

# Solid-State Time Relays

## 3RP10 and 3RP15

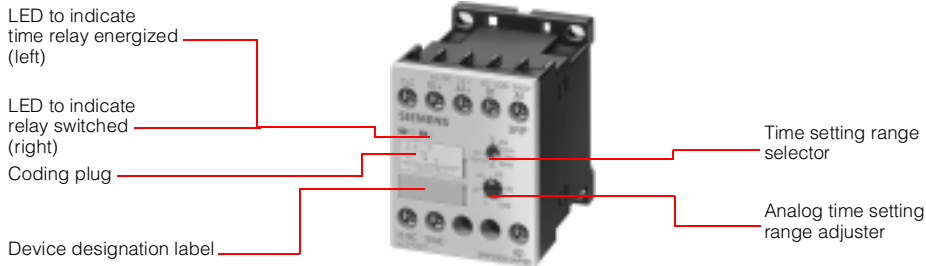
SIRIUS 3R



### Overview

#### SIRIUS 3RP10 time relay, assembly width 45 mm

#### Accessories

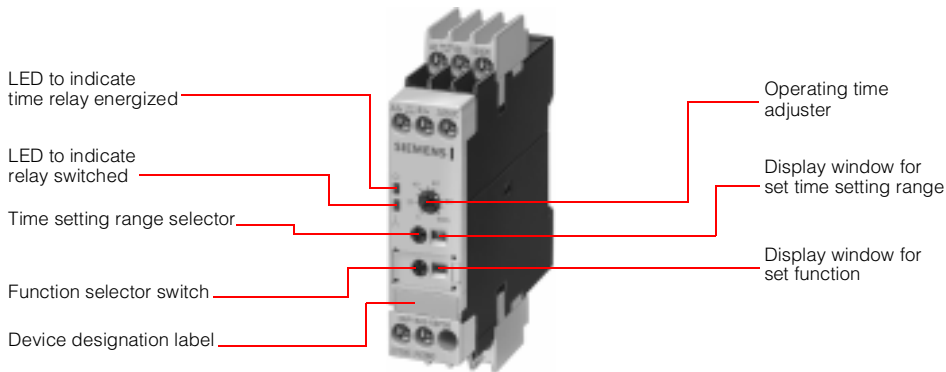


Set of coding plugs for setting function mode of multifunction time relay



#### SIRIUS 3RP15 time relay, assembly width 22.5 mm

#### Accessories



Push-in lugs for screw fixing



Sealable cap



Label set for designating the multifunction time relay





CAGE CLAMP

Selection and ordering data

**Screw and Cage Clamp connection**

Solid-state time relays for general use in control systems and mechanical engineering with


- 1 changeover contact
- eight selectable time setting ranges
- switching position and voltage indication by LEDs

Function table see page 7/8.

Design	Time setting range <i>t</i>	Rated control supply voltage		Screw connection		Cage Clamp connection <sup>1)</sup>		Weight approx.
		AC 50-60 Hz	DC	Order No.	Price	Order No.	Price	
	adjustable by rotary switch to	V	V	▶ Preferred type	1 unit	Preferred type	1 unit	kg
<b>3RP10 00 time relay, multifunction, 8 time setting ranges</b>								
The 3RP10 00 time relay can be set for different functions by means of coding plugs. The required coding plugs are supplied with the relay. For functions, see 7PX9 904 coding plugs.								
3RP10 00-2A...	with LED and 1 changeover contact, 7 functions The terminals A1 and B1 or A3 and B3 must be of equal potential.	0.05 – 1 s 0.5 – 10 s 0.05 – 1 min 5 – 100 s 0.5 – 10 min 0.05 – 1 h 5 – 100 min 0.5 – 10 h	24/100-127 24/200-240	24 24	▶ 3RP10 00-1AQ30 ▶ 3RP10 00-1AP30		3RP10 00-2AQ30 3RP10 00-2AP30	0.1 0.1
<b>3RP10 20 time relay, ON-delay, 8 time setting ranges</b>								
3RP10 00-1A...	with LED and 1 changeover contact, delayed	0.05 – 1 s 0.5 – 10 s 0.05 – 1 min 5 – 100 s 0.5 – 10 min 0.05 – 1 h 5 – 100 min 0.5 – 10 h	24/100-127 24/200-240	24 24	▶ 3RP10 20-1AQ30 ▶ 3RP10 20-1AP30		3RP10 20-2AQ30 3RP10 20-2AP30	0.1 0.1



Design	Application	Order No.	Price	Weight approx.
			1 unit	kg

Accessories, 7PX9 904 coding plugs			Order No.	Price	Weight approx.
	Complete set with 7 functions • ON-delay • OFF-delay with auxiliary voltage • ON-delay and OFF-delay with auxiliary voltage • flashing • passing make contact • passing break contact with auxiliary voltage • pulse shaping with auxiliary voltage	for relays with 1 changeover contact	<b>7PX9 904</b>		0.01

1) For notes on Cage Clamp technology, see page 6.

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# Solid-State Time Relays

## 3RP15

## SIRIUS 3R



### Selection and ordering data

**CAGE CLAMP**

#### Screw and Cage Clamp connection

Solid-state time relays for general use in control systems and mechanical engineering with

- 1 or 2 changeover contacts

- single or selectable time setting ranges
- switching position indication by LED
- voltage indication by LED



Function table see page 7/8.

Design	Time setting range $t$	Rated control supply voltage		Screw connection		Cage Clamp connection <sup>1)</sup>		Weight approx.
		AC 50-60 Hz	DC	Order No.	Price	Order No.	Price	
	adjustable by rotary switch to	V	V	▶ Preferred type	1 unit	Preferred type	1 unit	kg

**NEW**

#### 3RP15 05 time relay, multifunction, 15 time setting ranges



The functions<sup>2)</sup> can be selected by means of a rotary switch. The 3RP15 05 time relay can be provided with labels which allow for legible and unmistakable marking of different functions. The corresponding labels are supplied as accessories. The terminals A. and B. must be of equal potential.

	3RP15 05-1B	with LED and:	0.05 – 1 s 0.15 – 3 s 0.5 – 10 s	24/100-127 24 24/200-240 24 24-240 <sup>4)</sup> 24-240 <sup>5)</sup>	▶ 3RP15 05-1AQ30 ▶ 3RP15 05-1AP30 ▶ 3RP15 05-1AW30	3RP15 05-2AQ30 3RP15 05-2AP30 3RP15 05-2AW30	0.140
	1 changeover contact, 8 functions	1.5 – 30 s 0.05 – 1 min 5 – 100 s	400-440 24/100-127 24 24/200-240 24	▶ 3RP15 05-1BT20 <b>NEW</b> ▶ 3RP15 05-1BQ30 ▶ 3RP15 05-1BP30 ▶ 3RP15 05-1BW30	– 3RP15 05-2BQ30 3RP15 05-2BP30 3RP15 05-2BW30	0.150	
	2 changeover contacts, 16 functions	0.15 – 3 min 0.5 – 10 min 1.5 – 30 min 0.05 – 1 h 5 – 100 min	24-240 24-240	▶ 3RP15 05-1RW30 <b>NEW</b>	3RP15 05-2RW30	0.150	
	2 changeover contacts, positively driven <sup>6)</sup> and hard gold-plated. 8 functions <sup>7)</sup>	0.15 – 3 h 0.5 – 10 h 1.5 – 30 h 5 – 100 h $\infty$ <sup>3)</sup>					


#### 3RP15 1. time relay, ON-delay, 1 time setting range

	3RP15 1.-1A...	with LED and	0.5 – 10 s	24/100-127 24 24/200-240 24	▶ 3RP15 11-1AQ30 ▶ 3RP15 11-1AP30	3RP15 11-2AQ30 3RP15 11-2AP30	0.100
	1 changeover contact	1.5 – 30 s 5 – 100 s	24/100-127 24 24/200-240 24	▶ 3RP15 12-1AQ30 ▶ 3RP15 12-1AP30 ▶ 3RP15 13-1AQ30 ▶ 3RP15 13-1AP30	3RP15 12-2AQ30 3RP15 12-2AP30 3RP15 13-2AQ30 3RP15 13-2AP30	0.100	

#### 3RP15 25 time relay, ON-delay, 15 time setting ranges

	3RP15 25-1B...	with LED and:	0.05 – 1 s 0.15 – 3 s 0.5 – 10 s	24/100-127 24 24/200-240 24	▶ 3RP15 25-1AQ30 ▶ 3RP15 25-1AP30	3RP15 25-2AQ30 3RP15 25-2AP30	0.110
	1 changeover contact	1.5 – 30 s 0.05 – 1 min 5 – 100 s 0.15 – 3 min 0.5 – 10 min 1.5 – 30 min	42- 48/60 42-48/60 <sup>4)</sup> 24/100-127 24 24/200-240 24	▶ 3RP15 25-1BR30 ▶ 3RP15 25-1BQ30 ▶ 3RP15 25-1BP30 ▶ 3RP15 25-1BW30	3RP15 25-2BR30 3RP15 25-2BQ30 3RP15 25-2BP30 3RP15 25-2BW30	0.110	
	2 changeover contacts	0.05 – 1 h 5 – 100 min 0.15 – 3 h 0.5 – 10 h 1.5 – 30 h 5 – 100 h $\infty$ <sup>3)</sup>	24-240 <sup>4)</sup> 24-240 <sup>5)</sup>				

#### 3RP15 27 time relay, ON-delay, two-wire version, 4 time setting ranges

	3RP15 27-1E...	1 NO contact (semi-conductor)	0.05 – 1 s 0.2 – 4 s 1.5 – 30 s 12 – 240 s	24-66 24- 66 <sup>4)</sup> 90-240 90-240 <sup>4)</sup>	▶ 3RP15 27-1EC30 ▶ 3RP15 27-1EM30	3RP15 27-2EC30 3RP15 27-2EM30	0.100
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- 1) For notes on Cage Clamp technology, see page 6.
- 2) For functions, see 3RP19 01-0 label set, page 7/6.
- 3) With selection of  $\infty$ , no timing. For test purposes (ON/OFF function) on site. Relay is constantly on when activated, or relay remains constantly off when activated. Depending on which function is set.
- 4) Working range 0.8 to 1.1 x  $U_N$ .
- 5) Working range 0.7 to 1.1 x  $U_N$ .

- 6) Positively driven: NO and NC are never closed simultaneously; contact gap  $\geq 0.5$  mm is guaranteed, minimum make-break capacity 12 V, 3 mA.
- 7) The changeover contacts are actuated simultaneously, as a result of which only 8 functions are selectable (no  $\nabla\Delta$ , no instantaneous contact).



CAGE CLAMP

Selection and ordering data






**Screw and Cage Clamp connection**

Solid-state time relays for general use in control systems and mechanical engineering with

- 1 or 2 changeover contacts

- single or selectable time setting ranges
- switching position indication by LED
- voltage indication by LED

Function table see page 7/8.

Design	Time setting range $t$	Rated control supply voltage		Screw connection		Cage Clamp connection <sup>1)</sup>		Weight approx. kg
		AC 50-60 Hz	DC	Order No.	Price	Order No.	Price	
	adjustable by rotary switch to	V	V	▶ Preferred type	1 unit	▶ Preferred type	1 unit	
<b>3RP15 3. time relay, OFF-delay, with aux. voltage, 1 time setting range</b>								
 3RP15 3.-1A...	with LED and 1 changeover contact.	0.5 – 10 s	24/100-127	24	▶ 3RP15 31-1AQ30	▶ 3RP15 31-2AQ30		0.130
		1.5 – 30 s	24/100-127	24	▶ 3RP15 31-1AP30	▶ 3RP15 31-2AP30		
	The terminals A and B must be of equal potential	5 – 100 s	24/100-127	24	▶ 3RP15 32-1AQ30	▶ 3RP15 32-2AQ30		0.130
			24/200-240	24	▶ 3RP15 32-1AP30	▶ 3RP15 32-2AP30		
			24/100-127	24	▶ 3RP15 33-1AQ30	▶ 3RP15 33-2AQ30		0.130
			24/200-240	24	▶ 3RP15 33-1AP30	▶ 3RP15 33-2AP30		
<b>3RP15 40 time relay, OFF-delay, without auxiliary voltage<sup>3)</sup>, 7 time setting ranges</b>								
 3RP15 40-1.A...	with LED and:	0.05 – 1 s						
		0.15 – 3 s						
		0.3 – 6 s						
	1 changeover contact	0.5 – 10 s	24	24 <sup>4)</sup>	▶ 3RP15 40-1AB30	▶ 3RP15 40-2AB30		0.130
		1.5 – 30 s	100-127	100-127 <sup>5)</sup>	▶ 3RP15 40-1AJ30	▶ 3RP15 40-2AJ30		
		3 – 60 s	200-240	200-240 <sup>5)</sup>	▶ 3RP15 40-1AN30	▶ 3RP15 40-2AN30		
		5 – 100 s						
	2 changeover contacts		24	24 <sup>4)</sup>	▶ 3RP15 40-1BB30	▶ 3RP15 40-2BB30		0.150
			100-127	100-127 <sup>5)</sup>	▶ 3RP15 40-1BJ30	▶ 3RP15 40-2BJ30		
			200-240	200-240 <sup>5)</sup>	▶ 3RP15 40-1BN30	▶ 3RP15 40-2BN30		
<b>3RP15 55 time relay, clock-pulse relay, 15 time setting ranges</b>								
 3RP15 55-1A...	with LED and 1 changeover contact	0.05 – 1 s	42-48/60	42-48/60 <sup>6)</sup>	▶ 3RP15 55-1AR30	▶ 3RP15 55-2AR30		0.110
		0.15 – 3 s	24/100-127	24	▶ 3RP15 55-1AQ30	▶ 3RP15 55-2AQ30		
		0.5 – 10 s	24/200-240	24	▶ 3RP15 55-1AP30	▶ 3RP15 55-2AP30		
		1.5 – 30 s						
		0.05 – 1 min						
		5 – 100 s						
		0.15 – 3 min						
		0.5 – 10 min						
		1.5 – 30 min						
		0.05 – 1 h						
		5 – 100 min						
		0.15 – 3 h						
		0.5 – 10 h						
		1.5 – 30 h						
		5 – 100 h						
	$\infty$ <sup>2)</sup>							
<b>3RP15 60 time relay, star-delta function, dead interval 50 ms and overtravel time</b>								
 3RP15 60-1S...	3 NO contacts <sup>5)</sup>	star delta	24/ 100-127	24	▶ 3RP15 60-1SQ30	▶ 3RP15 60-2SQ30		0.150
	(common contact root terminal 17)	1.0 – 20 s	24/ 200-240	24	▶ 3RP15 60-1SP30	▶ 3RP15 60-2SP30		
		overtravel time (idling)						
		30 – 600 s						
<b>3RP15 7. time relay, star-delta function<sup>7)</sup>, dead interval 50 ms, 1 time setting range</b>								
 3RP15 7.-1N...	1 NO instantaneous and	1 – 20 s	24/100-127	24	▶ 3RP15 74-1NQ30	▶ 3RP15 74-2NQ30		0.110
	1 NO delayed (common contact root terminal 17)	3 – 60 s	24/100-127	24	▶ 3RP15 74-1NP30	▶ 3RP15 74-2NP30		
			24/200-240	24	▶ 3RP15 76-1NQ30	▶ 3RP15 76-2NQ30		0.110
			24/200-240	24	▶ 3RP15 76-1NP30	▶ 3RP15 76-2NP30		

1) For Cage Clamp technology, see page 6.

