Timers - Dedicated

Series Included

Single Function

Sequencer

Dual Function

HVAC Timers

Vending Timers

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 (Delay-on-Make):
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.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 8 for dimensional drawing.

Features:

- Switch settable time delay
- Three time ranges from 0.1s - 10,230s
- ±0.1% repeat accuracy
- ±2% setting accuracy
- 10A, DPDT output contacts
- LED indication

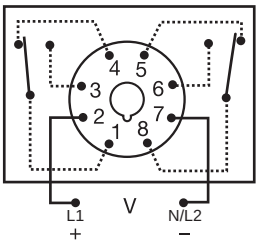
Approvals:

8-pin models UL listed when used in combination with P1011-6 socket only.

Auxiliary Products:

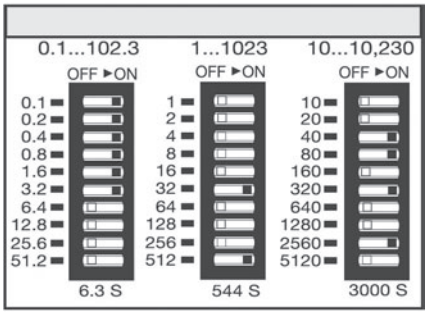
- **Panel mount kit:** P/N: BZ1
- **8-pin socket:** P/N: NDS-8
- **Hold-down clips (sold in pairs):** P/N: PSC8 (NDS-8)
- **Octal socket for UL listing:** P/N: P1011-6
- **DIN rail:** P/N: C103PM (Al)

Connection:



Relay contacts are isolated.

Digi-Set Binary Switch Operation:



Available Models:

TDM120AL	TDMH24DL
TDM12DL	TDML110DL
TDM230AL	TDML120AL
TDM24AL	TDML12DL
TDM24DL	TDML230AL
TDMH120AL	TDML24DL
TDMH24AL	

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

TDM - 1 - 1023s in 1s increments
TDMH - 10 - 10,230s in 10s increments
TDML - 0.1 - 102.3s in 0.1s increments

X
Input Voltage
- **12D** - 12VDC
- **24A** - 24VAC
- **24D** - 24VDC/28VDC
- **110D** - 110VDC
- **120A** - 120VAC
- **230A** - 230VAC

X
LED Indication
- **L**

Specifications

Time Delay
Type . . . . . Digital integrated circuitry
Range* . . . . . 0.1 - 102.3s in 0.1s increments
1 - 1023s in 1s increments
10 - 10,230s in 10s increments
Repeat Accuracy . . . . . ±0.1% or 20ms, whichever is greater
Setting Accuracy . . . . . ±2% or 50ms, whichever is greater
Reset Time . . . . . ≤ 50ms
Recycle Time . . . . . During Timing - TDMH: ≤ 500ms
TDM, TDML: ≤ 300ms
Time Delay vs Temp. & Voltage . . . . . ±2%
Indicator . . . . . LED glows during timing; relay is de-energized

Input
Voltage . . . . . 12, 24, or 110 VDC; 24, 120, or 230VAC
Tolerance 12VDC & 24VDC/AC . . . . . -15% - 20%
110VAC/DC to 230VAC . . . . . -20% - 10%
AC Line Frequency . . . . . 50/60 Hz
Power Consumption . . . . . ≤ 2.25W

Output
Type . . . . . Electromechanical relay
Form . . . . . DPDT
Rating . . . . . 10A resistive @ 120/240VAC & 28VDC;
1/3 hp @ 120/240VAC
Life . . . . . Mechanical - 1 x10^7; Electrical - 1 x 10^6

Protection
Polarity . . . . . DC units are reverse polarity protected
Isolation Voltage . . . . . ≥ 1500V RMS input to output

Mechanical
Mounting . . . . . Plug-in socket
Dimensions . . . . . 3.2 x 2.39 x 1.78 in. (81.3 x 60.7 x 45.2 mm)
Termination . . . . . Octal 8-pin plug-in

Environmental
Operating / Storage Temperature . . . . . -20° to 65°C / -30° to 85°C
Weight . . . . . ≅ 6 oz (170 g)

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

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 (Delay-on-Make):
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.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 9 for dimensional drawing.

Features:

- 10A, DPDT or SPDT output contacts
- 24 to 230V operation in ranges
- 8-pin or 11-pin plug-in
- Fixed or adjustable delays from 0.05 - 600s in multiple ranges
- ±2% repeat accuracy

Approvals:

8-pin models UL listed when used in combination with P1011-6 socket only.

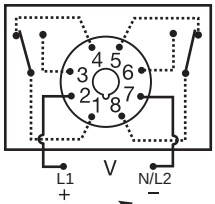
Auxiliary Products:

- **Octal socket for UL listing:** P/N: P1011-6
- **Hold-down clips (sold in pairs):**
  P/N: PSC8 (NDS-8)
  P/N: PSC11 (NDS-11)
- **8-pin socket:** P/N: NDS-8
- **11-pin socket:** P/N: NDS-11
- **Panel mount kit:** P/N: BZ1
- **Versa-knob:** P/N: P0700-7
- **External adjust potentiometer:**
  P/N: P1004-XX
  P/N: P1004-XX-X

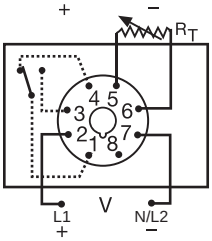
External R_T P/N Selection Table

Value	Part Number
1M ohm	P1004-16
1.5M ohm	P1004-15
2M ohm	P1004-14
3M ohm	P1004-12
5M ohm	P1004-13
1M ohm	P1004-16-X
1.5M ohm	P1004-15-X
2M ohm	P1004-14-X
3M ohm	P1004-12-X
5M ohm	P1004-13-X

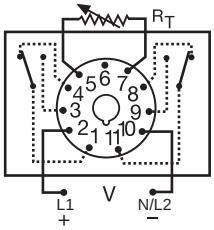
Connection:



8-pin octal DPDT



8-pin octal SPDT



11-pin DPDT

R_T is used when external adjustment is ordered.
Relay contacts are isolated.

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.

Available Models:

TRM110D1Z30	TRM120A2Y60
TRM120A2X1	TRM120A2Y600
TRM120A2X30	TRM24A8Y5
TRM120A2Y180	TRM24D1Y1

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

TRM **X** **Input Voltage**
- **24A** - 24VAC
- **24D** - 24VDC/28VDC
- **110D** - 110VDC
- **120A** - 120VAC
- **230A** - 230VAC

X **Adjustment and Output Form**
- **1** - Fixed, Octal, DPDT
- **2** - Knob Adjust, Octal, DPDT
- **3** - Lock Shaft Adjust, Octal, DPDT
- **5** - Ext. Adjust, 11-pin, DPDT without potentiometer
- **6** - Ext. Adjust, 11-pin, DPDT supplied with potentiometer
- **8** - Ext. Adjust, Octal, SPDT, without potentiometer
- **9** - Ext. Adjust, Octal, SPDT, with potentiometer

X **Time Tolerance**
- **X** - ±20%
- **Y** - ±10%
- **Z** - ±5%

X **Time Delay* (seconds)**
- **1** - 0.05 - 1
- **2** - 0.05 - 2
- **3** - 0.05 - 3
- **5** - 0.1 - 5
- **10** - 0.1 - 10
- **30** - 1 - 30
- **60** - 1 - 60
- **120** - 2 - 120
- **180** - 2 - 180
- **240** - 7 - 240
- **300** - 7 - 300
- **360** - 7 - 360
- **420** - 7 - 420
- **480** - 7 - 480
- **600** - 7 - 600

*If fixed delay is selected, insert delay (0.05 - 600) in seconds.

Specifications

Time Delay
Type ..... Analog circuitry
Range ..... 50ms - 10m 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 ..... ≤ 50ms
Recycle Time ..... After timing: ≤ 20ms
During timing: 0.1% of max. time delay or 75ms, whichever is greater
Time Delay vs Temp. & Voltage ..... ≤±10%

Input
Voltage ..... 24 or 110VDC; 24, 120, or 230VAC
Tolerance 24VDC/AC ..... -15% - 20%
110 to 230VAC/DC ..... -20% - 10%
AC Line Frequency ..... 50/60 Hz
Power Consumption ..... ≤ 2.25W

Output
Type ..... Electromechanical relay
Form ..... Isolated DPDT or SPDT
Rating ..... 10A resistive @ 120/240VAC & 28VDC; 1/3 hp @ 120/240VAC
Life ..... Mechanical - 1 x 10^7; Electrical - 1 x 10^6

Protection
Isolation Voltage ..... ≥ 1500V RMS between input & output terminals
Insulation Resistance ..... ≥ 100 MΩ
Polarity ..... DC units are reverse polarity protected

Mechanical
Mounting ..... Plug-in socket
Dimensions ..... 3.62 x 2.39 x 1.78 in. (91.6 x 60.7 x 45.2 mm)
Termination ..... Octal 8-pin or 11-pin plug-In

Environmental
Operating / Storage Temperature ..... -20° to 65°C / -30° to 85°C
Weight ..... ≅ 6 oz (170 g)

The PRLM Series is designed for use in non-critical timing applications. It offers low cost, knob adjustable timing control, full 10A 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 (Delay-on-Make):
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.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 9 for dimensional drawing.

Features:

- Knob adjustable time delay relay
- Electronic circuit with electromechanical relay
- Popular AC & DC operating voltages
- Industry standard octal plug-in connection
- Fixed or adjustable delays from 0.05 - 600s in multiple ranges
- ±2% repeat accuracy
- ±10% factory calibration
- LED indication
- 10A, DPDT output contacts
- Isolated relay contacts

Approvals:

Auxiliary Products:

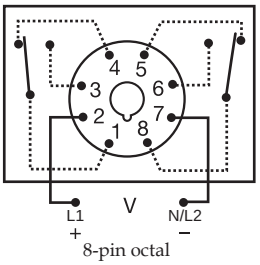
- **Panel mount kit:** P/N: BZ1
- **8-pin socket:** P/N: NDS-8
- **Hold-down clips (sold in pairs):** P/N: PSC8 (NDS-8)
- **DIN rail:** P/N: C103PM (Al)

Available Models:

PRLM41180
PRLM423

If desired part number is not listed, please call us to see if it is technically possible to build.

Connection:



8-pin octal
DPDT

Order Table:

PRLM **X** **X** **X**

Input Voltage
- **1** - 12VDC
- **2** - 24VAC
- **3** - 24VDC
- **4** - 120VAC
- **5** - 110VDC
- **6** - 230VAC

Adjustment
- **1** - Factory Fixed
- **2** - Adjustable

Time Delay*
- **1** - 0.05 - 3s
- **2** - 0.1 - 10s
- **3** - 1 - 60s
- **4** - 2 - 180s
- **5** - 7 - 480s
- **6** - 7 - 600s

*If fixed delay is selected, insert delay (0.05 - 600) in seconds.

Specifications

Time Delay
Type . . . . . Analog circuitry
Range . . . . . 0.05 - 600s in 6 adjustable ranges or fixed
Repeat Accuracy . . . . . ±2% or 20ms, whichever is greater
Tolerance . . . . . Knob adjust: guaranteed range
Fixed: ±10%
Reset Time . . . . . ≤ 50ms
Recycle Time . . . . . After timing: ≤ 20ms
During timing: 0.1% of max. time delay or 75ms, whichever is greater
Time Delay vs Temp. & Voltage . . . . . ≤ ±10%

Input
Voltage . . . . . 12, 24, or 110VDC; 24, 120, or 230VAC
Tolerance 12VDC & 24VDC/AC . . . . . -15% - 20%
110 to 240VAC/DC . . . . . -20% - 10%
AC Line Frequency . . . . . 50/60 Hz
Power Consumption . . . . . ≤ 2.25W

Output
Type . . . . . Electromechanical relay
Form . . . . . Isolated, DPDT
Rating . . . . . 10A resistive @ 28VDC;
10A resistive @ 240VAC;
1/3 hp @ 120/240VAC
Life . . . . . Mechanical - $1x10^7$; Electrical - $1x10^6$

Protection
Surge . . . . . IEEE C62.41-1991 Level A
Isolation Voltage . . . . . ≥ 1500V 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
Dimensions . . . . . 3.62 x 2.39 x 1.78 in. (91.6 x 60.7 x 45.2 mm)
Termination . . . . . Octal 8-pin plug-in

Environmental
Operating / Storage Temperature . . . . . -20° to 65°C / -30° to 85°C
Weight . . . . . ≅ 6 oz (170 g)

The HRDM Series combines an electromechanical relay output with microcontroller timing circuitry. It offers 12 to 230V operation in five ranges and factory fixed, onboard, or external 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 (Delay-on-Make):
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.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 2 for dimensional drawing.

Features:

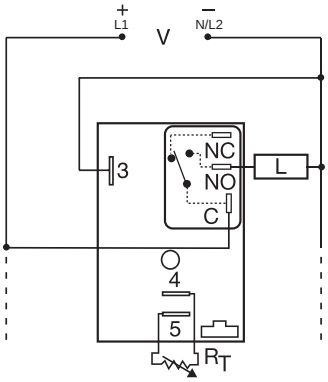
- 30A, SPDT, NO output contact
- 12 to 230V operation in 5 ranges
- Encapsulated circuitry
- Delays from 0.1s - 100m in 5 ranges
- ±0.5% repeat accuracy
- Factory fixed, onboard or external adjust

Approvals:

Auxiliary Products:

- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Mounting bracket:** P/N: P1023-6
- **Female quick connect:**
  P/N: P1015-13 (AWG 10/12)
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

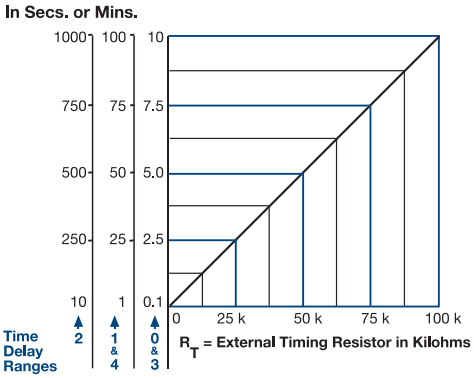
Connection:



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.

External Resistance vs. Time Delay:



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.

Available Models:

HRDM114S	HRDM322
HRDM120	HRDM323
HRDM220	HRDM324
HRDM221	HRDM4130S
HRDM222	HRDM413M
HRDM223	HRDM415M
HRDM224	HRDM420
HRDM3112S	HRDM421
HRDM320	HRDM422
HRDM321	HRDM423

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

HRDM **X** **Input Voltage**
- **1** - 12VDC
- **2** - 24VAC
- **3** - 24VDC
- **4** - 120VAC
- **6** - 230VAC

X **Adjustment**
- **1** - Fixed
- **2** - Onboard knob
- **3** - External adjust

X **Time Tolerance**
- **Blank** - ±5%
- **A** - ±1%

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

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec, or (**0.1 - 100**) (**M**) min.

Specifications

Time Delay

Type	Microcontroller circuitry
Range	0.1s - 100m in 5 adjustable ranges or fixed
Repeat Accuracy	±0.5% or 20 ms, whichever is greater
Tolerance (Factory Calibration)	±1%, ±5%
Reset Time	≤ 150ms
Time Delay vs Temp. & Voltage	±2%

Input

Voltage	12 or 24VDC; 24, 120, or 230VAC
Tolerance 12VDC & 24VDC	-15% - 20%
24 to 230VAC	-20% - 10%
AC Line Frequency	50/60 Hz
Power Consumption	AC ≤ 4VA; DC ≤ 2W

Output

Type	Electromechanical relay
Form	Non-isolated, SPDT

Ratings:		SPDT-NO	SPDT-NC
General Purpose	125/240VAC	30A	15A
Resistive	125/240VAC	30A	15A
	28VDC	20A	10A
Motor Load	125VAC	1 hp*	1/4 hp**
	240VAC	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	≥ 2000V 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
Dimensions	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° to 60°C / -40° to 85°C
Humidity	95% relative, non-condensing
Weight	≅ 3.9 oz (111 g)

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 (Delay-on-Make):
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.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 10 for dimensional drawing.

Features:

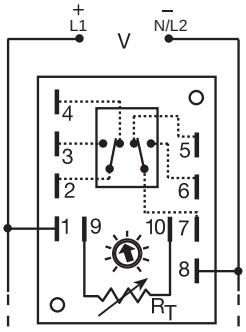
- Factory fixed, onboard or external adjust
- Delays from 0.1s - 1000m
- ±0.5% repeat accuracy
- Encapsulated, digital circuitry
- Isolated, 10A, DPDT output contacts

Approvals:

Auxiliary Products:

- **External ad just potentiometer:**
  P/N: P1004-16
  P/N: P1004-16-X
- **Female quick connect:**
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7

Connection:



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

R_T is used when external adjustment is ordered.

R_T Selection Chart						
Desired Time Delay* Seconds						R_T
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* Minutes					R_T
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.

Available Models:

ERDM1110S
ERDM123
ERDM126
ERDM128
ERDM222
ERDM310.5S
ERDM324
ERDM326
ERDM4110S
ERDM4130S
ERDM4210
ERDM422
ERDM423
ERDM425
ERDM427
ERDM429
ERDM6210
ERDM628
ERDM629

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

ERDM **X** **Input Voltage**
- **1** - 12VDC
- **2** - 24VAC
- **3** - 24VDC
- **4** - 120VAC
- **5** - 120VDC
- **6** - 230VAC

X **Adjustment**
- **1** - Fixed
- **2** - Onboard knob
- **3** - External adjust

X **Time Delay***
- **1** - 0.1 - 1s
- **2** - 0.1 - 5s
- **3** - 0.1 - 10s
- **4** - 0.2 - 15s
- **5** - 0.3 - 30s
- **6** - 0.6 - 60s
- **7** - 0.1 - 5m
- **8** - 0.1 - 10m
- **9** - 0.2 - 15m
- **10** - 1 - 100m
- **11** - 10 - 500m

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec or (**M**) min.

Specifications

Time Delay
Type . . . . . Digital integrated circuitry
Range . . . . . 0.1s - 500m in 11 adjustable ranges or 0.1s - 1000m fixed
Adjustment . . . . . Fixed, onboard or external adjust
Repeat Accuracy . . . . . ±0.5%
Tolerance (Factory Calibration) . . . . . ≤ ±10%
Recycle Time . . . . . ≤ 150ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±2%
Input
Voltage . . . . . 12, 24, or 120VDC; 24, 120, or 230VAC
Tolerance 12VDC & 24VDC/AC . . . . . -15% - 20%
120VAC/DC & 230VAC . . . . . -20% - 10%
AC Line Frequency . . . . . 50/60 Hz
Output
Type . . . . . Isolated relay contacts
Form . . . . . DPDT
Rating . . . . . 10A resistive @ 120/240VAC & 28VDC; 1/3 hp @ 120/240VAC
Life . . . . . Mechanical - 1 x 10^7; Full Load - 1 x 10^6
Protection
Isolation Voltage . . . . . ≥1500V 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
Dimensions . . . . . 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
Environmental
Operating / Storage Temperature . . . . . -40° to 65°C / -40° to 85°C
Weight . . . . . ≅ 5.7 oz (162 g)

The ORM Series features open PC board construction for reduced cost. It has isolated, 10A, 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 - 300 seconds.

Operation (Delay-on-Make):
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.

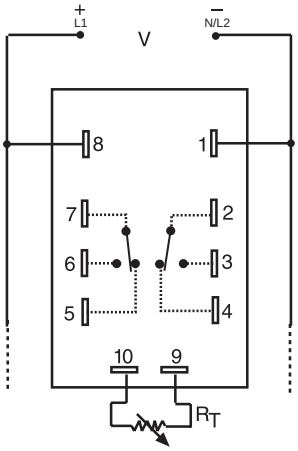
For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 11 for dimensional drawing.

Features:

- Time delays from 0.05s - 300s in 5 ranges or fixed
- Low cost open PCB construction
- 10A, DPDT output contacts
- ±2% repeat accuracy
- ±10% factory calibration
- Factory fixed, onboard or external adjust

Approvals:

Connection:



R_T is used when external adjustment is ordered.
Relay contacts are isolated.

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.

Auxiliary Products:

- **External ad just potentiometer:**
  P/N: P1004-12
  P/N: P1004-12-X
- **Female quick connect:**
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7

Available Models:

ORM120A110
ORM120A115
ORM120A145
ORM120A17
ORM120A25
ORM230A17
ORM24D13.5

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

ORM **X** **X** **X**

Input Voltage
- **24A** - 24VAC
- **24D** - 24VAC/28VDC
- **110D** - 110VDC
- **120A** - 120VAC
- **230A** - 230VAC

Adjustment
- **1** - Fixed
- **2** - Onboard knob
- **3** - External adjust

Time Delay*
- **1** - 0.05 - 3s
- **2** - 0.5 - 30s
- **3** - 0.6 - 60s
- **4** - 1.2 - 120s
- **5** - 3 - 300s

*If fixed delay is selected, insert delay (**0.05 - 300**) in seconds.

Specifications

Time Delay
Type . . . . . Analog circuitry
Range . . . . . 0.05 - 300s in 5 adjustable ranges or fixed
Repeat Accuracy . . . . . ±2% or 20ms, whichever is greater
Tolerance . . . . . Adjustable: guaranteed range
Fixed: ±10%
Recycle Time . . . . . After timing - ≤ 16ms;
During timing - 0.1% of max. time delay or 75ms, whichever is greater
Time Delay vs Temp. & Voltage . . . . . ≤ ±10%

Input
Voltage . . . . . 24 or 110VDC; 24, 120, or 230VAC
Tolerance 24VDC/AC . . . . . -15% - 20%
110 to 230VAC/DC . . . . . -20% - 10%
AC Line Frequency . . . . . 50/60 Hz
Power Consumption 2.25W

Output
Type . . . . . Electromechanical relay
Form . . . . . DPDT, Isolated
Rating . . . . . 10A resistive @ 120/240VAC & 28VDC;
1/3 hp @ 120/240VAC
Life . . . . . Mechanical - $1x10^7$; Electrical - $1x10^6$

Protection
Polarity . . . . . DC units are reverse polarity protected
Isolation Voltage . . . . . ≥1500V 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 / Storage Temperature . . . . . -20° to 65°C / -30° to 85°C
Weight . . . . . ≅ 2.7 oz (77 g)

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 (Delay-on-Make):
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.

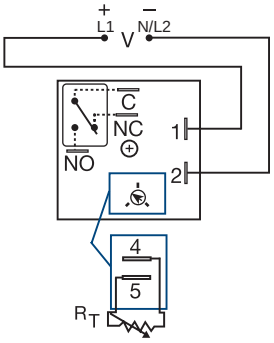
For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features:

- Compact time delay relay
- 10A, SPDT output contacts
- Factory fixed, onboard or external adjust
- Delays from 0.1s - 100m in 5 ranges or fixed
- ±0.5% repeat accuracy
- ±5% factory calibration
- Input voltages from 12 to 230V in 6 ranges

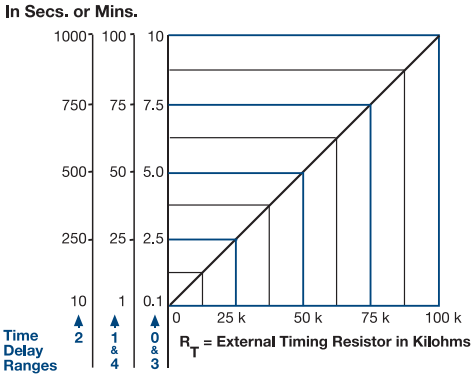
Approvals:

Connection:



V = Voltage
C = Common, Transfer Contact
NO = Normally Open
NC = Normally Closed
A knob is supplied for adjustable units, or RT terminals 4 & 5 for external adjust. See external adjustment vs time delay chart. Relay contacts are isolated.

External Resistance vs Time Delay:



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.

Auxiliary Products:

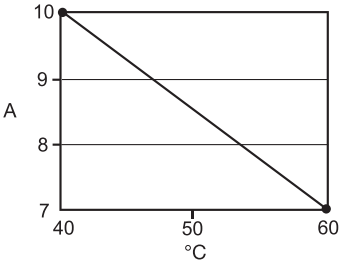
- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Female quick connect:**
  P/N: P1015-13 (AWG 10/12)
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7
- **Mounting bracket:** P/N: P1023-6
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20
-

Available Models:

KRDM110.4S	KRDM223
KRDM110.5S	KRDM224
KRDM111.5S	KRDM234
KRDM1110S	KRDM310.2S
KRDM111S	KRDM320
KRDM1130S	KRDM4110S
KRDM120	KRDM4145S
KRDM121	KRDM4160S
KRDM2110M	KRDM421
KRDM215M	KRDM430
KRDM220	KRDM433
KRDM221	KRDM623
KRDM222	

If desired part number is not listed, please call us to see if it is technically possible to build.

Output Current/Ambient Temperature:



Order Table:

KRDM **X** **Input Voltage**
- **1** - 12VDC
- **2** - 24VAC/DC
- **3** - 24VDC
- **4** - 120VAC
- **5** - 110VDC
- **6** - 230VAC

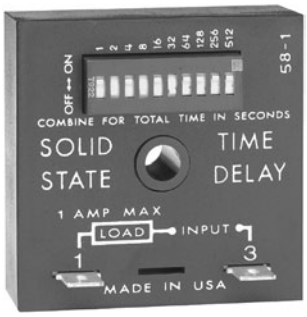
X **Adjustment**
- **1** - Fixed
- **2** - Onboard knob
- **3** - External adjust

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

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec. or (**0.1 - 100**) (**M**) min.

Specifications

Time Delay
Range . . . . . 0.1s - 100m in 5 adjustable ranges or fixed
Repeat Accuracy . . . . . ±0.5% or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ≤ ±5%
Recycle Time . . . . . ≤ 150ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±5%
Input
Voltage . . . . . 12, 24 or 110VDC; 24, 120 or 230VAC
Tolerance 12VDC & 24VAC/DC . . . . . -15% - 20%
110VDC 120 & 230VAC . . . . . -20% - 10%
AC Line Frequency / DC Ripple . . . . . 50/60 Hz / ≤ 10%
Power Consumption . . . . . AC ≤ 2VA; DC ≤ 2W
Output
Type . . . . . Isolated relay contacts
Form . . . . . SPDT
Rating (at 40°C) . . . . . 10A resistive @ 125VAC;
5A resistive @ 230VAC & 28VDC;
1/4 hp @ 125VAC
Max. Switching Voltage 250VAC
Life (Operations) . . . . . Mechanical - 1 x 10^7; Electrical - 1 x 10^5
Protection
Circuitry . . . . . Encapsulated
Isolation Voltage . . . . . ≥ 1500V 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
Dimensions . . . . . 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° to 60°C / -40° to 85°C
Humidity . . . . . 95% relative, non-condensing
Weight . . . . . ≅ 2.6 oz (74 g)



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 0.1s to 10,230s and does not include the DIP switch. These series are excellent choices for process control systems and OEM equipment.

Operation (Delay-on-Make):
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.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features:

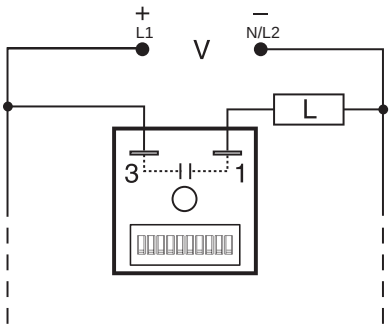
- 2 universal voltage ranges from 24 to 240VAC/DC
- Digital integrated circuitry
- Switch selectable delays from 0.1s - 2.8h in 3 ranges or factory fixed
- ±0.5% repeat accuracy
- 1A steady, 10A inrush
- Totally solid state & encapsulated

Approvals:

Auxiliary Products:

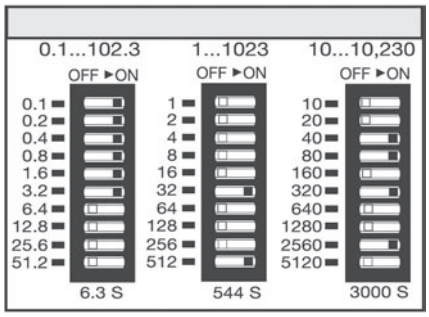
- **Female quick connect:** P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:** P/N: P1015-18
- **Mounting bracket:** P/N: P1023-6
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Connection:



Load may be connected to terminal 3 or 1.
TDU has DIP switch adjustment; KSDU is fixed.

Digi-Set Binary Switch Operation:



Available Models:

KSDU8110	TDUH3000A
KSDU811200	TDUH3001A
TDU3000A	TDUL3000A
TDU3001A	TDUL3001A
TDU3003A	

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Tables:

KSDU **X** **X** **X**

- **Input Voltage Range**
  - **8** - 24 to 120VAC/DC
  - **9** - 100 to 240VAC/DC
- **Type**
  - **1** - Fixed
- **Time Delay (Seconds)**
  - Specify fixed delay in seconds **0.1 - 10230**

TDU	Input Voltage Range	Time Range - Seconds	Part Number
	24 to 120VAC/DC	0.1 - 102.3	TDUL3000A
	100 to 240VAC/DC	0.1 - 102.3	TDUL3001A
	24 to 120VAC/DC	1 - 1023	TDU3000A
	100 to 240VAC/DC	1 - 1023	TDU3001A
	120 to 277VAC	1 - 1023	TDU3003A
	24 to 120VAC/DC	10 - 10230	TDUH3000A
	100 to 240VAC/DC	10 - 10230	TDUH3001A

Specifications

Time Delay
Type . . . . . Digital integrated circuitry
Range* Adjustable (TDU) . . . . . 0.1 - 102.3s in 0.1s increments
1 - 1023s in 1s increments
10 - 10230s in 10s increments
Fixed (KSDU) . . . . . Fixed from 0.1s - 10230s
Repeat Accuracy . . . . . ±0.5% or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ±10%
Recycle Time . . . . . ≤ 150ms
Time Delay vs Temp. & Voltage . . . . . ±5%
Input
Voltage . . . . . 24 to 120VAC/DC; 100 to 240VAC/DC
AC Line Frequency . . . . . 50/60 Hz
Tolerance . . . . . ±20%
Output
Type . . . . . Solid state
Form . . . . . NO, open during timing
Maximum Load Current . . . . . 1A steady state, 10A inrush at 60°C
Minimum Holding Current 40mA
Voltage Drop . . . . . ≅ 2.5V @ 1A
Protection
Circuitry . . . . . Encapsulated
Dielectric Breakdown . . . . . ≥ 2000V RMS terminals to mounting surface
Insulation Resistance . . . . . ≥100 MΩ
Mechanical
Mounting . . . . . Surface mount with one #10 (M5 x 0.8) screw
Dimensions . . . . . 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 . . . . . -40° to 60°C / -40° to 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.

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 (Delay-on-Make):
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.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features:

- Operates from 24 to 240VAC/DC
- Onboard or external adjust time delays
- Delays from 5s - 8m
- Totally solid state & encapsulated
- 1A steady, 10A inrush
- Two terminal series connection with load

Approvals:

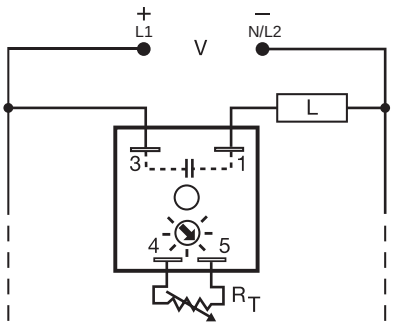
Auxiliary Products:

- **External ad just potentiometer:**
  P/N: P1004-12
  P/N: P1004-12-X
- **Female quick connect:**
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7
- **Mounting bracket:** P/N: P1023-6
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Available Models:

TMV8000
TSU2000

Connection:



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

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.

Order Table:

Input Voltage Range	Time Delay	Adjustment	Part Number
24 to 240VAC/DC	5 - 480s	External	TSU2000
24 to 240VAC/DC	0.1 - 8m	Onboard	TMV8000

Specifications

Time Delay
Type ..... Analog circuitry
Range ..... 5 - 480s (TSU2000)
0.1 - 8m (TMV8000)
Repeat Accuracy ..... ±2%
Tolerance (Factory Calibration) ..... ≤ ±10%
Reset Time ..... ≤ 100ms

Input
Voltage ..... 24 to 240VAC/DC ±20%
AC Line Frequency ..... 50/60 Hz

Output
Type ..... Solid State
Form ..... NO, open during timing
Maximum Load Current ..... 1A steady state, 10A inrush at 55°C
Minimum Holding Current ..... ≤ 40mA
Voltage Drop ..... ≅ 2.5V @ 1A

Protection
Circuitry ..... Encapsulated
Dielectric Breakdown ..... ≥ 2000V RMS terminals to mounting surface
Insulation Resistance ..... ≥ 100 MΩ

Mechanical
Mounting ..... Surface mount with one #10 (M5 x 0.8) screw
Dimensions ..... 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° to 70°C / -30° to 85°C
Humidity ..... 95% relative, non-condensing
Weight ..... ≅ 2.4 oz (68 g)

The TSD1 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 TSD1 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 1A steady and 10A inrush. The modules are totally solid state and encapsulated to protect the electronic circuitry.

Operation (Delay-on-Make):
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.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features:

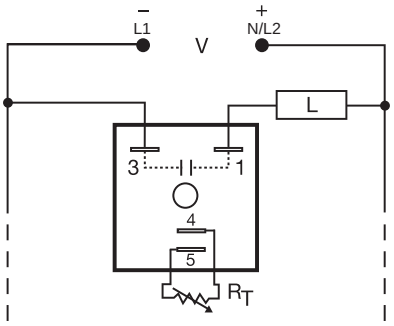
- Fixed or adjustable delays from 0.1s - 100h
- ±0.1% repeat accuracy
- ±1% factory calibration
- 12 to 230V in 6 ranges
- 1A, solid-state output
- Encapsulated

Approvals:

Auxiliary Products:

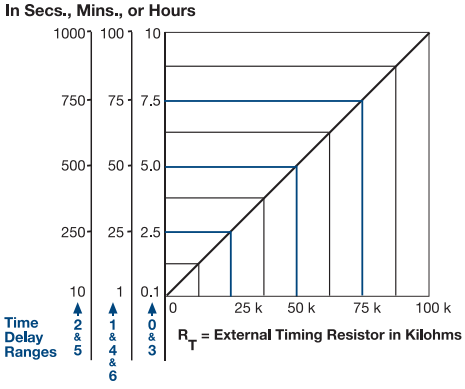
- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Female quick connect:**
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Mounting bracket:** P/N: P1023-6
- **Versa-knob:** P/N: P0700-7
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Connection:



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

External Resistance vs. Time Delay:



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.

Available Models:

TSD11110S
TSD1311.2S
TSD1315S
TSD1320
TSD1321
TSD1424

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

TSD1 **X** **X** **X**

Input Voltage
- **1** - 12VDC
- **2** - 24VAC
- **3** - 24VDC
- **4** - 120VAC
- **5** - 120VDC
- **6** - 230VAC

Adjustment
- **1** - Fixed
- **2** - External adjust
- **3** - Onboard adjust

Time Delay*
- **0** - 0.1 - 10s
- **1** - 1 - 100s
- **2** - 10 - 1000s
- **3** - 0.1 - 10m
- **4** - 1 - 100m
- **5** - 10 - 1000m
- **6** - 1 - 100h

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec. (**M**) min. or (**1 - 100**) (**H**) hours.

Specifications

Time Delay
Range . . . . . 0.1s - 100h in 7 adjustable ranges or fixed
Repeat Accuracy . . . . . ±0.1% or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ≤ ±1%
Recycle Time . . . . . ≤ 150ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±1%

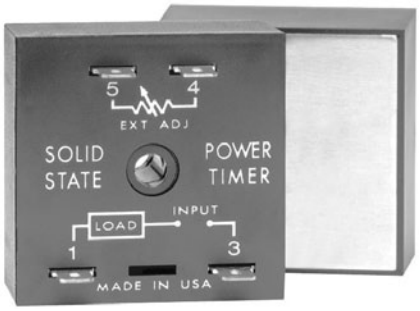
Input
Voltage 12, 24, 120VDC; 24, 120, 230VAC
Tolerance . . . . . ±20%
AC Line Frequency . . . . . 50/60 Hz

Output
Type . . . . . Solid state
Form . . . . . NO, open during timing
Maximum Load Current . . . . . 1A steady state, 10A inrush at 60°C
Minimum Holding Current . . . . . ≤ 40mA
Off State Leakage Current . . . . . ≅ 7mA @ 230VAC
Voltage Drop . . . . . ≅ 2.5V @ 1A

Protection
Circuitry . . . . . Encapsulated
Dielectric Breakdown . . . . . ≥ 2000V 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
Dimensions . . . . . 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 . . . . . -40° to 75°C / -40° to 85°C
Humidity . . . . . 95% relative, non-condensing
Weight . . . . . ≅ 2.4 oz (68 g)



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

Operation (Delay-on-Make):
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.

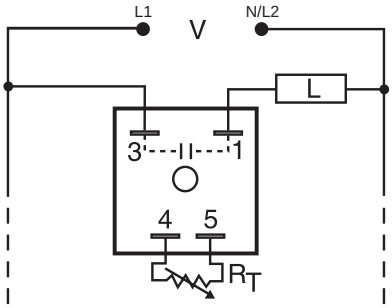
For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 4 for dimensional drawing.

Features:

- High load currents up to 20A, 200A inrush
- Simple-to-use two terminal series connection
- ± 0.5% repeat accuracy
- Fixed or adjustable delays from 1s - 1000m
- ± 10% factory calibration
- 24, 120, or 230VAC
- Metallized mounting surface for heat transfer
- Solid state & encapsulated

Approvals:

Connection:



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

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.

Auxiliary Products:

- **External ad just potentiometer:**
  P/N: P1004-13
  P/N: P1004-13-X
- **Female quick connect:**
  P/N: P1015-13 (AWG 10/12)
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7
- **Plug-on adjustment module:**
  P/N: VTP(X)(X)

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

Selection Table for VTP Plug-on Adjustment Accessory.

Available Models:

There are no part numbers currently active. Please call Technical Support with your requirements.

Order Table:

THDM **X** **Input Voltage**
- **2** - 24VAC
- **4** - 120VAC
- **6** - 230VAC

X **Adjustment**
- **1** - Fixed
- **2** - External adjust

X **Time Delay***
- **1** - 1 - 100s
- **2** - 10 - 1000s
- **3** - 0.1 - 10m
- **4** - 1 - 100m
- **5** - 10 - 1000m

X **Output Rating**
- **A** - 6A
- **B** - 10A
- **C** - 20A

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec. or (**1 - 100**) (**M**) min.

Specifications

Time Delay
Type ..... Digital intergrated circuitry
Range ..... 1s - 1000m in 5 adjustable ranges or fixed
Repeat Accuracy ..... ±0.5% or 20ms, whichever is greater
Tolerance (Factory Calibration) ..... ≤ ± 10%
Recycle Time ..... After timing - ≤ 350ms;
During timing - ≤150ms
Time Delay vs Temp. & Voltage ..... ≤ ±2%

Input
Voltage ..... 24, 120, or 230VAC
Tolerance ..... ±20%
AC Line Frequency ..... 50/60 Hz

Output
Type ..... Solid state
Form ..... NO, open during timing

Maximum Load Currents	Output	Steady State	Inrush**
	A	6A	60A
	B	10A	100A
	C	20A	200A

Minimum Load Current 100mA

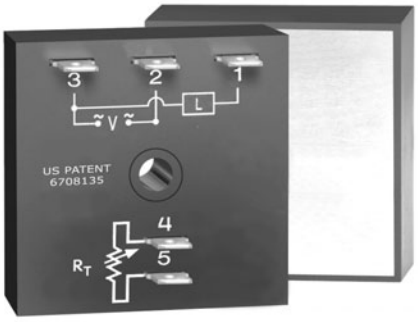
Effective Voltage Drop (V Line - V Load)	Input	Effective Drop
	24VAC	≤ 3V
	120VAC	≤ 3V
	230VAC	≤ 5V

Protection
Circuitry ..... Encapsulated
Dielectric Breakdown ..... ≥ 2000V RMS terminals to mounting surface
Insulation Resistance ..... ≥ 100 MΩ

Mechanical
Mounting ** ..... Surface mount with one #10 (M5 x 0.8) screw
Dimensions ..... 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 / Storage Temperature ..... -40° to 60°C / -40° to 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 16ms.



The THD1 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 (Delay-on-Make):
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.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 4 for dimensional drawing.

Features:

- High load currents up to 20A, 200A inrush
- Fixed or adjustable delays from 0.1s - 1000m
- ±0.5% repeat accuracy
- ±1% factory calibration
- 24, 120, or 230VAC
- Metallized mounting surface for heat transfer
- Totally solid state & encapsulated

Approvals:

Auxiliary Products:

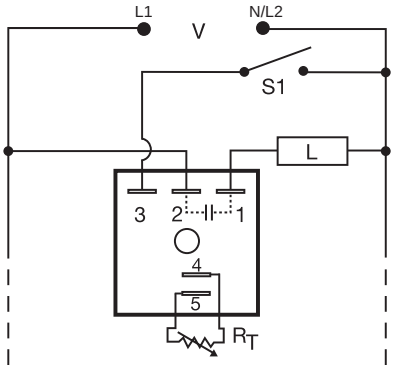
- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Female quick connect:**
  P/N: P1015-13 (AWG 10/12)
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7

Available Models:

THD1B410.5S	THD1C431
THD1C231	THD1C432
THD1C232	THD1C433
THD1C233	THD1C434
THD1C234	THD1C435
THD1C235	THD1C6110S
THD1C415M	

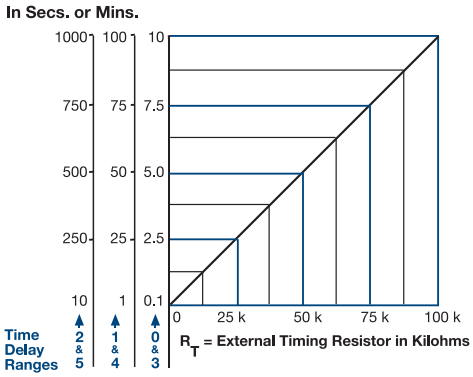
If desired part number is not listed, please call us to see if it is technically possible to build.

Connection:



S1 = Optional Low Current Initiate Switch
R_T is used when external adjustment is ordered.

External Resistance vs. Time Delay:



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.

Order Table:

THD1 **X** **Output Rating**
- **A** - 6A
- **B** - 10A
- **C** - 20A

X **Input Voltage**
- **2** - 24VAC
- **4** - 120VAC
- **6** - 230VAC

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

X **Time Delay***
- **0** - 0.1 - 10s
- **1** - 1 - 100s
- **2** - 10 - 1000s
- **3** - 0.1 - 10m
- **4** - 1 - 100m
- **5** - 10 - 1000m

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec. or (**M**) min.

