PM6 Range

Disconnector switch up to 52 kV

Medium Voltage Distribution

2020 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.

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

The Easergy T300 Feeder RTU is compliant with IEC 62351 and IEEE 1686 standards.

It offers SCADA communication security and a role-based access control (RBAC) system to help protect your electrical infrastructure from cyber attacks.

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)
- Reduce low-voltage (LV) outage durations by blown fuse detection

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
- Monitor transformer and substation

Deliver efficiency: Optimize networks to manage growing consumption

- Monitor transformers and substations to optimize asset management
- Reduce both technical and non-technical losses
- Manage load shedding and peak shaving

Improve cyber security: Defend against malicious software and unauthorized access

- Compliance with IEC 62351 and IEEE 1686
- SCADA communication security and Wi-Fi access

General Contents

What is EcoStruxure™?

450 000

EcoStruxure™ systems deployed since 2007 with the support of our 9 000 system integrators.

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.
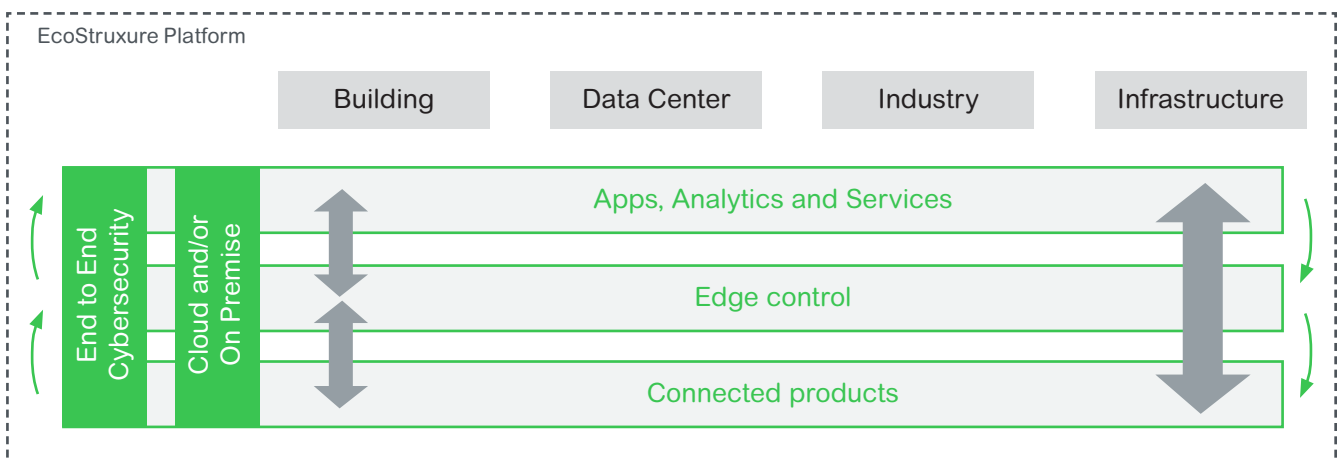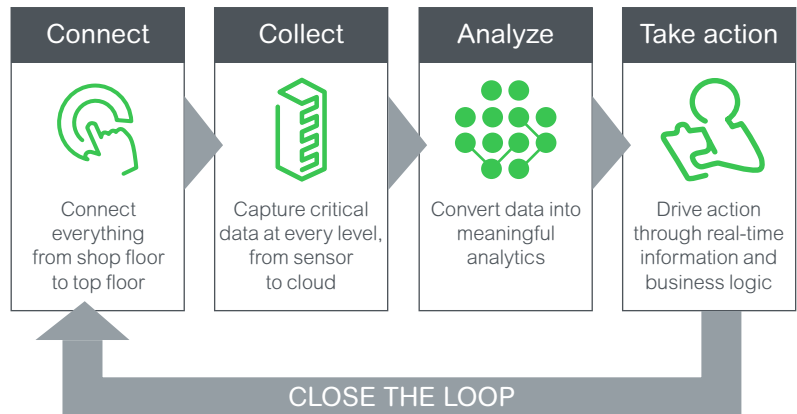
+

Increase uptime
Proven design and experience combined with fast embedded arc detection for assets protection.

EcoStruxure™ architecture and interoperable technology platform bring together energy, automation, and software. It provides enhanced value around safety, reliability, efficiency, sustainability, and connectivity.

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 & operational efficiency thanks to realtime control platforms
- Get visibility to their electrical distribution by measuring, collecting, aggregating and communicating data

Connect	Collect	Analyze	Take action
Connect everything from shop floor to top floor	Capture critical data at every level, from sensor to cloud	Convert data into meaningful analytics	Drive action through real-time information and business logic

CLOSE THE LOOP

EcoStruxure Platform

Building	Data Center	Industry	Infrastructure

End to End Cybersecurity | Cloud and/or On Premise

Apps, Analytics and Services

Edge control

Connected products

EcoStruxure™ Building

EcoStruxure™ Power

EcoStruxure™ IT

EcoStruxure™ Machine

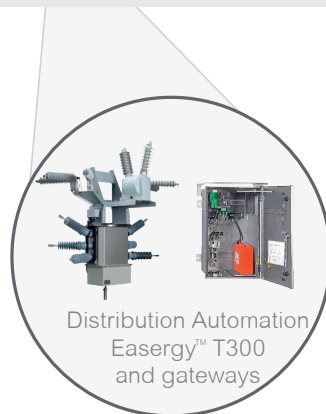EcoStruxure™ Plant

EcoStruxure™ Grid

What is EcoStruxure™?

Connected devices, real-time control, and open software, analytics and services

Innovation At Every Level

EcoStruxure™ Architecture

Apps, Analytics & Services	ArcFM	Grid Engineering Advisor	Microgrid Advisor	Smart Metering Advisor	Asset Advisor
Edge Control	ADMS	Substation Operation	Microgrid Operation	Advanced Metering Operation
Connected Products	Smart Sensor Easergy TH110	Power Meter PowerLogic™	Distribution Automation Easergy™ T300 and gateways	Protection Relays Easergy MICOM	DVCAS	CBGS-0	Transformer Minera SGrid	Energy Storage ESBox, Conext Core

Distribution Automation
Easergy™ T300
and gateways

Connected products for smarter operations

PM6 and T300P are a perfect tandem

Augmented with sensors, digital tools, and analytics throughout life cycles

- More precise conditioning, monitoring and asset diagnostics

- Extending network observability and controllability

- Safer and more flexible field operations

- PM6 Load Break Swich/Sectionaliser and T300P Feeder Remote Telecontrol Unit (FRTU) are ready to be integrated in your EcoStruxure solution.

Connected products							
Smart Sensor Easergy TH110	Power Meter PowerLogic™	Distribution Automation Easergy™ T300 and gateways	Protection Relays Easergy MICOM	DVCAS	CBGS-0	Transformer Minera SGrid	Energy Storage ESBox, Conext Core

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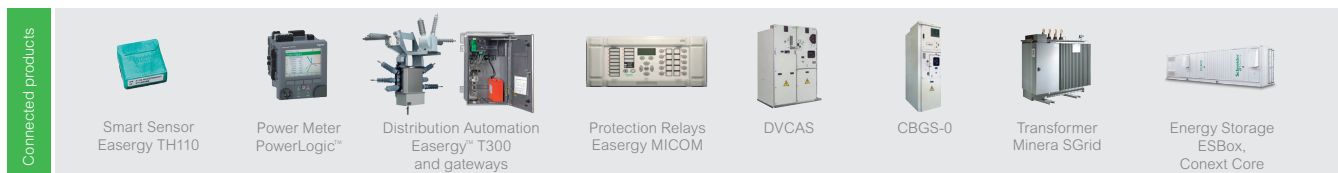
> The Quality Management System for development, production, sales and servicing of PM6 has been certified in conformity with the requirements in accordance with ISO 9001:2015.

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.

This process is:
- Uniform at all sites
- Acknowledged by many customers and recognized organizations.

Above all, there is a stringent Quality Management System which is audited on a regular basis by the international independent certification company Bureau Veritas Certification.

> 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.

Protected environment

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

These goals are secured over the long term, verified and continuously improved by a certified environmental management system for development, production, sales and service.
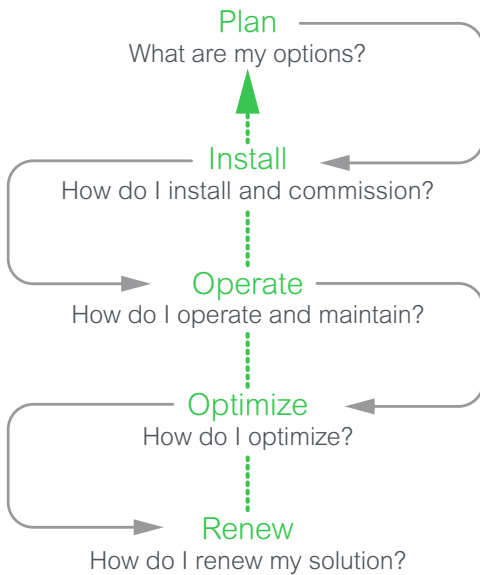
Schneider Electric Services

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

DB408843

Plan
What are my options?

Install
How do I install and commission?

Operate
How do I operate and maintain?

Optimize
How do I optimize?

Renew
How do I renew my solution?

