

User Manual

Keywatt 24 Station



DUM3017446-EN_V001b

www.ies-synergy.com

ies
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.

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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, which result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal 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

IES Synergy declines all responsibility for improper use of this equipment.

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.

2. About the manual

Purpose of this manual

This guide describes how to use the Keywatt 24 Station.

Document scope

This guide concerns the following charging stations:

- P/N: ST24 TRI 3PN CHARGER

Related documents

Document title	Product	Reference
Installation Manual	ST24	DIM3017446-EN
User Manual	ST24	DUM3017446-EN
Service Manual	ST24	DMM3017446-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.

3. General safety instructions

NOTICE



SAVE THESE INSTRUCTIONS

- To ensure proper and safe operation, please read these user instructions carefully and keep them for future reference.
- This manual contains important instructions for KEYWATT 24 STATION that shall be followed during installation, operation and maintenance of the unit.
- 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.

⚠ 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 (switches and relays), that tend to produce arcs or sparks.
- Never open the charger while input power is present.

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

⚠ CAUTION



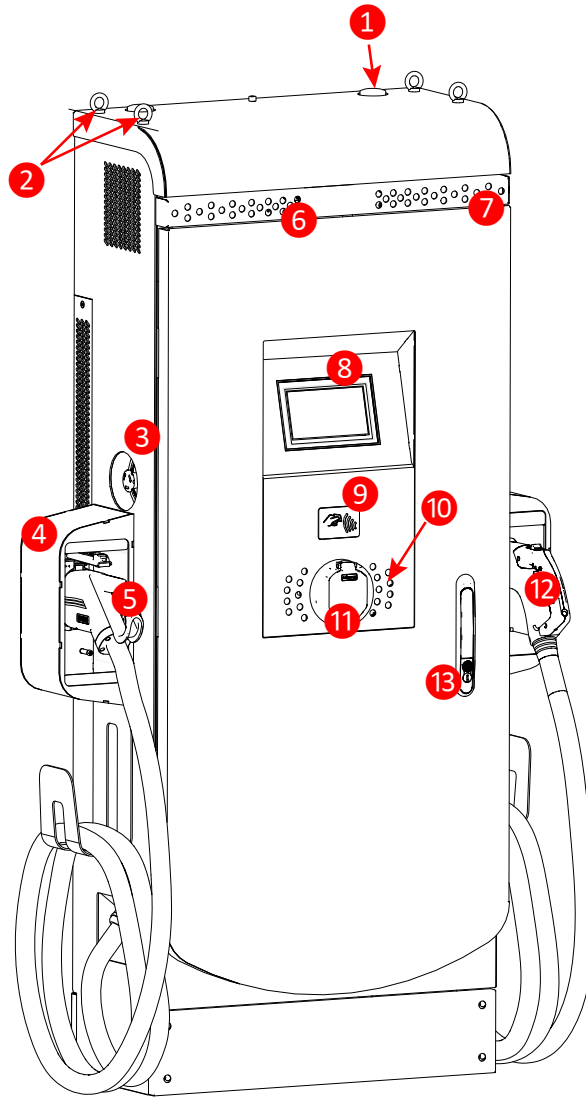
RISQUE DE DOMMAGE AU MATÉRIEL

- 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.

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

4. Overview

External view



Position	Description
1	Antenna (x2)
2	Lifting rings (x4)
3	Emergency Stop button
4	Connector support (x2)
5	CCS Type 2 DC connector
6	COMBO 2 LED
7	CHAdeMO LED
8	Touchscreen display
9	RFID reader
10	Type 2S AC outlet LED
11	AC socket outlet Type 2 S
12	CHAdeMO DC connector
13	Key lock

Note: May change depending on version or technical modification

5. Specification

Main supply

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

DC charger input			
Mains 3-phase voltage range (phase to phase)	V_{AC}	400 V_{AC}	$\pm 10\%$
Earthed electrical system	TT; TN		
Frequency range	f	50 Hz	$\pm 10\%$
Nominal input current	I_{AC}	38A	Nom
Maximum input current	I_{AC}	42A	Max
Power Factor	PF	0,99	Nom
Efficiency	η	95 %	Max
Harmonic current @ nominal network voltage	THDi	< 13 %	Max
AC charger input			
Mains 3-phase voltage range (phase to phase)	V_{AC}	400 V_{AC}	$\pm 10\%$
Earthed electrical system	TT; TN		
Frequency range	f	50 Hz	$\pm 10\%$
Nominal input current	I_{AC}	32A	Nom
Maximum input current	I_{AC}	35A	Max

