

Operating Manual SolarYes AC

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

- Function monitoring of solar systems, failure monitoring of inverters

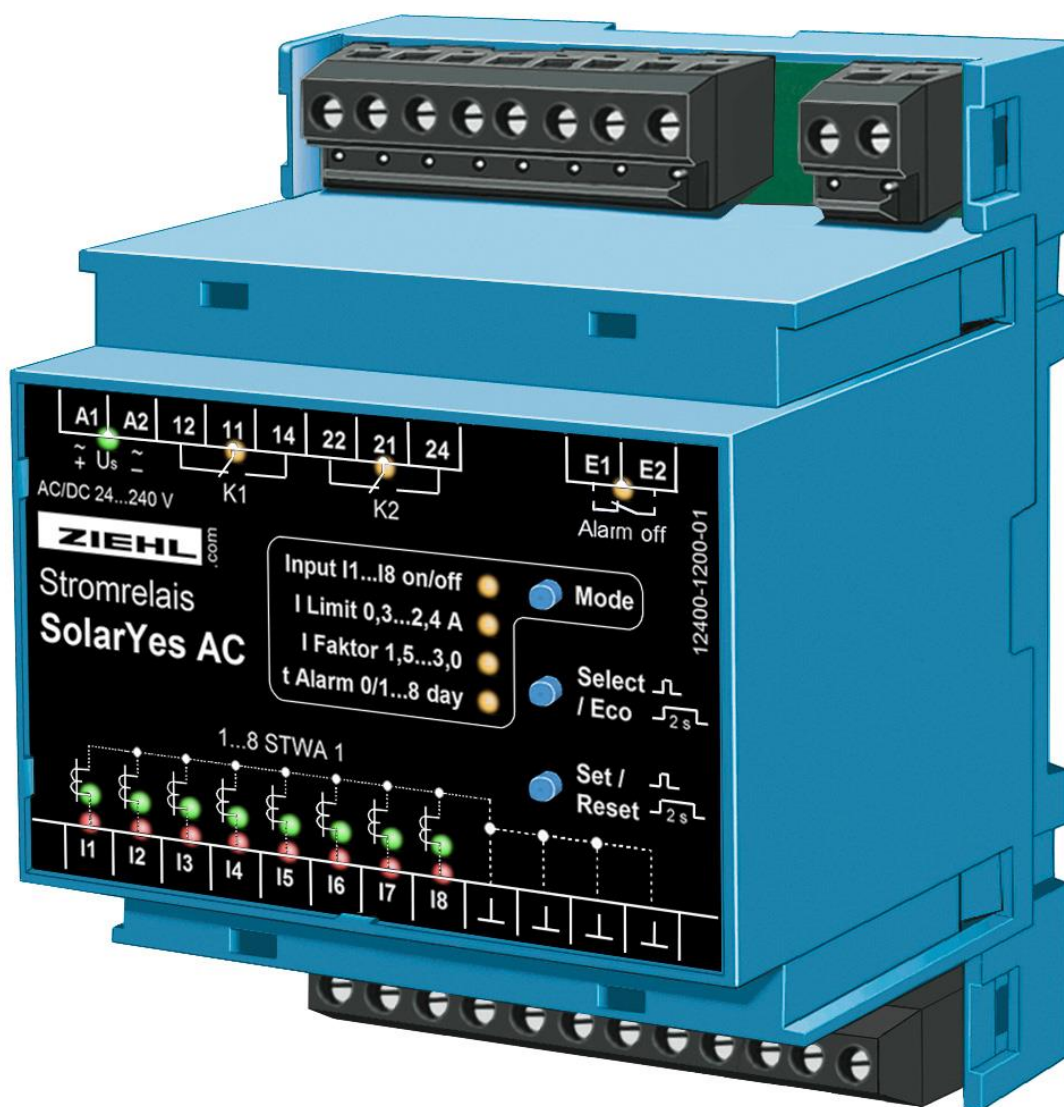


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1 General Notes

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 and controls

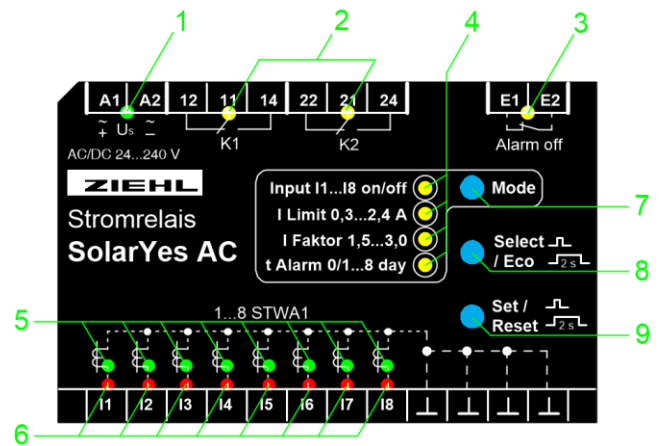
2.1 Green LED Mains	
on	Normal operation
off	Eco mode (power saving mode)

