open/close operation (plus associated communications) of the MV switchgear when power is restored.

DM101305



Example of power supply application with PS50

Options

Options
Description

Voltage configuration selection guide

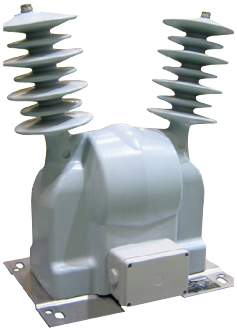
Functions	No voltage	Single phase VT or LPVT	3 phase VT or LPVT	VPIS V3	VDS PPACS
FPI					
ANSI 50/51	●	●	●	●	●
ANSI 50N/51N	●	●	●	●	●
ANSI 67			●	●	●
ANSI 67N			●	●	●
ANSI 32P			●	●	
ANSI 47			●	●	●
ANSI 27		●	●	●	●
ANSI 59		●	●	●	●
ANSI 59N			●	●	●
Measurement					
Voltage measurement 3 phases			●	●	●
Voltage measurement single phase		●			
Residual voltage			●	●	●
Power measurement		●	●	●	
Power quality			●	●	
Automation					
Sectionalizer	●	●	●	●	●

Voltage transformer 24 kV

Outdoor Phase-Phase VT to supply the control cabinet

Standard reference	IEC 61869-3
Insulation level	24/50/125 kV
Rated primary voltage	up to 23 kV
Rated secondary voltage	up to 240 V
Frecuency	50/60 Hz
Rated output	50 VA
Thermal burden	500 VA
Accuracy class	cl.3

*Consult us for other voltage transformers & ratios



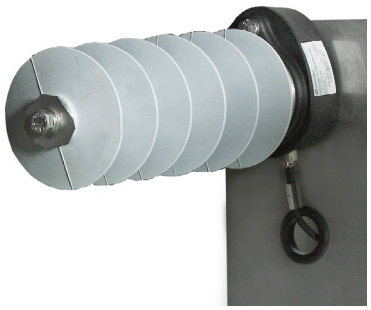
PE58462

Voltage sensor

PM6 can be supplied with integrated capacitive divider in each of the MV bushings on one side of the line allowing Directional Earth Fault (DEF) detection.

Used to differentiate between different fault types to ensure that co-ordination between protection devices is maintained.

LPVT1121



Low Power Voltage Transformer

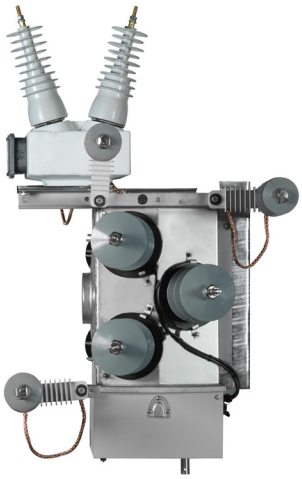
LPVT. Low Power Voltage Transformer

Low Power Voltage Transformers can be installed in each of the phases on one side of the line allowing directional earth fault (DEF) detection and power quality functions as well as precise power measurement.

Insulation level	24/50/125 kV
Rated Voltage	20/√3 kV
Rated Secundary Voltage	3,25/√3 V
Rated Frequency	50/60 Hz
Accuracy	Cl 1P (IEC 61869-11)

Options
Description

QVEVRTFL



Side view, current transformers

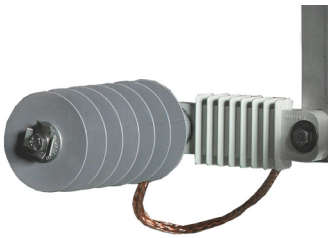
Current Transformer

High-performance features to measure and detect a fault current on the MV line. Three phase CTs compatible with all kind of neutral systems of the MV network, providing ground fault detection capability up to 5 A. Consult us for lower values.

Current transformer as per IEC 61869-1 & IEC 61869-2

Ratio:	600/1A
Rated Frequency:	50 Hz or 60 Hz
Accuracy:	0.2S / 5P10
Burden:	1 VA/0.5VA
Rated thermal current:	120% continuous
Short time withstand current (1s):	20 kA

PM6QVEHZTSINLPVY



Surge arrester

Surge arresters

Three surge arresters on each side of the disconnector switch can be placed directly on the switch to protect the equipment from overvoltages resulting from atmospheric conditions. Includes a ground wire with each lightning rod.

