User Manual

Keywatt 24 Wallbox CE

DUM020403-EN_V001a

Beyond Charging

The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein. This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications. It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof. Neither IES Synergy nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information contained herein. If you have any suggestions for improvements or amendments or have found errors in this publication, please notify us.

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All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.

When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

Failure to use IES Synergy software or approved software with our hardware products may result in injury, harm, or improper operating results.

Failure to observe this information can result in injury or equipment damage.

Table of content

1. Safety notes

Notice

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a Danger hazard statements indicates that an electrical hazard exists, wich result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personnal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, **will result** in death or serious injury.

⚠ WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **can result** in death or serious injury.

⚠ CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, **can result** in minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

Please note

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by IES Synergy for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

2. About the manual

Purpose of this manual

Technical documentation is an integral part of a product. Until it is disposed of, always keep the technical documentation close to the unit at hand, as it contains important information. Provide technical documentation to the person concerned if you sell, assign or lend the product.

This guide aims to provide informations needed for installation and end-of life of the Keywatt 24 Wallbox multi-standard. This guide must be read with other related documents. This guide is intended for qualified personnel to install on the charging stations

Document scope

This guide concerns the following charging stations:

- P/N: WBG3X_TRI S 3PN CHARGER V3
- P/N: WBG3X_BI S 3PN CHARGER V3

Related documents

Document title	Product	Reference
Installation Manual	WBG3X V3	DIM020403-EN
User Manual	WBG3X V3	DUM020403-EN
Service Manual	WBG3X V3	DMM020403-EN

User comments

We invite you to write to us to communicate any inaccuracies or omissions, or to make general comments or suggestions regarding the quality of this manual.

E-mail : support@ies-synergy.com

3. General Safety instructions

NOTICE

SAVE THIS MANUAL

- To ensure proper and safe operation, please read these user instructions carefully and keep them for future reference.
- This manual contains important instructions for the DC quick charger that shall be followed during installation, operation and maintenance of the unit.
- This equipment shall be installed, adjusted, and serviced by qualified electrical personnel familiar with the construction and operation of this type of equipment and associated hazards.
- The locking key, supplied with unit, should be kept in a secure and known location by an individual that has read and understands the content of this manual.
- Do not open the front cover at any time while input power is present.
- Do not operate the unit while the cabinet door is opened or unlocked.

Failure to follow these instructions may result in death, serious injury or equipment damage.

⚠ WARNING

RISK OF ELECTRIC SHOCK, INJURY, AND/OR BURNING

- Only qualified, trained and authorized people will repair, replace or adjust this equipment.
- Make sure the AC input breaker is OFF and measures 0V after the breaker.
- Do not use this product if the cables (input or output) are frayed, have damaged insulation or any other signs of damage.
- Do not use this product if the enclosure or the EV connectors are broken, cracked, opened or show any other indication of damage.
- This equipment employs parts, such as switches and relays, that tend to produce arcs or sparks and therefore, when used in a garage, locate in a room or enclosure provided for the purpose or not less than 500mm (18 inches) above the floor.

