



DESIGN FEATURES

- ◆ Available in On-Delay, True Off-Delay, and On/Off-Delay.
- ◆ Timing from 0.1 seconds to 60 minutes, fully calibrated in linear increments.
- ◆ Oversize time-calibrated adjustment knobs, serrated with high-resolution markings visible from all angles make this the most practical, easily-set timer available.
- ◆ Inherent Transient Immunity.
- ◆ Operating Voltages range from 6 to 550 VAC and 12 to 550 VDC with special voltages available.
- ◆ Available in 2-pole or 4-pole models.
- ◆ Many enclosure options: Explosion proof, Dust tight, Watertight, Hermetically-sealed, NEMA 1.
- ◆ Auxiliary timed and instantaneous switches can be added for greater switching flexibility.
- ◆ Numerous mounting options: Surface mount, Panel mount, Octal plug-in mounting
- ◆ Options and Accessories: Quick-connect terminals, Dial Stops, and Transient protection module.
- ◆ Front Terminals - easy-to-reach screw terminals, all on the face of the unit, clearly identified.
- ◆ Modular Assembly - timing head, coil assembly and switchblock are all individual modules, with coils and switches field-replaceable.

CONSTRUCTION

There are three main components of Series 7000 Timing Relays:

Calibrated Timing Head uses no needle valve, recirculates air under controlled pressure through a variable orifice to provide linearly adjustable timing. Patented design provides instant recycling, easy adjustment and long service life under severe operating conditions.

Precision-Wound Potted Coil module supplies the initial motive force with minimum current drain. Total sealing without external leads eliminates moisture problems, gives maximum insulation value.

Snap-Action Switch Assembly - custom-designed over-center mechanism provides greater contact pressure up to transfer time for positive, no flutter action.

Standard switches are DPDT arrangement, with flexible beryllium copper blades and silver-cadmium oxide contacts. Special "timing-duty" design assures positive wiping action, sustained contact pressure and greater heat dissipation during long delay periods.

Each of these subassemblies forms a self-contained module which is then assembled at the factory with the other two to afford a wide choice of operating types, coil voltages, and timing ranges.

The squared design with front terminals and rear mounting permits the grouping of Series 7000 units side-by-side in minimum panel space. Auxiliary switches may be added in the base of the unit, without affecting the overall width or depth.

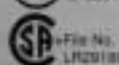
OPERATION

Two basic operating types are available. "On-Delay" models provide a delay period on energization, at the end of which the switch transfers the load from one set of contacts to another. De-energizing the unit during the delay period immediately recycles the unit, readying it for another full delay period on reenergization.

In "Off-Delay" models the switch transfers the load immediately upon energization, and the delay period does not begin until the unit is deenergized. At the end of the delay period the switch returns to its original position.

Reenergizing the unit during the delay period immediately resets the timing, readying it for another full delay period on deenergization. No power is required during the timing period.

In addition to these basic operating types, "Double-Head" models offer sequential delays on pull-in and drop-out in one unit, as described on page 44. With the addition of auxiliary switches the basic models provide two-step timing, pulse actuation for interlock circuits, or added circuit capacity.



Series 7000 Timing Relays are also manufactured to MIL-SPEC requirements, conforming to requirements of MIL-C-2212F (SHPS) with the exception of MIL-B-901. Consult factory for ordering information.
Exception: 7032 models and certain models with accessories are not agency approved.

SPECIFICATIONS

(All values shown are at nominal operating voltage and 77°F (25°C) unless otherwise noted.)

Operating Modes

Model 7012/7014: On-Delay (Delay on pick-up)

Model 7022/7024: Off-Delay (Delay on drop-out)

Model 7032: On-Delay, Off-Delay (Double Head)

Timing Adjustment: Timing is set by simply turning the calibrated dial to the desired time value. In the zone of approximately 25° separating the high and low end of timing ranges A,D,E, and K, instantaneous operation (no time delay) will occur. All other ranges produce an infinite time delay when the dial is set in this zone.

Models 7014 and 7032 are available with letter-calibrated dials only. The upper end of the time ranges in these models may be twice the values shown.

Linear Timing Ranges

Time Range Code	Models 7012, 7022, 7024	Models 7014, 7032
A	.1 to 1 Sec.	.2 to 2 Sec.
B	.5 to 5 Sec.	.7 to 7 Sec.
C	1.5 to 15 Sec.	2 to 20 Sec.
D	5 to 50 Sec.	10 to 100 Sec.
E	20 to 200 Sec.	30 to 300 Sec.
F	1 to 10 Min.	1.5 to 15 Min.
H	3 to 30 Min.	3 to 30 Min.
I	6 to 60 Min.	Not Avail.
J	3 to 120 Cyc.	Not Avail.
K	1 to 300 Sec.	Not Avail.

Repeat Accuracy:

For delays of 200 seconds or less:

7012*, 7022, 7024	±5%
7014*	±10%
7032	±15%

For delays greater than 200 seconds:

7012*, 7022, 7014*, 7024	±10%
7032	±15%

* The first time delay afforded by Model 7012 with H (3 to 30 min.) and I (6 to 60 min.) time ranges or Model 7014 with H time range will be approximately 15% longer than subsequent delays due to coil temperature rise.

Reset Time: 50 msec. (except model 7032)

Relay Release Time: 50 msec. for on-delay models (7012/7014)

Relay Operate Time: 50 msec. for off-delay models (7022/7024)

Operating Voltage Coil Data (for DPDT)

Coil Part #	Code Letter	Rated Voltage	Operating* Voltage Range @ 60Hz	Rated Voltage	Operating Voltage Range @50Hz
7000	A	120	102-132	110	93.5-121
	B	240	204-264	220	187-242
	C	480	408-528		
	D	550	468-605		
	E	24	20.5-26.5		
	F			127	108-140
	G			240	204-264
	H	12	10.2-13.2		
	I	6	5.1-6.6		
	J	208	178-229		
7010	K		Dual Voltage Coil (Combines A&B)		
	L		Special AC Coils (L1, L2, etc.)		
	M	28	22.4-30.8		
	N	48	38.4-52.8		
	O	24	19.2-26.4		
	P	125	100-137.5		
	Q	12	9.6-13.2		
	R	60	48-66		
	S	250	200-275		
	T	550	440-605		
7020	U	16	12.8-17.6		
	V	32	25.8-35.2		
	W	96	76.8-105.6		
	Y	6	4.8-6.6		
	Z	220	176-242		
	X		Special DC Coils (X1, X2, etc.)		

