

Section

5 Relays - Time Delay & Sensor



SECTION 5



Time Delay Relays – Application Data

Definition:

Time Delay is defined as the controlled period between the functioning of two events. A Time Delay relay is a combination of an electromechanical output relay and a control circuit. The control circuit is comprised of solid state components and timing circuits that control operation of the relay and timing range. Typical time delay functions include On-Delay, Repeat cycle (starting off), Interval, Off-Delay, Retriggerable One Shot, Repeat cycle (starting on), Pulse Generator, One Shot, On/Off Delay, and Memory Latch. Each function is explained in the table below. Time delay relays have a broad choice of timing ranges from less than one second to many days. There are many choices of timing adjustments from calibrated external knobs, DIP switches, thumbwheel switches, or recessed potentiometer. The output contacts on the electromechanical output relay are direct wired to the output terminals. The contact load ratings are specified for each specific type of time delay relay.

Understanding the differences between all the functions available in time delay relays can sometimes be a daunting task. When designing circuits using time delay relays questions such as:

“What initiates a time delay relay?”

“Does the timing start with the application or release of voltage?”

“When does the output relay come on?”

must be asked.

Time delay relays are simply control relays with a time delay built in. Their purpose is to control an event based on time. The difference between relays and time delay relays is when the output contacts open & close: on a control relay, it happens when voltage is applied and removed from the coil; on time delay relays, the contacts will open or close before or after a pre-selected, timed interval.

Typically, time delay relays are initiated or triggered by one of two methods:

- application of input voltage (On Delay, Interval On, Flasher, Repeat Cycle, Delayed Interval & Interval/Flasher).
- opening or closing of a trigger signal (Off Delay, Single Shot & Watchdog).

These trigger signals can be one of two designs:

- a control switch (dry contact), i.e., limit switch, push button, float switch, etc.
- voltage (commonly known as a power trigger).

To help understand, some definitions are important:

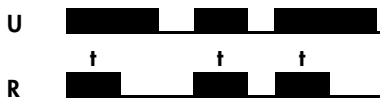
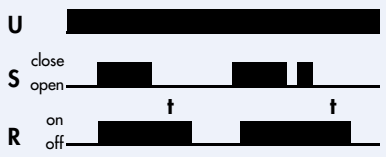
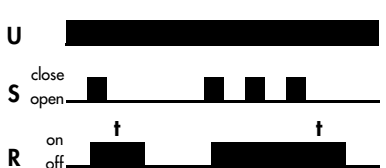
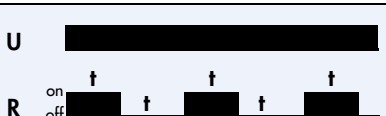
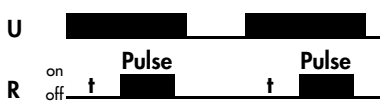
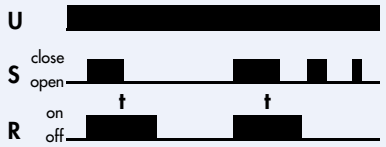
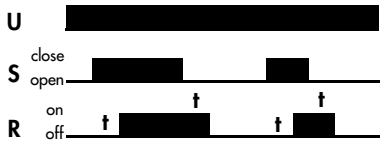
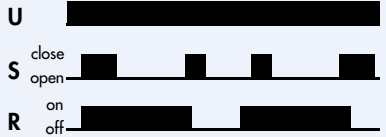
Input Voltage: Control voltage applied to the input terminals (see wiring diagrams below). Depending on the function, input voltage will either initiate the unit or make it ready to initiate when a trigger signal is applied.

Trigger Signal: On certain timing functions, a trigger signal is used to initiate the unit after input voltage has been applied. As noted above, this trigger signal can either be a control switch (dry contact switch) or a power trigger (voltage).

Output (Load): Every time delay relay has an internal relay (usually mechanical) with contacts that open & close to control the load. They are represented by the dotted lines in the wiring diagrams. Note that the user must provide the voltage to power the load being switched by the output contacts of the time delay relay.

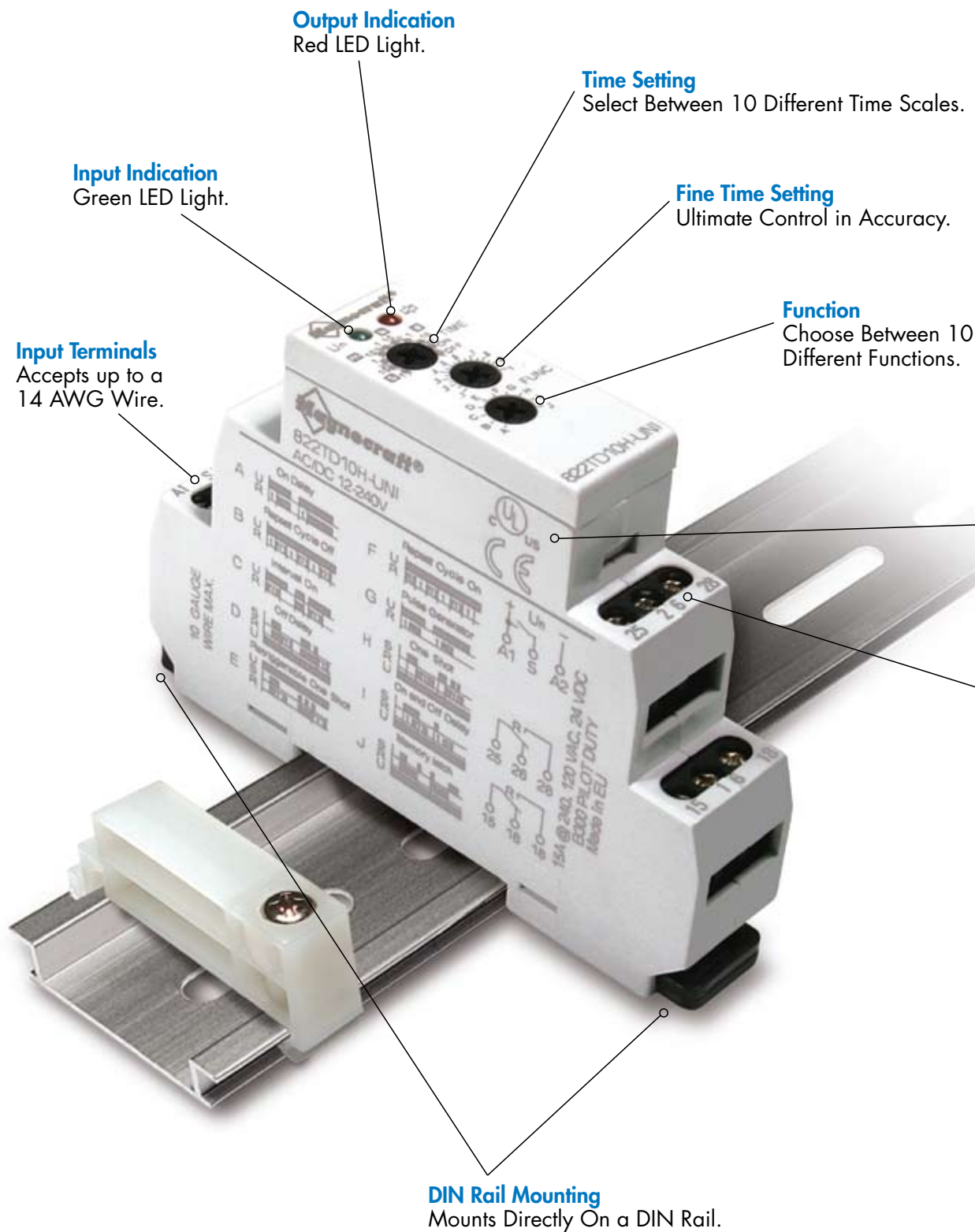
The following tables contain both written and visual descriptions on how the common timing functions operate. A Timing Chart shows the relationship between Input Voltage, Trigger Signal (if present) and Output Contacts.

