

DIN Rail Mounted Timing Relays

Product Overview/Product Selection



Bulletin 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

Table of Contents

Product Selection 9-67
 Accessories..... 9-68
 Connection
 Diagrams 9-69
 Specifications..... 9-72

Standards Compliance and Certifications

See Specification table in this section, 9-72.

Catalog Number Explanation

| | | | | | |
|-----------------|---------------|----------------|----------------|--------------|---------------|
| 700 | - FS | H | 3 | U | U23 |
| Bulletin Number | Type of Relay | Operating Mode | Contact Output | Timing Range | Input Voltage |

Single-Function (With SPDT 1 C/O contacts)

| | | | | |
|---------------|----------|----------|----------|------------|
| 700-FS | A | 3 | A | U23 |
| | <i>a</i> | <i>b</i> | <i>c</i> | <i>d</i> |

a

| Operating Mode | |
|----------------|---|
| Code | Description |
| A | On-delay* |
| B | Off-delay* |
| C | On- and off-delay* |
| D | One shot* |
| E | Fleeting off-delay* |
| 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)* |
| L | Pulse converter* |

b

| Contact Output | |
|---------------------------------|-------|
| All functions: | |
| 3 One changeover contact (SPDT) | 1 C/O |

c

| Timing Range | |
|--------------|-----------------|
| Code | Description |
| A | 0.05...1 s |
| B | 0.15...3 s |
| C | 0.5...10 s |
| D | 1.5...30 s |
| E | 0.05...1 min |
| F | 0.15...3 min |
| G | 0.5...10 min |
| H | 1.5...30 min |
| I | 0.05...1 hr |
| J | 0.15...3 hr |
| K | 0.5...10 hr |
| L | 3.0...60 hr |
| U | 0.05 s...60 hr* |

d

| Input Voltage | |
|---------------|--------------------------------------|
| Code | Description |
| Z12 | 12V DC |
| U23 | 24...48V DC 24...240V AC 50/60 Hz |

* Preferred availability item.
 * Valid for functions "A" and "B" only.

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

| Operating Mode | Contact Output | Timing Range | 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 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 24...240V AC, 50/60 Hz | 700-FSB4UU23 |

‡ The time range of "0.05 s...60 hr" is selectable in 12 smaller ranges plus an ON and OFF function for maintenance needs.
 Note: Information for hazardous location versions of this product (-EX) is available on the Industrial Controls Catalog website: www.ab.com/catalogs.

Single Function With Hazardous Location Certification ⚡ (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 | 700-FSK3AU23-EX |
| | | 0.5 s...10 s | 24...240V AC 50/60 Hz | 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 8 Single-functions: A, B, C, D, E, F, I, and L ON and OFF function additional (for installation and maintenance) 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 24...240V AC 50/60 Hz | 700-FSM3UU23 |
| | (DPDT) 2 C/O | | 12V DC | 700-FSM4UZ12 |
| | (DPDT) 2 C/O | | 24...48V DC 24...240V AC 50/60 Hz | 700-FSM4UU23 |

Note: Information for hazardous location versions of this product (-EX) is available on the Industrial Controls Catalog website: www.ab.com/catalogs.

Multi-Function With Hazardous Location Certification ⚡

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

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

| | | |
|---------------------------------------|---|---|
| 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 |

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

DIN Rail Mounted Timing Relays

Product Selection/Accessories

Special Function

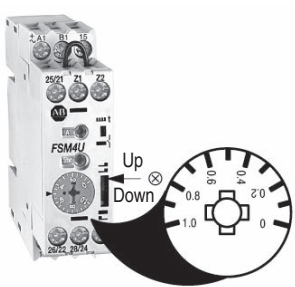

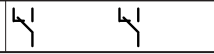

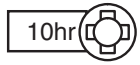
| Operating Mode | Contact Output | Timing Range | Input Voltage | Cat. No. |
|---|-------------------|-------------------------------|---|---------------------|
| Flasher (repeat cycle starting with pulse or pause) | (SPDT) 1 C/O | 0.05 s...60 hr* | 12V DC | 700-FSH3UZ12 |
| | | | 24...48V DC 24...240V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

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

* 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.





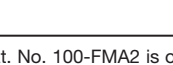
† Due to shock during shipment, the state of the contacts should be verified before initial use. Minimum power on time is 800 msec

Multi-Function Timing Relay Function and Time Range Settings

| Description | SPDT | DPDT |
|--|--|---|
|  <p>Multi-function timing relays 700-FSM3U includes 10 setting functions:</p> <ul style="list-style-type: none"> (A) On-Delay (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§ (Off) OFF-Function§ <p>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.</p> |  |  |
| | Multi-Time Setting Range 0.05 s...60 h | |
| |  |  |

§ For installation and maintenance.

