

AMPERFIED WALLBOX CONNECT.HOME

Modbus TCP Register Layout

This document describes the use of the implemented register layout for Modbus TCP communication.

- ➡ Please do not use registers that are not described in this document or are not intended for use by the user.
- ➡ Please check on our homepage that you have the latest version of this Modbus documentation so that you can take into account possible changes to the register layout.

<https://www.amperfied.de/de/service-support/downloads/>

- ➡ Please refer the original manual of the Wallbox for further information.

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Configuration

Connection by IP address

The IP address under which the Wallbox can be reached in the network must be used for communication.

It is recommended to set the IP address permanently for Modbus TCP Communication.

Connection by Host Name

Host Name

The Wallbox can also be found and addressed in the network via its host name, provided that the network router supports this.

The host's name consists of a defined device designation ("HDM-SMART-CONNECT-") and the last six characters of the MAC address on the communication module

Example

HDM-SMART-CONNECT-F431F2

Notice

With some routers, e.g., the FRITZ!Box, devices in the network can be reached with their host name as a subdomain, e.g. <https://hdm-smart-connect-f431f2.fritz.box/>

Communication Port

Port Number

The TCP port 502 is used for Modbus TCP communication.

Notice

Please note that only one connection can be established on this port at a time.

Register Layout

[004] Modbus TCP Register-Layouts Version

Description

This register can be read to check the Modbus Register Layouts Version.
This is important for correct use of registers.

Parameter

Bus-Adr.	R/W	Modbus TCP Function	Type	Range		Available at
4	R	04 - readInputRegister	uint16	0..65536		V1.0.8

Examples

The value contained in the register is in hexadecimal format. To determine the register layout version, no conversion to the decimal system is necessary. Instead, the individual digits of the hexadecimal number represent the version directly.

- decimal 256 ↔ hexadecimal 0x100 ↔ Version V1.0.0
- decimal 264 ↔ hexadecimal 0x108 ↔ Version V1.0.8

Notice

The register layout version is not the same as the software version of the Wallbox.

[005] Charging State

Description

This register represents the current charging state between the vehicle and the Wallbox.

Parameter

Bus-Adr.	R/W	Modbus TCP Function	Type	Range		Available at
5	R	04 - readInputRegister	uint16	1...11		V1.0.8

Examples

Value	State	Car	Wallbox
2	A1	No vehicle plugged	Wallbox doesn't allow charging
3	A2		Wallbox allows charging
4	B1	Vehicle plugged without charging request	Wallbox doesn't allow charging
5	B2		Wallbox allows charging
6	C1	Vehicle plugged with charging request	Wallbox doesn't allow charging
7	C2		Wallbox allows charging
8	---	---	Derating
9	E	Error	Error
10	F	---	Wallbox locked or not ready
11	---	---	Error

Notice

The charging states refer to the EN 61851-1 standard. Please see more details there.

[006 - 008] Current

Description

These registers represent the current rms drawn by the vehicle from the Wallbox per phase L1, L2, L3.

Parameter

Bus-Adr.	R/W	Modbus TCP Function	Type	Range	Unit	Available at
6	R	04 - readInputRegister	uint16	L1: 0....350	Ampere rms in steps of 0.1 A	V 1.0.8
7	R	04 - readInputRegister	uint16	L2: 0....350	Ampere rms in steps of 0.1 A	V 1.0.8
8	R	04 - readInputRegister	uint16	L3: 0....350	Ampere rms in steps of 0.1 A	V 1.0.8

Examples

- 1 = 0.1 A rms
- 145 = 14.5 A rms

Notice

These values are for internal purposes only and should not be used for accurate billing.

[009] Temperature (PCB)

Description

This register represents the internal temperature of the Wallbox.

Parameter

Bus-Adr.	R/W	Modbus TCP Function	Type	Range	Unit	Available at
9	R	04 - readInputRegister	int16	-2000 ... +2000	°C in steps of 0.1 °C	V 1.0.8

Examples

- 325 = +32.5 °C
- -145 = -14.5 °C

[010 – 012] Voltage

Description

This register represents the current voltage rms, provided by the connection point per phase.

Parameter

Bus-Adr.	R/W	Modbus TCP Function	Type	Range	Unit	Available at
10	R	04 - readInputRegister	uint16	L1 – N 0...65536	Volt in steps of 1 V	V 1.0.8
11	R	04 - readInputRegister	uint16	L2 – N 0...65536	Volt in steps of 1 V	V 1.0.8
12	R	04 - readInputRegister	uint16	L3 – N 0...65536	Volt in steps of 1 V	V 1.0.8

Examples

- 8 = 8 V rms
- 238 = 238 V rms
- 258 = 258 V rms

Notice

These values are for internal purposes only and should not be used for accurate billing.

