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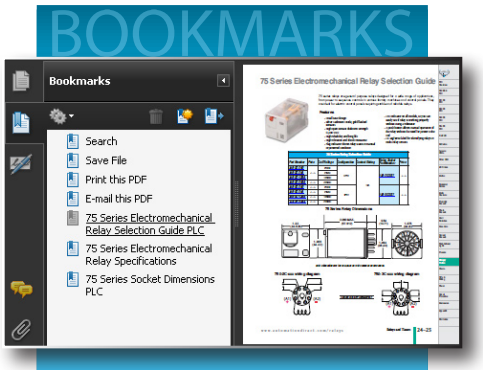
Relays and Timers



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A Full Lineup of Control Relays

Our general purpose industrial relays are a low-cost way of adding control and isolation relays to any application. Electromechanical relays are available in cube, open and card styles for a diverse range of installation requirements. Cube relays are available with standard linear or octal base connection patterns. Solid state relays available include hazardouse location, socket-mount, DIN-rail mount and panel-mount styles.

All relays feature LED indicators for easy troubleshooting.

Electromechanical Square/Cube Relays

QL Series: General purpose relays designed for a wide range of applications. Units plug into DIN-rail mountable relay sockets, with a 10A contact rating. Ideal for electric control panels requiring stable and reliable relays.

QM Series: General purpose relays with a 5A DPDT or 3A 4PDT contact rating, designed for use in applications from power to sequence controls in various factory machines and control panels.

Plug-in Octal Cube Relays

750R Series

750R series cube relays with standard octal base, offer high-current capability (10A) with a compact design. Available in 12 VAC, 24 VAC, 120 VAC, 240 VAC and 12 VDC, 24 VDC coil voltages.

Cube Relays

78 Series

78 series cube relays, with a 15A contact rating, are ideal for applications demanding high power control in various factory machines and control panels. Available in 24 VAC, 120 VAC, 240 VAC and 24 VDC coil voltages.

Open-Style Power Relays

AD Series

AD-PR40 series power relays are an open construction design with high power contacts capable of switching up to 40A. SPDT, DPST and DPDT models are available.

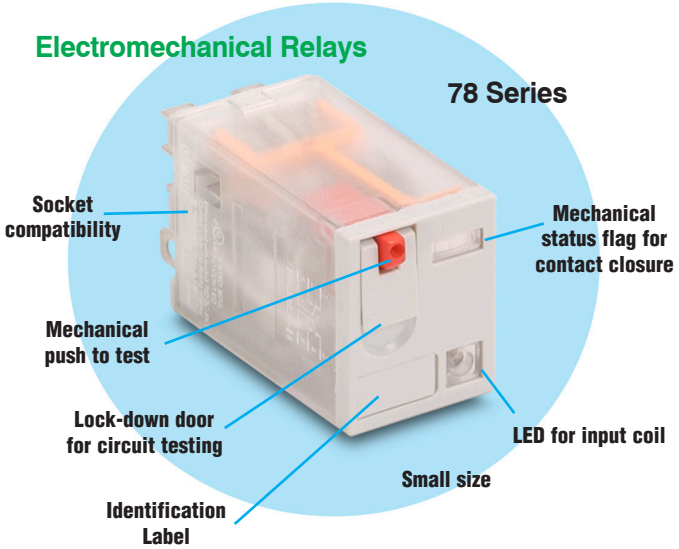
Plug-in Hazardous Location Octal and Square/Cube Relays

H782/H750 Series

H782/H750 series hermetically sealed, ice cube style relays are designed for applications requiring hermetically sealed units for hazardous factory locations. (Class I, Div. 2 Groups A, B, C, D).

Electromechanical Relays

78 Series



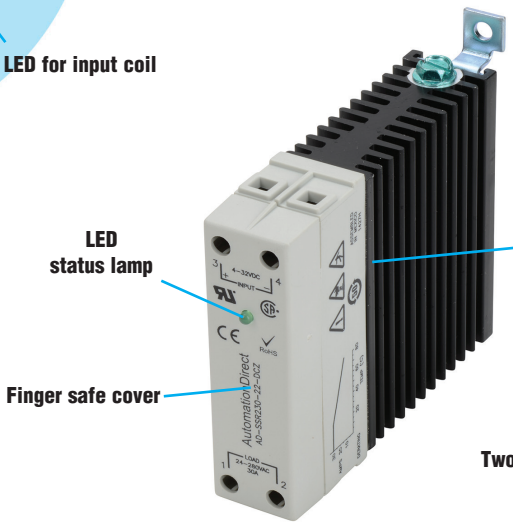
Check the technical specifications on the following pages to choose the right relay for your application.

Quality built into every relay at an affordable price.

Low price combined with industry-demanded quality make our relays one of the best values in automation.

Our manufacturers ensure that nothing is spared in the design and production of our products. By offering them direct to you, AUTOMATIONDIRECT makes certain that you get the same or better quality than other brands at a great price.

Solid State Relays



Solid State

Slim/Card Relay

RS Series

RS series relays are compact, space-saving, relay terminal modules containing four or six relays with one N.O. contact each.

These relay-and-terminal modules are ideal for interfacing electronic control devices with output devices.

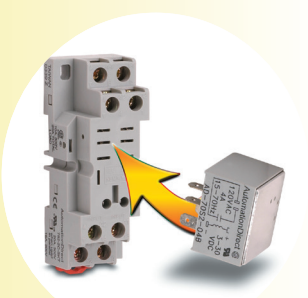
Panel Mount Hockey Puck Relays

AD-SSR6 Series

AD-SSR6 series Class 6 solid state relays have are energy-efficient, with high load ratings up to 75 amps in a finger-safe "Hockey Puck" housing.

Socket Mount Relays

AD-70S2 Series



These solid state relays, with DC input/AC output and 4A contact ratings, plug into a DIN-rail mountable relay socket or can be wired with the quick-connect terminals.

DIN Rail Mount Relays

AD-HSSR8 HAZLOC Series

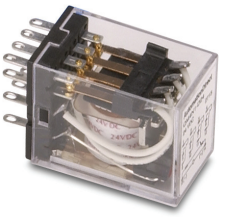
Class 8 AD-HSSR8 HAZLOC series in a slim, space-saving housing (in 8A, 10A, 15A models) with the approval for hazardous locations (Class 1, Div. 2, Groups A, B, C, D).

DIN Rail Mount Relays

AD-SSR Series

AD-SSR Series - Solid state relays are energy efficient current switching devices in a slim, space-saving housing. These relays carry 10 or 65 Amp loads, and are DIN-rail or panel-mountable.

Electromechanical Relay Selection Guide



Specification	QL Series	QM Series	RS Series Card Relays
Coil Voltages	110/120VAC, 220VAC, 24VDC	110/120VAC, 220VAC, 24VDC	24VDC
Configuration	2PDT, 4PDT	2PDT, 4PDT	SPST (up to six relays)
Contact Rating	10A	5A DPDT ; 3A 4PDT	5A
Base Socket	8 or 14 pin spade terminal	8 or 14 pin spade terminal	-
Agency Approvals	UL Recognized (#E222847), CE Certified (9667186-9811), CSA Certified (218218)	UL Recognized (#E222847), CE Certified (9667186-9811), CSA Certified (218218)	UL Recognized (E44592), CSA (LR20479) TUV (R95551729)
Prices starting at	$10.00	$4.75	$29.50

Specification	78 Series	H782 Series	750R Series
Coil Voltages	110/120VAC, 220VAC, 12VAC, 12VDC, 24VAC, 24VDC	120VAC, 240VAC, 12VAC, 12VDC, 24VAC, 24VDC	120VAC, 240VAC, 12VAC, 12VDC, 24VAC, 24VDC
Configuration	SPDT, DPDT, 3PDT, 4PDT	4PDT	DPDT, 3PDT
Contact Rating	12 to 15A	3A, 5A	10A
Base Socket	5, 8,11 or 14 pin spade terminal	14 pin spade terminal	11 pin
Agency Approvals	UL Recognized (E191059), CE, CSA 244610 (See specifications for additional information)	UL Recognized (E344123), cULus when used with 782-4C-SKT socket, CSA, CE, RoHS	UL Recognized file E191059, CE, CSA Certified 244610
Prices starting at	$4.50	$25.50	$7.75

Specification	H750 Series	AD-PR Series
Coil Voltages	120VAC, 240VAC, 12VAC, 12VDC, 24VAC, 24VDC	120VAC, 240VAC, 12VDC, 24VAC, 24VDC
Configuration	DPDT or 3PDT	SPDT, DPST, DPDT
Contact Rating	12A	40A
Base Socket	8-pin or 11-pin spade terminal,	Panel mount
Agency Approvals	UL Recognized (E344123), cULus when used with 750 sockets, RoHS	UL Recognized E191059, CE Certified (9667186-9811), CSA Certified 244610, RoHS
Prices starting at	$34.75	$14.75

QL Series Electromechanical Relay Selection Guide

QL 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 electric control panels requiring stable and reliable relays.

Features

- Small package design
- ARC Barrier equipped
- Silver Cadmium Oxide contact
- High dielectric strength (1,800 VAC)
- High reliability and long life
- Ultra-high sensitivity with quick response time (25 ms max.)
- High vibration and shock resistance
- LED indicator on all models, so you can easily see if relay is working properly without using a voltmeter
- Diode protection available on 24 VDC models, which protects contacts and electronic components from back EMF
- UL recognized, CE certified, CSA approval pending
- DPDT and 4PDT models

• *ORDER SOCKET SEPARATELY*

QL Series Selection Guide								
Part Number	***Price***	***Coil Voltage***	***Configuration***	***Contact Rating***	***Dimensions (see page 24-7)***	***Relay Socket Part Number***	***Price***	***Dimensions (see page 24-13)***
QL2N1-A120	$10.00	110/120VAC	2PDT	10A	Figure 1	***SQL08D***	$4.00	Figure 3
QL4N1-A120	$12.00		4PDT	10A	Figure 2	***SQL14D***	$4.50	Figure 4
QL2N1-A220	$10.00	220VAC	2PDT	10A	Figure 1	***SQL08D***	$4.00	Figure 3
QL4N1-A220	$12.50		4PDT	10A	Figure 2	***SQL14D***	$4.50	Figure 4
QL2N1-D24	$10.00	24VDC	2PDT	10A	Figure 1	***SQL08D***	$4.00	Figure 3
QL2X1-D24	$12.00		2PDT	10A	Figure 1	***SQL08D***	$4.00	Figure 3
QL4N1-D24	$11.50		4PDT	10A	Figure 2	***SQL14D***	$4.50	Figure 4
QL4X1-D24	$15.50		4PDT	10A	Figure 2	***SQL14D***	$4.50	Figure 4

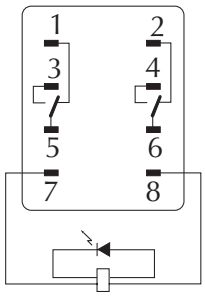
QL Series Electromechanical Relay Specifications

QL Series Specification Table								
Part Numbers	QL2N1-A120	QL2N1-A220	QL4N1-A120	QL4N1-A220	QL2N1-D24	QL2X1-D24	QL4N1-D24	QL4X1-D24
Contact Specifications								
Current Rating	10A							
Contact Type	DPDT		4PDT		DPDT		4PDT	
Terminal Type	Spade Plug-In Socket							
Rated Max. Resistive Load	10A@110VAC/10A@24VDC							
Rated Max. Inductive Load	7.5A@110VAC/ 5A@24VDC							
Minimum Recommended Load	1mA @ 5VDC							
Max. Switching Cap. (Resistive Load)	1,100VAC/240W							
Max. Switching Cap. (Inductive Load)	825VAC/120W							
Max. Contact Rating	250VAC/125VDC							
Coil Specifications								
Options	LED Indicator					LED Indicator/ Diode Protection	LED Indicator	LED Indicator/ Diode Protection
Coil Input Voltage	110/120VAC	220/240VAC	110/120VAC	220/240VAC	24VDC			
Rated Current at 50Hz	9.9 /10.8mA	6.2/6.8mA	17/19mA	11.5/13.1mA	36.9mA		69mA	
Rated Current at 60Hz	8.4/9.2mA	5.3/5.8mA	18/16.4mA	9.8/11.2mA	36.9mA		69mA	
Coil Resistance	4.43kΩ	12.95kΩ	2.2kΩ	6.7kΩ	650Ω		350Ω	
Power Consumption	Approx. 0.9W to 1.1W (at 60Hz)				Approx. 0.9W			
Dropout Voltage (% of rated voltage)	Min. 30%				Min. 10%			
Pick-Up Voltage (Must operate voltage)	Max. 80% of the rated coil voltage							
Max. Voltage (Max. continuous voltage)	110% of the rated coil voltage							
Min. Operating Voltage	80% of the rated coil voltage							
General Specifications								
Service Life	Mechanical: AC: Min. 50 million operations; DC: Min. 100 million operations (at operating frequency of 18,000 operations/hour)							
	Electrical: DPDT: Min. 500k operations; 4PDT: Min. 200k operations (at operating frequency of 1,800 operations/hour)							
Operate Time	25ms max							
Release Time	25ms max							
Ambient Temperature	-25° C to 70° C (-13° F to 158° F)							
Ambient Humidity	45% to 85% Relative Humidity							
Contact Material	Silver Cadmium Oxide							
Contact Resistance	50mΩ max.							
Operating Frequency	Mechanical 18,000 operations/hour; Electrical 1,800 operations/hour							
Vibration Resistance	10Hz to 55Hz at double amplitude of 1.0mm							
Shock Resistance	1,000m/s² (approx. 100G)							
Weight	35g (1.24oz.)							
Agency Approvals and Standards	UL Recognized (#E222847), CE Certified (9667186-9811), CSA Certified (218218)							

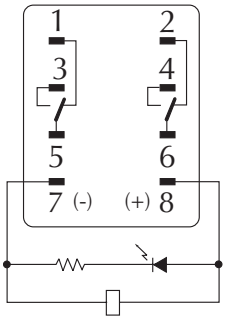
QL Series Wiring Diagrams and Derating Curves

Wiring Diagrams

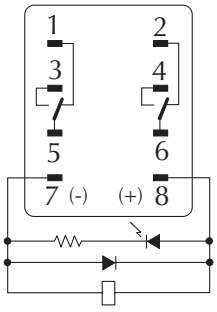
QL2N1-A120
QL2N1-A220



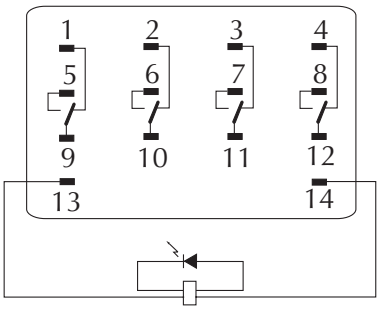
QL2N1-D24



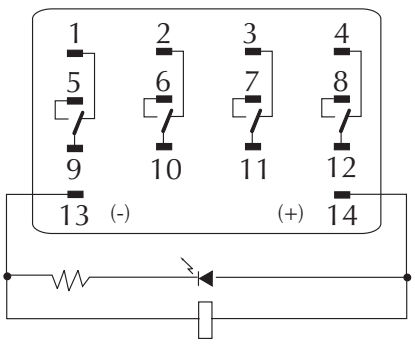
QL2X1-D24



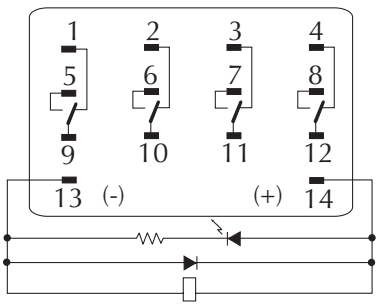
QL4N1-A120
QL4N1-A220



QL4N1-D24



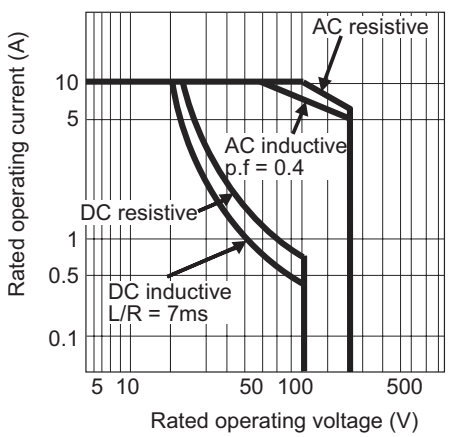
QL4X1-D24



Derating Curves

2PDT

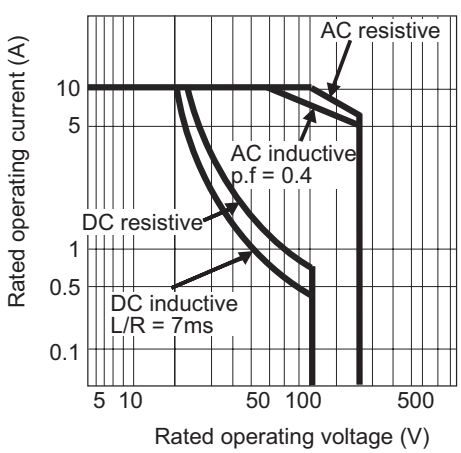
Max. Switching capacity



QL 2PDT

4PDT

Max. Switching capacity



QL 4PDT

QL Series Dimensional Drawings

Dimensions

mm [inches]

Figure 1
QL2

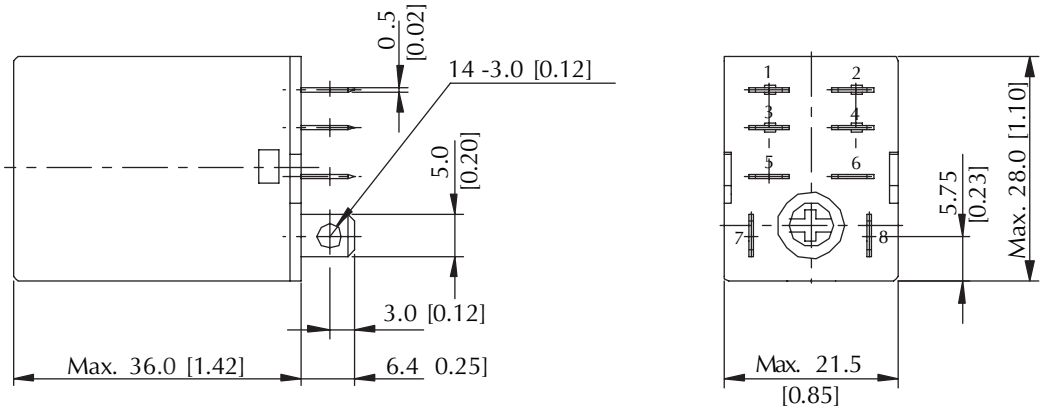
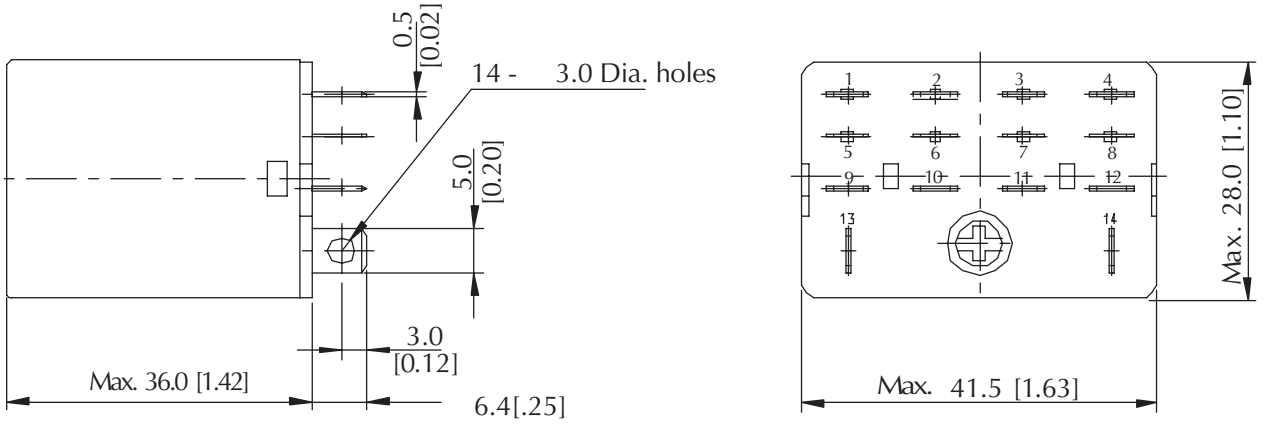
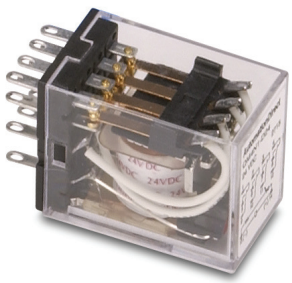


Figure 2
QL4



QM Series Electromechanical Relay Selection Guide



QM 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 electric control panels requiring stable and reliable relays.

