



RDC Charger

User manual



Robotina d.o.o.
OIC-Hrpelje 38 Hrpelje
SI-6240 Kozina
Slovenia

Table of Contents

Software	5
<i>Installation</i>	5
<i>EVSE overview</i>	7
<i>Error table</i>	11
HEMS Configurator	11
<i>home</i>	11
<i>power</i>	14
<i>energy</i>	16
<i>timetable</i>	17
<i>tariff</i>	18
<i>lo tariff dates</i>	19
<i>Dynamic Load Management</i>	20
<i>ev fleet</i>	21
<i>io mux</i>	21
<i>settings</i>	23
RDC Charger Update	25

Software

To run RDC Charger application it is required:

- to establish [connection](#) between charger and router by UTP cable
- to [connect](#) charger to the power supply
- download and install latest version of application for RDC Charger *

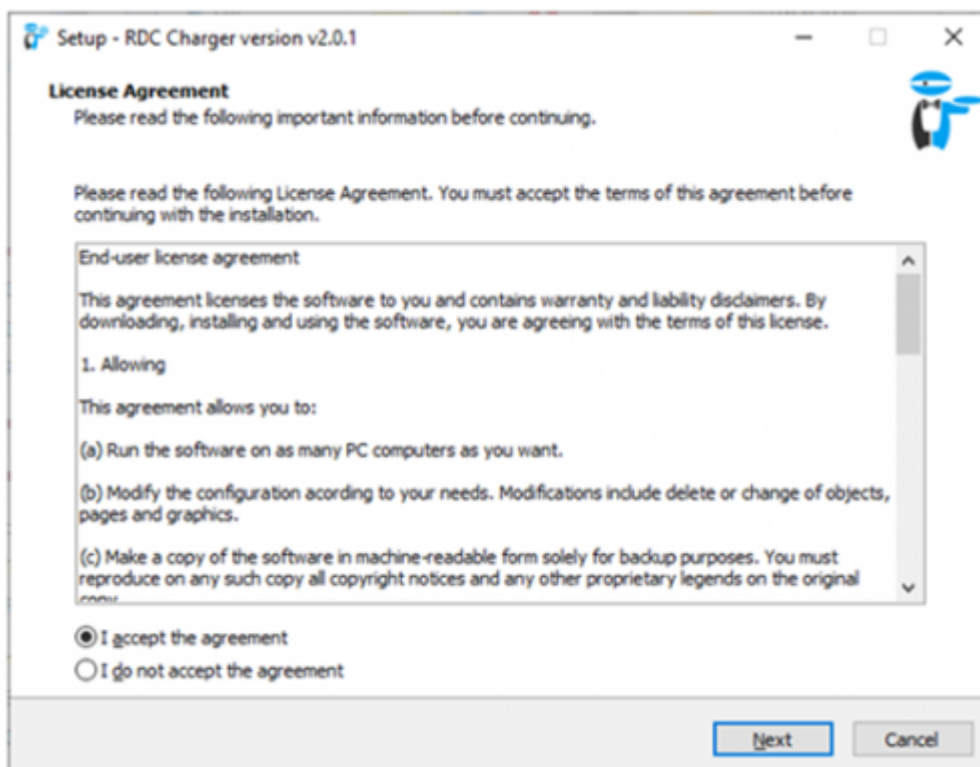


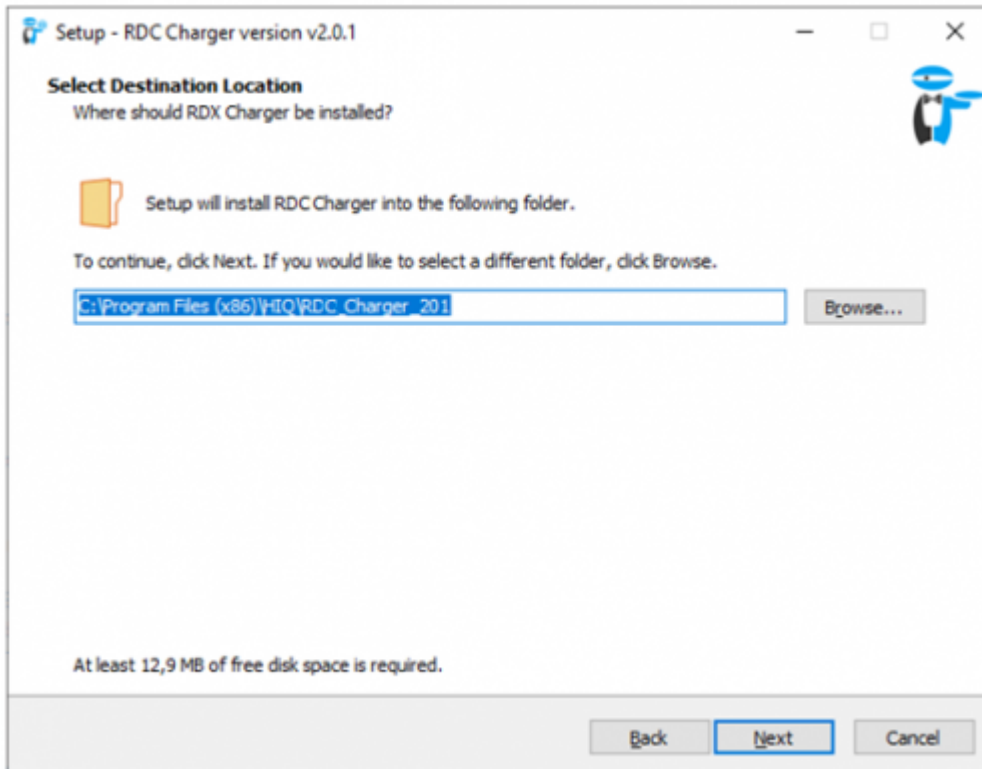
Once RDC Charger is configured, it does not require further connection to internet or configurator for normal operation !

*Latest version of RDC Charger (EVSE) can be found under [Downloads](#) map.

Installation

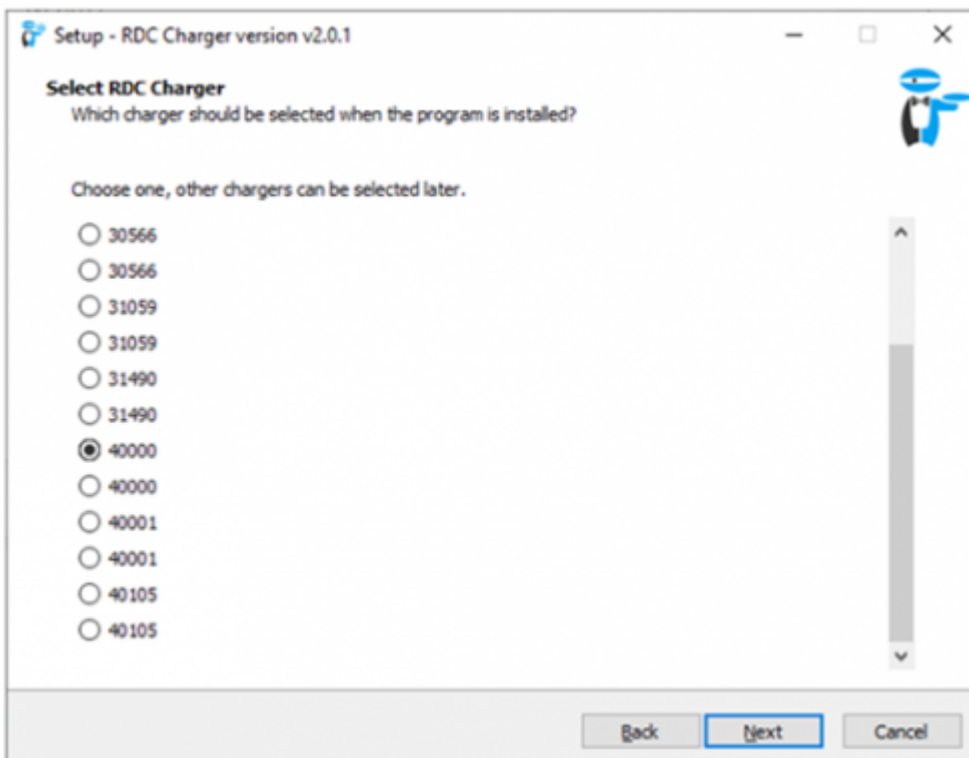
- run rdc_charger .exe file from [Downloads](#)
- select default or desired folder

