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Slim Interface Relays

Overview

Murrelektronik Slim Interface Relays are highly compact and lightweight relays especially useful where cabinet space is a consideration. Encased in a self-extinguishing plastic housing, these high quality relays offer a long useful life. Great for use with PLC automation systems, electric power plants, energy management systems, medium voltage panels, industrial machines, and more.

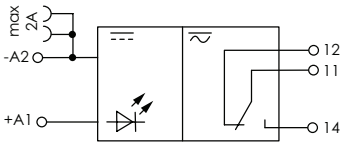
Features

- 35mm DIN-rail mount
- Slim 6.2 mm design
- Finger safe
- Status Indicator LED - Relay energized
- DC and AC supply voltage options

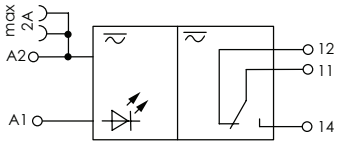
52007 52010 52030

Slim Interface Relays							
Part Number	*Price*	*Coil Voltage*	*Configuration*	*Contact Rating*	*Load Voltage*	*Action*	*Drawing Link*
52000	$;4ov[:	24 VDC	SPDT	6A	250 VAC/VDC	–	PDF
52001	$4ox4:	24 VAC/VDC	SPDT	6A	250 VAC/VDC	–	PDF
52003	$4ox6:	24 VAC/VDC	SPDT	6A	250 VAC/VDC	–	PDF
52007	$4ox3:	24 VAC/VDC	SPST	6A	250 VAC/VDC	H-O-A toggle switch	PDF
52010	$4ox2:	24 VAC/VDC	SPDT	6A	250 VAC/VDC	isolation disconnect	PDF
52030	$4ov_:	110 VAC/VDC	SPDT	6A	250 VAC/VDC	–	PDF
52040	$4ov#:	230 VAC/VDC	SPDT	6A	250 VAC/VDC	–	PDF
52050	$;4ov]:	12 VDC	SPDT	6A	250 VAC/VDC	–	PDF

Wiring Diagrams



52000



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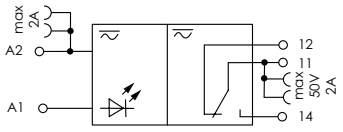

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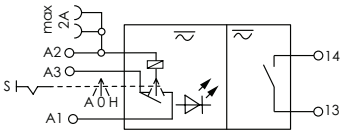
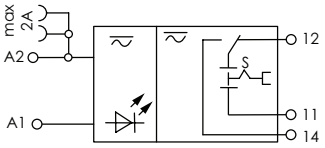


52007



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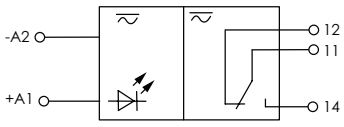

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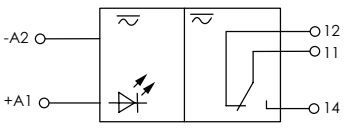

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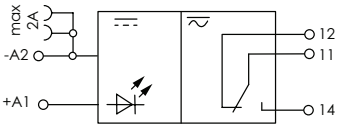

52050

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Slim Interface Relays Specifications

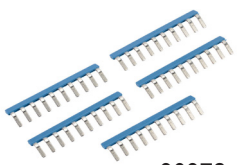
Slim Interface Relays Specifications									
Part Number		**52000**	**52001**	**52003**	**52007**	**52010**	**52030**	**52040**	**52050**
Input Specifications									
Nominal Voltage		24VDC	24 VAC/VDC 50/60 Hz	24 VAC/VDC 50/60 Hz	24 VAC/VDC 50/60 Hz	24 VAC/VDC 50/60 Hz	110 VAC/VDC 50/60 Hz	230 VAC/VDC 50/60 Hz	12VDC
Operating Voltage Range		19.2–30.0 VDC	19.2–30.0 VAC/VDC	19.2–30.0 VAC/VDC	19.2–26.4 VAC/VDC	19.2–30.0 VAC/VDC	95.0–121 VAC/VDC	195.0–253.0 VAC/VDC	10.0–15.0 VDC
Power Consumption	**AC**	n/a	0.4 VA	0.4 VA	0.34 VA	0.35 VA	0.45 VA	0.65 VA	n/a
	DC	0.35 W	0.4 W	0.4 W	0.34 W	0.35 W	0.45 W	0.65 W	0.24 W
Contact Specifications									
Type		SPDT	SPDT	SPDT	SPST	SPDT	SPDT	SPDT	SPDT
Material		Silver Tin Oxide (Ag Sn 02)							
Operate Time Max		8ms	8ms	8ms	8ms	8ms	8ms	12ms	8ms
Release Time Max		20ms	20ms	10ms	20ms	20ms	20ms	20ms	20ms
Wire Size Max		14AWG (stranded) / 12AWG (solid)							
Max Ratings	**AC**	6A/250 VAC 1500VA	6A/250 VAC 1500VA	6A/250 VAC 1500VA	6A/250 VAC 1500VA	6A/250 VAC 1500VA	6A/250 VAC 1500VA	6A/250 VAC 1500VA	6A/250 VAC 1500VA
	DC	6A/250 VDC 120W	6A/250 VDC 120W	6A/250 VDC 120W	6A/250 VDC 120W	6A/250 VDC 120W	6A/250 VDC 120W	6A/250 VDC 120W	6A/250 VDC 120W
Minimum Load		100mA	100mA	1mA	100mA	100mA	10mA	100mA	10mA
Mechanical Life Time		$10x10^6$ operations							
Electrical Life Time		$6x10^4$ operations							
General Specifications									
Connection		Screw terminal (M3)							
Tightening Torque		0.2 N·m (0.1)							
Ambient Temperature		-25 to +60°C [-13 to +140°F]			-25 to +50°C [-13 to +122°F]	-25 to +60°C [-13 to +140°F]			
Storage Temperature		-40°C to +80°C [-40°F to +176°F]							
Protection Rating		IP20							
Mounting		35mm DIN-rail							
Relay Indicator		Green LED							
Weight (g [oz])		35.0 [1.23]							
Agency Approvals and Standards *		CSA 1252427, cURus E140415, CE							

*** To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

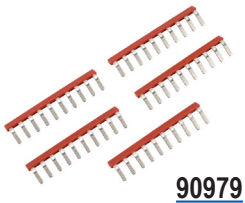
Interface Relays Accessories

Part Number	Price	Description
90963	$4oxh:	Murrelektronik interface relay jumper, push-in type, 2-pole, gray. Package of 5. For use with MurrElektronik relays with 6.2mm spacing.
90978	$4p18:	Murrelektronik interface relay jumper, push-in type, 10-pole, blue. Package of 5. For use with MurrElektronik relays with 6.2mm spacing.
90979	$4p19:	Murrelektronik interface relay jumper, push-in type, 10-pole, red. Package of 5. For use with MurrElektronik relays with 6.2mm spacing.

90963



90978



90979

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Interface Relays

Overview

Murrelektronik Interface Relays are highly compact and lightweight relays especially useful where cabinet space is a consideration. Encased in a self-extinguishing plastic housing, these high quality relays offer a long useful life. Great for use with PLC automation systems, electric power plants, energy management systems, medium voltage panels, industrial machines, and more.

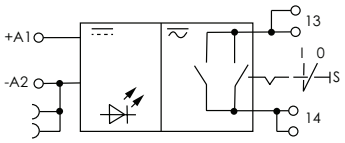
Features

- 35mm DIN-rail mount
- Status Indicator LED - Relay energized
- Wide range of coil voltage from 24 to 230 VDC/VAC
- High level of electromagnetic compatibility (EMC)
- Self-extinguishing plastic housing

51101 51152 52102

Interface Relays							
Part Number	*Price*	*Coil Voltage*	*Configuration*	*Contact Rating*	*Load Voltage*	*Action*	*Drawing Link*
51101	$4ox1:	24 VDC	SPST	3A	250 VAC/VDC	manual-auto toggle switch	PDF
51152	$4ox0:	24 VAC/VDC	SPDT	8A	250 VAC/VDC	H-O-A toggle switch	PDF
52102	$;4ov!:	24 VDC	DPDT	6A	250 VAC/VDC	–	PDF
52103	$4ox5:	24 VAC/VDC	DPDT	6A	250 VAC/VDC	–	PDF
52111	$4ox7:	24 VAC/VDC	DPDT	6A	250 VAC/VDC	–	PDF
52130	$4ov?:	110 VAC/VDC	DPDT	6A	250 VAC/VDC	–	PDF
52140	$;4ov,:	230 VAC/VDC	DPDT	6A	250 VAC/VDC	–	PDF

Wiring Diagrams



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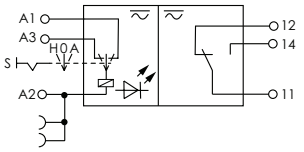

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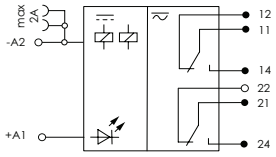

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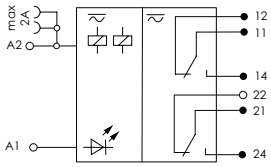

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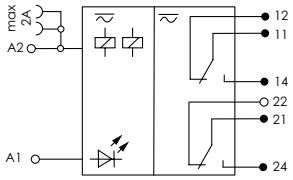

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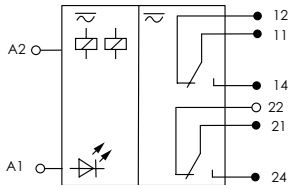

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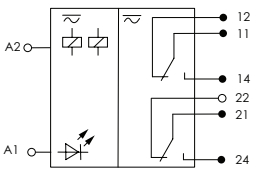

52140

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Interface Relays Specifications

Interface Relays Specifications								
Part Number		51101	51152	52102	52103	52111	52130	52140
Input Specifications								
Nominal Voltage		24VDC	24 VAC/VDC 50/60 Hz	24VDC	24 VAC/VDC 50/60 Hz	24 VAC/VDC 50/60 Hz	110 VAC/VDC 50/60 Hz	230 VAC/VDC 50/60 Hz
Operating Voltage Range		19.2–28.0 VDC	19.2–28.0 VAC/VDC	19.2–30.0 VDC	19.2–30.0 VAC/VDC	19.2–30.0 VAC/VDC	95.0–121 VAC/VDC	195.0–253.0 VAC/VDC
Power Consumption	**AC**	n/a	0.38 VA	n/a	0.48 VA	0.48 VA	0.8 VA	1VA
	DC	0.24 W	0.38 W	0.43 W	0.48 W	0.48 W	0.8 W	1W
Contact Specifications								
Type		SPST	SPDT	DPDT	DPDT	DPDT	DPDT	DPDT
Material		Silver Nickel (Ag Ni 015)	Silver Nickel (Ag Ni 015)	Silver Tin Oxide (Ag Sn 02)	Silver Tin Oxide (Ag Sn 02)	Silver Tin Oxide (Ag Sn 02)	Silver Tin Oxide (Ag Sn 02)	Silver Tin Oxide (Ag Sn 02)
Operate Time Max		10ms	10ms	15ms	15ms	15ms	15ms	15ms
Release Time Max		15ms	20ms	20ms	20ms	20ms	20ms	20ms
Wire Size Max		14 AWG (stranded) / 12 AWG (solid)						
Max Ratings	**AC**	3A/250 VAC 1250VA	8A/250 VAC 2000VA	6A/250 VAC 1500VA	6A/250 VAC 1500VA	6A/250 VAC 1500VA	6A/250 VAC 1500VA	6A/250 VAC 1500VA
	DC	3A/250 VDC 240W	8A/250 VDC 240W	6A/250 VDC 120W	6A/250 VDC 120W	6A/250 VDC 120W	6A/250 VDC 120W	6A/250 VDC 120W
Minimum Load		100mA	100mA	100mA	100mA	1mA	100mA	5mA
Mechanical Life Time		10×10^6 operations						
Electrical Life Time		6×10^4 operations						
General Specifications								
Connection		Screw terminal (M3)						
Tightening Torque		0.2 N·m (+0.1)						
Ambient Temperature		-25 to +60°C [-13 to +140°F]	-25 to +50°C [-13 to +122°F]	-25 to +60°C [-13 to +140°F]	-25 to +60°C [-13 to +140°F]	-25 to +60°C [-13 to +140°F]	-25 to +50°C [-13 to +122°F]	-25 to +60°C [-13 to +140°F]
Storage Temperature		-40 to +80°C [-40 to +176°F]						
Protection Rating		IP20						
Mounting		35mm DIN-rail						
Relay Indicator		Red LED	Red LED	Green LED	Green LED	Yellow LED	Green LED	Green LED
Weight (g [oz])		43.0 [1.51]	46.0 [1.62]	55 [1.91]	55 [1.91]	55 [1.91]	55 [1.91]	55 [1.91]
Agency Approvals and Standards *		CE		CSA 1252427, cURus E140415, CE				

*** To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

Interface Relays Accessories		
Part Number	**Price**	**Description**
90962	$4oxk:	Murrelektronik interface relay plug link, push-in type, 2-pole, gray. Package of 5. For use with MurrElektronik 51152 and 51101 interface relays.

90962

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Optocoupler Relays

Overview

Murrelektronik optocouplers and semiconductors are used to combine different signal levels or to isolate one signal from another. They are similar to a relay interface because they provide an optoelectronic signal transfer between input and output.

Optocouplers and semiconductors have a long life span because they don't have any mechanical components that could wear out. They are suitable for applications with high switching frequencies, even over a long time.

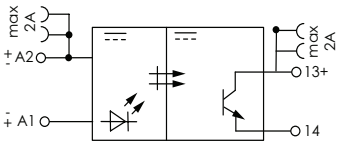
Features

- Silent operation
- No contact bounce
- Galvanic separation between input and output
- High resistance to shock and vibration
- High switching currents
- Low input power
- Shortest possible switching times
- High switching frequencies
- Resistant to EMC interference

52501 52507 52550

Optocoupler Relays							
Part Number	*Price*	*Input Voltage*	*Configuration*	*Output Type*	*Contact Rating*	*Load Voltage*	*Drawing Link*
52501	$4ox9:	10-48 VDC	SPST	(1) N.O. MOSFET	2A	5-48 VDC	PDF
52502	$4ox8:	4-5.5 VDC	SPST	(1) N.O. MOSFET	2A	5-48 VDC	PDF
52507	$4oxa:	90-250 VAC	SPST	(1) N.O. transistor	0.5A	5-48 VDC	PDF
52510	$4oxb:	10-53 VDC	SPDT	(1) N.O., (1) N.C. transistor	0.5A	5-48 VDC	PDF
52511	$4oxe:	15-30 VDC	SPST	(1) N.O. transistor	0.2A	5-48 VDC	PDF
52519	$4oxc:	10-53 VDC	SPST	(1) N.O. MOSFET	6A	5-48 VDC	PDF
52520	$4oxd:	10-53 VDC	SPST	(1) N.O. MOSFET	10A	5-48 VDC	PDF
52550	$;4oxf:	10-53 VDC	SPST	(1) N.O. TRIAC	0.5A	24-250 VAC	PDF

Wiring Diagrams



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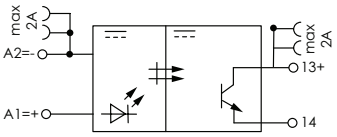

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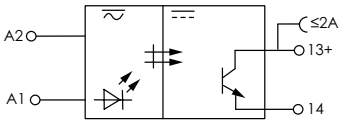

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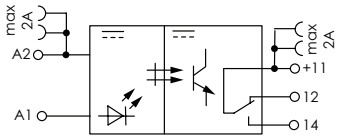

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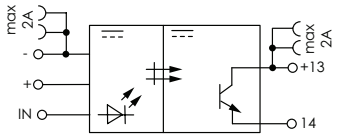

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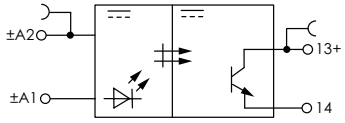

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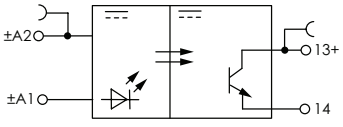

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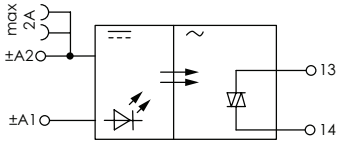


52550

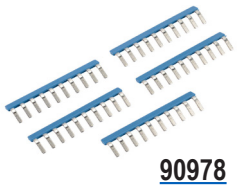
Optocoupler Relays Specifications

Optocoupler Relays Specifications								
Part Number	**52501**	**52502**	**52507**	**52510**	**52511**	**52519**	**52520**	**52550**
Input Specifications								
Input Voltage Range	10–48 VDC	4–5.5 VDC	90–250 VAC 50/60 Hz	11–53 VDC	15–30 VDC	10–53 VDC	10–53 VDC	10–53 VDC
Typical Input Current	7mA	7mA	7.5 mA	6.5 mA	16mA	10mA	10mA	6.5mA
Polarity	Any	A1 = +; A2 = –	Any	Any	A1 = +; A2 = –	Any	Any	Any
Output Specifications								
Load Voltage Range	5–48 VDC	5–48 VDC	5–48 VDC	5–48 VDC	5–48 VDC	5–48 VDC	5–48 VDC	24–250VAC
Rated Load Current	1mA – 2A	1mA – 2A	0.1 mA – 0.5 A	0.1 mA – 0.5 A	0.1 mA – 0.2A	1mA – 6A	1mA –10A	1. 5mA – 0.5 A
Max Switching Frequency	10Hz	10Hz	10Hz	10Hz	20KHz	1Hz	1Hz	20Hz
Power-Up Delay Max (Excluding Bounce Time)	1ms	1ms	55ms	0.04 ms	0.010 ms	2ms	2ms	10ms
Power-Down Delay Max (Excluding Bounce Time)	5ms	5ms	15ms	0.15 ms	0.018 ms	5ms	5ms	10ms
Switching Type	SPST	SPST	SPST	SPDT	SPST	SPST	SPST	SPST
Overvoltage Protection	48V	48V	68V	68V	68V	48V	48V	RC+VDR 320V
Isolation Voltage	2.5 kV	2.5 kV	3.75 kV	3.75 kV	3.75 kV	2.75 kV	2.75 kV	2.5 kV
General Specifications								
Connection	Screw terminal (M3)							
Tightening Torque	0.2 N·m (+0.1)							
Ambient Temperature	-20 to +60°C [-4 to +140°F]							
Storage Temperature	-40 to +80°C [-40 to +176°F]							
Protection Rating	IP20							
Mounting	35mm DIN-rail							
Power Indicator	Yellow							
Wire Size Max	14AWG (stranded) / 12AWG (solid)							
Mechanical & Electrical Life Time	20,000,000 switching cycles/load dependent							
Weight (g [oz])	32.0 [1.12]	32.0 [1.12]	32.0 [1.12]	32.0 [1.12]	32.0 [1.12]	30.0 [1.05]	30.0 [1.05]	32.0 [1.12]
Agency Approvals and Standards *	CSA 1252427, cURus E140415, CE							

*** To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

Interface Relays Accessories		
Part Number	***Price***	***Description***
90963	$4oxh:	Murrelektronik interface relay jumper, push-in type, 2-pole, gray. Package of 5. For use with MurrElektronik relays with 6.2mm spacing.
90978	$4p18:	Murrelektronik interface relay jumper, push-in type, 10-pole, blue. Package of 5. For use with MurrElektronik relays with 6.2mm spacing.
90979	$4p19:	Murrelektronik interface relay jumper, push-in type, 10-pole, red. Package of 5. For use with MurrElektronik relays with 6.2mm spacing.


90963


90978


90979

MURR ELEKTRONIK
stay connected

Multi-mode Relay Timers

Overview

Murrelektronik Multi-mode Relay Timers are for use in industrial applications such as control engineering, automation, signal and industrial installations.

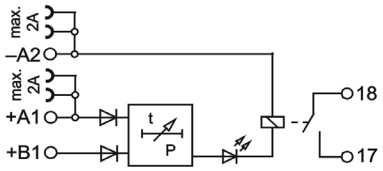
Features

- 35mm DIN-rail mount
- Slim 6.2 mm design
- Time ranges from 0.1 to 300 secs
- Status Indicator Green LED - Relay energized
- DC voltage
- Lexan 920 housing material

52350

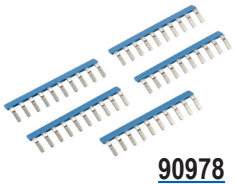
Multi-mode Relay Timers					
Part Number	***Price***	***Timing Range***	***Operating Voltage***	***Output Type***	***Drawing Link***
52350	$4oxg:	0.1 to 300 seconds selectable	24 VDC	(1) SPST timed relay	PDF

Wiring Diagram



Interface Relays Accessories		
Part Number	***Price***	***Description***
90963	$4oxh:	Murrelektronik interface relay jumper, push-in type, 2-pole, gray. Package of 5. For use with MurrElektronik relays with 6.2mm spacing.
90978	$4p18:	Murrelektronik interface relay jumper, push-in type, 10-pole, blue. Package of 5. For use with MurrElektronik relays with 6.2mm spacing.
90979	$4p19:	Murrelektronik interface relay jumper, push-in type, 10-pole, red. Package of 5. For use with MurrElektronik relays with 6.2mm spacing.

90963



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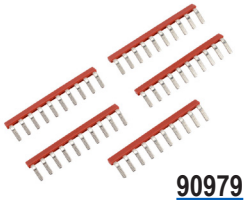


90979

MURR ELEKTRONIK
stay connected

Multi-mode Relay Timers Specifications

Multi-mode Relay Timers Specifications	
Input Specifications	
Nominal Voltage	24VDC
Operating Voltage Range	24VDC (+10% – 15%)
Trigger Voltage	24VDC +10% -15% 20.4 - 26.4 VDC 0-Signal/acc. to DIN 19240: < 5V / approx. 0.6 mA 1-Signal/acc. to DIN 19240: > 13V / approx. 7mA
Power Consumption	<16mA at 24V
Contact Specifications	
Type	SPST
Material	Silver Tin Oxide (Ag Sn 02)
Operate Time	8ms maximum
Release Time	10ms maximum
Bounce Time	2ms
Wire Size Max	14AWG (stranded) / 12AWG (solid)
Max Ratings	6A/250VAC, 1500VA
Minimum Load	6VDC 0.1 A
Mechanical Life Time	2×10^7 Switching cycles
Electrical Life Time Operations	230VAC / 6A 8×10^4 Switching cycles 24VDC / 2A 8×10^4 Switching cycles 26VDC / 15mA 3×10^5 Switching cycles
Time Circuit Specifications	
Time Ranges	0.1 ~ 1.2 sec, 0.4 ~ 5 sec, 3.5 ~ 40 sec, 30 ~ 300 sec
Setting Accuracy	≤ 10% of final value
Repeat Ready Time	≤ 5ms
Repeat Accuracy	≤ 0.2% of final value
Minimum Switch On Time	≥ 100ms
Minimum Trigger Time for Switch-off Delayer	0.5 ms
Temperature Coefficient	± 250 ppm of final value over temperature range
General Specifications	
Connection	Screw terminal (M3)
Tightening Torque	0.2 N·m (+0.1)
Ambient Temperature	-25 to +60°C [-13 to +140°F]
Storage Temperature	-40 to +80°C [-40 to +176°F]
Protection Rating	IP20
Mounting Position	35mm DIN-rail
Relay Indicator LED	Green
Weight (g [oz])	35.0 [1.23]
Agency Approvals and Standards *	CSA 1252427, cURus E140415, CE

*** To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

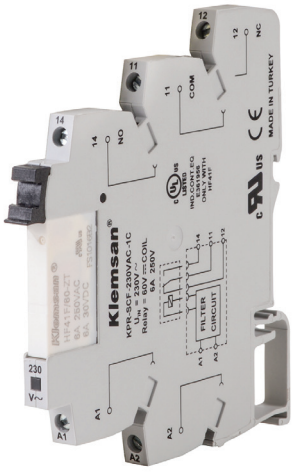
Slim Interface Relays

Overview

Klemsan Slim Interface Relays are highly compact and lightweight relays especially useful where cabinet space is a consideration. Encased in a self-extinguishing plastic housing, these high quality relays offer a long useful life. Great for use with PLC automation systems, electric power plants, energy management systems, medium voltage panels, industrial machines, and more.

Features

- 35mm DIN-rail mount
- Slim 6.2 mm design
- Integrated LED indicator (On)
- Integrated resistor, capacitor, and Zener diode (RCZ) filter on select models
- For use in supply circuits where leakage current is an issue
- DC and AC supply voltage options
- Wide range of power input from 12V to 230V
- High level of electromagnetic compatibility (EMC)
- Self-extinguishing plastic housing
- Plug-in bridges
- UL certified



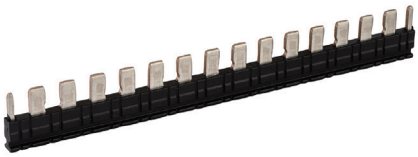
KPR-SCF-230VAC-1

Slim Interface Relays							
Part Number	*Price*	*Description*	*Coil Voltage*	*Configuration*	*Contact Rating*	*Integrated RCZ Filter*	*Drawing Link*
KPR-SCF-230VAC-1	$-44i9:	Interface relay with LED indicators	230VAC	SPDT	6A	Yes	PDF
KPR-SCF-115VACDC-1	$-44ia:		115V AC/DC			Yes	PDF
KPR-SCE-12VACDC-1	$-44ib:		12V AC/DC			No	PDF
KPR-SCE-24VACDC-1	$-44ic:		24V AC/DC			No	PDF
KPR-SCE-230VACDC-1	$-44id:		230V AC/DC			No	PDF

Slim Interface Relays Accessories				
Part Number	*Price*	*Description*	*Quantity*	*Drawing Link*
APP-KPR	$-44ie:	Orange polyamide separator plate	5	PDF
TK-KPR-S16	$;-44if:	16-pole push-in type interface relay jumper	5	PDF
TK-KPR-S8	$-44ig:	8-pole push-in type interface relay jumper	5	PDF

Note: Relay jumpers can be cut to match the number of relays when less than 8 or 16 count.

APP-KPR



TK-KPR-S16

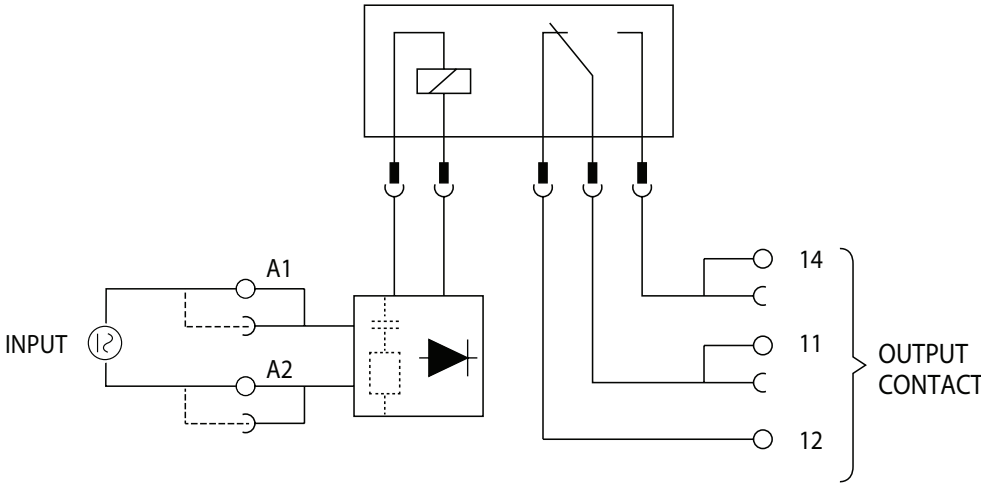
Slim Interface Relays Specifications

Slim Interface Relays Specifications						
Part Numbers		KPR-SCF-230VAC-1	KPR-SCF-115VACDC-1	KPR-SCE-12VACDC-1	KPR-SCE-24VACDC-1	KPR-SCE-230VACDC-1
Input Specifications						
Nominal Voltage		230VAC	115V AC/DC	12V AC/DC	24V AC/DC	230V AC/DC
Operating voltage range		196-265 VAC	98-132V AC/DC	10-14V AC/DC	20-28V AC/DC	196-265V AC/DC
Release voltage		92VAC	46V AC/DC	5V AC/DC	10V AC/DC	92V AC/DC
Power Consumption	**AC**	<0.9 VA	<0.7 VA	<0.35 VA	<0.2 VA	<1.3 VA
	DC	n/a	<0.6 W	<0.35 W	<0.2 W	<1.2 W
Contact Specifications						
Type		1 SPDT				
Material		Silver Tin Oxide (AqSn02)				
Operate time		10ms maximum				
Release time		5ms maximum				
Max Wire Size		2.5 mm² (14AWG)				
Maximum ratings	**AC**	6A/250VAC, 1500VA				
	DC	6A/30VDC; 180W				
Minimum Load		6VDC 0.1 A				
Mechanical life time		10^7 operations				
Electrical life time operations		$3x10^4$ N.O. operations $1x10^4$ N.C. operations				
Wiping Current		10VDC 10mA, 50 cycles 15-20 Hz				
General Specifications						
Connection		Screw terminal				
Isolation resistance		1000MΩ (500VDC)				
Dielectric strength		Between relay coil and contacts: 4000VAC for 1 minute Between contacts: 1000VAC for 1 minute				
Ambient temperature		-40 to +85°C [-40 to +185°F]				
Ambient humidity		5 to 85% (no condensation)				
Protection rating		IP20				
Mounting position		No restrictions				
Maximum torque		0.4 N•m [0.295 ft-lbs]				
Relay Indicator		Green LED				
Weight (g [oz])		33.4 [1.18]	33.6 [1.19]	33.2 [1.17]	33.0 [1.16]	33.2 [1.17]
Agency Approvals and Standards*		UL Listed (E361956) CE REACH				

*** To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

Slim Interface Relays Wiring Diagram

Wiring Diagram



Relays RS Series Specifications

Overview

RS series relays are compact, space-saving relay terminal modules containing four or six card relays with one normally open contact each. These relay-and-terminal modules are ideal for interfacing electronic control devices (such as PLCs or photoelectric sensors) with output devices.

Features

- Compact size of 34mm wide by 69mm long, including screw terminals
- Input terminals are located in the upper part and output terminals in the lower part of the module to separate them from each other, making wiring easy
- RB105 plug-in relays and TP04 sockets make maintenance easy
- Built-in coil surge-suppression diodes and operation indicator LEDs simplify circuit design and maintenance
- The module is easily-mounted on a 35mm DIN rail
- The RS4N module includes two standard accessory jumper plates, which are convenient for common wiring of terminals

RS6N-DE

Relays RS Series

Part Number	Price	Drawing Link	Description
RS4N-DE	$;0b]6:	PDF	Fuji Electric card relay, in-socket mount, finger-safe, 24 VDC coil voltage, 4PST, (4) N.O., 5A contact rating, screw terminal(s). (4) relays, TY3 relay remover and (2) jumpers included.
RS6N-DE	$;0b]7:	PDF	Fuji Electric card relay, in-socket mount, finger-safe, 24 VDC coil voltage, 6PST, (6) N.O., 5A contact rating, screw terminal(s). (6) relays and TY3 relay remover included.

Relays RS Series Specifications

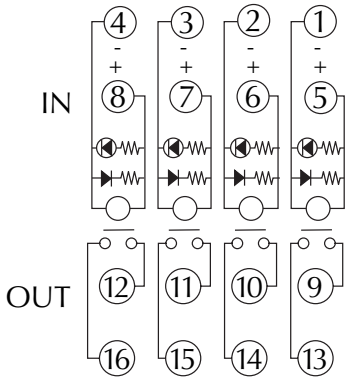
Contact		1 N.O. / SPST			
Contact Resistance		30mΩ or less (before use)			
Contact Material		Silver alloy (gold-plated)			
Min. Operating Voltage and Current		0.1 VDC, 1mA			
Rated Thermal Current		5A			
Max. Make/Break Current (Resistive Load)		250VAC, 5A 30VDC, 5A 120VDC, 0.5 A			
Max. Make/Break Current (Pilot Duty)		120VAC, 1A 30VDC, 2A 120VDC, 0.2 A			
Operating Time		10ms or less at rated voltage			
Release Time		10ms or less at rated voltage			
Insulation Resistance		100MΩ (at 500VDC megger)			
Dielectric Strength	Between Contact and Coil	2000VAC 1 minute			
	Between Contacts of Same Pole	750VAC 1 minute			
	Between Contacts of Different Pole	2000VAC 1 minute			
	Between Coils of Different Pole	500VAC 1 minute			
Vibration	Malfunction Durability	10 to 55Hz, 1mm double amplitude			
	Mechanical Durability	10 to 55Hz, 1.5mm double amplitude			
Shock	Malfunction Durability	100m/s²			
	Mechanical Durability	1000m/s²			
Life Expectancy	Mechanical	20 million operations			
	Electrical	Voltage	Make Current (A)	Break Current (A)	Operations
		220VAC (inductive load) 220VAC (resistive load) 24VDC (inductive load) 24VDC (resistive load)	2 (cos ø = 0.7) 3 (cos ø = 1.0) 1 (T = 15ms) 5 (T = 1ms or less)	2 (cos ø = 0.3 - 0.4) 3 (cos ø = 1.0) 1 (T = 15ms) 5 (T = 1ms or less)	100,000 130,000 150,000 100,000
Terminal Wire Capacity		Max wire gauge 14AWG			
Ambient Temperature		-25 to + 55°C (no icing)			
Terminal Torque Specification		0.8 - 0.9 N·m			

Relays RS Series Wiring Diagrams

Wiring Diagrams

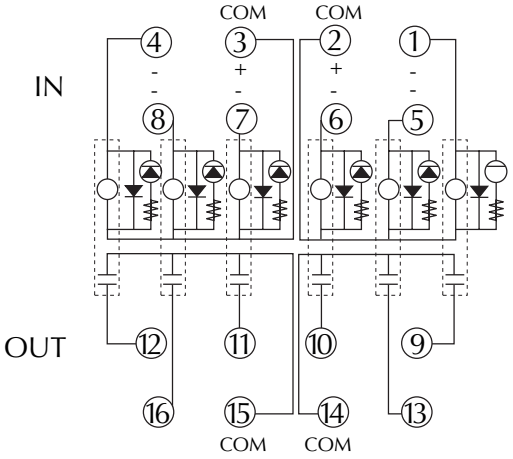
RS4N-DE

Internal Wiring



RS6N-DE

Internal Wiring



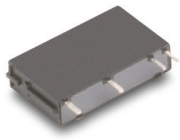
Electromechanical Relay RB105-DE Specifications

Overview

These relays are for replacement in RS4N-DE and RS6N-DE relay modules (5mm). Bifurcated contacts ensure high contact reliability, allowing use in low-level circuits.

Features

- Narrow, miniature size and light weight reduces space on the DIN rail
- UL, CSA, CE, and TUV approved
- Low power consumption
- Can be operated with a non-polarity magnet
- Flux-tight construction



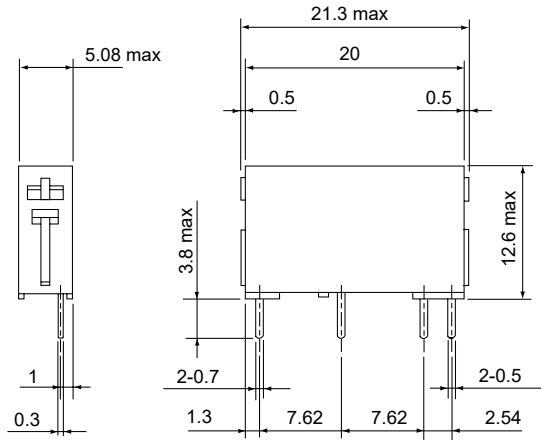
RB105-DE

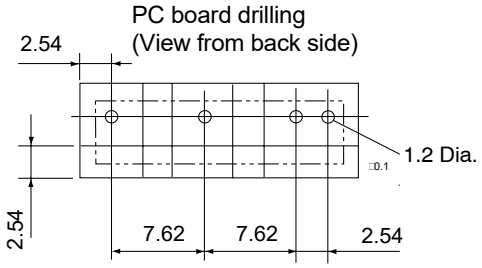
RB105-DE		
Part Number	***Price***	***Description***
RB105-DE	$;0b!3:	Fuji Electric card relay, socket mount, encapsulated, 24 VDC coil voltage, SPST, (1) N.O., 5A contact rating, 4-pin. Package of 10..

RB105-DE Card Relay Specifications Table		
Operating Time		10ms or less at rated voltage
Release Time		10ms or less at rated voltage
Insulation Resistance		100MΩ (at 500VDC megger)
Dielectric Strength		750VAC 1 minute between open contacts 2000VAC 1 minute between contact and coil
Impulse		4,500V or more 1.2 x 50µs between contact and coil
Electrical Life Expectancy		AC: 100,000 operations at 220VAC 2A, inductive load 130,000 operations at 220VAC 3A, resistive load DC: 150,000 operations at 24VDC 1A, inductive load 100,000 operations at 24VDC 5A, resistive load
Mechanical Life Expectancy		20 million operations
Ambient Temperature		-25 to 55° C (no icing)
Thermal Current		5A
Make and Break Current (Resistive Load)		250VAC, 5A 30VDC, 5A
Operating Coil	***Rated voltage***	24VDC
	Pick-up voltage	70% of rated coil voltage
	Drop-out voltage	5% of rated coil voltage
	Power consumption	200mW
	Coil resistance	2880Ω
Maximum Wire Size		14 AWG (2.5 mm²)

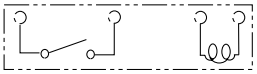
Dimensions

mm





Internal wiring diagram



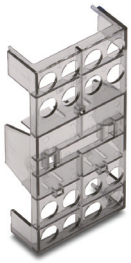
Relay Remover and Protective Cover RS Series

Relay remover, TY3

To remove a relay from the terminal module, use the TY3 relay remover. RS4N-DE and RS6N-DE modules include a TY3 relay remover. Pull the relay in a direction perpendicular to the terminal module surface. Incorrectly removing or mounting a relay may damage the relay pins and pin jacks of the module.

Optional protective cover, RZ4N

A protective cover fits over the RS4N-DE or RS6N-DE module and protects the terminals.

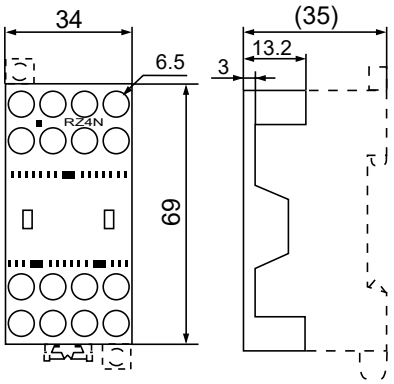


Accessories RS Series Relays		
Part Number	***Price***	***Description***
TY3	$;0b!5:	Fuji Electric relay remover, package of 10. For use with RS series relays.
RZ4N	$;0b!4:	Fuji Electric terminal guard, package of 10. For use with RS series relays.

Dimensions

mm

RZ4N



Electromechanical Relays 78 Series Selection Guide




Electromechanical Relays 78 Series				
Specification	***781 Series***	***782 Series***	***783 Series***	***784 Series***
Coil Voltages	120VAC, 240VAC, 12VAC, 12VDC, 24VAC, 24VDC	120VAC, 240VAC, 12VAC, 12VDC, 24VAC, 24VDC	120VAC, 240VAC, 12VAC, 12VDC, 24VAC, 24VDC	120VAC, 240VAC, 12VAC, 12VDC, 24VAC, 24VDC
Configuration	SPDT	DPDT	3PDT	4PDT
Contact Rating	15A	15A	15A	15A
Base Socket	5 pin spade terminal	8 pin spade terminal	11 pin spade terminal	14 pin spade terminal
Agency Approvals	UL Recognized (E191059), CE, IEC Std 947-4-1 and 947-5-1, CSA 244610	UL Recognized (E191059), CE, IEC Std 947-4-1 and 947-5-1, CSA 244610	UL Recognized (E191059), CE, IEC Std 947-4-1 and 947-5-1, CSA 244610	UL Recognized (E191059), CE, CSA 244610

Overview

These ice cube style relays are power relays designed for applications demanding high power control in various factory machines and control panels. They are ideal for electrical control panels requiring stable and reliable relays.

Features

- Small package design
- Silver alloy gold flashed contact
- High open contact dielectric strength (up to 2500V rms)
- High reliability and long life
- High vibration and shock resistance
- LED indicator on all models, so you can easily see if the relay is working properly without using a voltmeter
- Flag indicator shows relay status in manual or powered condition
- A pushbutton allows manual operation of the relay without the need for power to the coil
- Lock-Down door, when activated, holds pushbutton and contacts in the "operate" position, allowing circuits to be analyzed.
- SPDT, DPDT, 3PDT and 4PDT models
- Finger grip cover allows easier removal of relays from sockets than conventional relays
- I.D. tag/write labels for identifying relays in multi-relay circuits

Electromechanical Relays 78 Series Selection Guide

Electromechanical Relays 78 Series							
Part Number	***Price***	***Drawing Link***	***Coil Voltage***	***Configuration***	***Relay Socket Part Number***	***Price***	***Drawing Link***
781-1C-12D	$b#2:	PDF	12VDC	SPDT	***781-1C-SKT***	$-b?l:	PDF
781-1C-12A	$b#1:	PDF	12VAC				
781-1C-24D	$b#5:	PDF	24VDC				
781-1C-24A	$b#4:	PDF	24VAC				
781-1C-120A	$b#0:	PDF	120VAC				
781-1C-240A	$b#3:	PDF	240VAC				
782-2C-12D	$b#8:	PDF	12VDC	DPDT	***782-2C-SKT***	$b?n:	PDF
782-2C-12A	$b#7:	PDF	12VAC				
782-2C-24D	$b#b:	PDF	24VDC				
782-2C-24A	$b#a:	N/A	24VAC				
782-2C-120A	$b#6:	N/A	120VAC				
782-2C-240A	$b#9:	N/A	240VAC				
783-3C-12D	$b#e:	PDF	12VDC	3PDT	***783-3C-SKT***	$b?p:	PDF
783-3C-12A	$b#d:	PDF	12VAC				
783-3C-24D	$b#h:	N/A	24VDC				
783-3C-24A	$b#g:	N/A	24VAC				
783-3C-120A	$b#c:	N/A	120VAC				
783-3C-240A	$;b#f:	N/A	240VAC				
784-4C-12D	$b#k:	PDF	12VDC	4PDT	***784-4C-SKT-1***	$b?q:	PDF
784-4C-12A	$-0b#j:	PDF	12VAC				
784-4C-24D	$b#o:	PDF	24VDC				
784-4C-24A	$b#n:	N/A	24VAC				
784-4C-120A	$-b#i:	N/A	120VAC				
784-4C-240A	$-b#l:	N/A	240VAC				

NOTE: Not recommended for low current switching. Find contacts' Minimum Switching Requirement on following page.
For low current switching, please see the QM4N1 and QM4X1 series.

Electromechanical Relays 78 Series Specifications

Electromechanical Relays 78 Series Specifications												
Part Numbers	781-1C-12D	781-1C-12A	781-1C-24D	781-1C-24A	781-1C-120A	781-1C-240A	782-2C-12D	782-2C-12A	782-2C-24D	782-2C-24A	782-2C-120A	782-2C-240A
General Specifications												
***Service Life: Mechanical / Electrical Operations**	Mechanical: 10,000,000 operations not powered											
	Electrical: 100,000 operations @ rated resistive load											
***Operating Temperature**	-40 to 55°C [-40 to 131°F]											
***Response Time**	20ms											
***Vibration Resistance**	± 1mm [10-35 Hz] and 3gn [35-50Hz]											
***Shock Resistance**	15gn											
***Weight**	26g [0.92 oz]						36g [1.27 oz]					
***Environmental Protection**	IP40											
***NEMA B300 Pilot Duty Rated**	Yes											
****Agency Approvals and Standards**	UL Recognized File E191059, CE, CSA											
Coil Specifications												
***Standard**	Mechanical flag indicator, LED Indicator, lockable push to test button											
***Coil Input Voltage**	12VDC	12VAC	24VDC	24VAC	120VAC	240VAC	12VDC	12VAC	24VDC	24VAC	120VAC	240VAC
***Coil Resistance**	115Ω	44Ω	450Ω	177Ω	4.43kΩ	17.72kΩ	177Ω	44Ω	640Ω	177Ω	4.43 kΩ	17.72 kΩ
***Power Consumption**	1.4 W DC, 1.9 W AC @ 50/60 Hz						1.15 W DC, 1.4 W AC @ 50/60 Hz					
***Dropout Voltage (% of nominal voltage or more)**	10%	15%	10%	15%			10%	15%	10%	15%		
***Pull-in Voltage (% of nominal voltage or less)**	85%	85%	85%	85%			80%	85%	80%	85%		
***Max. Voltage (Max. continuous voltage)**	110% of the rated coil voltage											
Contact Specifications												
***Contact Type**	SPDT						DPDT					
***Contact Material**	Silver alloy, gold flashed											
***Minimum Switching Requirement**	10mA @ 17VDC											
***Max. Contact Rating**	Refer to Contact Ratings charts.											
***Dielectric Strength Between Contacts**	Between coil contact: 2000V rms; Between poles 2000V rms; Between contacts 1500V rms											

***Note: These devices are rated for 1,000 cycles when used in a motor application. (Per Table 45.1, UL 508).**
****Note: UL listed when used with sockets 781-1C-SKT, 782-2C-SKT, 783-3C-SKT, or 784-4C-SKT-1. Current limited to rating of relay or socket, whichever is less.**

NEMA Mechanical Switching Ratings and Test Values for AC Control Circuit Contacts											
Contact Rating Designation	**Thermal Continuous Test Current (A)**	**Maximum AC Current, 50/60Hz (A)**								**Voltamperes**	
		120 Volts		**240 Volts**		**480 Volts**		**600 Volts**			
		Make	**Break**	**Make**	**Break**	**Make**	**Break**	**Make**	**Break**	**Make**	**Break**
B300	5	30	3.00	15	1.50	---	---	---	---	3600	360

This chart is provided as a guideline only, and the ratings and values are not guaranteed to be accurate. It is the users' responsibility to properly size their control circuit devices. The chart values are from NEMA Standard ICS 5-2000, Table 1-4-1.

Contact Ratings 781 Series (current)				
Resistive				***Motor Load**
Voltage	**Nominal**	**UL**	**CSA**	**UL**
28VDC	15A	15A	12A	---
120VAC	15A	15A	15A	1/2Hp
277VAC	15A	12A	12A	1Hp

Contact Ratings 782 Series (current)				
Resistive				***Motor Load**
Voltage	**Nominal**	**UL**	**CSA**	**UL**
28VDC	15A	15A	12A	---
120VAC	15A	15A	15A	1/2Hp
277VAC	15A	12A	12A	1Hp

Electromechanical Relays 78 Series Specifications

Electromechanical Relay 78 Series Specifications												
Part Numbers	***783-3C-12D***	***783-3C-12A***	***783-3C-24D***	***783-3C-24A***	***783-3C-120A***	***783-3C-240A***	***784-4C-12D***	***784-4C-12A***	***784-4C-24D***	***784-4C-24A***	***784-4C-120A***	***784-4C-240A***
General Specifications												
****Service Life: Mechanical / Electrical Operations***	Mechanical: 10,000,000 operations not powered Electrical: 100,000 operations @ rated resistive load											
Operating Temperature	-40 to 55°C [-40 to 131°F]											
Response Time	20ms											
Vibration Resistance	± 1mm [10-35 Hz] and 3gn [35-100 Hz]											
Shock Resistance	15gn											
Weight	60g [2.12 oz]						80g [2.82 oz]					
Environmental Protection	IP40											
NEMA B300 Pilot Duty Rated	Yes											
*****Agency Approvals and Standards***	UL Recognized File E191059, CE, CSA											
Coil Specifications												
Standard	Mechanical flag indicator, LED Indicator, lockable push to test button											
Coil Input Voltage	12VDC	12VAC	24VDC	24VAC	120VAC	240VAC	12VDC	12VAC	24VDC	24VAC	120VAC	240VAC
Coil Resistance	80Ω	30Ω	320Ω	110Ω	2.88 kΩ	11.3 kΩ	76Ω	20Ω	303Ω	80Ω	2.1 kΩ	8kΩ
Power Consumption	1.85 W DC, 2.05 W AC @ 50/60 Hz						1.5 W DC, 1.5 W AC @ 50/60 Hz					
Dropout Voltage (% of nominal voltage or more)	10%	15%	10%	15%			10%	15%	10%	15%		
Pull-in Voltage (% of nominal voltage or less)	80%	85%	80%	85%			80%	85%	80%	85%		
Max. Voltage (Max. continuous voltage)	110% of the rated coil voltage											
Contact Specifications												
Contact Type	3PDT						4PDT					
Contact Material	Silver alloy, gold flashed											
Minimum Switching Requirement	10mA @ 17VDC											
Max. Contact Rating	Refer to Contact Ratings charts.											
Dielectric Strength Between Contacts	Between coil and contacts: 2000V rms; Between poles: 2000V rms; Between contacts: 1500V rms											

***Note: These devices are rated for 1,000 cycles when used in a motor application. (Per Table 45.1, UL 508).**
****Note: UL listed when used with sockets 781-1C-SKT, 782-2C-SKT, 783-3C-SKT, or 784-4C-SKT-1. Current limited to rating of relay or socket, whichever is less.**

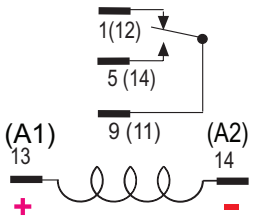
Contact Ratings 783 Series (current)				
Resistive				****Motor Load***
Voltage	***Nominal***	***UL***	***CSA***	***UL***
28VDC	15A	15A	15A @ 28VDC 30A max total	–
120VAC	15A	–	15A	1/2 hp
277VAC	15A	15A	15A @ 150VAC 30A max total	1hp 2hp max total

Contact Ratings 784 Series (current)				
Resistive				****Motor Load***
Voltage	***Nominal***	***UL***	***CSA***	***UL***
28VDC	15A	15A	15A @ 28VDC 30A max total	–
120VAC	15A	–	15A	1/2Hp
277VAC	15A	15A	15A @ 150VAC 30A max total	1hp 2hp max total

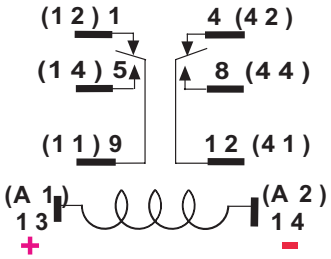
Wiring Diagrams 78 Series

Wiring Diagrams (viewed from pin end)

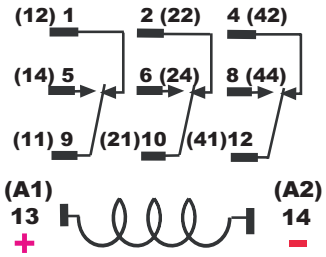
781-1C-XXX



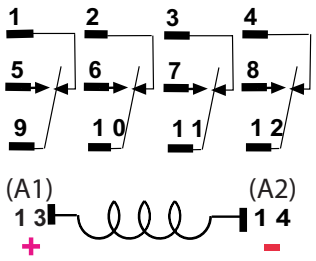
782-2C-XXX



783-3C-XXX



784-4C-XXX

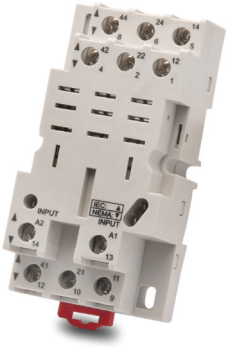


*Note: ALTERNATE NEMA OR IEC ( ) NUMBERS, VIEWED FROM PIN SIDE

Relay Sockets 78 Series

781-1C-SKT

782-2C-SKT



783-3C-SKT

784-4C-SKT-1

Relay Sockets 78 Series				
Part Number	***Price***	***Description***	***Drawing Link***	***Agency Approval***
781-1C-SKT	$-b?l:	AutomationDirect relay socket, 35mm DIN rail or panel mount. For use with 781 series cube relays.	PDF	UL Recognized file number: E225080
782-2C-SKT	$b?n:	AutomationDirect relay socket, 35mm DIN rail or panel mount. For use with 782 and AD-70S2 series cube relays.	PDF	
783-3C-SKT	$b?p:	AutomationDirect relay socket, 35mm DIN rail or panel mount. For use with 783 series cube relays.	PDF	
784-4C-SKT-1	$b?q:	AutomationDirect relay socket, 35mm DIN rail or panel mount. For use with 784 series cube relays.	PDF	

Relay Sockets 78 Series Screw Torques and Wire Sizes		
Part Number	***Maximum Screw Torques***	***Maximum Wire Sizes***
781-1C-SKT	Terminals 13, 14: 7 in·lbs/0.8 N·m Terminals 1, 5, 9: 9 in·lbs/1.0 N·m	Terminals 13, 14: 18 to 20 AWG, solid or stranded, one or two identical wires Terminals 1, 5, 9: 12 to 20 AWG, solid or stranded, one or two identical wires
782-2C-SKT	All terminals: 9 in·lbs/1.0 N·m	All terminals: 12 to 20 AWG, solid or stranded, one or two identical wires
783-3C-SKT		
784-4C-SKT-1		

Note: Order sockets separately; holding clips are included with sockets.

