

# Electronic Current-Transformers

## Current-Detection and Measuring-Transducers

### General

Electronic current-transformers are compact and good-valued devices for the detection of a current in a wire.

Electronic current-transformers and current-sensors give a signal, when there is a current in a wire. At STWA1SEH and at current-sensor S1 the response-value

is adjustable. The evaluation of the signals usually is made with digital inputs of PLCs. STWA1LH can directly switch AC-signals up to 230 V / 0,5 A.

Electronic current-transformers as measuring-transducers supply a signal 0-20 mA or 4-20 mA at the output that is proportional to the measured current. The output-signal of the STWA1FH is a frequency, which can be evaluated with digital inputs of PLCs.

2

### Overview

Function	Current-detection yes/no				Measuring-Transducer for AC-current			Current-detection
	Current-sensor S1	STWA1S	STWA1SH	STWA1SEH	STWA1AH	STWA2AH	STWA1FH	
Measuring-input	AC/DC	AC	AC	AC	AC	AC 0-20/ 0-100 A	AC 0-20 A	AC
Response-value	5 A/5-30 A	2 A	2 A	2-10 A	-	-	-	2-20 A
Output	Transistor +/-	Transistor	Transistor	Transistor	DC 0-20 mA	DC 4-20 mA	Transistor 0,5-20 Hz	Triac 0,5 A
Housing	S 1	Ø 34,5 mm	H	H	H	H	H	H

### Functions and Properties

The current-sensor S1 is attached at the outside of the monitored wire, e.g. with a cable-fastener. With help of a hall-sensor it detects AC- and DC-currents in the wire. The response-value depends on the orientation of the sensor to the current (distance, angle). Neighbouring wires can have an impact.

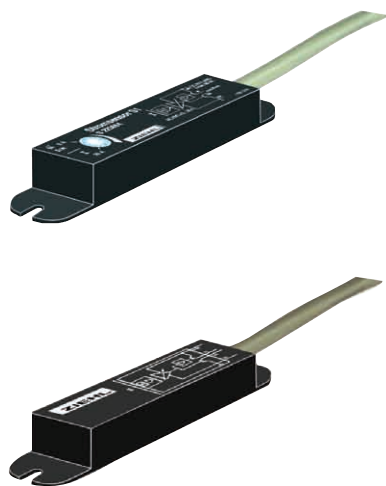
At Electronic current-transformers the monitored wire is pushed through the hole (11 mm) in the transformer. A built-in coil transforms the current into a measuring-signal. This signal is evaluated by the built-in electronics and transduced into the required output-signal. A supply-voltage is not necessary (except STWA1FH and current-sensor S1). The STWA2AH is loop-powered (4-20 mA).

Electronic current-transformers in housing type H can be fixed on an 35 mm DIN-rail or with 2 screws M4. The terminals are pluggable.

# Current Sensor for AC- and DC-Currents

## Put-on sensor with transistor-output

### Current Sensor S1 for AC- und DC-Ströme



The current sensor S1 records the current in a cable with a hall-sensor. At currents of app. 5 A (adjustable version 5-30 A) the transistor-outputs switch and report a current in the monitored cable.

The current sensor can be fixed with a cable fastener (apply to only 1 cable). Thus it can be mounted subsequently without disconnecting the cable.

As supply-voltage DC 24 V are required (e.g. ZIEHL-power-supply NG 4 V).

The current sensor can be connected to ZIEHL current-relays for current detection yes/ no ant to ZIEHL controls for dedusting plants. The connection to a digital input of a PLC also is possible. For easy change from cable to cable, for example at welding devices, a version with a 90° twisted sensor is available for mounting in a tong.

#### Application:

Recording of welding currents (mounting at ground wire) for controlling dedusting plants in combination with ZIEHL-controls type STW.

Recording of the state of a consumer of electricity (on or off or defective).