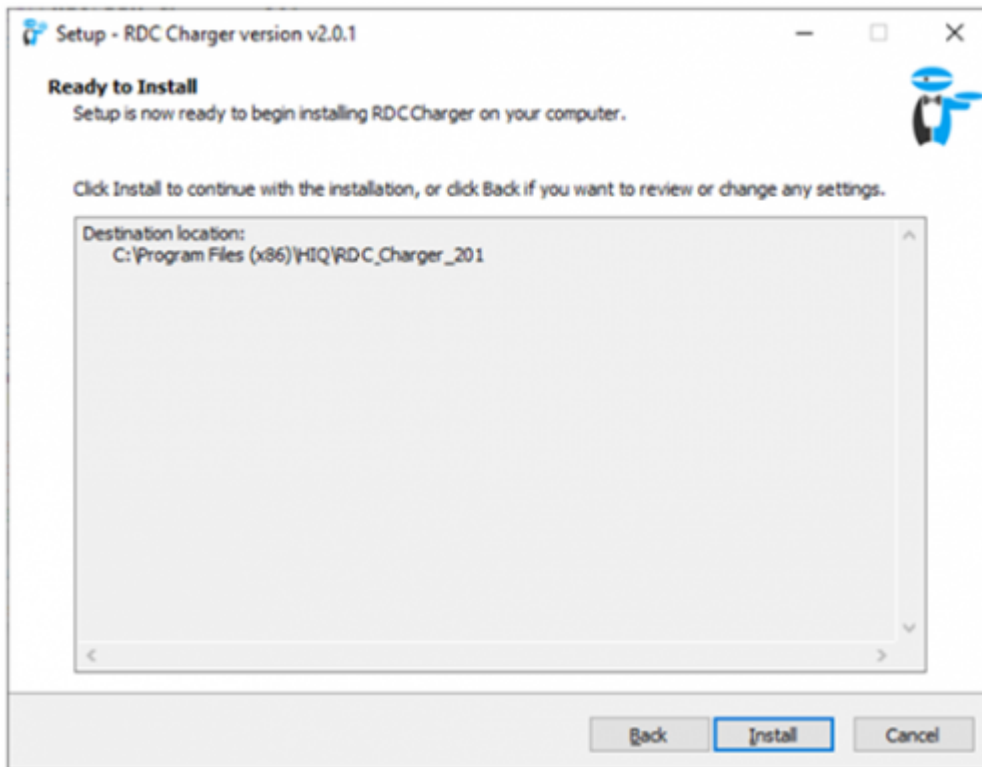




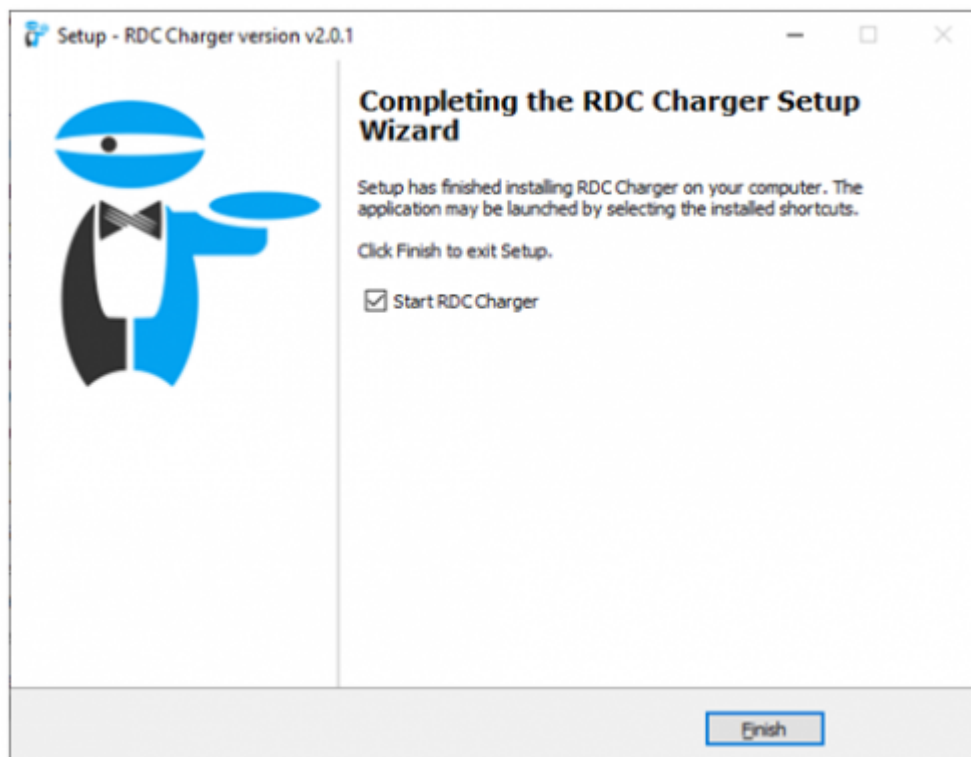
- select charger serial number (SN), visible on sticker *
- run install

*if does not appear a window with SN or it is not listed it means that application at this moment did not recognize charger. Continue with installation and select SN on application later.





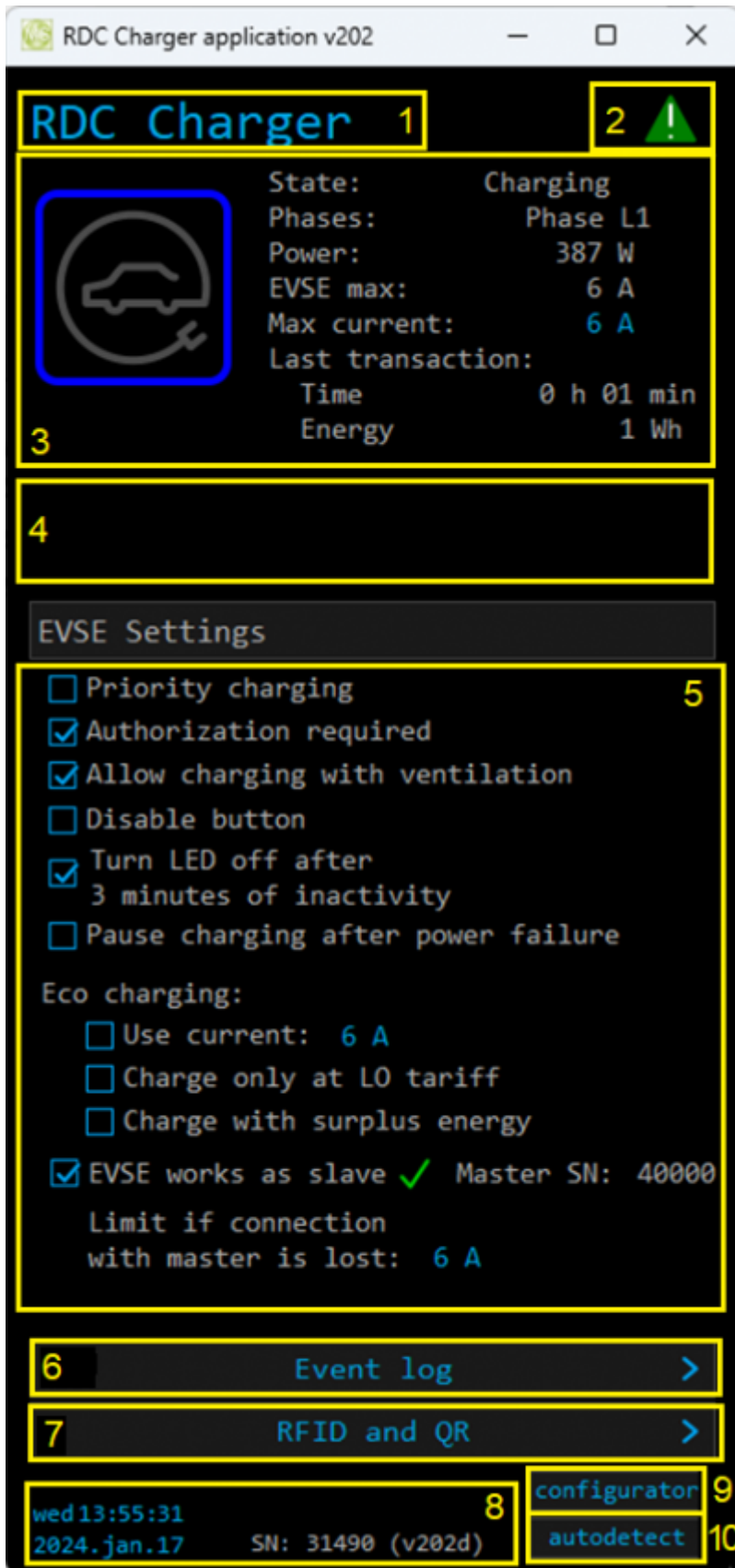
Installation is successful!

