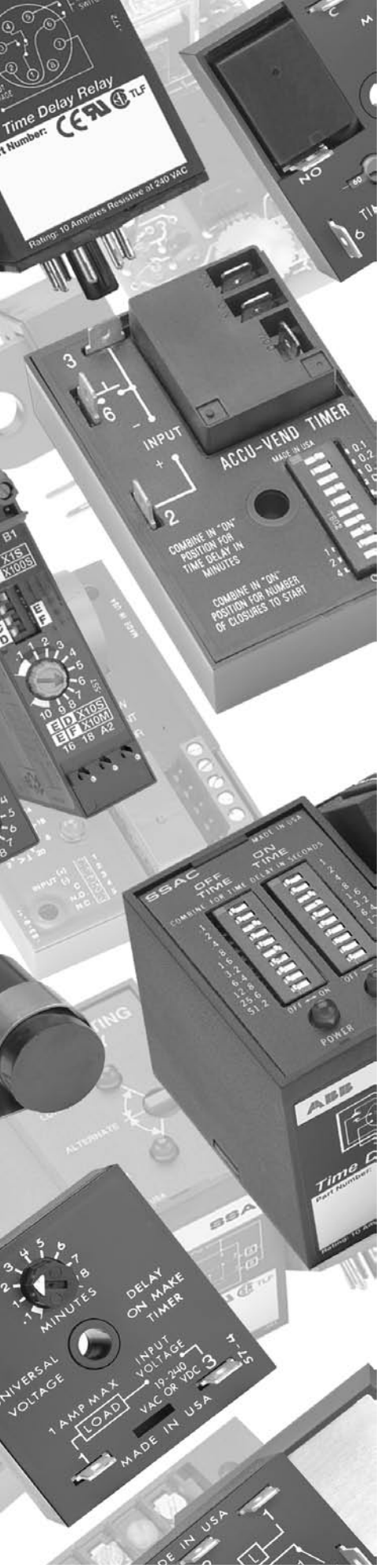


Section 5
Dedicated Timers

Note: DIN Rail Mounting Product pages are not included in this catalog.
Go to: www.ssac.com/sg5.pdf
Click on the Product Name
(ie: CT-SDS) to open the catalog page.
[Adobe Acrobat Reader is required]

Single Function


Delay on Make (ON Delay)
Relay Output 5.2
Solid State Output 5.16
DIN Rail Mounting.....see Note above
Delay on Make, Normally Closed
Solid State Output 5.34
Delay on Break (OFF Delay)
Relay Output 5.42
Solid State Output 5.54
DIN Rail Mounting.....see Note above
True Delay on Break (without auxiliary voltage)
Relay Output .....see Note above
Solid State Output .....see Note above
Single Shot (Pulse Former)
Relay Output 5.70
Solid State Output 5.84


Single Shot, Retriggerable (Watchdog, Zero Speed)
Relay Output 5.96
DIN Rail Mounting.....see Note Above
Trailing Edge Interval
DIN Rail Mounting..... see Note Above
Interval (Impulse ON)
Relay Output 5.100
Solid State Output 5.108
DIN Rail Mounting..... see Note above
Recycling & Percentage
Relay Output 5.126
Solid State Output 5.138
Recycling Flashers
DIN Rail Mounting..... see Note above

Sequencer

SQ3 & 4 -- Solid State Output 5.154

Dual Function

Delay on Make/Delay on Break
TDMB -- Plug-In.....5.156
DIN Rail Mounting
CT-MXS.xx ..... see Note above
Delay on Make/Interval
ESD5 -- Solid State.....5.158

HVAC Timers

Solid State Output
TAC1 -- Anti Short Cycle Random Start ..5.160
T2D -- Anti Short Cycle, Random Start ...5.162
TAC4 -- Bypass Timing.....5.164
TA -- Anti Short Cycle (DOB).....5.166
TL -- Anti Short Cycle (DOB).....5.168
CT -- Fan Delay.....5.170

Vending Timers

HRV -- Relay Output 5.172
THC/THS -- Solid State Output 5.94
KSPU -- Solid State Output.....5.176
NHPU -- Solid State Output.....5.178

Star Delta Motor Starting

DIN Rail Mounting
CT-SDS .....see Note above
CT-SDE .....see Note above
CT-YDE .....see Note above

5

Delay On Make (Operate)
TDML, TDM, TDMH Series
Time Delay Relay

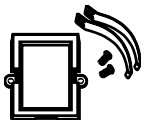
5

- Switch Settable Time Delay
- Three Time Ranges from 100 ms ... 10,230 s
- +/-0.1% Repeat Accuracy
- +/-2% Setting Accuracy
- DPDT, 10 A Output Contacts
- LED Indication

Approvals: **

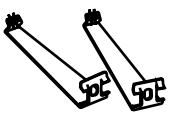
** 8 pin models used in combination with P1011-6 socket only.

Accessories



Panel mount kit
P/N: **BZ1**

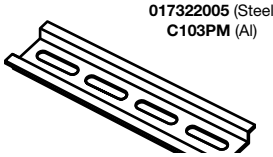
Octal
8 pin socket
P/N: **NDS-8**



Hold down clips
P/N: **PSC8**

Octal Socket
for UL Listing
P/N: **P1011-6**

DIN rail P/Ns:
017322005 (Steel)
C103PM (Al)



See accessory pages for specifications.

Description

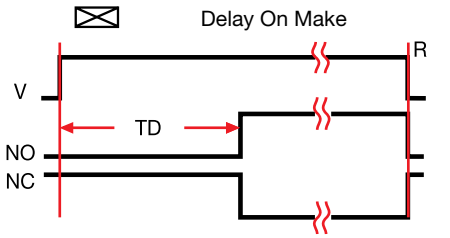
The TDM Series is a delay on make timer that combines accurate digital circuitry with isolated DPDT relay contacts in an industry standard 8 pin plug-in package. DIP switch adjustment allows precise selection of the time delay over the full time delay range. The TDM Series is the product of choice for custom control panel and OEM designers.

Operation

Upon application of input voltage, the time delay begins. The output is de-energized before and during the time delay. At the end of the time delay, the output relay energizes and remains energized until input voltage is removed.

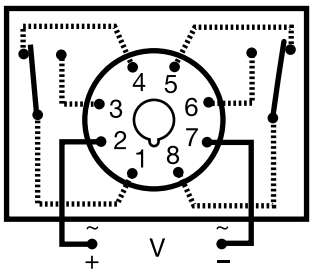
Reset: Removing input voltage resets the time delay and output.

Function



V = Voltage TD = Time Delay R = Reset
NO = Normally Open NC = Normally Closed
—⌇— = Undefined time

Connection



Relay contacts are isolated. Dashed lines are internal connections.

Ordering Table

X — **Series/Time Range**
- **TDML** - 0.1 ... 102.3 s in 0.1 s increments
- **TDM** - 1 ... 1023 s in 1 s increments
- **TDMH** - 10 ... 10,230 s in 10 s increments

X — **Input**
- **12D** - 12 V DC
- **24A** - 24 V AC
- **24D** - 24 V DC/28 V DC
- **110D** - 110 V DC
- **120A** - 120 V AC
- **230A** - 230 V AC

X — **LED Indication**
- **L**

Example P/N: **TDM120AL**

TDM02B01 12.22.04

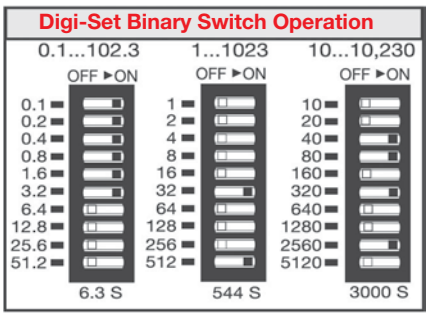
Technical Data

Time Delay	
Type	Digital integrated circuitry
Range*	0.1 ... 102.3 s in 0.1 s increments 1 ... 1023 s in 1 s increments 10 ... 10,230 s in 10 s increments
Repeat Accuracy	+/-0.1% or 20 ms, whichever is greater
Setting Accuracy	+/-2% or 50 ms, whichever is greater
Reset Time	≤ 50 ms
Recycle Time	During Timing -- TDMH: ≤ 500 ms TDM, TDML: ≤ 300 ms
Time Delay vs. Temperature & Voltage	+/-2%
Indicator	LED glows during timing; relay is de-energized
Input	
Voltage	12, 24, or 110 V DC; 24, 120, or 230 V AC
Tolerance 12 V DC & 24 V DC/AC	-15% ... +20%
110 V AC/DC ... 230 V AC	-20% ... +10%
Frequency	50 ... 60 Hz
Power Consumption	≤ 2.25 W
Output	
Type	Electromechanical relay
Form	Double pole double throw (DPDT)
Rating	10 A resistive at 120/240 V AC & 28 V DC; 1/3 hp at 120/240 V AC
Life	Mechanical -- 1 x10^7 Electrical -- 1 x 10^6
Protection	
Polarity	DC units are reverse polarity protected
Isolation Voltage	≥ 1500 V RMS input to output
Mechanical	
Mounting	Plug-in socket
Package	3.2 x 2.4 x 1.8 in. (81.3 x 60.7 x 45.2 mm)
Termination	Standard octal plug (8 Pin)
Environmental	
Operating Temperature	-20°C ... +65°C
Storage Temperature	-30°C ... +85°C
Weight	≅ 6 oz (170 g)

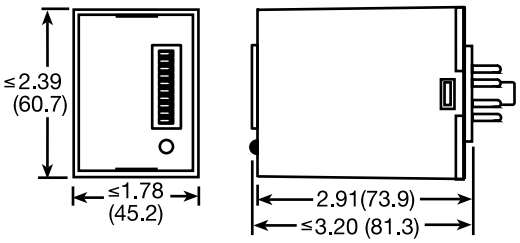
*For CE approved applications, power must be removed from the unit when a switch position is changed.

5

Digi-Set Binary Switch Operation



Mechanical View



Inches (Millimeters)

TDM02B01 12.22.04

Delay On Make (Operate)
TRM Series
Time Delay Relay

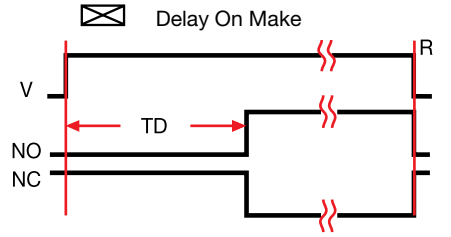
- 10 A DPDT or SPDT Output Contacts
- 24 ... 230 V Operation in Ranges
- Octal or 11 Pin Plug-in
- Fixed or Adjustable Delays from 0.05 to 600 s in ranges
- +/-2% Repeat Accuracy
- Hold Down Clamps Available

Approvals: **

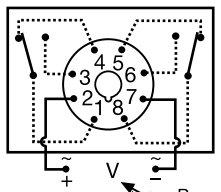
** 8 pin models used in combination with P1011-6 socket only.

Description
The TRM Series is a combination of analog electronic circuitry and electromechanical relay output. It provides input to output isolation with a wide variety of input voltages and time ranges. Standard plug-in base wiring, fast reset, rugged enclosure, and good repeat accuracy make the TRM a select choice in any OEM application.

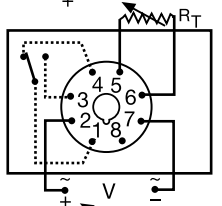
Operation
Upon application of input voltage, the time delay begins. The output is de-energized before and during the time delay. At the end of the time delay, the output relay energizes and remains energized until input voltage is removed.
Reset: Removing input voltage resets the time delay and output.

Function


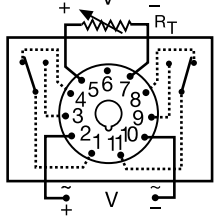
V = Voltage TD = Time Delay R = Reset
NO = Normally Open NC = Normally Closed
= Undefined time

Connection


8 Pin Octal DPDT



8 Pin Octal SPDT



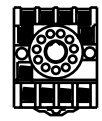
11 Pin DPDT

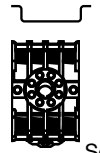
S1 = Initiate Switch

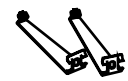
Relay contacts are isolated. Dashed lines are internal connections.
R_T is used when external adjustment is ordered.

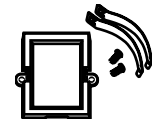
Accessories

Octal socket for UL Listing P/N: **P1011-6**


11 pin socket P/N: **NDS-11**


Octal 8 pin socket P/N: **NDS-8**


Hold down clips P/Ns: **PSC8** (NDS-8) **PSC11** (NDS-11)


Panel mount kit P/N: **BZ1**

See accessory pages for specifications.

Ordering Table

TRM Series	X Input	X Adjustment and Output Form	X Time Tolerance	X Time Delay* (Seconds)
	24A - 24 V AC	1 - Fixed, Octal, DPDT	X - +/-20%	0.05 ... 1 — 2 ... 120
	24D - 24 V DC/28 V DC	2 - Knob Adjust, Octal, DPDT	Y - +/-10%	0.05 ... 2 — 2 ... 180
	110D - 110 V DC	3 - Lock Shaft Adjust, Octal, DPDT	Z - +/- 5%	0.05 ... 3 — 7 ... 240
	120A - 120 V AC	5 - Ext. Adjust,11 Pin, DPDT without Potentiometer		0.1 ... 5 — 7 ... 300
	230A - 230 V AC	6 - Ext. Adjust, 11 Pin, DPDT supplied with Potentiometer		0.1 ... 10 — 7 ... 360
		8 - Ext. Adjust, Octal, SPDT, without Potentiometer		1 ... 30 — 7 ... 420
		9 - Ext. Adjust, Octal, SPDT, with Potentiometer		1 ... 60 — 7 ... 480
				7 ... 600

Example P/N: TRM120A2Y30 Fixed: TRM120A1X1

*If Fixed Delay is selected, insert delay [0.05 ... 600] in seconds

TRM02B01 07.07.04

Delay On Make (Operate)
TRM Series
Time Delay Relay

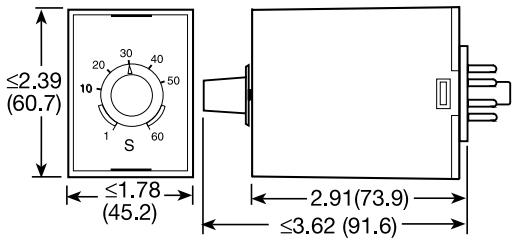
Technical Data

Time Delay		
Type		Analog circuitry
Range		50 ms ... 10 m in 15 adjustable ranges or fixed
Repeat Accuracy		+/-2% or 20 ms, whichever is greater
Fixed Time Tolerance & Setting Accuracy		+/-5, 10, or 20%
Reset Time		≤ 50 ms
Recycle Time		After timing: ≤ 20 ms
		During timing: 0.1% of max. time delay or 75 ms, whichever is greater
Time Delay vs. Temperature & Voltage		≤+/-10%
Input		
Voltage		24 or 110 V DC; 24, 120, or 230 V AC
Tolerance	24 V DC/AC	-15% ... +20%
	110 ... 230 V AC/DC	-20% ... +10%
Frequency		50 ... 60 Hz
Power Consumption		≤ 2.25 W
Output		
Type		Electromechanical relay
Form		Isolated DPDT or SPDT
Rating		10 A resistive at 120/240 V AC & 28 V DC; 1/3 hp at 120/240 V AC
Life		Mechanical: 1 x 10^7; Electrical: 1 x 10^6
Protection		
Isolation Voltage		≥ 1500 V RMS between input & output terminals
Insulation Resistance		≥ 100 MΩ
Polarity		DC units are reverse polarity protected
Mechanical		
Mounting		Plug-in socket
Termination		Octal (8 Pin) or 11 Pin plug-In
Package		3.62 x 2.39 x 1.78 in. (91.6 x 60.7 x 45.2 mm)
Environmental		
Operating Temperature		-20°C ... +65°C
Storage Temperature		-30°C ... +85°C
Weight		≅ 6 oz (170 g)

R_T Selection Chart	
Time Delay*	
Range	R_T
Seconds	Megohm
0.05...1	1.0
0.05...2	2.0
0.05...3	3.0
0.1...5	5.0
0.1...10	3.0
1...30	1.5
1...60	3.0
2...120	2.0
2...180	3.0
7...240	1.5
7...300	2.0
7...360	2.0
7...420	3.0
7...480	3.0
7...600	5.0

* When selecting an external R_T add at least 15...30% for tolerance of unit and the R_T.

