UWP 3.0

Universal web platform

Microsoft Azure Certified

powered by aws

Description

UWP 3.0 is a monitoring gateway and controller that allows the monitoring and controlling of installations where Energy Efficiency Management, Building Automation and Car Park Guidance functions are needed.
The system monitors and controls connected devices via its local bus management functions; it includes a web server with a powerful and intuitive user interface to display customised dashboards and interact with local devices and remote systems; the UWP 3.0 embedded automation server allows data to be exchanged locally or remotely via standard Internet protocols.
UWP 3.0 can manage the complete lighting control system based on DALI actuators and it can operate as a BACnet/IP gateway.

Benefits

- **Flexibility**. UWP 3.0 is the core of a powerful system which includes a complete range of meters, sensors and actuators
- **Integration**. UWP 3.0 includes all the necessary software tools to set up and operate the required solution. No subscriptions or additional services are required
- **Interoperability**. By leveraging its automation-server functions, it is easy to exchange data with other systems via FTP, SFTP, FTPS, SMTP, Rest-API, MQTT, Modbus and BACnet
- **Scalability**. It is easy to scale up the system, by leveraging its comprehensive set of monitoring, controlling and communication functions
- **Fast installation and set up.** Each function can be programmed with ease by means of the free configuration tool
- **Reliability**. The system is secure against cyber-attacks and computer viruses. It is the ideal Edge unit for providing local control and data redundancy to distributed applications
- **High storage capability.** Thanks to its 4GB of Storage memory, UWP 3.0 can store complex configurations and log history and events
- **IoT Ready**. UWP 3.0 is Microsoft Azure Certified for IoT
- **Powered by AWS**. UWP 3.0 is compatible with Amazon AWS IoT.
- **Awareness**. By means of scheduled reports and email/SMS alerts, users are constantly advised about installation status
- **Compact Size**. All of the above is available in a 2 DIN module

Applications

UWP 3.0 is suitable for applications in Building Automation, Energy Efficiency Performance Management, Car Parking Guidance and all their combinations are suitable application for UWP 3.0. Its comprehensive set of functions, small dimensions and reliability are the key factors for depending on UWP 3.0 as the local monitoring/controlling unit in a wider distributed scenario.

Main functions

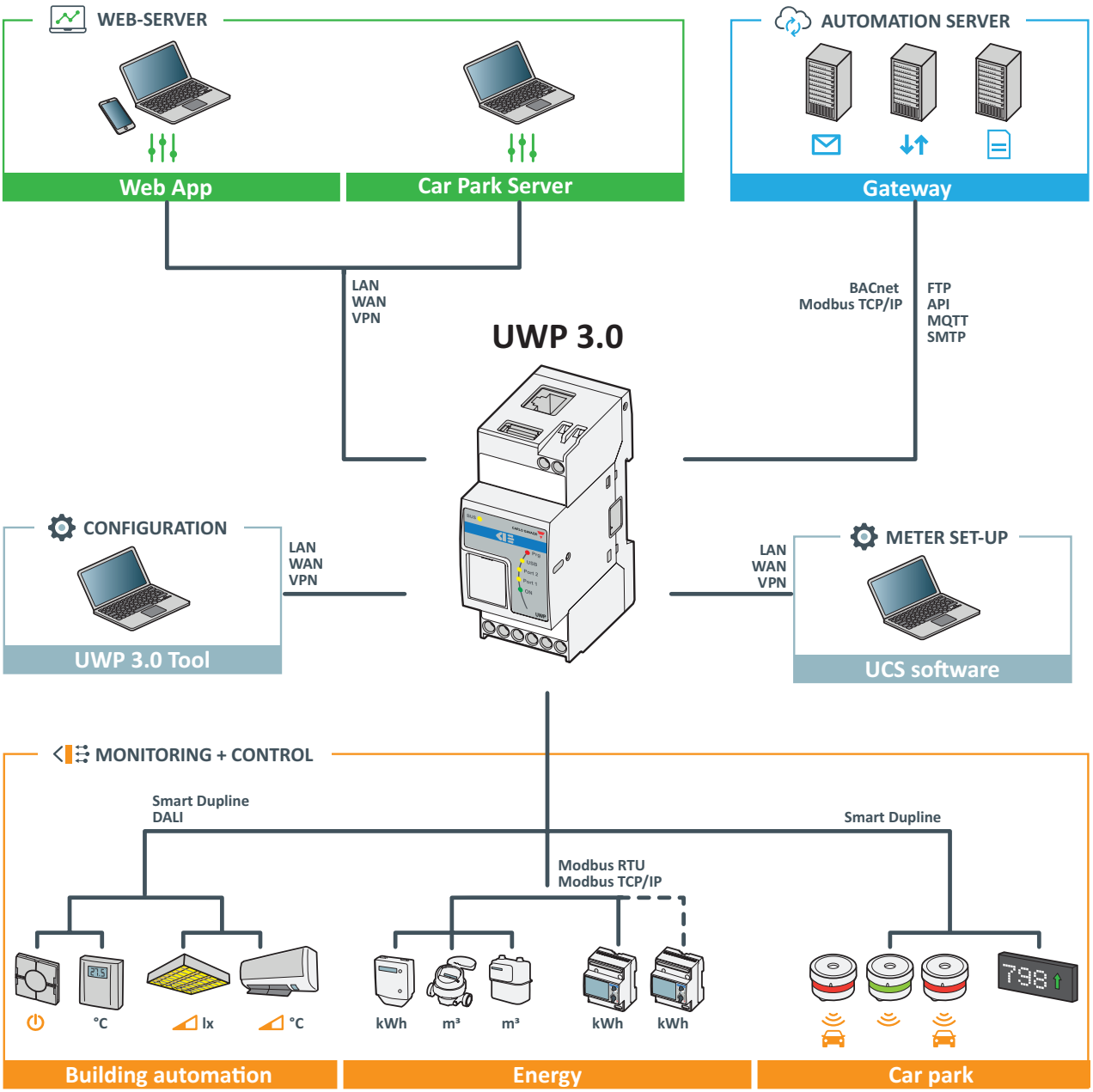
- Monitoring energy control systems so as to check energy efficiency status and improvements.
- Recording, displaying and transmitting information (events and history)
- Defining logical functions, reacting to abnormal conditions and control actuators
- Setting up and operating Building Automation functions
- Setting up and operating Lighting Control functions and DALI
- Setting up and operating Car Parking Guidance systems