Features

- Small package design
- DPDT has a fine silver contact with 5A capability
- 4PDT has a gold-plated silver contact with 3A capability
- High dielectric strength (1,800 VAC)
- High reliability and long life
- Ultra-high sensitivity with quick response time (20 ms max.)
- High vibration and shock resistance
- LED indicator on all models, so you can easily see if relay is working properly without using a voltmeter
- Diode protection on some 24 VDC models protects contacts and electronic components from back EMF
- UL recognized, CE certified, CSA certified (218218)

• *ORDER SOCKET SEPARATELY*

QM Series Selection Guide

Part Number	Price	Coil Voltage	Configuration	Contact Rating	Dimensions (see page 24-11)	Relay Socket Part Number	Price	Dimensions (see page 24-13)
QM2N1-A120	$4.75	110/120VAC	2PDT	5A	Figure 1	SQM08D	$3.25	Figure 5
QM4N1-A120	$4.75		4PDT	3A	Figure 2	SQM14D	$3.25	Figure 6
QM2N1-A220	$4.75	220VAC	2PDT	5A	Figure 1	SQM08D	$3.25	Figure 5
QM4N1-A220	$8.25		4PDT	3A	Figure 2	SQM14D	$3.25	Figure 6
QM2N1-D24	$4.75	24VDC	2PDT	5A	Figure 1	SQM08D	$3.25	Figure 5
QM2X1-D24	$9.25		2PDT	5A	Figure 1	SQM08D	$3.25	Figure 5
QM4N1-D24	$4.75		4PDT	3A	Figure 2	SQM14D	$3.25	Figure 6
QM4X1-D24	$9.25		4PDT	3A	Figure 2	SQM14D	$3.25	Figure 6

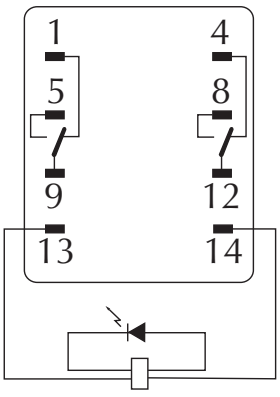
QM Series Electromechanical Relay Specifications

QM Series Specification Table								
Part Numbers	QM2N1-A120	QM2N1-A220	QM4N1-A120	QM4N1-A220	QM2N1-D24	QM2X1-D24	QM4N1-D24	QM4X1-D24
Contact Specifications								
Current Rating	5A		3A		5A		3A	
Contact Type	DPDT		4PDT		DPDT		4PDT	
Terminal Type	Spade plug-in socket							
Rated Max. Resistive Load	5A @ 220VAC/5A @ 24VDC		3A @ 220VAC/3A @ 24VDC		5A @ 220VAC/5A @ 24VDC		3A @ 220VAC/3A @ 24VDC	
Rated Max. Inductive Load	2A @ 220VAC/2A @ 24VDC		1.5 A @ 220VAC/0.8 A @ 24VDC		2A @ 220VAC/2A @ 24VDC		1.5A @ 220VAC/0.8 A @ 24VDC	
Minimum Recommended Load	1mA @ 1VDC							
Max. Switching Cap. (Resistive Load)	1,100VA/120W		660VA/72W		1,100VA/120W		660VA/72W	
Max. Switching Cap. (Inductive Load)	440VA/48W		176VA/36W		440VA/48W		176VA/36W	
Max. Contact Rating	250VAC/125VDC				250VAC/125VDC			
Coil Specifications								
Options	LED Indicator					LED Indicator/ Diode Protection	LED Indicator	LED Indicator/ Diode Protection
Coil Input Voltage	110/120 VAC	220/240 VAC	110/120 VAC	220/240 VAC	24VDC			
Rated Current at 50Hz	9.9 /10.8 mA	6.2/6.8 mA	9.9/10.8 mA	6.2/6.8 mA	36.9 mA			
Rated Current at 60Hz	8.4/ 9.2 mA	5.3/5.8 mA	8.4/9.2 mA	5.3/5.8 mA				
Coil Resistance	4.43 kΩ	12.95 kΩ	4.43 kΩ	12.95 kΩ	650Ω			
Power Consumption	Approx. 0.9 W to 1.1 W (at 60Hz)				Approx. 0.9 W			
Dropout Voltage (% of rated voltage)	Min. 30%				Min. 10%			
Pick-Up Voltage (Must operate voltage)	Max. 80% of the rated coil voltage							
Max. Voltage (Max. continuous voltage)	110% of the rated coil voltage							
Min. Operating Voltage	80% of the rated coil voltage							
General Specifications								
Service Life	Mechanical: AC: Min. 50 million operations; DC: Min. 100 million operations (at operating frequency of 18,000 operations/hour)							
	Electrical: DPDT: Min. 500k operations; 4PDT: Min. 200k operations (at operating frequency of 1,800 operations/hour)							
Operate Time	20ms max							
Release Time	20ms max							
Ambient Temperature	-25° C to 75° C (-13° F to 167° F)							
Ambient Humidity	45% RH to 85% RH							
Contact Material	Fine Silver		Gold-plated Silver		Fine Silver		Gold-plated Silver	
Contact Resistance	50mΩ max							
Operating Frequency	Mechanical: 18,000 operations/hour; Electrical: 1,800 operations/hour							
Vibration Resistance	10Hz to 55Hz at double amplitude of 1.0mm							
Shock Resistance	1,000m/s² (approx. 100G)							
Weight	35g (1.24oz.)							
Agency Approvals and Standards	UL Recognized (#E222847), CE Certified (9667186-9811), CSA Certified (218218)							

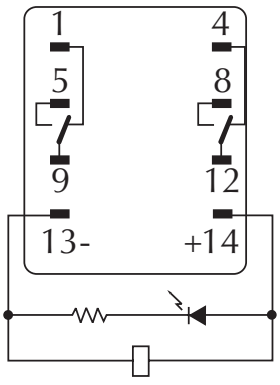
QM Series Wiring Diagrams and Derating Curves

Wiring diagrams

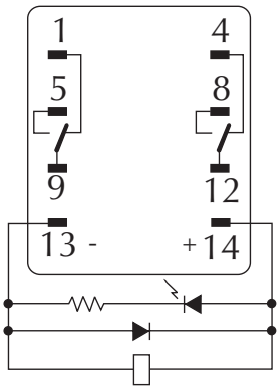
QM2N1-A120
QM2N1-A220



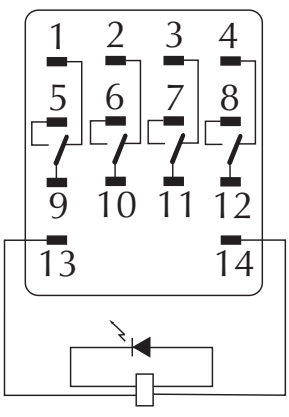
QM2N1-D24



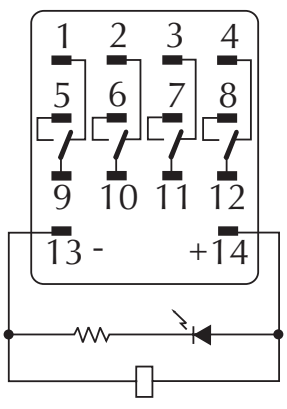
QM2X1-D24



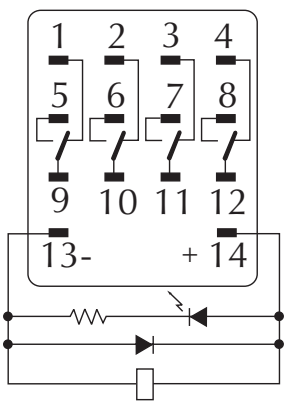
QM4N1-A120
QM4N1-A220



QM4N1-D24



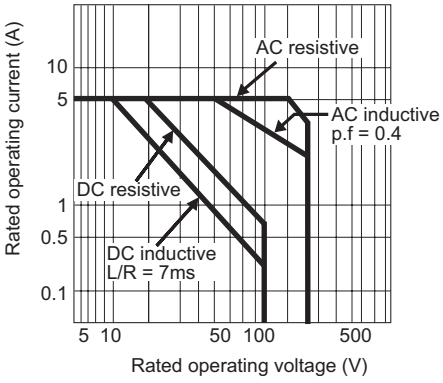
QM4X1-D24



Derating curves

DPDT

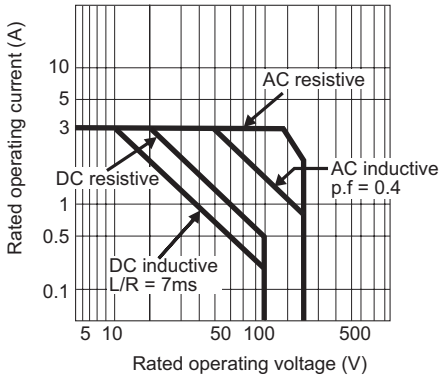
Max. Switching capacity



QM DPDT

4PDT

Max. Switching capacity



QM 4PDT

QM Series Dimensional Drawings

Dimensions

mm [inches]

Figure 1
QM2 Series

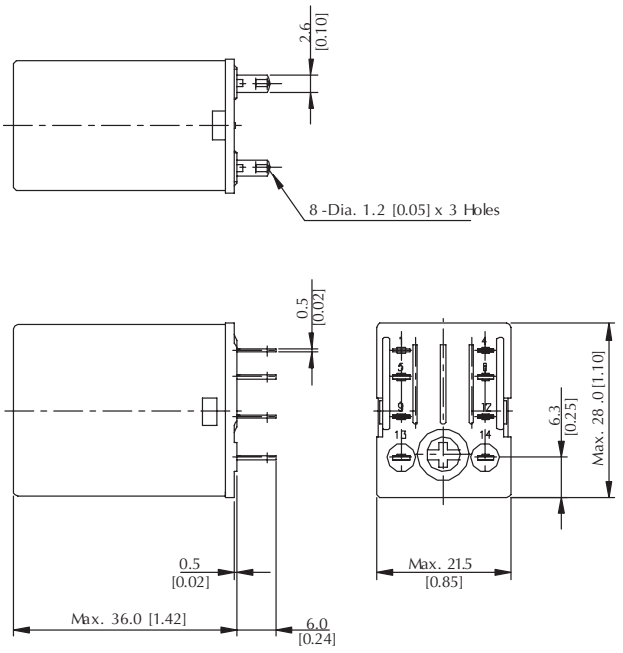
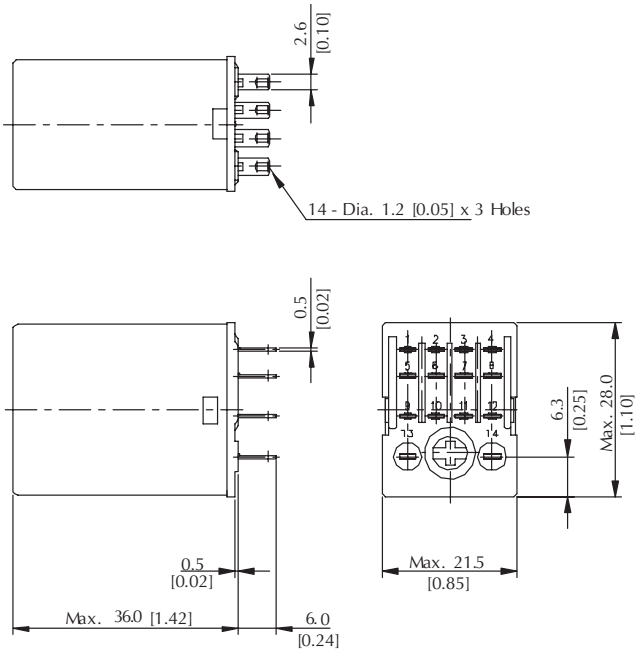


Figure 2
QM4 Series



Sockets for QL/QM Series Relays

SQL08D

Din-rail mounting, DPDT, for use with QL2 series relays

$4.00

SQL14D

Din-rail mounting, 4PDT, for use with QL4 series relays

$4.50

SQM08D

Din-rail mounting, DPDT, for use with QM2 series relays

$3.25

SQM14D

Din-rail mounting, 4PDT, for use with QM4 series relays

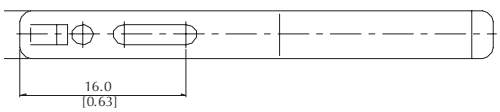
$3.25

Holding Clips

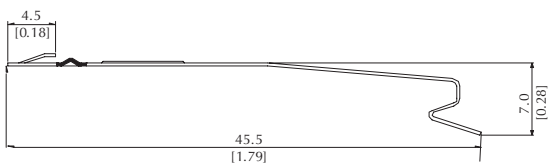
Holding clips for the QL2, QL4, QM2 and QM4 series relays can be removed by pushing the side of the inserting hole with a sharp object.

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

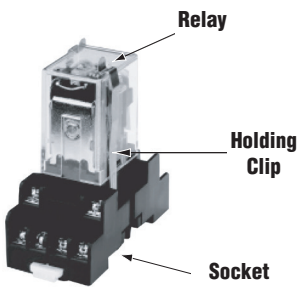
Holding Clip Dimensions mm [in]



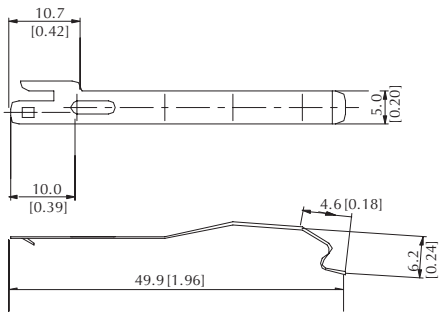
Holding clip for QL4 series relays is included with SQL14D sockets.



Insert holding clip into the slots provided on the socket.



Holding Clip Dimensions mm [in]



Holding clip for QL2, QM2 and QM4 series relays is included with SQL08D, SQM08D and SQM14D sockets.

Socket Dimensions for QL/QM Series Relays

Dimensions

mm

Figure 3
SQL08D (for QL2 Series Relays)

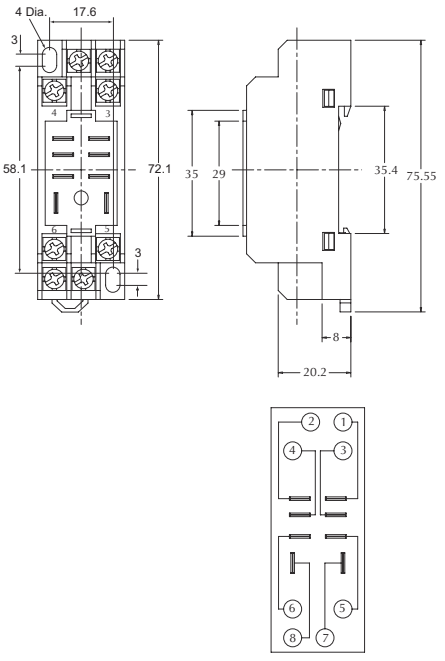


Figure 4
SQL14D (for QL4 Series Relays)

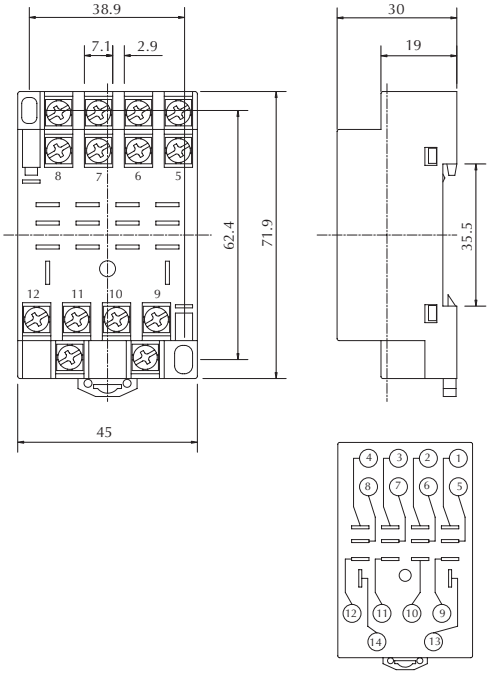


Figure 5
SQM08D (for QM2 Series Relays)

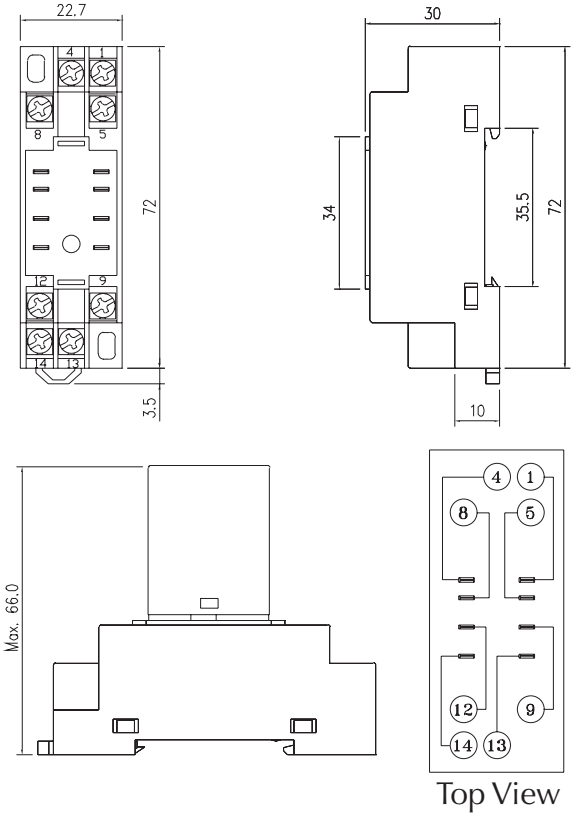
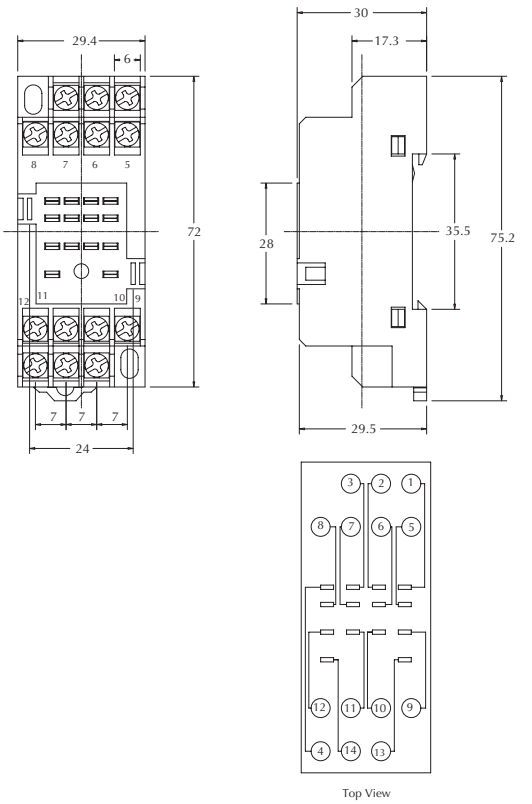
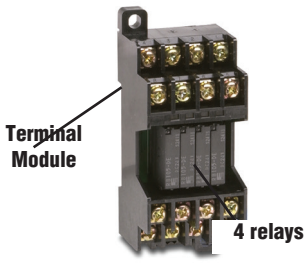


Figure 6
SQM14D (for QM4 Series Relays)



RS Series Electromechanical Relay Selection Guide



RS4N-DE

RB105-DE

TY3

RZ4N

RS Series Card Relay Selection Guide			
Part Number	***Price***	***Description***	***Dimensions and Wiring Diagrams***
RS4N-DE	$29.50	Card relay (4 relays included; 4 commons), mounted in socket, 24VDC coil, SPST, 5A rating. TY3 included; (can only be wired one way for proper operation of LEDs)	Figure 3
RS6N-DE	$39.00	Card relay (6 relays included; 2 commons; 3 relays per common), mounted in socket, 24VDC coil, SPST, 5A rating. TY3 included.	Figure 4
RB105-DE	$27.50	Spare relays (package of 10) for the RS series Relays. 24V DC coil, SPST, 5A rating.	Figure 1
TY3	$8.00	Relay remover for RS series relays. Package of 10.	-
RZ4N	$16.00	Terminal guard for RS series relays. Package of 10.	Figure 2

RS Series Relay Specifications

RS6N-DE

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.

RS6N-DE	$39.00
RS4N-DE	$29.50

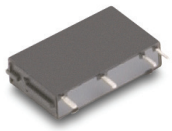
Features:

- Compact size of 34 mm wide by 69 mm 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 35 mm DIN rail
- The RS4N module includes two standard accessory jumper plates, which are convenient for common wiring of terminals

RS4N-DE and RS6N-DE Series Card Relay Specifications Table

Contact		1 NO / SPST			
Contact Resistance		30mΩ or less (before use)			
Contact Material		Silver alloy (gold-plated)			
Min. Operating Voltage and Current		0.1 VDC, 1mA			
Rated Thermal Current		5A			
Max. Make/Break Current (Resistive Load)		250VAC, 5A 30VDC, 5A 120VDC, 0.5 A			
Max. Make/Break Current (Pilot Duty)		120VAC, 1A 30VDC, 2A 120VDC, 0.2 A			
Operating Time		10ms or less at rated voltage			
Release Time		10ms or less at rated voltage			
Insulation Resistance		100MΩ (at 500VDC megger)			
Dielectric Strength	***Between Contact and Coil***	2000VAC 1 minute			
	Between Contacts of Same Pole	750VAC 1 minute			
	Between Contacts of Different Pole	2000VAC 1 minute			
	Between Coils of Different Pole	500VAC 1 minute			
Vibration	***Malfunction Durability***	10 to 55Hz, 1mm double amplitude			
	Mechanical Durability	10 to 55Hz, 1.5mm double amplitude			
Shock	***Malfunction Durability***	100m/s^2			
	Mechanical Durability	1000m/s^2			
Life Expectancy	***Mechanical***	20 million operations			
	Electrical	***Voltage***	***Make Current (A)***	***Break Current (A)***	***Operations***
		220VAC (inductive load) 220VAC (resistive load) 24VDC (inductive load) 24VDC (resistive load)	2 (cos ø = 0.7) 3 (cos ø = 1.0) 1 (T = 15ms) 5 (T = 1ms or less)	2 (cos ø = 0.3 - 0.4) 3 (cos ø = 1.0) 1 (T = 15ms) 5 (T = 1ms or less)	100,000 130,000 150,000 100,000
Terminal Wire Capacity		Max wire gauge AWG14			
Ambient Temperature		-25 to + 55° C (no icing)			
Terminal Torque Specification		0.8 - 0.9 N·m			

Electromechanical Relay RB105-DE Specifications



RB105-DE

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

RB105-DE $27.50

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

RS Series Relay Remover and Protective Cover

Relay remover, TY3

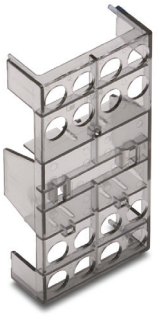
To remove a relay from the terminal module, use the TY3 relay remover. RS4N-DE and RS6N-DE modules include a TY3 relay remover. Pull the relay in a direction perpendicular to the terminal module surface. Incorrectly removing or mounting a relay may damage the relay pins and pin jacks of the module.

TY3 $8.00

Optional protective cover, RZ4N

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

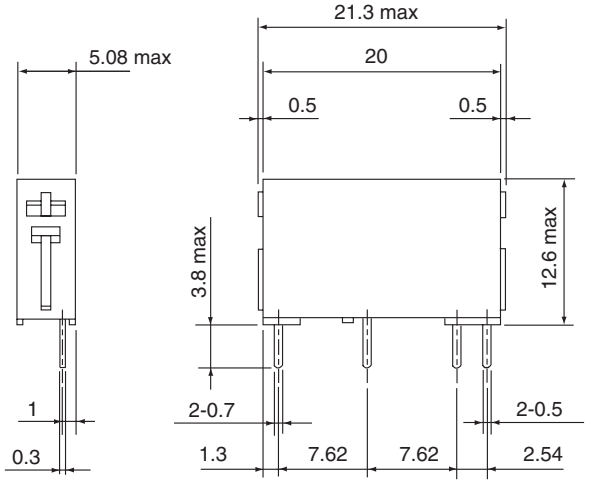
RZ4N $16.00

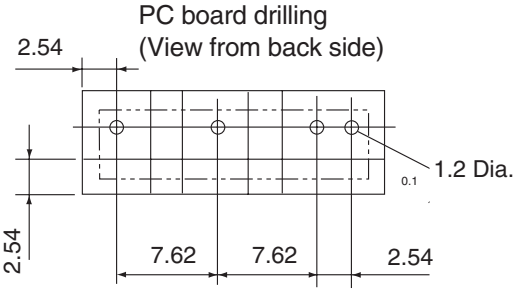


Dimensions

mm

Figure 1 RB105-DE





Internal wiring diagram

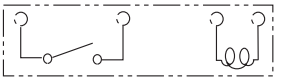
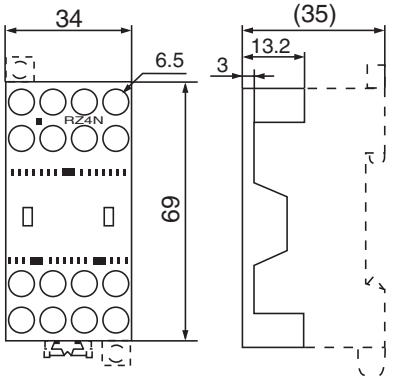


Figure 2 RZ4N (Terminal guard for RS Series)

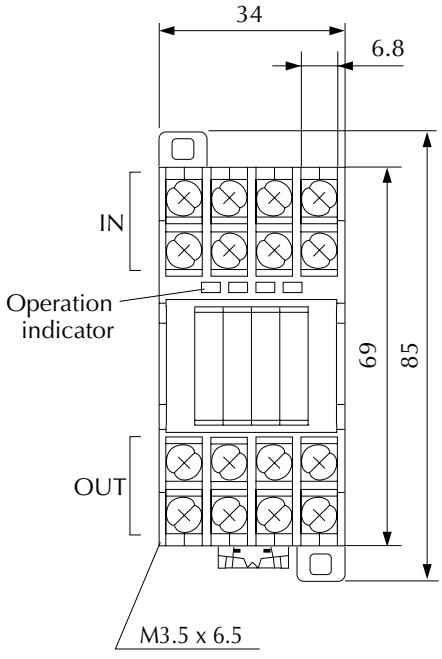


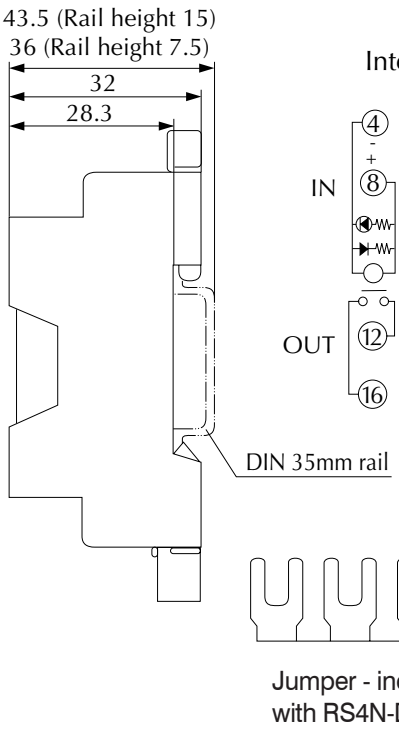
RS Series Relay Dimensions and Wiring Diagrams

Dimensions

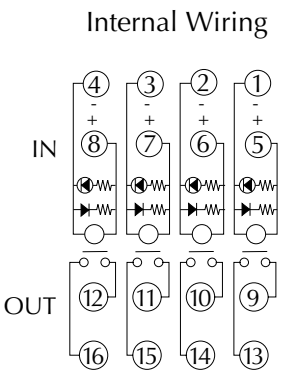
mm

Figure 3 RS4N-DE



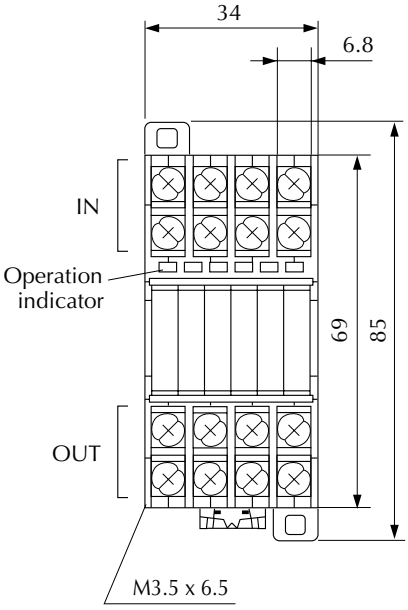


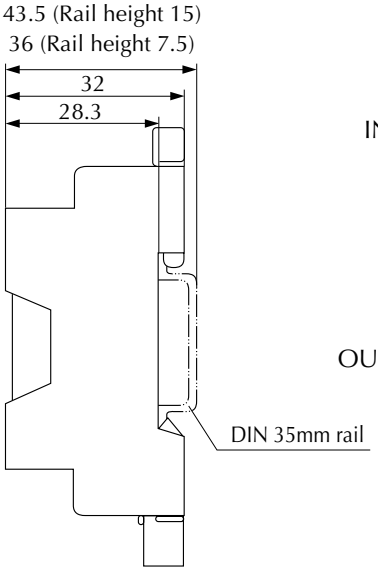
Wiring diagram RS4N-DE



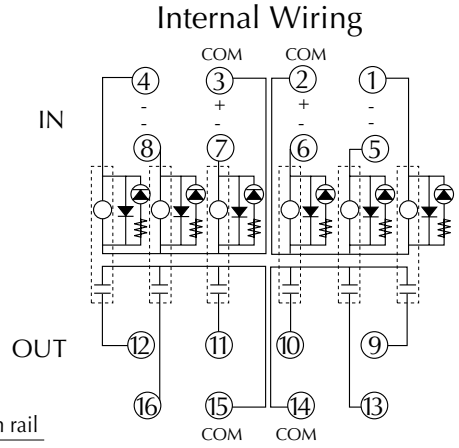
Jumper - included only with RS4N-DE

Figure 4 RS6N-DE





Wiring diagram RS6N-DE



78 Series Electromechanical Relay Selection Guide




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
Prices starting at	$4.50	$5.50	$5.75	$7.25

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

78 Series Relays Selection Guide

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.

