

EN

Technical information

PCE

Connection
to the future



EV11.3 WALLBOX

DIGITAL SIGNALS

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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“

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.	Normal „Factory setting“		
		Level status LOW 0V	Level status HIGH 12V-24V
	Input 1	Release	No release
	Input 2	No reduction	Reduction to 6A
	Inverted inputs		
		Level status LOW 0V	Level status HIGH 12V-24V
	Input 1	No release	Release
	Input 2	Reduction to 6A	No reduction
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.	Freigabe mit PWM-Funktion		
		Level status LOW 0V	Level status HIGH 12V-24V
	Input 1	PWM signal for charging current control	No release
	Input 2	S0-Interface for energy meter	
Operating mode „Reduction and S0 interface for energy meter“ The charging current can be specified via Modbus tcp. The charging energy can be read out via Modbus tcp and is recorded via the S0 interface.	Reduzierung		
		Level status LOW 0V	Level status HIGH 12V-24V
	Input 1	No reduction	Reduction to 6A
	Input 2	S0-Interface for energy meter	

Truth table

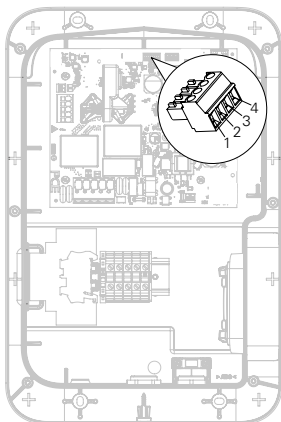
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Input 1	Input 2	normal „Factory setting“	Inverted inputs	Release with PWM function and S0 interface for energy meters	Reduction to 6A and S0 interface for energy meters
0V	0V	16A	0A	16A	16A
12V	0V	0A	6A	0A	6A
0V	12V	6A	0A	16A	16A
12v	12V	0A	16A	0A	6A

2. Connection for digital signals

Signal input

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

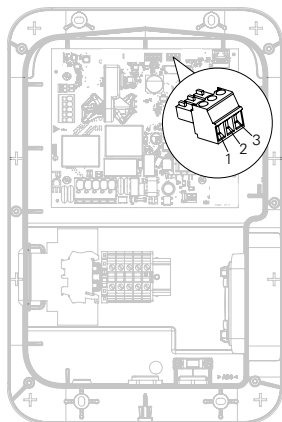


Pole	Occupancy
4	GND (Attention PELV - ground connected to PE)
3	Input 2 (12V - 24V)
2	Input 1 (12V - 24V)
1	15V max. 0,1A