2) With selection of  $\infty$ , no timing. For test purposes (ON/OFF function) on site. If interval time  $\infty$ , relay permanently off. If pulse time  $\infty$ , relay permanently on.

3) Setting of output contacts in as-supplied state not defined (bistable relay). Application of the control voltage once results in contact changeover to the correct setting.

4) Working range 0.7 to 1.25 x  $U_N$ .5) Working range 0.85 to 1.1 x  $U_N$ .6) Working range 0.8 to 1.1 x  $U_N$ .

7) For typical circuit, see page 7/19.

# Solid-State Time Relays

## Accessories

SIRIUS 3R



### Selection and ordering data

Design	Function	Code letter	Application	Order No. (Order No. and price for one packing unit)	Price 1 packg.	Weight approx. kg	Pack. 1 packg.
<b>Label set</b>							
Accessories for 3RP15 05 (not included in the scope of supply). Offers the possibility of labeling time relays with the set function in English and German.							
	Complete set with 8 functions	ON-delay	A	for relays with 1 changeover contact and 3RP15 05-.RW30	<b>3RP19 01-0A</b>	0.020	5 sets
		OFF-delay with auxiliary voltage	B				
		ON-delay and OFF-delay with auxiliary voltage.	C				
		flashing, starting with interval	D				
		passing make contact	E				
		passing break contact with auxiliary voltage	F				
		pulse shaping with auxiliary voltage	G				
		additive ON-delay with auxiliary voltage	H				
	Complete set with 16 functions	ON-delay	A	for relays with 2 changeover contacts	<b>3RP19 01-0B</b>	0.030	5 sets
		OFF-delay with auxiliary voltage	B				
		ON-delay and OFF-delay with auxiliary voltage	C				
		flashing, starting with interval	D				
		passing make contact	E				
		passing break contact with auxiliary voltage	F				
		pulse shaping with auxiliary voltage	G				
		additive ON-delay with auxiliary voltage and instantaneous contact	H●				
		ON-delay and instantaneous contact	A●				
		OFF-delay with auxiliary voltage and instantaneous contact	B●				
		ON-delay and OFF-delay with auxiliary voltage and instantaneous contact	C●				
		flashing, starting with interval, and instantaneous contact	D●				
		passing make contact and instantaneous contact	E●				
		passing break contact with auxiliary voltage and instantaneous contact	F●				
pulse shaping with auxiliary voltage and instantaneous contact	G●						
star-delta function	YΔ						
<b>Cap and push-in lug</b>							
	<b>Sealable cap</b> for screw fixing	for securing against misadjustment of setting knobs by unauthorized persons		for relays with 1 or 2 changeover contacts	<b>3RP19 02</b>	0.020	5 units
		<b>Push-in lug</b>			for relays with 1 or 2 changeover contacts	<b>3RP19 03</b>	0.020





### Selection and ordering data

#### Screw connection

Solid-state time relays for general use in control systems and mechanical engineering with

- 1 normally open contact or 1 changeover contact
- 22.5 mm standard housing

Function table see page 7/8.

Design	Time setting range $t$	Rated control supply voltage		Screw connection		Weight approx. kg
		AC 50-60 Hz V	DC V	Order No.	Price 1 unit	
<b>7PU51 20 time relay, flasher relay</b>						
 <p>7PU51 20</p> <p>with LED input and output isolated 1 NO contact (semi-conductor) operational voltage 17–240 V AC/DC</p>	0.2–2 s	24	24	● 7PU51 20-6CB30		0.150
		42–48	42–48	● 7PU51 20-6CE30		
		60	60	● 7PU51 20-6CF30		
		110–127	–	● 7PU51 20-6CJ20		
		220–240	–	● 7PU51 20-6CN20		
		–	110–127	● 7PU51 20-6CJ40		
		–	220–230	● 7PU51 20-6CN40		
<b>7PU57 20 time relay, interval time-delay relay</b>						
 <p>7PU57 20</p> <p>Function selectable by built-in rotary switch. 1 passing changeover contact</p>	Fixed setting 0.6 s	24	24	● 7PU57 20-0AB30		0.150
		42–48	42–48	● 7PU57 20-0AE30		
		60	60	● 7PU57 20-0AF30		
		110–127	–	● 7PU57 20-0AJ20		
		220–240	–	● 7PU57 20-0AN20		
<b>Accessories for 7PU5</b>						
 <p><b>Adapter for screw fixing</b> (required quantity: 1 set = 2 units per time relay)</p>				● 7PX9 906		0.003
	 <p><b>Sealable cap</b></p>				● 7PX9 913	

● Obsolete type; may be ordered up until September 2000.

# Solid-State Time Relays 3RP1 and 7PU5

## Function table

Function	Function diagram	3RP10 time relay and 7PX9 coding plugs		3RP15 time relay and 3RP15 19 label set								7PU time relay	
		3RP10 00 7PX9 904	3RP10 20	3RP15 05-A 3RP19 01-0A	Code letter	3RP15 1.	3RP15 25	3RP15 27	3RP15 3.	3RP15 40	3RP15 55	3RP15 7.	7PU51 20
<p><b>1 changeover contact</b></p> <p>time relay energized contact closed contact open</p>													
ON-delay		■	■	■	A	■	■						
OFF-delay with auxiliary voltage		■		■	B				■				
OFF-delay without auxiliary voltage										■			
ON-delay and OFF-delay with auxiliary voltage (t = t <sub>ON</sub> = t <sub>OFF</sub> )		■		■	C								
flashing, starting with interval (pulse/interval 1:1)		■		■	D								
clock-pulse, starting with interval (dead interval, pulse time and time setting ranges each separately adjustable)										■			
passing make contact		■		■	E								■
passing break contact with auxiliary voltage		■		■	F								■
passing make contact and passing break contact													■
pulse shaping with auxiliary voltage (pulse generation at the output does not depend on duration of energizing)		■		■	G 1)								
additive ON-delay with auxiliary voltage				■	H 1)								
<b>1 normally open contact (semi-conductor)</b>													
ON-delay										■			
flashing, starting with interval (pulse/interval 1:1)													■

1) Note on function with start contact: another control signal at terminal B after the operating time has started resets the operating time to zero. This does not apply to G, G● and H, H●, which are not retriggerable.



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Function	Function diagram	3RP10 time relay and 7PX9 904 coding plugs		3RP15 time relay and 3RP19 label set										
		3RP10 00 7PX9 904	3RP10 20	3RP15 05-B 3RP19 01-1B	3RP15 05-R 3RP19 01-0A	Code letter	3RP15 1.	3RP15 25	3RP15 27	3RP15 3.	3RP15 40	3RP15 55	3RP15 60	3RP15 7.
<b>2 changeover contacts</b>														
ON-delay	<p>NSK-7579</p>			■	■	A		■						
ON-delay and instantaneous contact	<p>NSK-7591a</p>			■		A●								
OFF-delay with auxiliary voltage	<p>NSK-7560</p>			■	■	B								
OFF-delay with auxiliary voltage and instantaneous contact	<p>NSK-7592a</p>			■		B●								
OFF-delay without auxiliary voltage	<p>NSK-7602</p>											■		
ON-delay and OFF-delay with auxiliary voltage ( $t_{ON}=t_{OFF}$ )	<p>NSK-7581b</p>			■	■	C								
ON-delay and OFF-delay with auxiliary voltage and instantaneous contact ( $t_{ON}=t_{OFF}$ )	<p>NSK-7593a</p>			■		C●								
flashing, starting with interval (pulse/interval 1:1)	<p>NSK-7582a</p>			■	■	D								
flashing, starting with interval (pulse/interval 1:1) and instantaneous contact	<p>NSK-7594a</p>			■		D●								
passing make contact	<p>NSK-7583a</p>			■	■	E								
passing make contact and instantaneous contact	<p>NSK-7595a</p>			■		E●								





### Function table

Function	Function diagram	3RP10 time relay and 7PX9 904 coding plugs		3RP15 time relay and 3RP19 label set													
		3RP10 00	7PX9 904	3RP10 20	3RP15 05-B	3RP19 01-0B	3RP15 05-R	3RP19 01-0A	Code letter	3RP15 1.	3RP15 25	3RP15 27	3RP15 3.	3RP15 40	3RP15 55	3RP15 60	3RP15 7.
<b>2 changeover contacts</b>																	
passing break contact with auxiliary voltage					■	■		F									
passing break contact with auxiliary voltage and instantaneous contact					■		F●										
pulse shaping with auxiliary voltage (pulse generation at the output does not depend on duration of energizing)					■	■	G <sup>1)</sup>										
pulse shaping with auxiliary voltage and instantaneous contact (pulse generation at the output does not depend on duration of energizing)					■		G● <sup>1)</sup>										
additive ON-delay with auxiliary voltage								H									
additive ON-delay with auxiliary voltage and instantaneous contact					■		H● <sup>1)</sup>										
star-delta function					■		YΔ										
<b>2 normally open contacts</b>																	
star-delta function YΔ																	■
<b>3 normally open contacts</b>																	
star delta function with overtravel function <sup>2)</sup> (idling)																	■

1) Note on function with start contact: a new control signal at terminal B after the operating time has started resets the operating time to zero. This does not apply to G, G● and H, H●, which are not retriggerable.

2) For function diagrams showing the various possibilities of operation of the 3RP15 60-1S.30, see page 7/11.



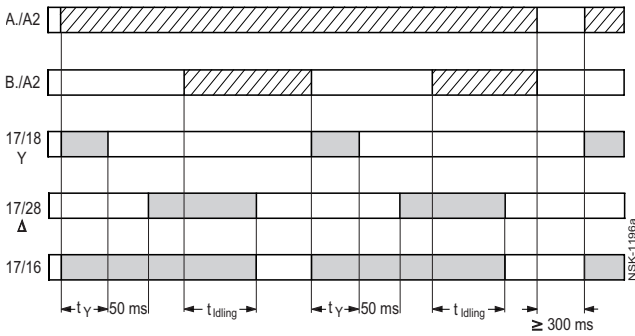
Possibilities of operation of the 3RP15 60-1S.30 time relay

- time relay energized
- contact closed
- contact open

$t_y$  = star time 1 - 20 s  
 $t_{idling}$  = idling time (overtravel time) 30 - 600 s

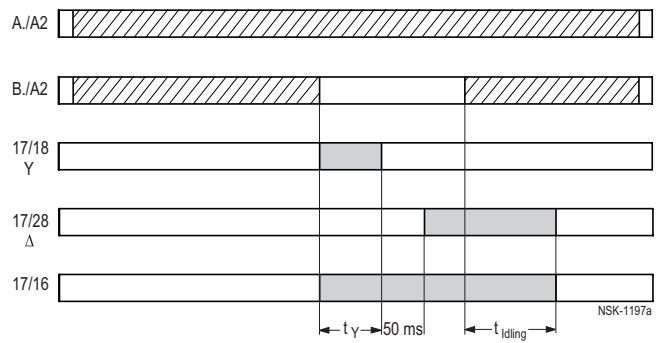
**Operation 1:**

Start contact B./A2 is opened when supply voltage A./A2 is applied.



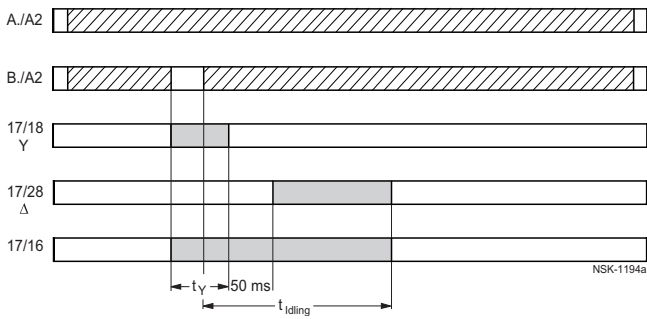
**Operation 2:**

Start contact B./A2 is closed when supply voltage A./A2 is applied.



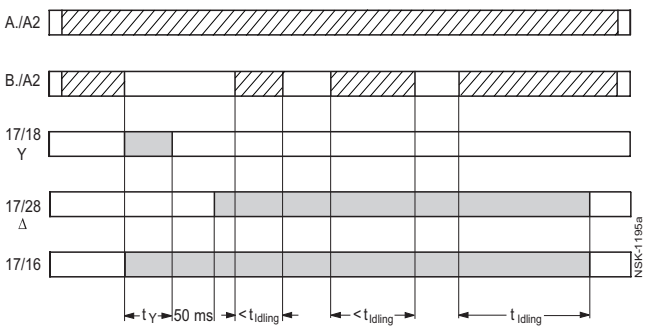
**Operation 3:**

Start contact B./A2 closes while star time is running.



**Operation 4:**

Start contact B./A2 opens while delta time is running.



