

## Section 3 ProgramaCube®

### ProgramaCube®

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### Relay Output - Single



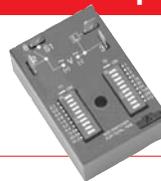
■ KRPD.....	3.4
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### Power Relay Output



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### Solid State Output - Dual



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### Solid State Output



■ KSPD.....	3.16
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ProgramaCube® represents leading edge technology in an encapsulated timing, counting or logic module designed for OEM applications. The design incorporates microcontroller and surface mount technology to deliver the maximum number of features in a compact package. These factory programmed modules are pre-manufactured without the function assigned. When an order is received, the function software is added, they are tested, inspected and shipped quickly. Finally, OEM designers can get any standard feature shipped at standard lead times.

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The ProgramaCube® family of products includes:

- Select 2" x 2" or 2" x 3" encapsulated package
- Select accurate switch, knob or external adjustment, or fixed time delays
- Select from over 29 single and dual timing functions
- Time delays from 0.1 s to 1000 h in 9 ranges
- Repeat Accuracy to 0.1%
- Predetermined counting functions on switch adjustable units
- 1 to 1023 counts in 3 ranges
- Custom functions, and time ranges are also available (see Custom Design Section)
- 10 A or 30 A res. isolated SPDT relay output
- 1, 6, 10 or 20 Amp solid state output
- 24 to 240 VAC plus popular DC voltages in 3 ranges
- 0.25" male quick connect terminals
- Surface Mounts on a back panel with one #10 screw
- Mounts on 35mm DIN rail using P1023-20 adapter



US Patent No. 6708135

See the ProgramaCube® catalog pages in this section for complete specifications.

### Select Single Adjustment Options



Single Knob Adjust



Single External Adjust



Accurate Switch Adjust

Add Switches in ON Position for Total Time

ProgramaCube® offers a complete assortment of adjustment options

### Solid State or Isolated Relay Outputs



10 or 30 A Relay

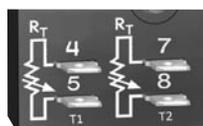


6, 10, 20 A SS Output

### Select Onboard, External or Fixed Delays

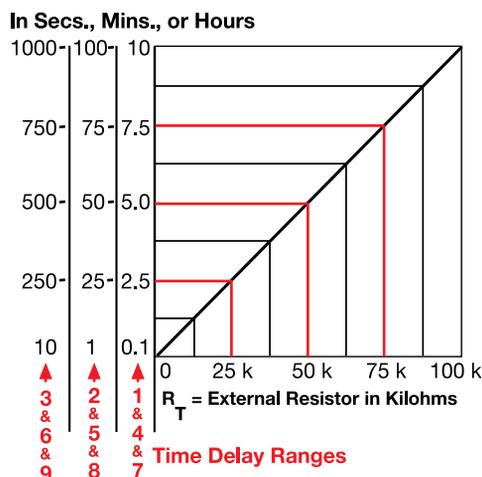


Dual Time Delays  
T1 is External Adjustment;  
T2 is Onboard Adjustment



Dual Time Delays  
T1 is External Adjustment;  
T2 is External Adjustment

### External Resistance vs Time Delay



This chart applies to externally adjustable part numbers. The time delay is adjustable over the time delay range by varying the resistance across the RT terminals. Add the tolerances of the timer and the RT for the full time range adjustment.  
**Examples:** 1 to 50 S adjustable time range, select time range 2 and a 50 K ohm RT. For 1 to 100 S, use a 100 K ohm RT.

### Select Dual Adjustment Options



Dual Onboard Adjustment



Accurate Dual Switch Adjustment

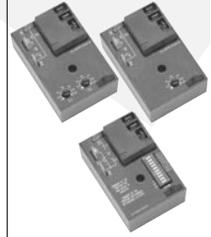
# Selection Guide

## ProgramaCube®

amaCube®

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For detailed product specifications, refer to catalog pages in this section.



	Series	KSPD	KSPS	KSPU	NHPD	NHPS	NHPU	KRPD	KRPS	HRPD	HRPS	HRPU	HSPZ
Functions and Features	Page	3.16	3.18	3.20	3.22	3.24	3.26	3.4	3.6	3.8	3.10	3.12	3.14
Relay Output Resistive Rating		1A	1A	1A	6...20A	6...20A	6...20A	10A	10A	30A	30A	30A	1A
Solid State Output Rating		•	•		•	•		•	•	•	•		
Knob or External Adjustment or Fixed		•	•		•	•		•	•	•	•		
Accurate Switch Adjustment				•			•					•	•
Repeat Accuracy 0.5%		•	•		•	•		•	•	•	•		
Repeat Accuracy 0.1%				•			•					•	•
<b>Single Timer Functions</b>													
Accumulative Delay on Make (AM)			•	•		•	•		•		•	•	
Alternating Relay (Trailing Edge Flip-Flop) (FT)									•		•	•	
Delay on Break (B)			•	•		•	•		•		•	•	
Delay on Make (M)			•	•		•	•		•		•	•	
Interval (I)			•	•		•	•		•		•	•	
Inverted Delay on Break (UB)			•	•		•	•		•		•	•	
Inverted Single Shot (US)			•	•		•	•		•		•	•	
Leading Edge Flip-Flop (F)			•	•		•	•		•		•	•	
Recycling (RE, RD)			•	•		•	•		•		•	•	
Retriggerable Single Shot (Motion Detector) (PSD)			•	•		•	•		•		•	•	
Retriggerable Single Shot (Motion Detector) (PSE)			•	•		•	•		•		•	•	
Single Shot (S, SD)			•	•		•	•		•		•	•	
Trailing Edge Single Shot (TS)			•	•		•	•		•		•	•	
<b>Dual Timer Functions</b>													
Accumulative Delay on Make/Interval (AMI)		•			•			•		•			•
Delay on Break/Recycle (BRE)		•			•			•		•			•
Delay on Make / Delay on Break (MB)		•			•			•		•			•
Delay on Make/Interval (MI)		•			•			•		•			•
Delay on Make/Recycle (MRE)		•			•			•		•			•
Delay on Make/Single Shot (MS)		•			•			•		•			•
Interval/Delay on Make (IM)		•			•			•		•			•
Interval/Recycle (IRE)		•			•			•		•			•
Recycling (RXE, RXD)		•			•			•		•			•
Single Shot/Recycle (SRE)		•			•			•		•			•
Single Shot/Lockout (SL)		•			•			•		•			•
<b>Counter Functions</b>													
Counter Pulse Output (C)				•			•					•	•
Counter Interval Output (CI)				•			•					•	•

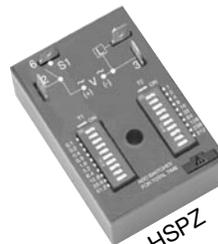
New ProgramaCube® Products



KRPD



HRPD/HRID



HSPZ



HRPD/HRID

PCSE1032 12.14.06

# KRPD Series Dual Function Time Delay Relay

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US Patent 6708135

10 YEAR WARRANTY

- Choose 1 of 12 Standard Dual Functions
- Special Time Ranges and Functions Available
- Factory Programmed
- Microcontroller Circuitry, +/-0.5% Repeat Accuracy
- Isolated 10 A SPDT Output Contacts
- Input Voltage from 12 ... 240 V in 2 Ranges
- Delays from 100 ms ... 1000 h in 9 Ranges

Approvals:

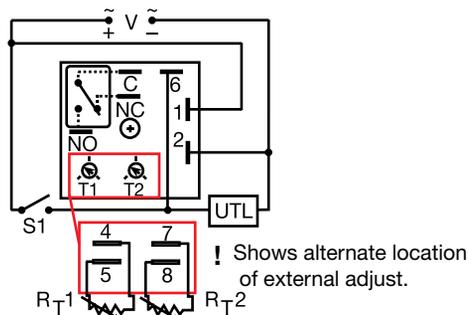
### Accessories

- A** External adjust potentiometer  
P/Ns: P1004-95 (fig A) P1004-95-X (fig B)
- B** Versa-knob  
P/N: P0700-7
- Female quick connect P/N: P1015-64 (AWG 14/16)
- Quick connect to screw adaptor P/N: P1015-18
- DIN rail P/Ns: 017322005 (Steel) C103PM (Al)
- DIN rail adaptor P/N: P1023-20  
See accessory pages for specifications.

### Description

The KRPD Series is a factory programmed time delay relay available with 1 of 12 standard dual functions. The time delays can be factory fixed, externally or onboard adjustable or a combination of fixed and adjustable. Modules are manufactured without the function assigned. When an order is received, the function software is added, making the modules complete. This approach provides fast delivery on all part numbers. The SPDT output relay contacts offer a full 10 A rating with complete isolation. Its microcontroller timing circuit provides excellent repeat accuracy and stability. Encapsulation protects against shock, vibration, and humidity. The KRPD Series is a cost effective approach for OEM applications that require small size, isolation, accuracy, and long life. Special time ranges and functions are available; contact Technical Assistance (see below) for more information.

### Connection



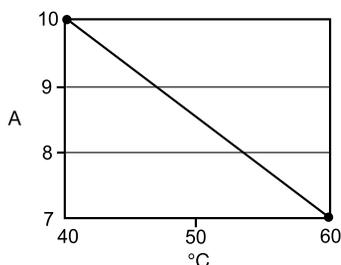
V = Voltage C = Common, Transfer Contact  
NC = Normally Closed NO = Normally Open  
S1 = Initiate Switch UTL = Untimed Load

A knob is supplied for adjustable units or R<sub>T</sub> terminals for external adjust. The untimed load is optional. S1 is not used for some functions. Dashed lines are internal connections.

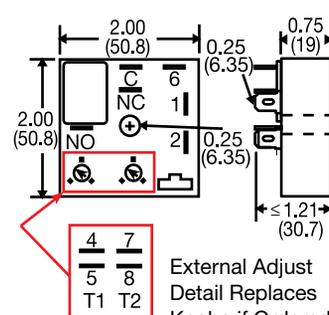
### External Resistance vs Time Delay

For details on external R<sub>T</sub> see the external resistance vs. time delay chart at beginning of this section.

### Output Current/Ambient Temperature



### Mechanical View



Inches (Millimeters)

### \*\*Function Chart

Function	Code
Delay On Make/Delay on Break	<b>MB</b>
Delay On Make/Recycle	<b>MRE</b>
Delay On Make/Interval	<b>MI</b>
Delay On Make/Single Shot	<b>MS</b>
Interval/Recycle	<b>IRE</b>
Delay On Break/Recycle	<b>BRE</b>
Single Shot/Recycle	<b>SRE</b>
Recycle	<b>RXE</b>
Recycle	<b>RXD</b>
Interval/Delay On Make	<b>IM</b>
Accumulative Delay On Make/Interval	<b>AMI</b>
Single Shot Lockout	<b>SL</b>

For a Complete List of Functions with Descriptions, See Timer Function Section.

KRPD Series	Input	First Adjustment (T1 or R <sub>T1</sub> )	First Time Delay*	Second Adjustment (T2 or R <sub>T2</sub> )	Second Time Delay*	Function**
<b>X</b>	<b>A</b> - 24 ... 240 V AC/DC	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
	<b>D</b> - 12 ... 48 V DC	<b>1</b> - Fixed	<b>1</b> - 0.1 ... 10 s	<b>1</b> - Fixed	<b>1</b> - 0.1 ... 10 s	- Specify Function (Refer to Function Chart for Code)
		<b>2</b> - Onboard Adjust	<b>2</b> - 1 ... 100 s	<b>2</b> - Onboard Adjust	<b>2</b> - 1 ... 100 s	
		<b>3</b> - External Adjust	<b>3</b> - 10 ... 1000 s	<b>3</b> - External Adjust	<b>3</b> - 10 ... 1000 s	
			<b>4</b> - 0.1 ... 10 m		<b>4</b> - 0.1 ... 10 m	
			<b>5</b> - 1 ... 100 m		<b>5</b> - 1 ... 100 m	
			<b>6</b> - 10 ... 1000 m		<b>6</b> - 10 ... 1000 m	
			<b>7</b> - 0.1 ... 10 h		<b>7</b> - 0.1 ... 10 h	
			<b>8</b> - 1 ... 100 h		<b>8</b> - 1 ... 100 h	
			<b>9</b> - 10 ... 1000 h		<b>9</b> - 10 ... 1000 h	

\*If Fixed Delay is selected, insert delay [0.1 ... 999] followed by (S) secs., (M) mins., or (H) hrs.

Example P/N: **KRPDA2525MRE** Fixed - **KRPDD10.5S110SMB**

# KRPD Series Dual Function Time Delay Relay

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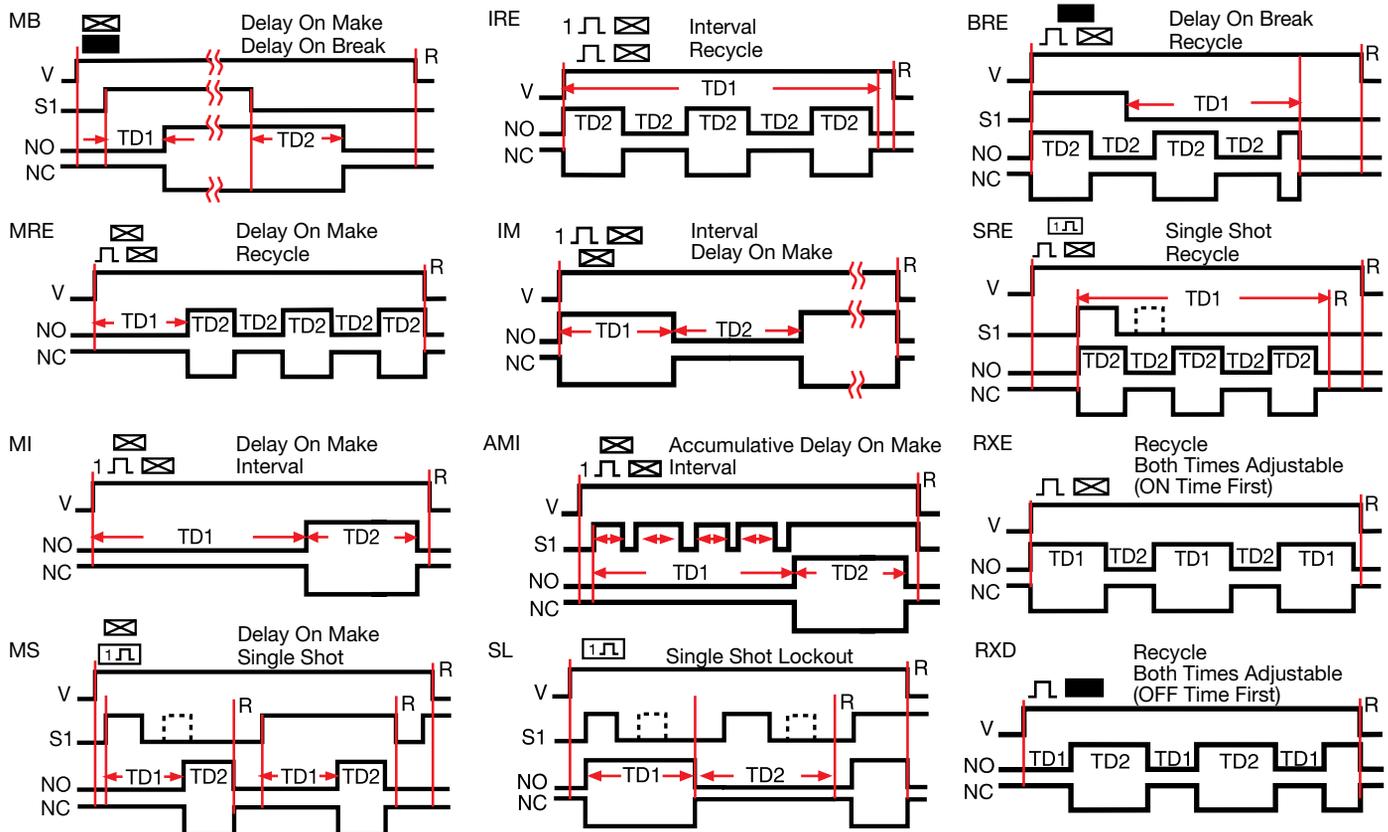
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## Technical Data

<b>Time Delay</b> Type Range Repeat Accuracy Tolerance (Factory Calibration) Reset Time Initiate Time Time Delay vs Temp. & Voltage	Microcontroller circuitry 0.1 s ... 1000 h in 9 adjustable ranges or fixed (to 999) +/-0.5% or 20 ms, whichever is greater ≤ +/-2% ≤ 150 ms ≤ 40 ms; 750 operations per minute ≤ +/-2%	<b>Protection</b> Circuitry Isolation Voltage Insulation Resistance Polarity	Encapsulated ≥ 1500 V RMS input to output ≥ 100 MΩ DC units are reverse polarity protected
<b>Input</b> Voltage Tolerance AC Line Frequency/DC Ripple Power Consumption	12 ... 48 V DC; 24 ... 240 V AC/DC -15% ... +20% -20% ... +10% 50 ... 60 Hz/≤ 10% AC ≤ 2 VA; DC ≤ 2 W	<b>Mechanical</b> Mounting screw Package Termination	Surface mount with one #10 (M5 x 0.8) 2 x 2 x 1.21 in. (50.8 x 50.8 x 30.7 mm) 0.25 in. (6.35 mm) male quick connects
<b>Output</b> Type Form Rating (at 40°C) Max. Switching Voltage Life (Operations)	Isolated relay contacts Single pole double throw, SPDT 10 A resistive at 125 V AC 5 A resistive at 230 V AC & 28 V DC 1/4 hp at 125 V AC 250 V AC Mechanical - 1 x 10 <sup>7</sup> ; Electrical - 1 x 10 <sup>5</sup>	<b>Environmental</b> Operating Temperature Storage Temperature Humidity Weight	-40°C ... +60°C -40°C ... +85°C 95% relative, non-condensing ≈ 2.6 oz (74 g)

## Function Diagrams

For a Complete List of Functions with Descriptions, See Timer Function Section.



