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Technical information

PCE

Connection
to the future

EV11.3 WALLBOX

DIGITAL SIGNALS

EN

Technical information 11229 EV11.3 WALLBOX DIGITAL SIGNALS V1.0 04/2024

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1. Overview of configuration variants for digital inputs

In addition to the „Plug in and load" operating mode, there are other variants that can be implemented with digital signals and Modbus tcp.

The configuration of the digital inputs can be changed via Modbus tcp and is saved permanently. The configuration is changed in the Modbus register „MODE_DIGITAL_IN". See chapter 4 „Communication via Modbus tcp"

<table>
<tr><td rowspan="8">Operating mode „Release and reduction"

There are two digital inputs for this, which can be configured as normal „factory setting" or inverted.

The charging current can be determined via Modbus tcp.</td><td colspan="3">Normal „Factory setting"</td></tr>
<tr><td></td><td>Level status
LOW 0V</td><td>Level status
HIGH 12V-24V</td></tr>
<tr><td>Input 1</td><td>Release</td><td>No release</td></tr>
<tr><td>Input 2</td><td>No reduction</td><td>Reduction to 8A</td></tr>
<tr><td colspan="3">Inverted inputs</td></tr>
<tr><td></td><td>Level status
LOW 0V</td><td>Level status
HIGH 12V-24V</td></tr>
<tr><td>Input 1</td><td>No release</td><td>Release</td></tr>
<tr><td>Input 2</td><td>Reduction to 8A</td><td>No reduction</td></tr>
<tr><td rowspan="2">Operating mode „Release with PWM function and S0 interface for energy meter"

The charging current can be specified via PWM signal or Modbus tcp.

The charging energy can be read out via Modbus tcp and is recorded via the S0 interface.</td><td>Input 1</td><td colspan="2">PWM signal for charging current control</td></tr>
<tr><td>Input 2</td><td colspan="2">S0-Interface for energy meter</td></tr>
</table>

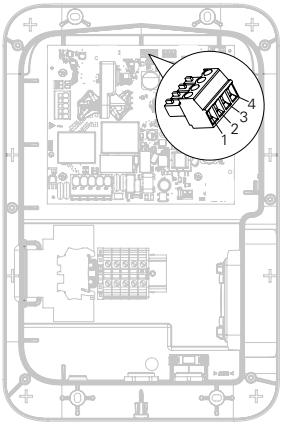
Truth table

Input 1	Input 2	normal „Factory setting"	Inverted inputs	Release with PWM function and S0 interface for energy meters
0V	0V	16A	0A	16A
12V	0V	0A	8A	0A
0V	12V	8A	0A	16A
12v	12V	0A	16A	0A

2. Connection for digital signals

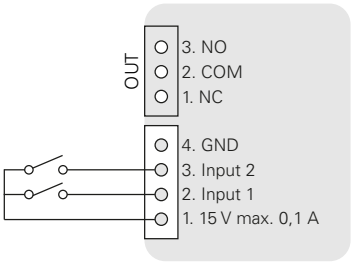
Signal input

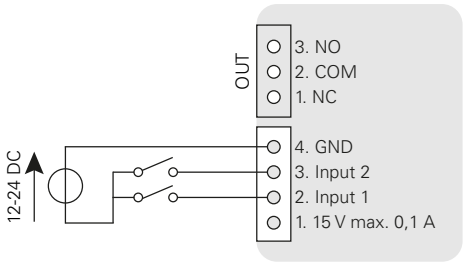
The connection for digital inputs is a 4-pin connector on the circuit board labeled „Signal input".



Pole	Occupancy
4	GND (Attention PELV - ground connected to PE)
3	Input 2 (12V - 24V)
2	Input 1 (12V - 24V)
1	15V max. 0,1A

„Digital inputs" connection examples for the „Enable & reduce" operating mode





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Installation work for the use of an energy meter

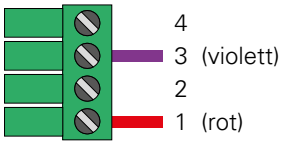
NOTE

When using an energy meter, be sure to change the Modbus register „MODE_ DIGITAL_IN“ to the value 2 before connecting the S0 signal.
Otherwise an operating error will occur and the charging current will be limited to 8A.

