

# User Manual

## Keywatt S50 Station

Edition: 10/2023



DUM019665-EN\_V001c



**KEYWATT®**  
Charging  
By IES

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

No responsibility is assumed by IES Synergy for any consequences arising out of the use of this material.

## 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 50x Station. 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:

- KEYWATT 50 STATION – X 43KVA
- KEYWATT 50 STATION – X 22KVA
- KEYWATT 50 STATION – B
- KEYWATT 50 STATION – CCS2

Refer to your product label sticker to get your charger informations.



KEYWATT S50 Mono  
Combo2

KEYWATT S50 Bi  
Combo2 / CHAdeMO

KEYWATT S50 Bi  
Combo2 / CHAdeMO  
+ TPE

KEYWATT S50 Dual  
Combo2 + AC22

KEYWATT S50 Dual  
Combo2 + AC43  
+ TPE

KEYWATT S50 TRI  
Combo2 / CHAdeMO  
+ AC22

KEYWATT S50 TRI  
Combo2 / CHAdeMO  
+ AC43 + TPE

### Related documents

Document title	Reference
Installation Manual	DIM019665-EN
User Manual	DUM019665-EN
Service Manual	DMM019665-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 the charging 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



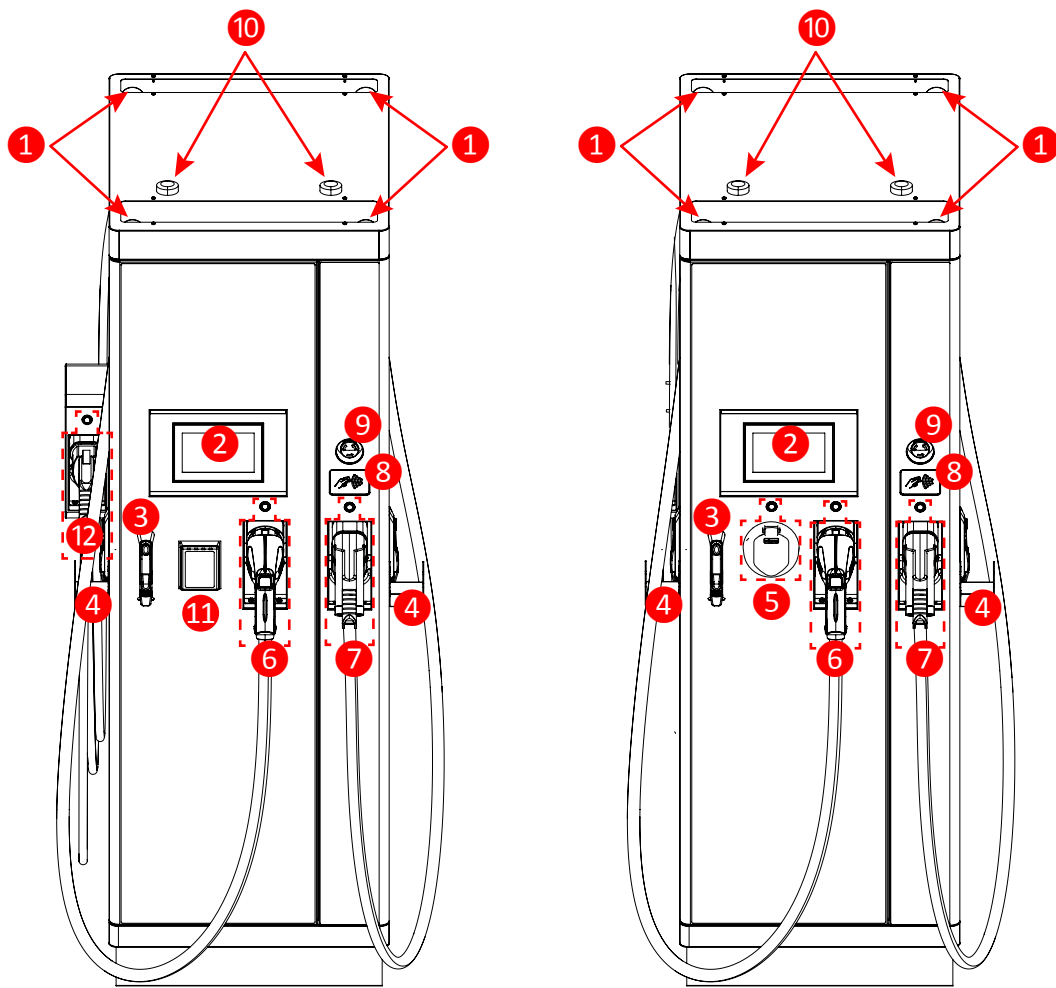
### RISK OF ELECTRIC SHOCK, INJURY, AND/OR BURNING

- 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.
- Disconnect the protective device located upstream of the charger before working on it.
- Do not use this product if the enclosure or the EV connectors are broken, cracked, opened or show any other indication of damage.
- Replace the damaged cables by same characteristics cables.
- Do not use a cord extension set, second cable assembly or adaptors in addition to the cable assembly for the connection of the EV to the EVSE.
- Do not alter AC plug provided – where it does not fit outlet, have proper outlet installed by a qualified electrician. Improper connection increases the risk of an electric shock.
- Charger shall be grounded to reduce risk of electric shock. Charger is equipped with an electric cord having an equipment-grounding conductor and a grounding plug. The plug is to be plugged into an outlet that is properly installed and grounded in accordance with all local codes and ordinances.
- This unit is for use on a circuit having a nominal rating more than 120V and is factory-equipped with a specific electric cord and plug that connects to an electric circuit. Make sure that the charger is connected to an outlet having the same configuration as the plug. Adapters shall not be used with this charger.
- This equipment employs parts, such as 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**

