

# Bulletin 700-FS High Performance Timing Relay

## 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

<b>700</b>	<b>- FS</b>	<b>H</b>	<b>3</b>	<b>U</b>	<b>U23</b>
<i>Bulletin Number</i>	<i>Type of Relay</i>	<i>Operating Mode</i>	<i>Contact Output</i>	<i>Timing Range</i>	<i>Input Voltage</i>

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

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

<b>a</b>	
<b>Operating Mode</b>	
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>b</b>	
<b>Contact Output</b>	
<b>All functions:</b>	
3 One changeover contact (SPDT)	1 C/O contact (SPDT)

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.

### Product Selection

#### 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.

#### Single Function With Hazardous Location Certification Δ (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 24...240V AC	700-FSK3AU23-EX
		0.5 s...10 s	50/60 Hz	700-FSK3CU23-EX

Δ 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:** 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**  
(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	

**Multi-Function With Hazardous Location Certification  $\Delta$**   
**(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

$\Delta$ Temp. Code T4A 2A 32VDC MAX.		
	II 3 G, EEx nL IIC T4 DEMKO 04 ATEX 0404974X 2A 32VDC MAX. Ta $\leq$ 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:** 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.

## 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 24...240V AC 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 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> <p>(A) On-Delay</p> <p>(B) Off-Delay</p> <p>(C) On- and Off-Delay</p> <p>(D) One shot</p> <p>(E) Fleeting Off-Delay</p> <p>(F) Flasher (repeat cycle starts with pulse)</p> <p>(I) On-Delay pulse generator</p> <p>(L) Pulse converter</p> <p>(On) ON-Function♣</p> <p>(Off) OFF-Function♣</p> <p><b>Note:</b> 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
		A	10hr

♣ For installation and maintenance.

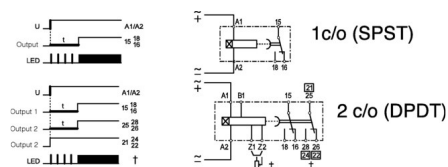
## Accessories

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

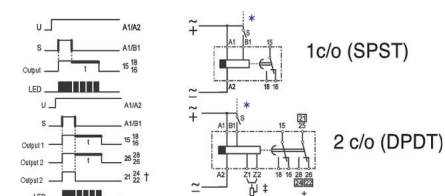
\* Cat. No. 100-FMA2 is only a marking tag carrier. Please refer to the Terminal Block Accessories section, **Marking Solutions** of this publication for appropriate marker cards to be used with this carrier.

## Connection Diagrams

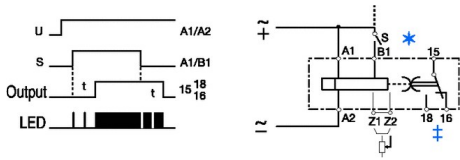
### (A) On-Delay



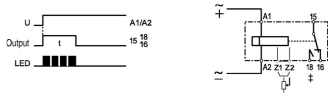
### (B) Off-Delay (Min. Pulse AC 50 ms...DC 30 ms)



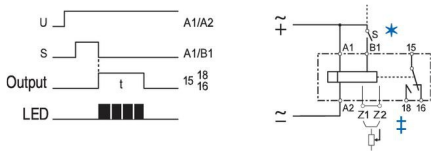
**(C) On- and Off-Delay**



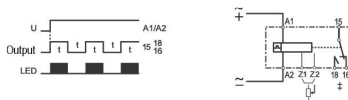
**(D) One Shot**



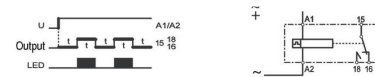
**(E) Fleeting Off-Delay (Min. Pulse AC 50 ms...DC 30 ms)**



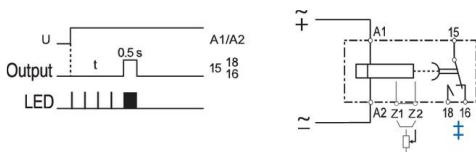
**(F) Flasher (Repeat Cycle Starts with Pulse)**



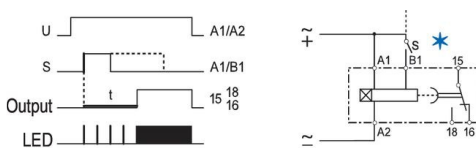
**(G) Flasher (Repeat Cycle Starts with Pause)**



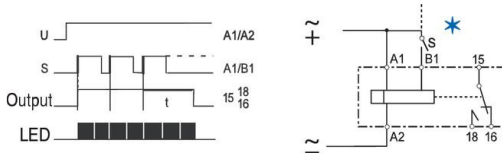
**(I) On-Delay Pulse Generator**



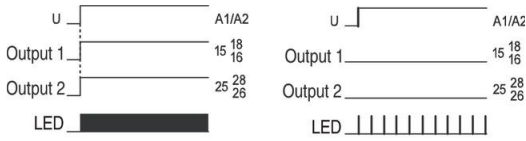
**(J) On-Delay (Pulse Controlled)**



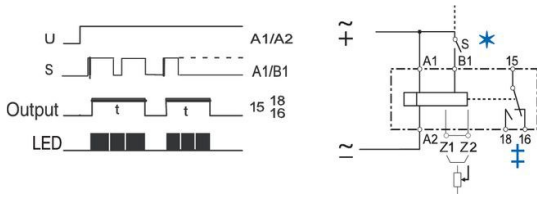
**(K) One Shot/Watch Dog (Pulse Controlled)**



(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.