Part Number	Price	Coil Voltage	Configuration	Dimensions	Relay Socket Part Number	Price	Dimensions
781-1C-12D	$4.75	12VDC	SPDT	Figure 1	781-1C-SKT	$4.00	Figure 5
781-1C-12A	$4.75	12VAC					
781-1C-24D	$4.50	24VDC					
781-1C-24A	$4.75	24VAC					
781-1C-120A	$4.75	120VAC					
781-1C-240A	$5.25	240VAC					
782-2C-12D	$5.50	12VDC	DPDT	Figure 2	782-2C-SKT	$4.00	Figure 6
782-2C-12A	$5.50	12VAC					
782-2C-24D	$5.50	24VDC					
782-2C-24A	$5.75	24VAC					
782-2C-120A	$5.75	120VAC					
782-2C-240A	$6.25	240VAC					
783-3C-12D	$5.75	12VDC	3PDT	Figure 3	783-3C-SKT	$4.50	Figure 7
783-3C-12A	$7.75	12VAC					
783-3C-24D	$8.25	24VDC					
783-3C-24A	$8.25	24VAC					
783-3C-120A	$8.25	120VAC					
783-3C-240A	$8.25	240VAC					
784-4C-12D	$7.25	12VDC	4PDT	Figure 4	784-4C-SKT-1	$4.75	Figure 8
784-4C-12A	$9.50	12VAC					
784-4C-24D	$7.50	24VDC					
784-4C-24A	$7.50	24VAC					
784-4C-120A	$7.50	120VAC					
784-4C-240A	$7.50	240VAC					

78 Series Electromechanical Relay Specifications

78 Series Relay Specification Table												
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 unpowered Electrical: 100,000 operations @ rated resistive load											
Operating Temperature	-40°C to 55°C (-40°F to 131°F)											
Response Time	20ms											
Vibration Resistance	± 1mm (10-35 Hz) and 3gn (35-50Hz)											
Shock Resistance	15gn											
Weight	26g (0.92 oz)						36 g (1.27 oz)					
****Agency Approvals and Standards**	UL Recognized File E191059, CE, CSA											
Environmental Protection	IP40											
NEMA B300 Pilot Duty Rated	Yes											
Coil Specifications												
Standard	LED Indicator, lockable push to test button, mechanical flag indicator											
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	0.7 W DC, 1.9 VA @ 60Hz AC						0.9 W DC, 1.4 VA@ 60Hz AC					
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 cadmium oxide, gold flashed											
Minimum Switching Requirement	100mA @ 5VDC											
Max. Contact Rating	Refer to Contact Ratings charts.											
Dielectric Strength 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, 784-4C-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.											

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

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

78 Series Electromechanical Relay Specifications

78 Series Relay Specification Table												
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 unpowered 200,000 operations @ rated resistive load											
Operating Temperature	-40°C to 55°C (-40°F to 131°F)											
Response Time	20 ms											
Ambient Humidity	45% RH to 85% RH											
Vibration Resistance	3 G's, 10 to 55Hz (0.6mm double amplitude)											
Shock Resistance	10 G's											
Weight	60 g. (2.12 oz.)						80 g (2.82 oz)					
****Agency Approvals and Standards**	UL Recognized File E191059, CE, CSA											
Environmental Protection	IEC IP40											
NEMA B300 Pilot Duty Rated	Yes											
Coil Specifications												
Standard	LED Indicator											
Coil Input Voltage	12VDC	12VAC	24VDC	24VAC	120VAC	240VAC	12VDC	12VAC	24VDC	24VAC	120VAC	240VAC
Coil Resistance	100 Ω	25.3Ω	400Ω	103Ω	2.77kΩ	12.1kΩ	96 Ω	21.2Ω	388Ω	84.5Ω	2.22kΩ	9.12kΩ
Power Consumption	1.4W DC, 1.5VA @ 60Hz AC @ 25°C						1.5W DC, 1.5VA @ 60Hz AC @ 25°C					
Dropout Voltage (% of nominal voltage or more)	10%	15%	10%	15%			10%	15%	Min. 10%	Min. 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 cadmium oxide, gold flashed											
Minimum Switching Requirement	100mA @ 5VDC											
Max. Contact Rating	Refer to Contact Ratings charts.											
Dielectric Strength Between Contacts	1500 V rms						2500V 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, 784-4C-SKT, or 784-4C-SKT-1. Current limited to rating of relay or socket, whichever is less.**

783 Series Contact Ratings (current)				
	Resistive			*Motor Load
Voltage	Nominal	UL	CSA	UL
28VDC	12A	12A	12A	---
120VAC	15A	15A	15A	1/2Hp
277VAC	12A	12A	12A	3/4Hp

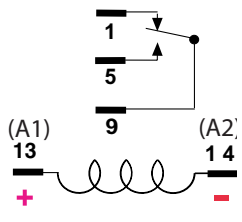
784 Series Contact Ratings (current)				
	Resistive			*Motor Load
Voltage	Nominal	UL	CSA	UL
28VDC	12A	12A	12A	---
120VAC	15A	15A	15A	1/2Hp
277VAC	12A	12A	12A	3/4Hp

***Note: These devices are rated for 1,000 cycles when applied to a motor application. (Per Table 46.1` UL 508)**

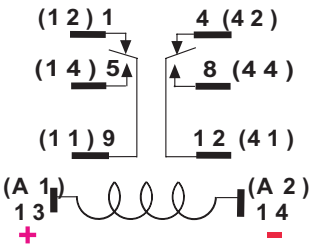
78 Series Wiring Diagrams and Dimensions

Wiring Diagrams (viewed from pin end)

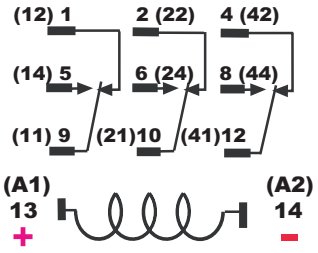
781-1C-XXX



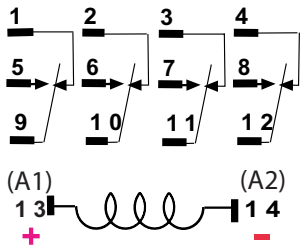
782-2C-XXX



783-3C-XXX



784-4C-XXX



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

Dimensions

inches [mm]

Figure 1: 781-1C

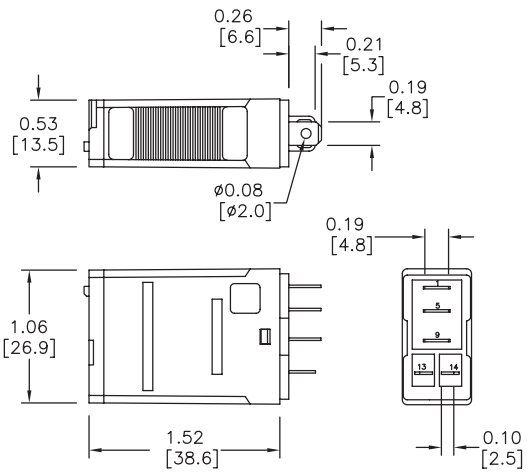


Figure 2: 782-2C

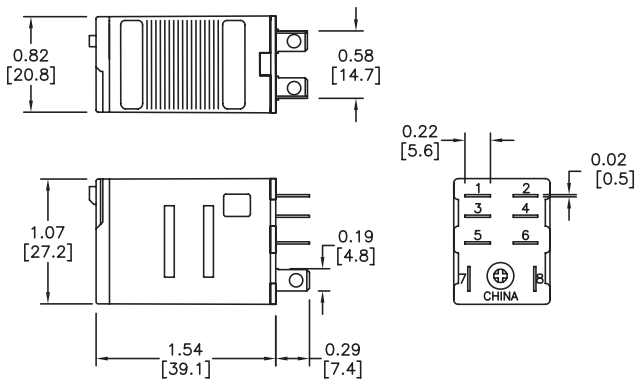


Figure 3: 783-3C

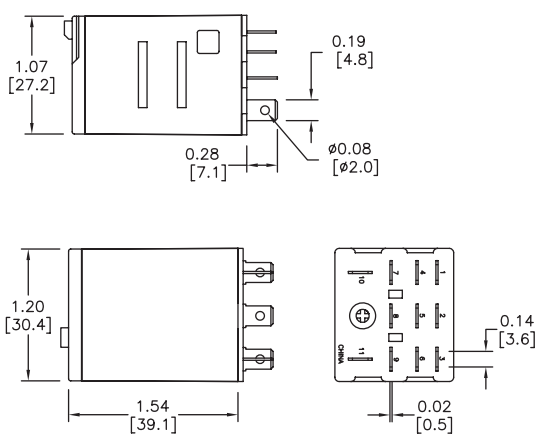
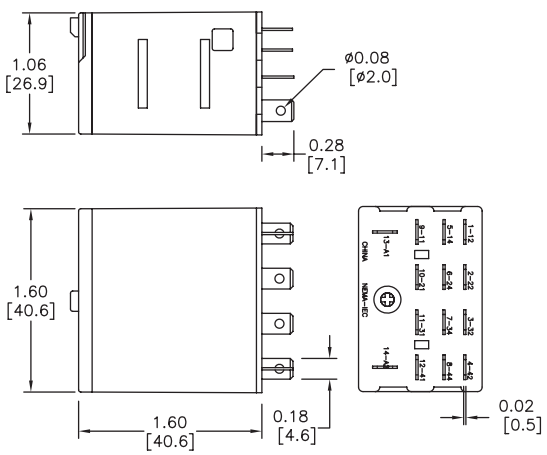


Figure 4: 784-4C



78 Series Relay Socket Dimensions

Dimensions

inches [mm]

Figure 5: 781-1C-SKT

DIN-rail mounting, SPDT, for use with 781 series relays

Note: See Table on next page for maximum screw torques and wire sizes

UL Recognized

file number: E225080

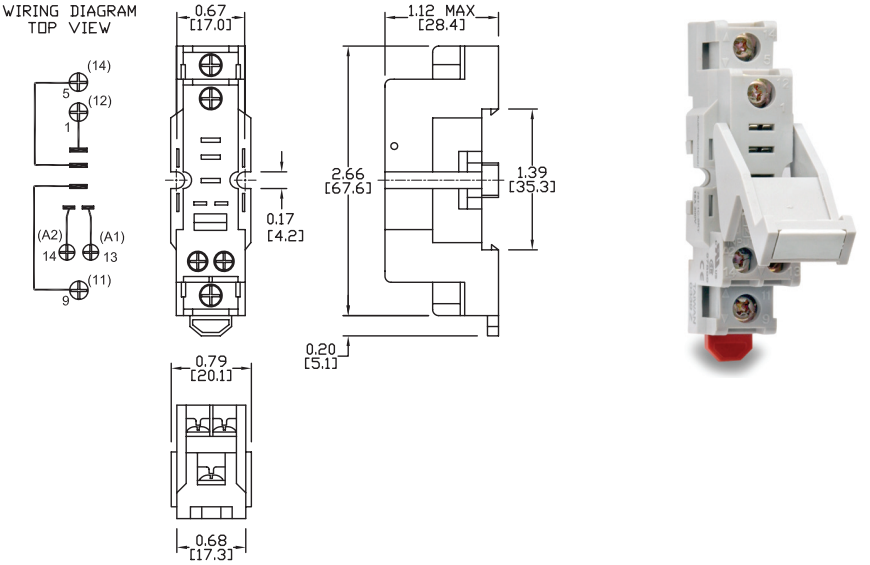


Figure 6: 782-2C-SKT

DIN-rail mounting, DPDT, for use with 782 series and AD-70S2 relays

Note: See Table on next page for maximum screw torques and wire sizes

UL Recognized

file number: E225080

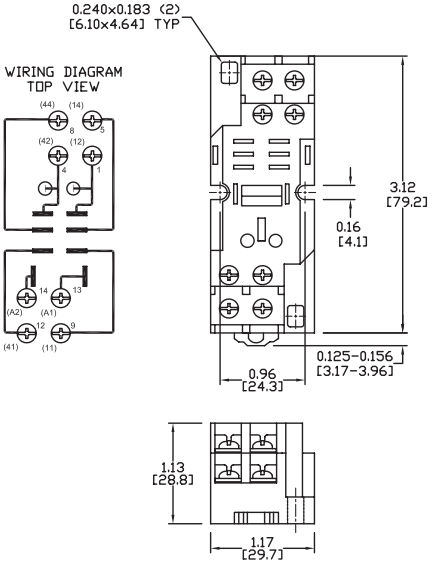


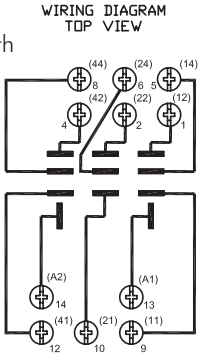
Figure 7: 783-3C-SKT

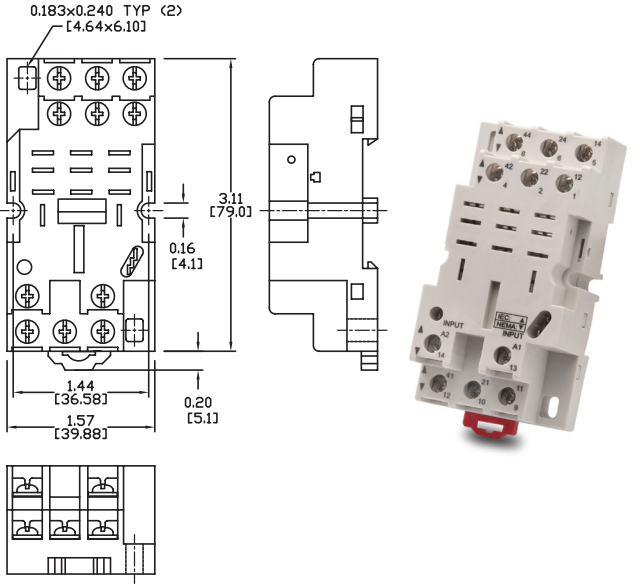
DIN-rail mounting, 3PDT, for use with 783 series relays.

Note: See Table on next page for maximum screw torques and wire sizes

UL Recognized

file number: E225080





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

78 Series Relay Socket Dimensions

Dimensions

inches [mm]

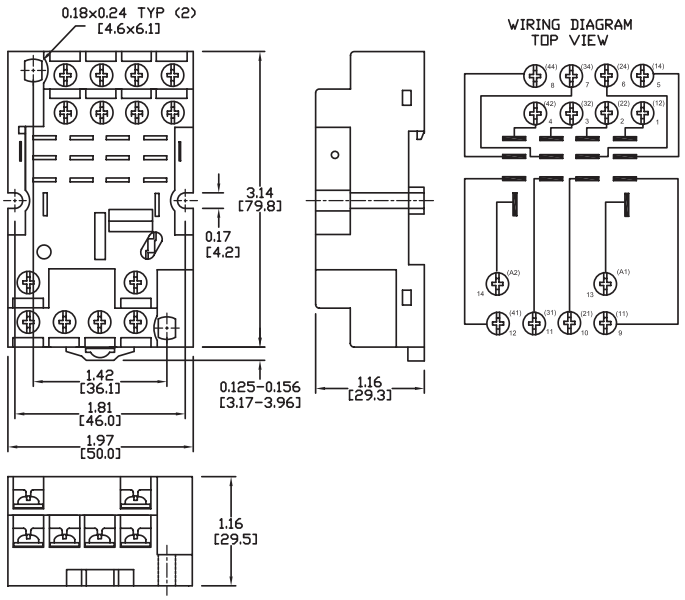


Figure 8: 784-4C-SKT-1

DIN-rail mounting, 4PDT,
for use with 784 series relays.

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

Note: See table below for maximum screw torques and wire sizes

UL Recognized
file number: E225080

Part Number	Price	Maximum Screw Torques	Maximum Wire Sizes
781-1C-SKT	$4.00	Terminals 13, 14: 7 in-lbs/0.8Nm Terminals 1, 5, 9: 9 in-lbs/1.0Nm	Terminals 13, 14: 18 to 20 AWG, solid or stranded, one or two identical wires Terminals 1, 5, 9: 12 to 20 AWG, solid or stranded, one or two identical wires
782-2C-SKT	$4.00	All terminals: 9 in-lbs/1.0Nm	All terminals: 12 to 20 AWG, solid or stranded, one or two identical wires
783-3C-SKT	$4.50		
784-4C-SKT-1	$4.75		

H782 Series Hermetically Sealed Electromechanical Relay Selection Guide

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
Prices starting at	$25.50

These ice cube style relays are designed for applications requiring hermetically sealed units for hazardous factory locations. **(Class I, Div. 2 Groups A, B, C, D).**

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

H782-4C3-12A shown

782 Series Hermetically Sealed Relays Selection Guide								
Part Number	*Price*	*Coil Voltage*	*Configuration*	*Contact Rating*	*Dimensions*	*Relay Socket Part Number*	*Price*	*Dimensions*
H782-4C3-12D	$35.00	12VDC	4PDT	3A	Figure 1	*782-4C-SKT*	$3.75	Figure 2
H782-4C3-12A	$25.50	12VAC						
H782-4C3-24D	$35.00	24VDC						
H782-4C3-24A	$34.75	24VAC						
H782-4C3-120A	$40.25	120VAC						
H782-4C3-240A	$29.00	240VAC						
H782-4C5-12D	$35.50	12VDC		5A				
H782-4C5-12A	$38.50	12VAC						
H782-4C5-24D	$35.50	24VDC						
H782-4C5-24A	$28.25	24VAC						
H782-4C5-120A	$39.75	120VAC						
H782-4C5-240A	$42.25	240VAC						

H782 Series Hermetically Sealed Electromechanical Relay Specifications

H782 Series Hermetically Sealed Relay Specification Table												
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 unpowered											
	Electrical life:100,000 operations @ rated resistive load											
Operating Temperature	-40°C to 70°C (-40°F to 158°F)											
Response Time	20 ms											
Vibration Resistance	6 gn at 10–55 Hz											
Shock Resistance	10 G's											
Weight	45 g (1.59 oz)											
****Agency Approvals and Standards**	UL Recognized File E344123, CE, CSA, RoHS											
Environmental Protection	IEC 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	0.9W DC; 1.2 VAC											
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	10 mA @ 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

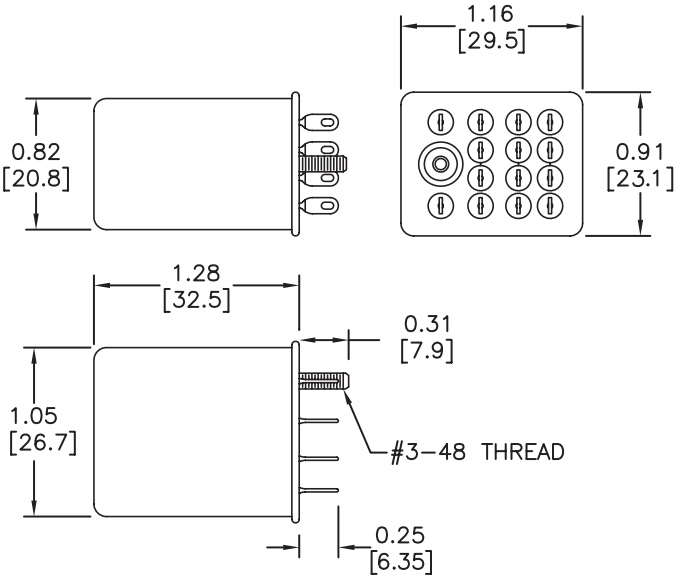
782 Series Contact Ratings (current)				
Resistive				***Motor Load**
Voltage	**Nominal**	**UL**	**CSA**	**UL**
30VAC	5A	5A	5A	
120VAC	5A	5A	5A	
240VAC	5A	5A	5A	

H782 Series Hermetically Sealed Electromechanical Relay Dimensions

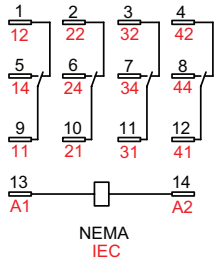
Dimensions

inches [mm]

Figure 1: H782-4C3-xx and H782-4C5-xx



Wiring



Wiring Diagram
Bottom View

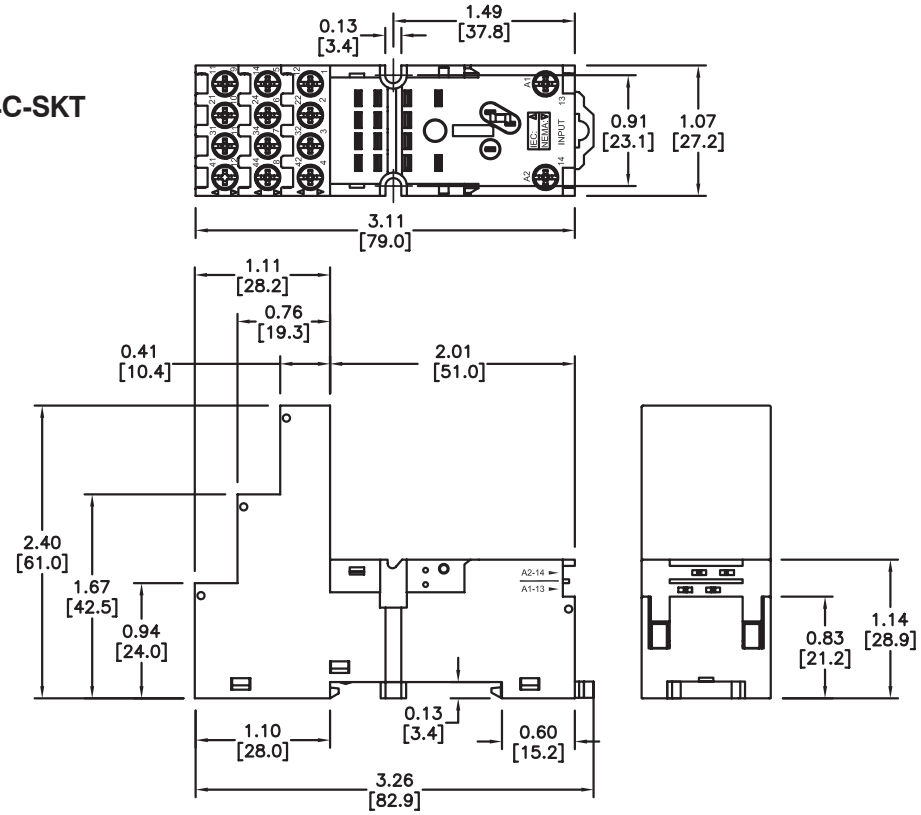
Socket for H782 Series Hermetically Sealed Electromechanical Relay

Part Number	Price	Maximum Screw Torques	Maximum Wire Sizes
782-4C-SKT	$3.75	All terminals: 9 in-lbs/1Nm	All terminals: 12 to 20 AWG, solid or stranded, one or two identical wires

Dimensions

inches [mm]

Figure 2: 782-4C-SKT



750R Series Electromechanical Relay Selection Guide

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 Relay Selection Guide								
Part Number	**Price**	**Coil Voltage**	**Configuration**	**Contact Rating**	**Dimensions**	**Terminals**	**Relay Socket Part Number**	**Price**
750R-2C-12D	$7.75	12VDC	DPDT	10A	Figure 1	8-pin	**750-2C-SKT**	$4.25
750R-2C-12A	$9.25	12VAC						
750R-2C-24D	$7.75	24VDC						
750R-2C-24A	$8.00	24VAC						
750R-2C-120A	$8.00	120VAC						
750R-2C-240A	$8.50	240VAC						
750R-3C-12D	$9.00	12VDC	3PDT	10A	Figure 2	11-pin	**750-3C-SKT**	$4.75
750R-3C-24D	$9.00	24VDC						
750R-3C-24A	$9.25	24VAC						
750R-3C-120A	$9.25	120VAC						
750R-3C-240A	$9.75	240VAC						

Order socket separately.

