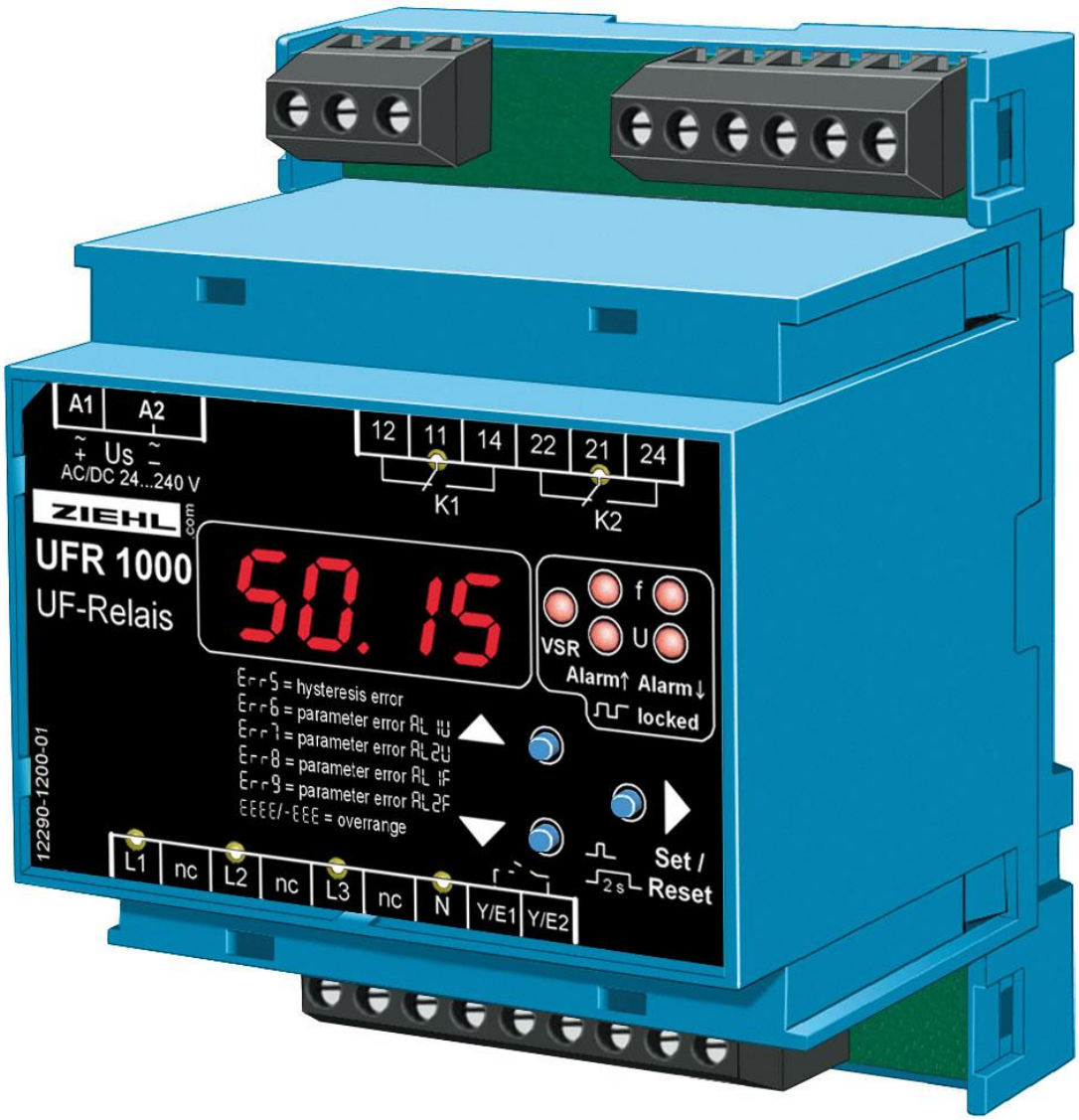
Operating instructions - Archive document

UFR 1000

Voltage and frequency relay
with integrated vector-surge relay



Quick installation guide
System disconnection of photovoltaic plants
See page 25

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1. Application and brief description

The voltage and frequency relay UFR 1000 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.

2. Overview 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)
- 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
- 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

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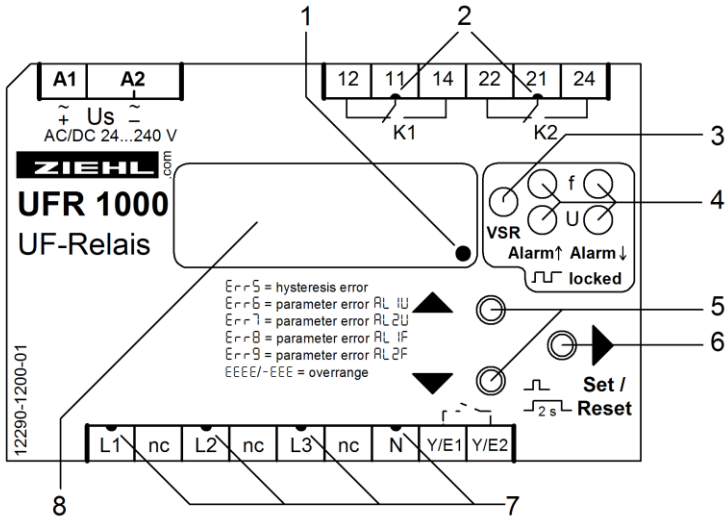
3. Display and controls



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 vector surge (VSR, red)

OFF	Vector surge limit not exceeded
ON, A 2	Vector surge limit exceeded
FLASHING, A 2L	Ready for reset after exceeding the limit
FLASHING, A 2	Reset delay doF running out