In general the current sensor S1 is used where the current flow is

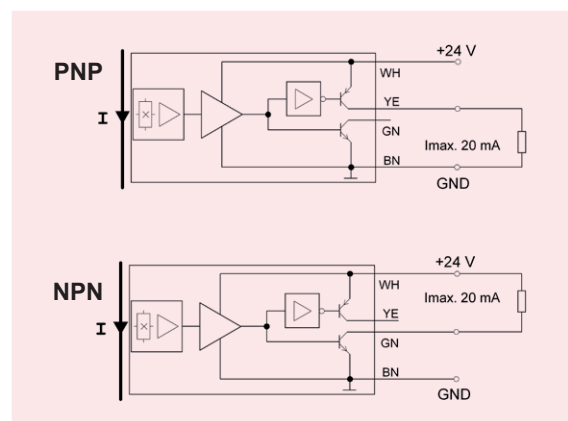
to be detected, with the exact value of the current either known from the power consumption of the connected consumer or does not matter for the evaluation.

For evaluation of measuring data in more than 1 cable, the outputs of several current sensors can be connected in parallel (or-evaluation).

- switching point app. 5 A (option: adjustable 5-30 A)
- LED for current flow
- monitoring of AC and DC currents
- mounting without disconnection of cable possible
- 2 transistor-outputs, switching + and direct connection to a PLC possible
- connection to current-relays ZIEHL type STW
- robust, sealed execution
- overload capacity: unlimited
- test-voltage 2,5 kV

Order-number:

Current Sensor S1, 5 A fixed **S225693**  
Current Sensor S1, 5-30 A adjustable **S225694**



### Technical Data

Supply voltage  $U_s$   
Switching point at  $T_u = 25^\circ\text{C}$   
Hysteresis  
Tolerance  
Repeat accuracy  
Temperature-dependance  
Max. measuring current  
Frequency of measured current

DC 24 V  $\pm 20\%$ , 15 mA  
<AC/DC 5 A (option: adjustable 5-30 A)  
app. 15%  
 $\pm 10\%$   
 $\pm 2\%$   
< 0,06%/K  
unlimited  
0 / 10 ... 400 Hz

Output 1  
Output 2  
On- / off-delay

DC 24 V, + switching, max. 10 mA  
DC 24 V, - switching, max. 10 mA  
app. 300 ms

Rated ambient temperature range  
Dimensions (l x w x h)  
Cable for connection  
Attachmant  
Weight

0...55°C  
75 x 16,5 x 10 mm  
app. 2 m, 4 x 0,34 mm<sup>2</sup>  
e.g. with cable fastener (not included)  
app. 150 g (cable included)

# AC-Electronic Current Transformer STWA1S

## with transistor-output

STWA1S  
Electronic current trans-  
former  
with fixed switching-point



The STWA1S has an integrated electronic with transistor-output. The switching point is 2A. Above app. 2 A the output transistor is switched on (LOW), below app. 1.5 A it is off (HIGH).

The conductor is simply pushed through the transformer. Multiple loops reduce the switching point correspondingly, for instance to 0.5 A with four loops. A supply voltage is not required.

Application: The STWA1S is used where current flow is to be detected, with the exact value of the current either known from the power consumption of the connected consumer or does not

matter for the evaluation.

For simultaneous evaluation of the current flow in several conductors the STWA1S device can be connected in series (AND circuit, pay attention to the voltage drop) or in parallel (OR circuit, pay attention to the leak current).

- isolated transistor-output max. DC 40 V/40 mA
- output can be directly connected to the digital input of a PLC
- integrated diode for reverse voltage protection
- 2-wire-connection, 1 m
- no supply voltage required
- transformer and electronic unit enapsulated in a climate-proof housing
- plug-in current transformer (Ø 11 mm)
- max. overload 100 A continuously, 300 A / 10 s

Order-number

**S225195**

Switching point at  $T_u = 25^\circ\text{C}$   
Switching-back Point  
Repeat accuracy  
Temperature dependence  
Overload cap. continous / 10s

AC 2 A  $\pm 25\%$   
AC 1,5 A  $\pm 25\%$   
 $\pm 5\%$   
< 0,06%/K  
100 A / 300 A

Output voltage/current max.  
Voltage drop (ON)  
Leak current (OFF)  
Switch-on /switch-off delay