# Solid-State Time Relays

## 3RP10 and 3RP15

SIRIUS 3R

Technical data  
acc. to IEC 61812-1/DIN VDE 0435 Part 2021



Type		3RP10 00 3RP10 20	3RP15 05 3RP15 31 3RP15 32 3RP15 33	3RP15 11 3RP15 12 3RP15 13 3RP15 25 3RP15 55	3RP15 40	3RP15 60	3RP15 74 3RP15 76	3RP15 27	
<b>Rated insulation voltage</b> Pollution degree 3 Overvoltage category III acc. to DIN VDE 0110	V AC	300; 500 for 3RP1505-1BT20							
<b>Working range of excitation</b> <sup>1)</sup>		0.85 to 1.1 x $U_N$ for AC; 0.8 to 1.25 x $U_N$ for DC 0.95 to 1.05 x rated frequency							
<b>Rated power</b> Power consumption at 230 V AC, 50 Hz	W VA	1 4	2 6	2 6	2 2 <sup>2)</sup>	2 6	2 6	1 1	
<b>Rated operational currents</b> $I_e$ AC-15 at 230 V AC, 50 Hz AC-140; DC-13 DC-13 at 24 V DC-13 at 48 V DC-13 at 60 V DC-13 at 110 V DC-13 at 230 V	A	3 <sup>3)</sup> – 1 0.45 0.35 0.2 0.1							– 0.01 to 0.6 – – – – –
<b>Required DIAZED fuse</b> <sup>4)</sup> Utilization category	gL/gG A	4							–
<b>Operating frequency</b> • when loaded with $I_e$ , 230 V AC • when loaded with 3RT10 16 contactor, 230 V AC	1/h 1/h	2500 5000							5000 5000
<b>Recovery time</b>	ms	150 <sup>5)</sup>				300	150 <sup>5)</sup>		50
<b>Minimum ON period</b>	ms	35	35 <sup>6)</sup>	–	200 <sup>7)</sup>	–			
<b>Off-state current</b> with non-conducting output	mA								≤ 5
<b>Voltage drop</b> with conducting output	V								≤ 3.5
<b>Short-time loading capacity</b>	A								10 (up to 10 ms)
<b>Setting accuracy</b> referred to upper limit of scale		typical ±5 %							
<b>Repeat accuracy</b>		≤ ±1 %							
<b>Mechanical endurance</b> operating cycles		30 × 10 <sup>6</sup>							100 × 10 <sup>6</sup>
<b>Permissible ambient temperature</b> during operation during storage	°C °C	-25 to +60 -40 to +85							
<b>Degree of protection</b> acc. to EN 60 529		cover IP 40 terminals IP 20							
<b>Conductor cross-sections</b>	<b>Main conductors and auxiliary conductors</b>								
• Screw connection (to connect 1 or 2 conductors) for standard screwdriver size 2 and Pozidriv 2	solid	mm <sup>2</sup>	2x(0.5-1.5) 2x(0.75-4)	1x(0.5-4) 2x(0.5-2.5)					
	finely stranded with end sleeve	mm <sup>2</sup>	2x(0.5 -2.5)	1x(0.5-2.5) 2x(0.5-1.5)					
	solid or stranded AWG conductors	AWG	2x(18-14)	2x(20-14)					
	terminal screw		M 3	M 3.5					
• Cage Clamp connection <sup>8)</sup> (to connect 1 or 2 conductors) for 22.5 mm time relay use screwdriver with 3 mm blade width	tightening torque	Nm	0.8 to 1.2						
	solid	mm <sup>2</sup>	2x(0.5-2.5)						
	finely stranded								
	• with end sleeve	mm <sup>2</sup>	2x(0.25 -1)						
• without end sleeve	mm <sup>2</sup>	2x(0.25 -1.5)							
solid or stranded AWG conductors	AWG	2x(24-16)							
<b>Permissible mounting position</b>		any							
<b>Shock resistance</b> Half-sine acc. to IEC 60 068-2-27	g/ms	15/11							
<b>Vibration performance</b> acc. to IEC 60 068-2-6	Hz/mm	10-55 / 0.35							
<b>EMC tests</b> acc. to basic specification		EN 50 081-1; EN 50 082-2							

1) If nothing else is stated.

2) Maximum inrush current 1 A/100 ms.

3) For 3RP15 05-.R: NC contact -->  $I_e = 1$  A.

4) Weld-free acc. to ICE 60 947-5-1.

5) With 3RP15 05-.BW30/ .AW30/ .RW30 and 3RP1525-.BW30, 10 to 250 ms, voltage-dependent.

6) Minimum ON period with 3RP15 05-1BW30, 150 ms until instantaneous contact has switched.

7) For correct operation, observe minimum ON period.

8) For details of Cage Clamp technology see page 6.

# Solid-State Time Relays 7PU51 and 7PU57

## Technical data

Type	7PU51 20		7PU57 20
<b>Rated insulation voltage</b> Pollution degree 3 Overvoltage category III acc. to DIN VDE 0110	V AC	250	
<b>Working range of excitation<sup>1)</sup></b>		0.8 to 1.1 x $U_g$ 0.95 to 1.05 x rated frequency	
<b>Rated power</b> (Power consumption) at 230 V AC, 50 Hz	W VA	2 3.5	1 5
<b>Rated operational current I<sub>e</sub></b>  AC-15 at 230 V AC, 50 Hz DC-13 at 24 V DC-13 at 230 V	A	0.01 to 0.8 A <sup>2)4)</sup> 0.01 to 0.4 A <sup>3)4)</sup>	3 1 0.1
<b>Required DIAZED fuse<sup>5)</sup></b> Utilization category	gL/gG	A	– 4
<b>Operating frequency</b> when loaded with $I_n$ , 230 V AC when loaded with 3RT10 16 contactor, 230 V AC	1/h 1/h	9000 9000	2500 5000
<b>Recovery time</b>	ms	150	200 (with passing make contact)
<b>Minimum ON period</b>	ms	–	400 (with passing break contact)
<b>Off-state current</b>	mA	≤1	–
<b>Voltage drop with conducting output</b>	V	≤4	–
<b>Short-time loading capacity</b>	A A	2 (up to 20 ms) 4 (up to 10 ms)	– –
<b>Setting accuracy</b> referred to upper limit of scale		± 5 %	± 30 %
<b>Repeat accuracy</b>		≤± 1 %	
<b>Mechanical endurance</b>	operating cycles	100 × 10 <sup>6</sup>	30 × 10 <sup>6</sup>
<b>Permissible ambient temperature</b>	during operation during storage	°C °C	-25 to +55 -40 to +85
<b>Degree of protection</b> acc. to EN 60 529		IP 40 terminals IP 20	
<b>Conductor connection</b> • solid • finely stranded with end sleeve • solid or stranded	mm <sup>2</sup> mm <sup>2</sup> mm <sup>2</sup>	max. 2 x 2.5 max. 2 x 1.5 min. 0.5	
<b>Terminal screw</b>		M 3.5	
<b>Tightening torque</b>	Nm	0.8 to 1.2	
<b>Permissible mounting position</b>		any	
<b>Shock resistance</b> Half-sine acc. to IEC 60 068-2-27	g/ms	15/11	
<b>Vibration performance</b> acc. to IEC 60 068-2-6	Hz/mm	10-55 / 0.35	
<b>EMC tests</b> acc. to basic specification		EN 50 081-1; EN 50 082-2	

- 1) If nothing else is stated.  
2) For AC, DC resistive load and DC inductive load with interference suppression diode.  
3) For DC inductive load without interference suppression.

- 4) Applies to rated control voltages from 24 V to 110/127 V AC/DC. With rated control voltage 220/230 V DC, the indicated rated operational currents are halved.  
5) Weld-free acc. to IEC 60.947-5-1.

# Solid-State Time Relays

## 3RP1

## SIRIUS 3R



### Description

#### Standards, specifications

The time relays comply with:

- IEC 60 721-3-3 "Ambient conditions"
- IEC 61 812-1/DIN VDE 0435 Part 201 "Solid-state relays, time relays"
- EN 50 081/50 082 "Electromagnetic compatibility"
- IEC 60 947-5-1; DIN VDE 0660 Part 200 "Low-voltage electromechanical control circuit devices"

#### Application

Time relays are used in control, starting and protective circuits for all switching operations involving time delays.

They guarantee a high level of functionality and a high repeat accuracy of timer settings.

#### Housing design

All time relays are suitable for snap-on mounting onto 35 mm standard mounting rails according to EN 50 022 or for screw fixing.

#### Configuration

- Changing the time setting ranges and the functions will only be effective when being carried out in de-energized state.
- Start input B1 or B3 must only be triggered when the supply voltage is applied.

The same potential must be applied to A1 and B1, or A3 and B3.

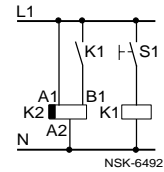
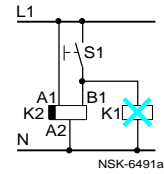
With the two-voltage version, only one voltage range must be connected.

The 3RP10 00 multifunction time relay is programmed for ON-delay without coding plugs.

The activation of loads parallel to the start input is not permissible when using AC (see adjacent diagrams).

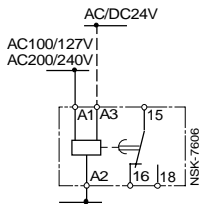
Surge suppression is integrated in the time relay. No additional damping measures are necessary.

#### Parallel load at start input



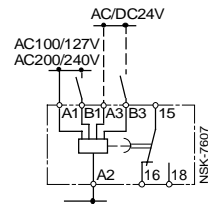
### Circuit diagrams (terminal designation acc. to DIN 46 199 Part 5)

3RP10 00  
3RP10 20  
3RP15 05-.A  
3RP151.  
3RP15 25-.A



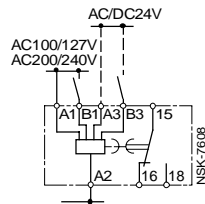
ON-delay

3RP10 00  
3RP15 05-.A  
3RP15 3-.A



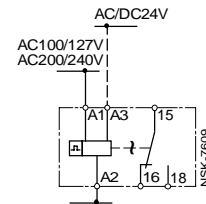
OFF-delay with auxiliary voltage

3RP10 00  
3RP15 05-.A



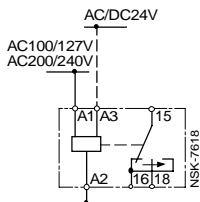
ON-delay and OFF-delay with auxiliary voltage

3RP10 00  
3RP15 05-.A



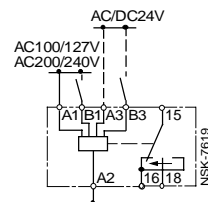
flashing

3RP10 00  
3RP15 05-.A



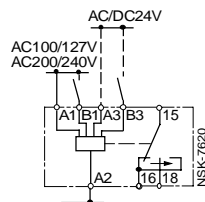
passing make contact

3RP10 00  
3RP15 05-.A



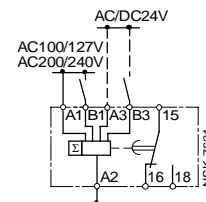
passing break contact with auxiliary voltage

3RP10 00  
3RP15 05-.A



pulse shaping with auxiliary voltage

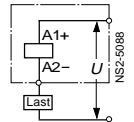
3RP15 05-.A



additive ON-delay with auxiliary voltage

3RP15 27

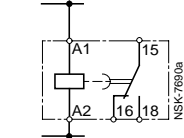
U = AC/DC 24-66 V  
AC/DC 90-240 V



ON-delay, two-wire version

3RP15 40-.A

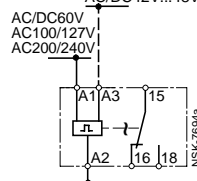
AC/DC 24V  
AC/DC 100/127V  
AC/DC 200/240V



OFF-delay without auxiliary voltage

3RP15 55

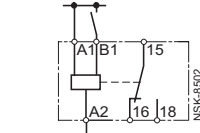
AC/DC 24V  
AC/DC 42V...48V



clock-pulse relay

3RP15 05-.AW30

AC/DC 24...240V



multifunction relay (functions as for 3RP15 05-1A)

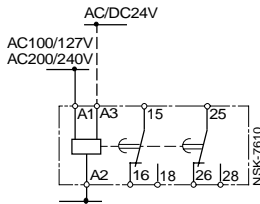
# Solid-State Time Relays

## 3RP1 and 7PU5

### Circuit diagrams

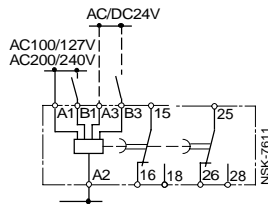
1  
2  
3  
4  
5  
6  
7

**3RP15 05-B, 3RP15 25-1B**



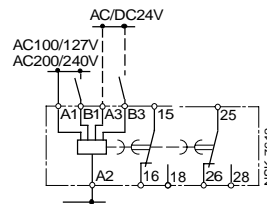
ON-delay, 3RP15 25-1B, also for 42...48/60 V AC/DC (see below 3RP15 25-1BR30)

**3RP15 05-B**



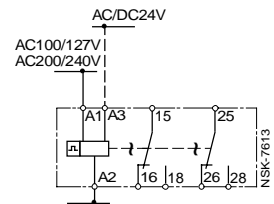
OFF-delay with auxiliary voltage

**3RP15 05-B**



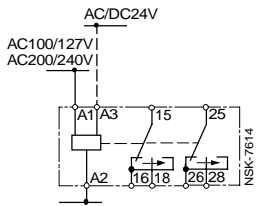
ON-delay and OFF-delay with auxiliary voltage

**3RP15 05-B**



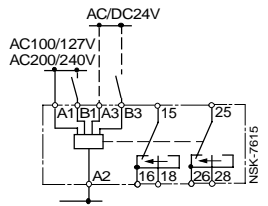
flashing

**3RP15 05-B**



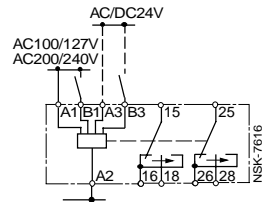
passing make contact

**3RP15 05-B**



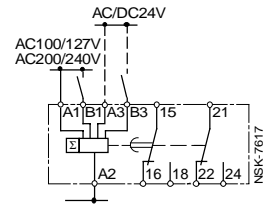
passing break contact with auxiliary voltage

**3RP15 05-B**



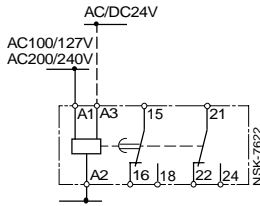
pulse shaping with auxiliary voltage

**3RP15 05-B**



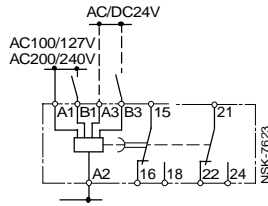
additive ON-delay with auxiliary voltage and instantaneous contact

**3RP15 05-B**



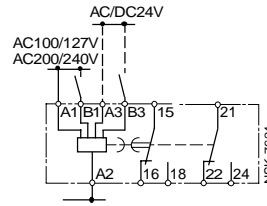
ON-delay and instantaneous contact

**3RP15 05-B**



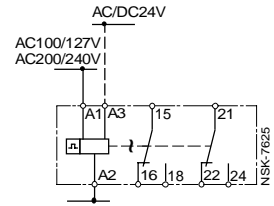
OFF-delay with auxiliary voltage and instantaneous contact

