canfield connector
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MBT

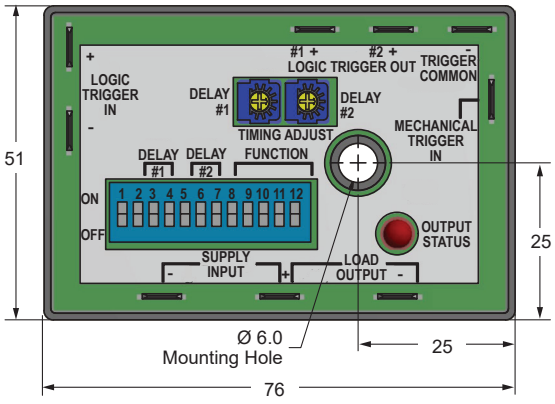
MULTIFUNCTION BLOCK TIMER
12 FUNCTIONS IN 1 TIMER

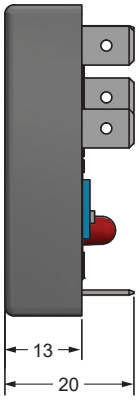
General Description

The Canfield Connector model MBT Multifunction Block Timer is designed as a full featured, multiple voltage, all-in-one programmable timer. It can be operated individually or cascaded to perform virtually any timing sequence desired. The unit has a time range adjustable from 0.1 seconds to 33.3 hours. Features include twelve modes of operation including a multitude of logic function possibilities and an indicator light for fast troubleshooting along with single turn timing adjustment. The MBT can instantly handle all mobile, industrial and automation applications right off the shelf.

