

# Monitoring Relays

## 3UG Monitoring Relays for Electrical and Additional Measurements

### Level monitoring: Level monitoring relays

#### Overview



The 3UG45 01 level monitoring relay is used together with 2- or 3-pole sensors to monitor the levels of conductive liquids.

#### Function

##### 3UG45 01 monitoring relays

The principle of operation of the 3UG45 01 level monitoring relay is based on measuring the electrical resistance of the liquid between two immersion sensors and a reference terminal. If the measured value is lower than the sensitivity set at the front, the output relay changes its switching state. In order to exclude electrolytic phenomena in the liquid, the sensors are supplied with alternating current.

##### Two-point control

The output relay changes its switching state as soon as the liquid level reaches the maximum sensor, while the minimum sensor is submerged. The relay returns to its original switching state as soon as the minimum sensor no longer has contact with the liquid.

##### Single-point control

If only one level is being controlled, the terminals for Min and Max on the monitoring relay are bridged. The output relay changes its switching state as soon as the liquid level is reached and returns to its original switching state once the sensor no longer has contact with the liquid.

In order to prevent premature tripping of the switching function caused by wave motion or frothing, even though the set level has not been reached, it is possible to delay this function by 0.5 ... 10 s.

For safe resetting, the supply voltage must be interrupted for at least the set delay time of +0.5 s.

##### Note:

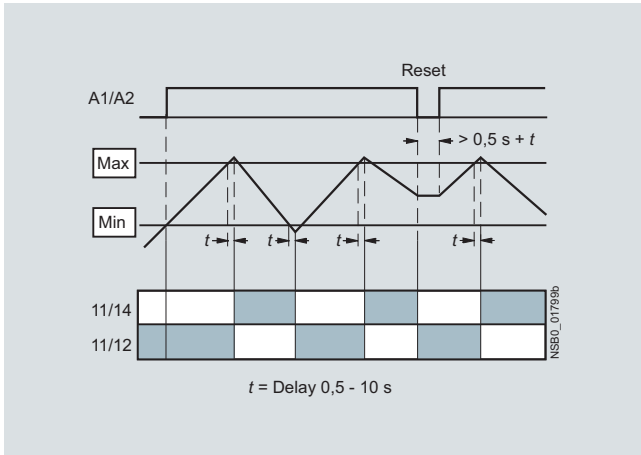
*It is also possible to connect other resistance sensors to the Min and Max terminals in the range 2 ... 200 kW, e. g. photoresistors, temperature sensors, encoders based on resistance etc. The monitoring relay can therefore also be used for other applications apart from monitoring the levels of liquids.*

# Monitoring Relays

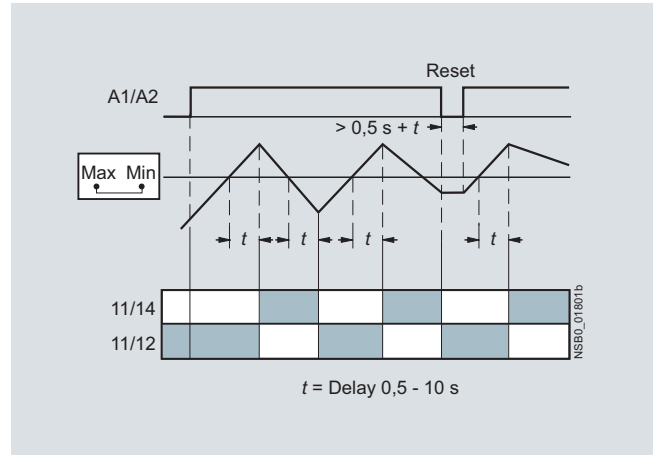
## 3UG Monitoring Relays for Electrical and Additional Measurements