Mechanical View



Inches (Millimeters)

Accessories

External adjust potentiometer
P/Ns:
P1004-XX (fig. A)
P1004-XX-X (fig. B)

Versa-knob
P/N: **P0700-7**

External R_T P/N Selection Table		
Figure	Value	Part Number
A	1 M ohm	P1004-16
A	1.5 M ohm	P1004-15
A	2 M ohm	P1004-14
A	3 M ohm	P1004-12
A	5 M ohm	P1004-13
B	1 M ohm	P1004-16-X
B	1.5 M ohm	P1004-15-X
B	2 M ohm	P1004-14-X
B	3 M ohm	P1004-12-X
B	5 M ohm	P1004-13-X

Delay On Make (Operate)
PRLM Series
Time Delay Relay

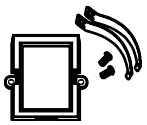
TEN YEAR 10 WARRANTY

5

- Knob Adjustable Time Delay Relay
- Electronic Circuit with Electro-mechanical Relay
- Popular AC & DC Operating Voltages
- Industry Standard Octal Plug-in Connection
- Time Delays to 600 s in 6 Ranges
- +/-2% Repeat Accuracy
- +/-10% Factory Calibration
- LED Indication
- 10 A Rated DPDT Relay Output

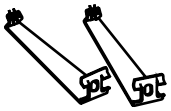
Approvals:

Accessories

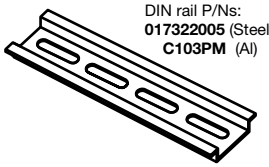


Panel mount kit
P/N: **BZ1**

Octal
8 pin socket
P/N: **NDS-8**



Hold down clips
P/N: **PSC8**



DIN rail P/Ns:
017322005 (Steel)
C103PM (Al)

See accessory pages for specifications.

Description

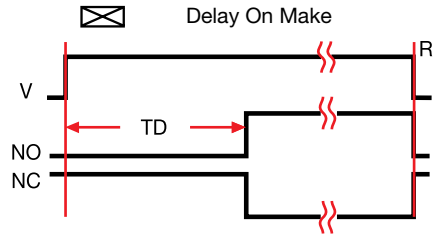
The PRLM Series is designed for use in non-critical timing applications. It offers low cost knob adjustable timing control, full 10 A relay output, and onboard LED indication. The knob adjustment provides a guaranteed time range of up to 10 minutes in 6 ranges. The onboard LED indicates whether or not the unit is timing (flashing LED) as well as the status of the output.

Operation

The time delay is initiated when input voltage is applied. LED flashes during timing. At the end of the delay period, the output contacts energize. LED is on steady after the unit times out.

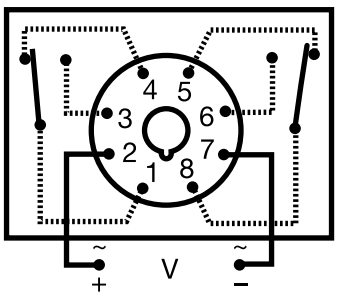
Reset: Reset is accomplished by removal of input voltage. There is no false output when reset during timing.

Function



V = Voltage TD = Time Delay R = Reset
NO = Normally Open NC = Normally Closed
= Undefined time

Connection



8 Pin Octal
DPDT

Relay contacts are isolated. Dashed lines are internal connections.

Ordering Table

PRLM	X	X	X
Series	**Input**	**Adjustment**	**Time Delay** *
	1 - 12 V DC	1 - Factory Fixed	1 - 0.05 ... 3 s
	2 - 24 V AC	2 - Adjustable	2 - 0.1 ... 10 s
	3 - 24 V DC		3 - 1 ... 60 s
	4 - 120 V AC		4 - 2 ... 180 s
	5 - 110 V DC		5 - 7 ... 480 s
	6 - 230 V AC		6 - 7 ... 600 s

Example P/N: PRLM422 Fixed – PRLM6160

*If Fixed Delay is selected, insert delay [0.05...600] in seconds.

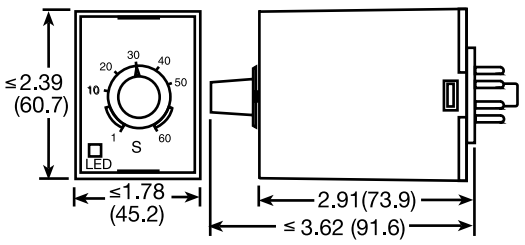
PRLM2B01 07.01.04

Delay On Make (Operate)
PRLM Series
Time Delay Relay

Technical Data

Time Delay		
Type		Analog circuitry
Range		0.05 ... 600 s in 6 adjustable ranges or fixed
Repeat Accuracy		+/-2% or 20 ms, whichever is greater
Tolerance		Knob Adjust: Guaranteed range
		Fixed: +/-10%
Reset Time		≤ 50 ms
Recycle Time		After timing: ≤ 20 ms
		During timing: 0.1% of max. time delay or 75 ms, whichever is greater
Time Delay vs. Temperature & Voltage		≤ +/-10%
Input		
Voltage		24, 120, or 230 V AC; 12, 24, or 110 V DC
Tolerance	12 V DC & 24 V DC/AC	-15% ... +20%
	110 ... 240 V AC/DC	-20% ... +10%
Line Frequency		50 ... 60 Hz
Power Consumption		≤ 2.25 W
Output		
Type		Electromechanical relay
Form		Isolated DPDT
Rating		10 A resistive at 28 V DC; 10 A resistive at 240 V AC;
		1/3 hp at 120 & 240 V AC
Life		Mechanical--1x10^7; Electrical--1x10^6
Protection		
Surge		IEEE C62.41-1991 Level A
Isolation Voltage		≥ 1500 V RMS input to output
Insulation Resistance		≥ 100 MΩ
Polarity		DC units are reverse polarity protected
Indication		
Type		LED
Operation		During Timing--Flashing
		Output Energized--ON steady
Mechanical		
Mounting		Plug-in socket
Package		3.62 x 2.39 x 1.78 in. (91.6 x 60.7 x 45.2 mm)
Termination		Octal plug-in (8 pin)
Environmental		
Operating Temperature		-20°C ... +65°C
Storage Temperature		-30°C ... +85°C
Weight		≅ 6 oz (170 g)

Mechanical View



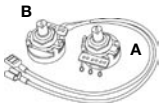
Inches (Millimeters)

Delay On Make (Operate)
HRDM Power-Time
Time Delay Relay

- 30 A SPDT N.O. Output Contact
- 12 ... 230 V Operation in 5 Ranges
- Encapsulated Circuitry
- Delays from 100 ms ...100 m in 5 Ranges
- +/-0.5% Repeat Accuracy
- Fixed, External, or Onboard Adjustment

Approvals:

Accessories



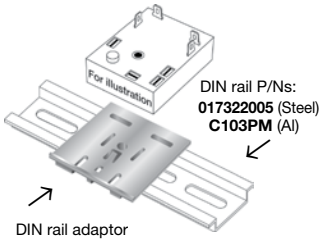
External adjust potentiometer P/Ns:
P1004-95 (fig A)
P1004-95-X (fig B)

Mounting bracket P/N: **P1023-6**

Female quick connect P/Ns:
P1015-64 (AWG 14/16)
P1015-13 (AWG 10/12)

Quick connect to screw adaptor P/N: **P1015-18**

Versa-knob P/N: **P0700-7**



DIN rail P/Ns:
017322005 (Steel)
C103PM (Al)

DIN rail adaptor P/N: **P1023-20**

See accessory pages for specifications.

Description

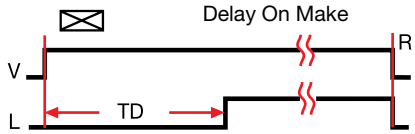
The HRDM Series combines an electromechanical relay output with microcontroller timing circuitry. It offers 12 to 230 V operation in five ranges and factory fixed, external, or onboard adjustable time delays with a repeat accuracy of +/-0.5%. The output contact rating allows for direct operation of heavy loads such as compressors, pumps, blower motors, heaters, etc. This series is ideal for OEM applications where cost is a factor.

Operation

Upon application of input voltage, the time delay begins. The output is de-energized before and during the time delay. At the end of the time delay, the output relay energizes and remains energized until input voltage is removed.

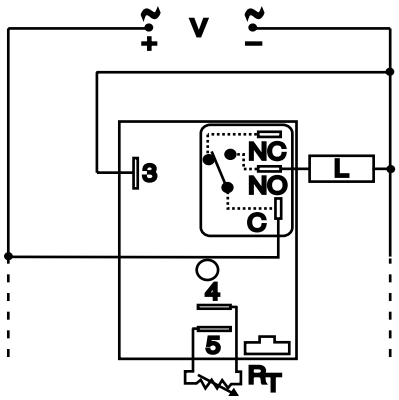
Reset: Removing input voltage resets the time delay and output.

Function



V = Voltage L = Load R = Reset
TD = Time Delay = Undefined time

Connection



NO = Normally Open L = Load
C = Common, Transfer Contact

NOTE: A knob, or terminals 4 & 5 are only included on adjustable units. R_T is used when external adjustment is ordered. Relay contacts are not isolated. Dashed lines are internal connections.

Ordering Table

HRDM Series	X Input	X Adjustment	X Time Tolerance	X Time Delay *
	1 - 12 V DC	1 - Fixed	A - +/-1%	0 - 0.1 ... 10 s
	2 - 24 V AC	2 - Onboard Knob	Blank - +/-5%	1 - 1 ... 100 s
	3 - 24 V DC	3 - External Adjust		2 - 10 ... 1000 s
	4 - 120 V AC			3 - 0.1 ... 10 m
	6 - 230 V AC			4 - 1 ... 100 m

Example P/N: HRDM421 Fixed – HRDM41A0.5S

* If Fixed Delay is selected, insert delay [0.1 ... 1000] followed by (S) sec. or [0.1 ... 100] (M) min.

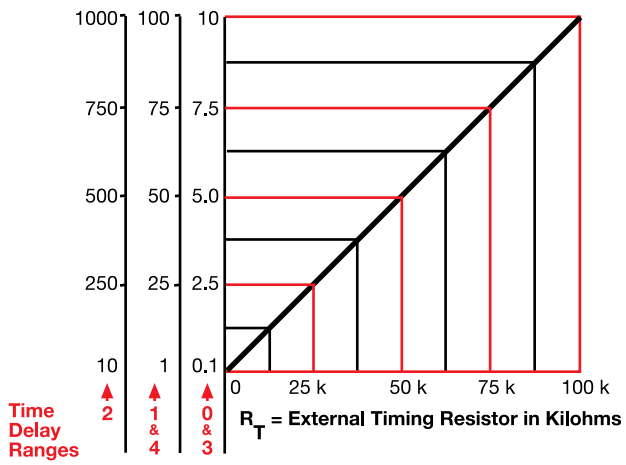
HRDMGen 10.03.05

Technical Data

Time Delay			
Type		Microcontroller circuitry	
Range		100 ms ... 100 m in 5 adjustable ranges or fixed	
Repeat Accuracy		+/-0.5% or 20 ms, whichever is greater	
Tolerance (Factory Calibration)		+/-1%, +/-5%	
Reset Time		≤ 150 ms	
Time Delay vs. Temperature & Voltage		+/-2%	
Input			
Voltage		12 or 24 V DC; 24, 120, or 230 V AC	
Tolerance	12 V DC & 24 V DC	-15% ... +20%	
	24 ... 230 V AC	-20% ... +10%	
Line Frequency		50 ... 60 Hz	
Power Consumption		AC ≤ 4 VA; DC ≤ 2 W	
Output			
Type		Electromechanical relay	
Form		SPDT, non-isolated	
Ratings:		**SPDT-N.O.**	**SPDT-N.C.**
General Purpose	125/240 V AC	30 A	15 A
Resistive	125/240 V AC	30 A	15 A
	28 V DC	20 A	10 A
Motor Load	125 V AC	1 hp*	1/4 hp**
	240 V AC	2 hp**	1 hp**
Life		Mechanical -- 1 x 10^6 ; Electrical -- 1 x 10^5, *3 x 10^4, **6,000	
Protection			
Surge		IEEE C62.41-1991 Level A	
Circuitry		Encapsulated	
Dielectric Breakdown		≥ 2000 V RMS terminals to mounting surface	
Insulation Resistance		≥ 100 MΩ	
Polarity		DC units are reverse polarity protected	
Mechanical			
Mounting		Surface mount with one #10 (M5 x 0.8) screw	
Package		3 x 2 x 1.5 in. (76.7 x 51.3 x 38.1mm)	
Termination		0.25 in. (6.35 mm) male quick connect terminals	
Environmental			
Operating / Storage Temperature		-40°C ... +60°C / -40°C ... +85°C	
Humidity		95% relative, non-condensing	
Weight		≅ 3.9 oz (111 g)	

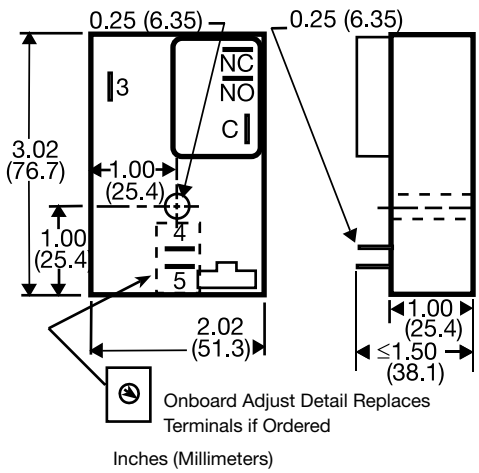
External Resistance vs Time Delay

In Secs. or Mins.



This chart applies to externally adjustable part numbers.
The time delay is adjustable over the time delay range selected by varying the resistance across the RT terminals; as the resistance increases the time delay increases.
When selecting an external RT, add the tolerances of the timer and the RT for the full time range adjustment.
Examples: 1 to 50 S adjustable time delay, select time delay range 1 and a 50 K ohm RT. For 1 to 100 S use a 100 K ohm RT.

Mechanical View



Onboard Adjust Detail Replaces Terminals if Ordered

Inches (Millimeters)

HRDMGen 10.03.05

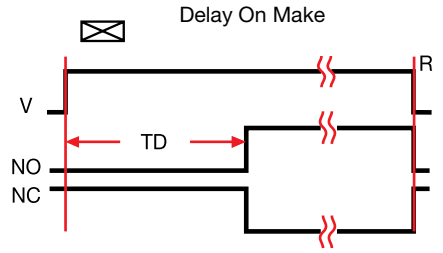
Delay On Make (Operate)
ERDM Econo-Timer
Time Delay Relay

- Knob or External Adjust or Factory Fixed
- Delays from 0.1 s ... 1000 m
- +/-0.5% Repeat Accuracy
- Encapsulated Digital Circuitry
- 10 A, Isolated, DPDT Output Contacts

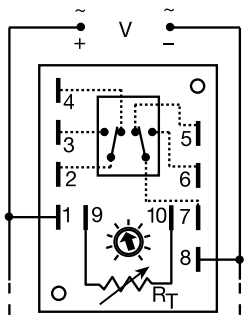
Approvals:

Description
Econo-Timers are a combination of digital electronics and a reliable electromechanical relay. These devices offer a DPDT relay output for relay logic circuits, and isolation of input to output voltages. Cost effective for OEM applications such as random starting, sequencing ON, switch de-bouncing, anti-short cycling, and other common delay on make applications.

Operation
Upon application of input voltage, the time delay begins. The output is de-energized before and during the time delay. At the end of the time delay, the output energizes and remains energized until input voltage is removed.
Reset: Removing input voltage resets the time delay and output.

Function


V = Voltage TD = Time Delay R = Reset
NO = Normally Open NC = Normally Closed
= Undefined time

Connection


A knob, or terminals 9 & 10 are only included on adjustable units. Relay contacts are isolated. Dashed lines are internal connections.

RT is used when external adjustment is ordered.

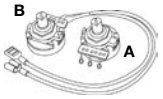
Ordering Table

ERDM	X	X	X
Series	**Input**	**Adjustment**	**Time Delay** *
	1 - 12 V DC	1 - Factory Fixed	1 - 0.1 ... 1 s
	2 - 24 V AC	2 - Knob on Unit	2 - 0.1 ... 5 s
	3 - 24 V DC	3 - External Adjust	3 - 0.1 ... 10 s
	4 - 120 V AC		4 - 0.2 ... 15 s
	5 - 120 V DC		5 - 0.3 ... 30 s
	6 - 230 V AC		6 - 0.6 ... 60 s
			7 - 0.1 ... 5 m
			8 - 0.1 ... 10 m
			9 - 0.2 ... 15 m
			10 - 1 ... 100 m
			11 - 10 ... 500 m

Example P/N: ERDM426 Fixed – ERDM410.1S

*If Fixed Delay is selected, insert delay [0.1...1000] followed by (S) sec. or (M) min.

Accessories



External adjust potentiometer
P/Ns:
P1004-16 (fig A)
P1004-16-X (fig B)

Female quick connect
P/N:
P1015-64 (AWG 14/16)

Quick connect to screw adaptor
P/N: **P1015-18**

Versa-knob
P/N: **P0700-7**

See accessory pages for specifications.