### Legend

V	Voltage	t	Incomplete Time Delay
R	Reset	NO	Normally Open
S1	Initiate Switch	NC	Normally Closed
TD1, TD2	Time Delay	—/—	Undefined time

Note: If S1 is closed when input voltage is applied, the function starts and the time delay begins. (MB, MS, BRE, SRE, AMI, SL)

KRPDGen 06.06.05

# KRPS Series Single Function Time Delay Relay

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US Patent 6708135



- Choose 1 of 13 Standard Functions
- Special Time Ranges and Functions Available
- Factory Programmed
- Microcontroller Circuitry, +/-0.5% Repeat Accuracy
- Isolated 10 A SPDT Output Contacts
- Input Voltage from 12...240 V in 2 Ranges
- Delays from 100 ms...1000 h in 9 Ranges

Approvals:

### Accessories

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

Versa-knob  
P/N: P0700-7

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

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

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

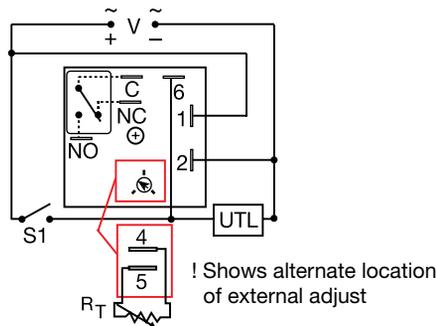
DIN rail adaptor  
P/N: P1023-20

See accessory pages for specifications.

### Description

The KRPS Series is a factory programmed time delay relay available in any 1 of 13 functions and measures only 2 inches square. The KRPS offers a wide range of fixed, onboard, or externally adjustable time delays. Modules are manufactured without the function assigned. When an order is received, the function software is added making the modules complete. This approach provides fast delivery on all part numbers. The output relay contacts offer a full 10 A rating with complete isolation. Its microcontroller timing circuit provides excellent repeat accuracy and stability. Encapsulation protects against shock, vibration, and humidity. The KRPS Series is a cost effective approach for OEM applications that require small size, isolation, accuracy, and long life. Special time ranges and functions are available; contact Technical Assistance (see below) for more information.

### Connection



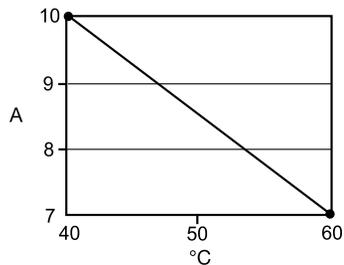
V = Voltage C = Common, Transfer Contact  
NC = Normally Closed NO = Normally Open  
S1 = Initiate Switch UTL = Untimed Load

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. S1 is not used for some functions. Dashed lines are internal connections.

### External Resistance vs Time Delay

For details on external  $R_T$  see the external resistance vs. time delay chart at the beginning of this section.

### Output Current/Ambient Temperature

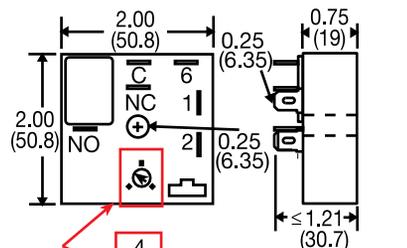


### Ordering Table

Series	Input	Adjustment	Time Delay*	Function**
<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
A	24 ... 240 V AC/DC	1 - Fixed	1 - 0.1 ... 10 s	Specify Function (Refer to Function Chart for Code)
D	12 ... 48 V DC	2 - Onboard Adjustment	2 - 1 ... 100 s	
		3 - External Adjustment	3 - 10 ... 1000 s	
			4 - 0.1 ... 10 m	
			5 - 1 ... 100 m	
			6 - 10 ... 1000 m	
			7 - 0.1 ... 10 h	
			8 - 1 ... 100 h	
			9 - 10 ... 1000 h	

Example P/N: KRPSA23RE Fixed - KRPSD10.5SI

### Mechanical View



External Adjust Detail Replaces Knobs if Ordered  
Inches (Millimeters)

### \*\*Function Chart

Function	Code
Delay On Make	M
Delay On Break	B
Recycle (ON Time First, Equal Times)	RE
Recycle (OFF Time First, Equal Times)	RD
Single Shot	S, SD
Interval	I
Trailing Edge Single Shot	TS
Inverted Single Shot	US
Inverted Delay On Break	UB
Accumulative Delay on Make	AM
Motion Detector/Retriggerable Single Shot	PSD
Alternating Relay	FT

For a Complete List of Functions with Descriptions, see Timer Function Section.

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

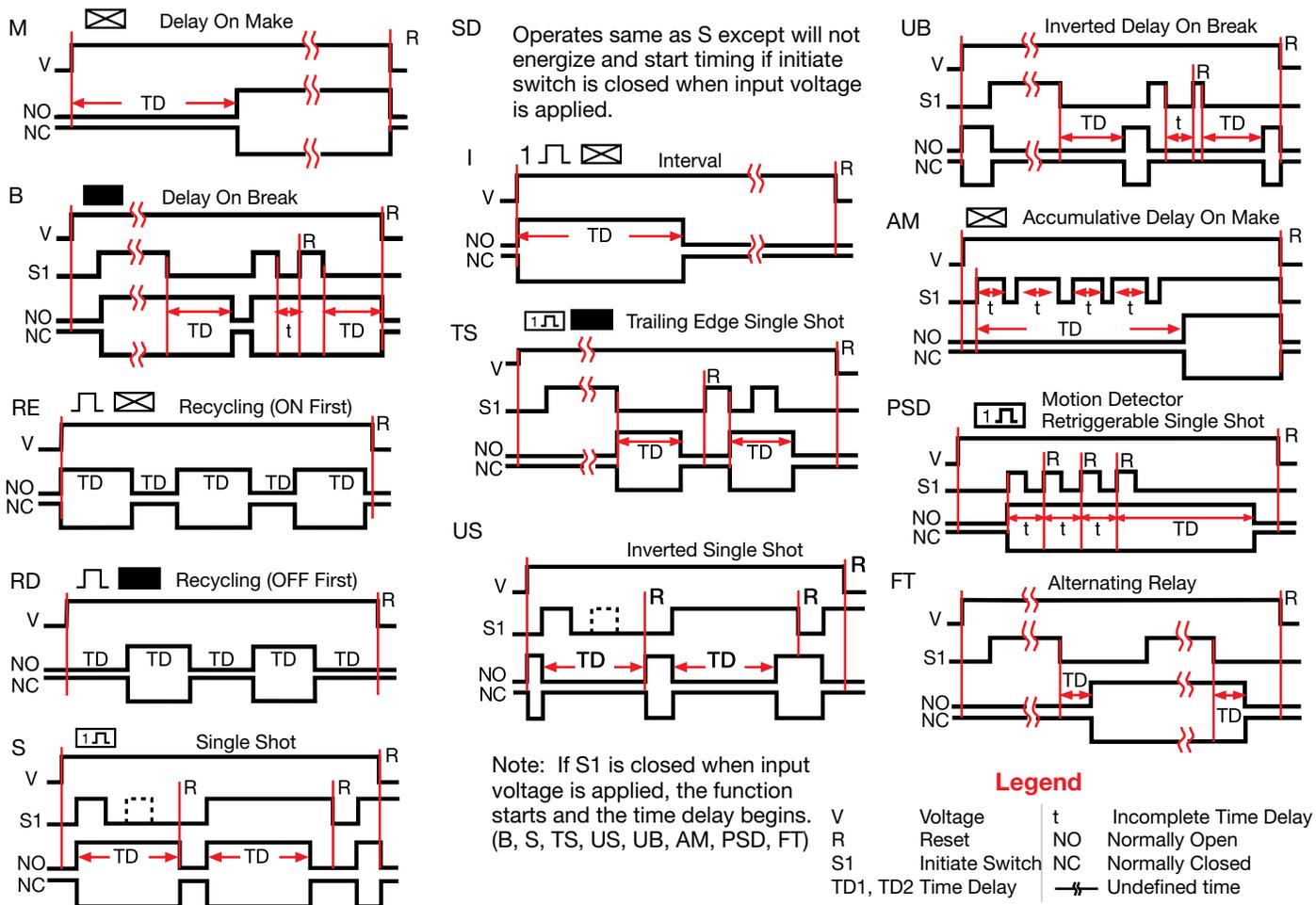
# KRPS Series Single Function Time Delay Relay

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## Technical Data

<b>Time Delay</b> Type: Microcontroller circuitry Range: 0.1 s ... 1000 h in 9 adjustable ranges or fixed Repeat Accuracy: +/-0.5% or 20 ms, whichever is greater Tolerance (Factory Calibration): ≤ +/-2% Reset Time: ≤ 150 ms Initiate Time: ≤ 40 ms; ≤ 750 operations per minute Time Delay/Temp. & Input Voltage: ≤ +/-2%		<b>Protection</b> Circuitry: Encapsulated Isolation Voltage: ≥ 1500 V RMS Input to Output Insulation Resistance: ≥ 100 MΩ Polarity: DC units are reverse polarity protected	
<b>Input</b> Voltage: 12 ... 48 V DC; 24 ... 240 V AC/DC Tolerance: 12 ... 48 V DC: -15% ... +20%; 24 ... 240 V AC/DC: -20% ... +10% Line Frequency/DC Ripple: 50 ... 60 Hz/≤ 10% Power Consumption: AC ≤ 2 VA; DC ≤ 2 W		<b>Mechanical</b> Mounting: Surface mt. with one #10 (M5 x 0.8) screw Package: 2 x 2 x 1.21 in. (50.8 x 50.8 x 30.7 mm) Termination: 0.25 in. (6.35 mm) male quick connects	
<b>Output</b> Type: Isolated relay contacts Form: Single pole double throw, SPDT Rating (at 40°C): 10 A resistive at 125 V AC; 5 A resistive at 230 V AC & 28 V DC; 1/4 hp at 125 V AC Max. Switching Voltage: 250 V AC Life (Operations): Mechanical - 1 x 10 <sup>7</sup> ; Electrical - 1 x 10 <sup>5</sup>		<b>Environmental</b> Operating Temp.: -40°C ... +60°C Storage Temp.: -40°C ... +85°C Humidity: 95% relative, non-condensing Weight: ≅ 2.6 oz (74 g)	

**Function Diagrams** For a Complete List of Functions with Descriptions, see Timer Function Section.



KRPSGen 06.06.05

# HRPD/HRID Power-Time Time Delay Relay

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US Patent 6708135

- Special Time Ranges and Functions Available
- Factory Programmed
- 30 A SPDT N.O. Output Contacts
- 12 ... 240 V Operation in 2 Ranges
- Delays from 100 ms ... 1000 h in 9 Ranges
- +/-0.5% Repeat Accuracy

Approvals:

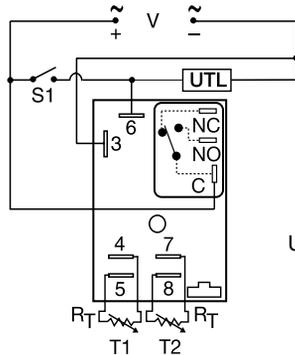
### Accessories

- A** External adjust potentiometer  
P/Ns: P1004-95 (fig A) P1004-95-X (fig B)
  - B** Versa-knob  
P/N: P0700-7
  - Quick connect to screw adaptor  
P/N: P1015-18
  - Female quick connect P/Ns:  
P1015-64 (AWG 14/16) P1015-13 (AWG 10/12)
  - Mounting bracket  
P/N: P1023-6
  - DIN rail P/Ns:  
017322005 (Steel) C103PM (Al)
  - DIN rail adaptor  
P/N: P1023-20
- See accessory pages for specifications.

### Description

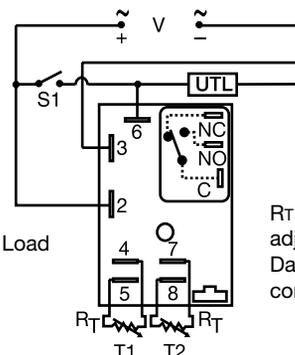
The HRPD/HRID Series combines an electromechanical relay with microcontroller timing circuitry. It is a factory programmed module available in any 1 of 12 standard functions. Modules are manufactured without the function assigned. When an order is received, the function software is added. It offers 12 to 240 V operation in two universal ranges and factory fixed, onboard knob 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. HRPD has non-isolated SPDT relay contacts, and the HRID has isolated SPDT relay contacts. An excellent choice for OEM applications where cost is a factor. Both offer dual functions in one convenient package.

### Connection



HRPD  
Relay contacts are non-isolated.

S1 = Initiate Switch  
UTL = Optional Untimed Load  
NO = Normally Open  
NC = Normally Closed  
C = Common



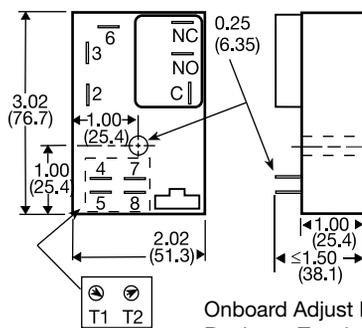
HRID  
Relay contacts are isolated.

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

### External Resistance vs Time Delay

For details on external RT see the external resistance vs. time delay chart at the beginning of this section.

### Mechanical View



Onboard Adjust Detail  
Replaces Terminals if Ordered

Inches (Millimeters)

### \*\*Function Chart

Code	Description
<b>MB</b>	Delay On Make/Delay on Break
<b>MRE</b>	Delay On Make/Recycle (ON Time First, Equal Times)
<b>MI</b>	Delay On Make/Interval
<b>MS</b>	Delay On Make/Single Shot
<b>IRE</b>	Interval/Recycle (ON Time First, Equal Times)
<b>BRE</b>	Delay On Break/Recycle (ON Time First, Equal Times)
<b>SRE</b>	Single Shot/Recycle (ON Time First, Equal Times)
<b>RXE</b>	Recycle (Both Times Adjustable, ON Time First)
<b>RXD</b>	Recycle (Both Times Adjustable, OFF Time First)
<b>IM</b>	Interval/Delay On Make
<b>AMI</b>	Accumulative Delay On Make/Interval
<b>SL</b>	Single Shot Lockout

For a Complete List of Functions with Descriptions, see Timer Function Section.

### HRPD/HRID Series

Input
<b>W</b> - 24...240 V AC
24...110 V DC
<b>D</b> - 12 ... 48 V DC

First Adjustment (T1 or RT1)
<b>1</b> - Fixed
<b>2</b> - Onboard Adjust
<b>3</b> - External Adjust

First Time Delay*
<b>1</b> - 0.1 ... 10 s
<b>2</b> - 1 ... 100 s
<b>3</b> - 10 ... 1000 s
<b>4</b> - 0.1 ... 10 m
<b>5</b> - 1 ... 100 m
<b>6</b> - 10 ... 1000 m
<b>7</b> - 0.1 ... 10 h
<b>8</b> - 1 ... 100 h
<b>9</b> - 10 ... 1000 h

Second Adjustment (T2 or RT2)
<b>1</b> - Fixed
<b>2</b> - Onboard Adjust
<b>3</b> - External Adjust

Second Time Delay*
<b>1</b> - 0.1 ... 10 s
<b>2</b> - 1 ... 100 s
<b>3</b> - 10 ... 1000 s
<b>4</b> - 0.1 ... 10 m
<b>5</b> - 1 ... 100 m
<b>6</b> - 10 ... 1000 m
<b>7</b> - 0.1 ... 10 h
<b>8</b> - 1 ... 100 h
<b>9</b> - 10 ... 1000 h

**Function\*\***  
Specify Function (Refer to Function Chart for Code)

\*If Fixed Delay is selected, insert delay [0.1 ... 999] followed by (S) secs., (M) mins., or (H) hrs.

