

23.04.2023

Technical Specifications

ZFP ceiling mounted charging solution for depots, bus terminals and covered bus stops

60 - 240 kW



Charging station type

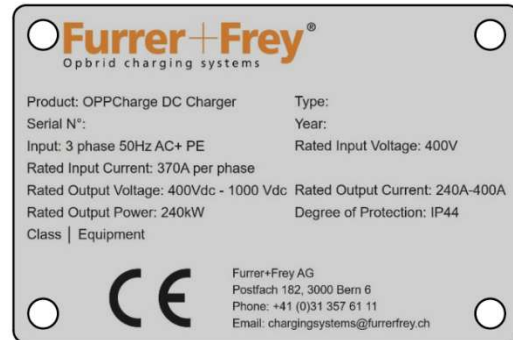
We distinguish two performance classes of our fully automatic charging system for heavy commercial battery vehicles:

- Performance Class 1: ZFP 60 – 120kW
- Performance Class 2: ZFP 150 – 240kW

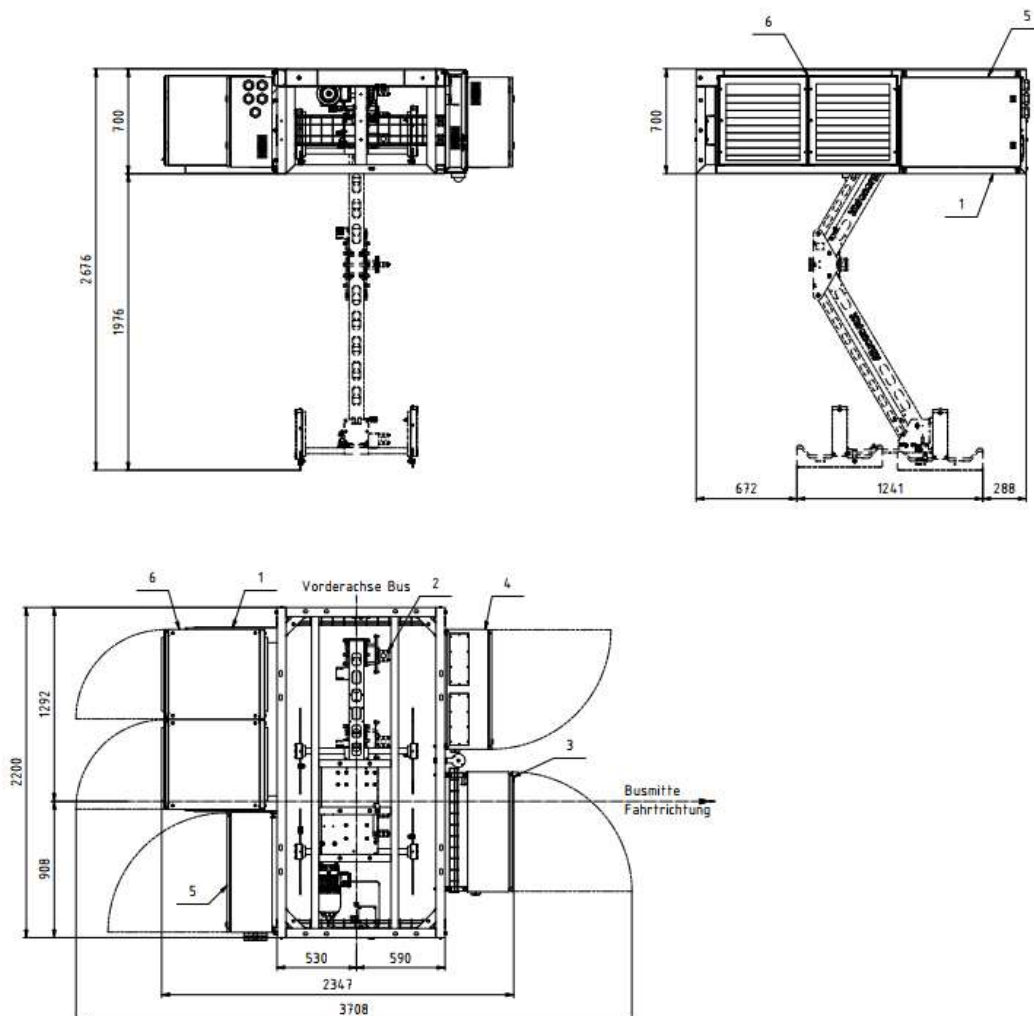
Type plate

The type plate is located on the front of each unit. It contains the following information:

1. Product and Type
2. Serial Number and Year Manufactured
3. Input Voltage and Frequency
4. Rated Input Current
5. Rated Output Voltage and Current
6. Rated Output Power
7. Degree of Ingress Protection
8. Electrical Equipment Class



Dimensions



Perf. Class 2, 150 - 240 kW (DXF available)

- | | |
|----------------|------------|
| 1 – Chassis | 4 – DC Box |
| 2 – Pantograph | 5 – AC Box |
| 3 – CT Box | 6 – CM Box |

Weights

Designation	Value	Unit
ZFP Performance Class 1 * (2 – 4 power converters possible)	685	kg
ZFP Performance Class 2 * (5 – 8 power converters possible)	750	kg
30kW Power Converter	25	kg

*without power converters.

