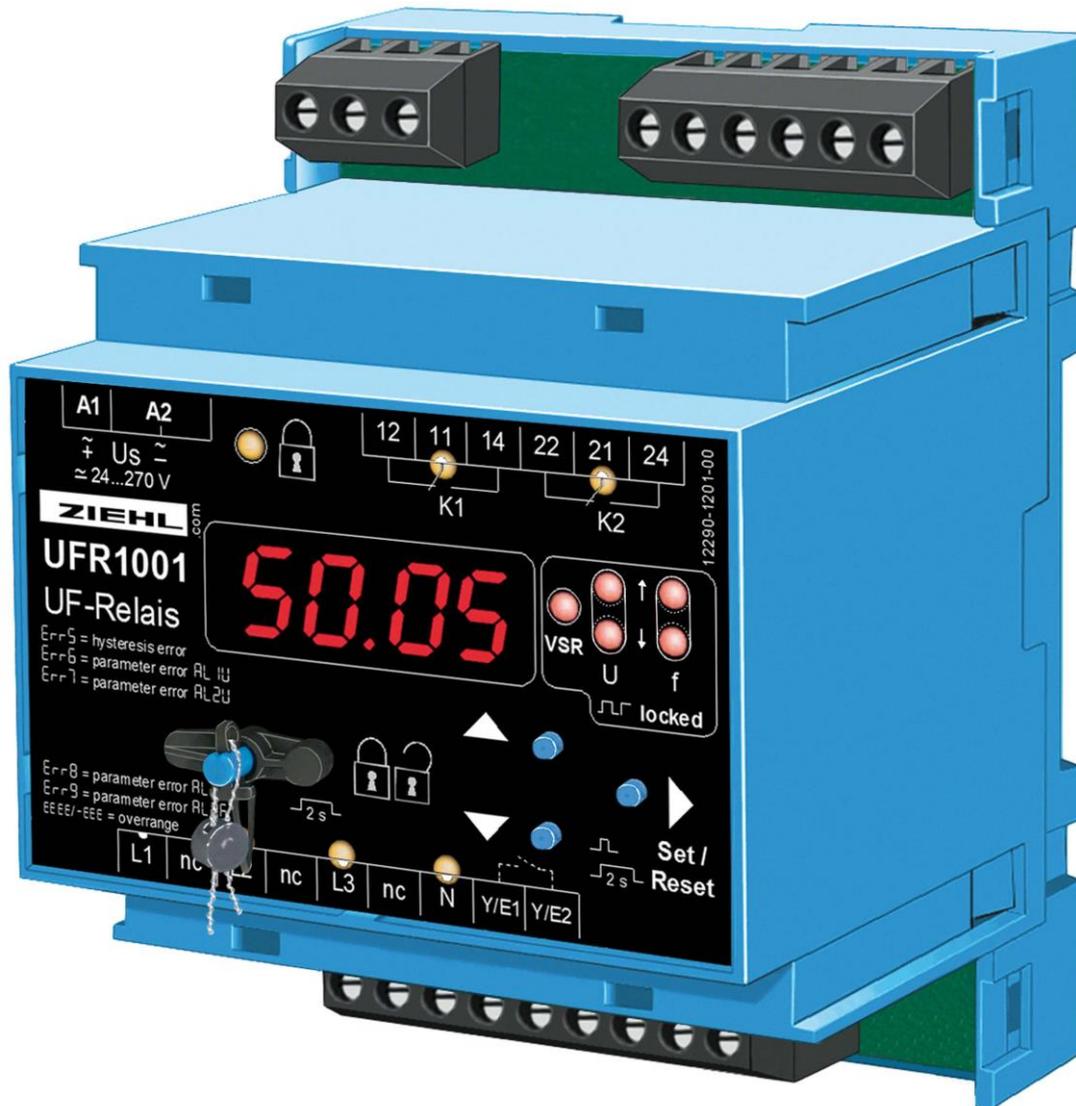


Operating Manual UFR1001 - archive data

updated: 2017-11-09/Fu
 from Firmware: 1-04

- Sealable voltage and frequency relay with integrated vector-surge relay



Quick installation guide

System disconnection of photovoltaic plants

See [Quick installation system disconnection on photovoltaic plants](#)

Applicable from software version: 12290-1401-02 (press key Set for 10s)

ATTENTION: new default setting 51,5 Hz for over-frequency from software version 1-04 and higher.
 (To display software version press button "Set" for >10 s)

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1 Display and controls

1 Sealable button + LED (yellow)

Press for > 2 s	LED ON - Lock activated LED OFF - Lock deactivated
-----------------	---

2 Last decimal point (red)

Off	Display mode
Illuminated	Menu mode
Flashes	Configuration mode

3 LEDs relay status (yellow)

OFF	Relay is released
ON	Relay operating

4 LED vector surge (VSR, red)

OFF	Vector surge limit not exceeded
ON, $R \ 2$	Vector surge limit exceeded
FLASHING, $R \ 2L$	Ready for reset after exceeding the limit
FLASHING, $R \ 2$	Reset delay Δt_F running out

5 LEDs frequency / voltage limit value undercut / exceeded (red)

ON, $R \ 1$ or $R \ 2$ or $R \ 1$ or $R \ 2$	Limit value undercut / exceeded
FLASHING, $R \ 1-L$ or $R \ 2-L$ or $R \ 1L$ or $R \ 2L$	Ready for reset after undercutting / exceeding the limit value
FLASHING, $R \ 1$ or $R \ 2$ or $R \ 1$ or $R \ 2$	Reset delay Δt_F running out
OFF	Limit value not undercut / exceeded

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

Press briefly	Change into the menu mode (see Point 8.5), display of alarm-counter (down) and added time of alarms (up), pushing of key Set for 2s makes a reset of stored values.
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)

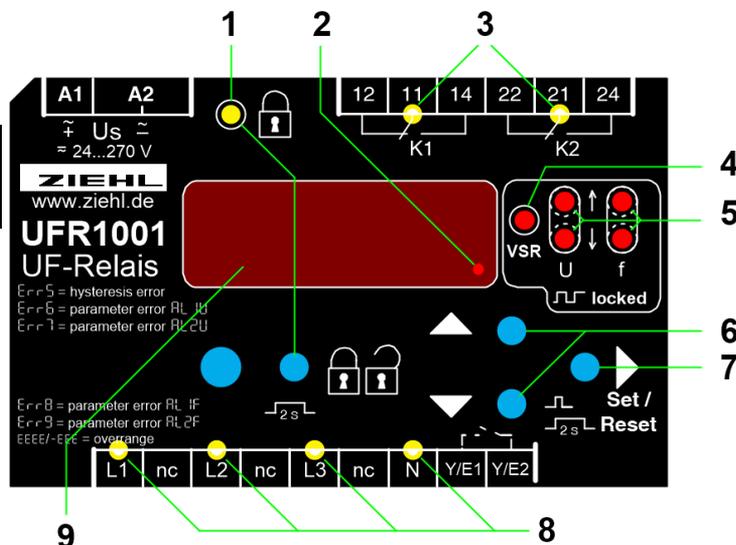
Press briefly	Displays the next measurement / alarm-counter
Press for > 2 s	Reset after locked alarm (manual restart) (not possible if DoF Reset delay is expiring)
Press for > 4 s	Displays the program, e.g. $P_r \ 1$
Press for > 10 s	Displays the software version e.g. 0000

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)
Lx FLASHING quickly	Vector surge (L1, L2, L3)
L1 FLASHING	Frequency

9 Digital display 4-digits (red)

Depending on the program display, actual voltage, frequency, vector surge
Displays the alarm signals, e.g. $R \ 1$, $R \ 2-L$, ...
Displays the errors with error code e.g. $Err \ 9$



