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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.

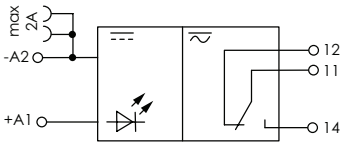
## Features

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

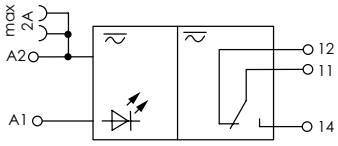
52007 52010 52030

| Slim Interface Relays | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Part Number* | *Price* | *Coil Voltage* | *Configuration* | *Contact Rating* | *Load Voltage* | *Action* | *Drawing Link* |
| ***52000*** | $11.00 | 24 VDC | SPDT | 6A | 250 VAC/VDC | – | PDF |
| ***52001*** | $11.00 | 24 VAC/VDC | SPDT | 6A | 250 VAC/VDC | – | PDF |
| ***52003*** | $14.50 | 24 VAC/VDC | SPDT | 6A | 250 VAC/VDC | – | PDF |
| ***52007*** | $44.00 | 24 VAC/VDC | SPST | 6A | 250 VAC/VDC | H-O-A toggle switch | PDF |
| ***52010*** | $16.50 | 24 VAC/VDC | SPDT | 6A | 250 VAC/VDC | isolation disconnect | PDF |
| ***52030*** | $16.50 | 110 VAC/VDC | SPDT | 6A | 250 VAC/VDC | – | PDF |
| ***52040*** | $17.00 | 230 VAC/VDC | SPDT | 6A | 250 VAC/VDC | – | PDF |
| ***52050*** | $12.50 | 12 VDC | SPDT | 6A | 250 VAC/VDC | – | PDF |

## Wiring Diagrams




52000

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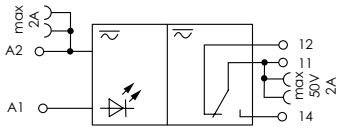


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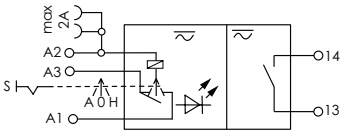


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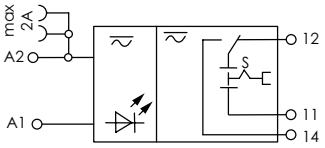


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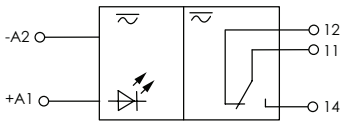
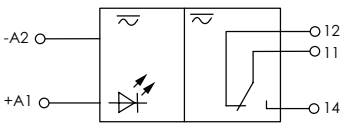



52030

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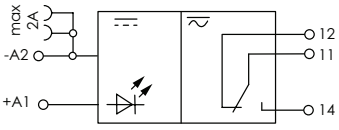


52050

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# Slim Interface Relays Specifications

## Slim Interface Relays Specifications

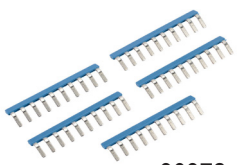
| Part Number | | 52000 | 52001 | 52003 | 52007 | 52010 | 52030 | 52040 | 52050 |
|---|---|---|---|---|---|---|---|---|---|
| **Input Specifications** | | | | | | | | | |
| Nominal Voltage | | 24VDC | 24 VAC/VDC 50/60 Hz | 24 VAC/VDC 50/60 Hz | 24 VAC/VDC 50/60 Hz | 24 VAC/VDC 50/60 Hz | 110 VAC/VDC 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.**

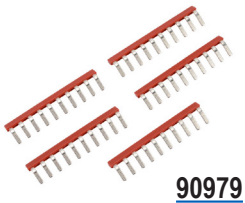
## Interface Relays Accessories

| Part Number | Price | Description |
|---|---|---|
| 90963 | $8.75 | Murrelektronik interface relay jumper, push-in type, 2-pole, gray. Package of 5. For use with MurrElektronik relays with 6.2mm spacing. |
| 90978 | $20.50 | Murrelektronik interface relay jumper, push-in type, 10-pole, blue. Package of 5. For use with MurrElektronik relays with 6.2mm spacing. |
| 90979 | $28.00 | 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.

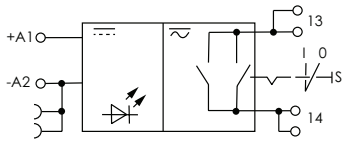
## Features

- 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

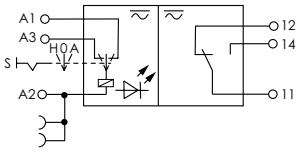
51101 51152 52102

| Interface Relays | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Part Number* | *Price* | *Coil Voltage* | *Configuration* | *Contact Rating* | *Load Voltage* | *Action* | *Drawing Link* |
| *51101* | $29.50 | 24 VDC | SPST | 3A | 250 VAC/VDC | manual-auto toggle switch | PDF |
| *51152* | $27.00 | 24 VAC/VDC | SPDT | 8A | 250 VAC/VDC | H-O-A toggle switch | PDF |
| *52102* | $19.50 | 24 VDC | DPDT | 6A | 250 VAC/VDC | – | PDF |
| *52103* | $22.50 | 24 VAC/VDC | DPDT | 6A | 250 VAC/VDC | – | PDF |
| *52111* | $25.50 | 24 VAC/VDC | DPDT | 6A | 250 VAC/VDC | – | PDF |
| *52130* | $32.50 | 110 VAC/VDC | DPDT | 6A | 250 VAC/VDC | – | PDF |
| *52140* | $44.00 | 230 VAC/VDC | DPDT | 6A | 250 VAC/VDC | – | PDF |

## Wiring Diagrams




51101

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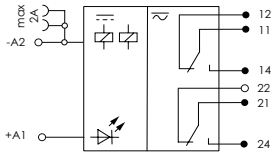


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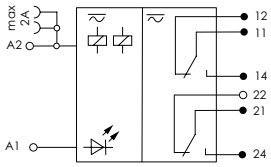


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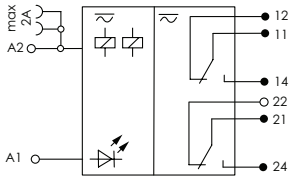
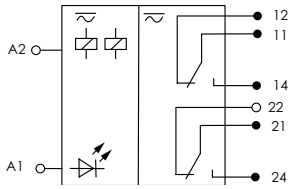
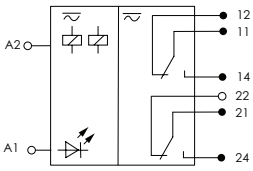



52111




52130




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** | | $10 \times 10^6$ operations | | | | | | |
| **Electrical Life Time** | | $6 \times 10^4$ 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** | $15.00 | 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.

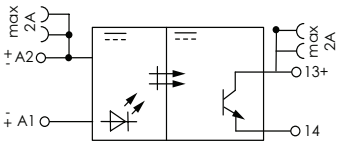
## Features

- 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

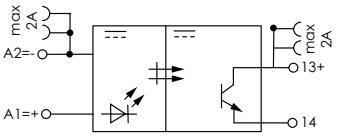
52501 52507 52550

| Optocoupler Relays | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Part Number* | *Price* | *Input Voltage* | *Configuration* | *Output Type* | *Contact Rating* | *Load Voltage* | *Drawing Link* |
| ***52501*** | $18.50 | 10-48 VDC | SPST | (1) N.O. MOSFET | 2A | 5-48 VDC | PDF |
| ***52502*** | $18.50 | 4-5.5 VDC | SPST | (1) N.O. MOSFET | 2A | 5-48 VDC | PDF |
| ***52507*** | $18.00 | 90-250 VAC | SPST | (1) N.O. transistor | 0.5A | 5-48 VDC | PDF |
| ***52510*** | $25.50 | 10-53 VDC | SPDT | (1) N.O., (1) N.C. transistor | 0.5A | 5-48 VDC | PDF |
| ***52511*** | $20.00 | 15-30 VDC | SPST | (1) N.O. transistor | 0.2A | 5-48 VDC | PDF |
| ***52519*** | $32.00 | 10-53 VDC | SPST | (1) N.O. MOSFET | 6A | 5-48 VDC | PDF |
| ***52520*** | $32.00 | 10-53 VDC | SPST | (1) N.O. MOSFET | 10A | 5-48 VDC | PDF |
| ***52550*** | $20.00 | 10-53 VDC | SPST | (1) N.O. TRIAC | 0.5A | 24-250 VAC | PDF |

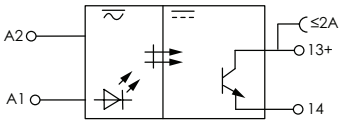
## Wiring Diagrams



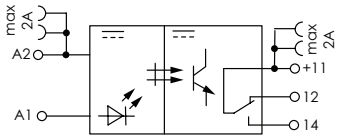

52501



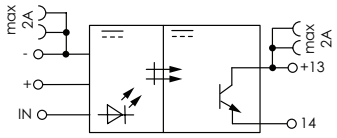

52502



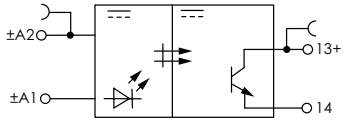

52507




52510




52511

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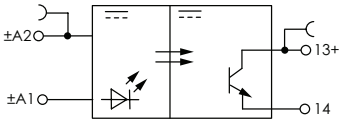


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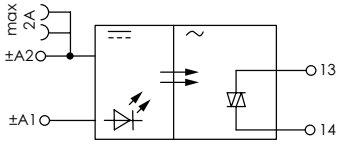



52550

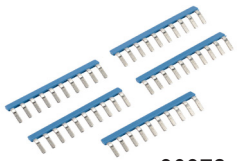
# Optocoupler Relays Specifications

| 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** | $8.75 | Murrelektronik interface relay jumper, push-in type, 2-pole, gray. Package of 5. For use with MurrElektronik relays with 6.2mm spacing. |
| **90978** | $20.50 | Murrelektronik interface relay jumper, push-in type, 10-pole, blue. Package of 5. For use with MurrElektronik relays with 6.2mm spacing. |
| **90979** | $28.00 | 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.

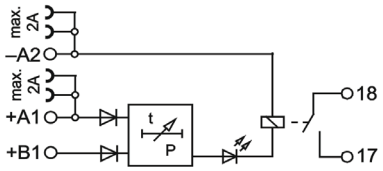
## Features

- 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

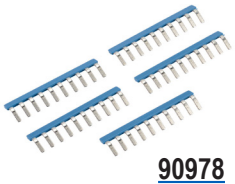
| Multi-mode Relay Timers | | | | | |
|---|---|---|---|---|---|
| ***Part Number*** | ***Price*** | ***Timing Range*** | ***Operating Voltage*** | ***Output Type*** | ***Drawing Link*** |
| ***52350*** | $30.50 | 0.1 to 300 seconds selectable | 24 VDC | (1) SPST timed relay | PDF |

## Wiring Diagram




| Interface Relays Accessories | | |
|---|---|---|
| ***Part Number*** | ***Price*** | ***Description*** |
| ***90963*** | $8.75 | Murrelektronik interface relay jumper, push-in type, 2-pole, gray. Package of 5. For use with MurrElektronik relays with 6.2mm spacing. |
| ***90978*** | $20.50 | Murrelektronik interface relay jumper, push-in type, 10-pole, blue. Package of 5. For use with MurrElektronik relays with 6.2mm spacing. |
| ***90979*** | $28.00 | 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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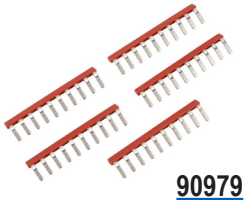


90979

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<br>0-Signal/acc. to DIN 19240: < 5V / approx. 0.6 mA<br>1-Signal/acc. to DIN 19240: > 13V / approx. 7mA |
| ***Power Consumption*** | <16mA at 24V |
| ***Contact Specifications*** | |
| ***Type*** | SPST |
| ***Material*** | Silver Tin Oxide<br>(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*** | $2 \times 10^7$ Switching cycles |
| ***Electrical Life Time Operations*** | 230VAC / 6A $8 \times 10^4$ Switching cycles<br>24VDC / 2A $8 \times 10^4$ Switching cycles<br>26VDC / 15mA $3 \times 10^5$ Switching cycles |
| ***Time Circuit Specifications*** | |
| ***Time Ranges*** | 0.1 ~ 1.2 sec,<br>0.4 ~ 5 sec,<br>3.5 ~ 40 sec,<br>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<br>[-13 to +140°F] |
| ***Storage Temperature*** | -40 to +80°C<br>[-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.**

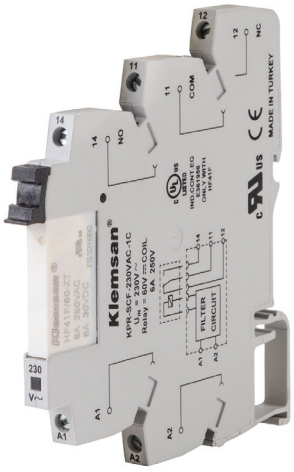
# Slim Interface Relays

## 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



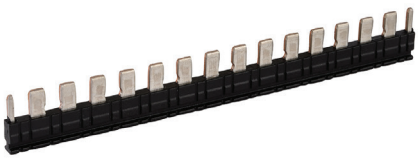

KPR-SCF-230VAC-1

| Slim Interface Relays | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Part Number* | *Price* | *Description* | *Coil Voltage* | *Configuration* | *Contact Rating* | *Integrated RCZ Filter* | *Drawing Link* |
| *KPR-SCF-230VAC-1* | $9.00 | Interface relay with LED indicators | 230VAC | SPDT | 6A | Yes | PDF |
| *KPR-SCF-115VACDC-1* | $9.00 | | 115V AC/DC | | | Yes | PDF |
| *KPR-SCE-12VACDC-1* | $8.00 | | 12V AC/DC | | | No | PDF |
| *KPR-SCE-24VACDC-1* | $8.00 | | 24V AC/DC | | | No | PDF |
| *KPR-SCE-230VACDC-1* | $9.00 | | 230V AC/DC | | | No | PDF |

| Slim Interface Relays Accessories | | | | |
|---|---|---|---|---|
| *Part Number* | *Price* | *Description* | *Quantity* | *Drawing Link* |
| *APP-KPR* | $4.00 | Orange polyamide separator plate | 5 | PDF |
| *TK-KPR-S16* | $13.00 | 16-pole push-in type interface relay jumper | 5 | PDF |
| *TK-KPR-S8* | $8.00 | 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

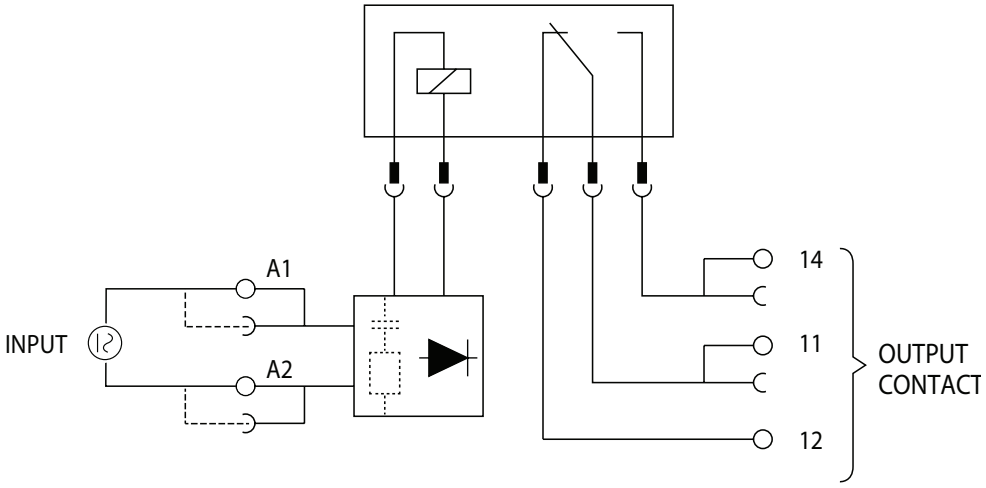
# Slim Interface Relays Specifications

| 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<br>$1x10^4$ 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<br>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)<br>CE<br>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 | $41.00 | 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 | $54.00 | 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. |

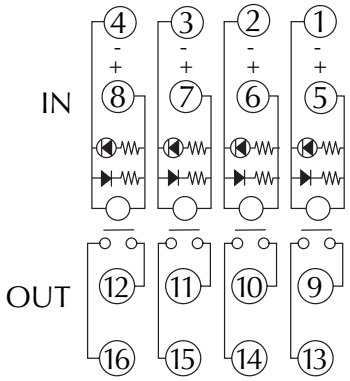
| Relays RS Series Specifications | | | | | |
|---|---|---|---|---|---|
| **Contact** | | 1 N.O. / SPST | | | |
| **Contact Resistance** | | 30mΩ or less (before use) | | | |
| **Contact Material** | | Silver alloy (gold-plated) | | | |
| **Min. Operating Voltage and Current** | | 0.1 VDC, 1mA | | | |
| **Rated Thermal Current** | | 5A | | | |
| **Max. Make/Break Current (Resistive Load)** | | 250VAC, 5A<br>30VDC, 5A<br>120VDC, 0.5 A | | | |
| **Max. Make/Break Current (Pilot Duty)** | | 120VAC, 1A<br>30VDC, 2A<br>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)<br>220VAC (resistive load)<br>24VDC (inductive load)<br>24VDC (resistive load) | 2 (cos ø = 0.7)<br>3 (cos ø = 1.0)<br>1 (T = 15ms)<br>5 (T = 1ms or less) | 2 (cos ø = 0.3 - 0.4)<br>3 (cos ø = 1.0)<br>1 (T = 15ms)<br>5 (T = 1ms or less) | 100,000<br>130,000<br>150,000<br>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

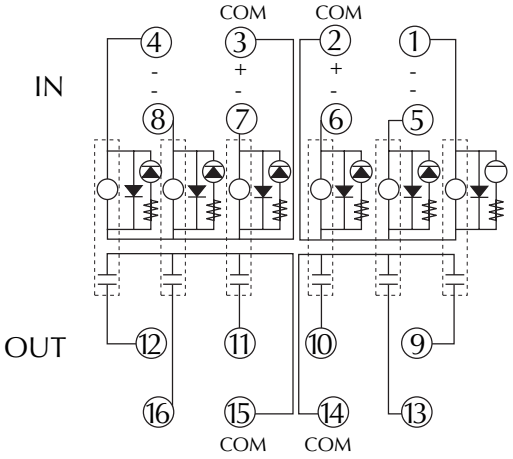
**RS4N-DE**

Internal Wiring




**RS6N-DE**

Internal Wiring



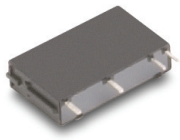
# Electromechanical Relay RB105-DE Specifications

## 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



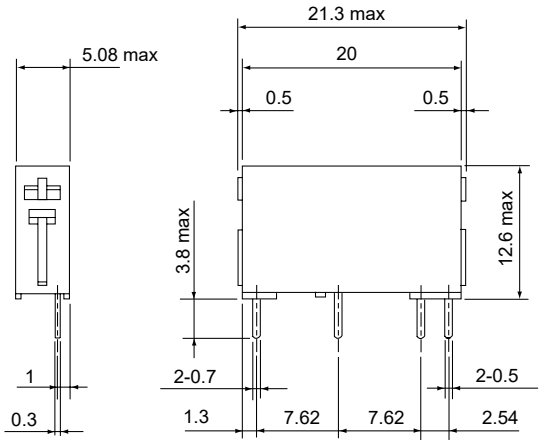
RB105-DE

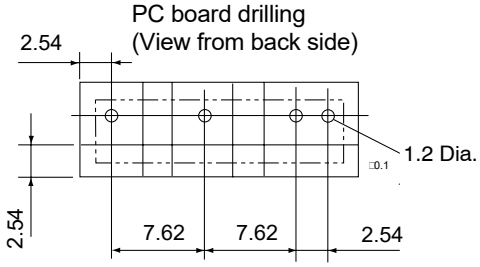
| RB105-DE | | |
|---|---|---|
| ***Part Number*** | ***Price*** | ***Description*** |
| ***RB105-DE*** | $37.50 | Fuji Electric card relay, socket mount, encapsulated, 24 VDC coil voltage, SPST, (1) N.O., 5A contact rating, 4-pin. Package of 10.. |

| 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<br>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<br>130,000 operations at 220VAC 3A, resistive load<br><br>DC: 150,000 operations at 24VDC 1A, inductive load<br>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<br>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) |

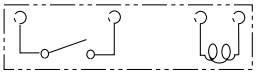
## Dimensions

***mm***




Internal wiring diagram



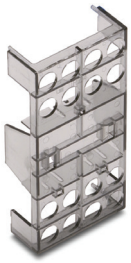
# Relay Remover and Protective Cover RS Series

## 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.

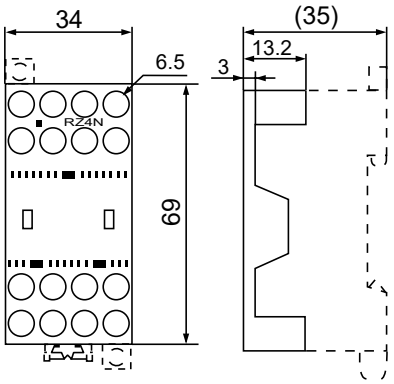


| Accessories RS Series Relays | | |
|---|---|---|
| ***Part Number*** | ***Price*** | ***Description*** |
| ***TY3*** | $11.00 | Fuji Electric relay remover, package of 10. For use with RS series relays. |
| ***RZ4N*** | $21.50 | Fuji Electric terminal guard, package of 10. For use with RS series relays. |