Minimum operating voltages are based on vertically mounted 7012 units. 7012 horizontally mounted or 7022 vertically or horizontally mounted units will operate satisfactorily at minimum voltages approximately 5% lower than those listed.

AC units drop out at approximately 50% of rated voltage. DC units drop out at approximately 10% of rated voltage. All units may be operated on intermittent duty cycles at voltages 10% above the listed maximums (intermittent duty - maximum 50% duty cycle and 30 minutes "on" time.)

*Four pole Models: Operational voltage range 90% to 110% for AC units; 85% to 110% for DC units.

Surge / Transient Protection Option

Characteristics (For D.C. Timers Only)

Coil Voltage Nominal (DC)	Max Excess Energy Capacity	Max De-energization Transient Voltage
12 V	0.4j	48 V
24 V	1.8j	93 V
28 V	1.8j	93 V
32 V	2.5j	135 V
48 V	3.57j	145 V
60 V	6j	250 V
96 V	10j	340 V
110 V	10j	340 V
125 V	10j	340 V
220 V	17j	366 V
250 V	17j	366 V

Surge Life

Applied 100,000 times continuously with the interval of 10 seconds at room temperature. Below 68 VAC: 12A
Above 68 VAC: 35A

Temperature Range

Operating: -22°F to +167°F (-30°C to +75°C)
Storage: -40°F to +167°F (-40°C to +75°C)

SPECIFICATIONS

Output/Life Contact Ratings: Contact Capacity in Amperes (Resistive Load)

Contact Voltage	Min. 100,000 Operations	Min. 1,000,000 Operations
30 VDC	15.0	7.0
110 VDC	1.0	0.5
120 V 60Hz	20.0	15.0
240 V 60Hz	20.0	15.0
480 V 60Hz	12.0	10.0

10 Amps Resistive, 240 VAC
1/4 Horsepower, 120 VAC/240VAC
15 Amps 30 VDC
5 Amps, General Purpose, 600VAC

Per Pole

Dielectric: Withstands 1500 volts RMS 60Hz between terminals and ground. 1,000 volts RMS 60 Hz between non-connected terminals. For dielectric specification on hermetically sealed models consult factory.

Insulation Resistance: 500 Megohms with 500VDC applied.

Temperature Range:

Operating: -20°F to +165°F (-29°C to 74°C)

Storage: -67°F to +165°F (-55°C to 74°C)

Temperature Variation: Using a fixed time delay which was set and measured when the ambient temperature was 77°F (25°C), the maximum observed shift in the average of three consecutive time delays was -20% at -20°F (-29°C) and +20% at 165°F (74°C).

Mounting/Terminals: Normal mounting of the basic unit is in a vertical position, from the back of the panel. A front mounting bracket is also supplied with each basic unit, for installation from the front of the panel. **All units are calibrated for vertical operation.** Basic models (7012, 7022) may also be horizontally mounted, and will be adjusted accordingly **when Accessory Y1 is specified in your order.**

Standard screw terminals (8-32 truss head screws supplied) are located on the front of the unit, with permanent schematic markings. Barrier isolation is designed to accommodate spade or ring tongue terminals, with spacing to meet all industrial control specifications.

The basic Series 7000 may also be panel mounted with the addition of a panelmount kit that includes all necessary hardware and faceplate. This offers the convenience of "out-front" adjustment, with large calibrated dial skirt knob. The faceplate and knob blend with advanced equipment and console designs, while the body of the unit and its wiring are protected behind the panel.

Other mounting options include plug-in styles and special configurations to meet unusual installation requirements. Contact factory for details.

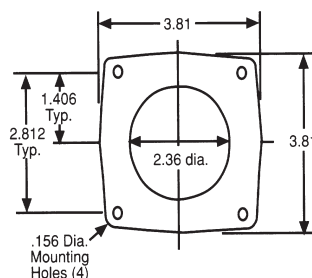
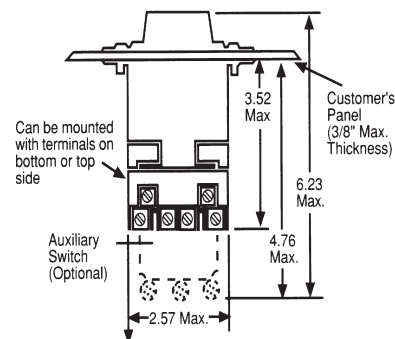
Power Consumption: Approximately 8 watts power at rated voltage.

Approximate Weights:

Models 7012, 7022	2 lbs. 4 ozs.
7014, 7024	2 lbs. 10 ozs.
7032	3 lbs. 5 ozs.

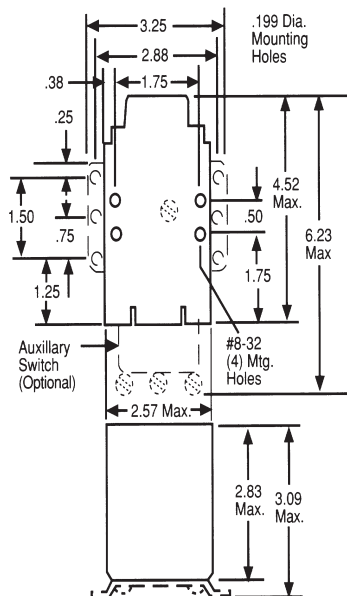
Weight may vary slightly with coil voltage.