Technical specifications

DC charger internal AC input protection			
Inrush current limitation per phase	$I_{APPEL\ LIMITE}$	$< 3 \times I_{AC}$	Max
Rated Current Fuse (per module)	$I_{COUPE\ RE}$ Nominal	80A	typ
Breaking capacity of fuses	$I_{COUPE\ RE}$ Capacité	80 000A	Max
Max earth leakage current	I_{FUITE}	< 5 mA	Max
Overvoltage category (IEC60664-1)	III		
Charger short-circuit current resistance	I_{CC}	6 kA	Max
Internal 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	-	5	Meters
Internal DC output protection			
Hardware and software short circuit protection	Oui		
Software and Hardware over voltage protection	adjustable	+10% max	

Internal DC output protection			
Over temperature protection	-	70	°C
Reverse polarity protection	Yes		
DC output Contactor	Yes (2 pôles)		
Rated Current Fuse (output)	I_{FUSE}	125	A
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	Nom
Max Output Power	P_{OUT}	22 kVA	Max
Car Plug socket	Plug #3	AC type 2 S	
Type of connection	Detachable cable		

Internal AC output protection			
Inrush current	230A during 100 µs		
Short circuit Socket I ² t	A ² s	75 000	
Circuit breaker for AC circuit	50A curve C		

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		
Measurement method	Continuous and switching measurement resistor method		
Fault trigger threshold (CCS, CHAdeMO and GB before the charge only)	100 Ω/V	± 10%	
Warning detection threshold (CCS only)	500 Ω/V	± 10%	
System leakage capacity Ce	≤ 1µF : response value (Ran) and time (tan) are not guaranteed for capacity above 1µF		

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.			
Output power (dBm)	Class 4 (33dBm±2dB) for GSM850 and EGSM900 Class 1 (30dBm±2dB) for DCS1800 and PCS1900 Class E2 (27dBm±3dB) for GSM850 and EGSM900 8-PSK Class E2 (26dBm+3/-4dB) for DCS1800 and PCS1900 8-PSK Class 3 (24dBm+1/-3dB) for UMTS800/850/900/1900/2100		

General & dimensions			
External dimensions (without support) (mm)	H x W x D	1750 x 700 x 356 mm	
External dimensions (with support) (mm)	H x W x D	1758 x 1000 x 396 mm	
Weight (without cable and connector)	kg	200 kg	Max
Type of installation	Fastening to concrete slab with suitable fastening points		
Fixation points	4 goujons M14 (non fournis)		
Mechanical impact resistance (not the screen)	IK	IK10	
Protection type (EN60529)	IP	IP55	

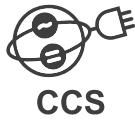
General & dimensions			
Cooling systems	Heatsink with forced air flow by fans IP55 without air filter		
Noise (1m)	dB(A)	56dBA (1m)	
Noise (5m)	dB(A)	41dBA (5m)	
Climatic & Environment constraints			
Operating temperature (with derating)	-25°C to +55°C ⁽²⁾		
Storage temperature	-25°C to +70°C		
Relative 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 & -2 V11.1.1 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		
Information technology equipment –Safety – Part 1: General requirements	EN 60950-1:2006 (A1, A2, A11, A12)		
Information technology equipment –Safety – Part 22: Equipment to be installed outdoors	EN 60950-22:2006		
Electric vehicle conductive charging system – Part 22: AC electric vehicle charging station	EN 61851-22:2002		
Electric vehicle conductive charging system – Part 24: Digital communication between a DC EV charging station and an electric vehicle for control of DC charging	EN 61851-24		
Electric vehicle conductive charging system – Part 21-2: Electric vehicle requirements for conductive connection to an AC/DC supply - EMC requirements for off board electric vehicle charging systems	IEC 61851-21-2		
Insulation Monitor Device (IMD)	IEC 61557-1 & IEC 61557-8		
RoHS	2015/863/EU		
Declaration of conformity CE ⁽³⁾	Yes		

⁽¹⁾ Max output current will be adapted versus maximum carrying current of the vehicle plug.

⁽²⁾ The output current is reduced as a function of the temperature above 40°C..

