

AMTRON® Compact 2.0s / AMTRON® Start 2.0s Modbus RTU Specification

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Table of Contents

1. Release information	2
2. General	2
3. Version Information of Modbus RTU Device - Version (0x0000-0x00FF)	2
4. Status (0x0100 - 0x02FF).....	3
5. Configuration (0x0300 - 0x04FF).....	4
6. Output Measurements (AC) (0x0500 - 0x06FF).....	5
7. Input Measurements (0x0900 - 0x0AFF)	5
8. Charging Session (0x0B00 - 0x0CFF).....	6
9. Functions (0x0D00 - 0x0DFF)	6
10. Diagnostic (0x0E00 -).....	7
11. Statistic (0x1000 -)	7

1. Release information

The Modbus RTU specification which is described in this document will be available for the AMTRON® Compact 2.0s and AMTRON Start 2.0s with MCU SW version 1.5 which includes the Modbus register settings 1.0.2.

2. General

MENNEKES Modbus RTU uses the following communication parameters:

- Baudrate 57600 bit/s
- 8 Data bits
- 2 Stop bits
- No parity
- Register Word order: LowWord / HighWord
- Byte order: Big Endian HighByte / LowByte

The following functional codes can be used:

- Read:
 - READ HOLDING REGISTERS (0x03)
 - READ INPUT REGISTERS (0x04)
- Write:
 - WRITE SINGLE REGISTER (0x06) (only if data size = 1 register)
 - WRITE MULTIPLE REGISTERS (0x10)

Note: If the AMTRON is configured as Satellite with help of the DIP-Switches on the baseboard, there is the address “50” already preconfigured. With help of the configuration tool you can additionally use the alternative addresses 11, 12, 13 or 14.

To start a charging session it is necessary to send the master heartbeat every 10s, set the charging release to 1 and the set a charging current limitation by the energy manager to a value of at least 6A.

3. Version Information of Modbus RTU Device - Version (0x0000-0x00FF)

Reading out this part will return basic information about the connected wallbox device, like firmware version, serial number, hardware version or the unique product ID.

Adr (Off-set)	R/W	Value	Bytes	Type	Range	Description	Available at
0x0000	R	Modbus Version	2	uint16	0...65536	Internal Modbus Register Layout Version (V1.0.0 = 0x100, V1.0.1 = 0x101)	V 1.0.0
0x0001 - 0x0008	R	Firmware Version	16	ascii	-	Firmware Version	V 1.0.0

0x0013 - 0x001A	R	Serial Number	16	ascii	-	Serial number	V 1.0.2
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4. Status (0x0100 - 0x02FF)

The following registers contain general information about the status of the device. General status, status of the downgrading input and the phase rotation are given.

Adr (Off-set)	R/W	Value	Bytes	Type	Range	Description	Available at
0x0100	R	EVSE State	2	uint16	0...7	Status of the charging station 0 = not initialized 1 = Idle (A1) 2 = EV connected (B1) 3 = Preconditions valid but not charging yet ready 4 = Ready to charge (B2) 5 = Charging (C2) 6 = Error 7 = Service Mode	V 1.0.0
0x0101	R	Authorization Status	2	uint16	0...2	Authorization Status (RFID & Energy Manager) 0 = not used (IDLE) 1 = authorized (charging released) 2 = not authorized (charging not released)	V 1.0.0
0x0102	R	Downgrade	2	uint16	0...2	Status of the Downgrade 0 = not relevant (no EV connected) 1 = charging current not downgraded 2 = charging current downgraded	V 1.0.0
0x0103	R	Phase Rotation	2	uint16	0...2	Order of the connected phases (relevant for load management) 0 = L1 - L2 - L3 1 = L2 - L3 - L1 2 = L3 - L1 - L2	V 1.0.0
0x0108	R	CP-State	2	uint16	0...29	State of the CP communication EVSE-EV 0 = Init 10 = A1 (no EV) 11 = B1 (EV connected) 12 = C1 (EV ready to charge) 13 = D1 14 = E (Error) 15 = F (Error) 26 = A2 (EV disconnected) 27 = B2 (EVSE ready to	V 1.0.2

						charge) 28 = C2 (charging) 29 = D2	
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5. Configuration (0x0300 - 0x04FF)

This section describes information about pre-configured settings via DIP switches or via web interface. Additionally it is possible (and necessary) for the external EMS to set charging current parameters for the EVSE.

