

## Operating Manual SW32V

updated: 2019-07-25/Ba  
 from Firmware: 0.15

**Voltage relay for monitoring direct, alternating and three-phase networks for overvoltage and/or undervoltage**

**from Firmware 0.15**

**Pr5+6 with default settings for grid and plant protection according to VDE-AR-N 4110:2018-11 directive (>135 kW)**



## Table of contents

<b>1</b>	<b>General Notes</b> .....	<b>3</b>
<b>2</b>	<b>Display and controls</b> .....	<b>3</b>
<b>3</b>	<b>Factory settings and software version</b> .....	<b>5</b>
<b>4</b>	<b>Adjustment values VDE-AR-N 4110:2018-11, acc table 13, Pr5</b> .....	<b>6</b>
<b>5</b>	<b>Adjustment values VDE-AR-N 4110:2018-11, acc table 12, Pr6</b> .....	<b>6</b>
<b>6</b>	<b>Application and brief description</b> .....	<b>6</b>
<b>7</b>	<b>Summary of the functions</b> .....	<b>6</b>
<b>8</b>	<b>Connection diagram and example grid- and plant protection</b> .....	<b>8</b>
<b>9</b>	<b>Important Notice</b> .....	<b>9</b>
<b>10</b>	<b>Mounting</b> .....	<b>9</b>
<b>11</b>	<b>Detailed description</b> .....	<b>10</b>
11.1	Description of the connections .....	10
11.2	Functional characteristics .....	10
<b>12</b>	<b>Commissioning</b> .....	<b>11</b>
12.1	Program setup .....	11
12.2	Control chart Pr 1 + 5, 3AC with N .....	12
12.3	Control chart Pr 2 + 6, 3AC without N .....	13
12.4	Control chart Pr 3, 1AC with N .....	14
12.5	Control chart Pr 4, DC .....	15
12.6	Description of the parameters .....	16
12.7	Display mode (last decimal point off) .....	17
12.8	Menu mode (last decimal point on) .....	17
12.9	Configuration mode (last decimal point flashes).....	17
12.10	Configuring the alarms .....	18
12.11	Configure Delay Display, Display Time .....	19
12.12	Simulation .....	19
12.13	Code lock .....	20
12.14	Possible indications in display .....	21
<b>13</b>	<b>Maintenance and repair</b> .....	<b>22</b>
<b>14</b>	<b>Troubleshooting</b> .....	<b>22</b>
<b>15</b>	<b>Disposal</b> .....	<b>22</b>
<b>16</b>	<b>Technical Data</b> .....	<b>23</b>
<b>17</b>	<b>Mounting type V4</b> .....	<b>24</b>

# 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, start-up 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

### 1 Last decimal point (red)

Off	Display mode
Illuminated	Menu mode
Flashes	Configuration mode

### 2 LEDs relay status (yellow)

OFF	Relay is released
ON	Relay operating

### 3 LED Asymmetry (red)

OFF	Asymmetry surge limit not exceeded
ON, R 1 or R 2	Asymmetry limit exceeded
FLASHES, R 1L or R 2L	Ready for reset after exceeding the limit
FLASHES, R 1 or R 2	Reset delay doF counting down

### 4 LEDs voltage limit undercut / exceeded (red)

ON, R 1 or R 2	Limit undercut / exceeded
FLASHES, R 1L or R 2L	Ready for reset after undercutting / exceeding the limit value
FLASHES, R 1 or R 2	Reset delay doF counting down
OFF	Limit value not undercut / exceeded

### 5 LED phase sequence (red)

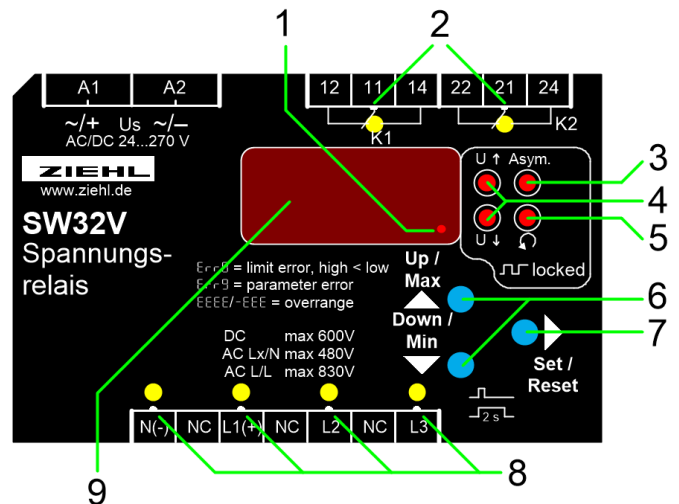
OFF	Phase sequence correct (rotating clockwise) or OFF
ON, R 1 or R 2	Phase sequence error (rotating counter-clockwise)
FLASHES, R 1L or R 2L	Ready for reset after phase sequence error

### 6 Up / Down key (in display mode, normal state)

Press briefly	Change into the menu mode (see Point 8.5)
Press for > 2 s	Displays the MAX (Up) and MIN (Down) measurement; additionally pressing the Set key for ≥ 2 s deletes the saved value

### 7 Set/Reset key (in display mode, normal state)

Press briefly	Displays the next measurement
Press for > 2 s	Reset after locked alarm (manual restart) (not possible if DoF Reset delay is counting down)
Press for > 4 s	Displays the program, e.g. Pr 1
Press for > 10 s	Displays the software version e.g. 000



8

**LEDs measurement allocation** (yellow)

	LEDs	Measurement
	Lx and N ON	Voltage value (L1 against N, L2 against N, L3 against N)
	Lx and Ly ON	Voltage value (L1 against L2, L2 against L3, L1 against L3)

**9 Digital display 3-digits** (red)

Depending on the program display, actual voltage, frequency
Displays the alarm messages, e.g. A1, A2L, ...
Displays the errors with error code e.g. Er9

### 3 Factory settings and software version

When changing programs, all parameters are reset to the factory settings.