2 Factory settings and software version

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

Menu point	Parameter / Unit		Factory setting					My data
			Pr 1	Pr 2	Pr 3	Pr 4	Pr 5	
AL IU	F _{un} (Function)		4000	4000	4000	4000	4000	
	AL I ⁺ (Upper limit)	V	264	460	264	460	264	
	AL I (Limit value)	V	184	320	184	320	184	
	AL $\bar{\Omega}$ I (10 min mean value)	V	253	440	253	440	253	
	H (Hysteresis)	V	5	5	5	5	5	
AL IF	F _{un} (Function)		4000	4000	4000	4000	4000	
	AL I ⁺ (Upper limit)	Hz	5 150	5 150	5 150	5 150	5 150	
	AL I (Limit value)	Hz	4750	4750	4750	4750	4750	
	H (Hysteresis)	Hz	145	145	145	145	145	
AL I	dAL (Alarm delay)	s	0.10	0.10	0.10	0.10	0.10	
	doF (Reset delay)	s	30	30	30	30	30	
	rEL (Relay function)		r	r	r	r	r	
AL2U	F _{un} (Function)		4000	4000	4000			
	AL2 ⁺ (Upper limit)	V	264	460	264			
	AL 2 (Limit value)	V	184	320	184			
	AL $\bar{\Omega}$ 2 (10 min mean value)	V	253	440	253	440	253	
	H (Hysteresis)	V	5	5	5			
AL2F	F _{un} (Function)		4000	4000	4000			
	AL2 ⁺ (Upper limit)	Hz	5 150	5 150	5 150			
	AL 2 (Limit value)	Hz	4750	4750	4750			
	H (Hysteresis)	Hz	145	145	145			
AL 2	AL 2 (Limit value)	°				5.0	5.0	
	dAL (Alarm delay)	s	0.10	0.10	0.10			
	doF (Reset delay)	s	30	30	30	3	3	
	rEL (Relay function)		r	r	r	r	r	
dEon	dEon (Switch-on delay)					3	3	
uSr	uSr (Vector surge)					3Ph	3Ph	
ddi	ddi (Display delay)	s	0.5	0.5	0.5	0.5	0.5	
Si	U (Voltage)	V	230	400	230	400	230	
	F (Frequency)	Hz	50.00	50.00	50.00	50.00	50.00	
	uSr (Vector surge)	°				0.0	0.0	
CodE	on / off		off	off	off	off	off	
	Pi n (Pincode)		504	504	504	504	504	

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.

3 Application and brief description

The voltage and frequency relay UFR 1001 monitors the voltage and the frequency in one- or three-phase voltage grids with or without N and, if required, switches rapidly off. The unit can be easily adapted to the network operator's requirements.

With the integrated vector-surge relay, it is also suited for monitoring synchronous generators.

After selecting a basic program, the limits for over/undervoltage and the over/under frequency can be programmed.

When using programs with vector-surge monitoring, the K2 relay only reports the vector surge.

4 Summary of the functions

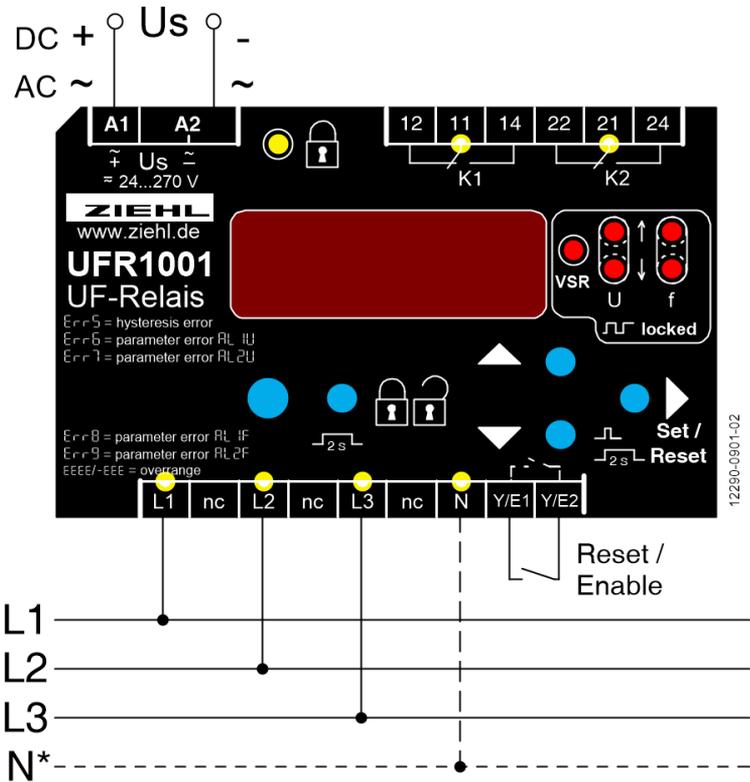
Applications include monitoring the network in large photovoltaic plants, power system protection in combined heat and power plants, also with synchronous generators (vector surge) or in general, monitoring the network quality in systems, on machines or in power supply systems.

The device complies with the requirements of the power suppliers for conventional protection in low-voltage systems >30 kVA.

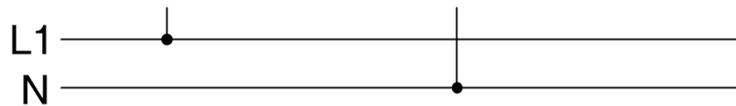
- 4-digit digital display for voltages, frequency and vector surge
- Under and overvoltage monitoring 40...520 V
- Under and overfrequency monitoring 45.00...65.00 Hz
- Monitoring the voltage quality (10 minute mean average value)
- Vector-surge monitoring 2.0...20.0 °
- Response time adjustable 50 ms...60 s
- Reset delay (zero voltage maintenance) can be set 0...1000 s (Vector surge 3...240 s)
- Alarm-counter for up to 100 alarms (with measured value and reason)
- Added time of alarm up to 999 hours. Displays the time, alarms have been active (while supply voltage applied only).
- LEDs for alarm signals, measurement value allocation and relay status
- 2 output relays, each for frequency and/or voltage monitoring
- Relay function operating or idle current programmable
- Locked shutdown or auto-reset programmable
- External input for Enable / Reset
- Delay time for Enable input during vector-surge monitoring
- Easy to program with 5 selectable basic programs
- Code protection against manipulation of the setpoint values
- Sealing facility for set point values
- Control voltage AC/DC 24-270 V
- Distributor housing for panel mounting 4 TE, front-to-back size 69 mm
- Mounting on 35 mm mounting rails DIN EN 60715

5 Connection diagram

3 phase



1-phase (only PR3, **no** vector-surge monitoring)



6 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 utilization 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.

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!

