

User Manual

Keywatt S120 / S150 / S180

Edition: 10/2023



DUM4021418-EN_V001a

KEYWATT®
Charging
By ies



The manuals are updated regularly. Visit www.sav-ies-synergy.zendesk.com to ensure that you have the latest version. The version type and update dates are listed on the front cover of this manual.

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.

You agree not to reproduce, other than for your own personal, noncommercial use, all or part of this document on any medium whatsoever without permission of IES Synergy, given in writing. You also agree not to establish any hypertext links to this document or its content. IES Synergy does not grant any right or license for the personal and noncommercial use of the document or its content, except for a non-exclusive license to consult it on an “as is” basis, at your own risk. All other rights are reserved.

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.

© 2023 IES Synergy. All rights reserved.

Table of contents

1. Safety notes	4
Notice	4
Please note	4
2. About the manual	5
Purpose of this manual	5
Document scope	5
Related documents	5
User comments	5
3. General Safety instructions	6
4. Overview	7
External view	7
5. Specifications	8
AC Main supply Specifications	8
DC output specifications	8
DC insulation monitor device characteristics	9
4G module characteristics	9
Other characteristics	10
6. Utilization	13
Human/Machine interface (HMI) and LEDs	13
Prerequisite	14
Start an EV charge session (A: Prepayment)	15
Start an EV charge session (B: Pre-authorization)	15
Start an EV charge session (C: Pre-authorization)	17
EV charge	18
Stop an EV charge session	19
Emergency Stop (available only on fleet version)	20
Other messages	21
Errors	22

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

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 information needed for installation and end-of life of the Keywatt S180 Station. This guide must be read with other related documents. This guide is intended for qualified personnel to install on the charging stations.

The equipment is considered an AEVCS in accordance with IEC61439-7.

Document scope

This guide concerns the following charging stations:

- KEYWATT® S180 CE
- KEYWATT® S150 CE
- KEYWATT® S120 CE

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



KEYWATT® S180
DUAL



KEYWATT® S180
MONO



KEYWATT® S180
FLEETS DUAL



KEYWATT® S180
FLEETS MONO



KEYWATT® S150
DUAL



KEYWATT® S150
MONO



KEYWATT® S150
FLEETS DUAL



KEYWATT® S150
FLEETS MONO



KEYWATT® S120
DUAL



KEYWATT® S120
MONO



KEYWATT® S120
FLEETS DUAL



KEYWATT® S120
FLEETS MONO

Related documents

Document title	Reference
Installation Manual	DIM4021418-EN
User Manual	DUM4021418-EN
Service Manual	DMM4021418-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 DC fast charger that shall be followed during installation, operation and maintenance of the unit.
- The locking key, supplied with the unit, should be kept in a secure and known location by an individual that has read and understands the content of this manual.

Failure to follow these instructions can 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.
- Disconnect the protective device located upstream of the charger before performing any work 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.
- 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



