**Technical Data**

Original Instructions

Allen-Bradley
by ROCKWELL AUTOMATION

# Relay and Timer Specifications

Bulletin 700


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Rockwell Automation

Allen Bradley 700DC-P400Z24 | gesrepair.com

# Summary of Changes

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes.

| Topic | Page |
|---|---|
| Added 700-HL_N Next Generation Terminal Block Relay | 56 |

# General Information

## Contact Data Tables

| | Relay Type | Contact Arrangement | Contact Style | Contact Material | NEMA Pilot Duty(1) | AC and DC Switching Capability |
|---|---|---|---|---|---|---|
| | | | | | | 1 mA / 20 mA / 50 mA / 100 mA / 1 A / 3 A / 5 A / 10 A / 20 A / 25 A / 30 A / 35 A |
| IEC Relays | 700-CF | Up to 8 form X or 8 form Y | cross stamped | Ag | A600 P600 | 24V: AC, DC |
| IEC Relays | 700S-CF | Up to 8 form X or 8 form Y | cross stamped | Ag | A600 P600 | 24 V: AC, DC |
| IEC Relays | 700-K | Up to 8 form X or 8 form Y | bifurcated | AgCu | A300 Q300 | 17V: AC, DC |
| NEMA Relays | 700-P | Up to 12 form X or 8 form Y | bifurcated | NiAg | A600 P600 | 10V: AC, DC |
| NEMA Relays | 700-PK | Up to 12 form X or 8 form Y | single | AgCdO | 2X A600 2X P600 | 10V: AC, DC; AC: (20 A Lighting Load) |
| NEMA Relays | 700-PH | Up to 6 form X or 4 form Y | tandem | AgCdO | A600 P600 | 10V: AC; DC; (35 A Lighting Load) |
| NEMA Relays | 700-R | Up to 8 form A or form B | sealed sw. | W | B300 C600 P300 | 5V: AC, DC |
| NEMA Relays | 700-RTC | Up to 4 form A or form B | sealed sw. | W | B600 P300 | 5V: AC, DC |
| NEMA Relays | 700S-P | Up to 12 form X or 8 form Y | bifurcated | NiAg | A600 P600 | 10V: AC |

(1) See NEMA Ratings and Test Values on page 5.

## Contact Data Tables

| | Relay Type | Contact Arrangement | Contact Style | Contact Material | NEMA Pilot Duty | AC and DC Switching Capability: 1 mA / 10 mA / 50 mA / 100 mA / 1 A / 3 A / 5 A / 10 A / 20 A / 25 A / 30 A / 35 A |
|---|---|---|---|---|---|---|
| Timing Relays | 700-FE | 1 N.O. | single | AgCdO | D300 | 10V; AC DC (24V Max.) |
| | 700-FS | 1, 2 form C | single | AgCdO | B300 | 10V; AC DC (24V Max.) |
| General Purpose Relays | 700-HA | 2, 3 form C | single | AgNi | B300 | 10V; AC DC (24V Max) |
| | 700-HAX | 2, 3 form C | bifurcated | Au/AgNi | B300 | 6V; AC DC (24V Max) |
| | 700-HB | 2, 3 form C | single | AgNi | B300 | 10V; AC DC (24VMax.) |
| | 700-HC14 | 4 form C | single | Ag/Au | C300 Q300 | 10V; AC DC (30V Max.) |
| | 700-HC22 | 2 form C | single | AgNi | B300 Q300 | 10V; AC DC |
| | 700-HC24 | 4 form C | single | AgNi | C300 Q300 | 10V; AC DC (30V Max.) |
| | 700-HD | 2, 3 form C | single | AgCdO | B300 | 10V; AC DC (24V Max) |
| | 700-HF | 2, 3, 4 form C | single | AgCdO | B300 | 10V; AC DC (30V Max) |
| | 700-HG | 1 form X, 1 form C, 2 form A, 2 form C | single | AgNi | A600 | 10V; AC DC (28V Max) |
| | 700-HHF45 | 1 form X | single | AgNi | A600 | 10V; AC DC (28V Max) |
| | 700-HHF62 | 2 form C | single | AgNi | B600 | 10V; AC DC (28V Max) |
| | 700-HHF73 | 3 form C | single | AgNi | B300 | 10V; AC DC (28V Max) |
| | 700-HJ | 1, 2 form C | single | AgCdO | — | 10V; AC DC (24V Max.) |
| | 700-HK36 | 1 form C | single | AgNi | B300 | 10V; AC DC (30V Max) |
| | 700- | 1 form C | single | Au/AgNi | B300 | 10V; AC DC (30V Max) |
| | 700-HK32 | 2 form C | single | AgNi | B300 | 5V; AC DC (30V Max) |
| | 700- | 2 form C | single | Au/AgNi | B300 | 5V; AC DC (30V Max) |

## Contact Data Tables

General Purpose Relays (continued)

| Relay Type | Contact Arrangement | Contact Style | Contact Material | NEMA Pilot Duty | AC and DC Switching Capability |
|---|---|---|---|---|---|
| | | | | | 1 mA / 10 mA / 50 mA / 100 mA / 1 A / 3 A / 5 A / 10 A / 20 A / 25 A / 30 A / 35 A |
| 700-HLS | Solid-State 1 N.O. | — | — | — | 3V — AC/DC |
| 700-HLT | 1 Form C | single | AgSnO | B300 R300 | 12V — 6 A AC/DC |
| 700-HLT__X | 1 Form C | single | AgSnO | B300 R300 | 8V — 6 A AC/DC |
| 700-HP | 2 Form C | single | AgNi | B300 Q300 | 5V (300 mW) — 8 A AC/DC |
| 700-HPX | 2 Form C | single | AgNi + Gold | B300 Q300 | 5V (50 mW) — 8 A AC/DC |
| 700-HS | 2 Form C | single | AgCdO | B300 | 10V — AC DC (30V Max) |
| 700-HT | 2 form C | single | AgNi | B300 | 10V — AC DC (30V Max) |

## NEMA Ratings and Test Values

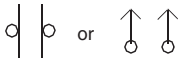
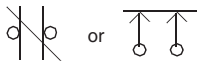
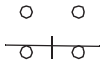
### NEMA Ratings and Test Values for AC Control Circuit Contacts at 50 or 60 Hz

| Maximum Current [A] | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NEMA Contact Rating Designation | Thermal Continuous Test Current [A] | 120V | | 240V | | 480V | | 600V | | VA | |
| | | Make | Break | Make | Break | Make | Break | Make | Break | Make | Break |
| A150 | 10 | 60 | 6.00 | — | — | — | — | — | — | 7200 | 720 |
| A300 | 10 | 60 | 6.00 | 30 | 3.00 | — | — | — | — | 7200 | 720 |
| A600 | 10 | 60 | 6.00 | 30 | 3.00 | 15 | 1.50 | 12 | 1.20 | 7200 | 720 |
| B150 | 5 | 30 | 3.00 | — | — | — | — | — | — | 3600 | 360 |
| B300 | 5 | 30 | 3.00 | 15 | 1.50 | — | — | — | — | 3600 | 360 |
| B600 | 5 | 30 | 3.00 | 15 | 1.50 | 7.5 | 0.75 | 6 | 0.60 | 3600 | 360 |
| C150 | 2.5 | 15 | 1.50 | — | — | — | — | — | — | 1800 | 180 |
| C300 | 2.5 | 15 | 1.50 | 7.5 | 0.75 | — | — | — | — | 1800 | 180 |
| C600 | 2.5 | 15 | 1.50 | 7.5 | 0.75 | 3.75 | 0.375 | 3 | 0.30 | 1800 | 180 |
| D150 | 1.0 | 3.60 | 0.60 | — | — | — | — | — | — | 432 | 72 |
| D300 | 1.0 | 3.60 | 0.60 | 1.8 | 0.30 | — | — | — | — | 432 | 72 |
| D600 | 0.5 | 1.80 | 0.30 | — | — | — | — | — | — | 216 | 36 |
| 2X A300 | 20 | 120 | 12 | 60 | 6.00 | — | — | — | — | 14400 | 1440 |
| 2X A600 | 20 | 120 | 12 | 60 | 6.00 | 30 | 3.00 | 24 | 2.40 | 14400 | 1440 |

### NEMA Ratings and Test Values for DC Control Circuit Contacts

| Maximum Current [A] | | | | | | |
|---|---|---|---|---|---|---|
| **NEMA Contact Rating Designation** | **Thermal Continuous Test Current [A]** | **5…28V** | **125V** | **250V** | **301…600V** | **Make or Break at 300V or less [VA]** |
| N150 | 10 | 10 | 2.2 | — | — | 275 |
| N300 | 10 | 10 | 2.2 | 1.1 | — | 275 |
| N600 | 10 | 10 | 2.2 | 1.1 | 0.40 | 275 |
| P150 | 5.0 | 5.0 | 1.1 | — | — | 138 |
| P300 | 5.0 | 5.0 | 1.1 | 0.55 | — | 138 |
| P600 | 5.0 | 5.0 | 1.1 | 0.55 | 0.20 | 138 |
| Q300 | 2.5 | 2.5 | 0.55 | 0.27 | 0.11 | 69 |
| Q600 | 2.5 | 2.5 | 0.55 | 0.27 | 0.11 | 69 |
| 2X P600 | 10 | 10 | 2.2 | 1.1 | 0.40 | 275 |

### NEMA Definitions for Contact Arrangements

| Contact Arrangement | Description | Diagram |
|---|---|---|
| **Form A** | A Form A contact arrangement is one that has single-pole, single-throw, normally open contacts. The function of this arrangement is to close a circuit when actuated. |  |
| **Form B** | A Form B contact arrangement is one that has single-pole, single-throw, normally closed contacts. The function of this arrangement is to open a circuit when actuated. |  |
| **Form C** | A Form C contact arrangement is one that has single-pole, double-throw contacts with three terminals - one for normally open, one for normally closed, and one common. The function of this arrangement is to transfer a circuit when actuated. |  |
| **Form X** | A Form X contact arrangement is one that has single-pole, single-throw, normally open double-make contacts. The function of this arrangement is to close a circuit when actuated. |   |
| **Form Y** | A Form Y contact arrangement is one that has single-pole single-throw normally closed double-break contacts. The function of this arrangement is to open a circuit when actuated. |   |
| **Form Z** | A Form Z contact arrangement is one that has single-pole, double-throw, contacts with four terminals — two for normally open and two for normally closed. The function of this arrangement is to open one circuit and close the other. |  |

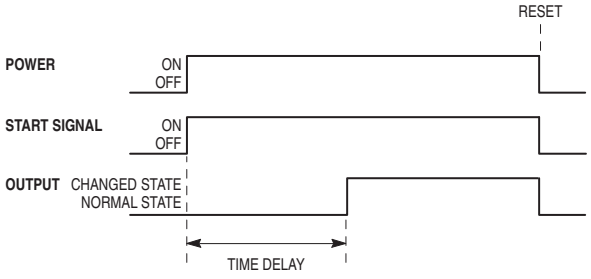
## Timing Relay Selection Criteria

Single Function Timers: Timers that have only 1 timing mode (for example, ON-Delay or OFF-Delay).

Multi-Function Timers: Timers that have 4...8 timing modes that are selected by turning the mode selection switch.

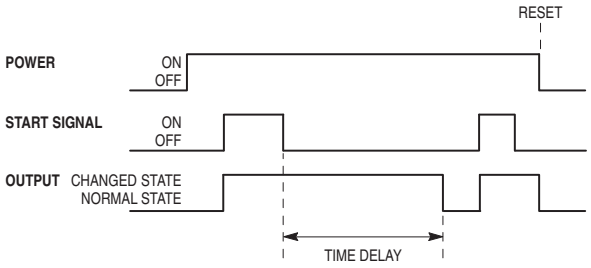
**ON-Delay or (Delay on Operate)**

When power is applied continuously (or when power and a start signal are applied), the timing cycle begins. The output contacts change state after the time delay is completed. The contacts will return to their normal state when a reset signal is applied or power is removed.



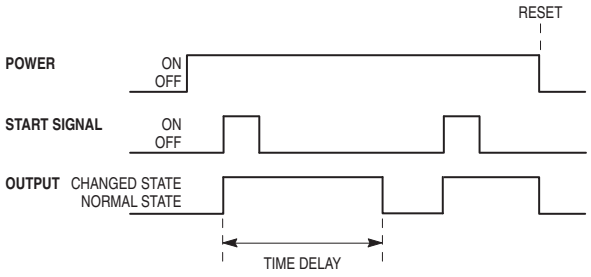

**OFF-Delay or (Delay on Release)**

Power is applied continuously. When a start signal is applied, the output contacts change state immediately. When the start signal is removed, the timing cycle begins. The output contacts will return to their normal state once the time delay is completed. Reset will occur when a reset signal is applied or power is removed.



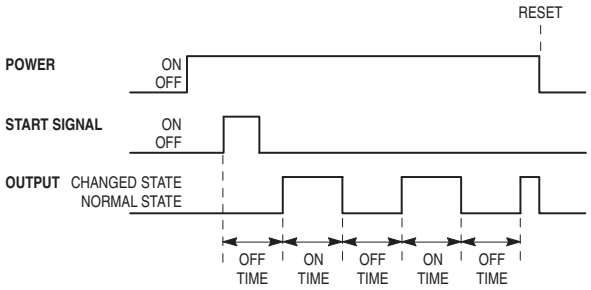

**One Shot or (Repeat Cycle)**

Power is applied continuously. When a start signal is applied, the output contacts change state immediately and the timing cycle begins. The output contacts will return to their normal state once the time delay is completed. Reset will occur when a reset signal is applied or power is removed.




**Repeat Cycle or (Flicker)**

Power is applied continuously. When a start signal is applied, the timing cycle begins. When the time delay is completed, the output contacts change state and the next timing cycle begins. This cycle will repeat until a reset signal is applied or power is removed.




## Flexibility

**Mounting —** Timing relays are available in several different models. They can be plugged into the same socket as the relay, or use a separate plug-in socket mounting.

**Contacts —** The contacts are of various types and ratings. See the appropriate specification pages for more details.

**Functionality —** Timing relays with multi-range and multi-function capability are available. Allowing you to stock one relay to cover a wide variety of applications.

**External Trigger Switch** — OFF-Delay, One-Shot, and other timer functions require an external trigger switch (from a relay or push button) to control the timing function. The external trigger switch will cause the timing function to start. In OFF-Delay, the trigger switch closes to energize the output and when the trigger switch opens the OFF-Delay starts to time out. At the end of the time delay, the output is de-energized and the output contacts return to their shelf state.

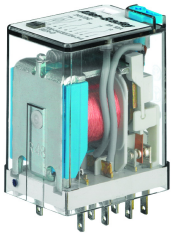
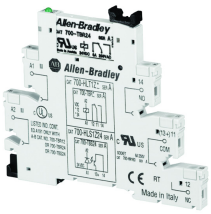
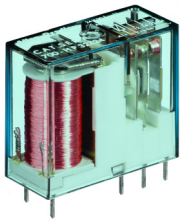
## Surge Suppression Information

| Photo | Cat. No. | For use with | Suppression Technique | Max. Relay Contact Dropout Time | Max. Transient Voltage Relative to System Voltage |
|---|---|---|---|---|---|
|  | 700-ADR | 700-HA, -HB,-HK, -HP (6…220V DC) | Diode | 3X | — |
| | 700-ADL1 | 700-HC (6…24V DC) | Diode + LED | 3X | — |
| | 700-ADL1R | 700-HB, -HA, -HK, -HP (6…24V DC) | Diode + LED | 3X | — |
| | 700-ADL2 | 700-HC (28…60V DC) | Diode + LED | 3X | — |
| | 700-ADL2R | 700-HB, -HA, -HK, -HP (28…60V DC) | Diode + LED | 3X | — |
| | 700-ADL3 | 700-HC (110…220V DC) | Diode + LED | 3X | — |
| | 700-ADL3R | 700-HB, -HA, -HK, -HP (110…220V DC) | Diode + LED | 3X | — |
| | 700-AR1 | 700-HB, -HA, -HC,-HK, -HP (6…24V AC/DC) | RC | No Effect | 3 |
| | 700-AR2 | 700-HB,-HA, -HC,-HK, -HP (110…240V AC/DC) | RC | No Effect | — |
| | 700-AV1R | 700-HB,-HA, -HC,-HK, -HP (6…24V AC) | Varistor + LED | No Effect | — |
| | 700-AV3R | 700-HB, -HA, -HC, -HK, -HP (110…240V AC) | Varistor + LED | No Effect | — |
| 700-CF Relay | 700-CF built-in | — | Diode | — | 6…10X |
|  | 100-FSC | 100C, 700-CF | R-C Ckt | No Effect | 3X |
| | 100-FSV | 100C, 700-CF | MOV | No Effect | — |
| | 100-FSD | 100C, 700-CF | Diode | 70…95 ms | 6…10X |
|  | 100-JE | 100C, 700-CF | Diode | 5X | 6…10X |
|  | 700-N5 | 700-P, 700-N | RC | No effect | 3X |
|  | 700-N24 | 700-P, 700-N | RC | No effect | 3X |
| 700-R Relay | 700-R built-in | — | Diode | — | 6…10X |
|  | 199-FSMA1, FSMA2 | 700-P, 700-H, 700-CF, 700DC-R | RC | No effect | 3X |
| | 199-FSMA9, 10, 11 | 700-P, 700-H, 700-CF, 700DC-R | MOV | No effect | — |
| | 199-FSMZ | 700-P, 700-H, 700-CF, 700DC-R | Diode | 5X | — |

# General Purpose Relays

## Product Overview

| |  |  |  |  |
|---|---|---|---|---|
| **Bulletin No.** | **700-HA** | **700-HB** | **700-HD** | **700-HF** |
| **Type** | **General-purpose Relay** | **General-purpose Relay** | **General-purpose Relay** | **General-purpose Relay** |
| **Features** | • Pin-style terminals<br>• Standard ON/OFF flag indicator<br>• Electrical schematic on face<br>• Clear cover for visual inspection<br>• Optional push-to-test and manual override<br>• Optional LED | • Blade-style quick connect terminals<br>• Standard ON/OFF flag indicator<br>• Electrical schematic on face<br>• Clear cover for visual inspection<br>• Optional push-to-test and manual override<br>• Optional LED | • Flange-mounted<br>• Blade-style quick connect terminals<br>• Clear cover for visual inspection | • Square-base<br>• Plug-in quick connect solder terminals<br>• Optional push-to-test<br>• Optional LED |
| **Contact Ratings** | | | | |
| **Contact Form** | DPDT, 3PDT | DPDT, 3PDT | DPDT, 3PDT | DPDT, 4 PDT |
| **Contact Type** | Single | Single | Single | Single |
| **Contact Material** | AgNi, AgNi + Gold | AgCdO | AgCdO | AgCdO |
| **Operating Current, Under Resistant Load, Max** | 700-HA: 10 A<br>700-HAX: 6 A | 15 A | 15 A | 10 A |
| **Permissible Load, min** | 700-HA: 10V, 5 mA<br>700-HAX: 6V 1 mA | 10V, 10 mA | 10V, 10 mA | 5V, 100 mA |
| **Coil Ratings** | | | | |
| **Coil Voltage** | AC: 6, 12, 24, 48, 110, 120, 230, 240, 277V<br>DC: 6, 12, 24, 36, 48, 60, 80, 110, 125, 140, 220V | AC: 6, 12, 24, 120, 240V<br>DC: 6, 12, 24, 48, 110V | AC: 6, 12, 24, 120, 208, 240V<br>DC: 6, 12, 24, 48, 110V | AC: 6, 12, 24, 120, 240V<br>DC: 6, 12, 24, 48, 110V |
| **Permissible Coil Voltage Variation** | 80…110% of nom voltage at 50 Hz<br>80…110% of nom voltage at 60 Hz<br>80…110% of nom voltage at DC | | | 85…110% of nom voltage at 50 Hz<br>85…110% of nom voltage at 60 Hz<br>80…110% of nom voltage at DC |
| **Electrical Ratings** | | | | |
| **Dielectric Withstand Voltage** | Pole-to-pole: 2000V<br>Contact-to-coil: 2000V<br>Contact-to-frame: 2000V | Pole-to-pole: 2500V<br>Contact-to-coil: 4000V<br>Contact-to-frame: 2500V | Pole-to-pole: 2500V<br>Contact-to-coil: 4000V<br>Contact-to-frame: 2500V | Pole-to-pole: 1500V<br>Contact-to-coil: 1500V<br>Contact-to-frame: 1500V |
| **Electrical Service Life (Cycles)** | 100,000 min | 100,000 min | 100,000 min | 200,000 min<br>500,000 min (DPDT) |
| **Reference** | | | | |
| **Certifications** | CE, cULus, cURus, CSA, Lloyds | CE, cULus, cURus, CSA, Lloyds | CE, UR, CSA, Lloyds | CE, UR, CSA |
| **Socket Catalog Numbers** | 700-HN100, 700-HN101, 700-HN125, 700-HN126, 700-HN204, 700-HN205 | 700-HN153, 700-HN154 | — | 700-HN262, 700-HN264 |
| **Page** | 12 | 22 | 28 | 32 |

| |  |  |  |  |
|---|---|---|---|---|
| **Bulletin Number** | **700-HC** | **700-HK** | **700-HL** | **700-HP** |
| **Type** | Interposing/Isolation Relay | Interposing/Isolation Relay | Interposing/Isolation Relay | Interposing/Isolation Relay |
| **Features** | • Blade-style terminals<br>• Standard ON/OFF flag indicator<br>• Electrical schematic on face<br>• Clear cover for visual inspection<br>• Optional push-to-test and manual override<br>• Optional LED | • Optional pilot light<br>• Retainer clip (comes with socket)<br>• Low switching capacity<br>• Push-to-test and manual override | • Ideal for PLC Interfaces<br>• Built-in Coil Surge Protection<br>• Fully Assembled Relay/Sockets<br>• Standard LED<br>• Relay or Solid-state Output<br>• Optional: Leakage Current<br>• Suppression Solution | • PCB "Pin Style" mounting<br>• 5 mm pin spacing |
| **Contact Ratings** | | | | |
| **Contact Form** | DPDT, 4PDT | SPDT, DPDT | SPDT 1 N.O. (SSR) | DPDT |
| **Contact Type** | Single | Single | Single | Single |
| **Contact Material** | AgNi, AgNi + Gold | AgNi, AgNi + Gold | AgSnO | AgNi, AgNi + Gold |
| **Operating Current, Under Resistant Load, Max** | 10 A (DPDT)<br>7 A (4PDT) | 8 A (DPDT), 16 A (SPDT) | 6 A (SPDT), 2 A (SSR DC output),<br>2 A (SSR AC output) | 8 A |
| **Permissible Load, min** | 10V, 10 mA (Gold), 5V, 10 mA or<br>25V, 2 mA (Silver) | 5V 60 mA (Silver), 5V 10 mA (Gold) | 12V 6 mA (72 mW) Silver<br>8V, 2.5 mA (20 mW) Gold | 5V 5 mA (50 mW) Gold,<br>5V 5 mA (300 mW) Silver |
| **Coil Ratings** | | | | |
| **Coil Voltage** | **AC:** 6, 12, 24, 120, 240V<br>**DC:** 6, 12, 24, 48, 110V | **AC:** 6, 12, 24, 120, 240V<br>**DC:** 6, 12, 24, 48, 110V | **AC:** 12, 24, 48, 110, 120, 230, 240V<br>**DC:** 12, 24, 48, 125, 230, 240V | **AC:** 6, 12, 24, 120, 240V<br>**DC:** 6, 12, 24, 48, 110V |
| **Permissible Coil Voltage Variation** | 80…110% of nom voltage at 50 Hz<br>80…110% of nom voltage at 60 Hz<br>80…110% of nom voltage at DC | 80…110% of nom voltage at 50 Hz<br>80…110% of nom voltage at 60 Hz<br>73…110% of nom voltage at DC | 85…110% of nom voltage at 50 Hz<br>85…110% of nom voltage at 60 Hz<br>80…110% of nom voltage at DC | 80…110% of nom voltage at 50 Hz<br>80…110% of nom voltage at 60 Hz<br>73…150% of nom voltage at DC |
| **Electrical Ratings** | | | | |
| **Dielectric Withstand Voltage** | Pole-to-pole: 1000V<br>Contact-to-coil: 2000V<br>Contact-to-frame: 2000V | Pole-to-pole: 1500V<br>Contact-to-coil: 1500V<br>Contact-to-frame: 1500V | Pole-to-pole: 1000V<br>Contact-to-coil: 4000V<br>Contact-to-frame: 1500V | Pole-to-pole: 2000V<br>Contact-to-coil: 5000V |
| **Electrical Service Life (Cycles)** | 100,000 min | 100,000 min | 100,000 min | 100,000 min |
| **Reference** | | | | |
| **Certifications** | CE, cULus, cURus, CSA, Lloyds | CE, UL, UR, CSA | CE, cURus, cULus, ABS | CE, cULus, cURus, CSA, Lloyds |
| **Socket Catalog Numbers** | 700-HN103, 700-HN128, 700-HN104 | 700-HN121, 700-HN221, 700-HN122, 700-HN222, 700-HN223, 700-HN224 | — | 700-HN123, 700-HN230 |
| **Page Number** | 39 | 44 | 50 | 70 |

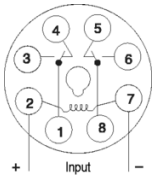
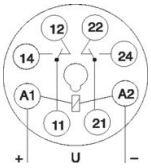
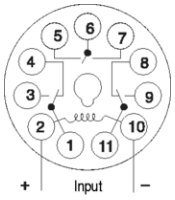
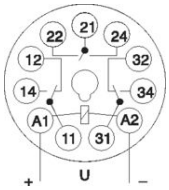
| |  |  |  |
|---|---|---|---|
| **Bulletin Number** | **700-HJ** | **700-HG** | **700-HHF** |
| **Type** | Magnetic Latching Relay | Power Relay | Power Relay |
| **Features** | • Socket mounted<br>• Ideal for lighting applications | • Panel mount with screw terminals<br>• Optional magnetic blowouts for switching DC loads<br>• Optional snap action switch | • Flange mounted<br>• Optional LED |
| **Contact Ratings** | | | |
| **Contact Form** | SPDT, DPDT (Single or Dual Coil) | SPST-N.O.-DM, SPDT, DPST-N.O., DPDT | SPST-NO-DM, DPDT, 3PDT |
| **Contact Type** | Single | Single | Single |
| **Contact Material** | AgCdO | AgNi | AgNi |
| **Operating Current, Under Resistant Load, Max** | 10 A | 40 A | 20 A (3PDT), 25 A (DPDT), 30 A (SPDT) |
| **Permissible Load, min** | 10V 50 mA | 10V 50 mA | 10V 50 mA<br>10V 100 mA (3PDT) |
| **Coil Ratings** | | | |
| **Coil Voltage** | **AC:** 24V, 120V, 240V<br>**DC:** 12V, 24V | **AC:** 24V, 120V, 240V, 277V, 480V<br>**DC:** 12V, 24V, 48V, 110V, 220V, 250V | **AC:** 24V, 120V, 240V<br>**DC:** 6V, 12V, 24V |
| **Permissible Coil Voltage Variation** | 85…110% of nom voltage at 50 Hz<br>85…110% of nom voltage at 60 Hz<br>80…110% of nom voltage at DC | 85…110% of nom voltage at 50 Hz<br>85…110% of nom voltage at 60 Hz<br>80…110% of nom voltage at DC | 85…110% of nom voltage at 50 Hz<br>85…110% of nom voltage at 60 Hz<br>80…110% of nom voltage at DC |
| **Electrical Ratings** | | | |
| **Dielectric Withstand Voltage** | Pole-to-pole: 1500V AC Contact-to-coil: 1500V AC Contact-to-frame: 1500V AC | Pole-to-pole: 2200V AC Contact-to-coil: 2200V AC Contact-to-frame: 2200V AC | Pole-to-pole: 2200V AC Contact-to-coil: 2200V AC Contact-to-frame: 2200V AC |
| **Electrical Service Life (Cycles)** | 100,000 minimum | 100,000 minimum | 100,000 minimum |
| **Reference** | | | |
| **Certifications** | CE, UR, CSA | CE, UL, CSA | CE, UR, CSA |
| **Socket Catalog Numbers** | 700-HN153, 700-HN154 | — | — |
| **Page Number** | 77 | 81 | 86 |

## 700-HA General-purpose Relay



- 10 A contact rating
- DPDT, 3PDT
- Pin-style terminals
- Standard ON/OFF flag indicator
- Options: LED, push-to-test and manual override, socket-mounted surge suppressor module, or multi-function timer
- Contact choices: standard silver nickel, or bifurcated silver nickel with gold plating

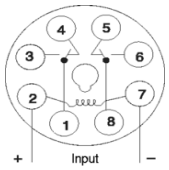
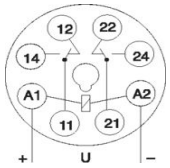
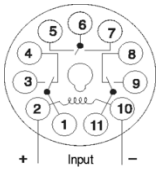
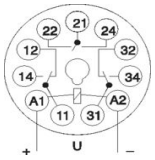
### Tube Base Relay with PIN Terminals (Single Contact) — Mechanical ON/OFF Indicator Included(1)

| Description | Contact Rating | Wiring Diagrams | | Coil Voltage | Cat. No.(1) |
|---|---|---|---|---|---|
| | | U.S./Canada | International | | |
| DPDT<br>2-pole<br>2 Form C<br>Single AgNi Contact | 10 A<br>B300 |  |  | 6V AC | 700-HA32A06 |
| | | | | 12V AC | 700-HA32A12 |
| | | | | 24V AC | 700-HA32A24 |
| | | | | 120V AC | 700-HA32A1 |
| | | | | 240V AC | 700-HA32A2 |
| | | | | 277V AC | 700-HA32A27 |
| | | | | 6V DC | 700-HA32Z06 |
| | | | | 12V DC | 700-HA32Z12 |
| | | | | 24V DC | 700-HA32Z24 |
| | | | | 36V DC | 700-HA32Z36 |
| | | | | 48V DC | 700-HA32Z48 |
| | | | | 60V DC | 700-HA32Z60 |
| | | | | 80V DC | 700-HA32Z80 |
| | | | | 110V DC | 700-HA32Z1 |
| | | | | 125V DC | 700-HA32Z01 |
| Sockets | | 700-HN125 | 700-HN100<br>700-HN204 | 140V DC | 700-HA32Z3 |
| | | | | 220V DC | 700-HA32Z2 |
| 3PDT<br>3-pole<br>3 Form C<br>Single AgNi Contact | 10 A<br>B300 |  |  | 6V AC | 700-HA33A06 |
| | | | | 12V AC | 700-HA33A12 |
| | | | | 24V AC | 700-HA33A24 |
| | | | | 120V AC | 700-HA33A1 |
| | | | | 240V AC | 700-HA33A2 |
| | | | | 6V DC | 700-HA33Z06 |
| | | | | 12V DC | 700-HA33Z12 |
| | | | | 24V DC | 700-HA33Z24 |
| | | | | 48V DC | 700-HA33Z48 |
| | | | | 60V DC | 700-HA33Z60 |
| | | | | 80V DC | 700-HA33Z80 |
| | | | | 110V DC | 700-HA33Z1 |
| | | | | 125V DC | 700-HA33Z01 |
| Sockets | | 700-HN126 | 700-HN101<br>700-HN205 | 140V DC | 700-HA33Z3 |
| | | | | 220V DC | 700-HA33Z2 |

(1) LED Option: Add suffix (-4) to the selected 700-HA Relay Cat. No., except for the 240V AC Units, add (-4L). Push-to-test, Manual Override, and LED Option: Add suffix (-3-4) to the selected 700-HA Relay Cat. No., except for the 240V AC units, add (-3-4L). Push-to-test and Manual Override option: Add suffix (-3) to the selected 700-HA relay.
LED not available for 220V DC and 277V AC coils.

(1) For Time Modules and Surge Suppressor Modules, see Accessories.

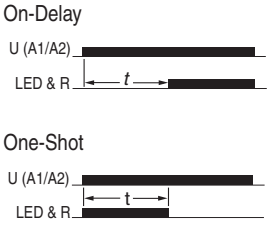
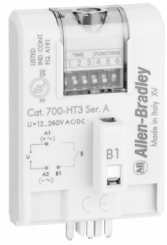
## Tube Base Relay with PIN Terminals (Bifurcated Contacts with Gold Overlay) — Mechanical ON/OFF Indicator Included

| Description | Contact Rating | Wiring Diagrams | | Coil Voltage | Cat. No |
|---|---|---|---|---|---|
| | | U.S./Canada | International | | |
| DPDT<br>2-Pole<br>2 Form C<br>Bifurcated AgNi Contacts with Gold Plating | 6 A |  |  | 6V AC | 700-HAX2A06 |
| | | | | 12V AC | 700-HAX2A12 |
| | | | | 24V AC | 700-HAX2A24 |
| | | | | 120V AC | 700-HAX2A1 |
| | | | | 240V AC | 700-HAX2A2 |
| | | | | 277V AC | 700-HAX2A27Δ |
| | | | | 6V DC | 700-HAX2Z06 |
| | | | | 12V DC | 700-HAX2Z12 |
| | | | | 24V DC | 700-HAX2Z24 |
| | | | | 36V DC | 700-HAX2Z36 |
| | | | | 48V DC | 700-HAX2Z48 |
| | | | | 110V DC | 700-HAX2Z1 |
| Sockets | | 700-HN125 | 700-HN100<br>700-HN204 | 125V DC | 700-HAX2Z01 |
| | | | | 140V DC | 700-HAX2Z3 |
| 3PDT<br>3-Pole<br>3 Form C<br>Bifurcated AgNi Contacts with Gold Plating | 6 A |  |  | 6V AC | 700-HAX3A06 |
| | | | | 12V AC | 700-HAX3A12 |
| | | | | 24V AC | 700-HAX3A24 |
| | | | | 120V AC | 700-HAX3A1 |
| | | | | 240V AC | 700-HAX3A2 |
| | | | | 6V DC | 700-HAX3Z06 |
| | | | | 12V DC | 700-HAX3Z12 |
| | | | | 24V DC | 700-HAX3Z24 |
| | | | | 48V DC | 700-HAX3Z48 |
| | | | | 110V DC | 700-HAX3Z1 |
| Sockets | | 700-HN126 | 700-HN101<br>700-HN205 | 125V DC | 700-HAX3Z01 |
| | | | | 140V DC | 700-HAX3Z3 |

## Accessories - 700-HA Relays

| Photo | Description | Pkg. Qty. | Cat. No. |
|---|---|---|---|
|  | **Screw Terminal Tube Base Socket — Panel or DIN Rail Mounting; Guarded Terminal Construction.** 8-Pin for use with DPDT 700-HA Relays, -HX Timing Relays, -HT (On-Delay), and -HRM, -HRC and -HV (Repeat Cycle) Timing Relays. | 10 | 700-HN100 |
|  | **Screw Terminal Tube Base Socket — Panel or DIN Rail Mounting; Open Style Construction.** 8-Pin for use with DPDT 700-HA Relays, -HT (On-Delay) and -HRM, -HRC, and -HV (Repeat Cycle) Timing Relays. No retainer clip required. | 10 | 700-HN125 |
|  | **Screw Terminal Tube Base Sockets — Panel or DIN Rail Mounting; Guarded Terminal Construction.** 11-pin for use with 3PDT 700-HA relays. | 10 | 700-HN101 |
|  | **Screw Terminal Tube Base Sockets — Panel or DIN Rail Mounting; Open Style Terminal Construction.** 11-pin for use with 3PDT 700-HA relays. No retainer clip required. | 10 | 700-HN126 |
|  | **8-Pin Socket — Can Be Used With or Without Timing Attachment or Surge Suppressor** Screw Terminal Tube Base Sockets — panel or DIN Rail mounting. Guarded terminal construction. Used with DPDT 700-HA Relays. | 10 | 700-HN204 |
| | **11-Pin Socket — Can Be Used With or Without Timing Module or Surge Suppressor.** Screw Terminal Tube Base Sockets — panel or DIN Rail mounting. Guarded terminal construction. Used with 3PDT 700-HA relays. | 10 | 700-HN205 |
|  | **DIN (#3) symmetrical hat rail** 35 x 7.5 x 1 m | 10 | 199-DR1 |

| Photo | Description | Pkg. Qty. | Cat. No. |
|---|---|---|---|
|  | **Diode Surge Suppressor** Voltage Range: 6…220V DC used with 700-HN204 and 700-HN205 socket | 10 | 700-ADR |
| | **Diode with LED Surge Suppressor** Voltage Range: 6…24V DC used with 700-HN204 and 700-HN205 socket | 10 | 700-ADL1R |
| | **Diode with LED Surge Suppressor** Voltage Range: 28…60V DC used with 700-HN204 and 700-HN205 socket | 10 | 700-ADL2R |
| | **Diode with LED Surge Suppressor** Voltage Range: 110…220V DC used with 700-HN204 and 700-HN205 socket | 10 | 700-ADL3R |
| | **Varistor with LED Surge Suppressor** Voltage Range: 6…24V AC used with 700-HN204 and 700-HN205 socket | 10 | 700-AV1R |
| | **Varistor with LED Surge Suppressor** Voltage Range: 110…240V AC used with 700-HN204 and 700-HN205 socket | 10 | 700-AV3R |
| | **RC Surge Suppressor** Voltage Range: 6…24V AC/DC used with 700-HN204 and 700-HN205 socket | 10 | 700-AR1 |
| | **RC Surge Suppressor** Voltage Range: 110…240V AC/DC used with 700-HN204 and 700-HN205 socket | 10 | 700-AR2 |

| Photo | Description | | | Pkg. Qty. | Cat. No. |
|---|---|---|---|---|---|
|  | **Timing Module**<br>On-Delay or One-Shot selectable voltage range:<br>12…24V AC/DC used with sockets that accept plug-in accessory modules. |  | | 1 | 700-AT3 |
| | **Timing Module**<br>On-Delay or One-Shot selectable voltage range:<br>110…125V AC used with sockets that accept plug-in accessory modules. | | | 1 | 700-AT3A1 |
| | **Timing Module**<br>On-Delay or One-Shot selectable voltage range:<br>230…240V AC used with sockets that accept plug-in accessory modules. | | | 1 | 700-AT3A2 |
|  | **Multi-Function Multi-Range Time Module**<br>Voltage range 12…240V AC 50/60 Hz and 12…240V DC, with a voltage variation of 85…110%.<br>Repeat accuracy of +/- 1%. Reset time <50 ms. For use with 700-HA relays using 700-HN204 and 700-HN205 sockets. Refer to Specifications - 700-HT3 Time Module on page 17. | | | 1 | 700-HT3 |
| | 1. 1 s | 0.05…1 s |  | | |
| | 2. 10 s | 0.5…10 s |  | | |
| | 3. 100 s | 5…100 s |  | | |
| | 4. 10 min | 0.5…10 min |  | | |
| | 5. 100 min | 5…100 min |  | | |
| | 6. 10 hours | 0.5…10 h |  | | |
| | 7. 100 hours | 5…100 h |  | | |
| | 8. LED Indicator | | | | |

## Socket and Retainer Clip Reference

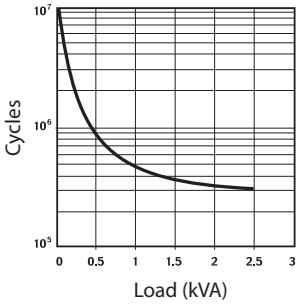
| Relay Type | Socket | Retainer Clip |
|---|---|---|
| 700-HA32<br>700-HAX2 | 700-HN100<br>700-HN125<br>700-HN204 | 700-HN157<br>Not Required<br>700-HN157 |
| 700-HA33<br>700-HAX3 | 700-HN101<br>700-HN126<br>700-HN205 | 700-HN157<br>Not Required<br>700-HN157 |

## Specifications - 700-HA Relays

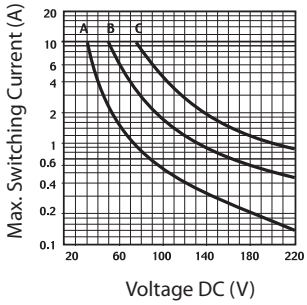
| Attribute | | 700-HA | | |
|---|---|---|---|---|
| **Electrical Ratings** | | | | |
| **Pilot Duty Rating** (1) | | NEMA B300 | | |
| **Rated Thermal Current ($I_{th}$)** | | HA = 10 A – 120V, 240V; HAX = 6 A – 120V, 240V | | |
| **Rated Insulation Voltage ($U_i$)** | | 250V IEC – 300V UL/CSA | | |
| **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 nom voltage at 50 Hz, 80…110% of nom voltage at 60 Hz, 80…110% of nom voltage at DC | | |
| **Coil Consumption ±10%** | **AC Coils** | 50 Hz | 60 Hz | |
| | **Inrush** | 3.3VA | 2.85VA | |
| | **Sealed** | 2.2VA | 1.9VA | |
| | **DC Coils** | 1.3 W | | |
| **Must Dropout Voltage** | | 20% of nom V AC; 10% of nom V DC | | |
| **Max. Contact Resistance** | | 50 MΩ (700-HA), 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 Lifecycles (AC/DC)** | | > 20 x $10^6$/ 50 x $10^6$ | | |
| **Switching Frequency Operations** | | 3600/HR | | |
| **Coil Voltages** | | See Product Selection | | |
| **Operating Time** | **Pickup** | 12 ms | | |
| | **Dropout** | 12 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 (–40…+158 °F) | |
| | **Storage** | AC/DC | –40…+100 °C (–40…+212 °F) | |
| **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 700-HN sockets noted (File No. E3125, Guide NLDX/NLDX7), CE Marked, CSA Certified, UR Certified (File 229473) | | |
| **Standards** | | UL508, CSA C22.2 No. 14, EN 61810-1 | | |

(1) See NEMA Ratings and Test Values on page 5

## Relay Performance Graphs

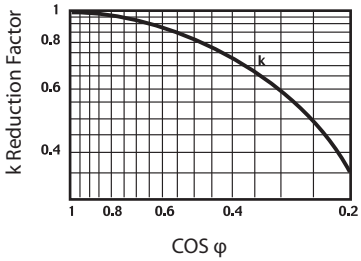



Contact life vs. AC1 load at 1,800 cycles/h




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

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




Load reduction factor vs. cos φ

## Specifications - 700-HT3 Time Module

| Attribute | | 700-HT3 |
|---|---|---|
| **Electrical Ratings** | | |
| **Operating Voltage Range** | | 12…240V AC (50/60 Hz) 12…240V DC |
| **Power Consumption** | | 0.1 W (12V)<br>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 …14 AWG)<br>2.0 x 0.2 $mm^2$…1.5 $mm^2$ (24…16 AWG) |
| **Input Terminal Torque Range** | | 0.45…0.8 N•m (4…7 lb•in) |
| **Status Indicator** | | Red |
| **Repeat Accuracy** (1) | | ±1% |
| **Recovery Time** | | <50 ms |
| **Selectable Timing Ranges** | | Three DIP switches, seven ranges (set from 5…100% of range):<br>1 s, 10 s, 100 s, 10 min, 100 min, 10 h, 100 h |
| **Selectable Timing Modes** | | Three DIP switches, eight modes:<br>1. PowerOn–Delay<br>2. Power On One-Shot<br>3. Power On Repeat Cycle, On Start<br>4. Signal On-Delay and Signal Off-Delay<br>5. Signal Off-Delay<br>6. Signal On-One-Shot<br>7. Signal Off-One-Shot<br>8. Signal On and Signal Off Watchdog Monitor |
| **Adjustable Trimmer Scale Accuracy** | | ±5% of Time Range |
| **Environmental** | | |
| **Temperature** | **Operating** | –20…+50 °C (–4 …+122 °F) |
| | **Storage** | –55…+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 |

(1) At constant voltage and temperature.

## Timing Charts - 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 light-emitting diode)

**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.



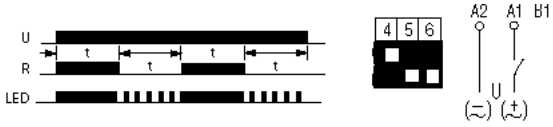

**2. Power On One-shot**

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.



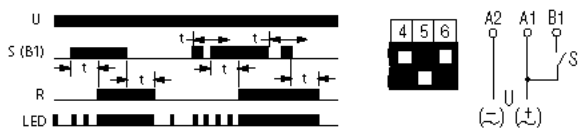

**3. Power On Repeat Cycle, On Start**

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 repeats 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 completed the relay contacts (R) change state. Opening the signal starts the time delay, after the time delay is completed 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.



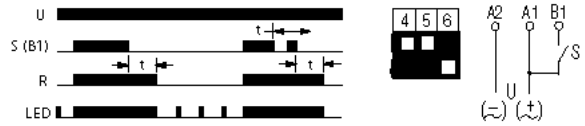

## Timing Charts -Cat. No. 700-HT3 Timing Modes, Time Description, Timing Charts, and DIP Switch Selections

**Terms:**

**U** is Power Input
**R** is Relay Output
**S** Signal, +A1 Socket, B1 Timer
**t** is the resulting Time Delay (Red light-emitting diode)

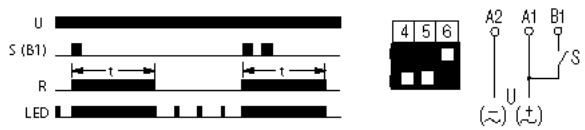
**5. Signal Off-delay**

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.



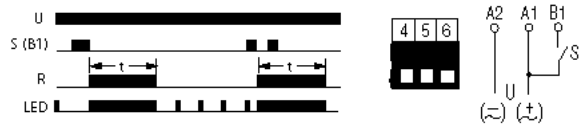

**6. Signal On One-shot**

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.



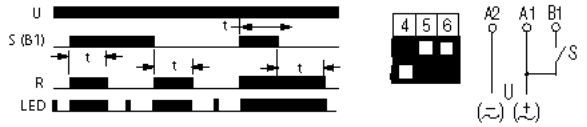

**7. Signal Off One-shot**

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.



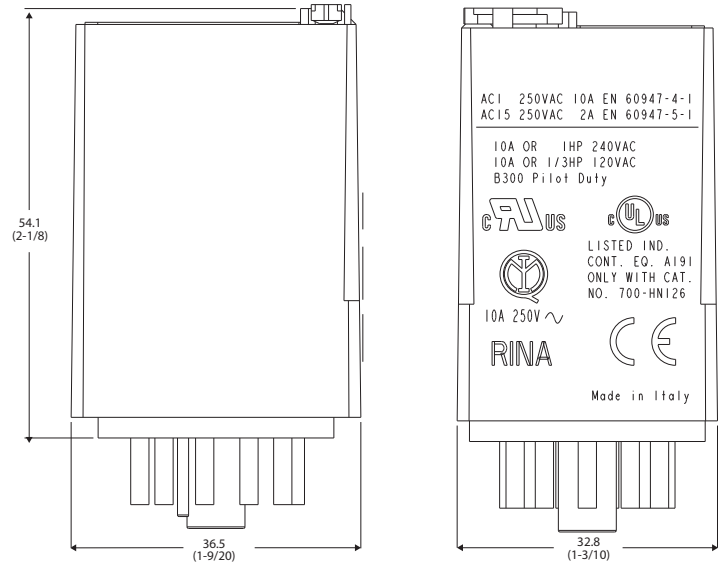

**8. Signal On and Signal Off Watchdog Monitor**

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 completed, 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 causes the relay contacts to remain energized. Contacts return to their shelf state when power is removed.

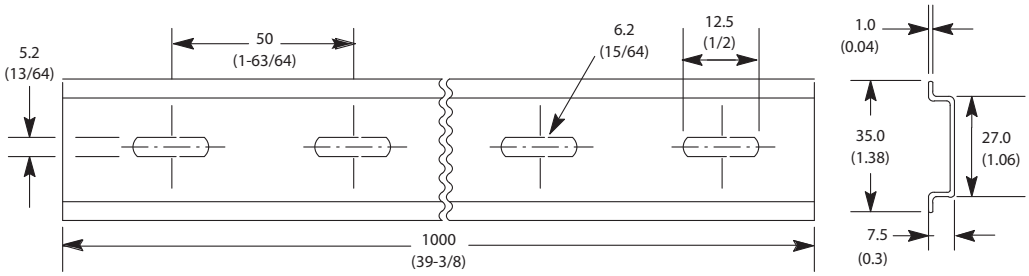


## Dimensions -700-HA Relays

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




700-HA Relay

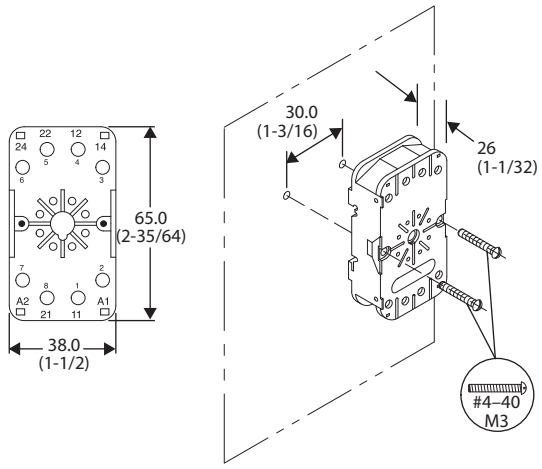



Cat. No. 199-DR1 DIN Mounting Rail Series B

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

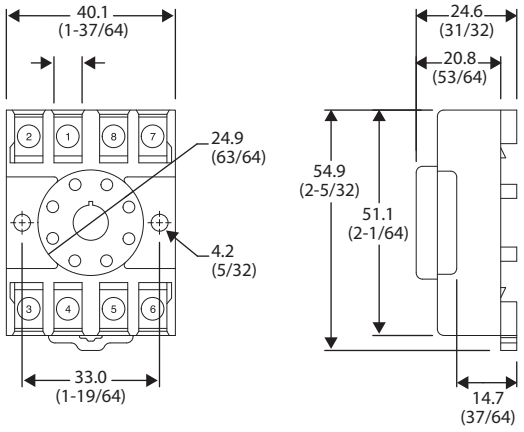
| Cat. No. | A | B | C | D | Approx. Shipping Wt. |
|---|---|---|---|---|---|
| 199-DR1 | 35<br>(1-3/8) | 27<br>(1-1/16) | 7.5<br>(19/64) | 1.02<br>(1/64) | 1.85 kg<br>(4.07 lb) (10/pkg) |
| 199-DR4 | 35<br>(1-3/8) | 27<br>(1-1/16) | 15<br>(19/32) | 2.3<br>(3/32) | 3.68 kg<br>(8 lb) (5/pkg) |

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



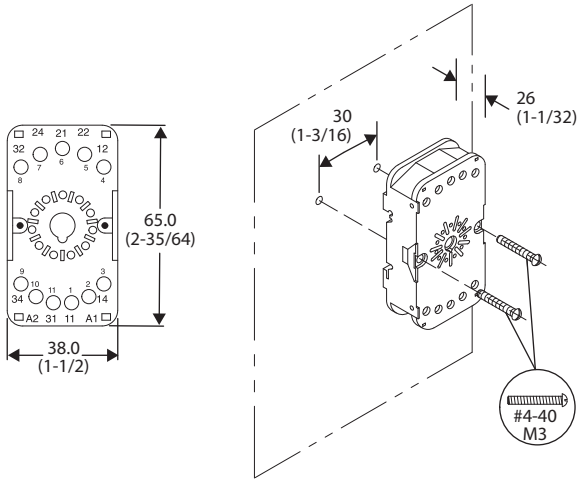

Cat. No. 700-HN100 Panel Mounting

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)



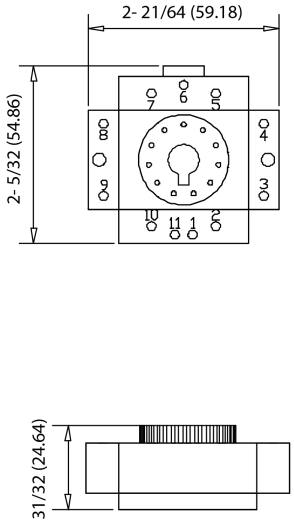

Cat. No. 700-HN125

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-HN101 Panel Mounting

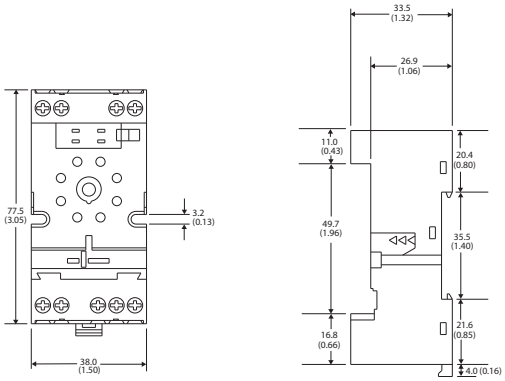
Wire Size: 2 x 2.5 $mm^2$
Single Wire – Up to #12 AWG
Double Wire – 2 x 2.5 $mm^2$ (#2–14 AWG…#2–20 AWG)
(Either Solid or Stranded)
Strip Length: 9 mm (3/8 in.) – Torque: 0.8 N•m (7 lb•in)




Cat. No. 700-HN126

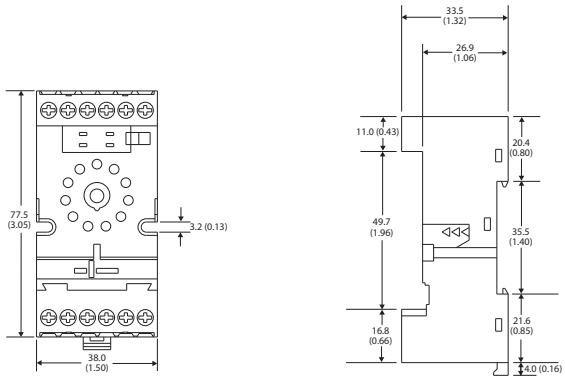
Wire Size: 2 x 2.5 $mm^2$
Single Wire – Up to #12 AWG
Double Wire – 2 x 2.5 $mm^2$ (#2–14 AWG…#2–20 AWG)
(Either Solid or Stranded)
Strip Length: 9 mm (3/8 in.) – Torque: 0.8 N•m (7 lb•in)

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



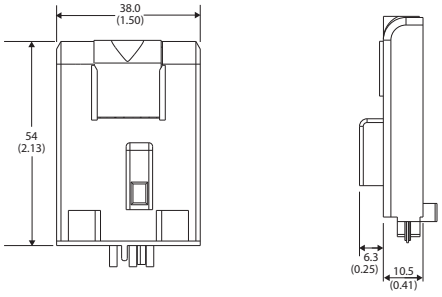

Cat. No. 700-HN204

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



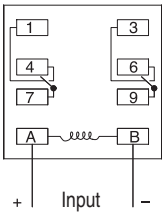
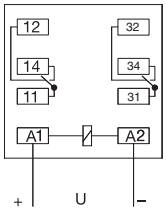
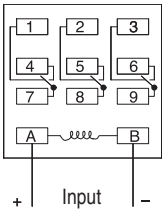
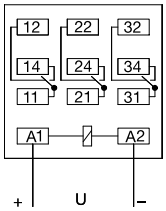

Cat. No. 700-HT3

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)

## 700-HB Square Base Relay

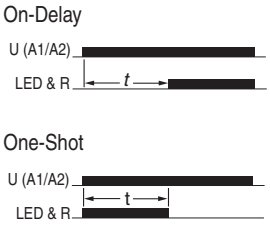


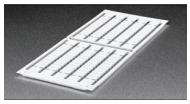
- 15 A contact rating
- DPDT, 3PDT
- Blade-style quick connect /solder terminals (Faston 187 - 4.8 x 0.5 mm)
- Standard ON/OFF flag indicator
- Options: LED, push-to-rest, and manual override

| Photo | Description | Contact Rating | Wiring Diagrams | | Coil Voltage | Cat. No.(1) |
|---|---|---|---|---|---|---|
| | | | U.S./Canada | International | | |
|  | DPDT<br>2-Pole<br>2 Form C<br>Single AgCdO Contact | 15 A<br>B300 |  |  | 6V AC | 700-HB32A06 |
| | | | | | 12V AC | 700-HB32A12 |
| | | | | | 24V AC | 700-HB32A24 |
| | | | | | 120V AC | 700-HB32A1 |
| | | | | | 240V AC | 700-HB32A2 |
| | | | | | 6V DC | 700-HB32Z06 |
| | | | | | 12V DC | 700-HB32Z12 |
| | | | | | 24V DC | 700-HB32Z24 |
| | | | | | 48V DC | 700-HB32Z48 |
| | Sockets | | 700-HN154 | 700-HN153 | 110V DC | 700-HB32Z1 |
| | 3PDT<br>3-Pole<br>3 Form C<br>Single AgCdO Contact | 15 A<br>B300 |  |  | 6V AC | 700-HB33A06 |
| | | | | | 12V AC | 700-HB33A12 |
| | | | | | 24V AC | 700-HB33A24 |
| | | | | | 120V AC | 700-HB33A1 |
| | | | | | 240V AC | 700-HB33A2 |
| | | | | | 6V DC | 700-HB33Z06 |
| | | | | | 12V DC | 700-HB33Z12 |
| | | | | | 24V DC | 700-HB33Z24 |
| | | | | | 48V DC | 700-HB33Z48 |
| | Sockets | | 700-HN154 | 700-HN153 | 110V DC | 700-HB33Z1 |

(1) LED Option: Add suffix (-4) to the selected 700-HB Relay Cat. No., except for the 240V AC Units, add (-4L).
Push-to-test, Manual Override, and LED Option: Add suffix (-3-4) to the selected 700-HB Relay Cat. No., except for the 240V AC units, add (-3-4L)
Push-to-test and Manual Override option: Add suffix (-3) to the selected 700-HB relay.

## Accessories - 700-HB Relays

| Photo | Description | | Pkg. Qty. | Cat. No. |
|---|---|---|---|---|
|  | **Diode Surge Suppressor** Voltage Range: 6…220V DC used with 700-HN204 and 700-HN205 socket | | 10 | 700-ADR |
| | **Diode with LED Surge Suppressor** Voltage Range: 6…24V DC used with 700-HN204 and 700-HN205 socket | | 10 | 700-ADL1R |
| | **Diode with LED Surge Suppressor** Voltage Range: 28…60V DC used with 700-HN204 and 700-HN205 socket | | 10 | 700-ADL2R |
| | **Diode with LED Surge Suppressor** Voltage Range: 110…220V DC used with 700-HN204 and 700-HN205 socket | | 10 | 700-ADL3R |
| | **Varistor with LED Surge Suppressor** Voltage Range: 6…24V AC used with 700-HN204 and 700-HN205 socket | | 10 | 700-AV1R |
| | **Varistor with LED Surge Suppressor** Voltage Range: 110…240V AC used with 700-HN204 and 700-HN205 socket | | 10 | 700-AV3R |
| | **RC Surge Suppressor** Voltage Range: 6…24V AC/DC used with 700-HN204 and 700-HN205 socket | | 10 | 700-AR1 |
| | **RC Surge Suppressor** Voltage Range: 110…240V AC/DC used with 700-HN204 and 700-HN205 socket | | 10 | 700-AR2 |
|  | **Timing Module**<br>On-Delay or One-Shot selectable voltage range: 12…24V AC/DC used with sockets that accept plug-in accessory modules. |  | 1 | 700-AT3 |
| | **Timing Module**<br>On-Delay or One-Shot selectable voltage range: 110…125V AC used with sockets that accept plug-in accessory modules. | | 1 | 700-AT3A1 |
| | **Timing Module**<br>On-Delay or One-Shot selectable voltage range: 230…240V AC used with sockets that accept plug-in accessory modules. | | 1 | 700-AT3A2 |
|  | **Multi-Function Multi-Range Time Module**<br>Voltage range 12…240V AC 50/60 Hz and 12…240V DC, with a voltage variation of 85…110%.<br>Repeat accuracy of +/- 1%. Reset time <50 ms. For use with 700-HB relays using 700-HN153 sockets.<br>Refer to Specifications - 700-HT3 Time Module on page 17 | | 1 | 700-HT3 |
| | 1. 1 s | 0.05 s…1 s | | |
| | 2. 10 s | 0.5 s…10 s | | |
| | 3. 100 s | 5 s…100 s | | |
| | 4. 10 min | 0.5 min…10 min | | |
| | 5. 100 min | 5 min…100 min | | |
| | 6. 10 hours | 0.5 h…10 h | | |
| | 7. 100 hours | 5 h…100 h | | |
| | 8. LED Indicator | | | |

| Photo | Description | Pkg. Qty. | Cat. No. |
|---|---|---|---|
|  | **Screw Terminal Socket — Panel or DIN Rail Mounting. Guarded Terminal Construction**<br>11-blade socket for use with 700-HB relays. This socket has coil and contact separation as well as the ability to use optional plug-in modules (700-A___ accessories, LED, surge suppression, timing modules). | 10 | 700-HN153 |
|  | **Screw Terminal Base Socket — Panel or DIN Rail Mounting. Open Style Construction**<br>11-blade for use with 700-HB relays. | 10 | 700-HN154 |
|  | **DIN (#3) symmetrical hat rail**<br>35 x 7.5 x 1 m | 10 | 199-DR1 |
|  | **Retainer Clip**<br>**For Cat. Nos. 700-HN154 Sockets with 700-HB Relays**<br>Secures relay in socket. Order must be for 10 clips or multiples of 10. | 10 | 700-HN156 |
| | **Retainer Clip**<br>**For Cat. Nos. 700-HN153 Sockets with 700-HB Relays**<br>Secures relay in socket. Order must be for 10 clips or multiples of 10. | 10 | 700-HN158 |
|  | **Relay Identification Snap-in Markers**<br>Snap-in markers fit on top of product covers. The following are blank cards. Squares slip into molded slot on top of product covers. | 100 | 1492-MS5X12<br>1492-MS6X9<br>1492-MS6X12<br>1492-MS8X9<br>1492-MS8X12<br>1492-MP-Blank |
|  | **Pre-Printed Identification Tags —** contains 10 sheets of pre-printed and blank tags. Each sheet contains 13 sets of the markings CR…9CR, TR…9TR, M…9M, F, R, 1S, and 117 blank tags. Tags are peel-off with sticky backing for easy placement on relays. | 10 | 700-N40 |
| | **Blank Identification Tags —** contains 10 sheets of blank identification tags for customer specialized printing. Each sheet contains 546 blank tags. Tags are peel-off with sticky backing for easy placement on relays. | 10 | 700-N41 |

### Socket and Retainer Clip Reference

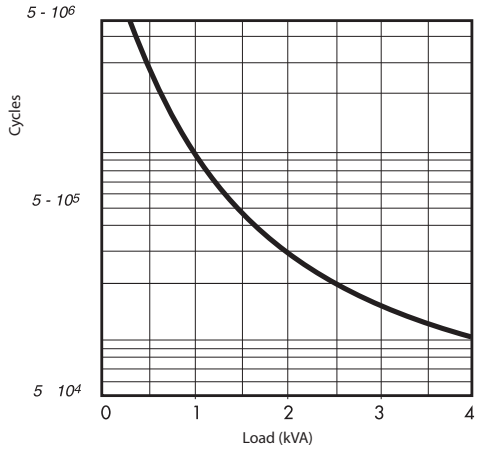
| Relay Type | Socket Cat. No. | Retainer Clip Cat. No. |
|---|---|---|
| 700-HB | 700-HN153<br>700-HN154 | 700-HN158<br>700-HN156 |

## Specifications - 700-HB Relays

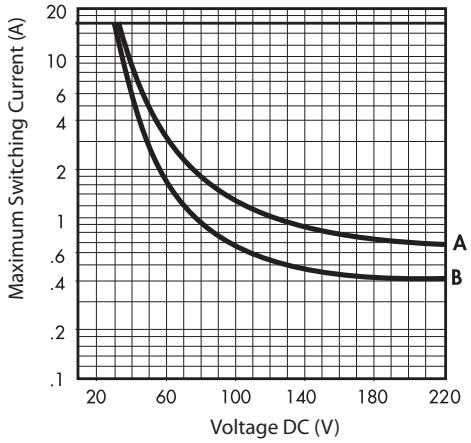
| Attribute | | 700-HB | | | | |
|---|---|---|---|---|---|---|
| **Electrical Ratings** | | | | | | |
| Pilot Duty Rating (1) | | NEMA B300 | | | | |
| Rated Thermal Current ($I_{th}$) | | 15 A – 120V, 240V | | | | |
| Rated Insulation Voltage ($U_i$) | | 250V IEC-300V UL/CSA | | | | |
| Contacts | Inductive | **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 | 3.3VA | | 2.85VA | | |
| | Sealed | 2.2VA | | 1.9VA | | |
| | DC Coils | 1.3 W | | | | |
| Max. Allowable Leakage | | 25% of VA | | | | |
| | | 10% of W | | | | |
| Max. Contact Resistance | | 50 MΩ | | | | |
| **Design Specification/Test Requirements** | | | | | | |
| Dielectric Withstand Voltage | | | | | | |
| Pole-to-Pole | | 2500V | | | | |
| Contact to Coil | | 4000V | | | | |
| **Mechanical** | | | | | | |
| Degree of Protection (Open Type) IEC 529 | | IP 40 | | | | |
| Mechanical lifecycles (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 (–40…+158 °F) | | |
| | Storage | AC/DC | | –40…+100 °C (–40…+212 °F) | | |
| 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 700-HN sockets noted | | | | |
| Standards | | UL508, CSA C22.2 No. 14, EN 61810-1 | | | | |

(1) See NEMA Ratings and Test Values on page 5

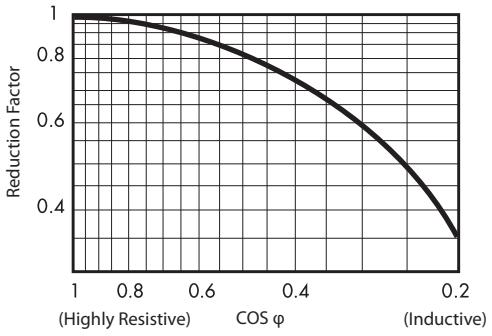
## Technical Data - 700-HB Relays




Contact life versus AC1 load at 600 cycles/h.



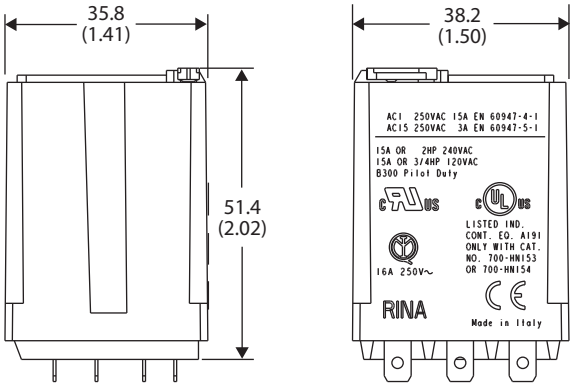

Breaking capacity for DC1 load at 600 cycles/h.
Load applied to one contact.
A = for N.O. types
B= other types



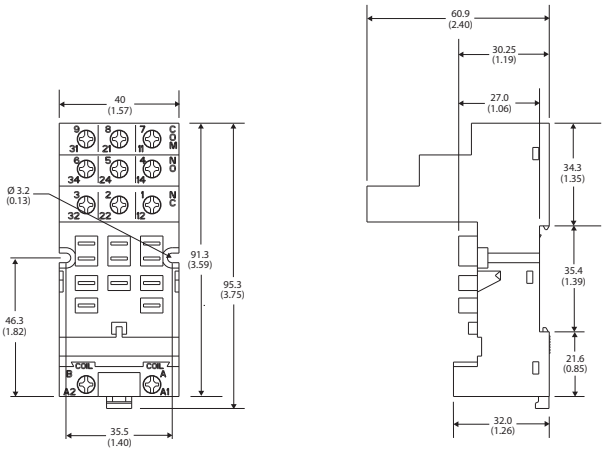

Load Reduction factor versus cos φ

## Dimensions - 700-HB Relays

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

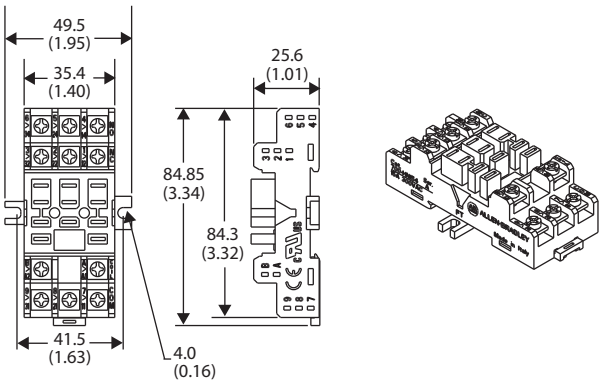



700-HB Relay



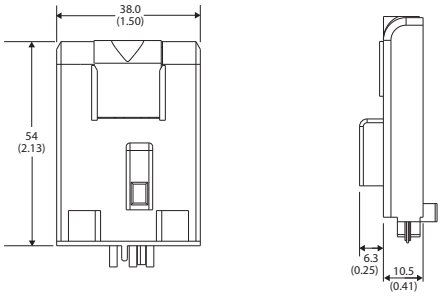

Cat. No. 700-HN153

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

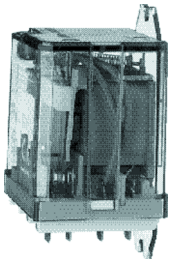
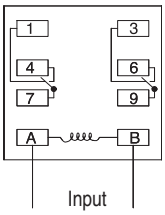
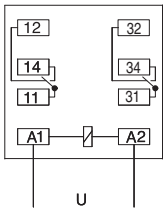
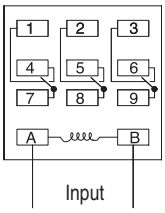
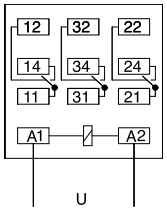



Cat. No. 700-HT3

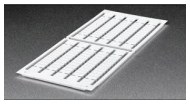
Wire Size: 2 x 1.5 $mm^2$ (#2 – 16 AWG…#1–20 AWG)
(Either Solid or Stranded)
Strip Length: 9 mm (3/8 in.) – Torque: 0.8 N•m (7 lb•in)

## 700-HD Flange Mount Square Base Relay

- Flange-mounted/panel-mounted
- 15 A contact rating
- DPDT, 3PDT
- Blade-style quick connect terminals (0.187 x 0.020)
- Solder terminals (no socket required)

| Photo | Contact Rating | | Wiring Diagrams | | Coil Voltage | Cat. No. |
|---|---|---|---|---|---|---|
| | | | U.S./Canada | International | | |
|  | DPDT<br>2-Pole<br>2 Form C<br>AgCdO Contacts | 15 A |  |  | 6V AC | 700-HD32A06 |
| | | | | | 12V AC | 700-HD32A12 |
| | | | | | 24V AC | 700-HD32A24 |
| | | | | | 120V AC | 700-HD32A1 |
| | | | | | 208V AC | 700-HD32A20 |
| | | | | | 240V AC | 700-HD32A2 |
| | | | | | 6V DC | 700-HD32Z06 |
| | | | | | 12V DC | 700-HD32Z12 |
| | | | | | 24V DC | 700-HD32Z24 |
| | | | | | 48V DC | 700-HD32Z48 |
| | | | | | 110V DC | 700-HD32Z1 |
| | 3PDT<br>3-Pole<br>3 Form C<br>AgCdO Contacts | 15 A |  |  | 6V AC | 700-HD33A06 |
| | | | | | 12V AC | 700-HD33A12 |
| | | | | | 24V AC | 700-HD33A24 |
| | | | | | 120V AC | 700-HD33A1 |
| | | | | | 208V AC | 700-HD33A20 |
| | | | | | 240V AC | 700-HD33A2 |
| | | | | | 6V DC | 700-HD33Z06 |
| | | | | | 12V DC | 700-HD33Z12 |
| | | | | | 24V DC | 700-HD33Z24 |
| | | | | | 48V DC | 700-HD33Z48 |
| | | | | | 110V DC | 700-HD33Z1 |

## Accessories - 700-HD Relays

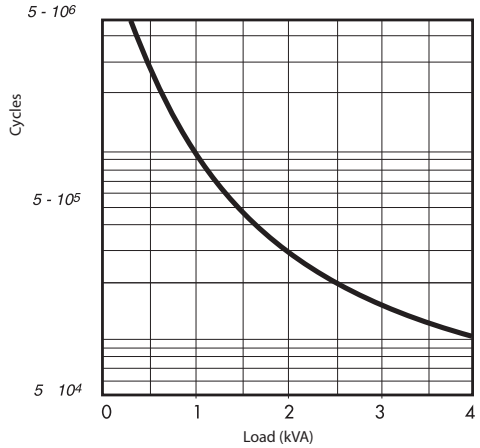
| Photo | Description | Pkg. Qty. | Cat. No. |
|---|---|---|---|
|  | **Relay Identification Snap-in Markers**<br>Snap-in markers fit on top of product covers. The following are blank cards. Squares slip into molded slot on top of product covers. | 100 | 1492-MS5X12 |
| | | | 1492-MS6X9 |
| | | | 1492-MS6X12 |
| | | | 1492-MS8X9 |
| | | | 1492-MS8X12 |
| | | | 1492-MP-Blank |
|  | **Pre-Printed Identification Tags —** contains 10 sheets of pre-printed and blank tags. Each sheet contains 13 sets of the markings CR…9CR, TR…9TR, M…9M, F, R, 1S, and 117 blank tags. Tags are peel-off with sticky backing for easy placement on relays. | 10 | 700-N40 |
| | **Blank Identification Tags —** contains 10 sheets of blank identification tags for customer specialized printing. Each sheet contains 546 blank tags. Tags are peel-off with sticky backing for easy placement on relays. | 10 | 700-N41 |

## Specifications - 700-HD Relays

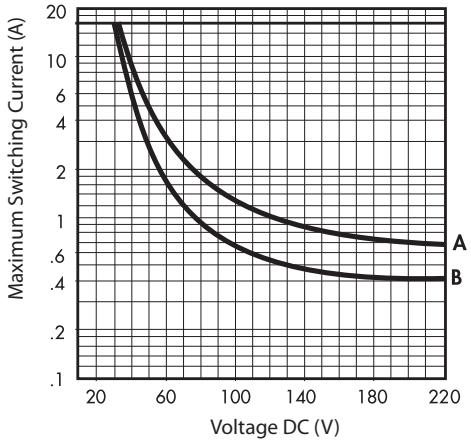
| Attribute | | 700-HD | | | | |
|---|---|---|---|---|---|---|
| **Electrical Ratings** | | | | | | |
| Pilot Duty Rating [1] | | NEMA B300 | | | | |
| Rated Thermal Current ($I_{th}$) | | 15 A [2] – 120V<br>15 A [2] – 240V, | | | | |
| Rated Insulation Voltage ($U_i$) | | 250V IEC-300V UL/CSA | | | | |
| 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<br>80…110% of Nominal Voltage at 60 Hz<br>80…110% of Nominal Voltage at DC | | | | |
| Coil Consumption ±10% | AC Coils | 50 Hz | | 60 Hz | | |
| | Inrush | 3.3VA | | 2.85VA | | |
| | Sealed | 2.2VA | | 1.9VA | | |
| | DC Coils | 1.3 W | | | | |
| Maximum Contact Resistance | | 50 MΩ | | | | |
| Must Dropout Voltage | | 20% of Nominal V AC<br>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 lifecycles (AC/DC) | | See Overview/Product Selection | | | | |
| Switching Frequency Operations | | 3600/HR | | | | |
| Coil Voltages | | $> 10 \times 10^6 / 30 \times 10^6$ | | | | |
| Operating Time | Pickup | 20 ms | | | | |
| | Dropout | 4 ms | | | | |
| Maximum Operating Rate | | 4 Ops/s | | | | |
| Minimum Low Energy Permissible Load | | 1000 mN (10V, 10 mA) | | | | |
| **Environmental** | | | | | | |
| Temperature | Operating | –40…+70 °C (–40…+158 °F) | | | | |
| | Storage | –40…+100 °C (–40…+212 °F ) | | | | |
| Altitude | | 2000 m (6560 ft) | | | | |

| Attribute | 700-HD |
|---|---|
| **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 |

(1) See NEMA Ratings and Test Values on page 5.
(2) 3-pole relays have a 20 A maximum total current rating for all three poles.

