AUGIER Master / Slave

MCEPI Coupler

STEP3
PLC Communication (G3-PLC)
For 950 V - 3200 V - 5500 V - 6600 V Networks
Product Leaflet

- Command and Control your installations
- Communication energy transportation cable
- Lighting control over permanent networks
- Receiver Supervision to simplify the maintenance
- Reliable, easy to install

FABRIQUÉ EN FRANCE

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AUGIER

Your energy since 60 years

Do you need to supervise or control remote electrical installations?
AUGIER provides a communication system using Power Line Communication (PLC) over High Voltage Networks.

INDEX

STEP3

Abbreviations

LV	Low Voltage
MV	Intermediate High Voltage - 3200 V to 6600 V
PLC	Power Line Communication
CBT	Low Voltage Cabinet
MCEP	Coupling Module

System Presentation

STEP3

STEP3 (Smart Transmission on Electrical Powerline) allows to command and control remote modems. Those modems are installed after the step-down transformers, which are connected to the energy transport network (950V to 6600V).

AUGIER is the specialist of Power Line Communication system over MV (< 7.2kV) with installations in Europe and Africa.

APPLICATIONS

The system is composed of AUGIER-Master and AUGIER-Slave modems, ensuring **surveillance and control** of electrical distribution installations over long distances, especially in cases where maintenance is difficult, such as:

- Motorways, highways, junctions
- Tunnels, bridges and other structures
- Railway tunnels
- Parking lots, industrial sites luna-parks
- Military sites

The STEP3 system allows as well to **remotely command lighting (on/off) or any other permanently powered electrical equipment**. Some application examples:

- Traffic Lights
- Video surveillance
- Emergency equipment
- Variable signs and information boards

STEP3 can as well drive remote equipment such as automation systems, I/O modules (dry contact) or an other equipment having a RS485 port.

STEPIII Modem

Applications Examples

STEP3

Road Equipements/Airports

Monitor and command in real time electrical installations on mixed networks with permanent junctions, lighting and powering of road equipents (cameras, messaging panels, radar)

Bridges

Control lighting on a network equiped with lamps, cameras and traffic management systems

Military Sites

Supervision of transformer substation equipment and tragets on the network (voltage presence, breaker fault, pump fault, water level in the well)

Hippodromes

Adapt lighting to different situations (training, race)

Parkings

Control lighting on demand on different parkings in function of afflux. Supervise network and transformer equipment.

STEP3 SYSTEM

System Characteristics :

- A single Master can talk to up to 300 Slave modules
- G3-PLC Communication standard
- 32 to 400 kHz transmission band
- Injection on A and B phases when used on three-phase networks
- Temperature range: –20 °C to +55 °C functional

Compatible to network voltage in the 120 V to 6 600 V range, including the French standard 950 V, 3200 V and 5500 V

