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TD2 Series Time Delay Relay

Product Facts

- Pending qualification to:
 - MIL-PRF-83726/28,
 - MIL-PRF-83726/29,
 - MIL-PRF-83726/30 &
 - MIL-PRF-83726/31.
- Fixed delay on operate, fixed delay on release, adjustable delay on operate & adjustable delay on release.
- Meets or exceeds electrostatic discharge MIL-STD-1686 Class Non-Sensitive.
- Welded hermetically sealed enclosure occupies about 1 in³ (16.4 cm³).
- 10A, 2 form C (DPDT) output contacts.



TD2 series time delay relays are available for delay on operate or delay on release operation. Either can be supplied as fixed or resistor adjustable types. Both military and commercial versions are offered.

These products consist of solid state timing circuits controlling our FCA-210 series relays, providing 2 Form C (DPDT) output contacts rated 10 amps. The internal timing circuit uses an R/C controlled oscillator with a program-

mable digital pulse counter, gating a semiconductor switch to operate the relay. Timing is independent of whether the controlling voltage is a ramp or step function.

For the adjustable models the user specifies a one decade range in seconds, within which the required delay will be set. This range is programmed internally at the time of manufacture. The required delay is obtained by calculating the oscillator timing resistor as

follows and connecting it externally to terminals 1D - 3D as below.

$$R_{EXT} = [(T_1 / T_0) - 1] 100K \text{ Ohms}$$

T_0 = Minimum time of selected decade in seconds.

T_1 = Required time delay.

EXAMPLE

Selected Range = 3-30 sec

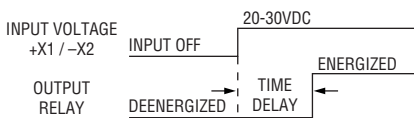
Required Time = 15 sec

$$R_{EXT} = [(15/3) - 1] 100K = 400K$$

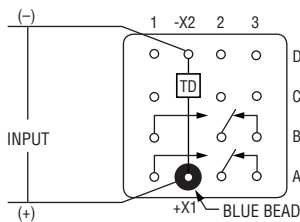
Timing Action and Terminal Wiring

Delay On Operate:

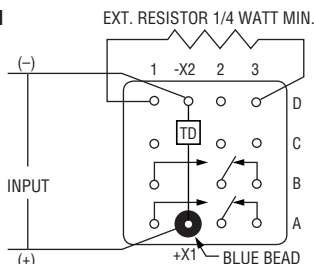
The time delay starts on the application of input voltage to X1-X2. The timing circuit energizes the relay at the end of the time delay period.



Fixed Model

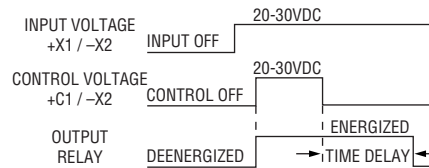


Adjustable Model

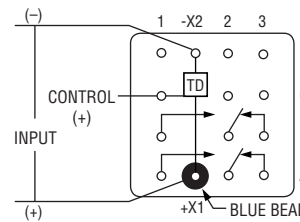


Delay On Release:

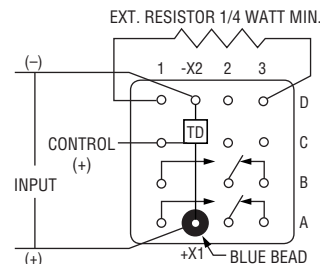
The input voltage is continuous to X1-X2. When the control voltage is applied to C1-X2 the timing circuit and the relay are both energized. The time delay relay starts when the control voltage is shut off.



Fixed Model



Adjustable Model



Terminal designations shown in the diagrams above are for reference only. They do not appear on the relay header.

TD2 Series Time Delay Relay (Continued)

Specifications

Timing Data

Timing Action	Delay on Operate or Delay on Release
Time Delay, Fixed – M83726/28, /29 and Commercial 28C, 29C	Select from 0.1 to 600 sec for Commercial Models Select from 0.1 to 500 sec for Mil-Spec Models
Time Delay, Adjustable – M83726/30, /31 and Commercial 30C, 31C	Select one decade between 0.1 to 1.0 and 60 to 600 seconds
Timing Accuracy (note 1)	±10% of Nominal Value
Recycle Time (note 2)	50 ms, max., to next cycle.
Power Interrupts	Accuracy is not affected by power interruptions up to 1 ms spaced at least 10ms apart.

Input Data

Input Voltage	28 Vdc nominal, range 20 - 32 Vdc
Duty Rating	Continuous
Input Current	110 mAdc Max @ 25°C
Control Voltage (applies only to Delay on Release type)	20 - 32 Vdc
Control Current	15 mAdc Max (applies only to delay on release types)
Input Voltage Polarity Protection	The timer will be inoperative during, and undamaged by, reversal of the polarity of the input voltage.

Output Data

Contact Form	2 Form C (DPDT)					
Contact Material	Silver Cadmium Oxide, Gold plated					
Contact Rating in Amps (Continuous Duty)	Type of Load	Life (Min.) Cycles	28 Vdc	115 Vac 400Hz	115/200 Vac – 3 phase 400 Hz. 60 Hz.*	
	Resistive	100 x 10 ³	10	10	10	2.5
	Inductive	20 x 10 ³	8	8	8	2.5
	Motor	100 x 10 ³	4	4	4	2.0
	Lamp	100 x 10 ³	2	2	2	1.0

* 60 Hz. loads are rated at 10 x 10³ cycles.

Overload Current	40 Adc; 60A, 400 Hz.
Rupture Current	50 Adc; 80A, 400 Hz.
Max. Contact Drop at 10A	Initial 0.150V; After Life 0.175V

Electrical Data

Electrostatic Discharge Withstand Voltage	16,000V
Transients (note 3):	
Positive Transients	+80V
Self-generated Transients	±50V, Max.
Spike Susceptibility	±600V, 10 μs, Max.
Insulation Resistance (note 4)	1,000 megohms at 500Vdc, between each pin and case
Dielectric Strength (note 4)	1,000Vrms at 60 Hz at sea level, between case and all pins connected together

Environmental Data

Ambient Temperature Range, Operating	-55°C to +125°C
Altitude	300,000 feet
Shock Resistance	100 G's, 6 ms.
Vibration Resistance, Sinusoidal	Z & Y Enclosure: 30 G's, 33-3000Hz.; X & W Enclosure: 20 G's, 33-3000Hz.

Mechanical Data

Approximate Weight	2.5 oz. (71g) Max.
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NOTES

- The accuracy requirement applies to any combination of operating temperature and voltage. Add ±10ms for timing less than one second.
- Recycle time to assure that the next timing cycle will be completed. Units can be recycled during timing and after time-out:
Delay on operate models – Power must be OFF the input at least 10 ms. Delay on release models – Power must be ON the control terminal at least 10 ms.
- Transient specifications are based on a maximum duty cycle of 1/50.
- All wired terminals must be connected together during this test. Dielectric withstanding voltage and insulation resistance are measured between all mutually insulated wired terminals and between all these terminals and case.

TD2 Series Time Delay Relay (Continued)

Outline Dimensions

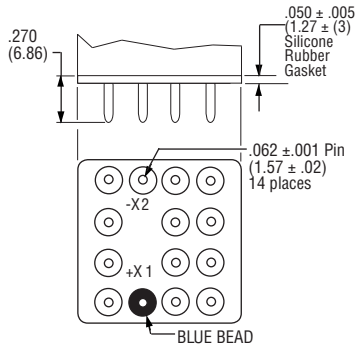
The standard terminal types and enclosures are illustrated below with dimensions expressed as inches ± 0.010 and (millimeters ± 0.25).

Terminals

All terminals on 0.200 (5.4) centers.