FUNCTION DEFINITION TABLES

Function	Operation	Timing Chart
A. ON DELAY Power On	When the input voltage U is applied, timing delay t begins. Relay contacts R change state after time delay is complete. Contacts return to their shelf state when power U is removed. Control switch is not used in this mode.	
B. REPEAT CYCLE Starting Off	When input voltage U is applied, time delay t begins. When time delay t is complete, relay contact R change state for time delay t . This cycle will repeat until input voltage U is removed. Control switch is not used in this mode.	
C. INTERVAL Power On	When input voltage U is applied, relay contacts R change state immediately and timing cycle begins. When time delay is complete, contacts return to shelf state. When input voltage U is removed, contacts return to their shelf state. Control switch is not used in this mode.	
D. OFF DELAY S Break	Input voltage U must be applied continuously. When control S is closed, relay contacts R change state. When control S is opened delay t begins. When delay t is complete, contact R return to their shelf state. If signal S is closed before time delay t is complete, then time is reset, the delay begins again, and relay contacts remain in their energized state. If input voltage U is removed, relay contact R return to their shelf state.	
E. RETRIGGERABLE ONE SHOT	Upon application of input voltage U , the time delay relay is ready to accept trigger signals S . Upon application of the trigger signal S , the relay contacts R transfer and the preset time t begins. At the end of the preset time t , the relay contacts R return to their normal condition unless the trigger signal S is opened and closed prior to time out t (before preset time elapses). Continuous cycling of the trigger signal S at a rate faster than the preset time will cause the relay contacts R to remain closed.	
F. REPEAT CYCLE Starting On	When input voltage U is applied, relay contacts R change state immediately and time delay t begins. When time delay t is complete, contacts return to their shelf state for time delay t . This cycle will repeat until input voltage U is removed. Control switch is not used in this mode.	
G. PULSE GENERATOR	Upon application of input voltage U , a single output pulse of 0.5 seconds long is delivered to relay after time delay t . Power must be removed and reapplied to repeat pulse. Control switch S is not used in the mode.	
H. ONE SHOT	Upon application of input voltage U , the time delay relay is ready to accept trigger signals S . Upon application of the trigger signal S , the relay contacts R transfer and the preset time t begins. During time-out, the trigger signal S is ignored. The time delay relay resets by applying the trigger signal S when the relay is not energized.	
I. ON/OFF DELAY S Make/Break	Input voltage U must be applied continuously. When control S is closed, time delay t begins. When time delay t is complete, relay contacts R change state and remain transferred until control S is opened. If input power U is removed relay contacts R return to their shelf state.	
J. MEMORY LATCH S Make	Input voltage U must be applied continuously. Output changes state with every control S closure. Returned to rest condition when power is removed.	

U = Input Voltage **S** = Control Switch **R** = Relay Contacts **t** = Time Delay

Advantages of the 820 Series Time Delay Relays



The new 820 Series Time Delay Relays are DIN rail mountable products offering 10 different timing functions, 2 status LEDs, ultra-wide timing range (0.1 sec to 10 days) and a universal voltage input (12-240 VAC/VDC) all in one modular package.

The 821 is available as a 15 amp SPDT timer while its counterpart 822 is available as a DPDT timer also capable of switching up to 15 amps per pole.

Solid State Circuitry

Used for Time and function Control.

Output Terminals

Accepts up to a 14 AWG Wire.

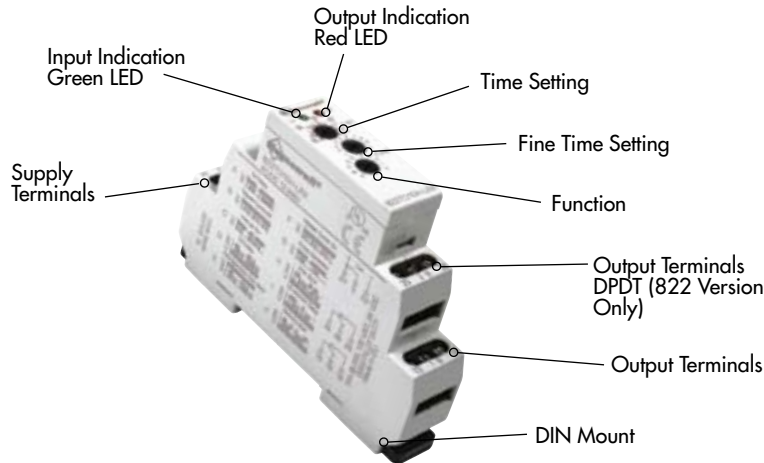
- Offers a "one stop solution" for your power management system.
- Available in both SPDT and DPDT contact configuration.
- The two LED status indicators indicate status at a glance.
- The Green LED is on when power is applied to the input terminals. The Red LED blinks during time-out, and is ON when the output is energized.
- Color and appearance designed for high visibility in all environments.
- Only 17.5 mm wide making it ideal for tight spaces.
- Engineering availability allows for customized relay solutions.



Optional Panel Adapter (16-788C1)

See Section 3 p.18

820 Series Time Delay Relays/SPDT, DPDT 15 Amp Rating



General Specifications (UL 508)

Output Characteristics		Units	821TD10H-UNI	822TD10H-UNI
Number and type of Contacts			SPDT	DPDT
Contact Material			Silver Alloy	Silver Alloy
Current rating @ 240 VAC, 24 VDC		A	15	15
Switching voltage		V	240 AC, 50/60 Hz	240 AC, 50/60 Hz
		V	24 DC	24 DC
		HP	1/2 @ 120VAC	1/2 @ 120VAC
		HP	1 @ 240 VAC	1 @ 240 VAC
		Pilot Duty	B300	B300
Minimum Switching Requirement		mA	100	100
Indication LED		Blinks = Timing On = Energized	Red	Red
Input Characteristics				
Voltage Range		VAC / VDC	12...240	12...240
Operating Range % of Nominal			85% to 110%	85% to 110%
Maximum consumption		AC VA	3	3
		DC W	1.7	1.7
Indication LED			Green	Green
Timing Characteristics				
Functions Available (See page 5/3)			A,B,C,D,E,F,G,H,I,J	A,B,C,D,E,F,G,H,I,J
Time Scales			10	10
Time Ranges Available			0.1...1	0.1...1
		sec	1...10	1...10
			0.1...1	0.1...1
		min	1...10	1...10
			0.1...1	0.1...1
		hr	1...10	1...10
			0.1...1	0.1...1
		day	1...10	1...10
Tolerance Mechanical Setting		%	5	5
Repeatability Constant Voltage and Temperature		%	0.2	0.2
Reset Time Maximum		ms	150	150
Trigger Pulse Length Minimum		ms	50	50
Performance Characteristics				
Electrical Life Operations @ Rated Current (Resistive)			100,000	100,000
Mechanical Life Unpowered			10,000,000	10,000,000
Dielectric strength Input to Contacts		V	2500 AC	2500 AC
		V	1000 AC	1000 AC
Terminal Wire Capacity		AWG (mm ²)	14 (2.1)	14 (2.1)
Terminal Torque (maximum)		in lb (Nm)	7.1 (0.8)	7.1 (0.8)
Environment				
Product certifications			UL, CE	UL, CE
Ambient air temperature around the device Storage		°C	-30...+70	-30...+70
Operation		°C	-20...+55	-20...+55
Degree of protection			IP 20	IP 20
Weight		grams	65	65



821



822

Optional Panel Adapter
(16-788C1)
See Section 3 p.18

Standard Part Numbers

BOLD-FACED PART NUMBERS ARE NORMALLY STOCKED

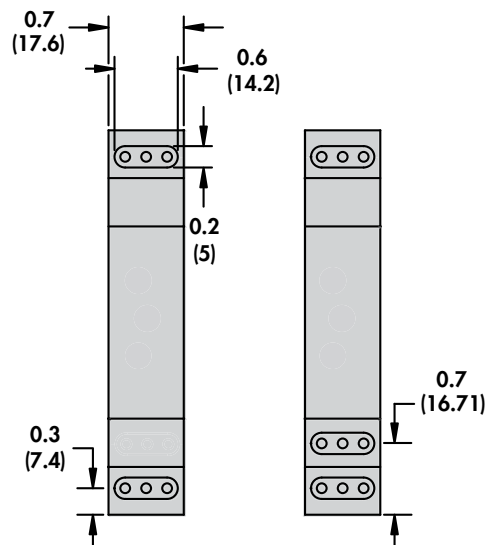
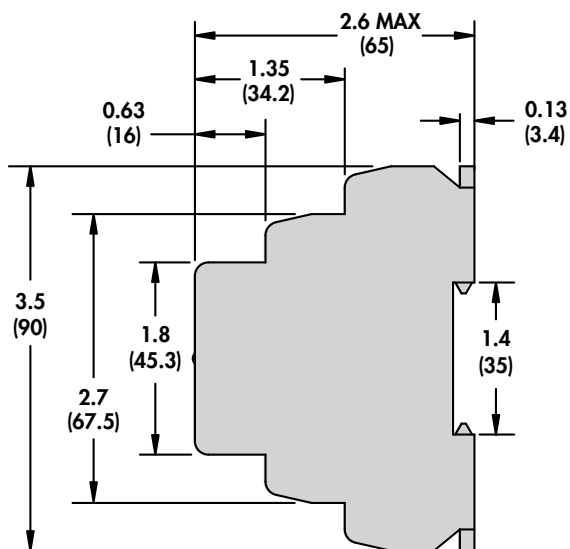
Part Number	Input Voltage	Timing Range	Functions Available	Contact Configuration	Rated Load Current
821TD10H-UNI	12...240 VAC/VDC	0.1s...10d	A,B,C,D,E,F,G,H,I,J	SPDT	15 Amps
822TD10H-UNI	12...240 VAC/VDC	0.1s...10d	A,B,C,D,E,F,G,H,I,J	DPDT	15 Amps