ADVANTAGES

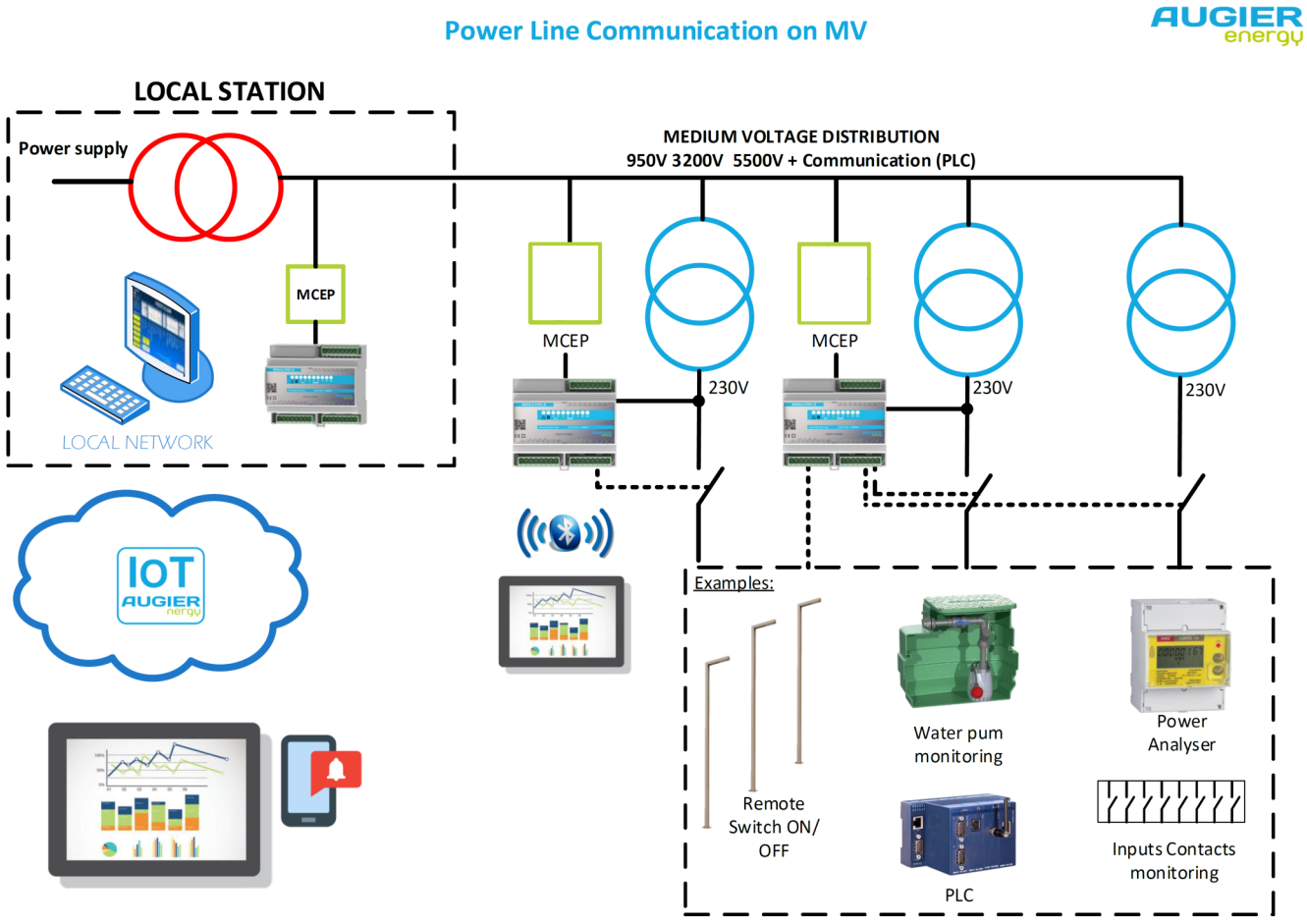
- ***Plug & Play Installation***, STEP3 relies on G3-PLC protocol (used for example by Lynky connected energy counter), allows to automatically address the communication equipment
- ***Reliable***, The system is tolerant to changes in electrical network topologies, even in case of modification due to maintenance (radial circuits connected in loop) the system will keep working without any external intervention
- ***Performing***, this system allows to adapt the communication speed following the measured signal quality and allowing to optimize the communication media use
- ***Secured,*** supports an authentication system for the equipment
- ***Compact*** and easy to install, it is installed on a standard DIN Rail (6 modules). It uses connectors to facilitate the installation and maintenance
- ***Bluetooth Communication*** allowing configuration and maintenance from a PC without physical connection with the AUGIER-Master or AUGIER-Slave modems
- ***Versatile***, its input/outputs allows to respond to a vast majority of installation needs
- ***Communication***, its RS485 Serial Port allows communicating with industrial automation systems over distances of several kilo meters

SYSTEM OVERVIEW DIAGRAM

A Master installed in the local transformer substation communicates with multiple Slaves installed on the network.

The transmission of information over the MV network is made possible by the MCEP, a signal coupler with galvanic isolation.

The information is transferred by PLC across two phases in a three-phase network or between phase and neutral in a single-phase network.