Main features

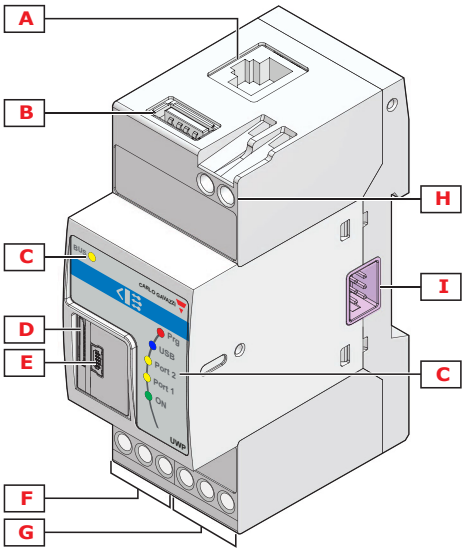
- Up to 5000 managed signals (including variables, I/Os) shared among Energy Management, Building Automation and Car Park applications*.
- Up to 128 Modbus devices connected to RS485 ports (64 devices each port).
- Up to 5 users concurrently connected to the Web-App.
- Up to 5 concurrent M2M connections (API connections, BACnet clients, Modbus masters).
- Up to 150 different products from the Carlo Gavazzi range can be connected to UWP 3.0
- BTL certified (max 500 BACnet points for used BACnet objects).

**Note: when the Car Park system is active, there will be 2000 signals available for the other applications (Energy Management and Building Automation).*

Architecture



Structure

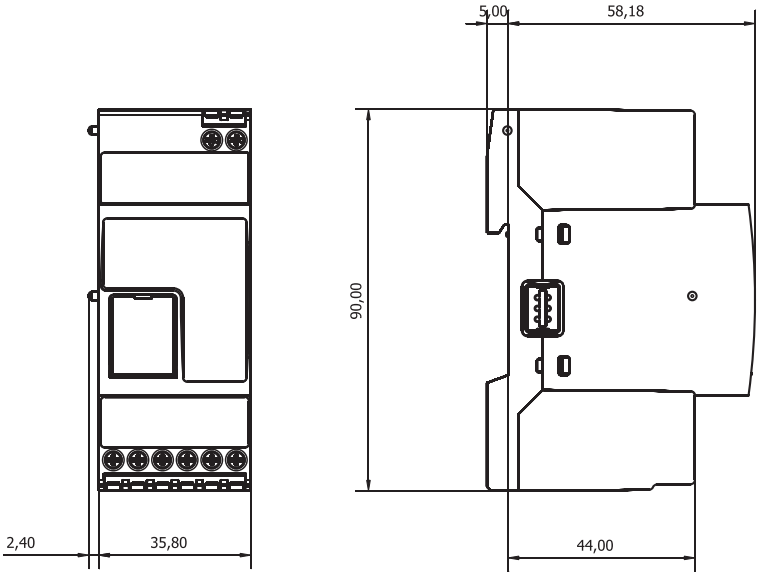


Area	Description
A	Ethernet port
B	USB port (host function)
C	Indication LEDs:
	Green (ON) ON - Power ON OFF - Power OFF
	Yellow (BUS) ON - Communication ON on the HS-bus OFF - No communication is present on the HS-bus Flashing - Communication error on the HS-bus
	Yellow (Port 1) OFF - Communication disabled Flashing 200 ms ON, 600 ms OFF - No communications on RS485 COM1 Flashing 200 ms ON, 200 ms OFF - Communications OK
	Yellow (Port 2) OFF - Communication disabled Flashing 200 ms ON, 600 ms OFF - No communications on RS485 COM2 Flashing 200 ms ON, 200 ms OFF - Communications OK
	Blue (USB) ON - USB device is present OFF - No USB device is present
	Red (Prg) ON - No configuration is present OFF - Configuration present in the UWP Flashing - UWP is connected to the UWP 3.0 Tool
D	Micro SD memory card slot
E	Mini-USB port (Device function)
F	RS485 COM1 port terminals
G	RS485 COM2 port terminals
H	Power supply connection block
I	Local bus ports (left side and right side)