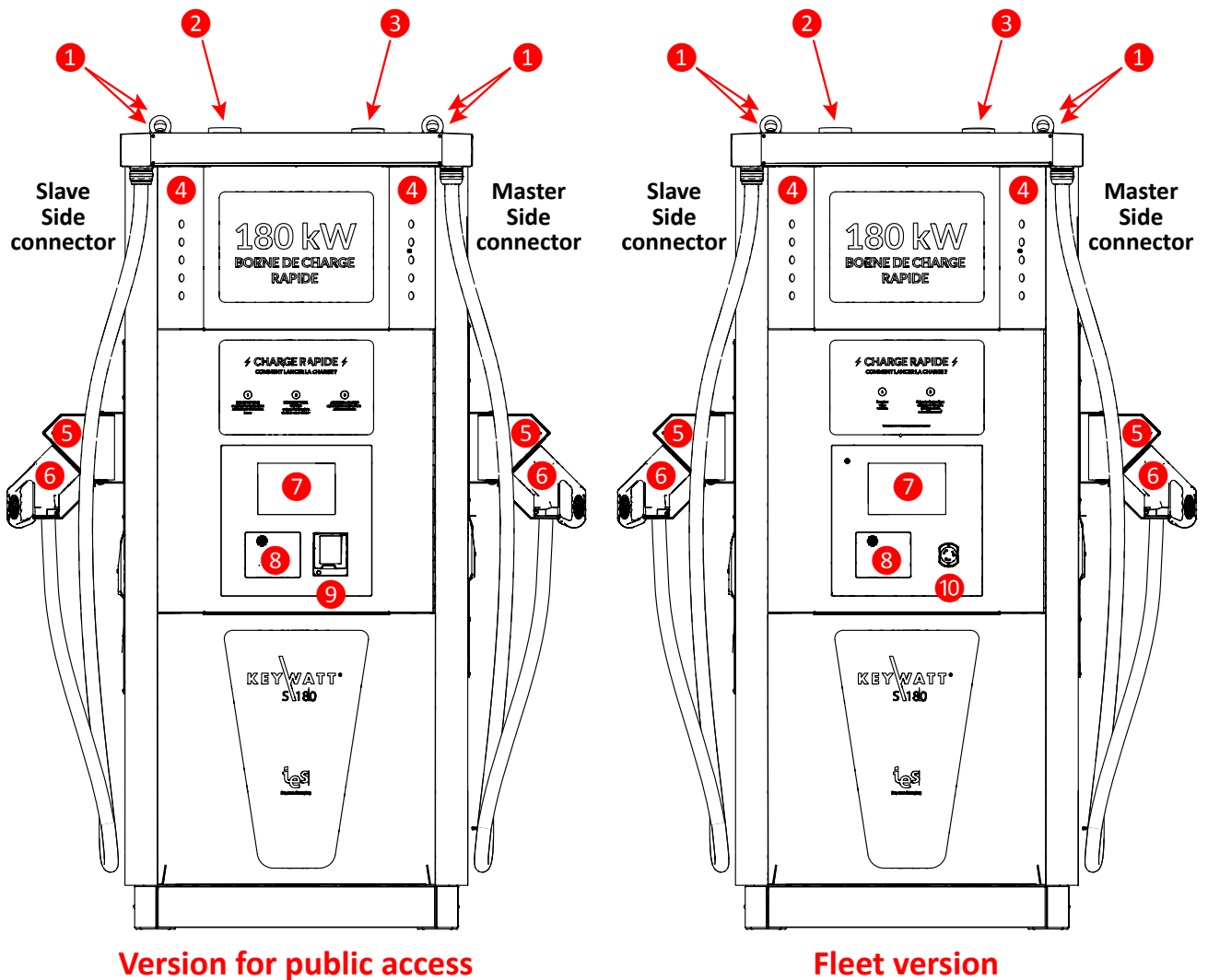
RISK OF DAMAGE TO THE TERMINAL

- 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.

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

4. Overview

External view



Position	Description
①	Lifting rings (x4)
②	Antenna 2x4G + GPS + WIFI
③	Antenna 2x4G
④	LEDs
⑤	Connector support
⑥	CCS Type 2 DC connector
⑦	Touchscreen display
⑧	Speaker IHM, RFID, light intensity and proximity sensors
⑨	Payment terminal and contactless RFID reader (in version for public access)
⑩	Emergency Stop button (in version for fleets)

*Note: May change depending on version or technical modification

5. Specifications

AC Main supply Specifications

Mains supply 3-phase L1/L2/L3 + N + PE			
Mains 3-phase voltage range	V_{AC}	230/400 V_{AC}	±10%
Earthed electrical system	TT; TN		
Frequency range	f	50 Hz	+4%/-6%
Rated impulse withstand voltage	U_{imp}	4kV	
Rated insulation voltage	U_i	400V	
Nominal input current	I_{nc}	279A (S180) / 233A (S150) / 186A (S120)	Nom
Maximum input current	I_{nA}	313A (S180) / 259A (S150) / 207A (S120)	Max
Presumed short circuit current	I_{cc}	25kA	Max
Rated peak permissible current	I_{pk}	≥ 25kA	
Rated short-time withstand current	I_{cw}	≥ 25kA	
Power factor	PF	0,99	Nom
Efficiency	η	0,95	Max
Harmonic current @ nominal network voltage	THDi	< 7 %	Max
Rated diversity factor	RDF	1	Nom

Internal protection of mains inputs			
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 in version for fleets, not in version for public access		
Overvoltage category	III		
Rated Impulse Voltage	6kV		
Rated Insulation Voltage (IEC 61439)	690 V_{AC}		

DC output specifications

DC Output Electrical System: IT			
Output voltage range	V_{DC_max}	1000 V_{DC}	Max
	V_{DC_min}	200 V_{DC}	Min
Output current range	I_{DC_max}	390A ⁽¹⁾⁽²⁾ (S180) / 325A ⁽¹⁾⁽²⁾ (S150) / 260A ⁽¹⁾⁽²⁾ (S120)	Max
	I_{DC_min}	1,5A	Min
Max Output Power	P_{OUT}	180kW (S180) / 150kW (S150) / 120kW (S120)	Max
Minimum Short-Circuit Ratio (IEC 61000-3-12)	R_{sce}	33	VA/VA
Connection	4 Wires + PE / 3 Wires + PEN		
Output connector (charging station side)	Permanent mounting		
Car Plug connectors	CCS type2 - IEC 62196-3		
Output cable length	Meters	3,15m / 5,5m / 9,5m ⁽⁵⁾	
Cable management system	Yes optional ; Mandatory from 7,5m		

DC output protection			
Hardware and software short circuit protection	Yes		
Hardware over voltage protection	Yes		
Software over voltage protection	Yes		
Over temperature protection	Yes		
Reverse polarity protection	Yes		
DC output Contactor	Yes (2 poles)		
Rated Current Fuse (output)	I_{FUSE}	600	A
Galvanic isolation	$V_{input/output}$		V_{DC}
Max time for DC line discharge < 60V	$T_{<60V}$	1	s

DC insulation monitor device characteristics

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 200V...1000V
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.