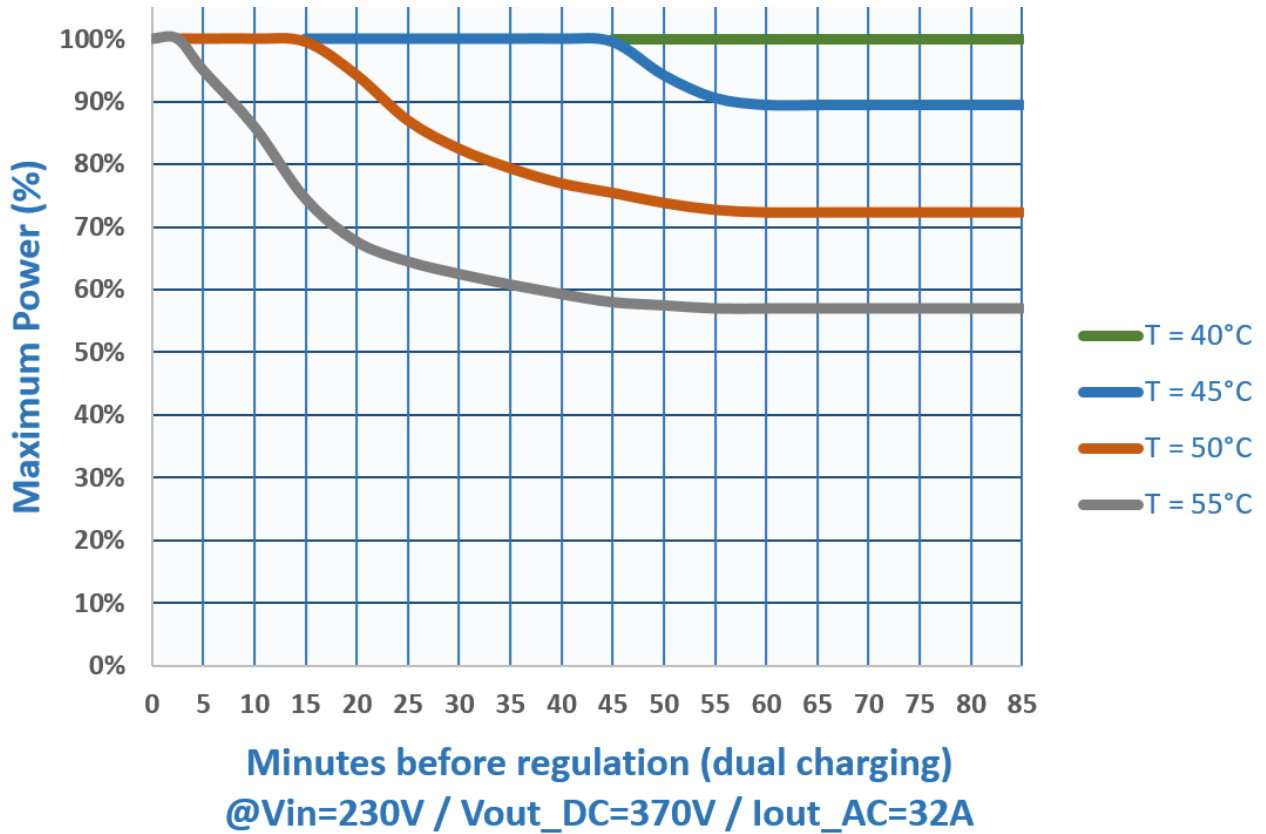
⁽³⁾ CE marking affixed on the product attest the conformity of the product with applicable requirements of relevant Community harmonization legislation.

Compliance



Derating

There is a direct correlation between the current delivered and the ambient temperature. The output power is determined by the power vs. temperature derating curve below :



6. Utilization

Human/Machine interface (HMI) and LEDs

CCS, AC and CHAdeMO available	CCS and AC plugged CHAdeMO unavailable Communicating with the EV	CCS and AC simultaneously charging CHAdeMO unavailable	End of CCS and AC charge Cables connected	AC error detected Dual charging disabled
 <p>CCS Available</p>	 <p>CCS Preparing</p>	 <p>CCS Charging</p>	 <p>CCS Finishing</p>	 <p>CCS Unavailable</p>
 <p>AC Available</p>	 <p>AC Preparing</p>	 <p>AC Charging</p>	 <p>AC Finishing</p>	 <p>AC Error</p>
 <p>CHAdeMO Available</p>	 <p>CHAdeMO Unavailable</p>	 <p>CHAdeMO Unavailable</p>	 <p>CHAdeMO Unavailable</p>	 <p>CHAdeMO Unavailable</p>
	 <p>OFF</p>	 <p>OFF</p>	 <p>OFF</p>	 <p>OFF OFF</p>

Note: Applicable in COMBO, CHAdeMO and AC.