FUNCTION DEFINITIONS

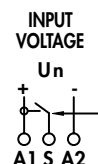
See Section 5 p.3

Part Number Builder

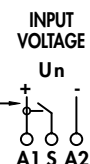
Series	Relay Style	Number of Functions	-	Input Voltage
821 = SPDT	TD - Time Delay	10H = 10 Functions		UNI = 12...240 VAC/VDC
822 = DPDT				



WIRING DIAGRAMS



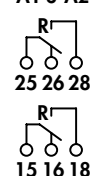
EXTERNAL
CONTROL
SWITCH



15 - COMMON
16 - NORMALLY CLOSED
18 - NORMALLY OPEN

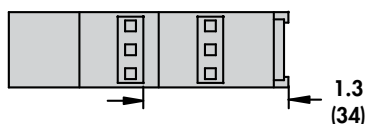
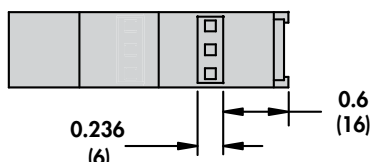


821TD10H-UNI

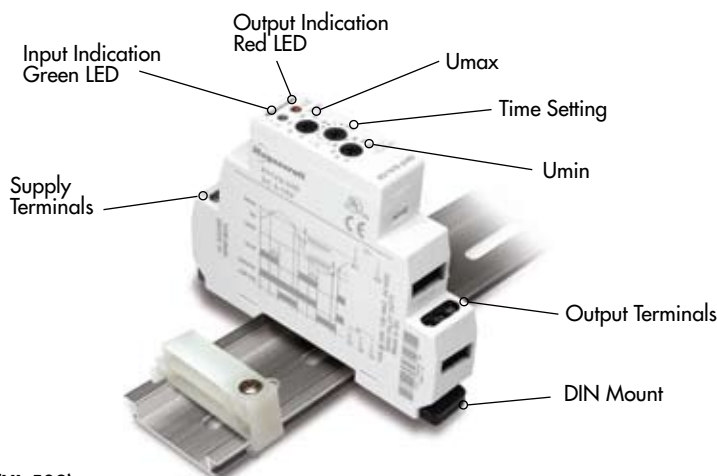
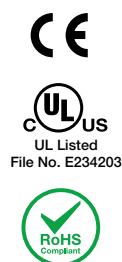


25 - COMMON
26 - NORMALLY CLOSED
28 - NORMALLY OPEN

822TD10H-UNI



831 Voltage Sensing Relay/SPDT 15 Amp Rating



General Specifications (UL 508)

Output Characteristics		Units	831VS-120A	831VS-240A
Number and type of Contacts			SPDT	SPDT
Contact Material			Silver Alloy	Silver Alloy
Current rating @ 240 VAC, 24 VDC		A	15	15
Switching voltage		V	240 AC, 50/60 Hz	240 AC, 50/60 Hz
		V	24 DC	24 DC
		HP	1/2 @ 120VAC	1/2 @ 120VAC
		HP	1 @ 240 VAC	1 @ 240 VAC
		Pilot Duty	B300	B300
Minimum Switching Requirement		mA	100	100
Indication LED		Blinks = Timing On = Energized	Red	Red
Input/Sensing Characteristics				
Voltage Range		V	120 AC	240 AC
Absolute Input Voltage Maximum		V	200 AC	280 AC
Upper Sensing Voltage Range		V	80....150 AC	160....276 AC
Lower Sensing Voltage Range		%	30....99	30....99
Maximum consumption AC/DC		VA	1.2	1.2
Indication LED			Green	Green
Timing Characteristics				
Time Scales			1	1
Time Ranges Available		sec	0....10	0....10
Tolerance Mechanical Setting		%	5	5
Repeatability Constant Voltage and Temperature		%	1	1
Operate Time Maximum		ms	25	25
Release Time Maximum		ms	20	20
Performance Characteristics				
Electrical Life Operations @ Rated Current (Resistive)			100,000	100,000
Mechanical Life Unpowered			10,000,000	10,000,000
Dielectric strength Input to Contacts		V	2500 AC	2500 AC
		V	1000 AC	1000 AC
Terminal Wire Capacity		AWG (mm ²)	14 (2.1)	14 (2.1)
Terminal Torque (maximum)		in lb (Nm)	7.1 (0.8)	7.1 (0.8)
Environment				
Product certifications Standard version			UL, CE	UL, CE
Ambient air temperature Storage		°C	-30...+70	-30...+70
around the device Operation		°C	-20...+55	-20...+55
Degree of protection			IP 20	IP 20
Weight		grams	71	71



Optional Panel Adapter
(16-788C1)
See Section 3 p.18

The 831 voltage sensor is a single phase AC voltage sensing device that is capable of monitoring and reacting to over and under voltage conditions. This product is designed to be wired across terminals A1 and A2 with the voltage that is being monitored. The two LED lamps indicate both when the input voltage is present (Green LED) and also when the output is energized (Red LED). The Umax dial is used to set the upper trip-point for the voltage sensor. The Umin dial is a percentage of the Umax dial and is used to set the lower trip-point for the voltage sensor. The timing dial is used to delay the transfer of the contacts, from 0 to 10 seconds, when a set point has been violated.

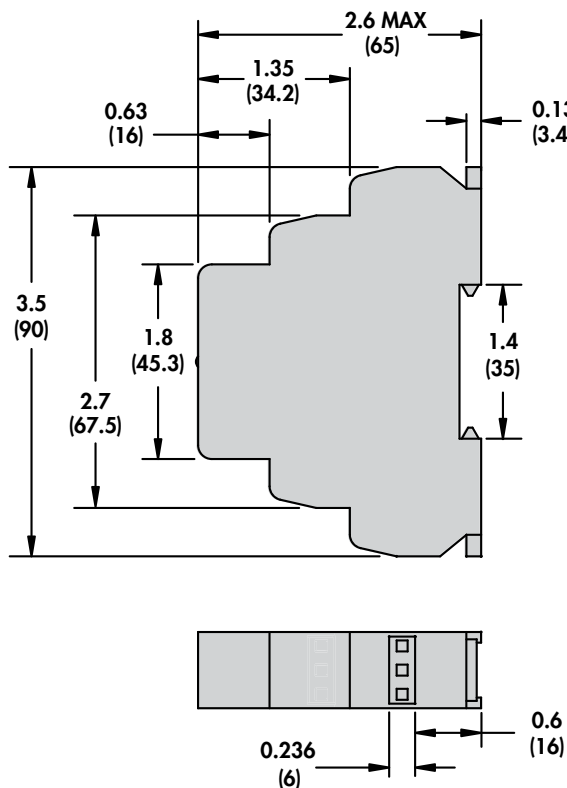
Standard Part Numbers

BOLD-FACED PART NUMBERS ARE NORMALLY STOCKED

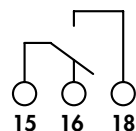
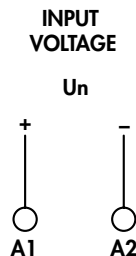
Part Number	Input Voltage	Timing Range	Sensing Voltage Range	Contact Configuration	Rated Load Current
831VS-120A	120 VAC	0s...10s	Upper: 80...150 VAC Lower: 30...99%	SPDT	15 Amps
831VS-240A	240 VAC	0s...10s	Upper: 160...276 VAC Lower: 30...99%	SPDT	15 Amps

Part Number Builder

Series	Relay Style	-	Input Voltage
831 = SPDT	VS = Voltage Sensor		120A = 120 VAC
			240A = 240 VAC