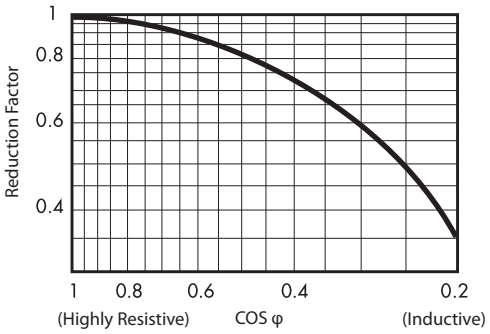



Contact life versus AC1 load at 600 cycles/h.




Breaking capacity for DC1 load at 600 cycles/h.

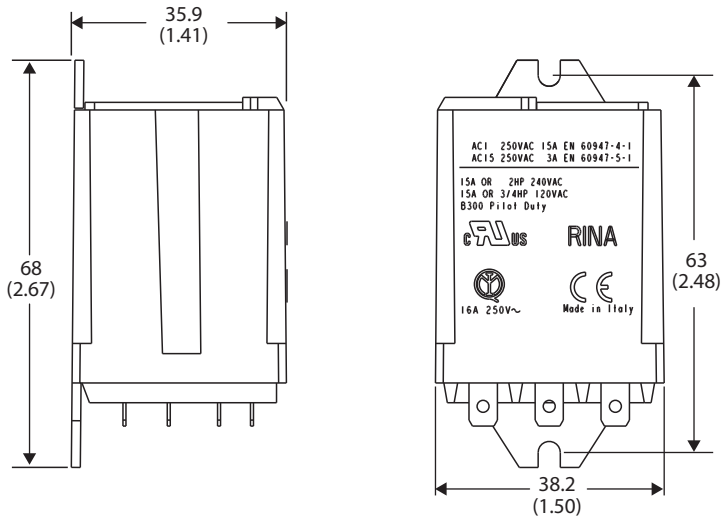
Load applied to one contact.
A = for N.O. types
B = other types




Load Reduction factor versus cos φ

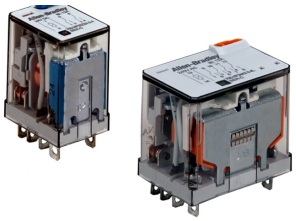
## Dimensions - 700-HD Relays

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

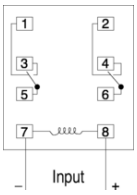
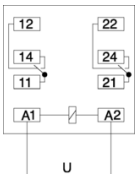
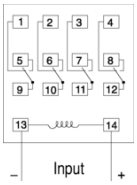
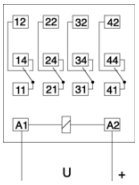



700-HD Relay

## 700-HF Square Base Relay

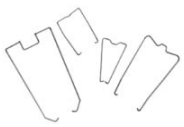


- 12 A contact rating
- DPDT, 4PDT
- Plug-in quick connect/solder terminals
- Options: LED, push-to-test manual override operator
- Blade size: 4.8 x 0.5 mm (0.19 x 0.02 in.)

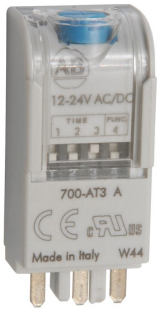
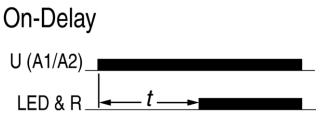
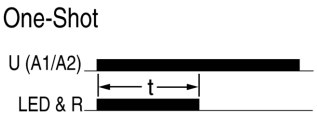
| Photo | Description | Contact Rating | Wiring Diagrams | | Coil Voltage | Cat. No.(1) |
|---|---|---|---|---|---|---|
| | | | U.S./Canada | International | | |
|  | DPDT<br>2-pole<br>2 Form C<br>AgCdO<br>Contacts | 12 A |  |  | 6V AC | 700-HF32A06 |
| | | | | | 12V AC | 700-HF32A12 |
| | | | | | 24V AC | 700-HF32A24 |
| | | | | | 120V AC | 700-HF32A1 |
| | | | | | 240V AC | 700-HF32A2 |
| | | | | | 6V DC | 700-HF32Z06 |
| | | | | | 12V DC | 700-HF32Z12 |
| | | | | | 24V DC | 700-HF32Z24 |
| | | | | | 48V DC | 700-HF32Z48 |
| | Socket | | 700-HN116<br>700-HN262 | 700-HN116<br>700-HN262 | 110V DC | 700-HF32Z1 |
|  | 4PDT<br>4-pole<br>4 Form C<br>AgCdO Contact | 12 A |  |  | 6V AC | 700-HF34A06 |
| | | | | | 12V AC | 700-HF34A12 |
| | | | | | 24V AC | 700-HF34A24 |
| | | | | | 120V AC | 700-HF34A1 |
| | | | | | 240V AC | 700-HF34A2 |
| | | | | | 6V DC | 700-HF34Z06 |
| | | | | | 12V DC | 700-HF34Z12 |
| | | | | | 24V DC | 700-HF34Z24 |
| | | | | | 48V DC | 700-HF34Z48 |
| | Socket | | 700-HN139<br>700-HN264 | 700-HN139<br>700-HN264 | 110V DC | 700-HF34Z1 |

(1) Pilot Light Option: Add suffix (-4) to the selected 700-HF Relay Cat. No. except for the 240V AC units, add (-4L).
Manual Operator and LED Option: Add suffix (-3-4) to the selected 700-HF Relay Cat. No., except for the 240V AC units, add (-3-4L).

## Accessories - 700-HF Relays

| Photo | Description | Pkg. Qty. | Cat. No. |
|---|---|---|---|
|  | **Pre-Printed Identification Tags —** contains 10 sheets of pre-printed and blank tags. Each sheet contains 13 sets of the markings CR…9CR, TR…9TR, M…9M, F, R, 1S, and 117 blank tags. Tags are peel-off with sticky backing for easy placement on relays. | 10 | 700-N40 |
| | **Blank Identification Tags —** contains 10 sheets of blank identification tags for customer specialized printing. Each sheet contains 546 blank tags. Tags are peel-off with sticky backing for easy placement on relays. | 10 | 700-N41 |
|  | **Screw Terminal Socket — Panel or DIN Rail Mounting** 8-blade miniature socket for use with DPDT HF relays. | 10 | 700-HN116 |
|  | **Screw Terminal Socket — Panel or DIN Rail Mounting, Guarded Terminal Construction**<br>8-blade socket for use with DPDT 700-HF relays. The socket has the ability to use optional plug-in modules (Cat. No. 700-A_ _ accessories, LED, surge suppression, timing modules). | 10 | 700-HN262 |
|  | **Screw Terminal Socket — Panel or DIN Rail Mounting, Guarded Terminal Construction**<br>14-blade socket for use with 4PDT 700-HF relays. | 10 | 700-HN139 |
|  | **Screw Terminal Socket — Panel or DIN Rail Mounting, Guarded Terminal Construction**<br>14-blade socket for use with 4PDT 700-HF relays. The socket has coil and contact separation and the ability to use optional plug-in modules (Cat. No. 700-A_ _ accessories, LED, surge suppression, timing modules). | 10 | 700-HN264 |
|  | **DIN (#3) symmetrical hat rail**<br>35 x 7.5 x 1 m | 10 | 199-DR1 |
|  | **Retainer Clip for Cat. Nos. 700-HN103, -HN104 and -HN128 Sockets with 700-HC Relays and Cat. Nos. 700-HN116, 700-HN262 Sockets with 700-HF DPDT Relays§**<br>Secures relay in socket. Order must be for 10 clips or multiples of 10. | 10 | 700-HN114 |
| | **Retainer Clip for Cat. Nos. 700-HN139 and -HN264 Sockets with 700-HF 4PDT Relays§**<br>Secures relay in socket. Order must be for 10 clips or multiples of 10. | 10 | 700-HN266 |

## Accessories - 700-HF Relays

| Photo | Description | | Pkg. Qty. | Cat. No. |
|---|---|---|---|---|
|  | **Diode with LED Surge Suppressor**<br>Voltage Range: 6…24V DC used with sockets that accept plug-in accessory modules. | | 10 | 700-ADL1 |
| | **Diode with LED Surge Suppressor**<br>Voltage Range: 28…60V DC used with sockets that accept plug-in accessory modules. | | 10 | 700-ADL2 |
| | **Diode with LED Surge Suppressor**<br>Voltage Range: 110…220V DC used with sockets that accept plug-in accessory modules. | | 10 | 700-ADL3 |
| | **Varistor with LED Surge Suppressor**<br>Voltage Range: 6…24V AC used with sockets that accept plug-in accessory modules. | | 10 | 700-AV1R |
| | **Varistor with LED Surge Suppressor**<br>Voltage Range: 110…240V AC used<br>with sockets that accept plug-in accessory modules. | | 10 | 700-AV3R |
| | **RC Surge Suppressor**<br>Voltage Range: 6…24V AC/DC used<br>with sockets that accept plug-in accessory modules. | | 10 | 700-AR1 |
| | **RC Surge Suppressor**<br>Voltage Range: 110…240V AC/DC used<br>with sockets that accept plug-in accessory modules. | | 10 | 700-AR2 |
|  | **Timing Module**<br>On-Delay or One-Shot selectable voltage range: 12…24V AC/DC used with sockets that accept plug-in accessory modules. |  | 1 | 700-AT3 |
| | **Timing Module**<br>On-Delay or One-Shot selectable voltage range: 110…125V AC used with sockets that accept plug-in accessory modules. | | | 700-AT3A1 |
| | **Timing Module**<br>On-Delay or One-Shot selectable voltage range: 230…240V AC used with sockets that accept plug-in accessory modules. |  | | 700-AT3A2 |



### Socket, and Retainer Clip Reference

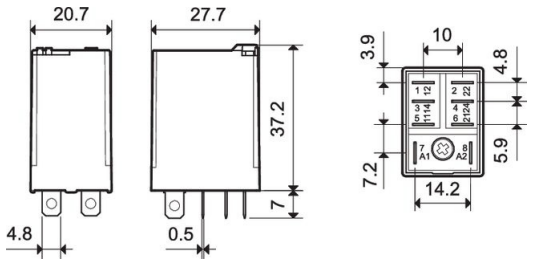
| Relay Type | Cat. No. Socket | Cat. No. Retainer Clip |
|---|---|---|
| 700-HF32 | 700-HN116<br>700-HN262 | 700-HN114 |
| 700-HF34 | 700-HN139<br>700-HN264 | 700-HN266 |

## Specifications- 700-HF Relays

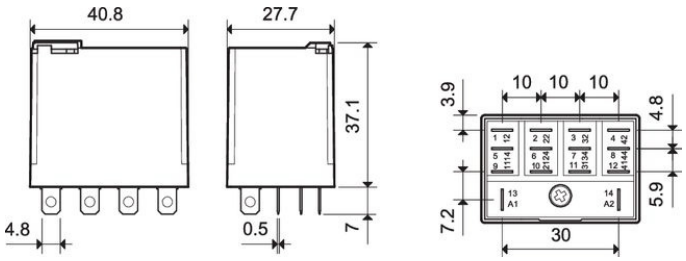
| Electrical Ratings | | | 700-HF 2 Pole | 700-HF 4 Pole |
|---|---|---|---|---|
| Contacts | Inductive V AC | 230V AC | AC 15 @ 700 VA | |
| | | | AC-1 @ 3000 VA | |
| | | | 1 Hp @ 240V AC | |
| | | 120V AC | 1/2 Hp @ 120V AC | |
| | VDC | DC-1 | 12 A @ 30V DC | |
| | | | 0.5 A @ 110V DC | |
| | | | 0.25 A @ 220V DC | |
| | Resistive | AC | 12 A @ 250 V AC (per pole) | |
| | | DC | 12 A @ 30 V DC (per pole) | |
| Operating Range | | AC | 80…110% nom voltage | |
| | | DC | 80…110% nom voltage | 85…110% nom voltage |
| Rated Power | | AC (50 Hz) | 1.5 VA | 2 VA |
| | | DC | 1 W | 1.3 W |
| Holding Voltage | | AC | 80% nom voltage | |
| | | DC | 60% nom voltage | |
| Must Drop Out Voltage | | AC | 20% nom voltage | |
| | | DC | 10% nom voltage | |
| Insulation Voltage | | | 250V AC | |
| **Design Specification/Test Requirements** | | | | |
| Dielectric Withstand Voltage | | Pole-to-Pole | 2500V AC | |
| | | Contact to Pole | 2500V AC | |
| Mechanical | | | | |
| Degree of Protection | | | Open Type (Sockets) | |
| Mechanical Life Operations | | | 20 x $10^6$ | |
| Switching Frequency Operations | | | 3600/hr | |
| Coil Voltages | | | See Product Selection | |
| Operating Time at nom voltage at 20 °C | | Pickup | 8 ms | 10 ms |
| | | Dropout | 3 ms | 4 ms |
| Maximum Operating Rate | | | 4 Ops/s | |
| Vibration | | | 15 G | |
| Shock | | | 15 G | |
| **Environmental** | | | | |
| Temperature | | Operating | –40…+70 °C (–40…+268 °F) | |
| | | Storage | –50…+80 °C (–89…+176 °F) | |
| Altitude | | | 2000 m (6560 ft) | |
| **Construction** | | | | |
| Insulating Material | | | Molded High-Dielectric Material | |
| Enclosure | | | Transparent Dust Cover | |
| Contact Material | | | Silver Cad. Oxide | |
| Terminal Markings on Socket | | | In accordance with EN50 0005 | |
| Sockets | | | 8-Blade Socket (DPDT) Cat. No. 700-HN116 & 700-HN262, 14-Blade Socket (4PDT) Cat. No. 700-HN139 & 700-HN264 | |
| Certifications | | | CSA Certified (File No. 229473), UL Recognized (File No. E3125, Guide NLDX2/NLDX8), CE Marked, UL Listed when used with sockets shown above, (File No. E3125, Guide NLDX/NLDX 7), LR Certified, RINA Certified, IMQ Certified | |
| Standards | | | UL 508, CSA 22.2 No. 14, EN-61810-1 | |

## Dimensions -700-HF Relays

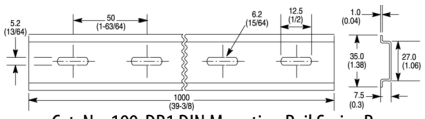
Approximate Dimensions are shown in millimeters (inches). Approximate Dimensions are not intended to be used for manufacturing purposes.




700-HF Relay (DPDT)




700-HF (4PDT)

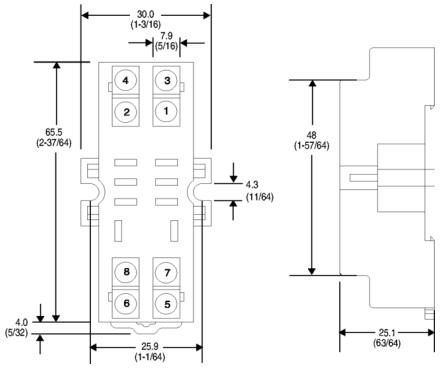


Cat. No. 199-DR1 DIN Mounting Rail Series B
Cat. No. 199-DR4 DIN Mounting Rail Series B Has No Mounting Holes

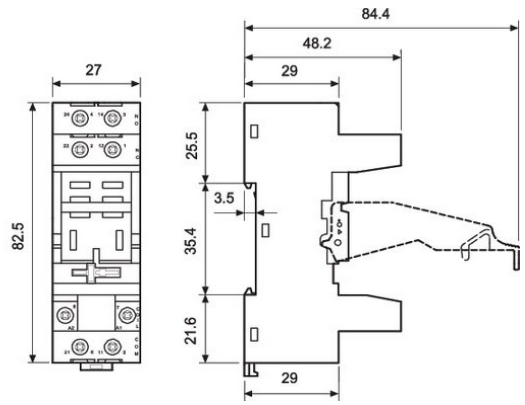
| Cat. No. | A | B | C | D | Approx. Shipping Wt. |
|---|---|---|---|---|---|
| 199-DR1 | 35 (1-3/8) | 27 (1-1/16) | 7.5 (19/64) | 1.02 (1/64) | 1.85 kg (4.07 lb) (10/pkg) |
| 199-DR4 | 35 (1-3/8) | 27 (1-1/16) | 15 (19/32) | 2.3 (3/32) | 3.68 kg (8 lb) (5/pkg) |

## Dimensions - 700-HF Relays

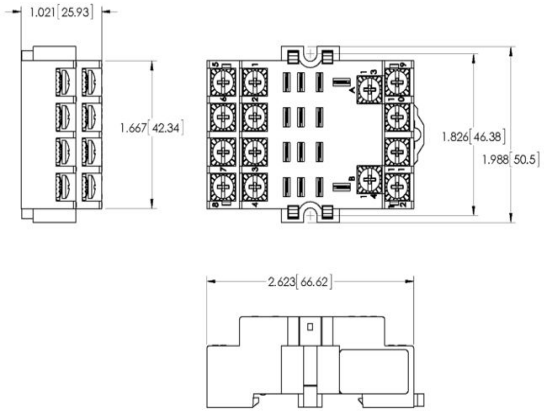
Approximate Dimensions are shown in millimeters (inches). Approximate Dimensions are not intended to be used for manufacturing purposes.



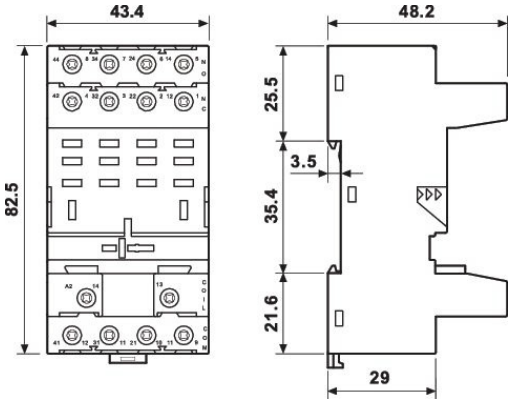

Cat. No. 700-HN116
Wire Size: 2 x 2.5 $mm^2$
Single Wire – Up to #12 AWG
Double Wire – 2.5 $mm^2$ (14 . . . 20 AWG), Qty. 2 wires
(Either Solid or Stranded)
Strip Length: 9 mm (3/8 in.) – Torque: 0.8 N•m (7 lb•in)




Cat. No. 700-HN262
Wire Size: Solid - 1x6/ 2 x 2.5 $mm^2$
1x10 / 2 x 14 AWG
Stranded - 1x4 / 2x2.5 $mm^2$
1x12 / 2x14 AWG
Length: 9 mm (3/8 in.) - Torque: 0.8 N•m (7 lb• in)
300V AC, 12 A, 50 °C

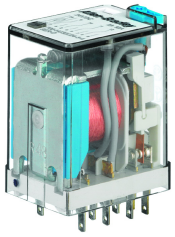



Cat. No. 700-HN139
Wire Size: 2 x 2.5 $mm^2$
Single Wire – Up to #12 AWG
Double Wire – 2.5 $mm^2$ (14 . . . 20 AWG), Qty. 2 wires
(Either Solid or Stranded)
Strip Length: 9 mm (3/8 in.) – Torque: 0.8 N•m (7 lb•in)

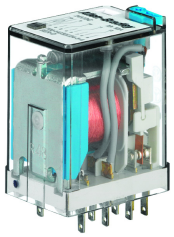
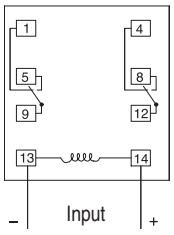
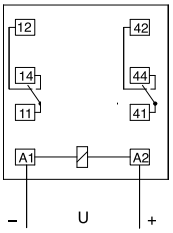
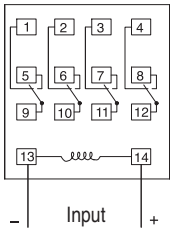
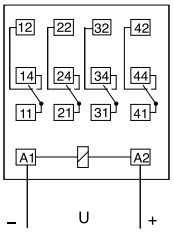



Cat. No. 700-HN264
Wire Size: Solid - 1x6/ 2 x 2.5 $mm^2$
1x10 / 2x14 AWG
Stranded - 1x4 / 2x2.5 $mm^2$
1x12 / 2x14 AWG
Length: 9 mm (3/8 in.) - Torque: 0.8 N•m (7 lb•in)
300V AC, 10 A, 70 °C

## 700-HC Miniature Ice Cube Relay



- 7 or 10 A contact ratings
- 2PDT or 4PDT
- Standard ON/OFF flag indicator
- Blade-style terminals (2.0 x 0.5 mm)
- Choice of standard silver nickel contacts, or silver nickel with gold-plated contacts for low-energy applications
- Options: LED, push-to-test with manual override option
- Tungsten UL Approvals
  - 4-Pole: 5A @ 24V DC
  - 2-Pole: 10A @ 24V DC

| Photo | Contact Rating | | Wiring Diagrams | | Coil Voltage | Cat. No.(1) |
|---|---|---|---|---|---|---|
| | | | U.S./Canada | International | | |
|  | 2PDT<br>2-Pole<br>2 Form C<br>Contacts:<br>10 A = AgNi<br>Contacts | 10 A<br>C300<br>R300<br>Low energy rating;<br>(10V, 10 mA)<br>100 mW |  |  | 12V DC | 700-HC22Z12 |
| | | | | | 24V DC | 700-HC22Z24 |
| | | | | | 24V AC | 700-HC22A24 |
| | | | | | 120V AC | 700-HC22A1 |
| | | | 700-HN128 | 700-HN103<br>700-HN104 | 240V AC | 700-HC22A2 |
| | 4PDT<br>4-Pole<br>4 Form C<br>Contacts:<br><br>7A = AgNiAu<br>Gold Plated<br>Contacts | 7 A<br>Low energy rating;<br>(5V, 10 mA or 25V, 2 mA)<br>50 mW |  |  | 6V AC | 700-HC14A06 |
| | | | | | 12V AC | 700-HC14A12 |
| | | | | | 24V AC | 700-HC14A24 |
| | | | | | 120V AC | 700-HC14A1 |
| | | | | | 240V AC | 700-HC14A2 |
| | | | | | 6V DC | 700-HC14Z06 |
| | | | | | 12V DC | 700-HC14Z12 |
| | | | | | 24V DC | 700-HC14Z24 |
| | | | | | 48V DC | 700-HC14Z48 |
| | | | | | 110V DC | 700-HC14Z1 |
| | 4PDT<br>4-Pole<br>4 Form C<br>Contacts:<br><br>7A = AgNi<br>Silver Contacts | 7 A<br>C300<br>R300<br>Low energy rating;<br>(10V, 10 mA)<br>100 mW | | | 6V AC | 700-HC24A06 |
| | | | | | 12V AC | 700-HC24A12 |
| | | | | | 24V AC | 700-HC24A24 |
| | | | | | 120V AC | 700-HC24A1 |
| | | | | | 240V AC | 700-HC24A2 |
| | | | | | 6V DC | 700-HC24Z06 |
| | | | | | 12V DC | 700-HC24Z12 |
| | | | | | 24V DC | 700-HC24Z24 |
| | | | | 700-HN103 | 48V DC | 700-HC24Z48 |
| | | | 700-HN128 | 700-HN104 | 110V DC | 700-HC24Z1 |

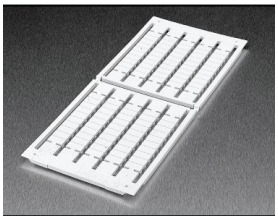
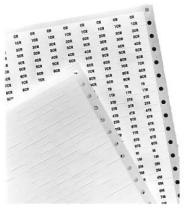
(1) LED Option: Add suffix (-4) to the selected 700-HC Relay catalog number, except for the 240V AC units, add (-4L).
Push-to-test, Manual Override, and LED Option: Add suffix (-3-4) to the selected 700-HC catalog number, except for the 240V AC units, add (-3-4L).
Push-to-test and Manual Override option: Add suffix (-3) to the selected 700-HC relay catalog number.

## Accessories - 700-HC Relays

| Photo | Description | | Pkg. Qty. | Cat. No. |
|---|---|---|---|---|
|  | **Diode with LED Surge Suppressor**<br>Voltage Range: 6…24V DC<br>used with 700-HN104 socket | | 10 | 700-ADL1 |
| | **Diode with LED Surge Suppressor**<br>Voltage Range: 28…60V DC<br>used with 700-HN104 socket | | 10 | 700-ADL2 |
| | **Diode with LED Surge Suppressor**<br>Voltage Range: 110…220V DC<br>used with 700-HN104 socket | | 10 | 700-ADL3 |
| | **Varistor with LED Surge Suppressor**<br>Voltage Range: 6…24V AC<br>used with 700-HN104 socket | | 10 | 700-AV1R |
| | **Varistor with LED Surge Suppressor**<br>Voltage Range: 110…240V AC<br>used with 700-HN104 socket | | 10 | 700-AV3R |
| | **RC Surge Suppressor**<br>Voltage Range: 6…24V AC/DC<br>used with 700-HN104 socket | | 10 | 700-AR1 |
| | **RC Surge Suppressor**<br>Voltage Range: 110…240V AC/DC<br>used with 700-HN104 socket | | 10 | 700-AR2 |
|  | **Timing Module**<br>On-Delay or One-Shot selectable voltage range: 12…24V AC/DC used with sockets that accept plug-in accessory modules. | On-Delay<br>U (A1/A2)<br>LED & R<br>t<br>One-Shot<br>U (A1/A2)<br>t<br>LED & R | 1 | 700-AT3 |
| | **Timing Module**<br>On-Delay or One-Shot selectable voltage range: 110…125V AC used with sockets that accept plug-in accessory modules. | | | 700-AT3A1 |
| | **Timing Module**<br>On-Delay or One-Shot selectable voltage range: 230…240V AC used with sockets that accept plug-in accessory modules. | | | 700-AT3A2 |
|  | Screw Terminal Socket — Panel or DIN Rail Mounting; Guarded Terminal Construction.$I_{th}$ = 10 A per pole. 14-blade miniature socket for use with 700-SC Relays. | | 10 | 700-HN103 |
|  | Screw Terminal Socket — Panel or DIN Rail Mounting; Guarded Terminal Construction $I_{th}$ = 10 A per pole. 14-blade miniature socket for use with 700-HC relays. This socket has coil and contact separation as well as the ability to plug in optional plug in modules (700-A___ accessories: LED, Surge Suppression, Timing Modules) | | 10 | 700-HN104 |
|  | Screw Terminal Base Socket — Panel or DIN Rail Mounting; Open-Style Construction $I_{th}$ = 10 A per pole. 14-blade miniature socket for use with 700-HC Relays. | | 10 | 700-HN128 |

| Photo | Description | Pkg. Qty. | Cat. No. |
|---|---|---|---|
|  | **DIN (#3) symmetrical hat rail**<br>35 x 7.5 x 1 m | 10 | 199-DR1 |
|  | **Retainer Clip for Cat. Nos. 700-HN103, -HN104 and -HN128 Sockets with 700-HC Relays.**<br>Secures relay in socket.(1) | 10 | 700-HN114 |
| | **Plastic Retainer and Ejection Lever**<br>For use with the 700-HN104 Sockets for 700-HC relays.<br>Built-in ability to accept 1492 Snap-in Markers | 10 | 700-HN124 |

(1) See 700-HC Miniature Square Base Relay, Socket, and Retainer Clip Reference Chart.

| Photo | Description | Pkg. Qty. | Cat. No. |
|---|---|---|---|
|  | **Relay Identification Snap-in Markers**<br>Snap-in markers fit on top of product covers. Squares slip into molded slot on top of product cover. | 5 | 1492-MS5X12 |
| | | 5 | 1492-MS6X9 |
| | | 5 | 1492-MS6X12 |
| | | 5 | 1492-MS8X9 |
| | | 5 | 1492-MS8X12 |
| | | 100 | 1492-MP-Blank |
|  | **Pre-Printed Identification Tags —** contains 10 sheets of pre-printed and blank tags. Each sheet contains 13 sets of the markings CR…9CR, TR…9TR, M…9M, F, R, 1S, and 117 blank tags. Tags are peel-off with sticky backing for easy placement on relays. | 10 | 700-N40 |
| | **Markers — Used for terminal identification** | 50 | 700-N41 |

### Socket and Retainer Clip Reference

| Relay Type | Socket Cat. No. | Retainer Clip Cat. No. |
|---|---|---|
| 700-HC | 700-HN103 | 700-HN114 |
| | 700-HN128 | 700-HN114 |
| | 700-HN104 | 700-HN114 or 700-HN124 |

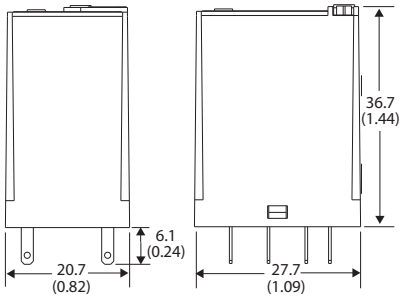
## Specifications- 700-HC Relays

| Attribute | | | 700-HC | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Electrical Ratings** | | | | | | | | |
| **Pilot Duty Rating** (1) | | | 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 |
| | | | Make ►][◄ | Break ◄][► | | Make ►][◄ | Break ◄][► | |
| | | **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<br>50 mW (5V, 10 mA, or 25V, 2 mA) - Gold Contacts | | | | | |
| **Permissible Coil Voltage Variation** | | | Pickup: | 80…110% of nom voltage at 50 Hz<br>80…110% of nom voltage at 60 Hz<br>80…110% of nom voltage at DC | | Must Dropout Voltage: | 20% of nom voltage at AC<br>10% of nom voltage at DC | |
| | | | 50 Hz | | | 60 Hz | | |
| **Coil Consumption ±10%** | **AC Coils** | **Inrush** | 2.2VA | | | 1.6VA | | |
| | | **Sealed** | 1.3VA | | | 1.1VA | | |
| | **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** | 2000V | | | | | |
| **Electrical Life (Cycles)** | | | 100,000 min | | | | | |
| **Mechanical** | | | | | | | | |
| **Degree of Protection (Open Type) IEC 529** | | | IP 20 (Guarded Terminal Sockets) | | | | | |
| **Mechanical lifecycles** | | | 20 x $10^6$ (AC), 50 x $10^6$ (DC) | | | | | |
| **Switching Frequency Operations** | | | 1800/HR | | | | | |
| **Coil Voltages** | | | See Product Selection | | | | | |
| **Operating Time** | | **Pickup** | 10 ms | | | | | |
| | | **Dropout** | 3 ms | | | | | |
| **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 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 | | | | | |

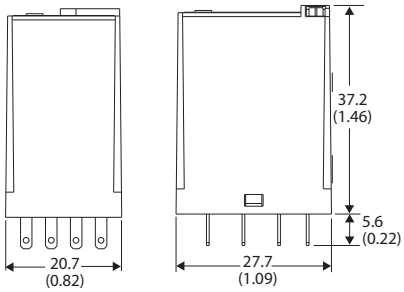
(1) See General Information on page 3.

## Dimensions, 700-HC Relays

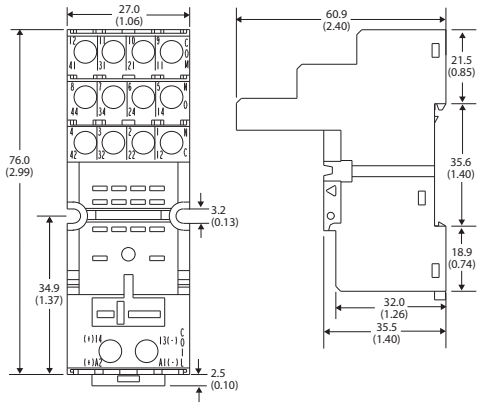
Approximate dimensions are shown in millimeters (inches). Dimensions are not intended for manufacturing purposes.




700-HC Relay (Two-Pole)

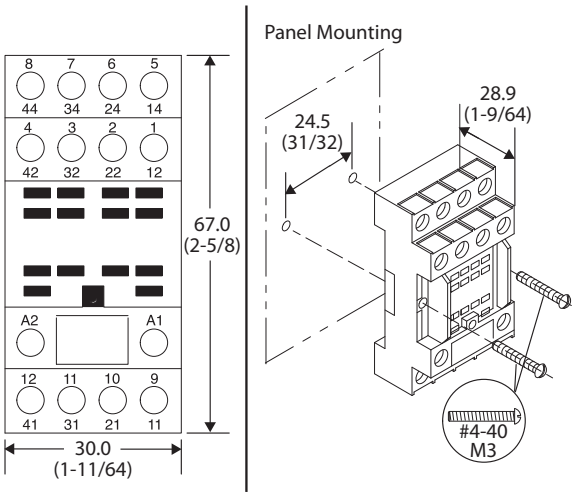



700-HC Relay (Four-Pole)



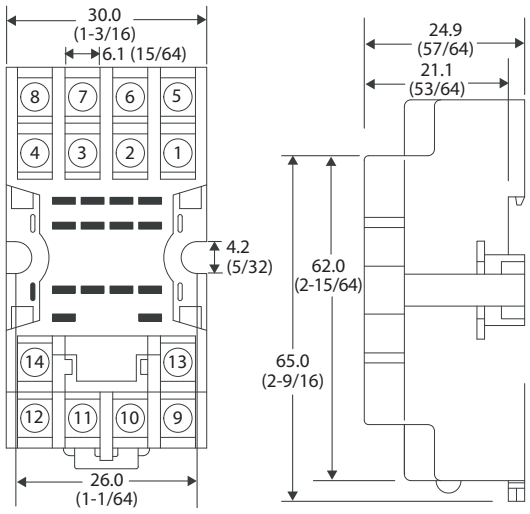

Cat. No. 700-HN104

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



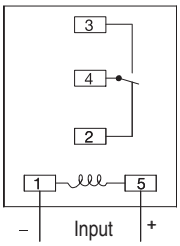
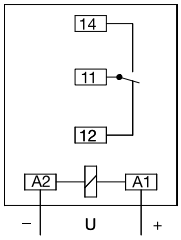
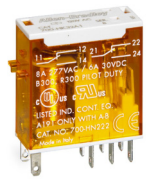
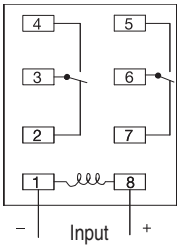
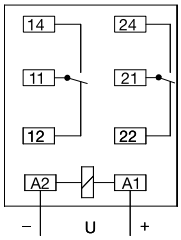

Cat. No. 700-HN128

Wire Size: 2 x 1.5 $mm^2$ (#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)

## 700-HK Slim Line Relay



- 8 A/16 A contact ratings
- DPDT/SPDT
- Plug-in blade-style terminals (2.5 x 0.5 mm)
- Retainer clip with sockets
- Options: LED, push-to-test and manual override, socket-mounted surge suppressor module, or timer module
- Standard ON/OFF flag indicator
- Relay faceplate accepts optional Bulletin1492 snap-in markers
- Choice of standard silver/nickel contacts or silver/nickel with gold plated contacts
- Maximum duty version available

| Photo | Description | Contact Rating | Wiring Diagrams | | Coil Voltage | Cat. No.(1) |
|---|---|---|---|---|---|---|
| | | | U.S./Canada | International | | |
|  | SPDT<br>1-Pole<br>1 Form C<br>AgNi Contacts | 16 A |  |  | 6V AC | 700-HK36A06 |
| | | | | | 12V AC | 700-HK36A12 |
| | | | | | 24V AC | 700-HK36A24 |
| | | | | | 120V AC | 700-HK36A1 |
| | | | | | 240V AC | 700-HK36A2 |
| | | | | | 6V DC | 700-HK36Z06 |
| | | | | | 12V DC | 700-HK36Z12 |
| | | | | | 24V DC | 700-HK36Z24 |
| | | | | | 48V DC | 700-HK36Z48 |
| | Socket | | 700-HN121, 700-HN221, 700-HN223 | 700-HN121, 700-HN221, 700-HN223 | 110V DC | 700-HK36Z1 |
|  | DPDT<br>2-Pole<br>2 Form C<br>AgNi Contacts | 8 A |  |  | 6V AC | 700-HK32A06 |
| | | | | | 12V AC | 700-HK32A12 |
| | | | | | 24V AC | 700-HK32A24 |
| | | | | | 120V AC | 700-HK32A1 |
| | | | | | 240V AC | 700-HK32A2 |
| | | | | | 6V DC | 700-HK32Z06 |
| | | | | | 12V DC | 700-HK32Z12 |
| | | | | | 24V DC | 700-HK32Z24 |
| | | | | | 48V DC | 700-HK32Z48 |
| | Socket | | 700-HN122, 700-HN222, 700-HN224 | 700-HN122, 700-HN222, 700-HN224 | 110V DC | 700-HK32Z1 |

**(1) Options**

Pilot Light: Add suffix (-4) to the selected 700-HK Relay catalog number except for the 240V AC units, add (-4L).
Manual Operator and LED: Add suffix (-3-4) to the selected 700-HK Relay catalog number, except for the 240V AC units, add (-3-4L).
AgNi Contact with Gold plating: Replace "3" with "X" om catalog number. For example, if catalog number 700-HK36A1 is required with gold plating, the new catalog number is 700-HKX6A1.
For high inductive, Tungsten, or Capacitive load applications, replace the "3" with a "M" in the catalog number. Only available in a SPDT configuration and with 24V DC, 120V AC, or 240V AC coil voltages.

## Accessories- 700-HK Relays

| Photo | Description | Pkg. Qty. | Cat. No. |
|---|---|---|---|
|  | **Screw Terminal Socket — Panel or DIN Rail Mounting** 5-blade miniature socket with 10 A rating for use with 1-pole, 700-HK relays. Accepts forked lug conductors. Socket includes a retainer clip. | 10 | 700-HN121 |
|  | **Screw Terminal Socket — Panel or DIN Rail Mounting** 5-blade miniature socket with 16 A rating for use with 1-pole, 700-HK relays. Retainer clips are packaged separately with socket. Guarded terminal construction and compatible with optional plug-in module accessories. | 10 | 700-HN221 |
| | **Spring Clamp Terminal Socket — Panel or DIN Rail Mounting**<br>5-blade miniature socket for use with 1-pole, 700-HK relays. | 10 | 700-HN223 |
|  | **Screw Terminal Socket — Panel or DIN Rail Mounting**<br>8-blade miniature socket with 5 A rating for use with 2-pole, 700-HK relays. Accepts forked lug conductors. This socket includes a retainer clip. | 10 | 700-HN122 |
|  | **Screw Terminal Socket — Panel or DIN Rail Mounting**<br>8-blade miniature socket with 8 A rating for use with 2-pole, 700-HK relays. Retainer clips are packaged separately with socket. Guarded terminal construction and compatible with optional plug-in module accessories. | 10 | 700-HN222 |
| | **Spring Clamp Terminal Socket — Panel or DIN Rail Mounting**<br>8-blade miniature socket for use with 2-pole 700-HK relays. | 10 | 700-HN224 |
|  | **Flange Mount Adapter**<br>Used for panel-mounting bulletin 700-HK relays. Order must be for 10 adapters or multiples of 10. | 10 | 700-HN226 |
|  | **35 mm Rail Mount Adapter**<br>Mounts bulletin 700-HK relays to a 35 mm rail. Order must be for 10 adapters or multiples of 10. | 10 | 700-HN227 |
|  | **Socket Retainer Clip and Ejection Lever**<br>For use with 700-HN22, -HN222, -HN223, and -HN224 sockets. Orders must be for 10 clips or multiples of 10. | 10 | 700-HN229 |

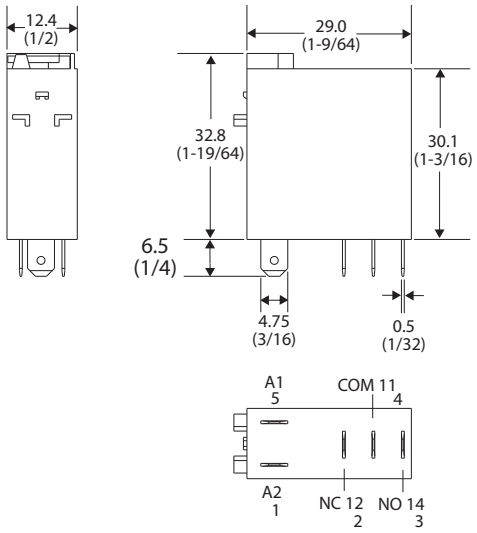
## Specifications- 700-HK Relays

| Attribute | | 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<br>B300 Pilot Duty, 3 A A300 (700-HKM_)<br>1/3 Hp (0.24 kW) 1-phase | 120V AC | AC-15, 2.9 A<br>B300 Pilot Duty, 3.0 A 1/4 Hp (0.18 kW), 1-phase |
| | | 240V AC | AC-15, 3.1 A<br>B300 Pilot Duty, 1.5 A A300(700-HKM_)<br>3/4 Hp (0.55 kW), 1-phase | 240V AC | AC-15, 1.4 A<br>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 |
| | **Resistive** | 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 , and 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_)<br>50 mW (5V/10 mA or 25V/2 mA) for AgNi + Gold Contacts (700-HKX_)<br>500 mW (100V/5 mA or 5V/100 mA) for $AgSnO_2$ Contacts (700-HKM_) | | | |
| **Permissible Coil Voltage Variation** | **Pickup:<br>holding Voltage:<br>Must Dropout Voltage:** | 80…110% of Nominal Voltage at 50/60 Hz, 73...110% of Nominal Voltage at DC<br>80% of Nominal V AC at 50/60 Hz, 40% of Nominal V DC<br>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)<br>Contact to Coil (VRMS)** | 2000V AC<br>4000V AC | | | |
| **Mechanical** | | | | | |
| **Degree of Protection** | | IP 20 (guarded terminal sockets), RT II — Flux-proof (Relay) | | | |
| **Mechanical Life Operations** | | $10 \times 10^6$ | | | |
| **Electrical Lifecycles** | | 230V AC, 16 A Resistive: 100 000 min.<br>277V AC, 16 A Resistive: 30 000 min.<br>30V DC, 10 A Resistive: 30 000 min.<br>B300, R300, Hp (kW): 6000 min.<br>A300 (700-HKM_): 100,000 min. | | 230V AC, 8 A Resistive: 100 000 min.<br>277V AC, 8 A Resistive: 30 000 min.<br>30V DC, 6 A Resistive: 30 000 min.<br>B300, R300, Hp (kW): 6000 min. | |
| **Switching Frequency** | | Mechanical: 18,000 cycles/hr.<br>Electrical: 900 cycles/hr. | | | |
| **Operating Time at Nominal Voltage at 20 °C (ms)** | **Pickup** | 15 ms | | | |
| | **Dropout** | 5 ms | | | |
| **Vibration** | **Operational<br>Non-Operational** | 10…2000 Hz, 0.76 mm (0.03 in.) 2.5 G<br>10…2000 Hz, 0.76 mm (0.03 in.) 5.0 G | | | |
| **Shock** | **Operational<br>Non-Operational** | 15 G<br>50 G | | | |
| **Environmental** | | | | | |
| **Temperature** | **Operating<br>Storage** | –40…+70 °C (–40…+158 °F)<br>–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 | | | |

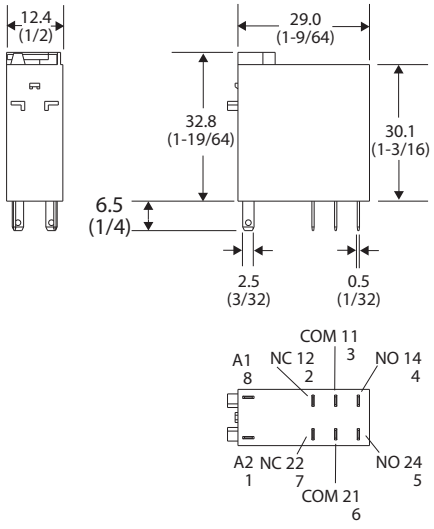
| Attribute | | 700-HK | |
|---|---|---|---|
| Sockets | | 1-Pole | 2-Pole |
| | Screw Terminal | 700-HN121 (10 A @ 70 °C)<br>700-HN221 (16 A @ 50 °C, 12 A @ 70 °C) | 700-HN122 (2 x 5 A @ 70 °C)<br>700-HN222 (2 x 8 A @ 70 °C) |
| | Spring Clamp | 700-HN223 (15 A @ 40 °C with 2 conductors per terminal)<br>(10 A @ 70 °C with 1 conductor per terminal) | 700-HN224 (2 x 8 A@ 70 °C) |
| **Approvals** | | | |
| Certifications | | CSA Certified, File 75088, UL Recognized, File E3125<br>Guide NLDX2/NLCX8, cULus Listed with Allen-Bradley sockets (File No. 3125 Guide NLDX/NLDX7), CE Marked | |
| Standards | | EN61810-1, CSA 22.2 No. 14, UL 508 | |

## Dimensions- 700-HK Relays

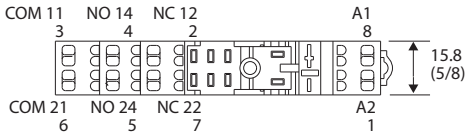
Approximate dimensions are shown in millimeters (inches). Dimensions are not intended for manufacturing purposes.



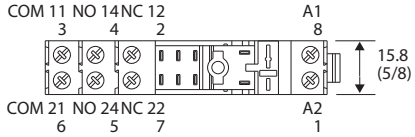

*Cat. No. 700-HK36_ (SPDT)*



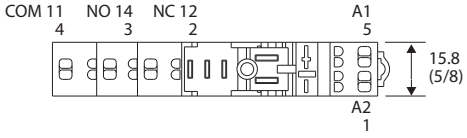

*Cat. No. 700-HK32_ (DPDT)*



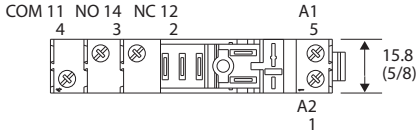

*Cat. No. 700-HN224*



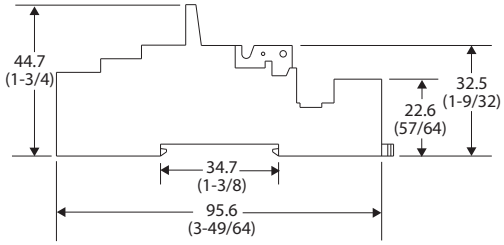

*Cat. No. 700-HN222*



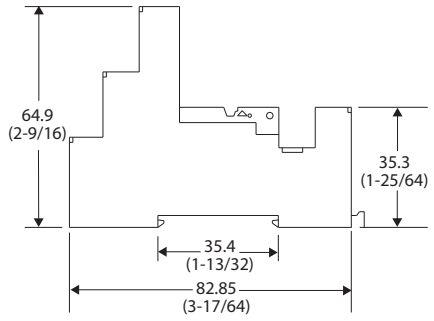

*Cat. No. 700-HN223*




*Cat. No. 700-HN221*



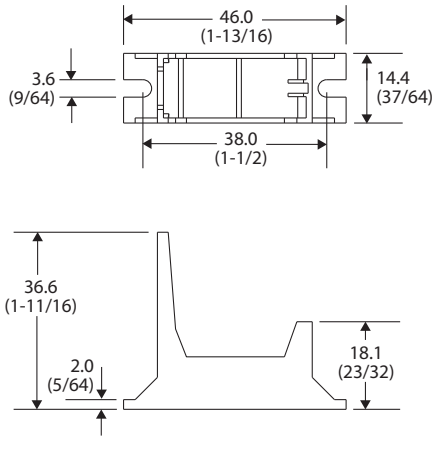

*Cat. No. 700-HN223, 700-HN224*
Wire Size: 0.2 $mm^2$...1.5 $mm^2$ (#24 AWG....#14 AWG)
Either Solid or Stranded
Strip Length: 8 mm (5/16 in)



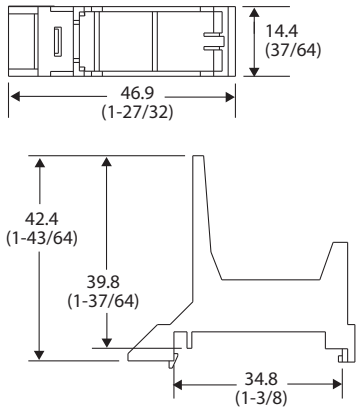

*Cat. No. 700-HN221, 700-HN222*
Wire Size: 0.2 $mm^2$...2.5 $mm^2$ (#24 AWG....#12 AWG)
Either Solid or Stranded
Strip Length: 8 mm (5/16 in), Torque: 0.8Nm (7.0 lb.-in.)

## Dimensions - 700-HK Relays

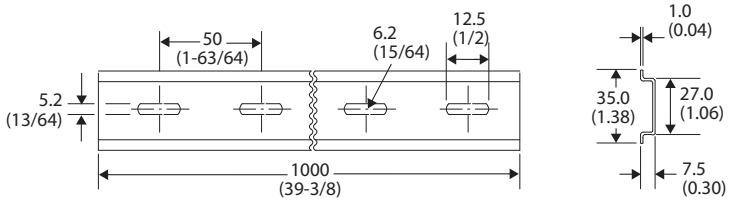
Approximate dimensions are shown in millimeters (inches). Dimensions are not intended for manufacturing purposes.




*Cat. No. 700-HN226*

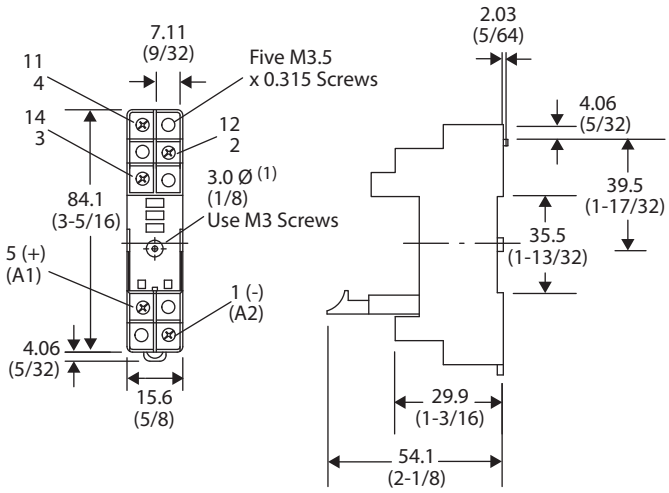



*Cat. No. 700-HN227*

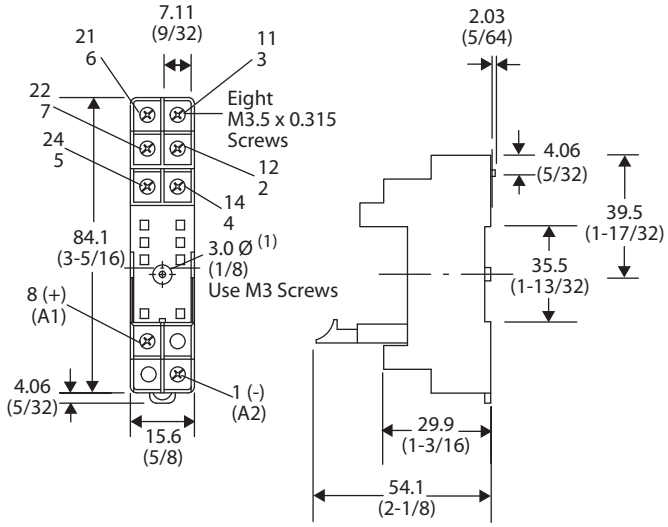



*Cat. No. 199-DR4 DIN Mounting Rail Series B Has No Mounting Holes*
*Cat. No. 199-DR1 DIN Mounting Rail Series B*

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

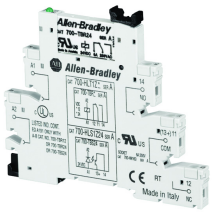



Cat. No. 700-HN121
Wire Size: 2 x 2.5 $mm^2$
Single Wire – Up to #14 AWG
Double Wire – 2 x 2.5 $mm^2$ (14 AWG… 20 AWG) Qty. 2 wires
(Either Solid or Stranded)
Strip Length: 9 mm (3/8 in.) – Torque: 0.8 N•m (7 lb•in)

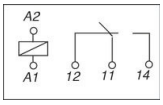
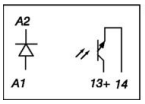



Cat. No. 700-HN122
Wire Size: 2 x 2.5 $mm^2$
Single Wire – Up to #14 AWG
Double Wire – 2 x 2.5 $mm^2$ (14 AWG… 20 AWG) Qty. 2 wires
(Either Solid or Stranded)
Strip Length: 9 mm (3/8 in.) – Torque: 0.8 N•m (7 lb•in)

## 700-HL Terminal Block Relay



- Relay and socket assembled interface modules for high density interposing or isolation applications
- Screw terminal and spring-clamp bases
- 6 A relay, choice of silver or gold contacts
- 2 A solid-state relay — DC output
- 2 A solid-state relay — AC output
- SPDT (relay), 1 N.O. (solid-state)
- Built-in retainer clip and snap-in marker lever
- Standard LED, reverse polarity protection, and surge protection
- Externally replaceable relay modules
- Unique leakage current suppression version to address industry concerns of nuisance coil turn-on or contact non-drop out when connecting to PLCs with leakage current
- Available with hazardous location certification

| Standard built-in Features:<br>• LED<br>• Reverse Polarity Protection for DC Inputs<br>• Coil Surge Protection(1) |  |  |  |  |
|---|---|---|---|---|
| | **Cat. No. 700-HLT1Z24** | **Cat. No. 700-HLT2Z24** | **Cat. No. 700-HLS1Z24** | **Cat. No. 700-HLS11Z24** |
| Specifications |  | | (3)<br>  | |
| Output Type | SPDT (1 C/O); $I_{th}$ = 6A(2) | | 1 N.O. solid-state; $I_{th}$ = 2 A, 24V DC or $I_{th}$ = 2 A, 240V AC | |
| Recommended Tightening Torque | 0.5 N• m max. (4.4 lb• in) | | | |
| Wire Range | Screw Terminal: 0.14 $mm^2$…2.5 $mm^2$ (#26…#14 AWG), Spring Terminal: 0.2 $mm^2$…2.5 $mm^2$ (#24…#14 AWG) | | | |
| Approvals | UL, cULus, cURus, ABS, CE | | | |

(1) Diode surge protection provided.

(2) For Gold-plated contacts: Add the letter "X" at the end of the catalog number. For example: if Cat. No. 700-HLT1Z24 is required with gold plating, the new cat. no. is 700-HLT1Z24X.

(3) Reverse polarity on the output terminals of the solid-state relay will result in the output being "ON" regardless of the state of the input voltage.

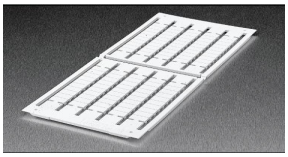
| Input Voltage | Pkg. Qty. | Cat. No. (Screw Terminals) | Cat. No. (Spring Clamp Terminals) | Pkg. Quantity | Cat. No. (Screw Terminals) (DC Output) | Cat. No. (Spring Clamp Terminals) (DC Output) | Cat. No. (Screw Terminals) (AC Output) |
|---|---|---|---|---|---|---|---|
| 12V DC | 10 | (2) 700-HLT1Z12 | 700-HLT2Z12 | — | — | — | — |
| 24V DC | 10 | (2) 700-HLT1Z24 | 700-HLT2Z24 | 10 | (2) 700-HLS1Z24 | 700-HLS2Z24 | 700-HLS11Z24 |
| 48V DC | 10 | (2) 700-HLT1Z48 | 700-HLT2Z48 | 10 | (2) 700-HLS1Z48 | 700-HLS2Z48 | 700-HLS11Z48 |
| 12V AC/DC | 10 | 700-HLT1U12 | 700-HLT2U12 | — | — | — | — |
| 24V AC/DC | 10 | 700-HLT1U24 | 700-HLT2U24 | — | — | — | — |
| 48V AC/DC | 10 | 700-HLT1U48 | 700-HLT2U48 | — | — | — | — |
| 110/125V AC/DC | 10 | 700-HLT1U1 | 700-HLT2U1 | 10 | (2) 700-HLS1U1 | 700-HLS2U1 | 700-HLS11U1 |
| 220…240V AC/DC | 10 | 700-HLT1U2 | 700-HLT2U2 | 10 | (2) 700-HLS1U2 | 700-HLS2U2 | 700-HLS11U2 |
| 240V AC | 10 | 700-HLT1A2 | — | — | — | — | — |

| Input Voltage | Pkg. Qty. | Cat. No. (Screw Terminals) | | Cat. No. (Spring Clamp Terminals) | Pkg. Quantity | Cat. No. (Screw Terminals) (DC Output) | | Cat. No. (Spring Clamp Terminals) (DC Output) | Cat. No. (Screw Terminals) (AC Output) |
|---|---|---|---|---|---|---|---|---|---|
| Built-in LCSC (leakage current suppression circuit) 120V AC and 125V DC[1] | 10 | (2) | 700-HLT1L1 | — | 10 | (2) | 700-HLS1L1 | — | 700-HLS11L1 |
| Built-in LCSC (leakage current suppression circuit) 240V AC [1] | 10 | (2) | 700-HLT1L2 | — | 10 | (2) | 700-HLS1L2 | — | 700-HLS11L2 |
| Hazardous Location Certification 24V DC | 10 | 700-HLT1Z24-EX | | — | 10 | 700-HLS1Z24-EX | | — | — |
| Hazardous Location Certification 12V DC | 10 | 700-HLT1Z12-EX | | — | 10 | — | | — | — |
| Hazardous Location Certification 110/125V AC/DC | 10 | 700-HLT1U1-EX | | — | 10 | 700-HLS1U1-EX | | — | — |

(1) Leakage current suppression up to 2.2 mA off state current.
(2) Electromechanical relay to solid-state relay interchangeability is possible.

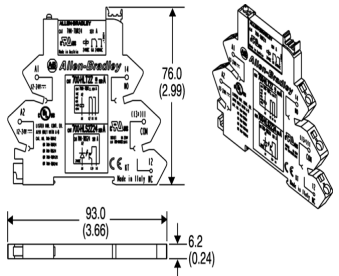
## Accessories - 700-HLT, -HLS Relays

| Photo | Description | Pkg. Quantity | Socket Input Voltage | Cat. No. |
|---|---|---|---|---|
|  | **Replacement Relays**[1]<br>Order must be for 20 relays or multiples of 20. | 20 | 12V AC/DC | 700-TBR12 |
| | | | 24V AC/DC | 700-TBR24 |
| | | | 48V AC/DC | 700-TBR48 |
| | | | 110/125V AC/DC<br>220…240V AC/DC | 700-TBR60 |
|  | **Replacement SSR**<br>4-blade miniature relay for use with 1 N.O. SSR DC output.<br>Order multiples of 20. | 20 | 24V DC | 700-TBS24 |
| | | | 48V DC, 110/125V AC/DC<br>220…240V AC/DC | 700-TBS60 |
| | **Replacement SSR**<br>4-blade miniature relay for use with 1 N.O. SSR AC output.<br>Order multiples of 20. | 20 | 24V DC | 700-TBS124 |
| | **Replacement SSR**<br>4-blade miniature relay for use with 1 N.O. SSR AC output.<br>Order must be for 20 relays or multiples of 20. | 20 | 48V DC<br>110/125V AC/DC<br>220…240V AC/DC | 700-TBS160 |
|  | 20-Way Jumper Can be cut to required length.<br>$I_{th}$ = 36 A max per 20-way jumper. | 1 | **Color** | |
| | | | Red | 700-TBJ20R |
| | | | Grey | 700-TBJ20G |
| | | | Blue | 700-TBJ20B |

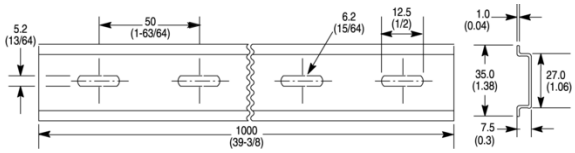
| Photo | Description | Pkg. Quantity | Socket Input Voltage | Cat. No. |
|---|---|---|---|---|
|  | **End Barrier**<br>Used for visual inspection of groups, safe separation of neighboring 700-HL modules that end with jumpers. | 10 | Black | 700-HN177 |
|  | **Snap-in Marker**<br>These snap-in markers have a 6 x 10 mm surface and snap into the ejection lever for the relay. For custom markers, contact your local Rockwell Automation sales office or Allen-Bradley distributor for more information. | 100 | Blank | 1492-MC6X10 |

(1) For gold-plated contacts: Add the letter "X" at the end of the catalog number. For example: if Cat. No. 700-TBR24 is required with gold plating, the new cat. no. is 700-TBR24X.

## Dimensions - 700-HL Relays




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.

## Specifications - 700-HLT Relays

| 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 | 1-Pole | | | | | | |
| | Inductive V AC | 24V AC, 1-phase | 30 A | ►][◄ Make | 5 A | ◄][► Break | |
| | | 120V AC, 1-phase | 30 A | | 3 A | | |
| | | 240V AC, 1-phase | 15 A | | 1.5 A | | |
| | Inductive V DC | 24V DC | DC-13, 1.0 A | | | | |
| | | 125V DC | DC-13, 0.2 A | | | | |
| | | 240V DC | DC-13, 0.1 A | | | | |
| | Resistive Make, Break, and Continuous | 24V DC | 6.0 A | | | | |
| | | 250V AC | 6.0 A | | | | |
| | | 240V DC | 0.1 A | | | | |
| Inductive Load | AC-15 250V, 3 A N.O. Contact, 1.5 A N.C. Contact<br>DC-13 24V, 1 A N.O., *and* N.C. Contact | | | | | | |

| Cat. No. 700-HLT… (Relay Output) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Min. Permissible Contact Ratings | 12V, 6 mA (72 mW) for Silver Contacts,<br>8V, 2.5 mA (20 mW) for Gold Contacts | | | | | | |
| Permissible Coil Voltage Variation | Pickup: | 85…110% of Nominal Voltage at 50 Hz<br>85…110% of Nominal Voltage at 60 Hz<br>80…110% of Nominal Voltage at DC | | | Must Dropout Voltage: | 10% of Nominal Voltage at AC<br>5% of Nominal Voltage at DC | |
| Power Consumption ±10% | AC<br>DC | 0.3VA<br>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) | 1K | 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.<br>24V DC, 1 A Inductive: 200 000 min.<br>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)<br>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, E14843 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 (UL60079-15) | 700-HLT1Z12-EX (12V DC supply)<br>700-HLT1Z24-EX, 700-HLS1Z24-EX (24V DC supply)<br>700-HLT1U1-EX, 700-HLS1U1-EX (110V/125V AC/DC supply) | | | | | |
| | CSA Certified (1) (CAN/CSA E60079-15) | 700-HLT1Z12-EX (12V DC supply)<br>700-HLT1Z24-EX, 700-HLS1Z24-EX (24V DC supply) | | | | | |

(1) 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%.

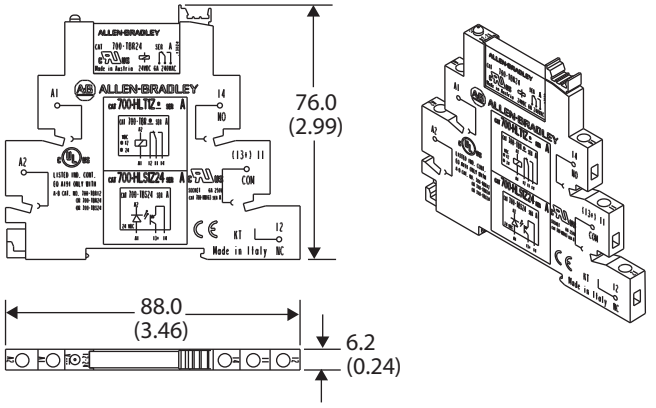
| Cat. No. 700-HLS… (Solid-state Output) | | | |
|---|---|---|---|
| **Electrical** | | | |
| Rated Thermal Current ($I_{th}$) | | 2 A (DC output) | 2 A (AC output) |
| Rated Insulation Voltage ($U_i$) | 250V IEC, 300V UL/CSA | | |

| Cat. No. 700-HLS… (Solid-state Output) | | | | | | |
|---|---|---|---|---|---|---|
| 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 | 0.6VA (120V), 1VA (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 (UL60079-15) | 700-HLT1Z24-EX, 700-HLS1Z24-EX (24V DC supply)<br>700-HLT1U1-EX, 700-HLS1U1-EX (110V/125V AC/DC supply) | | | | |
| | CSA Certified (1) (CAN/CSA60079-15) | 700-HLT1Z24-EX, 700-HLS1Z24-EX (24V DC supply) | | | | |

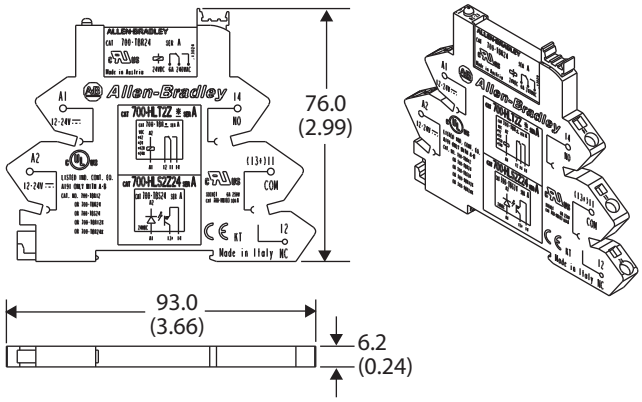
(1) Product shall be installed in an enclosure providing at least IP54 protection. Provisions shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 40%.

## Dimensions - 700-HLT, -HLS Relays

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

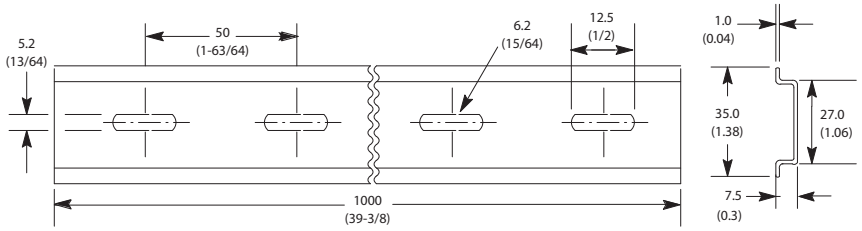



700-HLT / -HLS Screw Terminal Design
Single Wire: 0.14 $mm^2$…2.5 $mm^2$ (#26 AWG…#14 AWG)
Double Wire: 2 x 0.14 $mm^2$…2 x 1.5 $mm^2$ (2 x #26 AWG…2 x #16 AWG)
Wire Type: Solid or stranded, copper only
Strip Length: 9 mm (11/32 in). Torque: 0.5 N•m (4.4 lb•in)




700-HLT / -HLS 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.)

## Dimensions - 700-HLT, -HLS Relay Accessories

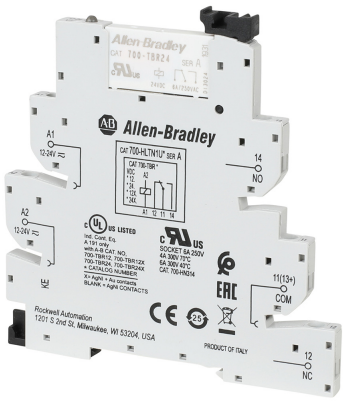


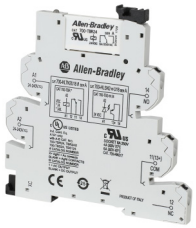
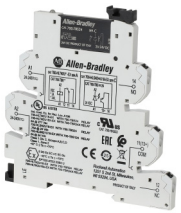
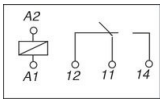
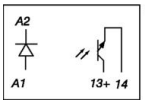

Cat. No. 199-DR1 DIN Mounting Rail Series B
Cat. No. 199-DR4 DIN Mounting Rail Series B Has No Mounting Holes

| Cat. No. | A | B | C | D | Approx. Shipping Wt. | Pkg. Qty. |
|---|---|---|---|---|---|---|
| **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 |

## 700-HL_N Next Generation Terminal Block Relay

- Relay and socket assembled interface modules for high density interposing or isolation applications
- Screw terminal and push-in terminal bases
- 6 A relay, choice of silver or gold contacts
- 2 A solid-state relay — DC output
- 2 A solid-state relay — AC output
- SPDT (relay), 1 N.O. (solid-state)
- Built-in retainer clip and snap-in marker lever
- Standard LED, reverse polarity protection, and surge protection
- Externally replaceable relay modules
- Universal input voltage versions
- Available with hazardous location certification



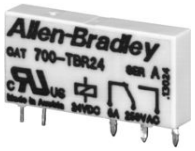
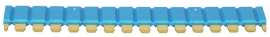
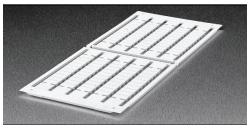

| Standard built-in Features:<br>• LED<br>• Reverse Polarity Protection for DC Inputs<br>• Coil Surface Protection(1) |  |  |  |  |
|---|---|---|---|---|
| | **Cat. No. 700-HLTN1_** | **Cat. No. 700-HLTN2_** | **Cat. No. 700-HLSN1_** | **Cat. No. 700-HLSN2_** |
| Specifications |  | | (3)  | |
| Output Type | SPDT (1 C/O); $I_{th}$ = 6A(2) | | 1 N.O. solid-state; $I_{th}$ = 2 A, 24V DC or $I_{th}$ = 2 A, 240V AC | |
| Recommended Tightening Torque | 0.5 N• m max. (4.4 lb• in) | | | |
| Wire Range | Screw Terminal: 0.14 $mm^2$…2.5 $mm^2$ (#26…#14 AWG), Push-in Terminal: 0.2 $mm^2$…2.5 $mm^2$ (#24…#14 AWG) | | | |
| Approvals | UL, cULus, cURus, ABS, CE | | | |

(1) Diode surge protection provided.
(2) For Gold-plated contacts: Add the letter "X" at the end of the catalog number. For example: if Cat. No. 700-HLTNU24 is required with gold plating, the new cat. no. is 700-HLTNU24X.
(3) Reverse polarity on the output terminals of the solid-state relay will result in the output being "ON" regardless of the state of the input voltage.

| Input Voltage | Pkg. Qty. | Cat. No. (Screw Terminals) | Cat. No. (Push-in Terminals) | Cat. No. (Screw Terminals) (DC Output) | Cat. No. (Push-in Terminals) (DC Output) | Cat. No. (Screw Terminals) (AC Output) | Cat. No. (Push-in Terminals) (AC Output) |
|---|---|---|---|---|---|---|---|
| 12V AC/DC | 10 | 700-HLTN1U12 | 700-HLTN2U12 | — | — | — | — |
| 24V AC/DC | 10 | 700-HLTN1U24 | 700-HLTN2U24 | 700-HLSN1U24 | 700-HLSN2U24 | 700-HLSN11U24 | 700-HLSN21U24 |
| 24…240V AC/DC(1) | 10 | 700-HLTN1U18 | 700-HLTN2U18 | 700-HLSN1U18 | 700-HLSN2U18 | 700-HLSN11U18 | 700-HLSN21U18 |
| Hazardous Location Certification 12V AC/DC | 10 | 700-HLTN1U12-EX | 700-HLTN2U12-EX | — | — | — | — |
| Hazardous Location Certification 24V AC/DC | 10 | 700-HLTN1U24-EX | 700-HLTN2U24-EX | 700-HLSN1U24-EX | 700-HLSN2U24-EX | 700-HLSN11U24-EX | 700-HLSN21U24-EX |
| Hazardous Location Certification 24…240V AC/DC | 10 | 700-HLTN1U18-EX | 700-HLTN2U18-EX | 700-HLSN1U18-EX | 700-HLSN2U18-EX | 700-HLSN11U18-EX | 700-HLSN21U18-EX |

(1) Leakage current suppression up to 2.2 mA off state current.

## Accessories - 700-HLT, -HLS Relays

| Photo | Description | Pkg. Quantity | Socket Input Voltage | Cat. No. |
|---|---|---|---|---|
|  | **Replacement Relays**(1)<br>Order must be for 20 relays or multiples of 20. | 20 | 12V AC/DC | 700-TBR12 |
| | | | 24V AC/DC<br>24…240V AC/DC | 700-TBR24 |
|  | **Replacement SSR**<br>4-blade miniature relay for use with 1 N.O. SSR DC output.<br>Order multiples of 20. | 20 | 24V AC/DC | 700-TBS24 |
| | **Replacement SSR**<br>4-blade miniature relay for use with 1 N.O. SSR AC output.<br>Order multiples of 20. | 20 | 24V AC/DC<br>24…240V AC/DC | 700-TBS124 |
|  | 16-Way Jumper Can be cut to required length.<br>$I_{th}$ = 36 A max per 16-way jumper. Maximum 6 A per pole. | 1 | **Color** | |
| | | | Red | 700-TBJ16R |
| | | | Grey | 700-TBJ16G |
| | | | Blue | 700-TBJ16B |
|  | **Terminal Doubler**<br>Allows two wires per one push-in terminal.<br>Max wire 2 X 1.5 $mm^2$ (2 X #16 AWG) | 5 | — | 700-TBT2 |
|  | **Terminal Block Relay Wiring Adapter**<br>Plugs into 700-HL_N Relays | 1 | — | 700-TBWA |
|  | **Cable**<br>Used with 700-TBWA. | 1 | — | 700-TBCBL |
|  | **End Barrier**<br>Used for visual inspection of groups, safe separation of neighboring 700-HLN modules that end with jumpers. | 10 | Black | 700-HN377 |
|  | **Snap-in Marker**<br>These snap-in markers have a 6 x 10 mm surface and snap into the ejection lever for the relay. For custom markers, contact your local Rockwell Automation sales office or Allen-Bradley distributor for more information. | 100 | Blank | 1492-MC6X10 |

(1) For gold-plated contacts: Add the letter "X" at the end of the catalog number. For example: if Cat. No. 700-TBR24 is required with gold plating, the new cat. no. is 700-TBR24X.

## Specifications - 700-HLTN Relays

| Cat. No. 700-HLTN… (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 | 1-Pole | | | | | | |
| | Inductive V AC | 24V AC, 1-phase | 30 A | ►][◄ Make | 5 A | ◄][► Break | |
| | | 120V AC, 1-phase | 30 A | | 3 A | | |
| | | 240V AC, 1-phase | 15 A | | 1.5 A | | |
| | Inductive V DC | 24V DC | DC-13, 1.0 A | | | | |
| | | 125V DC | DC-13, 0.2 A | | | | |
| | | 240V DC | DC-13, 0.1 A | | | | |
| | Resistive Make, Break, and Continuous | 24V DC | 6.0 A | | | | |
| | | 250V AC | 6.0 A | | | | |
| | | 240V DC | 0.1 A | | | | |
| Inductive Load | AC-15 250V, 3 A N.O. Contact, 1.5 A N.C. Contact<br>DC-13 24V, 1 A N.O., *and* N.C. Contact | | | | | | |
| Min. Permissible Contact Ratings | 12V, 10 mA (120 mW) for Silver Contacts,<br>8V, 3 mA (25 mW) for Gold Contacts | | | | | | |
| Permissible Coil Voltage Variation | Pickup: | 80…110% of Nominal Voltage at DC | | | Must Dropout Voltage: | 10% of Nominal Voltage | |
| Power Consumption ±10% | AC | 0.4 VA | | | | | |
| | DC | 0.3 W | | | | | |
| **Design Specification / Test Requirements** | | | | | | | |
| Dielectric Withstand Voltage | Pole to Pole (VRMS) | 1000V | | | | | |
| | Contact to Coil (VRMS) | 4000V | | | | | |
| **Mechanical** | | | | | | | |
| Degree of Protection | IP20 | | | | | | |
| Mechanical Life Operations | $1 \times 10^7$ | | | | | | |
| Electrical Life Operations | 6 A Resistive: 100 000 min.<br>24V DC, 1 A Inductive: 200 000 min.<br>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 | 6 ms | | | | | |
| | Dropout | 6 ms | | | | | |
| Maximum Operating Rate (full load = 6 A) | 6 cycles/min. | | | | | | |
| Coil Surge Protection | Per EN 61000-4.5; Surge Immunity (801-5)<br>Class III: 2 kV common and 1 kV differential mode | | | | | | |
| **Environmental** | | | | | | | |
| Temperature | Operating | –40…+70 °C | | | | | |
| | Storage | –40…+100 °C | | | | | |
| Altitude | 2000 m (6560 ft) | | | | | | |
| **Construction** | | | | | | | |
| Insulating Material | Molded High Dielectric Material | | | | | | |

| Cat. No. 700-HLTN… (Relay Output) | | |
|---|---|---|
| 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, E14843 Guide NLDX/NLDX7) with Allen-Bradley socket, CE Marked | |
| 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 T6 Ta < 70°C | |
| | UL Listed (UL60079-15) | 700-HLT1Z12-EX (12V DC supply)<br>700-HLT1Z24-EX, 700-HLS1Z24-EX (24V DC supply)<br>700-HLT1U1-EX, 700-HLS1U1-EX (110V/125V AC/DC supply) |
| | CSA Certified (1) (CAN/CSA E60079-15) | 700-HLT1Z12-EX (12V DC supply)<br>700-HLT1Z24-EX, 700-HLS1Z24-EX (24V DC supply) |

(1) 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%.

