User Manual

Keywatt 50 Station Bus

Beyond Charging

www.ies-synergy.com

DUM017749-EN_V001b

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

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 the use of the Keywatt 50 Station Bus. This guide must be read with other related documents. This guide is intended for users of the charging stations.

Document scope

This guide concerns the following charging station:

- P/N: 50kW CHARGING STATION

Related documents

Document title	Reference
Installation Manual	DIM017749-EN
User Manual	DUM017749-EN
Service Manual	DMM017749-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 STATION 50kW for TT, TN and IT earting systems 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

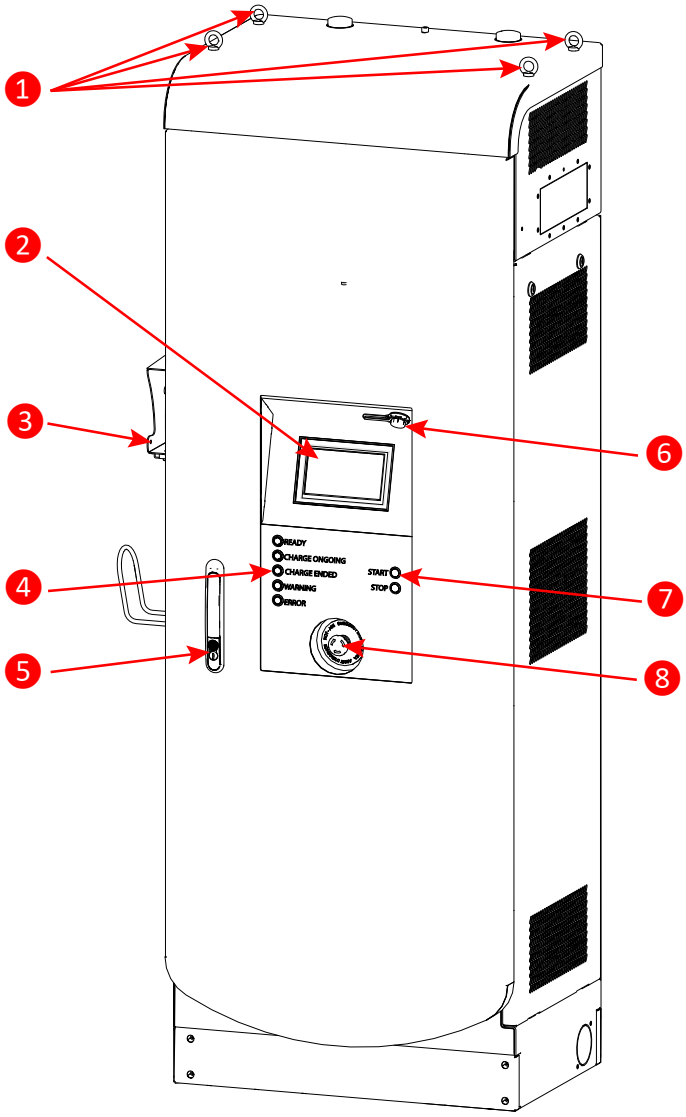
RISK OF ELECTRIC SHOCK, INJURY, AND/OR BURNING

- Only qualified, trained and authorized people will repair, replace or adjust this equipment.
- Make sure the AC input breaker is OFF and measures 0V before the breaker.
- Disconnect the protective device located upstream of the charger before working on it.
- 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.
- Replace the damaged cables by same caracteristics 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	Connector holster (in option)
4	State of charge
5	Door lock
6	RJ45 input **(for maintenance only)**
7	Power button (START/STOP)
8	Emergency Stop button

Note: May change depending on version or technical modification

5. Specification

Main supply

3-phase L1/L2/L3 + N + GND (3x400V_{AC})

The charging station can be connected to several mains supplies. This table shows the main power supply characteristics required for the following Station configuration operation:

