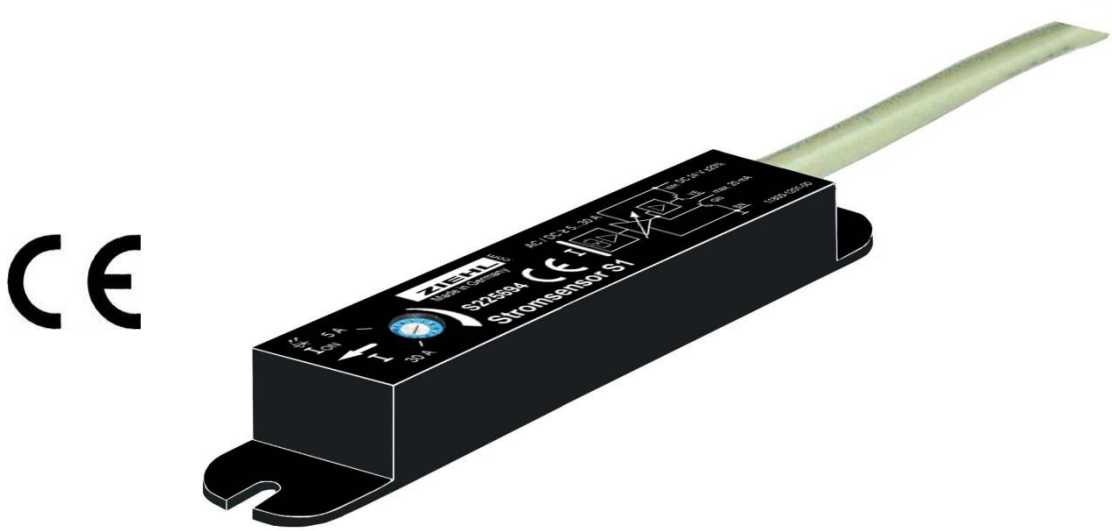
ZIEHL industrie – elektronik GmbH + Co KG
Daimlerstr.13, 74523 Schwäbisch Hall, Germany
+ 49 791 504-0, info@ziehl.de, www.ziehl.de



# Operating Manual S1 adjustable

updated: 2019-08-08/Fu

**- Detection of current flow in a conductor**




## Table of contents

# 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 and controls


# 3 Application and short description

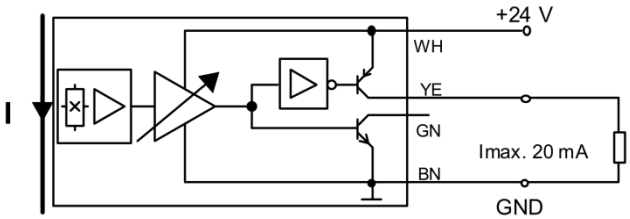
Recording of welding currents (mounting at ground wire) for controlling dedusting plants in combination with ZIEHL-controls type STW.
Recording the state of a consumer of electricity (on or off or defective).
In general, the current-sensor S1 is used where the current-flow is to be detected, with the 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, these outputs of several current-sensors can be connected in parallel (OR-evaluation).

# 4 Overview of functions

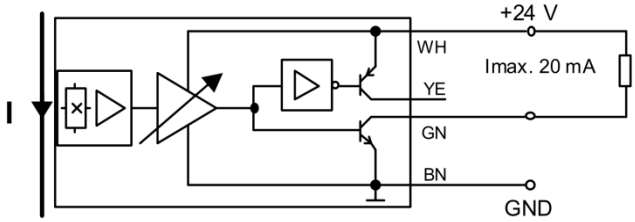
- switching point app. 5 A (option: adjustable 5-30 A)
- monitoring of AC and DC currents
- LED for current flow
- mounting without disconnection of cable possible
- 2 transistor-outputs, switching + and -, direct connection to a PLC possible
- connection to current-relays ZIEHL type STW
- robust, sealed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

## 5 Connecting diagram

**Connection Plan for output PNP**
Switching Plus, Output 1

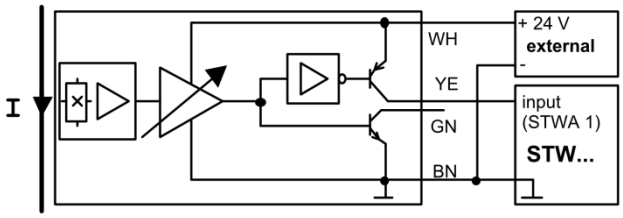



**Connection Plan for output NPN**
Switching Minus, Output 2




- Output 1 and output 2 can be connected at the same time
- Load of outputs max. 20 mA
- The output in non-short-circuit-proof, short circuit max. 3s
- When a current is applied> the adjusted limit, the yellow LED lights and the outputs switches

**Connection to ZIEHL current-relays (current on/off) for current recognition**
(instead of current transformer STWA1)




## 6 Detailed Description

The current sensor S1 records the current in a cable with a hall sensor. At currents of app. 5-30 A) the transistor-outputs switch and report a current in the monitored cable. Simultaneously the yellow LED is on. The current sensor can be fixed with a cable fastener with cable in parallel to the housing (apply to 1 phase only). Thus, it can be mounted subsequently without disconnecting the cable.
As supply-voltage DC 24 V / 12 ... 32 mA are required.

