

Installation manual

Smart Master G3 (MG3)



ENGLISH

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Reference documents

- RD1: FTE-0018-Datasheet Smart Master G3-V1

MyLight Systems regularly updates its instructions. Visit the website <u>www.mylight-systems.com</u> to make sure that you are using the latest version of this document.

You will also find the complete range of devices that are compatible with the Smart Master G3.

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1 Safety of goods and persons

1.1 Correct use

The Smart Master G3 (MG3) is a smart meter for energy monitoring and management solutions. It must be protected in accordance with the local electrical standards. The system is suitable for indoors use only. The operating range of all the components must be observed at all times (*refer to RD1*). The protection provided by the device may be compromised if it is used in a way that is not specified in this document.

Carefully follow the instructions for each step of the installation process in all the installation phases and pay attention to the warnings in each chapter to avoid any dangerous situations for the operator and risks of damaging the equipment. Any operations that do not follow the instructions provided immediately cancel the warranty.

The documentation must be read, followed and accessible at all times. The product label must be left on the product.

1.2 Country certification and authorisation

The product must only be used in approved countries (*refer to RD1*). Only use this product in accordance with the documentation provided and the standards and directives in force in the place of use.

1.3 Qualified technicians

The operations identified in this document must only be performed by qualified personnel. All persons working on the product must have the following qualifications:

- Training in the installation and commissioning of electrical devices
- Electrical authorisation
- Training in the hazards and risks related to the installation and use of electrical equipment and systems
- Knowledge of the applicable standards and directives

1.4	Product markings		
	Symbol	Meaning	
	\sim	Single-phase alternating current	
	3 \sim	Three-phase alternating current	
	\triangle	Caution: refer to the installation manual	
		WEEE directive 2012/19/EU (Waste Electrical and Electronic Equipment).	
	4	Caution: risk of electric shock.	
		Device fully protected by DOUBLE INSULATION or REINFORCED INSULATION.	

2 Contents of the box



3 Description of the Smart Master G3

The Smart Master G3 is a 3-in-1 smart meter that can measure three charges, such as photovoltaic production, the total consumption of a building or the consumption of an electrical device. The product is equipped with a built-in relay capable of controlling an electric charge.

The meter has several connectivity options for Internet: by Ethernet RJ45 cable, by PLC plug or by cellular modem (option). It also has external connections: such as an RS485 port and two Ethernet ports.



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Position	Designation
Α	Single or three-phase power supply
В	 Power light: On green: normal operation ➢ Flashing green: start-up / updates ➢ Ilashing green and red every 300 ms: Internet failure ➢ Ilashing green for 3s, flashing red for 1 s: no communication with a PLC device. ➢ Flashing red: request to restart On red: product out of order Off: product switched off.
C	Relay connector, button and light Light: On green: relay active, closed Off: relay inactive, open Button: Press and release after 1 s: switch the relay between the two positions
D	RS485 connector and communication light Light: ★ Flashing green irregularly: RS485 communication ○ Off: no RS485 communication
Ε	Ethernet LAN connector Light: * On green irregularly: Ethernet connection Off: No Ethernet connection
F	 PLC pairing light and button Light: On green: perform PLC pairing with at least one device PLC paired Flashing green: awaiting pairing On green, off, on green: PLC reset in progress Red: poor PLC communication Off: product not PLC-paired Button: Press and release after 1 s: request pairing Press and release after 6 s: reset pairing
G	Ethernet AUX connector Light: Irregular flashing green: Ethernet connection Off: no Ethernet connection
н	Factory Reset Button: Press and release after 5 s: product factory reset
I	Current transformer inputs



Position	Designation
Α	Manufacturer and product information
В	PLC identification information: MAC address and DAK number
С	Ethernet identification information: MAC addresses for the ETH and AUX ports
D	Product serial number
E	Safety marking and power supply information
F	Product P/N

4 Installation conditions

The Smart Master G3 must be installed in a suitable place, in view of the information below:

- The ambient temperature, humidity and dust are compatible with the proper operation of the device (*refer to RD1*)
- The device must not be installed in direct sunlight or close to other heat sources. Do not install the device direct sunlight, which can have the following consequences:
 - Rapid ageing of the electronic components
 - Deterioration of the paint and other minor aesthetic faults.
- When installed indoor, the Smart Master G3 must be enclosed in a casing offering at least IP4X protection
- The product can be installed on a 35 mm DIN rail:
 - Place the product in front of the DIN rail
 - Pull the tab with a screwdriver
 - Clip the product onto the DIN rail.