Example P/N: **HRPDW2221MB** Fixed - **HRIDD10.5S21RXE**

HRPDGen 06.06.05

# HRPD/HRID Power-Time Time Delay Relay

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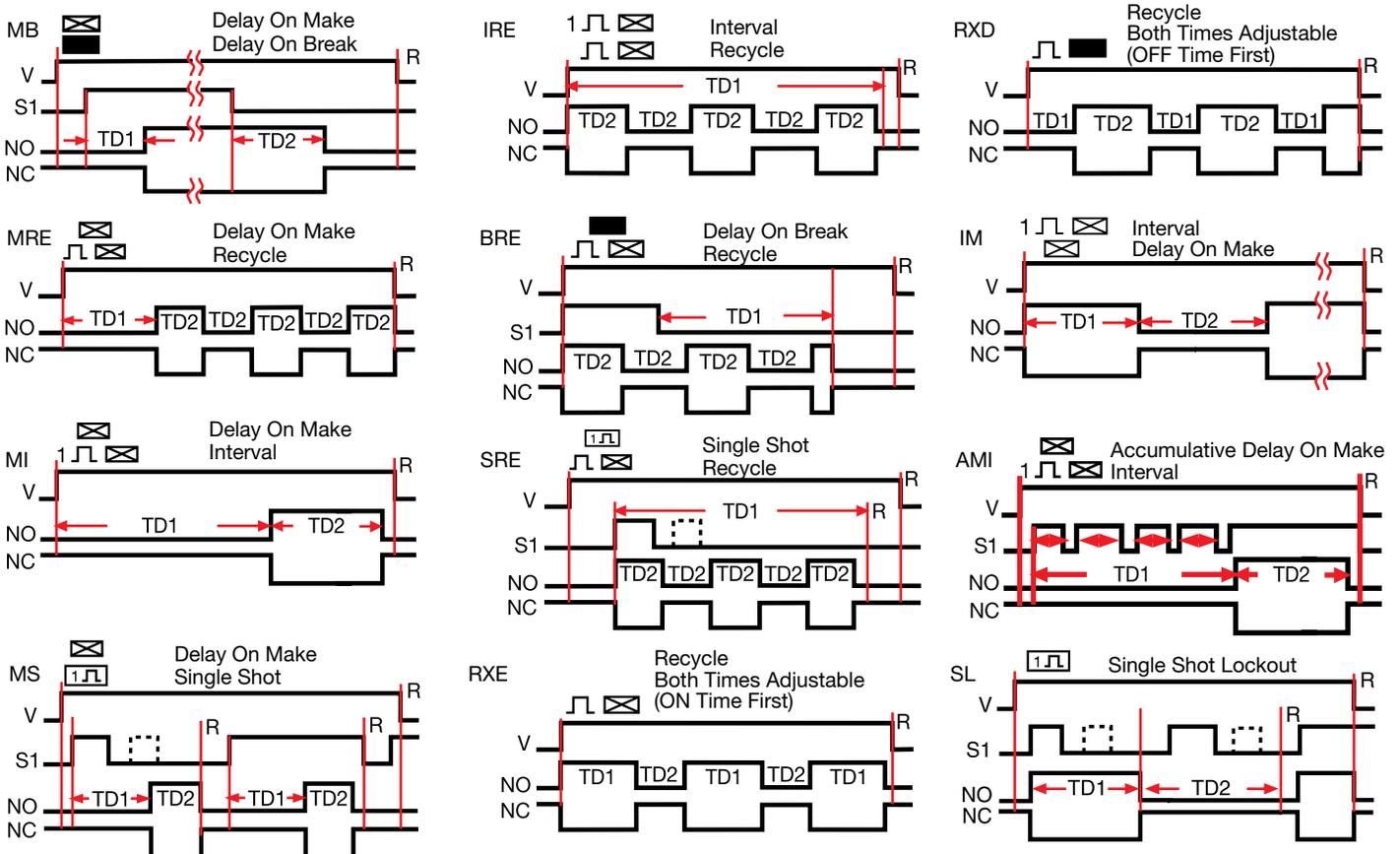
## Technical Data

<b>Time Delay</b>		<b>Protection</b>	
Range	100 ms ... 1000 h in 9 adjustable ranges or fixed	Surge	IEEE C62.41-1991 Level A
Repeat Accuracy	+/-0.5% or 20 ms, whichever is greater	Circuitry	Encapsulated
Tolerance (Factory Calibration)	+/-2%	Isolation Voltage	≥1500 V RMS input to output; isolated units
Reset Time	≤ 150 ms	Insulation Resistance	≥100 MΩ
Initiate Time	≤ 20 ms, ≤ 1500 operations per minute	Polarity	DC units are reverse polarity protected
Time Delay vs. Temp. & Voltage	≤ +/-2%	<b>Mechanical</b>	
<b>Input</b>		Mounting	Surface mt. with one #10 (M5 x 0.8) screw
Voltage	12 ... 48 V DC; 24 ... 240 V AC / 24 ... 110 V DC	Package	3 x 2 x 1.5 in. (76.7 x 51.3 x 38.1 mm)
Tolerance	12 ... 48 V DC 24 ... 110 V DC/24 ... 240 V AC	Termination	0.25 in. (6.35 mm) male quick connects
	-15% ... +20%	<b>Environmental</b>	
	-20% ... +10%	Operating Temp.	-40°C ... +60°C
Line Frequency	50 ... 60 Hz	Storage Temp.	-40°C ... +85°C
Power Consumption	AC ≤ 4 VA; DC ≤ 2 W	Humidity	95% relative, non-condensing
<b>Output</b>		Weight	≈ 3.9 oz (111 g)
Type/Form	Electromechanical relay/SPDT		
Ratings:	<b>SPDT-N.O.</b> <b>SPDT-N.C.</b>		
General Purpose	125/240 V AC      30 A      15 A		
Resistive	125/240 V AC      30 A      15 A		
	28 V DC      20 A      10 A		
Motor Load	125 V AC      1 hp*      1/4 hp**		
	240 V AC      2 hp**      1 hp**		
Life	Mechanical -- 1 x 10 <sup>6</sup> Electrical -- 1 x 10 <sup>5</sup> , *3 x 10 <sup>4</sup> , **6,000		

3

For a Complete List of Functions with Descriptions, see Timer Function Section.

## Function Diagrams



### Legend

V	Voltage	t	Incomplete Time Delay
R	Reset	NO	Normally Open
S1	Initiate Switch	NC	Normally Closed
TD1, TD2	Time Delay	—	Undefined time

Note: If S1 is closed when input voltage is applied, the function starts and the time delay begins. (MB, MS, BRE, SRE, AMI, SL)

HRPDGen 06.06.05

# HRPS/HRIS Power-Time Time Delay Relay

3



US Patent 6708135



- 30 A SPDT N.O. Output Contacts
- Factory Programmed
- 12 ... 240 V Operation in 2 Ranges
- Special Time Ranges and Functions Available
- Encapsulated Circuitry
- Delays from 100 ms...1000 h in 9 ranges
- +/-0.5% Repeat Accuracy
- +/-2% Factory Calibration
- Fixed, External, or Onboard Adjustment

Approvals:

### Accessories



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



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



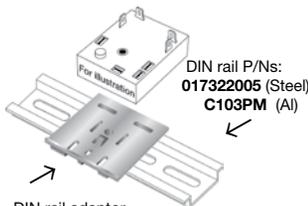
Female quick connect P/Ns:  
**P1015-64** (AWG 14/16)  
**P1015-13** (AWG 10/12)



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



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



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

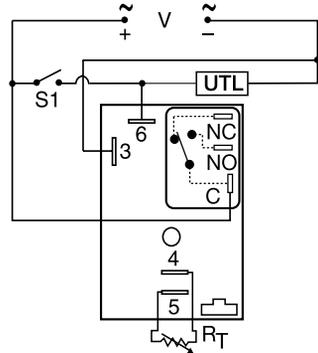
DIN rail adaptor  
P/N: **P1023-20**

See accessory pages for specifications.

### Description

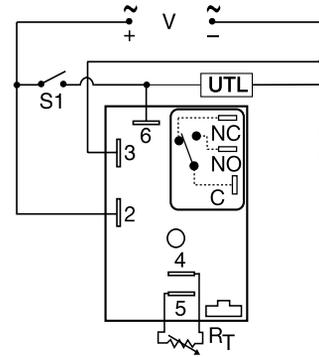
The HRPS/HRIS Series combines an electromechanical relay output with microcontroller timing circuitry. It is a factory programmed module available in any 1 of 13 standard functions. Modules are manufactured without the function assigned. When an order is received, the function software is added. It offers 12 to 240 V operation in two universal 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. HRPS has non-isolated SPDT relay contacts, and HRIS has isolated SPDT relay contacts. Both offer the most popular timer functions in the industry.

### Connection



HRPS

Relay contacts are not isolated.



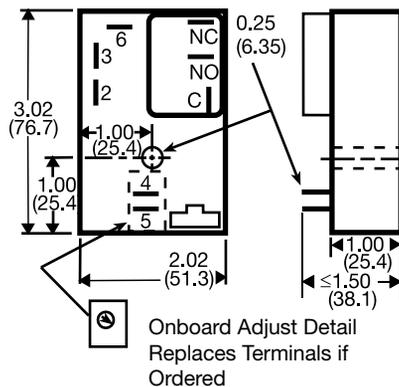
HRIS

Relay contacts are isolated.

S1 = Initiate Switch C = Common  
UTL = Optional Untimed Load  
NO = Normally Open NC = Normally Closed

NOTE: A knob, or terminals 4 & 5 are only included on adjustable units. R<sub>T</sub> is used when external adjustment is ordered. Dashed lines are internal connections.

### Mechanical View



Inches (Millimeters)

### External Resistance vs Time Delay

For details on external R<sub>T</sub> see the external resistance vs. time delay chart at the beginning of this section.

### \*\*Function Chart

	Code
Delay On Make	<b>M</b>
Delay On Break	<b>B</b>
Recycle (ON Time First, Equal Times)	<b>RE</b>
Recycle (OFF Time First, Equal Times)	<b>RD</b>
Single Shot	<b>S, SD</b>
Interval	<b>I</b>
Trailing Edge Single Shot	<b>TS</b>
Inverted Single Shot	<b>US</b>
Inverted Delay On Break	<b>UB</b>
Accumulative Delay on Make	<b>AM</b>
Motion Detector/Retriggerable Single Shot	<b>PSD</b>
Alternating Relay	<b>FT</b>

For a Complete List of Functions with Descriptions, see Timer Function Section.

### Ordering Table

HRPS/  
HRIS  
Series

<b>X</b>	<b>Input</b>
<b>-W</b>	24 ... 240 V AC
	24 ... 110 V DC
<b>-D</b>	12 ... 48 V DC

<b>X</b>	<b>Adjustment</b>
<b>-1</b>	Fixed
<b>-2</b>	Onboard Adjust
<b>-3</b>	External Adjust

<b>X</b>	<b>Time Delay *</b>
<b>-1</b>	0.1 ... 10 s
<b>-2</b>	1 ... 100 s
<b>-3</b>	10 ... 1000 s
<b>-4</b>	0.1 ... 10 m
<b>-5</b>	1 ... 100 m
<b>-6</b>	10 ... 1000 m
<b>-7</b>	0.1 ... 10 h
<b>-8</b>	1 ... 100 h
<b>-9</b>	10 ... 1000 h

**X**  
**Function\*\***  
Specify Function  
(Refer to Function  
Chart for Code)

Example P/N: **HRPSW23S** Fixed – **HRISD10.5SB**

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

# HRPS/HRIS Power-Time Time Delay Relay

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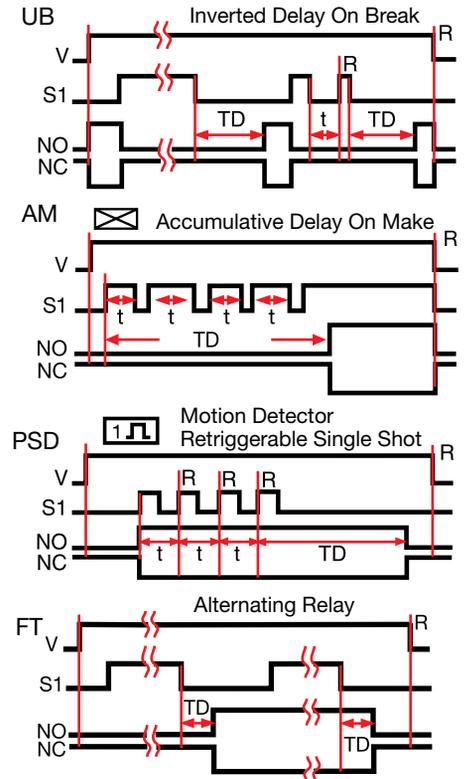
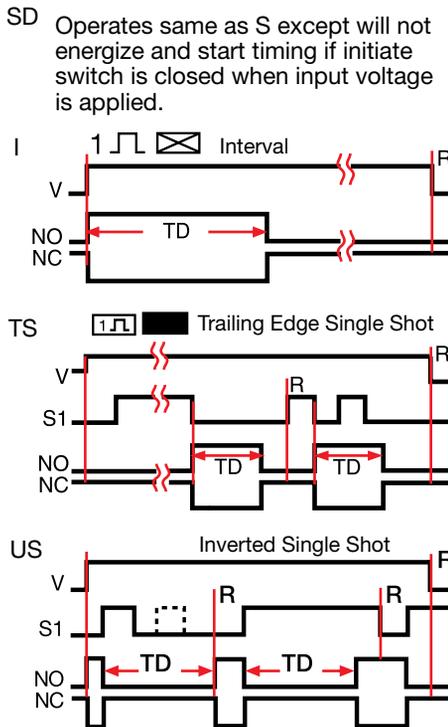
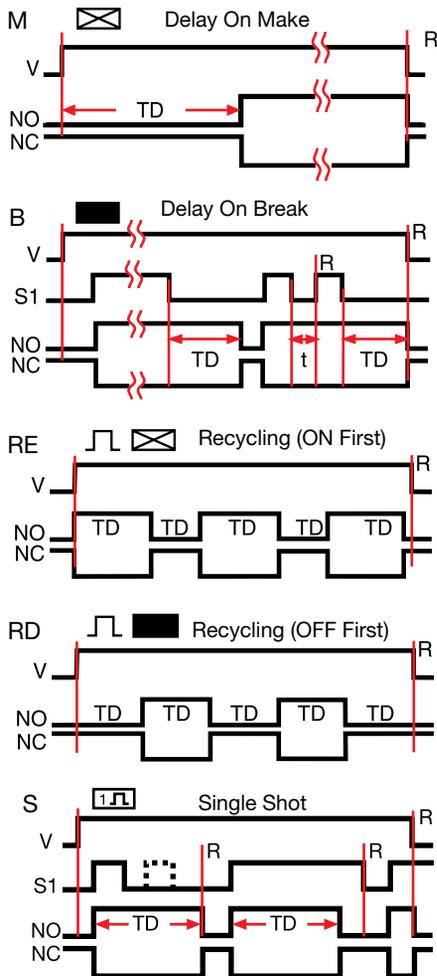
## Technical Data

<b>Time Delay</b>		<b>Protection</b>	
Type	Microcontroller circuitry	Surge	IEEE C62.41-1991 Level A
Range	100 ms ... 1000 h in 9 adjustable ranges or fixed	Circuitry	Encapsulated
Repeat Accuracy	+/-0.5% or 20 ms, whichever is greater	Isolation Voltage	≥ 1500 V RMS input to output; isolated units
Tolerance (Factory Calibration)	+/-2%	Insulation Resistance	≥ 100 MΩ
Reset Time	≤ 150 ms	Polarity	DC units are reverse polarity protected
Initiate Time	≤ 20 ms	<b>Mechanical</b>	
Time Delay vs. Temp. & Voltage	+/-2%	Mounting	Surface mt. with one #10 (M5 x 0.8) screw
<b>Input</b>		Package	3 x 2 x 1.5 in (76.7 x 51.3 x 38.1 mm)
Voltage	24 ... 240 V AC/24 ... 110 V DC; 12 ... 48 V DC	Termination	0.25 in. (6.35 mm) male quick connects
Tolerance 12 ... 48 V DC	-15% ... +20%	<b>Environmental</b>	
24 ... 110 V DC/240 V AC	-20% ... +10%	Operating Temp.	-40°C ... +60°C
Line Frequency	50 ... 60 Hz	Storage Temp.	-40°C ... +85°C
Power Consumption	AC ≤ 4 VA; DC ≤ 2 W	Humidity	95% relative, non-condensing
<b>Output</b>		Weight	≅ 3.9 oz (111 g)
Type/Form	Electromechanical relay/SPDT		
Ratings:	<b>SPDT-N.O.</b> <b>SPDT-N.C.</b>		
General Purpose 125/240 V AC	30 A    15 A		
Resistive 125/240 V AC	30 A    15 A		
28 V DC	20 A    10 A		
Motor Load 125 V AC	1 hp*    1/4 hp**		
240 V AC	2 hp**    1 hp**		
Life	Mechanical -- 1 x 10 <sup>6</sup> Electrical -- 1 x 10 <sup>5</sup> , *3 x 10 <sup>4</sup> , **6,000		

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## Function Diagrams

For a Complete List of Functions with Descriptions, see Timer Function Section.