DC 40 V / 40 mA  
max. 3 V  
max. 0,6 mA  
app. 50 / 200 ms

nominal frequency/ operating  
range  
error

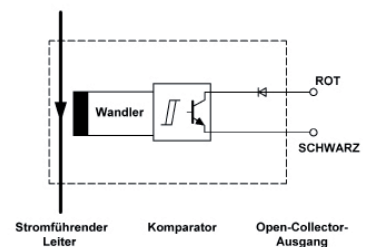
50 Hz/ 30...70 Hz  
 $\leq 1\%/Hz$

rated ambient temperature ran-  
ge

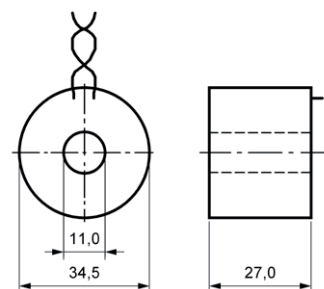
0...55°C

Housing  
Dimensions (Ø x H)  
Diameter for conductor  
Weight

Design S  
34,5 x 27 mm  
11 mm  
app. 60 g



## Dimension illustrations



Electronic current transformer STWA1S

# AC-Electronic Current Transformer STWA1SH

## 2 A, with transistor-output

STWA1SH  
Electronic Current Trans-  
former with  
fixed switching point



The STWA1SH has an integrated electronic with transistor-output. The switching point is 2A. Above app. 2 A the output transistor is switched on below app. 1.5 A it is off.

The conductor is simply pushed through the transformer. Multiple loops reduce the switching point correspondingly, for instance to 0.5 A with four loops. A supply voltage is not required.

**Application:** The STWA1SH is used where current flow is to be detected, with the exact value of the current either known from the power consumption of the connected consumer or does not

matter for the evaluation.

For simultaneous evaluation of the current flow in several conductors the STWA 1 S device can be connected in series (AND circuit, pay attention to the voltage drop) or in parallel (OR circuit, pay attention to the leak current).

- isolated transistor-output max. DC 40 V/40 mA
- output can be directly connected to the digital input of a PLC
- integrated diode for reverse voltage protection
- electrical connection via screwless pluggable terminals
- no supply voltage required
- DIN-rail-mount or with screws
- plug-in current transformer ( $\varnothing$  11 mm)
- max. overload 100 A continuously, 300 A / 10 s

Order-number

**S225550**

Switching point at  $T_u = 25^\circ\text{C}$

Switching-back Point

Repeat accuracy

Temperature dependence

Overload cap. continuous / 10s

AC 2 A  $\pm 25\%$

AC 1,5 A  $\pm 25\%$

$\pm 5\%$

$< 0,5\%/K$

100 A / 300 A

Output voltage/current max.

Voltage drop (ON)

Switch-on /switch-off delay

DC 40 V / 40 mA

max. 1 V

app. 50 / 200 ms

Nominal frequency

operating range

error

50 Hz

30...70 Hz

$\leq 1\%/Hz$

Rated ambient temperature

range

0...50 °C

Housing

Dimensions (h x w x d)

Diameter for conductor

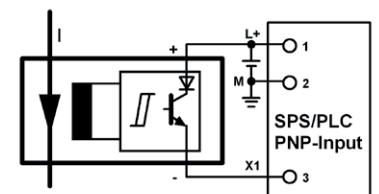
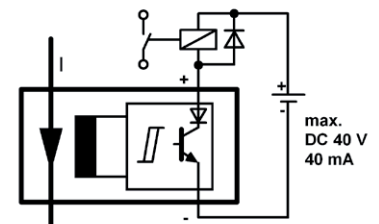
Weight

Design H

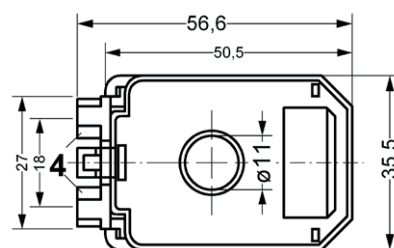
50 x 36 x 56 mm

11 mm

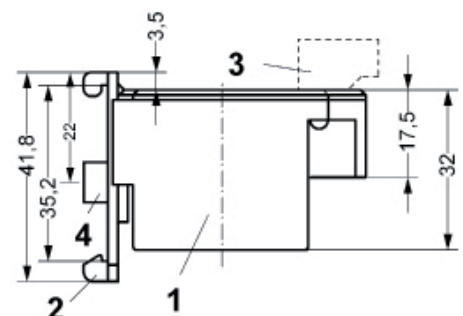
app. 90 g



### Dimension illustrations



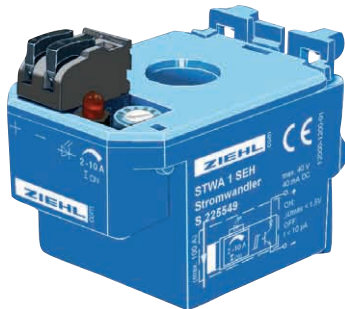
- 1 Housing
- 2 Clip for DIN-rail (removeable)
- 3 Terminal (pluggable)
- 4 Wall-mounting (M4)