Panel mount Option "X"

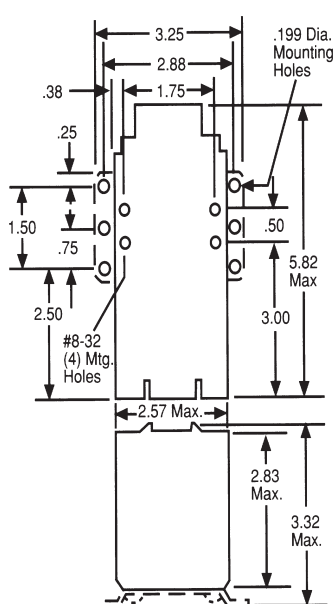


DIMENSIONS (inches)

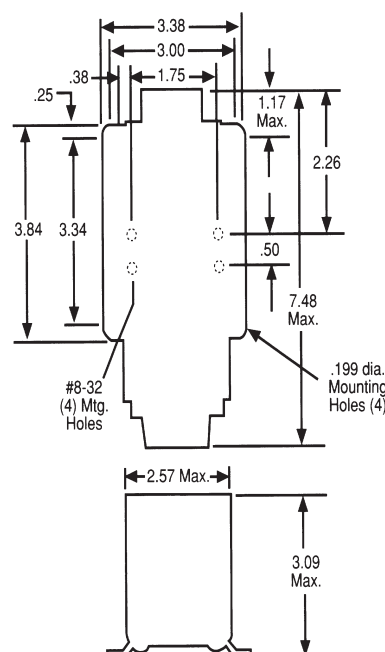
Basic Models 7012, 7022



Models 7014, 7024



Model 7032

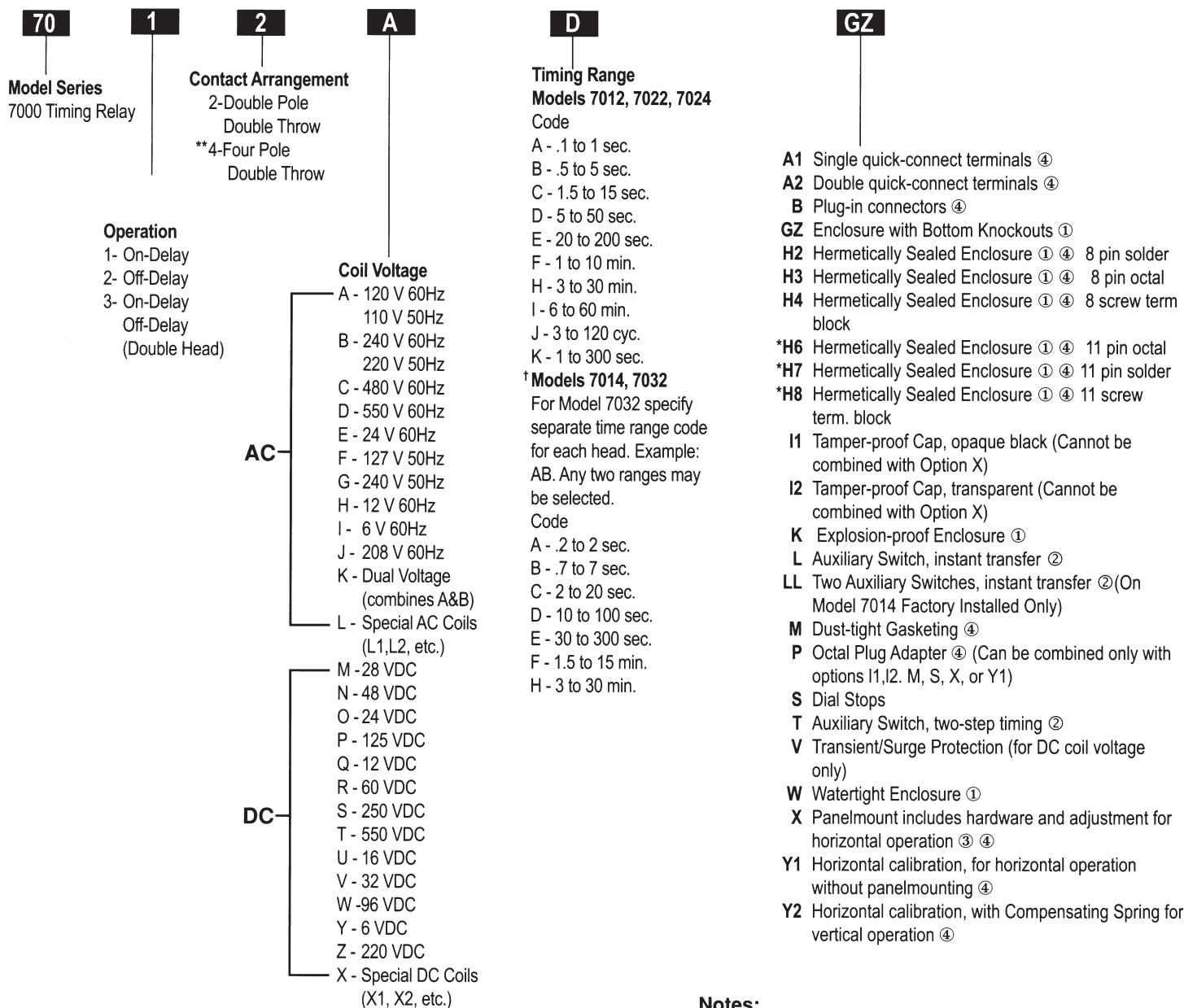


10

TIMERS & FLASHERS

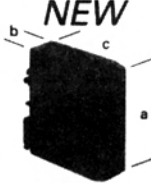
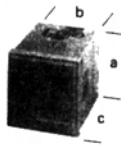
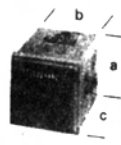
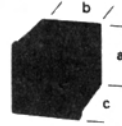
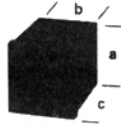
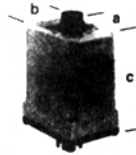
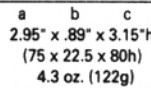
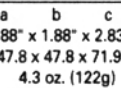
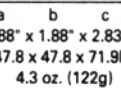
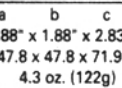
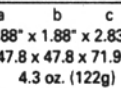
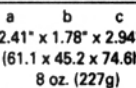
ORDERING INFORMATION

