



2022

OBO Ion Wallbox

Introduction of charging stations

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Building Connections



Introduction

OBO Bettermann is showing his commitment to the raising demand on more environment friendly technologies through new charging solutions for owners of electrical vehicles.

Although there is an intense competition among manufacturers, OBO Bettermann is do able to offer his strengths for the customers from private persons to companies.

With these units we are able to offer competitive products compared to our competitors and offer our customers different solutions for their charging needs.



Why E-Mobility?

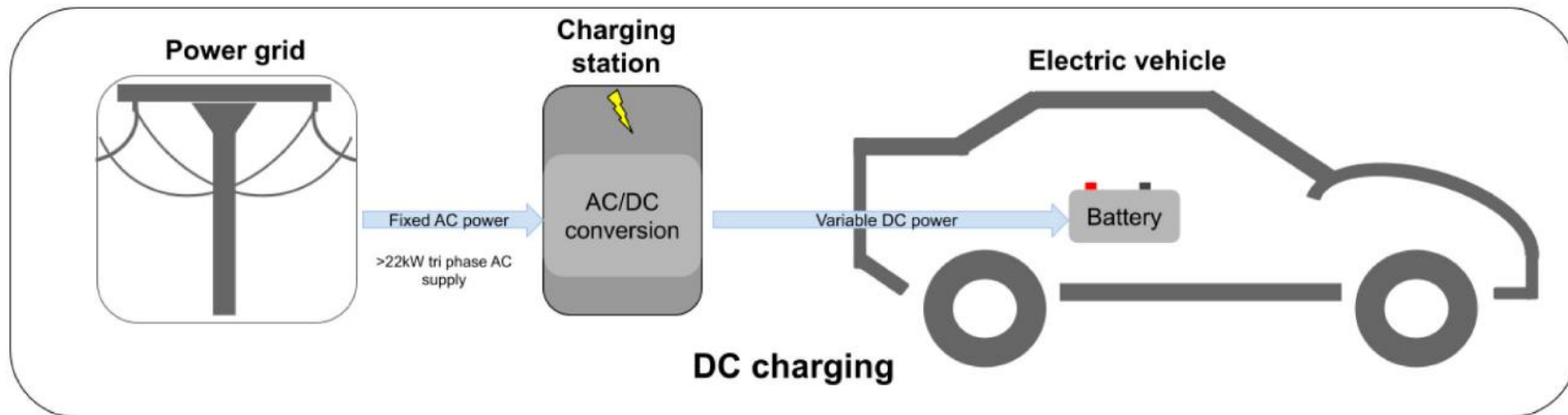
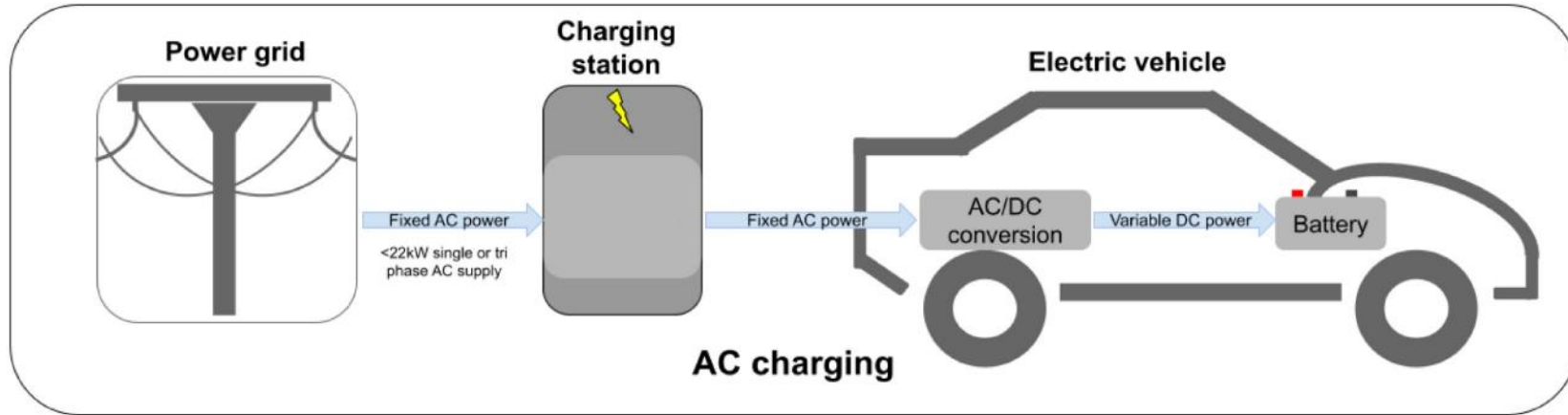
- Rapid development also in newly industrialized countries
- Limited resources on fossil energy carriers
- EU laws on reduction of CO₂
- Air contamination in inner cities
- An electric motor is four times effective as combustion engines
- Growing proportion of renewable energy-sources
- Average daily running of a car is ~50km in EU
- Reduction noise pollution