Dimensions

inches [mm]

Figure 1: 750R-2C-xxx

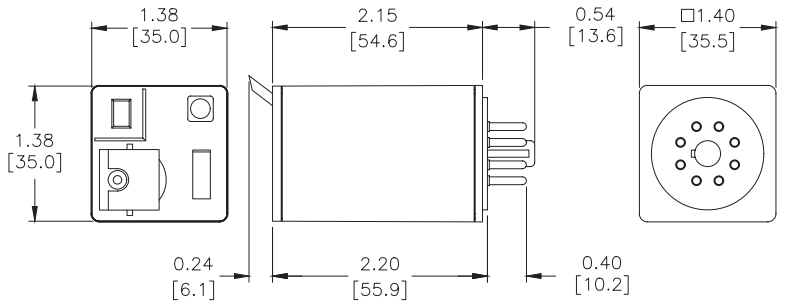
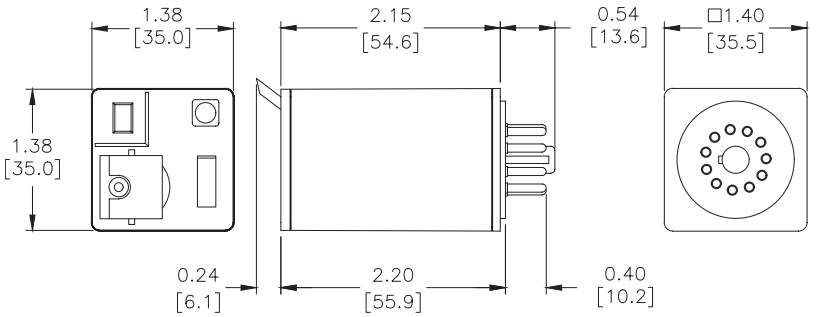
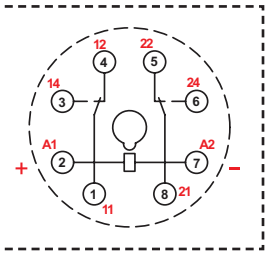


Figure 2: 750R-3C-xxx



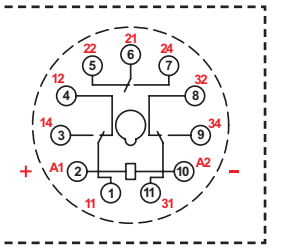
Wiring

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 Specification Table											
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°C to 55°C (-40°F 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	83g (2.93 oz)										
***Agency Approvals and Standards**	UL Recognized file E191059, CE, CSA Certified 2742760										
Environmental Protection	IEC IP40										
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	10 mA @ 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	
NO: 10 A at 250VAC, NC: 5 A at 250VAC NO: 10 A at 28VDC, NC: 5 A at 28VDC	

H750 Series Hermetically Sealed Electromechanical Relay Selection Guide

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 when used with 750 sockets RoHS
Prices starting at	$34.75

H750 series hermetically sealed relays are designed for use in hazardous applications. **(Class 1, Div 2, Groups A, B, C, D).**

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

H750-2C-12D shown

H750 Series Hermetically Sealed Relay Selection Guide							
Part Number	Price	Coil Voltage	Configuration	Contact Rating	Dimensions	Relay Socket Part Number	Price
H750-2C-12D	$45.00	12VDC	DPDT	12A	Figure 1	750-2C-SKT	$4.25
H750-2C-12A	$34.75	12VAC					
H750-2C-24D	$45.00	24VDC					
H750-2C-24A	$47.25	24VAC					
H750-2C-120A	$47.25	120VAC					
H750-2C-240A	$40.75	240VAC					
H750-3C-12D	$35.25	12VDC	3PDT		Figure 2	750-3C-SKT	$4.75
H750-3C-12A	$50.50	12VAC					
H750-3C-24D	$48.25	24VDC					
H750-3C-24A	$37.00	24VAC					
H750-3C-120A	$50.50	120VAC					
H750-3C-240A	$37.75	240VAC					

Order socket separately.

H750 Series Hermetically Sealed Electromechanical Relay Specifications

H750 Series Hermetically Sealed Relays Specification Table												
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	H750-3C-240A
	General Specifications											
Service Life	Mechanical: 10 million operations											
	Electrical: 100,000 operations @ rated resistive load											
Operating Temperature	-40°C to 55°C (-40°F to 131°F)											
Response Time	20 ms											
Vibration Resistance	3 gn at 35–150 Hz											
Shock Resistance	10 G											
Weight	130 g (4.6 oz)											
***Agency Approvals and Standards**	UL Recognized file E344123, CSA 244610, RoHS											
Environmental Protection	IEC IP67 (Class I, Div. 2; Groups A, B, C, D; T5 (DC) and T4A (AC) Temperature Codes)											
NEMA B300 Pilot Duty Rated	Yes											
	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	12VAC 50/60 Hz	24VDC	24VAC 50/60 Hz	120VAC 50/60 Hz	240VAC 50/60 Hz
Coil Resistance	120Ω	18Ω	470Ω	72Ω	1.7 kΩ	7.2 kΩ	120Ω	18Ω	470Ω	72Ω	1.7 kΩ	7.2 kΩ
Power Consumption	2.75 VA (60Hz) AC, 1.2 W DC											
Dropout Voltage (% of rated voltage)	15% (AC); 10% (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.

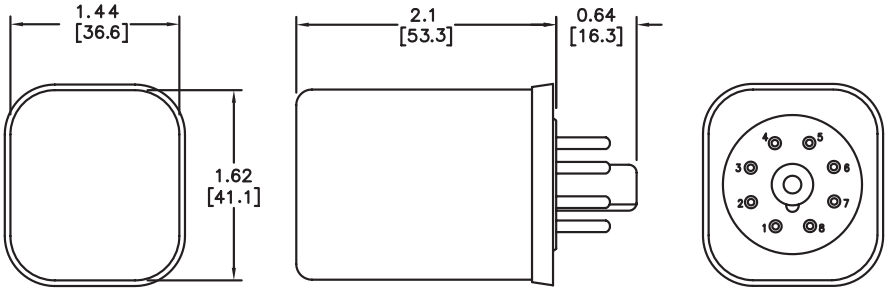
75 Series Contact Ratings (current)				
	Resistive			**Motor Load**
Voltage	**Nominal**	**UL**	**CSA**	**UL**
28VDC	12A	12A	12A	---
120VAC	12A	12A	12A	1/3Hp
240VAC	12A	12A	12A	1/2Hp

H750 Series Hermetically Sealed Electromechanical Relay Specifications

Dimensions

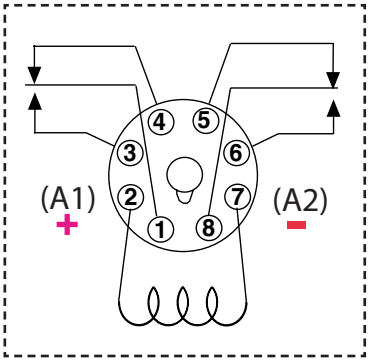
inches [mm]

Figure 1: H750-2C Series
8-pin



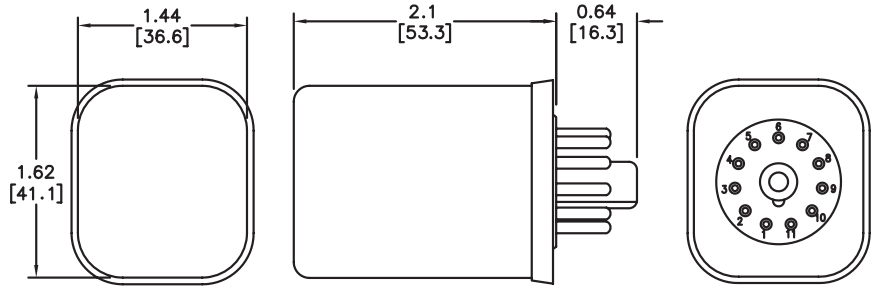
Wiring

H750-2C-xxx wiring diagram

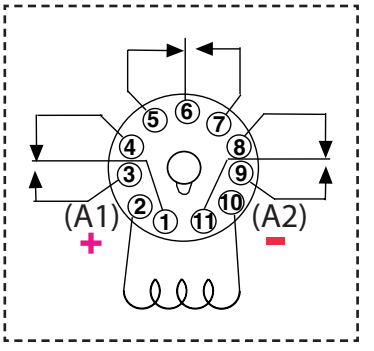


Note: Contacts and coil shown are internal to the relay

Figure 2: H750-3C Series
11-pin



H750-3C-xxx wiring diagram



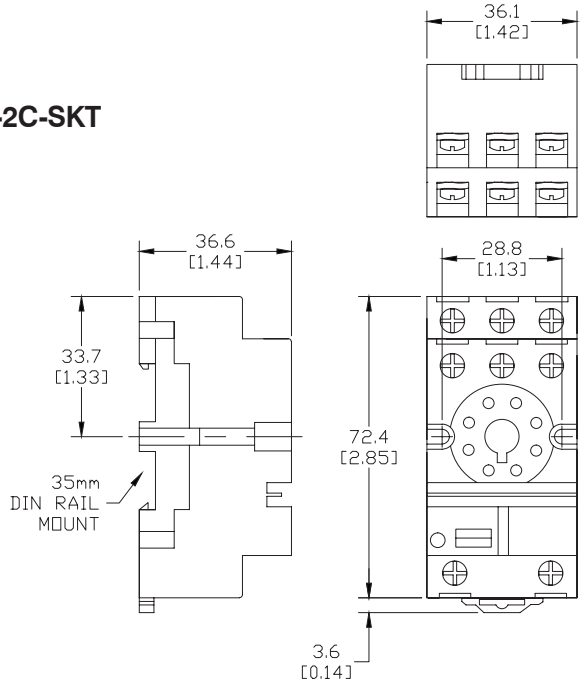
Note: Contacts and coil shown are internal to the relay

750R Series Socket Dimensions

Dimensions

inches [mm]

Figure 3: 750-2C-SKT



Wiring

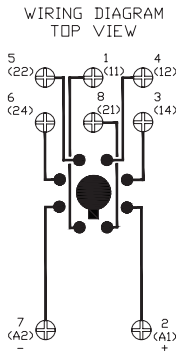
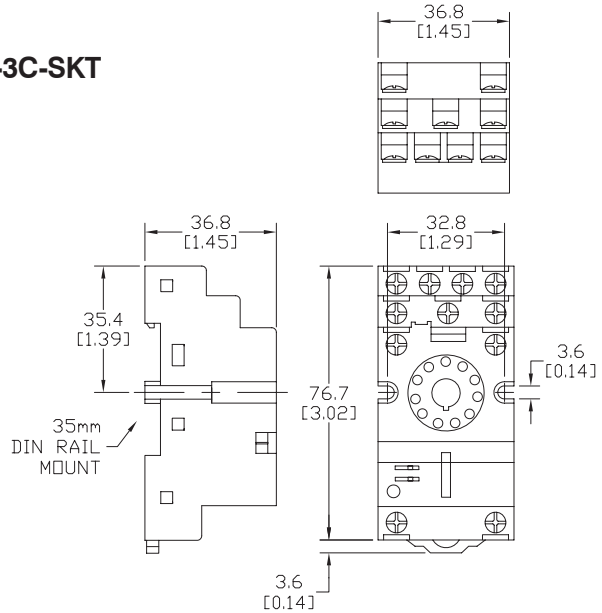
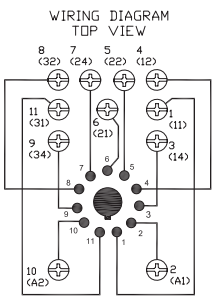


Figure 4: 750-3C-SKT



Wiring



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.	$3.25

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.

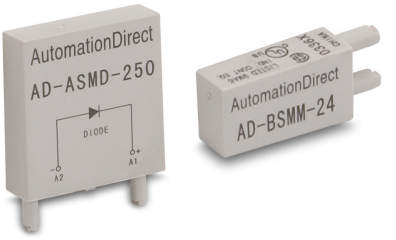
Features

- 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 Device Selection Guide

Part Number	Price	Description	Nominal Input Voltage	Dimensions & Package	Mating Socket
AD-ASMD-250	$9.75	Protection diode module for 784 and 75 series relays. Plug-in modules come in package of 5.	6-250VDC	Figure 1	783-3C-SKT 784-4C-SKT-1 750-2C-SKT 750-3C-SKT
AD-ASMM-24	$8.00	MOV module for 784 and 75 series relays that operate at 24VAC coil voltage. Package includes 5 modules.	24VAC/VDC		
AD-ASMM-120	$8.00	MOV module for 784 and 75 series relays that operate at 120VAC coil voltage. Package includes 5 modules.	120VAC/VDC		
AD-ASMM-240	$8.00	MOV module for 784 and 75 series relays that operate at 240VAC coil voltage. Package includes 5 modules.	240VAC/VDC		
AD-BSMD-250	$8.00	Protection diode module for 782 series relays. Plug-in modules come in package of 5.	6-250VDC	Figure 2	782-2C-SKT
AD-BSMM-24	$8.00	MOV module for 782 series relays that operate at 24VAC coil voltage. Package includes 5 modules.	24VAC/VDC		
AD-BSMM-120	$8.00	MOV module for 782 series relays that operate at 120VAC coil voltage. Package includes 5 modules.	120VAC/VDC		
AD-BSMM-240	$8.00	MOV module for 782 series relays that operate at 240VAC coil voltage. Package includes 5 modules.	240VAC/VDC		

Accessory dimensions

inches [mm]

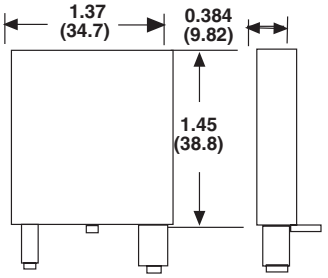
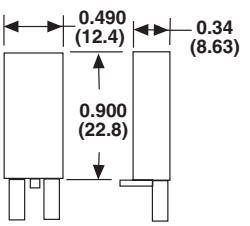


Figure 1



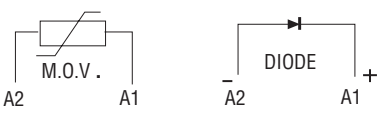


Figure 2

Power Relays

AD-PR40-1C-12D shown

Features

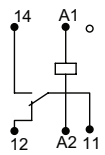
- High power contacts capable of switching up to 40A
- Open construction
- SPDT, DPST and DPDT models
- Riveted construction for high reliability
- Maximum contact voltage up to 600V

Power Relay Selection Guide

Part Number	Price	Coil Voltage	Configuration	Contact Rating	Dimensions
AD-PR40-1C-12D	$14.75	12VDC	SPDT	40A	Figure 1
AD-PR40-1C-24D	$15.75	24VDC			
AD-PR40-1C-24A	$18.00	24VAC			
AD-PR40-1C-120A	$16.25	120VAC			
AD-PR40-1C-240A	$18.50	240VAC			
AD-PR40-2A-12D	$17.50	12VDC	DPST		Figure 2
AD-PR40-2A-24D	$17.50	24VDC			
AD-PR40-2A-24A	$17.25	24VAC			
AD-PR40-2A-120A	$17.25	120VAC			
AD-PR40-2A-240A	$17.75	240VAC			
AD-PR40-2C-12D	$19.25	12VDC	DPDT		Figure 3
AD-PR40-2C-24D	$19.75	24VDC			
AD-PR40-2C-24A	$19.75	24VAC			
AD-PR40-2C-120A	$19.50	120VAC			
AD-PR40-2C-240A	$19.75	240VAC			

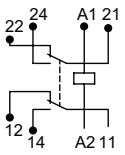
Wiring

AD-PR40-1C-xxxx



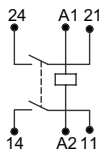
SPDT

AD-PR40-2C-xxxx



DPDT

AD-PR40-2A-xxxx



DPST

Dimensions inches [mm]

Figure 1
AD-PR40-1C-xx

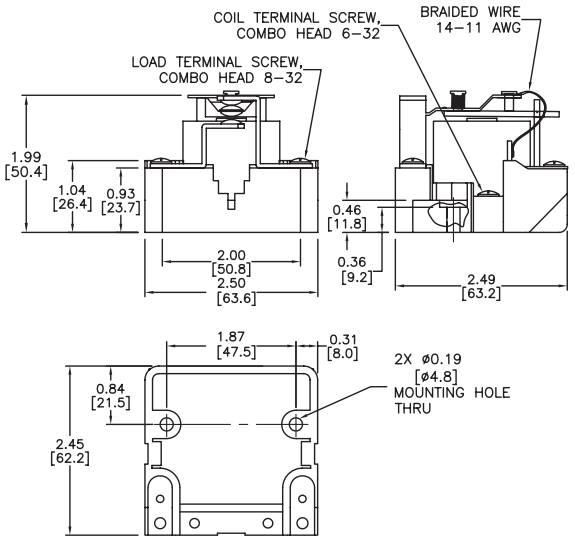
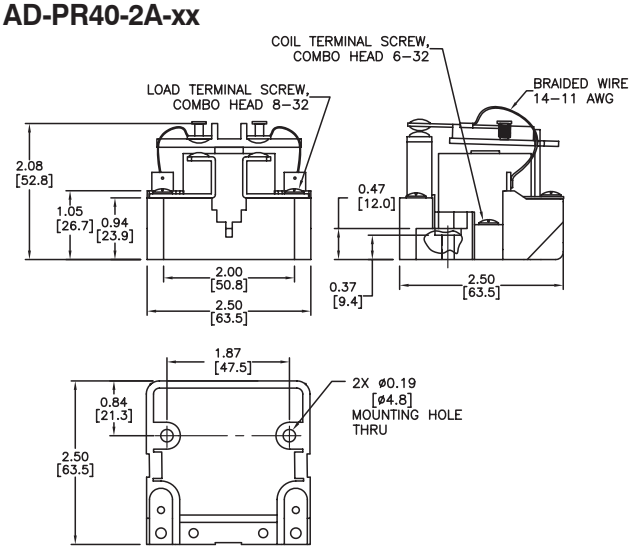


Figure 2
AD-PR40-2A-xx



Power Relays Specifications

Power Relays Specification Table															
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°C to 55°C (-67°F to 131°F)														
Response Time	30ms														
Weight	227g (8oz) to 312g (11oz)														
Agency Approvals and Standards	UL Recognized E191059, CE Certified (9667186-9811), CSA Certified 244610, RoHS														
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)														
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) , 4.0W 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					DPDT				
Contact Material	Silver Alloy, gold flashed														
Contact Rating	40A, 300 VAC / 28 VDC 5A, 480 / 600 VAC 2HP EA. POLE 120-600 VAC 2HP SW. 2 POLES 120-600 VAC 15A TUNG. 120 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														

Dimensions inches [mm]

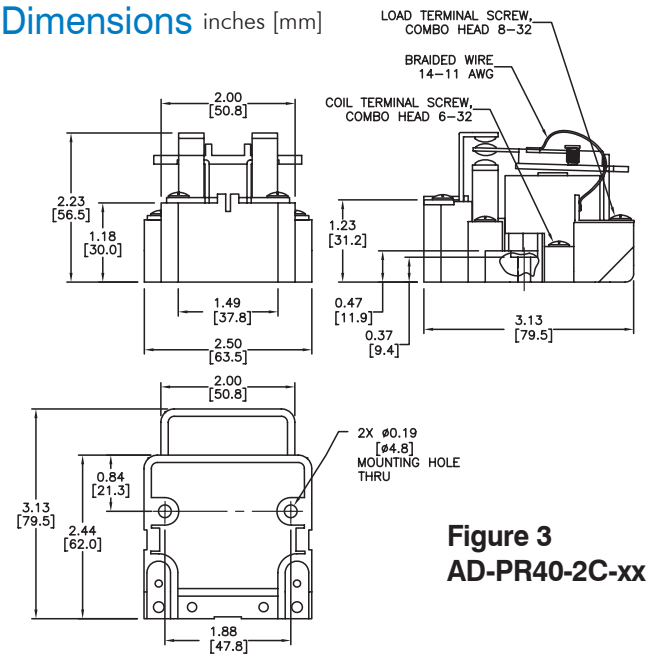
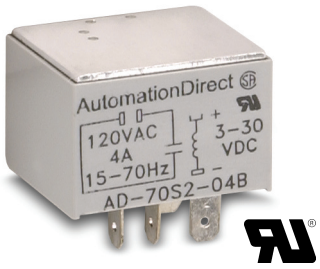


Figure 3
AD-PR40-2C-xx

AD Series Solid State Relays

AD-SSR210-22-DCZ shown



AD-70S2-04B shown

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.

Solid State Relay 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 Features

- 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 Features

- 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 Relay Selection Guide							
Part Number	**Price**	**Description**	**Switching Type**	**Dimensions & Derating Charts**	**Relay Socket Part Number**	**Price**	**Socket Dimensions**
AD-SSR210-22-ACZ	$39.00	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	N/A	N/A	N/A
AD-SSR210-22-DCZ	$39.00	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	$59.00	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	$59.00	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	$41.25	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	$37.50	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	$58.50	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	$54.00	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	$39.00	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	$39.00	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	$45.00	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	$45.00	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	$39.00	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	$39.00	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	$49.00	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	$49.00	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	$73.75	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	Figure 2			
AD-SSR245-45-DCZ	$73.25	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	$75.00	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	$75.00	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	$65.00	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	$65.00	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	$20.00	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 3	***782-2C-SKT (see wiring diagram on next page)***	$4.00	Figure 6 *
AD-70S2-04C	$20.00	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	$20.00	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.

