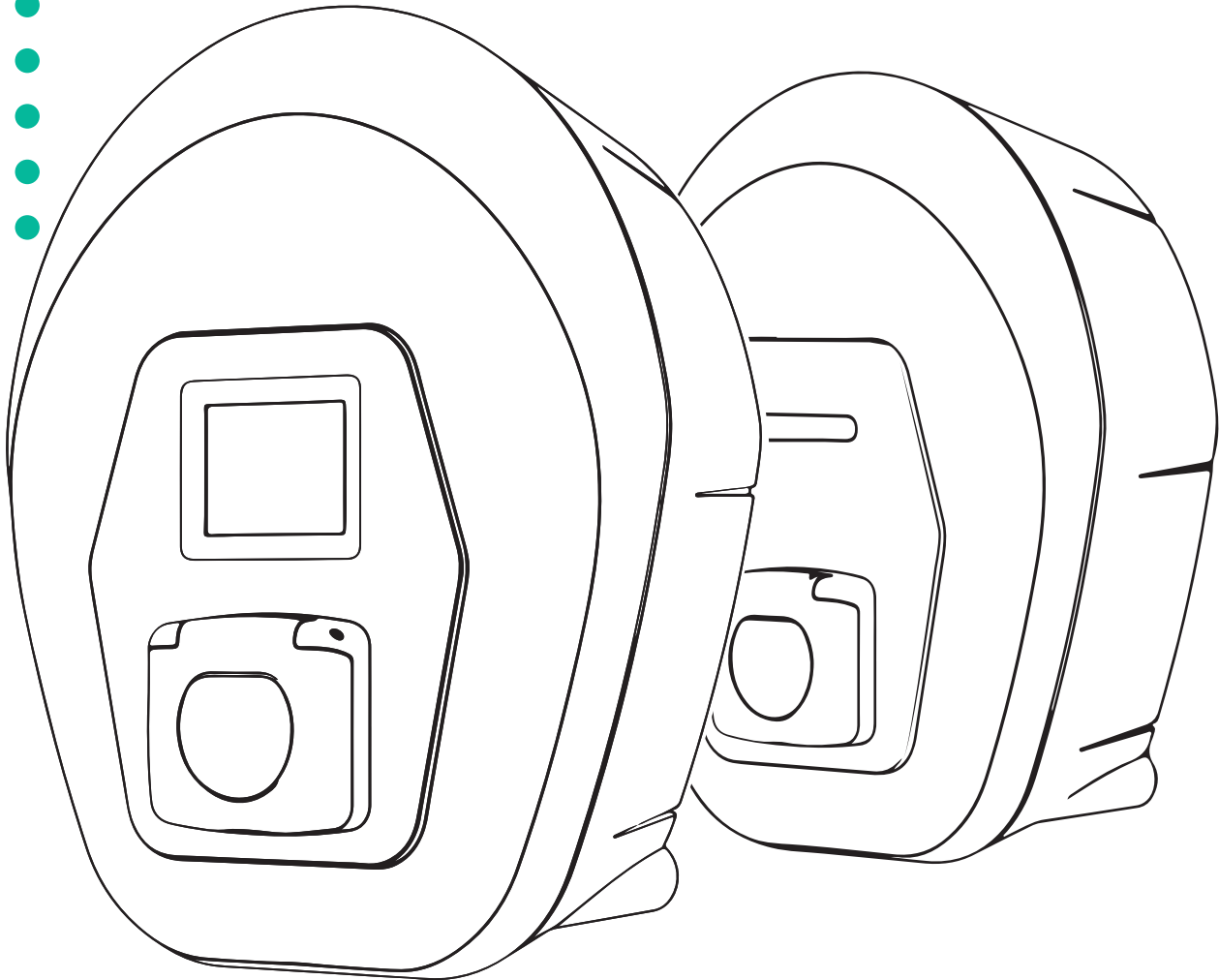
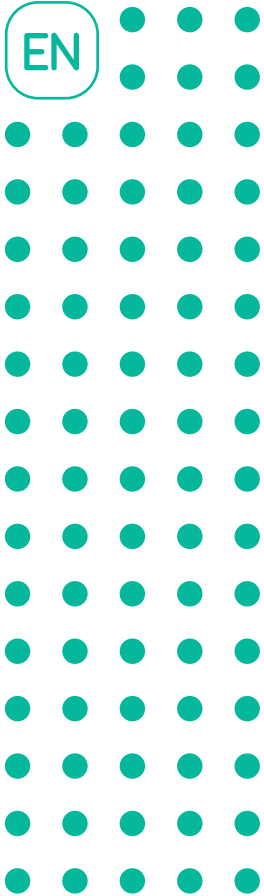


