

6.7 3UG4617 / 3UG4618 line monitoring relays

6.7.1 Operator controls and connection terminals

Front view / terminal labeling 3UG4617 / 3UG4618

Front view	Description	
	Position digits	
	①	Terminal block (removable): Connection is possible using screw terminals or spring-loaded terminals.
	②	Arrow keys for menu navigation
	③	SET key for menu navigation
	④	Device article number
	⑤	Label
	⑥	Legend for menu
	⑦	Display for parameterization, actual-value indication, and diagnostics
	Terminal labels	
	L1, L2, L3	Rated control supply voltage
	N	Neutral conductor (on 3UG4618 only)
	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	
21	Output relay K2 CO contact root	
24	Output relay K2 CO contact NO contact	

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 165)".

6.7.2 Functions

General functionality

The 3UG4617 line monitoring relays monitor a three-phase system for **phase sequence**, **phase failure**, **phase asymmetry**, **undervoltage**, and **overvoltage**.

Note

The 3UG4618 line monitoring relays have the same functions as the 3UG4617 monitoring relays and also monitor the **neutral conductor for failure**.

The devices feature a wide-range voltage input and 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 line-to-line voltage of 160 to 690 V (3UG4617) and with a line-to-neutral voltage of 90 to 400 V (3UG4618) through terminals L1 / L2 / L3.

The 3UG4617 / 3UG4618 line monitoring relays have a display and are parameterized with three keys.

You will find the setting ranges and factory settings of the available parameters in Chapter "Operation (Page 161)."

You will find a description of the individual parameters in Chapter "Parameters (Page 363)."

Note

The specified voltages represent the absolute thresholds.

Monitoring

Output relay K1 is for warning or shutdown on faults in the power system (voltage, asymmetry). Output relay K2 responds differently depending on the phase sequence.

Phase sequence

If the correct phase sequence is applied to terminals L1-L2-L3, output relay K2 (relay contact 21-22-24) picks up. This is represented by a relay symbol on the display. If the phase sequence is incorrect, output relay K2 will not pick up. An error is not indicated on the display; only the relay symbol remains in the disconnected state.

Undervoltage or overvoltage

If the monitored voltages (U_{x-y}) are larger than the set lower voltage value (U_{∇}) and smaller than the set upper voltage value (U_{\blacktriangle}), i.e. they are within the voltage limits and the line voltage asymmetry (A_{sy}) is less than the set value, the output relay K1 (relay contact 11-12-14) picks up approx. 50 ms after the response of output relay K2 (relay contact 21-22-24).

The display indicates the following voltages in the case of the line monitoring relays:

- 3UG4617: Line-to-line voltage between L1 and L2, L1 and L3, L2 and L3
- 3UG4618: Line-to-neutral voltage between L1 and N, L2 and N, L3 and N

Phase failure

In the case of a phase failure (or neutral conductor failure for the 3UG4618 line monitoring relays), output relay K1 (relay contact 11-12-14) drops out without delay to protect the application from any damage that may result. Set delay times have no effect on phase failure monitoring.

In the case of voltage undershoot, voltage overshoot, or asymmetry overshoot faults, output relay K1 drops out after the set tripping delay time (Del).

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 80 % from the load in the case of regenerative power recovery.

Incorrect direction of rotation

With the CO contact 21-22-24 of the output relay K2, for example, an incorrectly fed phase sequence for a load connected downstream can be automatically corrected using an external reversing combination. The Chapter "Circuit diagrams (Page 165)" provides an example of wiring for automatic phase correction.