Technical specs:

Material:	Metal oxide type in compliance with IEC 60099-4
Continuous operating voltage:	24 kV
Line discharge level:	Class I
Leak line level:	Class III
Nominal discharge current:	10 kA

MAN1120

Manometer

Manometer

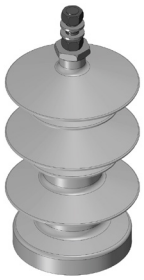
Visual indication of the existing pressure inside the SF6 tank.

Pressure switch

The optional pressure switch allows an alarm signal to be given in case of low SF6 and, by means of configuration on the FRTU T300, electrically lock the equipment for remote or local operation.

MVCCONN112

Plug-in terminal Type-C



Silicone connector

Line connections

The PM6 disconnector switch is equipped with 6 silicone connectors, enabling connection of the MV line using a non-insulated cable.

Silicone insulators guarantees a creepage distance of 780mm (32,5 mm/kV). This characteristic is above the requirements for very heavy pollution conditions creepage level E (IEC60815). Higher creepage distance insulators level D, up to 1.050mm (43,7mm/ kV) are available on request.

Optionally, the PM6 can be supplied with 6 plug-in terminals Type-C for insulated cable* or a combination of both.
*connector not included

Control Cabinet Options

Communication accesories

Modems box and interface	Technical characteristics
Serial modem box	• RJ45 connector The serial modem interface is configurable • RS232 - with all control signals for external modems such as radio or PC connection - Maximum flow rate: 115200 bit/s • RS422/RS485 - Maximum distance: 1500 m - Maximum flow rate: 38400 bit/s - Adaptation and polarization resistor: configurable for 2 wires - 2 Wires or 4 wires: configurable by the HU250
3G and 4G modem box	• 3G modem box - Five Bands UMTS/HSPA+ (WCDMA/FDD) - (850/800, 900, 1900 and 2100 MHz) - Quad-Band GSM (850/900/1800/1900 MHz) • 4G modem Box EU standard version - Penta Band LTE: 800/900/1800/2100/2600 MHz; FDD-Band (20, 8, 3, 7, 1) - Tri Band UMTS (WCDMA): 900/1800/2100 MHz; FDD-Band (8, 3, 1) - Dual Band GSM/GPRS/EDGE: 900/1800 MHz - GPS clock synchronisation option (required additional antenna) • 4G modem Box US standard version - Penta Band LTE: 700/700/850/AWS (1700/2100)/1900 MHz; FDD-Band (13, 17, 5, 4, 2) - Tri Band UMTS (WCDMA): 850/AWS (1700/2100)/1900 MHz; FDD-Band (5, 4, 2) - Quad Band GSM/GPRS/EDGE: 850/900/1800/1900 MHz - GPS clock synchronisation option (requires additional antenna)

External antenna for mobile data modem is recommended in order to have a good transmission coverage

TRIORADIO

Trio Data Radios (*)

Wireless communications for telemetry and remote SCADA solutions.

Providing secure and reliable wireless communication is a critical challenge for electical utilities.

Monitoring and control infrastructure can be situated in geographically-dispersed locations, comprised of a diverse mix of equipment and system architectures, and subject to stringent environmental and safety regulations.

Trio licensed and license-free data radios offer cost-effective and versatile wireless solutions for Telemetry and Remote SCADA applications.

*Note: for further information about the differents Trio Series, please contact us

Control Cabinet Options

Communication accesories

SAITELDRMODULES

HUe Main Features

- **Processor:** TI Sitara AM335x @600MHz
- **Memory:**
  - RAM: 256 MB (DDR3)
  - NVRAM: 2 MB - backed up by supercapacitor
- **Storage:**
  - FLASH: 32 MB (NOR) and 256 MB (NAND)
  - USB 2.0 (host) & SD ports
- **Communication ports:**
  - Console: mini USB (type C)
  - Serial: 1xRS485 (3-pin terminal), 2xRS232 (DB9)
  - 3xEthernet (10/100baseT): LAN1 & 2 support FO & PRP/HSR & IEEE1588
- **Synchronisation:** GPS, IRIG-B, SNTP, PTP
- **RTC:** High precision, drift < 7 ppm / ºC
- **Software:** Baseline SW and Linux RT
  - Cybersecurity: RBAC, Logging, cryptography
  - Protocols: Modbus, IEC101, IEC103, IEC104, DNP3
  - IEC61131 runtime
  - Embedded webApp
  - Configurations with **Easergy Builder**

