

HOME BOX SMART DYNAMIC CHARGING



Ratio
ELECTRIC

Manual

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IMPORTANT SAFETY INSTRUCTIONS

Carefully read these instructions and the charging instructions in your vehicle owner's handbook before charging your electrical vehicle.

Take special note of all information marked with the following symbols:

Note: *This means pay particular attention. Notes contain helpful suggestions*



Caution: *This symbol means be careful. You are capable of doing something that might result in damage to equipment.*



Warning: *This symbol means danger. You are in a situation that could cause bodily injury. Before you work on any electrical equipment, be aware of the hazards involved with electrical circuitry and standard practices for preventing accidents.*

Safety Guidelines

- ❖ Use this Home Box to charge electric vehicles equipped with a conductive charge port only. See the vehicle's owner's handbook to determine if the vehicle is equipped with a conductive charge port.
- ❖ Make certain the Home Box's supply cable is positioned so it will not be stepped on, tripped over, or otherwise subjected to damage or stress.
- ❖ There are no user serviceable parts inside. Refer to the Customer Support section in this manual for service information. Do not attempt to repair or service the Home Box yourself.
- ❖ Do not operate your Home Box if it or the supply cable or housing is visibly damaged. Switch off the MCB in the electrical cabinet and contact your Service Representative for service immediately. Refer to the Customer Support section in the manual for information on the Service Representative in your area.

SAFETY INFORMATION



Warning: When using electric products, basic precautions should always be followed, including the following:

- Read all the safety warnings and instructions before using the product. Failure to follow the warnings and the instructions may result in electric shock, fire and / or serious injury.
- This device should be supervised when used around children.
- Do not put fingers into the electric vehicle connector.
- Do not use this product if the flexible power cord or EV cable are frayed, have broken insulation, or any other signs of damage.
- Do not use this product if the enclosure or the EV connector are broken, cracked, open, or show any other indication of damage



Warning: If, at any time, you think the equipment is unsafe, switch off the MCB in your electrical cabinet and immediately contact Customer Support for service. Do not use your Home Box until the problem is identified and corrected.



Caution: Children should not be allowed to use this Home Box. Do not allow children to play in or around the Home Box. Close supervision of children is necessary when the Home Box is used.



Caution: Do not open the enclosure.

Note: This Home Box is designed according the IEC61851 Mode 3 standard.

Note: This product must be grounded/protective earthed. If it should malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. This product is equipped with a cord having an equipment grounding conductor and a grounding plug.



Warning: Improper connection of the equipment-grounding conductor is able to result in a risk of electric shock. Check with a qualified electrician or serviceman if you are in doubt as to whether the product is properly grounded.

INSTALLATION HOME BOX

1. The installation must be done by a qualified and licenced electrician according the local legislation.
2. The electrical installation must be free of power during the entire installation period.
3. Since this Charging Unit uses circuits that reference to ground, no Megging must be done after connecting to power.
4. Wiring and protection:

Version	Wiring *	Mains Circuit Breaker (MCB)	Residual Current Device (RCD)
32A / 1 Phase	3G6,00mm ²	40A B/C-Characteristic	30mA, Type A
32A / 3 Phase	5G6,00mm ²	40A C-Characteristic	30mA, Type A

* For cable length upto 25m

PLEASE NOTE: The Charging Station does not include the MCB or RCD. These must be installed separately in the electrical cabinet.

5. Open bottom cover of the Charge Station (5 screws – see picture). Carefully brake out required cable opening for incoming power cable and charge cable.
Use supplied M25 cable gland to fix power cable from the bottom. Use supplied grommet to fix power cable from the back. Use supplied M25 cable gland to fix charge cable.



6. Use 4 wood screws M4,5x35mm to mount Charging Station on the wall. The Charging Station should be installed between 0,80m and 1,20m from bottom to the ground.