The following wires are recommended for the S0 signal:

1x wire H07V-K 0,75mm² red with a length of 45cm
1x wire H07V-K 0,75mm² violett with a length of 45cm

1. Prepare the above-mentioned wires at both ends with an insulated wire end ferrule and cylindrical crimping.
2. Disconnect the green 4-pin plug (signal input) from the connector strip on the circuit board (see circuit board overview in the installation and operating instructions).
3. Connect the red and violet wire to the 4-pin connector (pin 1 = red / pin 3 = violet). Torque 20-25Ncm



4. Insert the 4-pin plug into the connector strip (signal input) on the circuit board (see circuit board overview in the installation and operating instructions).
5. Energiezähler mit der Hutschiene aus dem Gehäuse entnehmen. Vorsicht!: Der Energiezähler ist bereits angeschlossen und kann dadurch nicht komplett herausgenommen werden.
6. Remove the bottom cover of the energy meter.
7. Connect the two free ends of the red and violet wires to the energy meter- torque 40Ncm. Connect red wire = contact 9 (bottom). Connect violet wire = contact 10 (bottom)
8. Replace the bottom cover of the energy meter.
9. Insert the energy meter with top-hat rail in the housing.

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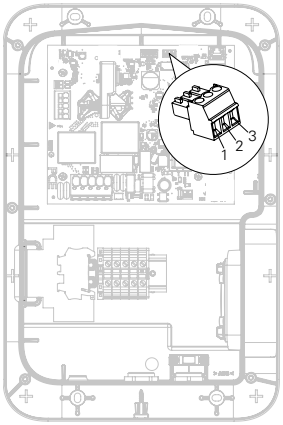
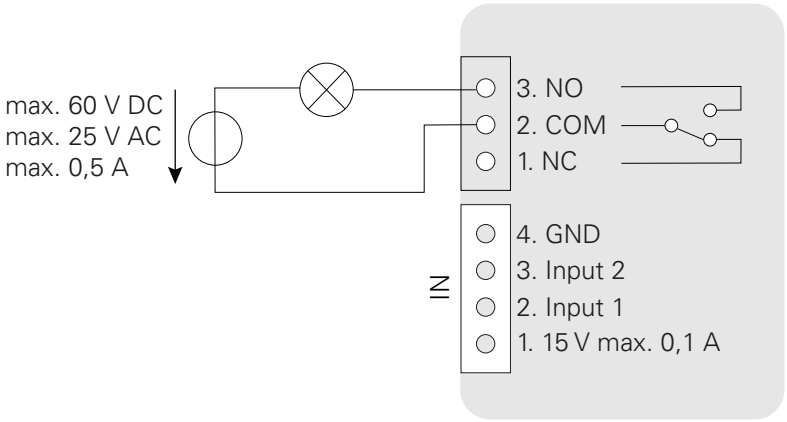
Signal output

The potential-free changeover contact is connected via the 3-pin plug connector on the circuit board labeled „Signal output".



Pole	Occupancy
3	NO (normally open) Contact closes during charging
2	COM (common) max. 25V AC / 60V DC 0.5A Changeover contact
1	NC (normally closed) Contact opens during charging

Connection example „Digital outputs- charging process active"