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MODBUS RTU

Configuration Guide



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INTRODUCTION

This manual describes the information required to use the wallbox Modbus RTU interface, to configure the local communication between the charging station and a third-party, describing how communication is established and interrupted, and how messages are exchanged. The Modbus Map is exposed on RS485 channel that allow Daisy Chain connection.

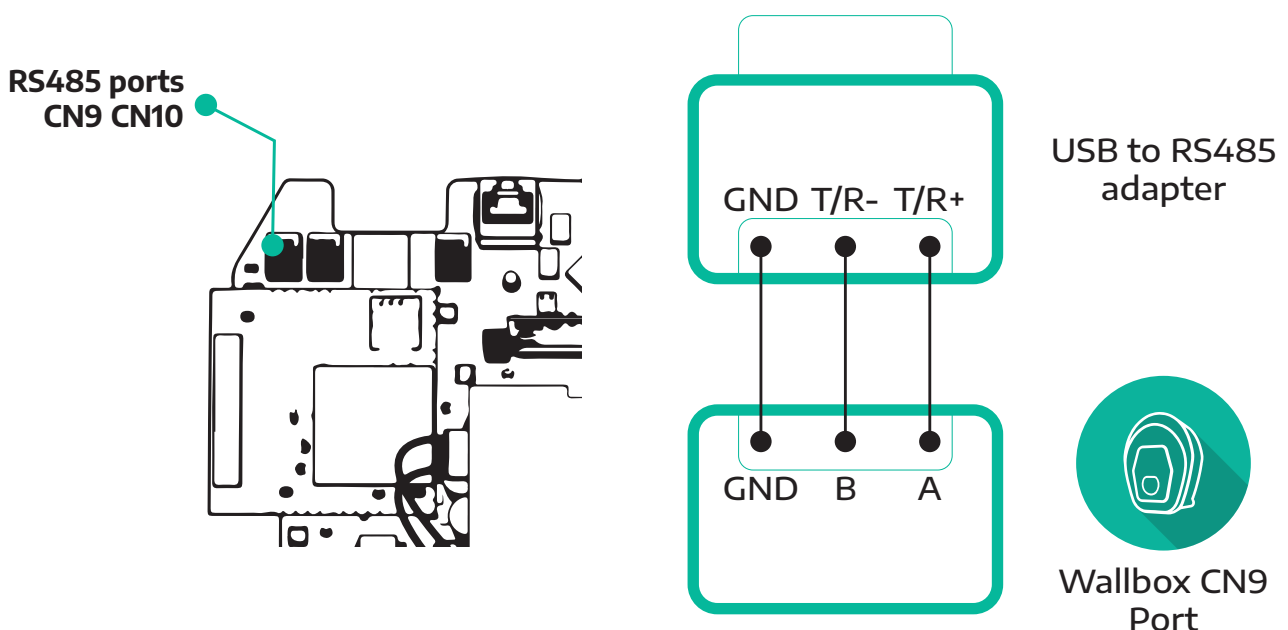


The following document is an extension to the supplied manuals of eProWallbox Family. **Please always refer to the dedicated installation manual before operating on the product.** Free2move eSolutions S.p.A. recommends only using experienced professionals who comply with current regulations to install the product correctly.

