Allen-Bradley

Relays and Timers Specifications

Bulletin Number 700

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

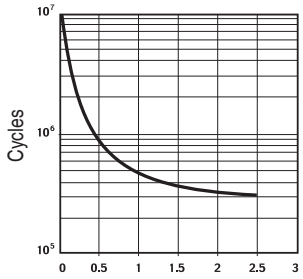
Resource	Description
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, http://www.ab.com	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at http://www.rockwellautomation.com/literature/. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.

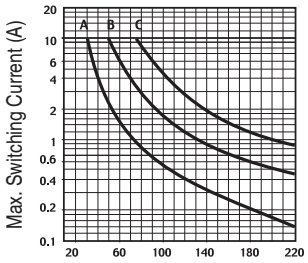
Cat. No. 700-HA…				
Electrical Ratings				
Pilot Duty Rating‡		NEMA B300		
Rated Thermal Current (I_{th})		HA = 10 A – 120V, 240V HAX = 6 A – 120V, 240V		
Rated Insulation Voltage (U_i)		250V IEC – 300V UL/CSA		
Contacts	Inductive	**Make**	**Break**	**Hp**
		►][◄	◄][►	
	120V AC	30 A	3 A	1/3
	240V AC	15 A	1.5 A	1
	General Purpose	10 A, 240V AC		
	Resistive	10 A, 30V DC		
Min. Low Energy Permissible Load		HA = 10V, 5 mA HAX = 5V, 2 mA		
Permissible Coil Voltage Variation		Pickup: 80…110% of Nominal Voltage at 50 Hz 80…110% of Nominal Voltage at 60 Hz 80…110% of Nominal Voltage at DC		
Coil Consumption ±10%	AC Coils	**50 Hz**	**60 Hz**	
	Inrush	3.3 VA	2.85 VA	
	Sealed	2.2 VA	1.9 VA	
	DC Coils	1.3 W		
Must Dropout Voltage		20% of nominal V AC 10% of nominal V DC		
Max. Contact Resistance		50 MΩ (700-HA and 700-HAB) 30 MΩ (700-HAX)		
Design Specification/Test Requirements				
Electrical				
Pole-to-Pole		2000V		
Contact to Coil		2000V		
Electrical Life (Operating)		100 000 min.		
Mechanical				
Degree of Protection (Open Type) IEC 529		IP 40		
Mechanical Life Cycles (AC/DC)		> 20 x 10^6/ 50 x 10^6		
Switching Frequency Operations		3600/HR		
Coil Voltages		See Product Selection		
Operating Time	Max. Pickup	10 ms		
	Max. Dropout	10 ms		
Maximum Operating Rate		4 Ops/s		
Vibration	Endurance	5 G		
	Operational	2.5 G		
Shock	Endurance	50 G		
	Operational	9 G		
Environmental				
Temperature	Operating	AC/DC	–40…+70 °C	
	Storage	AC/DC	–40…+100 °C	
Altitude		2000 m (6560 ft)		
Construction				
Insulating Material		Molded High-Dielectric Material		
Enclosure		Transparent Dust Cover		
Contact Material		700-HA:	10 A– AgNi	
		700-HAX:	6 A–Bifurcated/Gold Plating AgNi	
Terminal Markings on Socket		In accordance with EN50 0005		
Sockets		8-Pin Socket — 700-HN100, -HN125, -HN204 11-Pin Socket — 700-HN101, -HN126, -HN205		
Certifications		cURus Recognized (File No. E3125, Guide NLDX2/NLDX8), cULus Listed when used with Bulletin 700-HN sockets noted above (File No. E3125, Guide NLDX/NLDX7), CE Marked, CSA Certified, UR Certified (File 229473)		
Standards		UL508, CSA C22.2 No. 14, EN 61810-1		

‡ NEMA Rating Chart is in publication 700-SG003*

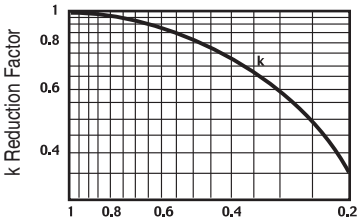
700-HA Relay Performance Graphs



Contact life vs. AC1 load at 1,800 cycles/h



Breaking capacity for DC1 load at 1,800 cycles/h.



Load reduction factor vs. cos ϕ

A *= load applied to one contact*
B *= load applied to two contacts in series*
C *= load applied to three contacts in series*

Time Module Cat. No. 700-HT3		
Electrical Ratings		
Operating Voltage Range		12…240V AC (50/60 Hz) 12…240V DC
Power Consumption		0.1 W (12V) 1.0 W (230V)
Mechanical		
Degree of Protection of Input (B1) Terminal		IP 20 (Guarded Terminal)
Input Terminal Wire Range		1.0 x 0.2 mm^2…2.5 mm^2 (24 AWG…14 AWG) 2.0 x 0.2 mm^2…1.5 mm^2 (24 AWG…16 AWG)
Input Terminal Torque Range		0.45…0.8 Nm (4…7 lb-in.)
LED Indicator		Red
Repeat Accuracy‡		±1%
Recovery Time		<50 ms
Selectable Timing Ranges		Three DIP switches, seven ranges (set from 5…100% of range): 1 s, 10 s, 100 s, 10 min, 100 min, 10 h, 100 h
Selectable Timing Modes		Three DIP switches, eight modes: 1. Power On–Delay 2. Power On One-Shot 3. Power On Repeat Cycle, On Start 4. Signal On-Delay and Signal Off-Delay 5. Signal Off-Delay 6. Signal On-One-Shot 7. Signal Off-One-Shot 8. Signal On and Signal Off Watchdog Monitor
Adjustable Trimmer Scale Accuracy		±5% of Time Range
Environmental		
Temperature	Operating	–20 °C…+50 °C (–4 °F…+122 °F)
	Storage	–55 °C…+85 °C (–67…+185 °F)
Altitude		2000 m (6560 ft)
Construction		
Enclosure		Gray Plastic Housing
Mounting with Socket Only		8- or 11-Pin Socket with Module Plug
Sockets		700-HN204 (8-Pin with Plug) 700-HN205 (11-Pin with Plug)
Certifications		cURus Recognized (File No. E14843, Guide NRNT2/NRNT8), CE Marked
Standards		UL508, CSA C22.2 No. 14, EN 61810-1

‡ At constant voltage and temperature.

Timing Charts, Cat. No. 700-HT3 Multi-Function Time Module (t = Time Range 0.05 s...100 h)

Terms:
U is Power Input
R is Relay Output
S Signal, **+A1** Socket, **B1** Timer
t is the resulting Time Delay (Red LED)

1. Power On-Delay

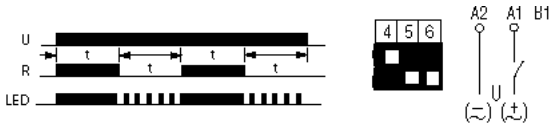
Apply power (U) to timer. Relay contacts (R) change state after time delay (t) is complete. Contacts return to their shelf state when power is removed. Terminal B1 is not used in this mode.

2. Power On One-Shot

Apply power (U) to timer. Relay contacts (R) change state immediately and the time delay begins. When the time delay (t) is complete, contacts return to their shelf state. Contacts return to their shelf state when power is removed. Terminal B1 is not used in this mode.

3. Power On Repeat Cycle, On Start

Apply power (U) to timer. Relay contacts (R) change state immediately and the time delay (t) begins. When the time delay is complete, the contacts return to their shelf state for time delay (t) (time on = time off). This cycle will repeat until the power is removed. Terminal B1 is not used in this mode.



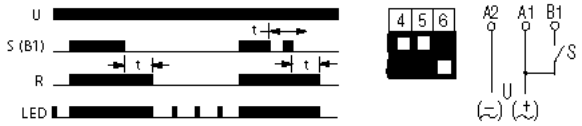
4. Signal On-Delay and Signal Off-Delay

Apply power (U) to timer. When the signal (S) is closed the time delay (t) begins, after the time delay is complete the relay contacts (R) change state. Opening the signal starts the time delay, after the time delay is complete the contacts return to their shelf state. If the signal is closed or opened before the time delay is complete, the time delay is reset. Contacts return to their shelf state when power is removed.

Cat. No. 700-HT3 Timing Modes, Time Description, Timing Charts, and DIP Switch Selections

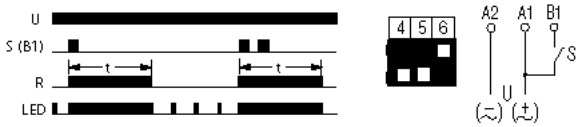
5. Signal Off-Delay

Apply power (U) to timer. When the signal (S) is closed, the relay contacts (R) change state immediately. When the signal is opened, the time delay (t) begins. If the signal is closed before the time delay is complete, the time delay is reset and the relay remains energized. When the time delay is complete, the contacts return to their shelf state. Contacts return to their shelf state when power is removed.



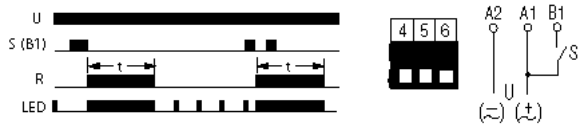
6. Signal On One-Shot

Apply power (U) to timer. When the signal (S) is closed, the relay contacts (R) change state immediately and the time delay (t) begins. After the time delay begins, opening or closing the signal will not reset the time delay. When the time delay is complete, the contacts return to their shelf state. Contacts return to their shelf state when power is removed.



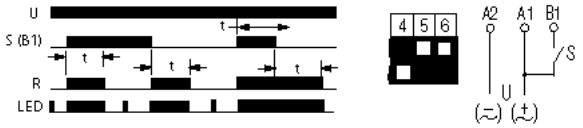
7. Signal Off One-Shot

Apply power (U) to timer. When the signal (S) is closed and then opened, the relay contacts (R) change state immediately and the time delay (t) begins. After the time delay begins, opening or closing the signal will not reset the time delay. When the time delay is complete, the contacts return to their shelf state. Contacts return to their shelf state when power is removed.



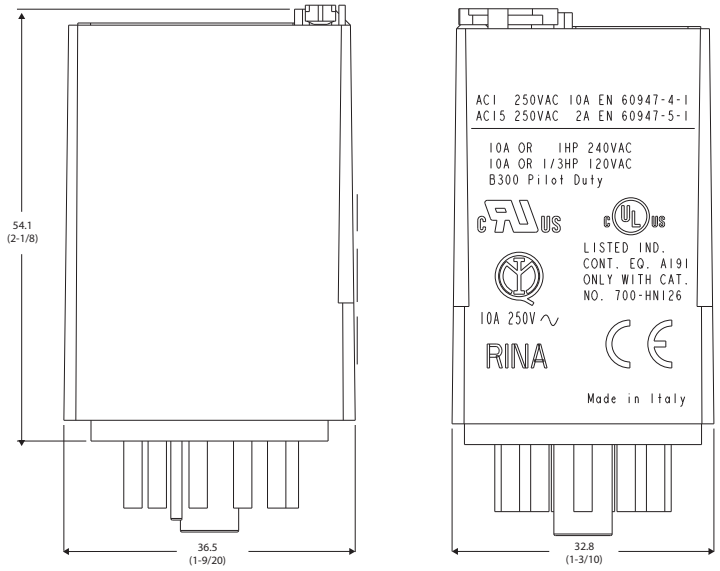
8. Signal On and Signal Off Watchdog Monitor

Apply power (U) to timer. When the signal (S) is closed, the relay contacts (R) energize immediately and the time delay (t) begins. If the signal is opened before the time delay is complete, the relay remains energized and the time delay is reset. When the time delay is complete the contacts return to their shelf state. If the signal is opened after the time delay is complete, the relay contacts energize immediately and the same time delay begins. Continuous cycling of the signal at a rate that is faster than the time delay will cause the relay contacts to remain energized. Contacts return to their shelf state when power is removed.

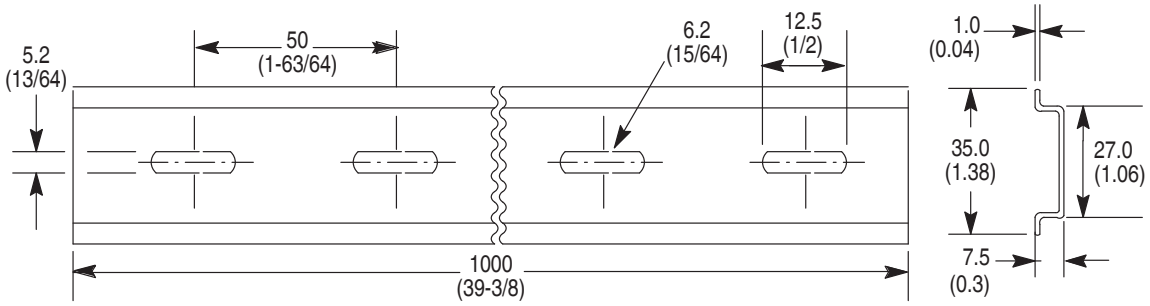


Approximate Dimensions

Approximate Dimensions are shown in millimeters (inches). Approximate Dimensions are not intended to be used for manufacturing purposes.



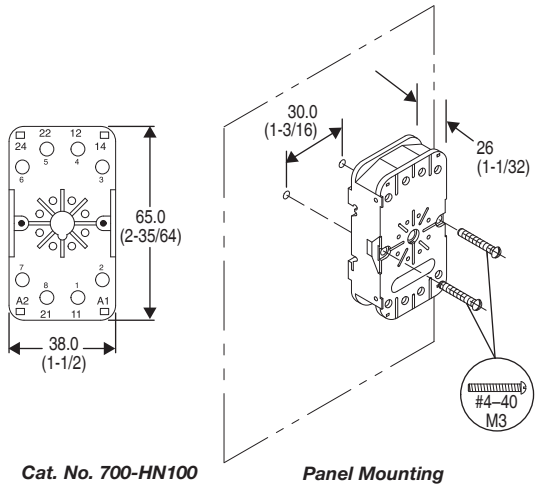
Bulletin 700-HA Relay



Cat. No. 199-DR1 DIN Mounting Rail Series B
Cat. No. 199-DR4 DIN Mounting Rail Series B Has No Mounting Holes

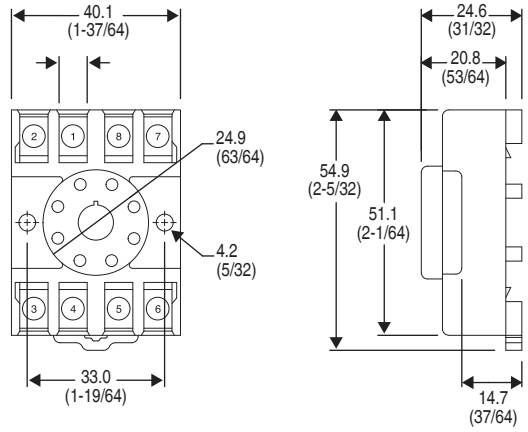
Cat. No.	A	B	C	D	Approx. Shipping Wt.
199-DR1	35 (1-3/8)	27 (1-1/16)	7.5 (19/64)	1.02 (1/64)	1.85 kg (4.07 lb) (10/pkg)
199-DR4	35 (1-3/8)	27 (1-1/16)	15 (19/32)	2.3 (3/32)	3.68 kg (8 lb) (5/pkg)

Approximate Dimensions are shown in millimeters (inches). Approximate Dimensions are not intended to be used for manufacturing purposes.



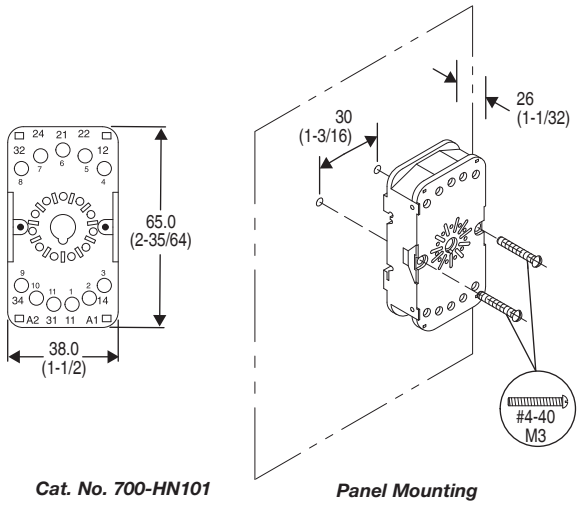
Cat. No. 700-HN100 ***Panel Mounting***

Wire Size: 2 x 2.5 mm²
Single Wire – Up to #12 AWG
Double Wire – 2 x 2.5 mm² (#2-14 AWG… #2-20 AWG)
(Either Solid or Stranded)
Strip Length: 9 mm (3/8 in.) – Torque: 0.8 N•m (7 lb•in)



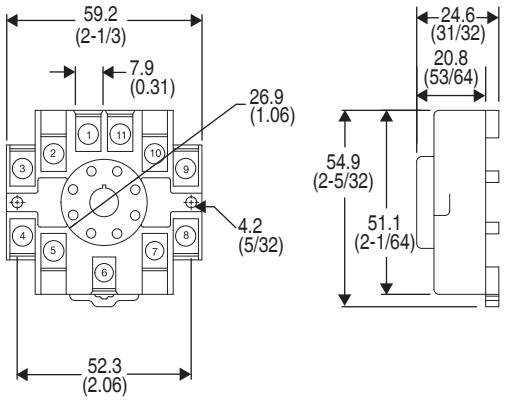
Cat. No. 700-HN125

Wire Size: 2 x 2.5 mm²
Single Wire – Up to 12 AWG
Double Wire – 2 x 2.5 mm² (#2–14 AWG…#2–20 AWG)
(Either Solid or Stranded)
Strip Length: 9 mm (3/8 in.) – Torque: 0.8 N•m (7 lb•in)



Cat. No. 700-HN101 ***Panel Mounting***

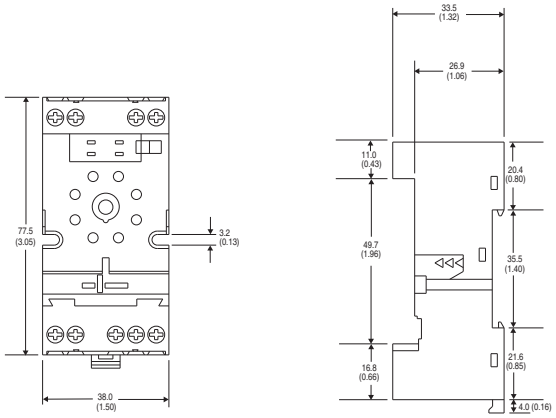
Wire Size: 2 x 2.5 mm²
Single Wire – Up to #12 AWG
Double Wire – 2 x 2.5 mm² (#2–14 AWG…#2–20 AWG)
(Either Solid or Stranded)
Strip Length: 9 mm (3/8 in.) – Torque: 0.8 N•m (7 lb•in)



Cat. No. 700-HN126

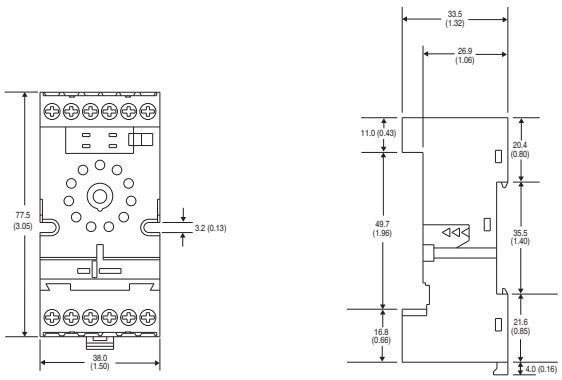
Wire Size: 2 x 2.5 mm²
Single Wire – Up to #12 AWG
Double Wire – 2 x 2.5 mm² (#2–14 AWG…#2–20 AWG)
(Either Solid or Stranded)
Strip Length: 9 mm (3/8 in.) – Torque: 0.8 N•m (7 lb•in)

Approximate Dimensions are shown in millimeters (inches). Approximate Dimensions are not intended to be used for manufacturing purposes.



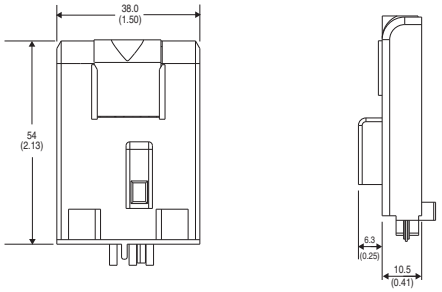
Cat. No. 700-HN204

Wire Size: 2 x 2.5 mm^2
Single Wire – Up to #12 AWG
Double Wire – 2 x 2.5 mm^2 (#2–14 AWG… #2–20 AWG)
(Either Solid or Stranded)
Strip Length: 9 mm (3/8 in.) – Torque: 0.8 N•m (7 lb•in)



Cat. No. 700-HN205

Wire Size: 2 x 2.5 mm^2
Single Wire – Up to #12 AWG
Double Wire – 2 x 2.5 mm^2 (#2–14 AWG …#2–20 AWG)
(Either Solid or Stranded)
Strip Length: 9 mm (3/8 in.) – Torque: 0.8 N•m (7 lb•in)



Cat. No. 700-HT3

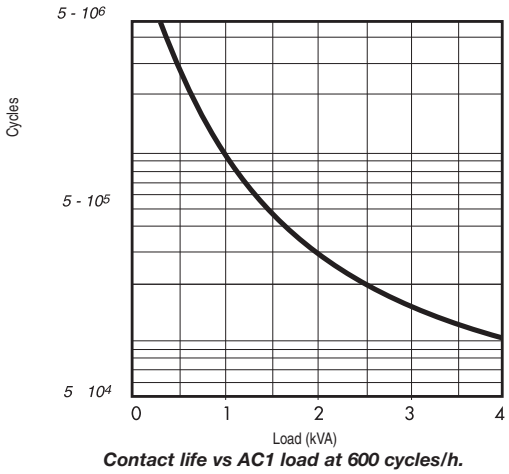
Wire Size: 2 x 1.5 mm^2 (#2 – 16 AWG…#1–20 AWG)
(Either Solid or Stranded)
Strip Length: 9 mm (3/8 in.) – Torque: 0.8 N•m (7 lb•in)

Specifications

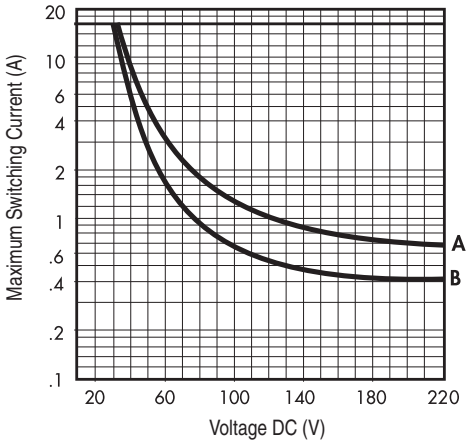
Cat. No. 700-HB…						
Electrical Ratings						
Pilot Duty Rating‡		NEMA B300				
Rated Thermal Current (I_{th})		15 A – 120V, 240V				
Rated Insulation Voltage (U_i)		250V IEC-300V UL/CSA				
Contacts	Inductive	**Make**		**Break**		**Hp**
		►][◄		◄][►		
		2 -Pole	3 -Pole	2 -Pole	3 -Pole	
	120V AC	60 A	30 A	6 A	3 A	3/4
	240V AC	30 A	15 A	3 A	1.5 A	2
	General Purpose	15 A, 240V AC				
	Resistive	15 A, 30V DC				
Min. Low Energy Permissible Load		1000 mW (10V, 10 mA)				
Permissible Coil Voltage Variation		80…110% of Nominal Voltage at 50 Hz				
		80…110% of Nominal Voltage at 60 Hz				
		80…110% of Nominal Voltage at DC				
Coil Consumption ±10%	AC Coils	**50 Hz**		**60 Hz**		
	Inrush	3.3 VA		2.85 VA		
	Sealed	2.2 VA		1.9 VA		
	DC Coils	1.3 W				
Max. Allowable Leakage		25% of VA				
		10% of W				
Max. Contact Resistance		50 mΩ				
Design Specification/Test Requirements Electrical						
Dielectric Withstand Voltage						
Pole-to-Pole		2500V				
Contact to Coil		4000V				
Mechanical						
Degree of Protection (Open Type) IEC 529		IP 40				
Mechanical Life Cycles (AC/DC)		> 10 x 10^6/30 x 10^6				
Switching Frequency Operations		3600/HR				
Coil Voltages		See Overview/Product Selection				
Operating Time (ms)	Pickup	20 ms				
	Dropout	4 ms				
Maximum Operating Rate		4 Ops/s				
Vibration	Endurance	5 G				
	Operational	1.5 G				
Shock	Endurance	50 G				
	Operational	15 G				
Environmental						
Temperature	Operating	AC/DC		–40…+70 °C		
	Storage	AC/DC		–40…+100 °C		
Altitude		2000 m (6560 ft)				
Construction						
Insulating Material		Molded High Dielectric Material				
Enclosure		Transparent Dust Cover				
Contact Material		AgCdO				
Terminal Markings on Socket		In accordance with EN50 0005				
Sockets		700-HN153, -HN154				
Certifications		cURus Recognized (File No. E3125, Guide NLDX2/NLDX8), cULus Listed when used with Bulletin 700-HN sockets noted above (File No. E3125, Guide NLDX/NLDX7), CE Marked, CSA Certified, UR Certified (File No. 229473)				
Standards		UL508, CSA C22.2 No. 14, EN 61810-1				

‡ NEMA Rating Chart is in publication 700-SG003*

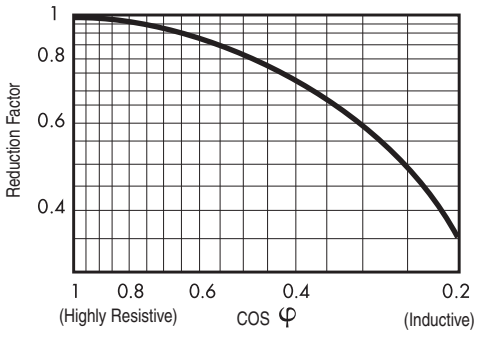
Technical Data



Contact life vs AC1 load at 600 cycles/h.



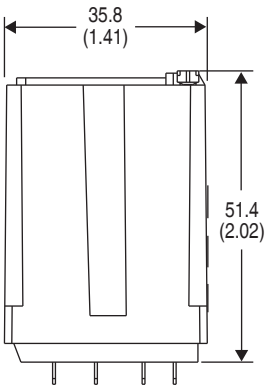
Breaking capacity for DC1 load at 600 cycles/h.
Load applied to 1 contact.
A = for N.O. types
B= other types

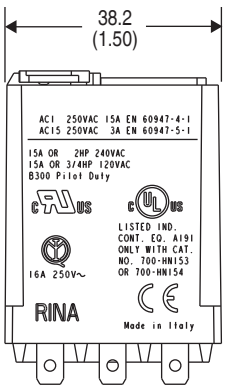


Load Reduction factor vs cos ϕ

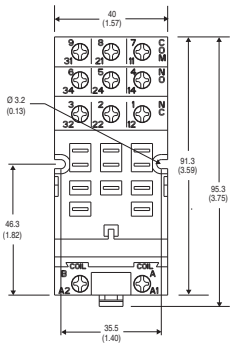
Approximate Dimensions

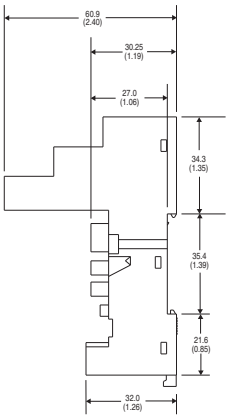
Approximate Dimensions are shown in millimeters (inches). Approximate Dimensions are not intended to be used for manufacturing purposes.





Bulletin 700-HB Relay

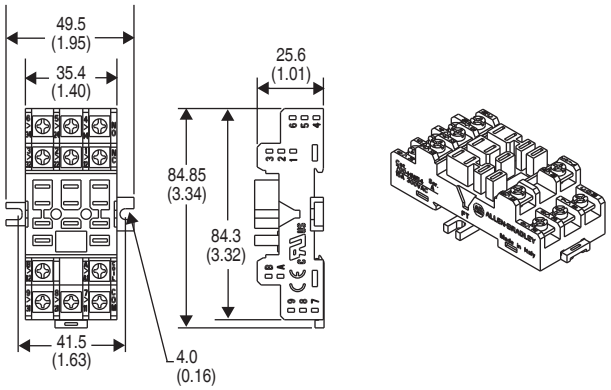




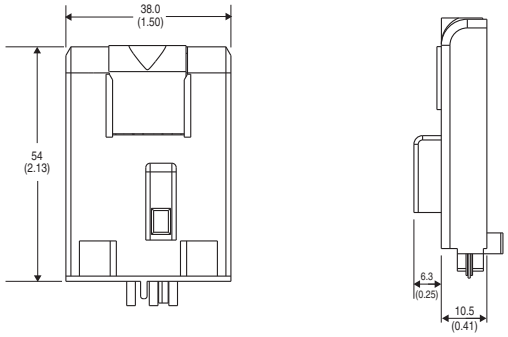
Cat. No. 700-HN153
Wire Size: 2 x 2.5 mm^2
Single Wire – Up to #12 AWG
Double Wire – 2 x 2.5 mm^2 (#2–14 AWG... #2-20 AWG)
(Either Solid or Stranded)
Strip Length: 9 mm (3/8 in.) – Torque: 0.8 N•m (7 lb•in)

Approximate Dimensions

Approximate Dimensions are shown in millimeters (inches). Approximate Dimensions are not intended to be used for manufacturing purposes.



Cat. No. 700-HN154
Wire Size: 2 x 2.5 mm^2
Single Wire – Up to #12 AWG
Double Wire – 2 x 2.5 mm^2 (#2–14 AWG... #2–20 AWG)
(Either Solid or Stranded)
Strip Length: 9 mm (3/8 in.) – Torque: 0.8 N•m (7 lb•in)



Cat. No. 700-HT3
Wire Size: 2 x 1.5 mm^2 (#2–16 AWG...#1–20 AWG)
(Either Solid or Stranded)
Strip Length: 9 mm (3/8 in.) – Torque: 0.8 N•m (7 lb•in)

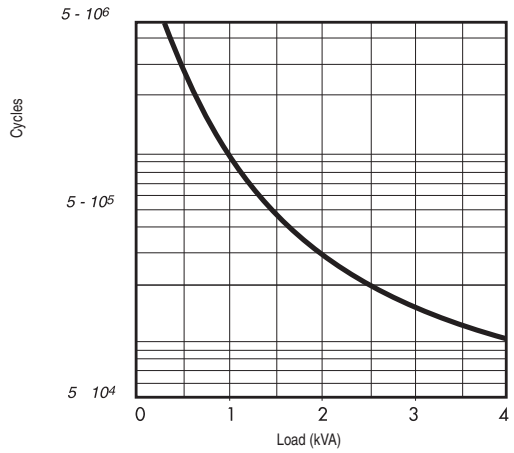
Specifications

Cat. No. 700-HD…						
Electrical Ratings						
Pilot Duty Rating‡		NEMA B300				
Rated Thermal Current (I_{th})		15 A§ – 120V 15 A§ – 240V				
Rated Insulation Voltage (U_i)		250V IEC-300V UL/CSA				
Contacts	Inductive	**Make** ►][◄		**Break** ◄][►		**Hp**
		2-Pole	3-Pole	2-Pole	3-Pole	
	120V AC	60 A	30 A	6 A	3 A	3/4
	240V AC	30 A	15 A	3 A	1.5 A	2
	General Purpose	15 A, 240V AC				
	Resistive	15 A, 30V DC				
Min. Low Energy Permissible Load		1000 mW (10V, 10 mA)				
Permissible Coil Voltage Variation		80…110% of Nominal Voltage at 50 Hz 80…110% of Nominal Voltage at 60 Hz 80…110% of Nominal Voltage at DC				
Coil Consumption ±10%	AC Coils	**50 Hz**		**60 Hz**		
	Inrush	3.3 VA		2.85 VA		
	Sealed	2.2 VA		1.9 VA		
	DC Coils	1.3 W				
Maximum Contact Resistance		50 mΩ				
Must Dropout Voltage		20% of Nominal V AC 10% of Nominal V DC				
Design Specification/Test Requirements						
Electrical						
Dielectric Withstand Voltage						
Pole-to-Pole		2500V				
Contact to Coil		4000V				
Mechanical						
Degree of Protection (Open Type) IEC 529		IP 40				
Mechanical Life Cycles (AC/DC)		> 10 x 10^6 / 30 x 10^6				
Switching Frequency Operations		3600/HR				
Coil Voltages		See Overview/Product Selection				
Operating Time	Pickup	20 ms				
	Dropout	4 ms				
Maximum Operating Rate		4 Ops/s				
Minimum Low Energy Permissible Load		1000 mN (10V, 10mA)				
Environmental						
Temperature	Operating	–40…+70 °C				
	Storage	–40…+100 °C				
Altitude		2000 m (6560 ft)				
Construction						
Insulating Material		Molded High Dielectric Material				
Enclosure		Transparent Dust Cover				
Contact Material		Silver Cad. Ox.				
Terminal Markings		In accordance with EN50 0005				
Certifications		cURs Recognized (File No. E3125, Guide NLDX2/NLDX8), CSA Certified (File No. 229473), CE Marked, UR Certified				
Standards		UL 508, CSA C22.2 No. 14, EN 61810-1				

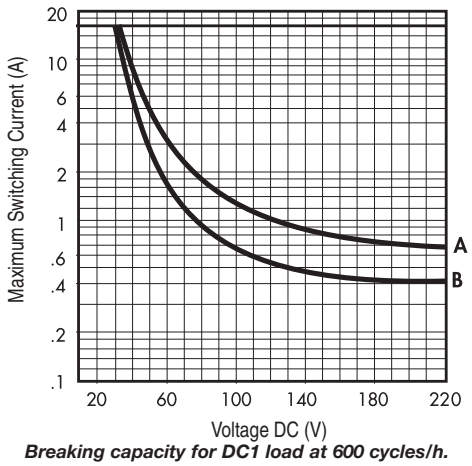
‡ NEMA Rating Chart is on page 19 of publication 700-SG003*

§ 3-pole relays have a 20 A maximum total current rating for all three poles.

Note: Bulletin 700-HD wiring terminals are the quick connect/solder type 4.7 x 0.5 mm (0.187 x 0.020 in.) termination.

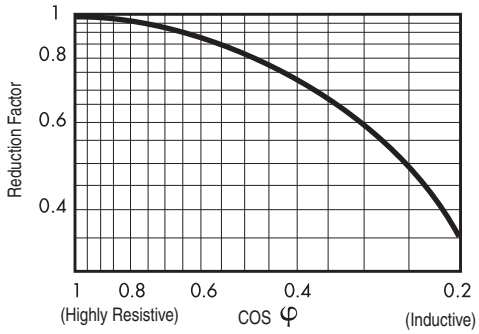


Contact life vs AC1 load at 600 cycles/h.



Breaking capacity for DC1 load at 600 cycles/h.

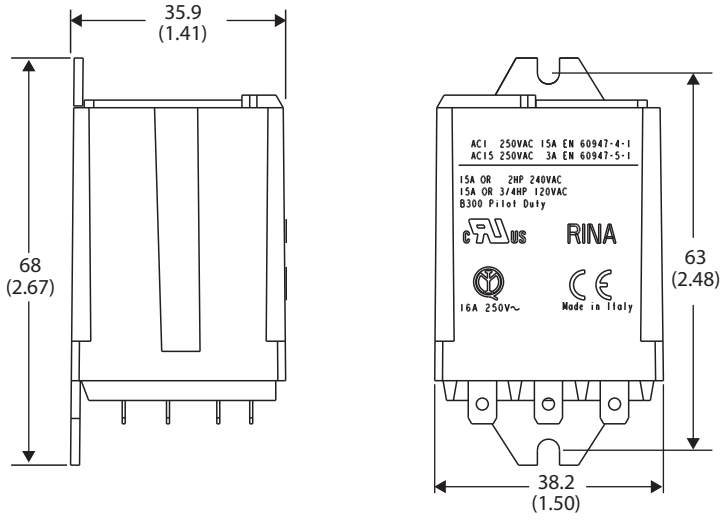
Load applied to 1 contact.
A = for N.O. types
B= other types



Load Reduction factor vs cos ϕ

Approximate Dimensions

Approximate Dimensions are shown in millimeters (inches). Approximate Dimensions are not intended to be used for manufacturing purposes.



Bulletin 700-HD Relay

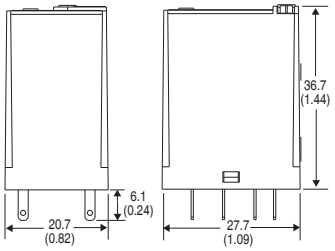
Specifications

Cat. No. 700-HC…								
Electrical Ratings								
Pilot Duty Rating ‡			NEMA C300, R300					
Rated Thermal Current (I_{th})			7 A and 10 A					
Rated Insulation Voltage (U_i)			250V IEC – 300V UL/CSA					
Contacts		Inductive	**700-HC_4**		**Hp**	**700-HC22**		**Hp**
			►][◄	◄][►		►][◄	◄][►	
		120V AC	15 A	1.5 A	1/8	15 A	1.5 A	1/3
		240V AC	7.5 A	0.75 A	1/3	7.5 A	0.75 A	3/4
		General Purpose	7 A, 277V AC			10 A, 277V AC		
		Resistive	7 A, 30V DC			10 A, 24V DC		
Min. Low Energy Permissible Load			100 mW (10V, 10 mA) - Silver Contacts 50 mW (5V, 10 mA or 25V, 2 mA) - Gold Contacts					
Permissible Coil Voltage Variation			Pickup:	80…110% of Nominal Voltage at 50 Hz 80…110% of Nominal Voltage at 60 Hz 80…110% of Nominal Voltage at DC		Must Dropout Voltage:	20% of Nominal Voltage at AC 10% of Nominal Voltage at DC	
			50 Hz			**60 Hz**		
Coil Consumption ±10%	AC Coils	Inrush	2.2 VA			1.6 VA		
		Sealed	1.3 VA			1.1 VA		
	DC Coils		1.0 W					
Max. Allowable Leakage			20% of VA (AC)					
			10% of W (DC)					
Design Specification/Test Requirements								
Electrical								
Dielectric Withstand Voltage		Pole-to-Pole	2000V					
		Contact to Coil	4000V					
Electrical Life (Cycles)			100 000 minimum					
Mechanical								
Degree of Protection (Open Type) IEC 529			IP 20 (Guarded Terminal Sockets)					
Mechanical Life Cycles			20×10^6 (AC) 50×10^6 (DC)					
Switching Frequency Operations			1800/HR					
Coil Voltages			See Product Selection					
Operating Time (ms)		Max. Pickup	10					
		Max. Dropout	3					
Maximum Operating Rate			8 cycles/s					
Environmental								
Temperature		Operating	–30…+55 °C					
			(–22…+131 °F)					
		Storage	–55…+85 °C					
			(–67…+185 °F)					
Altitude			2000 m (6560 ft)					
Insulating Material			Molded High Dielectric Material					
Enclosure			Transparent Dust Cover					
Contact Material			AgNi (700-HC2) AgNi + 5 µm All (700-HC1)					
Terminal Markings on Socket			In accordance with EN50 0005					
Sockets			700-HN103, -HN128, -HN104					
Certifications			cURus Recognized (File No. E14843, Guide NRNT2/NRNT8), cULus Listed when used with Bulletin 700-HN103, -HN104, and -HN128 sockets (File No. E14843, Guide NRNT/NRNT7), CE Marked, LR Certified					
Standards			UL 508, CSA 22.2 No. 14, EN 61810-1					

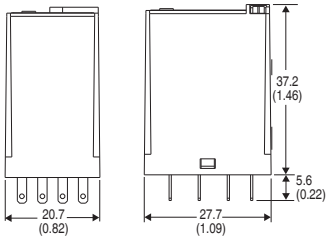
‡ NEMA Rating Chart is in publication 700-SG003*

Approximate Dimensions

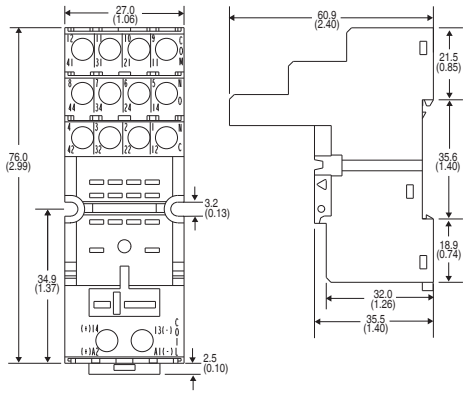
Approximate Dimensions are shown in millimeters (inches). Approximate Dimensions are not intended to be used for manufacturing purposes.



Bulletin 700-HC Relay (Two-Pole)

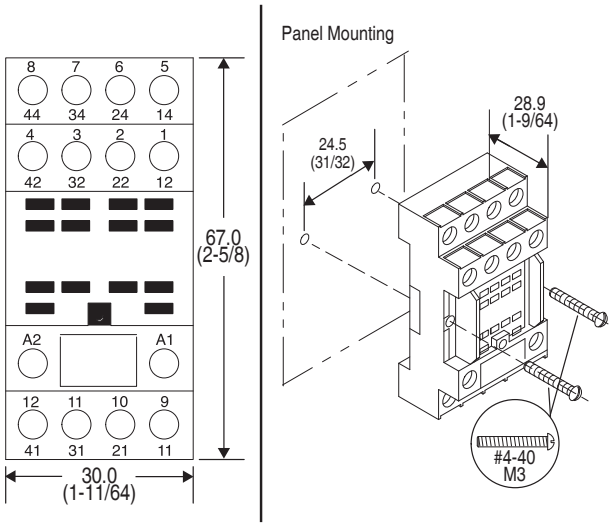


Bulletin 700-HC Relay (Four-Pole)



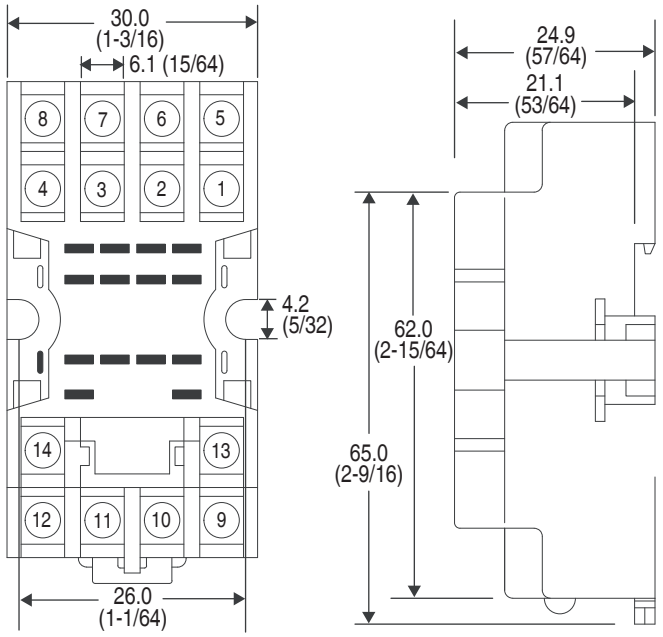
Cat. No. 700-HN104

Single Wire: 0.2 mm^2…2.5 mm^2 (#24 AWG…14 AWG)
Double Wire: 2 x 0.2 mm^2…2 x2.5 mm^2 (2 x 24 AWG…2 x 14 AWG)
Wire Type: solid or stranded, copper only
Strip Length: 7 mm (9/32 in.), Torque: 0.5 N•m (4.4 lb•in)



Cat. No. 700-HN103

Single Wire: 0.2 mm^2…2.5 mm^2 (#24 AWG…14 AWG)
Double Wire: 2 x 0.2 mm^2…2 x 1.5 mm^2 (2 x 24 AWG…2 x 16 AWG)
Wire Type: Solid or Stranded, Copper only
Strip Length: 8 mm (5/16 in.), Torque: 0.5 N•m (4.4 lb•in)



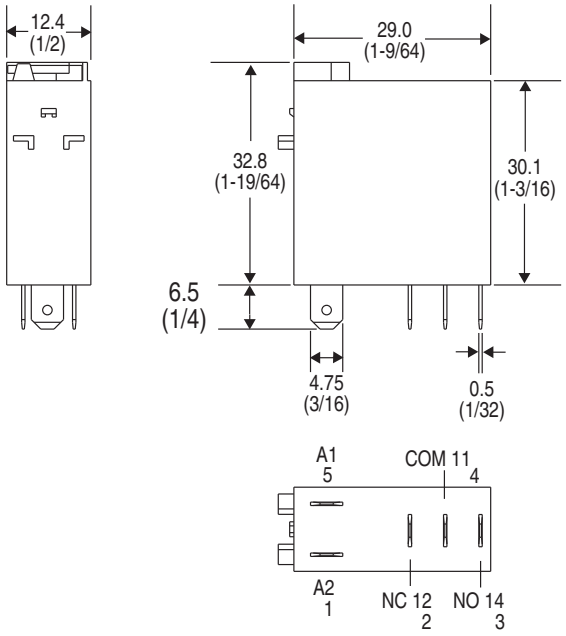
Cat. No. 700-HN128

Wire Size: 2 x 1.5mm^2 (#2-16 AWG…#1-20 AWG)
(Either Solid or Stranded)
Strip Length: 9 mm (3/8 in.) – Toque: 0.8 N•m (7 lb•in)

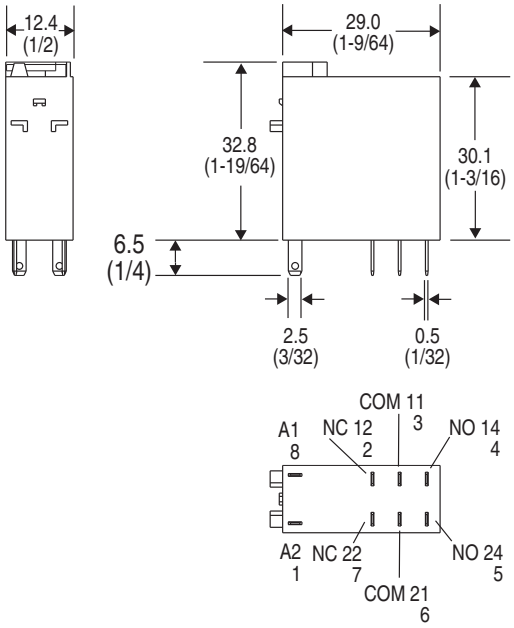
		Cat. No. 700-HK...			
Electrical Ratings					
Rated Thermal Current (I_{th})		1-Pole, 1 CO, SPDT — 16 A		2-Pole, 2 CO, DPDT — 8 A	
Rated Insulation Voltage (U_i)		250V IEC, 300V UL/CSA			
Contacts	Inductive V AC	120V AC	AC-15, 6.2 A B300 Pilot Duty, 3 A A300 (700-HKM_) 1/3 Hp (0.24 kW) 1-phase	120V AC	AC-15, 2.9 A B300 Pilot Duty, 3.0 A 1/4 Hp (0.18 kW), 1-phase
		240V AC	AC-15, 3.1 A B300 Pilot Duty, 1.5 A A300 (700-HKM_) 3/4 Hp (0.55 kW), 1-phase	240V AC	AC-15, 1.4 A B300 Pilot Duty, 1.5 A 1/2 Hp (0.37 kW), 1-phase
		230V AC	0.55 kW, 1-phase	230V AC	0.37 kW, 1-phase
	Inductive V DC	24V DC	DC-13, 5.0 A	24V DC	DC-13, 3.0 A
		125V DC	DC-13, 0.2 A R300 Pilot Duty, 0.22 A	125V DC	DC-13, 0.2 A R300 Pilot Duty, 0.22 A
		250V DC	DC-13, 0.1 A R300 Pilot Duty, 0.11 A	5 A, 250V AC	DC-13, 0.1 A R300 Pilot Duty, 0.11 A
	Resisitive	230V AC	AC-1, 16 A	230V AC	AC-1, 8 A
		277V AC	16 A, General Use	277V AC	8 A, General Use
	Make, Break & Continuous	30V DC	DC-1, 12 A 10 A, Resistive	30V DC	DC-1, 6 A 6 A, Resistive
Min. Permissible Contact Ratings		300 mW (5V/60 mA or 60V/5 mA) for AgNi Contacts (700-HK3_) 50 mW (5V/10 mA or 25V/2 mA) for AgNi + Gold Contacts (700-HKX_) 500 mW (100V/5 mA or 5V/100 mA) for $AgSnO_2$ Contacts (700-HKM_)			
Permissible Coil Voltage Variation	Pickup: holding Voltage: Must Dropout Voltage:	80…110% of Nominal Voltage at 50/60 Hz, 73...110% of Nominal Voltage at DC 80% of Nominal V AC at 50/60 Hz, 40% of Nominal V DC 20% of Nominal V AC at 50/60 Hz, 10% Nominal V DC			
Power Consumption		1.2V A (V AC Coils), 0.5 W (V DC Coils)			
Coil Voltages		See Overview/Product Selection			
Design Specification/Test Requirements					
Dielectric Withstand Voltage	Pole to Pole (VRMS)	2000V AC			
	Contact to Coil (VRMS)	4000V AC			
Mechanical					
Degree of Protection		IP 20 (guarded terminal sockets), RT II — Flux-proof (Relay)			
Mechanical Life Operations		10×10^6			
Electrical Life Cycles		230V AC, 16 A Resistive: 100 000 min. 277V AC, 16 A Resistive: 30 000 min. 30V DC, 10 A Resisitive: 30 000 min. B300, R300, Hp (kW): 6000 min. A300 (700-HKM_): 100,000 min.		230V AC, 8 A Resistive: 100 000 min. 277V AC, 8 A Resistive: 30 000 min. 30V DC, 6 A Resistive: 30 000 min. B300, R300, Hp (kW): 6000 min.	
Switching Frequency		Mechanical: 18,000 cycles/hr. Electrical: 900 cycles/hr.			
Operating Time at Nominal Voltage at 20 °C (ms)	Pickup	15 ms max.			
	Dropout	5 ms max.			
Vibration	Operational	10…2000 Hz, 0.76 mm (0.03 in.) 2.5 G			
	Non-Operational	10…2000 Hz, 0.76 mm (0.03 in.) 5.0 G			
Shock	Operational	15 G			
	Non-Operational	50 G			
Environmental					
Temperature	Operating	–40…+70 °C (–40…+158 °F)			
	Storage	–40…+85 °C (–40…+185 °F)			
Altitude		2000 m (6560 ft)			
Construction					
Insulating Material		Molded High Dielectric Material			
Enclosure		Transparent Dust Cover			
Contact Material		700-HK3_: Silver nickel (AgNi); 700-HKX_: Silver Nickel + Gold Plating (AgNi + Au); 700-HKM_: Silver Tin Oxide ($AgSnO_2$)			
Terminal Markings on Socket		In accordance with EN 50005			
Sockets		**1-Pole**		**2-Pole**	
	Screw Terminal	700-HN121 (10 A @ 70 °C) 700-HN221 (16 A @ 50 °C, 12 A @ 70 °C)		700-HN122 (2 x 5 A @ 70 °C) 700-HN222 (2 x 8 A @ 70 °C)	
	Spring Clamp (Available September 2006)	700-HN223 (15 A @ 40 °C with 2 conductors per terminal) (10 A @ 70 °C with 1 conductor per terminal)		700-HN224 (2 x 8 A@ 70 °C)	
Approvals					

Approximate Dimensions

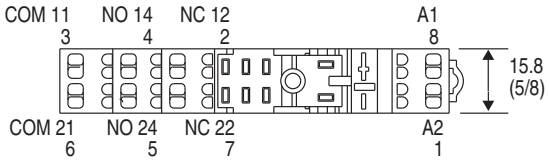
Approximate Dimensions are shown in millimeters (inches). Approximate Dimensions are not intended to be used for manufacturing purposes.