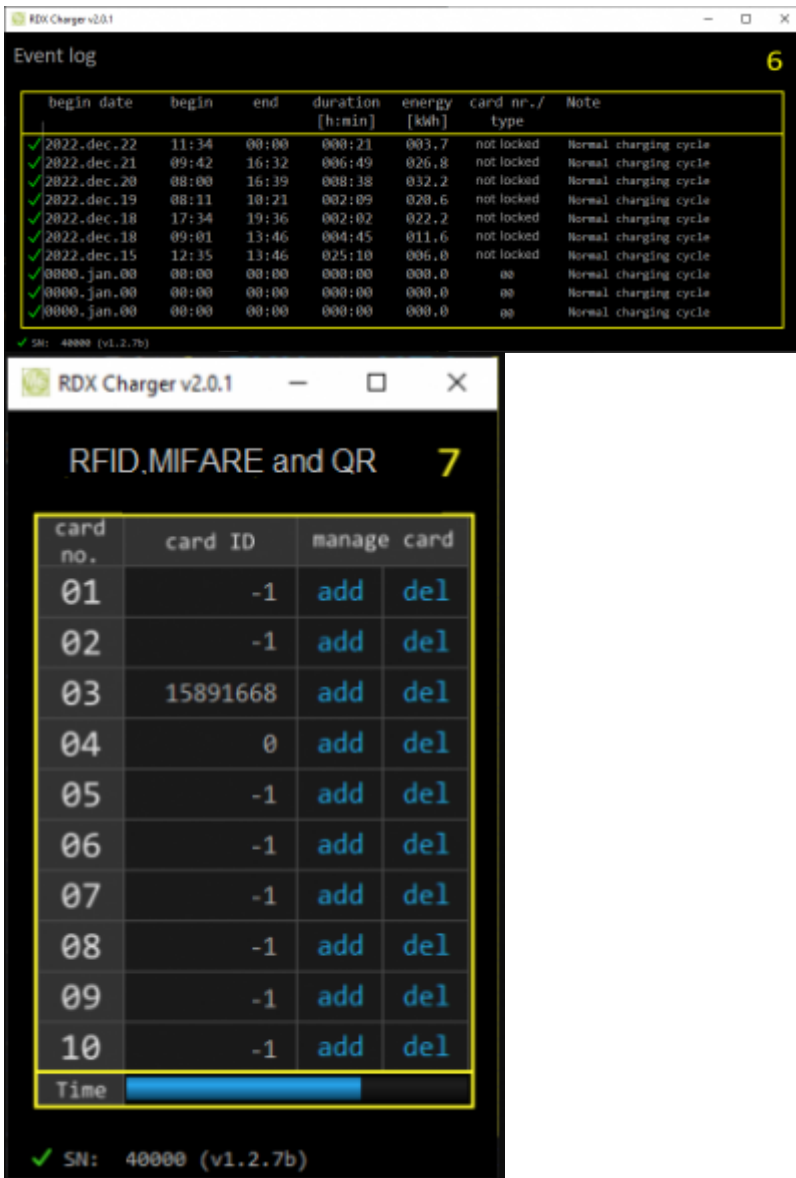


EVSE overview



Parameters in blue colour are editable.





1. EVSE Name

Name of EVSE - default is RDC Charger.

2. DLM sign



Yellow status when DLM is enabled and active. Green status when enabled and not active. None if DLM is not set.

3. Data from ongoing charging session

EV charging icon with LED light

Different LED light colour is presenting charger state, while icon acts as a button. Short press toggle enable/pause charging, long press for priority charging and error reset.

State

EVSE status: Communication error; Unknown; Available; Preparing (authorization done, waiting for vehicle to be connected) or (EV connected, authorization required); Charging; SuspendedEV(Paused by EV); SuspendedEVSE(Paused by EVSE); Finishing; Failed(error); Unpausing; Unavailable; No EVSE response; Available, Authorisation required; Stopping; Starting; Suspended by DLM; Reserved; Reserved, preparing(EV connected, authorization required); Charging ended or suspended by EV

Phases - number of used phases while charging

3 phases, Phase L1, Phase L2, Phase L3, Unknown phase, 2 phases.

Power	Charging power of EV.
EVSE max	Momentanely the maximum allowable charging current
Max current	Allowed max charging current.
Last session	Time - duration of charging session, Energy - consumed energy of charging session.
4. Error message(s)	
Possible errors are: CP positive voltage; CP negative voltage; RCD sensor trip; Overvoltage; Undervoltage; Charge with ventilation; PS reading error (EVSE); Current is higher than allowed; RCD sensor malfunction; Internal temperature is too high; PS reading error (grid); Can not lock; Can not unlock; Socket temperature is too high; Unavailable; Other error Note: for resolving errors please see table below.	
5. EVSE settings	
Priority charging	Utilize all available power to charge as fast as possible ignoring eco charging.
Authorization required	Disable unauthorized use of EVSE, authorization is possible with RFID Card/QR code or by cloud application.
Allow charging with ventilation	Allow/deny charging if EV requests ventilation.
Disable button	Disable functionality of button on housing.
Turn LED off after 3 minutes of inactivity	LED light is turned off after 3 minutes.
Eco charging	Use current: set desired current for charging. Charge only at LO tariff: charging possible at low tariff only. Note: LO tariff must be set. Charge with surplus energy: dynamically charge EV if there is surplus energy
EVSE works as slave	EVSE is a slave to master (Modbus TCP communication) EVSE with its serial number-SN. Green tick if communication is OK, red X for lost communication.
Limit if connection with master is lost	In case of lost communication, use set charging current.
6. Event log	
Shows last 10 charging session.	
begin & end time	Begin date, hour and end of charging session.
duration	Duration of charging session [h:min].
energy	Consumed energy in session.
card nr./type	Card ID used for charging session. If note "not locked" card ID is not used/needed.
note	Status message about charging session (normal or some error).
7. RFID, MIFARE and QR	
Add or delete RFID/MIFARE tag or QR code, for managing authorized access to EVSE.	
Card no. & card ID	Supported up to 10 RFID/MIFARE/QR tags/cards.
Manage card	Press Add for new card or delete existing one.
Time	60 seconds time frame for adding new card.
8. Time & date and SW version	
Time and date with software version release.	
9. configurator	
Runs Configurator	