- P/N: 50kW CHARGING STATION

Mains supplies 3-phase L1/L2/L3 + N + GND (3x400V_{AC}) (50kW)			
Mains 3-phase voltage range	V_{AC}	400 V_{AC}	± 10%
Earthed electrical system	TT, TN or IT		
Assigned frequency	f	50 Hz	+4%/-6%
Maximum input current per phase	I_{INmax}	80A	Max
Power Factor	PF	0,99	Nom
Efficiency (@ V_{IN} : 400V_{AC} / V_{OUT} : 800V / I_{OUT} : 62.5A / P_{OUT} : 49.6kW)	η	95 %	Max
Harmonic current @ nominal network voltage	THDi	< 16 % (@ P_{out} > 0,3 P_{max})	Max

Technical specification

Internal AC input protection			
Inrush current limitation per phase	$I_{INRUSH\ LIMIT}$	< 3 x I_{AC}	Max
Rated current circuit breaker	I_{BREAK} Rating	100A	typ
Rated short-circuit capacity	I_{BREAK} Capacity	15 kA	Max
Max earth leakage current	$I_{LEAKAGE}$	< 3,5 mA	Max
Emergency button connection	Yes		
Overvoltage category	III		

Internal DC Output			
Output voltage	V_{DC}_max	800 V_{DC}	Max
	V_{DC}_min	400 V_{DC}	Min
Output current	I_{DC}_max	75A (1)(2)	Max
	I_{DC}_min	5A	Min
Max Output Power	P_{OUT}	50kW	Max
Output connector (charging station side)	Permanent mounting		
Car Plug connector	IEC CCS Combo 2		
Output cable length	Meters	4m or 7m in option	

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}	175	A
Galvanic isolation	$V_{input\ /\ output}$	2520	V_{DC}
Max time for DC line discharge < 60V	$T_{<60V}$	1	s

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 gun holder (HxWxD)	mm	2010 x 710 x 510 mm	
External dimensions with gun holder (HxWxD)	mm	2010 x 820 x 510 mm	
Weight (with DC cable and cable management)	Kg	320kg	Max
Type of installation	Indoor / outdoor (but not public area)		
Fixation points	4 studs M14 for ground mounting		
Mechanical resistance to impact	IK	IK10 (except screen IK09)	
Protection Type (EN60529)	IP	IP55	
Cooling system	Heatsink with forced air flow by fans IP55 without air filter		
Acoustic level (1m, all directions)	Db(A)	58.9 dbA (1m)	

Climatic & Environment constraints		
Operating temperature (with derating)	-25°C to +50°C(3)	
Storage temperature	-25°C to +70°C	
Relative humidity	RH	5% to 95%
Installation altitude	Alt Max	2 000 m

Norms & standards	
Radio Equipment Directive (RED)	2014/53/EU (4)
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
Information technology equipment - Safety - Part 1: General requirements	IEC 60950-1:2005 (A1:2009 + A2:2013)
Information technology equipment - Safety - Part 22: Equipment to be installed outdoors	IEC 60950-22:2016
Electrical safety in low voltage distribution systems up to 1000 V_{AC} and 1500 V_{DC} - Equipment for testing, measuring or monitoring of protective measures - Part 8: Insulation monitoring devices for IT systems	IEC 61557-8 (4)
Electric vehicle conductive charging system - Part 1: General requirement	IEC 61851-1 (4)
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 (4)
Electric vehicle conductive charging system - Part 23: DC Electric vehicle charging station	IEC 61851-23 (4)

Norms & standards	
Electric vehicle conductive charging system - Part 24: Digital communication between a DC EV charging station and an electric vehicle for control of DC charging	IEC 61851-24 (4)
Charge Communication systems Standards	ISO/IEC 15118
OCPP design rules	010-030-007 Rev1.6
Digital communication between a DC EV charging station and an electric vehicle for control of DC charging in the Combined Charging System	DIN 70121
Vibration and shock resistance	STD ASTM D 4169-16 STD ASTM D 880-92 STD ASTM D 4728-17 STD ASTM D 6055-96 STD ASTM D 6179-07