Failure to follow these instructions can result in death or serious injury

⚠ CAUTION

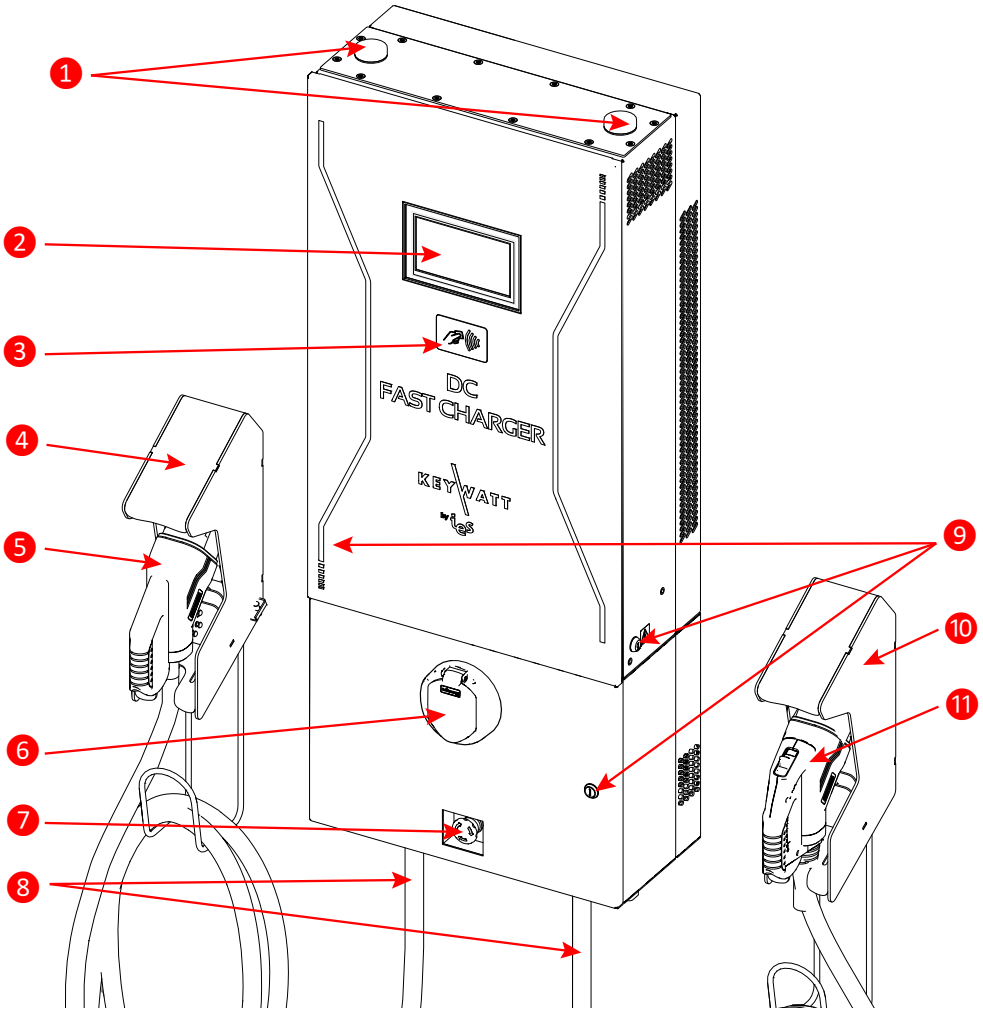
RISK OF DAMAGE TO THE TERMINAL

- Do not use this product if the cables (input or output) are frayed, have damaged insulation or any other signs of damage.
- Do not use this product if the enclosure or the Electrical Vehicle Supply Equipment (EVSE) connectors are broken, cracked, opened or shows any other indication of damage.
- Do not use a cord extension set or second cable assembly in addition to the cable assembly for the connection of the EV to the EVSE.
- This equipment is not intended for use in residential environments and may not provide adequate protection to radio reception in such environments.

Failure to follow these instructions may result in serious injury or equipment damage.

4. Overview

External view



Position	Description
❶	Antenna (x2)
❷	7" touchscreen display
❸	RFID reader
❹	Connector support
❺	Output Combo 2 DC connector
❻	AC socket outlet Type 2 S
❼	Emergency Stop button
❽	Output cable
❾	Key locks
❿	Connector support
⓫	Output CHAdeMO DC connector

Note: May change depending on version or technical modification

5. Specification

Mains supply

Mains supply 3-phase $L_1/L_2/L_3$ + N + PE

DC charge input			
Mains 3-phase voltage range (phase to phase)	V_{AC}	400 V_{AC}	± 10%
Neutral system	TT; TN		
Frequency range	f	50 Hz	± 10%
Rated input current	I_{AC}	38A	Nom
Maximum input current	I_{AC}	42A	Max
Short circuit current	I_{CC}	< 10kA	Max
Power Factor	PF	0,99	Nom
Efficiency	η	95 %	Max
Harmonic current @ nominal network voltage	THDi	< 13 %	Max

AC charge input			
Mains 3-phase voltage range (phase to phase)	V_{AC}	400 V_{AC}	± 10%
Neutral system	TT; TN		
Frequency range	f	50 Hz	± 10%
Rated input current	I_{AC}	32A	Nom
Maximum input current	I_{AC}	35A	Max
Short circuit current	I_{CC}	< 8kA	Max

Technical specification

Input DC charge internal protection			
Inrush current limitation per phase	$I_{INRUSH\ LIMIT}$	< 3 x I_{AC}	Max
Rated Current Fuse (per module)	I_{RATING}	80A	typ
Breaking capacity of fuses	I_{BREAK} Capacity	80 000A	Max
Max earth leakage current	$I_{LEAKAGE}$	< 3,5 mA	Max
Emergency button connection	Yes		
Overvoltage category (IEC60664-1)	III		
Insulation protection Class (IEC60664-1)	Class I		