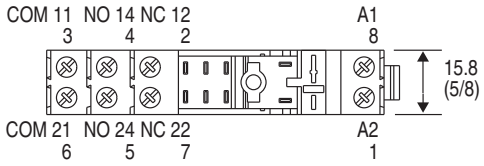
Cat. No. 700-HK36_ (SPDT)



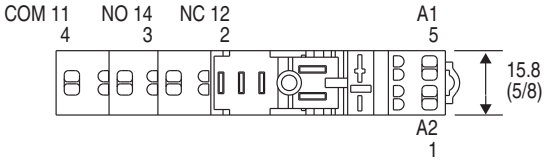
Cat. No. 700-HK32_ (DPDT)



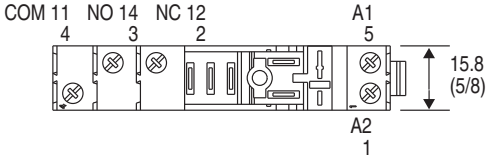
Cat. No. 700-HN224



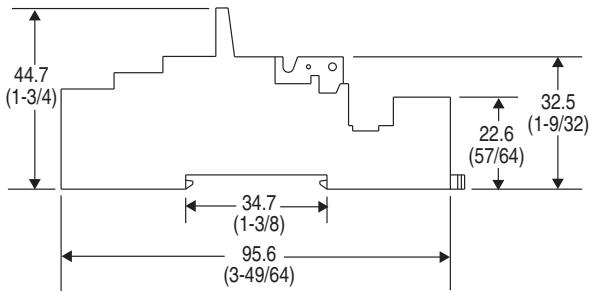
Cat. No. 700-HN222



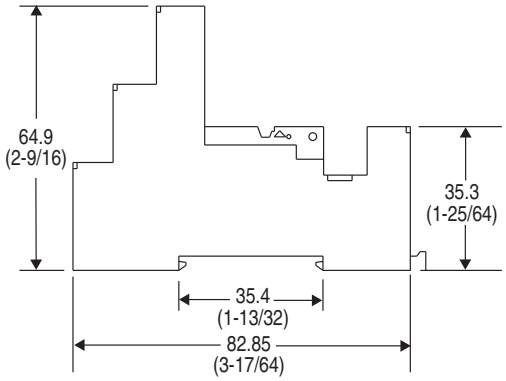
Cat. No. 700-HN223



Cat. No. 700-HN221

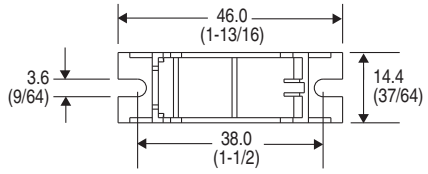


Cat. No. 700-HN223, 700-HN224
Wire Size: 0.2 mm^2...1.5 mm^2 (#24 AWG....#14 AWG)
Either Solid or Stranded
Strip Length: 8 mm (5/16 in)

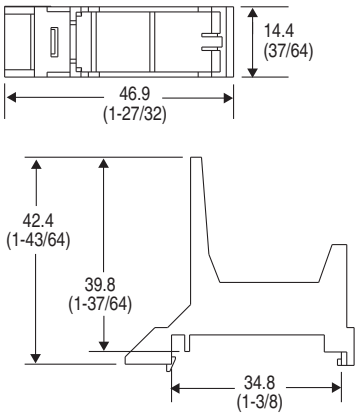


Cat. No. 700-HN221, 700-HN222
Wire Size: 0.2 mm^2...2.5 mm^2 (#24 AWG....#12 AWG)
Either Solid or Stranded
Strip Length: 8 mm (5/16 in), Torque: 0.8Nm (7.0 lb.-in.)

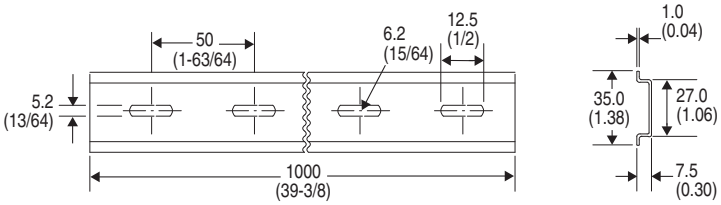
Approximate Dimensions are shown in millimeters (inches). Approximate Dimensions are not intended to be used for manufacturing purposes.



Cat. No. 700-HN226

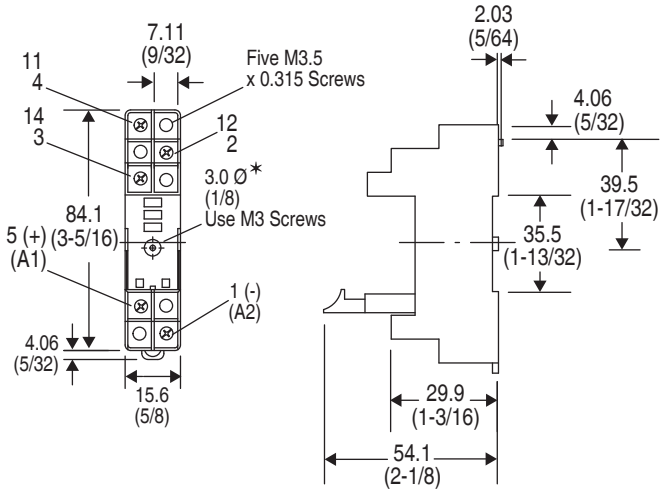


Cat. No. 700-HN227

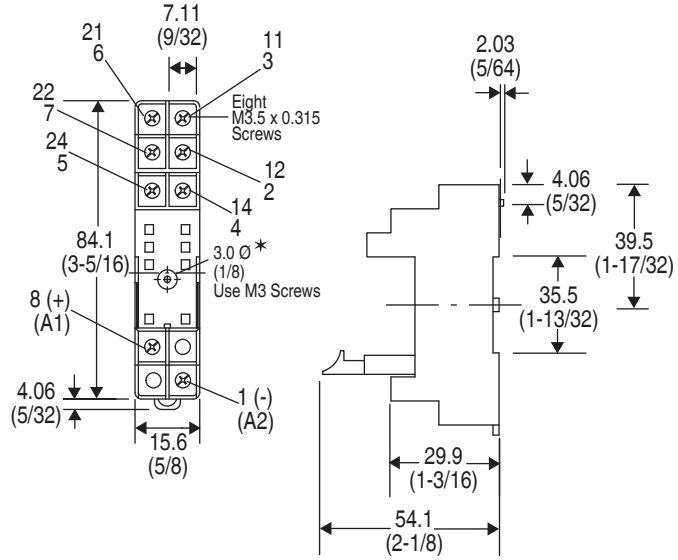


Cat. No. 199-DR4 DIN Mounting Rail Series B Has No Mounting Holes
Cat. No. 199-DR1 DIN Mounting Rail Series B

Cat. No.	A	B	C	D	Approx. Shipping Wt.
199-DR1	35 (1-3/8)	27 (1-1/16)	7.5 (19/64)	1.02 (1/64)	1.85 kg (4.07 lb) (10/pkg)
199-DR4	35 (1-3/8)	27 (1-1/16)	15 (19/32)	2.3 (3/32)	3.68 kg (8 lb) (5/pkg)



Cat. No. 700-HN121
Wire Size: 2 x 2.5 mm² Single Wire – Up to #14 AWG Double Wire – 2 x 2.5 mm² (#2–14 AWG… #2–20 AWG) (Either Solid or Stranded) Strip Length: 9 mm (3/8 in.) – Torque: 0.8 N•m (7 lb•in)



Cat. No. 700-HN122
Wire Size: 2 x 2.5 mm² Single Wire – Up to #14 AWG Double Wire – 2 x 2.5 mm² (#2–14 AWG… #2–20 AWG) (Either Solid or Stranded) Strip Length: 9 mm (3/8 in.) – Torque: 0.8 N•m (7 lb•in)

★ Holes required for mounting [3 mm (1/8 in.) diameter].

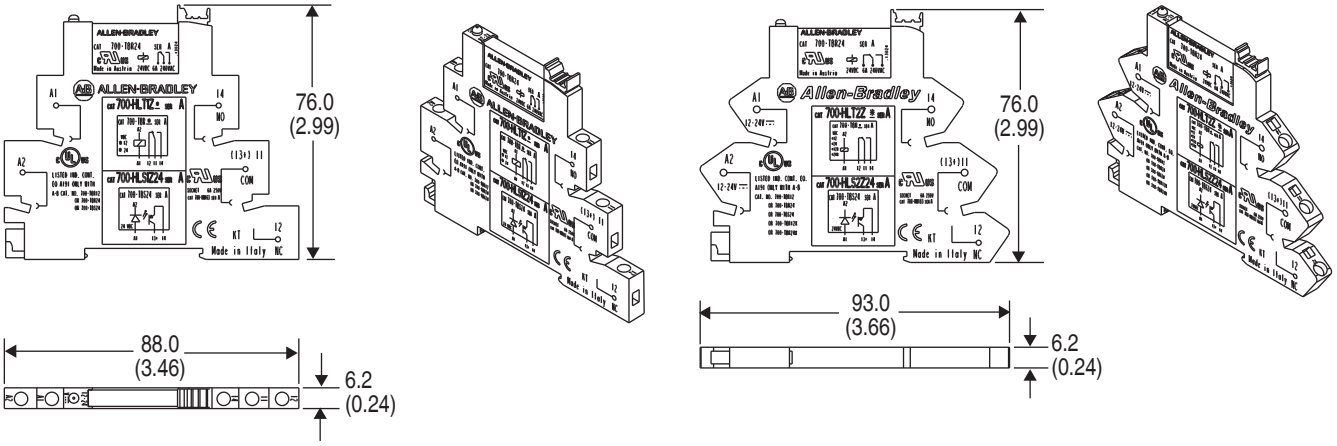
Cat. No. 700-HLT… (Relay Output)							
Electrical Ratings							
Pilot Duty Rating	B 300, R 300						
Rated Thermal Current (I_{th})	1-Pole — 6 A						
Rated Insulation Voltage (U_i)	250V IEC, 300V UL/CSA						
Contacts	Inductive	1-Pole					
	24V AC, 1-phase	30 A	►][◄	5 A	◄][►		
	120V AC, 1-phase	30 A		3 A			
	240V AC, 1-phase	15 A		1.5 A			
	Make, Break & Continuous V DC	24V DC			1.0 A		
		120V DC			0.2 A		
		240V DC			0.1 A		
Inductive Load	AC-15 250V, 3 A N.O. Contact, 1.5 A N.C. Contact DC-13 24V, 1 A N.O. *and* N.C. Contact						
Min. Permissible Contact Ratings	12V, 6 mA (72 mW) for Silver Contacts, 8V, 2.5 mA (20 mW) for Gold Contacts						
Permissible Coil Voltage Variation	Pickup:	85…110% of Nominal Voltage at 50 Hz 85…110% of Nominal Voltage at 60 Hz 80…110% of Nominal Voltage at DC			Must Dropout Voltage:	10% of Nominal Voltage at AC 5% of Nominal Voltage at DC	
Power Consumption ±10%	AC	0.3 VA					
	DC	0.2 W					
Design Specification/Test Requirements							
Dielectric Withstand Voltage	Pole to Pole (VRMS)	1000V					
	Contact to Coil (VRMS)	4000V					
Input Voltage	12V AC/DC	24V AC/DC	48V AC/DC	120V AC/DC	240V AC/DC	120V LCSC	240V LCSC
Impedance (Ohms)	1 K	2 K	6 K	26 K	56 K	16 K	35 K
Mechanical							
Degree of Protection	IP20						
Mechanical Life Operations	1 x 10^7						
Electrical Life Operations	6 A Resistive: 100 000 min. 24V DC, 1 A Inductive: 200 000 min. 120V AC 1 A Inductive: 300 000 min.						
Switching Frequency Operations (no-load)	10 cycles/sec						
Coil Voltages	See Overview/Product Selection						
Operating Time at Nominal Voltage at 20 °C (ms)	Pickup	7 ms					
	Dropout	3 ms					
Maximum Operating Rate (full load = 6 A)	6 cycles/min.						
Coil Surge Protection	Per EN 61000-4.5; Surge Immunity (801-5) Class III: 2 kV common and 1 kV differential mode						
Environmental							
Temperature	Operating	–40…+55 °C					
	Storage	–40…100 °C					
Altitude	2000 m (6560 ft)						
Construction							
Insulating Material	Molded High Dielectric Material						
Enclosure	Relay IP67						
Contact Material	Silver Tin Ox., $AgSnO_2$ or Silver with Gold Plating, $AgSnO_2$ + Au						
Terminal Markings on Socket	In accordance with EN50 0005						
Certifications	cULus Listed (File No. E3125, Guide NLDX/NLDX7) with Allen-Bradley socket, CE Marked, ABS (American Bureau of Shipping)						
Standards	EN 61810-1, CSA 22.2,UL 508,NEMA IEE MAC Compliant, ICS-2 Compliant						
Hazardous Location Approvals	Class 1, Zn 2, Groups IIC, Ex nC IIC T5 Ta < 55 °C						
	UL Listed (UL 60079-15)	700-HLT1Z12-EX (12V DC supply) 700-HLT1Z24-EX, 700-HLS1Z24-EX (24V DC supply) 700-HLT1U1-EX, 700-HLS1U1-EX (110V/125V AC/DC supply)					
	CSA Certified‡ (CAN/CSA E60079-15)	700-HLT1Z12-EX (12V DC supply) 700-HLT1Z24-EX, 700-HLS1Z24-EX (24V DC supply)					

Cat. No. 700-HLS... (Solid State Output)						
Electrical						
Rated Thermal Current (I_{th})		2 A (DC output)			1 A (AC output)	
Rated Insulation Voltage (U_i)	250V IEC, 300V UL/CSA					
Control Circuit	Min. Control Voltage	80% nominal voltage				
	Maximum Control Voltage	110% nominal voltage				
	Control Current	9 mA ±10% (24V) 4 mA ±10% (120/240V)				
	Release Voltage	0.4 x nominal voltage (24V), 0.35 x nominal voltage (120/240V)				
	Min. Control Circuit Resistance	3200 ohms (24V), 16k ohms (120V), 32k ohms (240V)			2500 ohms (24V), 12k ohms (120V), 24k ohms (240V)	
Outputs	Load Voltage Range	0…24V DC			24…240V AC	
	Max. Repetitive Blocking Voltage	33V			600V	
	Max. Switching Current (inductive/resistive)	2 A DC			1 A AC	
	On State Voltage Drop @ Max. Switching Current	<120 mV DC			<1V AC	
	Leakage Current	max. 100 µA (@U = 24V)				
Power Consumption ±10%	AC	0.6 VA (120V), 1 VA (240V)				
	DC	0.2 W			0.3 W	
Design Specification/Test Requirements						
Dielectric Withstand Voltage	Pole to Pole (VRMS)	2500V				
	Contact to Coil (VRMS)	2500V				
Input Voltage	24V DC	48V DC	120V AC/DC	240V AC/DC	120V LCSC	240V LCSC
Impedance (Ohms)	2K	9 K	26 K	58 K	16 K	35 K
Mechanical						
Degree of Protection	IP20					
Input Voltages	See Overview/Product Selection					
Operating Time at Nominal Voltage at 20 °C (ms)	Turn on Time	30 µs (DC only input voltage), 7 ms (AC/DC input voltage)				
	Drop Out Time	350 µs (DC only input voltage), 10 ms (AC/DC input voltage)				
Maximum Operating Rate	300 Hz					
Environmental						
Temperature	Operating	–20…+55 °C				
	Storage	–40…70 °C				
Altitude	2000 m (6560 ft)					
Construction						
Insulating Material	Molded High-Dielectric Material					
Enclosure	Relay IP67					
Terminal Markings on Socket	In accordance with EN50 0005					
Certifications	cULus Listed (File No. E14843, Guide NLDX/NLDX7), CE Marked, ABS (American Bureau of Shipping)					
Standards	UL 508, CSA C22.2 No. 14, EN 61810-1					
Hazardous Location Approvals	Class 1, Zn 2, Groups IIC, Ex nC IIC T5 Ta < 55 °C					
	UL Listed (UL 60079-15)	700-HLT1Z24-EX, 700-HLS1Z24-EX (24V DC supply) 700-HLT1U1-EX, 700-HLS1U1-EX (110V/125V AC/DC supply)				
	CSA Certified★ (CAN/CSA 60079-15)	700-HLT1Z24-EX, 700-HLS1Z24-EX (24V DC supply)				

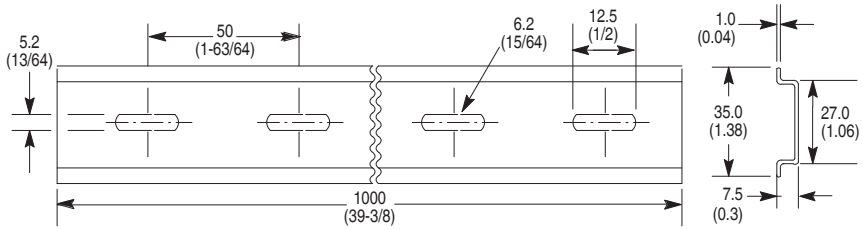
★ Product shall be installed in an enclosure providing at least IP54 protection. Provisions shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 40%.

Approximate Dimensions

Approximate Dimensions are shown in millimeters (inches). Approximate Dimensions are not intended to be used for manufacturing purposes.



Bulletin 700-HL Spring Terminal Design
Single Wire: 0.2 mm² ...2.5 mm² (#24 AWG...#14 AWG)
Wire Type: Solid or stranded, copper only
Strip Length: 9 mm (11/32 in.)



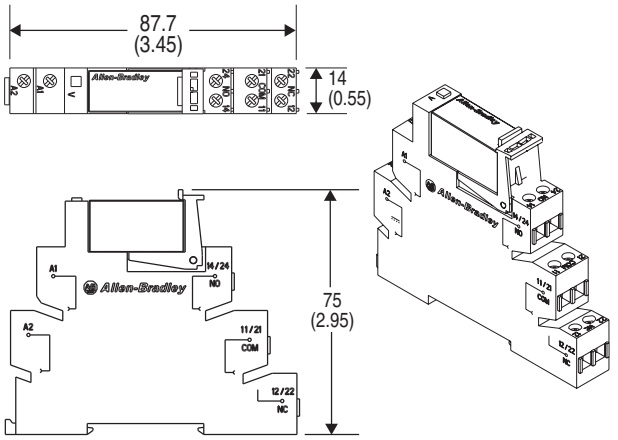
Cat. No. 199-DR1 DIN Mounting Rail Series B
Cat. No. 199-DR4 DIN Mounting Rail Series B Has No Mounting Holes

Cat. No.	A	B	C	D	Approx. Shipping Wt.
199-DR1	35 (1-3/8)	27 (1-1/16)	7.5 (19/64)	1.02 (1/64)	1.85 kg (4.07 lb) (10/pkg)
199-DR4	35 (1-3/8)	27 (1-1/16)	15 (19/32)	2.3 (3/32)	3.68 kg (8 lb) (5/pkg)

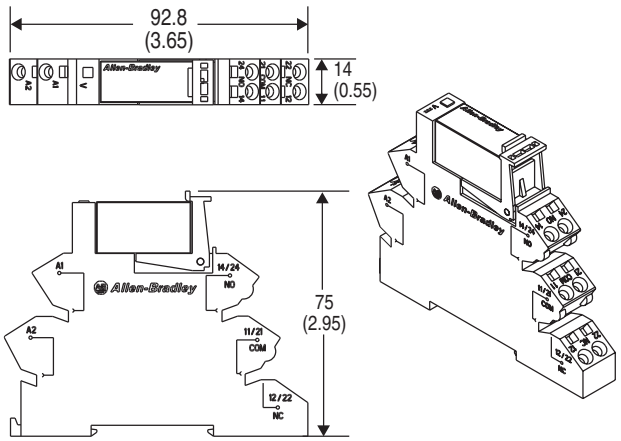
Cat. No. 700-HLT…2-Pole (Relay Output)							
Electrical Ratings							
Rated Thermal Current (I_{th})		2-Pole — 10 A					
Rated Insulation Voltage (U_i)		250V IEC, 300V UL/CSA					
Contacts	Inductive V AC UL	120V AC	AC-15, 3.0A B 300, 3.0 A	1/4 HP (186 W), 1-phase			
		240V AC	AC-15, 3.0 A B 300, 1.5 A	1/2 HP (373 W), 1-phase			
	Inductive V DC	24V DC	DC-13, 2.0 A				
		125V DC	DC-13, 0.3 A				
		250V DC	DC-13, 0.2 A				
	Resistive Make, Break and Continuous	250V AC	10 A				
		24V DC	10 A				
		250V DC	0.28 A				
Min. Permissible Contact Ratings		12V, 10 mA (120 mW) for Silver Contacts, 5V, 1 mA (50 mW) for Gold Contacts					
Permissible Coil Voltage Variation		Pickup:	85…110% of Nominal Voltage at 50 Hz 85…110% of Nominal Voltage at 60 Hz 80…110% of Nominal Voltage at DC		Must Dropout Voltage:	10% of Nominal Voltage at AC 5% of Nominal Voltage at DC	
Design Specification/Test Requirements							
Dielectric Withstand Voltage		Pole to Pole (VRMS)	1000V				
		Contact to Coil (VRMS)	5000V				
		Adjacent Contacts (VRMS)	2500V				
Input Voltage		12V AC/DC	24V AC/DC	48V DC	120V AC/DC	240V AC/DC	
Impedance (Ohms)		1 K	2 K	3 K	34 K	72 K	
Power Consumption	AC	N/A	0.5V A	N/A	0.4V A	0.8V A	
±10%	DC	0.4 W	0.5 W	0.8 W	0.5 W	0.7 W	
Mechanical							
Degree of Protection		IP20					
Mechanical Life Operations		3×10^7					
Electrical Life Operations		250V AC/24V DC, 8 A Resistive: 100 000 min. 24V DC, 10 A Resistive: 6000 min. 250V DC, 0.28 A Resistive: 6000 min. 250V AC, 10 A Resistive: 30 000 min.					
Switching Frequency Operations (no-load)		1200 cycles/sec					
Coil Voltages		See Overview/Product Selection					
Operating Time at Nominal Voltage at 20 °C (ms)		Pickup	typical 10 ms				
		Dropout	typical 10 ms				
Maximum Operating Rate (full load = 6 A)		6 cycles/min.					
Environmental							
Temperature		Operating	–40…+60 °C				
		Storage	–40…+100 °C				
Altitude		2000 m (6560 ft)					
Construction							
Insulating Material		Molded High-Dielectric Material					
Enclosure		Relay RT II — flux-proof, pollution degree 2 installation environment					
Contact Material		AgNi 90/10 or AgNi 90/10 + Au					
Terminal Markings on Socket		In accordance with EN50 0005					
Certifications		cULus Listed (File No. E3125, Guide NRNT/NRNT7), CE Marked					
Standards		UL 508, CSA C22.2 No. 14, EN 61810-1					

Approximate Dimensions

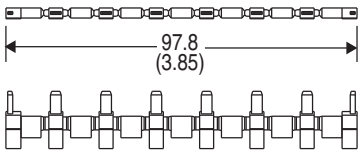
Approximate dimensions are shown in millimeters (inches). Approximate dimensions are not intended to be used for manufacturing purposes.



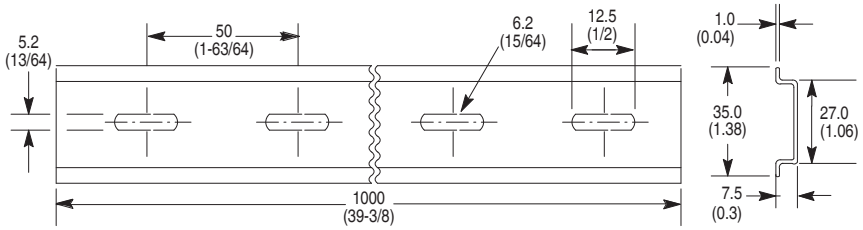
Bulletin 700-HL Screw Terminal Design
Single Wire: 0.14 mm^2…2.5 mm^2 (#26 AWG…14 AWG)
Double Wire: 2 x 0.14 mm^2…2 x 1.5 mm^2 (2 x #26 AWG…2 x 16 AWG)
Wire Type: Solid or stranded, copper only
Strip Length: 9 mm (11/32 in). Torque: 0.5 N•m (4.4 lb•in)



Bulletin 700-HL Spring Terminal Design
Single Wire: 0.2 mm^2…2.5 mm^2 (#24 AWG…#14 AWG)
Wire Type: Solid or stranded, copper only
Strip Length: 9 mm (11/32 in)



Bulletin 700-TBJ08_ 8-Way Jumper

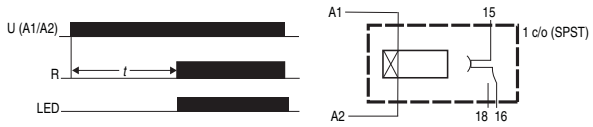


Cat. No. 199-DR1 DIN Mounting Rail Series B
Cat. No. 199-DR4 DIN Mounting Rail Series B Has No Mounting Holes

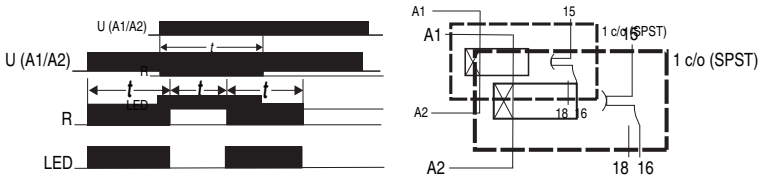
Cat. No.	A	B	C	D	Approx. Shipping Wt.
199-DR1	35 (1-3/8)	27 (1-1/16)	7.5 (19/64)	1.02 (1/64)	1.85 kg (4.07 lb) (10/pkg)
199-DR4	35 (1-3/8)	27 (1-1/16)	15 (19/32)	2.3 (3/32)	3.68 kg (8 lb) (5/pkg)

Function and Connection Diagrams

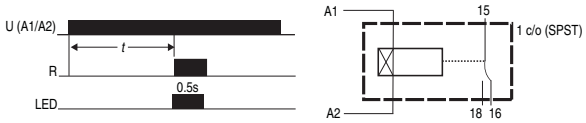
On-Delay



One Shot



Pulse



Flasher

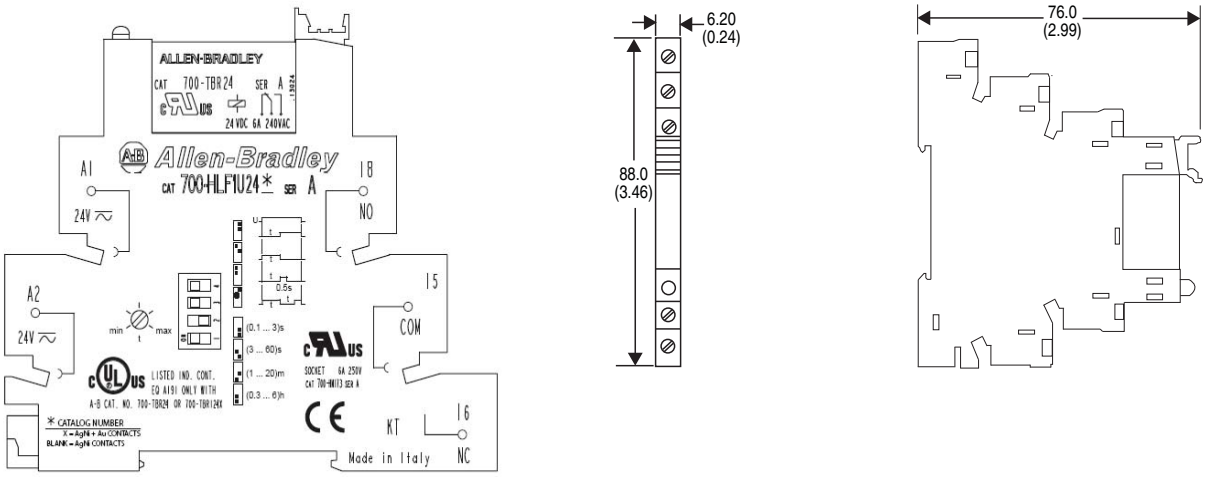
Specifications

Cat. No. 700-HLF… (Relay Output)					
Electrical Ratings					
Pilot Duty Rating	B 300, R 300				
Rated Thermal Current (I_{th})	1-Pole — 6 A				
Rated Insulation Voltage (U_i)	250V IEC, 300V UL/CSA				
Contacts	Inductive	1-Pole			
	24V AC, 1-phase	30 A	►][◄	5 A	◄][►
	120V AC, 1-phase	30 A		3 A	
	240V AC, 1-phase	15 A		1.5 A	
	Make, Break & Continuous V DC	24V DC			1.0 A
		120V DC			0.2 A
		240V DC			0.1 A
Inductive Load	AC-15 250V, 3 A N.O. Contact, 1.5 A N.C. Contact DC-13 24V, 1 A N.O. *and* N.C. Contact				
Min. Permissible Contact Ratings	12V, 6 mA (72 mW) for Silver Contacts, 8V, 2.5 mA (20 mW) for Gold Contacts				
Permissible Coil Voltage Variation	Pickup:	85…110% of Nominal Voltage at 50 Hz 85…110% of Nominal Voltage at 60 Hz 80…110% of Nominal Voltage at DC		Must Dropout Voltage:	10% of Nominal Voltage at AC 5% of Nominal Voltage at DC
Power Consumption ±10%	AC/DC	0.5 VA			
Design Specification/Test Requirements					
Dielectric Withstand Voltage	Pole to Pole (VRMS)	1000V			
	Contact to Coil (VRMS)	4000V			
Input Voltage	24V AC/DC				
Impedance (Ohms)	2 K				
Mechanical					
Degree of Protection	IP20				
Mechanical Life Operations	1 x 10^7				
Electrical Life Operations	6 A Resistive: 100 000 min. 24V DC, 1 A Inductive: 200 000 min. 120V AC 1 A Inductive: 300 000 min.				
Switching Frequency Operations (no-load)	10 cycles/sec				
Coil Voltages	See Overview/Product Selection				
Timer Functions	On-Delay, One Shot, Pulse and Flasher				
Timer Settings	0.1...3 s, 3...60 s, 1...20 min, and 0.3...6 hr				
Timer Adjustments	Min and Max adjustments with Potentionmeter				
Timer Accuracy	Repeatability 1%, Recovery Time < 50 ms, Setting Accuracy Full Range 5%				
Coil Surge Protection	Per EN 61000-4.5; Surge Immunity (801-5) Class III: 2 kV common and 1 kV differential mode				
Environmental					
Temperature	Operating	–40…55 °C			
	Storage	–40…100 °C			
Altitude	2000 m (6560 ft)				
Construction					
Insulating Material	Molded High Dielectric Material				
Enclosure	Relay IP67				
Contact Material	Silver Tin Ox., $AgSnO_2$ or Silver with Gold Plating, $AgSnO_2$ + Au				
Terminal Markings on Socket	In accordance with EN50 0005				
Certifications	cULus Listed (File No. E3125, Guide NLDX/NLDX7) with Allen-Bradley socket, CE Marked				
Standards	EN60947-4-1,EN60947-5-1,CSA 22.2,UL 508,NEMA IEE MAC Compliant, ICS-2 Compliant				

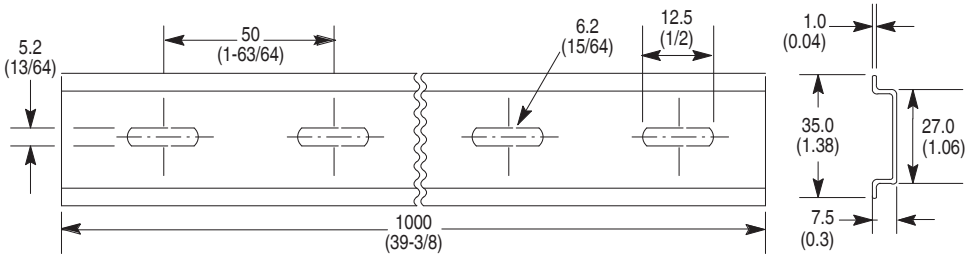
‡ Product shall be installed in an enclosure providing at least IP54 protection. Provisions shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 40%.

Approximate Dimensions

Approximate Dimensions are shown in millimeters (inches). Approximate Dimensions are not intended to be used for manufacturing purposes.



Bulletin 700-HLF Screw Terminal Design
Single Wire: 0.14 mm^2...2.5 mm^2 (#26 AWG...14 AWG)
Double Wire: 2 x 0.14 mm^2...2 x 1.5 mm^2 (2 x #26 AWG...2 x 16 AWG)
Wire Type: Solid or stranded, copper only
Strip Length: 9 mm (11/32 in.). Torque: 0.5 N•m (4.4 lb•in)



Cat. No. 199-DR1 DIN Mounting Rail Series B
Cat. No. 199-DR4 DIN Mounting Rail Series B Has No Mounting Holes

Cat. No.	A	B	C	D	Approx. Shipping Wt.
199-DR1	35 (1-3/8)	27 (1-1/16)	7.5 (19/64)	1.02 (1/64)	1.85 kg (4.07 lb) (10/pkg)
199-DR4	35 (1-3/8)	27 (1-1/16)	15 (19/32)	2.3 (3/32)	3.68 kg (8 lb) (5/pkg)

Bulletin 700-HP Pin Style (PCB) Slim Line Relay, Socket, and Retainer Clip Reference Chart

Relay Type	Socket Cat. No.	Retainer Clip Cat. No.
700-HPX2	700-HN123	700-HN119
700-HP32	700-HN123	700-HN119
700-HPS2	700-HN123	700-HN119
700-HPSX	700-HN123	700-HN119

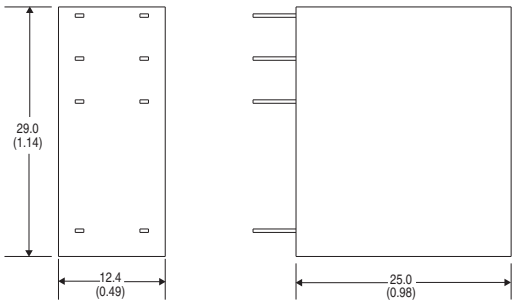
Specifications *

Cat. No. 700-HP…			Cat. No. 700-HP3…, 700-HPX	Cat. No. 700-HPS…
Contacts	Inductive	V AC	AC 15 @ 500V AC	
			C300	B300
			1/3 Hp @ 240V AC	1/2 Hp @ 240V AC
			1/6 Hp @ 120V AC	1/3 Hp @ 120V AC
			AC-1 2000VA	
		V DC	R300	—
			DC-1: 8A @ 30V DC	
			DC-1: 0.3A @ 110V DC	DC-1: 0.65A @ 110V DC
			DC-1: 0.1A @ 220V DC	DC-1: 0.2A @ 220V DC
	Resistive	AC	8 A @ 277V AC (per pole)	
		DC	8 A @ 30V DC (per pole)	
	Minimum Load		700-HP32: 300mW (5V, 5 mA) 700-HPX2: 50mW (5V, 5 mA)	700-HPS2: 500 mW (10V, 10 mA) 700-HPSX: 50 mW (5V, 5 mA)
Nominal Coil Power (AC/DC)			1.2 VA / 0.65 W	0.7 W
Operating Range (AC/DC)			80...110% / 73...150% Nominal Voltage	75...120% Nominal Voltage DC
Holding Voltage (AC/DC)			80 / 40% Nominal Voltage	40% Nominal Voltage DC
Must Drop Out Voltage (AC/DC)			20 / 10% Nominal Voltage	10% Nominal Voltage DC
Insulation Voltage			250V AC	
Design Specification/Test Requirements			**700-HP3, 700-HPX**	**700-HPS**
Dielectric Withstand Voltage for one minute	Pole to Pole (VRMS)		2000V AC	
	Contact to Coil (VRMS)		4000V AC	
Mechanical				
Degree of Protection			Open Type (Sockets)	
Mechanical Life Cycles			10×10^6 (AC Coils), 20×10^6 (DC coils)	10×10^6 (DC Coils)
Switching Frequency Operations			1800/hr (no load)	900/hr (no load)
Coil Voltages			See Overview/Product Selection	
Operating Time at Nominal Voltage at 20 °C (ms)	Pickup		12	10
	Dropout		4	
Maximum Operating Rate			16 Ops/s (full load)	8 Ops/s (full load)
Vibration	Enclosure		5 G	
	Fragility		2.5 G	
Shock	Endurance		50 G	
	Fragility		15 G	
Max. Socket Torque			0.5 N•m (4.4 lb•in)	
Environmental				
Temperature	Operating		–40…+85 °C	–40…+70 °C
	Storage		–45…+100 °C	–50…+80 °C
Altitude			2000 m (6560 ft)	
Construction				
Insulating Material			Molded High-Dielectric Material	
Enclosure			Transparent Dust Cover	Red Transparent Dust Cover
Contact Material			Silver Nickel, (AgNi) (700-HP32 and 700-HPS2), Silver Nickel + Gold Plating (AgNi + Au) (700-HPX2 and 700-HPSX)	
Terminal Markings on Socket			In accordance with EN50 0005	
Sockets			2-Pole	
			700-HN123	
Approvals				
Certifications			cURus Recognized (File No. E3125, Guide NLDX2/NLDX8), cULus Listed when used with Bulletin 700-HN123 socket (File No. E3125, Guide NLDX/NLDC7), CSA Certified (files 229473), CE Marked, LR Certified (700-HP), IMQ & TUV Certified (700-HPS)	
Standards			UL 508, CSA 22.2 No. 14, EN 61810-1, EN 50205 (700-HPS)	

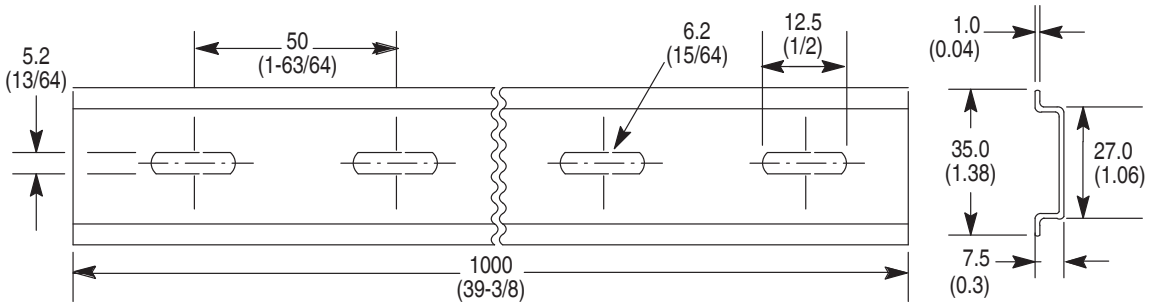
‡ NEMA Rating Chart is in publication 700-SG003*
§ The inrush VA equals 1.5 times the sealed VA.

Approximate Dimensions

Approximate Dimensions are shown in millimeters (inches). Approximate Dimensions are not intended to be used for manufacturing purposes.



Bulletin 700-HP Relay



Cat. No. 700-HN123

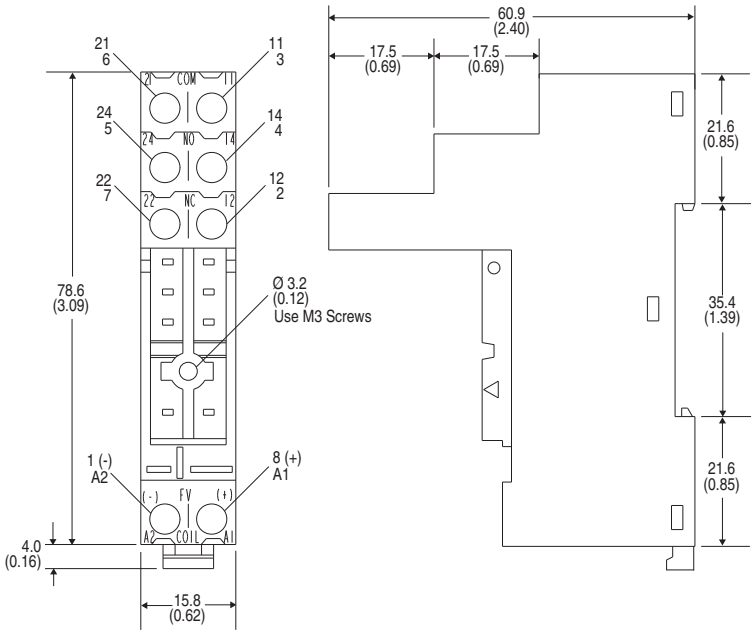
Single Wire: 0.2.....2.5 mm^2 (#24.....14 AWG)

Double Wire: 2 X 0.2.....2 X 2.5 mm^2 (#2 X 24....2 X 14 AWG)

Wire Type: solid or stranded, copper only

Strip Length: 7 mm (9/32 in.), Torque: 0.5 N•m (4.4 lb•in)

Cat. No.	A	B	C	D	Approx. Shipping Wt.
199-DR1	35 (1-3/8)	27 (1-1/16)	7.5 (19/64)	1.02 (1/64)	1.85 kg (4.07 lb) (10/pkg)
199-DR4	35 (1-3/8)	27 (1-1/16)	15 (19/32)	2.3 (3/32)	3.68 kg (8 lb) (5/pkg)



Cat. No. 700-HN123

Single Wire: 0.2.....2.5 mm^2 (#24.....14 AWG)

Double Wire: 2 X 0.2.....2 X 2.5 mm^2 (#2 X 24....2 X 14 AWG)

Wire Type: solid or stranded, copper only

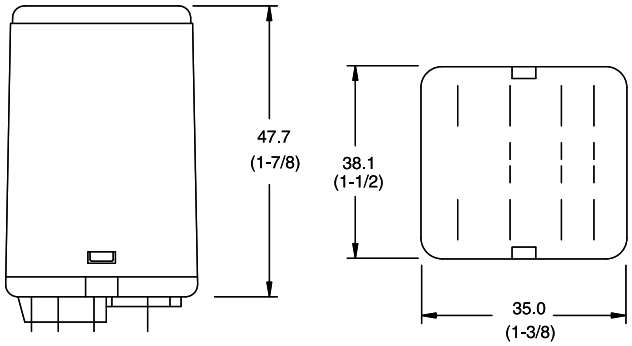
Strip Length: 7 mm (9/32 in.), Torque: 0.5 N•m (4.4 lb•in)

Specifications

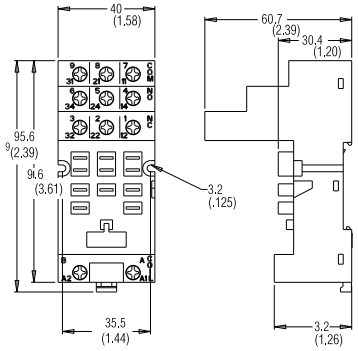
			Cat. No. 700-HJ…		
Electrical Ratings					
Pilot Duty Rating			—		
Rated Thermal Current (I^{th})			10 A		
Rated Insulation Voltage (U_i)			250V IEC, 300V UL/CSA		
Contacts		Inductive	**Make**	**Break**	**Hp**
			►][◄	◄][►	
		120V AC 240V AC	30 A 15 A	3 A 1.5 A	1/4 1/3
		DC	24V DC, 10 A		
Permissible Coil Voltage Variation			85…110% of Nominal Voltage at 50 Hz 85…110% of Nominal Voltage at 60 Hz 80…110% of Nominal Voltage at DC		
			Single AC Coil	**Single DC Coil**	**Dual DC Coil**
Coil Consumption ±10%	AC Coils	Inrush Sealed	1.44 VA 1.44 VA	—	—
	DC Coils		—	1.2 W	12V 1.63 W 24V 1.67 W
Design Specification/Test Requirements					
Dielectric Withstand Voltage		Pole-to-Pole	1500V AC		
		Contact-to-Pole	1500V AC		
		Contact-to-Frame	1500V AC		
Mechanical					
Degree of Protection			Open Type (Guarded Terminal Sockets)		
Mechanical Life Operations			10×10^6		
Switching Frequency Operations			1800/HR		
Coil Voltages			See Product Selection		
Operating Time at Nominal Voltage at 20 °C		Pickup Dropout	25 ms 25 ms		
Maximum Operating Rate			—		
Environmental					
Temperature		Operating	–45…+50 °C (–49…+122 °F)		
		Storage	–45…+100 °C (–49…+212 °F)		
Altitude			2000 m (6560 ft.)		
Construction					
Insulating Material			Molded High Dielectric Material		
Enclosure			Transparent Dust Cover		
Contact Material			Silver Cad. Ox.		
Terminal Markings on Socket			In accordance with EN50 0005		
Sockets			11-Blade Socket Cat. No. 700-HN153 Cat. No. 700-HN154		
Certifications			CSA Certified, File LR700026, UL Recognized, File E3125, Guide NLDX 2		
Standards			UL 508, CSA 22.2 No. 14, EN/IEC 60947-4-1, -5-1		

Approximate Dimensions

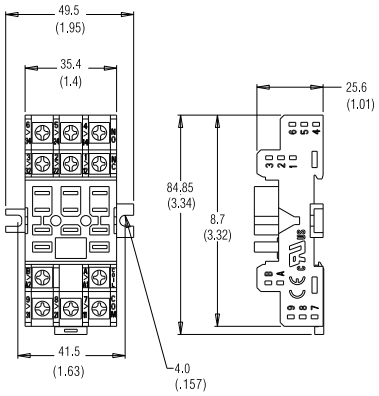
Approximate Dimensions are shown in millimeters (inches). Approximate Dimensions are not intended to be used for manufacturing purposes.