**3RP15 05-B**



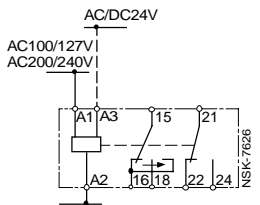
ON-delay and OFF-delay with auxiliary voltage and instantaneous contact

**3RP15 05-B**



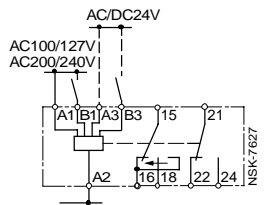
flashing and instantaneous contact

**3RP15 05-B**



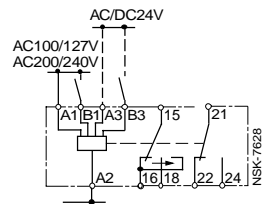
passing make contact and instantaneous contact

**3RP15 05-B**



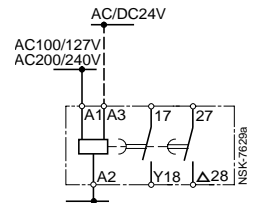
passing break contact with auxiliary voltage and instantaneous contact

**3RP15 05-B**



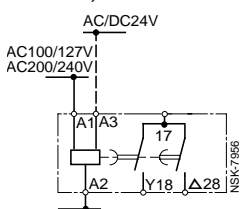
pulse shaping with auxiliary voltage and instantaneous contact

**3RP15 05-B**



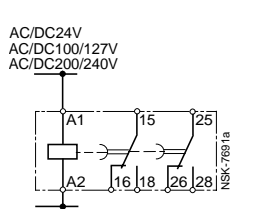
star-delta function

**3RP15 74, 3RP15 76**



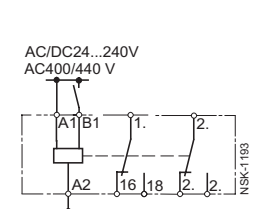
star delta time relay

**3RP15 40-B**



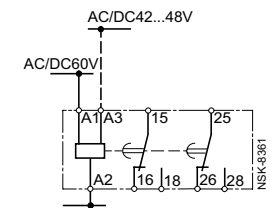
OFF-delay without auxiliary voltage

**3RP15 05-BW30 / -1BT20 / -R.W30**



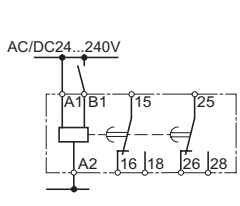
multifunction relay (for functions see function table)

**3RP15 25-1BR30**



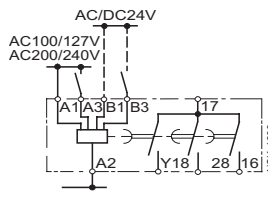
ON-delay

**3RP15 25-1BW30**



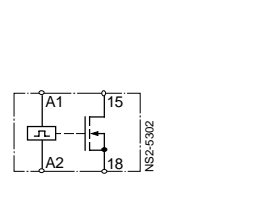
ON-delay

**3RP15 60-1S**



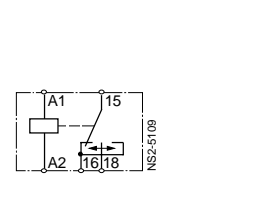
star delta time relay with overtravel function (idling)

**7PU51 20**



flasher relay

**7PU57 20**



interval time-delay relay

# 3RT19 Solid-State Time-Delay Blocks

## Time-Delay, for Mounting to Contactors and Contactor Relays

SIRIUS 3R



### Selection and ordering data

For contactors	Auxiliary contacts Function	Rated control supply voltage $U_s$	Time setting range $t$	Order No.	Price	Weight approx.
Type	time relay energized contact closed contact open	V	s		1 unit	kg
<b>For size S00 <sup>1)</sup>, with screw connection</b>						
3RT19 16-2...	3RT10 1, 3RH11	Terminal designation according to DIN EN 46 199 Part 5				
		<ul style="list-style-type: none"> <li>ON-delay (varistor integrated) 1 NO and 1 NC</li> </ul>	AC/DC 24	0.05 – 1 0.5 – 10 5 – 100	<b>3RT19 16-2EJ11</b> <b>3RT19 16-2EJ21</b> <b>3RT19 16-2EJ31</b>	0.07
		<ul style="list-style-type: none"> <li>AC 100–127</li> </ul>	0.05 – 1 0.5 – 10 5 – 100	<b>3RT19 16-2EC11</b> <b>3RT19 16-2EC21</b> <b>3RT19 16-2EC31</b>		
		<ul style="list-style-type: none"> <li>AC 200–240</li> </ul>	0.05 – 1 0.5 – 10 5 – 100	<b>3RT19 16-2ED11</b> <b>3RT19 16-2ED21</b> <b>3RT19 16-2ED31</b>		
		<ul style="list-style-type: none"> <li>OFF-delay without auxiliary voltage<sup>2)</sup> (varistor integrated) 1 NO and 1 NC</li> </ul>	AC/DC 24	0.05 – 1 0.5 – 10 5 – 100	<b>3RT19 16-2FJ11</b> <b>3RT19 16-2FJ21</b> <b>3RT19 16-2FJ31</b>	0.07
		<ul style="list-style-type: none"> <li>AC/DC 100–127</li> </ul>	0.05 – 1 0.5 – 10 5 – 100	<b>3RT19 16-2FK11</b> <b>3RT19 16-2FK21</b> <b>3RT19 16-2FK31</b>		
		<ul style="list-style-type: none"> <li>AC/DC 200–240</li> </ul>	0.05 – 1 0.5 – 10 5 – 100	<b>3RT19 16-2FL11</b> <b>3RT19 16-2FL21</b> <b>3RT19 16-2FL31</b>		
		<ul style="list-style-type: none"> <li>star-delta function (varistor integrated) 1 NO delayed and 1 NO instantaneous, dead interval 50 ms</li> </ul>	AC/DC 24 AC 100–127 AC 200–240	1.5 – 30 1.5 – 30 1.5 – 30	<b>3RT19 16-2GJ51</b> <b>3RT19 16-2GC51</b> <b>3RT19 16-2GD51</b>	0.07
<b>For sizes S0 to S3 <sup>3)</sup>, with screw connection</b>						
3RT19 26-2...	3RT10 2, 3RT10 3, 3RT10 4	<ul style="list-style-type: none"> <li>ON-delay 1 NO and 1 NC</li> </ul>	AC/DC 24	0.05 – 1 0.5 – 10 5 – 100	<b>3RT19 26-2EJ11</b> <b>3RT19 26-2EJ21</b> <b>3RT19 26-2EJ31</b>	0.07
		<ul style="list-style-type: none"> <li>AC 100–127</li> </ul>	0.05 – 1 0.5 – 10 5 – 100	<b>3RT19 26-2EC11</b> <b>3RT19 26-2EC21</b> <b>3RT19 26-2EC31</b>		
		<ul style="list-style-type: none"> <li>AC 200–240 V</li> </ul>	0.05 – 1 0.5 – 10 5 – 100	<b>3RT19 26-2ED11</b> <b>3RT19 26-2ED21</b> <b>3RT19 26-2ED31</b>		
		<ul style="list-style-type: none"> <li>OFF-delay without auxiliary voltage<sup>2)</sup> 1 NO and 1 NC</li> </ul>	AC/DC 24	0.05 – 1 0.5 – 10 5 – 100	<b>3RT19 26-2FJ11</b> <b>3RT19 26-2FJ21</b> <b>3RT19 26-2FJ31</b>	0.07
		<ul style="list-style-type: none"> <li>AC/DC 100–127</li> </ul>	0.05 – 1 0.5 – 10 5 – 100	<b>3RT19 26-2FK11</b> <b>3RT19 26-2FK21</b> <b>3RT19 26-2FK31</b>		
		<ul style="list-style-type: none"> <li>AC/DC 200–240 V</li> </ul>	0.05 – 1 0.5 – 10 5 – 100	<b>3RT19 26-2FL11</b> <b>3RT19 26-2FL21</b> <b>3RT19 26-2FL31</b>		
		<ul style="list-style-type: none"> <li>star-delta function 1 NO delayed and 1 NO instantaneous, dead interval 50 ms</li> </ul>	AC/DC 24 AC 100–127 AC 200–240	1.5 – 30 1.5 – 30 1.5 – 30	<b>3RT19 26-2GJ51</b> <b>3RT19 26-2GC51</b> <b>3RT19 26-2GD51</b>	0.07

1) The terminals for the rated control supply voltage are connected to the contactor by the integrated spring-type contacts of the solid-state time-delay auxiliary switch block when mounting.

2) Setting of output contacts in as-supplied state not defined (bistable relay). Application of the control voltage once results in contact changeover to the correct setting.

3) The terminals A1 and A2 for the rated control supply voltage of the solid-state time-delay auxiliary switch block must be connected to the corresponding contactor by connecting leads.



For contactors	Function	Rated control supply voltage $U_s$	Time setting range $t$	Order No.	Price	Weight approx.
Type		V	s		1 unit	kg

**For size S00, with semi-conductor output, screw connection**

3RT10 1, 3RH11

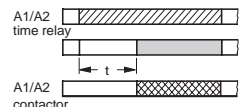
**for mounting onto the front of contactors**

The electrical connection between the time-delay block and the contactor beneath it is established automatically when snapped on.

3RT19 16-2C...



• ON-delay, two-wire version (varistor integrated)

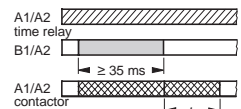


AC/DC 24- 66	0.05 - 1 0.5 - 10 5 - 100	3RT19 16-2CG11 3RT19 16-2CG21 3RT19 16-2CG31	0.035
AC/DC 90-240	0.05 - 1 0.5 - 10 5 - 100	3RT19 16-2CH11 3RT19 16-2CH21 3RT19 16-2CH31	0.035

3RT 19 16-2D



• OFF-delay with auxiliary voltage (varistor integrated)



AC/DC 24- 66	0.05 - 1 0.5 - 10 5 - 100	3RT19 16-2DG11 3RT19 16-2DG21 3RT19 16-2DG31	0.037
AC/DC 90-240	0.05 - 1 0.5 - 10 5 - 100	3RT19 16-2DH11 3RT19 16-2DH21 3RT19 16-2DH31	0.037

**For sizes S0 to S3, with semi-conductor output, screw connection**

3RT10 2, 3RT10 2, 3RT10 4 1)

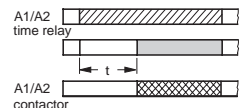
**for mounting onto coil terminals on top of the contactors**

The electrical connection between the relay block and the corresponding contactor is established by screwing the two terminal posts of the time-delay block to coil terminals A1/A2 on top of the contactor.

3RT19 26-2C...



• ON-delay, two-wire version (varistor integrated)

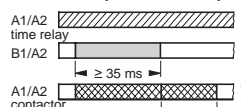


AC/DC 24-66	0.05 - 1 0.5 - 10 5 - 100	3RT19 26-2CG11 3RT19 26-2CG21 3RT19 26-2CG31	0.035
AC/DC 90-240	0.05 - 1 0.5 - 10 5 - 100	3RT19 26-2CH11 3RT19 26-2CH21 3RT19 26-2CH31	0.035

3RT19 26-2D...



• OFF-delay with auxiliary voltage (varistor integrated)



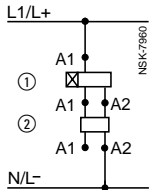
AC/DC 24-66	0.05 - 1 0.5 - 10 5 - 100	3RT19 26-2DG11 3RT19 26-2DG21 3RT19 26-2DG31	0.037
AC/DC 90-240	0.05 - 1 0.5 - 10 5 - 100	3RT19 26-2DH11 3RT19 26-2DH21 3RT19 26-2DH31	0.037

**Circuit diagrams**

**Solid-state time-delay block**

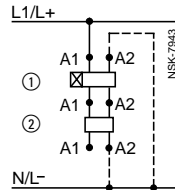
for 3RT10 contactors, sizes S00 to S3, and 3RH11 contactor relays

3RT19 16-2C...



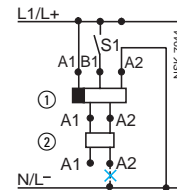
ON-delay

3RT19 26-2C...



ON-delay

3RT19 16-2D.../3RT19 26-2D...



OFF-delay (with auxiliary voltage)

- ① time-delay block
- ② contactor
- can be connected optionally
- ✗ must not be connected

1) Not for 3RT10 4 contactor with 24 to 42 V rated control supply voltage.



