

UWPA, UWPM



Long-range wireless gateway: endpoint adapter and master concentrator



Benefits

- **Long range communication.** Up to 10 km range in open air, 1 km in typical applications.
- **Low operating expenses.** Wireless solution (EU 868 MHz ISM band) with no SIM card or annual fees.
- **Easy and fast configuration** via free software.
- **Easy commissioning and diagnostics** thanks to the push button for communication test.
- **Security.** Embedded end-to-end AES128 encryption.
- **Reliable communication** thanks to high-performance antenna, interferences/obstacles immunity and downlink server acknowledge.
- **Compatibility.** It permits to interface a Carlo Gavazzi meter and analyser with standard third-party LoRaWAN® networks or with UWP 3.0 platform.

Description

UWPA is an endpoint adapter that provides LoRa® or LoRaWAN® communication to an RS485 Carlo Gavazzi meter. UWPM is a master concentrator that permits UWP 3.0 to gather data from multiple UWPA.

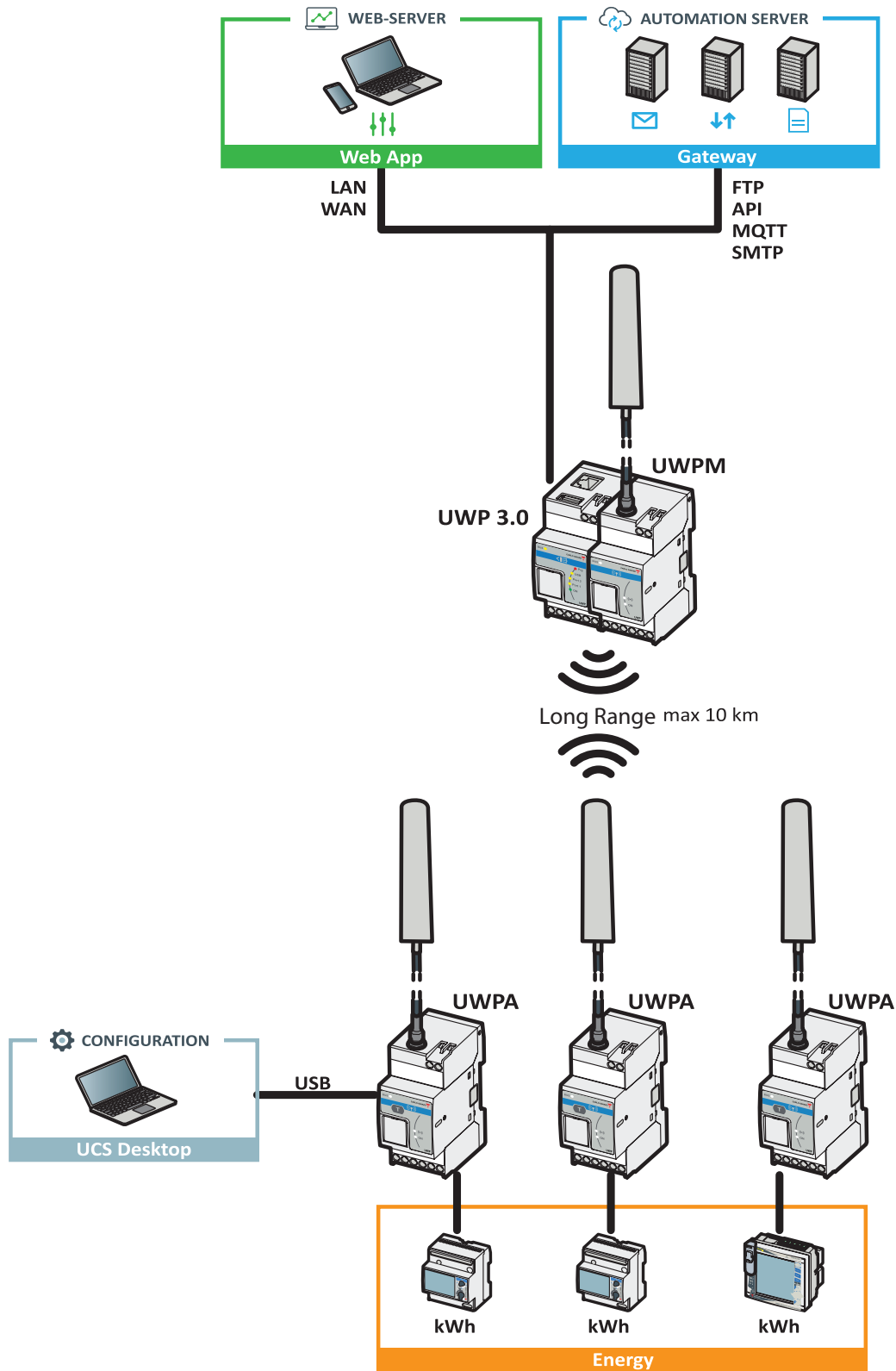
Applications

Energy efficiency monitoring and energy cost allocation, sub-metering in large buildings, big facilities, farms and city areas are the best use cases for long range wireless Carlo Gavazzi systems. Thanks to LoRa®/LoRaWAN® long communication range, security and robustness, wireless networks can be easily set-up, without high expenses due to the use of SIM cards or repeaters.

