eMobility

WAGO Leading the Charge

CoDeSys

WAGO®

Six Steps to a Full Battery

WAGO supports every aspect of charging from:

TO-PASS® GPRS Modem, VPN Router, **761-520**

TO-PASS® GPRS Modem, RS-232/ VPN Router, **761-510**

Identification / Registration / Authorization

- RFID
- SMS
- Keyboard
- Database connection: Wired via HTTP or wireless (e.g., GPRS) by HTTP/VPN connection
- Connection via *TO-PASS*® GPRS Modem, VPN Router

Serial Interface, **750-650 or 750-652**

ETHERNET Connectors, **750-975**

User Prompting

- Keyboard and text display connection via 750-650/750-652 Interface Modules and
- 762 Series *PERSPECTO*® Monitors

Serial Interface, **750-650 or 750-652**

PERSPECTO® Monitors, **762 Series**

Electrical Connection

WAGO-I/O-SYSTEM 750 Digital and Analog I/O Modules:

- Lock and unlock charging plug
- Open and close, e.g., charging flaps
- Monitor the connection

Digital and Analog I/O Modules **750-4xx** **750-14xx**

750-5xx **750-15xx**

At just 1/2 inch (12 mm) wide, the 16-channel I/O module is ideal for slim charging stations.

Charging Process

- Charging mode 3 according to IEC 61851-1
- Automatic connector lock
- Power measurement via 750-493 3-Phase Power Measurement Module
- Connecting standard billing meters via S0 bus acc. to DIN 43864 or SML

Power Optocoupler with S0 Interface, **286-740**

S0 Supply Module for Passive S0 Current Meter Interfaces, **286-742**

3-Phase Power Measurement Module, **750-493**

Completion of Charging Process

- SMS message via 761-510 *TO-PASS*® Modem
- Communication with external service providers and payment systems, such as prepaid cards

TO-PASS® GPRS Modem, RS-232/VPN Router, **761-510**

Charging Station Controllers

- Programmable via CoDeSys
- Internal Web server for visualization, multi-tasking and battery-backed, real-time clock
- Master/slave operation for use in main stations with satellites
- Both centralized and decentralized system architectures are possible
- Select WAGO-I/O-SYSTEM components are designed for an extended temperature range of **-20 °C to +60 °C**

Telecontroller, **750-872**

ETHERNET PLC, **750-880 / 881 / 882**

For additional information, please contact our specialists at:
eMobility@wago.com

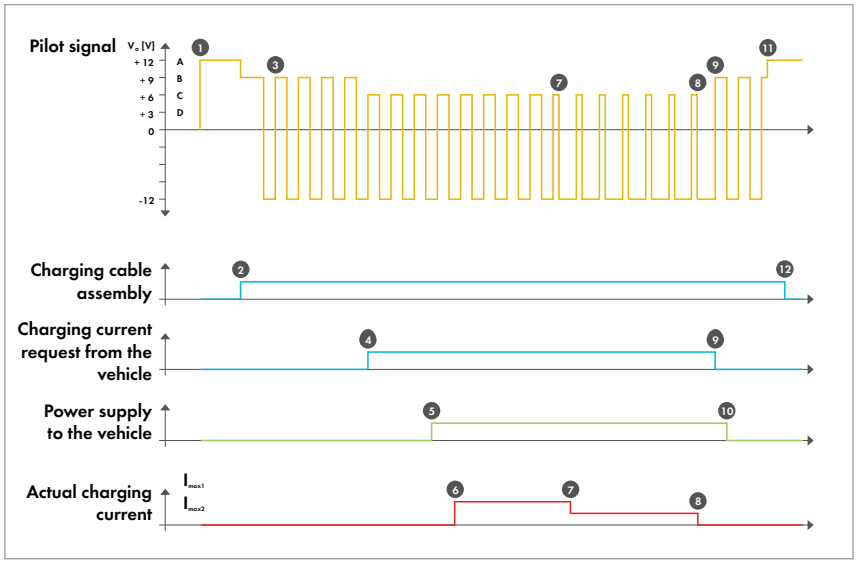
WAGO Pilot-Box

for charging mode 3 according to IEC 61851-1

Charging Mode 3

IEC 61851-1 distinguishes between four charging modes depending on the application. The most flexible, and therefore most extensive charging mode, is charging mode 3. The charging station assumes various tasks, which go beyond the "simple" supply of voltage. These tasks include detecting the rated power of the charging cable, monitoring the protective conductor connection, transmitting the maximum available charging current and detecting interruptions in the charging circuit. There is an exchange of information between the vehicle and charging station via pilot signals. The pilot signal is a PWM signal, which transmits corresponding charging conditions between the vehicle and charging station (bidirectional) by a change in the signal level and in the pulse-no-pulse ratio.

Standard Charging Cycle to EN 61851-1



1 The charging station is in standby. No electric vehicle is connected.

2 Connection between the charging station and electric vehicle is established (plug in the charging cable).

3 The charging station transmits the maximum available charging current via PWM signal to the vehicle.

4 Electric vehicle displays that is ready to charge (with or without ventilation).

5 The charging contactor closes. The supply voltage is connected to the vehicle.

6 Vehicle charges with the maximum available charging current (I_{max1}).

7 The maximum available charging current is reduced by the energy provider. The vehicle adjusts the charging current to the PWM signal.

8 Battery is charged. The charging current is reduced.

9 Vehicle notifies the charging station that charging is complete.

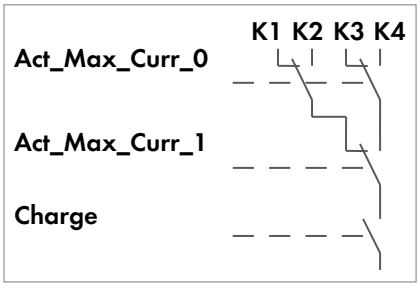
10 The charging contactor drops away. The vehicle is disconnected from the power supply.