## 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*** | $5.25 | PDF | 12VDC | SPDT | ***781-1C-SKT*** | $4.50 | PDF |
| ***781-1C-12A*** | $5.25 | PDF | 12VAC | | | | |
| ***781-1C-24D*** | $5.00 | PDF | 24VDC | | | | |
| ***781-1C-24A*** | $5.25 | PDF | 24VAC | | | | |
| ***781-1C-120A*** | $5.25 | PDF | 120VAC | | | | |
| ***781-1C-240A*** | $6.25 | PDF | 240VAC | | | | |
| ***782-2C-12D*** | $6.50 | PDF | 12VDC | DPDT | ***782-2C-SKT*** | $4.50 | PDF |
| ***782-2C-12A*** | $6.50 | PDF | 12VAC | | | | |
| ***782-2C-24D*** | $6.50 | PDF | 24VDC | | | | |
| ***782-2C-24A*** | $6.75 | N/A | 24VAC | | | | |
| ***782-2C-120A*** | $6.75 | N/A | 120VAC | | | | |
| ***782-2C-240A*** | $7.50 | N/A | 240VAC | | | | |
| ***783-3C-12D*** | $6.75 | PDF | 12VDC | 3PDT | ***783-3C-SKT*** | $5.00 | PDF |
| ***783-3C-12A*** | $9.00 | PDF | 12VAC | | | | |
| ***783-3C-24D*** | $9.50 | N/A | 24VDC | | | | |
| ***783-3C-24A*** | $9.50 | N/A | 24VAC | | | | |
| ***783-3C-120A*** | $9.50 | N/A | 120VAC | | | | |
| ***783-3C-240A*** | $9.50 | N/A | 240VAC | | | | |
| ***784-4C-12D*** | $8.50 | PDF | 12VDC | 4PDT | ***784-4C-SKT-1*** | $5.25 | PDF |
| ***784-4C-12A*** | $11.00 | PDF | 12VAC | | | | |
| ***784-4C-24D*** | $8.75 | PDF | 24VDC | | | | |
| ***784-4C-24A*** | $8.75 | N/A | 24VAC | | | | |
| ***784-4C-120A*** | $8.75 | N/A | 120VAC | | | | |
| ***784-4C-240A*** | $8.75 | 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.**

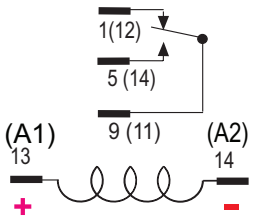
| Contact Ratings 783 Series (current) | | | | |
|---|---|---|---|---|
| ***Resistive*** | | | | ****Motor Load*** |
| ***Voltage*** | ***Nominal*** | ***UL*** | ***CSA*** | ***UL*** |
| 28VDC | 15A | 15A | 15A @ 28VDC 30A max total | – |
| 120VAC | 15A | – | 15A | 1/2 hp |
| 277VAC | 15A | 15A | 15A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

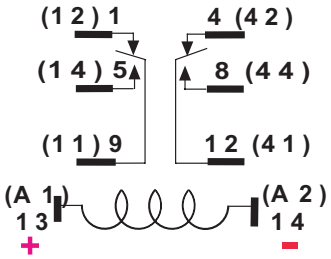
# Wiring Diagrams 78 Series

## Wiring Diagrams (viewed from pin end)

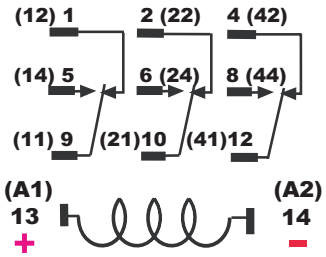
781-1C-XXX



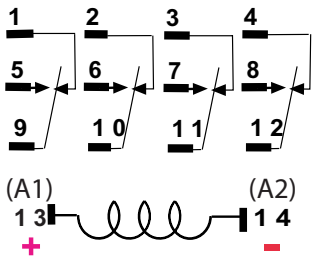

782-2C-XXX




783-3C-XXX




784-4C-XXX

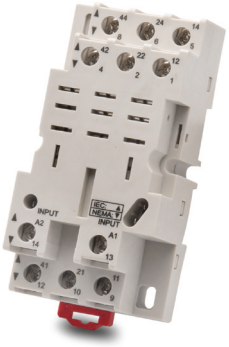



*Note: ALTERNATE NEMA OR IEC ( ) NUMBERS, VIEWED FROM PIN SIDE

# 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*** | $4.50 | 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*** | $4.50 | AutomationDirect relay socket, 35mm DIN rail or panel mount. For use with 782 and AD-70S2 series cube relays. | PDF | |
| ***783-3C-SKT*** | $5.00 | AutomationDirect relay socket, 35mm DIN rail or panel mount. For use with 783 series cube relays. | PDF | |
| ***784-4C-SKT-1*** | $5.25 | 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<br>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<br>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

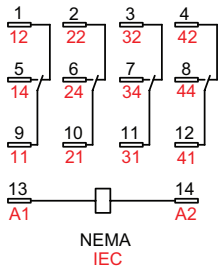
- Hermetically sealed for use in hazardous locations (Class I, Div. 2 Groups A, B, C, D)
- Small package design
- Silver alloy contacts
- High reliability and long life
- High vibration and shock resistance
- Sealed for washdown conditions
- 4PDT models

| 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**

| 782 Series Hermetically Sealed Relays | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ***Part Number*** | ***Price*** | ***Drawing Link*** | ***Coil Voltage*** | ***Configuration*** | ***Contact Rating*** | ***Relay Socket Part Number*** | ***Price*** | ***Drawing Link*** |
| ***H782-4C3-12D*** | $41.00 | PDF | 12VDC | 4PDT | 3A | ***782-4C-SKT*** | $4.25 | PDF |
| ***H782-4C3-12A*** | $41.00 | PDF | 12VAC | | | | | |
| ***H782-4C3-24D*** | $41.00 | PDF | 24VDC | | | | | |
| ***H782-4C3-24A*** | $40.50 | PDF | 24VAC | | | | | |
| ***H782-4C3-120A*** | $48.00 | PDF | 120VAC | | | | | |
| ***H782-4C3-240A*** | $48.00 | PDF | 240VAC | | | | | |
| ***H782-4C5-12D*** | $41.50 | PDF | 12VDC | | 5A | | | |
| ***H782-4C5-12A*** | $45.00 | PDF | 12VAC | | | | | |
| ***H782-4C5-24D*** | $41.50 | PDF | 24VDC | | | | | |
| ***H782-4C5-24A*** | $43.50 | PDF | 24VAC | | | | | |
| ***H782-4C5-120A*** | $46.50 | PDF | 120VAC | | | | | |
| ***H782-4C5-240A*** | $50.00 | 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*** | $4.25 | 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

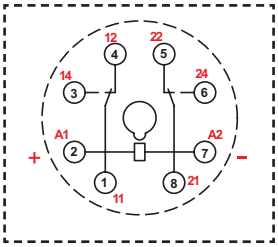
- Octal base design
- Silver alloy, gold flashed contacts
- High open contact dielectric strength (1500 Vrms)
- High reliability and long life
- High vibration and shock resistance
- Flag indicator shows relay status in manual or powered condition
- LED indicator on all models, so you can easily see 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*** | $9.00 | PDF | 12VDC | DPDT | 10A | 8-pin | ***750-2C-SKT*** | $4.75 | PDF |
| ***750R-2C-12A*** | $11.00 | PDF | 12VAC | | | | | | |
| ***750R-2C-24D*** | $9.00 | PDF | 24VDC | | | | | | |
| ***750R-2C-24A*** | $9.25 | PDF | 24VAC | | | | | | |
| ***750R-2C-120A*** | $9.25 | PDF | 120VAC | | | | | | |
| ***750R-2C-240A*** | $10.00 | PDF | 240VAC | | | | | | |
| ***750R-3C-12D*** | $10.50 | PDF | 12VDC | 3PDT | 10A | 11-pin | ***750-3C-SKT*** | $5.25 | PDF |
| ***750R-3C-24D*** | $10.50 | PDF | 24VDC | | | | | | |
| ***750R-3C-24A*** | $11.00 | PDF | 24VAC | | | | | | |
| ***750R-3C-120A*** | $11.00 | PDF | 120VAC | | | | | | |
| ***750R-3C-240A*** | $11.00 | PDF | 240VAC | | | | | | |

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

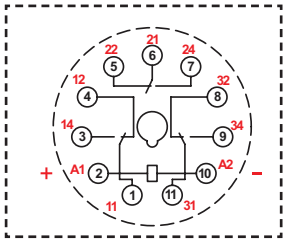
## Wiring Diagrams

***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<br>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 |

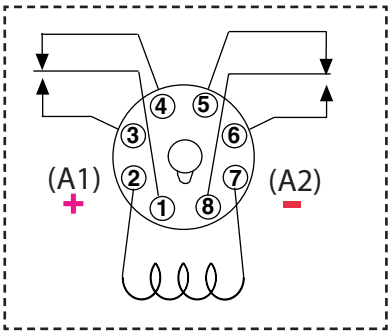
H750-2C-12D

| 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*** | $52.00 | PDF | 12VDC | DPDT | 12A | ***750-2C-SKT*** | $4.75 | PDF |
| ***H750-2C-12A*** | $55.00 | PDF | 12VAC | | | | | |
| ***H750-2C-24D*** | $52.00 | PDF | 24VDC | | | | | |
| ***H750-2C-24A*** | $55.00 | PDF | 24VAC | | | | | |
| ***H750-2C-120A*** | $55.00 | PDF | 120VAC | | | | | |
| ***H750-2C-240A*** | $63.00 | PDF | 240VAC | | | | | |
| ***H750-3C-12D*** | $59.00 | PDF | 12VDC | 3PDT | | ***750-3C-SKT*** | $5.25 | PDF |
| ***H750-3C-12A*** | $59.00 | PDF | 12VAC | | | | | |
| ***H750-3C-24D*** | $56.00 | PDF | 24VDC | | | | | |
| ***H750-3C-24A*** | $56.00 | PDF | 24VAC | | | | | |
| ***H750-3C-120A*** | $59.00 | PDF | 120VAC | | | | | |
| ***H750-3C-240A*** | $59.00 | PDF | 240VAC | | | | | |

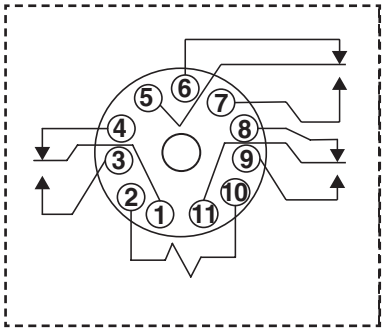
**Note: Order socket separately. 750-2C-SKT/750-3C-SKT socket torque 9 lb·in/ 1.0 N·m**

## 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

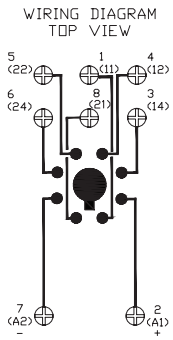
| H750 Series Hermetically Sealed Relays Specifications | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Part Numbers** | H750-2C-12D | H750-2C-12A | H750-2C-24D | H750-2C-24A | H750-2C-120A | H750-2C-240A | H750-3C-12D | H750-3C-12A | H750-3C-24D | H750-3C-24A | H750-3C-120A |
| **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.**

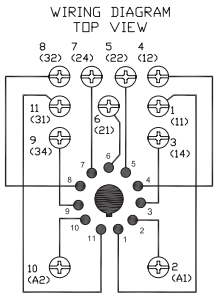
| 75 Series Contact Ratings (current) | | | | |
|---|---|---|---|---|
| **Resistive** | | | | **Motor Load** |
| **Voltage** | **Nominal** | **UL** | **CSA** | **UL** |
| 28VDC | 12A | 12A | 12A | --- |
| 120VAC | 12A | 12A | 12A | 1/3Hp |
| 240VAC | 12A | 12A | 12A | 1/2Hp |

# 750 Series Socket Wiring

## Wiring Diagrams




750-2C-SKT




750-3C-SKT

| 750 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. | $3.75 |

# 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.

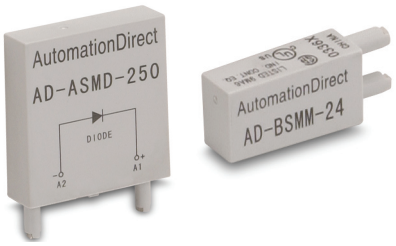
## Features

- 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 | $11.00 | 5 | Protection diode module for 783, 784 and 75 series relays. | 6-250VDC | Figure 1 | 783-3C-SKT<br>784-4C-SKT-1<br>750-2C-SKT<br>750-3C-SKT |
| AD-ASMM-24 | $9.25 | 5 | MOV module for 783, 784 and 75 series relays that operate at 24VAC coil voltage. | 24VAC/VDC | | |
| AD-ASMM-120 | $9.25 | 5 | MOV module for 783, 784 and 75 series relays that operate at 120VAC coil voltage. | 120VAC/VDC | | |
| AD-ASMM-240 | $9.25 | 5 | MOV module for 783, 784 and 75 series relays that operate at 240VAC coil voltage. | 240VAC/VDC | | |
| AD-BSMD-250 | $9.25 | 5 | Protection diode module for 782 series relays. | 6-250VDC | Figure 2 | 782-2C-SKT |
| AD-BSMM-24 | $9.25 | 5 | MOV module for 782 series relays that operate at 24VAC coil voltage. | 24VAC/VDC | | |
| AD-BSMM-120 | $9.25 | 5 | MOV module for 782 series relays that operate at 120VAC coil voltage. | 120VAC/VDC | | |
| AD-BSMM-240 | $9.25 | 5 | MOV module for 782 series relays that operate at 240VAC coil voltage. | 240VAC/VDC | | |

## Dimensions

***inches [mm]***

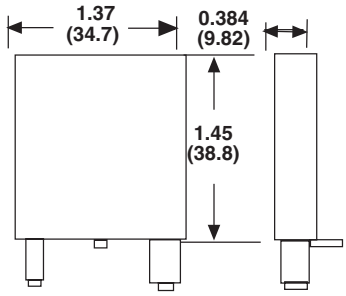



Figure 1

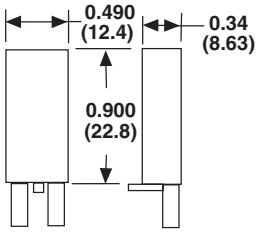



Figure 2

# Power Relays

## Features

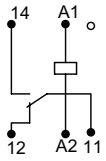
- High power contacts capable of switching up to 40A
- Open construction
- SPDT, DPST and DPDT models
- Riveted construction for high reliability
- Maximum contact voltage up to 600V

AD-PR40-1C-12D

| Power Relays | | | | | |
|---|---|---|---|---|---|
| *Part Number* | *Price* | *Drawing Links* | *Coil Voltage* | *Configuration* | *Contact Rating* |
| AD-PR40-1C-12D | $17.00 | PDF | 12VDC | SPDT | 40A |
| AD-PR40-1C-24D | $18.00 | PDF | 24VDC | | |
| AD-PR40-1C-24A | $21.50 | PDF | 24VAC | | |
| AD-PR40-1C-120A | $18.50 | PDF | 120VAC | | |
| AD-PR40-1C-240A | $22.00 | PDF | 240VAC | | |
| AD-PR40-2A-12D | $21.00 | PDF | 12VDC | DPST | |
| AD-PR40-2A-24D | $21.00 | PDF | 24VDC | | |
| AD-PR40-2A-24A | $20.00 | PDF | 24VAC | | |
| AD-PR40-2A-120A | $20.00 | PDF | 120VAC | | |
| AD-PR40-2A-240A | $21.00 | PDF | 240VAC | | |
| AD-PR40-2C-12D | $22.50 | PDF | 12VDC | DPDT | |
| AD-PR40-2C-24D | $23.00 | PDF | 24VDC | | |
| AD-PR40-2C-24A | $23.00 | PDF | 24VAC | | |
| AD-PR40-2C-120A | $23.00 | PDF | 120VAC | | |
| AD-PR40-2C-240A | $23.00 | PDF | 240VAC | | |

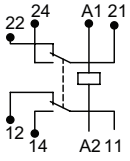
## Wiring Diagrams

**AD-PR40-1C-xxxx**



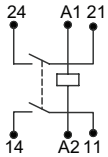

SPDT

**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)<br>40A, 28 VDC (resistive load)<br>5A, 480 VAC (resistive load)<br>5A, 600 VAC (resistive load)<br>15A, 120 VAC (tungsten filament)<br>2hp each pole 120-600 VAC<br>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 Series 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

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### Force Guided Relays

| Part Number | Price | Drawing Links | Type | Coil Voltage | Configuration | Contact Rating | Compatible Relay Socket |
|---|---|---|---|---|---|---|---|
| HC3096N-48-900-24 | $40.50 | PDF | Module | 24VDC | 4PST | 5A | NA |
| HC3096N-52-900-24 | $37.50 | PDF | Module | | 4PST | | |
| OA5611-48-24 | $16.50 | PDF | Relay | | 4PST | | HC3096N-102-24 |
| OA5611-52-24 | $16.50 | PDF | Relay | | 4PST | | |
| HL3096N-18-900-24 | $51.00 | PDF | Module | | 6PST | | NA |
| HL3096N-50-900-24 | $51.00 | PDF | Module | | 6PST | | |
| HL3096N-54-900-24 | $51.00 | PDF | Module | | 6PST | | |
| HL3096N-60-900-24 | $51.00 | PDF | Module | | 6PST | | |
| OA5612-18-24 | $23.00 | PDF | Relay | | 6PST | | HL3096N-102-24 |
| OA5612-50-24 | $23.00 | PDF | Relay | | 6PST | | |
| OA5612-54-24 | $23.00 | PDF | Relay | | 6PST | | |
| OA5612-60-24 | $23.00 | PDF | Relay | | 6PST | | |

### Relay Sockets

| Part Number | Price | Drawing Links | Type | Maximum Screw Torque | Maximum Wire Sizes | Weight |
|---|---|---|---|---|---|---|
| HC3096N-102-24 | $27.00 | 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 | $29.50 | 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<br>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: IP 40 IEC/EN 60 529<br>Terminals: IP 20 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.** | 230 VAC | 2A | - |
| **N.O.** | 230 VAC | 3A | - |

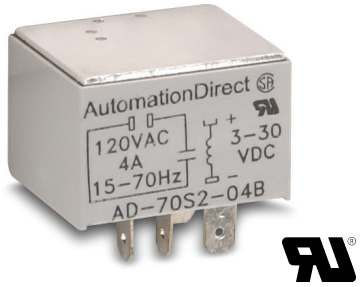
# Dold Force Guided Relays

| 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<br>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<br>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.** | 230VAC | 2A | - |
| **N.O.** | 230VAC | 3A | - |

# 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 | $46.00 | 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 | $46.00 | 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 | $69.00 | 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 | $69.00 | 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 | $49.00 | 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 | $44.00 | 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 | $69.00 | 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 | $62.00 | 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 | $46.00 | 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 | $46.00 | 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 | $52.00 | 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 | $52.00 | 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 | $46.00 | 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 | $46.00 | 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 | $57.00 | 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 | $57.00 | 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 | $87.00 | 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 | $86.00 | 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 | $88.00 | 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 | $88.00 | 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 | $77.00 | 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 | $77.00 | 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* | $23.50 | 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* | $23.50 | 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* | $23.50 | 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 | | | 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. I²T 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 around the Device - Storage*** | -40 to +125 °C | | |
| ***Ambient Air Temperature around the Device - Operation*** | -40 to +100 °C | | |
| ***Agency Approvals*** | UL (E258297), CSA (040787), RoHs | | |

## Wiring Diagrams

***Figure 1***
***AD-SSRxxx-xx wiring diagram***

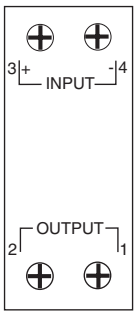
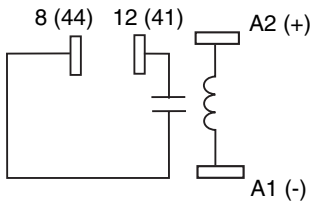


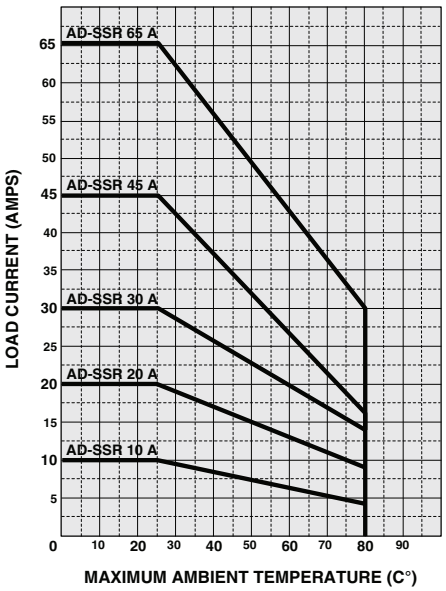

***Figure 2***
***AD-70S2-xx wiring diagram***



# SSR Series Derating Charts

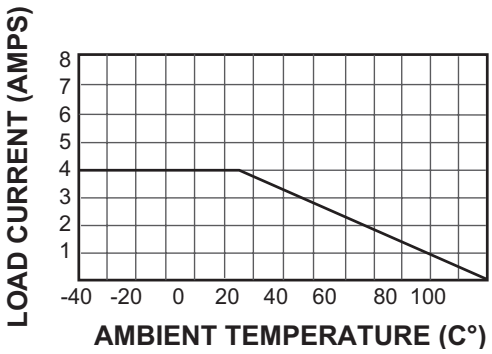
## Derating Charts

### 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*** | $21.50 | PDF | N.O. SCR | 90 to 280 VAC | 24 to 280 VAC | SPST | 10A |
| ***AD-SSR610-DC-280A*** | $18.50 | PDF | N.O. SCR | 3 to 32 VDC | | | |
| ***AD-SSR6T10-DC-280A*** | $18.50 | PDF | N.O. TRIAC | 3 to 32 VDC | | | |
| ***AD-SSR625-AC-280A*** | $27.00 | PDF | N.O. SCR | 90 to 280 VAC | | | 25A |
| ***AD-SSR625-DC-280A*** | $21.00 | PDF | N.O. SCR | 3 to 32 VDC | | | |
| ***AD-SSR6T25-DC-280A*** | $22.00 | PDF | N.O. TRIAC | 3 to 32 VDC | | | |
| ***AD-SSR640-AC-280A*** | $29.50 | PDF | N.O. SCR | 90 to 280 VAC | | | 40A |
| ***AD-SSR640-DC-280A*** | $28.50 | PDF | N.O. SCR | 3 to 32 VDC | | | |
| ***AD-SSR6T40-DC-280A*** | $26.50 | PDF | N.O. TRIAC | 3 to 32 VDC | | | |
| ***AD-SSR650-AC-280A*** | $35.50 | PDF | N.O. SCR | 90 to 280 VAC | | | 50A |
| ***AD-SSR650-DC-280A*** | $35.50 | PDF | N.O. SCR | 3 to 32 VDC | | | |
| ***AD-SSR675-AC-280A*** | $48.50 | PDF | N.O. SCR | 90 to 280 VAC | | | 75A |
| ***AD-SSR675-DC-280A*** | $48.50 | PDF | N.O. SCR | 3 to 32 VDC | | | |
| ***AD-SSR6M12-DC-200D*** | $20.00 | PDF | N.O. MOSFET | 3.5 to 32 VDC | 3 to 200 VDC | | 12A |
| ***AD-SSR6M25-DC-200D*** | $47.00 | PDF | N.O. MOSFET | 3.5 to 32 VDC | | | 25A |
| ***AD-SSR6M40-DC-200D*** | $47.00 | PDF | N.O. MOSFET | 3.5 to 32 VDC | | | 40A |
| ***AD-SSR610-AC-480A*** | $17.00 | PDF | N.O. SCR | 90 to 280 VAC | 48 to 480 VAC | | 10A |
| ***AD-SSR610-DC-480A*** | $17.00 | PDF | N.O. SCR | 3 to 32 VDC | | | |
| ***AD-SSR6T10-DC-480A*** | $17.00 | PDF | N.O. TRIAC | 3 to 32 VDC | | | |
| ***AD-SSR625-AC-480A*** | $22.00 | PDF | N.O. SCR | 90 to 280 VAC | | | 25A |
| ***AD-SSR625-DC-480A*** | $21.00 | PDF | N.O. SCR | 3 to 32 VDC | | | |
| ***AD-SSR6T25-DC-480A*** | $22.50 | PDF | N.O. TRIAC | 3 to 32 VDC | | | |
| ***AD-SSR640-AC-480A*** | $38.00 | PDF | N.O. SCR | 90 to 280 VAC | | | 40A |
| ***AD-SSR640-DC-480A*** | $35.50 | PDF | N.O. SCR | 3 to 32 VDC | | | |
| ***AD-SSR6T40-DC-480A*** | $26.50 | 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<br>11mA @120VAC | 16mA | 2mA | 20mA @240VAC<br>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 and Standards** | 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<br>11mA @120VAC | 16mA | 2mA | 4mA @240VAC<br>2mA @120VAC | 10mA | 4mA @240VAC<br>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 and Standards*** | 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<br>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 and Standards*** | UL file # E222847, CE, CSA, RoHS | | | | | |