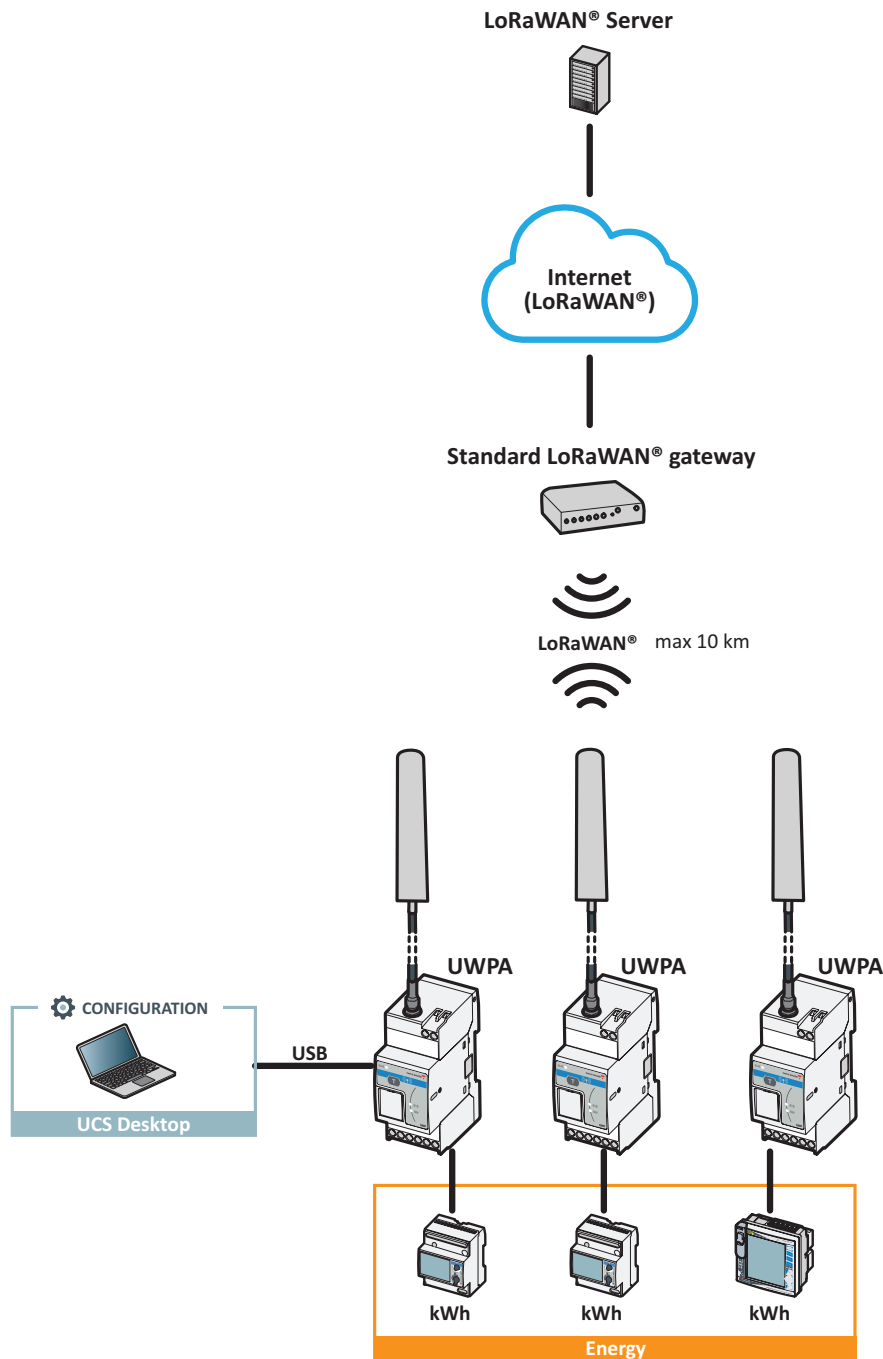
Main functions

- LoRa®/LoRaWAN® communication for a RS485 Carlo Gavazzi meter and analyser (UWPA)
- Plug'n play commissioning of a long-range wireless monitoring system based on UWP 3.0 (UWPA+UWPM)
- Integration of pulse output meters (electricity, gas and water) in combination with VMU-MC/OC.

Architecture (private UWP network)