Note: If S1 is closed when input voltage is applied, the function starts and the time delay begins. (B, S, TS, US, UB, AM, PSD, FT)

### Legend

V	Voltage	t	Incomplete Time Delay
R	Reset	NO	Normally Open
S1	Initiate Switch	NC	Normally Closed
TD1, TD2	Time Delay	—	Undefined time

HRPSGen 06.06.05

# HRPU/HRIU Series Time Delay Relay

3



US Patent 6708135



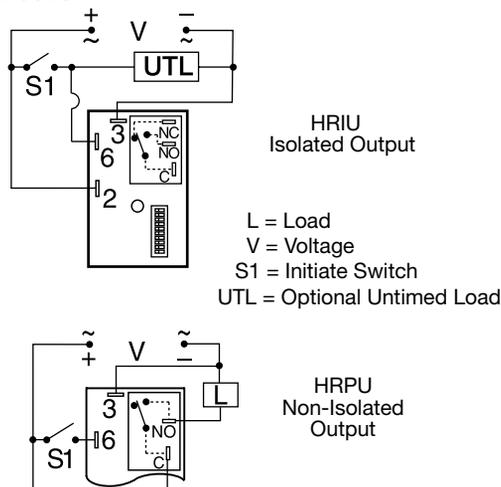
- Choose 1 of 14 Standard Functions
- Special Time Ranges and Functions Available
- Factory Programmed
- Microcontroller Circuitry, +/-0.1% Repeat Accuracy
- 30 A, N.O. Output Contacts
- Accurate Switch Adjustment
- 12 ... 240 V in 2 Ranges
- Delays from 100 ms ... 1023 h

Approvals:

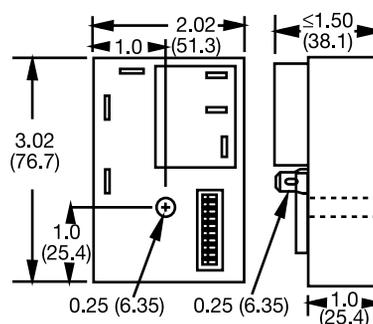
## Description

The HRP/HRIU combines the accuracy of microcontroller based circuitry with an electromechanical relay output. Its switching capacity allows direct control of loads like compressors, pumps, motors, heaters, and lighting. It is a factory programmed module available in any 1 of 14 standard functions. The HRP/HRIU offers a single adjustable timer or counter function. Modules are manufactured without the function assigned. When an order is received, the function software is added. This approach provides fast delivery on all part numbers. Switch adjustment allows accurate selection of the time delay or number of counts. The HRP/HRIU has non-isolated relay contacts, the HRIU has isolated relay contacts. Encapsulation protects against shock, vibration, and humidity. The HRP/HRIU Series is a cost effective approach for OEM applications that require small size, reliability and accurate switch adjustment. Special time ranges and functions are available; contact Technical Assistance (see below) for more information.

## Connection



## Mechanical View



Inches (Millimeters)

## Switch Adjustment

Adjustment Switch Operation			
TIME DELAY		COUNTER	
0.1...102.3	1...1023	1...165	1...63
OFF ▶ ON	OFF ▶ ON	OFF ▶ ON	OFF ▶ ON
0.1	1	1	1
0.2	2	2	2
0.4	4	3	4
0.8	8	4	8
1.6	16	5	16
3.2	32	10	32
6.4	64	20	M
12.8	128	30	1
25.6	256	40	2
51.2	512	50	4
6.3	544	57 counts	44 s Delay 2 counts to Start

One or more switches must be ON for proper operation.

## \*\*Function Chart

- |   |            |
|---|------------|
| Delay on Make Timer                             | <b>M</b>   |
| Delay on Break Timer                            | <b>B</b>   |
| Recycle Timer (ON Time First, Equal Times)      | <b>RE</b>  |
| Recycle Timer (OFF Time First, Equal Times)     | <b>RD</b>  |
| Single Shot Timer                               | <b>S</b>   |
| Single Shot Timer (See Time Diagram)            | <b>SD</b>  |
| Interval Timer                                  | <b>I</b>   |
| Trailing Edge Single Shot Timer                 | <b>TS</b>  |
| Motion Detector/Retriggerable Single Shot Timer | <b>PSD</b> |
| Inverted Single Shot Timer                      | <b>US</b>  |
| Accumulative Delay on Make Timer                | <b>AM</b>  |
| Inverted Delay on Break Timer                   | <b>UB</b>  |
| Counter/Pulsed Output                           | <b>C</b>   |
| Counter/Interval Output                         | <b>CI</b>  |

For a Complete List of Functions with Descriptions, see Timer Function Section.

## Accessories



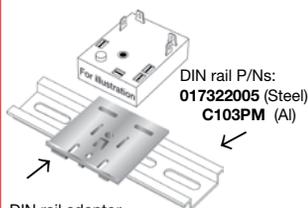
Mounting bracket  
P/N: P1023-6



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



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



DIN rail adaptor  
P/N: P1023-20

See accessory pages for specifications.

## HRPU/ HRIU Series

- X** Input
- W - 24 ... 240 V AC
  - 24 ... 110 V DC
  - D - 12 ... 48 V DC

- X** Time Delay/Counts
- 1 - 0.1 ... 102.3 s
  - 2 - 1 ... 1023 s
  - 3 - 0.1 ... 102.3 m
  - 4 - 1 ... 1023 m
  - 5 - 0.1 ... 102.3 h
  - 6 - 1 ... 1023 h
  - 7 - 1 ... 165 counts (straight) w/pulsed output
  - 8 - 1 ... 1023 counts (binary) w/pulsed output
  - 9 - 1 ... 7 counts to start 1 ... 63 s or m interval time

- X** Function\*\*
- Specify Function (Refer to Function Chart for Code)

Example P/N: **HRIUD2B, HRPW3AM**

# HRPU/HRIU Series Time Delay Relay

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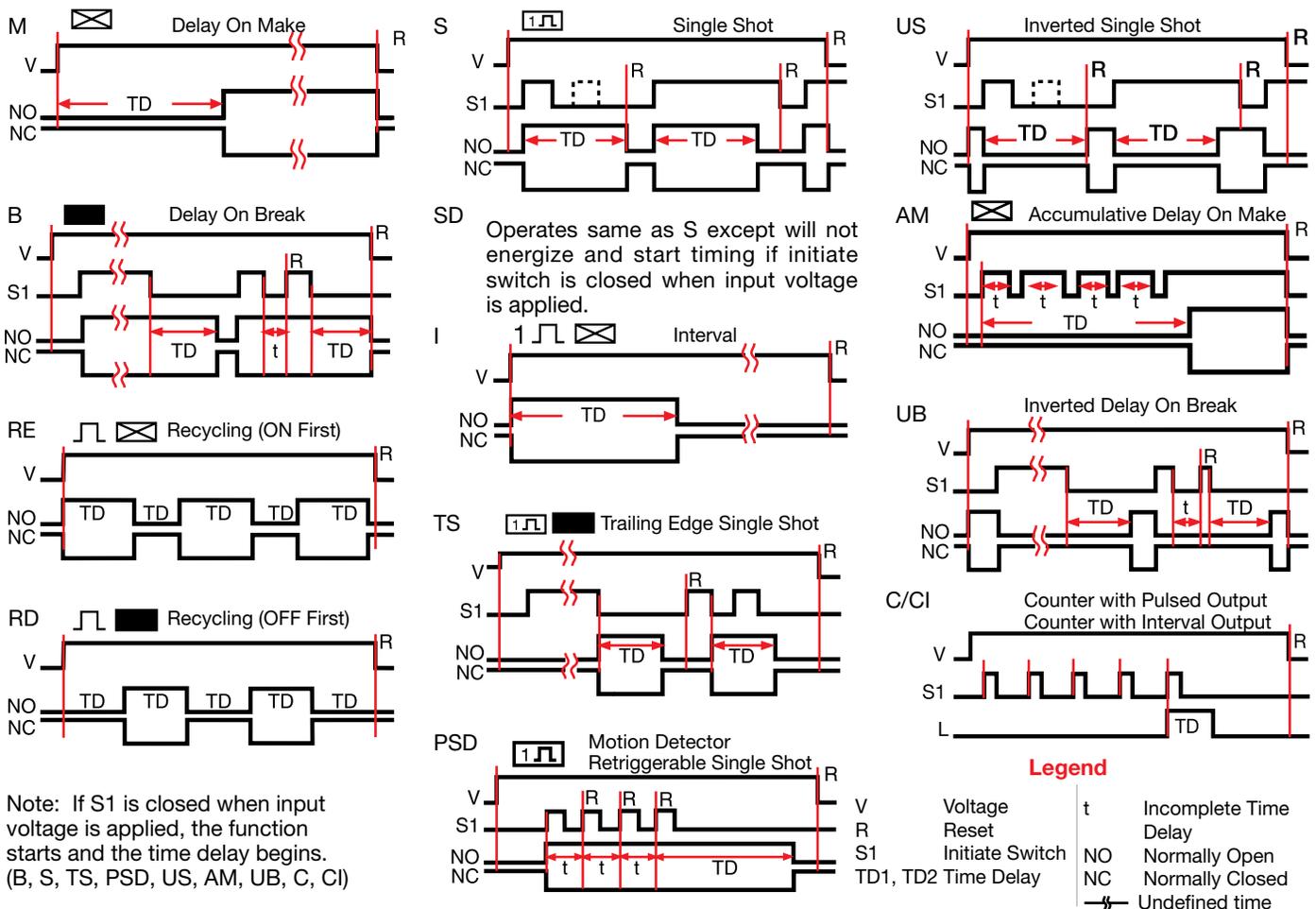
## Technical Data

<b>Count Functions/Switch Type</b>	Mechanical Switch (counts on switch closure)	<b>Output</b>	Electromechanical relay/SPDT
Count Range	1 ... 1023 counts in 8 ranges	Type/Form	<b>SPDT-N.O.</b> <b>SPDT-N.C.</b>
Counter Output (Variable 7 & 8)	Pulse Widths 300 ms +/-20%	Ratings:	30 A 15 A
Initiate Time	≤ 20 ms, ≤ 1500 operations per minute	General Purpose	125/240 V AC 30 A 15 A
		Resistive	125/240 V AC 30 A 15 A
			28 V DC 20 A 10 A
		Motor Load	125 V AC 1 hp* 1/4 hp**
			240 V AC 2 hp** 1 hp**
		Life	Mechanical -- 1 x 10 <sup>6</sup> Electrical -- 1 x 10 <sup>5</sup> , *3 x 10 <sup>4</sup> , ** 6,000
<b>Time Delay/Range ***</b>	Adjustable 0.1 s ... 1023 h in 8 ranges	<b>Protection</b>	Encapsulated
Setting Accuracy	+/-1%, or 50 ms, whichever is greater	Circuitry	IEEE C62.41-1991 Level A
Repeat Accuracy	0.1% or 20 ms, whichever is greater	Surge	≥ 1500 V RMS input to output; isolated units
Reset Time	≤ 150 ms	Isolation Voltage	≥ 100 MΩ
Time vs. Input Voltage & Temp.	+/-2%	Insulation Resistance	
<b>Input</b>		<b>Mechanical/Environmental</b>	
Voltage	12 ... 48 V DC; 24 ... 240 V AC/ 24 ... 110 V DC	Mounting	Surface mt. with one #10 (M5 x 0.8) screw
Line Frequency/DC Ripple	50 ... 60 Hz/≤ 10%	Termination	0.25 in. (6.35 mm) male quick connects
Tolerance 12 ... 48 V DC	-15% ... +20%	Humidity	95% relative, non-condensing
24 ... 240 V AC/24 ... 110 V DC	-20% ... +10%	Operating Temperature	-40°C ... +60°C
Power Consumption	AC: ≤ 4 VA; DC: ≤ 2 W	Storage Temperature	-40°C ... +85°C
		Weight	≈ 3.9 oz (111 g)

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

## Function Diagrams

For a Complete List of Functions with Descriptions, see Timer Function Section.



Note: If S1 is closed when input voltage is applied, the function starts and the time delay begins. (B, S, TS, PSD, US, AM, UB, C, CI)

HRPUGen 06.06.05

# HSPZ Series Timing Module

3



US Patent 6708135



- Choose 1 of 13 Standard Functions
- Special Time Ranges and Functions Available
- Factory Programmed
- Microcontroller Circuitry, +/-0.1% Repeat Accuracy
- 1 A Solid State Output
- Accurate Switch Adjustment
- 12 ... 240 V in 3 Ranges
- Delays from 100 ms...1023 h in 6 ranges
- Counts to 1023 in 2 Ranges

Approvals:

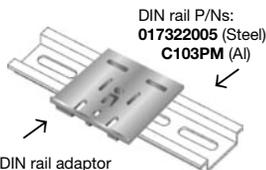
### Accessories



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



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



DIN rail adaptor  
P/N: P1023-20

See accessory pages for specifications.

### Ordering Table

HSPZ Series	X Input
A	24 ... 240 V AC
P	12 ... 120 V DC Positive Switching
N	12 ... 120 V DC Negative Switching

X T1 Time Delay/Counts	
-1	0.1 ... 102.3 s
-2	1 ... 1023 s
-3	0.1 ... 102.3 m
-4	1 ... 1023 m
-5	0.1 ... 102.3 h
-6	1 ... 1023 h
-7	1 ... 165 counts (straight)
-8	1 ... 1023 counts (binary)
-9	1 ... 512 m or s

X T2 Time Delay/Counts	
-1	0.1 ... 102.3 s
-2	1 ... 1023 s
-3	0.1 ... 102.3 m
-4	1 ... 1023 m
-5	0.1 ... 102.3 h
-6	1 ... 1023 h
-7	For Future Expansion
-8	For Future Expansion
-9	1 ... 512 m or s

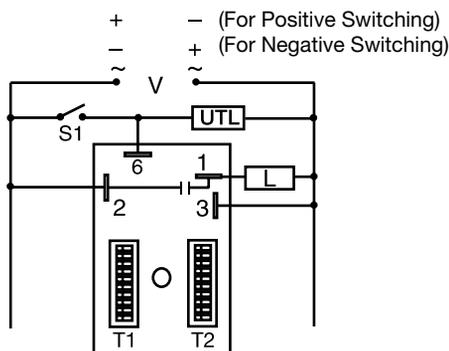
X Function**
Specify Function (Refer to Function Chart for Code)

Example P/N: HSPZA12MB, HSPZP84CI

### Description

The HSPZ Series is a factory programmed module available in any 1 of 13 standard functions. The HSPZ offers dual switch adjustable timer or counter functions. Modules are manufactured without the function assigned. When an order is received, the function software is added. This approach provides fast delivery on all part numbers. Switch adjustment allows accurate selection of the time delay or number of counts the first time and every time. The 1 A steady, 10 A inrush rated solid state output provides 100 million operations, typical. Its microcontroller timing circuit provides excellent repeat accuracy and stability. Encapsulation protects against shock, vibration, and humidity. The HSPZ Series is a cost effective approach for OEM applications that require small size, solid state reliability, and accurate switch adjustment. Special time ranges and functions are available; contact Technical Assistance (see below) for more information.

### Connection



V = Voltage S1 = Initiate Switch  
L = Load UTL = Optional Untimed Load

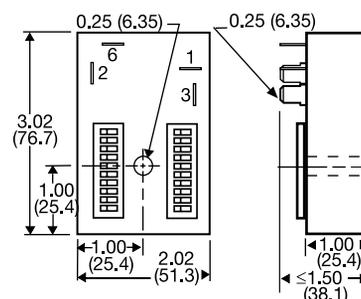
The untimed load is optional. S1 is not used for some functions. Dashed lines are internal connections.

### Adjustment Switch

Adjustment Switch Operation	
TIME DELAY	TIME DELAY and COUNTER
0.1...102.3	1...512
OFF ▶ ON	OFF ▶ ON
0.1	1
0.2	2
0.4	4
0.8	8
1.6	16
3.2	32
6.4	64
12.8	128
25.6	256
51.2	M
6.3	300 s Delay
	544
	57 counts

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

### Mechanical View



Inches (Millimeters)

### \*\*Function Chart

Code	
MB	Delay On Make/Delay on Break
MRE	Delay On Make/Recycle (ON Time First, Equal Times)
MI	Delay On Make/Interval
MS	Delay On Make/Single Shot Interval/Recycle (ON Time First, Equal Times)
IRE	Delay On Break/Recycle (ON Time First, Equal Times)
BRE	Delay On Break/Recycle (ON Time First, Equal Times)
SRE	Single Shot/Recycle (ON Time First, Equal Times)
RXE	Recycle (Both Times Adjustable, ON Time First)
RXD	Recycle (Both Times Adjustable, OFF Time First)
IM	Interval/Delay On Make
AMI	Accumulative Delay On Make/Interval
SL	Single Shot/Lockout
CI	Counter with Interval Output

For a Complete List of Functions with Descriptions, see Timer Function Section.