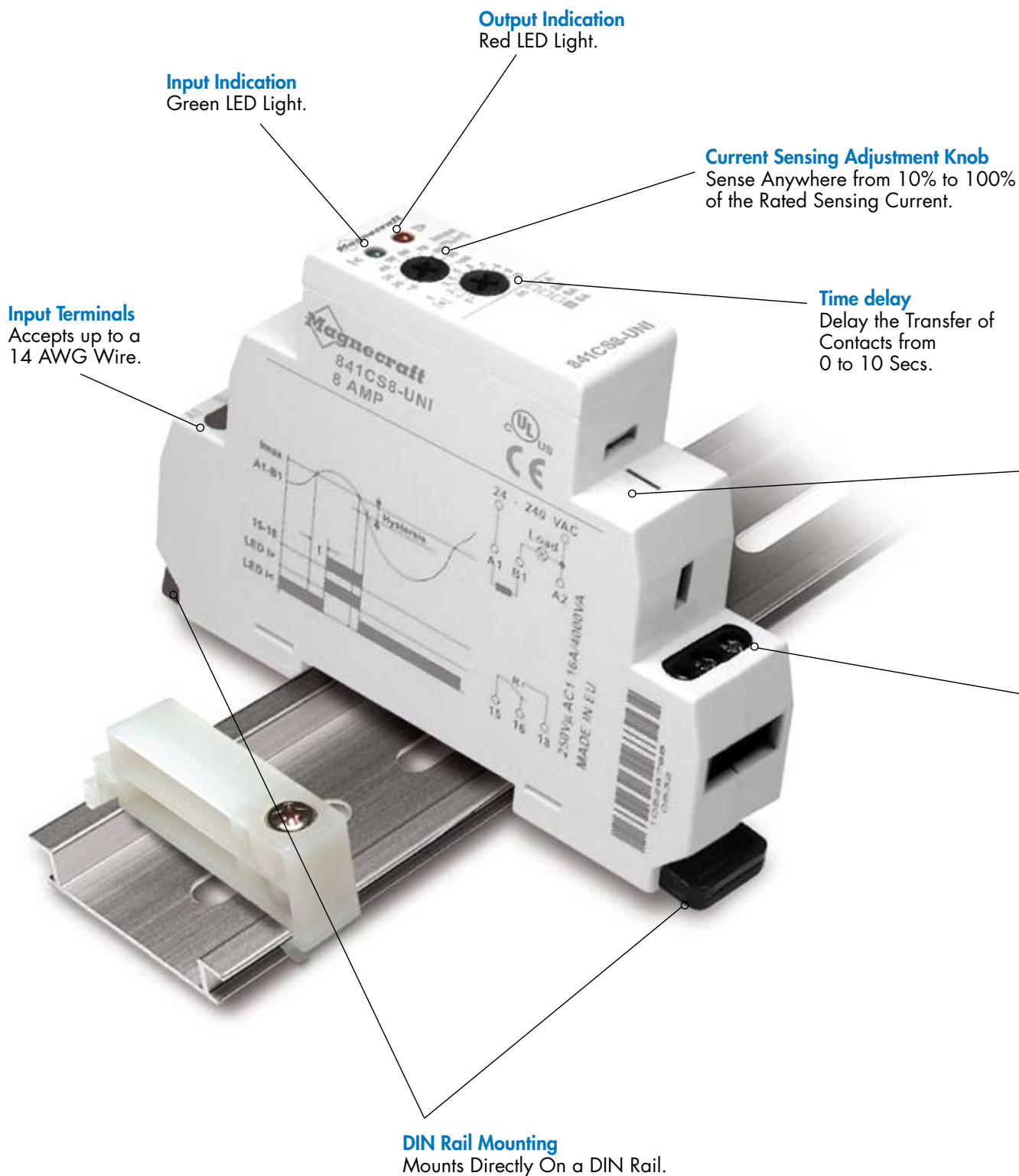


WIRING DIAGRAM



15 - COMMON
16 - NORMALLY CLOSED
18 - NORMALLY OPEN

Advantages of the 841 Current Sensing Relay



The 841 Current Sensor Series is a complete current sensing solution in one modular package which mounts directly to a DIN rail. This product allows the user to monitor the current of one circuit (1 to 8 amps) and switch another circuit in case of an over current or under current condition. The built in time delay feature allows the user to accurately switch the output anytime between 0 to 10 seconds after the preset current monitoring condition is violated. Also, the 841 has the capability to extend the sensing range up to 600 A through the use of current transformers.

Solid State Circuitry

Used for Sensing and Timing Control.

Output Terminals

Accepts up to a 14 AWG wire.

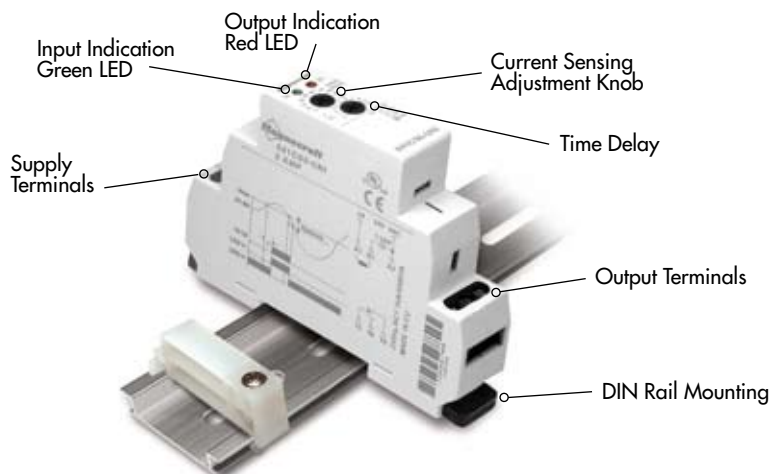
- The variable trip point feature allows the user to accurately sense over/under loads.
- Offers a "one stop solution" for your power management system.
- Two LED status indicators; indicate status at a glance.
- The Green LED is on when power is applied to the input terminals. The Red LED blinks during time-out, and is ON when the output is energized.
- Color and appearance designed for high visibility in all environments.
- The wide input voltage range of 24 to 240 AC enables the device to work with all popular AC voltages.
- Only 17.5 mm wide making it ideal for tight spaces.
- Engineering availability allows for customized relay solutions.



Optional Panel Adapter (16-788C1)

See Section 3 p.18

841 Current Sensing Relay/SPDT 15 Amp Rating



General Specifications (UL 508)

Output Characteristics		Units	841CS1-UNI	841CS2-UNI	841CS5-UNI	841CS8-UNI
Number and type of Contacts			SPDT	SPDT	SPDT	SPDT
Contact Material			Silver Alloy	Silver Alloy	Silver Alloy	Silver Alloy
Current rating	@ 240 VAC, 24 VDC	A	15	15	15	15
Switching voltage		V	240 AC, 50/60 Hz	240 AC, 50/60 Hz	240 AC, 50/60 Hz	240 AC, 50/60 Hz
		V	24 DC	24 DC	24 DC	24 DC
		HP	1/2 @ 120VAC	1/2 @ 120VAC	1/2 @ 120VAC	1/2 @ 120VAC
		HP	1 @ 240 VAC	1 @ 240 VAC	1 @ 240 VAC	1 @ 240 VAC
Minimum Switching Requirement		Pilot Duty mA	B300	B300	B300	B300
Indication	LED	Blinks = Timing On = Energized	Red	Red	Red	Red
Input Characteristics						
Voltage Range		V	24....240 AC	24....240 AC	24....240 AC	24....240 AC
Maximum consumption	LED	VA	1.5	1.5	1.5	1.5
Indication			Green	Green	Green	Green
Sensing Characteristics						
Sensing Range		A	0.1....1	0.2....2	0.5....5	0.8....8
Timing Characteristics						
Time Scales			1	1	1	1
Time Ranges Available		sec	0....10	0....10	0....10	0....10
Tolerance	Mechanical Setting	%	5	5	5	5
Repeatability	Constant Voltage and Temperature	%	1	1	1	1
Operate Time	Maximum	ms	25	25	25	25
Release Time	Maximum	ms	20	20	20	20
Performance Characteristics						
Electrical Life	Operations @ Rated Current (Resistive)		100,000	100,000	100,000	100,000
Mechanical Life	Unpowered		10,000,000	10,000,000	10,000,000	10,000,000
Dielectric strength	Input to Contacts	V	2500 AC	2500 AC	2500 AC	2500 AC
	Between Open Contacts	V	1000 AC	1000 AC	1000 AC	1000 AC
Terminal Wire Capacity		AWG (mm2)	14 (2.1)	14 (2.1)	14 (2.1)	14 (2.1)
Terminal Torque (maximum)		in lb (Nm)	7.1 (0.8)	7.1 (0.8)	7.1 (0.8)	7.1 (0.8)
Environment						
Product certifications	Standard version		UL, CE	UL, CE	UL, CE	UL, CE
Ambient air temperature around the device	Storage	°C	-30...+70	-30...+70	-30...+70	-30...+70
	Operation	°C	-20...+55	-20...+55	-20...+55	-20...+55
Degree of protection			IP 20	IP 20	IP 20	IP 20
Weight		grams	60	60	60	60