CONFIGURATION

In order to communicate with third parties such as HEMS or DSO, the configuration should be done via RS485 during the installation. The third party will be considered as a Master, while the charging station will be considered as a Slave. The data are sent via RTU.

On the charging station are present two RS485 communication ports, to be used for a Daisy Chain connection. The communication shall be established between the wallbox and a PC, using a USB to RS422/RS485 Serial Port Adapter Cable according to the following scheme for connection:





The power supply of the device must remain switched off throughout this phase.

Failure to comply with these instructions can lead to serious damage to persons and property, including death.

Once the connection is completed and the communication is established, follow the steps:

- 1.** Open the service tool for PC provided by Free2Move eSolutions
- 2.** Select the serial port COM4 by inserting 1
- 3.** Select the BaudRate 115200 by inserting 4
- 4.** Select the UnitAddress by inserting 1
- 5.** The page displayed contains all the accessible sections with useful information on the wallbox

LIST OF CHARGING STATION REGISTERS

REGISTER	START ADDRESS	SIZE	TYPE	R/W	DEFAULT VALUE	UNIT
SERIAL_NUMBER	40000	8	ASCII	R	0123456789ABCDEF	-
SW_VERSION	40008	4	ASCII	R	xx.yy.zz	-
MDBUS_VERSION	40012	4	ASCII	R		-
HW_TYPE	40016	1	UINT16	R	1	-
DEVICE_TYPE	40017	1	UINT16	R	1	-
HW_CURRENT_LIMIT	40018	2	UINT32	R	-	mA
ACTUAL_ERROR	40100	1	UINT16	R	-	-
GENERAL_STATUS	40101	1	UINT16	R	-	-
OCP_STATUS	40102	1	UINT16	R	-	-
USER_CURRENT_LIMIT	40103	2	UINT32	R	-	mA
LOAD_UNBALANCE_LIMITING	40106	1	UINT16	R	-	-
DPM_LIMITING	40107	1	UINT16	R	-	-
TEMP_DERATING_STAUTS	40108	1	UINT16	R	-	-
RTU_ADR	40200	1	UINT16	R	1	-
NEW_RTU_ADR	40201	1	UINT16	R/W	1	-
ACTIVATE_NEW_RTU_ADR	40202	1	UINT16	W	-	-
BAUD_RATE	40210	1	UINT16	R	4	-
NEW_BAUD_RATE	40211	1	UINT16	R/W	4	-
ACTIVATE_NEW_BAUD_RATE	40212	1	UINT16	W	-	-
DPM_ENABLED	40400	1	UINT16	R/W	0	-
MID_METER_ENABLED	40401	1	UINT16	R/W	0	-
LOAD_UNBALANCE_ENABLED	40402	1	UINT16	R/W	0	-
LOAD_UNBALANCE_CURRENT	40403	2	UINT32	R/W	32000	mA
ON_OFF_INPUT	40406	1	UINT16	R/W	1	-
CURRENT_LIMIT	40407	2	UINT32	R/W	32000	mA