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

ON, A 1 or A 2 or AN 1 or AN 2	Limit value undercut / exceeded
FLASHING, A1-L or A2-L or AN1L or AN2L	Ready for reset after undercutting / exceeding the limit value
FLASHING, A 1 or A 2 or AN 1 or AN 2	Reset delay doF running out
OFF	Limit value not undercut / exceeded

5 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

6 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 expiring)
Press for > 4 s	Displays the program, e.g. Pr 1
Press for > 10 s	Displays the software version e.g. 0000

7 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

8 Digital display 4-digits (red)

Depending on the program display, actual voltage, frequency, vector surge
Displays the alarm signals, e.g. A 1, A2-L,…
Displays the errors with error code e.g. Err9

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4. Detailed description

4.1 Description of the connections

Connection	Function
A1 and A2	Control voltage Us, see 12. Technical data
11, 12, 14	Relay K1, menu item AL 1U., AL 1F.
21, 22, 24	Relay K2, menu item AL2U., AL2F.
E1 – E2 (Pr 4-5) Enable input	Floating opener
	Contact closed = UFR 1000 disabled, no evaluation of voltage, frequency and vector surge
	Open = UFR 1000 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

4.2 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, doF, runs out for the respective alarm; whenever a reset delay time doF 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)

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5. 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.

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6. Mounting

The device can be mounted:

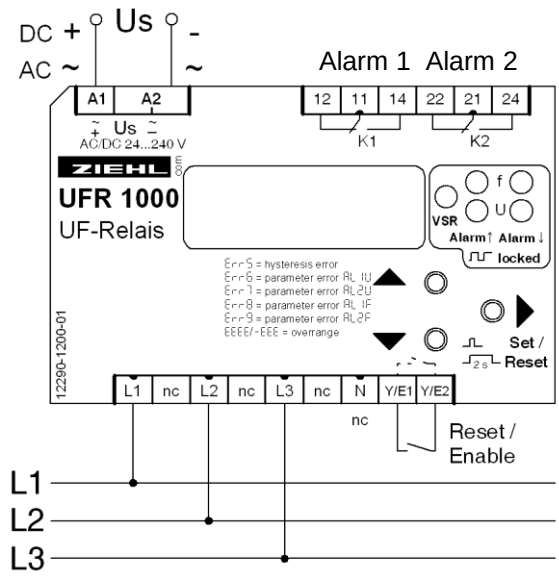
- Distribution board or switch cabinet on 35 mm rails according to EN 60715

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.

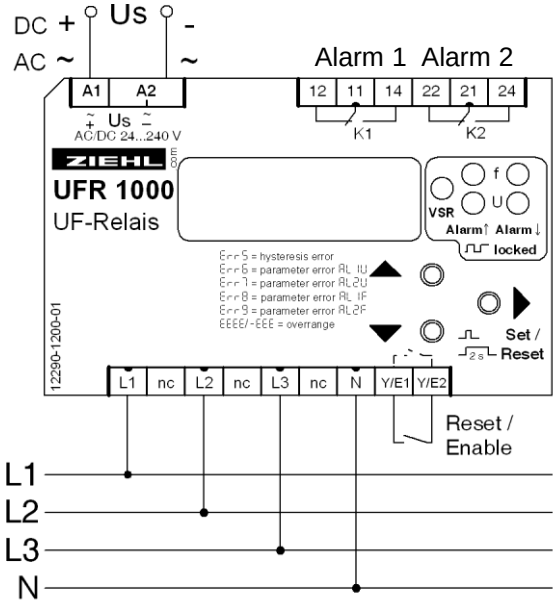
Caution!
Before you apply mains voltage to the device, make sure that the permissible control voltage $\mathbf{U_S}$ on the side rating plate matches the mains voltage connected to the device!

7. Connection diagram

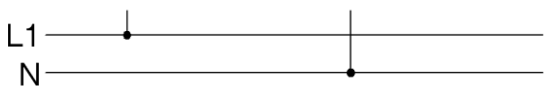
3-phase **with** N (PR1, PR5)



3-phase **without** N (PR2, PR4)



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



8. Commissioning

8.1 Program setup

The suitable program must be set on the UFR 1000 in accordance with the application (see table). That is taken care of during commissioning.

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:

- Switch off control voltage on UFR 1000
- Keep the Set key pressed and switch the control voltage on again

  ⇒ 

- Release the Set key
- Set the program with the UP/DOWN keys
- 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.