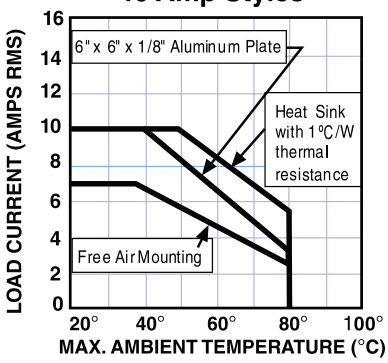
# AD Series Class 6 Solid State Relays

| 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<br>11mA @120VAC | 16mA | | 20mA @240VAC<br>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 and Standards*** | UL file # E222847, CE, CSA, RoHS | | | | | |

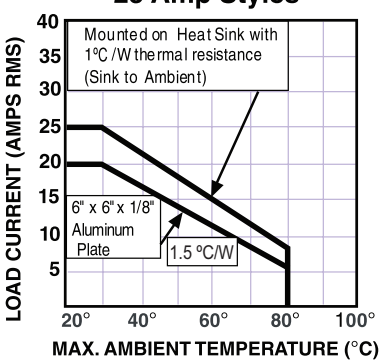
# AD Series Class 6 Solid State Relays Derating Charts

## Derating Charts

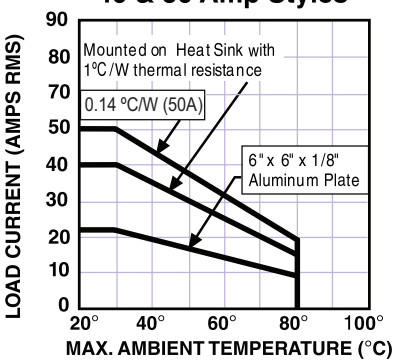
### 10 Amp Styles



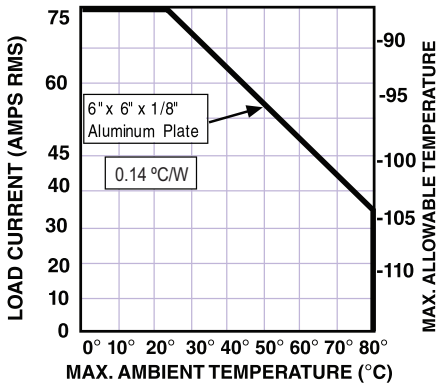

### 25 Amp Styles



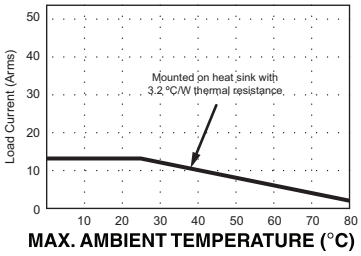

### 40 & 50 Amp Styles



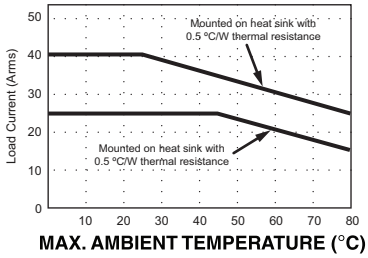

### 75 Amp Styles




### 12 A MOSFET



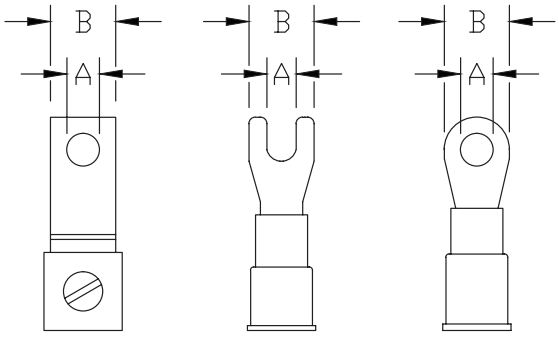

### 25/40 A MOSFET




*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*** | $21.50 | 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 | $29.50 | PDF | SPST-N.O. | 90 to 280 VAC | 24 to 280 VAC | SCR | 10A |
| AD-SSR810-AC-28R | $32.00 | PDF | | | | | |
| AD-SSR810-DC-28Z | $24.00 | PDF | | 3 to 32 VDC | | | |
| AD-SSR810-DC-28R | $24.00 | PDF | | | | | |
| AD-SSR810-DC-28RN | $25.50 | PDF | SPST-N.C. | 3 to 32 VDC | | | |
| AD-SSR810-AC-48Z | $29.50 | PDF | SPST-N.O. | 90 to 280 VAC | 48 to 480 VAC | | |
| AD-SSR810-AC-48R | $38.00 | PDF | | | | | |
| AD-SSR810-DC-48Z | $24.50 | PDF | | 3 to 32 VDC | | | |
| AD-SSR810-DC-48R | $26.50 | PDF | | | | | |
| AD-SSR810-AC-60Z | $38.00 | PDF | | 90 to 280 VAC | 48 to 600 VAC | | |
| AD-SSR810-AC-60R | $39.00 | PDF | | | | | |
| AD-SSR810-DC-60Z | $28.50 | PDF | | 3 to 32 VDC | | | |
| AD-SSR810-DC-60R | $28.50 | PDF | | | | | |

# AD Series Class 8 Solid State Relays

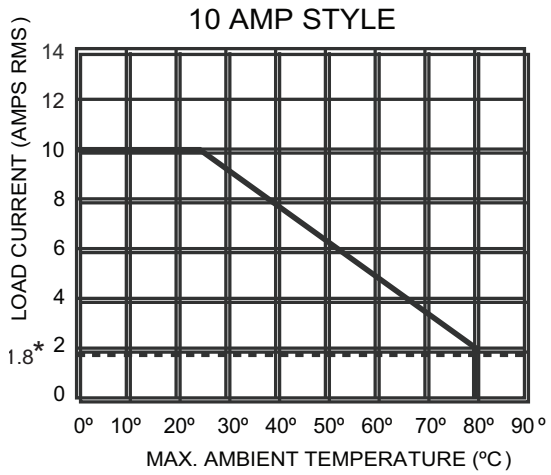
## Specifications

| 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 and Standards*** | 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*** | $66.00 | PDF | MOSFET | 3.5 to 32 VDC | 3 to 50 VDC | SPST N.O. | 15A |
| ***AD-HSSR808-DC-15*** | $64.00 | PDF | | | 3 to 150 VDC | | 8A |
| ***AD-HSSR810-AC-28*** | $64.00 | PDF | SCR | 90 to 280 VAC | 24 to 280 VAC | | 10A |
| ***AD-HSSR810-DC-28*** | $63.00 | PDF | | 3 to 32 VDC | | | |
| ***AD-HSSR810-AC-48*** | $66.00 | PDF | | 90 to 280 VAC | 48 to 480 VAC | | |
| ***AD-HSSR810-DC-48*** | $64.00 | PDF | | 3 to 32 VDC | | | |
| ***AD-HSSR810-AC-60*** | $69.00 | PDF | | 90 to 280 VAC | 48 to 600 VAC | | |
| ***AD-HSSR810-DC-60*** | $66.00 | PDF | | 3 to 32 VDC | | | |

# AD Series Class 8 Solid State Relays for Hazardous Locations

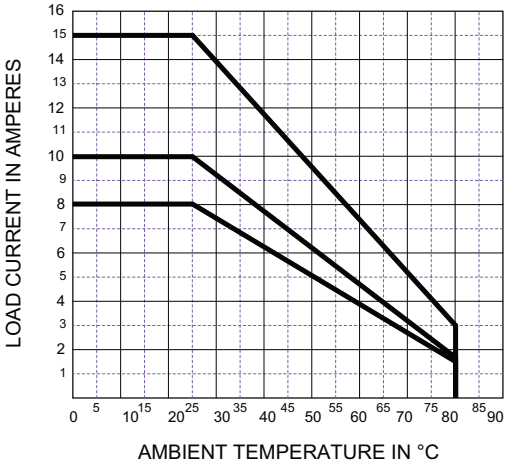
## Specifications

| 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.***

# 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 52.5mm 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*** | $47.50 | ProSense phase monitor relay, 3-phase, socket mount, finger-safe, 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*** | $55.00 | ProSense phase monitor relay, 3-phase, socket mount, finger-safe, 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*** | $55.00 | ProSense phase monitor relay, 3-phase, socket mount, finger-safe, 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*** | $55.00 | ProSense phase monitor relay, 3-phase, socket mount, finger-safe, 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*** | $80.00 | ProSense phase monitor relay, 3-phase, socket mount, finger-safe, 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*** | $83.00 | ProSense phase monitor relay, 3-phase, 35mm DIN rail mount, finger-safe, 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*** | $89.00 | ProSense phase monitor relay, 3-phase, 35mm DIN rail mount, finger-safe, 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*** | $5.25 | 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*** | $4.75 | 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

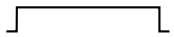
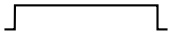
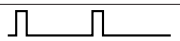
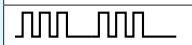
| Part Number | PMRU-1C-480A-TL | PMRU-2C-500A | PMRU-2C-600A | PMRR-1C-480A-TL | PMRRL-1C-208A-TL | PMRRL-1C-240A-TL | PMRRL-1C-480A-TL |
|---|---|---|---|---|---|---|---|
| **Input Voltage Range**** | 190–500 VAC, 50/60Hz (±20%) | 190-500 VAC, 50/60Hz (±5%) | 460-600 VAC 50/60Hz (±5%) | 190–500 VAC, 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

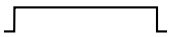
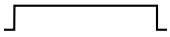
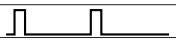
### *PMRU-TL, PMRU-2C LED Indication*

| 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<br>Severe (Twice Knob Setting): 0.3–2 seconds |
| ***Undervoltage/Overvoltage*** | 0.3–30 seconds adjustable |

### *PMRRL-TL LED Indication*

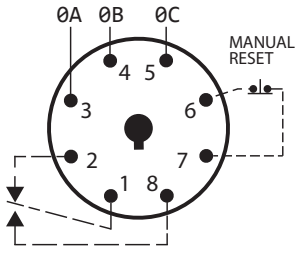
| Table 3 - LED Indication | | |
|---|---|---|
| ***LED Status**** | ***Indicator*** | |
| ***Green Steady*** |  | Normal (Relay ON) |
| ***Green Flashing*** |  | Restart (Delay) |
| ***Red Steady*** |  | Reversal |
| ***Red Flashing*** |  | Loss |
| |  | Low Volt (Undervoltage) |

### *PMRRL-TL Undervoltage*

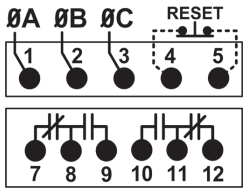
| Table 4 - Undervoltage Rating | |
|---|---|
| ***PMRRL-1C-208A-TL*** | 156–198 V |
| ***PMRRL-1C-240A-TL*** | 180–230 V |
| ***PMRRL-1C-480A-TL*** | 360–460 V |

## Wiring Diagrams

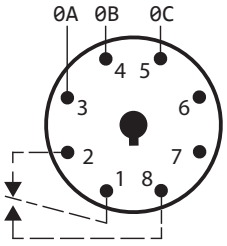
***PMRU-1C-480A-TL***




***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

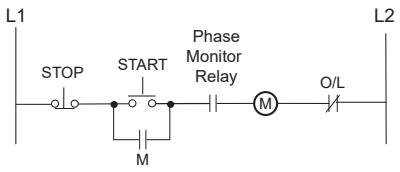
## Protection

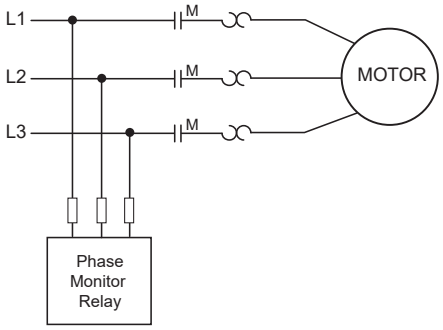
***Depending on the unit selected, it will protect 3-phase equipment against:***

- 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

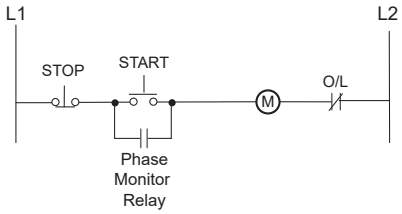
***Line Side Monitoring (recommended)***

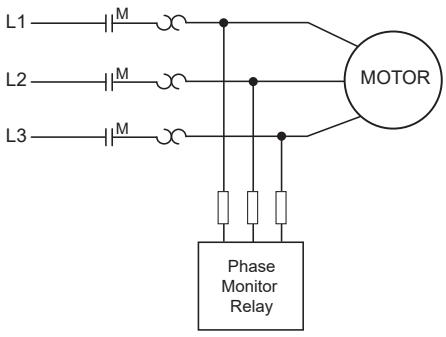



***Line Side Monitoring***
With the relay connected before the motor starter, the motor can be started in the reverse direction. However, the motor is unprotected against phase failures between the relay and the motor.

***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<br>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%<br>Minimum setting (adjustable): +0%, -50% Fixed Voltage Setting: ±2% | | |
| Repeatability | <1 % | | |
| Sensing Accuracy | Constant conditions within specifications: ±2%<br>Variable conditions within specifications: ±5% (percent base on nominal voltage) | | |
| Temperature | Operating: -28 to 65°C [-18 to 149°F]<br>Storage: -40 to 85°C [-40 to 185°F] | | |
| Indicator LED | Red when relay is energized<br>Green when relay is off | | |
| Response Times | Restart: 1 second (240 & 480V only)<br>Pick-up: 0.5 seconds<br>Drop-out (t): 0.5 seconds (VMR-xC-F-xxx);<br>Adjustable 0.1 - 10 seconds (VMR-xC-A-xxx) | | Restart: 1 second (240 & 480V only)<br>Pick-up: 0.5 seconds<br>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<br>(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

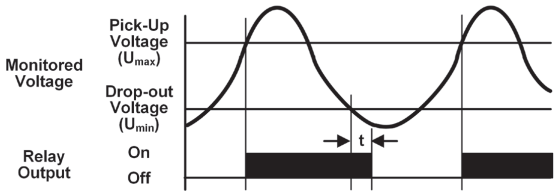
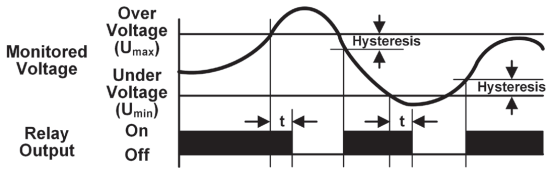
## 1-phase Voltage Monitor Relays Selection Table

| Part Number | Price | Input Voltage | Relay Configuration | Contact Rating | Protection Type | Diagram | Drawing Link |
|---|---|---|---|---|---|---|---|
| VMR-2C-F-120A | $68.00 | 90-150 VAC | DPDT | 10A | overvoltage undervoltage fixed drop-out | 213 | PDF |
| VMR-2C-A-120A | $68.00 | 90-150 VAC | DPDT | 10A | overvoltage undervoltage adjustable drop-out | | PDF |
| VMR-2C-B-120A | $68.00 | 90-150 VAC | DPDT | 10A | voltage band | | PDF |
| VMR-1C-F-240A | $79.00 | 180-300 VAC | SPDT | 10A | overvoltage undervoltage fixed drop-out | 150 | PDF |
| VMR-1C-A-240A | $79.00 | 180-300 VAC | SPDT | 10A | overvoltage undervoltage adjustable drop-out | | PDF |
| VMR-1C-B-240A | $79.00 | 180-300 VAC | SPDT | 10A | voltage band | | PDF |
| VMR-1C-F-480A * | $79.00 | 360-600 VAC | SPDT | 10A | overvoltage undervoltage fixed drop-out | | PDF |
| VMR-1C-A-480A * | $79.00 | 360-600 VAC | SPDT | 10A | overvoltage undervoltage adjustable drop-out | | PDF |
| VMR-1C-B-480A * | $68.00 | 360-600 VAC | SPDT | 10A | voltage band | | PDF |
| VMR-2C-F-12D | $68.00 | 9-15 VDC | DPDT | 10A | overvoltage undervoltage fixed drop-out | 214 | PDF |
| VMR-2C-A-12D | $68.00 | 9-15 VDC | DPDT | 10A | overvoltage undervoltage adjustable drop-out | | PDF |
| VMR-2C-B-12D | $68.00 | 9-15 VDC | DPDT | 10A | voltage band | | PDF |
| VMR-2C-F-24D | $68.00 | 18-30 VDC | DPDT | 10A | overvoltage undervoltage fixed drop-out | | PDF |
| VMR-2C-A-24D | $68.00 | 18-30 VDC | DPDT | 10A | overvoltage undervoltage adjustable drop-out | | PDF |
| VMR-2C-B-24D | $68.00 | 18-30 VDC | DPDT | 10A | voltage band | | PDF |
| VMR-2C-F-48D | $68.00 | 36-60 VDC | DPDT | 10A | overvoltage undervoltage fixed drop-out | | PDF |
| VMR-2C-A-48D | $68.00 | 36-60 VDC | DPDT | 10A | overvoltage undervoltage adjustable drop-out | | PDF |
| VMR-2C-B-48D | $68.00 | 36-60 VDC | DPDT | 10A | voltage band | | PDF |
| VMR-2C-F-110D | $68.00 | 83-138 VDC | DPDT | 10A | overvoltage undervoltage fixed drop-out | | PDF |
| VMR-2C-A-110D | $68.00 | 83-138 VDC | DPDT | 10A | overvoltage undervoltage adjustable drop-out | | PDF |
| VMR-2C-B-110D | $68.00 | 83-138 VDC | DPDT | 10A | voltage band | | PDF |

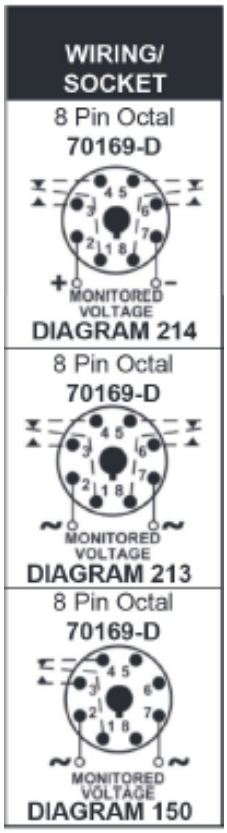
*** VMR-1C-x-480A requires part number 70169-D, (purchase separately).**

# ProSense® Voltage Monitor Relays

## Function Chart

| Catalog Number | Operation | Function Chart |
|---|---|---|
| **VMR-2C-F-12D**<br>**VMR-2C-F-24D**<br>**VMR-2C-F-48D**<br>**VMR-2C-F-110D**<br>**VMR-2C-F-120A**<br>**VMR-1C-F-240A**<br>**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**<br>**VMR-2C-A-24S**<br>**VMR-2C-A-48D**<br>**VMR-2C-A-110D**<br>**VMR-2C-A-120A**<br>**VMR-1C-A-240A**<br>**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**<br>**VMR-2C-B-24D**<br>**VMR-2C-B-48D**<br>**VMR-2C-B-110D**<br>**VMR-2C-B-120A**<br>**VMR-1C-B-240A**<br>**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

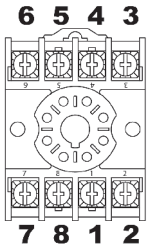
| Part Number | Price | Description | Qty | Wt (lb) | Drawing Links |
|---|---|---|---|---|---|
| 70169-D | $5.25 | Macromatic relay socket, 8-pin, 35mm DIN rail or panel mount. For use with ProSense octal relays. | 1 | 0.1 | PDF |
| 70170-D | $6.25 | Macromatic relay socket, 11-pin, 35mm DIN rail or panel mount. For use with ProSense octal relays. | 1 | 0.1 | PDF |
| 750-2C-SKT | $4.75 | 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

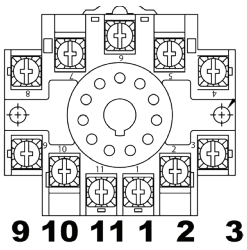
| Part Number | Number of Pins | Voltage | Current | Screw Size | Wire Size (capacity) | Screw Torque | Screw Chassis Mounting Torque | Agency Approval * |
|---|---|---|---|---|---|---|---|---|
| 70169-D | 8 | 600V | 10A | 6-32 | 1 or 2, 12-20 AWG | 12 in-lb | 7 in-lb | UL Recognized E169693, CSA, CE |
| 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.**