Specifications

Time Delay
Range ..... 0.1s - 1000m in 6 adjustable ranges or fixed
Repeat Accuracy ..... ±0.5% or 20ms, whichever is greater
Tolerance (Factory Calibration) ..... ≤ ±1%
Recycle Time ..... ≤ 150ms
Time Delay vs Temp. & Voltage ..... ≤ ±2%
Input
Voltage ..... 24, 120, or 230VAC
Tolerance ..... ±20%
Line Frequency ..... 50/60 Hz
Power Consumption ..... ≤ 2VA
Output
Type ..... Solid state
Form ..... NO, open during timing

Maximum Load Current	Output	Steady State	Inrush**
	A	6A	60A
	B	10A	100A
	C	20A	200A

Minimum Load Current 100mA
Voltage Drop ..... ≅ 2.5V @ rated current
OFF State Leakage Current ..... ≅ 5mA @ 230VAC
Protection
Circuitry ..... Encapsulated
Dielectric Breakdown ..... ≥ 2000V RMS terminals to mounting surface
Insulation Resistance ..... ≥ 100 MΩ
Mechanical
Mounting ** ..... Surface mount with one #10 (M5 x 0.8) screw
Dimensions ..... 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 / Storage Temperature ..... -40° to 60°C / -40° to 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 16ms.

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 1A steady and 10A inrush. The modules are totally solid state and encapsulated to protect the electronic circuitry.

Operation (Delay-on-Make):
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.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features:

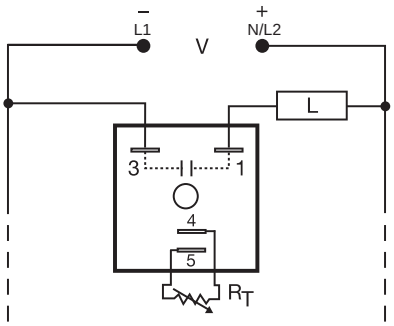
- Fixed or adjustable delays from 0.1s - 1000m in 6 ranges
- ±0.5% repeat accuracy
- ±5% factory calibration
- 12 to 230V in 5 options
- 1A, solid-state output
- Encapsulated

Approvals:

Auxiliary Products:

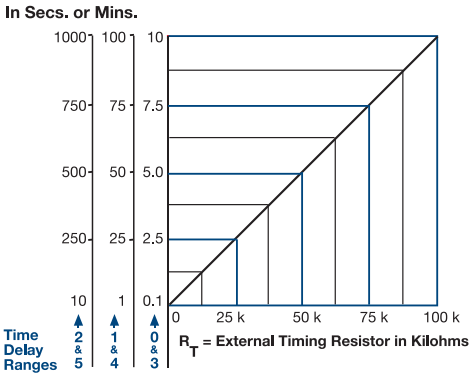
- **External adjust potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Mounting bracket:** P/N: P1023-6
- **Female quick connect:**
  P/N: P1015-64 (AWG 14/16)
  P/N: P1015-14 (AWG 18/22)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Connection:



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

External Resistance vs. Time Delay:



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.

Available Models:

KSD11120S	KSD1320
KSD1122	KSD1412S
KSD1123	KSD14130S
KSD1133	KSD1420
KSD1230	KSD1431
KSD13110M	KSD16130S

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

KSD1 **X** **X** **X**

Input Voltage
- **1** - 12VDC
- **2** - 24VAC
- **3** - 24VDC
- **4** - 120VAC
- **6** - 230VAC

Adjustment
- **1** - Fixed
- **2** - External adjust
- **3** - Onboard adjust

Time Delay*
- **0** - 0.1 - 10s
- **1** - 1 - 100s
- **2** - 10 - 1000s
- **3** - 0.1 - 10m
- **4** - 1 - 100m
- **5** - 10 - 1000m

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec. or (**M**) min.

Specifications

Time Delay
Range . . . . . 0.1s - 1000m in 6 adjustable ranges or fixed
Repeat Accuracy . . . . . ±0.5% or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ≤ ±5%
Recycle Time . . . . . ≤ 150ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±10%
Input
Voltage . . . . . 24, 120, or 230VAC; 12 or 24VDC
Tolerance . . . . . ±20%
AC Line Frequency . . . . . 50/60 Hz
Output
Type . . . . . Solid state
Form . . . . . NO, open during timing
Maximum Load Current . . . . . 1A steady state, 10A inrush at 60°C
Minimum Holding Current . . . . . ≤ 40mA
OFF State Leakage Current . . . . . ≅ 7mA @ 230VAC
Voltage Drop . . . . . ≅ 2.5V @ 1A
Protection
Circuitry . . . . . Encapsulated
Dielectric Breakdown . . . . . ≥ 2000V 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
Dimensions . . . . . 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 . . . . . -40° to 60°C / -40° to 85°C
Humidity . . . . . 95% relative, non-condensing
Weight . . . . . ≅ 2.4 oz (68 g)

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 5mA to 1A. May be connected in series with contactors, relays, valves, solenoids, small motors, and lamps.

Operation (Delay-on-Make):
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.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features:

- Two terminal series connection with load
- 5mA - 1A load currents
- Totally solid state & encapsulated
- ±2% repeat accuracy
- Fixed or adjustable delays from 0.05s - 10m in 8 ranges

Approvals:

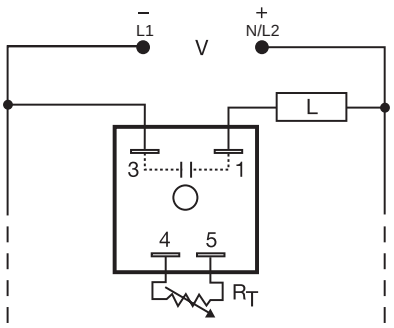
Auxiliary Products:

- **External ad just potentiometer:**
  P/N: P1004-XX
  P/N: P1004-XX-X
- **Female quick connect:**
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Mounting bracket:** P/N: P1023-6
- **Versa-knob:** P/N: P0700-7
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20
- **Plug-on adjustment module:**
  P/N: VTP(X)(X)
  Selection Table for VTP Plug-on Adjustment Accessory.

All Other Voltages	
Time Delay	VTP P/N
1 - 0.05-3s	VTP4B
2 - 0.5-60s	VTP4F
3 - 2-180s	VTP4J
4 - 5-600s	VTP5N

12VDC	
Time Delay	VTP P/N
1 - 0.05-1s	VTP2A
2 - 0.5-20s	VTP2E
3 - 2-60s	VTP2F
4 - 5-120s	VTP2H

Connection:



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

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

Available Models:

TS1111	TS1411
TS12110	TS14110
TS121150	TS141180
TS12120	TS1412
TS12130	TS14120
TS121360	TS14130
TS1214	TS1415
TS121420	TS1416
TS12160	TS1418
TS12190	TS1421
TS1221	TS1422
TS1222	TS1423
TS1224	TS1424
TS13115	TS1612
TS1321	TS1615
TS1410.1	TS1621
TS1410.25	TS1622

Order Table:

TS1 **X** **Input Voltage**
- **1** - 12VDC
- **2** - 24VAC
- **3** - 24VDC
- **4** - 120VAC
- **5** - 120VDC
- **6** - 230VAC

X **Adjustment**
- **1** - Fixed
- **2** - External adjust

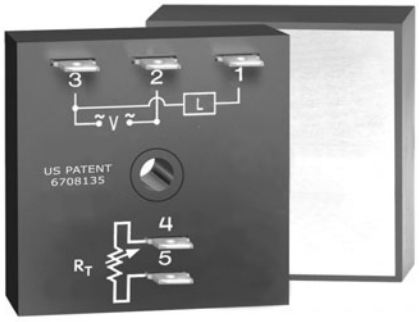
X **Time Delay* (12VDC)**
- **1** - 0.05 - 1s
- **2** - 0.5 - 20s
- **3** - 2 - 60s
- **4** - 5 - 120s

X **Time Delay* (ALL other voltages)**
- **1** - 0.05 - 3s
- **2** - 0.5 - 60s
- **3** - 2 - 180s
- **4** - 5 - 600s

*If fixed delay is selected, insert delay (**0.05 - 120**) (12VDC) or (**0.05 - 600**) (other voltages) in secs.

Specifications

Time Delay
Type . . . . . Analog circuitry
Range 12VDC . . . . . 0.05 - 120s in 4 adjustable ranges or fixed (1 MΩ max. R_T)
Other Voltages. . . . . 0.05 - 600s in 4 adjustable ranges or fixed
Repeat Accuracy . . . . . ±2% or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ≤ ±10%
Recycle Time . . . . . After timing – ≤ 16ms
During timing – 0.1% of time delay or 75ms, whichever is greater
Time Delay vs Temp. & Voltage . . . . . ≤ ±10%
Input
Voltage . . . . . 12, 24 or 120VDC; 24, 120, or 230VAC
Tolerance . . . . . ±20%
AC Line Frequency . . . . . 50/60 Hz
Output
Type . . . . . Solid state
Form . . . . . NO, open during timing
Maximum Load Current . . . . . 1A steady state, 10A inrush at 60°C
Minimum Holding Current 5mA
Voltage Drop . . . . . ≅ 2.5V @ 1A
Protection
Circuitry . . . . . Encapsulated
Dielectric Breakdown . . . . . ≥ 2000V 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
Dimensions . . . . . 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 . . . . . -40° to 80°C / -40° to 85°C
Humidity . . . . . 95% relative, non-condensing
Weight . . . . . ≅ 2.4 oz (68 g)



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 20A steady state, and 200A inrush.

Operation (Delay-on-Make):
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.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 4 for dimensional drawing.

Features:

- High current load capacity up to 20A with 200A inrush
- Solid-state switching - no contact wear or arcing
- Encapsulated
- Fixed or adjustable time delays from 0.1 - 600s
- ± 2% repeat accuracy
- ± 5% factory calibration
- Metallized mounting surface for heat transfer

Approvals:

Auxiliary Products:

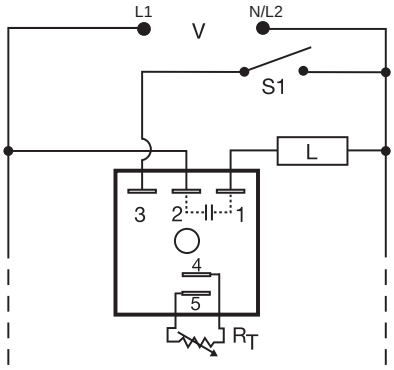
- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Female quick connect:**
  P/N: P1015-13 (AWG 10/12)
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7

Available Models:

TH1A421
TH1B633
TH1C415
TH1C621

If desired part number is not listed, please call us to see if it is technically possible to build.

Connection:



S1 = Optional Low Current Initiate Switch
R_T is used when external adjustment is ordered.

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

Order Table:

TH1 **X** **X** **X** **X**

Output Rating
- **A** - 6A
- **B** - 10A
- **C** - 20A

Input Voltage
- **2** - 24VAC
- **4** - 120VAC
- **6** - 230VAC

Adjustment
- **1** - Fixed
- **2** - External adjust
- **3** - Onboard adjust

Time Delay*
- **1** - 0.1 - 3s
- **2** - 0.5 - 60s
- **3** - 2 - 180s
- **4** - 5 - 600s

*If fixed delay is selected, insert delay (**0.1 - 600**) in secs.

Specifications

Time Delay
Range ..... 0.1 - 600s in 4 adjustable ranges or fixed
Repeat Accuracy ..... ±2% or 20ms, whichever is greater
Tolerance (Factory Calibration) ..... ≤ ± 5%
Time Delay vs Temp. & Voltage ..... ≤ ±10%
Recycle Time ..... ≤ 150ms
Input
Voltage ..... 24, 120, or 230VAC
Tolerance ..... ±15%
AC Line Frequency ..... 50/60 Hz
Power Consumption ..... ≤ 2VA
Output
Type ..... Solid state
Form ..... NO, open during timing

Maximum Load Currents	Output	Steady State	Inrush**
	A	6A	60A
	B	10A	100A
	C	20A	200A

Minimum Load Current 100mA
Voltage Drop ..... ≅ 2.5V at rated current
OFF State Leakage Current ..... ≅ 5mA @ 230VAC
Protection
Circuitry ..... Encapsulated
Dielectric Breakdown ..... ≥ 2000V RMS terminals to mounting surface
Insulation Resistance ..... ≥ 100 MΩ
Mechanical
Mounting ** ..... Surface mount with one #10 (M5 x 0.8) screw
Dimensions ..... 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 / Storage Temperature ..... -20° to 60°C / -40° to 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 16ms.

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 removable bracket and wire leads. The MSM offers immediate reset on removal of power.

Operation (Delay-on-Make):
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.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 167, Figure 25 for dimensional drawing.

Features:

- Printed circuit mount or wire leads
- Fixed delays from 0.05 - 180s
- ± 5% repeat accuracy
- ± 15% factory calibration
- Two-wire series connection with the load
- Fast reset

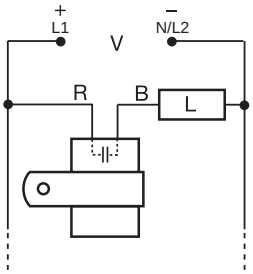
Approvals:

Available Models:

MSM10.2W7	MSM21W9
MSM10.5W6	MSM22W6
MSM10.7W6	MSM25W9
MSM11W6	MSM30.7W6
MSM110W6	MSM33W9
MSM130W9	MSM360P1
MSM16W9	MSM40.2W6
MSM190W6	MSM420W6
MSM20.15W9	MSM42W6
MSM210P3	MSM610W9

If desired part number is not listed, please call us to see if it is technically possible to build.

Connection:



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

Order Table:

MSM — **X** Input Voltage:
- **1** - 12VDC
- **2** - 24VAC
- **3** - 24VDC
- **4** - 120VAC
- **6** - 230VAC

X Fixed Time Delay:
- **0.05 - 180s**

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** - 0.5 (12.70)
- **4** - 0.625 (15.88)
- **5** - 0.75 (19.05)
- **6** - 6.0 (152.4)
- **7** - 7.0 (177.8)
- **8** - 8.0 (203.2)
- **9** - 9.0 (228.6)

Specifications

Time Delay	
Type	Analog Circuitry
Range	0.05 - 180s fixed
Repeat Accuracy	±5%
Tolerance (Factory Calibration)	±15%
Recycle Time	≤ 75ms
Time Delay vs Temp. & Voltage	±15%
Input	
Voltage	12 or 24VDC; 24, 120, or 230VAC
Tolerance	±10%
AC Line Frequency	50/60 Hz
Output	
Type	Solid State
Form	NO, open during timing
Maximum Load Current	0.5A steady state 25°C; 0.25A steady state 60°C
Minimum Holding Current	40mA
Voltage Drop	≅ 2.5V @ 0.5A
Protection	
Circuitry	Encapsulated
Dielectric Breakdown	≥ 2000V 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° to 60°C / -30° to 85°C
Humidity	95% relative, non-condensing
Weight	P: ≅ 1.1 oz (31.2 g) W: ≅ 1.2 oz (34 g)

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 are 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 1A steady and 10A inrush. The modules are totally solid state and encapsulated to protect the electronic circuitry.

Operation (Delay-on-Make NC):
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.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features:

- Fixed or adjustable delays from 0.1s - 100h
- 24, 120, or 230VAC
- ±0.1% repeat accuracy
- ±1% factory calibration
- 1A, solid-state output
- Encapsulated

Approvals:

Auxiliary Products:

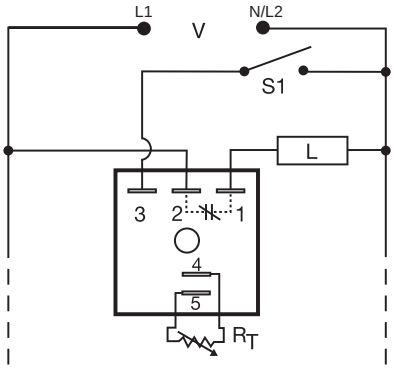
- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Mounting bracket:** P/N: P1023-6
- **Female quick connect:**
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Available Models:

TSD44115S

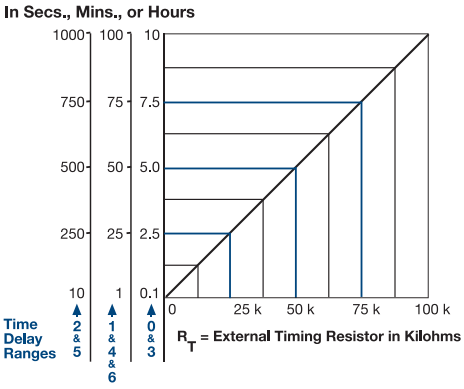
If desired part number is not listed, please call us to see if it is technically possible to build.

Connection:



S1 = Initiate Switch
R_T is used when external adjustment is ordered.

External Resistance vs. Time Delay:



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.

Order Table:

TSD4 **X** **X** **X**

Input Voltage
- **2** - 24VAC
- **4** - 120VAC
- **6** - 230VAC

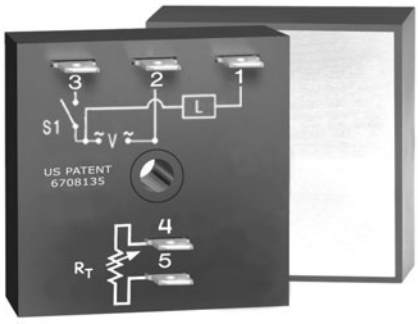
Adjustment
- **1** - Fixed
- **2** - External adjust
- **3** - Onboard adjust

Time Delay*
- **0** - 0.1 - 10s
- **1** - 1 - 100s
- **2** - 10 - 1000s
- **3** - 0.1 - 10m
- **4** - 1 - 100m
- **5** - 10 - 1000m
- **6** - 1 - 100h

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec. (**M**) min. or (**1 - 100**) (**H**) hours.

Specifications

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



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 (Delay-on-Make NC):
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.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 4 for dimensional drawing.

Features:

- High load current capacity up to 20A, 200A inrush
- Load energized prior to & during timing
- ±0.5% repeat accuracy
- ±1% factory calibration
- Totally solid state & encapsulated
- Fixed or adjustable delays from 0.1s - 1000m in 6 ranges

Approvals:

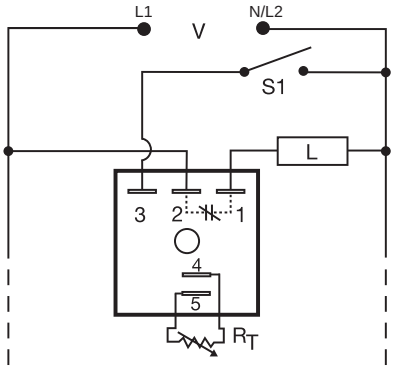
Auxiliary Products:

- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Female quick connect:**
  P/N: P1015-13 (AWG 10/12)
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7

Available Models:

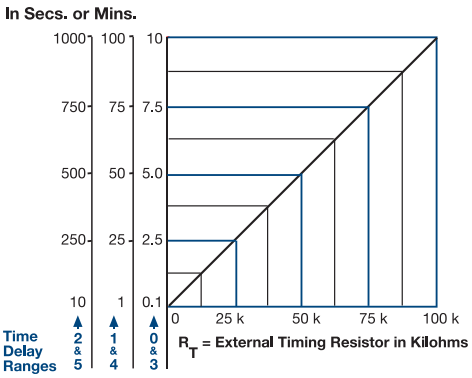
There are no part numbers currently active. Please call Technical Support with your requirements.

Connection:



S1 = Low Current Initiate Switch
R_1 is used when external adjustment is ordered.

External Resistance vs. Time Delay:



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.

Order Table:

THD4 **X** **X** **X** **X**

Output Rating
- **A** - 6A
- **B** - 10A
- **C** - 20A

Input Voltage
- **2** - 24VAC
- **4** - 120VAC
- **6** - 230VAC

Adjustment
- **1** - Fixed
- **2** - External adjust
- **3** - Onboard adjust

Time Delay*
- **0** - 0.1 - 10s
- **1** - 1 - 100s
- **2** - 10 - 1000s
- **3** - 0.1 - 10m
- **4** - 1 - 100m
- **5** - 10 - 1000m

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec. or (**M**) min.

Specifications

Time Delay
Range . . . . . 0.1s - 1000m in 6 adjustable ranges or fixed
Repeat Accuracy . . . . . ±0.5% or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ≤ ±1%
Reset Time . . . . . ≤ 150ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±2%

Input
Voltage . . . . . 24, 120, or 230VAC
Tolerance . . . . . ±20%
AC Line Frequency . . . . . 50/60 Hz
Power Consumption . . . . . ≤ 2VA

Output
Type . . . . . Solid state
Form . . . . . NC

Rating	Output	Steady State	Inrush**
	A	6A	60A
	B	10A	100A
	C	20A	200A

Minimum Load Current 100mA
Voltage Drop . . . . . ≅ 2.5V at rated current
OFF State Leakage Current . . . . . ≅ 5mA @ 230VAC

Protection
Circuitry . . . . . Encapsulated
Dielectric Breakdown . . . . . ≥ 2000V RMS terminals to mounting surface
Insulation Resistance . . . . . ≥ 100 MΩ

Mechanical
Mounting ** . . . . . Surface mount with one #10 (M5 x 0.8) screw
Dimensions . . . . . 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 / Storage Temperature . . . . . -40° to 60°C / -40° to 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 16ms.

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 230VAC. Time delays of 0.1 seconds to 1000 minutes are available in 6 ranges. The output is rated 1A steady and 10A inrush. The modules are totally solid state and encapsulated to protect the electronic circuitry.

Operation (Delay-on-Make NC):
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.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features:

- Fixed or adjustable delays from 0.1s - 1000m
- ±0.5% repeat accuracy
- ±5% factory calibration
- 24, 120, or 230VAC
- 1A, solid-state output
- Encapsulated

Approvals:

Auxiliary Products:

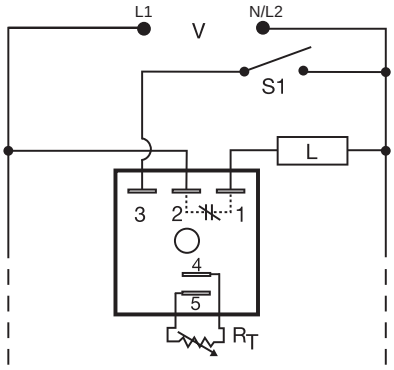
- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Mounting bracket:** P/N: P1023-6
- **Female quick connect:**
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Available Models:

KSD4433

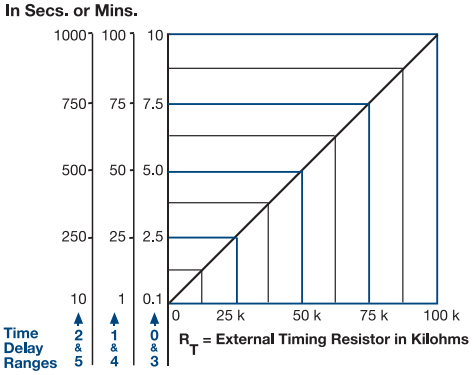
If desired part number is not listed, please call us to see if it is technically possible to build.

Connection:



S1 = Initiate Switch
R_T is used when external adjustment is ordered.

External Resistance vs. Time Delay:



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.

Order Table:

KSD4 **X** **X** **X**

Input Voltage
- **2** - 24VAC
- **4** - 120VAC
- **6** - 230VAC

Adjustment
- **1** - Fixed
- **2** - External adjust
- **3** - Onboard adjust

Time Delay*
- **0** - 0.1 - 10s
- **1** - 1 - 100s
- **2** - 10 - 1000s
- **3** - 0.1 - 10m
- **4** - 1 - 100m
- **5** - 10 - 1000m

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec. or (**M**) min.

Specifications

Time Delay
Range . . . . . 0.1s - 1000m in 6 adjustable ranges or fixed
Repeat Accuracy . . . . . ±0.5% or 20ms, whichever is greater
Tolerance (Factory Calibration . . . . . ≤ ± 5%
Reset Time. . . . . ≤ 150ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±10%

Input
Voltage. . . . . 24, 120, or 230VAC
Tolerance. . . . . ±20%
AC Line Frequency . . . . . 50/60 Hz
Power Consumption . . . . . ≤ 2VA

Output
Type. . . . . Solid state
Form. . . . . NC, closed before & during timing
Maximum Load Current. . . . . 1A steady state, 10A inrush at 60°C
OFF State Leakage Current . . . . . ≅ 5mA @ 230VAC
Voltage Drop . . . . . ≅ 2.5V @ 1A

Protection
Circuitry . . . . . Encapsulated
Dielectric Breakdown . . . . . ≥ 2000V RMS terminals to mounting surface
Insulation Resistance. . . . . ≥ 100 MΩ

Mechanical
Mounting . . . . . Surface mount with one #10 (M5 x 0.8) screw
Dimensions. . . . . 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 . . . . . -40° to 60°C / -40° to 85°C
Humidity. . . . . 95% relative, non-condensing
Weight. . . . . ≅ 2.4 oz (68 g)

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 (Delay-on-Make NC):
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.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features:

- Fixed or adjustable delay
- Load energized prior to & during time delay
- 0.05 - 600s in 4 ranges
- ±2% repeat accuracy
- 24, 120, or 230VAC
- 1A, solid-state output
- Encapsulated

Approvals:

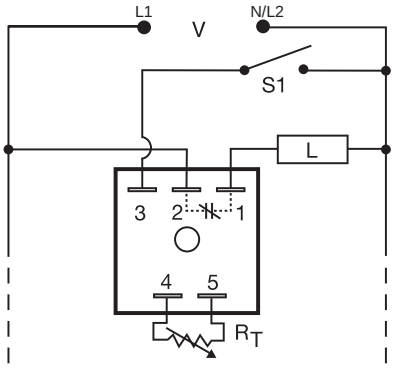
Auxiliary Products:

- **External ad just potentiometer:**
  P/N: P1004-XX
  P/N: P1004-XX-X
- **Mounting bracket:** P/N: P1023-6
- **Female quick connect:**
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20
- **Plug-on adjustment module:**
  P/N: VTP(X)(X)

Time Delay	VTP P/N
1 - 0.05-3s	VTP4B
2 - 0.5-60s	VTP4F
3 - 2-180s	VTP4J
4 - 5-600s	VTP5N

Selection Table for VTP Plug-on Adjustment Accessory.

Connection:



S1 = Initiate Switch
R_T is used when external adjustment is ordered.

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.

Available Models:

TS441180
TS4422
TS4611

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

TS4 **X** **X** **X**

Input Voltage
- **2** - 24VAC
- **4** - 120VAC
- **6** - 230VAC

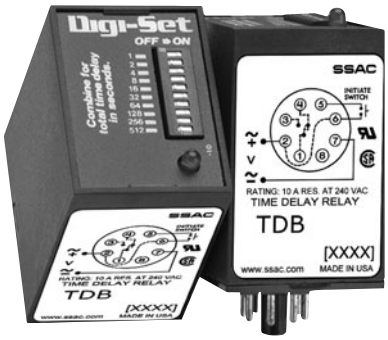
Adjustment
- **1** - Fixed
- **2** - External adjust

Time Delay*
- **1** - 0.05 - 3s
- **2** - 0.5 - 60s
- **3** - 2 - 180s
- **4** - 5 - 600s

*If fixed delay is selected, insert delay (**0.05 - 600**) in secs.

Specifications

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



The TDB Series combines accurate digital circuitry with isolated, 10A, DPDT or SPDT contacts in an 8 or 11-pin plug-in package. The TDB Series features DIP switch selectable time delays ranging from 0.1-10,230 seconds in three ranges. The TDB Series is the product of choice for custom control panel and OEM designers.

Operation (Delay-on-Break):
Input voltage must be applied to the input before and during timing. Upon closure of the initiate switch, the output relay is energized. The time delay begins when the initiate switch is opened (trailing edge triggered). The output remains energized during timing. At the end of the time delay, the output de-energizes. The output will energize if the initiate switch is closed when input voltage is applied.
Reset: Reclosing the initiate switch during timing resets the time delay. Loss of input voltage resets the time delay and output.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 8 for dimensional drawing.

Features:

- Switch settable time delay
- Three time ranges from 0.1s - 10,230s
- ±0.1% repeat accuracy
- ±2% setting accuracy
- 10A, SPDT or DPDT output contacts
- LED indication

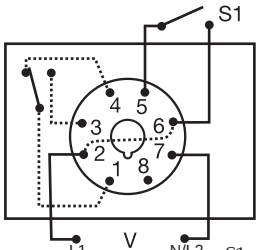
Approvals:

8-pin models UL listed when used in combination with P1011-6 socket only.

Auxiliary Products:

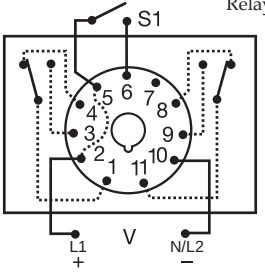
- **Panel mount kit:** P/N: BZ1
- **Hold-down clips (sold in pairs):**
  P/N: PSC8 (NDS-8)
  P/N: PSC11 (NDS-11)
- **11-pin socket:** P/N: NDS-11
- **Octal 8-pin socket:** P/N: NDS-8
- **Octal socket for UL listing:** P/N: P1011-6

Connection:



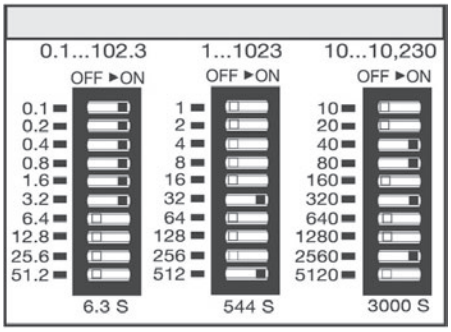
8-pin octal
SPDT

S1 = Initiate Switch
Relay contacts are isolated.



11-pin
DPDT

Digi-Set Binary Switch Operation:



Available Models:

TDB120AL	TDBH120AL
TDB120ALD	TDBH120ALD
TDB12D	TDBH24AL
TDB230AL	TDBL120AL
TDB24AL	TDBL120ALD
TDB24DL	TDBL24DL

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

TDB - 1 - 1023s in 1s increments
TDBH - 10 - 10,230s in 10s increments
TDBL - 0.1 - 102.3s in 0.1s increments

X — **Input Voltage**
- **12D** - 12VDC
- **24A** - 24VAC
- **24D** - 24VDC/28VDC
- **110D** - 110VDC
- **120A** - 120VAC
- **230A** - 230VAC

X — **LED***
- **L**

*Note: LED not available on 12VDC units.

X — **Type Plug / Output Form**
- **D** - 11-pin plug, DPDT
- **Blank** - Octal (8-pin) plug, SPDT

Specifications

Time Delay
Type: Digital integrated circuitry
Range**: 0.1 - 102.3s in 0.1s increments; 1 - 1023s in 1s increments; 10 - 10,230s in 10s increments
Repeat Accuracy: ±0.1% or 20ms, whichever is greater
Setting Accuracy: ±2% or 50ms, whichever is greater
Reset Time: ≤ 50ms
Recycle Time: ≤ 150ms
Time Delay vs Temp. & Voltage: ±5%
Indicator: LED indicates relay is energized
Initiate Time: ≤ 60ms

Input
Voltage: 12, 24/28, or 110VDC; 24, 120, or 230VAC
Tolerance: 12VDC & 24VDC/AC: -15% - 20%; 110 to 230VAC/DC: -20% - 10%
AC Line Frequency: 50/60 Hz
Power Consumption: ≤ 3.25W

Output
Type: Electromechanical relay
Form: SPDT or DPDT
Rating: 10A resistive @ 120/240VAC & 28VDC; 1/3 hp @ 120/240VAC
Life: Mechanical - 1 x 10^7; Electrical - 1 x 10^6

Protection
Isolation Voltage: ≥ 1500V RMS input to output
Polarity: DC units reverse polarity protected

Mechanical
Mounting: Plug-in socket
Dimensions: 3.2 x 2.4 x 1.8 in. (81.3 x 60.7 x 45.2 mm)
Termination: Octal 8-pin plug-in or 11-pin plug-in

Environmental
Operating / Storage Temperature: -20° to 65°C / -30° to 85°C
Weight: ≅ 6 oz (170 g)

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

The TRB Series combines an isolated, 10A electromechanical relay output with analog timing circuitry. False trigger of the TRB by a transient is unlikely because of the complete isolation of the circuit from the line prior to initiation. The initiate contact is common to one side of the line and may be utilized to operate other loads. Installation is easy due to the TRB's industry standard 8 or 11-pin plug-in base wiring.

Operation (Delay-on-Break):
Input voltage must be applied before and during timing. Upon closure of the initiate switch, the output relay energizes. The time delay begins when the initiate switch is opened (trailing edge triggered). The output remains energized during timing. At the end of the time delay, the output de-energizes. The output will energize if the initiate switch is closed when input voltage is applied.
Reset: Reclosing the initiate switch during timing resets the time delay. Loss of input voltage resets the time delay and output.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 9 for dimensional drawing.

Features:

- Onboard adjustable time delays
- Fixed or adjustable delays from 0.05 - 600s in multiple ranges
- ±2% repeat accuracy
- AC and DC operating voltages are available
- Isolated, 10A, SPDT or DPDT output contacts

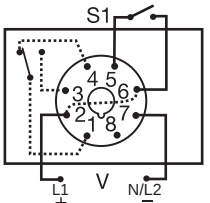
Approvals:

8-pin models UL listed when used in combination with P1011-6 socket only.

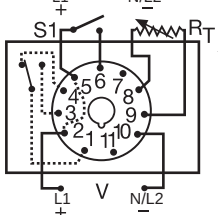
Auxiliary Products:

- **Panel mount kit:** P/N: BZ1
- **Hold-down clips (sold in pairs):** P/N: PSC8 (NDS-8) P/N: PSC11 (NDS-11)
- **Octal 8-pin socket:** P/N: NDS-8
- **11-pin socket:** P/N: NDS-11
- **Octal socket for UL listing:** P/N: P1011-6
- **External adjust potentiometers:** P/N: P1004-XX P/N: P1004-XX-X
- **Versa-knob:** P/N: P0700-7

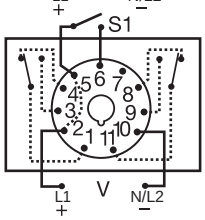
Connection:



8-pin octal SPDT



11-pin SPDT



11-pin DPDT

S1 = Initiate Switch
Relay contacts are isolated.
R_T is used when external adjustment is ordered.

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

Available Models:

TRB120A1Y240	TRB120A3X600
TRB120A2Y1	TRB24A1Y0.2
TRB120A2Y3	TRB24A4Y60
TRB120A2Y30	TRB24D10Y10

If desired part number is not listed, please call us to see if it is technically possible to build.

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.

Order Table:

TRB **X**

Input Voltage
- **24A** - 24VAC
- **24D** - 24VDC/28VDC
- **110D** - 110VDC
- **120A** - 120VAC
- **230A** - 230VAC

X

Adjustment and Output Form
- **1** - Fixed, Octal, SPDT (AC Volts only)
- **2** - Onboard Adjust, Octal, SPDT (AC Volts only)
- **3** - Lock Shaft Adjust, Octal, SPDT (AC Volts only)
- **4** - Onboard adjust, 11-pin, DPDT
- **7** - Ext. Adjust, 11-pin, SPDT without potentiometer
- **10** - Fixed, 11-pin, DPDT

X

Time Tolerance
- **X** - ±20%
- **Y** - ±10%
- **Z** - ±5%

X

Time Delay* (seconds)
- **1** - 0.05 - 1
- **2** - 0.05 - 2
- **3** - 0.05 - 3
- **5** - 0.1 - 5
- **10** - 0.1 - 10
- **30** - 1 - 30
- **60** - 1 - 60
- **120** - 2 - 120
- **180** - 2 - 180
- **240** - 7 - 240
- **300** - 7 - 300
- **360** - 7 - 360
- **420** - 7 - 420
- **480** - 7 - 480
- **600** - 7 - 600

*If fixed delay is selected, insert delay (0.05 - 600) in seconds.

Specifications

Time Delay
Type: Analog circuitry
Range: 50ms - 10m in 15 adjustable ranges or fixed
Repeat Accuracy: ±2% or 20ms, whichever is greater
Fixed Time Tolerance & Setting Accuracy: ±5, 10, or 20%
Initiate Time: ≤ 70ms
Reset Time: ≤ 75ms
Recycle Time: ≤ 250ms
Time Delay vs Temp. & Voltage: ≤±10%

Input
Voltage: 24/28 or 110VDC; 24, 120, or 230VAC (DC voltages on DPDT output models only)
Tolerance 24VDC/AC: -15% - 20%
Tolerance 110 to 230VAC/DC: -20% - 10%
AC Line Frequency: 50/60 Hz
Power Consumption: ≤ 3.25W

Output
Type: Electromechanical relay
Form: Isolated SPDT or DPDT
Rating: 10A resistive @ 120/240VAC & 28VDC; 1/3 hp @ 120/240VAC
Life: Mechanical - 1 x 10^7; Electrical - 1 x 10^6

Protection
Insulation Resistance: ≥ 100 MΩ
Isolation Voltage: ≥ 1500V RMS between input to output
Polarity: DC units are reverse polarity protected

Mechanical
Mounting: Plug-in socket
Dimensions: 3.62 x 2.39 x 1.78 in (91.6 x 60.7 x 45.2 mm)
Termination: Octal 8-pin plug-in or 11-pin plug-in

Environmental
Operating / Storage Temperature: -20° to 65°C / -30° to 85°C
Weight: ≅ 6 oz (170 g)

The PRLB Series is designed for use on non-critical timing applications. It offers low cost, knob adjustable timing control, full 10A 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 (Delay-on-Break):
Input voltage must be applied at all times prior to and during timing. Upon closure of the initiate switch, the output contacts transfer and remain transferred if no further action is taken. The LED is on steady. When the initiate switch is opened, the time delay is started. The LED flashes during timing. At the conclusion of the delay, the output contacts revert to their original unenergized position. Applying input voltage with the initiate switch closed will energize the load.
Reset: Reclosing the initiate switch during timing resets the time delay. Loss of input voltage resets the time delay and output.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 9 for dimensional drawing.

Features:

- Onboard adjustable time delay relay
- Electronic circuit with electromechanical relay
- Popular AC & DC operating voltages
- Industry standard octal plug-in connection
- Time delays 0.05 - 600s in 6 ranges
- ±2% repeat accuracy
- ±10% factory calibration
- LED indication
- 10A, SPDT output contacts

Approvals:

Auxiliary Products:

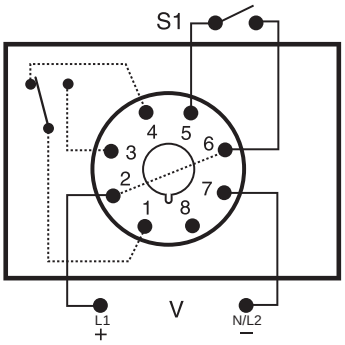
- **Panel mount kit:** P/N: BZ1
- **Hold-down clips (sold in pairs):** P/N: PSC8 (NDS-8)
- **Octal 8-pin socket:** P/N: NDS-8
- **DIN rail:** P/N: C103PM (Al)

Available Models:

PRLB422
PRLB425

If desired part number is not listed, please call us to see if it is technically possible to build.

Connection:



S1 = Initiate Switch
Relay contacts are isolated.

Order Table:

PRLB **X** **X** **X**

Input Voltage
- 1 - 12VDC
- 2 - 24VAC
- 3 - 24VDC
- 4 - 120VAC
- 5 - 110VDC
- 6 - 230VAC

Adjustment
- 1 - Factory Fixed
- 2 - Adjustable

Time Delay*
- 1 - 0.05 - 3s
- 2 - 0.1 - 10s
- 3 - 1 - 60s
- 4 - 2 - 180s
- 5 - 7 - 480s
- 6 - 7 - 600s

*If fixed delay is selected, insert delay (0.05 - 600) in seconds.

Specifications

Time Delay
Type ..... Analog circuitry
Range ..... 0.05 - 600s in 6 adjustable ranges or fixed
Repeat Accuracy ..... ±2% or 20ms, whichever is greater
Tolerance ..... Knob adjust: guaranteed range
Fixed: ±10%
Reset Time ..... ≤ 75ms
Recycle Time ..... ≤ 250ms
Time Delay vs Temp. & Voltage ..... ≤ ±10%

Input
Voltage ..... 12, 24, or 110VDC; 24, 120, or 230VAC
Tolerance 12VDC & 24VDC/AC ..... -15% - 20%
110 to 230VAC/DC ..... -20% - 10%
AC Line Frequency ..... 50/60 Hz
Power Consumption ..... ≤ 2.25W

Output
Type ..... Electromechanical relay
Form ..... Isolated, SPDT
Rating ..... 10A resistive @ 28VDC; 10A resistive @ 240VAC;
1/3 hp @ 120 & 240VAC
Life ..... Mechanical - $1x10^7$; Electrical - $1x10^6$

Protection
Surge ..... IEEE C62.41-1991 Level A
Isolation Voltage ..... ≥ 1500V RMS input to output
Insulation Resistance ..... ≥ 100 MΩ
Polarity ..... DC units are reverse polarity protected

Indication
Type ..... LED
Operation ..... Output energized - on steady
Output energized & timing - flashing

Mechanical
Mounting ..... Plug-in socket
Dimensions ..... 3.62 x 2.39 x 1.78 in. (91.6 x 60.7 x 45.2 mm)
Termination ..... Octal 8-pin plug-in

Environmental
Operating / Storage Temperature ..... -20° to 65°C / -30° to 85°C
Weight ..... ≅ 6 oz (170 g)

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

Operation (Delay-on-Break):
Input voltage must be applied before and during timing. Upon closure of the initiate switch, the output relay energizes. The time delay begins when the initiate switch is opened. The output remains energized during timing. At the end of the time delay, the output de-energizes. The output will energize if the initiate switch is closed when input voltage is applied.
Reset: Reclosing the initiate switch during timing resets the time delay. Loss of input voltage resets the time delay and output.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 2 for dimensional drawing.

Features:

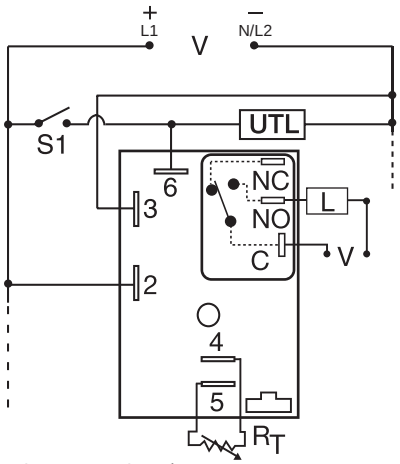
- Isolated, 30A, SPDT, NO output contacts
- 12 to 230V operation in 5 options
- Delays from 0.1s - 100m in 5 ranges
- ±0.5% repeat accuracy
- Factory fixed, onboard or external adjust

Approvals:

Auxiliary Products:

- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Mounting bracket:** P/N: P1023-6
- **Female quick connect:**
  P/N: P1015-13 (AWG 10/12)
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

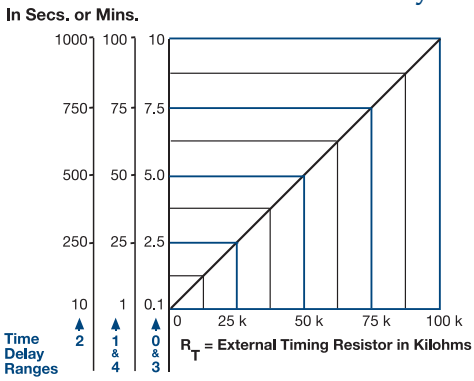
Connection:



S1 = Initiate Switch
L = Timed Load
UTL = Untimed Load (optional)
NO = Normally Open
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 isolated. Dashed lines are internal connections. The untimed load is optional.