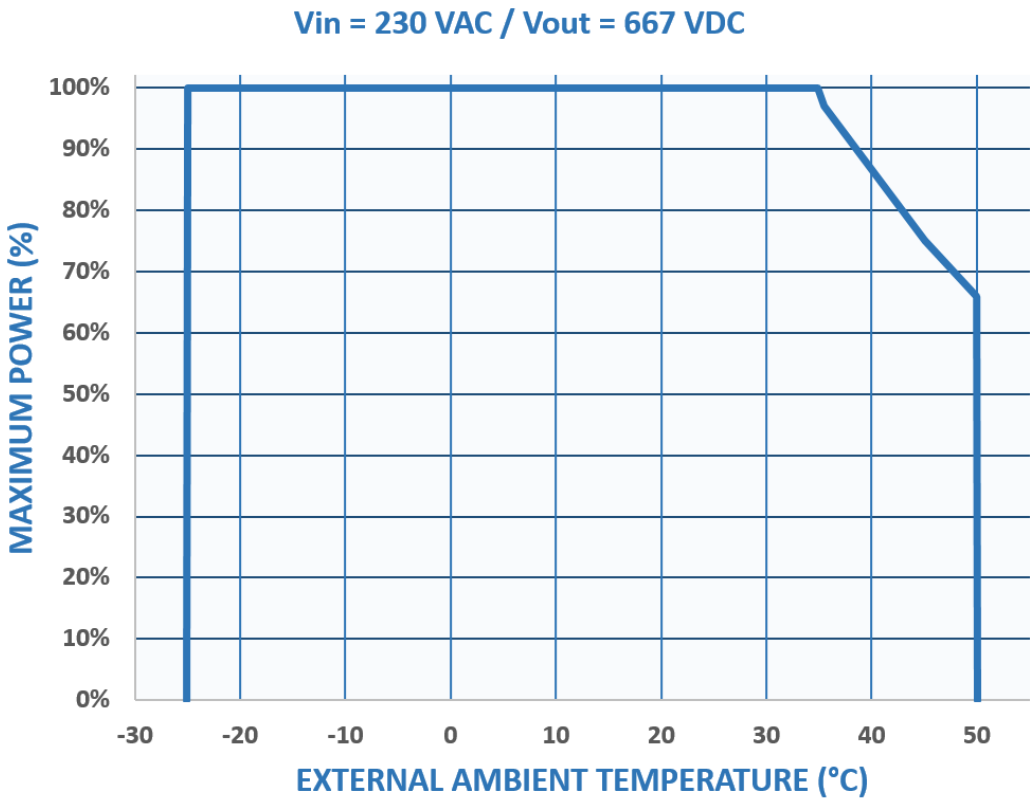
(1) Max output current will be adapted versus maximum carrying current of the vehicle plug
(2) Output current can be even reduced with the power derating versus temperature.
(3) With derating above 30°C
(4) Design in compliance with CE directives