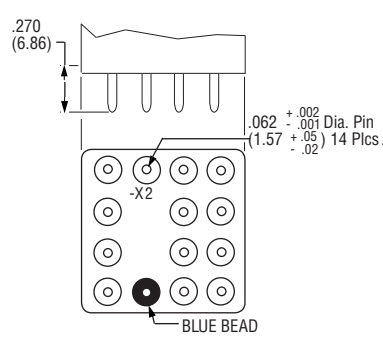
CODE "P"

Socket Pins – Gold Plated



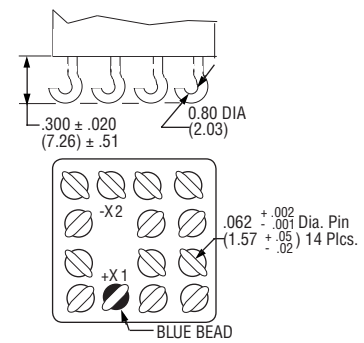
CODE "T"

Circuit Board Pins – Tin/Lead Plated



CODE "S"

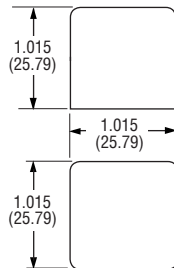
Solder Hooks



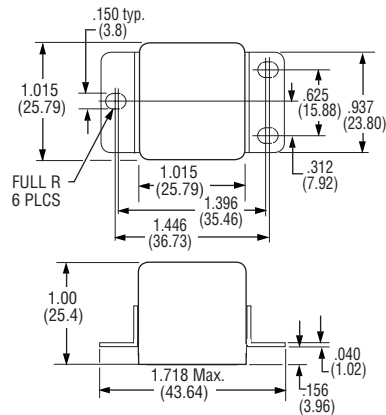
Enclosures

All Enclosures have cupro-nickel cans bright acid tin/lead plated after assembly to terminal headers.

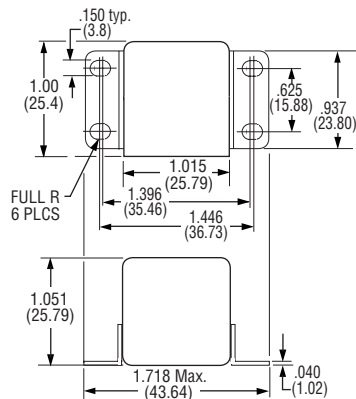
CODE "Z"



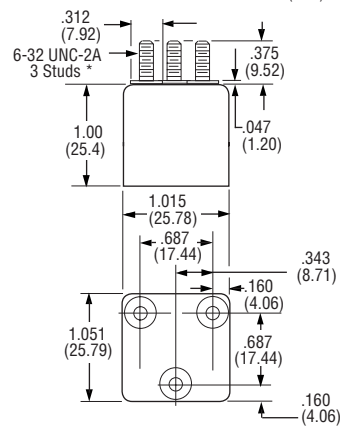
CODE "Y"



CODE "X"



CODE "W"



*Metric threads available. To specify use "M" in place of "W"

TD2 Series Time Delay Relay (Continued)

**Part Numbering System
Mil-Spec Types (Qualification Pending)**

Typical Mil-Spec Part Number	TD2	28-	5002	P
Series: TD2 = Time delay relay with 2 pole, 10A output				
Mil-Spec Model: 28 = M83726/28 (Fixed, Delay on Operate) 29 = M83726/29 (Fixed, Delay on Release) 30 = M83726/30 (Adjustable, Delay on Operate) 31 = M83726/31 (Adjustable, Delay on Release)				
Time Delay Range (Within 0.1 to 500 seconds): For /28 and /29 types (fixed types), the delay is expressed in milliseconds in a four-digit code. The first three digits are significant. The fourth is the number of zeros following the first three. Example: 5002 is 50 seconds. For /30 and /31 types (adjustable types), the delay decade range is expressed in milliseconds in a four-digit code representing the upper limit of the range. The first three digits are significant. The fourth is the number of zeros following the first three. Example: 1001 is 1 second, so the range is 0.1 to 1 second.				
Terminals: P= Socket Pin Terminals S= Solder Hook Terminals				

Note: Mil-spec models have "Y" type enclosure.

Commercial Types

Typical Commercial Part Number	TD2	28C-	1001	P	Y
Series: TD2 = Time delay relay with 2 pole, 10A output					
Commercial Model: 28C = Fixed, Delay on Operate (COTS version of M83726/28) 29C = Fixed, Delay on Release (COTS version of M83726/29) 30C = Adjustable, Delay on Operate (COTS version of M83726/30) 31C = Adjustable, Delay on Release (COTS version of M83726/31)					
Time Delay Range (Within 0.1 to 600 seconds): For fixed types, the delay is expressed in milliseconds in a four-digit code. The first three digits are significant. The fourth is the number of zeros following the first three. Example: 5002 is 50 seconds. For adjustable types, the delay decade range is expressed in milliseconds in a four-digit code representing the upper limit of the range. The first three digits are significant. The fourth is the number of zeros following the first three. Example: 1001 is 1 second, so the range is 0.1 to 1 second.					
Terminals: P= Socket Pin Terminals S= Solder Hook Terminals T= Solder Pin Terminals					
Enclosure W = Mounting Studs X = Horizontal Flange Mount Y = Raised Vertical Flange Mount Z = No Mount					

1600/1700 Series Delay On Operate Timers

Product Facts

- AC/DC input delay on operate timer offered in fixed (1600) and adjustable (1700) types
- Up to 10A loads
- CMOS digital design
- Hermetic package
- Built to MIL-R-83726 environmentals
- Many customizing options
 - Extended timing ranges
 - Tighter timing tolerances
 - Header and mounting
 - 115Vac, 60 Hz. input types

Electrical Specifications

Timing Range —

1600 series (fixed) — 50 ms to 600 s
1700 series (adjustable) — 50 ms to 240 s

Tolerance — ±10% or 10 ms, whichever is greater

Recycle Time — 10 ms (DC input), 50ms (AC input)

Recovery Time — 10 ms (DC input), 50ms (AC input)

Input Voltage — 18 to 31Vdc, 105 to 125Vac, 400 Hz

Current Drain (at 25°C, 28Vdc) —
DC Coil, 10A contacts —
1- and 2-pole — 135mA maximum

AC or DC Coil, 4A contacts —

1-pole — 100mA maximum

2-pole — 150mA maximum

3- and 4-pole — 200mA maximum

Contact Ratings —

DC Coil, 10A contacts —

10A resistive @ 30Vdc

5A inductive @ 30Vdc

5A resistive @ 115 Vrms, 400 Hz

3A inductive @ 115 Vrms, 400 Hz

AC or DC Coil, 4A contacts —

4A resistive @ 30Vdc

1A inductive @ 30Vdc

2A resistive @ 115 Vrms, 400 Hz

1A inductive @ 115 Vrms, 400 Hz

Environmental Specifications

Temperature Range —

-55°C to +85°C or -55°C to +125°C

Vibration — 20 G's, 10 - 2,000 Hz

Shock — 50 G's, 11 ± 1ms duration

Insulation Resistance — 1,000 megohms, min., at 500Vdc, all terminals to case

Dielectric Strength — 1,000Vrms, 60 Hz., at sea level, all terminals to case

Sealing — Hermetic, 1.3 in. (33.0mm) of mercury

Life — 100,000 operations, min.

Weight —

4A units — 4.5 oz (127.6g) max.

10A units — 8.5 oz (240g) max.

CII 1600/1700 series delay on operate timers combine solid state timing circuits with electromechanical output relays in robust hermetically sealed enclosures.



The 1600 types are fixed timers, while the 1700 models are adjustable via an external resistor. Numerous output options include 4A rated contacts in 1-4 form C

(SPDT - 4PDT) arrangements and 10A rated contacts in 1-2 form C (SPDT-DPDT) arrangements.