# HSPZ Series Timing Module

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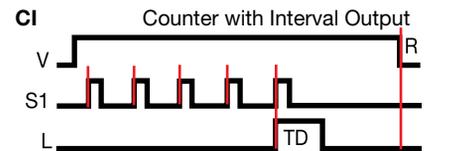
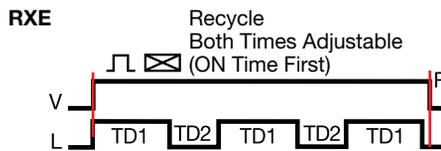
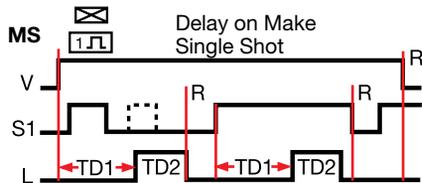
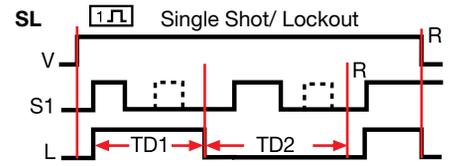
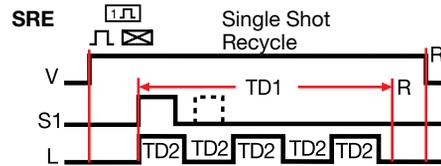
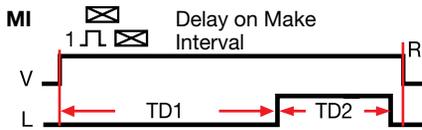
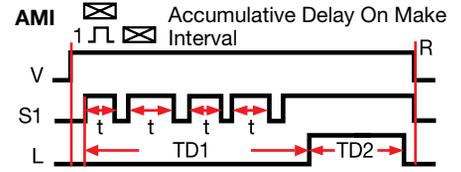
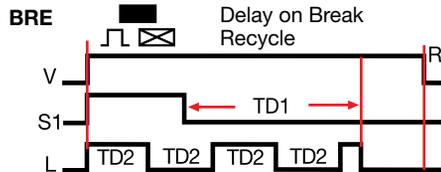
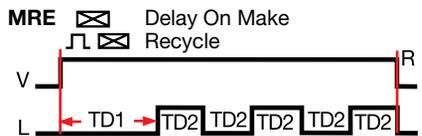
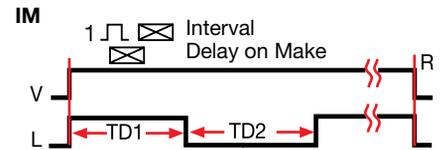
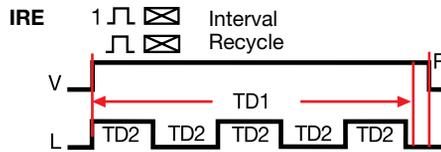
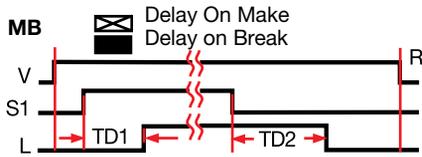
## Technical Data

<b>Time Delay</b> Type Range  Repeat Accuracy Setting Accuracy Reset Time Initiate Time Time Delay/Temp. & Voltage Count Range Count Rate	Microcontroller circuitry 0.1 ... 102.3 s, m or h in 0.1 s, m or h increments 1 ... 1023 s, m or h in 1 s, m or h increments 1 ... 512 s or m in 1 s or m increments +/-0.1% or 20 ms, whichever is greater ≤ +/-1% or 20 ms, whichever is greater ≤ 150 ms ≤ 20 ms ≤ +/-2% 1 ... 1023 in 2 ranges ≤ 25 counts per second	<b>Protection</b> Circuitry Dielectric Breakdown Insulation Resistance Polarity	Encapsulated ≥ 2000 V RMS terminals to mounting surface ≥ 100 MΩ DC units are reverse polarity protected
<b>Input</b> Voltage Tolerance Frequency/DC Ripple Power Consumption	12 ... 120 V DC; 24 ... 240 V AC ≤ +/-15% 50 ... 60 Hz / ≤ 10% AC ≤ 2 VA; DC ≤ 1 W	<b>Mechanical</b> Mounting Package Termination	Surface mt. with one #10 (M5 x 0.8) screw 2 x 2 x 1.21 in. (50.8 x 50.8 x 30.7 mm) 0.25 in. (6.35 mm) male quick connects
<b>Output</b> Type Rating Voltage Drop OFF State Leakage Current Counter Output (P/N Variable 7 & 8)	Solid state output 1 A steady, 10 A inrush for 16 ms AC ≅ 2.5 V at 1 A; DC ≅ 1 V at 1 A AC ≅ 5 mA at 240 V AC; DC ≅ 1 mA Output Pulse width: 300 ms +/-20%	<b>Environmental</b> Operating Temp. Storage Temp. Humidity Weight	-40°C ... +60°C -40°C ... +85°C 95% relative, non-condensing ≅ 2.4 oz (68 g)

3

## Function Diagrams

For a Complete List of Functions with Descriptions, see Timer Function Section.



**RXD**

Same as RXE except OFF Time is First.

## Legend

V	Voltage
R	Reset
S1	Initiate Switch
L	Output & Load
TD, TD1, TD2	Time Delay
t	Incomplete Time Delay
—	Undefined time

HSPZGen 06.06.05

# KSPD Series Dual Function Timing Module

3



US Patent 6708135



- Choose 1 of 12 Standard Dual Functions
- Special Time Ranges and Functions Available
- Factory Programmed
- Microcontroller Circuitry, +/-0.5% Repeat Accuracy
- 1 A Steady, 10 A Inrush
- 12 ... 240 V in 3 Ranges
- Delays from 100 ms ... 1000 h in 9 Ranges

Approvals:

### Accessories

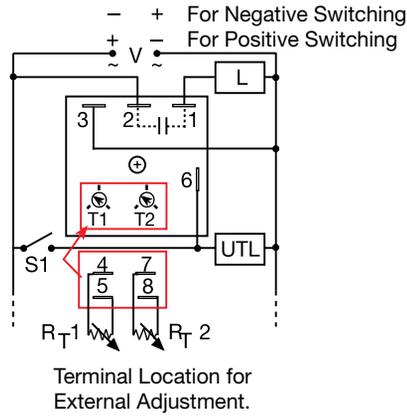
- A** External adjust potentiometer  
P/Ns: **P1004-95** (fig A) **P1004-95-X** (fig B)
- Female quick connect  
P/N: **P1015-64** (AWG 14/16)
- Versa-knob  
P/N: **P0700-7**
- Quick connect to screw adaptor  
P/N: **P1015-18**
- DIN rail P/Ns: **017322005** (Steel) **C103PM** (Al)
- DIN rail adaptor  
P/N: **P1023-20**

See accessory pages for specifications.

### Description

The KSPD Series is a factory programmed module available with 1 of 12 standard dual functions. The time delays can be factory fixed, externally or onboard adjustable, or a combination of fixed and adjustable. Modules are manufactured without the function assigned. When an order is received, the function software is added, making the modules complete. This approach provides fast delivery on all part numbers. The 1 A steady, 10 A inrush rated solid state output provides 100 million operations, typical. Its microcontroller timing circuit provides excellent repeat accuracy and stability. Encapsulation protects against shock, vibration, and humidity. The KSPD Series is a cost effective approach for OEM applications that require small size and long life. Special time ranges and functions are available, contact Technical Assistance (see below) for more information.

### Connection



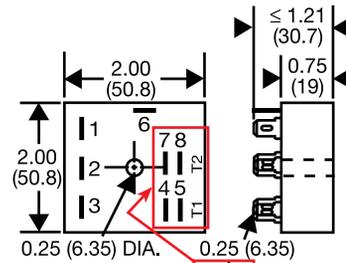
V = Voltage L = Load S1 = Initiate Switch  
UTL = Untimed Load T1 & R<sub>1</sub> = First Adjustment  
T2 & R<sub>2</sub> = Second Adjustment

A knob is supplied for adjustable units or R<sub>T</sub> terminals for external adjust. See external adjustment vs time delay chart. The untimed load is optional. S1 is not used for some functions. Dashed lines are internal connections.

### External Resistance vs Time Delay

For details on external R<sub>T</sub> see the external resistance vs. time delay chart at the beginning of this section.

### Mechanical View



Inches (Millimeters)

### \*\*Function Chart

Delay On Make/Delay on Break	Code
Delay On Make/Recycle (ON Time First, Equal Times)	<b>MB</b>
Delay On Make/Interval	<b>MRE</b>
Delay On Make/Single Shot	<b>MI</b>
Interval/Recycle (ON Time First, Equal Times)	<b>MS</b>
Delay On Break/Recycle (ON Time First, Equal Times)	<b>IRE</b>
Delay On Break/Recycle (ON Time First, Equal Times)	<b>BRE</b>
Single Shot/Recycle (ON Time First, Equal Times)	<b>SRE</b>
Recycle (Both Times Adjustable, ON Time First)	<b>RXE</b>
Recycle (Both Times Adjustable, OFF Time First)	<b>RXD</b>
Interval/Delay On Make	<b>IM</b>
Accumulative Delay On Make/Interval	<b>AMI</b>
Single Shot/Lockout	<b>SL</b>

For a Complete List of Functions with Descriptions, see Timer Function Section.

KSPD Series	X Input	X First Adjustment (T1 or R <sub>T</sub> 1)	X First Time Delay*	X Second Adjustment (T2 or R <sub>T</sub> 2)	X Second Time Delay*	X Function**
	<b>A</b> - 24 ... 240 V AC	<b>1</b> - Fixed	<b>1</b> - 0.1 ... 10 s	<b>1</b> - Fixed	<b>1</b> - 0.1 ... 10 s	**Specify Function (Refer to Function Chart for Code)  *If Fixed Delay is selected, insert delay [0.1 ... 999] followed by (S) secs., (M) mins., or (H) hrs.
	<b>P</b> - 12 ... 120 V DC Positive Switching	<b>2</b> - Onboard Adjust	<b>2</b> - 1 ... 100 s	<b>2</b> - Onboard Adjust	<b>2</b> - 1 ... 100 s	
	<b>N</b> - 12 ... 120 V DC Negative Switching	<b>3</b> - External Adjust	<b>3</b> - 10 ... 1000 s	<b>3</b> - External Adjust	<b>3</b> - 10 ... 1000 s	
			<b>4</b> - 0.1 ... 10 m		<b>4</b> - 0.1 ... 10 m	
			<b>5</b> - 1 ... 100 m		<b>5</b> - 1 ... 100 m	
			<b>6</b> - 10 ... 1000 m		<b>6</b> - 10 ... 1000 m	
			<b>7</b> - 0.1 ... 10 h		<b>7</b> - 0.1 ... 10 h	
			<b>8</b> - 1 ... 100 h		<b>8</b> - 1 ... 100 h	
			<b>9</b> - 10 ... 1000 h		<b>9</b> - 10 ... 1000 h	

Example P/N: **KSPDA2525MRE** Fixed - **KSPDP10.5S15SMB**

# KSPD Series Timing Module

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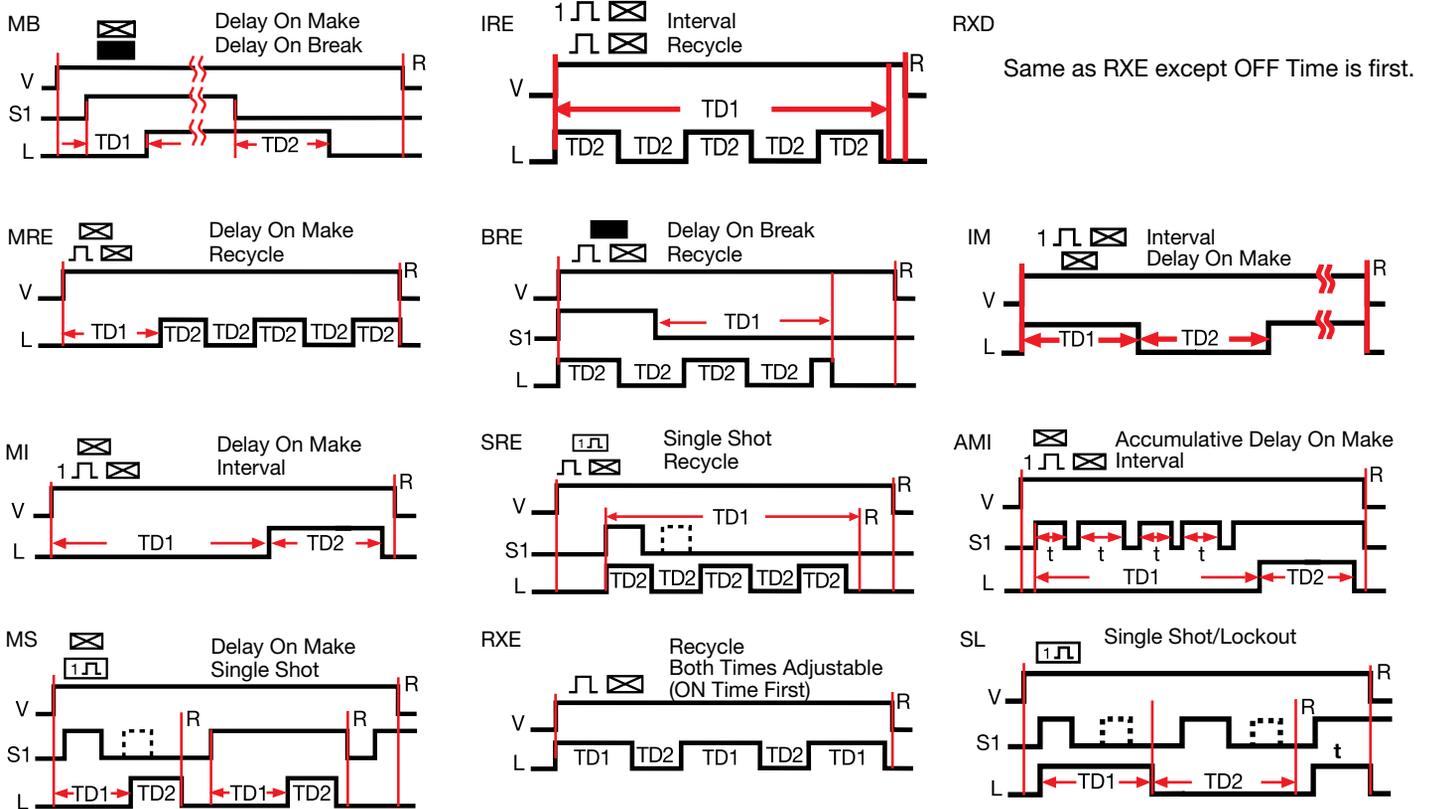
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## Technical Data

<b>Time Delay</b> Type Range Repeat Accuracy Tolerance (Factory Calibration) Reset Time Initiate Time Time Delay / Temp. & Voltage	Microcontroller circuitry 0.1 s ... 1000 h in 9 adjustable ranges or fixed (to 999) +/-0.5% or 20 ms, whichever is greater ≤ +/-2% ≤ 150 ms ≤ 20 ms; ≤ 1500 operations per minute ≤ +/-2%	<b>Protection</b> Circuitry Dielectric Breakdown Insulation Resistance Polarity	Encapsulated ≥ 2000 V RMS terminals to mounting surface ≥ 100 MΩ DC units are reverse polarity protected
<b>Input</b> Voltage Tolerance Line Frequency/DC Ripple Power Consumption	12 ... 120 V DC; 24 ... 240 V AC ≤ +/-15% 50 ... 60 Hz/≤ 10% AC ≤ 2 VA; DC ≤ 1 W	<b>Mechanical</b> Mounting Package Termination	Surface mt. with one #10 (M5 x 0.8) screw 2 x 2 x 1.21 in. (50.8 x 50.8 x 30.7 mm) 0.25 in. (6.35 mm) male quick connects
<b>Output</b> Type Rating Voltage Drop OFF State Leakage Current	Solid state output 1 A steady, 10 A inrush for 16 ms AC ≅ 2.5 V at 1 A; DC ≅ 1 V at 1 A AC ≅ 5 mA at 230 V AC; DC ≅ 1 mA	<b>Environmental</b> Operating Temperature Storage Temperature Humidity Weight	-40°C ... +60°C -40°C ... +85°C 95% relative, non-condensing ≅ 2.4 oz (68 g)

## Function Diagrams

For a Complete List of Functions with Descriptions, see Timer Function Section.