Note


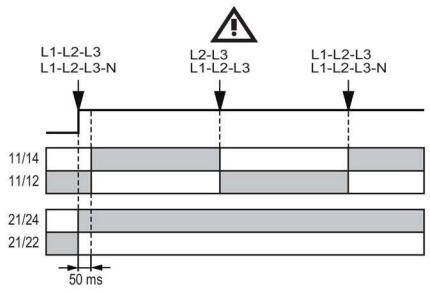
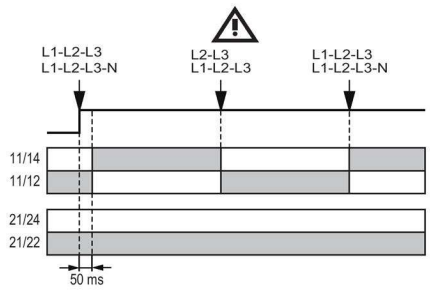
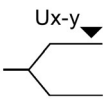
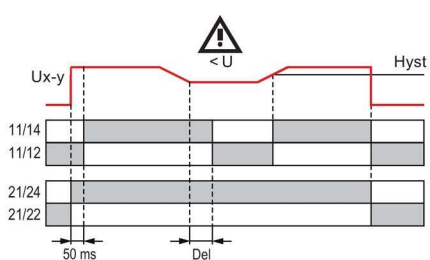
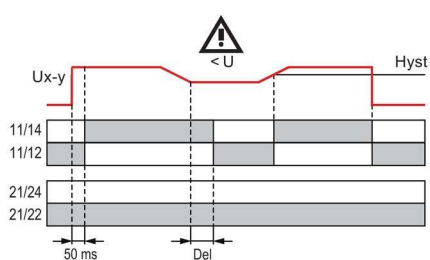
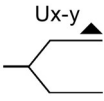
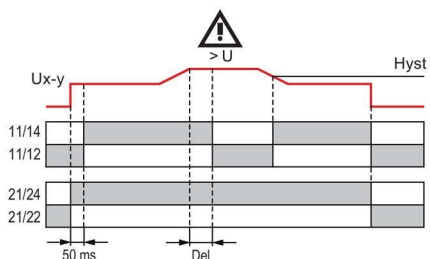
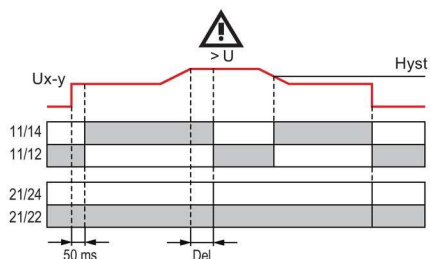
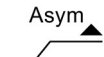
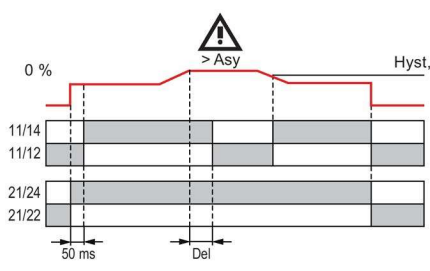
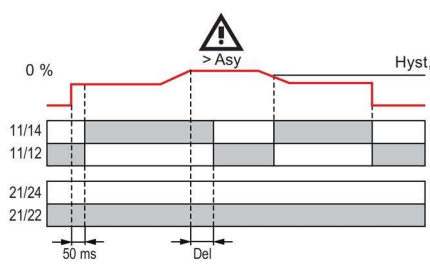
The 3UG4617 and 3UG4618 line monitoring relays only evaluate the phase sequence while all 3 phases are present. For safety reasons, the phase sequence is not reevaluated after 2-phase operation or a phase failure after which the third phase has appeared. In this case, the output relay for the phase rotation remains in its last switching state. The phase sequence is not reevaluated until after the device has been reset or all 3 phases have been simultaneously switched off and on again.

Note

The 3UG4617 and 3UG4618 line monitoring relays are only suitable for line frequencies of 50 / 60 Hz!

You will find the switching states of the output relays below in the Section "Function diagrams" and in the Chapter "Diagnostics (Page 162)."

Function diagrams 3UG4617 / 3UG4618

Display	Correct phase sequence L1-L2-L3 Memory = no	Incorrect phase sequence L3-L2-L1 Memory = no
		
		
		
		

6.7.3 Operation

Parameters

Parameterization of the devices is possible locally using the display and the three keys.