MASTER AND SLAVE MODEM

STEP3

COMMUNICATION:

Master & ***Slave*** modems communicate together by means of Power Line Communication, the AUGIER STEP3 technology adapted to power distribution network which allows to transfer information over long distances (several kilometers).

The Master is installed in a cabinet into the transformer substation, while the Slaves are installed into cabinets located after the step-down transformers.

PRESENTATION

AUGIER-Master and *AUGIER-Slave* MODEM INTEGRATE :

- A CPL Transceiver adapted to MV network
- Two output allowing to drive two independent contactors
- Height dry contact input, allowing the Master to send group-commands (up to 40 groups) and the Slave to return the status of breakers, contactors, etc...
- One RS485 communication port (2 wires)
- A 12V output (to power RS485 Equipment)
- A « current Transformer » input, together with an optional sensor, to measure homopolar currents
- 10 status lights to ease commissioning and maintenance
- A Bluetooth communication port, for configuration and testing

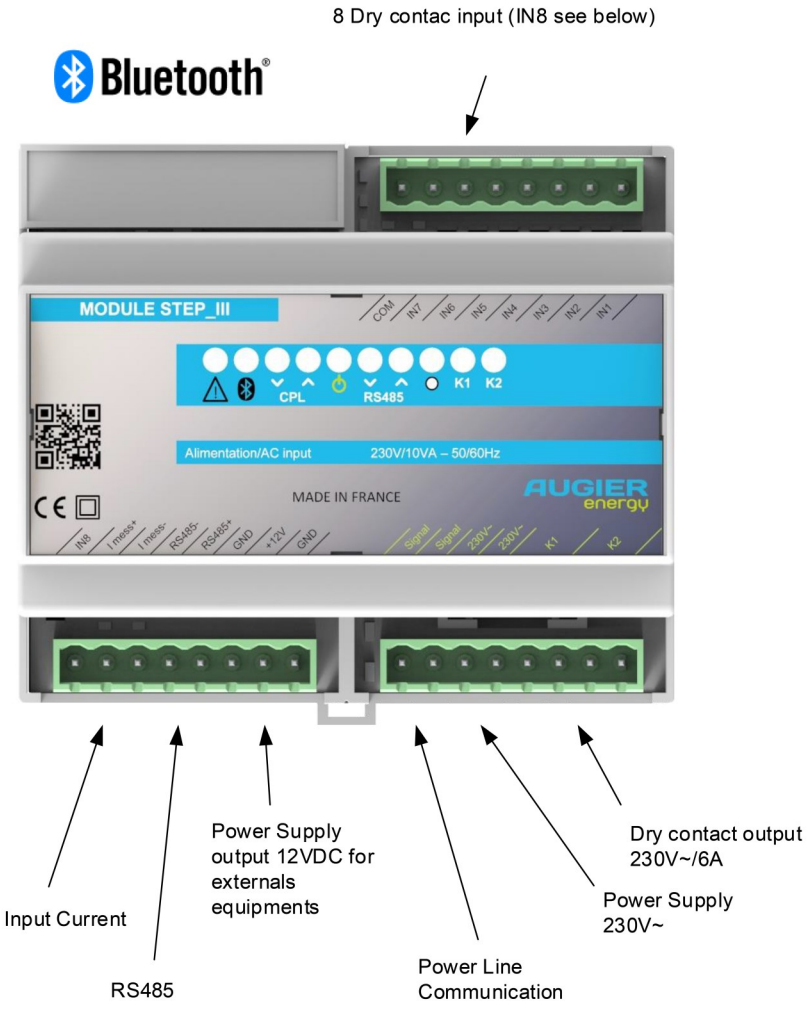
FUNCTIONALITES

- The Master monitors permanently the status of modem on the field (e.g. contact position) to identify any anomaly on the electrical network
- The Master can send automatically unitary commands or group commands, if it's connected to a timer or a supervision
- If a RS485 equipment is connected to a modem on the field, the Master has access to its data (JBUS Bridge -> example: energy counter)
- In case of an event occurring on a Slave, the information is sent automatically to the Master
- The configuration of Groups associated to each of the 2 relays on the modules allows to implement lighting (example: from the Master we can send commands during the day to turn on all the lamps into a tunnel, during the night half of the lamps will stay off)
- The system allows to keep an electric network powered to command only certain equipment from the Master

