smart-house Controller
Central Unit Module
Type SH2WEB24

- **Home automation functions and energy data logging configurable by software**
- **Micro PC with Web-server**
- **Linux embedded operating system**
- **Two RS485 communication ports (Modbus)**
- **One Ethernet port**
- **Two multi purpose USB 2.0 ports**
- **12 to 28 VDC power supply**
- **Dimensions: 2-DIN modules**
- **Protection degree (front): IP40**
- **All data exports on .XLSX and .CSV format compatible with Excel or other spread sheets**
- **Internal data storage up to 30 years in a 4GB memory**
- **Master web controller for smart-house installations**
- **Real time clock**
- **Connection to SH2MCG24 and SH2WBU230x via internal bus**

Ordering Key

SH 2 WEB 24

- **smart-house**
- **2-DIN housing**
- **CPU module**
- **Power supply**

Product Description

The SH2WEB24 is a programmable integrated unit specially designed for home automation applications. The controller includes dedicated functions for home automation such as light control, temperature control, roller blind control, alarm monitoring, energy monitoring, etc.... It includes smart functions such as sequence control which enables a series of actions to be performed automatically, and simulated occupation to control the lights and roller blinds while the owner is away, based upon the real life behaviour of the inhabitants.
Web server and data logger functions are included.

To be connected to the smart-house slave modules, the SH2MCG24 or SH2WBU230x has to be used.

Configuration software
The SH2WEB24 is as default configured without intelligent in- and output functions to run modules on the smart-house bus. In order to set up the intelligent functions, the SH2WEB24 has to be configured by the Windows based smart-house configuration software. This software is free and delivered on the SD-card together with the SH2WEB24. This software secures full documentation of the smart-house installation. It is used to create a logic overview of the house, and in each room you can place the smart-house I/O modules necessary for the required functions. To simplify this operation, the configuration software includes a database of all the smart-house products. Finally, the functions in each room are configured, using the input/ output modules installed. A configuration can be transferred to/from the controller either through the USB/Ethernet or by a standard SD-memory card.

Data logging
The SH2WEB24 has data logging capabilities for home automation events, environmental data read from smart-house sensors (temperature, light level, ...) and electrical values (energy, power, current, voltage) collected from energy meters and smart-house modules with energy reading.
All data are available as graphs and numbers in formatted tables. SH2WEB24 performs alarms control, managing also automatic e-mailing if an Internet connection is available, SMS when combined with SH2UMMF124. All available data can be exported in an .XLSX and .CSV format so to be imported in standard spread sheets for further analysis.

Type Selection

Housing	Mounting	Supply: 15 to 24 VDC ± 20%
2 DIN	DIN-rail	**SH2WEB24**

Supply Specifications

Power supply	Overvoltage cat. II (IEC 60664-1, par. 4.3.3.2)
Rated operational voltage	15 to 24 VDC ± 20%
Rated operational power	5 W
Protection for reverse polarity	Yes
Connection	A1 (+) and A2 (-)
Power off delay	1 s

Main Hardware Characteristics

Memory	
Flash (data)	4 GB (this memory manages the data during SD memory or USB device replacement)
RAM	128 MB (internal)
	Up to 2 GB in case of micro SD type and from 4 to 16 GB in case of micro SDHC type (removable, not supplied), industrial type (-25°C to 85° suggested
File system	External micro SD or USB memory stick only: FAT32 (VFAT)
Communication ports	
RS485	2 ports
Ethernet	1 port, for Internet/LAN connection
Auxiliary bus	HS BUS
Right side	Compatible with SH2MCG24 and SH2WBU24 units
Left side	Compatible with SH2UMMF124 (modem Unit)
USB ports	1, “D” device function only for firmware upgrade purpose
	1, “H” host function (not available when SH2UMMF124 is connected)

RS485 Communications Ports

Number of ports	2
Purpose	COM1: Modbus master. COM2: for energy meters (EM21- 72D, EM24-DIN, EM26-96 and EM33-DIN)
Type	Multidrop, bidirectional (static and dynamic variables)
Connections	2-wire. Max. distance 600m
Addresses	247
Protocol	MODBUS
Data (bidirectional)	All data
Data format	Selectable: 1 start bit, 7/8 data bit, no/odd/even/ parity,1/2 stop bit
Baud-rate	Selectable: 9600, 19200, 38400, 115200, bits/s
Driver input capability	1/8 unit load. Up to 256 nodes on a network.
Insulation	See the table “Insulation between inputs and outputs”

USB Ports

Type	High speed 2.0
Connections	"A" type as "Host" function on the top of the housing "Mini A" type as "Device" function on the front of the housing protected by front cover.
Host function (USB)	Available on the "H" USB port only. **Note:** this port cannot be used when SH2UMMF124 is already connected.
Device function (mini USB)	Available on the "D" USB port only, can be connected to a PC to perform the following functions: - service port for firmware upgrading
Working type	Hot swap
Communication speed	60MB/s (480Mbits/s)

Note: both USB and mini USB ports are working in parallel, so relevant port functions can work simultaneously.