Specifications by Model Number – 4 Amp Contact Versions

Fixed Timer Model Number	Adjustable Timer Model Number	Input Voltage	Temperature Range	Housing Length (Dim. "A")	Contact Arrangement
1601	1701	DC	-55°C to +85°C	1.656 [42.06]	1 Form C (SPDT)
1602	1702	DC	-55°C to +85°C	1.656 [42.06]	2 Form C (DPDT)
1603	1703	DC	-55°C to +85°C	2.0 [50.8]	3 Form C (3PDT)
1604	1704	DC	-55°C to +85°C	2.0 [50.8]	4 Form C (4PDT)
1621	1721	DC	-55°C to +125°C	1.656 [42.06]	1 Form C (SPDT)
1622	1722	DC	-55°C to +125°C	1.656 [42.06]	2 Form C (DPDT)
1623	1723	DC	-55°C to +125°C	2.0 [50.8]	3 Form C (3PDT)
1624	1724	DC	-55°C to +125°C	2.0 [50.8]	4 Form C (4PDT)
1651	1751	AC	-55°C to +85°C	2.0 [50.8]	1 Form C (SPDT)
1652	1752	AC	-55°C to +85°C	2.0 [50.8]	2 Form C (DPDT)
1653	1753	AC	-55°C to +85°C	2.375 [60.33]	3 Form C (3PDT)
1654	1754	AC	-55°C to +85°C	2.375 [60.33]	4 Form C (4PDT)
1671	1771	AC	-55°C to +125°C	2.0 [50.8]	1 Form C (SPDT)
1672	1772	AC	-55°C to +125°C	2.0 [50.8]	2 Form C (DPDT)
1673	1773	AC	-55°C to +125°C	2.375 [60.33]	3 Form C (3PDT)
1674	1774	AC	-55°C to +125°C	2.375 [60.33]	4 Form C (4PDT)

Specifications by Model Number – 10 Amp Contact Versions

Fixed Timer Model Number	Adjustable Timer Model Number	Input Voltage	Temperature Range	Housing Length (Dim. "A")	Contact Arrangement
1610	1710	DC	-55°C to +85°C	2.419 [61.44]	1 Form C (SPDT)
1620	1720	DC	-55°C to +85°C	2.419 [61.44]	2 Form C (DPDT)

Adjustable Timing Formula (1700 types)

The resistance required to obtain timing within this range is determined by using the formula:

$R_x = 400K (T/T_{max}) - 40K$, where

R_x = External Resistance in Ohms,
 T = Desired Time in Seconds, and
 T_{max} = Maximum Time (Code).

A high quality deposited carbon ±1%, 0.1W (min.) resistor is recommended for external resistance.

Part Numbering System

Typical Part Number

1722

-C

-1102

Model Number:

Four digit code from table above.

Mounting (see outline dimension drawings):

A = Studs on bottom B = Studs on top C = Studs on side

Timing Code:

Four-digit code for any value between 50ms and 600s for fixed (1600) timers, and 50ms and 240s for adjustable (1700) timers.

The timing code consists of four digits and gives the time in ms. The first three digits are the significant figures and the last digit is the number of zeros following the significant figures; thus 50 ms would be coded 0500, 1.1 s would read 1101, and 1 m (60 s) would be 6002.

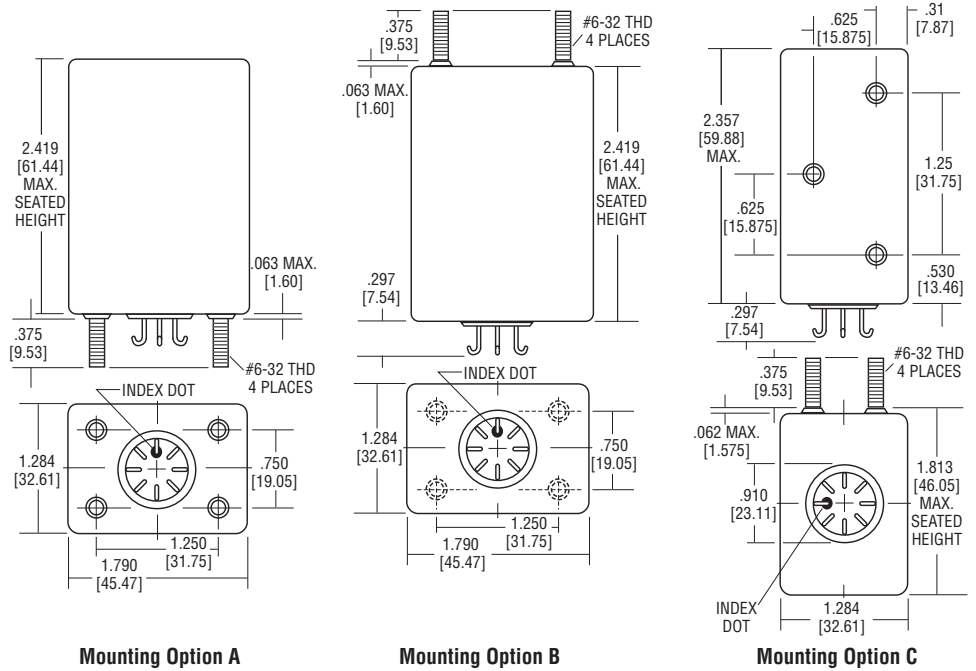
Adjustable timers cover one decade, e.g., 62 ms to 620 ms. The upper decade limit is T_{max} in the timing formula and is the value defined by the timing code in the part number.

A typical part number for an adjustable timer would be 1722-C-1102. This is a DC unit in the -55°C to +125°C temperature range with a 2 form C (DPDT) contact arrangement in a style "C" mounting, with a maximum time delay of 11s.

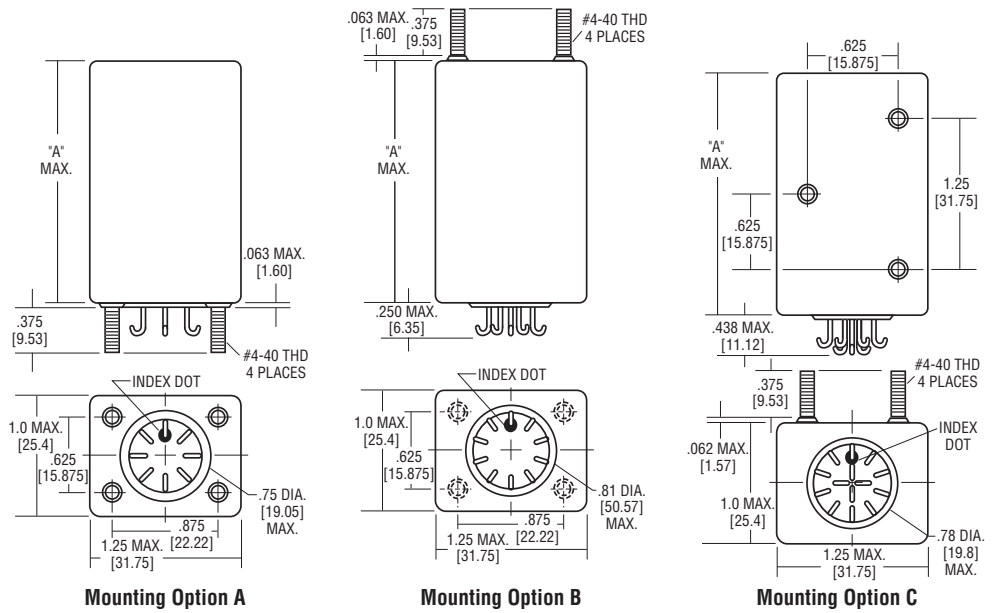
1600/1700 Series Delay On Operate Timers (Continued)

Outline Dimensions

10 Amp Units

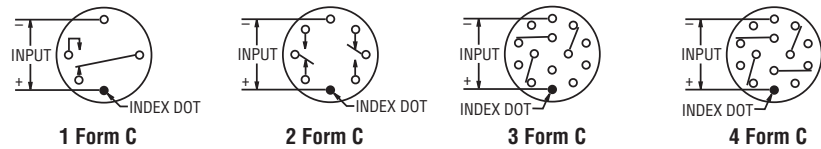


4 Amp Units

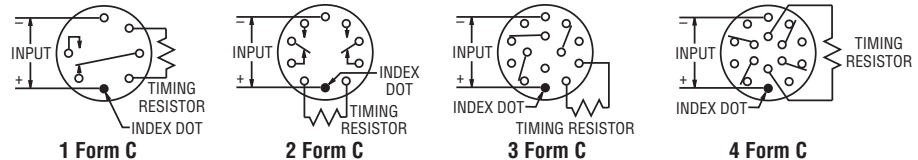


Wiring Diagrams

1600 Series (Fixed)



1700 Series (Adjustable)



2400 Series Delay On Operate Timer, Fixed Timing, Relay Output

Product Facts

- DC input fixed delay on operate timer
- 2 Form C (DPDT), 2A output
- CMOS digital design
- Reverse polarity protection
- Hermetic package
- Built to MIL-R-83726 environmentals
- Customizing options include
 - Tighter timing tolerances
 - Header and mounting
 - Different input voltages

Electrical Specifications

Timing Range — 50 ms to 600 s

Tolerance — ±10% or 10 ms, whichever is greater

Recycle Time — 10 ms

Recovery Time — 20 ms

Input Data —

Input Voltage — 18 to 31Vdc

Current Drain — 85mA @ 31Vdc, 25°C

Output Data —

Output Form — 2 Form C (DPDT).