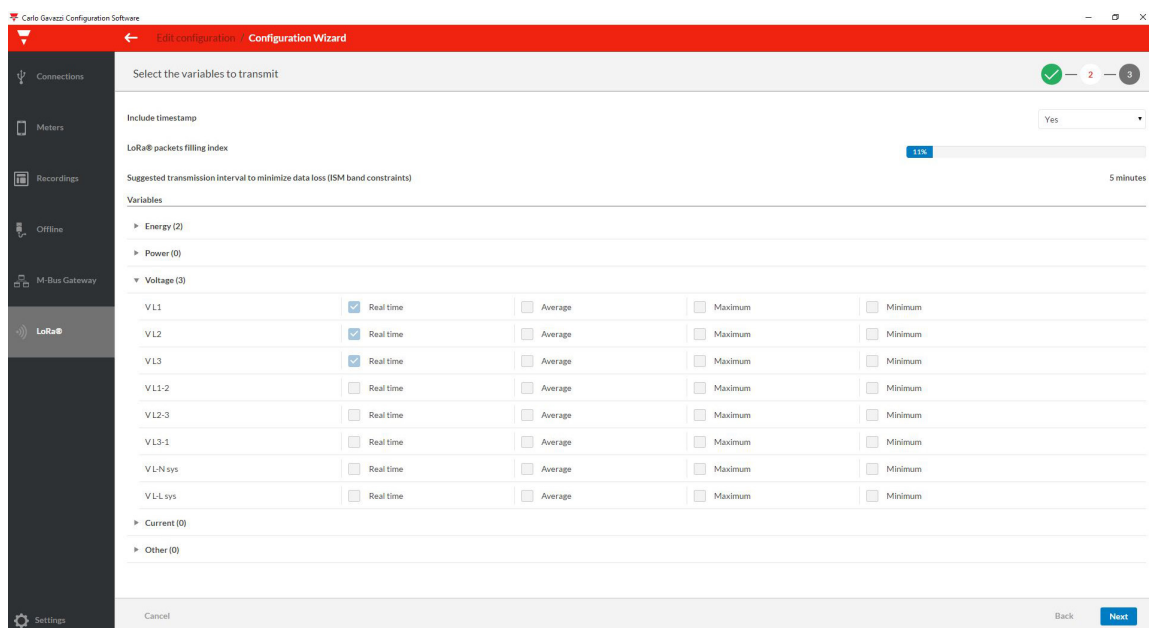
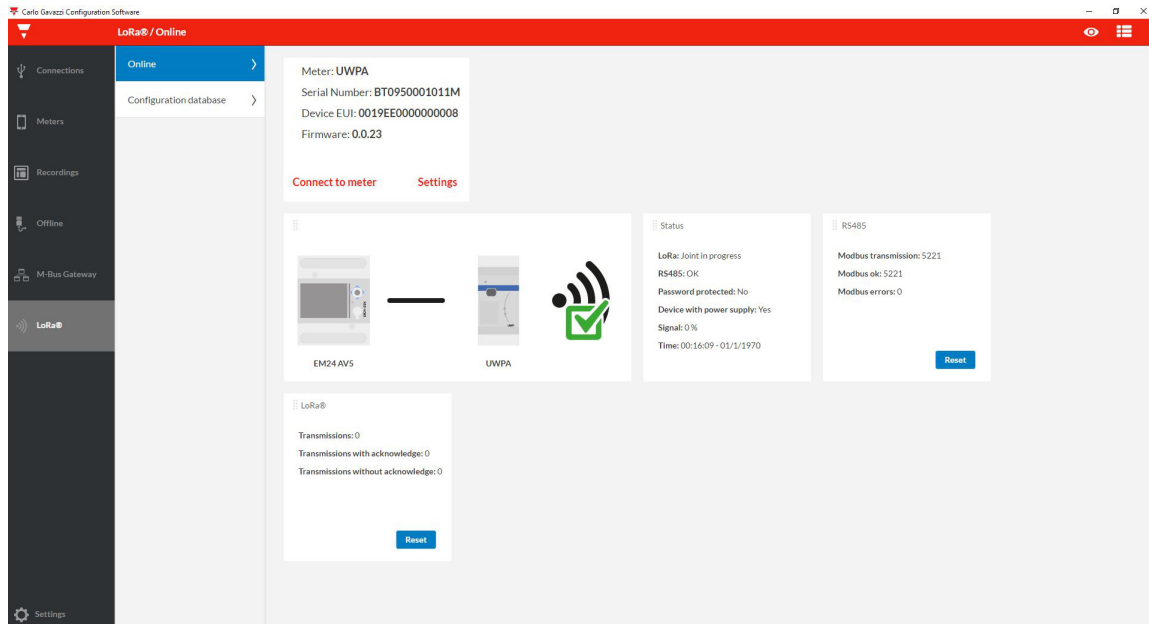
Architecture (LoRaWAN® network)



Main features

- Compatibility with generic LoRaWAN® Gateways/Servers/Networks (UWPA)
- Full ownership of data with no need to rely on any wireless/cloud operator (UWPA+UWPM)
- EU 868 MHz ISM band communication
- Up to 50 UWPA per UWPM (max. 3 UWPM per UWP 3.0)



UCS (Universal configuration software) specifications



- Free software, compatible with Windows® PCs
- Intuitive user interface
- The same software for configuring UWPA and a Carlo Gavazzi meter
- UWPA password management for protecting your LoRa@/LoRaWAN@ network
- Configurations database for helping system integrators
- Real time diagnostics and datalogging
- Export of .csv or Excel files from the configured devices list for an easy integration into LoRaWAN@ network
- Export of the configured devices file for the UWP network to import into UWP 3.0



Conformity

| | |
|-----------------------|--|
| Directives | 2014/53/EU (RED) 2011/65/EU (RoHS) 2015/865/EU (RoHS) |
| Standards | Electromagnetic compatibility (EMC) - Immunity EN61000-6-2 Electromagnetic compatibility (EMC) - Emission EN61000-6-3 EN60950-1 ETSI EN 300 220-1 ETSI EN 300 220-2 EN62479 |
| Approvals |   |
| Certifications | LoRaWAN Certified ^{CM} (only UWPA) |

UWPA



Wireless endpoint gateway



Main features

- Gateway from RS485 to LoRa®/LoRaWAN® for Carlo Gavazzi meters (one meter for each UWPA)
- USB port for easy set-up via UCS Software
- Universal power supply
- Configurable LoRaWAN® communication
- OTAA or ABP authentication
- Long communication range (10 km in open air, from 200 m to 3 km in typical applications)
- Communication interval from 5 min to 24 h
- Remote diagnostics via LoRa® RF technology communication
- LED indication of operating status

Description

UWPA is a device to be connected to a Carlo Gavazzi meter via RS485. The resulting system transmits measured data either to standard third-party LoRaWAN® systems or to the UWPM concentrator using LoRa® technology.