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

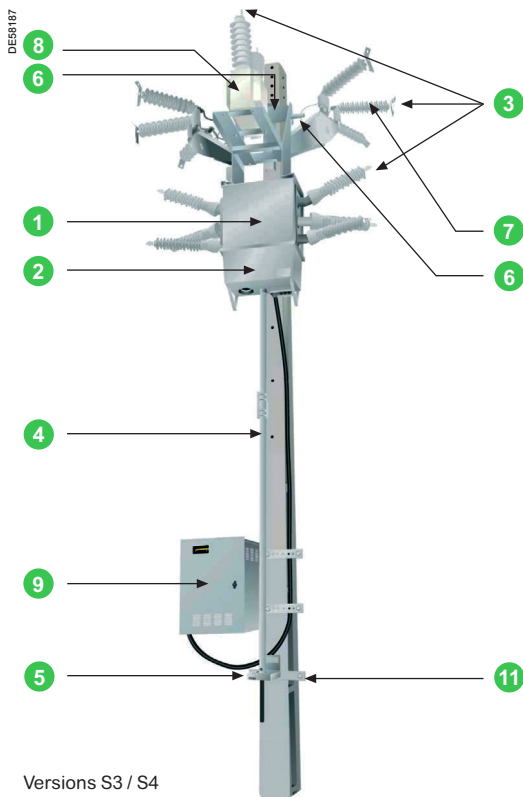Schneider Electric extends the life of your system while providing upgrades.

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

DE58187

Versions S3 / S4

DE58188

Versions S2D

PM6 is an SF6 load break switch-disconnector designed to be mounted on all types of poles. It can be installed in rural and semi-urban overhead distribution networks, up to 52 kV.

The breaking device is made up of an external stainless steel enclosure, without an additional protective coatings, to give a smooth, clean, self-cleaning and aerated surface that is highly resistant to corrosion.

The SF6 tank is connected to earth and it is therefore impossible for a dangerous leakage current to pass between the terminals on one side and the terminals on the other when the device is in the open position; in addition, additional disconnectors are not necessary to guarantee the isolation distance.
This feature is what gives the equipment its characteristics as a disconnector switch.

All sensitive components, which may need to be fully dismantled in the event of an external incident following transient network disturbances (ferroresonance, circuit breaker, overheating of components, etc.), are placed outside of the SF6 enclosure, e.g. motors, voltage transformer, current sensors, electronic components, etc.

The compact volume and the low internal SF6 pressure (0.3 bars at 20 °C), considerably reduce the risk of any gas leakage. The enclosure is sealed for life and meets "pressurized sealed system" criteria in conformity with standard IEC 62271-200, which is why it is not necessary to check the internal pressure of the equipment.

Components:

1 SF6 switch-disconnector

2 Electrical control mechanism

3 MV line connections

4 Manual control transmission

5 Manual control mechanism

6 Support cradle

7 Lightning arresters

8 Voltage transformer

9 Control unit

10 Lever for control rod
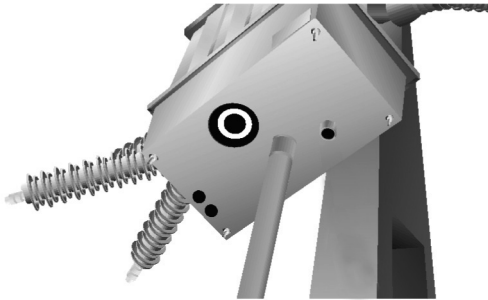
11 Mechanical latching
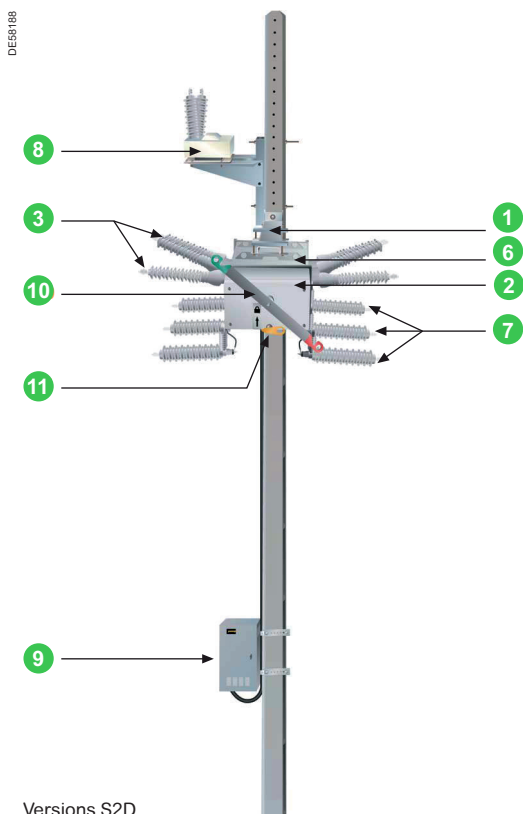
Reference standards

PM6 is manufactured in conformity with the following international standards:

- European: IEC 60265-1, IEC 62271-102, IEC 62271-1, IEC 60529, IEC 62271-200, IEC 60815.

Moreover, the equipment production process is carried out in compliance with an ISO 9001:2015 certified quality program.

Breaking device

Indicator black/open

Fixed contact — Moving contact

Opening contacts

Main shaft

Electrical operating mechanism control shaft

Indicator white/closed

Closed contacts

Electrical command and operating mechanism

The electrical command and operating mechanisms are located inside an independent enclosure, combined with the disconnector switch breaking device.

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).

With all these parts are inside an enclosure auxiliary, we can guarantee excellent behavior of our equipment in bad weather, as proven in the following tests:

- Resistance to salt mist for 1000 h
- Cyclic abrupt temperature variations testing (from -10°C to +70°C).

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 unit or from a remote control center.

A device directly linked to the disconnector switch contact position ("open" or "closed") makes sure it is in the right position. This device, and the position indicator that is easily visible from the ground, comply with the design of the position instruction devices described in the IEC 62271-102 standard.
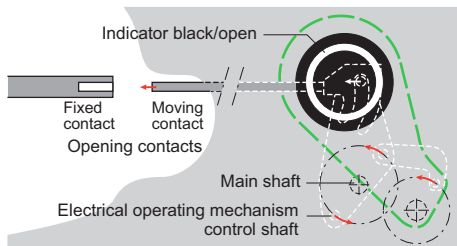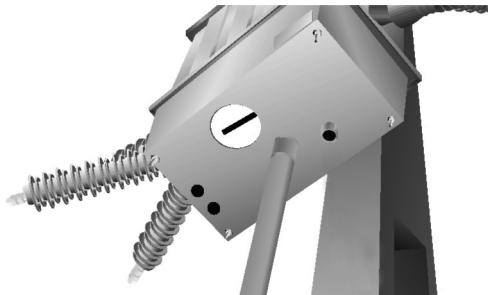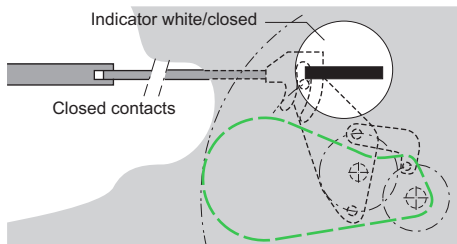
MV connections

The PM6 disconnector switch is equipped with 6 silicone connectors, enabling connection of the MV line using a non-insulated cable.
Creepage: Level IV according to standard IEC60815.

According to the type of installation, PM6 can optionally be supplied with plug-in terminals for insulated cable.

Support cradle and anchoring system

The disconnector switch and control mechanism are mounted on the support cradle.

This unit is then fixed at the desired height using the anchoring system.

PE56860

PE56845EN

Versions S3 / S4

PE56861

Versions S2D / S3D

According to requirements and market preferences, Schneider Electric can offer two variants, according to the type of manual control required.

The arrangement of the switch and the fixing of the equipment to the pole is consequently modified.

The sales reference number for the equipment varies according to the manual control mechanism chosen.

1. Manual operation via a transmission system

- Reference 24 kV: PM6-S3
- Reference 36 kV: PM6-S4
- Reference 52 kV: PM6

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.
The padlock is not supplied.

This type of manual operation offers the advantages of being quick and easy to activate in an emergency and of being easier and safer for the operator when carrying out switching operations.
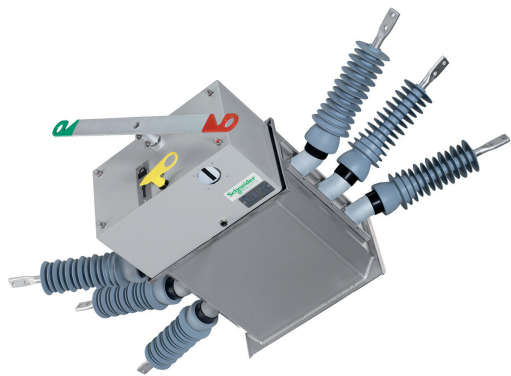
2. Manual operation via a hookstick system

- Reference 24 kV: PM6-S2D
- Reference 36 kV: PM6-S3D

The equipment is operated using a hookstick system. Mechanical locking to block the OPEN - CLOSED positions is optional.
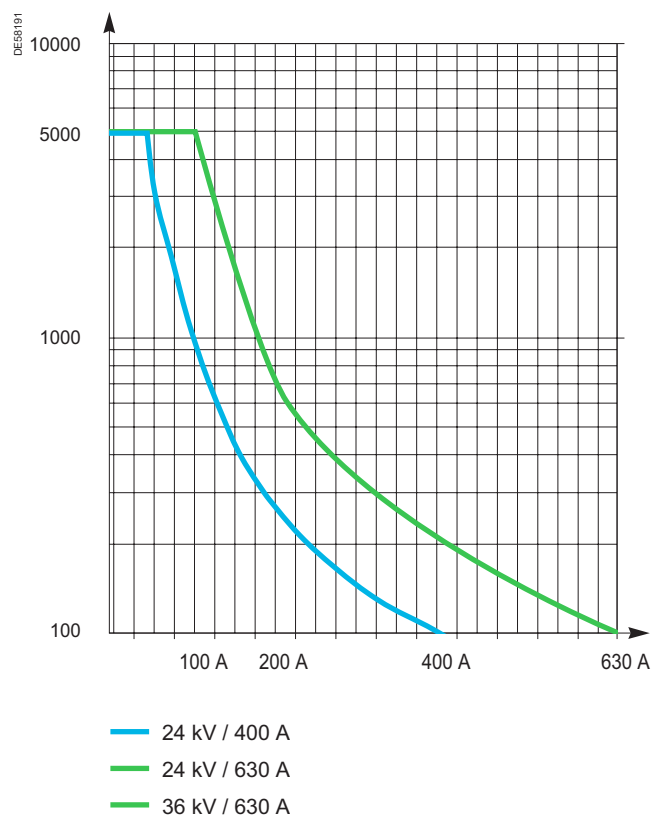
The main advantages of this type of operating mechanism for the equipment can be summarized in terms of the lack of any need for manual control settings when being installed and the total impossibility of the equipment being controlled by someone from outside of the company.