Parameter information

The table below shows the settable parameter information of the 3UG4617 and 3UG4618 line monitoring relays:

Table 6- 5 Parameter information, 3UG4617 and 3UG4618 line monitoring relays with digital setting

Menu level	Parameters	Setting range		Increment	Factory setting
		Minimum value	Maximum value		
"RUN"	Threshold for voltage undershoot (U▼)	160 V ¹⁾ 90 V ²⁾	690 V ¹⁾ 400 V ²⁾	1 V	375 V ¹⁾ 215 V ²⁾
"RUN"	Threshold for voltage overshoot (U▲)	160 V ¹⁾ 90 V ²⁾	690 V ¹⁾ 400 V ²⁾	1 V	425 V ¹⁾ 245 V ²⁾
"RUN"	Voltage asymmetry (Asy)	5 % or OFF	20 %	1 %	OFF
"SET"	Hysteresis (Hyst)	1 V	20.0 V	1 V	5 V
"SET"	Tripping delay time (Del)	0.1 s	20.0 s	0.1 s	0.1 s
"SET"	Reset response (Mem)	no = Autoreset	yes = Hand-RESET	--	no = Autoreset

1) 3UG4617 line monitoring relay

2) 3UG4618 line monitoring relay

The parameters are described in the Chapter "Parameters (Page 363)".

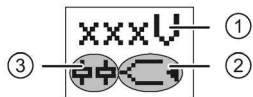
Menu-based operation is described in the Chapter "Menu-based operation (Page 39)".

6.7.4 Diagnostics

6.7.4.1 Indications on the display

Display information

The display is divided into three different areas.



- ① Voltage measured value or fault symbol
- ② Type of monitoring
- ③ Symbols of the changeover contacts




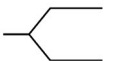




Meaning of the information on the display

Note

Indications in the event of a fault

The symbols on the display flash to indicate an error.

The following statuses and line faults are indicated as a diagnostics message with flashing symbols:

Display area	Symbol	Meaning
①	200V	Measured voltage is displayed
①	L 	Flashing: Phase failure detected
①	Asym	Flashing: Line voltage asymmetry detected
②		Monitoring for voltage overshoot
②		Monitoring for voltage undershoot
②		Range monitoring (monitoring for voltage overshoot and undershoot)
②	◀	Voltage is in correct range
②	▲	A voltage overshoot has occurred
②	▼	A voltage undershoot has occurred
③		Error <ul style="list-style-type: none"> • Not flashing: Relay contact 11/12 open, relay contact 11/14 closed • Flashing: Delay time (tripping delay) is running • Masked out: Relay contact 11/12 closed, relay contact 11/14 open
③	  	<ul style="list-style-type: none"> • Not flashing: Relay contact 21/22 open, relay contact 21/24 closed • Masked out: Relay contact 21/22 closed, relay contact 21/24 open

Note

CO contact 1 switches on all types of error.

CO contact 2 is for operating a reversing combination.

You will find more information about the switching behavior of the output relays in Chapter "Functions (Page 157)".

6.7.4.2 Reset

RESET



How the outputs are reset depends on the "Reset response" parameter (see Chapter "Reset response (Page 363)").

The following settings can be selected:

- Automatic reset (Memory = 0 / Mem = no)

The device is reset automatically as soon as a previously occurring error has been dealt with.

- Manual RESET (Memory = 1 / Mem = yes)

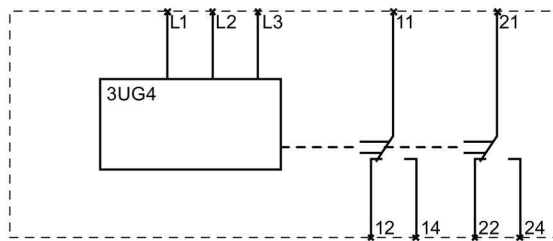
To reset the devices with digital setting, it is necessary to press both arrow keys   simultaneously for more than 2.5 s after removal of the cause of error. If the cause of the error has not been removed, a new error message appears immediately. Alternatively, the devices can be reset by switching the rated control supply voltage on and off.