# 4. Overview

## External view



Position	Description
①	Lifting rings
②	Touch screen
③	Door lock
④	Connector support *
⑤	AC Type 2-S outlet and LED *
⑥	CHAdeMO DC connector and LED *
⑦	CCS Type 2 DC connector and LED
⑧	RFID reader
⑨	Emergency Stop button
⑩	Antenna
⑪	Electronic Payment terminal *
⑫	AC Type 2 connector and LED *

\*Note: May change depending on version or technical modification

## 5. Specifications

### 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	+4%/-6%
Nominal input current	$I_{IN}$	83A	Nom
Power Factor	PF	0,98	Nom
Efficiency	$\eta$	94 %	Max
Harmonic current @ nominal network voltage	THDi	< 16 % (@ $P_{out} > 0,3 P_{max}$ )	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	+4%/-6%
Nominal input current	$I_{AC}$	32A or 63A	Nom

### Technical specifications

DC charger internal AC input protection			
Inrush current limitation per phase	$I_{INRUSH\ LIMIT}$	< 3 x $I_{AC}$	Max
Max earth leakage current	$I_{LEAKAGE}$	< 3,5 mA	Max
Emergency button connection	Yes		
Overvoltage category	III		

DC Output			
Output voltage	$V_{DC\_max}$	500 $V_{DC}$	Max
	$V_{DC\_min}$	200 $V_{DC}$	Min
Output current	$I_{DC\_max}$	125A <sup>(1)(2)</sup>	Max
	$I_{DC\_min}$	1,5A	Min
Max Output Power	$P_{OUT}$	50kW	Max
Output connector (charging station side)	Permanent mounting		
Car Plug connectors	COMBO 2		
	CHAdEMO		
Output cable length	Meters	4m	

DC output protection			
Hardware and software short circuit protection	Yes		
Hardware over voltage protection		+20% max	
Software over voltage protection	dynamic	+10% max	
Over temperature protection	-	70°C	
Reverse polarity protection	Yes		
DC output Contactor	Yes (2 poles)		
Rated Current Fuse (output)	$I_{FUSE}$	200	A
Galvanic isolation	$V_{input/output}$	4100	$V_{DC}$
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	$I_{AC\_max}$	32A or 63A	Max
Max Output Power	$P_{OUT}$	22kVA or 43kVA	Max
Car Plug	AC Type 2 S socket or AC Type 2 connector		

Internal AC output protection		
Inrush current	230A during 100 $\mu$ s 30A during following second	
Short circuit Socket $I^2t$	$A^2s$	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
Internal resistance $R_i$ 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 $I_m$	< 1,4mA at RF=0
Measurement range (Ran)	20Kohms...300Kohms
Relative uncertainty	±15%
Line L+/L- Voltage ( $U_n$ )	DC 200V...500V
System leakage capacity $C_e$	≤ 1 $\mu$ F : response value (Ran) and time (tan) are not guaranteed for capacity above 1 $\mu$ F
Parallelization	<b>⚠ Warning:</b> Do not connect the insulation monitor device (IMD) in parallel !! Response value (Ran) and time (tan) are not guaranteed.