Figure 1: Mechanical installation instructions

5 Internet connectivity options

The Smart Master G3 operates with an Internet connection. This product can be connected to the Internet by an Ethernet cable, by PLC or by a modem.

Choose the means of connection to the Internet before wiring the product.

Switch on the device before running the connection tests (refer to the electrical connections and commissioning chapters).

REMINDER: the device is communicating properly over the Internet when the power light is green.

CAUTION: if the Ethernet cable connected to the MG3 is outside the IPX4 casing, the operating voltage must be at least 300 V. Also, make sure that the cable does not touch any exposed live surfaces inside the casing.

5.1 Ethernet cable connection

The device has an Ethernet LAN connector for a direct connection to the internet router.



Figure 2: diagram of the connection by wire between the MG3 and the Internet router

The LAN LED comes on and flashes when a connection is established.

5.2 PLC plug connection

5.2.1 Ethernet cable on the Internet router

If the Internet router is a long way from the electrical system and is not equipped for PLC, the device can be connected to the Internet through a PLC plug (P/N: MLSH-COM-1).

PLC communication uses the electrical wiring in the housing, and no additional cables are necessary (for single- or three-phase power supplies).

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Figure 3: Diagram of connection to the Internet through a PLC plug

The steps to connect the PLC plug:

- Switch off the Internet router
- Connect the PLC plug to the wall socket next to the Internet router
- Use the Ethernet cable provided to connect the PLC plug to your Internet router (refer to your Internet access provider's documentation for more information). Use only one of the Ethernet ports numbered 1 to 4 on the back of the router. Do not use the fibre port or any other ports.
- Switch on the Internet router by connecting it to the available socket on the back of the PLC plug
- The two PLC devices (the MG3 and the PLC plug MLSH-COM1) are paired automatically in 1 to 15 minutes.

(refer to paragraph 3 to check the proper operation)

5.2.2 Wi-Fi connection on the Internet router

A Wi-Fi repeater can be used to connect to the router to establish Wi-Fi communication between the Smart Master G3 and the Internet router. *Recommended P/N: WA850RE*

The connection is shown below.



Figure 4: Diagram of connection to the Internet with a Wi-Fi repeater

- Connect the Wi-Fi repeater to a socket close to the unit
- Connect the RJ45 cable between the Wi-Fi repeater and the Smart Master G3
- Configure the Wi-Fi repeater (refer to the user manual) and wait for the Smart Master G3 to connect to the Internet
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Refer to the behaviour of the lights in paragraph "3 Description of the Smart Master G3 – chapter 3" to check the proper operation

5.3 Connection over an existing PLC circuit

The Smart Master G3 can communicate with other PLC devices in the home over the PLC circuit. If a PLC circuit connected to the Internet already exists in the house, the MG3 can be added to this network (*refer to chapter 7.3 to add the MG3 to the network*).

This means of communication is very useful in the following cases:

- The Internet router itself is equipped with PLC (intrinsically or through PLC plugs).
- A PLC circuit using PLC plugs already exists in the building.

Technical notes for connections to specific part numbers can be found on the MyLight Systems website.

5.4 Connection through a cellular modem

If there is no available Internet network, a connection through a cellular modem can be added. *Carefully read the installation manual of the cellular modem.*

Technical notes on specific modem configurations can be found on the MyLight Systems website (e.g., backups).

5.4.1 Ethernet connection to the cellular modem

The two devices can be connected by the LAN port on the Smart Master G3 and the LAN port on the cellular modem.



Figure 5: Diagram of the connection between the MG3 and a cellular modem

The cellular modem is a Smart Master G3 accessory. Refer to the user manual to install the equipment.

5.4.2 PLC connection on the cellular modem

Depending on the configuration of the building, the cellular modem may be installed a long way from the Smart Master G3 (for better signal reception, for example). In this case, the modem can be combined with a PLC plug as shown below.



Figure 6: Internet connection through the cellular modem and a PLC plug

- Connect the PLC plug to a wall socket.
- Connect the RJ45 cable between the PLC plug and the cellular modem.
- Connect the power supply of the modem to the PLC plug.
- Wait for the cellular modem to start up. This can take up to 10 minutes.
- The two devices (the MG3 and the PLC plug) are paired automatically in 1 to 15 minutes. *Refer to the behaviour of the lights in paragraph "Overview of the Smart Master G3 – chapter 5" to check the proper operation*

6 Electrical connections

6.1 Power supply connection

The Smart Master G3 must be protected by a power circuit breaker when it is powered from the electrical grid. The circuit breaker is used to cut the power to the device and must remain readily accessible. The requirements of compatible electrical grid are shown on the technical data sheet (RD1).

