



- Monitoring relays - GAMMA series
- Frequency and voltage monitoring in 3-phase mains in accordance with VDE AR-N 4105
- Quick net error recognition
- Connection of neutral wire necessary
- Detection of off-grid operation
- Single failure proof
- 2 change over contacts
- Width 45mm
- Industrial design



Read and understand these instructions before installing, operating or maintaining the equipment.



Danger!
Never carry out work on live parts! Danger of fatal injury! The product must not be used in case of obvious damage. To be installed by an authorized person.

Technical data

1. Functions

Frequency monitoring in Phase L1 in accordance with VDE AR-N 4105 with adjustable ON-Delay fixed threshold f_{min} and adjustable threshold f_{max} .

WIN_f (Frequency) Monitoring the window between Min and Max

Voltage monitoring in 3-phase mains in accordance with VDE AR-N 4105 with adjustable ON-Delay, adjustable thresholds and detection of off-grid operation.

WIN_v (Voltage) Monitoring the window between Min and Max

Adjustable 10-minutes average threshold (\bar{U}_{max}) in accordance with VDE AR-N 4105.

Volt-free-save error message memory (of the last 5 erros) including datestamp in accordance with VDE AR-N 4105.

Integrated test function of contactors in accordance with VDE AR-N 4105
Password protected in accordance with VDE AR-N 4105

2. Time ranges

ON-Delay: 60s*) to 10min
OFF-Delay: < 100ms

3. Thresholds

switch off	switch-on
$U_{\Delta} \leq 80\% U_N$	$U_{\Delta} > 85\% U_N$
$U_{\Delta} \geq 115\% U_N$	$U_{\Delta} < 110\% U_N$
$U_{\lambda} \leq 80\% U_N$	$U_{\lambda} > 85\% U_N$
$U_{\lambda} \geq 115\% U_N$	$U_{\lambda} < 110\% U_N$
$f \leq 47,5\text{Hz}$	$f > 47,54\text{ Hz}$
$f \geq 50,2\text{ Hz to } 51,5\text{ Hz}^1)$	$f < 50,05\text{ Hz}$
$\bar{U} \geq 110\% U_N^1)$ to $115\% U_N$	$\bar{U} < 110\% U_N$

*) mark preset values

4. Indicators

see display specification.

5. Mechanical design

Self-extinguishing plastic housing, IP rating IP40
Mounted on DIN rail TS 35 according to EN 60715
Mounting position: any
Shockproof terminal connection according to VBG 4 (PZ1 required), IP rating IP20
Tightening torque: max. 1Nm

Terminals capacity:

- 1 x 0.5 to 2.5mm² with/without multicore cable end
- 1 x 4mm² without multicore cable end
- 2 x 0.5 to 1.5mm² with/without multicore cable end
- 2 x 2.5mm² flexible without multicore cable end

6. Input circuit

Supply voltage: 230V a.c.
terminals A1-A2 (galvanically separated)
Tolerance: -20% to +15%
Rated frequency: 50Hz
Rated consumption: 6VA (4W)
Duty cycle: 100%
Reset time: 500ms
Drop-out voltage: 30% of nominal supply voltage
Overvoltage category: III (in accordance with IEC 60664-1)
Rated surge voltage: 4kV

A failure of the auxiliary voltage leads to a immediate switch-off of the relay contacts.

7. Output circuit

2 potential free change over contacts
Rated voltage: 250V a.c.
Switching capacity: 750VA (3A / 250V a.c.)
If the distance between the devices is less than 5mm.
Switching capacity: 1250VA (5A / 250V a.c.)
If the distance between the devices is greater than 5mm.
Fusing: 5A fast acting
Mechanical life: 20 x 10⁶ operations
Electrical life: 2 x 10⁵ operations
at 1000VA resistive load
Overvoltage category: III (in accordance with IEC 60664-1)
Rated surge voltage: 4kV

8. Load for external feedback contacts

Voltage: 12V d.c.
Current: 1mA d.c.