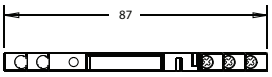
| Cat. No. 700-HLSN… (Solid-state Output) | | | |
|---|---|---|---|
| **Electrical** | | | |
| Rated Thermal Current ($I_{th}$) | | 2 A (DC output) | 2 A (AC output) |
| Rated Insulation Voltage ($U_i$) | | 250V IEC, 300V UL/CSA | |
| Control Circuit | Min. Control Voltage | 80% nominal voltage | |
| | 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) | |
| Outputs | Load Voltage Range | 1.5…33V DC | 12…275V AC |
| | Max. Repetitive Blocking Voltage | 33V | 600V |
| | Max. Switching Current (inductive/ resistive) | 2 A DC | 2 A AC |
| | On State Voltage Drop @ Max. Switching Current | <400 mV DC | <1.5V AC |
| | Leakage Current | max. 100 µA | max. 1.5 µA |
| Power Consumption ±10% | AC | 0.6VA (120V), 1VA (240V) | |
| | DC | 0.3 W (24V) | |
| **Design Specification/Test Requirements** | | | |
| Dielectric Withstand Voltage | Pole to Pole (VRMS) | 2500V | |
| | Contact to Coil (VRMS) | 3000V | |
| **Mechanical** | | | |
| Degree of Protection | IP20 | | |
| Input Voltages | See Overview/Product Selection | | |
| Operating Time at Nominal Voltage at 20 °C (ms) | Turn on Time | 200 µs (DC only input voltage), 12 ms (AC/DC input voltage) | |
| | Drop Out Time | 600 µs (DC only input voltage), 12 ms (AC/DC input voltage) | |
| Maximum Operating Rate | 300 Hz | | |
| **Environmental** | | | |
| Temperature | Operating | –20…+70 °C | |
| | Storage | –40…+70 °C | |
| Altitude | 2000 m (6560 ft) | | |

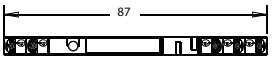
| Cat. No. 700-HLSN… (Solid-state Output) | | |
|---|---|---|
| **Construction** | | |
| Insulating Material | Molded High-Dielectric Material | |
| Enclosure | RelayIP67 | |
| Terminal Markings on Socket | In accordance with EN50 0005 | |
| Certifications | cULus Listed (File No. E14843, Guide NLDX/NLDX7), 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 T6 Ta < 70°C | |
| | UL Listed (UL60079-15) | 700-HLT1Z24-EX, 700-HLS1Z24-EX (24V DC supply)<br>700-HLT1U1-EX, 700-HLS1U1-EX (110V/125V AC/DC supply) |
| | CSA Certified (1) (CAN/CSA60079-15) | 700-HLT1Z24-EX, 700-HLS1Z24-EX (24V DC supply) |

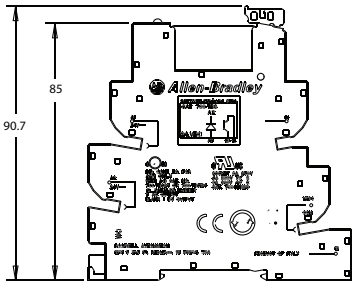
(1) Product shall be installed in an enclosure providing at least IP54 protection. Provisions shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 40%.

## Dimensions - 700-HLTN, -HLSN Relays

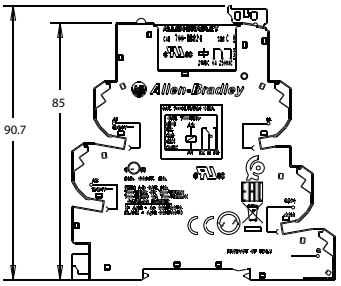
Approximate dimensions are shown in millimeters (inches). Dimensions are not intended for manufacturing purposes.



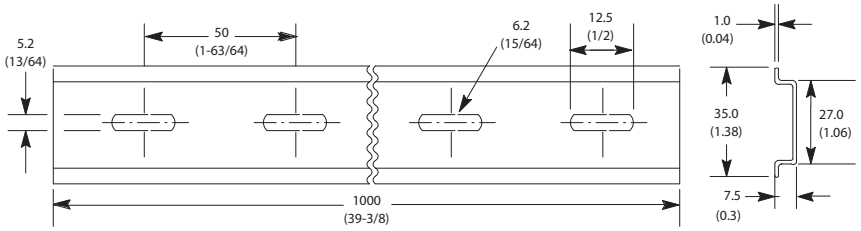




700-HLTN / -HLSN Screw Terminal Design
Single Wire: 0.5 $mm^2$…2.5 $mm^2$ (#21 AWG…#14 AWG)
Double Wire: 2 x 0.5 $mm^2$…2 x 1.5 $mm^2$ (2 x #26 AWG…2 x #16 AWG)
Wire Type: Solid or stranded, copper only
Strip Length: 10 mm (0.4 in). Torque: 0.5 N•m (4.4 lb•in)




700-HLTN / -HLSN Push-in Terminal Design
Single Wire: 0.5 $mm^2$…2.5 $mm^2$ (#21 AWG…#14 AWG)
Wire Type: Solid or stranded, copper only
Strip Length: 9 mm (11/32 in.)

## Dimensions - 700-HLTN, -HLSN Relay Accessories

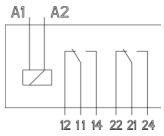



Cat. No. 199-DR1 DIN Mounting Rail Series B
Cat. No. 199-DR4 DIN Mounting Rail Series B Has No Mounting Holes

| Cat. No. | A | B | C | D | Approx. Shipping Wt. | Pkg. Qty. |
|---|---|---|---|---|---|---|
| **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 |

## 700-HL 2-pole Terminal Block Relay

- Relay and socket assembled interface modules for high density interposing or isolation applications
- Screw terminal and spring-clamp bases
- 10 A relay, choice of silver or gold contacts
- DPDT (relay)
- Built-in retainer clip and snap-in marker lever
- Standard LED, reverse polarity protection, and surge protection
- Externally replaceable relay modules



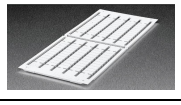



| | |
|---|---|
| Output Type | DPDT (2 C/O); $I_{th}$ = 10 A |
| Recommended Tightening Torque | 0.6 N•m max. (5.3 lb•in.) |
| Wire Range | Screw Terminal: 0.2…2.5 $mm^2$ (#24…14 AWG), Spring Terminal: 0.2…2.5 $mm^2$ (#24…14 AWG) |
| Approvals | cULus, cURus, CE |

| Input Voltages | Pkg. Quantity | Cat. No.(1) (Screw Terminals) | Cat. No.(Spring Clamp Terminals) |
|---|---|---|---|
| 12V DC | 10 | 700-HLT12Z12 | 700-HLT22Z12 |
| 24V DC | 10 | 700-HLT12Z24 | 700-HLT22Z24 |
| 48V DC | 10 | 700-HLT12Z48 | 700-HLT22Z48 |
| 24V AC/DC | 10 | 700-HLT12U24 | 700-HLT22U24 |
| 110/125V AC/DC | 10 | 700-HLT12U1 | 700-HLT22U1 |
| 220…240V AC/DC | 10 | 700-HLT12U2 | 700-HLT22U2 |

(1) For Gold-plated contacts: Add the letter "X" at the end of the catalog number. Example: Cat. No. 700-HLT12Z24 with gold plated contacts is Cat. No. 700-HLT12Z24X. The following relays are available with the gold-plated contact option: 700-HLT_2Z24, 700-HLT_2U24, 700-HLT_2U1, and 700-HLT_2U2. Not available on 12V and 48V DC products.

### Accessories - 700-HL Relays (2- pole)

| Photo | Description | Pkg. Qty. | Socket Input Voltage/Color | Cat. No. |
|---|---|---|---|---|
|  | **Replacement Relays** Order must be for 20 relays or multiples of 20. | 20 | 12V DC | 700-TBR212 |
| | | | 24V AC/DC | 700-TBR224 |
| | | | 48V DC | 700-TBR248 |
| | | | 110/125V AC/DC, 220…240V AC/DC | 700-TBR2110 |
|  | 8-Way Jumper Can be cut to required length. $I_{th}$ = 10 A max per 8-way jumper. | 1 | Red | 700-TBJ08R |
| | | | Grey | 700-TBJ08G |
| | | | Blue | 700-TBJ08B |
|  | **End Barrier** Used for visual inspection of groups, safe separation of neighboring 700-HL modules that end with jumpers. | 10 | Black | 700-HN177 |
|  | **Snap-in Marker**(1) These snap-in markers have a 6 x 12 mm surface and snap into the ejection lever for the relay. | 100 | Blank | 1492-MS6X12 |

(1) For custom markers, contact your local Rockwell Automation sales office or Allen-Bradley distributor for more information.

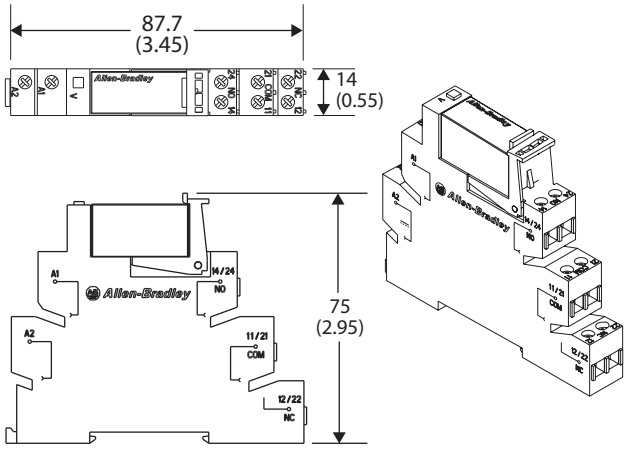
## Specifications - 700-HL Relays (2-Pole)

| Cat. No. 700-HLT…2-Pole (Relay Output) | | | | | | |
|---|---|---|---|---|---|---|
| **Electrical Ratings** | | | | | | |
| Pilot Duty Rating | | B 300, R 300 | | | | |
| 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<br>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<br>85…110% of Nominal Voltage at 60 Hz<br>80…110% of Nominal Voltage at DC | | Must Dropout Voltage: | 10% of Nominal Voltage at AC<br>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 ±10% | AC | N/A | 0.5V A | N/A | 0.4V A | 0.8V A |
| | DC | 0.4 W | 0.5 W | 0.8 W | 0.5 W | 0.7 W |
| **Mechanical** | | | | | | |
| Degree of Protection | | IP20 | | | | |
| Mechanical Life Operations | | $3 \times 10^7$ | | | | |
| Electrical Life Operations | | 250V AC/24V DC, 8 A Resistive: 100 000 min.<br>24V DC, 10 A Resistive: 6000 min.<br>250V DC, 0.28 A Resistive: 6000 min.<br>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. | | | | |

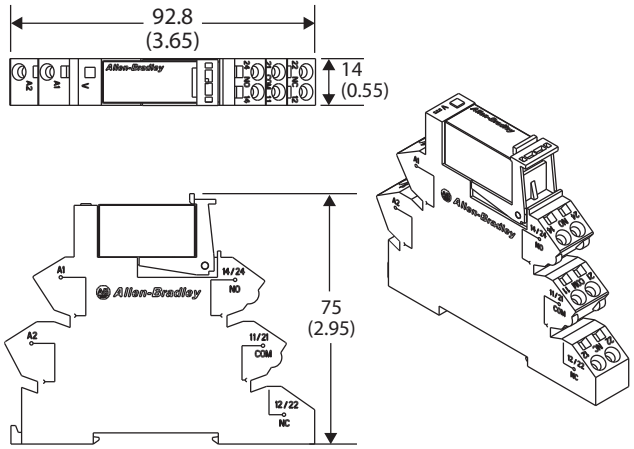
| Cat. No. 700-HLT…2-Pole (Relay Output) | | |
|---|---|---|
| **Environmental** | | |
| Temperature | Operating | –40…+60 °C |
| | Storage | –40…+100 °C |
| Altitude | 2000 m (6560 ft) | |
| **Construction** | | |
| Insulating Material | Molded High-Dielectric Material | |
| Enclosure | Relay RT II — 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 | |

## Dimensions - 700-HL (2-pole)

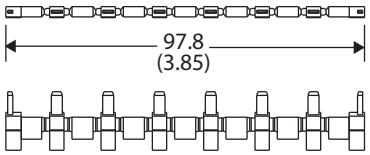
Approximate dimensions are shown in millimeters (inches). Dimensions are not intended for manufacturing purposes.



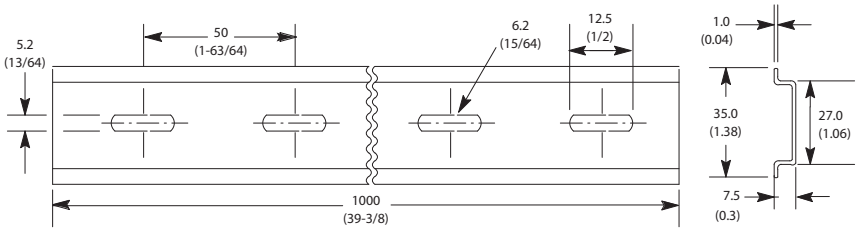

*Bulletin 700-HL Screw Terminal Design*
*Single Wire: 0.14 mm$^2$…2.5 mm$^2$ (#26 AWG…14 AWG)*
*Double Wire: 2 x 0.14 mm$^2$…2 x 1.5 mm$^2$ (2 x #26 AWG…2 x 16 AWG)*
*Wire Type: Solid or stranded, copper only*
*Strip Length: 9 mm (11/32 in). Torque: 0.5 N•m (4.4 lb•in)*




*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*



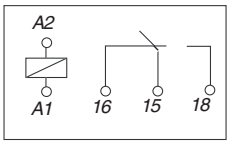

Cat. No. 199-DR1 DIN Mounting Rail Series B
Cat. No. 199-DR4 DIN Mounting Rail Series B Has No Mounting Holes

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

## 700-HLF Terminal Block Timing Relay

- Relay and socket assembled modules for high-density applications
- Screw terminal bases
- 6 A relay, choice of silver or gold contacts
- SPDT (relay)
- Four timing functions
- Time range from 0.1 sec...6 hr
- Built-in retainer clip and snap-in marker lever
- Standard LED, reverse polarity protection, and surge protection
- Externally replaceable relay modules



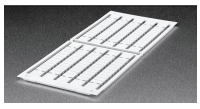
| | |
|---|---|
| Wiring Diagram |   |
| Output Type | SPDT (1 C/O); $I_{th}$ = 6A§ |
| Recommended Tightening Torque | 0.5 N•m max. (4.4 lb•in) |
| Wire Range | Screw Terminal: 0.14 $mm^2$…2.5 $mm^2$ (#26…#14 AWG) |
| Approvals | cULus, cURus, CE |

| **Assembled Device** | | |
|---|---|---|
| **Input Voltage** | **Pkg. Quantity** | **Cat. No.(1)** |
| 24V AC/DC | 10 | 700-HLF1U24 |

(1) For gold-plated contacts add an X after the catalog number listed.

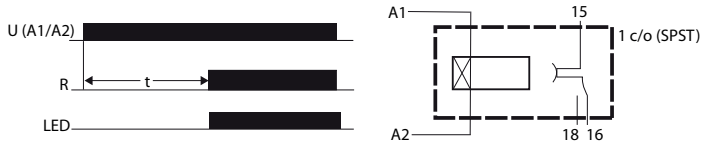
### Accessories - 700-HLF Relays

Terminal block timing relay bases are not sold separately.

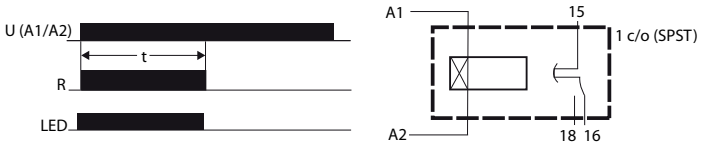
| Photo | Description | Pkg. Quantity | Socket Input Voltage | Cat. No. |
|---|---|---|---|---|
|  | **Replacement Relays**<br>Order must be for 20 relays or multiples of 20. | 20 | 24V AC/DC | 700-TBR24(1) |
|  | **20-Way Jumper**<br>Can be cut to required length. $I_{th}$ = 36 A max per 20-way jumper. | 1 | Color | |
| | | | Red | 700-TBJ20R |
| | | | Grey | 700-TBJ20G |
| | | | Blue | 700-TBJ20B |
|  | **End Barrier**<br>Used for visual inspection of groups, safe separation of neighboring 700-HL modules that end with jumpers. | 10 | Black | 700-HN177 |
|  | **Snap-in Marker**<br>These snap-in markers have a 6 x 10 mm surface and snap into the ejection lever for the relay. | 100 | Blank | 1492-MC6X10 |

(1) For gold-plated contacts: Add the letter "X" at the end of the catalog number. For example: if Cat. No. 700-TBR24 is required with gold plating, the new cat. no. is 700-TBR24X.

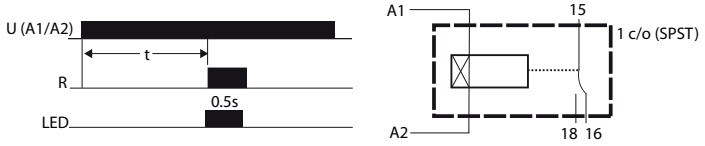
## Function and Connection Diagrams - 700-HLF Relays



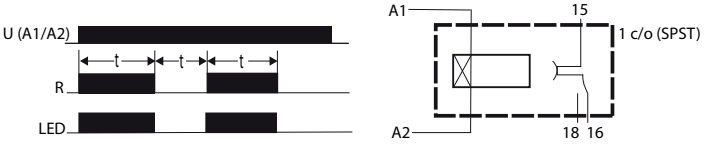

On-Delay




One Shot




Pulse




Flasher

## Specifications- 700-HLF Relays

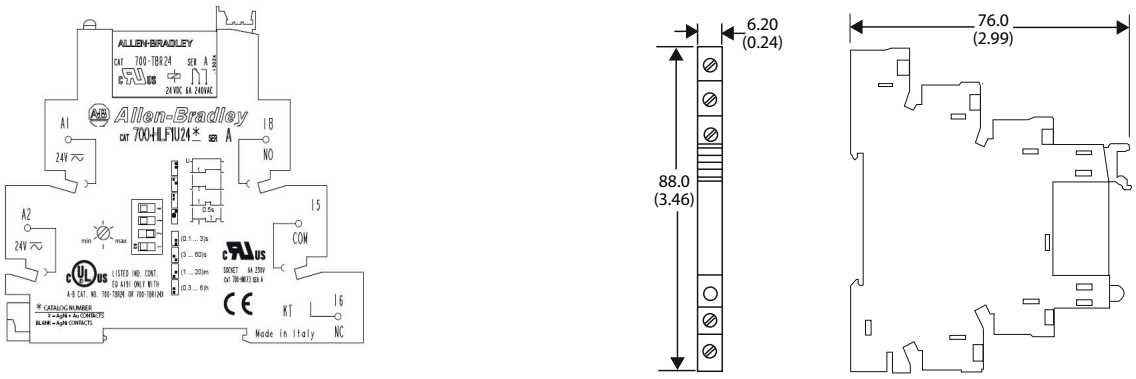
| Cat. No. 700-HLF… (Relay Output) [1] | | | | | |
|---|---|---|---|---|---|
| **Electrical Ratings** | | | | | |
| **Pilot Duty Rating** | B 300, R 300 | | | | |
| **Rated Thermal Current ($I_{th}$)** | 1-Pole — 6 A | | | | |
| **Rated Insulation Voltage ($U_i$)** | 250V IEC, 300V UL/CSA | | | | |
| **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 and 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<br>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<br>85…110% of Nominal Voltage at 60 Hz<br>80…110% of Nominal Voltage at DC | Must Dropout Voltage: | 10% of Nominal Voltage at AC,<br>5% of Nominal Voltage at DC |
| **Power Consumption ±10%** | AC/DC | 0.5VA | | |
| **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** | $1 \times 10^7$ | | | |
| **Electrical Life Operations** | 6 A Resistive: 100,000 min.<br>24V DC, 1 A Inductive: 200,000 min.<br>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 (–40…+131 °F) | | |
| | Storage | –40…+100 °C (–40…+212 °F) | | |
| **Altitude** | 2000 m (6560 ft) | | | |
| **Construction** | | | | |
| **Insulating Material** | Molded High Dielectric Material | | | |
| **Enclosure** | RelayIP67 | | | |
| **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 | | | |

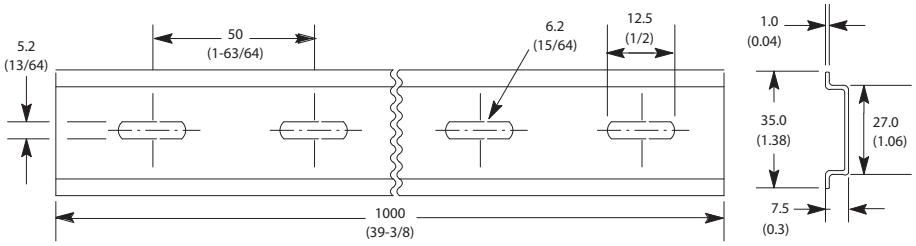
(1) Product shall be installed in an enclosure providing at least IP54 protection. Provisions shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 40%.

## Dimensions- 700-HLF Relays

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



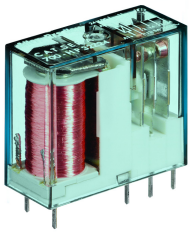

700-HLF Screw Terminal Design
Single Wire: 0.14 $mm^2$…2.5 $mm^2$ (#26 AWG…14 AWG)
Double Wire: 2 x 0.14 $mm^2$…2 x 1.5 $mm^2$ (2 x #26 AWG…2 x 16 AWG)
Wire Type: Solid or stranded, copper only
Strip Length: 9 mm (11/32 in.). Torque: 0.5 N•m (4.4 lb•in)



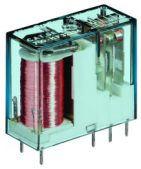
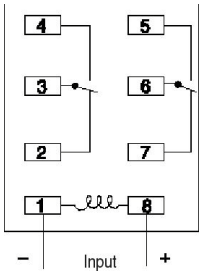
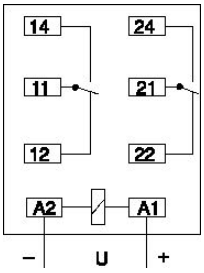

Cat. No. 199-DR1 DIN Mounting Rail Series B
Cat. No. 199-DR4 DIN Mounting Rail Series B Has No Mounting Holes

| 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) |

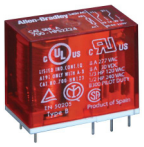
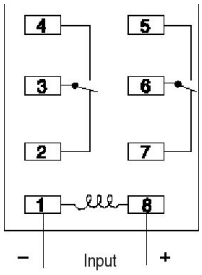
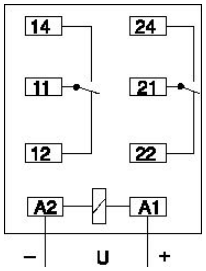
## 700-HP Slim Line Relay



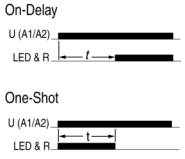
- 8 A contact ratings
- DPDT/ (2 c/o) contacts
- Plug-in PIN style (PCB) terminals (5 mm pinning)
- Choice of standard silver nickel contacts, or silver nickel with gold-plated contacts
- Available with mechanically linked contacts (Type B)
- Safety Control Relay Version (700-HPS)

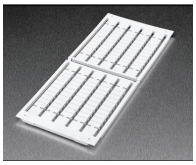
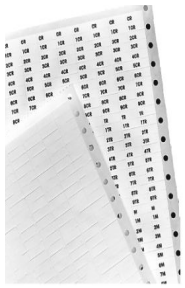
| Photo | Description | Contact Rating | Wiring Diagrams | | Coil Voltage | Pkg. Qty. | Cat. No. |
|---|---|---|---|---|---|---|---|
| | | | U.S./Canada | International | | | |
|  | DPDT<br>2-Pole<br>2 Form C<br>AgNi + Au<br>Gold Plated<br>Contacts | 8 A |  |  | 6V AC | 10 | 700-HPX2A06 |
| | | | | | 12V AC | 10 | 700-HPX2A12 |
| | | | | | 24V AC | 10 | 700-HPX2A24 |
| | | | | | 120V AC | 10 | 700-HPX2A1 |
| | | | | | 240V AC | 10 | 700-HPX2A2 |
| | | | | | 6V DC | 10 | 700-HPX2Z06 |
| | | | | | 12V DC | 10 | 700-HPX2Z12 |
| | | | | | 24V DC | 10 | 700-HPX2Z24 |
| | | | | | 48V DC | 10 | 700-HPX2Z48 |
| | | | | | 110V DC | 10 | 700-HPX2Z1 |
| | DPDT<br>2-Pole<br>2 Form C<br>AgNi Contacts | | | | 6V AC | 10 | 700-HP32A06 |
| | | | | | 12V AC | 10 | 700-HP32A12 |
| | | | | | 24V AC | 10 | 700-HP32A24 |
| | | | | | 120V AC | 10 | 700-HP32A1 |
| | | | | | 240V AC | 10 | 700-HP32A2 |
| | | | | | 6V DC | 10 | 700-HP32Z06 |
| | | | | | 12V DC | 10 | 700-HP32Z12 |
| | | | | | 24V DC | 10 | 700-HP32Z24 |
| | | | | | 48V DC | 10 | 700-HP32Z48 |
| | Sockets | | 700-HN123 | 700-HN123 | 110V DC | 10 | 700-HP32Z1 |

## 700-HPS Safety Control Relay

| Photo | Description | Contact Rating | Wiring Diagrams | | Coil Voltage | Pkg. Qty. | Cat. No. |
|---|---|---|---|---|---|---|---|
| | | | U.S./Canada | International | | | |
|  | DPDT 2-Pole<br>2 Form C AgNi + Au Gold Plated<br>Mechanically Linked Contacts | 8 A |  |  | 6V DC | 10 | 700-HPSXZ06 |
| | | | | | 12V DC | 10 | 700-HPSXZ12 |
| | | | | | 24V DC | 10 | 700-HPSXZ24 |
| | | | | | 48V DC | 10 | 700-HPSXZ48 |
| | | | | | 60V DC | 10 | 700-HPSXZ60 |
| | | | | | 110V DC | 10 | 700-HPSXZ1 |
| | | | | | 125V DC | 10 | 700-HPSXZ01 |
| | DPDT 2-Pole<br>2 Form C AgNi<br>Mechanically Linked Contacts | | | | 6V DC | 10 | 700-HPS2Z06 |
| | | | | | 12V DC | 10 | 700-HPS2Z12 |
| | | | | | 24V DC | 10 | 700-HPS2Z24 |
| | | | | | 48V DC | 10 | 700-HPS2Z48 |
| | | | | | 60V DC | 10 | 700-HPS2Z60 |
| | | | | | 110V DC | 10 | 700-HPS2Z1 |
| 700-HPS DPDT | Sockets | | 700-HN123 | 700-HN123 | 125V DC | 10 | 700-HPS2Z01 |

## Accessories - 700-HP, -HPS

| Photo | Description | | Pkg. Qty. | Cat. No. |
|---|---|---|---|---|
|  | **Diode Surge Suppressor**<br>Voltage Range: 6…220V DC used with 700-HN123 socket | | 10 | 700-ADR |
| | **Diode with LED Surge Suppressor**<br>Voltage Range: 6…24V DC used with 700-HN123 socket | | 10 | 700-ADL1R |
| | **Diode with LED Surge Suppressor**<br>Voltage Range: 28…60V DC used with 700-HN123 socket | | 10 | 700-ADL2R |
| | **Diode with LED Surge Suppressor**<br>Voltage Range: 110…220V DC used with 700-HN123 socket | | 10 | 700-ADL3R |
| | **Diode with LED Surge Suppressor**<br>Voltage Range: 6…24V AC used with 700-HN123 socket | | 10 | 700-AV1R |
| | **Varistor with LED Surge Suppressor**<br>Voltage Range: 110…240V AC<br>used with 700-HN123 socket | | 10 | 700-AV3R |
| | **RC Surge Suppressor**<br>Voltage Range: 6…24V AC/DC used with 700-HN123 socket | | 10 | 700-AR1 |
| | **RC Surge Suppressor**<br>Voltage Range: 110…240V AC/DC used with 700-HN123 socket | | 10 | 700-AR2 |
|  | **Timing Module**<br>On-Delay or One-Shot selectable voltage range: 12…24V AC/DC used with sockets that accept plug-in accessory modules. |  | 1 | 700-AT3 |
| | **Timing Module**<br>On-Delay or One-Shot selectable voltage range: 110…125V AC used with sockets that accept plug-in accessory modules. | | | 700-AT3A1 |
| | **Timing Module**<br>On-Delay or One-Shot selectable voltage range: 230…240V AC used with sockets that accept plug-in accessory modules. | | | 700-AT3A2 |

| Photo | Description | | Pkg. Qty. | Cat. No. |
|---|---|---|---|---|
|  | **Screw Terminal Socket — Panel or DIN Rail Mounting**<br>8-pin miniature socket for use with 2-pole, 700-HP relays. Incorporates coil and contact separation. | | 10 | 700-HN123 |
|  | 8-Way Jumper can be cut to required length. Rated 10 A – 250V | Red | 1 | 700-TBJ20R |
| | | Gray | | 700-TBJ20G |
| | | Blue | | 700-TBJ20B |
| | **Plastic Retainer and Ejection Lever**<br>For use with the 700-HN123 sockets<br>Built-in ability to accept 1492 snap-in markers | | 10 | 700-HN119 |
| | **Spring Clamp Terminal Socket — Panel or DIN Rail Mounting**<br>8-pin miniature socket for use with 2-pole, 700-HP relays. Incorporates coil and contact separation. | | 10 | 700-HN230 |
| | **Plastic Retainer and Ejection Lever**<br>For use with the 700-HN230 sockets<br>Built-in ability to accept 1492 snap-in markers | | 10 | 700-HN232 |
|  | **DIN (#3) symmetrical hat rail**<br>35 x 7.5 x 1 m | | 10 | 199-DR1 |
|  | **Relay Identification Snap-in Markers**<br>Note - These markers can only be used when the Plastic Retainer and Ejection Lever accessory (part # 700-HN119) is used because the markers snap into the Ejection Lever (and not into the relay itself). | | 5 | 1492-MS5X12 |
| | | | 5 | 1492-MS6X9 |
| | | | 5 | 1492-MS6X12 |
| | | | 5 | 1492-MS8X9 |
| | | | 5 | 1492-MS8X12 |
| | | | 100 | 1492-MP-Blank |
|  | **Pre-Printed Identification Tags —** contains 10 sheets of pre-printed and blank tags. Each sheet contains 13 sets of the markings CR…9CR, TR…9TR, M…9M, F, R, 1S, and 117 blank tags. Tags are peel-off with sticky backing for easy placement on relays. | | 10 | 700-N40<br>700-N41 |

**Socket, and Retainer Clip Reference**

| 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 [1] - 700-HP Relays

| 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)<br>700-HPX2: 50mW (5V, 5 mA) | 700-HPS2: 500 mW (10V, 10 mA)<br>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%<br>Nominal Voltage | 75...120%<br>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 1 minute | Pole to Pole (VRMS) | | 2000V AC | |
| | Contact to Coil (VRMS) | | 4000V AC | |
| **Mechanical** | | | | |
| Degree of Protection | | | Open Type (Sockets) | |
| Mechanical lifecycles | | | $10 \times 10^6$ (AC Coils), $20 \times 10^6$ (DC coils) | $10 \times 10^6$ (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…+185 °F) | –40…+70 °C (–40…+158 °F) |
| | Storage | | –45…+100 °C (–49…+212 °F) | –50…+80 °C (–40…+176 °F) |
| Altitude | | | 2000 m (6560 ft) | |
| **Construction** | | | | |

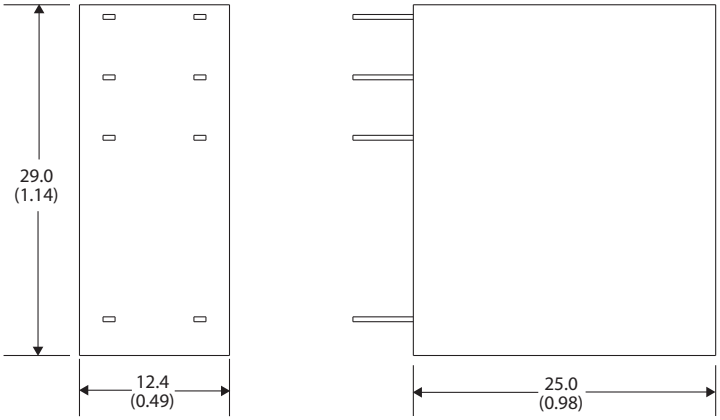
## Specifications [1] - 700-HP Relays

| | | |
|---|---|---|
| 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 700-HN123 socket (File No. E3125, Guide NLDX/NLDC7), CSA Certified (files 229473), CE Marked, LR Certified (700-HP), IMQ & TÜV Certified (700- HPS) | |
| Standards | UL 508, CSA 22.2 No. 14, EN 61810-1, EN 50205 (700-HPS) | |

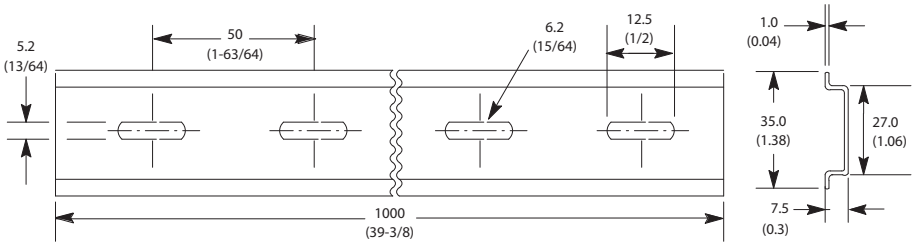
(1) The inrush VA equals 1.5 times the sealed VA.

## Dimensions - 700-HP Relays

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



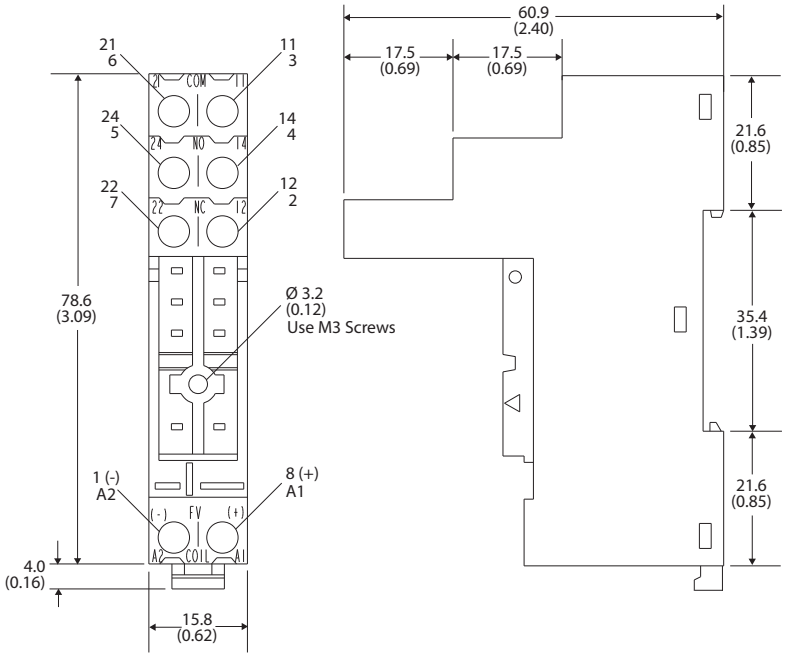

700-HP Relay



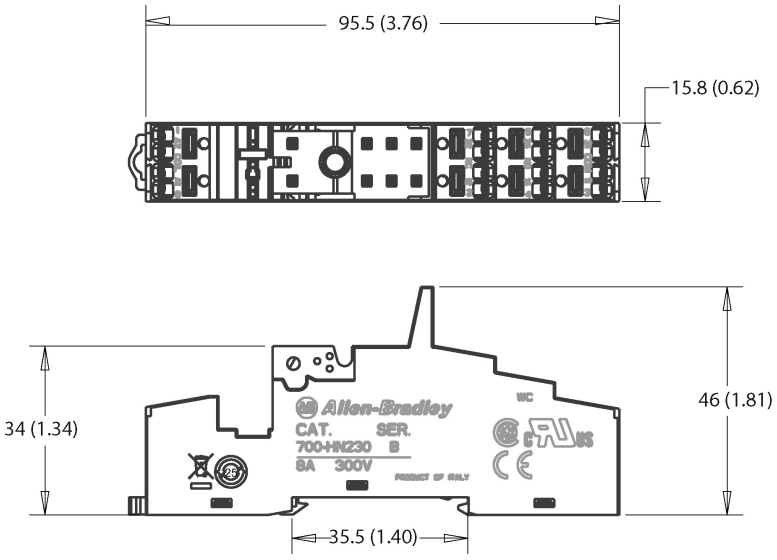

Cat. No. 700-HN123
Single Wire: 0.2.....2.5 $mm^2$ (#24.....14 AWG)
Double Wire: 2 X 0.2.....2 X 2.5 $mm^2$ (#2 X 24....2 X 14 AWG)
Wire Type: solid or stranded, copper only
Strip Length: 7 mm (9/32 in.), Torque: 0.5 N•m (4.4 lb•in)

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

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




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)

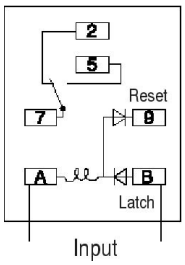
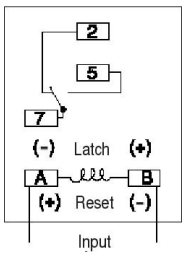
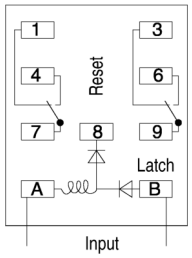
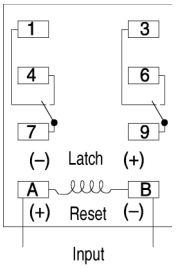
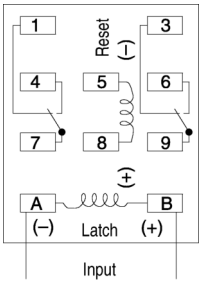



Cat. No. 700-HN230
Min wire size: 0.5$mm^2$ (21 AWG.)
Max wire size: 2 x 1.5 and 1 x 2.5 $mm^2$ (2 x18 / 1 x 14 AWG)
Wire Type: solid or stranded, copper only
Stripe Length: 8mm (10/32 in.)

## 700-HJ Magnetic Latching Relay



- 10 A Contact Rating
- SPDT
- DPDT Single Coil
- DPDT Dual Coil
- Blade Style Quick Connect Terminals

| Photo | Description | Contact Rating | Wiring Diagrams | | Coil Voltage | Cat. No. |
|---|---|---|---|---|---|---|
| | | | AC(2) | DC(3) | | |
|  | SPDT<br>1-Pole<br>1 Form C<br>AgCdO Contacts<br>(Single Coil<br>AC or DC) | 10 A |  |  | 24V AC | 700-HJ36A24 |
| | | | | | 120V AC | 700-HJ36A1 |
| | | | | | 24V DC | 700-HJ36Z24 |
| | Sockets | | 700-HN153 | 700-HN154 | | |
| | DPDT<br>2-Pole<br>2 Form C<br>AgCdO Contacts<br>(Single Coil<br>AC or DC) | 10 A |  |  | 24V AC | 700-HJ32A24 |
| | | | | | 120V AC | 700-HJ32A1 |
| | | | | | 240V AC | 700-HJ32A2 |
| | | | | | 12V DC | 700-HJ32Z12 |
| | Sockets | | 700-HN153 | 700-HN154 | 24V DC | 700-HJ32Z24 |
| | DPDT<br>2-Pole<br>2 Form C<br>AgCdO Contacts<br>(Dual Coil(1) | 10 A | DC Only |  | 24V DC | 700-HJD32Z24 |
| | Sockets | | | 700-HN153 or<br>700-HN154 | | |

(1) Available only in DC Coil with DPDT contacts.
(2) AC Relays include internal diodes.
(3) For DC operation, polarity must be observed.

## Accessories-700-HJ Relays

| Photo | Description | Pkg. Qty. | Cat. No. |
|---|---|---|---|
|  | **Screw Terminal Socket — Panel or DIN Rail Mounting. Guarded Terminal Construction**<br>11-blade socket for use with 700-HB relays. This socket has coil and contact separation as well as the ability to use optional plug-in modules ( 700-A___ accessories, LED, surge suppression, timing modules). | 10 | 700-HN153 |
|  | **Screw Terminal Base Socket — Panel or DIN Rail Mounting. Open Style Construction**<br>11-blade for use with 700-HB relays. | 10 | 700-HN154 |
|  | **DIN (#3) symmetrical hat rail**<br>35 x 7.5 x 1 m | 10 | 199-DR1 |
|  | **Retainer Clip**<br>**For Cat. Nos. 700-HN153 and -HN154 Sockets with 700-HJ Relays**<br>Secures relay in socket. Order must be for 10 clips or multiples of 10. | 10 | 700-HN159 |
|  | **Pre-Printed Identification Tags —** contains 10 sheets of pre-printed and blank tags. Each sheet contains 13 sets of the markings CR…9CR, TR…9TR, M…9M, F, R, 1S, and 117 blank tags. Tags are peel-off with sticky backing for easy placement on relays. | 10 | 700-N40 |
| | **Blank Identification Tags —** contains 10 sheets of blank identification tags for customer specialized printing. Each sheet contains 546 blank tags. Tags are peel-off with sticky backing for easy placement on relays. | 10 | 700-N41 |

### Socket and Retainer Clip Reference

| Relay Type | Socket Cat. No. | Retainer Clip Cat. No. |
|---|---|---|
| 700-HJ | 700-HN153 | 700-HN159 |
| | 700-HN154 | 700-HN159 |

## Specifications - 700-HJ Relays

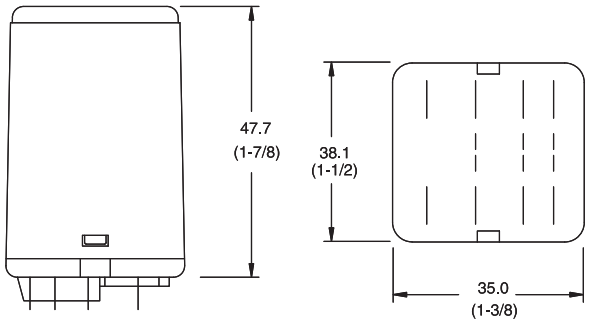
| Attribute | | 700-HJ | | |
|---|---|---|---|---|
| **Electrical Ratings** | | | | |
| Pilot Duty Rating | | — | | |
| Rated Thermal Current ($I_{th}$) | | 10 A | | |
| Rated Insulation Voltage ($U_i$) | | 250VIEC,<br>300V UL/CSA | | |
| Contacts | Inductive | **Make** | **Break** | **Hp** |
| | | ►][◄ | ◄][► | |
| | 120V AC<br>240V AC | 30 A<br>15 A | 3 A<br>1.5 A | 1/4<br>1/3 |
| | DC | 24V DC, 10 A | | |
| Permissible Coil Voltage Variation | | 85…110% of Nominal Voltage at 50 Hz<br>85…110% of Nominal Voltage at 60 Hz<br>80…110% of Nominal Voltage at DC | | |

## Specifications - 700-HJ Relays

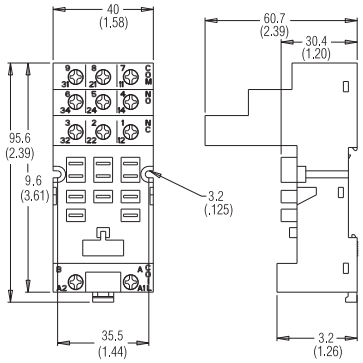
| | | | Single AC Coil | Single DC Coil | Dual DC Coil |
|---|---|---|---|---|---|
| Coil Consumption ±10% | AC Coils | Inrush<br>Sealed | 1.44 VA<br>1.44 VA | — | — |
| | DC Coils | | — | 1.2 W | 12V 1.63 W<br>24V 1.67 W |
| **Design Specification/Test Requirements** | | | | | |
| Dielectric Withstand Voltage | | Pole-to-Pole | 1500V AC | | |
| | | Contact-to-Pole | 1500V AC | | |
| | | Contact-to-Frame | 1500V AC | | |
| **Mechanical** | | | | | |
| Degree of Protection | | | Open Type<br>(Guarded Terminal Sockets) | | |
| Mechanical Life Operations | | | $10 \times 10^6$ | | |
| Switching Frequency Operations | | | 1800/HR | | |
| Coil Voltages | | | See Product Selection | | |
| Operating Time at Nominal Voltage at 20 °C | | Pickup<br>Dropout | 25 ms<br>25 ms | | |
| Maximum Operating Rate | | | — | | |
| **Environmental** | | | | | |
| Temperature | | Operating | –45…+50 °C<br>(–49…+122 °F) | | |
| | | Storage | –45…+100 °C<br>(–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<br>Cat. No. 700-HN153<br>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 | | |

## Dimensions - 700-HJ Relays

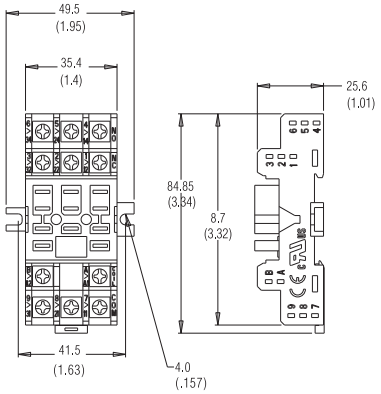
Approximate dimensions are shown in millimeters (inches). Dimensions are not intended for manufacturing purposes.



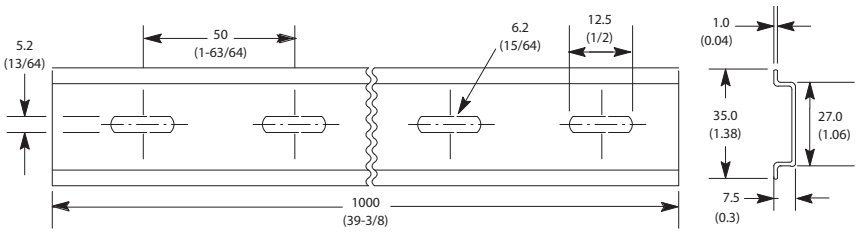

700-HJ Relay




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




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)

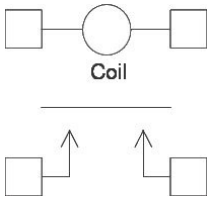
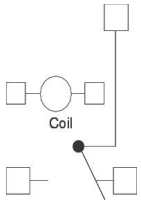
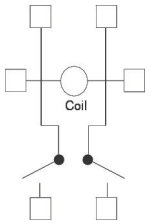
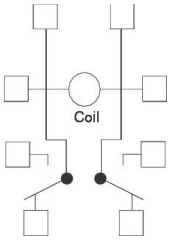



Cat. No. 199-DR1 DIN Mounting Rail Series B
Cat. No. 199-DR4 DIN Mounting Rail Series B Has No Mounting Holes

| 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) |

## 700-HG Power Relay

- 40 A Contact Ratings
- SPST-NO-DM, SPDT, DPST-NO, DPDT
- Panel Mounted
- Options: Magnetic Blowout for High DC Loads, Auxiliary Snap Action Switch
- Screw Terminals #6-32 for Coil, #8-32 for Contacts

| | Description | Contact Ratings | Wiring Diagrams | Coil Voltage | Cat. No.(1) |
|---|---|---|---|---|---|
|  | SPST-NO-DM<br>1 Form X<br>AgCdO Contacts | 40 A<br>(A600) |  | 24V AC | 700-HG45A24 |
| | | | | 120V AC | 700-HG45A1 |
| | | | | 240V AC | 700-HG45A2 |
| | | | | 277V AC | 700-HG45A27 |
| | | | | 480V AC | 700-HG45A4 |
| | | | | 12V DC | 700-HG45Z12 |
| | | | | 24V DC | 700-HG45Z24 |
| | | | | 48V DC | 700-HG45Z48 |
| | | | | 110V DC | 700-HG45Z1 |
|  | SPDT<br>1-pole<br>1 Form C<br>AgCdO Contacts | 40 A<br>(A600) |  | 24V AC | 700-HG46A24 |
| | | | | 120V AC | 700-HG46A1 |
| | | | | 240V AC | 700-HG46A2 |
| | | | | 12V DC | 700-HG46Z12 |
| | | | | 24V DC | 700-HG46Z24 |
| | | | | 48V DC | 700-HG46Z48 |
| | | | | 110V DC | 700-HG46Z1 |
|  | DPST-NO<br>2-pole<br>2 Form A<br>AgCdO Contacts | 40 A<br>(A600) |  | 24V AC | 700-HG47A24 |
| | | | | 120V AC | 700-HG47A1 |
| | | | | 240V AC | 700-HG47A2 |
| | | | | 480V AC | 700-HG47A4 |
| | | | | 12V DC | 700-HG47Z12 |
| | | | | 24V DC | 700-HG47Z24 |
| | | | | 48V DC | 700-HG47Z48 |
| | | | | 110V DC | 700-HG47Z1 |
|  | DPDT<br>2-pole<br>2 Form C<br>AgCdO Contacts | 40 A<br>(A600) |  | 24V AC | 700-HG42A24 |
| | | | | 120V AC | 700-HG42A1 |
| | | | | 240V AC | 700-HG42A2 |
| | | | | 277 AC | 700-HG42A27 |
| | | | | 12V DC | 700-HG42Z12 |
| | | | | 24V DC | 700-HG42Z24 |
| | | | | 48V DC | 700-HG42Z48 |
| | | | | 110V DC | 700-HG42Z1 |
| | | | | 220V DC | 700-HG42Z2 |
| | | | | 250V DC | 700-HG42Z25 |

(1) Auxiliary Snap Switch Option: Add suffix (-5) to the selected 700-HG relay Cat. No., except for the 220V DC add (-5L).
Magnetic Blowout Option: Add suffix (-6) to the selected 700-HG relay Cat. No. (suppresses the arc when switching DC loads – ratings listed below).

## Accessories - 700-HG Relays

| Photo | Description | Pkg. Qty. | Cat. No. |
|---|---|---|---|
|  | **Pre-Printed Identification Tags —** contains 10 sheets of pre-printed and blank tags. Each sheet contains 13 sets of the markings CR. . .9CR, TR. . .9TR, M. . .9M, F, R, 1S, and 117 blank tags. Tags are peel-off with sticky backing for easy placement on relays. | 10 | 700-N40 |
| | **Blank Identification Tags —** contains 10 sheets of blank identification tags for customer specialized printing. Each sheet contains 546 blank tags. Tags are peel-off with sticky backing for easy placement on relays. | 10 | 700-N41 |
|  | **Type 1 Enclosure** For use with any of the listed relays. Knockouts for 1/2 in. and 3/4 in. conduit connections. The enclosure exceeds the minimum clearances required by U.S. standards, resulting in generous wiring spaces. | 1 | 700-HN120 |

### Auxiliary Snap Action Switch

| Contact | Material | Rating | Dielectric Withstand V (1 Min.) |
|---|---|---|---|
| SPDT (1 Form C) | Silver Cad. Ox. | 10 A at 120 or 240 Resistive | 1500V AC RMS Contact to Frame |

## Specifications - 700-HG Relays

| Attribute | | | 700-HG | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Electrical Ratings** | | | | | | | | | | | | | |
| Pilot Duty Rating (1) | | | 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 (2) |
| | | | 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 | |
| 480V | | | 15 A | 1.5 A | 10 A | 12 A | 2 | 480 | 15 A | 1.5 A | 10 A | 5 A | 1 - 1/2 |
| 600V | | | 12 A | 1.2 A | 10 A | 10 A | | 600 | 15 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 | | | $5 \times 10^6$ | | | | | | | | | | |
| Switching Frequency Operations | | | 1600/Hr | | | | | | | | | | |
| Coil Voltage | | | See Overview/Product Selection | | | | | | | | | | |
| Operating Time at Nominal Voltage at 20 °C (68 °F) | | Pickup | 40 ms | | | | | | | | | | |
| | | Dropout | 35 ms | | | | | | | | | | |
| Maximum Operating Rate | | | — | | | | | | | | | | |

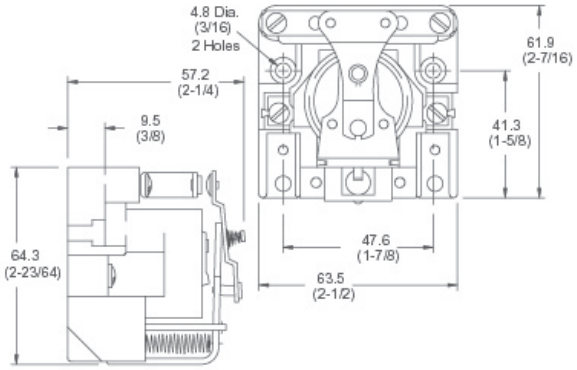
## Specifications - 700-HG Relays

| | | |
|---|---|---|
| **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 | | — |
| 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 |

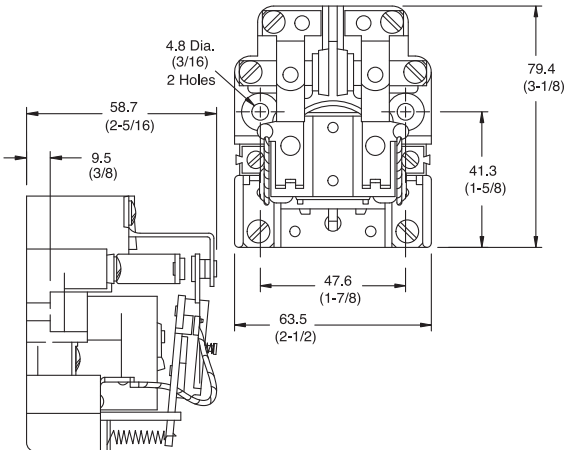
(1) NEMA Rating Chart is on page 19 of publication 700-SG003B-EN-P.
(2) For DPDT only: 2 Hp Switching 2 Poles, 200...600V AV, 50/60 Hz.

## Dimensions - 700-HG Relays

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



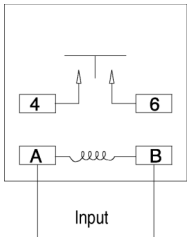
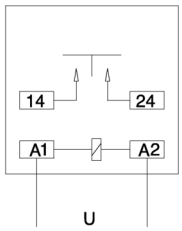
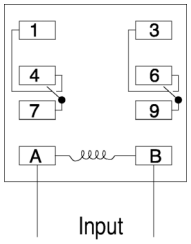
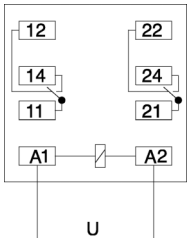
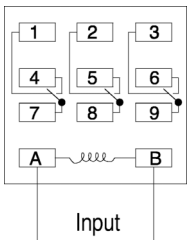
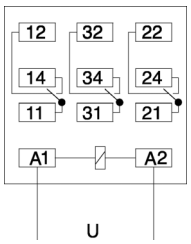

700-HG Relay, SPST-NO-DM




700-HG Relay

## 700-HHF Flange Mount Power Relay

- Flange-Mounted
- Blade Style 0.250 x 0.032 Quick Connect/Solder (no socket) Terminals
- Solder Terminals (no socket)

| | Description | Contact Rating | Wiring Diagrams | | Coil Voltage | Cat. No. |
|---|---|---|---|---|---|---|
| | | | U.S./Canada | International | | |
|  | SPST-NO-DM<br>1 Form X<br>AgCdO Contacts | 30 A<br>(A600) |  |  | 120V AC | 700-HHF45A1 |
| | | | | | 24V DC | 700-HHF45Z24 |
| | DPDT<br>2-Pole<br>2 Form C<br>AgCdO Contacts | 25 A<br>(B600) |  |  | 24V AC | 700-HHF62A24 |
| | | | | | 120V AC | 700-HHF62A1 |
| | | | | | 240V AC | 700-HHF62A2 |
| | | | | | 12V DC | 700-HHF62Z12 |
| | | | | | 24V DC | 700-HHF62Z24 |
| | 3PDT<br>3-Pole<br>3 Form C<br>AgCdO Contacts | 20 A<br>(B300) |  |  | 120V AC | 700-HHF73A1 |

### Specifications - 700-HHF Relays

| Attribute | | 700-HHF… | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Electrical Ratings** | | | | | | | | | | |
| Pilot Duty Rating (1) | | 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 | | | — | | |

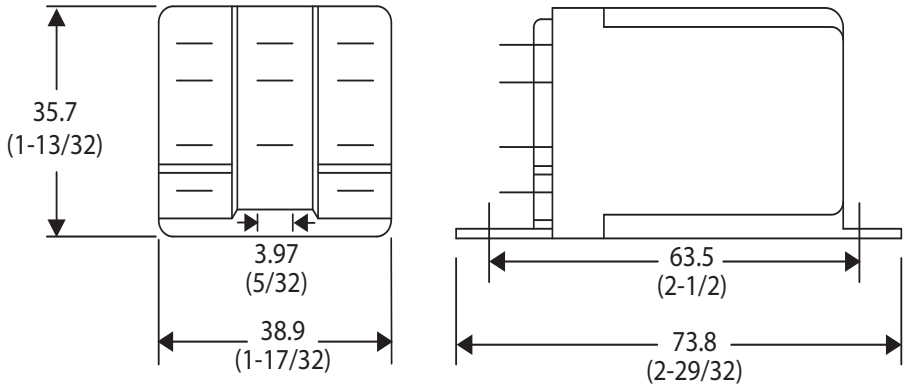
## Specifications - 700-HHF Relays

| Attribute | | | 700-HHF… | | | | | |
|---|---|---|---|---|---|---|---|---|
| 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 |
| | | 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 x $10^6$ | | | | | |
| 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 | | | (2) | | | | | |
| Certifications | | | cURus Recognized, File E3125,Guide NLDX2/NLDX8, CE Marked | | | | | |
| Standards | | | UL 508, CSA 22.2 No.14, EN/IEC 60947-1, -5-1 | | | | | |

(1) See NEMA Ratings and Test Values on page 5.
(2) 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.

## Dimensions - 700-HHF Relays

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




700-HHF Relay

## 700-HTA Alternating Relay



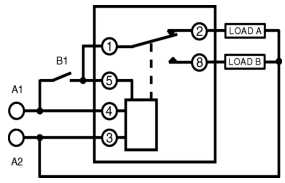
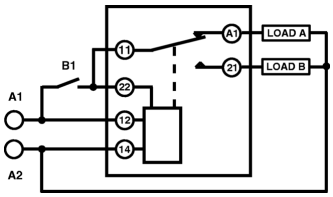
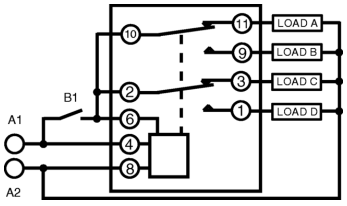
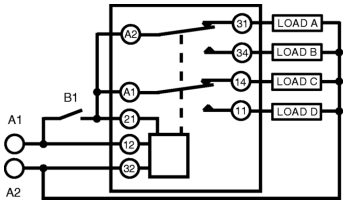
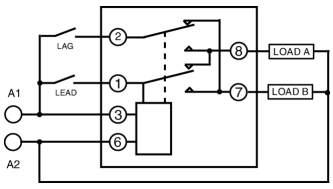
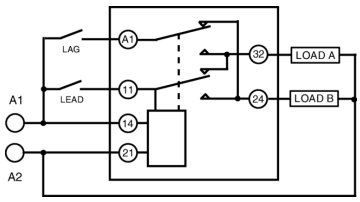
- Alternating Relay
- Rugged Pin Style Socket Mounting
- 10 A, SPDT, DPDT, and Cross Wired
- Excellent for Pump Panel Applications

| 700 | – | HTA | 2 | A12 | 7 |
|---|---|---|---|---|---|
| a | | b | c | d | e |

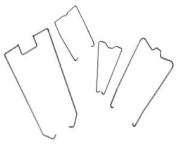
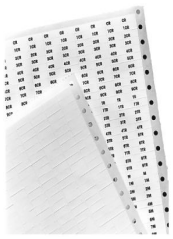
### Catalog Number Explanation - 700-HTA Relays

| a<br>Bulletin Number | - | b<br>Relay Type | c<br>Model Type | d<br>Coil Voltage | e<br>Gold Plated Contacts Option |
|---|---|---|---|---|---|
| 700 | | HTA - Tube Base Alternating Relay | 1 - SPDT<br>2 - DPDT<br>3 -Cross-Wired | A12 - 12V AC 50/60 Hz<br>A24 - 24V AC 50/60 Hz<br>A1 - 120V AC 50/60 Hz<br>A2 - 240V AC 50/60 Hz | Blank - Without switch<br>7 - With switch |

### Alternating Relays with Pin-Style Terminations

| 700-HTA | Alternating Relay | Wiring Diagrams | |
|---|---|---|---|
| | | U.S./Canada | International |
| SPDT Form C Contact | SPDT |  |  |
| DPDT 2 Form C Contact | DPDT |  |  |
| Cross-Wired DPDT 2 Form C Contacts | Cross-Wired |  |  |

## Accessories - 700-HTA Relays

| Photo | Description | Pkg. Qty. | Cat. No. |
|---|---|---|---|
|  | **Screw Terminal Tube Base Socket — Panel or DIN Rail Mounting; Guarded Terminal Construction.** 8-Pin for use with 700-HTA1A or -HTA3A alternating relays. Order ten or multiples of ten. | 10 | 700-HN100 |
|  | **Screw Terminal Tube Base Socket — Panel or DIN Rail Mounting; Open Style Construction.** 8-Pin for use with 700-HTA1A or -HTA3A alternating relays. Order ten or multiples of ten. No retainer clip required. | 10 | 700-HN125 |
|  | **Screw Terminal Tube Base Sockets — Panel or DIN Rail Mounting; Guarded Terminal Construction.** 11-pin for use with 700-HTA2A alternating relays. Order in multiples of 10. | 10 | 700-HN101 |
|  | **Screw Terminal Tube Base Sockets — Panel or DIN Rail Mounting; Open Style Terminal Construction.** 11-pin for use with 700-HTA2A alternating relays. Order in multiples of 10. No retainer clip required. | 10 | 700-HN126 |
|  | **DIN (#3) symmetrical hat rail**<br>35 x 7.5 x 1 m | 10 | 199-DR1 |
|  | **Retainer Clip for Cat. Nos. 700-HN100 and -HN101 Sockets with 700-HT Timing Relays, and 700-HTA Alternating Relays**<br>Secures relay in socket. Order must be for 10 clips or multiples of 10. | 10 | 700-HN110 |
|  | **Pre-Printed Identification Tags —** contains 10 sheets of pre-printed and blank tags. Each sheet contains 13 sets of the markings CR…9CR, TR…9TR, M…9M, F, R, 1S, and 117 blank tags. Tags are peel-off with sticky backing for easy placement on relays. | 10 | 700-N40 |
| | **Blank Identification Tags —** contains 10 sheets of blank identification tags for customer specialized printing. Each sheet contains 546 blank tags. Tags are peel-off with sticky backing for easy placement on relays. | 10 | 700-N41 |

## Specifications - 700-HTA Relays

| Attribute | | 700-HTA | | | |
|---|---|---|---|---|---|
| **Electrical Ratings** | | | | | |
| Pilot Duty Rating (1) | | | 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<br>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 | | | $10 \times 10^6$ | | |
| 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 | | |

## Specifications - 700-HTA Relays

| Attribute | | 700-HTA |
|---|---|---|
| **Environmental** | | |
| Temperature | Operating | –28…+65 °C (50 °C max., 240V AC coil)<br>(–18…+149 °F) (122 °F max., 240V AC coil) |
| | Storage | –55…+85 °C<br>(–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<br>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, CSA 22.2 No. 14, UL 508 |

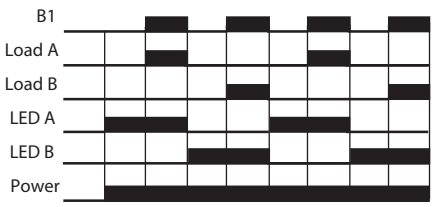
(1) See NEMA Ratings and Test Values on page 5.

### *Trigger Signal Cat. Nos. 700-HTA*

Contact closure provides signal to timer. The 700-HTA alternating relay generates a low energy signal. For optimum reliability, use contacts designed for low energy switching (10V, 1 mA) (Example: Bul. 800F-X_V, 800T-X_V). No external voltage can be connected to the contact signal.

### *Load Diagrams - 700-HTA Relays*

Common Input/Output SPDT/DPDT

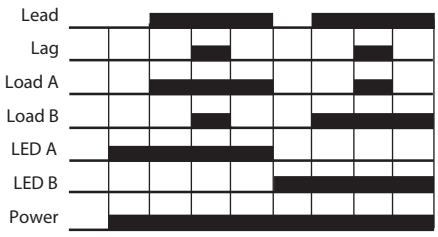



| Socket Pinout Map SPDT | |
|---|---|
| Relay | Socket |
| A1 | 4 |
| A2 | 3 |

| 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

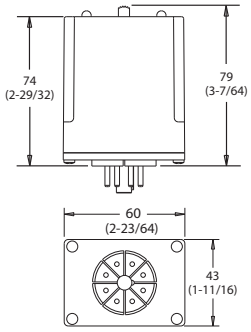


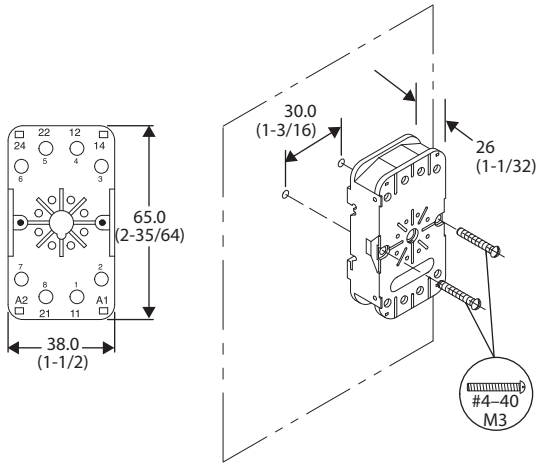

| Socket Pinout Map Cross-Wired | |
|---|---|
| Relay | Socket |
| A1 | 3 |
| A2 | 6 |

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

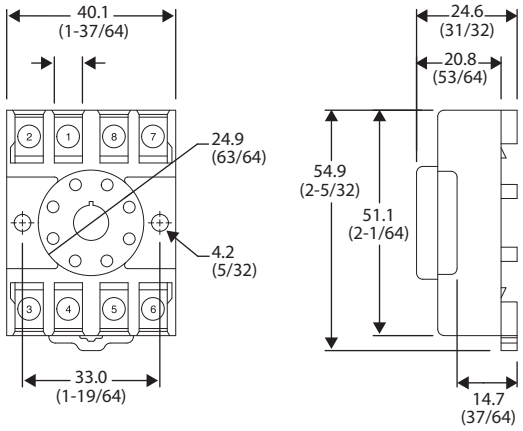
## Dimensions - 700-HTA Relays

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

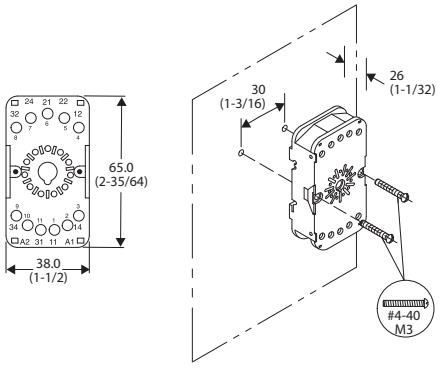


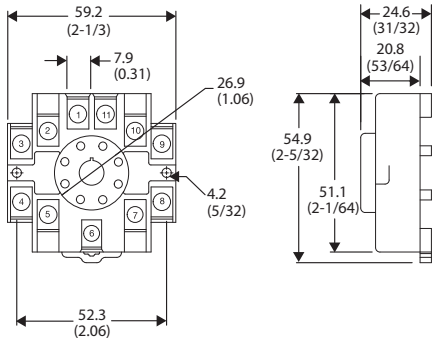

Cat. No. 700-HN100
Panel Mounting
Double Wire — 2 x 2.5 mm$^2$ (#2 – 14 AWG…#2 – 20 AWG)
(Either Solid or Stranded)
Strip Length: 9 mm (3/8 in) – Torque: 0.8 N•m (7 lb•in)




Cat. No. 700-HN125
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-HN101
Panel Mounting
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-HN126
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)

# General Purpose Electronic Timers and Counters

## Product Overview

| | | | | | |
|---|---|---|---|---|---|
| |  |  |  |  |  |
| **Bulletin No.** | **700-FE** | **700-FS** | **700-HR52, -HRP, -HRS, -HRT, -HRV** | **700-HRM/-HRC** | **700-HRF** |
| **Type** | DIN Rail Timer | DIN Rail Timer | Multifunction Timer | On-Delay Timer | Twin Timer |
| **Features** | • Only 17.5 mm wide<br>• 5 A contact rating<br>• Multifunction or single function<br>• No additional socket required | • Only 22.5 mm wide<br>• 8 A contact rating<br>• Multifunction or single function<br>• No additional socket required<br>• Optional:<br>• Star-delta timing function<br>• True off-delay timing function<br>• Hazardous location certification | • Dial timing relays<br>• 5 A contact rating<br>• Multiple programmable timing ranges<br>• Tube base pin style terminals<br>• Multi-voltage inputs<br>• Timed contacts and instantaneous contacts<br>• Transistor outputs<br>• Single function and multi-function<br>• 7 different operating modes | • Dial timing relays<br>• 5 A contact rating<br>• Multiple programmable timing ranges<br>• Tube base pin-style terminals<br>• Multi-voltage inputs<br>• Timed contacts and instantaneous contacts<br>• Transistor outputs<br>• Single function and multi-function | • Independent ON and OFF settings<br>• 14 time ranges<br>• 8-pin models available<br>• Dial timing relays<br>• UL508 |
| **Control Outputs:**<br>**Time Limit**<br>**Instantaneous** | 1 N.O. or SPDT timed | SPDT or DPDT or<br>2 N.O. + 1 common | DPDT Timed, Transistor<br>SPDT Timed/Instantaneous | DPDT Timed, Transistor<br>SPDT Timed/Instantaneous | DPDT Timed |
| **Operation Modes:** | On-delay<br>Off-delay<br>One shot<br>Repeat cycle-pulse<br>Fleeting off-delay<br>Pulse converter | 11 timing modes | On-Delay<br>Off-Delay<br>One Shot<br>Repeat Cycle Off Start<br>Repeat Cycle On Start<br>Signal On/Off-Delay<br>On-Delay One Shot | On-Delay | Repeat Cycle Off Start<br>Repeat Cycle On Start |
| **Time Range** | 0.05 s…10 hr | 0.05 s…60 hr | 0.05 s…300 h | 0.05 s…300 h | 0.05 s…300 h |
| **Supply Voltage** | 24V AC/DC<br>110…240V AC<br>24…48V AC/DC<br>24…240V AC | 12V DC<br>24V…48V DC<br>24V…240V AC | 12…48V DC<br>24…48V AC<br>100…240V AC<br>100…125V DC | 12…48V DC<br>24…48V AC<br>100…240V AC<br>100…125V DC | 12V DC<br>24V AC/DC<br>48…125V DC<br>100…240V AC |
| **Contact Rating at 120V AC** | 5 A | 8 A | 5 A | 5 A | 5 A |
| **Certifications** | CE, cULus | CE, cULus | cURus, CE, C-Tick | cURus, CE, C-Tick | cURus, CE, C-Tick |
| **Socket Cat. No(s).** | DIN Rail or panel mount | DIN Rail or panel mount | 700-HN100 OR 700-HN101<br>700-HN125 OR 700-HN126 | 700-HN100<br>700-HN125 | 700-HN100<br>700-HN125 |
| **Page** | 98 | 102 | 122 | 123 | 123 |

| | | | | |
|---|---|---|---|---|
| |  |  |  |  |
| **Bulletin No.** | **700-HRY** | **700-HRQ** | **700-HNC** | **700-HNK** |
| **Type** | Star-Delta Timer | True Off-Delay Timer | Miniature Timer | Ultra-Slim Timer |
| **Features** | • A wide star-time range (up to 120 s)<br>• Star-delta transfer time range (up to 0.5 s)<br>• UL Recognized | • Dial timing relays<br>• Long power Off-delay times<br>• 11-pin and 8-pin models are available<br>• UL Recognized | • Four different operating modes<br>• DIN Rail mount with socket<br>• Pin configuration same as 700-HC relay | • Ultra-slim timing relay<br>• Four different operating modes<br>• Three operating voltages<br>• DIN Rail mount with socket<br>• Pin configuration same as 700-HK relay |
| **Control Outputs:**<br>**Time Limit**<br>**Instantaneous** | SPST (Star, Delta) Timed<br>SPST - NO Instantaneous | DPDT Timed | 4PDT | SPDT, DPST-NO |
| **Operation Modes:** | Star-Delta | True OFF-delay Timer<br>True OFF-delay Timer w/reset | On-Delay<br>One Shot<br>Repeat Cycle Off Start<br>Repeat Cycle On Start | On-Delay<br>One Shot<br>Repeat Cycle Off Start<br>Repeat Cycle On Start |
| **Time Range** | 0.5 s…120 s | 0.05 s…12 min | 0.1 s…10 h | 0.1 s…10 h |
| **Supply Voltage** | 100…120V AC<br>200…240V AC | 48V DC<br>24V AC/DC<br>100…240V AC<br>100…125V DC | 12V DC<br>24V AC/DC<br>48…125V DC<br>100…240V AC | 12V DC<br>24V DC<br>24V AC |
| **Contact Rating at 120V AC** | 5 A | 5 A | 5 A | 5 A |
| **Certifications** | cURus, CE, C-Tick | cURus, CE, C-Tick | cURus, CSA, CE, C-Tick | cURus, CE, ACA |
| **Socket Cat. No(s).** | 700-HN100<br>700-HN125 | 700-HN100 OR 700-HN101<br>700-HN125 OR 700-HN126 | 700-HN103<br>700-HN128 | 700-HN121<br>700-HN122 |
| **Page** | 123 | 124 | 109 | 115 |

| | | | |
|---|---|---|---|
| |  |  |  |
| **Bulletin No.** | **700-HT** | **700-HV** | **700-HX** |
| **Type** | Tube Base Timing Relay | Repeat-Cycle Timing Relay | Digital Timer |
| **Features** | • Pin-style terminals<br>• Single range or fixed timers<br>• Available as ON- or OFF-Delays | • Pin-style terminals<br>• Single-range timer<br>• Repeat cycle | • Digital timer<br>• 5 A contact rating<br>• Negative transmissive LCD display<br>• 10 functions or modes<br>• Environmentally friendly—flash memory, no battery<br>• NEMA B300 rated<br>• NEMA 4/IP66<br>• DIN Rail or panel mount capable |
| **Control Outputs: Time Limit Instantaneous** | DPDT | DPDT | SPDT |
| **Timing Operation Modes:** | On-Delay<br>Off-Delay | Repeat Cycle | Signal On-Delay 1 and 2<br>Signal Off-Delay<br>One Shot<br>Repeat Cycle Off Start<br>Repeat Cycle On Start<br>Signal On/Off-Delay<br>Power On-Delay 1 and 2<br>Twin Timer Cumulative |
| **Time Range** | 0.1 s…30 min. | 0.1 s…30 min. | 0.05 s…300 h |
| **Supply Voltage** | 12V DC<br>24V DC<br>24V AC<br>120V AC<br>240V AC | 24V DC<br>24V AC<br>120V AC<br>240V AC | 12…24V DC<br>24V AC<br>100…240V AC |
| **Contact Rating at 120V AC** | 10 A | 10 A | 5 A |
| **Certifications** | UR, UL, CSA, CE | UR, UL, CSA, CE | cURus, CE, C-Tick |
| **Socket Cat. No(s).** | 700-HN100 OR 700-HN101<br>700-HN125 OR 700-HN126 | 700-HN100<br>700-HN125 | 700-HN100<br>700-HN125 |
| **Page** | 134 | 139 | 144 |

## 700-FE Economy Timing Relay

- Adjustable function and timing range timing relays
- DIN Rail mounted without cost of socket
- 17.5 mm wide, multi-function or single function
- Available as 1 N.O. or SPDT contact output, 5 A
- Timing ranges from 0.05 s...10.0 hr
- Coil surge protection




### Multi-Function

This device offers you the flexibility of selecting one of 4 single timing functions.

| Operating Mode | Contact Output | Timing Range(1) | Input Voltage | Cat. No. |
|---|---|---|---|---|
| ON-delay, OFF-delay, One Shot, Flasher (repeat cycle starting with pulse) | 1 N.O. | 0.05 s…10 hr (6 settings) | 24V AC/DC (2)<br>110…240V AC<br>50/60 Hz | 700-FEM1TU22 |
| ON-delay, OFF-delay, One Shot, Flasher (repeat cycle starting with pulse) | SPDT (1 C/O) | 0.05 s…10 hr (6 settings) | 24V…48V AC/DC<br>24…240V AC<br>50/60 Hz | 700-FEM3TU23 |

(1) Time ranges: 0.05 s…1 s, 0.5…10 s, 0.05…1 min, 0.5…10 min, 0.05…1 hr, 0.5…10 hr.
(2) Voltage is either 24V AC/DC 50/60 Hz.