7 Mounting

The device can be mounted:

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

8 Detailed description

8.1 Description of the connections

Connection	Function
A1 and A2	Control voltage U_S , see 12. Technical data
11, 12, 14	Relay K1, menu item AL IU. , AL IF.
21, 22, 24	Relay K2, menu item AL 2U. , AL 2F.
E1 – E2 (Pr 4-5) Enable input	Floating opener
	Contact closed = UFR 1001 disabled, no evaluation of voltage, frequency and vector surge
	Open = UFR 1001 enabled, voltage, frequency, and vector surge will be evaluated
Y1 – Y2 (Pr 1-3) external reset	Floating closing contact
	Function same as pressing the Set/Reset key for >2 s
nc	Not used
N	Neutral conductor
L1	Phase L1
L2	Phase L2
L3	Phase L3

8.2 Functional characteristics

Functional characteristics	Explanation
VSR display value	The highest measured value is always displayed. The display value is reset to 0 by deleting the max. value and when resetting into the go (good) state.
VSR MIN / MAX value	During a vector-surge alarm, the trigger value is always saved as the max. value; it is available until the max. value is deleted.
Enable input	Only in Pr 4 and 5, closed = disabled, no evaluation of voltage, frequency and vector surge
Delay Enable On time	Only in Pr 4 and 5, expires while starting the unit and after opening the Enable input; during this time, no evaluation of voltage, frequency and vector surge takes place
Reset delay	If an alarm is present while disconnecting the control voltage, after reconnection the programmed reset delay, Δt_F , runs out for the respective alarm; whenever a reset delay time Δt_F is expiring, it is counted down in the display (shortest first)
Reset	Use the Reset key or interrupt the control voltage for > 5 s (comply with reset delay)
Alarm-counter	The UFR records max. 50 alarms/relay (reason, measured value). When only 1 alarm is used (function Fun off at AL2U and AL2F, 100 alarms are stored. In the memory with the highest number, the last alarm is stored. LEDs show the reason of the alarm and the relay. The 7-segment-display shows the value, that has caused the alarm. At overflow all memories are deleted.
Added Time of Alarm	The added time of alarms shows for every alarm, how long the relay has been switched off because a limit had been exceeded. The resolution of the record is 1 minute. Time is only added as long as supply-voltage is applied. Readout in display mode under Ac. Up = added time of alarms TAL, Down = alarm-counter Ac xx...Ac00 (xx=last alarm)

9 Commissioning

9.1 Program setup

The suitable program must be set on the UFR 1001 in accordance with the application (see table). That is taken care of during commissioning. If the UFR 1001 is sealed/locked (LED illuminated), it is not possible to change the set program.

Pr	Connection	Limit AL1	Limit AL2
*1	3 AC with N	Voltage, mean value, frequency	Voltage, mean value, frequency
2	3 AC without N	Voltage, mean value, frequency	Voltage, mean value, frequency
3	1 AC with N	Voltage, mean value, frequency	Voltage, mean value, frequency
4	3 AC without N	Voltage, mean value, frequency	Vector surge
5	3 AC with N	Voltage, mean value, frequency	Vector surge

* factory set

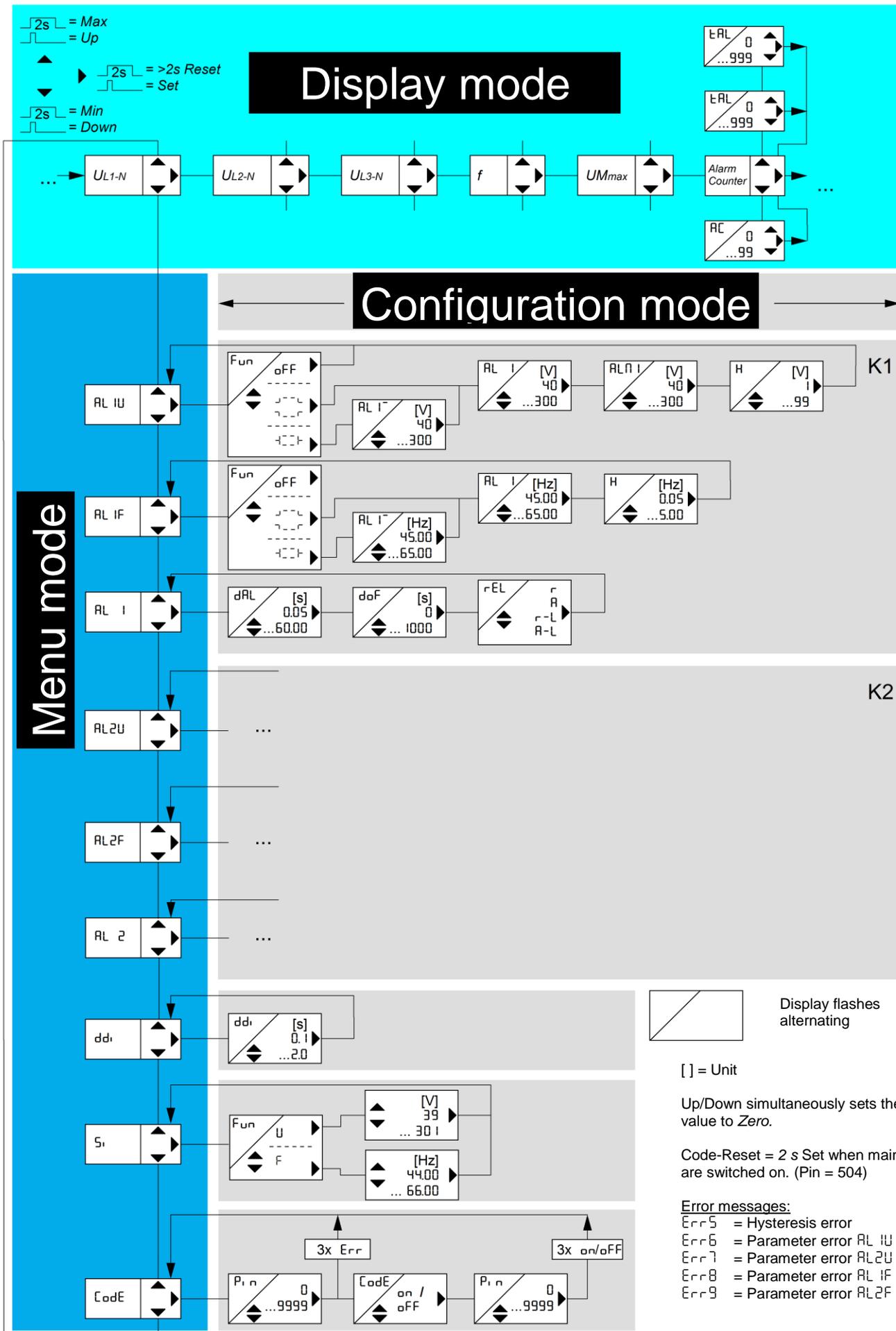
Adjustment process:

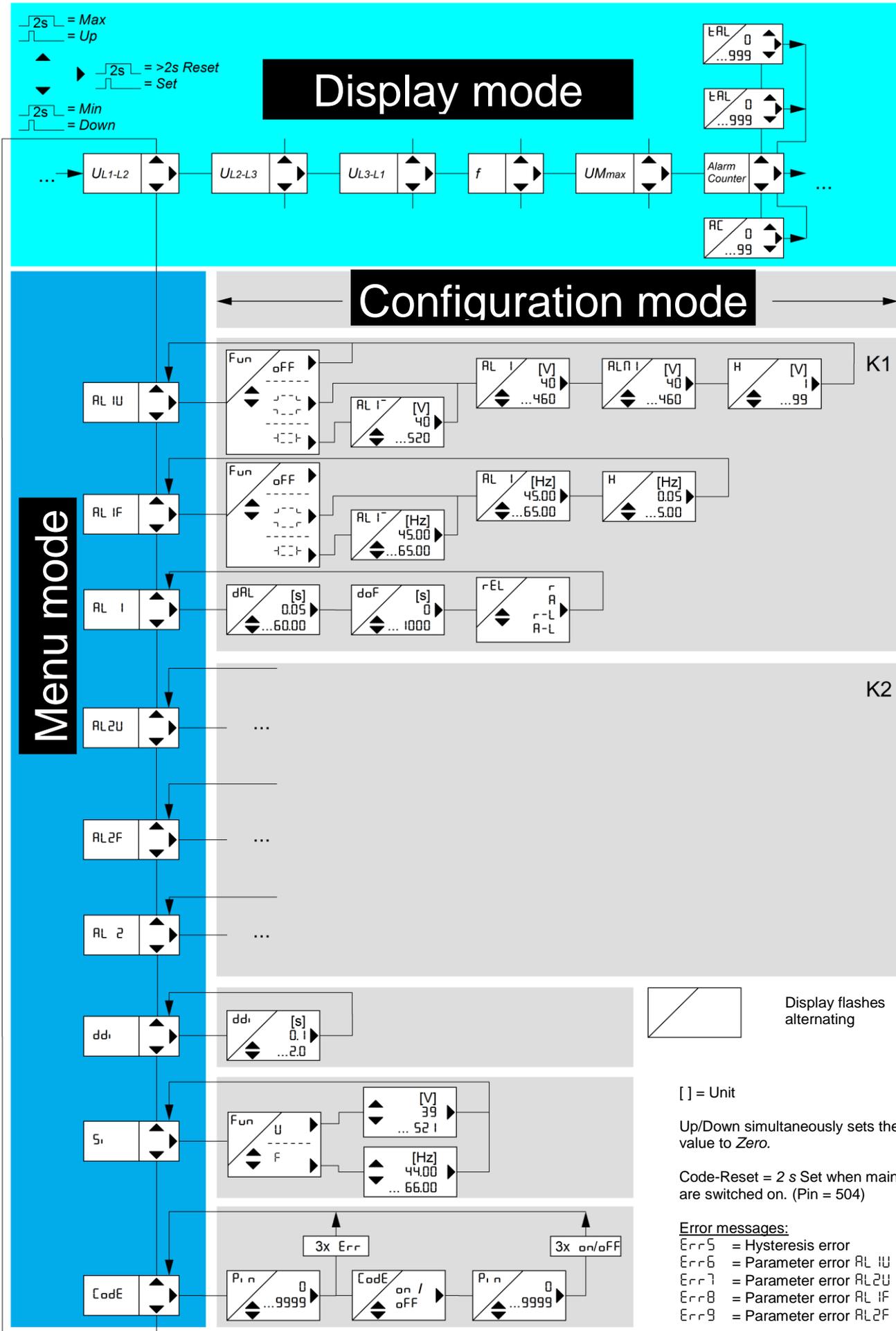
<ul style="list-style-type: none">• If present, remove seal (only authorised person)
<ul style="list-style-type: none">• Switch on control voltage on UFR 1001
<ul style="list-style-type: none">• Slightly lift the key cover and turn 180°
<ul style="list-style-type: none">• Press buttons on the key cover until locked LED is off
<ul style="list-style-type: none">• Switch off control voltage on UFR 1001
<ul style="list-style-type: none">• Keep the Set key pressed and switch the control voltage on again
⇒ Pr I.
<ul style="list-style-type: none">• Release the Set key
<ul style="list-style-type: none">• Set the program with the UP/DOWN keys
<ul style="list-style-type: none">• Press the Set key
⇒ Device resets and starts

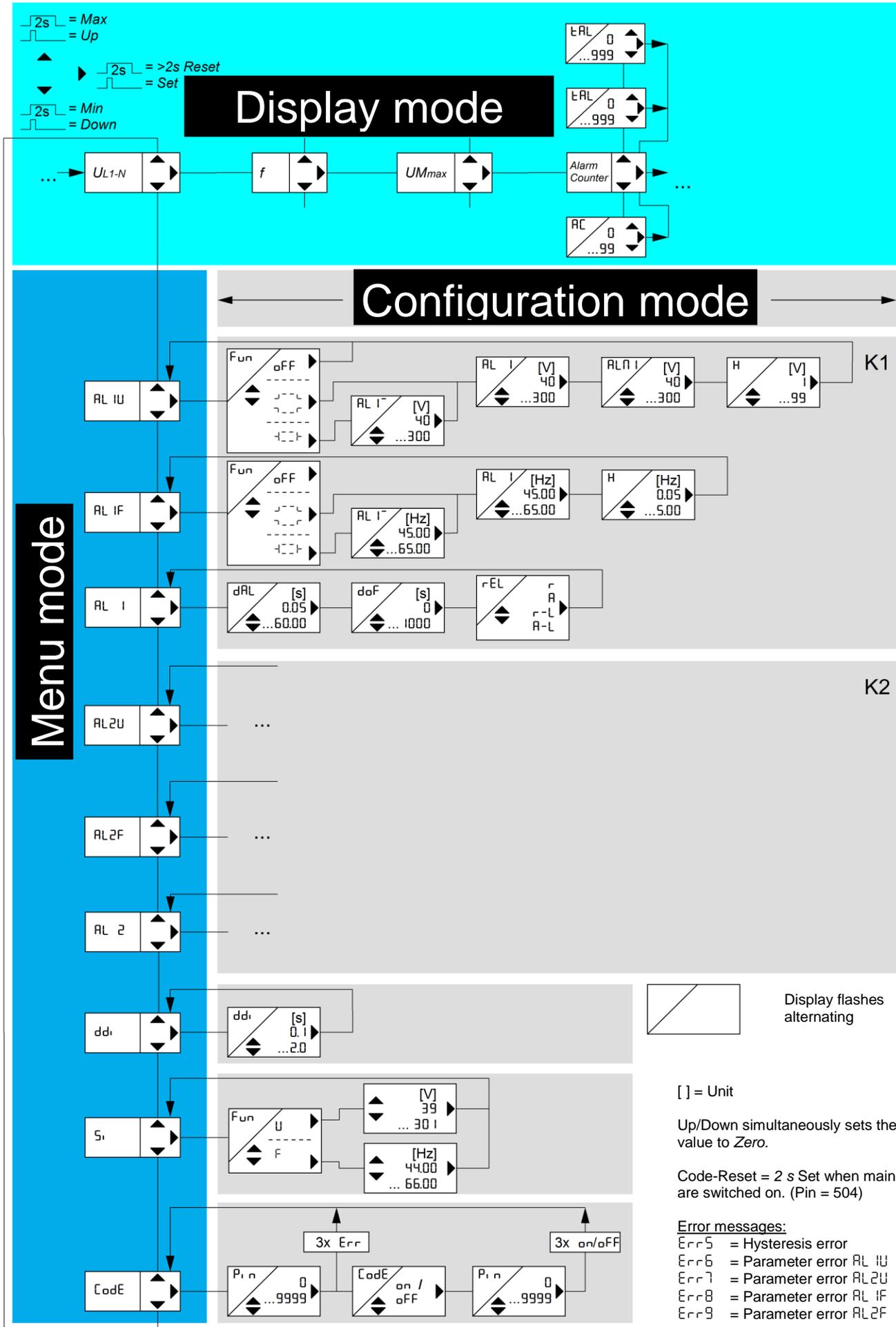
Hint: When changing programs, all parameters of the selected program are reset to "factory settings" (see table "Factory settings"); only change the parameters after selecting the correct program.