Catalog Numbering Code



Notes:

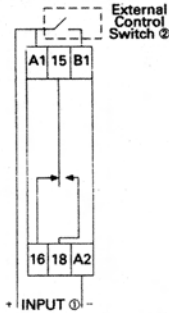
- ① Cannot be combined with B, P or X Options
- ② Cannot be combined with B, P or Y2 Options
- ③ Cannot be combined with GZ, H, I1, I2, K, W or Y1 Options
- ④ Not Avail. on 4-Pole Models
- * Sized to accommodate one L or T Auxiliary Switch
- ** Not available on On-Delay, Off-Delay (Double Head) model.
- † Available with letter calibrated dials only. Upper end of time range may be twice the value shown.

						
Series	CND	CNT	CNS	CNM5	CN1	CG
Features	<ul style="list-style-type: none"> • 10A rating • Programmable time delay relay • Universal input voltage • Fits 35 mm DIN track • UL, CSA & VDE pending 	<ul style="list-style-type: none"> • 10A rating • Programmable timer/counter • Digital display • Universal input voltage • 1/16 DIN style enclosure 	<ul style="list-style-type: none"> • 10A rating • Programmable time delay relay • Universal input voltage • 1/16 DIN style enclosure 	<ul style="list-style-type: none"> • 10A rating • Economical, programmable time delay relay • Digital accuracy • LED shows status • 1/16 DIN style enclosure 	<ul style="list-style-type: none"> • 10A rating • Economical single function (on delay) time delay relay • Digital accuracy • LED shows status • 1/16 DIN style enclosure 	<ul style="list-style-type: none"> • 10A rating • Top of the line non-programmable time delay relays • Extended timing ranges
Approximate Dimensions	 a b c 2.95" x .89" x 3.15"h (75 x 22.5 x 80h) 4.3 oz. (122g)	 a b c 1.88" x 1.88" x 2.83"h (47.8 x 47.8 x 71.9h) 4.3 oz. (122g)	 a b c 1.88" x 1.88" x 2.83"h (47.8 x 47.8 x 71.9h) 4.3 oz. (122g)	 a b c 1.88" x 1.88" x 2.83"h (47.8 x 47.8 x 71.9h) 4.3 oz. (122g)	 a b c 1.88" x 1.88" x 2.83"h (47.8 x 47.8 x 71.9h) 4.3 oz. (122g)	 a b c 2.41" x 1.78" x 2.94"h (61.1 x 45.2 x 74.6h) 8 oz. (227g)
Contact Arrang.	1 Form C	2 Form C	2 Form C	2 Form C	2 Form C	2 Form C
Contact Rating	10A @ 28VDC or 277VAC	10A @ 30VDC or 277VAC	10A @ 30VDC or 277VAC	10A @ 30VDC or 277VAC	10A @ 30VDC or 277VAC	10A @ 240VAC
Mode of Operation	Programmable: 5 timing functions	Programmable: 10 timing functions 2 counting functions	Programmable: 8 functions (11-pin) 4 functions (8-pin)	Programmable: 5 timing functions	On Delay	Delay on Operate Delay on Release Interval On
Delay Time	0.5 sec. to 100 min.	0.1 sec. to 9,990 hr.	0.1 sec. to 100 min.	0.1 sec. to 9,990 hr.	0.1 sec. to 9,990 hr.	0.5 sec. to 50 min.
Type of Control	Rotary switches & Potentiometer Adj.	Thumbwheel switches	DIP switches & Potentiometer Adj.	Thumbwheel switches & Rotary switch	Thumbwheel switches	Potentiometer Adj.
Maximum Repeatability	±2%	±0.1% ± 0.05 sec.	±0.2%	±0.05% ± 0.04 sec.	±0.05% ± 0.04 sec.	±0.5% (AC) ±0.1% (DC)
Max. Delta Time	±10%	±0.1% ± 0.05 sec.	±10%	—	—	±5%
Tolerance	-0, +20%	±0.1% ± 0.05 sec.	Min. spec. at min.; +20%, -0 at max.	±0.05% ± 0.04 sec.	±0.05% ± 0.04 sec.	+0, -10% at min. +10%, -0 at max.
Temp. Range	-10°C to +55°C	-10°C to +55°C	-10°C to +55°C	-10°C to +55°C	-10°C to +55°C	-10°C to +55°C
Input Voltage	24-240V ±15% 50/60 Hz. AC or DC	12VDC 24-240VAC/VDC	24-240VAC/VDC	120VAC	120VAC	24VDC 120VAC
Mounting	DIN Mount	Plug-in	Plug-in	Plug-in	Plug-in	Plug-in

CND DIN MOUNT TIME DELAY RELAY

Input Voltage	Time Range	Type of Adjustment	CND Part Number
Universal 24-240 VAC/VDC	0.5 S-100 M in 5 modes	Potentiometer for Time adjust Switches for Range & Function	CND

WIRING DIAGRAM (BOTTOM VIEW)



① Note input polarity for DC operation. For most reliable operation on AC, connect high side to "+" and low side to "-."

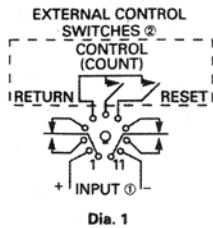
IMPORTANT: A dry circuit switch is recommended. A "dry circuit" switch is one rated to reliably switch currents of less than 50mA. Use of a switch rated for other than dry circuit may result in failure of the time delay relay to function properly.