Output Rating —

2A resistive at 30Vdc;
125mA resistive at 115Vac, 400 Hz

Transient Protection — 80Vdc for 50ms

Environmental Specifications

Temperature Range —
-55°C to +85°C or -55°C to +125°C

Vibration — 20 G's, 10 - 2,000 Hz

Shock — 50 G's, 11 ± 1ms duration

Insulation Resistance — 1,000 megohms, min., at 500Vdc, all terminals to case

Dielectric Strength — 500Vrms, 60 Hz., at sea level, all terminals to case

Sealing — Hermetic, 1.3 in. (33.0mm) of mercury

Life — 100,000 operations, min.

Weight — 1.2 oz (30g) max.



CII 2400 series delay on operate timers combine solid state timing circuits with relay outputs in robust hermetically sealed enclosures. They are fixed timers. The 2 Form C (DPDT) output relay is rated 2A.

Part Numbering System

Typical Part Number	2401	-1	A	- 1102
Model Number:	2401 = Fixed timer, -55°C to +85°C 2402 = Fixed timer, -55°C to +125°C			
Header Style (see Header Options drawings):	1 = Hook terminals 2 = Straight terminals, short 3 = Straight terminals, long			
Mounting (see outline dimension drawings):	A = Plain case B = Bracket B C = Studs on side E = Bracket E			

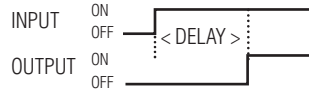
Timing Code:

Four-digit code for any value between 50ms and 600s.

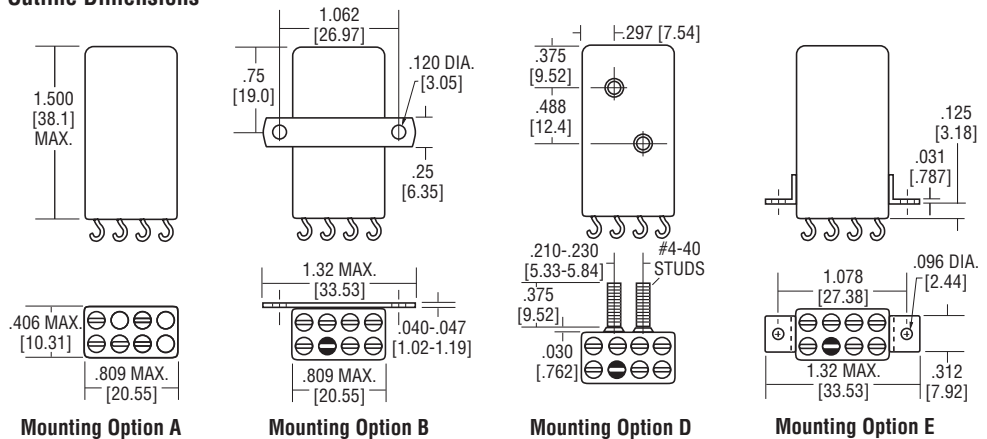
The timing code consists of four digits and gives the time in ms. The first three digits are the significant figures and the last digit is the number of zeros following the significant figures; thus 50 ms would be coded 0500, 1.1 s would read 1101, and 1 m (60 s) would be 6002.

A typical part number would be 2401-1A-1102. This fixed timer operates at -55°C to +85°C, has hook terminals, style "A" mounting, and a time delay of 11s.

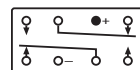
Timing Diagram



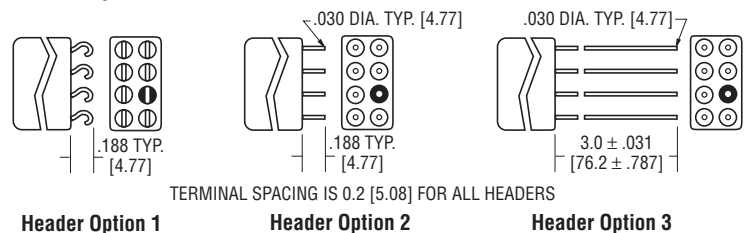
Outline Dimensions



Wiring Diagram



Header Options



Plug-in sockets are available

5600/5700 Series Delay On Release Timers

Product Facts

- DC input delay on release timer offered in fixed (5600) and adjustable (5700) types
- Up to 10A loads
- Reverse polarity protection
- CMOS digital design
- Built to MIL-R-83726 environmental standards
- Many customizing options
 - Extended timing ranges
 - Tighter timing tolerances
 - Header and mounting
 - Different Aux. voltages
 - Different control line voltages
 - Input either 115Vac, 60 Hz or 400 Hz.



CII 5600/6700 series delay on release timers combine solid state timing circuits with electromechanical output relays in robust her-

metically sealed enclosures. The 5600 types are fixed timers, while the 5700 models are adjustable via an external resistor. Numerous

output options include 2A, 5A and 10A rated contacts in 1, and 2 form C (SPDT and DPDT) arrangements.

Electrical Specifications

Timing Range —
5600 series (fixed) — 50 ms to 600 s
5700 series (adjustable) — 50 ms to 240 s

Tolerance — ±10% or ±15ms, whichever is less

Recycle Time — 10 ms

Reset Time — 20 ms

Operate Time (Max.) — 10 ms (2A and 5A models), 20ms (10A models)

Input Voltage — 18 to 31Vdc

Control Voltage — 10 to 31Vdc. Ground common to aux. power line. 10Vdc minimum must be applied for a minimum duration of 20ms to energize output and initiate the timing circuit.

Current Drain (at 25°C, 28Vdc) —
Control Line — 15mA typ., 25mA max.
Input Line De-energized (after completion of delay period) — 125 mA

Input Line Energized —
1-pole, 2 & 5A models — 100mA
1-pole, 10A models — 150mA
2-pole, 2 & 5A models — 150mA
2-pole, 10A models — 240mA

Contact Ratings —
10A contacts —
 10A resistive @ 30Vdc
 5A inductive @ 30Vdc
 5A resistive @ 115 Vrms, 400 Hz
 3A inductive @ 115 Vrms, 400 Hz

5A contacts —
 5A resistive @ 30Vdc
 1.5A inductive @ 30Vdc
 3A resistive @ 115 Vrms, 400 Hz
 1A inductive @ 115 Vrms, 400 Hz

2A contacts —
 2A resistive @ 30Vdc
 1A inductive @ 30Vdc
 1A resistive @ 115 Vrms, 400 Hz
 0.3A inductive @ 115 Vrms, 400 Hz

Specifications by Model Number

Fixed Timer Model Number	Adjustable Timer Model Number	Input Voltage	Temperature Range	Contact Rating	Contact Arrangement	Available Enclosures
5601	5701	DC	-55°C to +85°C	2 Amp	1 Form C (SPDT)	A - C - D - E
5602	5702	DC	-55°C to +85°C	2 Amp	2 Form C (DPDT)	A - C - D - E
5605	5705	DC	-55°C to +85°C	5 Amp	1 Form C (SPDT)	D - E
5606	5706	DC	-55°C to +85°C	5 Amp	2 Form C (DPDT)	D - E
5610	5710	DC	-55°C to +85°C	10 Amp	1 Form C (SPDT)	D - E
5611	5711	DC	-55°C to +85°C	10 Amp	2 Form C (DPDT)	D - E
5621	5721	DC	-55°C to +125°C	2 Amp	1 Form C (SPDT)	A - C - D - E
5622	5722	DC	-55°C to +125°C	2 Amp	2 Form C (DPDT)	A - C - D - E
5625	5725	DC	-55°C to +125°C	5 Amp	1 Form C (SPDT)	D - E
5626	5726	DC	-55°C to +125°C	5 Amp	2 Form C (DPDT)	D - E

See next page for complete ordering information and outline dimensions for the available enclosures.