MASTER and SLAVE MODEM

STEP3

CONNECTION SCHEME



Applicable Standards
Overvoltage Category II - Class 2 equipment
Security :
IEC/EN 60439-1 (LV Equipment)
IEC/EN 60947-1 (LV Equipment)
EC/EN 60664-1 (isolation coordination)
IEC/EN 61140 (Electric shock protection)

EMC :
IEC/EN 61000-6-2 (Industrial Immunity)
IEC/EN 61000-6-4 (Industrial Emission)

ELECTRICAL AND MECHANICAL CHARACTERISTICS

ELECTRICAL CHARACTERISTICS

- Power supply: 110 V to 230 V +/-10%, 45 Hz to 65 Hz
- Power consumption: 2W (5W during communication)
- RS485 connection, MODBUS protocol
- 8 dry contact inputs (5V/10mA)
- 1 current input 0/100A~ (±1%)
- 2 dry contact outputs NO (250V~ 6A)
- 1 signal input: 0/250V~
- Bluetooth® connection: Class 1
- Fuse protection

MECHANICAL CHARACTERISTICS

- Housing: IP 20
- Mounting: DIN Rail EN 60715 TH35
- Dimensions: 6 modules, L 107 x W 58 x H 90 mm
- Operating Temperature: -20°C to +55°C
- Humidity: 0 to 85 % non condensing
- Weight: 300 g

MCEP Coupling Module

STEP3

MCEP coupling module allows transmitting PLC data over the energy transportation network.
Every project includes at least one coupling module onto the transformer substation and few coupling modules for network transformers.

SUBSTATION COUPLING MODULE - for MV network

The substation coupling module is installed either into a High Voltage Cell or within the transformer compartment of a step-up substation. The coupling module should be close to the Master modem.

Presentation :

- Coupling module, in cabinet, IP 68
- Dimensions : Length 162 x Width 90 x Height 252 mm
- Weight : < 7 kg

Electrical Characteristics:

- Voltage Range : LV up to 415 V, IHV up to 6,6 kV
- Coupling : 90 to 150 kHz
- Dielectric Strenght : 15 kV up to 1 minute

Protections:
The coupling module includes a LV/MV galvanic insulation, as well as an overvoltage protection (fuse).

Connections:

- MV Connection : Cable to be connected to the HV Cell connection points
- LV Connection : 2 x 1,5 mm² (16AWG) cables

NETWORK COUPLING MODULE - for MODULO watertight transformers

MCEPI modules are installed in close proximity of step-down transformers. The coupling module is connected on the IDR connection interface.

Presentation :

- Coupling module, in cabinet, IP 68
- Dimensions : Length 162 x Width 90 x Height 252 mm
- Weight : < 7 kg

Electrical Characteristics:

- Voltage Range : LV up to 415 V, IHV up to 6,6 kV
- Coupling : 90 to 150 kHz
- Dielectric Strength : 15 kV up to 1 minute

Protections:
The coupling module includes a LV/MV galvanic insulation, as well as an overvoltage protection (fuse).

Connections:

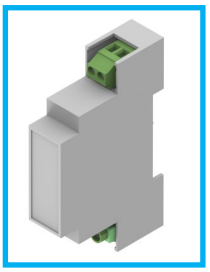
- MV Connection : 2 flexible cables, 3,6/6 kV 1x6mm² (10AWG), length 1,5 m
  Provided with a unipolar socket, to be connected on the derivation interface IDR
- LV Connection : HO7 RNF cable, length 4 m, section 2x1,5 mm² (16AWG)

MCEP Coupling Module

STEP3

SUBSTATION COUPLING MODULE - for 950 V network

The coupling module is installed into step-up substation. The coupling module should be installed as close as possible to AUGIER-Master modem. The network coupling module is installed into the step-down substation, close to AUGIER-Slave modem.