4G module characteristics

Network Mode/GNSS	Frequency band
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

Other characteristics

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	13.17 dBμA/m @10m (Self 2000)

EV Detection Loop characteristics

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

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

Radar RF output power - EIRP

Polarization	Level (dBm)
Vertical	4,48
Horizontal	-8,79

Wifi

Wifi Frequency band	2,4 GHz / 5 GHz
---------------------	-----------------

General & dimensions

External dimensions w/o cable support (HxWxD)	mm	2000 x 899 x 865	± 5%
External dimensions with cable support (HxWxD)	mm	2000 x 899 x 1115	± 5%
Weight (with DC cable and cable management)	Kg	600 (S180) 570 (S150) 540 (S120)	Max
Type of installation	Indoor or outdoor		
Fixation points	4		
Mechanical resistance to impact	IK	IK10	(IK09 on screen)
Protection Type (EN60529)	IP	IP55	
Cooling system	Air		

Climatic & Environment constraints			
Operating temperature (with derating)	-25°C to +50°C ⁽³⁾ (-20°C à +50°C If payment terminal)		
Storage temperature	-25°C to +70°C		
Relative humidity	RH	10% to 95%	
Installation altitude	Alt	2 000 m	Max

Norms & standards	
Low voltage EC directive (LVD)	2014 / 35 / UE
EC Electromagnetic directive	2014 / 30 / UE
Radio Equipment Directive	2014 / 53 / UE
Electric vehicle conductive charging system – Part 1: General requirements	EN61851-1:2019
ELECTRIC VEHICLE CONDUCTIVE CHARGING SYSTEM – Part 23: DC electric vehicle supply equipment	EN61851-23
Digital communication between a d.c. EV charging station and an electric vehicle for control of D.C. charging	IEC61851-24
Part 21-2 EMC requirements for OFF board electric Vehicle charging system	IEC61851-21-2
Low-voltage switchgear and controlgear assemblies – Part 1: General rules	IEC61439-1:2020
Low-voltage switchgear and controlgear assemblies - Part 7: Assemblies for specific applications such as marinas, camping sites, market squares, electric vehicle charging stations	IEC 61439-7:2018 + COR1:2019

⁽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 from 35°C.

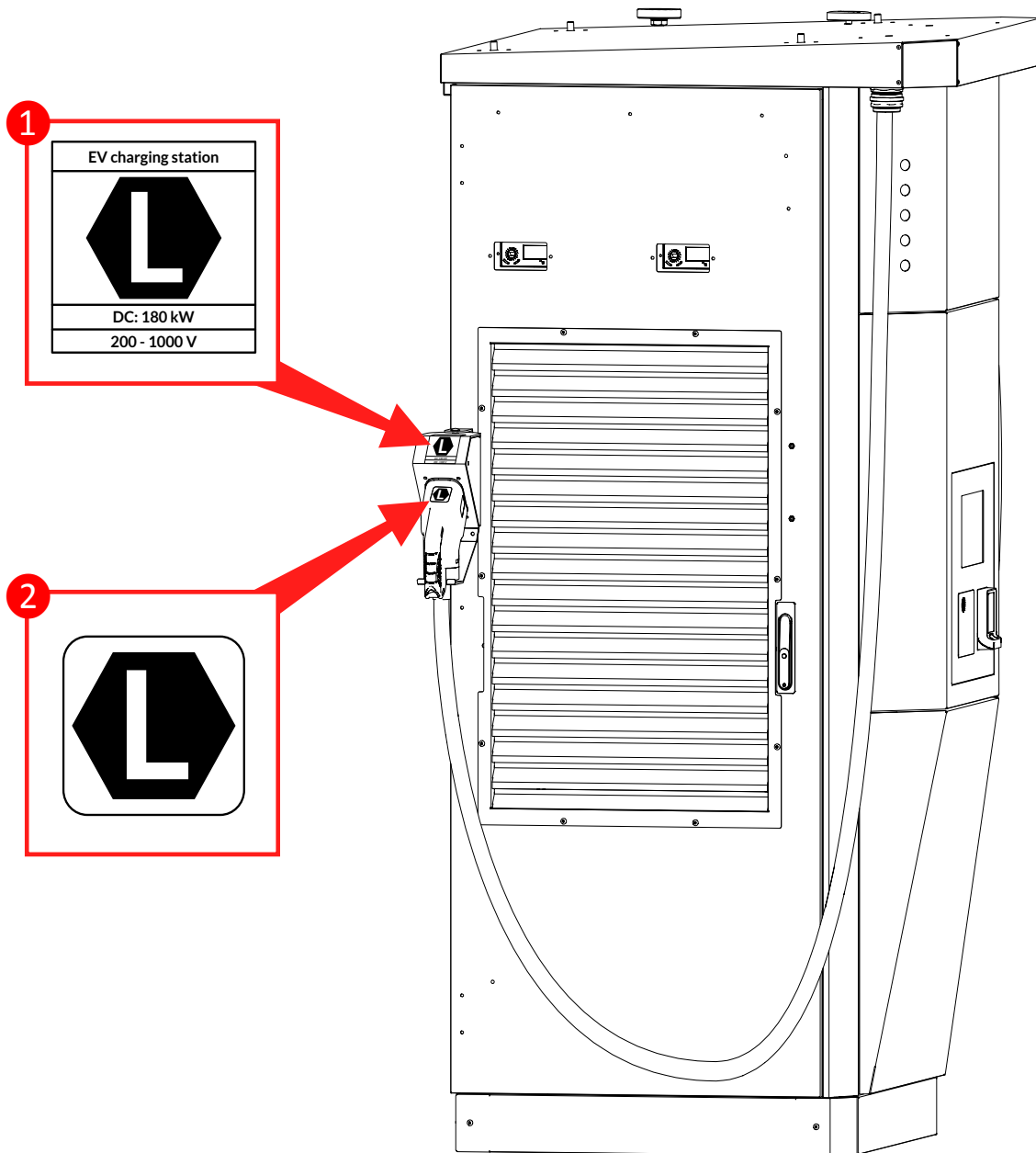
⁽⁴⁾ Design in compliance with CE directives.