Environmental Specifications

- Temperature Range** — -55°C to +85°C or -55°C to +125°C
- Vibration** — 20 G's, 10 - 2,000 Hz
- Shock** — 50 G's, 11 ± 1ms duration
- Insulation Resistance** — 1,000 megohms, min., at 500Vdc
- Dielectric Strength** — 1,000Vrms, 60 Hz., at sea level, all terminals to case
- Sealing** — Hermetic, 1.3 in. (33.0mm) of mercury
- Life** — 100,000 operations, min. (2A and 5A models); 50,000 operations, min. (10A models)
- Weight** — 8.5 oz (240g) max.

Adjustable Timing Formula (4700 types)

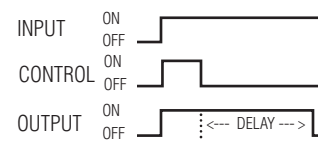
The resistance required to obtain timing within this range is determined by using the formula:

$$R_x = 400K (T/T_{max}) - 40K, \text{ where}$$

R_x = External Resistance in Ohms,
 T - Desired Time in Seconds, and
 T_{max} = Maximum Time (Code).

A high quality deposited carbon ±1%, 0.1W (min.) resistor is recommended for external resistance.

Timing Diagram



Apply input power. Upon application of control power, the output will energize. Remove control power and initiate delay period.

Special Notes

10Vdc minimum must be applied for a minimum duration of 20ms to energize output and initiate timing.

Units rated 10A have a minimum time delay of 100ms.

5600/5700 Series Delay On Release Timers (Continued)

Part Numbering System

Typical Part Number	5722	-C	- 1102
Model Number: Four digit code from table on the previous page.			
Mounting (see outline dimension drawings): A = Studs on bottom of 2.5 in tall case C = Studs on side of 2.5 in. tall case D = Studs on bottom of 1.812 in. tall case E = Bracket on side of 1.812 in. tall case			

Timing Code:

Four-digit code for any value between 50ms and 600s for fixed (5600) timers and between 50ms and 240s for adjustable (5700) timers.

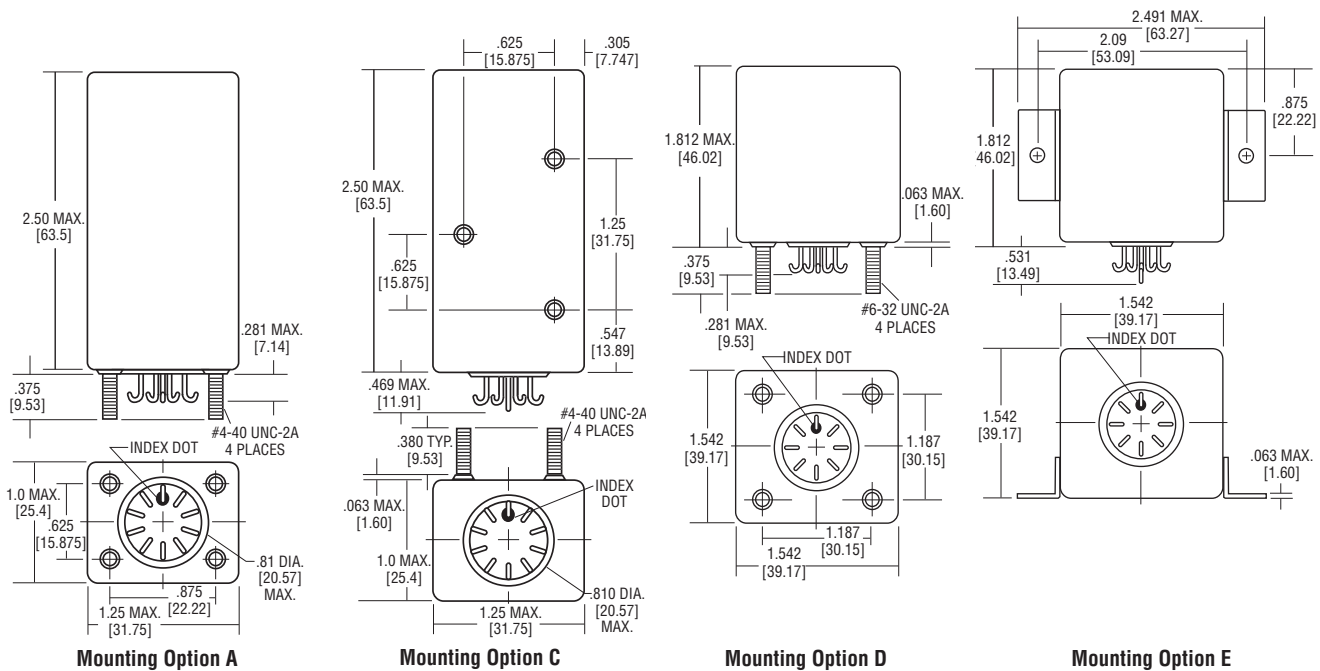
The timing code consists of four digits and gives the time in ms. The first three digits are the significant figures and the last digit is the number of zeros following the significant figures; thus 50 ms would be coded 0500, 1.1 s would read 1101, and 1 m (60 s) would be 6002.

Adjustable timers cover one decade, e.g., 62 ms to 620 ms. The upper decade limit is Tmax. in the timing formula and is the value defined by the timing code in the part number.

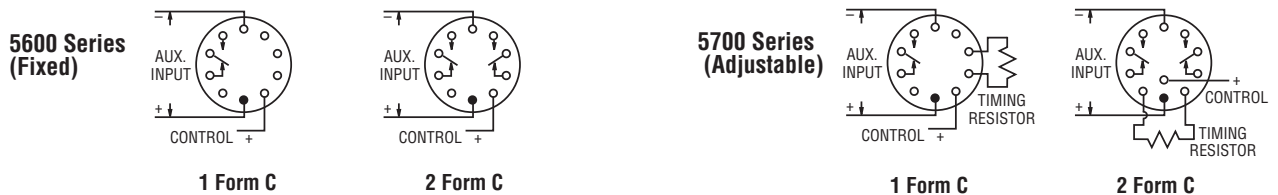
Note: Units with 10A contacts have a minimum time delay of 100ms.

A typical part number for an adjustable timer would be 5722-C-1102. This DC unit is in the -55°C to +125°C temperature range with a 2 amp contacts in a 2 form C (DPDT) arrangement, enclosed in case with a style "C" mounting, with a maximum time delay of 11s.

Outline Dimensions



Wiring Diagrams



1800/1900 Series Delay On Operate Digital Timing Modules

Product Facts

- DC input delay on operate timer offered in fixed (1800) and adjustable (1900) types
- 300mA output
- CMOS digital design
- Reverse polarity protection
- Hermetic package
- Built to MIL-R-83726 environmentals
- Customizing options include
 - Tighter timing tolerances
 - Header and mounting

Electrical Specifications

Timing Range —
1800 series (fixed) — 50 ms to 600 s
1900 series (adjustable) — 50 ms to 240 s

Tolerance — ±10% or 10 ms, whichever is greater

Repeatability — ±0.1%

Recovery Time — 10 ms

Recovery Time — 20 ms

Input Data —

Input Voltage — 18 to 31Vdc

Current Drain (at 25°C, 28Vdc) — 10mA, plus load current

Output Data —

Output Form — 1 Form A (SPST-NO) solid state switch closure to ground

Output Rating — 300mA @ 25°C, 100mA @ 125°C

Minimum Load — 10mA

Saturation Voltage — 2.5Vdc, max.