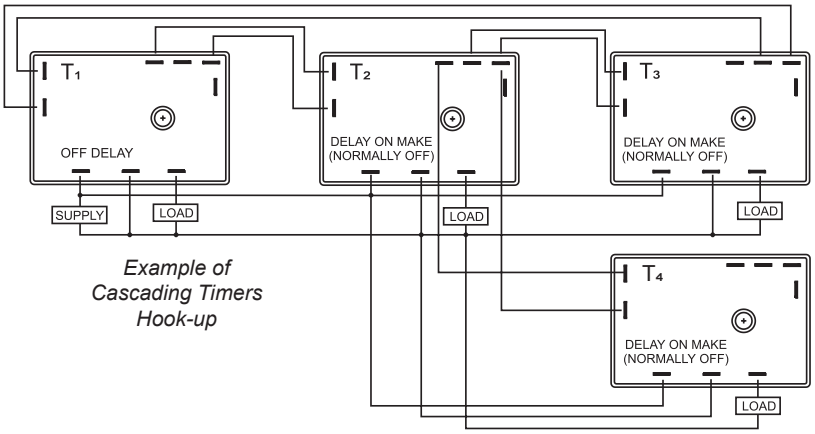
Dimensional Data

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED

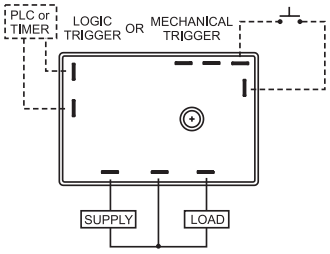




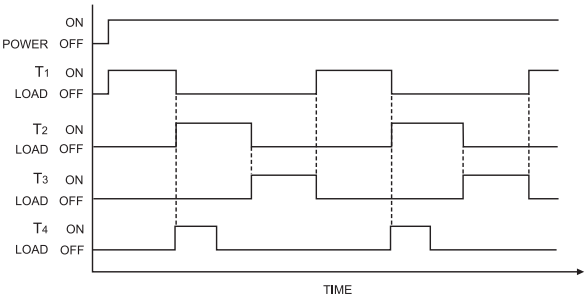
Hook-Up



Example of Cascading Timers Hook-up



Single Timer Hook-up

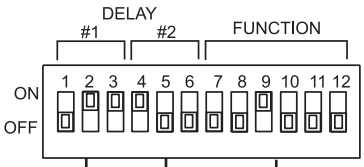


A56-1371 Rev.03

Technical Data

Input Voltage Range	12-240 VDC, 24-240 VAC (50/60 Hz)
Max. Output Current	1 Amp
Logic Trigger In	5-48 VDC (10k Input impedance)
Logic Trigger Out	5.5 V @ .55mA Max.
Mechanical Trigger In	80mA Max. Current draw
Transient Suppression	AC - MOV DC - Diode
Reset Time Max.	50ms
Repeat Accuracy	+/-0.1% or 10ms (whichever is greater)
Time Delay	+/-2% Variable over ambient temperature range
Ambient Temp. Range	-20° to +60°C
Materials	Housing: ABS Encapsulation: Epoxy
Environmental Protection	NEMA 1

Timer Programming



Switch Symbols

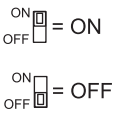


Chart 1

#1 Delay Range (seconds) All Function	Switch Settings
.10 - 4.70	
0.36 - 18.0	
2.80 - 150	
23.0 - 1200	
Delay = range X 1	
Delay = range X 100	

Chart 2

#2 Delay Range (seconds) Cycle Function Only	Switch Settings
0.10 - 4.70	
0.36 - 18.0	
2.80 - 150	
23.0 - 1200	
Delay = range X 1	
Delay = range X 100	

Chart 3

Function	Switch Settings
#1 Off delay (retriggerable)	
#2 On delay (retriggerable)	
#3a Cycle (on first)	
#3b Cycle (off first)	
#4a Square wave (on first)	
#4b Square wave (off first)	
#5 Delay on break (normally off)	
#6 Delay on break (normally on)	
#7 Delay on make (normally off)	
#8 Delay on make (normally on)	
#9a Toggle (on first)	
#9b Toggle (off first)	

Operation

Mechanical Trigger Input - A switch closure at this input begins or resets the timing period of any non-cycling MBT function.

Logic Trigger Input - A sourcing or sinking voltage signal (5 - 48 volts) at this input begins or resets the timing period of any non-cycling MBT function.

Logic Trigger Outputs - The logic output produces a voltage signal in sync with the timing cycle. Timers can be cascaded when the logic output of one timer is connected to the logic input of other timers.

The logic signal output is inactive when power is initially applied to the timer. The #1 logic output produces a voltage level opposite the #2 logic output.

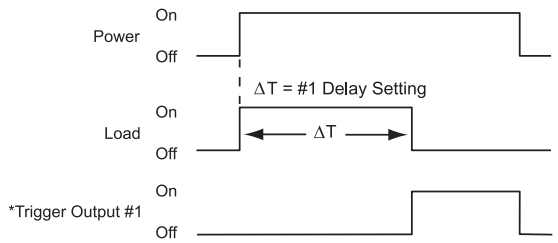
Cascading Multiple Timers - There is no limit to the number of MBTs that can be cascaded in series (the logic output of one MBT connected to the logic input of another MBT). However the number of parallel MBTs (the same logic output connected to the logic input of more than one other MBT) should be limited to 10 MBTs.

Timing Diagrams

FUNCTION #1

Load is energized for ΔT upon application of power. Reset occurs when power is removed or trigger is applied.

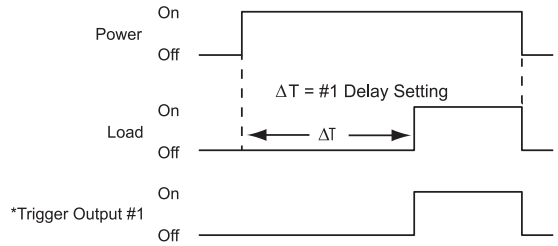
Off Delay (Retriggerable)



FUNCTION #2

Load remains Off for ΔT upon application of power. Reset occurs when power is removed or trigger is applied.