⁽⁵⁾ May change depending on version.

Labelling requirement

KeyWatt S180; S150 and S120 are equipped with CCS2 connectors which are marked in accordance with EN 17186 as follows:

- 1 on the station
- 2 on the CCS connector

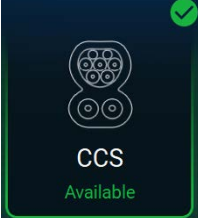

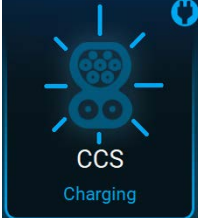

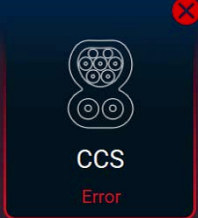
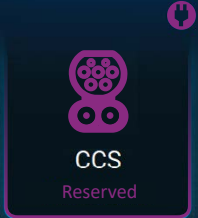
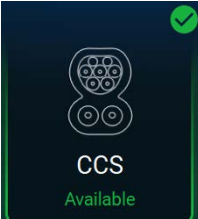

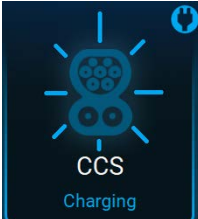
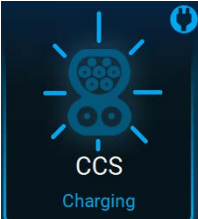
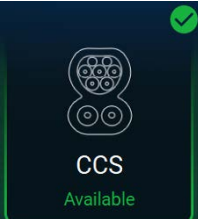
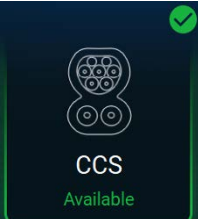
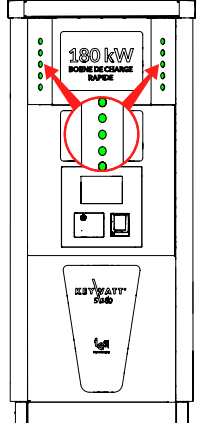
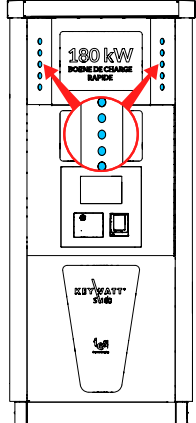
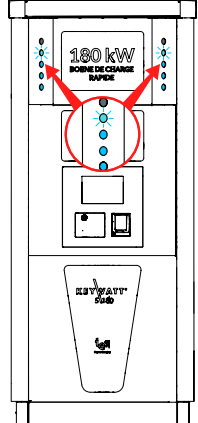
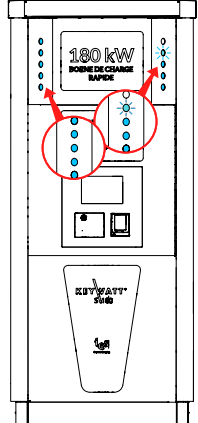
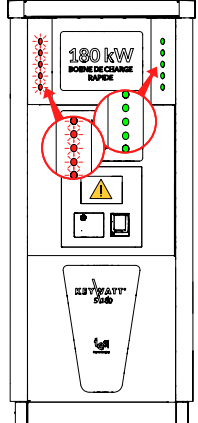
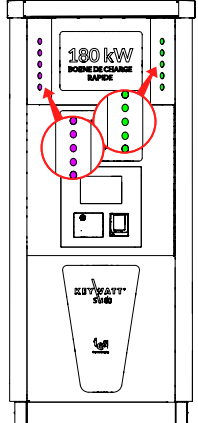