11 The charging process is completed by the charging station. The connector lock opens.

12 The connection between the charging station and vehicle is released (disconnect the charging cable).

Charging Current Path Selection

Pilot-Box determines the optimal charging path from the maximum available charging current and the current carrying capacity of the charging cable. The proximity signal of the charging cable is evaluated. The results are passed to the digital outputs Act_Max_Curr for further processing. The line protection / charging current path is then easy to select. In addition, this information can be further processed in a superimposed charge control.



Connector Lock

Plugging and unplugging the charging cable assembly under load should be avoided whenever possible. Unplugging the assembly under load can damage the plug and coupling. To prevent this, the connector is automatically locked after plugging it in. The connector is unlocked after completing the charging process and released by the user. In the event of a power failure, the module unlocks independently via integrated energy buffer. This also allows the vehicle to be disconnected in the event of a power failure.

Technical Data

Operating voltage:	12 – 24 VDC (±-10%)
Power consumption:	<2 W
Max. ambient operating temperature:	-30°C ... +75°C
Dimensions (W x H x D):	54 mm x 62 mm x 90 mm
Conductor termination:	MCS connector with CAGE CLAMP® 0.08 – 1.5 mm² (AWG 28–16) "s" + "f-st"

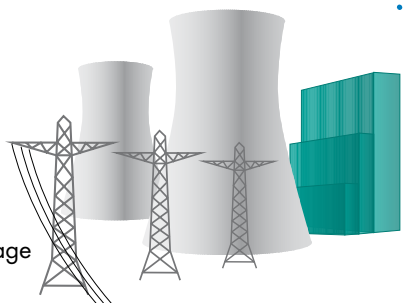
Adjusting the Charging Current

On the one hand, the maximum available charging current is determined by the spatial installation on site (cable cross section, circuit protection, accumulation of factors, etc.) and on the other, by the maximum capacity of the energy provider. To provide maximum flexibility to both, two digital inputs are available for configuration. The Smart Grid can then be used and the vehicle is charged based on the network capacity.

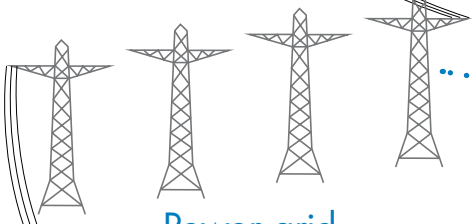
SMART GRID

Smart Grid – Intelligent Network for Smart Solutions

Conventional energy generation



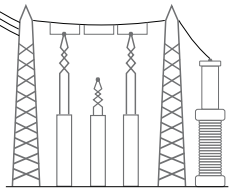
Power station
Extremely high voltage
up to 380 kV



Power grid

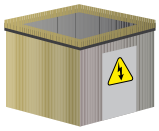
Control center

Substation
High voltage
up to 110 kV or
medium voltage
up to 20 kV



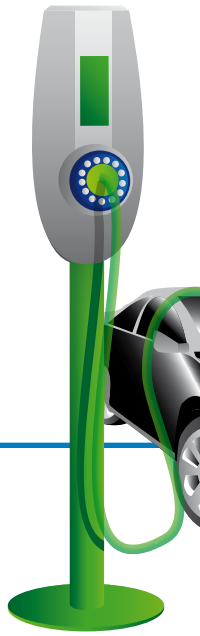
Substations

Substation
Low voltage
up to 400/230 V



Local network station

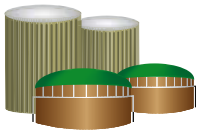
Smart Grid typically covers networking and control of power generators, energy storage systems and electrical loads.



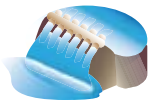
Smart Grid: Communication via IEC 60870-5-101/-104 and 61850/61400

Flexible, distributed energy producers

Combined heat and power plant

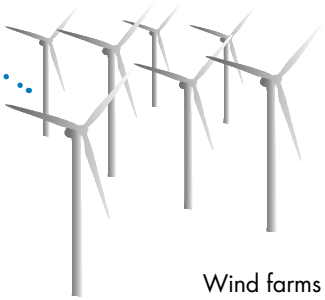


Biogas plants

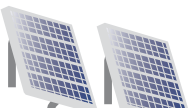


Hydro power

Modern, renewable energy producers

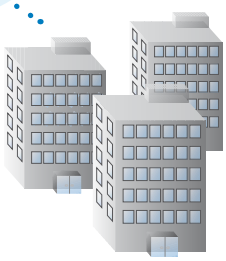


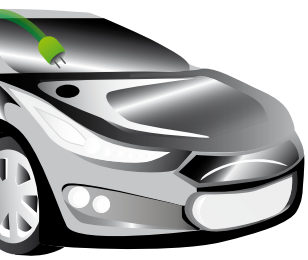
Wind farms



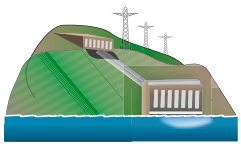
Solar farms

Consumers

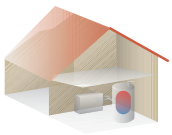




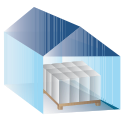
Energy storage facilities



Pumped-storage power plant



Building with heat pumps



Cold store

0888-0188/0300-6901 - eMOBILITY FLYER 3.0 US - 05/2012 - Subject to design changes

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