External Resistance vs. Time Delay:



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.

Available Models:

HRDB1110M	HRDB320
HRDB113S	HRDB321
HRDB117S	HRDB322
HRDB120	HRDB323
HRDB121	HRDB324
HRDB124	HRDB4130S
HRDB21A65M	HRDB420
HRDB220	HRDB421
HRDB221	HRDB422
HRDB222	HRDB423
HRDB223	HRDB424
HRDB224	HRDB615M
HRDB315M	HRDB621
HRDB3160M	HRDB623

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

HRDB **X** **X** **X** **X**

Input Voltage
- **1** - 12VDC
- **2** - 24VAC
- **3** - 24VDC
- **4** - 120VAC
- **6** - 230VAC

Adjustment
- **1** - Fixed
- **2** - Onboard knob
- **3** - External adjust

Time Tolerance
- **Blank** - ±5%
- **A** - ±1%

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

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec, or (**0.1 - 100**) (**M**) min.

Specifications

Time Delay
Type . . . . . Microcontroller circuitry
Range . . . . . 0.1s - 100m in 5 adjustable ranges or fixed
Repeat Accuracy . . . . . ±0.5 % or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ±1%, ±5%
Reset Time . . . . . ≤ 150ms
Initiate Time . . . . . ≤ 20ms
Time Delay vs Temp. & Voltage . . . . . ±2%

Input
Voltage . . . . . 12 or 24VDC; 24, 120, or 230VAC
Tolerance 12VDC & 24VDC . . . . . -15% - 20%
24 to 230VAC . . . . . -20% - 10%
AC Line Frequency . . . . . 50/60 Hz
Power Consumption . . . . . AC ≤ 4VA; DC ≤ 2W

Output
Type . . . . . Electromechanical relay
Form . . . . . Isolated, SPDT

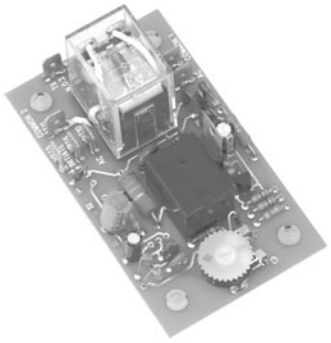
Ratings:		SPDT-NO	SPDT-NC
General Purpose	125/240VAC	30A	15A
Resistive	125/240VAC	30A	15A
	28VDC	20A	10A
Motor Load	125VAC	1 hp*	1/4 hp**
	240VAC	2 hp**	1 hp**

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 . . . . . ≥ 2000V 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
Dimensions . . . . . 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° to 60°C / -40° to 85°C
Humidity . . . . . 95% relative, non-condensing
Weight . . . . . ≅ 3.9 oz (111 g)



The ORB Series' open PCB construction offers the user good economy without sacrificing performance and reliability. The output relay is available in isolated, 10A, DPDT or SPDT forms. The time delay may be ordered as factory fixed, onboard knob, or external adjustment. All connections are 0.25 in. (6.35 mm) male quick connect terminals.

Operation (Delay-on-Break):
Input voltage must be applied before and during timing. Upon closure of the initiate switch, the output relay energizes. The time delay begins when the initiate switch is opened (trailing edge triggered). The output remains energized during timing. At the end of the time delay, the output de-energizes. The output will energize if the initiate switch is closed when input voltage is applied.
Reset: Reclosing the initiate switch during timing resets the time delay. Loss of input voltage resets the time delay and output.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 11 for dimensional drawing.

Features:

- Low cost open PCB construction
- 10A, DPDT or SPDT output contacts
- Line voltage initiation
- Delays from 0.05s - 300s in 5 ranges
- ±2% repeat accuracy
- ±10% factory calibration

Approvals:

Auxiliary Products:

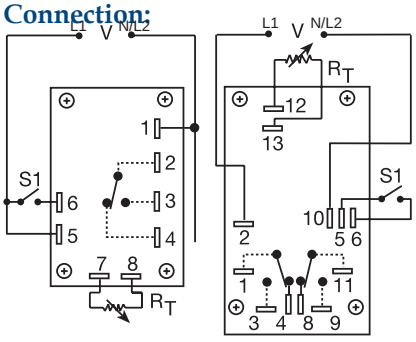
- **External ad just potentiometer:**
  P/N: P1004-12
  P/N: P1004-12-X
- **Female quick connect:**
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7

Available Models:

ORB120A160
ORB120A25
ORB24A15D
ORB24A21D
ORB24A25

If desired part number is not listed, please call us to see if it is technically possible to build.

Connection:



SPDT DPDT

Relay contacts are isolated.
R_T is used when external adjustment is ordered.

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.

Order Table:

ORB **X** **Input Voltage**
- **24A** - 24VAC
- **120A** - 120VAC
- **230A** - 230VAC

X **Adjustment**
- **1** - Fixed
- **2** - Onboard knob
- **3** - External adjust

X **Time Delay***
- **1** - 0.05 - 3s
- **2** - 0.5 - 30s
- **3** - 0.6 - 60s
- **4** - 1.2 - 120s
- **5** - 3 - 300s

X **Output Form**
- **Blank** - SPDT
- **D** - DPDT

*If fixed delay is selected, insert delay (**0.05 - 300**) in seconds.

Specifications

Time Delay
Type ..... Analog circuitry
Range ..... 0.05 - 300s in 5 adjustable ranges or fixed
Repeat Accuracy ..... ±2% or 20ms, whichever is greater
Tolerance (Factory Calibration) ..... Adjustable: guaranteed range
Fixed: ±10%
Reset Time ..... ≤ 50ms
Initiate Time ..... ≤ 70ms
Time Delay vs Temp. & Voltage ..... ≤ ±10%

Input
Voltage ..... 24, 120, or 230VAC
Tolerance 24VAC ..... -15% - 20%
120 & 230VAC ..... -20% - 10%
AC Line Frequency ..... 50/60 Hz
Power Consumption 2.25W

Output
Type ..... Electromechanical relay
Form ..... Isolated, SPDT or DPDT
Rating ..... 10A resistive @ 120/240VAC & 28VDC;
1/3 hp @ 120/240VAC
Life ..... Mechanical - $1x10^7$; Electrical - $1x10^6$

Protection
Isolation Voltage ..... ≥1500V 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 / Storage Temperature ..... -20° to 65°C / -30°to 85°C
Weight ..... ≅ 2.7 oz (77 g)

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

Operation (Delay-on-Break):
Input voltage must be applied before and during timing. Upon closure of the initiate switch, the output relay energizes. The time delay begins when the initiate switch is opened. The output remains energized during timing. At the end of the time delay, the output de-energizes. The output will energize if the initiate switch is closed when input voltage is applied.
Reset: Reclosing the initiate switch during timing resets the time delay. Loss of input voltage resets the time delay and output.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features:

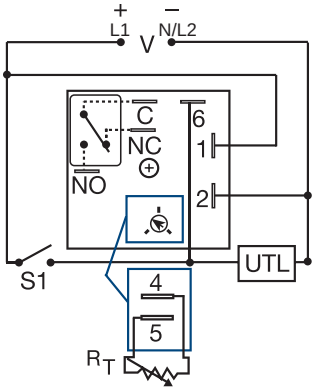
- Compact time delay relay
- Microcontroller circuitry
- ±0.5% repeat accuracy
- Isolated, 10A, SPDT output contacts
- Factory fixed, onboard or external adjust
- Delays from 0.1s - 1000m in 6 ranges
- Input voltages from 12 to 230V in 6 options
- ±5% factory calibration

Approvals:

Auxiliary Products:

- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Mounting bracket:** P/N: P1023-6
- **Female quick connect:**
  P/N: P1015-13 (AWG 10/12)
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

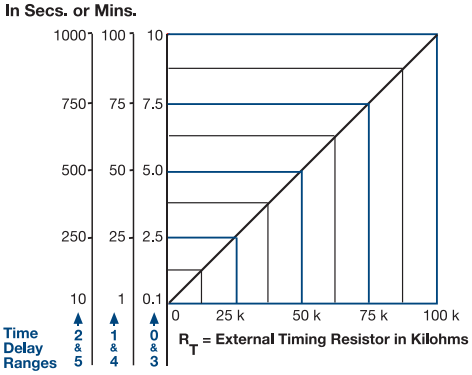
Connection:



V = Voltage
S1 = Initiate Switch
C = Common, Transfer Contact
NO = Normally Open
NC = Normally Closed
UTL = Untimed Load (optional)

A knob is supplied for adjustable units. The untimed load is optional. Relay contacts are isolated.

External Resistance vs. Time Delay:



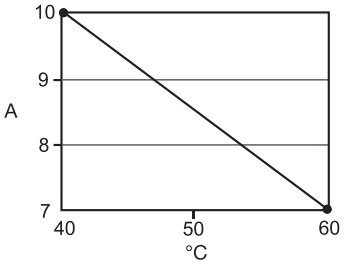
This chart applies to externally adjustable part numbers.
The time delay is adjustable over the time delay range selected by varying the resistance across the RT terminals; as the resistance increases the time delay increases.
When selecting an external RT, add the tolerances of the timer and the RT 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.

Available Models:

KRDB1110S	KRDB217S
KRDB112.5S	KRDB222
KRDB1120M	KRDB31120S
KRDB115M	KRDB415S
KRDB1160M	KRDB420
KRDB120	KRDB421
KRDB121	KRDB422
KRDB124	KRDB424
KRDB125	KRDB425

If desired part number is not listed, please call us to see if it is technically possible to build.

Output Current/Ambient Temperature



Order Table:

KRDB **X** **X** **X**

Input Voltage
- **1** - 12VDC
- **2** - 24VAC/DC
- **3** - 24VDC
- **4** - 120VAC
- **5** - 110VDC
- **6** - 230VAC

Adjustment
- **1** - Fixed
- **2** - Onboard knob
- **3** - External adjust

Time Delay*
- **0** - 0.1 - 10s
- **1** - 1 - 100s
- **2** - 10 - 1000s
- **3** - 0.1 - 10m
- **4** - 1 - 100m
- **5** - 10 - 1000m

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec, or (**M**) min.

Specifications

Time Delay
Type . . . . . Microcontroller with watchdog circuitry
Range . . . . . 0.1s - 1000m in 6 adjustable ranges or fixed
Repeat Accuracy . . . . . ±0.5% or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ≤ ±5%
Recycle Time . . . . . ≤ 150ms
Initiate Time . . . . . ≤ 40ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±5%

Input
Voltage . . . . . 12, 24, 110VDC; 24, 120 or 230VAC
Tolerance 12VDC & 24VDC/AC . . . . . -15% - 20%
110VDC, 120 or 230VAC . . . . . -20% - 10%
AC Line Frequency / DC Ripple . . . . . 50/60 Hz / ≤ 10%
Power Consumption . . . . . AC ≤ 2VA; DC ≤ 2W

Output
Type . . . . . Isolated relay contacts
Form . . . . . SPDT
Rating (at 40°C) . . . . . 10A resistive @ 125VAC;
5A resistive @ 230VAC & 28VDC;
1/4 hp @ 125VAC
Max. Switching Voltage 250VAC
Life (Operations) . . . . . Mechanical - 1 x 10^7; Electrical - 1 x 10^5

Protection
Circuitry . . . . . Encapsulated
Isolation Voltage . . . . . ≥ 1500V 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
Dimensions . . . . . 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 . . . . . -40° to 60°C / -40° to 85°C
Humidity . . . . . 95% relative, non-condensing
Weight . . . . . ≅ 2.6 oz (74 g)

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

Operation (Delay-on-Break):
Input voltage must be applied before and during timing. Upon closure of the initiate switch, the output energizes. The time delay begins when the initiate switch is opened (trailing edge triggered). The output remains energized during timing. At the end of the time delay, the output de-energizes. The output will energize if the initiate switch is closed when input voltage is applied.
Reset: Reclosing the initiate switch during timing resets the time delay. Loss of input voltage resets the time delay and output.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features:

- Switch selectable time setting
- 0.1s - 102.3m in 3 ranges
- ± 0.5% repeat accuracy
- ± 2% setting accuracy
- 1A, solid-state output
- Wide voltage ranges

Approvals:

Auxiliary Products:

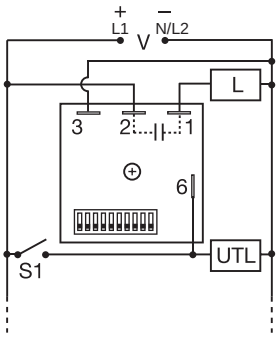
- **Female quick connect:**
  P/N: P1015-13 (AWG 10/12)
  P/N: P1015-64 (AWG 14/16)
  P/N: P1015-14 (AWG 18/22)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **DIN rail:** P/N: C103PM
- **DIN rail adaptor:** P/N: 1023-20

Available Models:

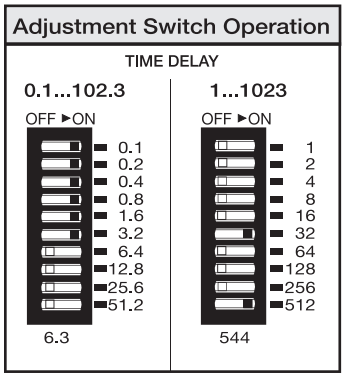
TDUB3000A	TDUBH3002A
TDUB3002A	TDUBL3002A

If desired part number is not listed, please call us to see if it is technically possible to build.

Connection:



UTL = Optional Untimed Load
S1 = Initiate Switch
L = Timed Load



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

Order Table:

Input Voltage Range	Time Range	Part Number
24 to 120VAC	0.1 - 102.3s	TDUBL3000A
100 to 240VAC	0.1 - 102.3s	TDUBL3001A
12 to 24VDC	0.1 - 102.3s	TDUBL3002A
24 to 120VAC	1 - 1023s	TDUB3000A
100 to 240VAC	1 - 1023s	TDUB3001A
12 to 24VDC	1 - 1023s	TDUB3002A
24 to 120VAC	0.1 - 102.3m	TDUBH3000A
100 to 240VAC	0.1 - 102.3m	TDUBH3001A
12 to 24VDC	0.1 - 102.3m	TDUBH3002A

Specifications

Time Delay
Range* ..... 0.1 - 102.3s in 0.1s increments
1 - 1023s in 1s increments
0.1 - 102.3m in 0.1m increments
Repeat Accuracy ..... ±0.5% or 20ms, whichever is greater
Setting Accuracy ..... ≤ ±2% or 20ms, whichever is greater
Reset Time ..... ≤ 150ms
Initiate Time ..... ≤ 20ms
Time Delay vs Temp. & Voltage ..... ≤ ±5%
Input
Voltage / Tolerance ..... 24 to 240VAC, 12 to 24VDC /±20%
AC Line Frequency / DC Ripple ..... 50/60 Hz / ≤ 10%
Power Consumption ..... AC ≤ 2VA; DC ≤ 1W
Output
Type ..... Solid state
Form ..... NO, closed before and during timing
Rating ..... 1A steady state, 10A inrush at 60°C
Voltage Drop ..... AC ≅ 2.5V @ 1A; DC ≅ 1V @ 1A
Off State Leakage Current ..... AC ≅ 5mA @ 230VAC; DC ≅ 1mA
Protection
Circuitry ..... Encapsulated
Dielectric Breakdown ..... ≥ 2000V 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
Dimensions ..... 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 ..... -40° to 60°C / -40° to 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.

The TSDB Series is designed for more demanding commercial and industrial applications where small size, and accurate performance are required. The factory calibration for fixed time delays is within 1% of the target time delay. The repeat accuracy, under stable conditions, is 0.5% of the time delay. The TSD Series is rated to operate over an extended temperature range. Time delays of 0.1 seconds to 1000 minutes are available. The output is rated 1A steady and 10A inrush. The modules are totally solid state and encapsulated to protect the electronic circuitry.

Operation (Delay-on-Break):
Input voltage must be applied before and during timing. Upon closure of the initiate switch, the output energizes. The time delay begins when the initiate switch is opened. The output remains energized during timing. At the end of the time delay, the output de-energizes. The output will energize if the initiate switch is closed when input voltage is applied.
Reset: Reclosing the initiate switch during timing resets the time delay. Loss of input voltage resets the time delay and output.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features:

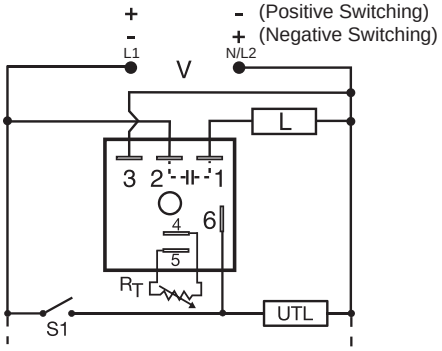
- Fixed or adjustable delays 0.1s - 1000m in 6 ranges
- ±0.5% repeat accuracy
- ± 1% factory calibration
- 12VDC to 230VAC in 5 options
- 1A, solid-state output
- Encapsulated

Approvals:

Auxiliary Products:

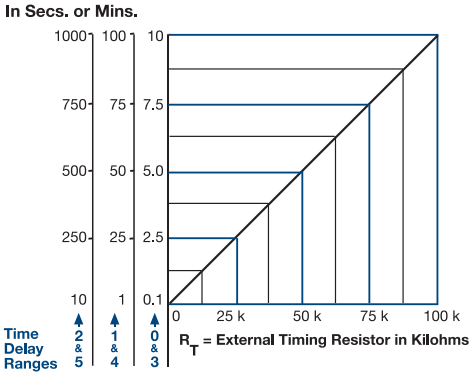
- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Mounting bracket:** P/N: P1023-6
- **Female quick connect:**
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Connection:



UTL = Optional Untimed Load
L = Timed Load
S1 = Initiate Switch
R_T is used when external adjustment is ordered.

External Resistance vs. Time Delay:



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.

Available Models:

TSDB120P
TSDB320P
TSDB420
TSDB431
TSDB434

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

TSDB **X** **Input Voltage**
- **1** - 12VDC
- **2** - 24VAC
- **3** - 24VDC
- **4** - 120VAC
- **6** - 230VAC

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

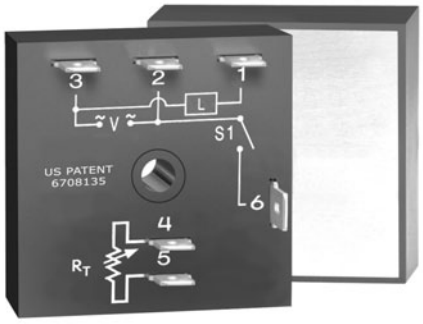
X **Time Delay***
- **0** - 0.1 - 10s
- **1** - 1 - 100s
- **2** - 10 - 1000s
- **3** - 0.1 - 10m
- **4** - 1 - 100m
- **5** - 10 - 1000m

X **Switching Mode (VDC only)**
- **P** - Positive
- **N** - Negative

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec. or (**M**) min.

Specifications

Time Delay
Range . . . . . 0.1s - 1000m in 6 adjustable ranges or fixed
Repeat Accuracy . . . . . ±0.5 % or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ≤ ±1%
Reset Time . . . . . ≤ 150ms
Initiate Time . . . . . ≤ 20ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±2%
Input
Voltage . . . . . 12 or 24VDC; 24, 120, or 230VAC
Tolerance . . . . . ±15%
Power Consumption . . . . . AC ≤ 2VA; DC ≤ 1W
AC Line Frequency / DC Ripple . . . . . 50/60 Hz / ≤ 10 %
Output
Type . . . . . Solid state
Form . . . . . NO, closed before & during timing
Maximum Load Current . . . . . 1A steady state, 10A inrush at 60°C
Off State Leakage Current . . . . . ≅ 5mA @ 230VAC; DC ≅ 1mA
Voltage Drop . . . . . AC ≅ 2.5V @ 1A; DC ≅ 1V @ 1A
DC Operation . . . . . Positive or negative switching
Protection
Circuitry . . . . . Encapsulated
Dielectric Breakdown . . . . . ≥ 2000V 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
Dimensions . . . . . 2 x 2 x 1.21 in. (50.8 x 50.8 x 30.7mm)
Termination . . . . . 0.25 in. (6.35 mm) male quick connect terminals
Environmental
Operating / Storage Temperature . . . . . -40° to 75°C / -40° to 85°C
Humidity . . . . . 95% relative, non-condensing
Weight . . . . . ≅ 2.4 oz (68 g)



The THDB 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 (Delay-on-Break):
Input voltage must be applied before and during timing. Upon closure of the initiate switch, the output energizes. The time delay begins when the initiate switch is opened. The output remains energized during timing. At the end of the time delay, the output de-energizes. The output energizes if the initiate switch is closed when input voltage is applied.
Reset: Reclosing the initiate switch during timing resets the time delay. Loss of input voltage resets the time delay and output.

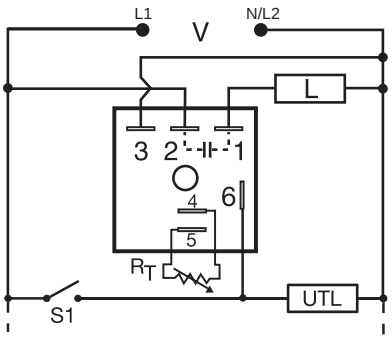
For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 4 for dimensional drawing.

Features:

- High load currents up to 20A, 200A inrush
- Fixed or adjustable 0.1s - 1000m in 6 ranges
- ±0.5% repeat accuracy
- ±1% factory calibration
- 24, 120, or 230VAC
- Metallized mounting surface for heat transfer
- Totally solid-state & encapsulated

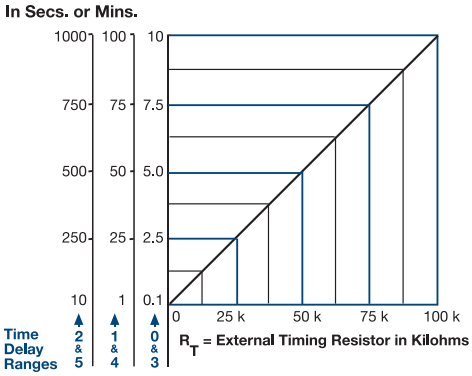
Approvals:

Connection:



UTL = Optional Untimed Load
L = Timed Load
S1 = Initiate Switch
R_T is used when external adjustment is ordered.

External Resistance vs. Time Delay:



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.

Auxiliary Products:

- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Female quick connect:**
  P/N: P1015-13 (AWG 10/12)
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7

Available Models:

THDB231C	THDB430C
THDB232C	THDB431C
THDB233C	THDB432C
THDB234C	THDB433C
THDB235C	THDB434C
THDB4110MC	THDB435C
THDB421A	

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

THDB **X** **Input Voltage**
- **2** - 24VAC
- **4** - 120VAC
- **6** - 230VAC

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

X **Time Delay***
- **0** - 0.1 - 10s
- **1** - 1 - 100s
- **2** - 10 - 1000s
- **3** - 0.1 - 10m
- **4** - 1 - 100m
- **5** - 10 - 1000m

X **Output Rating**
- **A** - 6A
- **B** - 10A
- **C** - 20A

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec. or (**M**) min.

Specifications

Time Delay
Range . . . . . 0.1s - 1000m in 6 adjustable ranges or fixed
Repeat Accuracy . . . . . ±0.5% or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ≤ ±1%
Reset Time . . . . . ≤ 150ms
Initiate Time . . . . . ≤ 20ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±2%
Input
Voltage . . . . . 24, 120, or 230VAC
Tolerance . . . . . ±20%
AC Line Frequency . . . . . 50/60 Hz
Power Consumption . . . . . ≤ 2VA
Output
Type . . . . . Solid state
Form . . . . . NO, closed before & during timing

Maximum Load Current	Output	Steady State	Inrush**
	A	6A	60A
	B	10A	100A
	C	20A	200A

Voltage Drop . . . . . ≅ 2.5V @ rated current
Off State Leakage Current . . . . . ≅ 5mA @t 230VAC
Minimum Load Current 100mA
Protection
Circuitry . . . . . Encapsulated
Dielectric Breakdown . . . . . ≥ 2000V RMS terminals to mounting surface
Insulation Resistance . . . . . ≥ 100 MΩ
Mechanical
Mounting ** . . . . . Surface mount with one #10 (M5 x 0.8) screw
Dimensions . . . . . 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 / Storage Temperature . . . . . -40° to 60°C / -40° to 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 surface temperature is 90°C. Inrush: Non-repetitive for 16ms.

The KSDB 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 1A steady and 10A inrush. The modules are totally solid state and encapsulated to protect the electronic circuitry.

Operation (Delay-on-Break):
Input voltage must be applied before and during timing. Upon closure of the initiate switch, the output energizes. The time delay begins when the initiate switch is opened. The output remains energized during timing. At the end of the time delay, the output de-energizes. The output energizes if the initiate switch is closed when input voltage is applied.
Reset: Reclosing the initiate switch during timing resets the time delay. Loss of input voltage resets the time delay and output.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features:

- Fixed or adjustable 0.1s - 1000m in 6 ranges
- ±0.5% repeat accuracy
- ± 5% factory calibration
- 12VDC to 230VAC in 6 ranges
- 1A, solid-state output
- Encapsulated

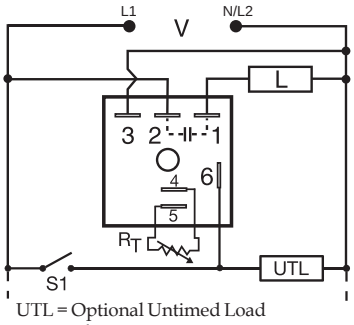
Approvals:

Auxiliary Products:

- **External adjust potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Mounting bracket:** P/N: P1023-6
- **Female quick connect:**
  P/N: P1015-64 (AWG 14/16)
  P/N: P1015-14 (AWG 18/22)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

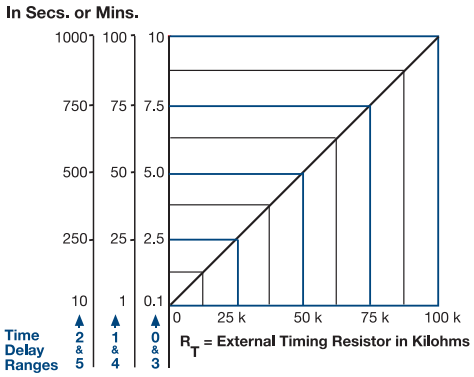
Connection:

\+ - (Positive Switching)
\- + (Negative Switching)



UTL = Optional Untimed Load
L = Load
S1 = Initiate Switch
R_T is used when external adjustment is ordered.

External Resistance vs. Time Delay:



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.

Available Models:

KSDB1110MP	KSDB320P
KSDB1115SP	KSDB324N
KSDB1120SP	KSDB330N
KSDB113MP	KSDB330P
KSDB113SP	KSDB334P
KSDB1160SP	KSDB4110S
KSDB120P	KSDB41150S
KSDB134P	KSDB4120M
KSDB2115S	KSDB4160S
KSDB220	KSDB4190M
KSDB231	KSDB431
KSDB312SN	KSDB61150S
KSDB314SP	KSDB631
KSDB315SP	

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

KSDB **X** **Input Voltage**
- **1** - 12VDC
- **2** - 24VAC
- **3** - 24VDC
- **4** - 120VAC
- **5** - 120VDC
- **6** - 230VAC

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

X **Time Delay***
- **0** - 0.1 - 10s
- **1** - 1 - 100s
- **2** - 10 - 1000s
- **3** - 0.1 - 10m
- **4** - 1 - 100m
- **5** - 10 - 1000m

X **Switching Mode (VDC only)**
- **P** - Positive
- **N** - Negative

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec. or (**M**) min.

Specifications

Time Delay
Range . . . . . 0.1s - 1000m in 6 adjustable ranges or fixed
Repeat Accuracy . . . . . ±0.5 % or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ≤ ±5%
Reset Time . . . . . ≤ 150ms
Initiate Time . . . . . ≤ 20ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±10%
Input
Voltage . . . . . 12, 24, or 120VDC; 24, 120, or 230VAC
Tolerance . . . . . ±20%
Power Consumption . . . . . AC ≤ 2VA; DC ≤ 2W
AC Line Frequency / DC Ripple . . . . . 50/60 Hz / ≤ 10 %
Output
Type . . . . . Solid state
Form . . . . . NO, closed before & during timing
Maximum Load Current . . . . . 1A steady state, 10A inrush at 60°C
OFF State Leakage Current . . . . . AC ≅ 5mA @ 230VAC; DC ≅ 1mA
Voltage Drop . . . . . AC ≅ 2.5V @ 1A; DC ≅ 1V @ 1A
DC Operation . . . . . Positive or negative switching
Protection
Circuitry . . . . . Encapsulated
Dielectric Breakdown . . . . . ≥ 2000V 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
Dimensions . . . . . 2 x 2 x 1.21 in. (50.8 x 50.8 x 30.7mm)
Termination . . . . . 0.25 in. (6.35 mm) male quick connect terminals
Environmental
Operating / Storage Temperature . . . . . -40° to 60°C / -40° to 80°C
Humidity . . . . . 95% relative, non-condensing
Weight . . . . . ≅ 2.4 oz (68 g)

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.
Operation (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.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features:

- Two terminal series connection to load
- Fixed or adjustable 1s - 1000m in 5 ranges
- Digital integrated circuitry
- ±0.5% repeat accuracy

Approvals:

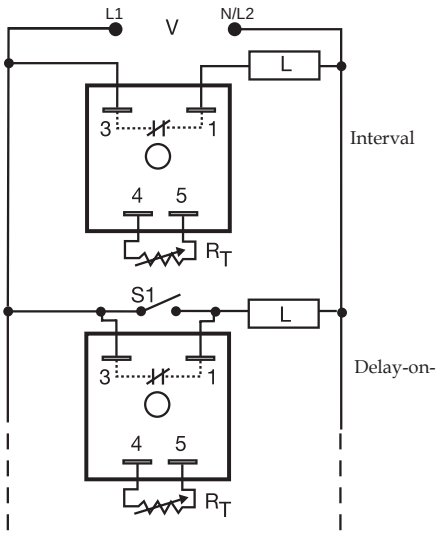
Auxiliary Products:

- **External ad just potentiometer:**
  P/N: P1004-13
  P/N: P1004-13-X
- **Female quick connect:**
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20
- **Mounting bracket:** P/N: P1023-6
- **Plug-on adjustment module:**
  P/N: VTP(X)(X)

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

Selection Table for VTP Plug-on Adjustment Accessory.

Connection:



V = Voltage
L = Load
S1 = Initiate Switch
R_T is used when external adjustment is ordered.

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.

Available Models:

TSD72130S
TSD7222
TSD74110M
TSD7412S
TSD7413S
TSD7414M
TSD7421
TSD7423
TSD7424
TSD761120S
TSD761180S
TSD7611S
TSD7621

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

TSD7 **X** **X** **X**

Input Voltage
- **2** - 24VAC
- **4** - 120VAC
- **6** - 230VAC

Adjustment
- **1** - Fixed
- **2** - External adjust

Time Delay*
- **1** - 1 - 100s
- **2** - 10 - 1000s
- **3** - 0.1 - 10m
- **4** - 1 - 100m
- **5** - 10 - 1000m

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec. or (**1 - 1000**) (**M**) min.

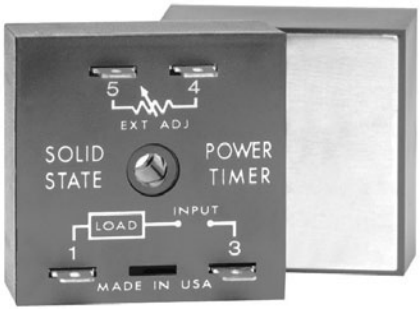
Specifications

Time Delay
Type . . . . . Digital integrated circuitry
Range . . . . . 1s - 1000m in 5 adjustable ranges or fixed
Repeat Accuracy . . . . . ±0.5% or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ≤ ±10%
Recycle Time . . . . . ≤ 400ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±2%
Input
Voltage . . . . . 24, 120, or 230VAC
Tolerance . . . . . ±20%
AC Line Frequency . . . . . 50/60 Hz
Output
Type . . . . . Solid state
Form . . . . . NO, closed during timing
Maximum Load Current . . . . . 1A steady state, 10A inrush at 45°C
Minimum Load Current 40mA

Effective Voltage Drop (VLine-VLoad)

Input	Effective Drop
24VAC	3V
120VAC	4V
230VAC	6V

Protection
Circuitry . . . . . Encapsulated
Dielectric Breakdown . . . . . ≥ 2000V RMS terminals to mounting surface
Insulation Resistance . . . . . ≥ 100 MΩ
Mechanical
Mounting . . . . . Surface mount with one #10 (M5 x 0.8) screw
Dimensions . . . . . 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 . . . . . -40° to 75°C / -40° to 85°C
Humidity . . . . . 95% relative, non-condensing
Weight . . . . . ≅ 2.4 oz (68 g)



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.
Operation (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.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 4 for dimensional drawing.

Features:

- Solid-state relay and timer combined
- Two terminal series connection to load
- Up to 20A steady state, 200A inrush
- Fixed or adjustable delays from 1s - 1000m
- ±0.5% repeat accuracy

Approvals:

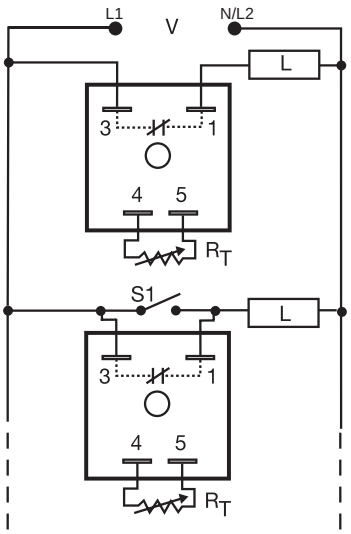
Auxiliary Products:

- **External ad just potentiometer:**
  P/N: P1004-13
  P/N: P1004-13-X
- **Mounting bracket:** P/N: P1023-6
- **Female quick connect:**
  P/N: P1015-13 (AWG 10/12)
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20
- **Versa-knob:** P/N: P0700-7
- **Plug-on adjustment module:**
  P/N: VTP(X)(X)

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

Selection Table for VTP Plug-on Adjustment Accessory.

Connection:



V = Voltage
L = Load
S1 = Initiate Switch
R_T is used when external adjustment is ordered.

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.

Available Models:

THD72110SA
THD7415SB
THD7421C
THD7612MA
THD7621C

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

THD7 **X** **Input Voltage**
- **2** - 24VAC
- **4** - 120VAC
- **6** - 230VAC

X **Adjustment**
- **1** - Fixed
- **2** - External adjust

X **Time Delay***
- **1** - 1 - 100s
- **2** - 10 - 1000s
- **3** - 0.1 - 10m
- **4** - 1 - 100m
- **5** - 10 - 1000m

X **Output Rating**
- **A** - 6A
- **B** - 10A
- **C** - 20A

*If fixed delay is selected, insert delay (**1 - 1000**) followed by (**S**) sec. or (**0.1 - 1000**)(**M**) min.

Specifications

Time Delay
Type . . . . . Digital integrated circuitry
Range . . . . . 1s - 1000m in 5 adjustable ranges or fixed
Repeat Accuracy . . . . . ±0.5% or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ≤ ±10%
Recycle Time . . . . . After timing: ≤150ms; During timing: ≤ 350ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±2%
Input
Voltage . . . . . 24, 120, or 230VAC
Tolerance . . . . . ±20%
AC Line Frequency . . . . . 50/60 Hz
Output
Type . . . . . Solid state
Form . . . . . NO, closed during timing

Rating	Output	Steady State	Inrush**
	A	6A	60A
	B	10A	100A
	C	20A	200A

Effective Voltage Drop (VLine-VLoad)	Input	Effective Drop
	24VAC	≤ 3V
	120VAC	≤ 3V
	230VAC	≤ 5V

Minimum Load Current 100mA
Protection
Circuitry . . . . . Encapsulated
Dielectric Breakdown . . . . . ≥ 2000V RMS terminals to mounting surface
Insulation Resistance . . . . . ≥ 100 MΩ
Mechanical
Mounting ** . . . . . Surface mount with one #10 (M5 x 0.8) screw
Dimensions . . . . . 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 / Storage Temperature . . . . . -40° to 60°C / -40° to 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 16ms.

The TSB Series is a totally solid-state, delay-on-break timing module. The TSB is available with a fixed, external, or onboard adjustable time delay. Time Delays from 0.05 to 600 seconds, in 4 standard ranges, cover over 90% of all OEM and commercial appliance timing applications. The repeat accuracy is ±2%. Operating voltages of 24, 120, or 230VAC are available. The TSB's 1A steady state, 10A rated, solid-state output is perfect for direct control of solenoids, contactors, relays, lamps, buzzers, and small heaters. The TSB can be surface mounted with a single screw, or snapped on a 35 mm DIN rail using the P1023-20 adaptor.

Operation (Delay-on-Break):
Input voltage must be applied before and during timing. Upon closure of the initiate switch, the output energizes. The time delay begins when the initiate switch opens. The output remains energized during timing. At the end of the time delay, the output de-energizes. The output will energize if the initiate switch is closed when input voltage is applied.
Reset: Reclosing the initiate switch during timing resets the time delay. Loss of input voltage resets the output and the time delay.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features:

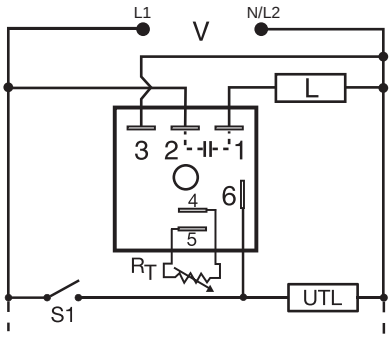
- Fixed or adjustable 0.05 - 600s in 4 ranges
- Totally solid state & encapsulated
- ± 2% repeat accuracy
- ±5% factory calibration

Approvals:

Auxiliary Products:

- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Mounting bracket:** P/N: P1023-6
- **Female quick connect:**
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Connection:



S1 = Initiate Switch
UTL = Optional Untimed Load
L = Load
R_T is used when external adjustment is ordered.

R_T Selection Chart				
Desired Time Delay* Seconds				R_T
1	2	3	4	Kohms
0.05	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 20% for tolerance of unit and the R_T.

Available Models:

TSB2130	TSB4190
TSB2190	TSB422
TSB222	TSB423
TSB232	TSB424
TSB4110	TSB432
TSB41300	TSB434
TSB414	TSB632
TSB4170	TSB634
TSB418	

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

TSB **X** **X** **X**

Input Voltage
- **2** - 24VAC
- **4** - 120VAC
- **6** - 230VAC

Adjustment
- **1** - Fixed
- **2** - External adjust
- **3** - Onboard adjust

Time Delay*
- **1** - 0.05 - 3s
- **2** - 0.5 - 60s
- **3** - 2 - 180s
- **4** - 5 - 600s

*If fixed delay is selected, insert delay (**0.05 - 600**) in seconds.

Specifications

Time Delay
Range . . . . . 0.05s - 600s in 4 adjustable ranges or fixed
Repeat Accuracy . . . . . ±2% or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ≤ ±5%
Time Delay vs Temp. & Voltage . . . . . ≤ ±10%
Reset Time. . . . . ≤ 150ms

Input
Voltage. . . . . 24, 120, or 230VAC
Tolerance. . . . . ±20%
AC Line Frequency . . . . . 50/60 Hz
Power Consumption . . . . . ≤ 2VA

Output
Type . . . . . Solid state
Form. . . . . NO, closed before & during timing
Maximum Load Current. . . . . 1A steady state, 10A inrush at 60°C
Off State Leakage Current . . . . . ≅ 5mA @ 230VAC
Voltage Drop . . . . . ≅ 2.5V @ 1A

Protection
Circuitry . . . . . Encapsulated
Dielectric Breakdown . . . . . ≥ 2000V RMS terminals to mounting surface
Insulation Resistance. . . . . ≥ 100 MΩ

Mechanical
Mounting . . . . . Surface mount with one #10 (M5 x 0.8) screw
Dimensions . . . . . 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 . . . . . -40° to 75°C / -40° to 85°C
Humidity. . . . . 95% relative, non-condensing
Weight . . . . . ≅ 2.4 oz (68 g)

The TDS Series combines accurate digital circuitry with isolated, 10A rated, DPDT or SPDT relay contacts in an 8 or 11-pin plug-in package. The TDS Series features DIP switch selectable time delays ranging from 0.1s to 10,230s in three ranges. The TDS Series is the product of choice for custom control panel and OEM designers.

Operation (Single Shot):
Input voltage must be applied to the input before and during timing. Upon momentary or maintained closure of the initiate switch (leading edge triggered), the output relay energizes for a measured interval of time. At the end of the delay, the output de-energizes. Opening or reclosing the initiate switch during timing has no affect on the time delay. The output will energize if the initiate switch is closed when input voltage is applied.
Reset: Reset occurs when the time delay is complete and the initiate switch is opened. Loss of input voltage resets the time delay and output.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 8 for dimensional drawing.

Features:

- Switch selectable time delay
- Three time ranges from 0.1s - 10,230s
- ±0.1% repeat accuracy
- ±2% setting accuracy
- 10A, SPDT or DPDT output contacts
- LED indication

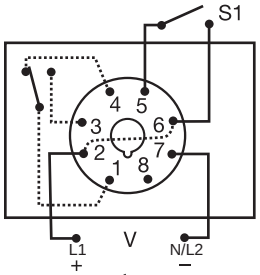
Approvals:

8-pin models UL listed when used in combination with P1011-6 socket only.

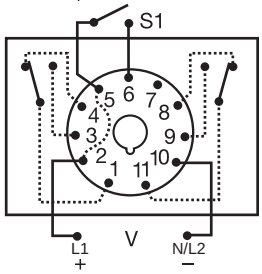
Auxiliary Products:

- **Panel mount kit:** P/N: BZ1
- **Hold-down clips (sold in pairs):**
  P/N: PSC8 (NDS-8)
  P/N: PSC11 (NDS-11)
- **11-pin socket:** P/N: NDS-11
- **Octal 8-pin socket:** P/N: NDS-8
- **Octal socket for UL listing:** P/N: P1011-6

Connection:



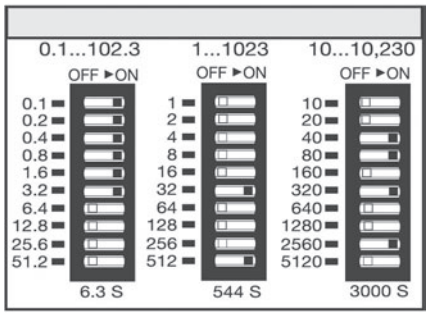
8-pin octal SPDT



11-pin DPDT

S1 = Initiate Switch
Relay contacts are isolated.