Memory Management

Function	Micro-SD (SDHC)	USB
Upload (from micro-SD/USB to SH2WEB24)		
IP settings upgrade	YES	YES

Ethernet Port

Rated inputs	HTTP
IP configuration	Static IP / Netmask / Default gateway
DNS	Primary and secondary DNS as a static or dynamic management (using DHCP server if configured).

	Port	N. of connections
WEB server	80	20
TOOL	10000/10001	1
MODBUS TCP/IP	configurable	10

Connections	RJ45 10/100 BaseTX Max. distance: 100m
Insulation	See "Insulation between inputs and outputs" table.

Auxiliary Internal Bus (left side)

Function	Connection to a GSM module
Number of slave	Max 1
Connection	By local bus on the left side

Note: On this bus only one GSM module SH2UMMF124 can be connected.

HS Bus Specs (right side)

Bus type	RS485 high speed bus
Function	Connection to master channel generator module (SH2MCG24 and SH2WBU230x)
Number of slave	Max 7
Connection	By local bus on the right side

Note: All the SH2MCG24 and SH2WBU230x modules have to be connected on the right side of the SH2WEB24.

Memory Format and Data Occupancy

Description	Used memory	Information format and time resolution		
Total available memory for database and events	1.8 GB	**Data resolution**	**Graph resolution**	**Graph format**
Yearly grouped data	6.0MB	24 hours	Day, month	Month, year
Single row	150 bytes	Text	NO	NO

Notes:
- When the 1.8 GB limit is reached, the 5% of the oldest data are deleted to provide the space for new data.
- The memory used data are relevant to the internal memory only.

Max. Number of Third Party Devices and Energy Meters which can be managed by one SH2WEB24

Max. number of third party devices	Maximum number of energy meters
Up to 64	Up to 64
• All third party Modbus slave devices have to be connected on "COM1". The refresh time of the data depends on the communication speed. • The data are stored at the selected resolution (from 1 to 30 minutes). • Those data will be available for graph displaying for more than 30 years.	**RS485 communication port:** • The information acquired from each single energy meter complies to the “Stored set of variables coming from every energy meter” table. • All the details of the daily logged data will be available and therefore displayable as graphs. The single day data will be available and displayable as graphs for more than 30 years (either “Month” or “Year” selection).

Main Function

Configuration	The configuration and the programming of SH2WEB24 and all other modules connected to either the same local bus or to the managed RS485 ports can be carried out using the SH configuration software. For the home installation configuration, please refer to the SH tool software manual.
Clock	
Functions	Universal clock and calendar with automatic synchronisation enabling through internet connection
Battery life	10 years
Event management and messaging	
E-mails configuration	Setting of recipient addresses and relevant subject, sender address, sender name, SMTP server, username of SMTP server and password of SMTP server.
Actions	The user can program according to which events the emails and relevant attachments have to be sent.
SMS configuration	Setting of phone numbers - events; - commands; - information on request.
Data logging	
Data	The data are accessible and downloadable using Ethernet communication port
Function enabling	Activation: NO/YES
Function description	All the variables gathered from both dupline modules and Modbus modules are stored individually into the internal memory.
Stored data type	Variables: V, A, W, Wh, temperatures, light levels, wind speed, humidity, in general all the analogue values collected from the smart house modules.
Storage interval	Selectable: from 1 to 30 minutes.
Sampling management	The sample stored within the selected time interval results from the continuous average calculation of the measured values. The average is calculated with an interval within two following measurements of approx. 2s.
Storage duration	Before overwriting: depending on the storage interval.
Number of variables	See “Stored set of variables.”
Data format	Variables, date (dd:mm:yy) and time (hh:mm:ss)
Storage method	Circular FIFO
Memory type	Flash and Micro SD (Industrial type suggested, not supplied)
Memory size	4 GB
Memory retention time	10 years
Events logging	
Events	The data are accessible and downloadable using Ethernet communication port: see “Memory Management” table
Function description	All the events gathered from the smart-house functions can be stored individually into the internal memory.
Number of events	Till memory is full
Data reset	The reset can be carried out through the proper command in the SH tool.
Data format	Event, date (dd:mm:yy) and time (hh:mm:ss)
Storage limit and over write method	No memory limit
Memory type	Flash and Micro SD (Industrial type suggested, not supplied)
Memory retention time	10 years