ERDM2B01 07.01.04

Delay On Make (Operate)
ERDM Econo-Timer
Time Delay Relay

Technical Data

Time Delay		
Type		Digital integrated circuitry
Range		100 ms ... 500 m in 11 adjustable ranges 100 ms ... 1000 m fixed
Adjustment		Knob, external adjust, or fixed
Repeat Accuracy		+/-0.5%
Tolerance (Factory Calibration)		≤ +/-10%
Recycle Time		≤ 150 ms
Time Delay vs. Temperature & Voltage		≤ +/-2%
Input		
Voltage		12, 24, or 120 V DC; 24, 120, or 230 V AC
Tolerance	12 V DC & 24 V DC/AC	-15% ... +20%
	120 V AC/DC & 230 V AC	-20% ... +10%
Line Frequency		50 ... 60 Hz
Output		
Type		Isolated relay contacts
Form		Double pole double throw (DPDT)
Rating		10 A resistive at 120/240 V AC & 28 V DC; 1/3 hp at 120/240 V AC
Life		Mechanical--1 x 10^7; Full Load--1 x 10^6
Protection		
Isolation Voltage		≥1500 V RMS input to output
Insulation Resistance		≥100 MΩ
Polarity		DC units are reverse polarity protected
Mechanical		
Mounting		Surface mount with two #6 (M3.5 x 0.6) screws
Termination		0.25 in. (6.35 mm) male quick connect terminals
Operating / Storage Temperature		-40°C ... +65°C / -40°C ... +85°C
Weight		≅ 5.7 oz (162 g)

5

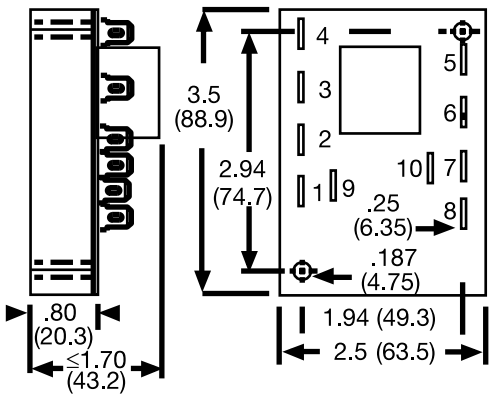
R_T Selection Chart						
Desired Time Delay*						R_T
Seconds						
1	2	3	4	5	6	Megohm
0.1	0.1	0.1	0.2	0.3	0.6	0.0
0.19	0.6	1	1.7	3	6	0.1
0.28	1.1	2	3.2	6	12	0.2
0.37	1.6	3	4.7	9	18	0.3
0.46	2.1	4	6.2	12	24	0.4
0.55	2.6	5	7.7	15	30	0.5
0.64	3.0	6	9.2	18	36	0.6
0.73	3.5	7	10.7	21	42	0.7
0.82	4.0	8	12.2	24	48	0.8
0.91	4.5	9	13.7	27	54	0.9
1.0	5.0	10	15	30	60	1.0

* When selecting an external R_T add at least 20% for tolerance of unit and the R_T.

R_T Selection Chart					
Desired Time Delay*					R_T
Minutes					
7	8	9	10	11	Megohm
0.1	0.1	0.2	1	10	0.0
0.6	1	1.7	10	50	0.1
1.1	2	3.2	20	100	0.2
1.6	3	4.7	30	150	0.3
2.1	4	6.2	40	200	0.4
2.6	5	7.7	50	250	0.5
3.0	6	9.2	60	300	0.6
3.5	7	10.7	70	350	0.7
4.0	8	12.2	80	400	0.8
4.5	9	13.7	90	450	0.9
5.0	10	15	100	500	1.0

* When selecting an external R_T add at least 20% for tolerance of unit and the R_T.

Mechanical View



Inches (Millimeters)

Delay On Make (Operate)
ORM Series
Time Delay Relay

- Low Cost Open PCB Construction
- Time Delays From 50 ms ... 300 s in 5 Ranges
- 10 A Double Pole Double Throw Relay Output
- +/-2% Repeat Accuracy
- +/-10% Factory Calibration
- Fixed, Adjustable on Unit, or External Adjust

Approvals:

Accessories

External adjust potentiometer
P/Ns:
P1004-12 (fig. A)
P1004-12-X (fig. B)

Female quick connect
P/N:
P1015-64 (AWG 14/16)

Quick connect to screw adaptor
P/N: **P1015-18**

Versa-knob
P/N: **P0700-7**

See accessory pages for specifications.

Description

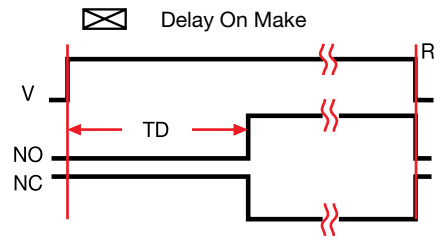
The ORM Series features open PC board construction for reduced cost. It has isolated 10 A DPDT relay contacts and all connections are 0.25 in (6.35 mm) male quick connect terminals. The time delay may be ordered as factory fixed, onboard knob, or external adjustment. Time delays from 0.05 to 300 seconds.

Operation

Upon application of input voltage, the time delay begins. The output is de-energized before and during the time delay. At the end of the time delay, the output energizes and remains energized until voltage is removed.

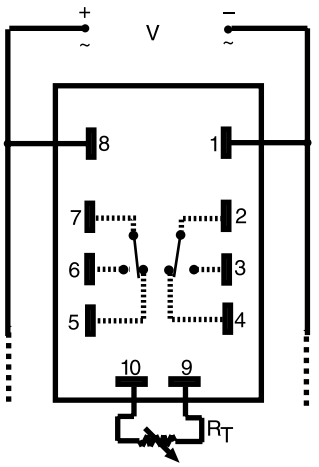
Reset: Removing input voltage resets the time delay and output.

Function



V = Voltage TD = Time Delay R = Reset
NO = Normally Open NC = Normally Closed
= Undefined time

Connection



Relay contacts are isolated. Dashed lines are internal connections.

R_T is used when external adjustment is ordered.

Ordering Table

ORM Series	X Input	X Adjustment	X Time Delay *
	24A - 24 V AC	1 - Fixed	1 - 0.05 ... 3 s
	24D - 24 V DC/ 28 V DC	2 - Adj. on Unit	2 - 0.5 ... 30 s
	110D - 110 V DC	3 - Remote Adjust	3 - 0.6 ... 60 s
	120A - 120 V AC		4 - 1.2 ... 120 s
	230A - 230 V AC		5 - 3.0 ... 300 s

Example P/N: ORM24A31 Fixed – ORM120A1200

*If Fixed Delay is selected, insert delay [0.05...300] in seconds.

ORM02B01 07.02.04

Delay On Make (Operate)
ORM Series
Time Delay Relay

Technical Data

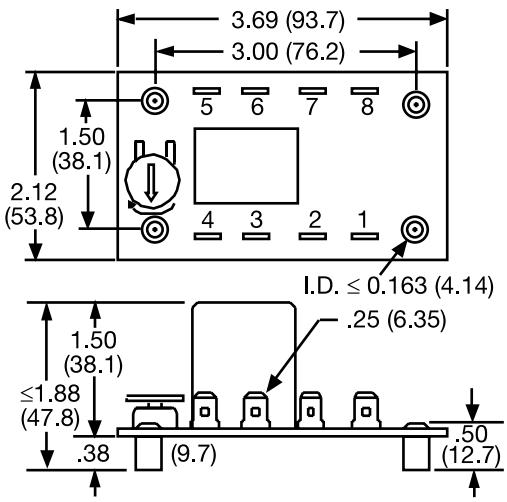
Time Delay		
Type		Analog circuitry
Range		0.05 ... 300 s in 5 adjustable ranges or fixed
Repeat Accuracy		+/-2% or 20 ms, whichever is greater
Tolerance (Factory Calibration)		Adjustable: Guaranteed range Fixed: +/-10%
Recycle Time		≤ 16 ms after timing, during timing -- 0.1% of max. time delay or 75 ms, whichever is greater
Time Delay vs. Temperature & Voltage		≤ +/-10%
Input		
Voltage		24 or 110 V DC; 24, 120, or 230 V AC
Tolerance	24 V DC/AC	-15% ... +20%
	110 ... 230 V AC/DC	-20% ... +10%
Line Frequency		50 ... 60 Hz
Power Consumption		2.25 W
Output		
Type		Electromechanical relay
Form		Isolated double pole double throw (DPDT)
Rating		10 A resistive at 120/240 V AC & 28 V DC; 1/3 hp at 120/240 V AC
Life		Mechanical--$1x10^7$; Electrical--$1x10^6$
Protection		
Polarity		DC units are reverse polarity protected
Isolation Voltage		≥1500 V RMS input to output
Mechanical		
Mounting		Surface mount with four #6 (M3.5 x 0.6) screws
Termination		0.25 in. (6.35 mm) male quick connect terminals
Environmental		
Operating Temperature		-20°C ... +65°C
Storage Temperature		-30°C ... +85°C
Weight		≅ 2.7 oz (77 g)

5

R_T Selection Chart					
Desired Time Delay* Seconds					R_T
1	2	3	4	5	Megohm
0.05	0.5	0.6	1.2	3.0	0.0
0.5	5.0	10	20	50	0.5
1.0	10	20	40	100	1.0
1.5	15	30	60	150	1.5
2.0	20	40	80	200	2.0
2.5	25	50	100	250	2.5
3.0	30	60	120	300	3.0

* When selecting an external R_T add at least 20% for tolerance of unit and the R_T.

Mechanical View



Inches (Millimeters)

Delay On Make (ON-Delay)
KRDM Digi-Timer
Time Delay Relay

- Compact Time Delay Relay
- Full 10 A SPDT Output Contacts
- Onboard or External Adjust or Fixed Delay
- Delays from 100 ms...100 m in 5 Ranges
- +/-0.5% Repeat Accuracy
- +/-5% Factory Calibration
- Input Voltages from 12 ... 230 V in 5 Ranges

Approvals:

Accessories

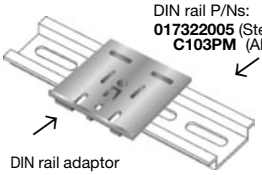
External adjust potentiometer
P/Ns:
P1004-95 (fig A)
P1004-95-X (fig B)

Versa-knob
P/N: **P0700-7**

Mounting bracket
P/N: **P1023-6**

Female quick connect
P/Ns:
P1015-64 (AWG 14/16)
P1015-13 (AWG 10/12)

Quick connect to screw adaptor
P/N: **P1015-18**



DIN rail P/Ns:
017322005 (Steel)
C103PM (Al)

DIN rail adaptor
P/N: **P1023-20**

See accessory pages for specifications.

Description

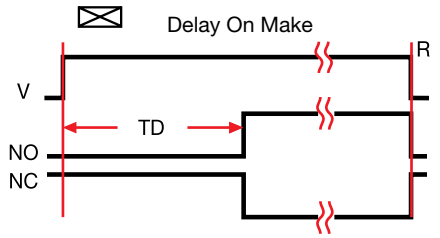
The KRDM Series is a compact time delay relay measuring only 2 in. (50.8 mm) square. Its solid state timing circuit provides excellent repeat accuracy and stability. Encapsulation protects against shock, vibration, and humidity. The KRDM Series is a cost effective approach for OEM applications that require small size, isolation, reliability, and long life.

Operation

Upon application of input voltage, the time delay begins. The output is de-energized before and during the time delay. At the end of the time delay, the output relay energizes and remains energized until input voltage is removed.

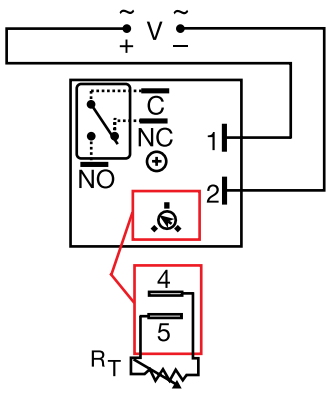
Reset: Removing input voltage resets the time delay and output.

Function



V = Voltage TD = Time Delay R = Reset
NO = Normally Open NC = Normally Closed
= Undefined time

Connection



V = Voltage C = Common, Transfer Contact
NO = Normally Open NC = Normally Closed

A knob is supplied for adjustable units, or R_T terminals 4 & 5 for external adjust. See external adjustment vs time delay chart. Relay contacts are isolated. Dashed lines are internal connections.

Ordering Table

KRDM Series

X Input
- 1 - 12 V DC
- 2 - 24 V AC/DC
- 4 - 120 V AC
- 5 - 110 V DC
- 6 - 230 V AC

X Adjustment
- 1 - Fixed
- 2 - Onboard Adjustment
- 3 - External Adjustment

X Time Delay *
- 0 - 0.1 ... 10 s
- 1 - 1 ... 100 s
- 2 - 10 ... 1000 s
- 3 - 0.1 ... 10 m
- 4 - 1 ... 100 m

* If Fixed Delay is selected, insert delay [0.1 ... 1000] followed by (S) sec. or [0.1 ... 100] (M) min.

Example P/N: KRDM421 = 120 V AC; Onboard adjust from 0.1 to 10 seconds
KRDM610.5S = 230 V AC; Fixed at 0.5 seconds

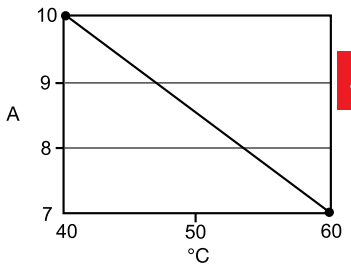
KRDMGen 08.15.06

Delay On Make (ON-Delay)
KRDM Digi-Timer
Time Delay Relay

Technical Data

Time Delay	
Range	0.1 s ... 100 m in 5 adjustable ranges or fixed
Repeat Accuracy	+/-0.5% or 20 ms, whichever is greater
Tolerance (Factory Calibration)	≤ +/-5%
Recycle Time	≤ 150 ms
Time Delay vs. Temperature & Voltage	≤ +/-5%
Input	
Voltage	12, 24 or 110 V DC; 24, 120 or 230 V AC
Tolerance 12 V DC & 24 V AC/DC	-15% ... +20%
110 V DC 120 & 230 V AC	-20% ... +10%
AC Line Frequency/DC Ripple	50 ... 60 Hz / ≤ 10%
Power Consumption	AC ≤ 2 VA; DC ≤ 2 W
Output	
Type	Isolated relay contacts
Form	Single pole double throw (SPDT)
Rating (at 40°C)	10 A resistive at 125 V AC 5 A resistive at 230 V AC & 28 V DC; 1/4 hp at 125 V AC
Max. Switching Voltage	250 V AC
Life (Operations)	Mechanical -- 1 x 10^7; Electrical -- 1 x 10^5
Protection	
Circuitry	Encapsulated
Isolation Voltage	≥ 1500 V RMS input to output
Insulation Resistance	≥ 100 MΩ
Polarity	DC units are reverse polarity protected
Mechanical	
Mounting	Surface mount with one #10 (M5 x 0.8) screw
Package	2 x 2 x 1.21 in (50.8 x 50.8 x 30.7 mm)
Termination	0.25 in. (6.35 mm) male quick connect terminals
Environmental	
Operating / Storage Temperature	-20°C ... +60°C / -40°C ... +85°C
Humidity	95% relative, non-condensing
Weight	≅ 2.6 oz (74 g)

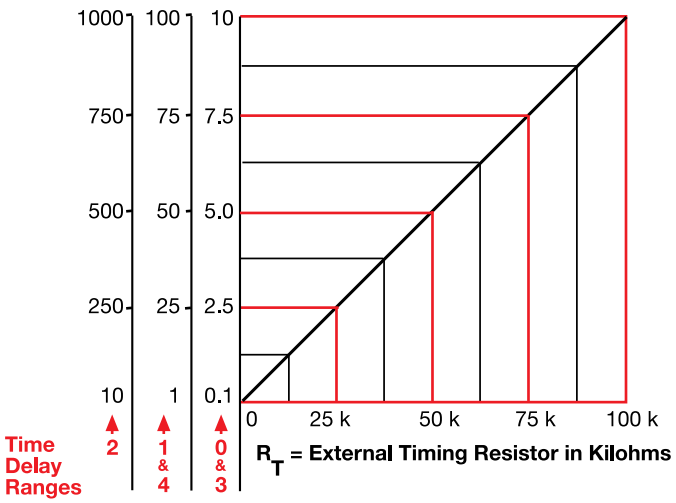
Output Current/Ambient Temp.



5

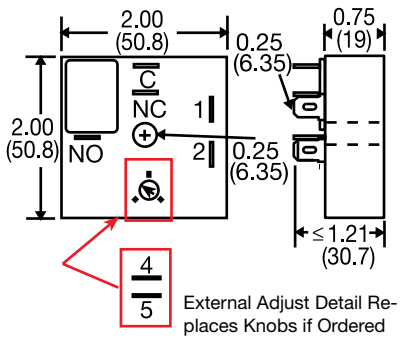
External Resistance vs Time Delay

In Secs. or Mins.



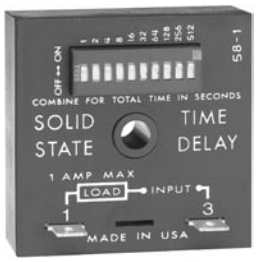
This chart applies to externally adjustable part numbers.
The time delay is adjustable over the time delay range selected by varying the resistance across the RT terminals; as the resistance increases the time delay increases.
When selecting an external RT, add the tolerances of the timer and the RT for the full time range adjustment.
Examples: 1 to 50 S adjustable time delay, select time delay range 1 and a 50 K ohm RT. For 1 to 100 S use a 100 K ohm RT.