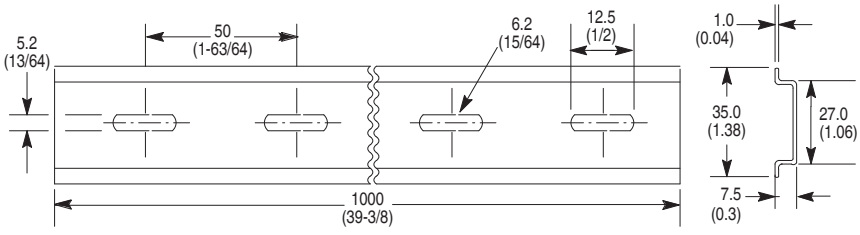
Bulletin 700-HJ Relay



Cat. No. 700-HN153
Wire Size: 2 x 2.5 mm²
Single Wire – Up to #12 AWG
Double Wire – 2 x 2.5 mm² (#2–14 AWG... #2–20 AWG)
(Either Solid or Stranded)
Strip Length: 9 mm (3/8 in) – Torque: 0.8 N•m (7 lb•in)



Cat. No. 700-HN154
Wire Size: 2 x 2.5 mm²
Single Wire – Up to #12 AWG
Double Wire – 2 x 2.5 mm² (#2–14 AWG... #2–20 AWG)
(Either Solid or Stranded)
Strip Length: 9 mm (3/8 in) – Torque: 0.8 N•m (7 lb•in)



Cat. No. 199-DR1 DIN Mounting Rail Series B
Cat. No. 199-DR4 DIN Mounting Rail Series B Has No Mounting Holes

Cat. No.	A	B	C	D	Approx. Shipping Wt.
199-DR1	35 (1-3/8)	27 (1-1/16)	7.5 (19/64)	1.02 (1/64)	1.85 kg (4.07 lbs.) (10/pkg)
199-DR4	35 (1-3/8)	27 (1-1/16)	15 (19/32)	2.3 (3/32)	3.68 kg (8 lbs.) (5/pkg)

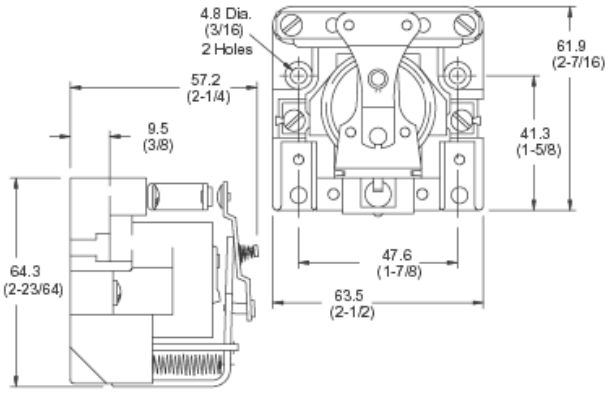
Specifications

Cat. No. 700-HG...												
Electrical Ratings												
Pilot Duty Rating ‡	A600											
Rated Thermal Current (I_{th})	40 A											
Rated Insulation Voltage (U_i)	600V UL											
Contact Ratings: AC Ratings SPST-NO-DM						**Contact Ratings**: AC Ratings SPDT, DPST - NO and DPDT						
Volts	Inductive			Resistive - Make/Break and Continuous	HP	Volts	Inductive			Resistive - Make/Break and Continuous	HP§	
	Make	Break	Continuous				Make	Break	Continuous			
120	60 A	6 A	10 A	40 A	2	120	60 A	6 A	10 A	40 A	1 - 1/2	
240	30 A	3 A	10 A	40 A		240	30 A	3 A	10 A	40 A		
480	15 A	1.5 A	10 A	12 A	2	480	15 A	1.5 A	10 A	5 A	1 - 1/2	
600	12 A	1.2 A	10 A	10 A		600	12 A	1.2 A	10 A	5 A		
DC Ratings: Without Magnetic Blowouts - 28V 40 A - Make, Break and Continuous Est Drop 125V 1.2...3 A												
DC Ratings: With Magnetic Blowouts:		SPST - NO - DM	SPDT, DPST - NO and DPDT									
Make, Break and Continuous		110V	20 A	10 A								
		220V	8 A	4 A								
		325V	4 A	2 A								
		500V	2 A	—								
Permissible Coil Voltage Variation			80...100% of Nominal Voltage at 50 Hz									
			85...110% of Nominal Voltage at 60 Hz									
			80...110% of Nominal Voltage at DC									
			50 HZ	**60 HZ**								
Coil Consumption ±10%	AC Coils	Inrush	13 VA	16 VA								
		Sealed	10 VA	11 VA								
	DC Coils		2.0 W									
Design Specification/Test Requirements												
Dielectric Withstand Voltage	Pole-to-Pole	2200V AC										
	Contact to Pole	2200V										
	Contact to Frame	2200V AC										
Mechanical												
Degree of Protection	Open Type											
Mechanical Life Operations	5×10^6											
Switching Frequency Operations	1600/Hr											
Coil Voltage	See Overview/Product Selection											
Operating Time at Nominal Voltage at 20 °C	Pickup	40 ms										
	Dropout	35 ms										
Maximum Operating Rate	—											
Environmental												
Temperature	Operating	-30...+55 °C										
		(-22...+149 °F)										
	Storage	-30...+65 °C										
		(-22...+149 °F)										
Altitude	2000 m (6560 ft.)											
Construction												
Insulating Material	Molded Thermo											
	Setting Plastic											
Enclosure	—											
Contact Material	Silver Cadmium Oxide											
Terminal Markings on Socket	—											
Sockets	N/A											
Certifications	CSA Certified, File 225674, UL Listed, File E3125, Guide NLDX, CE Marked											
Standards	UL 508, CSA 22.2 No. 14, EN/IEC 60947-1, -5-1											

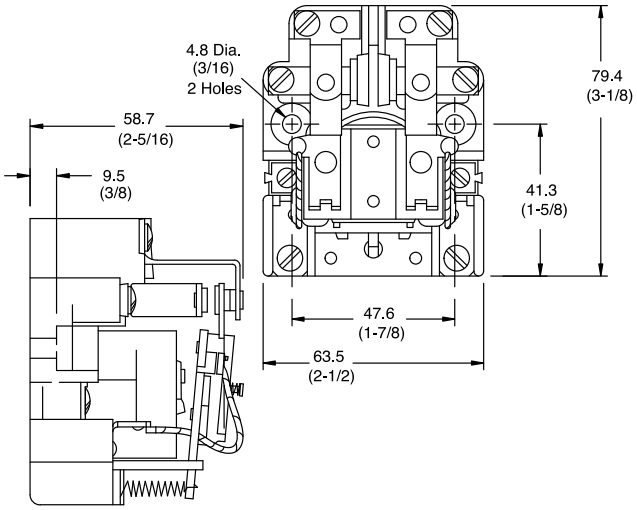
‡ NEMA Rating Chart is on page 19 of publication 700-SG003B-EN-P.
§ For DPDT only: 2 Hp Switching 2 Poles, 200...600V AV, 50/60 Hz.

Approximate Dimensions

Approximate Dimensions are shown in millimeters (inches). Approximate Dimensions are not intended to be used for manufacturing purposes.



Bulletin 700-HG Relays, SPST-NO-DM



Bulletin 700-HG Relays

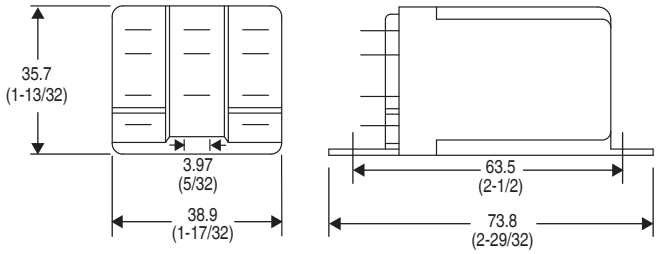
Specifications

Cat. No. 700-HHF…										
Electrical Ratings										
Pilot Duty Rating‡		SPST-NO-DM			NEMA A600					
		DPDT			NEMA B600					
		3PDT			NEMA B300					
Rated Thermal Current (I^{th})		SPST-NO-DM 30 A, DPDT 25A, 3PDT 20 A								
Rated Insulation Voltage (U_i)		250V IEC-300V UL/CSA								
Contacts	Inductive	**SPST-NO-DM**		**Hp**	**DPDT**		**Hp**	**3PDT**		**Hp**
		►][◄	◄][►		►][◄	◄][►		►][◄	◄][►	
	120V AC	60 A	6 A	1	30 A	3 A	1	30 A	3 A	1/2
	240V AC	30 A	3.0 A	1-1/2	15 A	1.5 A	1-1/2	15 A	1.5 A	—
	DC	28V DC, 30 A			28V DC, 13 A			—		
Permissible Coil Voltage Variation		85…110% of Nominal Voltage at 50 Hz								
		85…110% of Nominal Voltage at 60 Hz								
		80…110% of Nominal Voltage at DC								
		SPST-NO-DM			DPDT			3PDT		
		50 Hz	**60 Hz**		**50 Hz**	**60 Hz**		**50 Hz**	**60 Hz**	
Coil Consumption ±10%	AC Coils Inrush	7.2 VA	6.3 VA		7.2 VA	6.3 VA		7.2 VA	6.3 VA	
	AC Coils Sealed	4.8 VA	4.2 VA		4.8 VA	4.2 VA		4.8 VA	4.2 VA	
	DC Coils	1.4 W								
Max. Allowable Leakage		25% of VA								
		10% of W								
Design Specification/Test Requirements										
Dielectric Withstand Voltage	Pole-to-Pole	2200V AC								
	Contact-to-Pole	2200V AC								
	Contact-to-Frame	1600V AC								
Mechanical										
Mechanical Life Operations		5×10^6								
Switching Frequency Operations		3600/Hr								
Coil Voltages		See Overview/Product Selection								
Operating Time at Nominal Voltage at 20 °C	Pickup	20 ms								
	Dropout	15 ms								
Maximum Operating Rate		4 Ops/s.								
Environmental										
Temperature	Operating	–30…+50 °C								
		(–22…+122 °F)								
	Storage	–30…+100 °C								
		(–22…+212 °F)								
Altitude		2000 m (6560 ft)								
Construction										
Insulating Material		Molded High Dielectric Material								
Enclosure		Transparent Dust Cover								
Contact Material		Silver Cadmium Oxide								
Terminal Markings		In accordance with EN50 0005								
Sockets		§								
Certifications		cURus Recognized, File E3125,Guide NLDX2/NLDX8, CE Marked								
Standards		UL 508, CSA 22.2 No.14, EN/IEC 60947-1, -5-1								

‡ NEMA Rating Chart is in 700-SG003_-EN-P.
§ Bulletin 700-HHF relay wiring and terminals are the quick connect/solder type 6.35 x 0.82 mm (0.250 x 0.032 in) termination.

Approximate Dimensions

Approximate Dimensions are shown in millimeters (inches). Approximate Dimensions are not intended to be used for manufacturing purposes.



Bulletin 700-HHF Relays

Specifications

			Cat. No. 700-HTA…		
Electrical Ratings					
Pilot Duty Rating‡			NEMA B300 AC 15		
Rated Thermal Current (I^{th})			10 A		
Rated Insulation Voltage (U_i)			250V IEC, 300V UL/CSA		
Contacts		Inductive	Make	Break	HP
			►][◄	◄][►	
		120V AC	30 A	3 A	1/3
		240V AC	15 A	1.5 A	1/2
		Resistive 30V DC	10 A	10 A	—
Permissible Coil Voltage Variation			85…110% of Nominal Voltage at 50 Hz 85…110% of Nominal Voltage at 60 Hz		
Power Consumption ±10%	AC	24V AC	2 VA		
		120V AC	4 VA		
		240V AC	4 VA		
Design Specification/Test Requirements					
Dielectric Withstand Voltage		Pole-to-Pole, same circuit (VRMS)	1000V AC		
		Pole-to-Pole, different circuits (VRMS)	2000V AC		
		Contact-to-Coil (VRMS)	2000V AC		
Electrical Life Operations			100,000 minimum		
Switching Frequency Operations			1800/hr		
Coil Voltages			See product selection		
Mechanical					
Degree of Protection			Open Type (Guarded Terminal Sockets)		
Mechanical Life Operations			10×10^6		
Switching Frequency Operations			18,000/hr		
Start-up Time (max. time from power application until unit is timing)			0.05 sec		
Max. Function Time (max. time power can drop out and unit continues timing)			0.01 sec		
Min. Cycle Time			100 ms on release of the control switch		
Environmental					
Temperature		Operating	–28…+65 °C (50 °C max., 240V AC coil) (–18…+149 °F) (122 °F max., 240V AC coil)		
		Storage	–55…+85 °C (–67…+185 °F)		
Altitude			2000 m (6560 ft)		
Construction					
Insulating Material			Molded High Dielectric Material		
Enclosure			Impact Resistant Dust Cover		
Contact Material			Silver Tin Oxide		
Terminal Markings on Socket			In accordance with EN50 005		
Sockets			8- or 11-Pin Socket 700-HN100, -HN125 700-HN101, -HN126		
Certifications			CSA Certified, File 223833, UL Recognized (File E3125 Guide NLDX2/NLDX8), cULus Listed with 700-HN100, 700-HN101, 700-HN125, and 700-HN126 Sockets (File No. E3125 Guide NLDX/NLDX7), CE-Marked (per EU Low Voltage Directive)		
Standards			EN 61812-1, EN/IEC 60947-1, -5-1, CSA 22.2 No. 14, UL 508		

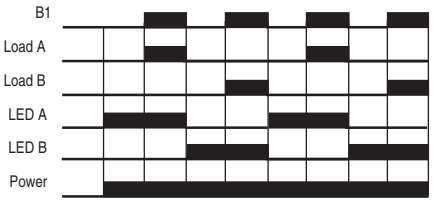
‡ NEMA Rating Chart is in publication 700-SG003_-EN-P.

Trigger Signal Cat. Nos. 700-HTA

Contact closure provides signal to timer. A low energy signal is generated by the 700-HTA alternating relay. For optimum reliability, use contacts designed for low energy switching (10V, 1 mA) (Example: Bul. 800F-X__V, 800T-X__V). No external voltage should be connected to the contact signal.

Load Diagrams

Common Input/Output SPDT/DPDT

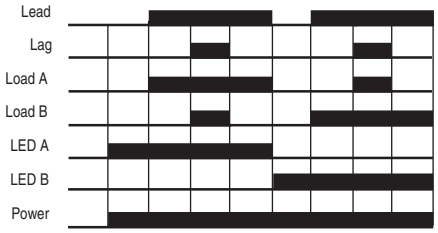


Socket Pinout Map SPDT	
Relay	Socket
A1	4
A2	3

Socket Pinout Map DPDT	
Relay	Socket
A1	4
A2	8

Note: pin out in wiring diagram may not match actual printed socket see pinout map for wiring up the power source

Cross Wired Lead/Lag/Lag/lead Sequence

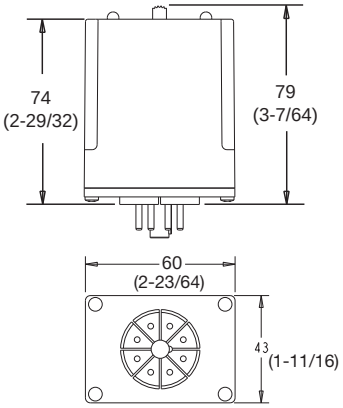


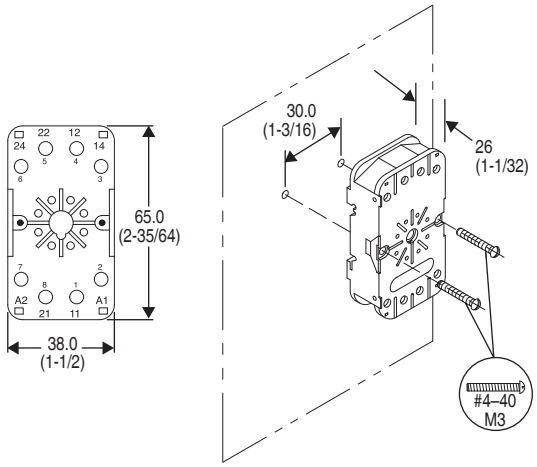
Socket Pinout Map Cross-Wired	
Relay	Socket
A1	3
A2	6

Note: pin out in wiring diagram may not match actual printed socket see pinout map for wiring up the power source

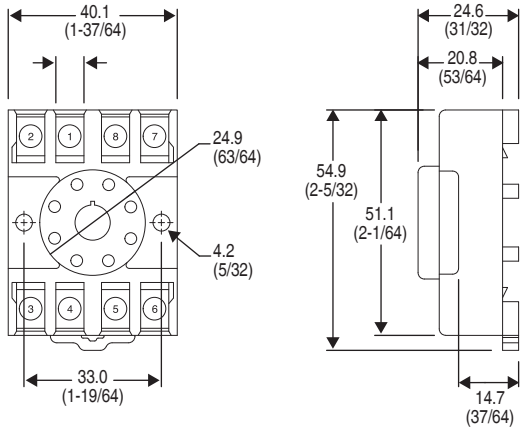
Approximate Dimensions

Approximate Dimensions are shown in millimeters (inches). Approximate Dimensions are not intended to be used for manufacturing purposes.

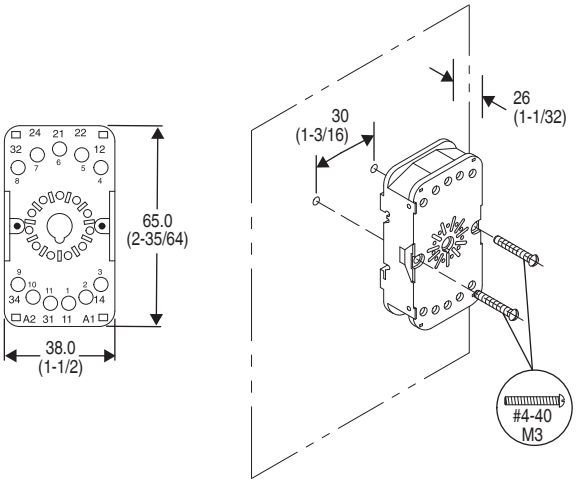




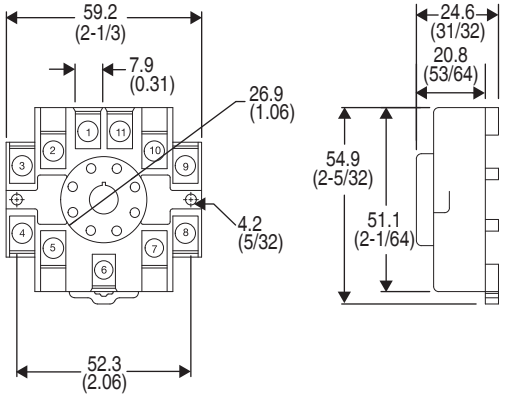
Cat. No. 700-HN100
Panel Mounting
Double Wire — 2 x 2.5 mm² (#2 – 14 AWG…#2 – 20 AWG)
(Either Solid or Stranded)
Strip Length: 9 mm (3/8 in) – Torque: 0.8 N•m (7 lb•in)



Cat. No. 700-HN125
Wire Size: 2 x 2.5 mm²
Single Wire — Up to #12 AWG
Double Wire — 2 x 2.5 mm² (#2 – 14 AWG… #2 – 20 AWG)
(Either Solid or Stranded)
Strip Length: 9 mm (3/8 in) — Torque: 0.8 N•m (7 lb•in)



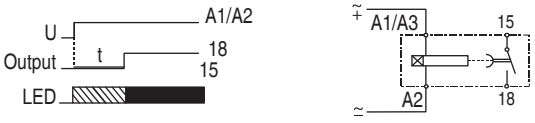
Cat. No. 700-HN101
Panel Mounting
Double Wire – 2 x 2.5 mm² (#2 – 14 AWG…#2 – 20 AWG)
(Either Solid or Stranded)
Strip Length: 9 mm (3/8 in) – Torque: 0.8 N•m (7 lb•in)



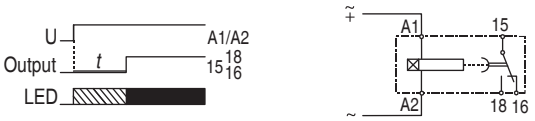
Cat. No. 700-HN126
Wire Size: 2 x 2.5 mm²
Single Wire — Up to 12 AWG
Double Wire — 2 x 2.5 mm² (#2 – 14 AWG…#2 – 20 AWG)
(Either Solid or Stranded)
Strip Length: 9 mm (3/8 in) — Torque: 0.8 N•m (7 lb•in)

Function and Connection Diagrams

(A) On-Delay

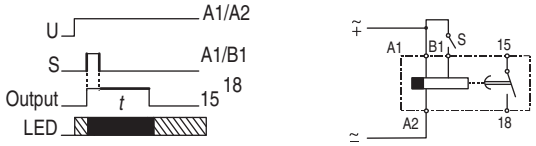


1 N.O. (SPST)

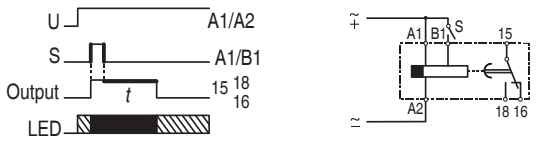


1 C/O (SPDT)

(B) Off-Delay

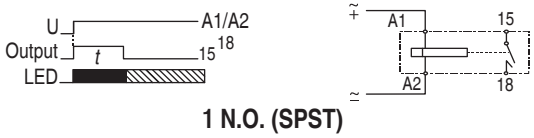


1 N.O. (SPST)

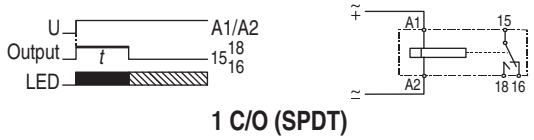


1 C/O (SPDT)

(D) One Shot

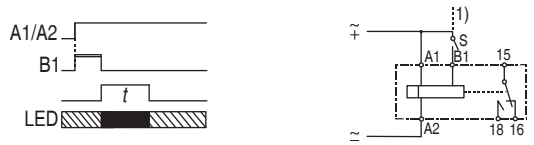


1 N.O. (SPST)



1 C/O (SPDT)

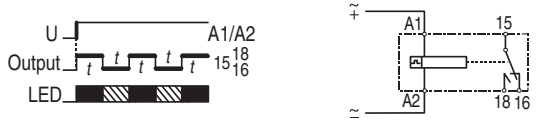
(E) Fleeting Off-Delay



1 C/O (SPDT)

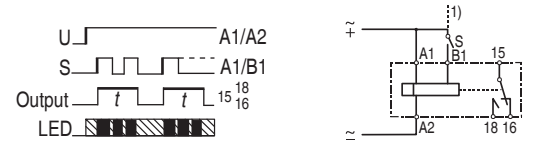
(F) Flasher (Repeat Cycle Starting with Pulse)

1 N.O. (SPST)

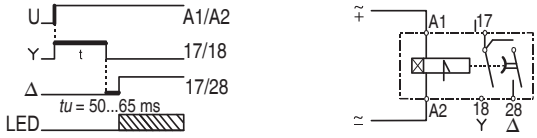


1 C/O (SPDT)

(L) Pulse Converter



(Y) Star-Delta Timing Relay



Bi-Color LED: 1 C/O (SPDT) or 1 N.O. Contact Timers

LED U = green: Supply voltage available.
LED Relay = red: Output is energized.

Single Color LED: 2 N.O. with Common

ON = green
OFF = red

Specifications

Time Characteristics (according to VDE 0435, part 2021)

		1 N.O.	SPDT
Setting Accuracy		±5% of full scale	
Repeatability		±1% of setting (typical)	
Tolerance		By voltage: ±0.01%/%ΔU By temperature: ±0.25%/°C	By voltage: ±0.001%/%ΔU By temperature: ±0.025%/°C
Supply			
Supply Voltage		24V AC/DC‡ and 110…240V AC, 50/60 Hz	24…48V DC and 24…240V AC, 50/60 Hz
Voltage Tolerance	AC	–15%/+10%	
	DC	–15%/+20%	
Power Consumption		0.5 W at 24V DC, 5 VA at 240V AC	
Time Energized		100%	
Reset Time		100 ms	
Cable Length (Supply Voltage Control)		Max. 250 m (750 feet)	
Pulse Control (B1)			
Impulse Duration		≥ 250 ms	≥ 50 ms (AC), ≥ 30 ms (DC)
Input Voltage		supply voltage range	
Input Current		1 mA	
Cable Length		Max. 250 m without parallel load between B1 and A2 Max. 50 m with load (< 3 kΩ) between B1 and A2	
Outputs			
Contact Type		1 N.O. contact	1 Form C – SPDT contact
Dielectric Withstand Voltage	Contact-to-coil	4000 V	
Switching Capacity	Power	1250 VA	
	According to IEC 947-5-1	AC-1	5 A /250V AC (resistive load)
		AC-14	1 A/250V AC (inductive load)
		DC-13	1 A/24V DC (inductive load)
	According to UL 508	NEMA D300 - 1 A/300V AC	
Short-Circuit Resistance		6 A gL (Fast Blow Fuse)	
Life	Mechanical	20 million operations	
	Electrical	0.4 million at 1 A/250V AC, resistive 0.4 million at 0.5 A/250V AC, cos ϕ = 0.4 0.4 million at 1 A/24V DC, resistive	
State Indicator		1 Bi-Color LED (Supply; Relay)	
Certifications		cULus Listed (File No. E14840, Guide NKCR/NKCR7), CE Marked	
Standards		EN/IEC 60947-1, EN/IEC 60947-5-1, UL 508, CSA 22.2 No. 14	

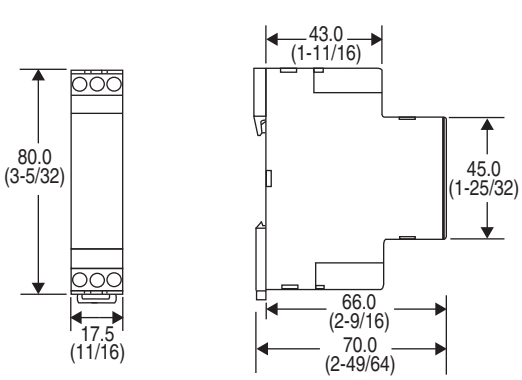
‡ Voltage is either 24V DC or AC 50/60 Hz.

General Specifications

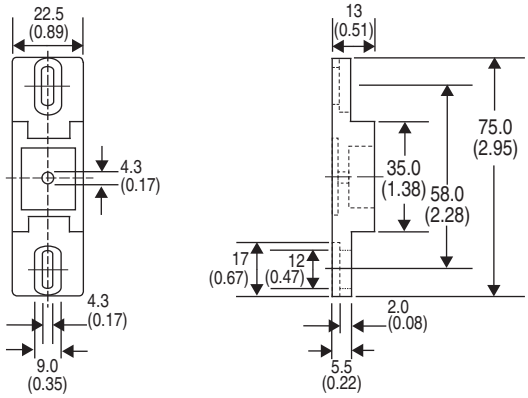
	 1 N.O.	 SPDT
Insulation Characteristics	2 kV AC/50 Hz test voltage according to VDE 0435 and 4 kV 1.2/50 µs surge voltage according to IEC 60947-1 between all inputs and outputs	
EMC/Interference Immunity	The following requirements are fulfilled: Surge capacity of the supply voltage according to IEC 61000-4-5: Level 3 Burst according to IEC 61000-4-4: Level 3 ESD discharge according to IEC 61000-4-2: Level 3	
EMC/Emmission	electromagnetical fields according to EN 55 022: Class B	
Safe Isolation	according to VDE 0106 T 101	
Climatic Withstand	56 cycles (24 hr) at 25…40 °C and 95% relative humidity according to IEC 60068-2-30	
Vibration Resistance	4 g in three axes at 10…500 Hz, test FC according to IEC 60068-2-6	
Shock Resistance	50 g according to IEC 68-2-27	
Protection Class IEC 60947-1	Enclosure:IP 40 Terminal:IP 20	
Weight	60 g	60 g
Certifications	cULus, CE Certified	cULus, Germanischer Lloyd, CE Certified
Ambient Temperature	Open:–25…+60 °C Enclosed:–25…+45 °C Storage:–40…+85 °C	
Connections	Screw terminal M3 for Pozidriv No.1, Philips and slotted screws No.2. suitable for power screw-driver. Rated tightening torque 8.8 lb.-in. (max. 1.0 Nm) For terminal cross-sections of 1 x 0.5 mm^2…2 x 1.5 mm^2 (solid) or 2 x 1.5 mm^2 (stranded with sleeve), #20…14 AWG. Finger protection according to EN 50274	
Mounting	For surface mounting in any position; snap-on mounting on 35 mm DIN Rail or by adapter and two screws (M4 type)	
Disposal	Synthetic materials without dioxin according to EC/EFTA-Notification No. 93/0141/D electrical contacts are AgCdO	

Approximate Dimensions

Approximate dimensions are shown in millimeters (inches). Dimensions are not intended to be used for manufacturing purposes.



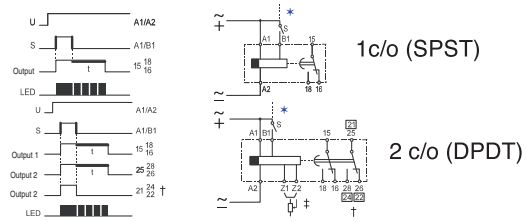
Cat. No. 700-FE...



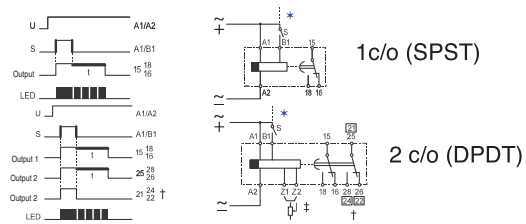
Cat. No. 199-FSA...

Connection Diagrams

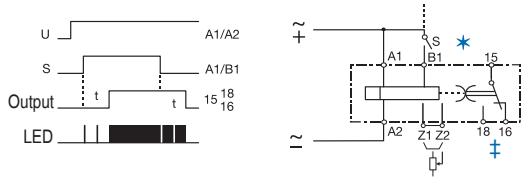
(A) On-Delay



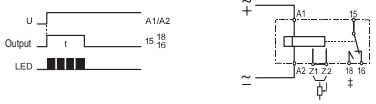
(B) Off-Delay (Min. Pulse AC 50 ms…DC 30 ms)



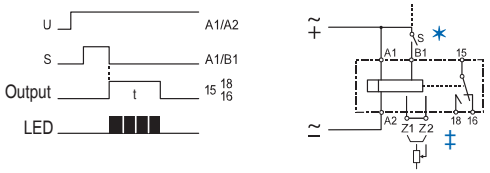
(C) On- and Off-Delay



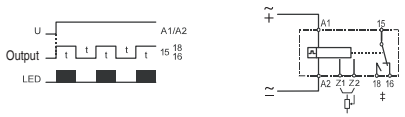
(D) One Shot



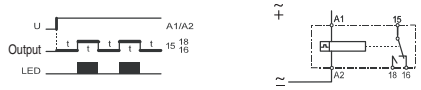
(E) Fleeting Off-Delay (Min. Pulse AC 50 ms…DC 30 ms)



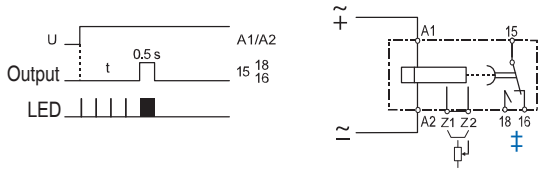
(F) Flasher (Repeat Cycle Starts with Pulse)



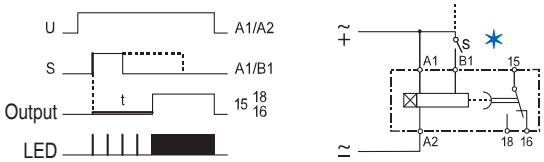
(G) Flasher (Repeat Cycle Starts with Pause)



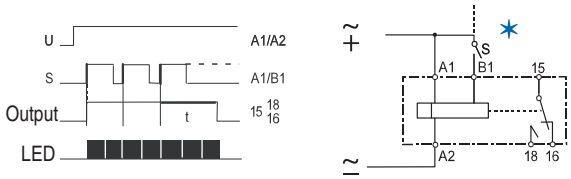
(I) On-Delay Pulse Generator



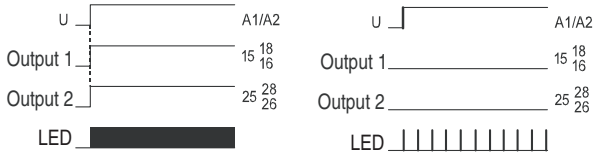
(J) On-Delay (Pulse Controlled)



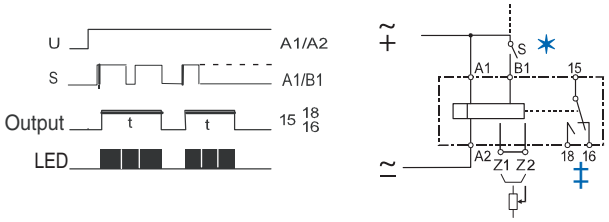
(K) One Shot/Watch Dog (Pulse Controlled)



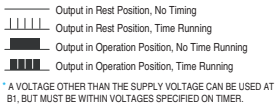
(On) ON-Function (Off) OFF-Function



(L) Pulse Converter (Min. Pulse AC 50 ms…DC 30 ms)



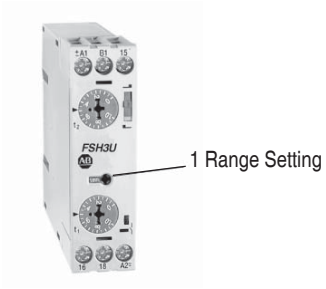
Cleverly Designed Function Display LED (Green)



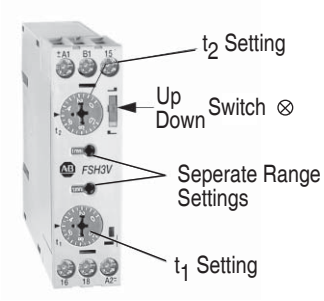
★ A voltage other than the supply voltage can be used at B1, but must be within voltages specified on timer.
† Output 2 is selectable as instantaneous contact with sliding switch (⊗) on front panel (instantaneous when switch is down, timed when switch is up).
‡ Available on multifunction "M," and single function "A" or "B" option timing relays along with code "4" (2PDT contacts). Bridge or potentiometer 10 kΩ, 0.25 W min. (low voltage) for external time setting. Set timer dial to 0.0.

Special Function Flasher (Repeat Cycle Starting with Pulse or Pause) Timing Relays

Description



700-FSH3U



700-FSH3V

Supply Voltages (A1/A2)

Z12 12V DC

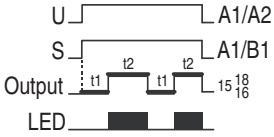
U23 24…48V DC, 24…240V AC, 50/60 Hz

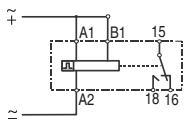
Function Diagram / Connection Diagram

(H) Flasher (Repeat Cycle Starting with Pulse or Pause)
The repeat cycle timer permits different settings for on and off times. The following operating modes are possible:

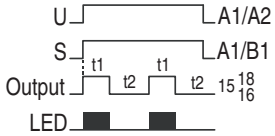
- Oscillating mode; repeat cycle starts with voltage applied at A1 and B1, and continues to repeat until voltage is off.
- One cycle mode; started by energizing B1 with voltage on A1 and A2.
- Output starts with pulse or pause (switch ⊗ Up or Down).
- 700-FSH3U provides (1) range setting for t_1 and t_2.
  700-FSH3V provides (2) range settings for t_1 and t_2.

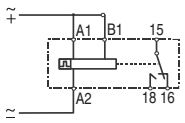
Supply Voltage Controlled, Oscillating Mode Starting with Pause — Switch ⊗ is Up



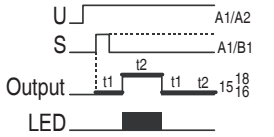


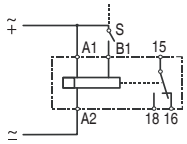
Supply Voltage Controlled, Oscillating Mode Starting with Pulse — Switch ⊗ is Down



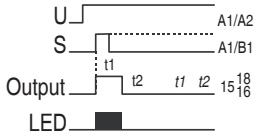


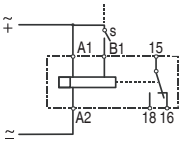
Pulse Controlled, Output Starts With Pause (Min. Pulse AC 50 ms — DC 30 ms) — Switch ⊗ is Up One Cycle Mode — Voltage Supplied at A1 and A2, then Pulsing "s" to Energize B1 will Initiate One Cycle.





Pulse Controlled, Output Starts with Pulse (Min. Pulse AC 50 ms — DC 30 ms) — Switch ⊗ is Down One Cycle Mode — Voltage Supplied at A1 and A2, then Pulsing "s" to Energize B1 will Initiate One Cycle.





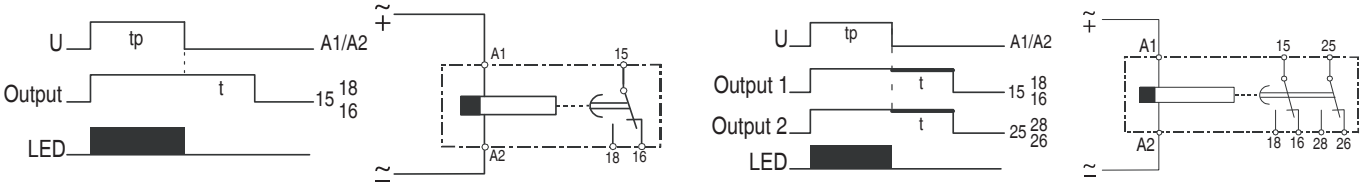
Note: If B1 is pulsed, a one full time cycle consisting of t_1 and t_2 is completed.

LED Operation Chart Ñ Green LED

LED ▁▁▁▁▁▁▁▁ Output at Shelf State, No Timing - LED OFF
LED ▁ ▁ ▁ ▁ Output at Shelf State, Time is Running - LED Flashing
LED ▁▁▁▁▁▁▁▁ Output NO Contact is Closed, No Timing - LED On
LED ▁▁▁▁▁▁▁▁ Output NO Contact is Closed, Time is Running - LED Long Flashing

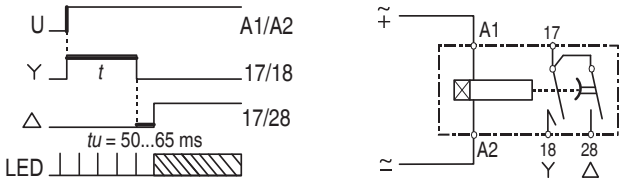
Function Diagram / Connection Diagram

(Q) Off-Delay without Supply Voltage (True Off-Delay) — When input power is turned on, the output contact changes state. When the power is removed, the time delay begins. The output contact returns to shelf state at the end of the time delay.



Note: Min. pulse (tp) required:
800 ms

(Y) Star-Delta Timing Relay — When power is applied, the output contact 17/18(Y) changes state. After the time setting, the output contact 17/28(Δ) changes state. Both output contacts return to shelf state whenever the power is removed.



Specifications

Time Characteristics (according to VDE 0435, Part 2021)

Setting Accuracy	±5% of full scale
Repeatability	±0.2% of the setting values
Tolerance	Voltage: ±0.001%/%ΔU Temperature: ±0.025%/°C

Supply

Supply Voltages	24…48V DC and 24…240V AC, 50/60 Hz (multi voltage)
Voltage Tolerance	–20…+20% (DC), –15…+10% (AC)
Power Consumption	0.5 W at 24V DC, 5 VA at 240V AC
Time Energized	100%
Reset Time	50 ms
Voltage Interruption	≤20 ms without reset (supply voltage)
Input Impedance	Relay ON: 3K-13K ohms Relay OFF: 0.7K-4K ohms
Cable Length (Supply Voltage Control)	Max. 250 m (800 ft)

Pulse Control (B1)

Pulse Duration	≥50 ms (AC), ≥30 ms (DC)
Input Voltage	Supply voltage range
Input Current	1 mA
Max. Leakage Current	400 micro Amps
Cable Length	Max. 250 m (800 ft) without parallel load between B1 and A2 Max. 50 m (160 ft) with load (<3 kΩ) between B1 and A2

Outputs

Contact Type	Relay as changeover switch
Dielectric Coil to Contact Withstand Voltage	5000 V
Switching Capacity	Voltage: 440V AC
	Current Ith (AC-1): 8 A (5 A for 700-FSQ)
	Power: 2000 VA
	According to IEC 947-5-1:
	3 A/440V AC (inductive load, AC 14)
	3 A/250V AC (inductive load, AC 15)
	1 A/24V DC (inductive load, DC 13)
	According to UL 508:
	1.5 A/250V AC (B300)
	3 A/120V AC (B300)
Short-Circuit Resistance	10 A gL
Life	Mechanical: 30 million operations
	Electrical operations:
	4 Mil. at 1 A/250V AC, cos ϕ = 1
	0.2 Mil. at 6 A/250V AC, cos ϕ = 1
	1.5 Mil. at 1 A/250V AC, cos ϕ = 0.3
	0.3 Mil. at 3 A/250V AC, cos ϕ = 0.3
	0.5 Mil. at 6 A/24V DC, resistive
	2 Mil. at 4 A/24V DC, resistive
	2 Mil. at 0.2 A/230V DC, resistive
	1 Mil. at 0.4 A/24V DC, L/R = 20 ms
	1 Mil. at 0.2 A/110V DC, L/R = 20 ms
	1 Mil. at 0.1 A/230V DC, L/R = 20 ms
State Indicator	1 LED, combination signal

General Data

Insulation Characteristics	2 kVAC/50 Hz test voltage according to VDE 0435 and 6 kV 1.2/50 µs surge voltage according to IEC 947-1 between all inputs and outputs
EMC/Interference Immunity	Performance of following requirements: Surge capacity of the supply voltage according to IEC 1000-4-5: 4 kV 1.2/50 µs Burst according to IEC 1000-4-4: 6 kV 6/50 ns ESD discharge according to IEC 1000-4-2: Contact 8 kV, air 8 kV Electromagnetic HF field according to IEC 801-3 and conducted electromagnetic HF signal according to IEC 801-6: Level 3
EMC/Emission	Electromagnetic fields according to EN 55 022: class B
Safe Isolation	According to VDE 106, part 101
Climatic Withstand	56 Cycles (24 hr) at 25…40 °C and 95% relative humidity according to IEC 68-2-30 and IEC 68-2-3
Vibration Resistance	4 g in three axes at 10…500 Hz, test FC according to IEC 68-2-6
Shock Resistance	50 g according to IEC 68-2-27
Protection Class	Enclosure:IP 40 IP 30 (Single-function) Terminal:IP 20 according to IEC 947-1
Weight	100 g
Approval	UL, C-UL
Ambient Temperature	Open: –25…+60 °C Enclosed: –25…+45 °C Storage: –40…+85 °C
Terminals	Screw terminal M3.5 for Number 2 Posidrive, Philips, and slotted screws. Suitable for power screwdriver. Rated tightening torque 8.8 lb.-in. (0.8 N•m, max. 1.2 N•m). Dual-chamber system for terminal cross-sections of 1 x 0.5 mm^2…2 x 2.5 mm^2 (solid) or stranded 2 x 2.5 mm^2 (flexible with sleeve), #20…14 AWG. Finger protection according to VDE 0106.
Mounting	Front mounting; For snap-on mounting on 35 mm DIN Rail or screw fixing by adapter and 2 screws (M4 type)
Disposal	Synthetic material without dioxin according to EC/EFTA notification Number 93/0141/D electrical contacts with cadmium
Certifications	cULus Listed (File No. E14840, Guide NKCR/NKCR7), CE Marked
Standards	EN/IEC 60947-1, EN/IEC 60947-5-1, UL 508, CSA 22.2 No. 14

Ex	c UL us	Temp. Code T4A 2A 32VDC MAX.

Mounting: Product shall be installed in an enclosure constructed in accordance with the requirements of EN50021.

Specifications

Ratings			
Item		700-HNC	
Pilot Duty Rating		NEMA B300	
Pin type		Plug-in	
Operating voltage range		85%…110% of rated supply voltage (12V DC: 90%…110% of rated supply voltage)‡	
Reset voltage		10% min. of rated supply voltage§	
Power consumption		24V AC:	Relay ON: Relay OFF: 1.5 VA (1.1 W) (at 24V AC, 60 Hz) 0.2 VA (0.1 W) (at 24V AC, 60 Hz)
		100…120V AC:	Relay ON: Relay OFF: 1.5 VA (1.3 W) (at 120V AC, 60 Hz) 0.8 VA (0.5 W) (at 120V AC, 60 Hz)
		200…230V AC:	Relay ON: Relay OFF: 1.8 VA (1.5 W) (at 230V AC, 60 Hz) 1.2 VA (0.9 W) (at 230V AC, 60 Hz)
		12V DC:	Relay ON: Relay OFF: 0.9 W (at 12V DC) 0.07 W (at 12V DC)
		24V DC:	Relay ON: Relay OFF: 0.9 W (at 24V DC) 0.07 W (at 24V DC)
		48V DC:	Relay ON: Relay OFF: 1.0 W (at 48V DC) 0.2 W (at 48V DC)
		100…110V DC:	Relay ON: Relay OFF: 1.3 W (at 110V DC) 0.3 W (at 110V DC)
		125V DC:	Relay ON: Relay OFF: 1.3 W (at 125V DC) 0.3 W (at 125V DC)
Control outputs		4PDT: 5 A at 250V AC, resistive load (cosϕ = 1)	
Characteristics			
►][◄ Make	120V AC	30 A	
	240V AC	15 A	
◄][► Break	120V AC	3 A	
	240V AC	1.5 A	
Hp at 120V AC		1/6 Hp	
Hp at 240V AC		1/6 Hp	
Accuracy of operating time		±1% FS max. (1 s range: ±1%±10 ms max.)	
Setting error		±10%±50 ms FS max.	
Reset time		Min. power-opening time: 0.1 s max. (including halfway reset)	
Influence of voltage		±2% FS max.	
Influence of temperature		±2% FS max.	
Insulation resistance		100 mΩ min. (at 500V DC)	
Dielectric strength		2000V AC, 50/60 Hz for 1 min (between current-carrying terminals and exposed non-current-carrying metal parts)★	
		2000V AC, 50/60 Hz for 1 min (between operating power circuit and control output)	
		2000V AC, 50/60 Hz for 1 min (between different pole contacts; 2-pole model)	
		1500V AC, 50/60 Hz for 1 min (between different pole contacts; 4-pole model)	
		1000V AC, 50/60 Hz for 1 min (between non-continuous contacts)	
Vibration resistance		Malfunction:10…55 Hz, 0.5 mm single amplitude	
Shock resistance		Malfunction:100 m/s^2 (approx. 10G)	
Ambient temperature		Operating:-10 °C…50 °C (with no icing)	
		Storage:-25 °C…65 °C (with no icing)	
Ambient humidity		Operating:35%…85%	
Life expectancy		Mechanical:10 000 000 operations min. (under no load at 1800 operations/hr)	
		Electrical:4PDT: 200 000 operations min. (3 A at 250V AC, resistive load at 1800 operations/hr)	

★ Single-phase, full-wave-rectified power supplies can be used.

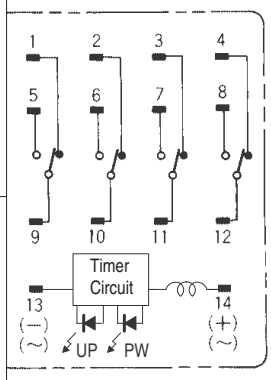
‡ When using the 700-HNC continuously in any place where the ambient temperature is in a range of 45 °C…50 °C, supply 90%…110% of the rated supply voltages supply 95%…110% with 12V DC type).

Characteristics, Continued	
Noise immunity	±1.5 kV, square-wave noise by noise simulator (pulse width: 100 ns/1 µs, 1-ns rise)
Static immunity	Destruction:8 kV Malfunction:4 kV
Enclosure rating	IP40
Weight	Approx. 50 g
EMC	Emission Enclosure:EN55011 Group 1 class A
	Emission AC Mains:EN55011 Group 1 class A
	Immunity ESD:EN61000-4-2:4 kV contact discharge (level 2) 8 kV air discharge (level 3)
	Immunity RF-interference:ENV50140:10 V/m (amplitude modulated, 80 MHz to 1 GHz) (level 3) 10 V/m (pulse modulated, 900 MHz)
	Immunity Conducted Disturbance:ENV50141:10 V (0.15…80 MHz) (level 3)
	Immunity Burst:EN61000-4-4:2 kV power-line (level 3) 2 kV I/O signal-line (level 4)
Standards	UL 508, CSA 22.2 No. 14, EN/IEC 61812-1
Certifications	cURus Recognized (File No. E14843, Guide NRNT2/NRNT8), CSA Certified (File 224268), CE Marked, C-Tick Marked

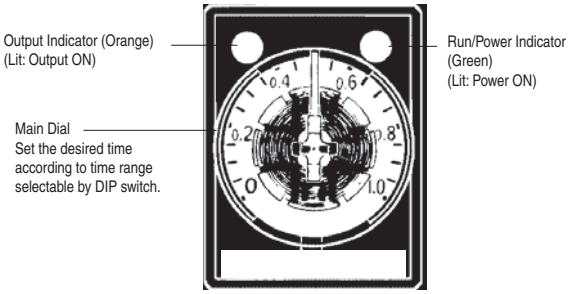
Timing Charts

Note :t:Set time
Rt:Reset time

Operating Mode	Timing Charts / Wiring Diagram
ON-Delay Power t Output	Power (13-14) Time limit contact NC (9-1, 10-2, 11-3, 12-4) Time limit contact NO (9-5, 10-6, 11-7,12-8) Run/Power indicator (PW) Output indicator (UP)
One Shot Power Output	Power (13-14) Time limit contact NC (9-1, 10-2, 11-3, 12-4) Time limit contact NO (9-5, 10-6, 11-7,12-8) Run/Power indicator (PW) Output indicator (UP)
Repeat Cycle OFF-Start Power Output	Power (13-14) Time limit contact NC (9-1, 10-2, 11-3, 12-4) Time limit contact NO (9-5, 10-6, 11-7,12-8) Run/Power indicator (PW) Output indicator (UP)
Repeat Cycle ON-Start Power t t t Output	Power (13-14) Time limit contact NC (9-1, 10-2, 11-3, 12-4) Time limit contact NO (9-5, 10-6, 11-7,12-8) Run/Power indicator (PW) Output indicator (UP)

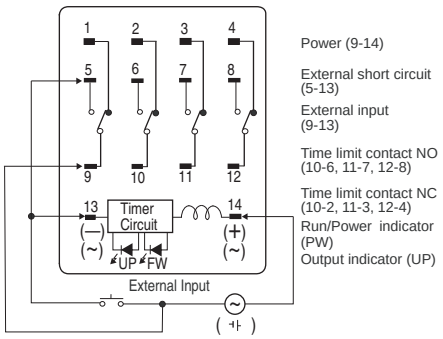


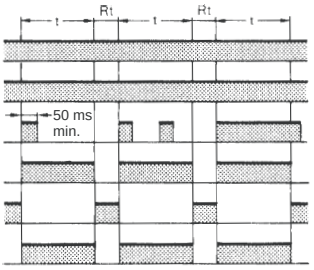
General Timer Functions



Pulse Operation

A pulse output for a certain period can be obtained with a random external input signal. Use the 700-HNC timing relay in interval mode as shown in the following timing charts.