# 3RT19 Solid-State Time-Delay Blocks

## Solid-State Time-Delay Auxiliary Switch Blocks

SIRIUS 3R



Technical data  
to IEC 61812-1/DIN VDE 0435 Part 2021

Type		3RT19 16-2C 2D	3RT19 16- 2E 2F 2G
		3RT19 26-2C 2D	3RT19 26- 2E 2F 2G
<b>Rated insulation voltage</b> Pollution degree 3 Overvoltage category III acc. to DIN VDE 0110	V AC	250	
<b>Working range of excitation</b>		0.8 to 1.1 x $U_s$ 0.95 to 1.05 x rated frequency	0.85 to 1.1 x $U_s$ 0.95 to 1.05 x rated frequency
<b>Rated power</b> Power consumption at 230 V AC, 50 Hz	W VA	1 1	2 4
<b>Rated operational current I<sub>e</sub></b> AC-140 at DC 13  AC-15 at 230 V AC, 50 Hz DC-13 at 24 V DC-13 at 110 V DC-13 at 230 V	A A A A A A	0.3 A with 3RT19 16 0.5 A with 3RT19 26 – – – –	– – 3 1 0.2 0.1
<b>Required DIAZED fuse</b> Utilization category	gL/gG A	–	4
<b>Operating frequency</b> • when loaded with I <sub>e</sub> 230 V AC • when loaded with 3RT10 16 contactor, 230 V AC	1/h 1/h	2500 2500	2500 5000
<b>Recovery time</b>	ms	50	150
<b>Minimum ON period</b>	ms	35	200 (OFF-delay)
<b>Off-state current</b> (two-wire)	mA	≤ 5	–
<b>Voltage drop</b> with conducting output	V	≤ 3.5	–
<b>Short-time loading capacity</b>	A	10 (to 10 ms)	–
<b>Setting accuracy</b> referred to upper limit of scale		≤ ±15%	
<b>Repeat accuracy</b>		≤ ±1%	
<b>Mechanical endurance</b>	operating cycles	100 x 10 <sup>6</sup>	10 x 10 <sup>6</sup>
<b>Permissible ambient temperature</b>	during operation °C during storage °C	-25 to +60 -40 to +85	
<b>Degree of protection</b> acc. to EN 60 529		IP 40 terminals IP 20	
<b>Conductor connection</b>	solid mm <sup>2</sup> finely stranded with end sleeve mm <sup>2</sup> solid or stranded AWG	2 x (0.5-1.5) 2 x (0.75-4) 2 x (0.5-2.5) 2 x (18-14)	
<b>Terminal screw</b>		M 3	
<b>Tightening torque</b>	Nm	0.8 to 1.2	
<b>Permissible mounting position</b>		any	
<b>Shock resistance</b> Half-sine acc. to IEC 60 068-2-27	g/ms	15/11	
<b>Vibration performance</b> acc. to IEC 60 068-2-6	Hz/mm	10-55 / 0.35	
<b>EMC tests</b> acc. to basic specification		EN 50 081-1; EN 50 082-2	
<b>Overvoltage protection</b>	varistor	integrated in time relay	integrated in 3RT19 16

# 3RT19 Auxiliary Switch Blocks and 3RP15 Time Relays in Star-Delta Circuits

SIRIUS 3R

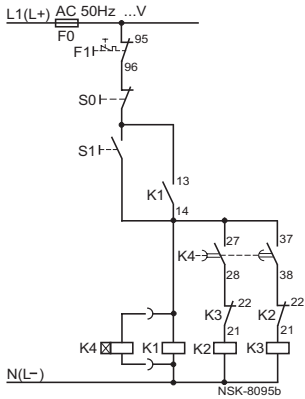


Circuit diagrams

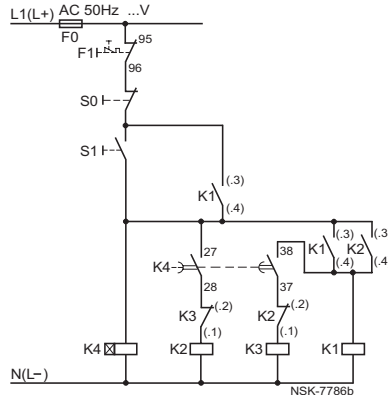
1  
2  
3  
4  
5  
6  
7

**Control circuits** (typical circuits) with 3RT19.6-2G time-delay auxiliary switch block with star delta function for momentary-contact operation

**Size S00**

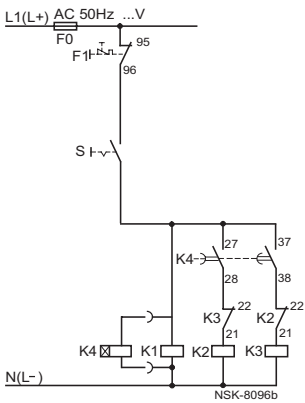


**Sizes S0 to S3**

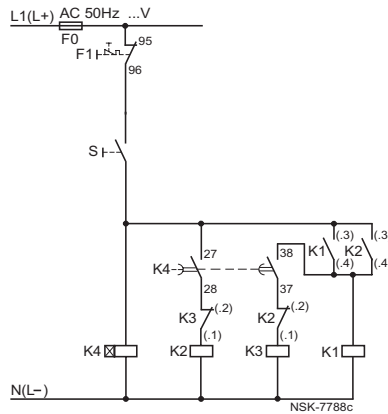


for maintained-contact operation

**Size S00**



**Sizes S0 to S3**



**Legend:**

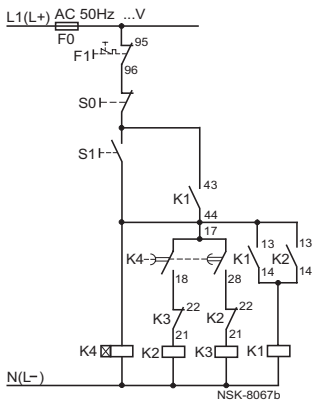
- S0 OFF pushbutton
- S1 ON pushbutton
- S maintained-contact switch
- K1 line contactor
- K2 star contactor
- K3 delta contactor
- K4 timing element or time relay
- F0 fuse
- F1 overload relay

The 27/28 contact of the solid-state time-delay auxiliary switch block with star-delta function is only closed in the star state; it is open both in the delta state and in the de-energized state.

**Control circuits** (typical circuits) with 3RP15 74 and 3RP15 76 time relays with star-delta function

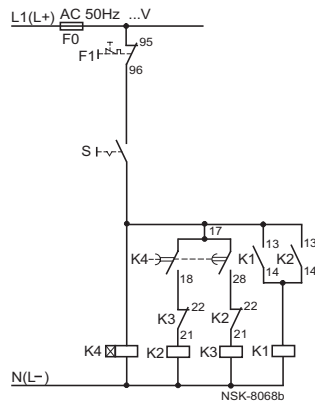
for momentary-contact operation

**Sizes S00 to S3**



for maintained-contact operation

**Sizes S00 to S3**



The 17/18 contact is only closed in the star state; it is open both in the delta state and in the de-energized state.

# 3UG35 11 Monitoring Relays for Phase Failure and Phase Sequence Monitoring

## Selection and ordering data

### Screw connection

For snap-on mounting onto 35 mm standard mounting rail or screw fixing  
Assembly width 22.5 mm

Phase monitoring relay, three-phase

- phase failure and phase sequence monitoring
- 1 yellow LED for indicating the relay state
- 2 changeover contacts

Design	Effective range $U_e$	Rated control supply voltage $U_s$	Order No.	Price	Weight approx.
	AC 50/60 Hz V	AC 50/60 Hz V	▶ Preferred type	1 unit	kg
Measured voltage = control supply voltage	3 × 230 to 400 phase-to-phase voltage	3 × 230 to 400 phase-to-phase voltage	▶ <b>3UG35 11-1BQ50</b>		0.120



## Technical data

<b>Rated control supply voltage <math>U_s</math></b>	V	3 × 230 to 400 (phase to phase)
<b>Voltage tolerance</b>	V	3 × 200 to 460 (corresponds to 0.85 to 1.15 × $U_s$ )
<b>Power consumption</b>	at 200 V at 400 V at 460 V	VA 5 VA 20 VA 25
<b>Frequency of the monitored line</b>	Hz	50/60
<b>Delay time</b>	T1 with correct phase sequence T2 in case of phase failure	ms max. 200 ms approx. 300

For further technical data, see page 7/34.

## Principle of operation

### Description

The 3UG35 11 relay monitors the phase sequence and the failure of one of the three phases. During operation, no settings are necessary. If the phase sequence is correct and none of the three phases has failed, the output relay picks up after the delay time T1, and the LED lights up. In the event of a phase failure, the output relay releases after the delay time T2, and the LED goes out.

If the phase sequence is incorrect when applying a voltage, the relay does not pick up.

### Note

The 3UG35 11 relay has no feedback voltage protection. If there is a risk of a motor feedback in the event of a phase failure, you can use the 3UG30 41 and 3UG30 42 relays with phase voltage monitoring or the 3UG30 12 relay with phase asymmetry monitoring.



① output relay

T1: ON-delay, max. 200 ms  
T2: OFF-delay, approx. 300 ms



## Selection and ordering data

### Screw connection

For snap-on mounting onto 35 mm standard mounting rail or screw fixing  
Assembly width 45 mm

Phase asymmetry monitoring relay, three-phase

- phase asymmetry monitoring
- phase sequence and phase failure monitoring
- 1 yellow LED for indicating the relay state; flashes during operating time T
- 1 green LED for indicating applied control supply voltage
- 1 changeover contact

Design	Measured voltage $U_n$	Order No.	Price	Weight approx.
	AC 50/60 Hz V	▶ Preferred type	1 unit	kg
Measured voltage = control supply voltage Asymmetry value and delay time adjustable	3 × 230 phase-to-phase voltage	▶ <b>3UG30 12-1AL50</b>		0.300
	3 × 400 phase-to-phase voltage	▶ <b>3UG30 12-1AP50</b>		0.300



## Technical data

<b>Rated control supply voltage <math>U_s</math></b>	V	see selection data (L1/L2 supplies the relay with power at the same time)
<b>Voltage tolerance</b>		0.8 to 1.2 × $U_s$
<b>Maximum power consumption</b>	W/VA	4/8
<b>Frequency of the measured voltage</b>	Hz	50/60 selectable
<b>Maximum setting range for asymmetry value</b>		adjustable to 5 ... 20 % of nominal supply voltage
<b>Maximum hysteresis</b>		fixed at 10 % of set asymmetry value
<b>Setting accuracy</b>		±20 % referred to maximum asymmetry value
<b>Repeat accuracy at constant parameters</b>		±1 %
<b>Deviations</b>	with temperature fluctuations	±0.1 %/°C
<b>Delay time</b>	T1 when relay releases T3 when relay picks up T2 in case of phase failure L1 or L2	s s ms adjustable to 0.5 ... 10 ±60 %, or T2 in case of phase failure of L1 or L2 max. 1 max. 300
<b>Mains buffering time</b>	ms	10

For further technical data, see page 7/34.

## Principle of operation

### Description

The relay monitors voltage asymmetries in the three-phase system. If the phase sequence is correct and the system asymmetry is below the set threshold value, the output relay picks up and the yellow LED lights up. The relay releases when one of the following faults occurs:

- correct phase sequence at terminals L1-L2-L3
- failure of a phase

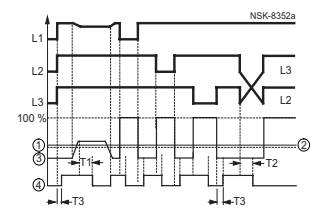
- system asymmetry greater than the set threshold

A system asymmetry is an increase or decrease in the voltage of one phase in relation to the voltage of the two other phases.

Feedback voltages from a running drive, for example after the rupture of a fuse, are detected up to 95 % of nominal voltage.

The delay time T1 only takes effect in the event of asymmetry faults and in the case of failure of phase L3. A hysteresis prevents the output relay from picking up and releasing permanently when the system asymmetry is close to the set value.

The relay does not respond to a symmetrical overvoltage or undervoltage.



- ① set asymmetry value
- ② hysteresis
- ③ degree of asymmetry
- ④ output relay

# 3UG30 13 Monitoring Relays for Line Monitoring



## Selection and ordering data

### Screw connection

For snap-on mounting onto 35 mm standard mounting rail or screw fixing  
Assembly width 45 mm

Line monitoring relay, three-phase

- phase failure and phase sequence monitoring
- range underflow monitoring of the variable measured voltage
- 1 yellow LED for indicating the relay state
- 1 green LED for indicating applied control supply voltage
- 2 changeover contacts

Design	Effective range $U_n$	Rated control supply voltage $U_S$	Order No.	Price	Weight approx.
	AC 50/60 Hz V	AC 50/60 Hz V	Preferred type	1 unit	kg
Measured voltage = control supply voltage	phase-to-phase voltage	phase-to-phase voltage	▶ <b>3UG30 13-1BL60</b>		0.350
Measured voltage and delay time adjustable	3 x 180 to 260	3 x 230	▶ <b>3UG30 13-1BP60</b>		
	3 x 320 to 460	3 x 400	▶ <b>3UG30 13-1BR60</b>		
	3 x 380 to 550	3 x 480	▶ <b>3UG30 13-1BS60</b>		
	3 x 460 to 660	3 x 575			



## Technical data

<b>Rated control supply voltage <math>U_S</math></b>	V	see selection data (L1/L2 supplies the relay with power at the same time)
<b>Voltage tolerance</b>	V	see selection data
<b>Maximum power consumption</b>	W/VA	5/8
<b>Frequency of the monitored line</b>	Hz	50/60
<b>Measured voltage <math>U_n</math> of the monitored line</b>		adjustable within the associated effective range, absolute scale for $U_n$
<b>Undervoltage detection</b>		-20 ± 10 % of the set measured voltage
<b>Hysteresis</b>	with symmetrical undervoltage with asymmetrical undervoltage	fixed, 2 - 5 % of the set measured voltage fixed, 5 - 10 % of the set measured voltage
<b>Delay time T</b>	on reaching the measured voltage	s adjustable to 0.2 ... 10; ± 50 %
<b>Response time</b>	on occurrence of a fault	ms 400
<b>Availability time after application of <math>U_S</math></b>		ms 500
<b>Operating frequency</b>	at max. make-break capacity	1/h 360
<b>Mains buffering time</b>		ms 10

For further technical data, see page 7/34.

## Principle of operation

### Description

The 3UG30 13 relay monitors the phase sequence, the failure of a phase and undershooting of the set measured voltage by 20 % ± 10 %. If the phase sequence is correct and the monitored voltage corresponds to the value of the set measured voltage, the output relays pick up and the LEDs for operating voltage indication and the relay state light up.

In the event of a phase failure, the output relays release (in the case of failure of L3 only after the time T set on the front has elapsed) and the LED for the relay state goes out.

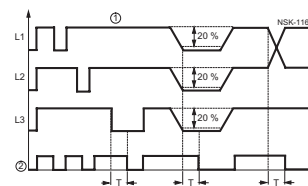
If the monitored voltage drops symmetrically (L1, L2 and L3 simultaneously) or asymmetrically (only one phase) by more than 20 % ± 10 % of the set measured voltage, the output relays also release after the set time T has elapsed and the associated LED goes out.

If the monitored voltage rises again via a hysteresis of 2 to 10 % of the set measured voltage, the output relays pick up again and the LED lights up again.

### Note

After the failure of a phase on a rotating motor, a phase feedback of up to 70 % of the set nominal measured voltage is detected as a fault.

The percentage value for the maximum phase feedback can be increased by raising the setting of the measured voltage.