Optional Panel Adapter
(16-788C1)
See Section 3 p.18

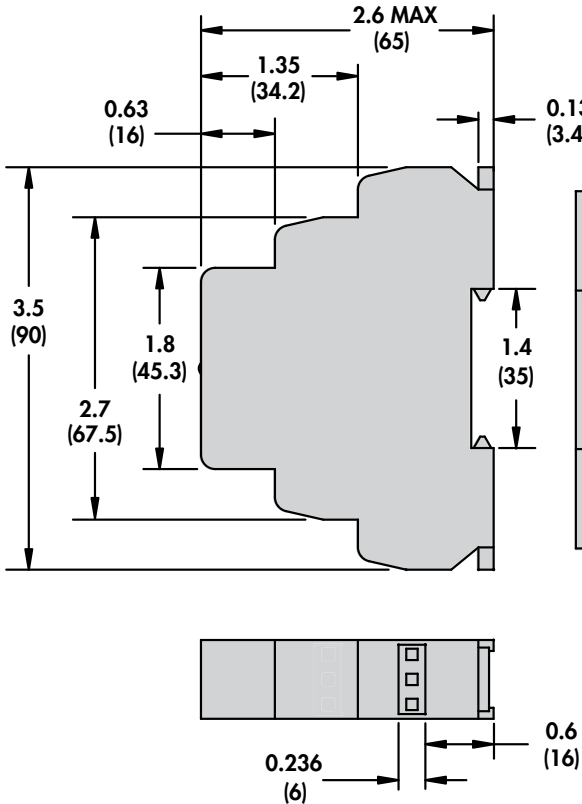
Standard Part Numbers

BOLD-FACED PART NUMBERS ARE NORMALLY STOCKED

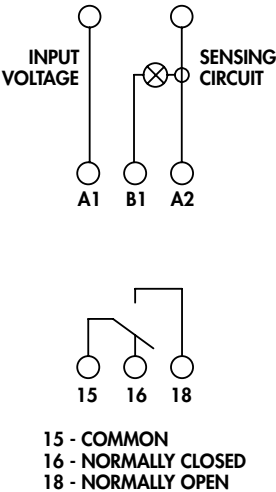
Part Number	Input Voltage	Timing Range	Sensing Current Range	Contact Configuration	Rated Load Current
841CS1-UNI	24...240 VAC	0.1s...10s	0.1...1A	SPDT	15 Amps
841CS2-UNI	24...240 VAC	0.1s...10s	0.2...2A	SPDT	15 Amps
841CS5-UNI	24...240 VAC	0.1s...10s	0.5...5A	SPDT	15 Amps
841CS8-UNI	24...240 VAC	0.1s...10s	0.8...8A	SPDT	15 Amps

Part Number Builder

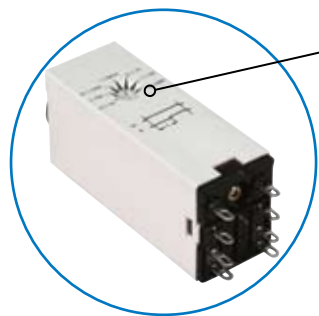
Series	Relay Style	Sensing Current	-	Input Voltage
841 = SPDT	CS = Current Sensor	1 = 0.1...1 Amp		UNI = 24...240 VAC
		2 = 0.2...2 Amp		
		5 = 0.5...5 Amp		
		8 = 0.8...8 Amp		



WIRING DIAGRAM



Advantages of the TDR782 Time Delay Relay

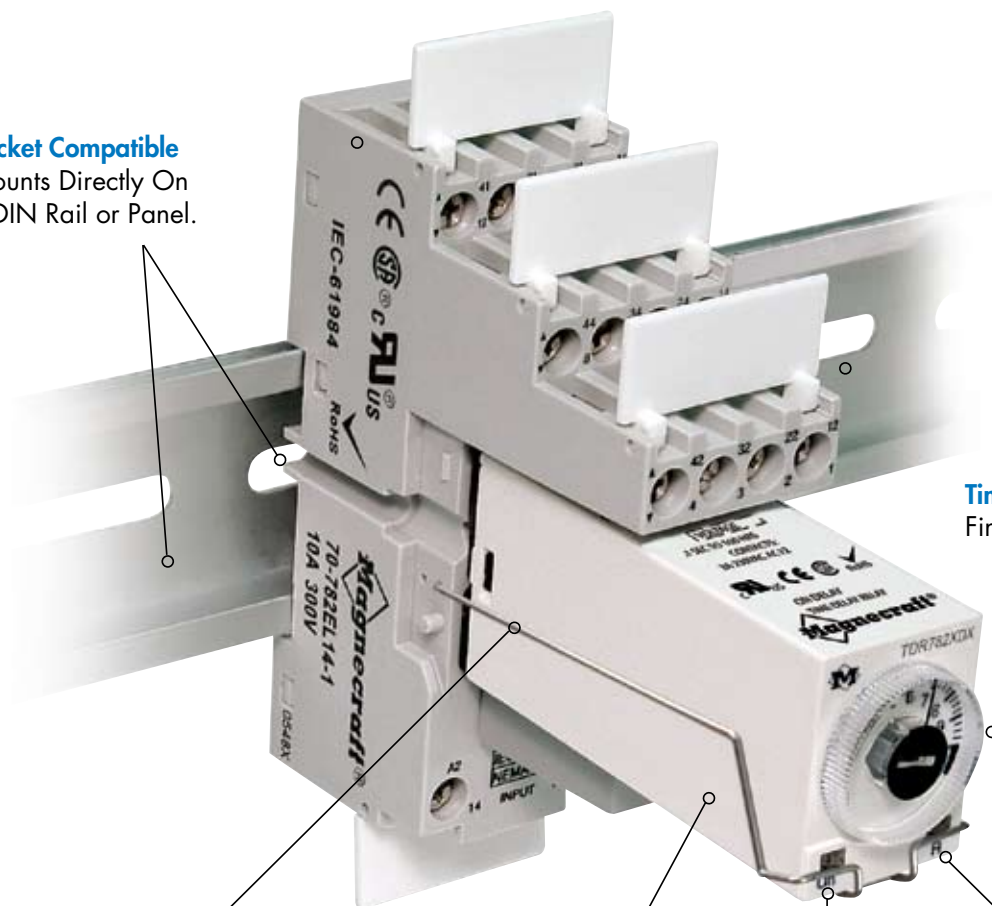


Time Setting
Select Between
7 Different Time
Scales.

**Marked with Both IEC
and NEMA Markings**
Universal Socket
Compatibility.



Socket Compatible
Mounts Directly On
a DIN Rail or Panel.



Time Adjustment Dial
Fine Tune the Time Setting.

Mating Hold-Down Clip Available
Secures Relay to Socket.

Excellent Immunity to Interference
Conforms to IEC 61812-1/A11.

Output Indication
Status at a Glance.

Input Indication
Status at a Glance.

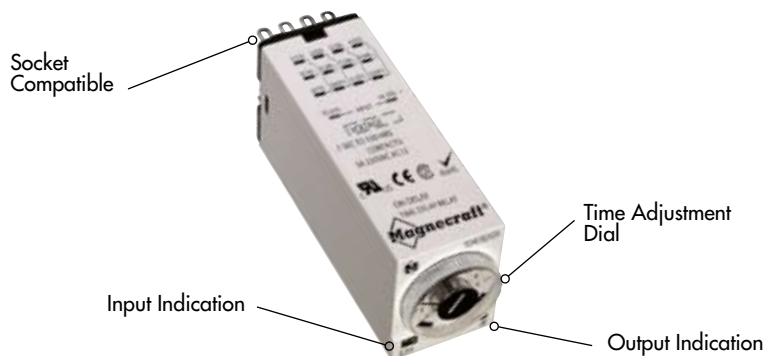
The Complete System Solution!



The miniature TDR782 series is a single-function, single-voltage time delay relay with multiple time ranges for the ultimate in packaging the most within the smallest space possible in a panel or on the DIN rail. The TDR782 features a screw driver adjustable knob which allows the user to choose 1 of 7 timing ranges and a large knob on top for fine tuning the timing setting. This dual adjustment design allows for supreme flexibility and timing accuracy. The dual LEDs allow the user to know when power is present at the coil and when the output is energized. When mated with the Magnecraft sockets and accessories, these ROHS compliant timers provide a complete modular system that will meet all your control relay requirements in a package that is both visually appealing and functionally outstanding.

- Offers a “one stop solution” for your power management system.
- Available as a DPDT and 4PDT to meet your individual needs.
- Switching capabilities of either 3 or 5 amps.
- The two LED status indicators; indicate status at a glance.
- Color and appearance designed to high visibility in all environments.
- Engineering availability allows for customized control system solutions.