Prerequisite

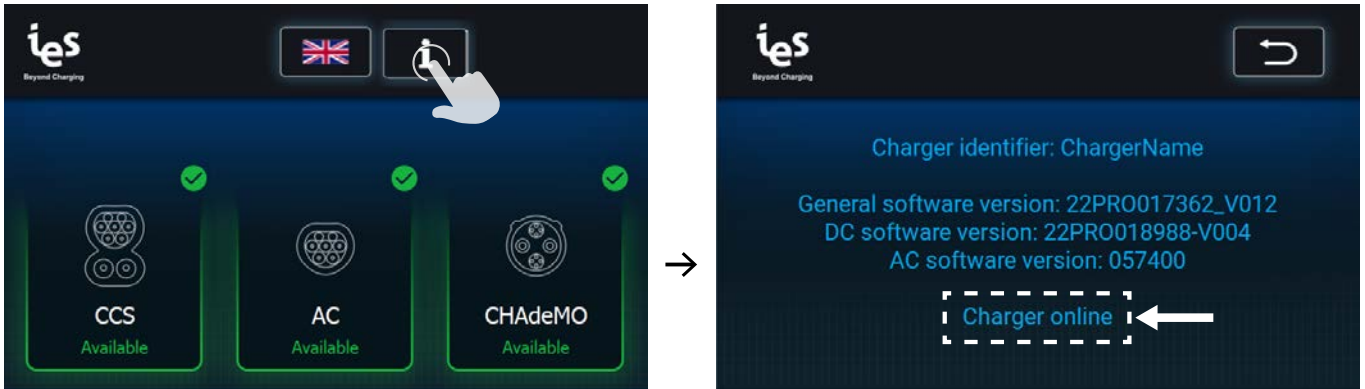
Before starting a charge:

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.

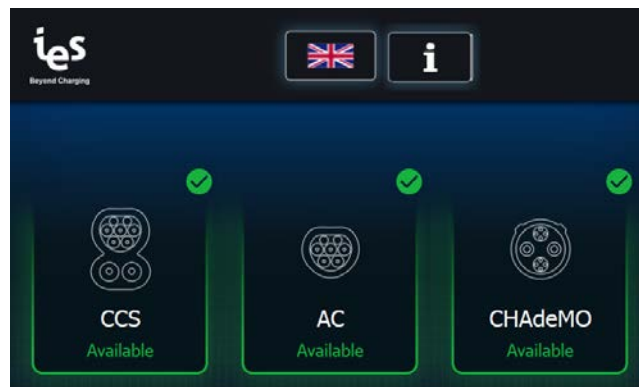
To check that the charging station is connected to the supervision tool:



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

Start an EV charge session

1) Select the type of charge



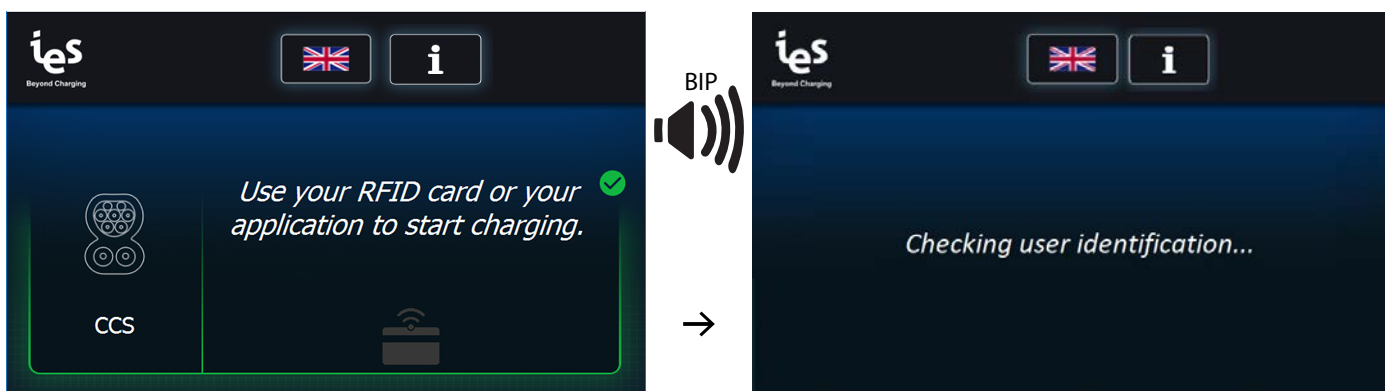
2) User identification

Press “Start” (free-use mode) or swipe an activated RFID card or start the charge remotely via a supervision application