Optional Remote Terminal Unit T250

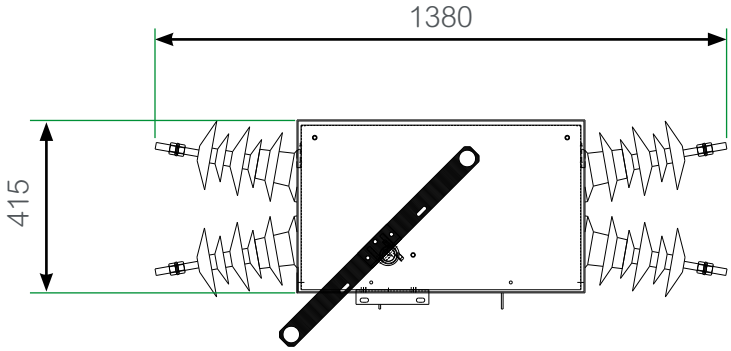
Main Features

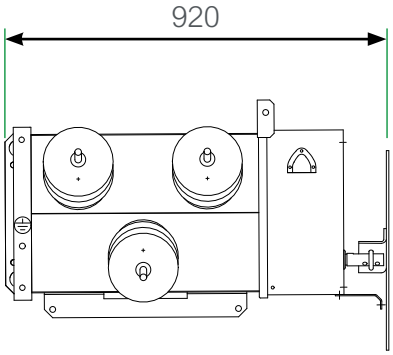
- **Scalable**
  Add acquisition blocks to match whatever requirements the customer may have. Several rows of acquisition blocks are possible, without the need of an additional Head Unit.
- **Compact**
  DIN rail mounted modules with integrated terminal blocks.
- **High capacity**
  HUe offers strong performance metrics for substation automation applications. Saitel Baseline software runs on a robust and secure operating system based on the LinuxRT kernel with the hardware offering USB 2.0 (host) & SD interfaces to expand file storage up to 32 GB.
- **Cyber-security**
  HUe is built around a Sitara ARM processor with an integrated security engine (SEC 3.3.2). The software infrastructure complies with the latest editions of IEC62351 & IEC62443, supporting natively a hardened infrastructure, embedded firewall, secured interfaces, centralised RBAC and Logging. Secure authentication mechanisms of IEC104 & DNP3 are also supported.
- **Communications**
  Saitel DR supports simultaneous concurrent communication links over different protocols via Ethernet or Serial: Modbus, IEC101, IEC103 (master only), IEC104 and DNP3.0.
- **IEC61850**
  HUe supports flexible integration in IEC61850 ed.1 & ed.2 networks. A novel configuration plugin for Easergy Builder simplifies the mapping of the IEC61850 data model elements to the internal real-time database.
- **Synchronisation**
  Saitel DR can be synchronised via: GPS connection, IRIG-B frames, SNTP, IEEE® 1588 (PTP) or Tele control protocols supporting synchronization messaging (DNP3, IEC101/4).