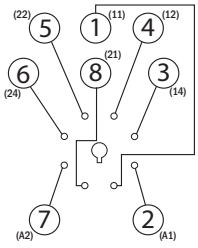
## Socket Pinouts




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*** | $57.00 | 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*** | $70.00 | 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*** | $5.25 | Macromatic relay socket, 8-pin, 35mm DIN rail or panel mount. For use with ProSense octal relays. | ------ | PDF |
| ***750-2C-SKT*** | $4.75 | AutomationDirect relay socket, 8-pin, 35mm DIN rail or panel mount. For use with 750-2C and H750-2C series octal relays. | ------- | PDF |

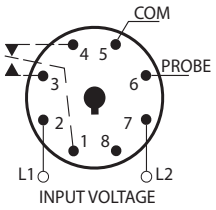
| Specifications | | |
|---|---|---|
| ***Part Number*** | ***PSFR-1C-120A-TL*** | ***PSFR-2C-120A-TL*** |
| ***Voltage Tolerance*** | 120VAC (+10% / -15%) at 50/60Hz | |
| ***Output Contacts*** | SPDT: 10A @ 240V AC / 7A @ 28V DC, 1/4HP @ 120V AC (N.O.) | SPST: 5A @ 240V AC / 5A @ 28V DC, 1/4HP @ 120V 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]<br>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.**

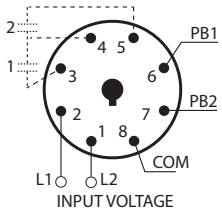
# Pump Seal Failure Relay Wiring Diagrams

## Wiring Diagrams

**PSFR-1C-120A-TL**

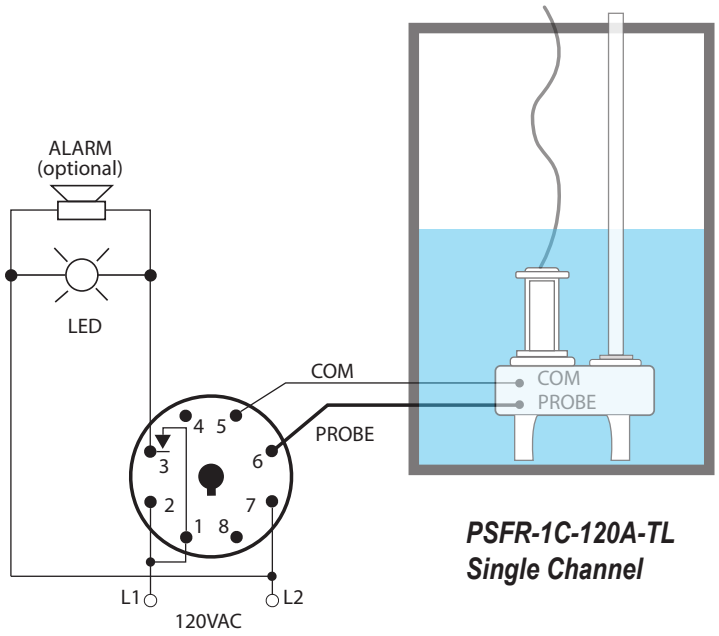



**PSFR-2C-120A-TL**

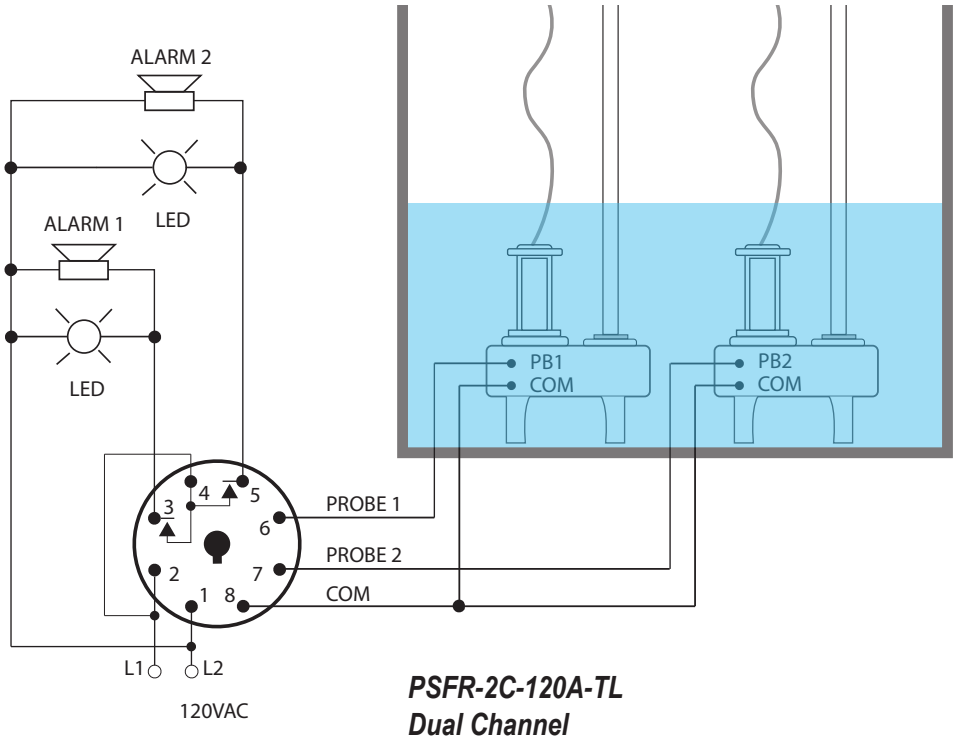


# ProSense® Pump Seal Failure Relay

## 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

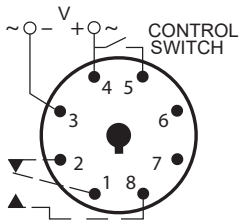
| Alternating Relays | | | | |
|---|---|---|---|---|
| **Part Number** | **Price** | **Description** | **Use With** | **Drawing Links** |
| AR-1C-120A-TL | $29.50 | ProSense alternating relay, socket mount, finger-safe, 120 VAC coil voltage, SPDT, (1) N.O., (1) N.C., 10A contact rating, 8-pin, LED indicator(s). Relay becomes UL listed when used with 70169-D relay socket. | 70169-D or 750-2C-SKT | PDF |
| ARX-2C-120A-TL | $31.50 | 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 | $5.25 | Macromatic relay socket, 8-pin, 35mm DIN rail or panel mount. For use with ProSense octal relays. | ----- | PDF |
| 750-2C-SKT | $4.75 | 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<br>1/2HP @ 120/240V AC (N.O.)<br>1/3HP @ 120/240VAC (N.C.)<br>B300, R300 (N.O.) Pilot Duty | DPDT: 10A @ 240V AC/24V DC<br>1/2HP @ 120/240V AC (N.O.)<br>1/3HP @ 120/240VAC (N.C.)<br>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]<br>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<br>ALTERNATE<br>LOAD 2 | LOAD 1 (Always energizes first)<br>ALTERNATE<br>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.**

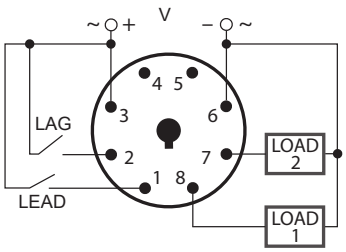
## Wiring Diagrams

### 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).

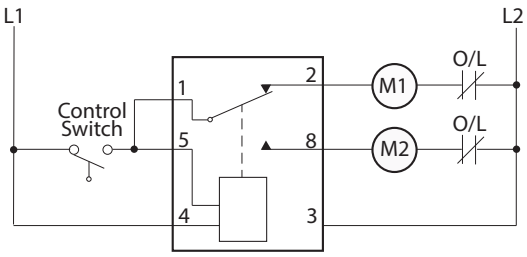



***Figure A***

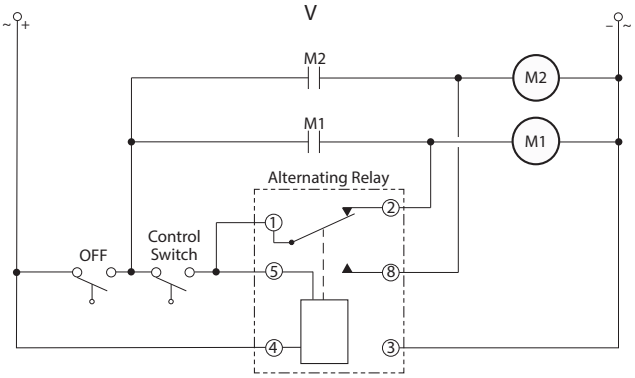



***Figure B***

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.

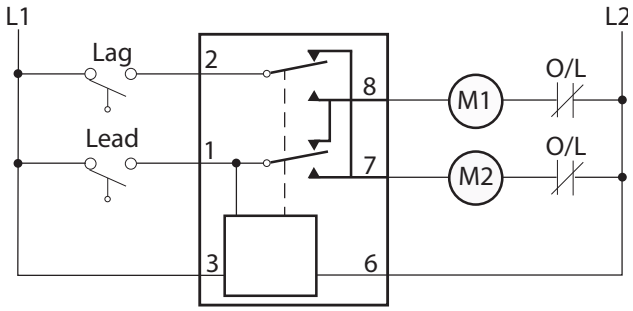



***Figure C***

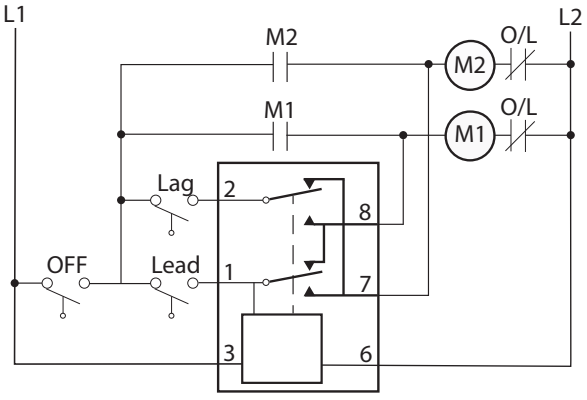



***Figure D***

***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*** | $302.00 | 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*** | $92.00 | 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 |

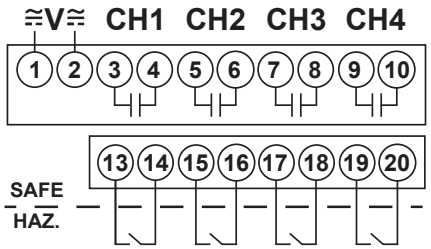
| Specifications | | |
|---|---|---|
| ***Part Number*** | ***ISDUR4*** | ***ISEUR1*** |
| ***Input Voltage*** | 102-132 VAC or 10-125 VDC@ (50/60 Hz) | |
| ***Input Switch Open Circuit Voltage:*** | 10VDC | |
| ***Output Contacts*** | SPST-N.O. (Form A): 3A Resistive @ 125VAC @ 60°C [140°F]<br>30VDC resistive, Pilot Duty Rating D300 | SPST-N.O. (Form A): 3A resistive @ 125VAC @ 60°C [140°F]<br>30VDC resistive, Pilot Duty Rating D300 |
| | SPST-N.O. (Form A): 5A resistive @ 125VAC @ 40°C (104°F)<br>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")<br>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]<br>Storage: -55 to 85°C [-67 to 185°F] | |
| ***Mounting*** | 35mm DIN-rail or panel-mounted | |
| ***Wiring*** | One 14-24 AWG Conductor or<br>Two 16 or 18 AWG Conductors | |
| ***Insulation Voltage*** | 1500VAC between coil & contacts<br>750VAC between open contacts<br>1500VAC between contacts of different output channels<br>1500VAC between hazardous and safe circuits | 1500VAC between coil & contacts<br>750VAC between open contacts<br>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.**

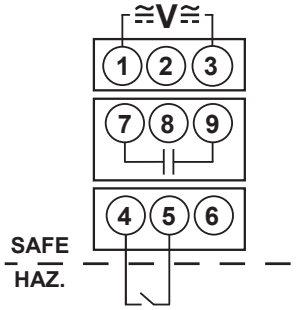
# Macromatic Intrinsically Safe Relays

## Wiring Diagrams

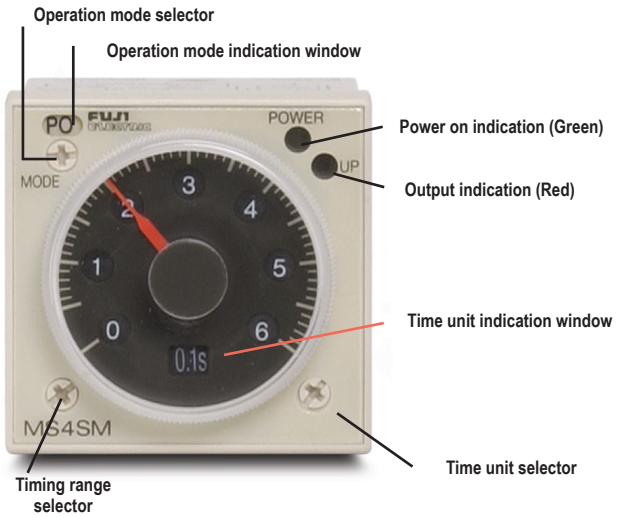
**ISDUR4**




**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<br>Time setting<br>Output LED indicator | Manual dial<br>Time setting<br>Power LED indicator<br>Output LED indicator<br>Output mode setting | 4-digit green LED display for time setting<br>4-Digit red LED display for current time<br>Output LED indicator<br>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<br>Start signal<br>Gate signal<br>Timed signal | Start signal<br>Reset signal<br>Timed signal |
| ***Outputs*** | Normally-open DPDT<br>Normally-closed DPDT | Normally-open DPDT<br>Normally-closed DPDT | 1 SPDT<br>DC NPN transistor |
| ***Contact Rating*** | 3 A @ 240 VAC (resistive load) | 5 A @ 250 VAC (resistive load) | Mechanical: 2 A @ 220 VAC<br>Transistor: 100 mA @ 24 VDC |
| ***Output Modes*** | On-delay | On-delay<br>Flicker<br>One shot<br>Off-delay | On-delay<br>Flicker<br>One shot<br>Off-delay<br>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**

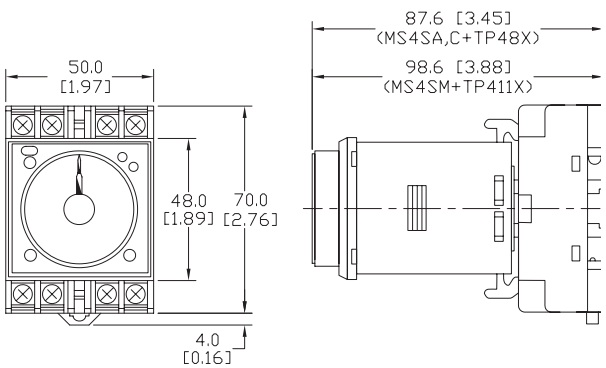
| Part Number | Price | Description | Time Range |
|---|---|---|---|
| MS4SM-AP-ADC* | $65.00 | Fuji Electric multi-mode relay timer, 0.05 seconds to 60 hours selectable timing range, 100-240 VAC operating voltage, 5A contact rating, (1) DPDT timed relay output(s), socket mount, 11-pin. Requires Fuji Electric TP411X or TP411SBA timer socket. | 0.05 seconds to 60 hours |
| MS4SA-AP-ADC | $65.00 | 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* | $65.00 | 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* | $65.00 | 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* | $65.00 | 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* | $60.00 | 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 | $9.25 | Fuji Electric timer socket, 35mm DIN rail mount. For use with MS4SM series timers. | N/A |
| TP411SBA | $9.25 | Fuji Electric timer socket, panel mount. For use with MS4SM series timers. | |
| TP48X | $9.25 | Fuji Electric timer socket, 35mm DIN rail mount. For use with MS4SA and MS4SC series timers. | |
| TP48SB | $9.25 | Fuji Electric timer socket, panel mount. For use with MS4SA and MS4SC series timers. | |
| PANEL-16 | $15.50 | AutomationDirect mounting clips, package of 5. For use with 1/16 DIN timers and counters. | |

*** Socket mounts must be purchased separately**

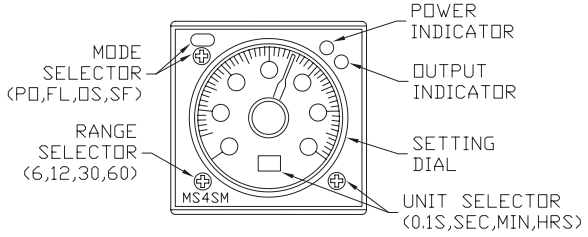
## Dimensions

***mm [inches]***

***(Timer and Socket Assembly)***




***Control***

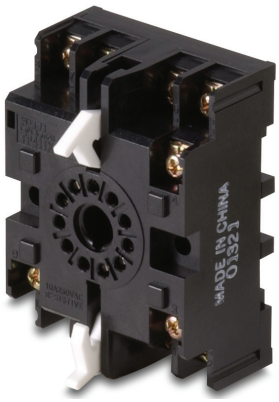


# Fuji 1/16 DIN Super Timers

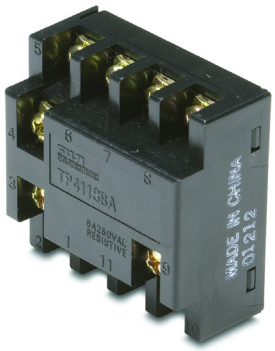

MS4SM-AP-ADC
MS4SM-CE-ADC


MS4SA-AP-ADC
MS4SA-CE-ADC


MS4SC-AP-ADC
MS4SC-CE-ADC



TP411X



TP411SBA*

TP48X

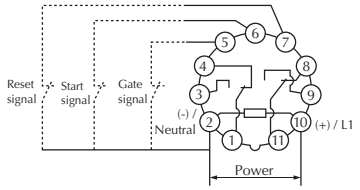
TP48SB*

| 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<br><br>MS4SA-AP-ADC<br>MS4SC-AP-ADC<br>MS4SM-AP-ADC | 20.4-26.4 VDC/AC<br><br>MS4SA-CE-ADC<br>MS4SC-CE-ADC<br>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<br>2000VAC 1 min. between output contact and control circuit<br>1000VAC 1 min. between open contacts | |
| ***Vibration*** | Malfunction durability: 10 to 55Hz, 0.5mm double amplitude<br>Mechanical durability: 10 to 55Hz, 0.75mm double amplitude | |
| ***Shock*** | Malfunction durability: 100m/s²<br>Mechanical durability: 500m/s² | |
| ***Life Expectancy*** | Mechanical: 20 million operations (No load operation cycle: 1800/hr.)<br>Electrical: 100,000 operations at 250 VAC 5 A resistive load (operation cycle: 1800/hr) | |
| ***Weight*** | Approx. 100g [3.527 oz] | |

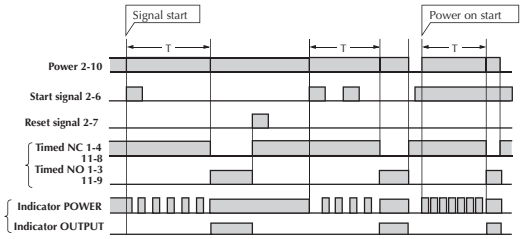
***When using panel mount sockets TP411SBA and TP48SB, mounting clip PANEL-16 is required and must be purchased separately.**

# Fuji 1/16 DIN Timers Timing and Wiring Diagrams

## MS4SM

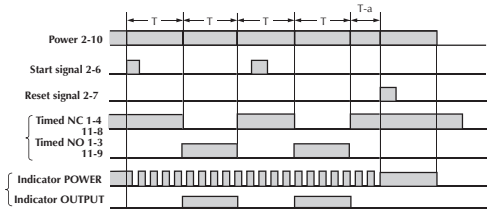



### 1. On-delay PO



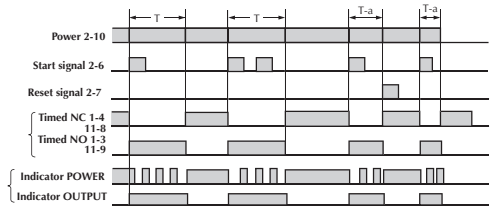

- With power off turn the mode selector until PO is displayed.
- When power is on, applying the start signal turns the timed N.O. (normally open) contact on after the set time has elapsed.
- When using a power-on start, pins 2 and 6 (start signal) must be jumpered together
- To make timer output a signal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

### 2. Flicker FL



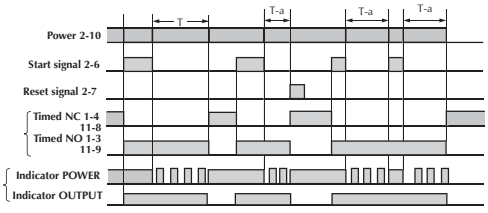

- With power off, turn the mode selector until FL is displayed.
- When power is on, applying the start signal turns the timed contact on and off repeatedly at the set time intervals.
- When using a power-on start, pins 2 and 6 (start signal) must be jumpered together

### 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



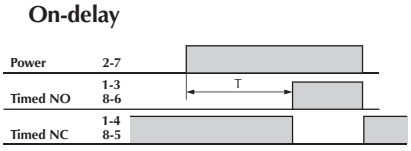

- With power off, turn the mode selector until SF is displayed.
- When power is on, applying the start signal instantly turns the timed N.O. contact on. Removing the start signal turns the contact off after the set time has elapsed.

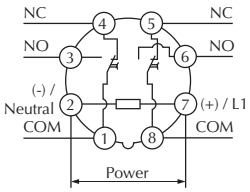
***Notes:***

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

## MS4SA

### On-delay

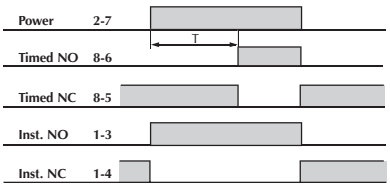


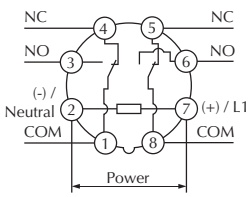




- When power is applied, the timed N.O. contacts make after the set time has elapsed.
- When power is removed, the contacts reset.
- To make timer output a signal as soon as power is turned on, turn timer dial fully counter-clockwise.