### Single-Function

This device offers you one specific timing function.

| Operating Mode | Contact Output | Timing Range(1) | Input Voltage | Cat. No. |
|---|---|---|---|---|
| ON-delay | 1 N.O. | 0.05 s…10 hr (6 settings) | 24V AC/DC<br>110…240V AC 50/60 Hz(2) | 700-FEA1TU22 |
| | SPDT (1 C/O) | 0.05 s…10 hr (6 settings) | 24V…48V AC/DC<br>24…240V AC 50/60 Hz | 700-FEA3TU23 |
| OFF-delay | 1 N.O. | 0.05 s…10 hr (6 settings) | 24V AC/DC<br>110…240V AC 50/60 Hz(2) | 700-FEB1TU22 |
| | SPDT (1 C/O) | 0.05 s…10 hr (6 settings) | 24V…48V AC/DC<br>24…240V AC 50/60 Hz | 700-FEB3TU23 |
| One Shot | 1 N.O. | 0.05 s…10 hr (6 settings) | 24V AC/DC<br>110…240V AC 50/60 Hz(2) | 700-FED1TU22 |
| | SPDT (1 C/O) | 0.05 s…10 hr (6 settings) | 24V…48V AC/DC<br>24…240V AC 50/60 Hz | 700-FED3TU23 |
| Fleeting OFF-delay | SPDT (1 C/O) | 0.05 s…10 hr (6 settings) | 24V…48V AC/DC<br>24…240V AC 50/60 Hz | 700-FEE3TU23 |
| Flasher (repeat cycle starting with pulse) | 1 N.O. | 0.05 s…10 hr (6 settings) | 24V AC/DC<br>110…240V AC 50/60 Hz(2) | 700-FEF1TU22 |
| | SPDT (1 C/O) | 0.05 s…10 hr (6 settings) | 24V…48V AC/DC<br>24…240V AC 50/60 Hz | 700-FEF3TU23 |
| Pulse Converter | SPDT (1 C/O) | 0.05 s…10 hr (6 settings) | 24V…48V AC/DC<br>24…240V AC 50/60 Hz | 700-FEL3TU23 |

(1) Time ranges: 0.05 s…1 s, 0.5…10 s, 0.05…1 min, 0.5…10 min, 0.05…1 hr, 0.5…10 hr.
(2) Voltage is either 24V AC 50/60 Hz or 24V DC.

### Special Functions

| Operating Mode | Contact Output | Timing Range(1) | Input Voltage | Cat. No. |
|---|---|---|---|---|
| Star-Delta | 2 N.O. with 1 Common | 0.15 s…10 min (4 settings) | 24V…48V AC/DC<br>24…240V AC 50/60 Hz | 700-FEY2QU23 |

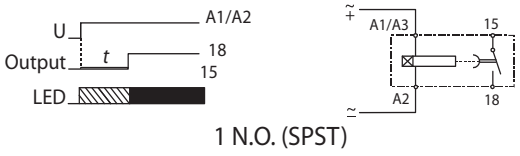
(1) Time ranges: 0.15…3 s, 0.5…10 s, 3 s…1 min, 30 s…10 min.

## Accessories - 700-FE Relays

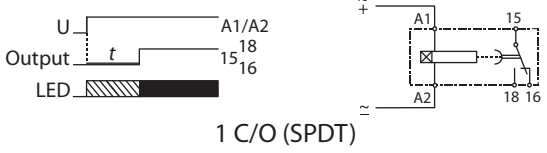
| Description | | Pkg. Quantity | Cat. No. |
|---|---|---|---|
|  | **Panel Mounting Adapter**<br>For surface mounting according to drilling plan EN 50 002 | 5 | 199-FSA |
| | **Label Sheet** 105 self-adhesive paper labels each, 6 x 17 mm | 10 | 100-FMS |

## Function and Connection Diagrams - 700-FE Relays

### (A) On-Delay

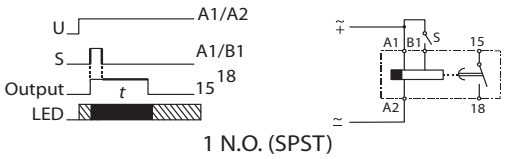



1 N.O. (SPST)

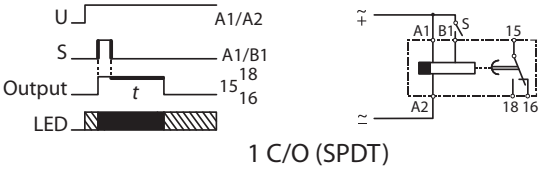



1 C/O (SPDT)

### (B) Off-Delay

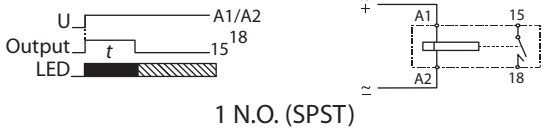



1 N.O. (SPST)

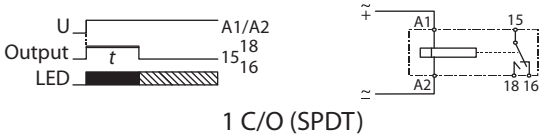



1 C/O (SPDT)

### (D) One Shot




1 N.O. (SPST)

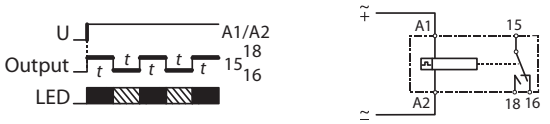



1 C/O (SPDT)

### (F) Flasher (Repeat Cycle Starting with Pulse)




1 N.O. (SPST)



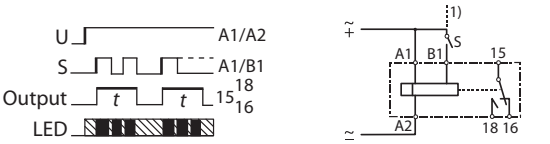

1 C/O (SPDT)

### (E) Fleeting Off-Delay




1 C/O (SPDT)

### (L) Pulse Converter




### (Y) Star-Delta Timing Relay




**Bi-color light-emitting diode: 1 C/O (SPDT) or 1 N.O. Contact Timers**

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

**Single Color light-emitting diode: 2 N.O. with Common**

ON = green
OFF = red

## Specifications - 700-FE Relays[1]

| Attribute | | 700-FE | | | |
|---|---|---|---|---|---|
| | |  | 1 N.O. |  | SPDT |
| Setting Accuracy | | ±5% of full scale | | | |
| Repeatability | | ±1% of setting (typical) | | | |
| Tolerance | | By voltage: ±0.01%/%ΔU<br>By temperature: ±0.25%/°C | | By voltage: ±0.001%/%ΔU<br>By temperature: ±0.025%/°C | |
| **Supply** | | | | | |
| Supply Voltage | | 24V AC/DC[1] 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, 5VA 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<br>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 | 4000V | | | |
| Switching Capacity | Power | 1250VA | | | |
| | 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<br>0.4 million at 0.5 A/250V AC, cos φ = 0.4<br>0.4 million at 1 A/24V DC, resistive | | | |
| State Indicator | | 1 bicolor light-emitting diode (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 | | | |
| Insulation Characteristics | | 2 kV AC/50 Hz test voltage according to VDE 0435<br>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:<br>Surge capacity of the supply voltage according to IEC 61000-4-5: Level 3<br>Burst according to IEC 61000-4-4: Level 3<br>ESD discharge according to IEC 61000-4-2: Level 3 | | | |
| EMC / Emission | | electromagnetic fields according to EN 55 022: Class B | | | |

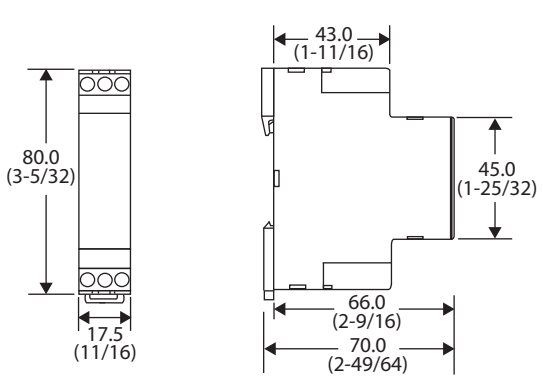
(1) Time Characteristics (according to VDE 0435, part 2021)

| Attribute | 700-FE | |
|---|---|---|
| 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<br>Terminal: IP 20 | |
| Weight | 60 g | 60 g |
| Certifications | cULus, CE Certified | cULus, Germanischer Lloyd, CE Certified |
| Ambient Temperature | Open: –25…+60 °C<br>Enclosed: –25…+45 °C<br>Storage: –40…+85 °C | |
| Connections | Screw terminal M3 for Pozidriv No.1, Philips, and slotted screws No.2. suitable for power screwdriver.<br>Rated tightening torque 8.8 lb.-in. (max. 1.0 Nm)<br>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 | |

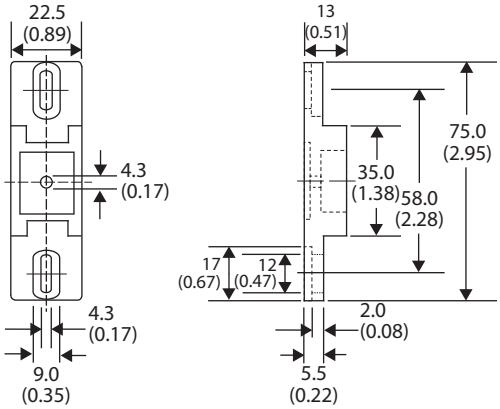
(1) Voltage is either 24V DC or AC 50/60 Hz.

## Dimensions - 700-FE Relays

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




Cat. No. 700-FE…




Cat. No. 199-FSA…

## 700-FS High Performance Timing Relay

- Adjustable function and timing range timing relays
- DIN Rail mounted without cost of socket
- 22.5 mm wide multi-function or single functions
- Available as SPDT or DPDT contact output, 8 A
- Timing Ranges From 0.05 s...60 hr
- Coil surge protection
- Hazardous location version available




### Catalog Number Explanation - 700-FS Relays

| 700 | – | FS | H | 3 | U | – | U23 |
|---|---|---|---|---|---|---|---|
| a | | b | c | d | e | | f |

| a<br>Bulletin Number | - | b<br>Type of Relay | c<br>Operating Mode | d<br>Contact Output | e<br>Timing Range | f<br>Input Voltage |
|---|---|---|---|---|---|---|
| 700 | | FS | A–On-delay<br>B–Off-delay<br>C–On- and off-delay<br>D–One shot<br>E–Fleeting off-delay<br>F–Flasher (repeat cycle starts with pulse)<br>G–Flasher (repeat cycle starts with pause)<br>I–On-delay pulse generator<br>J–On-delay (pulse controlled)<br>K–One shot/watch dog (pulse controlled)<br>L–Pulse converter | 3–One changeover contact (SPDT)1 C/O | A–0.05…1 s<br>B–0.15…3 s<br>C–0.5…10 s<br>D–1.5…30 s<br>E–0.05…1 min<br>F–0.15…3 min<br>G–0.5…10 min<br>H–1.5…30 min<br>I–0.05…1 hr<br>J–0.15…3 hr<br>K–0.5…10 hr<br>L–3.0…60 hr<br>U–0.05 s…60 hr (1) | Z12–12V DC<br>U23–24…48V DC \| 24…240V AC 50/60 Hz |

(1) Valid for functions "A" and "B" only.

### Single Function (With 2PDT 2 C/O contacts)

| Operating Mode | Contact Output | Timing Range(1) | Input Voltage | Cat. No. |
|---|---|---|---|---|
| On-delay | (DPDT) 2 C/O | 0.05 s…60 hr | 12V DC | 700-FSA4UZ12 |
| On-delay | (DPDT) 2 C/O | | 24…48V DC<br>24…240V AC, 50/60 Hz | 700-FSA4UU23 |
| Off-delay | (DPDT) 2 C/O | | 12V DC | 700-FSB4UZ12 |
| Off-delay | (DPDT) 2 C/O | | 24…48V DC<br>24…240V AC, 50/60 Hz | 700-FSB4UU23 |

(1) The time range of "0.05 s…60 hr" is selectable in 12 smaller ranges plus an ON and OFF function for maintenance needs.

### Single Function With Hazardous Location Certification(1) (With SPDT 1 C/O contacts)

| Operating Mode | Contact Output | Timing Range | Input Voltage | Cat. No. |
|---|---|---|---|---|
| One Shot / Watch Dog (Pulse Controlled) | (SPDT) 1 C/O | 0.05 s…1 s | 24…48V DC<br>24…240V AC<br>50/60 Hz | 700-FSK3AU23-EX |
| | | 0.5 s…10 s | | 700-FSK3CU23-EX |

## Multi-Function

This device allows the flexibility of selecting one of 8 single timing functions.

| Operating Mode | Contact Output | Timing Range | Input Voltage | Cat. No. |
|---|---|---|---|---|
| Multi-function timing relays<br>8 Single-functions:<br>A, B, C, D, E, F, I, and L<br>ON and OFF function additional<br>(for installation and maintenance)<br>note: See connection diagrams for further description. | (SPDT) 1 C/O | 0.05 s…60 hr | 12V DC | 700-FSM3UZ12 |
| | (SPDT) 1 C/O | | 24…48V DC<br>24…240V AC<br>50/60 Hz | 700-FSM3UU23 |
| | (DPDT) 2 C/O | | 12V DC | 700-FSM4UZ12 |
| | (DPDT) 2 C/O | | 24…48V DC<br>24…240V AC<br>50/60 Hz | 700-FSM4UU23 |

## Multi-Function With Hazardous Location Certification (1)

This device allows the flexibility of selecting one of 8 single timing functions.

| Operating Mode | Contact Output | Timing Range(1) | Input Voltage | Cat. No. |
|---|---|---|---|---|
| M Multi-function timing relays<br>8 Single-functions:<br>A, B, C, D, E, F, I, and L<br>ON and OFF function additional<br>(for installation and maintenance)<br>Note: See connection diagrams for further description. | (SPDT) 1 C/O | 0.05 s…60 h | 24…48V DC<br>24…240V AC<br>50/60 Hz | 700-FSM3UU23-EX |
| | (DPDT) 2 C/O | | | 700-FSM4UU23-EX |

(1) The time range of "0.05 s…60 hr" is selectable in 12 smaller ranges plus an ON and OFF function for maintenance needs.

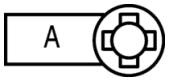
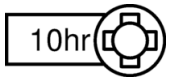
## Special Function

| Operating Mode | Contact Output | Timing Range | Input Voltage | Cat. No. |
|---|---|---|---|---|
| Flasher (repeat cycle starting with pulse or pause) | (SPDT) 1 C/O | 0.05 s…60 hr (2) | 12V DC | 700-FSH3UZ12 |
| | | | 24…48V DC<br>24…240V AC<br>50/60 Hz | 700-FSH3UU23 |
| | | 2 x 0.05 s…60 hr (2 ranges) | 12V DC | 700-FSH3VZ12 |
| | | | 24…48V DC<br>24…240V AC, 50/60 Hz | 700-FSH3VU23 |
| OFF-delay without supply voltages (True OFF-delay)(1) | (SPDT) 1 C/O | 0.15 s…10 min(3) | 24…240V DC<br>24…240V AC<br>50/60 Hz | 700-FSQ3QU18 |
| | (DPDT) 2 C/O | | | 700-FSQ4QU18 |
| Star-Delta | 2 N.O. + 1 Common | 0.5 s…10 s | 24…48V DC | 700-FSY2CU23 |
| | | 1.5…30 s | 24…240V AC<br>50/60 Hz | 700-FSY2DU23 |
| | | 0.05 s…1 min | | 700-FSY2EU23 |
| | | 0.15…3 min | | 700-FSY2FU23 |
| | | 0.5…10 min | | 700-FSY2GU23 |

(1) Due to shock during shipment, the state of the contacts should be verified before initial use. Minimum power on time is 800 msec.
(2) The time range of "0.05 s…60 hr" is selectable in 12 smaller ranges plus an ON and OFF function for maintenance needs.
(3) This time range is selectable in four smaller ranges: 0.15 s…2.5 s, 0.5 s…10 s, 4 s…80 s, 30 s…10 min.

(1) Temp. Code T4A 2A 32VDC MAX.: II 3 G, EEx nL IIC T4 DEMKO 04 ATEX 0404974X 2A 32VDC MAX. Ta 70 °C
Ind. Cont. Eq. for Hazardous Location Listed 87SL Class 1, Div. 2, Groups A,B,C,D Class 1, Zn 2, Group IIC
Subject devices are to be installed in an ATEX Certified IP54 (as defined in IEC 60529) enclosure and accessible only by the use of a tool.

## Multi-Function Timing Relay Function and Time Range Settings - 700-FS Relays

| Description | | | SPDT | DPDT |
|---|---|---|---|---|
|  | Multi-function timing relays 700-FSM3U includes 10 setting functions: | | Multi-Time Setting Range 0.05 s…60 h | |
| | (A)On-Delay |  | (1 s) 0.05…1 s<br>(3 s) 0.15…3 s<br>(10 s) 0.5…10 s<br>(1 min) 0.05…1 min<br>(3 min) 0.15…3 min<br>(10 min) 0.5…10 min<br>(1 hr) 0.05…1 hr<br>(3 hr) 0.15…3 hr<br>(10 hr) 0.5…10 hr<br>(60 hr) 3….60 hr |  |
| | (B)Off-Delay | | | |
| | (C)On- and Off-Delay | | | |
| | (D)One shot | | | |
| | (E)Fleeting Off-Delay | | | |
| | (F)Flasher (repeat cycle starts with pulse) | | | |
| | (I)On-Delay pulse generator | | | |
| | (L)Pulse converter | | | |
| | (On)ON-Function (1) | | | |
| | (Off)OFF-Function(1) | | | |
| | Note: Switch ⊗ is on DPDT relays only. When switch is down, one contact is instantaneous and one is timed. When switch is up, both contacts are timed. | | | |

(1) For installation and maintenance.

## Accessories - 700-FS Relays

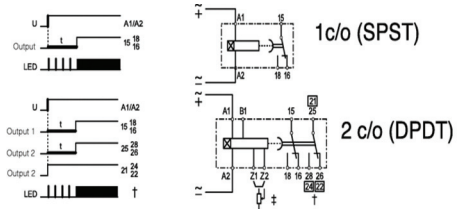
| | Description | Pkg. Quantity | Cat. No. |
|---|---|---|---|
|  <br>  | **Setting Knob with Scale**<br>(for time setting without tools) | 10 | 700-FSK |
|  | **Panel Mounting Adapter**<br>For surface mounting according to drilling plan EN 50 002 | 5 | 199-FSA |
|  | **Label Sheet**<br>105 self-adhesive paper labels each, 6 x 17 mm | 10 | 100-FMS |
| | **Marking Tag Sheet**<br>160 perforated paper labels each, 6 x 17 mm, to be used with a transparent cover | 10 | 100-FMP |
| | **Transparent Cover**<br>To be used with marking tag sheets | 100 | 100-FMC |
| | **Marking Tag Adapters**<br>To be used with marking tag: System 1492 W | 100 | (1) 100-FMA2 |

(1) Cat. No. 100-FMA2 is only a marking tag carrier. Please refer to the Terminal Block Accessories section, Marking Solutions of this publication for appropriate marker cards to be used with this carrier.

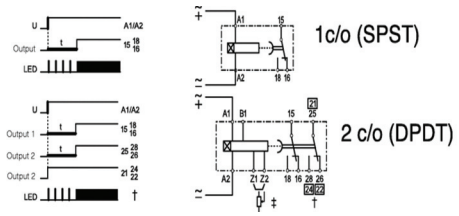
**IMPORTANT** Versatile Mounting: The 700-FS timing relay can be panel or DIN rail mounted. For best long-term performance, allow at least 5 mm (0.2 in.) of space on each side of the relay for proper ventilation.

## Function and Connection Diagrams - 700-FS Relays

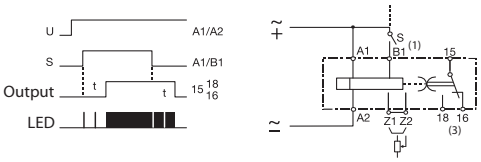
### (A) On-Delay



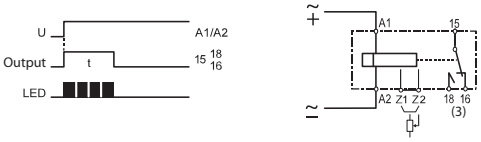

### (B) Off-Delay (Min. Pulse AC 50 ms…DC 30 ms)



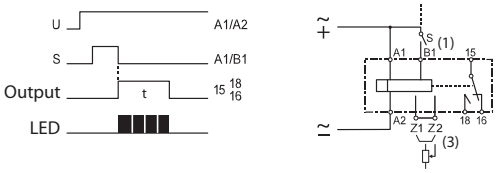

### (C) On- and Off-Delay



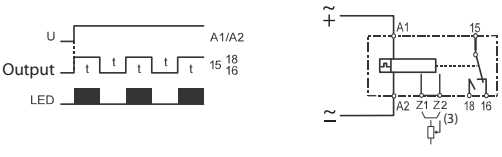
### (D) One Shot



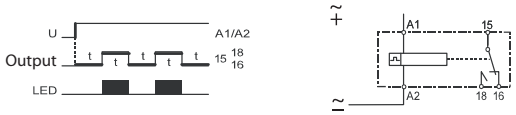
### (E) Fleeting Off-Delay (Min. Pulse AC 50 ms…DC 30 ms)



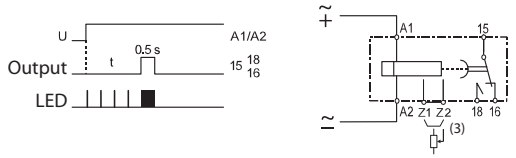
### (F) Flasher (Repeat Cycle Starts with Pulse)



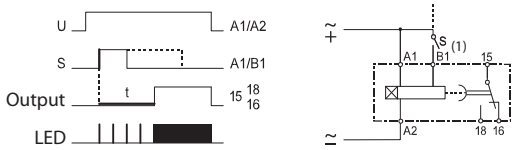
### (G) Flasher (Repeat Cycle Starts with Pause)



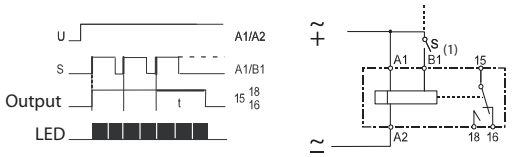
### (I) On-Delay Pulse Generator



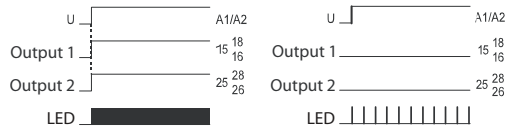
### (J) On-Delay (Pulse Controlled)



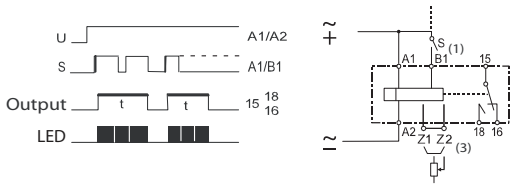
### (K) One Shot/Watch Dog (Pulse Controlled)



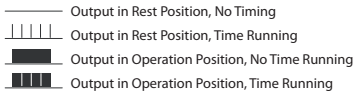
### (On) ON-Function (Off) OFF-Function



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



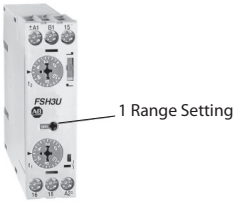
### Cleverly Designed Function Display light-emitting diode (Green)



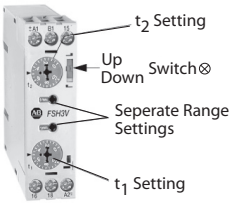

(1) A voltage other than the supply voltage can be used at B1, but must be within voltages specified on timer.
(2) Output 2 is selectable as instantaneous contact with sliding switch (⊗) on front panel (instantaneous when switch is down, timed when switch is up).
(3) Available on multifunction "M," and 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 Timing Relay

**Description**




700-FSH3U




700-FSH3V

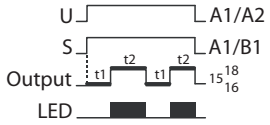
**Supply Voltages (A1/A2)**
**Z12** 12V DC
**U23** 24…48V DC, 24…240V AC, 50/60 Hz

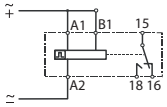
**Function Diagram / Connection Diagram(1)**

**(H) Flasher (Repeat Cycle Starting with Pulse or Pause)**

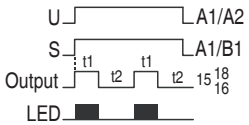
The repeat cycle timer permits different settings for on and off times. The following operating modes are possible:
- Oscillating mode; repeat cycle starts with voltage that is applied at A1 and B1, and continues to repeat until voltage is off.
- One cycle mode; started by energizing B1 with voltage 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 $t_2$

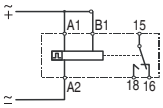
**Supply Voltage Controlled, Oscillating Mode Starting with Pause — Switch ⊗ Is up**



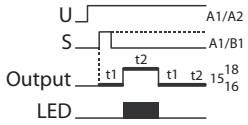



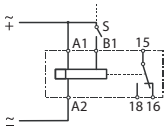

**Supply Voltage Controlled, Oscillating Mode Starting with Pulse — Switch ⊗ is Down**



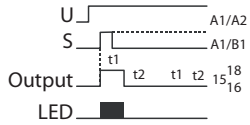



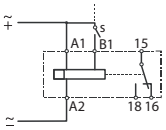

**Pulse Controlled, Output Starts With Pause (Min. Pulse AC 50 ms — DC 30 ms) — Switch ⊗ is Up One Cycle Mode — Voltage Supplied at A1 and A2, then Pulsing "s" to Energize B1 will Initiate One Cycle.**




**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.**




(1) If B1 is pulsed, a one full time cycle consisting of t1 and t2 is completed.

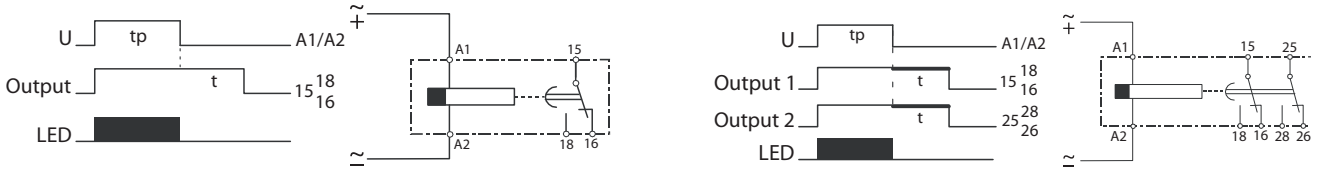
LED Operation Chart Ñ Green LED

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(1)**

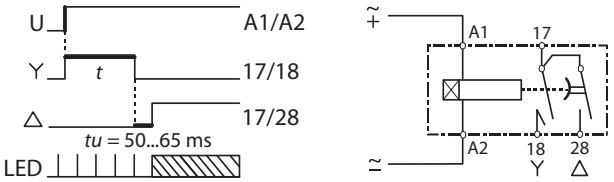
**(Q) Off-Delay without Supply Voltage (True Off-Delay)**

- 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.




**(Y) Star-Delta Timing Relay**

- When power is applied, the output contact 17/18(Y) changes state. After the time setting, the output contact 17/18(Y) returns to shelf state. After the fixed time (50… 60 ms), the output contact 17/28Δ changes state. Both output contacts return to shelf state whenever the power is removed.




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

## Specifications - 700-FS Relays(1)

| Attribute | Value |
|---|---|
| Setting Accuracy | ±5% of full scale |
| Repeatability | ±0.2% of the setting values |
| Tolerance | Voltage: ±0.001%/%ΔU<br>Temperature: ±0.025%/°C |

### Supply

| Attribute | Value |
|---|---|
| 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)

| Attribute | Value |
|---|---|
| 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,<br>Max. 50 m (160 ft) with load (<3 kΩ) between B1 and A2 |

### Outputs

| | |
|---|---|
| Contact Type | Relay as changeover switch |
| Dielectric Coil to Contact | 5000 V |
| Switching Capacity | Voltage: 440V AC |
| | Current $I_{th}$ (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 |

(1) Time Characteristics (according to VDE 0435, Part 2021)

| | |
|---|---|
| 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- 700-FS Relays

| | |
|---|---|
| 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:<br>Surge capacity of the supply voltage according to IEC 1000-4-5: 4 kV 1.2/50 µs<br>Burst according to IEC 1000-4-4: 6 kV 6/50 ns<br>ESD discharge according to IEC 1000- 4-2:<br>Contact 8 kV, air 8 kV<br>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<br>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<br>IP 30 (Single-function)<br>Terminal: IP 20 according to IEC 947-1 |
| Weight | 100 g |
| Approval | UL, C-UL |
| Ambient Temperature | Open: –25…+60 °C<br>Enclosed: –25…+45 °C<br>Storage: –40…+85 °C |
| Terminals | Screw terminal M3.5 for Number 2 Posidriv, Philips, and slotted screws. Suitable for power screwdriver. Rated tightening torque 8.8 lb.-in. (0.8 N•m, max. 1.2 N•m).<br>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.<br>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<br>2A 32VDC MAX. |

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

## 700-HNC Miniature Timing Relay



- Miniature timer, perfect for converting 700-HC "Ice Cube" relays into timing relays
- 4 operating modes
- 4PDT contact output
- Timing range from 0.1 s...10 hr
- Socket mounted

| Model | Timing Mode | Contact Output | Input Voltages | Timing Range | Socket Type | Cat. No. |
|---|---|---|---|---|---|---|
|  | On-Delay<br>One Shot<br>Repeat cycle, OFF-start<br>Repeat cycle, ON-start | 4PDT | 12V DC | 0.1 s…10 min | 700-HN103<br>700-HN128 | 700-HNC44AZ12 |
| | | | | .1 min…10 hr | | 700-HNC44BZ12 |
| | | | 24V DC | 0.1 s…10 min | | 700-HNC44AZ24 |
| | | | | 0.1 min.…10 hr | | 700-HNC44BZ24 |
| | | | 48V DC | 0.1 s…10 min | | 700-HNC44AZ48 |
| | | | | 0.1 min.…10 hr | | 700-HNC44BZ48 |
| | | | 100…110V DC | 0.1 s…10 min | | 700-HNC44AZ11 |
| | | | | 0.1 min.…10 hr | | 700-HNC44BZ11 |
| | | | 125V DC | 0.1 s…10 min | | 700-HNC44AZ25 |
| | | | | 0.1 min.…10 hr | | 700-HNC44BZ25 |
| | | | 24V AC | 0.1 s…10 min | | 700-HNC44AA24 |
| | | | | 0.1 min.…10 hr | | 700-HNC44BA24 |
| | | | 100…120V AC | 0.1 s…10 min | | 700-HNC44AA12 |
| | | | | 0.1 min.…10 hr | | 700-HNC44BA12 |
| | | | 200…230V AC | 0.1 s…10 min | | 700-HNC44AA23 |
| Cat. No. 700-HNC | | | | 0.1 min.…10 hr | | 700-HNC44BA23 |

### Accessories - 700-HNC Relays

| Photo | Description | Pkg. Quantity | Cat. No. |
|---|---|---|---|
|  | **Screw Terminal Socket — Panel or DIN Rail Mounting. Guarded Terminal Construction**<br>14-Blade miniature socket for use with 700-HNC timers. | 10 | 700-HN103 |
|  | **Screw Terminal Base Sockets — Panel or DIN Rail Mounting. Open Style Construction**<br>14-blade miniature socket for use with 700-HNC timers. | 10 | 700-HN128 |
|  | **Screw Terminal Socket – Panel or DIN Rail Mounting. Guarded Terminal Construction** 14-blade miniature socket for use with 700-HNC timers. This socket has coil and contact separation. | 10 | 700-HN104 |
|  | Retainer Clip for Cat. Nos. 700-HN103, -HN104 and -HN128 Sockets with 700-HNC Timers. Secures Timer in Socket. | 10 | 700-HN263 |

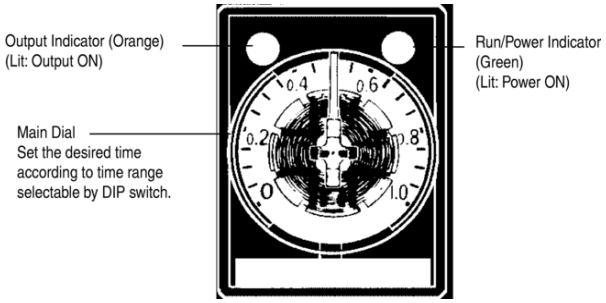
## Specifications - 700-HNC Relays

| Attribute | | 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) (1) | | |
| Reset voltage | | 10% min. of rated supply voltage | | |
| Power consumption | | 24V AC: | Relay ON:<br>Relay OFF: | 1.5 VA (1.1 W) (at 24V AC, 60 Hz)<br>0.2 VA (0.1 W) (at 24V AC, 60 Hz) |
| | | 100…120V AC: | Relay ON:<br>Relay OFF: | 1.5 VA (1.3 W) (at 120V AC, 60 Hz)<br>0.8 VA (0.5 W) (at 120V AC, 60 Hz) |
| | | 200…230V AC: | Relay ON:<br>Relay OFF: | 1.8 VA (1.5 W) (at 230V AC, 60 Hz)<br>1.2 VA (0.9 W) (at 230V AC, 60 Hz) |
| | | 12V DC: | Relay ON:<br>Relay OFF: | 0.9 W (at 12V DC)<br>0.07 W (at 12V DC) |
| | | 24V DC: | Relay ON:<br>Relay OFF: | 0.9 W (at 24V DC)<br>0.07 W (at 24V DC) |
| | | 48V DC: | Relay ON:<br>Relay OFF: | 1.0 W (at 48V DC)<br>0.2 W (at 48V DC) |
| | | 100…110V DC: | Relay ON:<br>Relay OFF: | 1.3 W (at 110V DC)<br>0.3 W (at 110V DC) |
| | | 125V DC: | Relay ON:<br>Relay OFF: | 1.3 W (at 125V DC)<br>0.3 W (at 125V DC) |
| Control outputs | | 4PDT: 5 A at 250V AC, resistive load (cos φ = 1) | | |
| **Characteristics** | | | | |
| Make<br>►][◄ | 120V AC | 30 A | | |
| | 240V AC | 15 A | | |
| Break<br>◄][► | 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) (2) | | |
| | | 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) | | |

| Attribute | 700-HNC |
|---|---|
| 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) |
| 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 |

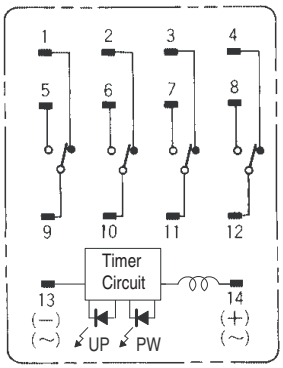
(1) Single-phase, full-wave-rectified power supplies can be used.
(2) When using the 700-HNC continuously in any place where the ambient temperature is in a range of 45 °C…50 °C, supply 90%…110% of the rated supply voltages supply 95%…110% with 12V DC type).

## General Timer Functions

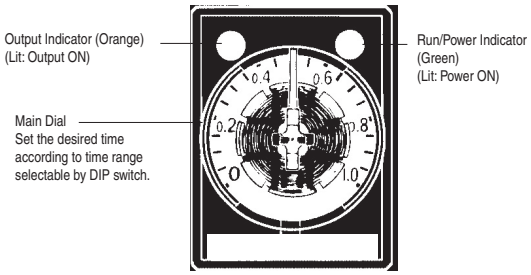


## Timing Charts - 700-HNC Relays

**IMPORTANT** t: Set time, Rt:Reset time

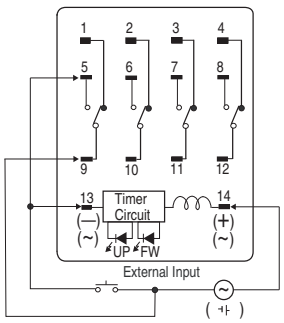
| Operating Mode | Timing Charts / Wiring Diagram | |
|---|---|---|
| ON-Delay<br>Power<br>t<br>Output | t Rt t<br>Power (13-14)<br>Time limit contact NC (9-1, 10-2, 11-3, 12-4)<br>Time limit contact NO (9-5, 10-6, 11-7, 12-8)<br>Run / Power Indicator (PW)<br>Output Indicator (UP) | |
| One shot<br>Power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

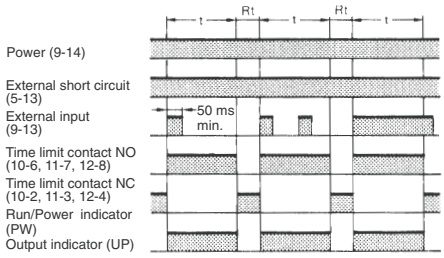
### General Timer Functions




### 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.



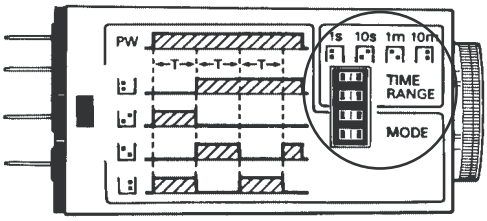

**Note:** t: Set time
Rt: Reset time

## DIP Switch Settings - 700-HNC Relays

### Time Ranges

| Cat. No. | Time Range | Time Setting Range | Setting | Factory-Set |
|---|---|---|---|---|
| 700-HNC44AZ12<br>700-HNC44AZ24<br>700-HNC44AZ48<br>700-HNC44AZ11<br>700-HNC44AZ25<br>700-HNC44AA24<br>700-HNC44AA12<br>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<br>700-HNC44BZ24<br>700-HNC44BZ48<br>700-HNC44BZ11<br>700-HNC44BZ25<br>700-HNC44BA24<br>700-HNC44BA12<br>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.

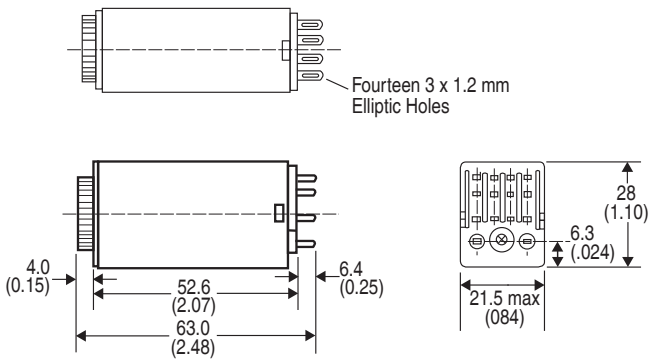



| Operating Mode | Setting | Factory-set |
|---|---|---|
| ON-delay |  | Yes |
| One Shot |  | No |
| Repeat Cycle OFF-start |  | No |
| Repeat Cycle ON-start |  | No |

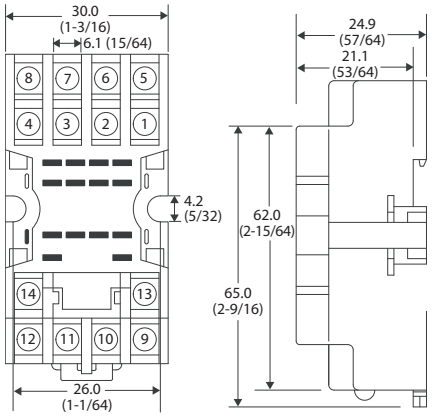
**Note:** The top two DIP switch pins are used to select the time ranges.

## Dimensions - 700-HNC Relays

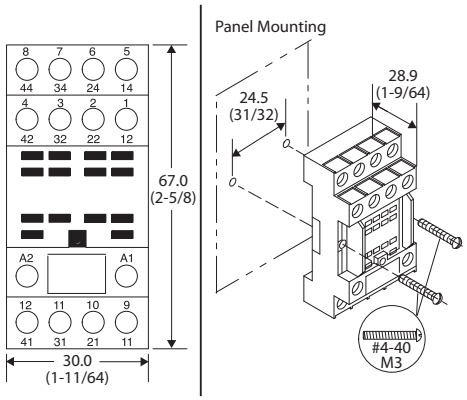
Approximate dimensions are shown in millimeters (inches). Dimensions are not intended for manufacturing purposes.



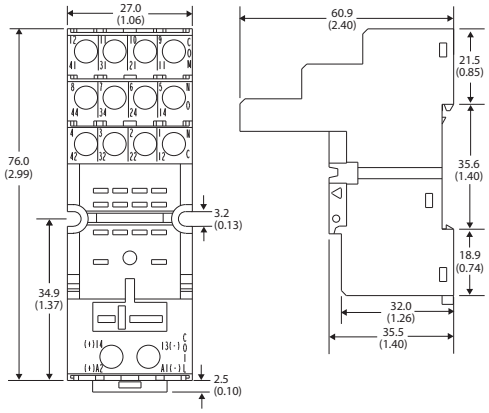

Cat. No. 700-HNC…




Cat. No. 700-HN128 (1)
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)




Cat. No. 700-HN103
Single wire: 0.2…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-HN104
Single Wire: 0.2…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)

(1) Total height of 700-HN128 + 700-HNC is 82.5 mm.

## 700-HNK Ultra-Slim Timing Relay




- The ultra-slim timing relay is the smallest relay available
- It is perfect for converting 700-HK relays into a timing relay
- SPDT and DPST-NO contact output
- Socket-mounted
- Timing range From 0.1 s...10 hr

| Photo | Timing Mode | Socket Type | Contact Output | Timing Range | Input Voltage | Cat. No. |
|---|---|---|---|---|---|---|
|  | On-Delay<br>One Shot<br>Repeat Cycle, OFF-start<br>Repeat Cycle, ON-start | 700-HN121 | SPDT (1) | 0.1 s…10 min | 12V DC | 700-HNK41AZ12 |
| | | | | | 24V DC | 700-HNK41AZ24 |
| | | | | | 24V AC | 700-HNK41AA24 |
| | | | | 0.1 min…10 hr | 12V DC | 700-HNK41BZ12 |
| | | | | | 24V DC | 700-HNK41BZ24 |
| | | | | | 24V AC | 700-HNK41BA24 |
| | | 700-HN122 | DPST-NO(2) | 0.1 s…10 min | 12V DC | 700-HNK42AZ12 |
| | | | | | 24V DC | 700-HNK42AZ24 |
| | | | | | 24V AC | 700-HNK42AA24 |
| | | | | 0.1 min…10 hr | 12V DC | 700-HNK42BZ12 |
| | | | | | 24V DC | 700-HNK42BZ24 |
| | | | | | 24V AC | 700-HNK42BA24 |

(1) 5-blade terminal type only.
(2) 8-blade terminal type only.

### Accessories - 700-HNK Relays

| Description | | Pkg. Quantity | Cat. No. |
|---|---|---|---|
|  | **Screw Terminal Socket — Panel or DIN Rail Mounting**<br>5-blade miniatue socket. For use with 1-pole type 700-HNK41 timers. Socket includes a retainer clip. | 10 | 700-HN121 |
|  | **Screw Terminal Socket — Panel or DIN Rail Mounting**<br>8-blade miniature socket for use with 2-pole, 700-HNK42 timers. This socket includes a retainer clip. | 10 | 700-HN122 |

#### Sockets and Retainer Clip Reference

| Timer Type | Socket Cat. No. | Retainer Clip Cat. No. |
|---|---|---|
| 700-HNK | 700-HN121 | Provided |
| | 700-HN122 | Provided |

## Specifications - 700-HNK Relays

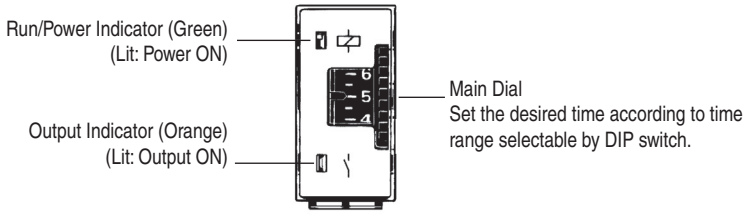
| Attribute | | 700-HNK | |
|---|---|---|---|
| Pilot Duty Rating | | NEMA B300 | |
| Rated Supply Voltage | | 24V AC; 12, 24V DC | |
| Pin Type | | Plug-in | |
| Operating Mode | | ON-delay, One Shot, Repeat Cycle OFF start, or Repeat Cycle ON start selectable with DIP switch. | |
| Operating Voltage Range | | 85%…110% of rated supply voltage (12 VDC: 90%…110% of rated supply voltage) (1) | |
| 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)<br>12V DC:Relay ON:approx. 0.4 W (at 12V DC) Relay OFF:0.1 W (at 12V DC)<br>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 (cos φ = 1)<br>The minimum applicable load is 10 mA at 5 VDC (P reference value). | |
| **Characteristics** | | | |
| Make ►][◄ | 120V AC | 30 A | |
| | 240V AC | 15 A | |
| Break ◄][► | 120V AC | 3 A | |
| | 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)<br>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)<br>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)<br>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)<br>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<br>Malfunction: 4 kV | |
| Enclosure Rating | | IP20 | |
| Weight | | Approx. 18 g | |

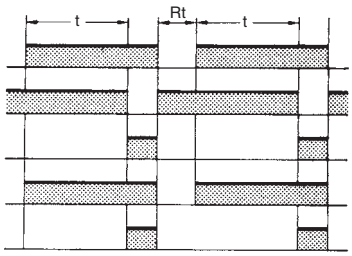
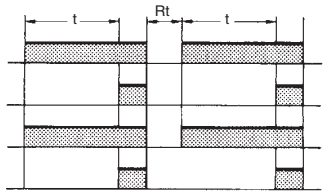
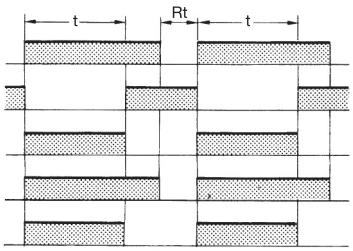
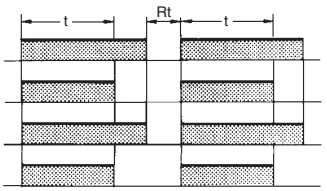
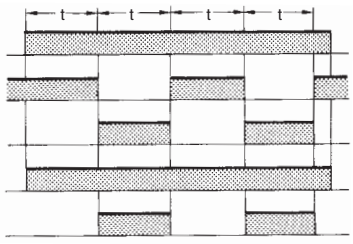
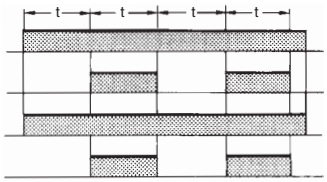
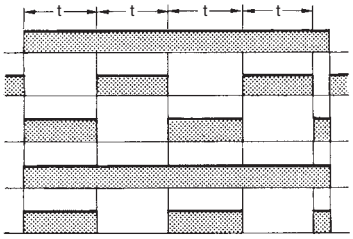
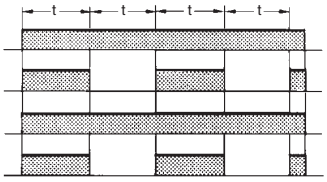
| Attribute | 700-HNK |
|---|---|
| EMC | Emission Enclosure: EN55011 Group 1 class A<br>Emission AC Mains: EN55011 Group 1 class A<br>Immunity ESD: EN61000-4-2:4 kV contact discharge (level 2) 8 kV air discharge (level 3)<br>Immunity RF-interference: ENV50140: 10 V/m (amplitude modulated, 80 MHz…1GHz) (level 3) 10 V/m (pulse modulated, 900 MHz)<br>Immunity Conducted Disturbance: ENV50141:10 V (0.15…80 MHz) (level 3)<br>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 |

(1) 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).

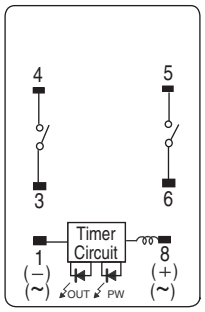
**IMPORTANT** t: Set time, Rt:Reset time

## General Timer Functions

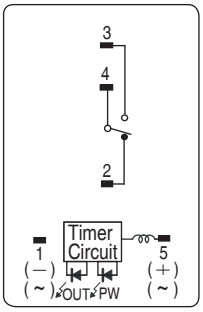


| Operating Mode | Timing Charts / Wiring Diagram | |
|---|---|---|
| | 700-HNK41... | 700-HNK42... |
| ON-Delay<br>Power<br>t<br>Output | Power (1-5)<br>Time limit contact NC (4-2)<br>Time limit contact NO (4-3)<br>Run/ Power Indicator (PW)<br>Output Indicator (OUT)<br>  | Power (1-8)<br>Time limit contact NO 4-3, 5-6<br>Run/Power indicator (PW)<br>Output indicator (OUT)<br>  |
| One shot<br>Power<br>t<br>Output | Power (1-5)<br>Time limit contact NC (4-2)<br>Time limit contact NO (4-3)<br>Run/ Power Indicator (PW)<br>Output Indicator (OUT)<br>  | Power (1-8)<br>Time limit contact NO (4-3, 5-6)<br>Run/Power indicator (PW)<br>Output indicator (OUT)<br>  |
| Repeat Cycle OFF-Start<br>Power<br>t t t<br>Output | Power (1-5)<br>Time limit contact NC (4-2)<br>Time limit contact NO (4-3)<br>Run/ Power Indicator (PW)<br>Output Indicator (OUT)<br>  | Power (1-8)<br>Time limit contact NO (4-3, 5-6)<br>Run/Power indicator (PW)<br>Output indicator (OUT)<br>  |
| Repeat Cycle ON-Start<br>Power<br>t t t<br>Output | Power (1-5)<br>Time limit contact NC (4-2)<br>Time limit contact NO (4-3)<br>Run/ Power Indicator (PW)<br>Output Indicator (OUT)<br>  | Power (1-8)<br>Time limit contact NO (4-3, 5-6)<br>Run/Power indicator (PW)<br>Output indicator (OUT)<br>  |

## Wiring- 700-HNK Relays

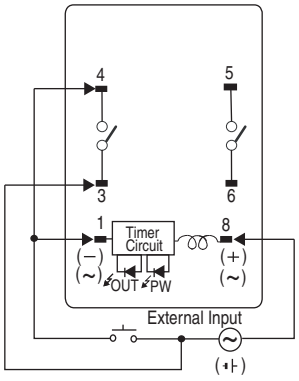


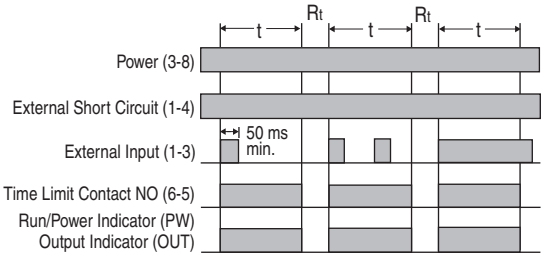

*Cat. No. 700-HNK42...*




*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.



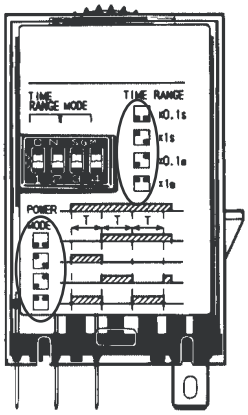

**Note:**t:Set time
Rt: Reset time

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

## Time Ranges- 700-HNK Relays

| Cat. No. | Time Range | Time Setting Range | Setting | Factory-Set |
|---|---|---|---|---|
| 700-HNK41AZ12<br>700-HNK41AZ24<br>700-HNK41AA24<br>700-HNK42AZ12<br>700-HNK42AZ24<br>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<br>700-HNK41BZ24<br>700-HNK41BA24<br>700-HNK42BZ12<br>700-HNK42BZ24<br>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.



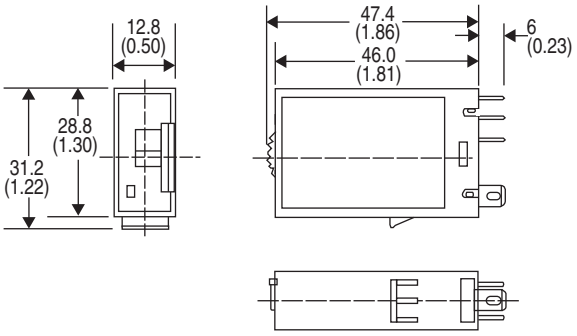

## Operating Modes - 700-HNK Relays

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

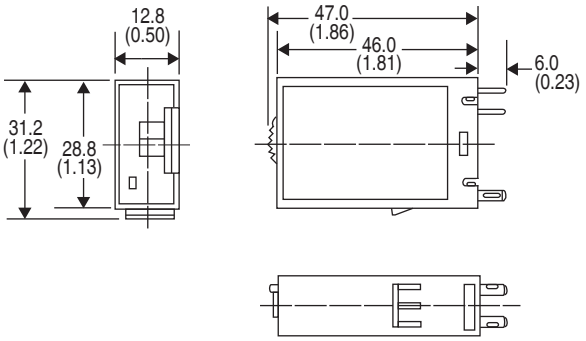
**Note:** The right two DIP switch pins are used to select the operating modes.

## Dimensions - 700-HNK Relays

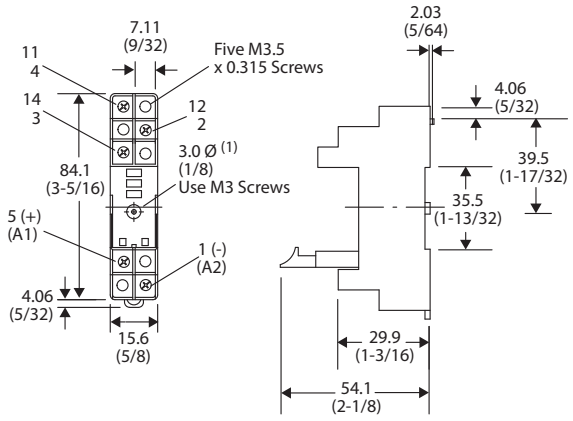
Approximate dimensions are shown in millimeters (inches). Dimensions are not intended for manufacturing purposes.



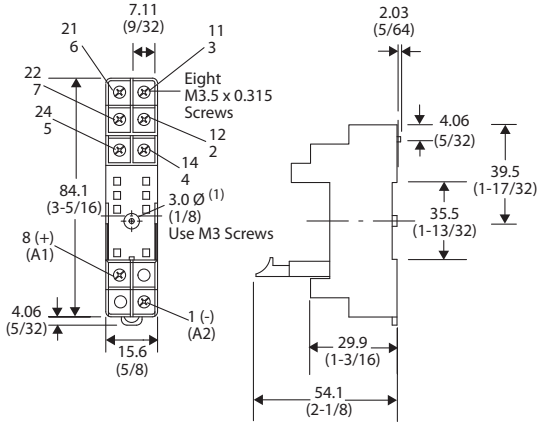

700-HNK41 SPDT Contact




700-HNK42 DPST-NO Contact




Cat No. 700-HN121
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)
Total height: 700-HN121 + 700-HNK41 is 78.0 mm.




Cat No. 700-HN122
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)
Total height: 700-HN122 + 700-HNK42 is 78.0 mm.

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

## 700-HR Dial Timing Relays

- Socket- or panel-mounted
- 5 A contact ratings or transistor outputs
- Single- or Multi-Function
- Timing range from 0.05 s...300 hr
- Multi-voltage inputs




### Multi-Function Timing Relays with Trigger and Reset Switch Options

- Socket or Panel Mounted
- Timing Range From 0.05 s...300 hr
- 11-pin base for socket cat. nos. 700-HN101, -HN126, -HN129
- Trigger: Power on or optional trigger signal
- Reset: Power off or optional reset signal

| Timing Mode | Supply Voltage | Trigger Options | Reset Options | Outputs | Cat. No. | |
|---|---|---|---|---|---|---|
| On-Delay (A)<br>OFF-Delay (D)<br>One Shot (E)<br>Repeat cycle OFF-Start (B)<br>Repeat Cycle ON-Start (B2)<br>Signal ON/OFF-delay (C)<br>Delayed One Shot (J)<br>Signal ON/OFF - Delay (G) | 24…48V AC<br>12…48V DC | 1. Power On<br>2. Start Signal<br>- contact closure (zero volts)<br>- NPN transistor<br>3. Gate Signal (pause) | 1. Power Off<br>2. Reset Signal<br>- contact closure (zero volts)<br>- NPN transistor | DPDT | 700-HR52TU24 | |
| | | | | Transistor | (1) | 700-HRT6TTU24 |
| | | 1. Power On<br>2. Start Signal<br>- contact closure (voltage)<br>- NPN transistor<br>- PNP transistor | Power Off | DPDT | 700-HRV52TU24 | |
| | 100…240V AC<br>100…125V DC | 1. Power On<br>2. Start Signal<br>- contact closure (zero volts)<br>3. Gate Signal (pause) | 1. Power Off<br>2. Reset Signal<br>- contact closure (zero volts) | DPDT | 700-HR52TA17 | |
| | | 1. Power On<br>2. Start Signal<br>- contact closure (voltage) | Power Off | DPDT | (1) | 700-HRV52TA17 |

(1) Voltage input connection to high signal instead of 0V signal.

### Multi-Function Timing Relays with Power On Trigger

- Socket or Panel Mounted
- Timing Range From 0.05 s...300 hr
- 8-pin base for socket cat. nos. 700-HN100, -HN125, -HN108
- Trigger: Power on
- Reset: Power off

| Timing Mode | Supply Voltage | Trigger Options | Reset Options | Outputs | Cat. No. | |
|---|---|---|---|---|---|---|
| ON-Delay (A)<br>One Shot (E)<br>Repeat Cycle OFF-Start (B)<br>Repeat Cycle ON-Start (B2)<br>Delayed One Shot (J) | 24…48V AC<br>12…48V DC | Power On | Power Off | DPDT | 700-HRS42TU24 | |
| | | | | Transistor | (1) | 700-HRT4TTU24 |
| | 24…48V AC/DC | Power On | Power Off | SPDT Timed + Instantaneous Contact | | 700-HRP42TU24 |
| | 100…240V AC<br>100…125V DC | Power On | Power Off | SPDT Timed + Instantaneous Contact | 700-HRP42TA17 | |
| | | | | DPDT | 700-HRS42TA17 | |

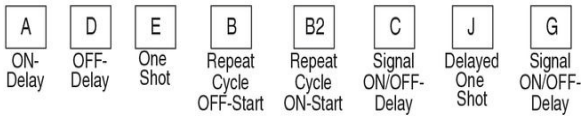
(1) Voltage input connection to high signal instead of 0V signal.

## ON-Delay Timing Relays

- Socket or Panel Mounted
- Timing Range From 0.05 s...300 h
- 8-pin base for socket cat. nos. 700-HN100, -HN125, -HN108
- Trigger: Power on
- Reset: Power off

| Timing Mode | Supply Voltage | Trigger Options | Reset Options | Outputs | Cat. No. |
|---|---|---|---|---|---|
| ON-Delay (A) | 24…48V AC/DC | Power On | Power Off | SPDT Timed + Instantaneous Contact | 700-HRC12TU24 |
| | 24…48V AC, 12…48V DC | | | DPDT | 700-HRM12TU24 |
| | 100…240V AC | Power On | Power Off | DPDT | 700-HRM12TA17 |
| | | | | SPDT Timed + Instantaneous Contact | 700-HRC12TA17 |

### Timing Mode Description




## 700-HRF Repeat Cycle Timing Relays

- Socket or Panel Mounted
- Independently adjustable on- and off-time
- 8-Pin base for socket cat. nos. 700-HN100, -HN125, and -HN108
- DPDT contact outputs
- Trigger: Power on
- Reset: Power off
- Hazardous location version available

| 700 | – | HRF | 7 | 2 | D | U26 |
|---|---|---|---|---|---|---|
| a | | b | c | d | e | f |

### Catalog Number Explanation

| a Bulletin Number | - | b Type of Relay | c Function | d Contact Output | e Timing Range | f Supply Voltage |
|---|---|---|---|---|---|---|
| 700 | | HRF–Repeat cycle with adjustable ON/OFF times | 7–Repeat cycle with OFF start<br>8–Repeat cycle with ON start | 2- DPDT | D–0.05 s…300 hr | U26 - 12…48V DC, 24…48V AC<br>U27 - 100…125V DC, 100…240V AC |

## 700-HRY Star-Delta Timing Relays

- 8-Pin base for socket cat. nos. 700-HN100, -HN125, and -HN108
- SPDT timed + instantaneous contact outputs
- Trigger: Power on
- Reset: Power off

| 700 | – | HRYY | 6 | F | A12 |
|---|---|---|---|---|---|
| a | | b | c | d | e |

### Catalog Number Explanation

| a Bulletin Number | - | b Type of Relay | c Function | d Timing Range | e Supply Voltage |
|---|---|---|---|---|---|
| 700 | | HRYY–YStar-Delta timer | 6–SPDT timed + SPDT instant | F–Star: 0.5…120 s<br>Delta: 0.05, 0.1, 1.25, 0.5, 0.75, 1.0 s | A12–100…120V AC, 50/60 Hz<br>A22–200…240V AC, 50/60 Hz |

## 700-HRQ True Off-Delay Timing Relays

- 11-Pin base for use with reset option — socket cat. nos. 700-HN101, -HN126, and -HN129
- 8-Pin base for use without reset option — socket cat. nos. 700-HN100, -HN125, and -HN108
- DPDT contact outputs
- Trigger: Power off
- Reset: optional reset signal

| 700 | – | HRQ | N | 2 | G | A12 |
|---|---|---|---|---|---|---|
| a | | b | c | d | e | f |

## Catalog Number Explanation

| a<br>Bulletin Number | - | b<br>Type of Relay | c<br>Function | d<br>Contact Output | e<br>Timing Range | f<br>Supply Voltage |
|---|---|---|---|---|---|---|
| 700 | | HRQ–True Off-Delay Timer | N–No reset option, 8-pin terminals<br>R–Reset option, 11-pin terminals | 2–DPDT | G–0.05…12 s<br>H–0.05…12 min | A12–100…120V AC, 50/60 Hz<br>A22–200…240V AC, 50/60 Hz<br>U25–24V AC, 50/60 Hz; 24V DC<br>Z48–48V DC<br>Z11–100…125V DC |

## Accessories - 700-HR Relays

| Photo | Description | Pkg. Qty. | Cat. No. |
|---|---|---|---|
|  | **Screw Terminal Tube Base Socket — Panel or DIN Rail Mounting; Guarded Terminal Construction.** 8-Pin for use with 700-HR and -HX timing relays. | 10 | 700-HN100 |
|  | **Screw Terminal Tube Base Socket — Panel or DIN Rail Mounting; Open Style Construction.** 8-Pin for use with 700-HR and -HX timing relays. No retainer clip required. | 10 | 700-HN125 |
|  | **Screw Terminal Tube Base Sockets — Panel or DIN Rail Mounting; Guarded Terminal Construction.** 11-pin for use with 3PDT 700-HA relays. | 10 | 700-HN101 |
|  | **Screw Terminal Tube Base Sockets — Panel or DIN Rail Mounting; Open Style Terminal Construction.** 11-pin for use with 3PDT 700-HA relays. No retainer clip required. | 10 | 700-HN126 |
|  | **DIN (#3) symmetrical hat rail**<br>35 x 7.5 x 1 m | 10 | 199-DR1 |

| Photo | Description | Pkg. Qty. | Cat. No. |
|---|---|---|---|
|  | **Specialty Socket**<br>8-pin backwired socket with solder terminals for use with 700-HR timing relays. Order 10 or multiples of 10. | 10 | 700-HN108 |
|  | **Specialty Socket**<br>11-pin back-wired socket with solder terminals for use with 700-HR timing relays. | 10 | 700-HN129 |
|  | **Frame Adapter**<br>For flush or door mounting of all 700-HR and -HX timers. | 1 | 700-HN130 |
|  | **Retainer Clip for Cat. Nos. 700-HN100 and -HN101 Sockets with all 700-HR Timing Relays**<br>Secures timer in socket.<br><br>**Note:** Not required for installation | 10 | 700-HN131 |
|  | **Protective Cover**<br>Helps prevent tampering of timing and mode settings. Provides a degree of protection against water and dirt from entering the front of the relay. For use with all 700-HRs and -HX timing relays. | 1 | 700-HN132 |
|  | **Pre-Printed Identification Tags —** contains 10 sheets of pre-printed and blank tags. Each sheet contains 13 sets of the markings CR…9CR, TR…9TR, M…9M, F, R, 1S, and 117 blank tags. Tags are peel-off with sticky backing for easy placement on relays. | 10 | 700-N40 |
| | **Blank Identification Tags —** contains 10 sheets of blank identification tags for customer specialized printing. Each sheet contains 546 blank tags. Tags are peel-off with sticky backing for easy placement on relays. | 10 | 700-N41 |

| Timer Type | Socket Cat. No. | | Retainer Clip Cat. No. |
|---|---|---|---|
| 700-HR52, -HRT6, -HRV, -HRQR | (1) | 700-HN101 | 700-HN131 |
| | | 700-HN126 | Not Required (3) |
| | | 700-HN129 | Not Applicable |
| 700-HRS, -HRT4, -HRP, -HRC, -HRM, -HRF, -HRY, -HRQN | (2) | 700-HN100 | 700-HN131(See note above) |
| | | 700-HN108 | Not Applicable |
| | | 700-HN125 | Not Required(3) |

(1) 11 pins.
(2) 8 + pins.
(3) Design of these sockets holds the timing relays securely and does not require retainer clips.

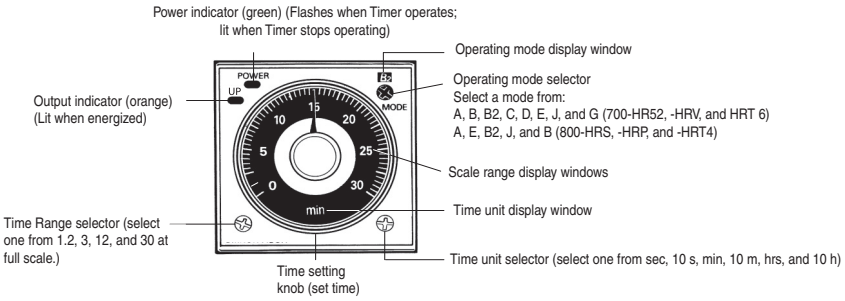
## Specifications - 700-HR Relays

| | | 700-HR, 700-HRS, 700-HRV | 700-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. |
| Make ►][◄ | 120V AC | 30 A | | | | | | | — |
| | 240V AC | 15 A | | | | | | | — |
| Break ◄][► | 120V AC | 3 A | | | | | | | — |
| | 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)<br>2000V AC (1000V AC for 700-HRT), 50/60 Hz for 1 min (between control output terminals and operating circuit)<br>2000V AC, 50/60 Hz for 1 min (pole-to-pole)<br>1000V AC, 50/60 Hz for 1 min (between contacts not located next to each other)<br>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 ( 14…131 °F) with no icing<br>Storage: -25…+65 °C ( 13…149 °F) with no icing | | | | | | | |
| Ambient Humidity | | Operating: 35…85 % | | | | | | | |
| **Construction** | | | | | | | | | |
| Life Rxpectancy (Min. Operations) | | Mechanical:20 000 000. (under no load at 1800 operations/h)<br>Electrical: 100 000 (5 A at 250V AC, resistive load at 1800 operations/h) | | | | | | Mech: $10^7$<br>Electrical: $10^4$ | |

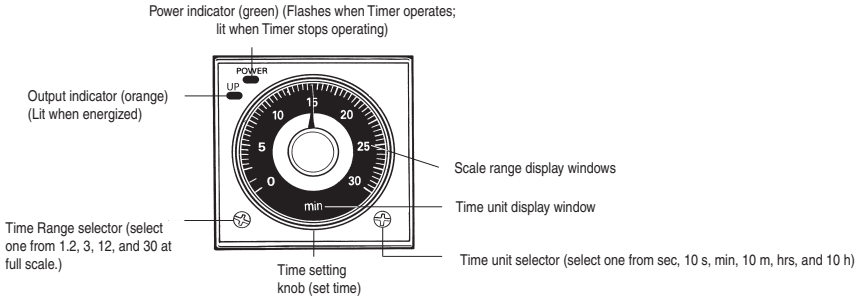
| | 700-HR, 700-HRS, 700-HRV | 700-HRP | 700-HRC | 700-HRM | 700-HRF | 700-HRY | 700-HRQ | 700-HRT (Transistor Outputs) |
|---|---|---|---|---|---|---|---|---|
| EMC | (EMI) EN50081-2<br>Emission Enclosure: EN55011 Group 1 class A<br>Emission AC Mains: EN55011 Group 1 class A<br>(EMS) EN50082-2<br>Immunity ESD:EN61000-4-2: 4 kV contact discharge (level 2); 8 kV air discharge (level 3)<br>Immunity RF-interference from AM Radio Waves: ENV50140:10 V/m (80 MHz…1 GHz) (level 3)<br>Immunity RF-interference from Pulse-modulated Radio Waves: ENV50204:10 V/m (900 ±5 MHz) (level 3)<br>Immunity Conducted Disturbance: ENV50141: 10V (0.15…80 MHz) (level 3)<br>Immunity Burst: EN61000-4-4:2 kV power-line (level 3)<br>Immunity Surge: EN61000-4-52 kV I/O signal-line (level 4)<br>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 Relays

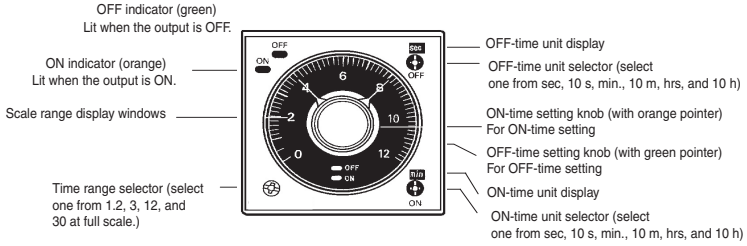
### 700-HR Multifunction Timer



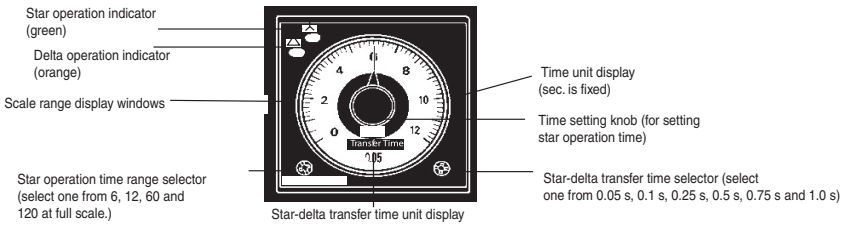

### 700-HRC -HRM On-Delay Timer



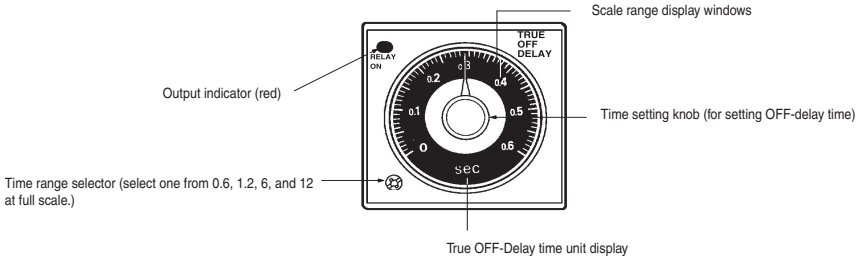

### 700-HRF Twin Timer




### 700-HRY Star-Delta Timer




### 700-HRQ True Off-Delay Timer

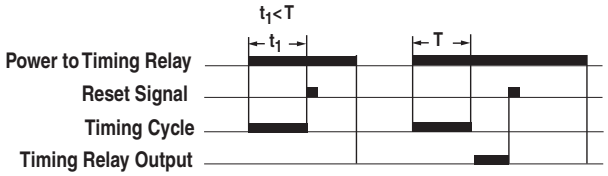


## Specifications for Start, Gate, Reset Signal (Cat. Nos. 700-HR52, -HRT6, -HRV, -HRQR)

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

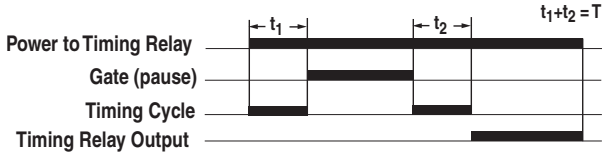
**(R) Reset Signal**

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.