> **Comment:** whatever manual control system is chosen, the breaking device and the accessories required for remote control of the device are identical and the electrical and functional characteristics are therefore the same for the whole of the PM6 range.

Version			S3/S2D	S4/S3D	-
Rated voltage (kV rms)			24 kV	36 kV	52 kV
Rated current in continuous (A)			400 to 630 A	400 to 630 A	630 A
Insulation level	kV rms, 50 Hz/1 min	To earth	50 kV	70 kV	95 kV
		Between poles	60 kV	80 kV	110 kV
	Impulse wave kV, 1.2/50 μs	To earth	125 kV	170 kV	250 kV
		Between poles	145 kV	195 kV	290 kV
Breaking capacity (A)		Mainly active load	400 A to 630 A	400 A to 630 A	400 to 630 A
		Close loop	400 A to 630 A	400 A to 630 A	400 to 630 A
		Cable charging	10 A	20 A	10 A
		Line charging	10 A	10 A	10 A
Making capacity		kA (peak value)	31.5 kA	40 kA	31,5 kA
Short time withstand current		kA (rms value)	12.5 kA/1 s	16 kA/3 s	12,5 kA/3 s
		kA (peak value)	31.5 kA	40 kA	31,5 kA
Other characteristics					
Temperature (°C)		Maximum	+50°C	+50°C	+40°C
		Minimum	-25°C	-25°C	-25°C
Mechanical strength		AC cycles	5000	5000	1000
Protection index		Switch enclosure	IP65	IP65	IP65
		Motor compartment	IP54	IP54	IP54
No. of short-circuit making operations (31,5 kA)		-	5	5	2
Internal arc (31,5 kA)		-	10 kA/1 s	10 kA/1 s	12,5 kA/0,5 s
Creepage distance (mm/kV)		-	31 mm/kV	31 mm/kV	31 mm/kV

The electrical endurance is represented on these diagrams which give us a sample of the number of switching operations that the PM6 can carry out.

Legend:
— 24 kV / 400 A
— 24 kV / 630 A
— 36 kV / 630 A

Easergy T300P
Remote Terminal Unit

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
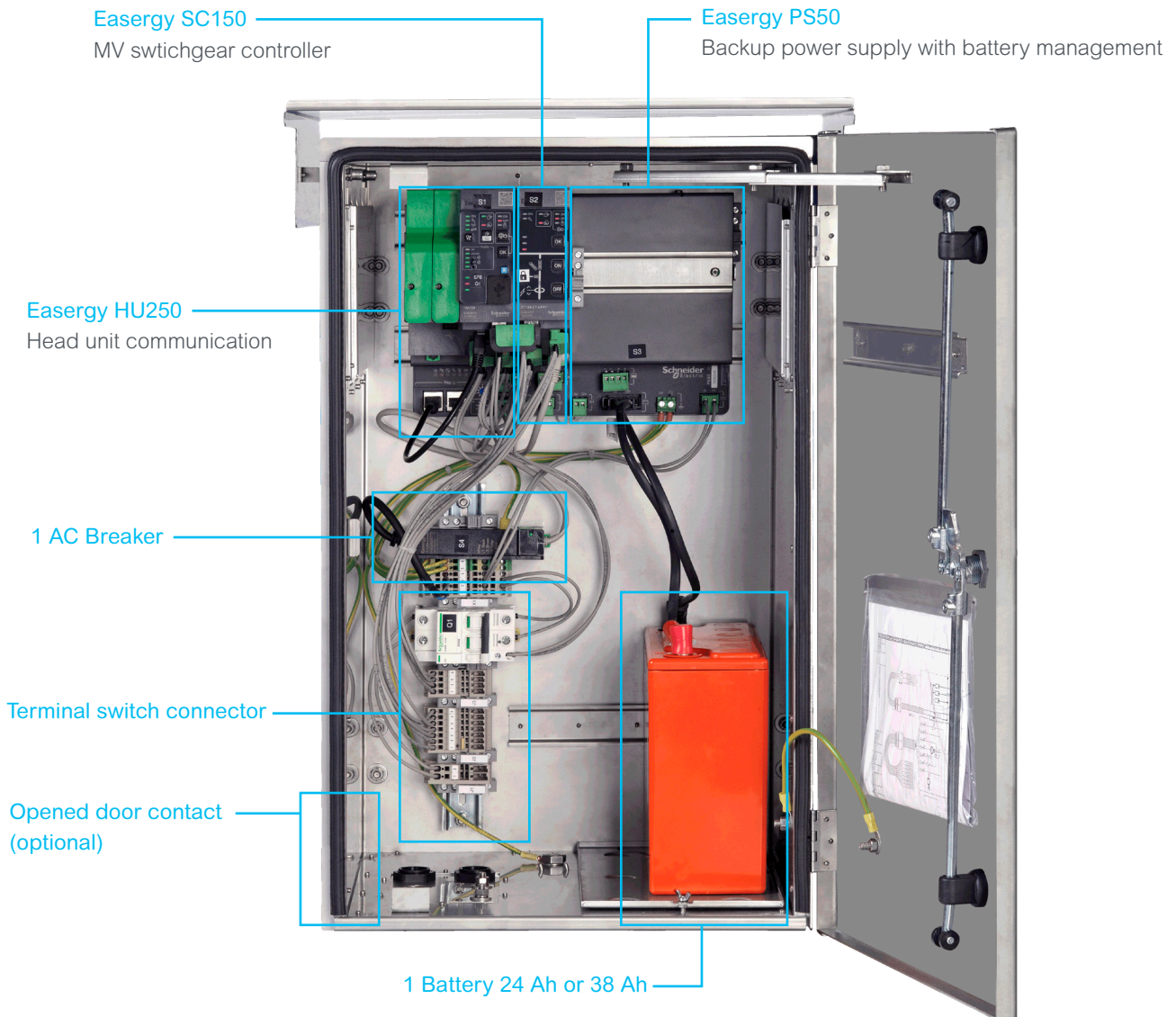
Enclosure
Protection index:IP55 and IK10 acc.
According to the Standards:
• IEC 60259:1989
• IEC 62262:2002
Dimensions
• Basic enclosure: H658 x W400 x D350
• Weight: 20Kg
• Material: Stainless steel AISI 316
• Mounting

The modules, with their supported applications, are:

Easergy HU250 – Head Unit communication gateway

- IEC 61850 data model
- Flexible communication 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 self-healing application
    - Flexible communication media (Ethernet, USB, GPRS, 2G, 3G, 4G)
- Cyber security management
- 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

Easergy SC150 – Switch controller

- IEC 61850 data model
- 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
- Large current and voltage measurement capabilities: standard CT for current, LPVT, VT
- Current and voltage measurement according to IEC 61557-12
- Power quality according to IEC 61000-4-30 class S:
    - Specific application automation: sectionalizer

Easergy PS50 – Power Supply for control and monitoring solutions

- PS50 is a harsh environment power supply for MVLV substation control with power supply for:
    - Switch control: 48 Vdc or 24 Vdc
    - Telecom devices: 12 Vdc
    - Easergy T300P: 12 Vdc
- HU250 and SC150 modules are compatible with other Power Suppliers (contact us)

Easergy HU250
Head Unit Communication

Easergy HU250
Head Unit Communication

General description

The Easergy Head Unit HU250 is the communication module of the Easergy T300P

Easergy HU250 is a powerful and flexible communication gateway for all Easergy T300P configurations.

- Easergy HU250 can also be used as a standalone gateway for third-party IEDs
- Open to any communication system and protocol
- Compliant with cyber security standards
- Advanced configuration tools
- Web server for easy commissioning and maintenance
- Open to IEC 61131 applications
- Easy remote and local firmware updates
- Secure Wi-Fi connectivity

Easergy HU250 manages:

- Cyber security access
- Communication with control center
- Communication with other substations (peer-to-peer communication)
- Easergy T300P modules gateway
- Local network communication with third-party IEDs
- Local and remote configuration access for all modules of Easergy T300P
- Web server with local and remote access
- Automation system with programmable logic control
- Global function as remote/local operation, automation enable/disable

The figure shows an example of the communication architecture and the capabilities of Easergy T300P.

Network control centers
This includes several types of remote control center from an entry-level SCADA like Easergy L500 to advanced ADMS systems.

Cyber security manager
One aspect of the cyber security objective is to secure all control and data acquisition for the operation of its electric system.

The Schneider Electric SAT is a security configuration tool to define/configure the security policy of the devices. It allows to create user account with password and role allocated.

Other services
Easergy T300P can also communicate with others services, such as field services for maintenance management, load prediction, and advanced news services.

Easergy Builder
Easergy Builder is a PC-based engineering tool for Easergy T300P customization and design. Easergy Builder can be used locally via Wi-Fi or wired connection, or remotely via the WAN with a secure connection.

Remote and local webserver
Remote access is available through the WAN network to embedded Easergy T300P web apps from a standard browser. This application can be used for data consultation, software update, configuration upload and maintenance.
Local access can be achieved via Wi-Fi or wired connection.

External display
The Easergy T300P can also support an external HMI such as a touch cabinet or an advanced display. This integration requires a dedicated configuration using Easergy Builder and can be incorporated by Schneider Engineering on request.

Extended I/O with PLC
An external Programmable Logic Controller can be used to extend the Easergy T300P capacity or for dedicated applications.

This integration requires the use of Easergy Builder and can be incorporated by Schneider Engineering center on demand.

