

RT22 50kW EV Charger Module

Preliminary Specification



The RT22 50kW EV Charger Module is a high efficiency AC-DC power module designed for charging electric vehicles (EVs) delivering DC straight to the EV battery. A wide output range permits charging from 50 to 1000V_{DC} to match any EV battery. When combined with a controller (SECC) and ancillary equipment a high-power EV charger (EVSE) can be made to CCS or CHAdeMO requirements from 50kW to 500kW or more.

Maximum efficiency 96% typically.

CAN control for easy interfacing.



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Detailed specifications at 400V_{AC} 50Hz in, 400V_{DC} out, 25°C, unless otherwise stated:

Input

Voltage requirement	Nominal: 380, 400, 415, 480 V _{AC} Three phase, 4-wire including earth (no neutral) Voltage tolerance: 320 – 530 V _{AC} Frequency: 45 – 66 Hz
Maximum current	94A _{RMS} input per phase Reduced maximum power below 360V _{AC} to limit input current
Power factor nominal	Greater than 0.998 at full power, 0.997 at half power, 0.995 to 5% power
Power factor adjustment	Adjustable from 0.9 _{inductive} to 0.9 _{capacitive} as required for grid support
Harmonic distortion of input current	Less than 1% at full load; 1% at half load
Voltage withstand test	2828V _{DC} input to chassis for 1 minute
Protection	Overvoltage: operates to 550 V _{AC} typically Undervoltage: operates to 303 V _{AC} typically Surge protection to 6 kV/3 kA Internally fused – external MCB recommended - additional external protection may be required by local wiring rules
Y capacitance	85nF per phase, for compatibility with 30mA RCD
Startup	Controlled soft-start – inrush current less than rated current;
Standby operation (lowest power)	Power on standby: <10 W VAR on standby: <230 VAR leading
Ready operation (fastest startup)	Power on ready: <220 W VAR on ready: <300 VAR leading or lagging

Output

Voltage	Adjustment range: 200 – 920 V _{DC} for CCS 50 – 1000 V _{DC} for CHAdeMO Smoothly variable output – no range changing required
Current	Up to 125 A _{DC} is available at and below 400V _{DC} . Constant power characteristic applies above this voltage.
Noise	<0.5% peak to peak (0 – 20MHz) Negligible mains frequency ripple
Ripple	Voltage ripple in CVC– better than +/- 5V or +/- 1% Current ripple in current control – better than 2.2App at 50kHz.
Protection	Short circuit protected with electronic trip. Internally fused – 30kA fault rating
Isolation	IT isolation 2828 V _{DC} output to chassis for 1 minute

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	Basic plus supplementary insulation to chassis and to primary circuits and control circuits.
Y capacitance	100nF total
Output rapid discharge circuit	Built in

Standards

Features and Safety	Designed to be used as part of a CCS vehicle charger to IEC61851-1: 3rd Ed 2017, and IEC61851-23: 1st Ed 2014, and general safety to IEC 62477-1 Ed 2016 Also, for a CHAdeMO vehicle charger to V1.0, 1.2, or 2.0.
EMC Emissions and Immunity	Designed to IEC 61851-21-2: 1 st edition 2018, Input Class B
Grid compatibility	Designed to VDE-AR-N 4100 Ed 2019

Mechanical

Dimensions	Width: Standard 19-inch width – 482.6mm Height: 4U – 175mm Depth: 600mm
Weight	< 48kg
Acoustic Noise	≤ 70dBA max, reducing with output power and temperature
Magazine	Standard 19-inch, height 4U

Environment

Operating temperature range	-35°C to +70°C, ≤90% RH, reduced power >50°C when stabilized.
Ingress protection	IP20
Environment	For rack mounting in a weather protected environment
Storage and transport	-40°C to +70°C, ≤95% RH
Altitude	2000m max, de-rating 5°C per 1000m

Connections

Installation: Rack mounting with front and rear support for magazine.

Input, Output, and Communications:

Two hot-plug connectors are mounted on the back of the rectifier module that carry the AC, DC, and CAN 2.0 communications lines, together with addressing and remote enable/disable control. Matching connectors are located at the back of the magazine.