Features

General

Material	Noryl, self-extinguishing V-0 (UL94)
Dimensions	2-DIN module
Weight	150 g
Protection degree	Front: IP40; Screw terminals: IP20
Dielectric strength	4000 VAC RMS for 1 minute
Rejection (CMRR)	>65 dB, from 45 to 65 Hz
Terminals	8 terminals, screw-type; Section: 1.5 mm² maximum; Torque: from 0.4 to 0.8 Nm



Environmental

Operating temperature	-20° to +50°C (-4° to 122°F)
Storage temperature	-30° to +70°C (-22° to +158°F)
Humidity (non-condensing)	20 to 90% RH

Power Supply

Power supply	15-28 V dc
Consumption	≤ 5 W
Battery	1 Metal-ion non-replaceable battery; 0.04 g

Note: The device contains metal-ion batteries. For the sending, you must comply with the relevant packaging and labelling regulation.

Inputs/outputs insulation

Type of input/ output	DC power supply	RS485 COM1	RS485 COM2	Ethernet	USB port "H"	USB port "D"	SH2UMMF124 and SH2DSP24
DC power supply	-	2 kV	2 kV	0.5 kV	0 kV	0 kV	0 kV
RS485 COM1	2 kV	-	0.5 kV	2 kV	2 kV	2 kV	2 kV
RS485 COM2	2 kV	0.5 kV	-	2 kV	2 kV	2 kV	2 kV
Ethernet	0.5 kV	2 kV	2 kV	-	0.5 kV	0.5 kV	0.5 kV
USB port "H"	0 kV	2 kV	2 kV	0.5 kV	-	0 kV	0 kV
USB port "D"	0 kV	2 kV	2 kV	0.5 kV	0 kV	-	0 kV
SH2DSP24	0 kV	2 kV	2 kV	0.5 kV	0 kV	0 kV	-

- **0kV**: inputs / outputs are not insulated.
- **2kVrms**: EN61010-1, IEC60664-1 - over-voltage category III, pollution degree 2, double insulation on systems with max. 300Vrms to ground.
- **0.5kVrms**: the insulation is functional type Mounting.

Compatibility and conformity

Standards	Electromagnetic compatibility (EMC) - immunity: EN61000-6-2
	Electromagnetic compatibility (EMC) - emissions: EN61000-6-3
	Safety: EN60950
Directives	EMC 2014/30/EU LVD 2014/35/EU RoHS 2011/65/EU
Approvals	

Ports

Ethernet

Standard	ISO9847
LAN Configuration	Static or DHCP IP Address; Net Mask; Default Gateway, DNS (primary, secondary)
DYNDNS	dyndns.it, dyndns.org, freedns.afraid.com, zoneedit.com, no-ip.com, easydns.com, 3322.org, sitelution.com, dnsoimatic.com, tunnelbroker.net, tzo.com, dhis.com
Protocols	HTTP, HTTPS, FTP, FTPS, SFTP, Modbus TCP/IP, DP (Data Push), SMTP, NTP, Azure IoT Hub, Modbus Gateway TCP/RTU, BACnet IP
Client connections	WEB server: Port: 80; 5 connections TOOL: 1 connection Modbus TCP/IP: 5 connections
Connection type	RJ45 connector (10 Base-T, 100 Base-TX); maximum distance: 100m

RS485

Number of ports	2
Function	COM1: Master or slave (gateway function) COM2: Master
Number of slaves	COM1: up to 64 COM2: up to 64
Connections	2-wire. Max. distance 600 m
Protocol	Modbus RTU
Data format	Selectable: 1 start bit, 7/8 data bit, no/odd/even/ parity, 1/2 stop bit
Baud-rate	Selectable: from 110 to 256000 bits/s
Driver input capability	1/8 unit load Up to 256 nodes on a network

USB

Type	Hi-speed 2.0 Type-A
Mode	Host
Communication speed	60MB/s
Function	Backup for disaster recovery
Supported Device Type	USB mass storage: direct connection to UWP 3.0 USB modem/router: via additional module SH2DSP24
Supported File System	ext4
Note	Disabled automatically when SH2DSP24 is connected

Mini-USB

Type	Hi-speed 2.0 mini-B
Mode	Device
Speed	60 MB/s
Function	RNDIS (Virtual Ethernet) Network Access via IP: 192.168.254.254

Micro SD slot

Type	Industrial (from -25 to +85 °C / -13 to + 185 °F)
Capacity	SD and SDHC Up to 32 GB
Function	Backup for disaster recovery
Supported File System	ext4

HS Bus

Bus type	RS485 high speed bus
Function	Connection to master channel generator modules (SH2MCG24, SH2WBU230x, SH2DUG24 and SBP2MCG324)
Number of slaves	Maximum 7
Connection	By local bus on the right hand side Note: All the SH2MCG24, SH2WBU230x, SH2DUG24 and SBP2MCG324 modules have to be connected on the right hand side of the SH2WEB24.
Termination	Always required on the last module
Max distance	600 m