CNT TIME DELAY RELAYS / COUNTERS

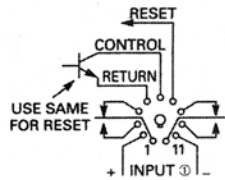
Input Voltage	Time Range	Type of Adjustment	Wiring Dia.	CNT Part Number
Universal 24-240 VAC/VDC	0.1 S-9,990 H in 7 ranges	Thumbwheel Switches	1	CNT-35-96**
12VDC				CNT-35-26**
120VAC				CNT-35-76**

OPTIONAL MOUNTING CLIP: Ratchet-fit clip, part number SSA-24C667, slides onto CNT from behind to secure CNT in panel mount applications.

WIRING DIAGRAM (BOTTOM VIEW)
Pins numbered clockwise from keyway



Dia. 1



OPTIONAL SOLIDSTATE INTERFACE

① Note input polarity for DC operation. For most reliable operation on AC, connect high side to "+".

② Important: A dry circuit switch is recommended for proper operation. A "dry circuit" switch is one rated to reliably switch currents of less than 50mA.

* Denotes UL
* Denotes CSA

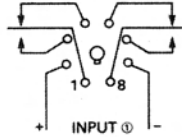
CNS TIME DELAY RELAYS

Input Voltage	Time Range	Type of Adjustment	Wiring Dia.	CNS Part Number
Universal 24-240 VAC/VDC	0.1 S-100 M in 6 ranges	Knob & DIP Switches	1	CNS-35-92**
120VAC				CNS-35-72**

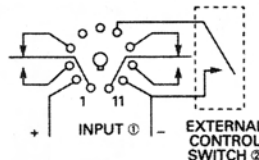
Input Voltage	Time Range	Type of Adjustment	Wiring Dia.	CNS Part Number
Universal 24-240 VAC/VDC	0.1 S-100 M in 6 ranges	Knob & DIP Switches	2	CNS-35-96**
120VAC				CNS-35-76**

OPTIONAL MOUNTING CLIP: Ratchet-fit clip, part number SSA-24C667, slides onto CNS from behind to secure CNS in panel mount applications.

WIRING DIAGRAMS (BOTTOM VIEWS)
Pins numbered clockwise from keyway



Dia. 1



Dia. 2

① Note input polarity for DC operation. For most reliable operation on AC, connect high side to "+".

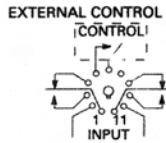
② Important: A 50 millisecond minimum switch closure is required. A dry circuit switch is recommended for proper operation. A "dry circuit" switch is one rated to reliably switch currents of less than 50mA.

CNM5 TIME DELAY RELAYS

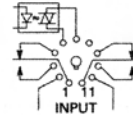
Input Voltage	Time Range	Type of Adjustment	Wiring Dia.	CNM5 Part Number
Universal 24-240 VAC/VDC	0.1 S-9,990 H in 7 ranges	Thumbwheel Switches	1	CNM5**

OPTIONAL MOUNTING CLIP: Ratchet-fit clip, part number SSA-24C667, slides onto CNM5 from behind to secure CNM5 in panel mount applications.

WIRING DIAGRAM (BOTTOM VIEW)
Pins numbered clockwise from keyway



Dia. 1



OPTIONAL SOLID STATE INTERFACE

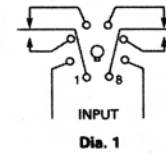
① IMPORTANT: A dry circuit switch is recommended. A "dry circuit" switch is one rated to reliably switch currents of less than 50mA. Use of a switch rated for other than dry circuit may result in failure of the time delay relay to function properly.

CN1 TIME DELAY RELAYS

Input Voltage	Time Range	Type of Adjustment	Wiring Dia.	CN1 Part Number
120VAC	0.1 S-9,990 H in 7 ranges	Thumbwheel Switches	1	CN1**

OPTIONAL MOUNTING CLIP: Ratchet-fit clip, part number SSA-24C667, slides onto CN1 from behind to secure CN1 in panel mount applications.

WIRING DIAGRAM (BOTTOM VIEW)
Pins numbered clockwise from keyway

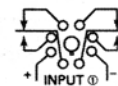


Dia. 1

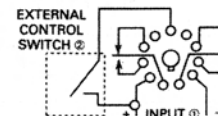
CG TIME DELAY RELAYS

Input Voltage	Time Range	Type of Adjustment	Wiring Dia.	CG Part Number
120VAC	1-10M 5-50 M	Knob	1	CGB-38-70010M** CGB-38-70050M**
120VAC	1-10 M 5-50 M	Knob	2	CGB-38-78010M** CGB-38-78050M**
120VAC	1-10 S 1-10 M	Knob	1	CGB-38-79010S** CGB-38-79010M**
24VDC	1-10 M	Knob	1	CGD-38-39010M**

WIRING DIAGRAMS (BOTTOM VIEWS)
Pins numbered clockwise from keyway



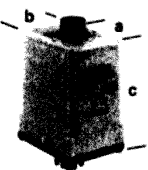
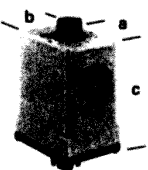
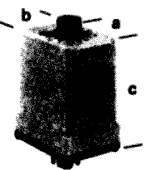
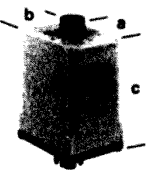
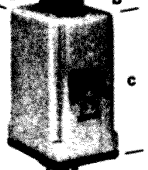
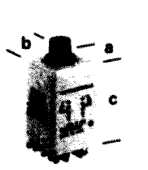






Dia. 1



Dia. 2

① Note input polarity for DC operation. For most reliable operation on AC, connect high side to "+".