Adr (Offset)	R/W	Value	Bytes	Type	Range	Description	Available at
0x0300 - 0x0301	R	Downgrade Current	4	float	0...xA	charging current limitation while downgrade is active	V 1.0.0
0x0302 - 0x0303	R/W	Charging Current Energy Manager	4	float	6...xA	charging current limitation by energy manager	V 1.0.0
0x0304 - 0x0305	R	Max Current House (DIP)	4	float	0...xA	Maximal installation current, configured from DIP-Switch with attention to the house installation.	V 1.0.0
0x0306 - 0x0307	R	Max Current EVSE	4	float	0...xA	Maximal current of the EVSE as configured during the installation.	V 1.0.0
0x030A	R	Phase Switching Mode	2	uint16	0...2	phase usage while using the solar algorithm 0 = Solar only 1 phase 1 = Solar only 3 phases 2 = Solar dynamic 1 or 3 phases	V 1.0.0
0x030C	R	Phase Options HW	2	uint16	0...2	phase options regarding the hardware 0 = HW only 1 phase 1 = HW only 3 phases 2 = HW 1 or 3 phases	V 1.0.1
0x030D	R	Cable Lock	2	uint16	0...1	permanent cable lock 0 = not enabled or unavailable 1 = enabled	V 1.0.2
0x030E	R	Master Lost Fallback Current	2	uint16	0...32	fallback behaviour if Master (energy manager) is unavailable 0 = fallback disabled (charging continues as before) 1 = pause charging (0A) 6...32 = charging continues with stored value in A	V 1.0.2
0x030F	R	Grid Imbalance	2	uint16	0...1	Grid Imbalance 0 = disabled 1 = enabled	V 1.0.2
0x0310	R	Grid Imbalance Threshold	2	uint16	10...30A	Grid Imbalance Threshold	V 1.0.2

0x0311	R	Grid Phases Connected	2	uint16	0...2	Setting of the number of grid phases connected to the EVSE. 1 = L1 2 = L1, L2 and L3	V 1.0.2
0x0312	R	Authorization	2	uint16	0...1	Authorization 0 = disabled 1 = enabled	V 1.0.2
0x0313	R	Sunshine+ Current	2	uint16	6...32A	minimal charging current in Sunshine+ mode	V 1.0.2
0x0314	R	Phase Switching Pause	2	uint16	0...1200 s	duration of the pause during a dynamic phase switch	V 1.0.2

6. Output Measurements (AC) (0x0500 - 0x06FF)

It is possible to read the RMS current, the voltage and power on all three connected phases separately. The overall power is also available.

Adr (Offset)	R/W	Value	Bytes	Type	Range	Description	Available at
0x0500 - 0x0501	R	Current L1	4	float	0 ... xA	RMS output current of phase L1	V 1.0.0
0x0502 - 0x0503	R	Current L2	4	float	0 ... xA	RMS output current of phase L2	V 1.0.0
0x0504 - 0x0505	R	Current L3	4	float	0 ... xA	RMS output current of phase L3	V 1.0.0
0x0506 - 0x0507	R	Voltage L1	4	float	0 ... xV	RMS output voltage of phase L1	V 1.0.0
0x0508 - 0x0509	R	Voltage L2	4	float	0 ... xV	RMS output voltage of phase L2	V 1.0.0
0x050A - 0x050B	R	Voltage L3	4	float	0 ... xV	RMS output voltage of phase L3	V 1.0.0
0x050C - 0x050D	R	Power L1	4	float	0 ... xW	Power on phase L1	V 1.0.0
0x050E - 0x050F	R	Power L2	4	float	0 ... xW	Power on phase L2	V 1.0.0
0x0510 - 0x0511	R	Power L3	4	float	0 ... xW	Power on phase L3	V 1.0.0
0x0512 - 0x0513	R	Power Overall	4	float	0 ... xW	overall Power on all phases	V 1.0.0

7. Input Measurements (0x0900 - 0x0AFF)

Adr (Offset)	R/W	Value	Bytes	Type	Range	Description	Available at
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0x0900 - 0x0901	R	Temperature	4	float	-x°C ... x°C	Temperature (°C) inside the EVSE	V1.0.2
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8. Charging Session (0x0B00 - 0x0CFF)

Information about the current charging session can be read in the following registers.