Menu	Parameter / Unit		Default settings						Users Data
			3AC+N	3AC	1AC	DC	3AC+N	3AC	
			Pr 1	Pr 2	Pr 3	Pr 4	Pr 5	Pr 6	
R1 <sup>-</sup> 59.S2 59>S2	R1 <sup>-</sup> (Alarm)		on	on	on	on	on	on	
	U1 <sup>-</sup> (upper limit)	V	253	440	253	242	287	120	
	H1 <sup>-</sup> (Hysteresis)	V	5.0	5.0	5.0	5.0	3.0	1.0	
	dRL (Alarm delay)	s	0.10	0.10	0.10	0.10	0.10	0.3	
	doF (Reset delay)	s	0	0	0	0	60	60	
R1 <sub>-</sub> 27.S2 27<S2	R1 <sub>-</sub> (Alarm)		on	on	on	on	on	oFF	
	U1 <sub>-</sub> (lower limit)	V	196	340	196	198	104	45.0	
	H1 <sub>-</sub> (Hysteresis)	V	5.0	5.0	5.0	5.0	1.15	50.0	
	dRL (Alarm delay)	s	0.10	0.10	0.10	0.10	0.30	0.30	
	doF (Reset delay)	s	0	0	0	0	60	60	
R1	RSY (Asymmetry)	%	oFF	oFF			oFF	oFF	
	dRL (Alarm delay)	s	0.10	0.10			0.10	0.10	
	PhF (Phase sequence)		oFF	oFF			oFF	oFF	
	rEL (Relay function)		r	r	r	r	r	r	
R2 <sup>-</sup> 59.S1 59>S1	R2 <sup>-</sup> (Alarm)		on	on	on	on	oFF	on	
	U2 <sup>-</sup> (upper limit)	V	253	440	253	242	249	110	
	H2 <sup>-</sup> (Hysteresis)	V	5.0	5.0	5.0	5.0	3.0	1.0	
	dRL (Alarm delay)	s	0.10	0.10	0.10	0.10	60.0	180	
	doF (Reset delay)	s	0	0	0	0	60	60	
R2 <sub>-</sub> 27.S1 27<S1	R2 <sub>-</sub> (Alarm)		on	on	on	on	on	on	
	U2 <sub>-</sub> (lower limit)	V	196	340	196	198	184	80.0	
	H2 <sub>-</sub> (Hysteresis)	V	5.0	5.0	5.0	5.0	35.0	15.5	
	dRL (Alarm delay)	s	0.10	0.10	0.10	0.10	1.00	2.70	
	doF (Reset delay)	s	0	0	0	0	60	60	
R2	RSY (Asymmetry)	%	oFF	oFF			oFF	oFF	
	dRL (Alarm delay)	s	0.10	0.10			0.10	0.10	
	PhF (Phase sequence)		oFF	oFF			oFF	oFF	
	rEL (Relay function)		r	r	r	r	r	r	
dd <sub>i</sub>	dd <sub>i</sub> (Display delay)	s	0.5	0.5	0.5	0.5	0.5	0.5	
	di <sub>t</sub> (Display duration)	s	3.5	3.5			3.5	3.5	
S <sub>i</sub>	U (Voltage)	V	230	400	230	220	230	100	
Cod	on / oFF		oFF	oFF	oFF	oFF	oFF	oFF	
	Pin (Pin code)		504	504	504	504	504	504	
Inf	Fnr Firmware version		_ 15	_ 15	_ 15	_ 15	_ 15	_ 15	
	Snr Serial number		xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	
	Pr Program		1	2	3	4	5	6	

**Display the program:** Press the "Set" key for 4 s in the display mode.

**Display the software version:** Press the "Set" key for 10 s in the display mode.

## 4 Adjustment values VDE-AR-N 4110:2018-11, acc table 13, Pr5

Function	Adjustment range of the protective relay	Default settings	
Voltage increase protection $U_{>>}$	1.00 – 1.30 $U_n$	1.25 $U_n$	300 ms
Voltage increase protection $U_{>}$	1.00 – 1.30 $U_n$	*1.08 $U_n$	*60 s
Voltage decrease protection $U_{<}$	0.15 – 1.00 $U_n$	0.80 $U_n$	1.0 s
Voltage decrease protection $U_{<<}$ *	0.15 – 1.00 $U_n$	0.45 $U_n$	300 ms
* Not enabled in as delivered condition			

## 5 Adjustment values VDE-AR-N 4110:2018-11, acc table 12, Pr6

Function	Adjustment range of the protective relay	Default settings	
Voltage increase protection $U_{>>}$	1.00 – 1.30 $U_n$	1.20 $U_n$	300 ms
Voltage increase protection $U_{>}$	1.00 – 1.30 $U_n$	1.10 $U_n$	180 s
Voltage decrease protection $U_{<}$	0.15 – 1.00 $U_n$	0.80 $U_n$	1.0 s
Voltage decrease protection $U_{<<}$ *	0.15 – 1.00 $U_n$	*0.45 $U_n$	*300 ms
* Not enabled in as delivered condition			

## 6 Application and brief description

The SW32V voltage relay is a high-quality voltage monitor with a large measurement range for monitoring direct, alternating and three-phase networks for overvoltage and/or undervoltage. In three-phase current networks, phase symmetry and phase sequence can be monitored in addition.

The limits are set in volts. That allows using the unit with various rated voltages.

The digital display is used to display the measurements and to precisely set limits, response times and functions.

## 7 Summary of the functions

For use as a voltage monitor in energy generation and distribution plants, especially in-plant systems such as PV plants or combined heat and power plants.

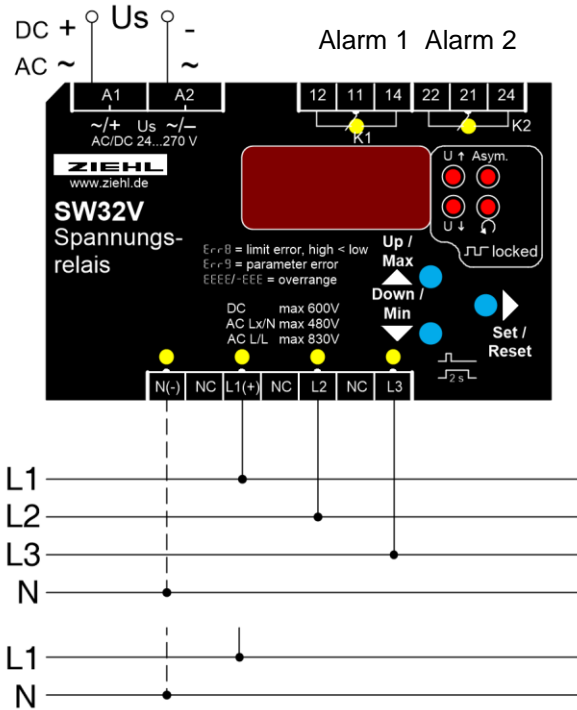
Voltage monitoring in machines and plants to prevent errors, damage or failures in sensitive equipment or devices.

- Voltage monitoring in direct current networks DC 10.0...600 V
- Voltage monitoring in alternating current networks AC 15.0...480 V
- Voltage monitoring in three-phase current networks with//without N up to 3AC 830 V, asymmetrical and phase failure monitoring connectible
- Preset programs for grid- and plant protection according to bdeu directive (medium voltage)
- Real root mean square measurement (for AC, both half waves)
- 2 Alarms/output relays, 1 each change-over contact
- Alarm and reset delay for every limit value can be individually set

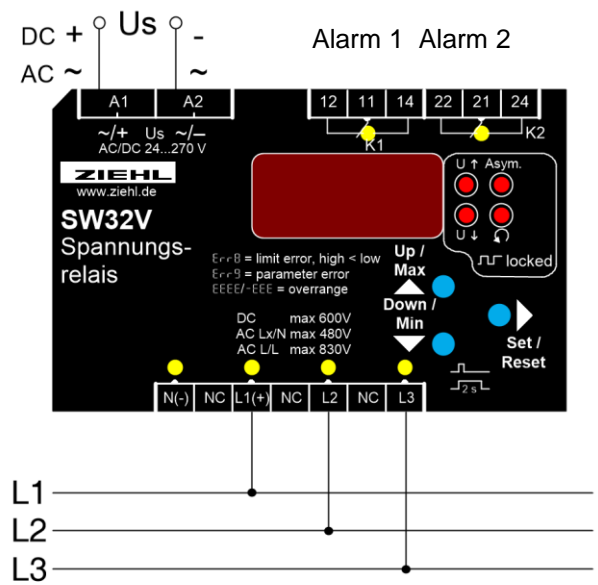
- Setting of limits and hysteresis in volts
- Measurement value simulation to check the settings
- Code lock can be enabled
- Control voltage AC/DC 24-270 V
- Distributor housing for panel mounting, 4 TE (70 mm), front-to-back size 55 mm
- Mounting on 35 mm mounting rails DIN EN 60715

