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Operating Manual STWA4MH

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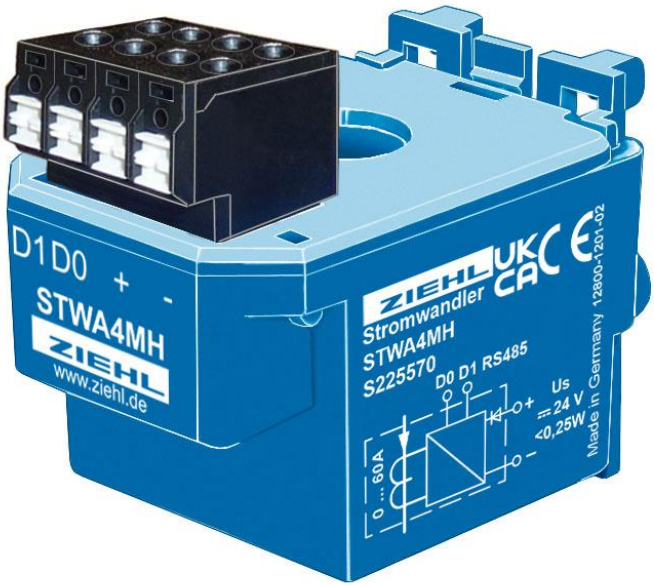
from Firmware: 0-00

For more information and help about this product please scan the QR-Code or choose the following link: STWA4MH

Operating manual, Quick guide, Datasheet, Connection diagram, CAD Data
Firmwareupdates, FAQ, Videos about installation and settings, Certificates

- Electronic current transducer for AC currents with modbus RTU



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1 General Notes

Compliance with the following instructions is mandatory to ensure the functionality and safety of the product. If the following instructions given especially but not limited for general safety, transport, storage, mounting, operating conditions, commissioning and disposal / recycling are not observed, the product may not operate safely and may cause a hazard to the life and limb of users and third parties.

Deviations from the following requirements may therefore lead both to the loss of the statutory material defect liability rights and to the liability of the buyer for the product that has become unsafe due to the deviation from the specifications.

2 Display elements

The STWA4MH has a status LED. The operating states are indicated by an LED:

LED Flashes 0,5s	For 60s after connecting Us (additional Modbus address 247 is active)
LED on	The device is ready for operation
LED flickers briefly	Modbus communication with STWA4MH

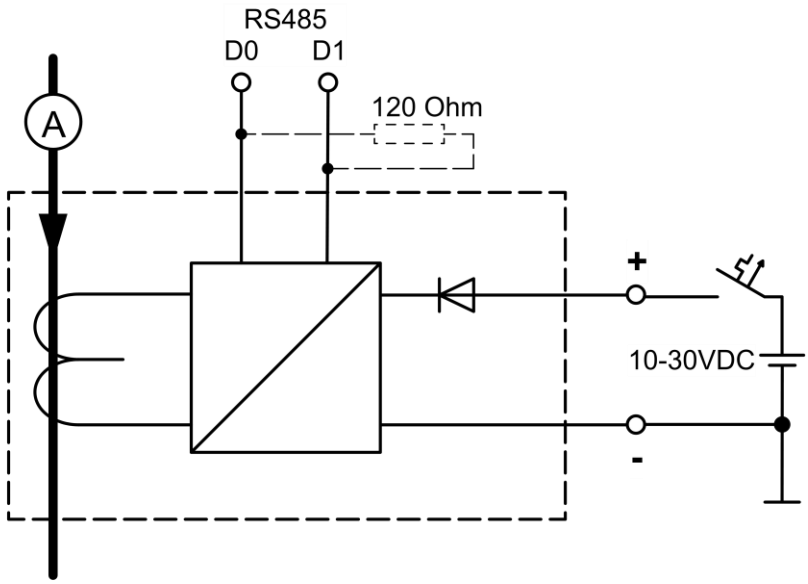
3 Application and short description

The STWA4MH enables the space-saving a cost-effective measurement of the actual RMS value of an alternating current. Compared to transducers with analogue output, the bus technology significantly reduces the effort for the hardware (one RS485 input for up to 246 devices) and the wiring. Applications are e.g. the recording of the current consumption of electrical motors in processing machines. Here the feed can be regulated depending on the load on the motor. Another example is the monitoring of heating elements for failure.