2.2 Yellow LED Relay Status	
on	Relay is energized, contacts 11/14 (K1) or 21/24 (K2) are closed
off	Relay has de-energized, contacts 11/12 (K1) or 21/22 (K2) are closed

2.3 Yellow LED Alarm off	
on	External jumper at E1/E2, the alarm function is deactivated (relays do not switch in case of alarm)

2.4 Yellow LED Mode	
on	Mode activated, the LEDs [5] and [6] indicate the value of the respective mode
flashes	Parameterization mode activated

2.5 Green LED input current transformer I1 ... I8		
Mode:	LED on	LED off
Input I1...I8 on/off	Input switched on	Input switched off
I Limit 0,3...2,4 A	Display of the set current threshold (I limit)	
I Faktor 1,5...3,0	Display of the factor for the I limit: Limit = I Limit * IFactor	
t Alarm 0/1...8 day	Display of the set delay time	No delay time (test operation)



2.6 Red LED Input current transformer I1 ... I8			
Mode:	LED on	LED flashes slowly	LED flashes quickly
Input I1...I8 on/off	Alarm message, the set current limit has been undershot for the set delay time	The set current limit has been undershot	The input is selected for parameterization
I Limit 0,3...2,4 A	The I Limit set for this input is displayed (green LEDs)		The input is selected for parameterization
I Factor 1,5...3,0			
t Alarm 0/1...8 day	Display of the number of days not fed in		

2.7 Button Mode	
Press briefly	Switch to the next mode (mode display by yellow LEDs [4])

2.8 Button Mode	
Press briefly	Jump to parameterization mode (corresponding yellow LED flashes)
Actuation for 2s	<p>Eco mode, power saving mode on/off</p> <p><u>Eco off:</u> Mains LED lights up.</p> <p><u>Eco on:</u> Mains LED flashes, all other LEDs turn off</p> <p>Pressing any button will interrupt Eco mode and turn the LEDs back on. The device can be operated normally.</p> <p>60 s after the last button actuation, the SolarYes switches back to Eco mode.</p> <p><u>Exception in test operation (t alarm = 0) and in case of alarm:</u> Device does not go into Eco mode</p>

2.9 Button Set / Reset	
Mode:	
Input I1...I8 on/off	Switching the current transformer input on/off (green LED on/off) selected input flashes red
I Limit 0,3...2,4 A	Increase I limit selected input flashes red
I Factor 1,5...3,0	Increase I factor
t Alarm 0/1...8 day	Increase t alarm Button actuation for $\geq 2s$ Reset for number of days not fed in (= 0)

3 Factory setting

Program 1

“Automatic configuration” restarts

Factor for current threshold = 2.0 (mode [I factor 1.5 ... 3.0])

Delay time = 1 day (mode [t alarm 0/1 ... 8 day])

4 Selection of the program number

3 programs can be selected ex works. With the help of these programs, the relay function of the SolarYes can be changed.

	Relay K1	Relay K2
Program 1	Quiescent current	Quiescent current
Program 2	Quiescent current	Working current
Program 3	Working current	Working current

Quiescent current:

Relay energized in normal operation (contacts 11-14 closed). De-energizes when an error is detected (11-12 closed) or when the control voltage of the device fails (self-monitoring). When the device is switched on, an alarm is signaled until the relay has energized.

Working current:

Relay energizes in the case of an error. No alarm in case of failure of the control voltage or the device.

Set program:

- Switch off the control voltage
- Press and hold the Set button
- Switch on the control voltage when the Set button is pressed
- After 10s, the green mains LED flashes quickly, release the Set button
- The program can be set with the Select button (LED I1 .. I3 = Pr1 .. Pr3, LED I8 = factory reset)

Press Set button, program is saved, device starts.

5 Application and short description

The SolarYes monitors outputs of inverters in solar systems. The output relays (2 potential-free contacts) switch when no current has flowed through one of up to 8 monitored lines for 24 hours. This detects and reports the failure of a feed-in (inverter, fuse). The operator can immediately initiate the repair and thus reduce costly downtime.

With the SolarYes, a simple, manageable and cost-effective way is available to protect solar systems from feed-in failures.

The device is installed in the control cabinet or distribution board. The current is detected without contact with simple, robust converters. These are pushed over the output lines of the inverters at any desired point, for example in the region of the fuses. A subsequent installation is easily possible.

The minimum currents occurring in the course of 24 hours (small reactive currents caused by filter capacitors can flow at night) are automatically determined and hidden during the evaluation.