# 8 Connection diagram and example grid- and plant protection

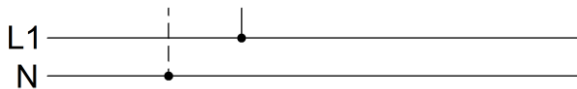
3 phase with N (Pr1)



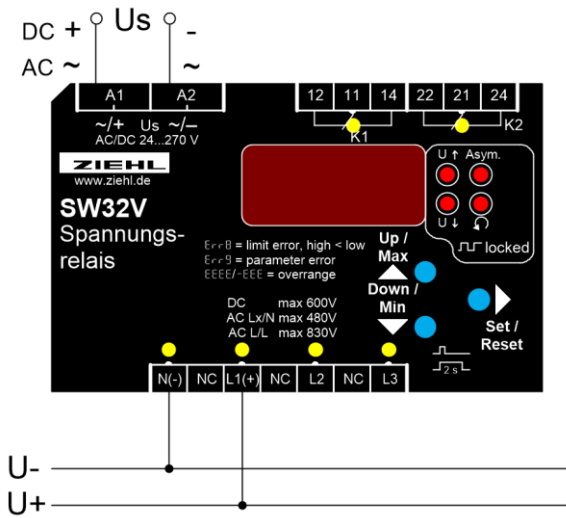
3 phase without N (Pr2)



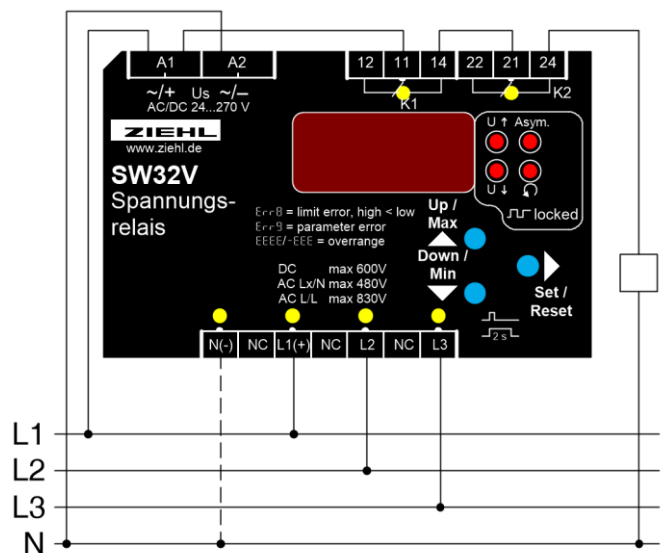
1 phase (Pr3)



DC (Pr4)



grid- and plant protection



## 9 Important Notice



### **WARNING**

**Hazardous electrical voltage!  
Can lead to electric shock and burns.  
Before starting work, switch plant and device voltage-free.**

The flawless and safe operation of a device requires that it is shipped and stored appropriately, professionally installed and put into operation and operated according to its intended use.

Only people who are familiar with the installation, commissioning and operation and who have qualifications corresponding to their job are permitted to work on the device. They must comply with the contents of the operating instructions, the notices attached to the device and the relevant safety regulations for constructing and operating electrical plants.

The devices are built and certified in accordance with EN 60255 and leave the factory in a safe and technically flawless condition. To maintain this state you must comply with the safety regulations indicated with "Caution" in the operating instructions. Non-compliance with the safety regulations can lead to death, bodily injury or property damage on the device itself and on other devices and equipment.

If the information in the operating instructions is insufficient at any time, please contact us directly or contact the representation responsible for you.

Instead of the industrial norms and stipulations stated in the operating instructions and applicable in Europe, you must comply with the valid and applicable regulations in the country of utilisation if the device is used outside of the area of application.



**Caution! If the operating current execution is programmed for all relays, a failure of the control voltage or the device will not be detected.  
When using as a monitoring device, the operator must ensure that this error is detected through periodic performance tests.  
We recommend programming and correspondingly evaluating at least one relay in closed-circuit (idle) current execution.**

## 10 Mounting

The device can be mounted:

- Distribution board or switch cabinet on 35 mm rails according to EN 60715

**Comply with the maximum permissible temperature when installing in a switch cabinet. Ensure sufficient clearance to other devices or heat sources. If cooling is inhibited, e.g., through close proximity to devices with increased surface temperature or interference with the cooling-air current, the permissible ambient temperature is decreased.**



### **Caution!**

Before you apply mains voltage to the device, make sure that the permissible control voltage  $U_S$  on the side rating plate matches the mains voltage connected to the device!

## 11 Detailed description

### 11.1 Description of the connections

Connection	Function
A1 and A2	Control voltage $U_s$ , see <a href="#">Technical Data</a>
11, 12, 14	Relay K1, menu item <code>R1_</code> , <code>R1_</code>
21, 22, 24	Relay K2, menu item <code>R2_</code> , <code>R2_</code>
nc	Not used
N (-)	Neutral conductor (DC -)
L1 (+)	Phase L1 (DC +)
L2	Phase L2
L3	Phase L3

### 11.2 Functional characteristics

Functional characteristics	Explanation
Display mode <code>Scn</code>	In programs with multiple display values, there is a switchover into the automatic display mode after the last display value, which is indicated by the display of <code>Scn</code> . All measurements will now be displayed cyclically for the time set in <code>dit</code> .
MIN / MAX values	All min and max values are saved zero-voltage maintained (non volatile). After triggering, the trip value is still available after the control voltage is switched off.
Reset delay	After applying the control voltage, for K1 the reset delay set in <code>R1_</code> and for K2 the reset delay set in <code>R2_</code> counts down. All alarms, excepting during false phase sequence, are suppressed during this time. During this time, the relay remains dropped out, which excludes a temporary line fault upon starting.
Reset	Use the Reset key or interrupt the control voltage for > 5 s (comply with reset delay)

## 12 Commissioning

### 12.1 Program setup

The suitable program must be set on the SW32V in accordance with the application (see table). That is taken care of during commissioning.