10. autodetect

Click to find EVSE in local network

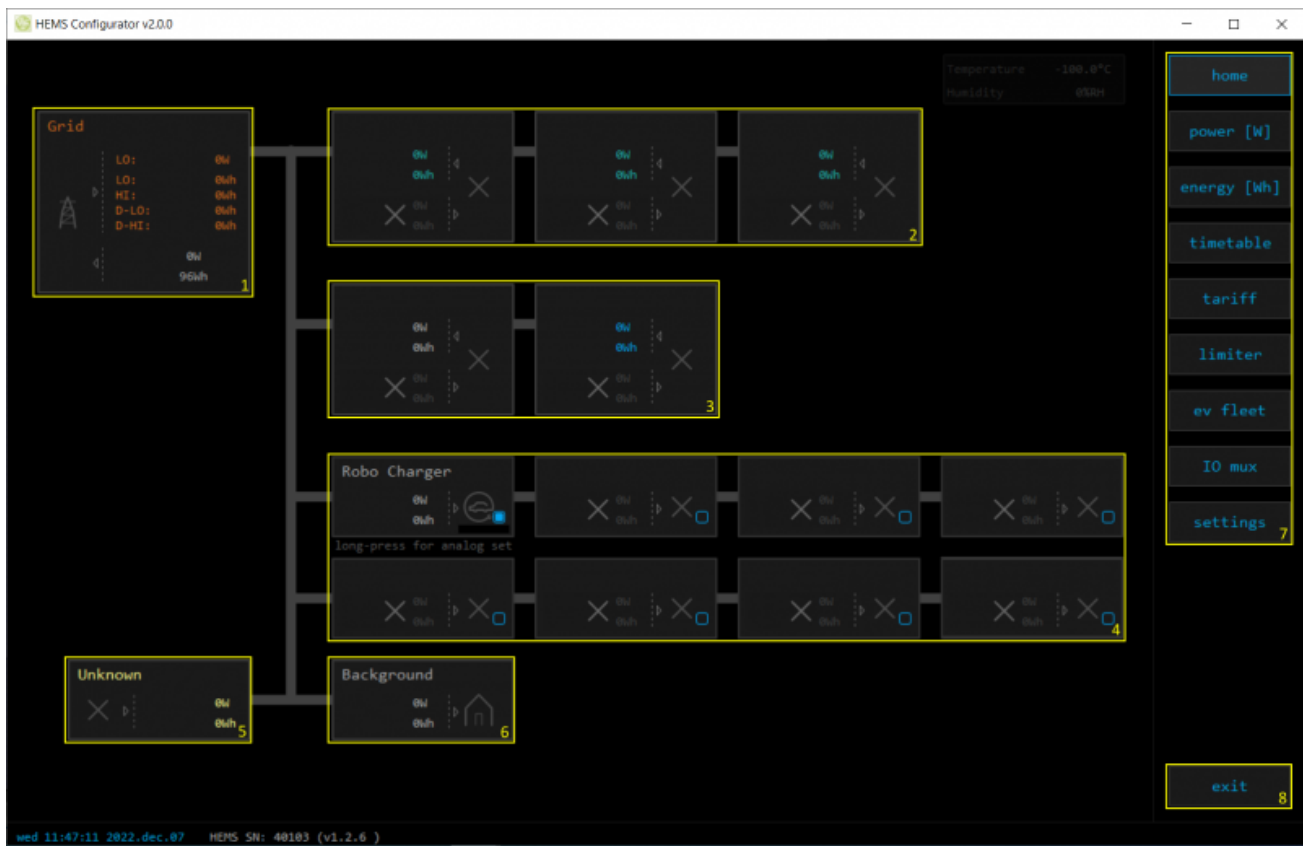
Error table

RDC Charger recovers error automatically. To delete error by yourself long press button on charger housing or on application. **Charging is stopped while error is active. If red light still flashes, please read table below.**

Error	Possible causes	Possible solution
CP positive voltage CP negative voltage	Measured voltage on CP pin is out of range.	Check your charging cable and plug. Reconnect your EV. If error still appears, please contact your EVSE service.
RCD sensor trip	DC current leak detected.	Please try to connect another EV, if error still appears, please contact your EVSE service. Otherwise, please contact an authorized car service department.
RCD sensor malfunction	RCD sensor is damaged or not connected.	Please contact your EVSE service.
Undervoltage Overvoltage	Supply voltage is out of range.	Please contact your EVSE installer.
Charge with ventilation	EV requests charging with ventilation and "Charging with ventilation" is not enabled on configurator	Enable "Allow charging with ventilation" if charged EV is located in ventilated area.
PS reading error	No communication with internal power sensor.	Please contact your EVSE service.
Current is higher than allowed	Vehicle draws more power than allowed.	Please try to charge another EV, if error still appears, please contact your EVSE service. Otherwise, please contact an authorized car service department.
Internal temperature is too high	Temperature inside of charger is too high.	Make sure charger is not exposed to direct sunlight. Please contact your EVSE installer.

HEMS Configurator**home**

Basic system overview.



1. Grid

>	From grid	Tariff (LO, HI, D-LO, D-HI) and power from grid in W Imported energy by tariff in Wh
<	To grid	Power exported to grid in W Exported energy in Wh

2. Plants

<	Produced	Produced power in W and energy in Wh
>	Consumed	Consumed power in W and energy in Wh

3. Storage systems

<	Sourced	Power in W and energy in Wh sourced from storage (battery)
>	Stored	Power in W and energy in Wh stored (to battery)
bargraph and %¹	SOC	Battery State Of Charge

4. Consumers

>	Consumed	Consumed power in W and energy in Wh
[]	Status	Output status for managed consumers
click	Toggle	Click in frame toggles managed consumers output

5. Unknown source

>	Sourced	Power in W and energy in Wh from unknown source
---	---------	---



Accumulate also all differences caused by power sensor inaccuracy

6. Other consumers

>	Consumed	Consumed power in W and energy in Wh by other (not measured) consumers
---	----------	--

7. Page navigation

	home	Home screen
	power [W]	Power screen
	energy [Wh]	Energy screen
	timetable	Timetable screen
	tariff	Tariff screen
	dIm	Limiterscreen
	ev fleet	EV fleet screen
	IO mux	IO mux screen
	settings	Settings screen
8. Exit		
	exit	Close appliction

¹ only for eStore

power

Overview of current power distribution by source / consumer.

	grid-L0	grid-L1	grid-L2	grid-H1	grid-H2	PV	estore	unknown
	0	2342	0	0	0	0	0	0
GRID SUP:	2342		0		0	0	0	0
PLANT SUP:	0		0		0	0	0	0
STORAGE SUP:	0		0		0	0	0	0
TOTAL:	2342		0		0	0	0	1
grid	0					0	0	0
PV	37	0	37	0	0	0	0	0
estore	0	0	0	0	0	0	0	0
Background	0	0	0	0	0	0	0	0
Robo Charger	0	0	0	0	0	0	0	0
EVSE c40106	400	0	400	0	0	0	0	0
DHW	0	0	0	0	0	0	0	0
EVSE c31498	0	0	0	0	0	0	0	0
EVSE INCH	0	0	0	0	0	0	0	0
EVSE c101	0	0	0	0	0	0	0	0
HP	1995	0	1995	0	0	0	0	0
Iskra	206	0	0	0	0	0	0	0

1. Sourced power

Sourced power for each source

Sums per source type

Total of all sourced power

2. Consumed power

Power for each consumer

3. Power distribution

Partial distributed power

4. Submeter (Green outline)

Power meter is not part of internal circuit

HEMS Configurator v2.0.1

	GridLO	GridHI	GridLO	GridHI	PV	eStore	unknown
	0	2342	0	0	0	0	0
	GRID SUP: 2342				PLANT SUP: 0	STORAGE SUP: 0	0
					TOTAL: 2342		
Grid	2	0			0	0	0
PV	37	0	37	0	0	0	0
eStore	0	0	0	0	0	0	0
Background	0	0	0	0	0	0	0
Robo Charger	0	0	0	0	0	0	0
EVSE c40100	400	0	400	0	0	0	0
OHV	0	0	0	0	0	0	0
EVSE c31490	0	0	0	0	0	0	0
EVSE INCH							
EVSE c101							
HP	1905	0	1905	0	0	0	0
Iskra	2068	0	0	0	0	0	0

home
power [W]
energy [Wh]
timetable
tariff
limiter
ev fleet
IO mux
settings
exit

tue 14:16:04 2022.dec.13 HEMS SN: 40000 (v1.2.7b)