4 Overview of functions

- Current measurement AC 0…60 A (RMS - Root Mean Square), resolution 1mA
  - Actual value
  - Average over 200ms
  - Average over 1s
  - Measured values from the last 50 periods
- Frequency measurement 40…70 Hz (sinus-shaped signals)
- RS485 interface (Modbus RTU)
- Addressable up to 246 participants
- Baud rates 4800, 9600, 19200, 57600, 115200
- Wiring effort minimized through bus technology
- Supply voltage DC 24 V (10…30V)
- Connection via plug-in spring-type terminals
- Lockable housing on mounting rail or screw fastening
- plug-in current transformer (Ø 11 mm)

5 Connecting diagram



6 Important Information

DANGER!
Hazardous voltage!
Will cause death or serious injury. Turn off and lock out all power supplying this device before working on this device.

Reference to isolation of input and output as well as relay contacts: Unless otherwise noted, the devices have basic insulation accordingly the measurement insulation voltage of the device. When higher isolation or safe separation is required for the application, this must be ensured due to additional measures.

To use the equipment flawless and safe, transport and store properly, install and start professionally and operate as directed.
Only let persons work with the equipment who are familiar with installation, start and use and who have appropriate qualification corresponding to their function. They must observe the contents of the instruction's manual, the information which are written on the equipment and the relevant security instructions for the setting up and the use of electrical units.
The equipment is built according to DIN / EN and checked and leave the plant according to security in perfect condition. If, in any case the information in the instruction's manual is not sufficient, please contact our company or the responsible representative.
To maintain this condition, you must observe the safety instructions in this instruction manual titled "Important Information". Failure to follow the safety instructions may result in death, personal injury, or property damage to the equipment itself and other equipment and facilities.
Instead of the industrial norms and regulations written in this instruction manual valid for Europe, you must observe out of their geographical scope the valid and relevant regulations of the corresponding country.

7 Installation

- mount on 35 mm mounting rail according to EN 60715
- wall-mount with 2 x screws M4
- connecting wires refer to the connection plan or type plate.

A circuit-breaker or switch must be situated within easy reach of the unit and fused. Installation excess current protection should be ≤ 10 A.

Note the maximum permissible temperature when installing in the control cabinet. There must be sufficient distance to other devices or heat sources. If cooling becomes difficult e.g. the permissible ambient temperature is reduced due to the close proximity of devices with an increased surface temperature or obstruction of the cooling air flow.

8 Commissioning / Detailed Description

The STWA4MH is a measurement transducer. It measures AC up to 60A and has an RS485 interface (Modbus RTU). The measured analog current value is made available as a digital signal and can be read by a PLC, an IPC, or a master computer.

8.1 Electrical connection

The electrical connection is made via a plug-in spring-type terminal. It is designed with two connections per pole, so that the supply voltage Us and the bus line D0-D1 can be passed on comfortably. Each connection can be opened separately by simply pressing the pressure plate. Single wire as well as multi-wire cables can be used.

Attention!
Note supply voltage DC 10…30V!
Observe cable cross-sections and fuse protection!

The conductor to be measured is passed through an opening (Ø 11 mm). In case of small currents, the sensitivity of the current transducer can be increased by looping through the current-carrying conductor several times, e.g. double looping doubles the sensitivity. The measuring range of the STWA4MH is reduced by multiple looping. The measure currents of any size, the STWA4MH is simply looped into the secondary circuit of a large current transformer with a secondary output of 5A (lead the cable through STWA4MH several times).

Attention!
There may be only one conductor through the transformer!

Attention!
Distance bus line to insulated conductor ≥ 3mm!
Distance bus line to non-insulated conductor ≥ 6mm!
Keep a sufficient distance from non-insulated live parts!

