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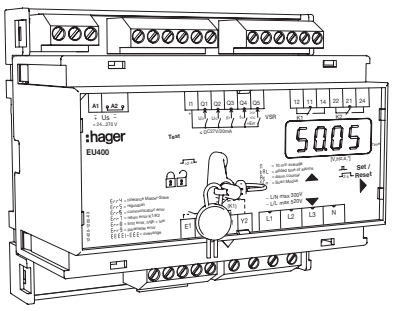
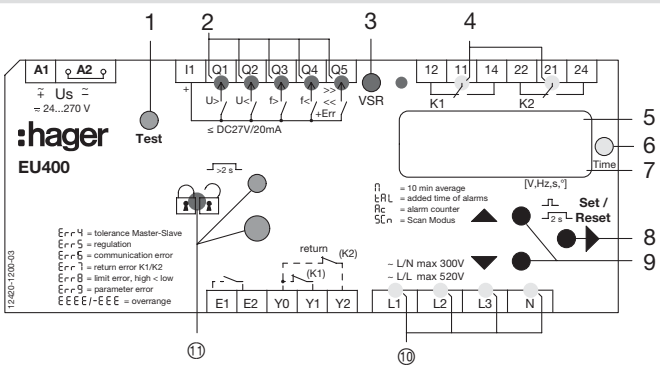


6LE002997C

EU400

System-disconnection relay NA-protection
- NA-protection according to VDE-AR-N 4105:2011+2018-11 / VSE NA/EEA-NE7 CH 2020, power generators at the low voltage grid, TAR medium voltage VDE-AR-N 4110:2018-11 and TAR high voltage VDE-AR-N 4120:2018-11
- for use in power generators at the medium voltage grid
- with selectable vector shift detection and Rate of Change of Frequency (ROCOF,df/dt)

Display and controls



1 Test button

Press briefly	Display test-menu Relay K1 tSt1 or relay K2 tSt2 can be tested independently. (3min without a button is pressed = go back to the normal mode)

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

ON, AL or AL n	Limit value undercut / exceeded
FLASHES, AL or AL n	Reset delay doF counting down

3 LED vector surge (VSR, red)

ON, AL	Threshold value for vector shift exceeded
FLASHES, AL	Reset delay doF counting down

4 LEDs relay status (yellow)

OFF	Relay is released
ON	Relay operating

5 Digital display 4-digits (red)

Depending on program, display of current voltage, frequency, vector shift, average value
Displays the alarm signals, e.g. AL, AL n
Displays the errors with error code e.g. Err9

6 LED Time (yellow)

ON	A time is displayed
Flashes	Function ruEF active

7 Last decimal point (red)

OFF	Display mode
Illuminated	Menu mode
Flashes	Configuration mode

8 Set/Reset key ▶ (in display mode, normal state)

Press briefly	Display of next measured value / alarm counter
Press for > 2 s	Reset, quit error messages
Press for > 4 s	Displays the program, e.g. Pr 1
Press for > 10 s	Displays the software version, e.g. 00-15

9 Up / Down key ▲▼ (in display mode, normal state)

Press shortly	Change to the menu mode, display of alarm memory (Down) / cumulative time of alarms, standby counter, standby time (Up), pushing Set button for ≥ 2 s resets the stored values
Press for > 2 s	Display of MAX (Up) / MIN (Down) - measured values, additional pushing of Set button for ≥ 2 s deletes the stored values

⑩ LEDs measurement allocation (yellow)

LEDs	Measured value
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 shift (L1, L2, L3)
L1 FLASHING	Frequency

⑪ Sealable button + LED

Press for > 2 s	Lock / Unlock
LED red	Settings and simulation mode are locked, While attempting to set, Loc is displayed for 3s
LED green	Setting and simulation enabled