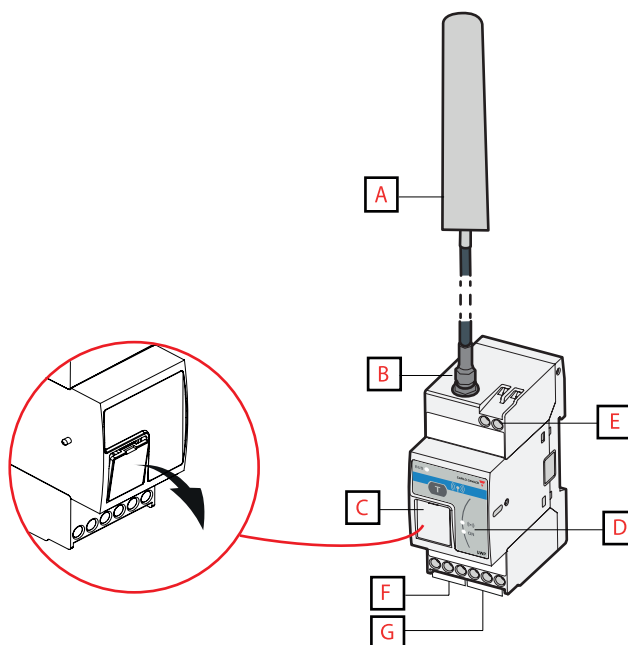
Applications

Energy efficiency monitoring and energy cost allocation, sub-metering in large buildings, big facilities, farms and city areas are the best use cases for long range wireless Carlo Gavazzi systems. Thanks to LoRa®/LoRaWAN® long communication range, security and robustness, wireless networks can be easily set-up, without high expenses due to the use of SIM cards or repeaters.

Main functions

- LoRa®/LoRaWAN® communication for RS485 Carlo Gavazzi meters and analyzers
- Plug'n play commissioning of a LoRa®-based monitoring system based on UWP 3.0 (in combination with UWPM)
- Compatibility with standard third-party LoRaWAN® Gateways/Servers/Networks
- Full ownership of data with no need to rely on any wireless/cloud operator (in combination with UWPM)
- Local diagnostics thanks to micro-USB connection and dashboard displaying the status in UCS software
- Communication test via push button


Structure



| Area | Description |
|------|--|
| A | High-performance antenna |
| B | Antenna connector |
| C | USB port |
| D | LEDs: Green: Power supply Yellow: RS485 Blue: LoRa® |
| E | Power supply connection block |
| F | Terminals for RS485 connection to meter |
| G | Terminals for RS485 termination |

Special functions

- Meter auto scan via RS485
- Powered by USB for setting up without an external power supply
- Password protected configuration
- The same software (UCS) to configure both UWPA and connected device
- Adapter firmware upgrade: user can select the firmware file and activate the firmware upgrade procedure
- Clock synchronization with server time via wireless downlink

 **LED indication**

| Colour | Status LED | Description |
|---------------|---------------|--|
| Green | ON | Power supply OK |
| | OFF | No Power supply |
| | Fast Blinking | Hardware failure |
| Yellow | ON | Communication in progress without errors |
| | OFF | Communication disabled |
| | Slow blinking | Meter auto scan in progress |
| | Fast blinking | Not valid meters or communication error |
| Blue | ON | Push button disabled to comply with ISM band restrictions on duty cycle |
| | OFF | LoRa® RF technology communication disabled or network joint successfully executed (waiting for the next communication) |
| | Slow blinking | Communication in progress |
| | Fast blinking | Network joint not executed or communication failed |

Features

General

| | |
|------------------------------------|--|
| Material | Noryl, self-extinguishing V-0 (UL 94) |
| Protection degree | Front: IP50 Terminals: IP20 |
| Terminals | Cable Section: 1.5 mm ² Torque: from 0.4 to 0.8 Nm |
| Mounting | DIN rail |
| Dimensions | 2-DIN module |
| Weight (packaging included) | 520 g |
| Antenna cable length | 2 m |
| Antenna dimensions | See picture 2 |

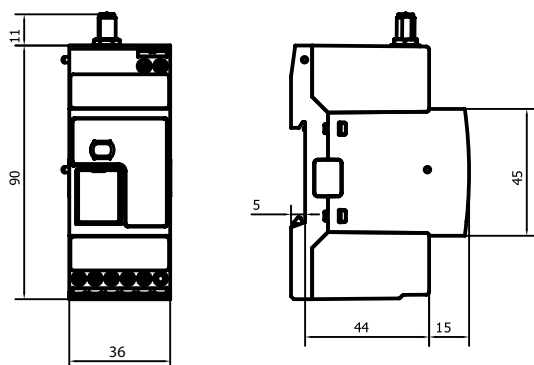


Fig. 1 UWPA dimensions

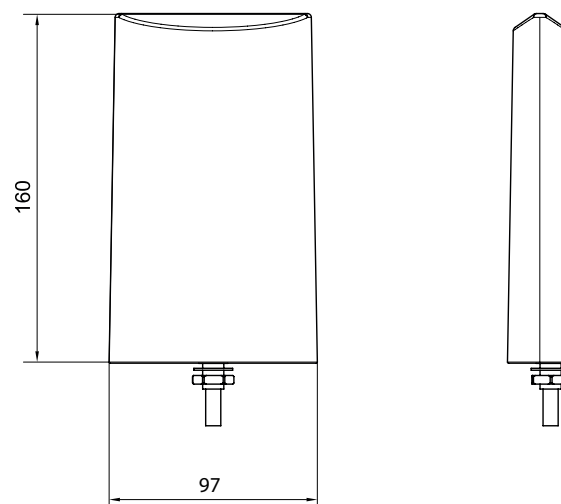


Fig. 2 High-performance antenna dimensions

Power supply

| | |
|---------------------|--|
| Power supply | 24 V dc +/-20% 115-240 V ac 50/60 Hz +/-10% |
| Consumption | DC: 1.3 W max. AC: 5.5 VA max. |
| Connector | Screw terminals |