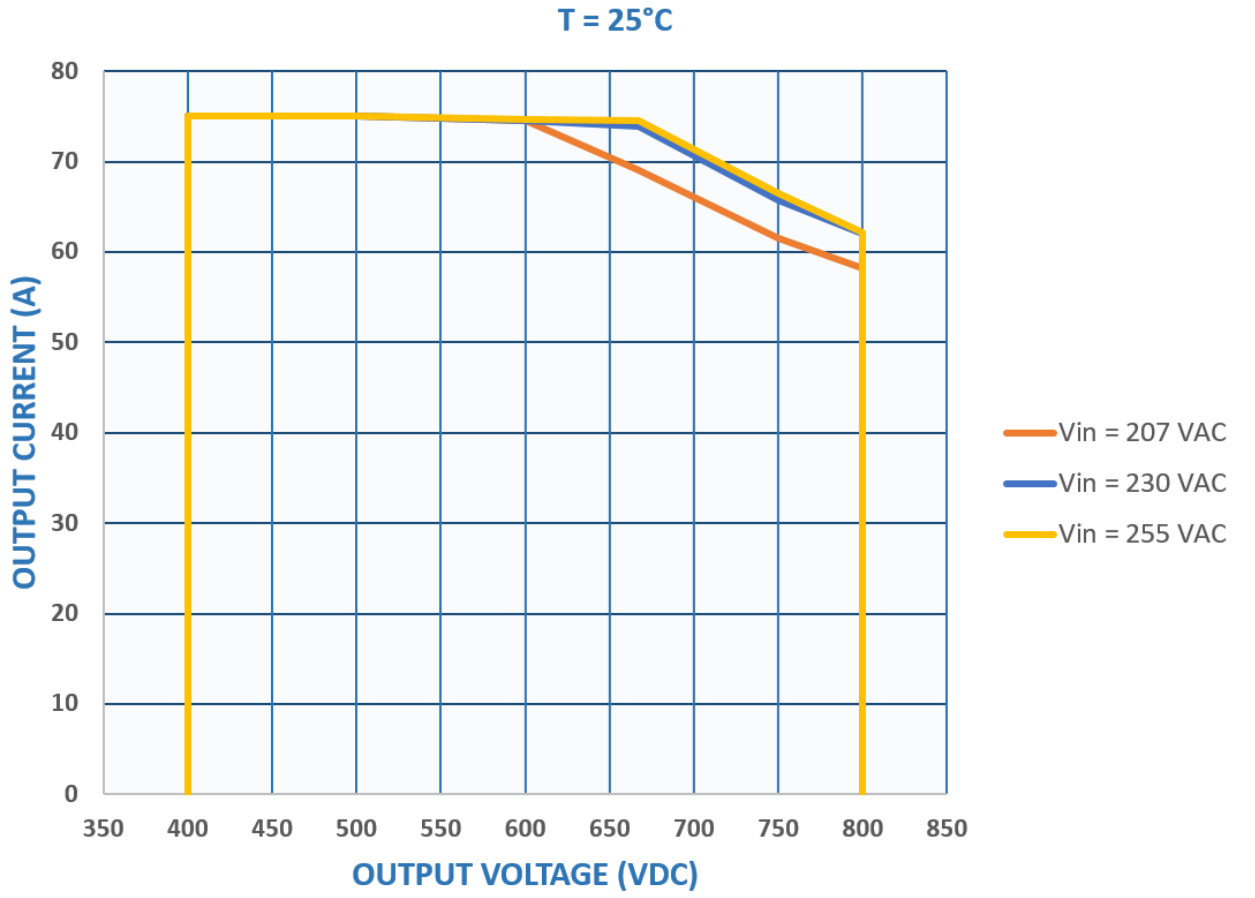
Compliance

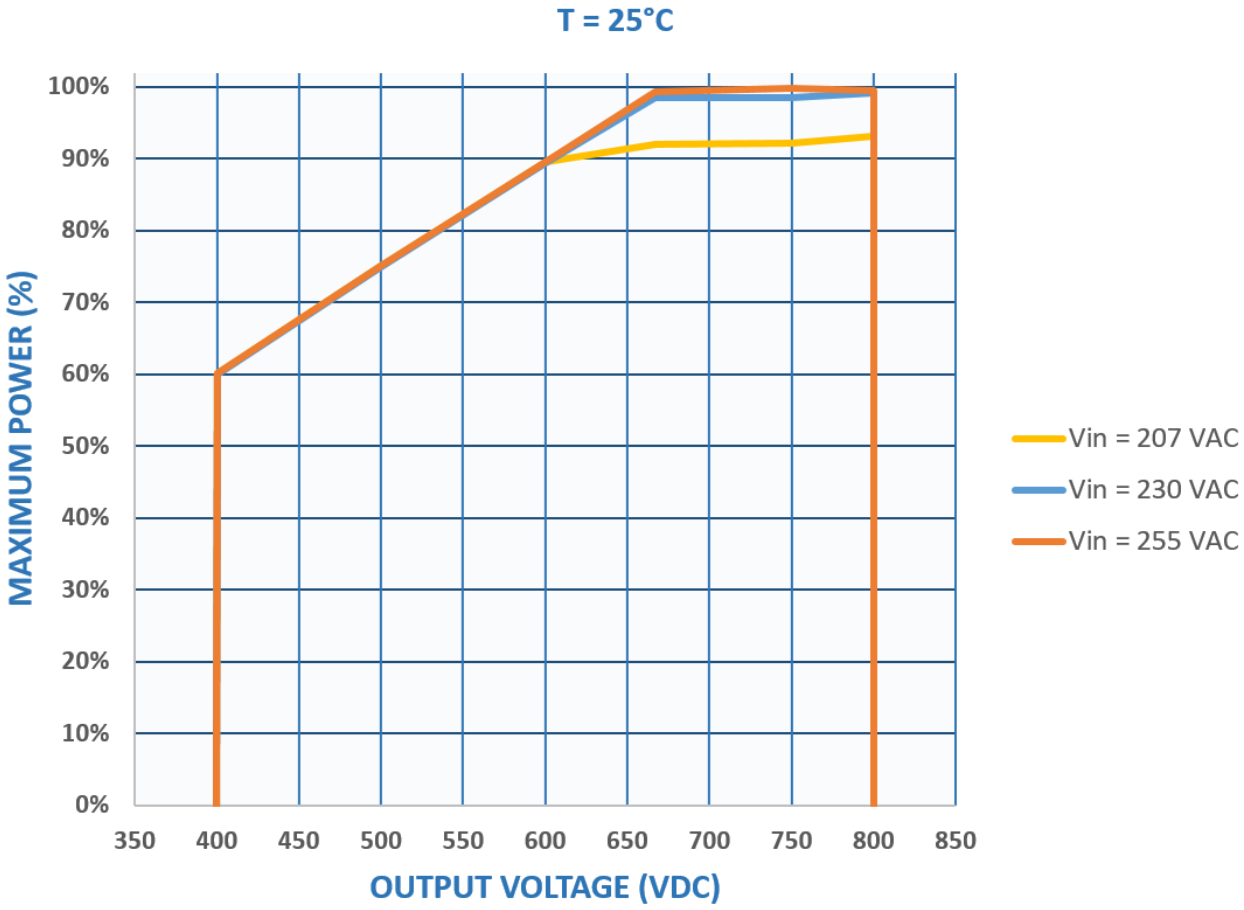
CCS

Derating

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




T = 25°C
OUTPUT CURRENT (A)
80
70
60
50
40
30
20
10
0
350
400
450
500
550
600
650
700
750
800
850
OUTPUT VOLTAGE (VDC)
Vin = 207 VAC
Vin = 230 VAC
Vin = 255 VAC


T = 25°C
MAXIMUM POWER (%)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
350
400
450
500
550
600
650
700
750
800
850
OUTPUT VOLTAGE (VDC)
Vin = 207 VAC
Vin = 230 VAC
Vin = 255 VAC