Description of the connections

Connection	Description
A1 and A2	Rated control supply voltage Us, see Technical Data
11, 12, 14; 21, 22, 24	Relay K1 and K2
E1 – E2 Enable – Input	Volt-free contact
	uSr → oFF, no function
	uSr → on, E1-E2 closed: Vector shift active but not evaluated, monitoring of feedback contacts off for use with generator (mains synchronization)
	uSr → StbY, E1-E2 closed: K1 and K2 off (standby), vector shift off
	uSr → y1y2, E1-E2 closed: Feedback contacts no evaluated, vector shift off, when using with generator (mains synchronization)
Y0, Y1, Y2 Inputs, feedback contacts	Volt-free n/o or n/c contact, self-learning when switching on
	Set value > turn-on time section switch under rEL → trEL / can switch-off if not connected or if external devices/switches can activate the section switch (oFF)
I1	Supply voltage for digital outputs, max. 27 V DC
Q1…Q4	Digital output over-/under voltage/-frequency, Q3 + Q4 = ROCOF
Q5	Digital output error, in Program 3-6 additionally the 2nd threshold value
L1, L2, L3, N	Phase L1, L2, L3 and neutral conductor

Important information

Caution

In the supply line in the vicinity of the device (easily accessible), a switch marked as disconnecting device as well as an overcurrent protection element (rated current ≤ 6 A) have to be provided.

Caution

Attention!
For the rated control supply voltage, see label at the side of the unit!

Assembly

The device can be mounted:
Distribution panel or control panel on 35 mm rail 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.

Program setup

The suitable program must be set on the EU400 in accordance with the application. If the EU400 is sealed/locked (red LED illuminated), the sealing has to be deactivated first.

Pr	Connection	Treshold Values	Voltage	Country / Standard
*2	3 AC with N	Low voltage 2x over voltage 10 min average value 2x under voltage 2x over frequency 2x under frequency 1x vector shift 1x ROCOF	230V	D VDE-AR-N 4105:2018
1	3 AC with N	Low voltage 1x over voltage 10 min average value 1x under voltage 1x over frequency 1x under frequency 1x vector shift 1x ROCOF	230V	D VDE-AR-N 4105:2011
7	2/1 AC with N			
11 (3)	3 AC with N	Medium voltage 2x over voltage 10 min mean value 2x under voltage 2x over frequency 2x under frequency 1x vector shift 1x ROCOF	57,7V	D VDE-AR-N 4110:2018 BDEW Juni 2008 nach 3.2.3.3-1
12 (4)	3 AC without N		100V	
13 (5)	3/2/1 AC with N		230V	
14 (6)	3 AC without N		400V	
10	3/2/1 AC with N	2x over voltage 10 min average value 2x under voltage 2x over frequency 1x under frequency 1x vector shift 1x ROCOF	230V	AT TOR producers Typ A, B, C, D
15	3 AC with N		230V	CH VSE NA/EEA-NE7 CH 2020
16	3 AC avec N	2x over voltage 1x over frequency 1x ROCOF 2x under voltage 1x under frequency zero voltage	230V	BE Synergrid C10/C11
20	3/2/1 AC with N	2x over voltage 10 min mean value 2x under voltage 2x over frequency 2x under frequency 1x vector shift 1x ROCOF	230V	GB G98(G83/2) + G99(G59/3)
21	3 AC without N		400V	
22	3 AC with N		57,7V	
23	3 AC without N		110V	

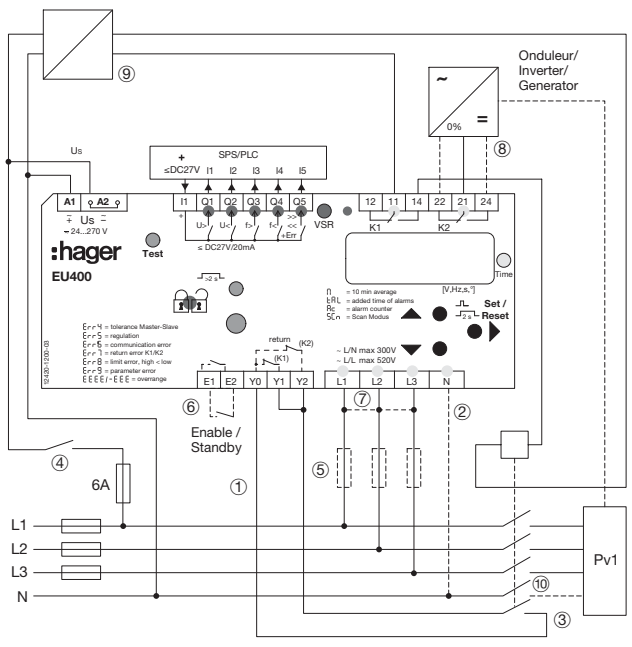
* default setting

Adjustment process:
- If present, remove seal (only authorised person)
- Apply control supply voltage at EU400
- Slightly lift the key cover and turn 180°
- Actuate the small blue button by firmly pressing the button cover (LED starts flashing) until the green LED 🔓 - is illuminated.