Environmental specifications

| | |
|------------------------------|--------------|
| Operating temperature | -25° to +55° |
| Storage temperature | -30° to +70° |

NOTE: R.H. < 90% non-condensing

 **Input and output insulation**

| | Power supply | RS485 | USB |
|---------------------|---------------------|--------------|-------------|
| Power supply | - | 4 kV VRMS | 4 kV VRMS |
| RS485 | 4 kV VRMS | - | 0.5 kV VRMS |
| USB | 4 kV VRMS | 0.5 kV VRMS | - |

Communication

▶ RS485 port

| | |
|--|---|
| Communication type | Multidrop, bidirectional (static and dynamic variables) |
| Connection type | Screw terminals 3 wires |
| Protocol | Modbus RTU |
| Data | All |
| Data format | 1 start bit, 8 data bits, Parity (None/ Odd/ Even), 1 or 2 stop bit |
| Configuration parameters | Modbus address (from 1 to 247) Baud rate: 4.8 / 9.6 / 19.2 / 38.4 / 57.6 / 115.2 kbps Parity (None/ Odd/ Even) Stop bit (1 or 2) |
| Maximum number of connected devices | 1 meter x 1 UWPA |



▶ USB port

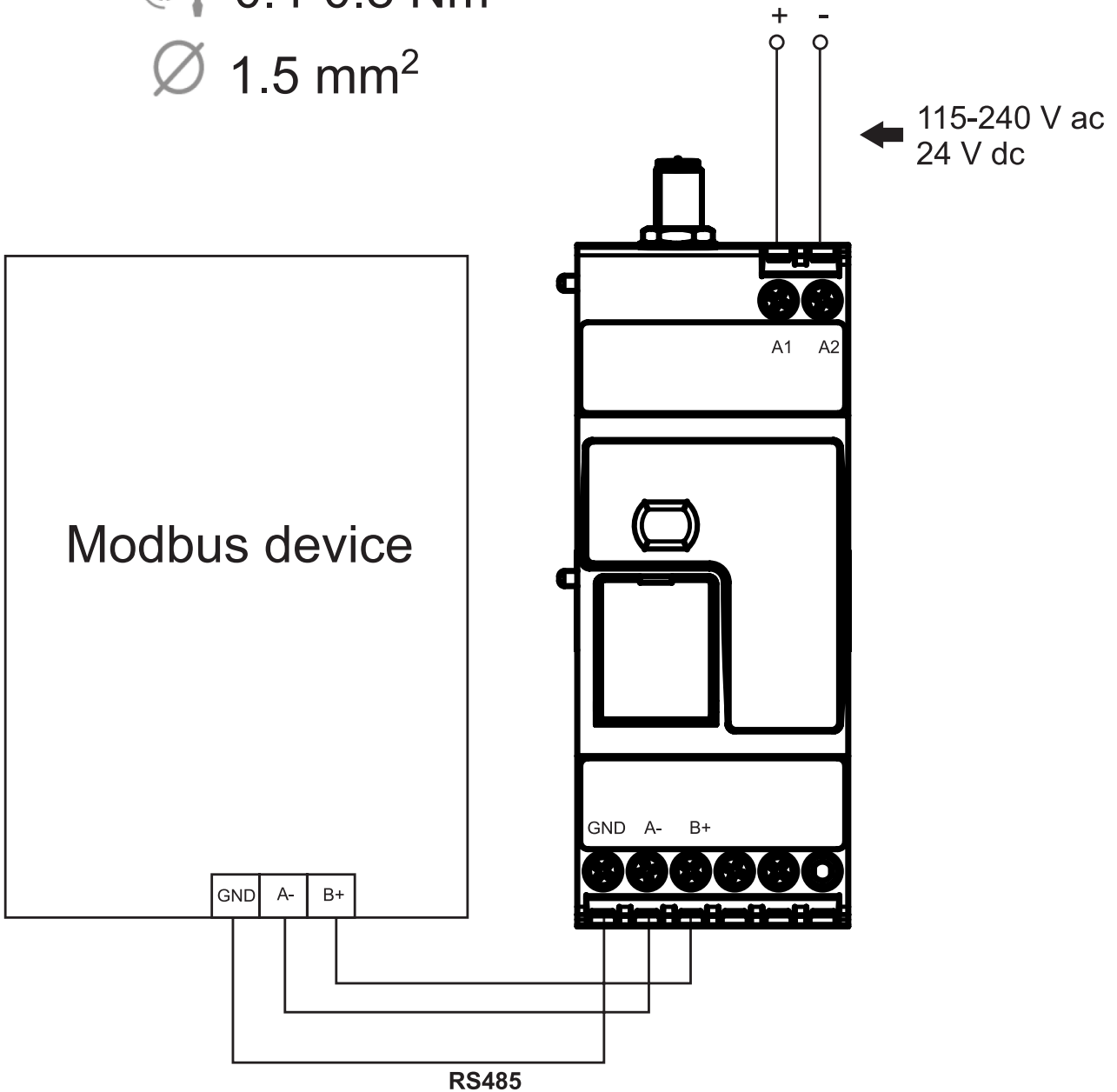
| | |
|---------------------------------|---|
| Type | USB2.0/USB3.0 |
| Connection type | Screw terminals 3 wires |
| Protocol | JBUS/Modbus compatible |
| Configuration parameters | Modbus address (from 1 to 247) Baud rate: 4.8 / 9.6 / 19.2 / 38.4 / 57.6 / 115.2 kbps Parity (None/ Odd/ Even) Stop bit (1 or 2) |

