

## Section 5 Dedicated Timers

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

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# Interval (Single Pulse On Operate) TDIL, TDI, TDIH Digi-Set Time Delay Relay



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- 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:

## Description

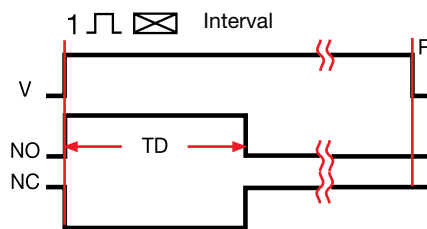
The TDI Series is an interval timer that combines accurate digital circuitry with isolated 10 A rated DPDT relay contacts in an 8 pin plug-in package. The TDI Series features DIP switch selectable time delays ranging from 100 milliseconds to 10,230 seconds in three ranges. The TDI Series is the product of choice for custom control panel and OEM designers.

## Operation

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

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

## Function



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

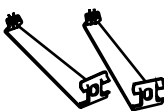
## Accessories



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

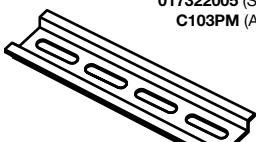


Octal  
8 pin socket  
P/N: **NDS-8**



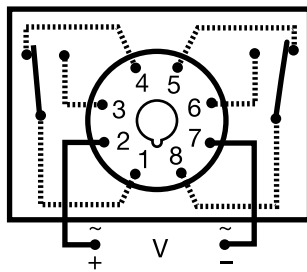
Hold down clips  
P/N: **PSC8**

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



See accessory pages for specifications.

## Connection



Relay contacts are isolated. Dashed lines are internal connections.

## Ordering Table

X	Series/Time Range
-	<b>TDIL</b> - 0.1 ... 102.3 s in 0.1 s increments
-	<b>TDI</b> - 1 ... 1023 s in 1 s increments
-	<b>TDIH</b> - 10 ... 10,230 s in 10 s increments

X	Input
-	<b>12D</b> - 12 V DC
-	<b>24A</b> - 24 V AC
-	<b>24D</b> - 24 V DC/28 V DC
-	<b>110D</b> - 110 V DC
-	<b>120A</b> - 120 V AC
-	<b>230A</b> - 230 V AC

X	LED Indication *
-	<b>L</b>

Example P/N: **TDIH24AL**

\* Note: LED not available on 12 V DC units

# Interval (Single Pulse On Operate)

## TDIL, TDI, TDIH Digi-Set

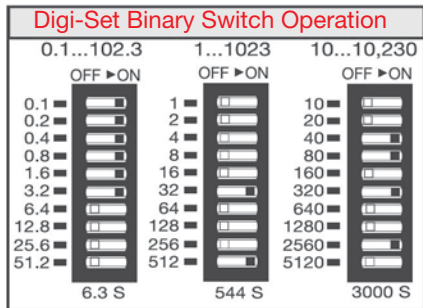
### Time Delay Relay

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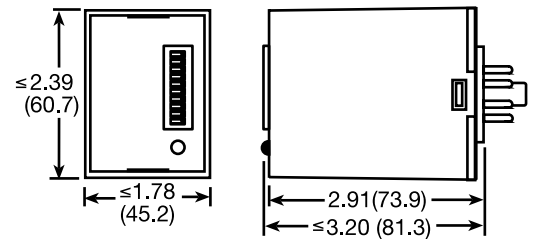
#### Technical Data

<b>Time Delay</b>			
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	**For CE approved applications, power must be removed from the unit when a switch position is changed.
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		≤ 150 ms	
Time Delay vs. Temperature & Voltage		+/-2%	
Indicator		LED glows during timing; relay is energized	
<b>Input</b>			
Voltage		12, 24, or 110 V DC; 24, 120, or 230 V AC	
Tolerance	12 V DC & 24 V DC/AC 110 ... 230 V AC/DC	-15% ... +20% -20% ... +10%	
Frequency		50 ... 60 Hz	
Power Consumption		≤ 3.25 W	
<b>Output</b>			
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 x 10 <sup>7</sup> ; Electrical -- 1 x 10 <sup>6</sup>	
<b>Protection</b>			
Polarity		DC units are reverse polarity protected	
Isolation Voltage		≥ 1500 V RMS input to output	
<b>Mechanical</b>			
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)	
<b>Environmental</b>			
Operating Temperature		-20°C ... +65°C	
Storage Temperature		-30°C ... +85°C	
Weight		≅ 6 oz (170 g)	

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#### Mechanical View



Inches (Millimeters)

Dedicated  
timers

# Interval (Single Pulse On Operate) HRDI Power-Time Time Delay Relay

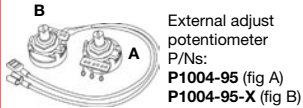


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- 30 A SPDT N.O. Output Contacts
- 12 ... 230 V Operation in 5 Ranges
- Encapsulated Circuitry
- Delays from 100 ms ... 100 m in 5 Ranges
- +/-0.5% Repeat Timing Accuracy
- Fixed, External, or Onboard Adjustment

Approvals:

### Accessories



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



Mounting bracket  
P/N: P1023-6



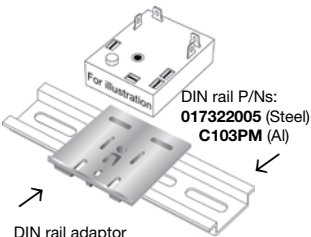
Female quick connect P/Ns:  
P1015-64 (AWG 14/16)  
P1015-13 (AWG 10/12)



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



Versa-knob  
P/N: P0700-7



DIN rail adaptor  
P/N: P1023-20

See accessory pages for specifications.

### Description

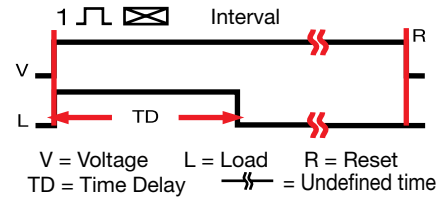
The HRDI Series combines an electromechanical relay output with microcontroller timing circuitry. It offers 12 to 230 V operation in five ranges and factory fixed, external, or onboard adjustable time delays with a repeat accuracy of +/-0.5%. The output contact rating allows for direct operation of heavy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

### Operation

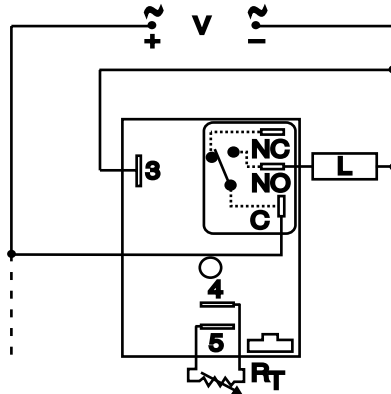
Upon application of input voltage, the time delay begins. The output relay is energized during the time delay. At the end of the time delay, the output de-energizes and remains de-energized until input voltage is removed.

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

### Function



### Connection



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

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

### Ordering Table

HRDI 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: **HRDI421** Fixed - **HRDI41A0.5S**

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

# Interval (Single Pulse On Operate) HRDI Power-Time Time Delay Relay

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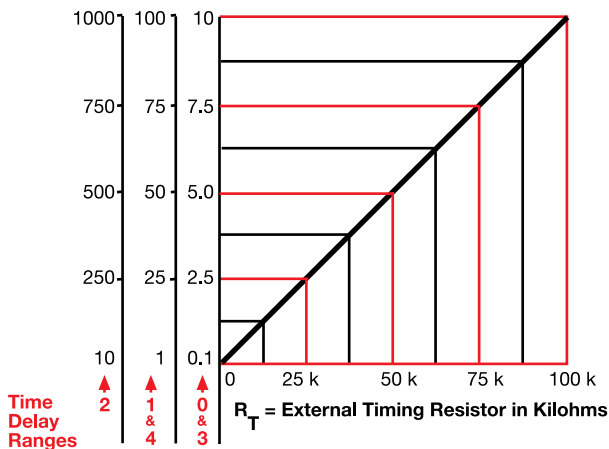
## Technical Data

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

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## External Resistance vs Time Delay

In Secs. or Mins.



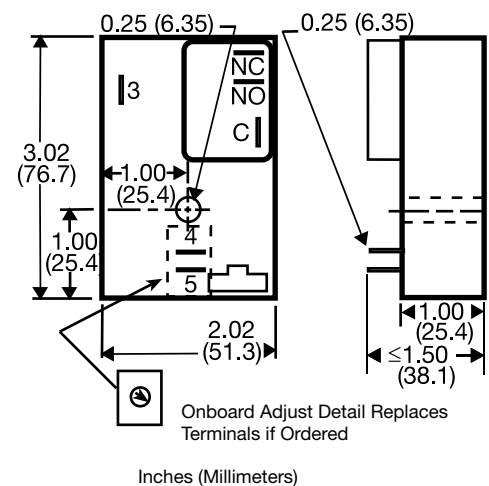
This chart applies to externally adjustable part numbers.