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

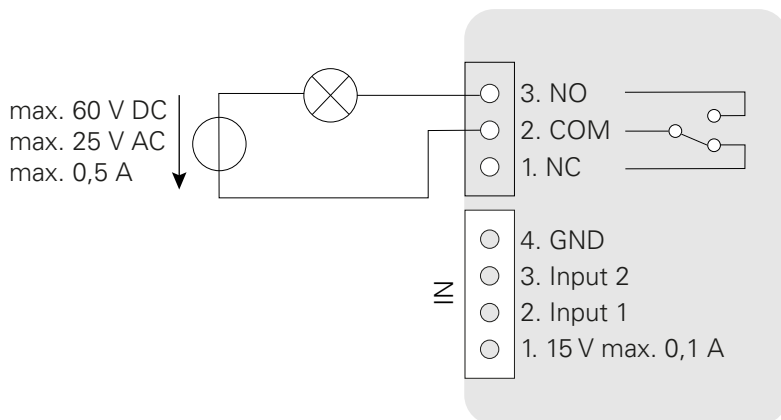
Signal output

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

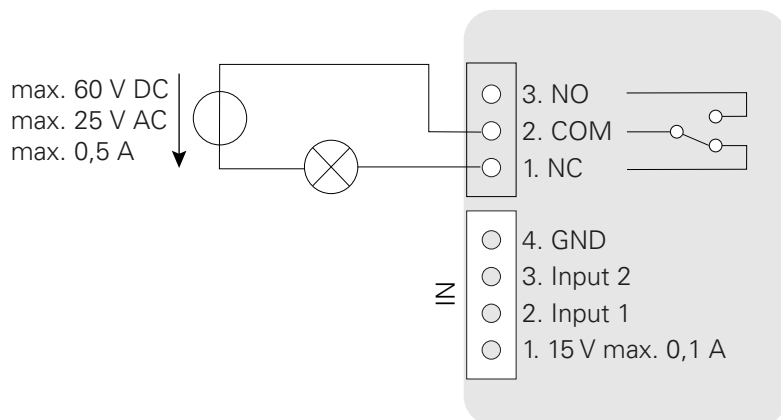


Pole	Occupancy
3	NO (normally open) Contact closes during charging
2	COM (common) max. 25V AC / 60V DC 0.5A Changeover contact
1	NC (normally closed) Contact opens during charging

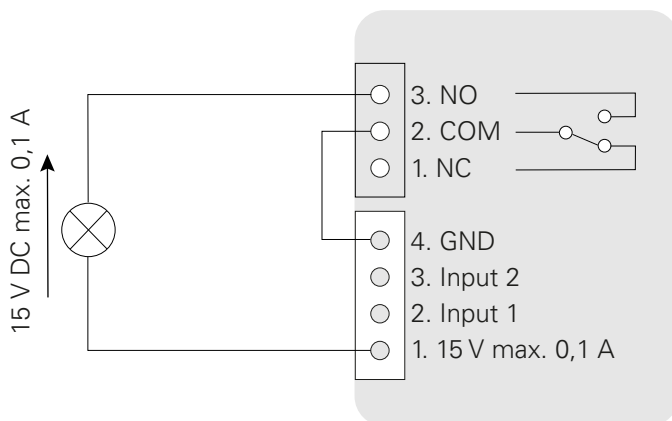
Connection example „Digital outputs- charging process active“



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

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

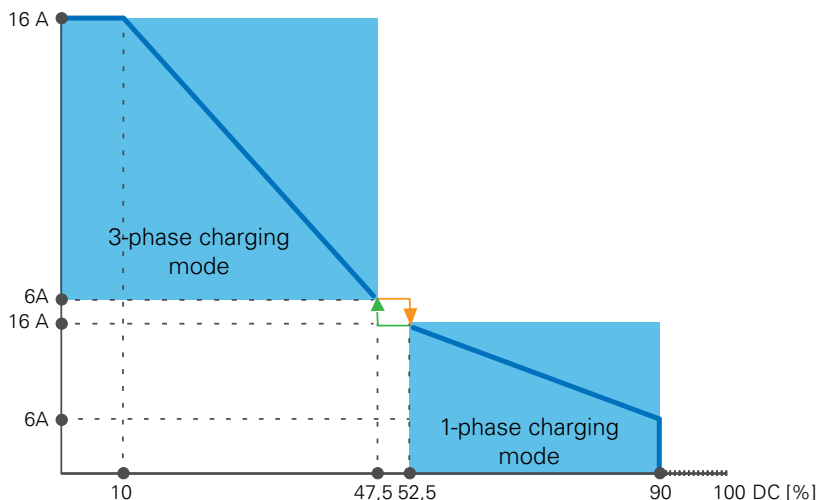
The charging current limit for the 1-phase or 3-phase charging mode is set using the „Maximum charging current“ DIP switch (see Setting the „Maximum charging current“ DIP switch in the installation and operating instructions).