TDR782 Time Delay Relay/DPDT, 4PDT, 3 or 5 Amp Rating



General Specifications (UL 508)

Output Characteristics		Units	TDR782XBX	TDR782XDX
Number and type of Contacts			DPDT	4PDT
Contact Material			Silver Alloy	Silver Alloy
Current rating		A	5	3
Maximum permissible current		A	10	10
Minimum Switching Requirement		mA	100	100
Indication		On = Energized	Amber	Amber
LED				
Input Characteristics				
Standard Voltage		VAC	24, 120, 230	24, 120, 230
		VDC	12, 24	12, 24
Operating Range		VAC	85% to 115%	85% to 115%
		VDC	90% to 110%	90% to 110%
Maximum consumption		24 AC	1.7	1.7
		120 AC	2.6	2.6
		230 AC	3	3
		12 DC	1.5	1.5
		24 DC	1.2	1.2
Indication		LED	Green	Green
Timing Characteristics				
Functions Available		(See page 5/3)	A (On Delay)	A (On Delay)
Time Scales			7	7
Time Ranges Available		sec	0.1....1 1....10	0.1....1 1....10
		min	0.1....1 1....10	0.1....1 1....10
		hr	0.1....1 1....10 10....100	0.1....1 1....10 10....100
Tolerance		Mechanical Setting	%	5
Repeatability		Constant Voltage and	%	0.5
Temperature Drift		Temperature	% / °C	0.05
Reset Time		Maximum	ms	50
Performance Characteristics				
Electrical Life		Operations @ Rated Current	(Resistive)	100,000
Mechanical Life		Unpowered		10,000,000
Dielectric strength		Input to Contacts	V	2000 AC
Environment				
Product certifications		Standard version	UR, CE, CSA	UR, CE, CSA
Ambient air temperature		Storage	°C	-40...+70
around the device		Operation	°C	-20...+60
Degree of protection			IP 50	IP 50
Weight			grams	43

Function	Operation	Timing Chart
A. ON DELAY Power On	When the input voltage U is applied, timing delay t begins. Relay contacts R change state after time delay is complete. Contacts return to their shelf state when power U is removed. Control switch is not used in this mode.	



TDR782 Relay with the 70-782EL14-1 Socket

Standard Part Numbers

BOLD-FACED PART NUMBERS ARE NORMALLY STOCKED

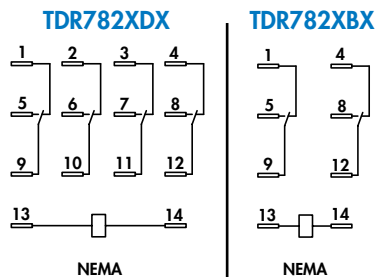
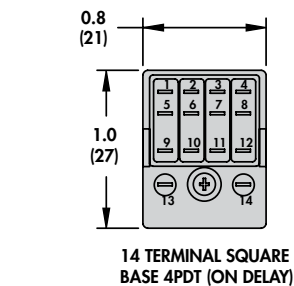
	Input Voltage	Timing Range	Functions Available	Contact Configuration	Rated Load Current
TDR782XBXA-12D	12 VDC	0.1s to 100h	A (On Delay)	DPDT	5 Amps
TDR782XBXA-24D	24 VDC	0.1s to 100h	A (On Delay)	DPDT	5 Amps
TDR782XBXA-24A	24VAC	0.1s to 100h	A (On Delay)	DPDT	5 Amps
TDR782XBXA-110A	110 VAC	0.1s to 100h	A (On Delay)	DPDT	5 Amps
TDR782XBXA-230A	230 VAC	0.1s to 100h	A (On Delay)	DPDT	5 Amps
TDR782XDXA-12D	12 VDC	0.1s to 100h	A (On Delay)	4PDT	3 Amps
TDR782XDXA-24D	24 VDC	0.1s to 100h	A (On Delay)	4PDT	3 Amps
TDR782XDXA-24A	24VAC	0.1s to 100h	A (On Delay)	4PDT	3 Amps
TDR782XDXA-110A	110 VAC	0.1s to 100h	A (On Delay)	4PDT	3 Amps
TDR782XDXA-230A	230 VAC	0.1s to 100h	A (On Delay)	4PDT	3 Amps

Part Number Builder

Series	Contact Configuration	Functions	-	Input Voltage
TDR782 = 782 Miniature Timer	XBX = DPDT	A = ON Delay	-	12D = 12 VDC
	XDX = 4PDT			24D = 24 VDC
				24A = 24 VAC
				110A = 110 VAC
				230A = 230 VAC

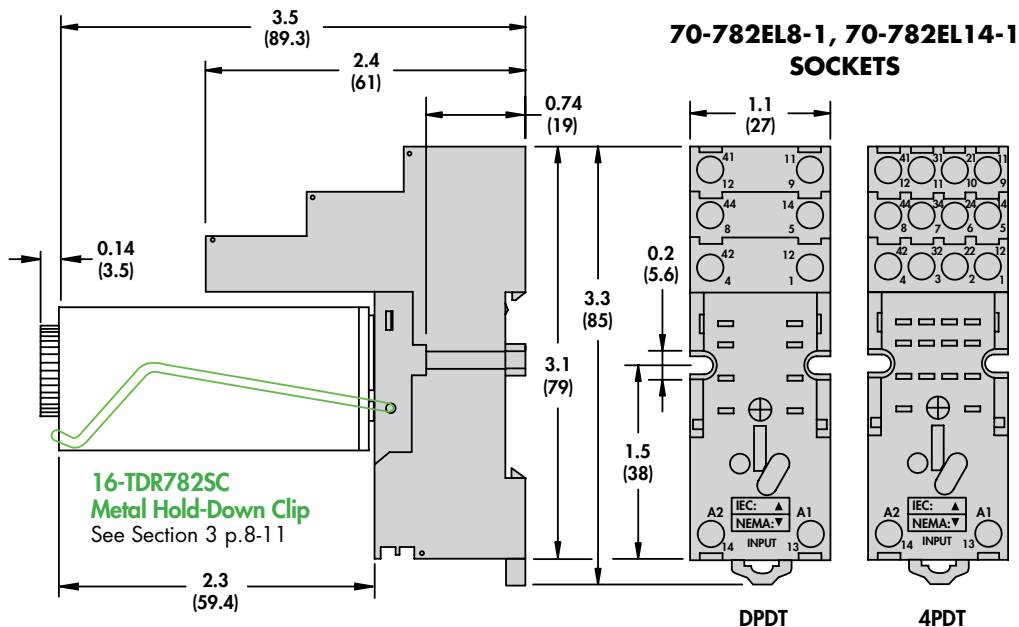
NOTE: Terminal size is 0.105 x 0.020
(2.68 x 0.508)

Other mating sockets see Section 2: 70-782E14-1, 70-782D14-1, 70-461-1, 70-378-1, 70-379-1

