

6.3 3UG4512 line monitoring relay

6.3.1 Operator controls and connection terminals

Front view / terminal labeling 3UG4512

Front view	Description	
	Position digits	
	①	Terminal block (removable) Connection is possible using screw-type terminals or spring-loaded terminals.
	②	Circuit diagram
	③	Device article number
	④	Label
	⑤	Status display: LED phase failure / phase sequence (red)
	⑥	Status display: LED coil symbol (green)
		Terminal labels
	L1, L2, L3	Rated control supply voltage
	12	Output relay K1 CO contact NC contact
	11	Output relay K1 CO contact root
	14	Output relay K1 CO contact NO contact
	22	Output relay K2 CO contact NC contact (on the 3UG4512-.B only)
	21	Output relay K2 CO contact root (on the 3UG4512-.B only)
24	Output relay K2 CO contact NC contact (on the 3UG4512-.B only)	

You can find additional information on the connection terminals and the permissible conductor cross-sections in the Chapter "Connection methods (Page 21)".

You can find information on connecting in the Chapter "Circuit diagrams (Page 115)".

6.3.2 Function

General functionality

The 3UG4512 line monitoring relays monitor the **phase sequence** and the **phase failure** of one of the three phases in a three-phase system. The asymmetry threshold is 10 %.

The devices are **self-powered** (measuring voltage = rated control supply voltage) and work on the closed-circuit principle. The 3UG4512 line monitoring relays monitor all phases of three-phase AC networks from 160 to 690 V through terminals L1 / L2 / L3 and also draw power from all three phases simultaneously.

All 3UG4512 line monitoring relays feature at least one output relay (output relay K1 CO contact). The 3UG4512-.B line monitoring relays have an additional relay (output relay K2 CO contact). Output relay K2 switches synchronously with output relay K1.

No settings are required for operation.

Note

The specified voltages represent the absolute thresholds.

Monitoring

Thanks to a special measuring method, a phase failure is detected with certainty despite wide-range voltage from 160 to 690 V AC and reverse power of up to 90 % from the load in the case of regenerative power recovery.

If the line voltage is switched on, the LED "coil symbol" will light up green. If the correct phase sequence is applied to terminals L1-L2-L3, the output relays pick up. If the phase sequence is incorrect, the "phase failure / phase sequence" LED flashes red and the output relays remain in their quiescent position. On a phase failure, the "phase failure / phase sequence" LED lights up red continuously and the output relays drop out to protect the application from any damage that may result.

You will find the switching states of the output relays below in section "Function diagrams" and in Chapter "Diagnostics (Page 114)."