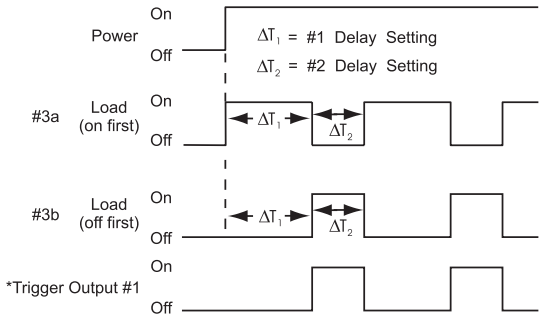
On Delay (Retriggerable)



FUNCTION #3a / 3b

Load cycles ΔT_1 and ΔT_2 when power is applied. Reset occurs when power is removed.

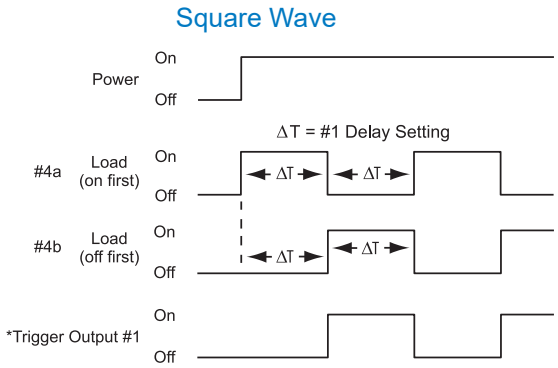
Cycle



FUNCTION #4a / 4b

Load cycles with equal On and Off times when power is applied. Reset occurs when power is removed.

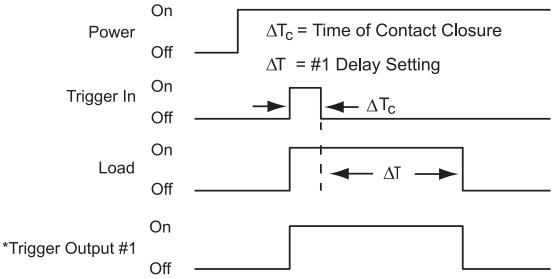
Square Wave



FUNCTION #5

When power is applied, load reins Off. Load is energized when trigger switch is closed. When trigger switch is opened, ΔT begins. The load de-energizes at completion of ΔT. Reset occurs when load is Off and trigger is re-applied.

Delay On Break (Normally Off)



NOTE: Refer to charts on page 103 for switch settings.

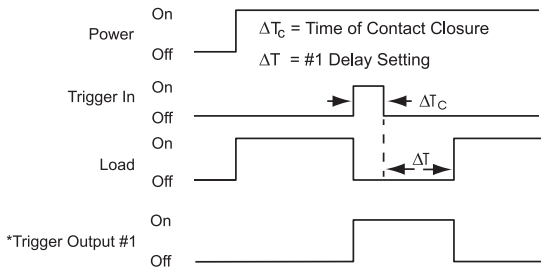
*Trigger Output #2 level is always opposite of Trigger Output #1.

Timing Diagrams con't

FUNCTION #6

When power is applied, load is energized and remains energized until the trigger switch is closed. Load is then Off for $\Delta T_c + \Delta T$. Reset occurs when load is On and the trigger is re-applied.

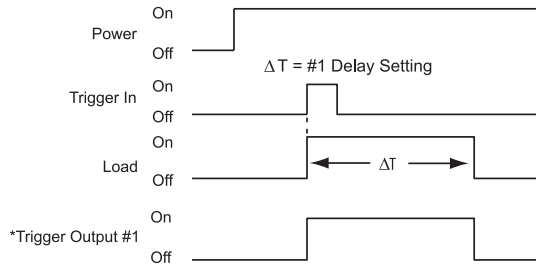
Delay On Break (Normally On)



FUNCTION #7

When power is applied, load remains Off. Load is energized for ΔT only upon closure of a normally open momentary contact switch (trigger). Reset occurs when load is Off and the trigger switch is closed.