▶ LoRa® and LoRaWAN®

| | |
|---------------------------------|---|
| Protocol | LoRa® (private UWP network, in combination with UWPM) or LoRaWAN® (LoRaWAN® network) |
| Configuration parameters | Transmission interval Authentication type (ABP or OTAA) Appkey or Appskey and Nwkskey |
| Frequency | EU 868 MHz ISM band |
| Encryption | Embedded end-to-end AES128 encryption |
| Transmission interval | Configurable from 5 min to 24 h |
| Antenna | Included high performance antenna (SMA connector, cable length 2m) |
| Test function | Push button command for diagnostic or commissioning purposes |

Connection Diagrams

 0.4-0.8 Nm
 1.5 mm²



References

▶ Further reading

| Document | Where to find it |
|--------------------|--|
| White paper | www.productselection.net/Pdf/UK/UWP-A-M-Whitepaper.pdf |
| Instruction manual | www.productselection.net/MANUALS/UK/UWPA_im.pdf |

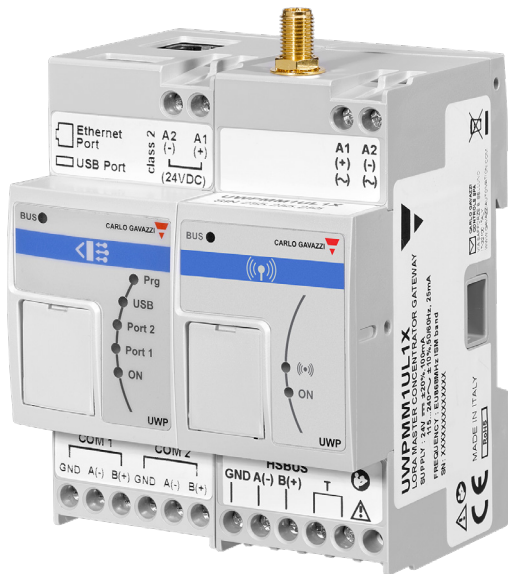
▶ CARLO GAVAZZI compatible components

| Purpose | Component name/code key | Notes |
|-------------------------|-----------------------------------|------------------------|
| Energy analyzers | EM24 (family), EM210 (family) | See relevant datasheet |
| Energy meters | EM100-300 (family) | See relevant datasheet |
| Power quality analyzers | WM20-30-40 (family), CPA (family) | See relevant datasheet |
| Power transducers | ET100-300 (family) | See relevant datasheet |
| Pulse concentrator | VMU-MC / OC | See relevant datasheet |
| Power analyzer | WM15 | See relevant datasheet |

UWPM



Master concentrator gateway



Main features

- Wireless solution with no SIM card (ISM band)
- Data concentrator for up to 50 UWPA endpoints
- Long communication range (up to 10 km in open air)
- Fast commissioning
- Robust and secure communication
- Compatible with Carlo Gavazzi UWP 3.0 platform
- High-performance antenna

Description

UWPM is a master concentrator that permits UWP 3.0 to gather data from multiple UWPA. This allows setting-up and operating a secure and robust wireless data network in the ISM band.

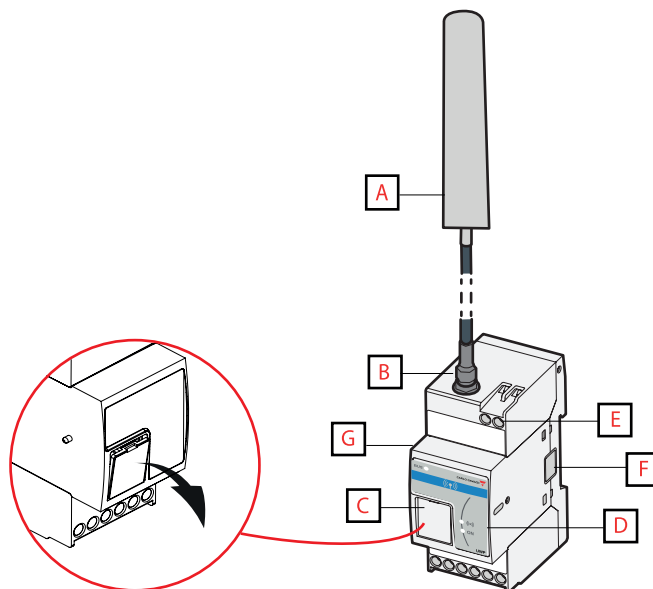
Applications

Energy efficiency monitoring and energy cost allocation, sub-metering in large buildings, big facilities, farms and city areas are the best use cases for LoRa®-based Carlo Gavazzi systems. Thanks to LoRa® long communication range, security and robustness, wireless networks can be easily set-up, without any expenses due to the use of SIM cards or repeaters.

Main functions

- Plug'n play commissioning of a wireless monitoring system based on UWP 3.0 (in combination with UWPA)
- Full ownership of data with no need to rely on any wireless/cloud operator (in combination with UWPA)

Structure



| Area | Description |
|------|--|
| A | High-performance antenna |
| B | Antenna connector |
| C | USB port |
| D | LEDs: Green: Power supply Yellow: HSBUS Blue: LoRa® |
| E | Power supply connection block |
| F | Right-side female HSBUS connector for additional modules |
| G | Left-side male HSBUS connector for UWP 3.0 |

Special functions

- Fully integrated with UWP 3.0 platform
- Data gathered by UWPM can be logged, displayed, transmitted to other systems thanks to UWP 3.0 powerful capabilities