[013] Extern Lock State

Description

This register represents the status of the input for external lock (see manual).

Parameter

Bus-Adr.	R/W	Modbus TCP Function	Type	Range		Available at
13	R	04 - readInputRegister	uint16	0 or 1		V1.0.8

Examples

- 0 = system locked
- 1 = system unlocked

[014] Power

Description

This register represents the sum of the power of all three phases (Power L1 + Power L2 + Power L3) drawn by the vehicle is displayed.

Parameter

Bus-Adr.	R/W	Modbus TCP Function	Type	Range	Unit	Available at
14	R	04 - readInputRegister	uint16	0..65536	VA in steps of 1 VA	V1.0.8

Examples

- 1000 → 1.000 kVA
- 9814 → 9.841 kVA
- 11000 → 11.000 kVA

Notice

These values are for internal purposes only and should not be used for accurate billing.

[015 - 016] Energy since Power on

Description

Electrical energy drawn from the vehicles since the last time the Wallbox was switched on.

It is a 32bit number represented in two 16bit registers (see examples).

Parameter

Bus-Adr.	R/W	Modbus TCP Function	Type	Description	Range	Unit	Available at
15	R	04 - readInputRegister	uint16	Energy since Power On [high byte]	0..65536	VAh in steps of 2^{16} VAh	V1.0.8
16	R	04 - readInputRegister	uint16	Energy since Power On [low byte]	0..65536	VAh in steps of 1 VAh	V1.0.8

Examples

- high Byte = 1 → $1 * 2^{16}$ VAh = 65536 VAh
low byte = 1000 → 1000 VAh
⇒ Result: 65536 VAh + 1000 VAh = 66536 VAh
- high Byte = 5 → $5 * 2^{16}$ VAh = 327680 VAh
low byte = 37 → 37 VAh
⇒ Result: 327680 VAh + 37 VAh = 327717 VAh

Notice

These values are for internal purposes only and should not be used for accurate billing.

[017 -018] Energy since Installation

Description

Electrical energy drawn by the vehicles since commissioning of the Wallbox. The register content is not lost when the Wallbox is disconnected from the mains. A reset is not possible.

It is a 32bit number represented in two 16bit registers (see examples).

Parameter

Bus-Adr.	R/W	Modbus TCP Function	Type	Description	Range	Unit	Available at
17	R	04 - readInputRegister	uint16	Energy since Installation [high byte]	0..65536	VAh in steps of 2^{16} VAh	V1.0.8
18	R	04 - readInputRegister	uint16	Energy since Installation [Low byte]	0..65536	VAh in steps of 1 VAh	V1.0.8

Examples

- high Byte = 10 → $10 * 2^{16}$ VAh = 655360 VAh
low byte = 100 → 100 VAh
⇒ Result: 655360 VAh + 100 VAh = 655460 VAh
- high Byte = 23 → $23 * 2^{16}$ VAh = 1507328 VAh
low byte = 1974 → 1974 VAh
⇒ Result: 1507328 VAh + 1974 VAh = 1509302 VAh

Notice

These values are for internal purposes only and should not be used for accurate billing.

[100] Hardware configuration maximal current

Description

In this register the configuration of the hardware switch in the Wallbox can be read (see Manual).

Parameter

Bus-Adr.	R/W	Modbus TCP Function	Type	Range	Unit	Available at
100	R	04 - readInputRegister	uint16	0...16	Ampere in steps of 1 A	V 1.0.8

Examples

- 6 = 6 A
- 16 = 16 A

[101] Hardware configuration minimal current

Description

In this register the minimal current of the Wallbox can be read. The value not changeable by Hardware or Software.

Parameter

Bus-Adr.	R/W	Modbus TCP Function	Type	Range	Unit	Available at
101	R	04 - readInputRegister	uint16	6	Ampere	V 1.0.8

[102 - 133] Logistic String

Description

This block of registers contains a logistic string for internal use.
Each Register represents two ASCII characters.

Parameter

Bus-Adr.	R/W	Modbus TCP Function	Type	Range		Available at
102	R	04 - readInputRegister	char[2]	ASCII		V1.0.8
...	R	04 - readInputRegister	char[2]	ASCII		V1.0.8
133	R	04 - readInputRegister	char[2]	ASCII		V1.0.8

Notice

Reserved by manufacturer. Only for internal use.