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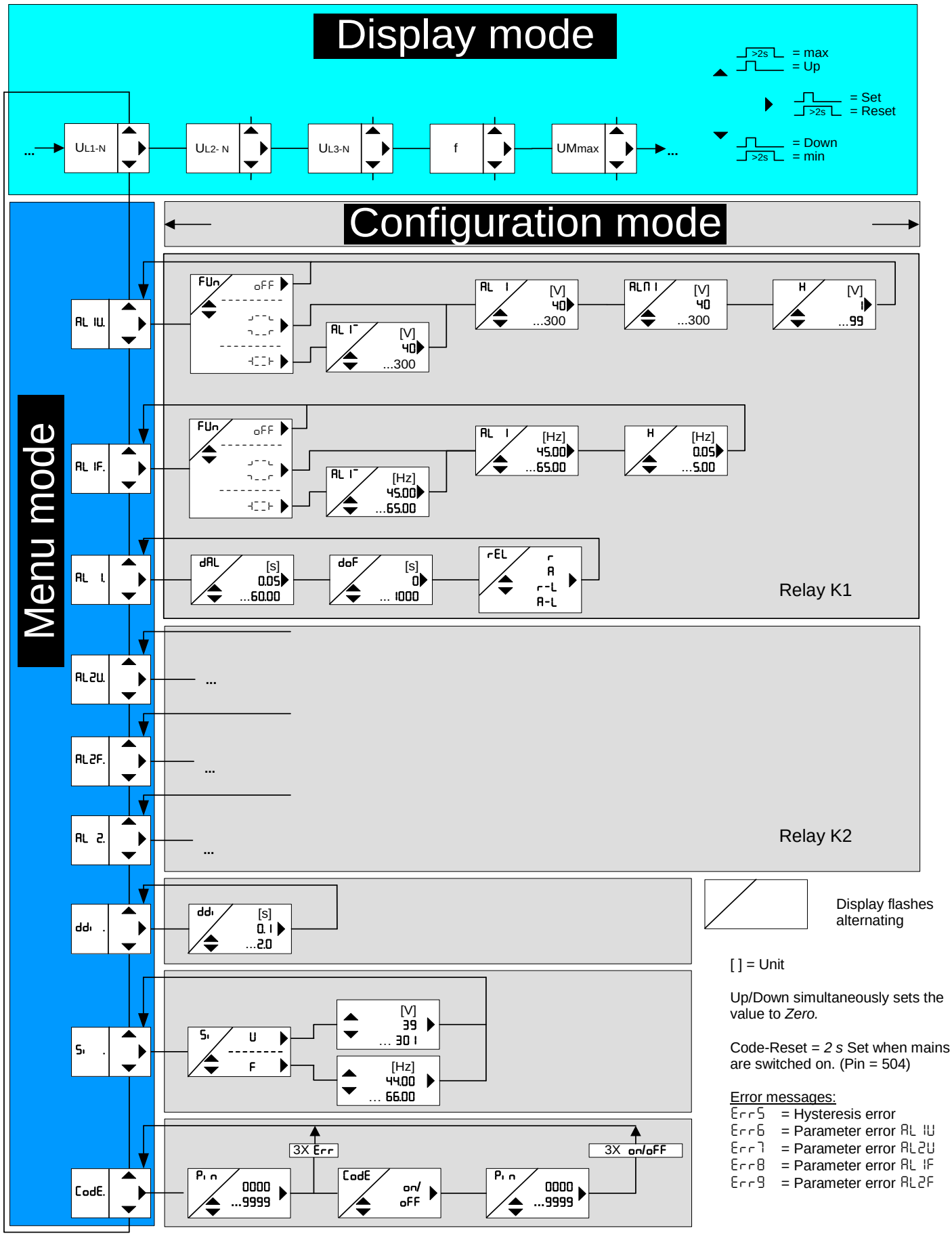
8.2 Control chart

Pr 1 **3AC with N** **AL1:** Voltage, frequency **AL2:** Voltage, frequency



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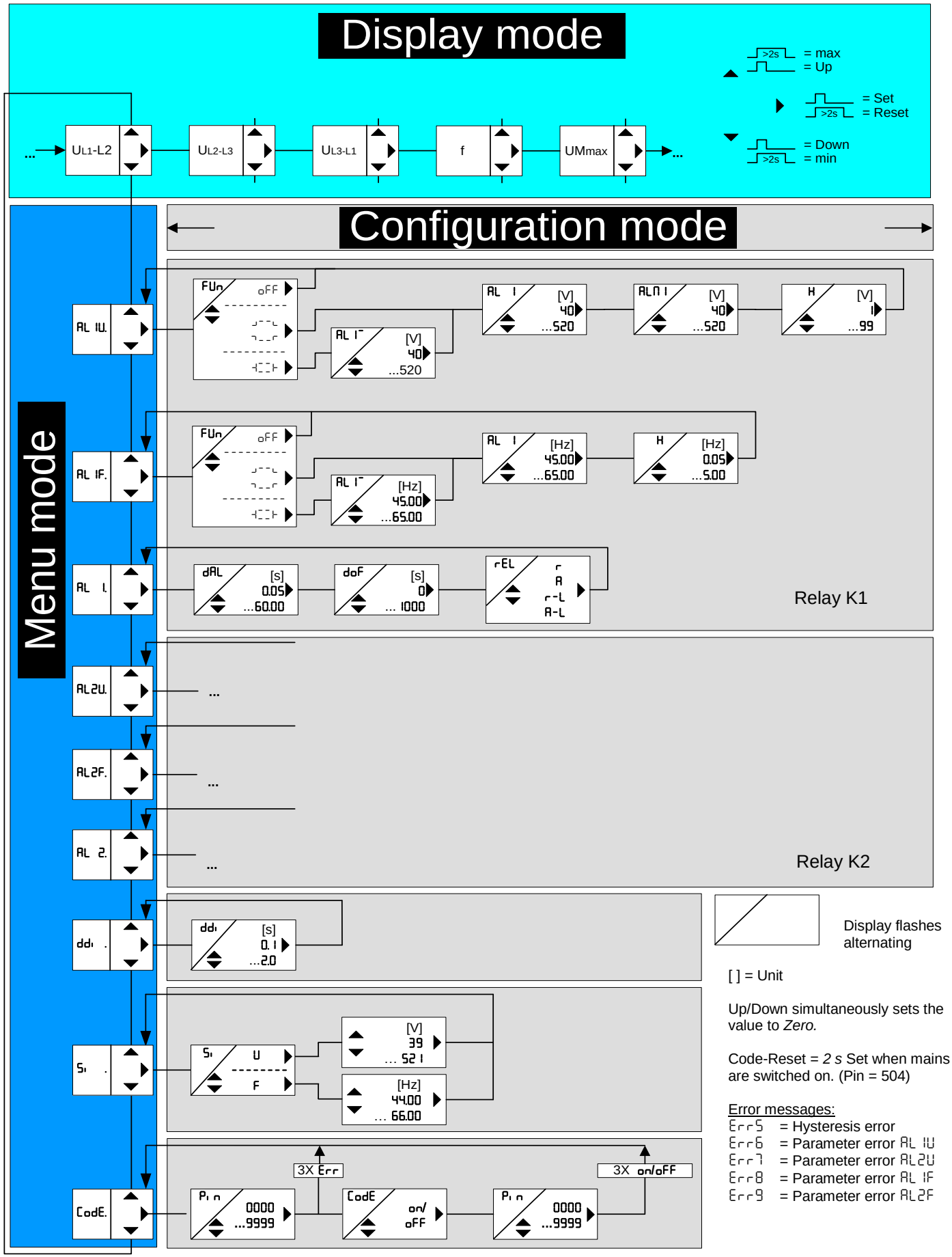