Note: If S1 is closed when input voltage is applied, the function starts and the time delay begins. (MB, MS, BRE, SRE, AMI, SL)

## Legend

V	Voltage
R	Reset
S1	Initiate Switch
L	Load
TD1, TD2	Time Delay
t	Incomplete Time Delay
—  —	Undefined time

KSPDGen 06.06.05

# KSPS Series Single Function Timing Module



US Patent 6708135



- Choose 1 of 12 Standard Functions
- Special Time Ranges and Functions Available
- Factory Programmed
- Microcontroller Circuitry, +/-0.5% Repeat Accuracy
- Solid State Output 1 A Steady, 10 A Inrush
- Onboard, External Adjust or Fixed Time Delay
- 12 ... 240 V in 3 Ranges
- Delays from 100 ms...1000 h in 9 Ranges

Approvals:

### Accessories

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

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

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

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

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

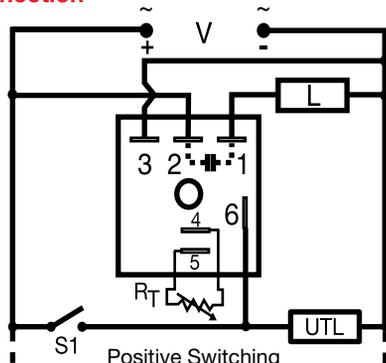
DIN rail adaptor  
P/N: **P1023-20**

See accessory pages for specifications.

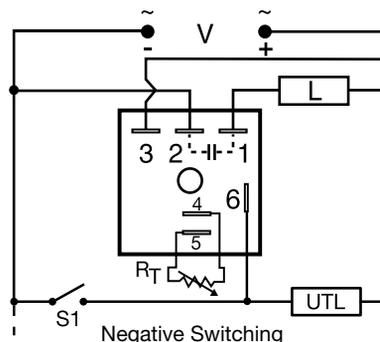
### Description

The KSPS Series is a factory programmed module available in any 1 of 12 standard functions. The KSPS offers a single, fixed, externally or onboard adjustable time delay. Modules are manufactured without the function assigned. When an order is received, the function software is added, making the modules complete. This provides fast delivery on all part numbers. The 1 A steady, 10 A inrush rated solid state output provides 100 million operations typical. Its microcontroller timing circuit provides excellent repeat accuracy and stability. Encapsulation protects against shock, vibration, and humidity. The KSPS Series is a cost effective approach for OEM applications that require small size and solid state reliability. Special time ranges and functions are available, contact Technical Assistance (see below) for more information.

### Connection

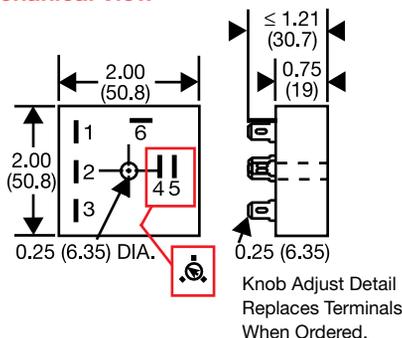


L = Load UTL = Untimed Load  
V = Voltage S1 = Initiate Switch



A knob is supplied for adjustable units, or  $R_T$  terminals for external adjust. See external adjustment vs time delay chart. The untimed load is optional. S1 is not used for some functions. Dashed lines are internal connections.

### Mechanical View



Inches (Millimeters)

Knob Adjust Detail  
Replaces Terminals  
When Ordered.

### External Resistance vs Time Delay

For details on external  $R_T$  see the external resistance vs. time delay chart at the beginning of this section.

### \*\*Function Chart

	<b>Code</b>
Delay on Make	<b>M</b>
Delay on Break	<b>B</b>
Recycle (ON Time First, Equal Times)	<b>RE</b>
Recycle (OFF Time First, Equal Times)	<b>RD</b>
Single Shot	<b>S, SD</b>
Interval	<b>I</b>
Trailing Edge Single Shot	<b>TS</b>
Inverted Single Shot	<b>US</b>
Inverted Delay on Break	<b>UB</b>
Accumulative Delay on Make	<b>AM</b>
Motion Detector/Retriggerable	
Single Shot	<b>PSD</b>

For a Complete List of Functions with Descriptions, see Timer Function Section.

### Ordering Table

<b>KSPS</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
<b>Series</b>	<b>Input</b>	<b>Adjustment</b>	<b>Time Delay*</b>	<b>Function**</b>
	<b>A</b> - 24 ... 240 V AC	<b>1</b> - Fixed	<b>1</b> - 0.1 ... 10 s	Specify Function (Refer to Function Chart for Code)  *If Fixed Delay is selected, insert delay [0.1 ... 1000] followed by (S) secs., (M) mins., or (H) hrs.
	<b>P</b> - 12 ... 120 V DC	<b>2</b> - Onboard Adjust	<b>2</b> - 1 ... 100 s	
	Positive Switching	<b>3</b> - External Adjust	<b>3</b> - 10 ... 1000 s	
	<b>N</b> - 12 ... 120 V DC		<b>4</b> - 0.1 ... 10 m	
	Negative Switching		<b>5</b> - 1 ... 100 m	
			<b>6</b> - 10 ... 1000 m	
			<b>7</b> - 0.1 ... 10 h	
			<b>8</b> - 1 ... 100 h	
			<b>9</b> - 10 ... 1000 h	

Example P/N: **KSPSA23RE** Fixed - **KSPSP10.5SI**

# KSPS Series Single Function Timing Module

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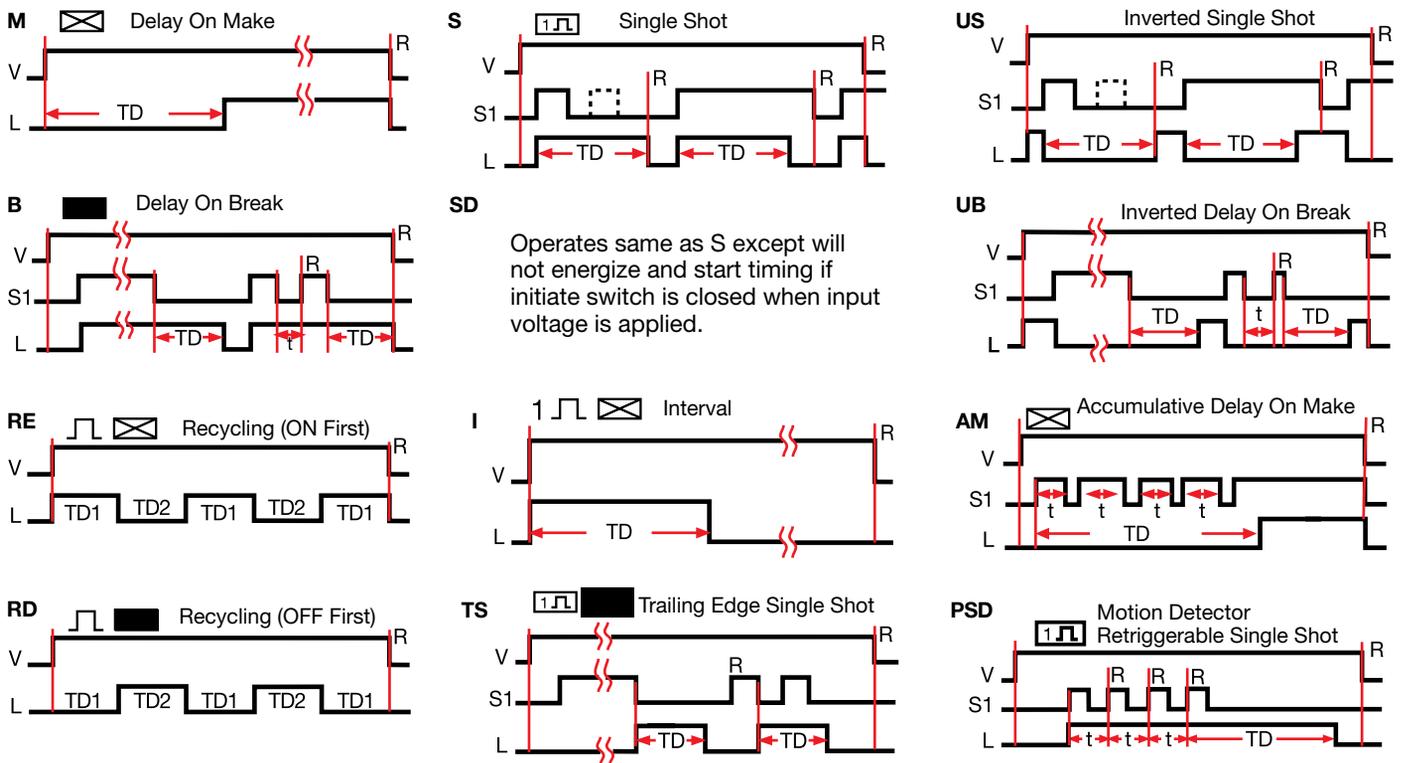
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## Technical Data

<b>Time Delay</b> Type Range Repeat Accuracy Tolerance (Factory Calibration) Reset Time Initiate Time Time Delay / Temp. & Voltage	Microcontroller circuitry 0.1 s ... 1000 h in 9 adjustable ranges or fixed +/-0.5% or 20 ms, whichever is greater ≤ +/-2% ≤ 150 ms ≤ 20 ms; ≤ 1500 operations per minute ≤ +/-2%	<b>Protection</b> Circuitry Dielectric Breakdown Insulation Resistance Polarity	Encapsulated ≥ 2000 V RMS terminals to mounting surface ≥ 100 MΩ DC units are reverse polarity protected
<b>Input</b> Voltage/Frequency Tolerance DC Ripple Power Consumption	12 ... 120 V DC; 24 ... 240 V AC/50 ... 60 Hz ≤ +/-15% ≤ 10% AC ≤ 2 VA; DC ≤ 1 W	<b>Mechanical</b> Mounting Package Termination	Surface mt. with one #10 (M5 x 0.8) screw 2 x 2 x 1.21 in. (50.8 x 50.8 x 30.7 mm) 0.25 in. (6.35 mm) male quick connects
<b>Output</b> Type Rating Voltage Drop OFF State Leakage Current	Solid state output 1 A steady, 10 A inrush for 16 ms AC ≅ 2.5 V at 1 A; DC ≅ 1 V at 1 A AC ≅ 5 mA at 240 V AC; DC ≅ 1 mA	<b>Environmental</b> Operating Temp. Storage Temp. Humidity Weight	-40°C ... +60°C -40°C ... +85°C 95% relative, non-condensing ≅ 2.4 oz (68 g)

## Function Diagrams

For a Complete List of Functions with Descriptions, see Timer Function Section.



Note: If S1 is closed when input voltage is applied, the function starts and the time delay begins. (B, S, TS, US, UB, AM, PSD)

### Legend

V	Voltage
R	Reset
S1	Initiate Switch
L	Output & Load
TD, TD1, TD2	Time Delay
t	Incomplete Time Delay
-	Undefined time

# KSPU Series Timing Module

3



US Patent 6708135



- Choose 1 of 14 Standard Functions
- Special Time Ranges and Functions Available
- Factory Programmed
- Microcontroller Circuitry, +/-0.1% Repeat Accuracy
- Solid State Output 1 A Steady, 10 A Inrush
- Accurate Switch Adjustment
- 12 ... 240 V in 3 Ranges
- Delays from 100 ms...1023 h in 6 ranges
- Counts to 1023 in 3 Ranges

Approvals:

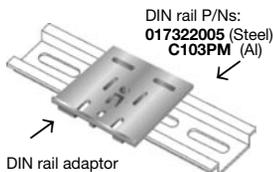
### Accessories



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



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



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

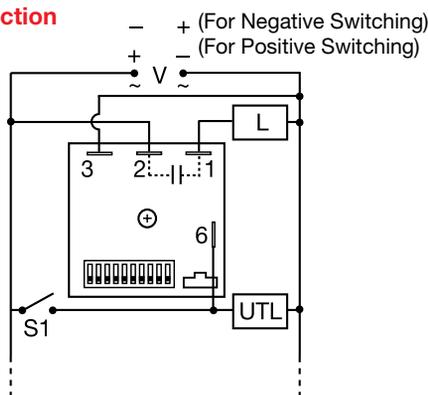
DIN rail adaptor  
P/N: **P1023-20**

See accessory pages for specifications.

### Description

The KSPU Series is a factory programmed module available in any 1 of 14 standard functions. The KSPU offers a single adjustable timer or counter function. Modules are manufactured without the function assigned. When an order is received, the function software is added. This approach provides fast delivery on all part numbers. Switch adjustment allows accurate selection of the time delay or number of counts the first time and every time. The 1 A steady, 10 A inrush rated solid state output provides 100 million operations, typical. Its microcontroller timing circuit provides excellent repeat accuracy and stability. Encapsulation protects against shock, vibration, and humidity. The KSPU Series is a cost effective approach for OEM applications that require small size, solid state reliability, and accurate switch adjustment. Special time ranges and functions are available; contact Technical Assistance (see below) for more information.

### Connection



V = Voltage S1 = Initiate Switch  
L = Load UTL = Untimed Load

The untimed load is optional. S1 is not used for some functions. Dashed lines are internal connections.

### Switch Adjustment

Adjustment Switch Operation			
TIME DELAY		COUNTER	
0.1...102.3	1...1023	1...165	1...63
OFF ON	OFF ON	OFF ON	OFF ON
6.3	544	57 counts	44 s Delay 2 counts to Start

One or more switches must be ON for proper operation.

### Ordering Table

**KSPU**  
Series

- X** Input  
**A** - 24 ... 240 V AC  
**P** - 12 ... 120 V DC Positive Switching  
**N** - 12 ... 120 V DC Negative Switching

**X** Time Delay/Counts

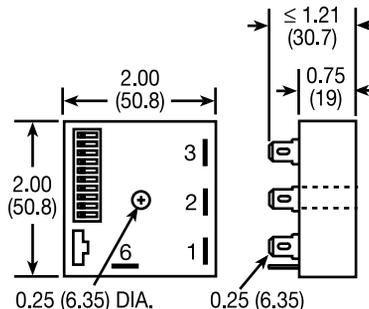
- 1** - 0.1 ... 102.3 s
- 2** - 1 ... 1023 s
- 3** - 0.1 ... 102.3 m
- 4** - 1 ... 1023 m
- 5** - 0.1 ... 102.3 h
- 6** - 1 ... 1023 h
- 7** - 1 ... 165 counts (straight) w/pulsed output
- 8** - 1 ... 1023 counts (binary) w/pulsed output
- 9** - 1 ... 7 counts to start 1 ... 63 s or m interval time

**X** Function\*\*

\*\*Specify Function (Refer to Function Chart for Code)

Example P/N: **KSPUA2RE**

### Mechanical View



Inches (Millimeters)

### \*\*Function Chart

- Delay on Make
- Delay on Break
- Recycle (ON Time First, Equal Times)
- Recycle (OFF Time First, Equal Times)
- Single Shot
- Interval
- Trailing Edge Single Shot
- Inverted Single Shot
- Inverted Delay on Break
- Accumulative Delay on Make
- Motion Detector/Retriggerable Single Shot
- Counter/Pulsed Output
- Counter/Interval Output

### Code

- M**
- B**
- RE**
- RD**
- S, SD**
- I**
- TS**
- US**
- UB**
- AM**
- PSD**
- C**
- CI**

For a Complete List of Functions with Descriptions, see Timer Function Section.