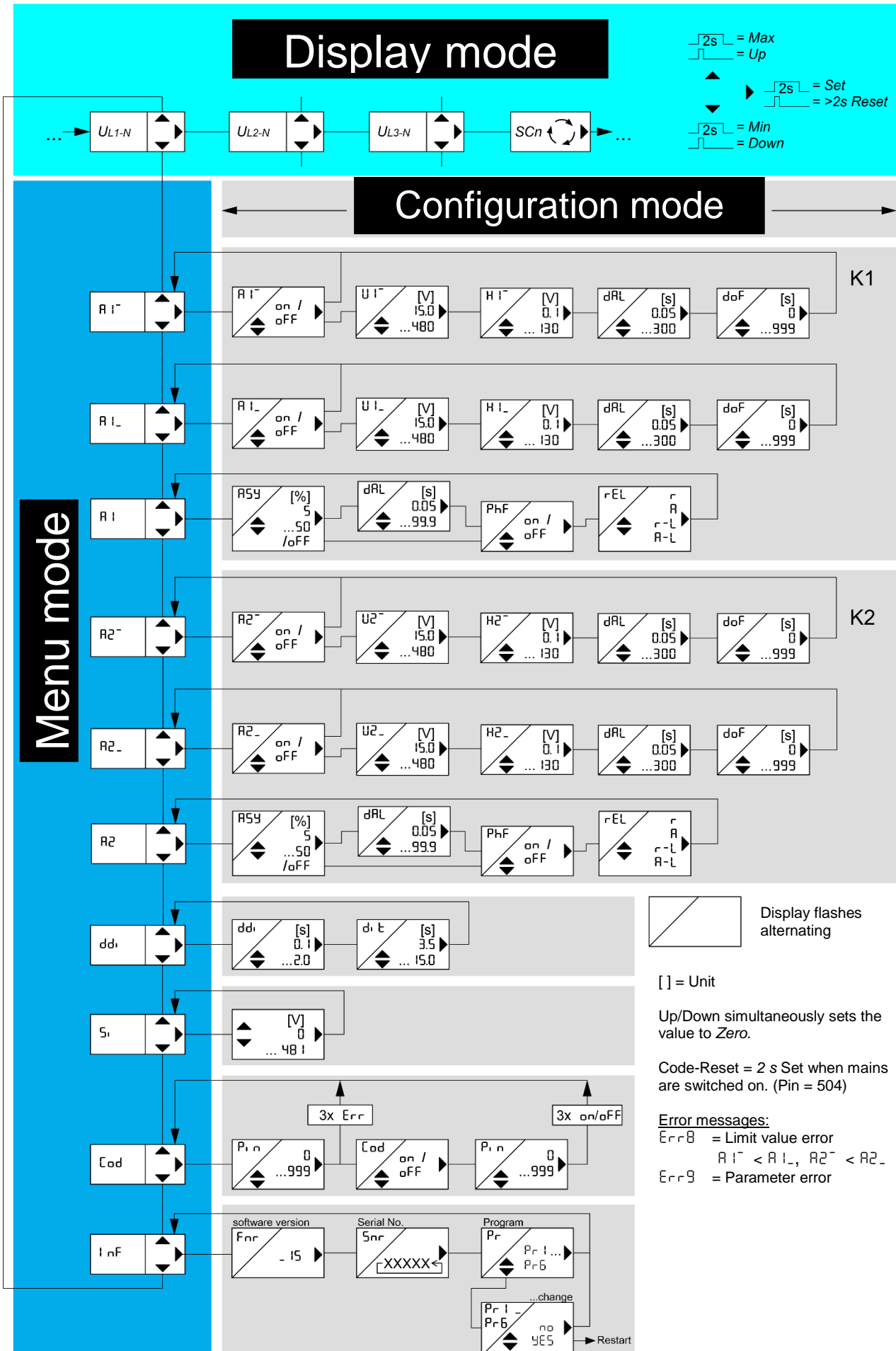
Pr	Connection	preset for rated voltage	Alarm1 (K1)	Alarm2 (K2)
*1	3 AC with N	230 V	Voltage + Asymmetry + Phase sequence	Voltage + Asymmetry + Phase sequence
2	3 AC without N	400 V	Voltage + Asymmetry + Phase sequence	Voltage + Asymmetry + Phase sequence
3	1 AC with N	230 V	Voltage	Voltage
4	DC	220 V	Voltage	Voltage
5	3 AC with N	230 V acc. to bdew	Voltage + Asymmetry + Phase sequence	Voltage + Asymmetry + Phase sequence
6	3 AC without N	100 V acc. to bdew	Voltage + Asymmetry + Phase sequence	Voltage + Asymmetry + Phase sequence

\* factory set

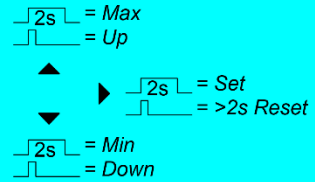
Adjustment process:

• Press ▲ button 1x → display I nF a.
• Press ► button 3x → display Pr l.
• Set the program with the buttons ▲ ▼
• Press ► button 1x → display n a.
• Press ▼ button 1x → display 4E5.
• Press ► button
⇒ Device resets and starts with the newly selected program

**Hint:** When changing programs, all parameters of the selected program are reset to “default settings” (see table „Default settings“). **Only change the parameters after having selected the correct program.**