6.1.1 Single-phase power supply

When connected to a single-phase power supply, the device must be protected by a P+N 2 A C curve circuit breaker. In this configuration:

- the neutral (N) must be powered by the system neutral
- the phase (L1) must be powered by the system's only phase



Figure 7: Example of single-phase wiring

6.1.2 Three-phase power supply

When connected to a three-phase power supply, the device must be protected by a 3P+N 2 A C curve circuit breaker or a four-pole 2 A C curve circuit breaker. In this configuration:

- the neutral (N) must be powered by the system neutral
- the three phases (L1, L2 and L3) must be powered by each of the system phases.

It is advisable to identify each of the phases when they are connected to the power supply. This identification is important in order to connect current transformers and to measure the energy accurately.



Figure 8: Example of three-phase wiring

6.2 Relay connection

The device is equipped with a switching relay. This relay is only used to open or close a power circuit. It can support a maximum current of 20 A at a voltage of 230 V. For safety reasons, the relay must be protected by a 20 A C curve circuit breaker.



Figure 9: Example of use for relay wiring

The Smart Master G3 relay is normally open. It is controlled by MyLight Systems software. In an emergency, press the relay button for 1 second to manually apply a voltage to the charge connected downstream of the relay. It is also possible to switch on using the MyProPortal interface for professionals or the MYL 2.0 user application.

The light is a constant green when the charge is powered up.

6.3 Extension and current transformer connections

The current transformers and extensions are designed to be used exclusively with MyLight Systems products. Extensions and current transformers must be enclosed in casings or technical ducts offering at least IP4X protection.

6.3.1 Extension connections

Depending on the configuration of the home, the supplied transformer cables could be too short (60cm by default) to reach the measuring device. Therefore, MyLight Systems offers extra

extensions to connect the current transformer to the measuring device. The extensions are 3m long and can be daisy-chained to reach a maximum length of 12m. *(extension P/N: MLSH-MG3-19)*

Perform the following steps to install an extension:

- Make sure that a dangerous voltage is not applied to the MG3 device by checking the position of the protective circuit breaker. The circuit breaker must be in position 0 (*down*).
- Put the extension in the cable duct provided (refer to the applicable regulations)
- Connect the male end of the extension to the output connector of the product (CT1, CT2 or CT3) and align the arrows on the male and female connectors.
- Screw in the connector to lock it.



Figure 10: Locking the current transformer or extension connector

- Connect the female end of the extension to the male end of the current transformer.
- Screw in the connector to lock.

6.3.2 Current transformer connections

The Smart Master G3 smart meter has three inputs for current transformers. The transformers are equipped with a cable measuring about 60 cm.

Perform the following steps to install a current transformer:

- Make sure that a dangerous voltage is not applied to the MG3 device by checking the position of the protective circuit breaker. The circuit breaker must be in position 0 (*down*).
- Check that the current transformer is not placed around a live cable.
- Connect the female end of the current transformer to the extension or the output connector of the product (CT1, CT2 or CT3) and align the arrows on the male and female connectors.
- Screw in the connector to lock it.
- Make sure that the cable to be monitored is not live.
- Put the current transformer around a phase cable of the house or of the equipment to be measured. Pay attention to the direction of the arrows. They point towards the mains to measure the consumption of the house or of an electrical device, and towards the inverter for production measurements.

For three-phase systems, two other current transformers must be placed around the cables L2 and L3, and respectively connected to the inputs CT2 and CT3 of the equipment.

CAUTION:

- The extension or the current transformer must not be pinched.
- The wires inside the cable must not be visible through the outer covering of the cable. In this case, replace the extension or the transformer.
- The connector must be fully inserted in the product. No metal parts must be visible and/or accessible. The connector must be screwed home.



Example of use:



Figure 11: Example of the use of the extension and the current transformer

6.4 Connection of the RS485 accessory

The Smart Master G3 can communicate with energy meters and external actuators. This functionality allows the number of measurement points and controls in the building to be increased.

Up to 10 external RS485 devices can be connected to the product. These devices can be placed at a maximum distance of 100 m. The product is compatible with all the MyLight Systems meters and actuators. Details of the products are available on the website <u>www.mylight-systems.com</u>.

Follow the steps below to install an RS485 product correctly:

- Install the Smart Master G3 (refer to chapter 4: Installation conditions).
- Install the meter or external actuator (*refer to the installation instructions supplied with the product*)
- Take one RS485 communication cable or two 0.5mm² twisted wires with a minimum operating voltage of 300 V AC. Cut to the estimated length required to connect the two devices.
- Connect one wire to connector A of the RS485 port of the MG3, then connect the second wire to connector B of the RS485 port of the MG3.