Digi-Set Binary Switch Operation:



Available Models:

TDS120AL	TDSH120AL
TDS120ALD	TDSH120ALD
TDS12D	TDSH24ALD
TDS230AL	TDSL120AL
TDS24AL	TDSL12D
TDS24DL	TDSL24D

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

TDS - 1 - 1023s in 1s increments
TDSH - 10 - 10,230s in 10s increments
TDSL - 0.1 - 102.3s in 0.1s increments

X — **Input Voltage**
- **12D** - 12VDC
- **24A** - 24VAC
- **24D** - 24VDC/28VDC
- **110D** - 110VDC
- **120A** - 120VAC
- **230A** - 230VAC

X — **LED***
- **L**

X — **Type of Plug /Output Form**
- **Blank** - Octal (8-pin) plug, SPDT
- **D** - 11-pin Plug, DPDT

* Note: LED not available in 12VDC

Specifications

Time Delay
Type . . . . . Digital integrated circuitry
Range** . . . . . 0.1 - 102.3s in 0.1s increments
1 - 1023s in 1s increments
10 - 10,230s in 10s increments
Repeat Accuracy . . . . . ±0.1% or 20ms, whichever is greater
Setting Accuracy . . . . . ±2% or 50ms, whichever is greater
Reset Time. . . . . ≤ 50ms
Recycle Time. . . . . ≤ 150ms
Time Delay vs Temp. & Voltage . . . . . ±5%
Indicator . . . . . LED glows during timing; relay is energized
Initiate Time . . . . . ≤ 60ms

Input
Voltage. . . . . 12, 24/28, or 110VDC; 24, 120, or 230VAC
Tolerance 12VDC & 24VDC/AC. . . . . -15% - 20%
110 to 230VAC/DC. . . . . -20% - 10%
AC Line Frequency . . . . . 50/60 Hz
Power Consumption . . . . . ≤ 3.25W

Output
Type . . . . . Electromechanical relay
Form. . . . . SPDT & DPDT
Rating . . . . . 10A resistive @ 120/240VAC & 28 VDC;
1/3 hp @ 120/240VAC
Life . . . . . Mechanical - 1 x 10^7; Electrical - 1 x 10^6

Protection
Isolation Voltage . . . . . ≥ 1500V RMS input to output
Polarity . . . . . DC units are reverse polarity protected

Mechanical
Mounting . . . . . Plug-in socket
Dimensions. . . . . 3.2 x 2.4 x 1.8 in. (81.3 x 60.7 x 45.2 mm)
Termination . . . . . Octal 8-pin plug-in or 11-pin plug-in

Environmental
Operating / Storage Temperature . . . . . -20° to 65°C / -30° to 85°C
Weight . . . . . ≅ 6 oz (170 g)

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

The TRS Series combines an isolated, 10A electromechanical, relay output with analog timing circuitry. False trigger of the TRS by a transient is unlikely because of the complete isolation of the circuit from the line prior to initiation. The initiate contact is common to one side of the line and may be utilized to operate other loads. Installation is easy due to the TRS's industry standard 8 or 11-pin plug-in base wiring.

Operation (Single Shot):
Input voltage must be applied to the input before and during timing. Upon momentary or maintained closure of the initiate switch (leading edge triggered), the output energizes for a measured interval of time. At the end of the delay, the output de-energizes. Opening or reclosing the initiate switch during timing has no affect on the time delay. Applying input voltage with the initiate switch closed will energize the load and begin the time delay.
Reset: Reset occurs when the time delay is complete and the initiate switch is opened. Loss of input voltage resets the time delay and output.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 9 for dimensional drawing.

Features:

- Knob adjustable time delays
- Fixed or adjustable 0.05 - 600s in 15 ranges
- Analog circuitry
- ±2% repeat accuracy
- AC & DC operating voltages are available
- Isolated, 10A, SPDT & DPDT output contacts

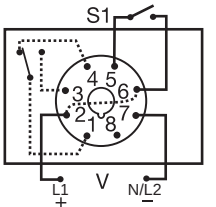
Approvals:

8-pin models UL listed when used in combination with P1011-6 socket only.

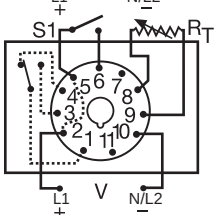
Auxiliary Products:

- **External ad just potentiometer:**
  P/N: P1004-XX
  P/N: P1004-XX-X
- **Octal socket for UL listing:** P/N: P1011-6
- **Hold-down clips (sold in pairs):**
  P/N: PSC8 (NDS-8)
  P/N: PSC11 (NDS-11)
- **Octal 8-pin socket:** P/N: NDS-8
- **11-pin socket:** P/N: NDS-11
- **Panel mount kit:** P/N: BZ1
- **Versa-knob:** P/N: P0700-7

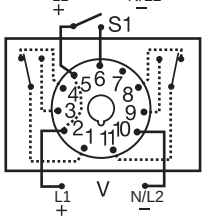
Connection:



8-pin octal SPDT



11-pin SPDT



11-pin DPDT

S1 = Initiate Switch
Relay contacts are isolated.
R_T is used when external adjustment is ordered.

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

Available Models:

TRS120A1X300
TRS120A2X300
TRS120A4Z3
TRS24D7Z10
TRS24D7Z3

If desired part number is not listed, please call us to see if it is technically possible to build.

R_T Selection Chart	
Time Delay*	
Range Seconds	R_T 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.

Order Table:

TRS **X** **X** **X** **X**

Input Voltage
- **24A** - 24VAC
- **24D** - 24VDC/28VDC
- **110D** - 110VDC
- **120A** - 120VAC
- **230A** - 230VAC

Adjustment and Output Form
- **1** - Fixed, Octal, SPDT (AC Volts only)
- **2** - Knob Adjust, Octal, SPDT (AC Volts only)
- **3** - Lock Shaft Adjust, Octal, SPDT (AC Volts only)
- **4** - Knob adjust, 11-pin, DPDT
- **7** - Ext. Adjust, 11-pin, SPDT without potentiometer
- **10** - Fixed, 11-pin, DPDT

*If fixed delay is selected, insert delay (0.05 - 600) in seconds.

Time Tolerance
- **X** - ±20%
- **Y** - ±10%
- **Z** - ±5%

Time Delay* (seconds)
- **1** - 0.05 - 1
- **2** - 0.05 - 2
- **3** - 0.05 - 3
- **5** - 0.1 - 5
- **10** - 0.1 - 10
- **30** - 1 - 30
- **60** - 1 - 60
- **120** - 2 - 120
- **180** - 2 - 180
- **240** - 7 - 240
- **300** - 7 - 300
- **360** - 7 - 360
- **420** - 7 - 420
- **480** - 7 - 480
- **600** - 7 - 600

Specifications

Time Delay
Type: Analog circuitry
Range: 0.05s - 10m in 15 adjustable ranges or fixed
Repeat Accuracy: ±2% or 20ms, whichever is greater
Fixed Time Tolerance & Setting Accuracy: ±5, 10, or 20%
Initiate Time: ≤ 70ms
Reset Time: ≤ 75ms
Recycle Time: ≤ 250ms
Time Delay vs Temp. & Voltage: ≤±10%

Input
Voltage: 24/28 or 110VDC; 24, 120, or 230VAC (DC voltages on DPDT output models only)
Tolerance 24VDC/AC: -15% - 20%
110 to 230VAC/DC: -20% - 10%
AC Line Frequency: 50/60 Hz
Power Consumption: ≤ 3.25W

Output
Type: Electromechanical relay
Form: Isolated SPDT or DPDT
Rating: 10A resistive @ 120/240VAC & 28VDC; 1/3 hp @ 120/240VAC
Life: Mechanical - 1 x 10^7; Electrical - 1 x 10^6

Protection
Insulation Resistance: ≥ 100 MΩ
Isolation Voltage: ≥ 1500V RMS between input & output terminals
Polarity: DC units are reverse polarity protected

Mechanical
Mounting: Plug-in socket
Termination: Octal 8-pin plug-in or 11-pin plug-in
Dimensions: 3.62 x 2.39 x 1.78 in. (91.6 x 60.7 x 45.2 mm)

Environmental
Operating / Storage Temperature: -20° to 65°C / -30° to 85°C
Weight: ≅ 6 oz (170 g)

The PRLS Series is designed for use on non-critical timing applications. It offers low cost, knob adjustable timing control; full 10A 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 (Single Shot):
Input voltage must be applied to the input at all times prior to and during timing. Upon closure of the initiate switch (momentary or maintained) the output contacts transfer and the time delay is initiated. The LED flashes during timing. At the end of the delay, the output contacts revert to their original position. If the initiate switch is reclosed during timing, the time delay will not be affected. Applying input voltage with the intiate switch closed will energize the load and begin the time delay.
Reset: Reset occurs when the time delay is complete and the initiate switch is opened. Loss of input voltage resets the time delay and output.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 9 for dimensional drawing.

Features:

- Knob adjustable time delay relay
- Electronic circuit with electromechanical relay
- AC & DC operating voltages
- Standard, octal plug-in connection
- Fixed or adjustable 0.05 - 600s in 6 ranges
- ±2% repeat accuracy
- ±10% factory calibration
- LED indication
- 10A, SPDT output contacts

Approvals:

Auxiliary Products:

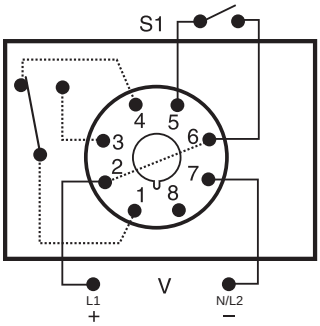
- **Panel mount kit:** P/N: BZ1
- **Hold-down clips (sold in pairs):** P/N: PSC8 (NDS-8)
- **Octal 8-pin socket:** P/N: NDS-8
- **DIN rail:** P/N: C103PM (Al)

Available Models:

PRLS625

If desired part number is not listed, please call us to see if it is technically possible to build.

Connection:



S1 = Initiate Switch
V = Voltage
Relay contacts are isolated.

Order Table:

PRLS **X** **X** **X**

Input Voltage
- **1** - 12VDC
- **2** - 24VAC
- **3** - 24VDC
- **4** - 120VAC
- **5** - 110VDC
- **6** - 230VAC

Adjustment
- **1** - Factory Fixed
- **2** - Adjustable

Time Delay*
- **1** - 0.05 - 3s
- **2** - 0.1 - 10s
- **3** - 1 - 60s
- **4** - 2 - 180s
- **5** - 7 - 480s
- **6** - 7 - 600s

*If fixed delay is selected, insert delay (0.05 - 600) in seconds.

Specifications

Time Delay	
Type	Analog circuitry
Range	0.05 - 600s in 6 adjustable ranges or fixed
Repeat Accuracy	±2% or 20ms, whichever is greater
Tolerance	Knob adjust: guaranteed range Fixed: ±10%
Reset Time	≤ 75ms
Recycle Time	≤ 250ms
Time Delay vs Temp. & Voltage	≤ ±10%
Input	
Voltage	24, 120, or 230VAC; 12, 24, or 110VDC
Tolerance 12VDC & 24VDC/AC	-15% - 20%
110 to 230VAC/DC	-20% - 10%
AC Line Frequency	50/60 Hz
Power Consumption	≤ 2.25W
Output	
Type	Electromechanical relay
Form	Isolated SPDT
Rating	10A resistive @ 28VDC; 10A resistive @ 240VAC; 1/3 hp @ 120 & 240VAC
Life	Mechanical - $1x10^7$; Electrical - $1x10^6$
Protection	
Surge	IEEE C62.41-1991 Level A
Isolation Voltage	≥ 1500V RMS input to output
Insulation Resistance	≥ 100 MΩ
Polarity	DC units are reverse polarity protected
Indication	
Type	LED
Operation	Output energized & timing - flashing
Mechanical	
Mounting	Plug-in socket
Dimensions	3.62 x 2.39 x 1.78 in. (91.6 x 60.7 x 45.2 mm)
Termination	Octal 8-pin, plug-in
Environmental	
Operating / Storage Temperature	-20° to 65°C / -30° to 85°C
Weight	≅ 6 oz (170 g)

The HRDS Series combines an electromechanical relay output with microcontroller timing circuitry. It offers 12 to 230V operation in five options and factory fixed, onboard or external 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 (Single Shot):
Input voltage must be applied before and during timing. Upon momentary or maintained closure of the initiate switch, the output relay energizes for a measured interval of time. At the end of the delay, the output de-energizes. Opening or reclosing the initiate switch during timing has no affect on the time delay. The output will energize if the initiate switch is closed when input voltage is applied.
Reset: Reset occurs when the time delay is complete and the initiate switch is opened. Loss of input voltage resets the time delay and output.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 2 for dimensional drawing.

Features:

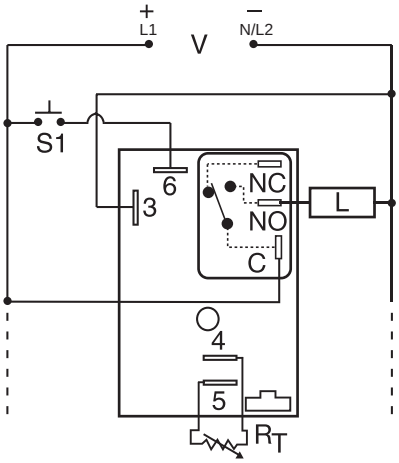
- 30A, SPDT, NO output contacts
- 12 to 230V operation in 5 options
- Encapsulated circuitry
- Delays from 0.1s - 100m in 5 ranges
- ±0.5% repeat accuracy
- Factory fixed, onboard or external adjust

Approvals:

Auxiliary Products:

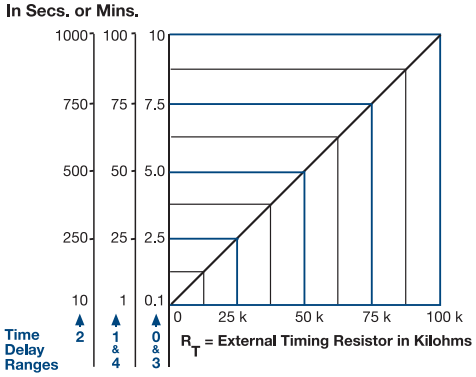
- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Mounting bracket:** P/N: P1023-6
- **Female quick connect:**
  P/N: P1015-13 (AWG 10/12)
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Connection:



NO = Normally Open
S1 = Initiate Switch
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.

External Resistance vs. Time Delay:



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.

Available Models:

HRDS120	HRDS322
HRDS124	HRDS323
HRDS21120S	HRDS324
HRDS220	HRDS420
HRDS221	HRDS421
HRDS222	HRDS422
HRDS223	HRDS423
HRDS313M	HRDS424
HRDS320	HRDS430
HRDS321	

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

HRDS **X** **Input Voltage**
- **1** - 12VDC
- **2** - 24VAC
- **3** - 24VDC
- **4** - 120VAC
- **6** - 230VAC

X **Adjustment**
- **1** - Fixed
- **2** - Onboard knob
- **3** - External adjust

X **Time Tolerance**
- **Blank** - ±5%
- **A** - ±1%

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

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec, or (**0.1 - 100**) (**M**) min.

Specifications

Time Delay

Type	Microcontroller circuitry
Range	0.1s - 100m in 5 adjustable ranges or fixed
Repeat Accuracy	±0.5% or 20 ms, whichever is greater
Tolerance (Factory Calibration)	±1%, ±5%
Reset Time	≤ 150ms
Initiate Time	≤ 20ms
Time Delay vs Temp. & Voltage	±2%

Input

Voltage	12 or 24VDC; 24, 120, or 230VAC
Tolerance 12VDC & 24VDC	-15% - 20%
24 to 230VAC	-20% - 10%
AC Line Frequency	50/60 Hz
Power Consumption	AC ≤ 4VA; DC ≤ 2W

Output

Type	Electromechanical relay
Form	Non-isolated, SPDT

Ratings:		SPDT-NO	SPDT-NC
General Purpose	125/240VAC	30A	15A
Resistive	125/240VAC	30A	15A
	28VDC	20A	10A
Motor Load	125VAC	1 hp*	1/4 hp**
	240VAC	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	≥ 2000V 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
Dimensions	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° to 60°C/-40° to 85°C
Humidity	95% relative, non-condensing
Weight	≅ 3.9 oz (111 g)

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 is 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 affect 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.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 10 for dimensional drawing.

Features:

- Factory fixed, onboard or external adjust
- Delays from 0.1s - 1000m in 11 ranges
- ±0.5% repeat accuracy
- ± 10% factory calibration
- Encapsulated digital circuitry
- Isolated 10A, DPDT output contacts

Approvals: CE cULus

Auxiliary Products:

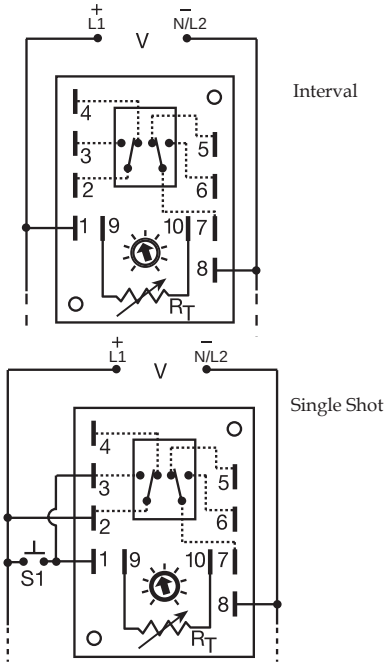
- **External ad just potentiometer:**
  P/N: P1004-16
  P/N: P1004-16-X
- **Female quick connect:**
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7

Available Models:

ERDI1210
ERDI123
ERDI323
ERDI326
ERDI4311
ERDI436
ERDI628

If desired part number is not listed, please call us to see if it is technically possible to build.

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. R_T is used when external adjustment is ordered.

R_T Selection Chart

Desired Time Delay* Seconds						R_T
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* Minutes					R_T
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.

Order Table:

ERDI **X** **X** **X**

Input Voltage
- **1** - 12VDC
- **2** - 24VAC
- **3** - 24VDC
- **4** - 120VAC
- **5** - 120VDC
- **6** - 230VAC

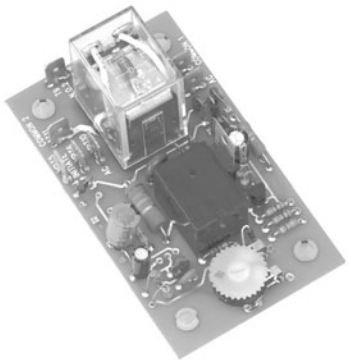
Adjustment
- **1** - Fixed
- **2** - Onboard knob
- **3** - External adjust

Time Delay*
- **1** - 0.1 - 1s
- **2** - 0.1 - 5s
- **3** - 0.1 - 10s
- **4** - 0.2 - 15s
- **5** - 0.3 - 30s
- **6** - 0.6 - 60s
- **7** - 0.1 - 5m
- **8** - 0.1 - 10m
- **9** - 0.2 - 15m
- **10** - 1 - 100m
- **11** - 10 - 500m

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec, or (**M**) min.

Specifications

Time Delay
Type . . . . . Digital integrated circuitry
Range . . . . . 0.1s - 500m in 11 adjustable ranges, 0.1s - 1000m fixed
Adjustment . . . . . Knob, external adjust, or fixed
Repeat Accuracy . . . . . ±0.5%
Tolerance (Factory Calibration) . . . . . ≤ ±10%
Reset Time . . . . . ≤ 150ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±2%
Input
Voltage . . . . . 12, 24, or 120VDC; 24, 120, or 230VAC
Tolerance 12VDC & 24VDC/AC . . . . . -15% - 20%
120VDC/AC & 230VAC . . . . . -20% - 10%
AC Line Frequency . . . . . 50/60 Hz
Output
Type . . . . . Isolated relay contacts
Form . . . . . DPDT
Rating . . . . . 10A resistive @ 120/240VAC & 28VDC; 1/3 hp @ 120/240VAC
Life . . . . . Mechanical - 1 x 10^7; Electrical - 1 x 10^6
Protection
Isolation Voltage . . . . . ≥ 1500V 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
Dimensions . . . . . 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
Environmental
Operating / Storage Temperature . . . . . -40° to 65°C / -40° to 85°C
Weight . . . . . ≅ 5.7 oz (162 g)



The ORS Series' open PCB construction offers the user good economy without sacrificing performance and reliability. The output relay is available in isolated, 10A, DPDT or SPDT forms. The time delay may be ordered as factory fixed, onboard knob, or external adjustment. All connections are 0.25 in. (6.35 mm) male quick connect terminals.

Operation (Single Shot):
Input voltage must be applied before and during timing. Upon momentary or maintained closure of the initiate switch (leading edge triggered), the output relay energizes for a measured interval of time. At the end of the time delay, the output de-energizes. Opening or reclosing the initiate switch during timing has no affect on the time delay. The output will energize if the initiate switch is closed when input voltage is applied.
Reset: Reset occurs when the time delay is complete and the initiate switch is opened. Loss of input voltage resets the time delay and output.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 11 for dimensional drawing.

Features:

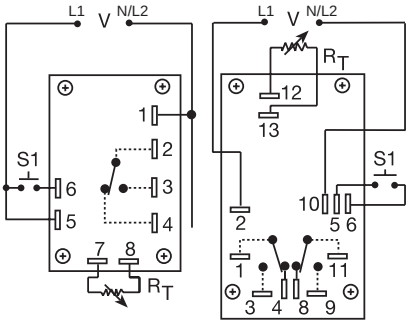
- Low cost open PCB construction
- Momentary or maintained initiation
- 10A, DPDT or SPDT output contacts
- Delays from 0.05s - 300s in 5 ranges
- ±2% repeat accuracy
- ±10% factory calibration

Approvals:

Auxiliary Products:

- **External ad just potentiometer:**
  P/N: P1004-12
  P/N: P1004-12-X
- **Female quick connect:**
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7

Connection:



SPDT DPDT

Relay contacts are isolated.
R_T is used when external adjustment is ordered.

Available Models:

ORS120A1180
ORS120A33
ORS230A150SD

If desired part number is not listed, please call us to see if it is technically possible to build.

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.

Order Table:

ORS **X** **X** **X** **X**

Input Voltage
- **24A** - 24VAC
- **120A** - 120VAC
- **230A** - 230VAC

Adjustment
- **1** - Fixed
- **2** - Onboard knob
- **3** - External adjust

Time Delay*
- **1** - 0.05 - 3s
- **2** - 0.5 - 30s
- **3** - 0.6 - 60s
- **4** - 1.2 - 120s
- **5** - 3 - 300s

*If fixed delay is selected, insert delay (**0.05 - 300**) in seconds.

Output Form
- **Blank** - SPDT
- **D** - DPDT

Specifications

Time Delay
Type . . . . . Analog circuitry
Range . . . . . 0.05 - 300s in 5 adjustable ranges or fixed
Repeat Accuracy . . . . . ±2% or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . Adjustable: guaranteed range
Fixed: ±10%
Reset Time . . . . . ≤ 50ms
Initiate Time . . . . . ≤ 70ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±10%

Input
Voltage . . . . . 24, 120, or 230VAC
Tolerance 24VAC . . . . . -15% - 20%
120 & 230VAC . . . . . -20% - 10%
AC Line Frequency . . . . . 50/60 Hz
Power Consumption 2.25W

Output
Type . . . . . Electromechanical relay
Form . . . . . Isolated, SPDT or DPDT
Rating . . . . . 10A resistive @ 120/240VAC & 28VDC;
1/3 hp @ 120/240VAC
Life . . . . . Mechanical - $1x10^7$; Electrical - $1x10^6$

Protection
Isolation Voltage . . . . . ≥1500V 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 / Storage Temperature . . . . . -20° to 65°C / -30° to 85°C
Weight . . . . . ≅ 2.7 oz (77 g)

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

Operation (Single Shot):
Input voltage must be applied before and during timing. Upon momentary or maintained closure of the initiate switch, the output relay energizes for a measured interval of time. At the end of the delay, the output de-energizes. Opening or reclosing the initiate switch during timing has no affect on the time delay. The output will energize if the initiate switch is closed when input voltage is applied.
Reset: Reset occurs when the time delay is complete and the initiate switch is opened. Loss of input voltage resets the time delay and output.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features:

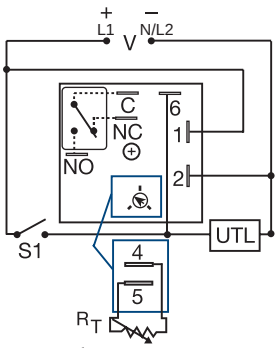
- Compact time delay relay
- ±0.5% repeat accuracy
- Isolated, 10A, SPDT output contacts
- Factory fixed, onboard or external adjust
- Delays from 0.1s - 1000m in 6 ranges
- ±5% factory calibration
- Input voltages from 12 to 230V in 5 options

Approvals:

Auxiliary Products:

- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Mounting bracket:** P/N: P1023-6
- **Female quick connect:**
  P/N: P1015-13 (AWG 10/12)
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

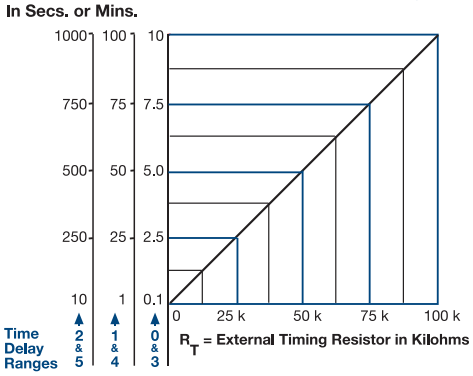
Connection:



V = Voltage
S1 = Initiate Switch
C = Common, Transfer Contact
NO = Normally Open
NC = Normally Closed
UTL = Untimed Load

R_T is used when external adjustment is ordered. A knob is supplied for adjustable units. The untimed load is optional. Relay contacts are isolated.

External Resistance vs. Time Delay:



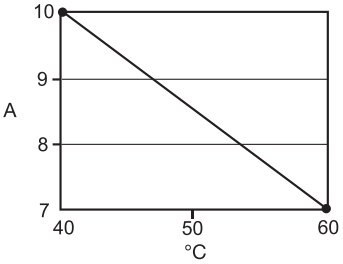
This chart applies to externally adjustable part numbers.
The time delay is adjustable over the time delay range selected by varying the resistance across the RT terminals; as the resistance increases the time delay increases.
When selecting an external RT, add the tolerances of the timer and the RT 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.

Available Models:

KRDS120
KRDS221
KRDS225
KRDS424
KRDS430

If desired part number is not listed, please call us to see if it is technically possible to build.

Output Current/Ambient Temperature:



Order Table:

KRDS **X** **X** **X**

Input Voltage
- **1** - 12VDC
- **2** - 24VAC/DC
- **4** - 120VAC
- **5** - 110VDC
- **6** - 230VAC

Adjustment
- **1** - Fixed
- **2** - Onboard knob
- **3** - External adjust

Time Delay*
- **0** - 0.1 - 10s
- **1** - 1 - 100s
- **2** - 10 - 1000s
- **3** - 0.1 - 10m
- **4** - 1 - 100m
- **5** - 10 - 1000m

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec, or (**M**) min.

Specifications

Time Delay
Type . . . . . Microcontroller with watchdog circuitry
Range . . . . . 0.1s - 1000m in 6 adjustable ranges or fixed
Repeat Accuracy . . . . . ±0.5% or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ≤ ±5%
Reset Time . . . . . ≤ 150ms
Initiate Time . . . . . ≤ 40ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±5%
Input
Voltage . . . . . 12, 24 or 110VDC; 24, 120 or 230VAC
Tolerance 12VDC & 24VDC/AC . . . . . -15% - 20%
110VDC, 120VAC or 230VAC . . . . . -20%- 10%
AC Line Frequency / DC Ripple . . . . . 50/60 Hz / ≤ 10%
Power Consumption . . . . . AC ≤ 2VA; DC ≤ 2W
Output
Type . . . . . Isolated relay contacts
Form . . . . . SPDT
Rating (at 40°C) . . . . . 10A resistive @ 125VAC;
5A resistive @ 230VAC & 28VDC;
1/4 hp @ 125VAC
Life (Operations) . . . . . Mechanical - 1 x 10^7; Electrical - 1 x 10^5
Protection
Circuitry . . . . . Encapsulated
Isolation Voltage . . . . . ≥ 1500V 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
Dimensions . . . . . 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 . . . . . -40° to 60°C/-40° to 85°C
Humidity . . . . . 95% relative, non-condensing
Weight . . . . . ≅ 2.6 oz (74 g)

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

Operation (Single Shot):
Input voltage must be applied before and during timing. Upon momentary or maintained closure of the initiate switch (leading edge triggered), the output energizes for a measured interval of time. At the end of the delay, the output de-energizes. Opening or reclosing the initiate switch during timing has no affect on the time delay. The output will energize if the initiate switch is closed when input voltage is applied. Reset: Reset occurs when the time delay is complete and the initiate switch is opened. Loss of input voltage resets the time delay and output.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features:

- Switch selectable time setting
- 0.1s - 102.3m in 3 ranges
- ± 0.5% repeat accuracy
- ± 2% setting accuracy
- 1A, solid-state output
- Encapsulated
- Wide voltage ranges

Approvals:

Auxiliary Products:

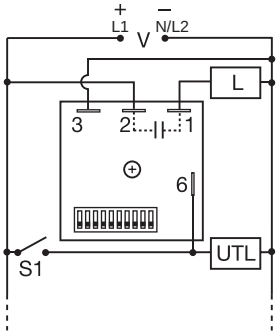
- **Female quick connect:**
  P/N: P1015-13 (AWG 10/12)
  P/N: P1015-64 (AWG 14/16)
  P/N: P1015-14 (AWG 18/22)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Available Models:

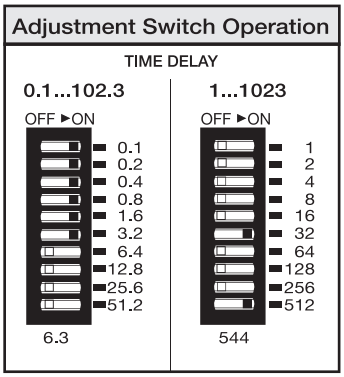
TDUS3000A
TDUS3002A
TDUSL3000A

If desired part number is not listed, please call us to see if it is technically possible to build.

Connection:



UTL = Optional Untimed Load
S1 = Initiate Switch
L = Timed Load



Order Table:

Input Voltage Range	Time Range	Part Number
24 to 120VAC	0.1 - 102.3s	TDUSL3000A
100 to 240VAC	0.1 - 102.3s	TDUSL3001A
12 to 24VDC	0.1 - 102.3s	TDUSL3002A
24 to 120VAC	1 - 1023s	TDUS3000A
100 to 240VAC	1 - 1023s	TDUS3001A
12 to 24VDC	1 - 1023s	TDUS3002A
24 to 120VAC	0.1 - 102.3m	TDUSH3000A
100 to 240VAC	0.1 - 102.3m	TDUSH3001A
12 to 24VDC	0.1 - 102.3m	TDUSH3002A

Specifications

Time Delay
Range* . . . . . .0.1 - 102.3s in 0.1s increments
1 - 1023s in 1s increments
0.1 - 102.3m in 0.1m increments
Repeat Accuracy . . . . . .±0.5% or 20 ms, whichever is greater
Setting Accuracy . . . . . .≤ ±2% or 20 ms, whichever is greater
Reset Time. . . . . .≤ 150ms
Initiate Time . . . . . .≤ 20ms
Time Delay vs Temp. & Voltage . . . . . .≤ ±5%
Input
Voltage/Tolerance. . . . . .24 to 240VAC, 12 to 24VDC /±20%
AC Line Frequency / DC Ripple. . . . . .50/60 Hz / ≤ 10%
Power Consumption . . . . . .AC ≤ 2VA; DC ≤ 1W
Output
Type. . . . . .Solid state
Form. . . . . .NO, closed during timing
Rating . . . . . .1A steady state, 10A inrush at 60°C
Voltage Drop . . . . . .AC ≅ 2.5V @ 1A; DC ≅ 1V @ 1A
Off State Leakage Current . . . . . .AC ≅ 5mA @ 230VAC; DC ≅ 1 mA
Protection
Circuitry . . . . . .Encapsulated
Dielectric Breakdown . . . . . .≥ 2000V 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
Dimensions. . . . . .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 . . . . . .-40° to 60°C / -40° to 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.

The TSD Series is designed for more demanding commercial and industrial applications where small size and accurate performance are required. The factory calibration for fixed time delays is within 1% of the target time delay. The repeat accuracy, under stable conditions, is 0.5% of the time delay. The TSD Series is rated to operate over an extended temperature range. Time delays of 0.1 seconds to 1000 minutes are available. The output is rated 1A steady and 10A inrush. The modules are totally solid state and encapsulated to protect the electronic circuitry. This product is suitable for many applications, including dispensing, welding, and exposure timing.

Operation (Single Shot):
Input voltage must be applied before and during timing. Upon momentary or maintained closure of the initiate switch, the output energizes for a measured interval of time. At the end of the delay, the output de-energizes. Opening or reclosing the initiate switch during timing has no affect on the time delay. The output will not energize if the initiate switch is closed when input voltage is applied. Reset: Reset occurs when the time delay is complete and the initiate switch is opened. Loss of input voltage resets the time delay and output.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features:

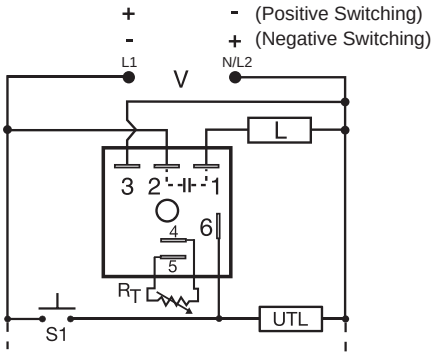
- Fixed or adjustable delays 0.1s - 1000m in 6 ranges
- ±0.5% repeat accuracy
- ±1% factory calibration
- 12VDC to 230VAC in 5 options
- 1A, solid-state output
- Encapsulated

Approvals:

Auxiliary Products:

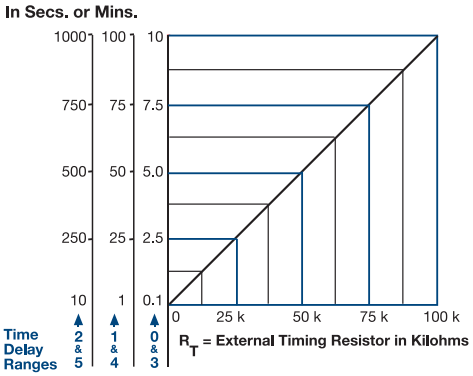
- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Mounting bracket:** P/N: P1023-6
- **Female quick connect:**
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Connection:



L = Timed Load
UTL = Optional Untimed Load
S1 = Initiate Switch
R_T is used when external adjustment is ordered.

External Resistance vs. Time Delay:



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.

Available Models:

TSDS11390SP
TSDS2110S
TSDS320N
TSDS321P
TSDS421

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

TSDS **X** **X** **X** **X**

Input Voltage
- **1** - 12VDC
- **2** - 24VAC
- **3** - 24VDC
- **4** - 120VAC
- **6** - 230VAC

Adjustment
- **1** - Fixed
- **2** - External adjust
- **3** - Onboard adjust

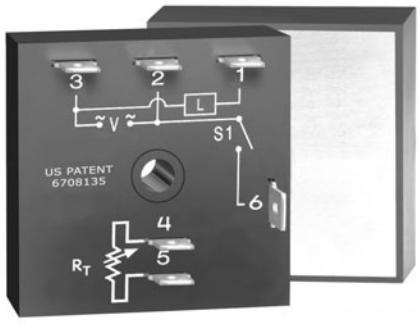
Time Delay*
- **0** - 0.1 - 10s
- **1** - 1 - 100s
- **2** - 10 - 1000s
- **3** - 0.1 - 10m
- **4** - 1 - 100m
- **5** - 10 - 1000m

Switching Mode (VDC only)
- **P** - Positive
- **N** - Negative

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec. or (**M**) min.

Specifications

Time Delay
Range . . . . . 0.1s - 1000m in 6 adjustable ranges or fixed
Repeat Accuracy . . . . . ±0.5% or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ≤ ±1%
Reset Time . . . . . ≤ 150ms
Initiate Time . . . . . ≤ 20ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±2%
Input
Voltage . . . . . 12 or 24VDC; 24, 120, or 230VAC
Tolerance . . . . . ±15%
Power Consumption . . . . . AC ≤ 2VA; DC ≤ 1W
AC Line Frequency / DC Ripple . . . . . 50/60 Hz / ≤ 10%
Output
Type . . . . . Solid state
Form . . . . . NO, closed during timing
Maximum Load Current . . . . . 1A steady state, 10A inrush at 60°C
Voltage Drop . . . . . AC ≅ 2.5V @ 1A; DC ≅ 1V @ 1A
Off State Leakage Current . . . . . AC ≅ 5mA @ 230VAC; DC ≅ 1mA
DC Operation . . . . . Positive or negative switching
Protection
Circuitry . . . . . Encapsulated
Dielectric Breakdown . . . . . ≥ 2000V 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
Dimensions . . . . . 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 . . . . . -40° to 75°C / -40° to 85°C
Humidity . . . . . 95% relative, non-condensing
Weight . . . . . ≅ 2.4 oz (68 g)



The THDS 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 (Single Shot):
Input voltage must be applied before and during timing. Upon momentary or maintained closure of the initiate switch, the output energizes for a measured interval of time. At the end of the delay, the output de-energizes. Opening or reclosing the initiate switch during timing has no affect on the time delay. The output energizes if the initiate switch is closed when input voltage is applied. Reset: Reset occurs when the time delay is complete and the initiate switch is opened. Loss of input voltage resets the time delay and output.

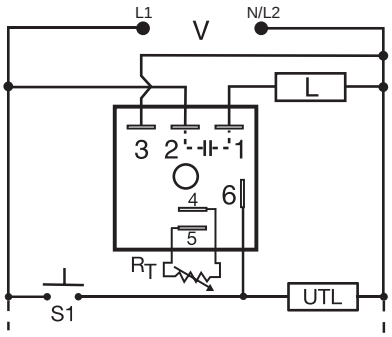
For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 4 for dimensional drawing.

Features:

- High load currents up to 20A, 200A inrush
- Fixed or adjustable delays from 0.1s - 1000m
- ±0.5% repeat accuracy
- ±1% factory calibration
- 24, 120, or 230VAC
- Metallized mounting surface for heat transfer
- Totally solid state and encapsulated

Approvals:

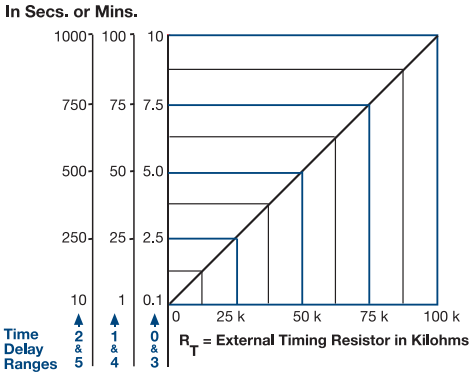
Connection:



UTL = Optional Untimed Load
L = Timed Load
S1 = Initiate Switch

R_T is used when external adjustment is ordered.

External Resistance vs. Time Delay:



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.

Auxiliary Products:

- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Female quick connect:**
  P/N: P1015-13 (AWG 10/12)
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7

Available Models:

THDS230C	THDS420B
THDS231C	THDS430C
THDS232C	THDS432C
THDS233C	THDS433C
THDS234C	THDS434C
THDS235C	THDS435C
THDS410.25SA	THDS610.25SA
THDS411.5SA	THDS611.5SA
THDS414MC	

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

THDS **X** **X** **X** **X**

Input Voltage
- **2** - 24VAC
- **4** - 120VAC
- **6** - 230VAC

Adjustment
- **1** - Fixed
- **2** - External adjust
- **3** - Onboard adjust

Time Delay*
- **0** - 0.1 - 10s
- **1** - 1 - 100s
- **2** - 10 - 1000s
- **3** - 0.1 - 10m
- **4** - 1 - 100m
- **5** - 10 - 1000m

Output Rating
- **A** - 6A
- **B** - 10A
- **C** - 20A

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec. or (**M**) min.

Specifications

Time Delay
Range . . . . . 0.1s - 1000m in 6 adjustable ranges or fixed
Repeat Accuracy . . . . . ±0.5% or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ≤ ±1%
Reset Time . . . . . ≤150ms
Initiate Time . . . . . ≤ 20ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±2%

Input
Voltage . . . . . 24, 120, or 230VAC
Tolerance . . . . . ±20%
AC Line Frequency . . . . . 50/60 Hz
Power Consumption . . . . . ≤ 2VA

Output
Type . . . . . Solid state
Form . . . . . NO, closed during timing

Maximum Load Current	Output	Steady State	Inrush**
	A	6A	60A
	B	10A	100A
	C	20A	200A

Voltage Drop . . . . . ≅ 2.5V @ rated current
Off State Leakage Current . . . . . ≅ 5mA @ 230VAC
Minimum Load Current 100mA

Protection
Circuitry . . . . . Encapsulated
Dielectric Breakdown . . . . . ≥ 2000V RMS terminals to mounting surface
Insulation Resistance . . . . . ≥ 100 MΩ

Mechanical
Mounting ** . . . . . Surface mount with one #10 (M5 x 0.8) screw
Dimensions . . . . . 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 / Storage Temperature . . . . . -40° to 60°C / -40° to 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 16ms.

The KSDS Series is ideal for applications that require momentary start interval timing including dispensing, exposure timing, or pulse shaping. This series is available for both AC and DC voltages. 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. Time delays of 0.1 seconds to 1000 minutes are available in 6 ranges. The output is rated 1A steady and 10A inrush. The modules are totally solid state and encapsulated to protect the electronic circuitry.

Features:

- Fixed or adjustable delays 0.1s - 1000m in 6 ranges
- ±0.5% repeat accuracy
- ± 5% factory calibration
- 12 to 230V in 5 ranges
- 1A, solid-state output

Approvals:

Auxiliary Products:

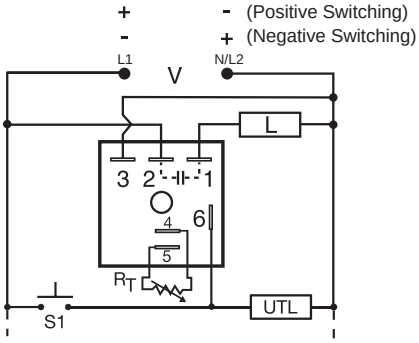
- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Mounting bracket:** P/N: P1023-6
- **Female quick connect:**
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Available Models:

KSDS1115SP
KSDS121P
KSDS130P
KSDS310.1SP
KSDS330P
KSDS415M
KSDS420

If desired part number is not listed, please call us to see if it is technically possible to build.

Connection:



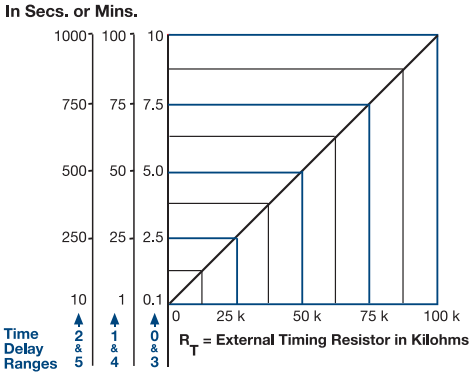
UTL = Optional Untimed Load
L = Timed Load
S1 = Initiate Switch

R_T is used when external adjustment is ordered.

Operation (Single Shot):
Input voltage must be applied before and during timing. Upon momentary or maintained closure of the initiate switch (leading edge triggered), the output energizes for a measured interval of time. At the end of the delay, the output de-energizes. Opening or reclosing the initiate switch during timing has no affect on the time delay. The output will not energize if the initiate switch is closed when input voltage is applied.
Reset: Reset occurs when the time delay is complete and the initiate switch is opened. Loss of input voltage resets the time delay and output.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

External Resistance vs. Time Delay:



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.