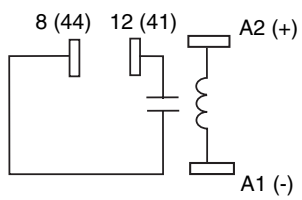
AD Series Solid State Relay Specifications

Specifications																						
Part Number	AD-SSR210-22-DCZ	AD-SSR230-22-DCZ	AD-SSR245-45-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	4-32 VDC											90-280 VAC						90-140 VAC	90-280 VAC		90-140 VAC	
Typical Input Current	8-12 mA											2-4 mA										
Maximum Turn-On Voltage	4VDC											90 Vrms										
Minimum Turn-Off Voltage	1VDC											10 Vrms										
	Output Characteristics																					
Output Type	SCR																					
Switching Type	Zero Cross		Random Switching			Zero Cross		Random Switching				Zero Cross		Random Switching		Zero Cross			Random Switching		Zero Cross	
Output Voltage	24-280 VAC					48-660 VAC						24-280 VAC				48-660 VAC					24-280 VAC	48-660 VAC
Load Current Range	10-45A																					65A
Transient Over-Voltage	600Vpk					1200Vpk						600Vpk				1200Vpk					600Vpk	1200Vpk
Maximum Surge Current	10A: 120Apk; 20A: 250Apk; 30/45A: 625Apk; (at 16.6 ms)					625Apk (at 16.6 ms)						10A: 120Apk; 20A: 250Apk; 30/45A: 625Apk; (at 16.6 ms)				625Apk (at 16.6 ms)					10A: 120Apk; 20A: 250Apk; 30/45A: 625Apk; (at 16.6 ms)	625Apk (at 16.6 ms)
Maximum On-State Voltage Drop at Rated Current	1.6 Vpk																					
Maximum I^2T for Fusing (8.3 ms)	10A: 60 A^2sec; 20A: 260 A^2sec; 30/45A: 1620 A^2sec					1620 A^2sec						10A: 60 A^2sec; 20A: 260 A^2sec; 30/45A: 1620 A^2sec				1620 A^2sec					10A: 60 A^2sec; 20A: 260 A^2sec; 30/45A: 1620 A^2sec	1620 A^2sec
Maximum Off-State Leakage Current at Rated Current	10mA					1mA						10mA				1mA					10mA	1mA
Maximum 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°C to 80°C (-40°F to 176°F) - derating applies																					
Frequency	Input: no frequency limitation / output: snubber 48-63 Hz																					
Storage Temperature Range	-40°C to 125°C (-40°F to 257°F)																					
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																					
Maximum Wire Size	8AWG																					
Agency Approvals	E222847 UL Recognized, CE, CSA 2742910																					

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

AD-SSRxxx-xx wiring diagram

AD-70S2-xx wiring diagram



Please see our website www.AutomationDirect.com for complete engineering drawings.

SSR Series Dimensions & Derating Charts

Dimensions

inches [mm]

AD-SSR Series

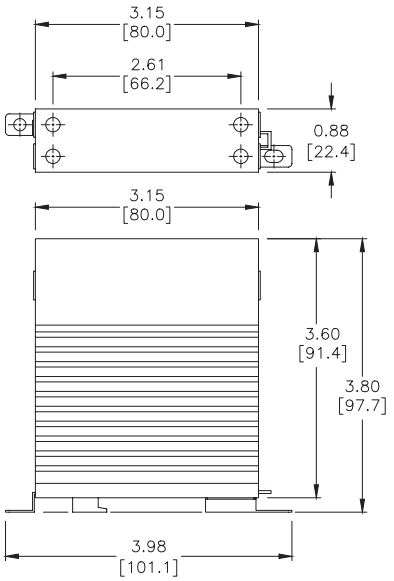


Figure 1

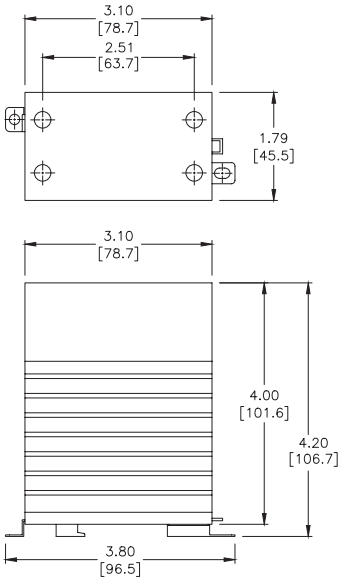
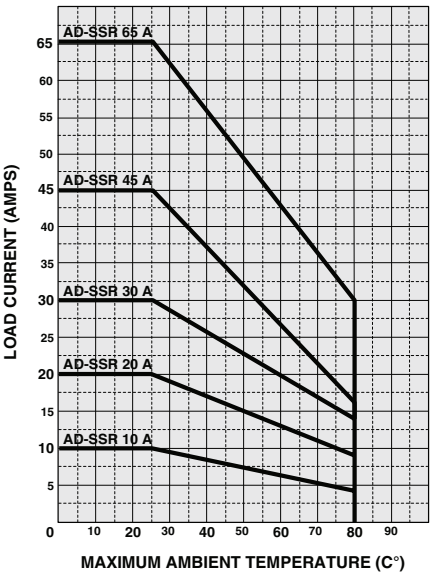


Figure 2

AD-SSR Series derating chart



Note: Recommended spacing between multiple SSRs is 0.75 inch.

AD-70S2 Series

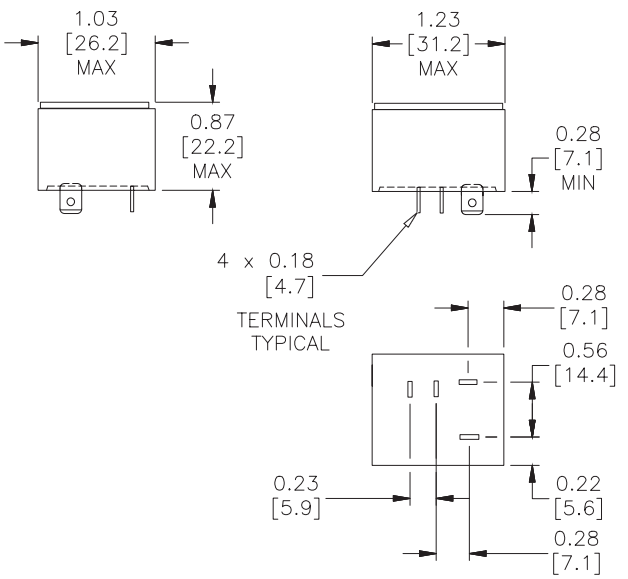
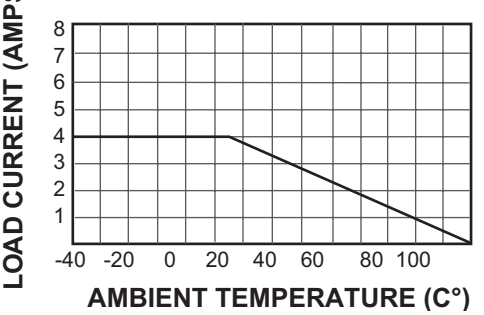


Figure 3

AD-70S2 Series derating charts

Maximum Continuous Current vs. Ambient Temperature



Please see our website www.AutomationDirect.com for complete engineering drawings.

AD Series Class 6 Solid State Relays

The Class 6 solid state relays offer an energy-efficient alternative to standard electro-mechanical 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 shown

Class 6 Solid State Relay Selection Guide

Part Number	Price	Type	Input Voltage	Load Voltage	Configuration	Contact Rating
AD-SSR610-AC-280A	$18.25	N.O. SCR	90 to 280 VAC	24 to 280 VAC	SPST	10A
AD-SSR610-DC-280A	$16.25	N.O. SCR	3 to 32 VDC			
AD-SSR6T10-DC-280A	$16.25	N.O. TRIAC	3 to 32 VDC			
AD-SSR625-AC-280A	$23.50	N.O. SCR	90 to 280 VAC			25A
AD-SSR625-DC-280A	$17.50	N.O. SCR	3 to 32 VDC			
AD-SSR6T25-DC-280A	$18.50	N.O. TRIAC	3 to 32 VDC			
AD-SSR640-AC-280A	$25.50	N.O. SCR	90 to 280 VAC			40A
AD-SSR640-DC-280A	$24.50	N.O. SCR	3 to 32 VDC			
AD-SSR6T40-DC-280A	$22.75	N.O. TRIAC	3 to 32 VDC			
AD-SSR650-AC-280A	$29.75	N.O. SCR	90 to 280 VAC			50A
AD-SSR650-DC-280A	$29.75	N.O. SCR	3 to 32 VDC			
AD-SSR675-AC-280A	$41.00	N.O. SCR	90 to 280 VAC			75A
AD-SSR675-DC-280A	$41.00	N.O. SCR	3 to 32 VDC			
AD-SSR6M12-DC-200D	$17.25	N.O. MOSFET	3.5 to 32 VDC	3 to 200 VDC		12A
AD-SSR6M25-DC-200D	$40.00	N.O. MOSFET	3.5 to 32 VDC			25A
AD-SSR6M40-DC-200D	$40.00	N.O. MOSFET	3.5 to 32 VDC			40A
AD-SSR610-AC-480A	$14.50	N.O. SCR	90 to 280 VAC	48 to 480 VAC		10A
AD-SSR610-DC-480A	$14.50	N.O. SCR	3 to 32 VDC			
AD-SSR6T10-DC-480A	$14.50	N.O. TRIAC	3 to 32 VDC			
AD-SSR625-AC-480A	$18.75	N.O. SCR	90 to 280 VAC			25A
AD-SSR625-DC-480A	$17.75	N.O. SCR	3 to 32 VDC			
AD-SSR6T25-DC-480A	$19.00	N.O. TRIAC	3 to 32 VDC			
AD-SSR640-AC-480A	$32.00	N.O. SCR	90 to 280 VAC			40A
AD-SSR640-DC-480A	$30.00	N.O. SCR	3 to 32 VDC			
AD-SSR6T40-DC-480A	$22.75	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	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		90 to 280 VAC	3 to 32 VDC	90 to 280 VAC	3 to 32 VDC
Maximum Input Current	2 mA	10 mA		2 mA	10 mA		2 mA	10 mA		2 mA	10 mA	2 mA	10 mA
Must Release Voltage	10 VAC	1 VDC		10 VAC	1 VDC		10 VAC	1 VDC		10 VAC	1 VDC	10 VAC	1 VDC
Reverse Polarity Protection	–	no		–	no		–	no		–	no	–	no
Switching Type	Zero Cross												
Power Indicator	Green LED status lamp												
Output Characteristics													
Load Voltage Range	24 to 280 VAC												
Rated Load Current	10 A			25 A			40 A			50 A		75 A	
Maximum Off-State Voltage dv/dt	500 V/µs												
Minimum Load Current	40 mA	150 mA		40 mA	150 mA		40 mA	150 mA		40 mA	150 mA	40 mA	150 mA
Maximum Non-Repetitive Surge Current (1 Cycle, 16.6 ms), peak	120 A			250 A			625 A					1000 A	
Maximum Off State Leakage current (RMS)	10 mA	1 mA		10 mA	1 mA		10 mA	1 mA		10 mA	1 mA	10 mA	1 mA
Maximum On-State Voltage Drop (RMS)	1.6 V rms												
Maximum I^2T for Fusing (A^2Sec)	60			260			1620					4150	
Operating Frequency Range	50 to 60 Hz												
Maximum Turn-On Time	10 ms	8.3 ms		10 ms	8.3 ms		10 ms	8.3 ms		10 ms	8.3 ms	10 ms	8.3 ms
Maximum Turn-Off Time	40 ms	8.3 ms		40 ms	8.3 ms		40 ms	8.3 ms		40 ms	8.3 ms	40 ms	8.3 ms
General Characteristics													
Dielectric Strength (Input-to-Output Isolation)	4000 VAC (rms)												
Thermal Resistance (Junction to Base)	1.48°C/W (34.66°F/W)			1.02°C/W (33.84°F/W)			0.63°C/W (33.13°F/W)					0.31°C/W (32.56°F)	
Minimum Insulation Resistance @ 500 VDC	$1^E + 9\ \Omega$												
Operating Temperature Range	-40°C to 80°C (-40° to 176°F) derating applies												
Storage Temperature Range	-40°C to 125°C (-40°F to 257°F)												
Weight	86.5 g (3.05 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

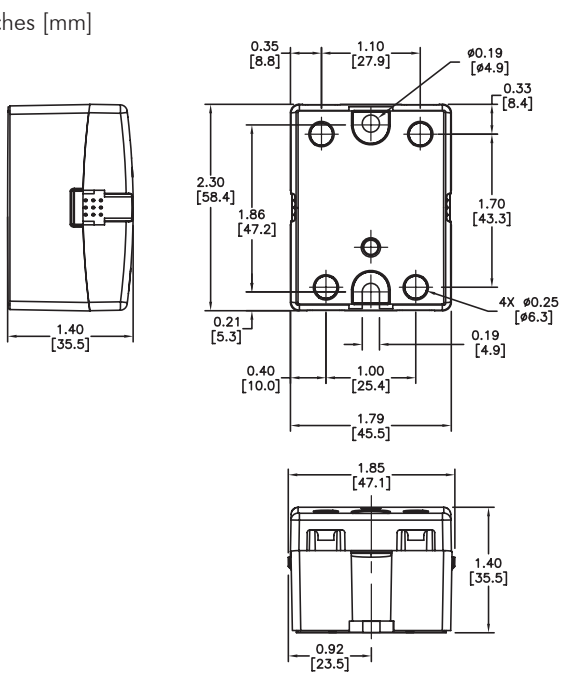
Specifications												
Part Number	AD-SSR6M12-DC-200D	AD-SSR6M25-DC-200D	AD-SSR6M40-DC-200D	AD-SSR610-AC-480A	AD-SSR610-DC-480A	AD-SSR6T10-DC-480A	AD-SSR625-AC-480A	AD-SSR625-DC-480A	AD-SSR6T25-DC-480A	AD-SSR640-AC-480A	AD-SSR640-DC-480A	AD-SSR6T40-DC-480A
Input Characteristics												
Control Voltage Range	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	10mA			4mA	15mA		4mA	15mA		4mA	15mA	
Must Release Voltage	1VDC			10VAC	1VDC		10VAC	1VDC		10VAC	1VDC	
Reverse Polarity Protection	no			–	no		–	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			25A			40A		
Maximum Off-State Voltage dv/dt	–			500 V/µs								
Minimum Load Current	–			40mA	150mA		40mA	150mA		40mA	150mA	
Maximum Non-Repetitive Surge Current (1 Cycle, 16.6 ms), peak	27A	50A	90A	140A			250A			625A		
Maximum Off State Leakage current (RMS)	<1mA			10mA	1mA		10mA	1mA		10mA	1mA	
Typical On-State Voltage Drop (RMS)	2.8 VDC (@ 40A load)			1.7 V rms	1.6 V rms		1.7 V rms	1.6 V rms		1.7 V rms	1.6 V rms	
Maximum I^2T for Fusing (A^2Sec)	–			81			260			1620		
Operating Frequency Range	–			50 to 60 Hz								
Maximum Turn-On Time	300µs			10ms	8.3 ms		10ms	8.3 ms		10ms	8.3 ms	
Maximum Turn-Off Time	1ms			40ms	8.3 ms		40ms	8.3 ms		40ms	8.3 ms	
General Characteristics												
Dielectric Strength (Input-to-Output Isolation)	2500VAC (rms)			4000VAC (rms)								
Thermal Resistance (Junction to Base)	1.06°C/W (33.90°F/W)			1.48°C/W (34.66°F/W)			1.02°C/W (33.84°F/W)			0.63°C/W (33.13°F/W)		
Minimum Insulation Resistance @ 500 VDC	$1^E + 9\Omega$											
Operating Temperature Range	-40°C to 80°C (-40°F to 176°F) (derating applies)											
Storage Temperature Range	-40°C to 100°C (-40°F to 212°F)			-40°C to 125°C (-40°F to 257°F)								
Weight	110g (3.88 oz)			86.5 g (3.05 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 Dimensions & Derating Charts

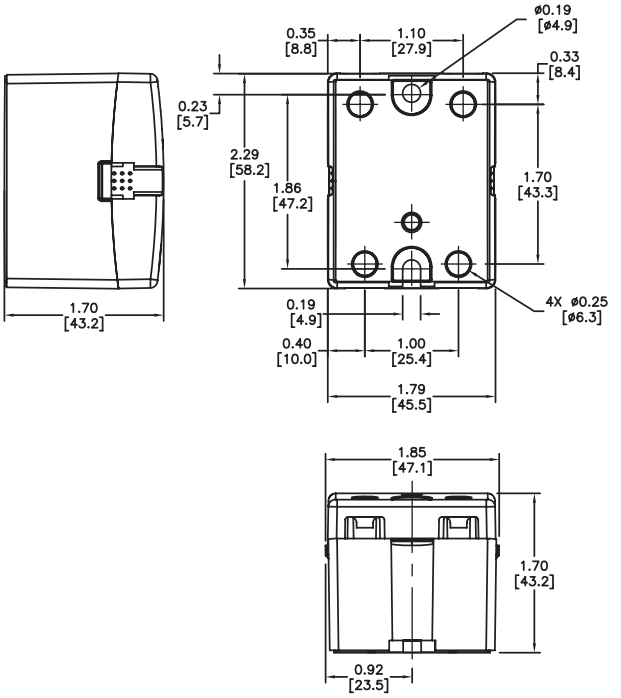
Dimensions

inches [mm]

AD-SSR6xx-xC-xxxA

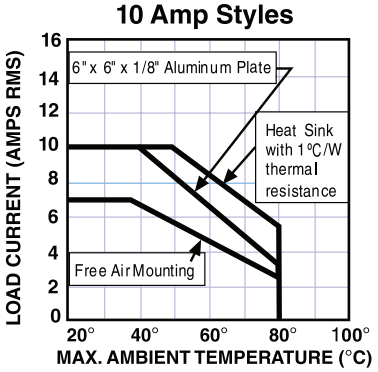


AD-SSR6Mxx-DC-200D

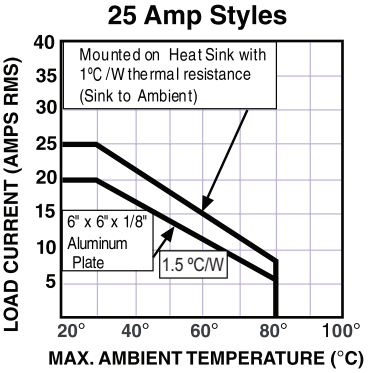


Derating Charts

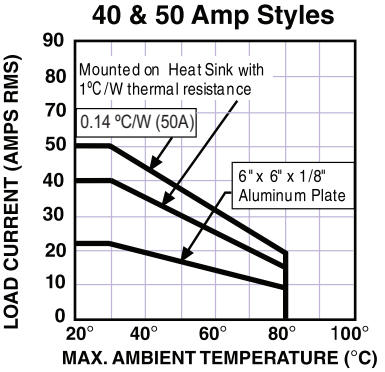
10 Amp Styles



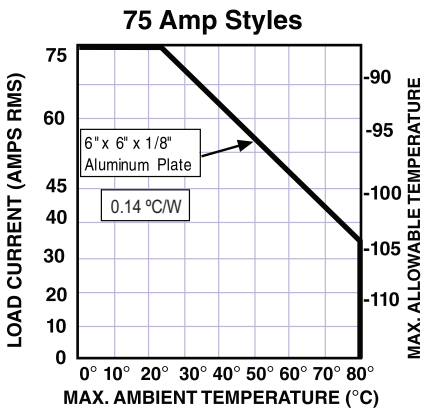
25 Amp Styles



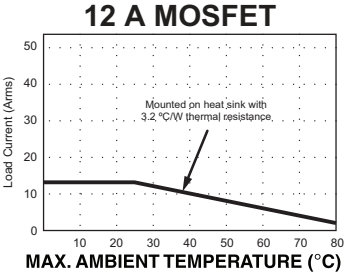
40 & 50 Amp Styles



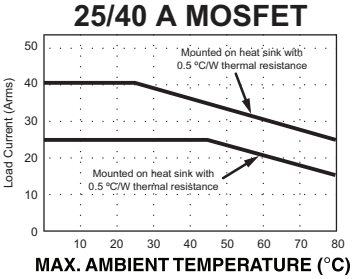
75 Amp Styles



12 A MOSFET



25/40 A MOSFET



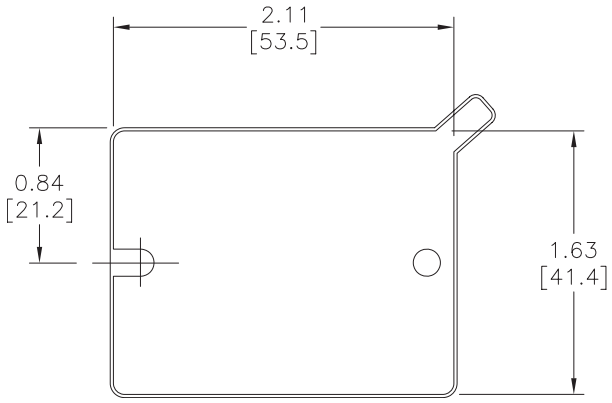
Note: Charts are based on using a thermal transfer medium such as the included thermal pad

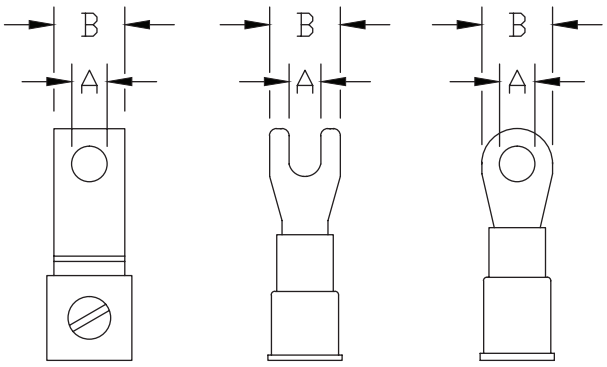
AD Series Class 6 Solid State Relays Accessory

Accessory for SSR6 Solid State Relay		
Part Number	**Price**	**Description**
AD-SSR-THERM-PAD	$18.00	Thermal mounting pad for AD-SSR6 solid state relays ONLY. 10/pk.