The time delay is adjustable over the time delay range selected by varying the resistance across the  $R_T$  terminals; as the resistance increases the time delay increases.

When selecting an external  $R_T$ , add the tolerances of the timer and the  $R_T$  for the full time range adjustment.

**Examples:** 1 to 50 S adjustable time delay, select time delay range 1 and a 50 K ohm  $R_T$ . For 1 to 100 S use a 100 K ohm  $R_T$ .

## Mechanical View



# Interval or Single Shot ERDI Econo-Timer Time Delay Relay

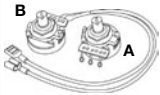


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- Knob or External Adjust or Factory Fixed
- Delays from 0.1 s ... 1000 m in 11 ranges
- +/-0.5% Repeat Accuracy
- +/- 10% Factory Calibration
- Encapsulated Digital Circuitry
- 10 A, Isolated, DPDT Output Contacts

Approvals:

### 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.

### Description

Econo-Timers are a combination of digital electronics and an electromechanical relay. DPDT relay output for relay logic circuits, and isolation of input to output voltages. For applications such as interval on, pulse shaping, minimum run time, etc. The ERD Series are encapsulated to protect the circuitry from shock, vibration and humidity.

### Operation - Interval

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

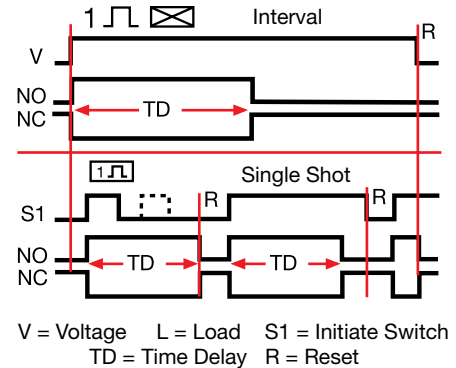
**Reset:** Removing input voltage resets the time delay and the output.

### Operation - Single Shot

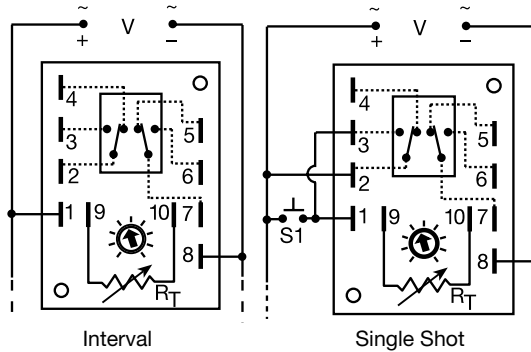
Input voltage must be applied before & during timing. Upon momentary or maintained closure of initiate switch, output relay energizes for time delay. At the end of the delay, output de-energizes. Opening or reclosing initiate switch during timing has no effect on time delay. Output will energize if initiate switch is closed when input voltage is applied.

**Reset:** Reset occurs when time delay is complete & initiate switch is opened. Loss of input voltage resets time delay & output.

### Function



### Connection



2-3 & 7-6 are Normally Open Contacts (NO)  
2-4 & 7-5 are Normally Closed Contacts (NC)

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

R<sub>T</sub> is used when external adjustment is ordered.

### Ordering Table

ERDI Series	X Input	X Adjustment	X 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			-7 - 0.1 ... 5 m
-8			-8 - 0.1 ... 10 m
-9			-9 - 0.2 ... 15 m
-10			-10 - 1 ... 100 m
-11			-11 - 10 ... 500 m

Example P/N: **ERDI426** Fixed – **ERDI410.1S**

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

# Interval or Single Shot ERDI Econo-Timer Time Delay Relay

DI  
timers

## Technical Data

<b>Time Delay</b>		Digital integrated circuitry
Type		100 ms ... 500 m in 11 adjustable ranges, 100 ms ... 1000 m fixed
Range		Knob, external adjust, or fixed
Adjustment		+/-0.5%
Repeat Accuracy		≤ +/-10%
Tolerance (Factory Calibration)		≤ 150 ms
Reset Time		≤ +/-2%
Time Delay vs. Temperature & Voltage		
<b>Input</b>		
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 DC/AC & 230 V AC	-20% ... +10%
Line Frequency		50 ... 60 Hz
<b>Output</b>		
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 <sup>7</sup> ; Electrical--1 x 10 <sup>6</sup>
<b>Protection</b>		
Isolation Voltage		≥ 1500 V RMS input to output
Insulation Resistance		≥ 100 MΩ
Polarity		DC units are reverse polarity protected
<b>Mechanical</b>		
Mounting		Surface mount with two #6 (M3.5 x 0.6) screws
Package		3.5 x 2.5 x 1.7 in. (88.9 x 63.5 x 43.2 mm)
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)

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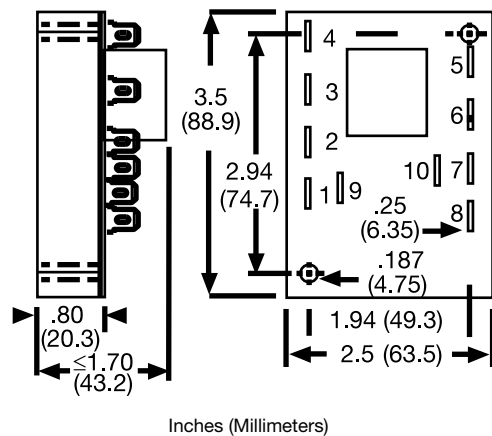
RT Selection Chart						
Desired Time Delay*						RT
Seconds						
1	2	3	4	5	6	Megohm
0.1	0.1	0.1	0.2	0.3	0.6	0.0
0.19	0.6	1	1.7	3	6	0.1
0.28	1.1	2	3.2	6	12	0.2
0.37	1.6	3	4.7	9	18	0.3
0.46	2.1	4	6.2	12	24	0.4
0.55	2.6	5	7.7	15	30	0.5
0.64	3.0	6	9.2	18	36	0.6
0.73	3.5	7	10.7	21	42	0.7
0.82	4.0	8	12.2	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 RT add at least 20% for tolerance of unit and the RT.

RT Selection Chart					
Desired Time Delay*					RT
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 RT add at least 20% for tolerance of unit and the RT.

### Mechanical View



ERDI2B01 01.04.05

# Interval (Impulse ON) KRDI Digi-Timer Time Delay Relay



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- 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

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

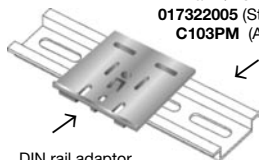
Versa-knob  
P/N: **P0700-7**

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

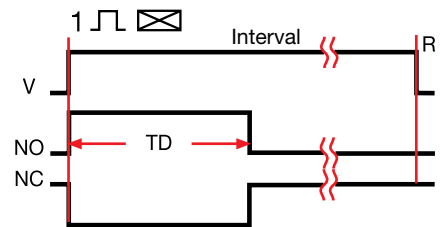
The KRDI Series is a compact time delay relay measuring only 2 in. (50.8 mm) square. Its solid state timing circuit provides excellent repeat accuracy and stability. Encapsulation protects against shock, vibration, and humidity. The KRDI Series is a cost effective approach for OEM applications that require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

### Operation

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

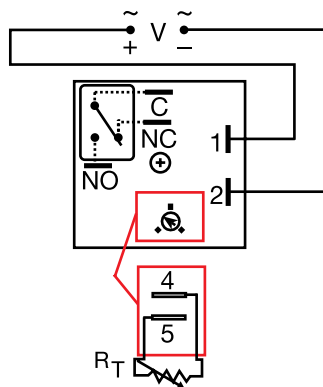
**Reset:** Removing input voltage resets the time delay and the output.