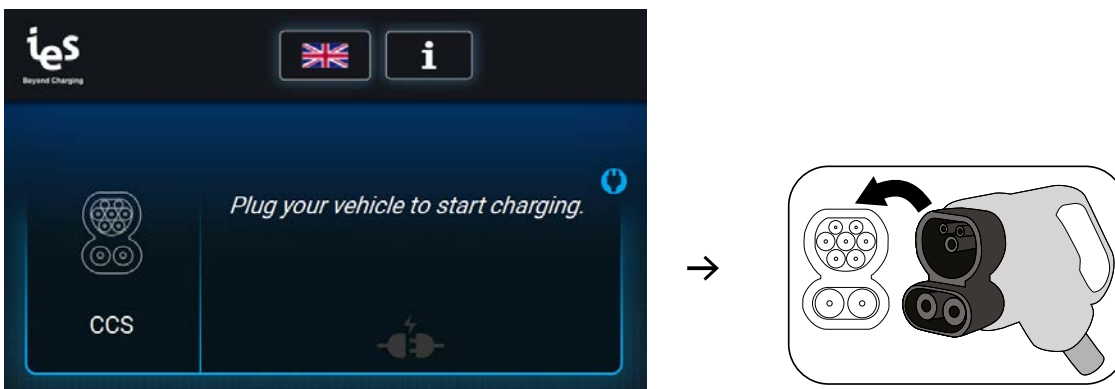
Note: Applicable in COMBO, CHAdeMO and AC

or



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



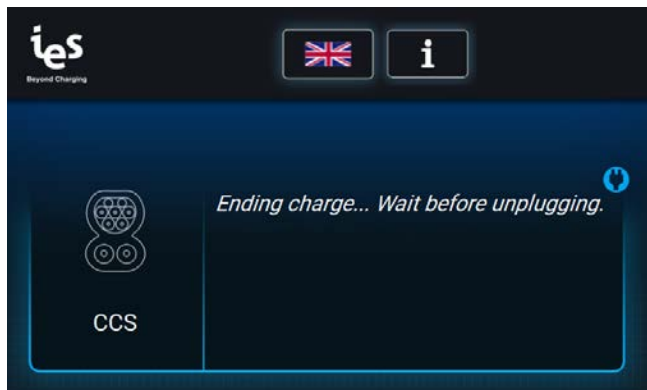
Note: Applicable in AC

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.

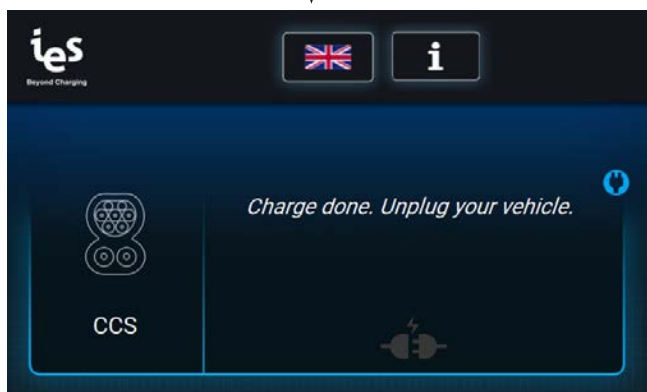
After completing the charge of the EV, the charging station performs multiple control steps before disconnecting the vehicle.

COMBO and AC

Unplug the EV once the charge is done .



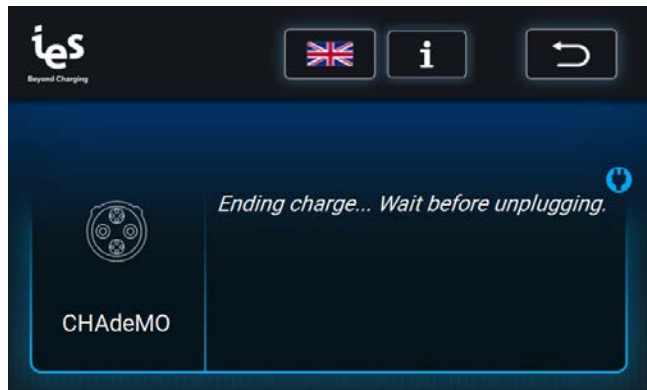
Note: Applicable in COMBO and AC



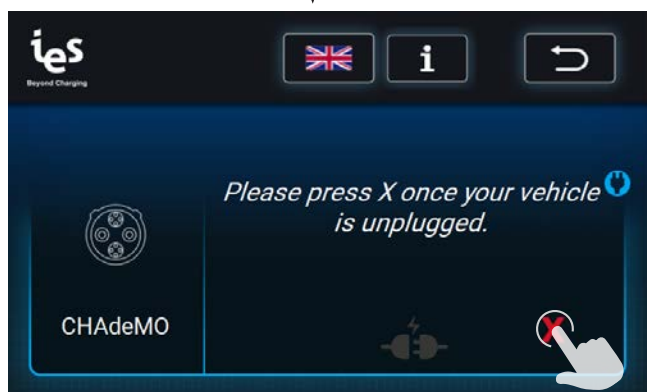
Note: Applicable in COMBO and AC

CHAdEMO

Press **X** once the EV is unplugged.