Adr (Offset)	R/W	Value	Bytes	Type	Range	Description	Available at
0x0B00 - 0x0B01	R	Max Current Session	4	float	0 ... xA	Max charging current, evaluated out of all sources that could restrict the maximal allowed current and are static during a charging session (e.g. Installation Current Limitation, Charging Cable ...)	V 1.0.0
0x0B02 - 0x0B03	R	Charged Energy Session	4	float	0 ... kWh	energy transferred within the current charging session	V 1.0.0
0x0B04 - 0x0B05	R	Duration Session	4	uint32	0...xs	duration of the current charging session	V 1.0.0
0x0B06	R	Detected EV Phases	2	uint16	0...3	Maximum number of the detected phases of the EV during a charging session. 0 = not init 1 = 1 phase detected 2 = 2 phases detected 3 = 3 phases detected	V1.0.2

9. Functions (0x0D00 - 0x0DFF)

The registers in the functions part allow control of the EVSE. It is possible to select either Solar charging mode or to use the phase switching function for 1- or 3-phase charging mode. Note that some functions have to be activated on the hardware dip-switches first.

Adr (Offset)	R/W	Value	Bytes	Type	Range	Description	Available at
0x0D00	W	Heartbeat	2	uint16	-	A master heartbeat with the value 0x55AA has to be sent at least every 10s by the energy manager to keep the communication valid.	V 1.0.0
0x0D02	R	Cable Lock	2	uint16	0...3	locking status of the cable 0 = cable locking unknown 1 = cable unlocked 2 = cable locked 3 = EVSE with fixed cable	V 1.0.0

0x0D03	R/W	Solar Charging Mode	2	uint16	0...3	active charge mode 0 = solar charging mode not active 1 = Standard Mode 2 = Sunshine Mode 3 = Sunshine+ Mode	V 1.0.0
0x0D04	R/W	Requested Phases	2	uint16	0...1	requested phases when using dynamic phase usage 0 = regular charging on all available phases 1 = force charging on 1 phase only	V 1.0.0
0x0D05	R/W	Charging Release Energy Manager	2	uint16	0...1	Charging Release Energy Manager 0 = charging is not allowed 1 = charging is allowed	V 1.0.0
0x0D06	R/W	Lock EVSE	2	uint16	0...1	lock charging station (prevent charging) 0 = EVSE is not locked 1 = EVSE is locked	V 1.0.0

10. Diagnostic (0x0E00 - ...)

It is also possible to read out the last generated error code from the EVSE.

Adr (Offset)	R/W	Value	Bytes	Type	Range	Description	Available at
0x0E00	R	Active Error Code	2	uint16	-	error code in case of an active error 0 = no error active	V 1.0.0
0x0E01	R	Master Lost Fallback State	2	uint16	0...1	Master lost fallback state 0 = not active 1 = active (energy manager unavailable)	V1.0.2
0x0E02	R	Switched Phases	2	uint16	0...1	Information what phase is used or will be used if the EVSE will close the charging relay. 0 = regular charging on all available phases 1 = only 1 phase charging	V1.0.2

In case of error codes please contact the responsible installer or MENNEKES service hotline. Further details can also be seen using the AMTRON® Compact 2.0s Configuration Tool available on the MENNEKES website <https://www.mennekes.de/emobility/services/software-updates/>

11. Statistic (0x1000 - ...)

Adr (Offset)	R/W	Value	Bytes	Type	Range	Description	Available at
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0x1000 - 0x1001	R	Charged Energy Total	4	float	0...xkWh	Cumulated charged energy in kWh on the AC-Port of the EVSE of all time. Not useable for billing.	V1.0.2
0x1002 - 0x1003	R	Charging Sessions Total	4	uint32	0...x	Total number of the charging sessions.	V1.0.2