### Function



V = Voltage R = Reset TD = Time Delay  
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

KRDI Series	X Input	X Adjustment	X Time Delay *
	-1 - 12 V DC	-1 - Fixed	-0 - 0.1 ... 10 s
	-2 - 24 V AC/DC	-2 - Onboard Adjustment	-1 - 1 ... 100 s
	-4 - 120 V AC	-3 - External Adjustment	-2 - 10 ... 1000 s
	-5 - 110 V DC		-3 - 0.1 ... 10 m
	-6 - 230 V AC		-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:** **KRDI421** = 120 V AC; Onboard adjust from 1 to 100 seconds  
**KRDI610.5S** = 230 V AC; Fixed at 0.5 seconds

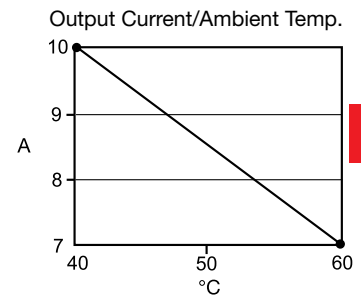


# Interval (Impulse ON) KRDI Digi-Timer Time Delay Relay

Digi  
timers  
and

## Technical Data

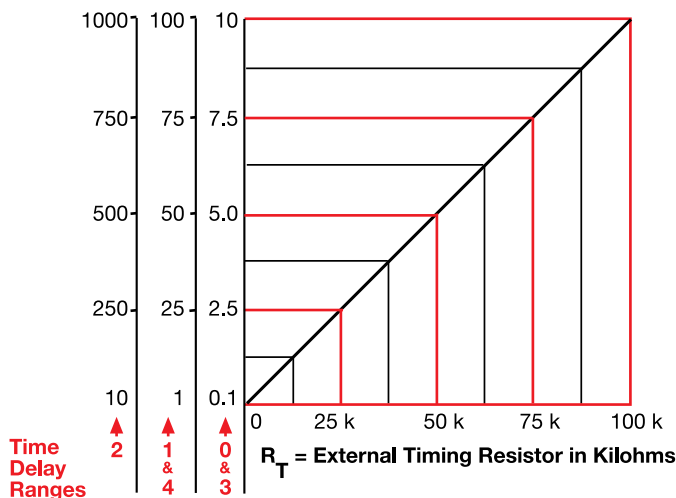
<b>Time Delay</b> Range Repeat Accuracy Tolerance (Factory Calibration) Reset Time Time Delay vs. Temperature & Voltage <b>Input</b> Voltage Tolerance 12 V DC & 24 V DC/AC 110 V DC, 120 V AC or 230 V AC AC Line Frequency/DC Ripple Power Consumption	0.1 s ... 100 m in 5 adjustable ranges or fixed +/-0.5%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



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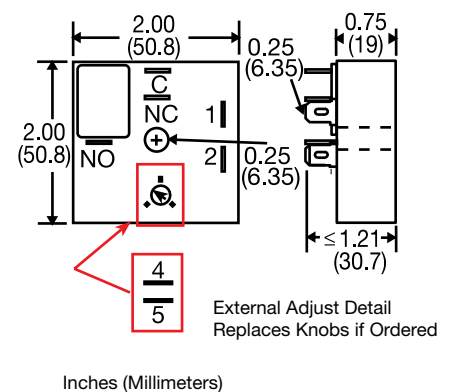
## External Resistance vs Time Delay

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  $R_T$  terminals; as the resistance increases the time delay increases. When selecting an external  $R_T$ , add the tolerances of the timer and the  $R_T$  for the full time range adjustment. **Examples:** 1 to 50 S adjustable time delay, select time delay range 1 and a 50 K ohm  $R_T$ . For 1 to 100 S use a 100 K ohm  $R_T$ .

## Mechanical View



# Interval (Single Pulse On Operate) TDUI Digi-Set Timing Module



- Switch Selectable Time Setting
- 0.1 s ... 102.3 m in 3 ranges
- +/-0.5% Repeat Accuracy
- +/-2% Setting Accuracy
- 1 A Solid State Output
- Encapsulated
- Wide Voltage Ranges

Approvals:

### Description

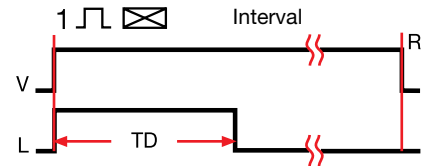
The TDUI Series combines digital timing circuitry with universal voltage operation. Voltages of 24 to 240 V AC and 12 to 24 V DC are available in three ranges. The TDUI Series offers DIP switch selectable time delays ranging from 0.1 seconds to 102.3 minutes in three ranges. Its 1 A rated output, ability to operate on multiple voltages, and wide range of switch selectable time delays make the TDUI Series an excellent choice for process control systems and OEM equipment.

### Operation

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

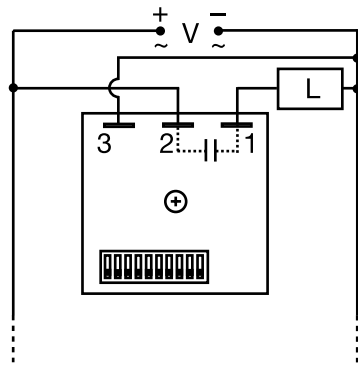
**Reset:** Removing input voltage resets the time delay and the output.

### Function



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

### Connection



Dashed lines are internal connections.

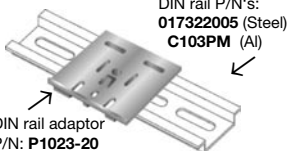
### Accessories



Female quick connect  
P/Ns:  
**P1015-13** (AWG 10/12)  
**P1015-64** (AWG 14/16)  
**P1015-14** (AWG 18/22)



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



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

DIN rail P/N's:  
**017322005** (Steel)  
**C103PM** (Al)

See accessory pages for specifications.

### Ordering Table

Input Voltage Range	Time Range	Part Number
24 ... 120 V AC	0.1 ... 102.3 s	TDUIL3000A
100 ... 240 V AC	0.1 ... 102.3 s	TDUIL3001A
12 ... 24 V DC	0.1 ... 102.3 s	TDUIL3002A
24 ... 120 V AC	1 ... 1023 s	TDUI3000A
100 ... 240 V AC	1 ... 1023 s	TDUI3001A
12 ... 24 V DC	1 ... 1023 s	TDUI3002A
24 ... 120 V AC	0.1 ... 102.3 m	TDUIH3000A
100 ... 240 V AC	0.1 ... 102.3 m	TDUIH3001A
12 ... 24 V DC	0.1 ... 102.3 m	TDUIH3002A

# Interval (Single Pulse On Operate)

## TDUI Digi-Set

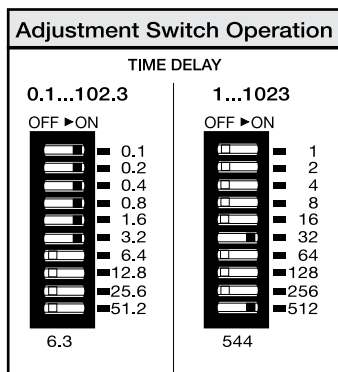
### Timing Module

Digi  
timers

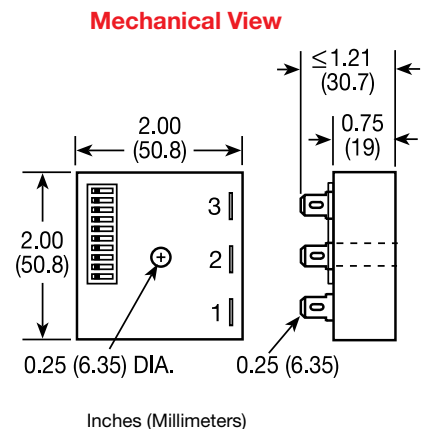
#### Technical Data

<b>Time Delay</b>		
Range*	0.1 ... 102.3 s in 0.1 s increments 1 ... 1023 s in 1 s increments 0.1 ... 102.3 m in 0.1 m increments	*For CE approved applications, power must be removed from the unit when a switch position is changed.
Repeat Accuracy	+/-0.5% or 20 ms, whichever is greater	
Setting Accuracy	≤ +/-2% or 20 ms, whichever is greater	
Reset Time	≤ 150 ms	
Time Delay vs. Temperature & Voltage	≤ +/-5%	
<b>Input</b>		
Voltage	24 ... 240 V AC, 12 ... 24 V DC +/-20%	
Line Frequency	50 ... 60 Hz	
Power Consumption	AC ≤ 2 VA; DC ≤ 1 W	
DC Ripple	≤ 10%	
<b>Output</b>		
Type	Solid state	
Form	Normally Open, closed during timing	
Rating	1 A steady state, 10 A inrush at 60°C	
Voltage Drop	≅ 2.5 V at 1 A; DC ≅ 1 V at 1 A	
OFF State Leakage Current	AC ≅ 5 mA at 230 V AC; DC ≅ 1 mA	
<b>Protection</b>		
Circuitry	Encapsulated	
Dielectric Breakdown	≥ 2000 V RMS terminals to mounting surface	
Insulation Resistance	≥ 100 MΩ	
Polarity	DC units are reverse polarity protected	
<b>Mechanical</b>		
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	
<b>Environmental</b>		
Operating Temperature	-40°C ... +60°C	
Storage Temperature	-40°C ... +85°C	
Humidity	95% relative, non-condensing	
Weight	≅ 2.4 oz (68 g)	

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Add the value of switches in the ON position for the total time delay.