Electrical power supply

Description	Value
Maximum Output power	Performance Class 1: 60kW, 90kW, 120kW Performance Class 2: 150kW, 180kW, 210kW, 240kW
Input	High Power Input: AC 3 Phase + PE Control Power Input AC 3 Phase + PE
Input voltage	380 to 420 V
Frequency	45 to 65 Hz
Output	DC (isolated)
Output voltage	150 to 1000 V
Maximum Output current	50A per power module
Vehicle interface type:	OPPCharge v1.3 (Inverted Pantograph)
Use	Indoor/Outdoor
Efficiency	95 %
Power factor	>0.99
Harmonics input current (THD)	<5 %

Characteristics

Designation	Explanation
Ceiling mounted integrated system	Each ZFP unit is fully integrated into the pantograph, including power electronics, controls and communications.
Remote Monitoring and control	OCPP 1.6
Monitoring / load management / diagnostics	On request
Charging process	Fully Automatic with Start/Stop Control
IP rating	IP44
Electrical Safety	According to CE Regulations
Electrical Isolation Type	Insulated earthing
Status Indicator	Green/Blue/Red
Optional High Voltage Indication on pantograph	HV warning light flashes when voltage > 45VDC
Pantograph Voltage	No voltage on pantograph when not connected
Vehicle communication	OppCharge 1.3 (ISO 15118-2 with OppCharge modifications) and Wifi 5GHz / directional antenna

Standards Compliance

Designation	Explanation
CE	Overall Standard Compliance
EN 1090-1	Execution of steel structures and aluminium structures. Requirements for conformity assessment of structural components.
EN 1090-2	Execution of steel structures and aluminium structures. Technical requirements for steel structures
IEC 61851-21-2	Electric vehicle conductive charging system - Part 21-2: EMC requirements for off-board electric vehicle charging systems. Table 4 (Immunity) and Class B (Radiated Emissions)
IEC 61851-23 (with deviations from IEC 61851-1 and -23 for OppCharge 2nd edition from https://www.oppcharge.org/)	Conductive charging systems for electric vehicles; DC power supplies for electric vehicles
ISO 15118-1, ISO 15118-2, DIN 70121, IEC 61851-24 (with version: 1.3.0 ACD extension for OppCharge on ISO/IEC DIS 15118-2 (2012) from https://www.oppcharge.org/)	Road vehicles - communication interface between vehicle and network - Network and Application Protocol Specification for the implementation of Siemens - Volvo OppCharge
OppCharge Common Interface for Automated Charging of Hybrid Electric and Electric Commercial Vehicles 2 nd Edition from https://www.oppcharge.org/)	OppCharge is an automated EV charging interface based on established industry standards with the intention of supporting a common charging interface for commercial vehicles.
2013/35/EU	Minimum health and safety requirements for the protection of workers from the risk of physical agents (electromagnetic fields)
2014/35/EU	Low Voltage Directive
EN 1991. Eurocode 1	General effects on supporting structures - specific weights, dead weight and live loads in building construction
EN 60529	Degrees of Protection Provided by enclosures (IP Code)
EN 62262	Special requirements – For street and path lighting
IEC 61508	Functional safety of electrical/electronic/programmable electronic safety-related systems
IEC 62477	Fire Safety
Non-ionizing radiation level	Compliant with NISV and EN 62311

Additional Specifications

Designation	Explanation
Pantograph deployment and retraction time	< 20s
Parking Tolerance XY	+/-30cm (OppCharge)
Redundancy of power electronics	Modular, redundant design. If one power module fails, the others continue operating.
Charging Duty Cycle	Continuous
Upgradability	Performance Class 1: 60kW to 90kW/120kW Performance Class 2: 150kW to 180kW/210kW/240kW (with cable upgrade)

Designation	Explanation
Earthing	All accessible conductive parts connected to earth. Earth clamping bar accessible for maintenance personnel.
Response to grid failure	Orderly electrical shutdown and mechanical retraction of pantograph by hand crank and/or battery backup. Automatic restart upon restoration of grid power.
Separation of control and power circuits	Control circuits physically separated from AC input and DC output circuits.
Control Circuit Function	Control Circuit remains functional when AC/DC conversion circuits are shut down.
Kneeling during charge	Yes
Operation Altitude	< 2000m
Operation Temperature	-25°C to 45°C
Operation Maximum Humidity	95% non condensing
Expected Lifetime	>15 years at 1-4 charging cycles/day when observing proper maintenance
Pantograph safety	Interlock of pantograph deployment coupled to bus parking location. Signal sent to bus to immobilize when pantograph is not in the full up position.
Contact sequence	Earth, power, pilot on connection. Pilot, power, earth on disconnection.
Electrical Checks before charging	Isolation check, short circuit check, voltage check.
Electrical Danger Protection Signage	Warning signs for maintenance personnel.
Maintenance personnel protections	No accessible live parts with access doors open.
Power control	Main switch to cut off power to system
Isolation of DC power circuit	DC IT isolated system > 1MΩ
Dielectric resistance of AC circuit	Current leakage < 2mA @ 1000V
Emergency Switch	Emergency switch accessible from outside, switches off high power DC power circuit and raises the pantograph.
HV Indicator	Redundant flashing light shows when high voltage is present on the pantograph. (Optional)
Over extension protection	Pantograph will not extend over its maximum working range.
External coating	Powder coated painting available to customer RAL color requirements that ensure mechanical and aesthetic stability against solar radiation, humidity or corrosion during the expected life cycle of the system. (Standard is black)
Locking during Maintenance work	The main switch can be locked in the open position by a customer provided padlock for safety during maintenance procedures.