Mechanical View



Inches (Millimeters)

Delay On Make (Operate)
TDU, KSDU Digi-Set
Timing Modules



- 2 Universal Voltage Ranges From 24 ... 240 V AC/DC
- Digital Integrated Circuitry
- Switch Selectable Delays From 0.1 s ... 2.8 h in 3 Ranges or Factory Fixed
- +/-0.5% Repeat Accuracy
- 1 A Steady - 10 A Inrush
- Totally Solid State and Encapsulated

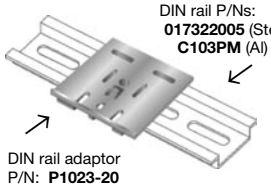
Approvals:

Accessories

Female quick connect
P/N:
P1015-64 (AWG 14/16)

Quick connect to screw adaptor
P/N: **P1015-18**

Mounting bracket
P/N: **P1023-6**



DIN rail P/Ns:
017322005 (Steel)
C103PM (Al)

DIN rail adaptor
P/N: **P1023-20**

See accessory pages for specifications.

Description

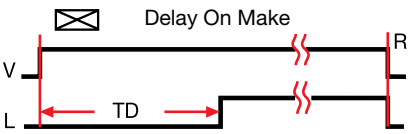
The TDU and KSDU Series are encapsulated solid state delay on make timers that combine digital timing circuitry with universal voltage operation. The TDU offers DIP switch adjustment allowing accurate selection of the time delay over the full time delay range. The KSDU is factory fixed from 0.1 s to 10,230 s and does not include the DIP switch. These series are excellent choices for process control systems and OEM equipment.

Operation

Upon application of input voltage, the time delay begins. The output is de-energized before and during the time delay. At the end of the time delay, the output energizes and remains energized until input voltage is removed.

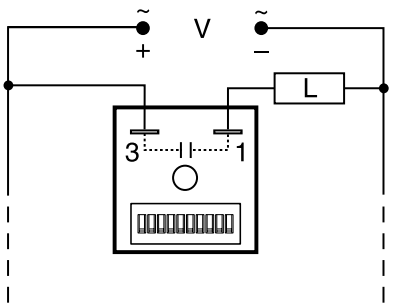
Reset: Removing input voltage resets the time delay and output.

Function



V = Voltage R = Reset TD = Time Delay
L = Load = Undefined time

Connection



Dashed lines are internal connections.
Load may be connected to terminal 3 or 1.
TDU has DIP switch adjustment; KSDU is fixed.

Ordering Table

TDU Series	Input Voltage Range	Time Range - Seconds	Part Number
	24 ... 120 AC/DC	0.1 ... 102.3	TDUL3000A
	100 ... 240 AC/DC	0.1 ... 102.3	TDUL3001A
	24 ... 120 AC/DC	1 ... 1023	TDU3000A
	100 ... 240 AC/DC	1 ... 1023	TDU3001A
	24 ... 120 AC/DC	10 ... 10230	TDUH3000A
	100 ... 240 AC/DC	10 ... 10230	TDUH3001A

KSDU Series

X — **Input Voltage Range**
- **8** - 24 ... 120 V AC/DC
- **9** - 100 ... 240 V AC/DC

X — **Type**
- **1** - Fixed

X — **Time Delay (Seconds)**
Specify fixed delay in seconds **0.1** ... **10230**

Example P/N: **KSDU81300, KSDU910.1**

TDKSDUB1 06.09.04

Delay On Make (Operate)
TDU, KSDU Digi-Set
Timing Modules

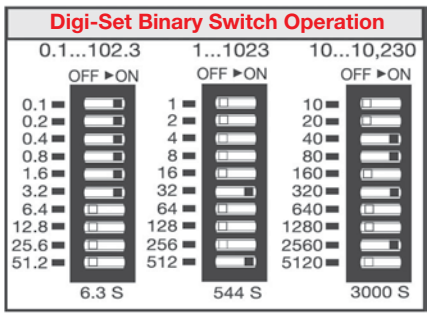
Technical Data

Time Delay		
Type		Digital integrated circuitry
Range*	Adjustable (TDU)	0.1 ... 102.3 s in 0.1 s increments 1 ... 1023 s in 1 s increments 10 ... 10230 s in 10 s increments
	Fixed (KSDU)	Fixed from 0.1 s ...10,230 s
Repeat Accuracy		+/-0.5% or 20 ms, whichever is greater
Tolerance (Factory Calibration)		+/-10%
Recycle Time		≤ 150 ms
Time Delay vs. Temperature & Voltage		+/-5%
Input		
Voltage		24 ... 120 V AC/DC 100 ... 240 V AC/DC
Line Frequency		50 ... 60 Hz
Tolerance		+/-20%
Output		
Type		Solid state
Form		Normally Open, open during timing
Maximum Load Current		1 A steady state, 10 A inrush at 60°C
Minimum Holding Current		40 mA
Voltage Drop		≅ 2.5 V at 1 A
Protection		
Circuitry		Encapsulated
Dielectric Breakdown		≥ 2000 V RMS terminals to mounting surface
Insulation Resistance		≥100 MΩ
Mechanical		
Mounting		Surface mount with one #10 (M5 x 0.8) screw
Package		2 x 2 x 1.21 in. (50.8 x 50.8 x 30.7 mm)
Termination		0.25 in. (6.35 mm) male quick connect terminals
Environmental		
Operating Temperature		-40°C ... +60°C
Storage Temperature		-40°C ... +85°C
Humidity		95% relative, non-condensing
Weight		≅ 2.4 oz (68 g)

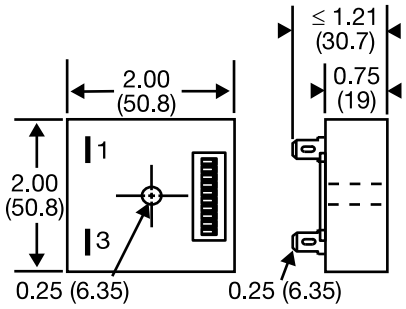
* For CE approved applications, power must be removed from the unit when a switch position is changed.

5

TDU Adjustment



Mechanical View



Inches (Millimeters)

Adjustment Switches Shown Not Included on KSDU Series.

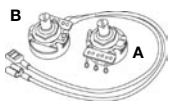
Delay On Make (Operate)
TMV8000/TSU2000 Uni-Timer
Timing Module

TMV8000

- Operates From 24 ... 240 V AC/DC
- Knob or External Adjust Time Delays
- Delays from 0.1 ... 8 m
- Totally Solid State - Encapsulated
- 1 A Steady - 10 A Inrush
- Two Terminal Series Connection with Load

Approvals:

Accessories



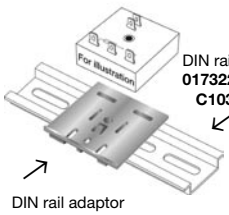
External adjust potentiometer P/Ns:
P1004-12 (fig A)
P1004-12-X (fig B)

Mounting bracket P/N: **P1023-6**

Female quick connect P/N:
P1015-64 (AWG 14/16)

Quick connect to screw adaptor P/N: **P1015-18**

Versa-knob P/N: **P0700-7**



DIN rail P/Ns:
017322005 (Steel)
C103PM (Al)

DIN rail adaptor P/N: **P1023-20**

See accessory pages for specifications.

Description

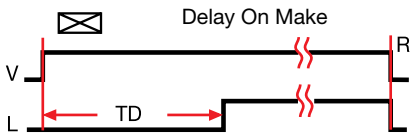
The TMV and TSU Series are universal voltage delay on make timers. Two models cover all the popular voltages and time delays. Available with knob or external adjust time delay. Its simple two terminals can easily be connected in series with a relay coil, contactor coil, solenoid, lamps, small motor, etc., to delay their energization, prevent short cycling or to sequence on various loads.

Operation

Upon application of input voltage, the time delay begins. The output is de-energized before and during the time delay. At the end of the time delay, the output energizes and remains energized until input voltage is removed.

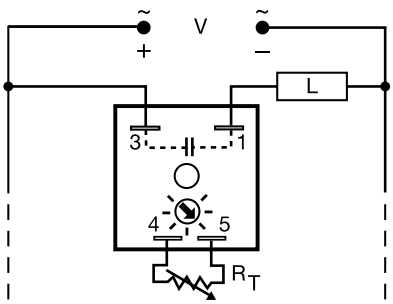
Reset: Removing input voltage resets the time delay and output.

Function



V = Voltage L = Load R = Reset
TD = Time Delay = Undefined time

Connection



Load may be connected to terminal 3 or 1.
TMV has knob adjustment.
TSU has external adjustment terminals 4 & 5.

Ordering Table

Input	Time Delay	Adjustment	Part Number
24 ... 240 V AC/DC	5 ... 480 s	External	TSU2000
24 ... 240 V AC/DC	0.1 ... 8 m	Knob	TMV8000

TMV02B01 02.08.05

Delay On Make (Operate)
TMV8000/TSU2000 Uni-Timer
Timing Module

Technical Data

Time Delay	
Type	Analog circuitry
Range	5 ... 480 s (TSU2000) 0.1 ... 8 m (TMV8000)
Repeat Accuracy	+/-2%
Tolerance (Factory Calibration)	≤ +/-10%
Reset Time	≤ 100 ms
Input	
Voltage	24 ... 240 V AC/DC +/-20%
Line Frequency	50 ... 60 Hz
Output	
Type	Solid State
Form	Normally Open, open during timing
Maximum Load Current	1 A steady state, 10 A inrush at 55°C
Minimum Holding Current	≤ 40 mA
Voltage Drop	≅ 2.5 V at 1 A
Protection	
Circuitry	Encapsulated
Dielectric Breakdown	≥ 2000 V RMS terminals to mounting surface
Insulation Resistance	≥ 100 MΩ
Mechanical	
Mounting	Surface mount with one #10 (M5 x 0.8) screw
Package	2 x 2 x 1.21 in. (50.8 x 50.8 x 30.7 mm)
Termination	0.25 in. (6.35 mm) male quick connect terminals
Environmental	
Operating Temperature	-20°C ... +70°C
Storage Temperature	-30°C ... +85°C
Humidity	95% relative, non-condensing
Weight	≅ 2.4 oz (68 g)

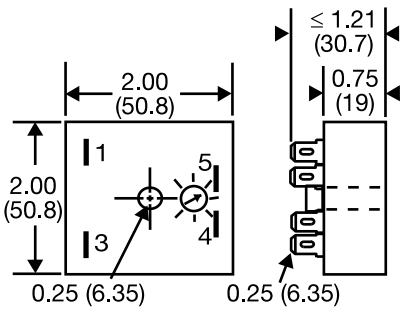
5

TSU2000

R_T Selection Chart	
Time Delay*	
Seconds	R_T Megohm
5	0.0
85	0.5
163	1.0
240	1.5
320	2.0
400	2.5
480	3.0

* When selecting an external R_T add at least 20% for tolerance of unit and the R_T.

Mechanical View



Inches (Millimeters)

TMV has the knob and dial.
TSU has terminals 4 & 5.

Delay On Make (Operate)
TSD1 Digi-Timer
Timing Module

- Fixed or Adjustable Delays From 0.1 s ... 100 h
- +/-0.1% Repeat Accuracy
- +/-1% Factory Calibration
- 12 ... 230 V in 6 Ranges
- 1 A Solid State Output
- Encapsulated

Approvals:

Description

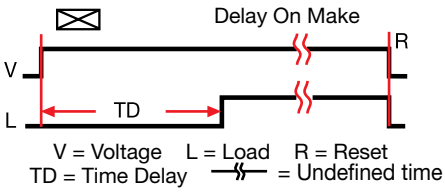
The TSD Series is designed for more demanding commercial and industrial applications where small size, and accurate performance is required. The factory calibration for fixed time delays is within 1% of the target time delay. The repeat accuracy, under stable conditions, is 0.1% of the time delay. The TSD Series is rated to operate over an extended temperature range. Time delays of 0.1 seconds to 100 hours are available. The output is rated 1 A steady and 10 A inrush. The modules are totally solid state and encapsulated to protect the electronic circuitry.

Operation

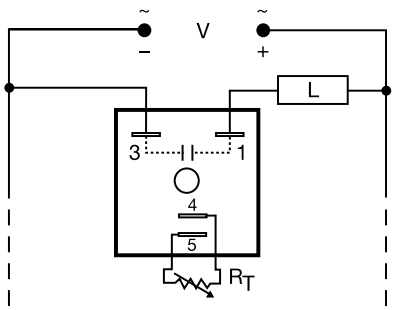
Upon application of input voltage, the time delay begins. The output is de-energized before and during the time delay. At the end of the time delay, the output energizes and remains energized until input voltage is removed.

Reset: Removing input voltage resets the time delay and output.

Function

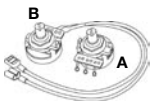


Connection



Load may be connected to terminal 3 or 1.
R_T is used when external adjustment is ordered.
Dashed lines are internal connections.

Accessories



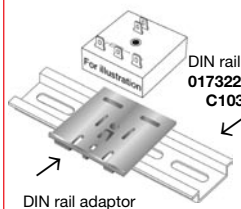
External adjust potentiometer
P/Ns:
P1004-95 (fig A)
P1004-95-X (fig B)

Mounting bracket
P/N: **P1023-6**

Female quick connect
P/N:
P1015-64 (AWG 14/16)

Quick connect to screw adaptor
P/N: **P1015-18**

Versa-knob
P/N: **P0700-7**



DIN rail P/Ns:
017322005 (Steel)
C103PM (Al)

DIN rail adaptor
P/N: **P1023-20**

See accessory pages for specifications.

Ordering Table

TSD1 Series	X Input	X Adjustment	X Time Delay*
	1 - 12 V DC	1 - Fixed	0 - 0.1 ... 10 s
	2 - 24 V AC	2 - External Adjust	1 - 1 ... 100 s
	3 - 24 V DC	3 - Onboard Adjust	2 - 10 ...1000 s
	4 - 120 V AC		3 - 0.1 ... 10 m
	5 - 120 V DC		4 - 1 ... 100 m
	6 - 230 V AC		5 - 10 ...1000 m
			6 - 1 ... 100 h

Example P/N: TSD1421 Fixed – TSD1410.5S

*If Fixed Delay is selected, insert delay [0.1 ... 1000] followed by (S) secs. or (M) mins., or [1 ... 100] (H) hours.

TSD1Gen 07.01.04

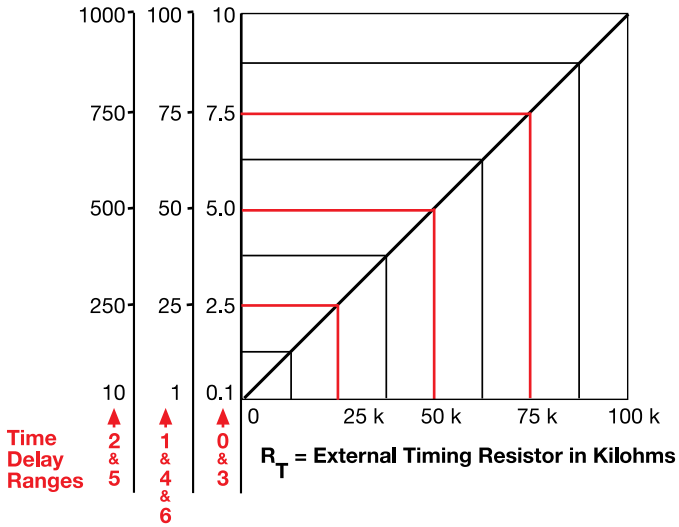
Delay On Make (Operate)
TSD1 Digi-Timer
Timing Module

Technical Data

Time Delay	
Range	0.1 s ... 100 h in 7 adjustable ranges or fixed
Repeat Accuracy	+/-0.1% or 20 ms, whichever is greater
Tolerance (Factory Calibration)	≤ +/-1%
Recycle Time	≤ 150 ms
Time Delay vs. Temperature & Voltage	≤ +/-1%
Input	
Voltage	12, 24, 120 V DC; 24, 120, 230 V AC
Tolerance	+/-20%
Line Frequency	50 ... 60 Hz
Output	
Type	Solid state
Form	Normally Open, open during timing
Maximum Load Current	1 A steady state, 10 A inrush at 60°C
Minimum Holding Current	≤ 40 mA
Off State Leakage Current	≅ 7 mA at 230 V AC
Voltage Drop	≅ 2.5 V at 1 A
Protection	
Circuitry	Encapsulated
Dielectric Breakdown	≥ 2000 V RMS terminals to mounting surface
Insulation Resistance	≥ 100 MΩ
Polarity	DC units are reverse polarity protected
Mechanical	
Mounting	Surface mount with one #10 (M5 x 0.8) screw
Package	2 x 2 x 1.21 in. (50.8 x 50.8 x 30.7 mm)
Termination	0.25 in. (6.35 mm) male quick connect terminals
Environmental	
Operating Temperature	-40°C ... +75°C
Storage Temperature	-40°C ... +85°C
Humidity	95% relative, non-condensing
Weight	≅ 2.4 oz (68 g)

External Resistance vs Time Delay

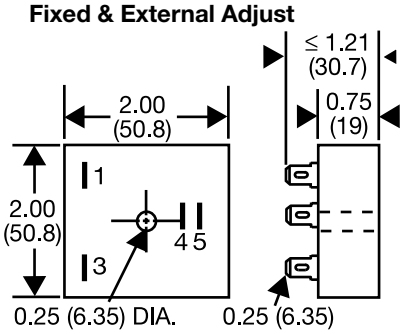
In Secs., Mins., or Hours



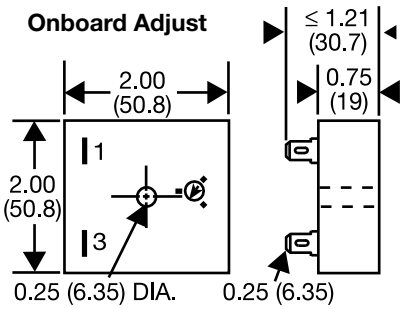
This chart applies to externally adjustable part numbers.
The time delay is adjustable over the time delay range selected by varying the resistance across the RT terminals; as the resistance increases the time delay increases.
When selecting an external RT, add the tolerances of the timer and the RT for the full time range adjustment.
Examples: 1 to 50 S adjustable time delay, select time delay range 1 and a 50 K ohm RT. For 1 to 100 S use a 100 K ohm RT.