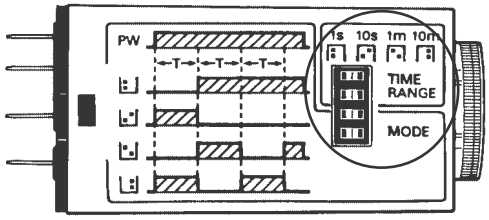
Note: t: Set time
Rt: Reset time

DIP Switch Settings

Time Ranges

Cat. No.	Time Range	Time Setting Range	Setting	Factory-Set
700-HNC44AZ12 700-HNC44AZ24 700-HNC44AZ48 700-HNC44AZ11 700-HNC44AZ25 700-HNC44AA24 700-HNC44AA12 700-HNC44AA23	1 s	0.1 s...1 s		Yes
	10 s	1 s...10 s		No
	1 min	0.1 s...1 min		No
	10 min	1...10 min		No
700-HNC44BZ12 700-HNC44BZ24 700-HNC44BZ48 700-HNC44BZ11 700-HNC44BZ25 700-HNC44BA24 700-HNC44BA12 700-HNC44BA23	1 min	0.1...1 min		Yes
	10 min	1...10 min		No
	1 hr	0.1...1 hr		No
	1 hr	1...10 hr		No

Note: The top two DIP switch pins are used to select the time ranges.



Operating Mode	Setting	Factory-set
ON-delay		Yes
One Shot		No
Repeat Cycle OFF-start		No
Repeat Cycle ON-start		No

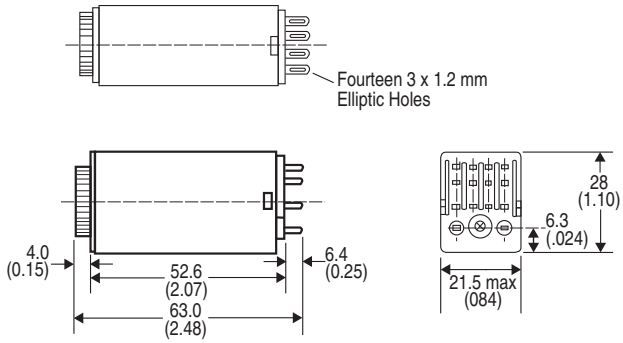
Note: The bottom two DIP switch pins are used to select the time ranges.

Approximate Dimensions

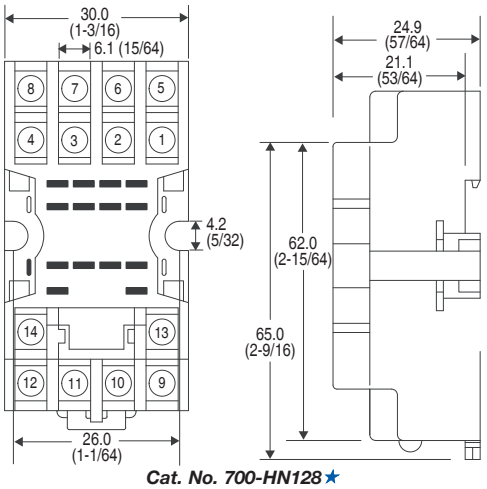
Approximate Dimensions are shown in millimeters (inches) where not specified. Approximate Dimensions are not intended to be used for manufacturing purposes.

Timers

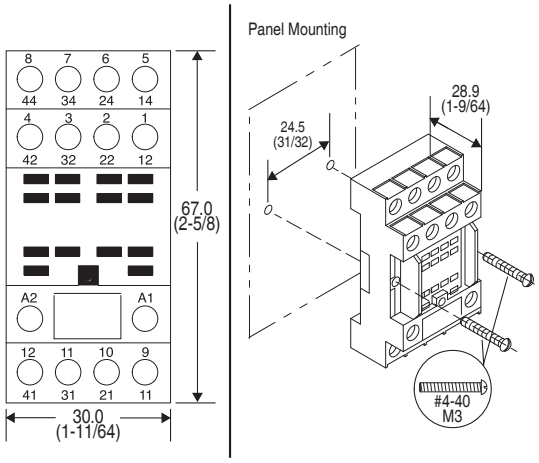
Front Mounting



Cat.No. 700-HNC

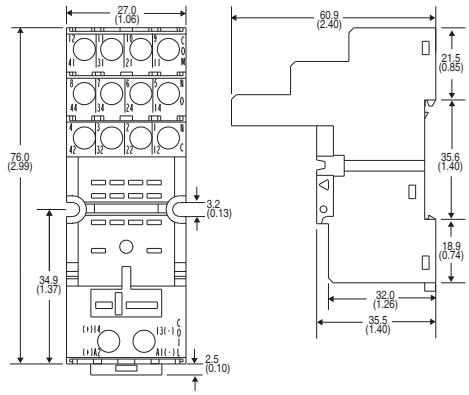


Cat. No. 700-HN128★
Wire Size: 2 x 1.5 mm² (#2-16 AWG…#1-20 AWG)
(Either Solid or Stranded)
Strip Length: 9 mm (3/8 in.) - Torque: 0.8 N•m (7 lb•in)



Cat. No. 700-HN103

Single wire: 0.2…2.5 mm² (#24 AWG…14 AWG)
Double wire: 2 x 0.2 mm²…2 x 1.5 mm² (2 x 24 AWG…2 x 16 AWG)
Wire type: solid or stranded, copper only
Strip length: 8 mm (5/16 in.), Torque: 0.5 N•m (4.4 lb•in)



Cat. No. HN-104

Single Wire: 0.2…2.5 mm² (#24 AWG…14 AWG)
Double Wire: 2 x 0.2 mm²…2 x2.5 mm² (2 x 24 AWG…2 x 14 AWG)
Wire Type: solid or stranded, copper only
Strip Length: 7 mm (9/32 in.), Torque: 0.5 N•m (4.4 lb•in)

★ Total height of 700-HN128 + 700-HNC is 82.5 mm.

Specifications

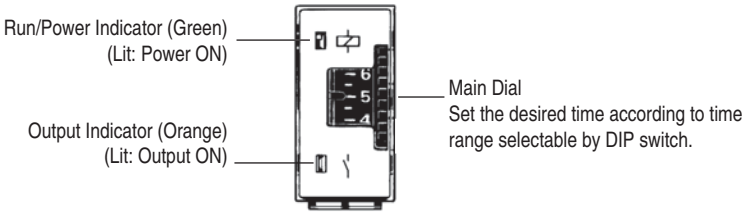
Ratings		
Item		
Pilot Duty Rating	NEMA B300	
Rated Supply Voltage	24V AC; 12, 24V DC	
Pin Type	Plug-in	
Operating Mode	ON-delay, One Shot, Repeat Cycle OFF start, or Repeat Cycle ON start selectable with DIP switch.	
Operating Voltage Range	85%…110% of rated supply voltage (12 VDC: 90%…110% of rated supply voltage)★	
Power Consumption	24V AC:Relay ON:approx. 0.8 VA (at 24 VAC, 60 Hz) Relay OFF:0.5 VA (at 24V AC, 60 Hz) 12V DC:Relay ON:approx. 0.4 W (at 12V DC) Relay OFF:0.1 W (at 12V DC) 24V DC:Relay ON:approx. 0.5 W (at 24V DC) Relay OFF:0.2 W (at 24V DC)	
Control Outputs	5 A at 250V AC, resistive load (cosϕ = 1) The minimum applicable load is 10 mA at 5 VDC (P reference value).	
Characteristics		
►][◄ 120V AC	30 A	
Make 240V AC	15 A	
◄][► 120V AC	3 A	
Break 240V AC	1.5 A	
Hp at 240V AC	1/6 Hp	
Accuracy of Operating Time	±1% FS max. (1 s range: +1%±10 ms max.)	
Setting Error	±15%+50 ms FS max.	
Reset Time	Min. power-opening time:	12, 24V DC: 0.1 s max. (including halfway reset) 24V AC: 0.5 s max. (including halfway reset)
Influence of Voltage	±2% FS max.	
Influence of Temperature	±2% FS max.	
Insulation Resistance	100 mΩ min. (at 500V DC)	
Dielectric Strength	2000V AC, 50/60 Hz for 1 min (between operating circuit and control output, or contacts of different poles) 1000V AC, 50/60 Hz for 1 min (between non-continuous contacts)	
Vibration Resistance	Malfunction:10…55 Hz, 0.5 mm single amplitude	
Shock Resistance	Malfunction:100 m/s^2 (approx. 10G)	
Ambient Temperature	Operating:-10 °C…50 °C (with no icing) Storage:-25 °C…65 °C (with no icing)	
Ambient Humidity	Operating:35…85%	
Life Expectancy	Mechanical:10 000 000 operations min. (under no load at 1800 operations/hr) Electrical:100 000 operations min. (3 A at 250V AC, resistive load at 1800 operations/hr)	
Impulse Withstand Voltage	Between power terminals: 1 kV	
Noise Immunity	±1.5 kV, square-wave noise by noise simulator (pulse width: 100 ns/1 µs, 1-ns rise)	
Static Immunity	Destruction:8 kV Malfunction:4 kV	
Enclosure Rating	IP20	
Weight	Approx. 18 g	
EMC	Emission Enclosure:EN55011 Group 1 class A Emission AC Mains:EN55011 Group 1 class A Immunity ESD:EN61000-4-2:4 kV contact discharge (level 2) 8 kV air discharge (level 3) Immunity RF-interference:ENV50140:10 V/m (amplitude modulated, 80 MHz…1GHz) (level 3) 10 V/m (pulse modulated, 900 MHz) Immunity Conducted Disturbance:ENV50141:10 V (0.15…80 MHz) (level 3) Immunity Burst:EN61000-4-4:2 kV power-line (level 3) 2 kV I/O signal-line (level 4)	
Standards	UL508, CSA C22.2 No. 14, EN/IEC 60947-5-1, EN/IEC 61812-1	
Certifications	cURus Recognized Component (File No. E14843, Guide NRNTZ/NRNT8), CE Marked, C-Tick Marked	

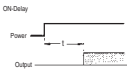
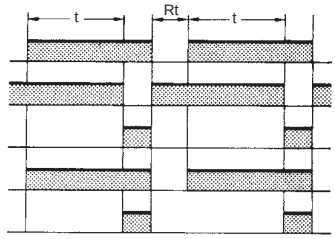
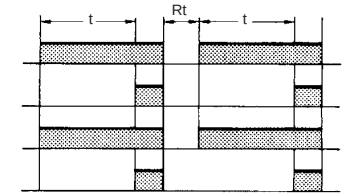
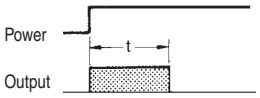
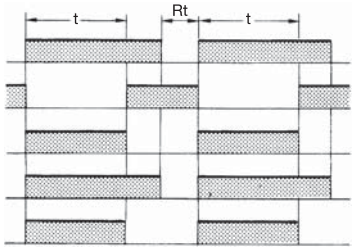
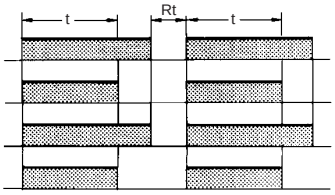
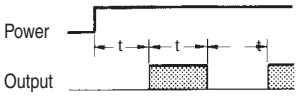
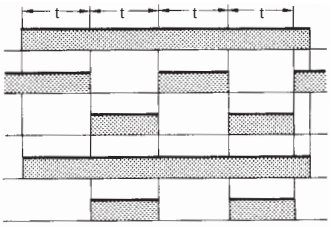
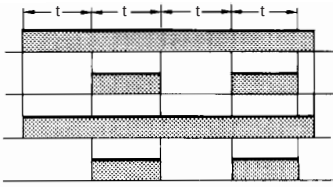
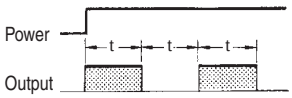
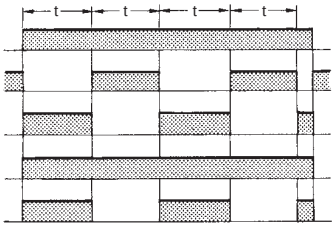
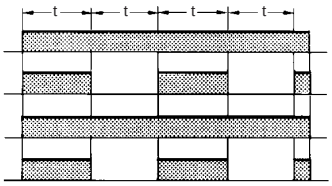
★ When using 700-HNK timer in any place where the ambient temperature is more than 50 °C, supply 90…110% of the rated voltages (12V DC: 95…11 % of the rated voltage).

Note:
t: Set time
Rt: Reset time

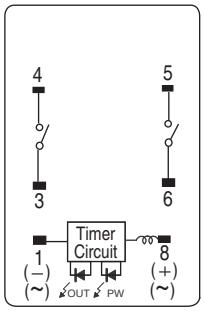
Bulletin 700-HNK — Ultra-Slim Timing Relay

General Timer Functions

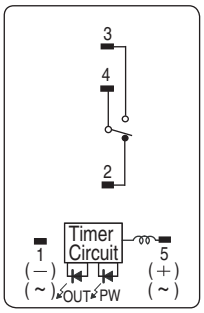


Operating Mode	Timing Chart	
	700-HNK41…	700-HNK42…
		
One shot 		
Repeat Cycle OFF-Start 		
Repeat Cycle ON-Start 		

Wiring Diagrams

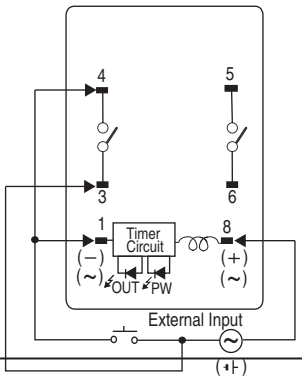


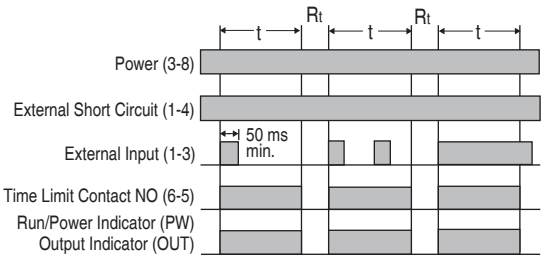
Cat. No. 700-HNK42...



Cat. No. 700-HNK41...

A pulse output for a certain period can be obtained with a random external input signal. Use the 700-HNK in interval mode as shown in the following timing chart.





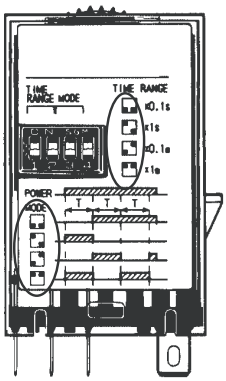
Note: t: Set time
Rt: Reset time

Mode	Terminals
Pulse Operation	Power supply between 3 and 8 Short-circuit between 4 and 1 Input signal between 3 and 1
Operating mode; One shot and all other modes	Power supply between 1 and 8

Time Ranges

Cat. No.	Time Range	Time Setting Range	Setting	Factory-Set
700-HNK41AZ12 700-HNK41AZ24 700-HNK41AA24 700-HNK42AZ12 700-HNK42AZ24 700-HNK42AA24	1 s	0.1…1 s		Yes
	10 s	1…10 s		No
	1 min	0.1 s…1 min		No
	10 min	1…10 min		No
700-HNK41BZ12 700-HNK41BZ24 700-HNK41BA24 700-HNK42BZ12 700-HNK42BZ24 700-HNK42BA24	1 min	0.1…1 min		Yes
	10 min	1…10 min		No
	1 hr	0.1…1 hr		No
	10 hr	1…10 hr		No

Note: The left two DIP switch pins are used to select the time ranges.



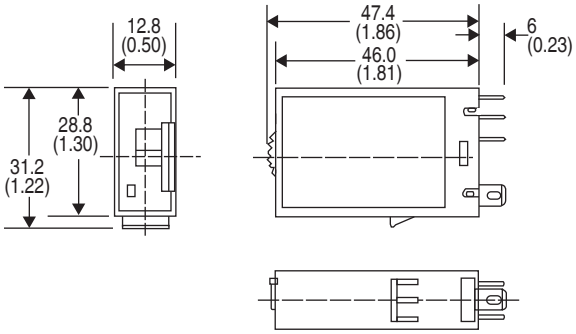
Operating Modes

Operating Mode	Setting	Factory-set
On-delay		Yes
One Shot		No
Repeat Cycle Off-start		No
Repeat Cycle On-start		No

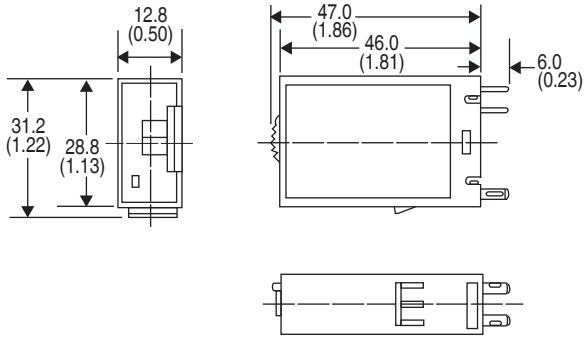
Note: The right two DIP switch pins are used to select the operating modes.

Approximate Dimensions

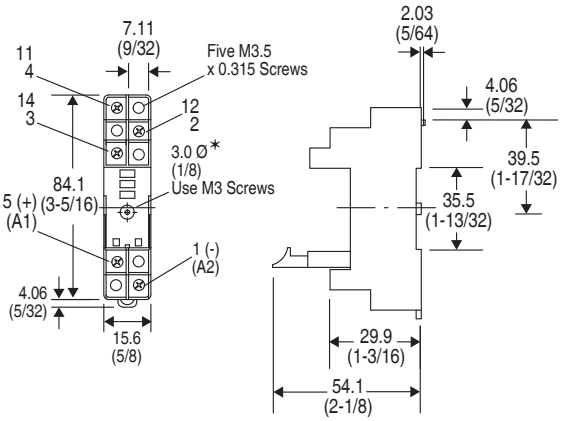
Approximate Dimensions are shown in millimeters (inches). Approximate Dimensions are not intended to be used for manufacturing purposes.



Bulletin 700-HNK41 SPDT Contact
Approximate Dimensions



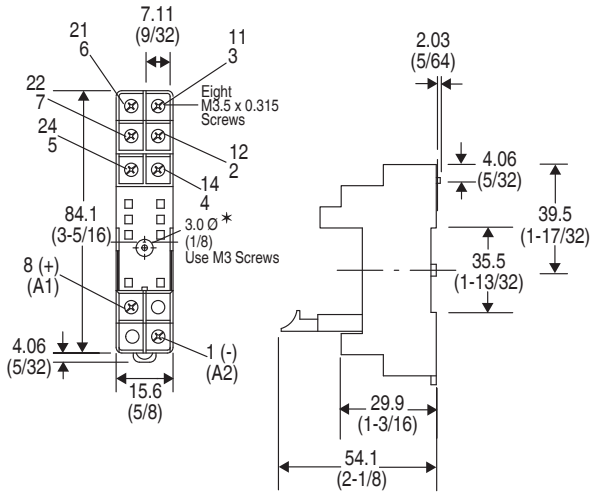
Bulletin 700-HNK42 DPST-NO Contact
Approximate Dimensions



Cat No. 700-HN121

Wire Size: 2 x 2.5 mm²
Single Wire – Up to #12 AWG
Double Wire – 2 x 2.5 mm² (#2–14 AWG... #2–20 AWG)
(Either Solid or Stranded)
Strip Length: 9 mm (3/8 in.) – Torque: 0.8 N•m (7 lb•in)
Total height: 700-HN121 + 700-HNK41 is 78.0 mm.

★ Holes required for mounting [3 mm (1/8 in.) diameter].



Cat No. 700-HN122

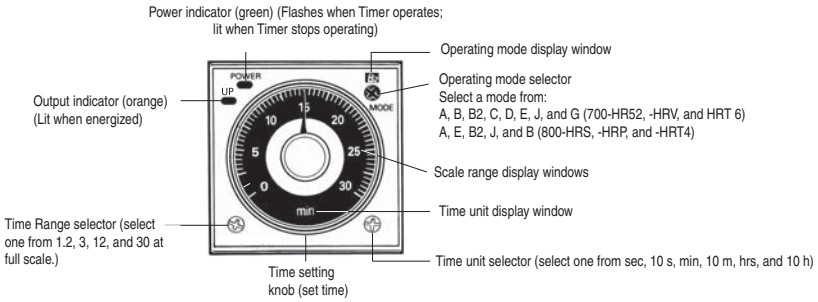
Wire Size: 2 x 2.5 mm²
Single Wire – Up to #12 AWG
Double Wire – 2 x 2.5 mm² (#2–14 AWG... #2–20 AWG)
(Either Solid or Stranded)
Strip Length: 9 mm (3/8 in.) – Torque: 0.8 N•m (7 lb•in)
Total height: 700-HN122 + 700-HNK42 is 78.0 mm.

★ Holes required for mounting [3 mm (1/8 in.) diameter].

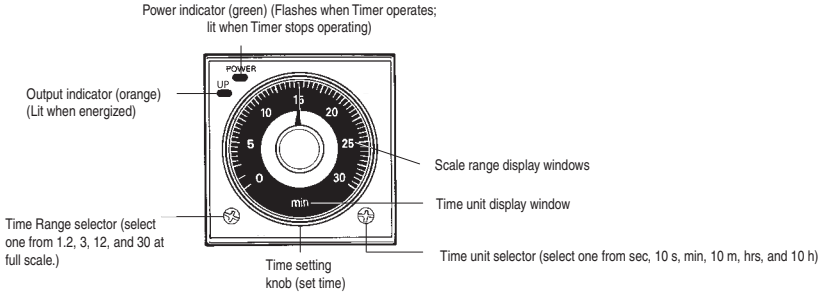
		700-HR, -HRS, -HRV	70-HRP	700-HRC	700-HRM	700-HRF	700-HRY	700-HRQ	700-HRT (Transistor Outputs)
Electrical Ratings									
Pilot Duty Rating		NEMA B300							—
Thermal Current (I_{th})		5 A							100 mA @ 30V DC max.
►][◄	120V AC	30 A							—
Make	240V AC	15 A							—
◄][►	120V AC	3 A							—
Break	240V AC	1.5 A							—
Hp at 120V		1/6 Hp (0.12 kW)	1/4 Hp (0.18 kW)		1/6 Hp (0.12 kW)		1/4 Hp (0.18 kW)	1/6 Hp (0.12 kW)	—
Hp at 240V		1/3 Hp (0.25 kW)							—
Resistive Load		5 A at 250V AC/30V DC							
Inductive Load		AC-15 @ 250V AC, 3 A/DC-13 @ 30V DC, 0.5 A							
Accuracy of Operating Time		±0.2 % FS max. (±0.2 % ±10 ms max. in a range of 1.2 s)							
Setting Error		±5 % FS ±50 ms (The value is ±5 % FS +100 ms to -0 ms max. when the C or D mode signal of the 700-HRVs are OFF.)							
Influence of Voltage		±0.2 % FS max. (±0.2 % ±10 ms max. in a range of 1.2 s)							
Influence of Temperature		±1 % FS max. (±1 % ±10 ms max. in a range of 1.2 s)							
Permissible Leakage Current									
Power Consumption		**-HR52, -HRS**	**-HRV**	**-HRP, -HRC**	**-HRM**	**-HRF**	**-HRY**	**-HRQ**	**-HRT**
240V AC, Output ON		2.1 VA	2.5 VA	2.0 VA	2.1 VA	10 VA	12 VA	0.4 VA	—
240V AC, Output OFF		1.3 VA	1.8 VA	2.0 VA	1.3 VA	10 VA	12 VA	0.4 VA	—
24V DC, Output ON		0.8 W	0.9 W	0.9 W	0.8 W	1.0 W	—	0.2 W	0.3 W
24V DC, Output OFF		0.2 W	0.3 W	0.9 W	0.2 W	1.0 W	—	0.2 W	0.2 W
Design Specifications									
Dielectric Strength		2000V AC (1000V AC for 700-HRT), 50/60 Hz for 1 min (contact to frame) 2000V AC (1000V AC for 700-HRT), 50/60 Hz for 1 min (between control output terminals and operating circuit) 2000V AC, 50/60 Hz for 1 min (pole-to-pole) 1000V AC, 50/60 Hz for 1 min (between contacts not located next to each other) 2000V AC, 50/60 Hz for 1 min (contact to coil)							
Mechanical									
Vibration Resistance		Malfunction: 10…55 Hz with 0.5 mm double amplitude each in three directions for ten minutes each							
Shock Resistance		Malfunction: 100 m/s^2 (10 G)				98 m/s^2 (10 G)	294 m/s^2 (10 G)	98 m/s^2 (10 G)	100 m/s^2 (10 G)
Environmental									
Noise Immunity		±1.5 kV for ±600V DC				±400V for 12V DC		±1kV for 48V DC	±1.5 kV for ±600V DC
Static Immunity		Malfunction: 8 kV							
Ambient Temperature		Operating: -10…55 °C (with no icing) Storage: -25…65 °C (with no icing)							
Ambient Humidity		Operating: 35…85 %							
Construction									
Life Rxpectancy (Min. Operations)		Mechanical:20 000 000. (under no load at 1800 operations/h) Electrical: 100 000 (5 A at 250V AC, resistive load at 1800 operations/h)						Mech: 10^7 Electrical: 10^4	
EMC		(EMI) EN50081-2 Emission Enclosure:EN55011 Group 1 class A Emission AC Mains: EN55011 Group 1 class A (EMS) EN50082-2 Immunity ESD:EN61000-4-2:4 kV contact discharge (level 2) 8 kV air discharge (level 3) Immunity RF-interference from AM Radio Waves: ENV50140:10 V/m (80 MHz…1 GHz) (level 3) Immunity RF-interference from Pulse-modulated Radio Waves:ENV50204:10 V/m (900 ±5 MHz) (level 3) Immunity Conducted Disturbance:ENV50141:10 V (0.15…80 MHz) (level 3) Immunity Burst:EN61000-4-4:2 kV power-line (level 3) Immunity Surge:EN61000-4-52 kV I/O signal-line (level 4) 1 kV line to line 2 kV line to ground (level 3)							
Degree of Protection		IP40 (panel surface)							
Weight		Approx. 90 g							
Certifications		CSA Certified (File No. 70751), UL Recognized (File No. E14843 Guide No. NRNT2), CE Marked, C-Tick Marked							
Standards		UL 508, CSA C22.2 No. 14, EN 61812-1, EN 61000-6-2, -6-4							

Timer Functions

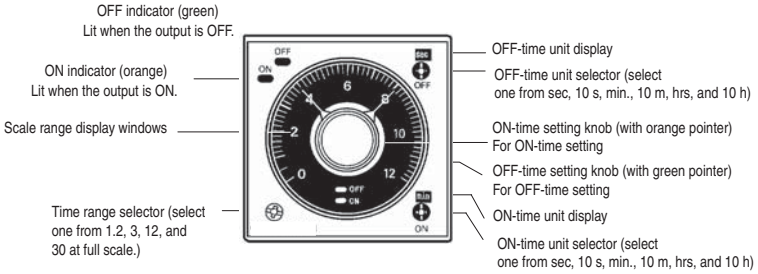
700-HR Multifunction Timer



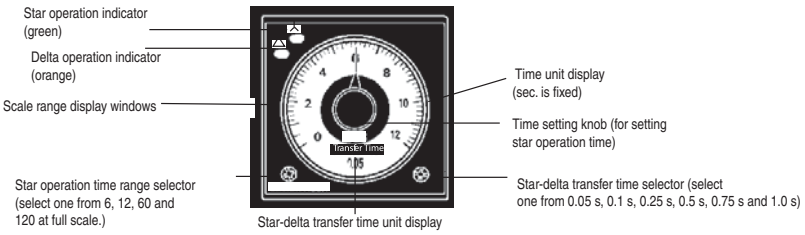
700-HRC -HRM On-Delay Timer



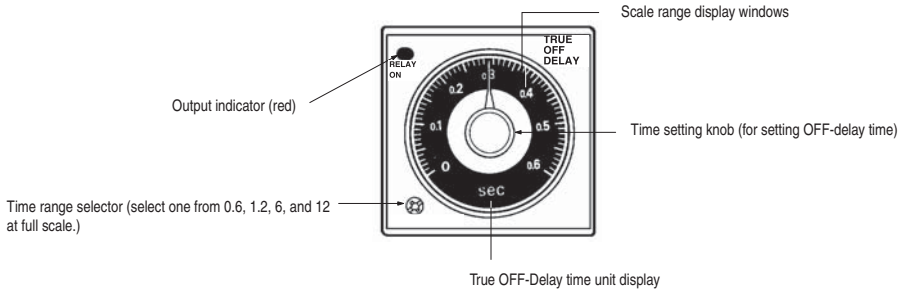
700-HRF Twin Timer



700-HRY Star-Delta Timer



700-HRQ True Off-Delay Timer

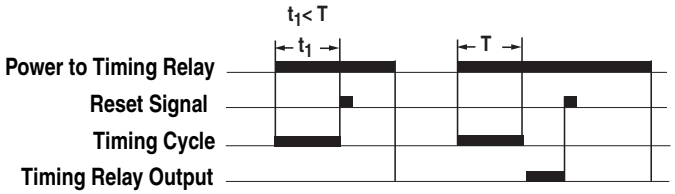


Specifications for Start, Gate, Reset Signal (Cat. Nos. 700-HR52, -HRT6, -HRV, -HRQR)

Start, Reset, and Gate signals are typically contact closures or signals from a solid-state sensor.

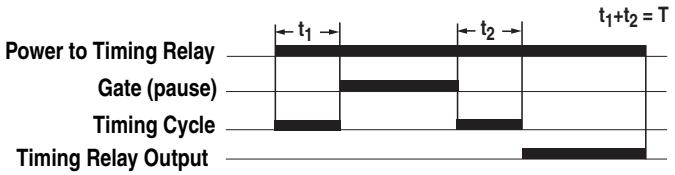
(R) Reset Signal

The reset signal is not required for normal operation. Reset can be accomplished by removing power from the timing relay. To reset the timer without removing power, a signal must be applied which resets the timing cycle and returns the output contacts to their shelf state. The reset signal will override both the start signal and gate signal. The reset signal can be either momentary or maintained.



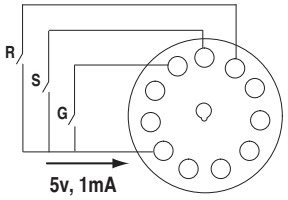
(G) Gate Signal

The gate signal is not required for normal operation. The gate signal provides a pause or retentive timing function. When the gate signal is applied the timing cycle is momentarily interrupted. When the signal is removed, the timing cycle resumes timing at the point the cycle was interrupted and will continue timing until the time delay is completed or the gate signal is re-applied.



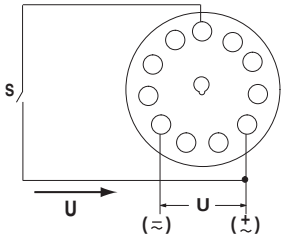
Contact Signal — Cat. Nos. 700-HR52, -HRT6, -HRQR

Contact closure provides signal to timer. A low energy signal is generated by the 700-HR timing relay. For optimum reliability, use contacts designed for low energy switching (5V, 1 mA) (Bul. 800F-X__V, 800T-X__V). No external voltage should be connected to the contact signal.



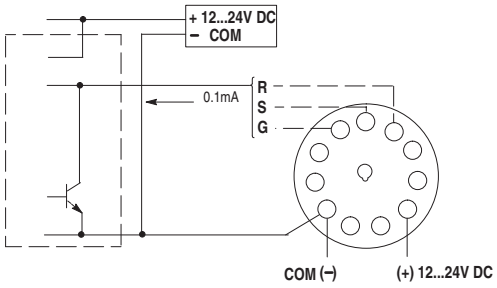
Contact Signal — Cat. No. 700-HRV

For use in applications where it is not possible to use contacts designed for low energy switching. Contact closure provides signal to timer. A signal is generated by the 700-HR timing relay, and is the same potential as the supply voltage of the timing relay. No external voltage should be connected to contact signal. 700-HRV52TU24 supply voltage: 24...48V AC, 12...48V DC / 700-HRV52TA17 supply voltage: 100...240V AC, 100...125V DC.



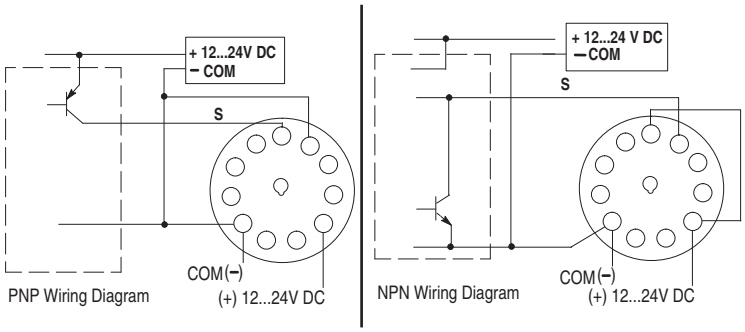
Solid-State Signal — Cat. Nos. 700-HR52, -HRT6

Timing relay is suitable for use with a 3-wire NPN 12...24V DC sensor. Supply voltage potential of sensor must be the same as the supply voltage potential of the timing relay. Permissible off-state leakage current from sensor: 0.01 mA max.



Solid-State Signal — Cat. No. 700-HRV

Timing relay is suitable for use with a 3-wire NPN or PNP 12...24V DC sensor. Supply voltage potential of sensor must be the same as the supply voltage potential of the timing relay. Permissible off-state leakage current from sensor: 0.01 mA max.



Signal Specifications					
Circuit Impedance	Circuit impedance can be used to calculate the maximum wiring distance from the signal switch to the timing relay, for example. Permissible signal-ON impedance: 1 kΩ max. Permissible signal-OFF impedance: 100 kΩ min.				
Power-OFF Reset	Min. power-off time: 0.1 s, Reset Voltage: 10% max. of rated voltage				
Signal Duration	Min. pulse width: 0.05 s				
Signal Options		700-HR52	700-HRT6	700-HRV5	700-HRQR
	Start	X	X	X	NA
	Reset	X	X	NA	X
	Gate	X	X	NA	NA

Nomenclature

Timing Charts

Mode A — ON-Delay

a. Needs continuous input power applied.

b. Timing is initiated by the leading edge of the start signal.

c. Contacts change state after timing is complete.

d. Additional start signals during timing don't reset timing or contacts.

e. When the input power is removed contacts return to shelf state.

Basic Operation

Mode B — Repeat Cycle, Off Start

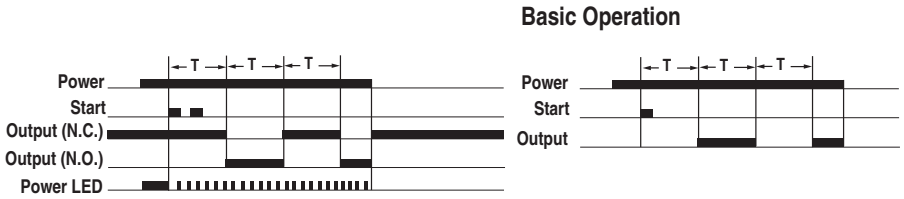
a. Need continuous input power applied.

b. Timing is initiated by the leading edge of the start signal. Additional start signals during timing do not reset timing or contacts.

c. For the first time period the contacts remain in their shelf state. When that time period is complete contacts change state for the same time period (time on = time off).

d. This cycle repeats itself until input power is removed or reset signal is applied. When the input power is removed or reset signal is applied contacts return to the shelf state.

Basic Operation



a. Need continuous input power applied.

b. Timing is initiated by the leading edge of the start signal. Additional start signals during timing do not reset timing or contacts.

c. For the first time period the contacts change state. When that time period is complete contacts return to the shelf state for the same time period (time on = time off).

d. This cycle repeats itself until input power is removed or reset signal is applied. When the input power is removed or reset signal is applied contacts return to the shelf state.

Basic Operation

Mode C — Watchdog monitor (Trigger = Signal On/Off)

a. Need continuous input power applied.

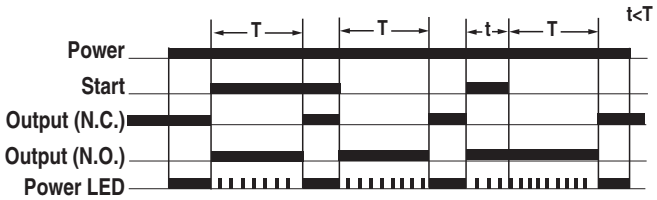
b. Contacts change state immediately when start signal is applied or when start signal is removed (only if timing cycle was complete).

c. Timing is initiated at the leading edge of the start signal. After the first timing cycle is complete, timing is initiated by the trailing edge of the start signal.

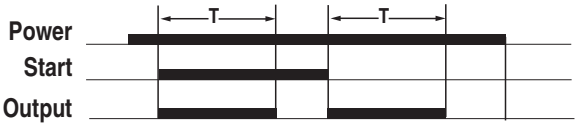
d. At the end of the time period contacts return to the shelf state.

e. Relay timing is reset when additional start signals are applied while the relay is timing. Contacts remain in energized state.

f. When the input power is removed contacts return to the shelf state.



Basic Operation



Mode D — Off-Delay (Trigger=Signal Off)

a. Need continuous input power applied.

b. Contacts change state immediately when start signal is applied.

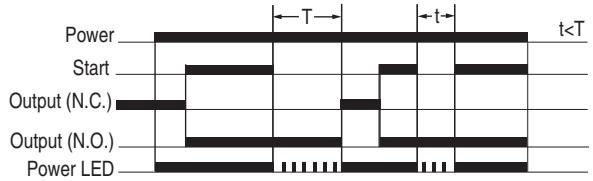
c. Timing is initiated by the trailing edge of the start signal.

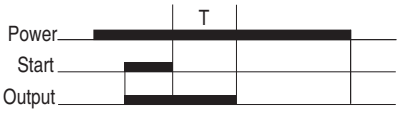
d. At the end of the time period contacts return to the shelf state.

e. Relay timing is reset when additional start signals are applied while the relay is timing. Contacts remain in energized state.

f. When the input power is removed contacts return to the shelf state.

Basic Operation





Mode E — One-Shot (Trigger=Signal On) 700-HR52, -HRV, and -HRT6

a. Need continuous input power applied.

b. Timing is initiated by the leading edge of the start signal.

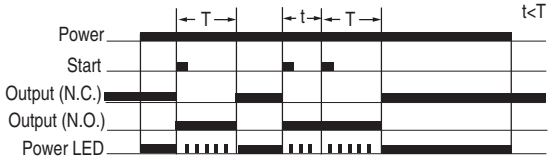
c. Contacts change state immediately when start signal is applied.

d. At the end of the time period contacts return to the shelf state.

e. Relay timing is reset when additional start signals are applied while the relay is timing. Contacts remain in energized state.

f. When the input power is removed contacts return to shelf state.

Basic Operation



Mode E — One-Shot (Trigger = Power On) 700-HRS, -HRP, and -HRT4

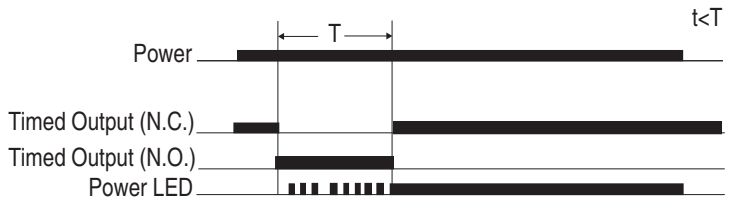
a. Need continuous input power applied.

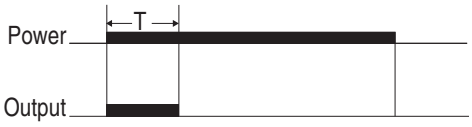
b. Timing is initiated when the input power is applied.

c. At the end of the time period contacts return to the shelf state.

d. Relay timing is reset when input power is removed.

Basic Operation





Mode J — Delayed One-Shot (Trigger=Power On)

a. Need continuous input power applied.

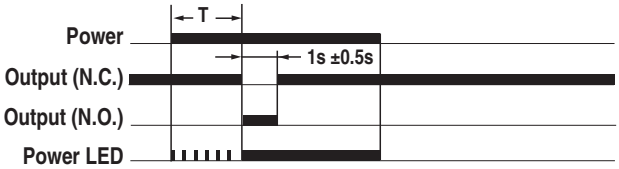
b. No start signal applied.

c. Timing is initiated when input power is applied.

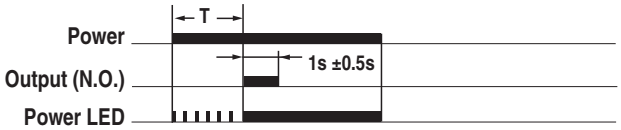
c. Contacts change state after the timing for a fixed time of 1s +/-0.5s

d. At the end of the 1 sec period the contacts return to the shelf state.

e. When the input power is removed contacts return to the shelf state.



Basic Operation



Mode Star-Delta

a. Need continuous input power applied.

b. No start signal required. Timing is initiated when input power is applied.

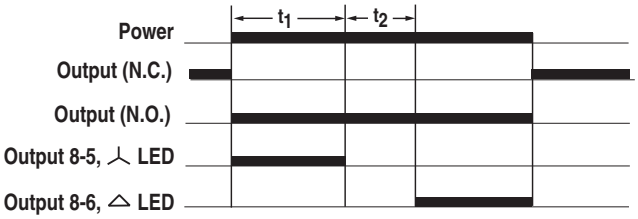
c. Star ouput contact changes state when input power is applied.

d. After timing is complete star output contact returns to the shelf state then both the star & delta contacts remain in shelf states until transfer time setting is complete.

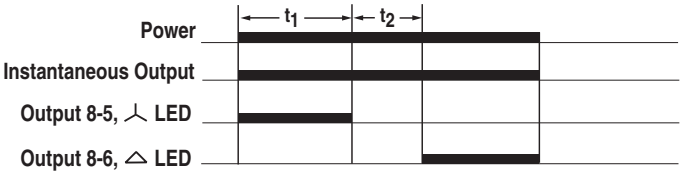
e. Delta output contact changes state after transfer time is complete.

f. Instantaneous contact changes state when input power is applied.

g. All contacts return to the shelf state when input power is removed.



Basic Operation



Mode True Off-Delay (Trigger=Power Off)

a. Continuous input power is NOT required.

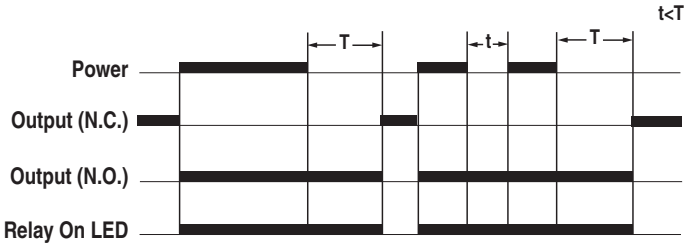
b. No start signal applied.

c. Contacts change state immediately when input power is applied.

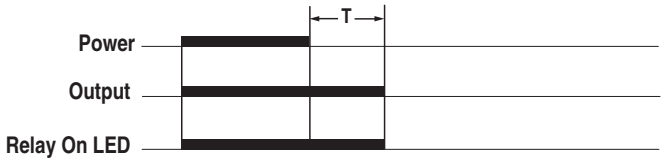
d. Timing starts when input power is removed.

e. At the end of the time period contacts return to the shelf state.

f. Relay timing is reset when input power is reapplied while the relay is timing. Contacts remain in energized state.

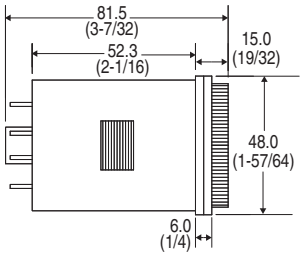


Basic Operation

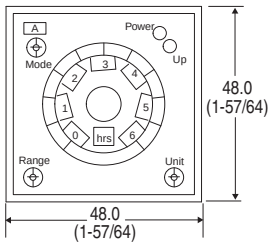


Approximate Dimensions

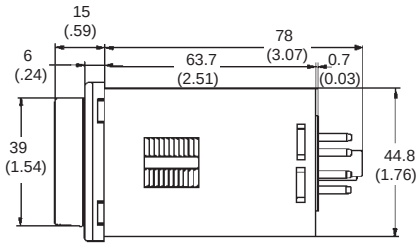
Approximate Dimensions are shown in millimeters (inches). Approximate Dimensions are not intended to be used for manufacturing purposes.



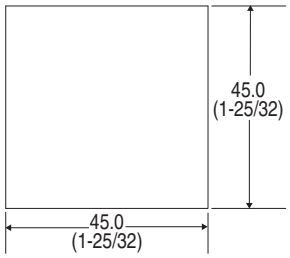
Cat. No. 700-HR, -HRM, -HRC, -HRF, -HRS, HRV, HRP Timing Relays



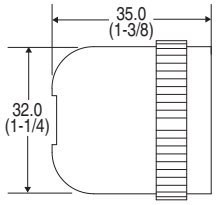
Cat. No. 700-HR, -HRM, -HRC, -HRF, -HRS, -HRV, -HRP, -HRY, -HRQ Timing Relays



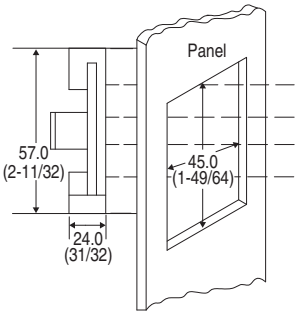
Cat. No. 700-HRY, -HRQ Timing Relays



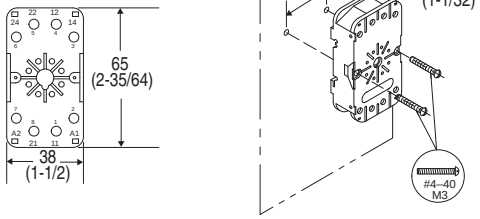
Cat. No. 700-HR...
Panel Cutout



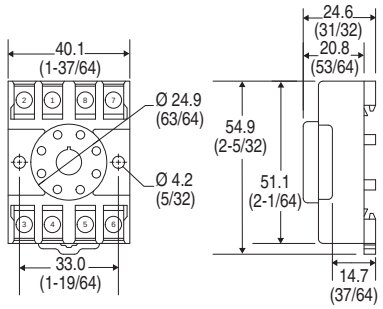
Cat. No. 700-HN129 — 11-pin
Cat. No. 700-HN108 — 8-pin socket



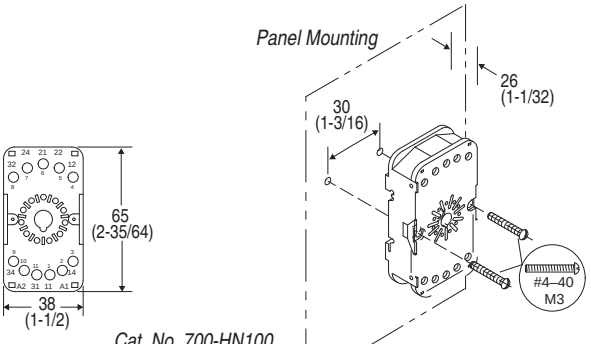
Cat. No. 700-HN130
Retainer



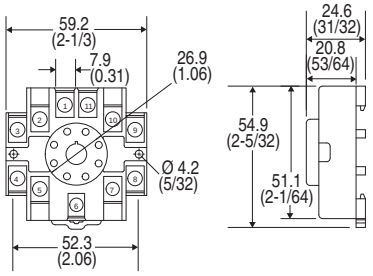
Cat. No. 700-HN100
Wire Size: 2x2.5 mm
Single Wire — Up to #12 AWG
Double Wire — 2x2.5 mm (#2-14 AWG...#2-20 AWG)
(Either Solid or Stranded)
Strip length: 9 mm (3/8 in) — Torque: 0.8 N•m (7 lb•in)



Cat. No. 700-HN125
Wire Size: 2x2.5 mm
Single Wire— Up to #12 AWG
Double Wire — 2x2.5 mm (#2-14...#2-20 AWG)
(Either Solid or Stranded)
Strip Length: 9 mm (3/8 in) — Torque: 0.8 N•m (7 lb•in)



Cat. No. 700-HN100
Wire Size: 2x2.5 mm
Single Wire — Up to #12 AWG
Double Wire — 2x2.5 mm (#2-14 AWG...#2-20 AWG)
(Either Solid or Stranded)
Strip Length: 9 mm (3/8 in.) — Torque: 0.8 N•m (7 lb•in.)



Cat. No. 700-HN126
Wire Size: 2x2.5 mm
Single Wire— Up to #12 AWG
Double Wire — 2x2.5 mm (#2-14...#2-20 AWG)
(Either Solid or Stranded)
Strip Length: 9 mm (3/8 in) — Torque: 0.8 N•m (7 lb•in)

General Timer Functions

Display Section

1. Key Protect Indicator (orange)

2. Control Output Indicator (orange)

3. Reset Indicator (orange)

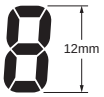
4. Present Value Display (Main display)
(Character height: 12 mm, red *)
* Characters on models with screw terminals can be switched between red, green, and orange.