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 T300P and the external lamp 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 transmission devices ON/OFF
- Battery status

Free configurable LEDs

Three free LEDs, configurable for multi-purpose 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
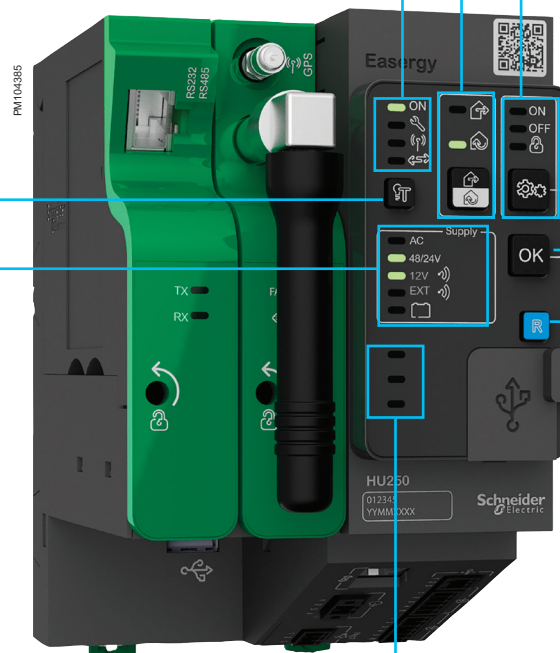
OK button

Reset button

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

Easergy HU250
Head Unit Communication
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

USB port

One mini USB port dedicated for
maintenance

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
- 2G/3G modem box with GPS clocks for
  accurate time synchronization (*)
- 4G European and US standard modem box
  with GPS clocks for accurate time
  synchronization

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.

Ethernet ports

These ports can accommodate one of the
following options:
- WAN communication
- LAN communication for third-party IEDs

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

USB port

One USB host port for multi-purpose use

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

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

Protocols and communication architecture
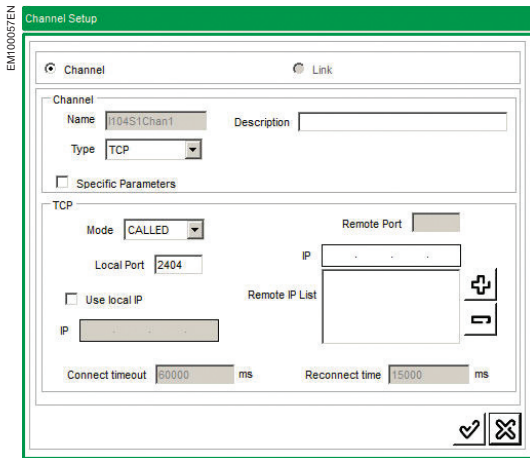
TCP channel configuration from Easergy Builder
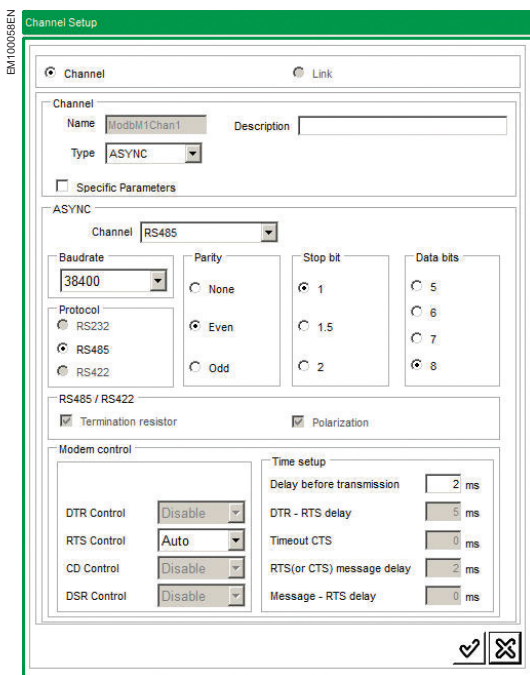
Serial channel configuration from Easergy Builder
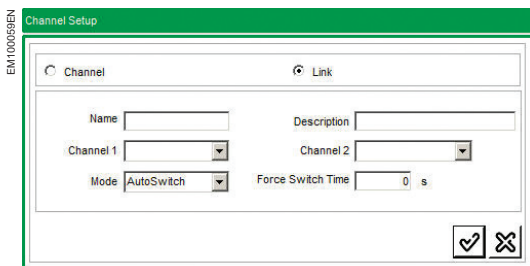
Association of channels

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

Example of Easergy T300P communication channel
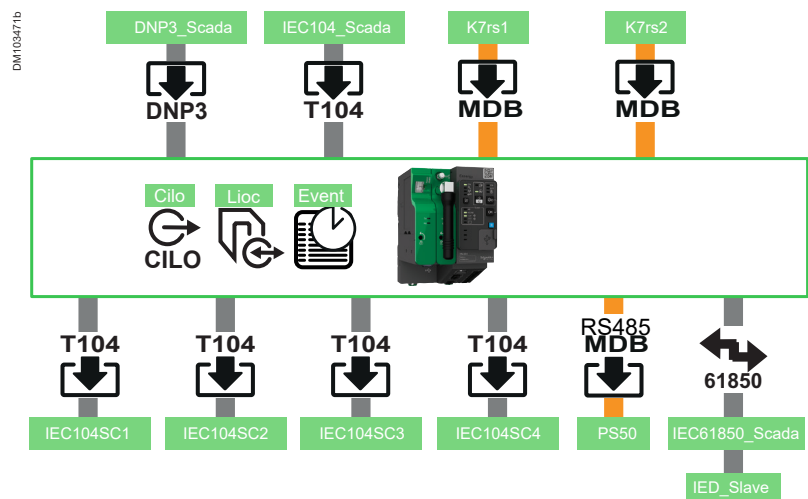
Easergy HU250
Head Unit Communication

Protocols and communication architecture

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.
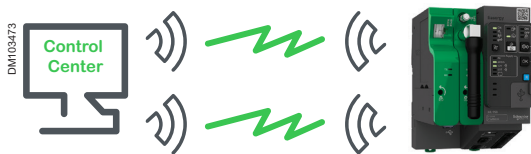
Two redundant physical channels to one control center

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.

Each communication channel manages its own:
• Protocol and modem
• Event tables
• Mapping protocol
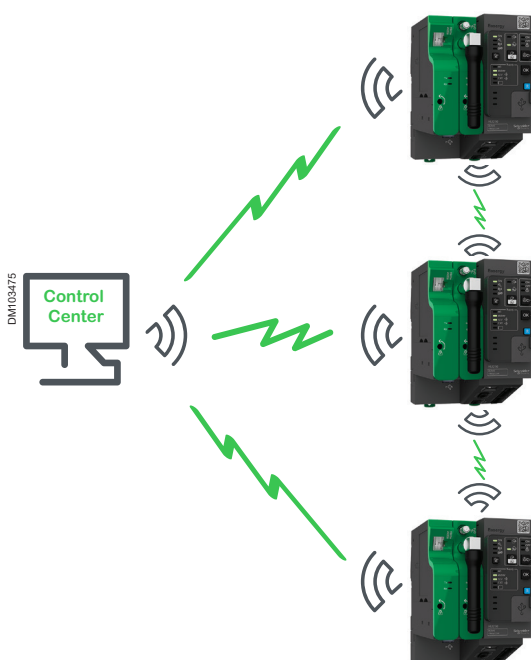
Control center and peer-to-peer communication

Communication channels can be configured for peer-to-peer communication between multiple Easergy T300P devices.

The main applications are:
• Automatic Change Over between two remote substations
• Self-healing automation between two or more remote substations
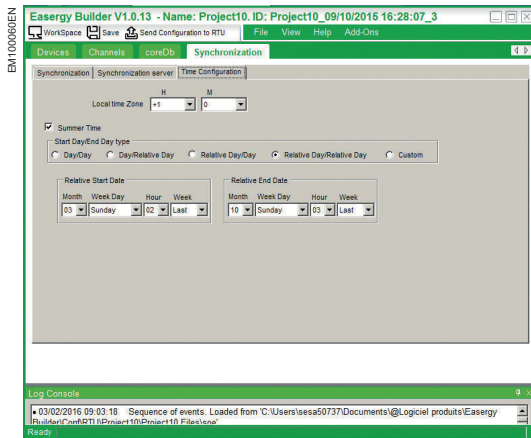
Easergy T300P can accommodate several kinds of clock synchronization and manages:
- Local time zone
- Summer/winter time

SOE configuration

Web server view of SOE

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.

Easergy T300P modules time synchro

Easergy HU250 operates as a time server to synchronize:

- T300P modules using the Time Protocol (IEEE 1588)
- IEDs in the substation
  - Master Protocol
  - SNTP server
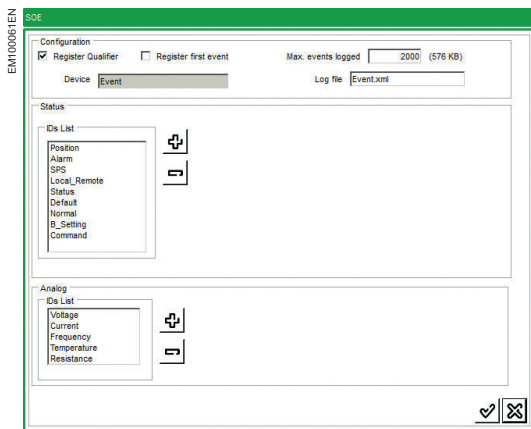
Sequences Of Events (SOE)

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
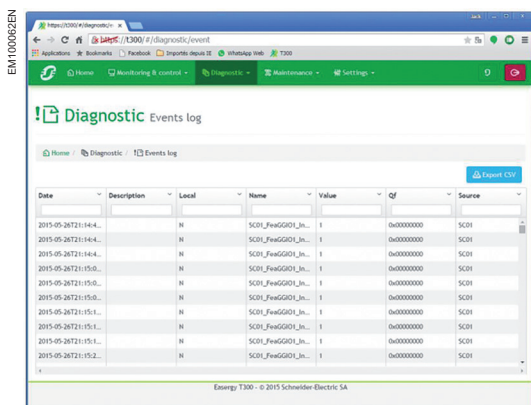
The purpose of cyber security is to help protect the device against unauthorized operation and to provide an audit trail of access.