7. Connect in-coming power to the left terminal block.

Single Phase :

L1=Brown

N= Blue

Earth= Green/Yellow

3 Phase

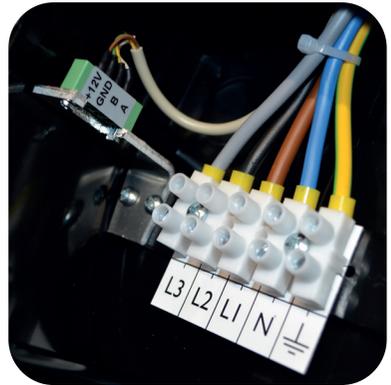
L1=Brown

L2=Black

L3=Grey

N=Blue

Earth=Green/Yellow



8. Close bottom cover and carefully slide metallized cover over the Charge Station.

INSTALLING SENSORBOX AND CURRENT TRANSFORMERS

The HomeBox Smart is capable of dynamically adjusting the charging current, depending on other loads that use the same mains connection. We call this smart mode, and it will require the following extra items:



- Current Transformers (type SCT 013-000) one for each phase (usually three are required)
- Sensorbox
- 4+ wire cable for the connection between HomeBox Smart and Sersorbox

The Sensorbox should be placed where the Mains connection enters the building. Usually just after the kWh meter, this way it will be able to measure the total current per phase and send this information to the HomeBox Smart.

In order to measure the current, Current transformers are used. Clip them around the L1, L2 and L3 wires and plug the other end into the Sensorbox.

The data cable coming from the Sensorbox should be connected to terminals A, B, +12V and GND.

CONFIGURING THE HOME BOX SMART

The HomeBox Smart has a display, which shows the charging status and the measured current per phase. It is possible to configure all settings using the build in menu. Three buttons below the display are used for navigation the menu.

Hold the center button for 2 seconds to enter the menu. You can now use the left and right buttons to go to the different menu options.

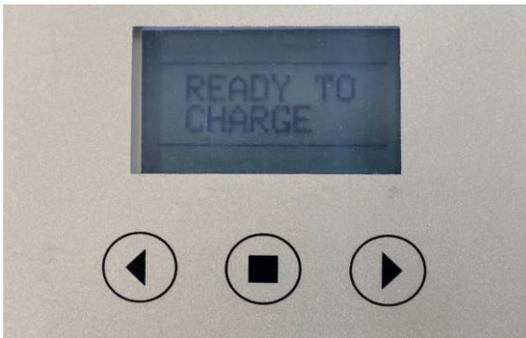
Pressing the center button, selects the option, and allows you change the value (for example change the charging current).

What is displayed depends on the options you have set.

If you enabled smart mode (MODE->SMART) then the MAINS and MIN option will be shown.

If you selected the CONFIG->FIXED option, a fixed cable is to be used, and therefore the cable LOCK option is removed. Instead a CABLE current option is shown, to let you set the max current the charging cable can handle.

The EXIT menu option stores the settings, if you don't want to store the settings, wait 2 minutes (or disconnect the mains) and the setup menu will be exited without saving any settings.



ALL MENU OPTIONS

- CONFIG:** Configure HomeBox Smart with Type 2 Socket or Fixed cable
 SOCKET HomeBox Smart has a type 2 socket
 FIXED HomeBox has a fixed charging cable
- MODE:** Use Normal HomeBox mode or Smart Mode (requires Sensorbox)
 NORMAL The EV will charge with the current set at MAX
 SMART The EV will charge with a dynamic charge current, depending on Sensorbox data and MAINS, MAX, MIN settings
- LOADBL:** Load Balancing mode for 2 – 4 HomeBox's
 DISABLE No load balancing is used
 MASTER Set one of the HomeBox's to Master
 SLAVE1-3 And the rest to Slave 1-3, when using load balancing
- MAINS:** Set Max Mains current (*)
 10-99A
- MAX:** Set MAX charge current for the EV
 10-80A
- MIN:** Set MIN charge current for the EV (*)
 6-16A
- LOCK:** Enable or disable the locking actuator (config = socket)
 DISABLE No lock is used
- CABLE:** Set the max current the charging cable can handle (config = fixed)
 13-80A
- CAL:** DO NOT CHANGE SETTINGS
- ACCESS:** DO NOT CHANGE SETTINGS
- RCMON:** DO NOT CHANGE SETTINGS

(*) = Available in Smart Mode and when Load Balancing has been set to Master

LOAD BALANCING

It is possible to connect up to 4 HomeBox modules to each other and let them share one mains supply.

Software configuration

Configure the HomeBox's load balancing option (LOADBL) and set one module to MASTER, the others to SLAVE 1,2,3.

Make sure there is only one Master, and the Slave numbers are unique. Example: for a two unit Load Balancing setup, set the first module to Master and the second to Slave 1.