Presentation :

- DIN mounting coupling module
- Dimensions : 1 module, L 17 x W 58 x H 90 mm
- Weight : < 0.2kg

Electrical Characteristics:

- Voltage Range : < 1000 V
- Coupling Frequency : 90 to 150 kHz
- Dielectric Strength : 3 kV up to 1 minute

Protections:

Galvanic Isolation

Connections:

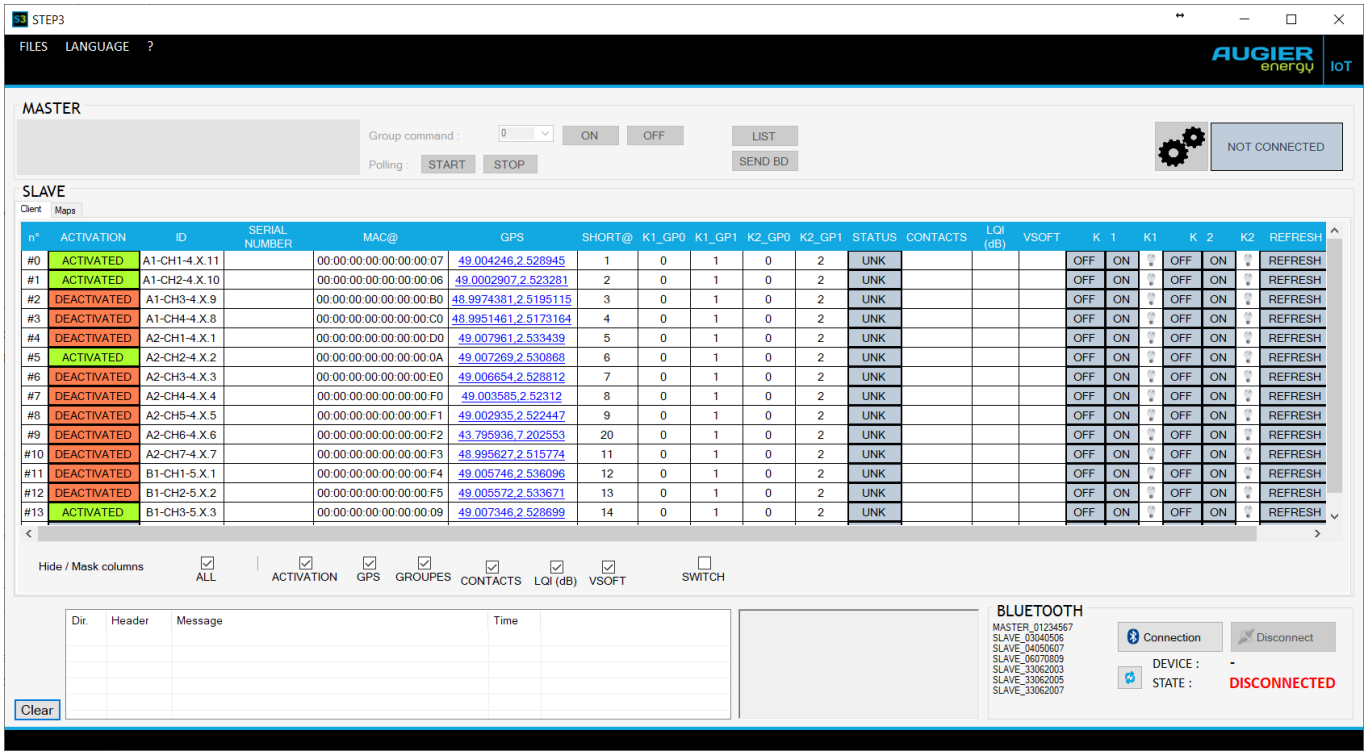
- 950 V : J1 1-2 section 1,5 mm² (16AWG)
- LV : J2 1-2 section 1,5 mm² (16AWG)

MASTER & SLAVE - CONFIGURATION

For each project, the PLC **STEP3** software is included.