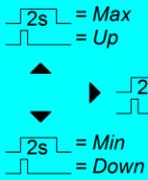
9.2 Control chart

Pr | 3AC with N AL1: Voltage, frequency AL2: Voltage, frequency

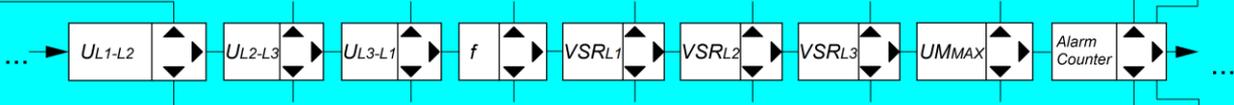
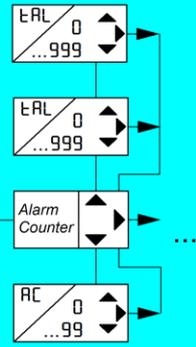






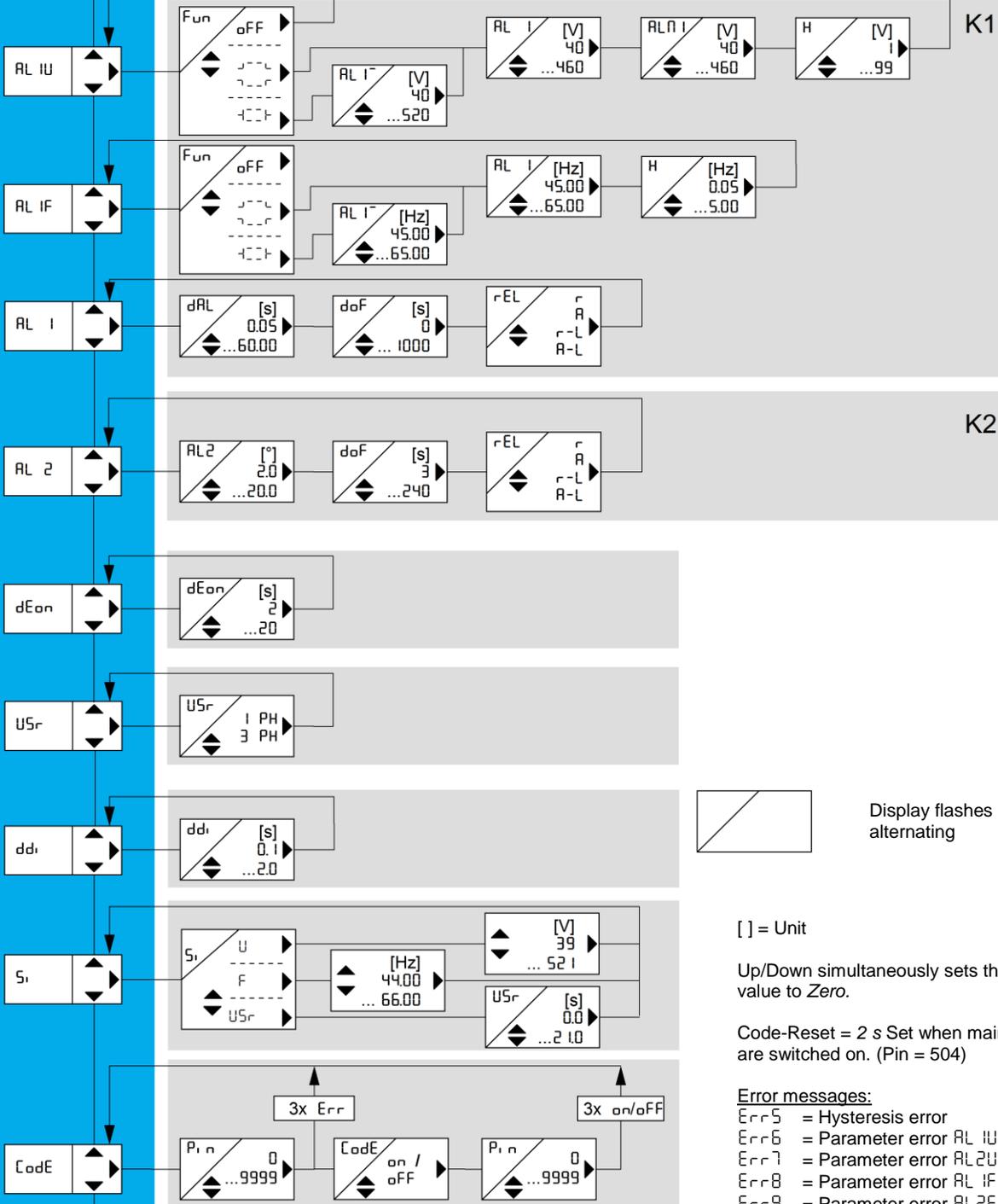


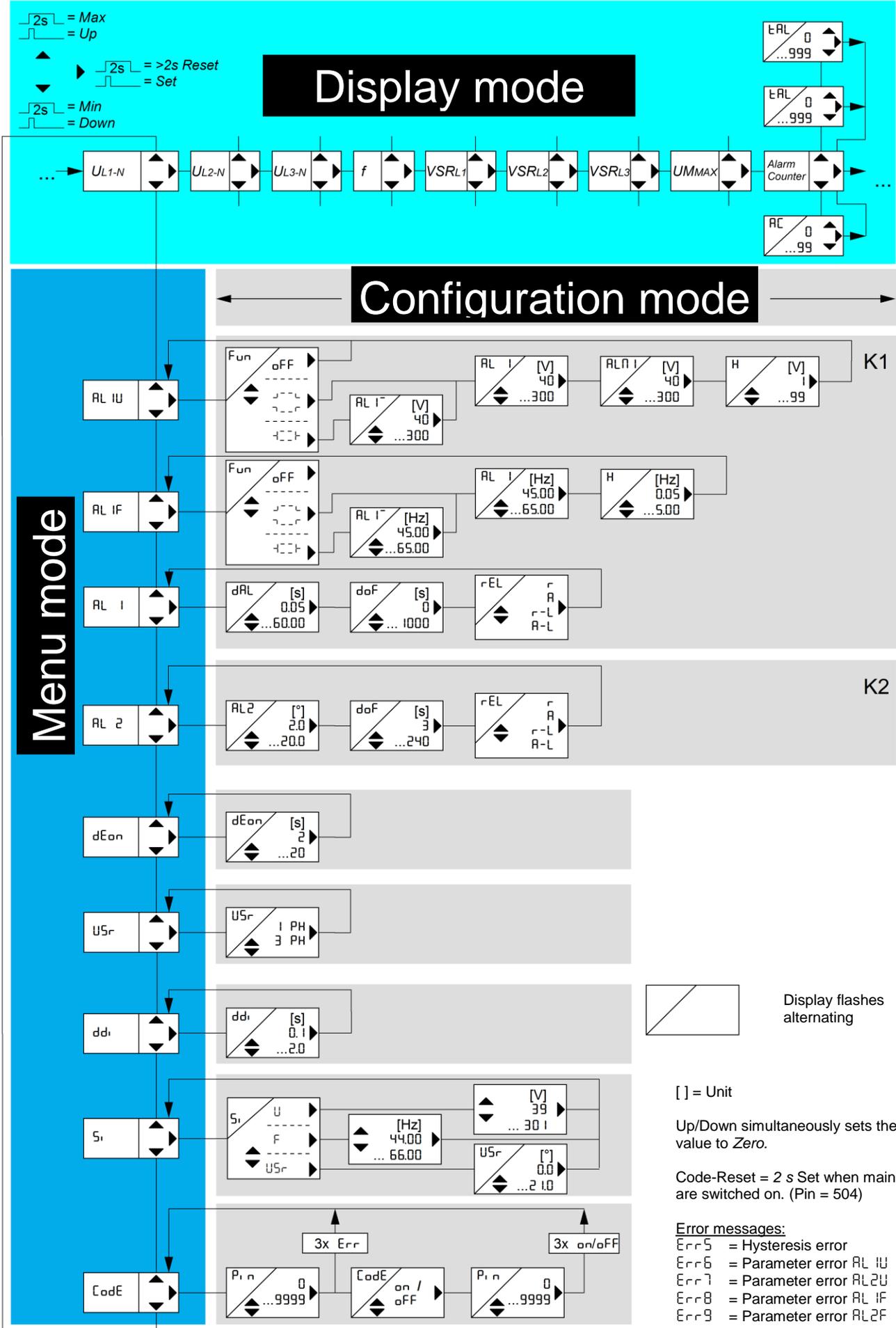
Display mode



Configuration mode

Menu mode





9.3 Description of the parameters

Parameter	Display	Explanation	Adjustment range
Measured quantity	AL 1U AL 2U AL 1F AL 2F	Voltage monitor Alarm 1 Voltage monitor Alarm 2 Frequency monitor Alarm 1 Frequency monitor Alarm 2	
Switching function	Fun	With --- , an upper limit must be set in addition	--- , --- , ---
Upper limit	AL 1 ---	Upper limit with switch function --- , when $\text{AL 1} < \text{AL 1}$ → Error message	40 ... 265 40 ... 520 45.00 ... 65.00
Limit value	AL 1 AL 2	Limits for the alarms, Alarm 1 for Relay K1 and Alarm 2 for Relay K2	40 ... 265 40 ... 520 45.00 ... 65.00
Limit value	AL 1 AL 2	Limits for 10 minutes mean value, Alarm 1 for Relay K1 and Alarm 2 for K2	40 ... 265 40 ... 520
Hysteresis	H	Switching function: --- , --- → 240 (limit) - 10(Hysteresis) = 230 (Reset value) --- , --- → 220 (Limit) + 10(Hysteresis) = 230 (Reset value)	1 ... 99 0.05 ... 5.00
Alarm delay (delay Alarm)	dAL	An alarm is suppressed for the set time (seconds)	0.05 ... 60.00
Reset delay (delay Off)	doF	Reset is delayed for the set time even with restoration of voltage if a trigger was present when disconnecting the control voltage (reset not possible); this time (seconds) is always counted down in the display	0 ... 1000
Relay function	rEL	<u>Idle current</u> --- : 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 (locked) --- -L : Reset only possible through Reset <u>Operating current</u> --- A : 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 (locked) --- -L : Reset only possible through Reset	--- A --- -L A-L
Enable time (delay On)	dEon	There is no evaluation this time; starts with applying the control voltage and when opening the Enable input	2 ... 20
VSR	uSr	1 Ph : a vector surge on one phase leads to an alarm 3 Ph : a vector surge on all phases simultaneously leads to an alarm	1 Ph ... 3 Ph
delay Display	ddi	Interval during which the display is updated in the display mode,	0.1 ... 2.0

9.4 Display mode (last decimal point off)

In the display mode, the UFR 1001 is in its normal state; here, depending on the program, the actual voltage, the highest actual 10 minute mean value, the frequency or the vector surge is displayed. In addition, the alarm signals (e.g., **RI**, **R2-L**, **Rn 2**, ...) and error codes (e.g. **Err9**) are displayed.

Function key Set / Reset	<u>Press briefly:</u> Switches the measurement, alarm-counter
	<u>Press for > 2 s:</u> Resets after locked alarm (not possible if DoF Reset delay is expiring)
	<u>Press for > 4 s:</u> Displays the program, e.g. Pr 1
	<u>Press for > 10 s:</u> Displays the software version e.g. 0000
Function key Up / Down	<u>Press briefly:</u> Changes into the menus mode
	<u>Display alarmcounter:</u> Down = readout memories Up = display added time of
	<u>Press for ≥2 s:</u> Displays MAX and MIN measurements, additionally pressing the Set key for ≥ 2 s deletes the saved values

9.5 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

9.6 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.

9.7 Configuring the alarms

Adjustment process:

<ul style="list-style-type: none"> Select the menu item with the Up/Down key until ...
⇒ Display RI IU
<ul style="list-style-type: none"> Press the Set key
⇒ Display Fun / J-L (Function / switching function) flash alternately
<ul style="list-style-type: none"> Set the desired switching function using the Up and Down keys
<ul style="list-style-type: none"> Press the Set key

Upper switch point, ONLY during window function! (F1)

⇒ Display RL I⁻ / 254 (Alarm 1 / Limit value) flash alternately

- Set the desired limit using the Up and Down keys
- Press the Set key

⇒ Display RL I / 184 (Alarm 1 / Limit value) flash alternately

(during window function F1 - lower switch point)

- Set the desired limit using the Up and Down keys
- Press the Set key

⇒ Display H / 5 (Hysteresis / Value) flash alternately

- Set the desired value with the Up and Down keys
- Press the Set key

⇒ Display RL II.

- Press Down key

⇒ Display RL IF.

- Press the Set key

⇒ Display Fun / 2 (Function / switching function) flash alternately

- Set the desired switching function using the Up and Down keys
- Press the Set key

Upper switch point, ONLY during window function! (F1)

⇒ Display RL I⁻ / 5150 (Alarm 1 / Limit value) flash alternately

- Set the desired limit using the Up and Down keys
- Press the Set key

⇒ Display RL I / 47.50 (Alarm 1 / Limit value) flash alternately

(during window function F1 - lower switch point)

- Set the desired limit using the Up and Down keys
- Press the Set key

⇒ Display RL II / 253 (Alarm 1 10 min / Limit value) flash alternately

- Set the desired value with the Up and Down keys
- Press the Set key

⇒ Display H / 0.05 (Hysteresis / Value) flash alternately

- Set the desired value with the Up and Down keys
- Press the Set key

⇒ Display RL IF

- Press Down key

⇒ Display RL I.

- Press the Set key

⇒ Display dRL / 0.10 (Delay Alarm / Time) flash alternately

- Set the desired time using the Up and Down keys
- Press the Set key

⇒ Display doF / 30 (Delay Off / Time) flash alternately

- Set the desired time using the Up and Down keys
- Press the Set key

⇒ Display rEL / r (Relay / Parameter) flash alternately

- Set the desired parameter using the Up and Down keys
- Press the Set key

⇒ Display RL I.
• Repeat configuration for Alarm 2

9.8 Delay Enable On, Delay Display, vector surge configuration

Adjustment process:

• Select the menu item with the Up/Down key until ...
⇒ Display dEon. (Delay Enable On)
• Press the Set key
⇒ Display dEon. / 3 (Delay Enable On / Time) flash alternately
• Set the desired time using the Up and Down keys
• Press the Set key
⇒ Display dEon. (Delay Enable On)
• Press Down key
⇒ Display uSr. (Vector surge)
• Press the Set key
⇒ Display uSr. / I PH (Vector surge / Parameter) flash alternately
• Set the desired parameter using the Up and Down keys
• Press the Set key
⇒ Display uSr. (Vector surge)
• Press Down key
⇒ Display ddi. (Delay display)
• Press the Set key
⇒ Display ddi. / 0.5 (Delay display / Current time) flash alternately
• Set the desired time using the Up and Down keys
• Press the Set key
⇒ Display ddi. (Delay display)

9.9 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:

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

9.10 Sealing

All the settings and the simulation mode can be locked.

If the LED is illuminated, the UFR 1001 is locked.

If an attempt is made in the locked state to change a setting, the display shows **Loc** for 3s.