# Interval (Single Pulse On Operate) TSD2 Digi-Timer Timing Module

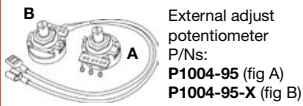


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- Fixed or Adjustable Delays From 0.1 s... 100 h
- +/-0.1% Repeat Accuracy
- +/-1% Factory Calibration
- 24, 120, or 230 V AC
- 1 A Solid State Output
- Encapsulated

Approvals:

### Accessories



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



Mounting bracket  
P/N: P1023-6



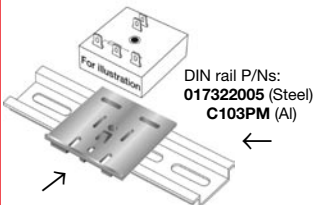
Female quick connect  
P/N:  
P1015-64 (AWG 14/16)



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



Versa-knob  
P/N: P0700-7



DIN rail adaptor  
P/N: P1023-20

See accessory pages for specifications.

### Description

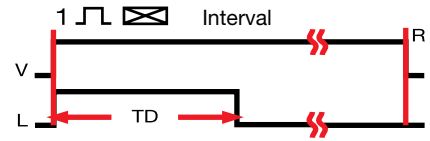
The TSD Series is designed for more demanding commercial and industrial applications where small size, and accurate performance is required. The factory calibration for fixed time delays is within 1% of the target time delay. The repeat accuracy, under stable conditions, is 0.1% of the time delay. The 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 energized during the time delay. At the end of the time delay, the output de-energizes and remains de-energized until input voltage is removed.

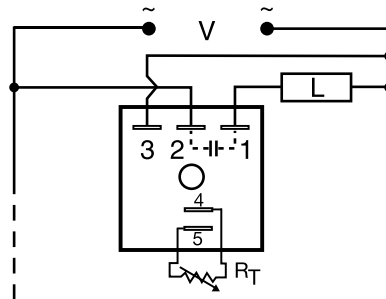
**Reset:** Removing input voltage resets the time delay and the output.

### Function



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

### Connection



R<sub>T</sub> is used when external adjustment is ordered.  
Dashed lines are internal connections.

### Ordering Table

TSD2 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: TSD2421 Fixed – TSD2410.1S

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

# Interval (Single Pulse On Operate) TSD2 Digi-Timer Timing Module

Digi  
timers

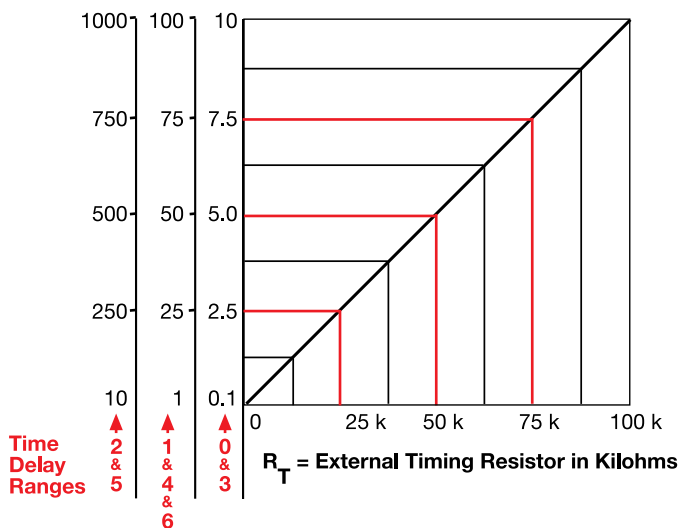
## Technical Data

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

5

## External Resistance vs Time Delay

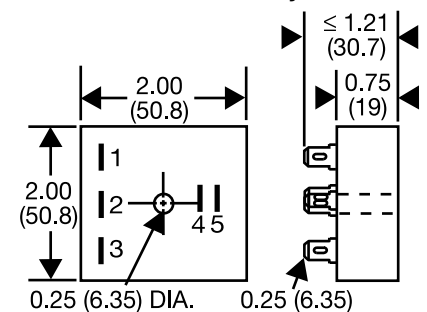
### In Secs., Mins., or Hours



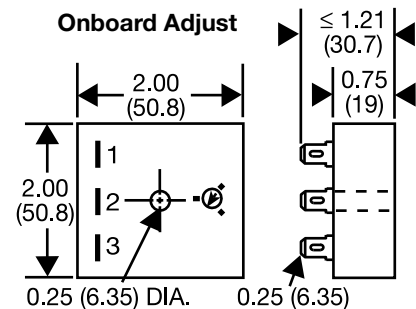
**This chart applies to externally adjustable part numbers.**  
 The time delay is adjustable over the time delay range selected by varying the resistance across the  $R_T$  terminals; as the resistance increases the time delay increases.  
 When selecting an external  $R_T$ , add the tolerances of the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

## Mechanical View

### Fixed & External Adjust



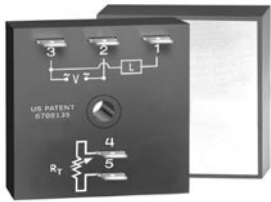
### Onboard Adjust



Inches (Millimeters)

TSD2Gen 06:30:04

# Interval (Single Pulse On Operate) THD2 Digi-Power Power Timing Module

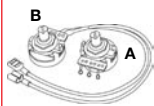


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- High Load Currents up to 20 A, 200 A Inrush
- Fixed or Adjustable Delays From 0.1 s ... 1000 m
- +/-0.5% Repeat Accuracy
- +/-1% Factory Calibration
- 24, 120, or 230 V AC
- Metallized Mounting Surface for Efficient Heat Transfer
- Totally Solid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

Approvals:

### 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.

### 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.

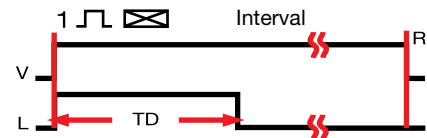
### Operation

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

### Reset:

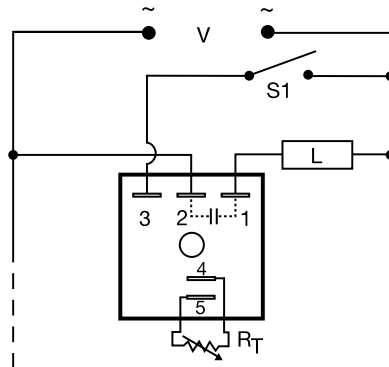
Removing input voltage resets the time delay and the output.

### Function



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

### Connection



R<sub>T</sub> is used when external adjustment is ordered.  
Dashed lines are internal connections.  
S1 = Optional Low Current Initiate Switch

### Ordering Table

THD2 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

Example P/N: THD2A620 Fixed - THD2C410.1S

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

# Interval (Single Pulse On Operate) THD2 Digi-Power Power Timing Module

Digi  
timers

## Technical Data

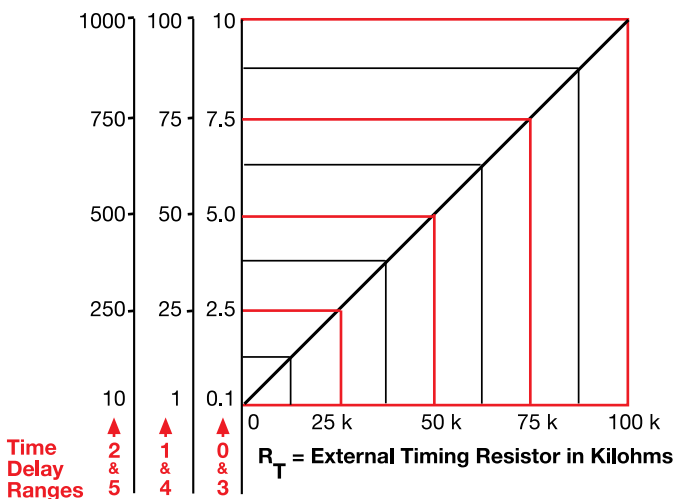
<b>Time Delay</b>													
Range	0.1 s ... 1000 m in 6 adjustable ranges or fixed												
Repeat Accuracy	+/-0.5% or 20 ms, whichever is greater												
Tolerance (Factory Calibration)	≤ +/-1%												
Reset Time	≤ 150 ms												
Time Delay vs. Temperature & Voltage	≤ +/-2%												
<b>Input</b>													
Voltage	24, 120, or 230 V AC												
Tolerance	+/-20%												
Line Frequency	50 ... 60 Hz												
<b>Output</b>													
Type	Solid state												
Form	Normally Open, closed during timing												
Maximum Load Current	<table border="1"> <thead> <tr> <th>Output</th> <th>Steady State</th> <th>Inrush**</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>6 A</td> <td>60 A</td> </tr> <tr> <td>B</td> <td>10 A</td> <td>100 A</td> </tr> <tr> <td>C</td> <td>20 A</td> <td>200 A</td> </tr> </tbody> </table>	Output	Steady State	Inrush**	A	6 A	60 A	B	10 A	100 A	C	20 A	200 A
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												
<b>Protection</b>													
Circuitry	Encapsulated												
Dielectric Breakdown	≥ 2000 V RMS terminals to mounting surface												
Insulation Resistance	≥ 100 MΩ												
<b>Mechanical</b>													
Mounting **	Surface mount with one #10 (M5 x 0.8) screw												
Termination	0.25 in. (6.35 mm) male quick connect terminals												
<b>Environmental</b>													
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.