## MS4SC

### On-delay



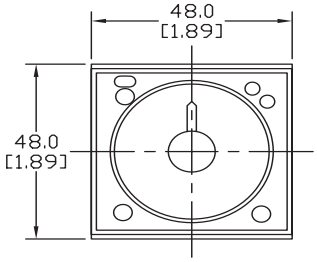

- Timed contact
  When power is applied, the N.O. contact makes after the set time has elapsed. When power is removed, the contacts reset.
- Instantaneous contact
  When power is applied, the N.O. contact makes instantly. When power is removed, the contacts reset.
- To make timer output a signal as soon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

# Fuji 1/16 DIN Super Timers Dimensions

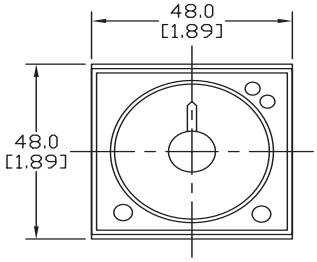
## Dimensions

***mm [inches]***

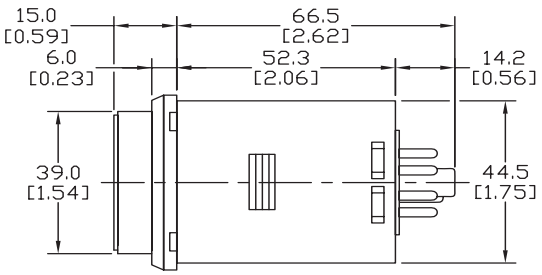
**MS4SM**



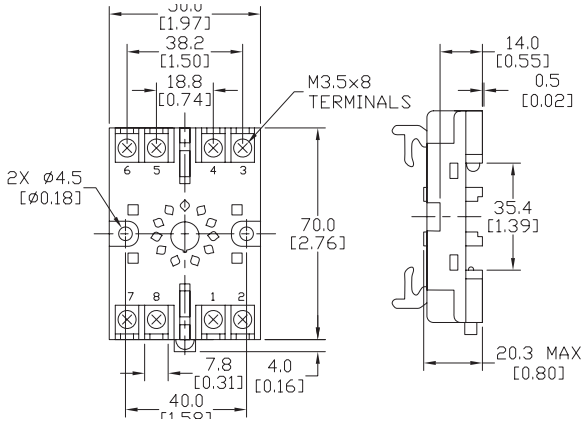

**MS4SA and MS4SC**



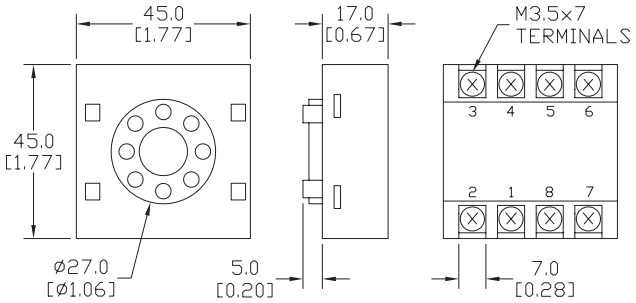

**Side View**



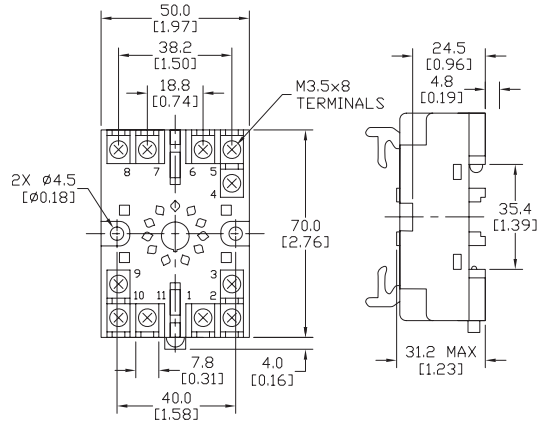

**Socket for MS4SA, MS4SC (8-pin)**
**TP48X**



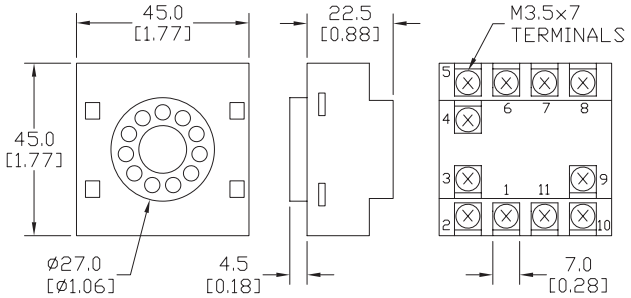

**Socket for MS4SA, MS4SC, (8-pin)**
**TP48SB**



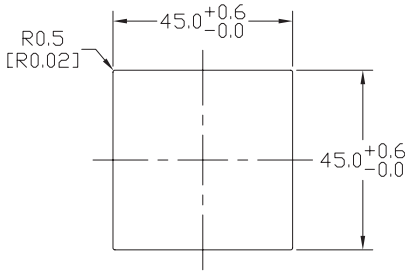

**Socket for MS4SM (11-pin)**
**TP411X**



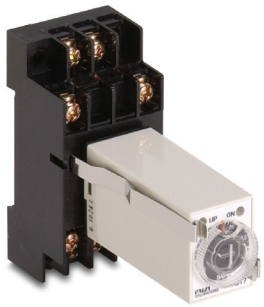

**Socket for MS4SM (11-pin)**
**TP411SBA**




**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

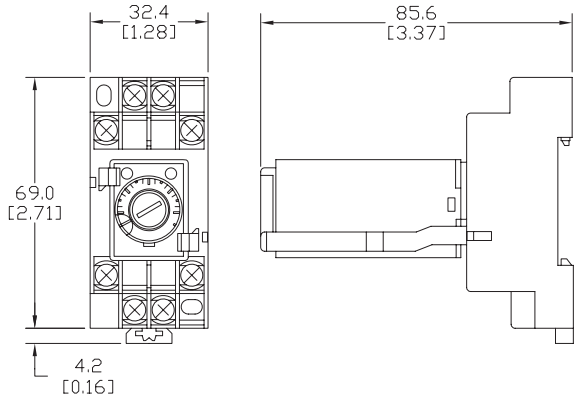
**Fuji Miniature DIN Super Timers Selection Chart**

| Part Number | Price | Description | Voltage | Time Range |
|---|---|---|---|---|
| ST7P-2A15S-ADC | $51.00 | 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 | $51.00 | 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 | $51.00 | 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 | $51.00 | 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 | $51.00 | 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 | $51.00 | 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 | $51.00 | 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 | $51.00 | 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 | $49.00 | 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 | $49.00 | 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 | $9.25 | DIN rail/surface mount socket for ST7P series timers. UL, CSA, TÜV approved | N/A | N/A |

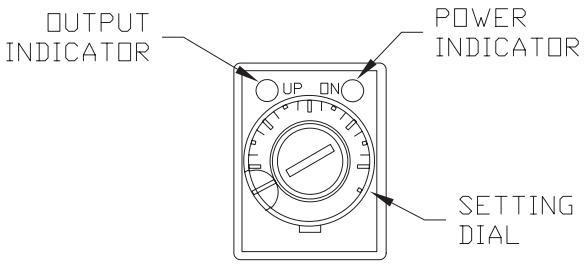
## Dimensions

***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<br><br>ST7P-2A15S-ADC<br>ST7P-2A13T-ADC<br>ST7P-2A16T-ADC<br>ST7P-2A11N-ADC<br>ST7P-2A16N-ADC | 20.4-26.4 VDC<br><br>ST7P-2DE5S-ADC<br>ST7P-2DE3T-ADC<br>ST7P-2DE6T-ADC<br>ST7P-2DE1N-ADC<br>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<br>2000 VAC 1 min. between output contact and control circuit<br>1000 VAC 1 min. between open contacts | |
| ***Vibration*** | Malfunction durability: 10 to 55Hz, 0.5mm double amplitude<br>Mechanical durability: 10 to 55Hz, 0.7mm double amplitude | |
| ***Shock*** | Malfunction durability: 50m/s²<br>Mechanical durability: 1000m/s² | |
| ***Life Expectancy*** | Mechanical: 50 million operations (No load; operation cycle 1800/hr.)<br>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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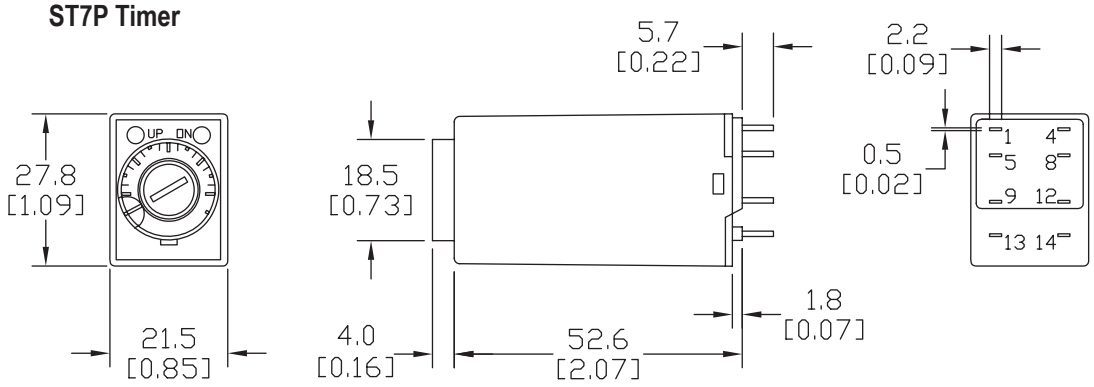
# Fuji Miniature DIN Timers, Dimensions, Timing and Wiring

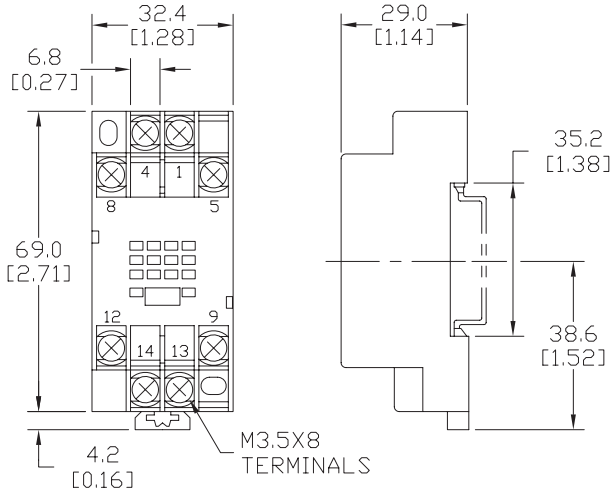
## Dimensions

***mm [inches]***

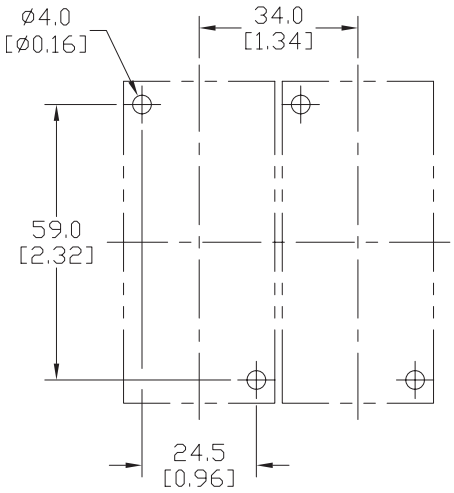
### ST7P Timer



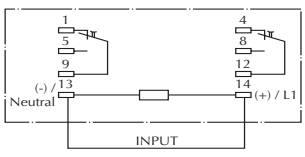

### TP88X2 Socket



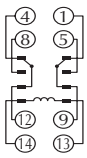

### Panel Mounting



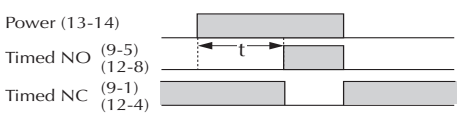

### Wiring Diagram




### 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 | $64.00 | 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<br>24VAC ~ 2VA<br>240VAC ~ 3VA<br>12VDC ~ 1W<br>24VDC ~ 1W<br>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<br>N.C. Contact 1A / 230VAC |
| ***Electrical Lifetime*** | $1.5 \times 10^5$ switching cycle (to AC 15 at 1A, 230VAC) |
| ***Switching Frequency*** | 36,000 switching cycle / hr |
| ***Max Fuse Rating*** | 4A |
| ***Mechanical Lifetime*** | $\geq 30 \times 10^6$ switching cycles |
| ***Time Circuit Specifications*** | |
| ***Time Ranges*** | 8 time ranges in one unit, selectable via rotational switch<br>0.02 ~ 1 sec, 0.06 ~ 6 sec, 0.3 ~ 30 sec<br>0.03 ~ 3 min, 0.3 ~ 30 min, 3 ~ 300 min<br>0.3 ~ 30 hr, 3 ~ 300 hr |
| ***Time Setting*** | t1 - continuous, 1:100 on relative scale |
| ***Recovery Time*** | 24VDC 15ms<br>240VDC 50ms<br>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<br>1 x 2.5 mm² / 14 AWG stranded ferruled or<br>2 x 1.5 mm² / 16 AWG stranded ferruled or<br>2 x 2.5 mm² / 14 AWG solid |
| ***Tightening Torque*** | 0.8 N·m |
| ***Ambient Temperature*** | -40 to +60°C<br>[-40 to +140°F] |
| ***Storage Temperature*** | -40 to +70°C<br>[-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<br>Yellow LED "R/t": Shows status of output relay and time delay:<br>-Continuously off: Output relay not active; no time delay<br>-Continuously on: Output relay active no time delay<br>-Flashing (short on, long off) output relay not active, time delay<br>-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<br>5A 250VAC G.P. |
| ***UL Specified Wire Connection*** | 60°C / 75°C copper conductors only<br>Screw terminals fixed: AWG 20 – 12 solid or stranded<br>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*** | $80.00 | 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<br>24VAC ~ 2VA<br>240VAC ~ 3VA<br>12VDC ~ 1W<br>24VDC ~ 1W<br>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<br>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<br>0.05 ~ 1 sec, 0.06 ~ 6 sec, 0.3 ~ 30 sec<br>0.03 ~ 3 min, 0.3 ~ 30 min, 3 ~ 300 min<br>0.3 ~ 30 hr, 3 ~ 300 hr |
| ***Time Setting*** | t1, t2 - continuous, 1:100 on relative scale |
| ***Recovery Time*** | 24VDC 15ms<br>240VDC 50ms<br>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<br>1 x 2.5 mm² / 14 AWG stranded ferruled or<br>2 x 1.5 mm² / 16 AWG stranded ferruled or<br>2 x 2.5 mm² / 14 AWG solid |
| ***Tightening Torque*** | 0.8 N·m |
| ***Ambient Temperature*** | -40 to +60°C<br>[-40 to +140°F] |
| ***Storage Temperature*** | -40 to +70°C<br>[-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<br>Yellow LED "R/t": Shows status of output relay and time delay:<br>-Flashing (short on, long off) : Output relay not active; time delay t2 (break time)<br>-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<br>5A 250VAC G.P. |
| ***UL Specified Wire Connection*** | 60°C / 75°C copper conductors only<br>Screw terminals fixed: AWG 20 – 12 solid or stranded<br>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*** | $74.00 | 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<br>24VAC ~ 2VA<br>240VAC ~ 3VA<br>12VDC ~ 1W<br>24VDC ~ 1W<br>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<br>N.C. Contact 1A / 230VAC |
| ***Electrical Lifetime*** | $1.5 \times 10^5$ switching cycle (to AC 15 at 1A, 230VAC) |
| ***Switching Frequency*** | 6,000 switching cycle / hr |
| ***Max Fuse Rating*** | 4A |
| ***Mechanical Lifetime*** | $\geq 30 \times 10^6$ switching cycles |
| ***Time Circuit Specifications*** | |
| ***Time Ranges*** | 8 time ranges in one unit, selectable via rotational switch<br>0.05 ~ 1 sec, 0.06 ~ 6 sec, 0.3 ~ 30 sec<br>0.03 ~ 3 min, 0.3 ~ 30 min, 3 ~ 300 min<br>0.3 ~ 30 hr, 3 ~ 300 hr |
| ***Time Setting*** | Continuous, 1:100 on relative scale |
| ***Minimum on Time*** | AC 50 Hz - 15ms<br>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<br>1 x 2.5 mm² / 14 AWG stranded ferruled or<br>2 x 1.5 mm² / 16 AWG stranded ferruled or<br>2 x 2.5 mm² / 14 AWG solid |
| ***Tightening Torque*** | 0.8 N·m |
| ***Ambient Temperature*** | -40 to +60°C<br>[-40 to +140°F] |
| ***Storage Temperature*** | -40 to +70°C<br>[-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<br>Yellow LED "R/t": shows status of output relay and time delay:<br>- LED off output relay not active; no time delay<br>- LED continuously on output relay active;no time delay (B1 input active)<br>- 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<br>5A 250VAC G.P. |
| ***UL Specified Wire Connection*** | 60°C / 75°C copper conductors only<br>Screw terminals fixed: AWG 20 – 12 solid or stranded<br>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*** | $60.00 | 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<br>24VAC ~ 2VA<br>240VAC ~ 3VA<br>12VDC ~ 1W<br>24VDC ~ 1W<br>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<br>N.C. Contact 1A / 230VAC |
| ***Electrical Lifetime*** | $1.5 \times 10^5$ switching cycle (to AC 15 at 1A, 230VAC) |
| ***Switching Frequency*** | 36,000 switching cycle / hr |
| ***Max Fuse Rating*** | 4A |
| ***Mechanical Lifetime*** | ≥ $30 \times 10^6$ switching cycles |
| ***Time Circuit Specifications*** | |
| ***Time Ranges*** | 8 time ranges in one unit, selectable via rotational switch<br>0.05 ~ 1 sec, 0.06 ~ 6 sec, 0.3 ~ 30 sec<br>0.03 ~ 3 min, 0.3 ~ 30 min, 3 ~ 300 min<br>0.3 ~ 30 hr, 3 ~ 300 hr |
| ***Time Setting*** | Continuous, 1:100 on relative scale |
| ***Recovery Time*** | 24VDC 15ms<br>240VDC 50ms<br>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<br>1 x 2.5 mm² / 14 AWG stranded ferruled or<br>2 x 1.5 mm² / 16 AWG stranded ferruled or<br>2 x 2.5 mm² / 14 AWG solid |
| ***Tightening Torque*** | 0.8 N·m |
| ***Ambient Temperature*** | -4 to +60°C<br>[-40 to +140°F] |
| ***Storage Temperature*** | -40 to +70°C<br>[-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<br>Yellow LED "R/t": Shows status of output relay and time delay:<br>- Flashing (long on, short off) output relay not active; time delay<br>- 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<br>5A 250VAC G.P. |
| ***UL Specified Wire Connection*** | 60°C / 75°C copper conductors only<br>Screw terminals fixed: AWG 20 – 12 solid or stranded<br>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*** | $96.00 | Off-delay | 0.15 to 3 seconds | 24-240 VAC/VDC | 2 changeover contacts | PDF |
| ***MK7873N-82-61-30S*** | $96.00 | Off-delay | 1.5 to 30 seconds | 24-240 VAC/VDC | 2 changeover contacts | PDF |
| ***MK7873N-82-61-300S*** | $96.00 | 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<br>19.2–264 VAC<br>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<br>N.C. Contact 1A / 230VAC |
| ***Electrical Lifetime*** | 8 x $10^5$ switching cycles |
| ***Switching Frequency*** | time ranges ≤ 10 sec - 1400 switching cycles per hr<br>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<br>MK7873N-82-61-30S = 1.5 - 30 sec<br>MK7873N-82-61-300S = 15 - 300 sec |
| ***Time Setting*** | Stepless |
| ***Minimum Switch-on Time*** | 24VDC 150ms<br>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<br>1 x 2.5 mm² / 14 AWG stranded ferruled or<br>2 x 1.5 mm² / 16 AWG stranded ferruled or<br>2 x 2.5 mm² / 14 AWG solid |
| ***Tightening Torque*** | 0.8 N·m |
| ***Ambient Temperature*** | -20 to +60°C<br>[-4 to +140°F] |
| ***Storage Temperature*** | -25 to +60°C<br>[-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<br>5A 250VAC G.P.<br>5A 24VDC G.P. |
| ***UL Specified Wire Connection*** | 60°C / 75°C copper conductors only<br>Screw terminals fixed: AWG 20 – 12 solid or stranded<br>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*** | $36.50 | 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*** | $34.00 | 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*** | $34.00 | 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*** | $43.50 | 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<br>230VAC ~ 6VA<br>24VDC ~ 0.4 W | | | 24VAC ~ 1VA<br>230VAC ~ 7.5 VA<br>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<br>N.C. Contact 1A / 230VAC | | | |
| **Max Wire Size** | 22–14 AWG solid or stranded | | | |
| **Mechanical Lifetime** | > 1x107 switching cycles | | | |
| **Electrical Lifetime** | > 1x105 switching cycle | | | |
| ***Time Circuit Specifications*** | | | | |
| **Time Ranges** | 0.05 ~ 0.5 sec,<br>0.2 ~ 2 sec,<br>1.5 ~ 15 sec,<br>12 ~ 120 sec | 1 ~ 10 sec | | 0.02* ~ 1 sec, 0.06* ~ 6 sec, 0.3 ~ 30 sec<br>0.03 ~ 3 min, 0.3 ~ 30 min, 3 ~ 300 min<br>0.3 ~ 30 hr, 3 ~ 300 hr<br>(* 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<br>≤ 5% at range -20 – 0°C |
| ***General Specifications*** | | | | |
| **Connection (fixed screw terminal)** | 0.34 – 2 x 2.5 mm² / 22–14 AWG solid or<br>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<br>(contact 15–18 closed) | | | Green LED: On, when supply connected<br>Yellow LED "R/t": Shows status of output relay and time delay (15-16-18):<br>-Continuous off: Output relay not active;no time delay<br>-Continuous on: Output relay active no time delay<br>-Flashing (short on, long off) Time delay: output relay not active<br>-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<br>4A 240VAC G.P.<br>4A 30VDC G.P. | | | |
| **UL Specified Wire Connection** | 60°C / 75°C copper conductors only<br>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*** | $64.00 | Multi-mode<br>8 mode selectable | 0.05 seconds to 100 hours<br>selectable | 24-240 VAC and 12-125<br>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<br>1/2 HP @ 120/240 VAC (N.O.)<br>1/3 HP @ 120/240 VAC (N.C.)<br>B300 & R300 (N.O.)<br>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%<br>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<br>1 or 2 #12-20AWG Wire |
| ***Tightening Torque*** | 12 in-lb |
| ***Wire/Ferrule Size*** | 1 or 2 #12-20 AWG<br>(Ferrule size: Stud size 6 with max overall width 0.30") |
| ***Ambient Temperature*** | -28 to +65°C<br>[-18 to +150°F] |
| ***Storage Temperature*** | -40 to +85°C<br>[-40 to +185°F] |
| ***Protection Rating*** | IP20 |
| ***Vibration Resistance*** | 10-55 Hz with 3G maximum and<br>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,<br>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.**