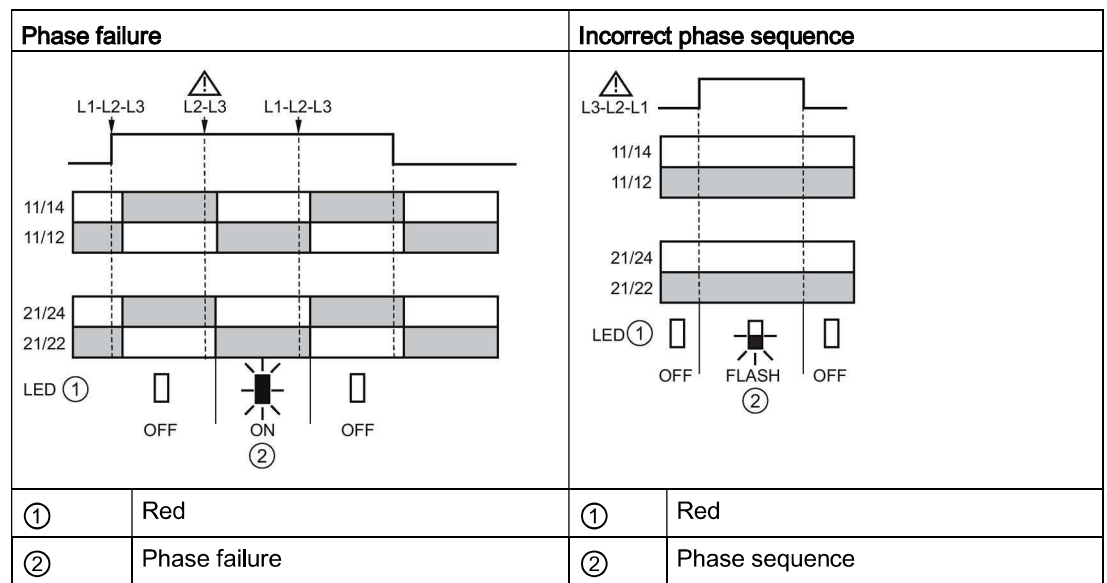
Reset response

The device features an autoreset function. The autoreset function resets the output relay to its original state after an error message and rectification of the fault that has occurred.

Note

The red "phase failure / phase sequence" LED is a fault diagnostics display and does not indicate the current state of the relay!

Function diagrams 3UG4512


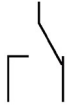
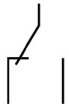



6.3.3 Diagnostics

6.3.3.1 Diagnostics with LED

Status display

The following information about the operating state is displayed on the 3UG4512 line monitoring relay:

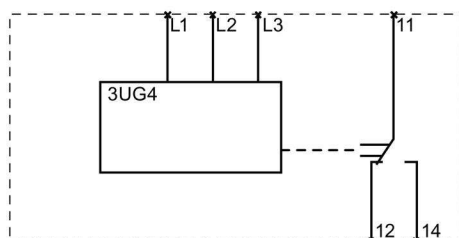
Operating state	LED		State of the output relays
	Coil symbol (green)	Phase failure / phase sequence (red)	12/ 11/ 14 22/ 21/ 24
<ul style="list-style-type: none"> Supply voltage not present 	Off	Off	
<ul style="list-style-type: none"> Supply voltage present Correct phase sequence All phases available 	On	Off	
<ul style="list-style-type: none"> Supply voltage present Incorrect phase sequence 	On	flashing	
<ul style="list-style-type: none"> Supply voltage present Phase failure 	On	On	

You will find more information about the switching behavior of the output relays in Chapter "Function (Page 112)".

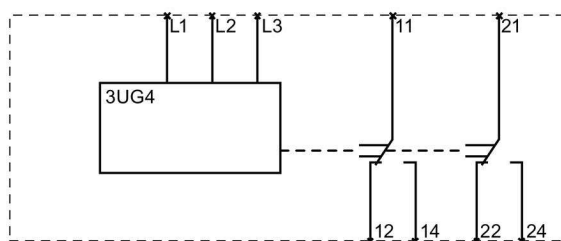
6.3.4 Circuit diagrams

Internal circuit diagrams 3UG4512

3UG4512-.A.. line monitoring relays



3UG4512-.B.. line monitoring relays



Note

It is not necessary to fuse the measuring circuit to protect the device. Fusing for line protection depends on the cross-section used.

Note

The 3UG4512 line monitoring relays are only suitable for line frequencies of 50 / 60 Hz!

6.3.5 Technical data

Measuring circuit

3UG4512-.....		
Type of voltage for monitoring		AC
Number of poles for main current circuit		3
Measurable voltage		
• for AC	V	160 ... 690
Adjustable voltage range	V	— ...

General technical details

3UG4512-.....		
Product function		Phase monitoring relay
Design of the display		—
Type of display LED		Yes
Product function		
• undervoltage recognition		No
• overvoltage recognition		No
• phase sequence recognition		Yes
• phase disturbance recognition		Yes
• asymmetry recognition		No
• overvoltage recognition of 3 phases		No
• undervoltage recognition of 3 phases		No
• tension window recognition of 3 phases		No
• reset external		—
• self-reset		Yes
• open-circuit or closed-circuit current principle		No
Starting time after the control supply voltage has been applied	s	1
Response time maximum	s	0.45
Temperature drift per °C	%/°C	—