① measured voltage  $U_n$   
② output relay

# 3UG35 32 Monitoring Relays for Single-Phase Voltage Monitoring


## Selection and ordering data

### Screw connection

For snap-on mounting onto 35 mm standard mounting rail or screw fixing  
Assembly width 22.5 mm

Voltage monitoring relay, single-phase

- range overflow or underflow monitoring of direct and alternating voltages
- 1 yellow LED for indicating the relay state; flashes during operating time T1
- 1 green LED for indicating applied control supply voltage
- 1 changeover contact

Design	Effective range AC/DC V	Rated control supply voltage $U_S$ AC 50/60 Hz V	Order No.	Price 1 unit	Weight approx. kg
 Separate measuring voltage and control supply voltage Threshold and hysteresis adjustable	15 to 600 (3 ranges)	24	▶ Preferred type		
	15 to 600 (3 ranges)	120	▶ <b>3UG35 32-1AC20</b>		0.160
	15 to 600 (3 ranges)	230	▶ <b>3UG35 32-1AG20</b>		
			▶ <b>3UG35 32-1AL20</b>		

## Technical data

<b>Rated control supply voltage <math>U_S</math></b>	V	see selection data (electrical isolation with transformer)			
<b>Voltage tolerance</b>		0.85 to 1.15 × $U_S$			
<b>Maximum power consumption</b>	W/VA	4/5			
<b>Frequency of the measured voltage</b>	Hz	40 to 500 and DC			
<b>Threshold <math>U_e</math></b>		adjustable to 10 ... 100 % of the selected effective range			
<b>Hysteresis</b>		adjustable to 5 ... 50 % of the set threshold			
<b>Setting accuracy</b>		±10 % referred to upper limit of effective range			
<b>Repeat accuracy</b>	at constant parameters	±0.1 %			
<b>Delay time T1</b>	after reaching the threshold	s	adjustable to 0.1 ... 3; ± 10 %		
<b>Availability time after application of <math>U_S</math></b>		ms	max. 500		
<b>Mains buffering time</b>		ms	10		
<b>Effective ranges</b>	inputs sensitivity input resistance overvoltage strength, permanent	V kΩ V	IN1-M 15 to 150 150 200	IN2-M 30 to 300 300 350	IN3-M 60 to 600 600 650
<b>Function mode setting</b>	overvoltage or undervoltage with or without memory		slide switch at the base of the housing slide switch at the base of the housing		

For further technical data, see page 7/34.

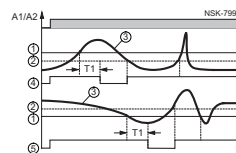
## Principle of operation

### Voltage monitoring without memory (NO MEMORY)

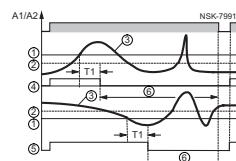
When the measured voltage has reached the set threshold and the set delay time T1 has elapsed, the output relay changes its switching state. As soon as the measured voltage reaches the set hysteresis value, the relay returns immediately to its original state.

### Voltage monitoring with memory (MEMORY)

When the set threshold value has been reached and the set delay time T1 has elapsed, the output relay changes its switching state and remains in this state, even when the measured voltage reaches the set hysteresis value again. A reset is performed by switching the supply voltage off and on.



- ① threshold  $U_e$
- ② hysteresis
- ③ measured voltage
- ④ output relay  
OVER function
- ⑤ output relay,  
UNDER function



- ⑥ MEMORY

# 3UG35 34/35 Monitoring Relays for Single-Phase Voltage Monitoring


## Selection and ordering data

### Screw connection

For snap-on mounting onto 35 mm standard mounting rail or screw fixing  
Assembly width 22.5 mm

Voltage monitoring relay, single-phase, absolute-value scale

- overvoltage and/or undervoltage monitoring mode, depending upon version
- 3UG35 34: 1 yellow LED for indicating the relay state, flashes during operating time T1, and with 1 green LED for indicating applied control supply voltage
- 3UG35 35: 1 yellow LED for indicating the relay state and 1 red LED each for  $U_{\min}$  and  $U_{\max}$ ; flashes during operating time T1
- 1 changeover contact

Design	Effective range	Rated control supply voltage $U_s$		Order No.	Price	Weight approx.
		AC 50/60 Hz V	DC V			
	AC/DC V			▶ Preferred type	1 unit	kg
3UG35 34 	Measured voltage = control supply voltage; threshold and hysteresis adjustable	20 to 80 65 to 260	15 to 150 50 to 275	▶ <b>3UG35 34-1AC50</b> ▶ <b>3UG35 34-1AM50</b>		0.120
	Measured voltage = control supply voltage; upper and lower threshold adjustable	20 to 80 65 to 260	15 to 150 50 to 275	▶ <b>3UG35 35-1AC50</b> ▶ <b>3UG35 35-1AM50</b>		0.120

## Technical data

Type		3UG35 34	3UG35 35
Rated control supply voltage $U_s$	V	see selection data	
Voltage tolerance		see selection data, min./max. values	
Maximum power consumption	W/VA	2/7	
Frequency of the measured voltage	Hz	50/60 and DC	
Threshold $U_e$	V	absolute scale for $U_e$	absolute scale for $U_{\min}$ and $U_{\max}$
Hysteresis		adjustable to 5 ... 20 % of the set threshold	fixed at 5 % of the set threshold
Setting accuracy		$\pm 10$ % referred to upper limit of effective range	
Repeat accuracy	at constant parameters	$\pm 0.3$ %	
Delay time T1	after reaching the threshold	s	adjustable to 0.1 ... 3 $\pm 10$ %
Effective range	inputs sensitivity overvoltage strength	V V	A1 / A2 see selection data, effective range of the corresponding version see selection data, upper limit of rated control supply voltage
Function mode setting	overvoltage or undervoltage with or without memory	slide switch slide switch	fixed: overvoltage and undervoltage fixed: without memory

For further technical data, see page 7/34.

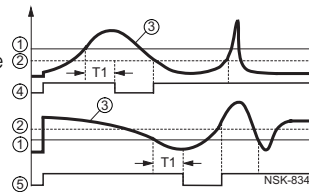
# 3UG35 34/35 Monitoring Relays for Single-Phase Voltage Monitoring

## Principle of operation

### 3UG35 34 relay

#### Voltage monitoring without memory (NO MEMORY)

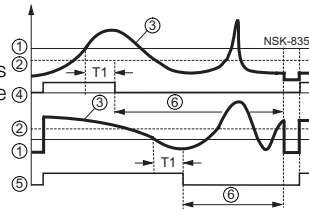
When the measured voltage has reached the set threshold and the set delay time T1 has elapsed, the output relay changes its switching state. As soon as the measured voltage reaches the set hysteresis value, the relay returns immediately to its original state.



- ① threshold  $U_e$
- ② hysteresis
- ③ measured voltage
- ④ output relay, OVER function
- ⑤ output relay, UNDER function

#### Voltage monitoring with memory (MEMORY)

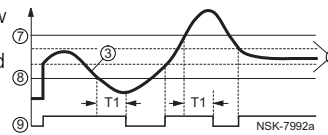
When the set threshold value has been reached and the set delay time T1 has elapsed, the output relay changes its switching state and remains in this state, even when the measured voltage reaches the set hysteresis value again. A reset is performed by switching the supply voltage off and on.



- ⑥ MEMORY

### 3UG35 35 relay

The 3UG35 35 relay monitors the applied voltage using the window technique. The upper and lower thresholds are set and monitored. As soon as the monitored voltage value exceeds the set range and the set delay time T1 has elapsed, the output relay releases.



- ② hysteresis
- ③ measured voltage
- ⑦ upper threshold
- ⑧ lower threshold
- ⑨ output relay



# 3UG30 41/42 Monitoring Relays for Three-Phase Voltage Monitoring


## Selection and ordering data

### Screw connection

For snap-on mounting onto 35 mm standard mounting rail or screw fixing  
Assembly width 45 mm

Three-phase voltage monitoring relay with/without PEN conductor

- upper and lower threshold separately adjustable
- 1 changeover contact for undervoltage and 1 changeover contact for overvoltage
- 1 yellow LED each for indicating or overvoltage
- 1 green LED for indicating applied control supply voltage

Design	Measured voltage $U_n$ AC 50/60 Hz V	Rated control supply voltage $U_s$ V	Monitoring relay		Weight approx. kg
			Order No.	Price	
3UG30 41 	<b>3UG30 41</b> Measured voltage = control supply voltage; upper and lower threshold adjustable, hysteresis fixed	400 (phase to phase)	400	▶ Preferred type ▶ <b>3UG30 41-1BP50</b>	1 unit 0.300
	<b>3UG30 42</b> Measured voltage = control supply voltage with monitoring of PEN conductor, upper and lower threshold adjustable, hysteresis fixed	400 (phase to phase) 230 (phase to PEN conductor)	400	▶ <b>3UG30 42-1BP50</b>	

## Technical data

Type	3UG30 41		3UG30 42	
Rated control supply voltage $U_s$	V	400 phase-to-phase voltage	400 phase-to-phase voltage/230 phase-to-neutral voltage	
Voltage tolerance		0.8 to 1.2 x $U_s$		
Maximum power consumption	W/A	4/8		
Frequency of the measured voltage	Hz	50/60		
Threshold $U_n$		min. 0.85 to 0.98 x $U_n$ (340 to 392 V phase / phase) max. 1.02 to 1.15 x $U_n$ (408 to 460 V phase / phase)		
Monitoring		undervoltage and overvoltage failure L1/L2/L3	undervoltage and overvoltage failure L1/L2/L3/N	
Hysteresis	fixed	max. 3 % of the set threshold		
Setting accuracy		±10 %		
Delay time T1/T2	after reaching the threshold	s	separately adjustable to 0.1 ... 10; ±50 %	
Response time	on occurrence of a fault	ms	500	
Availability time after application of $U_s$		ms	3000	
Mains buffering time		ms	10	

For further technical data, see page 7/34.

## Principle of operation

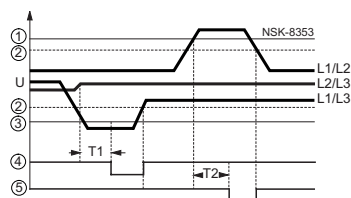
### Description

The output relay operates as long as the values of the three phase-to-phase voltages in the case of the 3UG30 41 or the three phase-to-neutral voltages of the phases to the PEN conductor in the case of the 3UG30 42 are between the upper and lower thresholds. These are set separately with two potentiometers on the front. If the value of a voltage is outside this range, the corresponding output relay drops out after

a delay time T1 or T2 has elapsed, separately adjustable on the front.

A fixed hysteresis of 3 % prevents the output relay from picking up and releasing constantly when the measured voltage is close to a threshold.

Neither the phase sequence nor the phase asymmetry are monitored. The 3UG30 42 relay also responds to the failure of the PEN conductor.



- ① threshold  $U_{max}$
- ② hysteresis
- ③ threshold  $U_{min}$
- ④ output relay  $U < U_{min}$  (terminals 11, 12, 14)
- ⑤ output relay  $U > U_{max}$  (terminals 21, 22, 24)

# 3UG35 01 Monitoring Relays for Monitoring Levels of Conductive Liquids

## Selection and ordering data

### Screw connection

For snap-on mounting onto 35 mm standard mounting rail or screw fixing  
Assembly width 22.5 mm

Level monitoring relay for conductive liquids

- inlet or outlet monitoring adjustable
- sensitivity adjustment by potentiometer
- 1 yellow LED for indicating the relay state
- 1 green LED for indicating applied control supply voltage
- 1 changeover contact

Design	Sensitivity	Rated control supply voltage $U_s$	Order No.	Price	Weight approx.
Inlet or outlet monitoring (UNDER/OVER function) adjustable	5 to 100 k $\Omega$	AC 50/60 Hz	Preferred type	1 unit	kg
		24	▶ 3UG35 01-1AC20		0.140
		120	▶ 3UG35 01-1AG20		
		230	▶ 3UG35 01-1AL20		



## Technical data

<b>Rated control supply voltage <math>U_s</math></b>	V	see selection data (electrical isolation with transformer)
<b>Voltage tolerance</b>		0.85 to 1.15 $\times U_s$
<b>Maximum power consumption</b>	W/VA	3/6
<b>Function mode setting</b>	inlet or outlet monitoring	UNDER/OVER slide switch at the front
<b>Sensitivity</b>	adjustable	k $\Omega$ 5 to 100
<b>Setting accuracy</b>	at maximum sensitivity	$\pm 30$ %
<b>Repeat accuracy</b>	at constant parameters	$\pm 0.5$ %
<b>Electrode voltage</b>	max.	V 24 (50/60 Hz)
<b>Electrode current</b>	max.	mA 1 (50/60 Hz)
<b>Conductor capacitance</b>	of the sensor cable <sup>1)</sup>	nF 10
<b>Delay time</b>	T1 at Max/M terminal T2 at Min/M terminal	ms typically 500 (ON-delay with OVER, OFF-delay with UNDER) ms typically 300 (OFF-delay with OVER, ON-delay with UNDER)
<b>Mains buffering time</b>	ms	300

For further technical data, see page 7/34.

## Principle of operation

### Description

The principle of operation 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 panel, the output relay changes its switching state. In order to exclude electrolytic phenomena in the liquid, the sensors are supplied with alternating current.

Two-level control:

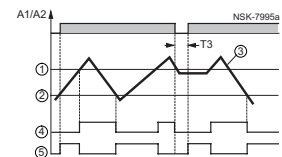
The output relay changes its switching state as soon as the liquid level reaches the maximum sensor, while the minimum sensor is submerged. The relay returns to its original switching state as soon as the minimum sensor no longer has contact with the liquid.

To be sure of resetting, the supply voltage must be interrupted for at least 0.5 s (T3).

The delay times T1 and T2 of the output relay have not been included in the diagram in order to enhance clarity.

### Note

Other resistance sensors within the range from 5 to 100 k $\Omega$  may also be connected to the Min and Max terminals, for example photoresistors, temperature sensors, displacement sensors operating on a resistance basis etc. The monitoring relay is therefore suitable for the monitoring of levels of other substances apart from liquids.








- ① maximum level<sup>2)</sup>
- ② minimum level<sup>2)</sup>
- ③ monitored level
- ④ output relay, OVER function
- ⑤ output relay, UNDER function

1) The sensor cable (max. 100 m) need not necessarily be shielded, but it is not recommended to lay 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.

2) Determined by the vertical positions of the sensors in the monitored liquid.