- On the meter or external actuator, connect wire A to terminal A of the meter, and wire B to terminal B of the meter or actuator. (*refer to the installation manual of the meter or actuator for the position of the terminals*)

Example of a connection:



Figure 12: Example of the connection of RS485 devices

Note:

- Several products can be connected to the same RS485 cable. The Smart Master G3 must always be at the master end of the RS485 cable.
- If the communication wire between several devices is longer than 10 m, a 120 Ohm resistor must be installed at the slave end. *(refer to the technical notes on our website).*

CAUTION:

- The RS485 protocol uses a low-current communication bus.
- If the RS485 cable comes out of the IP4X casing, it must be placed in the technical ducts for low currents. The RS485 cables must have an operating voltage of 300 V AC and must be kept well clear of bare live parts.

6.5 Ethernet connection

The Smart Master G3 has two Ethernet ports: LAN and AUX.

An additional device can be connected to the Internet by connecting an Ethernet cable to the AUX port. Example of use: Internet connection for an Envoy gateway.

Refer to the Internet connectivity options chapter to connect the Ethernet cable to the LAN port.



6.6 Example of final connections

Figure 13: Example of a single-phase power supply and production measurement by current transformer





7 Commissioning

7.1 Prerequisites

- Check that the means of communicating with the Internet are available
- Check the connections of all the cables and check they are tight.
- Install all the protective covers on the casing before switching on.

7.2 Switching on the Smart Master G3

Once the prerequisites have been met, switch on the Smart Master G3 by raising the circuit breaker to which it is connected. The power light must flash green while the product is starting up. If this is not the case, check the power supply and check that the connections are tight. The light \bigcup will indicate if the product is functional after 30 seconds.

 \rightarrow Refer to chapter 3 Description of the Smart Master G3 for more details about the indicator lights.

7.3 Connection of the Power Line Communication (PLC)

The Smart Master G3 communicates over PLC and is compatible with all off-the-shelf PLC devices. Once the Smart Master G3 has been switched on, it can be paired with other PLC devices.

7.3.1 Addition of a MyLight Systems PLC device

MyLight Systems offers other products that communicate using PLC. These products include meters, actuators and SmartPlugs.

Follow the recommendations below to improve the connections between the various PLC devices:

- All the PLC devices in the electrical system must be at least 1 metre away in order to guarantee a good connection.
- It is preferable to use only one PLC device per unit.

Pairing the devices:

- Before pairing a MyLight Systems PLC device, check that it is not connected to another network (the PLC light is off).
- Press the PLC button on the Smart Master G3 for 1 second. The PLC light flashes green.
- Press the PLC button on the second MyLight device for 2 seconds. The PLC light flashes green.
- Wait until both lights are permanently green.

Un-pairing the devices:

- Press the PLC button for 6 seconds, then release it.

NOTE:

- When they are produced, all the MyLight Systems devices are automatically paired with one another. Press the Factory Reset button for 5 seconds to reset your device.
- In three-phase systems, there is no need to add a PLC phase coupler. The phase coupler is built into the Smart Master G3.

Special case of the MyLight Systems PLC plug P/N MLSH-COM-1:

MyLight Systems has developed a specific PLC plug for easier installation. It can be used to connect the Smart Master G3 to the Internet by automatic pairing. This takes between 1 and 15 minutes. The PLC plug (MLSH-COM-1) is not a SmartPlug and does not measure the consumption of a device. CAUTION: Only one MLSH-COM1-1 must be present. It is not possible to have several in the same house.

7.3.2 Connection of an external PLC device

Follow the procedure below to pair the Smart Master G3 with another off-the-shelf device:

- Un-pair the third-party device (refer to the user manual)
- Press the PLC button on the Smart Master G3 for 1 second. The PLC light flashes green.
- Wait for the PLC light to shine fixed green to indicate that the two products have been paired.

7.4 Registration of the system

Only professionals qualified by MyLight Systems can register users.

Once the Smart Master G3 has been switched on, it is necessary to register it using the MyProPortal professional interface, so that it can monitor and manage the electrical devices in the home. To register the system, log on with the login provided by the MyLight Systems personnel at the address <u>https://pro.mylight-systems.com</u> on your computer, smartphone or tablet.