[200] Hardware Variant

Description

In this register hardware variants are described for internal use.

Parameter

Bus-Adr.	R/W	Modbus TCP Function	Type			Available at
200	R	04 - readInputRegister	uint16			V1.0.8

Notice

Reserved by manufacturer. Only for internal use.

[203] Application Software Revision

Description

The register contains the Revision Number of the Application Software.

Parameter

Bus-Adr.	R/W	Modbus TCP Function	Type			Available at
203	R	04 - readInputRegister	uint16			V1.0.8

Notice

Reserved by manufacturer. Only for internal use.

[257] WatchDog TimeOut

Description

This register is used for communication monitoring and sets WatchDog TimeOut for the Modbus TCP Leader. Within this time period, at least one successful Modbus TCP communication must have taken place between the Modbus TCP Leader and the Modbus TCP Follower. Otherwise, the Modbus TCP Follower goes into TimeOut mode.

Parameter

Bus-Adr.	R/W	Modbus TCP Function	Type	Range	Unit	Available at
257	R / W	03 - readHoldingRegister 06 - writeHoldingRegister	uint16	0...65536	Seconds in steps of 0.001 s	V 1.0.8

Default Value

15000 = 15.000 s

Examples

- 10000 = 10.000 s
- 9523 = 9.523 s
- 0 = Off, i.e., WatchDog deactivated

Notice

If Watchdog TimeOut is reached, the TCP port is closed.

After Power On the stored value is retained.

[259] Remote Lock

Description

This Register can be used to read and write the Remote lock.

It works only, if extern lock is unlocked. The extern lock has priority.

If you lock the system with register 259, this is indicated to the user by the LED.

Parameter

Bus-Adr.	R/W	Modbus TCP Function	Type	Range		Available at
259	R / W	06 - writeHoldingRegister	uint16	0 or 1		V1.0.8

Default Value

1 = system unlocked

Examples

- 0 = system locked
- 1= system unlocked

Notice

After Power On the stored value is retained.

[261] Maximal Current Command

Description

This Register can be used to read and write the maximal current.

The system can be locked by setting 0 in register 261. However, this is not displayed to the user. It is noticed that the charging does not start or is terminated.

The unit for this value is ampere in steps of 0.1 A

It is recommended to leave the current setting constant for 20 sec. after a change.

Parameter

Bus-Adr.	R/W	Modbus TCP Function	Type	Range	Unit	Available at
261	R/W	03 - readHoldingRegister 06 - writeHoldingRegister	uint16	[0; 60 to 160]	Ampere in steps of 0.1 A	V 1.0.8

Default Value

The default value 0, i.e., 0 A.

Examples

- 160 = 16 A
- 100 = 10 A
- 1...59 → not allowed, is interpreted as 0 A → means no charging possible
- 0 → is interpreted as 0 A → means no charging possible

[262] FailSafe Current

Description

FailSafe Current configuration in case of loss of Modbus TCP communication. The FailSafe current will be used for charging, if TimeOut Mode is activated (see Register 257 WatchDog TimeOut).

Parameter

Bus-Adr.	R/W	Modbus TCP Function	Type	Range	Unit	Available at
262	R/W	03 - readHoldingRegister 06 - writeHoldingRegister	uint16	0 60 to 160	Ampere in steps of 0.1 A	V1.0.8

Default Value

The default value 0, i.e., 0 A.

Examples

- 0 → 0.0 A, i.e., no charging possible
- 1...59 → not allowed, is interpreted as 0.0 A, i.e., no charging possible
- 60 = 6.0 A
- 160 = 16.0 A

Notice

After Power On the stored value is retained.

[300 - 318] Support Diagnostic Data

Description

Register Area for Support Diagnostic Data.

Parameter

Bus-Adr.	R/W	Modbus TCP Function	Type			Available at
300	R	04 - readInputRegister	uint16			V1.0.8
...	R	04 - readInputRegister	uint16			
318	R	04 - readInputRegister	uint16			

Notice

Reserved by manufacturer. Only for internal use.

[500 - 819] Error Memory

Description

Register Area for Error Memory.

Parameter

Bus-Adr.	R/W	Modbus TCP Function	Type			Available at
500	R	04 - readInputRegister	int16			V1.0.8
...	..	..	..			
819	R	04 - readInputRegister	int16			

Notice

Reserved by manufacturer. Only for internal use.