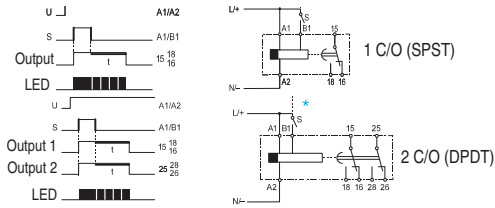
Accessories

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

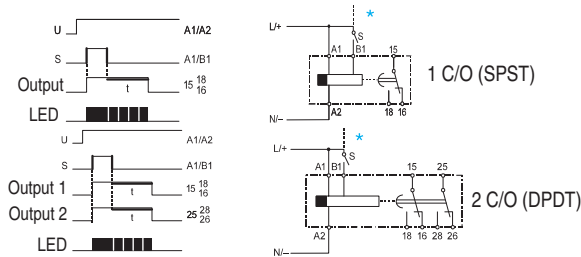
* Cat. No. 100-FMA2 is only a marking tag carrier. Please refer to the Terminal Block Accessories section, page 12-90 of this publication for appropriate marker cards to be used with this carrier.

Connection Diagrams

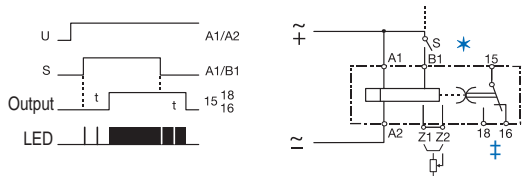
(A) On-Delay



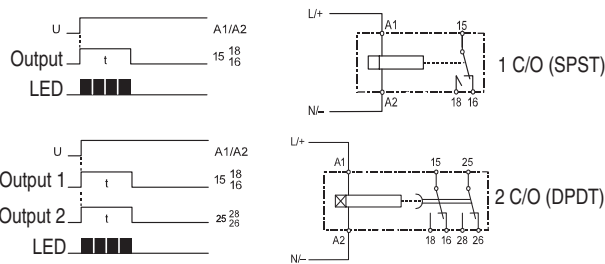
(B) Off-Delay (Min. Pulse AC 50 ms...DC 30 ms)



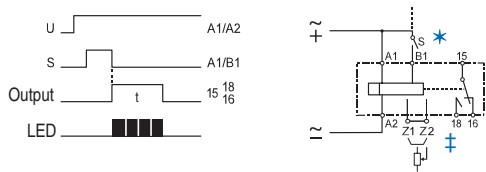
(C) On- and Off-Delay



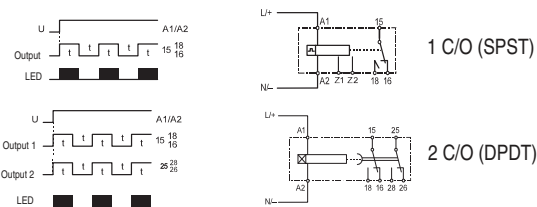
(D) One Shot



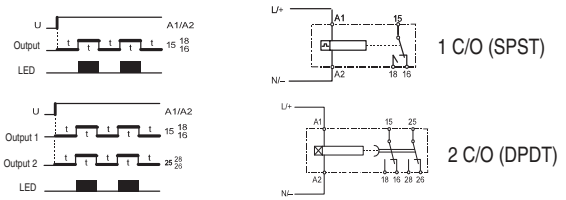
(E) Fleeting Off-Delay (Min. Pulse AC 50 ms...DC 30 ms)



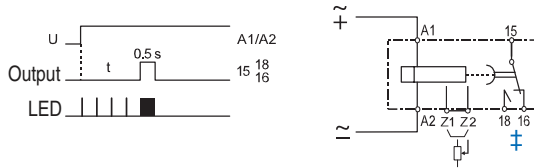
(F) Flasher (Repeat Cycle Starts with Pulse)



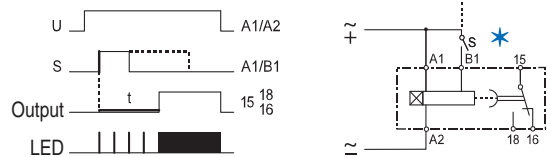
(G) Flasher (Repeat Cycle Starts with Pause)



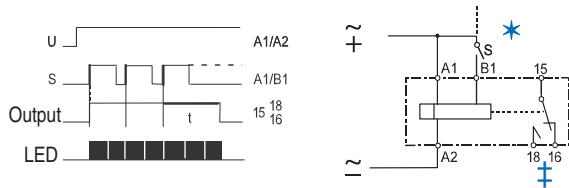
(I) On-Delay Pulse Generator



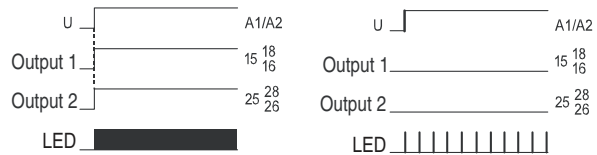
(J) On-Delay (Pulse Controlled)