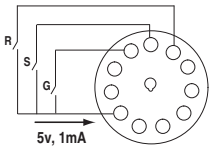

**(G) Gate Signal**

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.



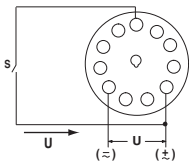

**Contact Signal — Cat. Nos. 700-HR52, -HRT6, -HRQR**

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.



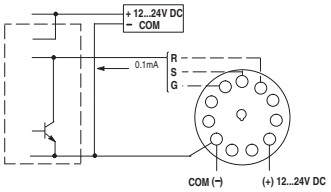

**Contact Signal — Cat. No. 700-HRV**

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.



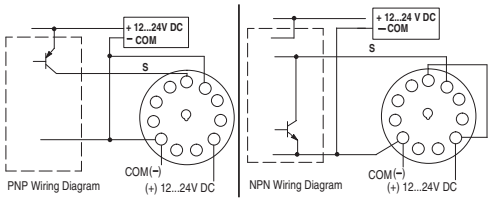

**Solid-State Signal — Cat. Nos. 700-HR52, -HRT6**

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.

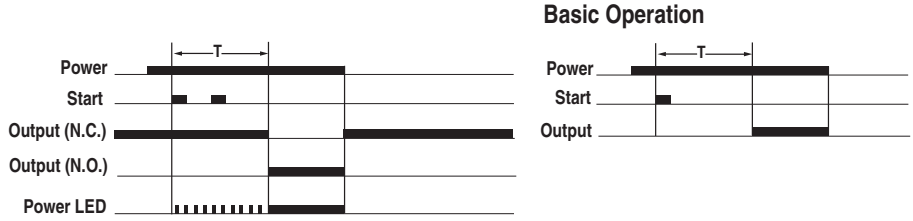



| Signal Specifications | | | | | |
|---|---|---|---|---|---|
| Circuit Impedance | Circuit impedance can be used to calculate the maximum wiring distance from the signal switch to the timing relay, for example.<br>Permissiblesignal-ONimpedance:1 kΩ max.<br>Permissible signal-OFF impedance: 100 kΩ min. | | | | |
| 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 |

## Timing Charts - 700-HR Relays

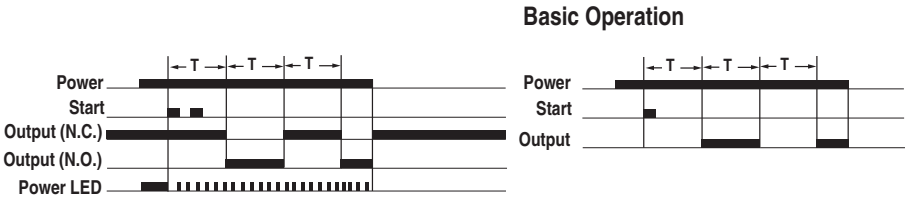
**Mode A — ON-Delay**

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.



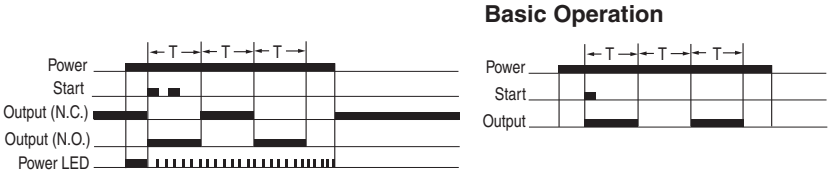

**Mode B — Repeat Cycle, Off Start**

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.



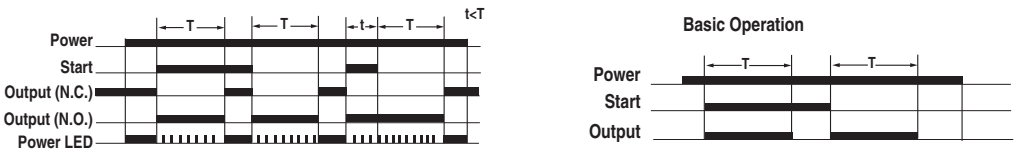

**Mode B2 —Repeat Cycle On start**

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 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.



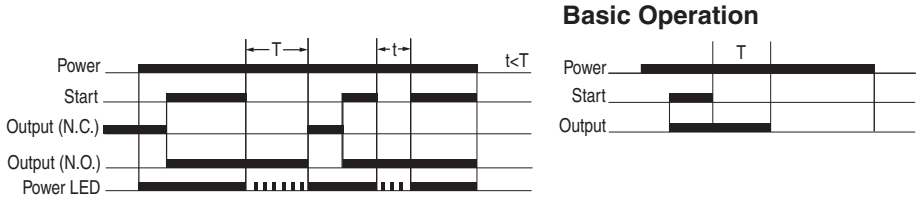

**Mode C — Watchdog monitor (Trigger = Signal On/Off)**

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.



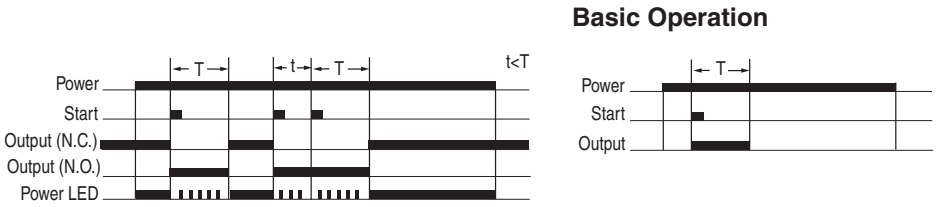
**Mode D — Off-Delay (Trigger = Signal Off)**

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.



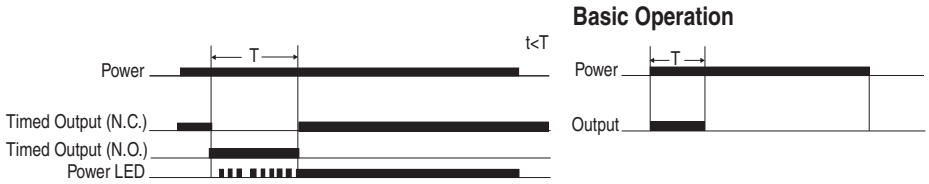

**Mode E — One-Shot (Trigger = Signal On) 700-HR52, -HRV, and -HRT6**

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.



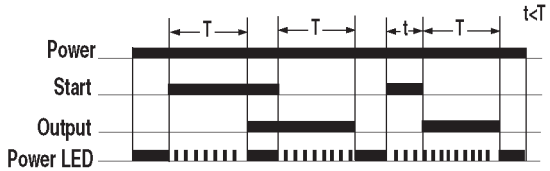

**Mode E — One-Shot (Trigger = Power On) 700-HRS, -HRP, and -HRT4**

a. Need continuous input power applied.
b. iming 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.



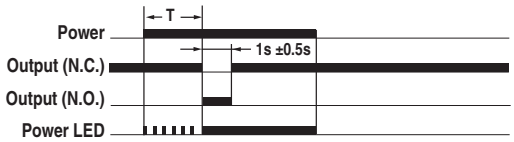

**Mode G — Watchdog Monitor (Trigger=Signal ON/OFF)**

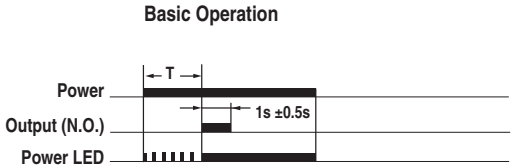
a. Need continuous input power applied.
b. Timing is initiated by the landing edge of the start signal.
c. After the first timing cycle is complete the contacts change state and timing is initiated by the trailing edge of the start signal.
d. At the end of the time period the contacts return to the shelf state.
e. Relay timing is reset when additional start signals are applied while the relay is timing.
f. When the power is removed contacts return to the shelf state.



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

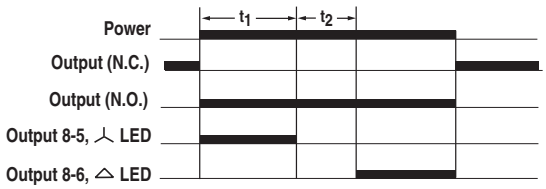
a. Need continuous input power applied.
b. No start signal applied.
c. Timing is initiated when input power is applied.
d. Contacts change state after the timing for a fixed time of 1s +/-0.5s
e. At the end of the 1 sec period the contacts return to the shelf state.
f. When the input power is removed contacts return to the shelf state.

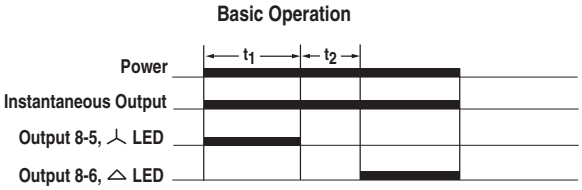



**Mode Star-Delta**

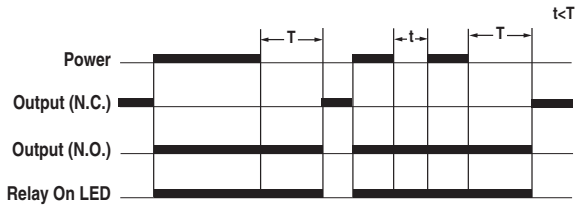
a. Need continuous input power applied.
b. No start signal required. Timing is initiated when input power is applied.
c. Star ouput contact changes state when input power is applied.
d. After timing is complete star output contact returns to the shelf state then both the star & delta contacts remain 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.

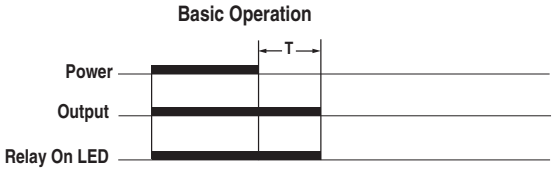



**Mode True Off-Delay (Trigger = Power Off)**

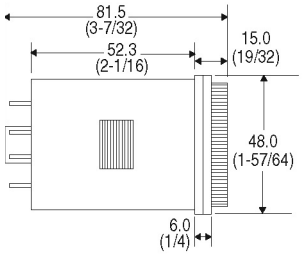
a. Continuous input power is NOT required.
b. No start signal applied.
c. Contacts change state immediately when input power is applied.
d. Timing starts when input power is removed.
e. At the end of the time period contacts return to the shelf state.
f. Relay timing is reset when input power is reapplied while the relay is timing. Contacts remain in energized state.



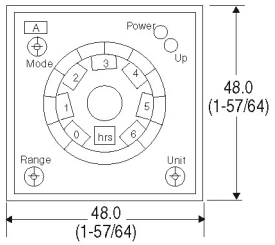



## Dimensions - 700-HR Relays

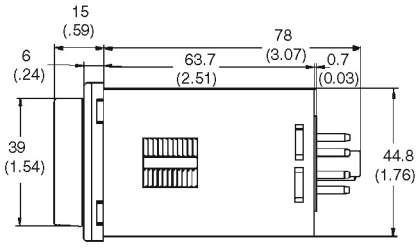
Approximate dimensions are shown in millimeters (inches). Dimensions are not intended for manufacturing purposes.



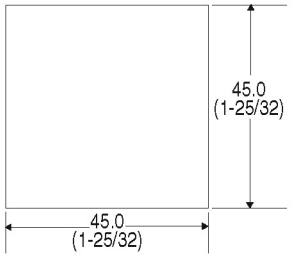

*Cat. No. 700-HR, -HRM, -HRC, -HRF, -HRS, HRV, HRP*
*Timing Relays*



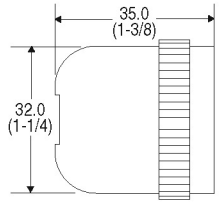

*Cat. No. 700-HR, -HRM, -HRC, -HRF, -HRS, -HRV, -HRP, -HRY, -HRQ Timing Relays*



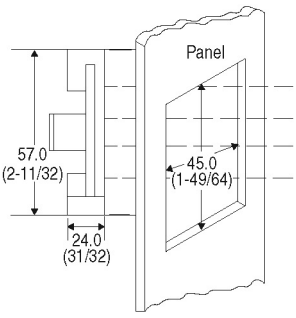

*Cat. No. 700-HRY, -HRQ Timing Relays*



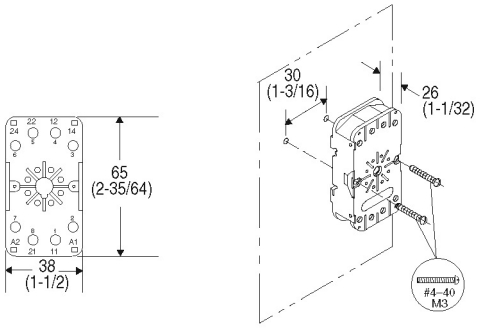

*Cat. No. 700-HR...*
*Panel Cutout*



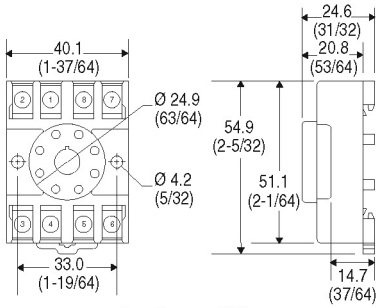

*Cat. No. 700-HN129 — 11-pin*
*Cat. No. 700-HN108 — 8-pin socket*



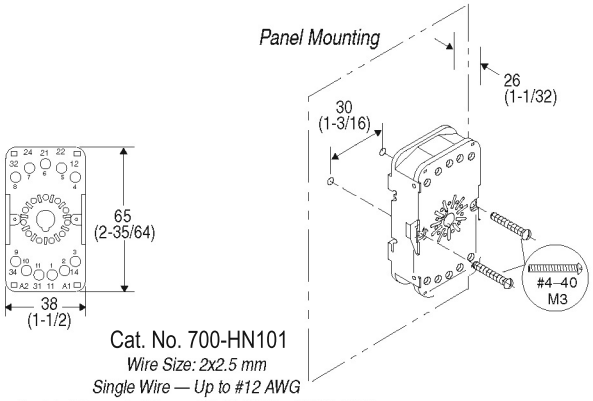

*Cat. No. 700-HN130*
*Retainer*



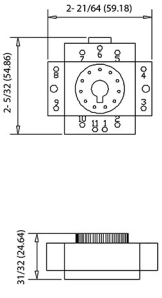

*Cat. No. 700-HN100*
*Wire Size: 2x2.5 mm*
*Single Wire — Up to #12 AWG*
*Double Wire — 2x2.5 mm (#2-14 AWG...#2-20 AWG)*
*(Either Solid or Stranded)*
*Strip length: 9 mm (3/8 in) — Torque: 0.8 N•m (7 lb•in)*




*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-HN101
*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)*

## 700-HT Plug-in Timing Relay



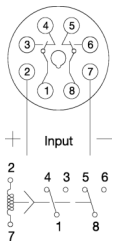
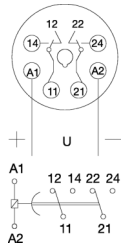
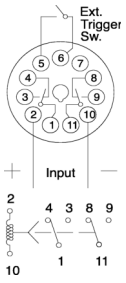
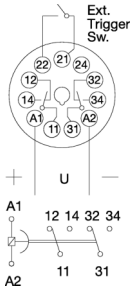
- Timing Relay (On-Delay or Off-Delay)
- Rugged Pin Style Socket Mounting
- 10 A, DPDT Contact Ratings
- 0.1 s...30 min Fixed Timing Relay
- 0.1 s...3 min Single Adjustable Timing Relay
- Single or Fixed Timing

### Single Range Timing Relay with Pin Style Terminations

| 700 | – | HT | 2 | 2 | A | A2 |
|---|---|---|---|---|---|---|
| a | | b | c | d | e | f |

### Catalog Number Explanation - 700-HT Relays

| a<br>Bulletin Number | - | b<br>Type of Relay | c<br>Operating Mode | d<br>Number of Poles | e<br>Timing Range | f<br>Coil Voltage |
|---|---|---|---|---|---|---|
| 700 | | HT -<br>Tube Base Adjustable Timing Relay | 1–On-delay<br>2–Off-delay | 2 - 2PDT | A– 0.1…10 s<br>B– 1.0…100 s<br>C– 0.1…10 min<br>D– 1.0…100 min<br>E – 0.1…10 hr | U12– 12V DC<br>U24– 24V AC/DC, 50/60 Hz<br>U120– 120V AC/DC, 50/60 Hz<br>A2 – 240V AC, 50/60 Hz |

| | Operating Mode | Wiring Diagrams | |
|---|---|---|---|
| | | U.S./Canada | International |
|  | On-Delay |  |  |
| | Socket | 700-HN125 or 700-HN100 | 700-HN100 |
| | Off-Delay |  |  |
| **700-HT<br>DPDT 2-Pole — 2 Form C Contacts** | Socket | 700-HN126 or 700-HN101 | 700-HN101 |

## Fixed Timing Relays



700-HTF Fixed Timing Relays feature a plug-in tube base. Construction is the same as the 700-HT relay except that the adjustment knob has been removed to help prevent unwanted tampering. The timing and output specifications are identical to those of the 700-HT relay. Setting time will be ±5% of the time ordered.

| 700 | – | HTF | 2 | 2 | 025 | S | A2 |
|---|---|---|---|---|---|---|---|
| a | | b | c | d | e | f | g |

## Catalog Number Explanation - 700-HTF Relays

| a<br>Bulletin Number | - | b<br>Type of Relay | c<br>Operating Mode | d<br>Number of Poles | e<br>Timing Range | f<br>Timing Units | g<br>Coil Voltage |
|---|---|---|---|---|---|---|---|
| 700 | | HTF-<br>Tube Base Fixed Timing Relay | 1–On-delay<br>2–Off-delay | 2 - 2PDT | 001…999 –<br>The three digit code represents a numeric value with one decimal place. For example: code 001 is 0.1, code 025 is 2.5, and code 999 is 99.9<br>The acceptable range for each time unit is listed below:<br>Seconds - 001…999<br>Minutes - 001…999<br>Hours - 001…100 | S –Seconds<br>M –Minutes<br>H –Hours | U12– 12V DC<br>U24– 24V AC/DC, 50/60 Hz<br>U120– 120V AC/DC, 50/60 Hz<br>A2 – 240V AC, 50/60 Hz |

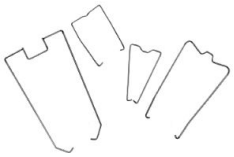
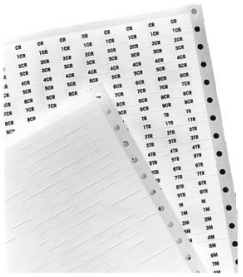
### Socket and Retainer Clip Reference

| Relay Type | Socket Cat. No. | Retainer Clip Cat. No. |
|---|---|---|
| 700-HT12 | 700-HN100 | 700-HN110 |
| | 700-HN125 | Not Required(1) |
| 700-HT22 | 700-HN101 | 700-HN110 |
| | 700-HN126 | Not Required(1) |

(1) Design of these sockets holds the relays securely and does not require retainer clips.

## Accessories - 700-HT Relays

| | Description | Pkg. Qty. | Cat. No. |
|---|---|---|---|
|  | **Screw Terminal Tube Base Socket — Panel or DIN Rail Mounting; Guarded Terminal Construction.** 8-Pin for use with DPDT 700-HA Relays, -HX Digital Timing Relays, -HT (On-Delay) and -HRM, -HRC and -HV (Repeat Cycle) Timing Relays. Order ten or multiples of ten | 10 | 700-HN100 |
|  | **Screw Terminal Tube Base Socket — Panel or DIN Rail Mounting; Open Style Construction.** 8-Pin for use with DPDT 700-HA Relays, -HT (On-Delay) and -HRM, -HRC and -HV (Repeat Cycle) Timing Relays. Order must be for 10 sockets or multiples of 10. No retainer clip required. | 10 | 700-HN125 |

| | Description | Pkg. Qty. | Cat. No. |
|---|---|---|---|
|  | **Screw Terminal Tube Base Sockets — Panel or DIN Rail Mounting; Guarded Terminal Construction.** 11-pin for use with 3PDT 700-HA relays. | 10 | 700-HN101 |
|  | **Screw Terminal Tube Base Sockets — Panel or DIN Rail Mounting; Open Style Terminal Construction.** 11-pin for use with 3PDT 700-HA relays. No retainer clip required. | 10 | 700-HN126 |
|  | **DIN (#3) symmetrical hat rail**<br>35 x 7.5 x 1 m | 10 | 199-DR1 |
|  | **Retainer Clip for Cat. Nos. 700-HN100 and -HN101 Sockets with 700-HT Timing Relays**[1] Secures relay in socket. Order must be for 10 clips or multiples of 10. | 10 | 700-HN110 |
|  | **Pre-Printed Identification Tags —** contains 10 sheets of pre-printed and blank tags. Each sheet contains 13 sets of the markings CR…9CR, TR…9TR, M…9M, F, R, 1S, and 117 blank tags. Tags are peel-off with sticky backing for easy placement on relays. | 10 | 700-N40 |
| | **Blank Identification Tags —** contains 10 sheets of blank identification tags for customer specialized printing. Each sheet contains 546 blank tags. Tags are peel-off with sticky backing for easy placement on relays. | 10 | 700-N41 |

(1) Refer to 700-HT Timing Relay, Socket, and Retainer Clip Reference Chart.

## Specifications - 700-HT

| | | | Cat. No. 700-HT… | | | Cat. No. 700-HTF… | | |
|---|---|---|---|---|---|---|---|---|
| **Electrical Ratings** | | | | | | | | |
| Pilot Duty Rating [1] | | | NEMA B300 | | | | | |
| Rated Thermal Current ($I_{th}$) | | | 10 A | | | | | |
| Rated Insulation Voltage ($U_i$) | | | 250V IEC, 300V UL/CSA | | | | | |
| Contacts | | Inductive | Make | Break | HP | Make | Break | HP |
| | | | ►][◄ | ◄][► | | ►][◄ | ◄][► | |
| | | 120V AC | 30 A | 3 A | 1/2 N.O. 1/3 N.C | 30 A | 3 A | 1/3 |
| | | 240V AC | 15 A | 1.5 A | 1/2 N.O. 1/3 N.C | 15 A | 1.5 A | 1/2 |
| | | Resistive 28V DC | 10 A | 10 A | — | 10 A | 10 A | — |
| Permissible Coil Voltage Variation | | | 85…110% of Nominal Voltage at 50 Hz<br>85…110% of Nominal Voltage at 60 Hz<br>80…110% of Nominal Voltage at DC | | | | | |
| Power Consumption ±10% | AC | 24V AC | 2 VA | | | | | |
| | | 120V AC | 4 VA | | | | | |
| | | 240V AC | 4 VA | | | | | |
| | DC | | 1.3 W | | | | | |
| **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 | | | $10 \times 10^6$ | | | | | |
| Switching Frequency Operations | | | 18,000/hr | | | | | |
| Timing | Duty Cycle | | Continuous | | | | | |
| Repeat Accuracy (constant voltage and temperature) | | | ±2% (Time Delay: 0.1…2 s)<br>±1% (Time Delay: >2 s) | | | | | |
| Repeat Accuracy (variable voltage and temperature) | | | ±10% | | | | | |
| Fixed Time Setting Accuracy | | | — | | | ±5% (Time Delay: 0.1…2 s)<br>±1% (Time Delay: >2 s) | | |
| Scale Tolerance | High End of Range | | +5% | | | — | | |
| | Low End of Range | | -50% | | | — | | |
| Reset Time | ON Delay | | 100 ms | | | | | |
| | OFF Delay | | 40 ms | | | | | |

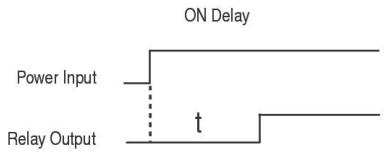
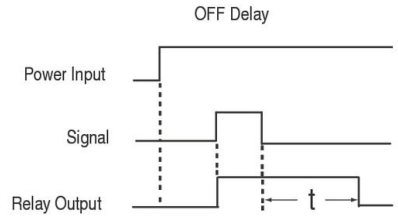
| | | Cat. No. 700-HT… | Cat. No. 700-HTF… |
|---|---|---|---|
| **Environmental** | | | |
| Temperature | Operating | –28…+65 °C (50 °C max., 240V AC coil)<br>(–18…+149 °F) (122 °F max., 240V AC coil) | |
| | Storage | –55…+85 °C<br>(–67…+185 °F) | |
| Altitude | | 2000 m (6560 ft) | |
| **Construction** | | | |
| Insulating Material | | Molded High Dielectric Material | |
| Enclosure | | Impact Resistant Dust Cover | |
| Contact Material | | Silver Cadmium Oxide | |
| Terminal Markings on Socket | | In accordance with EN50 005 | |
| Sockets | | 8- or 11-Pin Socket<br>(On = 8, Off = 11)<br>700-HN100, -HN125<br>700-HN101, -HN126 | |
| Certifications | | CSA Certified, File 223833, UL Recognized, File E3125 Guide NLDX 2,UL Listed,whe used with 700-HN100, 700-HN101, 700-HN125, and 700-HN126 Sockets, File No. E3125 Guide NLDX, CE Marked | |
| Standards | | EN 61812-1, CSA 22.2 No. 14, UL 508 | |

(1) See NEMA Ratings and Test Values on page 5.

## Trigger Signal Cat. Nos. 700-HT

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

## Timing Diagrams - 700-HT Relays

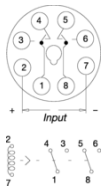
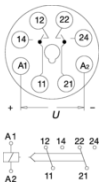
| | | |
|---|---|---|
|  | |  |
| ON Delay | | OFF Delay |

## 700-HV Timing Relay

- Repeat Cycle Timing Relay
- 10 A Contact Rating
- DPDT
- Pin Style Terminals
- 0.1 s...30 min.
- Repeat Cycle Adjustable Timing
- Two Timing Adjustments T1 ≠ T2




### Repeat Cycle Timing Relays with Pin Style Terminations with 2 Adjustments (T1 ≠ T2)

| | Operating Mode | Wiring Diagrams | |
|---|---|---|---|
| | | U.S./Canada | International |
|  | Repeat Cycle |  |  |
| **700-HV Repeat Cycle Timing Relay DPDT 2-Pole — 2 Form C Contacts** | *Socket* | 700-HN125 or 700-HN100 | 700-HN100 |

| 700 | – | HV | 3 | 2 | A | A | A2 |
|---|---|---|---|---|---|---|---|
| a | | b | c | d | e | f | g |

### Catalog Number Explanation - 700-HV Relays

| a<br>Bulletin Number | - | b<br>Type of Relay | c<br>Operating Mode | d<br>Number of Poles | e<br>Timing Range OFF Time | f<br>Timing Range ON Time | g<br>Coil Voltage |
|---|---|---|---|---|---|---|---|
| 700 | | HV – Tube Base Repeat Cycle Timing Relay | 3 –Power ON Repeat Cycle, OFF Start (Repeat Cycle, OFF/ON Delay) | 2 - 2PDT | Code OFF Time — Type HV<br>A – 0.1…10 s<br>B – 1.0…100 s<br>C – 0.1…10 min<br>D – 1.0…100 min<br>E –0.1…10 hr | Code ON Time — Type HV<br>A 0.1…10 s<br>B 1.0…100 s<br>C 0.1…10 min<br>D 1.0…100 min<br>E 0.1…10 hr | U12 –12V DC<br>U24 –24V AC/DC, 50/60 Hz<br>U120 – 120V AC/DC, 50/60 Hz<br>A2 –240V AC, 50/60 Hz |

#### Socket and Retainer Clip Reference

| Relay Type | Socket Cat. No. | Retainer Clip Cat. No. |
|---|---|---|
| 700-HV | 700-HN100 | 700-HN110 |
| | 700-HN125 | Not Required(1) |

(1) Design of these sockets holds the relays securely and does not require retainer clips.

## Accessories - 700-HV Relays

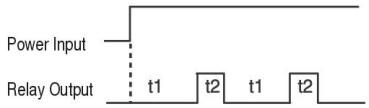
| Photo | Description | Pkg. Qty. | Cat. No. |
|---|---|---|---|
|  | **Screw Terminal Tube Base Socket — Panel or DIN Rail Mounting; Guarded Terminal Construction.** 8-Pin for use with DPDT 700-HA Relays, -HX Digital Timing Relays, -HT (On-Delay) and -HRM, -NRC and -HV (Repeat Cycle) Timing Relays. Order ten or multiples of ten | 10 | 700-HN100 |
|  | **DIN (#3) symmetrical hat rail**<br>35 x 7.5 x 1 m | 10 | 199-DR1 |
|  | **Screw Terminal Tube Base Socket — Panel or DIN Rail Mounting; Open Style Construction.** 8-Pin for use with DPDT 700-HA Relays, -HT (On-Delay) and -HRM, -HRC and -HV (Repeat Cycle) Timing Relays. Order must be for 10 sockets or multiples of 10. No retainer clip required. | 10 | 700-HN125 |
|  | **Pre-Printed Identification Tags —** contains 10 sheets of pre-printed and blank tags. Each sheet contains 13 sets of the markings CR…9CR, TR…9TR, M…9M, F, R, 1S, and 117 blank tags. Tags are peel-off with sticky backing for easy placement on relays. | 10 | 700-N40 |
| | **Blank Identification Tags —** contains 10 sheets of blank identification tags for customer specialized printing. Each sheet contains 546 blank tags. Tags are peel-off with sticky backing for easy placement on relays. | 10 | 700-N41 |

## Specifications - 700-HV Relays

| | | | Cat. No. 700-HV… | | |
|---|---|---|---|---|---|
| **Electrical Ratings** | | | | | |
| Pilot Duty Rating‡ | | | NEMA B300 | | |
| 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 | 1/2 N.O. 1/3 N.C. |
| | | 240V AC | 15 A | 1.5 A | 1/2 N.O. 1/3 N.C. |
| | | Resistive 28V DC | 10 A | 10 A | — |
| Permissible Coil Voltage Variation | | | 85…110 of Nominal Voltage at 50 Hz<br>85…110 of Nominal Voltage at 60 Hz<br>80…110 of Nominal Voltage at DC | | |
| Power Consumption ±10% | AC | 24V AC | 2 VA | | |
| | | 120V AC | 4 VA | | |
| | | 240V AC | 4 VA | | |
| | DC | | 1.3 W | | |
| **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 | | | $10 \times 10^6$ | | |
| Switching Frequency Operations | | | 18,000/hr | | |
| Timing | | Duty Cycle | Continuous | | |
| Repeat Accuracy (constant voltage and temperature) | | | ±2% (Time Delay: 0.1…2 s)<br>±1% (Time Delay: >2 s) | | |
| Repeat Accuracy (variable voltage and temperature) | | | ±10% | | |
| Scale Tolerance | | High End of Range | +5% | | |
| | | Low End of Range | -50% | | |
| Reset Time | | | 100 ms | | |
| **Environmental** | | | | | |
| Temperature | | Operating | –28…+65 °C (50 °C max., 240V AC coil)<br>(–18…+149 °F) (122 °F max., 240V AC coil) | | |
| | | Storage | –55…+85 °C<br>(–67…+185 °F) | | |
| Altitude | | | 2000 m (6560 ft.) | | |
| Construction | | | | | |
| Insulating Material | | | Molded High Dielectric Material | | |
| Enclosure | | | Impact Resistant Dust Cover | | |

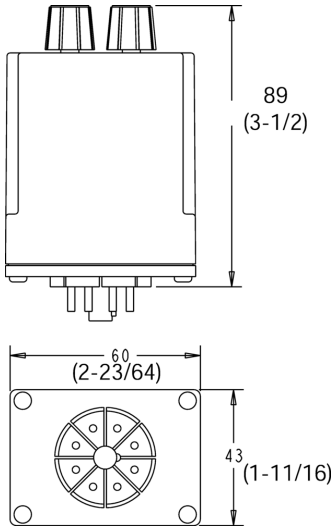
| | |
|---|---|
| Contact Material | Silver Cadmium Oxide |
| Terminal Markings on Socket | In accordance with EN50 005 |
| Sockets | 8-Pin Socket<br>Cat. No. 700-HN100, -HN125 |
| Certifications | CSA Certified, File 223833; UL Recognized, File E3125; Guide NLDX 2; cULus Listed when used with 700-HN100 and 700-HN125 sockets; CE Marked |
| Standards | EN 61812; CSA 22.2 No. 14; UL 508 |

## Timing Diagram- 700-HV Relays

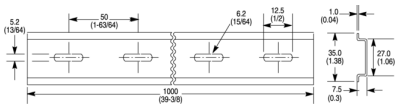



## Dimensions - 700-HV Relays

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

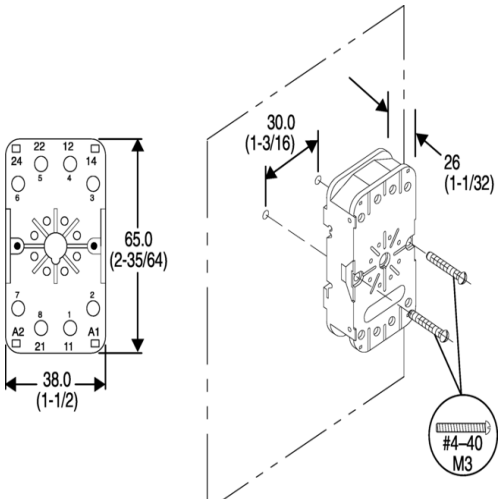



700-HV Timing Relay

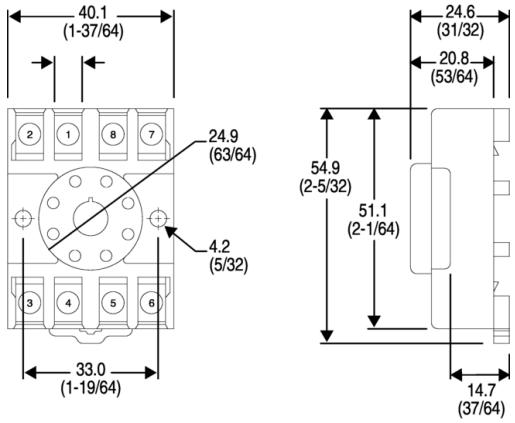


Cat. No. 199-DR1 DIN Mounting Rail Series B
Cat. No. 199-DR4 DIN Mounting Rail Series B Has No Mounting Holes

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




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




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

## 700-HX Multi-Function Digital Timing Relay




- Digital timing relay with LCD display
- Socket- or panel-mounted (NEMA 4X/IP66)
- 5A, B300, SPDT contact ratings
- 10 Functions or modes
- Environmentally friendly — flash memory, no battery

| Photo | Operating Mode | Timing Range | Socket Type | Contact Output | No. of Pins | Input Voltage | Cat. No. |
|---|---|---|---|---|---|---|---|
|  | A mode: Signal ON-Delay 1<br>A-1 mode: Signal ON-Delay 2<br>A-2 mode: Power ON-Delay 1<br>A-3 mode: Power On-Delay 2<br>B mode: Repeat Cycle 1<br>B-1 mode: Repeat Cycle 2<br>D mode: Signal OFF-delay<br>E mode: One Shot<br>F mode: Cumulative<br>Z mode: On/Off duty adjustable repeat cycle<br>S mode:stop watch<br>toff: Flicker OFF start 1<br>ton: Flicker ON start 1<br>toff-1: Flicker OFF start 2<br>ton-1: Flicker ON start 2 | 0.000…9.999 s<br>0.000…99.99 s<br>0.000…999.9 s<br>0.000…9999 s<br>0.000…99 min 59 s<br>0.000…999.9 min<br>0.000…9999 min<br>0.000…99 hr 59 min<br>0.000…999.9 hr<br>0.000…9999 hr | 700-HN100<br>700-HN125 | SPDT | 8 | 100…240V AC | 700-HX86SA17 |
| | | | | | | 24V AC<br>12…24V DC | 700-HX86SU24 |

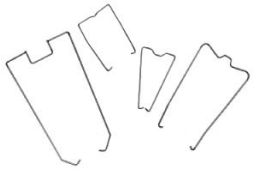
### Socket and Retainer Clip Reference

| Timer Type | Socket Cat. No. | Retainer Clip Cat. No. |
|---|---|---|
| 700-HX | 700-HN100 | 700-HN131 |
| | 700-HN108 | Not Required (1) |
| | 700-HN125 | Not Required |

(1) Design of socket holds the relay securely and does not require retainer clips.

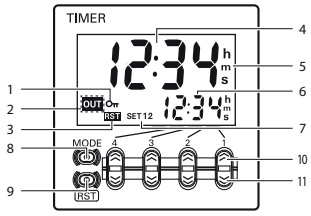
## Accessories - 700-HX Relays

| Photo | Description | Pkg. Quantity | Cat. No. |
|---|---|---|---|
|  | **Screw Terminal Tube Base Socket — Panel or DIN Rail Mounting; Guarded Terminal Construction.** 8-Pin for use with 700-HX Timing Relays. Order ten or multiples of ten | 10 | 700-HN100 |
|  | **Screw Terminal Tube Base Socket — Panel or DIN Rail Mounting; Open Style Construction.** 8-Pin for use with 700-HX Timing Relays. Order must be for 10 sockets or multiples of 10. No retainer clip required. | 10 | 700-HN125 |
|  | **DIN (#3) symmetrical hat rail**<br>35 x 7.5 x 1 m | 10 | 199-DR1 |

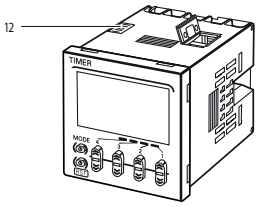
| Photo | Description | Pkg. Quantity | Cat. No. |
|---|---|---|---|
|  | **Specialty Socket**<br>8-pin backwired socket with solder terminals. For use with 700-HX Timing Relays. | 10 | 700-HN108 |
|  | **Retainer Clip for Cat. Nos. 700-HN100 Sockets with all 700-HX Timing Relays**<br>Secures timer in socket.<br><br>Note: Not required for installation | 10 | 700-HN131 |
|  | **Frame Adapter**<br>For flush or door mounting of all 700-HR and -HX timers. | 1 | 700-HN130 |
|  | **Protective Cover**<br>Helps prevent tampering of timing and mode settings. Provides a degree of protection against water and dirt from entering the front of the relay. For use with all 700-HR and -HX timing relays. | 1 | 700-HN132 |

## General Timer Functions- 700-HX Relays

| Display Section |
|---|
| **1. Key Protect Indicator** (orange) |
| **2. Control Output Indicator** (orange) |
| **3. Reset Indicator** (orange) |
| **4. Present Value Display** (Main display)<br>(Character height: 12 mm, red *)<br>* Characters on models with screw terminals can be switched between red, green, and orange. |
| **5. Time Unit Indicators**<br>(Color is same as present value display.)<br>(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)<br>(Character height: 6 mm, green) |
| **7. Set Value 1, 2 Indicator** (green) |

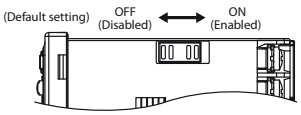



Front View

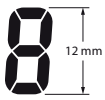



| Operation Key |
|---|
| **8. Mode Key**<br>(Changes modes and setting items) |
| **9. Reset Key**<br>(Resets present value and output) |
| **10. Up Keys 1 to 4** |
| **11. Down Keys 1 to 4** |

| Switches |
|---|
| **12. Key-protect Switch** |




Character Size for Present Value Display




Character Size for Set Value Display



## Specifications - 700-HX Relays

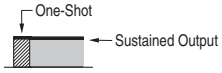
| Attribute | | 700-HX |
|---|---|---|
| **Electrical Ratings** | | |
| Pilot Duty Rating | | NEMA B300 |
| Rated supply voltage | | 100 to 240V AC, 24V AC/12 to 24V DC (50/60Hz) (permissible ripple: 20%(p-p) max.) |
| Operating voltage range | | 85…110% of rated supply voltage |
| Power consumption | 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;<br>Present value (red, 12 mm high characters);<br>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,<br>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)<br>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 (1) | | Power-ON start: +-0.01% +-50 ms max. (1)to be rated against set value<br>Signal start: +- 0.005% +-30 ms max. (1)to be rated against set value<br>Signal start at transistor output model: +- 0.005% +-3 ms max. (2)<br>If the set value is within the sensor waiting time (250 ms max.) |

(1) The values are based on the set value.
(2) The value is applied for a minimum pulse width of 1 ms.

| Attribute | | 700-HX |
|---|---|---|
| **Environmental** | | |
| Installation environment | | Setup category II, pollution degree 2 (as per IEC61010-1) |
| Ambient temperature | | -10…+55 °C (14…141 °F ), Avoid freezing or condensation |
| Ambient humidity | | 25…85 % |
| Storage temperature | | -25…+65 °C (-13…+149 °F ), Avoid freezing or condensation |
| Altitude, max | | 2,000 m |
| **Characteristics** [1] | | |
| 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 4 (indoors) [2] |
| 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 |

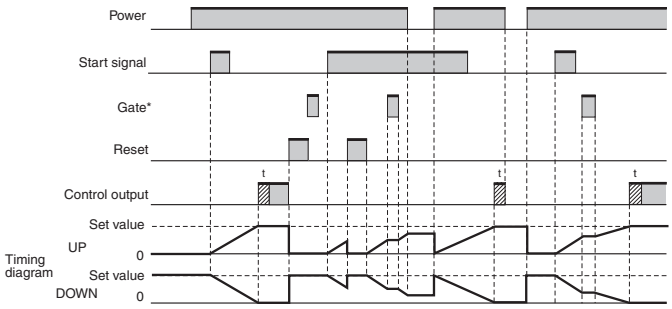
(1) More information in the 700-HX User Manual, publication 700-UM002.
(2) An attached waterproof packing is necessary to ensure IP66 waterproofing between the 700-HX and installation pan.

## *Timing Charts- 700-HX Relays*



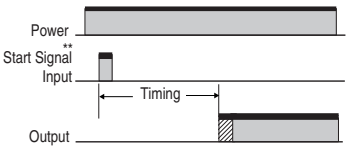

One-shot outputs can be set to 0.1s, 0.5 s, 1 s, 5 s, 10 s, or 20 s.

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



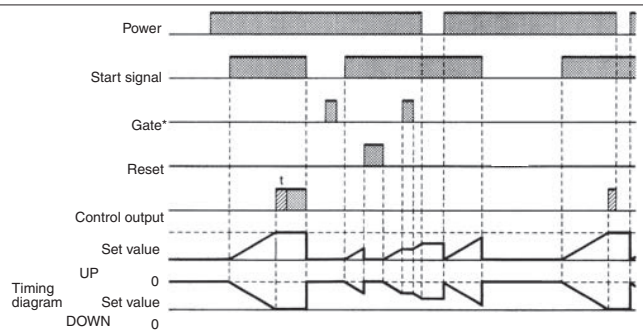

Timing starts when the start signal goes ON.
While the start signal is ON, the timer starts when power comes ON or when the reset input goes OFF.
The control output is controlled using a sustained or one-shot time period.

**Basic Operation**



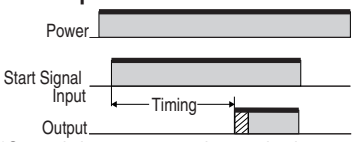

*Output is instantaneous when setting is 0.
** Start signal input is enabled during timing.

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



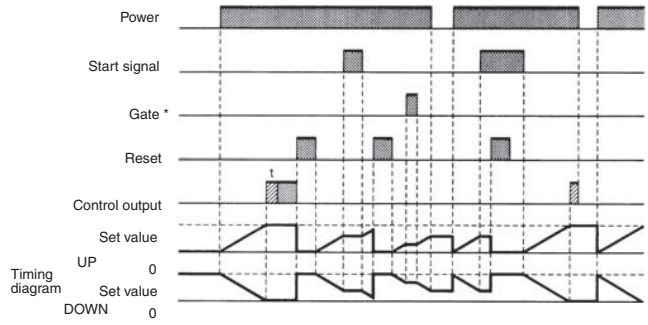

Timing starts when the reset input goes ON and is reset when the start signal goes OFF.
While the start signal is ON, the timer starts when the power comes ON or when the reset input goes OFF.
The control output is controlled using a sustained or one-shot time period.

**Basic Operation**



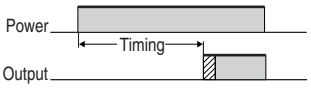

*Output is instantaneous when setting is 0.

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



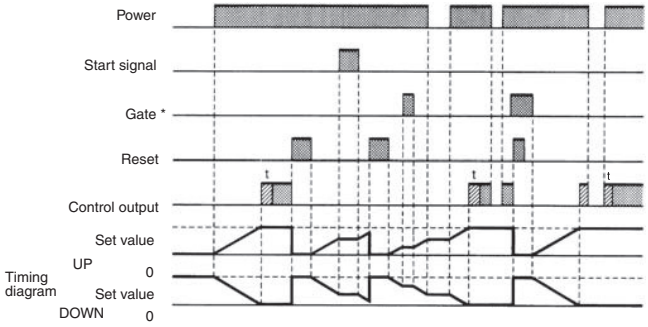

Timing starts when the reset input goes OFF.
The start signal disables the timing function (i.e., same function as the gate input).
The control output is controlled using a sustained or one-shot time period.

**Basic Operation**



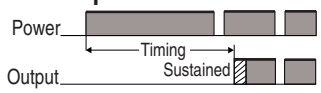

*Output is instantaneous when setting is 0.

### 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**

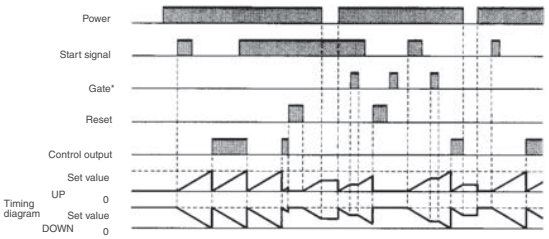



*Output is instantaneous when setting is 0.

[r] Gate not included on any mode of this relay.

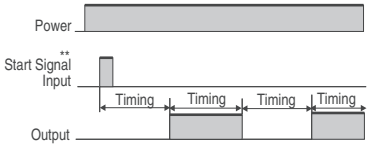
**Output Mode B: Repeat Cycle (Timer resets when power comes ON.)**

Sustained Output



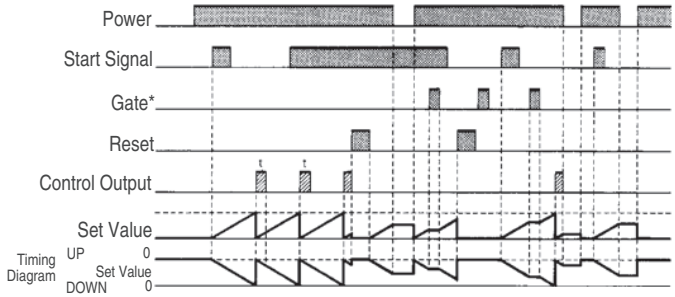

Timing starts when the start signal goes ON.
The status of the control output is reversed when time is up (OFF at start).
While the start signal is ON, the timer starts when the power comes ON or when the reset input goes OFF.

**Basic Operation**



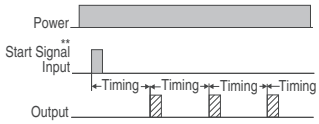

* Normal output operation will not be possible if the set time is too short.
Set the value to at least 100 ms (contact output type).
** Start signal input is disabled diring timing.

**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.

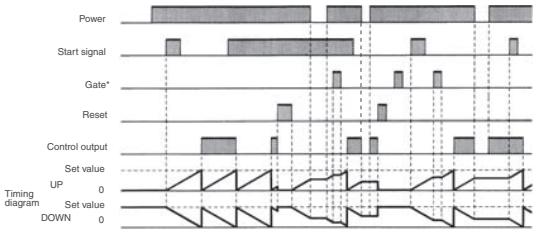
**Basic Operation**




* 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.

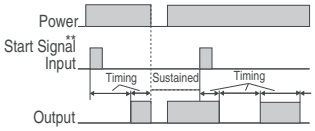
**Output Mode B-1: Repeat Cycle 2 (Timer does not reset when power comes ON)**

Sustained Output



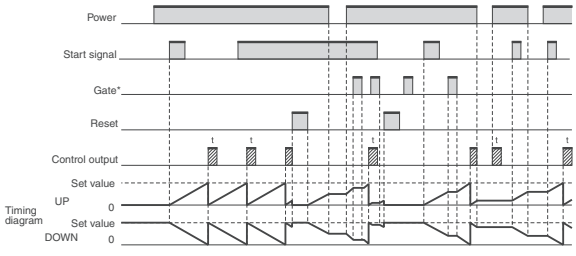

Timing starts when the start signal goes ON.
The status of the control output is reversed when time is up (OFF at the start).
While the start signal is ON, the timer starts when the power comes ON or when the rest input goes OFF.

**Basic Operation**



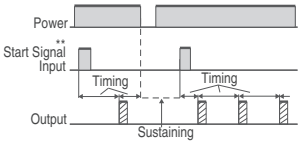

* Normal output operation will not be possible if the set time is too short
Set the value to at least 100 ms (contact output type).
** Start signal input is disabled during.

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.

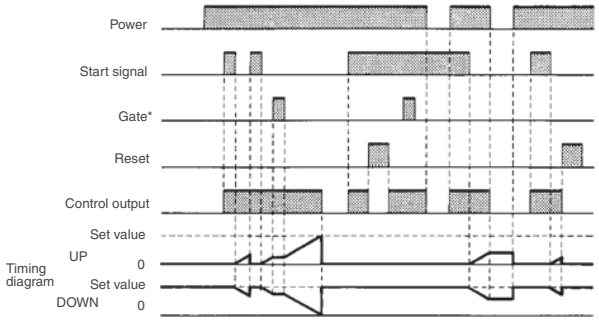
**Basic Operation**




* 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.

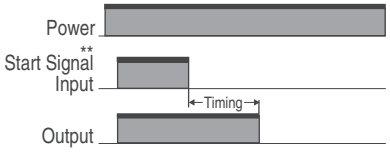
★ Gate not included on any mode of this relay.

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



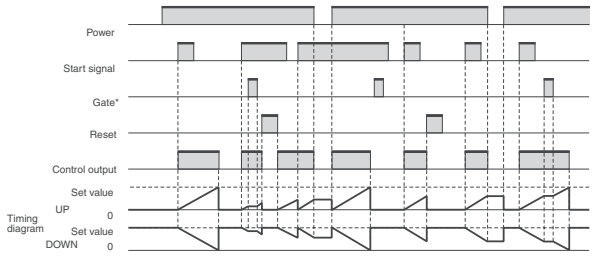

The control output is ON when the start signal is ON (except when the power is OFF or the reset is ON).
The timer is reset when the time is up.

**Basic Operation**



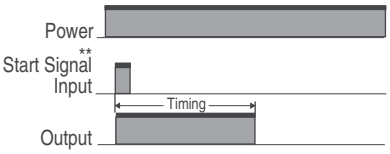

* Output functions only during start signal input when setting is 0.
** Start signal input is enabled during timing.

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



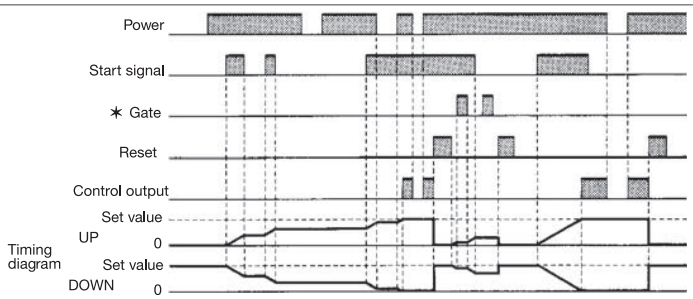

Timing starts when the start signal comes ON.
The control output is reset when time is up.
While the start signal is ON, the timer starts when power comes ON or when the reset input goes OFF.

**Basic Operation**



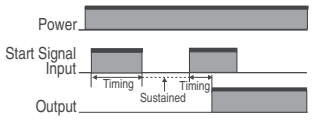

* Output is disabled when the setting is 0.
** Start signal input is enabled during timing.

**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**



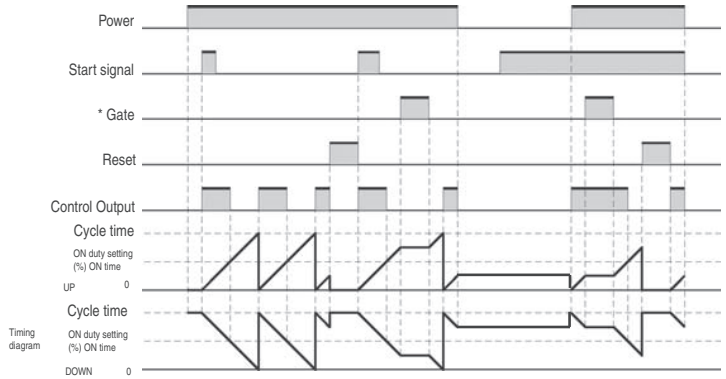

*Output is instantaneous when setting is 0.

* Gate not included on any mode of this relay.

## *Z Mode*

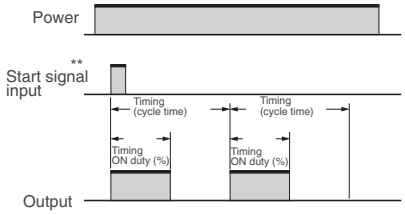
Output quantity can be adjusted by changing the cycle time set in the adjustment level to 1 and by changing the ON duty (%) set value. The set value shows the ON duty (%) and can be set to a value between 0 and 100 (%). When the cycle time is 0, the output will always be OFF. When the cycle time is not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

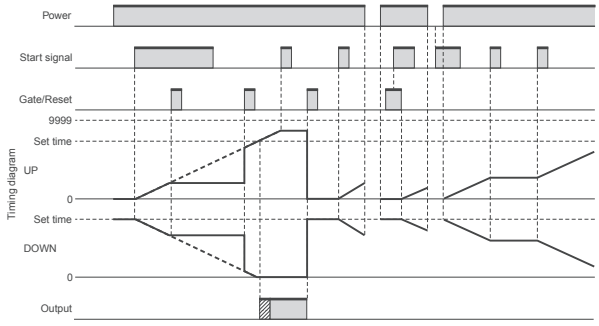
### Basic Operation




* 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).

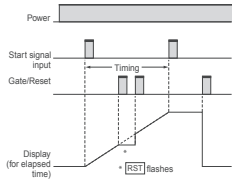
** Start signal input is enabled during timing.

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



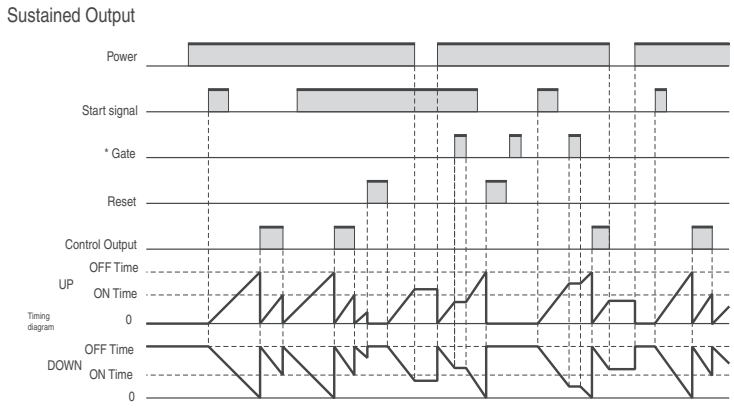

The signal starts and stops timing.
The display is held and timing is continued if the reset or gate input is received during timing operation.
The timer resets if the reset or gate input is received when the timing operation is stopped.

**Basic Operation**



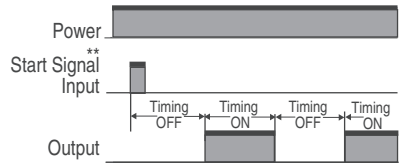

**Note:** Output is instantaneous when setting is 0.

## 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



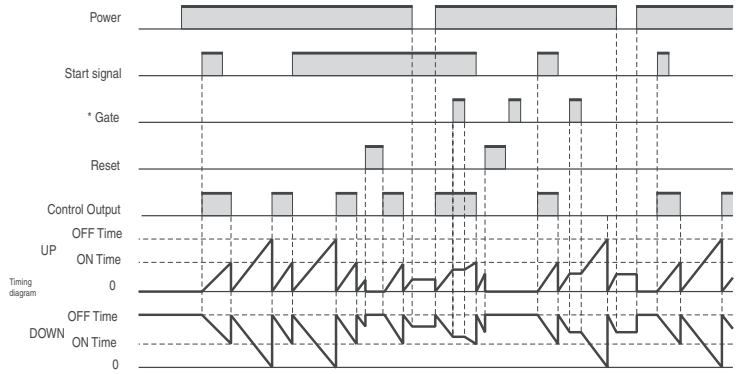

* Normal output operation will not be possible if the ON/OFF set time is too short. Set the value to at least 100 ms (contact output type).

** Start signal input is disabled during timing.

* Gate not included on any mode of this Relay.

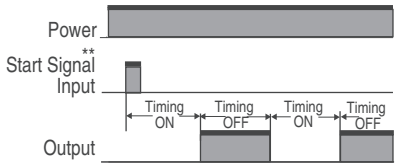
## Output Mode T ON: Twin Timer ON start

Sustained Output



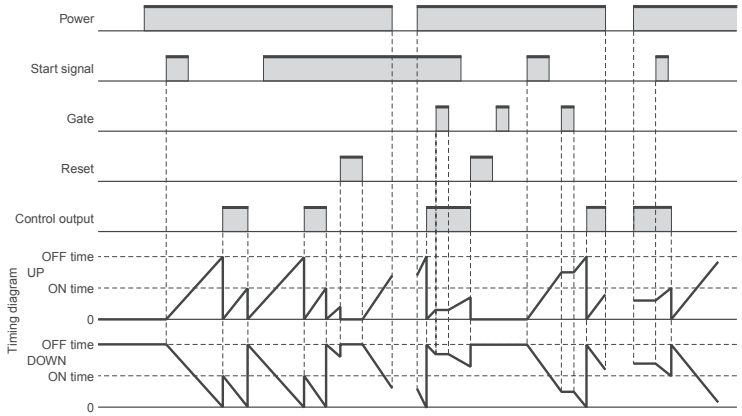

Timing starts when the start signal goes ON.
The status of the control output is reversed when time is up (ON at start).
While the start signal is ON, the timer starts when power comes ON or when the reset input goes OFF.

### Basic Operation



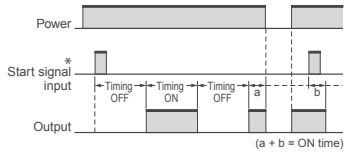

* Normal output operation will not be possible if the ON/OFF set time is too short. Set the value to at least 100 ms (contact output type).
** Start signal input is disabled during timing.

## 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.

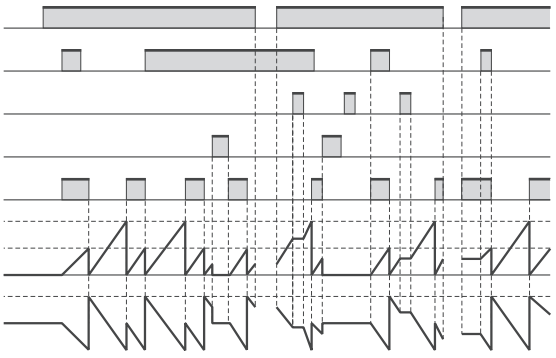
**Basic Operation**




* Start signal input is disabled during timing.

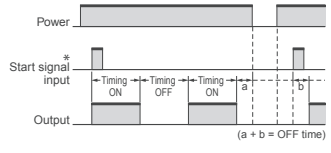
**Note:** Normal output operation will not be possible if the set time is too short.
Set the value to at least 100 ms (contact output type).

## 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**



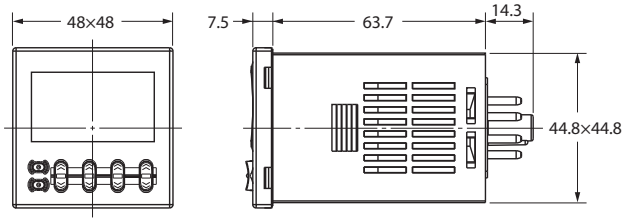

* Start signal input is disabled during timing.

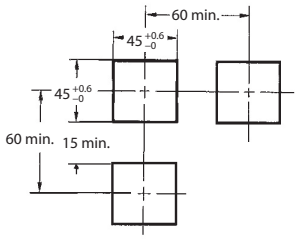
**Note:** Normal output operation will not be possible if the set time is too short.

r Gate not included on any mode of this Relay.

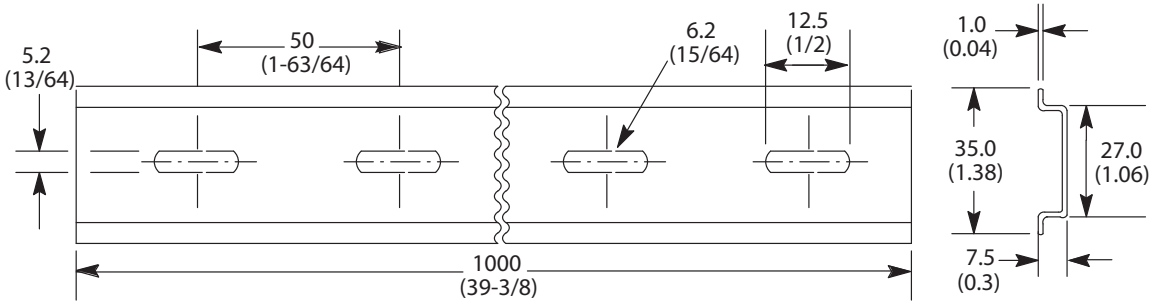
## Dimensions- 700-HX Relays

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



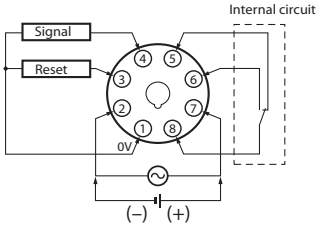




Cat. No. 700-HX…
Panel Cutout




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

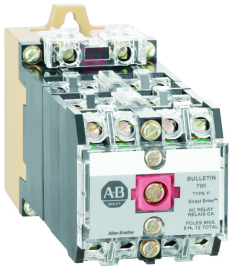
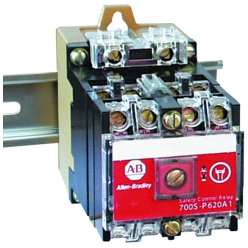
### Terminal Arrangement



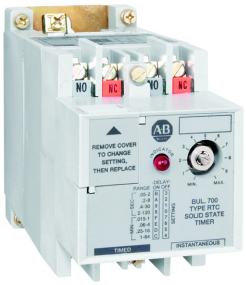

Cat. No. 700-HX…

# NEMA Industrial Relays

## Product Overview

| |  |  |  |
|---|---|---|---|
| **Bulletin No.** | **700-P** | **700S-P** | **700-N** |
| **Type** | Heavy-duty control relay | Heavy-duty control relay | Industrial Relay |
| **Features** | • Convertible contacts<br>• Up to 600V AC & DC<br>• Very long life<br>• Timer & latch options<br>• Mechanically linked | • Convertible contacts<br>• Up to 600V AC & DC<br>• Very long life<br>• Timer & latch options<br>• Mechanically linked | • Contact cartridges convertible from N.O. to N.C. and vice versa<br>• NEMA A300 AC<br>• 24…250V AC coils<br>• Pneumatic timing unit<br>• Solid-state timing unit<br>• Overlap contacts<br>• Logic reed contacts |
| **Contact Form** | 2…12 poles, double break | 2…12 poles, double break | 2- or 4-poles |
| **Contact Type** | Bifurcated double break | Bifurcated double break | — |
| **Contact Material** | Bifurcated silver nickel | Bifurcated silver nickel | Silver |
| **Electrical** | | | |
| **Max. Current AC Resistive** | 10 A | 10 A | 10 A |
| **Min. load** | 10V, 50 mA<br>1 mA, 5V with 700-CPR | 10V, 50 mA<br>1 mA, 5V with 700-CPR | — |
| **Coil Voltage** | 24…600V AC<br>6…600V DC | 24…600V AC<br>6…600V DC | — |
| **Coil Voltage Pickup** | 85…110% AC coils,<br>80…110% DC coils | 85…110% AC coils,<br>80…110% DC coils | — |
| **Dielectric Withstand** | 2640V | 2640V | — |
| **Reference** | | | |
| **Electric Service Life (cycles)** | 10 million at 10 A 120V AC | 10 million at 10 A 120V AC | — |
| **Certifications** | cULus, CE | cULus, CE | UL, CSA, CE |
| **Sockets** | DIN Rail, relay rail, or panel mount | DIN Rail, relay rail, or panel mount | — |
| **Product Selection** | 157 | 173 | 178 |

## Product Overview

| | | |
|---|---|---|
| |  |  |
| **Bulletin No.** | **700-R** | **700-RTC** |
| **Type** | Sealed Switch | **Solid-state Timing Relay** |
| **Features** | • Hazardous location ratings<br>• Long life in dirty environment<br>• Timer and latch options<br>• Switch 600V AC, 300V DC | • Timed and instantaneous contacts.<br>• Sealed contacts for harsh environments and hazardous locations. |
| **Contact Form** | 2...8 Poles | — |
| **Contact Type** | Sealed Switch | — |
| **Contact Material** | Sealed Switch | — |
| **Electrical** | | — |
| **Max. Current AC Resistive** | 5 A | — |
| **Min. load** | 1 mA, 5V | — |
| **Coil Voltage** | 24...240V AC<br>24...250V DC | — |
| **Coil Voltage Pickup** | 85...110% AC Coils<br>80...110% DC Coils | — |
| **Dielectric Withstand** | 2640V | — |
| **Reference** | | |
| **Electric Service Life (cycles)** | 1.5 million at 5 A 120V AC | — |
| **Certifications** | UL, CSA, CE | — |
| **Sockets** | Panel or rail mount | — |
| **Timing Relay Information** | | |
| **Control Outputs:**<br>**Time Limit Instantaneous** | — | Four output contacts |
| **Timing Operation Modes:** | — | On-Delay<br>Off-Delay |
| **Time Range** | — | 0.05 s…64 min |
| **Supply Voltage** | — | 24V AC<br>110…120V AC<br>220…240V AC<br>24V DC<br>120V DC<br>240V DC |
| **Product Selection** | 182 | 187 |

# 700-P Industrial Relays

## 700-P — Direct Drive™ Convertible Contact Cartridge Relays

- NEMA and IEC ratings
- 600V maximum AC/DC
- Accessories for field installation: contact cartridges, adder decks, time delay, latching, surge suppressors, mounting strip
- Contact Ratings: (10 A) 700-CP1, (20 A) 700-CPM, (35 A) 700-CPH, (Low Power) 700-CPR
- For machine tool and other heavy-duty applications
- Can accommodate ring tongue terminals
- Integral DIN Rail mount on AC relays
- Finger-safe protection standard
- Factory supplied standard at 120V AC and 24V DC - user configurable for field assembly
- Blank relays are available in all coil voltages for field custom configuration
- Contact cartridge is convertible from N.O. to N.C. by simply turning cartridge over.

The 700/700DC-P family of Direct Drive Industrial Relays offers switching solutions ranging from 200 mA in Low Energy Circuits to 35 A in Heavy Duty Circuits. All of the contacts can easily be changed from the standard N.O. to N.C. configuration. The relays can be accessorized to meet the application needs with the use of time delayed contacts, mechanical latches and NEMA enclosures. All devices are available in the most popular AC and DC control voltages. Combining different cartridges into one relay can yield a custom-tailored application solution. Relays are available without contact cartridges in all of the available AC and DC coil voltages for maximum flexibility.

700/700DC-P relays use standard (10 A) contact cartridges with a double-break and bifurcated design. Bifurcation provides excellent contact reliability and low-contact bounce, while the double-break contact design reduces the possibility of contacts welding and enhances the relay's ability to break DC circuits. These relays can be configured with a maximum of 12 contacts (only 8 may be N.C.).

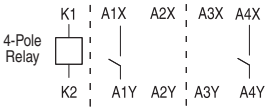
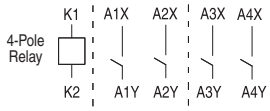
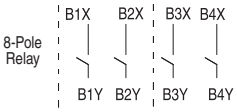
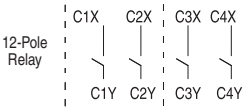
## A Modular Approach to Control Circuit Solutions

The 700-P AC control relay is factory assembled with a standard 10 A contact cartridges with all contacts as N.O.in either 2, 4, 8, or 12 pole configurations with a 120 volt operating coil. Four pole relays are also available at 240 and 480 VAC and can have up to eight contacts added by using adder decks. The 700DC-P control relay is factory assembled with a standard 10 A contact cartridges with all contacts as N.O. in either 4 or 8 poles with a 24 volt operating coil. The 4 pole is also available with a 120 VDC operating coil.

For control relays that require different contact ratings or control voltages we offer a modular design that are easily field configurable. A base blank relay (either AC or DC control), a variety of contact kits, adder decks, and operating coils can be used to make an infinite number of custom control relay solutions.

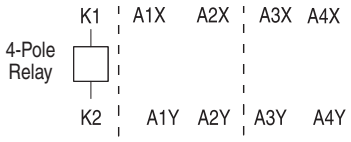
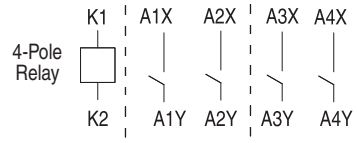
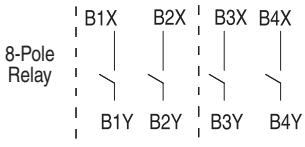
- Master Control 700-PMCKIT master control cartridges provide (20 A) switching capability with large single-contact pads on each side of the spanner for twice the current rating to control heavy loads and provide for master control of a system. The cartridge also has the same double-break design as the standard 700-P relay contact cartridge. Relays can be configured with up to a maximum of 12 contacts (only 8 may be N.C.). Time delay and latching attachments are compatible with master cartridges.
- Heavy Duty Control 700-PHDKIT contact cartridges provide (35 A) switching capability through tandem contact cartridges. A jumper allows two (20 A) master contact cartridges to be connected in parallel. A maximum of six poles can be configured in a relay, only four of which can be normally closed. Time delay and latch attachments are available.
- Low Energy Control Logic Reed 700-PLRKIT contact cartridges provide switching to 200 mA @ 30 VDC. These contacts are matched with standard control (10 A) contact cartridges for low energy switching applications.
- Overlapping Contact 700-POLKIT contact cartridges provide (10 A) switching capabilities with the same rating as the standard contact. These cartridge used in pairs operate with the N.O. contact closing before the N.C. contact opens on pick-up and vice versa on the drop-out.

## AC-Operated Relays - In-stock Contact Configurations

| Photo | Contacts | Contact Arrangement and Markings | Open Type, DIN Rail, or Relay Rail Mount (700-MP) | | |
|---|---|---|---|---|---|
| | N.O.(1) | | 120V AC | 240V AC | 480V AC |
|  | 0 |   | 700-P000A1 | — | — |
| | 2 |   | 700-P200A1 | — | — |
| | 4 |   | 700-P400A1 | 700-P400A2 | 700-P400A4 |
| | 8 |   | 700-P800A1 | — | — |
| | 12 |   | 700-P1200A1 | — | — |

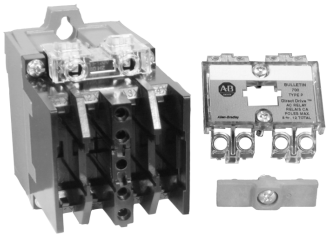
(1) Factory assembled N.O. contacts can be easily to N.C. in the field.

## DC-Operated Relays - In-stock Contact Configurations

| Photo | Contacts | Contact Arrangement and Markings | Open Type Relay Rail Mount (2) | |
|---|---|---|---|---|
| | N.O. (1) | | 24V DC | 120V DC |
| | | | Cat. No. | Cat. No. |
|  | 0 |   | 700DC-P000Z24 | — |
| | 4 |   | 700DC-P400Z24 | 700DC-P400Z1 |
| | 8 |   | 700DC-P800Z24 | — |

(1) Factory assembled N.O. contacts can be easily to N.C. in the field.
(2) For DIN Rail mounting, order Cat. No. 700-DRA.

## Base Blank Relay - Factory Assembled

| Photo | Type of Control Circuit | Cat. No. |
|---|---|---|
|  | AC | 700-P000⊗ |
| | DC | 700DC-P000⊗ |

## ⊗ AC Coil Voltage Code

| Hz | 24 | 110 | 115-120 | 200-208 | 230-240 | 277 | 460-480 | 575-600 |
|---|---|---|---|---|---|---|---|---|
| **50** | — | A1 | — | — | — | — | — | — |
| **60** | A24 | — | A1 | A20 | A2 | A27 | A4 | A6 |

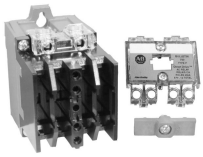
## ⊗ DC Coil Voltage Code

| 24 | 48 | 72 | 115-125 | 230-250 | 575-600 |
|---|---|---|---|---|---|
| Z24 | Z48 | Z72 | Z1 | Z2 | Z6 |

## Master (20 A) and Heavy Duty (35 A) Contact Cartridge Options

Follow this process to order a relay that utilizes: 20 A master contact cartridges or 35 A heavy duty contact cartridges.

**Base Blank Relay + Cartridge Kit + Adder Decks + Coil**

| Base Blank Relay | Type of Control Circuit | Cat. No. |
|---|---|---|
|  | AC | 700-P000A1 |
| | DC | 700DC-P000Z24 |

**+**

**Contact Cartridge Kits**

| Photo | Description | Contents | Continuous Carrying Current [A] | Cat. No. |
|---|---|---|---|---|
|  | **Master Contact Cartridge**<br>AC Rating Twice NEMA A600<br>DC Rating NEMA N150 P600 | 4 Master Cartridges (Cat. No. 700-CPM) | 20 | 700-PMCKIT |
| | Heavy Duty Contact Kit | 4 Master Cartridges and two sets of jumper terminals, rating label (makes two 35 A poles) | 35 | 700-PHDKIT |

**+**

**Adder Decks**

**Do you have more than four circuits or more than two 35 A circuits in the relay?**

| | Device Description | Adder Decks Required Cat. No. | Additional Cartridge Kits Required |
|---|---|---|---|
|  | 8 Pole Device | 700-PB00 | 1 additional kit |
| | 12 Pole Device | 700-PB00<br>700-PC00<br>(Qty 1 of each) | 2 additional kits |

**EXAMPLE** Heavy Duty circuit (35 A) application that requires 4 circuits and 240 AC control circuit:

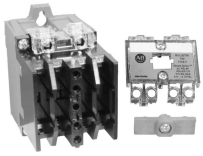
- Base Unit: Cat. No. 700-P000A1
- Cartridge Kits: Cat. No. 700-PHDKIT - Qty 2 (Each kit makes two circuits)
- Adder Deck: Cat. No. 700-PB00
- Coil: Cat. No. PA254

**IMPORTANT** If required, see Operating Coils for coil selection.

## Logic Reed and Overlapping Contact Cartridge Option

Follow this process to order a relay that utilizes: low energy contact cartridges or overlapping late make or late break cartridges.