### Level monitoring: Level monitoring relays

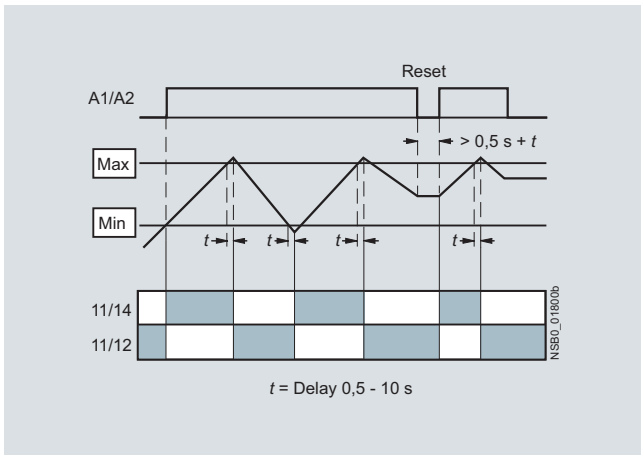
OVER, two-point control



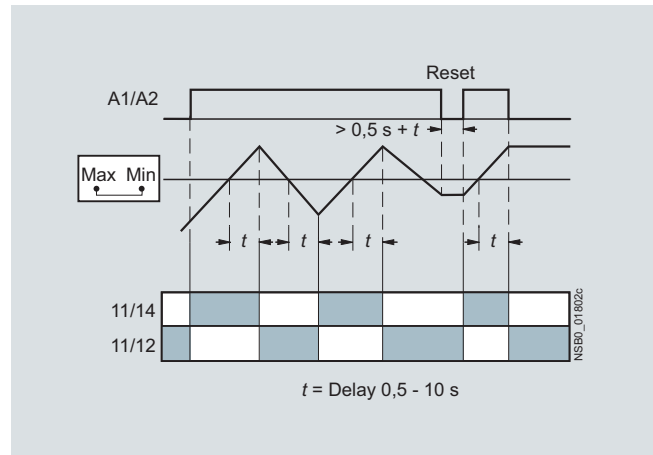
OVER, single-point control



UNDER, two-point control



UNDER, single-point control





# Monitoring Relays

## 3UG Monitoring Relays for Electrical and Additional Measurements

Level monitoring:  
Level monitoring relays

### Technical specifications

Type		3UG45 01-1AA30, 3UG45 01-2AA30	3UG45 01-1AW30, 3UG45 01-2AW30
<b>General data</b>			
<b>Rated control supply voltage <math>U_s</math></b>	V AC/DC	24	24 ... 240
<b>Rated frequency</b>	Hz	50/60	
<b>Operating range</b>	V	20.4 ... 26.4	20.4 ... 264
<b>Rated power, max.</b>			
• At 24 V AC	VA	2	2
• At 240 V AC	VA	--	4
<b>Width</b>	mm	22.5	
<b>Availability time</b> after application of $U_s$	ms	500	
<b>Response time</b> once a switching threshold is reached	ms	Max. 300	
<b>Adjustable delay time</b>	s	0.5 ... 10	
<b>Inlet or outlet monitoring function</b>		UNDER/OVER selector switch at the front	
<b>Mains buffering time, minimum</b>	ms	200	
<b>Rated insulation voltage <math>U_i</math></b>	V	300	
Degree of pollution 3, Overvoltage category III acc. to IEC 60664			
<b>Rated impulse withstand voltage</b>	kV	4	
<b>Permissible ambient temperature</b>			
• During operation	°C	-25 ... +60	
• During storage	°C	-40 ... +80	
<b>EMC tests<sup>1)</sup></b>		IEC 60947-5-1/IEC 61000-6-2/IEC 61000-6-4	
<b>Degree of protection</b> acc. to IEC 60529		IP40 Enclosure IP20 Terminals	
<b>Mounting position</b>		Any	
<b>Vibration resistance</b> acc. to IEC 60068-2-6		1 ... 6 Hz: 15 mm; 6 ... 500 Hz: 2 g	
<b>Shock resistance</b> acc. to IEC 60068-2-27	g/ms	15/11	
<b>Connection type</b>		 <b>Screw terminals</b>	
• Terminal screw		M3 (for standard screwdriver, size 2 and Pozidriv 2)	
• Solid	mm <sup>2</sup>	1 x (0.5 ... 4)/2 x (0.5 ... 2.5)	