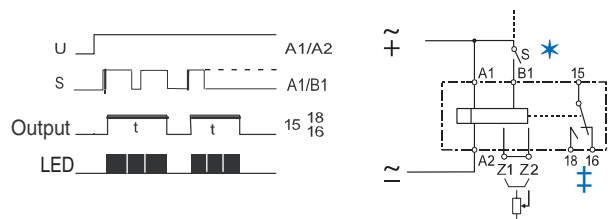
(K) One Shot/Watch Dog (Pulse Controlled)



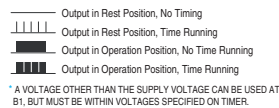
(On) ON-Function (Off) OFF-Function



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



Cleverly Designed Function Display LED (Green)



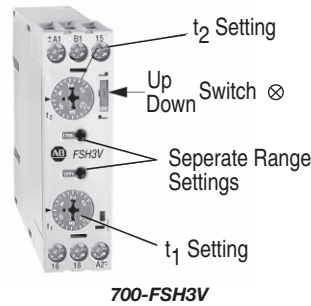
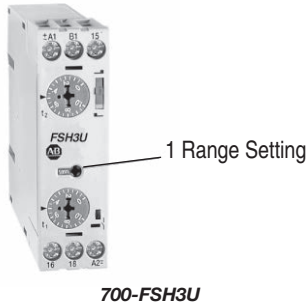
* A voltage other than the supply voltage can be used at B1, but must be within voltages specified on timer.
 * Output 2 is selectable as instantaneous contact with sliding switch (⊗) on front panel (instantaneous when switch is down, timed when switch is up).
 ‡ Available on multifunction "M," and single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

DIN Rail Mounted Timing Relays

Function and Connection Diagrams

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

Description



Supply Voltages (A1/A2)

Z12 12V DC

U23 24...48V DC, 24...240V AC, 50/60 Hz

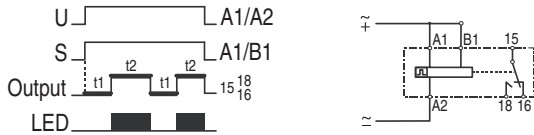
Function Diagram / Connection Diagram

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

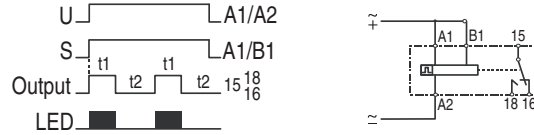
The repeat cycle timer permits different settings for on and off times. The following operating modes are possible:

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

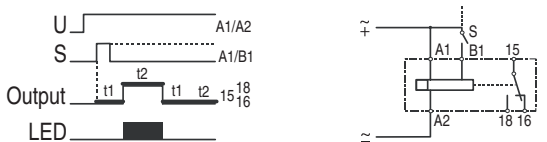
Supply Voltage Controlled, Oscillating Mode Starting with Pause — Switch ⊗ is Up



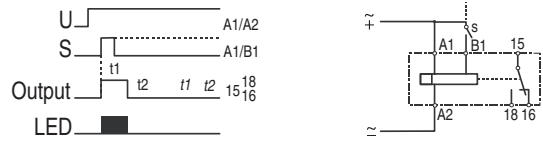
Supply Voltage Controlled, Oscillating Mode Starting with Pulse — Switch ⊗ is Down



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



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



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

LED Operation Chart \bar{N} 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

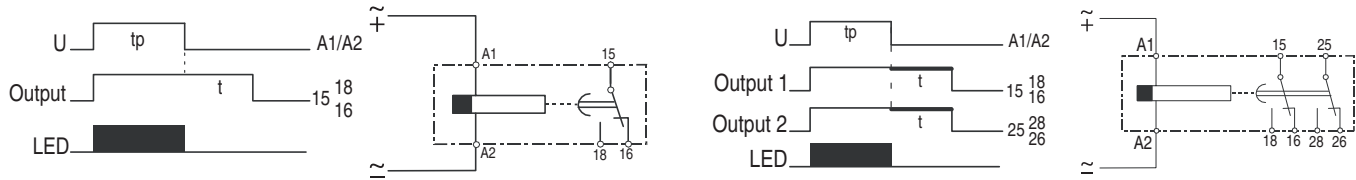


DIN Rail Mounted Timing Relays

Function and Connection Diagrams

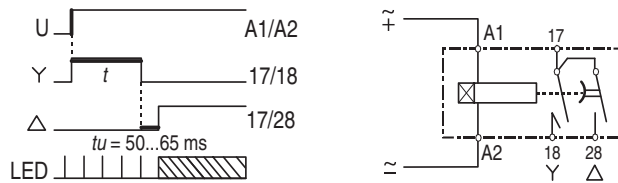
Function Diagram / Connection Diagram

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



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

(Y) Star-Delta Timing Relay — When power is applied, the output contact 17/18(Y) changes state. After the time setting, the output contact 17/18(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.



DIN Rail Mounted Timing Relays

Specifications

Specifications

Time Characteristics (according to VDE 0435, Part 2021)

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

Supply

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

Pulse Control (B1)

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

Outputs

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

General Data

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

* Performance Data — See this catalog, Important- 3.



Temp. Code T4A
2A 32VDC MAX.

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