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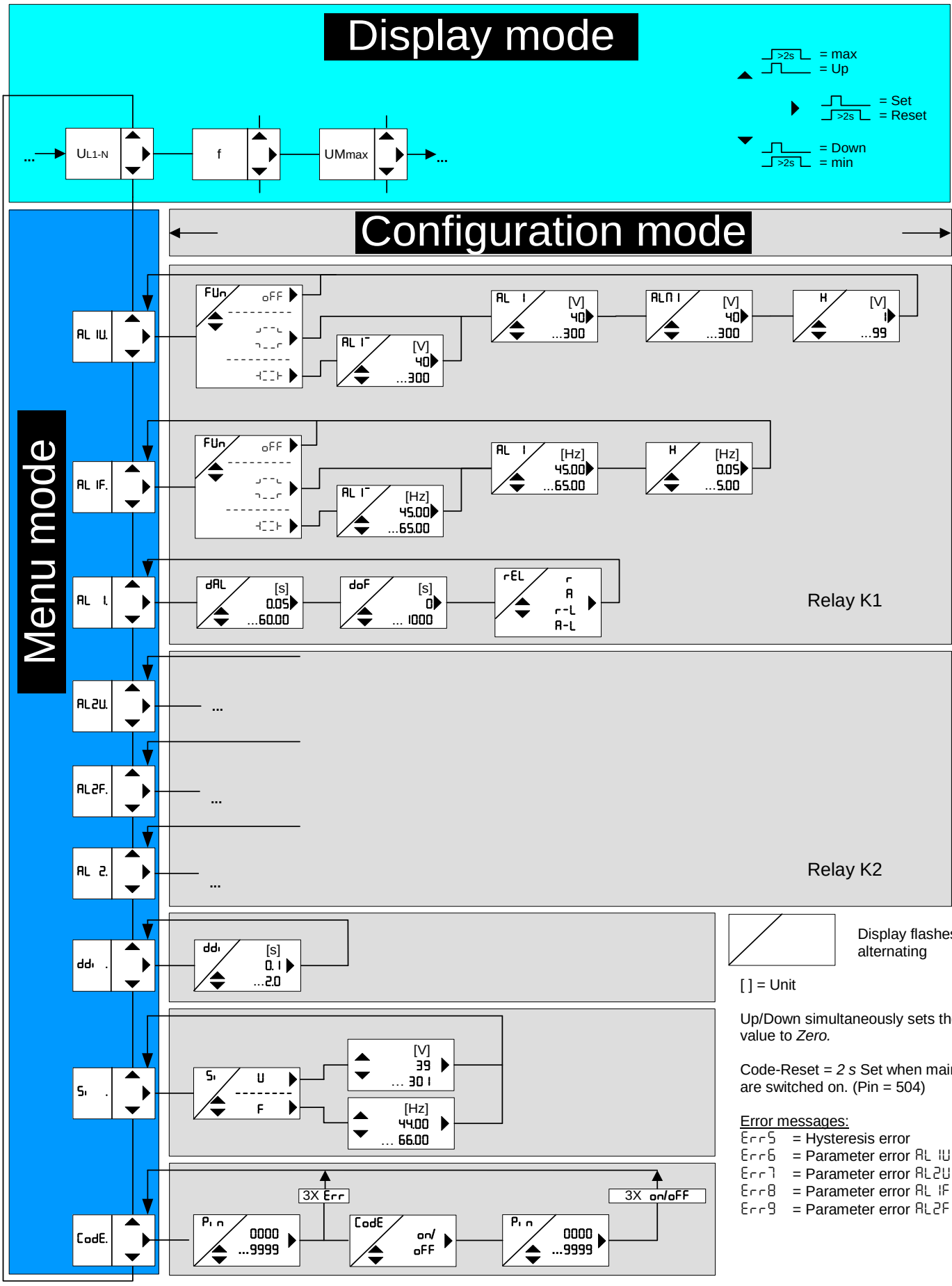
Pr 3 **1AC with N** **AL1:** Voltage, frequency **AL2:** Voltage, frequency



