

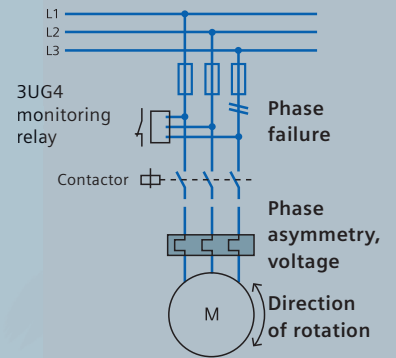
# 3UG Monitoring Relays

for line, single-phase voltage and insulation monitoring

The 3UG4 monitoring relays provide a maximum degree of protection for machines, plants and systems. Line and voltage faults are detected early and the appropriate response is initiated before significant damage can occur.



Configuration of a 3-phase monitoring function



## Your advantages:

- Due to the wide voltage range the monitoring relays can be used on all supply voltages around the world – from 160 V to 600 V – without auxiliary voltage
- Can be set to over-range, under-range and window monitoring
- Freely parameterizable delay times and reset functions
- Narrow width for all versions for line and voltage monitoring
- For the digital versions, the actual value and fault type are displayed
- Automatic correction of rotation direction by differentiating between line faults and incorrect phase sequence
- All versions have removable terminals
- All versions either with screw terminals or alternatively innovative spring-loaded terminals

## Application areas:

The applications are listed in the following table. It indicates the various equipment/system conditions that can be detected using the monitoring parameters.

Measured variable	Possible plant or system fault
Phase sequence Phase failure	<ul style="list-style-type: none"> <li>• Direction of rotation of the drive</li> <li>• A fuse has blown</li> <li>• Control supply voltage has failed</li> <li>• Single-phase operation of a motor with corresponding overheating</li> </ul>
Phase asymmetry	<ul style="list-style-type: none"> <li>• Motor overheating as a result of asymmetrical voltages or phase failure</li> <li>• Supply voltages with asymmetrical load are detected</li> <li>• A phase failure is detected in spite of regenerative feedback</li> </ul>
Undervoltage	<ul style="list-style-type: none"> <li>• Motor draws an increased current and therefore overheats</li> <li>• Unintended reset of a device</li> <li>• Detection of supply voltage dips, especially when supplied from a battery</li> <li>• Threshold value switch for analog signals 0 to 10 V</li> </ul>
Oversvoltage	<ul style="list-style-type: none"> <li>• A plant is protected against destruction due to supply overvoltages</li> <li>• A plant or system switches on above a certain voltage</li> <li>• Threshold value switch for analog signals 0 to 10 V</li> </ul>
Insulation monitoring	<ul style="list-style-type: none"> <li>• The insulation resistance for non-grounded plants and systems is monitored</li> </ul>

## Further information:

<http://support.automation.siemens.com/WW/view/en/40221419>  
(application of monitoring relays in safety functions)