**Base Blank Relay + Cartridge Kit + Adder Decks + Coil**

| Base Blank Relay | Type of Control Circuit | Cat. No. |
|---|---|---|
|  | AC | 700-P000A1 |
| | DC | 700DC-P000Z24 |

**+**

**Contact Cartridge Kits**

| Photo | Description | Contents | Continuous Carrying Current [A] | Cat. No. |
|---|---|---|---|---|
|  | **Logic Reed Cartridge for Low Energy Circuits**<br>150V AC 500 mA 25 VA Max. 30V DC 200 mA 6W Max. | 2 Logic Reed Cartridges (Cat. No. 700-CPR) | 500 mA 150V AC<br>200 mA 30V DC | 700-PLRKIT |
| | | 2 Standard Cartridges (Cat. No. 700-CP1) | 10 | |
| | **Overlap Contact Cartridges**<br>**Overlapping**<br>Used in pairs. N.O. contact closes before N.C. contact opens on pick-up and vice versa on drop-out. | 4 Overlapping Cartridges (Cat. No. 700-CP11Z) | 10 | 700-POLKIT |

**+**

**Adder Decks**

**Do you have more than four circuits or more than two 35 A circuits in the relay?**

| | Device Description | Adder Decks Required Cat. No. | Additional Cartridge Kits Required |
|---|---|---|---|
|  | 8 Pole Device | 700-PB00 | 1 additional kit |
| | 12 Pole Device | 700-PB00<br>700-PC00<br>(Qty 1 of each) | 2 additional kits |

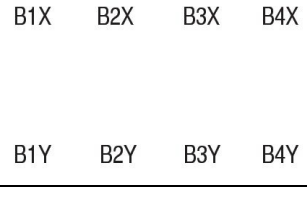
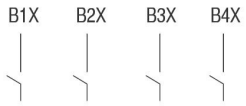
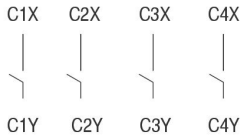
**EXAMPLE** Logic Reed and Overlapping Contact Cartridge Option:

- Low Voltage Circuit 24V DC less than 200 mA
- Base Unit: Cat. No. 700-P000A1
- Cartridge Kits: Cat. No. 700-PLRKIT - Qty 1
- Coil: Cat. No. PA254

**IMPORTANT** If required, see Operating Coils for coil selection.

## Accessories - 700-P Relays

### Adder Decks

| Photo | Description | No. of N.O. Contacts | Continuous Carrying Current [A] | Arrangement | Cat. No. |
|---|---|---|---|---|---|
|  | Second Deck (0-pole) | 0 | — |  | 700-PB00 |
| | Second Deck (4-pole) | 4 | 10 |  | 700-PB40 |
|  | Third Deck (0-pole) | 0 | 0 |  | 700-PC00 |
| | Third Deck (4-pole) | 4 | 10 |  | 700-PC40 |

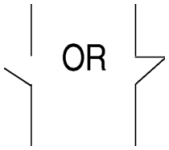
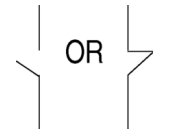
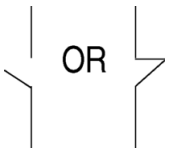
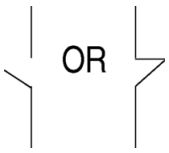
## Operating Coils

### Bulletin 700-P Relays — Bulletin 700-PLL-PKLL Mechanical Latch Attachments

| | Coil Volts[2] | Bulletin 700-P, 2…12-pole, AC control | | Bulletin 700-PLL–PKLL AC Mechanical Latch Attachment | | | Bulletin 700DC-P 2…12-pole, DC control |
|---|---|---|---|---|---|---|---|
| | | 60 Hz | 50 Hz | 60 Hz | 50 Hz | DC | — |
|  | 24 | PA013 | PA407 | PL013 | PL407 | PM714 | PD714 |
| | 48 | — | — | — | — | PM724 | PD724 |
| | 72 | — | — | — | — | PM730 | PD730 |
| | 110 [3] | — | PA236 | — | PL236 | — | PD733 (100…110) |
| | 115…120[3] | PA236 | — | PL236 | — | — | — |
| **110…115[1] Bulletin 700-P Operating Coil** | — | PA322 | — | PL322 | — | — | |
| | 115…125 | — | — | — | — | PM735 | PD735 |
| | 120§ | PA322 | — | PL322 | — | — | — |
| | 130…140 | — | — | — | — | — | — |
|  | 200…208 | PA249 | — | — | — | — | — |
| | 220…230 | PA251 | PA339 | — | — | — | — |
| | 230…240 | PA254 | PA342 | PL254 | — | — | — |
| | 230…250 | — | — | — | — | PM748 | PD748 |
| | 277 | PA260 | — | — | — | — | — |
| | 380 | — | PA354 | — | — | — | — |
| | 415 | — | PA357 | — | — | — | — |
| | 440…460 | — | PA360 | — | — | — | — |
| **Bulletin 700-PL Unlatch Coil and Magnet Assembly** | 460…480 | PA273 | — | — | — | — | — |
| | 500 | — | — | — | — | — | — |
| | 575…600 | PA278 | — | — | — | — | PD758 |

(1) This coil is optimized for 110…115V, 50 Hz applications and will operate satisfactorily at 120V, 60 Hz.
(2) Coils for AC relays cannot be used in DC relays and vice versa.
(3) This coil is optimized for 115…120V, 60 Hz applications and will operate satisfactorily at 110V, 50 Hz.

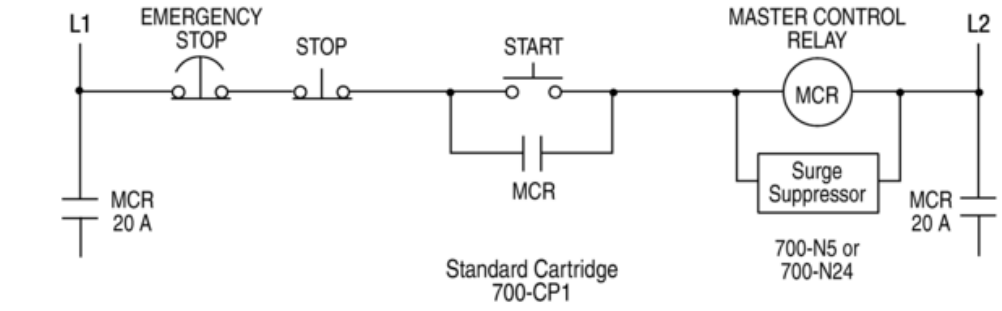
**Contact Cartridges (Convertible from N.O. to N.C. and N.C. to N.O.)**

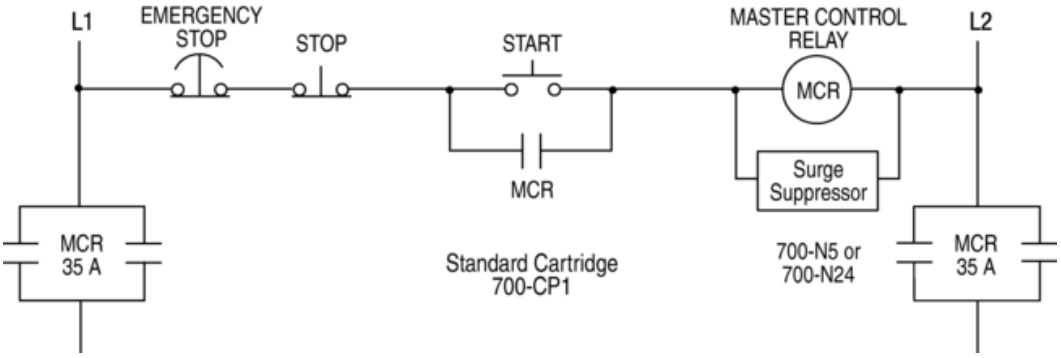
| Photo | Description | | Continuous Carrying Current [A] | Arrangement | Pkg. Quantity | Cat. No. |
|---|---|---|---|---|---|---|
|  | **Standard Contact Cartridge**<br>AC Rating NEMA A600<br>DC Rating NEMA P600 | | 10 |  | 1 | 700-CP1 |
| | **Overlap Contact Cartridges**<br>Overlapping<br>Used in pairs. N.O. contact closes before N.C. contact opens on pick-up and vice versa on drop-out. (1) | AC Rating<br>NEMA A600 | 10 |  | 2 | 700-CP11Z |
| | | DC Rating<br>NEMA P150<br>125V DC, 138 VA<br>Make and Break | 5 | | | |
|  | **Master Contact Cartridge**<br>AC Rating Twice NEMA A600<br>DC Rating NEMA N150 P600 | | 20 |  | 1 | 700-CPM |
|  | **Logic Reed Cartridge for Low Energy Circuits**<br>150V AC 500 mA 25 VA Max.<br>30V DC 200 mA<br>6W Max. (2) | Maximum<br>150V AC | 500 mA |  | 1 | 700-CPR |
| | | Maximum<br>30V DC | 200 mA | | | |

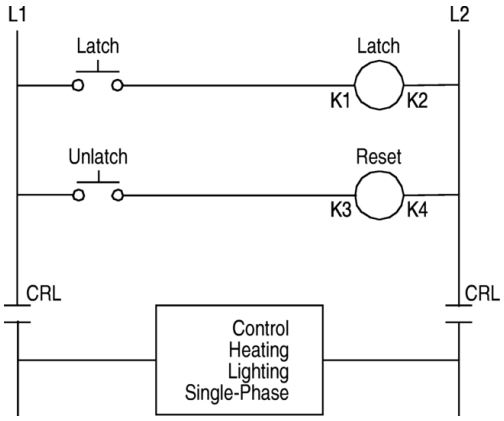
(1) Not Direct Drive.

(2) The 700-CPR Logic Reed cartridge must be installed only in the 2nd deck (B1X - B4X, B1Y - B4Y position) or 3rd deck (C1X - C4X, C1Y - C4Y position) of the Bulletin 700 Type P relay. It is not recommended that the 700-CPR cartridge be installed in the single deck (A1X - A4X, A1Y - A4Y position) because this may lead to improper operation.

**Electrically Held Relays — Typical Wiring Diagrams**

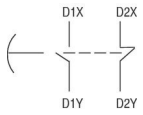


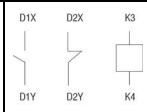
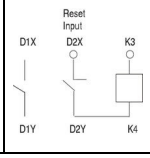
## Pneumatic Time-Delay Unit

- Timing Range — 0.1...60 s
- 0, 2, or 4 instantaneous contacts
- Two timed contacts — both ON Delay or both OFF Delay
- Convertible from ON Delay to OFF Delay and vice versa
- Standard contact cartridges rated NEMA A600 (AC) and P600 (DC)
- Master contact cartridges rated 2X NEMA A600 (AC) and N150 P600 (DC)

| Photo | Operating Mode | No. of Timed Contacts (1) | | Continuous Carrying Current [A] | Arrangement | Timing Range | Open Type Without Enclosure(2) |
|---|---|---|---|---|---|---|---|
| | | N.O. | N.C. | | | | Cat. No. |
|  | On-Delay<br>Off-Delay | 1 | 1 | 10 |  | 0.1…60 s | 700-PT |
| | | | | 20 | | | 700-PKT |

(1) In addition to instantaneous cartridges on the relay
(2) Mounts on 4-pole Bulletin 700-P or -PK relay or 2-pole Bulletin 700-PH relay.

### Mechanical Latch Units

| Photo | Description | Arrangement | Continuous Carrying Current [A] | Cat. No. |
|---|---|---|---|---|
|  | AC-Operated Latch Units |  | No cartridge | 700-PLL⊗ |
| | | | 10 | 700-PLL11⊗ |
| | | | 20 | 700-PKLL11⊗ |
| | DC-Operated Latch Units |  | No cartridge | 700DC-PLL⊗ |
| | | | 10 | 700DC-PLL10⊗ |
| | | | 20 | 700DC-PKLL10⊗ |

### ⊗ AC Coil Voltage Code

The Cat. No. as listed is incomplete. Select a voltage suffix code from the table below to complete the Cat. No. Example: Cat. No. 700-PLL⊗ becomes Cat. No. 700-PLLA1.

| Hz | 24 | 110 | 110-115 | 115-120 | 120 | 200-208 | 220-230 | 230-240 | 277 | 347 | 380 | 415 | 440-480 | 460-480 | 500 | 575-600 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50 | B24 | A1 (1) | B11 (2) | — | — | — | — | — | — | — | — | — | — | — | — | — |
| 60 | A24 | — | — | A1 (1) | B11(2) | — | — | A2 | — | — | — | — | — | — | — | — |

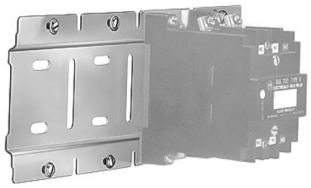
(1) Optimized for 115…120V, 60 Hz. Operates satisfactorily at 110V, 50 Hz.
(2) Optimized for 110…115V, 50 Hz. Operates satisfactorily at 120V, 60 Hz.

### ⊗ DC Coil Voltage Code

The Cat. No. as listed is incomplete. Select a voltage suffix code from the table below to complete the Cat. No. Example: Cat. No. 700DC-PLL⊗ becomes Cat. No. 700DC-PLLZ24.

| 24 | 48 | 64 | 72 | 115-125 | 230-250 | 575-600 |
|---|---|---|---|---|---|---|
| Z24 | Z48 | — | Z72 | Z1 | Z2 | Z6 |

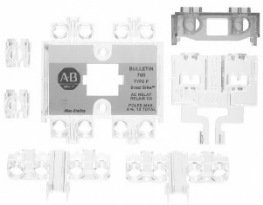
## Accessories

| Photo | Description | Relays per Strip | Pkg. Quantity | Cat. No. |
|---|---|---|---|---|
|  | **Relay Rail**<br>Simplifies panel layout. These indexed strips are easily cut to the required length and bolted, riveted, or spot-welded in place. Relays are installed adjacent to one another on the mounting strip with the captive mounting screws provided. Rows of relays on Relay Rail form their own wiring trough.<br>Can be used with the following relays: 700P, 700DC-P, 700S-P, 700N, 700-R, 700-RTC | 4 | 5 | 700-MP4 |
| | | 8 | 5 | 700-MP8 |
| | | 12 | 5 | 700-MP12 |
| | | 16 | 5 | 700-MP16 |
|  | **DIN Rail Adapter**<br>Can be used with the following relays:<br>Bulletin 700-P, 700DC-P, 700S-P, 700-N, 700-R, 700-RTC | | 1 | 700-DRA |
|  | **DIN (#3) symmetrical hat rail**<br>35 x 7.5 x 1 m | | 10 | 199-DR1 |
|  | **Type 1 Enclosure** — Use for all Bulletin 700-P relays except 10- and 12-pole DC relays or 6-pole DC Bulletin 700-PH relays. | | 1 | 700-N31 |
| | **Type 4/4X Enclosure** — For 2- and 4-pole Bulletin 700-P, -N, and -R relays and 2-pole heavy duty relays. | | 1 | 700-N39 |
| | **Type 7 & 9 Enclosure** — For 2- and 4-pole Bulletin 700-P, -N, and -R relays and 2-pole heavy duty relays. 1 conduit hub; top and bottom. | | 1 | 700-N33 |

## Accessories

| Photo | Description | | Pkg. Quantity | Cat. No. |
|---|---|---|---|---|
|  | **Surge Suppressors (RC Circuit) —** Surge suppressors reduce the high transient voltages generated when the coil circuit is opened. These suppressors can be used with Bulletin 700-P, -PH, -PK, and -N relays, and other electromechanical devices. They contain a resistor and capacitor. Maximum ratings: 150V, AC or DC, 35 VA. Cat. No. 700-N5 requires 1 in. additional depth of enclosure. | Mounting behind relay | 1 | 700-N5 |
|  | | Mounting on coil terminal | 1 | 700-N24 |
|  | **Surge Suppressor**<br>When the circuit to a DC operating coil is opened, the inductive energy stored in the coil can generate very high transient voltages. With the addition of the appropriate surge suppressor, the stored energy is absorbed and dissipated limiting the voltage spikes. A surge suppressor is not required with AC 700-R or -RM relays because the AC operating coil transients are suppressed by a full wave rectifier connected to the coil. | 24…48V AC/DC | 1 | 199-FSMA9 |
| | | 50…120V AC/DC | 1 | 199-FSMA10 |
| | | 130…250V AC/DC | 1 | 199-FSMA11 |
| | **Diode Surge Suppressor** — for 6…300V DC voltage coils. Used on Bulletin 700-P, -PH, -PK, -N, -F, and -R relays. | | 1 | 199-FSMZ-1 |
|  | **35 A Jumper Kit –** CSA Approved, UL Listed<br>This 35 A Jumper Kit can be used with any Bulletin 700-P and -PK AC or DC relay, Time-Delay relay or Latch Unit equipped with 20 A Master Cartridges. It does not require any additional panel space.<br>Jumper Kit terminals are designed for one #8 AWG wire or two #10 AWG wires. When connecting the two 20 A Master Cartridges in parallel, it is important that they be the same configuration (Normally Open or Normally Closed).<br>Jumpers can be added to any contact cartridge location on a relay except the two center poles because of the wide spacing. An adhesive label is included with each kit listing the contact ratings. | | 1 | 700-CPH |
|  | **Jumpers** (Not applicable for Bulletin 700-PH or -PK relays) – For connection between a middle pole and an outer pole on the left or right side of the relay. | **Jumper** – For outer poles | 50 | 700-N3 |
| **Cat. No. 700-N3** **Cat. No. 700-N4** | **Jumpers** (Not applicable for Bulletin 700-PH or -PK relays) – For connection between two middle poles. | **Jumper** – For middle poles | | 700-N4 |
|  | **Check Out Tool —** Mechanically maintains the Bulletin 700-P, -PH, or -PK relay in the energized position for troubleshooting purposes. | | 1 | 700-N23 |
| | **Adapter Plate —** Simplified relay conversion. Allows you to use the existing mounting holes when you replace a Bulletin 700-B, -BR, -BX, or -D relay with a Bulletin 700-P, -PH, or -PK relay. | | | 700-N34 |

## IP 2X Finger-Safe Cover Accessories

| Photo | Description | Pkg. Quantity | Cat. No. |
|---|---|---|---|
|  | **Top Covers (Covering Top Level Contact Screws)** | | |
| | IP2X Top Cover for 700-P | 1 | 700-PFSC |
| | Timer Top Cover Kit | 1 | 700-PFSTC |
| | Latch Top Cover Kit (for Relays with Mechanical Latch Attachment) | 1 | 700-PFSLCK |
| | Timer Top Cover Kit, (for Master Cont. Relays with Pneumatic Timer) | 1 | 700-PFSKTC |
| | Latch Top Cover Kit (for Master Cont. Relays with Mechanical Latch) | 1 | 700-PFSKLCK |
| | **Deck Covers (Covering all terminals not on top deck, only for multi-deck relays)** | | |
| | IP2X Deck Cover for all AC & DC Relays in the 700P Range | 1 | 700-PFSDEK |
| | **Coil Covers** | | |
| | IP2X Coil Cover for all AC Relays in the 700P Range | 1 | 700-PFSACC |
| | IP2X Coil Cover for all DC Relays in the 700P Range | 1 | 700-PFSDCC |

## Specifications - 700-P Relays

| Type | | | Standard Cartridge | | | | | | Master Cartridge | | | | | | Heavy duty | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Bulletin No.** | | | **700-P** | | | | | | **700-PMCKIT** | | | | | | **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.<br>2 Hp @ 240V AC - N.O./N.C.<br>1 Hp @ 120V AC - N.O./N.C.<br>20 A Resistive Heating to 600V AC<br>20 A Tungsten Lighting Load to 480V AC | | | | | | 5 Hp @ 240V AC - N.O.<br>3 Hp @ 240V AC - N.O./N.C.<br>2 Hp @ 120V AC - N.O./N.C.<br>35 A General Use At 0.75 PF to 600V AC<br>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 |
| | | | | | | | | | | | | | | | 480 W | 480 W | 275 W | 138 W | 135 W | 120 W |
| | | 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 | 85…115% | | | | | | 85…115% | | | | | | 85…115% | | | | | |
| **Coil Consumption** | | | 50 Hz | | | 60 Hz | | | 50 Hz | | | 60 Hz | | | 50 Hz | | | 60 Hz | | |
| | **AC** | Inrush | 132VA (2) | | | 138VA (2) | | | 132VA (2) | | | 138VA (2) | | | 132VA (2) | | | 138VA (2) | | |
| | | Sealed | 19.3VA (2) | | | 19VA (2) | | | 19.3 VA (2) | | | 19VA (2) | | | 19.3VA (2) | | | 19VA (2) | | |
| | **DC** | Inrush | 12.7VA (2) | | | | | | 12.7VA (2) | | | | | | 12.7VA (2) | | | | | |
| | | Sealed | 12.7VA (2) | | | | | | 12.7VA (2) | | | | | | 12.7VA (2) | | | | | |
| **PLL - PKLL AC Latch Unit** | | Inrush | 15VA (2) | | | 15.6VA (2) | | | 5VA (2) | | | 15.6VA (2) | | | 15VA (2) | | | 15.6VA (2) | | |
| | | Sealed | 5.4VA (2) | | | 5.5VA (2) | | | 5.4VA (2) | | | 5.5VA (2) | | | 5.4VA (2) | | | 5.5VA (2) | | |
| **PLL - PKLL DC Latch Unit** | | Unlatch | 35VA (2) | | | | | | 35VA (2) | | | | | | — | | | | | |
| | | Intermittent | 35 W (2) | | | | | | 35 W (2) | | | | | | — | | | | | |
| **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 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 | | | | | | | | | | | | | | | | | |
| **Environmental** | | | | | | | | | | | | | | | | | | | | |
| **Temperature** | **Operating (1)** | | –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) | | | | | | | | | | | | | | | | | |
| Standards Compliance | | | UL 508, CSA C22.2, No. 14, EN/IEC 60947-1, -5-1 | | | | | | | | | | | | | | | | | |
| Certifications | | | cULus Listed (File No. E14840, Guide NKCR/NKCR7), CE Marked, ABS | | | | | | | | | | | | | | | | | |

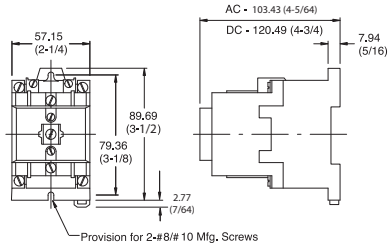
(1) Temperature inside the panel.

(2) 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.

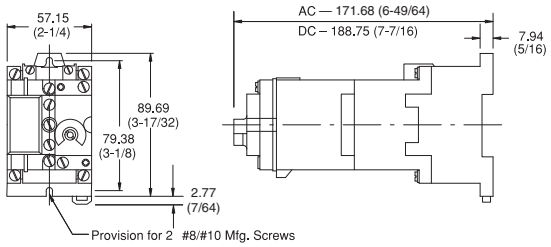
| | |
|---|---|
| International Symbol for Mechanically Linked Contacts |  |

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

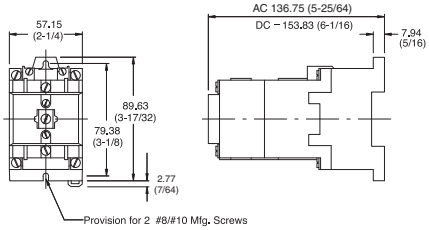
Approximate dimensions are shown in millimeters (inches). Dimensions are not intended for manufacturing purposes.



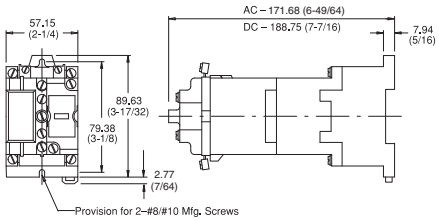

2- and 4-pole 700-P Relay
Approx Shipping Weight: AC – 0.68 kg (1.5 lb), DC – 1.34 kg (2.95 lb)



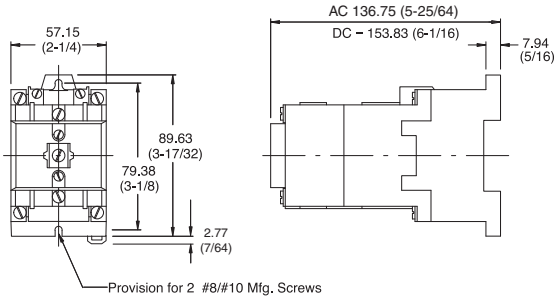

2- and 4-pole 700-P with Pneumatic Time Delay Attachment
Approx Shipping Weight: AC – 0.85 kg (1.88 lb), DC – 1.5 kg (3.33 lb)



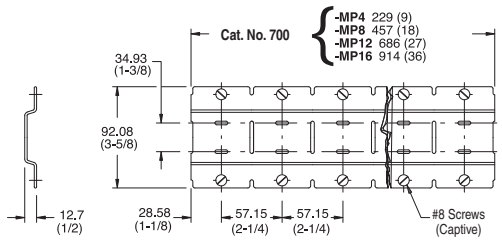

6- and 8-pole 700-P Relay with one -PB adder deck
Approx Shipping Weight: AC – 0.79 kg (1.75 lb), DC – 1.45 kg (3.20 lb)



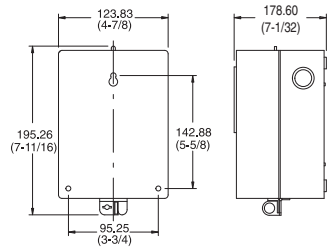

700-P Relay with Mechanical Latch Attachment
Approx Shipping Weight: AC – 0.97 kg (2.13 lb), DC – 1.62 kg (3.58 lb)



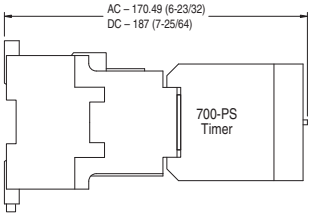

700-P Relay, up to 12 poles with -PB and -PC adder decks
Approx Shipping Weight: AC – 1.02 kg (2.25 lb), DC – 1.68 kg (3.7 lb)



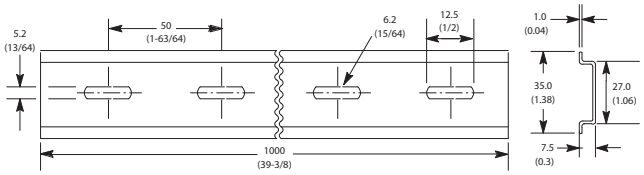

Relay Rail for 700-P, -N, -NM, -R, -RM, -RT, -RTA Relays
Secure the mounting strip with two screws at each end relay position.
Use a minimum of one screw at the 3rd, 5th, 7th, etc., relay positions.
Alternate between upper and lower horizontal slots.



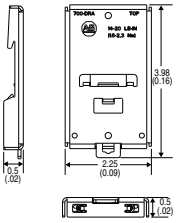

Cat. No. 700-N31, Type 1 Enclosure for
700-P, -RTC Relays
Approximate Shipping Weight: 1.26 kg (2.8 lb)




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



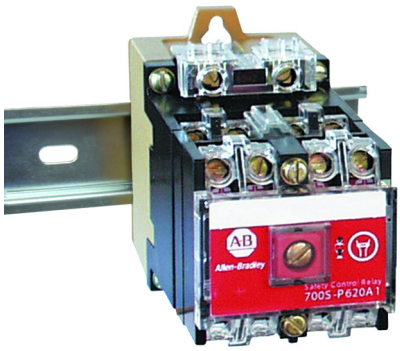

Cat. No. 199-DR1 DIN Mounting Rail Series B
Cat. No. 199-DR4 DIN Mounting Rail Series B Has No Mounting Holes



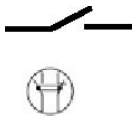

DIN Rail Adapter

## 700S-P and 700S-PK — Heavy-Duty Safety Control Relays

- Mechanically linked contacts meet IEC 947-5-1-L
- 2...12 poles – all mechanically linked
- Red cover for easy identification of safety circuits
- Tamper resistant cover helps prevent changes which could jeopardize safety
- IEC mechanically linked contacts symbol displayed on front
- Visual indication of contact state
- Ideal for use in safety circuits




### 700S-P (10 A) Safety Control Relays — AC and DC Coil Voltages

| Contacts | | AC Coils | 24V DC Coils | |
|---|---|---|---|---|
| | | Open Type Panel Mount Relay Rail Mount | Open Type Panel Mount Relay Rail Mount | Open Type DIN Rail Mount |
|  |  | | | |
| N.O. | N.C. | Cat. No. | Cat. No. | Cat. No. |
| 3 | 1 | 700S-P310⊗ | 700S-DCP310Z24 | 700S-DCP310DZ24 |
| 2 | 2 | 700S-P220⊗ | 700S-DCP220Z24 | 700S-DCP220DZ24 |
| 7 | 1 | 700S-P710⊗ | 700S-DCP710Z24 | 700S-DCP710DZ24 |
| 6 | 2 | 700S-P620⊗ | 700S-DCP620Z24 | 700S-DCP620DZ24 |
| 5 | 3 | 700S-P530⊗ | 700S-DCP530Z24 | 700S-DCP530DZ24 |
| 4 | 4 | 700S-P440⊗ | 700S-DCP440Z24 | 700S-DCP440DZ24 |
| 3 | 5 | 700S-P350⊗ | 700S-DCP350Z24 | 700S-DCP350DZ24 |
| 10 | 2 | 700S-P1020⊗ | 700S-DCP1020Z24 | 700S-DCP1020DZ24 |

### ⊗ AC Coil Voltage Code[1]

The Cat. No. as listed is incomplete. Select a coil voltage code from the table below to complete the Cat. No. Example: Cat. No. 700S-P310 becomes Cat. No. 700S-P310A1 for a 120V AC coil.

| [V] | 24 | 115-120 | 230-240 | 460-480 |
|---|---|---|---|---|
| 60 Hz | A24 | A1 | A2 | A4 |

IEC 947-5-1 Annex L has 2 requirements for a relay to meet for mechanically linked contacts:
1.) If a N.O. contact welds, all the N.C. contacts will remain open and meet a 2500V impulse test.
2.) If a N.C. contact welds, all the N.O. contacts will remain open and meet a 2500V impulse test.
700S-P and 700S-DCP relays meet these requirements including the 2500V impulse test.

The relays shown on this page are shipped from the factory with the 700-CPS safety cartridge installed and cannot be converted to N.O. or N.C. in the Field.

(1) For other coil voltages, consult your local Rockwell Automation sales office or Allen-Bradley distributor.

## 700S-PK (20 A) Safety Control Relays

| Contacts | | Coil Voltage | Cat. No. |
|---|---|---|---|
| N.O. | N.C. | | |
| 7 | 1 | 110V AC | 700S-PK710A1 |
| 6 | 2 | 110V AC | 700S-PK620A1 |
| 5 | 3 | 110V AC | 700S-PK530A1 |
| 4 | 4 | 110V AC | 700S-PK440A1 |
| 3 | 5 | 110V AC | 700S-PK350A1 |
| 10 | 2 | 110V AC | 700S-PK1020A1 |
| 3 | 1 | 110V AC | 700S-PK310A1 |
| 7 | 1 | 24V DC | 700S-DCPK710Z24 |
| 6 | 2 | 24V DC | 700S-DCPK620Z24 |
| 5 | 3 | 24V DC | 700S-DCPK530Z24 |
| 4 | 4 | 24V DC | 700S-DCPK440Z24 |
| 3 | 5 | 24V DC | 700S-DCPK350Z24 |
| 10 | 2 | 24V DC | 700S-DCPK1020Z24 |
| 3 | 1 | 24V DC | 700S-DCPK310Z24 |

## Specifications - 700S-P Relays

| Type | | 700S-P | | | | | |
|---|---|---|---|---|---|---|---|
| **Electrical** | | | | | | | |
| Contact Rating Continuous | | 10 A @ 600V AC<br>5 A @ 600V DC | | | | | |
| Ratings Make/ Break | AC | NEMA A600 | | | | | |
| | DC | NEMA P600 | | | | | |
| Minimum Contact Switching Ratings | | 10V, 50 mA | | | | | |
| DC Switching Inductive Load | 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<br>14 million operations at 1A break at 120V AC<br>6 million operations at 1A break at 24V DC | | | | | |
| Coil Voltage Range [1] | 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<br>DC – 30…50 ms | | | | | |
| | Dropout | AC – 10…20 ms<br>DC – 20…33 ms | | | | | |
| Mechanical Life | | 10 million operations | | | | | |
| **Construction** | | | | | | | |
| Contact Arrangement | | 2…12 Poles, Double Break Contacts<br>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 [2] | | -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) | | | | | |
| Standards Compliance | | UL 508, CSA C22.2, No. 14, EN/IEC 60947-1, -5-1 | | | | | |
| Certifications | | cULus Listed (File No. E14840, Guide NKCR/NKCR7), CE Marked, ABS | | | | | |

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

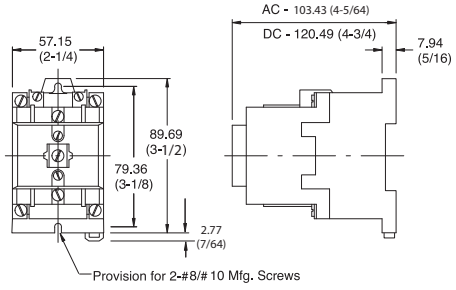
## Specifications - 700S-PK Relays

| Type | | 700S-PK | | | | | |
|---|---|---|---|---|---|---|---|
| **Electrical** | | | | | | | |
| Contact Rating Continuous | | 20 A @ 600V AC<br>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.<br>2 Hp @ 240V AC - N.O./N.C.<br>1 HP @ 120V AC - N.O./N.C.<br>20 A resistive heating to 600V AC<br>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 [1] | 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<br>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…12 Poles, Double Break Contacts N.O. or N.C. (8 N.C. Maximum) | | | | | |
| Contact Material/Design | | Silver Cadmium Oxide | | | | | |
| Mechanical (Mechanically-Linked Contacts) | | All contacts, are mechanically linked per IEC 947-5-1 Annex L for 2 to 12 poles | | | | | |
| Mounting | | Panel mount or strip mount recommended | | | | | |
| **Environmental** | | | | | | | |
| Operating Temperature [2] | | -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) | | | | | |
| Standards Compliance | | UL 508, CSA C22.2, No. 14, EN/IEC 60947-1, -5-1 | | | | | |
| Certifications | | cULus Listed (File No. E14840, Guide NKCR/NKCR7), CE Marked, ABS | | | | | |

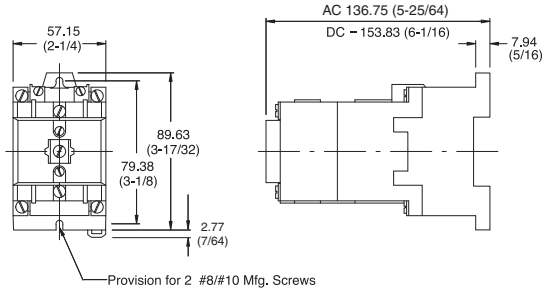
(1) Coil voltage required for proper operation (percent of rated coil voltage).
(2) Temperature inside the panel.

## Dimensions - 700S-P Relays

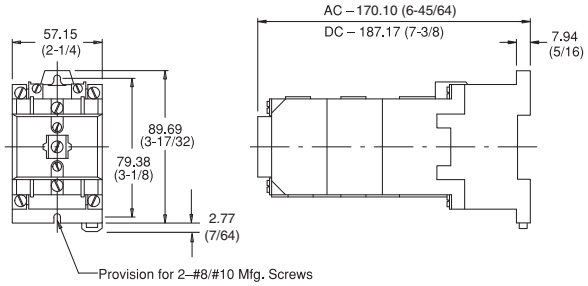
Approximate dimensions are shown in millimeters (inches). Dimensions are not intended for manufacturing purposes.



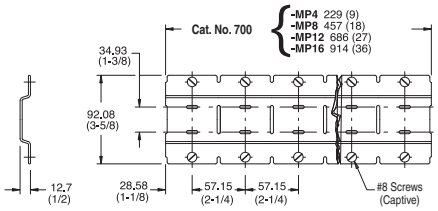

2- and 4-pole 700S-P Relay
Approximate Shipping Weight: AC – 0.68 kg (1.5 lb), DC – 1.34 kg (2.95 lb)



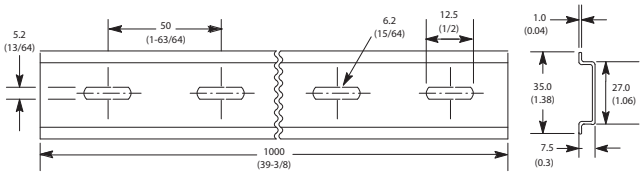

6- and 8-pole 700S-P Relay
Approximate Shipping Weight: AC – 0.79 kg (1.75 lb), DC – 1.45 kg (3.20 lb)




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




Relay Rail



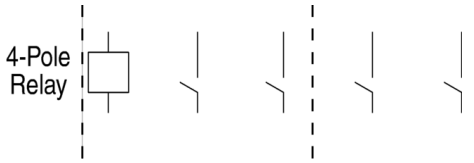
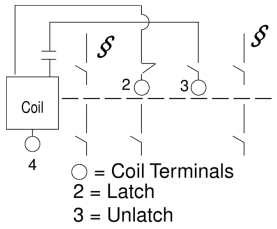

DIN Rail

## 700-N Industrial Relays



- Contact cartridges convertible from N.O. to N.C. and vice versa
- NEMA A300 AC
- 24...250V AC coils
- Pneumatic timing unit
- Solid-state timing unit
- Overlap contacts
- Logic reed contacts
- 4-...8-pole

*AC-Operated Relays*

| Photo | Contacts | | Contact Arrangement | Open Type |
|---|---|---|---|---|
| | N.O. | N.C. | | Cat. No. |
|  | 4 | — |  | 700-N400⊗ |
| **Type NM Relay 2 Poles§** | 2 | — |  | 700-NM200⊗ |

*⊗AC Coil Voltage Code*

The Cat. No. as listed is incomplete. Select a coil voltage code from the table below to complete the cat. no. Example: Cat. No. 700-N200⊗ becomes Cat. No. 700-N200A24 for 24V 60 Hz. For other coil voltages, contact your local Rockwell Automation sales office or Allen-Bradley distributor.

| [V] | 24 | 110 | 120 | 208 | 220 | 240 |
|---|---|---|---|---|---|---|
| 50 Hz | — | A1 | — | — | A2 | — |
| 60 Hz | A24 | — | A1 | A20 | — | A2 |

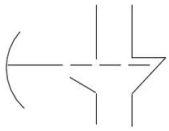
**IMPORTANT**

- NORMALLY CLOSED CONTACTS: Listed relays are supplied with all contacts normally open. These contacts can be readily converted to normally closed in the field.
- OVERLAP CONTACTS: Overlap contacts (normally open contact closes before the normally closed contact opens) can be supplied. See for information on kits for field installation of overlap contact cartridges.
- Location of contacts in 2-pole relays
- Permanent Magnet Latch AC Relay. Minimum Operating Time - Type NM - For reliable operation, power to the latch circuit must be maintained for a minimum time of 75 milliseconds and power to the unlatch circuit must be maintained for minimum time of 50 milliseconds.

## Operating Coils

| Photo | Coil Voltage | 700-N Relay • 2-…8-Pole | |
|---|---|---|---|
| | | 60 Hz | 50 Hz |
|  | 24 | 84AB27 | 84AB28 |
| | 110 | 84AB01 | 84AB86 |
| | 120 | 84AB86 | — |
| | 208 | 84AB113 | — |
| | 220 | 84AB06 | 84AB83 |
| | 240 | 84AB83 | — |

## 700-NT Pneumatic Timing Unit

| Photo | Description | Timed Contacts | | Contact Arrangement | Open Type |
|---|---|---|---|---|---|
| | | N.O. | N.C. |  | Cat. No. |
|  | **Timing Unit Only**<br>(for 700-N, 2…4-pole) | 1 | 1 | ON-Delay mode is standard. Timer is easily converted to OFF-Delay mode. | 700-NT |

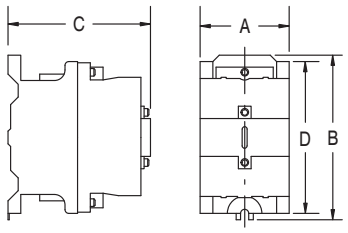
## Specifications - 700-N Relays

| Attribute | | 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) | | |
| Standards Compliance | | UL 508, CSA C22.2, No. 14 | | |
| Certifications | | cULus Listed (File No. E14840, Guide NKCR/NKCR7) | | |

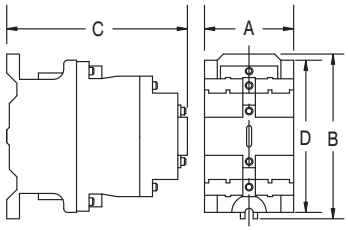
## Dimensions - 700-N Relays

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

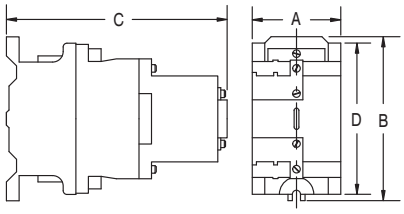
| Type of Relay | | No. of Poles | Open Type Without Enclosure | | | | | Approx. Ship. Wt. kg (lbs.) | Type 1 General Purpose Enclosure | | | | | Approx. Ship. Wt. kg (lbs.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Drawing Number | A Wide | B High | C Deep | D | | A Wide | B High | C Deep | D | E | |
| N | 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) |
| | 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 | 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 | 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) | — | — | — | — | — | — |



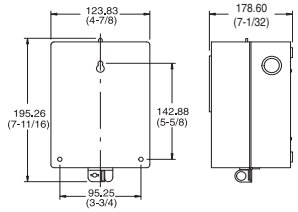

Drawing Number 1

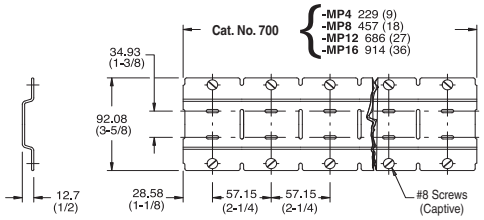


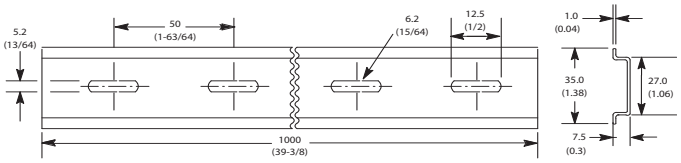

Drawing Number 2

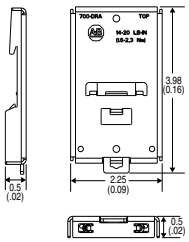



Drawing Number 3



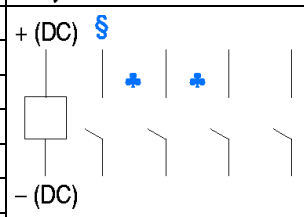
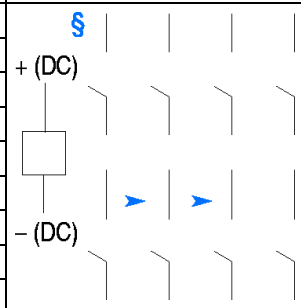




DIN Rail Adapter

## 700-R Sealed Switch Relays

- Sealed contacts
- Extremely long mechanical and electrical life
- Hazardous locations Class 1, Div 2 Groups A, B, C, D
- Harsh environments
- Suitable for applications with shock and vibration
- High reliability circuit integrity



| No. of Poles | Electrically Held | | | AC-Operated Relay Only | DC-Operated Relay Only |
|---|---|---|---|---|---|
| | Contacts | | Contact Arrangement and Markings‡ | Open Type | Open Type |
| | N.O. | N.C. | | Cat. No. | Cat. No. |
| 0 | 0 | 0 | Relay without Contact | 700-R000⊗ | 700DC-R000⊗ |
| 2 | 2 | 0 |  | 700-R200⊗ | 700DC-R200⊗ |
| | 1 | 1 | | 700-R110⊗ | 700DC-R110⊗ |
| | 0 | 2 | | 700-R020⊗ | 700DC-R020⊗ |
| 4 | 4 | 0 | | 700-R400⊗ | 700DC-R400⊗ |
| | 3 | 1 | | 700-R310⊗ | 700DC-R310⊗ |
| | 2 | 2 | | 700-R220⊗ | 700DC-R220⊗ |
| | 1 | 3 | | 700-R130⊗ | 700DC-R130⊗ |
| | 0 | 4 | | 700-R040⊗ | 700DC-R040⊗ |
| 6 | 6 | 0 |  | 700-R600 ⊗ | 700DC-R600 ⊗ |
| | 5 | 1 | | 700-R510 ⊗ | 700DC-R510 ⊗ |
| | 4 | 2 | | 700-R420 ⊗ | 700DC-R420 ⊗ |
| | 3 | 3 | | 700-R330 ⊗ | 700DC-R330 ⊗ |
| | 2 | 4 | | 700-R240 ⊗ | 700DC-R240 ⊗ |
| | 1 | 5 | | 700-R150 ⊗ | 700DC-R150 ⊗ |
| | 0 | 6 | | 700-R060 ⊗ | 700DC-R060 ⊗ |
| 8 | 8 | 0 | | 700-R800 ⊗ | 700DC-R800 ⊗ |
| | 7 | 1 | | 700-R710 ⊗ | 700DC-R710 ⊗ |
| | 6 | 2 | | 700-R620 ⊗ | 700DC-R620 ⊗ |
| | 5 | 3 | | 700-R530 ⊗ | 700DC-R530 ⊗ |
| | 4 | 4 | | 700-R440 ⊗ | 700DC-R440 ⊗ |
| | 3 | 5 | | 700-R350 ⊗ | 700DC-R350 ⊗ |
| | 2 | 6 | | 700-R260 ⊗ | 700DC-R260 ⊗ |
| | 1 | 7 | | 700-R170 ⊗ | 700DC-R170⊗ |
| | 0 | 8 | | 700-R080 ⊗ | 700DC-R080 ⊗ |

‡ Arrangement displays all N.O. contacts.
♣ Location of contacts in 6-pole relays.
Δ Polarity must be observed for DC voltage (700 DC) relays.
♦ Location of contacts in 2-pole relays.

### ⊗ Coil Voltage Code

The Cat. No. as listed is incomplete. Select a voltage code from the table below to complete the Cat. No. Example: Cat. No. 700-R000⊗ becomes Cat. No. 700-R000A24.

| Type of Relay | [V] | Coil Volts | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 24 | 48 | 110 | 115-125 | 120 | 220 | 230-250 | 240 |
| AC | 25, 50, 60 Hz | — | — | A1 | — | — | A2 | — | — |
| | | A24 | — | — | — | A1 | — | — | A2 |
| DC | — | Z24 | Z48 | — | Z1 | — | — | Z2 | — |

## Accessories - 700-R Relays

| Photo | Description | | Pkg. Qty. | Cat. No. |
|---|---|---|---|---|
|  | **Relay Rail**<br>Simplifies panel layout. These indexed strips are easily cut to the required length and bolted, riveted, or spot-welded in place. Relays are installed adjacent to one another on the mounting strip with the captive mounting screws provided. Rows of relays on Relay Rail form their own wiring trough.<br>Can be used with the following relays: 700P, 700DC-P, 700S-P, 700N, 700-R, 700-RTC | 4 Relays per Strip | 5 | 700-MP4 |
| | | 8 Relays per Strip | 5 | 700-MP8 |
| | | 12 Relays per Strip | 5 | 700-MP12 |
| | | 16 Relays per Strip | 5 | 700-MP16 |
|  | **DIN (#3) symmetrical hat rail**<br>35 x 7.5 x 1 m | | 10 | 199-DR1 |
|  | **DIN Rail Adapter**<br>Can be used with the following relays:<br>700-P, 700DC-P, 700S-P, 700-N, 700-R, 700-RTC | | 1 | 700-DRA |
|  | **Front Deck**<br>A front deck can be attached to 700 2-, 3-, or 4-pole AC and DC Type R relays. | Front Deck with one N.O. Contact Cartridge (700-R Relay) | 1 | 700-RA10 |
| | | Front Deck with one N.C. Contact Cartridge (700-R Relay) | 1 | 700-RA01 |
| | | Front Deck with one N.O. Contact Cartridge (700-RM Relay) | 1 | 700-RB10 |
| | | Front Deck with one N.C. Contact Cartridge (700-RM Relay) | 1 | 700-RB01 |
|  <br>Cat. No. 700-CR5 / Cat. No. 700-CR6 / Cat. No. 700-CR9 | **Contact Cartridges**<br>These cartridges are used to increase the number of poles of a relay. A dummy cartridge is also available to fill empty space not occupied by a contact cartridge. | N.O. Contact Cartridge - Green (700-R Relay) | 1 | 700-CR5 |
| | | N.C. Contact Cartridge - Yellow (700-R Relay) | 1 | 700-CR6 |
| |  <br>N.O. N.C. | "DUMMY" Cartridge - Black (700-R Relay) | 1 | 700-CR9 |
|  | **Surge Suppressor**<br>When the circuit to a DC operating coil is opened, the inductive energy stored in the coil can generate very high transient voltages. With the addition of the appropriate surge suppressor, the stored energy is absorbed and dissipated limiting the voltage spikes. A surge suppressor is not required with AC 700-R relays because the AC operating coil transients are suppressed by a full wave rectifier connected to the coil. | 12V DC (700-R Relay) | 1 | 199-FSMA9 |
| | | 24V DC (700-R Relay) | 1 | |
| | | 48V DC (700-R Relay) | 1 | |
| | | 115…125V DC (700-R Relay) | 1 | 199-FSMA10 |
| | | 230…250V DC (700-R Relay) | 1 | 199-FSMA11 |

## Specifications - 700-R

**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.

## 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 | 3.75 | 0.375 | 2.5 | | 5…46 | 3 A | 5 |
| | | 600V | 3.0 | 0.30 | | | | | |

## Maximum Allowable Off-State Leakage Current

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

## Relay Data

| Type | | 700-R |
|---|---|---|
| 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<br>24…250V DC |
| Coil Power | Sealed<br>Voltage Range: –15… +10% | 5.5 VA, 50/60 Hz<br>5.5 W DC |
| | Inrush | 5.5 VA, 50/60 Hz<br>5.5 W DC |
| Pickup Time | | 30 ms |
| Dropout Time | | 30 ms |
| Operating Temperature | | –40…+60 °C (–40…+140 °F) |
| Mounting | | Panel mount |
| Haz. Loc. Ratings | | Class I, Division 2, Groups A, B, C, and D |
| Standards Compliance | | ISA 12.12, CSA C22.2, No. 213, EN/IEC 60947-1, -5-1 |
| Certifications | | cULus Listed (File No. E10314, Guide NOIV/NOIV7), CE Marked |

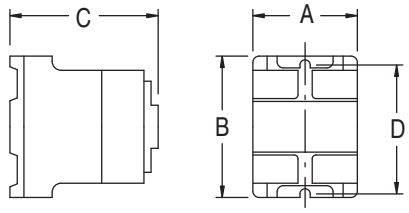
## 700-R Operating Coils

| | Coil Volts | 700-R 2-…8-Pole AC | | 700-R 2-…8-Pole DC |
|---|---|---|---|---|
| | | 60 Hz | 50 Hz | |
|  | 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 |

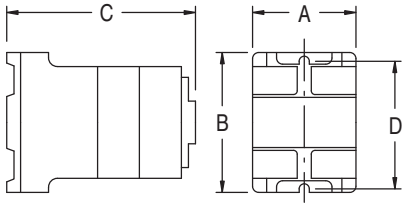
## Dimensions - 700-R

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

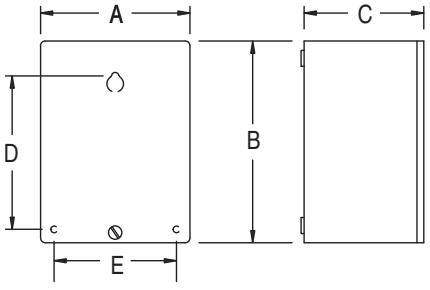
| 700-R Relays | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type of Relay | | No. of Poles | Open Type Without Enclosures | | | | | Approx. Ship Wt. [kg (lb)] | Type 1 General Purpose Enclosure | | | | | Approx. Ship Wt. [kg (lb)] |
| | | | Drawing Number | A Wide | B High | C Deep | D | | A Wide | B High | C Deep | D | E | |
| R | 700 and 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) |



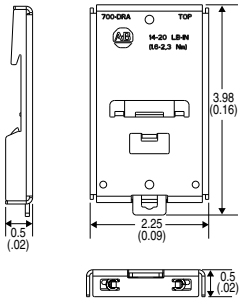

700-R400…



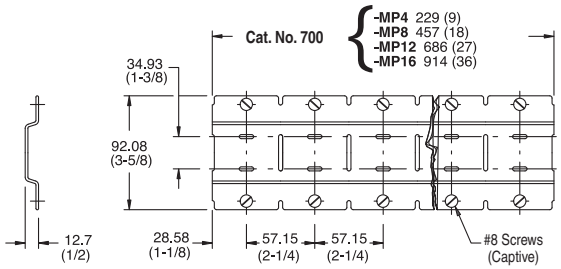

700-R800…




Type 1 Enclosure

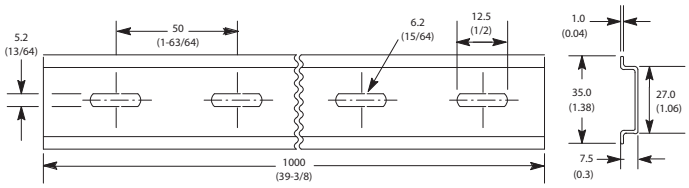



DIN Rail Adapter




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.

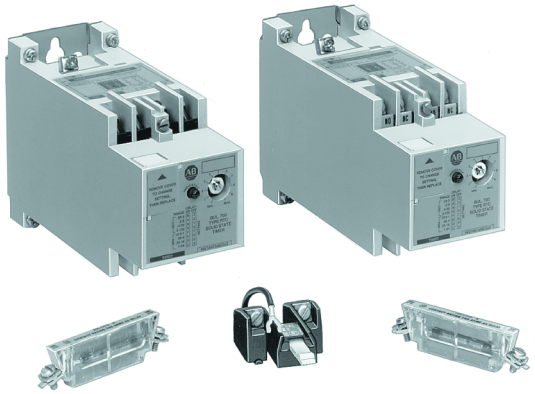
Relay Rail




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

## 700-RTC — Solid-State Timing Relay

- Timing functions
- 8 ON-delay
- 8 OFF-delay
- Timing ranges
- Seconds: 0.05...2, 0.2...8, 0.4...30, 2...120
- Minutes: 0.015...1, 0.06...4, 0.25...16 and 1...64
- AC, 50/60 Hz or DC
- 600V AC maximum
- 300V DC maximum
- Relays with fixed time delay
- Sealed contacts
- Harsh environments
- Hazardous locations Class I, Div. 2, Groups A, B, C and D



### 700-RTC Relay with Adjustable Time Delay – Relays with Provision for Instantaneous Contacts

Relays listed below have slots for two timed contacts and two instantaneous contacts. Unused slots are equipped with removable dummy cartridges.

| Number of Contact Cartridges | | | | | Open Type Without Enclosure |
|---|---|---|---|---|---|
| Total | Instantaneous | | Timed | | Cat. No. |
| | N.O. | N.C. | N.O. | N.C. | |
| 0 | 0 | 0 | 0 | 0 | 700-RTC00000⊗ |
| 1 | 0 | 0 | 1 | 0 | 700-RTC00100⊗ |
| | 0 | 0 | 0 | 1 | 700-RTC00010⊗ |
| 2 | 0 | 0 | 2 | 0 | 700-RTC00200⊗ |
| | 1 | 0 | 1 | 0 | 700-RTC10100⊗ |
| | 0 | 1 | 1 | 0 | 700-RTC01100⊗ |
| | 0 | 0 | 1 | 1 | 700-RTC00110⊗ |
| | 1 | 0 | 0 | 1 | 700-RTC10010⊗ |
| | 0 | 1 | 0 | 1 | 700-RTC01010⊗ |
| | 0 | 0 | 0 | 2 | 700-RTC00020⊗ |
| 3 | 1 | 0 | 2 | 0 | 700-RTC10200⊗ |
| | 2 | 0 | 1 | 0 | 700-RTC20100⊗ |
| | 0 | 1 | 2 | 0 | 700-RTC01200⊗ |
| | 1 | 1 | 1 | 0 | 700-RTC11100⊗ |
| | 1 | 0 | 1 | 1 | 700-RTC10110⊗ |
| | 2 | 0 | 0 | 1 | 700-RTC20010⊗ |
| | 0 | 2 | 1 | 0 | 700-RTC02100⊗ |
| | 0 | 1 | 1 | 1 | 700-RTC01110⊗ |
| | 1 | 1 | 0 | 1 | 700-RTC11010⊗ |
| | 1 | 0 | 0 | 2 | 700-RTC10020⊗ |
| | 0 | 2 | 0 | 1 | 700-RTC02010⊗ |
| | 0 | 1 | 0 | 2 | 700-RTC01020⊗ |

| Number of Contact Cartridges | | | | | Open Type Without Enclosure |
|---|---|---|---|---|---|
| Total | Instantaneous | | Timed | | Cat. No. |
| | N.O. | N.C. | N.O. | N.C. | |
| 4 | 2 | 0 | 2 | 0 | 700-RTC20200⊗ |
| | 1 | 1 | 2 | 0 | 700-RTC11200⊗ |
| | 2 | 0 | 1 | 1 | 700-RTC20110⊗ |
| | 0 | 2 | 2 | 0 | 700-RTC02200⊗ |
| | 1 | 1 | 1 | 1 | 700-RTC11110⊗ |
| | 2 | 0 | 0 | 2 | 700-RTC20020⊗ |
| | 1 | 1 | 0 | 2 | 700-RTC11020⊗ |
| | 0 | 2 | 1 | 1 | 700-RTC02110⊗ |
| | 0 | 2 | 0 | 2 | 700-RTC02020⊗ |

*⊗ Coil Voltage Code*

The Cat. No. as listed is not complete. Select a voltage code from the table below to complete the Cat. No. Example: Cat. No. 700-RTC00100⊗ becomes Cat. No. 700-RTC00100U24. For other voltages consult your local Rockwell Automation sales office or Allen-Bradley distributor.

| [V] | 24V DC, 24V AC | 120V DC, 110/120V AC |
|---|---|---|
| 50/60 Hz | U24 | U1 |

## 700-RTC Relays with Fixed Time Delay— Relays with Provision for Instantaneous Contacts

Relays listed below have slots for two timed and two instantaneous contacts. Unused slots are equipped with removable dummy cartridges.

| Number of Contact Cartridges | | | | | Open Type Without Enclosure |
|---|---|---|---|---|---|
| Total | Timed | | Instantaneous | | Cat. No. |
| | N.O. | N.C. | N.O. | N.C. | |
| 0 | 0 | 0 | 0 | 0 | 700-RTC00#0⊗ |
| 1 | 1 | 0 | 0 | 0 | 700-RTC10#0⊗ |
| | 0 | 1 | 0 | 0 | 700-RTC20#0⊗ |
| 2 | 2 | 0 | 0 | 0 | 700-RTC40#0⊗ |
| | 1 | 0 | 1 | 0 | 700-RTC11#0⊗ |
| | 1 | 0 | 0 | 1 | 700-RTC12#0⊗ |
| | 1 | 1 | 0 | 0 | 700-RTC30#0⊗ |
| | 0 | 1 | 1 | 0 | 700-RTC21#0⊗ |
| | 0 | 1 | 0 | 1 | 700-RTC22#0⊗ |
| | 0 | 2 | 0 | 0 | 700-RTC50#0⊗ |
| 3 | 2 | 0 | 1 | 0 | 700-RTC41#0⊗ |
| | 1 | 0 | 2 | 0 | 700-RTC14#0⊗ |
| | 2 | 0 | 0 | 1 | 700-RTC42#0⊗ |
| | 1 | 0 | 1 | 1 | 700-RTC13#0⊗ |
| | 1 | 1 | 1 | 0 | 700-RTC31#0⊗ |
| | 0 | 1 | 2 | 0 | 700-RTC24#0⊗ |
| | 1 | 0 | 0 | 2 | 700-RTC15#0⊗ |
| | 1 | 1 | 0 | 1 | 700-RTC32#0⊗ |
| | 0 | 1 | 1 | 1 | 700-RTC23#0⊗ |
| | 0 | 2 | 1 | 0 | 700-RTC51#0⊗ |
| | 0 | 1 | 0 | 2 | 700-RTC25#0⊗ |
| | 0 | 2 | 0 | 1 | 700-RTC52#0⊗ |

| Number of Contact Cartridges | | | | | Open Type Without Enclosure |
|---|---|---|---|---|---|
| Total | Timed | | Instantaneous | | Cat. No. |
| | N.O. | N.C. | N.O. | N.C. | |
| 4 | 2 | 0 | 2 | 0 | 700-RTC44#0⊗ |
| | 2 | 0 | 1 | 1 | 700-RTC43#0⊗ |
| | 1 | 1 | 2 | 0 | 700-RTC34#0⊗ |
| | 2 | 0 | 0 | 2 | 700-RTC45#0⊗ |
| | 1 | 1 | 1 | 1 | 700-RTC33#0⊗ |
| | 0 | 2 | 2 | 0 | 700-RTC54#0⊗ |
| | 1 | 1 | 0 | 2 | 700-RTC35#0⊗ |
| | 0 | 2 | 1 | 1 | 700-RTC53#0⊗ |
| | 0 | 2 | 0 | 2 | 700-RTC55#0⊗ |

*# Operating Mode*

Replace the # in the cat. no. with the appropriate letter and numbers to indicate the operating mode and the fixed time delay value. Refer to operating mode table below.

| Digit | Operating Mode | Fixed Time Delay |
|---|---|---|
| S | On-Delay – s | **Seconds** –Two digits indicating the fixed time delay in seconds.<br>Three digits indicating the fixed time delay (first digit indicates seconds, next two digits indicate 1/100 seconds). |
| Z | Off-Delay – s | |
| Y | On-Delay – Min. | **Minutes** –Two digits indicating the fixed time delay in minutes.<br>Three digits indicating the fixed time delay (first digit indicates minutes, next two digits indicate 1/100 minutes). |
| I | Off-Delay – Min. | |

**EXAMPLE** Cat. No. **700-RTC00Y200U1** is for a relay without contact cartridges. "Y20" indicates an On-Delay timer with a 20 minute fixed time delay. This is a "standard relay." Order the contact cartridges separately.

Cat. No. **700-RTC42S020U1** is for a relay with 2 N.O. cartridges in the timed position and 1 N.C. cartridge in the instantaneous position. "S02" indicates an On-Delay timer with a 2 second fixed time delay.

*⊗ Coil Voltage Code*

The cat. no. as listed is not complete. To complete the cat. no., add a coil code selected from the table below.

| [V] | 24V DC, 24V AC | 120V DC, 110/120V AC |
|---|---|---|
| 50/60 Hz | U24 | U1 |

## Accessories - 700-RTC Relays

| Photo | | | Description | Cartridge Type | Color | Cat. No. |
|---|---|---|---|---|---|---|
|  | | | **Contact Cartridges –** These cartridges are used to add contacts to timing relays having unused slots. The N.O., N.C., and Dummy cartridges are interchangeable and can be used in timed or instantaneous contact slots. Dummy cartridges should be placed in unused cartridge slots to guard against entrance of foreign material. | N.O. | Grey | 700-CRT5 |
| | | | | N.C. | Orange | 700-CRT6 |
| Cat. No. 700-CRT5 | Cat. No. 700-CRT6 | Cat. No. 700-CR9 | | Dummy Cartridge | Black | 700-CR9 |

| Photo | Description | Cartridge Type | Color | Cat. No. |
|---|---|---|---|---|
|  | **Type 1 Enclosure** — Use for all 700-P relays except 10- and 12-pole DC relays or 6-pole DC 700-PH relays. | | | 700-N31 |
|  | **Relay Rail**<br>Simplifies panel layout. These indexed strips are easily cut to the required length and bolted, riveted, or spot-welded in place. Relays are installed adjacent to one another on the mounting strip with the captive mounting screws provided. Rows of relays on Relay Rail form their own wiring trough.<br>Can be used with the following relays: 700P, 700DC-P, 700S-P, 700N, 700-R, 700-RTC | Relays per Strip | Pkg. Quantity | 700-MP4 |
| | | 4 | 5 | |
| | | 8 | 5 | 700-MP8 |
| | | 12 | 5 | 700-MP12 |
| | | 16 | 5 | 700-MP16 |
|  | **DIN (#3) symmetrical hat rail**<br>35 x 7.5 x 1 m | | 10 | 199-DR1 |
|  | **DIN Rail Adapter**<br>Can be used with the following relays:<br>700-P, 700DC-P, 700S-P, 700-N, 700-R, 700-RTC | | 1 | 700-DRA |

## Specifications - 700-RTC Relays

*Voltage and Power Requirements*

| AC Voltage<br>+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** |

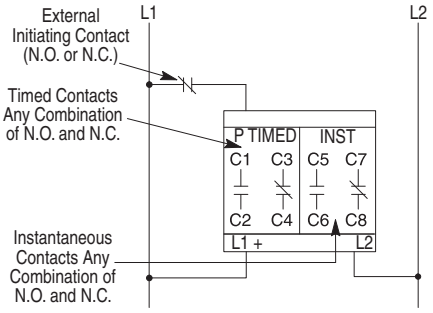
| DC Voltage<br>+10% –20% | Total Power Required | Initiate Terminal Power | Maximum Allowable Leakage Current | Coil Code |
|---|---|---|---|---|
| 24V DC | 10 W | 5 W | 10 mA | **U24** |
| 120V DC | 11 W | 5 W | 2.4 mA | **U1** |

| Type | 700-RTC |
|---|---|
| Contact Rating | NEMA B600 600V AC, 5 A<br>NEMA P300 300V DC, 5 A |
| Contact Arrangement | 1…4 poles. Max. of 2 timed and 2 instantaneous.<br>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 |

| Type | 700-RTC | |
|---|---|---|
| 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 (1) | | |
| Operating: | –20…+60 °C (–4…+140 °F) | |
| Storage: | –20…+60 °C (–4…+140 °F) | |
| Standards Compliance | ISA 12.12, CSA C22.2, No. 213 | |
| Certifications | cULus Listed (File No. E10314, Guide NOIV/NOIV7) | |

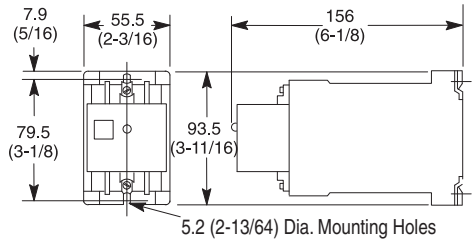
(1) Continuous duty units placed close to each other (3 in a row) have a temperature range of –20…+45 °C (–4…+113 °F) or should have air circulated around the units. Approximate space of 3/4 in (mm) on all sides is needed.

## Typical Wiring Diagram - 700-RTC Relays

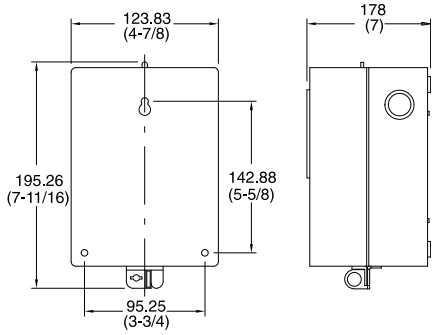



## Dimensions - 700-RTC Relays

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



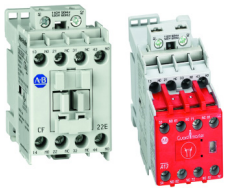

Approximate Shipping Weight 0.92 kg (2.1 lb.)




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

# IEC Control Relays

## Product Overview

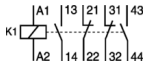
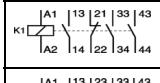
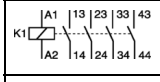
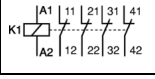
| | | | |
|---|---|---|---|
| |  |  |  |
| **Bulletin No.** | **700-CF and 700S-CF** | **700-EF and 700S-EF** | **700-K** |
| **Type** | Control Relay | Control Relay | Miniature Control Relay |
| **Features** | • Mechanically linked contacts<br>• Timer and latch operations<br>• Switch up to 690V AC and DC<br>• 700S-CF for safety circuits | • Mechanically linked contacts<br>• Timer and latch operations<br>• Switch up to 690V AC and DC<br>• 700S-EF for safety circuits | • Smallest size<br>• Long life<br>• Low power consumption<br>• Switch up to 690V AC and DC |
| **Contact Form** | 4…12 poles, double break | 4…8 poles | 4...8 Poles Double Break |
| **Contact Type** | Cross stamp or bifurcated | — | Bifurcated |
| **Contact Material** | Silver, gold | Silver | Silver |
| **Electrical** | | | |
| **Max. Current AC Resistive** | 20 A (relay)<br>10 A (adder deck) | 16 A (relay)<br>16 A (adder deck) | 10 A |
| **Min. load** | 17V, 10 mA (Silver)<br>5V, 3 mA (Gold) | 12V, 3 mA (Silver) | 15V, 2 mA (700-K) |
| **Coil Voltage** | 12…600V AC<br>9…250V DC | 24…500V AC<br>12…500V DC | 12…600V AC<br>9…250V DC |
| **Coil Voltage Pickup** | 85…110% AC coils,<br>80…110% DC coils | 85…110% AC coils,<br>80…110% DC coils | 85…110% AC Coils,<br>80…110% DC Coils |
| **Dielectric Withstand** | 2.5 kV | 2.5 kV | 2640V |
| **Electric Service Life (cycles)** | 1.2 million at 10 A | 1.2 million at 6 A | 800K at 10 A 120V AC |
| **Certifications** | CE, cULus, CCC | CE, cULus, CCC | CE, cULus, CCC |
| **Sockets** | DIN Rail or panel mount | DIN Rail or panel mount | DIN Rail or panel mount |
| **Page** | 194 | 194 | 231 |

## 700-CF Control Relay

- IEC industrial relays
- Mechanically linked contact performance per IEC 60947-5-1
- Gold plated, bifurcated version for low level switching applications
- Master control relay version rated 15 A (AC-15)
- Solid-state and pneumatic timing modules
- 4-...10 Poles



### 4-Pole AC Coil Voltage (Ratings for 700-CF Only)

| AC-12 | | AC-15 | | | | | | | Connection Diagrams | Contacts | | Standard Contacts(1) | Gold Plated Bifurcated Contacts(2) | Master Contacts(2) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ith [A] | | Ie [A] | | | | | | | | | | | | |
| 40 °C | 60 °C | 24/48V | 120V | 240V | 400V | 500V | 600V | 690V | | N.O. | N.C. | Cat. No. | Cat. No. | Cat. No. |
| 20 | 20 | 10 | 10 | 10 | 6 | 2.5 | 1 | 1 |  | 2 | 2 | 700-CF220⊗ | 700-CFB220⊗ | 700-CFM220⊗ |
| | | | | | | | | |  | 3 | 1 | 700-CF310⊗ | 700-CFB310⊗ | 700-CFM310⊗ |
| | | | | | | | | |  | 4 | 0 | 700-CF400⊗ | 700-CFB400⊗ | 700-CFM400⊗ |
| | | | | | | | | |  | 0 | 4 | 700-CF040⊗ | 700-CFB040⊗ | — |

(1) For spring clamp terminals, insert R after 700-C. Example: Cat. No. 700-CRF220D.

(2) All Cat. Nos. are factory-stocked.

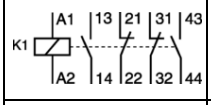
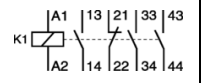
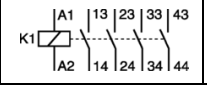
#### *⊗ ACoil Voltage Code*

The cat. no. as listed is incomplete. Select a coil voltage code from the table below to complete the cat. no. Example: Cat. No. 700-CF220⊗ becomes Cat. No. 700-CF220D for 120V, 60 Hz.

| [V] | 12 | 24 | 32 | 36 | 42 | 48 | 100 | 100... 110 | 110 | 120 | 127 | 200 | 200... 220 | 208 | 208... 240 | 220... 230 | 230 | 230... 240 | 240 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50 Hz | R | K | V | W | X | Y | KP | — | D | P | S | KG | L | — | — | F | — | VA | T |
| 60 Hz | Q | J | — | V | — | X | — | KP | — | D | — | — | KG | H | L | — | — | — | A |
| 50/60 Hz | — | KJ | — | — | — | KY | KP | — | KD | — | — | KG | KL | — | — | KL | KF | — | KA |

| [V] | 277 | 347 | 380 | 380... 400 | 400 | 400... 415 | 440 | 480 | 500 | 550 | 600 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 50 Hz | — | — | — | N | — | G | B | — | M | C | — |
| 60 Hz | T | I | E | — | — | — | N | B | — | — | C |
| 50/60 Hz | — | — | — | — | KN | — | KB | — | — | — | — |

## 4-Pole DC Coil Voltage (Ratings for 700-CF Only)

| AC-12 | | AC-15 | | | | | | | Connection Diagrams | Contacts | | Standard Contacts(1) | Gold Plated Bifurcated Contacts(2) | Master Contacts(2) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *I*th[A] | | *I*e [A] | | | | | | | | | | | | |
| 40 °C | 60 °C | 24/48V | 120V | 240V | 400V | 500V | 600V | 690V | | N.O. | N.C. | Cat. No. | Cat. No. | Cat. No. |
| 20 | 20 | 10 | 10 | 10 | 6 | 2.5 | 1 | 1 |  | 2 | 2 | 700-CF220⊗ | 700-CFB220⊗ | 700-CFM220⊗ |
| | | | | | | | | |  | 3 | 1 | 700-CF310⊗ | 700-CFB310⊗ | 700-CFM310⊗ |
| | | | | | | | | |  | 4 | 0 | 700-CF400⊗ | 700-CFB400⊗ | 700-CFM400⊗ |

(1) For spring clamp terminals, insert R after 700-C. Example: Cat. No. 700-CRF220D.

(2) All Cat. Nos. are factory-stocked.

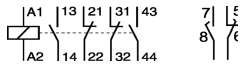
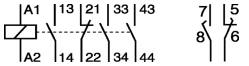
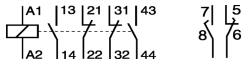
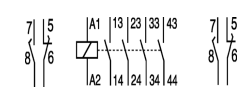
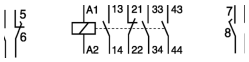
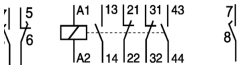
### ⊗DC Coil Voltage Code

The cat. no. as listed is incomplete. Select a coil voltage code from the table below to complete the cat. no. example: Cat. No. 700-CF220⊗ becomes Cat. No. 700-CF220EJ for 24V DC, electronic with diode.