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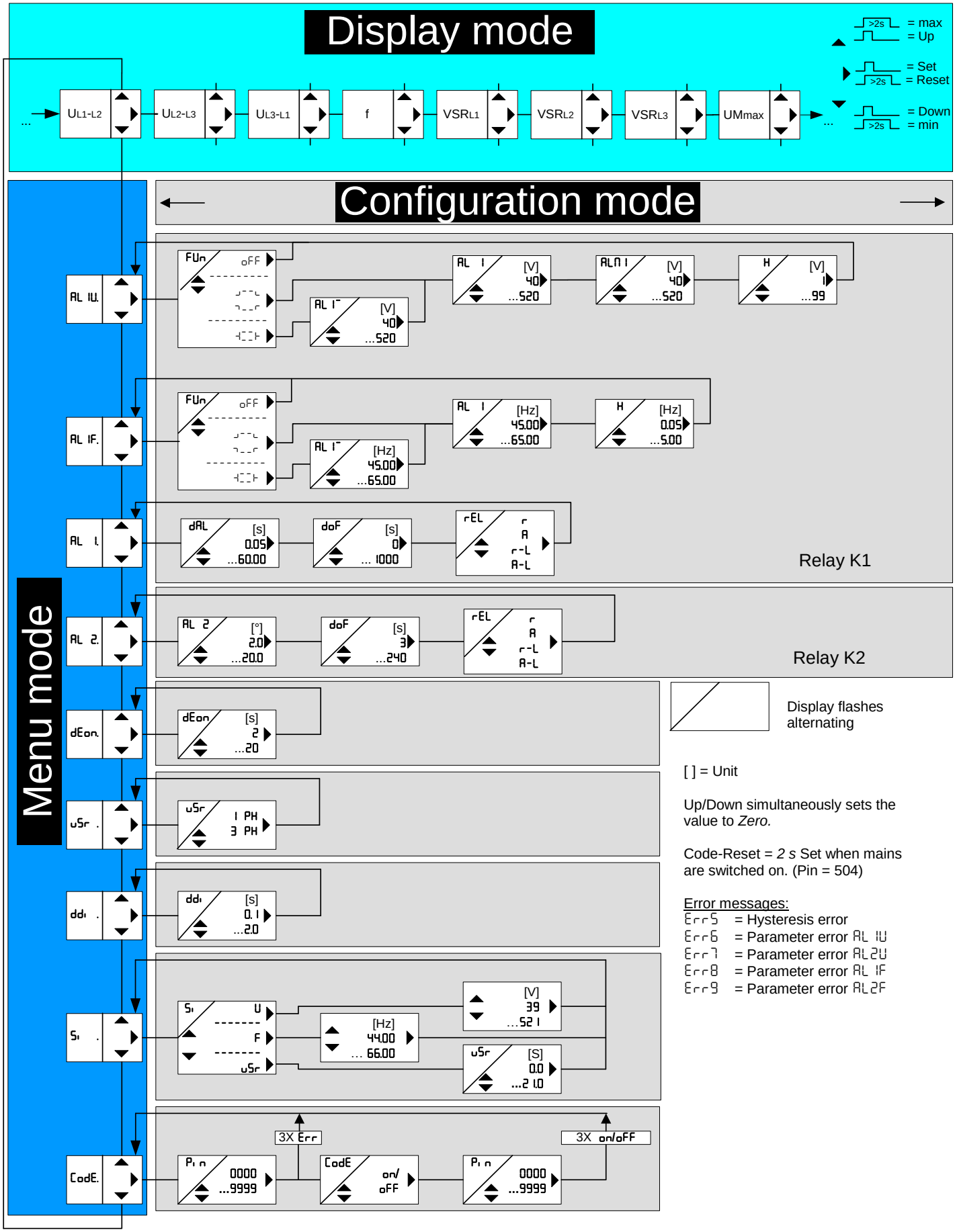
Pr 4 **3AC without N** **AL1:** Voltage, frequency **AL2:** Vector surge



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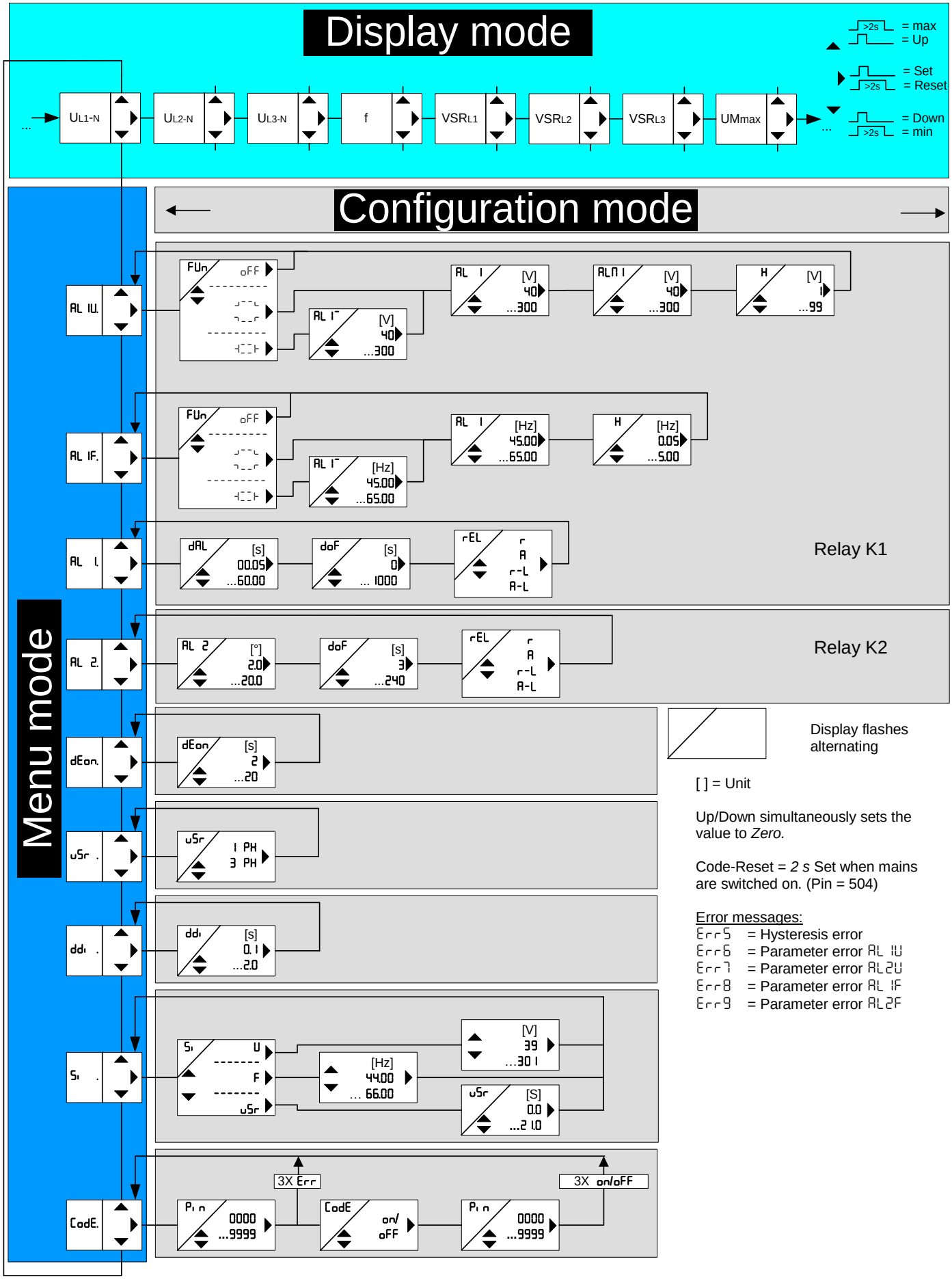
Pr 5 **3AC with N** **AL1:** Voltage, frequency **AL2:** Vector surge