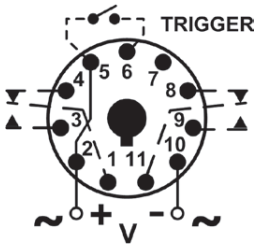
# ProSense® Relay Timers

## 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 | $69.00 | Multi-mode 10 mode selectable | 0.05 seconds to 999 hours selectable | 120 VAC/VDC | (1) DPDT timed relay | PDF |
| TRM-10-D-24AD | $69.00 | 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<br>1/2 HP @ 120/240 VAC (N.O.)<br>1/3 HP @ 120/240 VAC (N.C.)<br>B300 & R300 (N.O.)<br>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<br>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<br>For Variable Voltage & Temperature w/i specifications: +1% of set time or +0.02 seconds, whichever is greater | |

**Multi-Mode Relay Timer Specifications**

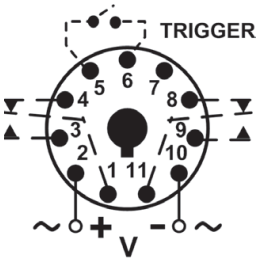
| General Specifications | |
|---|---|
| Connection (screw terminal) | Recommend 70170-D socket<br>1 or 2 -#12-20 AWG Wire |
| Tightening Torque | 12 in-lb |
| Wire/Ferrule Size | 1 or 2 #12-20 AWG<br>(Ferrule size: Stud size 6 with max overall width 0.30") |
| Ambient Temperature | -28 to +65°C<br>[-18 to +150°F] |
| Storage Temperature | -40 to +85°C<br>[-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<br>UL Listed with appropriate socket File E191059<br>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 | $88.00 | 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 | $88.00 | 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**

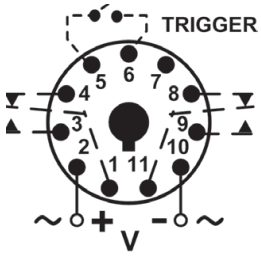
| Part Number | TRM-16-D-120AD | TRM-16-D-24AD |
|---|---|---|
| **Input Specifications** | | |
| Nominal Voltage | 120 VAC/VDC | 24 VAC/VDC |
| Nominal Consumption | Max 2VA | |
| Nominal Frequency | 50/60 Hz | |
| **Contact Specifications** | | |
| Type | (1) DPDT | |
| Switching Capacity | 10A @ 240VAC, 30VDC<br>1/2 HP @ 120/240 VAC (N.O.)<br>1/3 HP @ 120/240 VAC (N.C.)<br>B300 & R300 (N.O.)<br>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<br>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<br>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<br>1 or 2 -#12-20 AWG Wire |
| Tightening Torque | 12 in-lb |
| Wire/Ferrule Size | 1 or 2 #12-20 AWG<br>(Ferrule size: Stud size 6 with max overall width 0.30") |
| Ambient Temperature | -28 to +65°C<br>[-18 to +150°F] |
| Storage Temperature | -40 to +85°C<br>[-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<br>Red ON - Relay Energized |
| Weight | 0.22 lbs |
| Agency Approvals and Standards * | UR File E191059, CSA File 602618, CE,<br>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.**

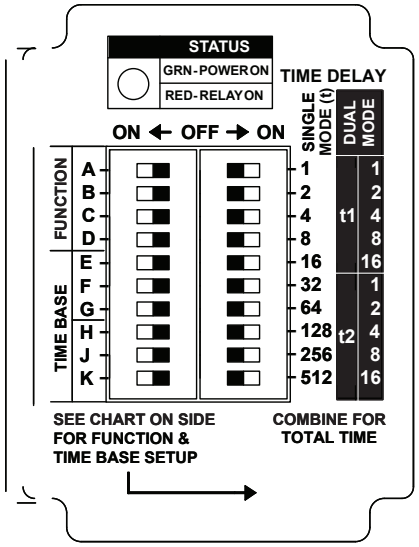
## Wiring Diagram



# ProSense® Relay Timers

## TRM-16 Series Multi-Mode Relay Timers

***Function Table***

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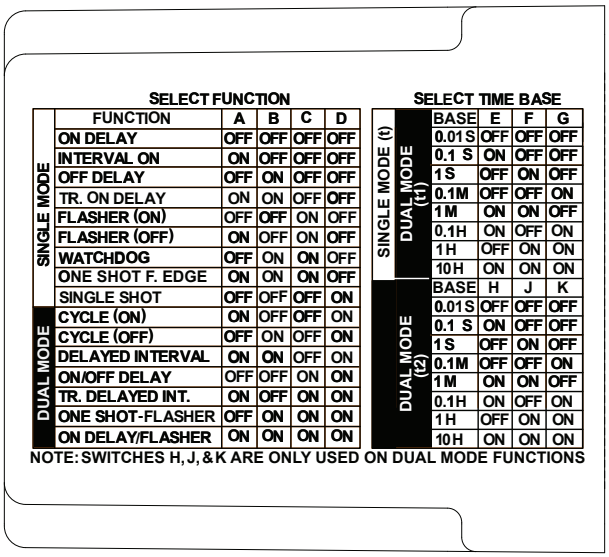


SELECT FUNCTION

| | 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* | $66.00 | Off-delay | 0.05 seconds to 30 minutes selectable | 120 VAC/VDC | (1) DPDT timed relay | PDF |
| *TRS-TD-D-24AD* | $66.00 | Off-delay | 0.05 seconds to 30 minutes selectable | 24 VAC/VDC | (1) DPDT timed relay | PDF |

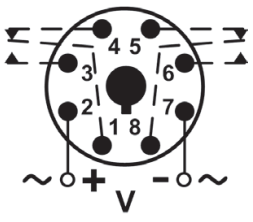
| Off-Delay Relay Timer Specifications | | |
|---|---|---|
| *Part Number* | *TRS-TD-D-120AD* | *TRS-TD-D-24AD* |
| ***Input Specifications*** | | |
| *Nominal Voltage* | 120 VAC/VDC | 24 VAC/VDC |
| *Nominal Consumption* | Max 2VA | |
| *Nominal Frequency* | 50/60 Hz | |
| ***Contact Specifications*** | | |
| *Type* | (1) DPDT | |
| *Switching Capacity* | 10A @ 240VAC, 30VDC<br>8A @ 28VDC<br>1/2 HP @ 240 VAC<br>1/4 HP @ 120 VAC<br>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%<br>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<br>1 or 2 -#12-20 AWG Wire |
| *Tightening Torque* | 12 in-lb |
| *Wire/Ferrule Size* | 1 or 2 #12-20 AWG<br>(Ferrule size: Stud size 6 with max overall width 0.30") |
| *Ambient Temperature* | -28 to +65°C<br>[-18 to +150°F] |
| *Storage Temperature* | -40 to +85°C<br>[-40 to +185°F] |
| *Protection Rating* | IP20 |
| *Vibration Resistance* | 10-55 Hz with 3G maximum and<br>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,<br>cULus with appropriate socket<br>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*** | $41.50 | 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*** | $41.50 | 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*** | $43.50 | 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<br>7A @ 28VDC SPDT<br>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%<br>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<br>[-18 to +149°F] |
| ***Storage Temperature*** | -40 to +85°C<br>[-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 |

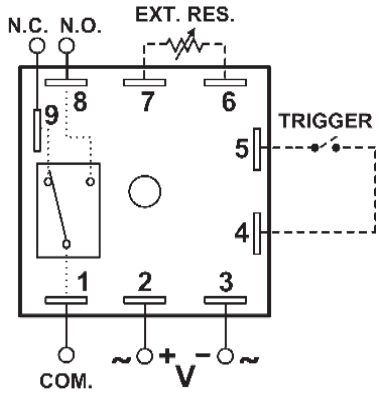
***To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

# ProSense® Relay Timers

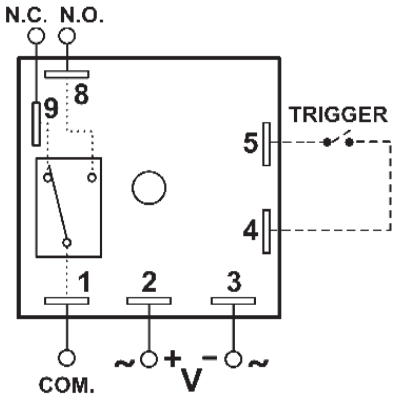
## Multi-Mode Relay Timers T2R-M Series

## 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 | $40.50 | On-delay | 0.1 to 10 seconds | 120 VAC/VDC | (1) SPDT timed relay | PDF |
| T2R-ND-30-24AD | $40.50 | On-delay | 0.1 to 10 seconds | 24 VAC/VDC | (1) SPDT timed relay | PDF |
| T2R-ND-31-120A | $40.50 | On-delay | 1 to 100 seconds | 120 VAC/VDC | (1) SPDT timed relay | PDF |
| T2R-ND-31-24AD | $40.50 | On-delay | 1 to 100 seconds | 24 VAC/VDC | (1) SPDT timed relay | PDF |
| T2R-ND-32-120A | $40.50 | On-delay | 0.1 to 10 minutes | 120 VAC/VDC | (1) SPDT timed relay | PDF |
| T2R-ND-32-24AD | $40.50 | On-delay | 0.1 to 10 minutes | 24 VAC/VDC | (1) SPDT timed relay | PDF |
| T2R-ND-33-120A | $40.50 | On-delay | 1 to 100 minutes | 120 VAC/VDC | (1) SPDT timed relay | PDF |
| T2R-ND-33-24AD | $40.50 | On-delay | 1 to 100 minutes | 24 VAC/VDC | (1) SPDT timed relay | PDF |

**On-Delay Relay Timers Specifications**

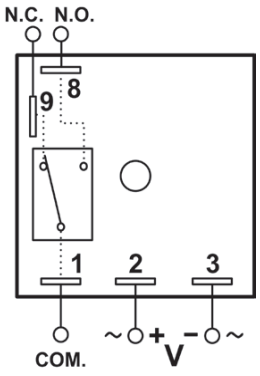
| Models | T2R-ND-3x-24AD | T2R-ND-3x-120A |
|---|---|---|
| **Input Specifications** | | |
| Nominal Voltage | 24 VAC/VDC | 120 VAC/VDC |
| Nominal Consumption | Maximum 2VA | |
| Nominal Frequency | 50/60 Hz | |
| Voltage Tolerance | AC operation: +10/-15% of nominal at 50/60 Hz<br>DC operation: +10/-15% of nominal | |
| **Contact Specifications** | | |
| Type | (1) SPDT | |
| Switching Capacity | 10A @ 240VAC, 30VDC<br>7A @ 28VDC SPDT<br>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%<br>Minimum setting (adjustable): +0%, -50%<br>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<br>[-18 to +149°F] |
| Storage Temperature | -40 to +85°C<br>[-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

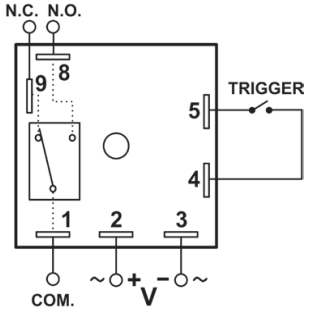
| Off-Delay Relay Timers T2R-FD Series | | | | | | |
|---|---|---|---|---|---|---|
| *Part Number* | *Price* | *Timer Type* | *Timing Range* | *Voltage* | *Output Type* | *Drawing Link* |
| *T2R-FD-30-24AD* | $43.50 | Off-delay | 0.1 to 10 seconds | 24 VAC/VDC | (1) SPDT timed relay | PDF |
| *T2R-FD-30J-120A* | $43.50 | Off-delay | 0.1 to 10 seconds | 120 VAC/VDC | (1) SPDT timed relay | PDF |
| *T2R-FD-31-24AD* | $43.50 | Off-delay | 1 to 100 seconds | 24 VAC/VDC | (1) SPDT timed relay | PDF |
| *T2R-FD-31J-120A* | $43.50 | Off-delay | 1 to 100 seconds | 120 VAC/VDC | (1) SPDT timed relay | PDF |
| *T2R-FD-32-24AD* | $43.50 | Off-delay | 0.1 to 10 minutes | 24 VAC/VDC | (1) SPDT timed relay | PDF |
| *T2R-FD-32J-120A* | $43.50 | Off-delay | 0.1 to 10 minutes | 120 VAC/VDC | (1) SPDT timed relay | PDF |
| *T2R-FD-33-24AD* | $43.50 | Off-delay | 1 to 100 minutes | 24 VAC/VDC | (1) SPDT timed relay | PDF |
| *T2R-FD-33J-120A* | $43.50 | 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<br>DC operation: +10/-15% of nominal | |
| *Contact Specifications* | | |
| *Type* | (1) SPDT | |
| *Switching Capacity* | 10A @ 240VAC, 30VDC<br>7A @ 28VDC SPDT<br>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%<br>Minimum setting (adjustable): +0%, -50%<br>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<br>[-18 to +149°F] |
| *Storage Temperature* | -40 to +85°C<br>[-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

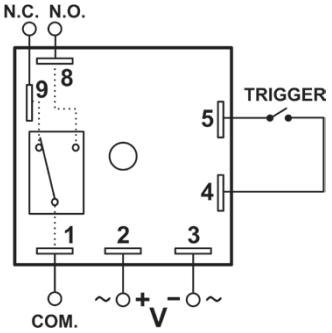
| Fleeting (single-shot) Relay Timers T2R-SST Series | | | | | | |
|---|---|---|---|---|---|---|
| *Part Number* | *Price* | *Timer Type* | *Timing Range* | *Voltage* | *Output Type* | *Drawing Link* |
| T2R-SST-30-120A | $43.50 | Fleeting (single-shot) | 0.1 to 10 seconds | 120 VAC/VDC | (1) SPDT timed relay | PDF |
| T2R-SST-30-24AD | $43.50 | Fleeting (single-shot) | 0.1 to 10 seconds | 24 VAC/VDC | (1) SPDT timed relay | PDF |
| T2R-SST-31-120A | $43.50 | Fleeting (single-shot) | 1 to 100 seconds | 120 VAC/VDC | (1) SPDT timed relay | PDF |
| T2R-SST-31-24AD | $43.50 | Fleeting (single-shot) | 1 to 100 seconds | 24 VAC/VDC | (1) SPDT timed relay | PDF |
| T2R-SST-32-120A | $43.50 | Fleeting (single-shot) | 0.1 to 10 minutes | 120 VAC/VDC | (1) SPDT timed relay | PDF |
| T2R-SST-32-24AD | $43.50 | Fleeting (single-shot) | 0.1 to 10 minutes | 24 VAC/VDC | (1) SPDT timed relay | PDF |
| T2R-SST-33-120A | $43.50 | Fleeting (single-shot) | 1 to 100 minutes | 120 VAC/VDC | (1) SPDT timed relay | PDF |
| T2R-SST-33-24AD | $43.50 | 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<br>DC operation: +10/-15% of nominal voltage | |
| ***Contact Specifications*** | | |
| *Type* | (1) SPDT | |
| *Switching Capacity* | 10A @ 240VAC, 30VDC<br>7A @ 28VDC SPDT<br>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%<br>Minimum setting (adjustable): +0%, -50%<br>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<br>[-18 to +149°F] |
| *Storage Temperature* | -40 to +85°C<br>[-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

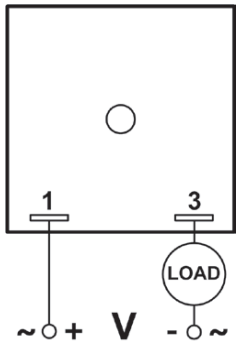
| On-Delay Inline Relay Timers T2L-ND Series | | | | | | |
|---|---|---|---|---|---|---|
| *Part Number* | *Price* | *Timer Type* | *Timing Range* | *Voltage* | *Output Type* | *Drawing Link* |
| ***T2L-ND-30-240U*** | $24.00 | On-delay | 0.1 to 10 seconds | 24-240 VAC and 12-48 VDC | (1) SPNO timed solid state relay | PDF |
| ***T2L-ND-31-240U*** | $24.00 | On-delay | 1 to 100 seconds | 24-240 VAC and 12-48 VDC | (1) SPNO timed solid state relay | PDF |
| ***T2L-ND-32-240U*** | $24.00 | 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*** | $24.00 | On-delay | 1 to 100 minutes | 24-240 VAC and 12-48 VDC | (1) SPNO timed solid state relay | PDF |
| ***T2L-ND-40-240U*** | $36.00 | 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*** | $36.00 | 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*** | $36.00 | 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%<br>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,<br>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%<br>Minimum setting (adjustable): +0%, -50%<br>Fixed time delay: ±2% or 50ms, whichever is greater | Constant voltage and temperature within specifications:<br>+2% of set time or +50ms, whichever is greater<br>Variable voltage and temperature within specifications:<br>+5% of set time or +50ms, whichever is greater |
| ***Start-up Time*** | Time from when power is applied until unit is timing:<br>0.02 seconds | |
| ***Maintain Function Time*** | Time unit continues to operate after power is removed:<br>0.01 seconds | |
| ***Repeat Accuracy*** | Constant voltage and temperature within specifications:<br>±0.1% or ± 0.04 seconds, whichever is greater | Constant voltage and temperature within specifications:<br>+0.1% of set time or +0.02 seconds, whichever is greater<br>Variable voltage and temperature within specifications:<br>+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

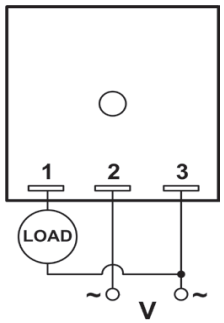
| On-Delay Relay Timers T2S-ND Series | | | | | | |
|---|---|---|---|---|---|---|
| *Part Number* | *Price* | *Timer Type* | *Timing Range* | *Voltage* | *Output Type* | *Drawing Link* |
| T2S-ND-30-125D | $38.50 | On-delay | 0.1 to 10 seconds | 12-125 VDC | (1) SPNO timed solid state relay | PDF |
| T2S-ND-30-240A | $33.50 | On-delay | 0.1 to 10 seconds | 24-240 VAC | (1) SPNO timed solid state relay | PDF |
| T2S-ND-31-125D | $38.50 | On-delay | 1 to 100 seconds | 12-125 VDC | (1) SPNO timed solid state relay | PDF |
| T2S-ND-31-240A | $33.50 | On-delay | 1 to 100 seconds | 24-240 VAC | (1) SPNO timed solid state relay | PDF |
| T2S-ND-32-125D | $38.50 | On-delay | 0.1 to 10 minutes | 12-125 VDC | (1) SPNO timed solid state relay | PDF |
| T2S-ND-32-240A | $33.50 | On-delay | 0.1 to 10 minutes | 24-240 VAC | (1) SPNO timed solid state relay | PDF |
| T2S-ND-33-125D | $38.50 | On-delay | 1 to 100 minutes | 12-125 VDC | (1) SPNO timed solid state relay | PDF |
| T2S-ND-33-240A | $33.50 | 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<br>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%<br>Minimum setting (adjustable): +0%, -50%<br>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<br>[-18 to +149°F] |
| *Storage Temperature* | -40 to +85°C<br>[-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<br>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 | $42.50 | Off-delay | 0.1 to 10 seconds | 12-125 VDC | (1) SPNO timed solid state relay | PDF |
| T2S-FD-30-240A | $39.50 | Off-delay | 0.1 to 10 seconds | 24-240 VAC | (1) SPNO timed solid state relay | PDF |
| T2S-FD-31-125D | $42.50 | Off-delay | 1 to 100 seconds | 12-125 VDC | (1) SPNO timed solid state relay | PDF |
| T2S-FD-31-240A | $39.50 | Off-delay | 1 to 100 seconds | 24-240 VAC | (1) SPNO timed solid state relay | PDF |
| T2S-FD-32-125D | $42.50 | Off-delay | 0.1 to 10 minutes | 12-125 VDC | (1) SPNO timed solid state relay | PDF |
| T2S-FD-32-240A | $39.50 | Off-delay | 0.1 to 10 minutes | 24-240 VAC | (1) SPNO timed solid state relay | PDF |
| T2S-FD-33-125D | $42.50 | Off-delay | 1 to 100 minutes | 12-125 VDC | (1) SPNO timed solid state relay | PDF |
| T2S-FD-33-240A | $39.50 | Off-delay | 1 to 100 minutes | 24-240 VAC | (1) SPNO timed solid state relay | PDF |

**Off-Delay Relay Timers Specifications**

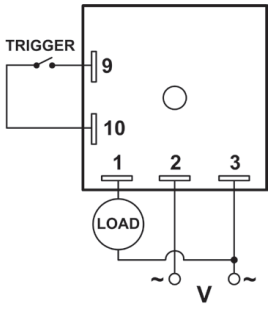
| Models | T2S-FD-3x-240A | T2S-FD-3x-125D |
|---|---|---|
| **Input Specifications** | | |
| Nominal Voltage | 24-240VAC | 12-125VDC |
| Nominal Consumption | Maximum 1VA | |
| Nominal Frequency | 50/60 Hz | |
| Voltage Tolerance | AC operation: +10 to -15% of nominal voltage, 50/60 Hz<br>DC operation: +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%<br>Minimum setting (adjustable): +0%, -50%<br>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<br>[-18 to +149°F] |
| Storage Temperature | -40 to +85°C<br>[-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<br>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