LED indication

| Colour | Status LED | Description |
|--------|---------------|---|
| Green | ON | Power supply OK |
| | OFF | No Power supply |
| | Fast Blinking | Hardware failure |
| Yellow | ON | HSBUS communication in progress without errors |
| | OFF | HSBUS communication error |
| | Fast blinking | |
| Blue | Slow blinking | Receiving message |
| | Fast blinking | The message is not valid or has been sent by a UWPA not included into the configuration |

Features

General

| | |
|------------------------------------|--|
| Material | Noryl, self-extinguishing V-0 (UL 94) |
| Protection degree | Front: IP50 Terminals: IP20 |
| Terminals | Cable Section: 1.5 mm ² Torque: from 0.4 to 0.8 Nm |
| Mounting | DIN rail |
| Dimensions | 2-DIN module |
| Weight (packaging included) | 520 g |
| Antenna cable length | 2 m |
| Antenna dimensions | See picture 2 |

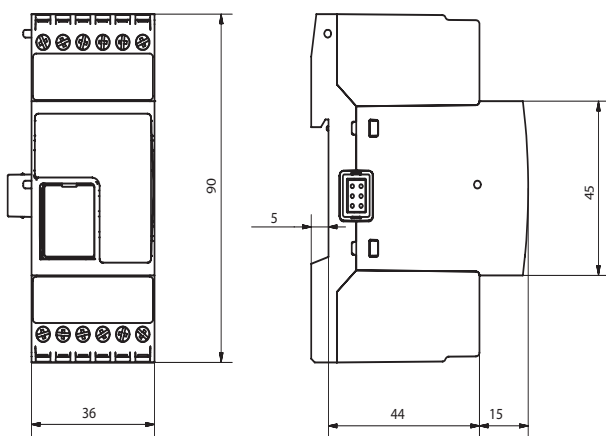


Fig. 3 UWPM dimensions

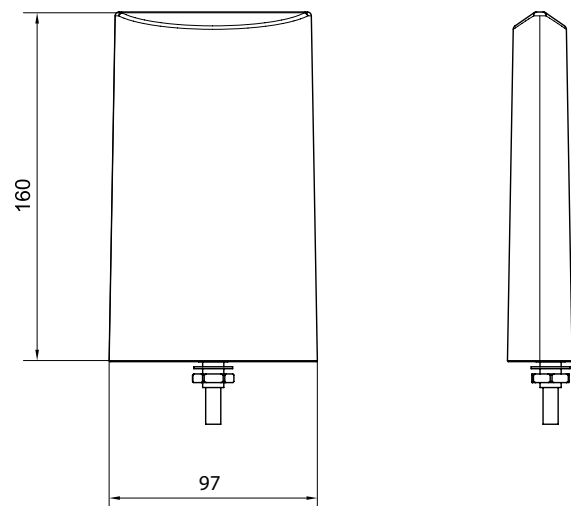


Fig. 4 High-performance antenna dimensions

Power supply

| | |
|---------------------|--|
| Power supply | 24 V dc +/-20% 115-240 V ac 50/60 Hz +/-10% |
| Consumption | DC: 1.3 W max. AC: 5.5 VA max. |
| Connector | Screw terminals |

Environmental specifications

| | |
|------------------------------|--------------|
| Operating temperature | -25° to +55° |
| Storage temperature | -30° to +70° |

NOTE: R.H. < 90% non-condensing

Communication

▶ Long-range wireless

| | |
|---------------------------------|--|
| Protocol | LoRa® (private UWP network, in combination with UWPA) |
| Configuration parameters | Managed UWPA devices and variables by means of UCS file import |
| Frequency | EU 868 MHz ISM band |
| Encryption | Embedded end-to-end AES128 encryption |
| Antenna | Included high performance antenna (SMA connector, cable length 2m) |
| Diagnostics | Signal strength UWPA status |
| UWPA number | Maximum: 50 UWPA per UWPM. The number may change according to the transmission interval and the interferences. |

▶ HSBUS

| | |
|-------------------------|---|
| Bus type | RS485 high speed bus |
| Protocol | Internal proprietary protocol |
| Number of slaves | Max. 3 per UWP 3.0 |
| Connection type | By local bus (left and right connectors) or terminals GND, A(-), B(+) T1, T2: terminalization inputs |



UWPA per UWPM and transmission parameters

1 package (max. 8 variables*)

| Transmission interval | Maximum number of UWPA per UWPM | UCS parameters | |
|-----------------------|---------------------------------|------------------|-------|
| | | Spreading factor | Retry |
| 5 min | 10 | SF11 | 1 |
| 10 min | 10 | SF12 | 1 |
| | 50 | SF11 | 2 |
| 15 min | 50 | SF12 | 2 |

2 packages (max. 16 variables*)

| Transmission interval | Maximum number of UWPA per UWPM | UCS parameters | |
|-----------------------|---------------------------------|------------------|-------|
| | | Spreading factor | Retry |
| 10 | 10 | SF11 | 1 |
| 15 | 10 | SF12 | 1 |
| 30 min | 10 | SF12 | 1 |
| | 50 | SF11 | 2 |
| 1 h | 50 | SF12 | 2 |

3 packages (max. 24 variables*)

| Transmission interval | Maximum number of UWPA per UWPM | UCS parameters | |
|-----------------------|---------------------------------|------------------|-------|
| | | Spreading factor | Retry |
| 15 min | 10 | SF11 | 1 |
| 30 min | 10 | SF12 | 1 |
| 1 h | 50 | SF12 | 2 |