H782 Series Hermetically Sealed Electromechanical Relay Selection Guide

Features

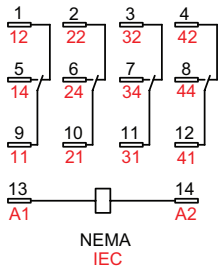
- Hermetically sealed for use in hazardous locations (Class I, Div. 2 Groups A, B, C, D)
- Small package design
- Silver alloy contacts
- High reliability and long life
- High vibration and shock resistance
- Sealed for washdown conditions
- 4PDT models

H782 Series Overview	
Specification	***H782 Series***
Coil Voltages	120VAC, 240VAC, 12VAC, 12VDC, 24VAC, 24VDC
Configuration	4PDT
Contact Rating	3A, 5A
Base Socket	14 pin spade terminal
Agency Approvals	UL Recognized (E344123), cULus when used with 782-4C-SKT socket, CSA, CE, RoHS

H782-4C3-12A

H782 Series Hermetically Sealed Relays								
Part Number	***Price***	***Drawing Link***	***Coil Voltage***	***Configuration***	***Contact Rating***	***Relay Socket Part Number***	***Price***	***Drawing Link***
H782-4C3-12D	$-0b_i:	PDF	12VDC	4PDT	3A	***782-4C-SKT***	$b?o:	PDF
H782-4C3-12A	$0b_h:	PDF	12VAC					
H782-4C3-24D	$-0b_l:	PDF	24VDC					
H782-4C3-24A	$0b_k:	PDF	24VAC					
H782-4C3-120A	$0b_g:	PDF	120VAC					
H782-4C3-240A	$-0b_j:	PDF	240VAC					
H782-4C5-12D	$0b_p:	PDF	12VDC		5A			
H782-4C5-12A	$0b_o:	PDF	12VAC					
H782-4C5-24D	$;0b_t:	PDF	24VDC					
H782-4C5-24A	$0b_s:	PDF	24VAC					
H782-4C5-120A	$0b_n:	PDF	120VAC					
H782-4C5-240A	$0b_q:	PDF	240VAC					

Wiring Diagram



Wiring Diagram
Bottom View

H782 Series Hermetically Sealed Electromechanical Relay Specifications

H782 Series Hermetically Sealed Relay Specifications												
Part Numbers	***H782-4C3-12D***	***H782-4C3-12A***	***H782-4C3-24D***	***H782-4C3-24A***	***H782-4C3-120A***	***H782-4C3-240A***	***H782-4C5-12D***	***H782-4C5-12A***	***H782-4C5-24D***	***H782-4C5-24A***	***H782-4C5-120A***	***H782-4C5-240A***
General Specifications												
****Service Life: Mechanical / Electrical Operations***	Mechanical: 10,000,000 operations not powered											
	Electrical life:100,000 operations @ rated resistive load											
Operating Temperature	-40 to 70°C [-40 to 158°F]											
Response Time	20ms											
Vibration Resistance	6 gn at 10–55 Hz											
Shock Resistance	10 G's											
Weight	45g [1.59 oz]											
*****Agency Approvals and Standards***	UL Recognized File E344123, CE, CSA, RoHS											
Environmental Protection	IP67 (Class I, Div. 2; Groups A, B, C, D; T5 Temp Code for Hazardous Locations)											
NEMA B300 Pilot Duty Rated	Yes											
Coil Specifications												
Coil Input Voltage	12VDC	12VAC	24VDC	24VAC	120VAC	240VAC	12VDC	12VAC	24VDC	24VAC	120VAC	240VAC
Coil Resistance	160Ω	43Ω	650Ω	160Ω	3.9kΩ	12kΩ	160Ω	43Ω	650Ω	160Ω	3.9kΩ	12kΩ
Power Consumption	0.9 W DC; 1.2 W AC											
Dropout Voltage (% of nominal voltage or more)	30% AC, 10%DC											
Pull-in Voltage (% of nominal voltage or less)	80% AC, 75% DC											
Max Voltage (Max continuous voltage)	110% of the rated coil voltage											
Contact Specifications												
Contact Type	4PDT											
Contact Material	Fine silver, gold flashed						Silver alloy					
Minimum Switching Requirement	10mA @ 5VDC						100mA @ 5VDC					
Max. Contact Rating	Refer to Contact Ratings charts.											
Dielectric Strength Between Contacts	Between Coil and Contact = 1600V rms ; Between Poles = 1600V rms											

***Note: These devices are rated for 1,000 cycles when used in a motor application. (Per Table 45.1, UL 508).**
****Note: UL listed when used with socket 782-4C-SKT. Current limited to rating of relay or socket, whichever is less.**

782 Series Contact Ratings (current)				
Resistive				****Motor Load***
Voltage	***Nominal***	***UL***	***CSA***	***UL***
30VAC	3A	3A	3A	–
120VAC	3A	3A	3A	1/10 HP
240VAC	3A	3A	3A	1/10 HP

782 Series Contact Ratings (current)				
Resistive				****Motor Load***
Voltage	***Nominal***	***UL***	***CSA***	***UL***
30VAC	5A	5A	5A	–
120VAC	5A	5A	5A	–
240VAC	5A	5A	5A	–

Socket for H782 Series Hermetically Sealed Electromechanical Relay

Relay Socket						
Part Number	***Price***	***Description***	***Maximum Screw Torques***	***Maximum Wire Sizes***	***Drawing Link***	***Agency Approval***
782-4C-SKT	$b?o:	AutomationDirect relay socket, 35mm DIN rail or panel mount. For use with H782 series cube relays.	All terminals: 9 in·lbs/1 N·m	All terminals:12 to 20 AWG, solid or stranded, one or two identical wires	PDF	UL Recognized file number: E344123

750R Series Electromechanical Relay Selection Guide

Overview

750R series relays are general purpose relays designed for a wide range of applications, from power to sequence controls in various factory machines and control panels. They are ideal for electrical control panels requiring stable and reliable relays.

Features

- Octal base design
- Silver alloy, gold flashed contacts
- High open contact dielectric strength (1500 Vrms)
- High reliability and long life
- High vibration and shock resistance
- Flag indicator shows relay status in manual or powered condition
- LED indicator on all models, so you can easily see if relay is working properly without using a voltmeter
- A pushbutton allows manual operation of the relay without the need for power to the coil
- I.D. tag/write label for identifying relays in multi-relay circuits

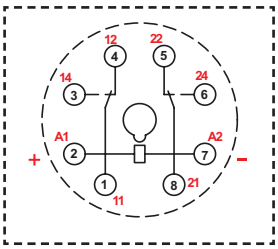
750R Series Relays

Part Number	Price	Drawing Link	Coil Voltage	Configuration	Contact Rating	Terminals	Relay Socket Part Number	Price	Drawing Link
750R-2C-12D	$?8e:	PDF	12VDC	DPDT	10A	8-pin	750-2C-SKT	$-b?j:	PDF
750R-2C-12A	$;0?8f:	PDF	12VAC						
750R-2C-24D	$?8g:	PDF	24VDC						
750R-2C-24A	$?8h:	PDF	24VAC						
750R-2C-120A	$-?8i:	PDF	120VAC						
750R-2C-240A	$-0?8j:	PDF	240VAC						
750R-3C-12D	$0?8k:	PDF	12VDC	3PDT	10A	11-pin	750-3C-SKT	$b?k:	PDF
750R-3C-24D	$-0?8l:	PDF	24VDC						
750R-3C-24A	$0?8n:	PDF	24VAC						
750R-3C-120A	$0?8o:	PDF	120VAC						
750R-3C-240A	$0?8p:	PDF	240VAC						

Note: Order socket separately. 750-2C-SKT/750-3C-SKT socket torque 9 lb·in/ 1.0 N·m

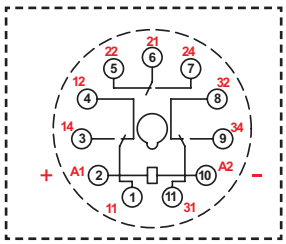
Wiring Diagrams

750R-2C-xxx wiring diagram



Note: Contacts and coil shown are internal to the relay

750R-3C-xxx wiring diagram



Note: Contacts and coil shown are internal to the relay

Note: Red numbers indicate IEC designations

750R Series Electromechanical Relay Specifications

750R Series Specifications											
Part Numbers	***750R-2C-12D***	***750R-2C-12A***	***750R-2C-24D***	***750R-2C-24A***	***750R-2C-120A***	***750R-2C-240A***	***750R-3C-12D***	***750R-3C-24D***	***750R-3C-24A***	***750R-3C-120A***	***750R-3C-240A***
General Specifications											
Service Life	Mechanical: 5 million operations, Electrical: 100,000 operations @ rated resistive load										
Operating Temperature	-40 to 55°C [-40 to 131°F]										
Response Time	20ms										
Vibration Resistance	+/- 1mm [10 -35 Hz] and 3 g-n [35 -150 Hz]										
Shock Resistance	10 G's										
Weight g (oz)	83 [2.93]										
Environmental Protection	IP40										
****Agency Approvals and Standards***	UL Recognized file E191059, CE, CSA Certified 2742760										
Coil Specifications											
Standard	LED Indicator										
Coil Input Voltage	12VDC	12VAC 50/60 Hz	24VDC	24VAC 50/60 Hz	120VAC 50/60 Hz	240VAC 50/60 Hz	12VDC	24VDC	24VAC 50/60 Hz	120VAC 50/60 Hz	240VAC 50/60 Hz
Coil Resistance	120Ω	16.9 Ω	470Ω	72Ω	1.7 kΩ	6.8 kΩ	120Ω	470Ω	72Ω	1.7 kΩ	6.8 kΩ
Power Consumption	3VA (60Hz) AC, 1.4 W DC										
Dropout Voltage (% of rated voltage)	15% AC, 10% DC										
Pull-in Voltage	Max. 85% (AC), 80% (DC) of nominal voltage or less										
Max. Voltage (Max. continuous voltage)	110% of the rated coil voltage										
Contact Specifications											
Contact Type	DPDT						3PDT				
Contact Material	Silver alloy, gold flashed										
Minimum Switching Requirement	10mA @ 17VDC										
Contact Rating	Refer to Contact Ratings chart										
Dielectric Strength Between Contacts	1500 Vrms										

***Note: UL listed when used with sockets 750-2C-SKT, 750-3C-SKT. Current limited to rating of relay or socket, whichever is less.**
To obtain the most current agency approval information, see the Agency Approval Checklist section on the specific part number's web page at www.AutomationDirect.com

750R Series Rated Switching Current	
UL	
Resistive	10A @ 277VAC, 200k cycles / 10A @ 30VDC, 200k cycles
Motor	1/3HP @ 120VAC, 6k cycles / 1HP @ 277VAC, 6k cycles
Pilot Duty	B300, 6k cycles
IEC	
N.O.: 10A at 250VAC, N.C.: 5A at 250VAC N.O.: 10A at 28VDC, N.C.: 5A at 28VDC	

H750 Series Hermetically Sealed Electromechanical Relay Selection Guide

Features

- Hermetically sealed for use in hazardous locations (Class 1, Div 2, Groups A, B, C, D)
- Octal base design
  Silver Cadmium Oxide, gold flashed contacts
- High open contact dielectric strength (1,500V rms)
- High reliability and long life
- High vibration and shock resistance
- DPDT and 3PDT models

H750 Series Overview	
Specification	***H750 Series***
Coil Voltages	120VAC, 240VAC, 12VAC, 12VDC,24VAC, 24VDC
Configuration	DPDT or 3PDT
Contact Rating	12A
Base Socket	8-pin or 11-pin spade terminal,
Agency Approvals	UL Recognized (E344123), cULus used with 750 sockets RoHS

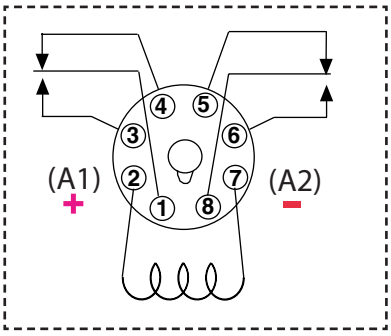
H750-2C-12D

H750 Series Hermetically Sealed Relays								
Part Number	***Price***	***Drawing Links***	***Coil Voltage***	***Configuration***	***Contact Rating***	***Relay Socket Part Number***	***Price***	***Drawing Links***
H750-2C-12D	$;0b[7:	PDF	12VDC	DPDT	12A	***750-2C-SKT***	$-b?j:	PDF
H750-2C-12A	$;0b[6:	PDF	12VAC					
H750-2C-24D	$;;0b[t:	PDF	24VDC					
H750-2C-24A	$;0b[s:	PDF	24VAC					
H750-2C-120A	$;0b[5:	PDF	120VAC					
H750-2C-240A	$;0b[8:	PDF	240VAC					
H750-3C-12D	$;0b[x:	PDF	12VDC	3PDT		***750-3C-SKT***	$b?k:	PDF
H750-3C-12A	$;0b[v:	PDF	12VAC					
H750-3C-24D	$;;0b[]:	PDF	24VDC					
H750-3C-24A	$;0b[z:	PDF	24VAC					
H750-3C-120A	$;0b[u:	PDF	120VAC					
H750-3C-240A	$;0b[y:	PDF	240VAC					

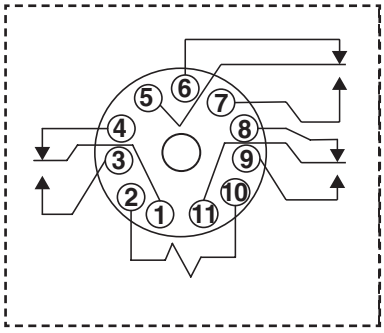
Note: Order socket separately. 750-2C-SKT/750-3C-SKT socket torque 9 lb·in/ 1.0 N·m

Wiring Diagrams

H750-2C-xxx wiring diagram



H750-3C-xxx wiring diagram



Note: Contacts and coil shown are internal to the relay

H750 Series Hermetically Sealed Electromechanical Relay Specifications

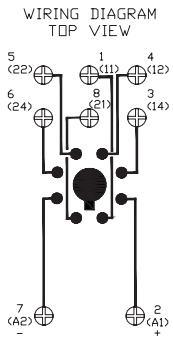
H750 Series Hermetically Sealed Relays Specifications											
Part Numbers	***H750-2C-12D***	***H750-2C-12A***	***H750-2C-24D***	***H750-2C-24A***	***H750-2C-120A***	***H750-2C-240A***	***H750-3C-12D***	***H750-3C-12A***	***H750-3C-24D***	***H750-3C-24A***	***H750-3C-120A***
General Specifications											
Service Life	Mechanical: 10 million operations										
	Electrical: 100,000 operations @ rated resistive load										
Operating Temperature	-40 to 55°C [-40 to 131°F]										
Response Time	20 ms										
Vibration Resistance	3 gn at 35–150 Hz										
Shock Resistance	10 G										
Weight	130g [4.6 oz]										
Environmental Protection	IP67 (Class I, Div. 2; Groups A, B, C, D; T5 (DC) and T4A (AC) Temperature Codes)										
NEMA B300 Pilot Duty Rated	Yes										
****Agency Approvals and Standards***	UL Recognized file E344123, CSA 244610, RoHS										
Coil Specifications											
Coil Input Voltage	12VDC	12VAC 50/60 Hz	24VDC	24VAC 50/60 Hz	120VAC 50/60 Hz	240VAC 50/60 Hz	12VDC	12VAC 50/60 Hz	24VDC	24VAC 50/60 Hz	120VAC 50/60 Hz
Coil Resistance	120Ω	18Ω	470Ω	72Ω	1.7 kΩ	7.2 kΩ	120Ω	18Ω	470Ω	72Ω	1.7 kΩ
Power Consumption	2.75 VA (60Hz) AC, 1.2 W DC										
Dropout Voltage (% of rated voltage)	10% (AC); 15% (DC)										
Pull-in Voltage	85% (AC); 80% (DC)										
Max. Voltage (Max. Continuous Voltage)	110% of the rated coil voltage										
Contact Specifications											
Contact Type	DPDT						3PDT				
Contact Material	Silver alloy										
Minimum Switching Requirement	100mA @ 5VDC										
Contact Rating	Refer to Contact Ratings charts										
Dielectric Strength Between Contacts	Between Coil and Contact: 1600V rms; Between Poles: 1600V rms; Between Open Contacts: 1500V rms										

***Note: UL listed when used with sockets 750-2C-SKT, 750-3C-SKT. Current limited to rating of relay or socket, whichever is less.**

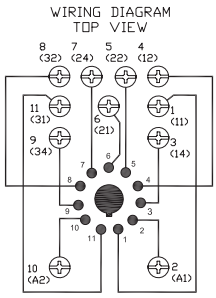
H750 Series Contact Ratings (current)				
	Resistive			***Motor Load***
Voltage	***Nominal***	***UL***	***CSA***	***UL***
28VDC	12A	12A	12A	---
120VAC	12A	12A	12A	1/3Hp
240VAC	12A	12A	12A	1/2Hp

H750 Series Socket Wiring

Wiring Diagrams



750-2C-SKT



750-3C-SKT

H750 Series Socket	
Specification	***Description***
Max Screw Torque	9 lb·in (1.0 N·m)
Max Wire Size	Solid or Stranded Cu: two 12–14 AWG (2.5–4 mm²)

Bus Connector

Accessory		
Part Number	***Description***	***Price***
33-796-1	Coil bus connector used to connect multiple relays in parallel. Package includes 5 pairs of bus bars to connect up to 5 relays together.	$b_9:

Packaged M.O.V.s and Diodes

Overview

Metal Oxide Varistors (MOV) and Diode circuits are offered as convenient plug-in modules. Plugging a module into the relay socket connects the circuit in parallel with the relay coil. No additional wiring is required.

Modules fit within the maximum dimensions of the relay and socket.

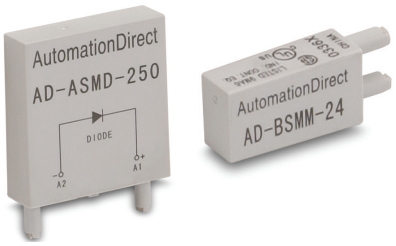
Features

- MOVs protect by shunting potentially damaging electrical spikes away from the relay coil. Ideal for AC and DC applications.
- Diodes protect external drive circuitry from inductive voltages generated when removing coil voltage.
  Ideal for DC applications.
  Polarity sensitive.

Application

Many PLC systems control one or more inductive load devices. These inductive loads (devices with a coil) generate transient voltages when they are de-energized with a relay contact. When a relay contact is closed it "bounces", which causes the coil to energize and de-energize until the "bouncing" stops. The transient voltage which is generated is much larger in amplitude than the supply voltage, especially with a DC supply voltage.

When switching a DC-supplied inductive load the full supply voltage is always present when the relay contact opens (or "bounces"). When switching an AC-supplied inductive load, if the voltage is not zero when the relay contact opens, there is energy stored in the inductor that is released when the voltage to the inductor is suddenly removed. This release of energy is what produces transient voltages.



When inductive load devices (motors, motor starters, interposing relays, solenoids, valves, etc.) are controlled with relay contacts, it is recommended that a surge suppression device be connected directly across the coil of the field device. If the inductive device has plug-type connectors, the suppression device can be installed on the terminal block of the relay output.

Metal oxide varistors (MOV) and diodes are devices which provide good surge and transient suppression of AC and DC powered coils.

Protection Devices

Part Number	Price	QTY	Description	Nominal Input Voltage	Dimensions & Package	Mating Socket
AD-ASMD-250	$0b_a:	5	Protection diode module for 783, 784 and 75 series relays.	6-250VDC	Figure 1	783-3C-SKT 784-4C-SKT-1 750-2C-SKT 750-3C-SKT
AD-ASMM-24	$b_c:	5	MOV module for 783, 784 and 75 series relays that operate at 24VAC coil voltage.	24VAC/VDC		
AD-ASMM-120	$b_b:	5	MOV module for 783, 784 and 75 series relays that operate at 120VAC coil voltage.	120VAC/VDC		
AD-ASMM-240	$b_d:	5	MOV module for 783, 784 and 75 series relays that operate at 240VAC coil voltage.	240VAC/VDC		
AD-BSMD-250	$b_e:	5	Protection diode module for 782 series relays.	6-250VDC	Figure 2	782-2C-SKT
AD-BSMM-24	$;b!0:	5	MOV module for 782 series relays that operate at 24VAC coil voltage.	24VAC/VDC		
AD-BSMM-120	$;b_f:	5	MOV module for 782 series relays that operate at 120VAC coil voltage.	120VAC/VDC		
AD-BSMM-240	$;b!1:	5	MOV module for 782 series relays that operate at 240VAC coil voltage.	240VAC/VDC		

Dimensions

inches [mm]

Figure 1

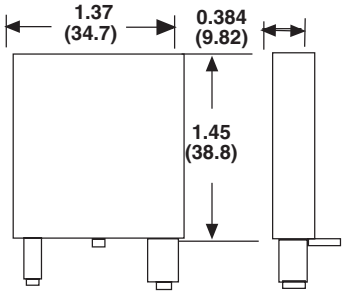
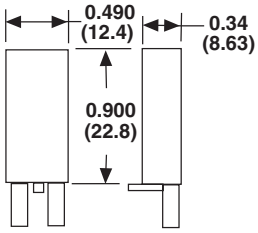


Figure 2



Power Relays

Features

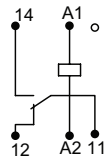
- High power contacts capable of switching up to 40A
- Open construction
- SPDT, DPST and DPDT models
- Riveted construction for high reliability
- Maximum contact voltage up to 600V

AD-PR40-1C-12D

Power Relays					
Part Number	*Price*	*Drawing Links*	*Coil Voltage*	*Configuration*	*Contact Rating*
AD-PR40-1C-12D	$;0b[_:	PDF	12VDC	SPDT	40A
AD-PR40-1C-24D	$;0b[?:	PDF	24VDC		
AD-PR40-1C-24A	$;;0b[!:	PDF	24VAC		
AD-PR40-1C-120A	$;;0b[[:	PDF	120VAC		
AD-PR40-1C-240A	$;0b[#:	PDF	240VAC		
AD-PR40-2A-12D	$0b_0:	PDF	12VDC	DPST	
AD-PR40-2A-24D	$0b_3:	PDF	24VDC		
AD-PR40-2A-24A	$0b_2:	PDF	24VAC		
AD-PR40-2A-120A	$;;0b[,:	PDF	120VAC		
AD-PR40-2A-240A	$0b_1:	PDF	240VAC		
AD-PR40-2C-12D	$0b_5:	PDF	12VDC	DPDT	
AD-PR40-2C-24D	$0b_8:	PDF	24VDC		
AD-PR40-2C-24A	$0b_7:	PDF	24VAC		
AD-PR40-2C-120A	$0b_4:	PDF	120VAC		
AD-PR40-2C-240A	$0b_6:	PDF	240VAC		

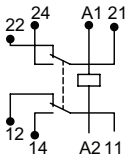
Wiring Diagrams

AD-PR40-1C-xxxx



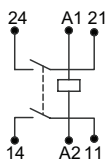
SPDT

AD-PR40-2C-xxxx



DPDT

AD-PR40-2A-xxxx



DPST

Power Relays Specifications

Power Relays Specifications																
Part Numbers	***AD-PR40-1C-12D***	***AD-PR40-1C-24D***	***AD-PR40-1C-24A***	***AD-PR40-1C-120A***	***AD-PR40-1C-240A***	***AD-PR40-2A-12D***	***AD-PR40-2A-24D***	***AD-PR40-2A-24A***	***AD-PR40-2A-120A***	***AD-PR40-2A-240A***	***AD-PR40-2C-12D***	***AD-PR40-2C-24D***	***AD-PR40-2C-24A***	***AD-PR40-2C-120A***	***AD-PR40-2C-240A***
General Specifications																
Service Life	Mechanical: 1 million operations AC and DC															
	Electrical (resistive): 50,000 operations @ 300VAC;100,000 @ 28VDC															
Operating Temperature	-55 to 55°C [-67 to 131°F]															
Response Time	30ms															
Weight	227g [8oz] to 312g [11oz]															
Environmental Protection	Not applicable to open relays															
Pilot Duty	A600															
Terminal Wire	Max 10AWG															
Terminal Torque	11 to 15 in·lb [1.2 to 1.7 N·m]															
Agency Approvals and Standards	UL Recognized E191059, CE Certified (9667186-9811), CSA Certified 244610, RoHS															
Coil Specifications																
Coil Input Voltage	12VDC	24VDC	24VAC 50/60 Hz	120VAC 50/60 Hz	240VAC 50/60 Hz	12VDC	24VDC	24VAC 50/60 Hz	120VAC 50/60 Hz	240VAC 50/60 Hz	12VDC	24VDC	24VAC 50/60 Hz	120VAC 50/60 Hz	240VAC 50/60 Hz
Coil Resistance	70Ω	290Ω	12Ω	290Ω	1.2 kΩ	70Ω	290Ω	12Ω	290Ω	1.2 kΩ	70Ω	290Ω	12Ω	290Ω	1.2 kΩ
Power Consumption	10VA (AC) , 4.0 W DC															
Dropout Voltage (% of rated voltage)	Min. 10%															
Pull-in Voltage	Max. 85% of nominal voltage or less AC, Max. 80% of nominal voltage or less DC															
Max. Voltage (Continuous Voltage)	110% of the rated coil voltage															
Contact Specifications																
Contact Type	SPDT					DPST (N.O.)					DPDT					
Contact Material	Silver Alloy, gold flashed															
Contact Rating	40A, 300 VAC (resistive load) 40A, 28 VDC (resistive load) 5A, 480 VAC (resistive load) 5A, 600 VAC (resistive load) 15A, 120 VAC (tungsten filament) 2hp each pole 120-600 VAC 2hp sw. 2 poles 120-600 VAC															
Minimum Switching Requirement	1A @ 5VAC/VDC															
Maximum Switching Voltage	600V															
Dielectric Strength Between Contacts	Between coil and contact: 2200V ; Between poles: 2200V ; Between open contacts: 1500V															

Dold Force Guided Relays

HC3096N-48-900-24

HC3096N-52-900-24

HC3096N-102-24

OA5611-48-24

HL3096N-102-24

OA5612-18-24

Overview

Force guided relays are constructed such that it is not possible for all contacts to be closed at the same time. Dold force guided relays have at least one N.C. contact set and one N.O. contact set. If a N.O. contact fails when trying to open, the associated N.C. contact cannot close when the power supply is switched off.

Force guided relays offer a cost and space saving alternative to contactors while providing simple contact monitoring via a forcibly guided N.C. contact.

Features

- Large wire cross-section (12-24 AWG) reduces thermal load on wires
- Polarity protection diode
- 35mm DIN rail mounting per IEC/EN 60715
- No mounting restrictions
- Available as plug and socket, or integrated module
- Module version possesses LED for indication
- Available in 4PST and 6PST configurations

Force Guided Relays							
Part Number	*Price*	*Drawing Links*	*Type*	*Coil Voltage*	*Configuration*	*Contact Rating*	*Compatible Relay Socket*
HC3096N-48-900-24	$2bz?:	PDF	Module	24VDC	4PST	5A	NA
HC3096N-52-900-24	$;2bz,:	PDF	Module		4PST		
OA5611-48-24	$;2b]1:	PDF	Relay		4PST		HC3096N-102-24
OA5611-52-24	$;2b]2:	PDF	Relay		4PST		
HL3096N-18-900-24	$;2b]3:	PDF	Module		6PST		NA
HL3096N-50-900-24	$;2b]8:	PDF	Module		6PST		
HL3096N-54-900-24	$;2b]9:	PDF	Module		6PST		
HL3096N-60-900-24	$;2b]a:	PDF	Module		6PST		
OA5612-18-24	$;2b]4:	PDF	Relay		6PST		HL3096N-102-24
OA5612-50-24	$;2b]5:	PDF	Relay		6PST		
OA5612-54-24	$;2b]6:	PDF	Relay		6PST		
OA5612-60-24	$;2b]7:	PDF	Relay		6PST		

Relay Sockets						
Part Number	*Price*	*Drawing Links*	*Type*	*Maximum Screw Torque*	*Maximum Wire Sizes*	*Weight*
HC3096N-102-24	$2dxg:	PDF	Socket	All terminals: 4.4 in·lbs/0.5 N·m	All terminals: 12 to 24 AWG	45g [1.59 oz]
HL3096N-102-24	$;2dxf:	PDF	Socket	All terminals: 4.4 in·lbs/0.5 N·m	All terminals: 12 to 24 AWG	63g [2.22 oz]

Dold Force Guided Relays

Force Guided Relay Specifications for 4PST Relays					
Part Number		HC3096N-48-900-24	HC3096N-52-900-24	OA5611-48-24	OA5611-52-24
General Specifications					
Service Life		Mechanical: 50 million operations Electrical: 200,000 operations @ rated resistive load			
Temperature Rating	**Operating**	-40 to 55°C [-40 to 131°F]			
	Storage	-40 to 70°C [-40 to 158°F]			
Operational Maximum Relative Humidity		93% at 40°C			
Response Time	**Operate**	20ms			
	Release	6ms			
Vibration Resistance		0.35 mm at 10–55 Hz			
Shock Resistance		Category 1, Class B, IEC/EN 61373			
Weight g(oz)		71 [2.5]		33 [1.16]	
NEMA B300 Pilot Duty Rated		Yes			
Agency Approvals and Standards		UL file E146415			
Coil Specifications					
Coil Input Voltage		24VDC			
Coil Resistance		820Ω			
Power Consumption		0.6 W			
Dropout Voltage		1.2 VDC			
Pull-in Voltage		19.8 VDC			
Max. Voltage (Max. Continuous Voltage)		26.4 VDC			
Contact Specifications					
Contacts		3 N.O. / 1 N.C.	2 N.O. / 2 N.C.	3 N.O. / 1 N.C.	2 N.O. / 2 N.C.
Contact Material		AgNi + 0.2µ Au			
Minimum Switching Requirement		10V AC/DC - 10mA			
Contact Rating		Refer to Contact Ratings table below			
Dielectric Strength Between Contacts		4kV			
IP Rating		Housing: IP40 IEC/EN 60 529 Terminals: IP20 IEC/EN 60 529			
Housing Material		Thermoplastic			

Force Guided Relay Contact Ratings (current)			
Contact Type	**Voltage**	**AC15**	**DC13**
N.C.	24VDC	-	4A
N.O.	24VDC	-	4A
N.C.	250 VAC	1A	-
N.O.	250 VAC	2A	-

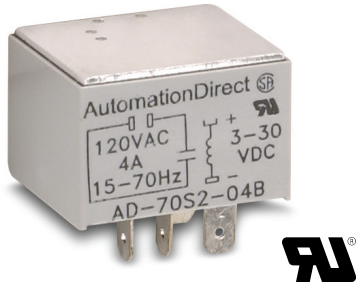
Dold Force Guided Relays

Force Guided Relay Specifications for 6PST Relays									
Part Number		HL3096N-18-900-24	HL3096N-50-900-24	HL3096N-54-900-24	HL3096N-60-900-24	OA5612-18-24	OA5612-50-24	OA5612-54-24	OA5612-60-24
General Specifications									
Service Life		Mechanical: 50 million operations Electrical: 200,000 operations @ rated resistive load							
Temperature Rating	**Operating**	-40 to 55°C [-40 to 131°F]							
	Storage	-40 to 70°C [-40 to 158°F]							
Operational Maximum Relative Humidity		93% at 40°C							
Response Time	**Operate**	20ms							
	Release	6ms							
Vibration Resistance		0.35 mm at 10–55 Hz							
Shock Resistance		Category 1, Class B, IEC/EN 61373							
Weight		90g [3.17 oz]				63g [2.22 oz]			
NEMA B300 Pilot Duty Rated		Yes							
Agency Approvals and Standards		UL file E146415							
Coil Specifications									
Coil Input Voltage		24VDC							
Coil Resistance		650Ω							
Power Consumption		0.8 W	1.0 W	0.8 W	0.8 W	0.8 W	1.0 W	0.8 W	0.8 W
Dropout Voltage		1.2 VDC							
Pull-in Voltage		19.8 VDC							
Max. Voltage (Max. Continuous Voltage)		26.4 VDC							
Contact Specifications									
Contacts		3 N.O. / 3 N.C.	2 N.O. / 4 N.C.	4 N.O. / 2 N.C.	5 N.O. / 1 N.C.	3 N.O. / 3 N.C.	2 N.O. / 4 N.C.	4 N.O. / 2 N.C.	5 N.O. / 1 N.C.
Contact Material		AgNi + 0.2µ Au							
Minimum Switching Requirement		10V AC/DC - 10mA							
Contact Rating		Refer to Contact Ratings table below							
Dielectric Strength Between Contacts		4kV							
IP Rating		Housing: IP40 IEC/EN 60 529 Terminals: IP20 IEC/EN 60 529							
Housing Material		Thermoplastic							

Force Guided Relay Contact Ratings (current)			
Contact Type	**Voltage**	**AC15**	**DC13**
N.C.	24VDC	-	4A
N.O.	24VDC	-	4A
N.C.	250VAC	1A	-
N.O.	250VAC	2A	-

AD Series Solid State Relays

AD-SSR210-22-DCZ



AD-70S2-04B

Overview

A solid state relay is a relay with an isolated input and output, whose functions are achieved by using electronic components without the use of moving parts (vs. electromechanical relays).

Operation

Solid state relays (SSR) are similar to electromechanical relays, in that both use a control circuit and a separate circuit for switching the load. When voltage is applied to the input of the SSR, the relay is energized by a light-emitting diode. The light from the diode is beamed into a light sensitive semiconductor which, in the case of zero voltage crossover relays, signals the control circuit to turn on the output of the solid state switch at the next zero voltage crossover.

Features

Solid state relays have features which electromechanical relays do not, such as:

- Long life
- Shock and vibration resistant
- No generation of RFI, EMI
- No contact bounce
- Arcless switching
- No acoustic noise
- Zero crossing or random switching types
- IC compatibility
- Immunity to humidity, salt spray and dirt
- UL # E222847
- CSA # 2742910

AD-SSR

- AC & DC input
- AC output
- 10 or 25 amp loads
- Photo isolated zero voltage switching
- 4000 Vrms isolation input to output
- Internal RC (snubber) network
- RFI suppression
- Integral safety cover and heatsink
- DIN-rail mounting or panel-mount

AD-70S2

- DC input
- AC output
- Up to 4 amp loads
- Optically isolated
- Quick connect terminal, or panel mount when inserted into DIN-rail mountable socket

AD Series Solid State Relay Selection Guide

Solid State Relays					
Part Number	***Price***	***Drawing Links***	***Description***	***Switching Type***	***Derating Charts***
AD-SSR210-22-ACZ	$0?8q:	PDF	Solid state DIN-rail mount relay with 10A contact rating. Coil voltage 90-280 VAC. Load voltage is 24-280 VAC. Finger-safe design and LED status lamp. SPST normally open.	Zero Cross	Figure 1
AD-SSR210-22-DCZ	Retired	PDF	Solid state DIN-rail mount relay with 10A contact rating. Coil voltage 4-32 VDC. Load voltage is 24-280 VAC. Finger-safe design and LED status lamp. SPST normally open.		
AD-SSR230-22-ACZ	Retired	PDF	Solid state DIN-rail mount relay with 30A contact rating. Coil voltage 90-280 VAC. Load voltage is 24-280 VAC. Finger-safe design and LED status lamp. SPST normally open.		
AD-SSR230-22-DCZ	$0?8u:	PDF	Solid state DIN-rail mount relay with 30A contact rating. Coil voltage 4-32 VDC. Load voltage is 24-280 VAC. Finger-safe design and LED status lamp. SPST normally open.		
AD-SSR610-22-ACZ	Retired	PDF	Solid state DIN-rail mount relay with 10A contact rating. Coil voltage 90-280 VAC. Load voltage is 48-660 VAC. Finger-safe design and LED status lamp. SPST normally open.		
AD-SSR610-22-DCZ	Retired	PDF	Solid state DIN-rail mount relay with 10A contact rating. Coil voltage 4-32 VDC. Load voltage is 48-660 VAC. Finger-safe design and LED status lamp. SPST normally open.		
AD-SSR630-22-ACZ	$;0?8]:	PDF	Solid state DIN-rail mount relay with 30A contact rating. Coil voltage 90-280 VAC. Load voltage is 48-660 VAC. Finger-safe design and LED status lamp. SPST normally open.		
AD-SSR630-22-DCZ	$;0?8[:	PDF	Solid state DIN-rail mount relay with 30A contact rating. Coil voltage 4-32 VDC. Load voltage is 48-660 VAC. Finger-safe design and LED status lamp. SPST normally open.		
AD-SSR210-22-ACR	$;0?8,:	PDF	Solid state DIN-rail mount relay with 10A contact rating. Coil voltage 90-280 VAC. Load voltage is 24-280 VAC. Finger-safe design and LED status lamp. SPST normally open.	Random Switching	
AD-SSR210-22-DCR	Retired	PDF	Solid state DIN-rail mount relay with 10A contact rating. Coil voltage 4-32 VDC. Load voltage is 24-280 VAC. Finger-safe design and LED status lamp. SPST normally open.		
AD-SSR230-22-ACR	$0?91:	PDF	Solid state DIN-rail mount relay with 30A contact rating. Coil voltage 90-280 VAC. Load voltage is 24-280 VAC. Finger-safe design and LED status lamp. SPST normally open.		
AD-SSR230-22-DCR	Retired	PDF	Solid state DIN-rail mount relay with 30A contact rating. Coil voltage 4-32 VDC. Load voltage is 24-280 VAC. Finger-safe design and LED status lamp. SPST normally open.		
AD-SSR610-22-ACR	$0?93:	PDF	Solid state DIN-rail mount relay with 10A contact rating. Coil voltage 90-280 VAC. Load voltage is 48-660 VAC. Finger-safe design and LED status lamp. SPST normally open.		
AD-SSR610-22-DCR	$0?94:	PDF	Solid state DIN-rail mount relay with 10A contact rating. Coil voltage 4-32 VDC. Load voltage is 48-660 VAC. Finger-safe design and LED status lamp. SPST normally open.		
AD-SSR630-22-ACR	$0?95:	PDF	Solid state DIN-rail mount relay with 30A contact rating. Coil voltage 90-280 VAC. Load voltage is 48-660 VAC. Finger-safe design and LED status lamp. SPST normally open.		
AD-SSR630-22-DCR	$0?96:	PDF	Solid state DIN-rail mount relay with 30A contact rating. Coil voltage 4-32 VDC. Load voltage is 48-660 VAC. Finger-safe design and LED status lamp. SPST normally open.		
AD-SSR245-45-ACZ	$0?8v:	PDF	Solid state DIN-rail mount relay with 45A contact rating. Coil voltage 90-140 VAC. Load voltage is 24-280 VAC. Finger-safe design and LED status lamp. SPST normally open.	Zero Cross	
AD-SSR245-45-DCZ	$0?8x:	PDF	Solid state DIN-rail mount relay with 45A contact rating. Coil voltage 3-32 VDC. Load voltage is 24-280 VAC. Finger-safe design and LED status lamp. SPST normally open.		
AD-SSR645-45-ACZ	Retired	PDF	Solid state DIN-rail mount relay with 45A contact rating. Coil voltage 90-140 VAC. Load voltage is 48-660 VAC. Finger-safe design and LED status lamp. SPST normally open.		
AD-SSR645-45-DCZ	$0?8#:	PDF	Solid state DIN-rail mount relay with 45A contact rating. Coil voltage 3-32 VDC. Load voltage is 48-660 VAC. Finger-safe design and LED status lamp. SPST normally open.		
AD-SSR665-45-ACZ	$;0?8!:	PDF	Solid state DIN-rail mount relay with 65A contact rating. Coil voltage 90-140 VAC. Load voltage is 48-660 VAC. Finger-safe design and LED status lamp. SPST normally open.		
AD-SSR665-45-DCZ	$0?8?:	PDF	Solid state DIN-rail mount relay with 65A contact rating. Coil voltage 3-32 VDC. Load voltage is 48-660 VAC. Finger-safe design and LED status lamp. SPST normally open.		
AD-70S2-04B*	Retired	NA	Solid state plug-in relay with 4A contact rating. Coil voltage is 3-30 VDC. Load voltage is 24-140 VAC. SPST normally open.		Figure 2
AD-70S2-04C*	Retired	NA	Solid state plug-in relay with 4A contact rating. Coil voltage is 3-30 VDC. Load voltage is 24-280 VAC. SPST normally open.		
AD-70S2-04D*	$;0b[3:	NA	Solid state plug-in relay with 4A contact rating. Coil voltage is 3-30 VDC. Load voltage is 8-50 VAC. SPST normally open.		

***NOTE: See 78 Series Relays Socket dimensions.**

AD Series Solid State Relay Specifications

Specifications

Part Number	AD-SSR245-45-DCZ	AD-SSR210-22-DCZ	AD-SSR230-22-DCZ	AD-SSR210-22-DCR	AD-SSR230-22-DCR	AD-SSR610-22-DCZ	AD-SSR630-22-DCZ	AD-SSR645-45-DCZ	AD-SSR665-45-DCZ	AD-SSR610-22-DCR	AD-SSR630-22-DCR	AD-SSR210-22-ACZ	AD-SSR230-22-ACZ	AD-SSR210-22-ACR	AD-SSR230-22-ACR	AD-SSR610-22-ACZ	AD-SSR630-22-ACZ	AD-SSR645-45-ACZ	AD-SSR610-22-ACR	AD-SSR630-22-ACR	AD-SSR245-45-ACZ	AD-SSR665-45-ACZ
Input Characteristics																						
Control Voltage Range	3-32 VDC	4-32 VDC										90-280 VAC						90-140 VAC	90-280 VAC		90-140 VAC	
Typical Input Current	8-12 mA											2-4 mA										
Max. Turn-On Voltage	4VDC											90 Vrms										
Min. Turn-Off Voltage	1VDC											10 Vrms										
Output Characteristics																						
Output Type	SCR																					
Switching Type	Zero Cross		Random Switching		Zero Cross			Random Switching			Zero Cross		Random Switching		Zero Cross			Random Switching			Zero Cross	
Output Voltage	24-280 VAC				48-660 VAC							24-280 VAC			48-660 VAC						24-280 VAC	48-660 VAC
Load Current Range	10-45A						65A					10-45A										65A
Transient Over-Voltage	600Vpk				1200Vpk							600Vpk			1200Vpk						600Vpk	1200Vpk
Max. Surge Current	10A: 120Apk; 30/45A: 625Apk; (at 16.6 ms)				625Apk (at 16.6 ms)							10A: 120Apk; 30/45A: 625Apk; (at 16.6 ms)			625Apk (at 16.6 ms)						10A: 120Apk; 30/45A: 625Apk; (at 16.6 ms)	625Apk (at 16.6 ms)
Max. On-State Voltage Drop at Rated Current	1.6 Vpk																					
Max. I^2T for Fusing (8.3 ms)	10A: 60 A2sec; 20A: 260 A2sec; 30/45A: 1620 A2sec				1620 A2sec							10A: 60 A2sec; 20A: 260 A2sec; 30/45A: 1620 A2sec			1620 A2sec						10A: 60 A2sec; 20A: 260 A2sec; 30/45A: 1620 A2sec	1620 A2sec
Max. Off-State Leakage Current at Rated Current	10mA				1mA							10mA			1mA						10mA	1mA
Max. Rate of Rise Off State Voltage (dv/dt)	500 V/us																					
Max Response Time (On and Off)	1/2 cycle																					
General Characteristics																						
Electrical Life	N/A for solid state relays																					
Operating Temperature Range	-40 to 80°C [-40 to 176°F] - derating applies																					
Storage Temperature Range	-40 to 125°C [-40 to 257°F]																					
Frequency	Input: no frequency limitation / output: snubber 48-63 Hz																					
Weight	10/20/30 A: 272g [9.6 oz]; 45A: 482g [17oz]																					
Input Indication	Green LED																					
Encapsulation	Thermally conductive epoxy																					
Input Terminal Screw Torque	10/20/30 A: 5.0-6.0 in·lb [0.6-0.7 N·m]; 45A: 5.0-6.0 in·lb [0.6-0.7 N·m]																					
Output Terminal Screw Torque	10/20/30 A: 5.0-6.0 in·lb [0.6-0.7 N·m]; 45A: 10.0-15.0 in·lb [1.1-1.7 N·m]																					
Mount Type	35mm DIN rail and panel mount																					
Max. Wire Size	8AWG																					
Agency Approvals *	E222847 UL Recognized, CE, CSA 2742910																					

*** To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

AD Series Solid State Relay Specifications

Specifications			
Part Number	***AD-70S2-04B***	***AD-70S2-04C***	***AD-70S2-04D***
Input Characteristics			
Input Voltage Range	3 - 30 VDC		
Must Release Voltage	5VDC		
Typical Input Current	1 - 17 mA	1 - 6 mA	1 - 17 mA
Maximum Reverse Control Voltage	5VDC		
Output Characteristics			
Contact Rating	4A		
Contact Configuration	SPST-N.O.		
Output Voltage Range	24 - 140 VAC	24 - 280 VAC	8 - 50 VAC
Switching Type	Zero Cross		
Switching Device	Triac		
Maximum Rate of Rise Off State Voltage (dv/dt)	300 V/us		
Min. Load Current to Maintain On	75mA		
Non-Repetitive Surge Current (1 cycle)	60A		
Max. Off Sate Leakage Current (rms)	6mA	6mA	10mA
Minimum Peak Blocking Voltage	400VAC	600VAC	200VAC
Typical On State Voltage Drop (rms)	1.6 VAC		
General Characteristics			
Mounting Type	Socket Mount		
Thermal Resistance (Junction to Case)	4 °C/W		
Dielectric Strength, Terminals to Chassis	3000 VAC		
Ambient Air Temperature - Storage	-40 to +125 °C		
Ambient Air Temperature - Operation	-40 to +100 °C		
Agency Approvals	UL (E258297), CSA (040787), RoHs		

Wiring Diagrams

Figure 1
AD-SSRxxx-xx wiring diagram

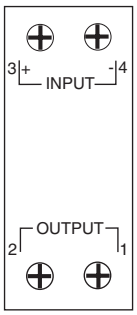
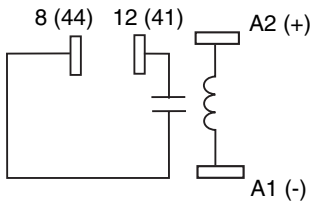


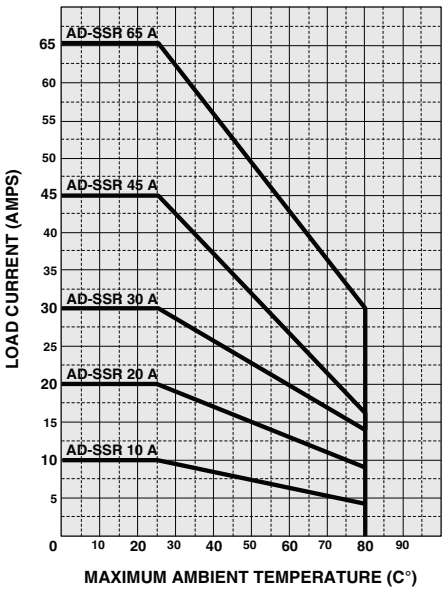
Figure 2
AD-70S2-xx wiring diagram



SSR Series Derating Charts

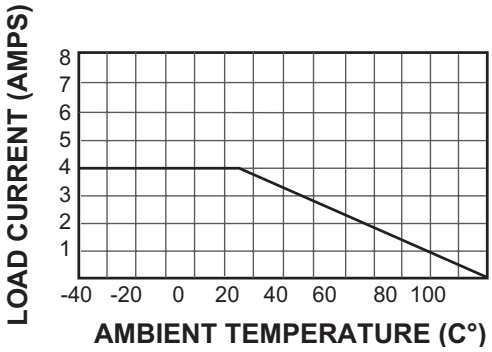
Derating Charts

AD-SSR Series derating chart



AD-70S2 Series derating charts

Maximum Continuous Current vs. Ambient Temperature



AD Series Class 6 Solid State Relays

Overview

The Class 6 solid state relays offer an energy-efficient alternative to standard electromechanical relays.

Switching types include DC switching for low-voltage DC loads and Zero Cross for resistive AC loads where the output energizes/de-energizes when control voltage is near zero.

Switching devices include: MOSFET for DC loads, Triac and SCR for AC loads.

Features

- Finger-safe "Hockey Puck" housing
- Solid-state circuitry
- High load ratings up to 75 amps
- Input indicating LED
- Optically coupled circuits
- Panel mount
- Thermal pad included with each relay

AD-SSR610-AC-280A

Class 6 Solid State Relays							
Part Number	***Price***	***Drawing Links***	***Type***	***Input Voltage***	***Load Voltage***	***Configuration***	***Contact Rating***
AD-SSR610-AC-280A	Retired	PDF	N.O. SCR	90 to 280 VAC	24 to 280 VAC	SPST	10A
AD-SSR610-DC-280A	Retired	PDF	N.O. SCR	3 to 32 VDC			
AD-SSR6T10-DC-280A	Retired	PDF	N.O. TRIAC	3 to 32 VDC			
AD-SSR625-AC-280A	Retired	PDF	N.O. SCR	90 to 280 VAC			25A
AD-SSR625-DC-280A	Retired	PDF	N.O. SCR	3 to 32 VDC			
AD-SSR6T25-DC-280A	Retired	PDF	N.O. TRIAC	3 to 32 VDC			
AD-SSR640-AC-280A	Retired	PDF	N.O. SCR	90 to 280 VAC			40A
AD-SSR640-DC-280A	Retired	PDF	N.O. SCR	3 to 32 VDC			
AD-SSR6T40-DC-280A	Retired	PDF	N.O. TRIAC	3 to 32 VDC			
AD-SSR650-AC-280A	$;0b]u:	PDF	N.O. SCR	90 to 280 VAC			50A
AD-SSR650-DC-280A	$;0b]v:	PDF	N.O. SCR	3 to 32 VDC			
AD-SSR675-AC-280A	$;0b]x:	PDF	N.O. SCR	90 to 280 VAC			75A
AD-SSR675-DC-280A	$;0b]y:	PDF	N.O. SCR	3 to 32 VDC			
AD-SSR6M12-DC-200D	Retired	PDF	N.O. MOSFET	3.5 to 32 VDC	3 to 200 VDC		12A
AD-SSR6M25-DC-200D	Retired	PDF	N.O. MOSFET	3.5 to 32 VDC			25A
AD-SSR6M40-DC-200D	Retired	PDF	N.O. MOSFET	3.5 to 32 VDC			40A
AD-SSR610-AC-480A	Retired	PDF	N.O. SCR	90 to 280 VAC	48 to 480 VAC		10A
AD-SSR610-DC-480A	Retired	PDF	N.O. SCR	3 to 32 VDC			
AD-SSR6T10-DC-480A	Retired	PDF	N.O. TRIAC	3 to 32 VDC			
AD-SSR625-AC-480A	$;-0b]l:	PDF	N.O. SCR	90 to 280 VAC			25A
AD-SSR625-DC-480A	$;0b]o:	PDF	N.O. SCR	3 to 32 VDC			
AD-SSR6T25-DC-480A	Retired	PDF	N.O. TRIAC	3 to 32 VDC			
AD-SSR640-AC-480A	Retired	PDF	N.O. SCR	90 to 280 VAC			40A
AD-SSR640-DC-480A	Retired	PDF	N.O. SCR	3 to 32 VDC			
AD-SSR6T40-DC-480A	Retired	PDF	N.O. TRIAC	3 to 32 VDC			

Note: Thermal pad included with each relay.