Order Table:

KSDS **X** **Input Voltage**
- **1** - 12VDC
- **2** - 24VAC
- **3** - 24VDC
- **4** - 120VAC
- **6** - 230VAC

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

X **Time Delay***
- **0** - 0.1 - 10s
- **1** - 1 - 100s
- **2** - 10 - 1000s
- **3** - 0.1 - 10m
- **4** - 1 - 100m
- **5** - 10 - 1000m

X **Switching Mode (VDC only)**
- **P** - Positive
- **N** - Negative

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec. or (**M**) min.

Specifications

Time Delay
Range . . . . . 0.1s - 1000m in 6 adjustable ranges or fixed
Repeat Accuracy . . . . . ±0.5 % or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ≤ ±5%
Reset Time . . . . . ≤ 150ms
Initiate Time . . . . . ≤ 20ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±10%
Input
Voltage . . . . . 12 or 24VDC; 24, 120, or 230VAC
Tolerance . . . . . ±20%
AC Line Frequency / DC Ripple . . . . . 50/60 Hz / ≤ 10 %
Power Consumption . . . . . AC ≤ 2VA; DC ≤ 1W
Output
Type . . . . . Solid state
Form . . . . . NO, closed during timing
Maximum Load Current . . . . . 1A steady state, 10A inrush at 60°C
OFF State Leakage Current . . . . . AC ≅ 5mA @ 230VAC; DC ≅ 1mA
Voltage Drop . . . . . AC ≅ 2.5V @ 1A; DC ≅ 1V @ 1A
DC Operation . . . . . Positive or negative switching
Protection
Circuitry . . . . . Encapsulated
Dielectric Breakdown . . . . . ≥ 2000V 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
Dimensions . . . . . 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 . . . . . -40° to 60°C / -40° to 85°C
Humidity . . . . . 95% relative, non-condensing
Weight . . . . . ≅ 2.4 oz (68 g)

The TSS is a totally solid-state timing module. Its 1A rated, solid-state output provides an excellent method of time control for exposures, dispensing, or for increasing or decreasing a switch closure. Time delays from 0.05 to 600 seconds, in 4 ranges, cover 90% of all OEM applications. Factory calibration of fixed delays is ±5% and the repeat accuracy is ±2%. The TSS can be surface mounted with a single screw, or snapped on a 35mm DIN rail using the P1023-20 accessory adaptor.

Operation (Single Shot):
Voltage must be applied before and during timing. Upon momentary or maintained closure of the initiate switch, the output energizes for a measured interval of time. At the end of the delay, the output de-energizes. Opening or reclosing the initiate switch during timing has no affect on the time delay. The output will energize if the initiate switch is closed when input voltage is applied.
Reset: Reset occurs when the time delay is complete and the initiate switch opens. Loss of input voltage resets the time delay and output.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features:

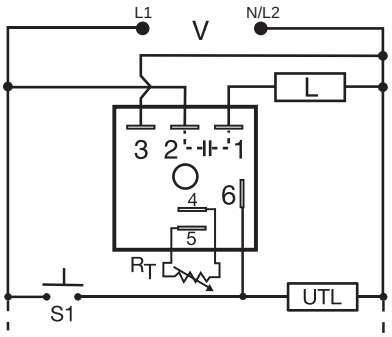
- Expands or decreases switch closures
- Momentary or maintained initiate switch
- Totally solid state
- Encapsulated to protect against shock & vibration
- Fixed or adjustable delays from 0.05 - 600s in 4 ranges
- ±2% repeat accuracy
- ±5% factory calibration

Approvals:

Auxiliary Products:

- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Mounting bracket:** P/N: P1023-6
- **Female quick connect:**
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Connection:



S1 = Initiate Switch
L = Timed Load
UTL = Optional Untimed Load

R_T is used when external adjustment is ordered.

R_T Selection Chart

Desired Time Delay* Seconds				R_T
1	2	3	4	Kohms
0.05	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 20% for tolerance of unit and the R_T.

Available Models:

TSS223	TSS424
TSS410.5	TSS432
TSS421	TSS622
TSS422	TSS624

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

TSS **X** **X** **X**

Input Voltage
- **2** - 24VAC
- **4** - 120VAC
- **6** - 230VAC

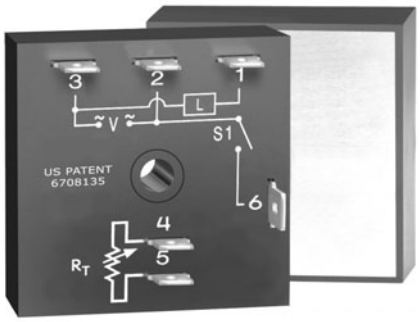
Adjustment
- **1** - Fixed
- **2** - External adjust
- **3** - Onboard adjust

Time Delay*
- **1** - 0.05 - 3s
- **2** - 0.5 - 60s
- **3** - 2 - 180s
- **4** - 5 - 600s

*If fixed delay is selected, insert delay (**0.05 - 600**) in seconds.

Specifications

Time Delay
Range . . . . . .0.05s - 600s in 4 adjustable ranges or fixed
Repeat Accuracy . . . . . .±2% or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . .≤ ±5%
Reset Time. . . . . .≤ 150ms
Initiate Time . . . . . .≤ 20ms
Time Delay vs Temp. & Voltage . . . . . .≤ ±10%
Input
Voltage. . . . . .24, 120, or 230VAC
Tolerance. . . . . .±20%
AC Line Frequency . . . . . .50/60 Hz
Power Consumption . . . . . .≤ 2VA
Output
Type . . . . . .Solid state
Form. . . . . .NO, closed during timing
Maximum Load Current. . . . . .1A steady state, 10A inrush at 60°C
Off State Leakage Current . . . . . .≅ 5mA @ 230VAC
Voltage Drop . . . . . .≅ 2.5V @ 1A
Protection
Circuitry . . . . . .Encapsulated
Dielectric Breakdown . . . . . .≥ 2000V RMS terminals to mounting surface
Insulation Resistance. . . . . .≥ 100 MΩ
Mechanical
Mounting . . . . . .Surface mount with one #10 (M5 x 0.8) screw
Dimensions. . . . . .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 . . . . . .- 40° to 75°C / - 40° to 85°C
Humidity. . . . . .95% relative, non-condensing
Weight . . . . . .≅ 2.4 oz (68 g)



The TH series is a solid-state relay and timer combined into one compact, easy-to-use control. When mounted to a metal surface, the TH Series may be used to directly control lamp or heater loads of up to 20A steady, 200A inrush. Its single shot function can perform dispensing and pulse shaping operations. The initiate switch can be a momentary or maintained type of switch. Time delays can be selected from 0.1 - 600 seconds in 4 ranges. The THC Series is used for coin vending applications where fast initiate response is required.

Operation (Single Shot):
Input voltage must be applied before and during timing. Upon momentary or maintained closure of the initiate switch (leading edge triggered), the output energizes for a measured interval of time. At the end of the delay, the output de-energizes. Opening or reclosing the initiate switch during timing has no affect on the time delay. The output will energize if the initiate switch is closed when input voltage is applied.
Reset: Reset occurs when the time delay is complete and the initiate switch opens. Loss of input voltage resets the time delay and output.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 4 for dimensional drawing.

Features:

- High load current capacity, up to 20A, 200A inrush
- Momentary or maintained initiate switch
- ±2% repeat accuracy
- ±5% factory calibration
- Fixed or adjustable 0.1 - 600s in 4 ranges
- Metallized mounting surface for heat transfer

Approvals:

Auxiliary Products:

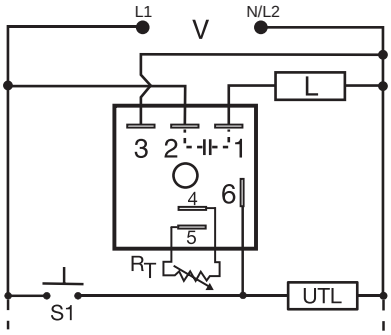
- **External adjust potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Female quick connect:**
  P/N: P1015-13 (AWG 10/12)
  P/N: P1015-64 (AWG 14/16)
- **Quick connect tos crew adaptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7

Available Models:

THC41180B
THC421C
THS422B

If desired part number is not listed, please call us to see if it is technically possible to build.

Connection:



S1 = Initiate Switch
L = Timed Load
UTL = Optional Untimed Load
R_T is used when external adjustment is ordered.

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 20% for tolerance of unit and the R_T.

Order Table:

THC / THS **X**

Input Voltage
- **2** - 24VAC
- **4** - 120VAC
- **6** - 230VAC

X

Adjustment
- **1** - Fixed
- **2** - External adjust
- **3** - Onboard adjust

X

Time Delay*
- **1** - 0.1 - 3s
- **2** - 0.5 - 60s
- **3** - 2 - 180s
- **4** - 5 - 600s

X

Output Rating
- **A** - 6A
- **B** - 10A
- **C** - 20A

*If fixed delay is selected, insert delay (**0.1 - 600**) in seconds.

Specifications

Time Delay
Range . . . . . 0.1 - 600s in 4 adjustable ranges or fixed
Repeat Accuracy . . . . . ±2% or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ≤ ± 5%
Reset Time . . . . . ≤ 150ms
Initiate Time . . . . . ≤ 20ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±10%
Input
Voltage . . . . . 24, 120, or 230VAC
Tolerance . . . . . ±15%
AC Line Frequency . . . . . 50/60 Hz
Power Consumption . . . . . ≤ 2VA
Output
Type . . . . . Solid state
Form . . . . . NO, closed during timing

Maximum Load Currents

Output	Steady State	Inrush**
A	6A	60A
B	10A	100A
C	20A	200A

Minimum Load Current 100mA
Voltage Drop . . . . . ≅ 2.5V at rated current
OFF State Leakage Current . . . . . ≅ 5mA @ 230VAC
Protection
Circuitry . . . . . Encapsulated
Dielectric Breakdown . . . . . ≥ 2000V RMS terminals to mounting surface
Insulation Resistance . . . . . ≥100 MΩ
Mechanical
Mounting ** . . . . . Surface mount with one #10 (M5 x 0.8) screw
Dimensions . . . . . 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 / Storage Temperature . . . . . -20° to 60°C / -40° to 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 16ms.

Timer - Retriggerable Single Shot

HRD9 Series

The HRD9 Series combines an electromechanical relay output with microcontroller timing circuitry. It offers 12 to 230V operation in five ranges and factory fixed, external, or onboard adjustable time delays with a repeat accuracy of ±0.5%. The isolated output contact rating allows for direct operation of heavy loads, such as compressors, pumps, blower motors, heaters, etc. The HRD9 is ideal for OEM applications where cost is a factor.

Operation (Motion Detector/Retriggerable Single Shot):
Input voltage must be applied prior to and during timing. The output is de-energized. Upon closure of the initiate switch (momentary or maintained) the output energizes and the time delay starts. On completion of the delay period, the output de-energizes.
Reset: Reclosing the initiate switch during or after timing will reset the time delay and restart timing. Reset is also accomplished by removing and reapplying input voltage.
Note: Powering up the unit with the initiate switch closed will not energize the output relay or start timing.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 2 for dimensional drawing.

Features:

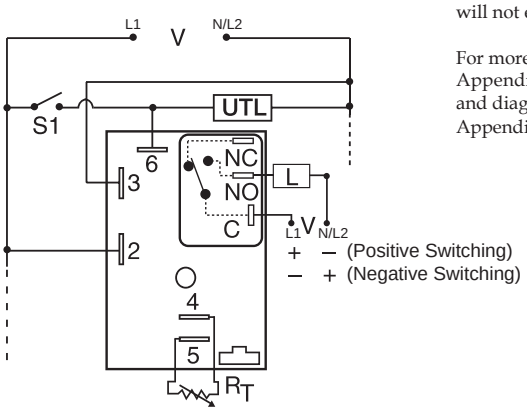
- Isolated, 30A, SPDT, NO output contacts
- 12 to 230V operation in 5 options
- Delays from 0.1s - 100m in 5 ranges
- 0.5% repeat timing accuracy
- Factory fixed, onboard or external adjust
- Encapsulated circuitry

Approvals:

Auxiliary Products:

- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Mounting bracket:** P/N: P1023-6
- **Female quick connect:**
  P/N: P1015-13 (AWG 10/12)
  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/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Connection:



S1 = Initiate Switch
L = Timed Load
UTL = Untimed Load (optional)
NO = Normally Open
C = Common, Transfer Contact

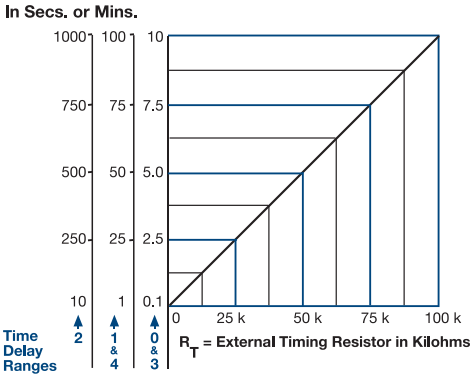
NOTE: A knob, or terminals 4 & 5 are only included on adjustable units. R_T is used when external adjustment is ordered. Relay contacts are isolated. The untimed load is optional.

Available Models:

HRD93110S
HRD9320

If desired part number is not listed, please call us to see if it is technically possible to build.

External Resistance vs. Time Delay:



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.

Order Table:

HRD9 **X** **X** **X** **X**

Input Voltage
- **1** - 12VDC
- **2** - 24VAC
- **3** - 24VDC
- **4** - 120VAC
- **6** - 230VAC

Adjustment
- **1** - Fixed
- **2** - Onboard knob
- **3** - External adjust

Time Tolerance
- **Blank** - ±5%
- **A** - ±1%

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

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec, or (**0.1 - 100**) (**M**) min.

Specifications

Time Delay
Type . . . . . Microcontroller circuitry
Range . . . . . 0.1s - 100m in 5 adjustable ranges or fixed
Repeat Accuracy . . . . . ±0.5 % or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ±1%, ±5%
Reset Time . . . . . ≤ 150ms
Time Delay vs Temp. & Voltage . . . . . ±2%
Initiate Time . . . . . ≤ 20ms (≤ 1500 operations per min.)

Input
Voltage . . . . . 12 or 24VDC; 24, 120, or 230VAC
Tolerance 12VDC & 24VDC . . . . . -15% - 20%
24 to 230VAC . . . . . -20% - 10%
AC Line Frequency . . . . . 50/60 Hz
Power Consumption . . . . . AC ≤ 4VA; DC ≤ 2W

Output
Type . . . . . Electromechanical relay
Form . . . . . Isolated, SPDT

Ratings:		SPDT-NO	SPDT-NC
General Purpose	125/240VAC	30A	15A
Resistive	125/240VAC	30A	15A
	28VDC	20A	10A
Motor Load	125VAC	1 hp*	1/4 hp**
	240VAC	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 . . . . . ≥ 2000V 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
Dimensions . . . . . 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° to 60°C/-40° to 85°C
Humidity . . . . . 95% relative, non-condensing
Weight . . . . . ≅ 3.9 oz (111 g)

The KRD9 Series microcontroller timing circuit provides excellent repeat accuracy and stability. Cost effective approach for OEM applications that require small size, isolation, reliability, and long life.

Operation (Retriggerable Single Shot):
Function Type A (Output Initially De-energized): Input voltage must be applied prior to and during timing. When the initiate switch is closed, (momentary or maintained) the output energizes and the time delay starts. On completion of the delay, the output de-energizes. The unit will time out if S1 remains in the open or closed position for the full time delay. Reclosing the initiate switch resets the time delay and restarts timing; the output remains energized. The output will not energize if the initiate switch is closed when input voltage is applied.
Function Type B (Output Initially Energized): Upon application of input voltage, the output energizes and the time delay starts. At the end of the time delay, the load de-energizes. The unit will time out if S1 remains in the open or closed position for the full time delay. Closing (re-closing) the initiate switch resets the time delay and restarts timing; the output remains energized.
Reset: The time delay and the output are reset when input voltage is removed.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features:

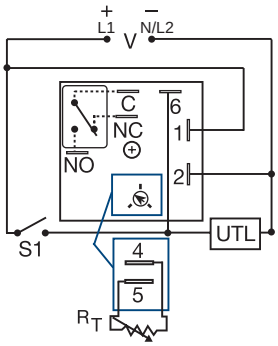
- Compact time delay relay
- Microcontroller circuitry
- ±0.5% repeat accuracy
- Isolated, 10A, SPDT output contacts
- Factory fixed, onboard or external adjust
- Delays from 0.1s - 1000m in 6 ranges
- Input voltages from 12 to 230V in 6 options

Approvals:

Auxiliary Products:

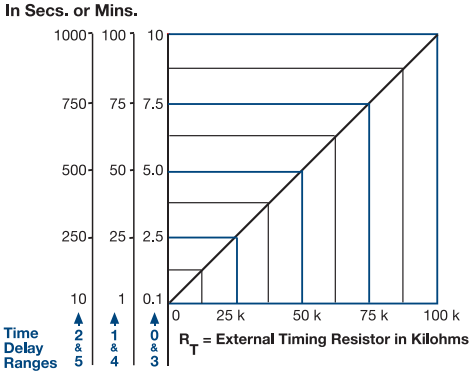
- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Female quick connect:**
  P/N: P1015-13 (AWG 10/12)
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7
- **Mounting bracket:** P/N: P1023-6
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Connection:



C = Common, Transfer Contact
UTL = Untimed Load (optional)
A knob is supplied for adjustable units, or R_T terminals 4 & 5 for external adjust. See external adjustment vs time delay chart. The untimed load is optional. Relay contacts are isolated.

External Resistance vs. Time Delay:



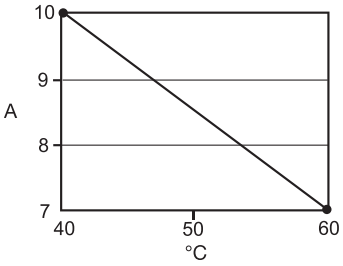
This chart applies to externally adjustable part numbers.
The time delay is adjustable over the time delay range selected by varying the resistance across the RT terminals; as the resistance increases the time delay increases.
When selecting an external RT, add the tolerances of the timer and the RT 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.

Available Models:

KRD9120B
KRD92115MA
KRD92115MB
KRD9220B
KRD93115MA
KRD94115SB
KRD9423B

If desired part number is not listed, please call us to see if it is technically possible to build.

Output Current / Ambient Temperature:



Order Table:

KRD9 **X** **X** **X** **X**

Input Voltage
- **1** - 12VDC
- **2** - 24VAC/DC
- **3** - 24VDC
- **4** - 120VAC
- **5** - 110VDC
- **6** - 230VAC

Adjustment
- **1** - Fixed
- **2** - Onboard knob
- **3** - External adjust

Time Delay*
- **0** - 0.1 - 10s
- **1** - 1 - 100s
- **2** - 10 - 1000s
- **3** - 0.1 - 10m
- **4** - 1 - 100m
- **5** - 10 - 1000m

Function Type
- **A** - De-energized
- **B** - Energized

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec, or (**M**) min.

Specifications

Time Delay	
Type	Microcontroller based with watchdog circuitry
Range	0.1s - 1000m in 6 adjustable ranges or fixed
Repeat Accuracy	±0.5% or 20ms, whichever is greater
Tolerance (Factory Calibration)	≤ ±5%
Reset Time	≤ 150ms
Initiate Time	≤ 40ms; ≤ 750 operations per minute
Time Delay vs Temp. & Voltage	≤ ±5%
Input	
Voltage	12, 24 or 110VDC; 24, 120 or 230VAC
Tolerance 12VDC & 24VDC/AC	-15% - 20%
110VDC, 120 or 230VAC	-20% - 10%
AC Line Frequency / DC Ripple	50/60 Hz / ≤ 10%
Power Consumption	AC ≤ 2VA; DC ≤ 2W
Output	
Type	Isolated relay contacts
Form	SPDT
Rating (at 40°C)	10A resistive @ 125VAC; 5A resistive @ 230VAC & 28VDC; 1/4 hp @ 125VAC
Max. Switching Voltage	250VAC
Life (Operations)	Mechanical - 1 x 10^7; Electrical - 1 x 10^5
Protection	
Circuitry	Encapsulated
Isolation Voltage	≥ 1500V RMS input to output
Insulation Resistance	≥ 100 MΩ
Polarity	DC units are reversed polarity protected
Mechanical	
Mounting	Surface mount with one #10 (M5 x 0.8) screw
Dimensions	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	-40°to 60°C / -40° to 85°C
Humidity	95% relative, non-condensing
Weight	≅ 2.6 oz (74 g)

The TDI Series is an interval timer that combines accurate digital circuitry with isolated, 10A rated, DPDT relay contacts in an 8-pin plug-in package. The TDI Series features DIP switch selectable time delays ranging from 0.1 to 10,230 seconds in three ranges. The TDI Series is the product of choice for custom control panel and OEM designers.

Operation (Interval):
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.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 8 for dimensional drawing.

Features:

- Switch settable time delay
- Three time ranges from 0.1s - 10,230s
- ±0.1% repeat accuracy
- ±2% setting accuracy
- 10A, DPDT output contacts
- LED indication

Approvals:

Auxiliary Products:

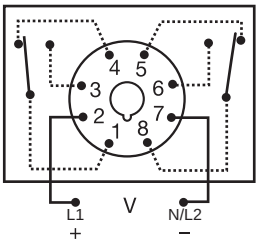
- **Panel mount kit:** P/N: BZ1
- **Octal 8-pin socket:** P/N: NDS-8
- **Hold-down clips (sold in pairs):** P/N: PSC8 (NDS-8)
- **DIN rail:** P/N: C103PM (Al)

Available Models:

TDI120AL	TDI24DL
TDI12D	TDIH24AL
TDI230AL	TDIL120AL
TDI24AL	TDIL24DL

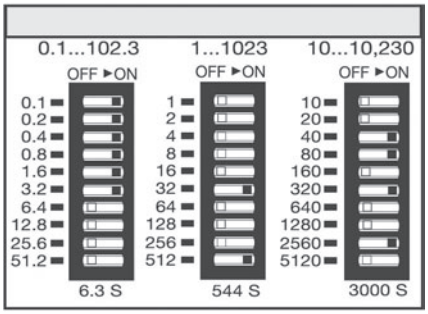
If desired part number is not listed, please call us to see if it is technically possible to build.

Connection:



Relay contacts are isolated.

Digi-Set Binary Switch Operation:



Order Table:

TDI - 1 - 1023s in 1s increments
TDIH - 10 - 10,230s in 10s increments
TDIL - 0.1 - 102.3s in 0.1s increments

X **Input Voltage**
- **12D** - 12VDC
- **24A** - 24VAC
- **24D** - 24VDC/28VDC
- **110D** - 110VDC
- **120A** - 120VAC
- **230A** - 230VAC

X **LED Indication***
- **L**

* Note: LED not available in 12VDC

Specifications

Time Delay
Type . . . . . Digital integrated circuitry
Range** . . . . . 0.1 - 102.3s in 0.1s increments
1 - 1023s in 1s increments
10 - 10,230s in 10s increments
Repeat Accuracy . . . . . ±0.1% or 20ms, whichever is greater
Setting Accuracy . . . . . ±2% or 50ms, whichever is greater
Reset Time. . . . . ≤ 50ms
Recycle Time. . . . . ≤ 150ms
Time Delay vs Temp. & Voltage . . . . . ±2%
Indicator . . . . . LED glows during timing; relay is energized
Input
Voltage. . . . . 12, 24, or 110VDC; 24, 120, or 230VAC
Tolerance 12VDC & 24VDC/AC . . . . . -15% - 20%
110 to 230VAC/DC. . . . . -20% - 10%
AC Line Frequency . . . . . 50/60 Hz
Power Consumption . . . . . ≤ 3.25W
Output
Type . . . . . Electromechanical relay
Form. . . . . DPDT
Rating . . . . . 10A resistive @ 120/240VAC & 28VDC;
1/3 hp @ 120/240VAC
Life . . . . . Mechanical - 1 x10^7; Electrical - 1 x 10^6
Protection
Polarity . . . . . DC units are reverse polarity protected
Isolation Voltage . . . . . ≥ 1500V RMS input to output
Mechanical
Mounting . . . . . Plug-in socket
Dimensions. . . . . 3.2 x 2.4 x 1.8 in. (81.3 x 60.7 x 45.2 mm)
Termination . . . . . Octal 8-pin plug-in
Environmental
Operating / Storage Temperature . . . . . -20° to 65°C / -30° to 85°C
Weight . . . . . ≅ 6 oz (170 g)

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

The HRDI Series combines an electromechanical relay output with microcontroller timing circuitry. It offers 12 to 230V 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 (Interval):
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.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 2 for dimensional drawing.

Features:

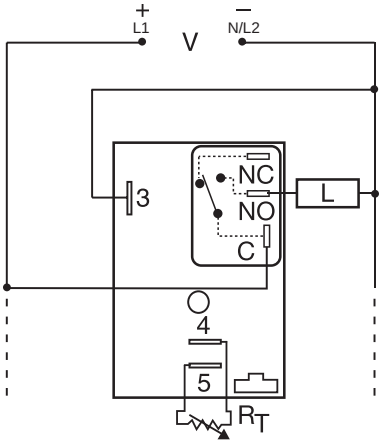
- 30A, SPDT, NO output contacts
- 12 to 230V operation in 5 options
- Encapsulated circuitry
- Delays from 0.1s - 100m in 5 ranges
- ±0.5% repeat timing accuracy
- Factory fixed, onboard or external adjust

Approvals:

Auxiliary Products:

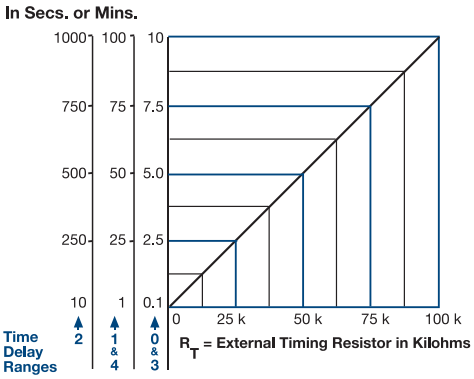
- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Female quick connect:**
  P/N: P1015-13 (AWG 10/12)
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7
- **Mounting bracket:** P/N: P1023-6
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Connection:



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

External Resistance vs. Time Delay:



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.

Available Models:

HRDI117S	HRDI323
HRDI220	HRDI324
HRDI221	HRDI4130M
HRDI222	HRDI421
HRDI223	HRDI422
HRDI224	HRDI423
HRDI320	HRDI424
HRDI321	HRDI431
HRDI322	

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

HRDI — **X** — **Input Voltage**
- **1** - 12VDC
- **2** - 24VAC
- **3** - 24VDC
- **4** - 120VAC
- **6** - 230VAC

X — **Adjustment**
- **1** - Fixed
- **2** - Onboard knob
- **3** - External adjust

X — **Time Tolerance**
- **Blank** - ±5%
- **A** - ±1%

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

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec, or (**0.1 - 100**) (**M**) min.

Specifications

Time Delay
Type . . . . . Microcontroller circuitry
Range . . . . . 0.1s - 100m in 5 adjustable ranges or fixed
Repeat Accuracy . . . . . ±0.5 % or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ±1%, ±5%
Recycle Time . . . . . ≤ 150ms
Time Delay vs Temp. & Voltage . . . . . ±2%

Input
Voltage . . . . . 12 or 24VDC; 24, 120, or 230VAC
Tolerance 12VDC & 24VDC . . . . . -15% - 20%
24 to 230VAC . . . . . -20% - 10%
AC Line Frequency . . . . . 50/60 Hz
Power Consumption . . . . . AC ≤ 4VA; DC ≤ 2W

Output
Type . . . . . Electromechanical relay
Form . . . . . SPDT, non-isolated

Ratings:		SPDT-NO	SPDT-NC
General Purpose	125/240VAC	30A	15A
Resistive	125/240VAC	30A	15A
	28VDC	20A	10A
Motor Load	125VAC	1 hp*	1/4 hp**
	240VAC	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 . . . . . ≥ 2000V 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
Dimensions . . . . . 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° to 60°C / -40° to 85°C
Humidity . . . . . 95% relative, non-condensing
Weight . . . . . ≅ 3.9 oz (111 g)

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 (Interval):
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.

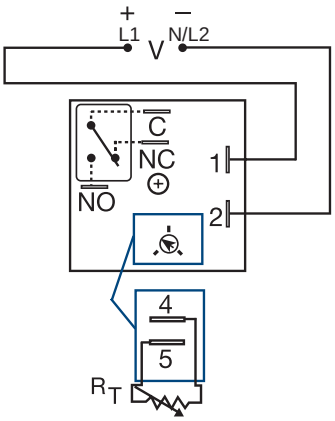
For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features:

- Compact time delay relay
- 10A, SPDT output contacts
- Factory fixed, onboard or external adjust
- Delays from 0.1s - 100m in 5 ranges
- ±0.5% repeat accuracy
- ±5% factory calibration
- Input voltages from 12 to 230V in 6 options

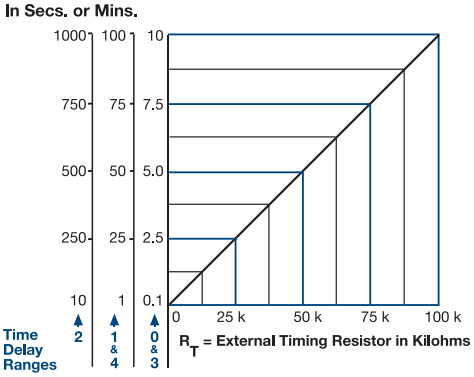
Approvals:

Connection:



V = Voltage
C = Common, Transfer Contact
NO = Normally Open
NC = Normally Closed
A knob is supplied for adjustable units, or RT terminals 4 & 5 for external adjust. See external adjustment vs time delay chart. Relay contacts are isolated.

External Resistance vs. Time Delay:



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.

Auxiliary Products:

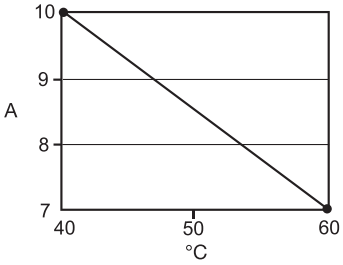
- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Female quick connect:**
  P/N: P1015-13 (AWG 10/12)
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Mounting bracket:** P/N: P1023-6
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20
- **Versa-knob:** P/N: P0700-7

Available Models:

KRDI1132S	KRDI2110S
KRDI120	KRDI21120S
KRDI121	KRDI320
KRDI122	KRDI420
KRDI210.1S	KRDI423

If desired part number is not listed, please call us to see if it is technically possible to build.

Output Current/Ambient Temperature:



Order Table:

KRDI **X** **X** **X**

Input Voltage	Adjustment	Time Delay*
1 - 12VDC	**1** - Fixed	**0** - 0.1 - 10s
2 - 24VAC	**2** - Onboard knob	**1** - 1 - 100s
3 - 24VDC	**3** - External adjust	**2** - 10 - 1000s
4 - 120VAC		**3** - 0.1 - 10m
5 - 110VDC		**4** - 1 - 100m
6 - 230VAC		

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec, or (**0.1 - 100**) (**M**) min.

Specifications

Time Delay
Range . . . . . 0.1s - 100m in 5 adjustable ranges or fixed
Repeat Accuracy . . . . . ±0.5% or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ≤ ± 5%
Reset Time . . . . . ≤ 150ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±5%
Input
Voltage . . . . . 12, 24 or 110VDC; 24, 120 or 230VAC
Tolerance 12VDC & 24VDC/AC . . . . . -15% - 20%
110VDC, 120VAC or 230VAC . . . . . -20% - 10%
AC Line Frequency / DC Ripple . . . . . 50/60 Hz / ≤ 10%
Power Consumption . . . . . AC ≤ 2VA; DC ≤ 2W
Output
Type . . . . . Isolated relay contacts
Form . . . . . SPDT
Rating (at 40°C) . . . . . 10A resistive @ 125VAC;
5A resistive @ 230VAC & 28VDC;
1/4 hp @ 125VAC
Max. Switching Voltage 250VAC
Life (Operations) . . . . . Mechanical - 1 x 10^7; Electrical - 1 x 10^5
Protection
Circuitry . . . . . Encapsulated
Isolation Voltage . . . . . ≥ 1500V 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
Dimensions . . . . . 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° to 60°C / -40° to 85°C
Humidity . . . . . 95% relative, non-condensing
Weight . . . . . ≅ 2.6 oz (74 g)

The TDUI Series combines digital timing circuitry with universal voltage operation. Voltages of 24 to 240VAC and 12 to 24VDC 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 1A 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 (Interval):
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.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features:

- Switch selectable time setting
- 0.1s - 102.3m in 3 ranges
- ±0.5% repeat accuracy
- ±2% setting accuracy
- 1A, solid-state output
- Encapsulated
- Wide voltage ranges

Approvals:

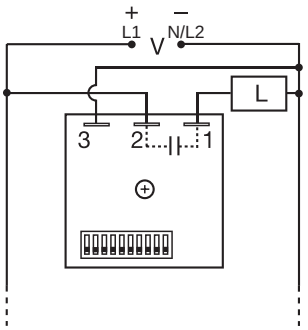
Auxiliary Products:

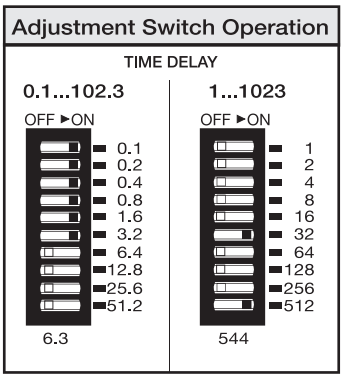
- **Female quick connect:**
  P/N: P1015-13 (AWG 10/12)
  P/N: P1015-64 (AWG 14/16)
  P/N: P1015-14 (AWG 18/22)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Available Models:

TDUI3000A
TDUIH3001A
TDUIH3002A
TDUIL3002A

Connection:





Order Table:

Input Voltage Range	Time Range	Part Number
24 to 120VAC	0.1 - 102.3s	TDUIL3000A
100 to 240VAC	0.1 - 102.3s	TDUIL3001A
12 to 24VDC	0.1 - 102.3s	TDUIL3002A
24 to 120VAC	1 - 1023s	TDUI3000A
100 to 240VAC	1 - 1023s	TDUI3001A
12 to 24VDC	1 - 1023s	TDUI3002A
24 to 120VAC	0.1 - 102.3m	TDUIH3000A
100 to 240VAC	0.1 - 102.3m	TDUIH3001A
12 to 24VDC	0.1 - 102.3m	TDUIH3002A

Specifications

Time Delay
Range* ..... 0.1 - 102.3s in 0.1s increments
1 - 1023s in 1s increments
0.1 - 102.3m in 0.1m increments
Repeat Accuracy ..... ±0.5% or 20ms, whichever is greater
Setting Accuracy ..... ≤ ±2% or 20ms, whichever is greater
Reset Time ..... ≤ 150ms
Time Delay vs Temp. & Voltage ..... ≤ ±5%
Input
Voltage ..... 24 to 240VAC, 12 to 24VDC ±20%
AC Line Frequency ..... 50/60 Hz
Power Consumption ..... AC ≤ 2VA; DC ≤ 1W
DC Ripple ..... ≤ 10%
Output
Type ..... Solid state
Form ..... NO, closed during timing
Rating ..... 1A steady state, 10A inrush at 60°C
Voltage Drop ..... ≅ 2.5V @ 1A; DC ≅ 1V @ 1A
OFF State Leakage Current ..... AC ≅ 5mA @ 230VAC; DC ≅ 1mA
Protection
Circuitry ..... Encapsulated
Dielectric Breakdown ..... ≥ 2000V 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
Dimensions ..... 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 ..... -40° to 60°C / -40° to 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.

The TSD Series is designed for more demanding commercial and industrial applications where small size and accurate performance are 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 1A steady and 10A inrush. The modules are totally solid state and encapsulated to protect the electronic circuitry.

Operation (Interval):
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.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features:

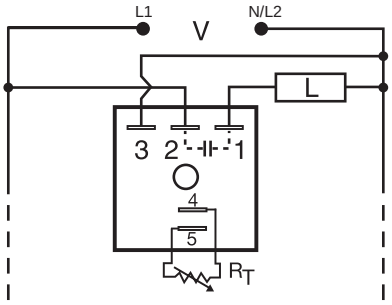
- Fixed or adjustable delays from 0.1s - 100h
- ±0.1% repeat accuracy
- ±1% factory calibration
- 24, 120, or 230VAC
- 1A, solid-state output
- Encapsulated

Approvals:

Auxiliary Products:

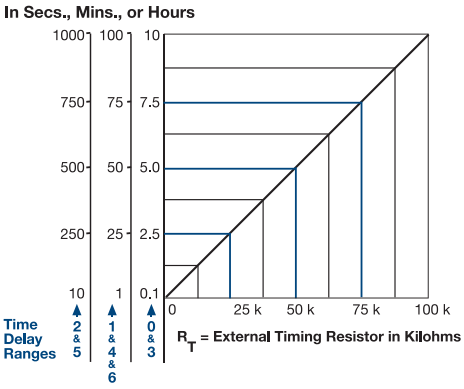
- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Female quick connect:**
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Mounting bracket:** P/N: P1023-6
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20
- **Versa-knob:** P/N: P0700-7

Connection:



R_T is used when external adjustment is ordered.

External Resistance vs. Time Delay:



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.

Available Models:

TSD2221	TSD241600S
TSD2411S	TSD2434
TSD24145S	

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

TSD2 **X** **X** **X**

Input Voltage
- **2** - 24VAC
- **4** - 120VAC
- **6** - 230VAC

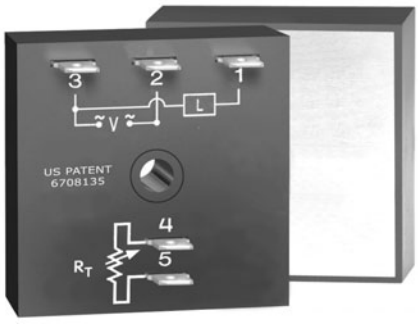
Adjustment
- **1** - Fixed
- **2** - External adjust
- **3** - Onboard adjust

Time Delay*
- **0** - 0.1 - 10s
- **1** - 1 - 100s
- **2** - 10 - 1000s
- **3** - 0.1 - 10m
- **4** - 1 - 100m
- **5** - 10 - 1000m
- **6** - 1 - 100h

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec. or (**M**) min. or (**1 - 100**) (**H**) hours

Specifications

Time Delay
Range . . . . . 0.1s - 100h in 7 adjustable ranges or fixed
Repeat Accuracy . . . . . ±0.1% or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ≤ ±1%
Reset Time . . . . . ≤ 150ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±1%
Input
Voltage . . . . . 24, 120, or 230VAC
Tolerance . . . . . ±20%
AC Line Frequency . . . . . 50/60 Hz
Power Consumption . . . . . ≤ 2VA
Output
Type . . . . . Solid state
Form . . . . . NO, closed during timing
Maximum Load Current . . . . . 1A steady state, 10A inrush at 60°C
Off State Leakage Current . . . . . ≅ 5mA @ 230VAC
Voltage Drop . . . . . ≅ 2.5V @ 1A
Protection
Circuitry . . . . . Encapsulated
Dielectric Breakdown . . . . . ≥ 2000V RMS terminals to mounting surface
Insulation Resistance . . . . . ≥ 100 MΩ
Mechanical
Mounting . . . . . Surface mount with one #10 (M5 x 0.8) screw
Dimensions . . . . . 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 . . . . . -40° to 75°C / -40° to 85°C
Humidity . . . . . 95% relative, non-condensing
Weight . . . . . ≅ 2.4 oz (68 g)



The THD2 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 (Interval):
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.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 4 for dimensional drawing.

Features:

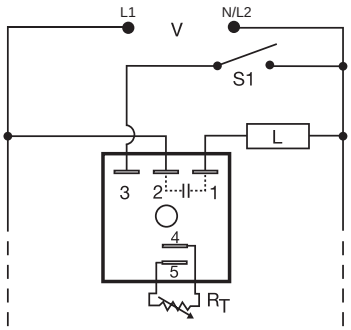
- High load currents up to 20A, 200A inrush
- Fixed or adjustable delays from 0.1s - 1000m
- ±0.5% repeat accuracy
- ±1% factory calibration
- 24, 120, or 230VAC
- Metallized mounting surface for heat transfer
- Totally solid state and encapsulated

Approvals:

Auxiliary Products:

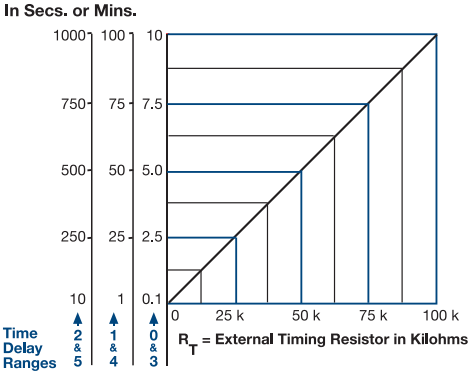
- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Female quick connect:**
  P/N: P1015-13 (AWG 10/12)
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7

Connection:



S1 = Optional Low Current Initiate Switch
R_T is used when external adjustment is ordered.

External Resistance vs. Time Delay:



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.

Available Models:

THD2B4110M	THD2C423
THD2B41600S	THD2C430
THD2B6110M	THD2C431
THD2C231	THD2C432
THD2C232	THD2C433
THD2C233	THD2C434
THD2C234	THD2C435
THD2C235	

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

THD2 **X** **X** **X** **X**

Output Rating
- **A** - 6A
- **B** - 10A
- **C** - 20A

Input Voltage
- **2** - 24VAC
- **4** - 120VAC
- **6** - 230VAC

Adjustment
- **1** - Fixed
- **2** - External adjust
- **3** - Onboard adjust

Time Delay*
- **0** - 0.1 - 10s
- **1** - 1 - 100s
- **2** - 10 - 1000s
- **3** - 0.1 - 10m
- **4** - 1 - 100m
- **5** - 10 - 1000m

*If fixed delay is selected, insert delay (**1 - 1000**) followed by (**S**) secs. or (**M**) mins.

Specifications

Time Delay
Range . . . . . 0.1s - 1000m in 6 adjustable ranges or fixed
Repeat Accuracy . . . . . ±0.5% or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ≤ ±1%
Reset Time . . . . . ≤ 150ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±2%
Input
Voltage . . . . . 24, 120, or 230VAC
Tolerance . . . . . ±20%
AC Line Frequency . . . . . 50/60 Hz
Output
Type . . . . . Solid state
Form . . . . . NO, closed during timing

Maximum Load Current	Output	Steady State	Inrush**
	A	6A	60A
	B	10A	100A
	C	20A	200A

Minimum Load Current 100mA
Voltage Drop . . . . . ≅ 2.5V at rated current
OFF State Leakage Current . . . . . ≅ 5mA @ 230VAC
Protection
Circuitry . . . . . Encapsulated
Dielectric Breakdown . . . . . ≥ 2000V RMS terminals to mounting surface
Insulation Resistance . . . . . ≥ 100 MΩ
Mechanical
Mounting ** . . . . . Surface mount with one #10 (M5 x 0.8) screw
Dimensions . . . . . 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 / Storage Temperature . . . . . -40° to 60°C / -40° to 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 16ms.