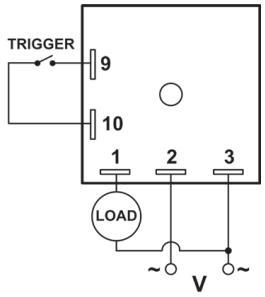
| Fleeting (single-shot) Relay Timers T2S-SST Series | | | | | | |
|---|---|---|---|---|---|---|
| *Part Number* | *Price* | *Timer Type* | *Timing Range* | *Voltage* | *Output Type* | *Drawing Link* |
| *T2S-SST-30-125D* | $42.50 | Fleeting (single-shot) | 0.1 to 10 seconds | 12-125 VDC | (1) SPNO timed solid state relay | PDF |
| *T2S-SST-30-240A* | $39.50 | Fleeting (single-shot) | 0.1 to 10 seconds | 24-240 VAC | (1) SPNO timed solid state relay | PDF |
| *T2S-SST-31-125D* | $42.50 | Fleeting (single-shot) | 1 to 100 seconds | 12-125 VDC | (1) SPNO timed solid state relay | PDF |
| *T2S-SST-31-240A* | $39.50 | Fleeting (single-shot) | 1 to 100 seconds | 24-240 VAC | (1) SPNO timed solid state relay | PDF |
| *T2S-SST-32-125D* | $42.50 | Fleeting (single-shot) | 0.1 to 10 minutes | 12-125 VDC | (1) SPNO timed solid state relay | PDF |
| *T2S-SST-32-240A* | $39.50 | Fleeting (single-shot) | 0.1 to 10 minutes | 24-240 VAC | (1) SPNO timed solid state relay | PDF |
| *T2S-SST-33-125D* | $42.50 | Fleeting (single-shot) | 1 to 100 minutes | 12-125 VDC | (1) SPNO timed solid state relay | PDF |
| *T2S-SST-33-240A* | $39.50 | 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<br>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%<br>Minimum setting (adjustable): +0%, -50%<br>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<br>[-18 to +149°F] |
| *Storage Temperature* | -40 to +85°C<br>[-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<br>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 | $40.50 | On-interval | 0.1 to 10 seconds | 12-125 VDC | (1) SPNO timed solid state relay | PDF |
| T2S-TT-30-240A | $38.00 | On-interval | 0.1 to 10 seconds | 24-240 VAC | (1) SPNO timed solid state relay | PDF |
| T2S-TT-31-125D | $40.50 | On-interval | 1 to 100 seconds | 12-125 VDC | (1) SPNO timed solid state relay | PDF |
| T2S-TT-31-240A | $38.00 | On-interval | 1 to 100 seconds | 24-240 VAC | (1) SPNO timed solid state relay | PDF |
| T2S-TT-32-125D | $40.50 | On-interval | 0.1 to 10 minutes | 12-125 VDC | (1) SPNO timed solid state relay | PDF |
| T2S-TT-32-240A | $38.00 | On-interval | 0.1 to 10 minutes | 24-240 VAC | (1) SPNO timed solid state relay | PDF |
| T2S-TT-33-125D | $40.50 | On-interval | 1 to 100 minutes | 12-125 VDC | (1) SPNO timed solid state relay | PDF |
| T2S-TT-33-240A | $38.00 | On-interval | 1 to 100 minutes | 24-240 VAC | (1) SPNO timed solid state relay | PDF |

**On-Interval Relay Timers Specifications**

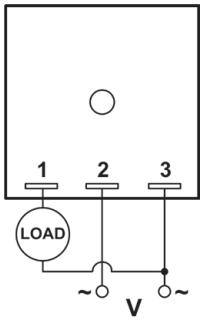
| Models | T2S-TT-3x-240A | T2S-TT-3x-125D |
|---|---|---|
| *Input Specifications* | | |
| Nominal Voltage | 24-240VAC | 12-125VDC |
| Nominal Consumption | Maximum 1VA | |
| Nominal Frequency | 50/60 Hz | |
| Voltage Tolerance | AC operation: +10 to -15% of nominal voltage, 50/60 Hz<br>DC operation: +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%<br>Minimum setting (adjustable): +0%, -50%<br>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<br>[-18 to +149°F] |
| Storage Temperature | -40 to +85°C<br>[-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<br>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.**

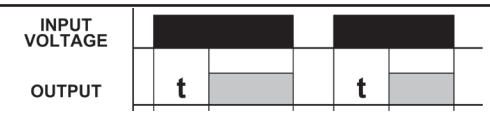
## Wiring Diagram



# ProSense® Relay Timers

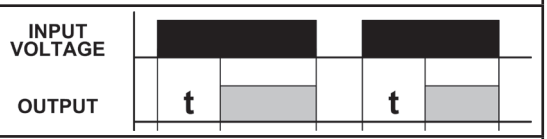
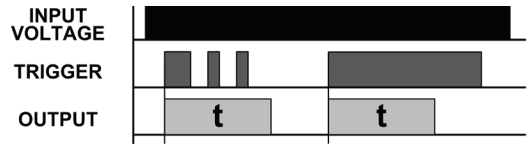
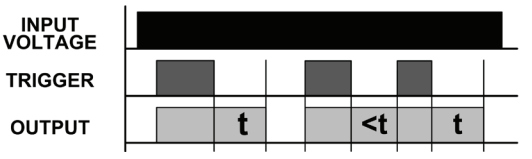
## Timing Charts

### T2L Series (-4X Suffix)

| Function | Series | Operation | Timing Chart |
|---|---|---|---|
| **ON DELAY**<br>Delay on Operate | T2L<br>(-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**<br>Delay on Operate | T2L-ND<br>T2R-ND<br>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**<br>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**<br>One Shot<br>Momentary<br>Interval | T2R-SST<br>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**<br>Delay on Release<br>Delay on Break<br>Delay on De-Energization | T2R-FD<br>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. |  |

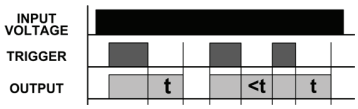
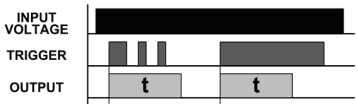
*Note: Please see inserts for more information*

# ProSense® Relay Timers

## Timing Charts

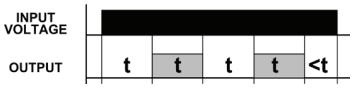
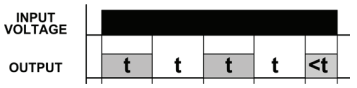
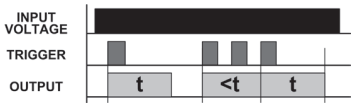
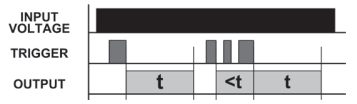
### T2R-M1-ADJ-240U, T2R-M2-ADJ-240U, & T2R-M3-ADJ-240U

**T2R-M1-ADJ-240U**

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

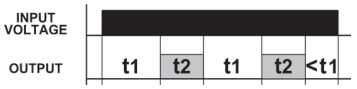
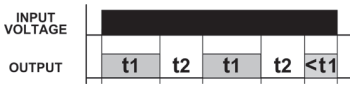
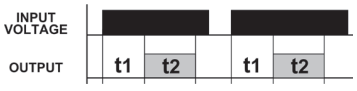
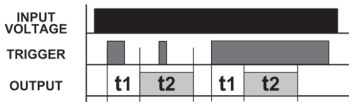
* Requires Trigger

**T2R-M2-ADJ-240U**

| FUNCTION | TIMING CHART |
|---|---|
| **FLASHER**<br>(Off First) |  |
| **FLASHER**<br>(On First) |  |
| **WATCHDOG ***<br>Retriggerable Single Shot |  |
| **SINGLE SHOT FALLING EDGE*** |  |

* Requires Trigger

**T2R-M3-ADJ-240U**

| FUNCTION | TIMING CHART |
|---|---|
| **REPEAT CYCLE**<br>(Off 1st) |  |
| **REPEAT CYCLE**<br>(On First) |  |
| **DELAYED INTERVAL**<br>Single Cycle |  |
| **TRIGGERED DELAYED INTERVAL ***<br>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 | $50.00 | On-delay | 0.1 to 10 seconds | 120 VAC/VDC | SPDT | PDF |
| T30R-ND-30-24AD | $49.00 | On-delay | 0.1 to 10 seconds | 24 VAC/VDC | SPDT | PDF |
| T30R-ND-31-120A | $50.00 | On-delay | 1 to 100 seconds | 120 VAC/VDC | SPDT | PDF |
| T30R-ND-31-24AD | $49.00 | On-delay | 1 to 100 seconds | 24 VAC/VDC | SPDT | PDF |
| T30R-ND-32-120A | $50.00 | On-delay | 0.1 to 10 minutes | 120 VAC/VDC | SPDT | PDF |
| T30R-ND-32-24AD | $49.00 | On-delay | 0.1 to 10 minutes | 24 VAC/VDC | SPDT | PDF |
| T30R-ND-33-120A | $50.00 | On-delay | 1 to 100 minutes | 120 VAC/VDC | SPDT | PDF |
| T30R-ND-33-24AD | $49.00 | On-delay | 1 to 100 minutes | 24 VAC/VDC | SPDT | PDF |
| T30R-ND-34-120A | $50.00 | On-delay | 0.1 to 10 hours | 120 VAC/VDC | SPDT | PDF |
| T30R-ND-34-24AD | $49.00 | On-delay | 0.1 to 10 hours | 24 VAC/VDC | SPDT | PDF |

### On-Delay Relay Timers Specifications

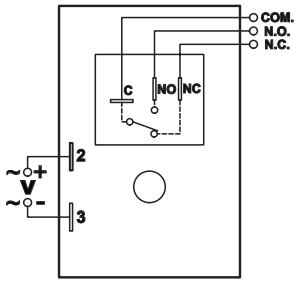
| Models | T30R-ND-3x-24AD | T30R-ND-3x-120A |
|---|---|---|
| **Input Specifications** | | |
| Nominal Voltage | 24 VAC/VDC | 120 VAC/VDC |
| Nominal Consumption | Maximum 3VA | |
| Nominal Frequency | 50/60 Hz | |
| Voltage Tolerance | AC operation: +10/-15% of nominal at 50/60 Hz<br>DC operation: +10/-15% of nominal | |
| **Contact Specifications** | | |
| Type | (1) SPDT | |
| Output Contact Ratings | 240VAC - 30A (N.O.), 15A (N.C.)<br>28VDC - 20A (N.O.), 10A (N.C.)<br>Motor Load - 115/120/125: 1HP (N.O.), 1/4HP (N.C.)<br>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%<br>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<br>[-18 to 149°F] |
| Storage Temperature | -40 to 85°C<br>[-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



# 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

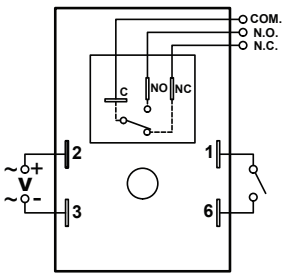
| Off-Delay Relay Timers T30R-FD Series | | | | | | |
|---|---|---|---|---|---|---|
| Part Number | Price | Timer Type | Timing Range | Voltage | Output Type | Drawing Link |
| T30R-FD-30-120A | $60.00 | Off-delay | 0.1 to 10 seconds | 120 VAC/VDC | SPDT | PDF |
| T30R-FD-30-24AD | $59.00 | Off-delay | 0.1 to 10 seconds | 24 VAC/VDC | SPDT | PDF |
| T30R-FD-31-120A | $60.00 | Off-delay | 1 to 100 seconds | 120 VAC/VDC | SPDT | PDF |
| T30R-FD-31-24AD | $59.00 | Off-delay | 1 to 100 seconds | 24 VAC/VDC | SPDT | PDF |
| T30R-FD-32-120A | $60.00 | Off-delay | 0.1 to 10 minutes | 120 VAC/VDC | SPDT | PDF |
| T30R-FD-32-24AD | $59.00 | Off-delay | 0.1 to 10 minutes | 24 VAC/VDC | SPDT | PDF |
| T30R-FD-33-120A | $60.00 | Off-delay | 1 to 100 minutes | 120 VAC/VDC | SPDT | PDF |
| T30R-FD-33-24AD | $59.00 | Off-delay | 1 to 100 minutes | 24 VAC/VDC | SPDT | PDF |
| T30R-FD-34-120A | $60.00 | Off-delay | 0.1 to 10 hours | 120 VAC/VDC | SPDT | PDF |
| T30R-FD-34-24AD | $59.00 | 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<br>DC operation: +10/-15% of nominal | |
| **Contact Specifications** | | |
| Type | (1) SPDT | |
| Output Contact Ratings | 240VAC - 30A (N.O.), 15A (N.C.)<br>28VDC - 20A (N.O.), 10A (N.C.)<br>Motor Load - 115/120/125: 1HP (N.O.), 1/4HP (N.C.)<br>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%<br>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<br>[-18 to 149°F] |
| Storage Temperature | -40 to 85°C<br>[-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 | $60.00 | Fleeting (single-shot) | 0.1 to 10 seconds | 120 VAC/VDC | SPDT | PDF |
| T30R-SST-30-24AD | $59.00 | Fleeting (single-shot) | 0.1 to 10 seconds | 24 VAC/VDC | SPDT | PDF |
| T30R-SST-31-120A | $60.00 | Fleeting (single-shot) | 1 to 100 seconds | 120 VAC/VDC | SPDT | PDF |
| T30R-SST-31-24AD | $59.00 | Fleeting (single-shot) | 1 to 100 seconds | 24 VAC/VDC | SPDT | PDF |
| T30R-SST-32-120A | $60.00 | Fleeting (single-shot) | 0.1 to 10 minutes | 120 VAC/VDC | SPDT | PDF |
| T30R-SST-32-24AD | $59.00 | Fleeting (single-shot) | 0.1 to 10 minutes | 24 VAC/VDC | SPDT | PDF |
| T30R-SST-33-120A | $60.00 | Fleeting (single-shot) | 1 to 100 minutes | 120 VAC/VDC | SPDT | PDF |
| T30R-SST-33-24AD | $59.00 | Fleeting (single-shot) | 1 to 100 minutes | 24 VAC/VDC | SPDT | PDF |
| T30R-SST-34-120A | $60.00 | Fleeting (single-shot) | 0.1 to 10 hours | 120 VAC/VDC | SPDT | PDF |
| T30R-SST-34-24AD | $59.00 | Fleeting (single-shot) | 0.1 to 10 hours | 24 VAC/VDC | SPDT | PDF |

**Fleeting (single-shot) Relay Timers Specifications**

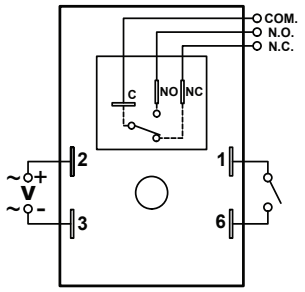
| Models | T30R-SST-3x-24AD | T30R-SST-3x-120A |
|---|---|---|
| **Input Specifications** | | |
| Nominal Voltage | 24 VAC/VDC | 120 VAC/VDC |
| Nominal Consumption | Maximum 3VA | |
| Nominal Frequency | 50/60 Hz | |
| Voltage Tolerance | AC operation: +10/-15% of nominal at 50/60 Hz<br>DC operation: +10/-15% of nominal | |
| **Contact Specifications** | | |
| Type | (1) SPDT | |
| Output Contact Ratings | 240VAC - 30A (N.O.), 15A (N.C.)<br>28VDC - 20A (N.O.), 10A (N.C.)<br>Motor Load - 115/120/125: 1HP (N.O.), 1/4HP (N.C.)<br>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%<br>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<br>[-18 to 149°F] |
| Storage Temperature | -40 to 85°C<br>[-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

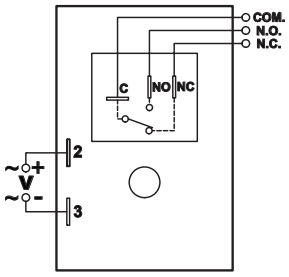
| Cyclic Relay Timers T30R-RC Series | | | | | | |
|---|---|---|---|---|---|---|
| *Part Number* | *Price* | *Timer Type* | *Timing Range* | *Voltage* | *Output Type* | *Drawing Link* |
| T30R-RC-30-120A | $62.00 | Cyclic | 0.1 to 10 seconds | 120 VAC/VDC | SPDT | PDF |
| T30R-RC-30-24AD | $62.00 | Cyclic | 0.1 to 10 seconds | 24 VAC/VDC | SPDT | PDF |
| T30R-RC-31-120A | $62.00 | Cyclic | 1 to 100 seconds | 120 VAC/VDC | SPDT | PDF |
| T30R-RC-31-24AD | $62.00 | Cyclic | 1 to 100 seconds | 24 VAC/VDC | SPDT | PDF |
| T30R-RC-32-120A | $62.00 | Cyclic | 0.1 to 10 minutes | 120 VAC/VDC | SPDT | PDF |
| T30R-RC-32-24AD | $62.00 | Cyclic | 0.1 to 10 minutes | 24 VAC/VDC | SPDT | PDF |
| T30R-RC-33-120A | $62.00 | Cyclic | 1 to 100 minutes | 120 VAC/VDC | SPDT | PDF |
| T30R-RC-33-24AD | $62.00 | Cyclic | 1 to 100 minutes | 24 VAC/VDC | SPDT | PDF |
| T30R-RC-34-120A | $62.00 | Cyclic | 0.1 to 10 hours | 120 VAC/VDC | SPDT | PDF |
| T30R-RC-34-24AD | $62.00 | 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<br>DC operation: +10/-15% of nominal | |
| ***Contact Specifications*** | | |
| *Type* | (1) SPDT | |
| *Output Contact Ratings* | 240VAC - 30A (N.O.), 15A (N.C.)<br>28VDC - 20A (N.O.), 10A (N.C.)<br>Motor Load - 115/120/125: 1HP (N.O.), 1/4HP (N.C.)<br>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%<br>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<br>[-18 to 149°F] |
| *Storage Temperature* | -40 to 85°C<br>[-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 |

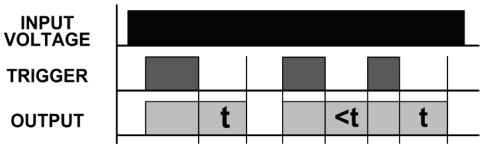
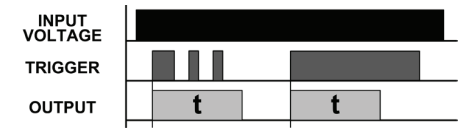
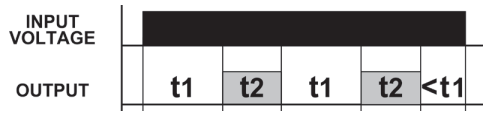
****To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.**

## Wiring Diagram



## Timing Charts

### T30R Series

| Function | Product Series | Operation | Timing Chart |
|---|---|---|---|
| **ON DELAY**<br>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**<br>Delay on Release<br>Delay on Break<br>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**<br>One Shot<br>Momentary<br>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**<br>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 | $94.00 |
| ***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 | $94.00 |
| ***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 | $94.00 |
| ***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 | $94.00 |

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

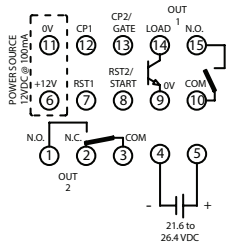
| Digital Counter / Timer / Tachometer General Specifications | | | |
|---|---|---|---|
| ***Input Power Requirements*** | | 100 to 240 VAC 50/60 Hz | 24 VDC |
| ***Operation Voltage Range*** | | 85 to 264 VAC | 21.6 to 26.4 VDC |
| ***Power Consumption*** | | Less than 10VA | |
| ***Power Source*** | | 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.<br>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.**

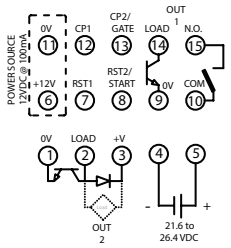
# CTT Series - Digital Counter / Timer / Tachometer

## Wiring Diagrams

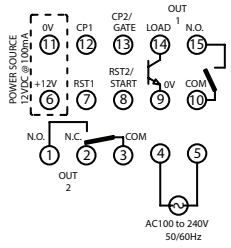
### CTT-1C-D24



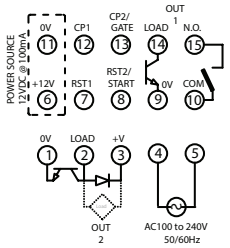

### CTT-AN-D24




### CTT-1C-A120

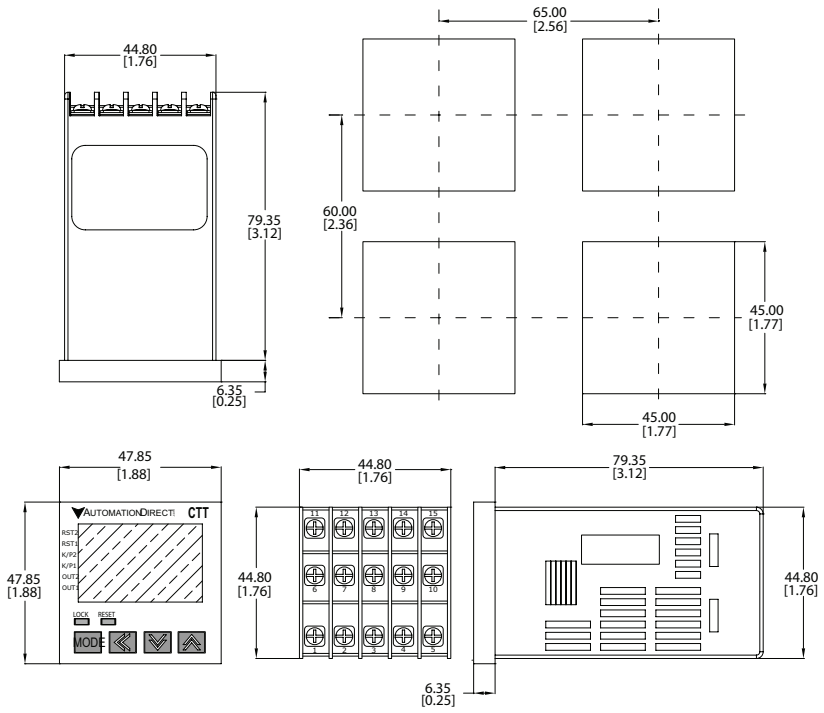



### CTT-AN-A120



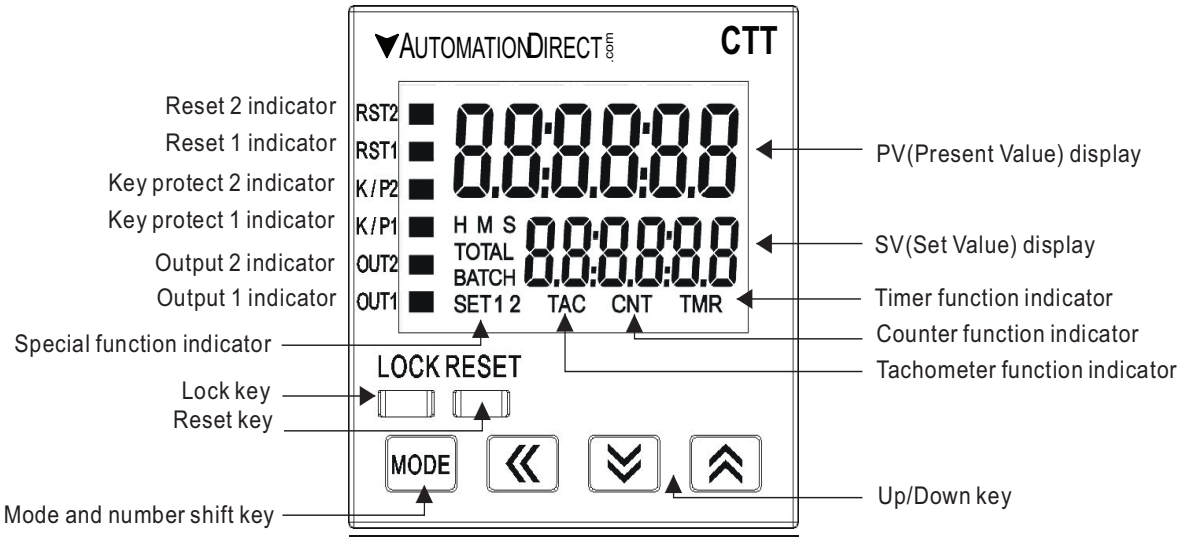

## Dimensions

***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

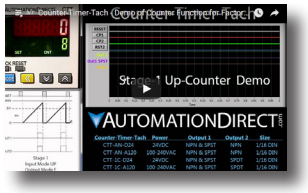
***1-Stage Counting***
A single count setting value SV is available in 1-Stage Counting. Both Outputs 1 and 2 operate concurrently and will turn ON momentarily or will be maintained ON depending on the Output Mode selected.