Compliance



6. Utilization

Human/Machine interface (HMI) and LEDs

CCS connector 1 and CCS connector 2 available.	CCS connector 1 and CCS connector 2 plugged. Communicating with the EV.	CCS connector 1 and CCS connector 2 simultaneously charging.	End of CCS connector 1. CCS connector 2 charging. Cables connected.	DC error detected on CCS connector 1. CCS connector 2 available	CCS connector 1 reserved. CCS connector 2 available
 <p>CCS Available</p>	 <p>CCS Preparing</p>	 <p>CCS Charging</p>	 <p>CCS Finishing</p>	 <p>CCS Error</p>	 <p>CCS Reserved</p>
 <p>CCS Available</p>	 <p>CCS Preparing</p>	 <p>CCS Charging</p>	 <p>CCS Charging</p>	 <p>CCS Available</p>	 <p>CCS Available</p>
					

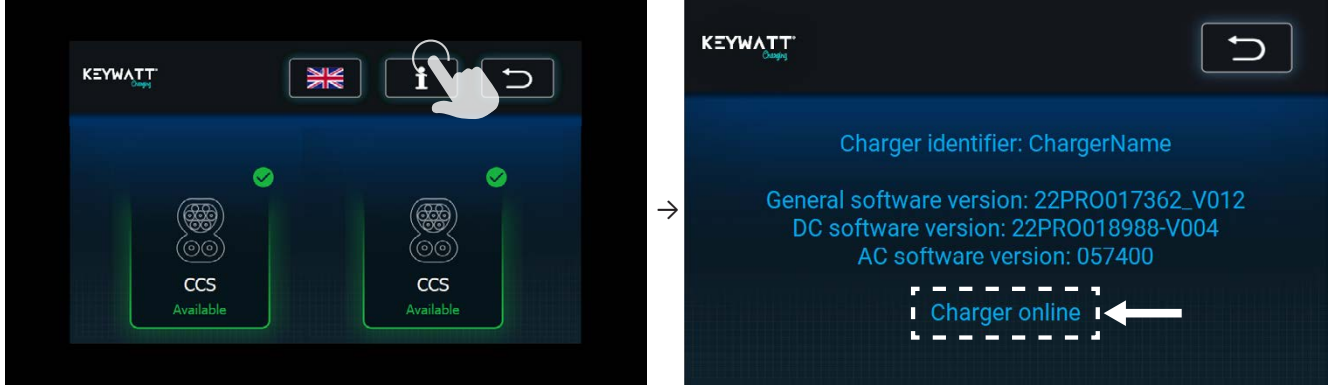
Prerequisite

Before starting a charge:

Make sure that the charge unit, the cable and the plug do not have any signs of damage or alteration before using it.

Make sure you have a valid RFID card with an operator, or a valid contactless bank card or a smartphone, or the necessary authorization to use this charging station according to operator and version of HMI.

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



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

Start an EV charge session (A: Prepayment)

Select the type of charge



Choose identification mode



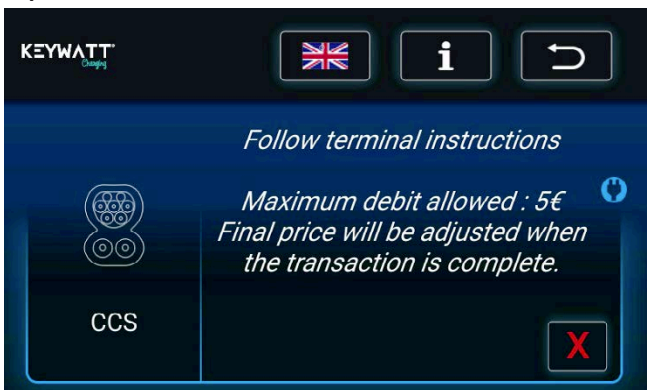
Click on (++) or (--) to choose your consumption amount



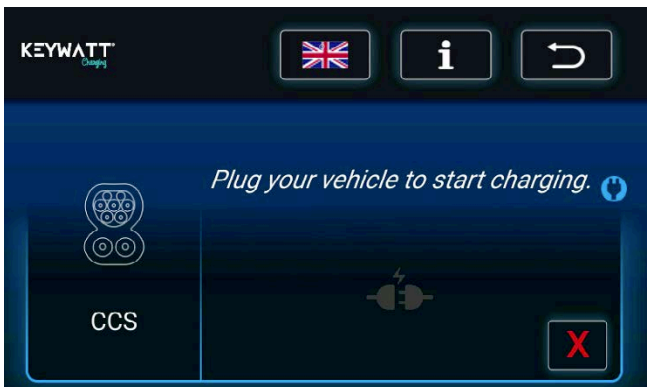
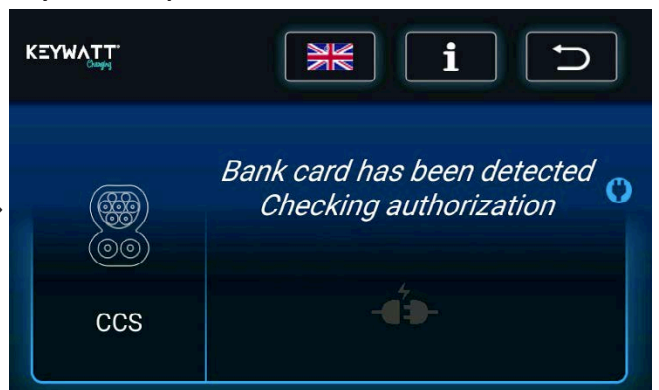
Press PLAY