AD Series Class 6 Solid State Relays

Specifications						
Part Number	***AD-SSR610-AC-280A***	***AD-SSR610-DC-280A***	***AD-SSR6T10-DC-280A***	***AD-SSR625-AC-280A***	***AD-SSR625-DC-280A***	***AD-SSR6T25-DC-280A***
Input Characteristics						
Control Voltage Range	90 to 280 VAC	3 to 32 VDC		90 to 280 VAC	3 to 32 VDC	
Typical Input Current	20mA @240VAC 11mA @120VAC	16mA	2mA	20mA @240VAC 11mA @120VAC	16mA	2mA
Must Release Voltage	10VAC	1VDC		10VAC	1VDC	
Reverse Polarity Protection	–	yes	yes	–	yes	yes
Switching Type	Zero Cross					
Power Indicator	Green LED status lamp					
Output Characteristics						
Load Voltage Range	24 to 280 VAC					
Rated Load Current	10A			25A		
Maximum Off-State Voltage dv/dt	200V/µs	200V/µs	250V/µs	500V/µs	500V/µs	250V/µs
Minimum Load Current	50mA	50mA	50mA	120mA	120mA	120mA
Maximum Non-Repetitive Surge Current (1 Cycle, 16.6 ms), peak	83A	83A	100A	250A		
Maximum Off State Leakage current (RMS)	8mA	10mA	10mA	8mA	10mA	10mA
Maximum On-State Voltage Drop (RMS)	1.6 V rms					
Maximum I2T for Fusing (A2Sec)	72	83	52	312	250	300
Operating Frequency Range	50 to 60 Hz					
Maximum Turn-On Time	1/2 cycle					
Maximum Turn-Off Time	1/2 cycle					
General Characteristics						
Dielectric Strength (Input-to-Output Isolation)	4000VAC (rms)					
Thermal Resistance (Junction to Base)	3.5°C/W (6.3°F/W)		2.1°C/W (3.78°F/W)	1.02°C/W (1.836°F/W)		1.45°C/W (2.61°F/W)
Minimum Insulation Resistance @ 500 VDC	1^{E} + 10Ω					
Operating Temperature Range	-40 to 80°C [-40 to 176°F] derating applies					
Storage Temperature Range	-40 to 125°C [-40 to 257°F]					
Weight	100g [3.53 oz]					
Terminal Screw Size	Input: M3.5 Output: M4					
Terminal Torque	Input terminals: 10 lb·in Output terminals: 20 lb·in					
Terminal Wire Capacity	Inputs up to 12AWG / Outputs up to 10AWG. For anything larger, fork or ring terminals are recommended.					
Agency Approvals	UL file # E222847 CE, CSA, RoHS					

AD Series Class 6 Solid State Relays

Specifications

Part Number	AD-SSR640-AC-280A	AD-SSR640-DC-280A	AD-SSR6T40-DC-280A	AD-SSR650-AC-280A	AD-SSR650-DC-280A	AD-SSR675-AC-280A	AD-SSR675-DC-280A
Input Characteristics							
Control Voltage Range	90 to 280 VAC	3 to 32 VDC		90 to 280 VAC	3 to 32 VDC	90 to 280 VAC	3 to 32 VDC
Typical Input Current	20mA @240VAC 11mA @120VAC	16mA	2mA	4mA @240VAC 2mA @120VAC	10mA	4mA @240VAC 2mA @120VAC	10mA
Must Release Voltage	10VAC	1VDC		10VAC	1VDC	10VAC	1VDC
Reverse Polarity Protection	–	yes	yes	–	yes	–	yes
Switching Type	Zero Cross						
Power Indicator	Green LED status lamp						
Output Characteristics							
Load Voltage Range	24 to 280 VAC						
Rated Load Current	40A			50A		75A	
Maximum Off-State Voltage dv/dt	500V/µs	500V/µs	250V/µs	500V/µs	500V/µs	500V/µs	500V/µs
Minimum Load Current	250mA	250mA	50mA	40mA	150mA	40mA	250mA
Maximum Non-Repetitive Surge Current (1 Cycle, 16.6 ms), peak	625A	625A	250A	625A	625A	1000A	1000A
Maximum Off State Leakage current (RMS)	10mA	10mA	10mA	10mA	1mA	10mA	1mA
Maximum On-State Voltage Drop (RMS)	1.6 V rms						
Maximum I2T for Fusing (A2Sec)	1250	625	488	1620	1620	4150	4150
Operating Frequency Range	50 to 60 Hz						
Maximum Turn-On Time	1/2 cycle			10ms	1/2 cycle	10ms	1/2 cycle
Maximum Turn-Off Time	1/2 cycle			40ms	1/2 cycle	40ms	1/2 cycle
General Characteristics							
Dielectric Strength (Input-to-Output Isolation)	4000VAC (rms)						
Thermal Resistance (Junction to Base)	0.9°C/W (1.62°F/W)		0.95°C/W (1.71°F/W)	0.63°C/W (1.134°F/W)			0.31°C/W (0.558°F)
Minimum Insulation Resistance @ 500 VDC	1^E + 10Ω			1^E + 9Ω			
Operating Temperature Range	-40 to 80°C [-40 to 176°F] derating applies						
Storage Temperature Range	-40 to 125°C [-40 to 257°F]						
Weight	100g [3.53 oz]						
Terminal Screw Size	Input: M3.5 Output: M4						
Terminal Torque	Input terminals: 10 lb·in Output terminals: 20 lb·in						
Terminal Wire Capacity	Inputs up to 12AWG / Outputs up to 10AWG. For anything larger, fork or ring terminals are recommended.						
Agency Approvals	UL file # E222847 CE, CSA, RoHS						

AD Series Class 6 Solid State Relays

Specifications						
Part Number	***AD-SSR6M12-DC-200D***	***AD-SSR6M25-DC-200D***	***AD-SSR6M40-DC-200D***	***AD-SSR610-AC-480A***	***AD-SSR610-DC-480A***	***AD-SSR6T10-DC-480A***
Input Characteristics						
Control Voltage Range	3.5 to 32 VDC			90 to 280 VAC	3 to 32 VDC	
Typical Input Current	10mA			20mA @240VAC 11mA @120VAC	16mA	
Must Release Voltage	1VDC			10VAC	1VDC	
Reverse Polarity Protection	no			–	no	
Switching Type	DC			Zero Cross		
Power Indicator	Green LED status lamp					
Output Characteristics						
Load Voltage Range	3 to 200 VDC			48 to 480 VAC		
Rated Load Current	12A	25A	40A	10A		
Maximum Off-State Voltage dv/dt	–			200V/µs		
Minimum Load Current	20mA			50mA	150mA	50mA
Maximum Non-Repetitive Surge Current (1 Cycle, 16.6 ms), peak	27A	50A	90A	83A	83A	100A
Maximum Off State Leakage current (RMS)	8mA			10mA	8mA	8mA
Typical On-State Voltage Drop (RMS)	2.8 VDC (@ 40A load)			1.7 V rms	1.6 V rms	1.6 V rms
Maximum I2T for Fusing (A2Sec)	–			72	72	35
Operating Frequency Range	–			50 to 60 Hz		
Maximum Turn-On Time	300µs	600µs	600µs	1/2 cycle	8.3 ms	1/2 cycle
Maximum Turn-Off Time	1ms			1/2 cycle	8.3 ms	1/2 cycle
General Characteristics						
Dielectric Strength (Input-to-Output Isolation)	2500VAC (rms)			4000VAC (rms)		
Thermal Resistance (Junction to Base)	1.03°C/W (1.854°F/W)	1.06°C/W (1.908°F/W)		3°C/W (5.4°F/W)		2.9°C/W (5.22°F/W)
Minimum Insulation Resistance @ 500 VDC	1^E + 10Ω					
Operating Temperature Range	-40 to 80°C [-40 to 176°F] (derating applies)					
Storage Temperature Range	-40 to 100°C [-40 to 212°F]			-40 to 100°C [-40 to 212°F]		
Weight	110g [3.88 oz]	135g [4.76 oz]	135g [4.76 oz]	100g [3.53 oz]		
Terminal Screw Size	Input: M3.5 Output: M4					
Terminal Torque	Input terminals: 10 lb·in. Output terminals: 20 lb·in					
Terminal Wire Capacity	Inputs up to 12AWG / Outputs up to 10AWG. For anything larger, fork or ring terminals are recommended.					
Agency Approvals	UL file # E222847, CE, CSA, RoHS					

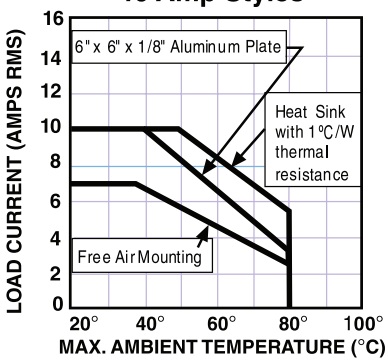
AD Series Class 6 Solid State Relays

Specifications						
Part Number	***AD-SSR625-AC-480A***	***AD-SSR625-DC-480A***	***AD-SSR6T25-DC-480A***	***AD-SSR640-AC-480A***	***AD-SSR640-DC-480A***	***AD-SSR6T40-DC-480A***
Input Characteristics						
Control Voltage Range	90 to 280 VAC	3 to 32 VDC		90 to 280 VAC	3 to 32 VDC	
Typical Input Current	20mA @240VAC 11mA @120VAC	16mA		20mA @240VAC 11mA @120VAC	16mA	
Must Release Voltage	10VAC	1VDC		10VAC	1VDC	
Reverse Polarity Protection	–	no		–	no	
Switching Type	Zero Cross					
Power Indicator	Green LED status lamp					
Output Characteristics						
Load Voltage Range	48 to 480 VAC					
Rated Load Current	25A			40A		
Maximum Off-State Voltage dv/dt	300V/µs	500V/µs	250V/µs	500V/µs	500V/µs	250V/µs
Minimum Load Current	120mA	120mA	20mA	250mA	250mA	250mA
Maximum Non-Repetitive Surge Current (1 Cycle, 16.6 ms), peak	250A	250A	250A	625A	625A	300A
Maximum Off State Leakage current (RMS)	10mA	8mA	8mA	10mA	8mA	8mA
Typical On-State Voltage Drop (RMS)	1.7 V rms	1.6 V rms	1.6 V rms	1.7 V rms	1.6 V rms	1.6 V rms
Maximum I2T for Fusing (A2Sec)	312	312	200	1250	1250	250
Operating Frequency Range	50/60 Hz					
Maximum Turn-On Time	8.3 ms	1/2 cycle	1/2 cycle	1/2 cycle	1/2 cycle	1/2 cycle
Maximum Turn-Off Time	8.3 ms	1/2 cycle	1/2 cycle	1/2 cycle	1/2 cycle	1/2 cycle
General Characteristics						
Dielectric Strength (Input-to-Output Isolation)	4000VAC (rms)					
Thermal Resistance (Junction to Base)	1.02°C/W (1.836°F/W)		1.2°C/W (2.16°F/W)	0.9°C/W (1.62°F/W)		0.95°C/W (1.71°F/W)
Minimum Insulation Resistance @ 500 VDC	1^E + 10Ω					
Operating Temperature Range	-40 to 80°C [-40 to 176°F] (derating applies)					
Storage Temperature Range	-40 to 100°C [-40 to 212°F]					
Weight	100g [3.53 oz]					
Terminal Screw Size	Input: M3.5 Output: M4					
Terminal Torque	Input terminals: 10 lb·in. Output terminals: 20 lb·in					
Terminal Wire Capacity	Inputs up to 12AWG / Outputs up to 10AWG. For anything larger, fork or ring terminals are recommended.					
Agency Approvals	UL file # E222847, CE, CSA, RoHS					

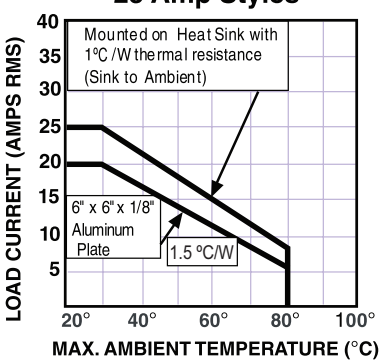
AD Series Class 6 Solid State Relays Derating Charts

Derating Charts

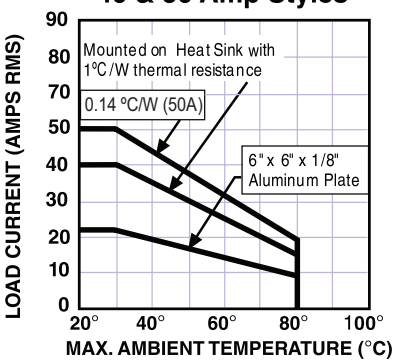
10 Amp Styles



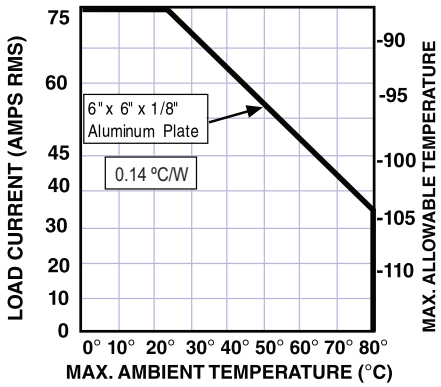
25 Amp Styles



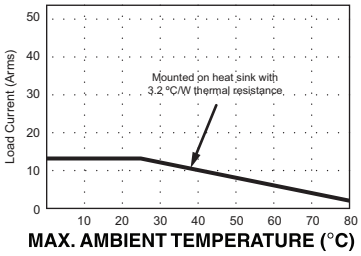
40 & 50 Amp Styles



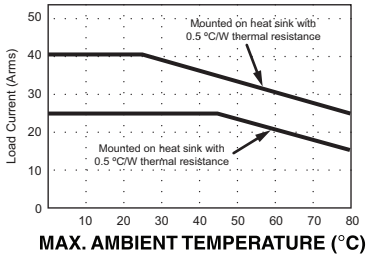
75 Amp Styles



12 A MOSFET



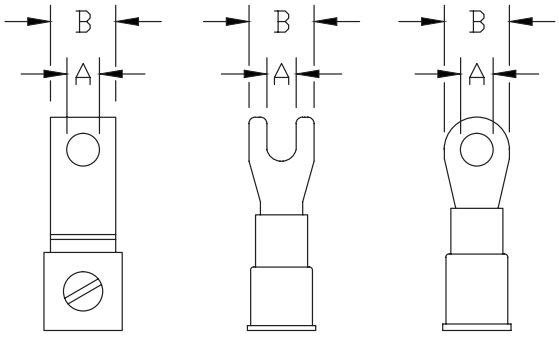
25/40 A MOSFET



Note: Charts are based on using a thermal transfer medium such as the included thermal pad

AD Series Class 6 Solid State Relays Accessory

Accessory for SSR6 Solid State Relay			
Part Number	***Price***	***Description***	***Drawing Link***
AD-SSR-THERM-PAD	Retired	AutomationDirect thermal mounting pad, package of 10. For use with solid state relays starting with AD-SSR6.	PDF



FORK/SPADE SIZES			
RELAY TERMINAL	A		B
	MIN.	MAX.	MAX.
INPUT SIDE	3.5 [0.14]	5.0 [0.20]	10.0 [0.39]
OUTPUT SIDE	4.2 [0.16]	6.4 [0.25]	10.0 [0.39]

AD Series Class 8 Solid State Relays

AD-SSR810-AC-28Z

Overview

The Class 8 solid state relays offer energy efficient current switching in a slim housing ideal for space-saving applications.

Switching types include Zero Cross for resistive AC loads where the output energizes/de-energizes when control voltage nears zero, and Random for AC loads where the output switches instantaneously with the actual voltage.

All Class 8 solid state relays use an SCR, which is suited for AC load applications, as the switching device .

Features

- Internal heat sink
- Finger-safe terminals
- DIN and panel mounting
- Optically coupled circuit

Class 8 Solid State Relays							
Part Number	***Price***	***Drawing Links***	***Configuration***	***Input Voltage***	***Load Voltage***	***Switching Device***	***Contact Rating***
AD-SSR810-AC-28Z	Retired	PDF	SPST-N.O.	90 to 280 VAC	24 to 280 VAC	SCR	10A
AD-SSR810-AC-28R	$;0b[d:	PDF					
AD-SSR810-DC-28Z	Retired	PDF		3 to 32 VDC			
AD-SSR810-DC-28R	Retired	PDF					
AD-SSR810-DC-28RN	Retired	PDF	SPST-N.C.	3 to 32 VDC			
AD-SSR810-AC-48Z	Retired	PDF	SPST-N.O.	90 to 280 VAC	48 to 480 VAC		
AD-SSR810-AC-48R	Retired	PDF					
AD-SSR810-DC-48Z	Retired	PDF		3 to 32 VDC			
AD-SSR810-DC-48R	Retired	PDF					
AD-SSR810-AC-60Z	Retired	PDF		90 to 280 VAC	48 to 600 VAC		
AD-SSR810-AC-60R	Retired	PDF					
AD-SSR810-DC-60Z	Retired	PDF		3 to 32 VDC			
AD-SSR810-DC-60R	Retired	PDF					

AD Series Class 8 Solid State Relays

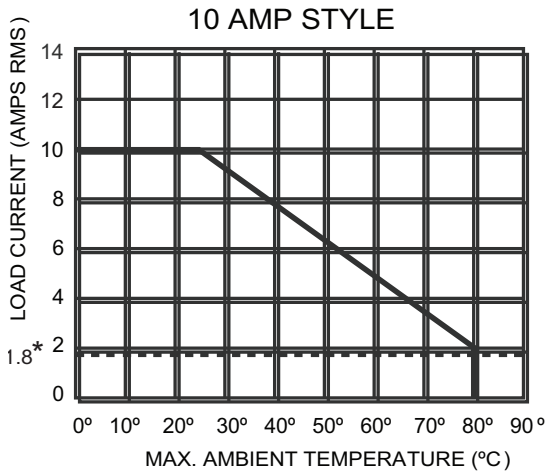
Specifications

Part Number	AD-SSR810-AC-28Z	AD-SSR810-AC-28R	AD-SSR810-DC-28Z	AD-SSR810-DC-28R	AD-SSR810-DC-28RN	AD-SSR810-AC-48Z	AD-SSR810-AC-48R	AD-SSR810-DC-48Z	AD-SSR810-DC-48R	AD-SSR810-AC-60Z	AD-SSR810-AC-60R	AD-SSR810-DC-60Z	AD-SSR810-DC-60R
Input Characteristics													
Control Voltage Range	90 to 280 VAC		3 to 32 VDC			90 to 280 VAC		3 to 32 VDC		90 to 280 VAC		3 to 32 VDC	
Typical Input Current	12mA		16mA		12mA	12mA		16mA		12mA		16mA	
Must Release Voltage	10VAC		1VDC			10VAC		1VDC		10VAC		1VDC	
Reverse Polarity Protection	–		Yes			–		Yes		–		Yes	
Switching Type	Zero Cross	Random	Zero Cross	Random	Random	Zero Cross	Random	Zero Cross	Random	Zero Cross	Random	Zero Cross	Random
Input Indicator	Green LED status lamp												
Output Characteristics													
Load Voltage Range	24 to 280 VAC					48 to 480 VAC				48 to 600 VAC			
Rated Load Current	10A												
Maximum Off-State Voltage dv/dt	500V/µs				200V/µs	350V/µs				200V/µs			
Minimum Load Current	50mA												
Non-Repetitive Surge Current (1 Cycle)	500A												
Maximum Off State Leakage current (RMS)	10mA												
Typical On-State Voltage Drop (RMS)	1.25 VAC												
Maximum I2T for Fusing (A2Sec)	1250					850				600			
RMS Overload Current/Sec	24A												
Contact Configuration	SPST N.O.				SPST N.C.	SPST N.O.							
Maximum Turn-On Time	8.3 ms												
Maximum Turn-Off Time	8.3 ms												
General Characteristics													
Dielectric Strength (Terminal to Chassis)	2500VAC												
Thermal Resistance (Junction to Case)	0.66°C/W (33.19°F/W)												
Internal Heat Sink	4°C/W (39.2°F/W)												
Operating Temperature Range	-30 to 80°C [-22 to 176°F]												
Storage Temperature Range	-40 to 100°C [-40 to 212°F]												
Weight - g (oz)	127 [4.1]												
Terminal Torque	7.1 lb·in [0.8 N·m] max												
Terminal Wire Capacity	14AWG [2.5 mm²] max												
Environmental Protection	IP20												
Agency Approvals	UL file # E222847, CE, CSA, RoHS												

AD Series Class 8 Solid State Relays Wiring Diagram and Derating Chart

Wiring Diagram

Derating Chart



* Indicates current cut-off.

Note: A minimum spacing of 17.5 mm (0.7 in) between adjacent AD Series Class 8 relays is required in order to achieve the maximum ratings. A 0mm spacing will result in a 50% reduction in the derating.

AD Series Class 8 Solid State Relays for Hazardous Locations

Overview

The Class 8 Hazardous Location series is similar to the Class 8 series with the added feature of being approved for hazardous locations (Class 1, Div. 2, Groups A, B, C, D).

Switching types include DC switching for DC loads and Zero Cross for resistive AC loads where the output energizes/de-energizes when the control voltage nears zero.

Switching devices include MOSFET for DC loads and SCR for AC loads.

Features

- For use in hazardous locations (Class I, Div 2, Groups A, B, C, D)
- Internal Heat Sink
- Finger-safe terminals
- DIN and panel mounting
- Optically coupled circuit

AD-HSSR808-DC-15

Class 8 Hermetically-sealed Solid State Relays							
Part Number	***Price***	***Drawing Links***	***Switching Device***	***Input Voltage***	***Load Voltage***	***Configuration***	***Contact Rating***
AD-HSSR815-DC-05	Retired	PDF	MOSFET	3.5 to 32 VDC	3 to 50 VDC	SPST N.O.	15A
AD-HSSR808-DC-15	Retired	PDF			3 to 150 VDC		8A
AD-HSSR810-AC-28	Retired	PDF	SCR	90 to 280 VAC	24 to 280 VAC		10A
AD-HSSR810-DC-28	Retired	PDF		3 to 32 VDC			
AD-HSSR810-AC-48	Retired	PDF		90 to 280 VAC	48 to 480 VAC		
AD-HSSR810-DC-48	Retired	PDF		3 to 32 VDC			
AD-HSSR810-AC-60	Retired	PDF		90 to 280 VAC	48 to 600 VAC		
AD-HSSR810-DC-60	Retired	PDF		3 to 32 VDC			

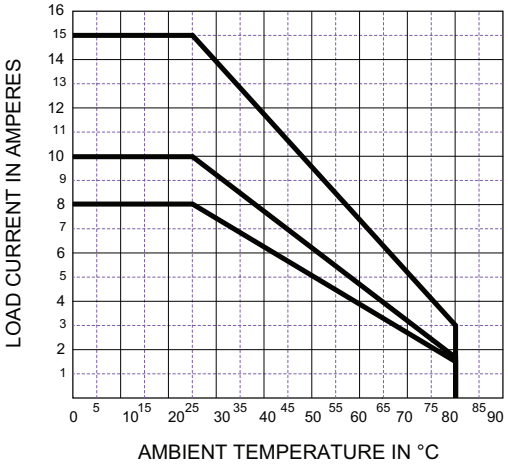
AD Series Class 8 Solid State Relays for Hazardous Locations

Specifications								
Part Number	***AD-HSSR815-DC-05***	***AD-HSSR808-DC-15***	***AD-HSSR810-AC-28***	***AD-HSSR810-DC-28***	***AD-HSSR810-AC-48***	***AD-HSSR810-DC-48***	***AD-HSSR810-AC-60***	***AD-HSSR810-DC-60***
Input Characteristics								
Control Voltage Range	3.5 to 32 VDC		90 to 280 VAC	3 to 32 VDC	90 to 280 VAC	3 to 32 VDC	90 to 280 VAC	3 to 32 VDC
Typical Input Current	12mA		12mA	16mA	12mA	16mA	12mA	16mA
Must Release Voltage	1VDC		10VAC	1VDC	10VAC	1VDC	10VAC	1VDC
Reverse Polarity Protection	Yes		—	Yes	—	Yes	—	Yes
Nominal Input Impedance	Current Limiter		16 to 25 kΩ	Current Limiter	16 to 25 kΩ	Current Limiter	16 to 25 kΩ	Current Limiter
Switching Type	DC		Zero Cross					
Input Indicator	Green LED status lamp							
Output Characteristics								
Load Voltage Range	3 to 50 VDC	3 to 150 VDC	24 to 280 VAC		48 to 480 VAC		48 to 600 VAC	
Rated Load Current	15A	8A	10A					
Maximum Off-State Voltage dv/dt	–	–	500 V/µs		350 V/µs		500 V/µs	
Minimum Load Current	20mA		50mA					
Non-Repetitive Surge Current (1 Cycle)	50A	35A	500A					
Maximum Off State Leakage current (RMS)	0.25 mA		10mA					
Typical On-State Voltage Drop (RMS)	N/A		1.25 VAC					
Maximum I2T for Fusing (A2Sec)	–	–	1250		850		600	
RMS Overload Current/Sec	24A	17A	24A					
Maximum Turn-On Time	5ms		8.3 ms					
Maximum Turn-Off Time	5ms		8.3 ms					
General Characteristics								
Dielectric Strength Terminals to Chassis	2500 V rms							
Thermal Resistance Junction to Case	1.4°C/W (34.52°F/W)	0.5°C/W (32.9°F/W)	0.66°C/W (33.19°F/W)					
Internal Heat Sink	4.0°C/W (39.2°F/W)							
Operating Temperature Range	-30 to 80°C [-22 to 176°F] (derating applies)							
Storage Temperature Range	-40 to 100°C [-40 to 212°F]							
Weight - g (oz)	127.1 [4.1]							
Terminal Torque	7.1 in·lb [0.8 N·m] max							
Terminal Wire Capacity	14AWG [2.5mm²] max							
Environmental Protections	IP20 (Class I, Div. 2 Groups A, B, C, D)							
Agency Approvals and Standards	UL file # E344125, CE, RoHS							

AD Series Class 8 Solid State Relays for Hazardous Locations Wiring Diagram and Derating Chart

Wiring Diagram

Derating Chart



Note: A minimum spacing of 17.5 mm (0.7 in) between adjacent AD Series Class 8 relays is required in order to achieve the maximum ratings. A 0mm spacing will result in a 50% reduction in the derating.

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Solid State Relays

Solid State Relays GQ and GRSH Series

GQ-25-24-D-1-3

GRSH-25-60-A-5-0

GRSH-120-60-A-5-61

Overview

A solid state relay is a relay with an isolated input and output, whose functions are achieved by using electronic components without the use of moving parts (vs. electromechanical relays).

Operation

Solid state relays (SSR) are similar to electromechanical relays, in that both use a control circuit and a separate circuit for switching the load. When voltage is applied to the input of the SSR, the relay is energized by a light-emitting diode. The light from the diode is beamed into a light sensitive semiconductor which, in the case of zero voltage crossover relays, signals the control circuit to turn on the output of the solid state switch at the next zero voltage crossover.

Features GQ Series

- Alternating current solid state relay
- Zero crossing switching
- In 15, 25, 50, 75, and 90 Arms contact ratings
- Nominal voltage up to 600VAC
- SCCR 100kA
- Isolation (input-output) 4000 Vrms
- Green LED drive active signal
- Thermal pad included
- IP20 finger-safe protection rating

Main Applications

- Packaging machinery
- Thermoforming
- Plastic extrusion lines
- Industrial ovens and furnaces
- Control application with high switching speed

Features GRSH Series

- In 15A to 120A contact ratings
- DIN rail and panel mounting
- Zero crossing switching
- Input command from DC/AC logic signal with push-in connectors; signaling LEDs
- Cage clamps for power cables
- Load voltage 480VAC, 600VAC
- SCCR 100kA
- Thermal alarm option with led and alarm output
- Interrupted load option with led and alarm output
- Internal overvoltage protection
- P20 finger-safe protection rating

Main Applications

- Extrusion, injection, blow molding, thermoforming of plastics
- Vulcanization of rubber
- Synthetic fiber production and polymerization
- Packing and packaging
- Dryers for ceramics and building elements
- Industrial electric ovens
- Food processing plants
- Chemical and pharmaceutical industry

Solid State Relays

Solid State Relays GQ Series 15-90A Models

Solid State Relays Selection Table GQ Series 15-90A Models							
Part Number	*Price*	*Contact Rating*	*Load Voltage*	*Input Voltage*	*Connector*	*Weight (lb)*	*Drawing Link*
GQ-15-24-D-1-3	$;67!o:	15A	24-230 VAC	3-32 VDC	Screw terminal(s)		PDF
GQ-15-24-A-1-3	$;67!p:	15A	24-230 VAC	20-260 VAC	Screw terminal(s)		PDF
GQ-15-24-D-1-4	$;67!q:	15A	24-230 VAC	3-32 VDC	Push-in spring		PDF
GQ-15-24-A-1-4	$;67!s:	15A	24-230 VAC	20-260 VAC	Push-in spring		PDF
GQ-15-60-D-1-3	$;;67!t:	15A	48-600 VAC	3-32 VDC	Screw terminal(s)		PDF
GQ-15-60-A-1-3	$;67!u:	15A	48-600 VAC	20-260 VAC	Screw terminal(s)		PDF
GQ-15-60-D-1-4	$;67!v:	15A	48-600 VAC	3-32 VDC	Push-in spring		PDF
GQ-15-60-A-1-4	$;67!x:	15A	48-600 VAC	20-260 VAC	Push-in spring		PDF
GQ-25-24-D-1-3	$;67!y:	25A	24-230 VAC	3-32 VDC	Screw terminal(s)		PDF
GQ-25-24-A-1-3	$;67!z:	25A	24-230 VAC	20-260 VAC	Screw terminal(s)		PDF
GQ-25-24-D-1-4	$;;67!]:	25A	24-230 VAC	3-32 VDC	Push-in spring		PDF
GQ-25-24-A-1-4	$;;67![:	25A	24-230 VAC	20-260 VAC	Push-in spring		PDF
GQ-25-60-D-1-3	$;67!_:	25A	48-600 VAC	3-32 VDC	Screw terminal(s)		PDF
GQ-25-60-A-1-3	$;67!#:	25A	48-600 VAC	20-260 VAC	Screw terminal(s)		PDF
GQ-25-60-D-1-4	$;;67!!:	25A	48-600 VAC	3-32 VDC	Push-in spring		PDF
GQ-25-60-A-1-4	$;67!?:	25A	48-600 VAC	20-260 VAC	Push-in spring		PDF
GQ-50-24-D-1-3	$;;67!,:	50A	24-230 VAC	3-32 VDC	Screw terminal(s)		PDF
GQ-50-24-A-1-3	$67?0:	50A	24-230 VAC	20-260 VAC	Screw terminal(s)		PDF
GQ-50-24-D-1-4	$67?1:	50A	24-230 VAC	3-32 VDC	Push-in spring		PDF
GQ-50-24-A-1-4	$67?2:	50A	24-230 VAC	20-260 VAC	Push-in spring		PDF
GQ-50-60-D-1-3	$67?3:	50A	48-600 VAC	3-32 VDC	Screw terminal(s)	0.17	PDF
GQ-50-60-A-1-3	$67?4:	50A	48-600 VAC	20-260 VAC	Screw terminal(s)		PDF
GQ-50-60-D-1-4	$67?5:	50A	48-600 VAC	3-32 VDC	Push-in spring		PDF
GQ-50-60-A-1-4	$67?6:	50A	48-600 VAC	20-260 VAC	Push-in spring		PDF
GQ-75-24-D-1-3	$67?7:	75A	24-230 VAC	3-32 VDC	Screw terminal(s)		PDF
GQ-75-24-A-1-3	$67?8:	75A	24-230 VAC	20-260 VAC	Screw terminal(s)		PDF
GQ-75-24-D-1-4	$67?9:	75A	24-230 VAC	3-32 VDC	Push-in spring		PDF
GQ-75-24-A-1-4	$67?a:	75A	24-230 VAC	20-260 VAC	Push-in spring		PDF
GQ-75-60-D-1-3	$67?b:	75A	48-600 VAC	3-32 VDC	Screw terminal(s)		PDF
GQ-75-60-A-1-3	$67?c:	75A	48-600 VAC	20-260 VAC	Screw terminal(s)		PDF
GQ-75-60-D-1-4	$67?d:	75A	48-600 VAC	3-32 VDC	Push-in spring		PDF
GQ-75-60-A-1-4	$67?e:	75A	48-600 VAC	20-260 VAC	Push-in spring		PDF
GQ-90-24-D-1-3	$;67?f:	90A	24-230 VAC	3-32 VDC	Screw terminal(s)		PDF
GQ-90-24-A-1-3	$67?g:	90A	24-230 VAC	20-260 VAC	Screw terminal(s)		PDF
GQ-90-24-D-1-4	$67?h:	90A	24-230 VAC	3-32 VDC	Push-in spring		PDF
GQ-90-24-A-1-4	$-67?i:	90A	24-230 VAC	20-260 VAC	Push-in spring		PDF
GQ-90-60-D-1-3	$-67?j:	90A	48-600 VAC	3-32 VDC	Screw terminal(s)		PDF
GQ-90-60-A-1-3	$67?k:	90A	48-600 VAC	20-260 VAC	Screw terminal(s)		PDF
GQ-90-60-D-1-4	$-67?l:	90A	48-600 VAC	3-32 VDC	Push-in spring		PDF
GQ-90-60-A-1-4	$67?n:	90A	48-600 VAC	20-260 VAC	Push-in spring		PDF

Note: Thermal mounting pad included.

Solid State Relays

Solid State Relays GQ Series 15-90A Models

Solid State Relays Specifications GQ Series 15-90A Models					
Part Number Series	***GQ-15***	***GQ-25***	***GQ-50***	***GQ-75***	***GQ-90***
Control Voltage Range	GQ-xx-xx-D-x-x models: 3–32 VDC GQ-xx-xx-A-x-x models: 20–260 VAC				
Turn-On Voltage	GQ-xx-xx-D-x-x models: ≥ 2.7 VCC GQ-xx-xx-A-x-x models: ≥ 15VAC				
Turn-Off Voltage	GQ-xx-xx-D-x-x models: ≤ 1VAC GQ-xx-xx-A-x-x models: ≤ 6VAC				
Consumption	GQ-xx-xx-D-x-x models: ≤ 8mA @ 260VAC GQ-xx-xx-A-x-x models: ≤ 13mA @ 32V				
Nominal Current (IEC 60947-4-3)	15 Arms	25 Arms	50 Arms	75 Arms	90 Arms
Nominal Current (IEC 60947-4-2)	3 Arms	5 Arms	15 Arms	18 Arms	20 Arms
Min. Load Current	0.1 Arms	0.3 Arms		0.5 Arms	
Repetitive Overcurrent	t = 1s: ≤ 35 Arms	t = 1s: ≤ 60 Arms	t = 1s: ≤ 125 Arms	t = 1s: ≤ 150 Arms	
Non-Repetitive Overcurrent	t = 20ms: 200 Ap	t = 20ms: 300 Ap	t = 20ms: 600 Ap	t = 20ms: 1,600 Ap	
Current Drop at Nominal Voltage	≤ 8m Arms			≤10m Arms	
I^2t for Fusing	t = 1-10ms: ≤ 200A^2s	t = 1-10ms: ≤ 450A^2s	t = 1-10ms: ≤ 1,800A^2s	t = 1-10ms: ≤ 12,800A^2s	
Critical dI/dt	≥ 100A/µs				
Voltage Drop at Nominal Current	≤1.45 Vrms		≤1.35 Vrms	≤1.3 Vrms	
Critical dV/dt Off-State	≥ 1000 V/µs				
Dielectric Strength (Input-to-Output Isolation)	4000 Vrms				
Relay Configuration	SPST				
Output Type	(1) N.O. SCR				
Switching Type	Zero Cross				
Heatsink/Thermal Resistance *	R_{th} ≤ 2.8 kW	R_{th} ≤ 0.83 kW		R_{th} ≤ 0.56 kW	
Operating Temperature Range	-25 to 80°C [-13 to 176°F]				
Storage Temperature Range	-55 to 100°C [-67 to 212°F]				
Max. Relative Humidity	90% at 40°C				
Protection Level	IP20				
Pollution Level	2				
Frequency	45–65 Hz				
Input Indication	Green LED				
Tightening Torque Command Terminals	0.5 – 0.6 N·m 7 [4.4 – 5.3 lb·in]				
Tightening Torque Power Terminals	2 – 2.4 N·m [18 – 21.3 lb·in]				
Mount Type	Panel mount				
Agency Approvals **	CE, cURus File E243386				

***R_{th} = (90°C - T. amb. max) (max air temperature inside the electrical cabinet) / Pd (dissipated power)**
****To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

Solid State Relays

Solid State Relays GQ Series

Power Terminals		
Wiring Type	***Rigid / Flexible / Ferrule Conductor***	***Fork Or Eyelet Cable***
Nominal Current of the Load	15-25-50-75-90	
Contact Area (WxD) Screw Type	13 x 11mm M5	
Stripping Length	11mm	–
Minimum Allowed Section 1 Conductor / 2 Conductors	1 x 1.5 mm^2 / 2 x 1.5 mm^2 1 x 15 AWG / 2 x 15 AWG	1 x 1.5 mm^2 1 x 15 AWG
Maximum Allowed Section 1 Conductor / 2 Conductors	1 x 6mm^2 / 2 x 6mm^2 1 x 10 AWG / 2 x 10 AWG	1 x 25 mm^2 1 x 3 AWG
Tightening Torque	2 – 2.4 N•m [18 – 21.3 lb•in]	

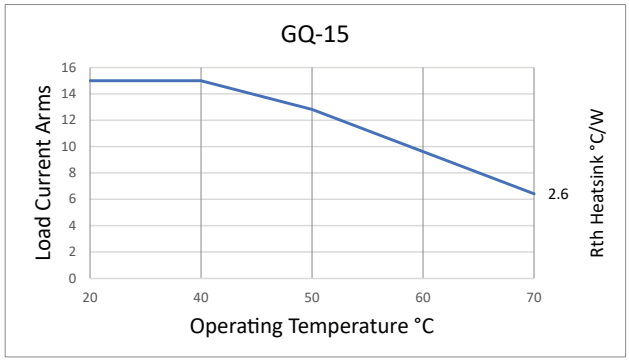
Note: Use 75°C (167°F) copper (CU), multi-stranded conductors.

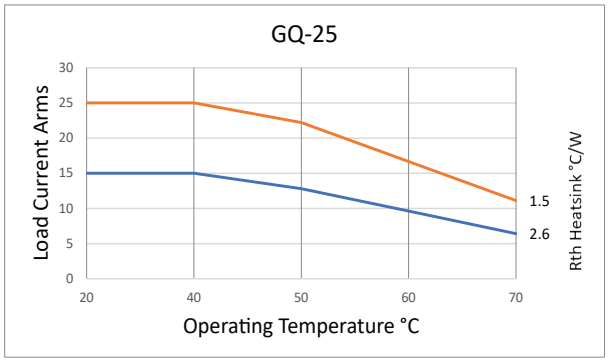
Control Signal Terminals		
Connector	***Extractable (MORS3)***	***Integrated (MORS4)***
Wire Locking Type	Screw M3	Push-in
Minimum Allowed Section 1 Conductor / 2 Conductors	1 x 0.25 mm^2 / 2 x 0.25 mm^2 1 x 23 AWG / 2 x 23 AWG	1 x 0.5 mm^2 / 2 x 0.5 mm^2 1 x 20 AWG / 2 x 20 AWG
Maximum Allowed Section 1 Conductor / 2 Conductors	1 x 2.5 mm^2 / 2 x 1mm^2 1 x 13 AWG / 2 x 17 AWG	1 x 1.5 mm^2 / 2 x 0.5 mm^2 1 x 15 AWG / 2 x 20 AWG
Stripping Length / Cable Lug	7mm	6mm

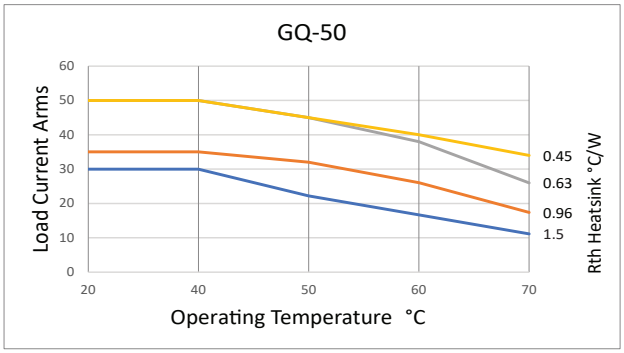
Note: Use 75°C (167°F) copper (CU), multi-stranded conductors.

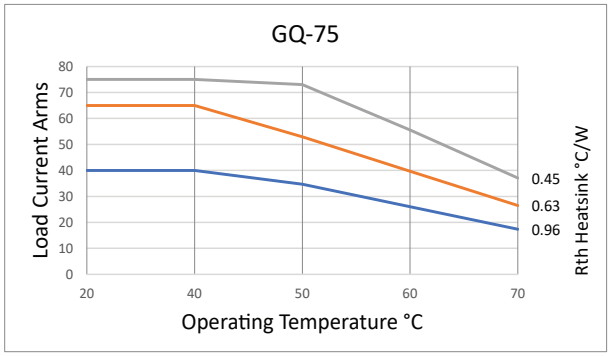
Solid State Relays

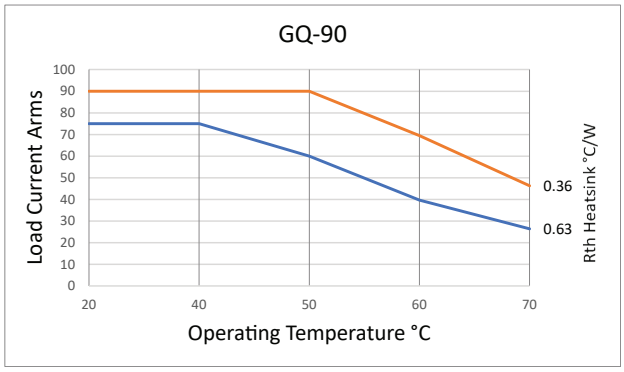
Solid State Relays GQ Series Derating Curves











Solid State Relays

Solid State Relays Accessories GQ Series

Terminal Block Replacement

Part Number	Price	Description	Weight (lb)	Drawing Link
MORS3	$6814:	Gefran terminal block, replacement. For use with all Gefran GQ-xx-xx-x-x-3 solid state relays.	0.01	N/A


MORS3

Thermal Mounting Pad Replacement

Part Number	Price	Description	Weight (lb)	Drawing Link
10-PAD-GQ	$6815:	Gefran thermal mounting pad, replacement. Package of 10. For use with all Gefran GQ series solid state relays.	0.01	N/A

10-PAD-GQ

Heatsink

Part Number	Price	Description	Weight (lb)	Drawing Link
HS-60-10	$6816:	Gefran heatsink, 35mm DIN rail mount. For use with Gefran GQ series solid state relays up to 25A. Mounting hardware included.	0.45	PDF
HS-52-50	$6817:	Gefran heatsink, 35mm DIN rail mount. For use with Gefran GQ series solid state relays up to 50A. Mounting hardware included.	0.80	PDF
HS-70-67	$6818:	Gefran heatsink, 35mm DIN rail mount. For use with Gefran GQ series solid state relays up to 75A. Mounting hardware included.	1.15	PDF
HS-52-50-FAN *	$6819:	Gefran heatsink with fan, 35mm DIN rail mount. For use with Gefran GQ series solid state relays up to 75A. Mounting hardware included.	0.80	PDF
DIS-90G-KIT	$681a:	Gefran heatsink, 35mm DIN rail mount. For use with Gefran GQ series solid state relays up to 90A. Mounting hardware included.	2.70	PDF
HS-70-67-FAN **	$681b:	Gefran heatsink with fan, 35mm DIN rail mount. For use with Gefran GQ series solid state relays up to 90A. Mounting hardware included.	1.30	PDF

* HS-52-50-FAN 24VDC 0.05 A
** HS-70-67-FAN 24VDC 0.11 A


HS-60-10


HS-70-67-FAN

Heatsink Performance Data

Part Number	Recommended Max Relay Load [A]	Rth Heatsink [°C/W]	Dimension WxHxD mm [inch]
HS-60-10	15	≤ 2.6	60 x 10 x 100 [2.36 x 0.39 x 3.93]
HS-52-50	25	≤ 1.5	52.5 x 50 x 90 [2.07 x 1.97 x 3.54]
HS-70-67	35	≤ 0.96	70 x 67 x 90 [2.76 x 2.64 x 3.54]
DIS-90G-KIT	65	≤ 0.63	127 x 100 x 100 [5 x 3.94 x 3.94]
HS-52-50-FAN	75	≤ 0.45	52.5 x 50 x 125 [2.07 x 1.97 x 4.92]
HS-70-67-FAN	90	≤ 0.36	70 x 67 x 130 [2.76 x 2.64 x 5.12]

Note: Data relating to 40°C ambient temperature, heatsink in vertical position, using part number 10-PAD-GQ.

Solid State Relays

Solid State Relays GRSH Series 15-40A Models

Solid State Relays Selection Table GRSH Series 15-40A Models							
Part Number	*Price*	*Contact Rating*	*Load Voltage*	*Input Voltage*	*Alarm Contact*	*Weight (lb)*	*Drawing Link*
GRSH-15-48-D-0-0	$67?o:	15A	24-480 VAC	6-32 VDC	—		PDF
GRSH-15-48-A-0-0	$67?p:	15A	24-480 VAC	20-260 VAC	—		PDF
GRSH-15-48-D-2-0	$67?q:	15A	24-480 VAC	6-32 VDC	Thermal/load interruption alarm		PDF
GRSH-15-48-A-5-0	$67?s:	15A	24-480 VAC	20-260 VAC	Thermal alarm		PDF
GRSH-15-60-D-0-0	$;67?t:	15A	24-600 VAC	6-32 VDC	—		PDF
GRSH-15-60-A-0-0	$67?u:	15A	24-600 VAC	20-260 VAC	—		PDF
GRSH-15-60-D-2-0	$67?v:	15A	24-600 VAC	6-32 VDC	Thermal/load interruption alarm		PDF
GRSH-15-60-A-5-0	$67?x:	15A	24-600 VAC	20-260 VAC	Thermal alarm	0.22	PDF
GRSH-25-48-D-0-0	$67?y:	25A	24-480 VAC	6-32 VDC	—		PDF
GRSH-25-48-A-0-0	$67?z:	25A	24-480 VAC	20-260 VAC	—		PDF
GRSH-25-48-D-2-0	$;67?]:	25A	24-480 VAC	6-32 VDC	Thermal/load interruption alarm		PDF
GRSH-25-48-A-5-0	$;67?[:	25A	24-480 VAC	20-260 VAC	Thermal alarm		PDF
GRSH-25-60-D-0-0	$67?_:	25A	24-600 VAC	6-32 VDC	—		PDF
GRSH-25-60-A-0-0	$67?#:	25A	24-600 VAC	20-260 VAC	—		PDF
GRSH-25-60-D-2-0	$;67?!:	25A	24-600 VAC	6-32 VDC	Thermal/load interruption alarm		PDF
GRSH-25-60-A-5-0	$067??:	25A	24-600 VAC	20-260 VAC	Thermal alarm		PDF
GRSH-30-48-D-0-0	$;67?,:	30A	24-480 VAC	6-32 VDC	—		PDF
GRSH-30-48-A-0-0	$;067,0:	30A	24-480 VAC	20-260 VAC	—		PDF
GRSH-30-48-D-2-0	$;067,1:	30A	24-480 VAC	6-32 VDC	Thermal/load interruption alarm		PDF
GRSH-30-48-A-5-0	$;067,2:	30A	24-480 VAC	20-260 VAC	Thermal alarm	0.36	PDF
GRSH-30-60-D-0-0	$;680!:	30A	24-600 VAC	6-32 VDC	—		PDF
GRSH-30-60-A-0-0	$;067,d:	30A	24-600 VAC	20-260 VAC	—		PDF
GRSH-30-60-D-2-0	$;067,e:	30A	24-600 VAC	6-32 VDC	Thermal/load interruption alarm		PDF
GRSH-30-60-A-5-0	$0680?:	30A	24-600 VAC	20-260 VAC	Thermal alarm		PDF
GRSH-40-48-D-0-0	$;67,g:	40A	24-480 VAC	6-32 VDC	—		PDF
GRSH-40-48-A-0-0	$;067,3:	40A	24-480 VAC	20-260 VAC	—		PDF
GRSH-40-48-D-2-0	$;067,4:	40A	24-480 VAC	6-32 VDC	Thermal/load interruption alarm		PDF
GRSH-40-48-A-5-0	$;067,5:	40A	24-480 VAC	20-260 VAC	Thermal alarm		PDF
GRSH-40-60-D-0-0	$;067,6:	40A	24-600 VAC	6-32 VDC	—	0.42	PDF
GRSH-40-60-A-0-0	$;067,7:	40A	24-600 VAC	20-260 VAC	—		PDF
GRSH-40-60-D-2-0	$;067,8:	40A	24-600 VAC	6-32 VDC	Thermal/load interruption alarm		PDF
GRSH-40-60-A-5-0	$;067,9:	40A	24-600 VAC	20-260 VAC	Thermal alarm		PDF

Solid State Relays

Solid State Relays GRSH Series 50-75A Models

Solid State Relays Selection Table GRSH Series 50-75A Models							
Part Number	*Price*	*Contact Rating*	*Load Voltage*	*Input Voltage*	*Alarm Contact*	*Weight (lb)*	*Drawing Link*
GRSH-50-48-D-0-0	$;067,a:	50A	24-480 VAC	6-32 VDC	—	0.42	PDF
GRSH-50-48-A-0-0	$;067,b:	50A	24-480 VAC	20-260 VAC	—		PDF
GRSH-50-48-D-2-0	$;067,c:	50A	24-480 VAC	6-32 VDC	Thermal/load interruption alarm		PDF
GRSH-50-48-A-5-0	$;;067,f:	50A	24-480 VAC	20-260 VAC	Thermal alarm		PDF
GRSH-50-60-D-0-0	$;067,h:	50A	24-600 VAC	6-32 VDC	—		PDF
GRSH-50-60-A-0-0	$;067,o:	50A	24-600 VAC	20-260 VAC	—		PDF
GRSH-50-60-D-2-0	$;067,p:	50A	24-600 VAC	6-32 VDC	Thermal/load interruption alarm		PDF
GRSH-50-60-A-5-0	$;0680,:	50A	24-600 VAC	20-260 VAC	Thermal alarm		PDF
GRSH-60-48-D-0-0	$;-067,i:	60A	24-480 VAC	6-32 VDC	—	0.70	PDF
GRSH-60-48-A-0-0	$;-067,j:	60A	24-480 VAC	20-260 VAC	—		PDF
GRSH-60-48-D-2-0	$;067,k:	60A	24-480 VAC	6-32 VDC	Thermal/load interruption alarm		PDF
GRSH-60-48-A-5-0	$;-067,l:	60A	24-480 VAC	20-260 VAC	Thermal alarm		PDF
GRSH-60-60-D-0-0	$;067,n:	60A	24-600 VAC	6-32 VDC	—		PDF
GRSH-60-60-A-0-0	$;067,q:	60A	24-600 VAC	20-260 VAC	—		PDF
GRSH-60-60-D-2-0	$;067,s:	60A	24-600 VAC	6-32 VDC	Thermal/load interruption alarm		PDF
GRSH-60-60-A-5-0	$06810:	60A	24-600 VAC	20-260 VAC	Thermal alarm		PDF
GRSH-75-48-D-0-0	$;067,u:	75A	24-480 VAC	6-32 VDC	—		PDF
GRSH-75-48-A-0-0	$;067,x:	75A	24-480 VAC	20-260 VAC	—		PDF
GRSH-75-48-D-2-0	$;;067,t:	75A	24-480 VAC	6-32 VDC	Thermal/load interruption alarm		PDF
GRSH-75-48-A-5-0	$;067,v:	75A	24-480 VAC	20-260 VAC	Thermal alarm		PDF
GRSH-75-60-D-0-0	$;067,y:	75A	24-600 VAC	6-32 VDC	—		PDF
GRSH-75-60-A-0-0	$06811:	75A	24-600 VAC	20-260 VAC	—		PDF
GRSH-75-60-D-2-0	$;;067,!:	75A	24-600 VAC	6-32 VDC	Thermal/load interruption alarm		PDF
GRSH-75-60-A-5-0	$;067,z:	75A	24-600 VAC	20-260 VAC	Thermal alarm		PDF

Solid State Relays

Solid State Relays With Fan GRSH Series 90A Models

Solid State Relays With Fan Selection Table GRSH Series 90A Models

Part Number	Price	Contact Rating	Load Voltage	Input Voltage	Alarm Contact	External Fan Voltage Required	Weight (lb)	Drawing Link
GRSH-90-48-D-0-62	$;;067,]:	90A	24-480 VAC	6-32 VDC	—	24VDC	0.89	PDF
GRSH-90-48-D-0-60	$;;067,[:	90A	24-480 VAC	6-32 VDC	—	230VAC	0.98	PDF
GRSH-90-48-D-0-61	$;067,_:	90A	24-480 VAC	6-32 VDC	—	115VAC	0.98	PDF
GRSH-90-48-A-0-60	$;067,#:	90A	24-480 VAC	20-260 VAC	—	230VAC	0.98	PDF
GRSH-90-48-A-0-61	$;067,?:	90A	24-480 VAC	20-260 VAC	—	115VAC	0.98	PDF
GRSH-90-48-D-2-63	$;;067,,:	90A	24-480 VAC	6-32 VDC	Thermal/load interruption alarm	*	0.89	PDF
GRSH-90-48-D-2-62	$06800:	90A	24-480 VAC	6-32 VDC	Thermal/load interruption alarm	24VDC	0.89	PDF
GRSH-90-48-D-2-60	$06801:	90A	24-480 VAC	6-32 VDC	Thermal/load interruption alarm	230VAC	0.98	PDF
GRSH-90-48-D-2-61	$06802:	90A	24-480 VAC	6-32 VDC	Thermal/load interruption alarm	115VAC	0.98	PDF
GRSH-90-48-A-5-60	$06808:	90A	24-480 VAC	20-260 VAC	Thermal alarm	230VAC	0.98	PDF
GRSH-90-48-A-5-61	$06809:	90A	24-480 VAC	20-260 VAC	Thermal alarm	115VAC	0.98	PDF
GRSH-90-60-D-0-62	$0680b:	90A	24-600 VAC	6-32 VDC	—	24VDC	0.89	PDF
GRSH-90-60-D-0-60	$0680d:	90A	24-600 VAC	6-32 VDC	—	230VAC	0.98	PDF
GRSH-90-60-D-0-61	$;0680f:	90A	24-600 VAC	6-32 VDC	—	115VAC	0.98	PDF
GRSH-90-60-A-0-60	$06803:	90A	24-600 VAC	20-260 VAC	—	230VAC	0.98	PDF
GRSH-90-60-A-0-61	$06804:	90A	24-600 VAC	20-260 VAC	—	115VAC	0.98	PDF
GRSH-90-60-D-2-63	$06805:	90A	24-600 VAC	6-32 VDC	Thermal/load interruption alarm	*	0.89	PDF
GRSH-90-60-D-2-62	$06806:	90A	24-600 VAC	6-32 VDC	Thermal/load interruption alarm	24VDC	0.89	PDF
GRSH-90-60-D-2-60	$06807:	90A	24-600 VAC	6-32 VDC	Thermal/load interruption alarm	230VAC	0.98	PDF
GRSH-90-60-D-2-61	$06812:	90A	24-600 VAC	6-32 VDC	Thermal/load interruption alarm	115VAC	0.98	PDF
GRSH-90-60-A-5-60	$0680a:	90A	24-600 VAC	20-260 VAC	Thermal alarm	230VAC	0.98	PDF
GRSH-90-60-A-5-61	$0680c:	90A	24-600 VAC	20-260 VAC	Thermal alarm	115VAC	0.98	PDF

*** The -63 models are internally powered and do not require external power.**

Solid State Relays

Solid State Relays With Fan GRSH Series 120A Models

Solid State Relays With Fan Selection Table GRSH Series 120A Models

Part Number	Price	Contact Rating	Load Voltage	Input Voltage	Alarm Contact	External Fan Voltage Required	Weight (lb)	Drawing Link
GRSH-120-48-D-0-62	$0680e:	120A	24-480 VAC	6-32 VDC	—	24VDC	1.13	PDF
GRSH-120-48-D-0-60	$0680g:	120A	24-480 VAC	6-32 VDC	—	230VAC	1.13	PDF
GRSH-120-48-D-0-61	$0680h:	120A	24-480 VAC	6-32 VDC	—	115VAC	1.13	PDF
GRSH-120-48-A-0-60	$-0680i:	120A	24-480 VAC	20-260 VAC	—	230VAC	1.13	PDF
GRSH-120-48-A-0-61	$-0680j:	120A	24-480 VAC	20-260 VAC	—	115VAC	1.13	PDF
GRSH-120-48-D-2-63	$0680k:	120A	24-480 VAC	6-32 VDC	Thermal/load interruption alarm	*	0.89	PDF
GRSH-120-48-D-2-62	$-0680l:	120A	24-480 VAC	6-32 VDC	Thermal/load interruption alarm	24VDC	0.89	PDF
GRSH-120-48-D-2-60	$0680n:	120A	24-480 VAC	6-32 VDC	Thermal/load interruption alarm	230VAC	1.13	PDF
GRSH-120-48-D-2-61	$0680o:	120A	24-480 VAC	6-32 VDC	Thermal/load interruption alarm	115VAC	1.13	PDF
GRSH-120-48-A-5-60	$0680p:	120A	24-480 VAC	20-260 VAC	Thermal alarm	230VAC	1.13	PDF
GRSH-120-48-A-5-61	$0680q:	120A	24-480 VAC	20-260 VAC	Thermal alarm	115VAC	1.13	PDF
GRSH-120-60-D-0-62	$0680s:	120A	24-600 VAC	6-32 VDC	—	24VDC	0.89	PDF
GRSH-120-60-D-0-60	$;0680t:	120A	24-600 VAC	6-32 VDC	—	230VAC	1.13	PDF
GRSH-120-60-D-0-61	$0680u:	120A	24-600 VAC	6-32 VDC	—	115VAC	1.13	PDF
GRSH-120-60-A-0-60	$0680v:	120A	24-600 VAC	20-260 VAC	—	230VAC	1.13	PDF
GRSH-120-60-A-0-61	$0680x:	120A	24-600 VAC	20-260 VAC	—	115VAC	1.13	PDF
GRSH-120-60-D-2-63	$0680y:	120A	24-600 VAC	6-32 VDC	Thermal/load interruption alarm	*	0.89	PDF
GRSH-120-60-D-2-62	$0680z:	120A	24-600 VAC	6-32 VDC	Thermal/load interruption alarm	24VDC	0.89	PDF
GRSH-120-60-D-2-60	$;0680]:	120A	24-600 VAC	6-32 VDC	Thermal/load interruption alarm	230VAC	1.13	PDF
GRSH-120-60-D-2-61	$;0680[:	120A	24-600 VAC	6-32 VDC	Thermal/load interruption alarm	115VAC	1.13	PDF
GRSH-120-60-A-5-60	$0680_:	120A	24-600 VAC	20-260 VAC	Thermal alarm	230VAC	1.13	PDF
GRSH-120-60-A-5-61	$0680#:	120A	24-600 VAC	20-260 VAC	Thermal alarm	115VAC	1.13	PDF

*** The -63 models are internally powered and do not require external power.**

Solid State Relays

Solid State Relays GRSH Series 15-120A Models

Solid State Relays Specifications GRSH Series 15-120A Models										
Part Number Series		***GRSH-15***	***GRSH-25***	***GRSH-30***	***GRSH-40***	***GRSH-50***	***GRSH-60***	***GRSH-75***	***GRSH-90***	***GRSH-120***
Rated Working Voltage		480VAC (max. range 24–530VAC) 600VAC (max range 24–660VAC)								
Rated Frequency		50/60 Hz								
Non-Repetitive Voltage		1200Vp for model with rated voltage 480VAC 1400Vp for model with rated voltage 600VAC								
Switching Voltage for Zero		< 20V								
Activation Time		1/2 cycle								
Deactivation Time		1/2 cycle								
Potential Drop At Rated Current		< 1.2 Vrms								
Power Supply		GRSH-xx-xx-D-1-x, GRSH-xx-xx-D-2-x, GRSH-xx-xx-D-3-x, GRSH-xx-xx-D-5-x models: range from 6 to 32VDC, Imax < 14 mA at 32V) Max reverse voltage: 36VDC								
Rated Current @ 40°C (Continuous Service)		15A	25A	30A	40A	50A	60A	75A	90A	120A
DC Input 6-32 VDC	***Max. Input***	< 9mA								
	Max. Reverse Voltage	36VDC								
	Control Voltage	32VDC								
	Activation Voltage	> 5.1 VDC								
	Deactivation Voltage	< 5VDC								
	Input Impedance	500kΩ								
Non-repetitive Overcurrent		t = 20ms: 620A				t = 20ms: 1600A			t = 20ms: 1500A	
I^2t For Blowout		≤1800^{A}2s				≤12800^{A}2s			≤11250^{A}2s	
Critical dV/dt With Output Deactivated		≥ 100V/µs								
Relay Configuration		SPST								
Output Type		(1) N.O.SCR								
Switching Type		Zero Cross								
Operating Temperature Range		0 to 80°C [0 to 176°F]								
Storage Temperature Range		-20 to 85°C [-4 to 185°F]								
Max Relative Humidity		90% non-condensing at 40°C								
Protection Level		IP20								
Pollution Level		2								
Status Indicators		Green LED Control, Yellow LED Temp Alarm, Red LED Fault/Out Alarm								
Connector Type		Push-in spring								
Mount Type		35mm DIN rail								
Agency Approvals *		CE, cURus File E243386								

*** To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

Solid State Relays

Solid State Relays GRSH Series 15-120A Models

Power Terminals									
Wiring Type	*Rigid/Flexible/Ferrule Conductor Cross Section*								
Nominal Current of the Load	15A	25A	30A	40A	50A	60A	75A	90A	120A
Contact Area (WxD) Screw Type	9.2 x 8mm M5						10.5 x 10.7 mm M5		
Minimum Allowed Section 1 Conductor / 2 Conductors	1 x 0.75 mm^2 / 2 x 075 mm^2 1 x 18AWG / 2 x 18AWG								
Maximum Allowed Section 1 Conductor / 2 Conductors	1 x 25mm^2 / 2 x 16mm^2 1 x 3AWG / 2 x 6AWG							1 x 50mm^2 / 2 x 25mm^2 1 x 1/0 AWG / 2 x 3AWG	
Stripping Length	11mm						13mm		
Tightening Torque	2.5-3 N•m [22-26.6 lb-in]								

Control Signal Terminals	
Wiring Type	*Rigid/Flexible/Cable Lug Conductor Cross Section*
1 Conductor Section 2 Conductors Sections	1 x 0.2 – 0.75 mm^2 / 2 x 0.1 - 0.5 mm^2 1 x 24 – 18AWG / 2 x 27 – 20AWG
Stripping Length / Cable Lug	1x 8 – 10mm 2 x 10 – 12mm

Note: Use 60/75°C (140/167°F) copper (CU), multi-stranded conductors.