The TSD6 offers total solid-state, interval timing for 12 or 24VDC 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 1A steady and 10A inrush. The modules are totally solid state and encapsulated to protect the electronic circuitry.

Operation (Interval):
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.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features:

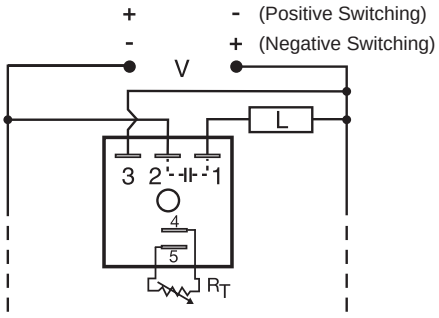
- Fixed or adjustable delays from 0.1s - 100h
- ±0.1% repeat accuracy
- ±1% factory calibration
- 12 or 24VDC interval timing
- 1A, solid-state output
- Encapsulated

Approvals:

Auxiliary Products:

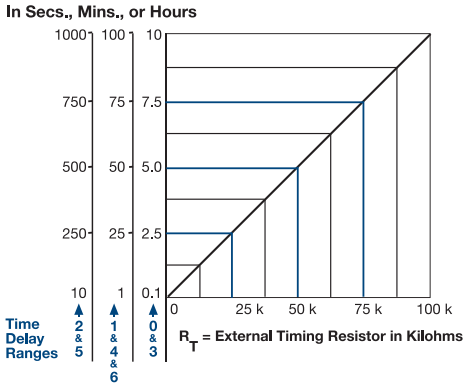
- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Female quick connect:**
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Mounting bracket:** P/N: P1023-6
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20
- **Versa-knob:** P/N: P0700-7

Connection:



R_T is used when external adjustment is ordered.

External Resistance vs. Time Delay:



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.

Available Models:

TSD6113SN	TSD6310.8SN
TSD6121N	TSD631180SP
TSD6121P	TSD631380SP
TSD6123N	TSD6320P
TSD6124P	TSD6334P

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

TSD6 **X** **X** **X** **X**

Input Voltage
- **1** - 12VDC
- **3** - 24VDC

Adjustment
- **1** - Fixed
- **2** - External adjust
- **3** - Onboard adjust

Time Delay*
- **0** - 0.1 - 10s
- **1** - 1 - 100s
- **2** - 10 - 1000s
- **3** - 0.1 - 10m
- **4** - 1 - 100m
- **5** - 10 - 1000m
- **6** - 1 - 100h

Switching Mode
- **P** - Positive
- **N** - Negative

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec. or (**M**) min. or (**1 - 100**) (**H**) hours

Specifications

Time Delay
Range . . . . . 0.1s - 100h 7 adjustable ranges or fixed
Repeat Accuracy . . . . . ±0.1% or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ≤ ±1%
Reset Time . . . . . ≤ 150ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±1%
Input
Voltage . . . . . 12 or 24VDC
Tolerance . . . . . ±15%
DC Ripple . . . . . ±10%
Power Consumption . . . . . ≤ 1W
Output
Type . . . . . Solid state, positive or negative switching
Form . . . . . NO, closed during timing
Maximum Load Current . . . . . 1A steady state, 10A inrush at 60°C
Off State Leakage Current . . . . . ≅ 1mA
Voltage Drop . . . . . ≅ 1.0V @ 1A
Protection
Circuitry . . . . . Encapsulated
Dielectric Breakdown . . . . . ≥ 2000V RMS terminals to mounting surface
Insulation Resistance . . . . . ≥ 100 MΩ
Polarity . . . . . Units are reverse polarity protected
Mechanical
Mounting . . . . . Surface mount with one #10 (M5 x 0.8) screw
Dimensions . . . . . 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 . . . . . -40° to 75°C / -40° to 85°C
Humidity . . . . . 95% relative, non-condensing
Weight . . . . . ≅ 2.4 oz (68 g)

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 230VAC. Time delays of 0.1 seconds to 1000 minutes are available in 6 ranges. The output is rated 1A steady and 10A 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 (Interval):
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.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features:

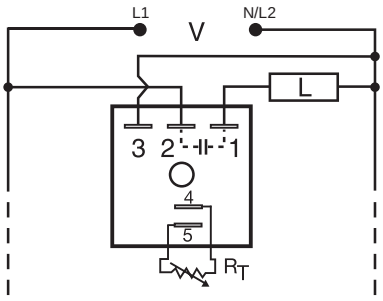
- Fixed or adjustable delays from 0.1s - 1000m
- ±0.5% repeat accuracy
- ± 5% factory calibration
- 24, 120, or 230VAC
- 1A, solid-state output
- Encapsulated

Approvals:

Auxiliary Products:

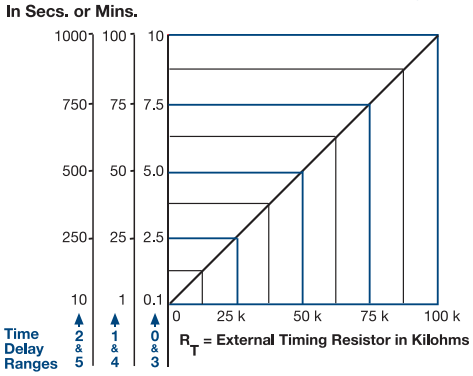
- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Mounting bracket:** P/N: P1023-6
- **Female quick connect:**
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Connection:



R_T is used when external adjustment is ordered.

External Resistance vs. Time Delay:



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.

Available Models:

KSD2211M
KSD2221
KSD2413M
KSD2420

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

KSD2	X	X	X
	Input Voltage	**Adjustment**	**Time Delay***
	2 - 24VAC	**1** - Fixed	**0** - 0.1 - 10s
	4 - 120VAC	**2** - External adjust	**1** - 1 - 100s
	6 - 230VAC	**3** - Onboard adjust	**2** - 10 - 1000s
			3 - 0.1 - 10m
			4 - 1 - 100m
			5 - 10 - 1000m

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) secs. or (**M**) mins.

Specifications

Time Delay
Range . . . . . 0.1s - 1000m in 6 adjustable ranges or fixed
Repeat Accuracy . . . . . ±0.5% or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ≤ ±5%
Reset Time . . . . . ≤ 150ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±10%
Input
Voltage . . . . . 24, 120, or 230VAC
Tolerance . . . . . ±20%
AC Line Frequency . . . . . 50/60 Hz
Power Consumption . . . . . ≤ 2VA
Output
Type . . . . . Solid state
Form . . . . . NO, closed during timing
Maximum Load Current . . . . . 1A steady state, 10A inrush at 60°C
OFF State Leakage Current . . . . . ≅ 5mA @ 230VAC
Voltage Drop . . . . . ≅ 2.5V @ 1A
Protection
Circuitry . . . . . Encapsulated
Dielectric Breakdown . . . . . ≥ 2000V RMS terminals to mounting surface
Insulation Resistance . . . . . ≥ 100 MΩ
Mechanical
Mounting . . . . . Surface mount with one #10 (M5 x 0.8) screw
Dimensions . . . . . 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 . . . . . -40° to 60°C / -40° to 85°C
Humidity . . . . . 95% relative, non-condensing
Weight . . . . . ≅ 2.4 oz (68 g)

The TS2 Series is designed for 24, 120 or 230VAC and the TS6 Series is designed for 12 or 24VDC. These series are capable of controlling load currents of up to 1A steady state, 10A inrush. Encapsulated circuitry and the reliability of a ±2% repeat accuracy make the TS2 and TS6 ideal for cost sensitive applications.

Operation (Interval):
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.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features:

- 12 or 24VDC; 24,120, or 230VAC input voltages
- Fixed or adjustable delays from 0.05s - 10m in 8 ranges
- Repeat accuracy ±2%
- Load currents to 1A, 10A inrush
- Totally solid state & encapsulated

Approvals:

Auxiliary Products:

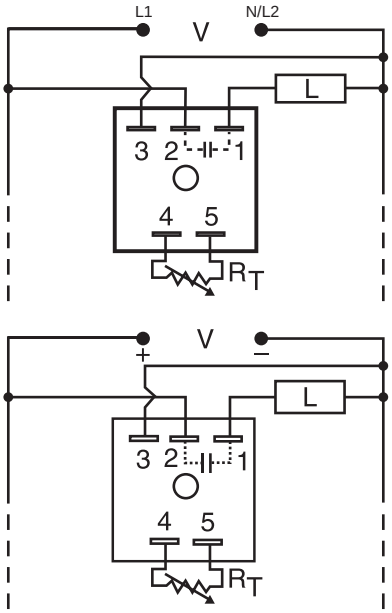
- **External ad just potentiometer:**
  P/N: P1004-XX
  P/N: P1004-XX-X
- **Female quick connect:**
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Mounting bracket:** P/N: P1023-6
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20
- **Versa-knob:** P/N: P0700-7
- **Plug-on adjustment module:**
  P/N: VTP(X)(X)

TS6 12VDC	
Time Delay	VTP P/N
1 - 0.05-1s	VTP2A
2 - 0.5-20s	VTP2E
3 - 2-60s	VTP2F
4 - 5-120s	VTP2H

TS2 & TS6 All Other Voltages	
Time Delay	VTP P/N
1 - 0.05-3s	VTP4B
2 - 0.5-60s	VTP4F
3 - 2-180s	VTP4J
4 - 5-600s	VTP5N

Selection Table for VTP Plug-on Adjustment Accessory.

Connection:



R_T is used when external adjustment is ordered.
Note: TS6 is not reverse polarity protected.

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

Order Tables:

TS2

X Input Voltage
- 2 - 24VAC
- 4 - 120VAC
- 6 - 230VAC

X Adjustment
- 1 - Fixed
- 2 - External adjust

X Time Delay*
- 1 - 0.05 - 3s
- 2 - 0.5 - 60s
- 3 - 2 - 180s
- 4 - 5 - 600s

*If fixed delay is selected, insert delay (**0.05 - 600**) in seconds.

TS6

X Input Voltage
- 1 - 12VDC
- 3 - 24VDC

X Adjustment
- 1 - Fixed
- 2 - External adjust

X Time Delay*

	12VDC	24VDC
1	0.05 - 1s	0.05 - 3s
2	0.5 - 20s	0.5 - 60s
3	2 - 60s	2 - 180s
4	5 - 120s	5 - 600s

X Switching Mode
- P - Positive

*If fixed delay is selected, insert delay (**0.05 - 120** 12VDC) or (**0.05 - 600** 24VDC) in secs.

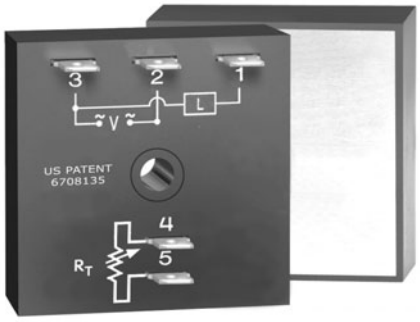
Available Models:

TS22120	TS2421	TS6116P
TS2213	TS2422	TS6122P
TS2223	TS2423	TS6123P
TS2411.5	TS2424	TS6311P
TS24110	TS2611.5	TS63110P
TS2412	TS26130	TS6321P
TS2413	TS26190	
TS24130	TS2621	

If desired part number is not listed, please call us to see if it is technically possible to build.

Specifications

Time Delay
Type . . . . . Analog circuitry
Range 12VDC . . . . . 0.05 - 120s in 4 adjustable ranges or fixed (1 MΩ max. R_T)
Other Voltages . . . . . 0.05 - 600s in 4 adjustable ranges or fixed
Repeat Accuracy . . . . . ±2% or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ≤ ±10%
Time Delay vs Temp. & Voltage . . . . . ≤ ±10%
Reset Time . . . . . ≤ 150ms
Input
Voltage . . . . . 12 or 24VDC; 24, 120, or 230VAC
Tolerance . . . . . ±15%
DC Ripple 10%
Power Consumption . . . . . DC ≤ 1W; AC ≤ 2VA
Output
Type . . . . . Solid state
Form . . . . . NO, closed during timing
Maximum Load Current . . . . . 1A steady state, 10A inrush at 60°C
Voltage Drop . . . . . DC ≅ 1.0V @ 1A; AC ≅ 2.5V @ 1A
Protection
Circuitry . . . . . Encapsulated
Polarity . . . . . TS6 is not reverse polarity protected
Dielectric Breakdown . . . . . ≥ 2000V RMS terminals to mounting surface
Insulation Resistance . . . . . ≥ 100 MΩ
Mechanical
Mounting . . . . . Surface mount with one #10 (M5 x 0.8) screw
Dimensions . . . . . 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 . . . . . -40° to 75°C / -40° to 85°C
Humidity . . . . . 95% relative, non-condensing
Weight . . . . . ≅ 2.4 oz (68 g)



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 20A steady state with 200A inrush. The TH2 replaces a timer and relay at a competitive price.

Operation (Interval):
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.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 4 for dimensional drawing.

Features

- High load current capacity up to 20A, 200A inrush
- Fixed or adjustable time delays from 0.1 - 600s in 4 ranges
- ±2% repeat accuracy
- ±5% factory calibration
- Metallized mounting surface for heat transfer
- Solid state & encapsulated

Approvals:

Auxiliary Products:

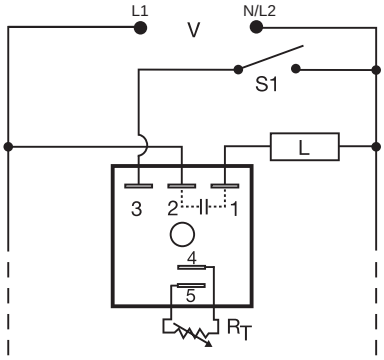
- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Female quick connect:**
  P/N: P1015-13 (AWG 10/12)
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7

Available Models:

TH2A421

If desired part number is not listed, please call us to see if it is technically possible to build.

Connection:



R_T is used when external adjustment is ordered.

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.

Order Table:

TH2 **X** **X** **X** **X**

Output Rating
- **A** - 6A
- **B** - 10A
- **C** - 20A

Input Voltage
- **2** - 24VAC
- **4** - 120VAC
- **6** - 230VAC

Adjustment
- **1** - Fixed
- **2** - External adjust
- **3** - Onboard adjust

Time Delay*
- **1** - 0.1 - 3s
- **2** - 0.5 - 60s
- **3** - 2 - 180s
- **4** - 5 - 600s

*If fixed delay is selected, insert delay (**0.1 - 600**) in seconds.

Specifications

Time Delay
Range . . . . . 0.1s - 600s in 4 adjustable ranges, or fixed
Repeat Accuracy . . . . . ±2% or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ≤ ±5%
Time Delay vs Temp. & Voltage . . . . . ≤ ±10%
Reset Time . . . . . ≤ 150ms
Input
Voltage . . . . . 24, 120, or 230VAC
Tolerance . . . . . ±15%
AC Line Frequency . . . . . 50/60 Hz
Power Consumption . . . . . ≤ 2VA
Output
Type . . . . . Solid state
Form . . . . . NO, closed during timing

Maximum Load Currents	Output	Steady State	Inrush**
	A	6A	60A
	B	10A	100A
	C	20A	200A

Minimum Load Current 100mA
Voltage Drop . . . . . ≅ 2.5V at rated current
OFF State Leakage Current . . . . . ≅ 5mA @ 230VAC
Protection
Circuitry . . . . . Encapsulated
Dielectric Breakdown . . . . . ≥ 2000V RMS terminals to mounting surface
Insulation Resistance . . . . . ≥ 100 MΩ
Mechanical
Mounting ** . . . . . Surface mount with one #10 (M5 x 0.8) screw
Dimensions . . . . . 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 / Storage Temperature . . . . . -20° to 60°C / -40° to 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 16ms.

The TDR Series of time-delay relays are comprised of digital circuitry and an isolated, 10A relay output. The on and off delays are selected by means of two, ten position binary switches, which allow the setting of the desired delay to be precise every time.

Operation (Recycling - ON Time First):
Upon application of input voltage, the green LED glows, the output relay is energized, the red LED glows, and the T1 ON time begins. At the end of the ON time, the output de-energizes, the red LED turns OFF and the T2, OFF time begins. At the end of the OFF time, the output relay energizes and the cycle repeats as long as input voltage is applied.
Reset: Removing input voltage resets the output and time delays, and returns the sequence to the first delay.
Operation (Recycling - OFF Time First):
Upon application of input voltage, the green LED glows, the T1 OFF time begins, the load is OFF. At the end of the OFF time, the T2 ON time begins, the load energizes, and the red LED glows. At the end of the ON time the load de-energizes and the red LED turns OFF. The cycle repeats until input voltage is removed.
Reset: Removing input voltage resets the output and the sequence to the OFF time.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 8 for dimensional drawing.

Features:

- Switch settable time delays - both times adjustable
- 0.1s - 2.84h in 3 ranges
- ±0.1% repeat accuracy
- ±2% setting accuracy
- Isolated, 10A, DPDT output contacts
- Octal plug-in base connection

Approvals:

Auxiliary Products:

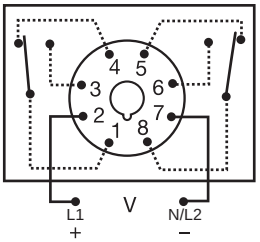
- **Panel mount kit:** P/N: BZ1
- **Octal 8-pin socket:** P/N: NDS-8
- **Hold-down clips (sold in pairs):** P/N: PSC8 (NDS-8)
- **DIN rail:** P/N: C103PM (Al)

Available Models:

TDR1A22	TDR4A22
TDR2A22	TDR4A23
TDR2A23	TDR4A33
TDR4A11	TDR4B22
TDR4A12	TDR4B23
TDR4A13	TDR6A22

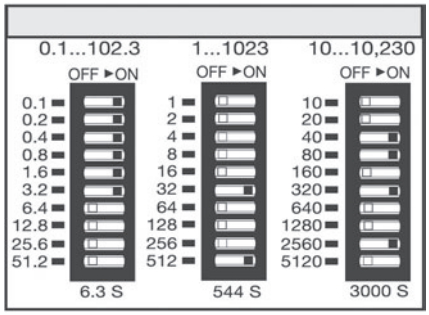
If desired part number is not listed, please call us to see if it is technically possible to build.

Connection:



Relay contacts are isolated.

Digi-Set Binary Switch Operation:



Order Table:

TDR **X** **X** **X** **X**

Input Voltage
- **A** - 24 to 240VAC/DC
- **D** - 12* to 48VDC
- **1** - 12VDC*
- **2** - 24VAC
- **3** - 24VDC
- **4** - 120VAC
- **5** - 110VDC
- **6** - 230VAC

Sequence
- **A** - ON Time First
- **B** - OFF Time First

ON Time
- **1** - 0.1 - 102.3s in 0.1s increments
- **2** - 1 - 1023s in 1s increments
- **3** - 10 - 10,230s in 10s increments

OFF Time
- **1** - 0.1 - 102.3s in 0.1s increments
- **2** - 1 - 1023s in 1s increments
- **3** - 10 - 10,230s in 10s increments

*Control status LED not available on 12VDC units.

Specifications

Time Delay
Type . . . . . Microcontroller circuitry
Range** . . . . . 0.1 - 102.3s in 0.1s increments
1 - 1023s in 1s increments
10 - 10,230s in 10s increments
Repeat Accuracy . . . . . ±0.1% or 20ms, whichever is greater
Setting Accuracy . . . . . ±2% or 50ms, whichever is greater
Reset Time. . . . . ≤ 150ms
Recycle Time. . . . . ≤ 500ms
Time Delay vs Temp. & Voltage . . . . . ±2%
Input
Voltage. . . . . 12 to 24VDC, 110VDC, 24, 120, or 230VAC; 24 to 240VAC/DC; 12 to 48VDC
Tolerance 12VDC & 24VDC/AC . . . . . -15% - 20%
110 to 230VAC/DC . . . . . -20% - 10%
AC Line Frequency / DC Ripple. . . . . 50/60 Hz / ≤ 10%
Power Consumption . . . . . AC ≤ 2VA; DC ≤ 2W
Input LED Indicator . . . . . Green; On when input voltage is applied
Output
Type . . . . . Electromechanical relay
Form. . . . . DPDT
Rating . . . . . 10A resistive @ 120/240VAC & 30VDC; 1/3 hp @ 230VAC
Life . . . . . Mechanical - 1 x 10^7; Electrical - 1 x 10^5
Max. Switching Voltage 250VAC
Relay LED Indicator . . . . . Red; ON when output relay energizes
Protection
Isolation Voltage . . . . . ≥ 1500V RMS input to output
Insulation Resistance. . . . . ≥ 100 MΩ
Polarity . . . . . DC units are reverse polarity protected
Mechanical
Mounting . . . . . Plug-in socket
Dimensions . . . . . 3.2 x 2.39 x 1.78 in. (81.3 x 60.7 x 45.2 mm)
Termination . . . . . Octal 8-pin plug-in
Environmental
Operating / Storage Temperature . . . . . -20° to 60°C / -30° to 85°C
Weight . . . . . ≅ 6 oz (170 g)

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

The HRDR Series combines an electromechanical relay and microcontroller timing circuitry. It offers 12 to 230V operation in five ranges and factory fixed, onboard or externally adjustable time delays with a repeat accuracy of ±0.5%. The high switching capacity of the output contacts allow for direct control of heavy loads like compressors, pumps, motors, heaters and lighting. A bypass/reset switch option allows operator to interrupt normal recycling sequence and energize output relay. An excellent choice for OEM applications.

Operation (Recycling with Reset Switch):
Upon application of input voltage, the ON time T1 begins and output relay energizes. At the end of the ON time, the output relay de-energizes and the OFF time T2 begins. At the end of the OFF time, the output relay energizes and the cycle repeats as long as input voltage is applied. Some recycling timers have the OFF time as the first delay.
Reset: Removing input voltage resets output and time delays, and returns sequence to the first delay.
Bypass/Reset Switch: Closing the normally open bypass/reset switch energizes the output relay and resets the time delays. Opening the switch restarts recycling operation with the first delay.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 2 for dimensional drawing.

Features

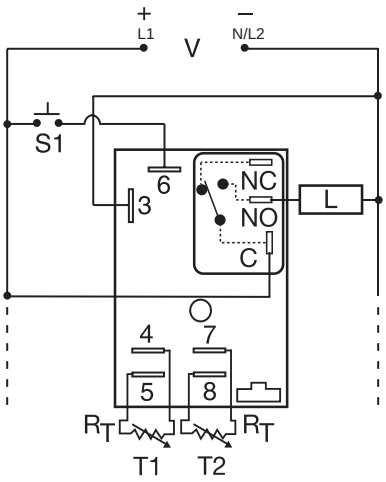
- 30A, SPDT, NO output contacts
- 12 to 230V operation in 5 options
- Encapsulated circuitry
- Delays from 0.1s - 1000m in 6 ranges
- Independent adjustment of on and off delays
- ±0.5% repeat accuracy
- ±5% factory calibration
- Factory fixed, onboard or external adjust

Approvals:

Auxiliary Products:

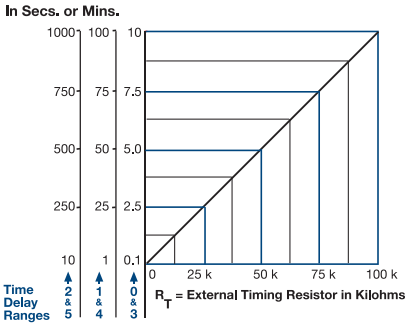
- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Female quick connect:**
  P/N: P1015-13 (AWG 10/12)
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7
- **Mounting bracket:** P/N: P1023-6
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Connection:



NO = Normally Open
S1 = Reset Switch
C = Common, Transfer Contact
L = Load
Terminals 4 & 5 and/or 7 & 8 are only included on externally adjustable units.
Relay contacts are non-isolated. R_T is included when external adjustment is ordered. Terminal 6 is included when Bypass/Reset is selected.

External Resistance vs. Time Delay:



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

Available Models:

HRDR11720MB60S	HRDR330A0R
HRDR120A1R	HRDR331A1
HRDR121A4R	HRDR4110MB20M
HRDR130A0R	HRDR431A1R
HRDR321A4R	
HRDR322B2R	

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

HRDR **X** **Input Voltage**
- **1** - 12VDC
- **2** - 24VAC
- **3** - 24VDC
- **4** - 120VAC
- **6** - 230VAC

X **External Adjust**
- **1** - Both Times Fixed
- **2** - Both Times Onboard Adj.
- **3** - Both Times External Adj.
- **4** - ON Time External Adj. OFF Time Fixed
- **5** - ON Time Fixed OFF Time External Adj.
- **6** - ON Time Onboard Adj. OFF Time Fixed
- **7** - ON Time Fixed OFF Time Onboard Adj.
- **8** - ON Time Onboard Adj. OFF Time External Adj.
- **9** - ON Time External Adj. OFF Time Onboard Adj.

X **T1 ON Time***
- **0** - 0.1 - 10s
- **1** - 1 - 100s
- **2** - 10 - 1000s
- **3** - 0.1 - 10m
- **4** - 1 - 100m
- **5** - 10 - 1000m

X **Operating Sequence**
- **A** - ON time first
- **B** - OFF time first

X **T2 OFF Time***
- **0** - 0.1 - 10s
- **1** - 1 - 100s
- **2** - 10 - 1000s
- **3** - 0.1 - 10m
- **4** - 1 - 100m
- **5** - 10 - 1000m

X **Operation**
- **Blank** - NoBypass/Reset Option
- **R** - Bypass/Reset Option

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec. or (**0.1 - 1000**) (**M**) min.

Specifications

Time Delay
Range . . . . . 100ms - 1000m in 6 adjustable ranges or fixed
Repeat Accuracy . . . . . ±0.5% or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ±5%
Reset Time . . . . . ≤ 150ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±2%

Input
Voltage . . . . . 12 or 24VDC; 24, 120, or 230VAC
Tolerance 12VDC & 24VDC . . . . . -15% - 20%
24 to 230VAC . . . . . -20% - 10%
AC Line Frequency . . . . . 50/60 Hz
Power Consumption . . . . . AC ≤ 4VA; DC ≤ 2W

Output
Type . . . . . Electromechanical relay
Form . . . . . SPDT, non-isolated

Ratings:		SPDT- NO	SPDT-NC
General Purpose	125/240VAC	30A	15A
Resistive	125/240VAC	30A	15A
	28VDC	20A	10A
Motor Load	125VAC	1 hp*	1/4 hp**
	240VAC	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 . . . . . ≥ 2000V 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
Dimensions . . . . . 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° to 60°C / -40° to 85°C
Humidity . . . . . 95% relative non-condensing
Weight . . . . . ≅ 3.9 oz (111 g)

The HRD3 Series combines an electromechanical relay output with microcontroller timing circuitry. It offers 12 to 230V operation in five options 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 (Recycling - ON Time First):
Upon application of input voltage, the output relay energizes and the T1 ON time begins. At the end of the ON time, the output de-energizes and the T2 OFF time begins. At the end of the OFF time, the output relay energizes and the cycle repeats as long as input voltage is applied
Reset: Removing input voltage resets the output and time delays, and returns the sequence to the first delay.
Operation (Recycling - OFF Time First):
Upon application of input voltage, the T2, OFF time begins. At the end of the OFF time, the T1, ON time begins and the load energizes. At the end of the ON time the load de-energizes, and the cycle repeats until input voltage is removed.
Reset: Removing input voltage resets the output and the sequence to the OFF time.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 2 for dimensional drawing.

Features:

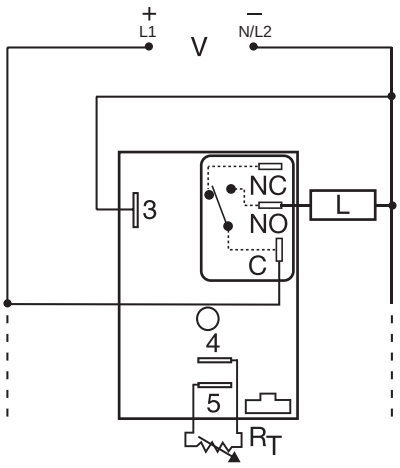
- Equal on and off delays
- 30A, SPDT, NO output contacts
- 12 to 230V operation in 5 options
- Encapsulated
- Delays from 0.1s - 100m in 5 ranges
- ±0.5% repeat accuracy
- Factory fixed, onboard or external adjust

Approvals:

Auxiliary Products:

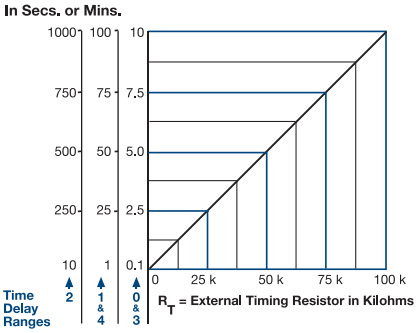
- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Female quick connect:**
  P/N: P1015-13 (AWG 10/12)
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7
- **Mounting bracket:** P/N: P1023-6
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Connection:



C = Common, Transfer Contact
NO = Normally Open
L = Load
NOTE: A knob, or terminals 4 & 5 are only included on adjustable units. RT is used when external adjustment is ordered. Relay contacts are not isolated.

External Resistance vs. Time Delay:



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.

Available Models:

HRD3220A	HRD3323A
HRD3221A	HRD3324A
HRD3222A	HRD3420A
HRD3223A	HRD3421A
HRD3224A	HRD3422A
HRD3320A	HRD3423A
HRD3321A	HRD342A0A
HRD3322A	

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

HRD3 **X** **X** **X** **X** **X**

Input Voltage
- **1** - 12VDC
- **2** - 24VAC
- **3** - 24VDC
- **4** - 120VAC
- **6** - 230VAC

Adjustment
- **1** - Fixed
- **2** - Onboard knob
- **3** - External adjust

Time Tolerance
- **Blank** - ±5%
- **A** - ±1%

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

Operating Sequence
- **A** - ON Time First
- **B** - OFF Time First

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec, or (**0.1 - 100**) (**M**) min.

Specifications

Time Delay
Type: Microcontroller circuitry
Range: 0.1s - 100m in 5 adjustable ranges or fixed
Repeat Accuracy: ±0.5 % or 20ms, whichever is greater
Tolerance (Factory Calibration): ±1%, ±5%
Reset Time: ≤ 150ms
Time Delay vs Temp. & Voltage: ±2%

Input
Voltage: 12 or 24VDC; 24, 120, or 230VAC
Tolerance: 12VDC & 24VDC: -15% - 20%
24 to 230VAC: -20% - 10%
Line Frequency: 50/60 Hz
Power Consumption: AC ≤ 4VA; DC ≤ 2W

Output
Type: Electromechanical relay
Form: Non-isolated, SPDT

Ratings:		SPDT-NO	SPDT-NC
General Purpose	125/240VAC	30A	15A
Resistive	125/240VAC	30A	15A
	28VDC	20A	10A
Motor Load	125VAC	1 hp*	1/4 hp**
	240VAC	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: ≥ 2000V 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
Dimensions: 3 x 2 x 1.5 in. (76.7 x 51.3 x 38.1 mm)
Termination: 0.25 in. (6.35 mm) male quick connect terminals

Environmental
Operating / Storage Temperature: -40° to 60°C / -40° to 85°C
Humidity: 95% relative, non-condensing
Weight: ≅ 3.9 oz (111 g)

Econo-Timers are a combination of digital electronics and a reliable electromechanical relay. DPDT relay output for relay logic circuits, and isolation of input to output voltages. Cost effective for OEM applications, such as duty cycling, drying, washing, signaling, and flashing.

Operation (Recycling - ON Time First):
Upon application of input voltage, the output relay energizes and the T1 ON time begins. At the end of the ON time, the output de-energizes and the T2 OFF time begins. At the end of the OFF time, the output relay energizes and the cycle repeats as long as input voltage is applied.
Reset: Removing input voltage resets the output and time delays, and returns the sequence to the first delay.
Operation (Recycling - OFF Time First):
Upon application of input voltage, the T2 OFF time begins. At the end of the OFF time, the T1 ON time begins and the load energizes. At the end of the ON time the load de-energizes, and the cycle repeats until input voltage is removed.
Reset: Removing input voltage resets the output and the sequence to the OFF time.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 10 for dimensional drawing.

Features

- Factory fixed, onboard or external adjust
- Delays from 0.1s - 1000m
- ±0.5% repeat accuracy
- Encapsulated digital circuitry
- Isolated, 10A, DPDT output contacts

Approvals:

Auxiliary Products:

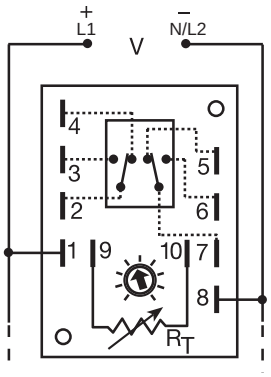
- **External ad just potentiometer:**
  P/N: P1004-16
  P/N: P1004-16-X
- **Female quick connect:**
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7

Available Models:

ERD3425A

If desired part number is not listed, please call us to see if it is technically possible to build.

Connection:



A knob, or terminals 9 & 10 are only included on adjustable units. Relay contacts are isolated. RT is used when external adjustment is ordered.

R_T Selection Chart						
Desired Time Delay* Seconds						R_T
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* Minutes					R_T
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.

Order Table:

ERD3 **X** **Input Voltage**
- **1** - 12VDC
- **2** - 24VAC
- **3** - 24VDC
- **4** - 120VAC
- **5** - 120VDC
- **6** - 230VAC

X **Adjustment**
- **1** - Fixed
- **2** - Onboard knob
- **3** - External adjust

X **Time Delay***
- **1** - 0.1 - 1s
- **2** - 0.1 - 5s
- **3** - 0.1 - 10s
- **4** - 0.2 - 15s
- **5** - 0.3 - 30s
- **6** - 0.6 - 60s
- **7** - 0.1 - 5m
- **8** - 0.1 - 10m
- **9** - 0.2 - 15m
- **10** - 0.3 - 30s
- **11** - 10 - 500m

X **Operating Sequence**
- **A** - ON Time First
- **B** - OFF Time First

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec, or (**M**) min.

Specifications

Time Delay
Type . . . . . Digital integrated circuitry
Range . . . . . 0.1s - 500m in 11 adjustable ranges
0.1s - 1000m fixed
Adjustment . . . . . Knob, external adjust, or fixed
Repeat Accuracy . . . . . ±0.5%
Tolerance (Factory Calibration) . . . . . ≤ ±10%
Reset Time . . . . . ≤ 150ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±2%
Input
Voltage . . . . . 12, 24, or 120VDC; 24, 120, or 230VAC
Tolerance 12VDC & 24VDC/AC . . . . . -15% - 20%
120VAC/DC & 230VAC . . . . . -20% - 10%
AC Line Frequency . . . . . 50/60 Hz
Output
Type . . . . . Isolated relay contacts
Form . . . . . DPDT
Rating . . . . . 10A resistive @ 120/240VAC & 28VDC;
1/3 hp @ 120/240VAC
Life . . . . . Mechanical - 1 x 10^7; Electrical - 1 x 10^6
Protection
Isolation Voltage . . . . . ≥ 1500V 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
Dimensions . . . . . 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
Environmental
Operating / Storage Temperature . . . . . -40° to 65°C / -40° to 85°C
Weight . . . . . ≅ 5.7 oz (162 g)

The KRDR 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 KRDR Series is a cost effective recycling timer for OEM applications that require small size, isolation, reliability, and long life.

Operation (Recycling - ON Time First):
Upon application of input voltage, the output relay energizes and the T2 ON time begins. At the end of the ON time, the output de-energizes and the T1 OFF time begins. At the end of the OFF time, the output relay energizes and the cycle repeats as long as input voltage is applied
Reset: Removing input voltage resets the output and the time delays, and returns the sequence to the ON time.
Operation (Recycling - OFF Time First):
Upon application of input voltage, the T1 OFF time begins. At the end of the OFF time, the T2 ON time begins and the load energizes. At the end of the ON time the load de-energizes, and the cycle repeats until input voltage is removed.
Reset: Removing input voltage resets the output and the sequence to the OFF time.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features:

- Compact time delay relay
- 10A, SPDT output contacts
- Factory fixed or onboard adjust
- Delays from 0.1s - 1000m in 6 ranges
- Input voltages from 120 to 230V in 6 options
- ±0.5% repeat accuracy
- ±5% factory calibration

Approvals:

Auxiliary Products:

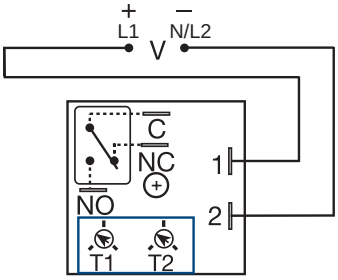
- **Female quick connect:**
  P/N: P1015-13 (AWG 10/12)
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Mounting bracket:** P/N: P1023-6
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Available Models:

KRDR115MB25M	KRDR321A4
KRDR120A0	KRDR321B4
KRDR123A4	KRDR421A4
KRDR124A4	KRDR424A0
KRDR320A1	KRDR440.5SA0
KRDR320B0	

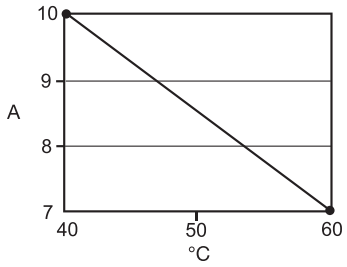
If desired part number is not listed, please call us to see if it is technically possible to build.

Connection:



T1 = OFF Time
T2 = ON Time
NO = Normally Open
NC = Normally Closed
C = Common
A knob is supplied for adjustable units.

Output Current/Ambient Temperature:



Order Table:

KRDR **X** **X** **X** **X** **X**

Input Voltage	Adjustments	T2 ON Time*	Operating Sequence	T1 OFF Time*
1 - 12VDC	**1** - Both Times Fixed	**0** - 0.1 - 10s	**A** - ON time first	**0** - 0.1 - 10s
2 - 24VAC	**2** - Both Times Adj.	**1** - 1 - 100s	**B** - OFF time first	**1** - 1 - 100s
3 - 24VDC	**3** - ON Time Adj. OFF Time Fixed	**2** - 10 - 1000s		**2** - 10 - 1000s
4 - 120VAC	**4** - ON Time Fixed OFF Time Adj.	**3** - 0.1 - 10m		**3** - 0.1 - 10m
5 - 110VDC		**4** - 1 - 100m		**4** - 1 - 100m
6 - 230VAC		**5** - 10 - 1000m		**5** - 10 - 1000m

*If fixed delay is selected, insert delay (**0.1 - 999**) followed by (**S**) sec. or (**M**) min.

Specifications

Time Delay
Range . . . . . 0.1s - 1000m in 6 adjustable ranges or fixed
Repeat Accuracy . . . . . ±0.5 % or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ≤ ±5%
Reset Time . . . . . ≤ 150ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±5%
Input
Voltage . . . . . 12, 24 or 110VDC; 24, 120 or 230VAC
Tolerance 12VDC & 24VDC/AC . . . . . -15% - 20%
110VDC & 120 or 230VAC . . . . . -20% - 10%
AC Line Frequency / DC Ripple . . . . . 50/60 Hz / ≤ 10%
Power Consumption . . . . . AC ≤ 2VA; DC ≤ 2W
Output
Type . . . . . Isolated relay contacts
Form . . . . . SPDT
Rating (at 40°C) . . . . . 10A resistive @ 125VAC;
5A resistive @ 230VAC & 28VDC;
1/4 hp @ 125VAC
Max. Switching Voltage 250VAC
Life (Operations) . . . . . Mechanical - 1 x 10^7; Electrical - 1 x 10^5
Protection
Circuitry . . . . . Encapsulated
Isolation Voltage . . . . . ≥ 1500V 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
Dimensions . . . . . 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° to 60°C / -40° to 85°C
Humidity . . . . . 95% relative, non-condensing
Weight . . . . . ≅ 2.6 oz (74 g)

The KRD3 Series measures 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 KRD3 Series is a cost effective approach for OEM applications that require small size, isolation, reliability, and long life.

Operation (Recycling Flasher - ON Time First):
Upon application of input voltage, the output energizes and the T1 ON time begins. At the end of the ON time, the output de-energizes and the T2 OFF time begins. At the end of the OFF time, the output energizes and the cycle repeats as long as input voltage is applied.
Reset: Removing input voltage resets the output and time delays, and returns the sequence to T1 ON time.
Operation (Recycling Flasher - OFF Time First):
Upon application of input voltage, the T2 OFF time begins. At the end of the OFF time, the T1 ON time begins and the load energizes. At the end of T1, T2 begins and the load de-energizes. This cycle repeats until input voltage is removed.
Reset: Removing input voltage resets the output and the sequence to T2 OFF time.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features

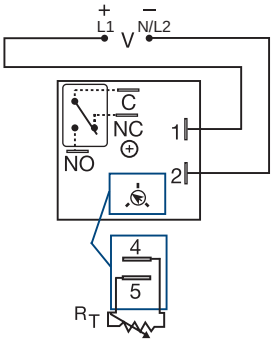
- Compact time-delay relay
- 10A, SPDT output contacts
- Factory fixed, onboard or external adjust
- Delays from 0.1s - 100m in 5 ranges
- ±0.5% repeat accuracy
- ±5% factory calibration
- Input voltages from 12 to 230V in 5 options

Approvals:

Auxiliary Products:

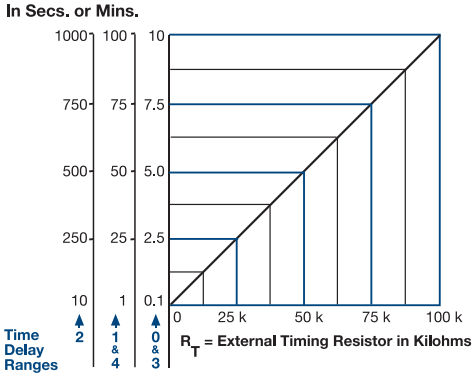
- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Female quick connect:**
  P/N: P1015-13 (AWG 10/12)
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7
- **Mounting bracket:** P/N: P1023-6
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Connection:



V = Voltage
C = Common, Transfer Contact
NO = Normally Open
NC = Normally Closed
A knob is supplied for adjustable units, or RT terminals 4 & 5 for external adjust. See external adjustment vs time delay chart. Relay contacts are isolated.

External Resistance vs. Time Delay:



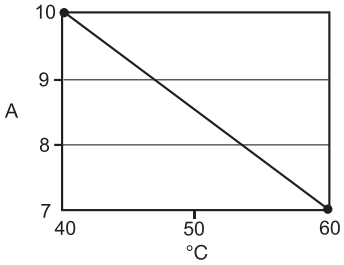
This chart applies to externally adjustable part numbers.
The time delay is adjustable over the time delay range selected by varying the resistance across the RT terminals; as the resistance increases the time delay increases.
When selecting an external RT, add the tolerances of the timer and the RT 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.

Available Models:

KRD3110.4SA	KRD3420A
KRD31160SA	KRD3434A

If desired part number is not listed, please call us to see if it is technically possible to build.

Output Current/Ambient Temperature:



Order Table:

KRD3 **X** **Input Voltage**
- **1** - 12VDC
- **2** - 24VAC
- **4** - 120VAC
- **5** - 110VDC
- **6** - 230VAC

X **Adjustment**
- **1** - Fixed
- **2** - Onboard knob
- **3** - External adjust

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

X **Operating Sequence**
- **A** - ON Time First
- **B** - OFF Time First

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec, or (**0.1 - 100**) (**M**) min.