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## External Resistance vs Time Delay

In Secs. or Mins.



This chart applies to externally adjustable part numbers.

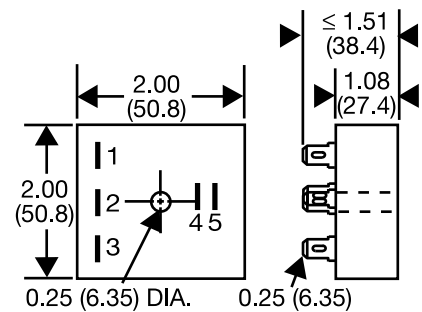
The time delay is adjustable over the time delay range selected by varying the resistance across the Rt terminals; as the resistance increases the time delay increases.

When selecting an external Rt, add the tolerances of the timer and the Rt for the full time range adjustment.

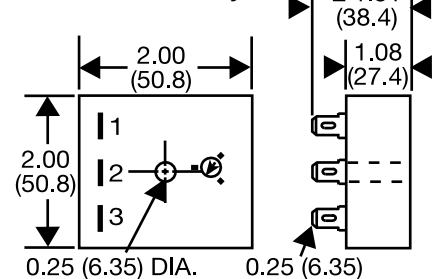
**Examples:** 1 to 50 S adjustable time delay, select time delay range 1 and a 50 K ohm Rt. For 1 to 100 S use a 100 K ohm Rt.

## Mechanical View

Fixed & External Adjust

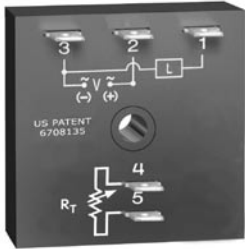


Onboard Adjust



Inches (Millimeters)

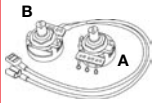
# Interval (Single Pulse On Operate) TSD6 Digi-Timer Timing Module



- Fixed or Adjustable Delays From 0.1 s... 100 h
- +/-0.1% Repeat Accuracy
- +/-1% Factory Calibration
- 12 or 24 V DC Interval Timing
- 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



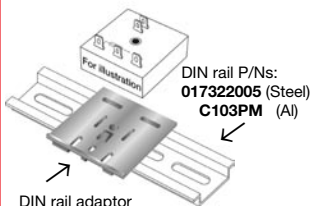
Female quick connect  
P/N:  
P1015-64 (AWG 14/16)



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



Versa-knob  
P/N: P0700-7



DIN rail adaptor  
P/N: P1023-20

See accessory pages for specifications.

### Description

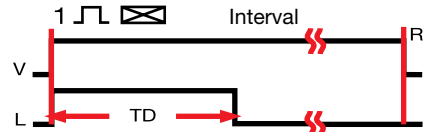
The TSD6 offers total solid state interval timing for 12 or 24 V DC applications. This series provides either negative or positive switching. The TSD Series is designed for more demanding commercial and industrial applications where small size, and accurate performance is required. The factory calibration 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 energizes during the time delay. At the end of the time delay, the output de-energizes and remains de-energized until input voltage is removed.

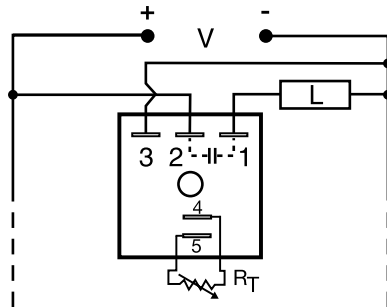
**Reset:** Removing input voltage resets the time delay and the output.

### Function

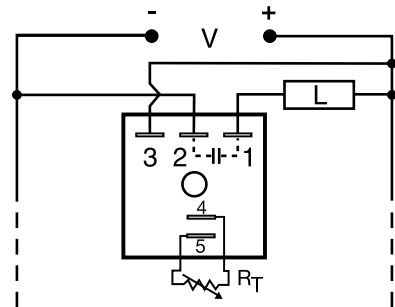


V = Voltage L = Load R = Reset  
TD = Time Delay = Undefined time

### Connection



Positive Switching



Negative Switching

R<sub>T</sub> is used when external adjustment is ordered.  
Dashed lines are internal connections.

### Ordering Table

TSD6 Series	X Input	X Adjustment	X Time Delay *	X Switching Mode
	-1 - 12 V DC	-1 - Fixed	-0 - 0.1 ... 10 s	-P - Positive
	-3 - 24 V DC	-2 - External Adjust	-1 - 1 ... 100 s	-N - Negative
		-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: TSD6320P Fixed -TSD6110.1SN

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



# Interval (Single Pulse On Operate) TSD6 Digi-Timer Timing Module

Digi  
timers

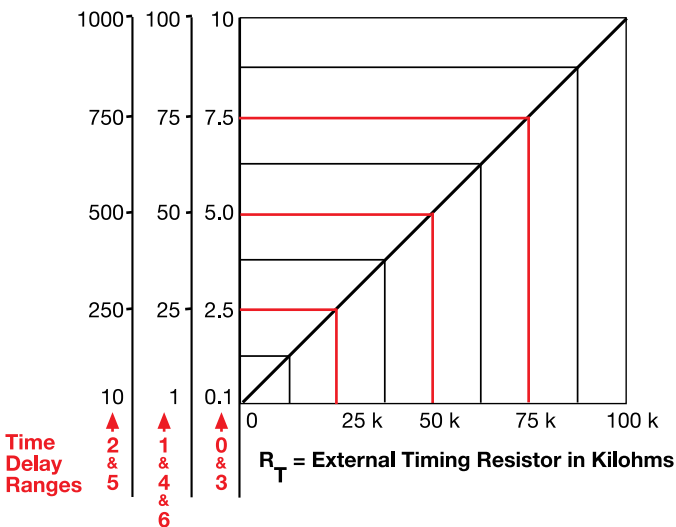
## Technical Data

<b>Time Delay</b>	
Range	0.1 s ... 100 h 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%
<b>Input</b>	
Voltage	12 or 24 V DC
Tolerance	+/-15%
Ripple	+/-10%
Power Consumption	≤ 1 W
<b>Output</b>	
Type	Solid state, positive or negative switching
Form	Normally Open, closed during timing
Maximum Load Current	1 A steady state, 10 A inrush at 60°C
Off State Leakage Current	≅ 1 mA
Voltage Drop	≅ 1.0 V at 1 A
<b>Protection</b>	
Circuitry	Encapsulated
Dielectric Breakdown	≥ 2000 V RMS terminals to mounting surface
Insulation Resistance	≥ 100 MΩ
Polarity	Units are reverse polarity protected
<b>Mechanical</b>	
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
<b>Environmental</b>	
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.

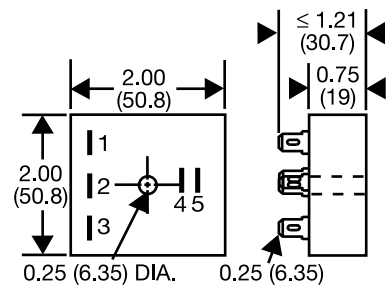
The time delay is adjustable over the time delay range selected by varying the resistance across the  $R_T$  terminals; as the resistance increases the time delay increases.

When selecting an external  $R_T$ , add the tolerances of the timer and the  $R_T$  for the full time range adjustment.

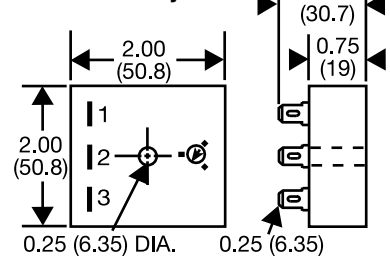
**Examples:** 1 to 50 S adjustable time delay, select time delay range 1 and a 50 K ohm  $R_T$ . For 1 to 100 S use a 100 K ohm  $R_T$ .