Electric vehicle

- no more a vision
- All ranges of vehicles are available: small cars to SUVs, trucks, motorcycles
- All A-Brand manufacturers do have EVs in program, future developements are focused on Evs
- Traction is via electric motor, energized through on-board batteries
- Charging via different type of power sockets
- Each year rapidly increasing newly sold EVs

Charging methods of EVs



Charging modes

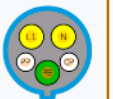

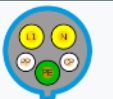

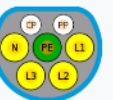
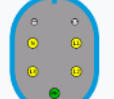

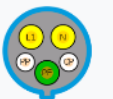



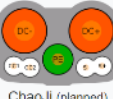
IEC 61851-1 modes

Mode	Type	Maximum supply		
		Current (A)	Voltage (V)	Power (kW)
1	1Φ AC	16	250	4
	3Φ AC	16	480	11
2	1Φ AC	32	250	7,4
	3Φ AC	32	480	22
3	1Φ AC	63	250	14,5
	3Φ AC	63	480	43,5
4	DC	200	400	80

Mode	Limits			Supply	Notes
	Phases	Current	Voltage		
1	1φ	16A	250V	AC	Direct connection of vehicle to conventional electrical outlets. Not allowed in the US, Israel, and England; prohibited for public charging by Italy; restricted in Switzerland, Denmark, Norway, and Germany.
	3φ	16A	480V		
2	1φ	32A	250V	AC	Requires control box between vehicle and electrical outlet. Prohibited for public charging by Italy; restricted in US, Canada, Switzerland, Denmark, France, and Norway.
	3φ	32A	480V		
3	1φ	63A	250V	AC	EVSE permanently connected to electrical grid. Typical public charger installation.
	3φ	63A	480V		
4	–	200A	400V	DC	Current conversion handled by EVSE, not EV.

Charging connectors

Connector designs listed in IEC 62196-2 and -3

Power Supply	United States	European Union	Japan	China
1-phase AC (62196.2)	 Type 1 (SAE J1772)	 Type 2 (DE, UK)	 Type 1 (SAE J1772)	 Type 2 (GB/T 20234.2)
3-phase AC (62196.2)	 Type 2 (SAE J3068)	 Type 3 (IT, FR; now deprecated)	N/A	 Type 2 (GB/T 20234.2)
DC (62196.3)	 EE (CCS Combo 1)	 FF (CCS Combo 2)	 AA (CHAdeMO)	 BB (GB/T 20234.3)
			 ChaoJI (planned)	



Wire lanes inside the connector:

- L1, L2, L3, N, PE for power transmission
- CP control pilot
 - For communication between vehicle and charging station like
 - system state,
 - charging current,
 - errors
- PP proximity pilot
 - Defines an I_{max} for cable
 - Resistor between PP and PE
 - 1,5k=13A, 0,68k=20A, 0,22k=32A

EV – Motorcycle (AC charging capabilities)



BMW CE 04:

- max 7 kW AC @1phase
30A
- Type2 plug



Harley Davidson LiveWire

- max 1,9 kW AC @1phase
8A
- Type2 plug

EV – passenger car



Nissan Leaf:

- max 7,4 kW AC @3phase
32A
- Type2 plug



VW ID3

- max 11 kW AC @3phase
16A
- Type2 plug

EV – Vans (AC charging capabilities)



VW E-Crafter:

- max 7,4 kW AC @1phase
32A
- Type2 plug



Opel Vivaro-e

- max 11 kW AC @3phase
16A
- Type2 plug

EV – Trucks (AC charging capabilities)



DAF CF/XF-Series:

- max 22/(44) kW AC @3phase 32(63)A
- Type2 plug



Volvo FL electric

- max 22 kW AC @3phase 32A
- Type2 plug

What is a wallbox?

Wallbox or charging stations is a unit to realise in most of the cases Mode3 AC charging. It is not a direct battery charger but an electric vehicle supply equipment (EVSE)

Main purposes

- To advertise maximum available current for Evs, to avoid wire overloading of installed electrical network
- To ensure a safe operation: monitoring DC-fault current which can blind the installed safety equipment (AC FI-relay)
- To ensure safe operating conditions: electric shock protection, ingress protection, withstand against mechanical shocks

Secondary purposes

- Comfortable cable management
- User feedback of system status
- Load management, PV-optimised charging, user authentication, Plug and charge etc...

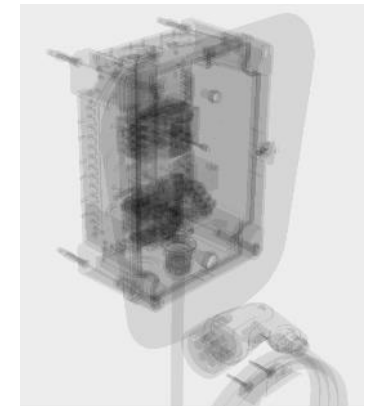
Overview

The Ion charging stations are suitable for the safe charging of electrical vehicles in private areas as a standalone charging point. Suitable for the stationary mounting on the wall in indoors or protected outdoor areas. It can be used to charge electrical vehicles like cars, vans and motorcycles with alternating current on 230/400 VAC networks.