Mechanical View

Fixed & External Adjust



Onboard Adjust

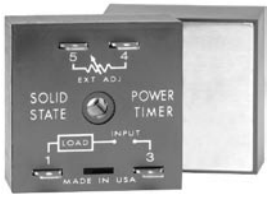


Inches (Millimeters)

5

TSD1Gen 07.01.04

Delay On Make (ON-Delay)
THDM Digi-Power
Power Timing Module

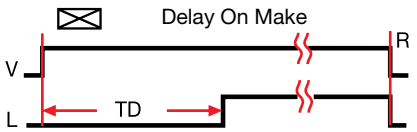


- High Load Currents up to 20 A, 200 A Inrush
- Simple-to-use Two Terminal Series Connection
- +/- 0.5% Repeat Accuracy
- Fixed or Adjustable Delays From 1 s ... 1000 m
- +/- 10% Factory Calibration
- 24, 120, or 230 V AC
- Metallized Mounting Surface for Heat Transfer
- Solid State & Encapsulated

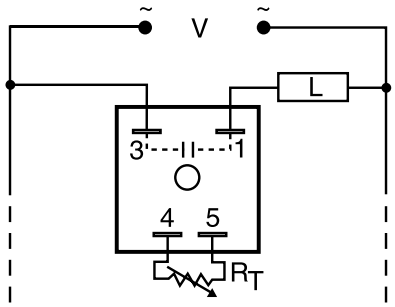
Approvals:

Description
The THDM Series is a high power solid state delay on make timer that is connected in series withthe load. The THDM eliminates the need for a timer and a spearate solid state relay. A cost effective approach for controlling larger loads such as motor, electric heating elements, and lamps. When mounted on a metal surface, it can switch loads up to 20 Amps steady, 200 Amps inrush.

Operation
Upon application of input voltage, the time delay begins. The output is de-energized before and during the time delay. At the end of the time delay, the output is energized and remains energized until input voltage is removed.
Reset: Removing input voltage resets the time delay and output.

Function


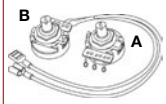
V = Voltage L = Load R = Reset
TD = Time Delay = Undefined time

Connection


Load may be connected to terminal 3 or 1.
R_T is used when external adjustment is ordered.
Dashed lines are internal connections.

Time Delay	VTP P/N
1 – 1 ... 100 s	VTP5G
2 – 10 ... 1000 s	VTP5K
3 – 0.1 ... 10 m	VTP5N
4 – 1 ... 100 m	VTP5P
5 – 10 ... 1000 m	VTP5R

Accessories



External adjust potentiometer P/Ns:
P1004-13 (fig A)
P1004-13-X (fig B)


Female quick connect P/Ns:
P1015-64 (AWG 14/16)
P1015-13 (AWG 10/12)


Quick connect to screw adaptor P/N: **P1015-18**


Versa-knob P/N: **P0700-7**

Plug-on adjustment module P/N: **VTP(X)(X)**

See accessory pages for specifications.

Ordering Table

THDM Series	X Input	X Adjustment	X Time Delay *	X Output Rating
	2 - 24 V AC	1 - Fixed	1 - 1.0 ... 100 s	A - 6 A
	4 - 120 V AC	2 - External Adjust	2 - 10 ... 1000 s	B - 10 A
	6 - 230 V AC		3 - 0.1 ... 10 m	C - 20 A
			4 - 1 ... 100 m	
			5 - 10 ... 1000 m	

*If Fixed Delay is selected, insert delay [1.0...1000] followed by (S) sec. or [0.1 ... 1000] (M) min.

Example P/N: **THDM621B** Fixed – **THDM210.5MC**

THDM2B01 02.11.05

Delay On Make (ON-Delay)
THDM Digi-Power
Power Timing Module

Technical Data

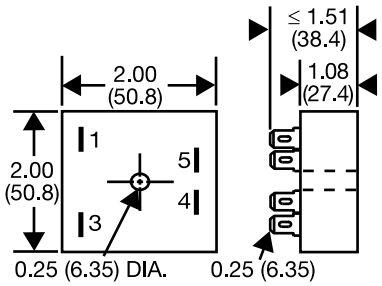
Time Delay		
Type	Digital intergrated circuitry	
Range	1 s ... 1000 m in 5 adjustable ranges or fixed	
Repeat Accuracy	+/-0.5% or 20 ms, whichever is greater	
Tolerance (Factory Calibration)	≤ +/- 10%	
Recycle Time	During timing--≤150 ms; After timing--≤ 350 ms	
Time Delay vs. Temperature & Voltage	≤ +/-2%	
Input		
Voltage	24, 120, or 230 V AC	
Tolerance	+/-20%	
Line Frequency	50 ... 60 Hz	
Output		
Type	Solid state	
Form	Normally Open, open during timing	
Maximum Load Currents	**Output** / **Steady State** / **Inrush** A / 6 A / 60 A B / 10 A / 100 A C / 20 A / 200 A	**Must be bolted to a metal surface using the included heat sink compound. The maximum mounting surface temperature is 90°C. Inrush: Non-repetitive for 16 ms.
Minimum Load Current	100 mA	
Effective Voltage Drop (V Line - V Load)	**Input** / **Effective Drop** 24 V AC / ≤ 3 V 120 V AC / ≤ 3 V 230 V AC / ≤ 5 V	
Protection		
Circuitry	Encapsulated	
Dielectric Breakdown	≥ 2000 V RMS terminals to mounting surface	
Insulation Resistance	≥ 100 MΩ	
Mechanical		
Mounting **	Surface mount with one #10 (M5 x 0.8) screw	
Termination	0.25 in. (6.35 mm) male quick connect terminals	
Environmental		
Operating/Storage Temperature	-40°C ... +60°C / -40°C ... +85°C	
Humidity	95% relative, non-condensing	
Weight	≅ 3.9 oz (111 g)	

5

R_T Selection Chart					
Desired Time Delay*					R_T
Seconds		Minutes			
1	2	3	4	5	Megohm
1	10	0.1	1	10	0.0
10	100	1	10	100	0.5
20	200	2	20	200	1.0
30	300	3	30	300	1.5
40	400	4	40	400	2.0
50	500	5	50	500	2.5
60	600	6	60	600	3.0
70	700	7	70	700	3.5
80	800	8	80	800	4.0
90	900	9	90	900	4.5
100	1000	10	100	1000	5.0

* When selecting an external R_T add at least 20% for tolerance of unit and the R_T.

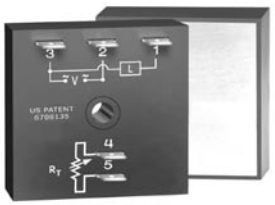
Mechanical View



Inches (Millimeters)

THDM2B01 02.11.05

Delay On Make (Operate)
THD1 Digi-Power
Power Timing Module

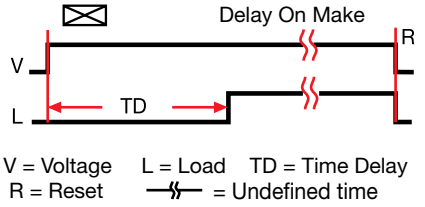


- High Load Currents up to 20 A, 200 A Inrush
- Fixed or Adjustable Delays From 0.1 s ... 1000 m
- +/-0.5% Repeat Accuracy
- +/-1% Factory Calibration
- 24, 120, or 230 V AC
- Metallized Mounting Surface for Efficient Heat Transfer
- Totally Solid State and Encapsulated

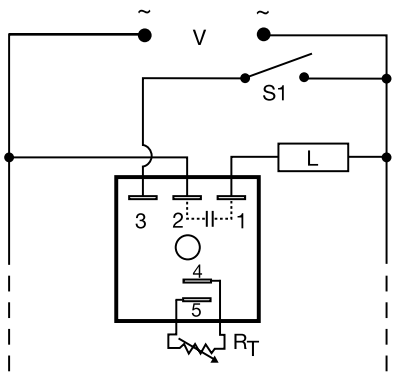
Approvals:

Description
The THD Series combines accurate timing circuitry with high power solid state switching. It can switch motors, lamps, and heaters directly without a contactor. You can reduce labor, component cost, and increase reliability with these small, easy-to-use, Digi-Power timers.

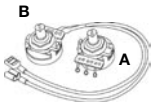
Operation
Upon application of input voltage, the time delay begins. The output is de-energized before and during the time delay. At the end of the time delay, the output energizes and remains energized until input voltage is removed.
Reset: Removing input voltage resets the time delay and output.

Function


V = Voltage L = Load TD = Time Delay
R = Reset = Undefined time

Connection


R_T is used when external adjustment is ordered.
Dashed lines are internal connections.
S1 = Optional Low Current Initiate Switch

Accessories


External adjust potentiometer
P/Ns:
P1004-95 (fig A)
P1004-95-X (fig B)


Female quick connect
P/Ns:
P1015-64 (AWG 14/16)
P1015-13 (AWG 10/12)


Quick connect to screw adaptor
P/N: **P1015-18**


Versa-knob
P/N: **P0700-7**

See accessory pages for specifications.

Ordering Table

THD1 Series	X Output Rating	X Input	X Adjustment	X Time Delay *
	A - 6 A	2 - 24 V AC	1 - Fixed	0 - 0.1 ... 10 s
	B - 10 A	4 - 120 V AC	2 - External Adjust	1 - 1.0 ... 100 s
	C - 20 A	6 - 230 V AC	3 - Onboard Adjust	2 - 10 ... 1000 s
				3 - 0.1 ... 10 m
				4 - 1 ... 100 m
				5 - 10 ... 1000 m

*If Fixed Delay is selected, insert delay [0.1...1000] followed by (S) secs. or (M) mins.

Example P/N: THD1B223 Fixed – THD1C410.1S

THD1Gen 06.30.04

Delay On Make (Operate)
THD1 Digi-Power
Power Timing Module

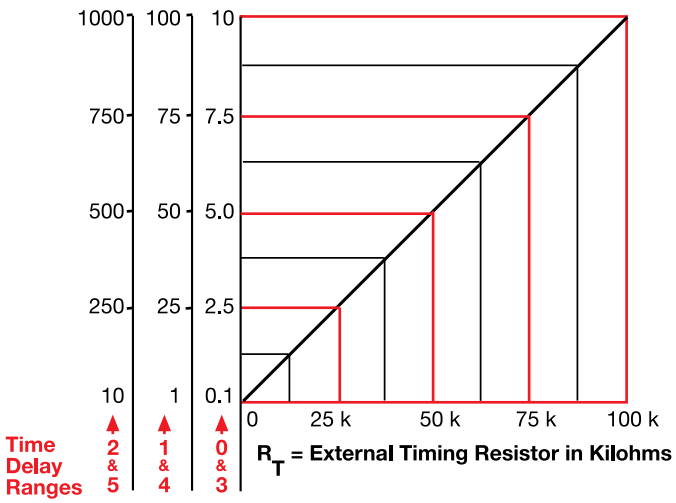
Technical Data

Time Delay	
Range	0.1 s ... 1000 m in 6 adjustable ranges or fixed
Repeat Accuracy	+/-0.5% or 20 ms, whichever is greater
Tolerance (Factory Calibration)	≤ +/-1%
Recycle Time	≤ 150 ms
Time Delay vs. Temperature & Voltage	≤ +/-2%
Input	
Voltage	24, 120, or 230 V AC
Tolerance	+/-20%
Line Frequency	50 ... 60 Hz
Power Consumption	≤ 2 VA
Output	
Type	Solid state
Form	Normally Open, open during timing
Maximum Load Current	Output / Steady State / Inrush** A / 6 A / 60 A B / 10 A / 100 A C / 20 A / 200 A **Must be bolted to a metal surface using the included heat sink compound. The maximum mounting surface temperature is 90°C. Inrush: Non-repetitive for 16 ms.
Minimum Load Current	100 mA
Voltage Drop	≅ 2.5 V at rated current
OFF State Leakage Current	≅ 5 mA at 230 V AC
Protection	
Circuitry	Encapsulated
Dielectric Breakdown	≥ 2000 V RMS terminals to mounting surface
Insulation Resistance	≥ 100 MΩ
Mechanical	
Mounting **	Surface mount with one #10 (M5 x 0.8) screw
Termination	0.25 in. (6.35 mm) male quick connect terminals
Environmental	
Operating/StorageTemperature	-40°C ... +60°C / -40°C ... +85°C
Humidity	95% relative, non-condensing
Weight	≅ 3.9 oz (111 g)

5

External Resistance vs Time Delay

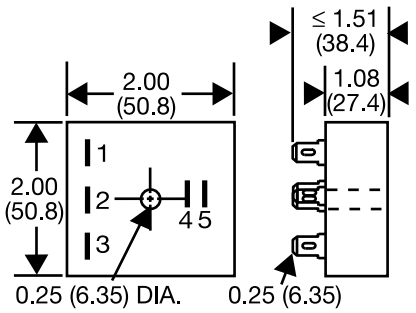
In Secs. or Mins.



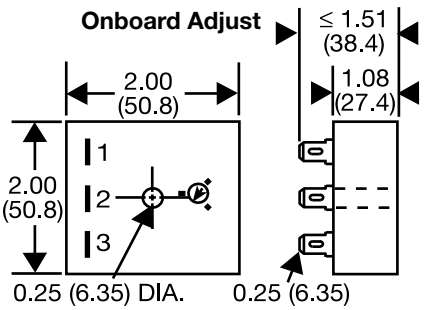
This chart applies to externally adjustable part numbers.
The time delay is adjustable over the time delay range selected by varying the resistance across the RT terminals; as the resistance increases the time delay increases.
When selecting an external RT, add the tolerances of the timer and the RT for the full time range adjustment.
Examples: 1 to 50 S adjustable time delay, select time delay range 1 and a 50 K ohm RT. For 1 to 100 S use a 100 K ohm RT.

Mechanical View

Fixed & External Adjust



Onboard Adjust



Inches (Millimeters)

THD1Gen 06.30.04

1TRC 001 009 C0202

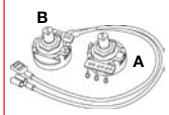
Delay On Make (Operate)
KSD1 Digi-Timer
Timing Module

TEN YEAR 10 WARRANTY

- Fixed or Adjustable Delays from 0.1 s ... 1000 min in 6 Ranges
- +/-0.5% Repeat Accuracy
- +/-5% Factory Calibration
- 12 ... 230 V in 5 Ranges
- 1 A Solid State Output
- Encapsulated

Approvals:

Accessories



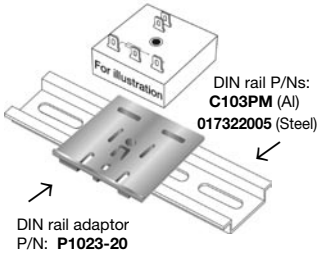
External adjust potentiometer
P/Ns:
P1004-95 (fig A)
P1004-95-X (fig B)

Mounting bracket
P/N: **P1023-6**

Female quick connect
P/Ns:
P1015-64 (AWG 14/16)
P1015-14 (AWG18/22)

Quick connect to screw adaptor
P/N: **P1015-18**

Versa-knob
P/N: **P0700-7**



DIN rail P/Ns:
C103PM (Al)
017322005 (Steel)

DIN rail adaptor
P/N: **P1023-20**

See accessory pages for specifications.

Description

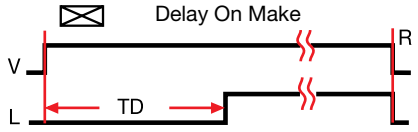
The KSD1 Series features two-terminal, series-connection with the load. The KSD1 Series is an ideal choice for delay on make timing applications. This series is designed for general purpose commercial and industrial applications where a small, cost effective, reliable solid state timer is required. The factory calibration for fixed time delays is within 5% of the target time delay. The repeat accuracy, under stable conditions, is 0.5% of the selected time delay. This series is designed for popular AC and DC voltages. Time delays of 0.1 seconds to 1000 minutes are available in 6 ranges. The output is rated 1 A steady and 10 A inrush. The modules are totally solid state and encapsulated to protect the electronic circuitry.

Operation

Upon application of input voltage, the time delay begins. The output is de-energized before and during the time delay. At the end of the time delay, the output energizes and remains energized until input voltage is removed.