1. Sourced power distribution

How sourced power is consumed by each consumer

2. Consumed power distribution

Who sources consumed power

energy

Energy overview of a given time distributed by sources / consumers.

	grid0	grid1	grid-L0	grid-H1	PV		estore	unknown	
	327434	431527	0	0	2918		3380	0	
	GRID SUP: 758961				PLANT SUP: 2918		STORAGE SUP: 3380	0	
	TOTAL: 765259							1	0
grid	4103				3925		100	0	
PV	19001	11098	7339	0	0		563	0	
estore	3808	2450	1358	0	0		0	0	
Background	0	39412	-42052	0	0	124	2514	0	
Robo Charger	486696	154864	331514	0	0	309	7	0	
EVSE c40106	26144	2	26029	0	0	12	99	0	
DHW	669	0	667	0	0	0	1	0	
EVSE c31498	105933	63412	33302	0	0	9134	3	0	
EVSE INCH									
EVSE c101									
HP	8914	0	8869	0	0	0	44	0	
Iskra	75655	327807	428748	0	0	0	0	0	

Energy since: sun 00:00:0000 00:00:00 5

reset all
long-press 6

home
power [W]
energy [Wh]
timetable
tariff
limiter
ev fleet
IO mux
settings
exit

tue 14:18:23 2022.dec.13 HEMS SN: 40000 (v1.2.7b)

1. Sourced energy

Sourced energy for each source

Sums per source type

Total of all sourced energy

2. Consumed energy

Energy for each consumer

3. Energy distribution

Partial distributed energy

4. Submeter (Green outline)

Power meter is not part of internal circuit

5. Energy since

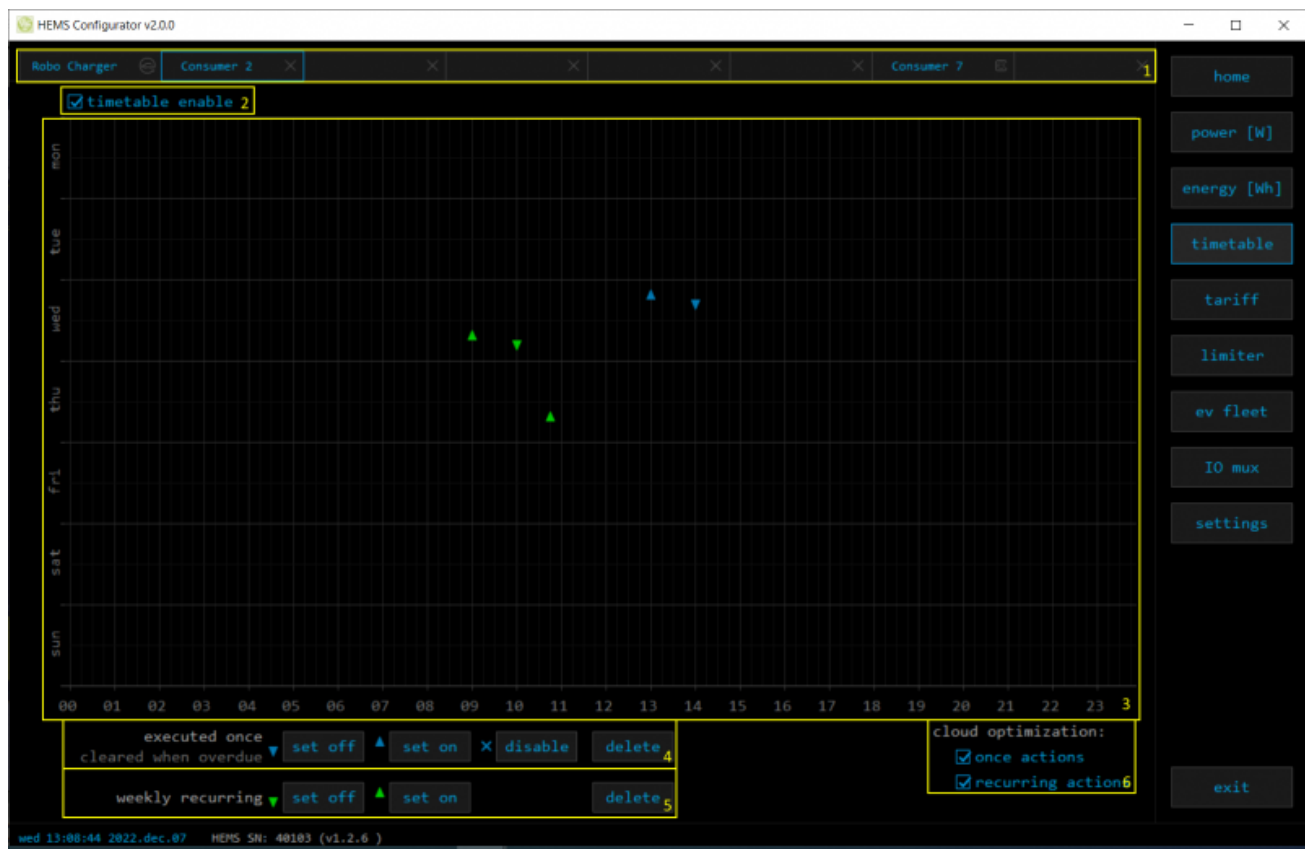
Date and time since energy is recorded

6. Reset all

Long-press to reset all energy counters

timetable

Weekly timetable for managed consumers.



1. Managed load menu

Switch between managed loads

2. Enable checkbox

When un-checked timetable is not executed

3. Events grid

Events displayed in weekly grid (15 min resolution)

Click to select time and set event by clicking buttons below

4. Once actions (top priority timetable actions)

Actions are executed and then automatically cleared.

“Disable” action will just disable recurring action.

5. Recurring actions (low priority actions)

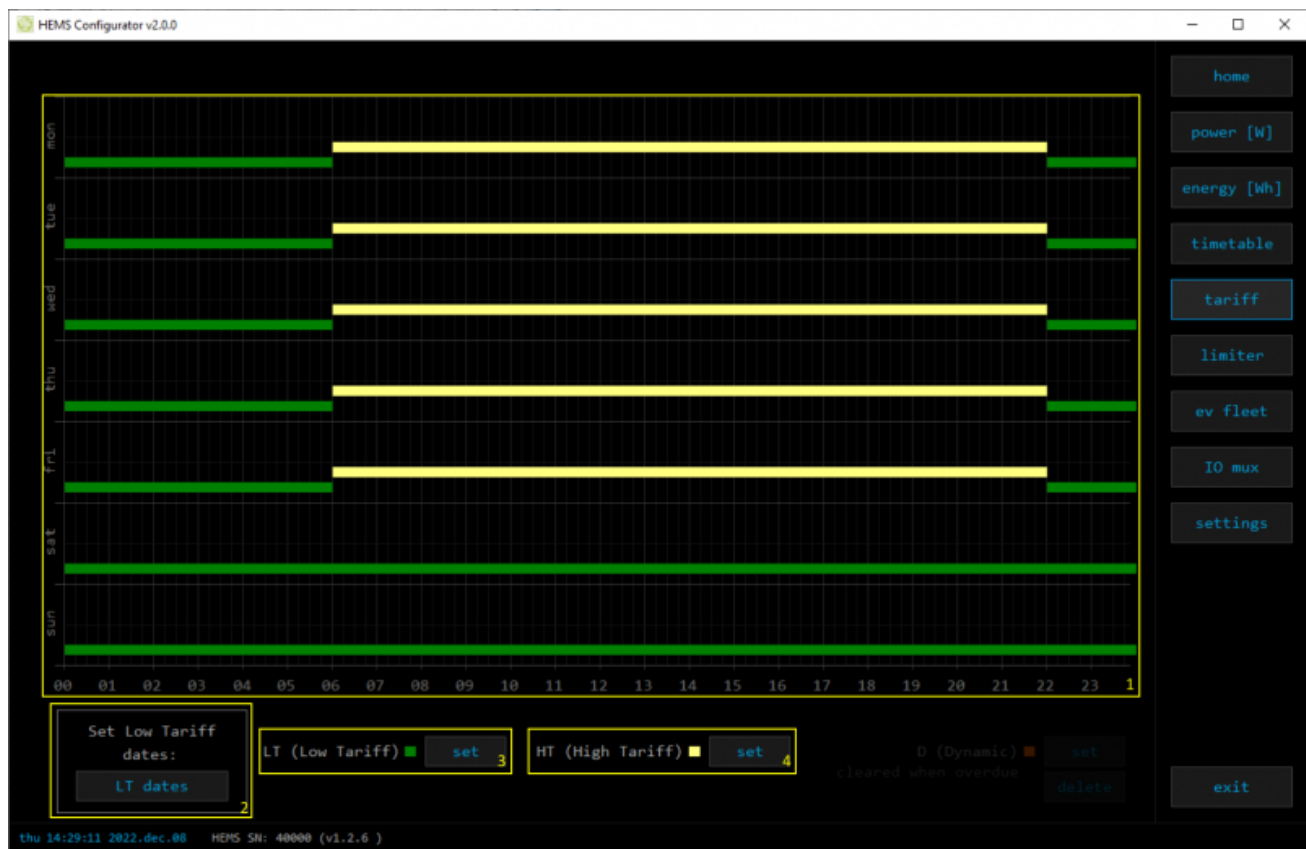
Actions are executed each week.