Note: Applicable in CHAdEMO



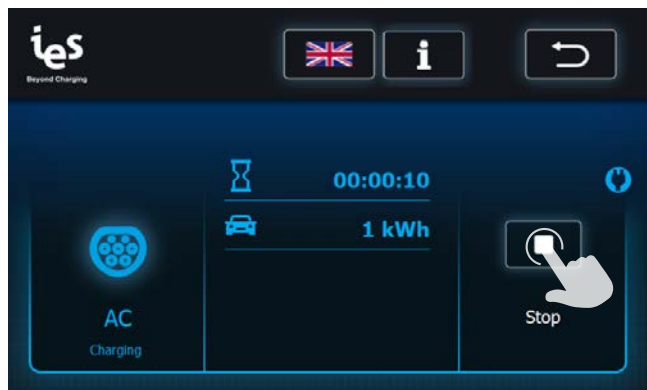
Note: Applicable in CHAdEMO

Stop an EV charge session

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

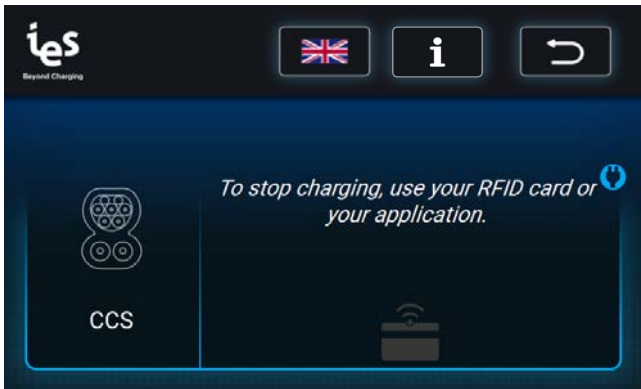


Note: Applicable in COMBO and CHAdEMO



Note: Applicable in AC

- A) Swipe the RFID card used to launch the charge in front of the RFID reader
- or
- B) Stop the charge remotely via a supervision application or directly on the screen

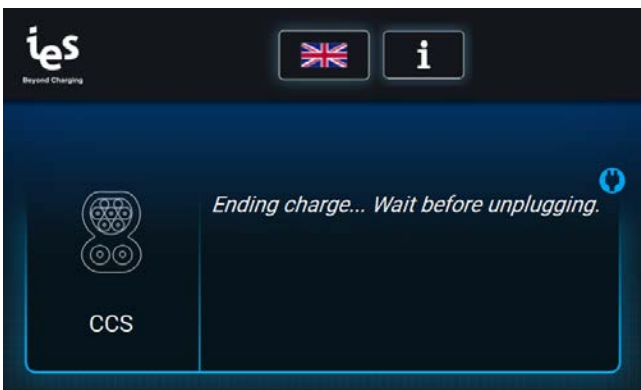


Note: Applicable in COMBO, CHAdeMO and AC

The screen displays that the session is ending:

COMBO and AC

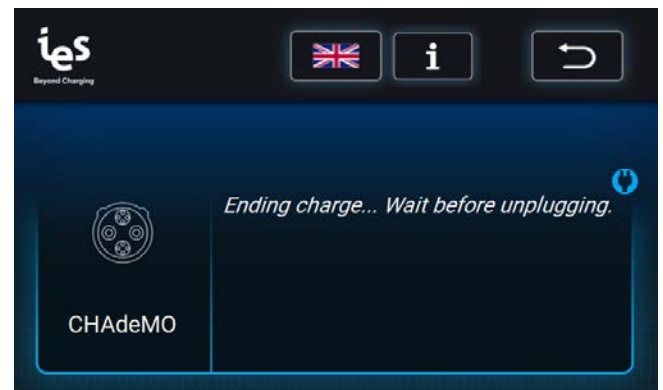
Unplug the EV once the charge is done .