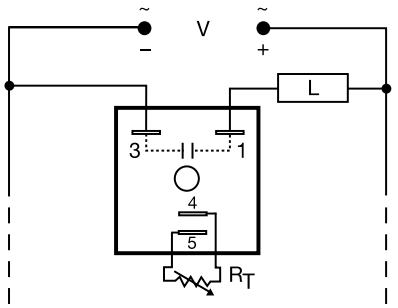
Reset: Removing input voltage resets the time delay and output.

Function



V = Voltage L = Load R = Reset
TD = Time Delay = Undefined time

Connection



R_T is used when external adjustment is ordered.
Load may be connected to terminal 3 or 1.
Dashed lines are internal connections.

Ordering Table

KSD1	X	X	X
Series	**Input Voltage**	**Adjustment**	**Time Delay***
	1 - 12 V DC	1 - Fixed	0 - 0.1 ... 10 s
	2 - 24 V AC	2 - External Adjust	1 - 1 ... 100 s
	3 - 24 V DC	3 - Onboard Adjust	2 - 10 ...1000 s
	4 - 120 V AC		3 - 0.1 ... 10 m
	6 - 230 V AC		4 - 1 ... 100 m
			5 - 10 ...1000 m

Example P/N: KSD1421 Fixed – KSD1410.5S

*If Fixed Delay is selected, insert delay [0.1 ... 1000] followed by (S) secs. or (M) mins.

KSD1Gen 07.02.04

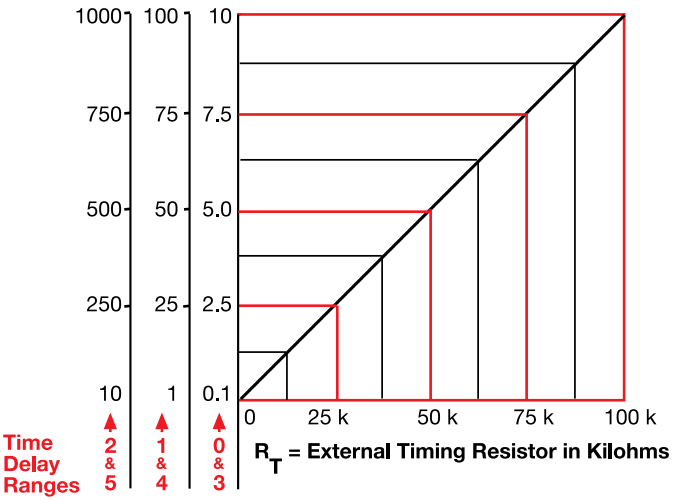
Delay On Make (Operate)
KSD1 Digi-Timer
Timing Module

Technical Data

Time Delay	
Range	0.1 s ... 1000 m in 6 adjustable ranges or fixed
Repeat Accuracy	+/-0.5% or 20 ms, whichever is greater
Tolerance (Factory Calibration)	≤ +/-5%
Recycle Time	≤ 150 ms
Time Delay vs. Temperature & Voltage	≤ +/-10%
Input	
Voltage	24, 120, or 230 V AC; 12 or 24 V DC
Tolerance	+/-20%
Line Frequency	50 ... 60 Hz
Output	
Type	Solid state
Form	Normally Open, open during timing
Maximum Load Current	1 A steady state, 10 A inrush at 60°C
Minimum Holding Current	≤ 40 mA
OFF State Leakage Current	≅ 7 mA at 230 V AC
Voltage Drop	≅ 2.5 V at 1 A
Protection	
Circuitry	Encapsulated
Dielectric Breakdown	≥ 2000 V RMS terminals to mounting surface
Insulation Resistance	≥ 100 MΩ
Polarity	DC units are reverse polarity protected
Mechanical	
Mounting	Surface mount with one #10 (M5 x 0.8) screw
Package	2 x 2 x 1.21 in. (50.8 x 50.8 x 30.7 mm)
Termination	0.25 in. (6.35 mm) male quick connect terminals
Environmental	
Operating Temperature	-40°C ... +60°C
Storage Temperature	-40°C ... +85°C
Humidity	95% relative, non-condensing
Weight	≅ 2.4 oz (68 g)

External Resistance vs Time Delay

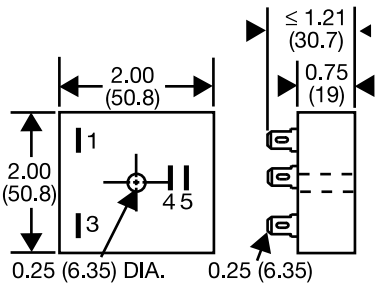
In Secs. or Mins.



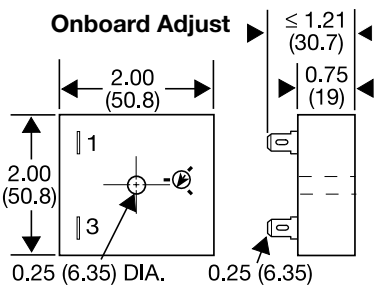
This chart applies to externally adjustable part numbers.
The time delay is adjustable over the time delay range selected by varying the resistance across the RT terminals; as the resistance increases the time delay increases.
When selecting an external RT, add the tolerances of the timer and the RT for the full time range adjustment.
Examples: 1 to 50 S adjustable time delay, select time delay range 1 and a 50 K ohm RT. For 1 to 100 S use a 100 K ohm RT.

Mechanical View

Fixed & External Adjust



Onboard Adjust



Inches (Millimeters)

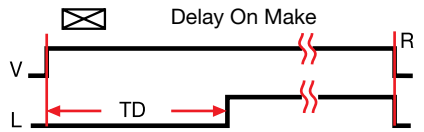
Delay On Make (Operate)
TS1 Versa-Timer
Timing Module

- Two Terminal Series Connection with Load
- 5 mA ... 1 A Load Currents
- Totally Solid State – Encapsulated
- +/-2% Repeat Accuracy
- Fixed or Adjustable Delays From 50 ms ... 10 m in 8 Ranges

Approvals:

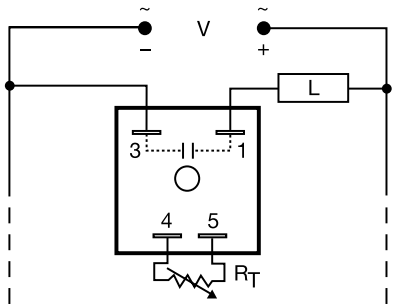
Description
Versa-Timer offers proven reliability and performance with years of use in OEM equipment and commercial applications. This encapsulated general use timing module is capable of controlling load currents ranging from 5 mA to 1 A. May be connected in series with contactors, relays, valves, solenoids, small motors, and lamps.

Operation
Upon application of input voltage, the time delay begins. The output is de-energized before and during the time delay. At the end of the time delay, the output energizes and remains energized until input voltage is removed.
Reset: Removing input voltage resets the time delay and output.

Function


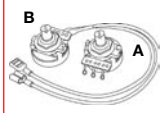
V = Voltage L = Load R = Reset
TD = Time Delay = Undefined time

12 VDC			
Time Delay	VTP P/N	Fig. A P/N	Fig. B P/N
1 – 0.05 ... 1 s	VTP2A	P1004-16	P1004-16-X
2 – 0.5 ... 20 s	VTP2E	P1004-16	P1004-16-X
3 – 2 ... 60 s	VTP2F	P1004-16	P1004-16-X
4 – 5 ... 120 s	VTP2H	P1004-16	P1004-16-X

Connection


Load may be connected to terminal 3 or 1.
R_T is used when external adjustment is ordered.

All Other Voltages			
Time Delay	VTP P/N	Fig. A P/N	Fig. B P/N
1 – 0.05 ... 3 s	VTP4B	P1004-12	P1004-12-X
2 – 0.5 ... 60 s	VTP4F	P1004-12	P1004-12-X
3 – 2 ... 180 s	VTP4J	P1004-12	P1004-12-X
4 – 5 ... 600 s	VTP5N	P1004-13	P1004-13-X

Accessories


External adjust potentiometer P/N: **P1004-XX** (fig A) **P1004-XX-X** (fig B)

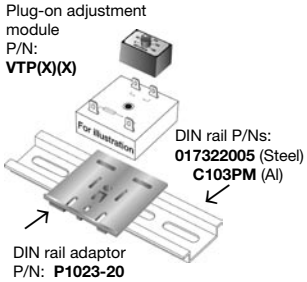

Mounting bracket P/N: **P1023-6**


Female quick connect P/N: **P1015-64** (AWG 14/16)


Quick connect to screw adaptor P/N: **P1015-18**


Versa-knob P/N: **P0700-7**

Plug-on adjustment module P/N: **VTP(X)(X)**



DIN rail P/Ns: **017322005** (Steel) **C103PM** (Al)

DIN rail adaptor P/N: **P1023-20**

See accessory pages for specifications.

Ordering Table

TS1 Series	X Input	X Adjustment	X Time Delay* 12 V DC	All Other Voltages
	1 - 12 V DC	1 - Fixed	1 - 0.05 ... 1 s	0.05 ... 3 s
	2 - 24 V AC	2 - External Adjust	2 - 0.5 ... 20 s	0.5 ... 60 s
	3 - 24 V DC		3 - 2 ... 60 s	2 ... 180 s
	4 - 120 V AC		4 - 5 ... 120 s	5 ... 600 s
	5 - 120 V DC			
	6 - 230 V AC			

Example P/N: TS1122 Fixed – TS1411.5

*If Fixed Delay is selected, insert delay [0.05 ... 120] (12V DC) or [0.05 ... 600] (other voltages) in secs.

TS102B01 06.09.04

Delay On Make (Operate)
TS1 Versa-Timer
Timing Module

Technical Data

Time Delay		
Type		Analog circuitry
Range	12 V DC	0.05 ... 120 s in 4 adjustable ranges or fixed (1 MΩ max. R_T)
	Other Voltages	0.05 ... 600 s in 4 adjustable ranges or fixed
Repeat Accuracy		+/-2% or 20 ms, whichever is greater
Tolerance (Factory Calibration)		≤ +/-10%
Recycle Time		After timing – ≤ 16 ms
		During timing – 0.1% of time delay or 75 ms, whichever is greater
Time Delay vs. Temperature & Voltage		≤ +/-10%
Input		
Voltage		12, 24 or 120 V DC; 24, 120, or 230 V AC
Tolerance		+/-20%
Line Frequency		50 ... 60 Hz
Output		
Type		Solid state
Form		Normally Open, open during timing
Maximum Load Current		1 A steady state, 10 A inrush at 60°C
Minimum Holding Current		5 mA
Voltage Drop		≅ 2.5 V at 1 A
Protection		
Circuitry		Encapsulated
Dielectric Breakdown		≥ 2000 V RMS terminals to mounting surface
Insulation Resistance		≥ 100 MΩ
Polarity		DC units are reverse polarity protected
Mechanical		
Mounting		Surface mount with one #10 (M5 x 0.8) screw
Termination		0.25 in. (6.35 mm) male quick connect terminals
Environmental		
Operating/Storage Temperature		-40°C ... +80°C / -40°C ... +85°C
Humidity		95% relative, non-condensing
Weight		≅ 2.4 oz (68 g)

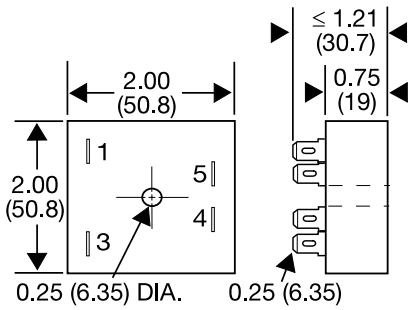
5

R_T Selection Chart

Desired Time Delay* Seconds				R_T
1	2	3	4	Megohm
0.05	0.5	2	5	0.0
0.5	10	30	60	0.5
1.0	20	60	120	1.0
▼	24VDC or AC ONLY†		▼	
1.5	30	90	180	1.5
2.0	40	120	240	2.0
2.5	50	150	300	2.5
3.0	60	180	360	3.0
			420	3.5
			480	4.0
			540	4.5
			600	5.0

* When selecting an external R_T add at least 20% for tolerance of unit and the R_T.
† 1 Megohm max for 12 VDC Units

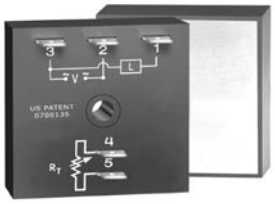
Mechanical View



Inches(Millimeters)

TS102B01 06.09.04

Delay On Make (ON-Delay)
TH1 Series
Power Timing Module

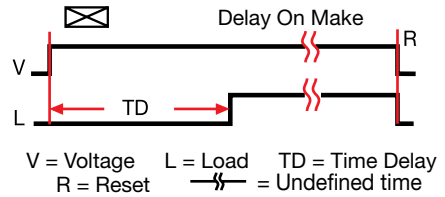


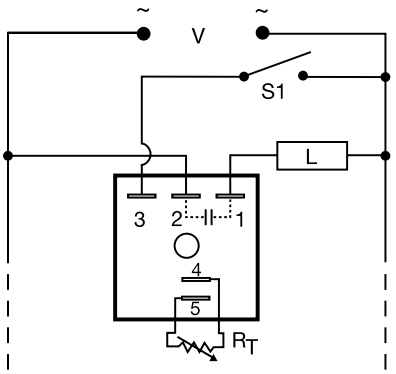
- High Current Load Capacity up to 20 A with 200 A Inrush
- Solid State Switching -- No Contact Wear or Arcing
- Encapsulated
- Fixed or Adjustable Time Delays From 0.1 ... 600 s in
- +/- 2% Repeat Accuracy
- +/- 5% Factory Calibration
- Metallized Mounting Surface for Efficient Heat Transfer

Approvals:

Description
The TH1 Series is a solid state relay and timer combined into one compact, easy-to-use control. This highly reliable device eliminates the need for a separate solid state relay. When mounted to a metal surface, it can switch load currents up to 20 A steady state, and 200 A inrush.

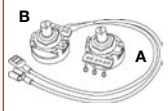
Operation
Upon application of input voltage, the time delay begins. The output is de-energized before and during the time delay. At the end of the time delay, the output energizes and remains energized until input voltage is removed.
Reset: Removing input voltage resets the time delay and output.

Function


Connection


R_T is used when external adjustment is ordered.
Dashed lines are internal connections.
S1 is an optional low current initiate switch.

Accessories



External adjust potentiometer P/Ns:
P1004-95 (fig A)
P1004-95-X (fig B)


Female quick connect P/Ns:
P1015-64 (AWG 14/16)
P1015-13 (AWG 10/12)


Quick connect to screw adaptor
P/N: **P1015-18**


Versa-knob
P/N: **P0700-7**

See accessory pages for specifications.

Ordering Table

TH1 Series	X Output Rating	X Input	X Adjustment	X Time Delay *
	A - 6 A	2 - 24 V AC	1 - Fixed	1 - 0.1 ... 3 s
	B - 10 A	4 - 120 V AC	2 - External Adjust	2 - 0.5 ... 60 s
	C - 20 A	6 - 230 V AC	3 - Onboard Adjust	3 - 2 ... 180 s
				4 - 5 ... 600 s

*If fixed delay is selected, insert delay [0.1 ... 600] in seconds.

Example P/N: TH1B223 Fixed – TH1C410.1

07.29.04
TH1Gen

Delay On Make (ON-Delay)
TH1 Series
Power Timing Module

Technical Data

Time Delay	
Range	0.1 ... 600 s in 4 adjustable ranges or fixed
Repeat Accuracy	+/-2% or 20 ms, whichever is greater
Tolerance (Factory Calibration)	≤ +/- 5%
Time Delay vs. Temperature and Voltage	≤ +/-10%
Recycle Time	≤ 150 ms
Input	
Voltage	24, 120, or 230 V AC
Tolerance	+/-15%
Line Frequency	50 ... 60 Hz
Power Consumption	≤ 2 VA
Output	
Type	Solid state
Form	Normally Open, open during timing
Maximum Load Currents	Output / Steady State / Inrush** A / 6 A / 60 A B / 10 A / 100 A C / 20 A / 200 A
Minimum Load Current	100 mA
Voltage Drop	≅ 2.5 V at rated current
OFF State Leakage Current	≅ 5 mA at 230 V AC
Protection	
Circuitry	Encapsulated
Dielectric Breakdown	≥ 2000 V RMS terminals to mounting surface
Insulation Resistance	≥ 100 MΩ
Mechanical	
Mounting **	Surface mount with one #10 (M5 x 0.8) screw
Package	2 x 2 x 1.51 in. (50.8 x 50.8 x 38.4 mm)
Termination	0.25 in. (6.35 mm) male quick connect terminals
Environmental	
Operating Temperature	-20°C ... +60°C
Storage Temperature	-40°C ... +85°C
Humidity	95% relative, non-condensing
Weight	≅ 3.9 oz (111 g)

**Must be bolted to a metal surface using the included heat sink compound. The maximum mounting surface temperature is 90°C. Inrush: Non-repetitive for 16 ms.