Leakage — 1µA @ 25°C, 10µA @ 125°C

Environmental Specifications

Temperature Range — -55°C to +85°C or -55°C to +125°C

Vibration — 20 G's, 10 - 2,000 Hz

Shock — 50 G's, 11 ± 1ms duration

Insulation Resistance — 1,000 megohms, min., at 500Vdc, all terminals to case

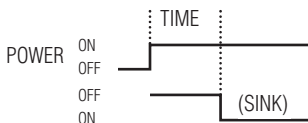
Dielectric Strength — 500Vrms, 60 Hz., at sea level, all terminals to case

Sealing — Hermetic, 1.3 in. (33.0mm) of mercury

Life — 100,000 operations, min.

Weight — 1 oz (28.3g) max

Timing Diagram



CII 1800/1900 series delay on operate timer modules combine solid state timing circuits with solid state switch outputs in robust hermetically sealed enclosures. The 1800 types are fixed timers, while the 1900 models are adjustable via an external resistor. The 1 Form A (SPST-NO) switch is rated 300mA.

Adjustable Timing Formula (1900 types)

The resistance required to obtain timing within this range is determined by using the formula:

$$R_x = 400K (T/T_{max}) - 40K, \text{ where}$$

R_x = External Resistance in Ohms,
 T - Desired Time in Seconds, and
 T_{max} = Maximum Time (Code).

A high quality deposited carbon ±1%, 0.1W (min.) resistor is recommended for external resistance.



Part Numbering System

Typical Part Number	1811	-1	A	-1002
Model Number:				
1811 = Fixed timer, -55°C to +85°C				
1821 = Fixed timer, -55°C to +125°C				
1911 = Adjustable timer, -55°C to +85°C				
1921 = Adjustable timer, -55°C to +125°C				
Header Style (see Header Options drawings):				
1 = Hook terminals	2 = Straight terminals			
Mounting (see outline dimension drawings):				
A = Plain case	B = Bracket B	C = Studs on side	E = Bracket E	

Timing Code:

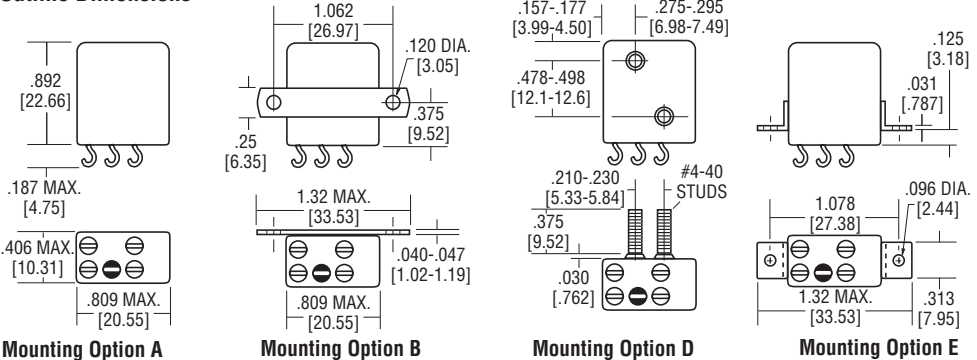
Four-digit code for any value between 50ms and 600s for fixed (1800) timers, and 50ms and 240s for adjustable (1900) timers.

The timing code consists of four digits and gives the time in ms. The first three digits are the significant figures and the last digit is the number of zeros following the significant figures; thus 50 ms would be coded 0500, 1.1 s would read 1101, and 1 m (60 s) would be 6002.

Adjustable timers cover one decade, e.g., 62 ms to 620 ms. The upper decade limit is T_{max} in the timing formula and is the value defined by the timing code in the part number.

A typical part number would be 1811-1A-1002. This fixed timing module operates at -55°C to +85°C, has hook terminals, style "A" mounting, and a time delay of 10s.

Outline Dimensions



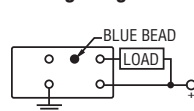
Mounting Option A

Mounting Option B

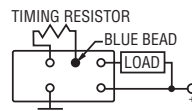
Mounting Option D

Mounting Option E

Wiring Diagrams



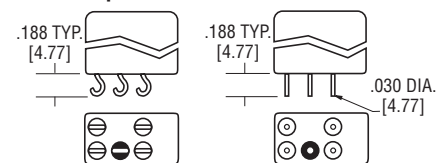
1800 Series (Fixed)



1900 Series (Adjustable)

Note: The blank pin on 1800 series types is active and must not be connected.

Header Options



Header Option 1

Header Option 2

TERMINAL SPACING IS 0.2 IN (5.08)

6001 Series Delay On Operate Digital Timing Module

Product Facts

- Fixed delay on operate timer
- 300mA output
- CMOS digital design
- Voltage surge protection
- Qualified to MIL-R-83726/13

Electrical Specifications

Timing Range — 50 ms to 600 s.

Timing Accuracy — $\pm 10\%$ of nominal timing under all conditions of input voltage and environmental extremes

Recycle Characteristics

Before Time Out — A power interruption occurring after the start but before completion of the timing cycle shall be for a duration of 0.5% of the nominal time delay or 10ms, whichever is greater, to ensure a loss in timing of no greater than 10%

After Time Out — A power interruption of 0.5% of the nominal time delay or 10ms, whichever is greater, will initiate a new timing cycle with a loss in timing of no greater than 5%

Input Data

Input Voltage — 28Vdc, nominal; range 18 to 31Vdc

Current Drain (at 25°C, 28Vdc) — 10mA (max.), plus load current

Reverse Polarity Protection — The timer will not be damaged or operate when input voltage polarity is reversed

Output Data

Configuration — 1 Form A (SPST-NO) solid state switch closure to ground

Load Ratings

Resistive — 300mA @ +25°C, derated to 100mA @ +125°C

Inductive — Three MIL-R-5757/9 relays (any relay with 26.5Vdc coil)

Lamp Load — Two MS25237-327 lamps per MIL-L-6363

Load Suppression — Suppression for inductive loads for output protection is provided within the unit

Voltage Drop — 2.5Vdc, max. @ -55°C and +25°C; 2.0 Vdc, max., @ +125°C

Leakage Current — 1 μ A, max. @ +25°C, 10 μ A, max. @ +125°C

Insulation Resistance — 1,000 megohms, min., @ 500Vdc, measured between all terminals tied together to the case

Dielectric Strength — 500Vrms, 60 Hz., at sea level, measured between all terminals tied together to the case

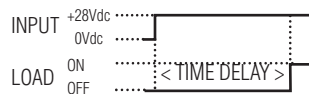
Transients

Voltage Surge — Per MIL-STD-704A, figure 9, limit 1, for category B equipment

Self-generated Spikes — ± 10 V

CII 6001 series delay on operate timer modules are miniature devices combining solid state timing circuits with solid state switch outputs in robust hermetically sealed DIP enclosures. The 1 Form A (SPST-NO) switch is rated 300mA.

Timing Diagram



Environmental Specifications

Temperature Range — -55°C to +125°C

Altitude — 80,000 ft.

Shock — 150 G's, 11 \pm 1ms half-sine wave

Vibration (sinusoidal) — 10 - 80 Hz. at 0.06 inch DA; 80 - 3,000 Hz. at 20 G's

Sealing — MIL-STD-202, method 112, condition C

Materials:

Cover — Nickel

Header — Kovar® Alloy

Pins — Kovar® Alloy, gold plated

Marking — Per MIL-R-83726

Weight — 0.42 oz (12g) max.

