

6.2 3UG4511 line monitoring relay

6.2.1 Operator controls and connection terminals

Front view / terminal labeling 3UG4511

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 contact 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 3UG4511-.B only)
	21	Output relay K2 CO contact root (on the 3UG4511-.B only)
	24	Output relay K2 CO contact NC contact (on the 3UG4511-.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 106)".

6.2.2 Function

General functionality

The 3UG4511 line monitoring relays monitor the **phase sequence** in a three-phase system.

The devices are **self-powered** (measuring voltage = rated control supply voltage) and work on the closed-circuit principle. Depending on the version, the line monitoring relays are powered with a rated control supply voltage of 160 V to 260 V (3UG4511-..N20), 320 to 500 V (3UG4511-..P20) and 420 to 690 V (3UG4511-..Q20) through terminals L1 / L2 / L3.

All 3UG4511 line monitoring relays feature at least one output relay (output relay K1 CO contact). The 3UG4511-.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

If the correct phase sequences are applied to terminals L1-L2-L3, the output relay picks up after the response time and the "contact symbol" LED lights up green. If the phase sequence is incorrect, the output relay remains in its quiescent position. After the power system has been disconnected, the output relays drop out after the response time has expired.

Note

After failure of one phase, motors generate a reverse voltage at the terminal of the failed phase due to the regenerative power recovery. This can be up to 90 % of the line voltage in magnitude. Because the 3UG4511 line monitoring relays are not protected against reverse voltage, such a phase failure is not reliably detected.

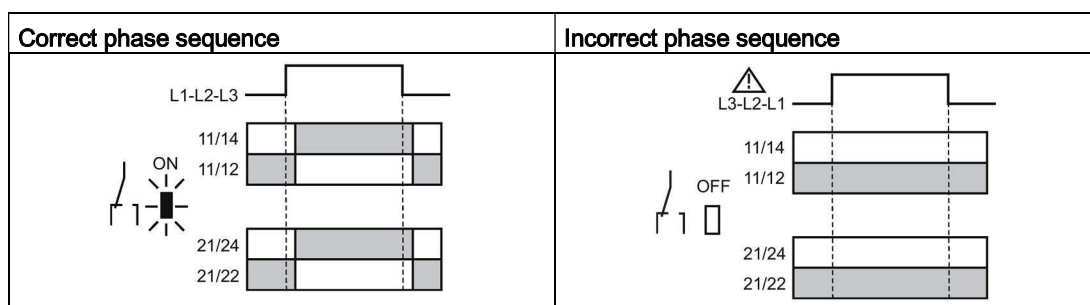
If this type of monitoring is required, the 3UG4512 line monitoring relay should be used, for example!

You will find the switching states of the output relays below in section "Function diagrams" and in Chapter "Diagnostics (Page 105)."

Reset response

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

Function diagrams 3UG4511



6.2.3 Diagnostics

6.2.3.1 Diagnostics with LED

Status display

The following information about the operating state is displayed on the 3UG4511 line monitoring relay:

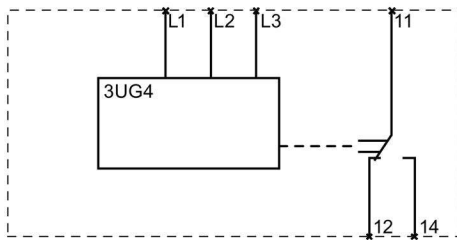
Operating status	LED contact symbol (green)	State of the output relay
		12/ 11/ 14 22/ 21/ 24
Correct phase sequence	On	
Incorrect phase sequence	Off	

You will find more information about the switching behavior of the output relays in Chapter "Function (Page 104)."

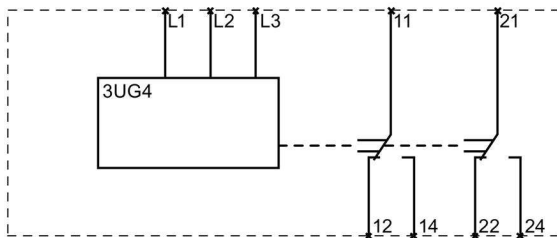
6.2.4 Circuit diagrams

Internal circuit diagrams 3UG4511

3UG4511-.A.. line monitoring relays



3UG4511-.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 3UG4511 line monitoring relays are only suitable for line frequencies of 50 / 60 Hz!

6.2.5 Technical data

Measuring circuit

		3UG4511-..N	3UG4511-..P	3UG4511-..Q
Type of voltage for monitoring		AC		
Number of poles for main current circuit		3		
Measurable voltage				
• for AC	V	160 ... 260	320 ... 500	420 ... 690

General technical details

		3UG4511-..N	3UG4511-..P	3UG4511-..Q
Product function		Phase monitoring relay		
Type of display LED		Yes		
Product function				
• undervoltage recognition		No		
• overvoltage recognition		No		
• phase sequence recognition		Yes		
• phase disturbance recognition		No		
• 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	0.2		
Response time maximum	s	0.45		
Temperature drift per °C	%/°C	—		
Relative repeat accuracy	%	—		
Voltage type of control feed voltage		AC		
Control supply voltage				
• at 50 Hz at AC rated value	V	160 ... 260	320 ... 500	420 ... 690
• at 60 Hz at AC rated value	V	160 ... 260	320 ... 500	420 ... 690
Operating range factor control supply voltage rated value				
• at 50 Hz for AC		1		1
• at 60 Hz for AC		1		1

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		3UG4511-...N	3UG4511-...P	3UG4511-...Q
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		
Degree of pollution		3		
Ambient temperature				
• during operating	°C	-25 ... +60		
• during storage	°C	-40 ... +85		
• during transport	°C	-40 ... +85		

		3UG4511-..N	3UG4511-..P	3UG4511-..Q
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

		3UG4511-1A...	3UG4511-1B...	3UG4511-2A...	3UG4511-2B...
Width	mm	22.5			
Height	mm	83	92	84	94
Depth	mm	91			
mounting position		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			

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	3UG4511-1A...	3UG4511-1B...	3UG4511-2A...	3UG4511-2B...
Distance, to be maintained, conductive elements				
• forwards	mm	0		
• backwards	mm	0		
• sideways	mm	0		
• upwards	mm	0		
• downwards	mm	0		
Mounting type	snap-on mounting			
Product function removable terminal for auxiliary and control circuit	Yes			
Design of the electrical connection	screw-type terminals		spring-loaded terminals	
Type of the connectable conductor cross-sections				
• solid	1x (0.5 ... 4 mm ²), 2x (0.5 ... 2.5 mm ²)		2x (0.25 ... 1.5 mm ²)	
• finely stranded				
– with 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)	
– without wire end processing	—		2x (0.25 ... 1.5 mm ²)	
• for AWG conductors				
– solid	2x (20 ... 14)		2x (24 ... 16)	
– stranded	2x (20 ... 14)		2x (24 ... 16)	
Tightening torque				
• with screw-type terminals	N·m	0.8 ... 1.2	—	
Number of change-over switches delayed switching	1	2	1	2