## 4G module (EG25-G) characteristics

Network Mode/GNSS	EG25-G
LTE-FDD	B1 to B5/B7/B8/B12/B13/B18/B19/B20/B25/B26/B28
LTE-TDD	B38 to B41
UMTS	B1/B2/B4/B5/B6/B8/B19
GSM	850/900/1800/1900 MHz

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. Note: Frequency bands for European network coverage are marked with a star (*)			
	Frequency bands (MHz)		Output power (dBm)
	Tx	Rx	Max
GSM850 / EGSM900* (GMSK)	880-915	925-960	33±2dB
GSM850 / E GSM900 (8-PSK)	880-915	925-960	27 ±3dB
DCS1800* /PCS1900 (GMSK)	1710-1785	1805-1880	30 ±2dB
DCS1800/PCS1900 (8-PSK)	1710-1785	1805-1880	26 ±3dB
WCDMA	B1*/B2/B4-B6/B8*/B19	B1/B2/B4-B6/B8*/B19	24 +1/-3dB
LTE-FDD	(B1/3/7/8/20/28/38/40)* (B2/B4/B5/B12/B13/B18/ B19/B25/B26/B28)	(B1/3/7/8/20/28/38/40)* (B2/B4/B5/B12/B13/B18/ B19/B25/B26/B28)	23±2dB
LTE-TDD	B38-B41	B38-B41	23±2dB

## RFID reader characteristics

To start a charge, users must swipe a contactless tag RFID card across the reader and/or can swipe a credit card across the RFID Payment terminal.

Frequency Bands	13.56 Mhz
Contactless tag RFID Power output	-4.35dBuA/m
Payment RFID Power output	6.56dBuA/m

## Detection Loop characteristics

The equipment is designed to be connected to two independent vehicle parking loop and provide detection. Frequency is determined by loop geometry.

Frequency Bands	18-110 KHz
Loop customization (1m x 1m)	20.4dBuA/m

## General & dimensions

External dimensions with cable support (HxWxD)	mm	1800 x 614 x 814	± 10%
External dimensions w/o cable support (HxWxD)	mm	1800 x 600 x 814	± 10%
Weight (with DC cable and cable management)	Kg	350	Max
Type of installation	Indoor or outdoor		
Fixation points	4 studs M14 for ground mounting		
Mechanical resistance to impact	IK	IK10 (except screen IK08)	
Protection Type (EN60529)	IP	IP55	
Cooling system	Air forced		
Sound pressure level (1m, all directions) @Pmax	dBa	57 dBA	Max
Sound pressure level (5m, all directions) @Pmax	dBa	43 dBA	Max

## Climatic & Environment constraints

Operating temperature (with derating)	-25°C to +50°C <sup>(3)</sup>		
Storage temperature	-25°C to +70°C		
Relative humidity	RH	10% to 90%	
Installation altitude	Alt	2 000 m	Max

## Norms & standards

Radio Equipment Directive (RED)	2014/53/EU <sup>(4)</sup>
---------------------------------	---------------------------

<sup>(1)</sup> Max output current will be adapted versus maximum carrying current of the vehicle plug

<sup>(2)</sup> Output current can be even reduced with the power derating versus temperature.

<sup>(3)</sup> With derating from 35°C

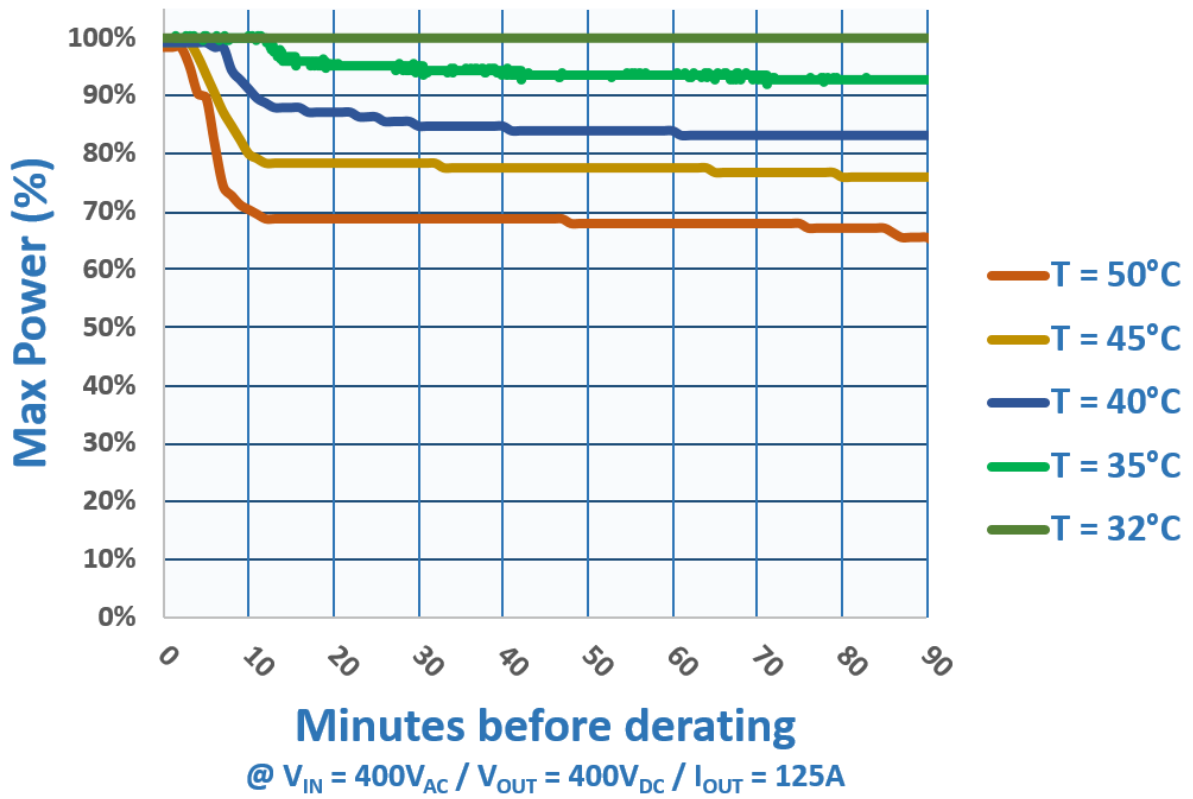
<sup>(4)</sup> Design in compliance with CE directives