Attention!
Sine filters must be used for frequency converters!

8.2 Modbus RTU (RS485)

The STWA4MH has a Modbus RTU interface. The STWA4MH acts as a slave in the bus system. The bus line is connected to the STWA4MH (D0 – D1) via a plug-in spring-type terminal. The spring-type terminal is designed with two connections per pole, so that the bus line can be passed on comfortably and terminating resistor can be mounted at last device in bus.

Each participant on the bus receives a unique address (1…246). After applying the supply voltage Us, the STWA4MH can always be reached at address 247 for 60s. During this time, the Modbus address can be reprogrammed, the status LED flashes (0,5s). Only one STWA4MH may be operated in the bus in this mode. The programmed address should be labelled on the STWA4MH.

The RS485 bus termination must be carried out by mounting a terminating resistor (120 Ohm) by the user.

The actual measured value for current (RMS), average value over 200ms or 1s, and the 50 last measured values can be read out via Modbus RTU. In addition, other parameters such as firmware version or serial number can be read, and the parameters can be set.

See “Modbus” operating manual for register definitions and further information.

Reference to shielding
Bus lines for Modbus RTU (RS485) must be shielded.
The shield must be grounded on one side.

Note bus line:
An RS485 Modbus cable requires a symmetrical, stranded wire pair (for D0-D1).
A cable with a characteristic line resistance between 100 … 120 Ohm must be used.
The maximum cable length is restricted. It is determined due to the cable cross-section, Interference and baud rate.

8.3 Firmware update

Firmware updates ca be installed via Modbus RTU. For this, a separate toot, which is provided by ZIEHL, must be used. The tool and available firmware updates can be found at www.ziehl.com

For further information see instruction manual “PC software”.

9 Error search

9.1 LED does not light up

Check supply voltage for correct polarity and voltage.

9.2 No communication via Modbus RTU

Address or bus parameters not set correctly. If the bus address is not known, disconnect the converter from the supply voltage. After applying the supply voltage, the converter responds to its set address and to address 247 (for 60s).

10 Technical data

Rated supply voltage Us	
Nominal voltage	DC 24 V
Tolerance	DC 10,0 … 30,0 V
Power consumption	< 0,25W
Measuring input: current	
Nominal current (I_{nom})	AC 60 A, sine
Measuring range	AC 0 … 60 A
Measuring principle	RMS
Tolerance (from 1% / I_{nom})	± 0,1 % ± 200 mA
Temperature coefficient	≤ 0,1 % / K
Resolution	1 mA
Measurement time	1 period (40 … 70Hz)
Overload constantly	I_{nom} + 20%
Overload 10s	AC 200A
Measuring input: frequency	
Nominal frequency	50 Hz
Measuring range	40 … 70 Hz
Tolerance (from 1% / I_{nom})	≤ 0,1 Hz
Temperature coefficient	≤ 0,001 Hz / K
Resolution	0,01 Hz
Measuring output: RS485 - Interface	
Baud rate	4800, 9600, 19200, 57600, 115200 Baud
Address	1 - 247
Data bits	8 bits
Stop bits	1, 2 bits
Parity	Even, odd, no
Terminating resistor	120 Ohm (included)
Test conditions	EN 61010-1
Rated impulse voltage	4000 V
Overvoltage category	III
Pollution degree	2
Rated insulation voltage Ui	300 V
On-period	100 %
Insulation test voltage	3 kV, U_{eff}, 50 Hz, 1 min.
EMC-tests	EN 61326-1 industrial Environment
Emission	EN 61326-1; CISPR 11 class B
Immunity	EN 61326-1 industrial Environment
Fast transient disturbances (Burst)	EN 61000-4-4 ±4 kV Pulse 5/50 ns, f = 5 kHz, t = 15 ms, T = 300 ms
Surge immunity test	IEC 61000-4-5 ±2 kV
Electrostatic discharge immunity test	IEC 61000-4-2 ± 6 kV Kontaktentladung, ± 8 kV Luftentladung
Measuring transducer EMC	IEC 61326-2-3:2013