## Mechanical View

Fixed & External Adjust



Onboard Adjust



Inches (Millimeters)

TSD06Gen 07.02.04

# Interval or Delay On Break TSD7 Series Timing Module



10 YEAR WARRANTY

5

- Two Terminal Series Connection to Load
- Fixed or Adjustable Delays From 1 s ... 1000 m
- Digital Integrated Circuitry
- +/-0.5% Repeat Accuracy

Approvals:

### Accessories

- B**
- A** External adjust potentiometer  
P/Ns: P1004-13 (fig A) P1004-13-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
  - Mounting bracket  
P/N: P1023-6
  - 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.

### Description

The TSD7 utilizes only two terminals connected in series with the load. Interval timing mode period is achieved by using a small portion of the AC sine wave allowing sufficient voltage for circuit operation. It can be used as an interval timer to control or pulse shape the operation of contactors, solenoids, relays, and lamp loads. The TSD7 can be wired to delay on the break of a switch for energy saving fan delays.

### Operation

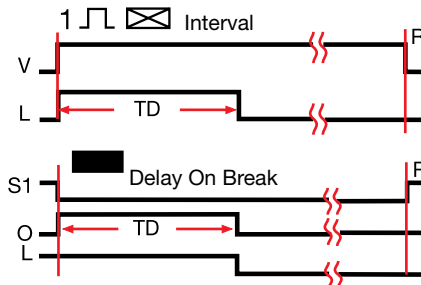
**Interval --** Upon application of input voltage, the output energizes and the time delay begins. The output remains energized throughout the time delay. At the end of the time delay, the output de-energizes and remains de-energized until power is removed.

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

**Delay On Break --** Upon closure of SW1, the load is energized and the timer is reset (zero volts across its input terminals). Opening SW1 re-applies input voltage to the timer, the load remains energized and the time delay begins. At the end of the time delay, the output de-energizes. If SW1 is open when power is applied, the load will energize for the time delay then de-energize.

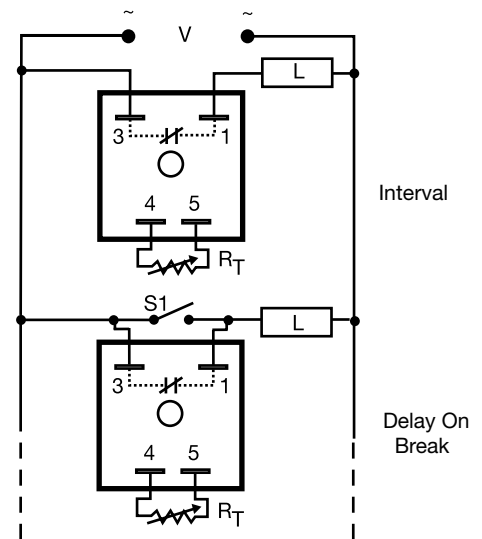
**Reset:** Reclosing SW1 resets the timer.

### Function



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

### Connection



V = Voltage L = Load S1 = Initiate Switch

R<sub>T</sub> 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

Selection Table for VTP Plug-on Adjustment Accessory.

### Ordering Table

TSD7 Series	X Input	X Adjustment	X Time Delay *
-2	24 V AC	-1 - Fixed	-1 - 1 ... 100 s
-4	120 V AC	-2 - External Adjust	-2 - 10 ... 1000 s
-6	230 V AC		-3 - 0.1 ... 10 m
			-4 - 1 ... 100 m
			-5 - 10 ... 1000 m

Example P/N: TSD7221 Fixed - TSD7410.5M

\*If Fixed Delay is selected, insert delay [1...1000] followed by (S) sec. or [0.1 ...1000] (M) min.

# Interval or Delay On Break

## TSD7 Series

### Timing Module

Digital  
timers

#### Technical Data

<p><b>Time Delay</b></p> <p>Type Range Repeat Accuracy Tolerance (Factory Calibration) Recycle Time Time Delay vs. Temperature &amp; Voltage</p>	<p>Digital integrated circuitry</p> <p>1 s ... 1000 m in 5 adjustable ranges or fixed</p> <p>+/-0.5% or 20 ms, whichever is greater</p> <p>≤ +/-10%</p> <p>≤ 400 ms</p> <p>≤ +/-2%</p>								
<p><b>Input</b></p> <p>Voltage Tolerance Line Frequency</p>	<p>24, 120, or 230 V AC</p> <p>+/-20%</p> <p>50 ... 60 Hz</p>								
<p><b>Output</b></p> <p>Type Form Maximum Load Current Minimum Load Current Effective Voltage Drop (VLine-VLoad)</p>	<p>Solid state</p> <p>Normally Open, closed during timing</p> <p>1 A steady state, 10 A inrush at 45°C</p> <p>40 mA</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Input</th> <th>Effective Drop</th> </tr> </thead> <tbody> <tr> <td>24 V AC</td> <td>3 V</td> </tr> <tr> <td>120 V AC</td> <td>4 V</td> </tr> <tr> <td>230 V AC</td> <td>6 V</td> </tr> </tbody> </table>	Input	Effective Drop	24 V AC	3 V	120 V AC	4 V	230 V AC	6 V
Input	Effective Drop								
24 V AC	3 V								
120 V AC	4 V								
230 V AC	6 V								
<p><b>Protection</b></p> <p>Circuitry Dielectric Breakdown Insulation Resistance</p>	<p>Encapsulated</p> <p>≥ 2000 V RMS terminals to mounting surface</p> <p>≥ 100 MΩ</p>								
<p><b>Mechanical</b></p> <p>Mounting Package Termination</p>	<p>Surface mount with one #10 (M5 x 0.8) screw</p> <p>2 x 2 x 1.21 in. (50.8 x 50.8 x 30.7 mm)</p> <p>0.25 in. (6.35 mm) male quick connect terminals</p>								
<p><b>Environmental</b></p> <p>Operating/Storage Temperature Humidity Weight</p>	<p>-40°C ... +75°C / -40°C ... +85°C</p> <p>95% relative, non-condensing</p> <p>≈ 2.4 oz (68 g)</p>								

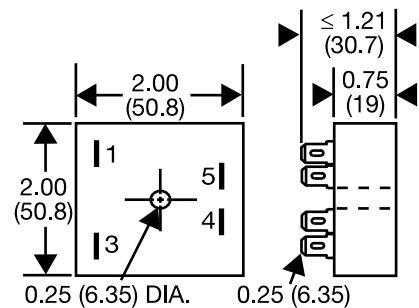
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#### External Resistance vs Time Delay

R <sub>T</sub> Selection Chart					
Desired Time Delay*					R <sub>T</sub>
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

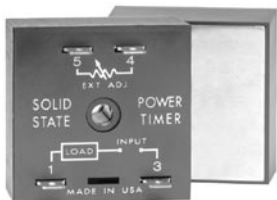
\* When selecting an external R<sub>T</sub> add at least 20% for tolerance of unit and the R<sub>T</sub>.

#### Mechanical View



Inches (Millimeters)

# Interval or Delay On Break THD7 Digi-Power Timing Module



10 YEAR WARRANTY

5

- Solid State Relay and Timer Combined
- Two Terminal Series Connection to Load
- Up to 20 A Steady State, 200 A Inrush
- Fixed or Adjustable Delays From 1 s ... 1000 m
- +/-0.5% Repeat Accuracy

Approvals:

### Accessories

**B** 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.

### Description

The THD7 utilizes only two terminals connected in series with the load. Interval timing mode is achieved by using a small portion of the AC sine wave allowing sufficient voltage for circuit operation. The THD7 can be used for interval or delay-on-break timing. It is designed to operate large loads directly, such as motors, heater elements, and motor starters.

### Operation

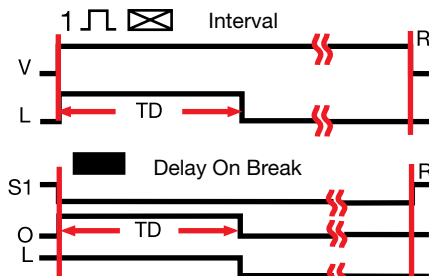
**Interval** -- Upon application of input voltage, the output energizes and the time delay begins. The output remains energized throughout the time delay. At the end of the time delay the output de-energizes and remains de-energized until power is removed.

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

**Delay On Break** -- Upon closure of SW1, the load energizes and the timer is reset (zero voltage across its input terminals). Opening SW1 re-applies input voltage to the timer, the load remains energized and the time delay begins. At the end of the time delay the output de-energizes. If SW1 is open when power is applied, the load will energize for the time delay then de-energize.