Ground Terminal *	
Contact Area (WxD) Screw Type	9x9mm M5
Tightening Torque	1.5 – 2.5 N•m [13.3 – 22 lb•in]

***The screw terminals are only suitable for on-site wiring connection when the wire is equipped with a tube terminal with eyelet. It is possible to make ground connection using a copper bar suitably ground connected and fixed to the heatsink of more GRS-H. (WxD) = Width x depth**

Protection Co-ordination (Type 1) According To UL 508

The devices are suitable for use on a circuit capable of delivering not more than 100,000 A rms symmetrical Amperes, 600V maximum when protected by UL listed fuses with size and class as specified in the table below.

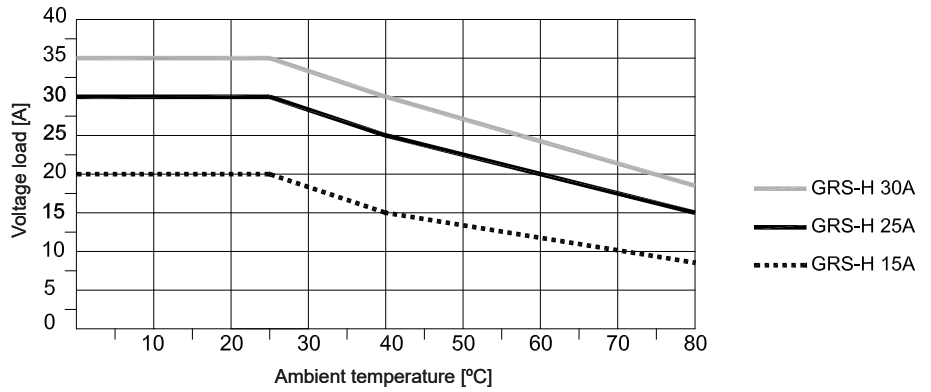
Protection Co-ordination (Type 1) According To UL 508			
Size Device	*Fuse Class*	*Fuse Current Max Size [A]*	*Prospective Short Circuit Current [kArms]*
15, 25, 30	J	40	100
	CC	30	
40	J	40	
50		80	
60		80	
75		80	
90		125	
120		125	

Solid State Relays GRSH Series Derating Curves

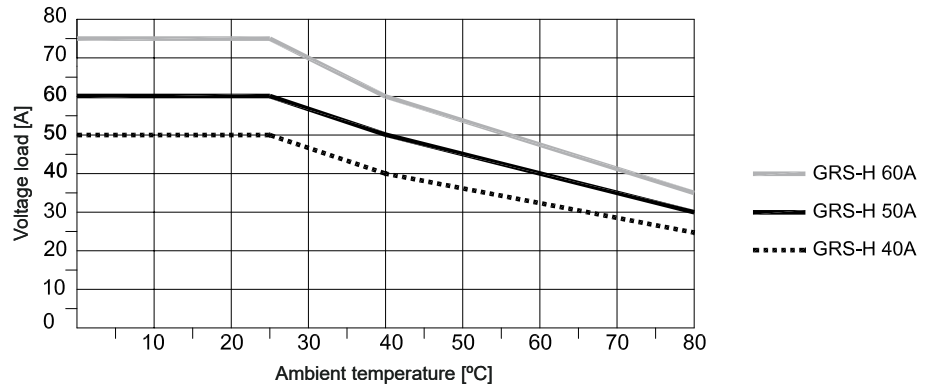
DERATING CURVES (UL508)

Rated current curves as a function of ambient temperature (minimum distance between GRS-H of 20mm).

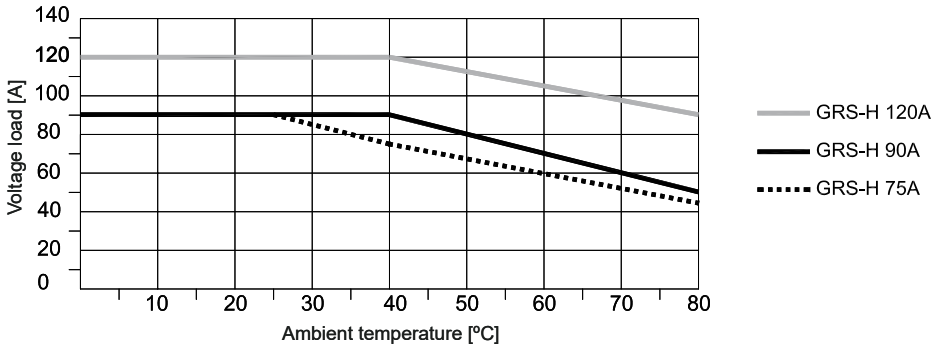
DERATING CURVES GRS-H 15 & 30A



DERATING CURVES GRS-H 40 & 60A

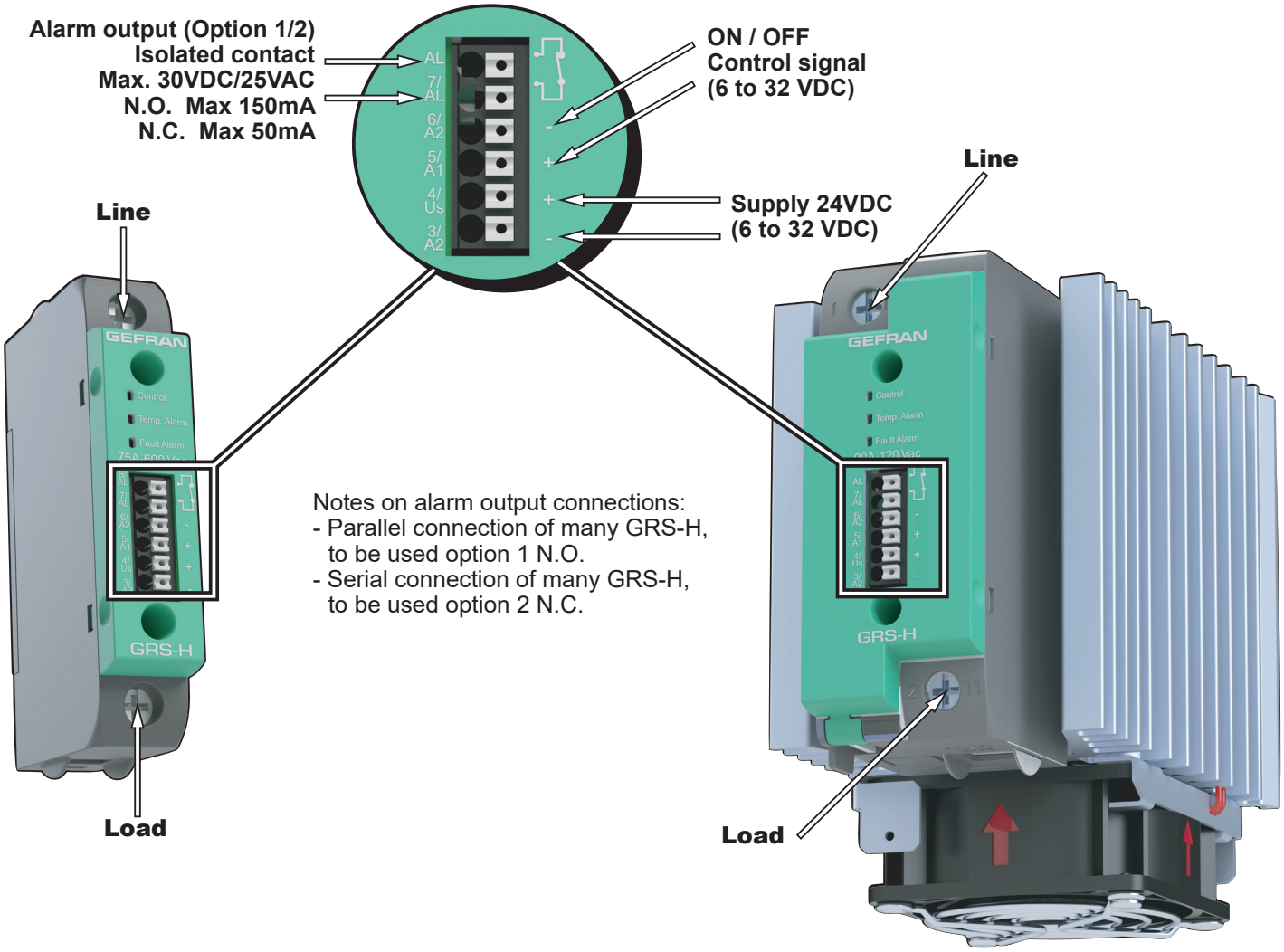


DERATING CURVES GRS-H 75 & 120A



N.B: The curves of the GRS-H 90/120 refer to the device complete with a working specified fan.

Solid State Relays



Notes on alarm output connections:
- Parallel connection of many GRS-H, to be used option 1 N.O.
- Serial connection of many GRS-H, to be used option 2 N.C.

DOLD Measuring Relays

Voltage Monitor Relays

Overview

RL 9836 and RL 9854 Varimeter Series

Dold VARIMETER series measuring relays are specifically designed to protect equipment in single-phase AC or DC voltage systems from fault conditions, such as overvoltage, undervoltage, or exceeding a voltage band. These relays provide reliable voltage monitoring without the need for external power sources. Four single-turn switches provide quick and easy setup, allowing these relays to be configured for a broad range of applications.

RL 9836

RL 9854

Features

RL 9836

- According to IEC/EN 60255-1
- For DC monitoring
- Detection of
  - Overvoltage
  - Undervoltage
  - Voltage range excess in single-phase DC voltage systems
- No separate auxiliary voltage necessary
- Output: 1 changeover contact
- De-energized on trip
- Adjustable switching voltage
- Adjustable hysteresis for reset
- Adjustable switching delay
- Fast fault detection
- Width 35mm

RL 9854

- According to IEC/EN 60255-1
- For monitoring AC single phase with 50 /60 Hz
- Detection of
  - Overvoltage
  - Undervoltage
  - Voltage range excess in single-phase AC voltage systems
- No separate auxiliary necessary
- Output: 1 changeover contact
- De-Energized on trip
- Adjustable switching voltage
- Adjustable hysteresis for reset
- Adjustable switching delay
- Fast fault detection
- Width 35mm

Application

- Monitoring of voltage systems to detect over- and undervoltage
- Switch over to emergency supply after fault detection

Approvals

RL 9836, RL 9854

CE cULus

Reference Guide

The reference guide below provides general information on the different versions of Dold Voltage Monitor Relays offered by AutomationDirect.com
(see Product Selection on the following pages for further details).

Series	*Under Voltage*	*Over Voltage*
RL 9836	> 24 VDC	< 250 VDC
RL 9854	> 45 VAC	<528 VAC

DOLD Measuring Relays

Voltage Relays

Voltage Measuring Relays			
Part Number	***Price***	***Description***	***Drawing Link***
RL9836DC24-130V	$;06fdb:	Dold voltage monitor relay, 1-phase, 35mm DIN rail mount, 24-130 VDC input voltage, SPDT, 5A contact rating, screw terminal(s), LED indicator(s), overvoltage, undervoltage and voltage range protection.	PDF
RL9836DC50-250V	$;06fdc:	Dold voltage monitor relay, 1-phase, 35mm DIN rail mount, 50-250 VDC input voltage, SPDT, 5A contact rating, screw terminal(s), LED indicator(s), overvoltage, undervoltage and voltage range protection.	PDF
RL9854AC100-300V	$;06fde:	Dold voltage monitor relay, 1-phase, 35mm DIN rail mount, 100-300 VAC input voltage, SPDT, 5A contact rating, screw terminal(s), LED indicator(s), overvoltage, undervoltage and voltage range protection.	PDF
RL9854AC45-135V	$;06fdd:	Dold voltage monitor relay, 1-phase, 35mm DIN rail mount, 45-135 VAC input voltage, SPDT, 5A contact rating, screw terminal(s), LED indicator(s), overvoltage, undervoltage and voltage range protection.	PDF

DOLD Measuring Relays

Voltage Monitor Relays

Technical Specifications					
Part Number		***RL9836DC24-130V***	***RL9836DC50-250V***	***RL9854AC100-300V***	***RL9854AC45-135V***
Input Voltage Range**		24-130 VDC	50-250 VDC	100-300 VAC	45-135 VAC single-phase with neutral
Undervoltage		> 24VDC		> 45 VAC	
Voltage Range		24-130 VDC	50-250 VDC	100-300 VAC	45-135 VAC
Hysteresis		4-20%			
Switching Voltage Capacity		250 VAC			
Life*	***Electrical***	To AC 15 at 1A, 230 VAC: Typ. 3 x 105 switching cycles			
	Mechanical	> 30 x 10^6 switching cycles			
Response Times		Infinite adjustable instantaneous, 2-30 s			
Power Consumption		Approx. 2W		Approx. 7VA	
Temperature		Operation: - 4 to 131 °F [-20 to 55 °C] Storage: - 13 to 140 °F [-25 to 60 °C] Relative air humidity: 93 % at 104 °F			
Mounting		DIN rail IEC/EN 60715			
Indicator LED		See Table 1 on following page			
Switching Delay		2-30s			
Weight (lb)		105 g			
Wire Size		AWG 24-12			
Tightening Torque		0.6 Nm		0.5 Nm	
Approvals		cULus, CE			

*** Resistive load**
**** Fusing is not required by code, but if fusing is used we recommend 2 Ampere MCL2 fuse between the phase monitor relay and the three phases.**

DOLD Measuring Relays

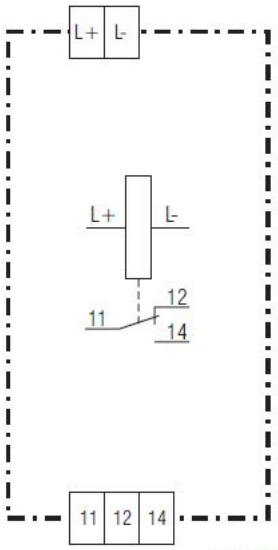
Voltage Monitor Relays

RL9836, RL9854 LED Indication

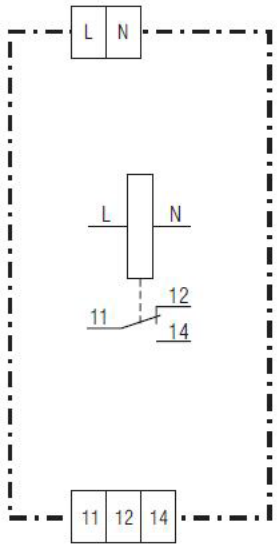
Table - LED Indication	
LED Status*	***Indicator***
Green ON	Relay On
Red >U	Relay On, when overvoltage
Red <U	Relay On, when undervoltage

Wiring Diagrams

RL9836



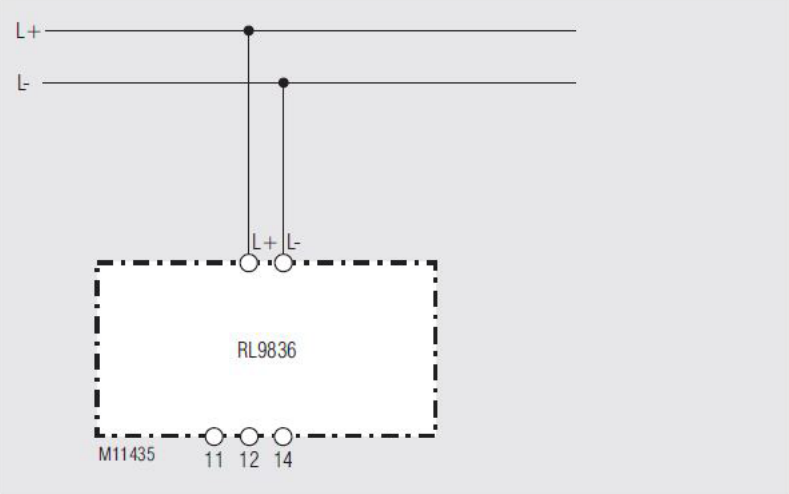
RL9854



Voltage Monitor Relays

Typical Connections

RL9836



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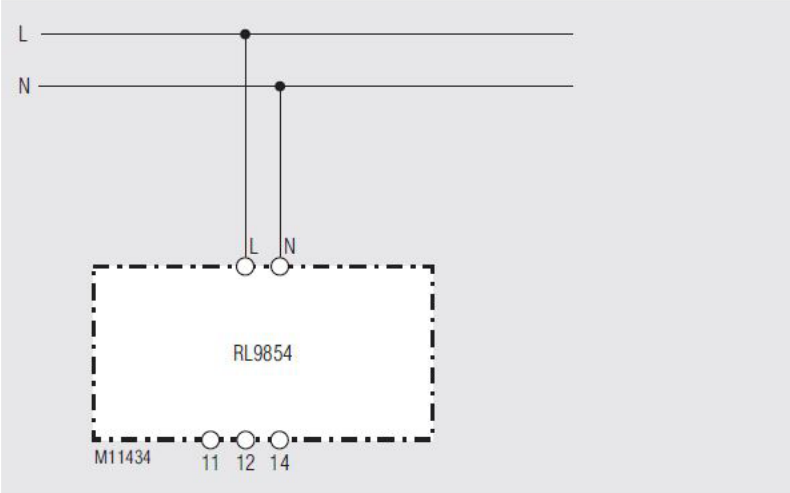


DOLD Measuring Relays

Phase Monitor Relays

Overview

RL 9877, RN 9877 Varimeter Series

RL 9877 and RN 9877 VARIMETER series measuring relays monitor overvoltage, undervoltage, voltage range, phase asymmetry and phase sequence in 3-phase or single-phase systems. The measurement is very simple and without extensive wiring as there is no auxiliary power supply necessary. The monitoring functions are easily selectable using a single turn switch without complex menu structure. The early detection of up-coming break downs and preventive maintenance avoid expensive damages. As the user, you profit from the reliability and availability of your plant.

RL 9877

RN 9877

Features

RL 9877, RN 9877

- According to IEC/EN 60255-1
- For monitoring of AC 3- and single-phase with 50 /60 Hz
- Detection of
  - Overvoltage
  - Undervoltage
  - Voltage range excess
  - Phase failure
  - Phase asymmetry
  - Missing neutral e.g. broken neutral wire
  - And phase sequence in 3-phase systems
- With or without neutral
- Without separately auxiliary voltage (internal supply from all 3 phases)
- Output: 1 changeover contact
- De-energized on trip
- Adjustable hysteresis for reset
- Adjustable switching delay
- Fast fault detection
- Width:
  - RL 9877: 35 mm
  - RN 9877: 52.5 mm

Application

- Monitoring of three-phase voltage systems to identify overvoltage and undervoltage
- Indication of phase sequence in 3-phase systems, phase failure, and voltage asymmetry
- Monitoring of voltage systems with motors
- Changeover to emergency supply after failure detection

Approvals

RL 9877, RN 9877

DOLD Measuring Relays

Phase Monitor Relays

Phase Monitor Relays			
Part Number	***Price***	***Description***	***Drawing Link***
RL9877-11	$;;06fdf:	Dold phase monitor relay, 3-phase, 35mm DIN rail mount, 80-230 VAC input voltage, SPDT, 5A contact rating, screw terminal(s), LED indicator(s), phase reversal, phase unbalance, overvoltage, undervoltage, voltage range and neutral protection.	PDF
RL9877-11-120	$;06fdg:	Dold phase monitor relay, 3-phase, 35mm DIN rail mount, 80-230 VAC input voltage, SPDT, 5A contact rating, screw terminal(s), LED indicator(s), phase reversal, phase loss and phase unbalance protection.	PDF
RN9877-0103P3W525V	$;-06fdi:	Dold phase monitor relay, 3-phase, 35mm DIN rail mount, 175-525 VAC input voltage, SPDT, 5A contact rating, screw terminal(s), LED indicator(s), phase reversal, phase unbalance, overvoltage, undervoltage and voltage range protection.	PDF
RN9877-1203P4W525V	$;-06fdj:	Dold phase monitor relay, 3-phase, 35mm DIN rail mount, 175-525 VAC input voltage, SPDT, 5A contact rating, screw terminal(s), LED indicator(s), phase reversal, phase loss and phase unbalance protection.	PDF
RN98773P4W525V	$;06fdh:	Dold phase monitor relay, 3-phase, 35mm DIN rail mount, 175-525 VAC input voltage, SPDT, 5A contact rating, screw terminal(s), LED indicator(s), phase reversal, phase unbalance, overvoltage, undervoltage, voltage range and neutral protection.	PDF

DOLD Measuring Relays

Phase Monitor Relays

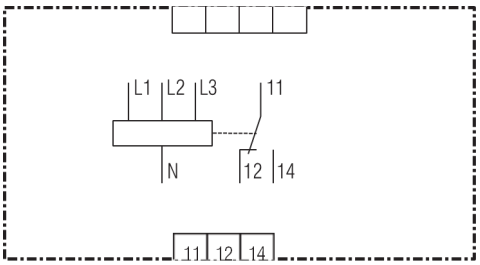
Technical Specifications						
Part Number		***RL9877-11***	***RL9877-11-120***	***RN9877-0103P3W525V***	***RN9877-1203P4W525V***	***RN98773P4W525V***
Input Voltage Range		3/N 80-230 VAC / 45-130 VAC 1- or 3-phase without / with neutral 3 80-230VAC 3-phase without neutral		3/N 175-525 VAC / 100-300VAC 1- or 3-phase without / with neutral 3 175-525 VAC 3-phase without neutral		
Phase Loss		No	Yes	No	Yes	No
Voltage Monitoring		Yes	No	Yes	No	Yes
Measuring Voltage		3/N 80-230 VAC / 45-130 VAC	3 80-230 VAC	3/N 175-525 VAC / 100-300VAC	3 175-525 VAC	
Voltage Range		0.85 UN-1.1 UN				
Phase Unbalance		Unit trips if sequence of the three phases is anything other than A-B-C				
Hysteresis		Infinite adjustable 4 to 20 %				
Phase Asymmetry Value		Infinite adjustable 4 to 20 %				
Life*	***Electrical***	To AC 15 at 1 A, AC 230V: Typ. 3 x 105 switching cycles				
	Mechanical	> 30 x 106 switching cycles				
Switching Capacity		To AC 15 N.O. contact: 3A / 230 VAC IEC/EN 60947-5-1 N.C. contact: 1A / 230 VAC IEC/EN 60947-5-1				
Response Times		Infinite adjustable instantaneous, 2-30 s				
Power Consumption		Approx. 7VA				
Temperature		Operation: - 4 to 131 °F [-20 to 55 °C] Storage: - 13 to 140 °F [-25 to 60 °C] Relative air humidity: 93 % at 104 °F				
Mounting		DIN rail IEC/EN 60715				
Indicator LED		Green LED ON: "On, when supply connected" Red LED U: "On, when overvoltage" Red LED <U: "On, when undervoltage" Yellow LED Asym.“Indicates a voltage asymmetry in 3-phase systems or loss of neutral" Yellow LED L1L2L3: "Indicates wrong phase sequence in 3-phase systems or loss of neutral"				
Switching Delay		0-30 s				
Weight (lb)		Approx. 0.25		Approx. 0.28		
Wire Size		AWG 24-12		For terminals 11, 12, 14: AWG 24 - 12 Sol/Str terminals L1, L2, L3, N: AWG 30 - 10 Sol/Str T		
Tightening Torque		0.6 Nm	0.7 Nm	For terminals 11, 12, 14: AWG 24 - 12 Sol/Str Torque 0.6 Nm For terminals L1, L2, L3, N: AWG 30 - 10 Sol/Str Torque 0.7 Nm	For terminals 11, 12, 14: AWG 24 - 12 Sol/Str Torque 0.6 Nm For terminals L1, L2, L3, N: AWG 30 - 10 Sol/Str Torque 0.7 Nm	For terminals 11, 12, 14: AWG 24 - 12 Sol/Str Torque 0.6 Nm For terminals L1, L2, L3, N: AWG 30 - 10 Sol/Str Torque 0.7 Nm
Approvals		cULus, CE				

Phase Monitor Relays

RN9877, RL9877 LED Indication

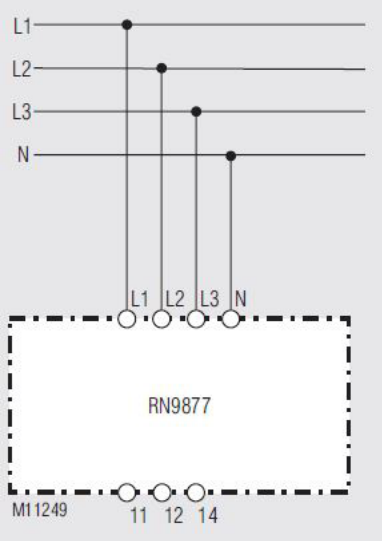
Table - LED Indication	
LED Status*	***Indicator***
Green	Normal (Relay ON)
Yellow	Voltage Asymmetry
Red	Overvoltage/Undervoltage (Relay ON)
Red L1	Phase 1 failure
Red L2	Phase 2 failure
Red L3	Phase 3 failure
Yellow L123	Wrong phase sequence in 3-phase systems

Wiring Diagram



Phase Monitor Relays

Typical Connections



ProSense® Phase Monitor Relays

PMRU-TL

PMRU-2C

PMRR-TL

PMRRL-TL

Phase Monitor Relays

Phase monitor relays provide protection against premature equipment failure caused by voltage faults on 3-phase systems. All ProSense® phase monitor relays are designed to be compatible with typical Wye or Delta systems. Phase monitor relays protect against single phasing regardless of any regenerative voltages.

PMRU-TL Series

The PMRU-TL Series phase monitor relays utilize a microprocessor based design to provide protection against phase loss, phase reversal, phase unbalance, undervoltage and overvoltage. The PMRU-TL is a universal voltage product that works on any 3-phase system voltage from 190V to 500V. These devices are designed to be compatible with typical Wye or Delta systems. In Wye systems, a connection to a neutral is not required. PMRU-TL Series products protect against unbalanced voltages or single phasing regardless of any regenerative voltages.

The relay is energized when the phase sequence and all voltages are correct. Any one of five fault conditions will de-energize the relay. Re-energization is automatic upon correction of the fault condition. A manual reset option is available if a momentary N.C. switch is wired to the appropriate terminals. A multi-color LED indicates normal condition and also provides specific fault indication to simplify troubleshooting.

The PMRU-TL Series offers a variety of user-adjustable settings. The percent phase unbalance is adjustable from 2% to 10%. The undervoltage drop-out can be set at 80% to 95% of operating voltage (overvoltage setting is fixed at 110% of nominal). The adjustable time delay drop-out on undervoltage (0.3 to 30 seconds) eliminates nuisance tripping caused by momentary voltage fluctuations. There is also an adjustable time delay (1 to 300 seconds) on both power-up and restart after a fault has been cleared.

PMRU-2C Series

The PMRU-2C Series Three-Phase Monitor Relays continuously monitor all voltages to protect motors and equipment from expensive damage due to phase loss, phase reversal, phase unbalance, undervoltage and overvoltage. These products detect single phasing and unbalanced voltages regardless of any regenerative voltages.

Utilizing an advanced microprocessor-based design allows true RMS voltage measurement with full wave monitoring. True RMS voltage measurement ensures accurate sensing in most generator and other applications with non-sinusoidal wave forms excluding V/Hz drives, eliminating nuisance tripping. Full wave monitoring provides a more accurate method to measure the voltages, regardless of load type or wave shape, resulting in improved protection across more applications.

The PMRU-2C Series is a true universal product, with two units that work on a wide variety of adjustable line-line voltages to cover more global applications.

PMRR-TL Series

The PMRR-TL Series phase monitor relays provide protection against phase reversal in a compact low-cost design. One relay will work on any 3-phase system from 190V to 500V. This relay is designed to be compatible with typical Wye or Delta systems. In Wye systems, a connection to a neutral is not required.

The relay is energized and the Green LED is ON when the sequence is correct. Any fault will de-energize the relay and turn ON the Red LED. Re-energization is automatic upon correction of the fault condition.

PMRRL-TL Series

The PMRRL-TL Series phase monitor relays provide protection against phase loss, phase reversal and undervoltage. These relays are designed to be compatible with typical Wye or Delta systems. In Wye systems, a connection to a neutral is not required. Phase monitor relays protect against single phasing regardless of any regenerative voltages.

The relay is energized and the Green LED is ON when all three phases are present in the correct sequence at a voltage level above the undervoltage setting. The undervoltage drop-out can be set at 75 to 95% of operating voltage. Any fault will instantaneously de-energize the relay and turn ON the Red LED. Re-energization is automatic upon correction of the fault condition.

Reference Guide

The reference guide below provides general information on the different versions of Phase Monitor Relays offered by AutomationDirect.com
(see Product Selection on the following pages for further details).

Series	Mounting Style	Phase Loss	Phase Reversal	Phase Unbalance	Under Voltage	Over Voltage	Time Delay on Undervoltage	Approvals*
PMRR-TL	Plug-in*		ø					cURus, CE
PMRRL-TL		ø	ø		ø (adj.)		4 secs fixed	
PMRU-TL		ø	ø	ø (adj.)	ø (adj.)	ø(fixed)	0.3–30 seconds	
PMRU-2C	DIN-rail	100ms fixed	100ms fixed	0.3–30 seconds	0.3–30 seconds	0.3–30 seconds	0.3–30 seconds	cULus, CE

*** In addition to the above approvals, all plug-in products are also UL Listed when used with the appropriate (70169-D) socket.**

ProSense® Phase Monitor Relays

Features

PMRR-TL
- Protects against phase reversal
- Works with 190 to 500V 3-phase systems
- LED indicates both normal and fault conditions
- Compact plug-in case utilizing industry standard 8-pin octal socket
- 10A SPDT output contacts

PMRU-TL
- Universal voltage range of 190 to 500VAC, 3-phase systems
- Protects against phase loss, phase reversal, phase unbalance, undervoltage and overvoltage
- Variety of user-selectable and adjustable settings for flexibility in 3-phase protection
- Automatic or Manual Reset
- Multi-Color LED indicates normal condition and provides fault indication to simplify troubleshooting
- Compact plug-in case utilizing industry standard 8-pin octal socket
- 10A SPDT output contacts

PMRRL-TL
- Protects against phase loss, phase reversal and undervoltage
- Undervoltage setting is adjustable from 75-95% of nominal
- LED indicates normal and fault conditions
- Compact plug-in case utilizing industry
- Standard 8-pin octal socket
- 10A SPDT output contacts

PMRU-2C
- Protects against phase loss, phase reversal, phase unbalance, undervoltage, overvoltage and rapid cycling
- True RMS voltage measurement ensures accurate sensing across more applications
- Retains fault indication and continues monitoring all voltages even with a lost phase
- Full fault indication on top of unit for easy troubleshooting
- Manual reset option works with external switch to reset the relay from outside the enclosure
- Compact 52.5 mm wide enclosure for both DIN-rail or panel-mount
- 10A DPDT output contacts

Agency Approvals
- cURus, File number E191059
- UL Listed, File number E191059
- CE

(with socket 70169-D)

Phase Monitor Relays

Part Number	*Price*	*Description*	*Use With:*	*Drawing Link*
PMRR-1C-480A-TL	$;4gtd:	ProSense phase monitor relay, 3-phase, socket mount, 190-500 VAC input voltage, SPDT, 10A contact rating, 8-pin, LED indicator(s), phase reversal protection.	70169-D or 750-2C-SKT	PDF
PMRRL-1C-208A-TL	$;4gte:	ProSense phase monitor relay, 3-phase, socket mount, 208 VAC input voltage, SPDT, 10A contact rating, 8-pin, LED indicator(s), phase reversal, phase loss and undervoltage protection.		PDF
PMRRL-1C-240A-TL	$;;4gtf:	ProSense phase monitor relay, 3-phase, socket mount, 240 VAC input voltage, SPDT, 10A contact rating, 8-pin, LED indicator(s), phase reversal, phase loss and undervoltage protection.		PDF
PMRRL-1C-480A-TL	$;4gtg:	ProSense phase monitor relay, 3-phase, socket mount, 480 VAC input voltage, SPDT, 10A contact rating, 8-pin, LED indicator(s), phase reversal, phase loss and undervoltage protection.		PDF
PMRU-1C-480A-TL	$;4gth:	ProSense phase monitor relay, 3-phase, socket mount, 190-500 VAC input voltage, SPDT, 10A contact rating, 8-pin, LED indicator(s), phase reversal, phase loss, phase unbalance, overvoltage and undervoltage protection.		PDF
PMRU-2C-500A	$;-5l3t:	ProSense phase monitor relay, 3-phase, 35mm DIN rail mount, 190-500 VAC input voltage, DPDT, 10A contact rating, screw terminal(s), LED indicator(s), phase reversal, phase loss, phase unbalance, overvoltage and undervoltage protection.	NA	PDF
PMRU-2C-600A	$-5l3u:	ProSense phase monitor relay, 3-phase, 35mm DIN rail mount, 460-600 VAC input voltage, DPDT, 10A contact rating, screw terminal(s), LED indicator(s), phase reversal, phase loss, phase unbalance, overvoltage and undervoltage protection.	NA	PDF
70169-D	$;5t6:	Relay socket, 10A at 600V, 8-pin octal configuration. Can be mounted on 35mm DIN-rail or directly mounted to the panel.	------	PDF
750-2C-SKT	$-b?j:	Relay socket, 5A at 600V, 8-pin octal configuration. Can be mounted on 35mm DIN-rail or directly mounted to the panel	------	PDF

Note: Requires a 600V rated socket when used on system voltages greater than 300 volts, such as the 70169-D or 750-2C-SKT.

ProSense® Phase Monitor Relays

Technical Specifications

Part Number	PMRU-1C-480A-TL	PMRU-2C-500A	PMRU-2C-600A	PMRR-1C-480A-TL	PMRRL-1C-208A-TL	PMRRL-1C-240A-TL	PMRRL-1C-480A-TL
Input Voltage Range**	190–500 VAC, 50/60Hz (±20%)	190-500 VAC, 50/60Hz (±5%)	460-600 VAC 50/60Hz (±5%)	190–500 VAC, 50/60Hz (+10/-25%)	208VAC, 50/60Hz (+10/-25%)	240VAC, 50/60Hz (+10/-25%)	480VAC, 50/60Hz (+10/-25%)
Phase Loss	Unit trips on total loss of one or more of the three phases (A,B,C)	Unit trips on loss of any phase A,B,C, regardless of any regenerative voltages.		N/A	Unit trips on total loss of one or more of the three phases (A,B,C)		
Phase Reversal	Unit trips if sequence of the three phases is anything other than A-B-C	Unit trips if sequence (rotation) of the three phases is anything other than A-B-C. It will not work on C-B-A.		Unit trips if rotation (sequence) of the three phases is anything other than A-B-C.	Unit trips if sequence of the three phases is anything other than A-B-C		
Phase Unbalance	Adjustable from 2-10%			N/A			
Undervoltage	Adjustable from 80-95% of nominal voltage	Adjustable from 80-95% of the line voltage setting.		N/A	Unit trips when the average of all three line phases is less than the adjusted set point		
Overvoltage	Fixed at 110% of nominal	Fixed at 110% of the line voltage setting.		N/A	N/A	N/A	N/A
Output Contacts	SPDT 10A @ 277VAC 7A @ 30VDC; 1HP @ 250VAC, 1/2HP @ 125VAC, C300 Pilot Duty	DPDT 10A @ 277VAC / 10A @ 30 VDC; 1/2 HP @ 120/240 VAC (N.O.), 1/3HP @ 120/240 VAC (N.C.), B300 Pilot Duty, R300 (N.O.)		SPDT 10A @ 277VAC / 7A @ 30VDC; 1HP @ 250VAC, 1/2HP @ 125VAC, C300 Pilot Duty			
Life*	Mechanical: 10,000,000 operations; Full Load: 100,000 operations						
Response Times	See table 2 on following page			Power Up & Restart After Fault: 1 second fixed Drop-out Due to Phase Reversal: 100ms fixed	Restart: 1 second fixed; Drop-out Due to Fault: Phase Loss and Reversal: 100ms fixed, Undervoltage: 4 seconds fixed		
Power Consumption	< 40VA						
Temperature	Operating: -28 to 65°C [-18 to 149°F] Storage: -40 to 85°C [-40 to 185°F]						
Mounting	8-pin octal socket requires a 600V rated socket when used on system voltages greater than 300V	35mm Din-rail or panel mount		8-pin octal socket requires a 600V rated socket when used on system voltages greater than 300V			
Indicator LED	See Table 1 on following page			Green LED is ON: when all conditions are normal; Red LED: Reversal	See Table 3 on following page		
Reset	Standard reset is automatic upon correction of fault or when a momentary-contact N.C. switch is wired across the Manual Reset terminals (6 & 7), the unit switches to manual reset mode and remote manual reset is available	Standard reset is automatic upon correction of fault or when a momentary-contact N.C. switch is wired across the Manual Reset terminals (4 & 5)		Standard reset is automatic upon correction of fault.			
Weight (lb)	0.3	0.3	0.3	0.4	0.3	0.3	0.3
Wire Size	12-22 AWG	12-30 AWG		12-22 AWG			
Tightening Torque	12 in•lbs	7 in•lbs		12 in•lbs			
Approvals	cURus, CE (cULus when used with socket 70169-D)	cULus		cURus, CE (cULus when used with socket 70169-D)			

*** Resistive load**

**** Fusing is not required by code but if fusing is used we recommend 2 Ampere MCL2 fuse between the phase monitor relay and the three phases.**

ProSense® Phase Monitor Relays

PMRU-TL, PMRU-2C LED Indication

Table 1 - LED Indication		
LED Status*	***Indicator***	
Green Steady		Normal (Relay ON)
Green Flashing		Restart (Delay)
Red Steady		Reversal
Red Flashing		Loss/UB (Unbalance)
		Low Volt (Undervoltage)
		High Volt (Overvoltage)

PMRU-TL, PMRU-2C Response Time

Table 2 - Response Times	
Power-up and restart after fault	1-300 seconds adjustable
Drop-out Due to Fault	
Phase Loss Reversal	100ms fixed
Phase Unbalance	Normal: 0.3–30 seconds adjustable Severe (Twice Knob Setting): 0.3–2 seconds
Undervoltage/Overvoltage	0.3–30 seconds adjustable

PMRRL-TL LED Indication

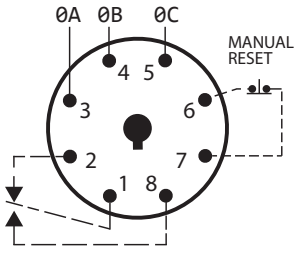
Table 3 - LED Indication		
LED Status*	***Indicator***	
Green Steady		Normal (Relay ON)
Green Flashing		Restart (Delay)
Red Steady		Reversal
Red Flashing		Loss
		Low Volt (Undervoltage)

PMRRL-TL Undervoltage

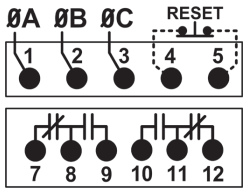
Table 4 - Undervoltage Rating	
PMRRL-1C-208A-TL	156–198 V
PMRRL-1C-240A-TL	180–230 V
PMRRL-1C-480A-TL	360–460 V

Wiring Diagrams

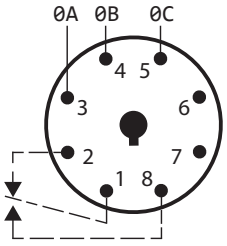
PMRU-1C-480A-TL



PMRU-2C-500A, PMRU-2C-600A



PMRRL-1C-208A-TL, PMRRL-1C-240A-TL PMRRL-1C-480A-TL, PMRR-1C-480A-TL



ProSense® Phase Monitor Relays

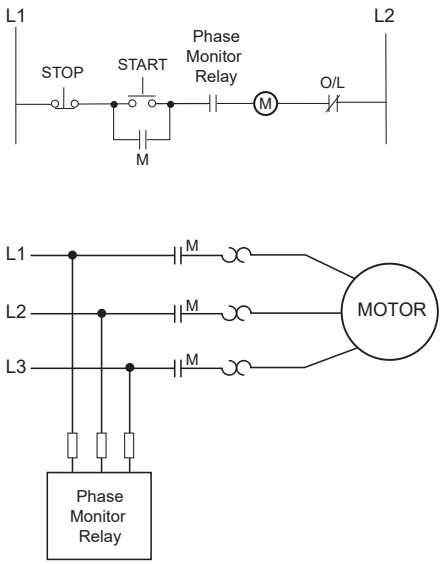
Protection

Depending on the unit selected, it will protect 3-phase equipment against:

- Phase Loss - total loss of one or more of the three phases. Also known as "single phasing." Typically caused by a blown fuse, broken wire, or worn contacts. This condition would result in a motor drawing locked rotor current during start-up. In addition, a 3-phase motor will continue to run after losing a phase, resulting in possible motor burn-out.
- Phase Reversal - reversing any two of the three phases will cause a 3-phase motor to run in the opposite direction. This may cause damage to driven machinery or injury to personnel. The condition usually occurs as a result of mistakes made during routine maintenance or when modifications are made to the circuit.
- Phase Unbalance - unbalance of a 3-phase system occurs when single phase loads are connected such that one or two of the lines (phases) carry more or less of the load. This could cause motors to run at temperatures above published ratings.
- Undervoltage - when voltage in all three lines of a 3-phase system drop simultaneously.
- Overvoltage - when voltage in all three lines of a 3-phase system increase simultaneously.

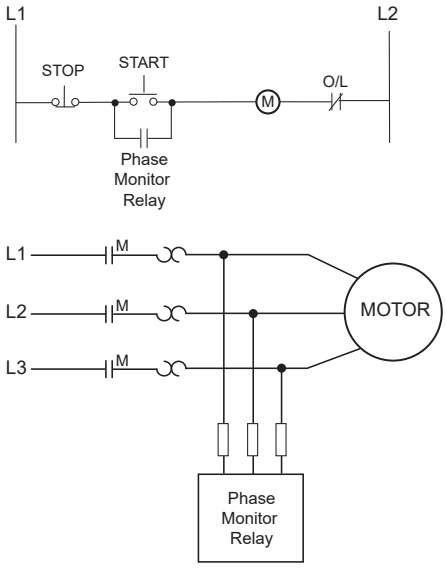
Typical Connections

Line Side Monitoring (recommended)



Line Side Monitoring
With the relay connected before the motor starter, the motor can be started in the reverse direction. However, the motor is unprotected against phase failures between the relay and the motor.

Load Side Monitoring



Load Side Monitoring
With the relay connected directly to the motor, the total feed lines are monitored. This connection should not be used with reversing motors.

ProSense® Voltage Monitor Relays

Overview

Voltage monitor relays monitor AC single-phase (50-60 Hz) or DC voltages to protect equipment from fault conditions. No separate supply is required since each unit is powered by monitored voltage.

ProSense® offers two styles of Voltage Monitor Relays:

Over/Under Voltage Relays - provides protection to equipment where either an over or under voltage condition is potentially damaging. They are designed to energize when monitored voltage reaches a preset value (U_{max}) and drop-out when the monitored voltage drops to a level below the preset value (U_{min}).

Voltage Band Relays - provides protection to equipment that is required to operate within an upper and lower voltage limit. As long as the monitored voltage remains within an OVER (U_{max}) and UNDER voltage (U_{min}) range, the internal relay stays energized. If the monitored voltage falls outside this range, the relay will drop-out.

Features

- Monitors AC single-phase and DC voltages
- True RMS voltage measurement ensures more accurate sensing
- Wide range of user adjustable pick-up voltages
- 8-pin socket mount
- LED indicates output relay status

(with socket 70169-D)


VMR-2C-F-120A


VMR-2C-A-120A


VMR-2C-B-120A

Technical Specifications

Part Number	VMR-xC-F-xxx	VMR-xC-A-xxx	VMR-xC-B-xxx
Input Voltage Range	See selection table on the following page		
Voltage Tolerance	±50% of nominal AC (50-60Hz, ±5%) or DC voltage No separate input voltage required since unit is powered by monitored voltage.		
Load Burden	Less than 2VA (12-120V); 30VA (240V & 480V)		
Undervoltage	Fixed at 95% of pick-up setting	Adjustable from 75-95% of pick-up setting	75-95% of over/under voltage setting
Overvoltage	Across full range as shown in the product selection table		
Setting Accuracy	Maximum setting (adjustable): +5%, -0% Minimum setting (adjustable): +0%, -50% Fixed Voltage Setting: ±2%		
Repeatability	<1 %		
Sensing Accuracy	Constant conditions within specifications: ±2% Variable conditions within specifications: ±5% (percent base on nominal voltage)		
Temperature	Operating: -28 to 65°C [-18 to 149°F] Storage: -40 to 85°C [-40 to 185°F]		
Indicator LED	Red when relay is energized Green when relay is off		
Response Times	Restart: 1 second (240 & 480V only) Pick-up: 0.5 seconds Drop-out (t): 0.5 seconds (VMR-xC-F-xxx); Adjustable 0.1 - 10 seconds (VMR-xC-A-xxx)		Restart: 1 second (240 & 480V only) Pick-up: 0.5 seconds Drop-out (t): Adjustable 0.1 -10 seconds
Output Contacts	(All except VMR-1C-x-240A): 10A @ 240 VAC, 7A@ 30 VDC, 1/4HP @ 120/240 VAC, C300 (VMR-1C-x-240A): 5A@ 277 VAC, 5A@ 30 VDC, 1/3HP@ 120/240 VAC, B300 Pilot Duty		10A@240 VAC, 7A@30 VDC, 1/4HP@ 120/240 VAC, C300
Life	Mechanical: 10,000,000 operations; Full Load: 100,000 operations		
Wire Size	12-22 AWG		
Tightening Torque	12 in•lbs		
Protection Rating	IP20		
Reset	Automatic		
Transient Protection	2000V per IEC 61000-4-5 Level 3 (±2kV)		
Weight (lb)	0.2	0.2	0.2
Agency Approvals	cURus, CE, (cULus when used with socket 70169-D)		

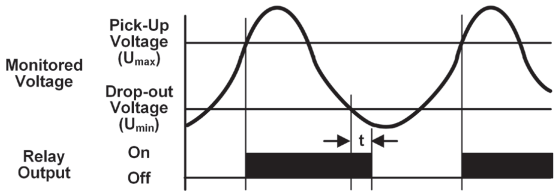
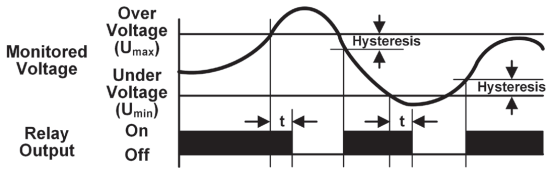
ProSense® Voltage Monitor Relays

1-phase Voltage Monitor Relays Selection Table							
Part Number	*Price*	*Input Voltage*	*Relay Configuration*	*Contact Rating*	*Protection Type*	*Diagram*	*Drawing Link*
VMR-2C-F-120A	$-5l3v:	90-150 VAC	DPDT	10A	overvoltage undervoltage fixed drop-out	213	PDF
VMR-2C-A-120A	$-5l3x:	90-150 VAC	DPDT	10A	overvoltage undervoltage adjustable drop-out		PDF
VMR-2C-B-120A	$-5l3y:	90-150 VAC	DPDT	10A	voltage band		PDF
VMR-1C-F-240A	$-5l3n:	180-300 VAC	SPDT	10A	overvoltage undervoltage fixed drop-out	150	PDF
VMR-1C-A-240A	$-5l3o:	180-300 VAC	SPDT	10A	overvoltage undervoltage adjustable drop-out		PDF
VMR-1C-B-240A	$-5l3p:	180-300 VAC	SPDT	10A	voltage band		PDF
VMR-1C-F-480A *	$-5l3q:	360-600 VAC	SPDT	10A	overvoltage undervoltage fixed drop-out		PDF
VMR-1C-A-480A *	$-5l3s:	360-600 VAC	SPDT	10A	overvoltage undervoltage adjustable drop-out		PDF
VMR-1C-B-480A *	$-5l3z:	360-600 VAC	SPDT	10A	voltage band		PDF
VMR-2C-F-12D	$;-5l3]:	9-15 VDC	DPDT	10A	overvoltage undervoltage fixed drop-out	214	PDF
VMR-2C-A-12D	$;-5l3[:	9-15 VDC	DPDT	10A	overvoltage undervoltage adjustable drop-out		PDF
VMR-2C-B-12D	$-5l3_:	9-15 VDC	DPDT	10A	voltage band		PDF
VMR-2C-F-24D	$-5l3#:	18-30 VDC	DPDT	10A	overvoltage undervoltage fixed drop-out		PDF
VMR-2C-A-24D	$;-5l3!:	18-30 VDC	DPDT	10A	overvoltage undervoltage adjustable drop-out		PDF
VMR-2C-B-24D	$-5l3?:	18-30 VDC	DPDT	10A	voltage band		PDF
VMR-2C-F-48D	$;-5l3,:	36-60 VDC	DPDT	10A	overvoltage undervoltage fixed drop-out		PDF
VMR-2C-A-48D	$-5l40:	36-60 VDC	DPDT	10A	overvoltage undervoltage adjustable drop-out		PDF
VMR-2C-B-48D	$-5l41:	36-60 VDC	DPDT	10A	voltage band		PDF
VMR-2C-F-110D	$-5l42:	83-138 VDC	DPDT	10A	overvoltage undervoltage fixed drop-out		PDF
VMR-2C-A-110D	$-5l43:	83-138 VDC	DPDT	10A	overvoltage undervoltage adjustable drop-out		PDF
VMR-2C-B-110D	$-5l44:	83-138 VDC	DPDT	10A	voltage band		PDF

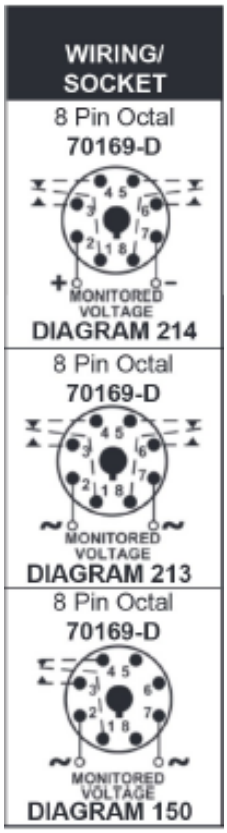
*** VMR-1C-x-480A requires part number 70169-D, (purchase separately).**

ProSense® Voltage Monitor Relays

Function Chart

Catalog Number	Operation	Function Chart
VMR-2C-F-12D **VMR-2C-F-24D** **VMR-2C-F-48D** **VMR-2C-F-110D** **VMR-2C-F-120A** **VMR-1C-F-240A** **VMR-1C-F-480A**	Adjust the pick-up voltage setting (U_{max}) between the full range as shown on the product nameplate. The drop-out voltage setting (U_{min}) is fixed at 95% of the pick-up setting. The relay energizes (and the LED is Red) when the monitored voltage is above the pick-up setting for a period longer than the fixed pick-up time delay of 0.5 seconds. The relay de-energizes (and the LED is Green) when the monitored voltage is below the drop-out setting for a period longer than the drop-out time delay (t) of 0.5 seconds.	
VMR-2C-A-12D **VMR-2C-A-24S** **VMR-2C-A-48D** **VMR-2C-A-110D** **VMR-2C-A-120A** **VMR-1C-A-240A** **VMR-1C-A-480A**	Adjust the pick-up voltage setting (U_{max}) between the full range as shown on the product nameplate. Then adjust the drop-out voltage setting (U_{min}) between 75% and 95% of the pick-up setting. The relay energizes (and the LED is Red) when the monitored voltage is above the pick-up setting for a period longer than the fixed pick-up time delay of 0.5 seconds. The relay de-energizes (and the LED is Green) when the monitored voltage is below the drop-out setting for a period longer than the drop-out time delay (t), which is adjustable between 0.1-10 seconds.	
VMR-2C-B-12D **VMR-2C-B-24D** **VMR-2C-B-48D** **VMR-2C-B-110D** **VMR-2C-B-120A** **VMR-1C-B-240A** **VMR-1C-B-480A**	Adjust the over voltage setting (U_{max}) between the full range as shown on the product nameplate. Adjust the under voltage setting (U_{min}) between 75% and 95% of the over voltage setting. The relay energizes (and the LED is Red) when the monitored voltage is between the over and under voltage settings. The relay de-energizes (and the LED is Green) when the monitored voltage falls outside the over or under voltage settings for a period longer than the drop-out time delay (t), which is adjustable from 0.1-10 seconds. The relay re-energizes when the monitored voltage returns to a value between the over and under voltage settings for a period longer than the pick-up time delay, which is fixed at 0.5 seconds.	