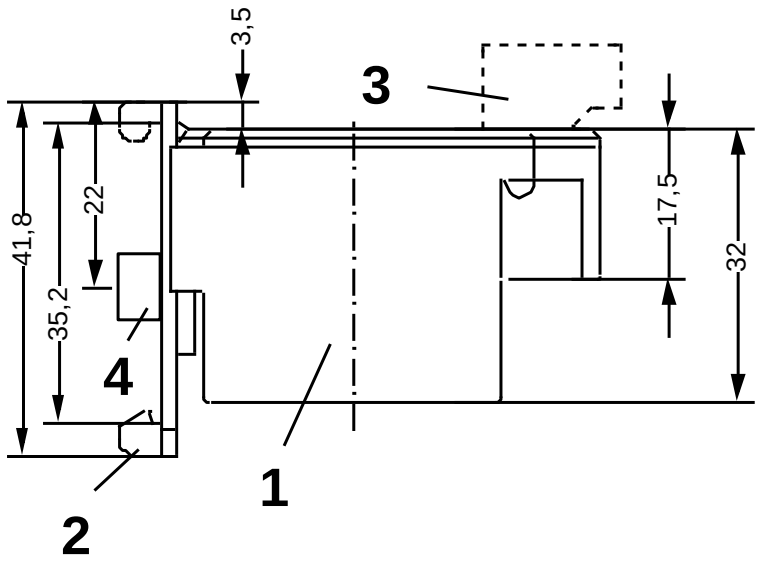
Installation conditions	
Permissible ambient temperature	-20 °C ... +55 °C
Permissible storage temperature	-20 °C …+70 °C
Installation height	< 2000 m above N.N.
Climatic conditions	5-85% rel. h., no condensation
Permissible wiring temperature	-5 °C …+70 °C
Vibration resistance EN 60068-2-6	2 … 13,2 Hz ±1 mm 13,2 ... 100 Hz 1 g 2 … 25 Hz ±1,6 mm 25,0 ... 150 Hz 5 g
Impact resistance	5g 11ms

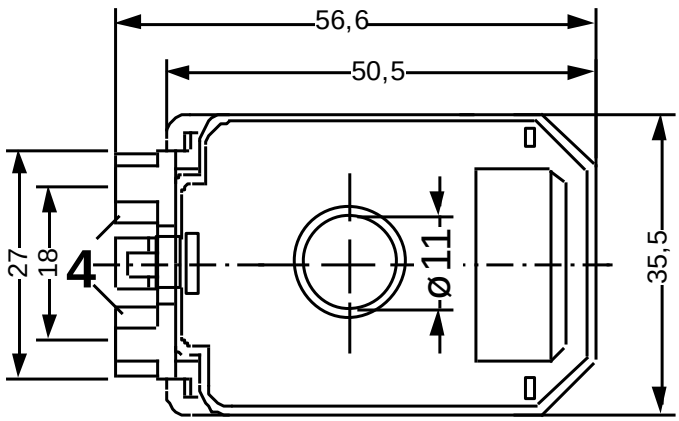
Housing	Type H
Dimensions (h x w x d)	53 x 36 x 56 mm
Max. Ø Conductor	11mm
Terminals	Spring-type terminal, pluggable
Line connection solid wire	1 x 0,2 mm² – 2,5 mm² / AWG 24 - 14
Stranded wire with insulated ferrules	1 x 0,2 mm² – 2,5 mm² / AWG 24 - 14
Stripping length	9 mm
Protection class housing / terminals	IP54 / IP20
Mounting	Snap mounting on 35 mm standard rail EN60715 or M4 screws
Mounting position	various
Weight	app. 90 g

Subject to technical changes

11 Housing Type H

Dimensions in mm





1 – Base
2 – Clip for DIN-rail
3 – Terminal
4 – Surface-mount (M4)

12 Disposal

Disposal should be carried out properly and in an environmentally friendly manner in accordance with legal provisions.
ZIEHL is registered with the EAR Foundation under WEEE no .: DE 49 698 543.