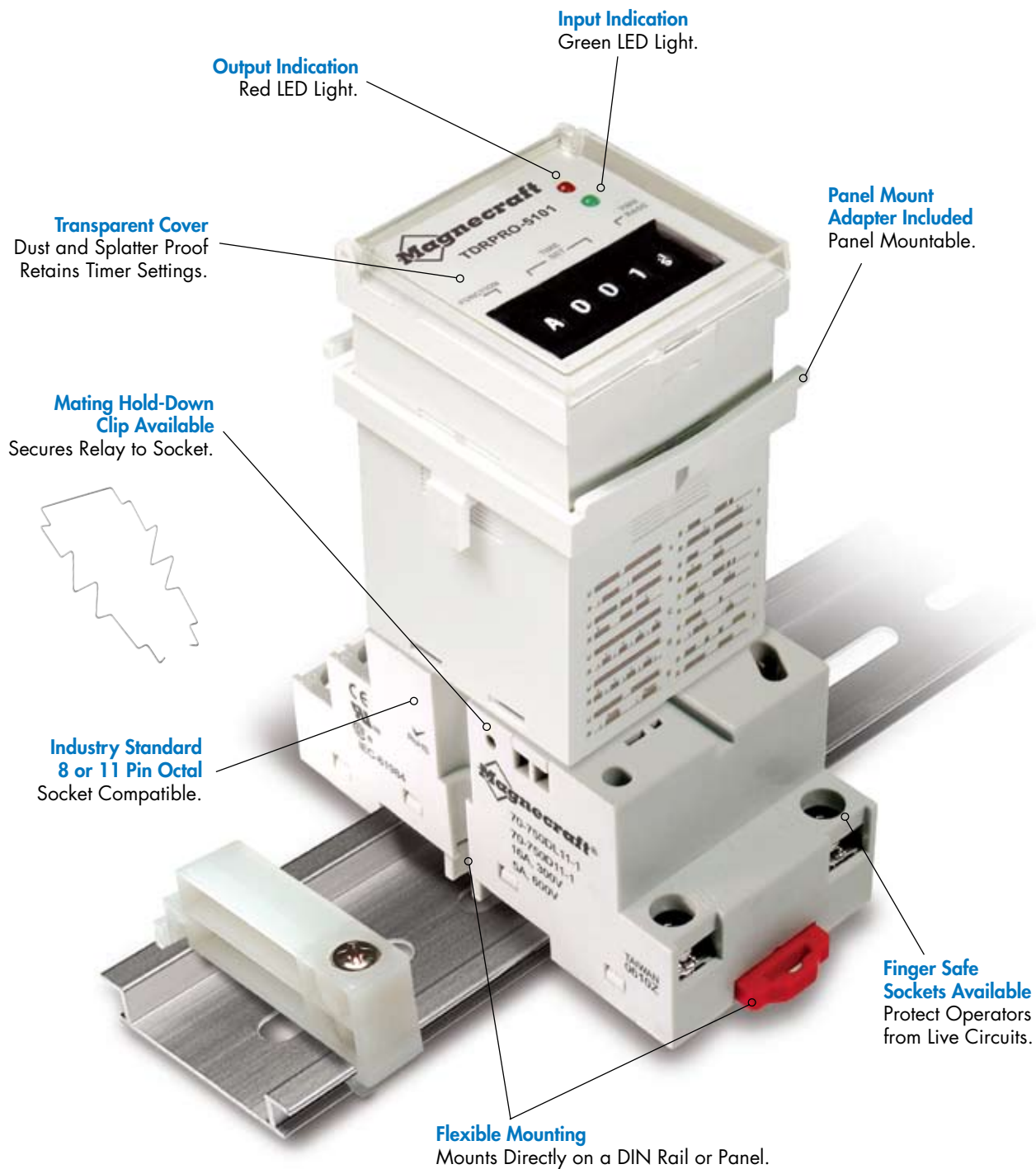


WIRING DIAGRAMS

Bottom View



Advantages of the TDRPRO-5100 Series Time Delay Relays



The Complete System Solution!



The TDRPRO-5100 Series is a programmable multi-function, multi-voltage time delay relay with multiple time ranges for the ultimate in flexibility. The TDRPRO-5100 features thumb wheel adjustment for impeccable accuracy. The two indicator LEDs allow the user to know when power is present at the coil, output is energized or if the relay is performing one of its 10 timing functions.

*See Application Data (p. 5/2-5/3) for Function Definition.

- Offers a “one stop solution” for your power management system.
- Several configurations available to meet your individual needs.
- Switching capabilities up to 12 amps.
- The broad timing range meets most timing requirements.
- The 12 to 240 VAC/VDC input voltage range enables this timer to work with all popular voltages.
- The two LED status indicators; indicate status at a glance. The green LED is on when power is applied to the input terminals. The red LED blinks during timeout and is on when the output is energized.
- The tamper proof dust cover retains the settings and keeps the dust out.
- The thumb wheel adjustment for function and timing ensures accuracy and eliminates mechanical deviation.
- Color and appearance designed to high visibility in all environments.
- Engineering availability allows for customized control system solutions.

TDRPRO-5100 Series Time Delay Relays/SPDT, DPDT 12 Amp Rating



General Specifications

(UL 508)

New Part Number:
Legacy Part Number:

TDRPRO-5100
TDRPRO-5000

TDRPRO-5101
TDRPRO-5001

TDRPRO-5102
TDRPRO-5002

Output Characteristics

		Units	DPDT	SPDT	DPDT
Number and type of Contacts			Silver Alloy	Silver Alloy	Silver Alloy
Contact Material			12	12	12
Current rating @ 240 VAC, 30 VDC		A	240 AC, 50/60 Hz	240 AC, 50/60 Hz	240 AC, 50/60 Hz
Switching voltage		V	30 DC	30 DC	30 DC
		HP	1/3 @ 120VAC	1/3 @ 120VAC	1/3 @ 120VAC
		HP	1/2 @ 240 VAC	1/2 @ 240 VAC	1/2 @ 240 VAC
Minimum Switching Requirement		Pilot Duty	B300	B300	B300
Indication		mA	100	100	100
		Blinks = Timing	Red	Red	Red
		On = Energized			

Input Characteristics

Voltage Range		VAC / VDC	12...240	12...240	12...240
Operating Range % of Nominal			85% to 115%	85% to 115%	85% to 115%
Maximum consumption		AC VA	2.5	2.5	2.5
		DC W	2	2	2
Indication		LED	Green	Green	Green

Timing Characteristics

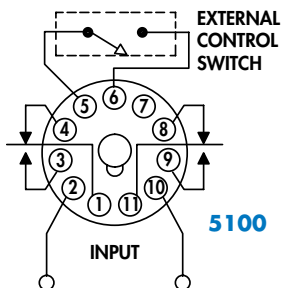
Functions Available (See page 5/3)			A,B,C,D,E,F,G,H,I,J	A,B,C,D,E,F,G,H,I,J	A,B,C
Time Scales			7	7	7
Time Ranges Available		0.1 sec	0...999	0...999	0...999
		sec	0...999	0...999	0...999
		0.1 min	0...999	0...999	0...999
		min	0...999	0...999	0...999
		0.1 hr	0...999	0...999	0...999
		hr	0...999	0...999	0...999
		10 hr	0...999	0...999	0...999
Tolerance Mechanical Setting		%	0	0	0
Repeatability Constant Voltage and Temperature		%	0.1	0.1	0.1
Operate Time Maximum		ms	25	25	25
Release Time Maximum		ms	25	25	25
Reset Time		ms	150	150	150

Performance Characteristics

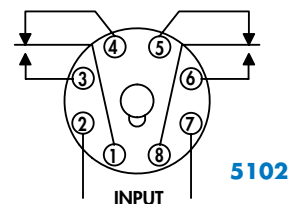
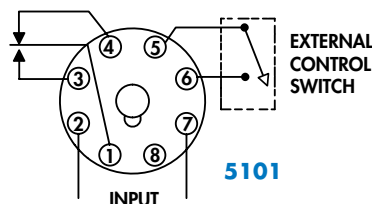
Electrical Life Operations @ Rated Current (Resistive)			100,000	100,000	100,000
Mechanical Life Unpowered		V	10,000,000	10,000,000	10,000,000
Dielectric strength Input to Contacts		V	2500 AC	2500 AC	2500 AC
		Between Open Contacts	1000 AC	1000 AC	1000 AC

Environment

Product certifications Standard version			UR, CE	UR, CE	UR, CE
Ambient air temperature Storage		°C	-30...+70	-30...+70	-30...+70
around the device Operation		°C	-20...+55	-20...+55	-20...+55
Degree of protection			IP 40	IP 40	IP 40
Weight		grams	133	133	133



WIRING DIAGRAMS





TDRPRO Relay with the 70-750DL8-1 Socket

Standard Part Numbers

BOLD-FACED PART NUMBERS ARE NORMALLY STOCKED

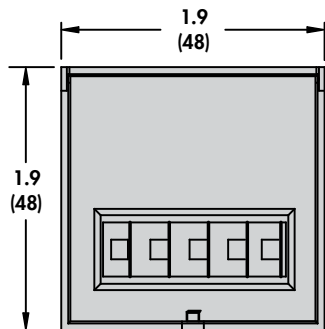
New Part Number	Supersedes	Input Voltage	Timing Range	Functions Available	Contact Configuration	Rated Load Current
TDRPRO-5100	TDRPRO-5000	12...240 VAC/VDC	0.1s...9990h	A,B,C,D,E,F,G,H,I,J	DPDT	12 Amps
TDRPRO-5101	TDRPRO-5001	12...240 VAC/VDC	0.1s...9990h	A,B,C,D,E,F,G,H,I,J	SPDT	12 Amps
TDRPRO-5102	TDRPRO-5002	12...240 VAC/VDC	0.1s...9990h	A,B,C	DPDT	12 Amps