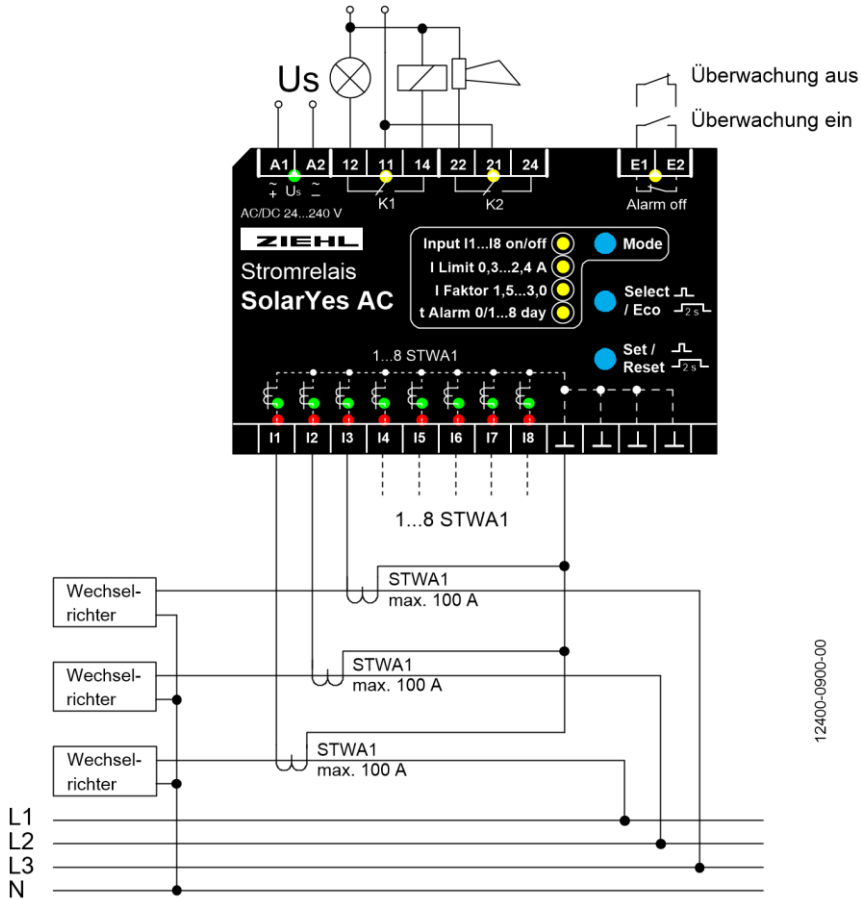
Response values from 0.3A enable the detection of even small currents. They can be further reduced by looping the conductor through the current transformer (\varnothing 11 mm) several times. If false alarms occur, e.g. snow on the modules, the evaluation interval can be extended up to 8 days or the alarm can be suppressed with a switch.

For example, warning lights or acoustic signal generators can be connected to the two output relays. Connection to an alarm system or other evaluation and monitoring units is also possible.

6 Overview of functions

- 8 inputs for STWA1(H) current transformer
- 2 alarms / relays
- 4 LEDs for display mode
- 8 LEDs for inputs
- 8 LEDs for alarms
- 2 LEDs for relays
- 1 LED for mains voltage
- 1 LED for "Alarm off"
- Automatic Calibration
- Power-saving mode
- Input "Monitoring off"
- Control voltage AC/DC 24-240V

7 Connecting diagram



Attention! **When using STWA1H current transformers instead of STWA1:**

- Pay attention to correct wiring of the connections

$$\text{STWA1H (+)} = I1 \dots I8$$

$$\text{STWA1H (-)} = \perp$$

- Red LED in STWA1H has no function and remains dark

8 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.



Attention!

If the working current version function is programmed for all relays, a failure of the control voltage or the device will not be detected. When used as a monitoring device, the operator must ensure that this error is detected by regular functional tests. We recommend programming at least one relay in quiescent current version and evaluating it accordingly.



Attention! Universal power supply

The device have a universal power supply, that is suitable for DC- and AC-voltages. Before connecting the device to supply-voltage make sure that the connected voltage corresponds with the voltage on the lateral type on the 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 VDE/EN/IEC 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.

In order to maintain this status, you must observe the safety regulations entitled "caution" in this operating manual. Failures to follow the safety regulations can result in death, personal injury or property damage to the device itself and to other devices and facilities.

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.

9 Installation

- mount on 35 mm mounting rail according to EN 60715
- wall-mount with 3 x screws M4
- connecting wires refer to the connection plan to prevent miss-operation and malfunction.



Attention!

Observe the maximum temperature permissible when installing in switching cabinet. Make sure sufficient space to other equipment or heat sources. If the cooling becomes more difficult e.g. through close proximity of apparatus with elevated surface temperature or hindrance of the cooling air, the tolerable environmental temperature is diminishing.