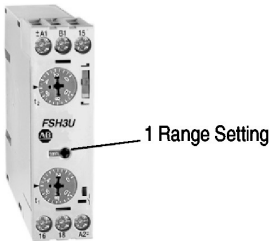
\* A voltage other than the supply voltage can be used at B1, but must be within voltages specified on timer.

† Output 2 is selectable as instantaneous contact with sliding switch (⊗) on front panel (instantaneous when switch is down, timed when switch is up).

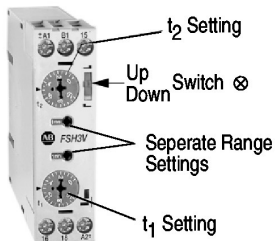
‡ Available on multifunction "M," and single function "A" or "B" option timing relays along with code "4" (2PDT contacts). Bridge or potentiometer 10 kΩ, 0.25 W min. (low voltage) for external time setting. Set timer dial to 0.0.

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

Description



700-FSH3U



700-FSH3V

## Supply Voltages (A1/A2)

Z12 12V DC

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

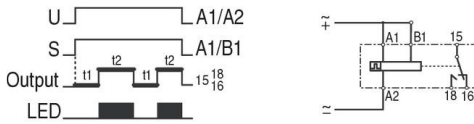
### Function Diagram / Connection Diagram

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

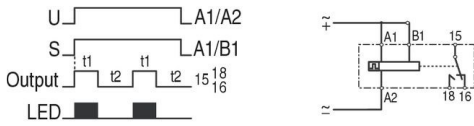
The repeat cycle timer permits different settings for on and off times. The following operating modes are possible:

- Oscillating mode; repeat cycle starts with voltage applied at A1 and B1, and continues to repeat until voltage is off.
- One cycle mode; started by energizing B1 with voltage on A1 and A2.
- Output starts with pulse or pause (switch  $\otimes$  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  $t_2$ .

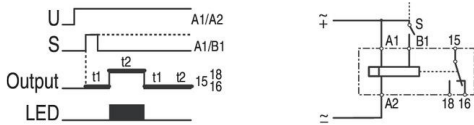
#### Supply Voltage Controlled, Oscillating Mode Starting with Pause – Switch $\otimes$ is Up



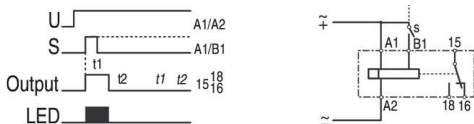
#### Supply Voltage Controlled, Oscillating Mode Starting with Pulse – Switch $\otimes$ is Down



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



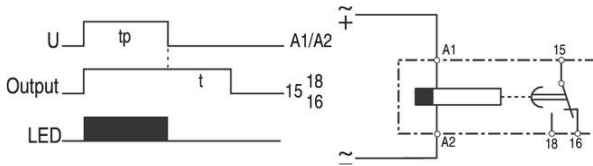
**Note:** If B1 is pulsed, a one full time cycle consisting of  $t_1$  and  $t_2$  is completed.

### LED Operation Chart Ñ Green LED

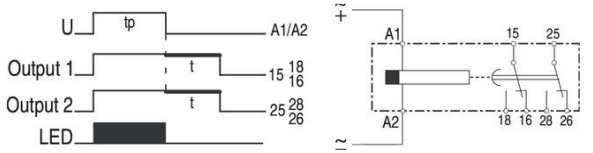
- LED \_\_\_\_\_ Output at Shelf State, No Timing - LED OFF
- LED  Output at Shelf State, Time is Running - LED Flashing
- LED  Output NO Contact is Closed, No Timing - LED On
- LED  Output NO Contact is Closed, Time is Running - LED Long Flashing

### Function Diagram / Connection Diagram

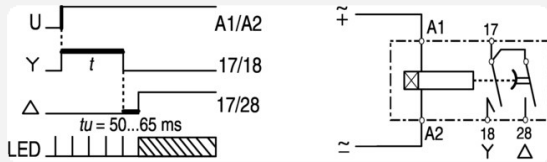
**(Q) Off-Delay without Supply Voltage (True Off-Delay)** – When input power is turned on, the output contact changes state. When the power is removed, the time delay begins. The output contact returns to shelf state at the end of the time delay.



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



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



## Specifications

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

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

### Supply

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

## Pulse Control (B1)

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



## Outputs

Contact Type	Relay as changeover switch
Dielectric Coil to Contact Withstand Voltage	5000 V
Switching Capacity	Voltage: 440V AC Current Ith (AC-1): 8 A (5 A for 700-FSQ) Power: 2000 VA According to IEC 947-5-1: 3 A/440V AC (inductive load, AC 14) 3 A/250V AC (inductive load, AC 15) 1 A/24V DC (inductive load, DC 13) According to UL 508: 1.5 A/250V AC (B300) 3 A/120V AC (B300)
Short-Circuit Resistance	10 A gL
Life	Mechanical: 30 million operations Electrical operations: 4 Mil. at 1 A/250V AC, $\cos \phi = 1$ 0.2 Mil. at 6 A/250V AC, $\cos \phi = 1$ 1.5 Mil. at 1 A/250V AC, $\cos \phi = 0.3$ 0.3 Mil. at 3 A/250V AC, $\cos \phi = 0.3$ 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 <sup>2</sup> ...2 x 2.5 mm <sup>2</sup> (solid) or stranded 2 x 2.5 mm <sup>2</sup> (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

\* See Performance Data.

	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	Temp. Code T4A 2A 32VDC MAX.
<b>Mounting:</b> 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.					