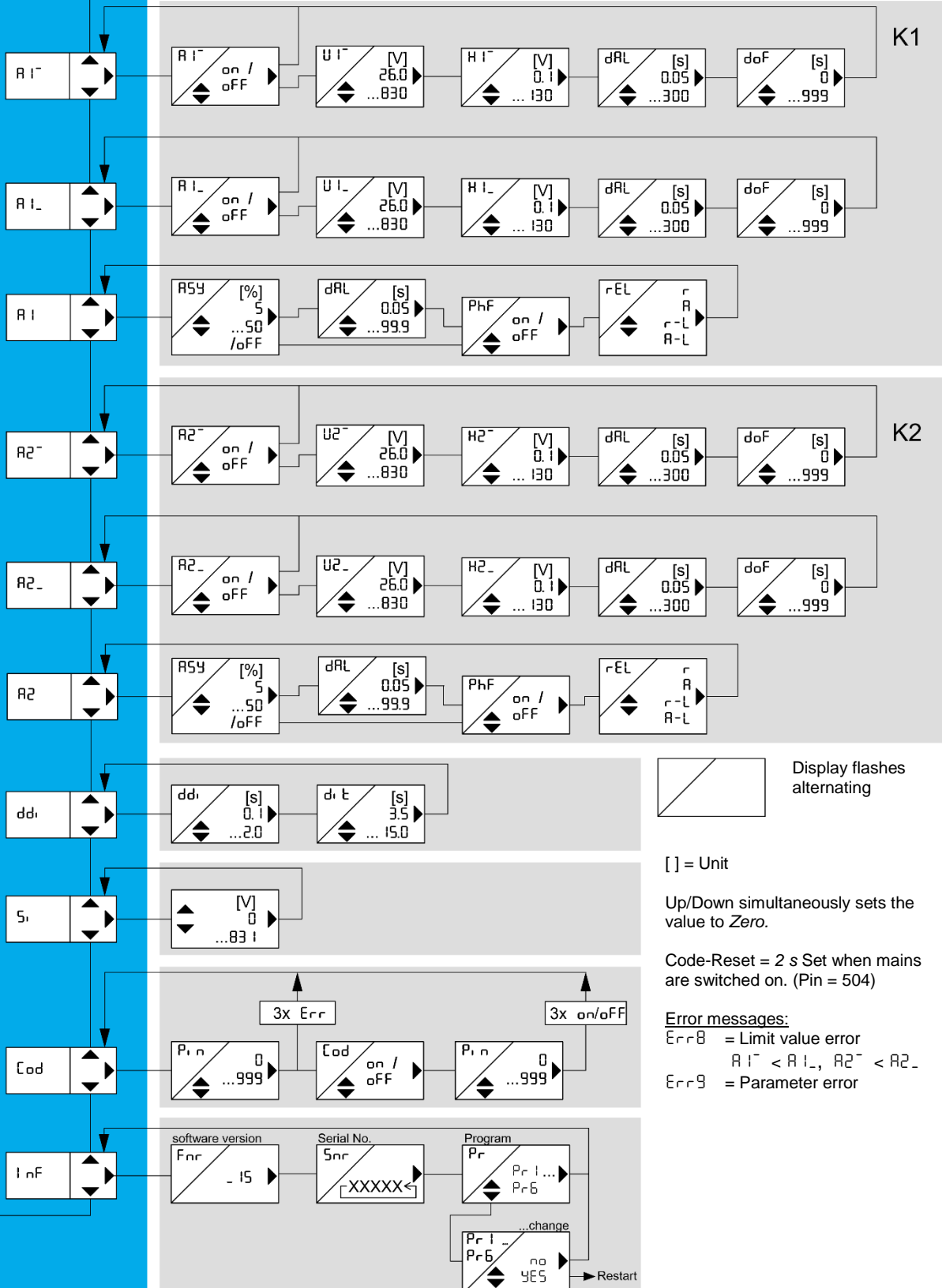


# Display mode

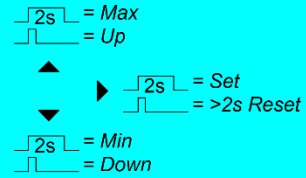


# Configuration mode

# Menu mode

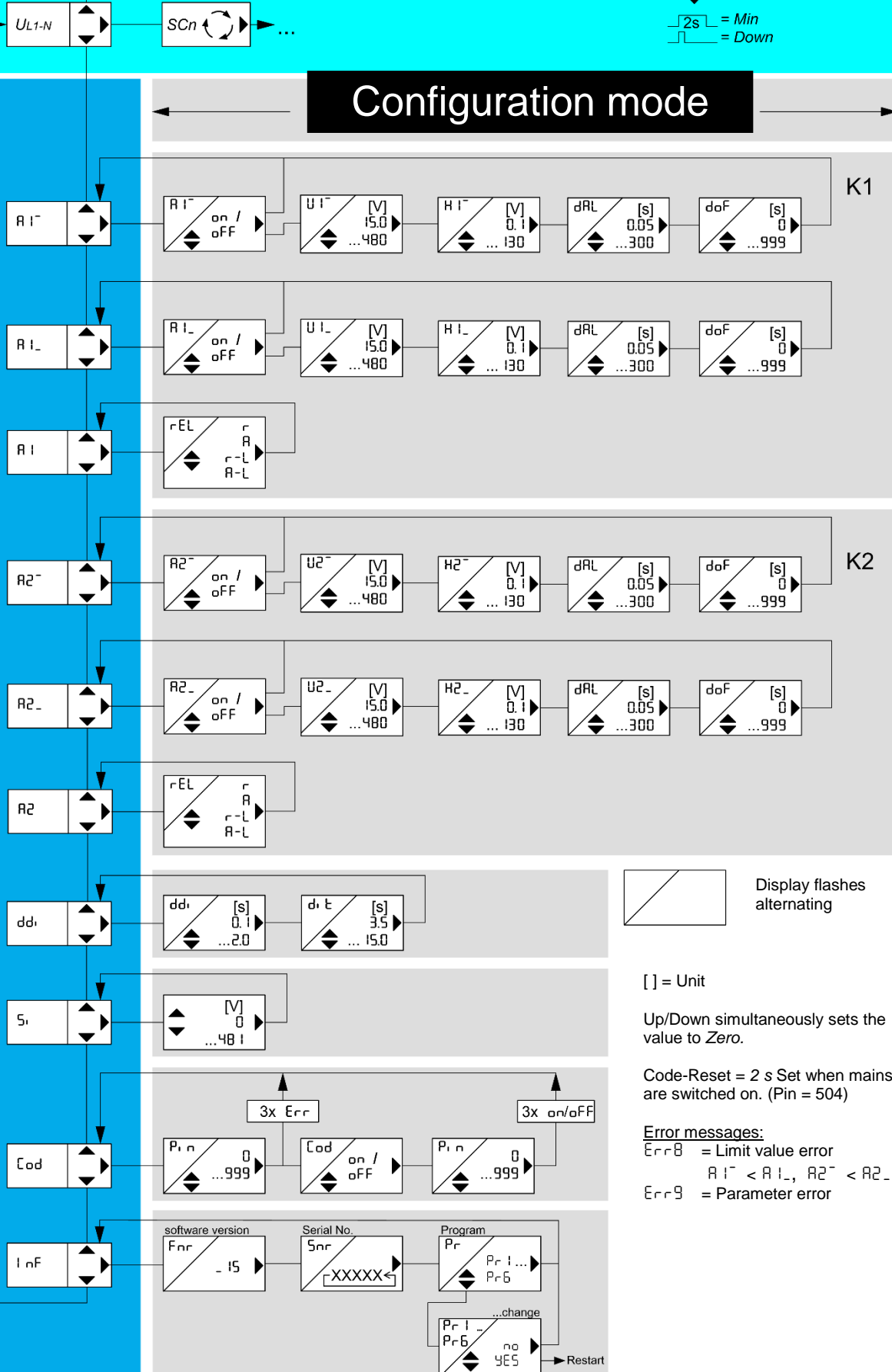


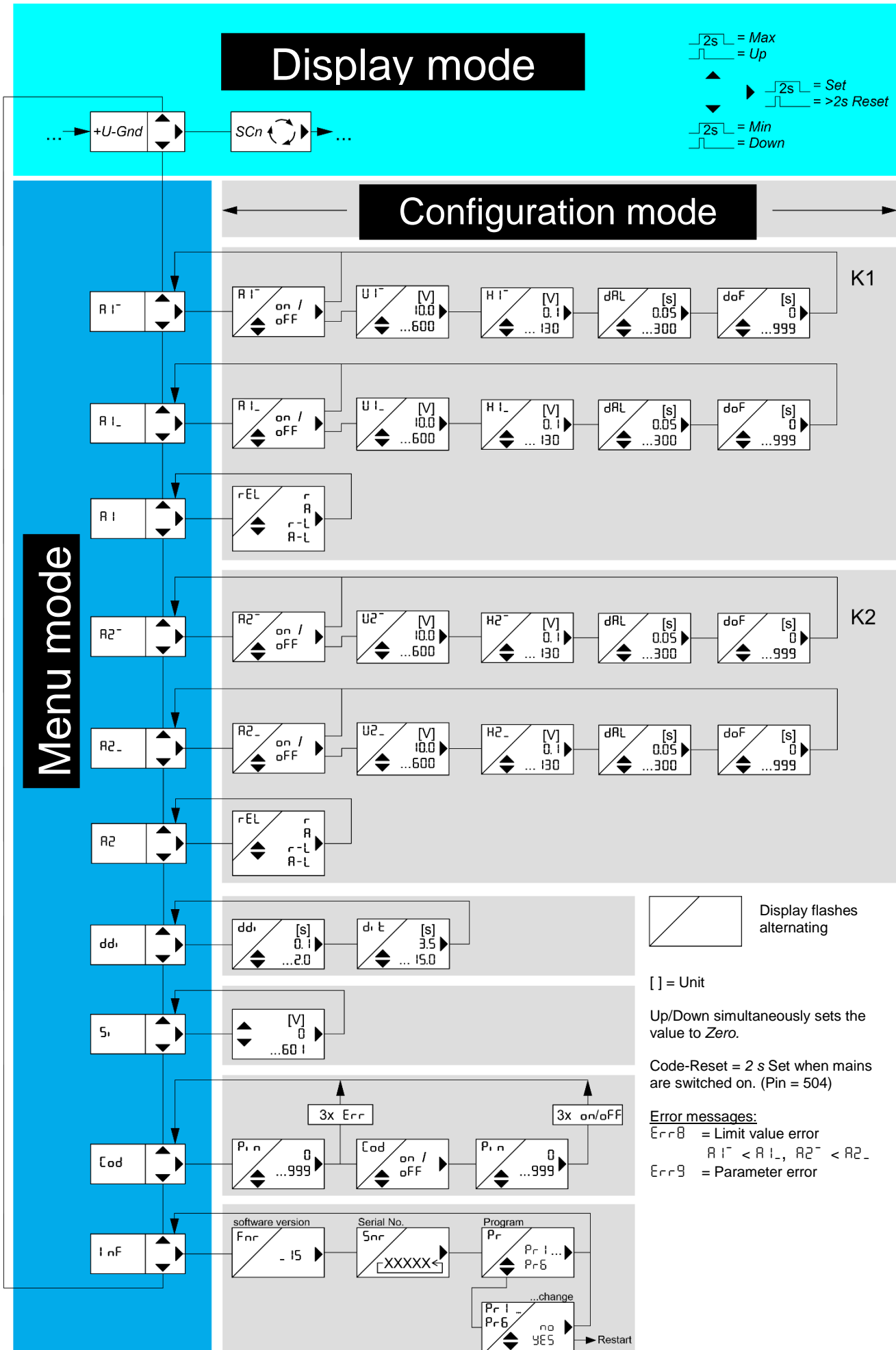
# Display mode



# Configuration mode

# Menu mode





## 12.6 Description of the parameters

Parameter	Display	Explanation	Adjustment range
Alarms	R1 <sup>-</sup> R2 <sup>-</sup> R1 <sub>-</sub> R2 <sub>-</sub>	Alarm 1, 2 Overvoltage (voltage increase) Alarm 1, 2 Undervoltage (voltage decrease)	on , off
Upper limit	U1 <sup>-</sup> U2 <sup>-</sup>	Upper limit, U1 <sup>-</sup> < U1 <sub>-</sub> → Er U2 <sup>-</sup> < U2 <sub>-</sub> → Er	15.0 ... 40 26.0 ... 30 10.0 ... 600
Lower limit	U1 <sub>-</sub> U2 <sub>-</sub>	Lower limit, U1 <sub>-</sub> > U1 <sup>-</sup> → Er U2 <sub>-</sub> > U2 <sup>-</sup> → Er	15.0 ... 40 26.0 ... 30 10.0 ... 600
Hysteresis upper limit	H1 <sup>-</sup> H2 <sup>-</sup>	253 (Limit) - 5(Hysteresis) = 248 (Reset value)	0.1 ... 130
Hysteresis lower limit	H1 <sub>-</sub> H2 <sub>-</sub>	196 (Limit) + 5(Hysteresis) = 201 (Reset value)	0.1 ... 130
Alarm delay (delay Alarm)	dAL	An alarm is suppressed for the set time (seconds).	0.05 ... 300
Reset delay (delay Off)	doF	Reset is delayed for the set time. On voltage recovery the control voltage, for K1 the reset delay set in R1 <sub>-</sub> and for K2 the reset delay set in R2 <sub>-</sub> counts down. All alarms, excepting during false phase sequence, are suppressed during this time.	0 ... 999
Asymmetry	ASY	Maximum phase asymmetry in %, e.g. 105 (Limit) – 1% (Fixed hysteresis) = 9% (Reset value) Measuring value: (Umin – Umax) / Uaverage L123	off , 5 ... 50
Phase sequence	PhF	Monitors for clockwise rotating field, alarm will not be delayed	on , off
Relay function	rEL	Idle current <b>r</b> : Relay is pulled up in good state (= no alarm) and releases when the alarm value is reached. Alarm even when the control voltage is switched off. Locked <b>r-L</b> : Reset only possible through Reset Operating current <b>R</b> : Relay has released in good state and operates (attracts) when the alarm value has been reached. No alarm when the control voltage is switched off and during device faults. Locked <b>R-L</b> : Reset only possible through Reset	<b>r</b> <b>R</b> <b>r-L</b> <b>R-L</b>
Delay display	ddi	Interval during which the display is updated in the display mode	0.1 ... 2.0
Display time	dit	Display duration per measurement in the <b>Scn</b> mode	3.5 ... 15.0