REGISTER	START ADDRESS	SIZE	TYPE	R/W	DEFAULT VALUE	UNIT
FALLBACK_CURRENT	40409	2	UINT32	R/W	32000	mA
METER_USED	40411	1	UINT16	R/W	1	-
WATCHDOG_TIMER_ENABLED	40412	1	UINT16	R/W	1	-
WATCHDOG_TIMER	40413	1	UINT16	R/W	600	s
RESET_LAST_ERRORS	40500	1	UINT16	W	-	-
RESET_ENERGY	40501	1	UINT16	W	-	-
RESET_WTCH_DOG	40502	1	UINT16	W	-	-
SET_DEFAULT_VALUE	40503	1	UINT16	W	-	-
CHARGE_TIME	40600	2	UINT32	R	-	s
TEMPERATURE	40602	2	FLOAT_IEEE754	R	-	K
L1_Vac	40604	2	FLOAT_IEEE754	R	-	V
L2_Vac	40606	2	FLOAT_IEEE754	R	-	V
L3_Vac	40608	2	FLOAT_IEEE754	R	-	V
L1_THD_V	40610	2	FLOAT_IEEE754	R	-	%
L2_THD_V	40612	2	FLOAT_IEEE754	R	-	%
L3_THD_V	40614	2	FLOAT_IEEE754	R	-	%
L1_lac	40620	2	FLOAT_IEEE754	R	-	A
L2_lac	40622	2	FLOAT_IEEE754	R	-	A
L3_lac	40624	2	FLOAT_IEEE754	R	-	A
L1_THD_I	40626	2	FLOAT_IEEE754	R	-	%
L2_THD_I	40628	2	FLOAT_IEEE754	R	-	%
L3_THD_I	40630	2	FLOAT_IEEE754	R	-	%
L1_Pac	40636	2	FLOAT_IEEE754	R	-	W
L2_Pac	40638	2	FLOAT_IEEE754	R	-	W
L3_Pac	40640	2	FLOAT_IEEE754	R	-	W
L1_Qac	40642	2	FLOAT_IEEE754	R	-	Var
L2_Qac	40644	2	FLOAT_IEEE754	R	-	Var
L3_Qac	40646	2	FLOAT_IEEE754	R	-	Var
L1_Sac	40648	2	FLOAT_IEEE754	R	-	VA
L2_Sac	40650	2	FLOAT_IEEE754	R	-	VA
L3_Sac	40652	2	FLOAT_IEEE754	R	-	VA
L1_ACTIVE_ENERGY	40658	2	FLOAT_IEEE754	R	-	Wh
L2_ACTIVE_ENERGY	40660	2	FLOAT_IEEE754	R	-	Wh
L3_ACTIVE_ENERGY	40662	2	FLOAT_IEEE754	R	-	Wh
L1_REACTIVE_ENERGY	40664	2	FLOAT_IEEE754	R	-	Varh
L2_REACTIVE_ENERGY	40666	2	FLOAT_IEEE754	R	-	Varh
L3_REACTIVE_ENERGY	40668	2	FLOAT_IEEE754	R	-	Varh



ADDRESS DESCRIPTION

Hereafter the description of charging station addresses:

SERIAL_NUMBER: 40000

The address contains the unique serial number of the charging station.

SW_VERSION: 40008

The address contains the revision of software or firmware of the charging station.

MDBUS_VERSION: 40012

The address contains the revision of the Modbus map.

HW_TYPE: 40016

tbd

DEVICE_TYPE: 40017

The address indicates the electrical connection of the charging station:

- 0 = AC 1-phase
- 1 = AC 3-phase

HW_CURRENT_LIMIT: 40018

The address contains the Current Limit measured in mA according to the specific position of the Rotary Switch

ACTUAL_ERROR: 40100

The address contains the current error occurred on the charging station

GENERAL_STATUS: 40101

The address contains the status of the charging station according to IEC 61851 State Machine as it follows:

- 0 = A1
- 1 = A2
- 2 = B1
- 3 = B2
- 4 = C1
- 5 = C2
- 6 = D1
- 7 = D2
- 8 = E
- 9 = F

OCPP_STATUS: 40102

The address contains the OCPP status of the charging station as it follows:

- 0 = Available (OCPP_Status A)
- 1 = Preparing (OCPP_Status B)
- 2 = Charging (OCPP_Status C)
- 3 = SuspendedEV (OCPP_Status D)
- 4 = SuspendedEVSE (OCPP_Status E)
- 5 = Finishing (OCPP_Status F)
- 6 = Reserved (OCPP_Status G)
- 7 = Unavailable (OCPP_Status H)
- 8 = Faulted (OCPP_Status I)

USER_CURRENT_LIMIT: 40103

The address contains the Current Limit set by the user through the App expressed in mA

LOAD_UNBALANCE_LIMITING: 40106

The address contains the status of the Current Unbalance Function:

- 0 = function disabled
- 1 = function enabled. Charging current limited by the Current Unbalance Function

DPM_LIMITING: 40107

The address contains the status of the DPM function:

- 0 = function disabled
- 1 = function enabled. Charging current limited by the DPM

TEMP_DERATING_STAUTS: 40108

The address contains the status of the current derating function:

- 0 = function disabled
- 1 = charging current limitation function enabled due to operation in overtemperature.
The function is enabled when the temperature overcomes 85°C

RTU_ADR: 40200

The address contains the current charging station Modbus Bus address, which is between 1 and 32.