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

According to the device location and installation, additional hardware or software may be required in order to limit access to the device and/or communication interfaces. Alarms may also be required to be sent to the control center (SCADA) when users access the device.

One of the key aspects of the cyber security is to define a security policy. This security policy structures the roles and responsibilities within the organization, and specifies who is authorized to perform what and when.

Easergy T300P supports hardening to help prevent unauthorized access:

- Authentification by centralized Radius client

- Local and remote control access security based on RBAC

- Local and remote connection security for maintenance: HTTPS, SSH

- Protocol security for file transfer: SFTP

- Protocol security for control center communication according to:

  - IEC 62351-5 for DNP3 and IEC 60870-5-104.

Secure 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 but is also configurable according to user requirements:

- 15 default user accounts
- User role assignments
- Roles to access assignments

Easergy T300P is provided with a pre-defined RBAC. It can be customized with the cyber security manager tool SAT.

Easergy T300P has an internal radius Serveur in order to coordinate the authentication from an unique customer security policy management system.

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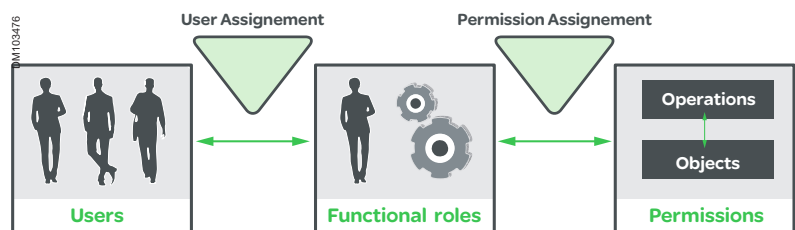
RBAC Role structure

- The RBAC is configurable from the web server
  - User authentication and password management

- RBAC can be modified with the cyber security manager SAT
  - User account management (add/modify/delete user accounts)
  - Easergy T300P installed base security management
  - Reset of default factory user

- Cyber security log

Easergy T300P supports advanced logging and monitoring features for cyber security implementations. Logs are protected against unauthorized access, modification and deletion and are preserved in the security events log.
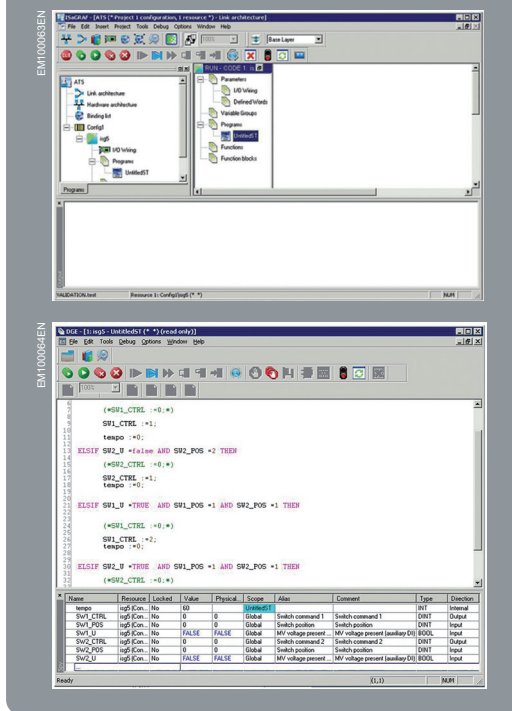
Powerful open PLC IEC 61131 software for automation design.

Easergy HU250 integrates ISaGRAF® runtime to execute the applications generated from IsaGRAF Workbench.

IEC 61131-3 support

The IsaGRAF® Application Workbench provides powerful and intuitive graphical and textual editors for SFC, FBD and LD, and Text Editors for ST and IL.

All data (analog and digital) can be configured with Easergy Builder for the IEC 61131 PLC used. The IEC 61131 program can be downloaded locally or remotely on the dedicated configuration.

Typical applications using an IEC 61131-3 program

Easergy T300P automation networks are designed in IEC 61131, except reflex automation like sectionalizers, which are managed by the SC150.

Local Automatic Transfer Source ATS [1]

An ATS system allows a critical load (such as a network section, a hospital or manufacturing plant) to have increased supply availability by switching between a primary and a backup supply.

- Automatically transfers between alternate supplies if one is lost
- Can be set to automatically reconfigure when the preferred supply is restored

Language	Type of application
Sequential Function Chart (SFC)	Sequential process
Function Block Diagram (FBD)	Process flow
Ladder Diagram (LD)	Electrical flow
Structured Text (ST)	Textual, calculative
Instruction List (IL)	Boolean, simple, textual
IEC 61499	Distributed process

For more information consult isagraf.com
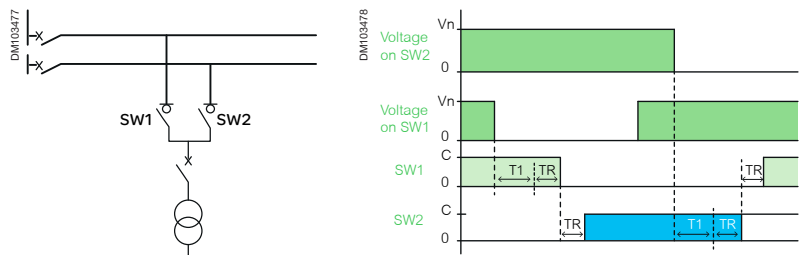
Distributed Automatic Transfer Source [1]

The principle is the same as local ATS with a peer-to-peer communication between two distant underground substations or overhead LBS.

(1) Available on project, consult us

Intelligent loop automation reconfiguration (self-healing network)[1]

An evolution of the classic loop automation algorithm to an intelligent loop automation utilizes peer-to-peer communications to exchange messages between feeder, mid-point and tie devices. This exchange reduces stress to pole-mounted switchgear by helping to eliminate unnecessary re-energization.
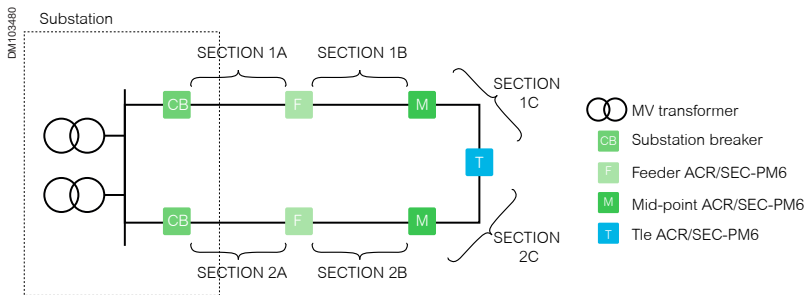
The loop automation applications consist of a number of ACR/SEC devices distributed in an open ring topology. Each device in a loop automation scheme operates independently according to its predefined role, each with its own set of operation rules.

[1] Available on project, consult us

Easergy SC150
Switch Controller Unit

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

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:

- Single or dual control-command to the switch

- Control security by dual relays: select and execute

- 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

MV current and voltage measurement

- SC150 is compatible with standard current sensors according to IEC 60044-1

- Three mountings are possible for acquiring current measurement:
    - 3 phase CTs
    - 1 core balance CT
    - 3 phase CTs + 1 core balance CT

Voltage measurement or indication using from different types of sensors:

- LPVT (Low Power VTs) according to IEC 60044-7

- Standard MV/LV VTs with secondary from 57 Vac to 220 Vac according to IEC 60044-2

- Schneider VPIS (switchgear voltage indicator) with voltage output

- VDS voltage indicator with voltage output according to IEC 61243-5

- External divider capacitor mounted on the MV cable head

Easergy SC150
Switch Controller Unit
General description

Fault Passage Indicator (FPI)

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

- Phase overcurrent fault detection (ANSI 50/51)

- Ground (earth) fault detection (ANSI 50N/51N)

- Negative sequence overvoltage/broken conductor detection (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 on the MV fault detector and for each SC150 channel. The first instance that checks the fault condition activates the detector and the corresponding indicator on the T300P.

The ability to combine instances allows the T300P to adapt to the characteristics and type of protection used upstream in line with the MV network characteristics. This also enables adjustment based on the fault current values measured by the measurement sensors.

For example, one instance can be defined for overload detection (typically an IDMT curve) and another instance can be defined for short-circuit detection (typically a DT curve).

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.

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 class S

Automation systems

The automation systems concerning several switchgear and MV network systems such as Automatic Transfer Source (ATS), self healing, etc., are hosted in HU250 and are designed in a IEC 61131-3 PLC workbench.

The sectionalizer automation (SEC) concerning one switchgear is managed by the SC150 module. This automation is factory predefined but configurable on site (setting).

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

Easergy SC150 Switch 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)
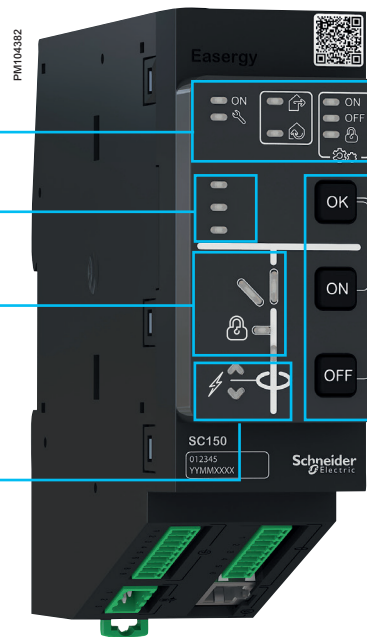- Automation status: ON/OFF and lock status

3 customisable LEDs

Switch status

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

Fault detection and voltage indications

- Fault 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.