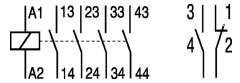
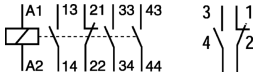
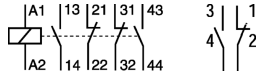
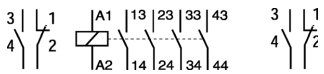
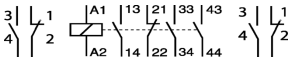
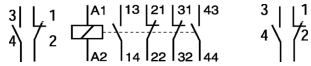
| [V] | 9 | 12 | 24 | 36 | 48 | 48... 72 | 60 | 64 | 72 | 80 | 110 | 110... 125 | 115 | 125 | 220 | 220... 250 | 230 | 250 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Electronic with diode | — | EQ | EJ | EW | — | EY | — | — | — | — | — | ED | — | — | — | EA | — | — |
| Electronic with diode/ Quick Pick-up | — | — | QJ | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

## 6- and 8-pole Relays

Control Relays with Overlapping Side-Mounted Contacts

| AC-12 | | | AC-15 | | | | | | | Left Aux. | Relay Arrangement | Right Aux. | Contacts | | Overlapping Side-Mounted Contacts | | Cat. No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $I_{th}$ [A] | | | $I_e$ [A] | | | | | | | | | | | | | | |
| | 40 °C | 60 °C | 24/ 48V | 120 V | 240 V | 400 V | 500 V | 600 V | 690 V | | | | N.O. | N.C. | N.O. | N.C. | |
| Main Relay | 20 | 20 | 10 | 10 | 10 | 6 | 2.5 | 1 | 1 |  | |  | 4 | 0 | 1 | 1 | 700-CFZ1510⊗ |
| | | | | | | | | | |  | |  | 3 | 1 | 1 | 1 | 700-CFZ1420⊗ |
| Side Contacts | 10 | 10 | 6 | 6 | 5 | 3 | 1.6 | 1 | 1 |  | |  | 2 | 2 | 1 | 1 | 700-CFZ1330⊗ |
| | | | | | | | | | |  | |  | 4 | 0 | 2 | 2 | 700-CFZ2620⊗ |
| | | | | | | | | | |  | |  | 3 | 1 | 2 | 2 | 700-CFZ2530⊗ |
| | | | | | | | | | |  | |  | 2 | 2 | 2 | 2 | 700-CFZ2440⊗ |

## Control Relays with Standard Side-mounted Contacts

| AC-12 | | | AC-15 | | | | | | | Left Aux. | Relay Arrangement | Right Aux. | Contacts | | Standard Side-Mounted Contacts | | Cat. No. (1) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $I_{th}$ [A] | | | $I_e$ [A] | | | | | | | | | | | | | | |
| | 40 °C | 60 °C | 24/ 48V | 120V | 240V | 400V | 500V | 600V | 690V | | | | N.O. | N.C. | N.O. | N.C. | |
| Main Relay | 20 | 20 | 10 | 10 | 10 | 6 | 2.5 | 1 | 1 |  | | | 4 | 0 | 1 | 1 | 700-CFZ0510⊗ |
| | | | | | | | | | |  | | | 3 | 1 | 1 | 1 | 700-CFZ0420⊗ |
| | | | | | | | | | |  | | | 2 | 2 | 1 | 1 | 700-CFZ0330⊗ |
| Side Contacts | 10 | 10 | 6 | 6 | 5 | 3 | 1.6 | 1 | 1 |  | | | 4 | 0 | 2 | 2 | 700-CFZ0620⊗ |
| | | | | | | | | | |  | | | 3 | 1 | 2 | 2 | 700-CFZ0530⊗ |
| | | | | | | | | | |  | | | 2 | 2 | 2 | 2 | 700-CFZ0440⊗ |

(1) All Cat. Nos. are factory stocked.

### ⊗ AC Coil Voltage Code

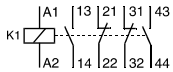
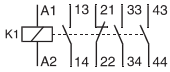
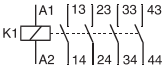
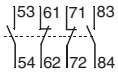
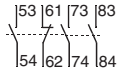
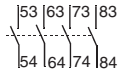
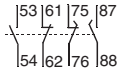
The cat. no. as listed is incomplete. Select a coil voltage code from the table below to complete the cat. no. Example: Cat. No. 700-CFZ051⊗ becomes Cat. No. 700-CFZ0510F.

| [V] | 12 | 24 | 32 | 36 | 42 | 48 | 100 | 100... 110 | 110 | 120 | 127 | 200 | 200... 220 | 208 | 208... 240 | 220... 230 | 230 | 230... 240 | 240 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50 Hz | R | K | V | W | X | Y | KP | — | D | P | S | KG | L | — | — | F | — | VA | T |
| 60 Hz | Q | J | — | V | — | X | — | KP | — | D | — | — | KG | H | L | — | — | — | A |
| 50/60 Hz | — | KJ | — | — | — | KY | KP | — | KD | — | — | KG | KL | — | — | KL | KF | — | KA |

| [V] | 277 | 347 | 380 | 380... 400 | 400 | 400... 415 | 440 | 480 | 500 | 550 | 600 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 50 Hz | — | — | — | N | — | G | B | — | M | C | — |
| 60 Hz | T | I | E | — | — | — | N | B | — | — | C |
| 50/60 Hz | — | — | — | — | KN | — | KB | — | — | — | — |

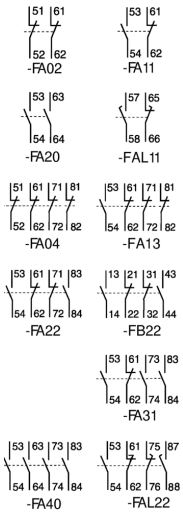
## Assignment of Contacts

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

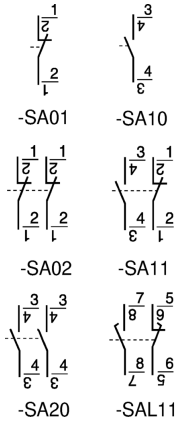
| Auxiliary Contact Blocks | | Control Relays 700-CF (AC and DC Control) | | | |
|---|---|---|---|---|---|
| | Circuit Diagram | Control | 700-CF⊗220 | 700-CF⊗310 | 700-CF⊗400 |
| | | |  |  |  |
| **Front Mounting** (1) | | | | | |
| 100-FA02 |  | AC/DC | 22E + 02E = 24Y | 31E + 02E = 33Y | 40E + 02E = 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 |

(1) Control relay and auxiliary contact block AC/DC max. 4 N. C.

## Auxiliary Contacts

| Photo | Description | N.O. | N.C. | Connection Diagrams | For Use With | Standard Contacts (1) | Bifurcated Contacts |
|---|---|---|---|---|---|---|---|
| | | | | | | Cat. No. | Cat. No. |
|  | **Auxiliary Contact Blocks for Front Mounting**§<br>2- and 4-pole<br>Quick and easy mounting without tools<br>Electronic-compatible contacts down to 17V, 5 mA<br>Mechanically linked performance between N.O. and N.C. poles and to the main relay poles (except for L types)<br>Models with equal function with several terminal numbering choices<br>1L = Late break N.C./early make N.O.<br>Bifurcated version for switching down to 5V, 3 mA | 0 | 2 |  | 700-CF | 100-FA02 | 100-FAB02 |
| | | 1 | 1 | | | 100-FA11 | 100-FAB11 |
| | | 2 | 0 | | | 100-FA20 | 100-FAB20 |
| | | 1L | 1L | | | 100-FAL11 | — |
|  | | 0 | 4 | | | 100-FA04 | 100-FAB04 |
| | | 1 | 3 | | | 100-FA13 | 100-FAB13 |
| | | 2 | 2 | | | 100-FA22 | 100-FAB22 |
| | | 3 | 1 | | | 100-FA31 | 100-FAB31 |
| | | 4 | 0 | | | 100-FA40 | 100-FAB40 |
| | | 1+1L | 1+1L | | | 100-FAL22 | — |

(1) For spring clamp terminals, insert CR after 100-. Example: Cat. No. 100-CRFA02.

| Photo | Description | N.O. | N.C. | Connection Diagrams | For Use With | Cat. No. |
|---|---|---|---|---|---|---|
|  | **Auxiliary Contact Blocks for Side Mounting without Sequence Terminal Designations**§<br>1- and 2-pole<br>Two-way numbering for right or left mounting on the contactor<br>Quick and easy mounting without tools<br>Electronic-compatible contacts down to 17V, 10 mA<br>Mirror contact performance to the main relay poles<br>1L = Late break N.C./early make N.O. | 0 | 1 |  | 700-CF | 100-SA01 |
| | | 1 | 0 | | | 100-SA10 |
| | | 0 | 2 | | | 100-SA02 |
| | | 1 | 1 | | | 100-SA11 |
| | | 2 | 0 | | | 100-SA20 |
|  | | 1L | 1L | | | 100-SAL11 |

**IMPORTANT** For maximum number of contacts, see the following tables.

## 700-CF (AC electronic coils), vertical mounting, 60 °C(1)

| 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 (2) | 4 | 4(3) | 6 | 5 | 8 |
| CF220 | 4 | 4 (2) | 4 | 2 | 8 | 5 | 8 |
| CF040 | 2 | 2 | 4 | 0 | 6 | 2 | 6 |

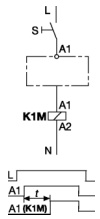
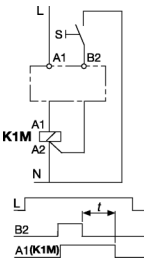
(1) For other operating conditions, please contact your local Rockwell Automation sales office or Allen-Bradley distributor.
(2) With no front auxiliary contacts installed. Otherwise 3 N.C. Maximum.
(3) With no side auxiliary contacts installed. Otherwise 3 N.C. Maximum.

## 700-CF (DC conventional coils), vertical mounting, 60 °C(1)

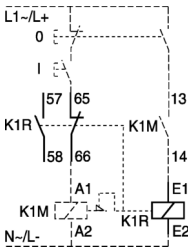
| Cat. No. 700… | Max. N.O. Side Aux. | Max. N.C. Side Aux. | Max. N.O. Front Aux. | Max. N.C. Front Aux. | Max. N.O. Front + Side Aux. | Max. N.C. Front + Side Aux. | Max. N.O. + N.C. Front + Side Aux. |
|---|---|---|---|---|---|---|---|
| CF400 | 2 | 2 | 4 | 4 (2) | 6 | 5 | 8 |
| CF310 | 2 | 2 | 4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

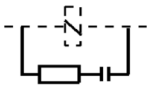
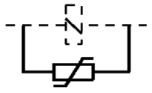
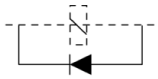
(1) For other operating conditions, please contact your local Rockwell Automation sales office or Allen-Bradley distributor.
(2) With no side auxiliary contacts installed. Otherwise 3 N.C. Maximum.

## Control Modules

| Photo | Description | Connection Diagrams | Reset Time | Repeat Accuracy | Delay | For Use With | Cat. No. |
|---|---|---|---|---|---|---|---|
|  | **Pneumatic Timing Modules**[1] **ON-Delay**<br>Pneumatic timing element contacts switch after the delay time. The contacts on the main control relay continue to operate without delay. |  | 25…90 ms for AC Coils<br>47…85 ms for DC coils | +/-10% | 0.3…30 s | 700-CF all [1] | 100-FPTA30 |
| | | | | | 1.8…180 s | | 100-FPTA180 |
| | **Pneumatic Timing Modules OFF-Delay**<br>Pneumatic timing element contacts switch after the delay time. The contacts on the main control relay continue to operate without delay. |  | | | 0.3…30 s | | 100-FPTB30 |
| | | | | | 1.8…180 s | | 100-FPTB180 |
|  | **Electronic Timing Modules — On-Delay**<br>Delay of the control relay coil assembly.<br>The control relay is energized at the end of the delay time. |  | 100 ms | +/-1% | 0.1…3 s | 700-CF 110…240V AC coils | 100-ETA3 |
| | | | | | 1…30 s | | 100-ETA30 |
| | | | | | 10…180 s | | 100-ETA180 |
| | | | | | 0.1…3 s | 700-CF 24…48V DC coils | 100-ETAZJ3 |
| | | | | | 1…30 s | | 100-ETAZJ30 |
| | | | | | 10…180 s | | 100-ETAZJ180 |
|  | **Electronic Timing Modules — Off-Delay**<br>Delay of the control relay coil assembly.<br>After interruption of the control signal, the control relay is deenergized at the end of the delay time. |  | 100 ms | +/-1% | 0.3…3 s | 700-CF 110…240V AC coils | 100-ETB3 |
| | | | | | 1…30 s | | 100-ETB30 |
| | | | | | 10…180 s | | 100-ETB180 |
| | | | | | 0.3…3 s | 700-CF 24V AC coils | 100-ETBKJ3 |
| | | | | | 1…30 s | | 100-ETBKJ30 |
| | | | | | 10…180 s | | 100-ETBKJ180 |

(1) On-Delay modules cannot be used with side-mounted auxiliary contacts on DC coil relays.

| Photo | Description | Connection Diagrams | For Use With | Cat. No. |
|---|---|---|---|---|
|  | **Mechanical Latch**<br>Following relay latching, the relay coil is immediately de-energized (off) by the N.C. auxiliary contact (65-66).<br>Electrical or manual release<br>1 N.O. + 1 N.C. auxiliary contacts |  | 700-CF with AC coils | 100-FL11⊗ |

| Photo | Description | | | Connection Diagrams | For Use With | Cat. No. (1) |
|---|---|---|---|---|---|---|
|  | **Surge Suppressors**<br>For limitation of coil switching transients.<br>Plug-in, coil mounted | **RC Module**<br>AC Operating Mechanism | 24…48V 50/60 Hz |  | 700-CF with AC coils | 100-FSC48 |
| | | | 110…280V 50/60 Hz | | | 100-FSC280 |
| | | | 380…480V 50/60 Hz | | | 100-FSC480 |
| | | **Varistor Module**<br>AC/DC Operating Mechanism | 12…55V AC/ 12…77V DC |  | 700-CF all | 100-FSV55 |
| | | | 56…136V AC/ 78…180V DC | | | 100-FSV136 |
| | | | 137…277V AC/ 181…350V DC | | | 100-FSV277 |
| | | | 278…575V AC | | | 100-FSV575 |
| | | **Diode Module**<br>DC Operating Mechanism<br>Dropout Time<br>70…95 ms | 12…250V DC |  | 700-CF with Conventional DC coils | 100-FSD250 |

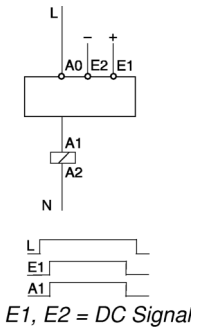
(1) For spring clamp terminals, insert CR after 100-. Example: Cat. No. 100-CRFSC48.

### *Coil Voltage Code*

The cat. no. as listed is incomplete. Select a coil voltage code from the table below to complete the cat. no. Example: Cat. No. 100-FL11⊗ becomes Cat. No. 100-FL11J.

| [V] (1) | 24 | 48 | 100 | 110 | 120 | 230...240 | 240 | 277 | 380...400 | 400...415 | 440 | 480 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50 Hz | K | Y | KP | D | — | VA | T | — | N | G | B | — |
| 60 Hz | J | — | — | — | D | — | A | T | — | — | N | B |

(1) For special voltages, consult your local Rockwell Automation sales office or Allen-Bradley distributor.

| Photo | Description (Relays) | | Connection Diagrams | For Use With (Relays) | Cat. No. |
|---|---|---|---|---|---|
|  | **DC Interface** (electronic)<br>Interface between the DC control signal (PLC) and the AC operating mechanism of the control relay.<br>Control (input) voltage<br>12V DC<br>24V DC<br>48V DC<br>Requires no additional surge suppression on the relay coils | Input:<br>24V DC<br>Output:<br>110…240V AC |  | 700-CF with 110…240V AC coils | 100-JE |
| | | Input:<br>12V DC<br>Output:<br>110…240V AC | | | 100-JE12 |
| | | Input:<br>48V DC<br>Output:<br>110…240V AC | | | 100-JE48 |

## Specifications 100-J... DC Interfaces

| | | | 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 (1) | 2 (1) | 2 (1) |
| 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 |

(1) To consider the maximum operations/hour of the relays.

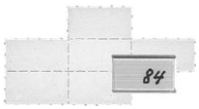
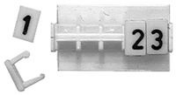
## Assembly Components

| Photo | Description | For Use With | Pkg Qty. (1) | Cat. No. |
|---|---|---|---|---|
|  | **Protective Covers**<br>Provides protection against unintended manual operation | 700-CF all | 1 | 100-SCCA |
|  | **Protective Covers**<br>• Provides protection against unintended manual operation<br>• For contactors and front-mounted auxiliary contacts, pneumatic timers, and latches | 100-FA, -FB, -FC, -FP, -FL; | 10 | 100-SCFA |

(1) All Cat. Nos. are factory stocked.

## Accessories

Uniform labeling materials for contactors, motor startup equipment, relays, and circuit breakers.

| Photo | Description | Pkg. Qty. (1) | Cat. No. |
|---|---|---|---|
|  | **Label Sheet**<br>105 self-adhesive paper labels each, 6 x 17 mm | 10 | 100-FMS |
|  | **Marking Tag Sheet** 160 perforated paper labels each, 6 x 17 mm, to be used with a transparent cover | 10 | 100-FMP |
| | **Transparent Cover** To be used with marking tag sheets | 100 | 100-FMC |
|  | **Marking Tag Adapters** To be used with marking tag: System V4/V5 | 100 | 100-FMA1 (2) |
| | System 1492 W | | 100-FMA2 |

(1) Must be ordered in multiples of package quantities.
(2) Marker for 100-FMA1 must be purchased from a third party.

## Coils

| Photo | AC Coil Code | AC Voltages | | | Cat. No. 700-CF | DC Coil Code | DC Voltages | Cat. No. 700-CF |
|---|---|---|---|---|---|---|---|---|
| | | 50Hz | 60Hz | 50/60Hz | | | | |
|  | Q | — | 12V | — | **TA006** | EQ | 12V | **TC708E** |
| | R | 12V | — | — | **TA404** | EJ | 24 V | **TC714E** |
| | J | — | 24V | — | **TA013** | QJ | 24V | **TC714Q** |
| | K | 24V | — | — | **TA407** | EY | 48. . .72V | **TC724E** |
| | KJ | — | — | 24V | **TA855** | EW | 36…48 | **TC719E** |
| | V | 32V | 36V | — | **TA481** | ED | 110…125 | **TC733E** |
| | W | 36V | — | — | **TA410** | EA | 220…250 | **TC747E** |
| | X | 42V | 48V | — | **TA482** | | | |
| | Y | 48V | — | — | **TA414** | | | |
| | KY | — | — | 48V | **TA860** | | | |
| | KP | 100V | 100 - 110V | 100V | **TA861** | | | |
| | D | 110V | 120V | — | **TA473** | | | |
| | KD | — | — | 110V | **TA856** | | | |
| | P | 120V | — | — | **TA425** | | | |
| | S | 127V | — | — | **TA428** | | | |
| | KG | 200V | 200 - 220V | 200V | **TA862** | | | |
| | 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** | | | |

## Specifications - 700-CF..., 700S-CF Relays

| | | | 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 [1] | | Main | Open | Open | Open [2] |
| | | Front aux. | Open | Open | — |

(1) Side mounted auxiliary contacts provide "mirror contact" performance with main poles only.
(2) 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.).

| Attribute | | | | 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 |
| | (1) | 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 |

(1) For 16 or more strands, end ferrule is required.

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

## Control Circuit

| Attribute | | | 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) (1) | 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 (2) |
| | 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 |
| DC (electronic - EW EY, ED, EA) | Closing Delay | [ms] | 25...50 |
| | Opening Delay | [ms] | 23...33 |
| DC (electronic- QJ) | Closing Delay | [ms] | 20...50 |
| | Opening Delay | [ms] | 15…22 |

| Attribute | | | Cat. No. 700-CF |
|---|---|---|---|
| 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% |

(1) 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 $U_s$.

(2) At 110V DC, coil code ED has an operating voltage range of 0.7...1.25 x $U_s$.

## General Specifications - 700-CF Relays

| | 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- | 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 IEC 60 947-4 |
| 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 |
| Standards Compliance | UL 508, CSA C22.2 No. 14, EN/IEC 60947-1, -5-1, Meets the material restrictions for European Directive 2002/95/EC - EU- |
| Certifications | cULus Listed (File No. E14840, Guide NKCR/NKCR7), CE Marked, CCC Certified |

## 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 (1)**

| Utilization Category | Normal Condition of Use | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Make (3) | | | Break (3) | | | Number and Rate of Making and Breaking operations | | |
| | $I/I_e$ | $U/U_e$ | cos φ | $I/I_e$ | $U/U_e$ | cos φ | No. operating cycles (5) | Operating cycles per minute | ON time [s] (6) |
| AC-12 (2) | 1 | 1 | 0.9 | 1 | 1 | 0.9 | 6050 | 6 | 0.05 |
| AC-13 (2) | 2 | 1 | 0.65 | 1 | 1 | 0.65 | 6050 | 6 | 0.05 |
| AC-14 (2) | 6 | 1 | 0.3 | 1 | 1 | 0.3 | 6050 | 6 | 0.05 |
| AC-15 (2) | 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 (6) |
| DC-13 | 1 | 1 | 6 x $P$ (4) | 1 | 1 | 6 x $P$ (4) | 6050 | 6 | 0.05 (6) |
| DC-14 (2) | 10 | 1 | 15 ms | 1 | 1 | 15 ms | 6050 | — | 0.05 (6) |

(1) See sub-clause 8.3.3.5.2.
(2) 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.
(3) For tolerances on test quantities, see sub-clause 8.3.2.2.
(4) 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.
(5) The first 50 operating cycles shall be run at $U/U_e = 1.1$ with the loads set at $U_e$.
(6) The ON time shall be at least equal to $T_{0.95}$.

$I_e$ 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)

## Contact Rating Table from EN 60947-5-1

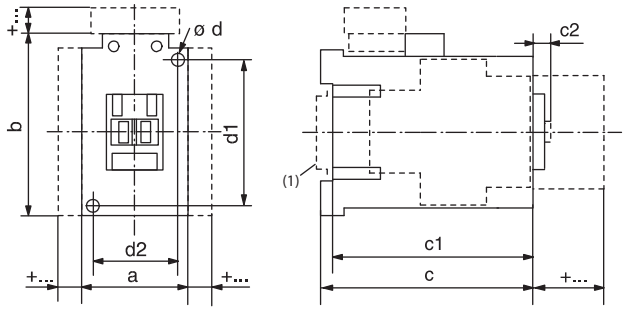
| Examples of Contact Rating Designation Based on Utilization Categories | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| NEMA Designation (1) | IEC Utilization Category | Conventional Thermal Current $I_{the}$ (A) | Rated Operational Current $I_e$ (A) at Rated Operational Voltage $U_e$ | | | | | | VA Rating | |
| **AC** | | | **120V** | **240V** | **380V** | **480V** | **500V** | **600V** | **Make** | **Break** |
| A150 | AC-15 | 10 | 6 | — | — | — | — | — | 7200 | 720 |
| A300 | AC-15 | 10 | 6 | 3 | — | — | — | — | 7200 | 720 |
| A600 | AC-15 | 10 | 6 | 3 | 1.9 | 1.5 | 1.4 | 1.2 | 7200 | 720 |
| B150 | AC-15 | 5 | 3 | — | — | — | — | — | 3600 | 360 |
| B300 | AC-15 | 5 | 3 | 1.5 | — | — | — | — | 3600 | 360 |
| B600 | AC-15 | 5 | 3 | 1.5 | 0.95 | 0.75 | 0.72 | 0.6 | 3600 | 360 |
| C150 | AC-15 | 2.5 | 1.5 | — | — | — | — | — | 1800 | 180 |
| C300 | AC-15 | 2.5 | 1.5 | 0.75 | — | — | — | — | 1800 | 180 |
| C600 | AC-15 | 2.5 | 1.5 | 0.75 | 0.47 | 0.375 | .035 | 0.3 | 1800 | 180 |
| D150 | AC-15 | 1.0 | 0.6 | — | — | — | — | — | 432 | 72 |
| D300 | AC-14 | 1.0 | 0.6 | 0.3 | — | — | — | — | 432 | 72 |
| E150 | AC-14 | 0.5 | 0.3 | — | — | — | — | — | 216 | 36 |
| **DC** | | | **125V** | **250V** | **440V** | **500V** | **600V** | **—** | **Make** | **Break** |
| N150 | DC-13 | 10 | 2.2 | — | — | — | — | — | 275 | 275 |
| N300 | DC-13 | 10 | 2.2 | 1.1 | — | — | — | — | 275 | 275 |
| N600 | DC-13 | 10 | 2.2 | 1.1 | 0.63 | 0.55 | 0.4 | — | 275 | 275 |
| P150 | DC-13 | 5 | 1.1 | — | — | — | — | — | 138 | 138 |
| P300 | DC-13 | 5 | 1.1 | 0.55 | — | — | — | — | 138 | 138 |
| P600 | DC-13 | 5 | 1.1 | 0.55 | 0.31 | 0.27 | 0.2 | — | 138 | 138 |
| Q150 | DC-13 | 2.5 | 0.55 | — | — | — | — | — | 69 | 69 |
| Q300 | DC-13 | 2.5 | 0.55 | 0.27 | — | — | — | — | 69 | 69 |
| Q600 | DC-13 | 2.5 | 0.55 | 0.27 | 0.15 | 0.13 | 0.1 | — | 69 | 69 |
| R150 | DC-13 | 1.0 | 0.22 | — | — | — | — | — | 28 | 28 |
| R300 | DC-13 | 1.0 | 0.22 | 0.1 | — | — | — | — | 28 | 28 |

(1) This letter stands for the conventional thermal current and identifies AC or DC: for example, B=5 A AC. The number that follows is the rated insulation voltage.

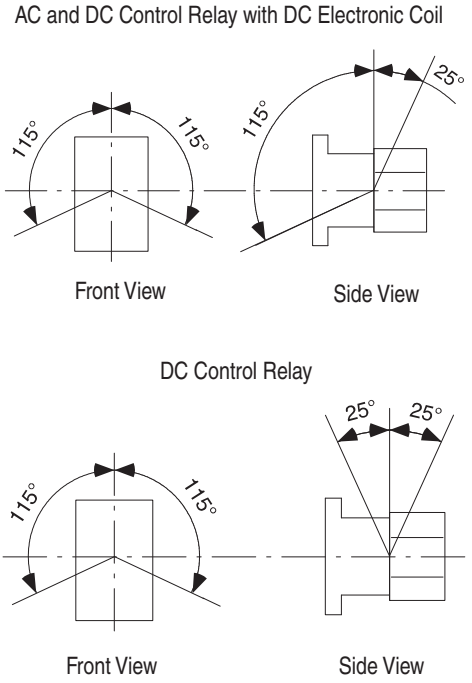
## Dimensions - 700-CF... Relays

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

*Mounting Position*




(1) May be mounted to 35 mm EN 50 022 DIN Rail.




### All AC Control Relays 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) |

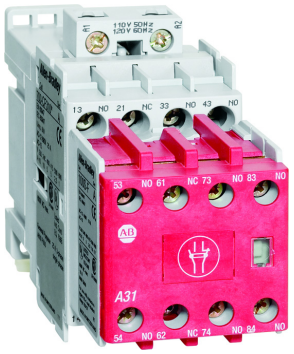
### DC Control Relays with Conventional Coil

| 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 - 700-CF Relays

| 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) |

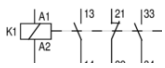
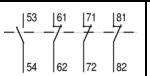
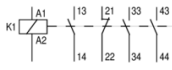
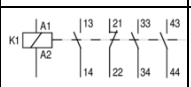
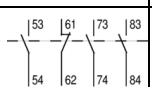
## 700S-CF Control Relays



The 700S-CF Safety Control Relay provides mechanically or mirror contact performance, which are required in feedback circuits for safety applications. Bifurcated contacts are ideal for low energy feedback safety circuits where high contact reliability is required.

- IEC industrial safety relay
- Mechanically linked contacts as per IEC 60947-5-1
- Third party certification SUVA
- Red cover and mechanically linked contact symbol on front face
- Gold plated, bifurcated version for low level switching applications
- Permanently fixed front mounted auxiliary contact block

### Type CF and CFB Safety Control Relays — 8-Pole AC Coil Voltage (Ratings for 700S-CF Only)

| AC-12 | | | AC-15 | | | | | | | Connection Diagrams | | Contacts | | Standard Contacts (Main) Gold-Plated Bifurcated (Front) Cat. No. | Gold-Plated Bifurcated, All Contacts Cat. No. (1) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *I*th [A] | | | *I*e [A] | | | | | | | | | | | | |
| | | | | | | | | | | Main Contacts | Auxiliary Contacts | N.O. | N.C. | | |
| | 40 °C | 60 °C | 24/ 48V | 120 V | 240 V | 400 V | 500 V | 600 V | 690 V | | | | | | |
| Main Contacts | 20 | 20 | 10 | 10 | 10 | 6 | 2.5 | 1 | 1 |  |  | 4 | 4 | 700S-CF440⊗BC | 700S-CFB440⊗C |
| | | | | | | | | | |  |  | 5 | 3 | 700S-CF530⊗BC | 700S-CFB530⊗C |
| Adder Deck Contacts | 10 | 6 | 6 | 6 | 5 | 3 | 1.6 | 1 | 1 |  |  | 6 | 2 | 700S-CF620⊗BC | 700S-CFB620⊗C |

(1) Ratings for 700S-CFB are on Specifications.

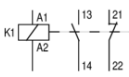
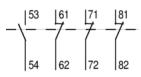
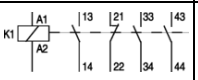
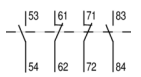
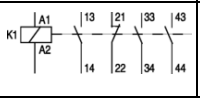
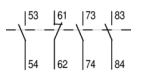
#### *⊗ AC Coil Voltage Code*

The cat. no. as listed is incomplete. Select a coil voltage code from the table below to complete the cat. no. Example: Cat. No. 700S-CF440⊗BC becomes Cat. No. 700S-CF440DBC for 120V, 60 Hz.

| [V] | 12 | 24 | 32 | 36 | 42 | 48 | 100 | 100... 110 | 110 | 120 | 127 | 200 | 200... 220 | 208 | 208... 240 | 220... 230 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50 Hz | R | K | V | W | X | Y | KP | — | D | P | S | KG | L | — | — | F |
| 60 Hz | Q | J | — | V | — | X | — | KP | — | D | — | — | KG | H | L | — |
| 50/60 Hz | — | KJ | — | — | — | KY | KP | — | KD | — | — | KG | KL | — | — | KL |

| [V] | 230 | 230... 240 | 240 | 277 | 347 | 380 | 380... 400 | 400 | 400... 415 | 440 | 480 | 500 | 550 | 600 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50 Hz | — | VA | T | — | — | — | N | — | G | B | — | M | C | — |
| 60 Hz | — | — | A | T | I | E | — | — | — | N | B | — | — | C |
| 50/60 Hz | KF | — | KA | — | — | — | — | KN | — | KB | — | — | — | — |

## Type CF and CFB Safety Control Relays — 8-Pole DC Coil Voltage (Ratings for 700S-CF Only)

| AC-12 | | | AC-15 | | | | | | | Connection Diagrams | | Contacts | | Standard Contacts (Main) Gold-Plated Bifurcated (Front) Cat. No. | Gold Plated Bifurcated All Contacts Cat. No.(1) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $I_{th}$ [A] | | | $I_e$ [A] | | | | | | | | | | | | |
| | | | | | | | | | | Main Contacts | Auxiliary Contacts | No. of N.O. Contacts | No. of N.C. Contacts | | |
| | 40 °C | 60 °C | 24/48V | 120V | 240V | 400V | 500V | 600V | 690V | | | | | | |
| Main Contacts | 20 | 20 | 10 | 10 | 10 | 6 | 2.5 | 1 | 1 |  |  | 4 | 4 | 700S-CF440⊗BC | 700S-CFB440⊗C |
| | | | | | | | | | |  |  | 5 | 3 | 700S-CF530⊗BC | 700S-CFB530⊗C |
| Adder Deck Contacts | 10 | 6 | 6 | 6 | 5 | 3 | 1.6 | 1 | 1 |  |  | 6 | 2 | 700S-CF620⊗BC | 700S-CFB620⊗C |

(1) Ratings for 700S-CFB are on Specifications.

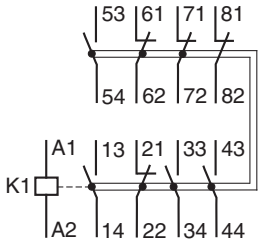
### ⊗DC Coil Voltage Code

The cat. no. as listed is incomplete. Select a coil voltage code from the table below to complete the cat. no. Example: Cat. No. 700S-CFB440⊗C becomes Cat. No. 700S-CFB440EJC for 24V DC, electronic with diode.

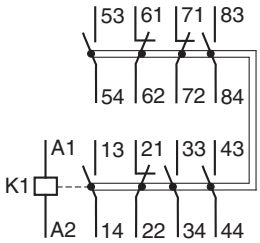
| [V] | 9 | 12 | 24 | 36 | 48 | 48... 72 | 60 | 64 | 72 | 80 | 110 | 110... 125 | 115 | 125 | 220 | 220... 250 | 230 | 250 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Electronic with diode | — | EQ | EJ | EW | — | EY | — | — | — | — | — | ED | — | — | — | EA | — | — |
| Electronic with diode/ Quick Pick-up | — | — | QJ | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

## Assignment of Contacts

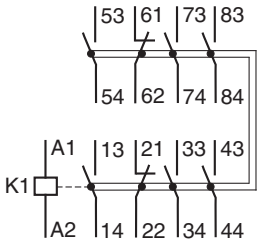
Safety Control Relays with Front-mount Auxiliary Contacts, 8-Pole AC or DC Coil Voltage




700S-CF440⊗…
700S-CFB440⊗…




700S-CF530⊗…
700S-CFB530⊗…




700S-CF620⊗…
700S-CFB620⊗…

## Specifications - 700S-CF Relays

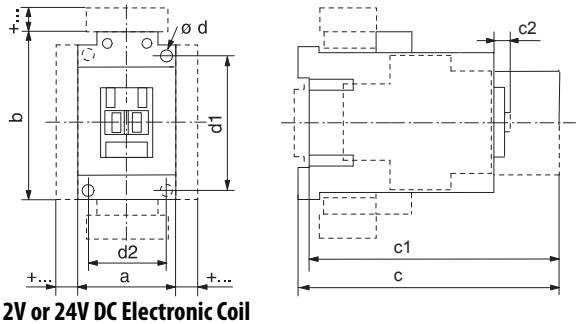
For more 700S-CF Specifications, see Specifications - 700-CF..., 700S-CF Relays on page 206.

| | | | | 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) | 1 Conductor | [mm2] | 1.5…6 | 0.5…2.5 |
| | | 2 Conductor | [mm2] | 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 |
| Standards Compliance | | | | UL 508, CSA C22.2 No. 14, EN/IEC 60947-1, -5-1, Meets the material restrictions for European Directive 2002/95/EC - EU-RoHS | |
| Certifications | | | | cULus Listed (File No. E14840, Guide NKCR/NKCR7), CE Marked, CCC Certified | |

(1) For 16 or more strands, end ferrule is required

## Dimensions - 700S-CF Relays

Approximate dimensions are shown in millimeters (inches). 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) |

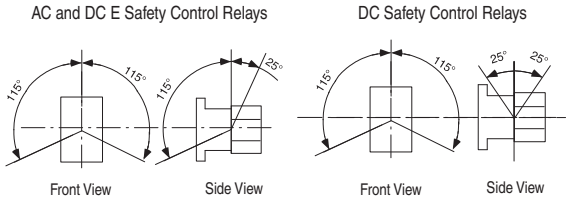
### DC Safety Control Relays with Conventional Coil

| 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) |

## Accessories - 700S-CF Relays

| 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) |

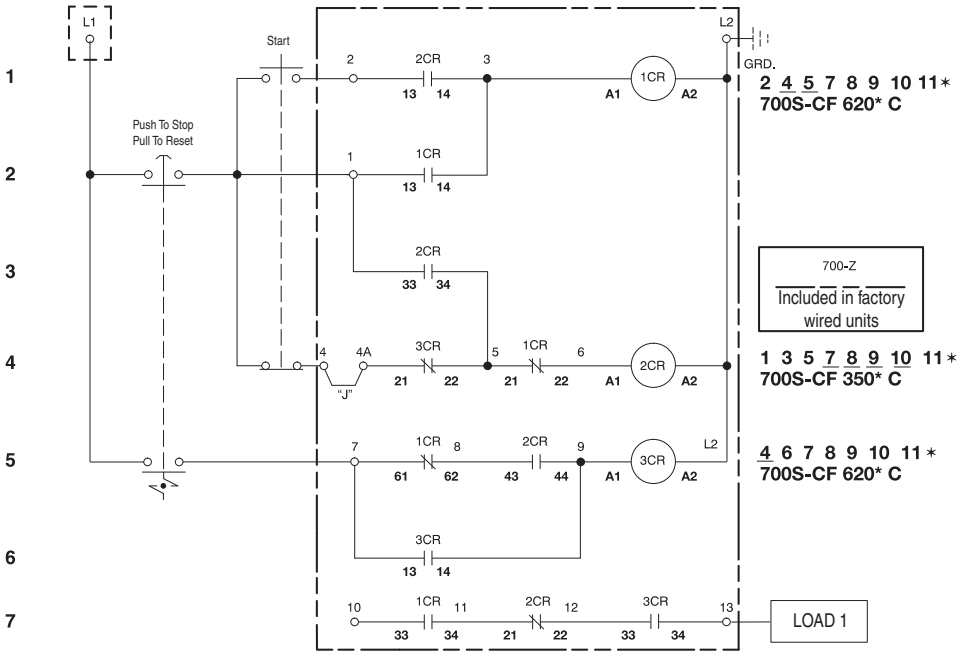
### Mounting Position



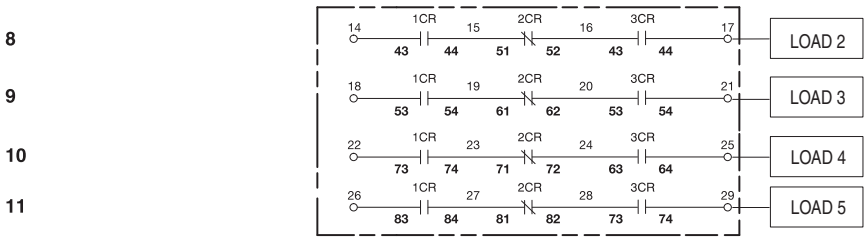
## *Safety Relay Circuit With 5 Safety Outputs*

- 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)




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



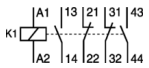
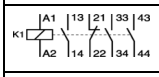
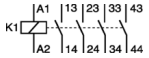

* Numbers shown are the line numbers where the contacts for this relay appear. Contact your local Rockwell Automation sales office or Allen-Bradley distributor for availability.

## 700-EF Control Relay

- IEC industrial relays
- Electronic coils
- Mechanically linked contact performance per IEC 60947-5-1
- Wide control voltage range
- Built-in surge protection
- Add-on auxiliary contact blocks - front or side mount



### 4-Pole AC Coil Voltage

| AC-12 | AC-15 | | | | | | Connection Diagrams | Contacts | | Standard Contacts(1) |
|---|---|---|---|---|---|---|---|---|---|---|
| *I*th [A] | *I*e [A] | | | | | | | | | |
| ≤ 40 °C | 24/48V | 120V | 240V | 400V | 500V | 690V | | N.O. | N.C. | Cat. No. |
| 16 | 6 | 6 | 4 | 3 | 2 | 2 |  | 2 | 2 | 700-EF220⊗ |
| | | | | | | |  | 3 | 1 | 700-EF310⊗ |
| | | | | | | |  | 4 | 0 | 700-EF400⊗ |

(1) All catalog numbers are factory stocked.

### ⊗ Voltage Codes.

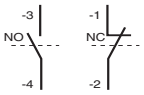
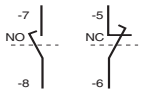
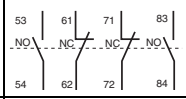
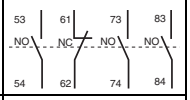
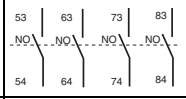
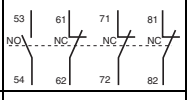
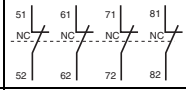
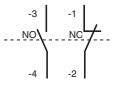
The catalog number listed is incomplete. Select a coil voltage from the table below to complete the catalog number. Example 700-EF220KJ.

| Voltage(1) | 12…20V DC | 24V DC | 24…60V AC<br>20…60V DC | 48…130V AC/DC | 100…250V AC/DC | 250…500V AC/DC |
|---|---|---|---|---|---|---|
| Standard AC/DC | — | — | KJ | KY | KD | KN |
| Low Consumption AC/DC | EQ | — | EJ | — | — | — |
| Low Consumption/Faster Drop-out DC | — | QJ | — | — | — | — |

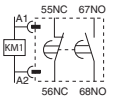
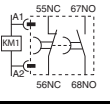
(1) AC Voltages are a 50/60 Hz.

## Accessories

### Auxiliary Contact Blocks with Standard Auxiliary Contacts

| | Description | N.O. | N.C. | Connection Diagrams | For Use With | Cat. No. |
|---|---|---|---|---|---|---|
|  | Auxiliary Contact Blocks for Front Mounting<br>• 1-pole<br>• Quick and easy mounting without tools<br>• Screw connection terminals<br>• Switching down to 12V, 3mA<br>• Mirror contact performance to the main relay poles<br>• L= Late break N.C./early make N.O. | 1 | 0 |  | 700-EF220⊗<br>700-EF310⊗ | 100-EFA10 |
| | | 0 | 1 | | | 100-EFA01 |
| | | 1L | 0 |  | 700-EF220⊗<br>700-EF310⊗ | 100-EFAL10 |
| | | 0 | 1L | | | 100-EFAL01 |
|  | Auxiliary Contact Blocks for Front Mounting<br>• 4-pole<br>• Quick and easy mounting without tools<br>• Screw connection terminals<br>• Switching down to 12V 3mA<br>• Mirror contact performance to the main relay poles | 2 | 2 |  | 700-EF220⊗ | 100-EFA22 |
| | | 3 | 1 |  | | 100-EFA31 |
| | | 4 | 0 |  | | 100-EFA40 |
| | | 1 | 3 |  | | 100-EFA13 |
| | | 0 | 4 |  | | 100-EFA04 |
|  | Auxiliary Contact Blocks for Side Mounting<br>• 2-pole<br>• Two-way numbering for right or left mounting on the relay<br>• With or without sequence terminal designations<br>• Quick and easy mounting without tools<br>• Screw connecting terminals<br>• Switching down to 12V, 3mA<br>• Mirror contact performance to the main relay poles | 1 | 1 |  | 700-EF220⊗<br>700-EF310⊗ | 100-ESA11 |

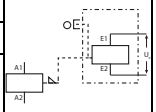
### Electronic Timers

| | Description | | N.O. | N.C. | Connection Diagrams | For Use With | Cat. No. |
|---|---|---|---|---|---|---|---|
|  | Electronic Timing Module—ON-Delay<br>• Delay of the relay solenoid<br>• The relay is energized at the end of the delay time | ON-Delay<br>0.1…1 s<br>1…10 s<br>10…100 s | 1 | 1 |  | 700-EF220⊗<br>700-EF310⊗ | 100-ETA |
| | Electronic Timing Module—OFF-Delay<br>• Delay of the relay solenoid<br>• After interruption of the control signal, the relay is de-energized a the end of the delay time | OFF-Delay<br>0.1…1 s<br>1…10 s<br>10…100 s | 1 | 1 |  | 700-EF220⊗<br>700-EF310⊗ | 100-ETB |

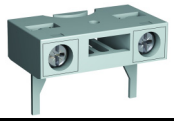
## DC Interface Module

| | Description | For Use With | Pkg. Qty. | Cat. No. |
|---|---|---|---|---|
|  | DC Interface<br>• Receives 24V DC signals from PLCs or other low output power sources and switches AC control power to operate the coils of the relay.<br>• Coil voltage: 24…250V AC 50/60 Hz<br>• Rated control circuit voltage $U_c$: 24VDC | 700-EF | 1 | 100-EJE |
| | | | 10 | 100-EJEM |

## Mechanical Latch

| | Description | Rated Voltage [V] | | Connection Diagram | For Use With | Cat. No. |
|---|---|---|---|---|---|---|
| | | V AC, 50/60 Hz | V DC | | | |
|  | Mechanical Latch<br>• Ensures contactor or relay is switched on even if there is a voltage failure<br>• Opening controlled either electrically by AC or DC impulse or manually by button<br>• Front mounting | 24…60 | 24…60 |  | 700-EF | 100-EFL11EJ |
| | | 48…130 | 48…130 | | | 100-EFL11EY |
| | | 100…250 | 100…250 | | | 100-EFL11ED |
| | | 250…500 | 250…500 | | | 100-EFL11EN |

## Additional Coil Terminal Block

| | Description | For Use With | Pkg. Qty. | Cat. No. |
|---|---|---|---|---|
|  | Additional Coil Terminal Block<br>• Allows bottom access to the coil terminals in addition to top access | 700-EF | 10 | 100-ECT |

## Functional Markers

| | Description | For Use With | Pkg. Qty. | Cat. No. |
|---|---|---|---|---|
|  | Functional Markers<br>• 256 markers (16 per card) printable on HTP500 thermal transfer printer and AMS 500 marking table<br>• 7 x 20 mm (0.276 x 0.787 in.) | 700-EF | 16 | 100-EFMS |

## Auxiliary Contacts

### 700-EF

| Cat. No. 700… | Max 2 Pole Side Aux. | Max 1 Pole Front Aux. | Max 4 Pole Front Aux. | Timer | Mechanical Latch |
|---|---|---|---|---|---|
| EF310 | 1 (L) | 2 | — | 1 | 1 |
| EF220 | 1 (L) 1 (R) | 4 | 1 | 1 | 1 |
| EF400 | — | — | — | — | — |

|  | Location of welded N.O. contacts | State of N.C. Contacts if N.O. contact welds | | |
|---|---|---|---|---|
| | | Main | Front aux. | Side aux. |
| | Main | Open | Open | Open [2] |
| Mechanically Linked Contacts [1] | Front aux. | Open | Open | — |

(1) Side mounted auxiliary contacts provide "mirror contact" performance with main poles only.
(2) 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.).

### Contacts

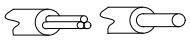
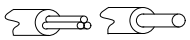
| | | | 700-EF | 100-EF | 100-ESA |
|---|---|---|---|---|---|
| **Switching of AC Loads** | | | | | |
| Rated Insulation voltage $U_i$ | | | 690V | 690V | 690V |
| Rated operational voltage $U_e$ | | | 690V | 690V | 690V |
| Rated impulse withstand voltage $U_{imp}$ | | | 6kV | 6kV | 6kV |
| AC-12 $I_{th}$ | at 40 °C | [A] | 16 | 16 | 16 |
| | at 60 °C | [A] | — | — | — |
| AC-15 at rated voltage of | 24V | [A] | 6 | 6 | 6 |
| | 42/48V | [A] | 6 | 6 | 6 |
| | 120V | [A] | 6 | 6 | 6 |
| | 230V | [A] | 4 | 4 | 4 |
| | 240V | [A] | 4 | 4 | 4 |
| | 400V | [A] | 3 | 3 | 3 |
| | 415V | [A] | 3 | 3 | 3 |
| | 500V | [A] | 2 | 2 | 2 |
| | 690V | [A] | 2 | 2 | 2 |
| **Switching of DC Loads** | | | | | |
| DC-13 switching electromagnets at | 24V DC | [A] | 6 | 6 | 6 |
| | 48V DC | [A] | 2.8 | 2.8 | 2.8 |
| | 110V DC | [A] | 0.55 | 0.55 | 0.55 |
| | 220V DC | [A] | 0.27 | 0.27 | 0.27 |
| | 440V DC | [A] | 0.13 | 0.13 | 0.13 |
| **Fuse gG** | | | | | |
| **Load Carrying Capacity per UL/CSA** | | | | | |
| Rated voltage | AC | [V] | 600 | 600 | 600 |
| Continuous rating | 40 °C | [A] | 10 | 10 | 10 |
| Switching capacity | AC | | A 600 | A 600 | A 600 |
| Rated voltage | DC | [V] | 600 | 600 | 600 |
| Continuous rating | 40 °C | [A] | 2.5 | 2.5 | 2.5 |
| Switching capacity | DC | | Q 600 | Q 600 | Q 600 |

### General Specifications - 700-EF Relays

| | Cat. No. 700-EF |
|---|---|
| **Rated Insulation Voltage $U_i$** | |
| IEC | 690V |
| UL; CSA | 600V |
| **Rated Impulse Strength $U_{imp}$** | 6 kV |
| **Rated Voltage $U_e$** | |
| AC | 24, 48, 120, 230, 400, 500, 690V |
| DC | 24, 48, 110, 220, 440V |
| **Short-Circuit Protection gG Fuse 10 A** | |
| **Rated Frequency** | 50/60 Hz, DC |
| **Ambient Temperature** | |
| Storage | –60…+80 °C (–76…+176 °F) |
| Operation at nominal current | –40…+70 °C (–40…+158 °F) |
| **Altitude** | 3000 m |
| Mechanical Life | 20 Mil |
| Electrical Life | 1.5 Mil (AC-15 240V, 3A) |
| Type of Protection | |
| IP2X (IEC 60529 and DIN 40050) | in connected state |
| Shock Resistance | IEC 60068-2: Half sinusoidal shock 11 ms, 25G (in 3 directions) |
| Vibration Resistance | IEC 60068-2: Static >2 G, in normal position no malfunction <5 G |
| Standards Compliance | UL 508, CSA C22.2 No. 14, EN/IEC 60947-1, -5-1, RoHS |
| Certifications | cULus Listed, CE Marked, CCC Certified |

## Conductors

### Cross Sections, Screw Type Terminals

| 700-EF/ 700S-EF | | | |
|---|---|---|---|
| Conductor Cross Sections—Main Contacts Terminal Type | | |  (1) |
|  | 1 conductor | [$mm^2$] | 0.75…6 |
| | 2 conductors | [$mm^2$] | 0.75…6 |
|  | 1 conductor | [$mm^2$] | 1…6 |
| | 2 conductors | [$mm^2$] | 1…6 |
| Recommended torque | | [N•m] | 1.5 |
| Cross Section per UL/CSA | | [AWG] | 16…10 |
| Recommended torque | | [lb•in] | 13 |
| Conductor Cross Sections- Coil and Auxiliary Contact Terminal Type | | |  (1) |
|  | 1 conductor | [$mm^2$] | 0.75…2.5 |
| | 2 conductors | [$mm^2$] | 0.75…2.5 |
|  | 1 conductor | [$mm^2$] | 1…2.5 |
| | 2 conductors | [$mm^2$] | 1…2.5 |
| Recommended torque | | [N•m] | 1.2 |
| Cross Section per UL/CSA | | [AWG] | 18…14 |
| Recommended torque | | [lb-in] | 11 |

(1) Pozidriv No. 2 / Blade No. 3 screw.

## Coil Data

| 700-EF/ 700S-EF | | | |
|---|---|---|---|
| **Operating Limits** | | | |
| 50/60Hz | pick-up | [x Us] | 0.85…1.1 |
| | dropout | [x Us] | ≤ 0.60 |
| DC Control | pick-up | [x Us] | 0.80…1.1 |
| | dropout | [x Us] | ≤ 0.60 |
| **Standard Coil** | | | |
| 24-60V AC, 20-60V DC (KJ) | pick-up | [VA]/[W] | 50/50 |
| | hold-in | [VA]/[W] | 2.2/2 |
| 48…130V AC/DC (KY) | pick-up | [VA]/[W] | 50/50 |
| | hold-in | [VA]/[W] | 2.2/2 |
| 100…250V AC/DC (KD) | pick-up | [VA]/[W] | 50/50 |
| | hold-in | [VA]/[W] | 2.2/2 |
| 250…500V AC/DC (KN) | pick-up | [VA]/[W] | 50/50 |
| | hold-in | [VA]/[W] | 2.2/2 |
| Operating Times | closing delay | [ms] | 40…95 |
| | opening delay | [ms] | 11…95 |
| **Energy-efficient Coil** | | | |
| 12-20V DC (EQ) | pick-up | [W] | 12…16 |
| | hold-in | [W] | 1.7 |
| 24-60V AC, 20-60V DC (EJ) | pick-up | [VA]/[W] | 16/12…16 |
| | hold-in | [VA]/[W] | 1.7/1.7 |
| Operating Times | closing delay | [ms] | 40…95 |
| | opening delay | [ms] | 11…95 |
| **High Energy Efficient Coil** | | | |
| 24V DC (QJ) | pick-up | [W] | 6 |
| | hold-in | [W] | 1.7 |
| Operating Times | closing delay | [ms] | 27…53 |
| | opening delay | [ms] | 17…29 |

## Contact Rating Table from EN 60947-5-1

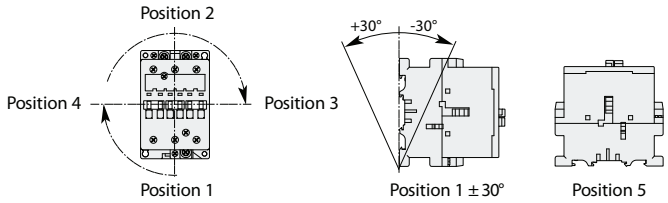
| Examples of Contact Rating Designation Based on Utilization Categories | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| NEMA Designation (1) | IEC Utilization Category | Conventional Thermal Current $I_{the}$ (A) | Rated Operational Current $I_e$ (A) at Rated Operational Voltage $U_e$ | | | | | | VA Rating | |
| **AC** | | | **120V** | **240V** | **380V** | **480V** | **500V** | **600V** | **Make** | **Break** |
| A150 | AC-15 | 10 | 6 | — | — | — | — | — | 7200 | 720 |
| A300 | AC-15 | 10 | 6 | 3 | — | — | — | — | 7200 | 720 |
| A600 | AC-15 | 10 | 6 | 3 | 1.9 | 1.5 | 1.4 | 1.2 | 7200 | 720 |
| B150 | AC-15 | 5 | 3 | — | — | — | — | — | 3600 | 360 |
| B300 | AC-15 | 5 | 3 | 1.5 | — | — | — | — | 3600 | 360 |
| B600 | AC-15 | 5 | 3 | 1.5 | 0.95 | 0.75 | 0.72 | 0.6 | 3600 | 360 |
| C150 | AC-15 | 2.5 | 1.5 | — | — | — | — | — | 1800 | 180 |
| C300 | AC-15 | 2.5 | 1.5 | 0.75 | — | — | — | — | 1800 | 180 |
| C600 | AC-15 | 2.5 | 1.5 | 0.75 | 0.47 | 0.375 | .035 | 0.3 | 1800 | 180 |
| D150 | AC-15 | 1.0 | 0.6 | — | — | — | — | — | 432 | 72 |
| D300 | AC-14 | 1.0 | 0.6 | 0.3 | — | — | — | — | 432 | 72 |
| E150 | AC-14 | 0.5 | 0.3 | — | — | — | — | — | 216 | 36 |
| **DC** | | | **125V** | **250V** | **440V** | **500V** | **600V** | **—** | **Make** | **Break** |
| N150 | DC-13 | 10 | 2.2 | — | — | — | — | — | 275 | 275 |
| N300 | DC-13 | 10 | 2.2 | 1.1 | — | — | — | — | 275 | 275 |
| N600 | DC-13 | 10 | 2.2 | 1.1 | 0.63 | 0.55 | 0.4 | — | 275 | 275 |
| P150 | DC-13 | 5 | 1.1 | — | — | — | — | — | 138 | 138 |
| P300 | DC-13 | 5 | 1.1 | 0.55 | — | — | — | — | 138 | 138 |
| P600 | DC-13 | 5 | 1.1 | 0.55 | 0.31 | 0.27 | 0.2 | — | 138 | 138 |
| Q150 | DC-13 | 2.5 | 0.55 | — | — | — | — | — | 69 | 69 |
| Q300 | DC-13 | 2.5 | 0.55 | 0.27 | — | — | — | — | 69 | 69 |
| Q600 | DC-13 | 2.5 | 0.55 | 0.27 | 0.15 | 0.13 | 0.1 | — | 69 | 69 |
| R150 | DC-13 | 1.0 | 0.22 | — | — | — | — | — | 28 | 28 |
| R300 | DC-13 | 1.0 | 0.22 | 0.1 | — | — | — | — | 28 | 28 |

(1) This letter stands for the conventional thermal current and identifies AC or DC: for example, B=5 A AC. The number that follows is the rated insulation voltage.

## Approximate Dimensions

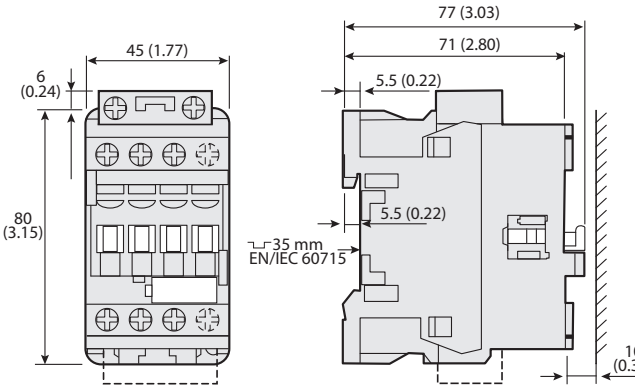
Dimensions are shown in millimeters (inches). Dimensions are not intended for manufacturing purposes.

### Mounting Position 700-EF Relays



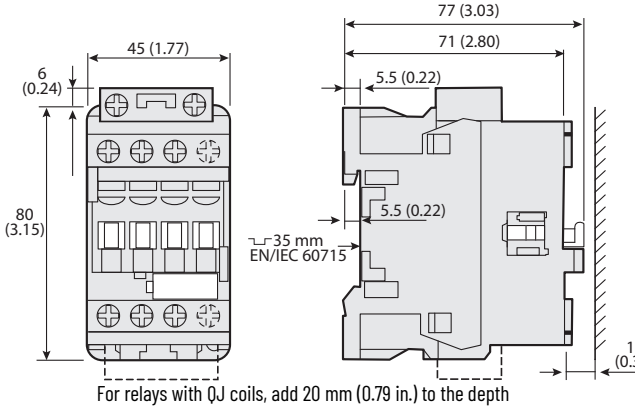

# 700-EF Relays

### 700-EF Relays with Standard Coils



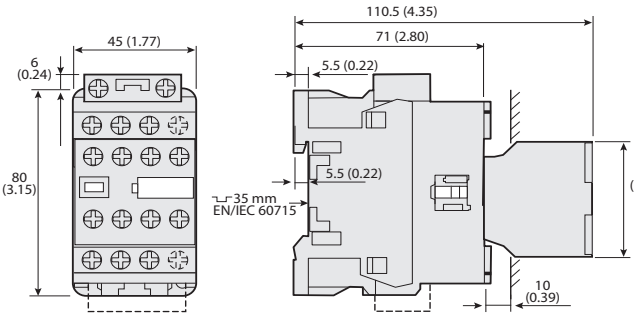

For relays with QJ coils, add 20 mm (0.79 in.) to the depth

### 700-EF Relays with Low-consumption Coils



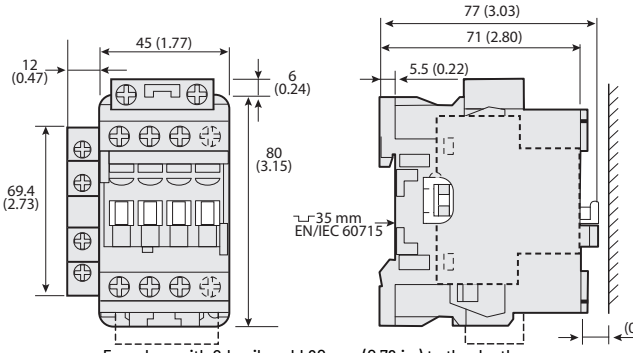

For relays with QJ coils, add 20 mm (0.79 in.) to the depth

### 700-EF Relays with Standard Coils and Front-mounted Auxiliary Contact



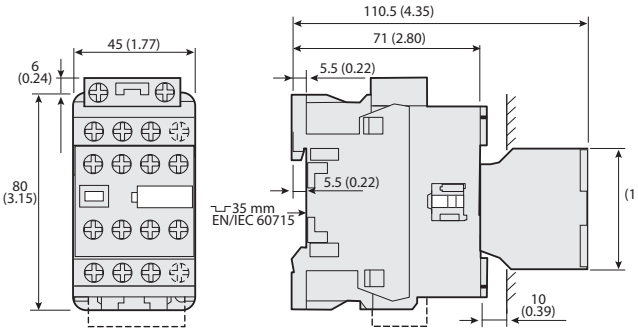

For relays with QJ coils, add 20 mm (0.79 in.) to the depth

### 700-EF Relays with Standard Coils and Side-mounted Auxiliary Contact



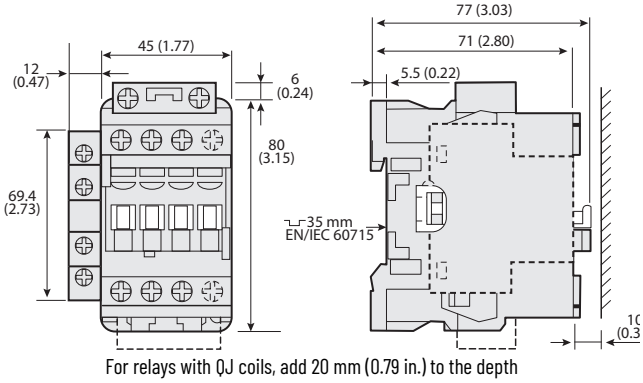

For relays with QJ coils, add 20 mm (0.79 in.) to the depth

### 700-EF Relays with Low-consumption Coils and Front-mounted Auxiliary Contact




For relays with QJ coils, add 20 mm (0.79 in.) to the depth

### 700-EF Relays with Low-consumption Coils and Side-mounted Auxiliary Contact



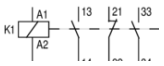
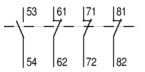
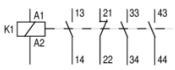
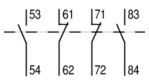
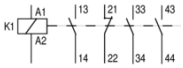
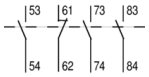

For relays with QJ coils, add 20 mm (0.79 in.) to the depth

## 700S-EF Control Relays



The 700S-EF Safety Control Relay provides mechanically or mirror contact performance, which are required in feedback circuits for safety applications.

- IEC industrial safety relay
- Electronic coils
- Mechanically linked contacts as per IEC 60947-5-1
- Red cover and mechanically linked contact symbol on front face
- Permanently fixed front mounted auxiliary contact block

| AC-12 | | AC-15 | | | | | | Connection Diagrams | | Contacts | | Standard Contacts Cat. No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *I*th [A] | | *I*e [A] | | | | | | Main Contacts | Auxiliary Contacts | | | |
| | 40 °C | 24/48V | 120V | 240V | 400V | 500V | 690V | | | N.O. | N.C. | |
| Main Contacts | 16 | 6 | 6 | 4 | 3 | 2 | 2 |  |  | 4 | 4 | 700S-EF440⊗C |
| | | | | | | | |  |  | 5 | 3 | 700S-EF530⊗C |
| Adder Deck Contacts | 16 | 6 | 6 | 4 | 3 | 2 | 2 |  |  | 6 | 2 | 700S-EF620⊗C |

### ⊗ Voltage Codes

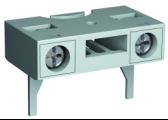
The catalog number listed is incomplete. Select a coil voltage from the table below to complete the catalog number. Example 700-EF220KJ.

| Voltage[1] | 12…20V DC | 24V DC | 24…60V AC 20…60V DC | 48…130V AC/DC | 100…250V AC/DC | 250…500V AC/DC |
|---|---|---|---|---|---|---|
| Standard AC/DC | — | — | KJ | KY | KD | KN |
| Low Consumption AC/DC | EQ | — | EJ | — | — | — |
| Low Consumption/Faster Drop-out DC | — | QJ | — | — | — | — |

(1) AC Voltages are a 50/60 Hz.

## Accessories

### Additional Coil Terminal Block

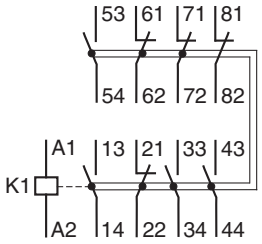
| | Description | For Use With | Pkg. Qty. | Cat. No. |
|---|---|---|---|---|
|  | Additional Coil Terminal Block<br>• Allows bottom access to the coil terminals in addition to top access | 700-EF | 10 | 100-ECT |

### Functional Markers

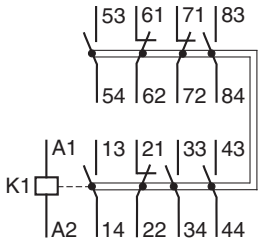
| | Description | For Use With | Pkg. Qty. | Cat. No. |
|---|---|---|---|---|
|  | Functional Markers<br>• 256 markers (16 per card) printable on HTP500 thermal transfer printer and AMS 500 marking table<br>• 7 x 20 mm (0.276 x 0.787 in) | 700-EF | 16 | 100-EFMS |

## Assignment of Contacts

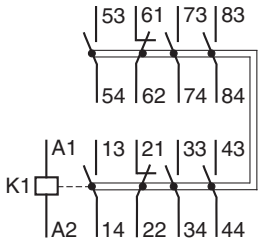
Safety Control Relays with Front-mount Auxiliary Contacts, 8-Pole AC or DC Coil Voltage



700S-EF440⊗...



700S-EF530⊗...



700S-EF620⊗...

## Specifications - 700S-EF Relays

See General Specifications - 700-EF Relays on page 223 for additional specifications.

| | | | Cat. No. 700S-EF | Aux. Contact (Front-mounted) |
|---|---|---|---|---|
| Mechanical Life | | [Mil] | 20 | 20 |
| Electrical Life | AC-15 (240V, 3 A) | [Mil] | 1.5 | 1.5 |
| Standards Compliance | | | UL 508, CSA C22.2 No. 14, EN/IEC 60947-1, -5-1, Meets the material restrictions for European Directive 2002/95/EC - EU-RoHS | |
| Certifications | | | cULus Listed , CE Marked, CCC Certified | |

## Conductors

### Cross Sections, Screw Type Terminals

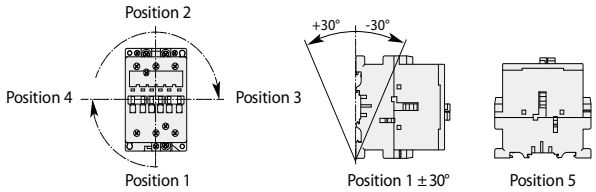
| 700-EF/ 700S-EF | | | |
|---|---|---|---|
| Conductor Cross Sections—Main Contacts Terminal Type | | | (1) |
| | 1 conductor | [$mm^2$] | 0.75…6 |
| | 2 conductors | [$mm^2$] | 0.75…6 |
| | 1 conductor | [$mm^2$] | 1…6 |
| | 2 conductors | [$mm^2$] | 1…6 |
| Recommended torque | | [N•m] | 1.5 |
| Cross Section per UL/CSA | | [AWG] | 16…10 |
| Recommended torque | | [lb•in] | 13 |
| Conductor Cross Sections- Coil and Auxiliary Contact Terminal Type | | | (1) |
| | 1 conductor | [$mm^2$] | 0.75…2.5 |
| | 2 conductors | [$mm^2$] | 0.75…2.5 |
| | 1 conductor | [$mm^2$] | 1…2.5 |
| | 2 conductors | [$mm^2$] | 1…2.5 |
| Recommended torque | | [N•m] | 1.2 |
| Cross Section per UL/CSA | | [AWG] | 18…14 |
| Recommended torque | | [lb-in] | 11 |

(1) Pozidriv No. 2 / Blade No. 3 screw.

## Approximate Dimensions

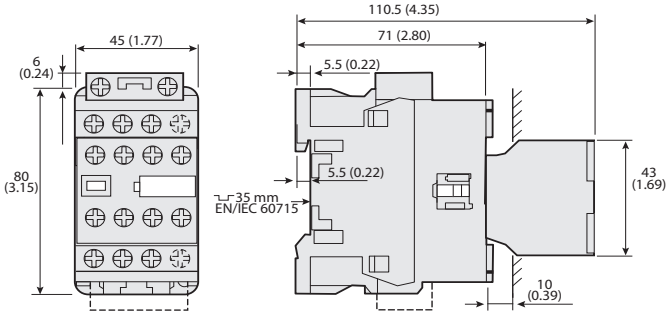
Dimensions are shown in millimeters (inches). Dimensions are not intended for manufacturing purposes.

### Mounting Position for 700S-EF Relays



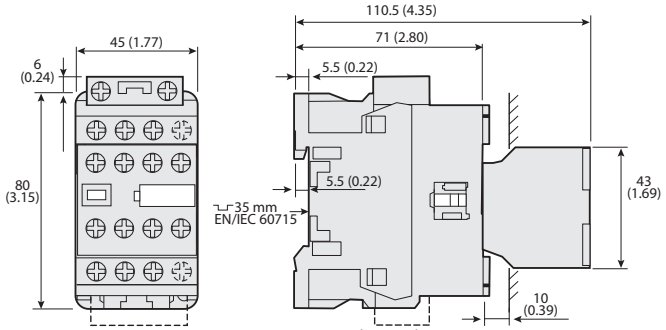

## 700S-EF Relays

### 700S-EF Relays with Standard Coils and Front-mounted Auxiliary Contact




For relays with QJ coils, add 20 mm (0.79 in.) to the depth

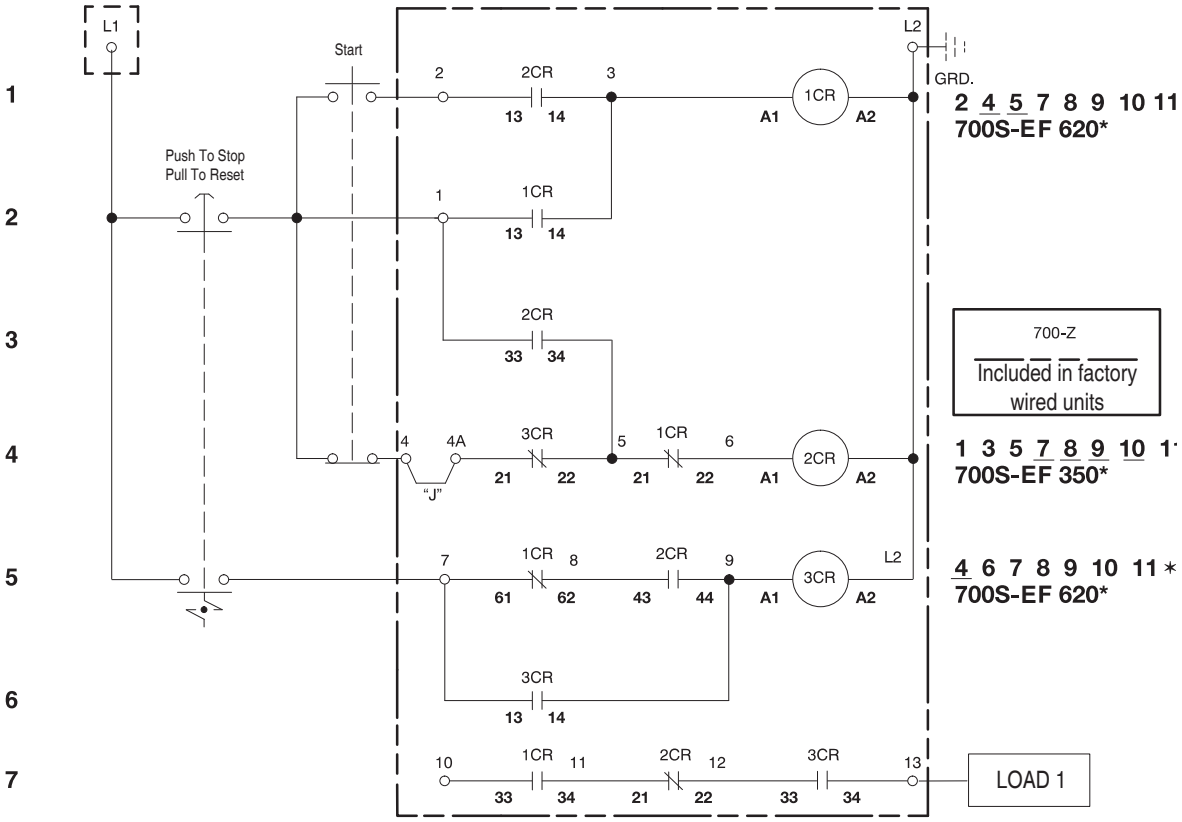
### 700S-EF Relays with Low-consumption Coils and Front-mounted Auxiliary Contact



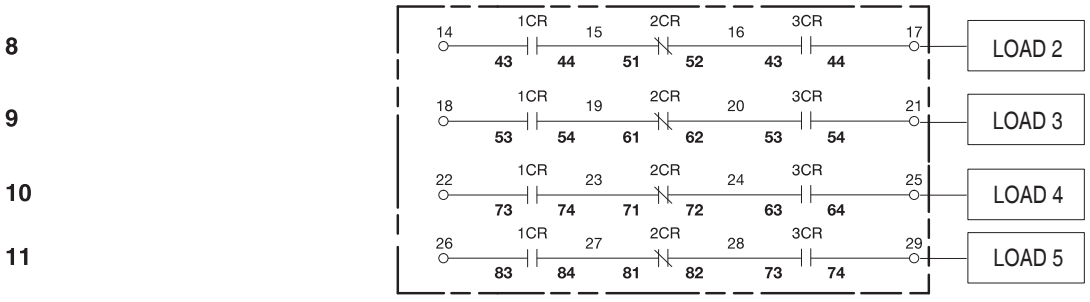

For relays with QJ coils, add 20 mm (0.79 in.) to the depth

### *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-EF relays and this diagram to construct the circuit




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

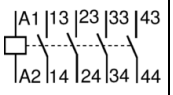
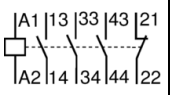
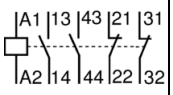
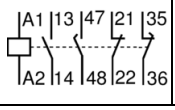


## 700-K Miniature Control Relays

- IEC compact industrial relay
- IP2X Finger Protection
- Bifurcated contacts for low-level signals
- Optional integrated coil protection diode




### 4-Pole AC or DC Coil Voltage

| AC-12 | | AC-15 (B600) | | | | | | | Connection Diagrams | Contacts | | Pkg. Qty.(2) | Cat. No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *I*th [A] | | $I_e$ [A] | | | | | | | | | | | |
| 40 °C | 60 °C | 24/48V | 120V | 240V | 400V | 500V | 600V | 690V | | N.O. | N.C. | | |
| 10 | 6 | 3 | 3 | 2 | 1 | 1 | 0.6 | 0.6 |  | 4 | 0 | 1 | 700-K40E-⊗ |
| | | | | | | | | |  | 3 | 1 | 1 | 700-K31Z-⊗ |
| | | | | | | | | |  | 2 | 2 | 1 | 700-K22Z-⊗ |
| | | | | | | | | |  | 1+1L (1) | 1+1L | 1 | 700-KL22Z-⊗ |

(1) 1L = Late Break N.C. / Early Make N.O.
(2) May be ordered in package quantities of 20. Add letter M to the end of the cat. no. Example: 700-K40E-ZJM.