10 Commissioning

10.1 Switch on the device

Switch on the supply voltage,

- All LEDs and indicators light up (1s)
- On initial commissioning, the “Automatic Configuration” starts (see below)

10.2 Automatic configuration

For easy commissioning of the device, an automatic configuration can be carried out. In doing so, the device determines over 24 hours which inputs are occupied and the minimum currents (at night), which are suppressed in later operation. Depending on the model of the inverter, reactive currents caused by filter capacitors can flow at night.

The automatic configuration starts when the device is switched on for the first time and ends after 24 hours of continuous operation. A manual termination or restart is carried out with a simultaneous actuation of the buttons Mode and Set/Reset for ≥ 2 s.

The operation of the automatic configuration is signaled by a running light of the red LEDs (current transformer inputs I1...I8).

After the automatic configuration is completed, the device is ready for operation.

It is recommended to check whether all occupied inputs have been detected. If this is not the case, it must be checked whether there is a wiring fault or a malfunction of the system, e.g. a defective fuse.

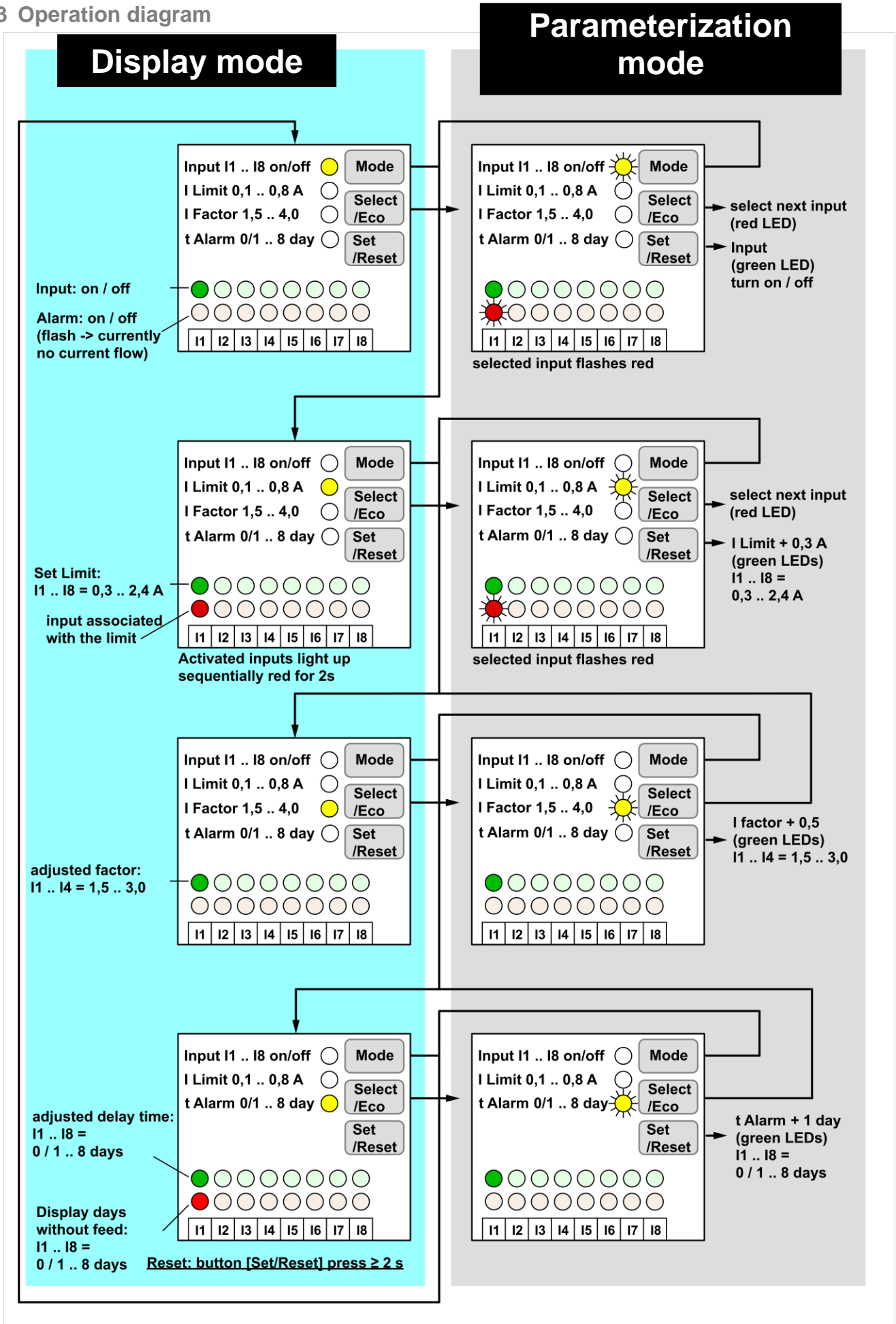
If the automatic configuration is interrupted by switching off the control voltage, it will be restarted at the next switch-on. This ensures that the automatic configuration is carried out automatically when the system is completely installed, even if the device was previously switched on for testing.