5. Time Unit Indicators
(Color is same as present value display.)
(If the time range is 0 min, 0 h, 0.0 h, or 0 h 0 min, these indicators flash to indicate timing operation.)

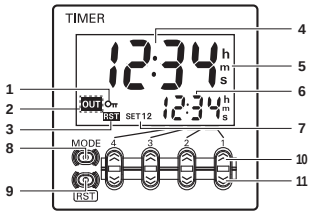
6. Set Value Display (Sub-display)
(Character height: 6 mm, green)

7. Set Value 1, 2 Indicator (green)

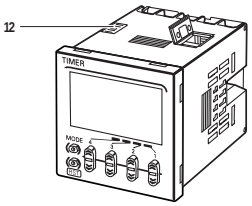
Character Size for Present Value Display



Character Size for Set Value Display



Front View



Operation Key

8. Mode Key
(Changes modes and setting items)

9. Reset Key
(Resets present value and output)

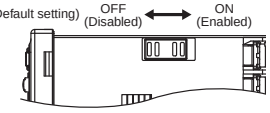
10. Up Keys 1 to 4

11. Down Keys 1 to 4

Switches

12. Key-protect Switch

(Default setting) OFF (Disabled) ⟷ ON (Enabled)



Specifications

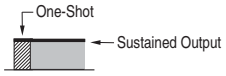
Electrical Ratings		
Pilot Duty Rating		NEMA B300
Rated supply voltage		100 to 240V AC, 24V AC/12 to 24V DC (50/60Hz) (permissible ripple: 20%(p-p) max.)
Operating voltage range		85…110% of rated supply voltage
Power consumption	100…240V AC	4.3VA
	24V AC/12…24V DC	3.4VA/1.7 W
Inrush Current	100…240V AC	3 A
	24V AC/12…24V DC	5 A
►][◄ Make	120V AC	30 A
	240V AC	15 A
◄][► Break	120V AC	3 A
	240V AC	1.5 A
Hp at 120V AC		1/4 Hp
Hp at 240V AC		1/3 Hp
Mechanical		
Mounting Method		Flush mounting, surface mounting, DIN mounting
Display		Seven-segment, negative transmissive LCD; Present value (red, 12 mm high characters); Set value (green, 6 mm high characters)
Digits		Four digits
Timer	Time ranges	0.000…9.999 s, 0.00…99.99 s, 0.0…999.9 s, 0…9999 s, 0 min 00 s…99 min 59 s, 0.0…999.9 min, 0 hr 00 min…99 hr 59 min, 0.0 hr…999.9 hr, 0 hr…9999 hr
	Timer modes	Elapsed time (Up), remaining time (Down), selectable
	Output modes	A, A-1, A-2, A-3, B, B-1, D, E, F, Z, S, tOFF, tON, tOFF-1, or tON-1
Inputs	Input signals	Start, reset
	Input method	No-voltage input via:NPN transistor or switching of contact
	Start, reset, gate	Minimum input signal width: 1 or 20 ms (selectable)
	Power reset	Minimum power-opening time: 0.5 s (Except for A-3, B-1, and F mode)
Control output		SPDT contact output: 5 A at 250V AC, resistive load (cosine=1) Minimum applied load: 10 mA at 5 V DC (failure level: P, reference value)
External Power Supply		No
Key Protect		Yes
Memory Backup		EEP-ROM (overwritten 100 000 times min), which can store data for 10 years min.
Accuracy of Operating Time and Setting Error★		Power-ON start: +-0.01% +-50 ms max. * to be rated against set value Signal start: +- 0.005% +-30 ms max. * to be rated against set value Signal start at transistor output model: +- 0.005% +-3 ms max.‡ If the set value is within the sensor waiting time (250 ms max.)

★ The values are based on the set value.
‡ The value is applied for a minimum pulse width of 1 ms.

		Characteristics★
Insulation Resistance		100 mΩ min. (at 500V DC)
Dielectric Strength		2000V AC, 50/60Hz for 1 min between current-carrying terminals and non-current-carrying metal parts (1000V AC for 24V AC/12 to 24V DC type), 1000 VAC, 50/60 Hz for 1 min between non-continuous contacts
Noise Immunity		'+-1.5 kV (between power terminals) for 100 to 240 VAC, +-480V for 24VAC/12 to 24VDC, and +-600V (between input terminals), square-wave noise by noise simulator (pulse width: 100 ns/1 µs, 1-ns rise)
Static Immunity		±8 kV (malfunction), ±15 kV (destruction)
Vibration Resistance	Malfunction	10…55 Hz with 0.35 mm single amplitude each in three directions for 10 min
Shock Resistance	Malfunction	98 m/s^2 (approx. 10 G) each in three directions
Life Expectancy	Mechanical	10 million operations min. (under no load at 18 000 operation/hr)
	Electrical	100 000 operations min. (5 A at 250V AC, resistive load at 1800 operation/hr)
EMC	(EMI)	EN61812-1
	Emission Enclosure:	EN55011 Group1 class A
	Emission AC mains:	EN55011 Group1 class A
	(EMS)	EN61812-1
	Immunity ESD:	EN61000-4-2: 4 kV contact discharge (level2) 8 kV air discharge (level3)
	Immunity RF-interference:	EN61000-4-3: 10 V/m
Enclosure Ratings		Panel surface:IP66 and NEMA Type 4X (indoors)‡
Weight		Approx. 100 g
Certifications		CE Certified; cURus (File No. E14843, Guide NRNTZ/NRNT8), C-Tick Marked
Standards		EN61010-1, EN 61326, VDE0106/P 100, CSA C22.2 No. 14, UL 508

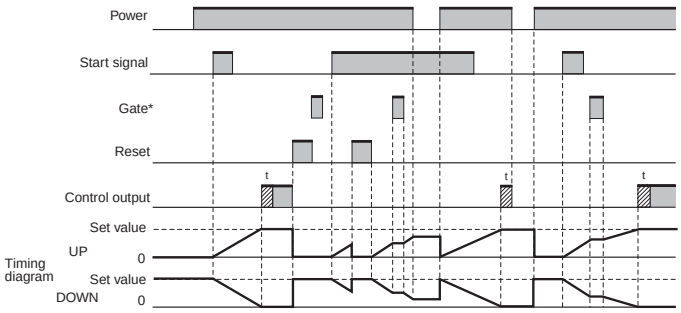
★ 700-HX User Manual, pub. number 700-UM002_-EN-D, available at Literature Library.
‡ An attached waterproof packing is necessary to ensure IP66 waterproofing between the 700-HX and installation pan.

Timing Charts



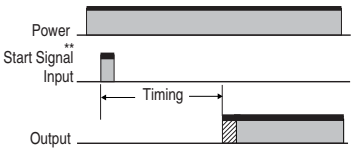
One-shot outputs can be set to 0.1s, 0.5 s, 1 s, 5 s, 10 s, or 20 s.

Output Mode A Mode: Signal ON-Delay (Timer resets when power comes ON.)



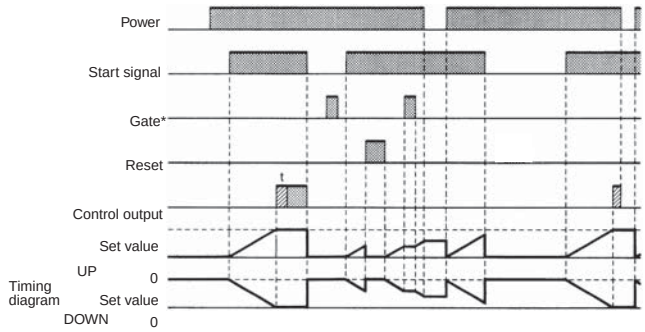
Timing starts when the start signal goes ON.
While the start signal is ON, the timer starts when power comes ON or when the reset input goes OFF.
The control output is controlled using a sustained or one-shot time period.

Basic Operation



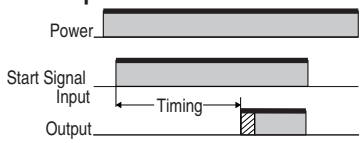
*Output is instantaneous when setting is 0.
** Start signal input is enabled during timing.

Output Mode A-1: Signal ON-Delay 2 (Timer resets when power comes ON.)



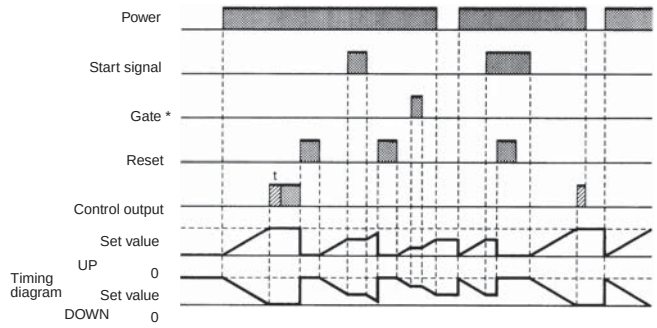
Timing starts when the reset input goes ON and is reset when the start signal goes OFF.
While the start signal is ON, the timer starts when the power comes ON or when the reset input goes OFF.
The control output is controlled using a sustained or one-shot time period.

Basic Operation



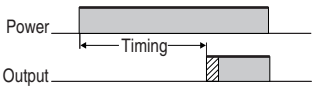
*Output is instantaneous when setting is 0.

Output Mode A-2: Power ON Delay 1 (Timer resets when power comes ON)



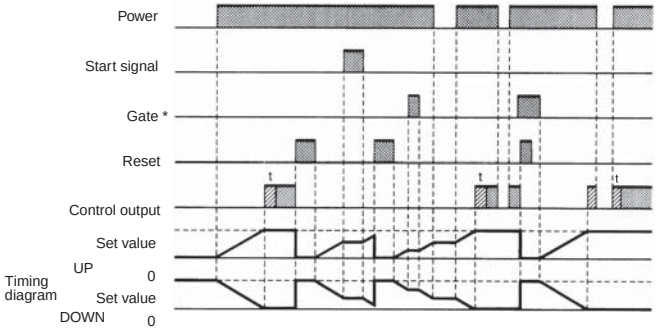
Timing starts when the reset input goes OFF.
The start signal disables the timing function (i.e., same function as the gate input).
The control output is controlled using a sustained or one-shot time period.

Basic Operation



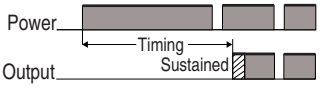
*Output is instantaneous when setting is 0.

Output Mode A-3 Power ON Delay 2 (Timer does not reset when power comes ON)



Timing starts when the reset input goes OFF.
The start signal disables the timing function (i.e., same function as the gate input).
The control output is controlled using a sustained or one-shot time period.

Basic Operation

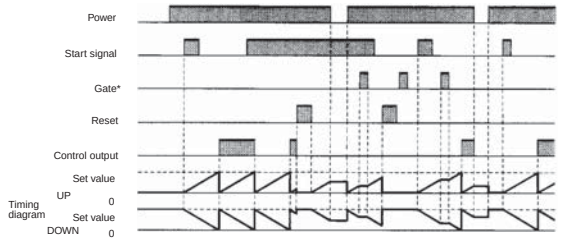


*Output is instantaneous when setting is 0.

★ Gate not included on any mode of this relay.

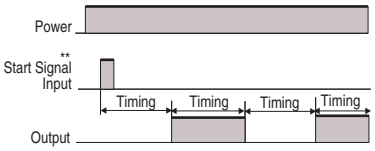
Output Mode B: Repeat Cycle (Timer resets when power comes ON.)

Sustained Output



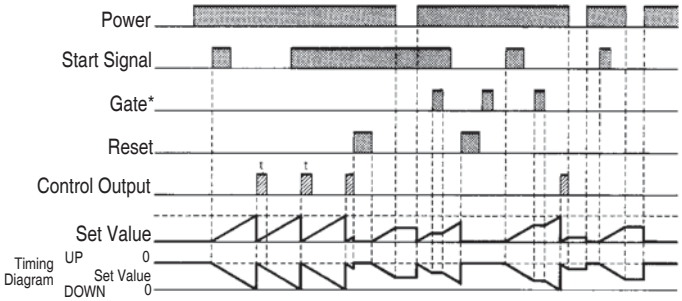
Timing starts when the start signal goes ON.
The status of the control output is reversed when time is up (OFF at start).
While the start signal is ON, the timer starts when the power comes ON or when the reset input goes OFF.

Basic Operation



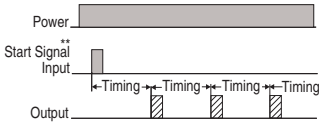
* Normal output operation will not be possible if the set time is too short.
Set the value to at least 100 ms (contact output type).
** Start signal input is disabled diring timing.

One-Shot Output



Timing starts when the start signal goes ON.
The control output is turned ON when time is up.
While the start signal is ON, the timer starts when the power cones ON or when the reset input goes OFF.

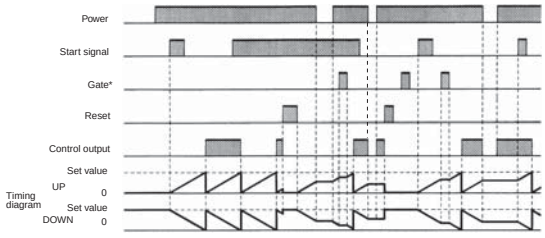
Basic Operation



* Normal output operation will not be possible if the set time is too short.
Set the value to at least 100 ms (contact output type).
** Start signal input is disabled during timing.

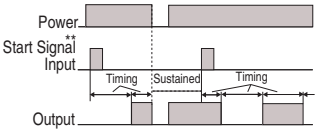
Output Mode B-1: Repeat Cycle 2 (Timer does not reset when power comes ON)

Sustained Output



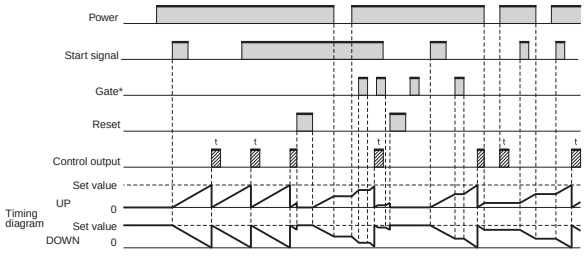
Timing starts when the start signal goes ON.
The status of the control output is reversed when time is up (OFF at the start).
While the start signal is ON, the timer starts when the power comes ON or when the rest input goes OFF.

Basic Operation



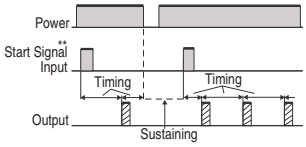
* Normal output operation will not be possible if the set time is too short
Set the value to at least 100 ms (contact output type).
** Start signal input is disabled during.

One-Shot Output



Timing starts when the start signal goes ON.
The control output comes ON when time is up.
While the start signal is ON, the timer starts when the power comes ON or when the reset input goes OFF.

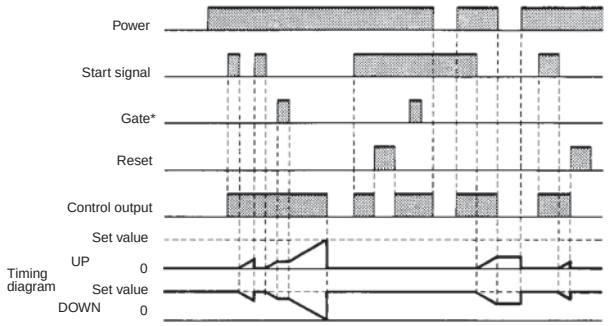
Basic Operation



* Normal outout operation will not be possible if the set time is too short.
Set the value to at least 100 ms (contact output type).
** Start signal input is disabled during timing.

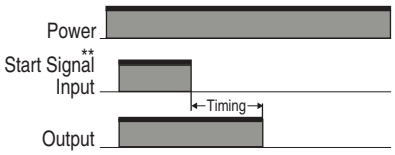
★ Gate not included on any mode of this relay.

Output Mode D: Signal OFF-Delay (Timer resets when power comes ON.)



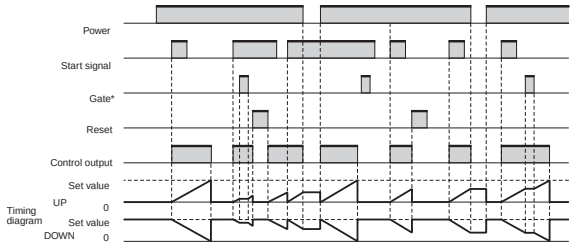
The control output is ON when the start signal is ON (except when the power is OFF or the reset is ON).
The timer is reset when the time is up.

Basic Operation



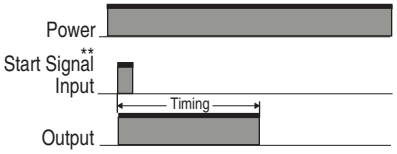
* Output functions only during start signal input when setting is 0.
** Start signal input is enabled during timing.

Output Mode E: Interval (Timer resets when power comes ON.)



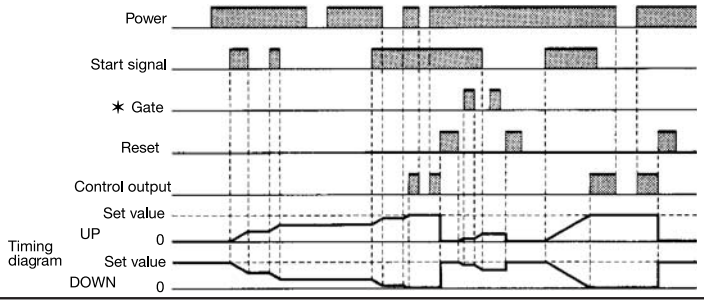
Timing starts when the start signal comes ON.
The control output is reset when time is up.
While the start signal is ON, the timer starts when power comes ON or when the reset input goes OFF.

Basic Operation



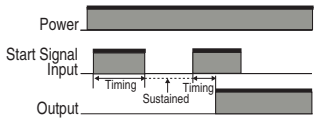
* Output is disabled when the setting is 0.
** Start signal input is enabled during timing.

Output Mode F: Cumulative (Timer does not reset when power comes ON)



Start signal enables timing (timing is stopped when the start signal is OFF or when the power is OFF).
A sustained control output is used.

Basic Operation



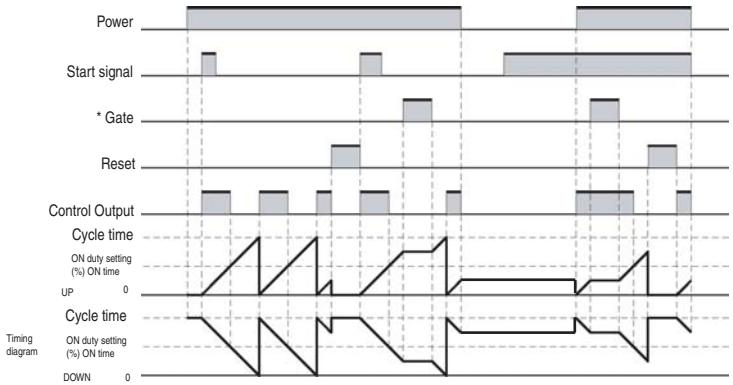
*Output is instantaneous when setting is 0.

★ Gate not included on any mode of this relay.

Z Mode

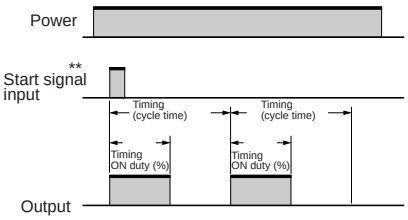
Output quantity can be adjusted by changing the cycle time set in the adjustment level to 1 and by changing the ON duty (%) set value. The set value shows the ON duty (%) and can be set to a value between 0 and 100 (%). When the cycle time is 0, the output will always be OFF. When the cycle time is not 0 and when ON duty has been set to 0 (%), the output will always be OFF. When ON duty has been set to 100 (%), the output will always be ON.

Z mode: ON/OFF-duty Adjustable Repeat Cycle



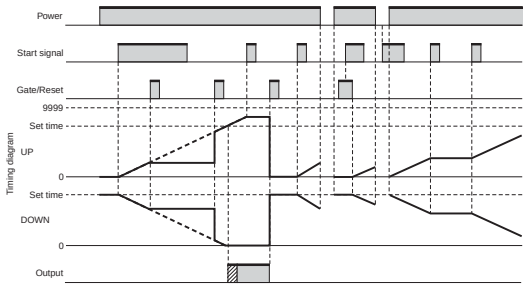
Timing starts when the start signal goes ON.
The status of the control output is reversed when time is up (ON at start).
While the start signal is ON, the timer starts when power comes ON or when the reset input goes OFF.

Basic Operation



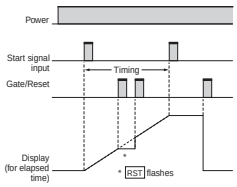
* Normal output operation will not be possible if the set time is too short.
Set the value to at least 100 ms (contact output type).
** Start signal input is enabled during timing.

Output Mode S: Stop Watch (Timer resets when power comes ON)



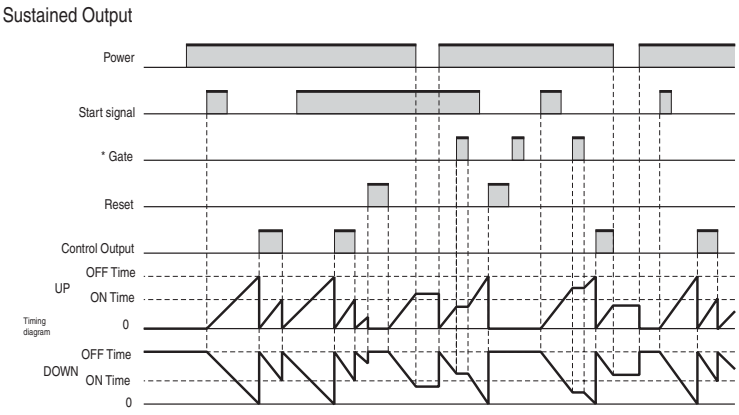
The signal starts and stops timing.
The display is held and timing is continued if the reset or gate input is received during timing operation.
The timer resets if the reset or gate input is received when the timing operation is stopped.

Basic Operation



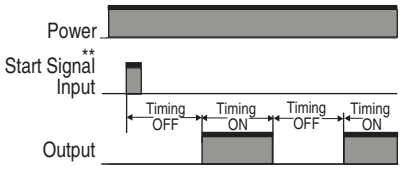
Note: Output is instantaneous when setting is 0.

Output Mode T OFF: Twin Timer OFF start



Timing starts when the start signal goes ON.
The status of the control output is reversed when time is up (OFF at start).
While the start signal is ON, the timer starts when power comes ON or when the reset input goes OFF.

Basic Operation

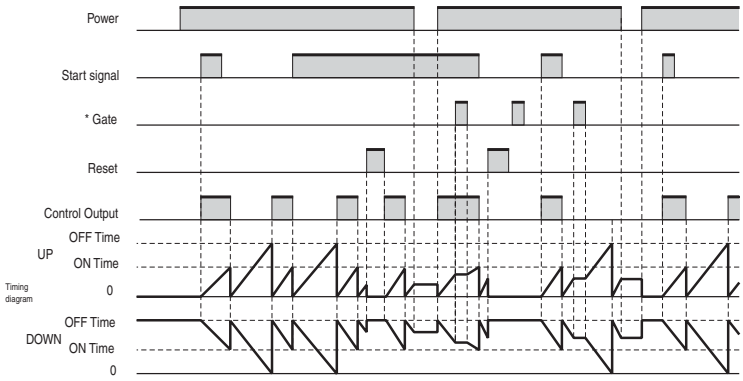


* Normal output operation will not be possible if the ON/OFF set time is too short. Set the value to at least 100 ms (contact output type).
** Start signal input is disabled during timing.

★ Gate not included on any mode of this Relay.

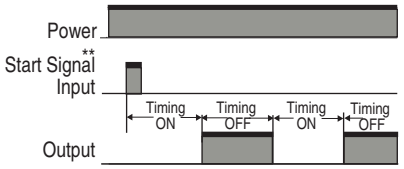
Output Mode T ON: Twin Timer ON start

Sustained Output



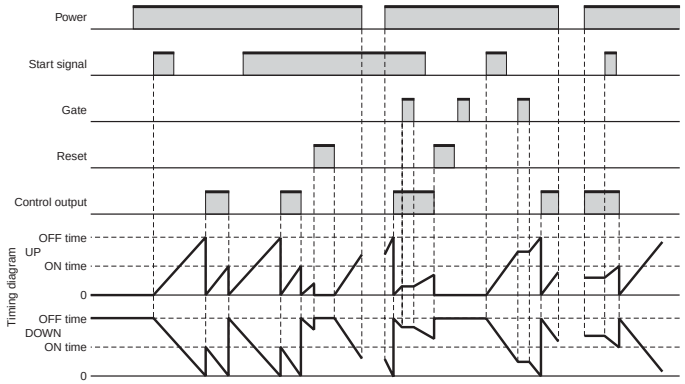
Timing starts when the start signal goes ON.
The status of the control output is reversed when time is up (ON at start).
While the start signal is ON, the timer starts when power comes ON or when the reset input goes OFF.

Basic Operation



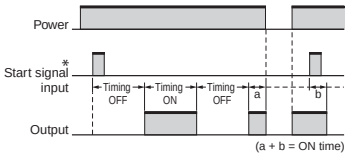
* Normal output operation will not be possible if the ON/OFF set time is too short. Set the value to at least 100 ms (contact output type).
** Start signal input is disabled during timing.

Output Mode TOFF-1: Flicker OFF start 2 (Timer does not reset when power comes ON)



Timing starts when the start signal goes ON.
The status of the control output is reversed when time is up (OFF at start).
While the start signal is ON, the timer starts when the power comes ON or when the reset input goes OFF.

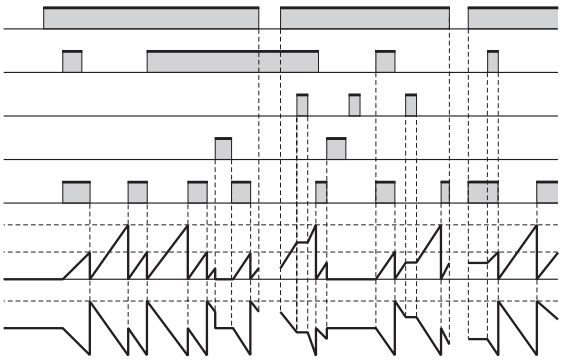
Basic Operation



* Start signal input is disabled during timing.

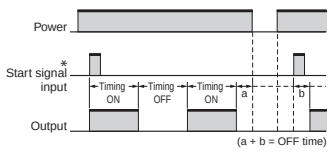
Note: Normal output operation will not be possible if the set time is too short.
Set the value to at least 100 ms (contact output type).

Output Mode TON-1: Flicker ON start 2 (Timer does not reset when power comes ON)



Timing starts when the start signal goes ON.
The status of the control output is reversed when time is up (ON at start).
While the start signal is ON, the timer starts when the power comes ON or when the reset input goes OFF.

Basic Operation



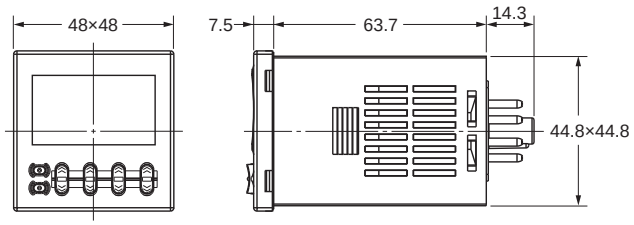
* Start signal input is disabled during timing.

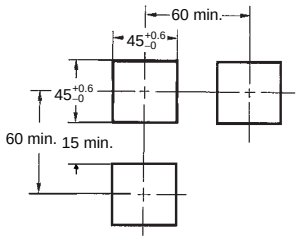
Note: Normal output operation will not be possible if the set time is too short.

★ Gate not included on any mode of this Relay.

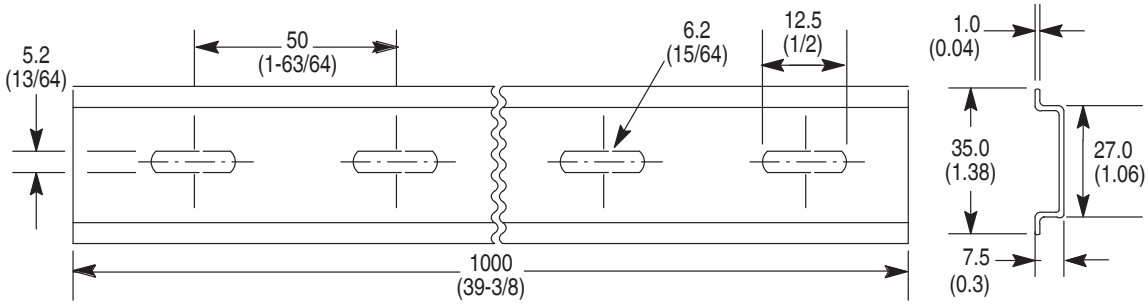
Approximate Dimensions

Approximate Dimensions are shown in millimeters (inches). Approximate Dimensions are not intended to be used for manufacturing purposes.



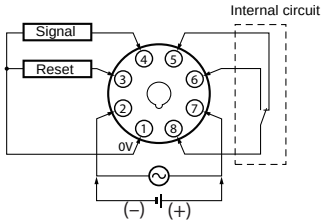


Cat. No. 700-HX...
Panel Cutout



Cat. No. 199-DR1 DIN Mounting Rail Series B
Cat. No. 199-DR4 DIN Mounting Rail Series B Has No Mounting Holes

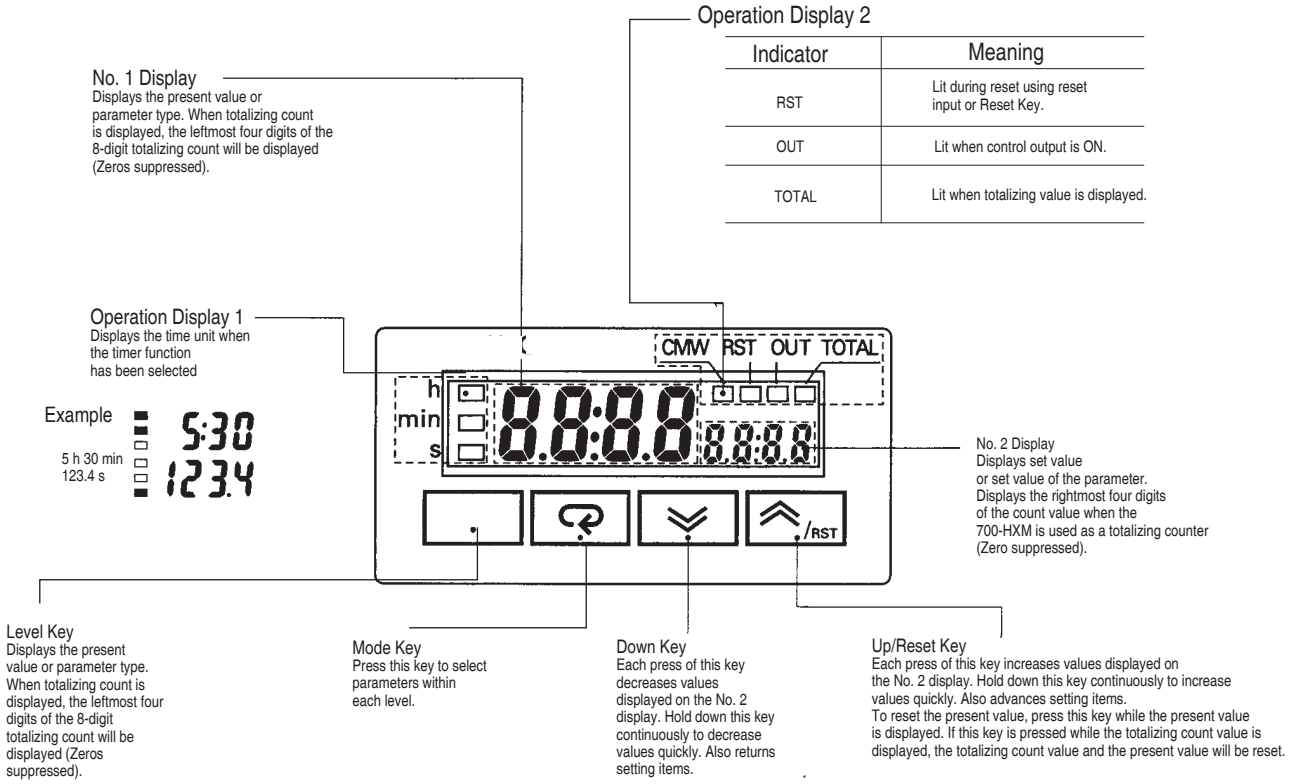
Terminal Arrangement



Cat. No. 700-HX...

Bulletin 700-HXM — Preset Counter/Timing Relay

General Timer Functions



Specifications

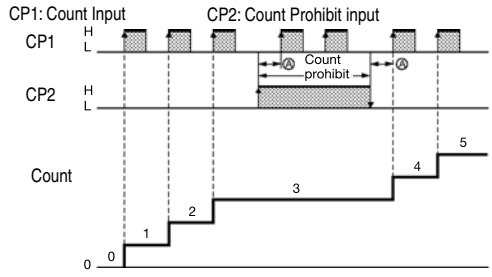
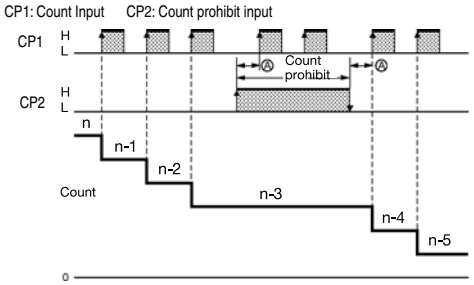
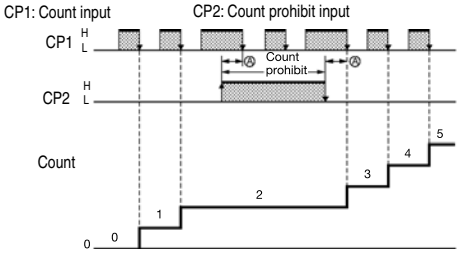
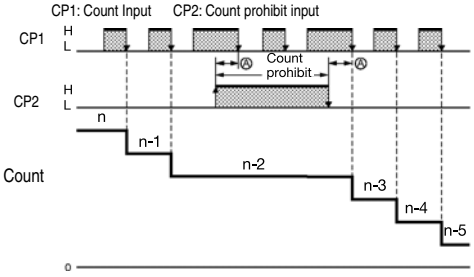
Electrical Ratings		
Pilot Duty Rating		NEMA B300
Rated Supply Voltage		24V DC
Operating Voltage Range		85…110% of rated supply voltage
Power Consumption		1.5 W max. (for max. DC load) (Inrush current: 15 A max.)
►][◄ Make	120V AC	30 A
	240V AC	15 A
◄][► Break	120V AC	3 A
	240V AC	1.5 A
Hp at 120V AC		1/4 Hp
Hp at 240V AC		1/3 Hp
Mechanical		
Mounting Method		Flush mounting (Panel or door)
Terminal Screw Tightening Torque		0.5 N•m max.
Display		Seven-segment, negative transmissive LCD; time display (hr, min, s); CMW, OUT, RST, TOTAL Present value (red, 7 mm high characters); Set value (green, 3.4 mm high characters)
Digits		PV: Four digits SV: Four digits When total count value is displayed: eight digits (Zeros suppressed)
Memory Backup		EEPROM (non-volatile memory) (number of writes: 100 000 times)
Counter	Maximum counting speed	30 Hz or 5 kHz★
	Counting range	-999…9,999
	Input modes	Increment, decrement, individual, quadrature inputs
	Output modes	N, F, C, or K
Timer	Time ranges	0.000…9.999 s, 0.00…99.99 s, 0.0…999.9 s, 0…9999 s, 0 min 00 s…99 min 59 s, 0.0…999.9 min, 0 h 00 min…99 h 59 min, 0.0…999.9 hr, 0 h…9999 hr
	Timer modes	Elapsed time (Up), remaining time (Down)
	Output modes	A, B, D, E, F, or Z
Inputs (OV input)	Input signals	For Counter: CP1, CP2, and reset For Timer: Start, gate, and reset
	Input method	No-voltage input (contact short-circuit and open input) Short-circuit (ON) impedance: 1 KΩ max. (Approx. 2 mA runoff current at 0Ω) Short-circuit (ON) residual voltage: 2V DC max. Open (OFF) impedance: 100 kΩ min. Applied voltage: 30V DC max.
	Start, reset, gate	Minimum input signal width: 1 or 20 ms (selectable)
	Power reset	Minimum power-opening time: 0.5 s
Control Output		SPDT contact output: 5 A at 250V AC/30V DC, resistive load (cos ϕ = 1)
Minimum Applied Load		10 mA at 5V DC (failure level: P, reference value)
Reset System		External, manual, and power supply resets (for timer in A, B, D, E, or Z modes)
Sensor Waiting Time		260 ms max. (Inputs cannot be received during sensor wait time if control outputs are turned OFF.)

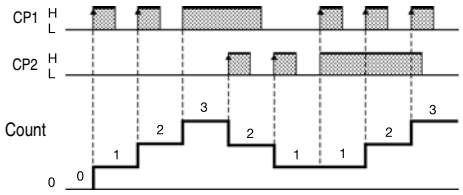
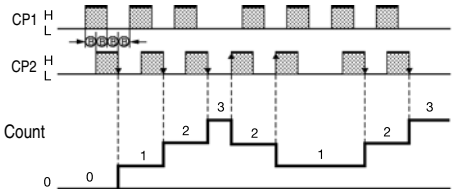
★ The figures given for maximum counting speed are for incrementing or decrementing operation with a prescale value of x1. If prescaling is used and 5 kHz is set, the maximum counting speed will be reduced to about half. The non-prescaling maximum counting speed will also be reduced to about half when the up/down mode is selected.

‡ "700-HXM User Manual" pub. no. 700-UM001*

Characteristics		
Timer Function		Signal start: ±0.03% ±30 ms max. Power-ON start: ±0.03% ±50 ms max.
Insulation Resistance		100 mΩ min. (at 500V DC)
Dielectric Strength		1500V AC, 50/60 Hz for 1 min between output terminals and non-current-carrying metal parts 510V AC, 50/60 Hz for 1 min between current-carrying terminals (except output terminals) and non-current-carrying metal parts 1500V AC, 50/60 Hz for 1 min between output terminals and current-carrying terminals (except output terminals) 500V AC, 50/60 Hz for 1 min between communications terminals and current-carrying terminals (except output terminals) 1000V AC, 50/60 Hz for 1 min between contacts not located next to each other
Noise Immunity		Square-wave noise by noise simulator; ±480V (between power terminals), ±600 V (between input terminals)
Static Immunity		±8 kV (malfunction), ±15 kV (destruction)
Vibration Resistance	Malfunction	10…55 Hz with 0.35 mm single amplitude each in three directions for 10 min.
Shock Resistance	Malfunction	100 m/s^2 (approx. 10 G), 3 times each in six directions
Life Expectancy	Mechanical	10 million operations
	Electrical	100 000 operations min (3 A at 250V AC, resistive load)
Ambient Temperature	Operating	-10…55 °C (with no icing or condensation)
	Storage	-25…65 °C (with no icing or condensation)
Ambient humidity		25…85%
EMC		(EMI): Emission Enclosure: EN61326 Class A (EMS): EN61326 Immunity ESD:EN61000-4-2:4 kV contact discharge (level 2) 8 kV air discharge (level 3) Immunity RF-interference:EN61000-4-3:10 V/m (Amplitude-modulated, 80 MHz…1 GHz) (level 3); 10 V/m (Pulse-modulated, 900 MHz ±5 MHz) (level 3) Immunity Conducted Disturbance:EN61000-4-6:3 V (0.15…80 MHz) (level 2) Immunity Burst:EN61000-4-4:2 kV power-line (level 3); 1 kV I/O signal-line (level 4); 1 kV communications-line (level 3) Immunity Surge:EN61000-4-5:1 kV between lines (power and output lines) (level 3); 2 kV between grounds (power and output lines) (level 3)
Enclosure Ratings		Panel surface: IP66 and NEMA Type 4 (indoors) Rear case: IP20 Terminal block: IP20
Weight		Approx. 80 g
Certifications		cURus Recognized Component (File No. E14843, Guide NRNT2/NRNT8), CE Marked, C-Tick Marked
Standards		EN61010-1, EN 61326, UL 508, CSA C22.2 No. 14

Input/Output Modes and Count Values

		Up (Increment) Mode ★	Down (Decrement) Mode ★
Input edge	UP		
	DOWN		

Up/Down B Individual Input	Up/Down C Quadrature Input★
	

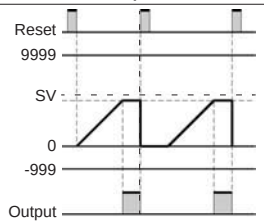
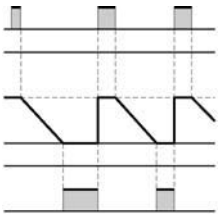
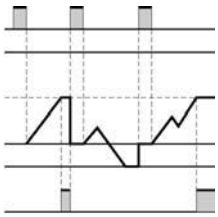
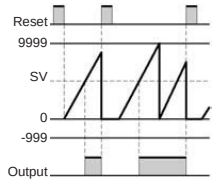
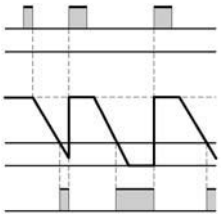
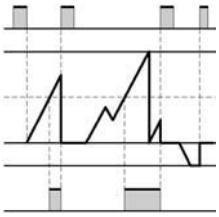
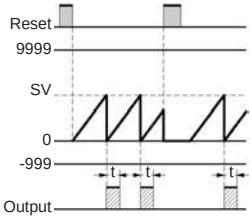
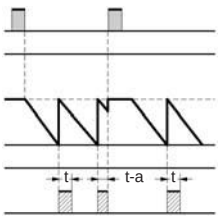
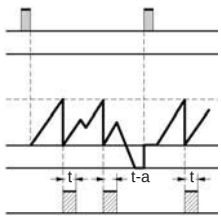
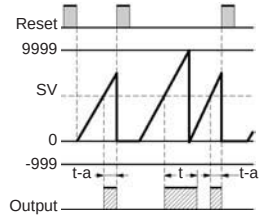
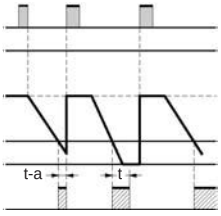
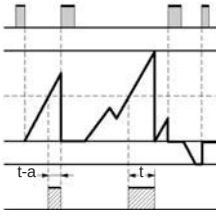
Note: H = Short-circuited
L = Open

★ (A) indicates the minimum signal width and (B) requires at least 1/2 the minimum signal width. If these conditions are not met, a counting error (+1 or -1) may occur.

Input/Output Mode Settings

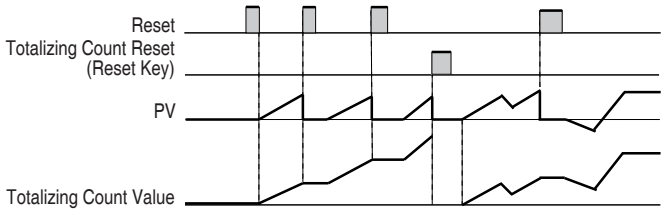
Counter Function

If there is a power failure during output ON, output will turn ON again when the power supply has recovered. For one-shot output, an output will be made again for the duration of the output time setting once the power supply has resumed. Output timing restarted during one-shot outputs is ignored.

		Input Mode		
		Up	Down	Up/Down B.C
Output mode	N			
	F			
	C			
	K			

Note: t-a: Less than the output time
t: Output time

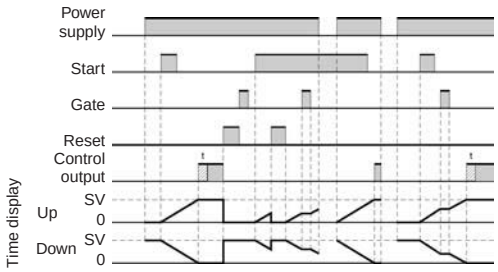
Totalizing Counter Operation



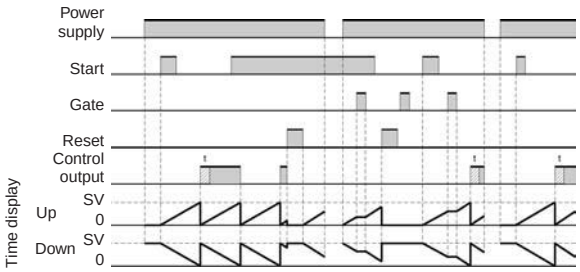
- Totalizing counter continues to count the present value, regardless of whether an reset input (by the reset key) has been made to reset the PV.
- When totalizing count value has reset, the PV is reset at the same time.
- The totalizing count range is 0…99999999. If the totalizing count exceeds 99999999, the count returns to 0. If the count drops below 0, it becomes 99999999.

Timer Function

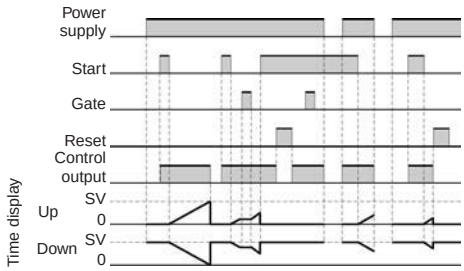
A Mode: Signal ON-Delay★



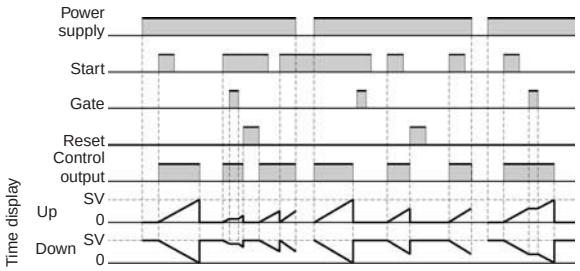
B Mode: Repeat Cycle★



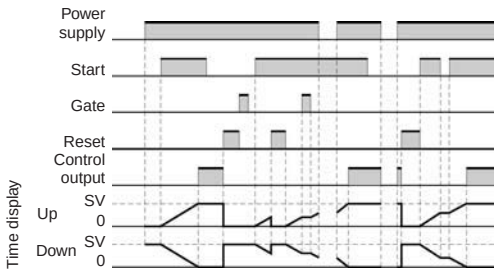
D Mode: Signal OFF-Delay



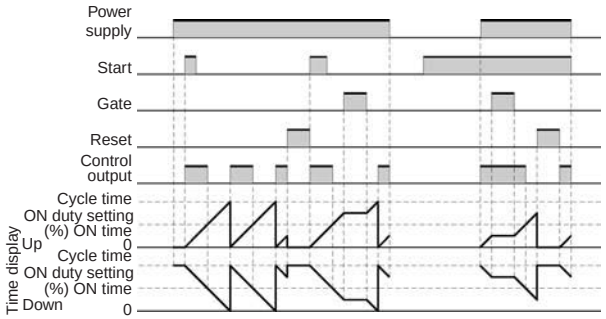
E Mode: One Shot



F Mode: Accumulative

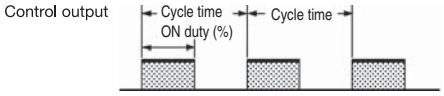


Z Mode: ON/OFF-Duty Adjustable Repeat Cycle



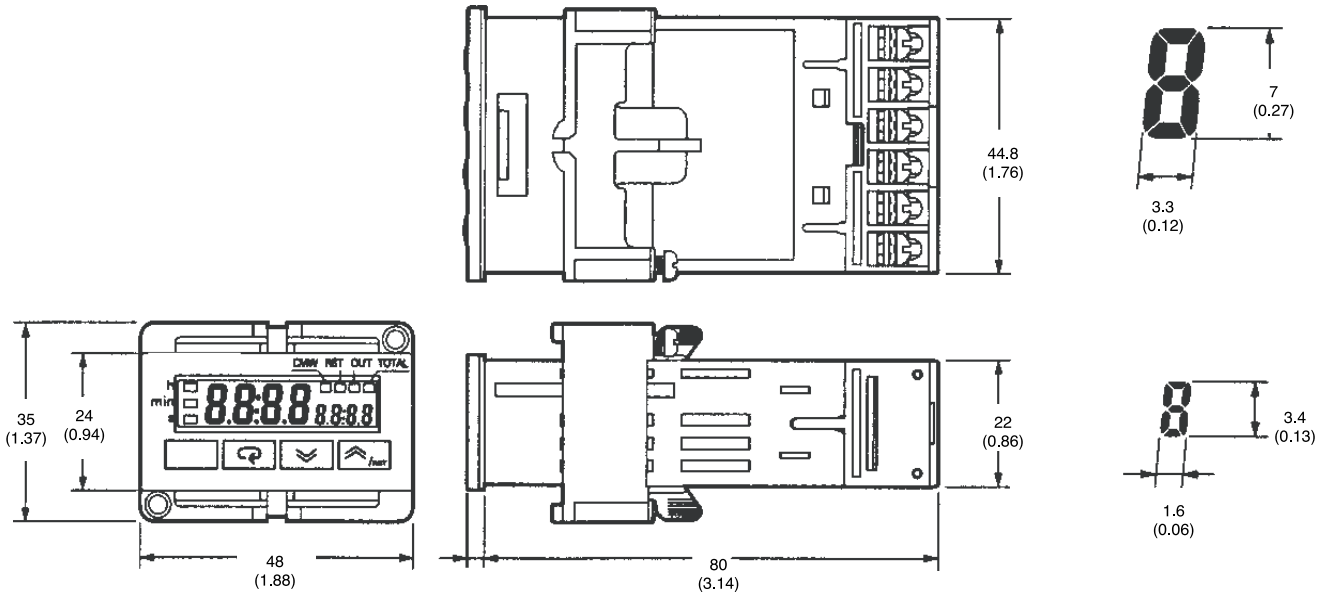
Z Mode

Output quantity can be adjusted by changing the cycle time set in the adjustment level to 1 and by changing the ON duty (%) set value. The set value shows the ON duty (%) and can be set to a value between 0 and 100 (%). When the cycle time is 0, the output will always be OFF. When the cycle time is not 0 and when ON duty has been set to 0 (%), the output will always be OFF. When ON duty has been set to 100 (%), the output will always be ON.