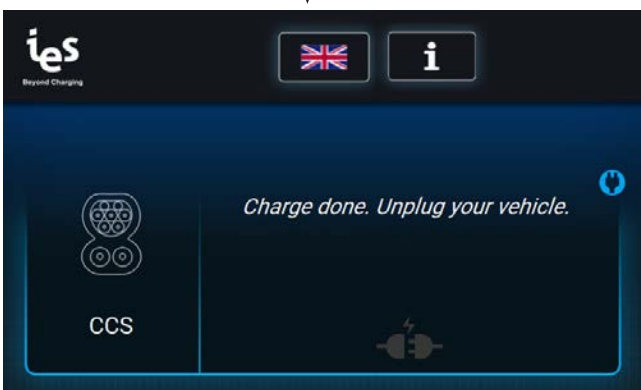
Note: Applicable in COMBO and AC

CHAdeMO

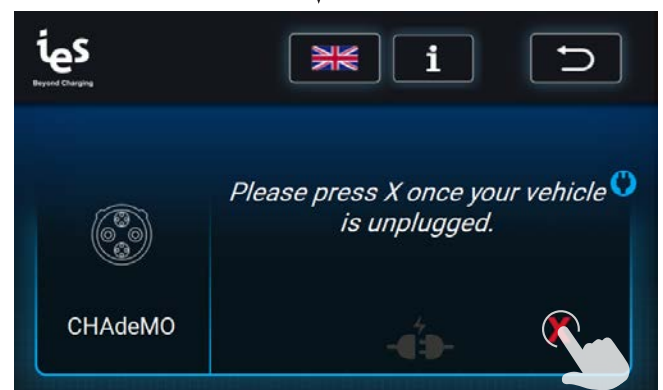
Press **X** once the EV is unplugged.



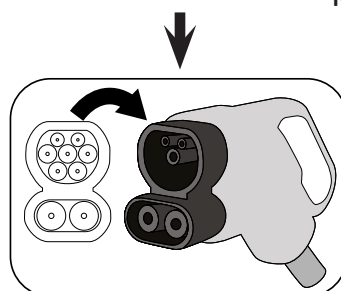
Note: Applicable in CHAdeMO



Note: Applicable in COMBO and AC



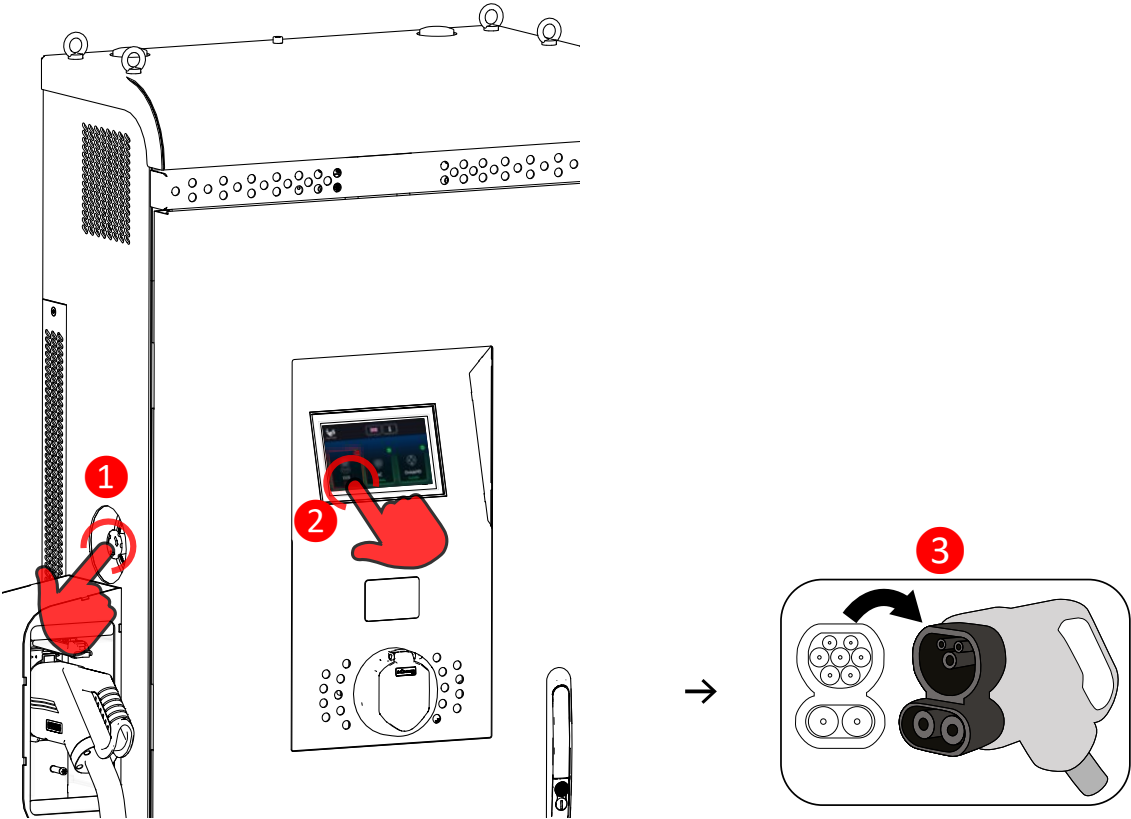
Note: Applicable in CHAdeMO



Emergency Stop

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

To emergency stop follow these steps:



To reset after an 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.
Plug your vehicle to start charging. Vehicle not detected. Retrying... X	CHAdEMO only: User identified, waiting for electrical vehicle connection.
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.	Not in CHAdEMO: 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 only: User not recognized by the backend server... Charging terminated. Unplug the vehicle.
Station shut down. Please reboot.	Charging station shut down. Please contact support to restart the charging station.
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.