Wiring Diagram



ProSense® Octal Sockets

Features

- Mounts on 35mm DIN rail
- Screw clamp wire termination

70169-D

70170-D

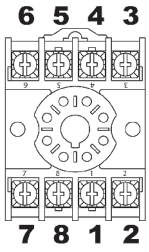
750-2C-SKT

Octal Sockets for Relays					
Part Number	*Price*	*Description*	*Qty*	*Wt (lb)*	*Drawing Links*
70169-D	$;5t6:	Macromatic relay socket, 8-pin, 35mm DIN rail or panel mount. For use with ProSense octal relays.	1	0.1	PDF
70170-D	$;53!s:	Macromatic relay socket, 11-pin, 35mm DIN rail or panel mount. For use with ProSense octal relays.	1	0.1	PDF
750-2C-SKT	$-b?j:	AutomationDirect relay socket, 8-pin, 35mm DIN rail or panel mount. For use with 750-2C and H750-2C series octal relays.	1	0.1	PDF

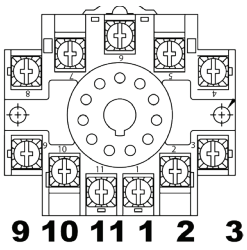
Octal Sockets Specifications								
Part Number	*Number of Pins*	*Voltage*	*Current*	*Screw Size*	*Wire Size (capacity)*	*Screw Torque*	*Screw Chassis Mounting Torque*	*Agency Approval **
70169-D	8	600V	10A	6-32	1 or 2, 12-20 AWG	12 in-lb	7 in-lb	UL Recognized E169693, CSA, CE
70170-D	11	300V	10A	6-32	1 or 2, 12-20 AWG	12 in-lb	12 in-lb	
750-2C-SKT	8	600V	5A	M3.5	1-12 AWG / 1-14 AWG	9 in-lb	7 in-lb	UL Recognized E225080, CSA, CE

*** To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

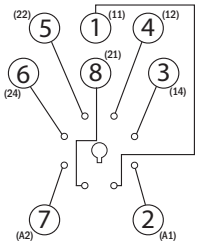
Socket Pinouts



70169-D



70170-D



750-2C-SKT

ProSense® Pump Seal Failure Relays

PSFR-1C-120A-TL

PSFR-2C-120A-TL

Overview

This relay is designed to monitor the shaft seals of submersible pumps. A resistive-measuring probe is installed in the pump seal cavity provided by pump manufacturer. If the seal starts to leak, contaminating fluid enters the seal cavity provided by pump manufacturer, lowering the resistance between the internal probe and the common connection.

When the resistance drops below the user-adjustable sensitivity setpoint of the relay, the output relay energizes and the LED turns Green. The LED turns Red for alarm state. The relay output can be used to give an alarm indication of a leaking seal. The relay will automatically reset when the fault condition clears.

Features

- Monitors submersible pump seals for leakage
- 8-pin, SPDT, single channel for monitoring one pump
- Adjustable sensitivity ranges (4.7K Ω to 100K Ω)
- Uses industry-standard 8-pin octal sockets

Agency Approvals

- cURus, File number E191059
- UL Listed, File number E191059
- CE

(with socket 70169-D)

Pump Seal Failure Relays				
Part Number	***Price***	***Description***	***Use With***	***Drawing Links***
PSFR-1C-120A-TL	$;4gt8:	ProSense pump seal failure relay, socket mount, finger-safe, 120 VAC coil voltage, SPDT, (1) N.O., (1) N.C., 10A contact rating, 8-pin, LED indicator(s), single channel for (1) pump monitoring. Relay becomes UL listed when used with 70169-D relay socket.	70169-D or 750-2C-SKT	PDF
PSFR-2C-120A-TL	$;4gt9:	ProSense pump seal failure relay, socket mount, finger-safe, 120 VAC coil voltage, SPST, (1) N.O., 5A contact rating, 8-pin, LED indicator(s), dual channel for (2) pump monitoring. Relay becomes UL listed when used with 70169-D relay socket.		PDF
70169-D	$;5t6:	Macromatic relay socket, 8-pin, 35mm DIN rail or panel mount. For use with ProSense octal relays.	------	PDF
750-2C-SKT	$-b?j:	AutomationDirect relay socket, 8-pin, 35mm DIN rail or panel mount. For use with 750-2C and H750-2C series octal relays.	-------	PDF

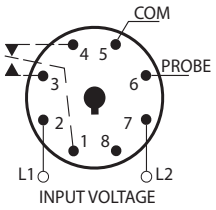
Specifications		
Part Number	***PSFR-1C-120A-TL***	***PSFR-2C-120A-TL***
Voltage Tolerance	120VAC (+10% / -15%) at 50/60Hz	
Output Contacts	SPDT: 10A @ 240V AC / 7A @ 28V DC, 1/4HP @ 120V AC (N.O.)	SPST: 5A @ 240V AC / 5A @ 28V DC, 1/4HP @ 120V AC (N.O.)
Life (Resistive Load)	Mechanical: 10,000,000 operations; Electrical: 100,000 operations	
Probe Voltage	5VDC Pulsed	
Response Time	Pick-up: 1s; Drop-out: 1s	
Power Consumption	3VA	
Temperature	Operating: -28 to 65°C [-18 to 149°F] Storage: -40to 85°C [-40 to 185°F]	
Mounting	8-pin octal socket	
Indicator LED	Green ON with input voltage applied; Red ON when seal leak detected and relay energized	
Output Contacts	10A at 240VAC / 7A at 28VDC Max	5A at 240VAC / 5A at 28VDC Max
Weight (lb)	0.4	
Agency Approvals *	cURus, (E191059), CE, (cULus when used with socket 70169-D)	

*** To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

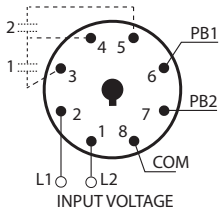
Pump Seal Failure Relay Wiring Diagrams

Wiring Diagrams

PSFR-1C-120A-TL

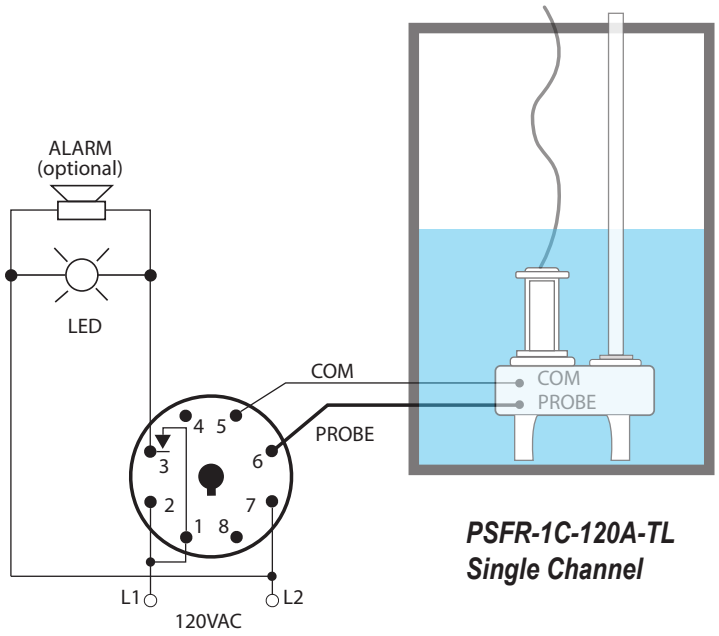


PSFR-2C-120A-TL

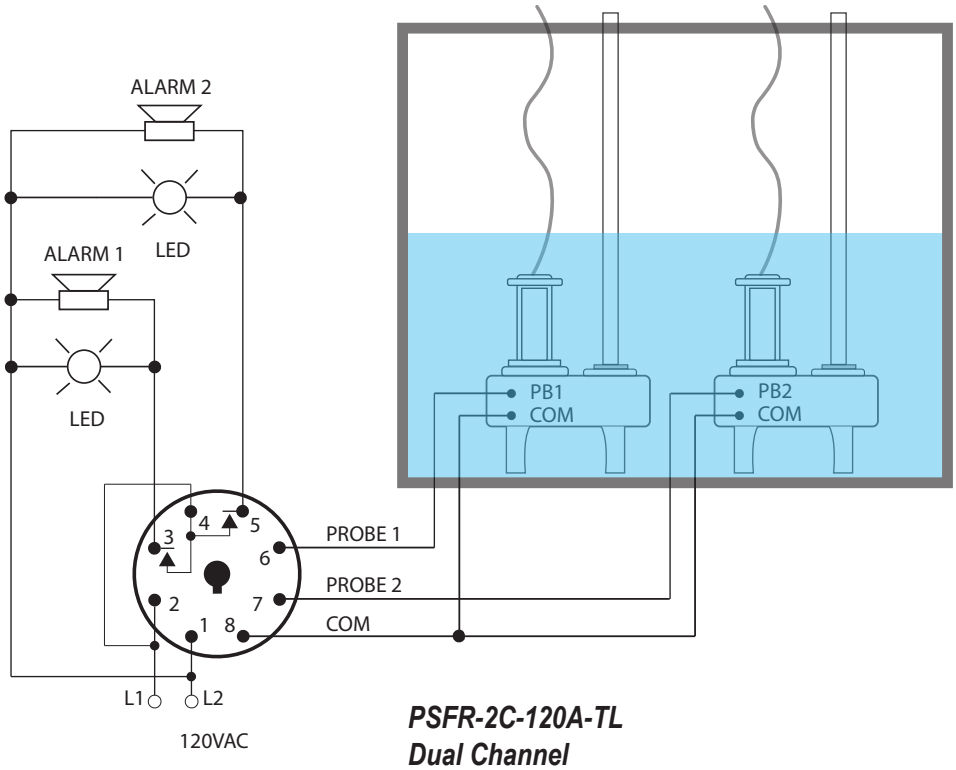


ProSense® Pump Seal Failure Relay

Typical Installation



PSFR-1C-120A-TL
Single Channel



PSFR-2C-120A-TL
Dual Channel

ProSense® Alternating Relays

AR-TL

ARX-TL

Overview

AR-TL Series
Alternating relays are used in special applications where the optimization of load usage is required by equalizing the run time of two loads. The alternating action is initiated by a control switch, such as a float switch, manual switch, timing delay, pressure switch, or other isolated contact. Each time the initiating switch is opened, the output relay contacts will change state, thus alternating the two loads. Two LED indicators show which load to energize next.

The alternating relay can be used with one or two control switches and is available in a SPDT output configuration.

The AR-TL Series Relays have a three-position selector switch. This allows the unit to alternate the two loads as normal, or lock the relay to one load or the other. By locking the alternating relay to one load, the other load can be removed for service without rewiring the first load for continuous operation. The selector switch has a low profile to prevent any accidental changes in status.

ARX-TL Series
Alternating relays with DPDT cross-wired outputs are used in applications requiring both (a) the optimization of load usage by equalizing the run time of two loads and (b) additional capacity in case of excess load requirements. The alternating action is initiated by a control switch, such as a float switch, manual switch, timing relay, pressure switch, or other isolated contact. Each time the initiating switch is opened, the output relay contacts will change state, thus alternating the two loads. Two LED indicators show the load to energize next.

Alternating relays with DPDT cross-wired output configurations can be used with two or three control switches.

The ARX-TL series relays have a three-position selector switch. This allows a DPDT cross-wired unit to alternate the two loads as normal, or lock the relay to always operate the same load first each time. In this manner, a load that has fewer hours of operation than the other load could be used more often in an effort to eventually balance the run time of both loads.

Features

AR-TL
- For duplex loads
- 10A SPDT output configuration
- Can be used with one or two control switches
- 120VAC Control voltage
- Compact plug-in design utilizing industry-standard 8-pin octal socket
- Low profile selector switch to lock in load
- 2 LEDs indicate load to energize next

ARX-TL
- For duplex loads
- 10A DPDT cross-wired output configuration
- Can be used with two or three control switches
- 120VAC control voltage
- Compact plug-in design utilizing industry-standard 8-pin octal socket
- Low profile selector switch to lock either load ON first
- 2 LEDs indicate load to energize first

Agency Approvals
- cURus, File number E191059
- UL Listed, File number E191059
- CE

(with socket 70169-D)

ProSense® Alternating Relays

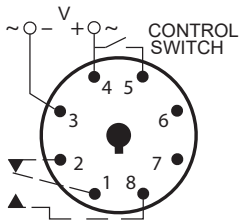
Alternating Relays				
Part Number	***Price***	***Description***	***Use With***	***Drawing Links***
AR-1C-120A-TL	$;4gtb:	ProSense alternating relay, socket mount, finger-safe, 120 VAC coil voltage, SPDT, (1) N.O., (1) N.C., 10A contact rating, 8-pin, LED indicator(s). Relay becomes UL listed when used with 70169-D relay socket.	70169-D or 750-2C-SKT	PDF
ARX-2C-120A-TL	$;4gta:	ProSense alternating relay, socket mount, finger-safe, 120 VAC coil voltage, DPDT, (2) N.O., (2) N.C., 10A contact rating, 8-pin, LED indicator(s). Relay becomes UL listed when used with 70169-D relay socket.		PDF
70169-D	$;5t6:	Macromatic relay socket, 8-pin, 35mm DIN rail or panel mount. For use with ProSense octal relays.	-----	PDF
750-2C-SKT	$-b?j:	AutomationDirect relay socket, 8-pin, 35mm DIN rail or panel mount. For use with 750-2C and H750-2C series octal relays.	-----	PDF

Specifications		
Part Number	***AR-1C-120A-TL***	***ARX-2C-120A-TL***
Voltage Tolerance	120VAC 50/60Hz (+10% / -15%)	
Output Contacts	SPDT: 10A @ 240V AC/24V DC 1/2HP @ 120/240V AC (N.O.) 1/3HP @ 120/240VAC (N.C.) B300, R300 (N.O.) Pilot Duty	DPDT: 10A @ 240V AC/24V DC 1/2HP @ 120/240V AC (N.O.) 1/3HP @ 120/240VAC (N.C.) B300, R300 (N.O.) Pilot Duty
Life (Resistive Load)	Mechanical: 10,000,000 operations; Electrical - Resistive: 100,000 operations	
Power Consumption	Less than 3VA	
Temperature	Operating: -28 to 65°C [-18 to 149°F] Storage: -40 to 85°C [-40 to 185°F]	
Mounting	8-pin octal socket	
Indicator LED	2 LEDs marked LOAD 1 and LOAD 2	
Selector Switch Settings	LOAD 1 ALTERNATE LOAD 2	LOAD 1 (Always energizes first) ALTERNATE LOAD 2 (Always energizes first)
Weight (lb)	0.3	
Agency Approvals *	cURus, (E191059), CE, (cULus when used with socket 70169-D)	

*** To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

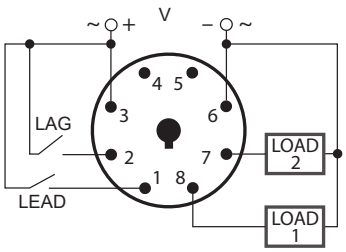
Wiring Diagrams

AR-1C-120A-TL



LOAD 1: PIN 2
LOAD 2: PIN 8

ARX-2C-120A-TL



ProSense® Alternating Relays

Typical Installations

When using the AR series relay with the selector switch in the "Alternate" position in the initial off state (Figure A), the Control Switch is open, the Alternating Relay is in the "LOAD 1" position, and both loads (M1 and M2) are off. The red LED marked "LOAD 1" is ON. When the Control Switch closes, it energizes Load M1. As long as the Control Switch remains closed, Load M1 remains energized. When the Control Switch opens, Load M1 is turned off and the Alternating Relay toggles to the "LOAD 2" position. The red LED marked "LOAD 2" glows. When the Control Switch closes again, it energizes Load M2. When the Control Switch opens, Load M2 is turned off, the Alternating Relay toggles back to the "LOAD 1" position, and the process can be repeated again. On relays with DPDT contacts, two pilot lights can be used for remote indication of "LOAD 1" or "LOAD 2" status.

To eliminate any bounce condition of the Control Switch, the addition of a second switch (OFF) along with two auxiliary contacts is recommended as shown (Figure B).

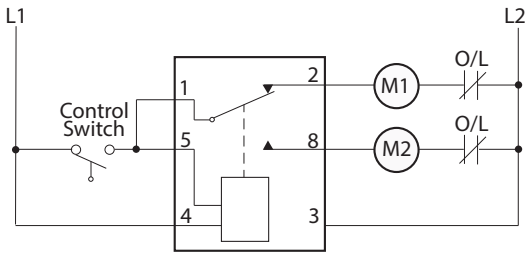


Figure A

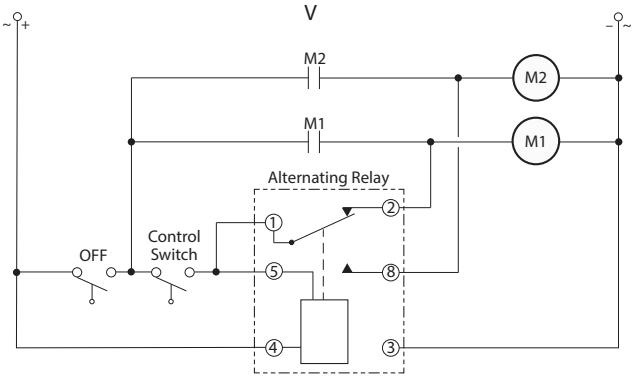


Figure B

When using the ARX series relay with the selector switch in the "Alternate" position in the initial off state (Figure C), both the LEAD Control Switch and the LAG Control Switch are open, the Alternating Relay is in the "LOAD 1" position, and both loads are off. The red LED marked "LOAD 1" is ON. When the LEAD Control Switch closes, it energizes Load M1. As long as the LEAD Control Switch remains closed, Load M1 remains energized. If the LAG Control Switch closes, it energizes Load M2. When the LAG Control Switch opens, Load M2 is turned off. When the LEAD Control Switch opens, Load M1 is turned off And the Alternating Relay toggles to the "LOAD 2" position. The red LED marked "LOAD 2" is ON. When the LEAD Control Switch closes, it turns on Load M2. If the LAG Control Switch closes, it will energize Load M1. When the LAG Control Switch opens, Load M1 is turned off. When the LEAD Control Switch opens, Load M2 is turned off, the Alternating Relay toggles back to the "LOAD 1" position, and the process can be repeated again.

A type of operation known as "Sequence On - Simultaneously Off (S.O.S.O.)" where the two loads are energized sequentially, but remain on together until the OFF switch is opened (Figure D). In the initial OFF state, all three switches are open, the Alternating Relay is in the "LOAD 1" position, and both loads are off. No action happens with the Alternating Relay or either load when the OFF Switch closes. When the LEAD Switch closes, Load M1 turns on. When the LAG Switch closes, Load M2 turns on. Both loads remain on as long as all three switches are closed. When the LAG Switch opens, Load M2 remains on because the OFF Switch is still closed. When the LEAD Switch opens, Load M1 remains on because the STOP Switch is still closed. When the OFF Switch opens, both Load M1 and Load M2 are turned off simultaneously. The Alternating Relay toggles to the "LOAD 2" position. The entire cycle is then repeated, but with Load M2 energized first followed by Load M1.

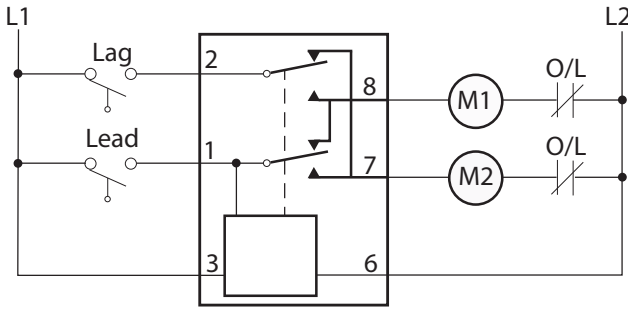


Figure C

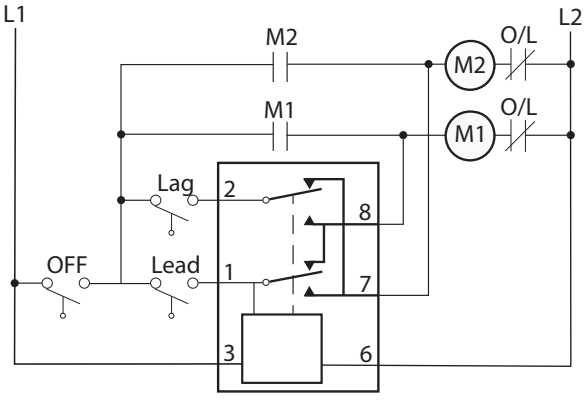


Figure D

Note: M1 and M2 reference in Figures A,B,C and D are coils.

Macromatic Intrinsically Safe Relays

ISDUR4

ISEUR1

ISD Series

The ISD Series of Intrinsically Safe Relays provide a safe and reliable method to control up to four loads (motor starters, relays, etc.) with up to four input devices (switches, sensors, etc.) located in a hazardous area. These products are approved for use in Class I Groups A, B, C, D, Class II Groups E, F, G, and Class III Hazardous Locations (Zones 0 & 1 in Canada). The ISD Series relay must be mounted in a safe area.

The ISD Series relays utilize a compact 60mm wide enclosure that can be both mounted on 35mm DIN rail or panel-mounted with two screws. Terminals for the input devices from the hazardous area are on the bottom of the unit for easy access in the enclosure to incoming wiring from the hazardous area. Pluggable terminal blocks on both the input and output sides allow for easy initial wiring of the unit as well as replacement without having to remove any wires.

Each input has two terminals, which eliminates the need to mount a separate terminal block to connect multiple incoming COM wires. Each output relay has two terminals for isolation from the others, allowing outputs to be at different voltages, i.e., contactor coils at 120VAC and an alarm circuit at 24VDC. A universal input voltage of 102–132 VAC & 10–125 VDC covers a variety of applications with one device.

Operation

Each ISD Series product consists of 4 intrinsically safe inputs and 4 corresponding electromechanical relay outputs. With input voltage applied, the V LED will be ON (GREEN) to indicate power is applied. When the input device is closed, the input LED is ON (GREEN). When the output relay is energized, the output LED is ON (ORANGE).

These products offer four operating configurations to meet a wide variety of applications. Each configuration is user-selectable using two DIP-switches easily accessible and clearly marked on the top of the product.

ISE Series

The ISE Series of Intrinsically Safe Relays provide a safe and reliable method to control a single load (motor starters, relays, etc.) with a single input device (switches, sensors, etc.) located in a hazardous area. These products are approved for use in Class I Groups A, B, C, D; Class II Groups E, F, G, and Class III Hazardous Locations (Zones 0 & 1 in Canada). The ISE Series relay must be mounted in a safe area.

The ISE Series relays utilize a compact 17.5 mm wide enclosure that can be both mounted on 35mm DIN rail or panel-mounted with two screws. Hazardous terminals are on the bottom of the unit for easy access in the enclosure to incoming wiring from the hazardous area and are clearly marked.

Standard Operation

Each ISE Series relay consists of an intrinsically safe input and a corresponding electromechanical relay output. There is one bi-color LED for status indication. With input voltage applied, the LED will be ON (Green) to indicate power is applied.

When the input device from the hazardous area is closed, the output relay is energized and the LED is ON (Orange). When the input device opens, the output relay will de-energize and the LED will be ON (Green).

ISDUR4 DIP-Switch Settings

DIP-Switch	Setting	Description	DIP-Switch	Setting	Description
Delay	0 S	The output relay will have an immediate change in status in response to the input device closing or opening.	Logic	STD	When the input device in the hazardous area is closed, the corresponding output relay is energized. When the input device opens, the corresponding output relay will de-energize.
	2 S	The output relay will delay 2 seconds before a change of status in response to the input device closing or opening.		INV	When the input device in the hazardous area is open, the corresponding output relay is energized. When the input device closes, the corresponding output relay will de-energize.

Macromatic Intrinsically Safe Relays

Features

ISD

- Approved for use in Class I, Class II, and Class III Hazardous Locations (Zones 0 & 1 in Canada)
- 4-Channel
- Isolated input terminals
- Isolated 5A relay outputs
- Load burden 5VA
- Pluggable terminals offer easy installation & replacement
- Universal input voltage, 10–125 VDC & 102–132 VAC, 50/60 Hz
- Compact 60mm wide enclosure for both DIN-rail or panel mount
- Instantaneous & delayed response times
- LED status indicator

ISE

- Approved for use in Class I, Class II, and Class III Hazardous Locations (Zones 0 & 1 in Canada)
- 1-Channel
- 5A relay output
- Universal input voltage of 102–132 VAC & 10–125 VDC
- Compact 17.5 mm wide enclosure for both DIN-rail or panel-mount
- LED status indicator

Agency Approvals

- cULus, UL913 8th Edition
- CE

Intrinsically Safe Relays			
Part Number	***Price***	***Description***	***Drawing Links***
ISDUR4	$;-04gtj:	Macromatic intrinsically safe relay, 35mm DIN rail mount, finger-safe, Discrete Input: 4-point, 10 VDC input voltage, 102-132 VAC or 10-125 VDC coil voltage, Discrete Output: 4-point, relay, 4PST, 5A contact rating, (4) N.O., LED indicator(s).	PDF
ISEUR1	$;4gtk:	Macromatic intrinsically safe relay, 35mm DIN rail mount, finger-safe, Discrete Input: 1-point, 10 VDC input voltage, 102-132 VAC or 10-125 VDC coil voltage, Discrete Output: 1-point, relay, SPST, 5A contact rating, (1) N.O., LED indicator(s).	PDF

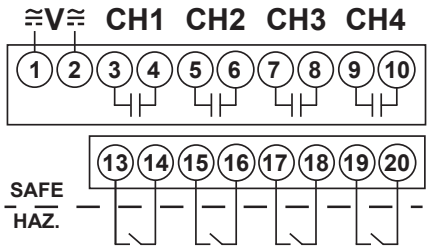
Specifications		
Part Number	***ISDUR4***	***ISEUR1***
Input Voltage	102-132 VAC or 10-125 VDC@ (50/60 Hz)	
Input Switch Open Circuit Voltage:	10VDC	
Output Contacts	SPST-N.O. (Form A): 3A Resistive @ 125VAC @ 60°C [140°F] 30VDC resistive, Pilot Duty Rating D300	SPST-N.O. (Form A): 3A resistive @ 125VAC @ 60°C [140°F] 30VDC resistive, Pilot Duty Rating D300
	SPST-N.O. (Form A): 5A resistive @ 125VAC @ 40°C (104°F) 30VDC resistive, Pilot Duty Rating D300	
Life (Resistive Load)	Mechanical: 5,000,000 operations; Electrical - Resistive: 50,000 operations	
Response Times	< 50ms (DIP Switch set to "0S") Fixed 2 Seconds (DIP Switch set to "2S")	< 50ms
Power Consumption	5VA Maximum	2VA Maximum
Temperature	Operation: -28 to 60°C [-18.4 to 140°F] Storage: -55 to 85°C [-67 to 185°F]	
Mounting	35mm DIN-rail or panel-mounted	
Wiring	One 14-24 AWG Conductor or Two 16 or 18 AWG Conductors	
Insulation Voltage	1500VAC between coil & contacts 750VAC between open contacts 1500VAC between contacts of different output channels 1500VAC between hazardous and safe circuits	1500VAC between coil & contacts 750VAC between open contacts 1500VAC between hazardous and safe circuits
Indicator LED	V: ON (Green); Inputs: ON (Green); Outputs: ON (Orange)	Standard Operation, ON (Green) - Input voltage; ON (Orange) - Input closed and relay energized
Weight (lb)	0.46	0.18
Approvals	cULus, (UL913 8th Edition), CE	

*** To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

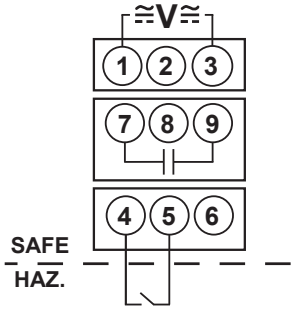
Macromatic Intrinsically Safe Relays

Wiring Diagrams

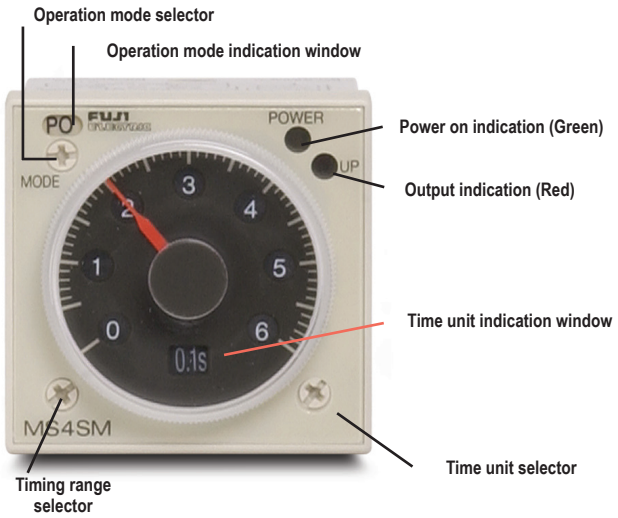
ISDUR4



ISEUR1



Timers for all Applications



Koyo digital timers: powerful but easy to use

This full-function timer has all the bells and whistles, including full programmability:

Timing ranges and modes: Seconds to hours time ranges with decimal selection and up and down timing modes accommodate a wide range of applications.

Output modes: Five output modes, from on-delay to one-shot, use a reliable 2A relay to operate the controlled device.

Tamper-proof: Key protection can be set for individual keys to prevent unintentional changes by the operator.

Fuji multi-mode timers with full features

Ease of use: As the time range is adjusted, the corresponding display changes.

Full functionality: Up to four output modes can be selected simply with the turn of a screw. All outputs contain 5A, DPDT relays.

LED indicators

Miniature DIN timers are small and accurate

Small size: Under one inch wide.

Easy operation: A simple dial allows easy setup for the operator.

Accuracy: The timer will perform its timing function with repeatable accuracy of +/- 1% of the setting.

	ST7P Series	MS4S Series	KT-V4S Series
			
Display	Manual dial Time setting Output LED indicator	Manual dial Time setting Power LED indicator Output LED indicator Output mode setting	4-digit green LED display for time setting 4-Digit red LED display for current time Output LED indicator Programming indicators
Input Power	100-120 VAC or 24 VDC	100-240 VAC or 24 VDC/AC	85-260 VAC or 10-26 VDC
Inputs	Timed signal	Reset signal Start signal Gate signal Timed signal	Start signal Reset signal Timed signal
Outputs	Normally-open DPDT Normally-closed DPDT	Normally-open DPDT Normally-closed DPDT	1 SPDT DC NPN transistor
Contact Rating	3 A @ 240 VAC (resistive load)	5 A @ 250 VAC (resistive load)	Mechanical: 2 A @ 220 VAC Transistor: 100 mA @ 24 VDC
Output Modes	On-delay	On-delay Flicker One shot Off-delay	On-delay Flicker One shot Off-delay Accumulation
Time Ranges	0.4 seconds to 60 minutes	0.05 seconds to 60 hours	0.001 seconds to 999.9 hours
Enclosure Rating	NEMA 1	NEMA 1	IP65 - faceplate
Agency Approvals	UL/CSA/CE/TUV	UL/CSA/CE/TUV	UL/CSA/CE

Fuji 1/16 DIN Super Timers

Overview

The MS4S series super timers are 1/16 DIN style timing relays designed for process control, machine tool control, safety control and many other types of applications. The timers are plug-in 8-pin or 11-pin surface/ DIN-rail mountable with up to four selectable modes of operation and four selectable timing ranges.

MS4SM Series

- Multi-mode timer with mode indication. On-delay (PO), flicker (FL), one-shot (OS), or signal off-delay (SF)
- 11-pin plug-in with start, reset and gate (interrupt) input signals and a DPDT contact output
- Timing range from 0.05 seconds to 60 hours
- Timer scale with selectable ranges of 0-6, 0-12, 0-30 and 0-60
- Timing units in selectable ranges of 0.1s, sec, min and hrs
- Power on LED indicator (green) flickers during timing operation, UP (red) LED is on when normally open contact is closed

MS4SA Series

- On-delay timer
- 8-pin plug-in with a DPDT contact output
- Timing range from 0.05 seconds to 60 hours
- Timer scale with selectable ranges of 0-6, 0-12, 0-30 and 0-60s
- Timing units in selectable ranges of 0.1s, sec, min and hrs
- Power on LED indicator (green) flickers during timing operation, UP (red) LED is on when normally open contact is closed

MS4SC Series

- On-delay timer
- 8-pin plug-in with a SPDT timed contact output and a SPDT instantaneous contact output
- Timing range from 0.05 seconds to 60 hours
- Timer scale with selectable ranges of 0-6, 0-12, 0-30 and 0-60
- Timing units in selectable ranges of 0.1s, sec, min and hrs
- Power on LED indicator (green) flickers during timing operation, UP (red) LED is on when normally open contact is closed

Fuji 1/16 DIN Super Timers Selection Chart

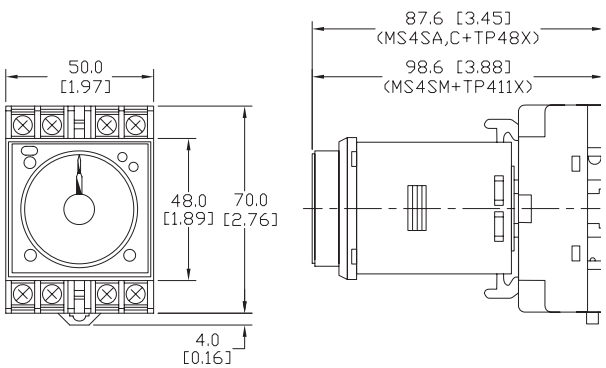
Part Number	Price	Description	Time Range
MS4SM-AP-ADC*	$04?u:	Fuji Electric multi-mode relay timer, 0.05 seconds to 60 hours selectable timing range, 100-240 VAC operating voltage, 5A contact rating, (1) DPDT timed relay output(s), socket mount, 11-pin. Requires Fuji Electric TP411X or TP411SBA timer socket.	0.05 seconds to 60 hours
MS4SA-AP-ADC	$04?q:	Fuji Electric on-delay relay timer, 0.05 seconds to 60 hours selectable timing range, 100-240 VAC operating voltage, 5A contact rating, (1) DPDT timed relay output(s), socket mount, 8-pin. Requires Fuji Electric TP48X or TP48SB timer socket.	0.05 seconds to 60 hours
MS4SC-AP-ADC*	$;;0d!f:	Fuji Electric on-delay relay timer, 0.05 seconds to 60 hours selectable timing range, 100-240 VAC operating voltage, 5A contact rating, (1) SPDT timed relay and (1) SPDT instant relay output(s), socket mount, 8-pin. Requires Fuji Electric TP48X or TP48SB timer socket.	0.05 seconds to 60 hours
MS4SM-CE-ADC*	$04?v:	Fuji Electric multi-mode relay timer, 0.05 seconds to 60 hours selectable timing range, 24 VAC/VDC operating voltage, 5A contact rating, (1) DPDT timed relay output(s), socket mount, 11-pin. Requires Fuji Electric TP411X or TP411SBA timer socket.	0.05 seconds to 60 hours
MS4SA-CE-ADC*	$04?s:	Fuji Electric on-delay relay timer, 0.05 seconds to 60 hours selectable timing range, 24 VAC/VDC operating voltage, 5A contact rating, (1) DPDT timed relay output(s), socket mount, 8-pin. Requires Fuji Electric TP48X or TP48SB timer socket.	0.05 seconds to 60 hours
MS4SC-CE-ADC*	$;04?t:	On-delay timer with selectable timing range from 0.05s to 60 hours. Input power is 24 VDC/AC. SPDT timed relay output and SPDT instantaneous relay output. 8-pin connection. UL, CSA, TÜV approved.	0.05 seconds to 60 hours
TP411X	$;05t2:	Fuji Electric timer socket, 35mm DIN rail mount. For use with MS4SM series timers.	N/A
TP411SBA	$;05t1:	Fuji Electric timer socket, panel mount. For use with MS4SM series timers.	
TP48X	$;05t4:	Fuji Electric timer socket, 35mm DIN rail mount. For use with MS4SA and MS4SC series timers.	
TP48SB	$;05t3:	Fuji Electric timer socket, panel mount. For use with MS4SA and MS4SC series timers.	
PANEL-16	$;0b[4:	AutomationDirect mounting clips, package of 5. For use with 1/16 DIN timers and counters.	

*** Socket mounts must be purchased separately**

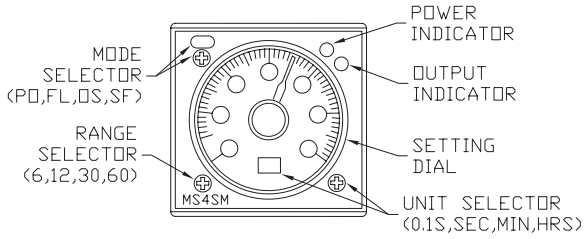
Dimensions

mm [inches]

(Timer and Socket Assembly)



Control

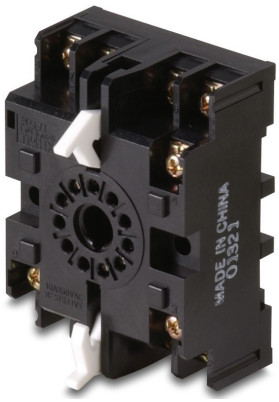


Fuji 1/16 DIN Super Timers

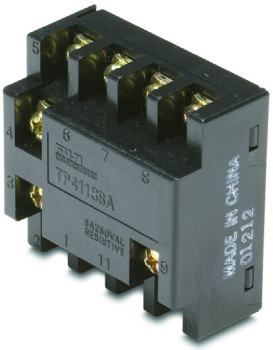
MS4SM-AP-ADC
MS4SM-CE-ADC

MS4SA-AP-ADC
MS4SA-CE-ADC

MS4SC-AP-ADC
MS4SC-CE-ADC



TP411X



TP411SBA*

TP48X

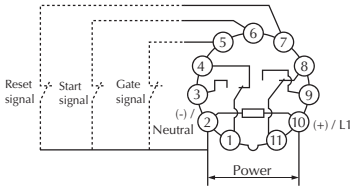
TP48SB*

Fuji 1/16 DIN Super Timers Specifications		
Approvals	UL file no.: E44592, CSA file no.: LR20479, TÜV license no: R9551800	
Repeat Accuracy	±0.3% at maximum setting time	
Reset Time	0.1 second or less	
Operating Voltage Range	85-264 VAC 50/60Hz MS4SA-AP-ADC MS4SC-AP-ADC MS4SM-AP-ADC	20.4-26.4 VDC/AC MS4SA-CE-ADC MS4SC-CE-ADC MS4SM-CE-ADC
Operating Temperature Range	-10 to +55°C [14 to 131°F] (no icing)	
Humidity	35 to 85% (no condensation)	
Contact Ratings	5A at 30VDC resistive load, 1A @ 30VDC inductive load, 5A @ 250VAC resistive load, 2.5 A @ 120VAC inductive load	
Power Consumption	Approx. 10VA for AC; 1W at 24VDC	
Insulation Resistance	100MΩ at 500VDC insulation tested	
Dielectric Strength	2000VAC 1 min. between current carrying part and non-current carrying part 2000VAC 1 min. between output contact and control circuit 1000VAC 1 min. between open contacts	
Vibration	Malfunction durability: 10 to 55Hz, 0.5mm double amplitude Mechanical durability: 10 to 55Hz, 0.75mm double amplitude	
Shock	Malfunction durability: 100m/s² Mechanical durability: 500m/s²	
Life Expectancy	Mechanical: 20 million operations (No load operation cycle: 1800/hr.) Electrical: 100,000 operations at 250 VAC 5 A resistive load (operation cycle: 1800/hr)	
Weight	Approx. 100g [3.527 oz]	

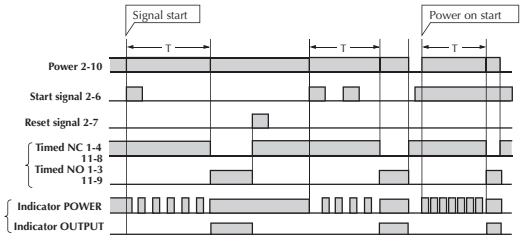
***When using panel mount sockets TP411SBA and TP48SB, mounting clip PANEL-16 is required and must be purchased separately.**

Fuji 1/16 DIN Timers Timing and Wiring Diagrams

MS4SM

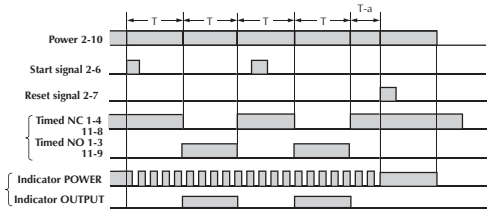


1. On-delay PO



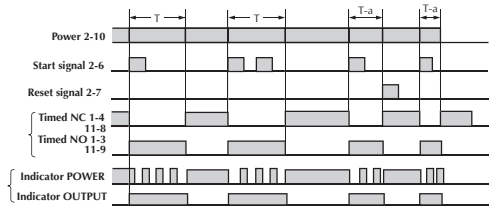
- With power off turn the mode selector until PO is displayed.
- When power is on, applying the start signal turns the timed N.O. (normally open) contact on after the set time has elapsed.
- When using a power-on start, pins 2 and 6 (start signal) must be jumpered together
- To make timer output a signal as soon as power is turned on, turn timer dial fully counter-clockwise.

2. Flicker FL



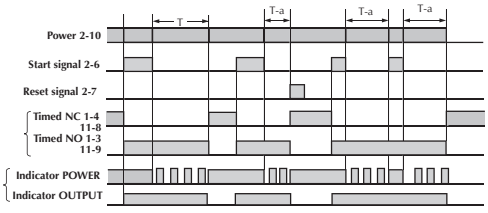
- With power off, turn the mode selector until FL is displayed.
- When power is on, applying the start signal turns the timed contact on and off repeatedly at the set time intervals.
- When using a power-on start, pins 2 and 6 (start signal) must be jumpered together

3. One-shot OS



- With power off, turn the mode selector until OS is displayed.
- When power is on, applying the start signal instantly turns the timed N.O. contact on and turns it off after the set time has elapsed.

4. Signal off-delay SF



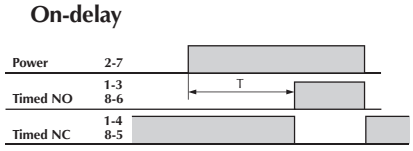
- With power off, turn the mode selector until SF is displayed.
- When power is on, applying the start signal instantly turns the timed N.O. contact on. Removing the start signal turns the contact off after the set time has elapsed.

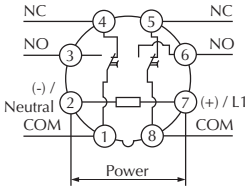
Notes:

1. ***T= set time. t = time period within set time.***
2. ***The gate signal is used to interrupt the timing operation.***

MS4SA

On-delay

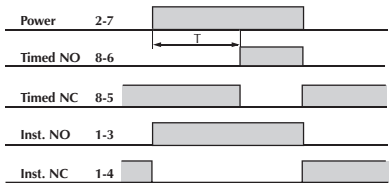


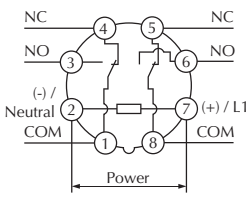


- When power is applied, the timed N.O. contacts make after the set time has elapsed.
- When power is removed, the contacts reset.
- To make timer output a signal as soon as power is turned on, turn timer dial fully counter-clockwise.

MS4SC

On-delay





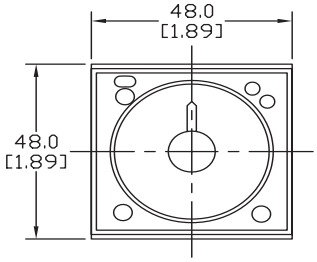
- Timed contact
  When power is applied, the N.O. contact makes after the set time has elapsed. When power is removed, the contacts reset.
- Instantaneous contact
  When power is applied, the N.O. contact makes instantly. When power is removed, the contacts reset.
- To make timer output a signal as soon as power is turned on, turn timer dial fully counter-clockwise.

Fuji 1/16 DIN Super Timers Dimensions

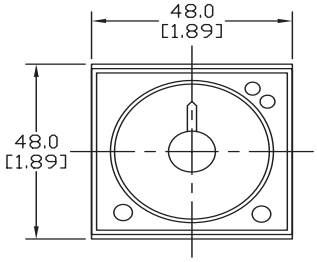
Dimensions

mm [inches]

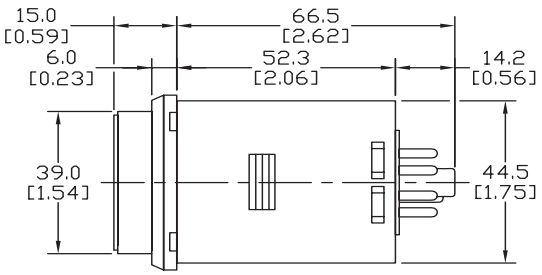
MS4SM



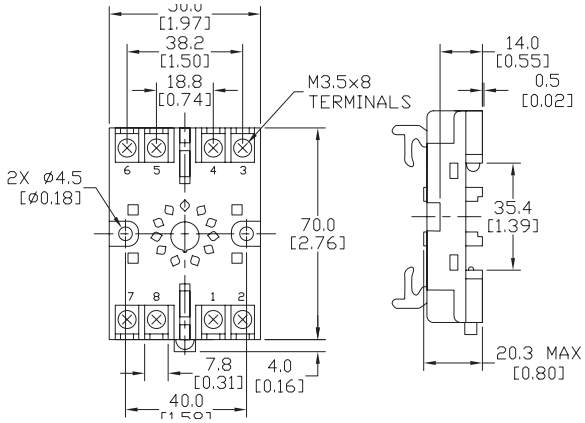
MS4SA and MS4SC



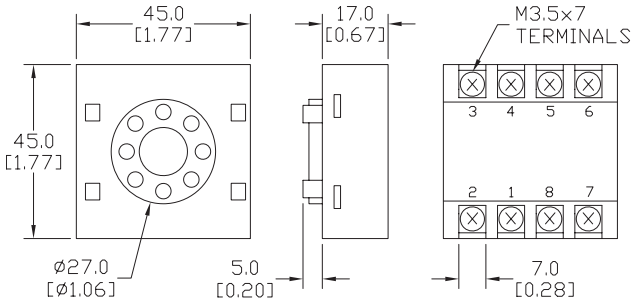
Side View



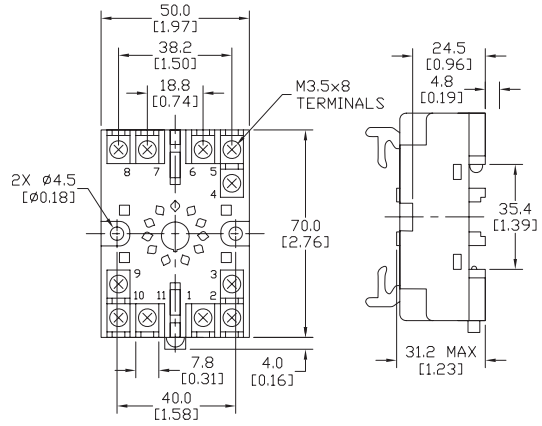
Socket for MS4SA, MS4SC (8-pin)
TP48X



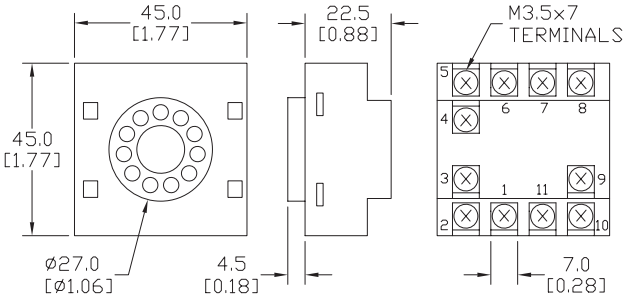
Socket for MS4SA, MS4SC, (8-pin)
TP48SB



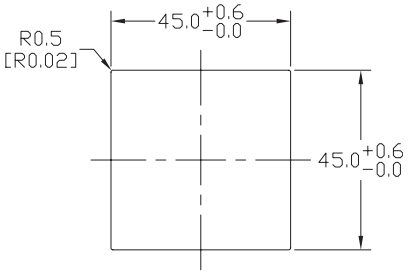
Socket for MS4SM (11-pin)
TP411X



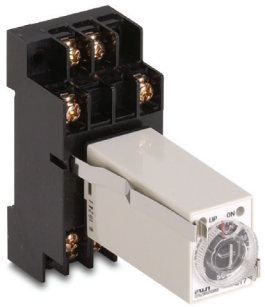
Socket for MS4SM (11-pin)
TP411SBA



Cutout for panel mounting TP48SB and TP411SBA sockets using PANEL-16 mounting clips



Fuji Miniature DIN Super Timers



Overview

The ST7P is a compact and highly accurate timer. It is an on-delay operation type with a single timing range. These timers are designed to optimize mounting space in small areas. Mounting is by DIN rail or by securing directly to a panel with a fastener.