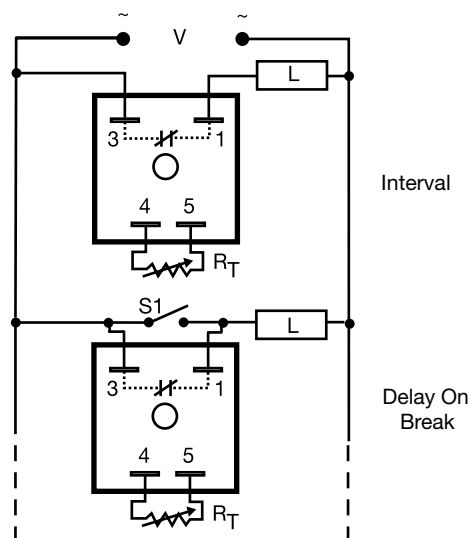
**Reset:** Reclosing SW1 resets the timer.

### Function



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

### Connection



V = Voltage L = Load S1 = Initiate Switch

R<sub>T</sub> 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

Selection Table for VTP Plug-on Adjustment Accessory.

### Ordering Table

THD7 Series	X Input	X Adjustment	X Time Delay *	X Output Rating
	2 - 24 V AC	1 - Fixed	1 - 1 ... 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	

Example P/N: THD7621B Fixed - THD7410.5MA

\*If Fixed Delay is selected, insert delay [1...1000] followed by (S) sec. or [0.1 ... 1000] (M) min.

# Interval or Delay On Break THD7 Digi-Power Timing Module

Digi  
timers

## Technical Data

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

\*\*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.

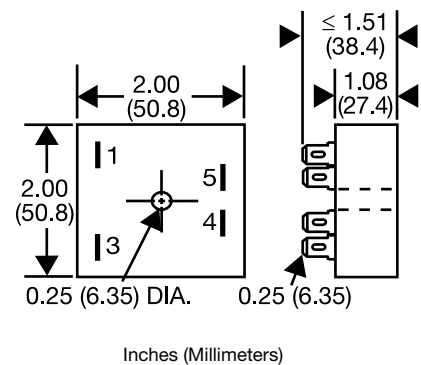
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## External Resistance vs Time Delay

R <sub>T</sub> Selection Chart					
Desired Time Delay*					R <sub>T</sub> Megohm
Seconds		Minutes			
1	2	3	4	5	
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<sub>T</sub> add at least 20% for tolerance of unit and the R<sub>T</sub>.

## Mechanical View



# Interval (Single Pulse On Operate) KSD2 Digi-Timer Timing Module

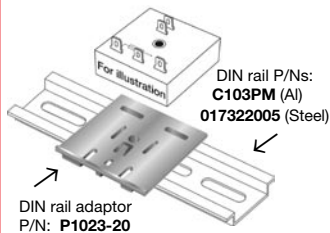


- Fixed or Adjustable Delays from 0.1 s ... 1000 m
- +/-0.5% Repeat Accuracy
- +/- 5% Factory Calibration
- 24, 120, or 230 V AC
- 1 A Solid State Output
- Encapsulated

Approvals:

### 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



See accessory pages for specifications.

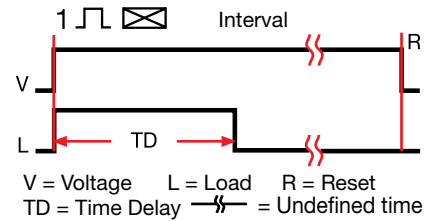
### Description

The KSD2 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 volts 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. An excellent choice for most OEM pulse shaping, maximum run time, and other process control applications.

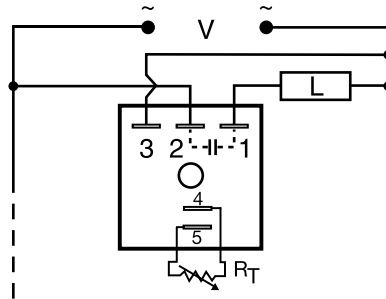
### Operation

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

### Function



### Connection



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

### Ordering Table

KSD2 Series	X Input Voltage	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

Example P/N: **KSD2421** Fixed - **KSD2410.5S**

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

# Interval (Single Pulse On Operate) KSD2 Digi-Timer Timing Module

Digi  
timers

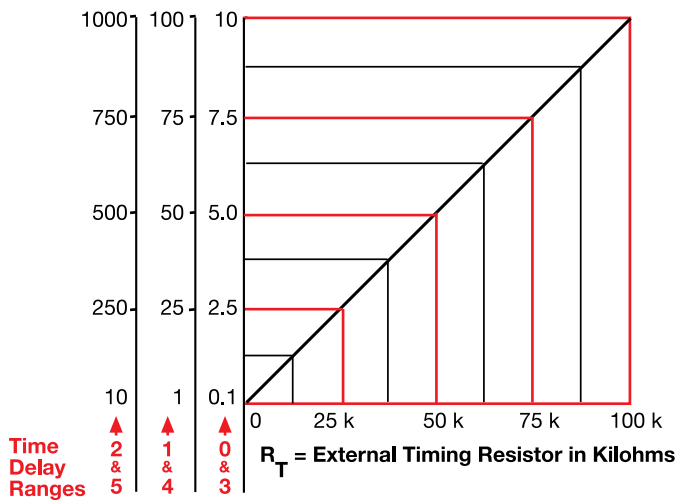
## Technical Data

<b>Time Delay</b>	
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%
<b>Input</b>	
Voltage	24, 120, or 230 V AC
Tolerance	+/-20%
Line Frequency	50 ... 60 Hz
Power Consumption	≤ 2 VA
<b>Output</b>	
Type	Solid state
Form	Normally Open, closed 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
<b>Protection</b>	
Circuitry	Encapsulated
Dielectric Breakdown	≥ 2000 V RMS terminals to mounting surface
Insulation Resistance	≥ 100 MΩ
<b>Mechanical</b>	
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
<b>Environmental</b>	
Operating Temperature	-40°C ... +60°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. or Mins.



This chart applies to externally adjustable part numbers.

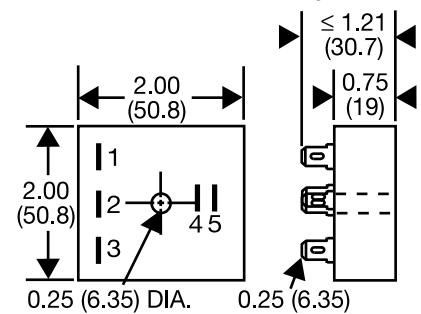
The time delay is adjustable over the time delay range selected by varying the resistance across the  $R_T$  terminals; as the resistance increases the time delay increases.

When selecting an external  $R_T$ , add the tolerances of the timer and the  $R_T$  for the full time range adjustment.

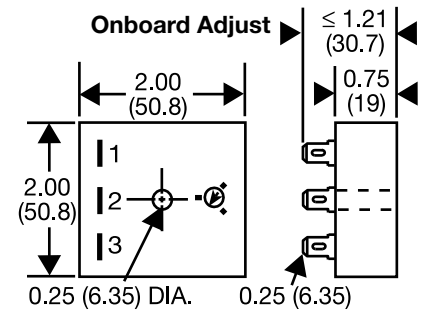
**Examples:** 1 to 50 S adjustable time delay, select time delay range 1 and a 50 K ohm  $R_T$ . For 1 to 100 S use a 100 K ohm  $R_T$ .

## Mechanical View

Fixed & External Adjust



Onboard Adjust



Inches (Millimeters)

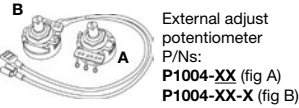
# Interval (Single Pulse On Operate) TS2, TS6 Versa-Timer Timing Module



- 12 or 24 V DC; 24,120, or 230 V AC Input Voltages
- Fixed or Adjustable Delays From 0.05 s ... 10 m in 8 Ranges
- Repeat Accuracy +/-2%
- Load Currents to 1 A, 10 A Inrush
- Totally Solid State and Encapsulated

Approvals: (TS2 only)

### Accessories



External adjust potentiometer  
P/Ns:  
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)



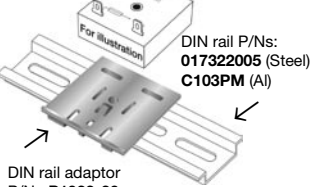
Quick connect to screw adaptor  
P/N: P1015-18



Versa-knob  
P/N: P0700-7



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



DIN rail adaptor  
P/N: P1023-20

See accessory pages for specifications.