Current acquisition

4 current inputs with standard CT

Daisy chain LAN

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

Voltage acquisition

3 phase acquisition through RJ45 interface and accessory sensors

Switchgear status

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

Switchgear control

2 digital outputs configurable

Daisy chain power supply

12-48 Vdc

Configuration Tools

Configuration tools

Home

Monitoring / Data / Status

Diagnostic / Events
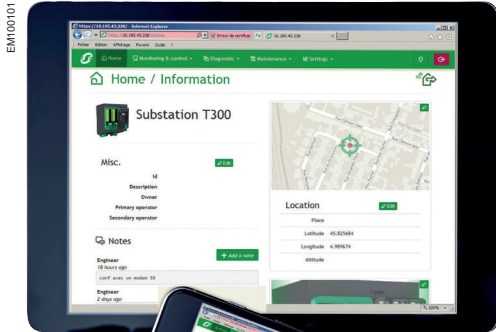
T300P Web Server - Commissioning, operation and maintenance

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, cyber security log and system log)

  - 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.
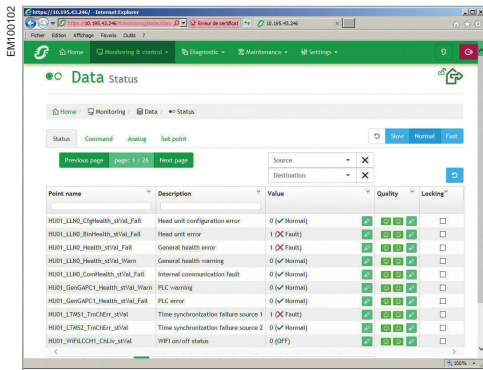
Operation and control

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
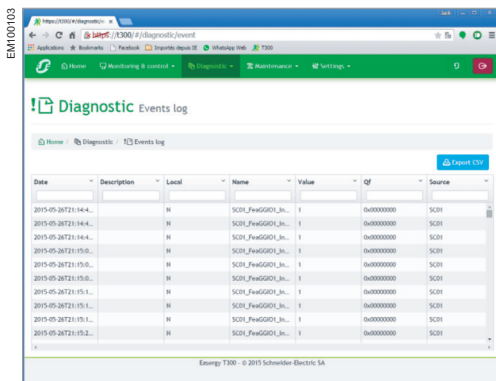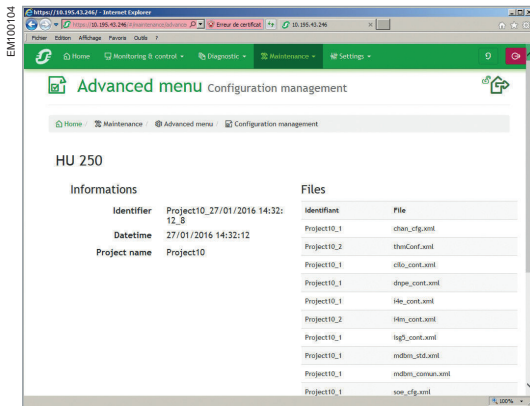
T300P Web Server: Maintenance / Configuration

Maintenance

- The Web Server is used to manage the T300P configuration based on files stored locally in the HU250 memory or saved externally on a backup device.
  Three configuration files can be stored in T300P, for exemple :

  - the active configuration

  - the Backup configuration (factory configuration for example)

  - the future configuration

- System events log file analysis

- Transmission of maintenance events

Setting by web server

- Configuration

  The settings that can be changed on the web server:

  - Switch management: command type and delays

  - Measurement sensors, fault current detectors, voltage presence parameters

  - Automation systems: operation mode and delays

  - Communication: protocol parameters, port operating mode

- Configuration by downloading files
  - Loading the predefined configuration with Easergy Builder

  - Saving one or two configurations for restoration

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.
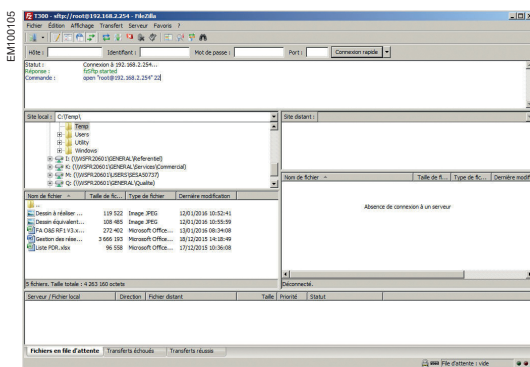
FTP server - Filezilla

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.
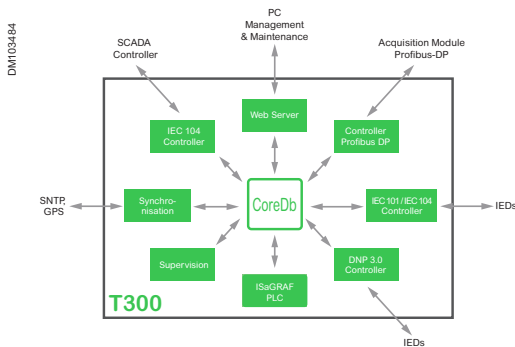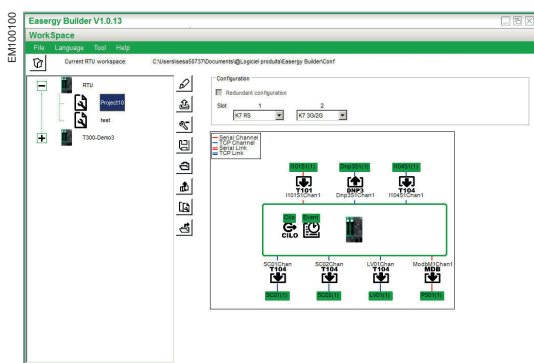
Easergy Builder: Relationship between coreDb and other applications
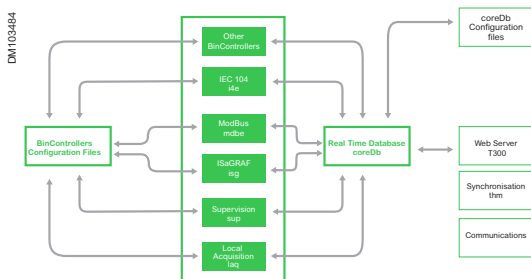
Easergy Builder: Real-time operating system architecture
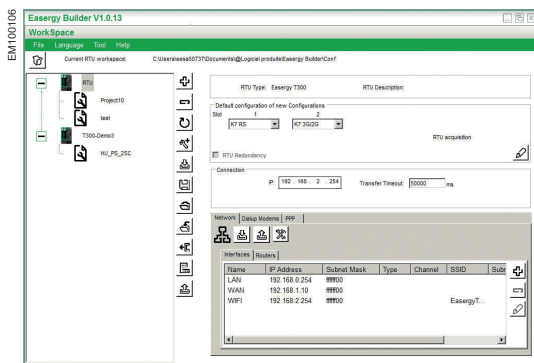
WorkSpace: RTU setting

WorkSpace: Device architecture page

Easergy Builder

Easergy Builder is the advanced configuration tool of the T300P RTU, reserved for the expert support team.

The basic use of T300P does not require advanced modifications of the T300P configuration.

The web server is sufficient for the user to personalize the system and change basic settings.

Interface

Easergy Builder permits the modification of an existing T300P configuration from the main page WorkSpace.

This page includes the following general settings:
- IP parameters for LAN, WAN, Wi-Fi access (IP address, delays, etc.)
- Slot (K7) to be used for the communication (RS232/485 or 3G)

The WorkSpace can manage several T300P RTU configurations. The WorkSpace page displays as a diagram the architecture of each T300P application (architecture of the different devices included in the configuration).

Each of the following elements (named devices) can be associated with a T300P RTU application:
- Master/Slave protocol setting (IEC 104, DNP3)
- ISaGRAF$^{®}$ project interface
- Supervision setting
- Local acquisition setting (input/output)
- SOE setting (Sequence Of Events)
- CoreDb signals (real-time database), including status, command, analog, setpoint
- Synchronization setting

To personalize the RTU application, Easergy Builder uses four main groups of settings pages:
- Devices: one device for each function (protocol, modem port, SOE, ISaGRAF, input/output)
- Channels: one channel for each internal or external communication link
- CoreDb: database including variables, labels and mapping of the application
- Synchronization: setting to synchronize the unit by SNTP server or by the protocol

Configuration tools

Calculation formula

The calculation formulas are used to carry out math, combinational logic operations or others on T300P data in order to perform specific personalized functions.
These Calculation formulas can be created via Easergy Builder.
The list of operations available are given in the Easergy Builder User Manual.
Refer to this document for more information related to the calculation formulae.

IEC 61131-3 PLC

An IEC 61131-3 programming tool (IsaGRAF® platform) is available with the T300P for developing PLC programs.

This IsaGRAF® platform is an external software tool to be installed on a PC.
It is used to develop specific custom applications in the following programming languages:

- SFC: Sequential Function Chart

- FBD: Function Block Diagram

- LD: Ladder Diagram

- ST: Structured Text

- IL: Instruction List

Options

Options
Voltage measurement

The SC150 offers many capabilities and quality levels to measure and monitor MV voltage. The voltage metering accuracy depends mainly on the kind of MV voltage sensors. According to the selection table, the SC150 allows the measurement of MV voltage for:

- Fault passage indication
- Automation and monitoring
- Voltage measurement
- Power measurement
- Power quality

MV Voltage acquisition

Easergy SC150 can be connected to one or several types of MV voltage sensor mounted in the Medium Voltage cubicle.