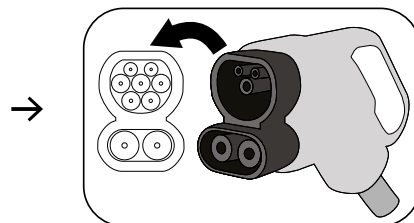
Tap card on POS



Payment accepted



Connect the EV



Start an EV charge session (B: Pre-authorization)



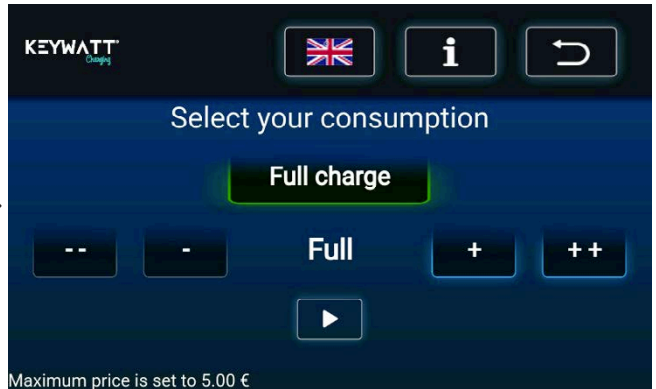
Press OK



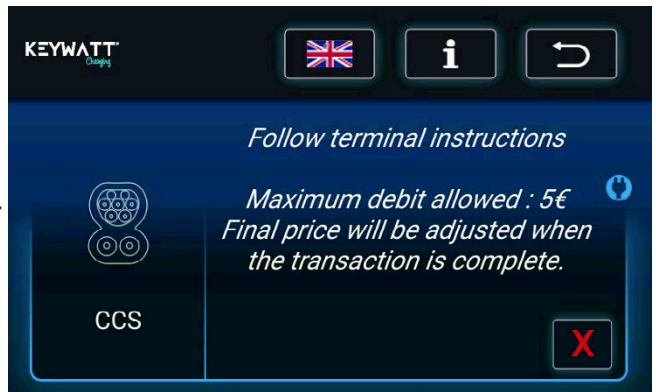
Press PLAY



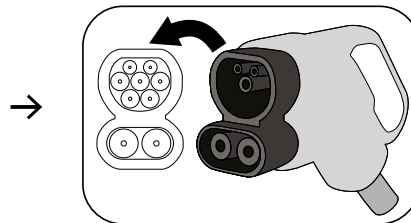
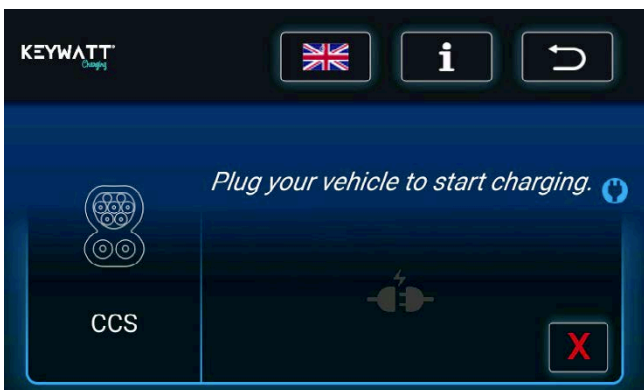
Click on (++) or (--) to choose the duration



Tap card on POS



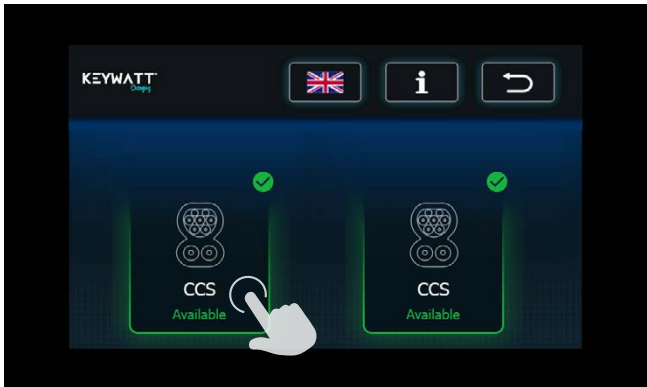
Connect the EV



Start an EV charge session (C: Pre-authorization)