Specifications

Time Delay
Range . . . . . 0.1s - 100m in 5 adjustable ranges or fixed
Repeat Accuracy . . . . . ±0.5% or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ≤ ± 5%
Reset Time . . . . . ≤ 150ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±5%
Input
Voltage . . . . . 12, 24 or 110VDC; 24, 120, or 230VAC
Tolerance 12VDC & 24VDC/AC . . . . . -15% - 20%
110VDC, 120 or 230VAC . . . . . -20% - 10%
AC Line Frequency / DC Ripple . . . . . 50/60 Hz / ≤ 10%
Power Consumption . . . . . AC ≤ 2VA; DC ≤ 2W
Output
Type . . . . . Isolated relay contacts
Form . . . . . SPDT
Rating (at 40°C) . . . . . 10A resistive @ 125VAC;
5A resistive @ 230VAC & 28VDC;
1/4 hp @ 125VAC
Max. Switching voltage 250VAC
Life (Operations) . . . . . Mechanical - 1 x 10^7; Electrical - 1 x 10^5
Protection
Circuitry . . . . . Encapsulated
Isolation Voltage . . . . . ≥ 1500V 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
Dimensions . . . . . 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° to 60°C / -40° to 85°C
Humidity . . . . . 95% relative, non-condensing
Weight . . . . . ≅ 2.6 oz (74 g)

The RS Series is a solid-state, encapsulated, recycling timer designed for tough industrial environments. It is used by many testing labs as a life cycle tester; by others as a cycle controller. The RS Series has separate DIP switch adjustments for the on delay and the off delay. These make accurate adjustment possible the first time, every time. Time delays of 0.1 seconds to 1023 hours are available in 4 ranges.

Operation (Recycling - ON Time First)
Upon application of input voltage, the output energizes and the T1 ON time begins. At the end of the ON time, the output de-energizes and the T2 OFF time begins. At the end of the OFF time, the output energizes and the cycle repeats as long as input voltage is applied.
Reset: Removing input voltage resets the output and time delays, and returns the sequence to the ON time.

Operation (Recycling - OFF Time First)
Upon application of input voltage, the T2 OFF time begins. At the end of the OFF time, the output energizes and the T1 ON time begins. At the end of the ON time, the output de-energizes and the cycle repeats as long as input voltage is applied.
Reset: Removing input voltage resets the output and time delays, and returns the sequence to the OFF time.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 2 for dimensional drawing.

Features:

- Accurate, reliable, recycling timer
- Switch settable time delays - both times adjustable
- ±0.1% repeat accuracy
- ±2% setting accuracy
- 0.1s - 1023h in 4 ranges
- 12 to 230V in 5 options
- 1A, solid-state output
- Totally solid state and encapsulated

Approvals:

Auxiliary Products:

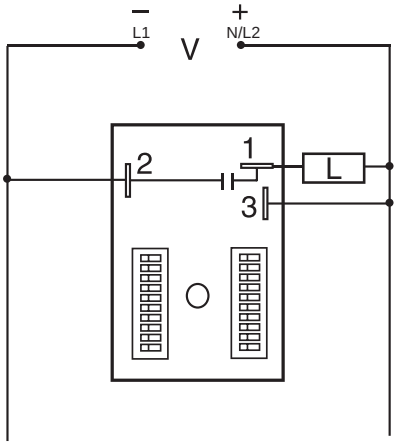
- **Female quick connect:** P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:** P/N: P1015-18
- **Mounting bracket:** P/N: P1023-6
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Available Models:

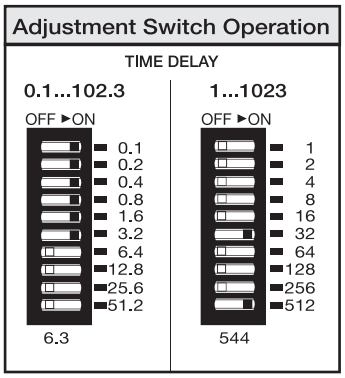
RS1A11	RS4A13
RS1A12	RS4A22
RS1B12	RS4A24
RS2A12	RS4A31
RS2A24	RS4A33
RS2B44	RS4B23
RS4A11	RS6A13
RS4A12	RS6A24

If desired part number is not listed, please call us to see if it is technically possible to build.

Connection:



L = Load



Order Table:

RS **X** **X** **X** **X**

Input Voltage
- **1** - 12VDC
- **2** - 24VAC
- **3** - 24VDC
- **4** - 120VAC
- **6** - 230VAC

Operating Sequence
- **A** - ON time first
- **B** - OFF time first

T1 ON Time
- **1** - 0.1 - 102.3s in 0.1s increments
- **2** - 0.1 - 102.3m in 0.1m increments
- **3** - 1 - 1023m in 1m increments
- **4** - 1 - 1023h in 1h increments

T2 OFF Time
- **1** - 0.1 - 102.3s in 0.1s increments
- **2** - 0.1 - 102.3m in 0.1m increments
- **3** - 1 - 1023m in 1m increments
- **4** - 1 - 1023h in 1h increments

Specifications

Time Delay
Range* . . . . . 0.1 - 102.3s in 0.1s increments
0.1 - 102.3m in 0.1m increments
1 - 1023m in 1m increments
1 - 1023h in 1h increments
Repeat Accuracy . . . . . ±0.1% or 20ms, whichever is greater
Setting Accuracy . . . . . ≤ ±2% or 20ms, whichever is greater
Reset Time. . . . . ≤ 150ms
Time Delay vs Temp. & Voltage . . . . . ≤ ± 2%

Input
Voltage. . . . . 12, or 24VDC; 24, 120, or 230VAC
Tolerance. . . . . ±20%
AC Line Frequency / DC Ripple. . . . . 50/60 Hz / ≤ ±10%
Power Consumption . . . . . AC ≤ 2VA; DC ≤ 1W

Output
Type. . . . . Solid state
Maximum Load Current. . . . . 1A steady state, 10A inrush at 60°C
OFF State Leakage Current . . . . . AC ≅ 5mA @ 230VAC; DC ≅ 1mA
Voltage Drop . . . . . AC ≅ 2.5V @ 1A; DC ≅ 1V @ 1A

Protection
Circuitry . . . . . Encapsulated
Dielectric Breakdown . . . . . ≥ 2000V 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
Dimensions. . . . . 3 x 2 x 1.5 in (76.7 x 51.3 x 38.1 mm)
Termination . . . . . 0.25 in. (6.35 mm) male quick connect terminals

Environmental
Operating / Storage Temperature . . . . . -40° to 75°C / -40° to 85°C
Humidity. . . . . 95% relative, non-condensing
Weight . . . . . ≅ 3.9 oz (111 g)

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

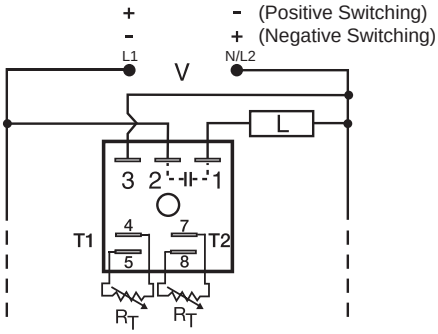
The ESDR Series offers independent time adjustment of both delay periods. Adjustment options include fixed, onboard or external adjust. The ESDR is recommended for air drying, automatic oiling, life testing, chemical metering and automatic duty cycling. This series is designed for general purpose commercial and industrial applications where a small, cost effective, reliable, solid-state timer is required. The factory calibration for fixed time delays is ≤±5%. The repeat accuracy, under stable conditions, is 0.1% of the selected time delay. This series is designed for input voltages of 12VDC to 230VAC in five ranges. Time delays of 0.1 seconds to 1000 minutes are available in six ranges. The output is rated 1A steady and 10A inrush. The modules are totally solid state and encapsulated to protect the electronic circuitry.

Features

- ON/OFF recycling with independent adjustment of both the on and off periods
- Factory fixed, onboard or external adjust
- 0.1s to 1000m in 6 ranges
- ±0.1% repeat accuracy
- ± 5% factory calibration
- Available in AC or DC voltages

Approvals:

Connection:

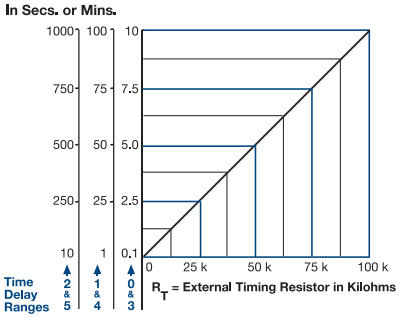


V = Voltage
L = Load
T1 = ON Time
T2 = OFF Time
R_T is used when external adjustment is ordered. A knob is supplied for adjustment on the unit; terminals for external adjustment.

Operation (Recycling - ON Time First):
Upon application of input voltage, the output energizes and the T1, ON time begins. At the end of the ON time, the output de-energizes and the T2, OFF time begins. At the end of the OFF time, the output energizes and the cycle repeats as long as input voltage is applied.
Reset: Removing input voltage resets the output and time delays, and returns the sequence to the first delay.

Operation (Recycling - OFF Time First):
Upon application of input voltage, the T2 OFF time begins. At the end of the OFF time, the output energizes and the T1 ON time begins. At the end of the ON time, the output de-energizes and the cycle repeats as long as input voltage is applied.
Reset: Removing input voltage resets the output and time delays, and returns the sequence to the first delay.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.



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.

Auxiliary Products:

- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Female quick connect:**
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7
- **Mounting bracket:** P/N: P1023-6
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Available Models:

ESDR120A0P	ESDR420A1
ESDR120A1P	ESDR420A4
ESDR120A4P	ESDR420B1
ESDR120B3P	ESDR420B4
ESDR121A2P	ESDR421A1
ESDR121A3P	ESDR421A4
ESDR123A0P	ESDR421B1
ESDR123B4P	ESDR423A4
ESDR124A0P	ESDR423B1
ESDR125A5P	ESDR424A0
ESDR152B1P	ESDR424A4
ESDR221A2	ESDR450A1
ESDR221B5	ESDR452B1
ESDR224B4	ESDR620B3
ESDR310.7SA10SP	ESDR621A1
ESDR320A0P	ESDR650A1
ESDR320A3P	

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

ESDR **X** **Input Voltage**
- **1** - 12VDC
- **2** - 24VAC
- **3** - 24VDC
- **4** - 120VAC
- **6** - 230VAC

X **External Adjust**
- **1** - Both Times Fixed
- **2** - Both Times Onboard Adj.
- **3** - ON Time Onboard Adj. OFF Time Fixed
- **4** - ON Time Fixed OFF Time Onboard Adj.
- **5** - Both Times External Adj.
- **6** - ON Time External Adj. OFF Time Fixed
- **7** - ON Time Fixed OFF Time External Adj.
- **8** - ON Time Onboard Adj. OFF Time External Adj.
- **9** - ON Time External Adj. OFF Time Onboard Adj.

X **T1 ON Time***
- **0** - 0.1 - 10s
- **1** - 1 - 100s
- **2** - 10 - 1000s
- **3** - 0.1 - 10m
- **4** - 1 - 100m
- **5** - 10 - 1000m

X **Operating Sequence**
- **A** - ON time first
- **B** - OFF time first

X **T2 OFF Time***
- **0** - 0.1 - 10s
- **1** - 1 - 100s
- **2** - 10 - 1000s
- **3** - 0.1 - 10m
- **4** - 1 - 100m
- **5** - 10 - 1000m

X **Switching Mode (VDC Only)**
- **P** - Positive
- **N** - Negative

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec. or (**M**) min.

Specifications

Time Delay
Range . . . . . 0.1s - 1000m in 6 adjustable ranges or fixed
Repeat Accuracy . . . . . ±0.1% or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ≤ ± 5%
Time Delay vs Temp. & Voltage . . . . . ≤ ±2%
Reset Time. . . . . ≤ 150ms
Input
Voltage. . . . . 12 or 24VDC; 24, 120, or 230VAC
Tolerance. . . . . ±20%
Power Consumption . . . . . AC ≤ 2VA; DC ≤ 1W
AC Line Frequency / DC Ripple. . . . . 50/60 Hz / ≤ 10%
Output
Type . . . . . Solid state
Maximum Load Current. . . . . 1A steady state , 10A inrush at 60°C
OFF State Leakage Current . . . . . AC ≅ 5mA @ 230VAC; DC ≅ 1mA
Voltage Drop . . . . . AC ≅ 2.5V @ 1A; DC ≅ 1V @ 1A
Protection
Circuitry . . . . . Encapsulated
Dielectric Breakdown . . . . . ≥ 2000V 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
Dimensions . . . . . 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
Operating / Storage Temperature . . . . . -40° to 75°C / -40° to 85°C
Humidity. . . . . 95% relative, non-condensing
Weight . . . . . ≅ 2.4 oz (68 g)

The TSDR Digi-Timer is an on/off or off/on recycling timing module designed to control metering pumps, chemical valves, flash lamps, or use in energy saving or duty cycling applications. It may be ordered with both time delays factory fixed, or one delay fixed and the other delay external or onboard adjustable. The TSD Series is designed for more demanding commercial and industrial applications where small size and accurate performance are required. The factory calibration for fixed time delays is ≤ ±5%. The repeat accuracy, under stable conditions, is 0.5% of the time delay. The TSD Series is rated to operate over an extended temperature range. Time delays of 0.1 seconds to 1000 minutes are available. The output is rated 1A steady and 10A inrush. The modules are totally solid state and encapsulated to protect the electronic circuitry.

Operation (Recycling - ON Time First):
Upon application of input voltage, the output energizes and the T1, ON time begins. At the end of the ON time, the output de-energizes and the T2, OFF time begins. At the end of the OFF time, the output energizes and the cycle repeats as long as input voltage is applied.
Reset: Removing input voltage resets the output and time delays, and returns the sequence to the T1 ON time.
Operation (Recycling - OFF Time First):
Upon application of input voltage, the T2 OFF time begins. At the end of the OFF time, the T1 ON time begins and the load energizes. At the end of the T1, T2 begins and the load de-energizes. This cycle repeats until input voltage is removed.
Reset: Removing input voltage resets the output and the sequence to T2 OFF time.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features:

- Fixed or adjustable 0.1s - 1000m in 6 ranges
- ± 0.5% repeat accuracy
- ± 5% factory calibration
- 24, 120, or 230VAC
- 1A, solid-state output
- Encapsulated

Approvals:

Auxiliary Products:

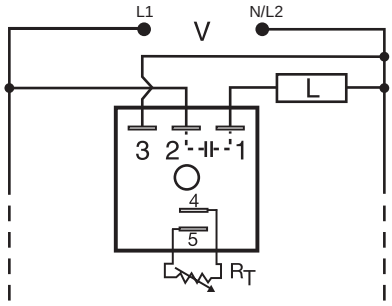
- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Female quick connect:**
  P/N: P1015-13 (AWG 10/12)
  P/N: P1015-64 (AWG 14/16)
  P/N: P1015-14 (AWG 18/22)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7
- **Mounting bracket:** P/N: P1023-6
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Available Models:

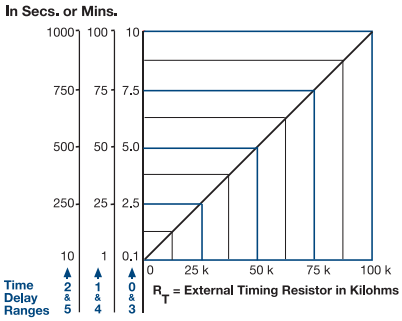
TSDR2150MA5M	TSDR440.25SA1
TSDR215SB18M	TSDR4412SA1
TSDR410.1SA0.3S	TSDR442MA2
TSDR410.4SB4S	TSDR4430SA2
TSDR412.5SA0.5S	TSDR450.3SA1
TSDR412.5SA4.5S	TSDR6110SA30S
TSDR4140MA20M	TSDR612.5SA4.5S
TSDR415SB18M	TSDR615SB18M

If desired part number is not listed, please call us to see if it is technically possible to build.

Connection:



R_T is used when external adjustment is ordered. An onboard adjustment, or terminals 4 & 5 are only included on adjustable units.



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.

Order Table:

TSDR **X** **Input Voltage**
- **2** - 24VAC
- **4** - 120VAC
- **6** - 230VAC

X **Adjustment**
- **1** - Both Times Fixed
- **2** - ON Time Onboard Adj. OFF Time Fixed
- **3** - ON Time External Adj. OFF Time Fixed
- **4** - ON Time Fixed OFF Time External Adj.
- **5** - ON Time Fixed OFF Time Onboard Adj.

X **T1 ON Time***
- **0** - 0.1 - 10s
- **1** - 1 - 100s
- **2** - 10 - 1000s
- **3** - 0.1 - 10m
- **4** - 1 - 100m
- **5** - 10 - 1000m

X **First Delay**
- **A** - ON time
- **B** - OFF time

X **T2 OFF Time***
- **0** - 0.1 - 10s
- **1** - 1 - 100s
- **2** - 10 - 1000s
- **3** - 0.1 - 10m
- **4** - 1 - 100m
- **5** - 10 - 1000m

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec. or (**M**) min.

Specifications

Time Delay
Range . . . . . 0.1s - 1000m in 6 adjustable ranges or fixed
Repeat Accuracy . . . . . ±0.5% or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ≤ ±5%
Reset Time . . . . . ≤ 150ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±5%
Input
Voltage . . . . . 24, 120, or 230VAC
Tolerance . . . . . ±20%
AC Line Frequency . . . . . 50/60 Hz
Power Consumption . . . . . ≤ 2VA
Output
Type . . . . . Solid state
Maximum Load Current . . . . . 1A steady state, 10A inrush at 60°C
Off State Leakage Current . . . . . ≅ 5mA @ 230VAC
Voltage Drop . . . . . ≅ 2.5V @ 1A
Protection
Circuitry . . . . . Encapsulated
Dielectric Breakdown . . . . . ≥ 2000V RMS terminals to mounting surface
Insulation Resistance . . . . . 100 MΩ
Mechanical
Mounting . . . . . Surface mount with one #10 (M5 x 0.8) screw
Dimensions . . . . . 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 . . . . . -40° to 75°C / -40° to 85°C
Humidity . . . . . 95% relative, non-condensing
Weight . . . . . ≅ 2.4 oz (68 g)

The KSDR Series offers independent time adjustment of both delay periods. The KSDR is recommended for air drying, automatic oiling, life testing, chemical metering, and automatic duty cycling. 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 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 230VAC. Time delays of 0.1 seconds to 1000 minutes are available in 6 ranges. The output is rated 1A steady and 10A inrush. The modules are totally solid state and encapsulated to protect the electronic circuitry.

Operation (Recycling - ON Time First)
Upon application of input voltage, the output energizes and the T1, ON time begins. At the end of the ON time, the output de-energizes and the T2, OFF time begins. At the end of the OFF time, the output energizes and the cycle repeats as long as input voltage is applied.
Reset: Removing input voltage resets the output and time delays, and returns the sequence to T1 ON time.
Operation (Recycling - OFF Time First)
Upon application of input voltage, the T2 OFF time begins. At the end of the OFF time, the T1 ON time begins and the load energizes. At the end of T1, T2 begins and the load de-energizes. This cycle repeats until input voltage is removed.
Reset: Removing input voltage resets the output and the sequence to T2 OFF time.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features

- Adjustable 0.1s - 1000m in 6 ranges
- ±0.5% repeat accuracy
- ± 5% factory calibration
- 24, 120, or 230VAC
- 1A, solid-state output
- Encapsulated

Approvals:

Auxiliary Products:

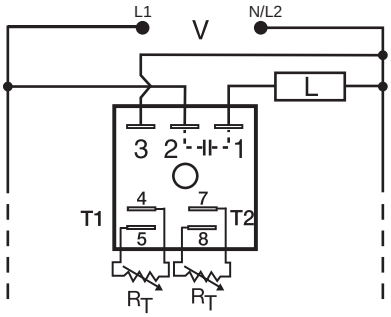
- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Female quick connect:**
  P/N: P1015-13 (AWG 10/12)
  P/N: P1015-64 (AWG 14/16)
  P/N: P1015-14 (AWG 18/22)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7
- **Mounting bracket:** P/N: P1023-6
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Available Models:

KSDR21A1
KSDR24A4
KSDR40A0
KSDR42A4
KSDR61A4
KSDR64A4

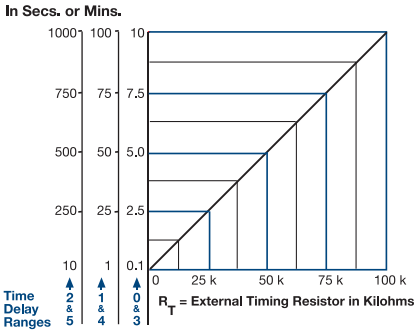
If desired part number is not listed, please call us to see if it is technically possible to build.

Connection:



R_T is used when external adjustment is ordered.

External Resistance vs. Time Delay:



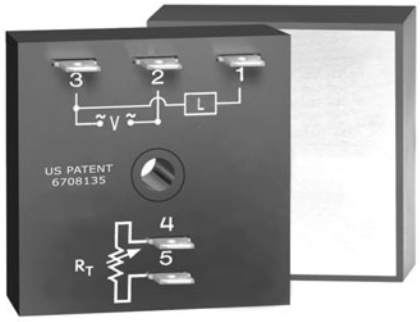
This chart applies to externally adjustable part numbers.
The time delay is adjustable over the time delay range selected by varying the resistance across the RT terminals; as the resistance increases the time delay increases.
When selecting an external RT, add the tolerances of the timer and the RT 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.

Order Table:

KSDR	X	X	X	X
	Input Voltage	**T1 ON Time**	**Operating Sequence**	**T2 OFF Time**
	2 - 24VAC	**0** - 0.1 - 10s	**A** - ON time first	**0** - 0.1 - 10s
	4 - 120VAC	**1** - 1 - 100s	**B** - OFF time first	**1** - 1 - 100s
	6 - 230VAC	**2** - 10 - 1000s		**2** - 10 - 1000s
		3 - 0.1 - 10m		**3** - 0.1 - 10m
		4 - 1 - 100m		**4** - 1 - 100m
		5 - 10 - 1000m		**5** - 10 - 1000m

Specifications

Time Delay
Range ..... 0.1s - 1000m in 6 ranges
Repeat Accuracy ..... ±0.5% or 20ms, whichever is greater
Tolerance (Factory Calibration) ..... ≤ ±5%
Reset Time ..... ≤ 150ms
Time Delay vs Temp. & Voltage ..... ≤ ±10%
Input
Voltage ..... 24, 120, or 230VAC
Tolerance ..... ±20%
AC Line Frequency ..... 50/60 Hz
Power Consumption ..... ≤ 2VA
Output
Type ..... Solid state
Rating ..... 1A steady state, 10A inrush at 60°C
Voltage Drop ..... ≅ 2.5V @ 1A
OFF State Leakage Current ..... ≅ 5mA @ 230VAC
Protection
Circuitry ..... Encapsulated
Dielectric Breakdown ..... ≥ 2000V RMS terminals to mounting surface
Insulation Resistance ..... ≥ 100 MΩ
Mechanical
Mounting ..... Surface mount with one #10 (M5 x 0.8) screw
Dimensions ..... 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 ..... -40° to 75°C / -40° to 85°C
Humidity ..... 95% relative, non-condensing
Weight ..... ≅ 2.4 oz (68 g)



The THD Series combines accurate timing circuitry with high power, solid-state switching. It can switch motors, lamps, and heaters directly without a contactor. The THD3 has equal on and off time delays. A single R_T sets both time delays. You can reduce labor, component cost, and increase reliability with these small, easy-to-use, Digi-Power timers.

Operation (Recycling Flasher - ON Time First):
Upon application of input voltage, the output energizes and the T1 ON time begins. At the end of the ON time, the output de-energizes and the T2 OFF time begins. At the end of the OFF time, the output energizes and the cycle repeats as long as input voltage is applied.
Reset: Removing input voltage resets the output and time delays, and returns the sequence to T1 ON time.
Operation (Recycling Flasher - OFF Time First):
Upon application of input voltage, the T2 OFF time begins. At the end of the OFF time, the T1 ON time begins and the load energizes. At the end of T1, T2 begins and the load de-energizes. This cycle repeats until input voltage is removed.
Reset: Removing input voltage resets the output and the sequence to T2 OFF time.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 4 for dimensional drawing.

Features:

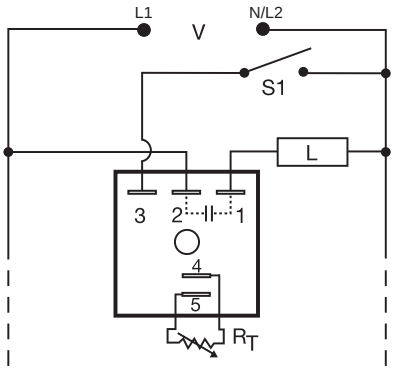
- High load currents up to 20A, 200A inrush
- Fixed or adjustable delays from 0.1s - 1000m
- ±0.5% repeat accuracy
- ±1% factory calibration
- 24, 120, or 230VAC
- Metallized mounting surface for heat transfer
- Totally solid state & encapsulated

Approvals:

Auxiliary Products:

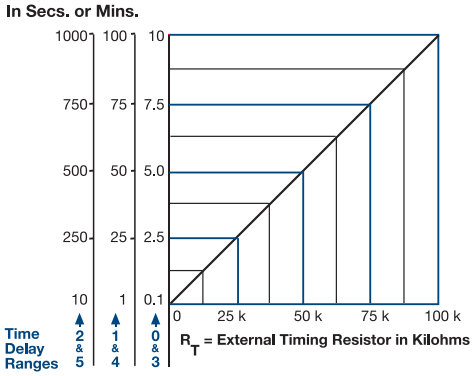
- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Female quick connect:**
  P/N: P1015-13 (AWG 10/12)
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7

Connection:



S1 = Optional Low Current Initiate Switch
R_T is used when external adjustment is ordered.

External Resistance vs. Time Delay:



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.

Available Models:

THD3C23A0	THD3C43A1
THD3C23A1	THD3C43A2
THD3C23A2	THD3C43A3
THD3C23A3	THD3C43A4
THD3C23A4	THD3C43A5
THD3C23A5	
THD3C42A0	

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

THD3 **X** **Output Rating**
- **A** - 6A
- **B** - 10A
- **C** - 20A

X **Input Voltage**
- **2** - 24VAC
- **4** - 120VAC
- **6** - 230VAC

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

X **Operating Sequence**
- **A** - ON time first
- **B** - OFF time first

X **Time Delay***
- **0** - 0.1 - 10s
- **1** - 1 - 100s
- **2** - 10 - 1000s
- **3** - 0.1 - 10m
- **4** - 1 - 100m
- **5** - 10 - 1000m

*If fixed delay is selected, insert delay (**0.5 - 1000**) followed by (**S**) secs. or (**M**) mins.

Specifications

Time Delay
Range . . . . . 0.1s - 1000m in 6 adjustable ranges or fixed
Adjustment . . . . . Single variable resistor changes both the on & off times equally
Repeat Accuracy . . . . . ±0.5% or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ≤ ±1%
Reset Time . . . . . ≤ 150ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±2%
Input
Voltage . . . . . 24, 120, or 230VAC
Tolerance . . . . . ±20%
AC Line Frequency . . . . . 50/60 Hz
Power Consumption . . . . . ≤ 2VA
Output
Type . . . . . Solid state

Maximum Load Current	Output	Steady State	Inrush**
	A	6A	60A
	B	10A	100A
	C	20A	200A

Minimum Load Current 100mA
Voltage Drop . . . . . ≅ 2.5V at rated current
OFF State Leakage Current . . . . . ≅ 5mA @ 230VAC
Protection
Circuitry . . . . . Encapsulated
Dielectric Breakdown . . . . . ≥ 2000V RMS terminals to mounting surface
Insulation Resistance . . . . . ≥ 100 MΩ
Mechanical
Mounting ** . . . . . Surface mount with one #10 (M5 x 0.8) screw
Dimensions . . . . . 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 / Storage Temperature . . . . . -40° to 60°C / -40° to 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 16ms.

The TSD3 is a solid-state ON/OFF recycling timer with the on time always equal to the off time. When time delay is changed by the RT, both the ON and the OFF periods are changed. 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 1A steady and 10A inrush. The modules are totally solid state and encapsulated to protect the electronic circuitry.

Operation (Recycling Falsher - ON Time First):
Upon application of input voltage, the output energizes and the T1, ON time begins. At the end of the ON time, the output de-energizes and the T2 OFF time begins. At the end of the OFF time, the output energizes and the cycle repeats as long as input voltage is applied.
Reset: Removing input voltage resets the output and time delays, and returns the sequence to the T1 ON time.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features

- Equal on and off delays
- Fixed or adjustable delays from 0.1s - 100h
- ±0.1% repeat accuracy
- ±1% factory calibration
- 24, 120, or 230VAC
- 1A, solid-state output
- Encapsulated

Approvals:

Auxiliary Products:

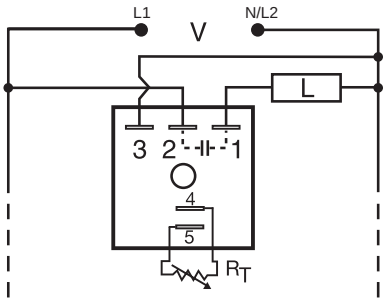
- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Female quick connect:**
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7
- **Mounting bracket:** P/N: P1023-6
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Available Models:

TSD3411S
TSD34150S
TSD36130M

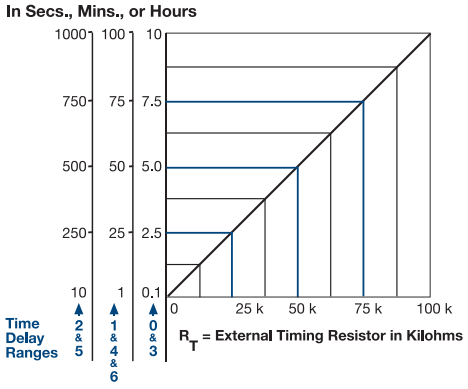
If desired part number is not listed, please call us to see if it is technically possible to build.

Connection:



R_T is used when external adjustment is ordered.

External Resistance vs. Time Delay:



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.

Order Table:

TSD3 **X** **X** **X**

Input Voltage
- **2** - 24VAC
- **4** - 120VAC
- **6** - 230VAC

Adjustment
- **1** - Fixed
- **2** - External adjust
- **3** - Onboard adjust

Time Delay*
- **0** - 0.1 - 10s
- **1** - 1 - 100s
- **2** - 10 - 1000s
- **3** - 0.1 - 10m
- **4** - 1 - 100m
- **5** - 10 - 1000m
- **6** - 1 - 100h

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec. or (**M**) min. or (**1 - 100**) (**H**) hours

Specifications

Time Delay
Range . . . . . .0.1s - 100h in 7 adjustable ranges or fixed
Repeat Accuracy . . . . . .±0.1% or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . .≤ ±1%
Reset Time. . . . . .≤ 150ms
Time Delay vs Temp. & Voltage . . . . . .≤ ±1%
Input
Voltage. . . . . .24, 120, or 230VAC
Tolerance. . . . . .±20%
AC Line Frequency . . . . . .50/60 Hz
Power Consumption . . . . . .≤ 2VA
Output
Type. . . . . .Solid state
Maximum Load Current. . . . . .1A steady state, 10A inrush at 60°C
Off State Leakage Current . . . . . .≅ 5mA @ 230VAC
Voltage Drop . . . . . .≅ 2.5V @ 1A
Protection
Circuitry . . . . . .Encapsulated
Dielectric Breakdown . . . . . .≥ 2000V RMS terminals to mounting surface
Insulation Resistance. . . . . .≥ 100 MΩ
Mechanical
Mounting . . . . . .Surface mount with one #10 (M5 x 0.8) screw
Dimensions. . . . . .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 . . . . . .-40° to 75°C / -40° to 85°C
Humidity. . . . . .95% relative, non-condensing
Weight. . . . . .≅ 2.4 oz (68 g)

The KSD3 Digi-Timer is a cost effective approach for ON/OFF recycling applications. The on time is equal to the off time. An adjustment of the R_T will change the time delays of both on and off times. 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 1A steady and 10A inrush. The modules are totally solid state and encapsulated to protect the electronic circuitry.

Operation (Recycling Flasher - ON Time First):
Upon application of input voltage, the output energizes and the T1, ON time begins. At the end of the ON time, the output de-energizes and the T2 OFF time begins. At the end of the OFF time, the output energizes and the cycle repeats as long as input voltage is applied.
Reset: Removing input voltage resets the output and time delays, and returns the sequence to the ON time.
Operation (Recycling Flasher - OFF Time First):
Upon application of input voltage, the T2 OFF time begins. At the end of the OFF time, the T1 ON time begins and the load energizes. At the end of the ON time the load de-energizes, and the cycle repeats until input voltage is removed.
Reset: Removing input voltage resets the output and time delays and the sequence to the OFF time.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features:

- Fixed or adjustable delays from 0.1s -1000m
- Equal on and off delays
- ±0.5% repeat accuracy
- ± 5% factory calibration
- 12 to 120V in 4 ranges
- 1A, solid-state output
- Encapsulated

Approvals:

Auxiliary Products:

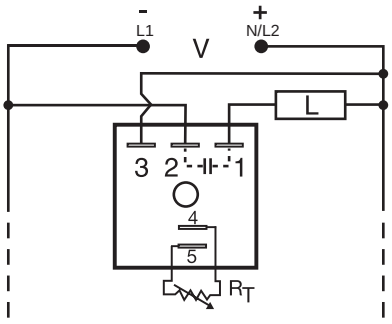
- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Female quick connect:**
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Mounting bracket:** P/N: P1023-6
- **Versa-knob:** P/N: P0700-7
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Available Models:

KSD3120A
KSD3310.1SA
KSD3410.5SA
KSD3432A

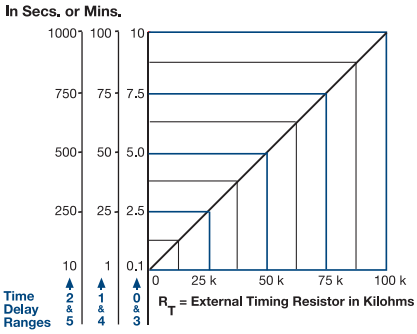
If desired part number is not listed, please call us to see if it is technically possible to build.

Connection:



R_T is used when external adjustment is ordered.

External Resistance vs. Time Delay:



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.

Order Table:

KSD3 **X** **Input Voltage**
- **1** - 12VDC
- **2** - 24VAC
- **3** - 24VDC
- **4** - 120VAC

Note: DC voltages available in negative switching only

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

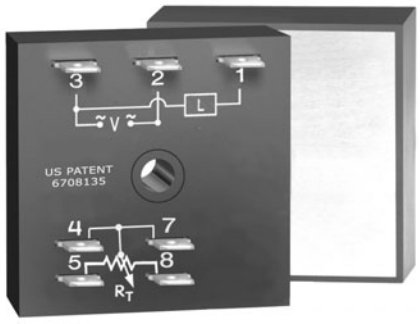
X **Time Delay***
- **0** - 0.1 - 10s
- **1** - 1 - 100s
- **2** - 10 - 1000s
- **3** - 0.1 - 10m
- **4** - 1 - 100m
- **5** - 10 - 1000m

X **Operating Sequence**
- **A** - ON time first
- **B** - OFF time first

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec. or (**M**) min.

Specifications

Time Delay
Range . . . . . 0.1s - 1000m in 6 adjustable ranges or fixed
Repeat Accuracy . . . . . ±0.5% or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ≤ ± 5%
Reset Time . . . . . ≤ 150ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±10%
Input
Voltage . . . . . 24 or 120VAC; 12 or 24VDC
Tolerance . . . . . ±20%
AC Line Frequency . . . . . 50/60 Hz
Power Consumption . . . . . AC ≤ 2VA; DC ≤ 1W
Output
Type . . . . . Solid state
Maximum Load Current . . . . . 1A steady state, 10A inrush at 60°C
OFF State Leakage Current . . . . . AC ≅ 5mA @ 230VAC; DC ≅ 1mA
Voltage Drop . . . . . AC ≅ 2.5V @ 1A; DC ≅ 1V @ 1A
DC Operation . . . . . Negative switching only
Protection
Circuitry . . . . . Encapsulated
Dielectric Breakdown . . . . . ≥ 2000V 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
Dimensions . . . . . 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 . . . . . -40° to 60°C / -40° to 85°C
Humidity . . . . . 95% relative, non-condensing
Weight . . . . . ≅ 2.4 oz (68 g)



The PTHF Series can be used for a variety of applications from chemical metering, to temperature regulating, to energy management. The infinite adjustability from 1 to 99% provides accurate percentage on control over a wide factory fixed cycle period. When mounted on a metal surface, it can be used to drive solenoids, contactors, relays, or lamps, up to 20A steady, 200A inrush. PTHF is the suggested replacement for the PT Series.

Operation (Percentage):
Upon application of input voltage, the output energizes and the T1 ON time begins. At the end of the ON time, the output de-energizes and the T2 OFF time begins. At the end of the OFF time, the output energizes and the cycle repeats as long as input voltage is applied. Increasing the ON time decreases the OFF time. The total cycle period is equal to the ON time plus the OFF time. The total cycle period is factory fixed. ON time range is 1 to 99 percent of cycle period.
Reset: Removing input voltage resets the output and time delays, and returns the sequence to the T1 ON time.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 4 for dimensional drawing.

Features

- ON/OFF recycling percentage control
- Controls loads up to 20A, 200A inrush
- Fixed cycle period 10s - 1000m
- ±0.5% repeat accuracy
- ±5% factory calibration
- Totally solid state & encapsulated
- Onboard or external adjustment 1 - 99% ON

Approvals:

Auxiliary Products:

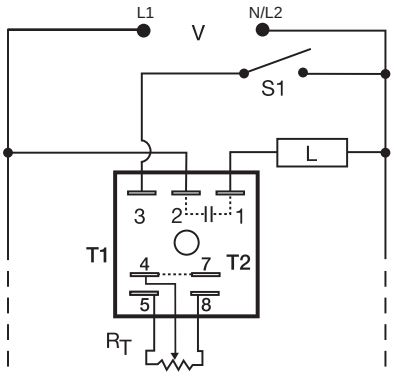
- **External ad just potentiometer:** P/N: P1004-95
- **Female quick connect:** P/N: P1015-13 (AWG 10/12) P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:** P/N: P1015-18
- **Versa-knob:** P/N: P0700-7

Available Models:

PTHF410C
PTHF410CK
PTHF4120D
PTHF615A

If desired part number is not listed, please call us to see if it is technically possible to build.

Connection:



R_T = 100 KΩ
S1 = Optional Low Current Initiate Switch
T1 = ON Time
T2 = OFF Time
R_T is used when external adjustment is ordered.

Order Table:

PTHF **X** **Input Voltage**
- **2** - 24VAC
- **4** - 120VAC
- **6** - 230VAC

X **Fixed Cycle Period**
Specify **10 - 1000** as the total fixed cycle period in seconds. If cycle period is in minutes insert (M) suffix.

X **Output Rating**
- **A** - 6A
- **B** - 10A
- **C** - 20A
- **D** - 1A

X **Adjustment**
- **Blank** - External adjust
- **K** - Onboard adjust

Specifications

Time Delay
Type . . . . . External or onboard knob
Range / External Adjustment Resistance . . . . . Adjustable from 1 - 99% / R_T = 100 KΩ
Cycle Period . . . . . Fixed from 10s - 1000m
Repeat Accuracy . . . . . ±0.5% or 20ms, whichever is greater
Cycle Period Tolerance (Factory Calibration) . . . ≤ ± 5%
Reset Time. . . . . ≤ 150ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±10%
Input
Voltage. . . . . 24, 120, or 230VAC
Tolerance. . . . . ±20%
AC Line Frequency . . . . . 50/60 Hz
Power Consumption . . . . . ≤ 2VA
Output
Type . . . . . Solid state

Maximum Load Currents	Output	Steady State	Inrush*	Minimum
	A	6A	60A	100mA
	B	10A	100A	100mA
	C	20A	200A	100mA
	D	1A	10A	- -

Voltage Drop . . . . . ≅ 2.5V at rated current
OFF State Leakage Current . . . . . ≅ 5mA @ 230VAC
Protection
Circuitry . . . . . Encapsulated
Dielectric Breakdown . . . . . ≥ 2000V RMS terminals to mounting surface
Insulation Resistance. . . . . ≥ 100 MΩ
Mechanical
Mounting * . . . . . Surface mount with one #10 (M5 x 0.8) screw
Dimensions . . . . . 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 / Storage Temperature . . . . . -40° to 60°C / -40° to 85°C
Humidity. . . . . 95% relative, non-condensing
Weight . . . . . 1A unit: ≅ 2.4 oz (68 g);
6, 10, 20A units: ≅ 3.9 oz (111 g)

*Units rated ≥ 6A 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 16ms.

The SQ Series is available with either three (SQ3) or four (SQ4) outputs and an adjustable or fixed time delay. The time delay period is the same for each output. This makes the SQ ideal for applications like dust collection, automatic lubrication, air drying, lighting displays, merchandising displays, duty cycling, and energy management.

Operation (Sequencing):
Upon application of input voltage, Load 1 energizes for the selected ON time delay. At the end of this ON time delay, Load 1 de-energizes and Load 2 immediately energizes starting another ON time delay. At the end of this ON time delay, Load 2 de-energizes and Load 3 immediately energizes. At the end of the ON time delay for Load 3 (Load 4 for 4 output devices), Load 1 re-energizes and the cycle repeats. The sequential operation continues as long as input voltage is applied.
Reset: Removing and re-applying input voltage resets the sequence to the Load 1 ON time delay.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 166, Figure 14 for dimensional drawing.

Features:

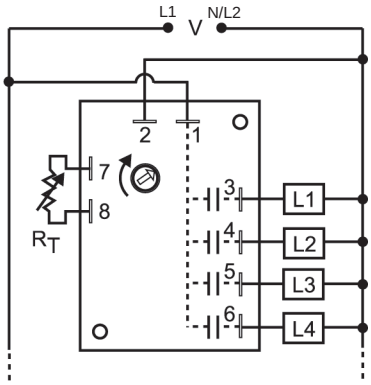
- Three or four outputs
- Variable delays from 0.1s - 100m in 5 ranges
- Totally solid state for a long, reliable life
- Encapsulated to protect against the environment
- Digital circuitry for accuracy and stability
- 1A, solid-state outputs

Approvals:

Auxiliary Products:

- **External ad just potentiometer:**
  P/N: P1004-12
  P/N: P1004-12-X
- **Female quick connect:**
  P/N: P1015-64 (AWG 14/16)
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7
- **Plug-on adjustment module:**
  P/N: VTP(X)(X)

Connection:



R_T is 3 megohms, when external adjustment is ordered. SQ4 shown; for SQ3, terminal 6 & load L4 are eliminated.