# KSPU Series Timing Module

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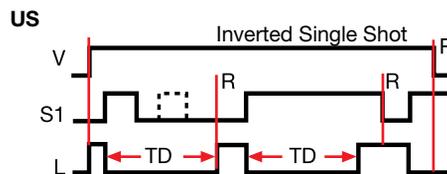
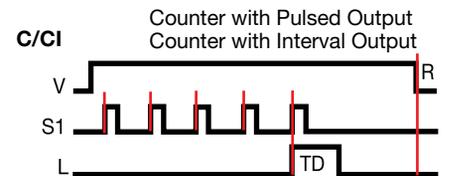
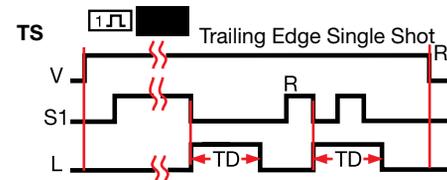
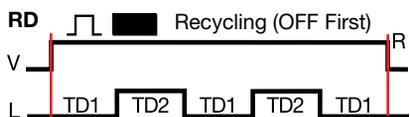
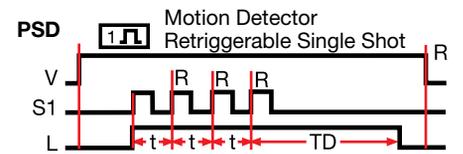
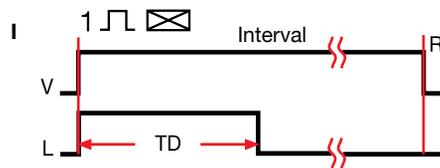
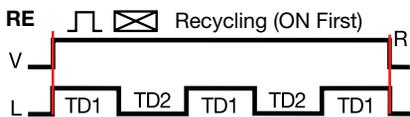
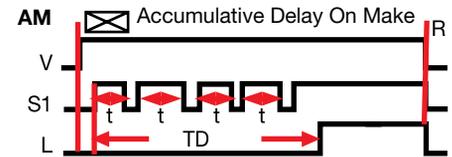
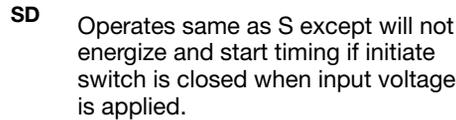
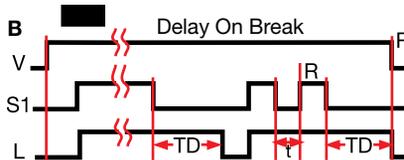
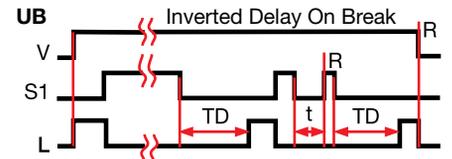
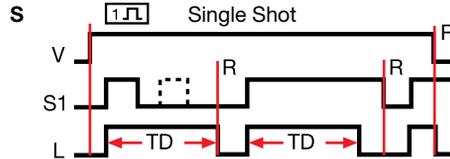
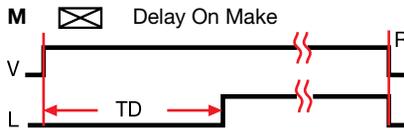
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## Technical Data

<b>Time Delay</b> Type Range  Repeat Accuracy Setting Accuracy Reset Time Initiate Time Time Delay / Temp. & Voltage Count Range Count Rate	Microcontroller circuitry 0.1 ... 102.3 s, m or h in 0.1 s, m or h increments 1 ... 1023 s, m or h in 1 s, m or h increments 1 ... 63 s or m in 1 s or m increments +/-0.1% or 20 ms, whichever is greater ≤ +/-1% or 20 ms, whichever is greater ≤ 150 ms ≤ 20 ms ≤ +/-2% 1 ... 1023 in 3 ranges ≤ 25 counts per second	<b>Protection</b> Circuitry Dielectric Breakdown Insulation Resistance Polarity	Encapsulated ≥ 2000 V RMS terminals to mounting surface ≥ 100 MΩ DC units are reverse polarity protected
<b>Input</b> Voltage Tolerance Frequency/DC Ripple Power Consumption	12 ... 120 V DC; 24 ... 240 V AC ≤ +/-15% 50 ... 60 Hz / ≤ 10% AC ≤ 2 VA; DC ≤ 1 W	<b>Mechanical</b> Mounting Package Termination	Surface mt. with one #10 (M5 x 0.8) screw 2 x 2 x 1.21 in. (50.8 x 50.8 x 30.7 mm) 0.25 in. (6.35 mm) male quick connects
<b>Output</b> Type Rating Voltage Drop OFF State Leakage Current Counter Output (P/N Variable 7 & 8)	Solid state output 1 A steady, 10 A inrush for 16 ms AC ≅ 2.5 V at 1 A; DC ≅ 1 V at 1 A AC ≅ 5 mA at 240 V AC; DC ≅ 1 mA Output Pulse width: 300 ms +/-20%	<b>Environmental</b> Operating Temp. Storage Temp. Humidity Weight	-40°C ... +60°C -40°C ... +85°C 95% relative, non-condensing ≅ 2.4 oz (68 g)

## Function Diagrams

For a Complete List of Functions with Descriptions, see Timer Function Section.



## Legend

V	Voltage
R	Reset
S1	Initiate Switch
L	Output & Load
TD, TD1, TD2	Time Delay
t	Incomplete Time Delay
—	Undefined time

Note: If S1 is closed when input voltage is applied, the function starts and the time delay begins. (B, S, TS, US, UB, AM, PSD, C, CI)

KSPUGen 06.06.05

# NHPD Series Power Timing Module



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US Patent 6708135



- High Load Currents up to 20 A, 200 A Inrush
- Factory Programmed
- Choose 1 of 12 Standard Dual Functions
- Special Time Ranges and Functions Available
- Microcontroller Circuitry, +/-0.5% Repeat Accuracy
- Onboard or External Adjust, or Fixed Time Delay
- 24 ... 240 V AC
- Delays from 100 ms ... 1000 h in 9 Ranges

Approvals:



### Accessories



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



Versa-knob  
P/N: P0700-7



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



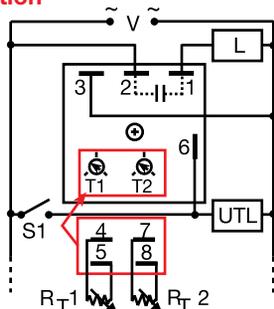
Female quick connect P/Ns:  
P1015-64 (AWG 14/16)  
P1015-13 (AWG 10/12)

See accessory pages for specifications.

### Description

The NHPD Series is a factory programmed module available in any 1 of 12 standard dual functions. The time delays can be factory fixed, externally or onboard adjustable, or a combination of fixed and adjustable. Modules are manufactured without the function assigned. When an order is received, the function software is added, making the modules complete. This approach provides fast delivery on all part numbers. The NHPD includes a high current solid state output. It can switch motors, lamps and heaters directly without the addition of a contactor. It can switch up to 20 A with up to 100 million operations typical. Its microcontroller timing circuit provides excellent repeat accuracy and stability. Encapsulation protects against shock, vibration, and humidity. The NHPD Series is a cost effective approach for OEM applications that require small size and long life. Special time ranges and functions are available; contact Technical Assistance (see below) for more information.

### Connection



Terminal Location for External Adjustment

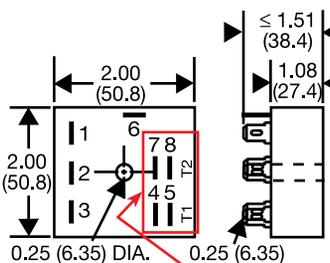
V = Voltage L = Load S1 = Initiate Switch  
UTL = Untimed Load T1 & R<sub>T1</sub> = First Adjustment  
T2 & R<sub>T2</sub> = Second Adjustment

A knob is supplied for adjustable units, or R<sub>T</sub> terminals for external adjust. See external adjustment vs time delay chart. The untimed load is optional. S1 is not used for some functions. Dashed lines are internal connections.

### External Resistance vs Time Delay

For details on external R<sub>T</sub> see the external resistance vs. time delay chart at the beginning of this section.

### Mechanical View



Knob Adjust Detail Replaces External Adjust If Ordered.

Inches (Millimeters)

### \*\*Function Chart

Code	Description
<b>MB</b>	Delay On Make/Delay on Break
<b>MRE</b>	Delay On Make/Recycle (ON Time First, Equal Times)
<b>MI</b>	Delay On Make/Interval
<b>MS</b>	Delay On Make/Single Shot Interval/Recycle (ON Time First, Equal Times)
<b>IRE</b>	Delay On Break/Recycle (ON Time First, Equal Times)
<b>BRE</b>	Single Shot/Recycle (ON Time First, Equal Times)
<b>SRE</b>	Recycle (Both Times Adjustable, ON Time First)
<b>RXE</b>	Recycle (Both Times Adjustable, OFF Time First)
<b>RXD</b>	Interval/Delay On Make
<b>IM</b>	Accumulative Delay On Make/Interval
<b>SL</b>	Single Shot/Lockout

For a Complete List of Functions with Descriptions, see Timer Function Section.

### Ordering Table

NHPD Series	Output Rating	Input	Adjustment TD1 or R <sub>T1</sub>	First Time Delay*	Adjustment TD2 or R <sub>T2</sub>	Second Time Delay*	Function**
X	X	X	X	X	X	X	X
-A	- 6 A	- 24 ... 240 V AC	-1 - Fixed	-1 - 0.1 ... 10 s	-1 - Fixed	-1 - 0.1 ... 10 s	- Specify Function (Refer to Function Chart for Code)
-B	- 10 A		-2 - Onboard Adjust	-2 - 1 ... 100 s	-2 - Onboard Adjust	-2 - 1 ... 100 s	
-C	- 20 A		-3 - External Adjust	-3 - 10 ... 1000 s	-3 - External Adjust	-3 - 10 ... 1000 s	
				-4 - 0.1 ... 10 m		-4 - 0.1 ... 10 m	
				-5 - 1 ... 100 m		-5 - 1 ... 100 m	
				-6 - 10 ... 1000 m		-6 - 10 ... 1000 m	
				-7 - 0.1 ... 10 h		-7 - 0.1 ... 10 h	
				-8 - 1 ... 100 h		-8 - 1 ... 100 h	
				-9 - 10 ... 1000 h		-9 - 10 ... 1000 h	

Example P/N: **NHPDAA2525MRE** Fixed - **NHPDBA10.5S15SMB**

\*If Fixed Delay is selected, insert delay [0.1 ... 999] followed by (S) secs., (M) mins., or (H) hrs.

# NHPD Series Power Timing Module

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## Technical Data

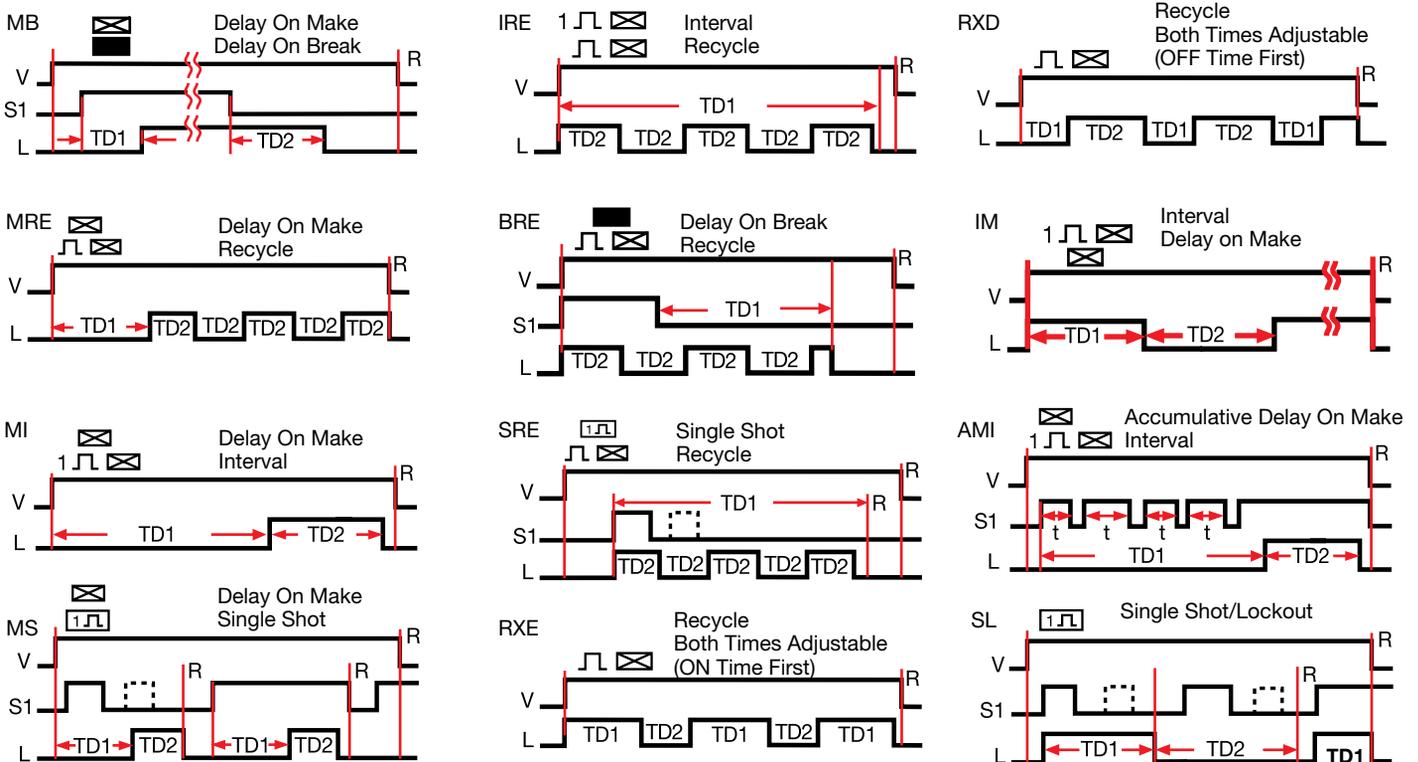
<b>Time Delay</b> Type Range  Repeat Accuracy Tolerance (Factory Calibration) Reset Time Initiate Time Time Delay vs Temp. & Voltage	Microcontroller circuitry 0.1 s ... 1000 h in 9 adjustable ranges or fixed (to 999)  +/-0.5% or 20 ms, whichever is greater ≤ +/-2% ≤ 150 ms ≤ 20 ms; ≤ 1500 operations per minute ≤ +/-2%	<b>Protection</b> Circuitry Dielectric Breakdown Insulation Resistance	Encapsulated ≥ 2000 V RMS terminals to mounting surface ≥ 100 MΩ
<b>Input</b> Voltage Tolerance Line Frequency	24 ... 240 V AC ≤ +/-15% 50 ... 60 Hz	<b>Mechanical</b> Mounting *** Package Termination	Surface mt with one #10 (M5 x 0.8) screw 2 x 2 x 1.51 in. (50.8 x 50.8 x 38.4 mm) 0.25 in. (6.35 mm) male quick connects
<b>Output</b> Type Rating	Solid state Output      Steady State      Inrush*** A              6 A                      60 A B              10 A                     100 A C              20 A                     200 A	<b>Environmental</b> Operating Temperature Storage Temperature Humidity Weight	-40°C ... +60°C -40°C ... +85°C 95% relative, non-condensing ≅ 3.9 oz (111 g)
Minimum Load Current Voltage Drop OFF State Leakage Current	100 mA ≅ 2.5 V at rated current ≅ 5 mA at 230 V AC		

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

## Function Diagrams

For a Complete List of Functions with Descriptions, see Timer Function Section.



### Legend

- V Voltage
- R Reset
- S1 Initiate Switch
- L Load
- TD1, TD2 Time Delay
- t Incomplete Time Delay
- Undefined time

Note: If S1 is closed when input voltage is applied, the function starts and the time delay begins. (MB, MS, BRE, SRE, AMI, SL)

NHPDGen 06.06.05

# NHPS Series Power Timing Module

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US Patent 6708135



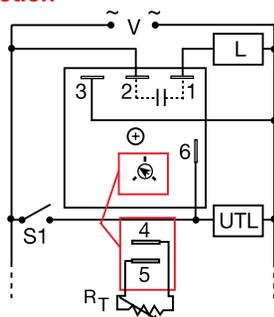
- High Load Currents up to 20 A, 200 A Inrush
- Factory Programmed
- Choose 1 of 12 Standard Functions
- Special Time Ranges and Functions Available
- Microcontroller Circuitry, +/-0.5% Repeat Accuracy
- Onboard Adjust, External Adjust, or Fixed Time Delay
- 24 ... 240 V AC
- Delays from 100 ms...1000 h in 9 Ranges

Approvals:

## Description

The NHPS Series is a factory programmed module available in any 1 of 12 standard functions. The NHPS offers a single, fixed, onboard adjustment or an externally adjustable time delay. Modules are manufactured without the function assigned. When an order is received, the function software is added, making the modules complete. This approach provides fast delivery on all part numbers. The NHPS includes a high current solid state output. It can switch motors, lamps and heaters directly without the addition of a contactor. It can switch up to 20 A with up to 100 million operations typical. Its microcontroller timing circuit provides excellent repeat accuracy and stability. Encapsulation protects against shock, vibration, and humidity. The NHPS Series is a cost effective approach for OEM applications that require small size and solid state reliability. Special time ranges and functions are available, contact Technical Assistance (see below) for more information.

## Connection



Terminal Location for External Adjustment

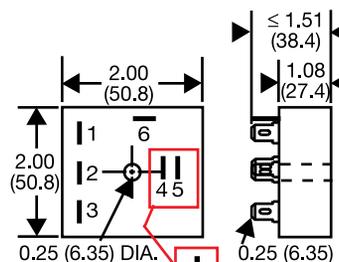
V = Voltage S1 = Initiate Switch  
UTL = Untimed Load L = Load

A knob is supplied for adjustable units, or  $R_T$  terminals for external adjust. See external adjustment vs time delay chart. The untimed load is optional. S1 is not used for some functions. Dashed lines are internal connections.

## External Resistance vs Time Delay

For details on external  $R_T$  see the external resistance vs. time delay chart at the beginning of this section.

## Mechanical View



Inches (Millimeters)

Knob Adjust Detail Replaces Terminals When Ordered.

## \*\*Function Chart

Function	Code
Delay on Make	<b>M</b>
Delay on Break	<b>B</b>
Recycle (ON Time First, Equal Times)	<b>RE</b>
Recycle (OFF Time First, Equal Times)	<b>RD</b>
Single Shot	<b>S, SD</b>
Interval	<b>I</b>
Trailing Edge Single Shot	<b>TS</b>
Inverted Single Shot	<b>US</b>
Inverted Delay on Break	<b>UB</b>
Accumulative Delay on Make	<b>AM</b>
Motion Detector/Retriggerable	
Single Shot	<b>PSD</b>

For a Complete List of Functions with Descriptions, see Timer Function Section.

## Accessories

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

Versa-knob  
P/N: P0700-7

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

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

See accessory pages for specifications.