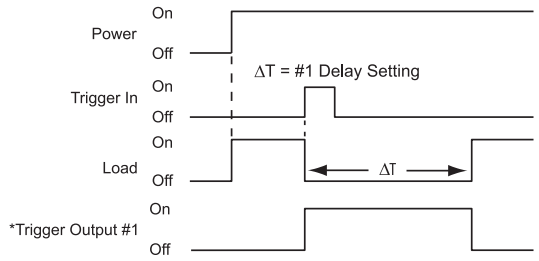
Delay On Make (Normally Off)



FUNCTION #8

When power is applied, load is energized. Load de-energizes for ΔT only upon closure of a normally open momentary contact switch (trigger). Reset occurs when load is On and the trigger switch is closed.

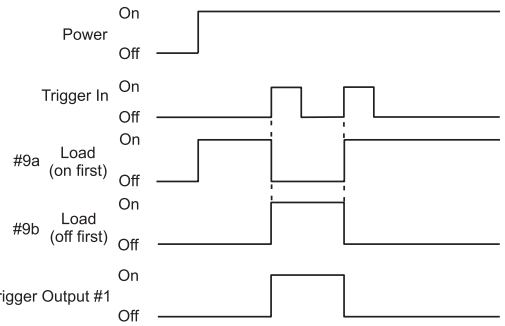
Delay On Make (Normally On)



FUNCTION #9a / 9b

When power is applied, load is On. Load switches state (On/Off) with each application of trigger

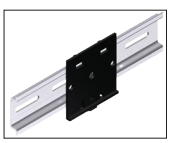
Toggle



NOTE: Refer to charts on page 103 for switch settings.

*Trigger Output #2 level is always opposite of Trigger Output #1.

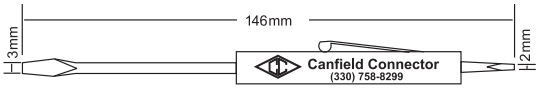
Ordering Information



DIN Rail Mounting Adapter
P/N: DRM-100

ORDER PART NUMBER

MBT-1000-00



Optional Adjustment Tool
P/N: 5000-TOOL

canfield connector
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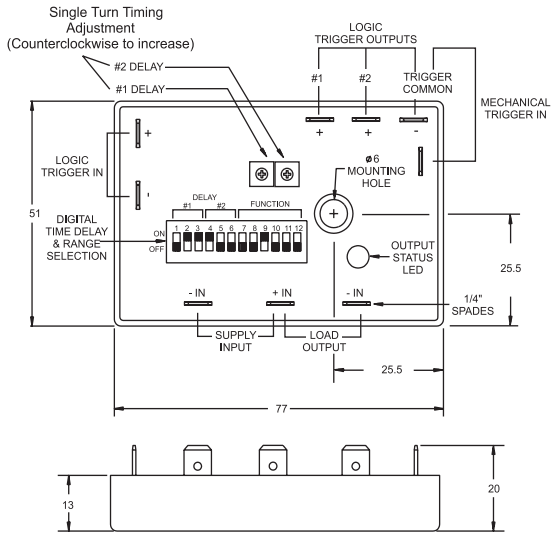
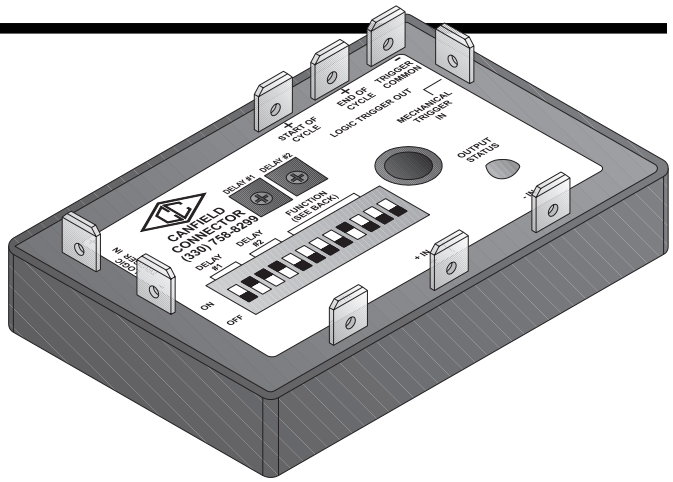
SERIES MBT
MULTIFUNCTION BLOCK TIMER