• Finely stranded with end sleeve	mm <sup>2</sup>	1 x (0.5 ... 2.5)/2 x (0.5 ... 1.5)	
• AWG cables, solid or stranded	AWG	2 x (20 ... 14)	
• Tightening torque	Nm	0.8 ... 1.2	
<b>Connection type</b>		 <b>Spring-type terminals</b>	
• Solid	mm <sup>2</sup>	2 x (0.25 ... 1.5)	
• Finely stranded, with end sleeves acc. to DIN 46228	mm <sup>2</sup>	2 x (0.25 ... 1.5)	
• Finely stranded	mm <sup>2</sup>	2 x (0.25 ... 1.5)	
• AWG cables, solid or stranded	AWG	2 x (24 ... 16)	
<b>Measuring circuit</b>			
<b>Electrode current, max.</b> (typ. 70 Hz)	mA	1	
<b>Electrode voltage, max.</b> (typ. 70 Hz)	V	15	
<b>Sensor feeder cable</b>	m	Max. 100	
<b>Conductor capacity of sensor cable<sup>2)</sup></b>	nF	Max. 10	
<b>Adjustable sensitivity</b>			
• Resistance	kΩ	2 ... 200	
<b>Measuring accuracy</b>	%	±20	
<b>Repeat accuracy</b> at constant parameters	%	±1	
<b>Deviations</b> for temperature fluctuations	%/°C	±1	
<b>Control circuit</b>			
<b>Number of CO contacts for auxiliary contacts</b>		1	
<b>Load capacity of the output relay</b>			
Conventional thermal current $I_{th}$	A	5	
<b>Rated operational current <math>I_o</math> at</b>			
• AC-15 at 24 ... 400 V	A	3	
• DC-13 at 24 V	A	1	
• DC-13 at 125 V	A	0.2	
• DC-13 at 250 V	A	0.1	
<b>Minimum contact load</b> at 17 V DC	mA	5	
<b>Output relay with DIAZED fuse</b>	A	4	
gL/gG operational class			
<b>Electrical endurance</b> AC-15, 3 A, million operating cycles		0.1	
<b>Mechanical endurance</b> million operating cycles		10	

<sup>1)</sup> Important: This is a Class A product. In the household environment this device may cause radio interference. In this case the user must introduce suitable measures.

<sup>2)</sup> The sensor cable does not necessarily have to be shielded, but we do not recommend installing this cable parallel to the power supply lines. It is also possible to use a shielded cable, whereby the shield has to be connected to the M terminal.