On the Master configure the following:

MODE	Set this Smart if a Sensorbox with CT's is used to measure the current draw on the mains supply. It will then dynamically change the charge current for all connected EV's. If you are using a dedicated mains supply for the EV's you can leave this set to Normal.
MAINS	Set this to the capacity of the mains supply. This will be the maximum current all EV's combined will use.
MAX	Set the maximum charging current for the EV connected to this HomeBox.
MIN	Set to the lowest allowable charging current for all connected EV's

On the Slave's configure the following:

MAX	Set the maximum charging current for the EV connected to this HomeBox
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After setting the Slave's load balancing option, there will be an error message on the display: "ERROR NO SERIAL COM"

This indicates, that the Slave unit was not able to communicate to the Master. This message will disappear after the modules are correctly wired up.

Hardware connections

Connect the A, B and GND connections from the Master to the Slave(s). So A connects to A, B goes to B etc...

If you are using the Sensorbox, you should also connect the A, B and GND wires to the same screw terminals of the HomeBox. Make sure that the +12V wire coming from the Sensorbox is connected to only one HomeBox. This wire will provide power to the Sensorbox.

ERROR MESSAGES

If an error occurs, the HomeBox will stop charging and display one of the following messages:

ERROR NO
SERIAL COM

No signal from the Sensorbox or other HomeBox (when load balancing is used) has been received for 10 seconds. Please check the wiring to the Sensorbox or other HomeBox.

ERROR NO
CURRENT

There is not enough current available to start charging, or charging was interrupted because there was not enough current available to keep charging. The HomeBox will try again in 60 seconds.

ERROR
HIGH TEMP

The temperature inside the module has reached 65° Celsius. Charging is stopped. Once the temperature has dropped to 55° Celsius charging is started again.

AVAILABLE HOME BOX OPTIONS

Key Switch : If your Charging station is equipped with a key switch operation can be switched off. Turn the key to position “0”. To turn on put the key in position “I” . The key does not switch off the charger completely, but prevents unwanted use.

KwH meter : If your Charging station is equipped with a KwH meter it is possible to measure power usage.
All our meters are MID certified.

SPECIFICATIONS

Charging System Socket	IEC 61851 Mode 3
Outlet	IEC 62196 Type 1 and Type 2
Power input	single-phase or 3 phase, 230V-400V, 16A and 32A
Power output	3.7kW, 7.4kW, 11kW, 22kW
Dimensions	400mm x 250mm x 105mm
Housing	PC/ABS
Weight	4 kg
Environment Operating Temperature	IP54, rain-tight -25°C to +40°C
Marking	CE

MAINTENANCE

The Home Box requires no maintenance other than occasional cleaning.



Warning: Switch off your Home Box before cleaning the unit.



Warning To reduce the risk of electrical shock or equipment damage, be cautious while cleaning the connectors and case.

Clean the Home Box using a soft cloth lightly moistened with mild detergent solution. Never use any type of abrasive pad, scouring powder, or flammable solvents such as alcohol or benzene.

FCC INFORMATION

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

This product has been designed to protect against Radio Frequency Interference (RFI). However there are some instances where high powered radio signals or nearby RF-producing equipment (such as digital phones, RF communications equipment, etc.) could affect operation.

If interference to your charge station is suspected, we suggest the following steps be taken before consulting your Service Representative for assistance:

1. Reorient or relocate nearby electrical appliances or equipment during charging.
2. Turn off nearby electrical appliances or equipment during charging.



Caution: Changes or modifications to this product by other than an authorized service facility may void FCC compliance.

WARRANTY INFORMATION

Ratio Electric B.V. warrants this product to be free from defects in material, manufacture and design for a period of one year after the date of purchase. If this product is defective in materials, manufacture or design during this warranty period, Ratio Electric B.V. will, at its option, repair or replace the product.

Repair parts and/or replacement products may be either new or reconditioned at Ratio Electric B.V. discretion.

This limited warranty does not include service to repair damage from improper installation, improper connections with peripherals, external electrical fault, accident, disaster, misuse, vandalism, unauthorized alteration or repair, abuse or modifications to the product not approved in writing by Ratio Electric B.V.

Any evidence of an attempt to disassemble the Home Box will void this warranty.

Any service repair outside the scope of this limited warranty shall be at applicable rates and terms then in effect.

CONTACT / CUSTOMER SUPPORT



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