Message	Description
Remote reset started... Station will reboot now.	Station is being rebooted.
Station rebooted. Please unplug your vehicle.	CCS only: 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.	Not in CHAdeMO: Emergency stop was initiated. Please unplug your vehicle and release the emergency button.
Error occurred: 0x02 - 0X03 - 0X81 Emergency stop. Please unplug your vehicle and release the emergency button.	CHAdeMO only: Emergency stop was initiated. Please unplug your vehicle, press X and release the emergency button.
Error occurred: 0x0A - 0x86 The charging station is overheating. Please unplug your vehicle and check that no air vent is clogged.	Not in CHAdeMO: The charging station is overheating. Please unplug your vehicle and check that no air vent is clogged.
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 only: The charging station is overheating. Please unplug your vehicle, press X and check that no air vent is clogged.
Error occurred: 0x51 The connection with the vehicle was lost. Please unplug your vehicle.	Not in CHAdeMO: The connection with the vehicle was lost. Please unplug your vehicle.
Error occurred: 0x07 - 0x29 - 0x51 The connection with the vehicle was lost. Please press X once your vehicle is unplugged.	CHAdeMO only: The connection with the vehicle was lost. Please unplug then press X.
Error occurred: 0x22 - 0x33 Connector error. Please keep the connector closely leant against your vehicle when plugging, until the charge has started.	Not in CHAdeMO: Connector error. Please keep the connector closely leant against your vehicle when plugging, until the charge has started.

Error	Error resolution
Error occurred: 0x22 The connector cannot lock. Please keep the connector closely leant against your vehicle when plugging, until the charge has started. Please press X once your vehicle is unplugged.	CHAdeMO only: The connector cannot lock. Please keep the connector closely leant against your vehicle when plugging, until the charge has started. Please press X once your vehicle is unplugged.
Error occurred: 0x3A Your battery model is incompatible with this charger. Please unplug your vehicle.	Not in CHAdeMO: Your battery model is incompatible with this charger. Please unplug your vehicle.
Error occurred: 0x11 Your battery model is incompatible with this charger. Please press X once your vehicle is unplugged.	CHAdeMO only: Your battery model is incompatible with this charger. Please unplug then press X.
Error occurred: 0x32 Your gear is not in parking position. Please unplug your vehicle and engage gear in parking position.	Not in CHAdeMO: Your gear is not in parking position. Please unplug your vehicle and engage gear in parking position.
Error occurred: 0x14 Your gear is not in parking position. Please press X once your vehicle is unplugged.	CHAdeMO only: Your gear is not in parking position. Please unplug your vehicle, press X and engage gear in parking position.
Error occurred: 0x15 Your vehicle raised an error. Please check error message in the vehicle and unplug your vehicle.	Not in CHAdeMO: Your vehicle raised an error. Please check error message in the vehicle and unplug it.
Error occurred: 0x15 Your vehicle raised an error. Please check error message in the vehicle. Please press X once your vehicle is unplugged.	CHAdeMO only: Your vehicle raised an error. Please check error message in the vehicle, unplug it then press X.
Error occurred: 0x31 Your battery's temperature is too high. Please unplug your vehicle.	Not in CHAdeMO: Your battery's temperature is too high. Please unplug your vehicle.
Error occurred: 0x19 Your battery's temperature is too high. Please press X once your vehicle is unplugged.	CHAdeMO only: Your battery's temperature is too high. Please press X once your vehicle is unplugged.
Error occurred: 0x46 Connection between screen and charger has been lost. Please unplug your vehicle.	Not in CHAdeMO: Connection between HMI screen and charger has been lost. Please unplug your vehicle.
Error occurred: 0x46 Connection between screen and charger has been lost. Please press X once your vehicle is unplugged.	CHAdeMO only: Connection between HMI screen charger has been lost. Please press X once your vehicle is unplugged.
Error occurred: 0x-- Please unplug your vehicle.	Not in CHAdeMO: For all other error codes, please refer to maintenance manual.
Error occurred: 0x-- Please press X once your vehicle is unplugged.	CHAdeMO only: For all other error codes, please refer to maintenance manual.

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