Sealing is deactivated
- Press ▲ button 1x → display inFo
- Press ▶ button 5x → display Pr 1
- Set the program with the buttons ▲▼
- Press ▶ button 1x → display no
- Press ▼ button 1x → display YES
- Press ▶ button
  ⇨Device resets and starts with the newly selected program

Connection diagram

DE VDE-AR-N 4105 2018-11 CH VSE-NA/EEA-NE7-CH 2020



1 Feedback contacts Y1/Y2 not connected set rEL → trEL → oFF
2 N connected set →
3 Nc- or no-contacts can be connected, automatic detection when switching on
4 Safely switches off the system (without recording an alarm), e.g. with output contact of a ripple control receiver
5 Fuses only when line protection necessary, e.g. 3x16A
6 Contact closed an uSr → StbY (default setting) = Standby, K1+2 switched-off (e.g. by ripple control receiver or clock,…)
Contact closed an uSr → on = repressed vector shifts (e.g. wehen switching on …),
Contact closed an uSr → y1y2 = no evaluation of the feedback contacts (e.g. for synchronisation, …)
7 1 phase Application connect L1-L2-L3, 2 phase Application L1 / L2+L3 (only Pr 5, 7, 10, 13, 20)
8 Additional switch-off of self generating plant Single-fault safety : Shutdown of the self-generation plant e.g. by ripple control input 0% with K2.
Use coupling relays ford contact multiplication of if safe isolation is required. This second shutdown path must be tested separately during commissioning. tSt2
9 Power supply / buffering. Switches have to withstand under voltage for min. 3 s (FRT).
⑩ TT-system: switch all line conductors and N, TN-system: only switch line conductor.

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.