## 3UG4 monitoring relays for line and three-phase voltages

Phase sequence	Phase failure	Phase asymmetry	Hysteresis	Under-voltage	Over-voltage	N-conductor monitoring	Delay times	Contacts	Rated control supply voltage $V_s$ <sup>1)</sup>	Order No.
<b>22.5 mm wide</b>										
<b>3UG4614 to 3UG4618 can be digitally set, with fault memory and with LC display</b>										
Yes	Conditional <sup>2)</sup>	–	–	–	–	–	–	1 CO	160–260 V 320–500 V 420–690 V	3UG4511-□AN20 3UG4511-□AP20 3UG4511-□AQ20
								2 CO	160–260 V 320–500 V 420–690 V	3UG4511-□BN20 3UG4511-□BP20 3UG4511-□BQ20
Yes	Yes	10 %	–	–	–	–	–	1 CO	160–690 V	3UG4512-□AR20
								2 CO	160–690 V	3UG4512-□BR20
Yes	Yes	20 %	5 %	80 % of $U_s$	–	–	OFF delay 0.1–20 s	2 CO	160–690 V	3UG4513-□BR20
Selectable	Yes	0 or 5–20 %	1–20 V	160–690 V	–	–	ON and OFF delay 0.1–20 s	2 CO	160–690 V	3UG4614-□BR20
Selectable	Yes	Using threshold values	1–20 V	160–690 V	160–690 V	–	0.1–20 s for $V_{min}$ and $V_{max}$	1 CO for $V_{min}$ and $V_{max}$	160–690 V	3UG4615-□CR20
Selectable	Yes	Using threshold values	1–20 V	90–400 V w.r.t. N	90–400 V w.r.t. N	Yes	0.1–20 s for $V_{min}$ and $V_{max}$	1 CO for $V_{min}$ and $V_{max}$	90–400 V w.r.t. N	3UG4616-□CR20
Autom. correction	Yes	0 or 5–20 %	1–20 V	160–690 V	160–690 V	–	OFF delay 0.1–20 s	1 CO for line faults and 1 CO for phase sequence	160–690 V	3UG4617-□CR20
Autom. correction	Yes	0 or 5–20 %	1–20 V	90–400 V w.r.t. N	90–400 V w.r.t. N	Yes	OFF delay 0.1–20 s	1 CO for line faults and 1 CO for phase sequence	90–400 V w.r.t. N	3UG4618-□CR20

<sup>1)</sup> Absolute limits<sup>2)</sup> Return voltage due to coupling between the individual phases

The 3UG4511 device cannot detect phase failures reliably.

Loads connected to the three-phase system – such as motor windings, lamps, transformers – result in a coupling between the individual phases. As a result of this coupling, there is always a return voltage at the equipment terminal of the phase that has failed.

Screw terminal



Spring-loaded terminal



## Single-phase voltage monitoring

Measuring range	Hysteresis	Contacts	Delay time	Rated control supply voltage $V_s$	Order No.
<b>22.5 mm wide, all of the devices can be digitally set and have an LC display, a fault memory that can be switched-in, simultaneous monitoring for overvoltage and undervoltage over the complete measuring range</b>					
17–275 V AC/DC	0.1–150 V	1 W	0.1–20 s	Self-supplied	3UG4633-□AL30
0.1–60 V AC/DC	0.1–30 V	1 W	0.1–20 s	24 V AC/DC	3UG4631-□AA30
				24–240 V AC/DC	3UG4631-□AW30
10–600 V AC/DC	0.1–300 V	1 W	0.1–20 s	24 V AC/DC	3UG4632-□AA30
				24–240 V AC/DC	3UG4632-□AW30

## Insulation monitoring for IT networks

Line supply	Measuring range	Auto reset/ fault memory	Contacts	Width	Rated control supply voltage $V_s$	Order No.
AC	1–110 kΩ	Selectable	1 W	45 mm	115/230 V AC	3UG3081-1AK20
					24–240 V AC	3UG3081-1AW30
DC	10–110 kΩ	Selectable	1 W	45 mm	24–240 V AC	3UG3082-1AW30

Screw terminal



Spring-loaded terminal



# 3UG4 Monitoring Relays

for single-phase current, power factor and active current monitoring

3UG4 relays that monitor current, power factor and active current are ideal for monitoring the load of motors and the functionality of electronic loads. These devices detect the effect of wear and faults early on, thereby for example facilitating the timely implementation of maintenance measures to prevent system failures.