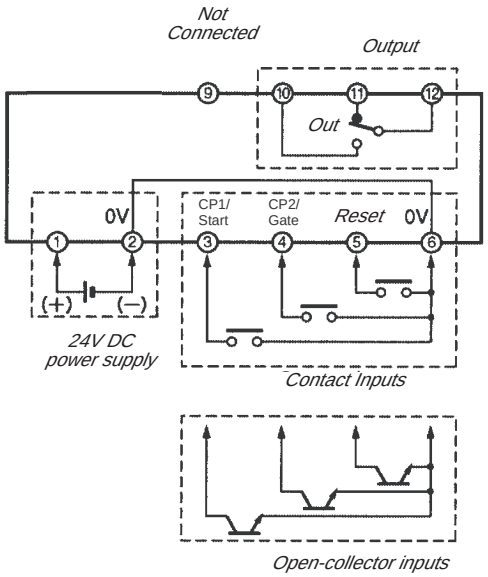
★ One-shot output or HOLD output can be selected for output: 

Approximate Dimensions are shown in millimeters (inches). Approximate Dimensions are not intended to be used for manufacturing purposes.



Cat. No. 700-HXM...

Terminal Arrangement



Cat. No. 700-HXM...

Type		Standard Cartridge						Master Cartridge						Heavy duty					
Bulletin No.		700-P						700-PMKIT						700-PHDKIT					
Electrical																			
Contact Rating Continuous		10 A @ 600V AC 5 A @ 600V DC						20 A @ 600V AC 10 A @ 600V DC						35 A @ 600V AC 20 A @ 600V DC					
Ratings Make/Break	AC	NEMA A600						2 x NEMA A600						2 x NEMA A600					
	DC	NEMA P600						N150 P600						N150 P600					
Additional Contact Ratings for AC single-phase loads		—						3 Hp @ 240V AC - N.O. 2 Hp @ 240V AC - N.O./N.C. 1 Hp @ 120V AC - N.O./N.C. 20 A Resistive Heating to 600V AC 20 A Tungsten Lighting Load to 480V AC						5 Hp @ 240V AC - N.O. 3 Hp @ 240V AC - N.O./N.C. 2 Hp @ 120V AC - N.O./N.C. 35 A General Use At 0.75 PF to 600V AC 35 A Tungsten Lighting Load to 480V AC					
DC Current Ratings Make/Break		Cartridge Cat. No. 700-CP1						Cartridge Cat. No. 700-CPM						Cartridge Cat. No. 700-CPH					
DC Switching Inductive Load	Contacts in Series	Volts DC																	
		24	64	125	250	500	600	24	64	125	250	500	600	24	64	125	250	500	600
														480W	480W	275W	138W	135W	120W
	1	5 A	2.2 A	1.1 A	.55 A	.24 A	.2 A	10 A	5 A	2.2 A	.55 A	.24 A	.2 A	10 A	5 A	2.2 A	.55 A	.24 A	.2 A
	2	10 A	10 A	5 A	2 A	.7 A	.5 A	20 A	10 A	5 A	2 A	.7 A	.5 A	20 A	10 A	5 A	2 A	.7 A	.5 A
	3	—	—	7 A	3 A	1.5 A	1.0 A	—	15 A	7 A	3 A	1.5 A	1.0 A	—	15 A	7 A	3 A	1.5 A	1.0 A
	4	—	—	10 A	5 A	2.5 A	1.5 A	—	20 A	10 A	5 A	2.5 A	1.5 A	—	20 A	10 A	5 A	2.5 A	1.5 A
Coil Voltage Range	AC	85…110%						85…110%						85…110%					
	DC	80…110%						80…110%						80…110%					
	Battery Charging	85…115%						85…115%						85…115%					
Coil Consumption		50 Hz			60 Hz			50 Hz			60 Hz			50 Hz			60 Hz		
	AC Inrush	132VA‡			138VA‡			132VA‡			138VA‡			132VA‡			138VA‡		
	AC Sealed	19.3VA‡			19VA‡			19.3 VA‡			19VA‡			19.3VA‡			19VA‡		
	DC Inrush	12.7VA‡						12.7VA‡						12.7VA‡					
	DC Sealed	12.7VA‡						12.7VA‡						12.7VA‡					
PLL - PKLL AC Latch Unit	Inrush	15VA‡			15.6VA‡			5VA‡			15.6VA‡			15VA‡			15.6VA‡		
	Sealed	5.4VA‡			5.5VA‡			5.4VA‡			5.5VA‡			5.4VA‡			5.5VA‡		
PLL - PKLL DC Latch Unit	Unlatch	35VA‡						35VA‡						—					
	Intermittent	35 W‡						35 W‡						—					
Reset Time	PT – PKT	75 ms						75 ms						—					
Minimum Pulse	PLL–PKLL	75 ms						75 ms						—					
Mechanical																			
Operating Time	Pickup	AC – 10…20 ms DC – 30…50 ms						AC – 10…20 ms DC – 30…50 ms						AC – 10…20 ms DC – 30…50 ms					
	Dropout	AC – 10…20 ms DC – 20…33 ms						AC – 10…20 ms DC – 20…33 ms						AC – 10…20 ms DC – 20…33 ms					
Mechanical Life		10 million operations																	
Construction																			
Contact Arrangement		Up to 12 Poles, Convertible to N.O. or N.C. (8 N.C. Maximum)						Up to 12 Poles, Convertible to N.O. or N.C. (8 N.C. Maximum)						Up to 6 Poles, Convertible to N.O. or N.C. (4 N.C. Maximum)					
Contact Material		Silver Nickel						Silver Cadmium Oxide						Silver Cadmium Oxide					
Mounting		Panel, Strip Mount, or DIN Rail Horizontal Mounting Recommended						Panel, Strip Mount, or DIN Rail Horizontal Mounting Recommended						Panel, Strip Mount, or DIN Rail Horizontal Mounting Recommended					
Environmental																			
Temperature	Operating★	–20…+65 °C (–4…149 °F)						–20…+65 °C (–4…149 °F)						–20…+65 °C (–4…149 °F)					
	Storage	–40…+65 °C (–40…149 °F)						–40…+65 °C (–40…149 °F)						–40…+65 °C (–40…149 °F)					
Wire Terminations																			
Wire size per UL/CSA		#18 AWG…(2) #12 AWG																	
Tightening Torque		8…12 lb•in (0.9…1.4 N•m)																	

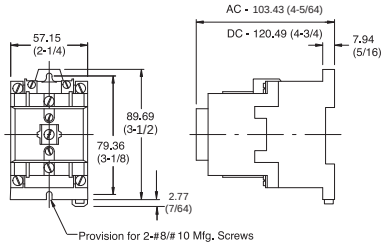
★ Temperature inside the panel.

‡ Average value for all coils within range. For values on a specific coil voltage, contact your local Rockwell Automation sales office or Allen-Bradley distributor.

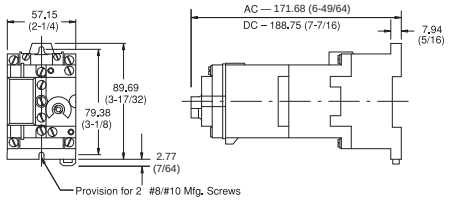
International Symbol for Mechanically Linked Contacts	

Dimensions are shown in millimeters (inches). Dimensions are not intended to be used for manufacturing purposes.

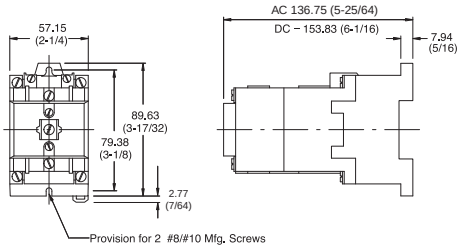
Bulletin 700-P Relays with standard, master contact, or heavy-duty contact cartridge



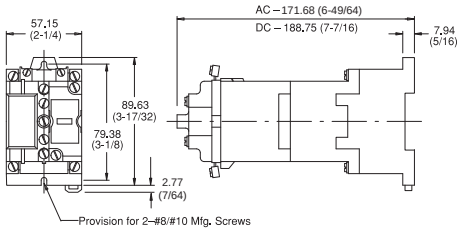
2- and 4-pole Bulletin 700-P Relay
Approximate Shipping Weight: AC – 0.68 kg (1.5 lb), DC – 1.34 kg (2.95 lb)



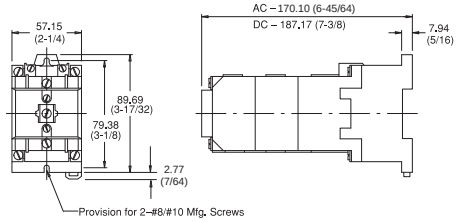
2- and 4-pole Bulletin 700-P with Pneumatic Time Delay Attachment
Approximate Shipping Weight: AC – 0.85 kg (1.88 lb), DC – 1.5 kg (3.33 lb)



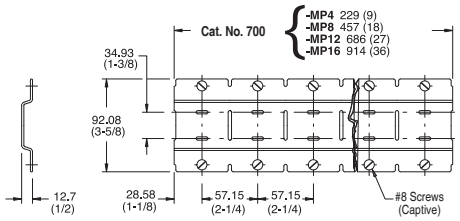
6- and 8-pole Bulletin 700-P Relay with one -PB adder deck
Approximate Shipping Weight:
AC – 0.79 kg (1.75 lb), DC – 1.45 kg (3.20 lb)



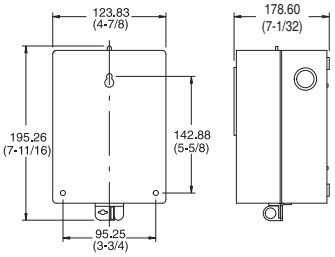
Bulletin 700-P Relay with Mechanical Latch
Attachment Approximate Shipping Weight:
AC – 0.97 kg (2.13 lb), DC – 1.62 kg (3.58 lb)



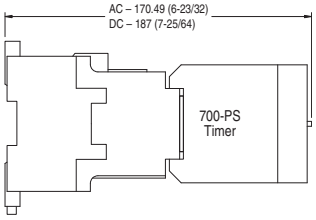
Bulletin 700-P Relay, up to 12 poles with -PB and -PC adder decks
Approximate Shipping Weight: AC – 1.02 kg (2.25 lb), DC – 1.68 kg (3.7 lb)



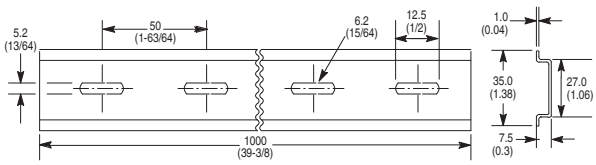
Relay Rail for Bulletin 700-P, -N, -NM, -R, -RM, -RT, -RTA Relays
Secure the mounting strip with two screws at each end relay position.
Use a minimum of one screw at the 3rd, 5th, 7th, etc., relay positions.
Alternate between upper and lower horizontal slots.



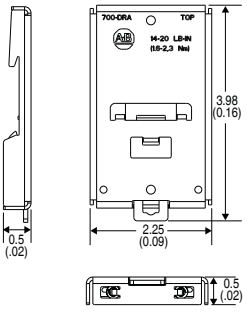
Cat. No. 700-N31, Type 1 Enclosure for
Bulletin 700-P, -RTC Relays
Approximate Shipping Weight: 1.26 kg (2.8 lb)



Bulletin 700-PS Timer Mounted on a Bulletin 700-P Relay
Approximate Shipping Weight: AC – 0.68 kg (1.5 lb) without 700-PS,
eDC – 1.34 kg (2.9 lb) without 700-PS



Cat. No. 199-DR1 DIN Mounting Rail Series B
Cat. No. 199-DR4 DIN Mounting Rail Series B Has No Mounting Holes



DIN Rail Adapter

Type		700S-P					
Electrical							
Contact Rating Continuous		10 A @ 600V AC 5 A @ 600V DC					
Ratings Make/ Break	AC	NEMA A600					
	DC	NEMA P600					
Minimum Contact Switching Ratings		10V, 50 mA					
DC Switching	Contacts in Series	Volts DC					
		24V	64V	125V	250V	500V	600V
	1	5 A	2.2 A	1.1 A	0.55 A	0.24 A	0.2 A
	2	10 A	10 A	5 A	2 A	0.7 A	0.5 A
	3	—	—	7 A	3 A	1.5 A	1.0 A
	4	—	—	10 A	5 A	2.5 A	1.5 A
Contact Electrical Life—Resistive Loads		1.5 million operations at 10A break at 120V AC 14 million operations at 1A break at 120V AC 6 million operations at 1A break at 24V DC					
Coil Voltage Range★	AC	85…110%					
	DC	80…110%					
	Battery Charging	85…115%					
Coil Consumption		50 Hz			60 Hz		
AC	Inrush	132 VA			138 VA		
	Sealed	19.3 VA			19 VA		
DC	Inrush	12.7 W					
	Sealed	12.7 W					
Mechanical							
Mechanically Linked Contacts		All contacts are mechanically linked per IEC 947-5-1 annex L for 2 to 12 poles					
Operating Time	Pickup	AC – 10…20 ms DC – 30…50 ms					
	Dropout	AC – 10…20 ms DC – 20…33 ms					
Mechanical Life		10 million operations					
Construction							
Contact Arrangement		2 to 12 Poles, Double Break Contacts N.O. or N.C. (8 N.C. Maximum)					
Contact Material/Design		Silver Nickel/Bifurcated					
Mounting		Panel mount or mount on 700-MP Relay or DIN Rail Horizontal Mounting Recommended					
Environmental							
Operating Temperature§		-20…+65 °C (-4…+149 °F)					
Storage Temperature		-40…+65 °C (-40…+149 °F)					
Wire Terminations							
Wire size per UL/CSA		#18 AWG…(2) #12 AWG					
Tightening Torque		8…12 lb•in (0.9…1.4 N•m)					

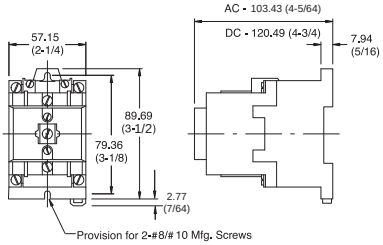
★ Coil voltage required for proper operation (percent of rated coil voltage).
§ Temperature inside the panel.

Type		700S-PK					
Electrical							
Contact Rating Continuous		20 A @ 600V AC 10 A @ 600V DC					
Ratings Make/ Break	AC	NEMA A600					
	DC	NEMA P600					
Additional Contact Ratings for AC Single-Phase Loss		3 Hp @ 240V AC - N.O. 2 Hp @ 240V AC - N.O./N.C. 1 HP @ 120V AC - N.O./N.C. 20 A resistive heating to 600V AC 20 A Tungsten lighting load to 480V AC					
DC Current Ratings Make/Break		Cartridge Cat. No. 700-CMS					
DC Switching	Contacts in Series	Volts DC					
		24V	64V	125V	250V	500V	600V
	1	10 A	5 A	2.2 A	0.55 A	0.24 A	0.2 A
	2	20 A	10 A	5 A	2 A	0.7 A	0.5 A
	3	—	15 A	7 A	3 A	1.5 A	1.0 A
	4	—	20 A	10 A	5 A	2.5 A	1.5 A
Coil Voltage Range★	AC	85…110%					
	DC	80…110%					
	Battery Charging	85…115%					
Coil Consumption		50 Hz			60 Hz		
AC	Inrush	132 VA			138 VA		
	Sealed	19.3 VA			19 VA		
DC	Inrush	12.7 W					
	Sealed	12.7 W					
Mechanical							
Mechanically Linked Contacts		All contacts are mechanically linked per IEC 947-5-1 annex L for 2 to 12 poles					
Operating Time	Pickup	AC – 10…20 ms DC – 30…50 ms					
	Dropout	AC – 10…20 ms DC – 20…33 ms					
Construction							
Contact Arrangement		2 to 12 Poles (8 N.C. Maximum)					
Contact Material/Design		Silver Cadmium Oxide					
Mechanical (Mechanically-Linked Contacts)		All contacts, are mechnically linked per IEC 947-5-1 Annex L for 2 to 12 poles					
Mounting		Panel mount or strip mount recommended					
Environmental							
Operating§ Temperature		-20…+65 °C (-4…+149 °F)					
		-40…+65 °C (-40…+149 °F)					
Wire Terminations							
Wire size per UL/CSA		#18 AWG…(2) #12 AWG					
Tightening Torque		8…12 lb•in (0.9…1.4 N•m)					

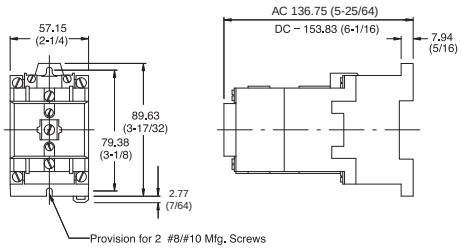
★ Coil voltage required for proper operation (percent of rated coil voltage).
§ Temperature inside the panel.

Approximate Dimensions

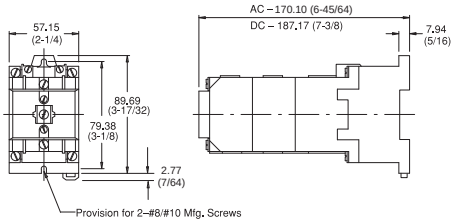
Dimensions are shown in millimeters (inches). Dimensions are not intended for manufacturing purposes.



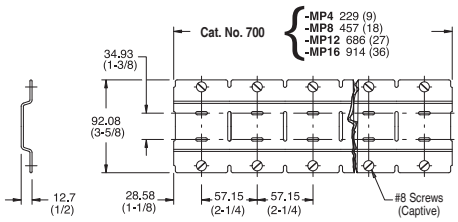
2- and 4-pole Bulletin 700S-P Relay
Approximate Shipping Weight: AC – 0.68 kg (1.5 lb), DC – 1.34 kg (2.95 lb)



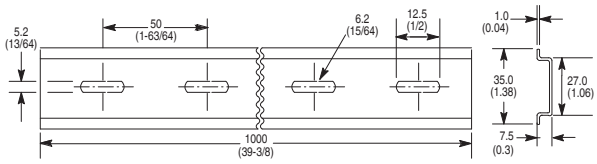
6- and 8-pole Bulletin 700S-P Relay
Approximate Shipping Weight: AC – 0.79 kg (1.75 lb), DC – 1.45 kg (3.20 lb)



10- and 12-pole Bulletin 700S-P
Approximate Shipping Weight: AC – 1.02 kg (2.25 lb), DC – 1.68 kg (3.7 lb)



Relay Rail



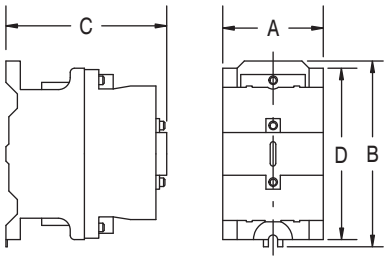
DIN Rail

		Bul. 700-N		Bul. 700-NT
Electrical Ratings				
Rated Thermal Current I_{th}		10 A		
Rated Insulation Voltage		300V		
Contact Rating		10 A @ 300V AC, NEMA A300		
Coil Voltage Range	AC	85…110%		—
	DC	80…110%		—
Coil Consumption				
		50 Hz	**60 Hz**	—
AC	Inrush	120 VA	133 VA	—
	Sealed	24 VA	20 VA	—
Mechanical				
		AC		—
Max. Operating Time	Pickup	14 ms		—
	Drop Out	13 ms		—
Timing Range		—		0.2…60 s
Repeat Accuracy		—		±15% of setting
Reset Time		—		75 ms
Timing Mode		—		On-Delay — convertible to OFF Delay, up to 2 poles convertible to N.O. or N.C.
Construction				
Contact Arrangement		Up to 8 Poles, Convertible to N.O. or N.C.		—
Contact Material		Silver		Silver
Mounting		Panel or strip mount Horizontal mounting recommended		On relay only
Environmental				
Ambient Temperature (Outside Enclosure)	Operating	–20…+40 °C (–4…+104 °F)		
	Storage	–40…+60 °C (–40…+140 °F)		
Operating Temperature Rise (Inside Enclosure)		+25 °C Max		—
Wire Terminations				
Wire size per UL/CSA		#18 AWG…(2) #12 AWG		
Tightening Torque		8…12 lb•in. (0.9…1.4 N•m)		

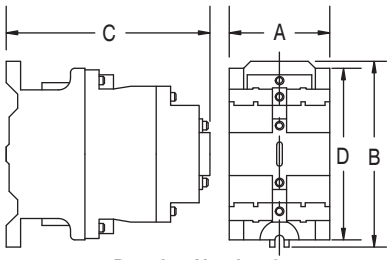
Approximate Dimensions

Dimensions are shown in millimeters (inches). Dimensions are not intended to be used for manufacturing purposes.

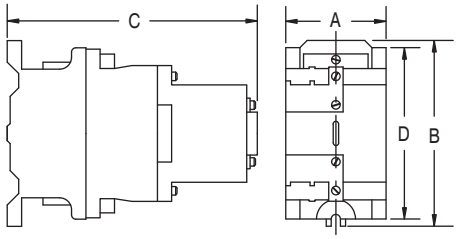
Type of Relay		No. of Poles	Open Type Without Enclosure					Approx. Ship. Wt. kg (lbs.)	Type 1 General Purpose Enclosure					Approx. Ship. Wt. kg (lbs.)
			Drawing Number	A Wide	B High	C Deep	D		A Wide	B High	C Deep	D	E	
N	Bulletin 700	2…4	1	57.15 (2-1/4)	88.90 (3-1/2)	82.55 (3-1/4)	79.38 (3-1/8)	0.68 (1-1/2)	107.95 (4-1/4)	185.74 (7-5/16)	103.19 (4-1/16)	146.05 (5-3/4)	85.73 (3-3/8)	1.59 (3-1/2)
	Bulletin 700	6…8	2	57.15 (2-1/4)	88.90 (3-1/2)	106.36 (4-3/16)	79.38 (3-1/8)	0.79 (1-3/4)	112.71 (4-7/16)	228.60 (9)	120.65 (4-3/4)	206.38 (8-1/8)	92.08 (3-5/8)	2.27 (5)
N with Pneumatic Timer	Bulletin 700	2…4	3	57.15 (2-1/4)	88.90 (3-1/2)	138.11 (5-7/16)	79.38 (3-1/8)	0.91 (2)	—	—	—	—	—	—
N with Solid-State Timer	Bulletin 700	2…4	3	57.15 (2-1/4)	88.90 (3-1/2)	160.34 (6-5/16)	79.38 (3-1/8)	1.02 (2-1/4)	—	—	—	—	—	—



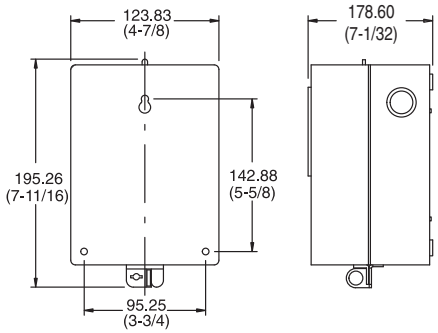
Drawing Number 1

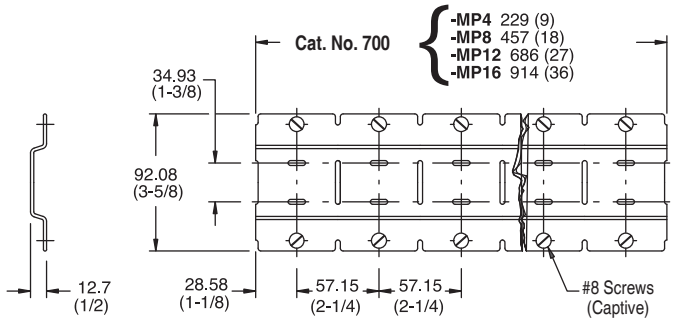


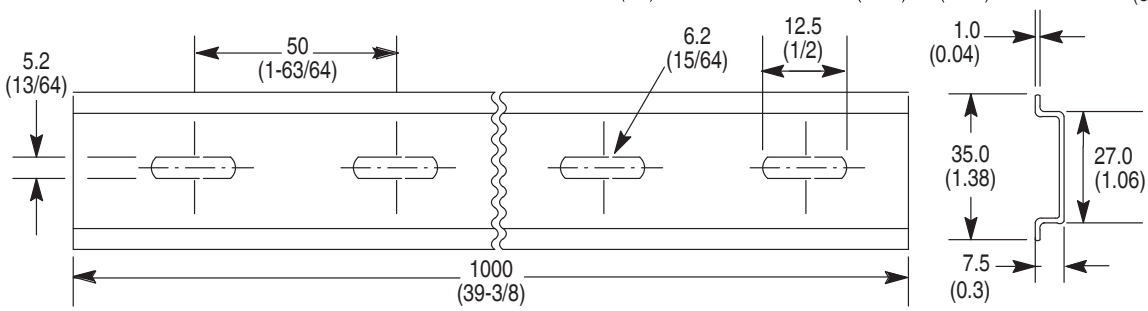
Drawing Number 2

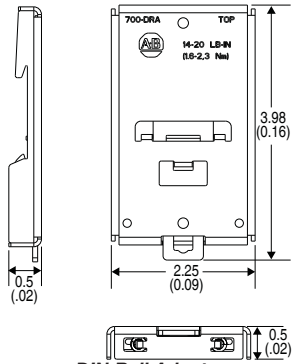


Drawing Number 3









DIN Rail Adapter

Application Data – Because of the inherent characteristics of this device, the normally open contacts may close before the normally closed contacts open on energization and the normally closed contacts may close before the normally open contacts open on de-energization.

Note: For Bul. 700-RM, energizing both the latch and unlatch coil together will cause the relay to be energized and both latch and unlatch coils can be operated together continuously.

Ratings

AC Voltage						DC Voltage			
NEMA Rating Designation	Voltage		Make	Break	Continuous Carrying Current [A]	NEMA Rating Designation	Volts DC	Make/Break	Continuous Carrying Current [A]
B300	Up to 300V AC	120V	30	3	5	NEMA P300	46…300	138 VA	5
		240V	15	1.5					
C600	Above 300V AC	480V	7.5	0.75	2.5		5…46	3 A	5
		600V	6.0	0.60					

Maximum Allowable Off-State Leakage Current

Voltage	Maximum Off-State Leakage Current [mA] Type R	Maximum Off-State Leakage Current [mA] Type RM
24V DC	23	8
24V AC	23	8
120V AC	5	2

Relay Data

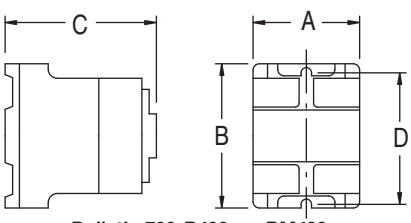
Type		700-R	700-RM
Contact Arrangement		Up to 8 poles, available in any combination of N.O. or N.C. contacts	
Contact Material		W (tungsten in a controlled gas atmosphere)	
Coil Voltage Range		24…250V AC 24…250V DC	
Coil Power	Sealed Voltage Range: –15… +10%	5.5 VA, 50/60 Hz 5.5 W DC	1.7 VA, 50/60 Hz (latch or unlatch) 1.7 W DC
	Inrush	5.5 VA, 50/60 Hz 5.5 W DC	1.7 VA, 50/60 Hz (latch or unlatch) 1.7 W DC
Pickup Time		30 ms	75 ms min. latch pulse
Dropout Time		30 ms	75 ms min. unlatch pulse
Operating Temperature		–40…+60 °C (–40…+140 °F)	–40…+60 °C (–40…+140 °F)
Mounting		Panel mount	
Haz. Loc. Ratings		Class I, Division 2, Groups A, B, C, and D	

Bulletin 700-R Operating Coils

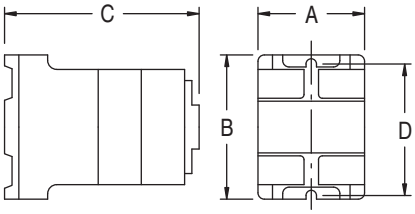
Bulletin 700-R Operating Coil

Coil Volts	Bulletin 700-R 2-…8-Pole AC 60 Hz	Bulletin 700-R 2-…8-Pole AC 50 Hz	Bulletin 700-R 2-…8-Pole DC
24	77AB27	77AB27	77D152
48	77AB134	77AB134	77D166
110	77AB86	77AB86	—
115…125	—	—	77D155
120	77AB86	77AB86	—
208	—	—	—
220	77AB83	77AB83	—
240	77AB83	77AB83	—
230…250	—	—	77D156

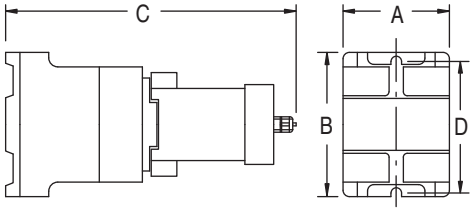
Dimensions are shown in millimeters (inches) shown. Dimensions are not intended to be used for manufacturing purposes.



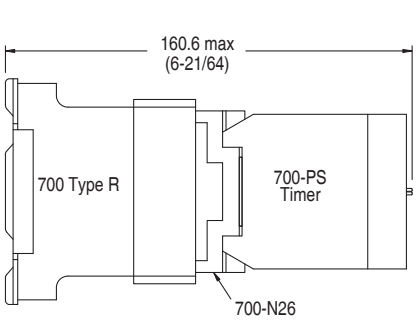
Bulletin 700-R400..., -RM400...

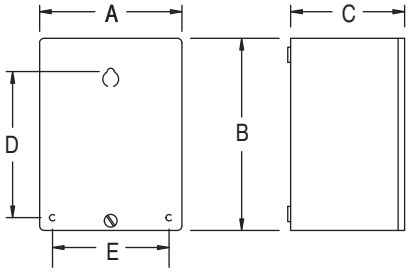


Bulletin 700-R800, -RM800...

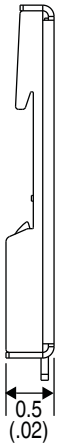


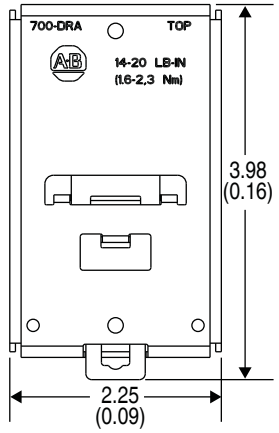
Bulletin 700-R with 852s timer

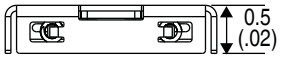


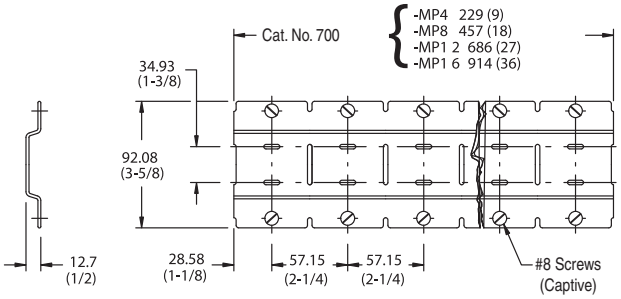


Type 1 Enclosure



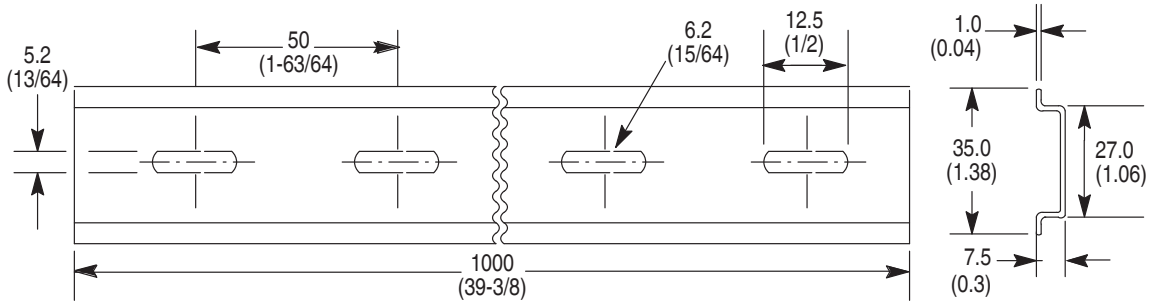






Relay Rail

Secure the mounting strip with 2 screws at each end relay position. Use a minimum of one screw at the 3rd, 5th, 7th, etc., relay positions. Alternate between upper and lower horizontal slots.



Cat. No. 199-DR1 DIN Mounting Rail Series B

Bulletin 700-R, -RM Relays														
Type of Relay		No. of Poles	Open Type Without Enclosures					Approx. Ship Wt. [kg (lb)]	Type 1 General Purpose Enclosure					Approx. Ship Wt. [kg (lb)]
			Drawing Number	A Wide	B High	C Deep	D		A Wide	B High	C Deep	D	E	
R	Bulletin 700 and Bulletin 700DC	2...4	1	55.56 (2-3/16)	88.90 (3-1/2)	92.25 (3-3/8)	79.38 (3-1/8)	0.91 (2)	104.78 (4-1/8)	185.74 (7-5/16)	103.19 (4-1/16)	146.05 (5-3/4)	85.73 (3-3/8)	1.81 (4)
		5...8	2	55.56 (2-3/16)	88.90 (3-1/2)	111.13 (4-3/8)	79.38 (3-1/8)	1.02 (2-1/4)	112.71 (4-7/16)	228.60 (9)	120.65 (4-3/4)	206.38 (8-1/8)	92.08 (3-5/8)	2.49 (5)
R with Bulletin 852S Timer	Bulletin 700 and Bulletin 700DC	2...4	3	55.56 (2-3/16)	88.90 (3-1/2)	165.1 (6-1/2)	79.38 (3-1/8)	1.25 (2-3/4)	—	—	—	—	—	—
RM	Bulletin 700 and Bulletin 700DC	2...4	1	55.56 (2-3/16)	88.90 (3-1/2)	95.25 (3-3/8)	79.38 (3-1/8)	0.91 (2)	104.78 (4-1/8)	185.74 (7-5/16)	103.19 (4-1/16)	146.05 (5-3/4)	85.73 (3-3/8)	1.81 (4)
		5...8	2	55.56 (2-3/16)	89.90 (3-1/2)	111.13 (4-3/8)	79.38 (3-1/8)	1.02 (2-1/4)	112.71 (4-7/16)	228.60 (9)	120.65 (4-3/4)	206.38 (8-1/8)	92.08 (3-5/8)	2.49 (5)
RM with Bulletin 852S Timer	Bulletin 700 and Bulletin 700DC	2...4	3	55.56 (2-3/16)	88.90 (3-1/2)	165.1 (6-1/2)	79.38 (3-1/8)	1.25 (2-3/4)	—	—	—	—	—	—

Voltage and Power Requirements

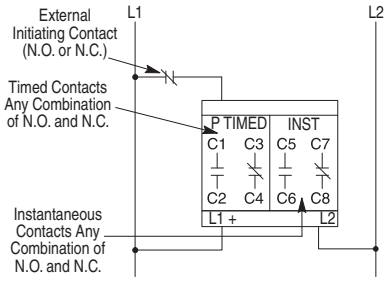
AC Voltage +10% –15% 50/60 Hz	Total Power Required	Initiate Terminal Power	Maximum Allowable Leakage Current	Coil Code
24V AC	8 VA	4 VA	10 mA	U24
110/120V AC	9 VA	4 VA	2.4 mA	U1

DC Voltage +10% –20%	Total Power Required	Initiate Terminal Power	Maximum Allowable Leakage Current	Coil Code
24V DC	10 W	5 W	10 mA	U24
120V DC	11 W	5 W	2.4 mA	U1

Type	700-RTC	
Contact Rating (See pub. 700-SG003*)	NEMA B600 600V AC, 5 A NEMA P300 300V DC, 5 A	
Contact Arrangement	1…4 poles. Max. of 2 timed and 2 instantaneous. Available in any combination of N.O. and N.C. contacts	
Contact Material	W (tungsten in a controlled gas atmosphere)	
Operating Mode	Convertible to ON-Delay or OFF-Delay	
Timing Range	0.015…64 minutes; 0.05...120 seconds	
Reset Time	25 ms	
Repeat Accuracy	±1% (or ±50 ms) at constant voltage and temperature	
Mounting	Panel or strip mount	
Surge Suppression	Not required. Timers have internal suppression	
Haz. Loc. Ratings	Class I, Division 2, Groups A, B, C, and D	
Maximum Allowable Leakage Current	24V AC/DC	10 mA
	110/120V AC, 120V DC	2.4 mA
Ambient Temperature★		
Operating:	–20…+60 °C (–4…+140 °F)	
Storage:	–20…+60 °C (–4…+140 °F)	

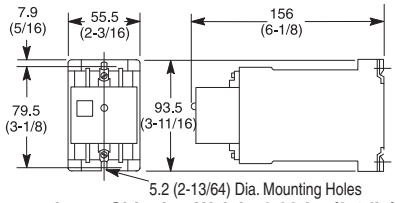
★ Continuous duty units placed close to each other (3 in a row) have a temperature range of –20…+45 °C (–4…+113 °F) or should have air circulated around the units. Approximate space of 3/4 in (mm) on all sides is needed.

Typical Wiring Diagram

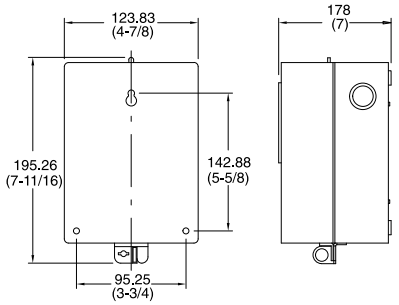


Approximate Dimensions

Approximate Dimensions are shown in millimeters (inches). Approximate Dimensions are not intended to be used for manufacturing purposes.



Approximate Shipping Weight 0.92 kg (2.1 lb.)



NEMA Type 1 Enclosure for RTC Relays
Approximate Shipping Weight 1.26 kg (2.8 lb.)

Specifications

Bulletin 700-PS

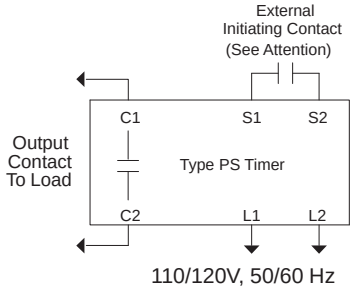
Operation

The timer must be energized continuously (L1-L2). ON-Delay: When the initiating contact closes, timing begins. At time-out, the output contact closes. OFF-Delay: When the initiating contact closes, the output contact closes instantly. When the initiating contact re-opens, timing begins. At time-out, the output contact re-opens.

Typical Wiring Diagram§

Attention — To avoid damage to timer, do not switch any load in addition to timing relay at terminals S1–S2. Do not apply an external voltage to terminals S1–S2.

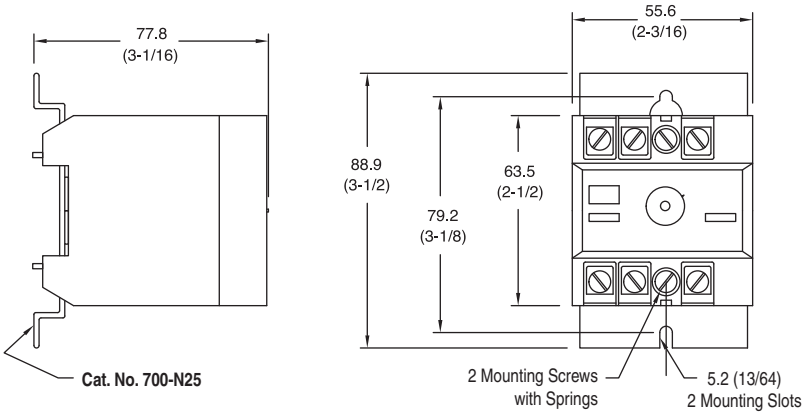
§ External Potentiometer units have R1, R2 terminals for connecting the potentiometer.



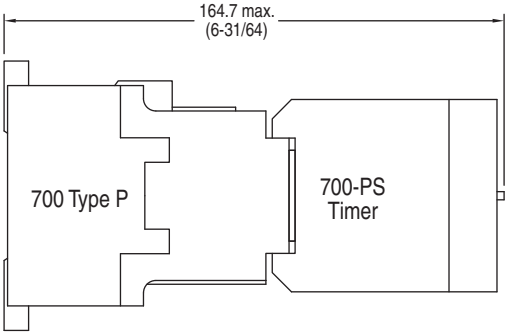
Approximate Dimensions

Dimensions are shown in millimeters (inches). Dimensions are not intended to be used for manufacturing purposes.

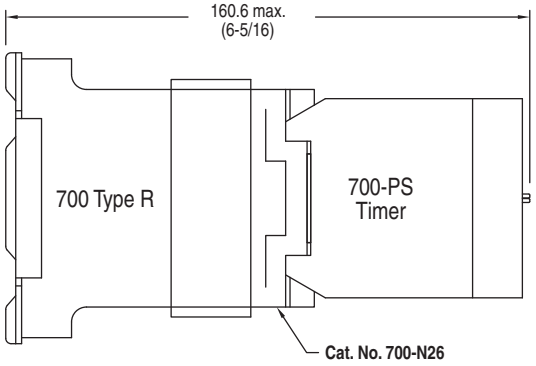
Bulletin 700-PS



Bulletin 700-PS Timer Mounted on the Adapter Plate
Cat. No. 700-N25
Approximate Shipping Wt. 0.45 kg (1 lb)

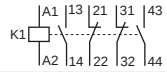
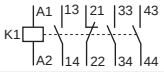
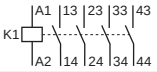
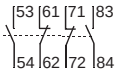
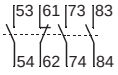
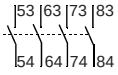
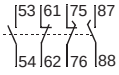


Bulletin 700-PS Timer Mounted on a 4-Pole Bulletin 700-P or -PK, or 2-Pole Bulletin 700-PH Relay Approximate Shipping Wt. 1.02 kg (2.3 lb)



Bulletin 700-PS Timer Mounted on a 4-Pole Bulletin 700-R or -RM Relay Approximate Shipping Wt. 1.25 kg (2.8 lb)

Assignment of Contacts
Device Combinations in Accordance with IEC 60947-1 / -4-1

Auxiliary Contact Blocks		Control Relays 700-CF (AC and DC Control)			
			700-CF⊗220	700-CF⊗310	700-CF⊗400
	Circuit Diagram	Control			
Front Mounting ★					
100-FA02		AC/DC	22E + 02E = 24Y	31E + 02E = 33Y	40E + 02E = 42Y
100-FA11		AC/DC	22E + 11E = 33Y	31E + 11E = 42Y	40E + 11E = 51Y
100-FA20		AC/DC	22E + 20E = 42Y	31E + 20E = 51Y	40E + 20E = 60Y
100-FA22		AC/DC	22E + 22E = 44Y	31E + 22E = 53Y	40E + 22E = 62Y
100-FA31		AC/DC	22E + 31E = 53Y	31E + 31E = 62Y	40E + 31E = 71Y
100-FA40		AC/DC	22E + 40E = 62Y	31E + 40E = 71Y	40E + 40E = 80Y
100-FAL22		AC/DC	22E + L22E = L44Y	31E + L22E = L53Y	40E + L22E = L62Y

★ Control relay and auxiliary contact block AC/DC max. 4 N. C.

700-CF (AC and DC electronic coils), vertical mounting, 60 °C♦

Cat. No. 700…	Max. N.O. Side Aux.	Max. N.C. Side Aux.	Max. N.O. Front Aux.	Max. N.C. Front Aux.	Max. N.O. Front + Side Aux.	Max. N.C. Front + Side Aux.	Max. N.O. + N.C. Front + Side Aux.
CF400	2	4	4	4	6	7	8
CF310	2	4♣	4	4Δ	6	5	8
CF220	4	4♣	4	2	8	5	8
CF040	2	2	4	0	6	2	6

♣ With no front auxiliary contacts installed. Otherwise 3 N.C. Maximum
Δ With no side auxiliary contacts installed. Otherwise 3 N.C. Maximum
♦ For other operating conditions, please contact your local Rockwell Automation sales office or Allen-Bradley distributor.

700-CF (DC conventional coils), vertical mounting, 60 °C ♦

Cat. No. 700…	Max. N.O. Side Aux.	Max. N.C. Side Aux.	Max. N.O. Front Aux.	Max. N.C. Front Aux.	Max. N.O. Front + Side Aux.	Max. N.C. Front + Side Aux.	Max. N.O. + N.C. Front + Side Aux.
CF400	2	2	4	4Δ	6	5	8
CF310	2	2	4	4Δ	6	5	8
CF220	2	2	4	2	6	4	8

Δ With no side auxiliary contacts installed. Otherwise 3 N.C. Maximum
♦ For other operating conditions, please contact your local Rockwell Automation sales office or Allen-Bradley distributor.

			Cat. No. 100-JE	Cat. No. 100-JE12	Cat. No. 100-JE48
Electrical					
Input Voltage			24V DC	12V DC	48V DC
Input Voltage Range			18…30V DC	6…12V DC	35…48V DC
Output Voltage			110…240V AC	110…240V AC	110…240V AC
Power Consumption			0.1…0.4 W	0.02…0.12 W	0.2…0.5 W
Minimum Actuation			5V DC, 2 mA DC	5V DC, 2 mA DC	5V DC, 2 mA DC
Mechanical					
Finger Protection			IP20	IP20	IP20
Pickup Time			0…10 ms + pickup time of the contactor	0…10 ms + pickup time of the contactor	0…10 ms + pickup time of the contactor
Dropout Time			0…10 ms + dropout time of the contactor	0…10 ms + dropout time of the contactor	0…10 ms + dropout time of the contactor
Max. Cycles Per Second			2★	2★	2★
Isolation/Breakdown Voltage			In: 50V, Out: 250V	In: 50V, Out: 250V	In: 50V, Out: 250V
Rated Impulse Withstand Voltage			4 kV	4 kV	4 kV
Environmental					
Ambient Temperature Range			-25…60 °C	-25…60 °C	-25…60 °C
Storage Temperature Range			-50…+80 °C	-50…80 °C	-50…80 °C
Operating Life			100+ million ops	100+ million ops	100+ million ops
Construction					
Wire Size Range	Flexible wire	1 Wire	0.5…2.5 mm^2	0.5…2.5 mm^2	0.5…2.5 mm^2
		2 Wire	0.75…2.5 mm^2	0.75…2.5 mm^2	0.75…2.5 mm^2
	Solid wire	1 Wire	1.0…2.5 mm^2	1.0…2.5 mm^2	1.0…2.5 mm^2
		2 Wire	1.0…2.5 mm^2	1.0…2.5 mm^2	1.0…2.5 mm^2
	Solid and Stranded		18…14 AWG	18…14 AWG	18…14 AWG
Tightening Torque			1…1.5 N•m/7…15 lb•in	1…1.5 N•m/7…15 lb•in	1…1.5 N•m/7…15 lb•in
Type of Light			LED	LED	LED

★ To consider the maximum operations/hour of the relays.