6. Cloud optimization

When enabled (checked) cloud optimization is enabled.

tariff

Weekly tariff timetable for grid energy per tariff distribution.



1. Tariff grid

Graphical weekly timetable with tariffs.

Click to select term, click-and-drag to select multiple terms.

2. Low tariff dates

Set low tariff dates for holidays.

3. Low tariff

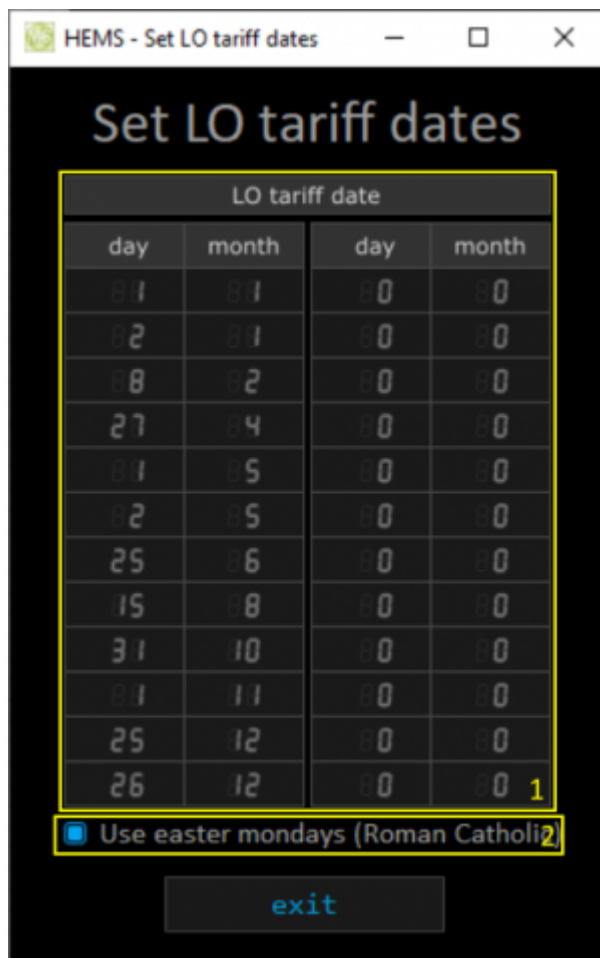
Set low tariff for selected terms.

4. High tariff

Set high tariff for selected terms.

lo tariff dates

Holiday dates when tariff is low



1. Date table

Up to 24 days when tariff is low on holiday

2. Use easter mondays

Use preprogrammed roman-catholic easter monday holidays

Dynamic Load Management

Overview and configuration of DLM

The screenshot displays the 'Dynamic Load Management' configuration window in the HEMS Configurator v201. The window is divided into several sections:

- Grid current limit [A]:** A table showing current limits for L1, L2, and L3 phases. The 'MAX current limit' is set to 20 A for all phases. There are also sections for 'Enable cluster slave connection' and 'Enable limiting from cloud', both with checkboxes checked and associated current limits.
- Power [W] and Current [A] Table:** A large table with columns for Total, L1, L2, L3 power and current. It lists various components like Grid, Pv, eStore, RDX Charger, Main PS, OMS, RDX 31490, EVSE 21CH, RDX 40001, HP, and Background. The 'RDX Charger' row is highlighted with a yellow status icon and a priority of 'Limit first'.
- Voltage [V] and Phase order:** Columns for L1, L2, L3 voltage and phase order (e.g., L1|L2|L3, L3, L2, L1|L2|L3).
- Priority:** A column indicating the priority of each device, such as 'Limit first', 'No limiter', or 'No limiter'.
- Grid FREQUENCY [Hz]:** Set to 50.0.
- Sidebar:** A vertical list of buttons: home, power [W], energy [Wh], timetable, tariff, DLM (highlighted), ev fleet, IO mux, settings, exit, and autodetect.

1. Grid Current limit

MAX current limit	Current limit threshold for main grid fuse
Enable cluster slave connection	Current limit threshold if charger lost connection with master
Enable limiting from cloud	Current limit threshold if charger lost connection with cloud

2. Consumer management

Turn consumers on or off

3. Power

Total power and power for each phase

4. Current

Current for each phase

5. Voltage

Voltage for each phase

6. Phase order

First set correct phase order for grid power sensor and then set for other power sensors/devices. **NOTE:** changing grid phase order will NOT apply to phase order of other connected devices!

7. Status and priority



Yellow status when limiter is enabled and active.
Green status when enabled and not active

Priority

Device priority group: no limiter, limit last (last to be limited), limit second, limit first (first to be limited)

8. Grid frequency

Grid frequency measured on grid power meter sensor

ev fleet

Overview and configuration of EVSE station. Up to 7 external EVSE supported.

1. EVSE - RDC Charger

[RDC charger](#)

2. Additional EVSE (charging station) linked to RDC charger

EVSE supports up to 7 charging stations. Settings are as for [RDC Charger](#).

Slave SN: Serial number of slave charger

Green tick → control of slave by master is allowed,

Red X → control of slave by master is disabled.

io mux

Overview and configuration of input/output ports IO mux

HEMS Configurator v2.0.1

IO mux

Wireless relay WR-1 output function			
act.	status	output function	out mode
WR 1	<input checked="" type="checkbox"/>	/	normal
WR 2	<input checked="" type="checkbox"/>	/	normal
WR 3	<input checked="" type="checkbox"/> OK	HP 1 channel 0	Inverted
WR 4	<input checked="" type="checkbox"/>	/	normal
WR 5	<input checked="" type="checkbox"/>	/	normal
WR 6	<input checked="" type="checkbox"/>	/	normal
WR 7	<input checked="" type="checkbox"/>	/	normal
WR 8	<input checked="" type="checkbox"/> OK	HP 1 channel 1	Inverted

1

HEMS input and output function (wired connection)		
	input/output function	out mode
QX0	/	normal
QX1	Digital-2	normal
QX2	Digital-3	normal
QX3	Digital-4	normal
IO12	/	normal
IO13	/	normal
IO14	/	normal
IO15	/	normal
IX0	toggle consumer-1	normal
IX1	toggle consumer-1	normal
IX2	toggle consumer-1	normal

2

Heat pump supported operation mode					
	Off	Reduced	Normal	Increased	Increased + Enter number add. heater of channels
Heat pump 1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> 2
Heat pump 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Heat pump 3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Heat pump 4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> 3

3

Slave device IP address		
Device	IP address	SN
Grid	0.0.0.0	0
PV	0.0.0.0	0
eStore	0.0.0.0	0
Robo Charger	0.0.0.0	0
EVSE c40106	192.168.0.210	40106
DMU	0.0.0.0	0
EVSE c31490	192.168.0.152	31490
EVSE INCH	192.168.0.107	0
EVSE c101	192.168.0.103	0
HP	0.0.0.0	0
Iskra	0.0.0.0	0

4

home

power [W]

energy [Wh]

timetable

tariff

limiter

ev fleet

IO mux

settings

exit

tue 14:37:30 2022.dec.13 HEMS SN: 40000 (v1.2.7b)

1. Wireless relay WR-1 output function

In the left column are WR modules **WR-1** (max 8) with corresponding status (active + communication status). To each WR could be assigned HEMS function (e.g. digital, linker reset, router reset, heat pump channel etc) with output mode (normal or inverted).