To register, you will need:

- your name, first name, address, e-mail address, telephone number and the customer's date of birth
- the number of photovoltaic modules and the power of the installed modules
- the customer's Internet access provider
- the number of the Enedis supply point
- the serial number of the CMU (if integrated)
- the MAC address or the serial number of the Smart Master G3
- the MAC address or the serial number of the MyLight PLC devices to be paired

Note: registration is only possible if the Smart Master G3 is connected to the Internet using one of the connectivity options described in chapter 5 (the power light is fixed green).

Users can consult their production and consumption data, programme their devices automatically with the GreenPlay program, or manually on their dedicated application at the address <u>https://myhome.mylight-systems.com</u> (on a computer, smartphone or tablet).

8 Maintenance and cleaning

To protect the safety of users, it is forbidden to open and repair the product.

Cleaning the product with water or any other product is forbidden. Clean the exterior surfaces of the product with a dry, lint-free cloth. Clean the accessible surfaces by rubbing gently.

9 De-commissioning

9.1 Disassembly

Follow the instructions below to disassemble the Smart Master G3:

- Switch off the electric power supply of the equipment by lowering the protective circuit breaker.
- Unscrew the electric connection terminals and the current transformers.
- Pull the tab under the product towards you with a screwdriver to detach the Smart Master G3 from the DIN rail.

9.2 Recycling

The Smart Master G3 is an electrical and electronic device. Do not dispose of the product with the household waste.

Refer to the applicable rules for this type of waste at the point of use.

10 FAQ

Problem	Causes
The power light flashes green and red	The product is not connected to the Internet. Check the selected connectivity option (chapter 5)
The PLC light flashes red	Poor or no PLC connection (chapter 3)
The device downstream of the relay does not appear to be switched on	If the relay light is off, press the relay button for 1 second (chapter 3)
It is difficult to screw in the extensions	Check that the connectors are the right way round. DO NOT FORCE
PLC pairing does not work	 Solution 1: Check that each PLC device is at least 1 metre away Solution 2: Check that the PLC device is not connected to a multiple plug Solution 3: Check the quality of the power supply of the PLC device (old circuit breaker, poor connectors, possible filter) Solution 4: Switch the electrical devices off or on one by one to check whether they interfere with the PLC device Solution 5: Put the third-party device close to the MG3 and connect it to the nearest plug Solution 6: Press the Factory Reset button on the MG3 for 5 seconds with a suitable tool, then start the configuration process again. Then press the PLC plug for 10 seconds (chapter 7)
A PLC device seems to be interfering with another electrical/PLC device	Solution 1: Move the PLC/electrical devices well clearSolution 2: Contact the supplier of the device causing the problem

RS485 communication does not work	Check that a twisted communication cable is present. Add a 120 Ohm resistor at the end of the connection (chapter 6.4)
l already have PLC at home.	Refer to chapter 5.3 to add the Smart Master G3 to your network.
The product heats up	The product may not remain cool, depending on the operating mode. The MG3 switches itself off automatically if it overheats.
l would like to start the configuration again	Press the Factory Reset button for 5 seconds with a suitable tool and start the configuration process again
My cellular modem does not receive a signal	Check that the "Signals" lights on the cellular modem are on, and that at least one bar is visible.
Is my data secure?	The Smart Master G3 is equipped with a cryptographic chip for very secure communication with the cloud. The data can only be deciphered using MLS software.

11 GLOSSARY

Acronym	Definition
Actuator	A device with a relay switch that can be activated remotely. Actuators communicate with the MG3 over RS485. These relays are used to switch high-power contact switches.
AUX	An Ethernet port used to connect third-party devices, such as batteries or an inverter, to the Internet and/or to the MG3.
Internet router	An Internet gateway supplied by the Internet access provider
Meter	A product used to measure the energy produced or consumed in an electrical conductor.
PLC	Power Line Communication. A technology that enables two devices to communicate over the electricity network
LAN	The Local Area Network, which is used to directly connect the MG3 to an Internet router or a cellular modem
MyLight Systems software	MyProPortal: an interface for professionals <u>pro.mylight-systems.com</u> MYL 2.0: an application for users that monitors production and consumption <u>myhome.mylight-systems.com</u>
MG3	Abbreviation of Smart Master G3
Cellular modem	A device used to connect to the Internet and communicate on the mobile telephony network. P/N: MLSH-COM-2
Qualified professional	A professional trained by MyLight Systems on its products and who has access (login and password) to the software interfaces.
RS485	Two-wire serial communication bus. It is used to send data between devices such as meters and actuators and the Smart Master G3.
Smart Plugs	Connected plugs that measure the power of the equipment they are connected to.



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