Dimensions

inches [mm]





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 shown

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 Relay Selection Guide						
Part Number	***Price***	***Configuration***	***Input Voltage***	***Load Voltage***	***Switching Device***	***Contact Rating***
AD-SSR810-AC-28Z	$25.50	SPST-NO	90 to 280 VAC	24 to 280 VAC	SPST	10A
AD-SSR810-AC-28R	$27.75					
AD-SSR810-DC-28Z	$20.25		3 to 32 VDC			
AD-SSR810-DC-28R	$20.50					
AD-SSR810-DC-28RN	$21.75	SPST-NC	3 to 32 VDC			
AD-SSR810-AC-48Z	$25.50	SPST-NO	90 to 280 VAC	48 to 480 VAC		
AD-SSR810-AC-48R	$32.00					
AD-SSR810-DC-48Z	$20.75		3 to 32 VDC			
AD-SSR810-DC-48R	$22.75					
AD-SSR810-AC-60Z	$32.25		90 to 280 VAC	48 to 600 VAC		
AD-SSR810-AC-60R	$33.00					
AD-SSR810-DC-60Z	$24.50		3 to 32 VDC			
AD-SSR810-DC-60R	$24.50					

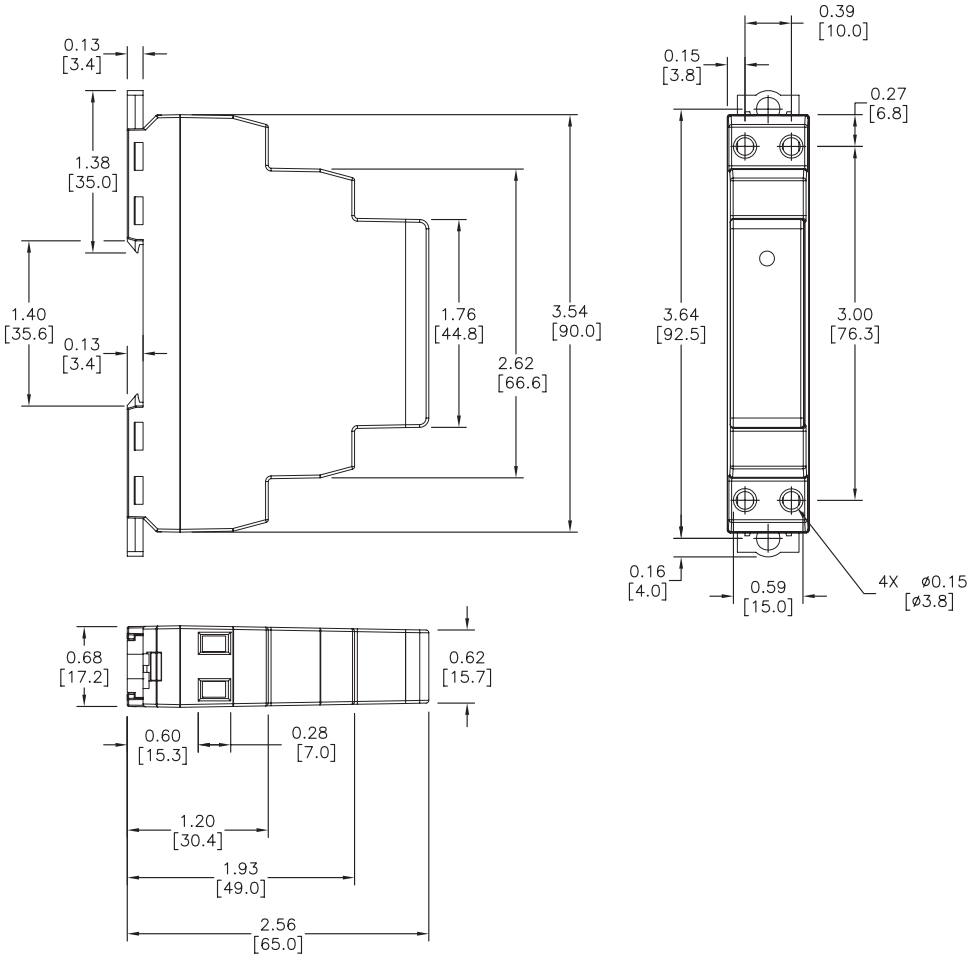
AD Series Class 8 Solid State Relays

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	500 V/µs				200 V/µs	350 V/µs				200 V/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 I^2T for Fusing (A^2Sec)	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°C to 80°C (-22°F to 176°F)												
Storage Temperature Range	-40°C to 100°C (-40°F to 212°F)												
Weight	127 g (4.1 oz)												
Terminal Torque	7.1 lb·in (0.8 N·m) max												
Terminal Wire Capacity	14AWG (2.5 mm^2) max												
Agency Approvals and Standards	UL file # E222847, CE, CSA, RoHS												
Environmental Protection	IP20												

AD Series Class 8 Solid State Relays Dimensions & Derating Charts

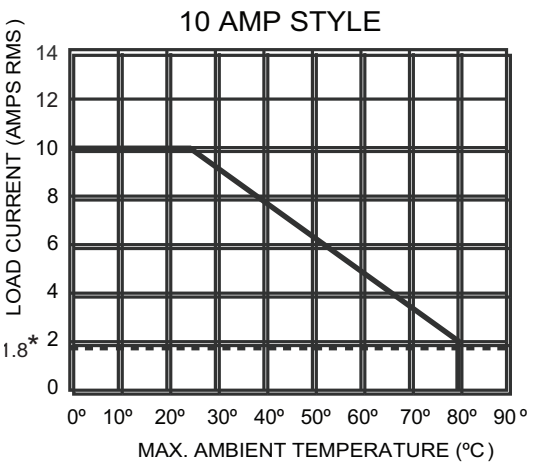
Dimensions

inches [mm]



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 de-rating.

AD Series Class 8 Solid State Relays for Hazardous Locations

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 shown

Class 8 Hermetically-sealed Solid State Relay Selection Guide						
Part Number	*Price*	*Switching Device*	*Input Voltage*	*Load Voltage*	*Configuration*	*Contact Rating*
AD-HSSR815-DC-05	$56.75	MOSFET	3.5 to 32 VDC	3 to 50 VDC	N.O. SPST	15A
AD-HSSR808-DC-15	$55.25			3 to 150 VDC		8A
AD-HSSR810-AC-28	$56.00	SCR	90 to 280 VAC	24 to 280 VAC		10A
AD-HSSR810-DC-28	$54.50		3 to 32 VDC			
AD-HSSR810-AC-48	$41.75		90 to 280 VAC	48 to 480 VAC		
AD-HSSR810-DC-48	$55.25		3 to 32 VDC			
AD-HSSR810-AC-60	$42.75		90 to 280 VAC	48 to 600 VAC		
AD-HSSR810-DC-60	$41.75		3 to 32 VDC			

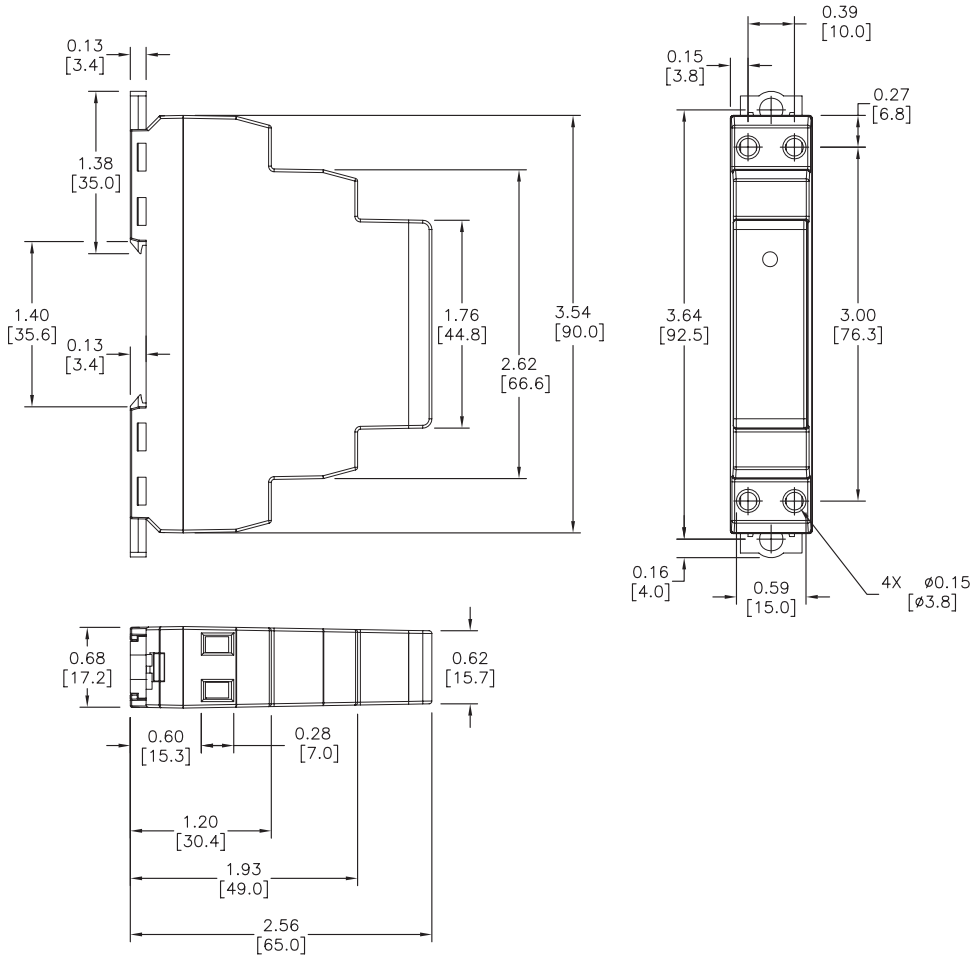
AD Series Class 8 Solid State Relays for Hazardous Locations

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	10 A					
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 I^2T for Fusing (A^2Sec)	–	–	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	127.1 g (4.1 oz)							
Terminal Torque	7.1 in·lb (0.8 N·m) maximum							
Terminal Wire Capacity	14AWG (2.5mm^2) max							
Agency Approvals and Standards	UL file # E344125, CE, RoHS							
Environmental Protections	IP20 (Class I, Div. 2 Groups A, B, C, D)							

AD Series Class 8 Solid State Relays for Hazardous Locations Dimensions and Derating Charts

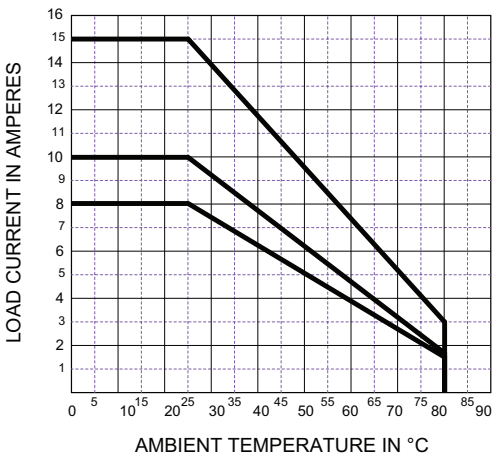
Dimensions

inches [mm]



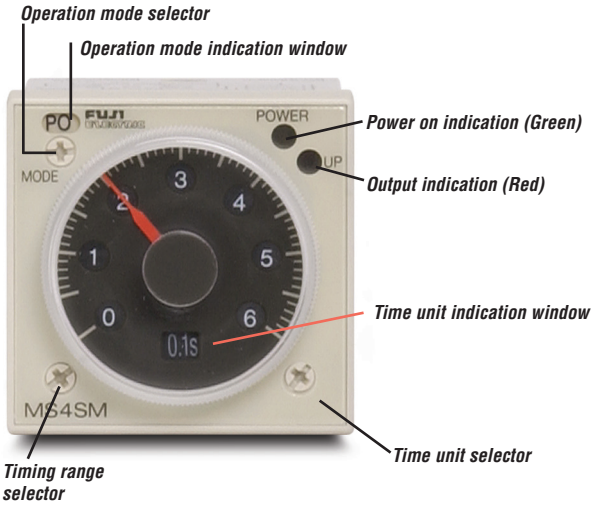
Wiring Diagram

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 de-rating.

Timers for all Applications



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.

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.

	ST7P Series	MS4S Series	KT-V4S Series
			
Display	Manual dial Time setting Output LED indicator	Manual dial Time setting Power LED indicator Output LED indicator Output mode setting	4-digit green LED display for time setting 4-Digit red LED display for current time Output LED indicator Programming indicators
Input Power	100-120 VAC or 24 VDC	100-240 VAC or 24 VDC/AC	85-260 VAC or 10-26 VDC
Inputs	Timed signal	Reset signal Start signal Gate signal Timed signal	Start signal Reset signal Timed signal
Outputs	Normally-open DPDT Normally-closed DPDT	Normally-open DPDT Normally-closed DPDT	1 SPDT DC NPN transistor
Contact Rating	3 A @ 240 VAC (resistive load)	5 A @ 250 VAC (resistive load)	Mechanical: 2 A @ 220 VAC Transistor: 100 mA @ 24 VDC
Output Modes	On-delay	On-delay Flicker One shot Off-delay	On-delay Flicker One shot Off-delay Accumulation
Time Ranges	0.4 seconds to 60 minutes	0.05 seconds to 60 hours	0.001 seconds to 999.9 hours
Enclosure Rating	NEMA 1	NEMA 1	IP65 - faceplate
Agency Approvals	UL/CSA/CE/TUV	UL/CSA/CE/TUV	UL/CSA/CE
Price	starting at $36.00	starting at $44.50	starting at $100.00

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.

Features

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 0-60
- 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

MS4SC Series

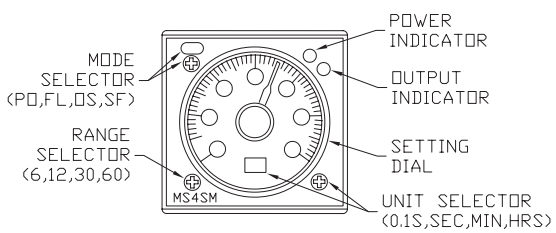
- On-delay timer
- 8-pin plug-in with a SPDT timed contact output and a SPDT instantaneous contact output
- Timing range from 0.05 seconds to 60 hours
- Timer scale with selectable ranges of 0-6, 0-12, 0-30 and 0-60
- Timing units in selectable ranges of 0.1s, sec, min and hrs
- Power on LED indicator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

Product Selection Guide

Part Number	Description	Voltage	Time Range	Price
MS4SM-AP-ADC	Multi-mode timer with selectable timing range from 0.05s to 60 hours. Input power is 100 - 240 VAC. DPDT relay output. 11-pin connection. UL, CSA , TÜV approved. *Note*: Socket mounts must be purchased separately	100-240 VAC	0.05 seconds to 60 hours	$48.50
MS4SA-AP-ADC	On-delay timer with selectable timing range from 0.05s to 60 hours. Input power is 100 - 240 VAC. DPDT relay output. 8-pin connection. UL, CSA, TÜV approved. Note: Socket mounts must be purchased separately		0.05 seconds to 60 hours	$48.50
MS4SC-AP-ADC	On-delay timer with selectable timing range from 0.05s to 60 hours. Input power is 100 - 240 VAC. SPDT timed relay output and SPDT instantaneous relay output. 8-pin connection. UL, CSA, TÜV approved		0.05 seconds to 60 hours	$48.50
MS4SM-CE-ADC	Multi-mode timer with selectable timing range from 0.05s to 60 hours. Input power is 24 VDC/AC DPDT relay output. 11-pin connection. UL, CSA , TÜV approved. *Note*: Socket mounts must be purchased separately	24 VDC/AC	0.05 seconds to 60 hours	$48.50
MS4SA-CE-ADC	On-delay timer with selectable timing range from 0.05s to 60 hours. Input power is 24 VDC/AC. DPDT relay output. 8-pin connection. UL, CSA, TÜV approved. *Note*: Socket mounts must be purchased separately		0.05 seconds to 60 hours	$48.50
MS4SC-CE-ADC	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. *Note*: Socket mounts must be purchased separately		0.05 seconds to 60 hours	$44.50
TP411X	DIN rail/surface mount socket for MS4SM series timers. UL, CSA, TÜV approved	N/A	N/A	$6.50
TP411SBA	Panel mount socket for MS4SM series timers. UL, CSA, TÜV approved, requires PANEL-16*			$6.50
TP48X	DIN rail/surface mount socket for MS4SA and MS4SC series timers. UL, CSA, TÜV approved			$6.50
TP48SB	Panel mount socket for MS4SA and MS4SC series timers. UL, CSA, TÜV approved, requires PANEL-16*			$6.50
PANEL-16	Mounting clip for 1/16th DIN timers and temperature/process controllers, for door (flush) mounting. 5 clips per package			$11.00

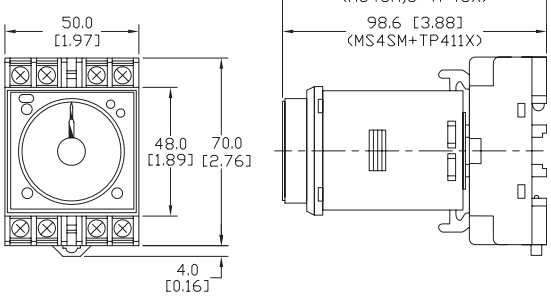
Panel clips for mounting through a door are optional and must be purchased seperately.

Control



Dimensions (timer and socket assembly)

mm [inches]

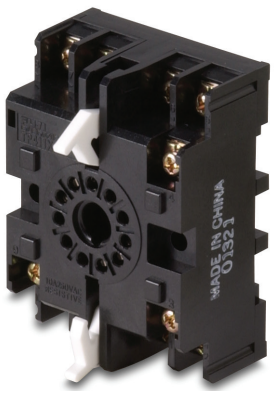


Fuji 1/16 DIN Super Timers

MS4SM-AP-ADC
MS4SM-CE-ADC

MS4SA-AP-ADC
MS4SA-CE-ADC

MS4SC-AP-ADC
MS4SC-CE-ADC



TP411X

TP411SBA*

TP48X

TP48SB*

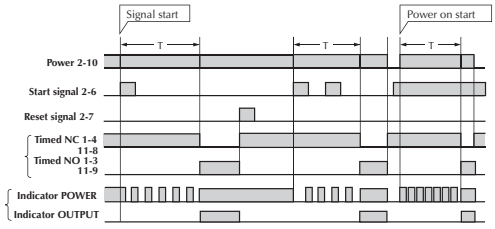
Specifications		
Approvals	UL file no.: E44592, CSA file no.: LR20479, TÜV license no: R9551800	
Repeat Accuracy	±0.3% at maximum setting time	
Reset Time	0.1 second or less	
Operating Voltage Range	85-264 VAC 50/60Hz MS4SM-AP-ADC MS4SA-AP-ADC MS4SC-AP-ADC	20.4-26.4 VDC/AC MS4SM-CE-ADC MS4SA-CE-ADC MS4SC-CE-ADC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

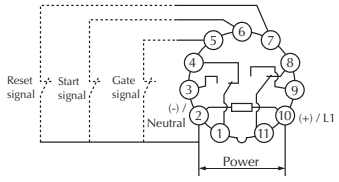
When using panel mount sockets TP411SBA and TP48SB, mounting clip PANEL-16 is required and must be purchsed seperately.

Fuji 1/16 DIN Timers Timing and Wiring Diagrams

MS4SM

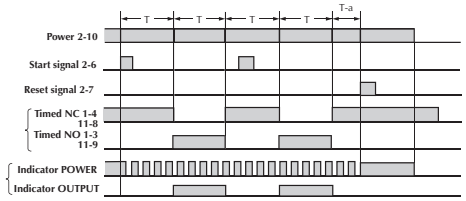
1. On-delay PO





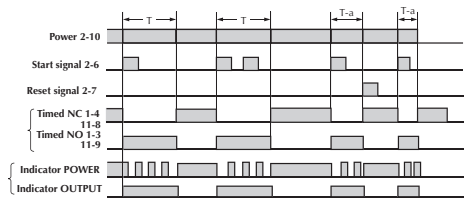
- With power off turn the mode selector until PO is displayed.
- When power is on, applying the start signal turns the timed N.O. (normally open) contact on after the set time has elapsed.
- When using a power-on start, pins 2 and 6 (start signal) must be jumpered together
- To make timer output a signal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

2. Flicker FL



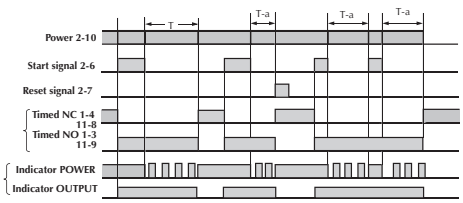
- With power off, turn the mode selector until FL is displayed.
- When power is on, applying the start signal turns the timed contact on and off repeatedly at the set time intervals.
- When using a power-on start, pins 2 and 6 (start signal) must be jumpered together

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



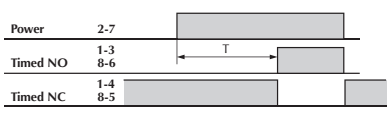
- With power off, turn the mode selector until SF is displayed.
- When power is on, applying the start signal instantly turns the timed N.O. contact on. Removing the start signal turns the contact off after the set time has elapsed.

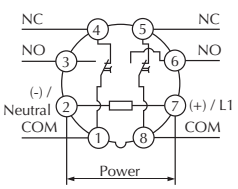
Notes:

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

MS4SA

On-delay

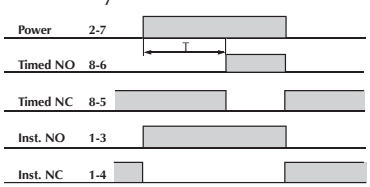


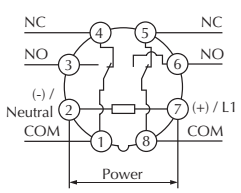


- When power is applied, the timed N.O. contacts make after the set time has elapsed.
- When power is removed, the contacts reset.
- To make timer output a signal as soon as power is turned on, turn timer dial fully counter-clockwise.

MS4SC

On-delay

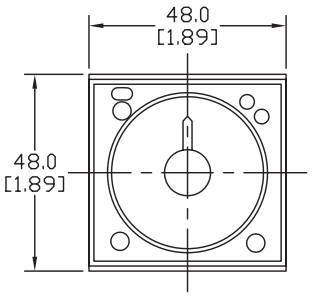




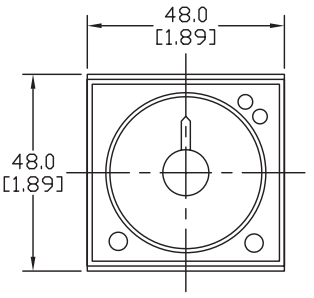
- Timed contact
  When power is applied, the N.O. contact makes after the set time has elapsed. When power is removed, the contacts reset.
- Instantaneous contact
  When power is applied, the N.O. contact makes instantly. When power is removed, the contacts reset.
- To make timer output a signal as soon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

Fuji 1/16 DIN Super Timers Dimensions

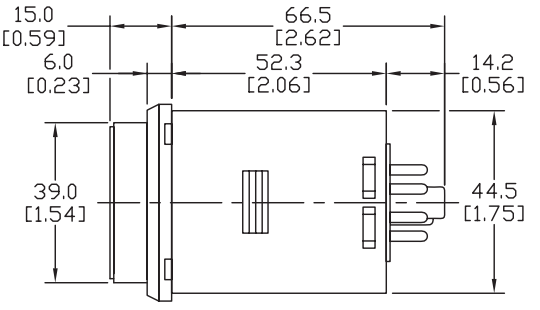
MS4SM



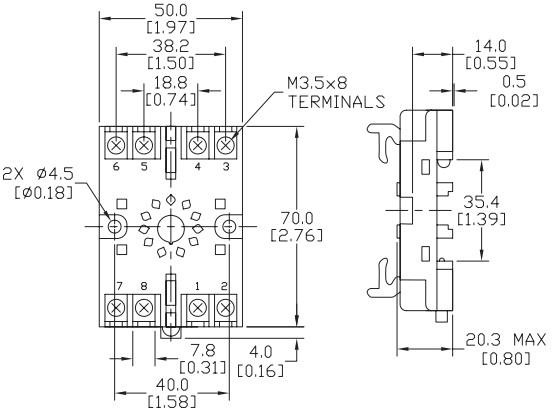
MS4SA and MS4SC



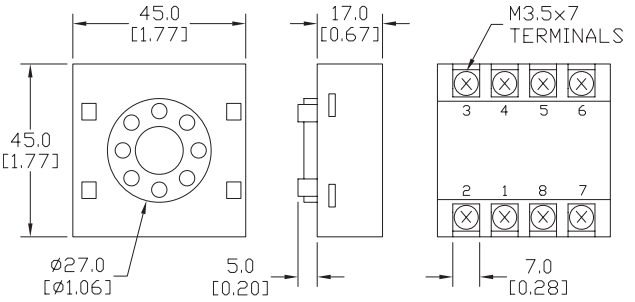
Side View



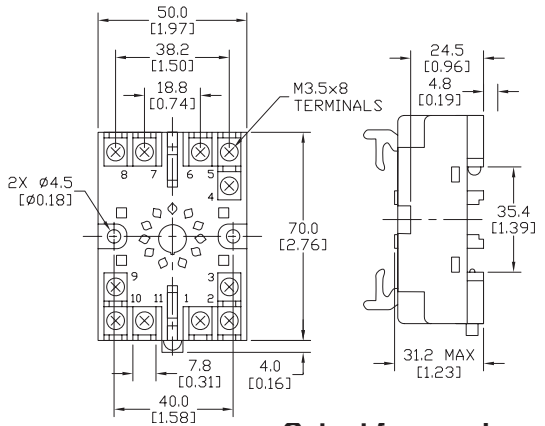
Socket for MS4SA, MS4SC (8-pin)
TP48X



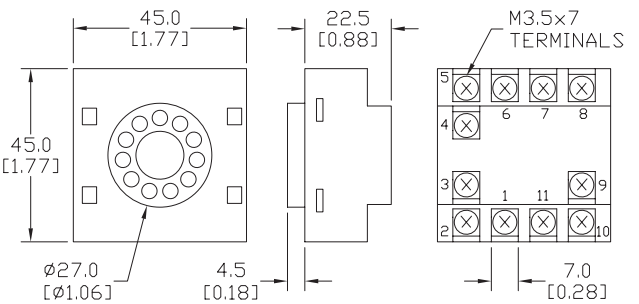
Socket for MS4SA, MS4SC, (8-pin)
TP48SB



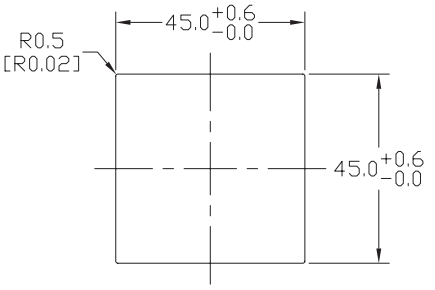
Socket for MS4SM (11-pin)
TP411X



Socket for MS4SM (11-pin)
TP411SBA

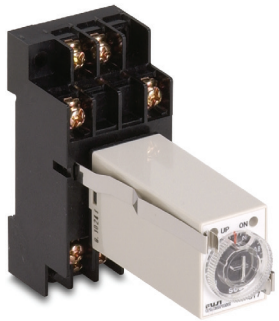


Cutout for panel mounting TP48SB and TP411SBA sockets using PANEL-16 mounting clips



All dimensions in mm [inches]

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.