INSTALLATION GUIDE
For: MBT-100000

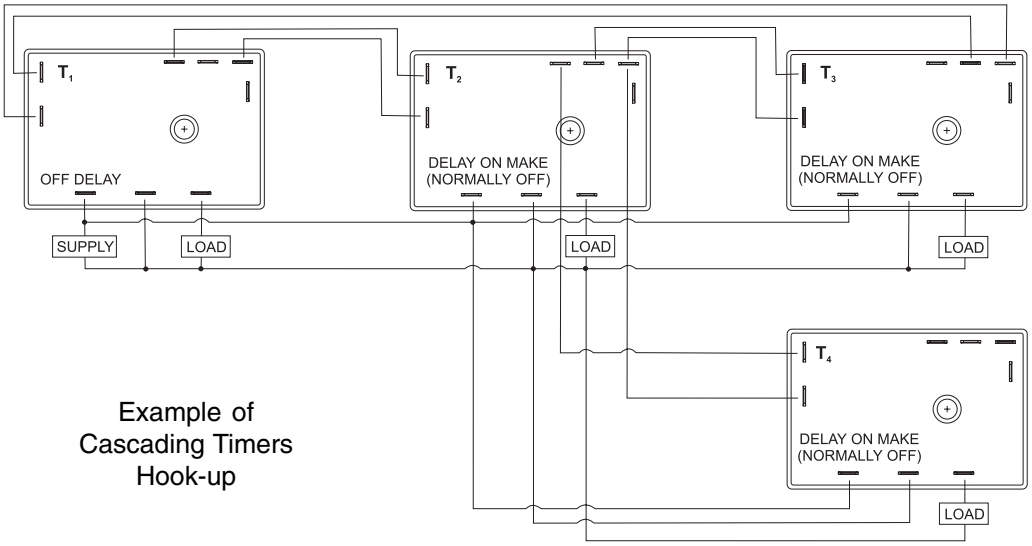
ALL DIMENSIONS ARE MILLIMETERS UNLESS OTHERWISE NOTED



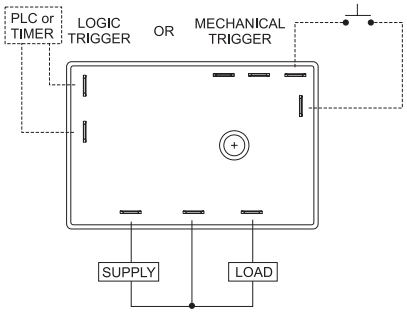


Warning:
Do not exceed the electrical rating of this device or permanent damage can result.