# AC-Electronic Current Transformer STWA1SEH

adjustable 2...10 A, with transistor-output

**STWA1SEH**  
Electronic current transformer with fixed switching-point 2...10 A



The STWA1SEH has an integrated electronic with transistor-output.

The switching point is adjustable 2-10A. Above switching-point the output transistor is switched on, below it is off.

The conductor is simply pushed through the transformer. Multiple loops reduce the switching point correspondingly, for instance to 0.5-2,5 A with four loops. A supply voltage is not required.

For monitoring of higher currents, the STWA1SEH is simply looped into the secondary current of big current transformers.

Application: The STWA1SE is used where AC current flow is to be detected in a conductor, e.g. to give a warning if a defined current value is exceeded or not reached, or to switch off a machine or to simply report the current flow.

- adjustable switching limit 2...10 A
- isolated transistor-output max. DC 40 V/40 mA
- output can be directly connected to the digital input of a PLC
- LED for display state of output
- integrated diode for reverse voltage protection
- electrical connection via screwless pluggable terminals
- no supply voltage required
- plug-in current transformer (Ø 11 mm)
- max. overload 100 A continuously, 300 A / 10 s

Order-number

**S225550**

Switching point at  $T_u = 25^\circ\text{C}$   
Hysteresis  
Repeat accuracy  
Temperature dependence  
Overload cap. continuous / 10s

AC 2...10 A  $\pm 25\%$   
5...30 %  
 $\pm 2\%$   
< 0,06%/K  
100 A / 300 A

Output voltage/current max.  
Voltage drop (ON)  
Leak current (OFF)  
Switch-on /switch-off delay

DC 40 V / 40 mA  
max. 3 V  
max. 0,6 mA  
0,2...2s /  $\leq 0,3$  s

nominal frequency  
operating range  
error

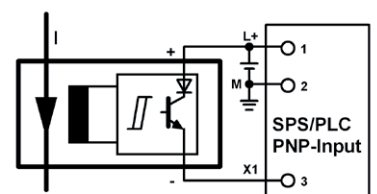
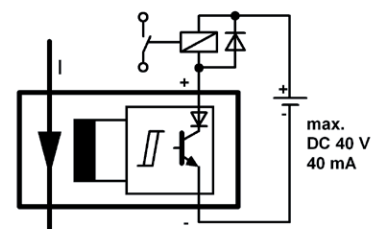
50 Hz  
30...70 Hz  
 $\leq 3\%/Hz$

rated ambient temperature range

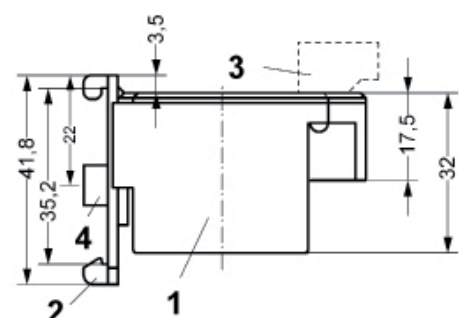
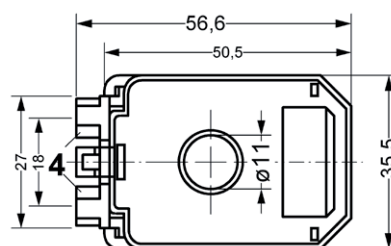
-20...+50°C

Housing  
Dimensions (h x w x d)  
Diameter for conductor  
Weight

Design H  
50 x 36 x 56 mm  
11 mm  
app. 90 g



## Dimension illustrations

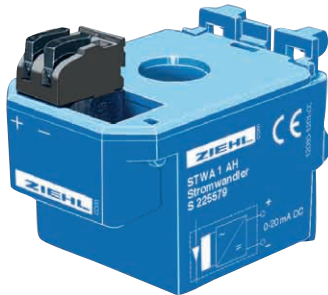


- 1 Housing
- 2 Clip for DIN-rail (removeable)
- 3 Terminal (pluggable)
- 4 Wall-mounting (M4)

# AC-Electronic Current Transducer STWA1AH

## with analog output

STWA1AH  
Electronic current transformer  
AC 0...15 A - DC 0...20 mA



The STWA1AH is a measuring transducer for AC currents 0...15 A. Multiple loops of the conductor through the transformer reduces the measuring range correspondingly (for instance to 0...5 A with three loops).