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8.3 Description of the parameters

Parameter	Display	Explanation	Adjustment range
Measured quantity	AL 1U AL2U AL 1F AL2F	Voltage monitor Alarm 1 Voltage monitor Alarm 2 Frequency monitor Alarm 1 Frequency monitor Alarm 2	
Switching function	Fun	With HIGH, an upper limit must be set in addition	LOW , rEF , HIGH
Upper limit	AL 1-	Upper limit with switch function HIGH, when AL 1- < AL 1 → Error message	40 … 265 40 … 460 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 … 460 45.00 … 65.00
Limit value	ALM1 ALM2	Limits for 10 minutes mean value, Alarm 1 for Relay K1 and Alarm 2 for K2	40 … 265 40 … 460
Hysteresis	H	Switching function: LOW , HIGH → 240 (limit) - 10(Hysteresis) = 230 (Reset value) rEF , HIGH → 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	Idle current r: 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) r-L: Reset only possible through Reset Operating current 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) A-L: Reset only possible through Reset	r A r-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	ddı	Interval during which the display is updated in the display mode,	0.1 ... 2.0

8.4 Display mode (last decimal point off)

In the display mode, the UFR 1000 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., A1 , A2-L, AN 2, …) and error codes (e.g. Err9) are displayed.

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

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

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

8.7 Configuring the alarms

Adjustment process:

- Select the menu item with the Up/Down key until …

  ⇒ Display AL 1U.

- Press the Set key

  ⇒ Display Fun / ⌐¯¯¬ (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! (⌐¯¯¬)

⇒ Display AL 1 / 264 (Alarm 1 / Limit value) flash alternately

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

⇒ Display AL 1 / 184 (Alarm 1 / Limit value) flash alternately
(during window function ⌐¯¯¬ - 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 AL 1U.

- Press Down key

  ⇒ Display AL 1F.

- Press the Set key

  ⇒ Display Fun / ⌐¯¯¬ (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! (⌐¯¯¬)

⇒ Display AL 1 / 50.20 (Alarm 1 / Limit value) flash alternately

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

⇒ Display AL 1 / 47.50 (Alarm 1 / Limit value) flash alternately
(during window function ⌐¯¯¬ - lower switch point)

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

  ⇒ Display AL01 / 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 AL 1F
- Press Down key
  - ⇒ Display AL 1.
- Press the Set key
  - ⇒ Display dAL. / 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 AL 1.
- Repeat configuration for Alarm 2

8.8 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 / 1 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 ddı . (Delay display)
- Press the Set key
  - ⇒ Display ddı / 0.5 (Delay display / Current time) flash alternately
- Set the desired time using the Up and Down keys
- Press the Set key
  - ⇒ Display ddı . (Delay display)

8.9 Simulation

Here, depending on the program the voltage, frequency or a vector surge can be simulated and the setting can be tested. All 3 phases plus the 10 minute mean value are always simulated. 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.
Set values are simulated until the menu item SI. is exited with the Up or Down key.

Adjustment process:

• Select the menu item with the Up/Down key until…
⇒ Display SI. (Simulation)
• Press the Set key
⇒ Display SI / U (Simulation / Measurement factor) flash
• Use the Up and Down keys to select U
• Press the Set key
• A voltage value can be simulated with the Up and Down keys (frequency = most recently simulated value)
• Press the Set key (exits the configuration mode)
⇒ Display SI. (Simulation)
• Press the Set key
⇒ Display SI / U (Simulation / Measurement factor) flash
• Use the Up and Down keys to select F
• Press the Set key
• The value in the display can be set with the Up and Down keys so that it is within the limit value for F.
• Press the Set key (exits the configuration mode)
⇒ Display SI. (Simulation)
• Press Set key (starts the simulation)
• Use the Up and Down keys to select the measured variable
• Press the Set key
⇒ Display - the set measured variable
• A frequency value can be simulated with the Up and Down keys (voltage = most recently set value)
• Press the Set key (exits the configuration mode)
⇒ Display SI. (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.

8.10 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 Cod (Code lock)
• Press the Set key
⇒ Display Pin / 0 (Pin / Pin code) flash alternately
• Use the Up and Down keys to set the **saved** pin code (**factory setting is** 504)
• Press the Set key
• Set the desired code lock using the Up and Down keys: ○ oFF off, all parameters can be changed ○ on on, no parameters can be changed
• Press the Set key
⇒ Display Pin / 504 (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 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 CodE / oFF appears in the display.