DC Output			
COMBO 2 output voltage	V_{DC}_max	530 V_{DC}	Max
	V_{DC}_min	200 V_{DC}	Min
CHAdeMO output voltage	V_{DC}_max	500 V_{DC}	Max
	V_{DC}_min	150 V_{DC}	Min
Output current	I_{DC}_max	65A (1)(2)	Max
	I_{DC}_min	1,5A	Min
Max Output Power	P_{OUT}	24kW	Max
Output connector (charging station side)	Permanent mounting		
Car Plug connector	Plug #1	COMBO 2	
	Plug #2	CHAdeMO	
Output cable length	Meters	3,5 (5,2 in option) *5m for Switzerland	-10/+0%

Internal DC output protection			
Hardware and software short circuit protection	Yes		
Software and Hardware over voltage protection	adjustable	+10% max	
Over temperature protection	-	70	°C
Reverse polarity protection	Yes		
DC output Contactor	Yes (2 poles)		
Rated Current Fuse (output)	I_{FUSE}	125	A
Galvanic isolation	$V_{input\ /\ output}$	5200	V_{DC}
Max time for DC line discharge < 60V	$T_{<60V}$	1	s

AC output			
AC Output voltage	V_{AC}_nom	400 V_{AC}	± 10%
AC Output current	I_{AC}_max	32 A	Max
Max Output Power	P_{OUT}	22 kVA	Max
Car Plug socket	Plug #3	AC type 2 S	
Type of connection	Case “B” connection (mode3) Detachable cable		

Output AC charge internal protection		
Inrush current	230A during 100 µs 30A during following second	
Short circuit Socket I^2t	A^2s	75 000
Circuit breaker for AC circuit	50A C-curve	

Embedded Insulation device of charger module	
Response time (tan)	< 3sec. for asymmetrical fault < 62sec. for symmetrical fault
Self test time	At power on and every 60s during charge
Internal resistance Ri of the measuring circuit	1.5Mohms permanent 750Kohms continuous measurement 300Kohms during simultaneous switching measurement
Measurement method	Continuous and switching measurement resistor method
Measuring current Im	< 1,4mA at RF=0
Measurement range (Ran)	20Kohms…300Kohms
Relative uncertainty	±15%
Line L+/L- Voltage (Un)	DC 150V…530V
System leakage capacity Ce	≤ 1µF : response value (Ran) and time (tan) are not guaranteed for capacity above 1µF
Parallelization	⚠ **Warning:** Do not connect the insulation monitor device (IMD) in parallel !! Response value (Ran) and time (tan) are not guaranteed.

Radio Frequency characteristics

The equipment module is designed to provide customers with global network coverage on the connectivity of UMTS/ HSPA+, and it is also fully backward compatible with the existing EDGE and GSM/GPRS networks.

	Frequency band (MHz)		Output power (dBm)	
	Tx	**Rx**	**Min**	**Max**
GSM850/EGSM900 (GMSK)	880-915	925-960	5 ±5dB	33 ±2dB
GSM850/EGSM900 (8-PSK)	880-915	925-960	0 ±5dB	27 ±3dB
DCS1800/PCS1900 (GMSK)	1710-1785	1805-1880	0 ±5dB	30 ±2dB
DCS1800/PCS1900 (8-PSK)	1710-1785	1805-1880	0 ±5dB	26 ±3dB
WCDMA	B1/B2/B4-B6/B8/B19	B1/B2/B4-B6/B8/B19	<-49	24 +1/-3dB
LTE-FDD	B1-B5/B7/B8/B12/ B13/B18-B20/B25/ B26/B28	B1-B5/B7/B8/B12/ B13/B18-B20/B25/ B26/B28	<-39	23 ±2dB
LTE-TDD	B38-B41	B38-B41	<-39	23 ±2dB

RFID reader characteristics

To start a charge, users must swipe a contactless RFID card across the card reader.

Frequency bands	13.56 Mhz
Output power	-5dBuA/m@3m

General & dimensions

External dimensions (mm)	H x W x D	1225 x 507 x 250mm	
Weight (without bracket)	kg	93kg	Max
Type of installation	Wall / Pedestal mounting		
Fixation points	8 screws		
Charger International Protection (IP) (EN60529)	IP55		
Car plug connector IP (EN60529)	COMBO 2	IP24	
	CHAdeMO	IP24 not plugged	
Cooling systems	Heatsink with forced air flow by fans IP55 without air filter		
Noise (1m, all direction)	Db(A)	65dbA (1m)	