## Compliance





















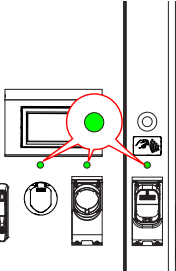
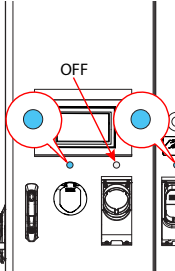
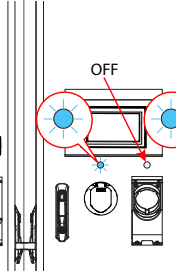
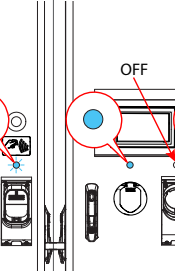
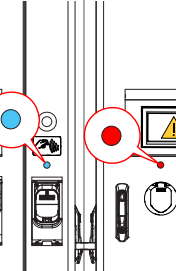
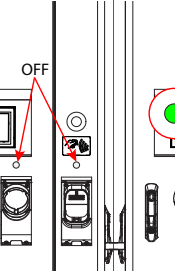
## Derating

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



# 6. Utilization

## Human/Machine interface (HMI) and LEDs

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
 <p><b>CCS</b> Disponible</p>	 <p><b>CCS</b> Communication en cours</p>	 <p><b>CCS</b> Charge en cours</p>	 <p><b>CCS</b> Fin de charge</p>	 <p><b>CCS</b> Indisponible</p>	 <p><b>CCS</b> Réservé</p>
 <p><b>AC</b> Disponible</p>	 <p><b>AC</b> Communication en cours</p>	 <p><b>AC</b> Charge en cours</p>	 <p><b>AC</b> Fin de charge</p>	 <p><b>AC</b> Erreur</p>	 <p><b>AC</b> Disponible</p>
 <p><b>CHAdeMO</b> Disponible</p>	 <p><b>CHAdeMO</b> Indisponible</p>	 <p><b>CHAdeMO</b> Indisponible</p>	 <p><b>CHAdeMO</b> Indisponible</p>	 <p><b>CHAdeMO</b> Indisponible</p>	 <p><b>CHAdeMO</b> Disponible</p>
					

**Note:** Applicable in COMBO, CHAdeMO and AC.

## Prerequisite

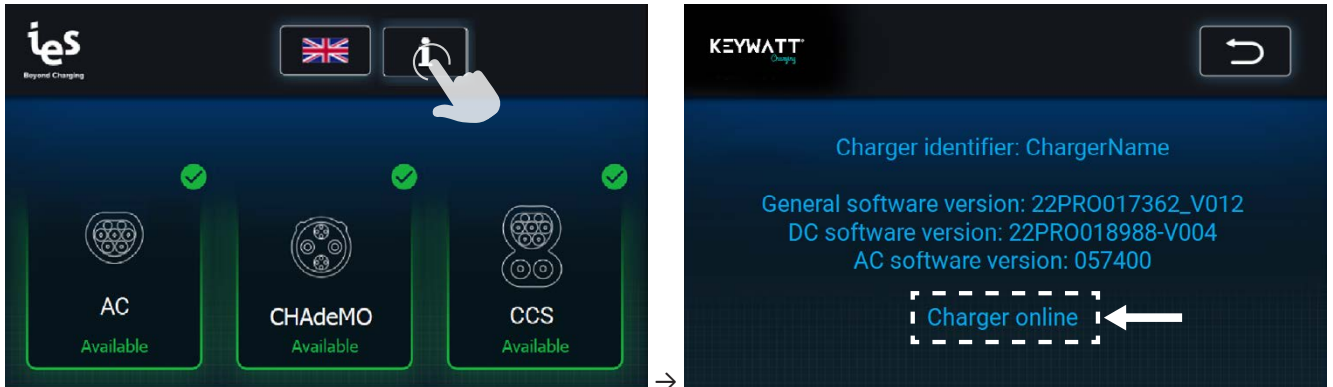
Before starting a charge:

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.