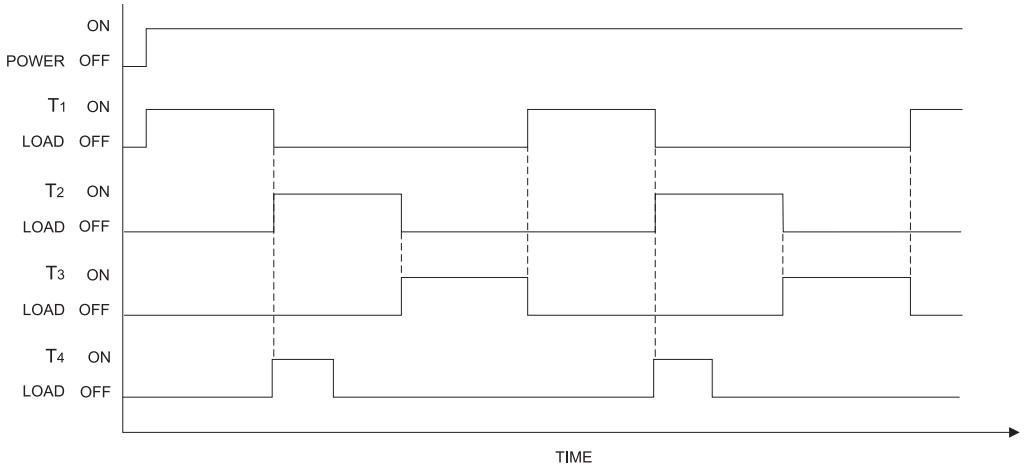
Hook-Up



Example of Cascading Timers Hook-up



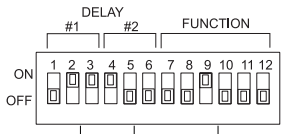
Single Timer Hook-up



Operating Parameters

Maximum timer current draw:	2 mA (No Load)	Ambient temperature range:	-20 to 60 °C
Absolute maximum input voltage:	240V AC/DC	Max. reset time:	50 ms
Input voltage range:	24-240 VAC (50/60Hz) 12-240 VDC	Repeat accuracy:	0.1% or 10 ms whichever is greater
Maximum output current:	1 Amp	Time delay variable over ambient temperature range:	+/- 2%
Logic trigger in:	5-48 VDC (10k input impedance)	Enclosure material:	ABS
Logic trigger out:	5.5 V @ .55 mA max.	Potting:	Epoxy
Mechanical trigger in:	80 mA max. current draw		

Timer Programming



Switch Symbols

ON / OFF = ON

ON / OFF = OFF

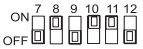
Chart 1

#1 Delay Range (seconds) All Functions	Switch Settings
0.10 - 4.70	
0.36 - 18.0	
2.80 - 150	
23.0 - 1200	
Delay = above range X 1	
Delay = above range X 100	

Chart 2

#2 Delay Range (seconds) Cycle Function Only	Switch Settings
0.10 - 4.70	
0.36 - 18.0	
2.80 - 150	
23.0 - 1200	
Delay = above range X 1	
Delay = above range X 100	

Chart 3

Function	Switch Settings
#1 Off Delay (Retriggerable)	
#2 On Delay (Retriggerable)	
#3a Cycle (On First)	
#3b Cycle (Off First)	
#4a Square Wave (On First)	
#4b Square Wave (Off First)	
#5 Delay on Break (Normally Off)	
#6 Delay on Break (Normally On)	
#7 Delay on Make (Normally Off)	
#8 Delay on Make (Normally On)	
#9a Toggle (On First)	
#9b Toggle (Off First)	

Operation

General Description - The MBT is a Solid State Timer/Toggle Latch, programmable in 12 modes of operation (refer to chart 3). It can operated individually or cascaded to perform virtually any timing sequence desired.

Mechanical Trigger Input - A switch closure at this input begins or resets the timing period of any non-cycling MBT function. Refer to page 3 - 4 for timing diagrams.

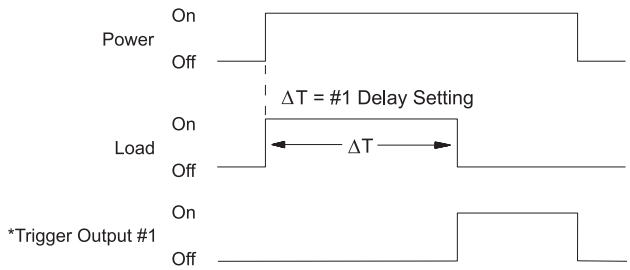
Logic Trigger Input - A sourcing or sinking voltage signal (5 - 48 volts) at this input begins or resets the timing period of any non-cycling MBT function. Refer to pages 3 - 4 for timing diagrams.

Logic Trigger Outputs - The logic output produces a voltage signal in sync with the timing cycle (see timing diagrams). Timers can be cascaded when the logic output of one timer is connected to the logic input of other timers. The #1 logic output produces a voltage level opposite the #2 logic output.

Cascading Multiple Timers - There is no limit to the number of MBTs that can be cascaded in series (the logic output of one MBT connected to the logic input of one other MBT). However the number of parallel MBTs (the same logic output connected to the logic input of more than one other MBT) should be limited to 10 MBTs.