MV voltage sensors or interface	Description
VTs	Standard VTs according to IEC 60044-2 with external Easergy SC150 - VT - adapter
LPVT	Low Power VTs according to IEC 60044-7

VT	LPVT
2 phases mounting	3 phases mounting

■ RJ45 connector   ■ Easergy T300P voltage adapter
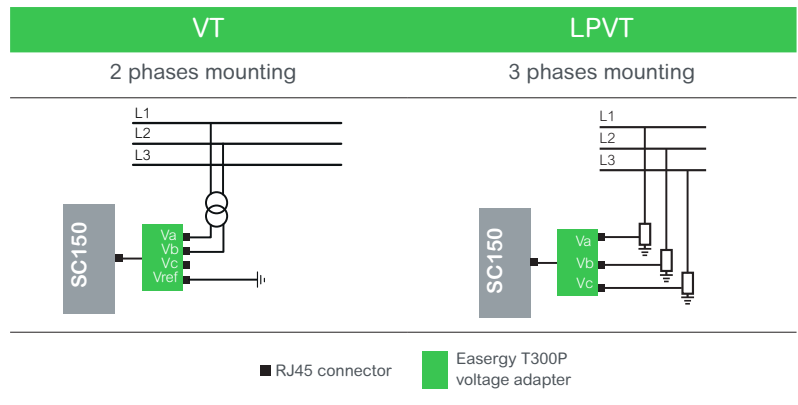
Voltage configuration selection guide

Functions	3 phase VT or LPVT
FPI	
ANSI 50/51	●
ANSI 50N/51N	●
ANSI 67	●
ANSI 67N	●
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	●
Automatic Transfer of Source(*)	●

(*) Consult us for availability

Options
Voltage measurement
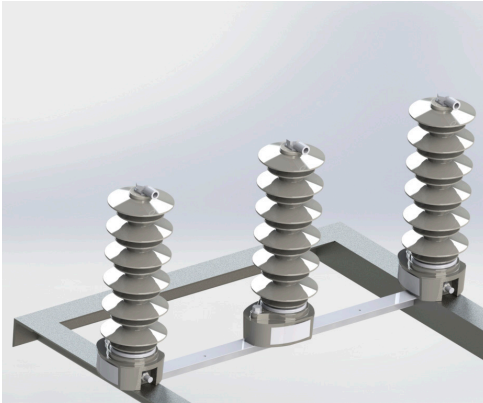
Voltage measurement settings and characteristics

Voltage input setting		
Type of sensor input		LPVT; VT
Voltage input wiring		Single phase; 3 phases
Un network rated voltage		3 kV to 36 kV in 1 V step
LPVT	Rated value	Configurable from 0 V to 10 V in 0.001 V step
	Magnitude correction	• 0.5 to 2.0 in 0.00001 step • Phase angle: -180° to +180°
VT	Secondary rated value	Configurable from 50 V to 250 V in 0.001 V step
	Magnitude correction	30 to 60 in 0.001 step
PhRot		• 1 = ABC • 2 = ACB

Voltage measurement characteristics		
Metering range		0.1 Un to 2 Un
Accuracy without sensor	Standard	IEC 61557-12
	Voltage	• 0.5% - from 20% Un to 120% Un • 5% - Un < 20% and Un > 120%
Voltage accuracy with sensors	LPVT	0.5% with calibration
MV voltage range	Rated voltage (Un)	up to 36 kV
	Frequency	45 to 67 Hz
Voltage Input Impedance		SC150 LPVT-VT interface: 10 MΩ

Options
Current measurement

Mounting A: **3 phase CTs**

Mounting C: **1 core balance CT**
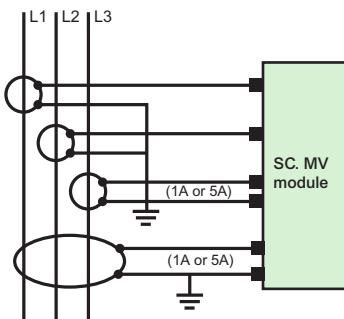
Mounting D: **3 phase CTs
+ 1 core balance CT**

Description

The Easergy SC150 module offers many high-performance features needed to measure and detect a fault current on the MV line.

Three CT mountings are possible depending on the required measurement capabilities, the neutral system of the MV network, the ground fault detection capability required and the MV cables used.

MV Current acquisition

- Type A: 3 phase current transformers
- Type C: 1 core balance current transformer
- Type D: 3 phase current transformers and 1 core balance current transformer

Applications and selector guide

Functions	Mounting		
	Type A	Type C	Type D
MV cable type			
Unipolar cables	●	●	●
Tripolar cables		●	
FPI			
ANSI 50/51	●		●
ANSI 50N/51N	●	●	●
ANSI 67	●		●
ANSI 67N	●	●	●
Sensitive ground fault detection (50N/51N and 67N)			●
Measurement			
Phase current RMS	●		●
Residual current RMS		●	●
Residual current computed	●		●
True power measurement	●		●
Automation			
Sectionalizer	●	●	●
Automatic Transfer of Source (*)	●	●	●

(*) Consult us for availability

Options
More options

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

Lightning arresters

Three lightning arresters on each side of the disconnector switch can be placed on an appropriate support frame to protect the equipment from overvoltages resulting from atmospheric conditions.

These lightning arresters are of zinc oxide type.

Manometer or pressure switch

Visual alarm indication and electrical alarm indication of the existing pressure inside the SF6 compartment, available under request.

SAITEL
Remote Terminal Unit

Saitel DR
Remote terminal unit

Saitel DR has been designed to support a variety of electrical and industrial applications.

Versatile, scalable and compact, its modular design enables use fo Saitel DR as communications gateway, automation controller, remote I/O or feeder RTU.

This is achieved by choosing the appropriate I/O modules (called acquisition blocks) and the flexibility of Schneider Electric's Baseline software package, which enables easy configuration and diagnostics/monitoring.

Architecture

A Saitel DR controller is built using a Head Unit (HUe) that can be expanded with several acquisition blocks.

Head Units integrate processing, communications, configuration and cyber-security functions while the Acquisition blocks allow for the expansion of I/O acquisition or additional serial ports.

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).

Saitel DR
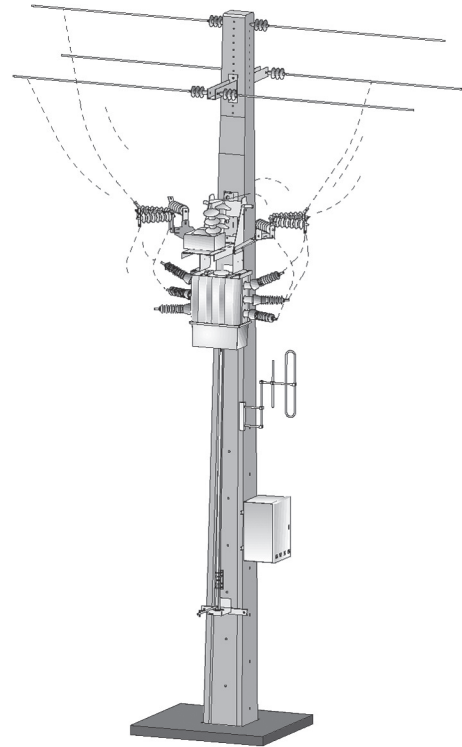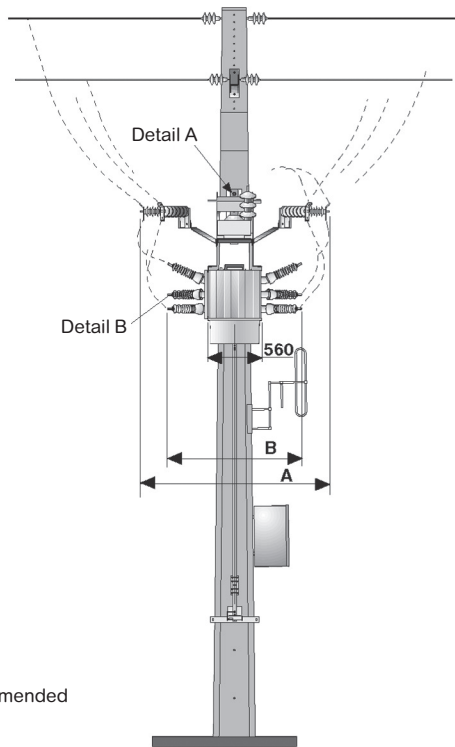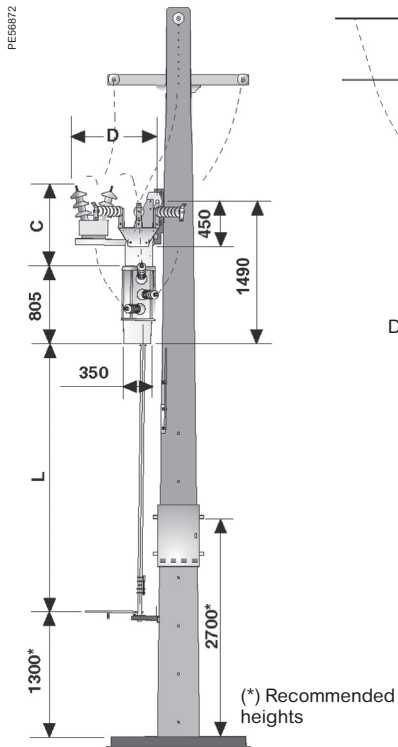## Remote terminal unit
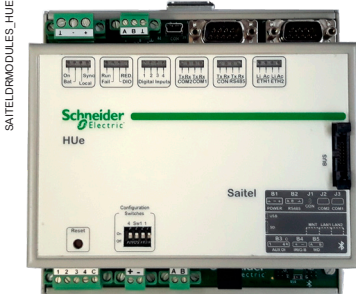
HUe Main Features

- **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**

General dimensions

General dimensions

Versions S3 (24 kV) / S4 (36 kV)