For the monitoring of currents of any level, the STWA1AH is simply looped into the secondary circuit of a large transformer with secondary 5 A (cable three times through the STWA1AH). Consequently, the output is proportional to the primary current of the transformer, e.g. 0...100 A for a transformer with 100/5 A.

The analog output is isolated. The load should be 50...300  $\Omega$ .

Application: The STWA1AH makes it possible to monitor the value of an AC current. The output signal can be evaluated or displayed with components with analog inputs, e.g. ZIEHL TR210, STW1000/V2 or MINIPAN®.

- current-proportional analog output DC 0...20 mA = AC 0...15 A (isolated)
- electrical connection via screwless pluggable terminals
- no supply voltage required
- DIN-rail-mount or with screws
- plug-in current transformer ( $\varnothing$  11 mm)
- max. overload 100 A continuously, 300 A / 10 s
- plug-in current transformer, easy assembly

Order-number

**S225579**

Monitoring range  
Analog output  
Adjustment time  
Error (from 10% /  $I_{nom}$ )

AC 0 - 15 A  
DC 0 - 20 mA  
< 0,5 s.  
<3% from FS ( at 100  $\Omega$  ), <5% 50...200 $\Omega$   
<7% ..300 $\Omega$

Error with other load  
Temperature coefficient  
Ripple at 50 Hz

+5%/100  $\Omega$ , max. 500  $\Omega$   
< 0,06%/K  
<2,5 % at 300 $\Omega$ , <4,5 % at 100 $\Omega$ , <7,5 % at 50 $\Omega$

Nominal frequency  
Operating range  
Error

50 Hz  
30...400 Hz  
 $\leq$  0,2%/Hz

Overload cap. continuous / 10s

100 A / 300 A

Rated ambient temperature range

0...55°C

Housing

Design H

Dimensions (h x w x d)

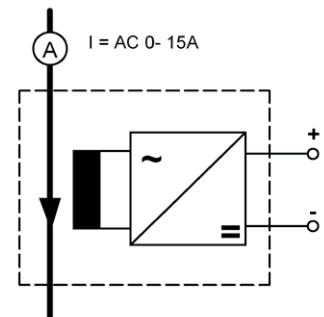
42 x 36 x 56 mm

Diameter for conductor

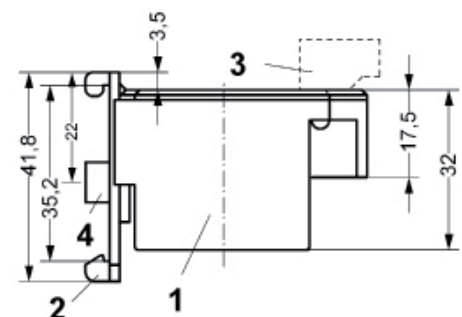
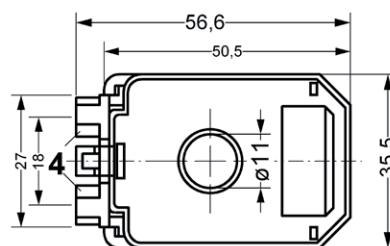
11 mm

Weight

app. 90 g



### Dimension illustrations

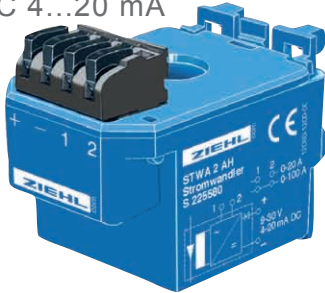


- 1 Housing
- 2 Clip for DIN-rail (removeable)
- 3 Terminal (pluggable)
- 4 Wall-mounting (M4)