Adjustment procedure Sealing/Lock ON (OFF):

<ul style="list-style-type: none">• If present, remove seal (only authorised person)
<ul style="list-style-type: none">• Slightly lift the key cover and turn 180°
<ul style="list-style-type: none">• Keep keys pressed by pushing on the key cover (locked - LED flashes) until Locked – LED is permanently OFF (ON)

9.11 Possible indications in display

Display mode

A 1 , A 2 , AN 1 , AN 2 , A 1L , A 2L , AN 1L , AN 2L , Ac , tAL	Alarm1, Alarm2, Alarm1(10min), Alarm2(10min) active in addition "L", (locked), Reset required to reset alarm-counter, added time of alarms
Err5 ... Err9	Error messages (see 11. Error messages and measures)

Menu mode / Configuration mode

U	Voltage
AL 1U , AL 2U	Alarms for voltage
F	Frequency
AL 1F , AL 2F	Alarms for frequency
uSr	Vector surge
Fun	Switching function
AL 1 , AL 2	Limits
AL 1 ⁻ , AL 2 ⁻	Upper limit during window monitoring
u ⁻ L	Monitoring exceeding of the limit value (Max)
u ⁻ r	Monitoring falling below the limit value (Min)
u ⁻ L ⁻	Monitoring the limit value of falling below and exceeding (window)
H	Hysteresis
dAL	Alarm delay
doF	Reset delay, Reconnection delay if an alarm is present when the UFR 1001 is shutting down (no reset possible); is always counted down in the display
rEL	Relay function
r , R	Zero signal (idle) current, operating current
r-L , R-L	Zero signal current locked, operating current locked
on , oFF	On, Off
dEon	Delay Enable On, delay time during power up and after opening the enable input
1 Ph	Single-phase vector surge evaluation
3 Ph	Three-phase vector surge evaluation
dd	Delay display, to quiet down the display
Si	Simulation
CodE , Loc	Code lock, sealed/locked
Pin	Pin code (factory setting 504)

10 Maintenance and repair

The UFR 1001 is maintenance-free. Periodically test for proper functioning.

11 Troubleshooting and measures

Error	Cause	Remedy
EEEE or -EEE appears in the display	Measurement is in excess / undercut range	Measured voltage, frequency or the vector surge is too large or too small; comply with measurement range
Err5 appears in the display	Hysteresis error	A reset point is outside the measurement range; check the hysteresis
Err6 appears in the display	Parameter error in AL1U	AL1 limit value must be less than the upper AL1 ⁻ limit value
Err7 appears in the display	Parameter error in AL2U	AL2 limit value must be less than the upper AL2 ⁻ limit value
Err8 appears in the display	Parameter error in AL1F	AL1 limit value must be less than the upper AL1 ⁻ limit value
Err9 appears in the display	Parameter error in AL2F	AL2 limit value must be less than the upper AL2 ⁻ limit value
A time expires in the display after switching on the control voltage	If an alarm is present while shutting down the UFR 1001, the reset delay time runs down for the triggered alarm during reconnection	Set wait or reset delay to 0 (if the application allows)
Device cannot be configured / only the limits can 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? -> Perform a code reset:</u> <ul style="list-style-type: none"> ▪ While switching on the control voltage, keep the "Set" key pressed for 2 s ⇒ The display alternates 8888 – Code – OFF – 8888 ⇒ Release the Set key 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
Loc appears in the display	Seal is active	See 8.11 Sealing

12 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 440 V

Conventional thermal current I_{th}

6 A

Inrush current (at 10 % ED)

25 A max. 4 s / 50 A max. 1 s

Nominal operating current I_e

AC15 I_e = 6 A U_e = 250 V

DC13 I_e = 2 A U_e = 24 V

DC13 I_e = 0,2A U_e = 250 V

Recommended series fuse

gG/gL 6 A

Contact service life, mech.

30 x 10⁶ operating cycles

Contact service life, electr.

1 x 10⁶ operating cycles at AC 250V / 6A

2 x 10⁵ operating cycles at AC 250V / 10A cos φ 0.6

Voltage measurement:

Measurement voltage phase – phase

AC 35...530 V (< 5V: 0 is displayed)

Adjustment range phase – phase

AC 40...520 V

Measurement voltage phase – N

AC 20...310 V (< 5V: 0 is displayed)

Adjustment range phase – N

AC 40...300 V

Measuring principle

root mean square measurement

Hysteresis

adjustable 1...99 V

Measurement error (with N)

± 0.8% of the measurement value ± 1 digit

Measurement error (without N)

± 1% of the measurement value ± 1 digit

Measuring functions

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

Response time

adjustable 0.05 (±15ms)...60.00 s

Reset time

adjustable 0(>200ms) ... 1000 s

Frequency measurement

Frequency range

40...70 Hz

Adjustment range

45.00...65.00 Hz

Hysteresis

0.05...5.00 Hz

Measurement error

± 0.05Hz ± 1 digit

Response time

adjustable 0.05 (±15ms)...60.00 s

Reset time

adjustable 0 (>200ms) ... 1000 s

Vector surge

Measurement range

0...45.0°

Adjustment range

2.0...20.0°

Response time

< 50 ms

Reset time

adjustable 3...240 s

Delay at Us on

adjustable 2...20 s

Test conditions

Rated impulse withstand voltage

EN 60255
4000 V

Overvoltage category

III

Pollution degree

2

Rated insulation voltage U_i

300 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 61000-6-3

Housing:

Mounting type

Front-to-back size

Dimensions (W x H x D)

Wiring connection single strand

Finely stranded with wire end ferrule

Protection class, housing

Protection class, terminals

Mounting

V4:

69 mm

90 x 70 x 58 mm

ea. 1 x 4 mm²

ea. 1 x 2.5 mm²

IP 30

IP 20

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)