450
1490
C
805
350
D
L
2700*
1300*

(*) Recommended heights

Detail A
Detail B
560
B
A

	S3 / 24 kV	S4 / 36 kV
A	1950	2200
B	1350	1520
C	830	1050
D	900	970
E	290	360

200
126
296
47
170
85
174
Ø18
Ø INT.19
M8

Detail A

45
40
Ø14

Detail B

Fixing of lightning arresters

Ø 14
Thickness: 8
50

Fixing of the voltage transformer

40
20
Ø15
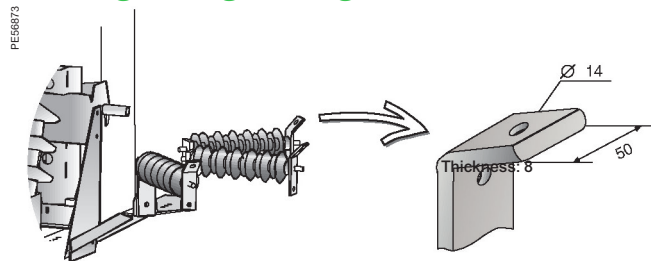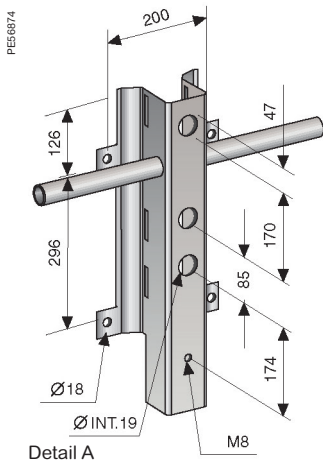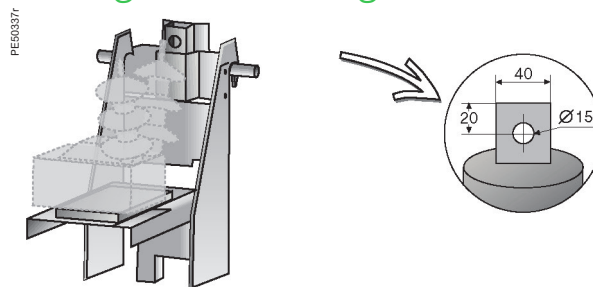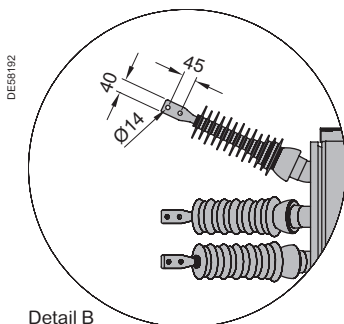
Weight (kg approximate)

	S3 / 24 kV	S4 / 36 kV
Basic equipment	127	138
Basic equipment + VT	165	182
Basic equipment + lightning arresters	182	238
Basic equipment + VT + lightning arresters	220	282

The rods, the manual control and the control unit not included.

General dimensions

Versions S2D (24 kV) / S3D (36 kV)

PE56875

1050
680
A A
Detail A
715
500
135 min. 805 110
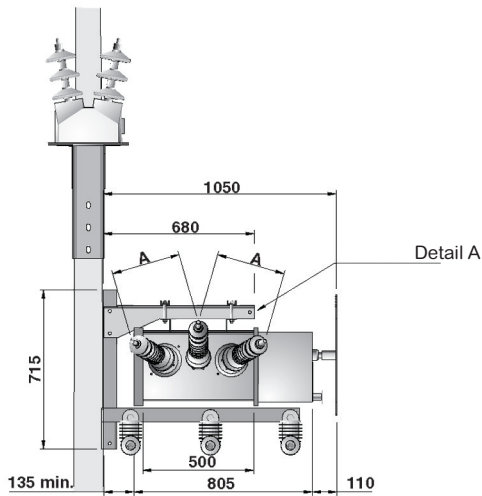
	S2D / 24 kV	S3D / 36 kV
A	265	300
B	1350	1500
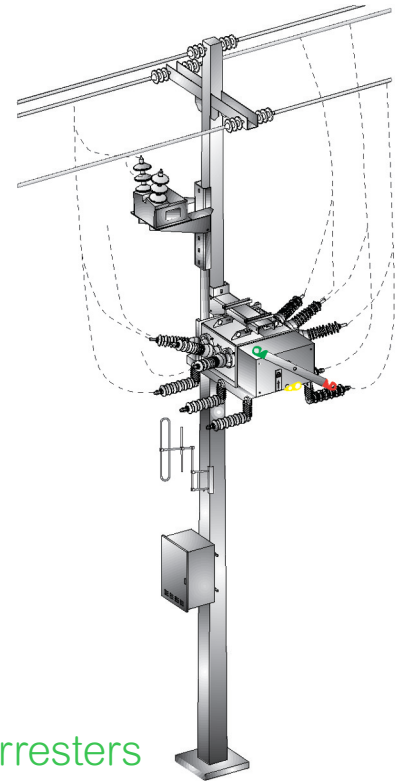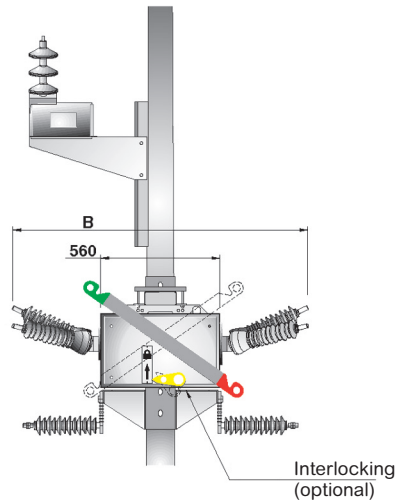
B
560
Interlocking
(optional)

Fixing of lightning arresters

PE56876

Ø 10 (3)
Ø 16 (3)
360
360

PE56877

UPN 140x60
240
210
170
Ø14 (4)
UPN 40x20
100
400
500
600
370
125
18x30 (4)
Ø14 (8)

Detail A

Fixing of the voltage transformer

PE56878

320
220
25
648
240
140
40
14x25 (4)
18x30 (4)
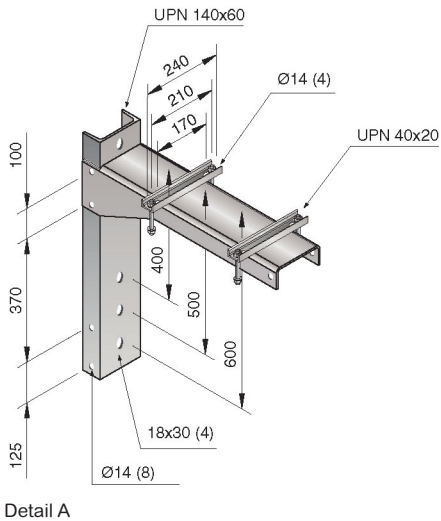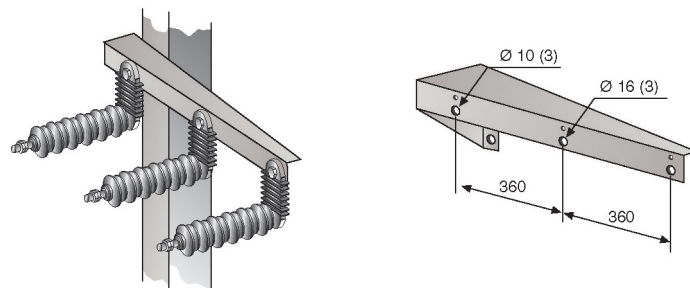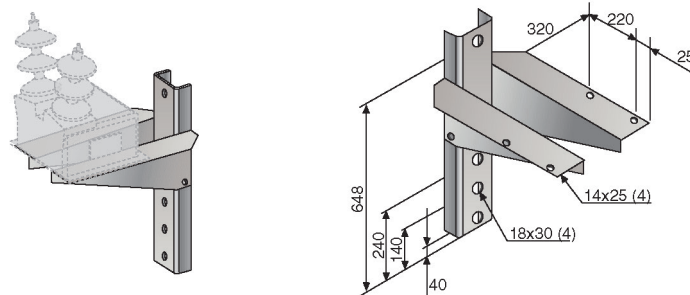
Weight (kg approximate)

	S2D / 24 kV	S3D / 36 kV
Basic equipment	130	140
Basic equipment + VT	170	180
Basic equipment + lightning arresters	205	255
Basic equipment + VT + lightning arresters	245	295

Control unit not included.

PM6 (52 kV)

15G104_01_A

HI 42 SNI_TC

1100—1200

Detail A

15G104_01_B

HI 42 SNI_TC

<21000

Mounting diagram

15G104_02

Detail A

PE56874

Weight (kg approximate)

	52 kV
Basic equipment	417
Basic equipment + VT	517
Basic equipment + lightning arresters	441
Basic equipment + VT + lightning arresters	541

Order Form

Order form
PM6

Ticket		Or fill with needed value	

Basic equipment
PM6

		Quantity	

Rated voltage	24 kV	36 kV	52 kV

Rated current	400 A	630 A

Motor auxiliary supply (if motorized)	24 Vdc	48 Vdc

Manual operated via hook stick (S2D / S3D)	

Manual control via transmission at the base of the pole (S3 / S4)	

Altitude meters (a.s.l)	≤1000 m	Above 1000 m specify

Remote Terminal Unit
T300P

Easergy HU250: head unit and communication interfaces

Communication interfaces

Empty modem box for Easergy HU250	
RS232-485 modem box for Easergy HU250	
2G/3G modem box for Easergy HU250	
4G US standard modem box for Easergy HU250	
4G EU standard 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	

Language

English	
French	

Order form
PM6

Easergy SC150: switchgear controller	
Firmware options	
Broken conductor detection	
Power measurement	
Power quality	

Easergy PS50: power supply	
Backup power supply 24 V output for motor	
Backup power supply 48 V output for motor	

LPVT sensors	
24 kV	
36 kV	

Current sensors	
Type A: 3 phase current transformers	
Type C: 1 core balance current transformer	
Type D: 3 phase and 1 core balance current transformer	

Options

		YES	NO
Mechanical locking (option in S2D / S3D)			
Lightning arresters			
Support frame	For the switch		
	With support for voltage transformer		
	With support for lightning arresters		
Standard height of the transmission is 8 m			Mark X if it is the option required
Indicate height required (in meters)			Fullfill if height required is different
Pressure switch *			
Manometer *			
* Consider that pressure switch and manometer options cannot be included at the same time, consult us for other options			
Voltage transformer			

	Primary	Secondary
Transformer ratio (kV)		
Trio Data Radios		

Notes

Life Is On | Schneider Electric

se.com