6. Utilization

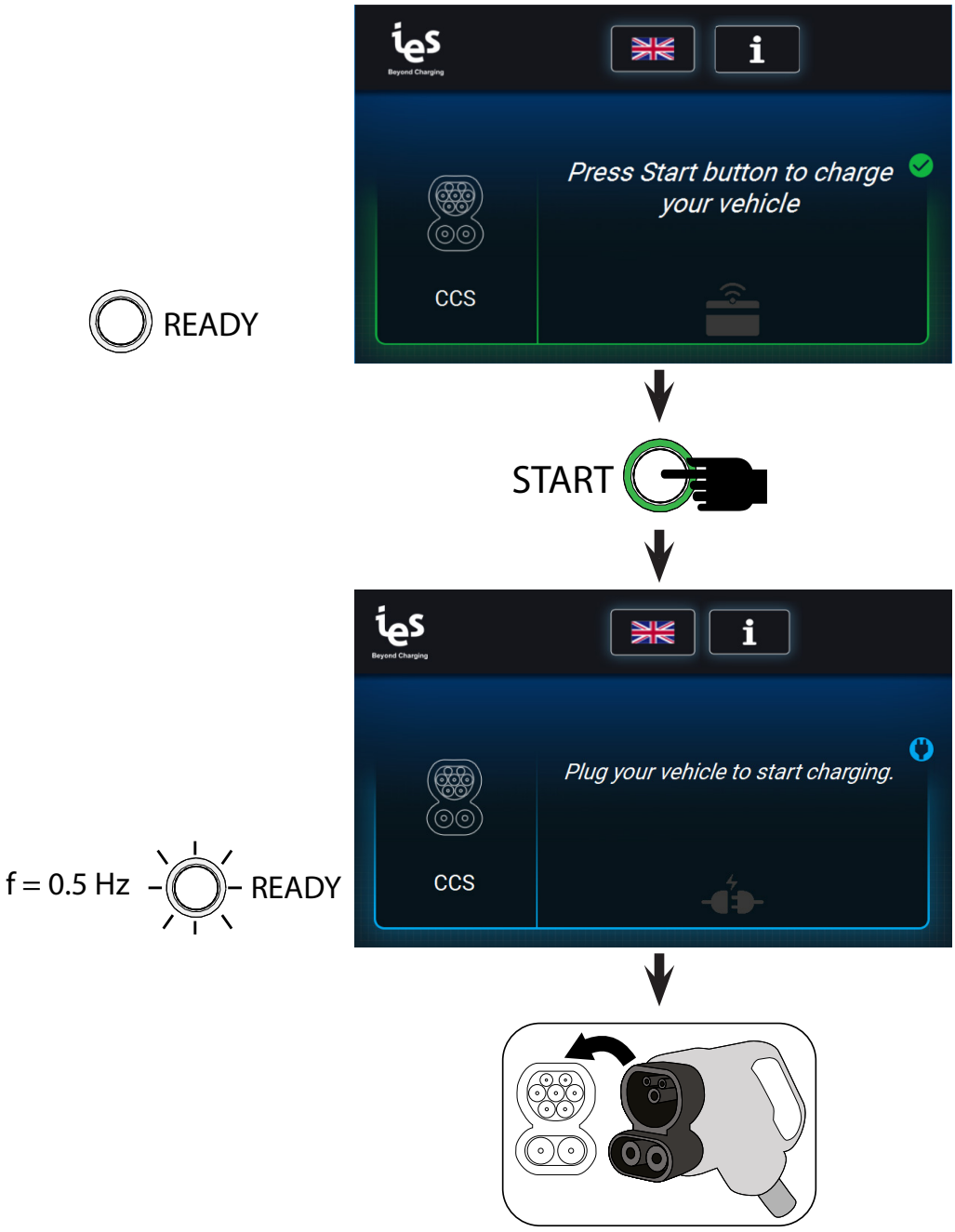
Human/Machine interface (HMI)

Lights

Charger ready	CCS connected	Charging	Charge ended	Warning	Error

Start a charge session

Before starting a charge session, ensure the unit is properly assembled in accordance with the assembly instructions being used.



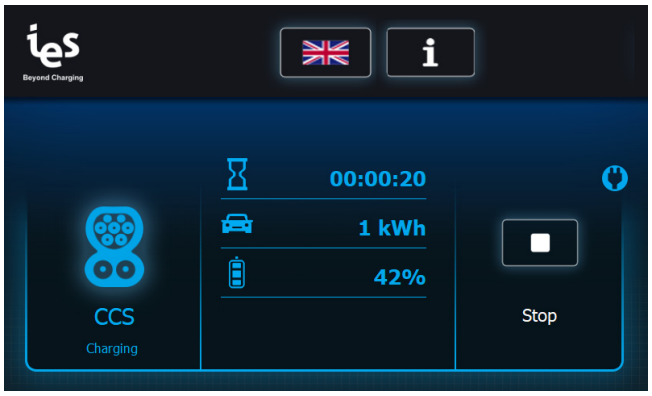
EV communication

Before starting a charge, the charging station communicates with the electrical vehicle to collect information. All these steps are necessary to adapt the charging station parameters to the EV.