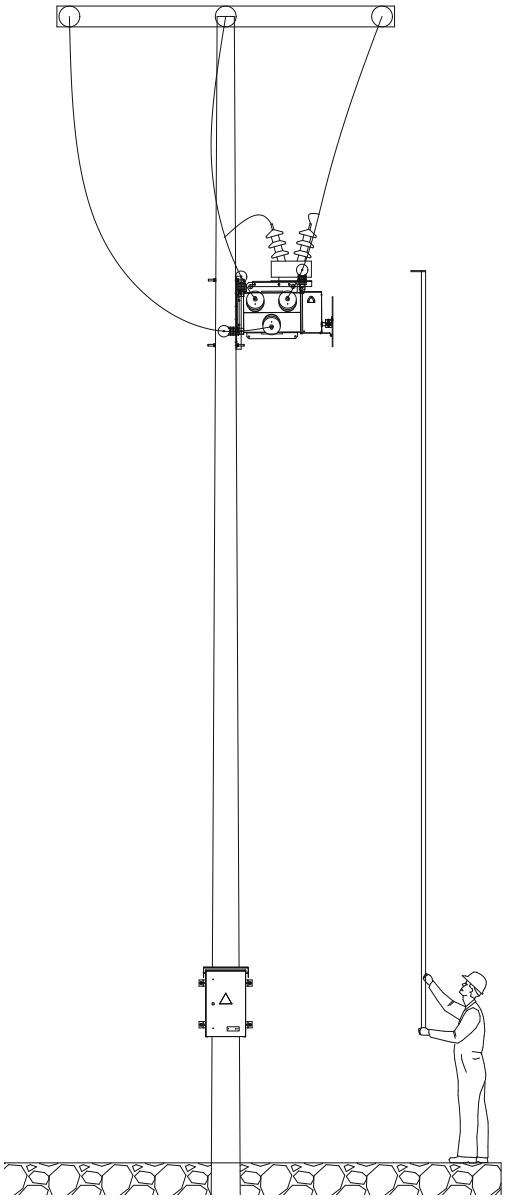
General dimensions

General dimensions

PM6 24 kV Hookstick system

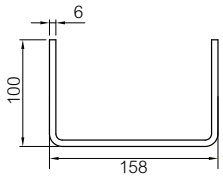


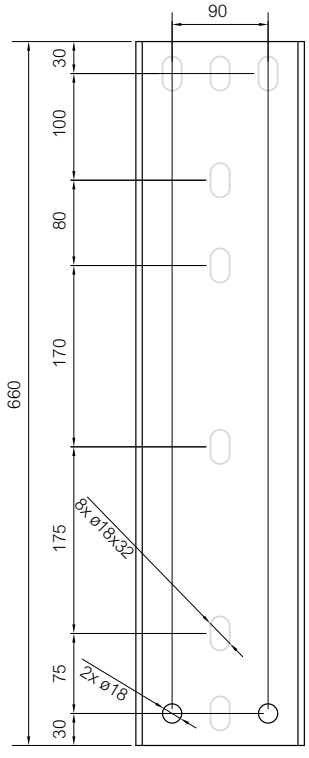




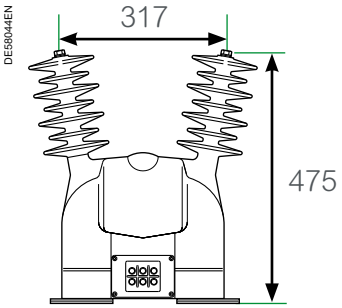
Switch Support

(Consult us for round pole installation)





Voltage Transformer



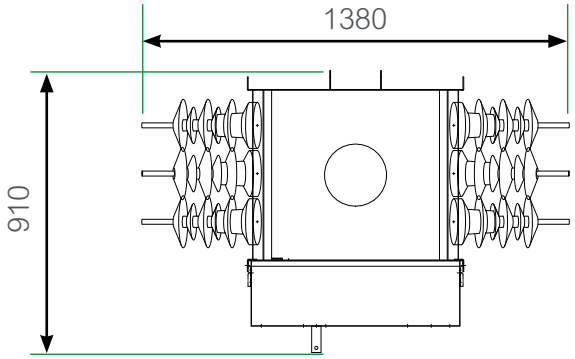
Weight (kg approximate)

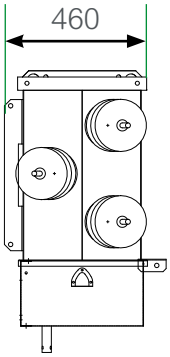
	Hookstick
Basic equipment	100
Switch + TT support	20
Voltage transformer	50
Control cabinet	45

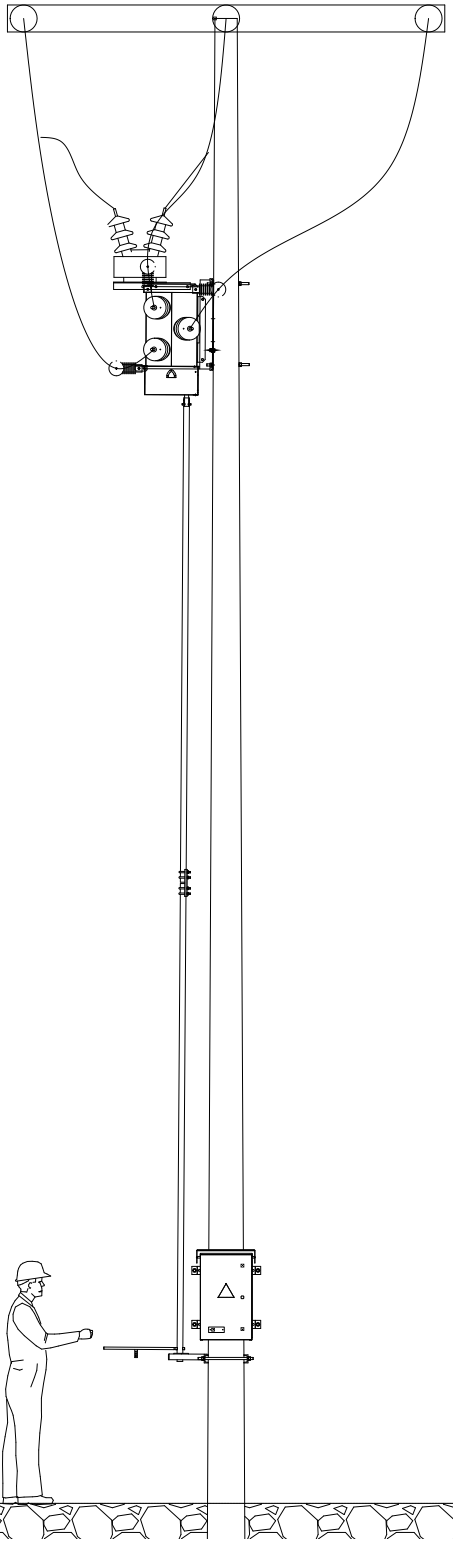
Rod not included.