# AC-Electroic Current Transducer STWA2AH

with analog output

STWA2AH  
Electronic current trans-  
former  
AC 0...20 A / 0...100 A -  
DC 4...20 mA



The STWA2AH is a measuring transducer for AC currents 0...100 A, divided in 2 ranges 0...20 A and 0...100 A. Multiple loops of the conductor through the transformer reduces the measuring range correspondingly (for instance to 0...5 A with four loops). For the monitoring of currents of any level, the STWA2AH is simply looped into the secondary circuit of a large transformer with secondary 5 A (cable four times through the STWA2AH). Consequently, the output is proportional to the primary current of the transformer, e.g. 0...100 A for a transformer with 100/5 A. The analog output is isolated. The STWA2AH is in 2-wire execution

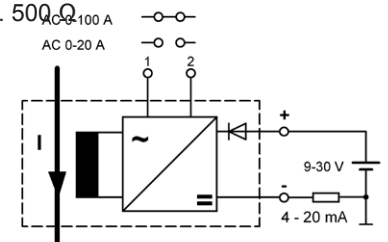
and needs a supply-voltage DC 9...30 V.

**Application:** The STWA " AH makes it possible to monitor the value of an AC current. The output signal can be evaluated or displayed with components with analog inputs, e.g. ZIEHL TR210, STW1000V2 or MINIPAN®.

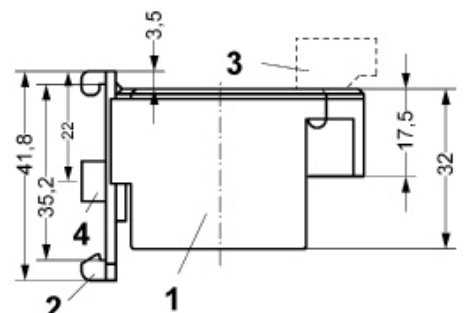
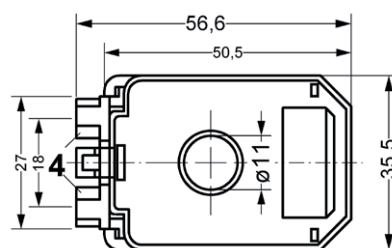
- current-proportional analog output DC 4...20 mA = AC 0...20 / 0...100 A (isolated)
- electrical connection via screwless pluggable terminals
- supply voltage DC 9...30 V (2-wire)
- DIN-rail-mount or with screws
- plug-in current transformer (Ø 11 mm)
- max. overload 100 A continuously, 300 A / 10 s

Order-number **S225580**

Supply voltage	DC 9...30 V (2-wire), depending on load
Monitoring ranges	AC 0 - 20 / 0...100 A
Analog output	DC 4 - 20 mA (max. 32 mA)
Adjustment time	< 0,5 s.
Error (of scale, above 10% / I rated)	<5% (50 - 300 Ω)
Error with other load	+5%/100 Ω, max. 500 Ω
Temperature coefficient	< 0,06%/K
Nominal frequency	50 Hz
Operating range	30...400 Hz
Error	≤ 0,2%/Hz
Overload cap. continous / 10s	100 A / 300 A
Rated ambient temperature range	0...55°C
Housing	Design H
Dimensions (h x w x d)	42 x 36 x 56 mm
Diameter for conductor	11 mm
Weight	app. 90 g



## Dimension illustrations

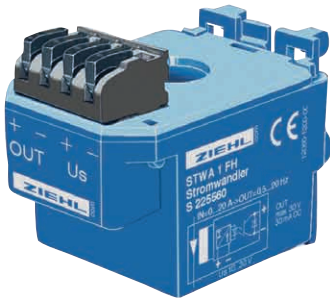


- 1 Housing
- 2 Clip for DIN-rail (removeable)
- 3 Terminal (pluggable)
- 4 Wall-mounting (M4)

# AC-Electronic Current Transducer STWA1FH

## with frequency output

STWA1FH  
Electronic Current Trans-  
former with current pro-  
portional frequency output  
0...20 A - 0,5...20 Hz