6.7.5 Circuit diagrams

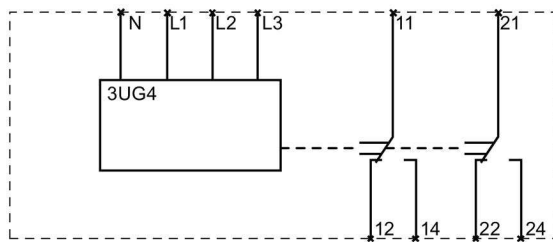
6.7.5.1 Internal circuit diagrams

Internal circuit diagram 3UG4617 / 3UG4618

3UG4617 line monitoring relay



3UG4618 line monitoring relay



Note

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

6.7.5.2 Wiring examples

Automatic phase correction

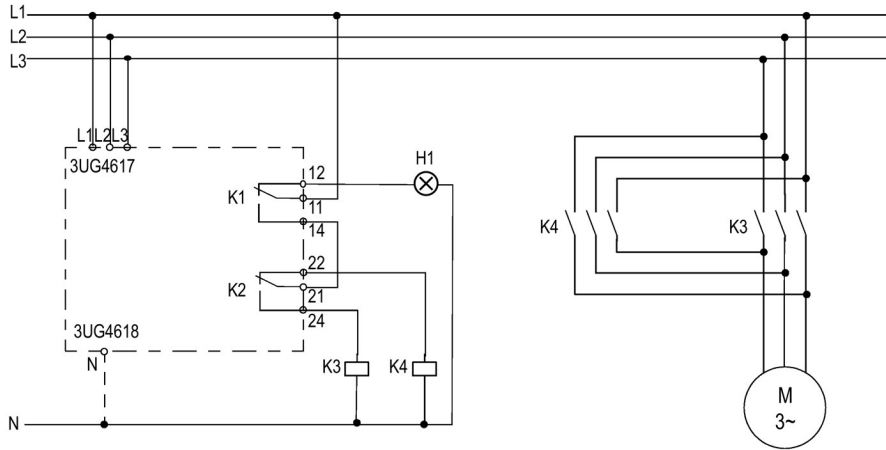


Image 6-2 3UG4617 / 3UG4618 automatic phase correction

6.7.6 Technical data

Measuring circuit

	3UG4617-.....	3UG4618-.....
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	160 ... 690
Adjustable response delay time with lower or upper limit violation	s	0.1 ... 20

General technical details

	3UG4617-.....	3UG4618-.....
Product function	Phase monitoring relay	
Design of the display	LCD	
Type of display LED	No	
Product function		
• undervoltage recognition	Yes	
• overvoltage recognition	Yes	
• phase sequence recognition	Yes	
• phase disturbance recognition	Yes	
• asymmetry recognition	Yes	
• overvoltage recognition of 3 phases	Yes	
• undervoltage recognition of 3 phases	Yes	
• tension window recognition of 3 phases	Yes	
• reset external	—	
• self-reset	Yes	
• open-circuit or closed-circuit current principle	No	

	3UG4617-.....	3UG4618-.....
Starting time after the control supply voltage has been applied	s	1
Response time maximum	s	0.45
Relative adjustment accuracy	%	0.2
Relative metering precision	%	5
Precision of digital display		+/-1 digit
Relative repeat accuracy	%	1
Type of voltage of the controlled supply 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
Working range factor 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
Resistance against shock 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

		3UG4617-.....	3UG4618-.....
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	
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

		3UG4617-1....	3UG4618-1....	3UG4617-2....	3UG4618-2....
Width	mm	22.5			
Height	mm	92	102	94	103
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			

	3UG4617-1....	3UG4618-1....	3UG4617-2....	3UG4618-2....
Type of mounting	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-section				
• 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	2			