② Important: If control switch is closed when power is applied, relay will immediately energize. A 50 millisecond minimum switch closure is required. A dry circuit switch is recommended for proper operation. A "dry circuit" switch is one rated to reliably switch currents of less than 50mA.

					
CD	CK	CH	CB	CR	CL/CU
<ul style="list-style-type: none"> • 10A rating • Ideal for many demanding applications • Broad temperature range 	<ul style="list-style-type: none"> • 10A rating • Broad line • Wide choice of functions • Extremely versatile 	<ul style="list-style-type: none"> • 10A rating • Wide range of industrial applications • Dependable timing cycles 	<ul style="list-style-type: none"> • 10A rating • Economical for volume applications • Various timing ranges 	<ul style="list-style-type: none"> • 10A rating • Recycle timer allows independent control of ON and OFF delays • Time as low as 0.1 sec. 	<ul style="list-style-type: none"> • 10A rating • Compact package is well-suited for many OEM applications • Various mounting options
					
a b c 2.41" x 1.78" x 2.94"h (61.1 x 45.2 x 74.6h) 8 oz. (227g)	a b c 2.41" x 1.78" x 2.94"h (61.1 x 45.2 x 74.6h) 6 oz. (170g)	a b c 2.41" x 1.78" x 2.94"h (61.1 x 45.2 x 74.6h) 6 oz. (170g)	a b c 2.41" x 1.78" x 2.94"h (61.1 x 45.2 x 74.6h) 6 oz. (170g)	a b c 2.41" x 1.78" x 3.56"h (61.1 x 45.2 x 90.4h) 6 oz. (170g)	a b c 1.53" x 1.41" x 1.91"h (38.9 x 35.7 x 48.4h) 3.5 oz. (99g)
2 Form C	2 Form C	2 Form C	2 Form C	2 Form C	2 Form C
10A @ 240VAC	10A @ 240VAC	10A @ 240VAC	10A @ 240VAC	10A @ 240VAC	10A @ 28VDC or 240VAC
Delay on Operate Delay on Release	Delay on Operate Delay on Release Interval On Delay on Dropout	Delay on Operate Delay on Release Interval On	Delay on Operate Delay on Release Interval On	Recycle Timer	Delay on Operate
0.1 sec. to 180 sec.	0.1 sec. to 180 sec.	1 sec. to 180 sec.	0.1 sec. to 100 min.	0.1 sec. to 180 sec.	0.1 sec. to 120 sec.
Fixed, Potentiometer Adj., Ext. Res. Adj.	Potentiometer Adj., Ext. Res. Adj.	Fixed, Potentiometer Adj.	Potentiometer Adj.	Potentiometer Adj.	Potentiometer Adj., Ext. Res. Adj.
±1%	±2%	±2%	±2%	±2%	±3%
±5%	±10%	±10%	±10%	±10%	-
±5% (fixed only)	Min. specified delay time or less at min.; -0, +20% at max.	±5% (fixed only)	Min. specified delay time or less at min.; -0, +30% at max.	Min. specified delay time or less at min.; -0, +20% at max.	Min. specified delay time or less at min.; -0, +20% at max.
-40°C to +55°C	-10°C to +55°C	-10°C to +55°C	-10°C to +55°C	-10°C to +55°C	-10°C to +40°C
24-48VDC 24-120VAC	12-110VDC 24-120VAC	24VDC 24-240VAC	12-24VDC 24-120VAC	24VDC 120VAC	24VDC 24-120VAC
Plug-in	Plug-in	Plug-in	Plug-in	Plug-in	Plug-in

CD TIME DELAY RELAYS

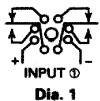
Input Voltage	Time Range	Type of Adjustment	Wiring Dia.	CD Part Number
Delay On Operate Models				
24VAC	1-10 S	Knob	1	CDB-38-30001**
120VAC	0.1-1 S 0.1-5 S 0.1-10 S 0.3-30 S 0.6-60 S 1.8-180 S	Knob	1	CDB-38-70001** CDB-38-70002** CDB-38-70003** CDB-38-70006** CDB-38-70004** CDB-38-70005**
120VAC	1 S	Fixed	1	CDA-38-70012**
120VAC	0.1-5 S 0.1-10 S	Resistor	2	CDP-38-70002** CDP-38-70003**
24VDC	0.1-10 S 0.6-60 S 1.8-180 S	Knob	1	CDD-38-30003** CDD-38-30004** CDD-38-30005**
48VDC	0.6-60 S	Knob	1	CDD-38-40002**
Delay On Release Models				
120VAC	0.1-1 S 0.1-5 S 0.1-10 S 0.3-30 S 0.6-60 S 1.8-180 S	Knob	3	CDB-38-70016** CDB-38-70091** CDB-38-70014** CDB-38-70092** CDB-38-70012** CDB-38-70015**
120VAC	1 S	Fixed	3	CDA-38-70025**
24VDC	0.1-10 S 0.6-60 S 1.8-180 S	Knob	3	CDD-38-30014** CDD-38-30012** CDD-38-30008**

CDF EXTERNAL RESISTOR VALUES

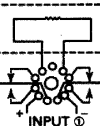
Factory Set Time Delay (No Resistor)	Approx. Resistance to Reduce Delay 50%	Short Circuit Time Delay
5 S	200K Ohms	0.1 S
10 S	400K Ohms	0.1 S

WIRING DIAGRAMS (BOTTOM VIEWS)

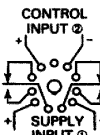
Pins numbered clockwise from keyway



Dia. 1



Dia. 2



Dia. 3

- ① Note input polarity for DC operation. For most reliable operation on AC, connect high side to "+."
- ② Important: If control voltage is present when supply voltage is applied, the relay will immediately energize.

CK TIME DELAY RELAYS (Cont'd)

CKF EXTERNAL RESISTOR VALUES
Short circuit provides minimum (0.1 S) time delay. 200K resistor (approx.) provides maximum (10 S) time delay.