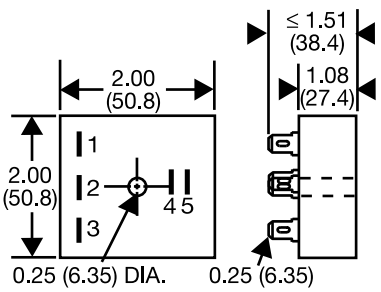
5

R_T Selection Chart				
Desired Time Delay* Seconds				R_T
1	2	3	4	Kohms
0.1	0.5	2	5	0
0.3	6	20	60	10
0.6	12	38	120	20
0.9	18	55	180	30
1.2	24	73	240	40
1.5	30	90	300	50
1.8	36	108	360	60
2.1	42	126	420	70
2.4	48	144	480	80
2.7	54	162	540	90
3.0	60	180	600	100

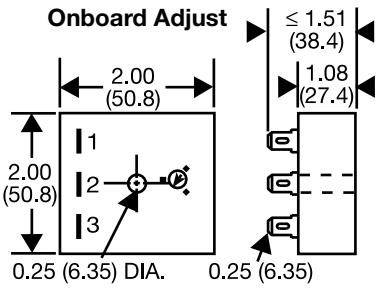
* When selecting an external R_T add at least 15% for tolerance of unit and the R_T.

Mechanical View

Fixed & External Adjust



Onboard Adjust



Inches (Millimeters)

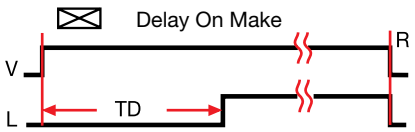
Delay On Make (Operate)
MSM PC Mount Timer
Timing Module

- Printed Circuit Mount or Wire Leads
- Fixed Delays from 0.05 ... 180 s
- +/- 5% Repeat Accuracy
- +/- 15% Factory Calibration
- Two-Wire Series Connection with the Load
- Fast Reset

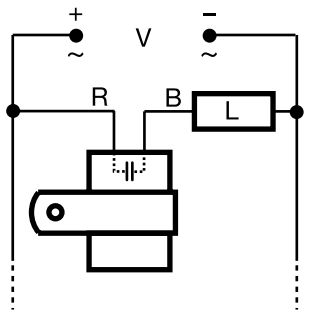
Approvals:

Description
The MSM replaces bi-metal type timing with reliable solid state circuitry. There are no moving parts to arc or wear. It is a cost effective solution for OEM designers. It is available for printed circuit board mounting or surface mounting with a removeable bracket and wire leads. The MSM offers immediate reset on removal of power.

Operation
The time delay begins upon application of input voltage. The output is de-energized before and during the time delay. At the end of the time delay, the output energizes and remains energized until input voltage is removed.
Reset: Removing input voltage resets the time delay and output.

Function


V = Voltage R = Reset L = Load
TD = Time Delay = Undefined time

Connection


V = Voltage L = Load
R = Red Wire B = Black Wire

Ordering Table

MSM Series

X Input
- 1 - 12 V DC
- 2 - 24 V AC
- 3 - 24 V DC
- 4 - 120 V AC
- 6 - 230 V AC

X Fixed Time Delay
0.05 ... 180 s
Specify fixed time in seconds

X Wire Type
- P - PC Mount
- W - Stranded Wire Leads

X Wire Length Inches (mm)
- 1 - 0.250 (6.35)
- 2 - 0.375 (9.53)
- 3 - 0.500 (12.70)
- 4 - 0.625 (15.88)
- 5 - 0.750 (19.05)
- 6 - 6.0 (152.4)
- 7 - 7.0 (177.8)
- 8 - 8.0 (203.2)
- 9 - 9.0 (228.6)

Example P/N: MSM47P3, MSM610W8

MSM02B01 05.03.04

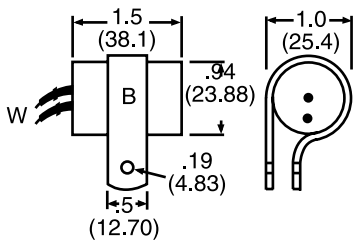
Delay On Make (Operate)
MSM PC Mount Timer
Timing Module

Technical Data

Time Delay	
Type	Analog Circuitry
Range	0.05 ... 180 s fixed
Repeat Accuracy	+/-5%
Tolerance (Factory Calibration)	+/-15%
Recycle Time	≤ 75 ms
Time Delay vs. Temperature & Voltage	+/-15%
Input	
Voltage	12 or 24 V DC; 24, 120, or 230 V AC
Tolerance	+/-10%
Line Frequency	50 ... 60 Hz
Output	
Type	Solid State
Form	Normally Open, open during timing
Maximum Load Current	0.5 A steady state 25°C; 0.25 A steady state 60°C
Minimum Holding Current	40 mA
Voltage Drop	≅ 2.5 V at 0.5 A
Protection	
Circuitry	Encapsulated
Dielectric Breakdown	≥ 2000 V RMS input to mounting surface
Insulation Resistance	≥ 100 MΩ
Polarity	DC units are reverse polarity protected
Mechanical	
Mounting	a. PC Mount 14 AWG (2.087mm²) wires (Can be inserted in AMP Miniature Spring Socket #645980-1) b. Stranded 18 AWG wire leads (0.933 mm²) with mounting bracket
Environmental	
Operation/Storage Temperature	-20°C ... +60°C / -30°C ... +85°C
Humidity	95% relative, non-condensing
Weight	P: ≅ 1.1 oz (31.2 g) W: ≅ 1.2 oz (34 g)

5

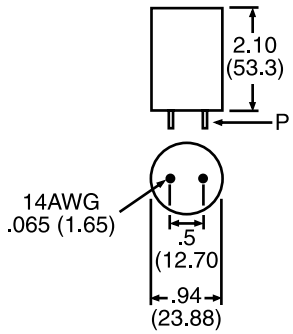
Mechanical View



Stranded Wire Leads

See Ordering Table for wire length

W = 18 AWG (0.82 mm²) wires
B = Removable mounting bracket
P = 14 AWG (2.087 mm²) wires



PC Mount

Inches (Millimeters)

MSM02B01 05.03.04

Delay On Make - Normally Closed
TSD4 Digi-Timer
Timing Module

- Fixed or Adjustable Delays From 0.1 s ... 100 h
- 24, 120, or 230 V AC
- +/-0.1% Repeat Accuracy
- +/-1% Factory Calibration
- 1A Solid State Output
- Encapsulated

Approvals:

Description

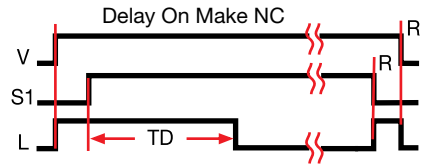
The TSD4 Digi-Timer is a delay on make timer with a normally closed solid state output. The load is energized prior to and during the delay period. The TSD Series is designed for more demanding commercial and industrial applications where small size, and accurate performance is required. The factory calibration for fixed time delays is within 1% of the target time delay. The repeat accuracy, under stable conditions, is 0.1% of the time delay. The TSD Series is rated to operate over an extended temperature range. Time delays of 0.1 seconds to 100 hours are available. The output is rated 1 A steady and 10 A inrush. The modules are totally solid state and encapsulated to protect the electronic circuitry.

Operation

Upon application of input voltage, the load energizes immediately. When the initiate switch is closed, the time delay begins. At the end of the time delay, the load de-energizes.

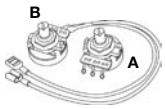
Reset: When the initiate switch is reopened, the load energizes again and the time delay is reset. Removing input voltage resets the time delay.

Function



V = Voltage S1 = Initiate Switch L = Load
R = Reset TD = Time Delay
= Undefined time

Accessories



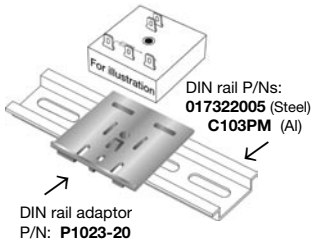
External adjust potentiometer
P/Ns:
P1004-95 (fig A)
P1004-95-X (fig B)

Mounting bracket
P/N: **P1023-6**

Female quick connect
P/N:
P1015-64 (AWG 14/16)

Quick connect to screw adaptor
P/N: **P1015-18**

Versa-knob
P/N: **P0700-7**

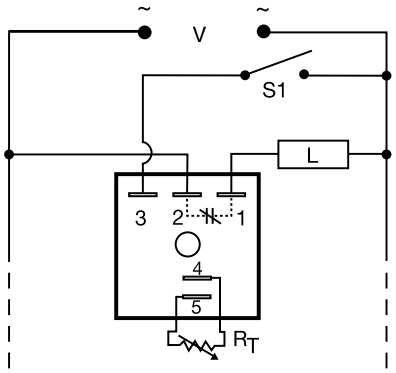


DIN rail P/Ns:
017322005 (Steel)
C103PM (Al)

DIN rail adaptor
P/N: **P1023-20**

See accessory pages for specifications.

Connection



R_T is used when external adjustment is ordered.
Dashed lines are internal connections.
S1 = Initiate Switch

Ordering Table

TSD4 Series	X Input	X Adjustment	X Time Delay*
	-2 - 24 V AC	-1 - Fixed	-0 - 0.1 ... 10 s
	-4 - 120 V AC	-2 - External Adjust	-1 - 1 ... 100 s
	-6 - 230 V AC	-3 - Onboard Adjust	-2 - 10 ... 1000 s
			-3 - 0.1 ... 10 m
			-4 - 1 ... 100 m
			-5 - 10 ... 1000 m
			-6 - 1 ... 100 h

Example P/N: TSD4421 Fixed – TSD4410.5S

*If Fixed Delay is selected, insert delay [0.1 ... 1000] followed by (S) secs. or (M) mins., [1 ... 100] (H) hrs

TSD4Gen 07.29.04

Delay On Make - Normally Closed
TSD4 Digi-Timer
Timing Module

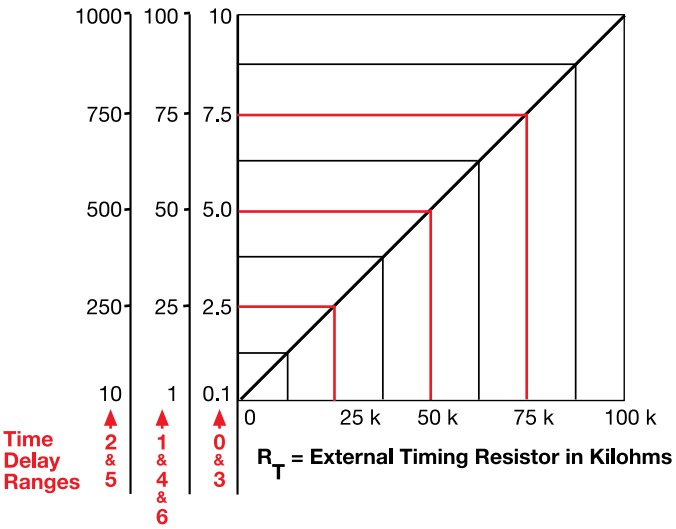
Technical Data

Time Delay	
Range	0.1 s ... 100 h in 7 adjustable ranges or fixed
Repeat Accuracy	+/-0.1% or 20 ms, whichever is greater
Tolerance (Factory Calibration)	≤ +/-1%
Reset Time	≤ 150 ms
Time Delay vs. Temperature & Voltage	≤ +/-1%
Input	
Voltage	24, 120, or 230 V AC
Tolerance	+/-20%
Line Frequency	50 ... 60 Hz
Power Consumption	≤ 2 VA
Output	
Type	Solid state
Form	Normally Closed, closed before & during timing
Maximum Load Current	1 A steady state, 10 A inrush at 60°C
OFF State Leakage Current	≅ 5 mA at 230 V AC
Voltage Drop	≅ 2.5 V at 1 A
Protection	
Circuitry	Encapsulated
Dielectric Breakdown	≥ 2000 V RMS terminals to mounting surface Insulation
Resistance	≥ 100 MΩ
Mechanical	
Mounting	Surface mount with one #10 (M5 x 0.8) screw
Package	2 x 2 x 1.21 in. (50.8 x 50.8 x 30.7 mm)
Termination	0.25 in. (6.35 mm) male quick connect terminals
Environmental	
Operating Temperature	-40°C ... +75°C
Storage Temperature	-40°C ... +85°C
Humidity	95% relative, non-condensing
Weight	≅ 2.4 oz (68 g)

5

External Resistance vs Time Delay

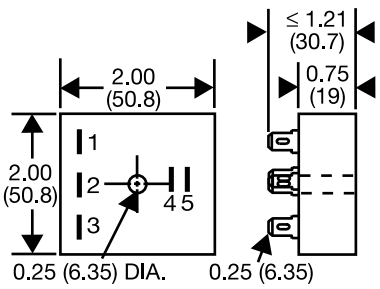
In Secs., Mins., or Hours



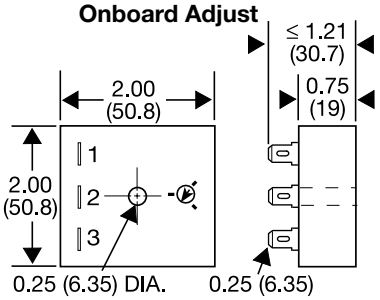
This chart applies to externally adjustable part numbers.
The time delay is adjustable over the time delay range selected by varying the resistance across the RT terminals; as the resistance increases the time delay increases.
When selecting an external RT, add the tolerances of the timer and the RT for the full time range adjustment.
Examples: 1 to 50 S adjustable time delay, select time delay range 1 and a 50 K ohm RT. For 1 to 100 S use a 100 K ohm RT.

Mechanical View

Fixed & External Adjust



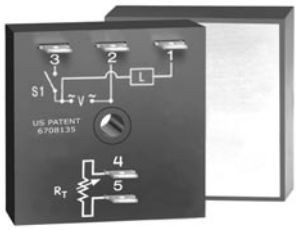
Onboard Adjust



Inches (Millimeters)

TSD4Gen 07.29.04

Delay On Make - Normally Closed
THD4 Digi-Power
Timing Module



- Load Energized Prior To and During Timing
- High Load Current Capacity up to 20 A, 200 A Inrush
- +/-0.5% Repeat Accuracy
- +/-1% Factory Calibration
- Totally Solid State and Encapsulated
- Fixed or Adjustable Delays From 0.1 s ... 1000 m in 6 Ranges

Approvals:

Description

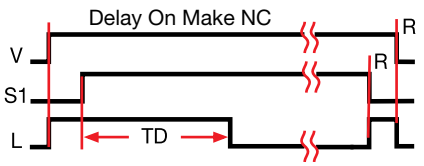
The THD4 utilizes solid state circuitry and a solid state relay in one easy to use control. The metallized mounting surface allows a metal panel to dissipate heat rather than adding an expensive heat sink. The solid state output is rated 6, 10, or 20 amps steady and up to 200 amps inrush. Motors, heaters and valves can be switched directly, eliminating the expense of a separate contactor. The THD4 offers substantial performance, reliability, and cost advantages for OEM designers.

Operation

Upon application of input voltage, the load is energized immediately. When the initiate switch closes, the time delay begins. At the end of the time delay, the load de-energizes.

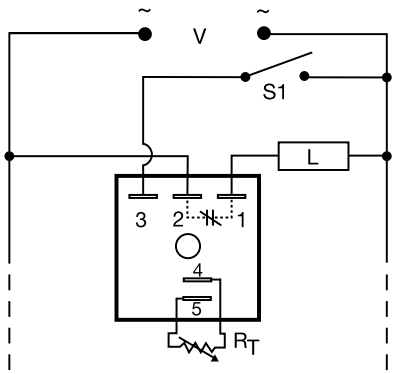
Reset: When the initiate switch is reopened, the load is again energized and the time delay is reset. Removing input voltage resets the time delay and the output.

Function



V = Voltage S1 = Initiate Switch L = Load
TD = Time Delay R = Reset
= Undefined time

Connection



S1 = Low current initiate switch

R_T is used when external adjustment is ordered.
Dashed lines are internal connections.

Accessories

External adjust potentiometer
P/Ns:
P1004-95 (fig A)
P1004-95-X (fig B)

Female quick connect
P/Ns:
P1015-64 (AWG 14/16)
P1015-13 (AWG 10/12)

Quick connect to screw adaptor
P/N: **P1015-18**

Versa-knob
P/N: **P0700-7**

See accessory pages for specifications.

Ordering Table

THD4 Series	X Output Rating	X Input	X Adjustment	X Time Delay *
	A - 6 A	2 - 24 V AC	1 - Fixed	0 - 0.1 ... 10 s
	B - 10 A	4 - 120 V AC	2 - External Adjust	1 - 1 ... 100 s
	C - 20 A	6 - 230 V AC	3 - Onboard Adjust	2 - 10 ... 1000 s
				3 - 0.1 ... 10 m
				4 - 1 ... 100 m
				5 - 10 ... 1000 m

*If Fixed Delay is selected, insert delay [...1000] followed by (S) secs. or (M) mins.