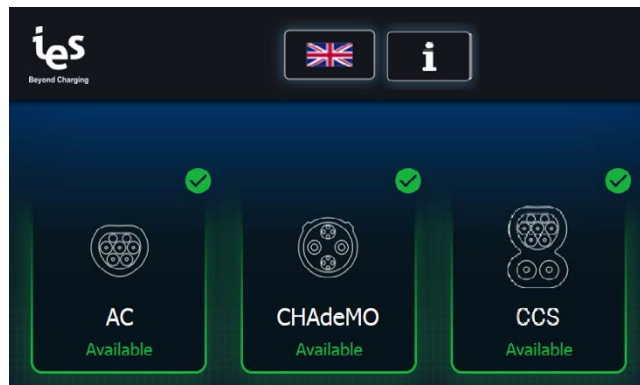
To check that the charging station is connected to the supervision tool:



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

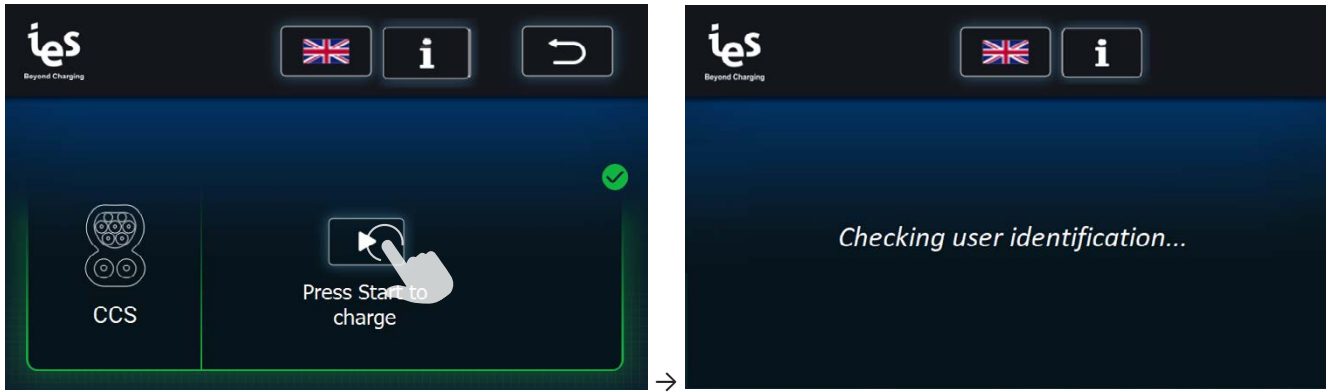
## Start an EV charge session

### 1) Select the type of charge



## 2) User identification

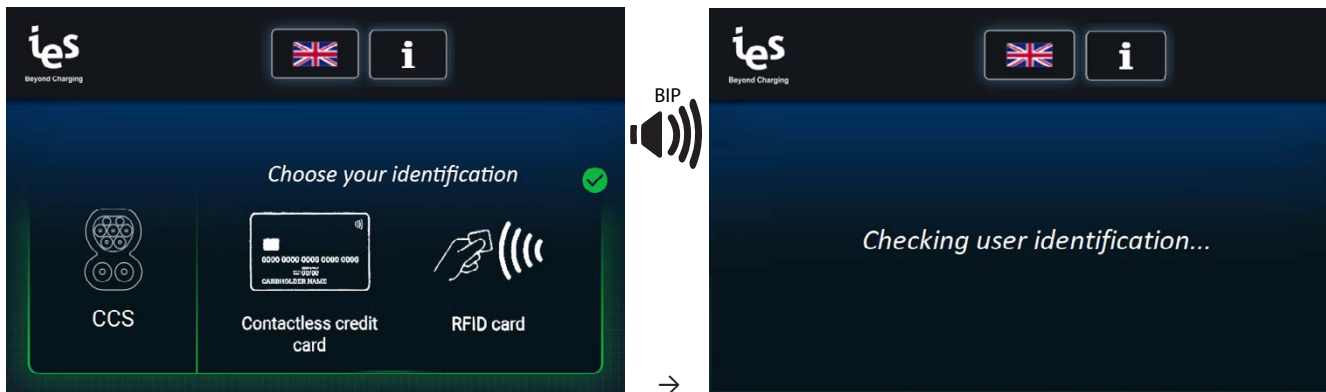
Press "Start" (if button available on screen)