## 7 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.**

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 instructions 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 instructions 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.

## 8 Installation

The Current Sensor S1 can be mounted on the conductor with 2 screws M3, e.g. at a current bar, or with a cable fastener.
Make sure that the conductor is closely led lengthwise along the side of the housing with the latches.
The direction of the current is not relevant.
The sensitivity depends on the distance from the cable, its diameter and the thickness of the insulation.
To avoid crosstalk from neighbouring cables has to be sufficient clearance.
The necessary clearance depends on the current in the neighbouring cable, e.g.:
at 10 A: >25 mm, at 20 A: >50 mm, at 40 A: >80 mm.

## 9 Commissioning

Connect Current Sensor S1 according to Connection Plan.

## 10 Error search

Output does **not switch on**

- Check adjusted limit
- Distance from monitored cable is too high
- no current trough monitored cable or current too low.
- supply-voltage (24 V DC) is missing
- Sensor misplaced (put on the cable and in parallel)

Output does **not switch off**

- Check adjusted limit
- crosstalk from a current is a neighbouring conductor
- sensor is in a magnetic field
- output has internal short-circuit (defective)

## 11 Technical data

| | |
|---|---|
| Rated supply voltage Us | DC 24 V |
| Tolerance | 0.8 … 1.2 Us |
| current consumption | max. 12 mA + max. 20 mA per output |
| monitoring function | current monitoring |
| Limit at Tu = 25°C | AC/DC > 5…30 A |
| Tolerance | ± 20 % |
| Repeat accuracy | ± 2 % |
| Temperature dependence | Typical < ±0.2 A / K<br>Maximal < ±0.45 A / K |
| Frequency of measured current | DC, AC 10 ... 400 Hz |
| Overload capacity, continuously | 500 A |
| Overload capacity, max. 1 minute | 1000 A |
| Switching-delay (on / off) | ca. 300 ms |
| Indication of the switching | LED yellow |
| Output PNP (Switching Plus) | Open collector |
| output current | ≤ 20 mA |
| short circuit | ≤ 3 s |
| Output NPN (Switching Minus) | Open collector |
| output current | ≤ 20 mA |
| short circuit | ≤ 3 s |

| | |
|---|---|
| electrical Safety | IEC/EN 61010-1 |
| Rated insulation voltage Ui | 300 V |
| Rated impulse voltage Uimp | 4000 V |
| Overvoltage category | CAT III |
| Insulation material group I | CTI = 600 |
| Pollution degree | 3 |
| Reinforced insulation | Housing – input/output |
| Insulation test voltage type test | AC 3510 V / 50 Hz 60 s |
| EMC emitted interference EN 61326 | |
| RF radiated – EN 55011 | Class B |
| RF conducted – EN 55011 | Class B |
| EMC-tests EN 61326 | |
| ESD IEC/EN 61000-4-2 | ±8 kV air |
| RF radiated IEC/EN 61000-4-3 | 10V/m |
| Burst IEC/EN 61000-4-4 | 2 kV |
| Surge IEC/EN 61000-4-5 | ±1 kV |
| RF conducted IEC/EN 61000-4-6 | 3V/m |
| Environmental conditions | |
| temperature range | |
| - operation | 0 °C … + 50 °C |
| - transport | - 25 °C … + 55 °C |
| - storage | - 25 °C … + 55 °C (70°C max. 24 h) |
| Altitude | Up to 2000 m NN |
| climatic conditions | |
| - environmental Class EN60721-3-3 | 3K3 |
| Humidity | |
| - Damp heat (IEC60068-2-30) | 55 °C and 93% r.H. |
| Vibration | |
| - Operation (IEC 60255-21-1) IEC 60068-2-6 | Class 2 |
| - Transport (IEC 60255-21-1) IEC 60068-2-6 | Class 1 |
| - Seismic IEC 60255-21-3) | Class 1 |
| Shock | |
| - Operation (IEC 60255-21-2) | Class 2 |
| - Transport (IEC 60255-21-2) | Class 1 |
| Housing | Design S1 |
| Dimensions (width x height x depth) | 16.5 x 11 x 102 mm |
| Housing material | PC |
| Fire-protection class | UL 94 V-0 |
| Protection class housing | IP64 |
| Installation | with 2 cable fasteners (included)<br>or with 2x screws M3 |
| installation position | in accordance with current direction |
| Weight | approx. 0.150 kg including cable |
| Line connection | LiYY 4 x 0.34 $mm^2$ |
| cable length | 2000 mm |
| ferrules | 8 mm |

**Subject to technical changes**

## 12 Disposal

Disposal should be carried out properly and in an environmentally friendly manner in accordance with legal provisions.

## 13 Housing Type S1

Dimensions in mm