Coils

AC Coil Code	AC Voltages 50Hz	60Hz	50/60Hz	Cat. No. 700-CF	DC Coil Code	DC Voltages	Cat. No. 700-CF
Q	—	12V	—	TA006	ZR	9V	TA766
R	12V	—	—	TA404	ZQ	12V	TA708
J	—	24V	—	TA013	DJ	24V Diode	TA714M
K	24V	—	—	TA407	ZJ	24V	TA714
KJ	—	—	24V	TA855	ZW	36V	TA719
V	32V	36V	—	TA481	ZY	48V	TA724
W	36V	—	—	TA410	ZZ	60V	TA774
X	42V	48V	—	TA482	ZB	64V	TA727
Y	48V	—	—	TA414	ZG	72V	TA728
KY	—	—	48V	TA860	ZE	80V	TA729
KP	100V	100 - 110V	100V	TA861	ZD	110V	TA733
D	110V	120V	—	TA473	ZP	115V	TA734
KD	—	—	110V	TA856	ZS	125V	TA737
P	120V	—	—	TA425	ZA	220V	TA747
S	127V	—	—	TA428	ZF	230V	TA749
KG	200V	200 - 220V	200V	TA862	ZT	250V	TA751
H	—	208V	—	TA049	—	—	—
L	200 - 220V	208 - 240V	—	TA296	—	—	—
KL	—	—	200 - 230V	TA864	—	—	—
A	220V	240V	—	TA474	—	—	—
F	220 - 230V	260V	—	TA441	—	—	—
KF	—	—	230V	TA851	—	—	—
VA	230 - 240V	—	—	TA440	—	—	—
T	240V	277V	—	TA480	—	—	—
KA	—	—	240V	TA858	—	—	—
I	—	347V	—	TA065	—	—	—
E	—	380V	—	TA067	—	—	—
N	380 - 400V	440V	—	TA071	—	—	—
KN	—	—	400V	TA863	—	—	—
G	400-415V	—	—	TA457	—	—	—
B	440V	480V	—	TA475	—	—	—
KB	—	—	440V	TA859	—	—	—
M	500V	—	—	TA479	—	—	—
C	550V	600V	—	TA476	—	—	—

Utilization Category Table from EN 60947-5-1

Verification of Making and Breaking Capacities of Switching Elements Under Normal Conditions Corresponding to the Utilization Categories‡

Utilization Category	Normal Condition of Use								
	Make§			Break§			Number and Rate of Making and Breaking operations		
	I/I_e	U/U_e	cos ψ	I/I_e	U/U_e	cos ψ	No. operating cycles♣	Operating cycles per minute	ON time [s]♦
AC-12♠	1	1	0.9	1	1	0.9	6050	6	0.05
AC-13♠	2	1	0.65	1	1	0.65	6050	6	0.05
AC-14♠	6	1	0.3	1	1	0.3	6050	6	0.05
AC-15♠	10	1	0.3	1	1	0.3	6050	6	0.05
DC	—	—	$T_{0.95}$	—	—	$T_{0.95}$	—	—	—
DC-12	1	1	1 ms	1	1	1 ms	6050	6	0.05♦
DC-13	1	1	6 x PΔ	1	1	6 x PΔ	6050	6	0.05♦
DC-14♠	10	1	15 ms	1	1	15 ms	6050	—	0.05♦

I_e Rated operational current, I Current to be made or broken

U_e Rated operational voltage, U Voltage before make

PU_eI_e Steady-state power consumption (W)

$T_{0.95}$ Time to reach 95% of the steady-state current (ms)

‡ See sub-clause 8.3.3.5.2.

§ For tolerances on test quantities, see sub-clause 8.3.2.2.

♣ The first 50 operating cycles shall be run at U/U_e=1.1 with the loads set at U_e.

Δ The value "6 x P" results from an empirical relationship which is found to represent most DC magnetic loads to an upper limit of P = 50 W, e.g., 6 x P= 300 W.

♦ The ON time shall be at least equal to $T_{0.95}$.

♠ Where the break current differs from the make current value, the ON time refers to the make current value after which the current is reduced to the break current value for a suitable period e.g., 0.05 s.

General

			Main Relay Cat. Nos. 700-CF, 700S-CF	Front Mounted Standard Auxiliary Contacts	Main Relay Cat. No. 700-CFB, 700S-CFB	Master Relay Cat. No. 700-CFM	Front Mounted Bifurcated Auxiliary Contacts	Side-mounted Auxiliary Contacts
Contact Ratings — NEMA			A600, P600	A600, Q600	A600, Q600	2 x A600, P600	A600, Q600	A600, Q600
Min. Contact Rating			17V, 10 mA	17V, 5 mA	8V, 5 mA	—	5V, 3 mA	17V, 10 mA
Contact Ratings — IEC AC-15 (solenoids, contactors) at rated voltage IEC 60947-5-1		24V	10 A	6 A	3 A	15 A	3 A	6 A
		48V	10 A	6 A	3 A	15 A	3 A	6 A
		120V	10 A	6 A	3 A	15 A	3 A	6 A
		240V	10 A	5 A	3 A	15 A	3 A	5 A
		400V	6 A	3 A	2 A	7.5 A	2 A	3 A
		480V/500V	2.5 A	1.6 A	1.2 A	5 A	1.2 A	1.6 A
		600V	1 A	1 A	0.7 A	2 A	0.7 A	1 A
		690V	1 A	1 A	0.7 A	2 A	0.7 A	1 A
AC-12 (Control of resistive loads) IEC 60947-5-1	**40 °C**	***I*th**	20 A	10 A	10 A	20 A	10 A	10 A
		230V	8 kW					
		400V	14 kW					
		690V	24 kW					
	60 °C	***I*th**	20 A	6 A	6 A	20 A	6 A	6 A
		230V	8 kW					
		400V	14 kW					
		690V	24 kW					
DC-12 Switching DC Loads L/R < 1ms, Resistive Loads IEC 60947-5-1		24V	15 A	10 A	6 A	20 A	6 A	6 A
		48V	10 A	9 A	3.2 A	20 A	3.2 A	3.2 A
		110V	6 A	3.5 A	1 A	8 A	1 A	1 A
		220V	1 A	0.7 A	0.5 A	1.5 A	0.5 A	0.5 A
		440V	0.4 A	0.2 A	0.2 A	0.4 A	0.2 A	0.2 A
DC-13 IEC 60947-5-1, Solenoids and contactors		24V	5 A	5 A	2.5 A	5 A	2.5 A	5 A
		48V	3 A	3 A	1.5 A	3 A	1.5 A	2.5 A
		110V	1.2 A	1.2 A	0.6 A	1.2 A	0.6 A	0.68 A
		220V	0.6 A	0.6 A	0.3 A	0.6 A	0.3 A	0.32 A
		440V	0.3 A	0.15 A	0.15 A	0.3 A	0.15 A	0.15 A

	Location of welded N.O. contacts	State of N.C. Contacts if N.O. contact welds		
		Main	Front aux.	Side aux.
Mechanically Linked Contacts‡	Main	Open	Open	Open★
	Front aux.	Open	Open	—

★ Side mounted auxiliary contacts provide “mirror contact” performance with main poles only.

‡ Defined in IEC 60947-5-1 annex L. Mechanically linked is a relationship between contacts of opposite types (i.e., N.O. and N.C.).

				Cat. No. 700-CF	Aux./Pneumatic Timer Contact (Front-mounted)
Mechanical Life			[Mil]	15	5
Electrical Life	AC-15 (240V, 3 A)		[Mil]	1.5	1.5
Weight	AC Coil		[g]	390	—
Terminal Cross-Sections					
Terminal Type					
Terminal Size per IEC60 947-1				2 x A4	2 x A4
	Solid/ Stranded	1 Conductor	[mm^2]	1.5…6	0.5…2.5
	♣	2 Conductor	[mm^2]	1.5…6	0.75…2.5
Max. Wire Size per UL/CSA			[AWG]	16…10	18…14
Tightening Torque			[lb·in]	13.3…17.7	8.9…13.3
Tightening Torque			[N·m]	1.5…2.0	1…1.5

♣ For 16 or more strands, end ferrule is required.

DC Switching Ratings for 700-CF Main Poles in Series (Resistive Load at 60 °C)			
	1 pole	2 poles	3 poles
24/48V	15/10 A	25 A	25 A
125V	6 A	25 A	25 A
220V	1.5 A	8 A	25 A
440V	0.4 A	1 A	3 A

Control Circuit

			Cat. No. 700-CF
Operating Voltage			
AC 50/60 Hz	Pickup	[x U_s]	0.85…1.1
	Dropout	[x U_s]	0.3…0.6
DC (conventional)★	Pickup	[x U_s]	0.8…1.1
	Dropout	[x U_s]	0.1…0.6
DC (electronic - EQ, EW)	Pickup	[x U_s]	0.7...1.25
	Dropout	[x U_s]	0.3...0.4
DC (electronic - EY)	Pickup	[x U_s]	0.8...1.25
	Dropout	[x U_s]	0.3...0.4
DC (electronic - ED)	Pickup	[x U_s]	0.7...1.12 ‡
	Dropout	[x U_s]	0.3...0.4
DC (electronic - EA)	Pickup	[x U_s]	0.8...1.1
	Dropout	[x U_s]	0.3...0.4
Coil Consumption			
AC 50/60 Hz	Inrush	[VA]	75
	Sealed	[VA/W]	9.5/2.7
DC (conventional)	Inrush	[W]	7.7
	Sealed	[W]	6.3
DC (electronic - EQ, EJ)	Inrush (avg./ peak)	[W]	10/17
	Sealed	[W]	1.7
DC (electronic - EY)	Inrush (avg./ peak)	[W]	10/17
	Sealed	[W]	1.9
DC (electronic - ED)	Inrush (avg./ peak)	[W]	12/19
	Sealed	[W]	2.1
DC (electronic - EA)	Inrush (avg./ peak)	[W]	14/22
	Sealed	[W]	3.0
Operating Times			
AC 50/60 Hz	Pickup Time	[ms]	15…30
	Dropout Time	[ms]	10…60
DC (conventional)	Pickup Time	[ms]	40…70
	Dropout Time	[ms]	7…15
With integrated diode	Opening Delay	[ms]	14...20
With external diode	Opening Delay	[ms]	70...125
DC (electronic- EQ, EJ)	Closing Delay	[ms]	25…50
	Opening Delay	[ms]	27...45
Min OFF time		[ms]	50
Max. ripple			± 15%
DC (electronic- EY, ED, EA)	Closing Delay	[ms]	25...50
	Opening Delay	[ms]	23...33
Min OFF time		[ms]	50
Max. ripple			± 15%
Latch Attachment Release, 100-FL			
Coil Consumption	AC	[VA/W]	45/40
	DC	[W]	25
Contact Signal Duration		[min./max]	0.03…15 s
Timing Attachment			
Reset Time, 100-ETA, 100-ETB	at min. time setting	[ms]	10
	at max. time setting	[ms]	70
Repeat Accuracy			± 10%

★ For 9V DC, code ZR, use operating voltage 0.65…1.3 x U_s.
For 24V DC, code ZJ, DJ, or EJ use operating voltage 0.7…1.25 x U_s.

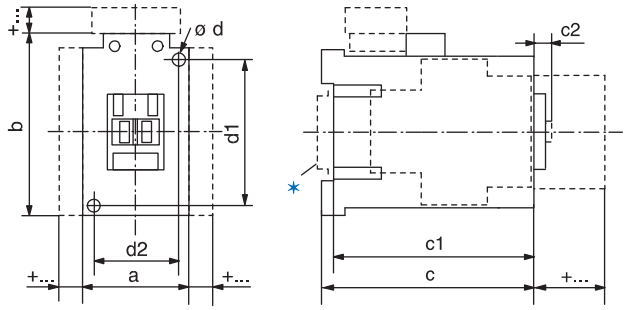
‡ At 110V DC, coil code ED has an operating voltage range of 0.7...1.25 x U_s.

General

	Cat. No. 700-CF
Rated Insulation Voltage U_i	
IEC	690V
UL; CSA	600V
Rated Impulse Strength U_{imp}	6 kV
High Test Voltage 1 minute (per IEC 60947-4)	2500V
Rated Voltage U_e	
AC	115, 230, 400, 500, 690V
DC	24, 48, 110, 220, 440V
Short-Circuit Protection gG Fuse 20 A	
Rated Frequency	50/60 Hz, DC
Ambient Temperature	
Storage	–55…+80 °C (–67…176 °F)
Operation at nominal current	–25…+60 °C (–13…140 °F)
15% current reduction for AC-12 at > 60 °C	–25…+70 °C (–13…158 °F)
Corrosion Resistance	humid-alternating climate, cyclic, per IEC 60068-2-30 and DIN 50 016, 56 cycles
Altitude	2000 m above mean sea level, per IEC60 947-4
Type of Protection	
IP2X (IEC 60529 and DIN 40050)	in connected state
Shock Resistance	IEC 60068-2: Half sinusoidal shock 11 ms, 30 G (in 3 directions)
Vibration Resistance	IEC 60068-2: Static >2 G, in normal position no malfunction <5 G

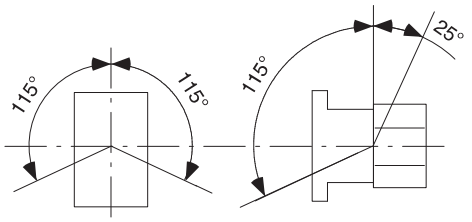
Approximate Dimensions are shown in millimeters (inches). Approximate Dimensions are not intended for manufacturing purposes.

Mounting Position



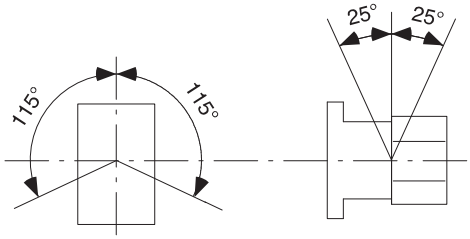
★*May be mounted to 35 mm EN 50 022 DIN Rail.*

AC and DC Control Relay with DC Electronic Coil



Front View Side View

DC Control Relay



Front View Side View

AC and DC Control Relays with 12V or 24V DC Electronic Coil

Type	a	b	c	c1	c2	Ød	d1	d2
700-CF, -CFB, -CFM	45 (1-25/32)	81 (3-3/16)	80.5 (3-11/64)	75.5 (3-3/32)	6 (1/4)	2 screws 4.5 (3/16)	60 (2-23/64)	35 (1-25/64)

DC Control Relays with 48...72V, 110...125V or 220...250V DC Electronic Coil

Type	a	b	c	c1	c2	Ød	d1	d2
700-CF, -CFB, -CFM	45 (1-25/32)	105 (4-1/8)	80.5 (3-11/64)	75.5 (3-3/32)	6 (1/4)	2 screws 4.5 (3/16)	60 (2-23/64)	35 (1-25/64)

DC Control Relays with Conventional Coil

Type	a	b	c	c1	c2	Ød	d1	d2
700-CF, -CFB, -CFM	45 (1-25/32)	81 (3-3/16)	106.5 (4-3/16)	101.5 (4)	6 (1/4)	2 screws 4.5 (3/16)	60 (2-23/64)	35 (1-25/64)

Accessories

Relay with		AC Control Relay		DC Control Relay	
		mm	(inches)	mm	(inches)
Auxiliary Contact for Front Mounting	2- or 4-pole	c/c1 + 39	(c/c1 + 1 – 37/64)	c/c1 + 39	c/c1 + 1 – 37/64)
Auxiliary Contact for Side Mounting	1- or 2-pole	a + 9	(a + 23/64)	a + 9	(a + 23/64)
Pneumatic Timing Module	—	c/c1 + 58	(c/c1 + 2 – 23/64)	—	—
Solid-state Timing Module	on coil terminal side	b + 24	(b + 15/16)	b + 24	(b + 15/16)
Mechanical Latching	—	c/c1 + 61	(c/c1 + 2 – 31/64)	—	—
DC Interface	on coil terminal side	b + 9	(b + 23/64)	—	—
Surge Suppressor	on coil terminal side	b + 3	(b + 1/8)	b + 3	(b + 1/8)
Labelling with:	label sheet	+0	(+0)	+0	(+0)
—	marking tag with cover	+0	(+0)	+0	(+0)
—	marking tag carrier for System V4/V5	+5.5	(+7/32)	+5.5	(+7/32)
—	marking tag carrier for System Bull. 1492W	+5.5	(+7/32)	+5.5	(+7/32)

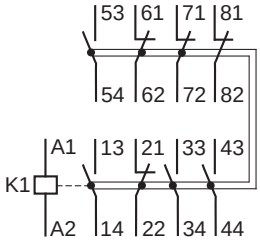
				Cat. No. 700S-CF	Aux. Contact (Front-mounted)
Mechanical Life			[Mil]	15	15
Electrical Life	AC-15 (240V, 3 A)		[Mil]	1.5	1.5
Weight	AC Coil		[g]	390	—
Terminal Cross-Sections					
Terminal Type					
Terminal Size per IEC 947-1				2 x A4	2 x A4
	Solid/ Stranded§	1 Conductor	[mm^2]	1.5…6	0.5…2.5
		2 Conductor	[mm^2]	1.5…6	0.75…2.5
Max. Wire Size per UL/CSA			**[AWG]**	16…10	18…14
Tightening Torque			[lb•in]	13.3…22	8.9…13.3
Tightening Torque			[N•m]	1.5…2.5	1…1.5

§ For 16 or more strands, end ferrule is required

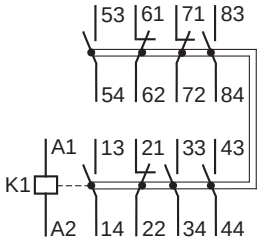
DC Switching Ratings for 700S-CF Main Poles in Series (Resistive Load at 60 °C)			
	1 pole	2 poles	3 poles
24/48V	15/10 A	25 A	25 A
125V	6 A	25 A	25 A
220V	1.5 A	8 A	25 A
440V	0.4 A	1 A	3 A

Assignment of Contacts

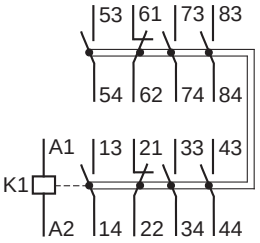
Safety Control Relays with Front-mount Auxiliary Contacts, 8-Pole AC or DC Coil Voltage



700S-CF440⊗…
700S-CFB440⊗…



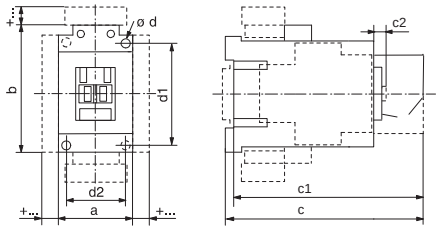
700S-CF530⊗…
700S-CFB530⊗…



700S-CF620⊗…
700S-CFB620⊗…

Approximate Dimensions

Approximate Dimensions are shown in millimeters (inches). Approximate Dimensions are not intended for manufacturing purposes.



AC and DC Safety Control Relays with 12V or 24V DC Electronic Coil

Cat. No.	a	b	c	c1	c2	Ød	d1	d2
700S-CF	45	81	119.5	114.5	6	2 - 4.5	60	35
	(1-25/32)	(3-3/16)	(4-3/4)	(4-43/64)	(1/4)	(2 - 3/16)	(2-23/64)	(1-25/64)

DC Safety Control Relays with 48...72V, 110...125V or 220...250V DC Electronic Coil

Cat. No.	a	b	c	c1	c2	Ød	d1	d2
700S-CF	45	105	119.5	114.5	6	2 - 4.5	60	35
	(1-25/32)	(4-1/8)	(4-3/4)	(4-43/64)	(1/4)	(2 - 3/16)	(2-23/64)	(1-25/64)

DC Safety Control Relays with Conventional Coil

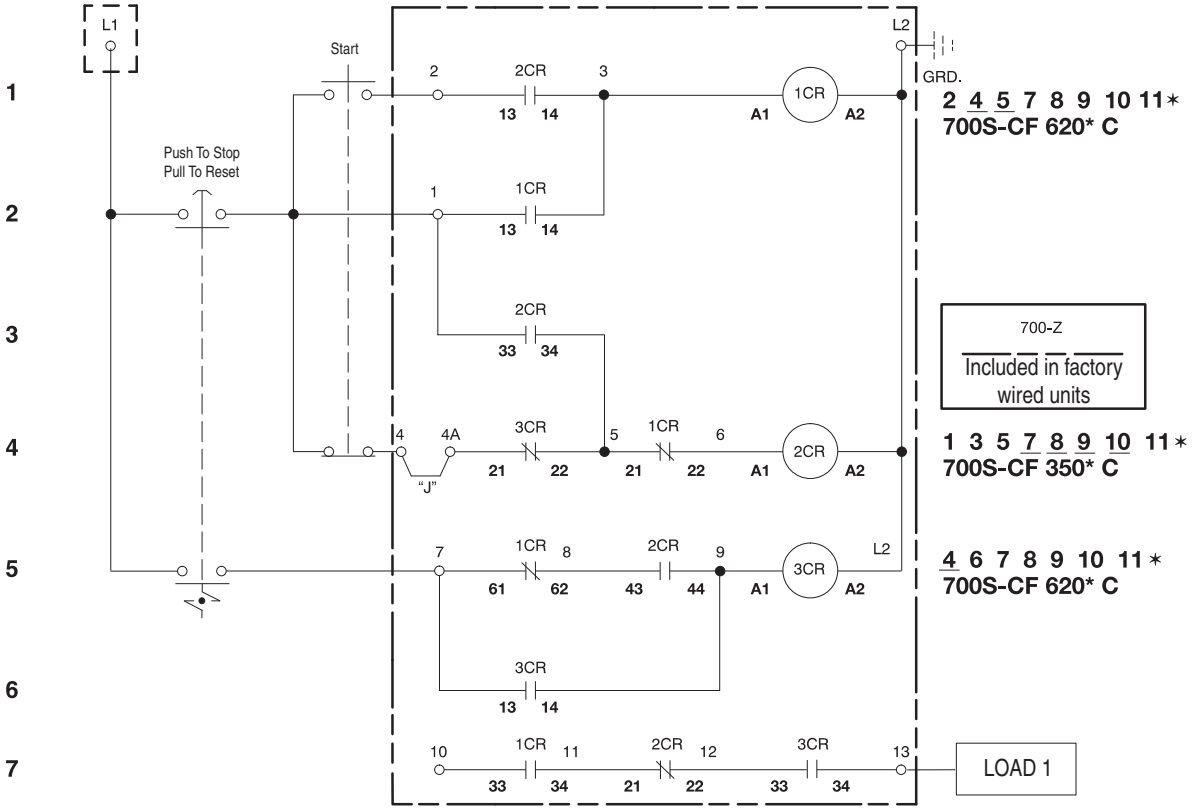
Cat. No.	a	b	c	c1	c2	Ød	d1	d2
700S-CF	45	81	145.5	140.5	6	2 - 4.5	60	35
	(1-25/32)	(3-3/16)	(5-49/64)	(5-37/64)	(1/4)	(2 - 3/16)	(2-23/64)	(1-25/64)

Safety Relay Circuit With 5 Safety Outputs

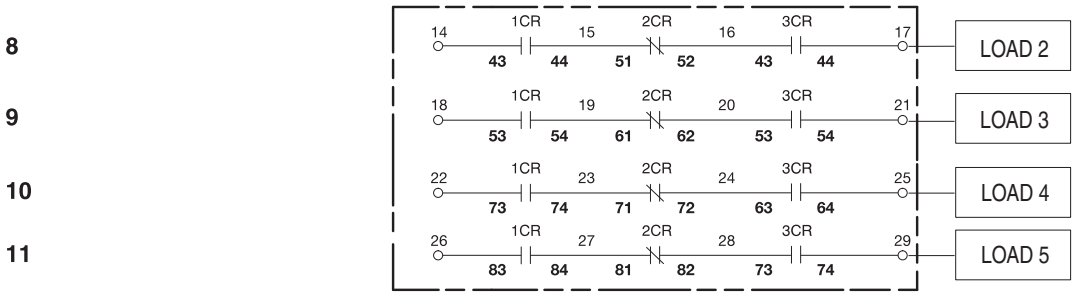
- Use for E-stop control. E-stop will work properly if any one fault occurs (a fault could be one welded contact or one undesired open connection such as a loose wire).
- High output switching capability and long contact life.
- Circuit complies with EN 954 categories 1, 2, 3, 4.
- Helps prevent restart of the 5 safety outputs if there is a single fault anywhere in the system.
- Use (3) 700S-CF relays and this diagram to construct the circuit

Basic Circuit
(1) Output Circuit (3 Relays, 9 Terminal Blocks)

Basic Circuit
(1) Output Circuit (3 Relays, 9 Terminal Blocks)



(5) Output Circuit (3 Relays, 17 Terminal Blocks)

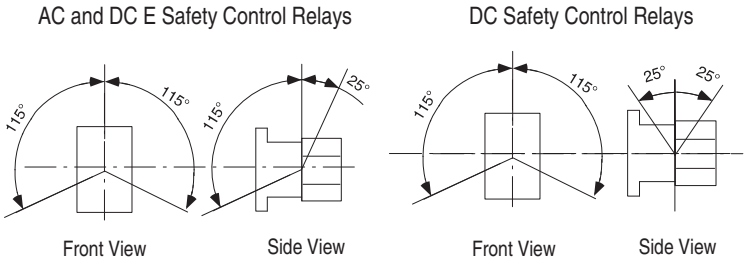


★ Numbers shown are the line numbers where the contacts for this relay appear.
Contact your local Rockwell Automation sales office or Allen-Bradley distributor for availability.

Accessories

Safety Control Relays with	mm	[in.]
Auxiliary contact block for side mounting 1- or 2-pole	a + 9	(a + 23/64)
Electronic Timing Module on coil terminal side	b + 24	(b + 15/16)
Interface Module on coil terminal side	b + 9	(b + 23/64)
Surge Suppressor on coil terminal side	b + 3	(b + 1/8)
Labeling with label sheet	+ 0	(+ 0)
Marking tag sheet with clear cover	+ 0	(+ 0)
Marking tag adapter for System Bul. 1492W	+ 5.5	(+ 7/32)

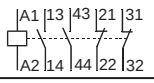
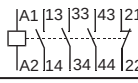
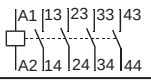
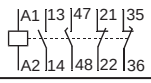
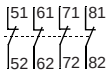
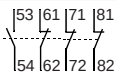
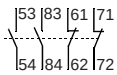
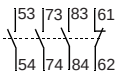
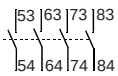
Mounting Position



Assignment of Contacts

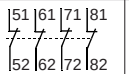
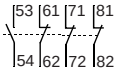
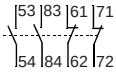
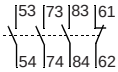
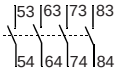
Device Combinations in Accordance with IEC 60947-1 / -4-1

Table valid for : AC / DC = 0.85…1.1 x U_s, $T_{amb.}$ = -25 °C…+60 °C, normal position (horizontal rail mounting). Also valid for Bulletin 700-KR relays and Bulletin 100-KR auxiliary contacts. ★

Auxiliary Contact Blocks		Control Relays 700-K (AC and DC Control)				
			700-K22Z-⊗	700-K31Z-⊗	700-K40E-⊗	700-KL22Z-⊗
	Circuit Diagram	Control				
Front Mounting						
100-KFA02E		AC/DC	—	31Z + 02E = 33Y ‡	40E + 02E = 42Y	—
100-KFA11E		AC/DC	22Z + 11E = 33Y	31Z + 11E = 42Y	40E + 11E = 51Y	L22Z + 11E = L33Y
100-KFA20E		AC/DC	22Z + 20E = 42Y	31Z + 20E = 51Y	40E + 20E = 60Y	L22Z + 20E = L42Y
100-KFA04E		AC/DC	—	—	40E + 04E = 44Y ‡	—
100-KFA13E		AC/DC	—	31Z + 13E = 44Y ‡	40E + 13E = 53Y	—
100-KFA22Z		AC/DC	—	31Z + 22Z = 53Y ‡	40E + 22Z = 62Y	—
100-KFA31Z		AC/DC	—	—	40E + 31Z = 71Y §	—
100-KFA40E		AC/DC	22Z + 40E = 62Y	31Z + 40E = 71Y	40E + 40E = 80Y	L22Z + 40E = L62Y

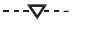
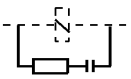
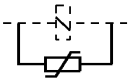
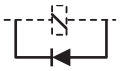
★ For other operating limits, please contact our technical consultant.
‡ $T_{amb.}$ max. +40 °C
§ $T_{amb.}$ max. +40 °C and only allowed for coil voltage 24V DC or 230V AC

Auxiliary Contact Blocks

	Description	Connection Diagrams	N.O.	N.C.	For Use With	Pkg. Qty. ★	Screw Type Terminals Cat. No.	Spring Clamp Terminals Cat. No.
	**Front-mounted auxiliary contacts** • Auxiliary Contact Blocks • 2- and 4-pole versions • Choice of contact configurations • Snap on, no tools required • Electronic-compatible bifurcated contacts for signals down to 15V/2 mA		0	2	100/104-K, 700-K	1	**100-KFA02E**	100-KRFA02E
			1	1	100/104-K, 700-K	1	**100-KFA11E**	100-KRFA11E
			2	0	100/104-K, 700-K	1	**100-KFA20E**	100-KRFA20E
			0	4	100/104-K, 700-K	1	**100-KFA04E**	100-KRFA04E
			1	3	100/104-K, 700-K	1	**100-KFA13E**	100-KRFA13E
			2	2	100/104-K, 700-K	1	**100-KFA22Z**	100-KRFA22Z
			3	1	100/104-K, 700-K	1	**100-KFA31Z**	100-KRFA31Z
			4	0	100/104-K, 700-K	1	**100-KFA40E**	100-KRFA40E

★ May be ordered in package quantities of 10. Add letter **M** to the end of the cat. no. Example: **100-KFA02EM**.

Control Modules

	Description			Connection Diagrams	For Use With	Pkg. Qty.	Cat. No.
	**Mechanical Interlock** • For interlocking of two adjacent contactors • No added width to contactor assembly • Front mount plug-in type • Optional auxiliary contact blocks and suppressor modules mount onto the interlock				100/104-K/-KR, 700-K/-KR	1	**100-KMCH**
	**Surge Suppressor** • Plug-in type • Limits surge voltage on coil drop-off	**RC Suppressor**	24…48V AC		100/104-K/-KR, 700-K/-KR	1 ★	100-KFSC50
			110…280V AC			1 ★	**100-KFSC280**
			380…480V AC			1 ★	100-KFSC480
		MOV Suppressor	12…55V AC, 12…77V DC		100/104-K/-KR, 700-K/-KR	1 ★	**100-KFSV55**
			56…136V AC, 78…180V DC			1 ★	**100-KFSV136**
			137…277V AC, 181…250V DC			1 ★	100-KFSV277
		Diode Suppressor	12…250V DC		100/104-K/-KR, 700-K/-KR	1 ★	**100-KFSD250**

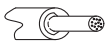
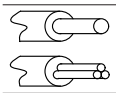
★ May be ordered in package quantities of 10. Add letter **M** to the end of the cat. no. Example: **100-KFSC50M**.

IEC Specifications

			700-K	700-KR
AC-12 Rated Thermal Current Ambient temperature 40°C				
I_{th}	24…240V	[A]	10	
	230…500V	[A]	10	
	230…690V	[A]	10	
Ambient temperature 60°C				
I_{th}	24…240V	[A]	6	
	230…500V	[A]	6	
	230…690V	[A]	6	
AC-15/B600 Switching of Solenoids and contactors				
I_e	24V	[A]	3	
	48V	[A]	3	
	120V	[A]	3	
	230V	[A]	2	
	240V	[A]	2	
	400V	[A]	1.2	
	480V	[A]	1	
	500V	[A]	1	
	600V	[A]	0.6	
	690V	[A]	0.6	
Short-circuit Protection "gG" Fuse acc. to IEC 60947-5-1, no welding of contacts				
	Fuse gG	[A]	10	
Min. Switching Capacity 15V For bifurcated contacts (control relays and auxiliary contact blocks)				
		[mA]	2	
Resistance and Power Dissipation				
Main current circuit resistance, 1 pole		[mΩ]	6.5	
Power dissipation, 4 poles		[W]	2.6	
Total power dissipation				
	AC control, warm	[W]	4.4	
	DC control, warm	[W]	5.2	
Lifespan				
Mechanical		[Mio. op.]	15	
Electrical AC-15 (240V / 2 A)		[Mio. op.]	0.7	
Weight				
	AC control	kg (lbs.)	0.16 (0.35)	
	DC control	kg (lbs.)	0.2 (0.44)	
Load Carrying Capacity per UL/CSA				
Rated voltage	AC	[V]	max. 600	
Continuous rating	40 °C	[A]	10	6
Switching capacity	AC	[A]	B 600	
Rated voltage	DC	[V]	max. 600	
Switching capacity	DC	[A]	Q 600	

			700-K
DC-13/Q600			
1 pole	24V	[A]	2.3
	48V	[A]	1
	110V	[A]	0.55
	125V	[A]	0.55
	220V	[A]	0.27
	250V	[A]	0.27
	400V	[A]	0.15
	440V	[A]	0.15
	600V	[A]	0.1

Cross Sections

Conductor Cross Sections - Main Contacts, Auxiliary Contacts, and Coil Terminals			700-K	700-KR
Terminal type			★ 	
 Fine stranded with ferrule	(1) Conductor (2) Conductors	[mm^2] [mm^2]	0.75…2.5 0.75…2.5	0.50…2.5 0.50…2.5
 Solid or coarse stranded	(1) Conductor (2) Conductors	[mm^2] [mm^2]	1…4 1…2.5 + 1…4	0.75…2.5 ♣ 0.75…2.5 ♣
Recommended torque		[Nm]	1.2	—
Cross section per UL/CSA		[AWG]	18…12 ‡	18…14 ♣
Recommended torque		[lb-in]	10.6	—

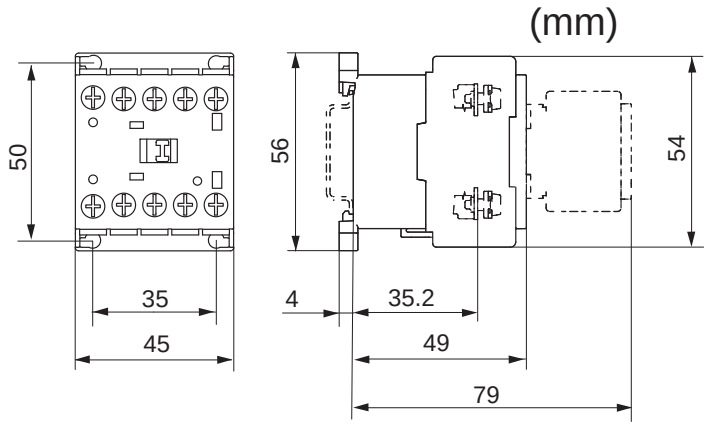
★ Pozidriv No. 2 / Blade No. 3 screw
‡ Use same cross sections
♣ Stranded wire only

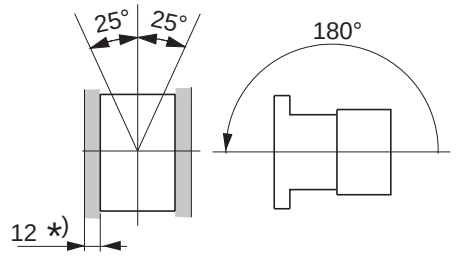
Coil Data

			700-K
Operating Limits			
AC control 50 Hz, 60 Hz, 50/60 Hz	pick-up	[x U_s]	0.85…1.1
	dropout	[x U_s]	0.2…0.75
DC control	pick-up	[x U_s]	0.8…1.1 9, 12, 24, 110V DC: 0.7…1.25
	dropout	[x U_s]	0.1…0.75
Coil Consumption			
AC control 50 Hz, 60 Hz, 50/60 Hz	pick-up	[VA/W]	35/32
	hold-in	[VA/W]	5/1.8
DC control	pick-up	[W]	cold 3.0, warm 2.6
	hold-in	[W]	cold 3.0, warm 2.6
Operating Times			
AC	closing delay	[ms]	15…40
	opening delay	[ms]	15…33
With RC module	opening delay	[ms]	15…28
DC	closing delay	[ms]	18…40
	opening delay	[ms]	6…12
With integrated diode	opening delay	[ms]	8…12
With external diode	opening delay	[ms]	35…50

Approximate Dimensions

Approximate Dimensions are shown in millimeters. Approximate Dimensions are not intended for manufacturing purposes.





*) -Minimum distance to grounded parts or walls

Control/Input Ratings

Cat. No.	Rated Control Voltage	Max. Operating Control Voltage Range	Max. Reverse Control Voltage	Impedance	Control Voltage Levels	
					Pick-up Voltage	Drop-out Voltage
700-SAZY5Z25	5…24V DC	4…32V DC	-32V DC	15 mA max.★	4V DC max.	1V DC min.
700-SANY3Z25		4…30V DC	-30V DC	1.5 kΩ (+20% -10%)		

Load/Output Ratings

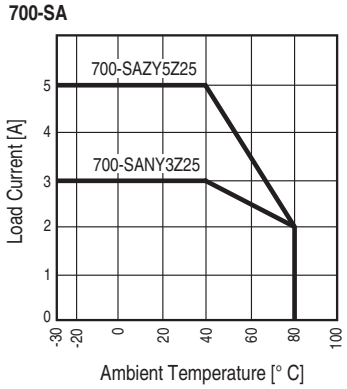
Cat. No.	Rated Load Voltage	Maximum Load Voltage Range	Continuous Load Current (Resistive) [A]		Max. Inrush Current‡
			Min.	Max❄	
700-SAZY5Z25	100…240V AC	75…264V AC	0.1	5.0	80 A, @ 50/60 Hz for 1 cycle
700-SANY3Z25	5…110V DC	3…125V DC	0.1	3.0	12 A (10 ms)

Characteristics

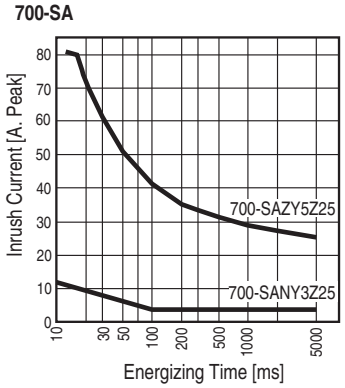
Description		Cat. No. 700-SAZY5Z25	Cat. No. 700-SANY3Z25
Load Switching Method/Device		Triac	Transistor
Pick-up Time		1/2 cycle of load power source cycle time§ + 1 ms max.	0.5 ms max.
Drop-out Time		1/2 cycle of load power source cycle time§ + 1 ms max.	2.5 ms max.
Output ON Voltage Drop		1.6V (RMS) max.	1.5V max.
Output Leakage Current		5 mA max. (at 100V AC); 10 mA max. (at 200V AC)	5 mA max. (at 125V DC)
Output V_{DRM} V_{CEO} (V)		600	150
Output di/dt (A/uS)		50	—
Output dv/dt (V/uS)		500	—
Output I^2t (A^2S)		41.6	—
Output Tj (°C) Max.		125	150
Insulation Resistance		100 MΩ min. (at 500V DC)	
Dielectric Strength		1500V AC, 50/60 Hz for 1 min	
Vibration Resistance (Max.)		10…55 Hz, 1.5 mm double amplitude (10 G)	
Shock Resistance (max.)		1000 m/s² (100 G)	
Ambient Temperature	Operating	–30…80 °C (–22…176 °F) with no icing or condensation	
	Storage	–30…100 °C (–22…212 °F) with no icing or condensation	
Ambient Humidity		45…85% (no condensation)	
Standards Compliance		UL 508, CSA C22.2 No. 14, EN 60947-1, -4-3	
Certifications		cURus Recognized (File No. E96956, Guide NMFT2/NMFT8), CE Marked, VDE Certified	
Weight		Approx. 70 g	

✶ With constant current input system. SSR input impedance varies with a change in input (control) voltage.
❄ Refer to the following graph "Load Current Vs. Ambient Temperature Characteristics" for additional load current details.
‡ If the SSR operation is continuous ON/OFF, this value should be reduced by 50%. Refer to "Inrush Current Resistivity" graph below.
§ 60 Hz full cycle time = 16.6 ms, 50 Hz full cycle time = 20 ms.

Load Current vs. Ambient Temperature Characteristics

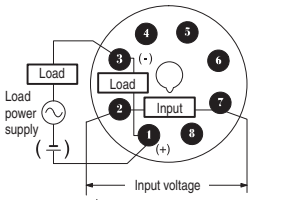


Inrush Current Resistivity∆



∆ Inrush current resistivity is the ability of an SSR to withstand a large surge current for a short period of time. Surges are considered non-repetitive (max. repeatability once every 5 seconds). Keep the inrush current to half the rated value if it occurs repetitively. Exceeding the non-repetitive inrush current will damage the SSR.

Terminal Arrangement (Bottom View)



Note: The plus and minus symbols shown in parentheses are for DC loads.

Basic Application Considerations

High Density Mounting of Multiple SSRs

If multiple SSRs are installed side-by-side be aware that the outer case wall of the SSR serves to dissipate heat. Install the relays so that they are adequately ventilated. If poor ventilation is unavoidable, reduce the load current to half.

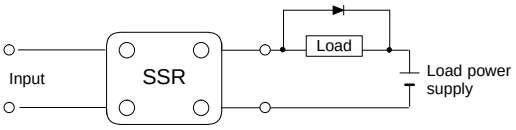
Protective Component

When controlling AC inductive loads, connect an inrush/surge absorbing device (varistor) across the SSR load terminals. If the SSR has built-in surge suppression (Bulletins 700-SE and 700-SH) and additional surge suppression is required, connect the varistor across the terminals of the load device. Select a varistor that meets the conditions of the load voltage outlined in the table below.

Load Voltage	Varistor Voltage [V]	Varistor Surge Resistance
100…120V AC	240…270	1000 A min.
200…240V AC	440…470	
380…480V AC	820…1000	

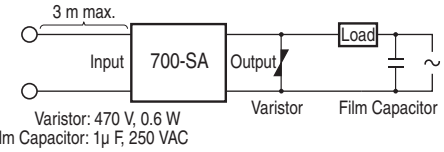
Note: For additional details applying solid-state relays, refer to pub. 700-AT001*, Solid-State Relay Application Guide.

For a DC inductive load, a diode should be connected parallel to the load to absorb the counter electromotive force (OFF) of the load.



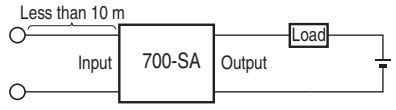
EMC Directive Compliance

1. AC-switching models comply with EMC Directives under the following conditions:



- Connect a varistor between the output terminals.
- Connect a film capacitor to the load power supply.
- The input cable must be less than 3 m.

2. DC-switching models comply with EMC Directives under the following conditions:

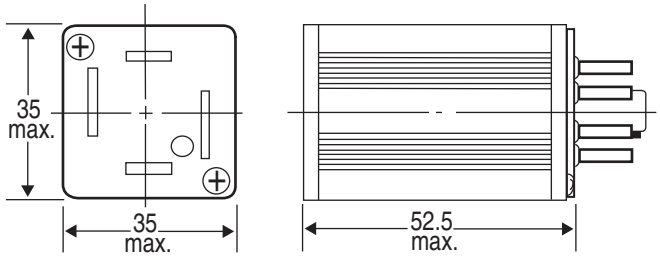


- The input cable must be less than 10 m.

Approximate Dimensions

All units in millimeters unless otherwise indicated. To convert millimeters to inches multiply by 0.0394. Dimensions are not intended to be used for manufacturing purposes.

Bul. 700-SA★



★ Bulletin 700-SA is compatible with Cat. Nos. 700-HN100, -108, -125, and -204 (sockets).

Control/Input Ratings

Cat. No.	Rated Control Voltage	Max. Operating Control Voltage Range	Max. Reverse Control Voltage [V]	Impedance	Control Voltage Levels	
					Pick-up Voltage	Drop-out Voltage
700-SCZY3Z25	5…24V DC	4…28V DC	-28.8	15 mA max. ★	4V DC max.	1V DC min.
700-SCZY2A1	100/110V AC	75…125V AC	NA	41 kΩ± 20%	75V AC max.	20V AC min.
700-SCZY2A2	200/220V AC	150…250V AC	NA	72 kΩ± 20%	150V AC max.	40V AC min.
700-SCTY3Z24	24V DC	19.2…28.8V DC	-28.8	2 kΩ± 20%	19.2V DC max.	1V DC min.
700-SCNY3Z25	5…24V DC	4…28V DC	-28	1.5 kΩ +20%/ -10% ‡	4V DC max.	
700-SCZN3Z26	4…24V DC	3…28V DC	-28.8	15 mA max. ★	3V DC max.	
700-SCTN3Z24	24V DC	19.2…28.8V DC	-28.8	2 kΩ± 20%	19.2V DC max.	
700-SCNN3Z26	4…24V DC	3…28V DC	-28	1.5 kΩ +20%/ -10% ‡	3V DC max.	
700-SCNN2Z25	5…24V DC		-28.8			

Load/Output Ratings

Cat. No.	Rated Control Voltage	Max. Load Voltage Range	Continuous Load Current (Resistive) [A]		Max. Inrush Current§
			Min.	Max.♣	
700-SCZY3Z25	100…240V AC	75…264V AC	0.1	3	45 A (@50/60 Hz, 1 cycle)
700-SCTY3Z24					
700-SCZN3Z26					
700-SCTN3Z24					
700-SCZY2A1			0.1	2	
700-SCZY2A2					
700-SCNN3Z26	4…48V DC	3…52.8V DC	0.1	3	18 A (10 ms)
700-SCNY3Z25					
700-SCNN2Z25	5…110V DC	3…125V DC	0.1	2	10 A (10 ms)

★ With constant current input circuit system. SSR impedance varies with a change in input (control) voltage.
‡ Input impedance attains its maximum at the operating voltage.
§ If the SSR operation is continuous ON/OFF, this value should be reduced by 50%. Refer to "Inrush Current Resistivity" graphs on page 9-177 for details.
♣ Refer to the following "Load Current Versus Ambient Temperature Characteristics" graphs on page page 9-177 for additional load current details.

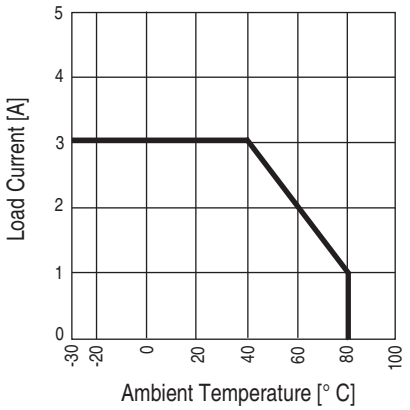
Characteristics

Description	Cat. No. 700-SCZ…	Cat. No. 700-SCT	Cat. Nos. 700-SCNY, 700-SCNN3…	Cat. Nos. 700-SCNN2…
Load Switching Method/Device	Triac		Transistor	
Pick-up time	1/2 of load power source cycle time Δ+ 1 ms max. (DC input)	1 ms max	0.5 ms max.	0.5 ms max.
	3/2 of load power source cycle time Δ+ 1 ms max. (AC input)			
Drop-out time	1/2 of load power source cycle timeΔ + 1 ms max. (DC input)	1/2 of load power source cycle timeΔ + 1 ms max	2 ms max.	2.5 ms max.
	3/2 of load power source cycle timeΔ + 1 ms max. (AC input)			
Output On Voltage Drop	1.6 V (RMS) max.	1.6 V (RMS)	1.5 V max.	1.5 V max.
Output Leakage Current	5 mA max (@ 100 V AC) 10 mA max (@ 200 V AC)	2.5 mA max (@ 100 V AC) 5 mA max (at 200 V AC)	5 mA max (@ 50 V DC)	0.1 mA max (@ 100 V DC)
Output V_{DRM}, V_{CEO} (V)	600	600	80	80
Output di/dt (A/uS)	50	50	—	—
Output dv/dt (V/uS)	250	250	—	—
Output I^2t (A^2S)	18	18	—	—
Output Tj (°C) Max.	125	125	150	150
Insulation Resistance	100 MΩ min (@500V DC)			
Dielectric Strength	1500V AC, 50/60 Hz for 1 minute			
Vibration Resistance (max.)	10…55 Hz, 1.5 mm double amplitude (10 G)			
Shock Resistance (max.)	1000 m/s^2 (100 G)			
Ambient Temperature	Operating: -30…+80 °C (-22...+176 °F) with no icing or condensation Storage: -30…+100 °C (-22...+212 °F) with no icing or condensation			
Standards Compliance	UL5 08, CSA C22.2 No. 14, EN/IEC 60950, EN 50011, EN 61000-6-2, EN/IEC 60947-1, -4-3			
Certifications	cURus Recognized (File No. E96956, Guide NMFT2/NMFT8), CE Marked, VDE Certified			
Ambient Humidity	Operating: 45…85% (no condensation)			
Weight	Approx. 50 g			

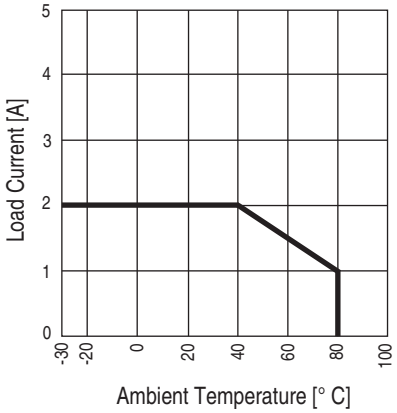
Δ 60 Hz full cycle time = 16.6 ms, 50 Hz full cycle time = 20 ms

Load Current Versus Ambient Temperature Characteristics

700-SC_ _3...

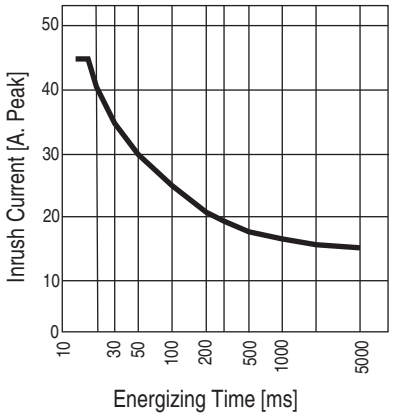


700-SC_ _2...