Features

- Highly accurate, with a repeat accuracy within ±1% at maximum setting time
- ST7P models offer a number of timing ranges. Please see Selection Guide below
- Large dial makes time setting easy
- LED indicators make it easy to monitor timer operation
- ST7P series meets UL and CSA standards

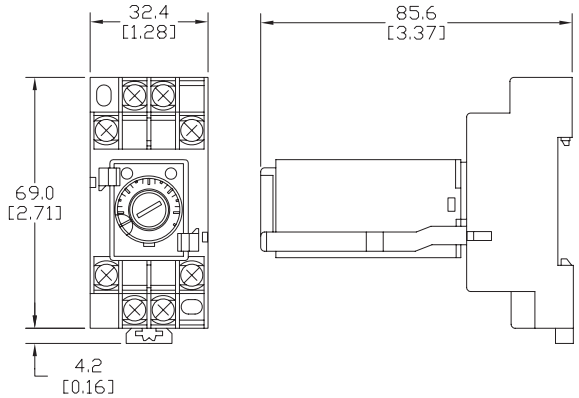
Fuji Miniature DIN Super Timers Selection Chart

Part Number	Price	Description	Voltage	Time Range
ST7P-2A15S-ADC	$04?z:	Mini-DIN on-delay timer with timing range of 0.4s to 5s. Input power is 100-120 VAC. DPDT relay output. UL, CSA, TÜV approved	100-120VAC	0.4 seconds to 5 seconds
ST7P-2A13T-ADC	$04?y:	Mini-DIN on-delay timer with timing range of 2s to 30s. Input power is 100-120 VAC. DPDT relay output. UL, CSA, TÜV approved		2 seconds to 30 seconds
ST7P-2A16T-ADC	$;04?[:	Mini-DIN on-delay timer with timing range of 4s to 60s. Input power is 100-120 VAC. DPDT relay output. UL, CSA, TÜV approved		4 seconds to 60 seconds
ST7P-2A11N-ADC	$04?x:	Mini-DIN on-delay timer with timing range of 1 min. to 10 min. Input power is 100-120 VAC. DPDT relay output. UL, CSA, TÜV approved		1 minute to 10 minutes
ST7P-2A16N-ADC	$;04?]:	Mini-DIN on-delay timer with timing range of 4 min. to 60 min. Input power is 100-120 VAC. DPDT relay output. UL, CSA, TÜV approved		4 minutes to 60 minutes
ST7P-2DE5S-ADC	$;04?!:	Mini-DIN on-delay timer with timing range of 0.4s to 5s. Input power is 24 VDC. DPDT relay output. UL, CSA, TÜV approved	24VDC	0.4 seconds to 5 seconds
ST7P-2DE3T-ADC	$04?#:	Mini-DIN on-delay timer with timing range of 2s to 30s. Input power is 24 VDC. DPDT relay output. UL, CSA, TÜV approved		2 seconds to 30 seconds
ST7P-2DE6T-ADC	$;04?,:	Mini-DIN on-delay timer with timing range of 4s to 60s. Input power is 24 VDC. DPDT relay output. UL, CSA, TÜV approved		4 seconds to 60 seconds
ST7P-2DE1N-ADC	$04?_:	Mini-DIN on-delay timer with timing range of 1 min. to 10 min. Input power is 24 VDC. DPDT relay output. UL, CSA, TÜV approved		1 minute to 10 minutes
ST7P-2DE6N-ADC	$04??:	Mini-DIN on-delay timer with timing range of 4 min. to 60 min. Input power is 24 VDC. DPDT relay output. UL, CSA, TÜV approved		4 minutes to 60 minutes
TP88X2	$;05t5:	DIN rail/surface mount socket for ST7P series timers. UL, CSA, TÜV approved	N/A	N/A

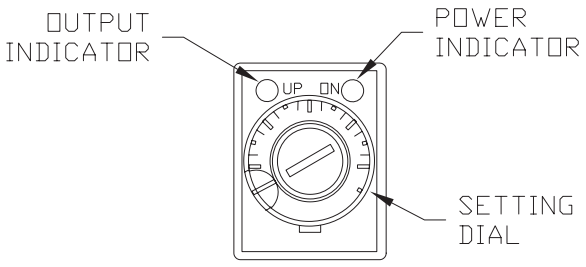
Dimensions

mm [inches]

Timer and Socket Assembly



Control



Fuji Miniature DIN Super Timer Specifications

Fuji Miniature DIN Super Timers Specifications		
Repeat Accuracy	±01% at maximum setting time	
Reset Time	0.1 second or less	
Maximum Operating Cycle	1800 cycles/hour	
Operating Voltage Range	85-132 VAC 50/60 Hz ST7P-2A15S-ADC ST7P-2A13T-ADC ST7P-2A16T-ADC ST7P-2A11N-ADC ST7P-2A16N-ADC	20.4-26.4 VDC ST7P-2DE5S-ADC ST7P-2DE3T-ADC ST7P-2DE6T-ADC ST7P-2DE1N-ADC ST7P-2DE6N-ADC
Operating Temperature Range	-10 to +50°C [14 to 122°F]	
Humidity	35 to 85% (no condensation)	
Contact Ratings	3A @ 240 VAC resistive load, 1 A @120 VAC inductive load; 3A @ 30 VDC resistive load, 0.5 A @ 30 VDC inductive load	
Power Consumption	Approx. 1.2 VA at 100 VAC, approx. 1.5 VA at 200 VAC, 1.1 W at 24 VDC.	
Insulation Resistance	100MΩ at 500 VDC insulation tested	
Surge Voltage *	3000 Volts	
Dielectric Strength	2000 VAC 1 min. between current carrying part and non-current carrying part 2000 VAC 1 min. between output contact and control circuit 1000 VAC 1 min. between open contacts	
Vibration	Malfunction durability: 10 to 55Hz, 0.5mm double amplitude Mechanical durability: 10 to 55Hz, 0.7mm double amplitude	
Shock	Malfunction durability: 50m/s² Mechanical durability: 1000m/s²	
Life Expectancy	Mechanical: 50 million operations (No load; operation cycle 1800/hr.) Electrical: 500,000 operations (3A @ 220 VAC, resistive load; operation cycle 1800/hr.)	
Weight	36.288 g [1.28 oz]	
Agency Approvals and Standards **	UL file no.: Body - E44592, Socket - E90265; TÜV license no: R9551799	

*** Note: If surge voltage exceeds 3000V, use surge suppressors.**
**** To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**
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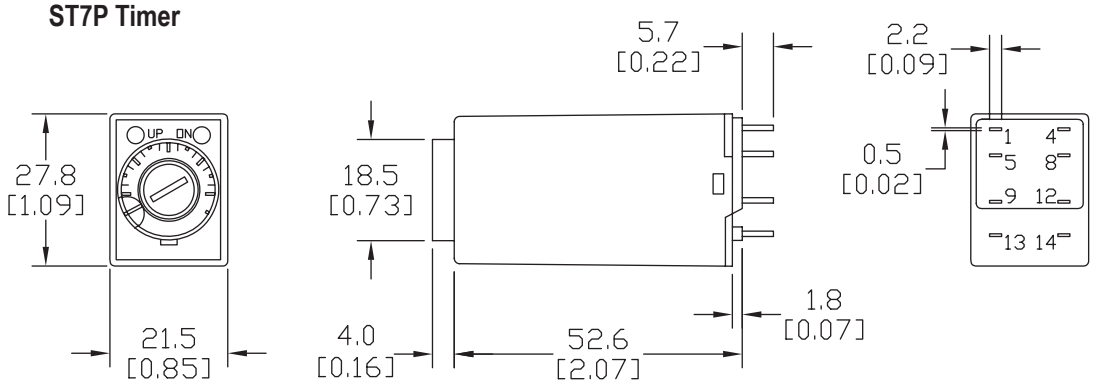
Fuji Miniature DIN Timers, Dimensions, Timing and Wiring

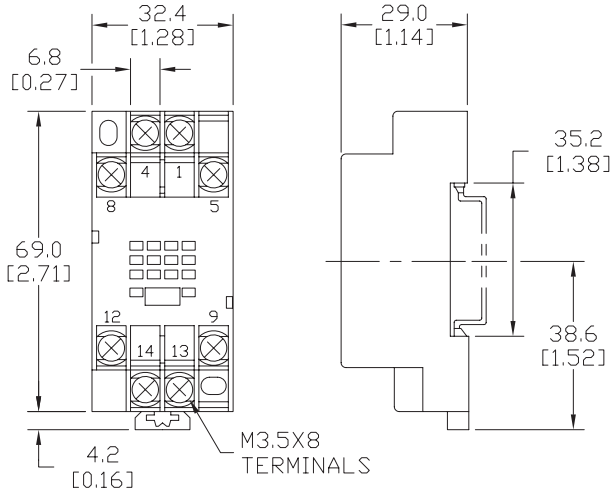
Dimensions

mm [inches]

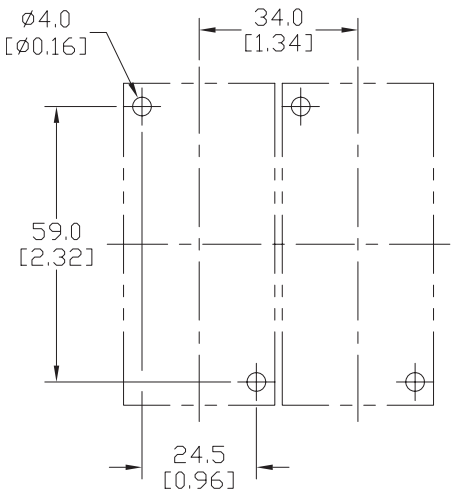
ST7P Timer



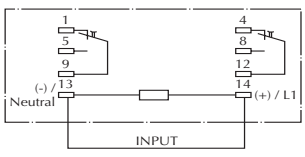
TP88X2 Socket



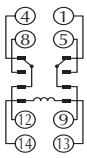
Panel Mounting



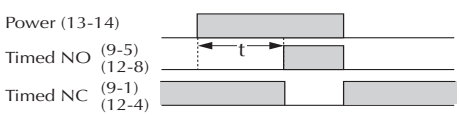
Wiring Diagram



Sockets/Screw Terminal and Rail Mounting



Timing Diagram



Dold Relay Timers

Multi-Mode Relay Timers MK Series

Overview

The MK series relay timers are timing relays designed for process control, machine tool control, safety control and many other types of applications. The timers are DIN-rail mountable with up to 8 functions in one unit.

Fleeting/single shot on make:
The relay switches on immediately when energized and switches off after the time delay, or when de-energized.

Fleeting/single shot on break:
When energizing nothing happens. When de-energized, the relay switches on for the adjusted time and switches off after the time is elapsed.

Features

- Eight time ranges from 0.02 sec to 300hr selectable via rotational switches
- Voltage range 12– 240 VAC/VDC
- Eight functions can be set via rotational switch:
- Delay on energization (AV)
- Fleeting on make (EW)
- Delayed pulse (IE)
- Flasher, start with pulse (BI)
- Delay on de-energization (RV)
- Pulse forming function (IF)
- Fleeting on break (AW)
- Delay on energization and de-energization (AV / RV)

MK7850N-82-200-61

Multi-Mode Relay Timers MK Series						
Part Number	***Price***	***Timer Type***	***Timing Range***	***Voltage***	***Output Type***	***Drawing Link***
MK7850N-82-200-61	$;4tky:	Multi-mode	0.02 seconds to 300 hours selectable	12-240 VAC/VDC	2 changeover contacts, one programmable as instantaneous	PDF

Multi-Mode Relay Timers Specifications	
Input Specifications	
Nominal Voltage	12–240 VAC/VDC
Nominal Consumption	12VAC ~ 1.5 VA 24VAC ~ 2VA 240VAC ~ 3VA 12VDC ~ 1W 24VDC ~ 1W 240VDC ~ 1W
Nominal Frequency	45 – 400 Hz
Contact Specifications	
Type	2 changeover contacts, one programmable as instantaneous
Contact Material	AgNi
Measured Nominal Voltage	250VAC
Switching Capacity (according to AC 15)	N.O. Contact 3A / 230VAC N.C. Contact 1A / 230VAC
Electrical Lifetime	1.5 x 10^5 switching cycle (to AC 15 at 1A, 230VAC)
Switching Frequency	36,000 switching cycle / hr
Max Fuse Rating	4A
Mechanical Lifetime	≥ 30 x 10^6 switching cycles
Time Circuit Specifications	
Time Ranges	8 time ranges in one unit, selectable via rotational switch 0.02 ~ 1 sec, 0.06 ~ 6 sec, 0.3 ~ 30 sec 0.03 ~ 3 min, 0.3 ~ 30 min, 3 ~ 300 min 0.3 ~ 30 hr, 3 ~ 300 hr
Time Setting	t1 - continuous, 1:100 on relative scale
Recovery Time	24VDC 15ms 240VDC 50ms 230VAC 80ms
Repeat Accuracy	± 0.5% of selected end of scale value +20ms
Voltage and Temperature Influence	≤ 1% with the complete operating range

Multi-Mode Relay Timers Specifications	
General Specifications	
Connection (screw terminal)	1 x 4mm² / 12AWG solid or 1 x 2.5 mm² / 14 AWG stranded ferruled or 2 x 1.5 mm² / 16 AWG stranded ferruled or 2 x 2.5 mm² / 14 AWG solid
Tightening Torque	0.8 N·m
Ambient Temperature	-40 to +60°C [-40 to +140°F]
Storage Temperature	-40 to +70°C [-40 to +158°F]
Relative Air Humidity	93% at 40°C
Protection Rating	Housing IP40 / Terminals IP20
Vibration Resistance	Amplitude 0.35 mm frequency 10 – 55Hz
Mounting	35mm Din-rail
Relay Indicator	Green LED: On, when supply connected Yellow LED "R/t": Shows status of output relay and time delay: -Continuously off: Output relay not active; no time delay -Continuously on: Output relay active no time delay -Flashing (short on, long off) output relay not active, time delay -Flashing (long on, short off) output relay active, time delay
Weight (g [oz])	150.0 [5.29]
Agency Approvals and Standards *	cULus, CE
UL Data	
Switching Capacity	Ambient temperature 60°C: Pilot duty B300 5A 250VAC G.P.
UL Specified Wire Connection	60°C / 75°C copper conductors only Screw terminals fixed: AWG 20 – 12 solid or stranded Torque 0.8 Nm

***To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

Dold Relay Timers

Cyclic Relay Timers MK Series

Features

- 8 time ranges from 0.05 sec to 300hr selectable via rotational switches
- Impulse and break time separately adjustable
- Selectable start with impulse or break
- Voltage range 12–240 VAC/VDC
- Adjustment aid for quick setting of long time values
- Suitable for 2-wire proximity sensor control
- LED indicators for operation, contact position, and time delay
- 2 changeover contacts

MK7854N-82-61

Cyclic Relay Timers MK Series						
Part Number	***Price***	***Timer Type***	***Timing Range***	***Voltage***	***Output Type***	***Drawing Link***
MK7854N-82-61	$;;4tk[:	Cyclic	0.05 seconds to 300 hours selectable	12-240 VAC/VDC	2 changeover contacts	PDF

Cyclic Relay Timers Specifications	
Input Specifications	
Nominal Voltage	12–240 VAC/VDC
Nominal Consumption	12VAC ~ 1.5 VA 24VAC ~ 2VA 240VAC ~ 3VA 12VDC ~ 1W 24VDC ~ 1W 240VDC ~ 1W
Contact Specifications	
Type	2 changeover contacts
Contact Material	AgNi
Measured Nominal Voltage	250VAC
Switching Capacity (according to AC 15)	N.O. Contact 3A / 230VAC N.C. Contact 1A / 230VAC
Electrical Lifetime	1.5 x 10^5 switching cycle (to AC 15 at 1A, 230VAC)
Switching Frequency	36,000 switching cycle / hr
Max Fuse Rating	4A
Mechanical Lifetime	≥ 30 x 10^6 switching cycles
Time Circuit Specifications	
Time Ranges	8 time ranges in one unit, selectable via rotational switch 0.05 ~ 1 sec, 0.06 ~ 6 sec, 0.3 ~ 30 sec 0.03 ~ 3 min, 0.3 ~ 30 min, 3 ~ 300 min 0.3 ~ 30 hr, 3 ~ 300 hr
Time Setting	t1, t2 - continuous, 1:100 on relative scale
Recovery Time	24VDC 15ms 240VDC 50ms 230VAC 80ms
Repeat Accuracy	± 0.5% of selected end of scale value
Voltage and Temperature Influence	≤ 1% with the complete operating range

Cyclic Relay Timers Specifications	
General Specifications	
Connection (screw terminal)	1 x 4mm² / 12AWG solid or 1 x 2.5 mm² / 14 AWG stranded ferruled or 2 x 1.5 mm² / 16 AWG stranded ferruled or 2 x 2.5 mm² / 14 AWG solid
Tightening Torque	0.8 N·m
Ambient Temperature	-40 to +60°C [-40 to +140°F]
Storage Temperature	-40 to +70°C [-40 to +158°F]
Relative Air Humidity	93% at 40°C
Protection Rating	Housing IP40 / Terminals IP20
Vibration Resistance	Amplitude 0.35 mm frequency 10 – 55Hz
Mounting	35mm Din-rail
Relay Indicator	Green LED: On, when voltage connected Yellow LED "R/t": Shows status of output relay and time delay: -Flashing (short on, long off) : Output relay not active; time delay t2 (break time) -Flashing (long on, short off) output relay active; time delay t1 (pulse time)
Weight (g [oz])	150.0 [5.29]
Agency Approvals and Standards *	cULus, CE
UL Data	
Switching Capacity	Ambient temperature 60°C: Pilot duty B300 5A 250VAC G.P.
UL Specified Wire Connection	60°C / 75°C copper conductors only Screw terminals fixed: AWG 20 – 12 solid or stranded Torque 0.8 Nm

***To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

Dold Relay Timers

Off-Delay Relay Timers MK Series

Features

- 8 time ranges from 0.05 sec to 300 hr selectable via rotational switch
- Voltage range 12–240 VAC/VDC for auxiliary supply and control input
- Adjustment aid for quick setting of long time values
- Input for interruption of timing
- LED indicators for operation, contact position and time delay
- 2 changeover contacts

MK9962N-82-61

Off-Delay Relay Timers MK Series						
Part Number	***Price***	***Timer Type***	***Timing Range***	***Voltage***	***Output Type***	***Drawing Link***
MK9962N-82-61	$;;4tk]:	Off-delay	0.05 seconds to 300 hours selectable	12-240 VAC/VDC	2 changeover contacts	PDF

Off-Delay Relay Timers Specifications	
Input Specifications	
Nominal Voltage	12–240 VAC/VDC
Nominal Consumption	12VAC ~ 1.5 VA 24VAC ~ 2VA 240VAC ~ 3VA 12VDC ~ 1W 24VDC ~ 1W 240VDC ~ 1W
Contact Specifications	
Type	2 changeover contacts
Contact Material	AgNi
Measured Nominal Voltage	250VAC
Switching Capacity (according to AC 15)	N.O. Contact 3A / 230VAC N.C. Contact 1A / 230VAC
Electrical Lifetime	1.5 x 10^5 switching cycle (to AC 15 at 1A, 230VAC)
Switching Frequency	6,000 switching cycles / hr
Max Fuse Rating	4A
Mechanical Lifetime	≥ 30 x 10^6 switching cycles
Time Circuit Specifications	
Time Ranges	8 time ranges in one unit, selectable via rotational switch 0.05 ~ 1 sec, 0.06 ~ 6 sec, 0.3 ~ 30 sec 0.03 ~ 3 min, 0.3 ~ 30 min, 3 ~ 300 min 0.3 ~ 30 hr, 3 ~ 300 hr
Time Setting	Continuous, 1:100 on relative scale
Minimum on Time	AC 50 Hz - 15ms DC - 5 ms
Repeat Accuracy	± 0.5% of selected end of scale value + 20ms
Voltage and Temperature Influence	≤ 1% with the complete operating range

Off-Delay Relay Timers Specifications	
General Specifications	
Connection (cage clamp terminal)	1 x 4mm² / 12AWG solid or 1 x 2.5 mm² / 14 AWG stranded ferruled or 2 x 1.5 mm² / 16 AWG stranded ferruled or 2 x 2.5 mm² / 14 AWG solid
Tightening Torque	0.8 N·m
Ambient Temperature	-40 to +60°C [-40 to +140°F]
Storage Temperature	-40 to +70°C [-40 to +158°F]
Relative Air Humidity	93% at 40°C
Protection Rating	Housing IP40 / Terminals IP20
Vibration Resistance	Amplitude 0.35 mm frequency 10 – 55Hz
Mounting	35mm Din-rail
Relay Indicator	Green LED: on when auxiliary voltage connected Yellow LED "R/t": shows status of output relay and time delay: - LED off output relay not active; no time delay - LED continuously on output relay active;no time delay (B1 input active) - LED flashing output relay active; long on, short off - time delay
Weight (g [oz])	150.0 [5.29]
Agency Approvals and Standards *	cULus, CE
UL Data	
Switching Capacity	Ambient temperature 60°C: Pilot duty B300 5A 250VAC G.P.
UL Specified Wire Connection	60°C / 75°C copper conductors only Screw terminals fixed: AWG 20 – 12 solid or stranded Torque 0.8 Nm

***To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

Dold Relay Timers

On-Delay Relay Timers MK Series

Features

- 8 time ranges from 0.05 sec to 300 hr selectable via rotational switch
- Voltage range 12-240 VAC/VDC for auxiliary supply and control input
- Adjustment aid for quick setting of long time values
- Input for interruption of timing
- LED indicators for operation, contact position, and time delay
- 2 changeover contacts

MK9906N-82-61

On-Delay Relay Timers MK Series						
Part Number	***Price***	***Timer Type***	***Timing Range***	***Voltage***	***Output Type***	***Drawing Link***
MK9906N-82-61	$;4tkz:	On-delay	0.05 seconds to 300 hours selectable	12-240 VAC/VDC	2 changeover contacts one programmable as instantaneous	PDF

On-Delay Relay Timers Specifications	
Input Specifications	
Nominal Voltage	12–240 VAC/VDC
Nominal Consumption	12VAC ~ 1.5 VA 24VAC ~ 2VA 240VAC ~ 3VA 12VDC ~ 1W 24VDC ~ 1W 240VDC ~ 1W
Contact Specifications	
Type	2 changeover contacts one programmable as instantaneous
Contact Material	AgNi
Measured Nominal Voltage	250VAC
Switching Capacity (according to AC 15)	N.O. Contact 3A / 230VAC N.C. Contact 1A / 230VAC
Electrical Lifetime	1.5 x 10^5 switching cycles (to AC 15 at 1A, 230VAC)
Switching Frequency	36,000 switching cycle / hr
Max Fuse Rating	4A
Mechanical Lifetime	≥ 30 x 10^6 switching cycles
Time Circuit Specifications	
Time Ranges	8 time ranges in one unit, selectable via rotational switch 0.05 ~ 1 sec, 0.06 ~ 6 sec, 0.3 ~ 30 sec 0.03 ~ 3 min, 0.3 ~ 30 min, 3 ~ 300 min 0.3 ~ 30 hr, 3 ~ 300 hr
Time Setting	Continuous, 1:100 on relative scale
Recovery Time	24VDC 15ms 240VDC 50ms 230VAC 80ms
Repeat Accuracy	± 0.5% of selected end of scale value + 20ms
Voltage and Temperature Influence	≤ 1% with the complete operating range

On-Delay Relay Timers Specifications	
General Specifications	
Connection (cage clamp terminal)	1 x 4mm² / 12AWG solid or 1 x 2.5 mm² / 14 AWG stranded ferruled or 2 x 1.5 mm² / 16 AWG stranded ferruled or 2 x 2.5 mm² / 14 AWG solid
Tightening Torque	0.8 N·m
Ambient Temperature	-4 to +60°C [-40 to +140°F]
Storage Temperature	-40 to +70°C [-40 to +158°F]
Relative Air Humidity	93% at 40°C
Protection Rating	Housing IP40 / Terminals IP20
Vibration Resistance	Amplitude 0.35mm frequency 10 – 55Hz
Mounting	35mm Din-rail
Relay Indicator	Green LED: On, when voltage connected Yellow LED "R/t": Shows status of output relay and time delay: - Flashing (long on, short off) output relay not active; time delay - Continuously on: output relay active after time delay
Weight (g [oz])	150.0 [5.29]
Agency Approvals and Standards *	cULus, CE
UL Data	
Switching Capacity	Ambient temperature 60°C: Pilot duty B300 5A 250VAC G.P.
UL Specified Wire Connection	60°C / 75°C copper conductors only Screw terminals fixed: AWG 20 – 12 solid or stranded Torque 0.8 Nm

***To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

Dold Relay Timers

Off-Delay Relay Timers MK Series

Features

- Release delay, without control signal
- No voltage safe
- Delay up to 3, 30 or 300 sec
- Repeat accuracy ≤ ± 0.5 %
- No recovery time
- Voltage range 24–240 VAC/VDC
- LED display for power supply
- 2 changeover contacts

MK7873N-82-61-3S

Off-Delay Relay Timers MK Series						
Part Number	***Price***	***Timer Type***	***Timing Range***	***Voltage***	***Output Type***	***Drawing Links***
MK7873N-82-61-3S	$;04tk_:	Off-delay	0.15 to 3 seconds	24-240 VAC/VDC	2 changeover contacts	PDF
MK7873N-82-61-30S	$;04tks:	Off-delay	1.5 to 30 seconds	24-240 VAC/VDC	2 changeover contacts	PDF
MK7873N-82-61-300S	$;;04tkt:	Off-delay	15 to 300 seconds	24-240 VAC/VDC	2 changeover contacts	PDF

Off-Delay Relay Timers Specifications	
Input Specifications	
Nominal Voltage	24–240 VAC/VDC
Operating Voltage Range	24–240 VAC/VDC 19.2–264 VAC 21.6–300 VDC
Nominal Consumption	0.8W
Nominal Frequency	45 – 400 Hz
Contact Specifications	
Type	2 changeover contacts
Contact Material	$AgSnO_2$ +0.2 µm AU
Measured Nominal Voltage	250VAC
Switching Capacity (according to AC 15)	N.O. Contact 3A / 230VAC N.C. Contact 1A / 230VAC
Electrical Lifetime	8 x 10^5 switching cycles
Switching Frequency	time ranges ≤ 10 sec - 1400 switching cycles per hr time ranges ≥ 30 sec - 700 switching cycles per hr
Max Fuse Rating	6A
Mechanical Lifetime	30 x 10^6 switching cycles
Time Circuit Specifications	
Time Ranges	MK7873N-82-61-3S = 0.15 - 3 sec MK7873N-82-61-30S = 1.5 - 30 sec MK7873N-82-61-300S = 15 - 300 sec
Time Setting	Stepless
Minimum Switch-on Time	24VDC 150ms 200VAC 25ms
Recovery Time	0
Repeat Accuracy	≤ 0.5% of set value
Voltage Influence	≤ 0.5 %
Temperature Influence	< 0.2% / K

Off-Delay Relay Timers Specifications	
General Specifications	
Connection (Integrated Screw terminals)	1 x 4mm² / 12AWG solid or 1 x 2.5 mm² / 14 AWG stranded ferruled or 2 x 1.5 mm² / 16 AWG stranded ferruled or 2 x 2.5 mm² / 14 AWG solid
Tightening Torque	0.8 N·m
Ambient Temperature	-20 to +60°C [-4 to +140°F]
Storage Temperature	-25 to +60°C [-13 to +140°F]
Relative Air Humidity	93% at 40°C
Protection Rating	Housing IP40 / Terminals IP20
Vibration Resistance	Amplitude 0.35 mm frequency 10 – 55Hz
Mounting	35mm Din-rail
Relay Indicator	LED: on, when supply connected
Weight (g [oz])	132.0 [4.65]
Agency Approvals and Standards *	cULus, CE
UL Data	
Switching Capacity	Ambient temperature 60°C: Pilot duty B300 5A 250VAC G.P. 5A 24VDC G.P.
UL Specified Wire Connection	60°C / 75°C copper conductors only Screw terminals fixed: AWG 20 – 12 solid or stranded Torque 0.8 Nm

***To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

Dold Relay Timers

Relay Timers RK Series

Overview

The RK series timers are timing relays that have been designed to be economical and compact to meet the demands of all the modern time control needs. With a few variants of single function and a multi-function model, the RK series covers all common timing functions, time ranges and voltage needs. These timers are suitable for time-dependent control needs in most industrial automation and building automation systems.

Features

RK7814

- 4 time ranges up to 120 sec
- LED indicator for state of contact
- Dual-voltage version 110 – 127VAC + 24 VAC/VDC
- 1 changeover contact

RK7815, RK7816

- Time ranges up to 10 sec
- LED indicator for state of contact
- 1 changeover contact
- Dual voltage version 110 – 127 VAC + 24 VAC/VDC

RK7817

- 8 time ranges adjustable from 0.02 sec to 300 hr via rotational switches
- Dual-voltage-version 110 – 127VAC + 24 VAC/VDC
- 1 changeover contact

8 selectable functions via rotational switches

- Delay on energization (AV)
- Fleeting on make (EW)
- Delayed pulse (IE)
- Flasher, start with pulse (BI)
- Delay on de-energization (RV)
- Pulse forming function (IF)
- Fleeting on break (AW)
- Delay on energization and de-energization (AV / RV)

RK7814-81-61

RK7815-71-61

RK7816-81-61

RK7817-81-61

On-Delay Relay Timer RK Series						
Part Number	***Price***	***Timer Type***	***Timing Range***	***Voltage***	***Output Type***	***Drawing Link***
RK7814-81-61	$;4tkv:	On-delay	0.05 to 120 seconds selectable	24 VAC/VDC and 110-127 VAC	1 changeover contact	PDF

Fleeting (single shot) Relay Timer RK Series						
Part Number	***Price***	***Timer Type***	***Timing Range***	***Voltage***	***Output Type***	***Drawing Link***
RK7815-71-61	$;4tkx:	Fleeting (single-shot)	1 to 10 seconds	24 VAC/VDC and 110-127 VAC	1 changeover contact	PDF

Flasher Relay Timer RK Series						
Part Number	***Price***	***Timer Type***	***Timing Range***	***Voltage***	***Output Type***	***Drawing Link***
RK7816-81-61	$;4tk#:	Flasher	1 to 10 seconds	24 VAC/VDC and 110-127 VAC	1 changeover contact	PDF

Multi-Mode Relay Timer RK Series						
Part Number	***Price***	***Timer Type***	***Timing Range***	***Voltage***	***Output Type***	***Drawing Link***
RK7817-81-61	$;4tku:	Multi-mode	0.02 seconds to 300 hours selectable	24 VAC/VDC and 110-127 VAC	1 changeover contact	PDF

Dold Relay Timers

Relay Timers RK Series Specifications				
Part Number	***RK7814-81-61***	***RK7815-71-61***	***RK7816-81-61***	***RK7817-81-61***
Input Specifications				
Nominal Voltage	24 VAC/VDC [1] + 110-127 VAC[2]			24 VAC/VDC [1] + 110-127 VAC [2]
Nominal Consumption	24VAC ~ 1VA 230VAC ~ 6VA 24VDC ~ 0.4 W			24VAC ~ 1VA 230VAC ~ 7.5 VA 24VDC ~ 0.5 W
Nominal Frequency	50/60 Hz			
Frequency Range	± 5%			
Contact Specifications				
Type	1 changeover contact			
Switching Capacity (according to AC 15)	N.O. Contact 2A / 230VAC N.C. Contact 1A / 230VAC			
Max Wire Size	22–14 AWG solid or stranded			
Mechanical Lifetime	> $1x10^7$ switching cycles			
Electrical Lifetime	> $1x10^5$ switching cycles			
Time Circuit Specifications				
Time Ranges	0.05 ~ 0.5 sec, 0.2 ~ 2 sec, 1.5 ~ 15 sec, 12 ~ 120 sec	1 ~ 10 sec		0.02* ~ 1 sec, 0.06* ~ 6 sec, 0.3 ~ 30 sec 0.03 ~ 3 min, 0.3 ~ 30 min, 3 ~ 300 min 0.3 ~ 30 hr, 3 ~ 300 hr (* 0.08 s for AV and IE functions)
Time Setting	Infinite, 1:10 on relative scale			Infinite, 1:100 on relative scale
Recovery Time	< 100ms			
Repeat Accuracy	≤ 0.5% of set time delay + 10ms			≤ 0.8% of set time delay + 20ms
Voltage Influence	≤ 1%			
Temperature Influence	0.25 % / K			≤ 2% at range 0 – 60°C ≤ 5% at range -20 – 0°C
General Specifications				
Connection (fixed screw terminal)	0.34 – 2 x 2.5 mm² / 22–14 AWG solid or 0.34 – 2 x 2.5 mm² / 22–14 AWG stranded wire with and without ferrules			
Tightening Torque	0.5 N·m			
Ambient Temperature	-40 to +60°C [-40 to +140°F]			-20 to +60°C [-4 to +140°F]
Storage Temperature	-40 to +70°C [-40 to +158°F]			-25 to +70°C [-13 to +158°F]
Relative Air Humidity	93 % at 40°C			
Protection Rating	Housing IP40 / Terminals IP20			
Vibration Resistance	Amplitude 0.35 mm frequency 10 – 55Hz			
Mounting	35mm DIN rail			
Relay Indicator	On, when corresponding output relay is active (contact 15–18 closed)			Green LED: On, when supply connected Yellow LED "R/t": Shows status of output relay and time delay (15-16-18): -Continuous off: Output relay not active;no time delay -Continuous on: Output relay active no time delay -Flashing (short on, long off) Time delay: output relay not active -Flashing (long on, short off) Time delay: output relay active
Weight (g [oz])	65.0 [2.29]	60.0 [2.11]		70.0 [2.46]
Agency Approvals and Standards *	cULus, CE			
UL Data				
Switching Capacity	Ambient temperature 60°C: Pilot duty B300 4A 240VAC G.P. 4A 30VDC G.P.			
UL Specified Wire Connection	60°C / 75°C copper conductors only AWG 22 – 14 solid or stranded Torque 0.5 N·m			

Notes: [1]at terminals A3-A2 [2] at terminals A1-A2
***To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

ProSense® Relay Timers

Multi-Mode Relay Timer TRM-8 Series

Overview

The TRM-8 series offer the flexible programmability of a multi-function and multi-range time delay relay together with a universal input voltage. This series provides an easy method to select one of eight time delay functions and any time range between 0.05 seconds and 100 hours. Programming is accomplished through the use of two rotary switches to select function and time range. The actual time delay is then set by using the potentiometer to adjust within the selected time range.

Features

- Eight timing functions in one unit easily selectable with rotary switch
- 16 timing ranges built-in covering 0.05 seconds to 100 hours
- 24-240 VAC and 12-125 VDC
- 11-pin octal socket
- 10A DPDT output contact

TRM-8-D-240AD

Multi-Mode Relay Timer TRM-8 Series						
Part Number	***Price***	***Timer Type***	***Timing Range***	***Voltage***	***Output Type***	***Drawing Link***
TRM-8-D-240AD	$;53!x:	Multi-mode 8 mode selectable	0.05 seconds to 100 hours selectable	24-240 VAC and 12-125 VDC	(1) DPDT timed relay	PDF

Multi-Mode Relay Timer Specifications	
Input Specifications	
Nominal Voltage	20.4 - 264 VAC @ 50/60 Hz, 10.2 - 137.5 VDC
Nominal Consumption	Max 3VA
Nominal Frequency	50/60 Hz
Contact Specifications	
Type	1 DPDT
Switching Capacity	10A @ 240VAC, 30VDC 1/2 HP @ 120/240 VAC (N.O.) 1/3 HP @ 120/240 VAC (N.C.) B300 & R300 (N.O.) AC15 and DC13
Electrical Lifetime	Full Load: 100,000 operations
Mechanical Lifetime	10,000,000 operations
Reset Time	
Functions Triggered with Input Voltage	0.1 seconds
Functions Triggered with Control Switch	0.04 seconds
Time Circuit Specifications	
Setting Accuracy	Maximum Setting (Adjustable): +5%, 0% Minimum Setting (Adjustable): +0%, -50%
Start-up Time	Time from when power is applied until unit is timing: 50ms
Maintain Function Time	Time unit continues to operate after power is removed: 0.01 seconds
Repeat Accuracy	Constant Voltage & Temperature w/i specifications: +0.1% or +50ms, whichever is greater

Multi-Mode Relay Timer Specifications	
General Specifications	
Connection (screw terminal)	Recommend 70170-D socket 1 or 2 #12-20AWG Wire
Tightening Torque	12 in-lb
Wire/Ferrule Size	1 or 2 #12-20 AWG (Ferrule size: Stud size 6 with max overall width 0.30")
Ambient Temperature	-28 to +65°C [-18 to +150°F]
Storage Temperature	-40 to +85°C [-40 to +185°F]
Protection Rating	IP20
Vibration Resistance	10-55 Hz with 3G maximum and 0.5mm total displacement (+/-.25mm).
Mounting	Socket mount (11-pin required)
Mounting Orientation	Any
Weight	0.22 lbs
Agency Approvals and Standards *	UR File E191059, CE, UL Listed with appropriate socket File E191059

***To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

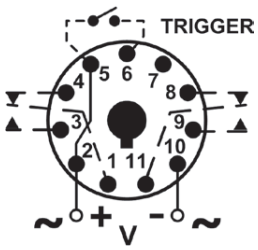
ProSense® Relay Timers

Multi-Mode Relay Timer TRM-8 Series

Function Table	
Select Function	
1	On Delay
2	Interval On
3	Flasher - On 1st
4	Triggered On Delay
5	Watchdog
6	Single Shot
7	Off Delay
8	One Shot Falling Edge

Timing Ranges			
Dial Setting	*Timing Range*	*Dial Setting*	*Timing Range*
A	0.05 - 0.5 Sec	*I*	1 - 10 Min
B	0.1 - 1 Sec	*J*	3 - 30 Min
C	0.5 - 5 Sec	*K*	6 - 60 Min
D	1 - 10 Sec	*L*	0.2 - 2 Hr
E	3 - 30 Sec	*M*	0.5 - 5 Hr
F	6 - 60 Sec	*N*	1 - 10 Hr
G	0.2 - 2 Min	*O*	2.4 - 24 Hr
H	0.5 - 5 Min	*P*	10 - 100 Hr

Wiring Diagram



ProSense® Relay Timers

Multi-Mode Relay Timers TRM-10 Series

Overview

The TRM-10 series offers an easy and accurate way to select a function and any time delay between 50ms and 999 hours. Programming is accomplished by using a pushbutton thumbwheel to select one of seven built-in time ranges and three pushbutton thumbwheels to digitally set the time delay required. These units have a fifth pushbutton thumbwheel to select one of ten built-in functions. An LED indicates timing mode and time out condition.

Features

- Ten user-selectable modes in one unit
- Pushbutton thumbwheels for digital set of time delay and function
- 50ms to 999 hour programmable time range
- 120 VAC/VDC and 24 VAC/VDC models available
- 11-pin octal socket
- 10A DPDT output contact
- LED indicates timing mode and time out conditions.

TRM-10-D-120AD

Multi-Mode Relay Timers TRM-10 Series

Part Number	Price	Timer Type	Timing Range	Voltage	Output Type	Drawing Links
TRM-10-D-120AD	$;53!y:	Multi-mode 10 mode selectable	0.05 seconds to 999 hours selectable	120 VAC/VDC	(1) DPDT timed relay	PDF
TRM-10-D-24AD	$;53!z:	Multi-mode 10 mode selectable	0.05 seconds to 999 hours selectable	24 VAC/VDC	(1) DPDT timed relay	PDF

Multi-Mode Relay Timer Specifications

Part Number	TRM-10-D-120AD	TRM-10-D-24AD
Input Specifications		
Nominal Voltage	120 VAC/VDC	24 VAC/VDC
Nominal Consumption	3VA	
Nominal Frequency	50/60 Hz	
Contact Specifications		
Type	(1) DPDT	
Switching Capacity	10A @ 240VAC, 30VDC 1/2 HP @ 120/240 VAC (N.O.) 1/3 HP @ 120/240 VAC (N.C.) B300 & R300 (N.O.) AC15 and DC13	
Electrical Lifetime	Full Load: 100,000 operations	
Mechanical Lifetime	10,000,000 operations	
Reset Time		
Functions Triggered with All Other Functions	0.1 seconds	
Functions Triggered with Control Switch	0.04 seconds	
Time Circuit Specifications		
Setting Accuracy	Constant Voltage & Temperature w/i specifications: +0.1% of set time or +50ms, whichever is greater For Variable Voltage & Temperature w/i specifications: +1% of set time or +50ms, whichever is greater	
Start-up Time	Time from when power is applied until unit is timing: 0.05 seconds	
Maintain Function Time	Time unit continues to operate after power is removed: 0.01 seconds	
Repeat Accuracy	For Constant Voltage & Temperature w/i specifications: +0.1% of set time or +0.02 seconds, whichever is greater For Variable Voltage & Temperature w/i specifications: +1% of set time or +0.02 seconds, whichever is greater	

Multi-Mode Relay Timer Specifications

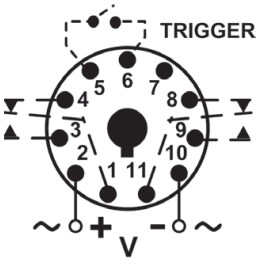
General Specifications	
Connection (screw terminal)	Recommend 70170-D socket 1 or 2 -#12-20 AWG Wire
Tightening Torque	12 in-lb
Wire/Ferrule Size	1 or 2 #12-20 AWG (Ferrule size: Stud size 6 with max overall width 0.30")
Ambient Temperature	-28 to +65°C [-18 to +150°F]
Storage Temperature	-40 to +85°C [-40 to +185°F]
Protection Rating	IP20
Vibration Resistance	10-55 Hz with 3G maximum and 0.5mm total displacement (+/-.25mm).
Mounting	Socket mount (11-pin required)
Mounting Orientation	Any
LED Indicator	See Installation Instructions
Weight	0.22 lbs
Agency Approvals and Standards *	cULus, / UL Recognized File E191059, CE UL Listed with appropriate socket File E191059 CSA 602618

***To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

Function Table

Select Function	
A	On Delay
B	Interval
C	Off Delay
D	One Shot
E	Flasher - Off 1st
F	Flasher - On 1st
G	On/Off Delay
H	1 Shot Falling Edge
J	Watchdog
K	Trig. On Delay

Wiring Diagram



ProSense® Relay Timers

Multi-Mode Relay Timers TRM-16 Series

Overview

The TRM-16 series offers the digital accuracy of DIP-switch setting as well as the flexible programmability of a multi-function and multi-time range relay. These products provide an easy and accurate method to select any of 16 time delay functions and any time delay between 0.05 seconds and 10,230 hours (310 hours maximum for Dual Mode functions). Programming is accomplished through the use of two 10-position DIP-switches.

Features

- Sixteen user-selectable modes in one unit
- DIP-switches for accurate digital set of time delay and selection of function
- 0.05 seconds to 10,230 hours programmable time delay (Single mode functions only)
- 120 VAC/VDC and 24 VAC/VDC models available
- 11-pin octal socket
- 10A DPDT output contact
- LED indicates timing mode and time out conditions

TRM-16-D-120AD

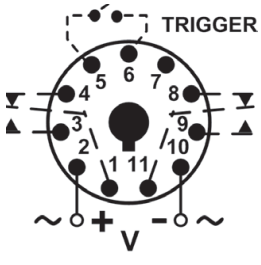
Multi-Mode Relay Timers TRM-16 Series						
Part Number	**Price**	**Timer Type**	**Timing Range**	**Voltage**	**Output Type**	**Drawing Links**
TRM-16-D-120AD	$;;53!]:	Multi-mode 16 mode selectable	0.05 seconds to 10,230 hours selectable	120 VAC/VDC	(1) DPDT timed relay	PDF
TRM-16-D-24AD	$;53!v:	Multi-mode16 mode selectable	0.05 seconds to 10,230 hours selectable	24 VAC/VDC	(1) DPDT timed relay	PDF

Multi-Mode Relay Timer Specifications		
Part Number	TRM-16-D-120AD	TRM-16-D-24AD
Input Specifications		
Nominal Voltage	120 VAC/VDC	24 VAC/VDC
Nominal Consumption	Max 2VA	
Nominal Frequency	50/60 Hz	
Contact Specifications		
Type	(1) DPDT	
Switching Capacity	10A @ 240VAC, 30VDC 1/2 HP @ 120/240 VAC (N.O.) 1/3 HP @ 120/240 VAC (N.C.) B300 & R300 (N.O.) AC15 and DC13	
Electrical Lifetime	Full Load: 100,000 operations	
Mechanical Lifetime	10,000,000 operations	
Reset Time		
Functions Triggered with All Other Functions	0.1 seconds	
Functions Triggered with Control Switch	0.04 seconds	
Time Circuit Specifications		
Setting Accuracy	Constant Voltage & Temperature w/i specifications: +0.1% of set time or +50ms, whichever is greater For Variable Voltage & Temperature w/i specifications: +1% of set time or +50ms, whichever is greater	
Start-up Time	Time from when power is applied until unit is timing: 0.05 seconds	
Maintain Function Time	Time unit continues to operate after power is removed: 0.01 seconds	
Repeat Accuracy	+Constant Voltage & Temperature w/i specifications: +0.1% of set time or +0.02 seconds, whichever is greater For Variable Voltage & Temperature w/i specifications: +1% of set time or +0.02 seconds, whichever is greater	

Multi-Mode Relay Timer Specifications	
General Specifications	
Connection (screw terminal)	Recommend 70170-D socket 1 or 2 -#12-20 AWG Wire
Tightening Torque	12 in-lb
Wire/Ferrule Size	1 or 2 #12-20 AWG (Ferrule size: Stud size 6 with max overall width 0.30")
Ambient Temperature	-28 to +65°C [-18 to +150°F]
Storage Temperature	-40 to +85°C [-40 to +185°F]
Protection Rating	IP20
Vibration Resistance	10-55 Hz with 3G maximum and 0.5mm total displacement (+/-.25mm).
Mounting	Socket mount (11-pin required)
Mounting Orientation	Any
LED Indicator	Green ON - Power Red ON - Relay Energized
Weight	0.22 lbs
Agency Approvals and Standards *	UR File E191059, CSA File 602618, CE, UL Listed with appropriate socket File E191059

***To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

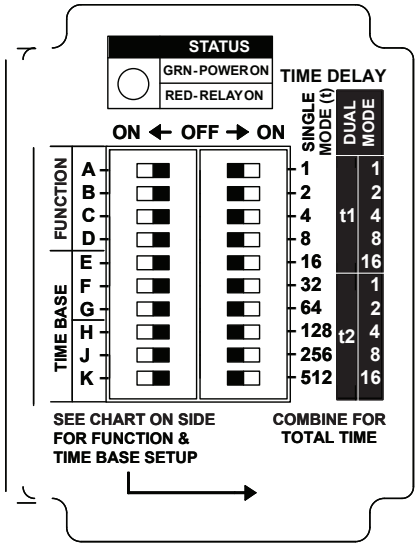
Wiring Diagram



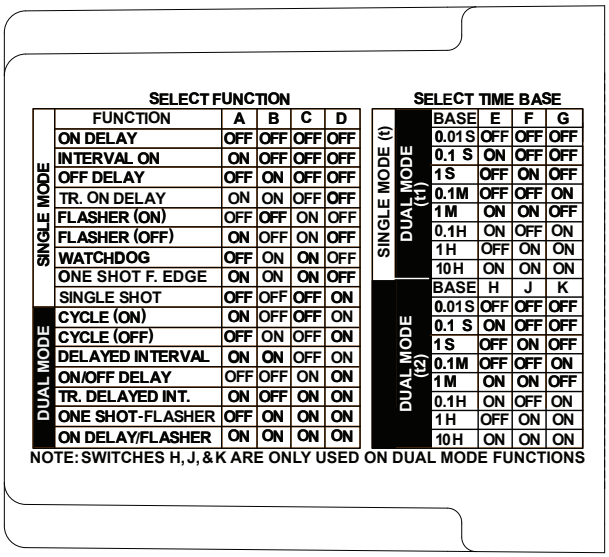
ProSense® Relay Timers

TRM-16 Series Multi-Mode Relay Timers

Function Table



Top



SELECT FUNCTION

	FUNCTION	A	B	C	D
SINGLE MODE	ON DELAY	OFF	OFF	OFF	OFF
	INTERVAL ON	ON	OFF	OFF	OFF
	OFF DELAY	OFF	ON	OFF	OFF
	TR. ON DELAY	ON	ON	OFF	OFF
	FLASHER (ON)	OFF	OFF	ON	OFF
	FLASHER (OFF)	ON	OFF	ON	OFF
	WATCHDOG	OFF	ON	ON	OFF
	ONE SHOT F. EDGE	ON	ON	ON	OFF
	SINGLE SHOT	OFF	OFF	OFF	ON
DUAL MODE	CYCLE (ON)	ON	OFF	OFF	ON
	CYCLE (OFF)	OFF	ON	OFF	ON
	DELAYED INTERVAL	ON	ON	OFF	ON
	ON/OFF DELAY	OFF	OFF	ON	ON
	TR. DELAYED INT.	ON	OFF	ON	ON
	ONE SHOT-FLASHER	OFF	ON	ON	ON
	ON DELAY/FLASHER	ON	ON	ON	ON

SELECT TIME BASE

	BASE	E	F	G
SINGLE MODE (t) / DUAL MODE (t1)	0.01 S	OFF	OFF	OFF
	0.1 S	ON	OFF	OFF
	1 S	OFF	ON	OFF
	0.1M	OFF	OFF	ON
	1 M	ON	ON	OFF
	0.1H	ON	OFF	ON
	1 H	OFF	ON	ON
	10 H	ON	ON	ON
	BASE	H	J	K
DUAL MODE (t2)	0.01 S	OFF	OFF	OFF
	0.1 S	ON	OFF	OFF
	1 S	OFF	ON	OFF
	0.1M	OFF	OFF	ON
	1 M	ON	ON	OFF
	0.1H	ON	OFF	ON
	1 H	OFF	ON	ON
	10 H	ON	ON	ON

NOTE: SWITCHES H, J, & K ARE ONLY USED ON DUAL MODE FUNCTIONS

Side

ProSense® Relay Timers

Off-Delay Relay Timers TRS-TD Series

Overview

The TRS-TD series is designed to replace the functionality of pneumatic time delay relays which are very large, expensive and not very accurate. Unlike standard electronic off delay time relays, the TRS-TD does not require a trigger switch or continuous application of input voltage. With an on board power source, these units keep the logic circuit and relay energized during the off delay period.

Features

- 8 timing ranges built-in covering 0.05 seconds to 30 minutes
- Selecting a range is easy using a rotary switch
- 120 VAC/VDC and 24 VAC/VDC models available
- 8-pin octal socket
- 10A DPDT output contact

TRS-TD-D-120AD

Off-Delay Relay Timers TRS-TD Series						
Part Number	***Price***	***Timer Type***	***Timing Range***	***Voltage***	***Output Type***	***Drawing Links***
TRS-TD-D-120AD	$;53!u:	Off-delay	0.05 seconds to 30 minutes selectable	120 VAC/VDC	(1) DPDT timed relay	PDF
TRS-TD-D-24AD	$;;53!t:	Off-delay	0.05 seconds to 30 minutes selectable	24 VAC/VDC	(1) DPDT timed relay	PDF

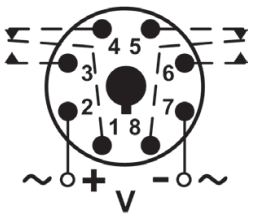
Off-Delay Relay Timer Specifications		
Part Number	***TRS-TD-D-120AD***	***TRS-TD-D-24AD***
Input Specifications		
Nominal Voltage	120 VAC/VDC	24 VAC/VDC
Nominal Consumption	Max 2VA	
Nominal Frequency	50/60 Hz	
Contact Specifications		
Type	(1) DPDT	
Switching Capacity	10A @ 240VAC, 30VDC 8A @ 28VDC 1/2 HP @ 240 VAC 1/4 HP @ 120 VAC B300 & R300	
Electrical Lifetime	Full Load: 100,000 operations	
Reset Time	0.1 seconds	
Mechanical Lifetime	2,000,000 operations	
Time Circuit Specifications		
Setting Accuracy	Maximum Setting (Adjustable): +5%, -0% Minimum Setting (Adjustable): +0%, -50%	
Start-up Time	Time from when power is applied until unit is timing : 0.05 seconds	
Maintain Function Time	Time unit continues to operate after power is removed: 0.01 seconds	
Repeat Accuracy	± 50ms	

Timing Ranges	
Dial Setting	***Timing Range***
A	0.05 - 5 Sec
B	0.1 - 10 Sec
C	0.3 - 30 Sec
D	0.6 - 60 Sec
E	1.8 - 180 Sec
F	3 - 300 Sec
G	0.1 - 10 Min
H	0.3 - 30 Min

Off-Delay Relay Timer Specifications	
General Specifications	
Connection (screw terminal)	Recommend 70169-D socket 1 or 2 -#12-20 AWG Wire
Tightening Torque	12 in-lb
Wire/Ferrule Size	1 or 2 #12-20 AWG (Ferrule size: Stud size 6 with max overall width 0.30")
Ambient Temperature	-28 to +65°C [-18 to +150°F]
Storage Temperature	-40 to +85°C [-40 to +185°F]
Protection Rating	IP20
Vibration Resistance	10-55 Hz with 3G maximum and 0.5mm total displacement (+/-.25mm).
Mounting	Socket mount (8-pin required)
Mounting Orientation	Any
Weight	0.22 lbs
Agency Approvals and Standards *	cURus File E191059, cULus with appropriate socket CE EN60947-1, EN60947-5-1

***To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

Wiring Diagram



ProSense® Relay Timers

Multi-Mode Relay Timers T2R-M Series

Overview

The T2R-M series come with four functions and four timing ranges covering 0.1 seconds to 100 minutes (1,000 minutes on T2R-M3-ADJ-240U dual time unit). On the unit, choose between onboard adjustable, onboard fixed and remote adjustable time delay settings (remote time delay not available on T2R-M3-ADJ-240U). All set-up is done with DIP switches for ease of use. A universal input voltage of 24-240VAC and 12-125VDC adds to the ultimate flexibility of these products. All products are encapsulated for protection against harsh elements. A 10A SPDT relay output rating can handle most pilot duty and fractional HP loads.

Features

- Four timing functions in one unit easily selectable with rotary switch
- Timing ranges built-in covering 0.1 seconds to 100 minutes (T2R-M3-ADJ-240U goes up to 1000 minutes)
- Universal Voltage: 24-240 VAC and 12-125 VDC
- 10A SPDT output contact

T2R-M1-ADJ-240U

T2R-M3-ADJ-240U

Multi-Mode Relay Timers T2R-M Series

Part Number	Price	Timer Type	Timing Range	Voltage	Output Type	Drawing Link
T2R-M1-ADJ-240U	$;;58][:	Multi-mode	0.1 seconds to 100 minutes selectable	24-240 VAC and 12-125 VDC	(1) SPDT timed relay	PDF
T2R-M2-ADJ-240U	$;58]_:	Multi-mode	0.1 seconds to 100 minutes selectable	24-240 VAC and 12-125 VDC	(1) SPDT timed relay	PDF
T2R-M3-ADJ-240U	$;58]#:	Multi-mode	0.1 seconds to 1,000 minutes selectable	24-240 VAC and 12-125 VDC	(1) SPDT timed relay	PDF

Multi-Mode Relay Timers Specifications

Input Specifications	
Nominal Voltage	20.4 - 264VAC @ 50/60Hz, 10.2 - 137.5 VDC
Nominal Consumption	Max 2VA
Contact Specifications	
Type	1 SPDT
Switching Capacity	10A @ 240VAC, 30VDC 7A @ 28VDC SPDT 1/4 HP @ 120VAC (N.O.)
Electrical Lifetime	Full load: 100,000 operations
Mechanical Lifetime	10,000,000 operations
Reset Time	
Functions Triggered with Input Voltage	0.1 seconds
Functions Triggered with Control Switch	0.04 seconds
Time Circuit Specifications	
Setting Accuracy	Maximum setting (adjustable): +5%, 0% Minimum setting (adjustable): +0%, -50%
Start-up Time	Time from when power is applied until unit is timing: 50ms
Maintain Function Time	Time unit continues to operate after power is removed: 0.01 seconds
Repeat Accuracy	Constant voltage & temperature within specifications: ±0.1% or ± 0.04 seconds whichever is greater

Multi-Mode Relay Timers Specifications

General Specifications	
Connection	0.25 inch male quick-connect terminals
Ambient Temperature	-28 to +65°C [-18 to +149°F]
Storage Temperature	-40 to +85°C [-40 to +185°F]
Protection Rating	IP00
Mounting	Surface with one #8 or #10 screw and a maximum tightening torque of 15 in•lb.
Mounting Orientation	Any
Weight	0.15 lb
Agency Approvals and Standards *	cURus File E191059

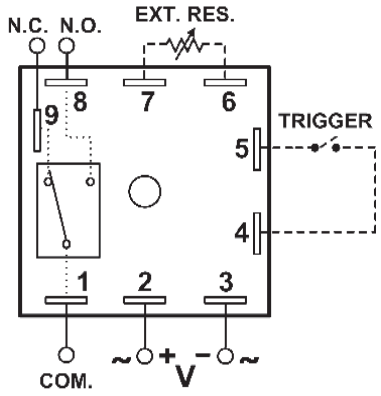
***To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

ProSense® Relay Timers

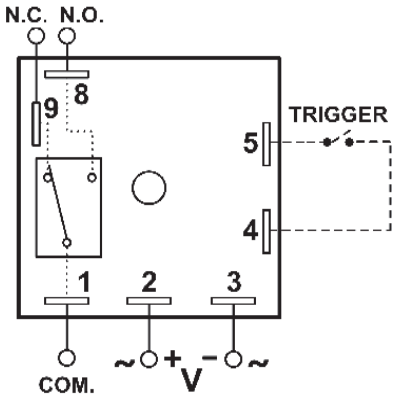
Multi-Mode Relay Timers T2R-M Series

Wiring Diagrams

T2R-M1-ADJ-240U
T2R-M2-ADJ-240U



T2R-M3-ADJ-240U



Functions

T2R-M1-ADJ-240U

Function Table	
Select Function	
1	On-delay
2	Off-delay
3	Interval
4	Single-shot

T2R-M2-ADJ-240U

Function Table	
Select Function	
1	Flasher OFF
2	Flasher ON
3	Watchdog
4	Single-shot falling edge

T2R-M3-ADJ-240U

Function Table	
Select Function	
1	Repeat cycle OFF
2	Repeat cycle ON
3	Delayed interval
4	Delayed interval (triggered)

Timing Ranges

Timing Ranges			
Part Number	*Time Range (t) Options*	*Switches*	
		C	*D*
T2R-M1-ADJ-240U	0.1 - 10s	ON	ON
	1-100s	OFF	ON
	10-1000s	ON	OFF
	1-100m	OFF	OFF
T2R-M2-ADJ-240U	0.1 - 10s	ON	ON
	1-100s	OFF	ON
	10-1000s	ON	OFF
	1-100m	OFF	OFF

Timing Ranges						
Part Number	*Time Range (t1) Options*	*Switches*		*Time Range (t2) Options*	*Switches*	
		C	*D*		*E*	*F*
T2R-M3-ADJ-240U	0.1 - 10s	ON	ON	0.1 - 10s	ON	ON
	1-100s	OFF	ON	1-100s	OFF	ON
	1-100m	ON	OFF	1-100m	ON	OFF
	10-1000m	OFF	OFF	10-1000m	OFF	OFF

ProSense® Relay Timers

On-Delay Relay Timers T2R-ND Series

Overview

The T2R-ND series offers a single on-delay timing function in a cost-effective design and compact size. The T2R-ND series is an ideal choice for many industrial applications. Units in this series utilize a microprocessor-based design for reliable performance and maximum flexibility. A 10A SPDT relay output can handle most pilot duty and fractional horsepower loads. All products are encapsulated for robust protection of internal components. This series is offered in a wide range of adjustable timing ranges.