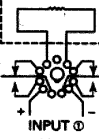
WIRING DIAGRAMS (BOTTOM VIEWS)

Pins numbered clockwise from keyway

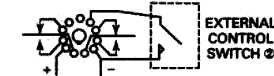


Dia. 1

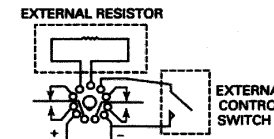
EXTERNAL RESISTOR



Dia. 2



Dia. 3



Dia. 4

- ① Note input polarity for DC operation. For most reliable operation on AC, connect high side to "+."
- ② Important: If control switch is closed when power is applied, relay will immediately energize. A 50 millisecond minimum switch closure is required. A dry circuit switch is recommended for proper operation. A "dry circuit" switch is one rated to reliably switch currents of less than 50mA.

CH TIME DELAY RELAYS

Input Voltage	Time Range	Type of Adjustment	Wiring Dia.	CH Part Number
Delay On Operate Models				
24VAC	1-10 S 1-180 S	Knob	1	CHB-38-30001** CHB-38-30003**
120VAC	1-10 S 1-60 S 1-180 S	Knob	1	CHB-38-70001** CHB-38-70002** CHB-38-70003**
120VAC	10 S	Fixed	1	CHA-38-70001**
240VAC	1-10 S	Knob	1	CHB-38-80001**
24VDC	1-10 S 1-180 S	Knob	1	CHD-38-30001** CHD-38-30003**
Delay On Release Models				
24VAC	1-10 S	Knob	3	CHB-38-30011**
120VAC	1-10 S 1-60 S 1-180 S	Knob	3	CHB-38-70011** CHB-38-70012** CHB-38-70013**
24VDC	1-180 S	Knob	3	CHD-38-30013**
Interval On Models				
120VAC	1-10 S 1-60 S 1-180 S	Knob	1	CHB-38-70021** CHB-38-70022** CHB-38-70023**
24VDC	1-10 S	Knob	1	CHD-38-30021**

WIRING DIAGRAMS (BOTTOM VIEWS)

Pins numbered clockwise from keyway



Dia. 1

WIRING DIAGRAMS (BOTTOM VIEWS)

Pins numbered clockwise from keyway



Dia. 1

- ① Note input polarity for DC operation. For most reliable operation on AC, connect high side to "+."
- ② Important: If control switch is closed when power is applied, relay will immediately energize. A 50 millisecond minimum switch closure is required. A dry circuit switch is recommended for proper operation. A "dry circuit" switch is one rated to reliably switch currents of less than 50mA.

CH TIME DELAY RELAYS (Cont'd)

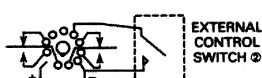
Input Voltage	Time Range	Type of Adjustment	Wiring Dia.	CH Part Number
Delay On Operate Models				
24VAC	0.1-10 S 1.8-180 S	Knob	1	CB-1041B-30** CB-1042B-30**
120VAC	0.1-1 S 0.1-5 S 0.1-10 S 0.6-60 S 1.8-180 S 1-10 M 10-100 M	Knob	1	CB-1001B-70** CB-1002B-70** CB-1003B-70** CB-1004B-70** CB-1005B-70** CB-1006B-70** CB-1007B-70**
12VDC	0.1-10 S	Knob	1	CB-1047D-20**
24VDC	0.1-1 S 0.1-10 S 0.6-60 S	Knob	1	CB-1026D-30** CB-1028D-30** CB-1029D-30**
Delay On Release Models				
24VAC	0.1-10 S 1.8-180 S	Knob	3	CB-1045B-38** CB-1046B-38**
120VAC	0.1-10 S 0.1-10 S 0.6-60 S 1.8-180 S	Knob	3	CB-1021B-78** CB-1022B-78** CB-1023B-78** CB-1024B-78**
24VDC	0.1-10 S 1.8-180 S	Knob	3	CB-1038D-38** CB-1039D-38**
Interval On Models				
24VAC	0.1-10 S	Knob	1	CB-1043B-39**
120VAC	0.1-5 S 0.1-10 S 0.6-60 S 1-10 M	Knob	1	CB-1011B-79** CB-1014B-79** CB-1016B-79** CB-1018B-79**
24VDC	0.1-5 S 1.8-180 S	Knob	1	CB-1034D-39** CB-1036D-39**

WIRING DIAGRAMS (BOTTOM VIEWS)

Pins numbered clockwise from keyway



Dia. 1



Dia. 3



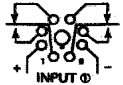
Dia. 5

- ① Note input polarity for DC operation. For most reliable operation on AC, connect high side to "+."
- ② Important: If control switch is closed when power is applied, relay will immediately energize. A 50 millisecond minimum switch closure is required. A dry circuit switch is recommended for proper operation. A "dry circuit" switch is one rated to reliably switch currents of less than 50mA.

CK Data Continues in the Next Column.

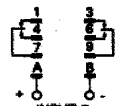
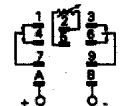
CH Data Continues in the Next Column.

* Denotes UL
* Denotes CSA

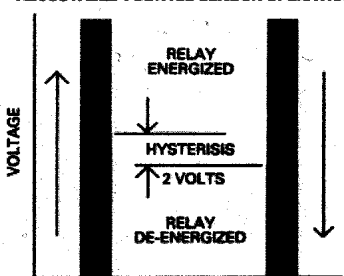
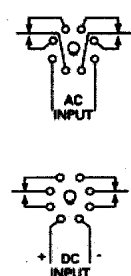
CR TIME DELAY RELAYS				
Input Voltage	Time Range	Type of Adjustment	Wiring Dia.	CR Part Number
Recycle Models				
120VAC	0.1-10 S	Knob	1	CRB-48-70010**
	0.3-30 S			CRB-48-70030**
	0.6-60 S			CRB-48-70060**
24VDC	1.8-180 S	Knob	1	CRD-48-30180**
WIRING DIAGRAM (BOTTOM VIEW) Pins numbered clockwise from keyway  Dia. 1				
Ⓢ Note input polarity for DC operation. For most reliable operation on AC, connect high side to "+."				