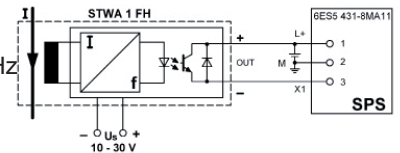
The STWA1FH provides a frequency output with 0.5...20 Hz which corresponds to a current flow of AC 0 - 20 A through the transformer. Multiple loops of the conductor through the transformer reduce the current range correspondingly (e.g. with fourfold looping-through 0 - 5 A correspond to 0.5...20 Hz). For the monitoring of high currents, the STWA1FH is simply looped in the secondary circuit of a large current transformer. Consequently, the frequency output is proportional to the primary current of the transformer, e.g. 0 - 100 A for a transformer with 100/5A (cable four times through the STWA1F). The offset of 0.5 Hz at the beginning of the transducing range is for technical reasons. During evaluation, it can be taken into account.

Application: The STWA1FH enables moderately priced detection of the value of an AC-current with a DIGITAL INPUT of a PLC. Costly analogue inputs are no longer necessary.

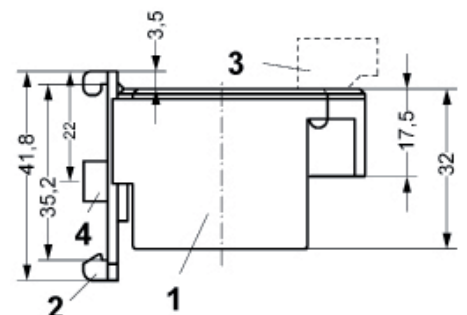
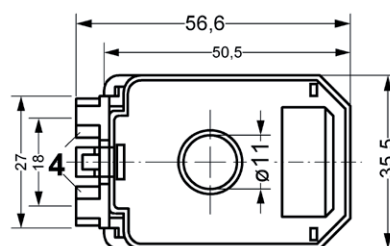
The STWA1FH is particularly suitable to evaluate the current in electric motors in machines of i.e. saws. The feed can be regulated dependent from the load of the motor of the saw.

- current-proportional frequency output 0.5 - 20 Hz = AC 0 - 20 A
- output isolated, max DC 30 V/30 mA
- output frequency limited to 30 Hz
- output can be connected to the digital input of a PLC
- incorporated reverse voltage protection diode
- electrical connection via screwless pluggable terminals
- supply voltage DC 10...30 V
- DIN-rail-mount or with screws  
plug-in current transformer (Ø 11 mm)
- Options:
  - currents up to 60 A
  - other frequencies

Power supply $U_s$	DC 10 - 30 V
Monitoring range	AC 0...20 A
Output	0,5...20 Hz
Switching voltage	max. DC 30 V
Switching current min/max	DC 1 / 30 mA
Adjustment time	< 0,5 s.
Error (of scale, above 10% / $I_{rated}$ )	≤ 3%
Temperature coefficient	< 0,06%/K
Nominal frequency/operating range	50 Hz/50...400 Hz
Error	≤ 0,2%/Hz
Overload capacity cont./10 s	500 V 0...55°C
Testing voltage to supply voltage	Design H
max. ambient temperature	42 x 36 x 56 mm 11 mm app. 90 g
Housing	



### Dimension illustrations

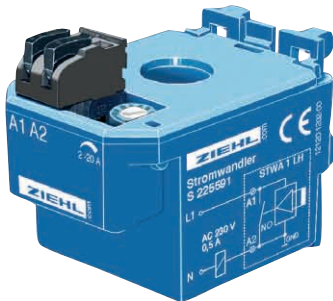


- 1 Housing
- 2 Clip for DIN-rail (removeable)
- 3 Terminal (pluggable)
- 4 Wall-mounting (M4)

# AC-Electronic Current Transformer STWA1LH

with output AC 230 V / 0,5 A

## STWA1LH



The electronic current transformer STWA1LH monitors alternating currents 2 ... 20 A. For lower currents, the monitored wire can be led multiple times through the transformer. Used in the secondary circuit of transformers (e.g. 100/5 A), it is possible to monitor higher currents.

The STWA1LH directly switches alternating voltage up to AC 230 V / 0,5 A.

It is available with output (contactless) normally opened (standard) and normally closed (option).