EV charge

While the EV is charging, the charging station shows the information about the charge (time since the start of charging, charged energy and percentage of charge).

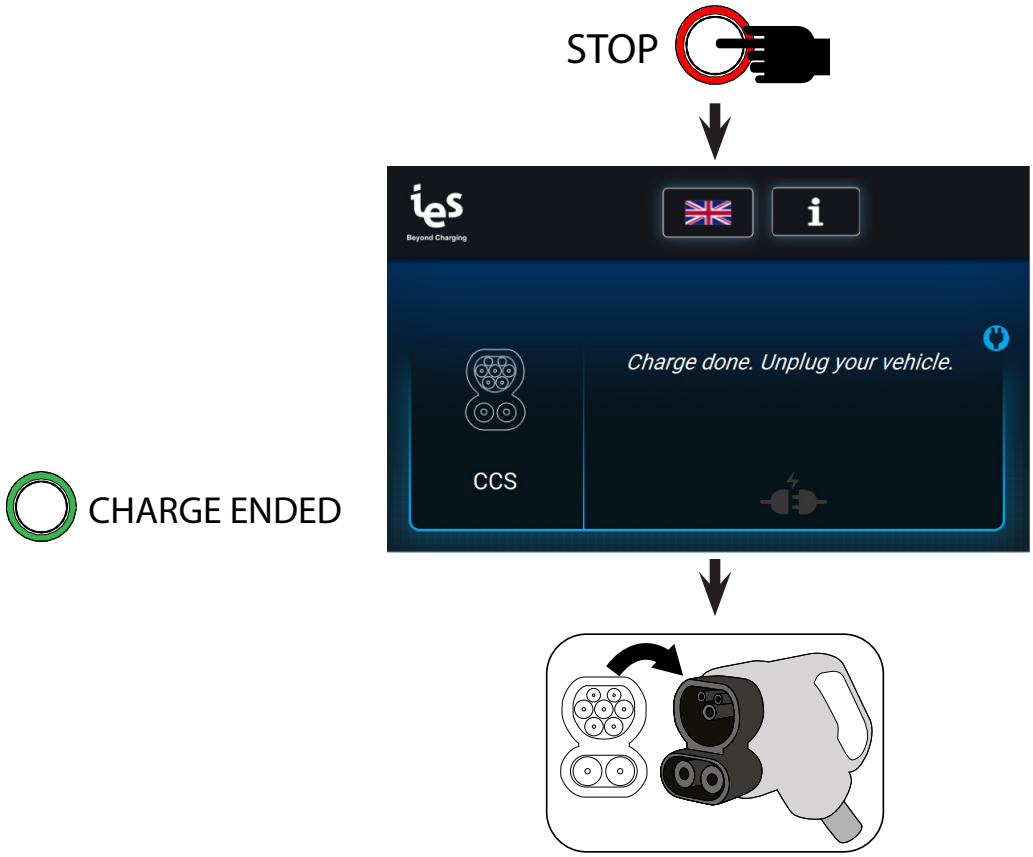
f = 0.5 Hz – CHARGE ONGOING



Stop a charge session

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.