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8.11 Possible indications in display

Display mode

A 1 , A 2 , AN 1 , AN 2 , A 1L , A 2L , AN1L , AN2L	Alarm1, Alarm2, Alarm1(10min), Alarm2(10min) active in addition "L", (locked), Reset required to reset
Err5 ... Err9	Error messages (see 11. Error messages and measures)

Menu mode / Configuration mode

U	Voltage
AL1U , AL2U	Alarms for voltage
F	Frequency
AL1F , AL2F	Alarms for frequency
uSr	Vector surge
Fun	Switching function
AL 1 , AL 2	Limits
AL1¯ , AL2¯	Upper limit during window monitoring
⌐¯¯¬	Monitoring exceeding of the limit value (Max)
¬__⌐	Monitoring falling below the limit value (Min)
⌐¯¯⌐	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 1000 is shutting down (no reset possible); is always counted down in the display
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
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
ddı	Delay display, to quiet down the display
Sı	Simulation
CodE	Code lock
Pın	Pin code (factory setting 504)

9. 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 1U	Fun (Function)		⊣⊏⊐⊢	⊣⊏⊐⊢	⊣⊏⊐⊢	⊣⊏⊐⊢	⊣⊏⊐⊢	
	AL 1¯ (Upper limit)	V	264	460	264	460	264	
	AL 1 (Limit value)	V	184	320	184	320	184	
	ALn1 (10 min mean value)	V	253	440	253	440	253	
	H (Hysteresis)	V	5	5	5	5	5	
AL 1F	Fun (Function)		⊣⊏⊐⊢	⊣⊏⊐⊢	⊣⊏⊐⊢	⊣⊏⊐⊢	⊣⊏⊐⊢	
	AL 1¯ (Upper limit)	Hz	50.20	50.20	50.20	50.20	50.20	
	AL 1 (Limit value)	Hz	47.50	47.50	47.50	47.50	47.50	
	H (Hysteresis)	Hz	0.10	0.10	0.10	0.10	0.10	
AL 1	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	Fun (Function)		⊣⊏⊐⊢	⊣⊏⊐⊢	⊣⊏⊐⊢			
	AL2¯ (Upper limit)	V	264	460	264			
	AL 2 (Limit value)	V	184	320	184			
	ALn2 (10 min mean value)	V	253	440	253	440	253	
	H (Hysteresis)	V	5	5	5			
AL2F	Fun (Function)		⊣⊏⊐⊢	⊣⊏⊐⊢	⊣⊏⊐⊢			
	AL2¯ (Upper limit)	Hz	50.20	50.20	50.20			
	AL 2 (Limit value)	Hz	47.50	47.50	47.50			
	H (Hysteresis)	Hz	0.10	0.10	0.10			
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	
	Pin (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.

10. Maintenance and repair

The UFR 1000 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 AL 1U	AL 1 limit value must be less than the upper AL 1- limit value
Err7 appears in the display	Parameter error in AL2U	AL 2 limit value must be less than the upper AL2- limit value
Err8 appears in the display	Parameter error in AL 1F	AL 1 limit value must be less than the upper AL 1- limit value
Err9 appears in the display	Parameter error in AL2F	AL 2 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 1000, 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> ▪ 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

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12. Technical data

Control voltage Us:	
Rated connection	AC/DC 24-240 V, 0/45...65 Hz, < 5 VA
	DC: 20.4...297 V, AC: 20.4...264 V
Output relay:	2 x change-over contact
Switching voltage	max. AC 440 V
Conventional thermal current Ith	6 A
Inrush current (at 10 % ED)	25 A max. 4 s / 50 A max. 1 s
Nominal operating current Ie (AC 15)	6 A AC 250 V
Recommended series fuse	gG/gL 6 A
Contact service life, mech.	30 x 10^6 operating cycles
Contact service life, electr.	1 x 10^6 operating cycles at AC 250V / 6A
	2 x 10^5 operating cycles at AC 250V / 10A cos φ 0.6
Voltage measurement:	
Measurement voltage phase – phase	AC 35…465 V (< 5V: 0 is displayed)
Adjustment range phase – phase	AC 40…460 V
Measurement voltage phase – N	AC 20…270 V (< 5V: 0 is displayed)
Adjustment range phase – N	AC 40…265 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	EN 60255
Rated impulse withstand voltage	4000 V
Surge category	III
Pollution level	2
Rated insulation voltage Ui	300 V
Insulation group	II
Operating time	100 %
Permissible ambient temperature	-20 °C... +55 °C
	EN 60 068-2-1 dry heat
EMC - noise immunity	EN 61000-6-2
EMC - noise emission	EN 61000-6-4

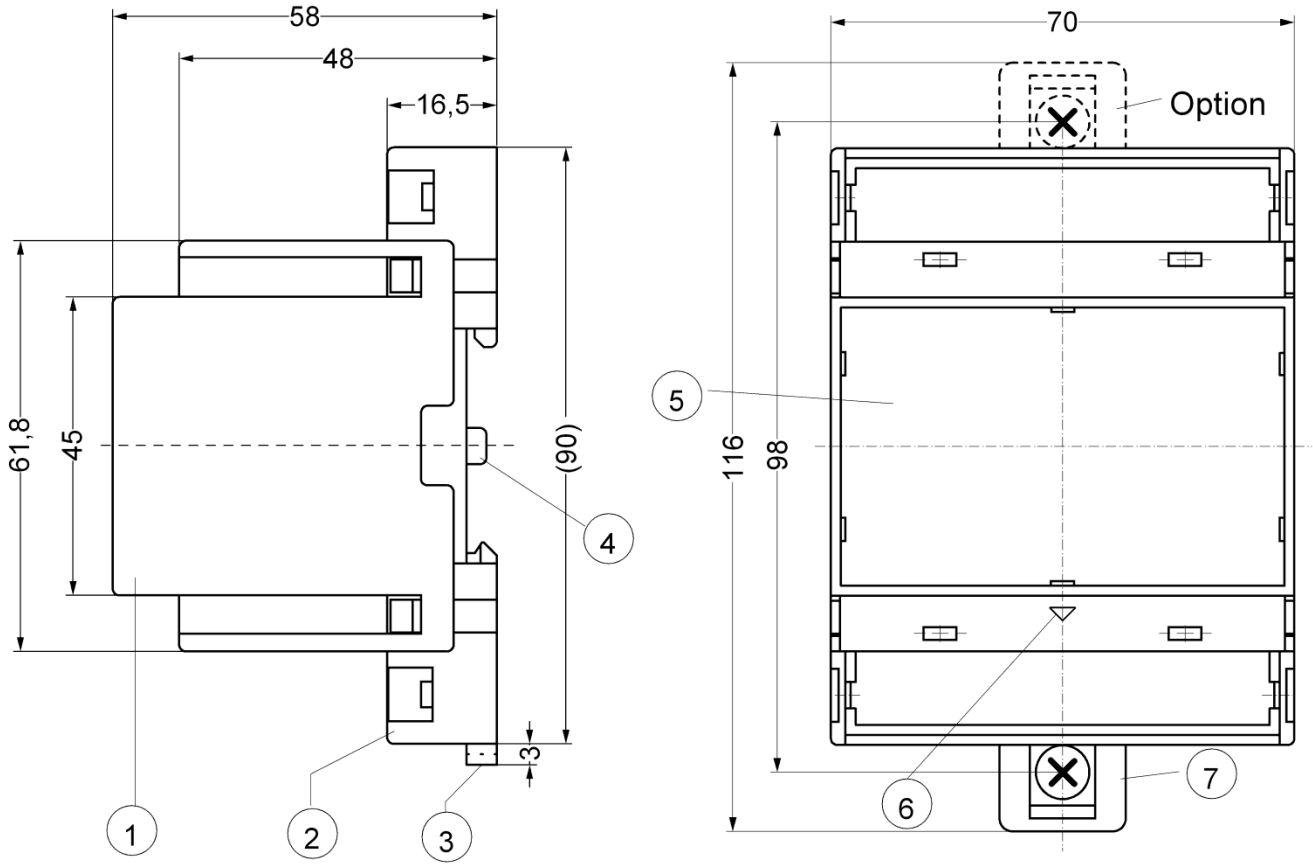
Housing:

Mounting type	V4:
Front-to-back size	69 mm
Dimensions (W x H x D)	90 x 70 x 58 mm
Wiring connection single strand	ea. 1 x 4 mm^2
Finely stranded with wire end ferrule	ea. 1 x 2.5 mm^2
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

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 Ø 4.2 mm / for fixing to wall with screws, Ø 4.2 mm.

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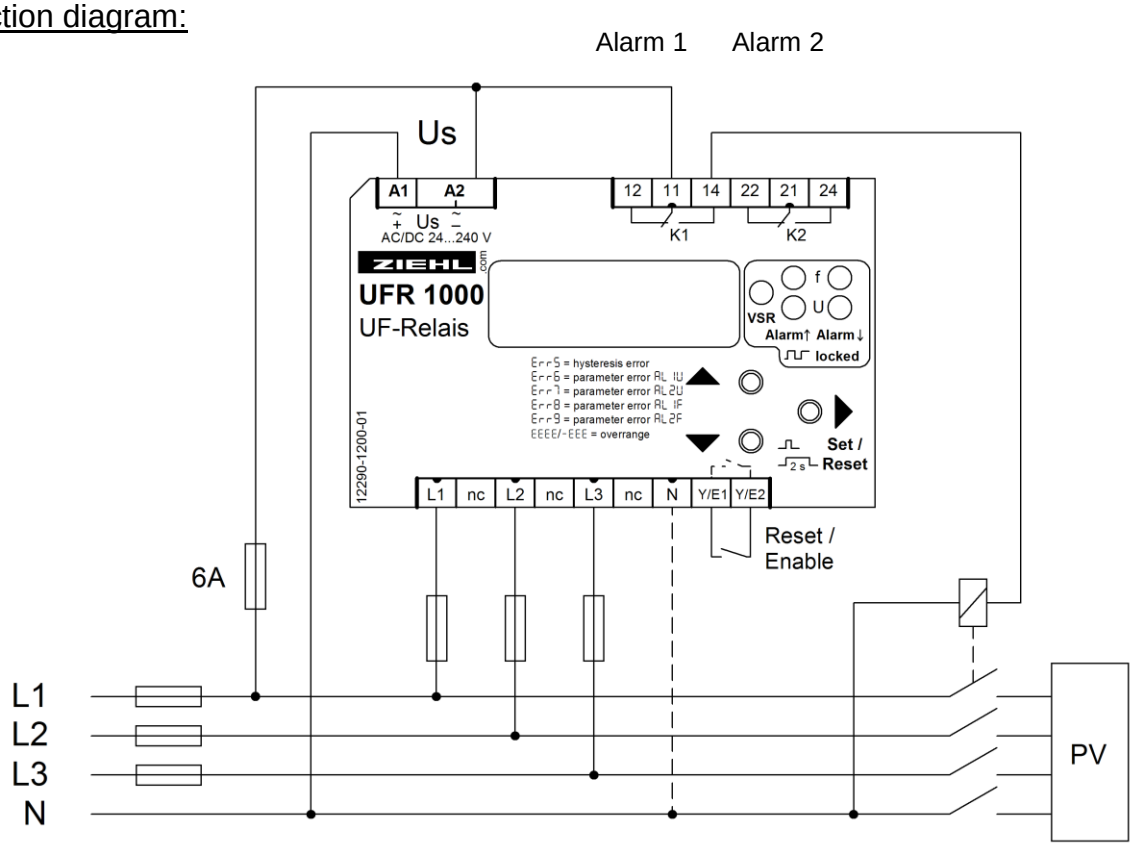
14. Quick installation system disconnection on photovoltaic plants

The UFR 1000 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:
- 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

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

		PR1 (with N)	Pr2 (without N)
Overvoltage (rise-in voltage protection U>>)	+15 % (1.15 Un)	264 V	460 V
Undervoltage (undervoltage protection U<)	-20 % (0.8 Un)	184 V	320 V
Overvoltage 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>)	50.20 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) 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.
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.

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.

You can find it and additional operating instructions in the Internet at
www.ziehl.com

You'll find this and other user manuals also written in English in the internet at
www.ziehl.com

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