## Ordering Table

NHPS Series	X Output Rating	X Input	X Adjustment	X Time Delay*	X Function**
	A - 6 A	A - 24 ... 240 V AC	-1 - Fixed	-1 - 0.1 ... 10 s	- Specify Function (Refer to Function Chart for Code)
	B - 10 A		-2 - Onboard Adjust	-2 - 1 ... 100 s	
	C - 20 A		-3 - External Adjust	-3 - 10 ... 1000 s	
				-4 - 0.1 ... 10 m	
				-5 - 1 ... 100 m	
				-6 - 10 ... 1000 m	
				-7 - 0.1 ... 10 h	
				-8 - 1 ... 100 h	
				-9 - 10 ... 1000 h	

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

Example P/N: **NHPSAA22M** Fixed – **NHPSBA10.5SB**

# NHPS Series Power Timing Module

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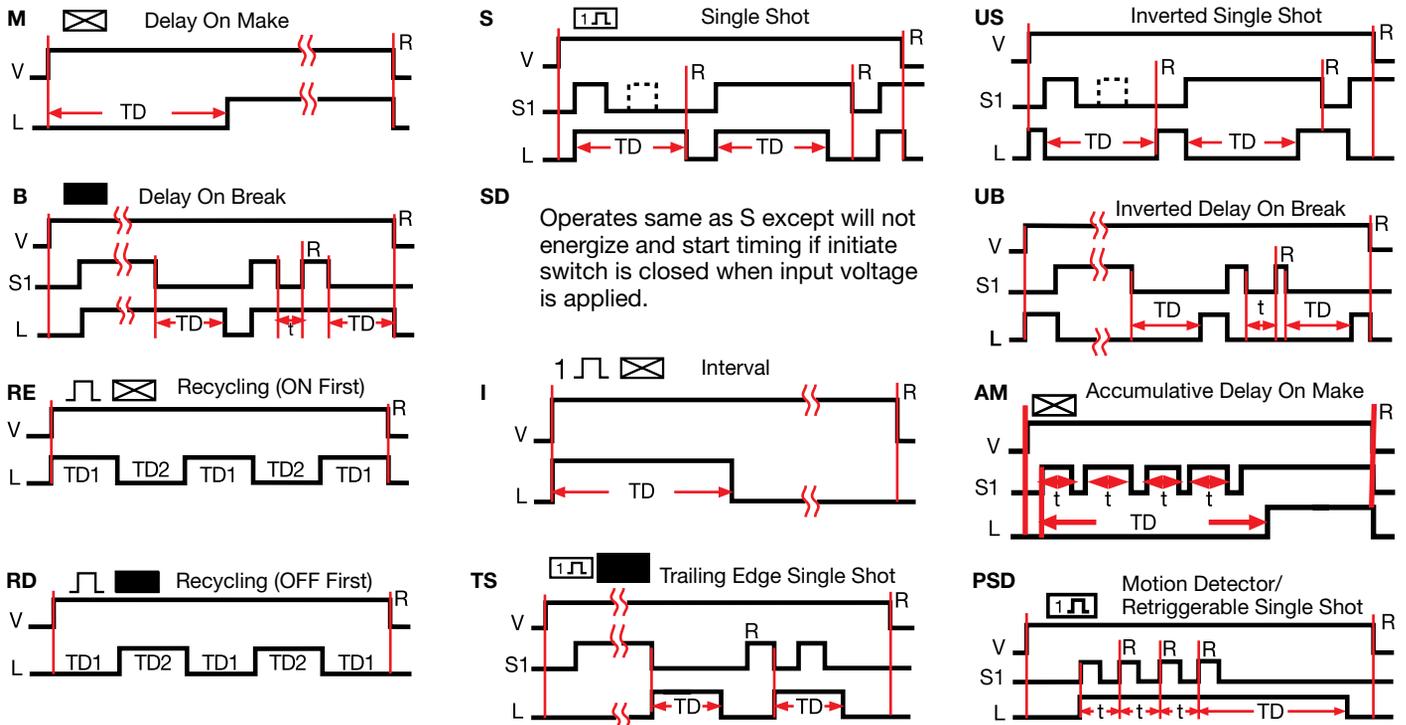
## Technical Data

<b>Time Delay</b>		<b>Protection</b>		Encapsulated ≥ 2000 V RMS terminals to mounting surface ≥ 100 MΩ
Type	Microcontroller circuitry	Circuitry	Dielectric Breakdown	
Range	0.1 s ... 1000 h in 9 adjustable ranges or fixed	Insulation Resistance		
Repeat Accuracy	+/-0.5% or 20 ms, whichever is greater			
Tolerance (Factory Calibration)	≤ +/-2%			
Reset Time	≤ 150 ms			
Initiate Time	≤ 20 ms; ≤ 1500 operations per minute			
Time Delay / Temp. & Voltage	≤ +/-2%			
<b>Input</b>		<b>Mechanical</b>		Surface mt. with one #10 (M5 x 0.8) screw 2 x 2 x 1.51 in. (50.8 x 50.8 x 38.4 mm) 0.25 in. (6.35 mm) male quick connects
Voltage	24 ... 240 V AC	Mounting ***	Package	
Tolerance	≤ +/-15%	Termination		
Line Frequency	50 ... 60 Hz			
<b>Output</b>		<b>Environmental</b>		
Type	Solid state	Operating Temp.	-40°C ... +60°C	
Rating	Output	Storage Temp.	-40°C ... +85°C	
	A	6 A	60 A	
	B	10 A	100 A	
	C	20 A	200 A	
Minimum Load Current	100 mA	Humidity	95% relative, non-condensing	
Voltage Drop	≅ 2.5 V at rated current	Weight	≅ 3.9 oz (111 g)	
OFF State Leakage Current	≅ 5 mA at 230 V AC			

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

## Function Diagrams

For a Complete List of Functions with Descriptions, see Timer Function Section.



Note: If S1 is closed when input voltage is applied, the function starts and the time delay begins. (B, S, TS, US, UB, AM, PSD)

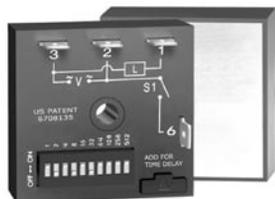
## Legend

V	Voltage
R	Reset
S1	Initiate Switch
L	Output & Load
TD, TD1, TD2	Time Delay
t	Incomplete Time Delay
—/—	Undefined time

NHPSGen 06.06.05

# NHPU Series Power Timing Module

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US Patent 6708135



- High Load Currents up to 20 A, 200 A Inrush
- Factory Programmed
- Choose 1 of 14 Standard Functions
- Special Time Ranges and Functions Available
- Microcontroller Circuitry, +/-0.1% Repeat Accuracy
- Accurate Switch Adjustment
- 24 ... 240 V AC
- Delays from 100 ms...1023 h in 6 Ranges
- Counts to 1023 in 3 Ranges

Approvals:

### Accessories



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



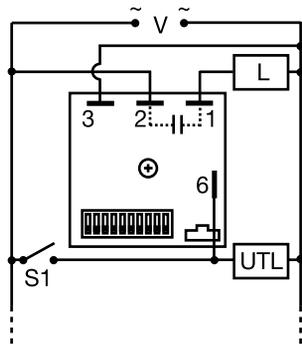
Quick connect to screw adaptor P/N: **P1015-18**

See accessory pages for specifications.

### Description

The NHPU Series is a factory programmed module available in any 1 of 14 standard functions. The NHPU offers a single adjustable timer or counter function. Modules are manufactured without the function assigned. When an order is received, the function software is added, making the modules complete. This approach provides fast delivery on all part numbers. Switch adjustment allows accurate selection of the time delay or number of counts, the first time and every time. The NHPU includes a high current solid state output. It can switch motors, lamps and heaters directly without the addition of a contactor. It can switch up to 20 A with up to 100 million operations, typical. Its microcontroller timing circuit provides excellent repeat accuracy and stability. Encapsulation protects against shock, vibration, and humidity. The NHPU Series is a cost effective approach for OEM applications that require small size, solid state reliability, and accurate switch adjustment. Special time ranges and functions are available; contact Technical Assistance (see below) for more information.

### Connection



V = Voltage L = Load  
 UTL = Untimed Load S1 = Initiate Switch

The untimed load is optional. S1 is not used for some functions. Dashed lines are internal connections.

### Switch Adjustment

Adjustment Switch Operation			
TIME DELAY		COUNTER	
0.1...102.3	1...1023	1...165	1...63
OFF ▶ ON	OFF ▶ ON	OFF ▶ ON	OFF ▶ ON
0.1	1	1	1
0.2	2	2	2
0.4	4	3	3
0.8	8	4	4
1.6	16	5	5
3.2	32	10	10
6.4	64	20	20
12.8	128	30	30
25.6	256	40	40
51.2	512	50	50
6.3	544	57 counts	44 s Delay 2 counts to Start

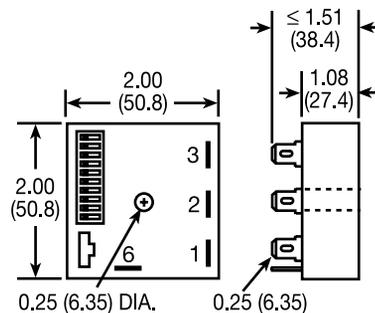
One or more switches must be ON for proper operation.

### Ordering Table

NHPU Series	X Output/Rating	X Input	X Time Delay/Counts	X Function**
	A - 6 A	A - 24 ... 240 V AC	1 - 0.1 ... 102.3 s	Specify Function (Refer to Function Chart for Code)
	B - 10 A		2 - 1 ... 1023 s	
	C - 20 A		3 - 0.1 ... 102.3 m	
			4 - 1 ... 1023 m	
			5 - 0.1 ... 102.3 h	
			6 - 1 ... 1023 h	
			7 - 1 ... 165 counts (straight) w/pulsed output	
			8 - 1 ... 1023 counts (binary) w/pulsed output	
			9 - 1 ... 7 counts to start 1 ... 63 s or m interval time	

Example P/N: **NHPUBA3TS, NHPUCA7C**

### Mechanical View



Inches (Millimeters)

### \*\*Function Chart

Function	Code
Delay on Make	M
Delay on Break	B
Recycle (ON Time First, Equal Times)	RE
Recycle (OFF Time First, Equal Times)	RD
Single Shot	S, SD
Interval	I
Trailing Edge Single Shot	TS
Inverted Single Shot	US
Inverted Delay on Break	UB
Accumulative Delay on Make	AM
Motion Detector/Retriggerable Single Shot	PSD
Counter/Pulsed Output	C
Counter/Interval Output	CI

For a Complete List of Functions with Descriptions, see Timer Function Section.

# NHPU Series Power Timing Module

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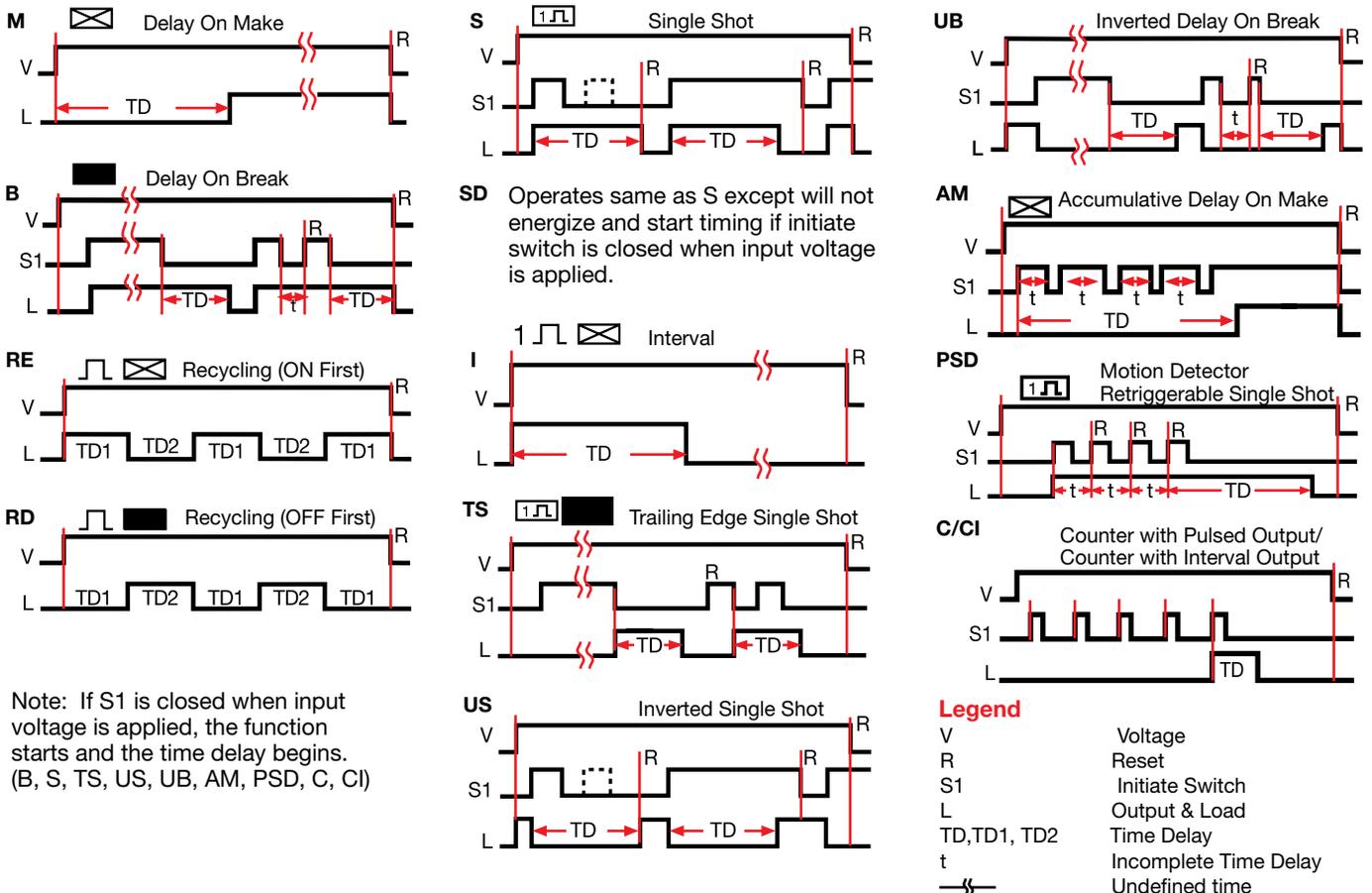
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## Technical Data

<b>Time Delay</b> Type Range  Repeat Accuracy Setting Accuracy Reset Time Initiate Time Time Delay vs. Temp. & Voltage Count Range Count Rate		Microcontroller circuitry 0.1 ... 102.3 s, m or h in 0.1 s, m or h increments 1 ... 1023 s, m or h in 1 s, m or h increments 1 ... 63 s or m in 1 s or m increments +/-0.1% or 20 ms, whichever is greater +/-1% or 20 ms, whichever is greater ≤ 150 ms ≤ 20 ms ≤ +/-2% 1 ... 1023 in 3 ranges ≤ 25 counts per second	<b>Protection</b> Circuitry Dielectric Breakdown Insulation Resistance	Encapsulated ≥ 2000 V RMS terminals to mounting surface ≥ 100 MΩ												
<b>Input</b> Voltage Tolerance Line Frequency		24 ... 240 V AC ≤ +/-15% 50 ... 60 Hz	<b>Mechanical</b> Mounting *** Package Termination	Surface mt. with one #10 (M5 x 0.8) screw 2 x 2 x 1.51 in. (50.8 x 50.8 x 38.4 mm) 0.25 in. (6.35 mm) male quick connects												
<b>Output</b> Type Rating  Minimum Load Current Voltage Drop OFF State Leakage Current Counter Output (P/N Variable 7 & 8)		Solid state <table border="1"> <thead> <tr> <th>Output</th> <th>Steady State</th> <th>Inrush***</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>6 A</td> <td>60 A</td> </tr> <tr> <td>B</td> <td>10 A</td> <td>100 A</td> </tr> <tr> <td>C</td> <td>20 A</td> <td>200 A</td> </tr> </tbody> </table> 100 mA ≅ 2.5 V at 1 A ≅ 5 mA at 230 V AC  Pulse width: 300 ms +/-20%	Output	Steady State	Inrush***	A	6 A	60 A	B	10 A	100 A	C	20 A	200 A	<b>Environmental</b> Operating Temp. Storage Temp. Humidity Weight	-40°C ... +60°C -40°C ... +85°C 95% relative, non-condensing ≅ 3.9 oz (111 g)  ***Must be bolted to a metal surface using the included heat sink compound. The maximum mounting surface temperature is 90°C. Inrush: Non-repetitive for 16 ms.
Output	Steady State	Inrush***														
A	6 A	60 A														
B	10 A	100 A														
C	20 A	200 A														

## Function Diagrams

For a Complete List of Functions with Descriptions, see Timer Function Section.



Note: If S1 is closed when input voltage is applied, the function starts and the time delay begins. (B, S, TS, US, UB, AM, PSD, C, CI)

NHPUgen 06.15.05