TCP/IP Ports

Inbound communication

Port number	Description	Purpose
80	HTTP	Access to the internal web-server, API functions
443	HTTPS	Access to the internal web-server, API functions
52325	SSH	Remote service (reserved to support personnel)
10000	UWP 3.0	Configuration and maintenance (UWP 3.0 Tool)
10001	UWP 3.0	Configuration and maintenance (UWP 3.0 Tool)
10002	UWP 3.0	Configuration and maintenance (UWP 3.0 Tool)
52326	UWP 3.0	Reserved for communication between UWP 3.0 and UWP 3.0 Software Tool

Outbound communication

Port number	Description	Purpose
53	DNS	Domain name resolution
123	NTP	Network time services access
21	FTP	Data upload to FTP server
25	SMTP	Email message dispatching
80	HTTP	DP (data push communication)

UCS bridge

Mode	Port	Description
Secure	443	For the HTTPS connection for bridge opening.
Insecure	503*	Through any TCP Modbus client. **Note: This port is the default one. Users can change it from the web-app relevant page.*

Modbus TCP/IP

Function	TCP Port	Purpose
Modbus TCP/IP Slave	502 (selectable)	Modbus TCP data communication
Modbus bridge TCP/RTU	503 (selectable)	Bridge function for accessing (read and write) RTU meter connected to the UWP RTU ports

Data management

Multi-BUS communication	INPUT from: Modbus RTU, Modbus TCP/IP, Dupline OUTPUT to: Modbus RTU, Modbus TCP/IP, BACnet, Dupline, DALI
Embedded Database	Embedded database for storing system configuration, variables, events Flexible data model based on signals definition and functions creation
Automation server	Automation server for exchanging data with other systems via: FTP, SFTP, FTPS, Rest-API, SMTP, MQTT

**Note: Data stored on the internal UWP 3.0 database (including logged data points, events and configuration parameters) are preserved in the case of system shutdown. UWP 3.0 storage memory size is 4.0 GB (including all the logged data points, events and configuration parameters).*

Functions

Local monitoring and control

Connectable devices	Carlo Gavazzi Meters Smart Dupline sensors and actuators BACnet masters Modbus RTU, Modbus TCP/IP slaves (any Modbus slave can be integrated thanks to the Free Modbus Editor tool)
Monitoring functions	Logging of variables and events Average, Maximum, Minimum calculation Creation of triggers based on events
User Interface functions	Responsive web interface Customised dashboards Charting tools for displaying and analysing history data Cost centres base navigation tree Energy Summary display Dedicated widgets for monitoring control functions
Automation Server functions	M2M communication via: Rest-API, FTP, SFTP, FTPS, MQTT, SMTP, Modbus TCP/IP, BACnet Email or SMS alerts Multi-site data aggregation via Em²-Server Microsoft Azure certified for IoT
Reporting	Online or scheduled reports in XLSX, XML, CSV format XLSX report templates with free variable selection

Local control

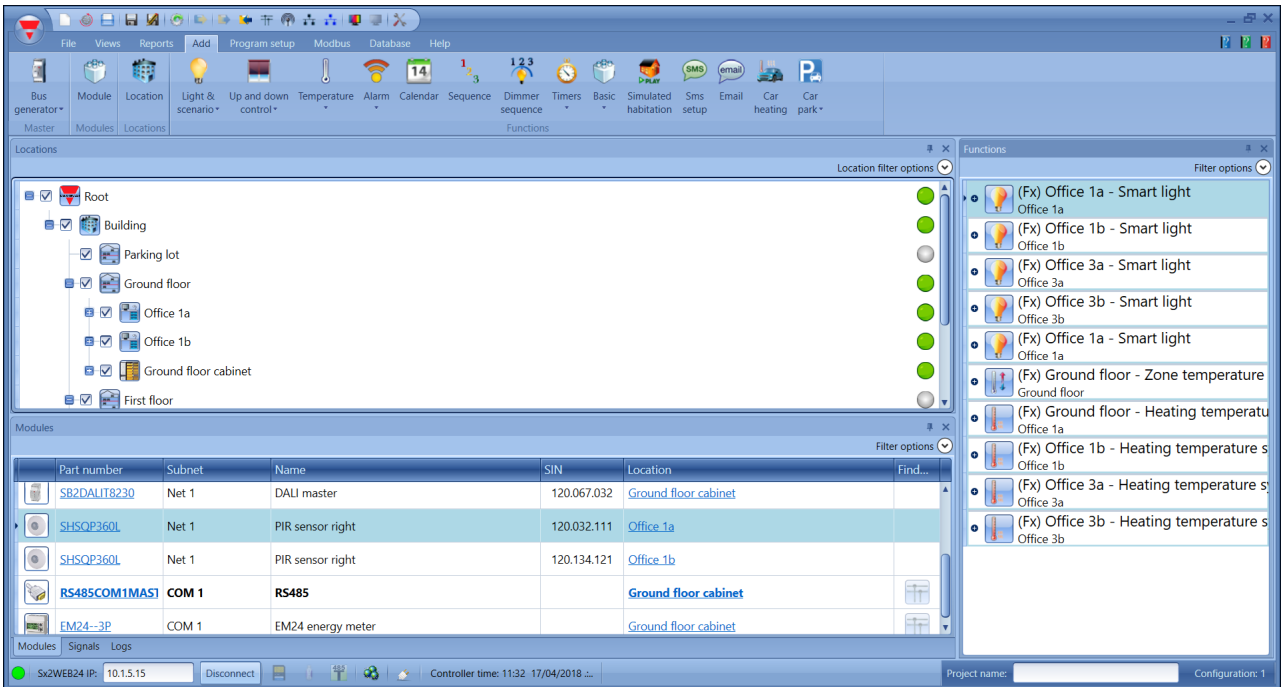
Connectable devices	Carlo Gavazzi Meters Smart Dupline sensors and actuators Modbus RTU, Modbus TCP/IP slaves and DALI ballasts
Control functions	ON/OFF switching Standard Light Control functions, including DALI and dimming Advanced Light Control, including Tunable White Control and Constant Light Temperature control Roller Blind control BMS integration via Modbus TCP/IP and BACnet Logic functions, timers, analog comparators Calendar scheduler Math function Analogue (0-10 V) Output Smoke, Water, Intruder alarms Astronomical clock Hour counter Commands over Modbus Modbus driver writing/reading functions for any Modbus device
User Interface functions	Responsive web interface Customised dashboards Dedicated widgets for monitoring control functions and events
Automation Server functions	Integration into BMS systems via BACnet and Modbus TCP/IP Email or SMS alerts
Reporting	Online or scheduled reports in XLSX, XML CSV format for events