R_T Selection Chart					
Desired Time Delay*					
Seconds			Minutes		R_T
0	1	2	3	4	Megohm
0.1	1	10	0.1	1	0.0
1	10	100	1	10	0.3
2	20	200	2	20	0.6
3	30	300	3	30	0.9
4	40	400	4	40	1.2
5	50	500	5	50	1.5
6	60	600	6	60	1.8
7	70	700	7	70	2.1
8	80	800	8	80	2.4
9	90	900	9	90	2.7
10	100	1000	10	100	3.0

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

Time Delay	VTP P/N
0 - 0.1-10s	VTP4C
1 - 1-100s	VTP4G
2 - 10-1000s	VTP4K
3 - 0.1-10m	VTP45N
4 - 1-100m	VTP4P

Selection Table for VTP Plug-on Adjustment Accessory.

Available Models:

SQ3221
SQ4424
SQ4434

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

SQ **X** **X** **X** **X**

# of Outputs
- **3** - Three
- **4** - Four

Input Voltage
- **2** - 24VAC
- **4** - 120VAC
- **6** - 230VAC

Adjustment
- **1** - Fixed
- **2** - Onboard adjust
- **3** - External adjust

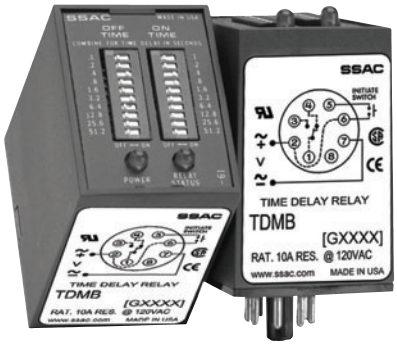
Time Delay*
- **0** - 0.1 - 10s
- **1** - 1 - 100s
- **2** - 10 - 1000s
- **3** - 0.1 - 10m
- **4** - 1 - 100m

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec. or (**1 - 100**) (**M**) min

Specifications

Time Delay
Type . . . . . Digital integrated circuitry
Range . . . . . 0.1s - 100m in 5 adjustable ranges or fixed
Repeat Accuracy . . . . . ±1% or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ≤ ±10%
Time Delay vs Temp. & Voltage . . . . . ≤ ±10%
Input
Voltage . . . . . 24, 120, or 230VAC
Tolerance . . . . . ±20%
AC Line Frequency . . . . . 50/60 Hz
Output
Type . . . . . Solid state
Form . . . . . SPST NO (three or four)
Rating . . . . . 1A steady state, 10A inrush per output
Voltage Drop (Each Output) . . . . . ≅ 1.5V @ 1A

Protection
Circuitry . . . . . Encapsulated
Dielectric Breakdown . . . . . ≥ 2000V RMS terminals to mounting surface
Insulation Resistance . . . . . ≥ 100 MΩ
Mechanical
Mounting . . . . . Surface mount with two #6 (M3.5 x 0.6) screws
Dimensions . . . . . 3.5 x 2.5 x 1.22 in. (88.9 x 63.5 x 31 mm)
Termination . . . . . 0.25 in. (6.35 mm) male quick connect terminals
Environmental
Operating / Storage Temperature . . . . . -20° to 60°C / -40° to 85°C
Humidity . . . . . 95% relative, non-condensing
Weight . . . . . ≅ 5.4 oz (153 g)



The TDMB combines both delay-on-make and delay-on-break functions into one plug-in package. Selection of the time period is accomplished with dual switches, one for the on delay and the other for the off delay. SPDT or DPDT output options provide isolated, 10A switching capability.

Operation (Delay-on-Make/Delay-on-Break):
Input voltage must be applied at all times. The output relay is de-energized. Upon closure of the initiate switch, the green LED glows and the delay-on-make time delay (T1) begins. At the end of T1, the output relay energizes and the red LED glows. When the initiate switch opens, the green LED turns OFF and the delay-on-break time delay (T2) begins. At the end of T2, the output relay de-energizes and the red LED turns OFF.
Reset: Removing input voltage resets time delay and output. Opening the initiate switch during the delay-on-make delay, resets T1. Closing the initiate switch during the delay-on-break delay, resets T2.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 8 for dimensional drawing.

Features

- Switch settable time delays from 0.1s - 10,230s in 3 ranges
- ±2% setting accuracy
- ±0.1% repeat accuracy
- 10A, SPDT or DPDT output contacts

Approvals:

Auxiliary Products:

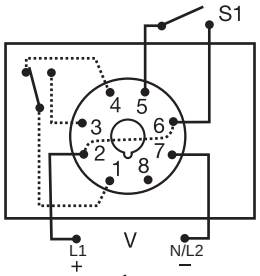
- **Panel mount kit:** P/N: BZ1
- **11-pin socket:** P/N: NDS-11
- **Octal 8-pin socket:** P/N: NDS-8
- **Hold-down clips (sold in pairs):**
  P/N: PSC8 (NDS-8)
  P/N: PSC11 (NDS-11)

Available Models:

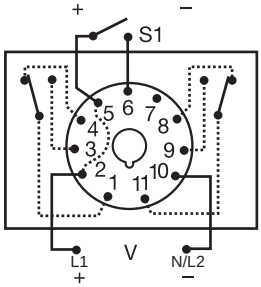
TDMB411	TDMB422
TDMB411D	TDMB422D
TDMB413D	TDMB622

If desired part number is not listed, please call us to see if it is technically possible to build.

Connection:



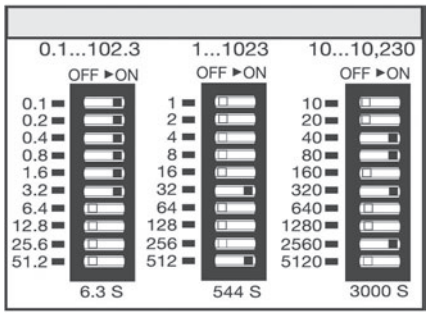
8-pin octal SPDT



11-pin DPDT
(P/N ends with D)

Relay contacts are isolated.

Digi-Set Binary Switch Operation:



Order Table:

TDMB **X** **X** **X** **X**

Input Voltage
- **A** - 24 to 240VAC/DC
- **D** - 12 to 48VDC
- **1** - 12VDC*
- **2** - 24VAC
- **3** - 24VDC
- **4** - 120VAC
- **5** - 110VDC
- **6** - 230VAC

*No control status LED for 12VDC

Delay-on-Make
- **1** - 0.1 - 102.3s in 0.1s increments
- **2** - 1 - 1023s in 1s increments
- **3** - 10 - 10230s in 10s increments

Delay-on-Break
- **1** - 0.1 - 102.3s in 0.1s increments
- **2** - 1 - 1023s in 1s increments
- **3** - 10 - 10230s in 10s increments

Type Plug/Output Form
- **Blank** - Octal plug (8-pin) SPDT
- **D** - 11-pin plug DPDT

Specifications

Time Delay
Type . . . . . Microcontroller circuitry
Range** . . . . . 0.1 - 102.3s in 0.1s increments
1 - 1023s in 1s increments
10 - 10,230s in 10s increments
Repeat Accuracy . . . . . ±0.1% or 20ms, whichever is greater
Setting Accuracy . . . . . ≤ ±2% or 50ms, whichever is greater
Reset Time . . . . . ≤ 150ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±2%
Control LED Indicator . . . . . Green; on when the initiate switch is closed

Input
Voltage . . . . . 12 or 24VDC; 24, 120, or 230VAC;
24 to 240VAC/DC; 12 to 48VDC
Tolerance 12VDC & 24VDC/AC . . . . . -15% - 20%
110 to 230VAC/DC . . . . . -20% - 10%
AC Line Frequency / DC Ripple . . . . . 50/60 Hz / ≤ 10%
Power Consumption . . . . . AC ≤ 2VA; DC ≤ 2W

Output
Type . . . . . Electromechanical relay
Form . . . . . SPDT or DPDT
Rating . . . . . 10A resistive @ 120/240VAC & 28VDC;
1/3 hp @ 230VAC
Life . . . . . Mechanical - 1 x10^7; Electrical - 1 x 10^5
Max. Switching Voltage 250VAC
Relay LED Indicator . . . . . Red; on when output relay energizes
(not included on 12VDC units)

Protection
Insulation Resistance . . . . . ≥ 100M
Polarity . . . . . DC units are reverse polarity protected
Isolation Voltage . . . . . ≥ 1500V RMS input to output

Mechanical
Mounting . . . . . Plug-in socket
Dimensions . . . . . 3.2 x 2.4 x 1.8 in. (81.3 x 60.7 x 45.2 mm)
Termination . . . . . Octal 8-pin plug-in, magnal 11-pin plug-in

Environmental
Operating / Storage Temperature . . . . . -20° to 60°C / -30° to 85°C
Weight . . . . . ≅ 6 oz (170 g)

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

The ESD5 Series is an accurate, solid-state, delayed interval timer. It offers a 1A steady, 10A inrush output and is available with adjustable or fixed time delays of 0.1 seconds to 1000 minutes in six ranges. Input voltages of 24, 120, or 230VAC are available. Encapsulation offers protection against shock and vibration. Adjustment options are factory fixed, onboard or externally adjustable. The repeat accuracy, under stable conditions, is 0.1%. The factory calibration of the time delay is ± 5%.

Operation (Delayed Interval):
Upon application of input voltage, the T1 delay-on-make time delay begins and the output remains de-energized. At the end of this delay, the output energizes and the T2 interval delay begins. At the end of the interval delay period, the output de-energizes.
Reset: Removing input voltage resets the output and the time delays, and returns the sequence to the first delay.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features:

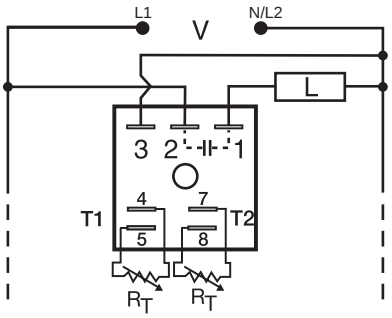
- Delay-on-Make with interval output
- 0.1s - 1000m in 6 ranges
- ±0.1% repeat accuracy
- ±5% factory calibration
- Factory fixed, onboard or external adjust
- Totally solid state & encapsulated
- 24, 120 or 230VAC
- 1A, solid-state output

Approvals:

Auxiliary Products:

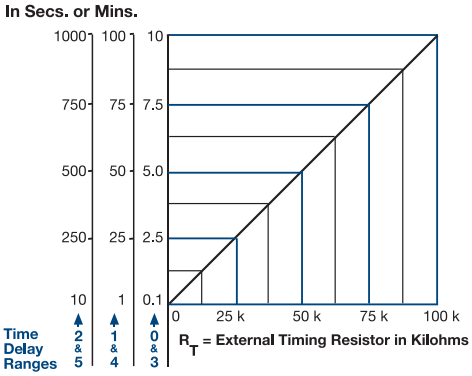
- **External ad just potentiometer:**
  P/N: P1004-95
  P/N: P1004-95-X
- **Female quick connect:**
  P/N: P1015-64 (AWG 14/16)
- **Mounting bracket:** P/N: P1023-6
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Connection:



R_T is the external adjustment component.
Note: Terminals 4, 5 and/or 7, 8 are included when external adjustment is ordered. A knob is included when onboard adjust is ordered.

External Resistance vs. Time Delay:



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.

Available Models:

ESD52233
ESD54160S2S
ESD54233
ESD54500

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

ESD5 **X** **X** **X** **X**

Input Voltage
- **2** - 24VAC
- **4** - 120VAC
- **6** - 230VAC

Adjustment
- **1** - Both Times Fixed
- **2** - Both Times External Adj.
- **3** - T1 Fixed, T2 External Adj.
- **4** - T1 External Adj., T2 Fixed
- **5** - Both Times Onboard Adj.
- **6** - T1 Fixed, T2 Onboard Adj.
- **7** - T1 External Adj., T2 Onboard Adj.
- **8** - T1 Onboard Adj., T2 Fixed
- **9** - T1 Onboard Adj., T2 External Adj.

T1 Delay-on-Make*
- **0** - 0.1 - 10s
- **1** - 1 - 100s
- **2** - 10 - 1000s
- **3** - 0.1 - 10m
- **4** - 1 - 100m
- **5** - 10 - 1000m

T2 Interval*
- **0** - 0.1 - 10s
- **1** - 1 - 100s
- **2** - 10 - 1000s
- **3** - 0.1 - 10m
- **4** - 1 - 100m
- **5** - 10 - 1000m

*If fixed delay is selected, insert delay (**0.1 - 1000**) followed by (**S**) sec. or (**M**) min.

Specifications

Time Delay
Range . . . . . 0.1s - 1000m in 6 adjustable ranges or fixed
Repeat Accuracy . . . . . ±0.1% or 20ms, whichever is greater
Tolerance (Factory Calibration) . . . . . ≤ ±5%
Reset Time . . . . . ≤ 150ms
Time Delay vs Temp. & Voltage . . . . . ≤ ±2%

Input
Voltage . . . . . 24, 120, or 230VAC
Tolerance . . . . . ±20%
AC Line Frequency . . . . . 50/60 Hz
Power Consumption . . . . . ≤ 2VA

Output
Type . . . . . Solid state
Rating . . . . . 1A steady state, 10A inrush at 60°C
OFF State Leakage Current . . . . . ≅ 5mA @ 230VAC
Voltage Drop . . . . . ≅ 2.5V @ 1A

Protection
Circuitry . . . . . Encapsulated
Dielectric Breakdown . . . . . ≥ 2000V RMS terminals to mounting surface
Insulation Resistance . . . . . ≥ 100 MΩ

Mechanical
Mounting . . . . . Surface mount with one #10 (M5 x 0.8) screw
Dimensions . . . . . 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 . . . . . -40° to 75°C / -40° to 85°C
Humidity . . . . . 95% relative, non-condensing
Weight . . . . . ≅ 2.4 oz (68g)

The TAC1 Series was designed to delay the operation of a compressor relay. It eliminates the possibility of relay chatter due to half-wave failure of the output. It connects in series with the load relay coil and provides a delay-on-make time delay each time input voltage is applied. It can be used for random start, anti-short cycling, sequencing, and many other applications. It is an excellent choice for all air conditioning and refrigeration equipment.

Operation (Delay-on-Make):
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.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features

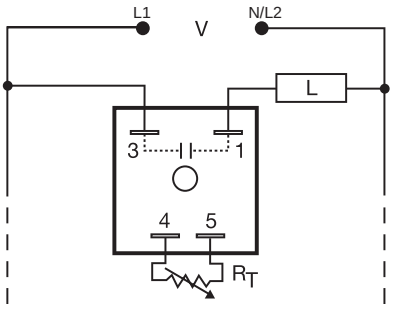
- UL approved for air conditioning & refrigeration equipment
- Fixed or adjustable delays from 0.05 - 600s
- 24 to 230VAC
- Fail-safe design eliminates contactor chatter problems
- ±2% repeat accuracy

Approvals:

Auxiliary Products:

- **External adjust potentiometer:**
  P/N: P1004-XX
  P/N: P1004-XX-X
- **Female quick connect:**
  P/N: P1015-64 (AWG 14/16)
- **Mounting bracket:** P/N: P1023-6
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20
- **Plug-on adjustment module:**
  P/N: VTP(X)(X)

Connection:



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

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 30% for tolerance of unit and the R_T.

Time Delay	VTP P/N
1 - 0.05-3s	VTP4B
2 - 0.5-60s	VTP4F
3 - 2-180s	VTP4J
4 - 5-600s	VTP5N

Selection Table for VTP Plug-on Adjustment Accessory.

Available Models:

TAC1223
TAC1411
TAC141150
TAC1412
TAC1413
TAC14164

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

TAC1 **X** **Input Voltage**
- **2** - 24VAC
- **4** - 120VAC
- **6** - 230VAC

X **Adjustment**
- **1** - Fixed
- **2** - External adjust

X **Time Delay***
- **1** - 0.05 - 3s
- **2** - 0.5 - 60s
- **3** - 2 - 180s
- **4** - 5 - 600s

*If fixed delay is selected, insert delay (**0.05 - 600**) in seconds.

Specifications

Time Delay
Type . . . . . Analog circuitry
Range . . . . . 0.05 - 600s in 4 adjustable ranges or fixed
Repeat Accuracy . . . . . ±2%
Tolerance (Factory Calibration) . . . . . ±20%
Recycle Time . . . . . ≤ 20ms after timing, during timing - 0.1% of time delay or 75ms, whichever is greater
Time Delay vs Temp. & Voltage . . . . . ≤ ±10%
Input
Voltage . . . . . 24, 120, or 230VAC
Tolerance . . . . . ±20%
AC Line Frequency . . . . . 50/60 Hz
Output
Type . . . . . Solid state
Form . . . . . NO, open during timing
Rating . . . . . 0.5A steady state, 10A inrush at 60°C
Voltage Drop . . . . . 120 & 230VAC: ≅ 4.2V @ 0.5A
24VAC: ≅ 2.5V @ 0.5A
Protection
Circuitry . . . . . Encapsulated
Dielectric Breakdown . . . . . ≥ 2000V RMS terminals to mounting surface
Insulation Resistance . . . . . ≥ 100 MΩ
Mechanical
Mounting . . . . . Surface mount with one #10 (M5 x 0.8) screw
Dimensions . . . . . 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 . . . . . -40° to 80°C / -40° to 85°C
Humidity . . . . . 95% relative, non-condensing
Weight . . . . . ≅ 2.4 oz (68 g)

The T2D Series provides protection against short cycling of compressors and other motors. At the end of each operation, a lockout delay prevents restarting the compressor or motor until the delay is completed. 24VAC models can be used with thermostats that include a cooling anticipator resistor. It can be connected in series with the load for delay-on-make operation.

Operation (Lockout with Random Start):
Connection #1: Upon application of input voltage, a random start time delay begins. At the end of this time delay, the output is energized. Lockout Delay: Input voltage must be applied prior to and during timing. When the thermostat or initiate switch opens, the output de-energizes and the lockout time delay begins. At the end of the lockout delay, the output is energized allowing the load to immediately energize when the initiate switch or thermostat closes.
Connection #2: Upon application of input voltage and closure of initiate switch, the time delay begins. At the end of the time delay, the output is energized and remains energized until power is removed.
Reset: Removing power resets the output and the time delay.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features:

- Lockout delay prevents rapid recycling of compressor
- Random start delay helps prevent low voltage starting
- Delay-on-make timer optional two terminal series connection
- Totally solid-state 1A output
- 24VAC to 230VAC in 2 ranges

Approvals:

Auxiliary Products:

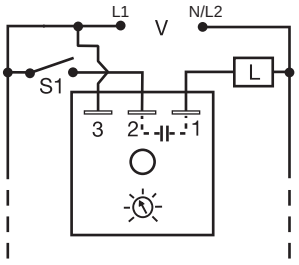
- **Female quick connect:** P/N: P1015-64 (AWG 14/16)
- **Mounting bracket:** P/N: P1023-6
- **Quick connectt os crewad aptor:** P/N: P1015-18
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Available Models:

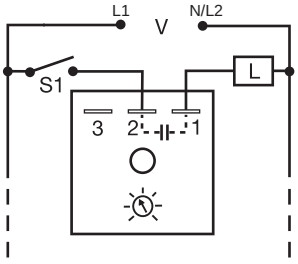
T2D120A1150S
T2D120A15M

If desired part number is not listed, please call us to see if it is technically possible to build.

Connection:



1
Random Start
Plus Lockout



2
Delay-on-Make

V = Voltage
L = Load
S1 = Initiate Switch or Thermostat

Order Table:

T2D **X** **X** **X**

Input Voltage
- **24A** - 24VAC
- **120A** - 120/230VAC

Adjustment
- **1** - Fixed
- **2** - External adjust

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

*If fixed delay is selected, insert delay (**1 - 1000**) followed by (**S**) sec. or (**0.1 - 100**) (**M**) min.

Specifications

Input
Voltage. . . . . .24VAC, or 120/230VAC in 2 ranges
Tolerance. . . . . .±20%
AC Line Frequency . . . . . .50/60 Hz
Output
Minimum Load Current . . . . . .24VAC - 100mA; 120/230VAC - 40mA
Rating . . . . . .1A steady state, 10A inrush at 60°C
Voltage Drop . . . . . .≅ 2.5V @ 1A
Time Delay
Initiate Time . . . . . .After timing - 16ms
Type. . . . . .Analog circuitry
Lockout & Random Start Delays. . . . . .1s - 100m in 4 adjustable ranges or fixed
Note: The lockout & random start delays are the same length.
Tolerance. . . . . .Adjustable: ±30%; factory fixed: ±30%
Repeat Accuracy . . . . . .±1% or 20ms, whichever is greater
Reset Time. . . . . .After timing - ≤ 16ms;
During timing - ≤ 200ms
Protection
Dielectric Breakdown . . . . . .≥ 2000V RMS terminals to mounting surface
Insulation Resistance. . . . . .≥ 100 MΩ
Mechanical
Mounting . . . . . .Surface mount with one #10 (M5 x 0.8) screw
Dimensions. . . . . .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° to 60°C / -40° to 85°C
Humidity. . . . . .95% relative, non-condensing
Weight. . . . . .≅ 2.4 oz (68 g)
Cooling Anticipator (24VAC Units Only)
Minimum Cooling Anticipator . . . . . .≥ 3,000 Ω

The TAC4 is a bypass timer that provides a closure across the low-pressure switch during compressor startup. Its time-delay circuit is totally solid state including the normally closed output. The molded housing with encapsulation, the single hole mounting, and 0.25 in. (6.35 mm) termination makes the TAC4 easy to use, rugged, and reliable.

Operation (Bypass Timer):
(As shown in the connection & function diagrams) Upon application of input voltage and closure of controller contact, CC, the load, CR, energizes and the time delay begins. During the time delay, the TAC4's solid-state output bypasses the LPC, low pressure cutout switch. This allows the compressor controlled by CR to start and establish acceptable pressure. At the end of the time delay, TAC4's output de-energizes and remains de-energized until reset. The TAC4 may be used in other applications where a controlling contact must be bypassed for a specified period of time.
Reset: Removing input voltage or opening CC resets the output and time delay.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features

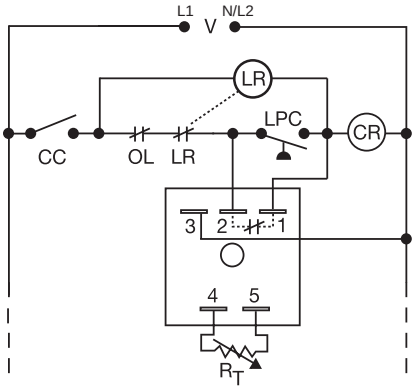
- UL approved for air conditioning & refrigeration equipment
- Fixed or adjustable delays from 0.05 - 600s
- 24, 120 or 230VAC
- Fail-safe design eliminates contactor chatter problems
- ±2% repeat accuracy

Approvals:

Auxiliary Products:

- **External ad just potentiometer:**
  P/N: P1004-12
  P/N: P1004-12-X
- **Female quick connect:**
  P/N: P1015-64 (AWG 14/16)
- **Mounting bracket:** P/N: P1023-6
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **Versa-knob:** P/N: P0700-7
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20
- **Plug-on adjustment module:**
  P/N: VTP(X)(X)

Connection:



V = Voltage
LR = Lockout Relay
OL = Overload or High Pressure Switch
LPC = Low Pressure Cutout
CR = Compressor Control Relay
CC = Controller Contact
R_T is used when external adjustment is ordered.

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	30	0.5
1.0	20	60	60	1.0
1.5	30	90	90	1.5
2.0	40	120	120	2.0
2.5	50	150	150	2.5
3.0	60	180	180	3.0
			210	3.5
			240	4.0
			270	4.5
			300	5.0

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

Time Delay	VTP P/N
1 - 0.05-3s	VTP4B
2 - 0.5-60s	VTP4F
3 - 2-180s	VTP4J
4 - 5-300s	VTP5T

Selection Table for VTP Plug-on Adjustment Accessory.

Available Models:

TAC42110
TAC441120
TAC4415

If desired part number is not listed, please call us to see if it is technically possible to build.

Order Table:

TAC4 **X** **X** **X**

Input Voltage
- **2** - 24VAC
- **4** - 120VAC
- **6** - 230VAC

Adjustment
- **1** - Fixed
- **2** - External adjust

Time Delay*
- **1** - 0.05 - 3s
- **2** - 0.5 - 60s
- **3** - 2 - 180s
- **4** - 5 - 300s

*If fixed delay is selected, insert delay (**0.05 - 300**) in seconds.

Specifications

Time Delay
Type . . . . . Analog circuitry
Range . . . . . 0.05 - 300s in 4 adjustable ranges or fixed
Repeat Accuracy . . . . . ±2%
Tolerance (Factory Calibration) . . . . . ±20%
Time Delay vs Temp. & Voltage . . . . . ≤±10%
Reset Time . . . . . ≤ 150ms
Input
Voltage . . . . . 24, 120, or 230VAC
Tolerance . . . . . ±20%
AC Line Frequency . . . . . 50/60 Hz
Output
Type . . . . . Solid state
Form . . . . . NC, closed during timing
Rating . . . . . 0.5A steady state, 10A inrush at 60°C
Voltage Drop . . . . . 120 & 230VAC ≅ 4.2V @ 0.5A
24VAC ≅ 2.5V @ 0.5A
Protection
Circuitry . . . . . Encapsulated
Dielectric Breakdown . . . . . ≥ 2000V 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
Dimensions . . . . . 2 x 2 x 1.21 in. (50.8 x 50.8 x 30.7 mm)
Environmental
Operating / Storage Temperature . . . . . -40° to 75°C / -40° to 85°C
Humidity . . . . . 95% relative, non-condensing
Weight . . . . . ≅ 2.4 oz (68 g)

The TA Series prevents rapid recycling of a compressor. A lockout delay is started when the thermostat opens, or input voltage is lost. Eliminates tripped circuit breakers or blown fuses caused by a locked rotor during short cycling. The TA will not allow the compressor to start when the line voltage is low. Chatter of the compressor relay is eliminated. Because of the fast initiate time, bounce of the thermostat will not be transmitted to the compressor relay coil. A 30 second delay provides anti-reversing protection for scroll compressors.

Operation (Lockout):
On initial closure of the S1, the compressor relay energizes immediately. When S1 opens or input voltage is interrupted, a lockout time delay is initiated. During this lockout time delay, the compressor relay cannot be energized. The low voltage (brownout) protection prevents energization of the compressor when the line voltage is low.
Reset: The lockout time delay cannot be reset. After the time delay is completed, the unit automatically resets.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features:

- Ideal for HVAC/R applications
- Lockout delay prevents rapid recycling of a compressor
- Low voltage brownout protection
- Circuitry to activate the cooling anticipator (24VAC models)
- Eliminates nuisance service calls due to blown fuse or tripped breakers

Approvals:

Auxiliary Products:

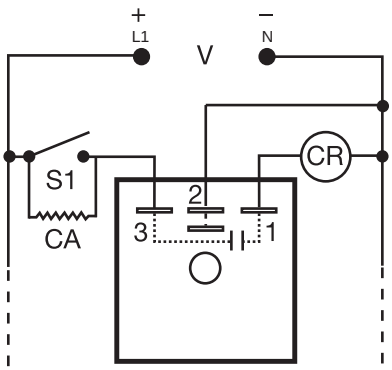
- **Female quick connect:** P/N: P1015-64 (AWG 14/16)
- **Mounting bracket:** P/N: P1023-6
- **Quick connectt os crewad aptor:** P/N: P1015-18
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Available Models:

TA12D2	TA24A5
TA24A0.5	TA24D0.5
TA24A3	TA24D2

If desired part number is not listed, please call us to see if it is technically possible to build.

Connection:



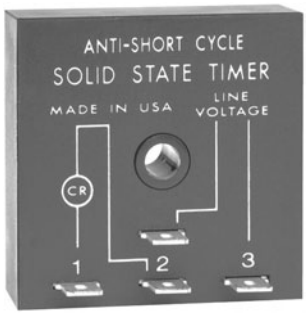
S1 = Initiate Switch, Contact, or Thermostat
CR = Compressor Relay (Load)
CA = Optional Cooling Anticipator
V = Voltage

Order Table:

Input Voltage	Time Delay	Part Number
24VAC	30s	TA24A0.5
24VAC	2m	TA24A2
24VAC	3m	TA24A3
24VAC	5m	TA24A5
12VDC	1m	TA12D1
12VDC	2m	TA12D2
24VDC	30s	TA24D0.5
24VDC	2m	TA24D2
24VDC	3m	TA24D3
24VDC	5m	TA24D5

Specifications

Input
Voltage. . . . . 12 or 24VDC; 24VAC
AC Line Frequency . . . . . 50/60 Hz
Impedance. . . . . 450 Ω (anticipator by-pass)
Output
Minimum Load Current 75mA
Maximum Load Current. . . . . 1A at 60°C
Voltage Drop . . . . . ≤ 1.25V
Time Delay
Initiate Time . . . . . ≅ 16ms
Lockout Time . . . . . Fixed 0.5, 1, 2, 3, or 5m
Tolerance. . . . . -15% - 35%
Protection
Circuitry . . . . . Encapsulated
Low Voltage Protection . . . . . ≅ 20V: 24VAC/DC; ≅ 9V: 12VDC
Dielectric Breakdown . . . . . ≥ 2000V RMS terminals to mounting surface
Insulation Resistance. . . . . ≥ 100 MΩ
Mechanical
Mounting . . . . . Surface mount with one #10 (M5 x 0.8) screw
Dimensions. . . . . 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 . . . . . -40° to 70°C / -40° to 85°C
Humidity. . . . . 95% relative, non-condensing
Weight . . . . . ≅ 2.4 oz (68 g)
Thermostat
Cooling Anticipator Resistor . . . . . ≥ 1800 Ω



The TL Series provides protection against short cycling of a compressor. At the end of each operation, or whenever power is lost, a lockout delay is initiated. This lockout delay prevents restarting of the compressor until the head pressure has equalized. Compressor relay chatter due to thermostat bounce is eliminated by use of optional one second delay-on-make. The TL Series should not be used with cooling anticipator resistors or solid-state switches. (See the TA Series).

Operation (Lockout):
Lockout: On initial closure of S1, the compressor relay energizes immediately (or after an optional 1 s delay). When the S1 opens or input voltage is interrupted, the output opens and remains open for the lockout time delay. During this lockout time delay period, the compressor relay cannot be re-energized.
Reset: The lockout time delay cannot be reset. After the time delay is completed, the unit automatically resets.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 1 for dimensional drawing.

Features

- Ideal for HVAC/R applications
- Lockout delay prevents short cycling of a compressor
- Optional 1s delay-on-make prevents contactor chatter
- Totally solid state and encapsulated
- 24VAC to 230VAC in 3 ranges
- Eliminates nuisance service calls due to blown fuse or tripped breakers

Approvals:

Auxiliary Products:

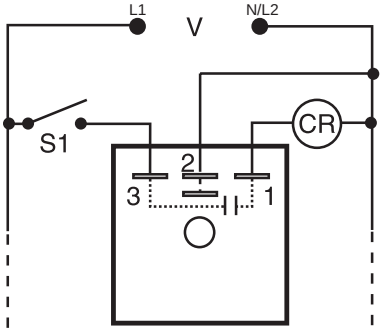
- **Female quick connect:** P/N: P1015-64 (AWG 14/16)
- **Mounting bracket:** P/N: P1023-6
- **Quick connectt os crewad aptor:** P/N: P1015-18
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Available Models:

TL120A5T
TL230A5
TL230A5T
TL24A5

If desired part number is not listed, please call us to see if it is technically possible to build.

Connection:



V = Voltage
S1 = Initiate Switch
CR = Compressor or Control Relay

Order Table:

TL	X	X	X
	Input Voltage	**Lockout Time**	**Delay-on-Make**
	24A - 24VAC	**2** - 2m	**Blank** - No delay
	120A - 120VAC	**3** - 3m	**T** - 1s
	230A - 230VAC	**5** - 5m	

Specifications

Input
Voltage . . . . . 24, 120, or 230VAC
AC Line Frequency . . . . . 50/60 Hz
Tolerance . . . . . ±20%
Output
Minimum Load Current . . . . . ≤ 40mA
Maximum Load Current . . . . . 1A @ 24VAC; 0.5A @ 120 & 230VAC at 60°C
Inrush Current . . . . . 10A at 60°C
Voltage Drop . . . . . 24VAC - 2.5V @ 1A
120 & 230VAC - 4.2V @ 0.5A
Time Delay
Initiate Time . . . . . ≅ 8ms
Lockout Time* . . . . . Fixed 2, 3, or 5m
Tolerance . . . . . -15% - 35%
Option . . . . . 1s delay-on-make eliminates contactor chatter due to thermostat bounce

Protection
Circuitry . . . . . Encapsulated
Dielectric Breakdown . . . . . ≥ 2000V RMS terminals to mounting surface
Insulation Resistance . . . . . ≥ 100 MΩ
Mechanical
Mounting . . . . . Surface mount with one #10 (M5 x 0.8) screw
Dimensions . . . . . 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 . . . -40° to 70°C / -40° to 85°C
Humidity . . . . . 95% relative, non-condensing
Weight . . . . . ≅ 2.4 oz (68 g)

*Power must be applied for at least 15 s to achieve a full lockout delay. Less than 15s will result in proportionally shorter delay periods.
NOTE: Cooling anticipator resistor or leakage may cause erratic operation. See TA Series for use with 24VAC systems that include anticipator resistors or use solid-state switches.

The CT Series combines a delay-on-make and delay-on-break time delay into one unit and may be used to control fan delays in heating and/or cooling equipment. The CT includes bypass circuitry to allow it to operate with cooling anticipators ≥ 3000 ohms. It is designed to operate in 24VAC control circuits. Several CT modules may be combined to provide sequencing on of any number of loads and sequencing off of the same loads, such as electric heating elements.

Operation (Delay-on-Make/Delay-on-Break):
Forced Air Heating or Air Conditioning (as shown): When the thermostat closes, the compressor relay is immediately energized. At the end of a fixed delay-on-make delay (T1), the fan relay is energized. When the thermostat opens, the compressor relay is de-energized and the delay-on-break delay is initiated. On completion of the fixed delay-on- break delay (T2) the fan relay is de-energized. If the thermostat is reclosed during the delay-on-break delay, the delay-on-break delay is reset and the fan relay remains energized. If the thermostat is closed when input voltage is applied, the delay-on-make delay (T1) begins as normal.
Reset: Removing input voltage resets the output and time delays.

For more information see:
Appendix B, page 165, Figure 1 for dimensional drawing.

Features:

- Delay-on-make and delay-on-break in one unit
- Use for fan delays in heating or cooling equipment
- Use for multiple load sequencing
- 24VAC operation
- Factory fixed delays from 1 - 600s in 1s increments

Approvals:

Auxiliary Products:

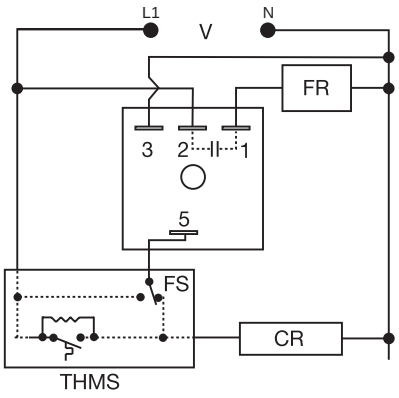
- **Female quick connect:** P/N: P1015-64 (AWG 14/16)
- **Mounting bracket:** P/N: P1023-6
- **Quick connectt os crewad aptor:** P/N: P1015-18
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Available Models:

CT1S12
CT1S30
CT1S300
CT1S45
CT1S8
CT1S90
CT30S1
CT45S45
CT5S300

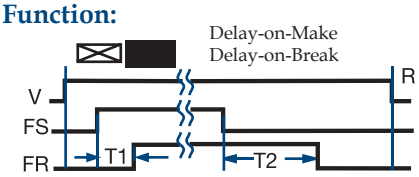
If desired part number is not listed, please call us to see if it is technically possible to build.

Connection:



CR = Compressor Relay
THMS = Wall Thermostat

Function:



V = Voltage
R = Reset
FS = Fan Switch
FR = Fan Relay
T1 = Delay-on-Make
T2 = Delay-on-Break

Order Table:

CT **X**

Delay-on-Make (fixed)
Specify time in seconds from **1 - 600**s followed by (S)

X

Delay-on-Break (fixed)
Specify time in seconds from **1 - 600**s

Specifications

Time Delay
Type . . . . . Microcontroller
Range . . . . . 1 - 600s
Repeat Accuracy . . . . . ±5%
Tolerance (Factory Calibration) . . . . . ±20%
Recycle Time . . . . . ≤ 300ms
Input
Voltage 24VAC
Tolerance . . . . . ±15%
AC Line Frequency . . . . . 50/60 Hz
Output
Type . . . . . Solid state
Form . . . . . NO
Rating . . . . . 0.75A steady state, 5A inrush at 55°C
Voltage Drop . . . . . ≅ 1.25V

Protection
Circuitry . . . . . Encapsulated
Dielectric Breakdown . . . . . ≥ 2000V RMS terminals to mounting surface
Insulation Resistance . . . . . ≥ 100 MΩ
Mechanical
Mounting . . . . . Surface mount with one #10 (M5 x 0.8) screw
Dimensions . . . . . 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 . . . . . -40° to 70°C / -40° to 85°C
Humidity . . . . . 95% relative, non-condensing
Weight . . . . . ≅ 2.4 oz (68 g)
Thermostat . . . . . Anticipator Resistor: ≥ 3000 Ω

The HRV combines the accuracy of microcontroller based circuitry with an electromechanical relay output. The HRV's switching capacity allows direct control of loads like compressors, pumps, motors, heaters, and lighting. The HRV "S" version provides a vend time after the selected number of initiate switch closures to start is reached. The HRV "A" version includes all of the "S" features and allows the total vend time to be extended for each additional initiate switch closure. The HRV is ideal for cost sensitive single coin or token vending machines. The electronic circuitry is encapsulated to protect against humidity and vibration.

Features

- Accumulates 1 - 256 coins
- Switch selectable 1 - 7 coins to start
- Vend time from 1s - 31.75m
- Coin switch can be connected to a counter
- Up to 30A, 1 Hp at 125VAC, NO contacts
- Encapsulated circuitry

Approvals:

Auxiliary Products:

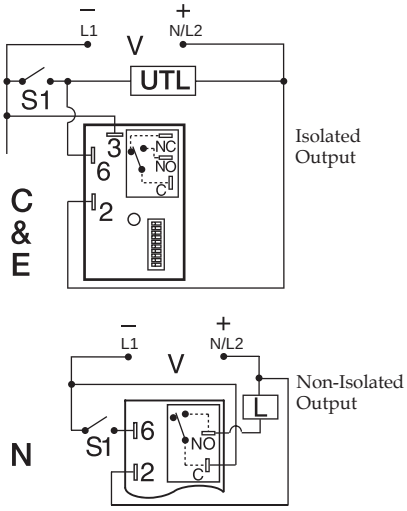
- **Female quick connect:**
  P/N: P1015-13 (AWG 10/12)
  P/N: P1015-64 (AWG 14/16)
- **Mounting bracket:** P/N: P1023-6
- **Quick connectt os crewad aptor:**
  P/N: P1015-18
- **DIN rail:** P/N: C103PM (Al)
- **DIN rail adaptor:** P/N: P1023-20

Available Models:

HRV11SC	HRV41SC
HRV24AC	HRV41SE
HRV31AC	HRV42SE
HRV31SC	HRV43AE
HRV41AE	HRV43AN

If desired part number is not listed, please call us to see if it is technically possible to build.

Connection:



V = Voltage
S1 = Initiate Switch
L = Load
UTL = Optional Untimed Load

Operation

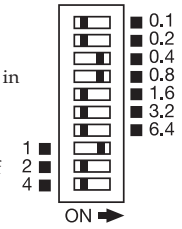
Coin Totalizer & Vending Timer ("S" Version):
Input voltage must be applied prior to & during operation. When the total number of S1 initiate switch closures equals the number to start set on the lower 3 DIP switches, the load energizes and the vending time set on the upper 7 DIP switches begins. At the end of the vending time, the load de-energizes and the vending time is reset. Closing the initiate switch during vend timing will have no affect on vend time delay.
Accumulating Vending Timer ("A" Version):
Input voltage must be applied prior to & during operation. When the total number of S1 initiate switch closures equals the number to start set on the lower 3 DIP switches, the load energizes and the vending time starts. For every initiate switch closure, the HRV unit adds one time per coin period, as set on the upper 7 DIP switches, to the total vending time.
Operation Note: If S1 is closed when input voltage is applied, the output remains de-energized and the S1 counter remains at zero closures. At least one "vend time" and one "closures to start" DIP switch must be in the "ON" position for proper operation.
Reset: Removing input voltage resets the vend time delay, the S1 closure counter, and de-energizes the output relay.

For more information see:
Appendix A, pages 156-164 for function descriptions and diagrams.
Appendix B, page 165, Figure 2 for dimensional drawing.

Switch Adjustment

Combine upper seven switches in "ON" position for vend time in minutes.

Combine lower three switches in "ON" position for number of closures to start.



Order Table:

HRV **X**

Input Voltage
- **1** - 12VDC
- **2** - 24VAC
- **3** - 24VDC
- **4** - 120VAC
- **6** - 230VAC

X

Vend Time
- **1** - 1 - 127s
- **2** - 5 - 635s
- **3** - 0.1 - 12.7m
- **4** - 0.25 - 31.75m

X

Mode of Operation
- **S** - Coin totalizer vending timer
- **A** - Accumulating vending timer

X

Output Form & Rating
- **C** - 30A SPDT - NO (Isolated)
- **E** - 30A SPDT - NO (Isolated)
- **N** - 30A SPDT - NO (Non-Isolated)

Specifications

Count Functions/Switch Type	Mechanical (counts on switch closure)
Minimum Switch Closure Time	≥ 20ms
Min. Switch Open (between closures) Time	≥ 20ms
Count Range to start	1 - 7 counts
Maximum Counts ("A" Version)	250
Time Delay/Range ***	Adjustable 1s - 31.75m in 4 ranges
Adjustment	7 of a 10 position DIP switch
Setting Accuracy	0% to +2% or 50ms, whichever is greater
Repeat Accuracy	±0.1% or 20ms, whichever is greater
Reset Time	≤ 150ms
Time Delay vs Temp. & Voltage	≤ ±2%
Input	
Voltage	12 or 24VDC; 24, 120, or 230VAC
Tolerance 12VDC & 24VDC/AC	-15% - 20%
120 & 230 VAC	-20% - 10%
AC Line Frequency / DC Ripple	50/60 Hz / ≤ 10%
Power Consumption	AC ≤ 4VA; DC ≤ 2W
Output	
Type	Electromechanical relay
Form	Isolated, SPDT or non-isolated, SPDT

Ratings:		SPDT-NO	SPDT-NC
General Purpose	125/240VAC	30A	15A
Resistive	125/240VAC	30A	15A
	28VDC	20A	10A
Motor Load	125VAC	1 hp*	1/4 hp**
	240VAC	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	≥ 1500V RMS input to output on isolated units
Insulation Resistance	≥ 100 MΩ
Mechanical	
Mounting	Surface mount with one #10 (M5 x 0.8) screw
Dimensions	3 x 2 x 1.5 in (76.7 x 51.3 x 38.1 mm)
Termination	0.25 in. (6.35 mm) male quick connect terminals
Environmental	
Operating / Storage Temperature	-40° to 70°C / -40° to 85°C
Humidity	95% relative, non-condensing
Weight	≅ 3.9 oz (111 g)

***For CE approved applications, voltage must be removed when a switch position is changed.