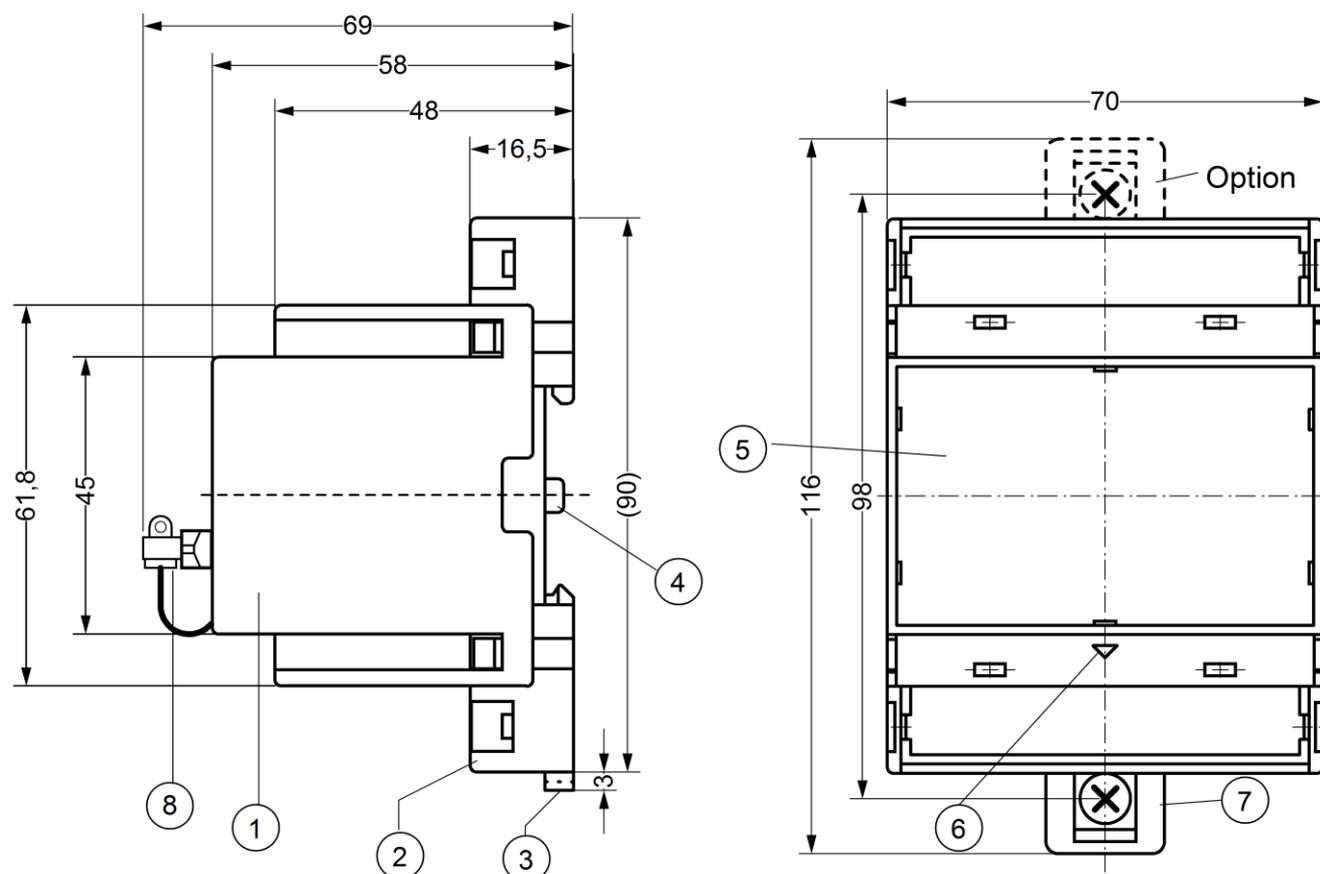
approx. 200 g

Weight:

We reserve the right to make technical changes

13 Mounting type V4:

Dimensions in mm



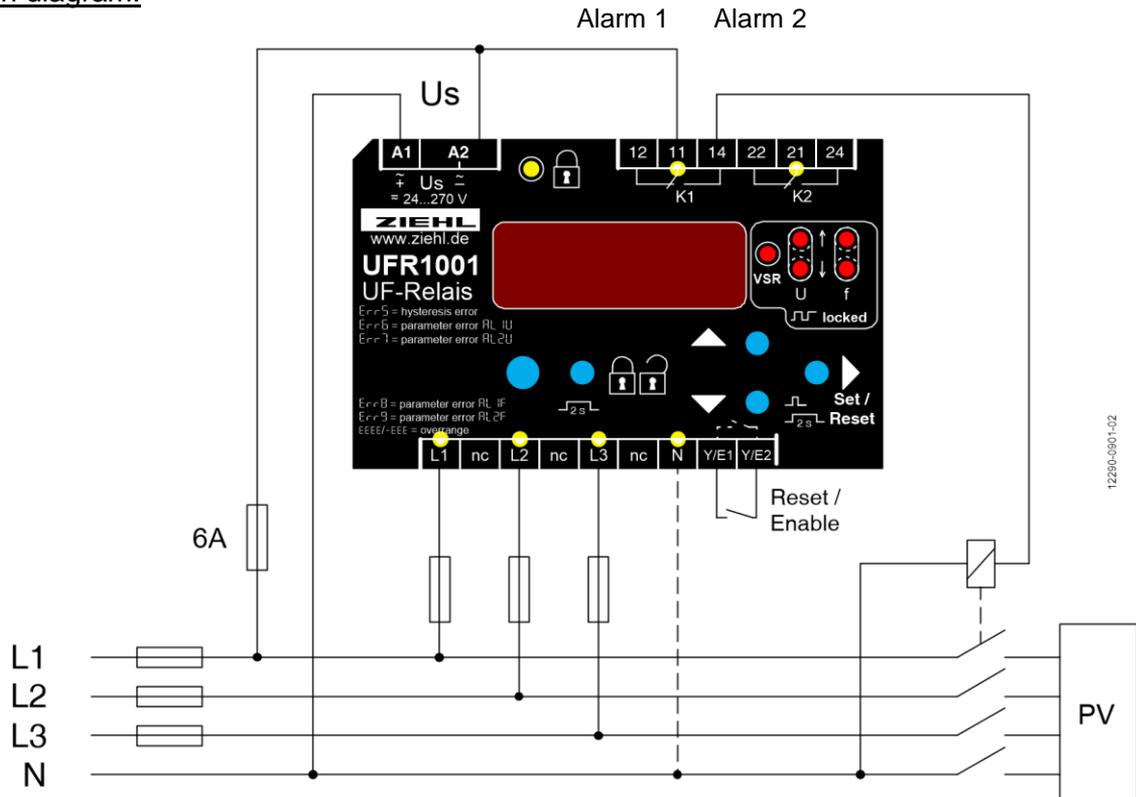
- 1 Cover
- 2 Base
- 3 Bar for snap mounting
- 4 Latch for sealing
- 5 Front panel
- 6 Identification for bottom / position downward
- 7 Bar for wall mounting with screws. Bar drill hole \varnothing 4.2 mm / for fixing to wall with screws, \varnothing 4.2 mm.
- 8 Sealing max. \varnothing 1.8 mm

14 Quick installation system disconnection on photovoltaic plants

The UFR 1001 is preconfigured for this application.

The settings and connection diagrams comply with those in the draft for the application rules of the VDE "Forum Netztechnik und Netzbetrieb (FNN)" for connection of in-plant systems to the low-voltage network. Whether these apply to the actual application/place of use has to be checked.

Connection diagram:



Connection is possible with and without N. We recommend measuring with N.

We recommend fusing the relay contact with 6 A.

No extra fuse is required for the measurement voltage and the control voltage. Fuse the power input to the unit.

Basic setting:

The unit is preset for measuring with N (Program 1).

When measuring without N, switch to Program 2 as in the following:

- If present, remove seal (only authorised person)
- Switch on control voltage
- Slightly lift the key cover and turn 180°
- Keep keys pressed by pushing on the key cover until locked LED is OFF
- Switch off control voltage
- Press the Set key while switching on the control voltage
- Keep the Set key pressed until "Pr1" appears in the display
- Release the Set key
- Switch over to "Pr 2" with the Up/Down key
- Briefly press the Set key:
- Finished

The following values are now preset for both alarms (Relay K1 and K2):

		PR1 (with N)	Pr2 (without N)
Oversvoltage (rise-in voltage protection U>>)	+15 % (1.15 Un)	264 V	460 V
Undersvoltage (undersvoltage protection U<)	-20 % (0.8 Un)	184 V	320 V
Oversvoltage 10-minute mean value (U>)	+10 % (1.1 Un)	253 V	440 V
Underfrequency (underfrequency protection F<)	47.50 Hz		
Overfrequency (rise-in frequency protection F>)	51.50 Hz		
Response delay (disconnection time)	0.10 s		
Reset delay doF (reconnection time) (zero voltage maintenance)	30 s		

In the **display mode**, the actual measurements (3x voltage, 1x frequency, 1x highest 10-minute mean value) and the alarm-counter can be viewed successively by briefly pressing the Set keys. While doing so, the LED of the phase of which the voltage is being displayed illuminates (with N). When measuring without N, both LEDs of the phases between which the voltage is being measured illuminate.

When alarm-counter (Ac) is displayed, added time of alarms TAL can be read-out by pressing key up. TAL = time relays have been switched off because of alarms.

Press on the Up/Down keys for a long time to display the saved maximum and maximum values. Reset by simultaneously pressing the Up or Down key plus the Set key (>2 s).

In the **simulation mode** (Key up 2x), the values for voltage, frequency and vector surge can be simulated, which means the correct parameter settings can be checked and the functioning of the downstream systems can be tested.

For an exact description, see 8.9.

To **enable the seal**, plug in the key cover and turn it so that the connection rib faces up toward the sealing pin; press the key by pressing on the key cover until the LED is permanently illuminated with "Loc"

Turn the key cover 180° (connector to the sealing pin faces down) and plug in completely, push the sealing pin into the recess and seal.

All set values are now protected against manipulation.

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.

Comply with the safety instructions in the operating instructions.