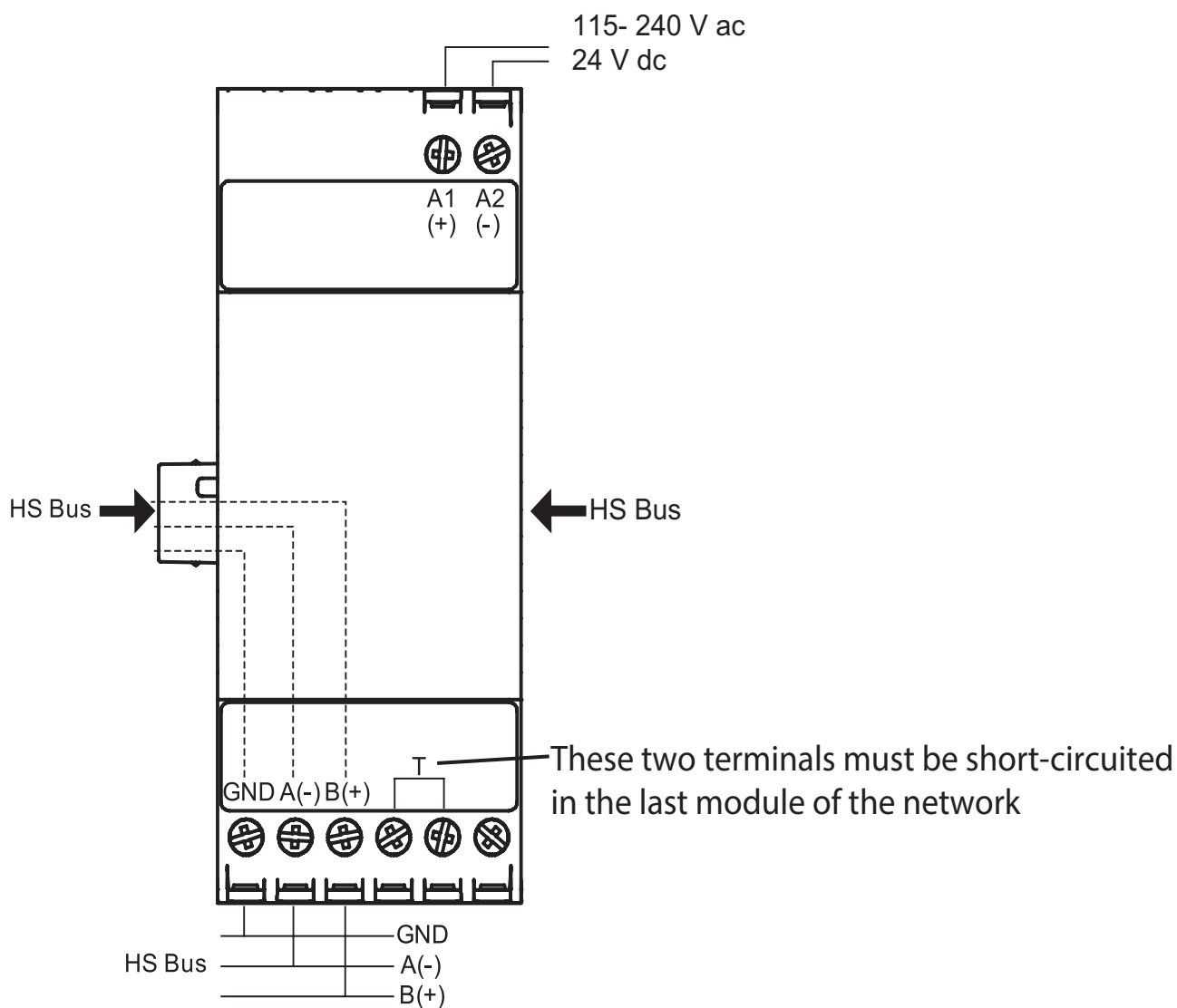
**The maximum number of variables for each package depends on their format. The indicated value refers to the real time variables (such as voltage, current, power); with hour counter variables (such as energy) that value has to be halved.*

Note: The SF11 spreading factor, unlike the SF12, reduces the distance and the resilience to interferences of the signal. This reduction is more evident with spreading factors inferior to SF11.

Frequencies

| Name | Type | Channel (MHz) | Bandwidth (MHz) | Band | Band duty cycle (%) |
|------|--------|---------------|-----------------|------|---------------------|
| FA | Base | 868.100 | 125 | M-B1 | 1 |
| FB | Base | 868.300 | 125 | M-B1 | 1 |
| FC | Base | 868.500 | 125 | M-B1 | 1 |
| F1 | Custom | 869.900 | 125 | R-B4 | 1 |
| F2 | Custom | 867.100 | 125 | L-B0 | 1 |
| F3 | Custom | 867.300 | 125 | L-B0 | 1 |
| F4 | Custom | 867.500 | 125 | L-B0 | 1 |

Connection Diagrams



References

Further reading

| Document | Where to find it |
|--------------------|--|
| White paper | www.productselection.net/Pdf/UK/UWP-A-M-Whitepaper.pdf |
| Instruction manual | www.productselection.net/MANUALS/UK/UWPM_im.pdf |

CARLO GAVAZZI compatible components

| Purpose | Component name/code key | Notes |
|---------------------------|-------------------------|------------------------|
| Universal web platform | UWP 3.0 | See relevant datasheet |
| Wireless endpoint gateway | UWPA | See relevant datasheet |

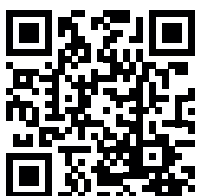
How to order

UWPA

| Code | Description |
|---------------------|---------------------------|
| UWPAM1US1L1X | Wireless endpoint gateway |

UWPM

| Code | Description |
|------------------|-----------------------------|
| UWPM1UL1X | Master concentrator gateway |



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