### ⊗ *Coil Voltage Codes*

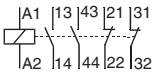
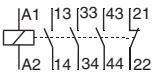
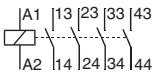
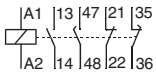
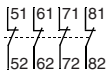
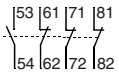
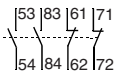
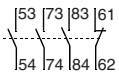
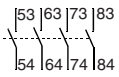
The cat. no. as listed is incomplete. Select a coil voltage code from the table below to complete the cat. no. Example: 230V, 50/60 Hz: Cat. No. 700-K40E-⊗ becomes Cat. No. 700-K40E-KF. For other voltages, consult your local Rockwell Automation sales office or Allen-Bradley distributor.

| For Screw Type Terminal Versions | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | [V] | 12 | 24 | 110 | 120 | 125 | 220 | 230 | 240 | 250 | 400 | 440 | 480 | 525 | 600 |
| AC, 50 Hz | | — | — | D | — | — | — | — | — | — | — | B | — | VC | — |
| AC, 60 Hz | | — | — | — | D | — | — | — | — | — | — | — | B | — | VC |
| AC, 50/60 Hz | | — | KJ | — | — | — | — | KF | KA | — | KN | — | — | — | — |
| Standard | DC | ZQ | ZJ | ZD | — | ZS | ZA | — | — | ZT | — | — | — | — | — |
| Standard diode | DC | — | DJ | — | — | — | — | — | — | — | — | — | — | — | — |
| **For Spring Clamp Type Terminal Versions** | | | | | | | | | | | | | | | |
| AC, 50 Hz | | — | — | D | — | — | — | — | — | — | — | — | — | — | — |
| AC, 60 Hz | | — | — | — | D | — | — | — | — | — | — | — | — | — | — |
| AC, 50/60 Hz | | — | KJ | — | — | — | — | KF | — | — | — | — | — | — | — |
| Standard | DC | — | ZJ | ZD | — | — | — | — | — | — | — | — | — | — | — |
| Standard diode | DC | — | DJ | — | — | — | — | — | — | — | — | — | — | — | — |

## Assignment of Contacts

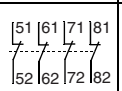
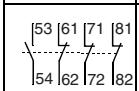
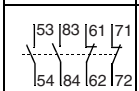
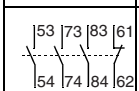
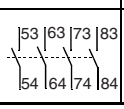
**Device Combinations in Accordance with IEC 60947-1 / -4-1**

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 700-KR relays and 100-KR auxiliary contacts. (3)

| Auxiliary Contact Blocks | | Control Relays 700-K (AC and DC Control) | | | | |
|---|---|---|---|---|---|---|
| Cat. No. | Circuit Diagram | Control | 700-K22Z- | 700-K31Z- | 700-K40E- | 700-KL22Z- |
| | | |  |  |  |  |
| **Front Mounting** | | | | | | |
| 100-KFA02E |  | AC/DC | — | 31Z + 02E = 33Y (1) | 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 (1) | — |
| 100-KFA13E |  | AC/DC | — | 31Z + 13E = 44Y (1) | 40E + 13E = 53Y | — |
| 100-KFA22Z |  | AC/DC | — | 31Z + 22Z = 53Y (1) | 40E + 22Z = 62Y | — |
| 100-KFA31Z |  | AC/DC | — | — | 40E + 31Z = 71Y (2) | — |
| 100-KFA40E |  | AC/DC | 22Z + 40E = 62Y | 31Z + 40E = 71Y | 40E + 40E = 80Y | L22Z + 40E = L62Y |

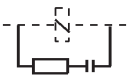
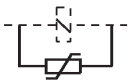
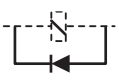
(1) Tamb. max. +40 °C.
(2) Tamb. max. +40 °C and only allowed for coil voltage 24V DC or 230V AC.
(3) For other operating limits, please contact our technical consultant.

## Auxiliary Contact Blocks

| Photo | Description | Connection Diagrams | N.O. | N.C. | For Use With | Pkg. Qty. (1) | Screw Type Terminals Cat. No. | Spring Clamp Terminals Cat. No. |
|---|---|---|---|---|---|---|---|---|
|  | **Front-mounted auxiliary contacts**<br>• Auxiliary Contact Blocks<br>• 2- and 4-pole versions<br>• Choice of contact configurations<br>• Snap on, no tools required<br>• 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 |

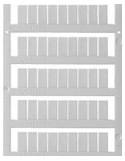
(1) May be ordered in package quantities of 10. Add letter **M** to the end of the cat. no. Example: **100-KFA02EM**.

## Control Modules

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

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

## Accessories

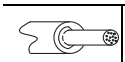
| Photo | Description | Pkg. Qty. | Cat. No. |
|---|---|---|---|
|  | **Label Sheet**<br>105 self-adhesive paper labels each, 6 x 17 mm | 10 | 100-FMS |
|  | **Snap-In Marker Card** | 5 | 1492-M6X12 |

## IEC Specifications - 700-K... Relays

| | | | 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** | | | | |
| | Fuse gG | [A] | 10 | |
| **Min. Switching Capacity 15V** | | | | |
| | | [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** | | | | (1)  |  |
|  | Fine stranded with ferrule | (1) Conductor<br>(2) Conductors | [mm2]<br>[mm2] | 0.75…2.5<br>0.75…2.5 | 0.50…2.5<br>0.50…2.5 |
| | Solid or coarse stranded | (1) Conductor<br>(2) Conductors | [mm2]<br>[mm2] | 1…4<br>1…2.5 + 1…4 | 0.75…2.5 (3)<br>0.75…2.5 (3) |
| Recommended torque | | | [Nm] | 1.2 | — |
| Cross section per UL/CSA | | | [AWG] | 18…12 (2) | 18…14 (3) |
| Recommended torque | | | [lb-in] | 10.6 | — |

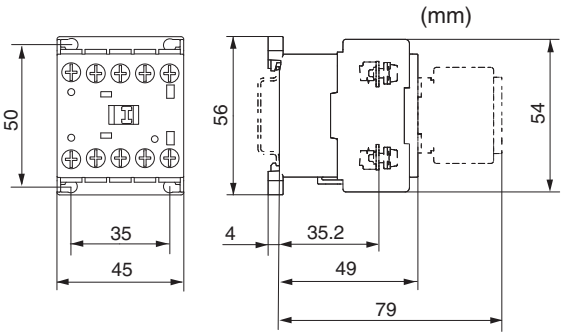
(1) Pozidriv No. 2 / Blade No. 3 screw.
(2) Use same cross sections.
(3) Stranded wire only.

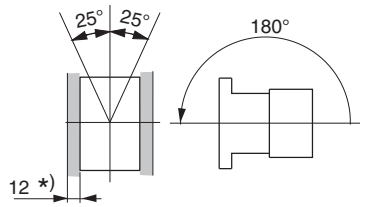
## Coil Data

| | | | 700-K |
|---|---|---|---|
| **Operating Limits** | | | |
| AC control<br>50 Hz, 60 Hz, 50/60 Hz | pick-up | [x *Us*] | 0.85…1.1 |
| | dropout | [x *Us*] | 0.2…0.75 |
| DC control | pick-up | [x *Us*] | 0.8…1.1<br>9, 12, 24, 110V DC: 0.7…1.25 |
| | dropout | [x *Us*] | 0.1…0.75 |
| **Coil Consumption** | | | |
| AC control<br>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 | closing delay | [ms] | 8…12 |
| With external diode | opening delay | [ms] | 35…50 |

## Dimensions - 700-K... Relays

Approximate dimensions are shown in millimeters. To convert millimeters to inches multiply by 0.0394. Dimensions are not intended to be used for manufacturing purposes.



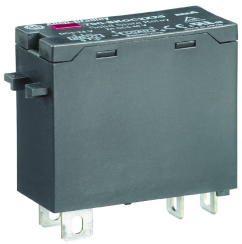

*) -Minimum distance to grounded parts or walls

# Solid-state Relays

## Product Overview

| |  | |  | |
|---|---|---|---|---|
| **Bulletin No.** | **700-SA** | | **700-SC** | |
| **Type** | Tube Base, Socketed | | Miniature, Ice Cube Socketed | |
| **Features** | Compatible with 700-HN100, 125,108, and 204 socket, LED status, zero-cross switching | | Compatible with 700-HN103 or 128 socket, LED Status, and Zero-cross AC Switching Options | |
| **Load Type** | AC<br>(47…63 Hz) | DC | AC (47…63 Hz) | DC |
| **Load Voltage Range** | 75…264V AC | 3…125V DC | 75…264V AC | 3…52.8V DC or 3…125V DC |
| **Load Current Max. (Continuous)** | 5 A | 3 A | 3 A | 3 A @ 48V DC or 2 A @ 110V DC |
| **Max. Leakage Current to Load** | 5 mA @ 100V, 10 mA @ 200V | 5 mA @ 125V | 5 mA @ 100V AC | 10 mA @ 200V AC, 5 mA @ 50V DC or 0.1 mA @ 100V DC |
| **Zero Cross Load Switching** | Yes | Not Applicable | Yes (optional) | Not Applicable |
| **Equivalent Electromechanical Relay Contact Arrangement** | Form A | | Form A | |
| **Rated Control (Input) Voltage** | 5…24V DC | | 5…24V DC, 100…110V AC, 200/220V AC | 5...24V DC |
| **LED Indicator** | Yes | | Yes (optional) | Yes (optional for 48V DC) |
| **Mounting Method** | Panel or DIN with socket | | Panel or DIN with socket | |
| **Dielectric Strength** | 1500V AC, 50/60 Hz, 1 min. | | 1500V AC, 50/60 Hz, 1 min. | |
| **Certification** | cURus, CE, VDE | | cURus, CE, VDE | |
| **Max. Ambient Operating Temperature** | -30…+80 °C (no condensation) | | -30…+80 °C (no condensation) | |
| **Page** | 241 | | 246 | |

## Product Overview

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| |  | |  | |  | | | |
| **Bulletin No.** | **700-SF** | | **700-SH** | **700-SK** | | | |
| **Type** | Square Base, Socketed | | Hockey Puck | Slim Line, Socketed | | | |
| **Features** (1) | Compatible with 700-HN116 socket, LED status, zero-cross AC switching | | Panel/DIN Mount, High Current, Protective Cover, LED Status | Compatible with 700-HN121 socket. Supports Input (sensor) module or Output (SSR) module | | | |
| **Load Type** | AC (47…63 Hz) | DC | AC (47…63 Hz)<br>3…60V DC | Output Module | | Input Module | |
| | | | | AC<br>(47…63 Hz) | DC | AC (47…63 Hz) | DC |
| **Load Voltage Range** | 75…264V AC | 3 … 52.8V DC | 3…50V DC, 24…265V AC<br>42…530V AC, 42…265V AC,<br>42…660V AC | 75 … 264V AC | 4 … 60V DC, 40 … 200V DC | Field Input: 60… 264V AC | Field Input: 6.6… 32V DC |
| **Load Current Max. (Continuous)** | 3 A | | 10 A/100 A‡ | 2 A | 2 A @ 60V, 1.5 A @ 200V | Supply Current: 0.1…100 mA | Supply Current: 0.1…100 mA |
| **Max. Leakage Current to Load** | 5 mA @ 100V AC,<br>10 mA @ 200V AC | 5 mA @ 50V DC | <3 mA | 1.5 mA | 1 mA | 5 µA | 5 µA |
| **Zero Cross Load Switching** | Yes | Not Applicable | Yes | Yes (optional) | N/A | No | N/A |
| **Equivalent Electromechanical Relay Contact Arrangement** | Form A | | Form A | Form A | | | |
| **Rated Control (Input) Voltage** | 4V DC or 24V DC | | 3…32V DC, 4…32V DC,<br>80…130V AC, 20…260V AC<br>20…280V AC/22…48V DC | 5… 24 V DC | | | |
| **LED Indicator** | Yes | | Yes | Yes | | | |
| **Mounting Method** | Panel or DIN with socket | | Panel without heat sink, Panel, or DIN with heat sink | Panel or DIN with socket | | | |
| **Dielectric Strength** | 1500V AC, 50/60 Hz, 1 min. | | >4000V AC RMS | 4000V AC, 50/60 Hz, 1 min. | | | |
| **Certification** | cURus, CE, VDE | | cURus, CE, CSA | cURus, CE, TÜV | | | |
| **Max. Ambient Operating Temperature** | -30…+80 °C (no condensation) | | -20…+70 °C (no condensation) | -30…+80 °C (no condensation) | | | |
| **Page** | 251 | | 255 | 264 | | | |

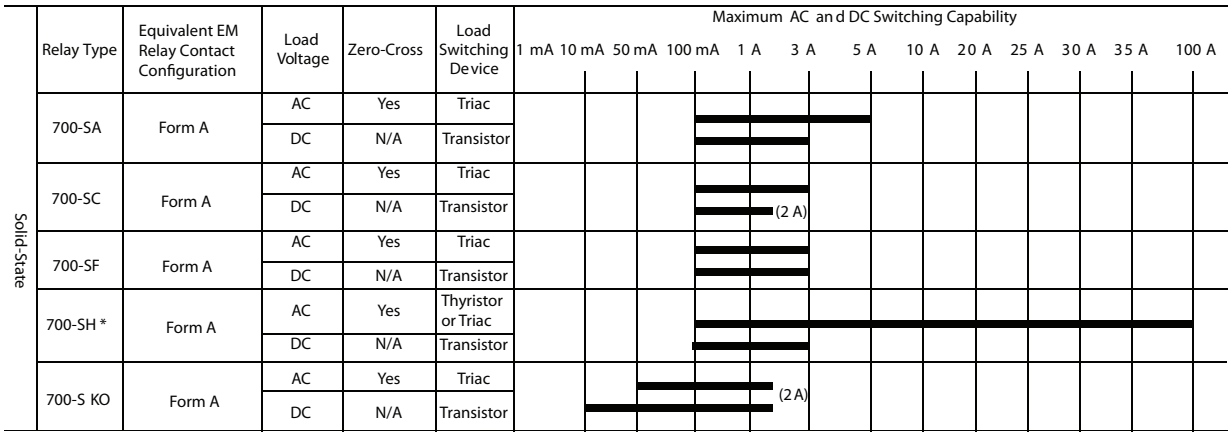
(1) See Solid-state Relay Glossary on page 241 for term definitions.

## Solid-state Relay Glossary

| Terms | | Meaning |
|---|---|---|
| Insulation | Basic insulation | Insulation for basic protection from electric shock (IEC950 1.2.9.2) |
| | Supplemental insulation | Independent insulation that is provided outside of basic insulation to protect from electric shock when the basic insulation breaks down (IEC950 1.2.9.3) |
| | Reinforced insulation | A single-layer of insulation (IEC950 1.2.9.5) that provides the same protection from electric shock as double insulation (insulation including both basic and supplemental insulation) according to conditions stipulated in IEC950 standards |
| Circuit functions | Zero cross circuit | A circuit that starts operation with the AC load voltage at close to zero-phase. |
| | Trigger circuit | A circuit for controlling the triac or thyristor trigger signal, which turns the load current ON and OFF. |
| Input | Isolated input circuit | If the external circuit is prone to generating noise, or if wires from external sources are prone to the influence of inductive noise, in order to prevent malfunctions due to noise, it is necessary to electrically isolate internal circuits and external circuits (output circuits). An isolated input circuit is a circuit that isolates inputs and outputs by using components that are not connected electrically but that can transmit signals, such as contact relays or photocouplers. |
| | Photocoupler | A component that runs the electric signal into a light emitter (for example, LED), changes it to a light signal, and then returns it to an electric signal using a photoelectric conversion element, such as a photo transistor. The space that is used for transferring the light signal is isolated thus providing good insulation and a high propagation speed. |
| | Rated voltage | The voltage that serves as the standard value of an input signal voltage |
| | Pickup (must-operate) voltage | Minimum input voltage when the output status changes from OFF to ON. |
| | Input impedance | The impedance of the input circuit and the resistance of current-limiting resistors used. Impedance varies with the input signal voltage in case of the constant current input method. |
| | Operating voltage | The permissible voltage range within which the voltage of an input signal voltage may fluctuate. |
| | Dropout (Reset) voltage | Maximum input voltage when the output status changes from ON to OFF. |
| | Input current | The current value when the rated voltage is applied. |
| Output | Load voltage | This is the effective value for the power supply voltage that can be used for load switching or in the continuous-OFF state. |
| | Maximum load current (continuous) | The effective value of the maximum current that can continuously flow into the output terminals under specified cooling conditions (i.e., the size, materials, thickness of the heat sink, and an ambient temperature radiating condition). |
| | Leakage current | The effective value of the current that can flow into the output terminals when a specified load voltage is applied to the SSR with the output turned OFF. |
| | Output ON voltage drop | The effective value of the AC voltage that appears across the output terminals when the maximum load current flows through the SSR under specified cooling conditions (such as the size, material, and thickness of heat sink, ambient temperature radiation conditions, etc.). |
| | Minimum load current (continuous) | The minimum load current at which the SSR can operate normally. |
| | Snubber circuit | A circuit consisting of a resistor R and capacitor C, which prevents faulty ignition from occurring in the SSR triac by suppressing a sudden rise in the voltage that is applied to the triac. |
| | Semiconductor output element (switching element) | This is a generic name for semiconductors such as the thyristor, triac, power transistor, and power MOS FET. In particular, triacs are often used in SSRs because they allow switching to be performed with one element. |
| | Repetitive peak OFF-state voltage (VDRM) | This is a rating for an output semiconductor that used in an SSR for AC loads. |
| | Collector-emitter voltage (VCEO) | This is a rating for an output semiconductor that used in an SSR for DC loads. |

| Terms | | Meaning |
|---|---|---|
| Characteristics | Operating (pick-up) time | A time lag between the moment a specified signal voltage is imposed to the input terminals and the output is turned ON. |
| | Release (drop-out) time | A time lag between the moment the imposed signal input is turned OFF and the output is turned OFF. |
| | Insulation resistance | The resistance between the input and output terminals or I/O terminals and metal housing (heat sink) when DC voltage is imposed. |
| | Dielectric strength | The effective AC voltage that the SSR can withstand when it is applied between the input terminals and output terminals or I/O terminals and metal housing (heat sink) for more than 1 minute. |
| | Ambient temperature and humidity (operating) | The ranges of temperature and humidity in which the SSR can operate normally under specified cooling, input/output voltage, and current conditions. |
| | Storage temperature | The temperature range in which the SSR can be stored without voltage imposition. |
| Others | Inrush current resistance | A current, which can be applied for short periods of time to the electrical element. |
| | Counter-electromotive force | Extremely steep voltage rise which occurs when the load switched or turned OFF. |
| | Recommended applicable load | The recommended load capacity which takes into account the safety factors of ambient temperature and inrush current. |
| | Bleeder resistance | The resistance connected in parallel to the load in order to increase apparently small load currents, so that the ON/OFF of minute currents functions normally. (It is also used to shunt leakage currents.) |

### Solid-state Relay Switching Capacity




**IMPORTANT** * Requires a heat sink to reach maximum current value.

## 700-SA Tube Base Relays



- 5 A (resistive) max. continuous load (output) current
- 264V AC or 125V DC max. load voltage options
- Photocoupler isolation between control and load voltage
- LED indicator (standard) for input/logic ON/OFF status monitoring
- 700-HN100, -HN125, -HN 202, or -HN108 specialty socket compatible
- 700-HT2 timing module

| Input-to-Output Isolation Method | Zero Cross Function | Status Indicator | Output (Load) Max. Continuous Current and Rated Voltage Range | Rated Input (Control) Voltage | Cat. No. |
|---|---|---|---|---|---|
| Photocoupler | Yes | Yes | 5 A @ 100…240V AC (47…63 Hz) | 5…24V DC | 700-SAZY5Z25 |
| | Not Applicable | | 3 A @ 5…110V DC | | 700-SANY3Z25 |

## Accessories - 700-SA Relays

| Photo | Description | Pkg. Quantity | Cat. No. |
|---|---|---|---|
|  | **Screw Terminal Tube Base Socket — Panel or DIN Rail Mounting; Guarded Terminal Construction.** 8 Pin for use with DPDT 700-HA Relays. | 10 | 700-HN100 |
|  | **Specialty Socket** 8 Pin back wired socket with solder terminals | 10 | 700-HN108 |
|  | **Screw Terminal Tube Base Socket — Panel or DIN Rail Mounting; Open Style Construction.** 8 Pin for use with DPDT 700-HA Relays. No retainer clip required. | 10 | 700-HN125 |
|  | **DIN (#3) symmetrical hat rail** 35 x 7.5 x 1 m | 10 | 199-DR1 |
|  | **Pre-Printed Identification Tags —** contains 10 sheets of pre-printed and blank tags. Each sheet contains 13 sets of the markings CR…9CR, TR…9TR, M…9M, F, R, 1S, and 117 blank tags. Tags are peel-off with sticky backing for easy placement on relays. | 10 | 700-N40 |
| | **Blank Identification Tags —** contains 10 sheets of blank identification tags for customer specialized printing. Each sheet contains 546 blank tags. Tags are peel-off with sticky backing for easy placement on relays. | 10 | 700-N41 |
|  | **Retainer Clip** for Sockets with 700-SA AND 700-HB Relays. Secures relay in socket. | 10 | 700-HN158 |
|  | **8-Pin Socket — Can Be Used With or Without Timing Module or Surge Suppressor.** Screw Terminal Tube Base Sockets — panel or DIN Rail mounting. Guarded terminal construction. Used with DPDT 700-HA Relays. | 10 | 700-HN204 |

## Specifications - 700-SA Relays

### 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. (1) | 4V DC max. | 1V DC min. |
| **700-SANY3Z25** | | 4…30V DC | -30V DC | 1.5 kΩ (+20% -10%) | | |

### Load/Output Ratings

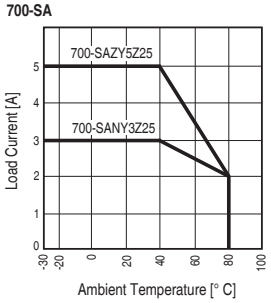
| Cat. No. | Rated Load Voltage | Maximum Load Voltage Range | Continuous Load Current (Resistive) [A] | | Max. Inrush Current (3) |
|---|---|---|---|---|---|
| | | | Min. | Max. (2) | |
| **700-SAZY5Z25** | 100…240V AC | 75…264V AC | 0.1 | 5.0 | 80 A, @ 50/60 Hz for 1 cycle |
| **700-SANY3Z25** | 5…110V DC | 3…125V DC | 0.1 | 3.0 | 12 A (10 ms) |

### Characteristics

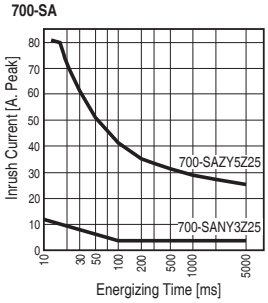
| Description | | Cat. No. 700-SAZY5Z25 | Cat. No. 700-SANY3Z25 |
|---|---|---|---|
| Load Switching Method/Device | | Triac | Transistor |
| Pick-up Time | | 1/2 cycle of load power source cycle time (4) + 1 ms max. | 0.5 ms max. |
| Drop-out Time | | 1/2 cycle of load power source cycle time (4) + 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 (V/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/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 60947-1, -4-3 | |
| Certifications | | cURus Recognized (File No. E96956, Guide NMFT2/NMFT8), CE Marked, VDE Certified | |
| Weight | | Approx. 70 g | |

(1) With constant current input system. SSR input impedance varies with a change in input (control) voltage.
(2) See the following graph "Load Current Vs. Ambient Temperature Characteristics" for additional load current details.
(3) If the SSR operation is continuous ON/OFF, this value should be reduced by 50%. See "Inrush Current Resistivity" graph.
(4) 60 Hz full cycle time = 16.6 ms, 50 Hz full cycle time = 20 ms.

**Load Current vs. Ambient Temperature Characteristics**

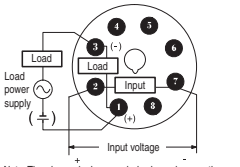



**Inrush Current Resistivity (1)**




(1) Inrush current resistivity is the ability of an SSR to withstand a large surge current for a short period. 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 Solid-state Relays (SSRs)*

If multiple SSRs are installed side by side,, 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.

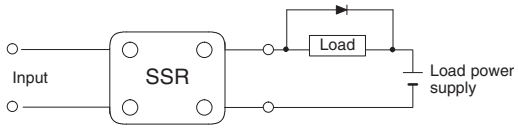
### *Protective Component*

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 (s 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 that is outlined in the table.

| 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 | |

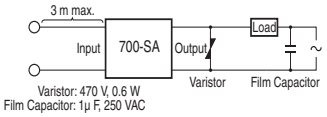
**TIP** For additional details on solid-state relays, see the Solid-State Relay Application Guide, publication 700-AT001.

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



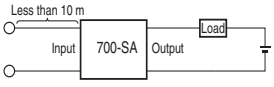

**EMC Directive Compliance**

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:

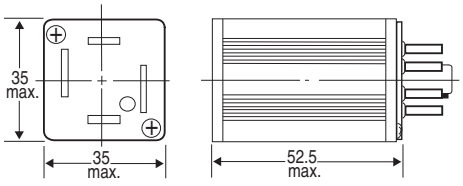



- The input cable must be less than 10 m.

## Dimensions - 700-SA Relays

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.

**700-SA** (1)




(1) 700-SA is compatible with Cat. Nos. 700-HN100, -108, -125, and -204 (sockets).

## 700-SC Ice Cube Relays



- 3 A (resistive) max. continuous load (output) current
- 264V AC, 48V DC or 125V DC max. load voltage options
- 5...24V DC or 110/220V AC control (input) voltage options
- LED indicator (optional) for input/logic On/Off status monitoring
- 700-HN103, 700-HN104, or 700-HN128 socket compatible
- Compatible with 700-AT1 or 700-AT2 timer modules

| Input-to-Output Isolation Method | Zero Cross Function | Status Indicator | Output (Load) Max. Continuous Current and Rated Voltage Range | Rated Input (Control) Voltage | Cat. No. |
|---|---|---|---|---|---|
| Photocoupler | Yes | Yes | 3 A @ 100…240V AC(1) | 5…24V DC | 700-SCZY3Z25 |
| | | | 2 A @ 100…240V AC(1) | 100/110V AC | 700-SCZY2A1 |
| | | | | 200/220V AC | 700-SCZY2A2 |
| Phototriac | No | | 3 A @ 100…240V AC (1) | 24V DC | 700-SCTY3Z24 |
| Photocoupler | Not Applicable | | 3 A @ 4…48V DC | 5…24V DC | 700-SCNY3Z25 |
| | Yes | No | 3 A @ 100…240V AC (1) | 4…24V DC | 700-SCZN3Z26 |
| Phototriac | No | | | 24V DC | 700-SCTN3Z24 |
| Photocoupler | Not Applicable | | 3 A @ 4…48V DC | 4…24V DC | 700-SCNN3Z26 |
| | | | 2 A @ 5…110V DC | 5…24V DC | 700-SCNN2Z25 |

(1) 47…63 Hz.

### Accessories - 700-SC Relays

| Photo | Description | Pkg. Quantity | Cat. No. |
|---|---|---|---|
|  | **Screw Terminal Socket —** Panel or DIN Rail Mounting; Guarded Terminal Construction.$I_{th}$ = 10 A per pole. 14-blade miniature socket for use with 700-SC Relays. | 10 | 700-HN103 |
|  | **Screw Terminal Socket —** Panel or DIN Rail Mounting; Guarded Terminal Construction $I_{th}$ = 10 A per pole. 14-blade miniature socket for use with 700-SC relays. This socket has coil and contact separation and the ability to plug in optional plug-in modules (700-A___ accessories: LED, Surge Suppression, Timing Modules) | 10 | 700-HN104 |
|  | **Screw Terminal Base Socket —** Panel or DIN Rail Mounting; Open-Style Construction $I_{th}$ = 10 A per pole. 14-blade miniature socket for use with 700-SC Relays. | 10 | 700-HN128 |
|  | **DIN (#3) symmetrical hat rail**<br>35 x 7.5 x 1 m | 10 | 199-DR1 |

| Photo | Description | Pkg. Quantity | Cat. No. | |
|---|---|---|---|---|
|  | **Pre-Printed Identification Tags —** contains 10 sheets of pre-printed and blank tags. Each sheet contains 13 sets of the markings CR…9CR, TR…9TR, M…9M, F, R, 1S, and 117 blank tags. Tags are peel-off with sticky backing for easy placement on relays. | 10 | 700-N40 | |
| | **Blank Identification Tags —** contains 10 sheets of blank identification tags for customer specialized printing. Each sheet contains 546 blank tags. Tags are peel-off with sticky backing for easy placement on relays. | 10 | 700-N41 | |
|  | **Retainer Clip for Cat. Nos. 700-HN103, -HN104, and -HN128 Sockets with 700-HC Relays.** Secures relay in socket. | 10 | (1) | 700-HN114 |

(1) Series B retainer clip must be used with 700-SC.

## Specifications- 700-SC Relays

### 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 | 15mAmax.(1) | 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%(2) | 4V DC max. | |
| **700-SCZN3Z26** | 4…24V DC | 3…28V DC | -28.8 | 15mAmax.(1) | 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%(2) | 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(4) |
|---|---|---|---|---|---|
| | | | Min. | Max.(3) | |
| **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) |

(1) With constant current input circuit system. SSR impedance varies with a change in input (control) voltage.
(2) Input impedance attains its maximum at the operating voltage.
(3) If the SSR operation is continuous ON/OFF, this value should be reduced by 50%. See "Inrush Current Resistivity" graphs on page 112 for details
(4) See **Load Current Versus Ambient Temperature Characteristics** **on page 248** for additional load current details.

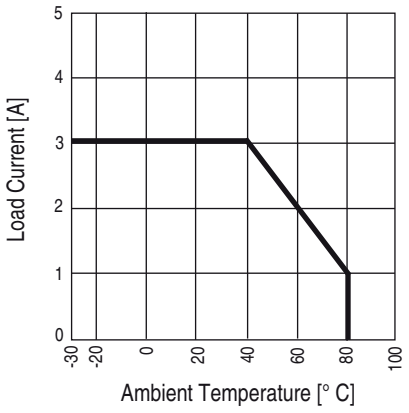
### Characteristics

| 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 (1) + 1 ms max. (DC input)<br>3/2 of load power source cycle time (1) + 1 ms max. (AC input) | | | |
| Drop-out time | 1/2 of load power source cycle time (1) + 1 ms max. (DC input)<br>3/2 of load power source cycle time (1) + 1 ms max. (AC input) | 1/2 of load power source cycle time (1) + 1 ms max. | 2 ms max. | 2.5 ms max. |
| Output On Voltage Drop | 1.6V (RMS) max. | 1.6V (RMS) | 1.5V max. | 1.5V max. |
| Output Leakage Current | 5 mA max (@ 100V AC)<br>10 mA max (@ 200V AC) | 2.5 mA max (@ 100V AC)<br>5 mA max (at 200V AC) | 5 mA max (@ 50V DC) | 0.1 mA max (@ 100V 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 | UL 508, 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 | | | |

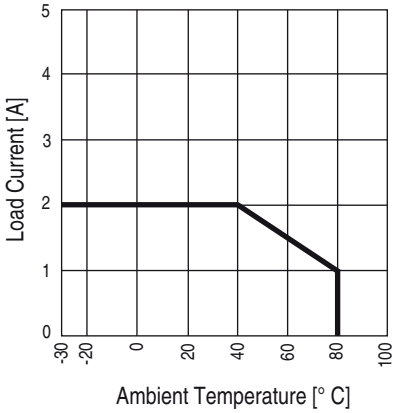
(1) 60 Hz full cycle time = 16.6 ms, 50 Hz full cycle time = 20 ms

### Load Current Versus Ambient Temperature Characteristics

**700-SC_ _3...**

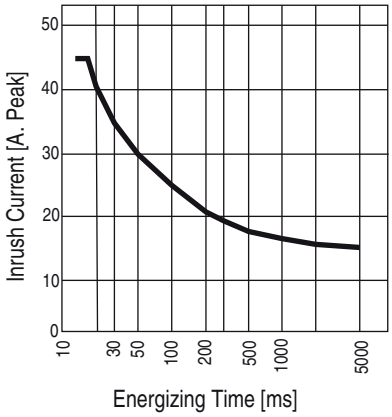



**700-SC_ _2...**

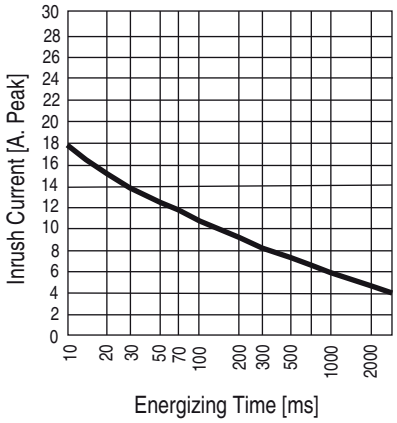


### Inrush Current Resistivity (1)

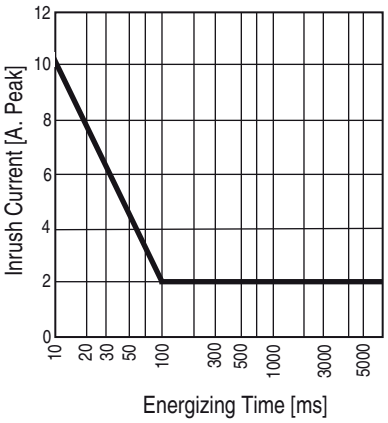
**700-SCZ.... 700-SCT...**




**700-SCNN3... 700-SCNY3**



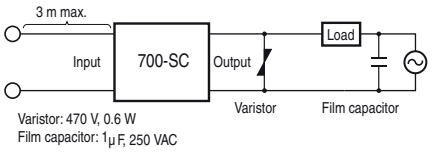

**700-SCNN2...**




(1) Inrush current resistivity is the ability of an SSR to withstand a large surge current for a short period. 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.

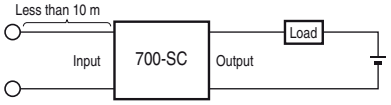
## EMC Directive Compliance

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.

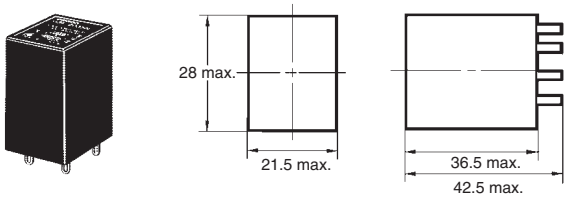
2. DC-switching models comply with EMC Directives under the following conditions



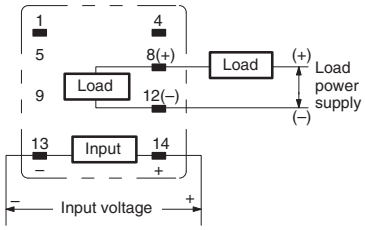

- The input cable must be less than 10 m.

## Dimensions - 700-SC Relays

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.




**Terminal Arrangement/ Internal Connections (Bottom View)**




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

Cat. No 700-SC… (1)

(1) 700-SC is compatible with Cat. Nos. 700-HN103, -HN104, and -HN128 socket.

## Basic Application Considerations for 700-SC

### *High-density Mounting of Multiple Solid-state Relays (SSRs)*

If multiple relays are mounted side by side, 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.

### *Connection*

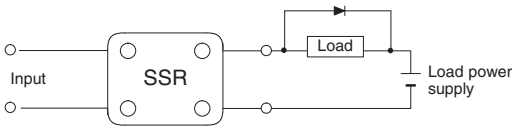
For DC Load Switching, 700-SC will operate properly if the load is connected to either the positive or negative SSR load terminal.

### *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 (s 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 that is 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 | |

**TIP** For additional details on solid-state relays, see the Solid-State Relay Application Guide, publication 700-AT001.



## 700-SF Square Base Relays



- 3 A (resistive) max. continuous load (output) current
- 264V AC or 52.8V DC max. load voltage options
- 4...24V DC control/input voltage
- Photocoupler or phototriac isolation option between control and output voltage
- LED Indicator for input/logic ON/OFF status monitoring
- 700-HN116 socket compatible

| Input-to-Output Isolation Method | Zero Cross Function | Status Indicator | Output (Load) Max. Continuous Current and Rated Voltage Range | Rated Input Control Voltage | Cat. No. |
|---|---|---|---|---|---|
| Photocoupler | Yes | Yes | 3 A @ 100…240V AC (47...63 Hz) | 5…24V DC | 700-SFZY3Z25 |
| Phototriac | No | | | 24V DC | 700-SFTY3Z24 |
| Photocoupler | Not Applicable | | 3 A @ 4…48V DC | 4…24V DC | 700-SFNY3Z25 |

## Accessories-700-SF Relays

| Photo | Description | Pkg. Quantity | Cat. No. |
|---|---|---|---|
|  | **Screw Terminal Socket — Panel or DIN Rail Mounting** 8-blade miniature socket for use with DPDT HF relays. | 10 | 700-HN116 |
|  | **DIN (#3) symmetrical hat rail** 35 x 7.5 x 1 m | 10 | 199-DR1 |
|  | **Pre-Printed Identification Tags —** contains 10 sheets of pre-printed and blank tags. Each sheet contains 13 sets of the markings CR…9CR, TR…9TR, M…9M, F, R, 1S, and 117 blank tags. Tags are peel-off with sticky backing for easy placement on relays. | 10 | 700-N40 |
| | **Blank Identification Tags —** contains 10 sheets of blank identification tags for customer specialized printing. Each sheet contains 546 blank tags. Tags are peel-off with sticky backing for easy placement on relays. | 10 | 700-N41 |
|  | **Retainer Clip for Cat. Nos. 700-HN103, -HN104, and -HN128 Sockets with 700-HC Relays.** Secures relay in socket. | 10 | 700-HN114(1) |

(1) 700-SF must use Cat. No. 700-HN114 series B retainer clip.

## Specifications- 700-FS Relays

### 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. (1) | 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% (2) | 4V DC max. | 1V DC min. |

### Load/Output Ratings

| Cat. No. | Rated Control Voltage | Max. Load Voltage Range | Continuous Load Current (Resistive) [A] | | Max. Inrush Current (4) |
|---|---|---|---|---|---|
| | | | Min. | Max. (3) | |
| 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 (5) + 1 ms max. | 1 ms max. | 0.5 ms max. |
| Drop-out Time | 1/2 cycle of load power source cycle time (5) + 1 ms max. | | 2 ms max. |
| Output ON Voltage Drop | 1.6V (RMS) max. | | 1.5V max. |
| Output Leakage Current | 5 mA max. (@ 100V AC); 10 mA max. (@ 200V 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 | | |

(1) With constant current input circuit system, SSR impedance varies with a change in input voltage.

(2) Input impedance reaches its maximum at the operating voltage.

(3) If the SSR operation is continuous ON/OFF, this value should be reduced by 50%. See the "Inrush Current Resistivity" graphs on page 116 for more details.

(4) See "Load Current vs. Ambient Temperature Characteristics" on page 116 for additional load current details.

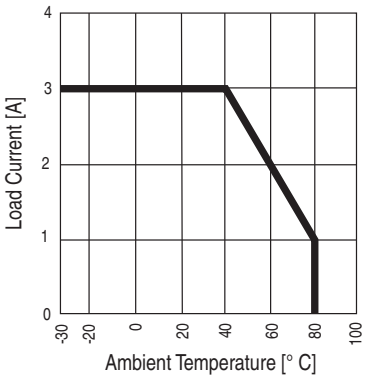
(5) 60 Hz full cycle time = 16.6 ms, 50 Hz full cycle time 20 ms.

**IMPORTANT** 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.

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.

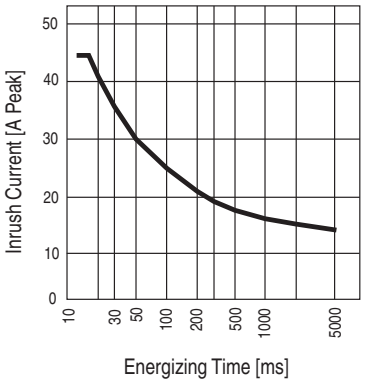
**Load Current vs. Ambient Temperature Characteristics**

**700-SF**



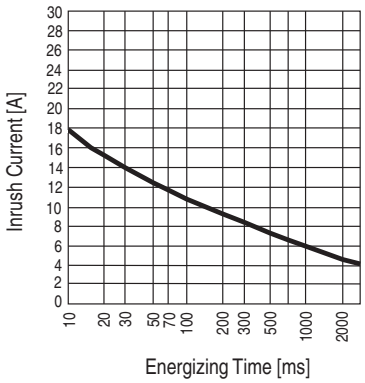

**Inrush Current Resistivity (1)**

**700-SFZ… 700SFT…**




**Inrush Current Resistivity (1)**

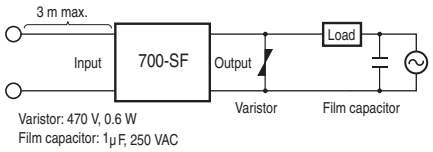
**700-SFN…**




(1) Inrush current resistivity is defined as the ability of an SSR to withstand a large surge current for a short period. 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.

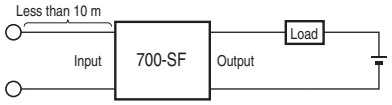
## EMC Directive Compliance

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.

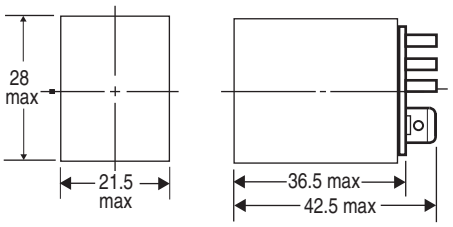
2. DC-switching models comply with EMC Directives under the following conditions



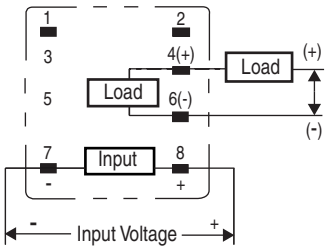

- The input cable must be less than 10 m.

## Dimensions - 700-SF Relays

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.




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.

**IMPORTANT** 700-SF is compatible with Cat. No. 700-HN116 socket.

## Basic Application Considerations of 700-SF

### *High-density Mounting of Multiple Solid-state Relays (SSRs)*

If multiple SSRs are mounted side by side, 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.

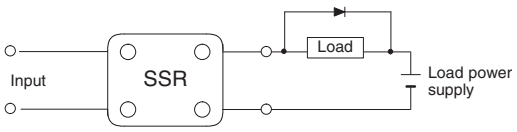
### *Protective Component to Extend SSR Life*

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 (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 that is outlined in the table.

| 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 | |

**TIP** For additional details on solid-state relays, see the Solid-State Relay Application Guide, publication 700-AT001.

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



## 700-SH Hockey Puck Relays

- 100 A max. continuous load (output) current with appropriate heat sink
- 264V AC, 530V AC, or 660V AC max. load voltage options
- 3...32V DC, 4...32V DC, 80...130V AC, 200...260V AC, 20...280V AC/22...48V DC control (input) voltage options
- LED indicator for input/logic ON/OFF status monitoring
- Protective cover for added safety

| Photo | Input-to-Output Isolation Method | Zero Cross Function | Status Indicator | Output (Load) Max. Continuous Current and Rated Voltage Range [1] | Rated Input Control Voltage | Cat. No.[2] |
|---|---|---|---|---|---|---|
|  | Optocoupler | Yes | Yes | 10 A @ 42…265V AC | 3…32V DC | 700-SH10JZ24 |
| | | | | 10 A @ 42…265V AC | 80…130V AC | 700-SH10JA12 |
| | | | | 10 A @ 42…265V AC | 200…260V AC | 700-SH10JA22 |
| | | | | 10 A @ 42…530V AC | 4…32V DC | 700-SH10HZ25 (Series B) |
| | | | | 25 A @ 42…530V AC | 4…32V DC | 700-SH25HZ25 (Series B) |
| | | | | 25 A @ 24…265V AC | 3…32V DC | 700-SH25GZ24 |
| | | | | 25 A @ 24…265V AC | 20…280V AC/ 22…48V DC | 700-SH25GA24 |
| | | | | 50 A @ 24…265V AC | 3…32V DC | 700-SH50GZ24 |
| | | | | 50 A @ 24…265V AC | 20…280V AC/ 22…48V DC | 700-SH50GA24 |
| | | | | 50 A @ 42…530V AC | 4…32V DC | 700-SH50HZ25 |
| | | | | 25 A @ 42…660V AC | 4…32V DC | 700-SH25VZ25 |
| | | | | 25 A @ 42…660V AC | 20…280V AC/ 22…48V DC | 700-SH25VA24 |
| | | | | 50 A @ 42…660V AC | 4…32V DC | 700-SH50VZ25 |
| | | | | 50 A @ 42…660V AC | 20…280V AC/ 22…48V DC | 700-SH50VA24 |
| | | | | 75 A @ 42…530V AC | 4…32V DC | 700-SH75HZ25 |
| | | | | 75 A @ 42…660V AC | 4…32V DC | 700-SH75VZ25 |
| | | | | 75 A @ 42…530V AC | 20…280V AC/ 22…48V DC | 700-SH75HA24 |
| | | | | 75 A @ 42…660V AC | 20…280V AC/ 22…48V DC | 700-SH75VA24 |
| | | | | 100 A @ 42…530V AC | 4…32V DC | 700-SH100HZ25 |
| | | | | 100 A @ 42…530V AC | 20…280V AC/ 22…48V DC | 700-SH100HA24 |
| | | | | 100 A @ 42…660V AC | 4…32V DC | 700-SH100VZ25 |
| | | | | 100 A @ 42…660V AC | 20…280V AC/ 22…48V DC | 700-SH100VA24 |
| | | Yes | No | 5 A @ 3...60V DC | 3…32V DC | 700-SH5FZ24 |
| | | Yes | Yes | 25 A @ 90…280V AC | 4…20 mA DC | 700-SH25WA25 |
| | | | | 50 A @ 90…280V AC | 4…20 mA DC | 700-SH50WA25 |

(1) When used with heat sink.
(2) All catalog numbers are Series A unless noted.

## Accessories - 700-SH Relays

| Photo | Description | Pkg. Quantity | Cat. No. |
|---|---|---|---|
|  | **Heat Sink— Panel or DIN Rail Mount** | 1 | 700-SN10 |
|  | **Heat Sink— Panel or DIN Rail Mount** | 1 | 700-SN25 |
|  | **Heat Sink— Panel or DIN Rail Mount** | 1 | 700-SN50 |
|  | **Heat Sink— Panel or DIN Rail Mount** | 1 | 700-SN50HC |
|  | **Heat Sink— Panel or DIN Rail Mount** | 1 | 700-SN50VHC |
|  | **DIN (#3) symmetrical hat rail**<br>35 x 7.5 x 1 m | 10 | 199-DR1 |
| | **Thermal Conductive Pads** | 50 | 700-SHCPAD |
| | **Plastic Covers —** for DC output version | 25 | 700-SHCOV |
| | **Thermal Adapters -** for 100 A Wire | 10 | 700-SHTRMA |

## Specifications- 700-SH Relays

### 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. (1) |
| | 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 |

(1) When specified heatsink is used.

### Output Ratings

| Cat. No. | Load Voltage Range | Applicable Load Current with Heat Sink [A] (2) |
|---|---|---|
| **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 |

(2) AC unless indicated.

### Characteristics

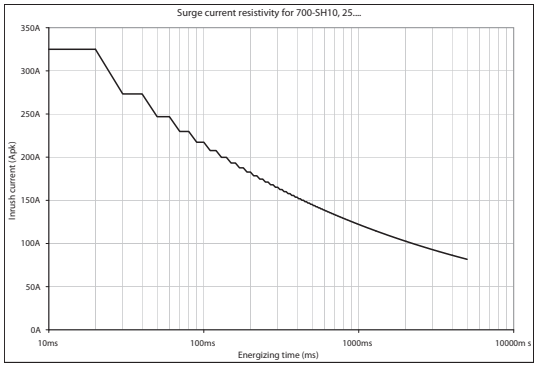
| Description | Cat. Nos. 700-SH10, 25, 50 (not including 700-SH_ _W) | Cat. Nos. 700-SH75, 100 |
|---|---|---|
| Pick-up Time | 1/2 of load power source cycle time(DC input) / 1 of load power source cycle time (AC input) | |
| Drop-out Time | 1/2 of load power source cycle time (DC input) / 2 of load power source cycle time (AC input) | |
| Output ON Voltage Drop | 1.6V (RMS) max. | |
| Output Leakage Current | <3 $mA_{RMS}$<br>100MΩ min (@500V DC) | |
| Insulation Resistance | 100MΩ min. (at 500V DC) | |
| Dielectric Strength | >4000V $AC_{RMS}$ | |
| Vibration Resistance | Malfunction: 10…55 Hz, 1.5 mm double amplitude | |
| Shock Resistance | Malfunction: 1000 $m/s^2$ | |
| Ambient Temperature | Operating: –20…+70 °C (–4…+158 °F) with no icing or condensation | |
| | Storage: –40…+100 °C (–40…+212 °F) 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 |

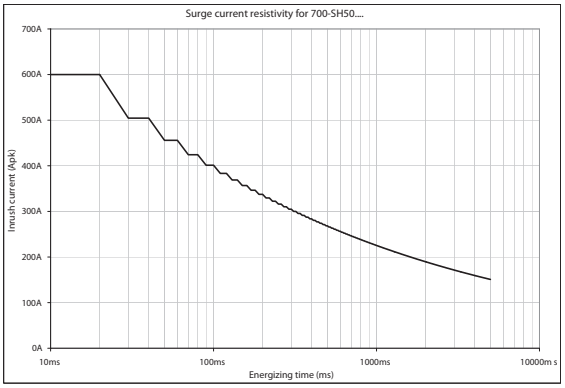
| Description | Cat. No. 700-SH_ _W |
|---|---|
| Pick-up Current | 4.2 mA |
| Drop-out Current | 4.1 mA |
| Voltage Drop | <10V DC @ 20 mA |
| Leakage Current | <3 mA |
| Insulation Voltage | <4000 $V_{RMS}$ |
| Vibration Resistance | Malfunction: 10…55 Hz, 1.5 mm double amplitude |
| Shock Resistance | Malfunction: 1000 $m/s^2$ |
| Ambient Temperature | Operating: –20…+70 °C (–4…+158 °F) 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,<br>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 |

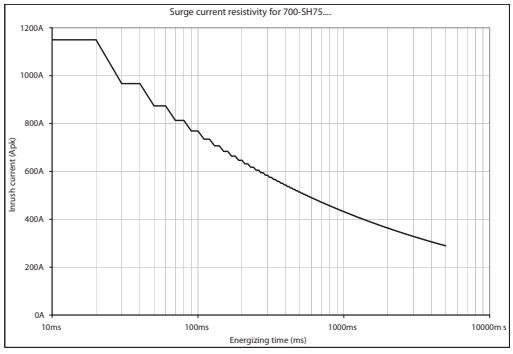
| Description | Cat. No. 700-SH5FZ24 |
|---|---|
| Pick-up Voltage | <3V DC |
| Drop-out Voltage | >1V DC |
| Activating Frequency | <100 Hz |
| Input Impedance | 1kΩ |
| Response Time Pick-up @ Vin > 5V | <4000 uS |
| Response Time Drop-out | <1 mS |
| On-state Voltage Drop @ Rated Current | <1.5V |

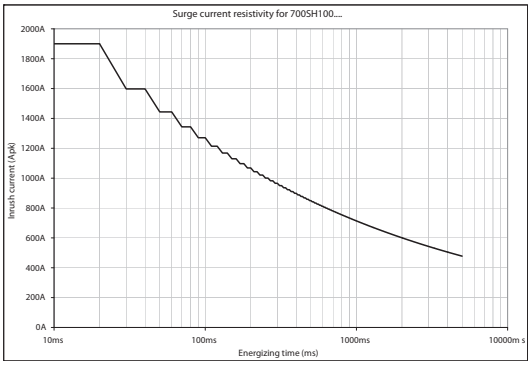
| Description | Cat. No. 700-SH5FZ24 |
|---|---|
| Off-state Current Drop @ Rated Voltage | <1 mA |
| Insulation Voltage | <1 mA |
| Vibration Resistance | Malfunction: 10…55 Hz, 1.5 mm double amplitude |
| Shock Resistance | Malfunction: 1,000 $m/s^2$ |
| Ambient Temperature | Operating: –20…+70 °C 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),<br>CSA Certified (File No. 240924) |
| Weight | Approx. 60 g |

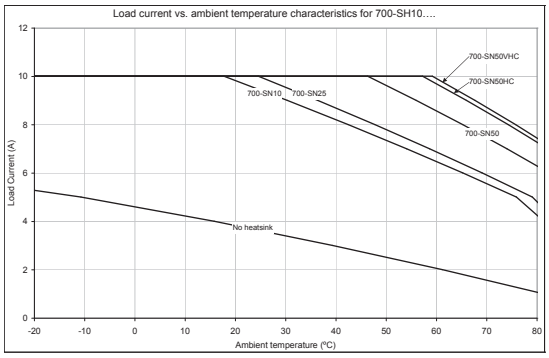
## Surge Current vs. Ambient Temperature Characteristics

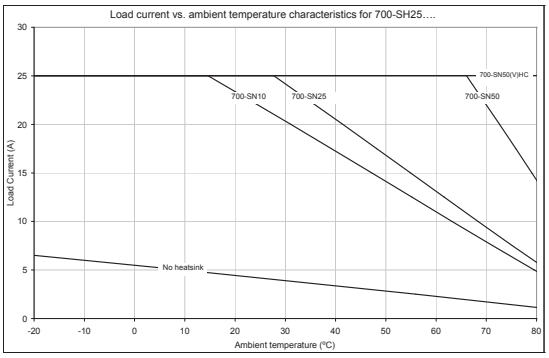


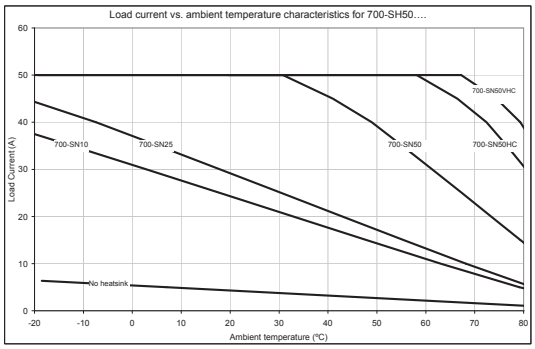



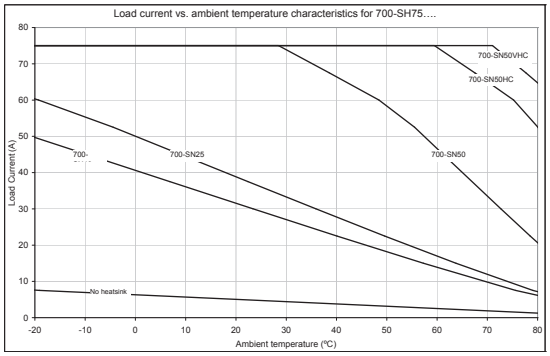



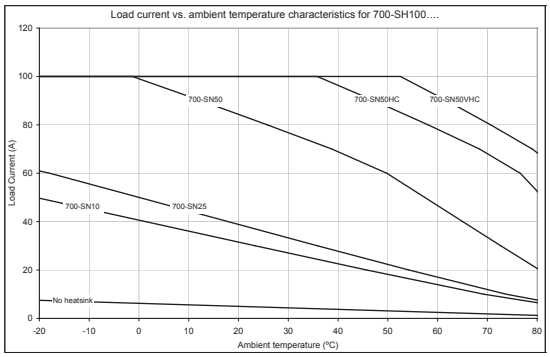



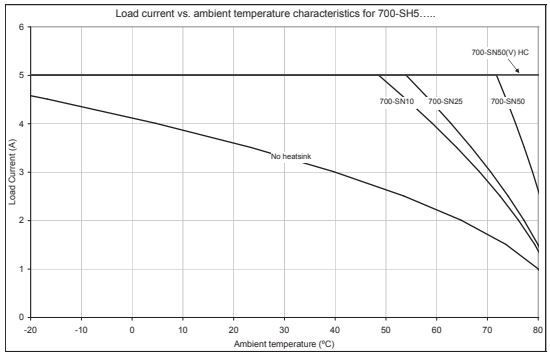

Load current vs. ambient temperature characteristics for 700-SH10....
Load Current (A)
Ambient temperature (ºC)
700-SN50VHC
700-SN50HC
700-SN10
700-SN25
700-SN50
No heatsink


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


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

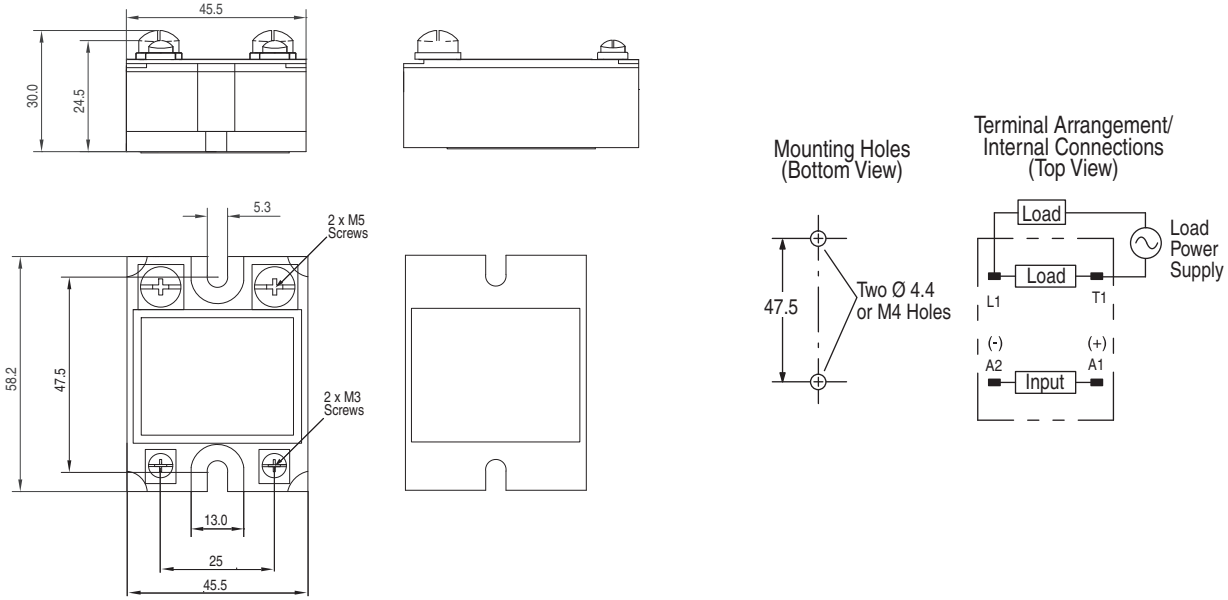

Load current vs. ambient temperature characteristics for 700-SH75....
Load Current (A)
Ambient temperature (ºC)
700-SN50VHC
700-SN50HC
700-SN25
700-SN50
No heatsink


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

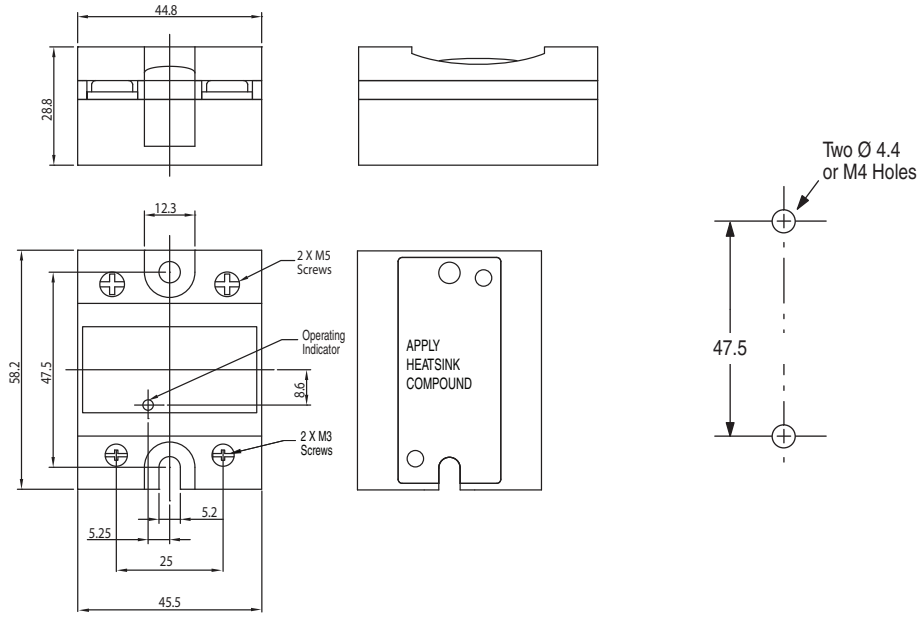

Load current vs. ambient temperature characteristics for 700-SH5.....
Load Current (A)
Ambient temperature (ºC)
700-SN50(V) HC
700-SN10
700-SN25
700-SN50
No heatsink

## Mounting Considerations (1) (2) (3) (4)

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

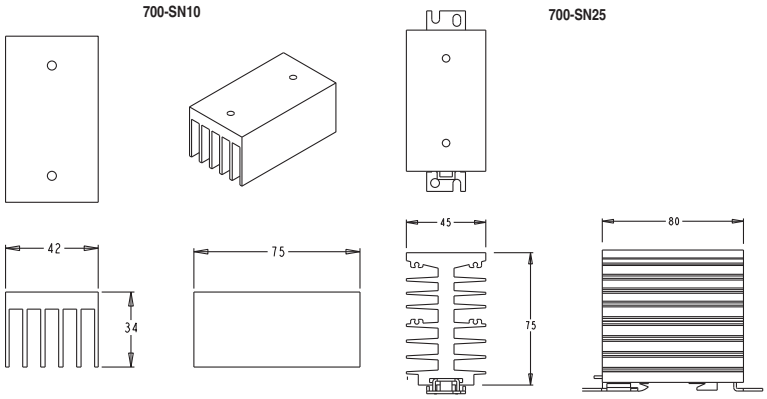


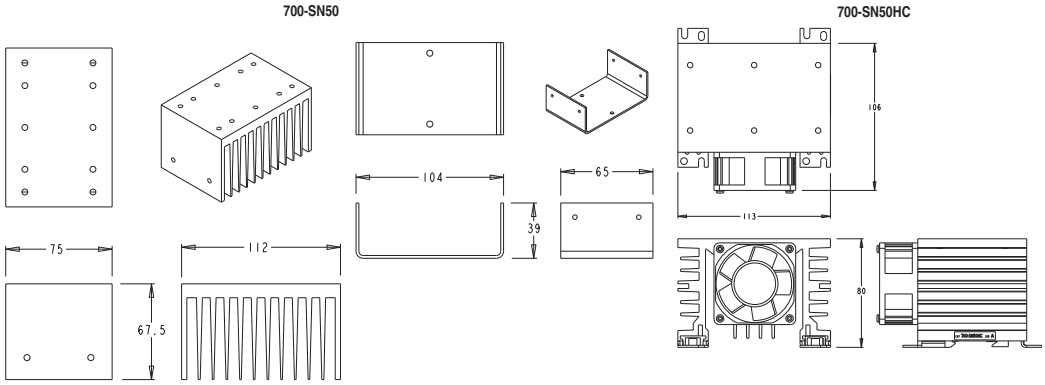

Cat. No. 700-SH5F. . .

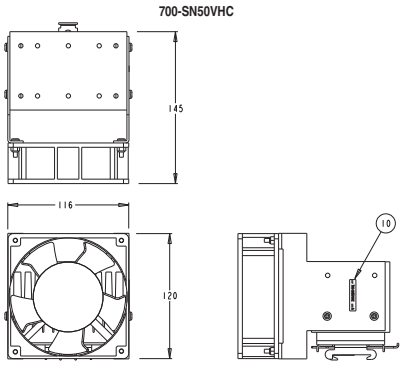


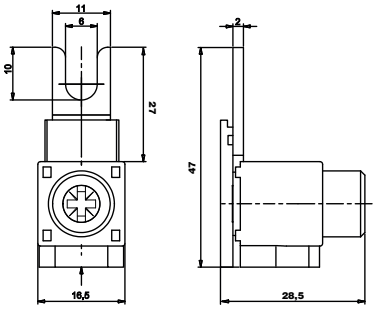

Cat. No. 700-SH10, -SH25, -SH50, -SH75, -SH100

(1) 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.
(2) When attaching a heat sink to 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).
(3) Tighten the SSR panel/heat sink mounting screws to a torque of 0.78. . .0.98 N•m (6.9. . .8.7 lb•in).
(4) 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).

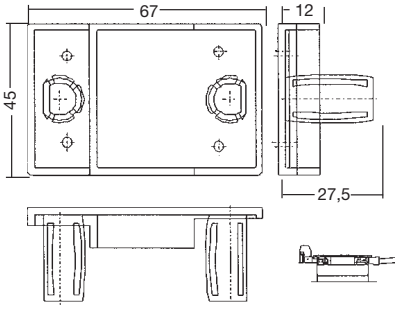



Cat. No.700-SHTRMA




Cat. No. 700-SHC0V

### *Load Connection*

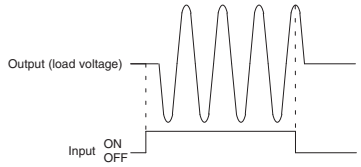
- For an AC load, use a power supply that is rated at 50 Hz. or 60 Hz. The maximum operating frequency is 10 Hz.
- The 700-SH has a built-in varistor for surge/inrush protection of AC loads. If additional suppression is required, connect an external varistor across the load device terminals. Select a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

| 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 | |

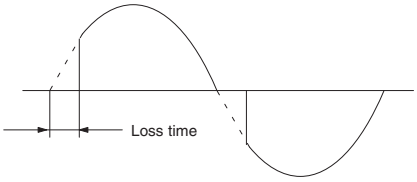
**TIP** For additional details on solid-state relays, see the Solid-State Relay Application Guide, publication 700-AT001.

Zero Cross Function

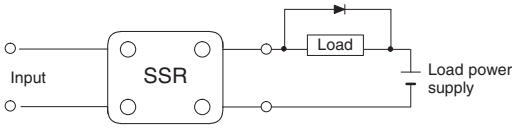
An SSR with a zero cross function operates when an AC load voltage reaches the zero point or its vicinity. This reduces clicking noises when the load is switched and minimizes the influence of an inductive load, (such as, lamp, heater, or motor) on the power supply because the inrush current of the load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




At a low applied voltage (for example, 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.



## 700-SK Slim Line Relays



- High-response speed models
- Input sensor module to allow high voltage 100...240V AC or 12...24V DC sensor
- Interface to low voltage (logic) device such as a PC output module for typical SSR applications
- LED indicator
- Input modules and output modules can be used with the 700-HN121 or 700-HN221 sockets

### Input/Sensor Module

| Input-to-Output Isolation Method | Status Indicator | Response Frequency | Logic Level | | Rated Input Sensor Voltage | Cat. No. |
|---|---|---|---|---|---|---|
| | | | Supply Voltage | Supply Current | | |
| Photocoupler | Yes | 10 Hz | 4…32V DC | 0.1…100 mA | 100…240V AC (1) | 700-SKICA18 |
| | | 1 kHz | | | 12…24V DC | 700-SKICZ24 |

(1) 47…63 Hz

### Output/SSR Module

| Input-to-Output Isolation Method | Zero Cross Function | Status Indicator | Output (Load) Max. Continuous Current and Rated Voltage Range | Rated Input Control Voltage | Cat. No. |
|---|---|---|---|---|---|
| Phototriac | Yes | Yes | 2 A @ 100…240V AC (1) | 5…24V DC | 700-SKOZ2Z25 |
| | No | | | | 700-SKON2Z25 |
| Photocoupler | Not Applicable | | 2 A @ 5…48V DC | | 700-SKOC2Z25 |
| | | | 1.5 A @ 48…200V DC | | 700-SKOC1Z25 |

(1) 47…63 Hz

## Accessories - 700-SK Relays

| Photo | Description | Pcs./Pkg. | Cat. No. |
|---|---|---|---|
|  | **Screw Terminal Socket — Panel or DIN Rail Mounting** 5-blade miniature socket with 10 A rating for use with 1-pole, 700-HK relays. Accepts forked lug conductors. Socket includes a retainer clip. | 10 | 700-HN121 |
|  | **DIN (#3) symmetrical hat rail**<br>35 x 7.5 x 1 m | 10 | 199-DR1 |
|  | **Pre-Printed Identification Tags —** contains 10 sheets of pre-printed and blank tags. Each sheet contains 13 sets of the markings CR…9CR, TR…9TR, M…9M, F, R, 1S, and 117 blank tags. Tags are peel-off with sticky backing for easy placement on relays. | 10 | 700-N40 |
| | **Blank Identification Tags —** contains 10 sheets of blank identification tags for customer specialized printing. Each sheet contains 546 blank tags. Tags are peel-off with sticky backing for easy placement on relays. | 10 | 700-N41 |

## Specifications - 700-SK Relays

*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 | 100 Hz |
| Output ON voltage drop | | 1.6V max. | |
| Leakage current (from SSR) | | 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 (1) | Pick-up Voltage | Drop-out Voltage |
|---|---|---|---|---|---|---|
| **700-SK0Z2Z25** | 5…24V DC | 4…32V DC | -32V DC | 15 mA max. at 25 °C (77 °F) | 4V DC max. | 1V DC min. |
| **700-SK0N2Z25** | | | | | | |
| **700-SK0C2Z25** | | | | 8 mA max. | | |
| **700-SK0C1Z25** | | | | | | |

## Load/Output Ratings

| Cat. No. | Rated Load Voltage | Maximum Load Voltage Range | Continuous Load Current (Resistive) [A] | | Max. Inrush Current [3] |
|---|---|---|---|---|---|
| | | | Min. | Max. [2] | |
| **700-SK0Z2Z25** | 100…240V AC | 75…264V AC | 0.05 | 2 | 30 A (@50/60 Hz, One cycle) |
| **700-SK0N2Z25** | | | | | |
| **700-SK0C2Z25** | 5…48V DC | 4…60V DC | 0.1 | 2 | 8 A (10 ms) |
| **700-SK0C1Z25** | 48…200V DC | 40…200V DC | 0.1 | 1.5 | 8 A (10 ms) |

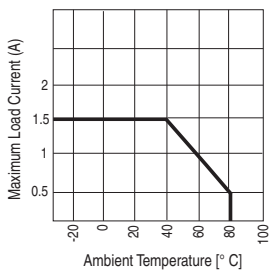
(1) With a constant current input system. SSR impedance varies with a change in input voltage.
(2) See Load Current Versus Ambient Temperature Characteristics for additional details.
(3) If the SSR operation is continuous ON/OFF, this value should be reduced by 50%. See the "Inrush Current Resistivity" graphs on page 126 for more details.

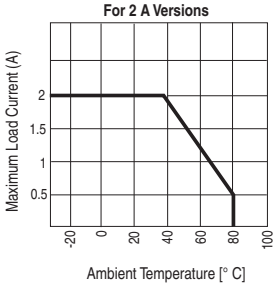
## Characteristics

| Description | | Cat. No. 700-SK0Z2Z25 | Cat. No. 700-SK0N2Z25 | Cat. No. 700-SK0C2Z25 | Cat. No. 700-SK0C1Z25 |
|---|---|---|---|---|---|
| Load Switching Method/Device | | Triac | | Transistor | |
| Pick-up Time | | 1/2 cycle of load power source cycle time [1] + 1 ms max. | | 1 ms max. | |
| Drop-out Time | | 1/2 of load power source cycle time [1] + 1 ms max. | | 2 ms max. | |
| Response Frequency | | 20 Hz | | 100 Hz | |
| Output ON Voltage Drop | | 1.6V max. | | | 2.5V max. |
| Leakage Current (from SSR) | | 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 | | | |

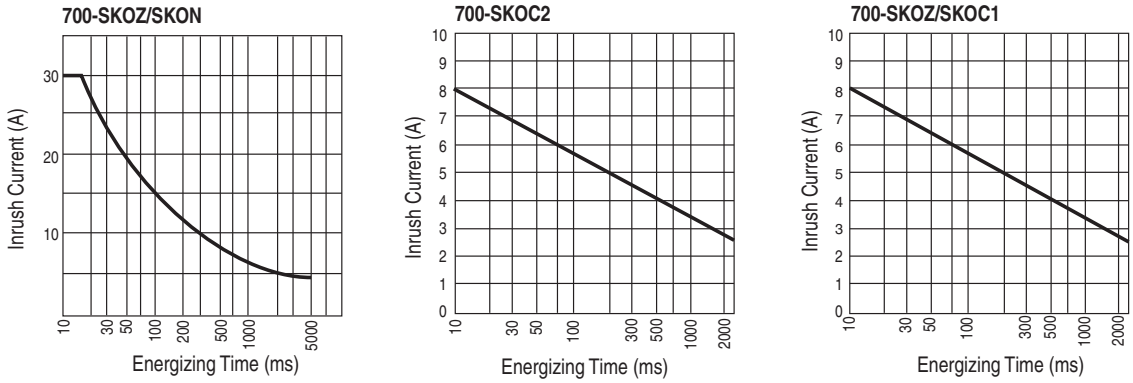
(1) 60 Hz cycle time = 16.6 ms, 50 Hz cycle time = 20 ms.

## Load Current vs. Ambient Temperature Characteristics



### Inrush Current Resistivity (2)

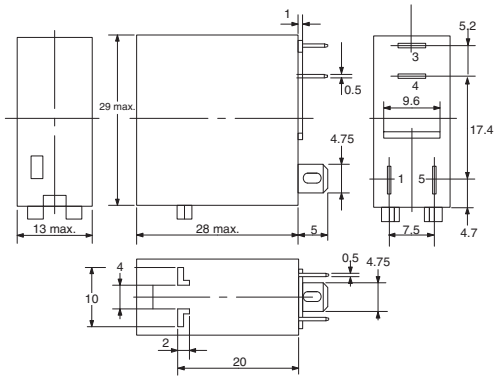



(2) Inrush current resistivity is the ability of an SSR to withstand a large surge current for a short period. Surges are considered non-repetitive (max. repeatability once every 2…5 seconds). Keep the inrush current to half the rated value if it occurs repetitively. Exceeding the non-repetitive inrush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

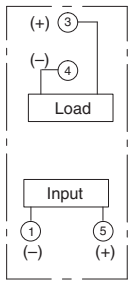
## Dimensions - 700-SK Relays

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.

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




**Terminal Arrangement/ Internal Connections (Bottom View)**




## Application Considerations of the700-SK Relay

### *Connection*

For DC load switching, 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.

**TIP** For additional details on solid-state relays, see the Solid-State Relay Application Guide, publication 700-AT001.

## Notes:

# Additional Resources

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

| Resource | Description |
|---|---|
| General Purpose, Interposing, Solid-State and Specialty Relays Brochure publication 700-BR018 | Provides product overview and applications for Bul 700 relay line. |
| Solid-state Relay Application Guide, publication 700-AT001 | Provides methods for applying and troubleshooting Solid-state relays. |
| EtherNet/IP Network Devices User Manual, ENET-UM006 | Describes how to configure and use EtherNet/IP devices to communicate on the EtherNet/IP network. |
| Ethernet Reference Manual, ENET-RM002 | Describes basic Ethernet concepts, infrastructure components, and infrastructure features. |
| System Security Design Guidelines Reference Manual, SECURE-RM001 | Provides guidance on how to conduct security assessments, implement Rockwell Automation products in a secure system, harden the control system, manage user access, and dispose of equipment. |
| Industrial Components Preventive Maintenance, Enclosures, and Contact Ratings Specifications, publication IC-TD002 | Provides a quick reference tool for Allen-Bradley industrial automation controls and assemblies. |
| Safety Guidelines for the Application, Installation, and Maintenance of Solid-state Control, publication SGI-1.1 | Designed to harmonize with NEMA Standards Publication No. ICS 1.1-1987 and provides general guidelines for the application, installation, and maintenance of solid-state control in the form of individual devices or packaged assemblies incorporating solid-state components. |
| Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1 | Provides general guidelines for installing a Rockwell Automation industrial system. |
| Product Certifications website, rok.auto/certifications. | Provides declarations of conformity, certificates, and other certification details. |

You can view or download publications at rok.auto/literature.

## Rockwell Automation Support

Use these resources to access support information.

| | | |
|---|---|---|
| **Technical Support Center** | Find help with how-to videos, FAQs, chat, user forums, and product notification updates. | rok.auto/support |
| **Knowledgebase** | Access Knowledgebase articles. | rok.auto/knowledgebase |
| **Local Technical Support Phone Numbers** | Locate the telephone number for your country. | rok.auto/phonesupport |
| **Literature Library** | Find installation instructions, manuals, brochures, and technical data publications. | rok.auto/literature |
| **Product Compatibility and Download Center (PCDC)** | Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes. | rok.auto/pcdc |

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