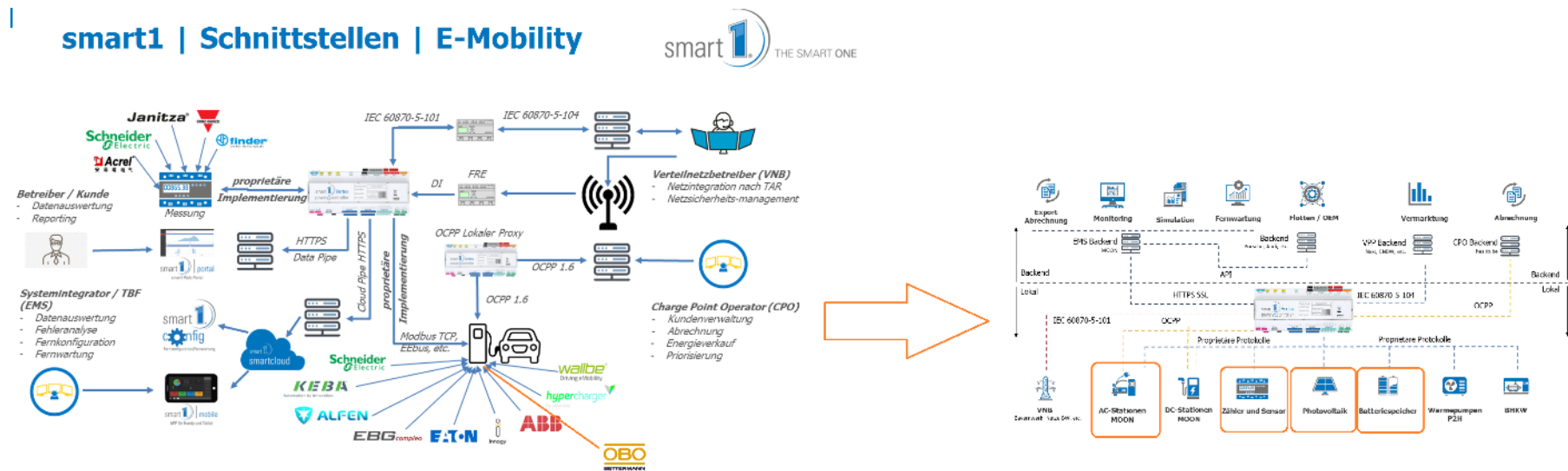
Key features

- Charging mode 3 according to IEC 61851-1
- Single, two and three-phase charging
- Suitable for TN and TT networks
- Integrated temperature monitor
- DC fault current monitor
- Status information via LED display
- Prewired, ready for connection
- 5 m charging cable with type 2 charging plug according to IEC 62196-2
- cable holder included
- Electrical supply connection from top or bottom
- Stainless steel design elements
- Charging power can be set to a fixed value, factory setting 11 kW
- Modbus RTU protocol over RS-485 for a bidirectional communication
- Integrated surge protection for power and data cables (option)
- With key-operated switch for authorisation (option)
- Listed on German government grant programmes: KfW439, KfW440, kfW441



USPs

- Compatibility with “32A one -phase” on board chargers (eg.: 7,4kW on one phase)
- Electrical supply connection from top or bottom
- in case of Ion Protect versions: CP Data Line overvoltage protection
- Stainless steel design cover with stainless steel cable holder
- High quality charge plug: withstand against car-overrun
- Integration to larger systems



Articles

Artikelnummer	Typ	Bezeichnung 1 (englisch)	Bezeichnung 2 (englisch)
6570020	WB AC BL	Charging station for EVs	Type 2 plug, switch
6570022	WB AC BL KS	Charging station for EVs	Type 2 plug, keyswitch
6570024	WB AC BL SPD	Charging station for EVs	Type 2 plug, switch, SPD
6570026	WB AC BL KS SPD	Charging station for EVs	Type 2 plug, keyswitch, SPD
6570105	WB WPR	Weather protection roof	charging station without SPD
6570107	WB WPR SPD	Weather protection roof	charging station with SPD



Compatible control systems

Via Modbus-RTU OBO Ion charging stations are compatible with a huge range of RTU-based control units and homebrew/DIY applications.

Load balancing, solar charging, charge-timeshiftings are picturing the main functional extensions of Ions with systems listed below.

Current status:

Smart1 Solutions - Vertex Controller (ok)

ASKI Mini, ASKI ALS profi (ok)

TQ-Systems TQ-410 (ongoing, Q1 2023)

Loxone Electronics Miniserver (ok)

Comexio IO server (ok)

Solar optimised charging with OBO Bettermann Ion Basic

⇒ Wallbox / E-Auto Lademöglichkeiten mit PV-Strom 



Variante1:

All charging stations are suitable. Customer should charge the car, when there enough sunpower.

Variante2:

The Ion Basic has an IC input that must be connected to the 0V via enable signal from the inverter. The charging current can be permanently set using a DIP switch or via Modbus.

Variante3:

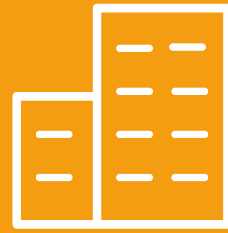
The actual generated solar power should be measured, and charging power is continuously adjusted to the available solar power. You need an energy management system for that. Actual compatible manufacturers: ASKI Smart1Solutions, Loxone.

Testing of charging station after installation

- Optical inspection
- Continuity test of wiring
- Insulation resistance test
- Automatic disconnection test
- Functional test of each charging modes
 - if vehicle is properly connected
 - Selecting the charging current
 - Locking / unlocking the connector
 - Coordination of charging process
 - Monitoring for termination by the user



All this requires proper test equipment, documentation, personal



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Building Connections