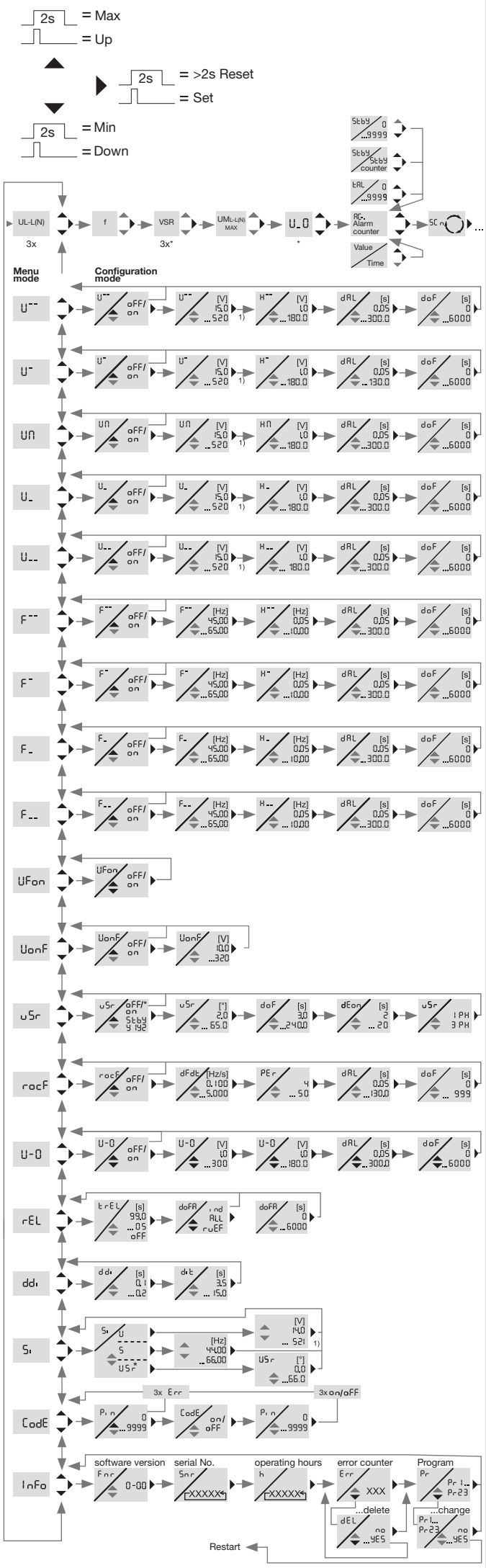
Technical data

Rated control supply voltage U_s	
	24-270V AC/DC -15…+10 %, DC / 40-70 Hz, <5 VA
Output relays	2 c/o contacts
Max. switching voltage	400 V AC
Inrush current (at 10 % ED)	25 A max. 4 s / 50 A max. 1 s
Rated operational current I_e (AC15)	230 V AC / 6 A
Fuse rating to achieve short-ciruit protection	max. gG/gL 6 A
Output voltage - transistor outputs	Q1-Q5
Operational voltage V_Q	4.5-27 V DC
Max. current consumption Q1…Q5	20 mA / output
Contactor feedback inputs: (Max. Cable length 30m)	
Voltage / Current Y0 – Y1/2	DC 15…35 V / env. 4 mA

Control chart, Pr 2-6, 10-14, 20-23

(25-28 Detailed operating manual - 6LE002996C)

Display mode



1) 3AC+N = 300V
[ ] = Unit

Pressing buttons Up/Down simultaneously, sets the values to the smallest one.

Code-Reset = Press button Set 2 s while applying control supply voltage. (Pin = 504)

Error reports:
Err4 = Tolerance Master Slave
Err5 = Internal regulation
Err6 = Communication error
Err7 = return error K1/K2
Err8 = Limit error high < low
Err9 = Parameter error

Pr	Connection	Country /Standard
2	3 AC + N	(DE) VDE-AR-N 4105:2018
11	3 AC + N	(DE) VDE-AR-N 4110:2018 4120:2018
12	3 AC	
13	3/2/1 AC + N	
14	3 AC	
3	3 AC + N	(DE) BDEW Juni 2008 according to 3.2.3.3-1
4	3 AC	
5	3/2/1 AC + N	
6	3 AC	
10	3/2/1 AC + N	(AT) TOR Erzeuger Typ A, B, C, D
15	3 AC + N	(CH) VSE NA/EEA-NE7 CH 2020
16	3 AC + N	(BE) Synergrid C10/C11
20	3/2/1 AC + N	(GB) G98(G83/2) + G99(G59/3)
21	3 AC	
22	3 AC + N	
23	3 AC	