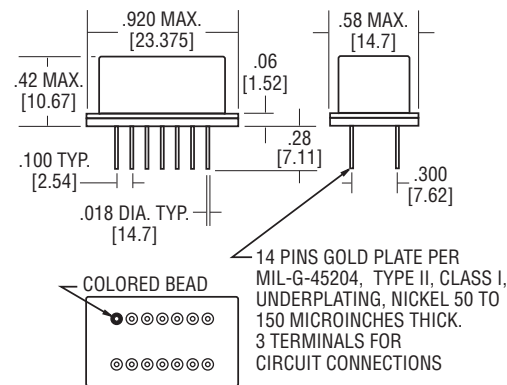


Part Numbering System

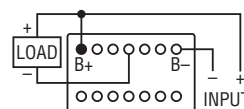
Typical Part Number	6001	-6002	C
Model Number: 6001 = Fixed timer, -55°C to +125°C			
Timing Code: Four-digit code for any value between 50ms and 600s.			
The timing code consists of four digits and gives the time in ms. The first three digits are the significant figures and the last digit is the number of zeros following the significant figures; thus 50 ms would be coded 0500, 1.1 s would read 1101, and 1 m (60 s) would be 6002.			
Optional Suffix: C = Commercial version equivalent to M83726/13.			

A typical part number would be 6001-6002C. This solid state output timing module has a time delay of 60s at 28Vdc and is the commercial equivalent to M83726/13.

Outline Dimensions



Wiring Diagram



PIN 10 IS ACTIVE. DO NOT CONNECT.

Special Notes:

- Load is connected between B+ and terminal designated. Delay begins upon application of power to terminals (B+ and B-).
- Always consult latest military specification for changes and additional information.

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4600/4700 Series Interval Timers

Product Facts

- AC/DC input interval timer offered in fixed (4600) and adjustable (4700) types
- Up to 10A loads
- Reverse polarity protection
- Hermetic package
- Built to MIL-R-83726 environmental standards
- Many customizing options
 - Extended timing ranges
 - Tighter timing tolerances
 - Header and mounting
 - 115Vac, 60 Hz. input types

Electrical Specifications

Timing Range —

4600 series (fixed) — 100 ms to 600 s
4700 series (adjustable) — 100 ms to 240 s

Tolerance — ±10%

Recycle Time — 10 ms (DC input), 50ms (AC input)

Operate Time (Max.) — 10 ms (4A models), 20ms (10A models)

Input Voltage — 18 to 31Vdc, 105 to 125Vac, 400 Hz

Current Drain (at 25°C, 28Vdc) —
DC Coil, 10A contacts —
1- and 2-pole — 135mA maximum

AC or DC Coil, 4A contacts —

1-pole — 100mA maximum

2-pole — 150mA maximum

3- and 4-pole — 200mA maximum

Contact Ratings —

DC Coil, 10A contacts —

10A resistive @ 30Vdc

5A inductive @ 30Vdc

5A resistive @ 115 Vrms, 400 Hz

3A inductive @ 115 Vrms, 400 Hz

AC or DC Coil, 4A contacts —

4A resistive @ 30Vdc

1A inductive @ 30Vdc

2A resistive @ 115 Vrms, 400 Hz

1A inductive @ 115 Vrms, 400 Hz

Environmental Specifications

Temperature Range —

-55°C to +125°C

Vibration — 20 G's, 10 - 2,000 Hz

Shock — 50 G's, 11 ± 1ms duration

Insulation Resistance — 1,000 megohms, min., at 500Vdc

Dielectric Strength — 1,000Vrms, 60 Hz., at sea level, all terminals to case

Sealing — Hermetic, 1.3 in. (33.0mm) of mercury

Life — 100,000 operations, min. (4A models); 50,000 operations, min. (10A models);

Weight —

4A units — 4.5 oz (127.6g) max.

10A units — 8.5 oz (240g) max.



CII 4600/4700 series interval timers combine solid state timing circuits with electromechanical output relays in robust hermetically sealed enclosures. The

4600 types are fixed timers, while the 4700 models are adjustable via an external resistor. Numerous output options include 4A rated contacts in 1, 2 and 4 form

C (SPDT, DPDT and 4PDT) arrangements and 10A rated contacts in 1-2 form C (SPDT-DPDT) arrangements.

Specifications by Model Number – 4 Amp Contact Versions

Fixed Timer Model Number	Adjustable Timer Model Number	Input Voltage	Temperature Range	Contact Rating	Contact Arrangement
4610	4710	DC	-55°C to +125°C	10 Amp	1 Form C (SPDT)
4611	4711	DC	-55°C to +125°C	10 Amp	2 Form C (DPDT)
4621	4721	DC	-55°C to +125°C	4 Amp	1 Form C (1PDT)
4622	4722	DC	-55°C to +125°C	4 Amp	2 Form C (DPDT)
4624	4724	DC	-55°C to +125°C	4 Amp	4 Form C (4PDT)
4671	4771	AC	-55°C to +125°C	4 Amp	1 Form C (SPDT)
4672	4772	AC	-55°C to +125°C	4 Amp	2 Form C (DPDT)
4674	4774	AC	-55°C to +125°C	4 Amp	4 Form C (4PDT)

Timing Diagram



Apply power and the output will energize. After time-out, the output will revert to de-energized state. Remove and reapply input to cycle.

Adjustable Timing Formula (4700 types)

The resistance required to obtain timing within this range is determined by using the formula:

$R_x = 400K (T/T_{max}) - 40K$, where

R_x = External Resistance in Ohms,

T - Desired Time in Seconds, and

T_{max} = Maximum Time (Code).

A high quality deposited carbon ±1%, 0.1W (min.) resistor is recommended for external resistance.

Part Numbering System

Typical Part Number 4722 -C -1102

Model Number:

Four digit code from table above.

Mounting (see outline dimension drawings):

A = Studs on bottom B = Studs on top C = Studs on side

Timing Code:

Four-digit code for any value between 100ms and 600s for fixed (4600) timers, and 100ms and 240s for adjustable (4700) timers.

The timing code consists of four digits and gives the time in ms. The first three digits are the significant figures and the last digit is the number of zeros following the significant figures; thus 50 ms would be coded 0500, 1.1 s would read 1101, and 1 m (60 s) would be 6002.

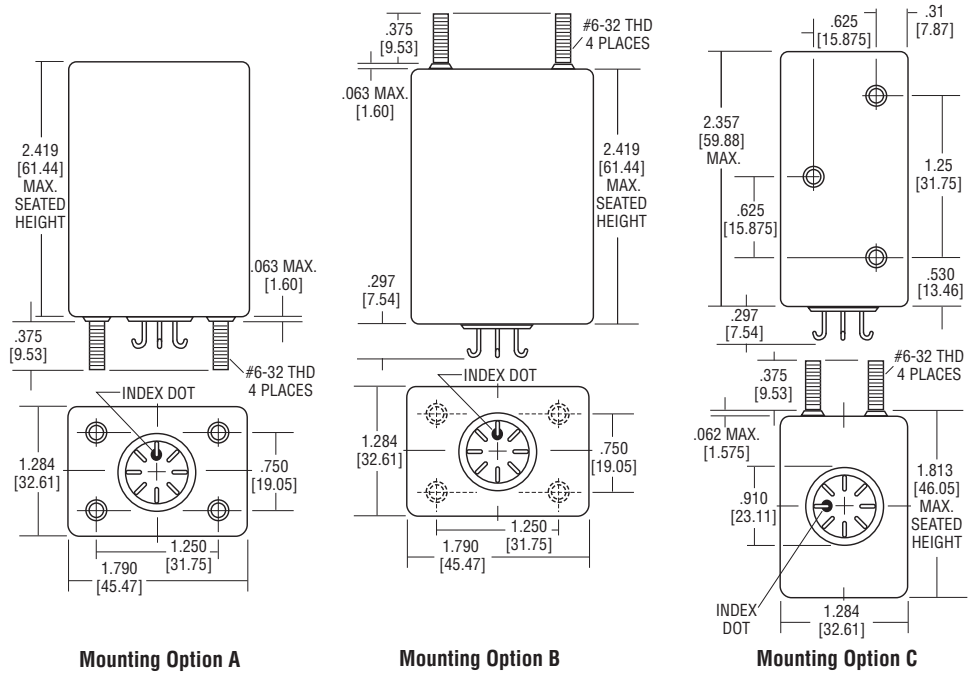
Adjustable timers cover one decade, e.g., 62 ms to 620 ms. The upper decade limit is T_{max} in the timing formula and is the value defined by the timing code in the part number.