### Description

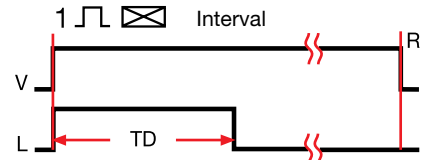
The TS2 is designed for AC voltages. The TS6 Series is designed for DC voltages at 12 or 24 V DC. These series are capable of controlling load currents of up to 1 A steady state, 10 A inrush. Encapsulated circuitry and the reliability of a +/-2% repeat accuracy make the TS2 and TS6 ideal for cost sensitive applications.

### Operation

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

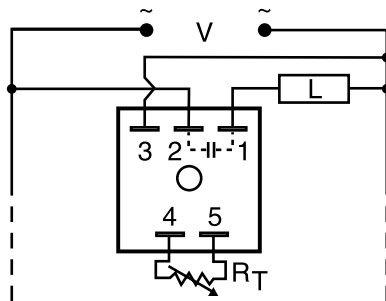
**Reset:** Removing input voltage resets the time delay and the output.

### Function

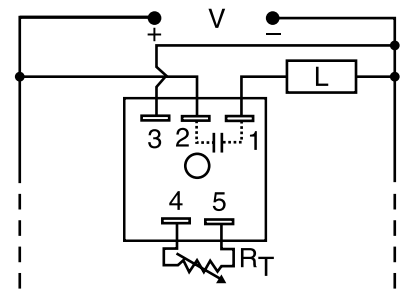


V = Voltage L = Load R = Reset  
TD = Time Delay = Undefined time

### Connection



R<sub>T</sub> is used when external adjustment is ordered.



R<sub>T</sub> is used when external adjustment is ordered.

**Note:** TS6 is not reverse polarity protected.

### Ordering Table

TS2	X	X	X	
Series	Input	Adjustment	Time Delay*	
	-2 - 24 V AC	-1 - Fixed	-1 - 0.05 ... 3 s	* If Fixed Delay is selected, insert delay [0.05 ... 600] in seconds.
	-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: **TS2421** Fixed - **TS24130**

TS6	X	X	X	X	
Series	Input	Adjustment	Time Delay*	Switching Mode	
	-1 - 12 V DC	-1 - Fixed	-1 - 0.05 ... 1 s	- P - Positive	*If Fixed Delay is selected, insert delay [0.05 ... 120] or [0.05 ... 600] in secs.
	-3 - 24 V DC	-2 - External Adjust	-2 - 0.5 ... 20 s		
			-3 - 2 ... 60 s		
			-4 - 5 ... 120 s		

Example P/N: **TS6123P** Fixed - **TS6110.5P**



# Interval (Single Pulse On Operate)

## TS2, TS6 Versa-Timer

### Timing Module

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timers  
=d

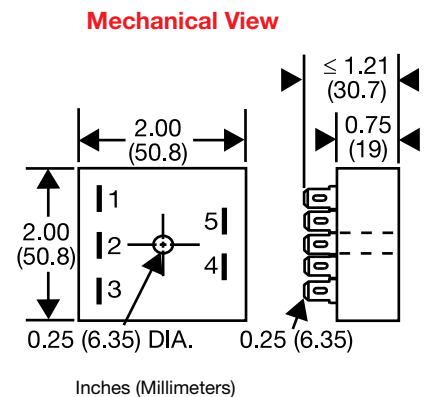
#### Technical Data

<b>Time Delay</b>		
Type		Analog circuitry
Range	12 V DC Other Voltages	0.05 ... 120 s in 4 adjustable ranges or fixed (1 MΩ max. R <sub>T</sub> ) 0.05 ... 600 s in 4 adjustable ranges or fixed
Repeat Accuracy		+/-2% or 20 ms, whichever is greater
Tolerance (Factory Calibration)		≤ +/-10%
Time Delay vs. Temperature & Voltage		≤ +/-10%
Reset Time		≤ 150 ms
<b>Input</b>		
Voltage		12 or 24 V DC; 24, 120, or 230 V AC
Tolerance		+/-15%
DC Ripple		10%
Power Consumption		DC ≤ 1 W; AC ≤ 2 VA
<b>Output</b>		
Type		Solid state
Form		Normally Open, closed during timing
Maximum Load Current		1 A steady state, 10 A inrush at 60°C
Voltage Drop		DC ≅ 1.0 V at 1 A; AC ≅ 2.5 V at 1 A
<b>Protection</b>		
Circuitry		Encapsulated
Polarity		TS6 is not reverse polarity protected
Dielectric Breakdown		≥ 2000 V RMS terminals to mounting surface
Insulation Resistance		≥ 100 MΩ
<b>Mechanical</b>		
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
<b>Environmental</b>		
Operating/Storage Temperature		-40°C ... +75°C / -40°C ... +85°C
Humidity		95% relative, non-condensing
Weight		≅ 2.4 oz (68 g)

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R <sub>T</sub> Selection Chart				
Desired Time Delay*				R <sub>T</sub>
Seconds				
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<sub>T</sub> add at least 20% for tolerance of unit and the R<sub>T</sub>.  
 † 1 Megohm max for 12 VDC Units

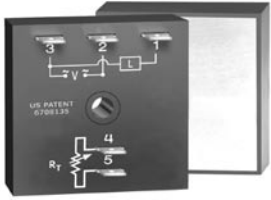


TS6 12 VDC			
Time Delay	VTP P/N	Fig. A P/N	Fig. B P/N
1 - 0.05 ... 1 s	VTP2A	P1004-16	P1004-16-X
2 - 0.5 ... 20 s	VTP2E	P1004-16	P1004-16-X
3 - 2 ... 60 s	VTP2F	P1004-16	P1004-16-X
4 - 5 ... 120 s	VTP2H	P1004-16	P1004-16-X

TS2 & TS6 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

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# Interval (Impulse - ON) TH2 Series Power Timing Module

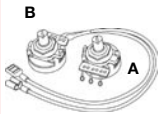


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- High Load Current Capacity up to 20 A, 200 A Inrush
- Fixed or Adjustable Time Delays From 0.1 ... 600 s in 4 ranges
- +/-2% Repeat Accuracy
- +/-5% Factory Calibration
- Metallized Mounting Surface for Efficient Heat Transfer
- Solid State & Encapsulated

Approvals:

### 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.

### Description

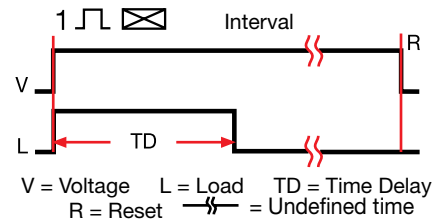
The TH2 is the combination of a timer and a solid state relay into one easy-to-use solid state molded module. When mounted to a metal surface, the TH2 Series can switch load currents up to 20 A steady state with 200 A inrush. The TH2 replaces a timer and contactor at a competitive price.

### Operation

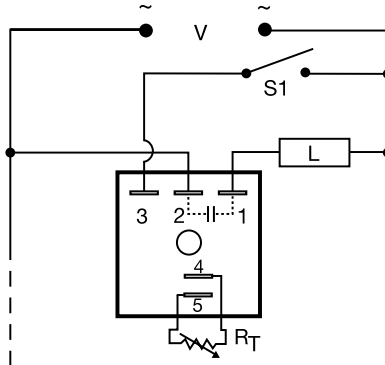
Upon application of input voltage, the time delay begins. The output energizes during the time delay. At the end of the time delay, the output de-energizes and remains de-energized until input voltage is removed.

**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.

### Ordering Table

TH2 Series	X Output Rating	X Input	X Adjustment	X Time Delay * s
	-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

Example P/N: **TH2C422** Fixed – **TH2A410.5**

\* If Fixed Delay is selected, insert delay [0.1 ... 600] in seconds.

# Interval (Impulse - ON) TH2 Series Power Timing Module

DI  
timers

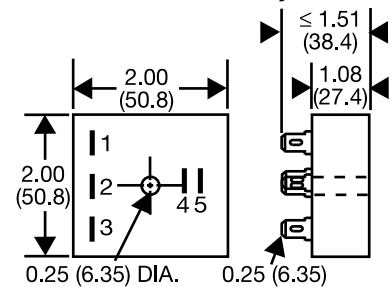
## Technical Data

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

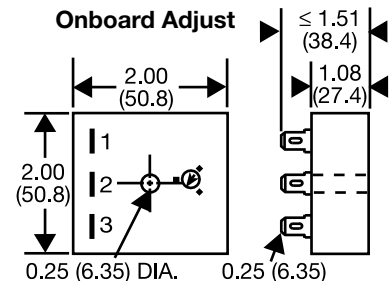
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## Mechanical View

### Fixed & External Adjust



### Onboard Adjust



Inches (Millimeters)

RT Selection Chart				
Desired Time Delay*				RT
Seconds				
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 RT add at least 15% for tolerance of unit and the RT.