AllowConsumptionChoice = FALSE

Select the type of charge



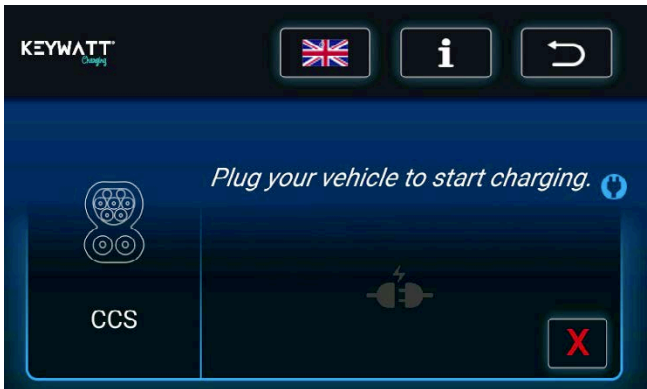
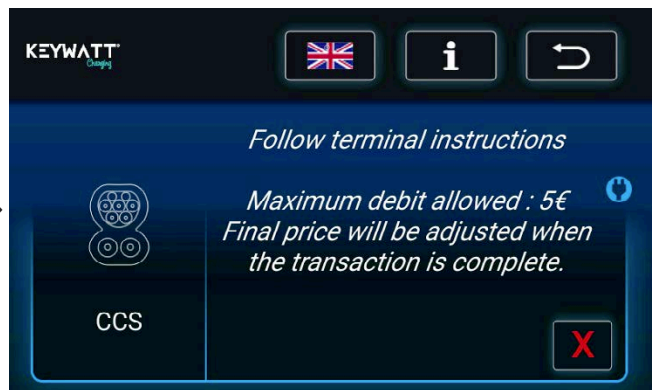
Choose identification mode



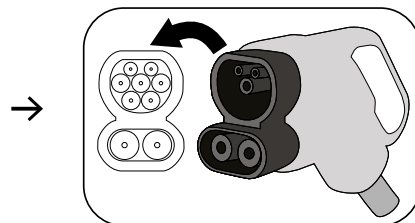
Press OK



Tap card on POS



Connect the EV

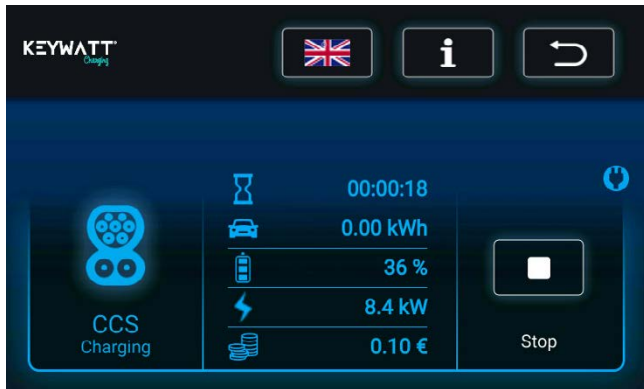


EV charge

Two DC connectors can be used under simultaneous charge.

The charging station displays the:

- time since the start of charging
- charged energy
- percentage of charge
- amount of transaction



The charger will automatically stop once charging is completed. The charger will adjust its output according to the demands of the vehicle, ambient temperature and other factors.

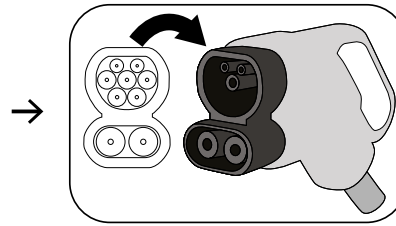
After completing the charge of the EV, the charging station performs multiple control steps before disconnecting the vehicle.

Stop an EV charge session

Selected consumption reached

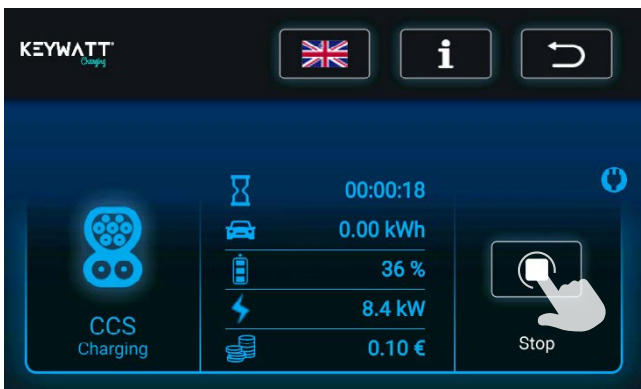


Unplug the EV

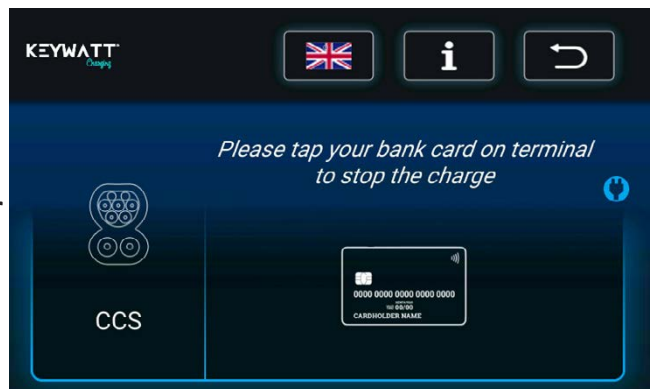


To stop the charge before the end of the EV charge:

Press "STOP"



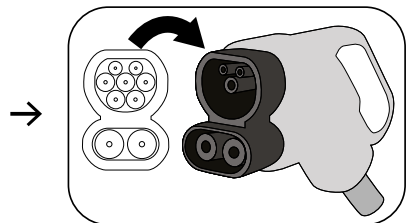
Tap same card on POS



or



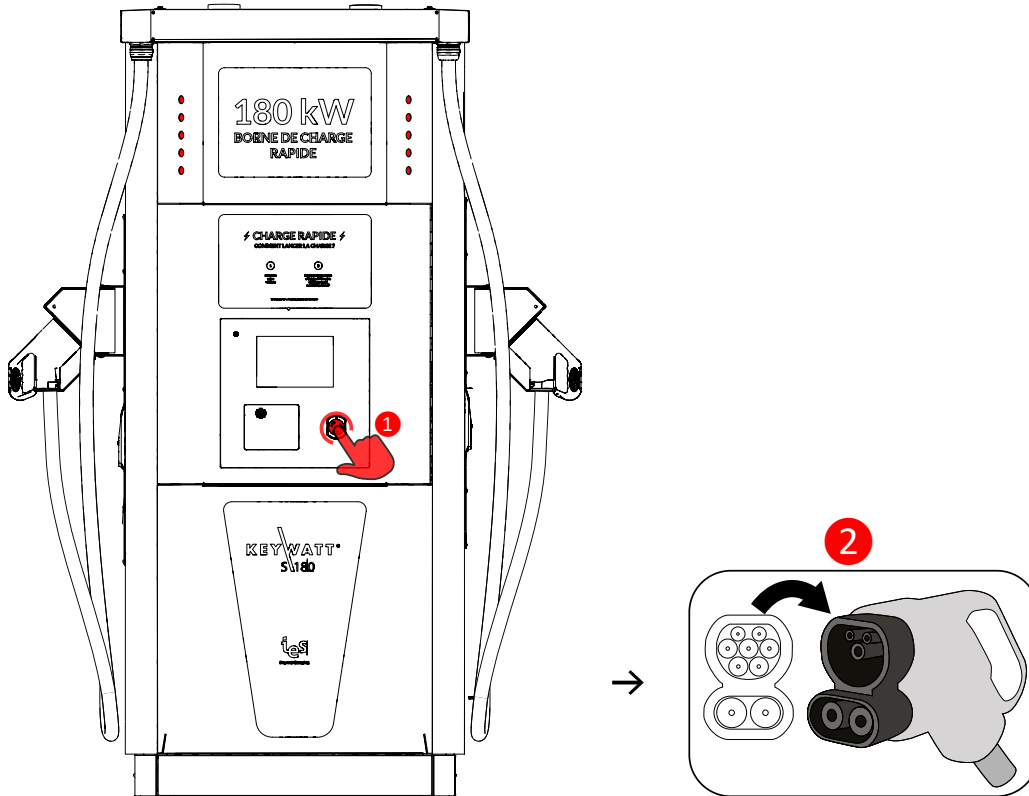
Unplug the EV



Emergency Stop (available only on fleet version)

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.	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.	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 which 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.	The charging station is overheating.
Error occurred: 0x51 The connection with the vehicle was lost. Please unplug your vehicle.	The connection with the vehicle was lost.
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.	Your battery model is incompatible with this charger.
Error occurred: 0x32 Your gear is not in parking position. Please unplug your vehicle and engage gear in parking position.	Your gear is not in parking position.
Error occurred: 0x15 Your vehicle raised an error. Please check error message in the vehicle and unplug your vehicle.	Your vehicle raised an error. Please check error message in the vehicle.
Error occurred: 0x31 Your battery's temperature is too high. Please unplug your vehicle.	Your battery's temperature is too high.
Error occurred: 0x46 Connection between screen and charger has been lost. Please unplug your vehicle.	Connection between HMI screen and charger has been lost.
Error occurred: 0x-- Please press X once your vehicle is unplugged.	For all other error codes, please refer to maintenance manual.

IES Synergy (Head Office)

615, Avenue de la Marjolaine
34130 Saint Aunès
France
Tel: +33 (0)4 99 13 62 80
Fax: +33 (0)4 99 13 62 81

IES GmbH (North Europe)

Ammerthalstrasse 27,
D-8551 Kirchheim bei München
Germany
Tel: +49(0)8972017919

IES-Synergy Inc. (USA)

330 East Maple Rd
Unit U
MI43084 Troy
USA
Tel: +1 (586)206-4410

IES WANMA New Energy (China)

Building No 4, Wellong Technology Park
No. 88 Jiang Lin Rd
Binjiang Hangzhou
Zhejiang 310051
China
Tel: +8657189877710

DUM4021418-EN_V001a

March 2024

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