Car parking guidance

Connectable devices	Carlo Gavazzi Car Park sensors and actuators
Control functions	Car Park Guidance
User Interface functions	Responsive web interface Real time Car Park zones/bays mapping Analysis of historical occupation Commands and indicators display
Automation Server functions	Scalability via Carlo Gavazzi CPY system

Software and interfaces
UWP 3.0 Tool

UWP 3.0 Tool is the UWP 3.0 configuration software. It allows the user to:
- carry out the system commissioning
- define the automation and control logics
- set the measuring instruments and sensors monitoring.



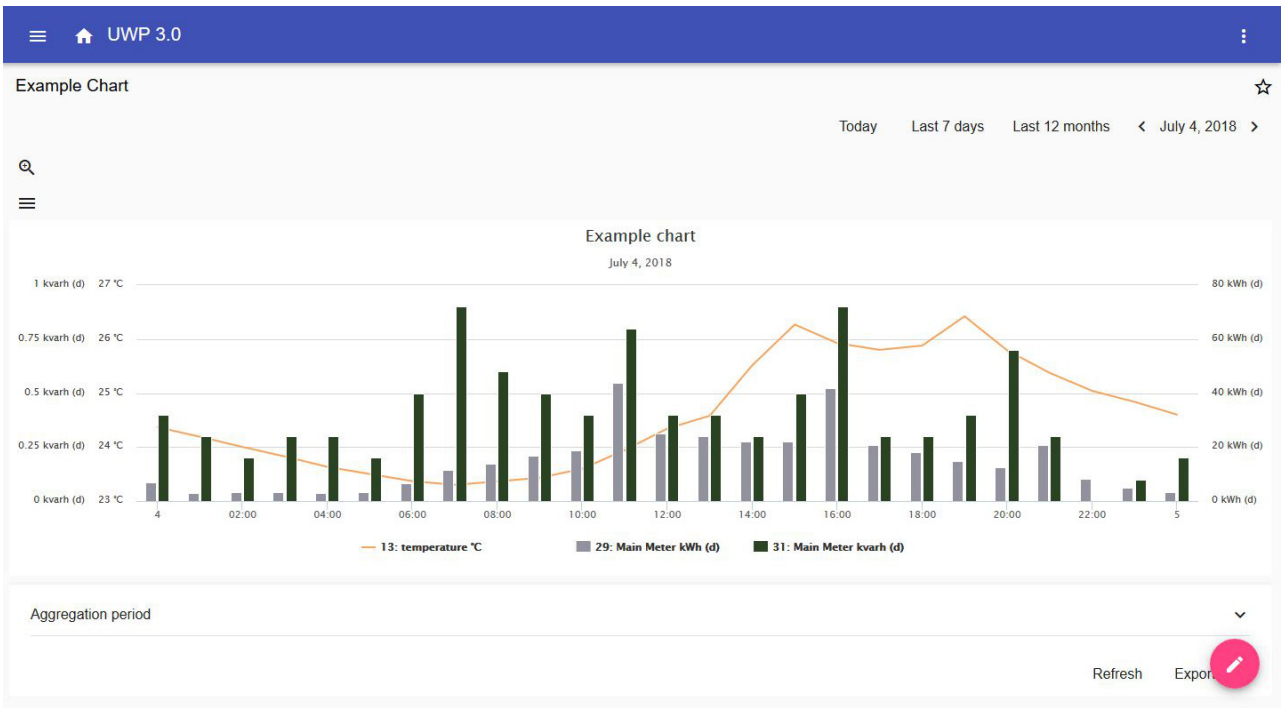
Main functions

- Configuring interfaces and communication protocols
- Executing the Dupline modules automatic scan for fast commissioning
- Configuring and manage the connected modules
- Defining the control and automation functions
- To generate a driver to monitor third party Modbus devices
- To set the data and events collection and storage from Carlo Gavazzi or third party instruments
- To configure the Carlo Gavazzi Car Park system
- To setup the Carpark devices (sensors, indicators, displays)
- To develop Modbus drivers for UWP 3.0 with both reading and writing functions for any Modbus device
- To save a configuration offline for backup or any subsequent use
- Disaster recovery via scheduled or on-demand triggers