Climatic & Environment constraints

Operating temperature (with derating)	-25°C to +50°C[3]		
Storage temperature	-25°C to +60°C		
Relative humidity	RH	10% to 95%	
Installation altitude	Alt	2 000m	Max

Norms & standards	
Radio Equipment Directive (RED)	2014/53/EU
Efficient use of Radio Spectrum (RED)	ETSI EN 301 511 V12.5.1 ETSI EN 301 908-1 V13.1.1 ETSI EN 301908-2 V11.1.2 ETSI EN 301908-13 V11.1.2 ETSI EN 300 330 v2.1.1
Electric vehicle conductive charging system Part 1: General requirement	IEC 61851-1
Electric vehicle conductive charging system Part 23: DC Electric vehicle charging station	IEC 61851-23
Electric vehicle conductive charging system Part 24: Digital communication between a DC charging station and an EV for control of DC charging	IEC 61851-24
Electromagnetic compatibility (EMC)	IEC 61851-21-2
Insulation Monitor Device (IMD)	IEC 61557-1 IEC 61557-8
RoHS	2011/65/EU
Declaration of conformity CE[4]	Yes
EV Ready	Compliant

[1] Max output current will be adapted versus maximum carrying current of the vehicle plug.

[2] Output current can be even reduced with the power derating versus temperature.

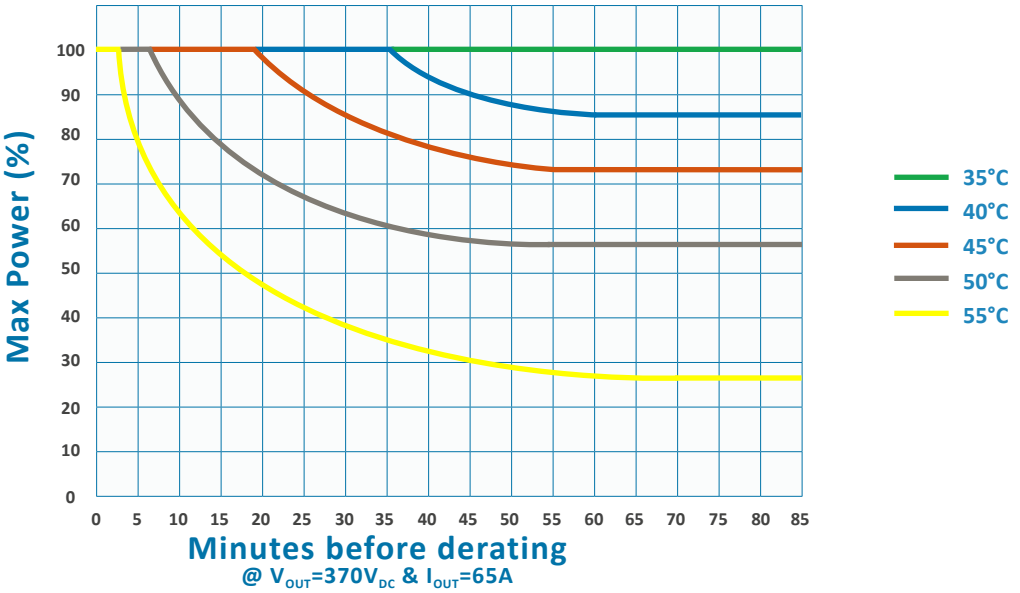
[3] Potential derating above 35°C.

[4] CE marking affixed on the product attest the conformity of the product with applicable requirements of relevent Community harmonization legislation.

Compliance

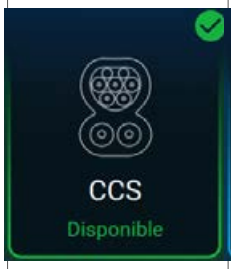
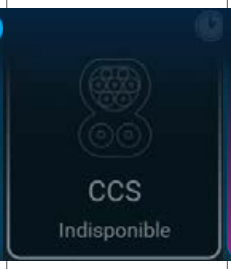
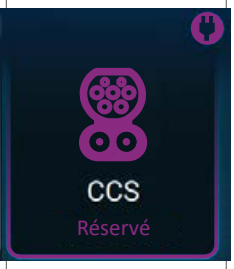
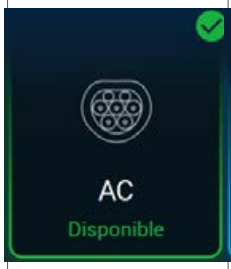
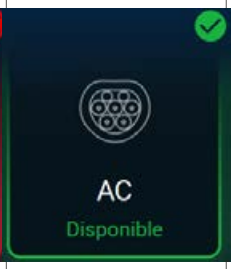
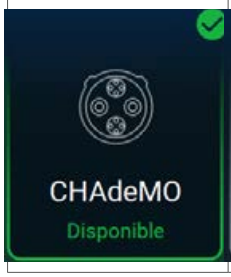
Derating

As a direct correlation exists between the current and ambient temperature a derating curve is provided for all charging station.