Timing Diagrams

Function #1 Off Delay (Retriggerable)

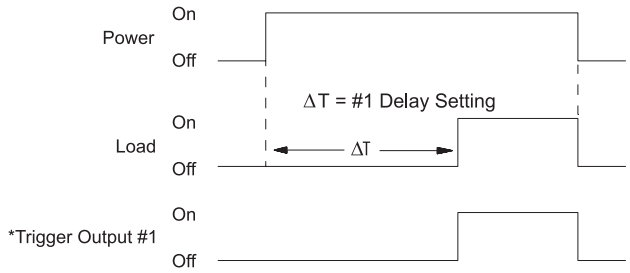


Load is energized for ΔT upon application of power. Reset occurs when power is removed.

Refer to charts 1 and 3 on previous page for switch settings.

*Trigger Output #2 level is always opposite of Trigger Output #1.

Function #2 On Delay (Retriggerable)

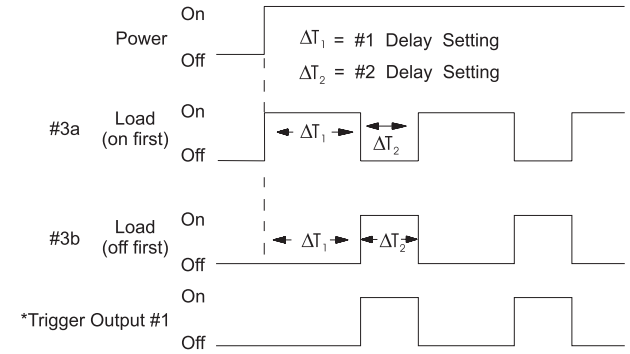


Load remains Off for ΔT upon application of power. Reset occurs when power is removed.

Refer to charts 1 and 3 on previous page for switch settings.

*Trigger Output #2 level is always opposite of Trigger Output #1.

Function #3a / 3b Cycle

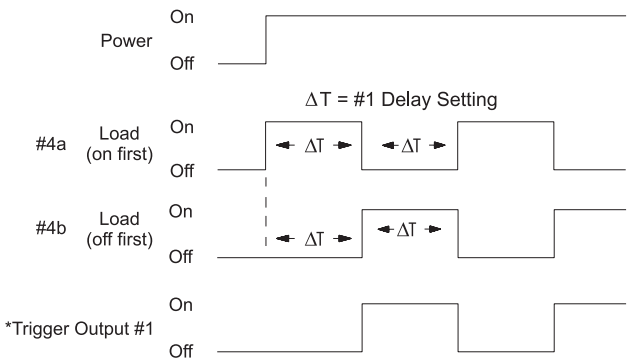


Load cycles ΔT_1 and ΔT_2 when power is applied. Reset occurs when power is removed.

Refer to charts 1, 2 and 3 on previous page for switch settings.

*Trigger Output #2 level is always opposite of Trigger Output #1.

Function #4a / 4b Square Wave

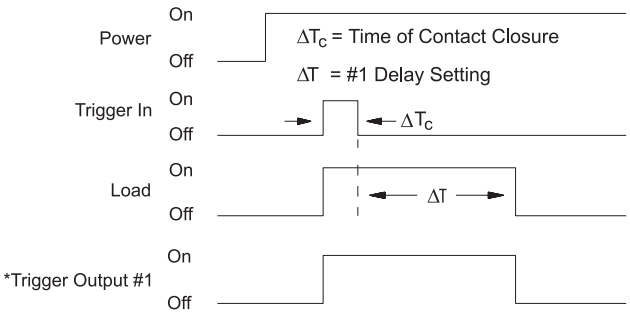


Load cycles with equal On and Off times when power is applied. Reset occurs when power is removed.

Refer to charts 1 and 3 on previous page for switch settings.

*Trigger Output #2 level is always opposite of Trigger Output #1.