2. HEMS input and output function (wired connection) - not for EVSE available

In the left column are MC controller ports to which could be assigned MC-230 functions (digital, linker reset, router reset, etc) with output mode (normal or inverted).

Default settings are for e.g. QX0 → digital 1 while digital 1 is defined for consumer 1 on settings page. Change to define new function role to QX0 port e.g. for linker reset

Enable consumer at input IX0,IX1 or IX2 means that dedicated consumer will be managed (ON/OFF) by input signal on IX0,IX1 or IX2. For example, if thermostat signal is wired to IX0 port and “Enable consumer 1” to IX0, while thermostat is active, consumer 1 is active and otherwise.

Limitations: one temperature sensor is allowed, one consumer could be managed by one input only.

3. Heat pump supported operation mode

To control Heat pump by EVSE, define supported operation(control) mode based on heat pump specification. E.g. SGRHP supports external control by two channels (Off, Normal, Increased and Increased + additional heater) thus select them in table to enable functionality.

Note: Before selecting modes, heat pump must be defined in setting page!

4. Slave device IP address

For device (PV inverter or external EVSE) define its IP address.

settings

The screenshot displays the HEMS Configurator v201 interface. The main window is titled "System settings" and contains several sections:

- System Information:** HEMS SN: 40000 (v127b), eStore SN: 16853 (enable), HIQ Home SN: 0 (enable), Virtual grid PS: (enable), Internal temperature: 29,9°C, Modbus cycle times (wired, wireless, TCP).
- IP Configuration:** IP address: 192.168. 0.166, DHCP status, static IP details (address, mask, gateway, DNS server), and buttons for "apply and save" and "cancel".
- SOURCES and CONSUMERS Tables:** Lists various energy sources (Grid, PV, eStore, Unknown) and consumers (RDX Charger, Main PS, DPM, EVSE, HP, Iskra, Background) with management options (add, del) and meter/sub information.
- Permanent memory parameters:** Includes buttons for "init parameters", "save parameters", "read parameters", "autosave parameters", "backup", and "restore".
- Navigation and Status:** A sidebar on the right contains buttons for "home", "power [W]", "energy [Wh]", "timetable", "tariff", "DLM", "ev fleet", "IO mux", "settings", "exit", and "autodetect".

A second window titled "HEMS - Wireless Modules Pairing" is shown below, displaying instructions for pairing wireless modules:

Wireless WM and WR modules pairing


To pair a new module(s):

1. Turn ON target module(s)
2. Within 10 seconds press "Pair module(s)"

Buttons: "Pair module(s)", "exit"

1. System settings

eStore	c.....	eStore serial number (automatically detected or can be entered manually).
[] enable		When selected EVSE will obtain necessary data (power, voltage...) directly from battery storage system, no need to additional power sensor.
[detect]		eStore address is cleared and new eStore can be detected.

HIQ Home	c.....	HIQ Home serial number (automatically detected or can be entered manually).
	[] enable	When checked HEMS will read Grid power and energy from HIQ Home (so there is no need to duplicate power-sensor).
	[detect]	HIQ Home address is cleared so new can be detected.
Virtual grid PS	[] enable	Select if system is without main grid power meter. Energy, power and currents are calculated from other power meters.
Internal temperature	Temperature inside of EVSE	
Modbus (wired) cycle time	Cumulative reading time of all wired power sensor in ms	
Modbus (wireless) cycle time	Cumulative reading time of all wireless connected power sensor in ms	
Modbus (TCP) cycle time	Cumulative reading time of all TCP connected devices in ms	
IP address	IP address of EVSE	
DHCP	Select for DHCP to obtain an IP address automatically → apply and save to confirm.	
Static IP	Set static IP to EVSE → apply and save to confirm.	
Note: If static IP settings are wrong, we won't be able to access RDC Charger any more!!! Restart EVSE with jumper between IX1-GND to return RDC Charger to DHCP settings.		
2. Sources and Consumers settings table		
SOURCES	Source name	
icon	Source icon	
3. Device status		
Status	Status OK, Warning, Error, Detected	
4. Device message		
source and consumer management	Source or consumer power sensor management	
	message	Messages related to source or consumer power sensor
		Power sensor is connected via WM-1 module
5. Device configuration		
Configuration	add	Associate new power sensor to source or consumer
	del	Disassociate power sensor from source or consumer & configure it as new power-sensor
6. Device type		
meter	Source or consumer power-sensor type	
configuration	in/ex	Power plant connection ¹
7. Submeter option		
sub	Check if this power meter or device is not part of internal circuit. Energy division for this device is ignored and outlined in green color.	
8. New device		
Detected new power sensor.		
9. Device output		
output	Select consumer output type	

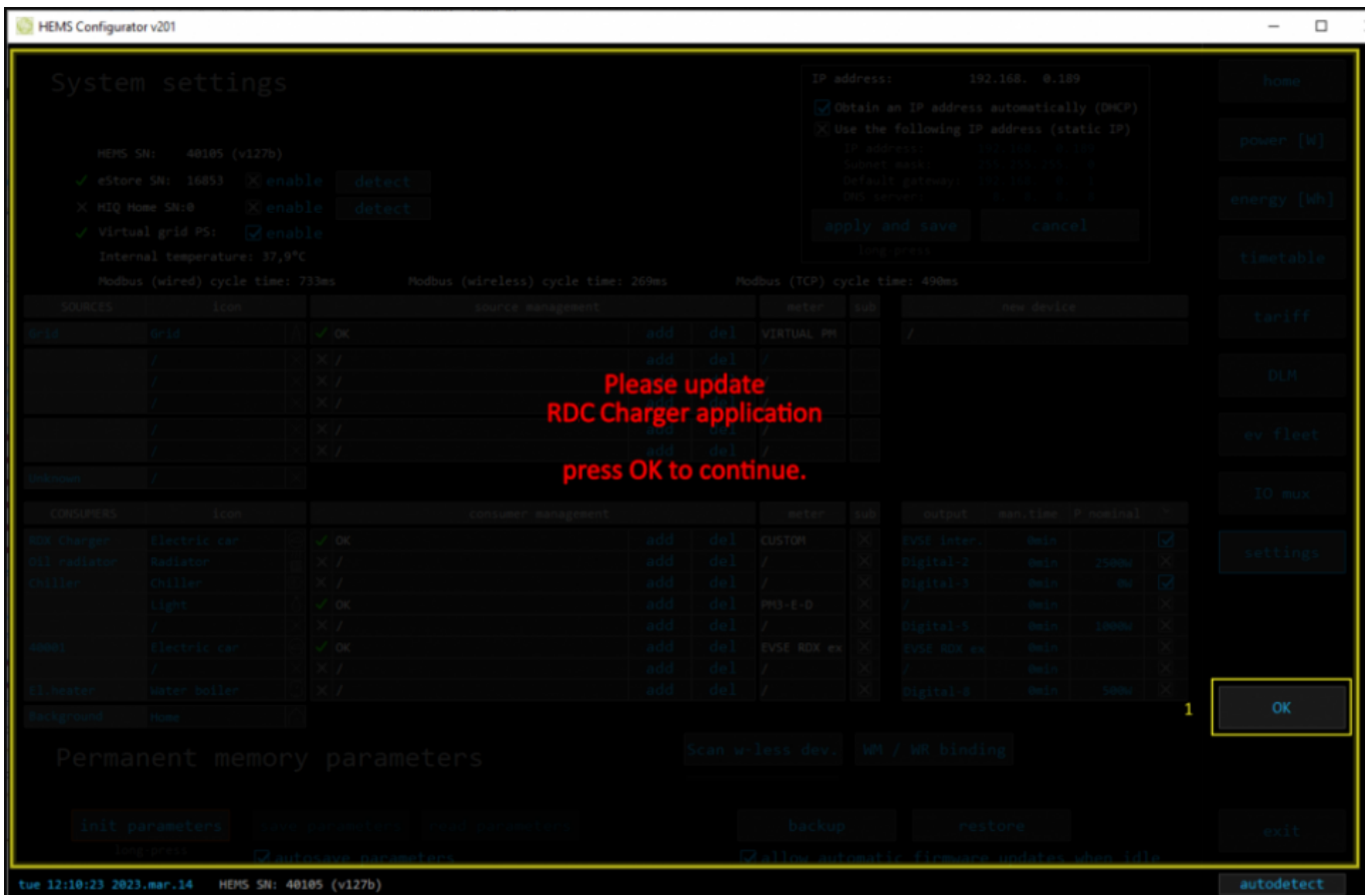
man. time	Managed consumer manual override timer
P nominal	Enter power for device in case where power sensor is not assigned to device.
clock	Enable timetable
10. Permanent memory parameters	
[init parameters]	Init all parameters to default values
[save parameters]	Save all parameters to permanent memory
[read parameters]	Read all parameters from permanent memory
[] autosave parameters	Parameters will be automatically saved to permanent memory in 15 minutes after last parameter change
11. WM / WR settings	
Scan w-less dev.	Press to start scanning for power sensors wirelessly connected via WM-1 module as well as for WR-1 relay. Scanning is active for 5 minutes.
WM / WR pairing	Press to pair new WM-1 or/and WR-1.
12. Backup / Restore to PC	
[backup]	Backup all parameters to PC
[restore]	Restore all parameters from PC backup ²
13. Autodetect	
[autodetect]	Click to find EVSE in local network.