Default settings and firmware version

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

Menu	Parameter / Unit	Default settings								(DE) (CH)
			Low voltage VDE-AR-N 4105			Medium voltage / high voltage VDE-AR-N 4110 / 4120:2018-11				VSE NA/ EEA-NE7 -CH 2020
			2011	2018	2011					
			3 AC +N 230V	3AC + N 230V	2/1 AC +N 230V	3 AC +N 57,7V	3 AC 100V	3/2/1 AC +N 230V	3 AC 400V	3 AC +N 230V
			Pr1	Pr2*	Pr7	Pr11	Pr12	Pr13	Pr14	Pr15
U-- 59.S2 59>S2	U-- Alarm on/off		-	on	-	on	on	on	on	on
	U-- Overvoltage	V	-	287	-	69.2	120	287	498	276
	H-- Hysteresis	V	-	35.0	-	1.0	1.0	3.0	3.0	23.0
	dAL Response time	s	-	0.10	-	0.30	0.30	0.10	0.10	0.10
	doF OFF-delay	s	-	60	-	60	60	60	60	60
U- 59.S1 59>S1	U- Alarm on/off		on	oFF	on	on	on	oFF	oFF	oFF
	U- Overvoltage	V	264	264	264	63.5	110	249	430	253
	H- Hysteresis	V	5.0	12.0	5.0	1.0	1.0	3.0	3.0	3.0
	dAL Response time	s	0.10	0.10	0.10	180.0	180.0	60.00	60.00	60.00
	doF OFF-delay	s	60	60	60	60	60	60	60	60
UN 59-Av	UN Alarm on/off		on	on	on	oFF	oFF	oFF	oFF	on
	UN Overvoltage	V	253	253[3]	253	63.5	110	253	438	253
	HN Hysteresis	V	3.0	5.0	3.0	1.0	1.0	3.0	3.0	3.0
	dAL Response time	s	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
	doF OFF-delay	s	60	60	60	60	60	60	60	60
U_ 27.S1 27<S1	U_ Alarm on/off		on	on	on	on	on	on	on	on
	U_ Undervoltage	V	184	184	184	46.2	80.0	184	318	184
	H_ Hysteresis	V	5.0	12.0	5.0	9.0	15.5	35.0	61.0	12.0
	dAL Response time	s	0.10	3.00[3]	0.10	2.70	2.70	1.00	1.00	1.50
	doF OFF-delay	s	60	60	60	60	60	60	60	60
U__ 27.S2 27<S2	U__ Alarm on/off		-	on	-	oFF	oFF	on	on	on
	U__ Undervoltage	V	-	103	-	26.0	45.0	104	179	104
	H__ Hysteresis	V	-	93.0	-	29.0	50.0	115	180	92.0
	dAL Response time	s	-	0.30[3]	-	0.30	0.30	0.30	0.30	0.30
	doF OFF-delay	s	-	60	-	60	60	60	60	60
F-- 81.S2 81>S2	F-- Alarm on/off		-	oFF	-	oFF	oFF	on	on	oFF
	F-- Overfrequency	Hz	-	52.5	-	51.50	51.50	52.50	52.50	51.50
	H-- Hysteresis	Hz	-	2.40[2]	-	1.40[2]	1.40[2]	2.40[2]	2.40[2]	1.40[2]
	dAL Response time	s	-	0.10	-	0.10	0.10	0.10	0.10	0.10
	doF OFF-delay	s	-	60	-	60	60	60	60	60
F- 81.S1 81>S1	F- Alarm on/off		on	on	on	oFF	oFF	on	on	on
	F- Overfrequency	Hz	51.50	51.50	51.50	51.50	51.50	51.50	51.50	51.50
	H- Hysteresis	Hz	1.45[1]	1.40[2]	1.45[1]	1.40[2]	1.40[2]	1.40[2]	1.40[2]	1.40[2]
	dAL Response time	s	0.10	0.10	0.10	5.40	5.40	5.00	5.00	0.10
	doF OFF-delay	s	60	60	60	60	60	60	60	60
F_ 81.S1 81<S1	F_ Alarm on/off		on	on	on	oFF	oFF	on	on	on
	F_ Underfrequency	Hz	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50
	H_ Hysteresis	Hz	1.00	0.10	1.00	2.40[4]	2.40[4]	2.40[4]	2.40[4]	0.10
	dAL Response time	s	0.10	0.10	0.10	0.40	0.40	0.10	0.10	0.10
	doF OFF-delay	s	60	60	60	60	60	60	60	60
F__ 81.S2 81<S2	F__ Alarm on/off		-	oFF	-	oFF	oFF	oFF	oFF	oFF
	F__ Underfrequency	Hz	-	47.00	-	47.50	47.50	47.50	47.50	47.50
	H__ Hysteresis	Hz	-	0.60	-	2.40[4]	2.40[4]	2.40[4]	2.40[4]	0.10
	dAL Response time	s	-	0.10	-	0.10	0.10	0.10	0.10	0.10
	doF OFF-delay	s	-	60	-	60	60	60	60	60
UFon	UFon Switching conditions		oFF	oFF	oFF	oFF	oFF	on	on	oFF
UonF	UonF on/off		oFF	oFF	oFF	oFF	oFF	oFF	oFF	oFF
	UonF voltage	V	46.0	46.0	46.0	20.0	20.0	46.0	46.0	161.0
uSr 78	uSr Alarm on/off		Stby	Stby	Stby	Stby	Stby	Stby	Stby	Stby
	uSr Vector shift	°	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
	doF OFF-delay	s	3	3	3	3	3	3	3	3
	dEon Suppression time	s	2	2	2	3	3	3	3	2
	uSr OFF-delay		3Ph	3Ph	3Ph	3Ph	3Ph	3Ph	3Ph	3Ph
rocF 81r	rocF Alarm on/off		oFF	oFF	oFF	oFF	oFF	oFF	oFF	oFF
	dFdt delta f / delta t	Hz/s	0.800	2.000	0.800	2.000	2.000	2.000	2.000	2.000
	PEr periods		20	20	20	20	20	20	20	20
	dAL Response time	s	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
	doF OFF-delay	s	60	60	60	60	60	60	60	60
U-0 59v0	U-0 Alarm on/off		oFF	oFF	oFF	oFF	oFF	oFF	oFF	oFF
	U-0 **Zero voltage**	V	46.0	46.0	46.0	46.0	80.0	46.0	80.0	46.0
	U-0 Hysteresis	V	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
	dAL Response time	s	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
	doF OFF-delay	s	60	60	60	60	60	60	60	60
rEL	trEL Response time Y1,Y2	s	5.0	5.0[3]	5.0	oFF	oFF	oFF	oFF	5.0
	doFA Mode		ind	ind	ind	ind	ind	ind	ind	ind
	doFA Off-delay all	s	0	0	0	0	0	0	0	0
dd	dd Display delay	s	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	dt Display duration Scn	s	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Si	U Voltage	V	230	230	230	57.7	100	230	400	230
	F Frequency	Hz	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
	uSr Vector shift	°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CodE	Pin Pincode		504	504	504	504	504	504	504	504
	CodE on/oFF		oFF	on	oFF	oFF	oFF	oFF	oFF	oFF
InFo	Fnr Firmware version		0-16	0-16	0-16	0-16	0-16	0-16	0-16	0-16
	Snr Serial number		xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx
	h Operating hours	h	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx
	Err Error counter		xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx
	Pr Program		1	2	7	11	12	13	14	15