SH2WEB24 Based Insulation between Inputs and Outputs

Type of input/output	DC Power supply	RS485 - COM 1	RS485 - COM 2	Ethernet	USB port "H"	USB port "D"	SH2UMMF12 4
DC Power supply	-	2kV	2kV	0.5kV	0kV	0kV	0kV
RS485 - COM 1	2kV	-	0.5kV	2kV	2kV	2kV	2kV
RS485 - COM 2 (energy meter)	2kV	0.5kV	-	2kV	2kV	2kV	2kV
Ethernet (LAN/Internet)	0.5kV	2kV	2kV	-	0.5kV	0.5kV	0.5kV
USB port "H" (Host)	0kV	2kV	2kV	0.5kV	-	0kV	0kV
USB port "D" (Service)	0kV	2kV	2kV	0.5kV	0kV	-	0kV
SH2UMMF124	0kV	2kV	2kV	0.5kV	0kV	0kV	-

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

General Specifications

Operating temperature	-20 to +50°C (-4°F to 122°F) (R.H. < 90% non-condensing @ 40°C)
Storage temperature	-30 to +70°C (-22°F to 158°F) (R.H. < 90% non-condensing @ 40°C)
Over voltage category	Cat. III (IEC 60664, EN60664) For inputs from string: equivalent to Cat. I, reinforced insulation.
Dielectric strength	4000 VAC RMS for 1 minute
Noise rejection	
CMRR	65 dB, 45 to 65 Hz
Standard compliance	
Safety	IEC60664, IEC61010-1 EN60664, EN61010-1
Protection degree	
Front	IP40
Screw terminals	IP20
Housing	
Dimensions (WxHxD)	35 x 90 x 67 mm
Material	Noryl, self-extinguishing: UL 94 V-0
Weight	Approx. 150 g (packing included)

Mounting	DIN-rail
Approvals	cULus, according to UL60950 **UL notes:** Max room temperature: 40°C Equipment must be supplied by a separately certified NEC class 2 (LPS) power unit.
CE Marking	Yes
EMC	
Immunity	EN 61000-6-2
- Electrostatic discharge	EN 61000-4-2
- Radiated radiofrequency	EN 61000-4-3
- Burst immunity	EN 61000-4-4
- Surge	EN 61000-4-5
- Conducted radio frequency	EN 61000-4-6
- Power frequency magnetic fields	EN 61000-4-8
- Voltage dips, variations, interruptions	EN 61000-4-11
Emission	EN 61000-6-3
- Conducted and radiated emissions	CISPR 22 (EN55022), cl. B
- Conducted emissions	CISPR 16-2-1 (EN55016-2-1)
- Radiated emissions	CISPR 16-2-3 (EN55016-2-3)

Connections

Ethernet	RJ-45 connector (10/100Base-T)
USB	High speed USB 2.0
RS485	3 screw terminals per port
Cable cross-section area	1.5 mm^2 max
Screws tightening torque	Min. 0.4 Nm, Max. 0.8 Nm

Power supply	2 screw terminals
Cable cross-section area	1.5 mm^2 max
Screws tightening torque	Min. 0.4 Nm, Max. 0.8 Nm

CARLO GAVAZZI

Stored Set of Variables coming from each single SH2RE16AE230, SH2D500WE230, SHDW..., SHJW....

		SH2D500WE230	SH2RE16A2E230	SHDWRE16AE230
No.	Variable	Data format	Data format	Data format
1	V	0.0 to 300.0	0.0 to 300.0	0.0 to 300.0
2	A	0.000 to 5.000	0.000 to 32.000	0.000 to 16.000
3	W	0.0 to 1000.0	0.0 to 10000.0	0.0 to 9600
4	kWh	0.0 to 99999999.9	0.0 to 99999999.9	0.0 to 99999999.9
5	Wdmd	0.0 to 1000.0	0.0 to 10000.0	0 to 9600
6	VA	0.0 to 1000.0	0.0 to 10000.0	0 to 9600
7	VAR	0.0 to 1000.0	0.0 to 10000.0	0 to 9600
8	PF	-999 to 1000	-999 to 1000	0 to 100 (- C load, + L load)

Stored Set of Variables coming from every External AC Energy Meter

Full set of all variables read from the Energy Meters managed (EM21, EM23, EM24, EM26, EM33, WM30, WM40, VMUE).