Note: Applicable in COMBO, CHAdeMO and AC

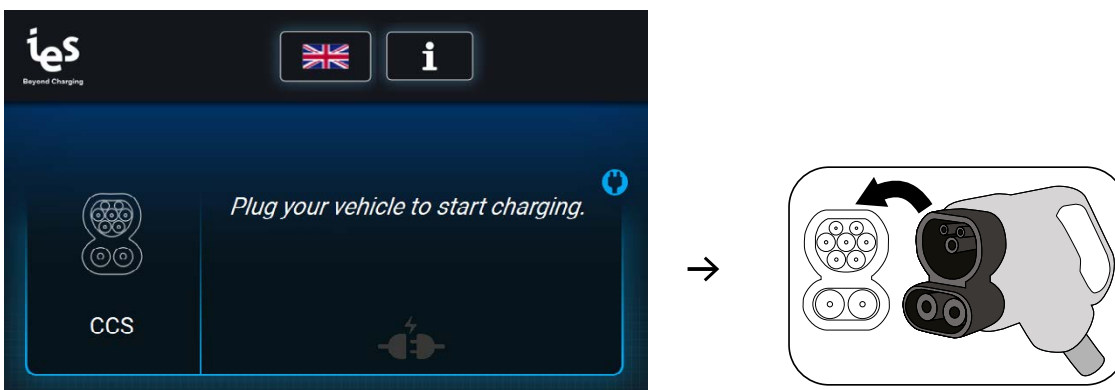
or

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



Note: Applicable in COMBO, CHAdeMO and AC

## 3) EV connection

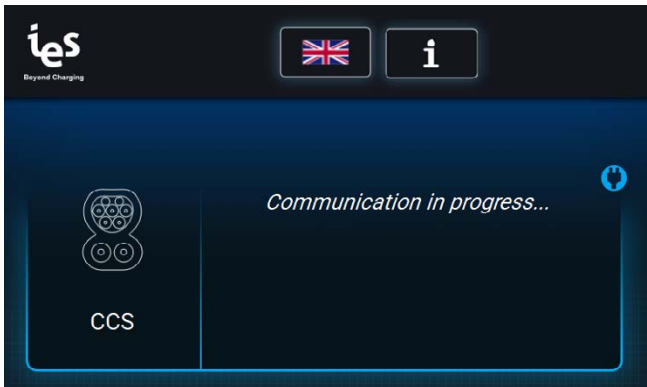


Note: Applicable in COMBO, CHAdeMO and AC

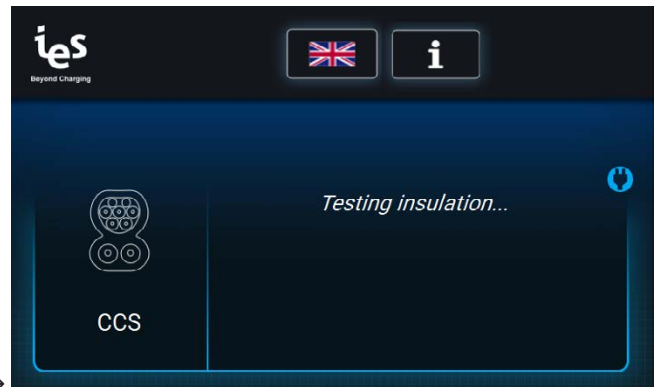
## 4) EV communication

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



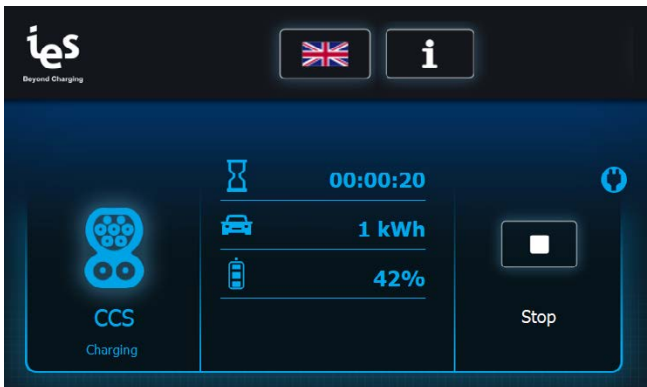
**Note:** Applicable in COMBO and CHAdeMO

## EV charge

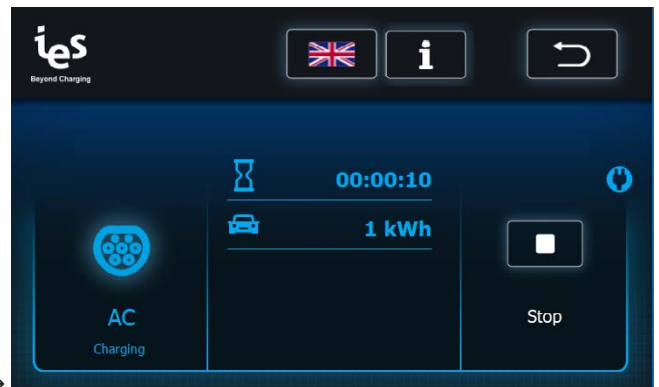
Only one DC connector and one AC connector can be used under simultaneous charge.