		3UG4512-.....
Voltage type of control feed voltage		AC
Control supply voltage		
• at 50 Hz at AC rated value	V	160 ... 690
• at 60 Hz at AC rated value	V	160 ... 690
Operating range factor control supply voltage rated value		
• at 50 Hz for AC		1
• at 60 Hz for AC		1
Impulse voltage resistance rated value	kV	6
Recorded real power	W	2
Protection class IP		IP20
Electromagnetic compatibility		IEC 60947-1 / IEC 61000-6-2 / IEC 61000-6-4
Operating current at 17 V minimum	mA	5
Continuous current of the DIAZED fuse link of the output relay	A	4
Resistance against vibration according to IEC 60068-2-6		1 ... 6 Hz: 15 mm, 6 ... 500 Hz: 2g
Shock resistance according to IEC 60068-2-27		sinusoidal half-wave 15g / 11 ms
Current carrying capacity of output relay		
• at AC-15		
– at 250 V at 50/60 Hz	A	3
– at 400 V at 50/60 Hz	A	3
• at DC-13		
– at 24 V	A	1
– at 125 V	A	0.2
– at 250 V	A	0.1
Installation altitude at a height over sea level maximum	m	2 000
Conductor-bound parasitic coupling BURST according to IEC 61000-4-4		2 kV
Conductor-bound parasitic coupling conductor-earth SURGE according to IEC 61000-4-5		2 kV
Conductor-bound parasitic coupling conductor-conductor SURGE according to IEC 61000-4-5		1 kV
Electrostatic discharge according to IEC 61000-4-2		6 kV contact discharge / 8 kV air discharge
Field-bound parasitic coupling according to IEC 61000-4-3		10 V/m
Thermal current of the contact-affected switching element maximum	A	5
Insulation voltage for overvoltage category III according to IEC 60664 with degree of pollution 3 rated value	V	690

		3UG4512-.....
Degree of pollution		3
Ambient temperature		
• during operating	°C	-25 ... +60
• during storage	°C	-40 ... +85
• during transport	°C	-40 ... +85
Galvanic isolation		
• between entrance and outlet		Yes
• between the outputs		Yes
• between the voltage supply and other circuits		Yes
Mechanical operating cycles as operating time typical		10 000 000
Electrical operating cycles as operating time at AC-15 at 230 V typical		100 000
Operating cycles with 3RT2 contactor maximum	1/h	5 000

Mechanical design

		3UG4512-1A...	3UG4512-1B...	3UG4512-2A...	3UG4512-2B...
Width	mm	22.5			
Height	mm	83	92	84	94
Depth	mm	91			
Built in orientation		any			
Distance, to be maintained, to earthed part					
• forwards	mm	0			
• backwards	mm	0			
• sideways	mm	0			
• upwards	mm	0			
• downwards	mm	0			
Distance, to be maintained, to the ranks assembly					
• forwards	mm	0			
• backwards	mm	0			
• sideways	mm	0			
• upwards	mm	0			
• downwards	mm	0			
Distance, to be maintained, conductive elements					
• forwards	mm	0			
• backwards	mm	0			
• sideways	mm	0			
• upwards	mm	0			
• downwards	mm	0			
Type of mounting		snap-on mounting			
Product function removable terminal for auxiliary and control circuit		Yes			

	3UG4512-1A...	3UG4512-1B...	3UG4512-2A...	3UG4512-2B...
Design of the electrical connection	screw-type terminals		spring-loaded terminals	
Type of the connectable conductor cross-section				
<ul style="list-style-type: none"> • solid 	1x (0.5 ... 4 mm ²), 2x (0.5 ... 2.5 mm ²)		2x (0.25 ... 1.5 mm ²)	
<ul style="list-style-type: none"> • finely stranded <ul style="list-style-type: none"> – with wire end processing – without wire end processing 	1x (0.5 ... 2.5 mm ²), 2x (0.5 ... 1.5 mm ²)		2 x (0.25 ... 1.5 mm ²)	
<ul style="list-style-type: none"> – 	—		2x (0.25 ... 1.5 mm ²)	
<ul style="list-style-type: none"> • for AWG conductors <ul style="list-style-type: none"> – solid – stranded 	2x (20 ... 14)		2x (24 ... 16)	
<ul style="list-style-type: none"> – 	2x (20 ... 14)		2x (24 ... 16)	
Tightening torque				
<ul style="list-style-type: none"> • with screw-type terminals 	N·m	0.8 ... 1.2	— ...	
Number of change-over switches delayed switching	1	2	1	2