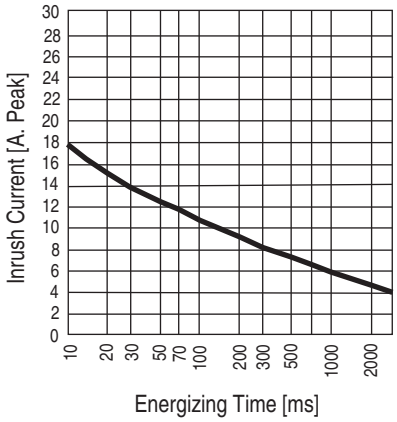


Inrush Current Resistivity★

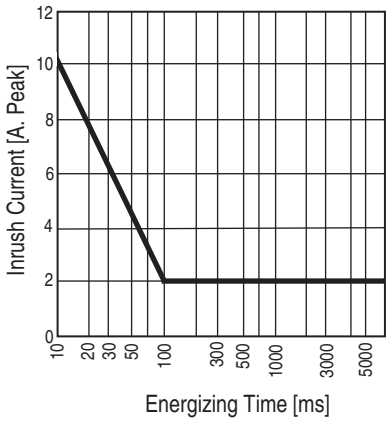
700-SCZ.... 700-SCT...



700-SCNN3... 700-SCNY3



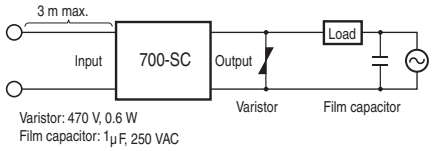
700-SCNN2...



★ Inrush current resistivity is the ability of an SSR to withstand a large surge current for a short period of time. Surges are considered non-repetitive (max. repeatability once every 2…5 seconds). Keep the inrush current to half the rated value if it occurs repetitively. Exceeding the non-repetitive inrush current will damage the SSR.

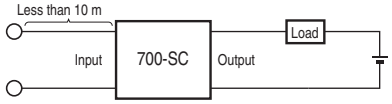
EMC Directive Compliance

1. AC-switching models comply with EMC Directives under the following conditions



- Connect a varistor between the output terminals.
- Connect a film capacitor to the load power supply.
- The input cable must be less than 3 m.

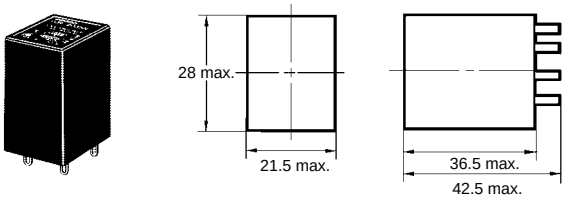
2. DC-switching models comply with EMC Directives under the following conditions



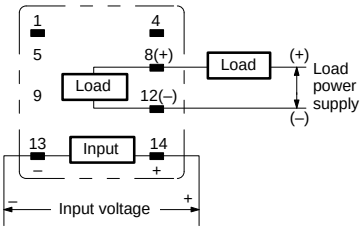
- The input cable must be less than 10 m.

Approximate Dimensions

All units in millimeters unless otherwise indicated. To convert to inches multiply by 0.0394. Dimensions are not intended for manufacturing purposes.



Terminal Arrangement/ Internal Connections (Bottom View)



Note: The plus and minus symbols shown in parentheses are for DC loads.

Cat. No 700-SC...★

★ Bulletin 700-SC is compatible with Cat. Nos. 700-HN103, -HN104, and -HN128 socket.

Basic Application Considerations For Bulletin 700-SC

Connection

For DC Load Switching, Bulletin 700-SC will operate properly if the load is connected to either the positive or negative SSR load terminal.

High-Density Mounting of Multiple SSRs

If multiple relays are mounted side-by-side, be aware that the outer wall of each SSR works as a radiator.

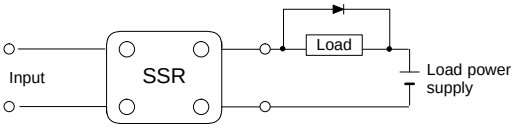
The SSR casing serves to dissipate heat. Install the relays so that they are adequately ventilated. If poor ventilation is unavoidable, reduce the load current by half.

Protective Component

When controlling AC inductive loads, connect an inrush/surge absorbing device (varistor) across the SSR load terminals. If the SSR has built-in surge suppression (Bulletins 700-SE and 700-SH) and additional surge suppression is required, connect the varistor across the terminals of the load device. Select a varistor that meets the conditions of the load voltage outlined in the table below.

Load Voltage [V AC]	Varistor Voltage [V]	Varistor Surge Resistance
100…120	240…270	1000 A min.
200…240	440…470	
380…480	820…1000	

For a DC inductive load, a diode should be connected parallel to the load to absorb the counter electromotive force (OFF) of the load.



Note: For additional details when using Solid-State Relays, refer to pub. 700-AT001*, Solid-State Relay Application Guide.

Specifications

Control/Input Ratings

Cat. No.	Rated Control Voltage	Max. Operating Control Voltage Range [V DC]	Max. Reverse Control Voltage [V]	Impedance	Control Voltage Levels	
					Pick-up Voltage	Drop-out Voltage
700-SFZY3Z25	5…24V DC	4…28V DC	–32	15 mA max.★	4V DC max.	1V DC min.
700-SFTY3Z24	24V DC	19.2…28.8V DC	–28.8	2 kΩ ± 20%	19.2V DC max.	1V DC min.
700-SFNY3Z25	5…24V DC	4…28V DC	–28.8	1.5 kΩ + 20%/–10%‡	4V DC max.	1V DC min.

Load/Output Ratings

Cat. No.	Rated Load Voltage	Max. Load Voltage Range	Continuous Load Current (Resistive) [A]		Max. Inrush Current§
			Min.	Max.♣	
700-SFZY3Z25	100…240V AC	75…264V AC	0.1	3	45 A @ 50/60 Hz, 1 cycle
700-SFTY3Z24			0.1	3	
700-SFNY3Z25	4…48V DC	3…52.8V DC	0.1	3	18 A (10 ms)

Characteristics

Description	Cat. No. 700-SFZY3Z25	Cat. No. 700-SFTY3Z24	Cat. No. 700-SFNY3Z25
Load Switching Method/Device	Triac	Transistor	
Pick-up Time	1/2 cycle of load power source cycle time Δ + 1 ms max.	1 ms max.	0.5 ms max.
Drop-out Time	1/2 cycle of load power source cycle timeΔ + 1 ms max.		2 ms max.
Output ON Voltage Drop	1.6V (RMS) max.		1.5V max.
Output Leakage Current	5 mA max. (@ 100 V AC); 10 mA max. (@ 200 V AC)	2.5 mA max. (@ 100V AC); 5 mA max. (@ 200V AC)	5 mA max. (@ 50V DC)
Output V_{DRM}, V_{CEO} (V)	600	600	80
Output di/dt (A/uS)	50	50	—
Output dv/dt (V/uS)	250	250	—
Output I^2t (A^2S)	18	18	—
Output Tj (°C) Max.	125	125	150
Insulation Resistance	100 MΩ min. (at 500V DC)		
Dielectric Strength	1,500V AC, 50/60 Hz for 1 min		
Vibration Resistance (Max.)	10…55 Hz, 1.5 mm double amplitude (10 G)		
Shock Resistance (Max.)	1000 m/s^2 (100 G)		
Ambient Temperature	Operating: –30…+80 °C (–22…+176 °F) with no icing or condensation Storage: –30…+100 °C (–22…=212 °F) with no icing or condensation		
Ambient Humidity	45…85% (no condensation)		
Standards Compliance	UL 508, CSA C22.2 No. 14, EN/IEC 60947-1, -4-3, EN/IEC 60950		
Certifications	cURus Recognized (File No. E96956, Guide NMFT2/NMFT8), CE Marked, VDE Certified		
Weight	Approx. 50 g		

★ With constant curent input circuit system, SSR impedance varies with a change in input voltage.

‡ Input impedance reaches its maximum at the operating voltage.

§ If the SSR operation is continuous ON/OFF, this value should be reduced by 50%. Refer to the “Inrush Current Resistivity” graphs on page 9-181 for more details.

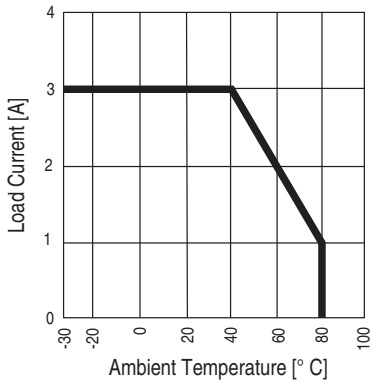
♣ Refer to “Load Current vs. Ambient Temperature Characteristics” on page 9-181 for additional load current details.

Δ 60 Hz full cycle time = 16.6 ms, 50 Hz full cycle time 20 ms.

Note: This data is non-repetitive. Keep the inrush current to half the rated value if it occurs repetitively. Inrush current resistivity is the ability of an SSR to withstand a large surge current for a short period of time. Surges are considered non-repetitive (max. repeatability once every 2…5 seconds). Keep the inrush current to half the rated value if it occurs repetitively. Exceeding the non-repetitive inrush current will damage the SSR.

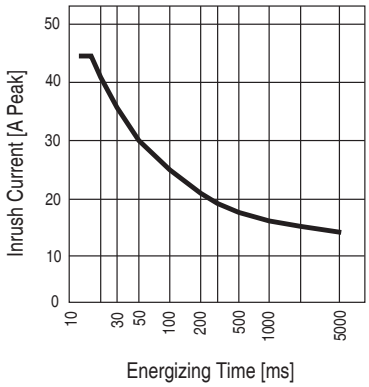
Load Current vs. Ambient Temperature Characteristics

700-SF…



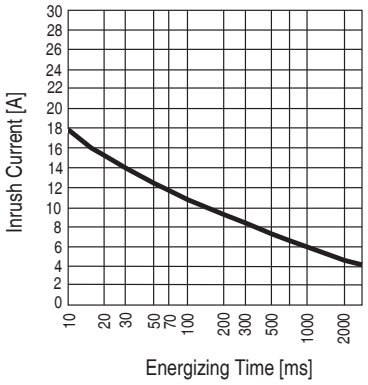
Inrush Current Resistivity★

700-SFZ… 700SFT…



Inrush Current Resistivity★

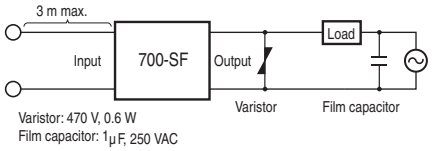
700-SFN…



★ Inrush current resistivity is defined as the ability of an SSR to withstand a large surge current for a short period of time. Surges are considered non-repetitive (max. repeatability once every 2…5 seconds). Keep the inrush current to half the rated value if it occurs repetitively. Exceeding the non-repetitive inrush current will damage the SSR.

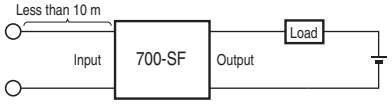
EMC Directive Compliance

1. AC-switching models comply with EMC Directives under the following conditions



- Connect a varistor between the output terminals.
- Connect a film capacitor to the load power supply.
- The input cable must be less than 3 m.

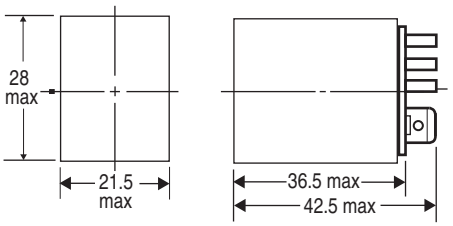
2. DC-switching models comply with EMC Directives under the following conditions



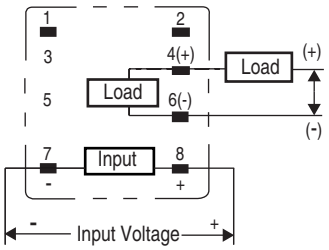
- The input cable must be less than 10 m.

Approximate Dimensions

All units are in millimeters unless otherwise indicated. To convert to inches multiply by 0.0394. Dimensions are not intended for manufacturing purposes.



Terminal Arrangement/Input Connections
(Bottom View)



Notes: 1. The plus and minus symbols shown in parentheses are for DC loads.
2. The coil has no polarity.

Note: Bul. 700-SF is compatible with Cat. No. 700-HN116 socket.

Basic Application Considerations of Bulletin 700-SF

High Density Mounting of Multiple SSRs

If multiple SSRs are mounted side-by-side, be aware that the outer case wall of the SSR acts as a radiator. The SSR case serves to dissipate heat. Install the relays so that they are adequately ventilated. If poor ventilation is unavoidable, reduce the load current by half.

Connection

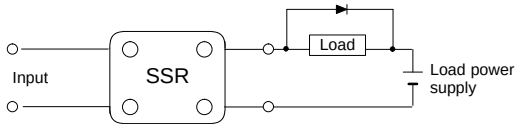
For DC load switching, the Bul. 700-SF SSR will operate properly if the load is connected to either the positive or negative load terminals.

Protective Component To Extend SSR Life

When controlling AC inductive loads, connect an inrush/surge absorbing device (varistor) across the SSR load terminals. If the SSR has built-in surge suppression (Bulletins 700-SE and 700-SH) and additional surge suppression is required, connect the varistor across the terminals of the load device. Select a varistor that meets the conditions of the load voltage outlined in the table below.

Load Voltage [V AC]	Varistor Voltage [V]	Varistor Surge Resistance
100…120	240…270	1000 A min.
200…240	440…470	
380…480	820…1000	

For a DC inductive load, a diode should be connected parallel to the load to absorb the counter electromotive force (OFF) of the load.



Note: For additional details when using Solid-State Relays, refer to pub. 700-AT001*, Solid-State Relay Application Guide.

Control/Input Ratings

Cat. No.	Operating Voltage	Input Current @ Max. Voltage	Voltage Level Pickup Voltage	Drop-Out Voltage
700-SH10J…	3…32V DC	12 mA	2.75V DC max.	1.2V DC min.
	80…130V AC	13 mA	70V AC max.	30V AC min.★
	200...280V AC	13 mA	190V AC max.	90V AC min.
700-SH_ _ H…	4…32V DC	12 mA	4V DC max.	1V DC min.
	20…280V AC/22…48V DC	20 mA	18V AC/DC	6V AC/DC
700-SH_ _ G…	3…32V DC	12 mA	2.5V DC	1.2V DC
	20…280V AC/22…48V DC	20 mA	-32V DC	6V AC/DC
700-SH_ _ V…	4…32V DC	12 mA	3.5V DC	1.2V DC
	20…280V AC/22…48V DC	20 mA	18V AC/DC	6V AC/DC
700-SH_ _ W…	Current Control	4…20 mA	—	—
700-SH_ _ F…	3…32V DC	12 mA	3V DC max.	1.0V DC

★ When specified heatsink is used.

Output Ratings

Cat. No.	Load Voltage Range	Applicable Load Current with Heat Sink [A]‡
700-SH5FZ24	3…60V DC	0.001…5 A DC
700-SH10J…	42…265V AC	0.15…10
700-SH10H…	42…530V AC	0.15…10
700-SH25G…	24…265V AC	0.15…25
700-SH25H…	42…530V AC	0.15…25
700-SH25V…	42…660V AC	0.15…25
700-SH25W…	90…280V AC	0.15…25
700-SH50G…	24…265V AC	0.15…50
700-SH50H…	42…530V AC	0.15…50
700-SH50V…	42…660V AC	0.15…50
700-SH50W…	90…280V AC	0.15…50
700-SH75H…	42…530V AC	0.15…75
700-SH75V…	42…660V AC	0.15…75
700-SH100H…	42…530V AC	0.15…100
700-SH100V…	42…660V AC	0.15…100

‡ AC unless indicated.

Characteristics

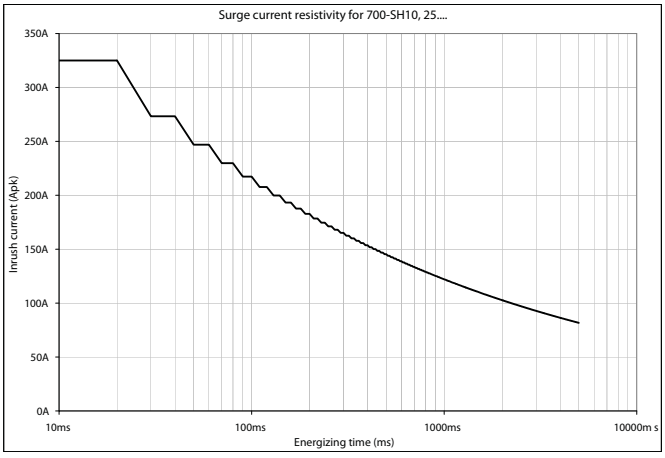
Description	Cat. Nos. 700-SH10, 25, 50 (not including 700-SH_ _W)	Cat. Nos. 700-SH75, 100
Pick-up Time	1/2 of load power source cycle time(DC input) 1 of load power source cycle time (AC input)	
Drop-out Time	1/2 of load power source cycle time (DC input) 2 of load power source cycle time (AC input)	
Output ON Voltage Drop	1.6V (RMS) max.	
Output Leakage Current	<3 mArms 100 MΩ min (@ 500V DC)	
Insulation Resistance	100 MΩ min. (at 500V DC)	
Dielectric Strength	>4000 VACrms	
Vibration Resistance	Malfunction: 10…55 Hz, 1.5 mm double amplitude	
Shock Resistance	Malfunction: 1000 m/s^2	
Ambient Temperature	Operating: –20…+70 °C with no icing or condensation	
	Storage: –40…+100 °C with no icing or condensation	
Ambient Humidity	0…95% no condensing	
Standards Compliance	UL 508, CSA C22.2 No. 14, EN/IEC 60947-1, -4-2, -4-3, EN 61000-6-2, EN 61000-6-4	
Certifications	cURus Recognized (File No. E14843, Guide NPNT2), CSA Certified (File No. 240924)	
Weight	Approx. 60 g	Approx. 100 g

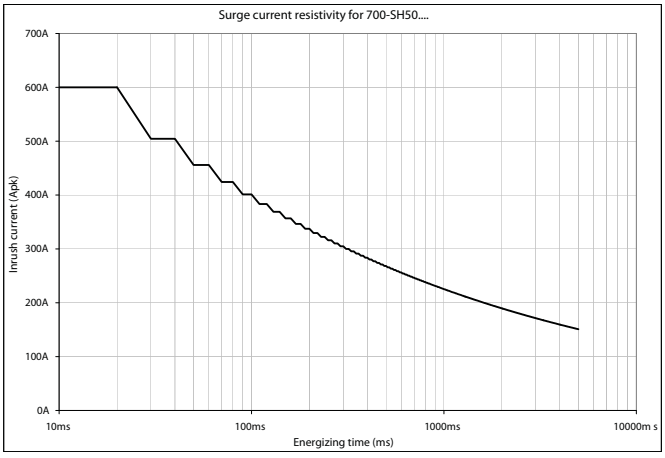
Characteristics

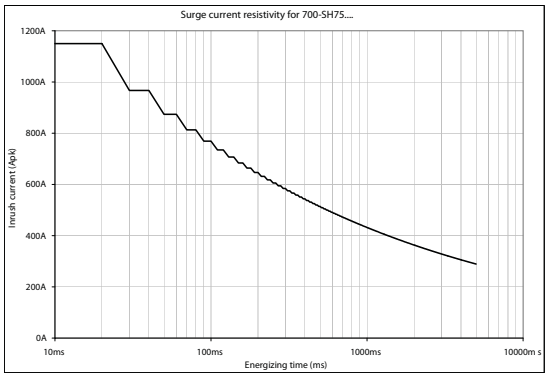
Description	Cat. No. 700-SH_ _W
Pick-up Current	4.2 mA
Drop-out Current	4.1 mA
Voltage Drop	<10V DC @ 20 mA
Leakage Current	<3 mA
Insulation Voltage	<4000 Vrms
Vibration Resistance	Malfunction: 10…55 Hz, 1.5 mm double amplitude
Shock Resistance	Malfunction: 1000 m/s^2
Ambient Temperature	Operating: –20…+70 °C with no icing or condensation
Ambient Humidity	0…95% no condensing
Standards Compliance	UL 508, CSA C22.2 No. 14, EN/IEC 60947-1, -4-2, -4-3, EN 61000-6-2, EN 61000-6-4
Certifications	cURus Recognized (File No. E14843, Guide NPNT2), CSA Certified (File No. 24024)
Weight	Approx. 60 g

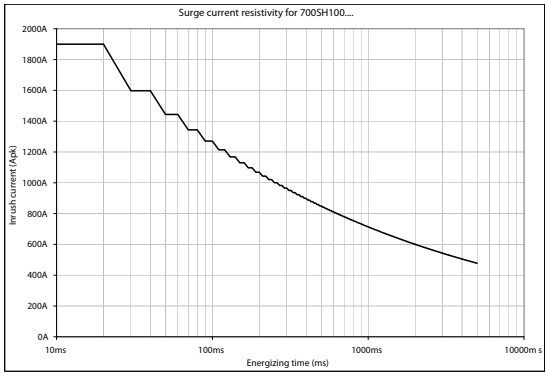
Description	Cat. No. 700-SH5FZ24
Pick-up Voltage	<3V DC
Drop-out Voltage	>1V DC
Activating Frequency	<100 Hz
Input Impedance	1kΩ
Response Time Pick-up @ Vin > 5V	<4000 uS
Response Time Drop-out	<1 mS
On-state Voltage Drop @ Rated Current	<1.5V
Off-state Current Drop @ Rated Voltage	<1 mA
Insulation Voltage	<1 mA
Vibration Resistance	Malfunction: 10…55 Hz, 1.5 mm double amplitude
Shock Resistance	Malfunction: 1,000 m/s^2
Ambient Temperature	Operating: –20…+70 °C with no icing or condensation
Ambient Humidity	0…95% no condensing
Standards Compliance	UL 508, CSA C22.2 No. 14, EN/IEC 60947-1, -4-2, -4-3, EN 61000-6-2, EN61000-6-4
Certifications	cURus Recognized (File No. E14843, Guide NPNT2), CSA Certified (File No. 240924)
Weight	Approx. 60 g

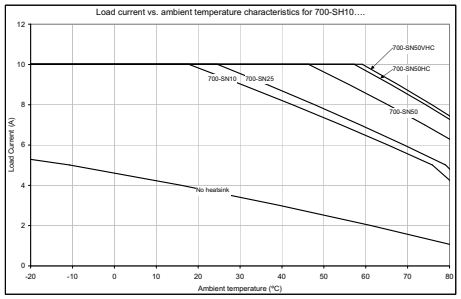
Surge Current vs. Ambient Temperature Characterstics

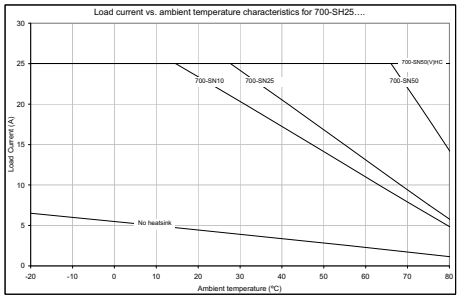


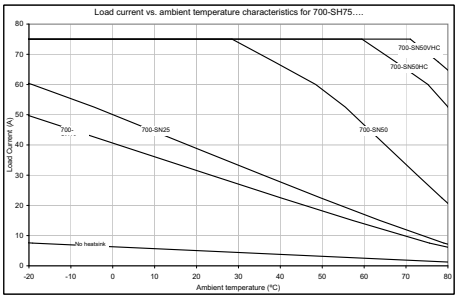


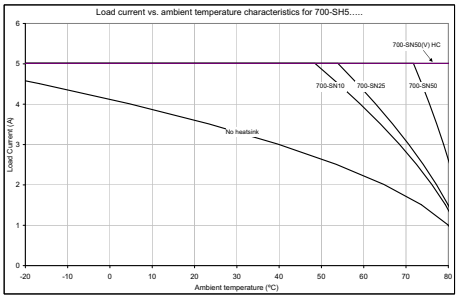

Surge current resistivity for 700-SH75....
Inrush current (Apk)
1200A
1000A
800A
600A
400A
200A
0A
10ms
100ms
1000ms
10000m s
Energizing time (ms)

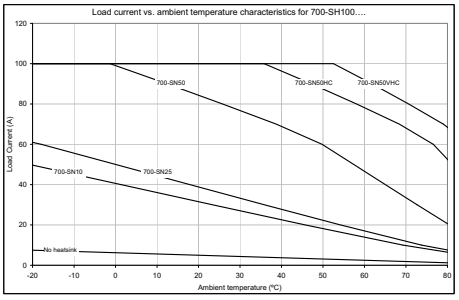

Surge current resistivity for 700SH100....
Inrush current (Apk)
2000A
1800A
1600A
1400A
1200A
1000A
800A
600A
400A
200A
0A
10ms
100ms
1000ms
10000m s
Energizing time (ms)

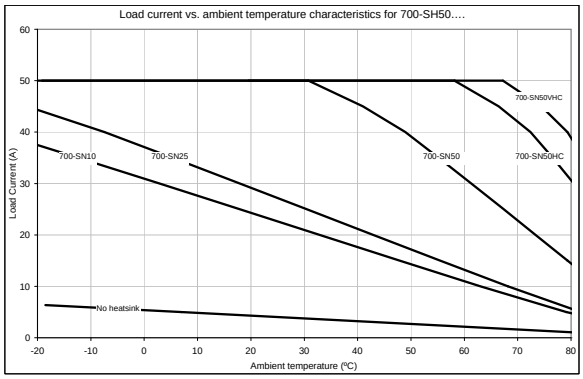

Load current vs. ambient temperature characteristics for 700-SH10....
Load Current (A)
700-SN50VHC
700-SN50HC
700-SN10
700-SN25
700-SN50
No heatsink
Ambient temperature (°C)


Load current vs. ambient temperature characteristics for 700-SH25....
Load Current (A)
700-SN50(V)HC
700-SN10
700-SN25
700-SN50
No heatsink
Ambient temperature (°C)


Load current vs. ambient temperature characteristics for 700-SH75....
Load Current (A)
700-SN50VHC
700-SN50HC
700-SN25
700-SN50
No heatsink
Ambient temperature (°C)

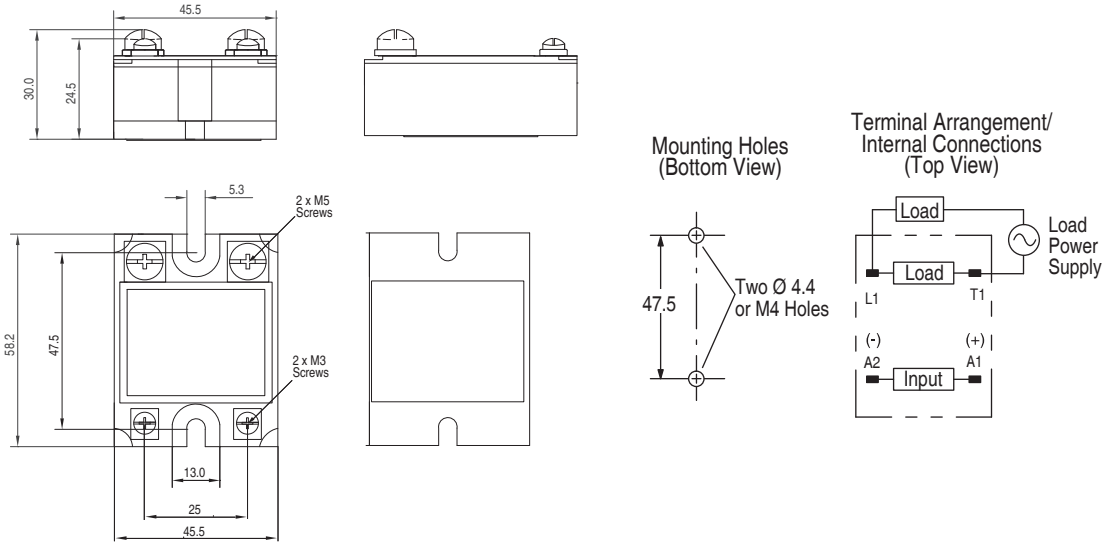

Load current vs. ambient temperature characteristics for 700-SH5.....
Load Current (A)
700-SN50(V) HC
700-SN10
700-SN25
700-SN50
No heatsink
Ambient temperature (°C)


Load current vs. ambient temperature characteristics for 700-SH100....
Load Current (A)
700-SN50
700-SN50HC
700-SN50VHC
700-SN10
700-SN25
No heatsink
Ambient temperature (°C)

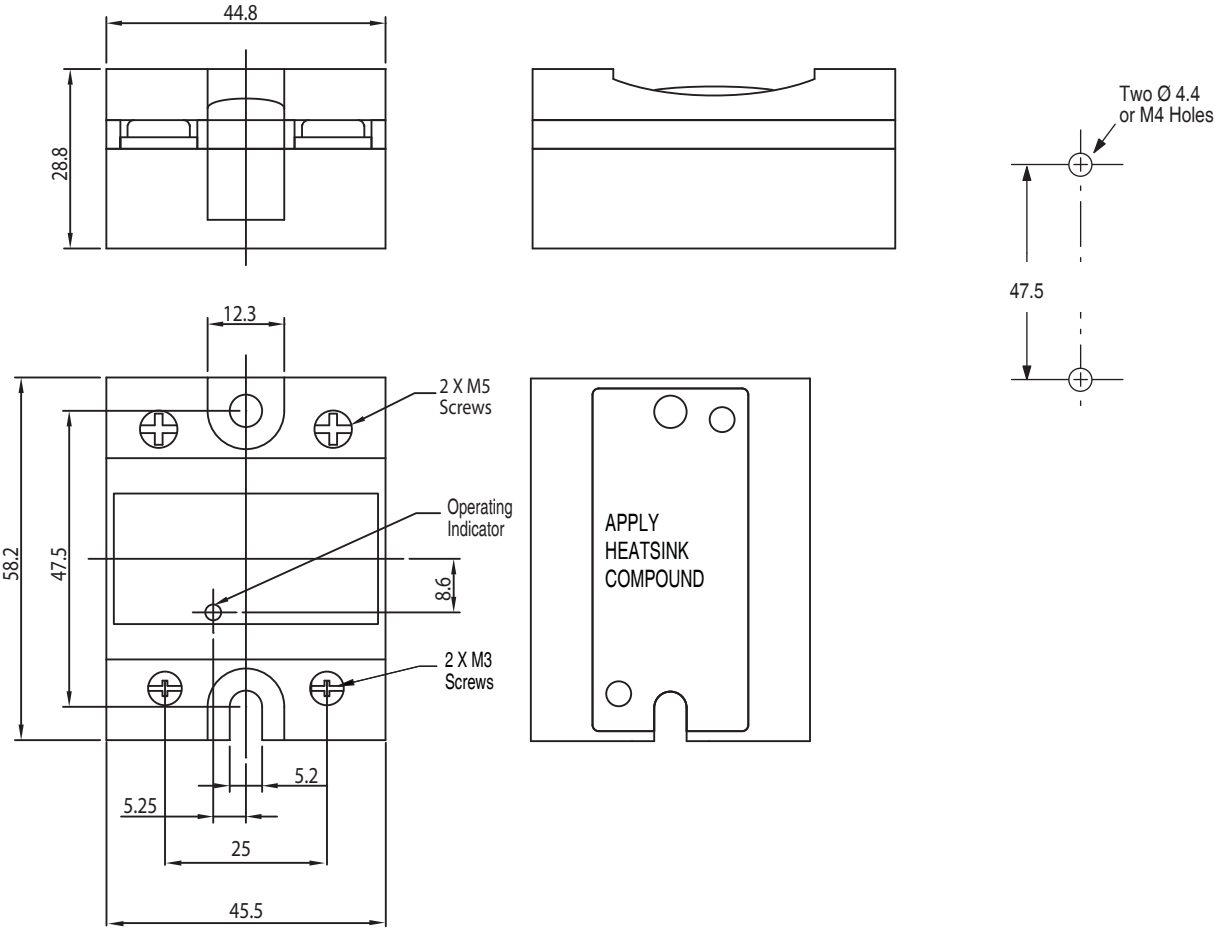

Load current vs. ambient temperature characteristics for 700-SH50....
Load Current (A)
700-SN50VHC
700-SN10
700-SN25
700-SN50
700-SN50HC
No heatsink
Ambient temperature (°C)

Mounting Considerations★§♣Δ

All units are in mm's unless otherwise indicated. To convert to inches multiply by 0.0394. Dimensions are not intended for manufacturing purposes.



Cat. No. 700-SH5F...



Cat. No. 700-SH10, -SH25, -SH50, -SH75, -SH100

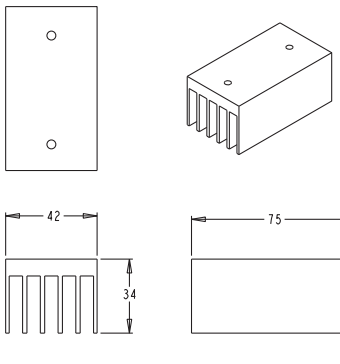
★ The proper mounting orientation of the heat sink is so the heat fins run perpendicular to the floor (vertical) to maximize ventilation flow. If the fins do not run perpendicular to the floor, a 30% current derating is required.

§ When attaching a heat sink to Bulletin 700-SH, apply a thin layer of heat conductive grease (approximately 0.002 in. thick) on the heat sink to maximize heat transfer between the SSR and the heat sink. Recommended types: Silicon based, Dow Corning 340, Toshiba YG6240; Non-silicon based, AOS company type 53300 (Cat. No. 46801-010-01).

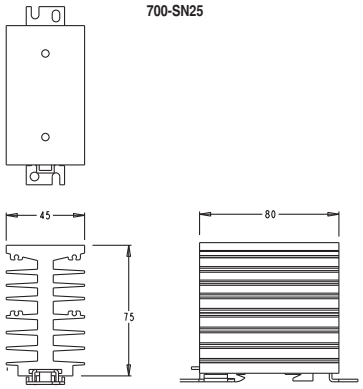
♣ Tighten the SSR panel/heat sink mounting screws to a torque of 0.78…0.98 N•m (6.9…8.7 lb•in).

Δ Tighten the SSR terminal wiring screws as follows M4: 0.98…1.37 N•m (8.67…12.12 lb•in), M5: 1.57…2.35 N•m (13.89…20.8 lb•in).

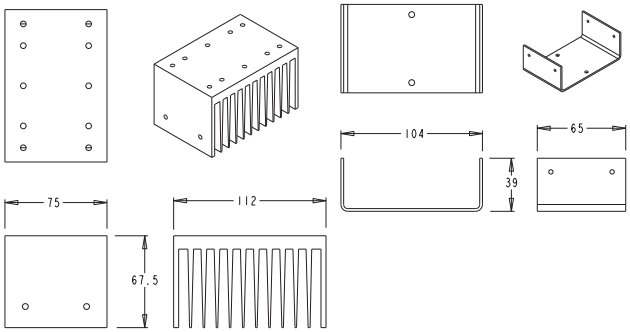
700-SN10



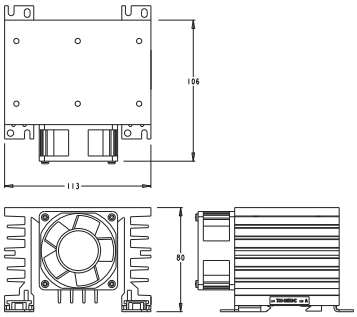
700-SN25



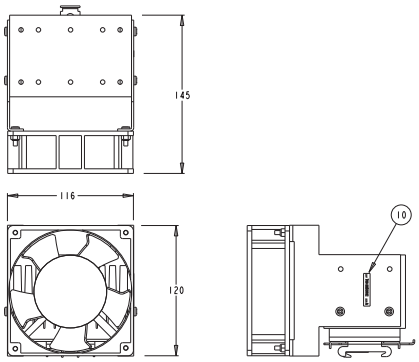
700-SN50



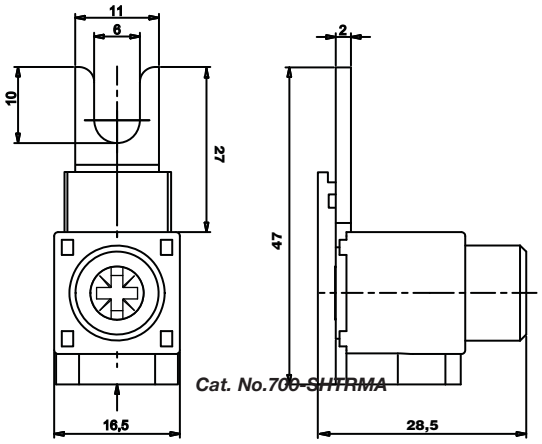
700-SN50HC



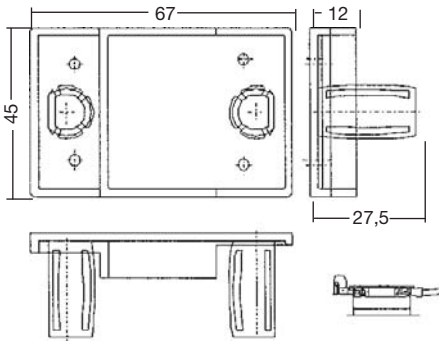
700-SN50VHC



♦ Tighten the heat sink mounting screws (M4) to a torque of 0.98…1.37 N•m (8.67…12.12 lb•in).
♠ Heat sink weight: Cat. Nos. 700-S10 = 200 g, 700-S20 = 400 g, 700-S30 = 560 g.



Cat. No.700-SHTRMA



Cat. No. 700-SHCOV

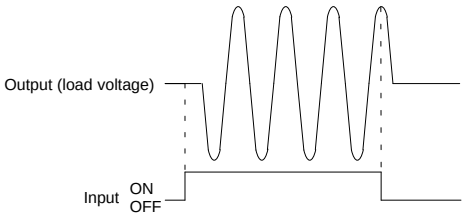
Load Connection

- For an AC load, use a power supply rated at 50 or 60 Hz. The maximum operating frequency is 10 Hz.
- The Bulletin 700-SH has a built-in varistor for surge/inrush protection of AC loads. If additional suppression is required, connect an external varistor across the load device terminals. Select a varistor which meets the load voltage condition outlined in the table below.

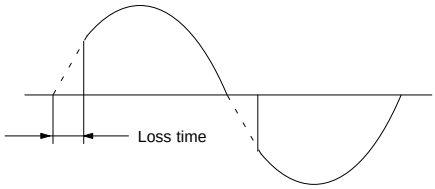
Load Voltage [V AC]	Varistor Voltage [V]	Varistor Surge Resistance
100…120	240…270	1000 A min.
200…240	440…470	
380…480	820…1000	

Zero Cross Function

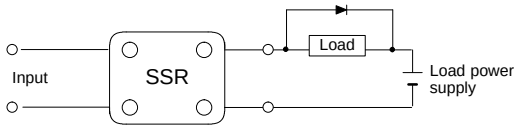
A SSR with a zero cross function operates when an AC load voltage reaches the zero point or its vicinity. This reduces clicking noises when the load is switched and minimizes the influence of an inductive load, (e.g., lamp, heater, or motor) on the power supply because the inrush current of the load is reduced. This can also minimize the scale of the inrush current protection circuit.



At a low applied voltage (e.g., 24V AC) the load current is not fully supplied. When the unit is switched ON, the voltage required to power the unit deprives the output signal of the necessary voltage level and thus creates loss time. The lower the load voltage is, the greater the loss time is. This condition, however, will not create any serious problems.



For a DC inductive load, a diode should be connected parallel to the load to absorb the counter electromotive force (OFF) of the load.



Note: For additional details when using Solid-State Relays, refer to pub. 700-AT001*, Solid-State Relay Application Guide.

Input Sensor Module

Input Sensor Ratings

Cat. No.	Rated Input Voltage	Max. Operating Input Voltage Range	Input Current	Pick-up Voltage	Drop-out Voltage
700-SKICZ24	12…24V DC	6.6…32V DC	8 mA max.	6.6V DC max.	3.6V DC min.
700-SKICA18	100…240V AC	60…264V AC	15 mA max.	60V AC max.	20V AC min.

Output Logic Ratings

Cat. No.	Logic Level Supply Voltage	Logic Level Supply Current Draw
700-SKICZ24	4…32V DC	0.1…100 mA
700-SKICA18		

Characteristics

Description		Cat. No. 700-SKICA18	Cat. No. 700-SKICZ24
Pick-up time		20 ms max.	0.1 ms max.
Drop-out time		20 ms max.	0.1 ms max.
Response frequency		10 Hz	1 kHz
Output ON voltage drop		1.6V max.	
Leakage current		5 µA max.	
Output V_{DRM}, V_{CEO} (V)		80 (ref. value)	80 (ref. value)
Output di/dt (A/uS)		—	—
Output dv/dt (V/uS)		—	—
Output I^2t (A^2S)		—	—
Output Tj (°C) Max.		150	150
Insulation Resistance		100 MΩ min. between input and output	
Dielectric Strength		4000V AC, 50/60 Hz for 1 min between input and output	
Vibration Resistance (Max.)		10…55 Hz, 1.5 mm double amplitude (10 G)	
Shock Resistance (Max.)		1000 m/s^2 (100 G)	
Ambient Temperature	Operating	–30…+80 °C (–22…+176 °F) with no icing or condensation	
	Storage	–30…+100 °C (–22…+212 °F) with no icing or condensation	
Standards Compliance		UL 508, CSA C22.2 No. 14, EN/IEC 60950	
Certifications		cURus Recognized (File No. E96956, Guide NMFT2/NMFT8), CE Marked, TÜV Certified	
Ambient humidity Operating		45…85% (no condensation)	
Weight		Approx. 18 g	

Output SSR Module

Control/Input Ratings

Cat. No.	Rated Control Voltage	Max. Operating Control Voltage Range	Max. Reverse Control Voltage	Impedance★	Pick-up Voltage	Drop-out Voltage
700-SKOZ2Z25	5…24V DC	4…32V DC	-32V DC	15 mA max. at 25 °C (77 °F)	4V DC max.	1V DC min.
700-SKON2Z25						
700-SKOC2Z25				8 mA max.		
700-SKOC1Z25						

Load/Output Ratings

Cat. No.	Rated Load Voltage	Maximum Load Voltage Range	Continuous Load Current (Resistive) [A]		Max. Inrush Current‡
			Min.	Max.§	
700-SKOZ2Z25	100…240V AC	75…264V AC	0.05	2	30 A (@50/60 Hz, 1 cycle)
700-SKON2Z25					
700-SKOC2Z25	5…48V DC	4…60V DC	0.1	2	8 A (10 ms)
700-SKOC1Z25	48…200V DC	40…200V DC	0.1	1.5	8 A (10 ms)

★ With a constant current input system. SSR impedance varies with a change in input voltage.

‡ If the SSR operation is continuous ON/OFF, this value should be reduced by 50%. Refer to the “Inrush Current Resistivity” graphs on page 9-193 for more details.

§ Refer to "Load Current vs. Ambient Temperature Characteristics" graphs on page 9-193 for additional details.

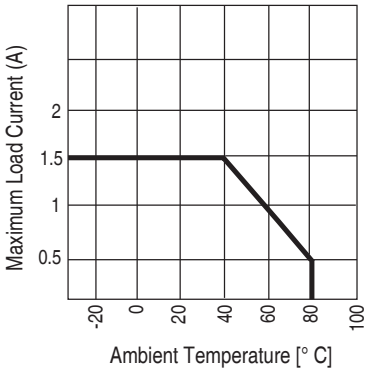
Output Module, Continued

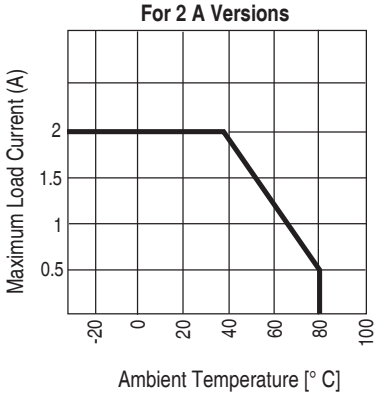
Characteristics

Description		Cat. No. 700-SKOZ2Z25	Cat. No. 700-SKON2Z25	Cat. No. 700-SKOC2Z25	Cat. No. 700-SKOC1Z25
Load Switching Method/Device		Triac		Transistor	
Pick-up Time		1/2 cycle of load power source cycle time★ + 1 ms max.		1 ms max.	
Drop-out Time		1/2 of load power source cycle time★ + 1 ms max.		2 ms max.	
Response Frequency		20 Hz		100 kHz	
Output ON Voltage Drop		1.6V max.			2.5V max.
Leakage Current		1.5 mA max.		1 mA max.	
Output V_{DRM}, V_{CEO} (V)		600 (ref.value)	600 (ref.value)	80 (ref.value)	400 (ref.value)
Output di/dt (A/uS)		30	30	—	—
Output dv/dt (V/uS)		300	300	—	—
Output I^2t (A^2S)		10.4	10.4	—	—
Output Tj (°C) Max.		125	125	150	150
Insulation Resistance		100 MΩ min. between input and output			
Dielectric Strength		4000V AC, 50/60 Hz for 1 min between input and output			
Vibration Resistance (Max.)		10…55 Hz, 1.5 mm double amplitude (10 G)			
Shock Resistance (Max.)		1000 m/s^2 (100 G)			
Ambient Temperature	Operating	–30…+80 °C (–22…+176 °F) with no icing or condensation			
	Storage	–30…+100 °C (–22…+212 °F) with no icing or condensation			
Standards Compliance		UL 508, CSA C22.2 No. 14, EN/IEC 60950			
Certifications		cURus Recognized (File No. E96956, Guide NMFT2/NMFT8), CE Marked, TÜV Certified			
Ambient Humidity	Operating	45…85% (no condensation)			
Weight		Approx. 18 g			

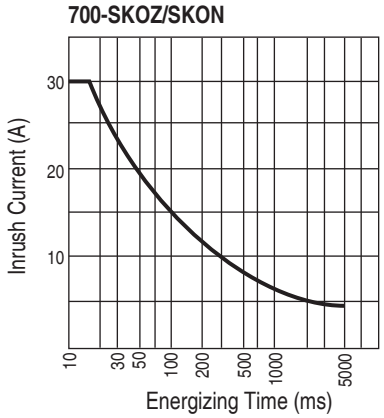
★ 60 Hz cycle time = 16.6 ms, 50 Hz cycle time = 20 ms.

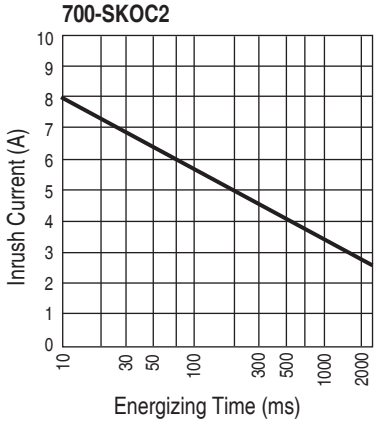
Load Current vs. Ambient Temperature Characteristics

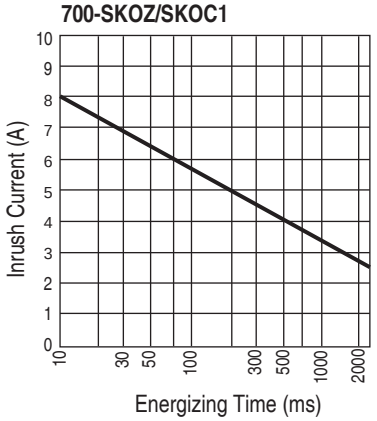




Inrush Current Resistivity‡



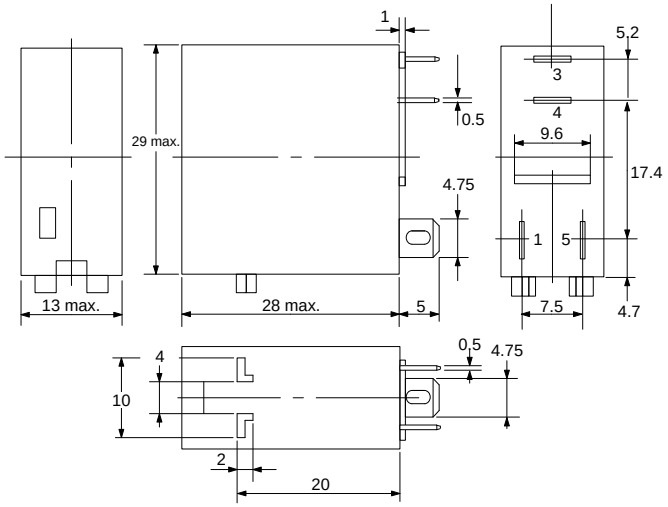




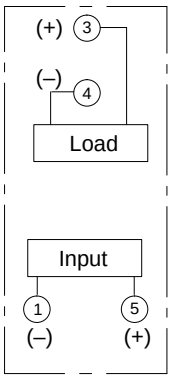
‡ Inrush current resistivity is the ability of an SSR to withstand a large surge current for a short period of time. Surges are considered non-repetitive (max. repeatability once every 2…5 seconds). Keep the inrush current to half the rated value if it occurs repetitively. Exceeding the non-repetitive inrush current will damage the SSR.

All units are in millimeters unless otherwise indicated. To convert to inches multiply by 0.0394. Dimensions are not to be used for manufacturing purposes.

Note: The input module (Bul. 700-SKI) and output module (Bul. 700-SKO) are compatible with the Cat. No. 700-HN121 socket.



Terminal Arrangement/ Internal Connections (Bottom View)



Application Considerations of Bulletin 700-SK

Connection

For DC load switching, Bulletin 700-SK SSR will operate properly if the load is connected to either the positive or negative SSR load terminal. The load can be connected to either positive or negative output terminals of the SSR.

Protective Element (to extend SSR life)

Since the SSR does not incorporate a surge absorption component, be sure to connect a surge absorption component when using the SSR to control an inductive load.
For additional details applying solid-state relays, refer to pub. 700-AT001A*, Solid-State Relay Application Guide.

Important User Information

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

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Publication 700-TD552A-EN-P - September 2014