## 12.7 Display mode (last decimal point off)

In the display mode, the SW32V is in its normal state; the current voltages are displayed here. In addition, the alarm messages (e.g. **R1** , **R2L** , ...) and error codes (e.g. **Er9** ) are displayed.

Function key Set / Reset	<u>Press briefly:</u> Switches over the measurements, after the last measurement value <b>5cn</b> mode (measurements are cyclically displayed until Set is pressed briefly)
	<u>Press for &gt; 2 s:</u> Resets after locked alarm (not possible if DoF Reset delay is counting down)
	<u>Press for &gt; 4 s:</u> Displays the program, e.g. <b>Pr1</b>
	<u>Press for &gt; 10 s:</u> Displays the software version e.g. <b>0-5</b>
Function key Up / Down	<u>Press briefly:</u> Changes into the menus mode
	<u>Press for ≥2 s:</u> Displays MAX and MIN measurements, additionally pressing the Set key for ≥ 2 s deletes the saved values

## 12.8 Menu mode (last decimal point on)

The menu mode is used to select the menu items. If no key is pressed for 30 s, one automatically returns to the display mode.

Function key Set / Reset	<u>Press briefly:</u> Changes into the configuration mode
	<u>Press for ≥2 s:</u> Returns to the display mode (the most recently set values are then applied)
Function key Up / Down	<u>Press briefly:</u> Selects menu item; switches to the display mode

## 12.9 Configuration mode (last decimal point flashes)

The value of a parameter can be set in the configuration mode. The display continually alternates between the parameter name and the currently set value until the Up/Down key is pressed, which changes the value of the parameter. If no key is pressed for 2 s, the display starts alternating again.

If no key is pressed for 30 s (simulation mode 15 min), one automatically returns to the display mode (the most recently set value is applied during this)

Function key Set / Reset	<u>Press briefly:</u> The settings are applied; continues to next parameter. After the last parameter, change into menu mode
	<u>Press for ≥2 s:</u> Returns to the display mode (the most recently set values are then applied)
Function key Up / Down	<u>Press short/long:</u> Changes the parameter value (fast/slow)

Hint: Pressing the Up and Down keys simultaneously sets the adjustable value to zero. If you keep the Up or Down key pressed while setting a value, the speed of the change in the display is accelerated.

## 12.10 Configuring the alarms

Adjustment process:

<ul style="list-style-type: none"> <li>• Select the menu item with the Up/Down key until ...</li> </ul>
⇒ Display <b>R I<sup>-</sup></b> .
<ul style="list-style-type: none"> <li>• Press the Set key</li> </ul>
⇒ Display <b>R I<sup>-</sup></b> / <b>on</b> (Alarm / Status) flash alternately
<ul style="list-style-type: none"> <li>• Use the Up and Down keys to select: <ul style="list-style-type: none"> <li>○ <b>off</b> off, limit monitoring inactive</li> <li>○ <b>on</b> on, limit monitoring active</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• Press the Set key</li> </ul>
⇒ Display <b>U I<sup>-</sup></b> / <b>253</b> (Voltage / Limit value) flash alternately
<ul style="list-style-type: none"> <li>• Set the desired limit using the Up and Down keys</li> </ul>
<ul style="list-style-type: none"> <li>• Press the Set key</li> </ul>
⇒ Display <b>H I<sup>-</sup></b> / <b>5.0</b> (Hysteresis / Value) flash alternately
<ul style="list-style-type: none"> <li>• Set the desired value with the Up and Down keys</li> </ul>
<ul style="list-style-type: none"> <li>• Press the Set key</li> </ul>
⇒ Display <b>dRL</b> / <b>0.10</b> (Delay alarm / Time) flash alternately
<ul style="list-style-type: none"> <li>• Set the desired time using the Up and Down keys</li> </ul>
<ul style="list-style-type: none"> <li>• Press the Set key</li> </ul>
⇒ Display <b>dof.</b> / <b>0</b> (Delay off / Time) flash alternately
<ul style="list-style-type: none"> <li>• Set the desired time using the Up and Down keys</li> </ul>
<ul style="list-style-type: none"> <li>• Press the Set key</li> </ul>
⇒ Display <b>R I<sup>-</sup></b> .
<ul style="list-style-type: none"> <li>• Press Down key</li> </ul>
⇒ Display <b>R I<sub>-</sub></b> .
<ul style="list-style-type: none"> <li>• Press the Set key</li> </ul>
⇒ Display <b>R I<sup>-</sup></b> / <b>on</b> (Alarm / Status) flash alternately
<ul style="list-style-type: none"> <li>• Use the Up and Down keys to select: <ul style="list-style-type: none"> <li>○ <b>off</b> off, limit monitoring inactive</li> <li>○ <b>on</b> on, limit monitoring active</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• Press the Set key</li> </ul>
⇒ Display <b>U I<sub>-</sub></b> / <b>253</b> (Voltage / Limit) flash alternately
<ul style="list-style-type: none"> <li>• Set the desired limit using the Up and Down keys</li> </ul>
<ul style="list-style-type: none"> <li>• Press the Set key</li> </ul>
⇒ Display <b>H I<sub>-</sub></b> / <b>5.0</b> (Hysteresis / Value) flash alternately
<ul style="list-style-type: none"> <li>• Set the desired value with the Up and Down keys</li> </ul>
<ul style="list-style-type: none"> <li>• Press the Set key</li> </ul>
⇒ Display <b>dRL</b> / <b>0.10</b> (Delay alarm / Time) flash alternately
<ul style="list-style-type: none"> <li>• Set the desired time using the Up and Down keys</li> </ul>
<ul style="list-style-type: none"> <li>• Press the Set key</li> </ul>
⇒ Display <b>dof.</b> / <b>0</b> (Delay off / Time) flash alternately
<ul style="list-style-type: none"> <li>• Set the desired time using the Up and Down keys</li> </ul>
<ul style="list-style-type: none"> <li>• Press the Set key</li> </ul>
⇒ Display <b>R I<sub>-</sub></b> .

• Press Down key
⇒ Display <b>RI.</b>
• Press the Set key
⇒ Display <b>RSY.</b> / <b>OFF</b> (Asymmetry / Status) flash alternately
• Set the desired limit or switch off the monitoring with the Up and Down keys
• Press the Set key
⇒ Display <b>dRL.</b> / <b>0.10</b> (Delay alarm / Time) flash alternately
• Set the desired time using the Up and Down keys
• Press the Set key
⇒ Display <b>PHF.</b> / <b>OFF</b> (Phase sequence / Status) flash alternately
• Switch monitoring on or off with the Up and Down keys
• Press the Set key
⇒ Display <b>rEL.</b> / <b>r</b> (Relay / Parameter) flash alternately
• Set the desired parameter using the Up and Down keys
• Press the Set key
⇒ Display <b>RL.</b>
• Repeat configuration for Alarm 2

## 12.11 Configure Delay Display, Display Time

Adjustment process:

• Select the menu item with the Up/Down key until ...
⇒ Display <b>dd.</b> (Delay display)
• Press the Set key
⇒ Display <b>dd.</b> / <b>0.5</b> (Delay display / Actual time) flash alternately
• Set the desired time using the Up and Down keys
• Press the Set key
⇒ Display <b>d.t.</b> (Display time)
• Set the desired time using the Up and Down keys
• Press the Set key
⇒ Display <b>dd.</b> (Delay display)

## 12.12 Simulation

You can simulate a measurement and test the setting here. All 3 phases are simulated simultaneously. All device functions operate as if this value is actually being measured. Alarm and error messages are only indicated with the LEDs and not in the display.

The set values are simulated until the menu item **5.** is exited with the Up or Down key. If the SW32V is locked, simulation is not possible.

Adjustment process:

• Select the menu item with the Up/Down key until...
⇒ Display <b>5.</b> (Simulation)
• Press the Set key
• A voltage value can be simulated with the Up and Down keys (voltage = most recently set value)
• Press the Set key (exits the configuration mode)
⇒ Display <b>5.</b> (Simulation)

After exiting the Simulation menu item with the Up/Down keys, the unit switches over to monitoring the limits.

If no key is pressed for 15 minutes, the device automatically switches back to the display mode.

## 12.13 Code lock

Here, the set parameters can be protected by activating a code lock.

The device acknowledges an incorrect entry with **Err** (flashes three times).

Adjustment process:

• Select the menu item with the Up/Down key until...
⇒ Display <b>Code</b> (Code lock)
• Press the Set key
⇒ Display <b>Pin / 0</b> (Pin / Pin code) flash alternately
• Use the Up and Down keys to set the <b>saved</b> pin code ( <b>factory setting is 504</b> )
• Press the Set key
• Set the desired code lock using the Up and Down keys: <ul style="list-style-type: none"> <li>○ <b>off</b> off, all parameters can be changed</li> <li>○ <b>on</b> on, no parameters can be changed</li> </ul>
• Press the Set key
⇒ Display <b>Pin / 504</b> (Pin / Pin code) flash alternately
• Set the desired new pin code with the Up and Down keys (caution: write down the pin code)
• Press the Set key
⇒ Code lock on, display <b>on</b> flashes three times
⇒ Code lock off, display <b>off</b> flashes three times
⇒ Return to menu mode, menu item code lock

If there are any problems with the code lock (pin forgotten), the lock can be switched off and the pin can be reset to 504 by keeping the Set key pressed while switching on the mains until **Code / off** appears in the display.

## 12.14 Possible indications in display

### Display mode

A 1 , A 2 , A 1L , A2L , A 1L , A2L	Alarm1, Alarm2, additional "L" locked, Reset required to reset
Er ... Er9	Error messages (see <a href="#">Error messages and measures</a> )

### Menu mode / Configuration mode

A 1 <sup>-</sup> , A 2 <sup>-</sup>	Alarms for the upper limits
A 1 <sub>-</sub> , A 2 <sub>-</sub>	Alarms for the lower limits
U 1 <sup>-</sup> , U 2 <sup>-</sup>	Upper limits
U 1 <sub>-</sub> , U 2 <sub>-</sub>	Lower limits
H 1 <sup>-</sup> , H 2 <sup>-</sup>	Hysteresis upper limit
H 1 <sub>-</sub> , H 2 <sub>-</sub>	Hysteresis lower limit
dAL	Alarm delay
doF	Reset delay
A 1 , A 2	Alarms
ASY	Asymmetry
PhF	Phase sequence
rEL	Relay function
r , A	Zero signal (idle) current, operating current
r-L , A-L	Zero signal current locked, operating current locked
on , off	On, Off
ddi	Delay display, to calm down the display
d.t	Display duration per measurement in the <b>Scn</b> mode
S <sub>i</sub>	Simulation
[od	Code lock, locked
Pi n	Pin code (factory setting 504)
I nF	Device information, program change
Fnr , Snr	Firmware version, serial number
Pr	Program
YES , no	Yes, no query for acknowledgement

## 13 Maintenance and repair

The SW32V is maintenance-free. If necessary, periodically test for proper functioning.