Features

- Cost-effective design and compact 2 x 2in enclosure
- Encapsulated for protection
- 10A SPDT relay output contacts
- 24 VAC/VDC and 120 VAC/VDC models available

T2R-ND-30-24AD

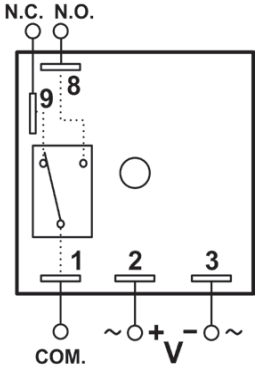
On-Delay Relay Timers T2R-ND Series						
Part Number	*Price*	*Timer Type*	*Timing Range*	*Voltage*	*Output Type*	*Drawing Link*
T2R-ND-30-120A	$;58[4:	On-delay	0.1 to 10 seconds	120 VAC/VDC	(1) SPDT timed relay	PDF
T2R-ND-30-24AD	$;;58]!:	On-delay	0.1 to 10 seconds	24 VAC/VDC	(1) SPDT timed relay	PDF
T2R-ND-31-120A	$;58[5:	On-delay	1 to 100 seconds	120 VAC/VDC	(1) SPDT timed relay	PDF
T2R-ND-31-24AD	$;58]?:	On-delay	1 to 100 seconds	24 VAC/VDC	(1) SPDT timed relay	PDF
T2R-ND-32-120A	$;58[6:	On-delay	0.1 to 10 minutes	120 VAC/VDC	(1) SPDT timed relay	PDF
T2R-ND-32-24AD	$;58]v:	On-delay	0.1 to 10 minutes	24 VAC/VDC	(1) SPDT timed relay	PDF
T2R-ND-33-120A	$;58[7:	On-delay	1 to 100 minutes	120 VAC/VDC	(1) SPDT timed relay	PDF
T2R-ND-33-24AD	$;58]x:	On-delay	1 to 100 minutes	24 VAC/VDC	(1) SPDT timed relay	PDF

On-Delay Relay Timers Specifications		
Models	*T2R-ND-3x-24AD*	*T2R-ND-3x-120A*
Input Specifications		
Nominal Voltage	24 VAC/VDC	120 VAC/VDC
Nominal Consumption	Maximum 2VA	
Nominal Frequency	50/60 Hz	
Voltage Tolerance	AC operation: +10/-15% of nominal at 50/60 Hz DC operation: +10/-15% of nominal	
Contact Specifications		
Type	(1) SPDT	
Switching Capacity	10A @ 240VAC, 30VDC 7A @ 28VDC SPDT 1/4 HP @ 120VAC (N.O.)	
Electrical Lifetime	Full load: 100,000 operations	
Mechanical Lifetime	10,000,000 operations	
Reset Time		
Triggered with Input Voltage	0.1 seconds	
Functions Triggered with Control Switch	0.04 seconds	
Time Circuit Specifications		
Setting Accuracy	Maximum setting (adjustable): +5%, -0% Minimum setting (adjustable): +0%, -50% Fixed time delay: ±2% or 50ms, whichever is greater	
Start-up Time	Time from when power is applied until unit is timing: 0.05 seconds	
Maintain Function Time	Time unit continues to operate after power is removed: 0.01 seconds	
Repeat Accuracy	Constant voltage and temperature within specifications: ±0.1% or ± 0.04 seconds, whichever is greater	

On-Delay Relay Timers Specifications	
General Specifications	
Connection	0.25 inch male quick-connect terminals
Ambient Temperature	-28 to +65°C [-18 to +149°F]
Storage Temperature	-40 to +85°C [-40 to +185°F]
Protection Rating	IP00
Mounting	Surface with one #8 or #10 screw and a maximum tightening torque of 15 in•lb.
Mounting Orientation	Any
Weight	0.15 lb
*Agency Approvals and Standards **	cURus File E191059, CE

***To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

Wiring Diagram



ProSense® Relay Timers

Off-Delay Relay Timers T2R-FD Series

Overview

The T2R-FD series offers a single off-delay timing function in a cost-effective design and compact size. The T2R-FD series is an ideal choice for many industrial applications. They utilize a microprocessor- based design for reliable performance and maximum flexibility. A 10A SPDT relay output can handle most pilot duty and fractional horsepower loads. All products are encapsulated for robust protection of internal components. This series is offered in a wide range of adjustable timing ranges.

Features

- Cost effective design and compact 2 x 2in enclosure
- Encapsulated for protection
- 10A SPDT relay output contacts
- 24VAC/VDC and 120VAC/VDC models available

T2R-FD-30-24AD

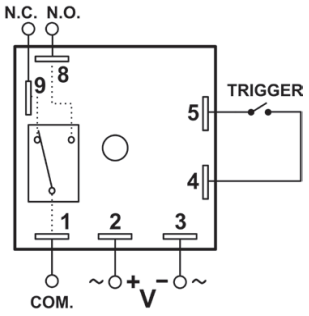
Off-Delay Relay Timers T2R-FD Series						
Part Number	*Price*	*Timer Type*	*Timing Range*	*Voltage*	*Output Type*	*Drawing Link*
T2R-FD-30-24AD	$;58]y:	Off-delay	0.1 to 10 seconds	24 VAC/VDC	(1) SPDT timed relay	PDF
T2R-FD-30J-120A	$;58[8:	Off-delay	0.1 to 10 seconds	120 VAC/VDC	(1) SPDT timed relay	PDF
T2R-FD-31-24AD	$;58]z:	Off-delay	1 to 100 seconds	24 VAC/VDC	(1) SPDT timed relay	PDF
T2R-FD-31J-120A	$;58[9:	Off-delay	1 to 100 seconds	120 VAC/VDC	(1) SPDT timed relay	PDF
T2R-FD-32-24AD	$;;58]]:	Off-delay	0.1 to 10 minutes	24 VAC/VDC	(1) SPDT timed relay	PDF
T2R-FD-32J-120A	$;58[a:	Off-delay	0.1 to 10 minutes	120 VAC/VDC	(1) SPDT timed relay	PDF
T2R-FD-33-24AD	$;;58],:	Off-delay	1 to 100 minutes	24 VAC/VDC	(1) SPDT timed relay	PDF
T2R-FD-33J-120A	$;58[b:	Off-delay	1 to 100 minutes	120 VAC/VDC	(1) SPDT timed relay	PDF

Off-Delay Relay Timers Specifications		
Models	*T2R-FD-3x-24AD*	*T2R-FD-3xJ-120A*
Input Specifications		
Nominal Voltage	24VAC/VDC	120VAC/VDC
Nominal Consumption	Maximum 2VA	
Nominal Frequency	50/60 Hz	
Voltage Tolerance	AC operation: +10/-15% of nominal at 50/60 Hz DC operation: +10/-15% of nominal	
Contact Specifications		
Type	(1) SPDT	
Switching Capacity	10A @ 240VAC, 30VDC 7A @ 28VDC SPDT 1/4 HP @ 120VAC (N.O.)	
Electrical Lifetime	Full load: 100,000 operations	
Mechanical Lifetime	10,000,000 operations	
Reset Time		
Triggered with Input Voltage	0.1 seconds	
Functions Triggered with Control Switch	0.04 seconds	
Time Circuit Specifications		
Setting Accuracy	Maximum setting (adjustable): +5%, -0% Minimum setting (adjustable): +0%, -50% Fixed time delay: ±2% or 50ms, whichever is greater	
Start-up Time	Time from when power is applied until unit is timing: 0.05 seconds	
Maintain Function Time	Time unit continues to operate after power is removed: 0.01 seconds	
Repeat Accuracy	Constant voltage and temperature within specifications: ±0.1% or ± 0.04 seconds, whichever is greater	

Off-Delay Relay Timers Specifications	
General Specifications	
Connection	0.25 inch male quick-connect terminals
Ambient Temperature	-28 to +65°C [-18 to +149°F]
Storage Temperature	-40 to +85°C [-40 to +185°F]
Protection Rating	IP00
Mounting	Surface with one #8 or #10 screw and a maximum tightening torque of 15 in•lb.
Mounting Orientation	Any
Weight	0.15 lb
*Agency Approvals and Standards **	cURus File E191059, CE

***To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

Wiring Diagram



ProSense® Relay Timers

Fleeting (single-shot) Relay Timers T2R-SST Series

Overview

The T2R-SST series offers a single-shot timing function in a cost-effective design and compact size. Units in the T2R-SST series are an ideal choice for many industrial applications. They utilize a microprocessor-based design for reliable performance and maximum flexibility. A 10A SPDT relay output can handle most pilot duty and fractional horsepower loads. All products are encapsulated for robust protection of internal components. This series is offered in a wide range of adjustable timing ranges.

Features

- Cost effective design and compact 2 x 2 inch enclosure
- Encapsulated for protection
- 10A SPDT relay output contacts
- 24VAC/VDC and 120VAC/VDC models available

T2R-SST-30-24AD

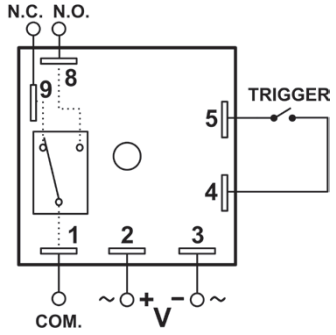
Fleeting (single-shot) Relay Timers T2R-SST Series						
Part Number	*Price*	*Timer Type*	*Timing Range*	*Voltage*	*Output Type*	*Drawing Link*
T2R-SST-30-120A	$;58[c:	Fleeting (single-shot)	0.1 to 10 seconds	120 VAC/VDC	(1) SPDT timed relay	PDF
T2R-SST-30-24AD	$;58[0:	Fleeting (single-shot)	0.1 to 10 seconds	24 VAC/VDC	(1) SPDT timed relay	PDF
T2R-SST-31-120A	$;58[d:	Fleeting (single-shot)	1 to 100 seconds	120 VAC/VDC	(1) SPDT timed relay	PDF
T2R-SST-31-24AD	$;58[1:	Fleeting (single-shot)	1 to 100 seconds	24 VAC/VDC	(1) SPDT timed relay	PDF
T2R-SST-32-120A	$;58[e:	Fleeting (single-shot)	0.1 to 10 minutes	120 VAC/VDC	(1) SPDT timed relay	PDF
T2R-SST-32-24AD	$;58[2:	Fleeting (single-shot)	0.1 to 10 minutes	24 VAC/VDC	(1) SPDT timed relay	PDF
T2R-SST-33-120A	$;;58[f:	Fleeting (single-shot)	1 to 100 minutes	120 VAC/VDC	(1) SPDT timed relay	PDF
T2R-SST-33-24AD	$;58[3:	Fleeting (single-shot)	1 to 100 minutes	24 VAC/VDC	(1) SPDT timed relay	PDF

Fleeting (single-shot) Relay Timers Specifications		
Models	*T2R-SST-3x-24AD*	*T2R-SST-3x-120AD*
Input Specifications		
Nominal Voltage	24VAC/VDC	120VAC/VDC
Nominal Consumption	Maximum 2VA	
Nominal Frequency	50/60 Hz	
Voltage Tolerance	AC operation: +10/-15% of nominal at 50/60 Hz DC operation: +10/-15% of nominal voltage	
Contact Specifications		
Type	(1) SPDT	
Switching Capacity	10A @ 240VAC, 30VDC 7A @ 28VDC SPDT 1/4 HP @ 120VAC (N.O.)	
Electrical Lifetime	Full load: 100,000 operations	
Mechanical Lifetime	10,000,000 operations	
Reset Time		
Triggered with Input Voltage	0.1 seconds	
Functions Triggered with Control Switch	0.04 seconds	
Time Circuit Specifications		
Setting Accuracy	Maximum setting (adjustable): +5%, -0% Minimum setting (adjustable): +0%, -50% Fixed time delay: ±2% or 50ms, whichever is greater	
Start-up Time	Time from when power is applied until unit is timing: 0.05 seconds	
Maintain Function Time	Time unit continues to operate after power is removed: 0.01 seconds	
Repeat Accuracy	Constant voltage and temperature within specifications: ±0.1% or ± 0.04 seconds, whichever is greater	

Fleeting (single-shot) Relay Timers Specifications	
General Specifications	
Connection	0.25 inch male quick-connect terminals
Ambient Temperature	-28 to +65°C [-18 to +149°F]
Storage Temperature	-40 to +85°C [-40 to +185°F]
Protection Rating	IP00
Mounting	Surface with one #8 or #10 screw and a maximum tightening torque of 15 in•lb.
Mounting Orientation	Any
Weight	0.15 lb
*Agency Approvals and Standards **	cURus File E191059, CE

***To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

Wiring Diagram



ProSense® Relay Timers

On-Delay Inline Relay Timers T2L-ND Series

Overview

The T2L-ND series of on-delay inline (series connection) relay timers is connected in series with the load, requiring only 2 terminals/connections. These products feature a universal input voltage of 24-240VAC and 12-48VDC. The inline solid state two-terminal output is rated 1A continuous/10A inrush pilot duty, and is ideal for high duty cycle and long-life applications. The enclosure is encapsulated for robust protection.

The T2L-ND series is offered in both an analog or digital programing versions. The analog versions offer time setting via an onboard potentiometer, and the digital versions are set through the use of a 10-postion DIP switch which offers a greater setting accuracy than is found on the analog models.

Features

- Cost effective design and compact 2 x 2 inch enclosure
- Encapsulated for protection
- Two-terminal series connection with the load
- Solid state 1A continuous/10A inrush pilot duty output
- Universal input voltage range: 24-240VAC and 12-48VDC
- DIP switch for accurate digital setting of time delay or easy to use analog potentiometer models are available

T2L-ND-30-240U

T2L-ND-40-240U

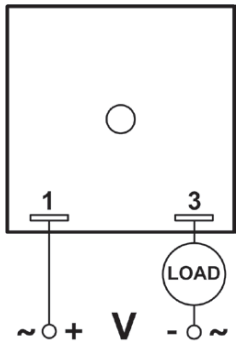
On-Delay Inline Relay Timers T2L-ND Series						
Part Number	*Price*	*Timer Type*	*Timing Range*	*Voltage*	*Output Type*	*Drawing Link*
T2L-ND-30-240U	$;58[g:	On-delay	0.1 to 10 seconds	24-240 VAC and 12-48 VDC	(1) SPNO timed solid state relay	PDF
T2L-ND-31-240U	$;58[h:	On-delay	1 to 100 seconds	24-240 VAC and 12-48 VDC	(1) SPNO timed solid state relay	PDF
T2L-ND-32-240U	$;-58[i:	On-delay	0.1 to 10 minutes	24-240 VAC and 12-48 VDC	(1) SPNO timed solid state relay	PDF
T2L-ND-33-240U	$;-58[j:	On-delay	1 to 100 minutes	24-240 VAC and 12-48 VDC	(1) SPNO timed solid state relay	PDF
T2L-ND-40-240U	$;58[k:	On-delay	0.1 to 102.3 seconds selectable	24-240 VAC and 12-48 VDC	(1) SPNO timed solid state relay	PDF
T2L-ND-41-240U	$;-58[l:	On-delay	1 to 1,023 seconds selectable	24-240 VAC and 12-48 VDC	(1) SPNO timed solid state relay	PDF
T2L-ND-42-240U	$;58[n:	On-delay	10 to 10,230 seconds selectable	24-240 VAC and 12-48 VDC	(1) SPNO timed solid state relay	PDF

On-Delay Inline Relay Timers Specifications	
General Specifications	
Connection	0.25 inch male quick-connect terminals
Ambient Temperature	-28 to +65°C [-18 to +149°F]
Storage Temperature	-40 to +85°C [-40 to +185°F]
Protection Rating	IP00
Mounting	Surface with one #8 or #10 screw and a maximum tightening torque of 15 in•lb.
Mounting Orientation	Any
Weight	0.15 lb
*Agency Approvals and Standards**	cURus File E222847, CE

***To obtain the most current agency approval information, see the Agency Approval Checklist section on the specific part number's web page.**

Specifications continued on following page.

Wiring Diagram



ProSense® Relay Timers

T2L-ND Series On-Delay Inline Relay Timers

On-Delay Inline Relay Timers Specifications (continued)		
Series	***T2L-ND-3x***	***T2L-ND-4x***
Input Specifications		
Nominal Voltage	AC operation: +10 to -15% of nominal voltage, 50/60 Hz +5% DC operation: +10 to -15% of nominal voltage	
Nominal Consumption	Maximum 1VA	
Contact Specifications		
Minimum Load Current	20mA	
Type	(1) SPNO	
Switching Capacity	Normally open solid state 1A continuous, 10A inrush @ 65ºC, pilot duty	
Lifetime		
	No predictable failure if used within operating parameters	
Reset Time		
Reset Time	0.05 seconds	
Time Circuit Specifications		
Setting Accuracy	Maximum setting (adjustable): +5%, -0% Minimum setting (adjustable): +0%, -50% Fixed time delay: ±2% or 50ms, whichever is greater	Constant voltage and temperature within specifications: +2% of set time or +50ms, whichever is greater Variable voltage and temperature within specifications: +5% of set time or +50ms, whichever is greater
Start-up Time	Time from when power is applied until unit is timing: 0.02 seconds	
Maintain Function Time	Time unit continues to operate after power is removed: 0.01 seconds	
Repeat Accuracy	Constant voltage and temperature within specifications: ±0.1% or ± 0.04 seconds, whichever is greater	Constant voltage and temperature within specifications: +0.1% of set time or +0.02 seconds, whichever is greater Variable voltage and temperature within specifications: +1% of set time or +0.02 seconds, whichever is greater

ProSense® Relay Timers

On-Delay Relay Timers T2S-ND Series

Overview

The T2S-ND series offers a single on-delay timing function in a cost-effective design and compact size. The T2S-ND series is an ideal choice for many industrial applications. Models in this series utilize a microprocessor-based design for reliable performance and maximum flexibility. Units feature a 1A continuous/10A inrush solid state output is perfect for high duty cycle/long life applications All products are encapsulated for robust protection of internal components. This series is offered in a wide range of adjustable timing ranges.

Features

- Three time delay options
- Pushbutton thumbwheels for digital set of time delay and function
- 24-240VAC and 12-125VDC models available
- 1A continuous, 10A inrush SPNO timed solid state relay output

T2S-ND-30-240A

On-Delay Relay Timers T2S-ND Series

Part Number	Price	Timer Type	Timing Range	Voltage	Output Type	Drawing Link
T2S-ND-30-125D	$;;58[,:	On-delay	0.1 to 10 seconds	12-125 VDC	(1) SPNO timed solid state relay	PDF
T2S-ND-30-240A	$;58[o:	On-delay	0.1 to 10 seconds	24-240 VAC	(1) SPNO timed solid state relay	PDF
T2S-ND-31-125D	$58_0:	On-delay	1 to 100 seconds	12-125 VDC	(1) SPNO timed solid state relay	PDF
T2S-ND-31-240A	$;58[p:	On-delay	1 to 100 seconds	24-240 VAC	(1) SPNO timed solid state relay	PDF
T2S-ND-32-125D	$58_1:	On-delay	0.1 to 10 minutes	12-125 VDC	(1) SPNO timed solid state relay	PDF
T2S-ND-32-240A	$;58[q:	On-delay	0.1 to 10 minutes	24-240 VAC	(1) SPNO timed solid state relay	PDF
T2S-ND-33-125D	$58_2:	On-delay	1 to 100 minutes	12-125 VDC	(1) SPNO timed solid state relay	PDF
T2S-ND-33-240A	$;58[s:	On-delay	1 to 100 minutes	24-240 VAC	(1) SPNO timed solid state relay	PDF

On-Delay Relay Timers Specifications

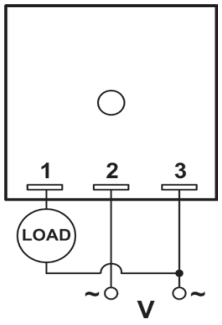
Models	T2S-ND-3x-240A	T2S-ND-3x-125D
Input Specifications		
Nominal Voltage	24-240VAC	12-125VDC
Nominal Consumption	Maximum 1VA	
Nominal Frequency	50/60 Hz	
Voltage Tolerance	AC operation: +10 to -15% of nominal voltage, 50/60 Hz DC operation: +10 to -15% of nominal voltage	
Contact Specifications		
Type	(1) SPNO	
Switching Capacity	1A continuous, 10A inrush @ 65ºC, pilot duty	
Electrical Lifetime	No predictable failure if used within operating parameters	
Reset Time		
Triggered with Input Voltage	0.05 seconds	
Functions Triggered with Control Switch	0.04 seconds	
Time Circuit Specifications		
Setting Accuracy	Maximum setting (adjustable): +5%, -0% Minimum setting (adjustable): +0%, -50% Fixed time delay: ± 2% or 50ms, whichever is greater	
Start-up Time	Time from when power is applied until unit is timing: 0.05 seconds	
Maintain Function Time	Time unit continues to operate after power is removed: 0.01 seconds	
Repeat Accuracy	Constant voltage and temperature within specifications: ± 0.1% or ± 0.04 seconds, whichever is greater	

On-Delay Relay Timers Specifications

General Specifications	
Connection	0.25 inch male quick-connect terminals
Ambient Temperature	-28 to +65°C [-18 to +149°F]
Storage Temperature	-40 to +85°C [-40 to +185°F]
Protection Rating	IP00
Mounting	Surface with one #8 or #10 screw and a maximum tightening torque of 15 in•lb.
Mounting Orientation	Any
Weight	0.15 lb
Agency Approvals and Standards *	cURus File E191059, CE cURus File E222847

***To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

Wiring Diagram



ProSense® Relay Timers

Off-Delay Relay Timers T2S-FD Series

Overview

The T2S-FD series offers a single off-delay timing function in a cost-effective design and compact size. The T2S-FD series is an ideal choice for many industrial applications. Models in this series utilize a microprocessor-based design for reliable performance and maximum flexibility. Units feature a 1A continuous/10A inrush solid state output that is perfect for high duty cycle/long life applications All products are encapsulated for robust protection of internal components. This series is offered in a wide range of adjustable timing ranges.

Features

- Three time delay options
- Pushbutton thumbwheels for digital set of time delay and function
- Universal 24-240VAC and 12-125VDC
- 1A continuous, 10A inrush SPNO timed solid state relay output

T2S-FD-30-240A

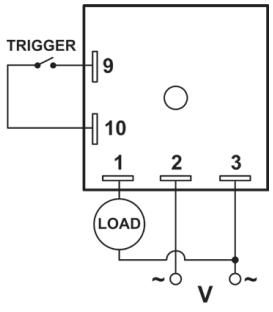
Off-Delay Relay Timers T2S-FD Series						
Part Number	*Price*	*Timer Type*	*Timing Range*	*Voltage*	*Output Type*	*Drawing Link*
T2S-FD-30-125D	$58_3:	Off-delay	0.1 to 10 seconds	12-125 VDC	(1) SPNO timed solid state relay	PDF
T2S-FD-30-240A	$;;58[t:	Off-delay	0.1 to 10 seconds	24-240 VAC	(1) SPNO timed solid state relay	PDF
T2S-FD-31-125D	$58_4:	Off-delay	1 to 100 seconds	12-125 VDC	(1) SPNO timed solid state relay	PDF
T2S-FD-31-240A	$;58[u:	Off-delay	1 to 100 seconds	24-240 VAC	(1) SPNO timed solid state relay	PDF
T2S-FD-32-125D	$58_5:	Off-delay	0.1 to 10 minutes	12-125 VDC	(1) SPNO timed solid state relay	PDF
T2S-FD-32-240A	$;58[v:	Off-delay	0.1 to 10 minutes	24-240 VAC	(1) SPNO timed solid state relay	PDF
T2S-FD-33-125D	$58_6:	Off-delay	1 to 100 minutes	12-125 VDC	(1) SPNO timed solid state relay	PDF
T2S-FD-33-240A	$;58[x:	Off-delay	1 to 100 minutes	24-240 VAC	(1) SPNO timed solid state relay	PDF

Off-Delay Relay Timers Specifications		
Models	*T2S-FD-3x-240A*	*T2S-FD-3x-125D*
Input Specifications		
Nominal Voltage	24-240VAC	12-125VDC
Nominal Consumption	Maximum 1VA	
Nominal Frequency	50/60 Hz	
Voltage Tolerance	AC operation: +10 to -15% of nominal voltage, 50/60 Hz DC operation: +10 to -15% of nominal voltage	
Contact Specifications		
Minimum Load Current	20mA	
Type	(1) SPNO	
Switching Capacity	1A continuous, 10A inrush @ 65ºC, pilot duty	
Electrical Lifetime	No predictable failure if used within operating parameters	
Reset Time		
Triggered with Input Voltage	0.05 seconds	
Functions Triggered with Control Switch	0.04 seconds	
Time Circuit Specifications		
Setting Accuracy	Maximum setting (adjustable): +5%, -0% Minimum setting (adjustable): +0%, -50% Fixed time delay: ± 2% or 50ms, whichever is greater	
Start-up Time	Time from when power is applied until unit is timing: 0.05 seconds	
Maintain Function Time	Time unit continues to operate after power is removed: 0.01 seconds	
Repeat Accuracy	Constant voltage and temperature within specifications: ± 0.1% or ± 0.04 seconds, whichever is greater	

Off-Delay Relay Timers Specifications	
General Specifications	
Connection	0.25 inch male quick-connect terminals
Ambient Temperature	-28 to +65°C [-18 to +149°F]
Storage Temperature	-40 to +85°C [-40 to +185°F]
Protection Rating	IP00
Mounting	Surface with one #8 or #10 screw and a maximum tightening torque of 15 in•lb.
Mounting Orientation	Any
Weight	0.15 lb
*Agency Approvals and Standards **	cURus File E191059, CE cURus File E222847

***To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page..**

Wiring Diagram



ProSense® Relay Timers

Fleeting (single-shot) Relay Timers T2S-SST Series

Overview

The T2S-SST series offers a single fleeting (one-shot) timing function in a cost- effective design and compact size. The T2S-SST series is an ideal choice for many industrial applications. Models in this series utilize a microprocessor-based design for reliable performance and maximum flexibility. Units feature a 1A continuous/10A inrush solid state output is perfect for high duty cycle/long life applications All products are encapsulated for robust protection of internal components. This series is offered in a wide range of adjustable timing ranges.

Features

- Three time delay options
- Pushbutton thumbwheels for digital set of time delay and function
- 24-240VAC or 12-125VDC models available
- 1A continuous, 10A inrush SPNO timed solid state relay output

T2S-SST-30-240A

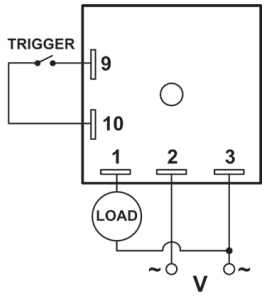
Fleeting (single-shot) Relay Timers T2S-SST Series						
Part Number	*Price*	*Timer Type*	*Timing Range*	*Voltage*	*Output Type*	*Drawing Link*
T2S-SST-30-125D	$58_7:	Fleeting (single-shot)	0.1 to 10 seconds	12-125 VDC	(1) SPNO timed solid state relay	PDF
T2S-SST-30-240A	$;58[y:	Fleeting (single-shot)	0.1 to 10 seconds	24-240 VAC	(1) SPNO timed solid state relay	PDF
T2S-SST-31-125D	$58_8:	Fleeting (single-shot)	1 to 100 seconds	12-125 VDC	(1) SPNO timed solid state relay	PDF
T2S-SST-31-240A	$;58[z:	Fleeting (single-shot)	1 to 100 seconds	24-240 VAC	(1) SPNO timed solid state relay	PDF
T2S-SST-32-125D	$58_9:	Fleeting (single-shot)	0.1 to 10 minutes	12-125 VDC	(1) SPNO timed solid state relay	PDF
T2S-SST-32-240A	$;;58[]:	Fleeting (single-shot)	0.1 to 10 minutes	24-240 VAC	(1) SPNO timed solid state relay	PDF
T2S-SST-33-125D	$58_a:	Fleeting (single-shot)	1 to 100 minutes	12-125 VDC	(1) SPNO timed solid state relay	PDF
T2S-SST-33-240A	$;;58[[:	Fleeting (single-shot)	1 to 100 minutes	24-240 VAC	(1) SPNO timed solid state relay	PDF

Fleeting (single-shot) Relay Timers Specifications		
Models	*T2S-SST-3x-240A*	*T2S-SST-3x-125D*
Input Specifications		
Nominal Voltage	24-240VAC	12-125VDC
Nominal Consumption	Maximum 1VA	
Nominal Frequency	50/60 Hz	
Voltage Tolerance	AC operation: +10 to -15% of nominal voltage, 50/60 Hz DC operation: +10 to -15% of nominal voltage	
Contact Specifications		
Minimum Load Current	20mA	
Type	(1) SPNO	
Switching Capacity	1A continuous, 10A inrush @ 65ºC, pilot duty	
Electrical Lifetime	No predictable failure if used within operating parameters.	
Reset Time		
Triggered with Input Voltage	0.05 seconds	
Functions Triggered with Control Switch	0.04 seconds	
Time Circuit Specifications		
Setting Accuracy	Maximum setting (adjustable): +5%, -0% Minimum setting (adjustable): +0%, -50% Fixed time delay: ± 2% or 50ms, whichever is greater	
Start-up Time	Time from when power is applied until unit is timing: 0.05 seconds	
Maintain Function Time	Time unit continues to operate after power is removed: 0.01 seconds	
Repeat Accuracy	Constant voltage and temperature within specifications: ± 0.1% or ± 0.04 seconds, whichever is greater	

Fleeting (single-shot) Relay Timers Specifications	
General Specifications	
Connection	0.25 inch male quick-connect terminals
Ambient Temperature	-28 to +65°C [-18 to +149°F]
Storage Temperature	-40 to +85°C [-40 to +185°F]
Protection Rating	IP00
Mounting	Surface with one #8 or #10 screw and a maximum tightening torque of 15 in•lb.
Mounting Orientation	Any
Weight	0.15 lb
*Agency Approvals and Standards **	cURus File E191059, CE cURus File E222847

***To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

Wiring Diagram



ProSense® Relay Timers

On-Interval Relay Timers T2S-TT Series

Overview

The T2S-TT series offers a single on-interval timing function in a cost-effective design and compact size. The T2S-TT series is an ideal choice for many industrial applications. Models in this series utilize a microprocessor-based design for reliable performance and maximum flexibility. Units feature a 1A continuous/10A inrush solid state output is perfect for high duty cycle/long life applications All products are encapsulated for robust protection of internal components. This series is offered in a wide range of adjustable timing ranges.

Features

- Three time delay options
- Pushbutton thumbwheels for digital set of time delay and function
- 24-240VAC and 12-125VDC models available
- 1A continuous, 10A inrush SPNO timed solid state relay output

T2S-TT-30-240A

On-Interval Relay Timers T2S-TT

Part Number	Price	Timer Type	Timing Range	Voltage	Output Type	Drawing Link
T2S-TT-30-125D	$58_b:	On-interval	0.1 to 10 seconds	12-125 VDC	(1) SPNO timed solid state relay	PDF
T2S-TT-30-240A	$;58[_:	On-interval	0.1 to 10 seconds	24-240 VAC	(1) SPNO timed solid state relay	PDF
T2S-TT-31-125D	$58_c:	On-interval	1 to 100 seconds	12-125 VDC	(1) SPNO timed solid state relay	PDF
T2S-TT-31-240A	$;58[#:	On-interval	1 to 100 seconds	24-240 VAC	(1) SPNO timed solid state relay	PDF
T2S-TT-32-125D	$58_d:	On-interval	0.1 to 10 minutes	12-125 VDC	(1) SPNO timed solid state relay	PDF
T2S-TT-32-240A	$;;58[!:	On-interval	0.1 to 10 minutes	24-240 VAC	(1) SPNO timed solid state relay	PDF
T2S-TT-33-125D	$58_e:	On-interval	1 to 100 minutes	12-125 VDC	(1) SPNO timed solid state relay	PDF
T2S-TT-33-240A	$;58[?:	On-interval	1 to 100 minutes	24-240 VAC	(1) SPNO timed solid state relay	PDF

On-Interval Relay Timers Specifications

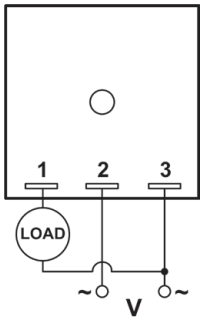
Models	T2S-TT-3x-240A	T2S-TT-3x-125D
Input Specifications		
Nominal Voltage	24-240VAC	12-125VDC
Nominal Consumption	Maximum 1VA	
Nominal Frequency	50/60 Hz	
Voltage Tolerance	AC operation: +10 to -15% of nominal voltage, 50/60 Hz DC operation: +10 to -15% of nominal voltage	
Contact Specifications		
Minimum Load Current	20mA	
Type	(1) SPNO	
Switching Capacity	1A continuous, 10A inrush @ 65ºC, Pilot Duty	
Electrical Lifetime	No predictable failure if used within operating parameters.	
Reset Time		
Triggered with Input Voltage	0.05 seconds	
Functions Triggered with Control Switch	0.04 seconds	
Time Circuit Specifications		
Setting Accuracy	Maximum setting (adjustable): +5%, -0% Minimum setting (adjustable): +0%, -50% Fixed time delay: ± 2% or 50ms, whichever is greater	
Start-up Time	Time from when power is applied until unit is timing: 0.05 seconds	
Maintain Function Time	Time unit continues to operate after power is removed: 0.01 seconds	
Repeat Accuracy	Constant voltage and temperature within specifications: ± 0.1% or ± 0.04 seconds, whichever is greater	

On-Interval Relay Timers Specifications

General Specifications	
Connection	0.25 inch male quick-connect terminals
Ambient Temperature	-28 to +65°C [-18 to +149°F]
Storage Temperature	-40 to +85°C [-40 to +185°F]
Protection Rating	IP00
Mounting	Surface with one #8 or #10 screw and a maximum tightening torque of 15 in•lb.
Mounting Orientation	Any
Weight	0.15 lb
Agency Approvals and Standards *	cURus File E191059, CE cURus File E222847

***To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

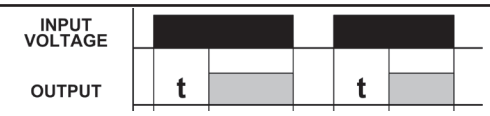
Wiring Diagram



ProSense® Relay Timers

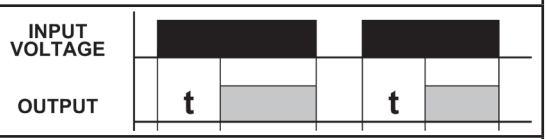
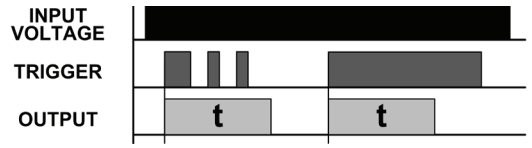
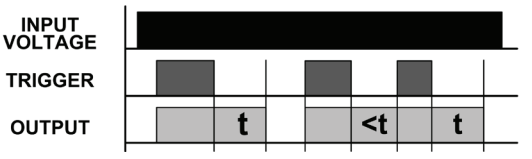
Timing Charts

T2L Series (-4X Suffix)

Function	Series	Operation	Timing Chart
ON DELAY Delay on Operate	T2L (-4x Suffix)	Upon application of input voltage, the time delay (t) begins. At the end of the time delay (t), the output is energized. Input voltage must be removed to reset the time delay relay & de-energize the output.	

Note: Please see inserts for more information

T2L, T2R, & T2S Series

Function	Product Series	Operation	Timing Chart
ON DELAY Delay on Operate	T2L-ND T2R-ND T2S-ND	Upon application of input voltage, the time delay (t) begins. At the end of the time delay (t), the output is energized. Input voltage must be removed to reset the time delay relay & de-energize the output.	
INTERVAL ON Interval	T2S-TT	Upon application of input voltage, the output is energized and the time delay (t) begins. At the end of the time delay (t), the output is de-energized. Input voltage must be removed to reset the time delay relay.	
SINGLE SHOT One Shot Momentary Interval	T2R-SST T2S-SST	Upon application of input voltage, the time delay relay is ready to accept a trigger. When the trigger is applied, the output is energized and the time delay (t) begins. During the time delay (t), the trigger is ignored. At the end of the time delay (t), the output is de-energized and the time delay is ready to accept another trigger.	
OFF DELAY Delay on Release Delay on Break Delay on De-Energization	T2R-FD T2S-FD	Upon application of input voltage, the time delay relay is ready to accept a trigger. When the trigger is applied, the output is energized. Upon removal of the trigger, the time delay (t) begins. At the end of the time delay (t), the output is de-energized. Any application of the trigger during the time delay will reset the time delay (t) and the output remains energized.	

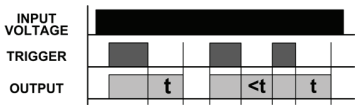
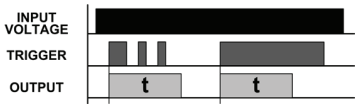
Note: Please see inserts for more information

ProSense® Relay Timers

Timing Charts

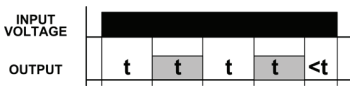
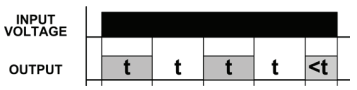
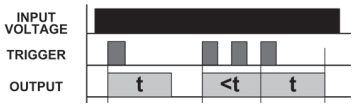
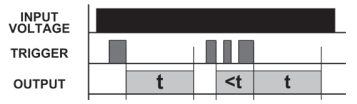
T2R-M1-ADJ-240U, T2R-M2-ADJ-240U, & T2R-M3-ADJ-240U

T2R-M1-ADJ-240U

FUNCTION	TIMING CHART
ON DELAY Delay on Make Delay on Operate	
INTERVAL ON Interval	
OFF DELAY * Delay on Release Delay on Break Delay on De-Energization	
SINGLE SHOT* One Shot Momentary Interval	

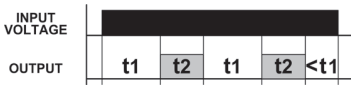
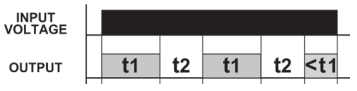
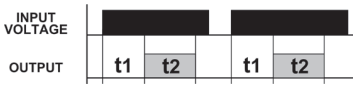
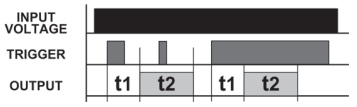
* Requires Trigger

T2R-M2-ADJ-240U

FUNCTION	TIMING CHART
FLASHER (Off First)	
FLASHER (On First)	
WATCHDOG * Retriggerable Single Shot	
SINGLE SHOT FALLING EDGE*	

* Requires Trigger

T2R-M3-ADJ-240U

FUNCTION	TIMING CHART
REPEAT CYCLE (Off 1st)	
REPEAT CYCLE (On First)	
DELAYED INTERVAL Single Cycle	
TRIGGERED DELAYED INTERVAL * Single Cycle	

* Requires Trigger

Note: Please see inserts for more information

ProSense® Relay Timers

On-Delay Relay Timers T30R-ND Series

T30R-ND-30-120A

Overview

The T30R-ND series offers a single on-delay timing function in a cost-effective design and compact size and is an ideal choice for many industrial applications. Units in this series utilize a microprocessor-based design for reliable performance and maximum flexibility. The 30A SPDT relay output can handle most pilot duty and fractional horsepower loads. All products are encapsulated for robust protection of internal components. This series is offered in a wide range of adjustable timing ranges.

Features

- 30A SPDT relay output contacts can control loads without a separate contactor
- Cost effective design and compact 2x3 inch enclosure
- Microprocessor-based for superior accuracy and repeatability
- Encapsulated for resistance to harsh environments
- Made in USA

On-Delay Relay Timers T30R-ND Series

Part Number	Price	Timer Type	Timing Range	Voltage	Output Type	Drawing Link
T30R-ND-30-120A	$60ah:	On-delay	0.1 to 10 seconds	120 VAC/VDC	SPDT	PDF
T30R-ND-30-24AD	$60a2:	On-delay	0.1 to 10 seconds	24 VAC/VDC	SPDT	PDF
T30R-ND-31-120A	$-60ai:	On-delay	1 to 100 seconds	120 VAC/VDC	SPDT	PDF
T30R-ND-31-24AD	$60a3:	On-delay	1 to 100 seconds	24 VAC/VDC	SPDT	PDF
T30R-ND-32-120A	$-60aj:	On-delay	0.1 to 10 minutes	120 VAC/VDC	SPDT	PDF
T30R-ND-32-24AD	$60a4:	On-delay	0.1 to 10 minutes	24 VAC/VDC	SPDT	PDF
T30R-ND-33-120A	$60ak:	On-delay	1 to 100 minutes	120 VAC/VDC	SPDT	PDF
T30R-ND-33-24AD	$60a5:	On-delay	1 to 100 minutes	24 VAC/VDC	SPDT	PDF
T30R-ND-34-120A	$-60al:	On-delay	0.1 to 10 hours	120 VAC/VDC	SPDT	PDF
T30R-ND-34-24AD	$60a6:	On-delay	0.1 to 10 hours	24 VAC/VDC	SPDT	PDF

On-Delay Relay Timers Specifications

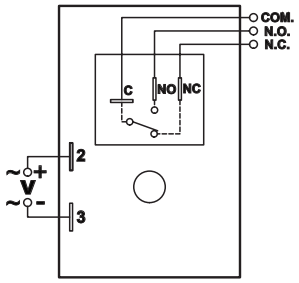
Models	T30R-ND-3x-24AD	T30R-ND-3x-120A
Input Specifications		
Nominal Voltage	24 VAC/VDC	120 VAC/VDC
Nominal Consumption	Maximum 3VA	
Nominal Frequency	50/60 Hz	
Voltage Tolerance	AC operation: +10/-15% of nominal at 50/60 Hz DC operation: +10/-15% of nominal	
Contact Specifications		
Type	(1) SPDT	
Output Contact Ratings	240VAC - 30A (N.O.), 15A (N.C.) 28VDC - 20A (N.O.), 10A (N.C.) Motor Load - 115/120/125: 1HP (N.O.), 1/4HP (N.C.) Motor Load - 230/240/250: 2HP (N.O.), 1/2 HP (N.C.)	
Electrical Lifetime	Full load: 100,000 operations	
Mechanical Lifetime	10,000,000 operations	
Reset Time		
Triggered With Input Voltage	100ms	
Units Triggered With Control Switch	Minimum required trigger switch closure time is 50ms	
Time Circuit Specifications		
Setting Accuracy	Maximum setting (adjustable): +5%, -0% Minimum setting (adjustable): +0%, -50%	
Start-up Time	Time from when power is applied until unit is timing: 0.05 seconds	
Maintain Function Time	Time unit continues to operate after power is removed: 0.01 seconds	
Repeat Accuracy	Constant voltage and temperature within specifications: ±0.1% or ± 0.04 seconds, whichever is greater	

On-Delay Relay Timers Specifications

General Specifications	
Connection	0.25 inch male quick-connect terminals
Operating Temperature	-28 to 65°C [-18 to 149°F]
Storage Temperature	-40 to 85°C [-40 to 185°F]
Protection Rating	IP00
Mounting	Surface with one #8 or #10 screw and a maximum tightening torque of 15 in•lb.
Mounting Orientation	All directions
Weight	0.25 lb
Agency Approvals And Standards *	cURus File E191059

***To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

Wiring Diagram



For the latest prices, please check AutomationDirect.com.

Relay Timers

Off-Delay Relay Timers T30R-FD Series

Overview

The T30R-FD series offers a single off-delay timing function in a cost-effective design and compact size, making it an ideal choice for many industrial applications. They utilize a microprocessor- based design for reliable performance and maximum flexibility. The 30A SPDT relay output can handle most pilot duty and fractional horsepower loads. All products are encapsulated for robust protection of internal components. This series is offered in a wide range of adjustable timing ranges.

Features

- 30A SPDT relay output contacts can control loads without a separate contactor
- Cost effective design and compact 2x3 inch enclosure
- Microprocessor-based for superior accuracy and repeatability
- Encapsulated for resistance to harsh environments
- Isolated control switch and isolated relay common
- Made in USA

T30R-FD-30-120A

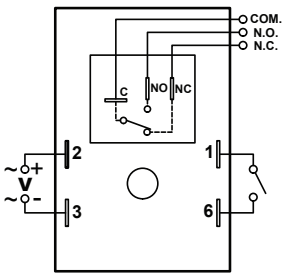
Off-Delay Relay Timers T30R-FD Series						
Part Number	*Price*	*Timer Type*	*Timing Range*	*Voltage*	*Output Type*	*Drawing Link*
T30R-FD-30-120A	$60an:	Off-delay	0.1 to 10 seconds	120 VAC/VDC	SPDT	PDF
T30R-FD-30-24AD	$;609!:	Off-delay	0.1 to 10 seconds	24 VAC/VDC	SPDT	PDF
T30R-FD-31-120A	$60ao:	Off-delay	1 to 100 seconds	120 VAC/VDC	SPDT	PDF
T30R-FD-31-24AD	$609?:	Off-delay	1 to 100 seconds	24 VAC/VDC	SPDT	PDF
T30R-FD-32-120A	$60ap:	Off-delay	0.1 to 10 minutes	120 VAC/VDC	SPDT	PDF
T30R-FD-32-24AD	$;609,:	Off-delay	0.1 to 10 minutes	24 VAC/VDC	SPDT	PDF
T30R-FD-33-120A	$60aq:	Off-delay	1 to 100 minutes	120 VAC/VDC	SPDT	PDF
T30R-FD-33-24AD	$60a0:	Off-delay	1 to 100 minutes	24 VAC/VDC	SPDT	PDF
T30R-FD-34-120A	$60as:	Off-delay	0.1 to 10 hours	120 VAC/VDC	SPDT	PDF
T30R-FD-34-24AD	$60a1:	Off-delay	0.1 to 10 hours	24 VAC/VDC	SPDT	PDF

Off-Delay Relay Timers Specifications		
Models	*T30R-FD-3x-24AD*	*T30R-FD-3xJ-120A*
Input Specifications		
Nominal Voltage	24 VAC/VDC	120 VAC/VDC
Nominal Consumption	Maximum 3VA	
Nominal Frequency	50/60 Hz	
Voltage Tolerance	AC operation: +10/-15% of nominal at 50/60 Hz DC operation: +10/-15% of nominal	
Contact Specifications		
Type	(1) SPDT	
Output Contact Ratings	240VAC - 30A (N.O.), 15A (N.C.) 28VDC - 20A (N.O.), 10A (N.C.) Motor Load - 115/120/125: 1HP (N.O.), 1/4HP (N.C.) Motor Load - 230/240/250: 2HP (N.O.), 1/2 HP (N.C.)	
Electrical Lifetime	Full load: 100,000 operations	
Mechanical Lifetime	10,000,000 operations	
Reset Time		
Triggered With Input Voltage	100ms	
Units Triggered With Control Switch	Minimum required trigger switch closure time is 50ms	
Time Circuit Specifications		
Setting Accuracy	Maximum setting (adjustable): +5%, -0% Minimum setting (adjustable): +0%, -50%	
Start-up Time	Time from when power is applied until unit is timing: 0.05 seconds	
Maintain Function Time	Time unit continues to operate after power is removed: 0.01 seconds	
Repeat Accuracy	Constant voltage and temperature within specifications: ±0.1% or ± 0.04 seconds, whichever is greater	

Off-Delay Relay Timers Specifications	
General Specifications	
Connection	0.25 inch male quick-connect terminals
Operating Temperature	-28 to 65°C [-18 to 149°F]
Storage Temperature	-40 to 85°C [-40 to 185°F]
Protection Rating	IP00
Mounting	Surface with one #8 or #10 screw and a maximum tightening torque of 15 in•lb.
Mounting Orientation	All directions
Weight	0.25 lb
*Agency Approvals And Standards **	cURus File E191059

***To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

Wiring Diagram



ProSense® Relay Timers

Fleeting (single-shot) Relay Timers T30R-SST Series

Overview

The T30R-SST series offers a single-shot timing function in a cost-effective design and compact size. Units in the T30R-SST series are an ideal choice for many industrial applications, using a microprocessor-based design for reliable performance and maximum flexibility. The 30A SPDT relay output can handle most pilot duty and fractional horsepower loads. All products are encapsulated for robust protection of internal components. This series is offered in a wide range of adjustable timing ranges.

Features

- 30A SPDT relay output contacts can control loads without a separate contactor
- Cost effective design and compact 2x3 inch enclosure
- Microprocessor-based for superior accuracy and repeatability
- Encapsulated for resistance to harsh environments
- Isolated control switch and isolated relay common
- Made in USA

T30R-SST-30-120A

MADE IN USA

c UL us

Fleeting (single-shot) Relay Timers Timers T30R-SST Series

Part Number	Price	Timer Type	Timing Range	Voltage	Output Type	Drawing Link
T30R-SST-30-120A	$;60at:	Fleeting (single-shot)	0.1 to 10 seconds	120 VAC/VDC	SPDT	PDF
T30R-SST-30-24AD	$60a7:	Fleeting (single-shot)	0.1 to 10 seconds	24 VAC/VDC	SPDT	PDF
T30R-SST-31-120A	$60au:	Fleeting (single-shot)	1 to 100 seconds	120 VAC/VDC	SPDT	PDF
T30R-SST-31-24AD	$60a8:	Fleeting (single-shot)	1 to 100 seconds	24 VAC/VDC	SPDT	PDF
T30R-SST-32-120A	$60av:	Fleeting (single-shot)	0.1 to 10 minutes	120 VAC/VDC	SPDT	PDF
T30R-SST-32-24AD	$60a9:	Fleeting (single-shot)	0.1 to 10 minutes	24 VAC/VDC	SPDT	PDF
T30R-SST-33-120A	$60ax:	Fleeting (single-shot)	1 to 100 minutes	120 VAC/VDC	SPDT	PDF
T30R-SST-33-24AD	$60aa:	Fleeting (single-shot)	1 to 100 minutes	24 VAC/VDC	SPDT	PDF
T30R-SST-34-120A	$60ay:	Fleeting (single-shot)	0.1 to 10 hours	120 VAC/VDC	SPDT	PDF
T30R-SST-34-24AD	$60ab:	Fleeting (single-shot)	0.1 to 10 hours	24 VAC/VDC	SPDT	PDF

Fleeting (single-shot) Relay Timers Specifications

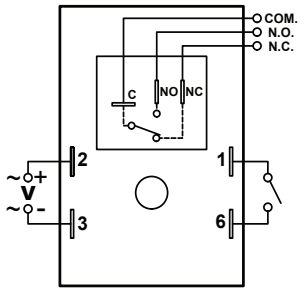
Models	T30R-SST-3x-24AD	T30R-SST-3x-120A
Input Specifications		
Nominal Voltage	24 VAC/VDC	120 VAC/VDC
Nominal Consumption	Maximum 3VA	
Nominal Frequency	50/60 Hz	
Voltage Tolerance	AC operation: +10/-15% of nominal at 50/60 Hz DC operation: +10/-15% of nominal	
Contact Specifications		
Type	(1) SPDT	
Output Contact Ratings	240VAC - 30A (N.O.), 15A (N.C.) 28VDC - 20A (N.O.), 10A (N.C.) Motor Load - 115/120/125: 1HP (N.O.), 1/4HP (N.C.) Motor Load - 230/240/250: 2HP (N.O.), 1/2 HP (N.C.)	
Electrical Lifetime	Full load: 100,000 operations	
Mechanical Lifetime	10,000,000 operations	
Reset Time		
Triggered With Input Voltage	100ms	
Units Triggered With Control Switch	Minimum required trigger switch closure time is 50ms	
Time Circuit Specifications		
Setting Accuracy	Maximum setting (adjustable): +5%, -0% Minimum setting (adjustable): +0%, -50%	
Start-up Time	Time from when power is applied until unit is timing: 0.05 seconds	
Maintain Function Time	Time unit continues to operate after power is removed: 0.01 seconds	
Repeat Accuracy	Constant voltage and temperature within specifications: ±0.1% or ± 0.04 seconds, whichever is greater	

Fleeting (single-shot) Relay Timers Specifications

General Specifications	
Connection	0.25 inch male quick-connect terminals
Operating Temperature	-28 to 65°C [-18 to 149°F]
Storage Temperature	-40 to 85°C [-40 to 185°F]
Protection Rating	IP00
Mounting	Surface with one #8 or #10 screw and a maximum tightening torque of 15 in•lb.
Mounting Orientation	All directions
Weight	0.15 lb
Agency Approvals And Standards *	cURus File E191059

****To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

Wiring Diagram



For the latest prices, please check AutomationDirect.com.

Relay Timers

Cyclic Relay Timers T30R-RC Series

T30R-RC-30-120A

Overview

The T30R-RC Series cyclic relay timers offer time-based control with high amperage switching which allows effective and economical operation of heavy loads such as pumps, compressors, and heaters. This cost-effective solution can eliminate the need for a separate contactor, reducing cost and saving space.