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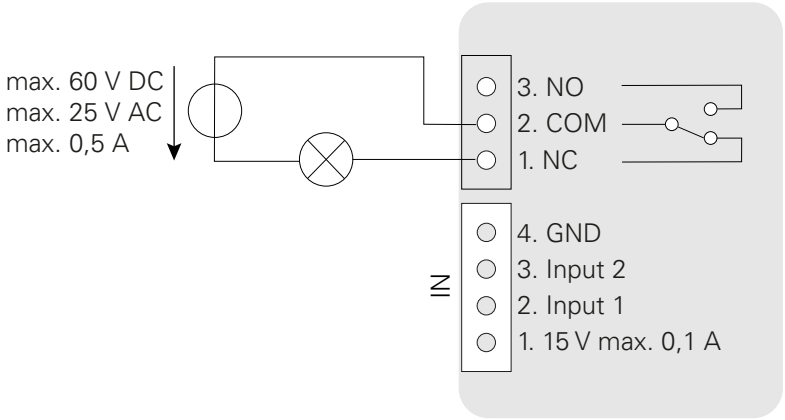
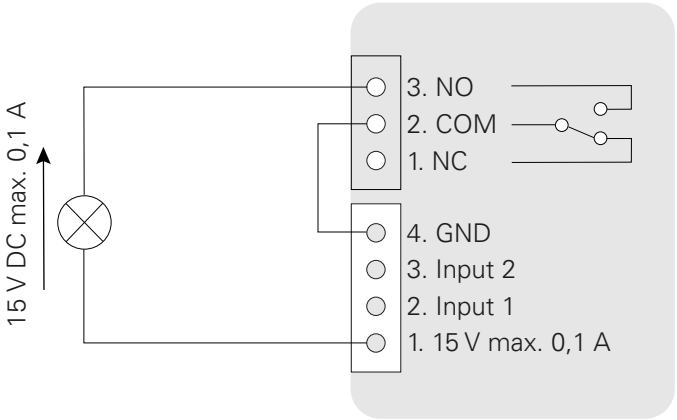
Connection example „Digital outputs- charging process not active“



Connection example „Digital outputs with internal supply- charging process active“



3. Operating mode: Release with PWM function and S0 interface for energy meter

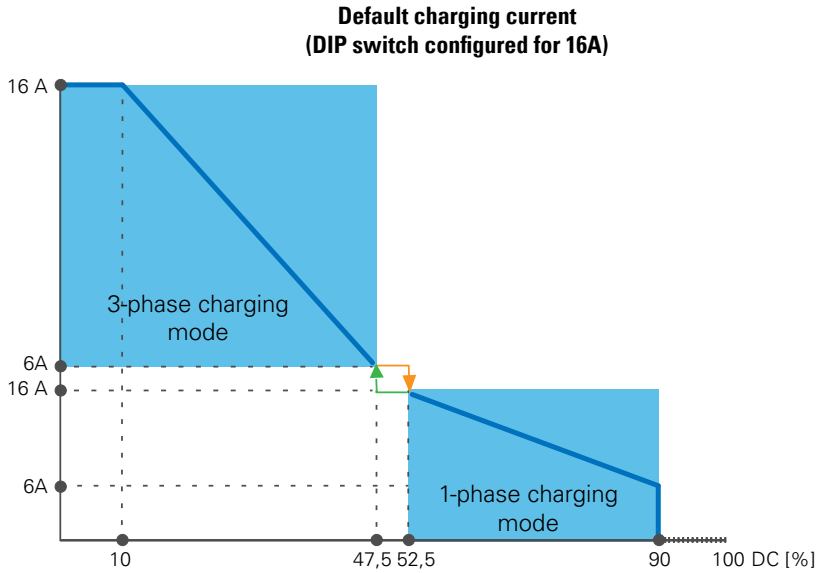
The digital input can also be used as a PWM signal input (1kHz +/-5%). The PWM signal input controls the charging current and is evaluated cyclically.

The charging current limit for the 1-phase or 3-phase charging mode is set using the „Maximum charging current" DIP switch (see Setting the „Maximum charging current" DIP switch in the installation and operating instructions).

The setting via the DIP switch is the upper limit.

Automatic phase changeover is activated using the „Enable automatic phase changeover" DIP switch (see circuit board overview in the installation and operating instructions) on the circuit board.

PWM-signal input (see graphic)	Charging current	Charging power (calculated)	Charging type
0% to 10% or digital input open	16A	11kW	3-phase
10% to 47,5%	16A to 6A	11kW to 4,1kW	3-phase
47,5% to 52,5%	If PWM ≥ 52.5%, the switchover from 3-phase to 1-phase charging takes place	Power range from 4.1kW to 3.7kW technically not possible	1-phase oder 3-phase
	If PWM ≤ 47.5%, the switchover from 1-phase to 3-phase charging takes place		
	With 1-phase charging and PWM between 47.5% and 52.5%, the charging current is 16A		
	With 3-phase charging and PWM between 47.5% and 52.5%, the charging current is 6A		
52,5% to 90%	16A to 6A	3,7kW to 1,4kW	1-phase
90% to 100% or digital input closed	no charging process	no charging process	-



4. Communication via Modbus tcp

The charging current can be specified via Modbus tcp.