The default value is set to 1.

NEW_RTU_ADR: 40201

The address is used for setting the new Modbus Bus address. Insert in this field the new value that will identify the charging station.

The default value is set to 1.

ACTIVATE_NEW_RTU_ADR: 40202

The address is used for the activation of a new Modbus Bus address. Enter 0x5555 to activate the new Modbus Bus address inserted in the address 40201.

BAUD_RATE: 40210

The address contains the number of transitions per second occurring on the communication line expressed as Baud Rate:

- 4 = 115200
- 3 = 57600
- 2 = 38400
- 1 = 19200
- 0 = 9600

The default value is set to 4.

NEW_BAUD_RATE: 40211

The address is used for setting the new Baud Rate value. Insert in this field the new Baud Rate value.

The default value is set to 4.

ACTIVATE_NEW_BAUD_RATE: 40212

The address is used for the activation of a new Baud Rate value. Enter 0x5555 to activate the new Baud Rate value inserted in the address 40211.

DPM_ENABLED: 40400

The address contains the status of the DPM:

- 0 = disabled
- 1 = enabled

MID_METER_ENABLED: 40401

The address contains the status of the MID meter:

- 0 = disabled
- 1 = enabled (External MID meter connected)

LOAD_UNBALANCE_ENABLED: 40402

The address contains the status of the Load unbalance function:

- 0 = disabled
- 1 = enabled

To enable this parameter, you can connect to the wallbox following the procedure described in this manual in the Configuration chapter. This function is enabled only if the wallbox is connected in three-phase configuration:

- Enter the Setting section
- Select the register 3 – Load unbalance en.
- Set the register equal to 1 to enable the load unbalance function, or 0 to disable it
- The new settings are automatically saved

LOAD_UNBALANCE_CURRENT: 40403

The address is used to set the current for the load unbalance function. It contains the maximum allowable current unbalance between the phases. This function is enabled only if the wallbox is connected in three-phase configuration

The default value is set to 32000 mA

To modify this parameter, you can connect to the wallbox following the procedure described in this manual in the Configuration chapter:

1. Enter the Setting section
2. Select the register 4 – Load unbalance val.
3. Set the new value of current in mA in the register
4. The new settings are automatically saved

ON_OFF_INPUT: 40406

The address is used to enable or disable the charging station:

- 0 = charging station disabled (stuck in C1 or B1 state when the user plug the charging cable or during the charging phase)
- 1 = charging station enabled (according to standard IEC 61851 State Machine)

CURRENT_LIMIT: 40407

The address contains the current limitation value that can be set remotely through third-party EMS in real time.

NOTE: The lower current limit value set (e.g. the one set on the Rotary Switch) will always prevail. The minimum current limit value to be set is 6A.

FALLBACK_CURRENT: 40409

With this register is possible to set the fallback current in case communication with third-party EMS is lost.

The default value is set to 32000 mA.

METER_USED: 40411

With this register is possible to indicate if another meter, external from the charging station, is installed:

- 0 = External Meter
- 1 = Internal Meter

WATCHDOG_TIMER_ENABLED: 40412

With this register is possible to enable the load unbalance and fallback current functions:

- 0 = Watchdog timer disabled; functions disabled
- 1 = Watchdog timer enabled; functions enabled with the following default logic:
 - A 600 s timer will start
 - If in the 600 s the reset signal (Address 40502) is sent, the charging station doesn't react
 - If the timer runs out, the fallback current (Address 40409) and load unbalance (Address 40402) functions will be enabled

WATCHDOG_TIMER: 40413

When the timeout occurs (Address 40412 = 1) the timer will start. If the timer runs out, the fallback current function and the load unbalance function are enabled.