6. Utilization

Human/Machine interface (HMI)

CCS/AC/CHAdeMO available	CCS/AC plugged CHAdeMO unavailable Comm. with the EV	CCS/AC charging simultaneously CHAdeMO unavailable.	End of CCS and AC charge Cables connected	AC error detected Dual charging disabled	CCS reserved AC/CHAdeMO available
					
					
					

Note: Applicable in COMBO, CHAdeMO and AC.

Prerequisite

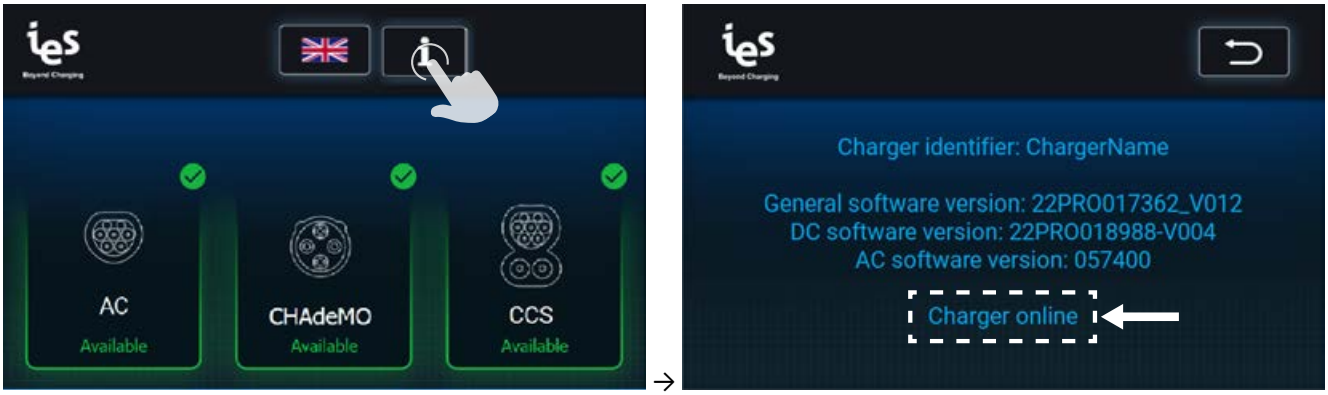
Before starting a charge:

Make sure that the unit is mounted according to the installation instructions before using it.

You must have an RFID card activated on the supervision server (backend) or be connected to the supervision tool.

Note: The MIFARE 1k RFID card is recommended.

To check that the charging station is connected to the supervision tool:



If the charging station is not connected to the supervision server, please refer to the maintenance manual.

Start an EV charge session

Depending on your configuration, the Wallbox can offer 2 or 3 means of connection to the vehicle.

WBG3X V3 tri-standard or WBG3X V3 bi-standard

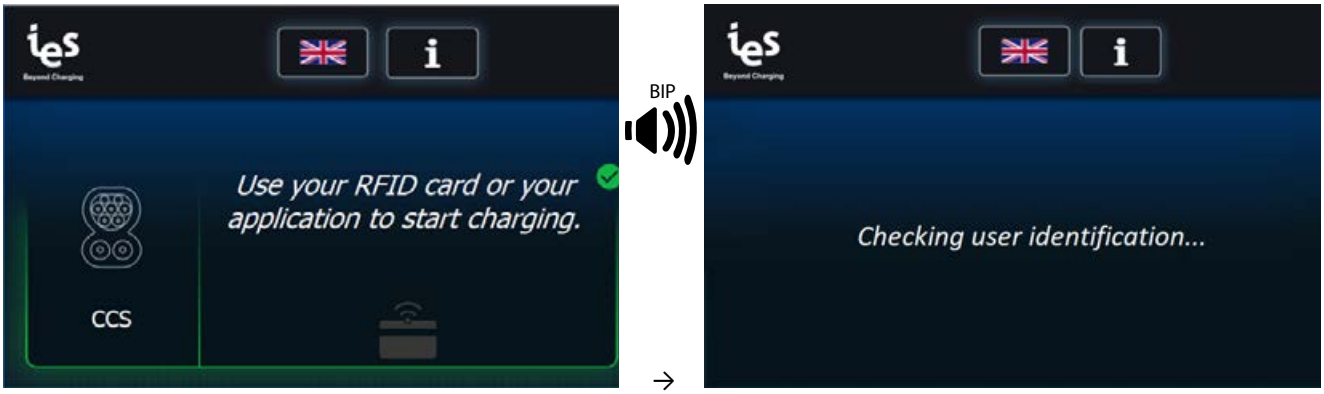
2) User identification

Press “Start” (if button available on screen)