To stop the charge before the end of the EV 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:

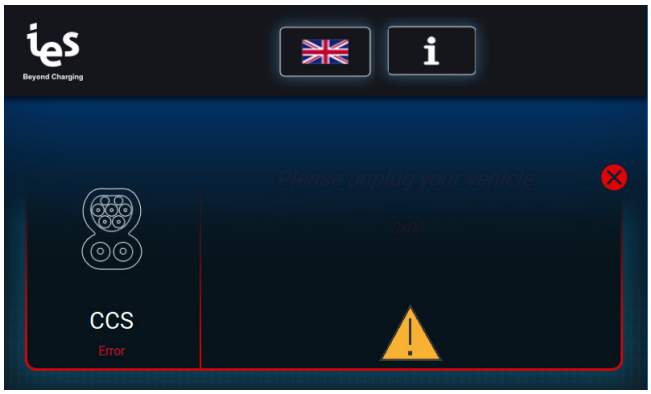
1. Press the emergency stop button bellow the charger
2. The display will show the text “Error ocurred: 0x02 Emergency stop was launched. Please unplug your vehicle and check that the emergency button is released.”
3. Unplug the connector from the vehicle

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.

7. Displayed messages

Error messages

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. 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.	Emergency stop was initiated. Please unplug your vehicle and release the emergency button.
Error occurred: 0x22 - 0x33 The connector cannot lock. Please keep the connector closely leant against your vehicle when plugging, until the charge has started. Please unplug your vehicle.	The connector cannot lock. Please keep the connector closely leant against your vehicle when plugging, until the charge has started. Please unplug your vehicle.
Error occurred: 0x3A Your battery model is incompatible with this charger. Please unplug your vehicle.	Your battery model is incompatible with this charger. Please unplug your vehicle.
Error occurred: 0x31 Your battery's temperature is too high. Please unplug your vehicle.	Your battery's temperature is too high. Please unplug your vehicle.
Error occurred: 0x46 Connection between screen and charger has been lost. Please unplug your vehicle.	Connection between HMI screen and charger has been lost. Please unplug your vehicle.
Error occurred: 0x-- Please unplug your vehicle.	For all other error codes, please refer to maintenance manual.
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 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 timeout. Please unplug your vehicle then identify.	Time out, user identified, unplug the vehicle before retrying to identify.

Error	Error resolution
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.
Error updating. DO NOT CHARGE HERE. Wait for correct update.	Error updating. Please contact support for updating the charging station.
Warning: insulation failure.	Cable insulation failed. Please contact support.
0x1B: ERR_Insulation_Measure_Failure	Insulation measure failure.
0x88: ERR_PSU_Insulation_Fault	PSU insulation fault.
0x8C: ERR_PSU_INS_CONTROLLER_FAILED	PSU insulation controller failed.

Other messages

When the following messages are displayed on the charging station's screen, the charge is unavailable.

Message	Description
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.
Charger offline. Set up to refuse offline charging.	Charger offline.
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.
Remote reset started... Station will reboot now.	Station is being rebooted.
Station rebooted. Please unplug your vehicle.	Station rebooted during a charge. Please unplug and retry to launch the charge.

8. Cleaning

⚠ CAUTION

RISK OF DAMAGE TO THE TERMINAL

- DO NOT use a high pressure jet to clean the device.
- Preserve the terminal from contact with gasoline, diesel and other automotive fluids.
- DO NOT use solvents to clean the terminal.

Failure to follow these instructions can cause damage.

⚠ WARNING

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- To avoid danger of electrical shock or injury, turn off power at the panel board or load center before working on the equipment or removing any component. Do not remove circuit protective devices or any other component until the power is turned off.
- Disconnect electrical power to the harging station before any maintenance work to ensure that it is separated from the supply of AC mains. Failure to do so may cause physical injury or damage to the electrical system and charging unit.
- Maintenance of the charging station shall be conducted only by a qualified technician.

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

Cleaning the charger is only made with a dry cloth, twice a year, charger OFF and not connected.

Every six months,

- Conduct a visual inspection of the air inlet of the charging station and ensure that they are not clogged.
- Conduct a visual inspection of the charging cable and ensure that cable does not show any visual damage or deformation.
- Conduct a visual inspection of the charging gun and ensure that gun does not show any visual damage, arcing or rust.

Every year, conduct a visual inspection of the state of the lightning protections and ensure that they are not damages.

Notes

Notes

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