Note: If during the night hours (darkness, no feed-in) a connected input does not flash red (in mode [Input I1...I8]), a higher setting must be selected under mode [I factor 1.5...3.0].

If an automatic configuration fails or is not desired, the parameters can also be set or changed individually on the device.

The following points describe this process!

10.3 Operation diagram



10.4 Parameterize mode [Input I1 ... I8 on/off]

Switching current inputs I1 ... I8 on/off

Button	Function
Press Mode so often until ...	<ul style="list-style-type: none"> Yellow LED mode [Input I1 ... I8 on/off] lights up ⇒ Status display current inputs (green LEDs I1 ... I8), red LEDs flash when current threshold is undershot and light up in case of alarm
Press Select and select input	<ul style="list-style-type: none"> Yellow LED Mode [Input I1 ... I8 on/off] flashes Selection of the current input (I1 ... I8) Red LED of the selected input flashes quickly
Press Set	<ul style="list-style-type: none"> Green LED on, current input switched on Green LED off, current input switched off
Press Select	<ul style="list-style-type: none"> Selection of the next current input After current input I8, there is a return to normal operation
≥ 10s no button	<ul style="list-style-type: none"> Parameterization is terminated Yellow LED of mode [Input I1 ... I8 on/off] lights up

Normal operation: Display which inputs are active (green LEDs).

- Current flow interrupted: Red LEDs flash, no current was measured in the affected channel for the set time, a red LED lights up and the relays switch.

For example, if one or more channels do not indicate any current flow (and the inverters themselves do not show any error) when there is a thick snow cover on the modules (despite solar radiation), it is recommended to extend the delay time (up to 8 days). This avoids false alarms.

If an inverter fails, the relevant input can simply be deactivated and the device can continue to be used for monitoring the remaining inverters.

It is recommended to select this mode in normal operation!

10.5 Parameterize mode [I Limit 0.3 ... 2.4A]

Current threshold from which a valid feed-in is detected

Button	Function
Press Mode so often until ...	<ul style="list-style-type: none"> Yellow LED mode [I Limit 0.3 ... 2.4A] lights up ⇒ Status display of the set current threshold (green LEDs I1 ... I8) ⇒ If all red LEDs (I1...I8) light up, the same current limit is set for all inputs
Press Select	<ul style="list-style-type: none"> Yellow led mode [I Limit 0.3 ... 2.4A] flashes Red LED of the selected input flashes quickly If all red LEDs (I1...I8) flash, the same current limit can be set for all inputs
Press Set	<ul style="list-style-type: none"> Setting the current threshold ⇒ Green LEDs I1 ... I8 = 0.3 ... 2.4A (I1=0.3 / I2=0.6 / I3=0.9 / I4=1.2 / I5=1.5 / I6=1.8 / I7=2.1 / I8=2.4A)
Press Select	<ul style="list-style-type: none"> Selection of the next current input After current input I1...I8, there is a return to normal operation
≥ 10s no button	<ul style="list-style-type: none"> Parameterization is terminated Yellow LED of mode [I Limit 0.3 ... 2.4A] lights up

This mode is used to set the current threshold at which a current flow is detected. It is recommended to set the current value at night so that no input detects a current. To do this, set the smallest possible value and check in the mode [Input I1 ... I8 on/off]. If necessary, increase the current threshold and repeat until no more current is detected in any channel. This ensures that a possible current consumption of the inverters is hidden in the idle state and that the function of the inverters is already detected at the lowest possible solar radiation.

Due to tolerances of the current transformers STWA1, especially at very low currents, the response value of the individual channels may differ. However, this is irrelevant for the correct function.

This mode has no function in normal operation.

After 5 minutes without pressing the button, the mode [Input I1...I8 on/off] is changed.

10.6 Parameterize mode [I factor 1.5...3.0]

Factor by which the minimum current is multiplied to determine the value above which a current flow is detected. This mode has no function in normal operation.

After 5 minutes without pressing the button, the mode [Input I1...I8 on/off] is changed.

ATTENTION! Please note: The currents are only evaluated up to AC 4.2A. Larger currents are automatically recognized as a valid feed-in.