This software allows to :

- Create a database
- Save or modify the database after a network modification occurs
- Communicate directly via Bluetooth from a PC with slaves modems
- Transfer the database to Master or Slaves modems
- Perform unit commands or diagnostic tests
- Perform group commands
- Perform a polling, i.e. visualize the status of each modem in the installation (option: LV voltage, current and power measurement, one phase)



Configuration - Supervision

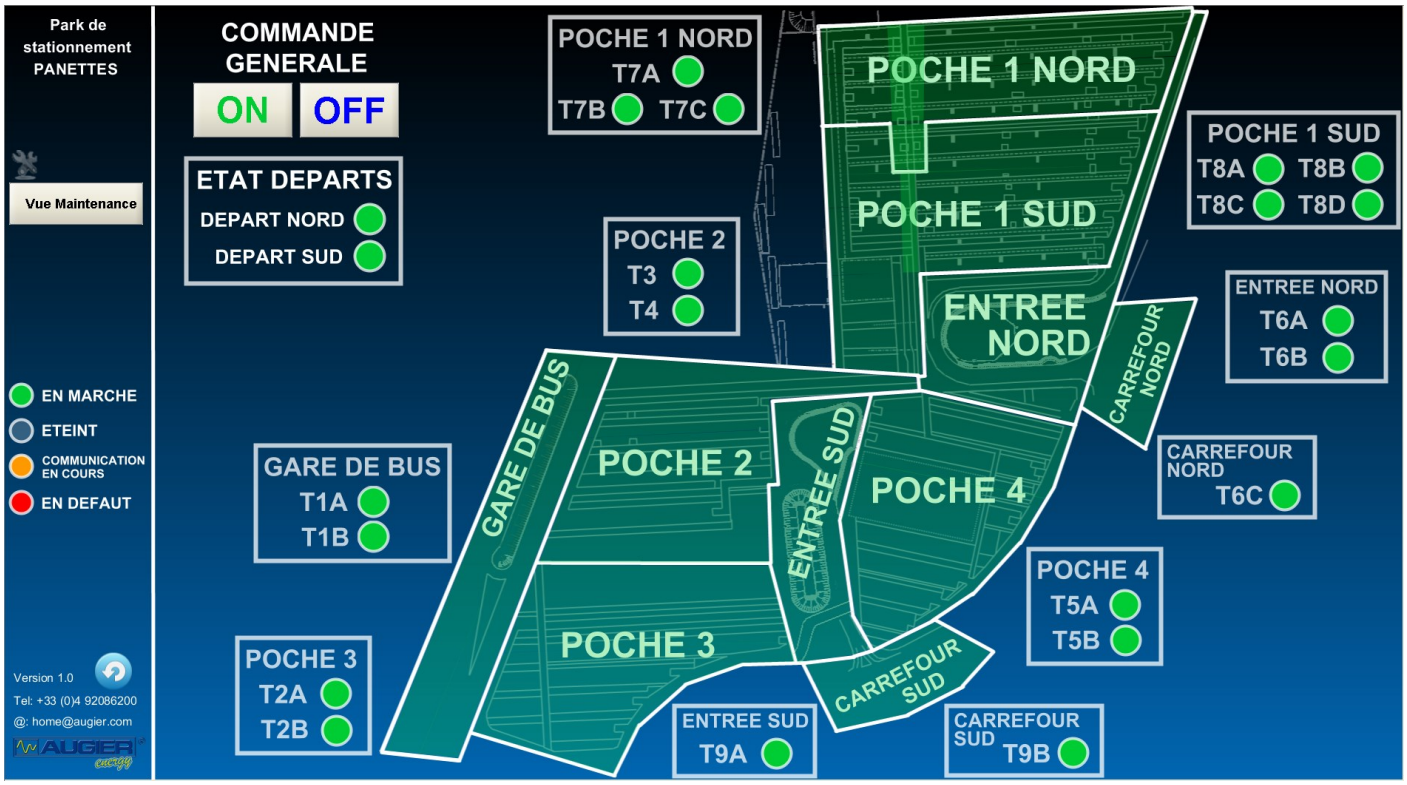
STEP3

SUPERVISION

AUGIER developed the GTCEP supervision, which allows monitoring networks equipped with STEP3 system.