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



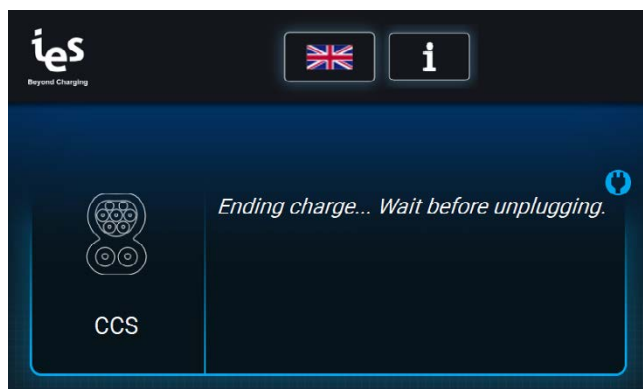
**Note:** Applicable in AC

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.



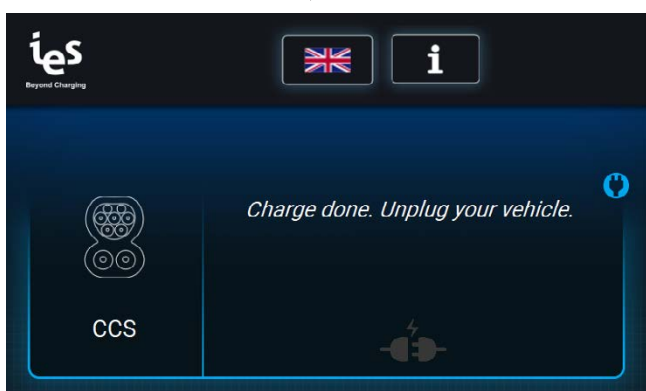
## Stop an EV charge session



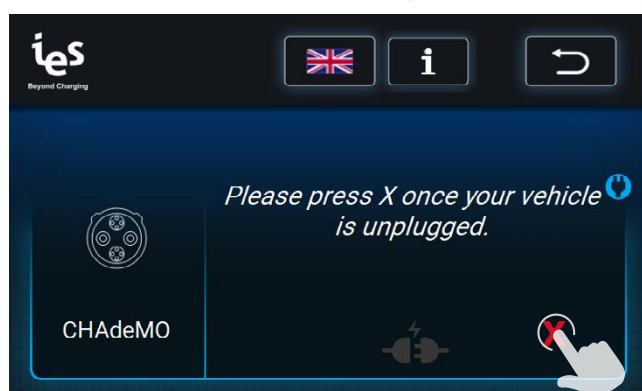
Note: Applicable in CHAdeMO

COMBO and AC

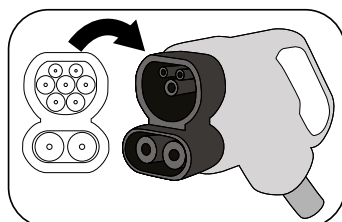
CHAdeMO



Note: Applicable in COMBO and AC



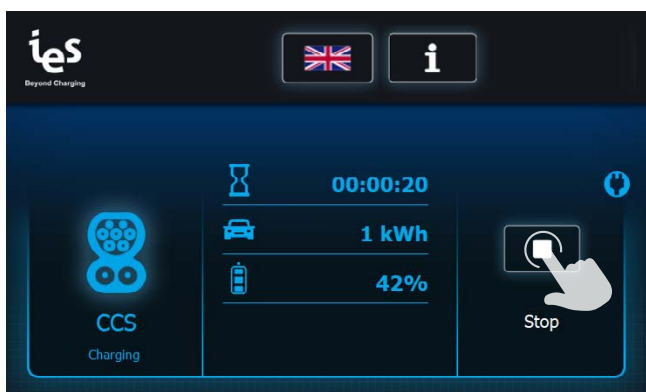
Note: Applicable in CHAdeMO



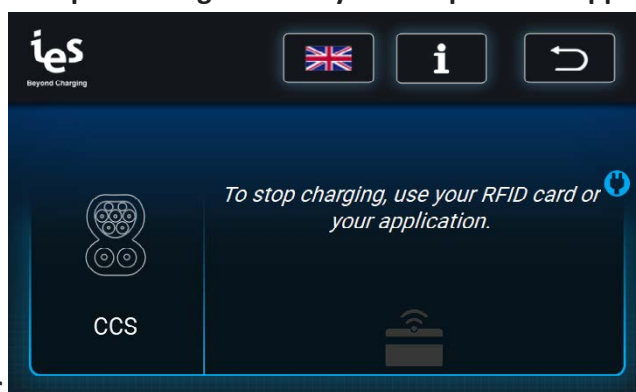
To stop the charge before the end of the EV charge:

Press "Stop" (if charge launched with "Start")

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



Note: Applicable in COMBO, CHAdeMO and AC



Note: Applicable in COMBO, CHAdeMO and AC

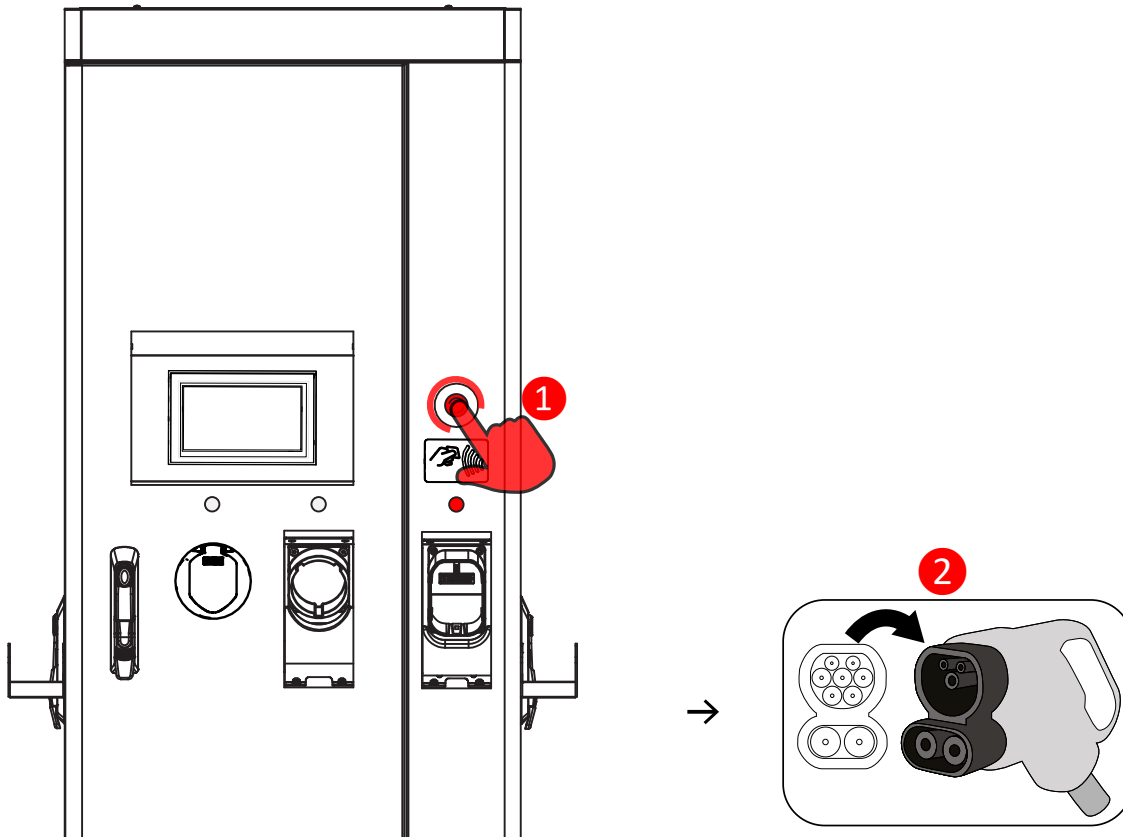
The following steps are identical to those described during normal stopping of the charge.



## Emergency Stop

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

To emergency stop follow these steps:



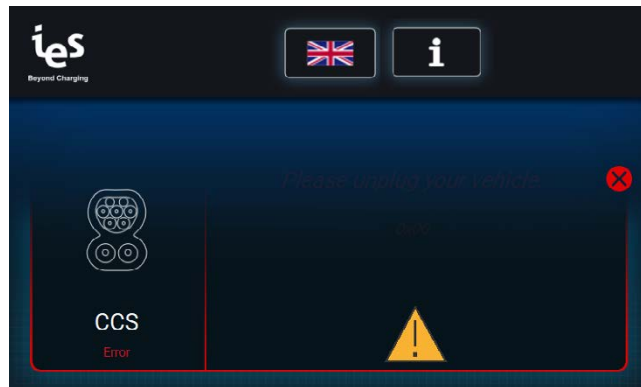
To reset after an emergency stop, rotate the button clockwise until it pops outward. After a self-test, the display will remove the emergency stop message and will be ready for a new session.

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

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







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As standards, specifications, and designs change from time to time, please ask for confirmation of the information given in this publication.