Note: Applicable in COMBO, CHAdeMO and AC

or

Swipe an activated RFID card or Start the charge remotely via a supervision application



Note: Applicable in COMBO, CHAdeMO and AC

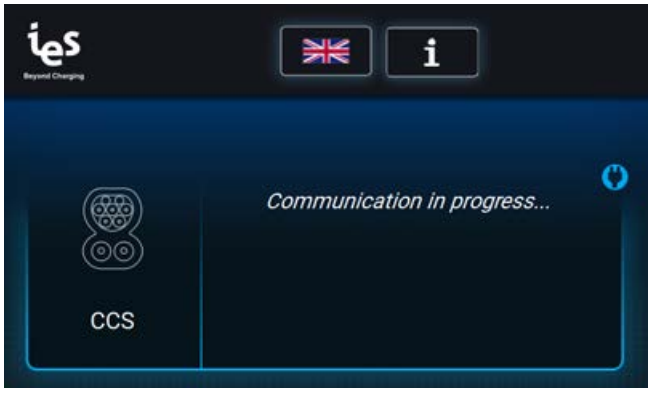
3) EV connection

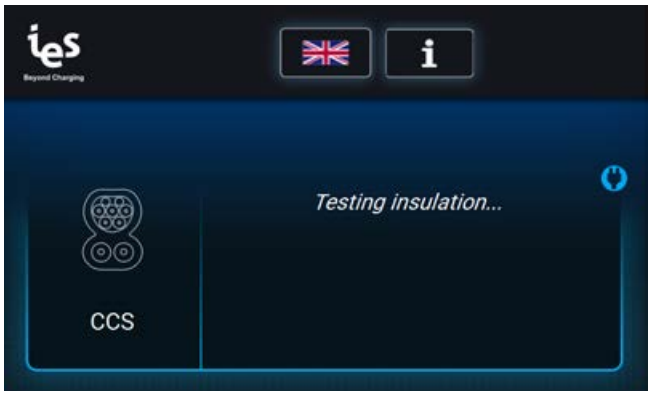
Note: Applicable in COMBO, CHAdeMO and AC

4) EV communication

This step is necessary to adapt the charger parameters to the EV.

Observe the display; charging will begin once communication has been established between the charger and the EV.





Note: Applicable in COMBO, CHAdeMO and AC

Note: Applicable in COMBO and CHAdeMO

EV charge

Only one DC connector and one AC connector can be used under simultaneous charge.

The charging station displays the:

- time since the start of charging
- charged energy
- percentage of charge (not in AC)

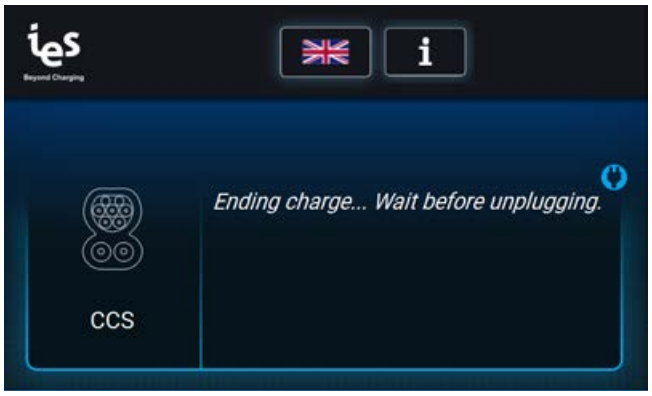
Note: Applicable in COMBO and CHAdeMO

Note: Applicable in AC

The charger will automatically stop once charging is completed. Fast charging will occur up to 80% of the vehicle battery state of charge. The charger will adjust its output according to the demands of the vehicle, ambient temperature and other factors.