It will be possible, with any PC, smartphone or tablet, to:

- Verify modem communication status
- Check the presence of voltage after the step-down transformers
- Check equipment status, such as LV breakers or contactors position
- Verify up to 8 information (dry contact) or one automation equipment trough RS485 port
- Report voltage on three phases, current, active and reactive power, for road lighting applications, trough a energy counter connected to a Slave modem
- Execute commands



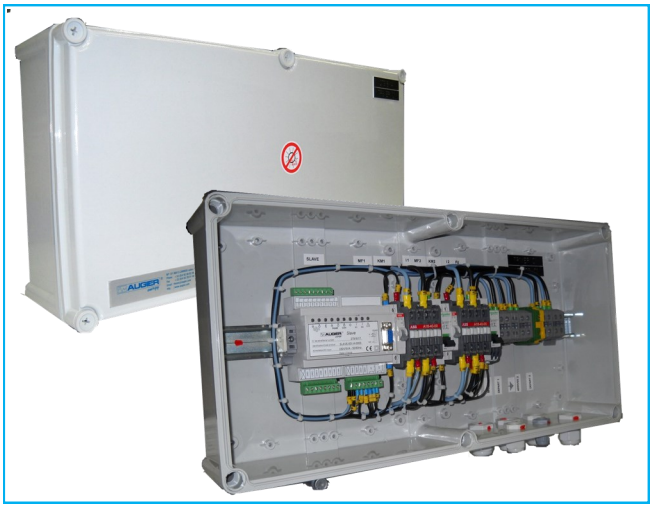
CBT Cabinet

STEP3

PRESENTATION

The cabinet can be either IP67 if installed into a pit, or IP55 if installed in proximity of the pit. A cabinet is generally constituted of:

- An AUGIER-Slave modem
- One or two LV circuit breakers; to protect the network
- One or two LV contactors to command lighting
- A manual override switch
- Connection screw terminal blocks
- Hearth connection
- Input and output cable clamps