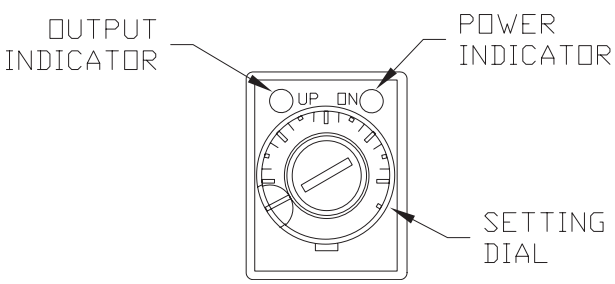
Features

- 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

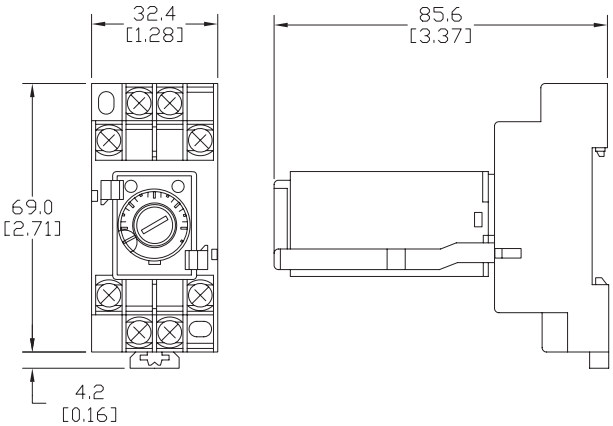
Product Selection Guide

Part Number	Description	Voltage	Time Range	Price
ST7P-2A15S-ADC	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	$37.00
ST7P-2A13T-ADC	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	$37.00
ST7P-2A16T-ADC	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	$37.00
ST7P-2A11N-ADC	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	$37.00
ST7P-2A16N-ADC	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	$37.00
ST7P-2DE5S-ADC	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	$37.00
ST7P-2DE3T-ADC	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	$37.00
ST7P-2DE6T-ADC	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	$37.00
ST7P-2DE1N-ADC	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	$36.00
ST7P-2DE6N-ADC	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	$36.00
TP88X2	DIN rail/surface mount socket for ST7P series timers. UL, CSA, TÜV approved	N/A	N/A	$6.50

Control



Dimensions (timer and socket assembly)



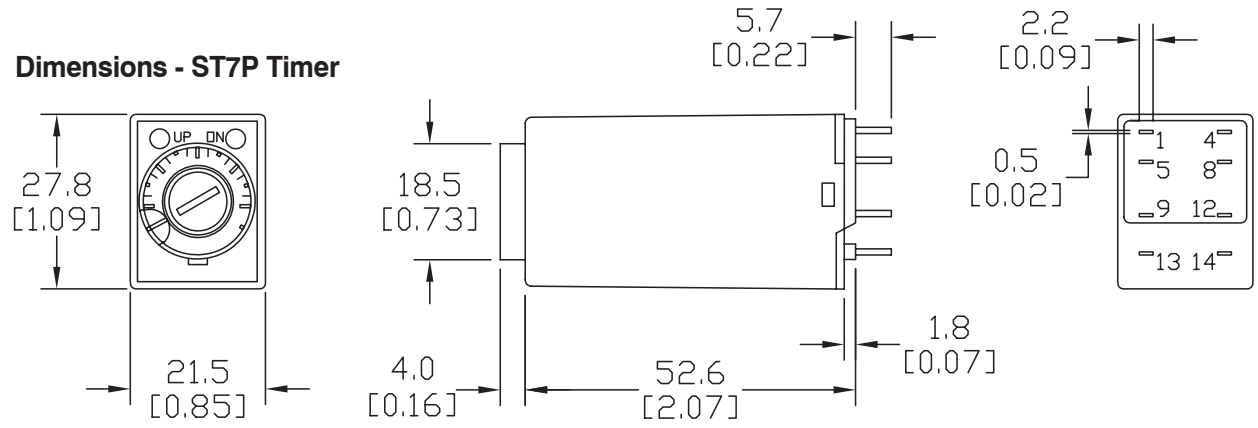
Fuji Miniature DIN Super Timer Specifications

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

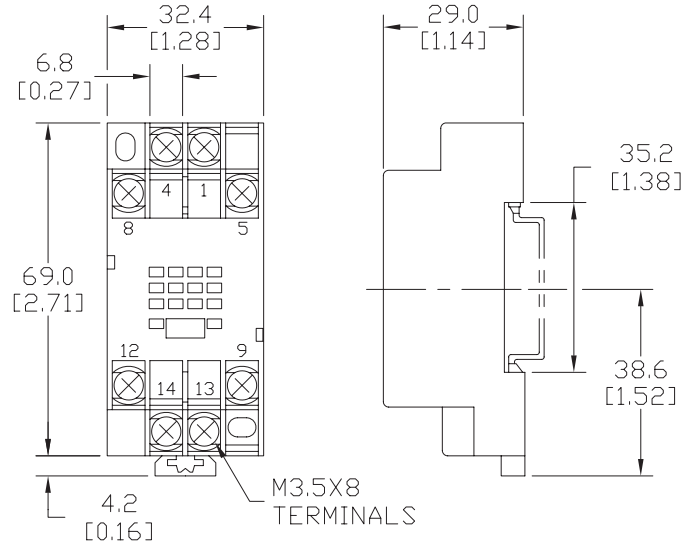
**** Note: If surge voltage exceeds 3000V, use surge suppressors.***

Fuji Miniature DIN Timers, Dimensions, Timing and Wiring

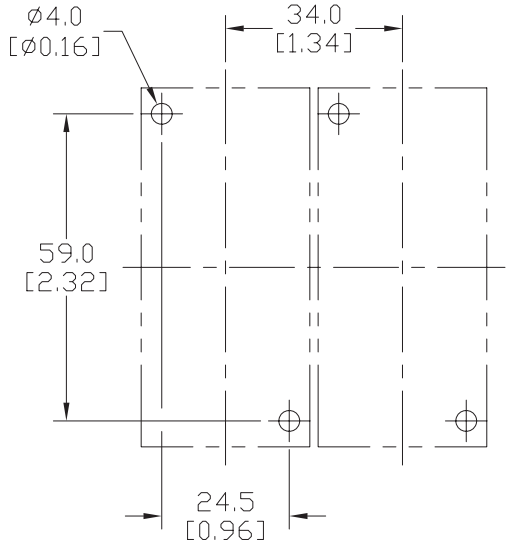
Dimensions - ST7P Timer



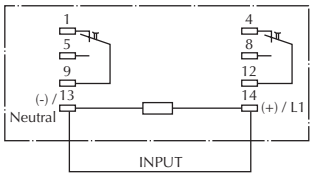
Dimensions - TP88X2 Socket



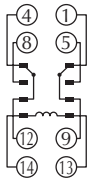
Panel Mounting



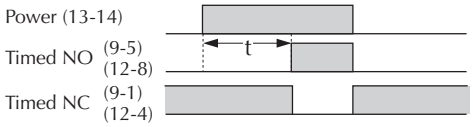
Wiring Diagram



Sockets/Screw Terminal and Rail Mounting



Timing Diagram



All dimensions in mm [inches]

Koyo Digital Timers

Overview

Koyo digital timers offer flexible features at a great price. A large, easy to read display is offered in a small 1/16 DIN size. The large, bright red LED display has a 12 mm character display height which allows it to be seen easily from a distance and at an angle. In addition, set values use a green LED display to differentiate from timing values. Basic function settings are made with digital switches. Detailed settings are selected with digital keys, so operation is easy.

Features

- Tamper-proof: key protection can be set for individual keys to prevent a malfunction or tampering
- Battery-less memory retention: EEPROM is used to retain values in memory, so there is no need for battery maintenance
- Maintenance has been reduced via removable terminals. After wiring, the terminal cover provides a safe barrier for worry-free use
- Power source for a DC sensor: you can source the power for the sensor from the built-in power source which supplies 60 mA at 24 VDC
- Wide operating AC voltage range of 85-264 VAC
- Various types of time ranges: covers ten types of time ranges with times of 0.001 second to 999.9 hours
- Five types of operating modes: settings of on-delay, off-delay, one-shot, accumulation and flicker
- Flush door/panel mounting
- Display of elapsed time/remaining time
- IP65 protective structure: front cover panel is made of a clear membrane, so operation with wet or dirty hands can be worry-free
- Fully CE and UL compliant

KT-V4S-D

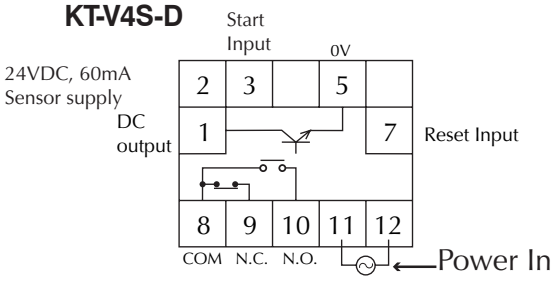
KT-V4S-C-D

Product Selection Guide					
Part Number	**Description**	**Number of Digits**	**Source Voltage**	**Time Range**	**Price**
KT-V4S-D*	Digital timer with 10 types of time ranges (see specifications). Input power is 100-240 VAC. UL and CSA approved.	4	100-240 VAC	0.001 second to 999.9 hours	$100.00
KT-V4S-C-D*	Digital timer with 10 types of time ranges (see specifications). Input power is 12-24 VDC. UL and CSA approved		12-24 VDC		$100.00
Accessories					
Part Number	**Description**				**Price**
PANEL-16	Mounting clip for 1/16th DIN timers and temperature/process controllers, for door (flush) mounting. 5 clips per package				$11.00

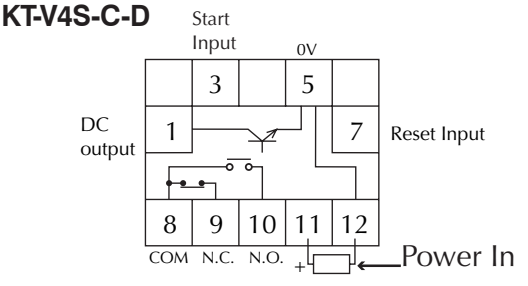
**** Units ship with a panel mounting clip for door (flush) mounting.***

Wiring

KT-V4S-D



KT-V4S-C-D



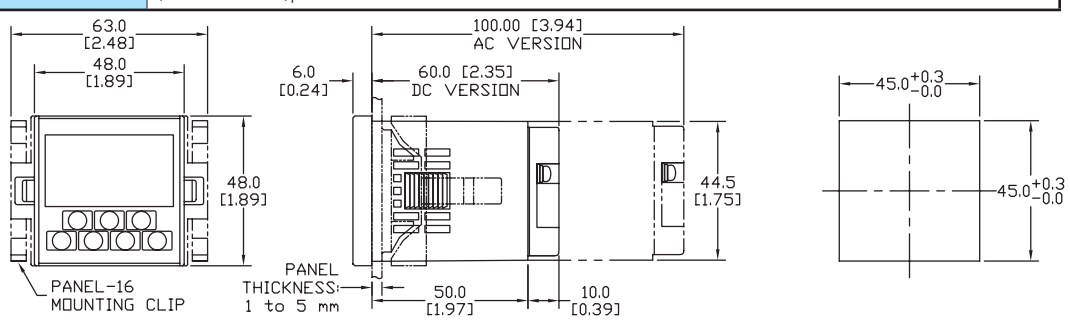
Koyo Digital Timers Specifications

General Specifications			
Power		**AC Power**	**DC Power**
Part Number		KT-V4S-D	KT-V4S-C-D
Approvals		UL listed, CSA listed	UL recognized only with Class II power supply; CSA: EN61010-1 and EMI: EN55-11, EMS: EN50082-2. If product has DC power supply, an EMI/EMC filter must be installed on the power supply.
Source Voltage		100-240 VAC, 50/60 Hz	12-24 VDC
Permitted Power Fluctuation		85-264 VAC	10-26.4 VDC
Power Consumption		Approx. 11 VA	Approx. 4 W
Sensor Power		24 VDC (20-28 V) 60 mA (less than 10%p-p ripple noise)	N/A
Memory Backup upon Power Failure		EEPROM writing up to 100,000 times; Memory duration: 10 years	
Ambient Temperature		-10-50°C (14 to 122°F)	
Storage Temperature		-20-70°C (-4 to 158°F) (with no icing)	
Ambient Humidity		35-85% RH non-condensing	
Withstand Voltage		2 kVAC for one minute	
Vibration Resistance		Durability: Displacement amplitude 0.5mm 10-55 Hz along three axes Operating vibration: Displacement amplitude 0.35mm 10-55 Hz along three axes	
Impact Resistance		Durability: 490 m/s^2 along three axes Operating impact: 98 m/s^2 along three axes	
Noise Resistance		AC power between terminals ±1.5 kV (pulse width 1µs and rise time 1ns)	DC power between terminals ± 1.0 kV (pulse width 1 µ s and rise time 1 ns)
Protective Structure		IP65 (front panel only) when mounted in appropriate enclosure	
Weight		Approx. 150 grams (5.291 oz.)	Approx. 110 grams (3.88 oz.)
Terminals	**Conforming wiring**	0.25-1.65 mm^2 24 to 16 gauge	
	Permitted Torque	0.5 Nm (.369 ft./lbs.)	

Performance Specification	
Category	Timer
Operational Format	On-delay, off-delay, one-shot, accumulator, and flicker (with alarm output)
Number of Digits	4 digits
Display	Current values: red LED, character height 12 mm; Preset value: green LED, character height: 7mm
Time Range	0.001s-9.999s/0.01s-99.99s/0.1s-999.9 s/1s-9999 s/1 s-99 min 59 s/1 min-9999 min/1 h-9999 h/ 1 min-99 h 59 min/0.1 min-999.9 min/0.1h-999.9 h
Display	Elapsed time/remaining time
Timer Precision	0.013% or ±15 ms (using large values)
Input	Input logic: negative logic (no voltage input) positive logic (voltage input)
	Input resistance: positive logic 15 kΩ; negative logic 3.3 kΩ (AC power)/1.8 kΩ (DC power)
	Input voltage: "L" 0-3V "H" 7-30 V
Start Input Response	Less than 15 ms/5 ms/1 ms
External Reset	Min. signal amplitude 5 ms
Output	DC output: NPN open collector output/24 V 100 mA. Withstand voltage 35 V. Residual voltage less than 1.5 V
	Relay output: 1 SPDT 220 VAC 2 A (resistive load). 3A @ 30 VDC, minimum 10mA @ 5 VDC
Output Duration (flicker)	10-9990 ms variable every 10 ms
Installation	1/16 DIN flush door/panel mount

Dimensions

mm[inches]

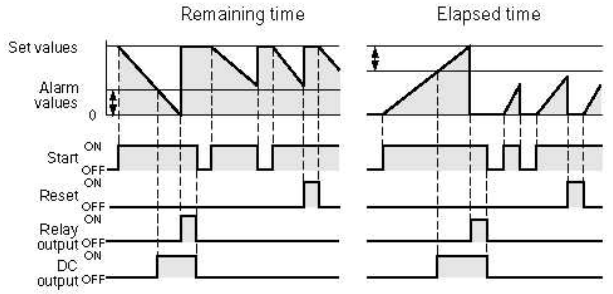


Koyo Digital Timers Timing Diagrams

On-delay

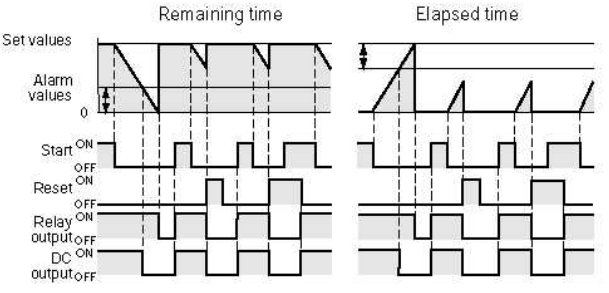
: Alarm setting

SW 1 2
OFF OFF



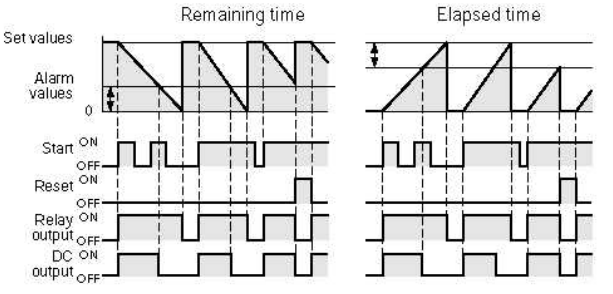
Off-delay

SW 1 2
OFF ON



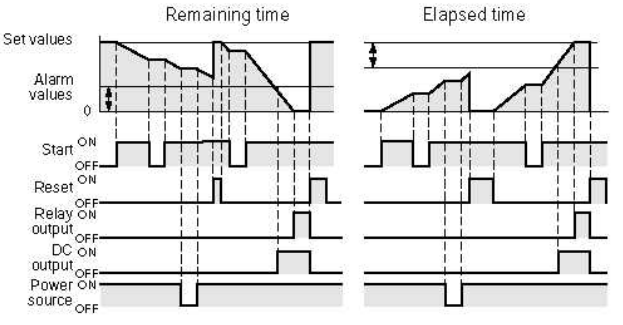
One-shot

SW 1 2
ON OFF



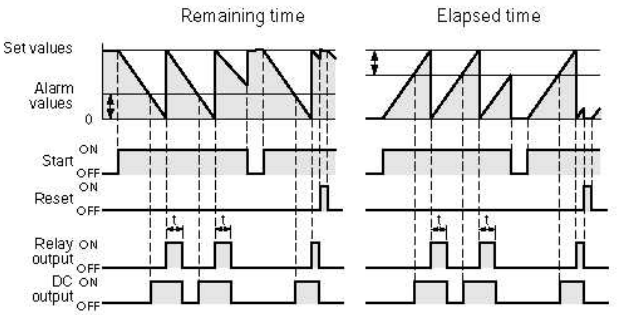
Accumulation

SW 1 2
ON ON



Flicker

(in Setup mode)



Note: Output duration is variable from 0-9990 ms. (Default: 100 ms)

: Alarm settings

When alarm settings are 0, the DC output is the same as the output operations for a relay output.

Note: Alarm settings should be less than preset values. Using alarm settings with values that exceed preset values will result in measurement values of 0 and the alarm output (DC output) will come ON.

KOYO Digital Timers Modes of Operation

ON Delay: The rising edge of the Start signal initiates the Timer. When the Timer reaches the set point, the Relay Output turns ON. The Relay Output stays ON until the falling edge (OFF state) of the Start signal, then the Relay Output turns OFF.

OFF Delay: The falling edge of the Start signal initiates the Timer. When the timer reaches the set point, the Relay Output turns OFF. The Relay Output stays OFF until the rising edge (On state) of the Start signal turns the Relay Output ON.

One Shot: The Start signal works as a one-shot operation. The rising edge of the Start signal initiates the Timer. When the Timer starts timing, the Relay Output turns ON. Once the Timer starts, the Start signal is ignored. The Relay Output stays ON until the Timer reaches the set point, and then it turns OFF.

Accumulation: The rising edge of the Start signal initiates the Timer. The Timer operates as long as the Start signal is ON. When the Start signal turns OFF, the Timer value is held in the accumulator. When the Start signal turns ON again, the Timer continues to operate until it reaches the set point, at which time the Relay Output turns ON.

Flicker: The rising edge of the Start signal initiates the Timer. When the Timer reaches the set point, the Relay Output turns ON for a preset amount of time. The Relay Output continues to toggle ON and OFF at the preset amount of time as long as the Start signal remains ON.