***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.

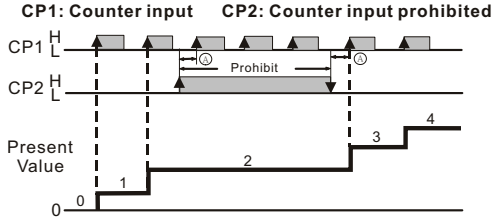



*Click on the above thumbnail or go to https://www.automationdirect.com/VID-RL-0004 for a short Counter demo video.*

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

## Counter Input Modes

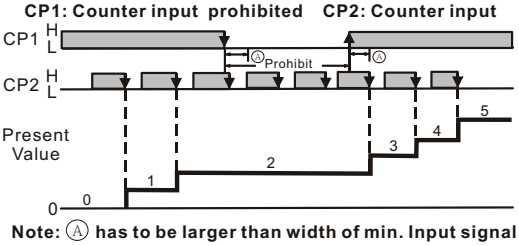
Counting up




**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.

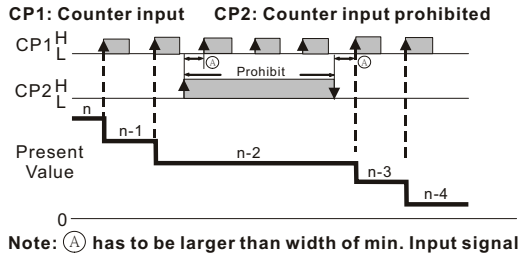



**Note: Ⓐ has to be larger than width of min. Input signal**

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.

# CTT Series - Digital Counter / Timer / Tachometer

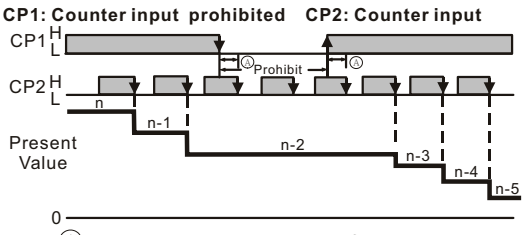
Counting down




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

**Counting Down**

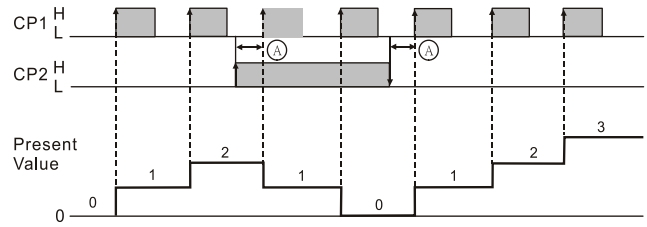
With the input signal OFF at input CP2, each leading edge of the input signal at CP1 will decrement the count present value PV by 1. Turning ON the input signal at CP2 will prohibit the input signal at CP1 from decrementing the PV.




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



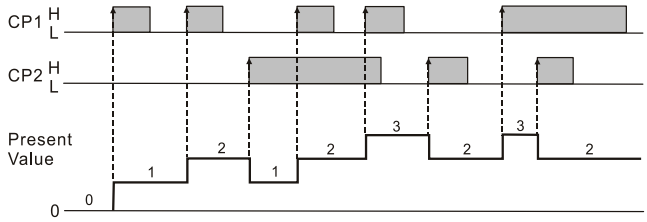

Note: Ⓐ has to be larger than width of min. input signal.

**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

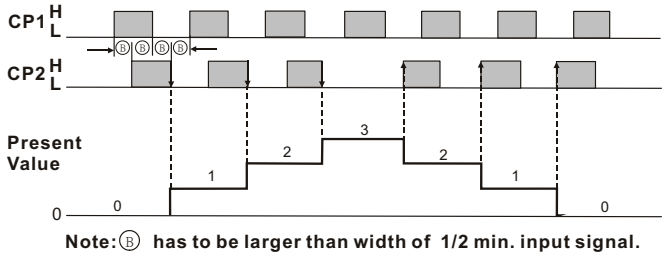



**Counting Up / Counting Down**

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.

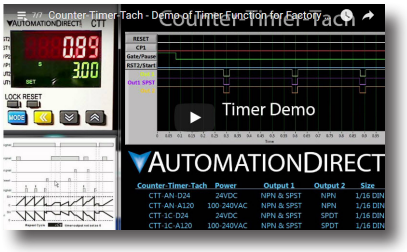
Subtraction

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.

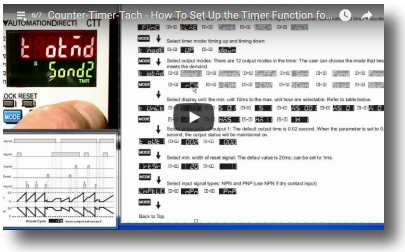
# CTT Series - Digital Counter / Timer / Tachometer

## 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

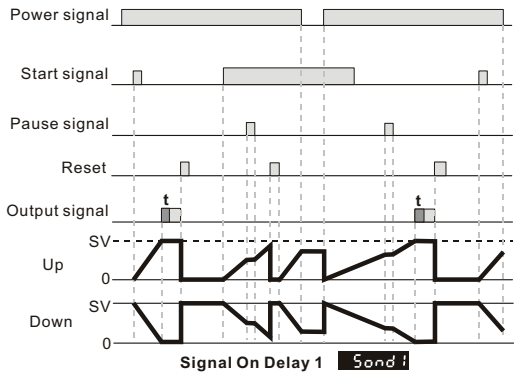
***Signal On Delay 1 (Sond 1)***

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 (tout 1) or will be maintained ON if the output pulse width parameter (tout 1) 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.



# CTT Series - Digital Counter / Timer / Tachometer

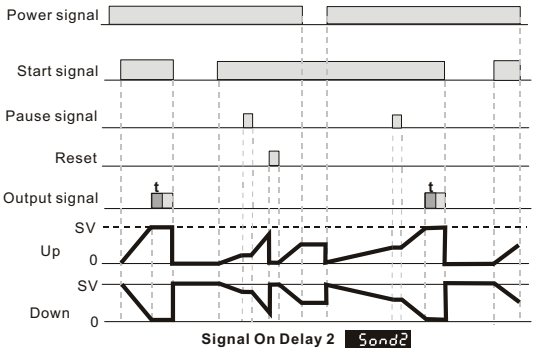
***Signal On Delay 2 (Sond2)***

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 (L 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.



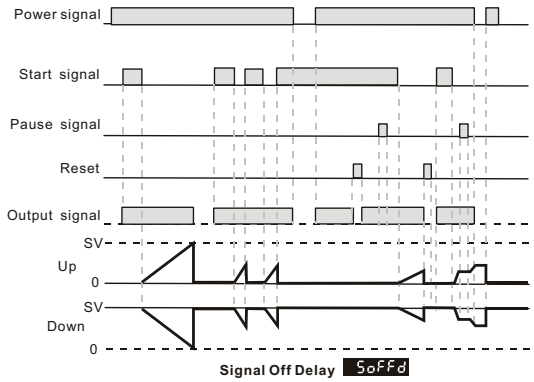

***Signal Off Delay (SoFFd)***

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 (L 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.



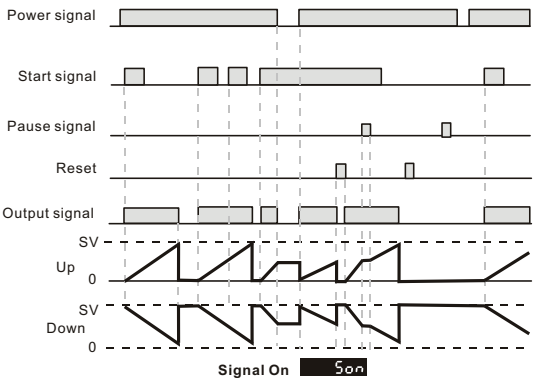

***Signal On (Son)***

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 (L 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.



# CTT Series - Digital Counter / Timer / Tachometer

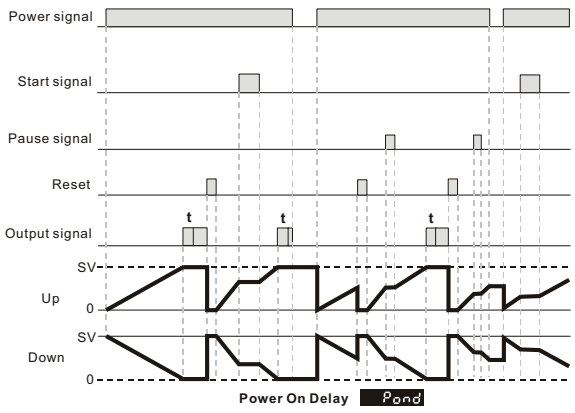
***Power On Delay (Pond)***

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.



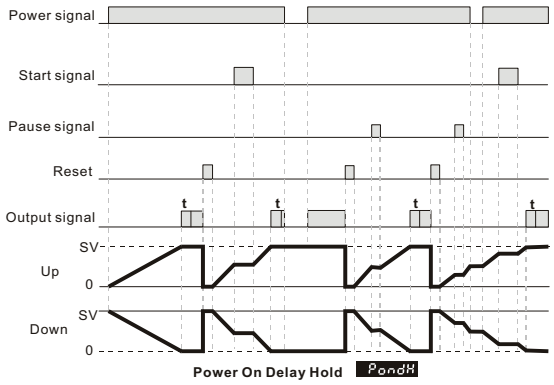

***Power On Delay HOLD (PondH)***

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.



# CTT Series - Digital Counter / Timer / Tachometer

***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 (tout 1) 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.

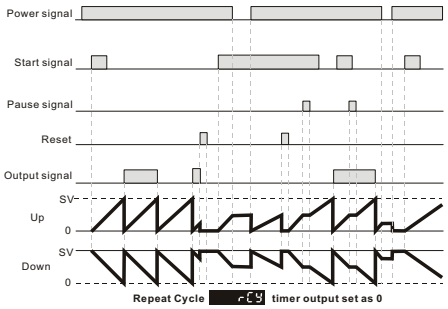
If the output pulse width parameter (tout 1) is set to >0.00 both outputs will turn ON momentarily for the time set in the output pulse width parameter (tout 1) at the beginning of the each timing period.

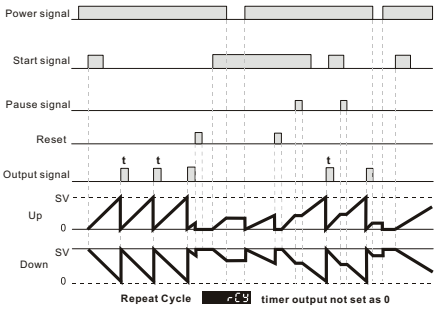
The trailing edge of the "start" signal has no effect on the outputs or timing period.

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 (tout 1) 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.

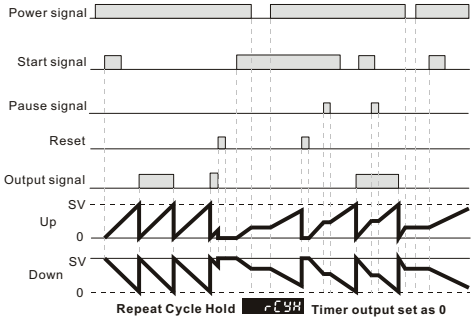
If the output pulse width parameter (tout 1) is set to >0.00, both outputs will turn ON momentarily for the time set in the output pulse width parameter (tout 1) at the beginning of the each timing period.

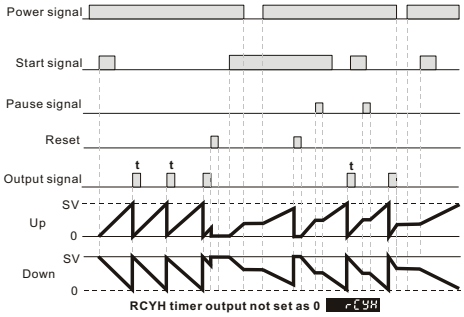
The trailing edge of the "start" signal has no effect on the outputs or timing period.

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.



# CTT Series - Digital Counter / Timer / Tachometer

***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 (E modE). At the end of the timing period, the timing period will reset and repeat automatically.

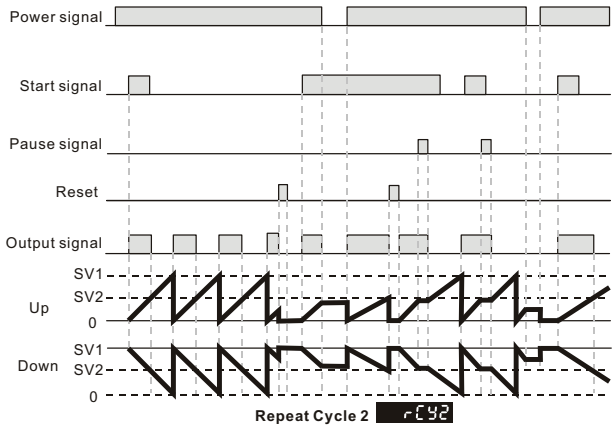
Both outputs will turn ON at the beginning of the first timing period and turn OFF when the timing period reaches time period setting SV2. The outputs will turn ON again when the time period reaches time period setting SV1.

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.

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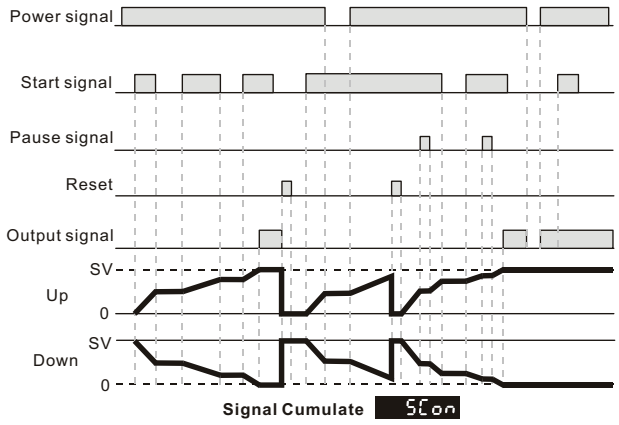
***Signal Cumulate (SCon)***

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 (E 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.



# CTT Series - Digital Counter / Timer / Tachometer

***Signal Twin ON-Start (Ston)***

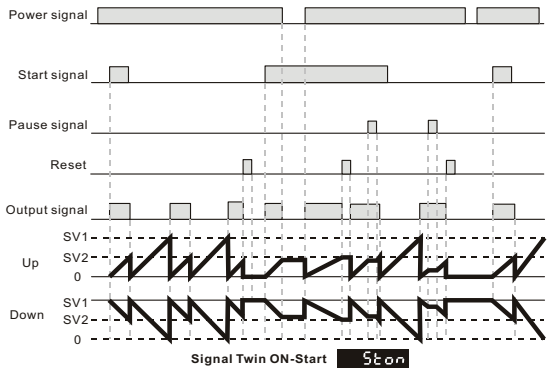
With power applied to the CTT, the leading edge of the input signal at START will turn ON the outputs and begin the timing period timing up or down based on parameter (t mode). When the timing period reaches time setting SV2 the outputs will turn OFF and the time period will reset and restart automatically. 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.

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***Signal Twin OFF-Start (StoFF)***

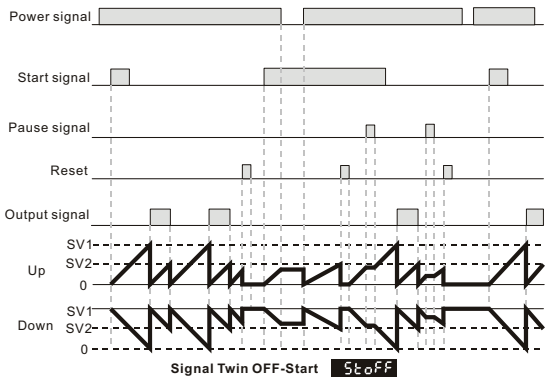
With power applied to the CTT, the leading edge of an input signal at START will begin the timing period timing up or down based on parameter (t mode). When the timing period reaches time setting SV1 the outputs will turn ON and the time period will reset and restart automatically. When the time period 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.

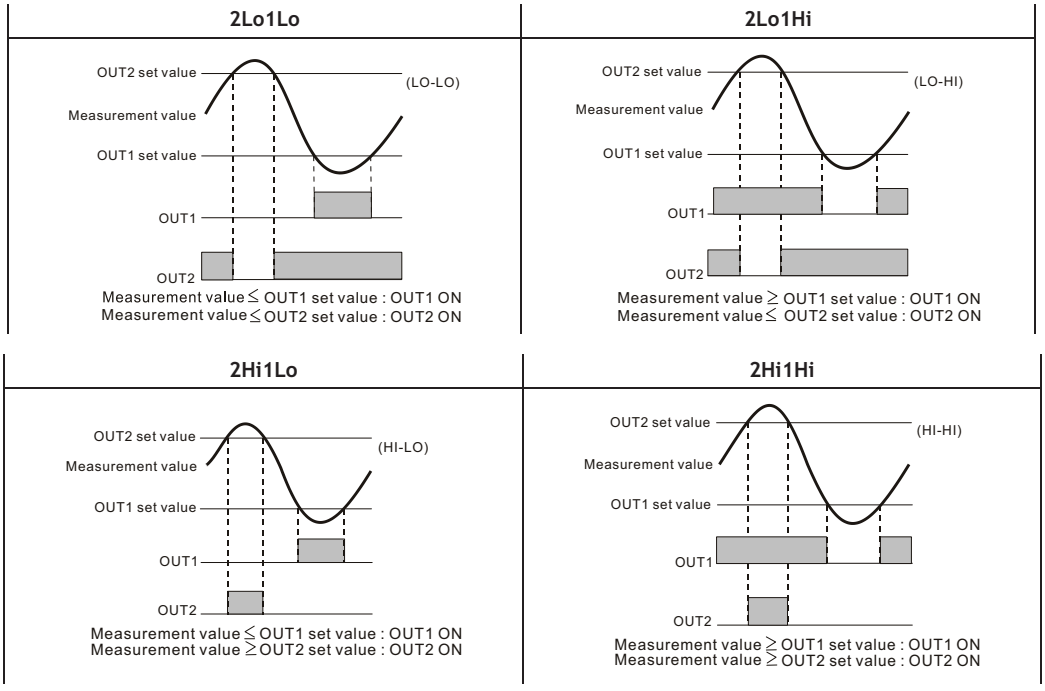


# CTT Series - Digital Counter / Timer / Tachometer

## Tachometer Mode

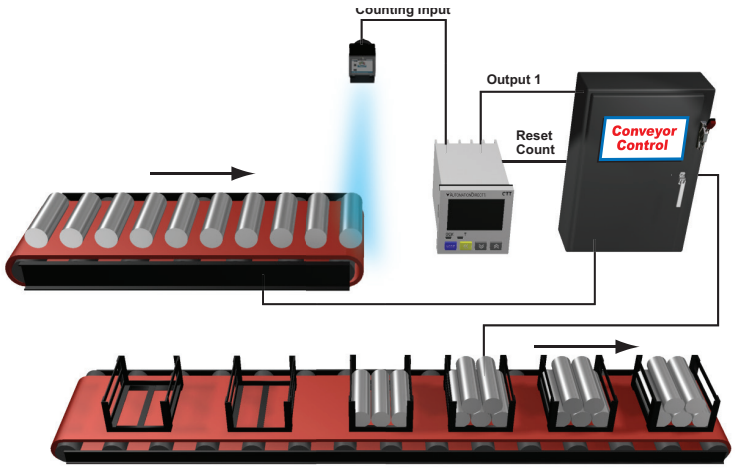
| Tachometer Performance Specifications | |
|---|---|
| ***Output Modes*** | 2Lo1Lo, 2Lo1Hi, 2Hi1Lo, and 2Hi1Hi (See tachometer output mode charts below). |
| ***Number of Digits*** | 6 digits on each line |
| ***Input Frequency*** | 1Hz, 30Hz, 200Hz, 1kHz, 5kHz, 10kHz |
| ***Display*** | Present values: 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 |

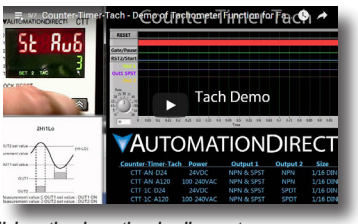
## Tachometer Output Mode Charts




## 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.



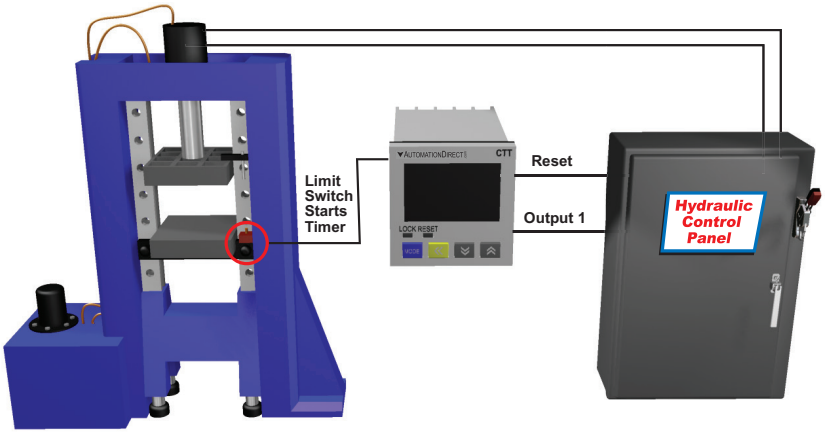

*Click on the above thumbnail or go to https://www.automationdirect.com/VID-RL-0006 for a short Tachometer demo video.*


*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.