Mode of Operation

The SH2WEB24 is a programmable unit and the programming can be done in different ways, once the project configuration is created with the SH Tool.
1) Programming with the SH Tool via Ethernet:
- local downloading of the configuration file (PC and SH2WEB24 are on the same network).
- Remote downloading of the configuration file (PC and SH2WEB24 are on different network). In this case the SH2WEB24 is reachable using a public IP address.
- Firmware downloading.
- Webserver downloading.
- The IP address is programmable using an SD-card or a USB key.

Using the SH Tool the user will be able to test the application monitoring it. This is possible with both local and remote Ethernet connections (see SH Tool specifications).
The SH2WEB24 is also a data logger: it records the home automation events as well as the electrical values collected from both CG's energy meters (EMxx) and the smart-house output modules with energy management capabilities (SH2RE16A2E230, SH2D500WE230, SHDW...., SHJW...).
The data logging is configured via the SH Tool: once the user selects the required events/variables to log, a database will be created. It is accessible as a text file by downloading it from the SH2WEB24 or as a linear graph and bargraph accessing the webserver integrated into the SH2WEB24.

LEDs Indication

Green LED: Power status
ON: power ON.
OFF: power OFF.
Flashing: 200ms ON 200ms OFF writing in progress on the µSD memory, do not remove it.

Yellow LEDs:
COM 1
OFF: no communications on RS485 A.
Flashing: 200ms ON 600ms OFF, no answer from the slave.
Flashing: 200ms ON 200ms OFF, communications OK.

COM 2
OFF: no communications on RS485 B.
Flashing: 200ms ON 600ms OFF, no answer from the slave.
Flashing: 200ms ON 200ms OFF, communications OK.

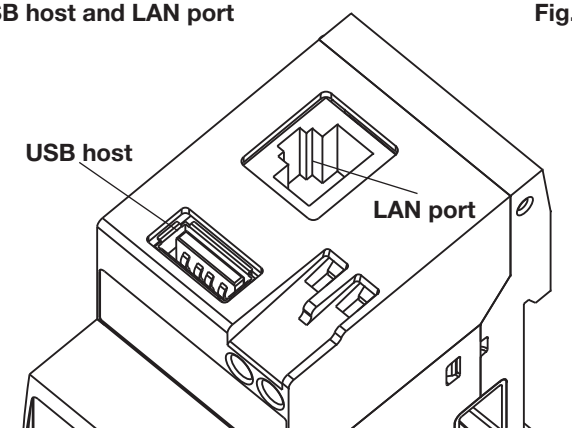
BUS
OFF: no communication is present on the HSbus.
ON: communication error on HSbus.
Flashing: communication OK on HSbus.

Blue LED: USB
ON: acknowledged device, no writing in progress, device can be removed.
OFF: neither acknowledged device nor connected device.
Flashing: acknowledged device and writing cycle in progress, device cannot be removed.

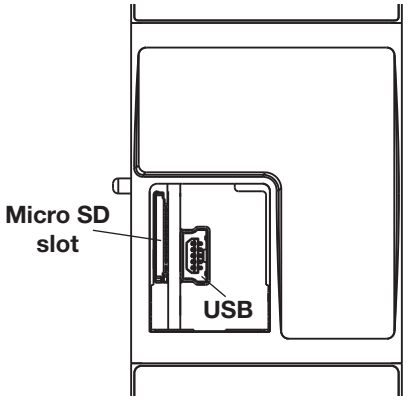
Red LED: STATUS
ON: NO configuration present.
OFF: configuration present in the SH2WEB24.
Flashing: SH2WEB24 is connected to the SHTool.

Connections

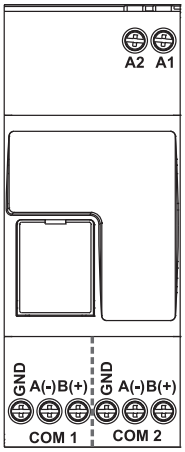
USB host and LAN port Fig. 1



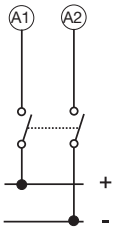
Micro SD slot and USB “device” cable connection Fig. 2



Frontal connectors Fig. 3



Power supply Fig. 4



Dimensions