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 $PWM \geq 52.5\%$, 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 $PWM \leq 47.5\%$, 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	-

Default charging current (DIP switch configured for 16A)



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 ≤ 60 s, [CHARGING_CURRENT] is used. If the monitoring time is > 60 s, [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_CURRENT_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_CHARGING_TIME	After this time, the charging process is ended by the wallbox regardless of the communication (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_BRIGHTNESS	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*
PHASE_AUTOSWITCH_PAUSE**	Switchover phase during phase changeover Range 5-600 sec.	[uint16]	40207	6
PHASE_AUTOSWITCH_MIN_CHARGINGTIME**	Minimum charging time after phase changeover for renewed phase changeover. A charging pause is always possible. Range 5-600 seconds.	[uint16]	40208	120
FORCE_CHARGING_RESUME**	If, after a longer charging pause (state B1), the electric vehicle does not resume charging within 30 seconds (state B2), the charging process is reinitialised (state E). This is stored permanently. Recommended for older electric vehicles if the charging process does not start reliably after a longer charging pause. Bit 0 = 0 ... inactive Bit 0 = 1 ... active	[uint16]	40209	0

* for variant with energy meter DEFAULT = 2

** available from Wallbox firmware version V0.25 onwards

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 = (F) 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)
POWMETER_0	Current charging process - either S0 pulse from electricity meter at input 2, if configured (1000 pulses = 1kWh) - or Modbus rtu from electricity meter	kWh/100	[uint16]	40107
POWMETER_1	Last charging process	kWh/100	[uint16]	40108
POWMETER_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 11 = Network monitoring triggered**	-	[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_CURRENT_DC	Residual current DC	mA / 10	[int16]	40134
RCD_CURRENT_ACTUEL	Residual current AC (current measured value, unfiltered)	mA / 10	[uint16]	40135
FIRMWARE_REVISION	4 Byte (ASCII)	-	[uint32]	40136 40137
HARDWARE_REVISION	2 Byte	-	[uint16]	40138
SERIAL_NUMBER	Max. 9876543210		3x [uint16]	40139 40140 40141
MAC	MAC address of the network interface		3x [uint16]	40142 40143 40144
CHARGING_POWER_ACTUAL**	Current charging power - either S0 pulses from electricity meter at input 2 if configured - or Modbus RTU from electricity meter	W	[uint16]	40145

Bezeichnung	Beschreibung	Format	Format	Register (16 bit)
DIGITAL_IN_ACTUAL**	Current status of digital inputs bit 0 = Input 1 (0 = low; 1 = high) (For PWM snapshot) bit 1 = Input 2 (0 = low; 1 = high) (For S0 snapshot) bit 14 = Charging current limitation active bit 15 = Charging pause active		[uint16]	40146
R37_MODE**	The R37 variant is configured during manufacture and cannot be changed 0 .. Deactivated (no mains monitoring) 1 .. Electricity meter 2 .. Mains monitoring relay at input 1		[uint16]	40147
R37_1PH_3PH**	The number of phases to be monitored is set using DIP switch no. 4 if mains monitoring is implemented via the electricity meter (R37_MODE = 1) 1 .. 1ph / 3 .. 3ph		[uint16]	40148
R37_DELAY**	The delay for the undervoltage trip when mains monitoring is implemented via the electricity meter (R37_Mode = 1)	Sek	[uint16]	40149
R37_UNDERVOLTAGE**	The threshold value for undervoltage tripping when mains monitoring is implemented via the electricity meter (R37_MODE = 1)	V	[uint16]	40150
VOLTAGE_L1**	Voltage L1 - N	V / 10	[uint16]	40151
VOLTAGE_L2**	Voltage L2 - N	V / 10	[uint16]	40152
VOLTAGE_L3**	Voltage L3 - N	V / 10	[uint16]	40153
CURRENT_L1**	Apparent current L1	mA	[uint16]	40154
CURRENT_L2**	Apparent current L2	mA	[uint16]	40155
CURRENT_L3**	Apparent current L3	mA	[uint16]	40156
ACTIVE_POWER_L1**	Active power L1	W / 10	[uint16]	40157
ACTIVE_POWER_L2**	Active power L2	W / 10	[uint16]	40158
ACTIVE_POWER_L3**	Active power L3	W / 10	[uint16]	40159
CHARGING_ENERGY_TOTAL**	Total active energy	kWh / 10	[uint32]	40160 40161

** available from Wallbox firmware version V0.25 onwards

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