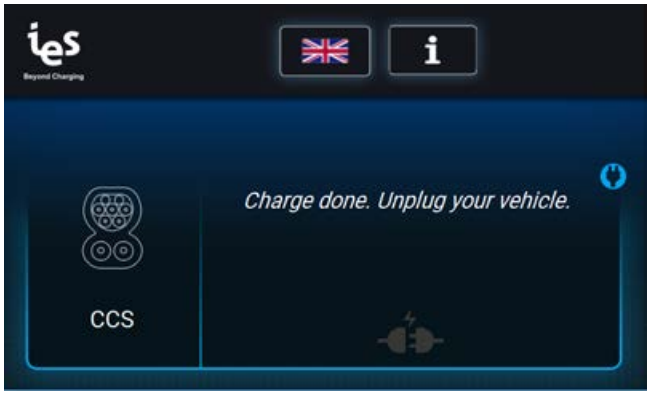
After completing the charge of the EV, the charging station performs multiple control steps before disconnecting the vehicle.

Stop an EV charge session



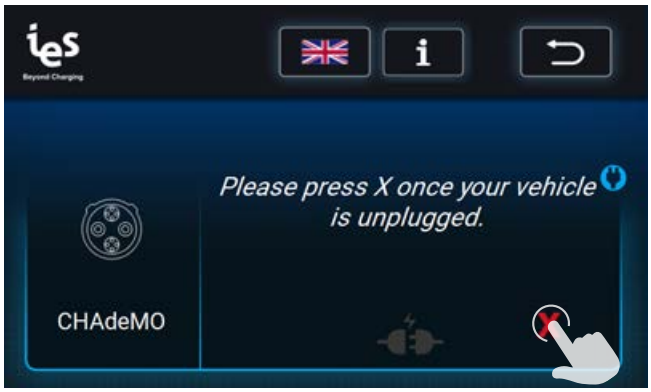
Note: Applicable in CHAdeMO

COMBO and AC

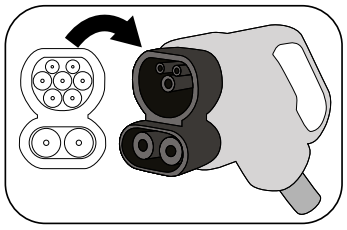


Note: Applicable in COMBO and AC

CHAdeMO



Note: Applicable in CHAdeMO



To stop the charge before the end of the EV charge:

Press “Start” (if charge launched with “Start”)

Note: Applicable in COMBO, CHAdeMO and AC

or

Swipe the same RFID card used at launch Stop the charge remotely via a supervision app

Note: Applicable in COMBO, CHAdeMO and AC

The following steps are identical to those described during normal stopping of the charge.

Emergency Stop

In the event of an emergency, the Emergency Stop button may be depressed to instantly stop charging.

To emergency stop follow these steps:

1. Depress the emergency stop button bellow the charger
2. The display will show the connector in red, press on your connector and follow the indication
3. Unplug the connector from the vehicle

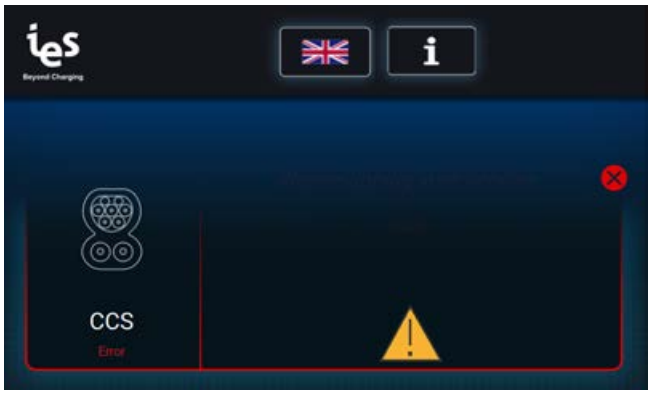
To reset after emergency stop rotate the button clockwise until it pops outward. After a self-test the display will remove the emergency stop message and will be ready for a new session.