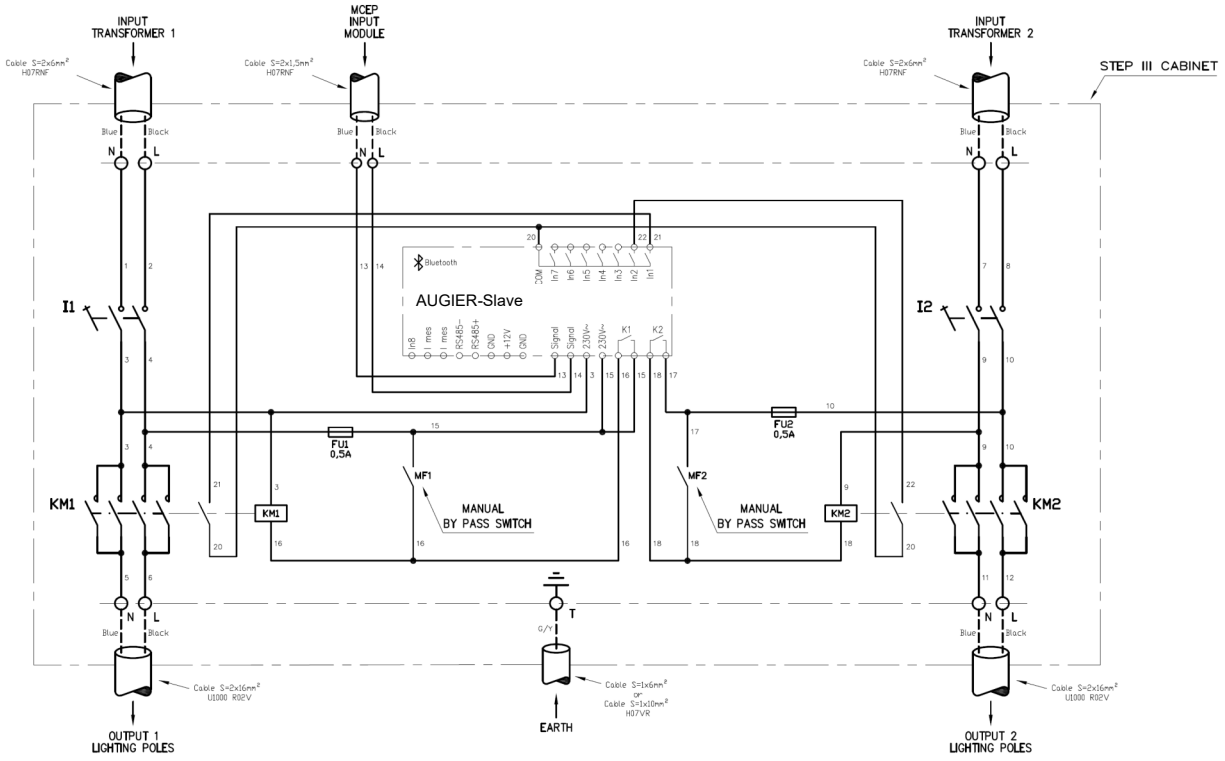


The CBT Cabinets can also be provided with an optional module, allowing to remote measure three -phase voltage, current and active/reactive power.

Dimensions :

The actual dimensions will vary with the installed equipment. For information only:
One-transformer cabinet: 380 x 280 x 130 mm
Two-transformers cabinet : 560 x 280 x 130 mm

ELECTRICAL SCHEME EXAMPLE



Installation

STEP3

MASTER

The ***AUGIER-Master*** modem has to be installed into a Low Voltage cabinet, close to MV cells

Master

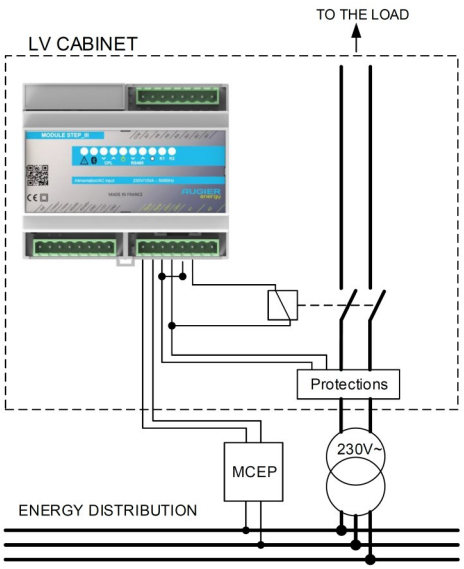
LV Cabinet

MV Cells

SLAVE

The ***AUGIER-Slave*** modem has to be installed close to network transformers:

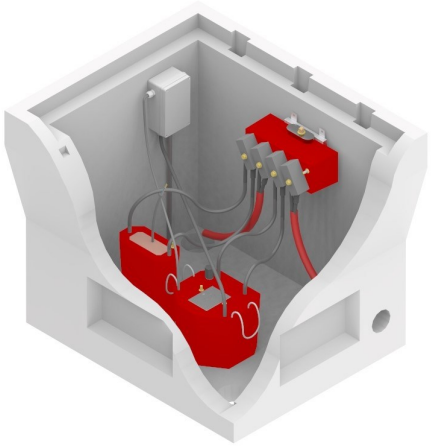
- Either in a pit with a IP67 cabinet
- Or into an IP55 cabinet in proximity of the pit



MCEPI

MCEPI coupling modules have to be installed into the pit, close to network transformers. They have to be connected directly on IDR interface.

MCEPI



AUGIER IS ISO 9001 CERTIFIED SINCE 1995

Vendor details

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