9. Measuring circuit

Frequency monitoring
Measured variable: frequency of phase L1
Measurement input: 230V a.c.
Terminals: Na-L1a & Nb-L1b
Switching threshold:
Max: 50.2 to 51.5Hz
Min: fixed 47.5Hz

Technical data

Voltage monitoring U_{Δ}

Measured variable:	voltage, a.c. sinus
Measuring input:	3x 400V a.c.
Terminals:	Na-L1a-L2a-L3a & Nb-L1b-L2b-L3b
Overload capacity:	
3N~ 400/230V	3N~ 600/346V
Input resistance:	
3N~ 400/230V	1M Ω
Switching threshold U_s :	
Max:	fixed 115% of U_N (460V)
Min:	fixed 80% of U_N (380V)

Voltage monitoring U_{λ}

Messgröße:	voltage, a.c. sinus
Measuring Input:	3x 230V a.c.
Terminals:	Na-L1a-L2a-L3a & Nb-L1b-L2b-L3b

Input resistance:	
3N~ 400/230V	1M Ω
Switching threshold U_s :	
Max:	fixed 115% of U_N (264.5V)
Min:	80% of U_N (184V)

10-minutes-average \bar{U}_{max} :	110% to 115% of U_N
Overvoltage category:	III (in accordance with IEC 60664-1)
Rated surge voltage:	4kV

10. Accuracy

Base accuracy voltage measurement :	1% of U_{nom}
Temperature influence voltage measurement:	0.05% / °C
Accuracy frequency measurement:	<0.02Hz

11. Ambient conditions

Ambient temperature:	-25 to +55°C (in accordance with IEC 60068-1) -25 to +40°C (in accordance with UL 508)
Storage temperature:	-25 to +70°C
Transport temperature:	-25 to +70°C
Relative humidity:	15% to 85% (in accordance with IEC 60721-3-3 class 3K3)
Pollution degree:	3 (in accordance with IEC 60664-1)
Vibration resistance:	10 bis 55Hz 0.35mm (in accordance with IEC 60068-2-6)
Shock resistance:	15g 11ms (in accordance with IEC 60068-2-27)

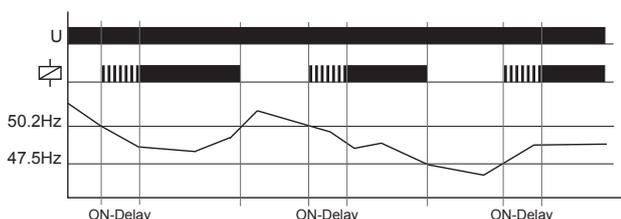
Functions

If a failure already exists when the device is activated, the output relay R remains in off-position and the failure is displayed.
The monitoring of frequency and voltage works in parallel.

Window function WIN_f (Frequency):

When the supply voltage U is applied, the output relay R switches into on-position after the set interval of the tripping delay (ON-Delay) has expired and if the frequency is within the adjusted window. As soon as the frequency leaves the acceptance region, the output relay R switches into off-position.

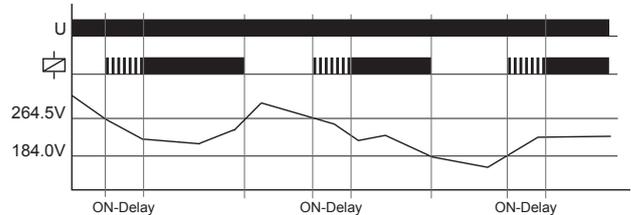
The output relay R switches into on-position again after the frequency reenters the acceptance region and the tripping delay (ON-Delay) has expired.



Window function WIN_v (Voltage):

When the supply voltage U is applied, the output relay R switches into on-position after the set interval of the tripping delay (ON-Delay) has expired and if the voltage is within the adjusted window. As soon as the voltage leaves the acceptance region, the output relay R switches into off-position.

The output relay R switches into on-position again after the voltage reenters the acceptance region and the tripping delay (ON-Delay) has expired.



10-minutes-average

The 10-minute average value is used for monitoring the voltage quality. The floating average over 10 minutes will be measured for each input phase. The output relay R switches into off-position if the floating average is exceeded. The output relay R switches into on-position again after the floating average reenters the acceptance region and the tripping delay (ON-Delay) has expired.

These functions are implemented twice for fail-safe operation.

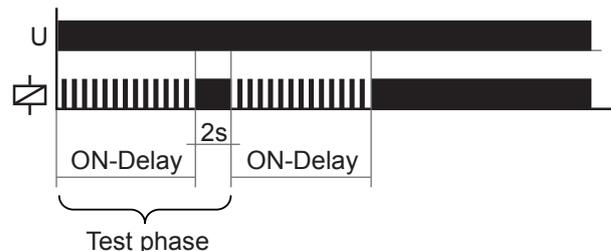
Relay test

The relay test is executed:

- after powering up
- after manually resetting an error
- after each parameter change
- after manual initiation of a self test

During the relay test a question mark is displayed at the bottom left corner of the display.