## 14 Troubleshooting

Fault	Cause	Remedy
EEE or -EE appears in the display	Measurement is above/below range	Measured voltage is too large or too small; comply with measurement range
Er appears in the display	Limit error	$U1_ > U1^-$ $U2_ > U2^-$ Upper limit must be larger than lower limit
Er9 appears in the display	Parameter error, internal error	Switch unit on and off, if necessary, rest to factory settings. If the error message continues, send the unit back to the factory for repair.
The device cannot be configured	Code lock	The code lock provides protection against unauthorised manipulations on the device. If the code lock is active, the parameters cannot be changed. The pin can be set by the user. <u>Pin code unknown? -&gt; Perform a code reset:</u> <ul style="list-style-type: none"> <li>▪ While switching on the control voltage, keep the "Set" key pressed for <b>2 s</b></li> <li>⇒ The display alternates 888 – Cod</li> <li>– oFF – 888</li> <li>⇒ Release the Set key</li> </ul> Code lock is switched off, Pin code = 504
Implausible voltage value	Pr selected with N, but N not connected	Select Pr without N or connect N

## 15 Disposal

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

## 16 Technical Data

### Control voltage Us:

Rated connection

AC/DC 24-270 V, 0/45...65 Hz, < 5 VA

DC: 20.4...297 V, AC: 20.4...297 V

### Output relay:

Switching voltage

2 x change-over contact

Max. AC 415 V

Switching capacity max. AC  $\cos \varphi = 1$

5 A 250 V

Switching capacity max. DC (resistive)

0.3 A DC 300 V    5 A DC 30 V

Nominal operational current  $I_e$

AC-15  $I_e = 3$  A  $U_e = 250$  V

DC-13  $I_e = 2$  A  $U_e = 24$  V    DC-13  $I_e = 0.4$  A  $U_e = 120$  V

DC-13  $I_e = 0.2$  A  $U_e = 250$  V

Contact service life, mech.

30 x 10<sup>6</sup> operating cycles

Contact service life, electr.  $\cos \varphi = 1$

5 x 10<sup>5</sup> operating cycles at AC 250 V / 3 A

### Voltage measurement:

Measurement voltage DC

DC 10.0...600V

Measurement voltage phase – phase

AC 26.0...830 V (< 5V: 0 is displayed)

Measurement voltage phase – N

AC 15.0...480 V (< 5V: 0 is displayed)

Frequency AC measurement

40...100 Hz

Measurement time DC

DC Mean value over 50ms

Measurement time AC

< 50ms

Measurement accuracy DC

0.5% of measurement  $\pm 1$  digit

Measurement accuracy AC (with N)

> 100V: 0.8% of measurement  $\pm 1$  digit

< 100V: 0.8% of measurement  $\pm 5$  digits (res. 0.1V)

Measurement accuracy AC (without N)

> 100V: 1.0% of measurement  $\pm 1$  digit

< 100V: 1.0% of measurement  $\pm 5$  digits (res. 0.1V)

Measurement principle

Real root mean square measurement (both half waves)

Input resistance Phase-N

609 k $\Omega$

Hysteresis

Adjustable 1...130 V

Accuracy asymmetry

$\pm$  Asymmetry in % \* 0.15

Hysteresis asymmetry

Fixed 1%

Measuring functions

3-phase with/without N, 1-phase against N, DC

Response time

Adjustable 0.05 ( $\pm 15$ ms)...300 s

Reset time

Adjustable 0(>200ms) ... 999 s

Delay with Us on

4s +  $R_{L\_}$   $\rightarrow$   $d_{\alpha F}$  for K1 (  $R_{2\_}$   $\rightarrow$   $d_{\alpha F}$  for K2)

### Test conditions

Rated impulse withstand voltage

6000 V

Overvoltage category

III

Pollution degree

2

Rated insulation voltage  $U_i$

AC 690 V

Operating time

100 %

Permissible ambient temperature

-20 °C... +55 °C

EN 60 068-2-2 dry heat

EMC - immunity

EN 61000-6-2

EMC - emission

EN 61000-6-4

### Housing:

Mounting type

V4

Front-to-back size

55 mm

Dimensions (W x H x D)

90 x 70 x 58 mm

Wiring connection single strand

ea. 1 x 4 mm<sup>2</sup>

Finely stranded with wire end ferrule

ea. 1 x 2.5 mm<sup>2</sup>

Protection class, housing

IP 30

Protection class, terminals

IP 20

Mounting

Snap-on fastening on 35 mm mounting rail acc

EN 60 715 or with M4 screwed attachment

(additional bar not included in the scope of delivery)

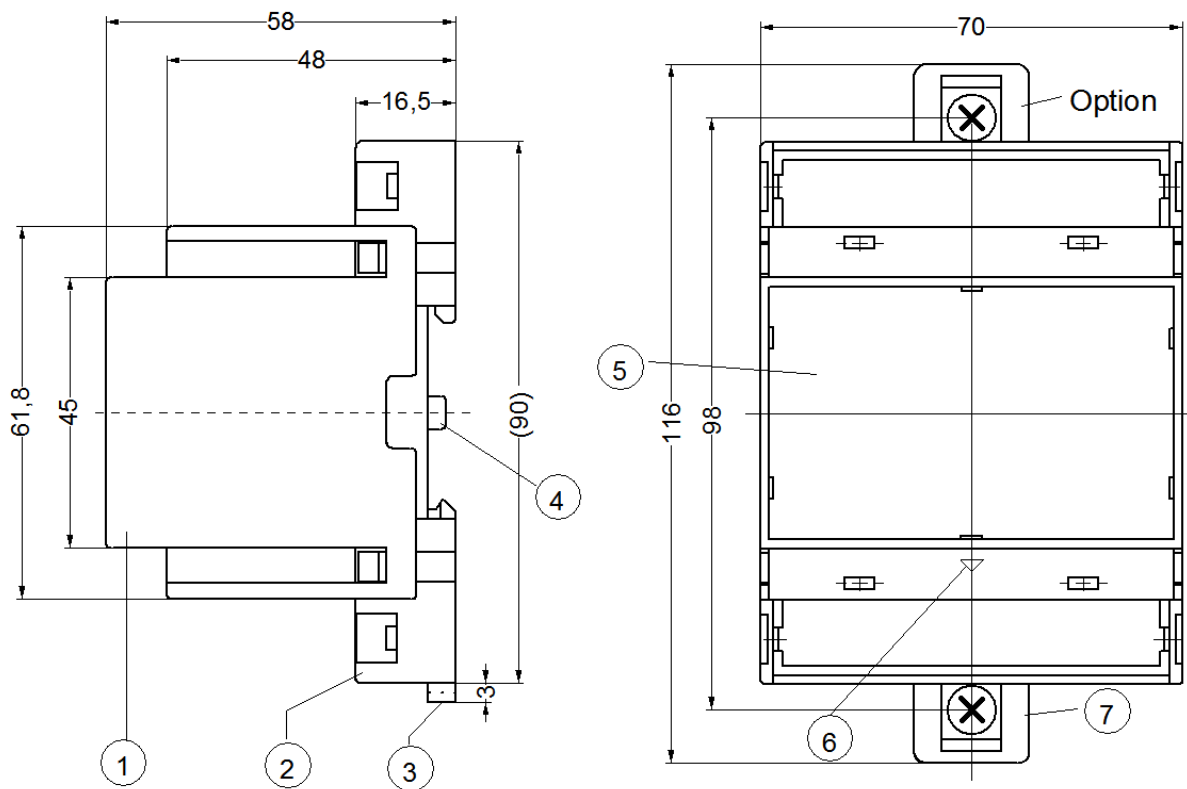
Weight:

approx. 200 g

**We reserve the right to make technical changes**

## 17 Mounting type V4

Dimensions in mm



- 1 Cover
- 2 Base
- 3 Bar for snap mounting
- 4 Latch for sealing
- 5 Front panel
- 6 Identification for bottom / position downward
- 7 Bar for wall mounting with screws. Bar drill hole  $\varnothing$  4.2 mm / for fixing to wall with screws,  $\varnothing$  4.2 mm.