# 3UG35 01 Monitoring Relays for Monitoring Levels of Conductive Liquids

## Accessories Sensors for level monitoring

Design	Assignment cable --> electrode	Application	Order No.	Price 1 unit	Weight approx. kg
 <p><b>Three-pole wire electrode,</b> 500 mm long, with Teflon insulation (PTFE), screw-in gland width A/F 22 mm, <math>\frac{3}{8}</math> inch thread, PVC connecting cable, 3 x 0.5 mm<sup>2</sup>, 2 m long, max. operating temperature 90 °C, max. operating pressure 10 bar</p>	<p>brown white green</p>	<p>center electrode  not assign- able</p>	<p>The electrodes can be cut or bent to the required length before or after installation. The Teflon insulation must be removed over a length of approx. 5 mm.  Application: for 2-point liquid-level control in an insulating tank. One electrode each for the min. and max. value and a common reference electrode.</p>	<b>3UG32 07-3A</b>	
 <p><b>Two-pole wire electrode,</b> 500 mm long, with Teflon insulation (PTFE), screw-in gland width A/F 22 mm, <math>\frac{3}{8}</math> inch thread, PVC connecting cable, 3 x 0.5 mm<sup>2</sup>, 2 m long, max. operating temperature 90 °C, max. operating pressure 10 bar</p>	<p>brown white</p>	<p>not assign- able</p>	<p>For installation, see 3UG32 07-3A  Application: for alarm indication in the event of overflow or low level and for 2-step liquid-level control, when the conductive tank is used as the reference electrode.</p>	<b>3UG32 07-2A</b>	
 <p><b>Two-pole bow electrode for lateral fitting,</b> screw-in gland width A/F 22 mm, <math>\frac{3}{8}</math> inch thread, PVC connecting cable, 3 x 0.5 mm<sup>2</sup>, 2 m long, max. operating temperature 90 °C, max. operating pressure 10 bar</p>	<p>brown white green</p>	<p>gland not assign- able</p>	<p>Thanks to the small space requirements due to lateral fitting, ideal for use in small containers and pipes, as a leak monitor and level monitor or for warning of water entering a housing.</p>	<b>3UG32 07-2B</b>	
 <p><b>Single-pole bow electrode for lateral fitting,</b> screw-in gland width A/F 22 mm, <math>\frac{3}{8}</math> inch thread, PVC connecting cable, 3 x 0.5 mm<sup>2</sup>, 2 m long, max. operating temperature 90 °C, max. operating pressure 10 bar</p>	<p>brown white</p>	<p>gland electrode</p>	<p>As a max. value electrode for lateral fitting or for alarm indication with conductive tanks or pipes.</p>	<b>3UG32 07-1B</b>	
 <p><b>Single-pole, rugged design,</b> screw-in gland width A/F 22 mm, <math>\frac{3}{8}</math> inch thread, PVC connecting cable, 3 x 0.5 mm<sup>2</sup>, 2 m long, max. operating temperature 90 °C, max. operating pressure 10 bar</p>	<p>brown white</p>	<p>gland electrode</p>	<p>For high flow velocities or with highly bubbly liquid.</p>	<b>3UG32 07-1C</b>	

# 3UG35 21/22 Monitoring Relays for Single-Phase Current Monitoring


## Selection and ordering data

### Screw connection

For snap-on mounting onto 35 mm standard mounting rail or screw fixing  
Assembly width 22.5 mm

Current monitoring relay, single-phase

- range overflow or underflow monitoring of direct and alternating currents
- 1 yellow LED for indicating the relay state; flashes during operating time T1, T2
- 1 green LED for indicating applied control supply voltage
- 1 changeover contact

Design	Effective range	Rated control supply voltage $U_s$	Order No.	Price	Weight approx.
	AC/DC A	AC 50/60 Hz V	Preferred type	1 unit	kg
	Measured current isolated against control supply voltage	0.002 to 0.5 (3 ranges)	24	▶ <b>3UG35 21-1AC20</b> ▶ <b>3UG35 21-1AG20</b> ▶ <b>3UG35 21-1AL20</b>	0.150
		120			
		230			
	Threshold and hysteresis adjustable	0.1 to 10 (3 ranges)	24	▶ <b>3UG35 22-1AC20</b> ▶ <b>3UG35 22-1AG20</b> ▶ <b>3UG35 22-1AL20</b>	0.150
		120			
		230			

## Technical data

Type	3UG35 21			3UG35 22				
Rated control supply voltage $U_s$	V	see selection data (electrical isolation with transformer)						
Voltage tolerance	0.85 to 1.15 × $U_s$							
Maximum power consumption	W/VA	4/5						
Frequency of the measured current	Hz	40 to 500 and DC						
Threshold $I_e$	adjustable to 10 ... 100 % of the selected effective range							
Hysteresis	adjustable to 5 ... 50 % of the set threshold							
Setting accuracy <sup>1)</sup>	± 10 % referred to upper limit of effective range							
Repeat accuracy	at constant parameters	± 0.1 %						
Deviations	with voltage fluctuations with temperature fluctuations	≤ 0.5 % ± 0.05 %/°C						
Delay time	T2, ON-delay	s	1 ... 20 ± 10 %					
	T1 after reaching the threshold	s	0.1 ... 3 ± 10 %					
Effective ranges	inputs		IN1-M	IN2-M	IN3-M	IN1-M	IN2-M	IN3-M
	sensitivity	A	0.002 ... 0.02	0.01 ... 0.1	0.05 ... 0.5	0.1 ... 1	0.5 ... 5	1 ... 10
	input resistance	Ω	5	1	0.2	0.1	0.02	0.01
	overcurrent strength, permanent <sup>2)</sup>	A	0.04	0.2	1	2	10	14
	overcurrent strength, < 1 s <sup>2)</sup>	A	1	5	8	17	20	50
Function mode setting	overcurrent or undercurrent	slide switch at the base of the housing						
	with or without memory	slide switch at the base of the housing						

For further technical data, see page 7/34.

1) With sinusoidal currents.

Measuring principle: Arithmetic mean-value generation

2) Caution: Excess currents will lead to destruction of the device!

# 3UG35 21/22 Monitoring Relays for Single-Phase Current Monitoring

## Principle of operation

### Current monitoring without memory (NO MEMORY)

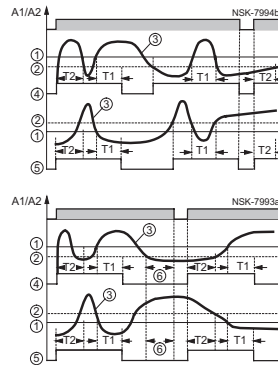
When the value of the monitored alternating or direct current has reached the threshold set at the front panel and the set delay time T1 has elapsed, the output relay releases. As soon as the current reaches the hysteresis value, the relay picks up again.

### Current monitoring with memory (MEMORY)

When the set threshold value has been reached and the set delay time T1 has elapsed, the output relay changes its switching state and remains in this state, even when the measured voltage reaches the set hysteresis value again. A reset is performed by switching the supply voltage off and on.

### ON-delay T1 and T2:

Due to the ON-delay T2, current peaks (OVER function) or current drops (UNDER function), which may occur during closing, do not result in a change to the relay state, for example suppression of the starting current during motor acceleration. The delay time T1 prevents the relay from picking up and releasing constantly when the measured current is close to the set threshold.



- ① threshold  $I_e$
- ② hysteresis
- ③ monitored measured current
- ④ output relay, OVER function
- ⑤ output relay, UNDER function

- ⑥ memory

# 3UG37 23 Monitoring Relays for Single-Phase Current Monitoring

## Selection and ordering data

### Screw connection

For snap-on mounting onto  
35 mm standard mounting rail  
Assembly width 17.5 mm

Current monitoring relay, single-phase

- range overflow monitoring of alternating current
- version with window-type current transformer
- 1 NO contact



Design	Effective range	Rated control supply voltage $U_s$		Order No.	Price	Weight approx.
	AC A	AC 50/60 Hz V	DC V	▶ Preferred type	1 unit	kg
Measured current isolated against control supply voltage Threshold for overcurrent adjustable	1 to 20	24/110 to 240	24	▶ <b>3UG37 23-1HK30</b>		0.080

## Technical data

<b>Rated control supply voltage <math>U_s</math></b>	V	see selection data (electrical isolation with window-type transformer)
<b>Voltage tolerance</b>		$\pm 15\%$ at 24 V AC/DC, $-15/+10\%$ at 110 to 240 V AC
<b>Maximum power consumption</b>	W/VA	1/10
<b>Frequency of the measured current</b>	Hz	30 to 400
<b>Threshold <math>I_e</math></b>	A	absolute scale from 1 to 20
<b>Hysteresis</b>		fixed, at 15 % of the set threshold
<b>Setting accuracy<sup>1)</sup></b>		$\pm 10\%$ referred to upper limit of effective range
<b>Repeat accuracy</b>	at constant parameters	$\pm 0.5\%$
<b>Deviations</b>	with voltage fluctuations with temperature fluctuations	$\pm 0.01\%/V$ $\pm 0.06\%/^{\circ}C$
<b>Delay time</b>	T1 when exceeding the threshold T2 when falling below the hysteresis	ms ms 400 $\pm$ 50 % 120 $\pm$ 50 %
<b>Effective range</b>	sensitivity overcurrent strength, permanent overcurrent strength < 3 s	A A A 1 ... 20 40 100
<b>Availability time after application of <math>U_s</math></b>	ms	max. 500

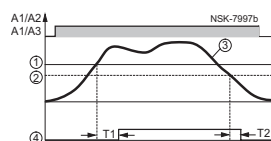
For further technical data, see page 7/34.

## Principle of operation

### Description

The individual conductor through which the measured current to be monitored flows is brought out through the window opening of the window-type transformer at the front (max. diameter 5 mm).

As soon as the value of the monitored measured current has reached the set threshold and the fixed delay time T1 (400 ms) has elapsed, the output relay picks up. When the current falls below the set threshold minus a fixed hysteresis of 15 % of the threshold and the fixed delay time T2 (120 ms) has elapsed, the relay returns to its release state.



A1/A2: 110 ... 240 V AC  
A1/A3: 24 V AC/DC

- ① threshold  $I_e$
- ② hysteresis
- ③ monitored measured current
- ④ output relay

1) With sinusoidal currents.  
Measuring principle: Arithmetic mean-value generation

# 3UG30 51 Monitoring Relays for Underspeed Monitoring


## Selection and ordering data

### Screw connection

For snap-on mounting onto 35 mm standard mounting rail or screw fixing  
Assembly width 45 mm

### Underspeed monitoring relay

- underspeed monitoring
- 4 effective ranges adjustable on front panel
- 1 green LED for indicating applied control supply voltage
- 1 yellow LED for indicating the relay state, flashes during operating time T
- 1 changeover contact

Design	Effective range	Rated control supply voltage $U_s$	Order No.	Price	Weight approx.
	revolutions/min	AC 50 to 60 Hz V	▶ Preferred type	1 unit	kg
	Effective range with or without memory, start override 0.3 to 30 s	0.1 to 600	▶ <b>3UG30 51-1AC20</b>		0.26
		(4 ranges)	▶ <b>3UG30 51-1AG20</b>		
			▶ <b>3UG30 51-1AL20</b>		

## Technical data

<b>Rated control supply voltage <math>U_s</math></b>	V	see selection data (electrical isolation with transformer)				
<b>Voltage tolerance</b>		0.85 to 1.5 × $U_s$				
<b>Maximum power consumption</b>	W/VA	4/5				
<b>Set value</b>		adjustable to 10 ... 100 % of the selected time setting range				
<b>Hysteresis</b>		typically 5 % of the set value				
<b>Setting accuracy</b>		10 % referred to upper limit of time setting range				
<b>Repeat accuracy</b>	at constant parameters	±0.5 %				
<b>Deviation</b>	with temperature fluctuations	±0.1 % / °C				
<b>ON-delay T</b>	s	adjustable to 0.3 ... 30 ±10 %				
<b>Signal input IN1<sup>1)</sup></b>	(input resistance 16 kΩ)	V	max. voltage 30 V, 3-wire sensor, pnp operation			
<b>Signal input IN2<sup>1)</sup></b>	(input resistance 1 kΩ)		floating contact, 2-wire NAMUR sensor			
<b>Voltage level for reliable operation</b>	level 1	V	4.5 ... 30			
	level 0	V	0 ... 1			
<b>Sensor supply</b>	+24 V/0 V +8V2		24 V DC (20 to 35 V), max. 50 mA 8.2 V DC			
<b>Effective ranges, selectable (rotary switch on front)</b>	time setting range	Hz	0.1 ... 1 s	1 ... 10 s	0.1 ... 1 min	1 ... 10 min
	frequency	min-1	10 ... 1	1 ... 0.1	0.17 ... 0.017	0.017 ... 0.0017
	revolutions	ms	600 ... 60	60 ... 6	10 ... 1	1 ... 0.1
	minimum pulse duration of signal	ms	5	5	5	5
	minimum interval between 2 pulses	ms	5	5	5	5
<b>Function mode setting</b>	with or without memory		rotary switch on front panel			
<b>Availability time after application of <math>U_s</math></b>	ms		200			
<b>Mains buffering time</b>	ms		10			

For further technical data, see page 7/34.

1) The sensors are not included in the scope of supply.

# 3UG30 51 Monitoring Relays for Underspeed Monitoring

## Principle of operation

### Description

The underspeed monitoring relay operates according to the principle of retriggerable OFF-delay. During the time (Value) set on the front panel, another pulse must arrive at input IN1 or IN2 in order to ensure that the output relay remains picked up. If the retrigger pulse does not arrive, indicating a reduction in speed, the output relay releases. In order to be able to start a drive, the output relay remains picked up during the ON-delay time T, even if the speed is still below the set value (motor starting override time).

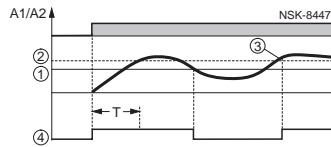
The monitoring relay can be used for all functions where a continuous pulse signal needs to be monitored (belt running monitoring, completeness monitoring, passing monitoring, clock-time monitoring).

### Speed monitoring without memory (NO MEMORY)

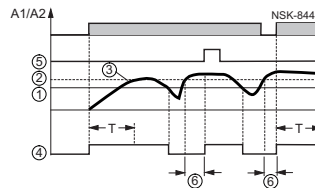
When the speed of the drive drops below the set value, the output relay releases. It picks up again when the speed is greater than the set value plus the fixed hysteresis.

### Speed monitoring with memory (MEMORY)

When the output relay drops out, this state remains stored even when the speed reaches a permissible value again. The stored state can be ended by a control signal at the reset terminal or by interruption of the supply voltage for at least 200 ms.



- ① set value
- ② hysteresis
- ③ actual value
- ④ output relay



- ① set value
- ② hysteresis
- ③ actual value
- ④ output relay
- ⑤ reset
- ⑥ memory

1

2

3

4

5

6

7



# 3UG3 Monitoring Relays

## General technical data

Type			3UG30 / 3UG35	3UG37 23
<b>Loadability of the output relay</b>	rated operational current	A	max. 8	max. 5
	$I_{th}$ /AC-15/ 230 V	A	3	1.5
	make-break capacity	VA/W	2000/80	1250/30
<b>Required DIAZED fuse</b> <sup>1)</sup>	utilization category gL/gG	A	4	4
<b>Electrical endurance</b>	operating cycles		1 x 10 <sup>5</sup>	1 x 10 <sup>5</sup>
<b>Mechanical endurance</b>	operating cycles		2 x 10 <sup>6</sup>	2 x 10 <sup>6</sup>
<b>Ambient temperature</b>	during operation	°C	-20 to +60	-20 to +60
	during storage	°C	-30 to +70	-30 to +70
<b>Conductor connection</b>	solid	mm <sup>2</sup>	2 x (0.5 to 2.5)	2 x (0.5 to 2.5)
	finely stranded with end sleeves	mm <sup>2</sup>	2 x (0.5 to 1.5)	2 x (0.5 to 1.5)
<b>Degree of protection</b>	terminals		IP 20	IP 20
	housing		IP 50	IP 30
	front cover			IP 50
<b>Rated insulation voltage</b> <sup>2)</sup>	pollution degree 2 overvoltage category III acc. to DIN VDE 0110	V AC	300	300
	exception: 3UG30 13, 3UG35 11	V AC	600	

## Description

The solid-state monitoring relays are offered in the field-proven design for different functions. There are relays for voltage, current, speed, level and phase monitoring. Their reduced space requirements, high measuring accuracy and optimized safety functions make them extremely comfortable to use.