Default value: 600 s.



RESET_LAST_ERRORS: 40500

The address is used to reset the last error occurred on the wallbox: enter 0x5555 to activate.

RESET_ENERGY: 40501

The address is used to reset the energy measures registered on each phase: enter 0x5555 to activate.

RESET_WTCH_DOG: 40502

The address is used to reset the watchdog configuration: enter 0x5555 to activate.

SET_DEFAULT_VALUE:40503

The address is used to reset the charging station parameters to default values.

CHARGE_TIME: 40600

The address contains the time of the charging session expressed in s.

TEMPERATURE: 40602

The address contains the temperature value at which the charging station is operating, expressed in K.

L1_Vac: 40604

This address contains the measured RMS voltage on phase 1, expressed in mV

L2_Vac: 40606

This address contains the measured RMS voltage on phase 2, expressed in mV

L3_Vac: 40608

This address contains the measured RMS voltage on phase 3, expressed in mV

L1_THD_V: 40610

This address contains the measured THD of voltage on phase 1, expressed in %

L2_THD_V: 40612

This address contains the measured THD of voltage on phase 2, expressed in %

L3_THD_V: 40614

This address contains the measured THD of voltage on phase 3, expressed in %

L1_lac: 40620

This address contains the measured RMS current on phase 1, expressed in A

L2_lac: 40622

This address contains the measured RMS current on phase 2, expressed in A

L3_lac: 40624

This address contains the measured RMS current on phase 3, expressed in A

L1_THD_I: 40626

This address contains the measured THD of charging current on phase 1, expressed in %

L2_THD_I: 40628

This address contains the measured THD of charging current on phase 2, expressed in %

L3_THD_I: 40630

This address contains the measured THD of charging current on phase 3, expressed in %



L1_Pac: 40636

This address contains the Active Power value measured on phase 1, expressed in W

L2_Pac: 40638

This address contains the Active Power value measured on phase 2, expressed in W

L3_Pac: 40640

This address contains the Active Power value measured on phase 3, expressed in W

L1_Qac: 40642

This address contains the Reactive Power value measured on phase 1, expressed in VAR

L2_Qac: 40644

This address contains the Reactive Power value measured on phase 2, expressed in VAR

L3_Qac: 40646

This address contains the Reactive Power value measured on phase 3, expressed in VAR

L1_Sac: 40648

This address contains the Apparent Power value measured on phase 1, expressed in VA

L2_Sac: 40650

This address contains the Apparent Power value measured on phase 2, expressed in VA

L3_Sac: 40652

This address contains the Apparent Power value measured on phase 3, expressed in VA



L1_ACTIVE_ENERGY: 40658

This address contains the Active Energy value measured on phase 1, expressed in Wh

L2_ACTIVE_ENERGY: 40660

This address contains the Active Energy value measured on phase 2, expressed in Wh

L3_ACTIVE_ENERGY: 40662

This address contains the Active Energy value measured on phase 3, expressed in Wh

L1_REACTIVE_ENERGY: 40664

This address contains the Reactive Energy value measured on phase 1, expressed in Varh

L2_REACTIVE_ENERGY: 40666

This address contains the Reactive Energy value measured on phase 2, expressed in Varh

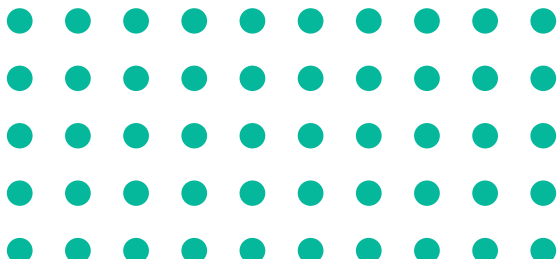
L3_REACTIVE_ENERGY: 40668

This address contains the Reactive Energy value measured on phase 3, expressed in Varh



MODBUS RTU

Configuration Guide



Registered office
Free2move eSolutions S.p.A.
Piazzale Lodi, 3
20137 Milan – Italy

esolutions.free2move.com