Button	Function
Press Mode so often until ...	<ul style="list-style-type: none"> Yellow LED mode [I factor 1.5...3.0] lights up ⇒ Status display of the set factor, Green LEDs I1 ... I4 = I factor 1.5...3.0
Press Select	<ul style="list-style-type: none"> Yellow LED mode [I factor 1.5...3.0] flashes
Press Set	<ul style="list-style-type: none"> Setting the I factor ⇒ Green LEDs I1 ... I4 = I factor 1.5...3.0 (I1=1.5 / I2=2.0 / I3=2.5 / I4=3.0)
Press Select	<ul style="list-style-type: none"> Storage of the set I factor Yellow LED of the mode [I factor 1.5...3.0] lights up
≥ 10s no button	<ul style="list-style-type: none"> Parameterization is terminated Yellow LED of the mode [I factor 1.5...3.0] lights up

10.7 Parameterize mode [t alarm 0/1 ... 8 day]

Evaluation time after how many days without current flow an alarm is reported.

Button	Function
Press Mode so often until ...	<ul style="list-style-type: none"> Yellow LED mode [t alarm 0/1 ... 8 day] lights up ⇒ Green LEDs = status display of the set delay time ⇒ Red LEDs = currently not fed in days (reset with button "Set/Reset" ≥ 2s)
Press Select	<ul style="list-style-type: none"> Yellow LED mode [t alarm 0/1 ... 8 day] flashes
Press Set	<ul style="list-style-type: none"> Setting the delay time ⇒ Green LED I1 ... I8 = 1 ... 8 days (0 = without delay time -> setup operation / test operation)
Press Select	<ul style="list-style-type: none"> Storage of the set delay time Yellow LED of the mode [I factor 1.5...3.0] lights up
≥ 10s no button	<ul style="list-style-type: none"> Parameterization is terminated Yellow LED of mode [t Alarm 0/1 ... 8 day] lights up

In this mode, the evaluation interval can be extended if required, e.g. in winter when the modules are covered with snow, thus reducing false alarms.

Don't forget: If the weather improves, reset to 1 day.

In the case of 3-phase inverters, only one phase is fed in when solar radiation is low. In this case, the phase with the fewest operating hours is switched on. In order to avoid false alarms in bad weather, the evaluation time should be set to 3 days in this case.

In normal operation, the red LEDs indicate how many days no current flow has been detected in at least one inverter.

10.8 Setup operation / test operation

For commissioning or for test purposes, the delay time t_{alarm} can be switched off (see point 7.9).

10.9 External input "Alarm off"

A jumper at terminals E1/E2 switches off the alarm function.

Status messages are displayed on the device, but the relays do not report an alarm.

10.10 Query program number and software version

In the [Input I1 ... I8 on/off] mode, press and hold the Set button:

⇒ After 5s:

- Mains LED flashes quickly (blockwise always 2x)
- Display of the program number (green LED I1 ... I3)

⇒ After 10s:

- Mains LED flashes quickly (blockwise always 3x)
- Display of the software version (green LED I1 ... I8)