UWP 3.0 Web App

The UWP 3.0 Web App is the UWP 3.0 Web Interface, accessible through Web browsers from mobile or desktop devices. Through widgets contained in predefined and customised dashboards, it allows the user to:

- view and export collected data
- control the automation functions
- define specific settings (User Interface and Server Automation).



Main functions

- To view collected data as real time values or charts
- To generate data and events reports
- To manage and adjust the functions parameters (e.g. modify temperature set points)
- To send commands (e.g. switching on/off or select scenarios)
- To configure Data Push Services to FTP/SFTP/FTPS servers or Em²-Server (Carlo Gavazzi)
- To configure MQTT link to IoT Hubs (Amazon AWS and Microsoft Azure)
- To learn the main tasks by using the embedded tutorial

Car Park Server

The Car Park solution includes the setup of the system and the monitoring of the installation.
It allows the user to:

- define the configuration of the user interface
- view and export statistics for the car park occupancy.

Main functions

- To collect data from ultrasonic sensors
- To elaborate statistics: real time and historical occupation data from groups of sensors or single bays
- To command displays and indicators
- To represent data using with real time maps on the built-in car park web server
- To set the zone counter function for rooftop car park control or complete indoor/outdoor monitoring.

Note: The Car Park and the Data Push (to Em²-Server and IoT Hubs) functions can not be used concurrently.

Cybersecurity

Introduction

Cybersecurity is the practice of protecting systems, networks, and programs from digital attacks. These cyberattacks are usually aimed at:

- accessing, changing, or destroying sensitive information;
- extorting money from users;
- interrupting normal business processes.

Implementing effective cybersecurity measures is particularly challenging today because there are more devices than people, and attackers are becoming more innovative.

Pillars

- **Disaster recovery**. UWP 3.0 includes a solid disaster recovery system for saving and restore both configuration and history data on USB stick, SD card, SFTP server.
- **Easy upgrade function**. UWP 3.0 Tool and Web-APP notify users about the availability of a new software and firmware version; the whole upgrade process is managed by the UWP 3.0 Tool.
- **UWP secure bridge function.** It permits you to establish a secure connection through LAN or Internet network between the UCS software and Carlo Gavazzi Modbus meters connected to UWP 3.0 via RS485 or LAN network. This way, you can perform the following tasks remotely:
  - configure a wired device via UCS without disconnecting UWP 3.0;
  - check the proper functioning of the devices, the real time measures, the status of alarms and the inputs/outputs
  - modify or correct the configuration parameters, in case of measures anomalies or of project structure changes.

  Note: This function will be available from September 2020.
- **Minimalist approach**: UWP 3.0 has been designed to include only the necessary sub-systems into a highly optimized linux core, so to avoid unnecessay risks due to attacks to unmonitored services.

For further information, refer to the following whitepaper: ***"Security in energy monitoring and building automation applications based on the UWP 3.0 ecosystem".***