Function #5 Delay On Break (Normally Off)

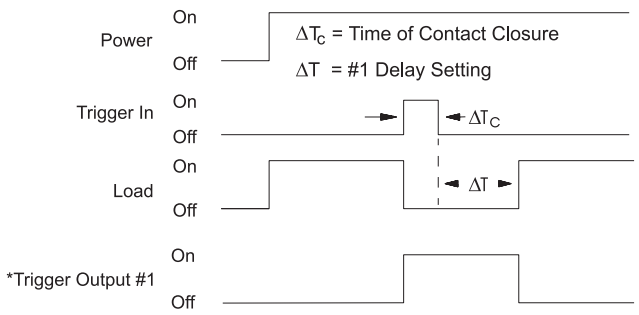


When power is applied, load remains Off. Load is energized for $\Delta T_C + \Delta T$ when trigger switch is closed and opened. Reset occurs when load is Off and trigger is re-applied.

Refer to charts 1 and 3 on previous page for switch settings.

*Trigger Output #2 level is always opposite of Trigger Output #1.

Function #6 Delay On Break (Normally On)

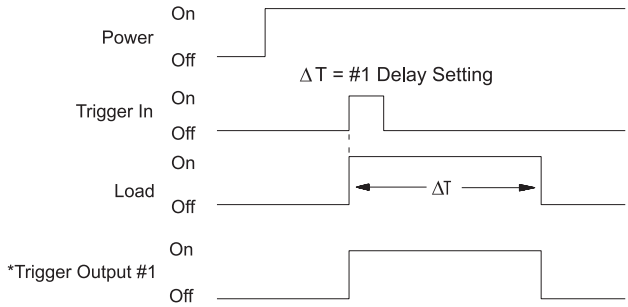


When power is applied, load is energized and remains energized until the trigger switch is closed. Load is then Off for $\Delta T_C + \Delta T$. Reset occurs when load is On and the trigger is re-applied.

Refer to charts 1 and 3 on previous page for switch settings.

*Trigger Output #2 level is always opposite of Trigger Output #1.

Function #7 Delay On Make (Normally Off)

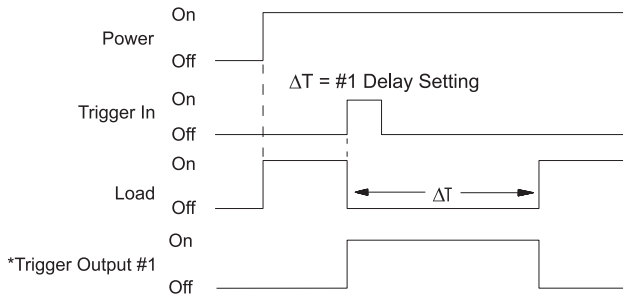


When power is applied, load remains Off. Load is energized for ΔT only upon closure of a normally open momentary contact switch (trigger). Reset occurs when load is Off and the trigger switch is closed.

Refer to charts 1 and 3 on previous page for switch settings.

*Trigger Output #2 level is always opposite of Trigger Output #1.

Function #8 Delay On Make (Normally On)

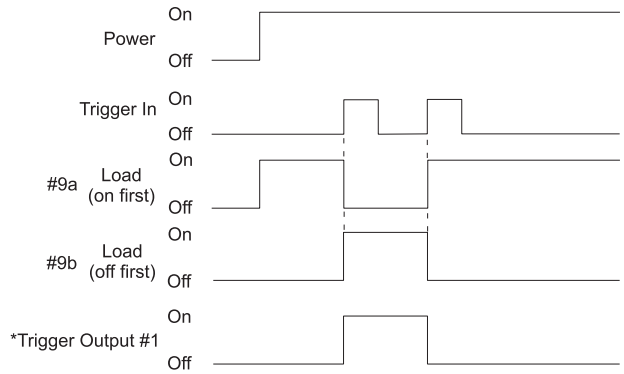


When power is applied, load is energized. Load de-energizes for ΔT only upon closure of a normally open momentary contact switch (trigger). Reset occurs when load is On and the trigger switch is closed.

Refer to charts 1 and 3 on previous page for switch settings.

*Trigger Output #2 level is always opposite of Trigger Output #1.

Function #9a / 9b Toggle



When power is applied, load is On. Load switches state (On/Off) with each application of trigger

Refer to chart 3 on previous page for switch settings.

*Trigger Output #2 level is always opposite of Trigger Output #1.