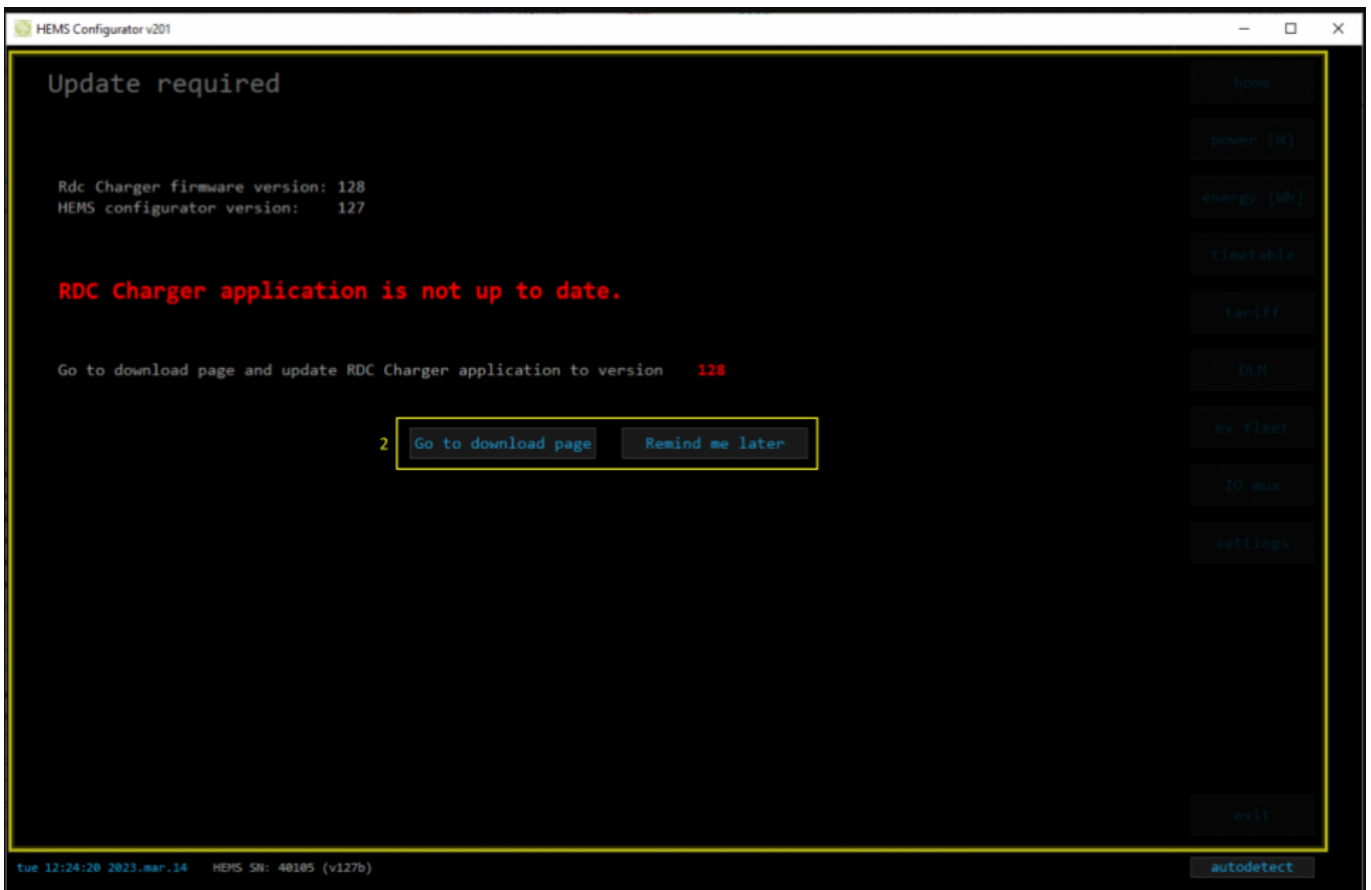
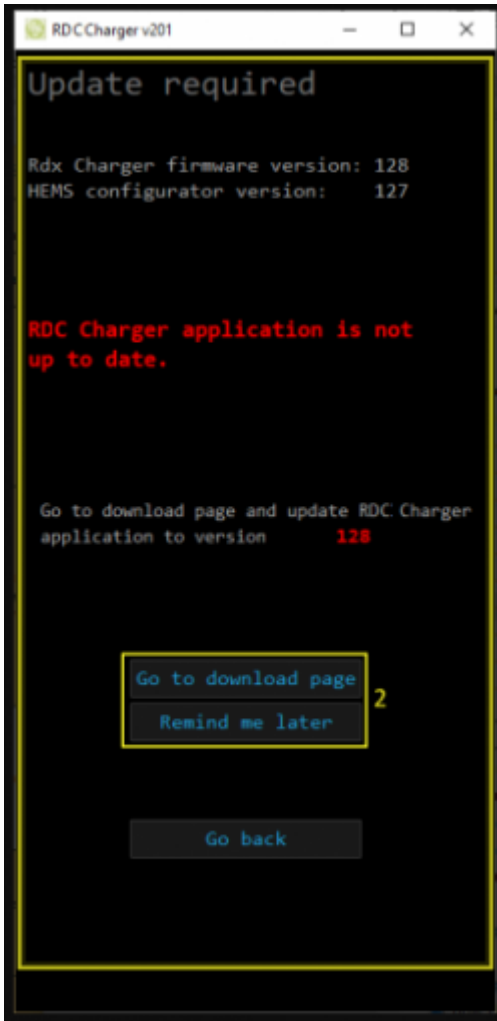
¹ only for the first power plant

² older versions of backup files may be used. Any unsuccessfully backup or restored parameters will be displayed but operation will end successfully if you use **continue**.

RDC Charger Update

RDC Charger application will detect update automatically.





Procedure to update RDC Charger application is as follows:

- press OK and **make sure to follow** further instructions on page (1) (2)
- hit the button Go to download page (2) which will open internet browser on download page, download and install
- hit the button Remind me later to postpone update for 5 minutes