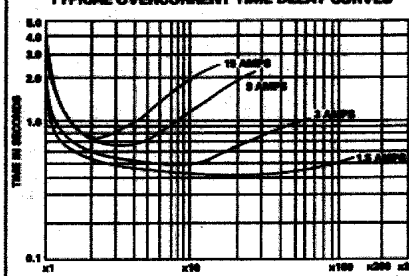
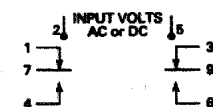
CL/CLU TIME DELAY RELAYS				
Input Voltage	Time Range	Type of Adjustment	Wiring Dia.	CL/CLU Part Number
Delay On Operate Models				
Types With No Timing Cycle Interrupt Transfer				
24VAC	0.1-10 S	Knob	1	CLB-61-30010**
120VAC	0.1-10 S	Knob	1	CLB-61-70010**
	0.3-30 S			CLB-61-70030**
	1.2-120 S			CLB-61-70120**
120VAC	0.1-10 S	Resistor	2	CLF-41-70010**
	0.1-10 S			CLF-42-70010**
24VDC	0.1-10 S	Resistor	2	CLH-41-30010**
Types Which May Momentarily Transfer Contacts If Timing Cycle Is Interrupted				
24VAC	10 S	Fixed	1	CUA-41-30010**
24VAC	1-10 S	Resistor	2	CUF-41-30010**
120VAC	1-10 S	Knob	1	CUB-61-70010**
	1-30 S			CUB-61-70030**
	1-60 S			CUB-61-70060**
	1-120 S			CUB-61-70120**
120VAC	1 S	Fixed	1	CUA-41-70001**
	3 S			CUA-41-70003**
	5 S			CUA-41-70005**
	10 S			CUA-41-70010**
	30 S			CUA-42-70010**
	120 S			CUA-41-70120**
120VAC	1-10 S	Resistor	2	CUF-41-70010**
	1-10 S			CUF-42-70010**
	1-30 S			CUF-41-70030**
	1-120 S			CUF-41-70120**
	1-120 S			CUF-42-70120**
24VDC	1-10 S	Resistor	2	CUH-41-30010**
	1-10 S			CUH-42-30010**
	1-120 S			CUH-41-30120**
CLF-42-70010 "42" denotes bracket mount case with two mounting slots on 2.5 (63.5) centers. All Others All other models listed have a plain case for socket mounting.				

CLF/CLH/CUF/CUH EXTERNAL RESISTOR VALUES			
Time Delay	CL	Approximate Resistance	DC Input
CU	CL	AC Input	DC Input
1 S	0.1 S	Short	Short
10 S	10 S	200K Ohm	160K Ohm
1 S	0.3 S	Short	Short
30 S	30 S	600K Ohm	500K Ohm
1 S	1.2 S	Short	Short
120 S	120 S	2.4 Megohm	2.0 Megohm

WIRING DIAGRAMS (BOTTOM VIEWS)	
 Dia. 1	 Dia. 2
Ⓢ Note input polarity for DC operation. For most reliable operation on AC, connect high side to "+."	

* Denotes UL
* Denotes CSA

CV VOLTAGE SENSORS				
Voltage Type	Pick-Up Voltage	Drop-Out Voltage†	Max. Voltage	Part Number
Adjustable Pick-Up and Drop-Out Models				
AC (50/60 Hz.)	92-140	90-138	150	CSJ-38-70010**
DC	20-30	18-28	40	CSL-38-30010**
	40-58	38-56	60	CSL-38-40010**
	92-140	90-138	150	CSL-38-60010**
Fixed Pick-Up and Adjustable Drop-Out Models				
AC (50/60 Hz.)	105	90-103	140	CSJ-38-71010**
DC	22	18-21	40	CSL-38-31010**
† Actual max. drop-out voltage is the selected pick-up voltage less hysteresis voltage.				
ADJUSTABLE VOLTAGE SENSOR OPERATIONS				
 NOTE 1: As voltage increases, the relay will pick up at its selected point and remain energized while voltage is maintained at that level or higher. NOTE 2: As voltage decreases, after pick up, the relay will drop out at its selected point. NOTE 3: Minimum hysteresis, the voltage differential between pick-up and drop-out, is typically 2% of pick-up.				
WIRING DIAGRAMS (BOTTOM VIEWS) Pins numbered clockwise from keyway  AC INPUT DC INPUT				

SDAS CURRENT SENSOR		
Part Number	Control Voltage (50/60 Hz. or DC ±10%)	Power Requirement
Overcurrent Sensor (1.5-15A AC Sense Range)		
SDAS-018Y2S1024	24V	1.7VA or 1W
Undercurrent Sensor (1.5-15A AC Sense Range)		
SDAS-017Y2S1024	24V	1.7VA or 1W
ADJUSTABLE CURRENT SENSOR OPERATIONS		
Overcurrent Sensor: Internal relay energizes when sense current exceeds the user-set level for longer than the built-in time delay allows (200ms min.). Actual delay is dependent upon the potentiometer setting and the magnitude of the overcurrent (see curves). The relay remains energized until sensor control voltage is removed, even if the overcurrent ceases to exist. Undercurrent Sensor: Internal relay energizes when sense current drops below the user-set level for at least 360ms. The relay remains energized until sense current exceeds the potentiometer setting or sensor control voltage is removed. A 360ms delay after control voltage is applied allows line components to turn on.		
TYPICAL OVERCURRENT TIME DELAY CURVES  WIRING DIAGRAM (BOTTOM VIEW)  INPUT VOLTS AC or DC		