A typical part number for an adjustable timer would be 4722-C-1102. This is a DC unit in the -55°C to +125°C temperature range with a 2 form C (DPDT) contact arrangement in a style "C" mounting, with a maximum time delay of 11s.

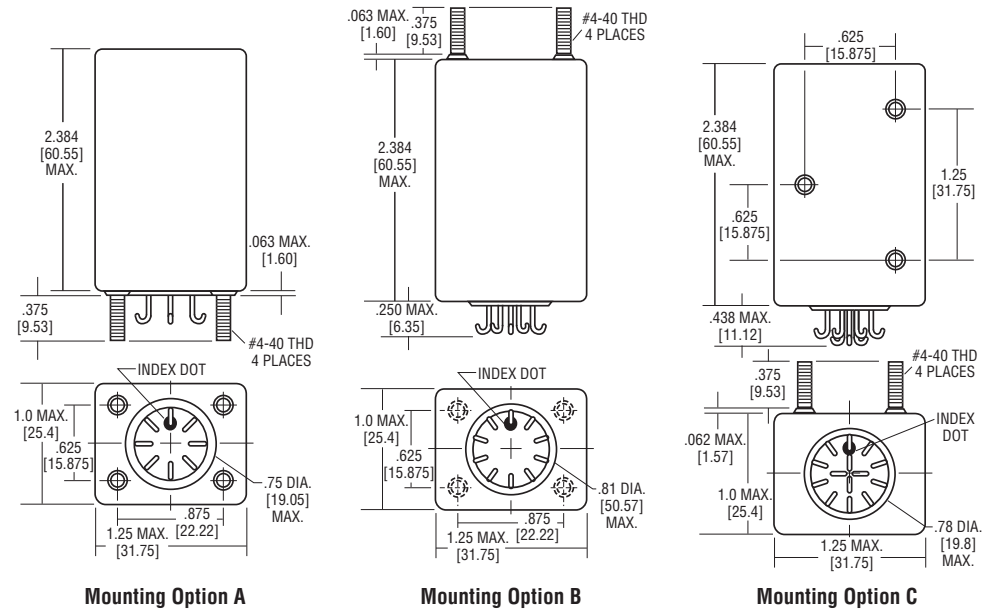
4600/4700 Series Interval Timers (Continued)

Outline Dimensions

10 Amp Units

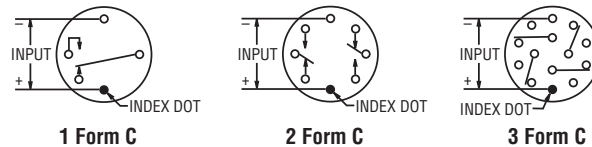


4 Amp Units

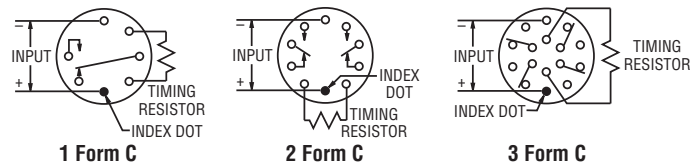


Wiring Diagrams

4600 Series (Fixed)



4700 Series (Adjustable)



4800 Series Interval Timer, Fixed Timing, Solid State Output

Product Facts

- DC input fixed delay interval timer
- 1 Form A (SPST-NO), 500mA output
- CMOS digital design
- Reverse polarity protection
- Hermetic package
- Built to MIL-R-83726 environmentals
- Customizing options include
 - Adjustable timing
 - Tighter timing tolerances
 - Header and mounting
 - Relay output
 - AC input

Electrical Specifications

Timing Range: 100 s. to 600 s.
Tolerance: ±10%.
Repeatability: ±2%.
Recycle Time: 0.5% of Max. Delay.
Input Data:
Input Voltage: 18 to 31Vdc.
Current Drain: 40mA. max.
Output Data:
Output Form: 1 Form A (SPST-NO).
Output Rating:
 500mA @ +25°C;
 200mA @ +125°C.
Saturation Voltage:
 1.0V, 500mA (25°C).

Leakage:
 10µA (125°C).

Environmental Specifications

Temperature Range:
 -55°C to +85°C or -55°C to +125°C.
Vibration: 20 G's, 10 - 2,000 Hz.
Shock: 50 G's, 11 ± 1ms duration.
Insulation Resistance: 1,000 megohms, min., at 500Vdc.
Dielectric Strength: 500Vrms, 60 Hz., at sea level, all terminals to case.
Sealing: Hermetic, 1.3 in. (33.0mm) of mercury.
Life: Over 1 million operations.
Weight: 2 oz (50g) max.



CII 4800 series interval timers combine solid state timing circuits with solid state outputs in robust hermetically sealed enclosures. They are fixed timers. The 1 Form A (SPST-NO) output switch is rated 500mA.

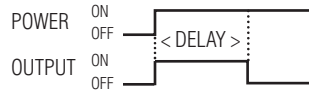
Part Numbering System

Typical Part Number	4801	-1	A	-1102
Model Number:				
4801 = Fixed timer, -55°C to +85°C				
4851 = Fixed timer, -55°C to +125°C				
Header Style (see Header Options drawings):				
1 = Hook terminals	2 = Straight terminals, short			
3 = Straight terminals, long				
Mounting (see outline dimension drawings):				
A = Plain case	B = Bracket B	C = Studs on side	E = Bracket E	
Timing Code:				
Four-digit code for any value between 50ms and 600s.				

The timing code consists of four digits and gives the time in ms. The first three digits are the significant figures and the last digit is the number of zeros following the significant figures; thus 50 ms would be coded 0500, 1.1 s would read 1101, and 1 m (60 s) would be 6002.

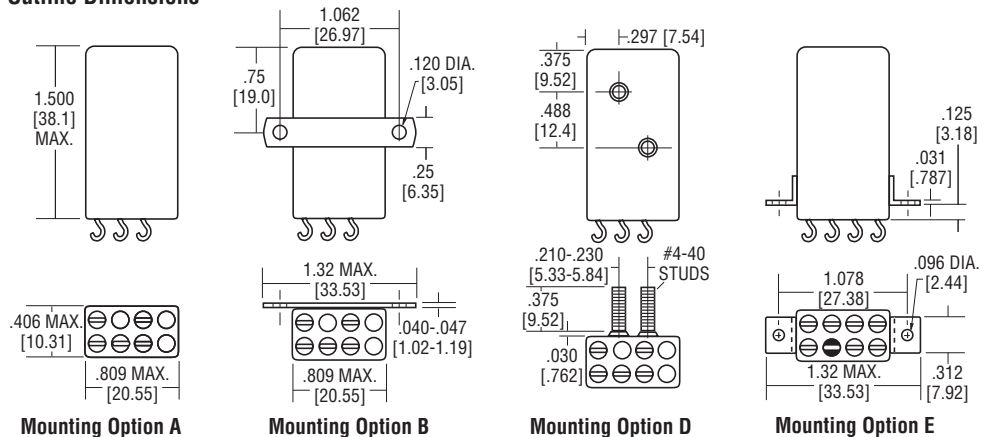
A typical part number would be 4801-1A-1102. This fixed timer operates at -55°C to +85°C, has hook terminals, style "A" mounting, and a time delay of 11s.

Timing Diagram

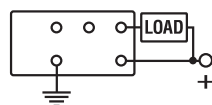


Apply power and the output will energize. After time-out, the output will revert to de-energized state. Remove and reapply power to recycle.

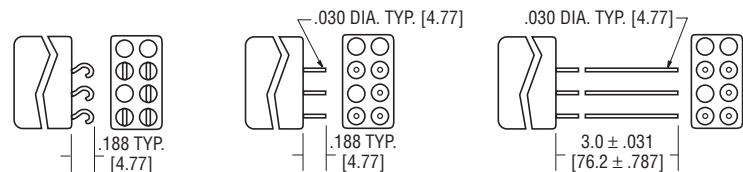
Outline Dimensions



Wiring Diagram



Header Options



TERMINAL SPACING IS 0.2 [5.08] FOR ALL HEADERS

Plug-in sockets are available

Engineering Notes