11 Technical data

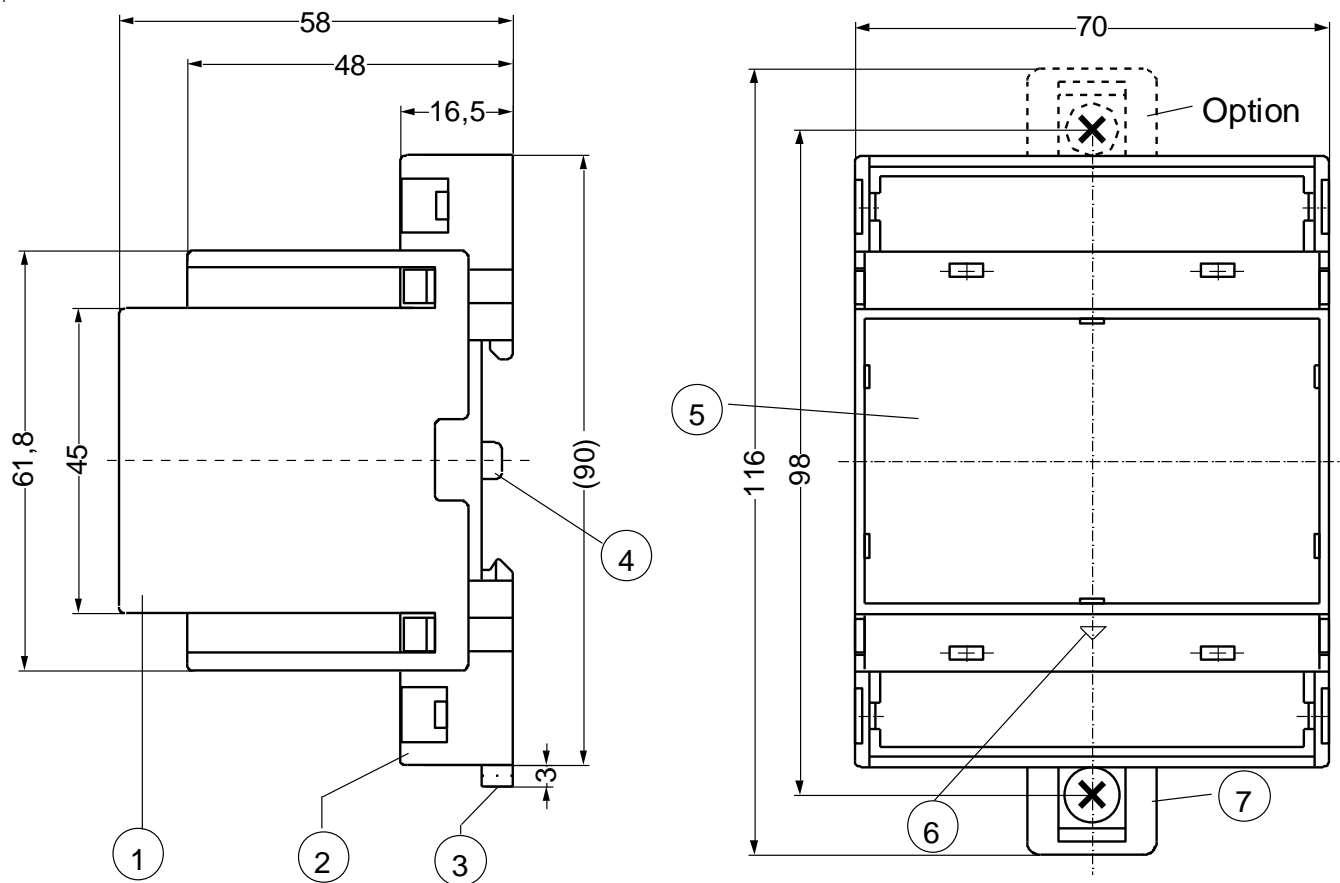
Rated supply voltage U_s	DC/AC 24 – 240 V 0/45 ... 60 Hz	
Tolerance	DC 20.4 - 297 V	AC 20 - 264 V
Power consumption	Eco-Mode off:	< 0,7 W < 2,6 VA
	Eco-Mode on:	< 0,4 W < 1,7 VA
Current transformer connection		
Connectable converters	1 ... 8 Current transformer STWA1 / STWA1H	
Load capacity of the STWA1	100A continuous, max. 300A for 10s	
Response Sensitivity (I Limit)		
	Adjustable – 0.3 ... 2.4A \pm 30% -> (step size 0.3A)	
Factor (I Limit * Factor)	Adjustable – 1.5 ... 3.0 (step size 0.5)	
Evaluation range currents	Up to AC 4.2A \pm 30%	
Response delay	Adjustable – 1 ... 8 days Can be switched off for test operation / set-up operation Factor (I Limit * Factor)	
“Alarm off” Input E1/E2		
	approx. DC 18V / 1.3mA E1/E2 closed = Alarm function off	
Relay output		
Switching voltage	2 x 1 Change-over contact (CO) (Bistable relays) max. AC 440 V, max. DC 230 V	
Switching current	max. 8 A	
Switching power (resistive load)	max. 2000 VA max. 240 W at DC 30 V	
Nominal operating current I_e for changers	AC15 $I_e = 3$ A	$U_e = 250$ V
	DC13 $I_e = 0,2$ A	$U_e = 250$ V
Recommended back-up fuse	max. 4 A	
Mechanical contact life	10^7 operations	
Electrical contact life	Resistive 1×10^5 AC Resistive 5×10^4 DC	
Testing conditions		
Rated impulse voltage	EN 50178 / EN 60 947 4000 V	
Overvoltage category	III	
Pollution degree	2	
Rated insulation U_i	300 V	
On period	100 %	
permissible ambient temperature	-20 °C ... +65 °C EN 60068-2-2 dry warmth	
EMC immunity (industry)	EN 61000-6-2	
EMC emission	EN 61000-6-3	
Vibration resistance EN 60068-2-6	2...25 Hz \pm 1,6 mm 25 ... 150 Hz 5 g	
Galvanic isolation/test voltage	Us – Relays, Sensors	DC 3820V
	Relay Sensors	DC 3820V

Housing	Type V4
Mounting height / Width (DIN 43880)	55 mm/4 TE
Dimensions (W x H x D)	70 x 90 x 58 mm
Connection cross-section – solid-core fine wire with ferrules	1x0.5...2.5mm ² each 1x0.14mm ² to 1.5mm ² each
Protection class housing / terminals	IP 30 / IP 20
Mounting	Snap mounting on 35 mm standard rail EN60715 or M4 screws (additional bar not included)
Weight	app. 180 g

Subject to technical changes

12 Housing Type V4

Dimension in mm



- 1 cover
- 2 base
- 3 bar for snap mounting
- 4 latch for sealing
- 5 front panel
- 6 position downward
- 7 for fixing to wall with screws, Ø 4,2 mm