Thus the current and voltage monitoring relays allow, for example, setting the "overcurrent/overvoltage" and "undercurrent/undervoltage" monitoring modes via DIP switch. It is equally possible to set the storage function and different delay times.

## Application

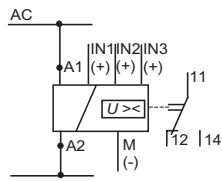
Depending on the relay type, these relays can be used for monitoring currents, voltages, phases, speed and levels. They pick up, for example, as soon as the set value is reached and release as soon as the value, e.g. the current in the hysteresis range, falls below the set value.

According to the relay version, they can be used for conductor and device protection in AC and DC systems. Combined with circuit breakers, they can e.g. be used for overload protection of motors in chain conveyors, packaging machines etc.

1) Weld-free according to DIN VDE 0660 Part 200.

2) According to DIN VDE 0664, at a rated insulation voltage of 300 V/600 V operation of the devices is permissible on three-phase systems at up to 480 V/ 690 V phase-to-phase voltage.

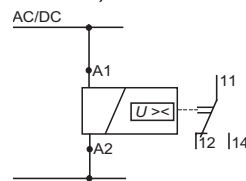
**Voltage monitoring relay, single-phase  
3UG35 32**



NSK-8009a

IN1/IN2/IN3: AC/DC

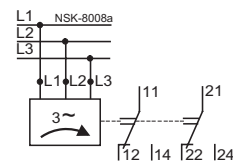
**Voltage monitoring relay, single-phase  
3UG35 34, 3UG35 35**



NSK-8011a

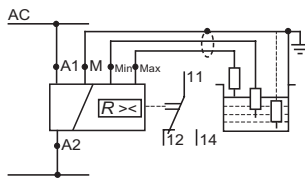
A1/A2: AC/DC

**Phase monitoring relay, three-phase  
3UG35 11**



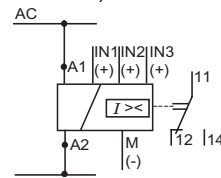
NSK-8008a

**Level monitoring relay  
3UG35 01**



NSK-8007b

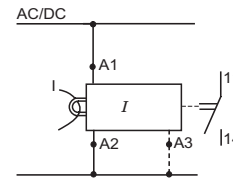
**Current monitoring relay, single-phase  
3UG35 21, 3UG35 22**



NSK-8010a

IN1/IN2/IN3: AC/DC

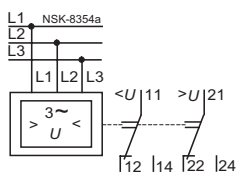
**Current monitoring relay, single-phase  
3UG37 23**



NSK-8012a

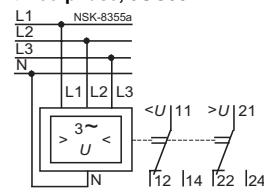
A1/A2: AC 110 to 240 V  
A1/A3: AC/DC 24 V

**Voltage monitoring relay, three-phase  
3UG30 41**



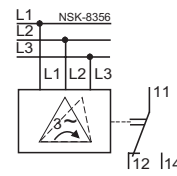
NSK-8354a

**Voltage monitoring relay with PEN conductor,  
three-phase, 3UG30 42**



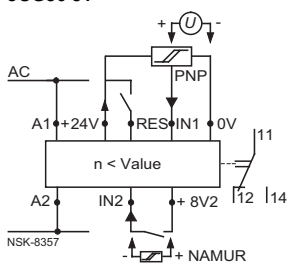
NSK-8355a

**Asymmetry monitoring relay, three-phase  
3UG30 12**



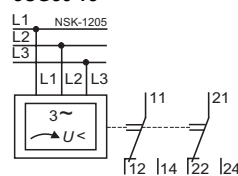
NSK-8356

**Underspeed monitoring relay  
3UG30 51**



NSK-8357

**Line monitoring relay, three-phase  
3UG30 13**

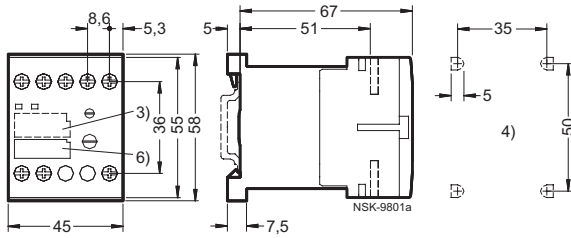


NSK-1205

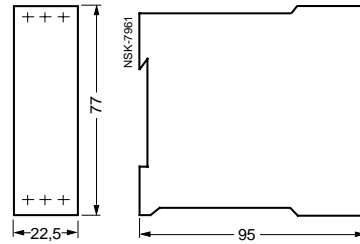
# 3RP1 and 7PU5 Time Relays, 3UG3 Monitoring Relays

## Dimensions

**3RP10 time relay**

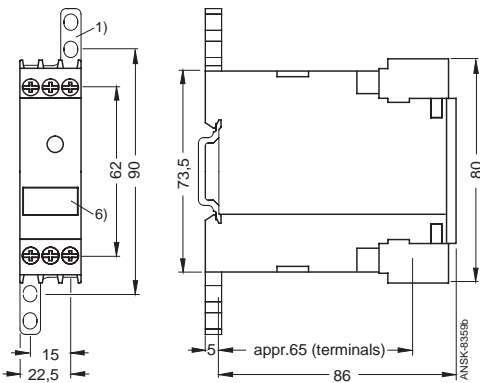


**7PU51 20 flasher relay, 7PU57 20 interval time-delay relay**



screw fixing with  
7PX9 906 screw adapter

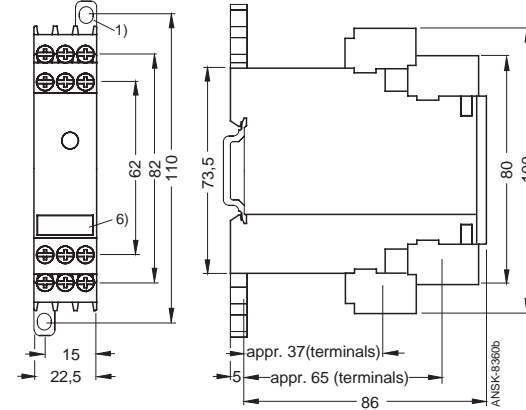
**3RP15 time relay**



1 changeover contact without auxiliary voltage<sup>5)</sup>,  
two-wire version, clock-pulse relay, star-delta function

- 1) Push-in lug for screw fixing
- 3) Coding plug (with 3RP10) or identification label
- 4) Drilling pattern

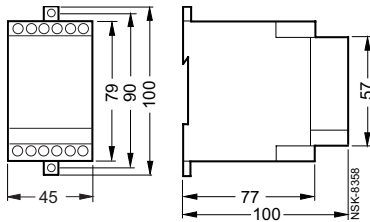
**3RP15 time relay**



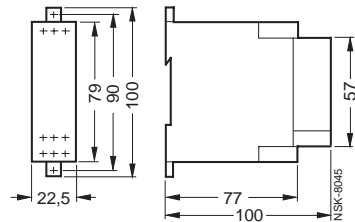
1 and 2 changeover contact devices with auxiliary voltage

- 5) Except 3RP1505-1A.30
- 6) Identification label

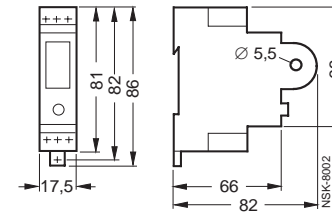
**3UG30 monitoring relay**



**3UG35 monitoring relay**



**3UG37 23 current monitoring relay**

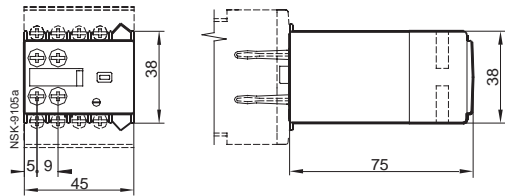


Version with window-type current transformer

# 3RT19 Auxiliary Switch Blocks and Time-Delay Blocks

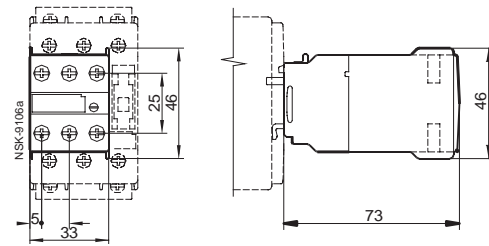
## Dimensions

**3RT19 16-2E, -2F, -2G ...**  
**Solid-state time-delay auxiliary switch blocks**



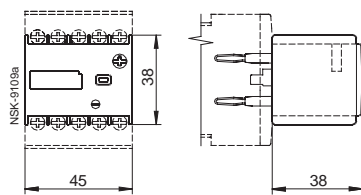
for contactors and contactor relays  
 for size S00

**3RT19 26-2E, -2F, -2G ...**  
**Solid-state time-delay auxiliary switch blocks**



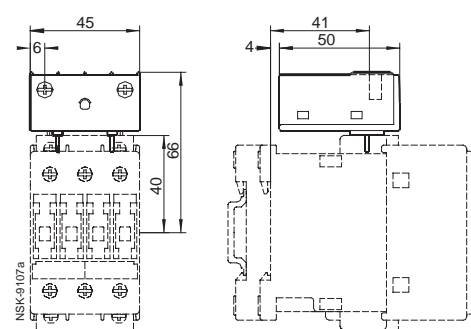
for contactors and contactor relays  
 for sizes S0 to S3

**3RT19 16-2C ...**  
**Solid-state time-delay blocks, ON-delay**



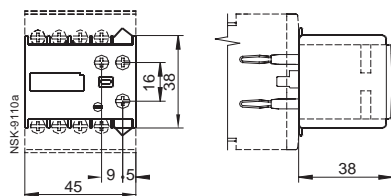
for mounting at the front of the contactors  
 for size S00

**3RT19 26-2C ...**  
**Solid-state time-delay blocks, ON-delay**



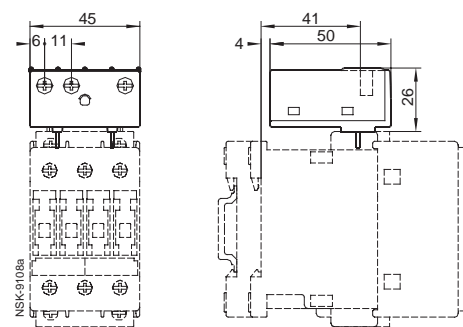
for mounting at the top or bottom of the contactors  
 for sizes S0 to S3

**3RT19 16-2D ...**  
**Solid-state time-delay blocks, OFF-delay**



for mounting at the front of the contactors  
 for size S00

**3RT19 26-2D ...**  
**Solid-state time-delay blocks, OFF-delay**

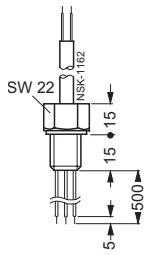


for mounting at the top or bottom of the contactors  
 for sizes S0 to S3

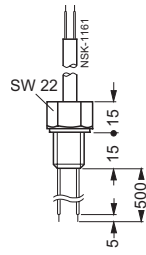
# Sensors for Level Monitoring

## Dimensions

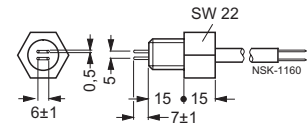
**3UG32 07-3A**  
Three-pole wire electrode



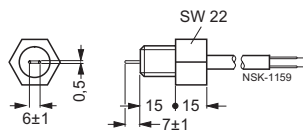
**3UG32 07-2A**  
Two-pole wire electrode



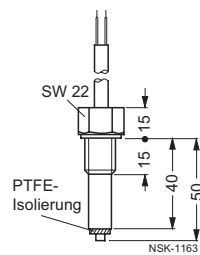
**3UG32 07-2B**  
Two-pole bow electrode



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



**3UG32 07-1C**  
Single-pole electrode, rugged design



# 3RP15 Time Relays

## Position of terminals



**3RP15 05-1A.**

A1	B1	15
A3	B3	
for 1 changeover contact		
16	18	A2

**3RP15 05-1AW**

A1	B1	15
for 1 changeover contact		
16	18	A2

**3RP15 05-1B.**

A1	B1	15/17
A3	B3	21/25/27
for 2 changeover contacts		
22/26	24/28	
16	18	A2

**3RP15 05-1BT**

A1	B1	15/17
		21/25/27
for 2 changeover contacts		
22/26	24/28	
16	18	A2

**3RP15 05-1BW**

A1	B1	15/17
		21/25/27
for 2 changeover contacts		
22/26	24/28	
16	18	A2

**3RP15 05-1RW**

A1	B1	15
		25
for 2 changeover contacts		
26	28	
16	18	A2

**3RP15 1.**

A1	A3	15
for 1 changeover contact		
16	18	A2

**3RP15 25-1A. or -1B. 1)**

A1	A3	15
for 1 changeover contact		
16	18	A2
A1		15
A3		25
for 2 changeover contacts		
26	28	
16	18	A2

**3RP15 27**

A1		
for 1 NO contact		
		A2

**3RP15 3.**

A1	B1	15
A3	B3	
for 1 changeover contact		
16	18	A2

**3RP15 40**

A1		15
for 1 changeover contact		
16	18	A2
A1		15
		25
for 2 changeover contacts		
26	28	
16	18	A2

**3RP15 55**

A1	A3	15
for 1 changeover contact		
16	18	A2

**3RP15 60**

A1	B1	17
A3	B3	
for 3 NO contacts		
16		
18	28	A2

**3RP15 7.**

A1	A3	17
for 2 NO contacts		
18	28	A2

1) Depending on the version.

# 3RP15 Time Relays

Position of terminals