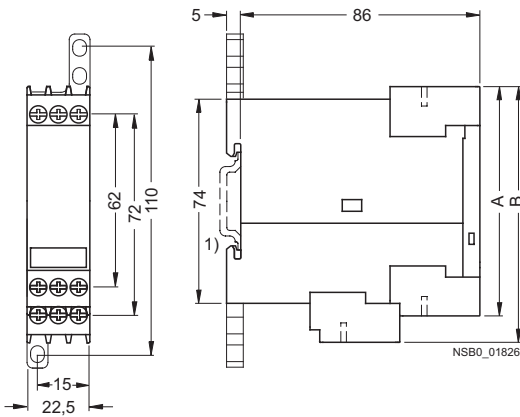
# Monitoring Relays

## 3UG Monitoring Relays for Electrical and Additional Measurements

Level monitoring:  
Level monitoring relays

### Dimensional drawings

3UG45 01



Type	3UG45 01	
	A	B

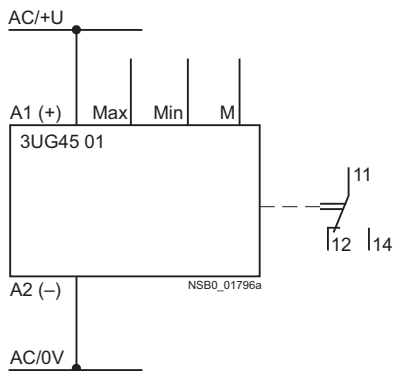
#### Removable terminals

Screw terminals	83	92
Spring-loaded terminals	84	94

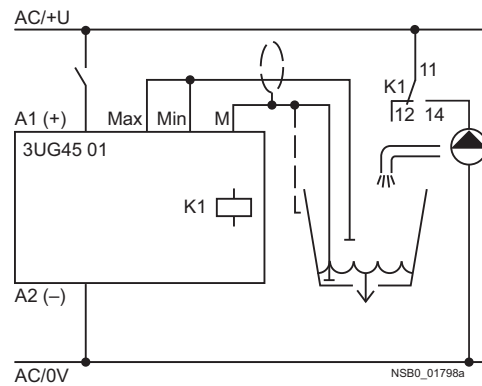
1) For standard mounting rail according to EN 60715.

### Schematics

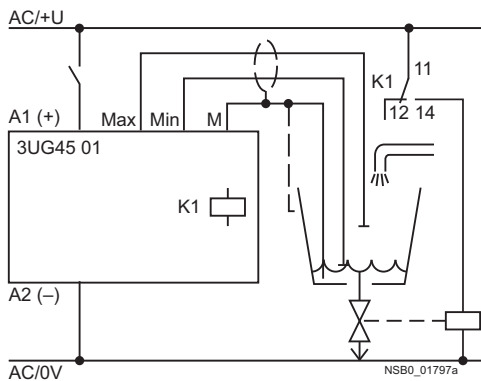
3UG45 01



#### Single-point control with inlet monitoring



#### Two-point control with outlet monitoring



#### Position of the terminals

A1+	M	
MIN	MAX	A2-
12	11	14

# Monitoring Relays

## 3UG Monitoring Relays for Electrical and Additional Measurements

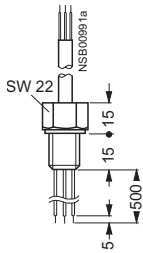
Level monitoring:  
Level monitoring sensors

### Technical specifications

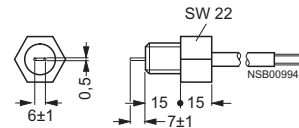
Type		3UG32 07-3A three-pole	3UG32 07-2A two-pole	3UG32 07-2B two-pole	3UG32 07-1B single-pole	3UG32 07-1C single-pole
Length	mm	500	500	--	--	--
Insulation	Teflon insulation (PTFE)	Yes	Yes	Yes	--	Yes
Installation		Vertical	Vertical	Lateral	Lateral	Lateral
Screw-in gland width A/F		22				
Thread	inch	R 3/8				
Connecting cable	mm <sup>2</sup>	3 x 0.5, 2 m long				
Operating temperature	°C	90				
Operating pressure	bar	10				
Assignment						
Cable/Electrode	<ul style="list-style-type: none"> <li>• Cable brown</li> <li>• Cable white</li> <li>• Cable green</li> </ul>	Center electrode	Not assignable	Gland	Gland	Gland
		Not assignable	Not assignable	Not assignable	Electrode	Electrode
		Not assignable	--	Not assignable	--	--

### Dimensional drawings

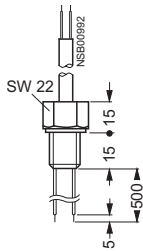
**3UG32 07-3A**  
three-pole wire electrode



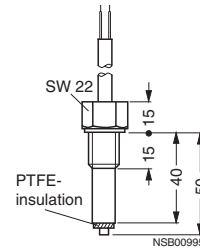
**3UG32 07-1B**  
single-pole bow electrode



**3UG32 07-2A**  
two-pole wire electrode



**3UG32 07-1C**  
single-pole electrode, rugged version



**3UG32 07-2B**  
two-pole bow electrode