Additional installation work is required so that the meter values can be read. See section „Installation work for the use of an energy meter“.

This is a Modbus tcp network.
The IP address of the wallbox is assigned using DHCP (IPv4).
The wallbox is a slave in the network and the load management control unit is the master.

With the wallbox, the registers can be written to individually with write access [0x06 Write Single Register] and with write access [0x10 Write Multiple Registers] simultaneously at one-second intervals.

With each transfer to register [Heartbeat], a different value is written and the monitoring time of 60s is reset with each change.

If the monitoring time is ≤ 60s, [CHARGING_CURRENT] is used. If the monitoring time is > 60s, [CHARGING_CURRENT_OFFLINE] is used.

As long as no operating parameters need to be changed, the Modbus network can be relieved by changing only the [Heartbeat] register every 60s.

Write access via Modbus tcp to Wallbox EV11.3 Command 0x06 [Write Single Register] or 0x10 [Write Multiple Registers]					
Designation	**Description**	**Unit**	**Format**	**Register (16 bit)**	**DEFAULT**
CHARGING_ CURRENT	0 = charging pause 1 to 5999 lower range with 6A 1-phase 6000 to 16000 Charging 1-phase 16001 to 38767 Transition range If last valid value ≤ 16000 and current value between 16001 and 38767, then value = 16000 If last valid value ≥ 38768 and current value between 16001 and 38767, then value = 38768 38768 to 48768 3-phase charging process (38768 = 6A, 48768 = 16A; bit no. 15 is always 1) 48768 to 65535 upper range with 16A 3-phase	mA	[uint16]	40201	64768
CHARGING_CUR-RENT_OFFLINE	0 = loading pause, if heartbeat NOK 1 to 5999 invalid range, last valid value is retained 6000 to 16000 Charging 1-phase 16001 to 38767 invalid range, last valid value is retained 38768 to 48768 3-phase charging process (38768 = 6A, 48768 = 16A; bit no. 15 is always 1) 48769 to 65534 invalid range, last valid value is retained 65535 = no change if heartbeat NOK	mA	[uint16]	40202	65535
MAX_CHAR-GING_TIME	After this time, the charging process is ended by the wallbox regardless of the communica-tion (heartbeat) 0 = without limitation	min	[uint16]	40203	0
HEARTBEAT	Value must change every 60s at the latest for the commands to be processed. If no communication, then „Charging power setpoint if heartbeat NOK"	-	[uint16]	40204	0
LED_BRIGHT-NESS	Luminosity is saved remanently. Setting range: 0 to 100% (results in PWM 0x37 to 0xff)	%	[uint16]	40205	100

Designation	Description	Format	Register (16 bit)	DEFAULT
MODE_DIGITAL_IN	**Configuration of the digital inputs*:** 0 = Enable charging and reduce charging current (factory setting) 1 = Enable charging and reduce charging current (inverted inputs) 2 = PWM signal input and S0 signal input * For a detailed configuration description, see chapter 1 „Overview of configuration variants for digital inputs“	[uint16]	40206	0

Read access via Modbus tcp to Wallbox EV11.3 Command 0x03 [Read Holding Registers]				
Designation	**Description**	**Unit**	**Format**	**Register (16 bit)**
CHARGING_STATE	0 = Initialization 1 = (A1) Charging station ready / no vehicle connected 2 = (A2) 3 = (B1) Charging station ready / vehicle connected / pending authorization 4 = (B2) Charging station ready / vehicle connected 5 = (C1) Charging pause / vehicle ready 6 = (C2) Charging process active 7 = (E) Fault (red status LED)	-	[uint16]	40101
CHARGING_RELAY_STATE	0 = no charging process 1 = 1-phase charging process 2 = 3-phase charging process	-	[uint16]	40102
MAX_CURRENT	Adjustable via DIP switch	mA	[uint16]	40103
PHASE_AUTOSWITCH	0 = deactivated 1 = activated	-	[uint16]	40104
ACTIVE_CHARGING_CURRENT	This value is transferred to the electric vehicle	mA	[uint16]	40105
CHARGING_TIME	Charging time since start of charging (no overflow)	s x 10	[uint16]	40106