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 persecond
- 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

CTT Series - Digital Counter / Timer / Tachometer

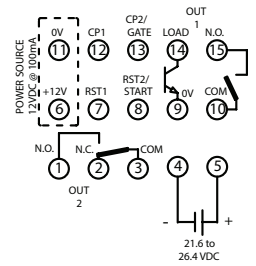
Digital Counter / Timer / Tachometer				
Part Number	**Description**	**Pcs/Pkg**	**Wt (lb)**	**Price**
CTT-AN-D24	Counter / Timer / Tachometer, Output 1 NPN & SPST relay, Output 2 NPN, 24 VDC powered, panel mounting clip is included*	1	0.4	$74.00
CTT-AN-A120	Counter / Timer / Tachometer, Output 1 NPN & SPST relay, Output 2 NPN, 100-264 VAC powered, panel mounting clip is included*	1	0.4	$74.00
CTT-1C-D24	Counter / Timer / Tachometer, Output 1 NPN & SPST relay, Output 2 SPDT relay, 24 VDC powered, panel mounting clip is included*	1	0.4	$74.00
CTT-1C-A120	Counter / Timer / Tachometer, Output 1 NPN & SPST relay, Output 2 SPDT relay, 100-264 VAC powered, panel mounting clip is included*	1	0.4	$74.00

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

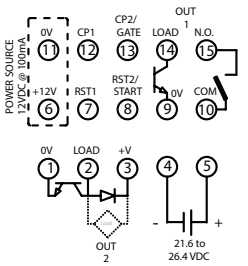
Digital Counter / Timer / Tachometer General Specifications			
Input Power Requirements		100 to 240 VAC 50/60 Hz	24 VDC
Operation Voltage Range		85 to 264 VAC	21.6 to 26.4 VDC
Power Consumption		Less than 10VA	
Power Source		12VDC ±10%, 100mA	
Display		Double-line, 6-digit LCD display (SV = 8mm, PV = 6mm)	
Input Signal		NPN ON impedance 1K ohm max. ON residual voltage: 2V max. PNP 4.5 to 30VDC, low level: 0 to 2VDC	
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, 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	1000,000 operations (frequency 900 operations/hr)	
Output Switching Time		2 milliseconds max	
Dielectric Strength		2000VAC 50/60Hz for 1 minute	
Vibration Resistance		Without damage: 10 ~ 55Hz, amplitude = 0.75mm, 3 axes for 2 hours	
Shock Resistance		Without damage: drop 4 times, 300m/s² 3 edges, 6 surfaces and 1 corner	
Ambient Temperature		+32°F to +122°F (0°C to +50°C)	
Storage Temperature		-4°F to +149°F (-20°C 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	0.5Nm (0.369 ft/lbs)	
Agency Approvals		UL508 listed (E311366), cULus, CE marked	

Wiring

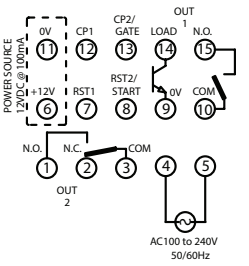
CTT-1C-D24



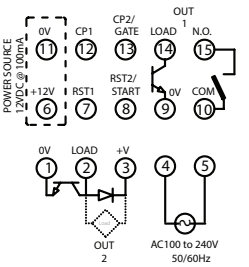
CTT-AN-D24



CTT-1C-A120

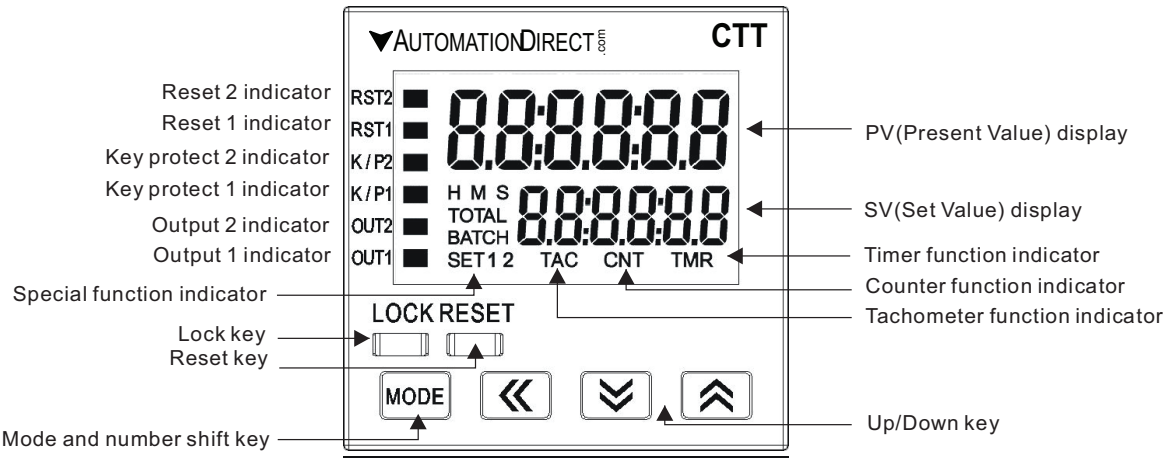


CTT-AN-A120



CTT Series - Digital Counter / Timer / Tachometer

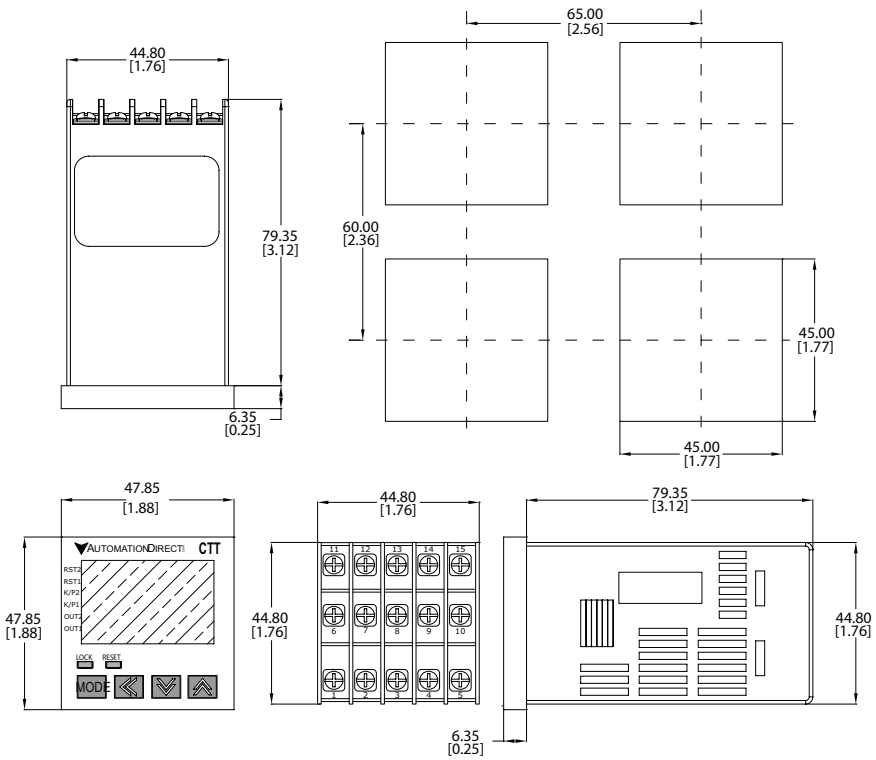
Display, Indicators & Keys



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 Dimensions

mm [inches]



CTT Series - Digital Counter / Timer / Tachometer

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
Start Input Response	Less than 15ms / 5ms / 1ms
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

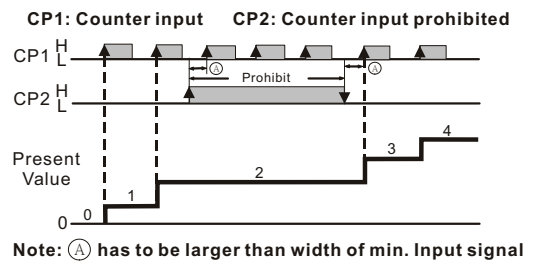
A single count setting value SV is available in Total Counting. Both Outputs 1 and 2 operate concurrently and will turn ON momentarily or will be maintained ON depending on the Output Mode selected.

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.

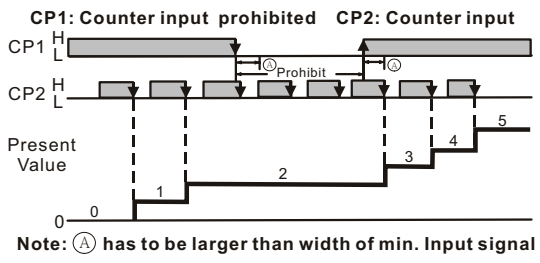
Counter Input Modes

Counting up



Counting Up

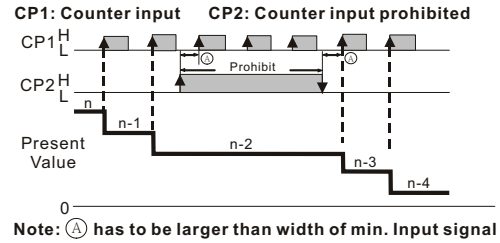
With the input signal OFF at input CP2, each leading edge of the input signal at CP1 will increment the count present value PV by 1. Turning ON the input signal at CP2 will prohibit the input signal at CP1 from incrementing the PV.



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.

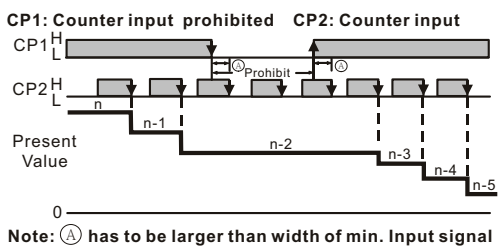
CTT Series - Digital Counter / Timer / Tachometer

Counting down



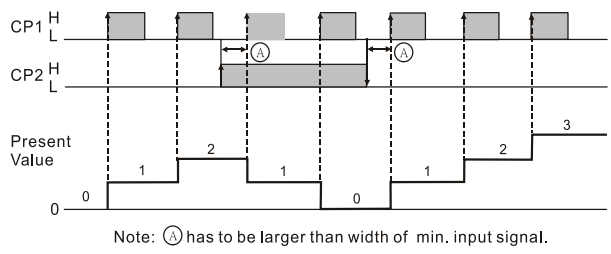
Counting Down

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.



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

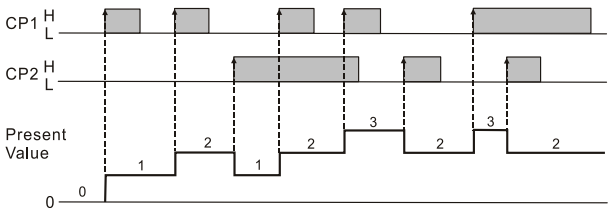


Counting Up / Command Counting Down

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

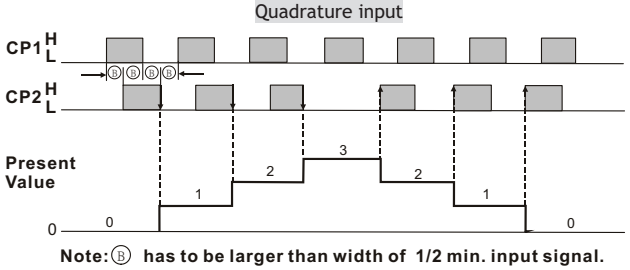


Counting Up / Counting Down

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



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 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% ±0.05 sec, Signal start max ±0.01% ±0.03 sec			
Start Input Response	Less than 15ms / 5ms / 1ms			
External Reset	Minimum reset input signal width 1ms or 20ms (selectable)			
Output Duration (flicker)	10-9990ms variable every 10ms			

Timing Charts

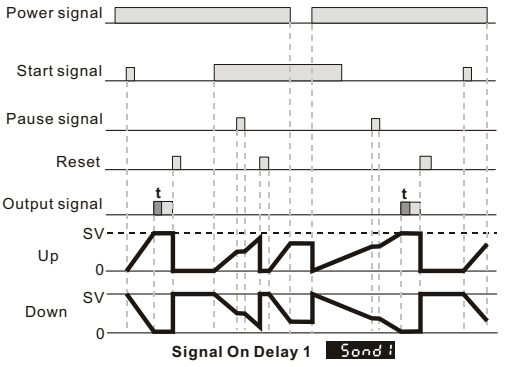
Signal On Delay 1 (Sond 1)

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.



Signal On Delay 1 Sond 1

CTT Series - Digital Counter / Timer / Tachometer

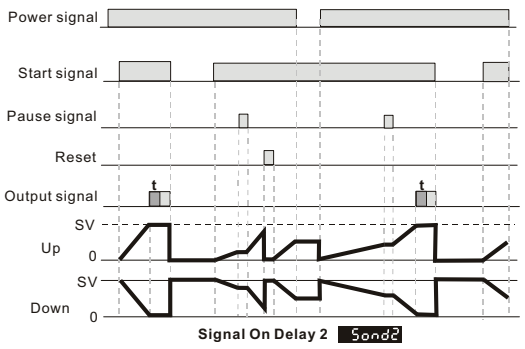
Signal On Delay 2 (Sond2)

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 (E 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 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 On Delay 2 Sond2

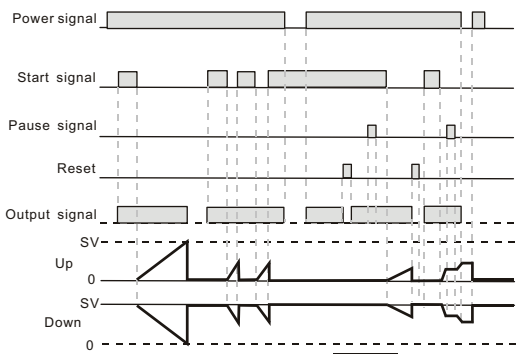
Signal Off Delay (SoFFd)

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 (E 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 Off Delay SoFFd

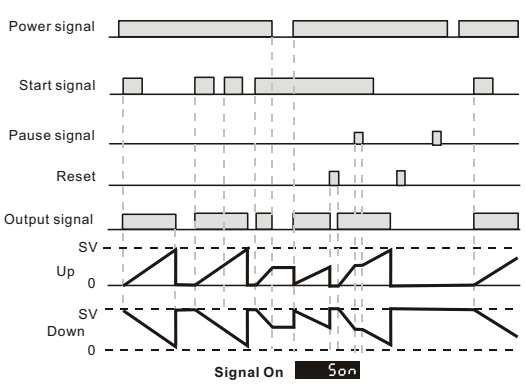
Signal On (Son)

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 (E 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.



Signal On Son

CTT Series - Digital Counter / Timer / Tachometer

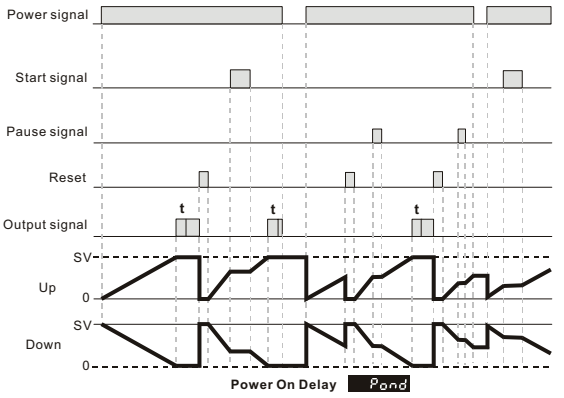
Power On Delay (Pond)

When power is applied to the CTT, the timing period setting value SV will begin (timing up or down based on parameter (b 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.



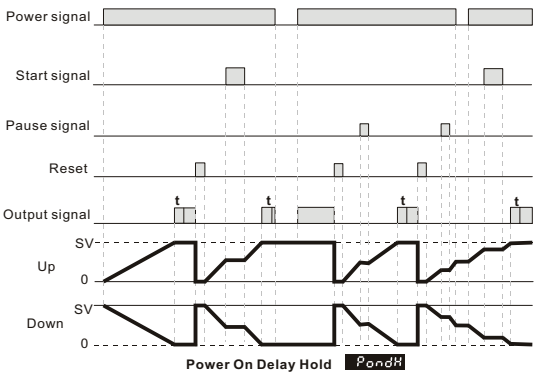
Power On Delay HOLD (PondH)

When power is applied to the CTT, the timing period setting value SV will begin (timing up or down based on parameter (b 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.

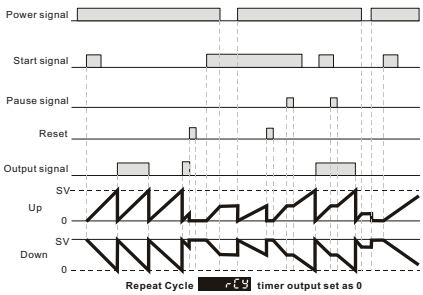
If the output pulse width parameter (toUt 1) is set to >0.00 both outputs will turn ON momentarily for the time set in the output pulse width parameter (toUt 1) at the beginning of the each timing period.

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

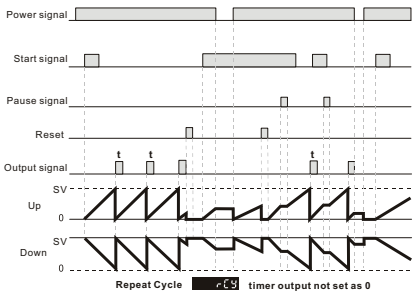
The leading edge of a "reset" input signal at RST1 will turn OFF the outputs and reset the timing period. The "reset" signal minimum pulse width is set by reset pulse width parameter (rtSr). The leading edge of a new "start" signal is necessary to restart the cycle.

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 rCY timer output set as 0



Repeat Cycle rCY timer output not set as 0

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.

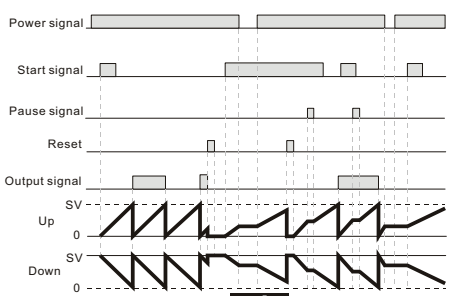
If the output pulse width parameter (toUt 1) is set to >0.00, both outputs will turn ON momentarily for the time set in the output pulse width parameter (toUt 1) at the beginning of the each timing period.

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

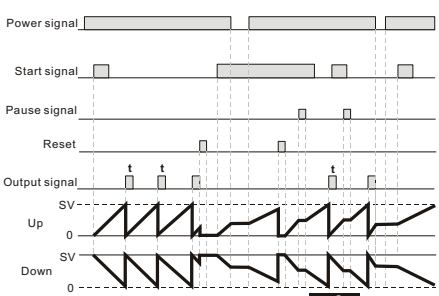
The leading edge of a "reset" input signal at RST1 will turn OFF the outputs and reset the timing period. The "reset" signal minimum pulse width is set by reset pulse width parameter (rtSr). The leading edge of a new "start" signal is necessary to restart the cycle.

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.



Repeat Cycle Hold rCYH Timer output set as 0



RCYH timer output not set as 0 rCYH

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

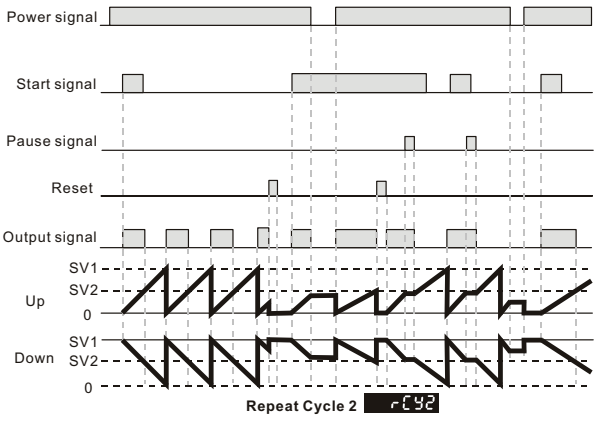
Both outputs will turn ON at the beginning of the first timing period and turn OFF when the timing period reaches time period setting SV2. The outputs will turn ON again when the time period reaches time period setting SV1.

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

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

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

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



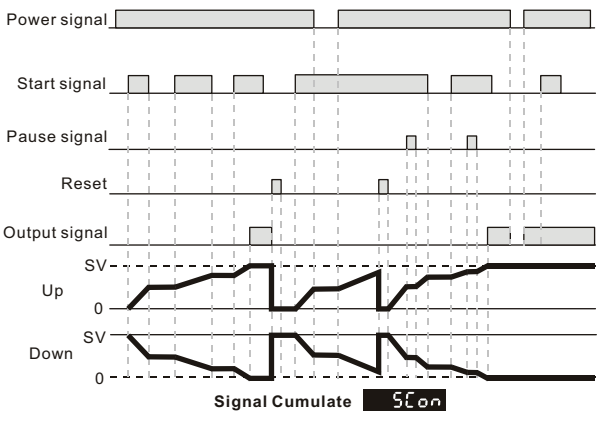
Signal Cumulate (SCon)

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

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

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

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



CTT Series - Digital Counter / Timer / Tachometer

Signal Twin ON-Start (Ston)

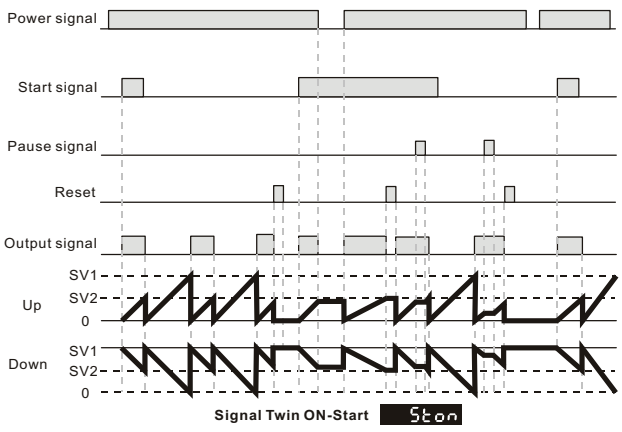
With power applied to the CTT, the leading edge of the input signal at START will turn ON the outputs and begin the timing period timing up or down based on parameter (t modE). When the timing period reaches time setting SV2 the outputs will turn OFF and the time period will reset and restart automatically.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



Signal Twin OFF-Start (StoFF)

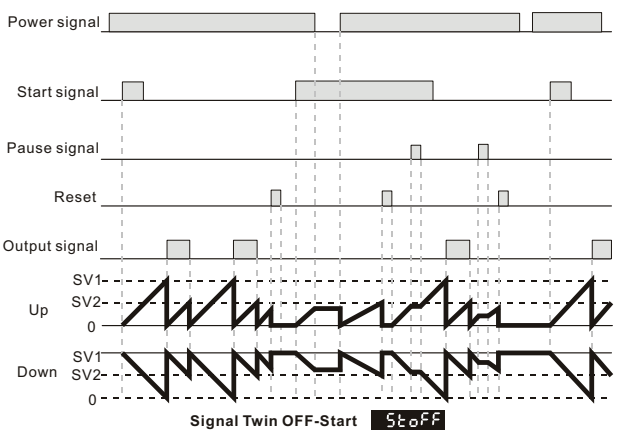
With power applied to the CTT, the leading edge of an input signal at START will begin the timing period timing up or down based on parameter (t modE). When the timing period reaches time setting SV1 the outputs will turn ON and the time period will reset and restart automatically. When the time period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

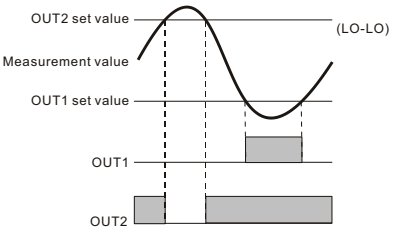


CTT Series - Digital Counter / Timer / Tachometer

Tachometer 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
Timer Precision	Power ON start Max ± 0.01% ±0.05 sec, Signal start Max ±0.01% ±0.03
Start Input Response	Less than 15ms / 5ms / 1ms
External Reset	Minimum reset input signal width 1ms or 20ms (selectable)
Output Duration (Flicker)	10-9990ms variable every 10ms

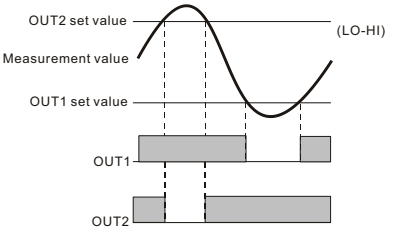
Tachometer Output Mode Charts

2Lo1Lo



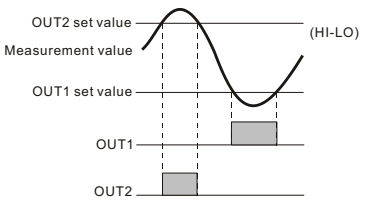
Measurement value ≤ OUT1 set value : OUT1 ON
Measurement value ≤ OUT2 set value : OUT2 ON

2Lo1Hi



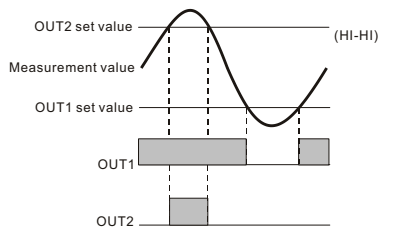
Measurement value ≥ OUT1 set value : OUT1 ON
Measurement value ≤ OUT2 set value : OUT2 ON

2Hi1Lo



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

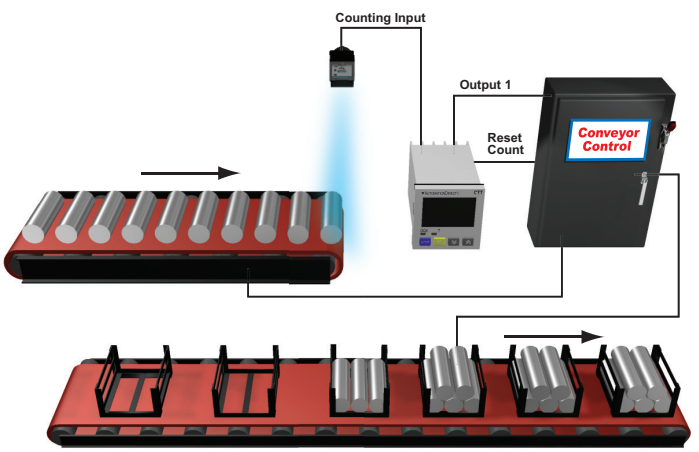
2Hi1Hi



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

Counter Example:

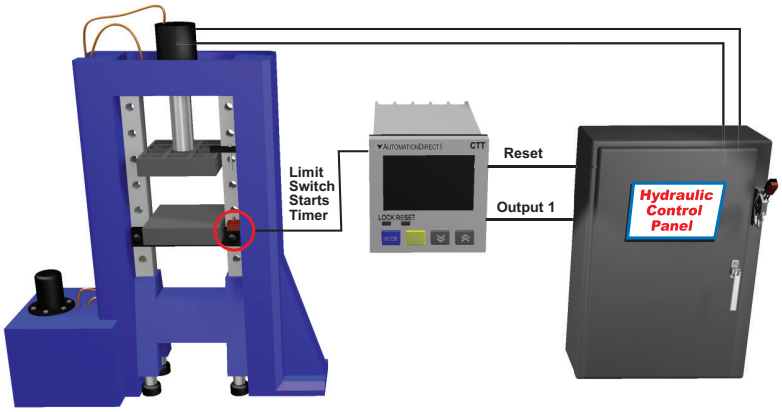
Using the counter feature of the CTT to count the total number of pieces in a box to signal a conveyor to advance to the next station.



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 60/38

PSCALE = 1.579

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