Other messages

Message	Description
Error connecting server. Booting interrupted ! Please call support.	Message displayed during the startup of the charging station if the backend server reject the connection.
Error connecting to RFID reader. Booting interrupted ! Please call support.	Message displayed during the startup of the charging station if the RFID module does not work. Please contact support.
Error connecting to Communication Control Unit. Booting interrupted ! Please call support.	Message displayed during the startup of the charging station if the CCU board does not work. Please contact support.
Error connecting to AC Unit. Booting interrupted ! Please call support.	Message displayed during the startup of the charging station if the AC powershare board does not work. Please contact support.
AC contactor failed. Please unplug any connected vehicle and call support.	Message displayed during the startup of the charging station if the AC powershare board does not work. Please contact support.
Charger inoperative. Cannot charge here.	Charger inoperative. Backend server request charger does not accept charge
Charger inoperative. Please unplug your vehicle.	Charger inoperative. Backend server request charger does not accept charge. Unplug the vehicle.
Authorization failed! Please retry identifying.	User rejected by the backend server.
Charger offline. Set up to refuse offline charging.	Charger offline.
Error timeout. Please unplug your vehicle then identify.	Time out, user identified, unplug the vehicle before retrying to identify.
Link established. Waiting for car's start command...	This screen can be displayed when the user is using AC charging. The vehicle decides when to start charging.
Error: Authorization failed. You cannot stop the charge session.	The charge cannot be interrupted by this user who is not recognized by the backend server.
To stop charging, use your RFID card or your application.	User wants to stop the charge. He should identify himself to be able to switch off the charge and disconnect his vehicle.
Charge done. Wrong RFID pass. Unplug your vehicle.(**CCS and AC**)	User not recognized by the backend server... Charging terminated. Unplug the vehicle.
Charge done. Wrong RFID pass. Please press X once your vehicle is unplugged. **(CHAdeMO)**	User not recognized by the backend server... Charging terminated. Unplug the vehicle.
Updating station... Charging not available.	Charging station is being updated. Please wait.
Error updating. DO NOT CHARGE HERE. Wait for correct update.	Error updating. Please contact support for updating the charging station.
Remote reset started... Station will reboot now.	Station is being rebooted.
Station rebooted. Please unplug your vehicle. (**CCS**)	Station rebooted during a charge. Please unplug and retry to launch the charge.
Warning: insulation failure.	Cable insulation failed. Please contact support.

Errors

The error messages are displayed with a characteristic screen. They are thus easily identifiable by the user. A warning pictogram is displayed along with the error message as shown below.



The table below list errors messages who appears on the screen.

Error	Error resolution
Error occurred: 0x02 - 0X03 - 0X81 Emergency stop. Please unplug your vehicle and release the emergency button.	Emergency stop was initiated.
Error occurred: 0x0A - 0x86 The charging station is overheating. Please unplug your vehicle and check that no air vent is clogged. (**CCS and AC**)	The charging station is overheating.
Error occurred: 0x0A - 0x86 The charging station is overheating. Check that no air vent is clogged. Please press X once your vehicle is unplugged. **(CHAdeMO)**	
Error occurred: 0x51 The connection with the vehicle was lost. Please unplug your vehicle. (**CCS and AC**)	The connection with the vehicle was lost.
Error occurred: 0x07 - 0x29 - 0x51 The connection with the vehicle was lost. Please press X once your vehicle is unplugged. **(CHAdeMO)**	
Error occurred: 0x22 - 0x33 Connector error. Please keep the connector closely leant against your vehicle when plugging, until the charge has started.	The connector has not been locked. Please keep the connector closely leant against your EV when plugging, until the charge has started.
Error occurred: 0x3A Your battery model is incompatible with this charger. Please unplug your vehicle. (**CCS and AC**)	Your battery model is incompatible with this charger.
Error occurred: 0x11 Your battery model is incompatible with this charger. Please press X once your vehicle is unplugged. **(CHAdeMO)**	
Error occurred: 0x32 Your gear is not in parking position. Please unplug your vehicle and engage gear in parking position. (**CCS and AC**)	Your gear is not in parking position.
Error occurred: 0x14 Your gear is not in parking position. Please press X once your vehicle is unplugged. **(CHAdeMO)**	

Error	Error resolution
Error occurred: 0x15 Your vehicle raised an error. Please check error message in the vehicle and unplug your vehicle. (**CCS and AC**)	Your vehicle raised an error. Please check error message in the vehicle.
Error occurred: 0x15 Your vehicle raised an error. Please check error message in the vehicle. Please press X once your vehicle is unplugged. **(CHAdeMO)**	
Error occurred: 0x31 Your battery's temperature is too high. Please unplug your vehicle. (**CCS and AC**)	Your battery's temperature is too high.
Error occurred: 0x19 Your battery's temperature is too high. Please press X once your vehicle is unplugged. **(CHAdeMO)**	
Error occurred: 0x46 Connection between screen and charger has been lost. Please unplug your vehicle. (**CCS and AC**)	Connection between HMI screen and charger has been lost.
Error occurred: 0x46 Connection between screen and charger has been lost. Please press X once your vehicle is unplugged. **(CHAdeMO)**	
Error occurred: 0x-- Please press X once your vehicle is unplugged.	For all other error codes, please refer to maintenance manual.

Notes

Notes

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Beyond Charging