Example P/N: THD4A620 Fixed – THD4A410.5S

THD4Gen 08.11.04

Delay On Make - Normally Closed
THD4 Digi-Power
Timing Module

Technical Data

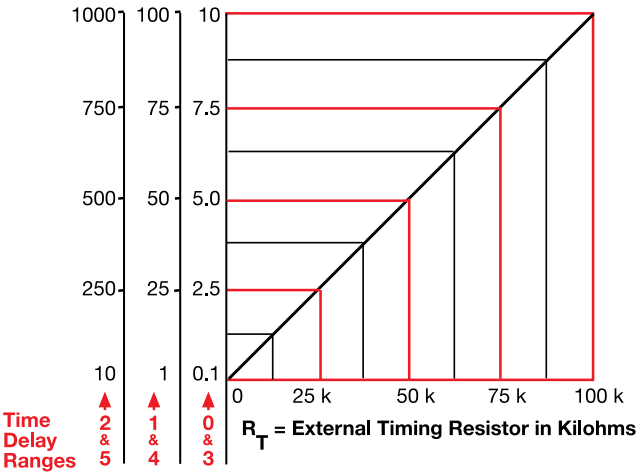
Time Delay	
Range	0.1 s ... 1000 m in 6 adjustable ranges or fixed
Repeat Accuracy	+/-0.5% or 20 ms, whichever is greater
Tolerance (Factory Calibration)	≤ +/-1%
Reset Time	≤ 150 ms
Time Delay vs. Temperature & Voltage	≤ +/-2%
Input	
Voltage	24, 120, or 230 V AC
Tolerance	+/-20%
Line Frequency	50 ... 60 Hz
Power Consumption	≤ 2 VA
Output	
Type	Solid state
Form	Normally closed
Rating	Output / Steady State / Inrush* A / 6 A / 60 A B / 10 A / 100 A C / 20 A / 200 A
Minimum Load Current	100 mA
Voltage Drop	≅ 2.5 V at rated current
OFF State Leakage Current	≅ 5 mA at 230 V AC
Protection	
Circuitry	Encapsulated
Dielectric Breakdown	≥ 2000 V RMS terminals to mounting surface
Insulation Resistance	≥ 100 MΩ
Mechanical	
Mounting *	Surface mount with one #10 (M5 x 0.8) screw
Termination	0.25 in. (6.35 mm) male quick connect terminals
Environmental	
Operating/Storage Temperature	-40°C ... +60°C / -40°C ... +85°C
Humidity	95% relative, non-condensing
Weight	≅ 3.9 oz (111 g)

*Must be bolted to a metal surface using the included heat sink compound. The maximum mounting surface temperature is 90°C. Inrush: Non-repetitive for 16 ms.

5

External Resistance vs Time Delay

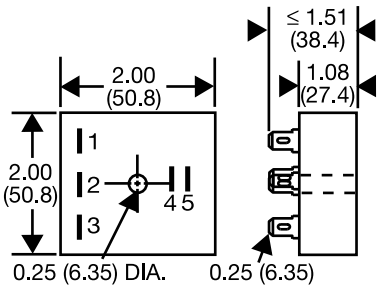
In Secs. or Mins.



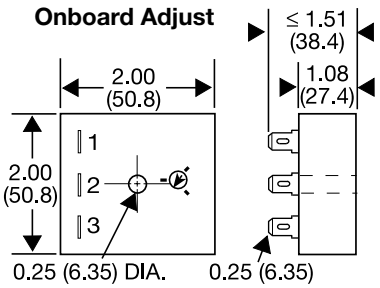
This chart applies to externally adjustable part numbers.
The time delay is adjustable over the time delay range selected by varying the resistance across the RT terminals; as the resistance increases the time delay increases.
When selecting an external RT, add the tolerances of the timer and the RT for the full time range adjustment.
Examples: 1 to 50 S adjustable time delay, select time delay range 1 and a 50 K ohm RT. For 1 to 100 S use a 100 K ohm RT.

Mechanical View

Fixed & External Adjust



Onboard Adjust



Inches (Millimeters)

Delay On Make - Normally Closed
KSD4 Digi-Timer
Timing Module

- Fixed or Adjustable Delays from 0.1 s ... 1000 m
- +/-0.5% Repeat Accuracy
- +/-5% Factory Calibration
- 24, 120, or 230 V AC
- 1 A Solid State Output
- Encapsulated

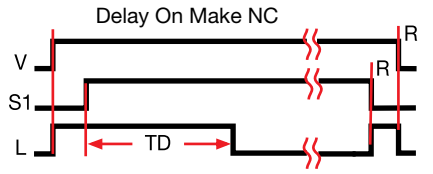
Approvals:

5

Description
The KSD4 Digi-Timer offers a delay on make function with normally closed solid state output. The load is energized prior to and during the time delay. This series is designed for general purpose commercial and industrial applications where a small, cost effective, reliable solid state timer is required. The factory calibration for fixed time delays is within 5% of the target time delay. The repeat accuracy, under stable conditions, is 0.5% of the selected time delay. This series is designed for input voltages of 24, 120 or 230 V AC. Time delays of 0.1 seconds to 1000 minutes are available in 6 ranges. The output is rated 1 A steady and 10 A inrush. The modules are totally solid state and encapsulated to protect the electronic circuitry.

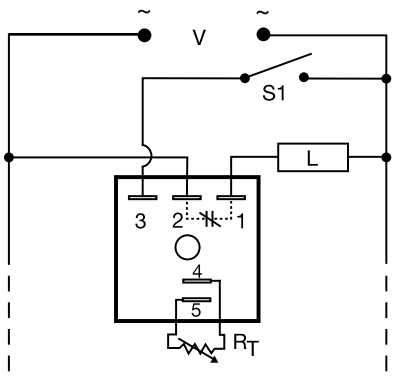
Operation
Upon application of input voltage, the load energizes immediately. When the initiate switch is closed, the time delay begins. At the end of the time delay, the load de-energizes.
Reset: When the initiate switch is reopened, the load energizes and the time delay is reset. Removing input voltage resets the time delay.

Function



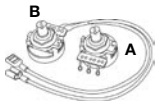
V = Voltage S1 = Initiate Switch L = Load
R = Reset TD = Time Delay
= Undefined time

Connection



R_T is used when external adjustment is ordered.
Dashed lines are internal connections.
S1 = Initiate Switch

Accessories



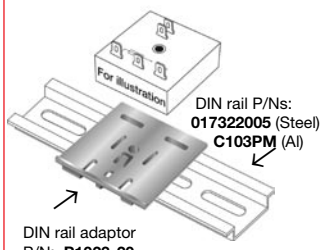
External adjust potentiometer
P/Ns:
P1004-95 (fig A)
P1004-95-X (fig B)

Mounting bracket
P/N: **P1023-6**

Female quick connect
P/N:
P1015-64 (AWG 14/16)

Quick connect to screw adaptor
P/N: **P1015-18**

Versa-knob
P/N: **P0700-7**



DIN rail P/Ns:
017322005 (Steel)
C103PM (Al)

DIN rail adaptor
P/N: **P1023-20**

See accessory pages for specifications.

Ordering Table

KSD4 Series	X Input	X Adjustment	X Time Delay*
	-2 - 24 V AC	-1 - Fixed	-0 - 0.1 ... 10 s
	-4 - 120 V AC	-2 - External Adjust	-1 - 1 ... 100 s
	-6 - 230 V AC	-3 - Onboard Adjust	-2 - 10 ... 1000 s
			-3 - 0.1 ... 10 m
			-4 - 1 ... 100 m
			-5 - 10 ... 1000 m

*If Fixed Delay is selected, insert delay [**0.1 ... 1000**] followed by (**S**) secs. or (**M**) mins.

Example P/N: **KSD4421** Fixed – **KSD4410.5S**

KSD4Gen 07.29.04

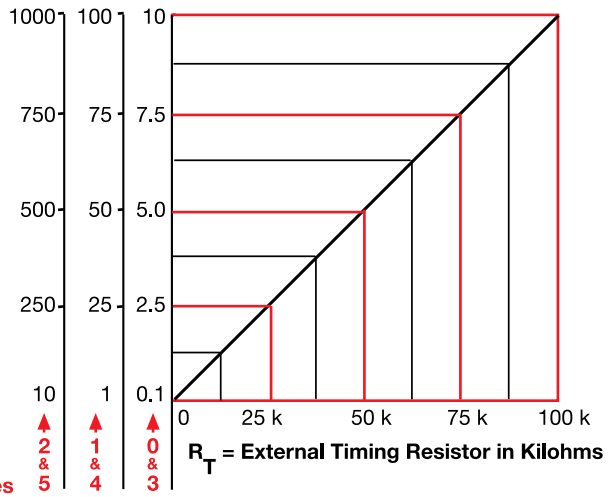
Delay On Make - Normally Closed
KSD4 Digi-Timer
Timing Module

Technical Data

Time Delay	
Range	0.1 s ... 1000 m in 6 adjustable ranges or fixed
Repeat Accuracy	+/-0.5% or 20 ms, whichever is greater
Tolerance (Factory Calibration	≤ +/- 5%
Reset Time	≤ 150 ms
Time Delay vs. Temperature & Voltage	≤ +/-10%
Input	
Voltage	24, 120, or 230 V AC
Tolerance	+/-20%
Line Frequency	50 ... 60 Hz
Power Consumption	≤ 2 VA
Output	
Type	Solid state
Form	Normally Closed, closed before and during timing
Maximum Load Current	1 A steady state, 10 A inrush at 60°C
OFF State Leakage Current	≅ 5 mA at 230 V AC
Voltage Drop	≅ 2.5 V at 1 A
Protection	
Circuitry	Encapsulated
Dielectric Breakdown	≥ 2000 V RMS terminals to mounting surface
Insulation Resistance	≥ 100 MΩ
Mechanical	
Mounting	Surface mount with one #10 (M5 x 0.8) screw
Package	2 x 2 x 1.21 in. (50.8 x 50.8 x 30.7 mm)
Termination	0.25 in. (6.35 mm) male quick connect terminals
Environmental	
Operating Temperature	-40°C ... +60°C
Storage Temperature	-40°C ... +85°C
Humidity	95% relative, non-condensing
Weight	≅ 2.4 oz (68 g)

External Resistance vs Time Delay

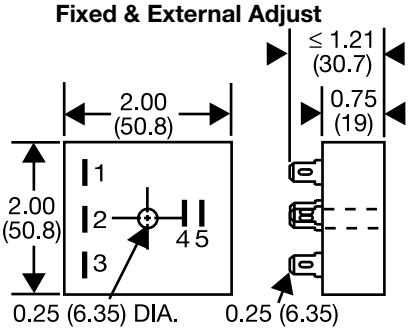
In Secs. or Mins.



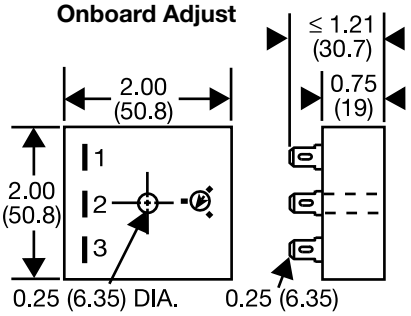
This chart applies to externally adjustable part numbers.
The time delay is adjustable over the time delay range selected by varying the resistance across the RT terminals; as the resistance increases the time delay increases.
When selecting an external RT, add the tolerances of the timer and the RT for the full time range adjustment.
Examples: 1 to 50 S adjustable time delay, select time delay range 1 and a 50 K ohm RT. For 1 to 100 S use a 100 K ohm RT.

Mechanical View

Fixed & External Adjust



Onboard Adjust



Inches (Millimeters)

5

KSD4Gen 07.29.04

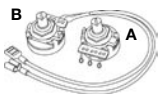
Delay On Make - Normally Closed
TS4 Series
Versa Timing Module

5

- Load Energized Prior To and During Time Delay
- Fixed or Adjustable Delays
- 0.05 ... 600 s in 4 Ranges
- +/-2% Repeat Accuracy
- 24, 120, or 230 V AC
- 1A Solid State Output
- Encapsulated

Approvals:

Accessories



External adjust potentiometer
P/Ns:
P1004-XX (fig A)
P1004-XX-X (fig B)
(See R_T Table)

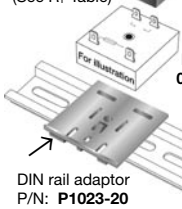
Mounting bracket
P/N: **P1023-6**

Female quick connect
P/N:
P1015-64 (AWG 14/16)

Quick connect to screw adaptor
P/N: **P1015-18**

Versa-knob
P/N: **P0700-7**

Plug-on adjustment module P/N:
VTP(X)(X)
(See R_T Table)



DIN rail P/Ns:
017322005 (Steel)
C103PM (Al)

DIN rail adaptor
P/N: **P1023-20**

See accessory pages for specifications.

Description

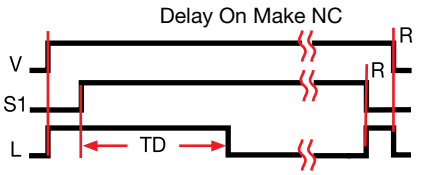
The TS4 Versa-Timer is an analog delay on make timer with a normally closed solid state output. Unlike an Interval Timer, the load is energized prior to and during the time delay period. It can be used as a faster starting Interval time delay when S1 is closed upon application of input voltage.

Operation

Upon application of input voltage, the load is energized immediately. When the initiate switch is closed, the time delay begins. At the end of the time delay, the load de-energizes.

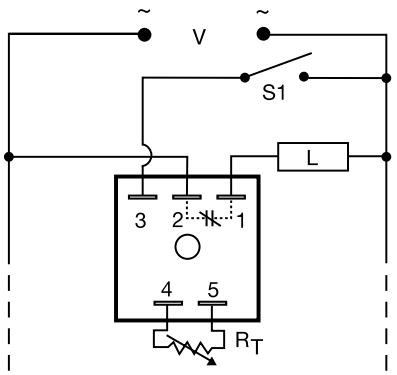
Reset: When the initiate switch is reopened, the load again energizes and the time delay is reset. Removing input voltage resets the time delay and output.

Function



V = Voltage R = Reset L = Load
TD = Time Delay S1 = Initiate Switch
⫽ = Undefined time

Connection



S1 = Initiate Switch

R_T is used when external adjustment is ordered.
Dashed lines are internal connections.

R_T Selection Table			
Time Delay	VTP P/N	Fig. A P/N	Fig. B P/N
1 – 0.05 ... 3 s	VTP4B	P1004-12	P1004-12-X
2 – 0.5 ... 60 s	VTP4F	P1004-12	P1004-12-X
3 – 2 ... 180 s	VTP4J	P1004-12	P1004-12-X
4 – 5 ... 600 s	VTP5N	P1004-13	P1004-13-X

Ordering Table

TS4	X	X	X
Series	**Input**	**Adjustment**	**Time Delay***
	2 - 24 V AC	1 - Fixed	1 - 0.05 ... 3 s
	4 - 120 V AC	2 - External Adjust	2 - 0.5 ... 60 s
	6 - 230 V AC		3 - 2 ... 180 s
			4 - 5 ... 600 s

Example P/N: TS4624 Fixed – TS4410.5

*If Fixed Delay is selected, insert delay [0.05 ... 600] in seconds.

TS402B01 06.29.04

Delay On Make - Normally Closed
TS4 Series
Versa Timing Module

Technical Data

Time Delay	
Type	Analog circuitry
Range	0.05 ... 600 s in 4 adjustable ranges or fixed
Repeat Accuracy	+/-2% or 20 ms, whichever is greater; under fixed conditions
Tolerance (Factory Calibration)	≤ +/-10%
Time Delay vs. Temperature & Voltage	≤ +/-10%
Recycle Time	≤ 150 ms
Input	
Voltage	24, 120, or 230 V AC
Tolerance	+/-20%
Line Frequency	50 ... 60 Hz
Output	
Type	Solid state
Form	Normally Closed, closed during timing
Maximum Load Current	1 A steady state, 10 A inrush at 60°C
Voltage Drop	≅ 2.5 V at 1 A
Protection	
Circuitry	Encapsulated
Dielectric Breakdown	≥ 2000 V RMS terminals to mounting surface
Insulation Resistance	≥ 100 MΩ
Mechanical	
Mounting	Surface mount with one #10 (M5 x 0.8) screw
Package	2 x 2 x 1.21 in. (50.8 x 50.8 x 30.7 mm)
Termination	0.25 in. (6.35 mm) male quick connect terminals
Environmental	
Operating Temperature	-40°C ... +75°C
Storage Temperature	-40°C ... +85°C
Humidity	95% relative, non-condensing
Weight	≅ 2.4 oz (68 g)

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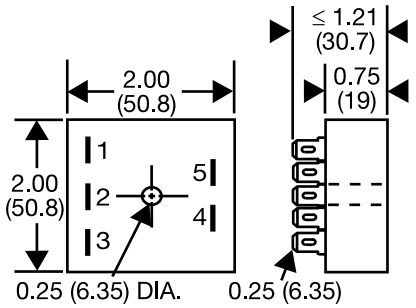
R_T Selection Chart				
Desired Time Delay* Seconds				R_T
1	2	3	4	Megohm
0.05	0.5	2	5	0.0
0.5	10	30	60	0.5
1.0	20	60	120	1.0
1.5	30	90	180	1.5
2.0	40	120	240	2.0
2.5	50	150	300	2.5
3.0	60	180	360	3.0
			420	3.5
			480	4.0
			540	4.5
			600	5.0

* When selecting an external R_T add at least 20% for tolerance of unit and the R_T.

Mechanical View



Inches (Millimeters)

TS402B01 06.29.04