13 Disposal



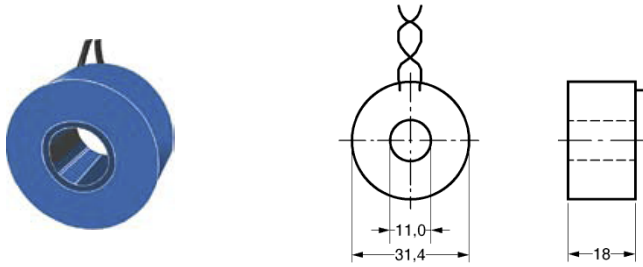
Disposal should be carried out properly and in an environmentally friendly manner in accordance with legal provisions.

ZIEHL is registered with the EAR Foundation under WEEE no. : DE 49 698 543.

14 Current transformer for SolarYes for current detection

The SolarYes includes the matching current transformer STWA1 / STWA1H. A current transformer is required for each monitored inverter (not included).

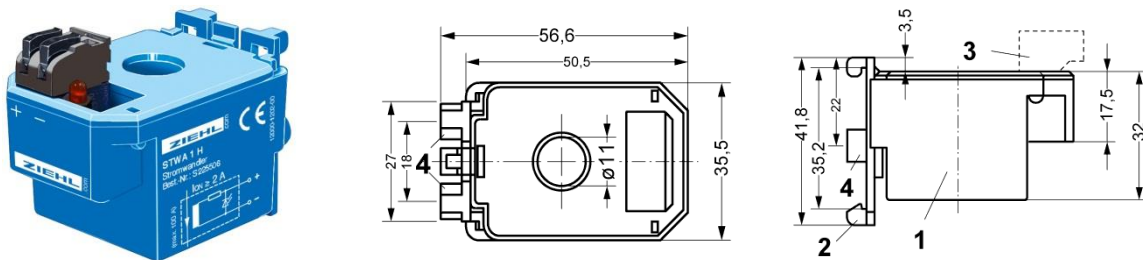
14.1 Current transformer STWA1



The STWA1 consists of a climate-proof cast coil with ferrite core. The connection cables are firmly connected to the converter and have a length of 1 m.

Order number: **S225201**

14.2 Current transformer STWA1H

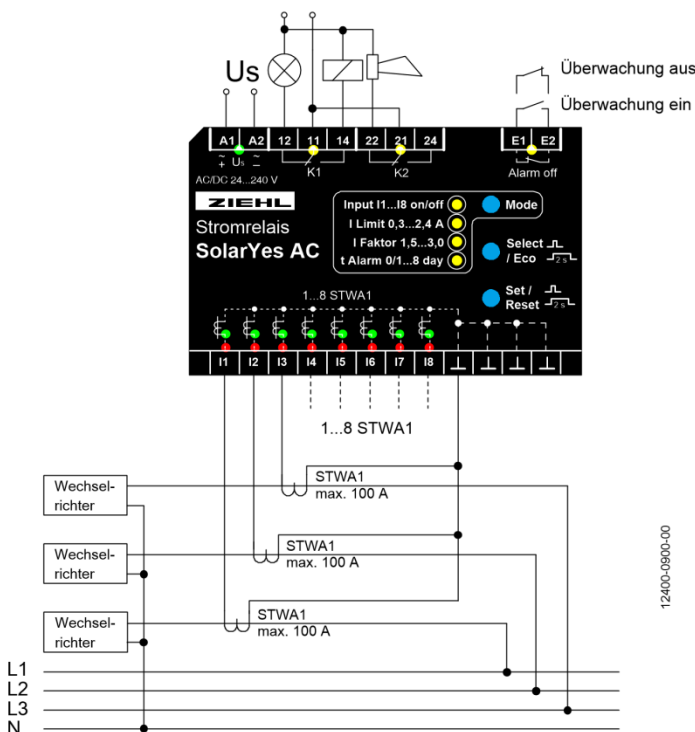


Current transformers STWA1H can be snapped onto a 35 mm support rail or fastened with 2 screws. The electrical connection is made via pluggable spring-loaded terminals. The monitored cables are fed through the converter vertically (at right angles to the supporting rail). The usable diameter is 11 mm.

Order number: **S225506**

15 Quick Installation

The SolarYes is preconfigured for this case.



Commissioning:

The SolarYes starts the “Automatic Configuration” (see point 7.4). After completion of this, the device is set and ready for operation. If necessary, the I factor and/or the delay time t Alarm can be adjusted.

Values set ex works:

- Program 1
- I factor = 2.0
(Mode [I factor 1.5 ... 3.0])
- Delay time = 1 day
(Mode [t Alarm 0/1 ... 8 day])