Version with normally closed contact:

- Control of ventilations or suction fans
- Control of valves at suction plants in the wood-working industry

Version with break contact:

- Load decrease (Disconnection or locking of consumers)
- Monitoring of motor current

Features

- Monitoring of alternating current up to 20 A
- Response value adjustable 2 ... 20 A
- Two-wire contact (voltage supply through output)
- Operating voltage AC 24 ... 230 V
- Transformer,  $\varnothing$  11 mm
- Space-saving, easy mounting
- Potential separation between monitored current circuit and switch output

Order-numbers:

**normally-open contact (no)**

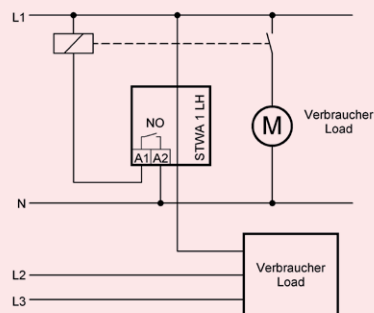
**S225591**

normally-closed contact (nc)

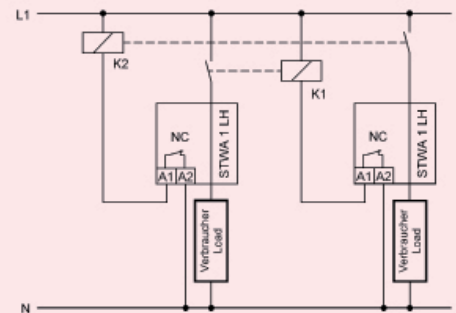
S225590

(Option)

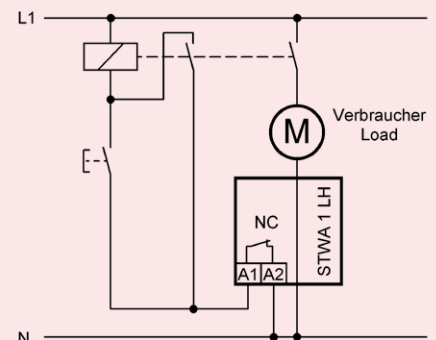
### ① Automatic switching-on of additional consumers



### ② Load decrease

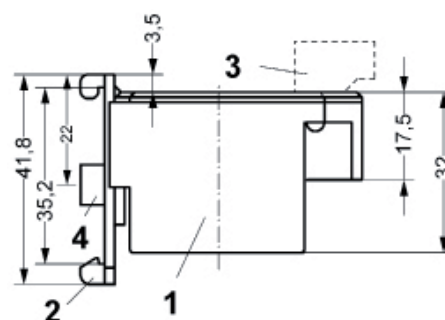
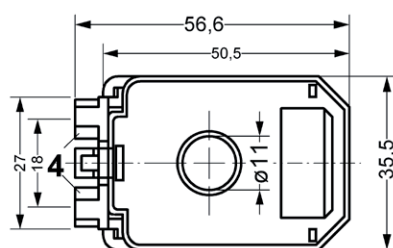


### ③ Monitoring of over-current



## Technical Data STWA1LH

Operating voltage	Operating voltage	AC 24...240 V
	Operating voltage tolerance	± 10 %
	Frequency	60/60 Hz
	Overvoltage category	III (EC 60 664)
Current measuring range	Current measuring range	AC 2...20 A For lower currents, the monitored wire can be led multiple times through the transformer
	Maximum permanent current	AC 40 A
	Maximum excess current	AC 100 A for 60 s
Output	Maximum output current	AC 500 mA
	Minimum output current	ca. 10 mA
	Voltage drop	≤ AC 8 V
	Leakage current	≤ AC 2 mA at 230 V
	Switch	solid state
	Electromagnetic compatibility	EN 61000-6-2 and EN 61 000-6-4
	Adjustment accuracy	± 15 %
	Repeat accuracy	± 5 %
	Hysteresis	ca. 10 % of value
	Release time	On = <100 ms...800 ms Off = app. 1,5 s
	Design	housing H
	dimensions (H x W x D)	50 x 36 x 56 mm
	Fitting position	any
	max. ambient temperature range	0...55 °C
	storage temperature	- 20...+70 °C
	Attachment	35 mm standard rails conform to EN 50 022 or M 4 screws
	Protection	IP 20
Weight	approx. 90 g	



- 1 Housing
- 2 Clip for DIN-rail (removeable)
- 3 Terminal (pluggable)
- 4 Wall-mounting (M4)