General dimensions

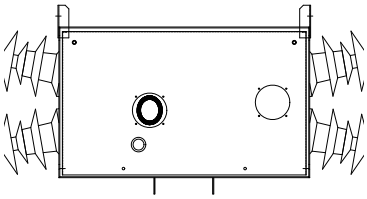
PM6 24 kV Transmission system



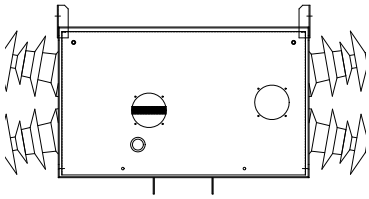




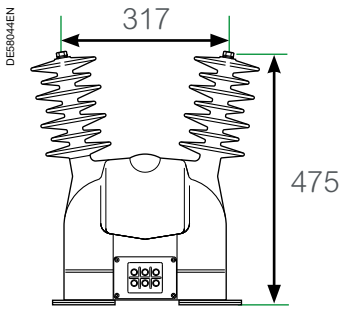
Bottom view - switch open



Bottom view - switch close

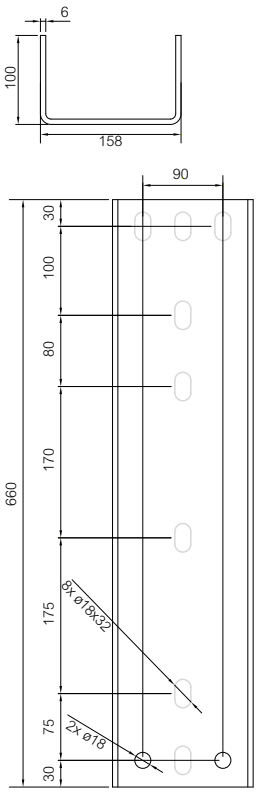


Voltage Transformer



Switch Support

(Consult us for round pole installation)



Weight (kg approximate)

	Hookstick
Basic equipment	100
Switch + TT support	20
Voltage transformer	50
Control cabinet	45
Transmission system	45

Order Form

Order form

PM6

Tick ☒ Or fill with needed value

Service Voltage		
Isolated or compensated neutral system	Yes	No
Altitude meters (a.s.l)	≤1000 m	Specify

PM6 24 kV

Load break switch

Basic equipment

PM6 24 kV 630 A (Includes support frame)	Quantity	
Manual operation system	Hookstick	
	Transmission (8m) Consult us for higher values	
Motorized operation	48 Vdc	
Voltage transformer (Includes support frame)	24 kV	
3 phase current transformers	600 / 1 A	
Surge arresters (No additional support frame needed)	24 kV	

Line connections

Silicone connectors	Level E - 780mm	
Plug-in terminals (Connector not included)	Type - C	

SF6 pressure monitoring

Manometer (recommended for manual operation)	
Pressure switch (recommended for motorized operation)	

Directional Earth Fault Detection

3 Capacitive Dividers	

Directional Earth Fault Detection & Power Quality

3 Low Power Voltage Transformers	

* Capacitive dividers and LPVTs cannot be included at the same time

Order form
PM6

Remote Terminal Unit T300P

Easergy HU250: head unit and communication interfaces

Communication interfaces

Reference	Description	
EMS59150	Empty modem box for Easergy HU250	
EMS59151	RS232-485 modem box for Easergy HU250	
EMS59152	2G/3G modem box for Easergy HU250	
EMS59154	4G US modem box for Easergy HU250	
EMS59155	4G EU modem box for Easergy HU250	

Protocols

IEC 60-870-5-101 slave	
DNP3 serial slave	
Modbus serial master	
IEC 60-870-5-104 slave	
DNP3 slave TCP	
Modbus slave TCP	
DNP3 master TCP	

Notes

Notes

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