* default setting
[1] = Autohysteresis 50,05 Hz
[2] = Autohysteresis 50,10 Hz
[3] = Parameter can be changed without unlocking code lock (Pr2 only)
[4] = Autohysteresis 49,90 Hz

Display of the program:
InFo → Pr or when switching on
Display of the firmware version:
InFo → Fnr

Troubleshooting and measures

Error	Cause	Remedy
EEEE or -EEE appears in the display	Measured voltage, frequency or the vector shift is too large or too small	Consider the measuring range
Err4 appears in the display	Tolerance error, internal measurement value deviation of both channels	Perform a reset → interrupt control voltage for >5s *
Err5 appears in the display	Error internal interface	
Err6 appears in the display	Communication error, internal interface	
Err7 also appears in the display after 2 automatic reconnection attempts, LED K1 and / or K2 illuminated	Error feedback contacts, switches not connected correctly or broken or switches are controlled from other device	Feedback contacts not connected - Set rEL → trEL → oFF - Feedback contacts not connected - Check for correct connection - Set turn-on time of section switch under trEL - Perform a reset → interrupt control voltage for >5s
Err8 appears in the display	Hysteresis error: overlapping of the release points	Upper threshold value must be higher than the lower threshold value, check the threshold values
Err9 appears in the display	Parameter error	Reset to factory settings, see “Program setup” *
A time expires in the display	Always when an OFF-delay time doF is running, it is counted down in the display (shortest one first)	Wait until the time is complete (depending on the setting, several times may elapse one after the other)
Device cannot be configured / only the limits can be configured	Code lock / Sealing activated	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.
Implausible voltage values	Pr selected with N, but N not connected	Select Pr without N or connect N
Loc appears in the display	Seal is active	See „Program setup"
CodE appears in the display	Code lock is active	See „Code lock"
Stby appears in the display	Standby mode, E1-E2 closed	Check parameter uSr
AL and LED Q3 (f>) is on, reading in good range	hysteresis for F- incorrectly	Check hysteresis for reset point 50,05 Hz
noy1 or noy2 appears in the display	Feedback contact not connected or switch does not switch	Check the connection and function of the switch. Its normal in Pr2 at Test 2 noy2

*If the error cannot be patched by a reset, send back to factory for repair.