Connection Diagrams

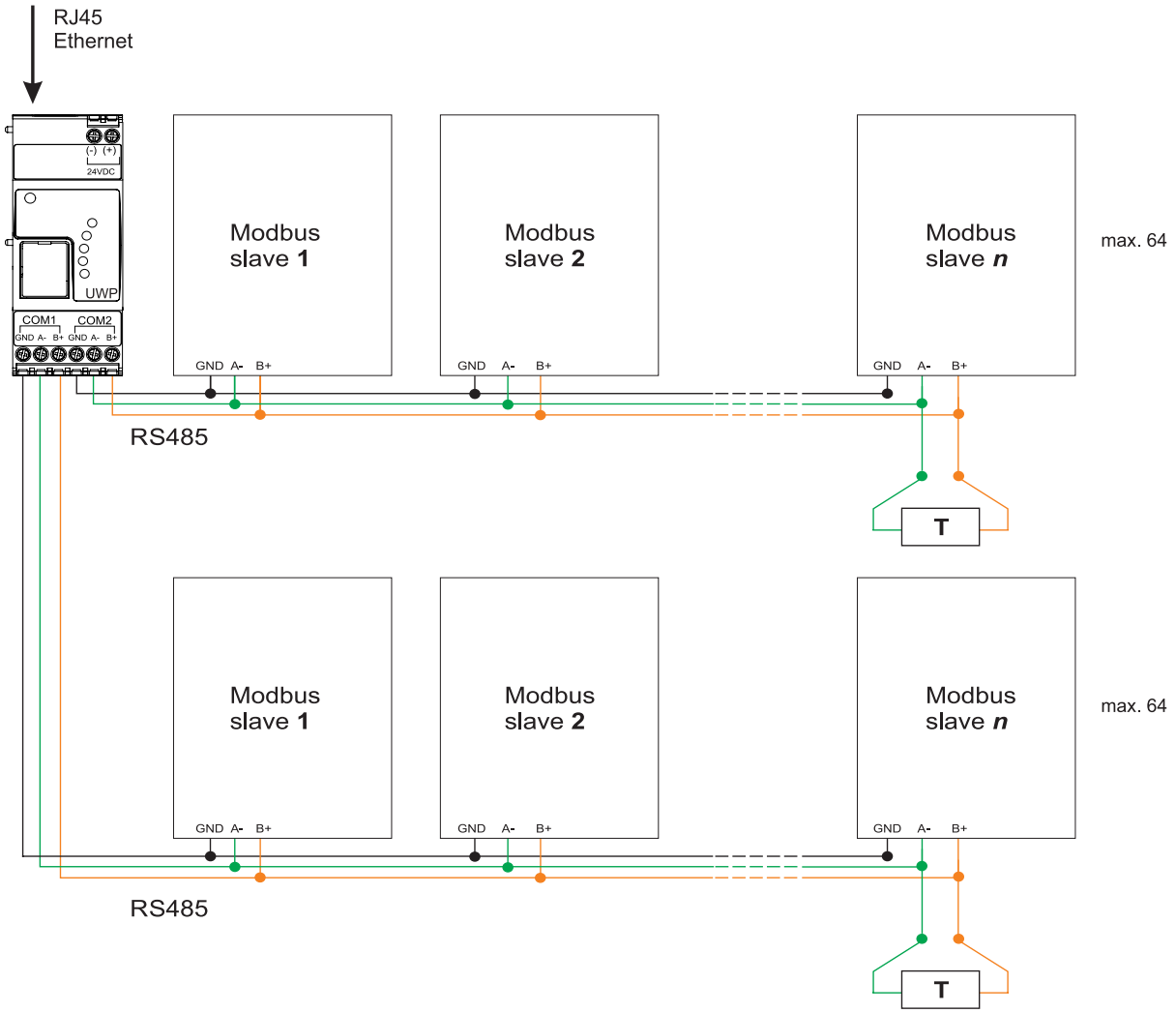


Fig. 1 *Modbus RTU connection. COM 1 master, COM 2 master*

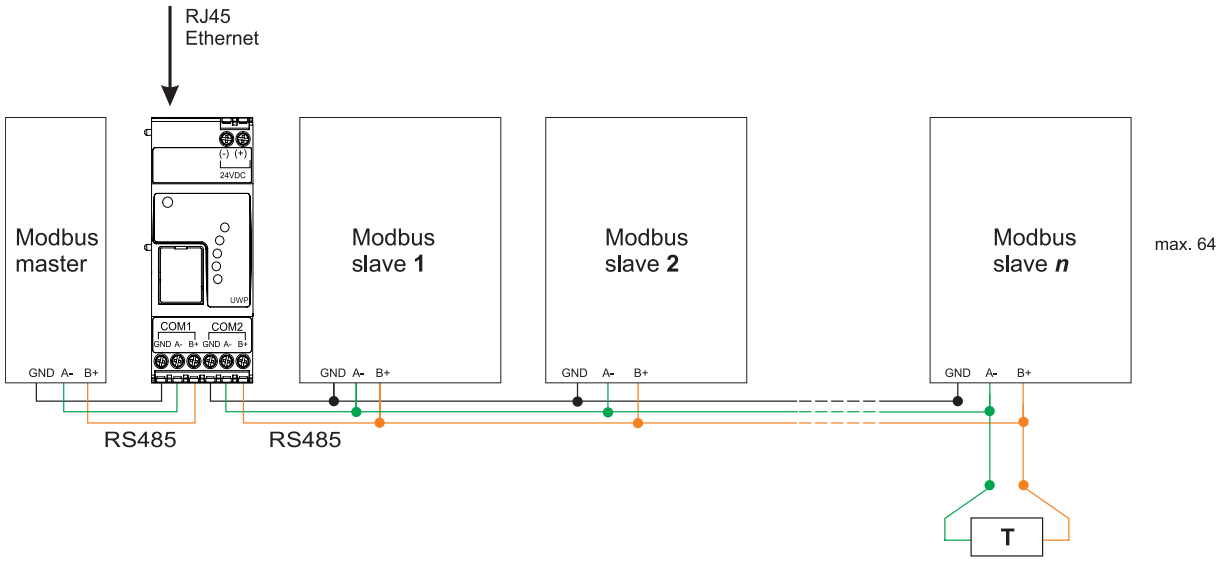


Fig. 2 *Modbus RTU connection. COM 1 slave, COM 2 master*

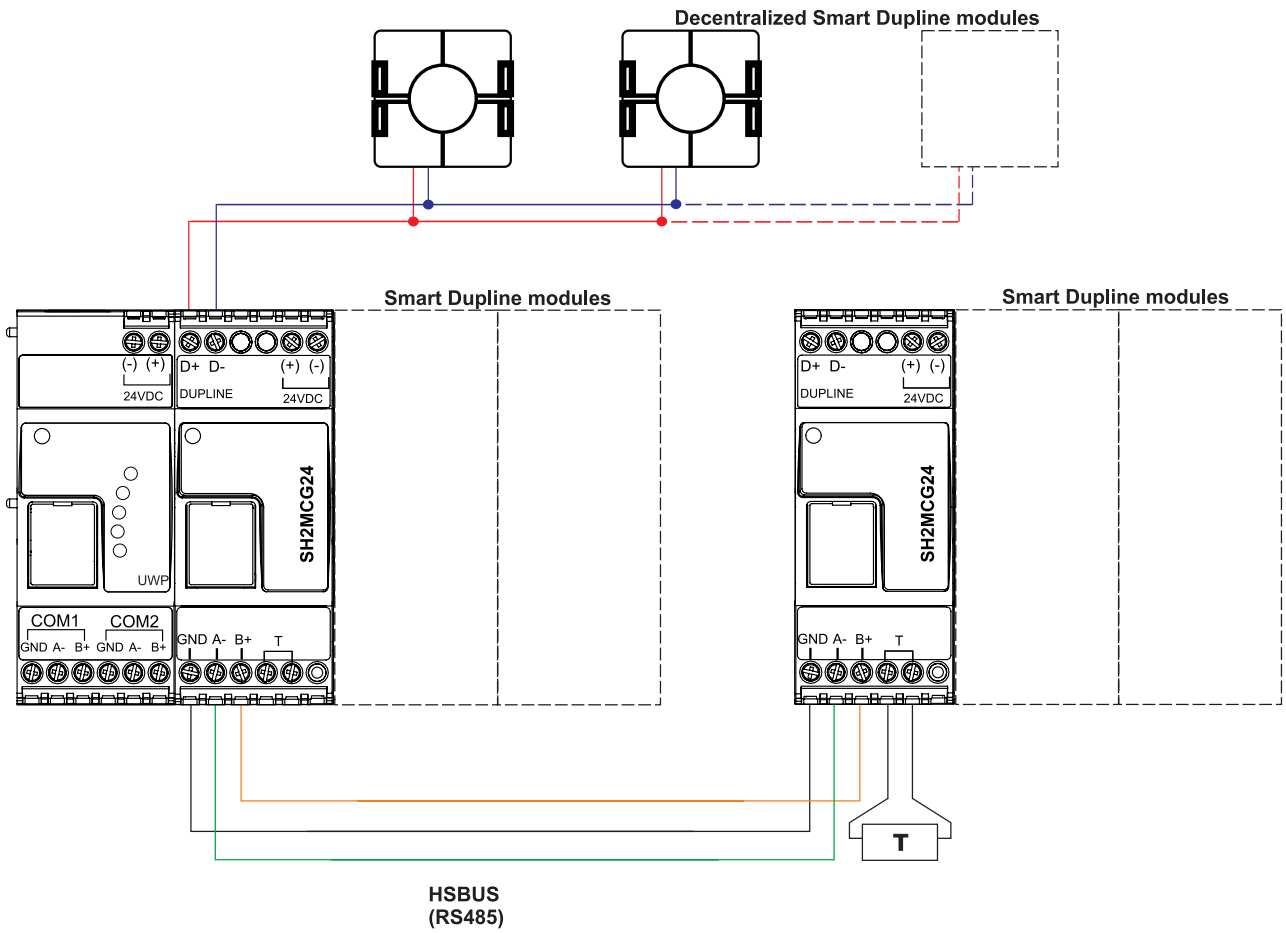


Fig. 3 *Example of Smart Dupline modules connection using master channel generators*

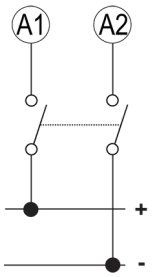


Fig. 4 *Power supply*

References

Compatible devices

Device	Instruction manual
UWP-MODEM-KIT-4G-US	
UWP-Modem-Kit-4G-EU	www.productselection.net/Pdf/UK/UWP-Modem-Kit-4G-EU.pdf
UWP-Modem-Kit-4G-E01	www.productselection.net/Pdf/UK/UWP-Modem-Kit-4G-E01.pdf
UWP-WIFI-KIT-01	

Further reading

Information	Document	Where to find it
Hardware manual	UWP 3.0 HW manual	www.productselection.net/MANUALS/UK/uwp3.0_system.pdf
Software manual	UWP 3.0 Tool manual	www.productselection.net/MANUALS/UK/uwp3.0_tool.pdf
Wireless manual	UWP 3.0 wireless installation manual	www.productselection.net/MANUALS/UK/uwp3.0_wireless.pdf
White paper	UWP 3.0 for Azure IoT- whitepaper	www.productselection.net/Pdf/UK/CGC-W-EE-IoT-002.pdf
Web App manual	UWP 3.0 Web App - Instruction manual	www.productselection.net/MANUALS/UK/uwp3.0_web_app_eim.pdf

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