Features

- 30A SPDT relay output contacts can control loads without a separate contactor
- Cost effective design and compact 2x3 inch enclosure
- Microprocessor-based for superior accuracy and repeatability
- Encapsulated for resistance to harsh environments
- Made in USA

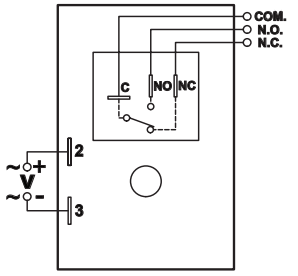
Cyclic Relay Timers T30R-RC Series						
Part Number	*Price*	*Timer Type*	*Timing Range*	*Voltage*	*Output Type*	*Drawing Link*
T30R-RC-30-120A	$60az:	Cyclic	0.1 to 10 seconds	120 VAC/VDC	SPDT	PDF
T30R-RC-30-24AD	$60ac:	Cyclic	0.1 to 10 seconds	24 VAC/VDC	SPDT	PDF
T30R-RC-31-120A	$;60a]:	Cyclic	1 to 100 seconds	120 VAC/VDC	SPDT	PDF
T30R-RC-31-24AD	$60ad:	Cyclic	1 to 100 seconds	24 VAC/VDC	SPDT	PDF
T30R-RC-32-120A	$;60a[:	Cyclic	0.1 to 10 minutes	120 VAC/VDC	SPDT	PDF
T30R-RC-32-24AD	$60ae:	Cyclic	0.1 to 10 minutes	24 VAC/VDC	SPDT	PDF
T30R-RC-33-120A	$60a_:	Cyclic	1 to 100 minutes	120 VAC/VDC	SPDT	PDF
T30R-RC-33-24AD	$;60af:	Cyclic	1 to 100 minutes	24 VAC/VDC	SPDT	PDF
T30R-RC-34-120A	$60a#:	Cyclic	0.1 to 10 hours	120 VAC/VDC	SPDT	PDF
T30R-RC-34-24AD	$60ag:	Cyclic	0.1 to 10 hours	24 VAC/VDC	SPDT	PDF

Cyclic Relay Timers Specifications		
Models	*T30R-RC-3x-24AD*	*T30R-RC-3x-120A*
Input Specifications		
Nominal Voltage	24 VAC/VDC	120 VAC/VDC
Nominal Consumption	Maximum 3VA	
Nominal Frequency	50/60 Hz	
Voltage Tolerance	AC operation: +10/-15% of nominal at 50/60 Hz DC operation: +10/-15% of nominal	
Contact Specifications		
Type	(1) SPDT	
Output Contact Ratings	240VAC - 30A (N.O.), 15A (N.C.) 28VDC - 20A (N.O.), 10A (N.C.) Motor Load - 115/120/125: 1HP (N.O.), 1/4HP (N.C.) Motor Load - 230/240/250: 2HP (N.O.), 1/2 HP (N.C.)	
Electrical Lifetime	Full load: 100,000 operations	
Mechanical Lifetime	10,000,000 operations	
Reset Time		
Triggered With Input Voltage	100ms	
Units Triggered With Control Switch	Minimum required trigger switch closure time is 50ms	
Time Circuit Specifications		
Setting Accuracy	Maximum setting (adjustable): +5%, -0% Minimum setting (adjustable): +0%, -50%	
Start-up Time	Time from when power is applied until unit is timing: 0.05 seconds	
Maintain Function Time	Time unit continues to operate after power is removed: 0.01 seconds	
Repeat Accuracy	Constant voltage and temperature within specifications: ±0.1% or ± 0.04 seconds, whichever is greater	

Cyclic Relay Timers Specifications	
General Specifications	
Connection	0.25 inch male quick-connect terminals
Operating Temperature	-28 to 65°C [-18 to 149°F]
Storage Temperature	-40 to 85°C [-40 to 185°F]
Protection Rating	IP00
Mounting	Surface with one #8 or #10 screw and a maximum tightening torque of 15 in•lb.
Mounting Orientation	All directions
Weight	0.25 lb
*Agency Approvals And Standards **	cURus File E191059

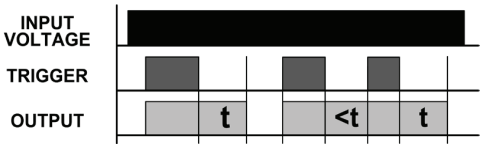
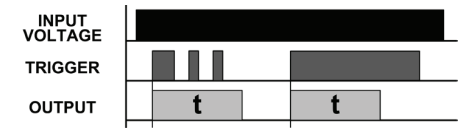
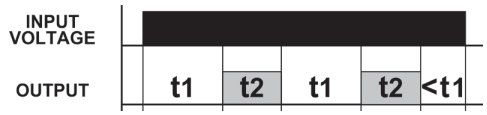
****To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

Wiring Diagram



Timing Charts

T30R Series

Function	Product Series	Operation	Timing Chart
ON DELAY Delay on Operate	T30R-ND	Upon application of input voltage, the time delay (t) begins. At the end of the time delay (t), the output is energized. Input voltage must be removed to reset the time delay relay & de-energize the output.	
OFF DELAY Delay on Release Delay on Break Delay on De-Energization	T30R-FD	Upon application of input voltage, the time delay relay is ready to accept a trigger. When the trigger is applied, the output is energized. Upon removal of the trigger, the time delay (t) begins. At the end of the time delay (t), the output is de-energized. Any application of the trigger during the time delay will reset the time delay (t) and the output remains energized.	
SINGLE SHOT One Shot Momentary Interval	T30R-SST	Upon application of input voltage, the time delay relay is ready to accept a trigger. When the trigger is applied, the output is energized and the time delay (t) begins. During the time delay (t), the trigger is ignored. At the end of the time delay (t), the output is de-energized and the time delay relay is ready to accept another trigger.	
REPEAT CYCLE OFF First	T30R-RC	Upon application of input voltage, the time delay (t1) begins. At the end of the time delay (t1), the output is energized and remains in that condition for the time delay (t2). At the end of this time delay, the output is de-energized and the sequence repeats until input voltage is removed.	

CTT Series - Digital Counter / Timer / Tachometer

Features

- Can operate as a digital counter, timer, combination timer + counter or tachometer
- Accepts voltage and non-voltage inputs from a wide variety of NPN, PNP, or dry contact sensors
- Selectable counting speeds from 1 to 10,000 cycles per second
- Multiple transistor and relay outputs can operate as momentary or maintained
- Double-line, 6-digit, 2-color LCD display
- Easy configuration with externally accessible DIP switches or the lockable keypad
- Display decimal point selection
- Available in 100-240VAC and 24VDC powered models
- UL508 listed (E311366), cULus, CE marked

E311366

A lot of functionality in one powerful little unit!

The CTT series is an extremely versatile multi-function device that is easily configured for operation as a digital counter, timer, combination timer + counter, or tachometer. Both voltage and non-voltage inputs are accepted from a wide variety of sensor types with NPN, PNP, or dry contact outputs. The first output on the CTT is a single-pole, single-throw relay and NPN transistor that operate concurrently. The second CTT output can be ordered as either a single-pole, double throw relay or NPN transistor. Parameters are easily set using the externally accessible DIP switches or the lockable keypad. The double-line, 6-digit, two-color LCD display shows the counter, timer, or tachometer present values, setting values and menu parameters during set-up. Additional individual indicators are provided for inputs, outputs and functions. The standard 1/16 DIN size, with included panel mounting clip and gasket, make panel mounting a snap. The CTT is available in 100-240VAC and 24VDC powered models.

Visit www.Automationdirect.com to download the free comprehensive CTT Series manual.

Counter/Timer/ Tachometer Functions

Counter Functions	Counter Input Modes	Counter Output Modes
1-Stage	Up	Select from eleven (11) different output modes (F, N, C, R, K, P, Q, A, S, T, D)
2-Stage	Down	
Batch	Up / Command Down	
Total	Up/ Down	
Dual	Quadrature	
	Addition	
	Subtraction	

Timer + Counter

Timer Functions (Up or Down)	Counter Input Modes	Counter Output Modes
Signal On Delay 1	Up	Select from eight (8) different output modes (F, N, C, R, K, P, Q, A)
Signal On Delay 2	Down	
Signal Off Delay		
Signal On		
Power On Delay		
Power On Delay Hold		
Repeat Cycle		
Repeat Cycle Hold		

Timer Functions (Up or Down)

Signal On Delay 1	Repeat Cycle
Signal On Delay 2	Repeat Cycle Hold
Signal Off Delay	Repeat Cycle 2
Signal On	Signal Cumulate
Power On Delay	Signal Twin On-Start
Power On Delay Hold	Signal Twin Off-Start

Tachometer Output Modes

Select from four (4) different output modes
2Lo/1Lo
2Lo/1Hi
2Hi/1Lo
2Hi/1Hi

Click on the above thumbnail or go to https://www.automationdirect.com/VID-RL-0001 for a short introductory video for the CTT units.

For a full set of Demo and Set Up videos for the CTT units please scan the QR code or follow the link below. https://www.automationdirect.com/videos/home?t=link&-cat1=60

CTT Series - Digital Counter / Timer / Tachometer

Digital Counter / Timer / Tachometer			
Part Number	***Description***	***Wt (lb)***	***Price***
CTT-AN-D24	Counter / Timer / Tachometer, Output 1 NPN & SPST relay, Output 2 NPN, 24 VDC powered, panel mounting clip is included*	0.4	$;-00d!l:
CTT-AN-A120	Counter / Timer / Tachometer, Output 1 NPN & SPST relay, Output 2 NPN, 100-264 VAC powered, panel mounting clip is included*	0.4	$;00d!k:
CTT-1C-D24	Counter / Timer / Tachometer, Output 1 NPN & SPST relay, Output 2 SPDT relay, 24 VDC powered, panel mounting clip is included*	0.4	$;-00d!j:
CTT-1C-A120	Counter / Timer / Tachometer, Output 1 NPN & SPST relay, Output 2 SPDT relay, 100-264 VAC powered, panel mounting clip is included*	0.4	$;-00d!i:

*** Spare panel clips part number PANEL-16**

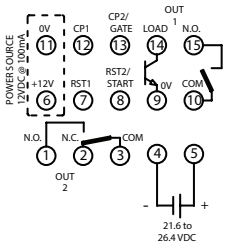
Digital Counter / Timer / Tachometer General Specifications			
Input Power Requirements		100 to 240 VAC 50/60 Hz	24 VDC
Operation Voltage Range		85 to 264 VAC	21.6 to 26.4 VDC
Power Consumption		Less than 10VA	
Power Source		12VDC +10%, 100mA	
Display		Double-line, 6-digit LCD display (SV = 8mm, PV = 6mm)	
Input Signal		NPN ON impedance 1K ohm max. ON residual voltage: 2V max. PNP 4.5 to 30VDC, low level: 0 to 2VDC	
		Counting Speed Setting (Count per second)	Minimum Input Signal Width (Milliseconds)
		1cps	20ms
		30cps	16.7 ms
		1K cps	0.5 ms
		5K cps	0.1 ms
		10K cps	0.05 ms
Output 1		Relay: SPST max. 250VAC, 5A (resistive load), 4A (inductive load); Transistor: NPN open collector. When 100mA @ 30VDC, residual voltage = 1.5VDC max	
Output 2	***CTT-1C-xxx***	Relay: SPDT max. 250VAC/30VDC, 5A (resistive load), 4A (inductive load)	
	CTT-AN-xxx	Transistor: NPN open collector. When 100mA @ 30VDC residual voltage = 1.5VDC max	
Life Expectancy	***Mechanical***	10,000,000 operations (frequency 18,000 operations/hr)	
	Electrical	100,000 operations (frequency 900 operations/hr)	
Output Duration (where used)		0.00 (latching) / 0.01 to 99.99 seconds	
Output Switching Time		2 milliseconds max	
Dielectric Strength		2000VAC 50/60 Hz for 1 minute	
Vibration Resistance		Without damage: 10 ~ 55 Hz, amplitude = 0.75 mm, 3 axes for 2 hours	
Shock Resistance		Without damage: drop 4 times, 300m/s^2 3 edges, 6 surfaces and 1 corner	
Ambient Temperature		+32 to +122°F (0 to +50°C)	
Storage Temperature		-4 to +149°F (-20 to +65°C)	
Altitude		2000m or less	
IP Rating		IP 66 (with proper enclosure installation)	
Case Materials		Case = ABS Plastic, Lens = Polycarbonate	
Ambient Humidity		35% to 85% RH (non-condensing)	
Memory Backup upon Power Failure		EEPROM writing up to 100,000 times; Memory duration: 10 years	
Terminals	***Conforming Wiring***	0.25-1.65mm² (24 to 16 AWG)	
	Permitted Torque	0.5 N·m (0.369 ft·lb)	
Agency Approvals *		UL508 listed (E311366), cULus, CE marked	

*** To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

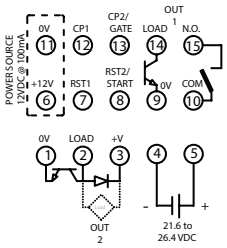
CTT Series - Digital Counter / Timer / Tachometer

Wiring Diagrams

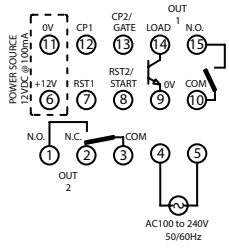
CTT-1C-D24



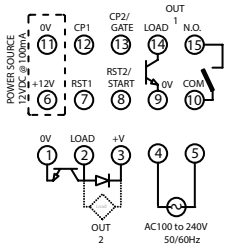
CTT-AN-D24



CTT-1C-A120

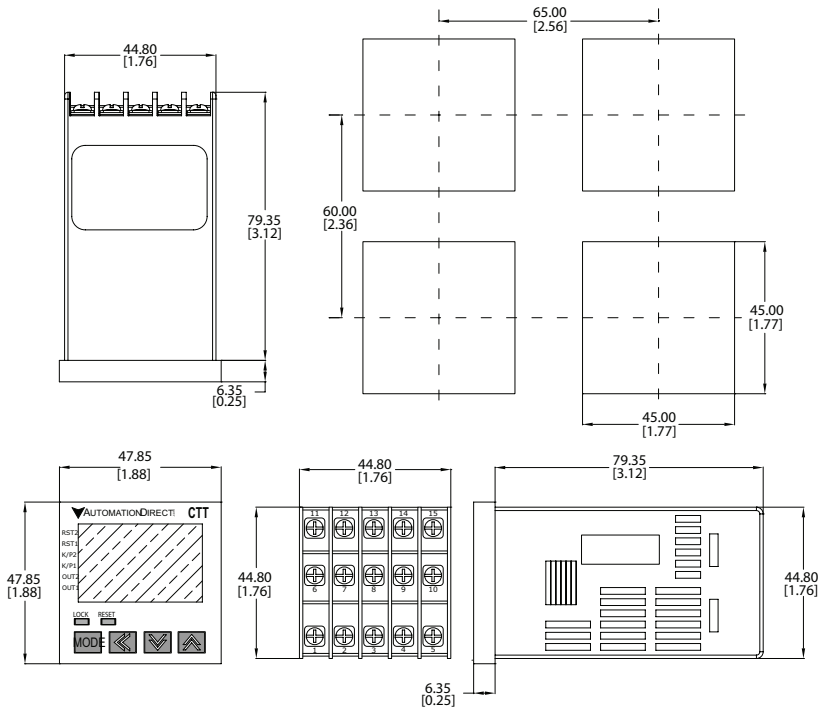


CTT-AN-A120



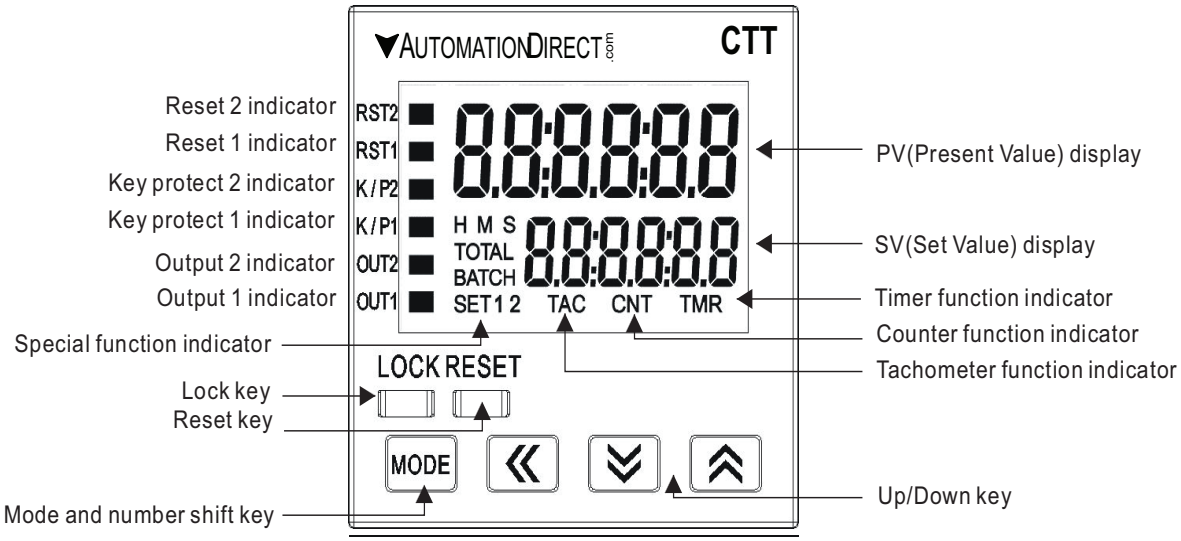
Dimensions

mm [inches]



CTT Series - Digital Counter / Timer / Tachometer

Display, Indicators & Keys



LCD Display and Indicators			
RST 1/2	Light on when reset signal is detected	***BATCH***	"Batch Counting Mode" in Counter
K/P 1/2	Light on when key-protected mode is enabled	***SET 1 2***	SV1, SV2 display
OUT 1/2	Light on when output is executing	***TAC***	Light on in Tachometer function
H M S	Hour, minute, second, unit of timer, displayed in Timer function	***CNT***	Light on in Counter function
TOTAL	"Total Counting Mode" in Counter function	***TMR***	Light on in Timer function

CTT Series - Digital Counter / Timer / Tachometer

Counter Mode

Counter Performance Specifications	
Counter Functions	1-Stage Counting, 2-Stage Counting, Batch Counting, Total Counting, Dual Counting (See descriptions below)
Input Modes	Counting Up, Counting Down, Counting Up / Command Counting Down, Counting Up / Counting Down, Quadrature, Addition, Subtraction (see descriptions below)
Output Modes	F, N, C, R, K, P, Q, A, S, T, D (For explanation see the manual available at www.AutomationDirect.com)
Timer Precision	Power On start max 0.01% 0.05 sec. Signal start max 0.01% 0.03 sec
External Reset	Minimum reset input signal width 1ms or 20ms (selectable)
Output Duration (flicker)	10-9990ms variable every 10ms
Number of Digits	6 digits on each line
Display	Current values: red LED, character height 8mm; Preset value: green LED character height 6mm

Counter Functions

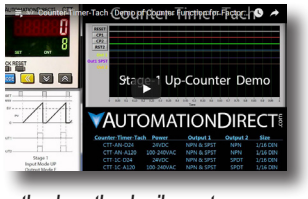
1-Stage Counting
A single count setting value SV is available in 1-Stage Counting. Both Outputs 1 and 2 operate concurrently and will turn ON momentarily or will be maintained ON depending on the Output Mode selected.

2-Stage Counting
In 2-Stage Counting, count setting value SV1 controls Output 1 and count setting value SV2 controls Output 2. Outputs will turn ON momentarily or will be maintained ON depending on the output mode selected.

Batch Counting
In Batch Counting, count setting value SV controls Output 2 which will turn ON momentarily or will be maintained ON depending on the output mode selected. Count setting value BATCH SV controls Output 1which will be maintained ON.

Total Counting
A single count setting value SV is available in Total Counting. Both Outputs 1 and 2 operate concurrently and will turn ON momentarily or will be maintained ON depending on the Output Mode selected.

Dual Counting
A single count setting value SV is available in Dual Counting. Both Outputs 1 and 2 operate concurrently and will turn ON momentarily or will be maintained ON depending on the Output Mode selected.

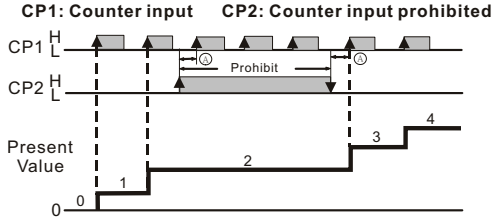


Click on the above thumbnail or go to https://www.automationdirect.com/VID-RL-0004 for a short Counter demo video.

Click on the above thumbnail or go to https://www.automationdirect.com/VID-RL-0003 for a Counter Set-up video.

Counter Input Modes

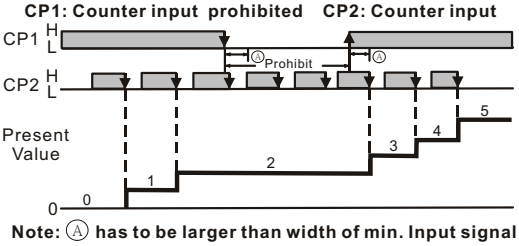
Counting up



Note: Ⓐ has to be larger than width of min. Input signal

Counting Up

With the input signal OFF at input CP2, each leading edge of the input signal at CP1 will increment the count present value PV by 1. Turning ON the input signal at CP2 will prohibit the input signal at CP1 from incrementing the PV.



Note: Ⓐ has to be larger than width of min. Input signal

With the input signal ON at input CP1, each trailing edge of the input signal at CP2 will increment the count present value PV by 1. Turning OFF the input signal at CP1 will prohibit the input signal at CP1 from incrementing the PV.

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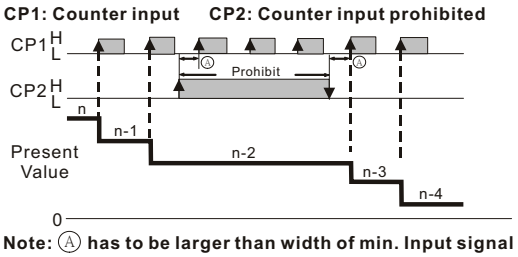
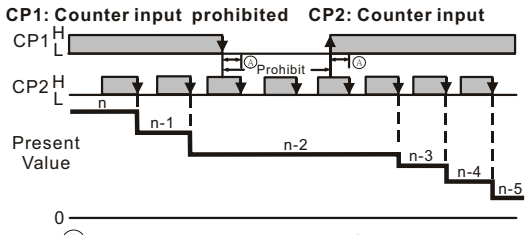
Counting down



Note: Ⓐ has to be larger than width of min. Input signal

Counting Down

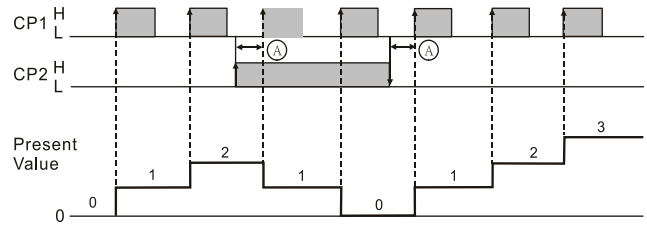
With the input signal OFF at input CP2, each leading edge of the input signal at CP1 will decrement the count present value PV by 1. Turning ON the input signal at CP2 will prohibit the input signal at CP1 from decrementing the PV.



Note: Ⓐ has to be larger than width of min. Input signal

With the input signal ON at input CP1, each trailing edge of the input signal at CP2 will decrement the count present value PV by 1. Turning OFF the input signal at CP1 will prohibit the input signal at CP2 from decrementing the PV.

Counting Up/Command Counting Down



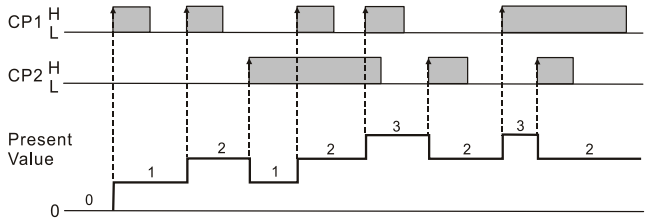
Note: Ⓐ has to be larger than width of min. input signal.

Counting Up / Command Counting Down

With the input signal OFF at input CP2, each leading edge of the input signal at CP1 will increment the count present value PV by 1.

With the input signal ON at input CP2, each leading edge of the input signal at CP1 will decrement the count present value PV by 1.

Counting up/down

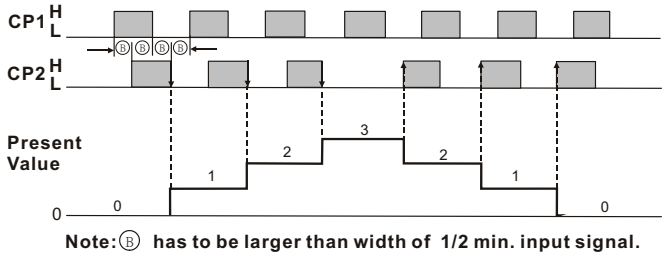


Counting Up / Counting Down

Each leading edge of the input signal at CP1 will increment the count present value PV by 1.

Each leading edge of the input signal at CP2 will decrement the count present value PV by 1.

Quadrature input



Note: Ⓑ has to be larger than width of 1/2 min. input signal.

Quadrature

When the quadrature input signal at CP1 leads the input signal at CP2, the trailing edge of CP2 will increment the count present value PV by 1.

When the quadrature input signal at CP2 leads the input signal at CP1, the leading edge of CP2 will decrement the count present value PV by 1.

Addition

Each leading edge of the input signal at CP1 will increment the count present value PV by 1.
Each leading edge of the input signal at CP1 will increment the count present value PV by 1.

Subtraction

Each leading edge of the input signal at CP1 will increment the count present value PV by 1.
Each leading edge of the input signal at CP2 will decrement the count present value PV by 1.

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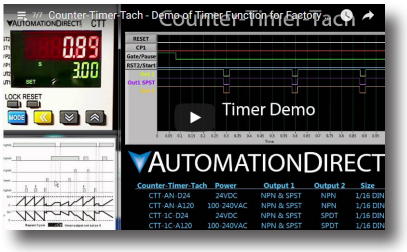
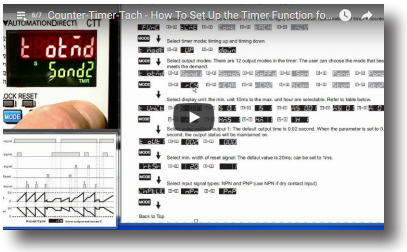
Timer Mode

Timer Performance Specifications				
Timer Functions	Signal On Delay 1, Signal On Delay 2, Signal Off Delay, Signal On, Power On Delay, Power On Delay Hold, Repeat Cycle, Repeat Cycle Hold, Repeat Cycle 2, Signal Cumulate, Signal Twin On Start, Signal Twin Off Start (See time charts below).			
Number of Digits	6 digits on each line			
Display	Present values: red LED, character height 8mm; Set value: green LED, character height: 6mm			
Time Range	***Setting***	***Range***	***Units***	***Maximum***
	sec.	0.01 ~ 9,999.99	A unit = 10ms	9,999.99 secs.
	sec.	0.1 ~ 99,999.9	A unit = 0.1 sec.	99,999.9 secs.
	sec.	1 ~ 999,999	A unit = 1 sec.	999,999 secs.
	min., sec.	0.01 ~ 9,959.99	A unit = 0.01 sec.	5,999.99 secs.
	min., sec.	0.1 ~ 99,959.9	A unit = 0.1 sec.	59,999.9 secs.
	min.	0.1 ~ 99,999.9	A unit = 0.1 min.	99,999.9 mins.
	min.	1 ~ 999,999	A unit = 1 min.	999,999 mins.
	hr., min., sec.	1 ~ 995,959	A unit =1 sec.	359,999 secs. (100 hrs.)
	hr., min.	1 ~ 999,959	A unit =1 min.	35,999,999 secs. (10,000 hrs.)
	hr.	1 ~ 999,999	A unit = 1 hr.	699,999 hrs.
Display	Elapsed time / remaining time			
Timer	Power ON start max +0.01% w0.05 sec, Signal start max +0.01% w0.03 sec			
External Reset	Minimum reset input signal width 1ms or 20ms (selectable)			
Output Duration (flicker)	10-9990ms variable every 10ms			



Click on the above thumbnail or go to https://www.automationdirect.com/VID-RL-0008 for a short Timer demo video.



Click on the above thumbnail or go to https://www.automationdirect.com/VID-RL-0007 for a Timer Set-up video.

Timing Charts

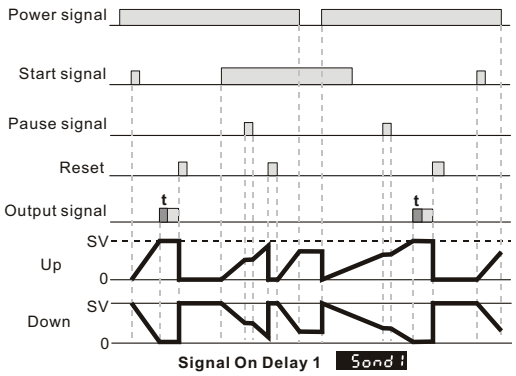
Signal On Delay 1 (Sond1)

With power applied to the CTT, the leading edge of the input signal at START will begin the timing period setting value SV (timing up or down based on parameter (t modE) or by DIP switch 2). At the end of the timing period both outputs will turn ON momentarily for the time set in the output pulse width parameter (tout1) or will be maintained ON if the output pulse width parameter (tout1) is set to 0.00. The trailing edge of the "start" signal has no effect on the outputs or timing period.

The leading edge of a "reset" input signal at RST1 will turn OFF the outputs and reset the timing period. The "reset" signal minimum pulse width is set by reset pulse width parameter (rtSr) or DIP Switch 8.

The leading edge of a "pause" input signal at GATE will pause the timing period after it has been started. The timing period will continue after the trailing edge of the external switch "pause" (Gate) signal.

When power is removed, both outputs will turn OFF and the timing period will be reset.



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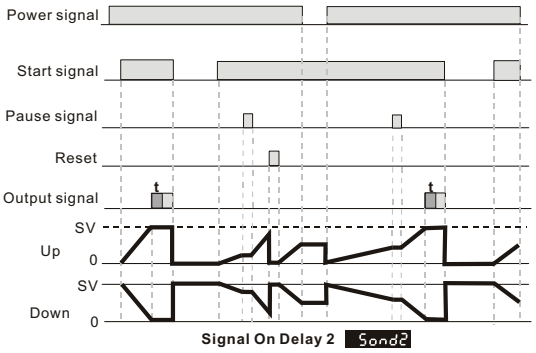
Signal On Delay 2 (Sond2)

With power applied to the CTT, the leading edge of the input signal at START will begin the timing period setting value SV (timing up or down based on parameter (t modE) or by DIP switch 2). At the end of the timing period both outputs will turn ON momentarily for the time set in the output pulse width parameter (tout1) or will be maintained ON if the output pulse width parameter (tout1) is set to 0.00. The trailing edge of the "start" signal will turn OFF the outputs and reset the timing period.

The leading edge of a "reset" input signal at RST1 will turn OFF the outputs and reset the timing period. The "reset" signal minimum pulse width is set by reset pulse width parameter (rtSr) or DIP Switch 8.

The leading edge of a "pause" input signal at GATE will pause the timing period after it has been started. The timing period will continue after the trailing edge of the external switch "pause" (Gate) signal.

When power is removed, both outputs will turn OFF and the timing period will be reset.



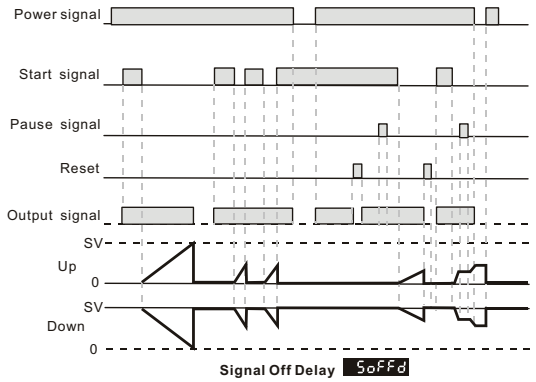
Signal Off Delay (Soffd)

With power applied to the CTT, the leading edge of the input signal at START will immediately turn ON the outputs. The trailing edge of the "start" signal will begin the timing period setting value SV (timing up or down based on parameter (t modE) or by DIP switch 2). At the end of the timing period both outputs will turn OFF. The leading edge of a "start" signal applied during a previously initiated timing period will reset the timing period.

The leading edge of a "reset" input signal at RST1 will turn OFF the outputs and reset the timing period. The "reset" signal minimum pulse width is set by reset pulse width parameter
(rtSr) or DIP Switch 8.

The leading edge of a "pause" input signal at GATE will pause the timing period after it has been started. The timing period will continue after the trailing edge of the external switch "pause" (Gate) signal.

When power is removed, both outputs will turn OFF and the timing period will be reset.



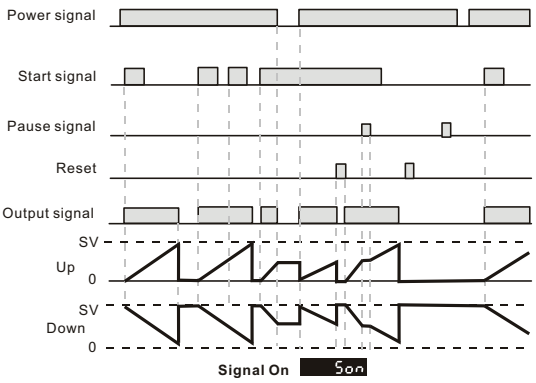
Signal On (Son)

With power applied to the CTT, the leading edge of the input signal at START will immediately turn ON the outputs and begin the timing period setting value SV (timing up or down based on parameter (t modE) or by DIP switch 2). The trailing edge of the "start" signal has no effect on the outputs or timing period. At the end of the timing period both outputs will turn OFF and the timing period will reset. The leading edge of a "start" signal applied during a previously initiated timing period will not reset the timing period.

The leading edge of a "reset" input signal at RST1 will turn OFF the outputs and reset the timing period. The "reset" signal minimum pulse width is set by reset pulse width parameter (rtSr) or DIP Switch 8.

The leading edge of a "pause" input signal at GATE will pause the timing period after it has been started. The timing period will continue after the trailing edge of the external switch "pause" (Gate) signal.

When power is removed, both outputs will turn OFF and the timing period will be reset.



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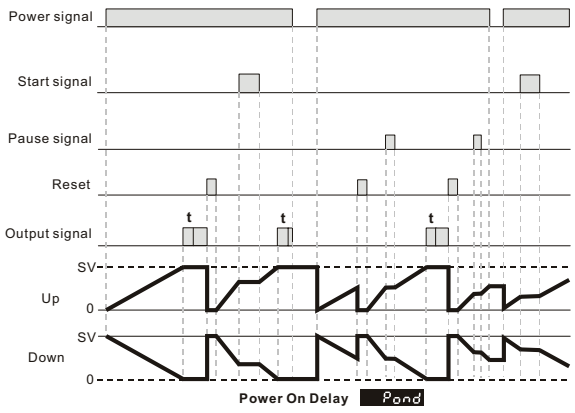
Power On Delay (Pond)

When power is applied to the CTT, the timing period setting value SV will begin (timing up or down based on parameter (t modE). At the end of the timing period both outputs will turn ON momentarily for the time set in the output pulse width parameter (tout1) or will be maintained ON if the output pulse width parameter (tout1) is set to 0.00.

The leading edge of a "reset" input signal at RST1 will turn OFF the outputs and reset the timing period. The "reset" signal minimum pulse width is set by reset pulse width parameter (rtSr).

The leading edge of a "pause" input signal at GATE or signal at START will pause the timing period after it has been started. The timing period will continue after the trailing edge of the external switch "pause" (Gate) or "start" signal.

When power is removed, both outputs will turn OFF and the timing period will be reset.



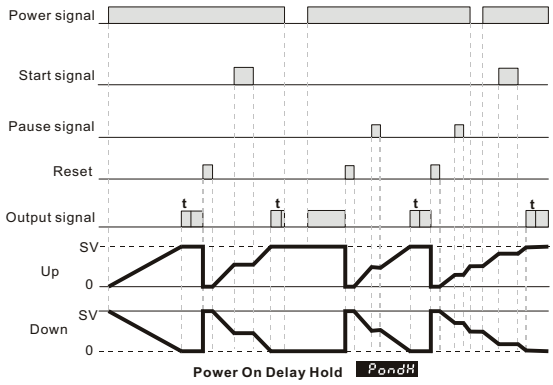
Power On Delay HOLD (PondH)

When power is applied to the CTT, the timing period setting value SV will begin (timing up or down based on parameter (t modE). At the end of the timing period both outputs will turn ON momentarily for the time set in the output pulse width parameter (tout1) or will be maintained ON if the output pulse width parameter (tout1) is set to 0.00.

The leading edge of a "reset" input signal at RST1 will turn OFF the outputs and reset the timing period. The "reset" signal minimum pulse width is set by reset pulse width parameter (rtSr).

The leading edge of a "pause" input signal at GATE or signal at START will pause the timing period after it has been started. The timing period will continue after the trailing edge of the "pause" (Gate) or "start" signal.

When power is removed, both outputs will turn OFF. The last state of the outputs and the last value of the current timing period will be "stored" in EEprom when power is removed. When power is reapplied the outputs will return to their last state and timing will resume from the last value of the timing period.



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Repeat Cycle (rCy)
With power applied to the CTT, the leading edge of the input signal at START will begin the timing period setting value SV (timing up or down based on parameter
(t modE). At the end of the timing period, the timing period will reset and repeat automatically.

If the output pulse width parameter (tout1) is set to 0.00 both outputs will turn ON at the end of the first timing period, turn OFF at the end of the next timing period, turn ON at the end of the next timing period, etc.

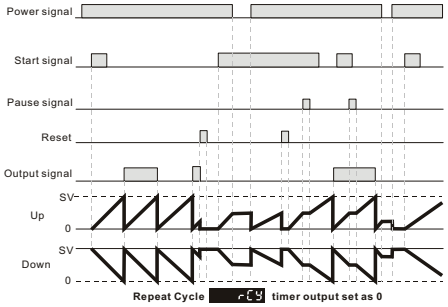
If the output pulse width parameter (tout1) is set to >0.00 both outputs will turn ON momentarily for the time set in the output pulse width parameter (tout1) at the beginning of the each timing period.

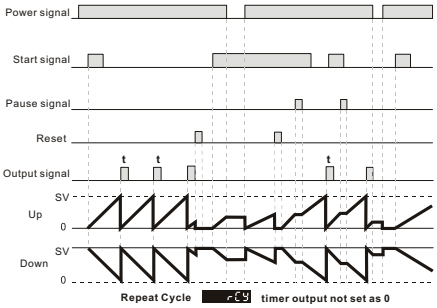
The trailing edge of the "start" signal has no effect on the outputs or timing period.

The leading edge of a "reset" input signal at RST1 will turn OFF the outputs and reset the timing period. The "reset" signal minimum pulse width is set by reset pulse width parameter (rtSr). The leading edge of a new "start" signal is necessary to restart the cycle.

The leading edge of a "pause" input signal at GATE will pause the timing period after it has been started. The timing period will continue after the trailing edge of the external switch "pause" (Gate) signal.

When power is removed, both outputs will turn OFF and the timing period will be reset.





Repeat Cycle HOLD (rCyH)
With power applied to the CTT, the leading edge of the input signal at START will begin the timing period setting value SV (timing up or down based on parameter (t modE). At the end of the timing period, the timing period will reset and repeat automatically.

If the output pulse width parameter (tout1) is set to 0, both outputs will turn ON at the end of the first timing period, turn OFF at the end of the next timing period, turn ON at the end of the next timing period, etc.

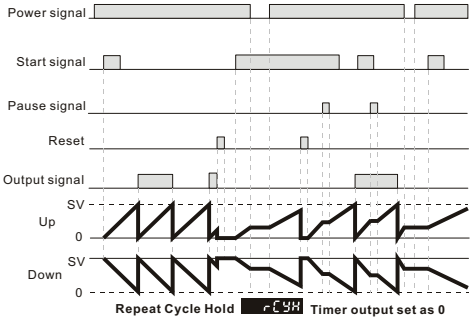
If the output pulse width parameter (tout1) is set to >0.00, both outputs will turn ON momentarily for the time set in the output pulse width parameter (tout1) at the beginning of the each timing period.

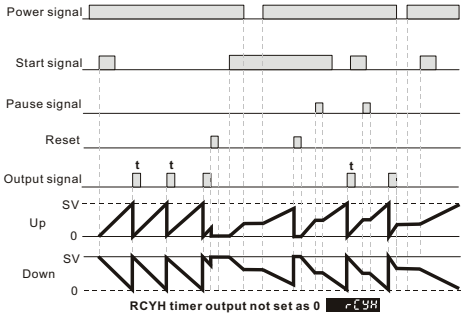
The trailing edge of the "start" signal has no effect on the outputs or timing period.

The leading edge of a "reset" input signal at RST1 will turn OFF the outputs and reset the timing period. The "reset" signal minimum pulse width is set by reset pulse width parameter (rtSr). The leading edge of a new "start" signal is necessary to restart the cycle.

The leading edge of a "pause" input signal at GATE will pause the timing period after it has been started. The timing period will continue after the trailing edge of the external switch "pause" (Gate) signal.

When power is removed, both outputs will turn OFF. The last state of the outputs and the last value of the current timing period will be "stored" in EEprom when power is removed. When power is reapplied the outputs will return to their last state and timing will resume from the last value of the timing period by the leading edge of a new "start" signal.





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Repeat Cycle 2 (rCy2)

With power applied to the CTT, the leading edge of the input signal at START will begin the timing period timing up or down based on parameter (t modE). At the end of the timing period, the timing period will reset and repeat automatically.

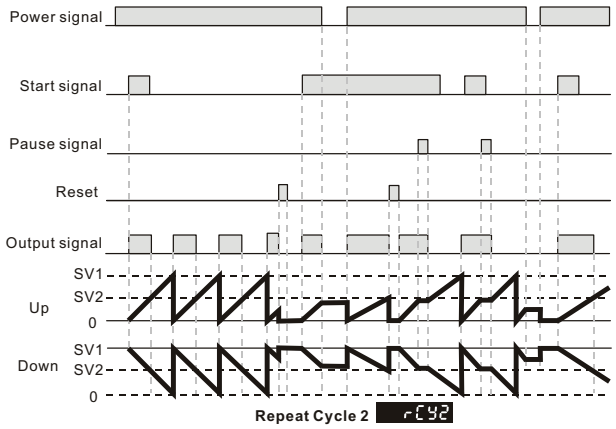
Both outputs will turn ON at the beginning of the first timing period and turn OFF when the timing period reaches time period setting SV2. The outputs will turn ON again when the time period reaches time period setting SV1.

The trailing edge of the "start" signal has no effect on the outputs or timing period.

The leading edge of a "reset" input signal at RST1 will turn OFF the outputs and reset the timing period. The "reset" signal minimum pulse width is set by reset pulse width parameter (rtSr). The leading edge of a new "start" signal is necessary to restart the cycle.

The leading edge of a "pause" input signal at GATE will pause the timing period after it has been started. The timing period will continue after the trailing edge of the external switch "pause" (Gate) signal.

When power is removed, both outputs will turn OFF and the timing period will be reset.



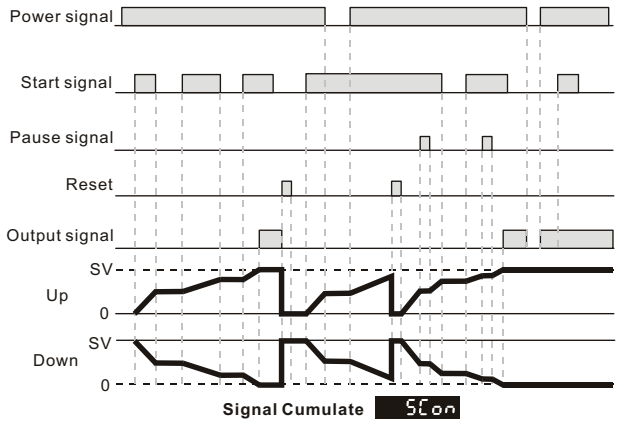
Signal Cumulate (SCon)

With power applied to the CTT, the leading edge of the input signal at START will begin the timing period setting value SV timing up or down based on parameter (t modE). The trailing edge of the "start" signal will pause the timing period. The leading edge of a subsequent "start" signal will resume timing from the last value of the timing period. At the end of the timing period both outputs will turn ON.

The leading edge of a "reset" input signal at RST1 will turn OFF the outputs and reset the timing period. The "reset" signal minimum pulse width is set by reset pulse width parameter (rtSr).

The leading edge of a "pause" input signal at GATE will pause the timing period after it has been started. The timing period will continue after the trailing edge of the external switch "pause" (Gate) signal.

When power is removed, both outputs will turn OFF. The last state of the outputs and the last value of the current timing period will be "stored" when power is removed. When power is reapplied the outputs will return to their last state and timing will resume from the last value of the timing period by the leading edge of a new "start" signal.



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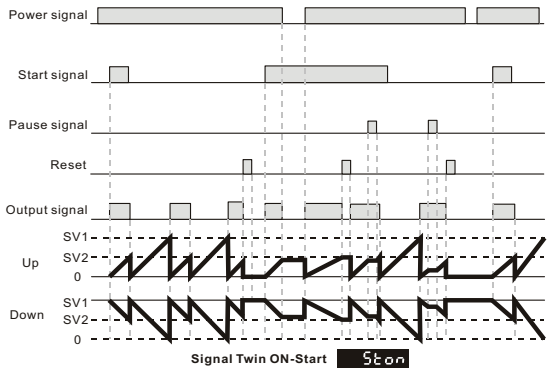
Signal Twin ON-Start (Ston)
With power applied to the CTT, the leading edge of the input signal at START will turn ON the outputs and begin the timing period timing up or down based on parameter (t modE). When the timing period reaches time setting SV2 the outputs will turn OFF and the time period will reset and restart automatically. When the time period now reaches time setting SV1 the outputs will turn ON again and the time period will reset and repeat automatically.

The trailing edge of the "start" signal has no effect on the outputs or timing period.

The leading edge of a "reset" input signal at RST1 will turn OFF the outputs and reset the timing period. The "reset" signal minimum pulse width is set by reset pulse width parameter (rtSr). The leading edge of a new "start" signal is necessary to restart the cycle.

The leading edge of a "pause" input signal at GATE will pause the timing period after it has been started. The timing period will continue after the trailing edge of the external switch "pause" (Gate) signal.

When power is removed, both outputs will turn OFF and the timing period will be reset.



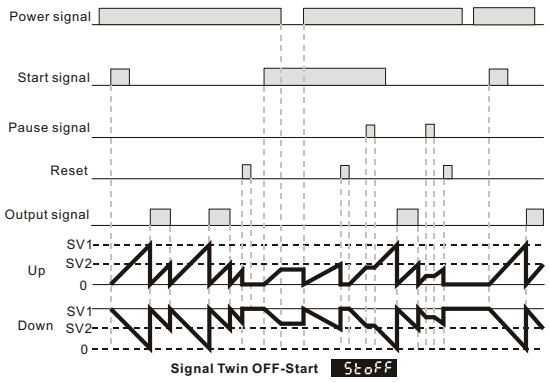
Signal Twin OFF-Start (StoFF)
With power applied to the CTT, the leading edge of an input signal at START will begin the timing period timing up or down based on parameter (t modE). When the timing period reaches time setting SV1 the outputs will turn ON and the time period will reset and restart automatically. When the time period now reaches time setting SV2 the outputs will turn OFF again and the time period will reset and repeat automatically.

The trailing edge of the "start" signal has no effect on the outputs or timing period.

The leading edge of a "reset" input signal at RST1 will turn OFF the outputs and reset the timing period. The "reset" signal minimum pulse width is set by reset pulse width parameter (rtSr). The leading edge of a new "start" signal is necessary to restart the cycle.

The leading edge of a "pause" input signal at GATE will pause the timing period after it has been started. The timing period will continue after the trailing edge of the external switch "pause" (Gate) signal.

When power is removed, both outputs will turn OFF and the timing period will be reset.



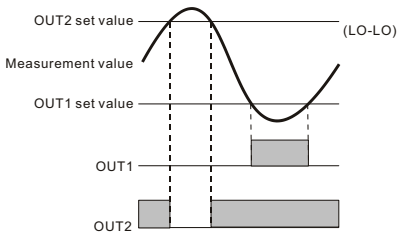
CTT Series - Digital Counter / Timer / Tachometer

Tachometer Mode

Tachometer Performance Specifications	
Output Modes	2Lo1Lo, 2Lo1Hi, 2Hi1Lo, and 2Hi1Hi (See tachometer output mode charts below).
Number of Digits	6 digits on each line
Input Frequency	1Hz, 30Hz, 200Hz, 1kHz, 5kHz, 10kHz
Display	Present values: red LED, character height: 8mm; Set value: green LED, character height: 6mm
External Reset	Minimum reset input signal width 1ms or 20ms (selectable)
Output Duration (Flicker)	10-9990ms variable every 10ms

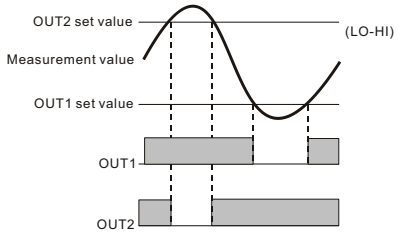
Tachometer Output Mode Charts

2Lo1Lo



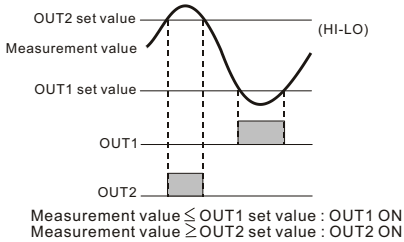
Measurement value ≤ OUT1 set value : OUT1 ON
Measurement value ≤ OUT2 set value : OUT2 ON

2Lo1Hi



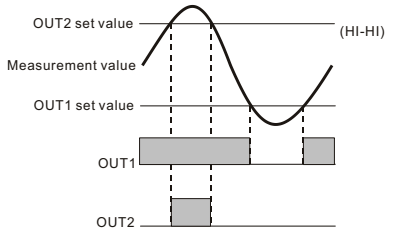
Measurement value ≥ OUT1 set value : OUT1 ON
Measurement value ≤ OUT2 set value : OUT2 ON

2Hi1Lo



Measurement value ≤ OUT1 set value : OUT1 ON
Measurement value ≥ OUT2 set value : OUT2 ON

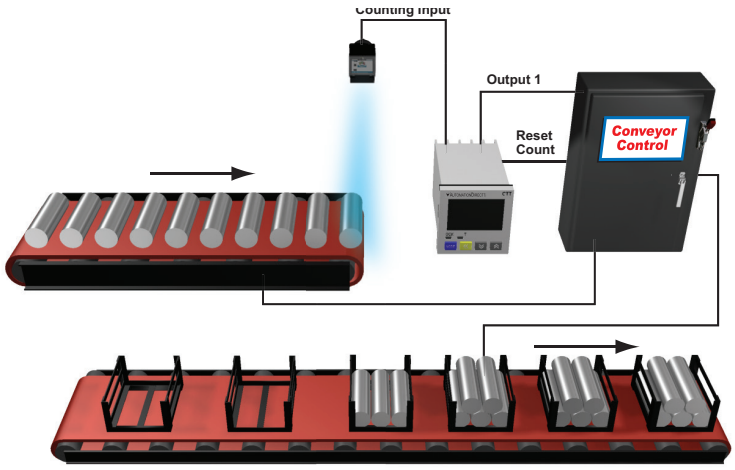
2Hi1Hi

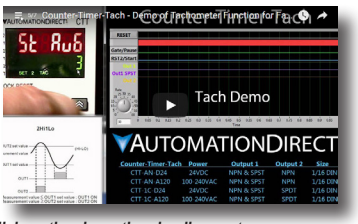


Measurement value ≥ OUT1 set value : OUT1 ON
Measurement value ≥ OUT2 set value : OUT2 ON

Counter Example

Using the counter feature of the CTT to count the total number of pieces in a box to signal a conveyor to advance to the next station.





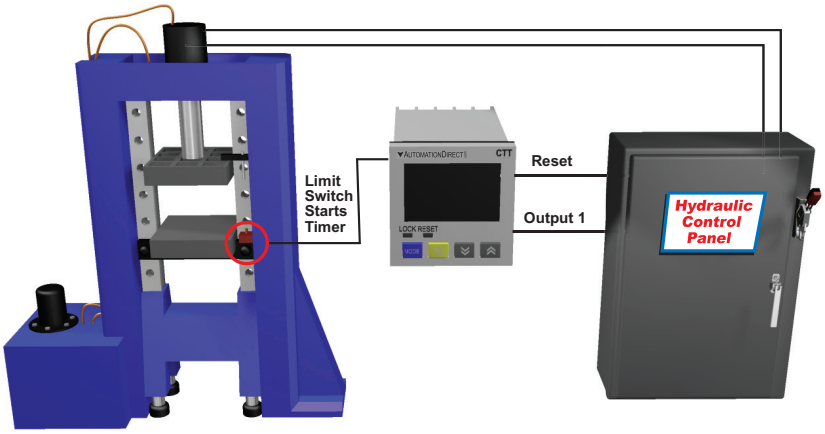
Click on the above thumbnail or go to https://www.automationdirect.com/VID-RL-0006 for a short Tachometer demo video.

Click on the above thumbnail or go to https://www.automationdirect.com/VID-RL-0005 for a Tachometer Set-up video.

CTT Series - Digital Counter / Timer / Tachometer

Timer Example

A basic Timer used to control the clamp time of a compression model press. When the operator signals, the mold is loaded with material. When a start button is pressed, the hydraulic cylinder closes the press to make a limit switch which starts the CTT timing. Upon completion of the timer cycle, Output 1 is turned on and the press is opened by the hydraulic cylinder.



Tachometer Example

Using PSCALE to convert pulses into engineering units

The PSCALE feature of the CTT is very useful in converting the pulsed signal from an encoder or sensor into a usable unit of measurement.

For example, if connecting a proximity switch to the CTT to monitor the speed of a motor using a sensing gear, there is a simple calculation to convert the pulses from the sensor to Motor RPMs.

Using the following formula, you can calculate a PSCALE value to change a pulse signal into RPMs. First, obtain the pulses per revolution (ppr) or number of teeth on the sensing gear.

For example, in the illustration below, there are 38 teeth on the gear or 38 ppr. If the gear is coupled directly to the motor, this is all that is required to perform the calculation.

PSCALE = 60/ppr or 60/38PSCALE = 1.579

With the PSCALE set to 1.579 for every 38 input cycles the CTT will display a value of 1.