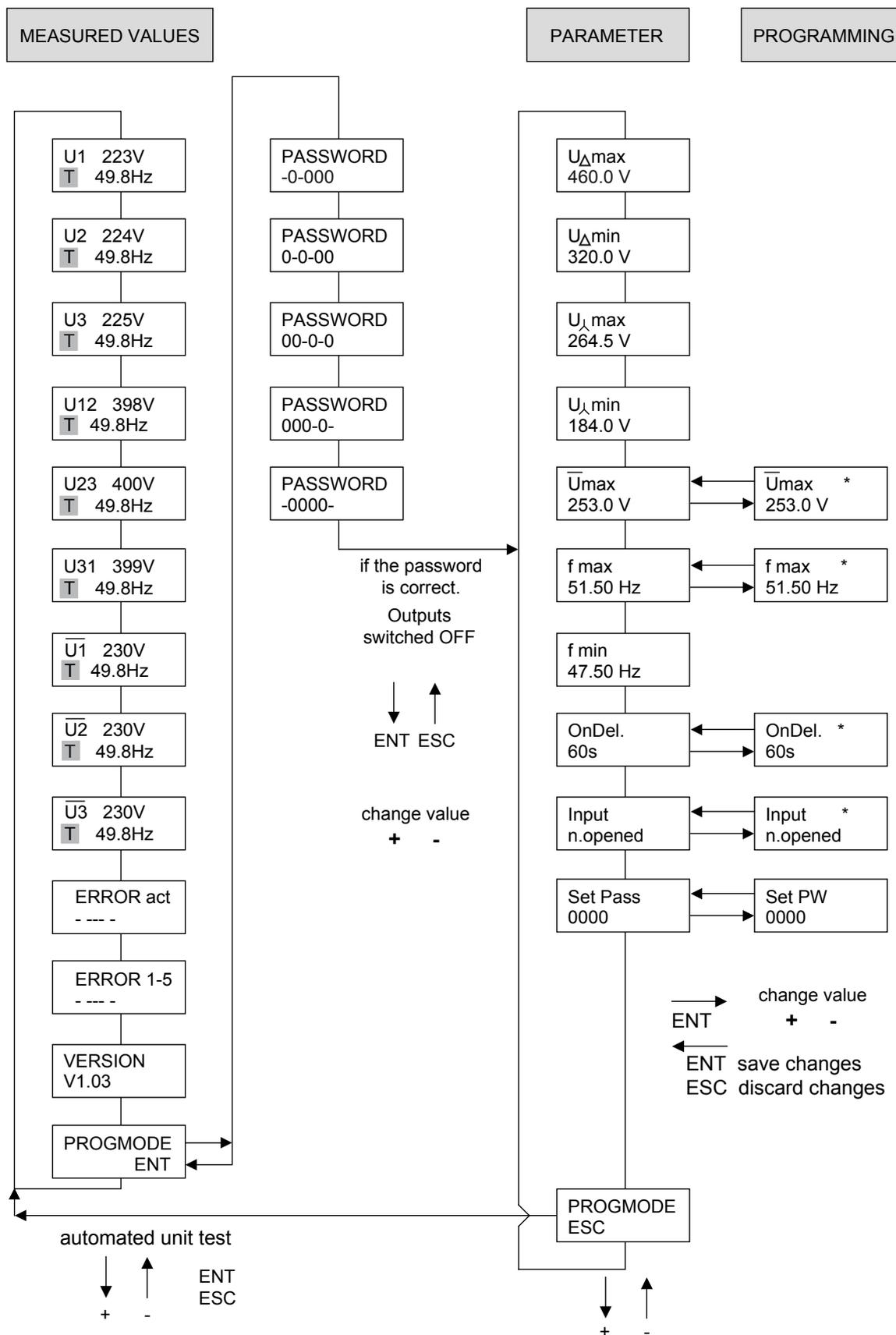
No relay test is executed when the input is deactivated!