Designation	Description	Unit	Format	Register (16 bit)
POWERMETER_0	Current charging process (1000 Imp = 1kWh)	kWh/100	[uint16]	40107
POWERMETER_1	Last charging process	kWh/100	[uint16]	40108
POWERMETER_2	Penultimate charging process	kWh/100	[uint16]	40109
TEMPERATURE	Onboard temperature	°C / 10	[uint16]	40110
ERROR	The current error is displayed here. 0 = no error active The error code is contained in bits 0 to 3. 1 = Overtemperature. Charging process is continued automatically 2 = DC residual current sensor triggered 3 = Charging request with ventilation 4 = CP signal, error code E or F 5 = CP signal, bypass 6 = CP signal, diode defective 7 = DC residual current sensor, calibration 8 = DC residual current sensor, communication error 9 = DC residual current sensor, error	-	[uint16]	40111
ERROR_1	As soon as a new error occurs, the old error is copied here		[uint16]	40112
ERROR_1_TIME	max. 65535 corresponds to 655350s = 7.59 days	s x 10	[uint16]	40113
ERROR_2	As soon as a new error occurs, the old error is copied here		[uint16]	40114
ERROR_2_TIME	max. 65535 corresponds to 655350s = 7.59 days	s x 10	[uint16]	40115
ERROR_3	As soon as a new error occurs, the old error is copied here		[uint16]	40116
ERROR_3_TIME	max. 65535 corresponds to 655350s = 7.59 days	s x 10	[uint16]	40117
ERROR_4	As soon as a new error occurs, the old error is copied here		[uint16]	40118
ERROR_4_TIME	max. 65535 corresponds to 655350s = 7.59 days	s x 10	[uint16]	40119
ERROR_5	As soon as a new error occurs, the old error is copied here		[uint16]	40120
ERROR_5_TIME	max. 65535 corresponds to 655350s = 7.59 days	s x 10	[uint16]	40121
ERROR_6	As soon as a new error occurs, the old error is copied here		[uint16]	40122
ERROR_6_TIME	max. 65535 corresponds to 655350s = 7.59 days	s x 10	[uint16]	40123

Bezeichnung	Beschreibung	Format	Format	Register (16 bit)
ERROR_7	As soon as a new error occurs, the old error is copied here		[uint16]	40124
ERROR_7_TIME	max. 65535 corresponds to 655350s = 7.59 days	s x 10	[uint16]	40125
ERROR_8	As soon as a new error occurs, the old error is copied here		[uint16]	40126
ERROR_8_TIME	max. 65535 corresponds to 655350s = 7.59 days	s x 10	[uint16]	40127
ERROR_9	As soon as a new error occurs, the old error is copied here		[uint16]	40128
ERROR_9_TIME	max. 65535 corresponds to 655350s = 7.59 days	s x 10	[uint16]	40129
PWM_IN_MAX_ CURRENT	Maximum charging current	mA	[uint16]	40130
PWM_IN_ DUTY_CYCLE	Duty cycle	% / 10	[uint16]	40131
CP_SIGNAL_ VOLTAGE_HI	Ua_high	mV	[int16]	40132
CP_SIGNAL_ VOLTAGE_LO	Ua_low	mV	[int16]	40133
RCD_CUR- RENT_DC	Residual current DC	mA / 10	[int16]	40134
RCD_CURRENT_ ACTUEL	Residual current AC (current measured value, unfiltered)	mA / 10	[uint16]	40135
FIRMWARE_RE- VISION	4 Byte (ASCII)	-	[uint32]	40136
				40137
HARDWARE_RE- VISION	2 Byte	-	[uint16]	40138
SERIAL_NUM- BER	Max. 9876543210		3x [uint16]	40139
				40140
				40141
MAC	MAC address of the network interface		3x [uint16]	40142
				40143
				40144

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