## Your advantages:

- Wide-voltage versions reduce stock-keeping
- Variable settings for over-range, under-range or window monitoring
- Freely parameterizable delay times and reset behavior
- Actual value and fault type are permanently displayed
- All versions have removable terminals
- All versions available with screw terminals or innovative spring-loaded terminals

## Current monitoring:

- Only two versions from 2 mA to 10 A
- Real effective value measurement
- Applicable for frequencies with 40–500 Hz AC and DC

## Power factor and active current monitoring:

- Global application thanks to wide-range voltage between 90 and 690 V AC
- Capable of monitoring even small single-phase motors with a no-load running current below 0.5 A
- Easy identification of threshold values thanks to direct relationship between the measured variable and the motor load
- Window monitoring and active current measurement allow for easy identification of cable break between control cabinet and motor as well as phase failure
- Monitoring of the motor load independent of the main voltage
- Selectable measuring principle power factor and/or  $I_{res}$  (active current)

## Application areas:

- The applications can be seen in the adjacent table. It shows the various equipment/system states that can be detected using the monitoring parameters.

## Further information:

<http://support.automation.siemens.com/WW/view/en/40221419>  
(application of monitoring relays in safety functions)

**3UG4 monitoring relays – single-phase current monitoring**

Measuring range	Hysteresis	Contacts	Starting-bypass time	Tripping delay	Rated control supply voltage $V_s$	Order No.
Width 22.5 mm, all devices digitally adjustable and with LC display, a fault memory that can be switched-in, simultaneous monitoring for current exceedance and shortfall over the entire measuring range						
3.0 mA AC/DC up to 500 mA AC/DC	0.1 – 250 mA	1 CO	0.1–20 s	0.1–20 s	24 V AC/DC 24–240 V AC/DC	3UG4621-□AA30 3UG4621-□AW30
0.05 A AC/DC up to 10 A AC/DC	0.01 – 5 A	1 CO	0.1–20 s	0.1–20 s	24 V AC/DC 24–240 V AC/DC	3UG4622-□AA30 3UG4622-□AW30

**Power factor and active current monitoring**

Measuring range for power factor	Measuring range for active current $I_{res}$	Power factor hysteresis	Active current hysteresis	ON delay	Tripping delay	Rated control supply voltage $V_s^{1)}$	Order No.
22.5 mm wide, all of the devices can be digitally set and have an LC display, a fault memory that can be switched-in, simultaneous power factor and active current monitoring over the entire measuring range							
0.1–0.99 (cos $\varphi$ )	0.2–10.0 A	0.1 (cos $\varphi$ )	0.1–2.0 A	0–99 s	0.1–20.0 s	90–690 V AC	3UG4641-□CS20

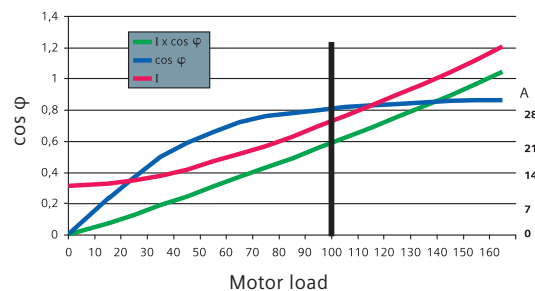
<sup>1)</sup> Absolute limits

Screw terminal **1**  
Spring-loaded terminal **2**

Monitoring parameter	Plant/system states
Current monitoring	<ul style="list-style-type: none"> <li>• Overload monitoring</li> <li>• Underload monitoring close to the rated torque</li> <li>• Monitoring of the functionality of electric loads</li> <li>• Wire breakage monitoring</li> <li>• Energy management (phase current monitoring)</li> <li>• Threshold value switch for analog signals up to 20 mA</li> </ul>
Power factor and active current monitoring	<ul style="list-style-type: none"> <li>• No-load monitoring</li> <li>• Underload monitoring in the lower power range</li> <li>• Overload monitoring</li> <li>• Extremely simple power factor monitoring of power supply systems to control compensation systems</li> <li>• Energy management</li> <li>• Interrupted cable between the cabinet and the motor</li> </ul>

**Current and cos  $\varphi$  as a function of the motor load**

Rule of thumb:  
Cos  $\varphi$  changes significantly below the rated load; the current increases disproportionately above the rated load.



The active current  $I_{res}$  indicates a linear correlation between the motor load and the measured value over the entire measuring range.