The following list shows causes and display for this error states:

Definition	Display	Remark
incorrect combination of SW versions	ERROR! VERSION	Enter to quit and reset device
communication error	ERROR! INTERCOM	
unacceptable deviation between measured values of channel A and B	ERROR! CHA<>CHB	Enter to quit and reset device
although the relay outputs are „off“ the auxiliary contact of the disconnection device signals „on“ (after expiring of a delay)	ERROR! CONTACT	Enter to quit and reset device
inconsistent data and/or checksums	ERROR! DATA	Enter to quit and reset device

Display specification

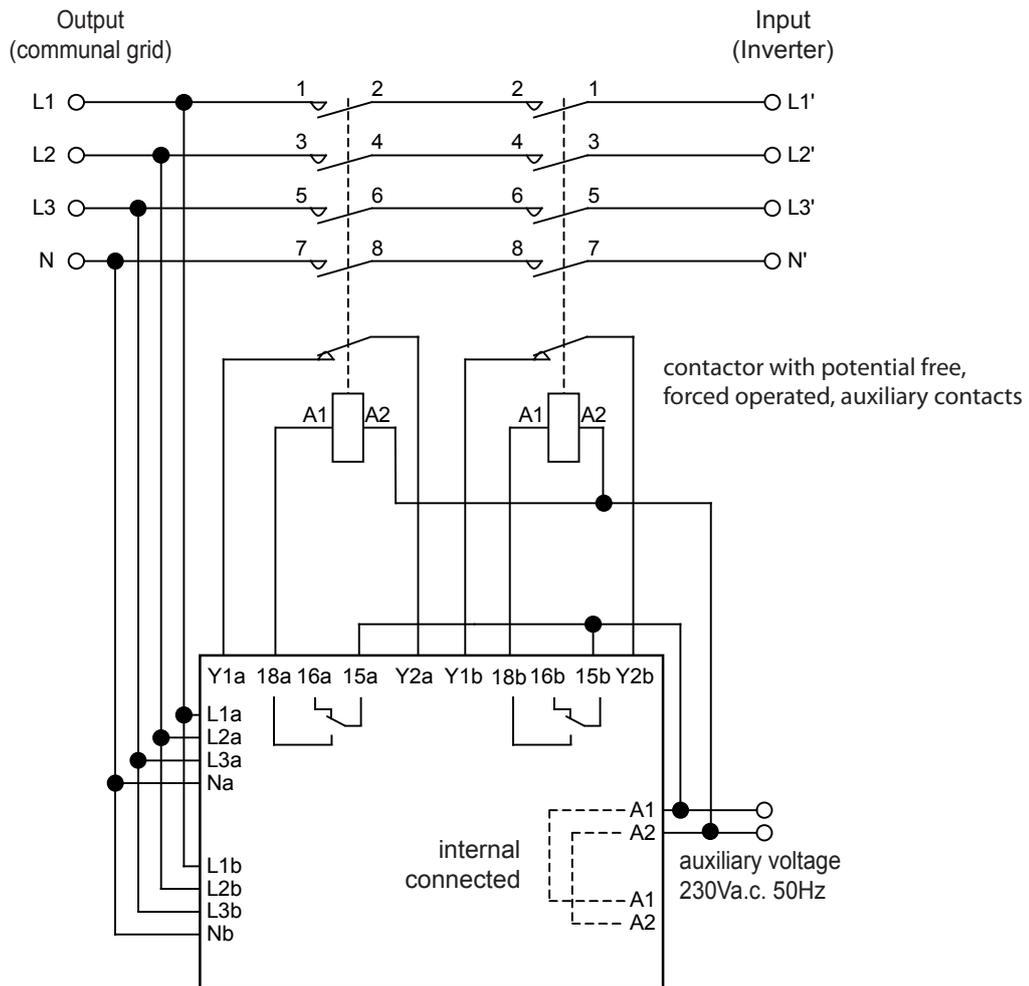


In this mode, „ESC“ activates the automated unit test

*) mark pre-set values

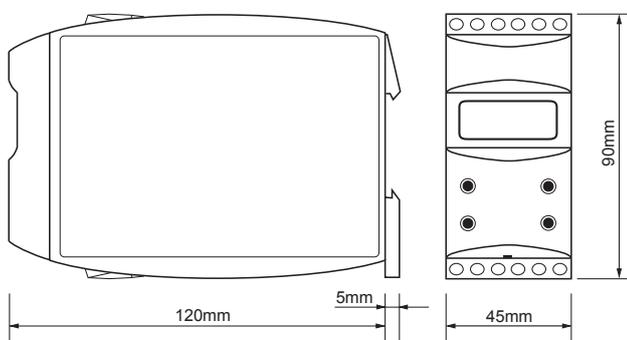
Connection

G4PF33-1



Remark, the terminals A1-A1 and A2-A2 are internal connected. The maximum permissible load of this connection is 100mA.

Dimensions



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Subject to alterations and errors