FUNCTION DEFINITIONS

See Section 5 p.3

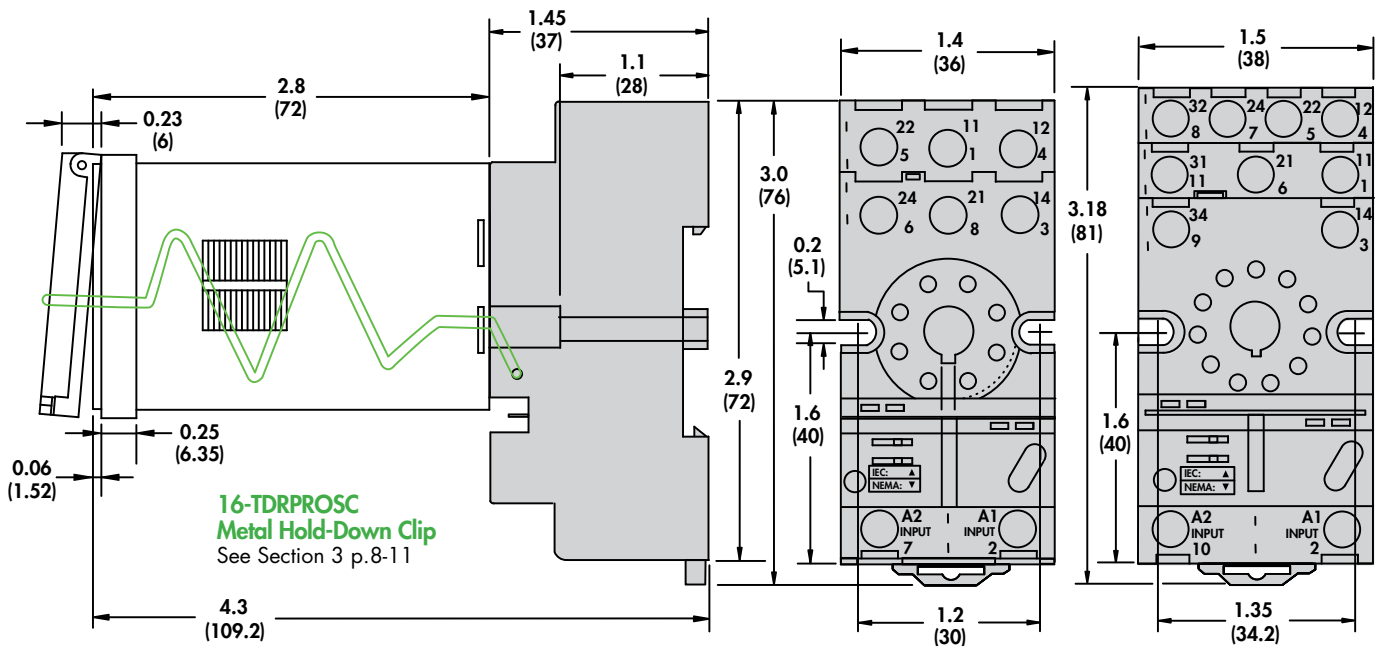
Part Number Builder

Series	Contact Configuration/ # of Functions
TDRPRO = 48 X 48 Time Delay Relay	5100 = DPDT, 10 Functions
	5101 = SPDT, 10 Functions
	5102 = DPDT, 3 Functions

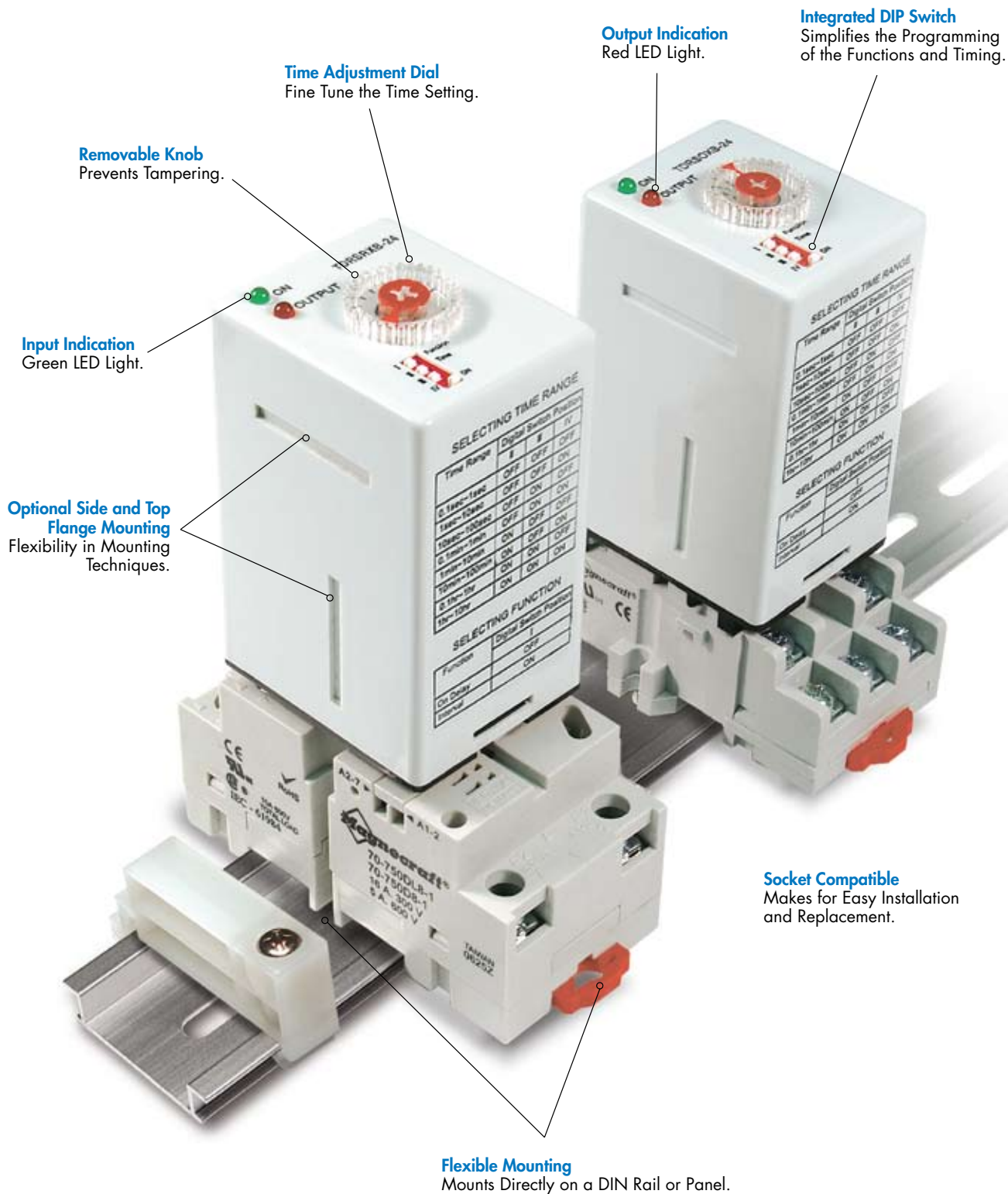


Other mating sockets see Section 2: 70-750E8-1, 70-750E11-1, 70-169-1, 70-170-1, 70-465-1, 70-464-1

70-750DL8-1, 70-750DL11-1 SOCKETS



Advantages of the TDRSOX/SRX Time Delay Relays



The Complete System Solution!



The TDRSOX/SRX series is a dual-function, dual-voltage time delay relay that offers a wide timing range. This cost sensitive timer features DIP switches that allow the user to set the function modes and choose between eight separate time scales. The knob on top is used for fine tuning the time setting. This dual adjustment design allows for supreme flexibility and timing accuracy. The dual LEDs allow the user to know when power is present at the coil and when the output is energized.

The SOX series features both On Delay and Interval functions, in contrast the SRX series has the capability of handling the Off Delay and Retriggerable One Shot functions. Please see the Application Data at the beginning of this section for a complete description of the above four functions. Combining all of this into one affordable package is the reason Magnecraft continues to be a leader in providing the most comprehensive line of control and timing relays.

- Offers a “one stop solution” for your power management system.
- Several configurations available to meet your individual needs.
- Switching capabilities up to 12 amps.
- The broad timing range meets most timing requirements.
- Dual voltage coils eliminate the need to specify AC or DC. (AC only for 240).
- The two LED status indicators; indicate status at a glance. The green LED is on when power is applied to the input terminals. The red LED blinks during timeout and is on when the output is energized.
- Integrated DIP switch simplifies the programming of the functions and timing.
- Color and appearance designed for high visibility in all environments.
- Engineering availability allows for customized control system solutions.

TDRSOX/SRX Time Delay Relays/DPDT 12 Amp Rating

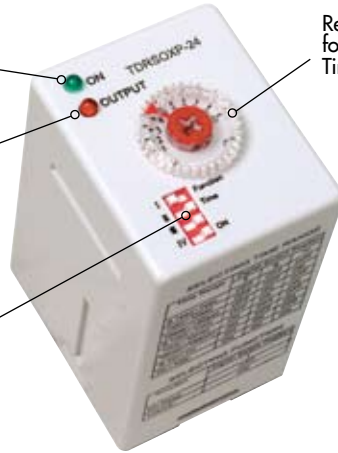


Input Indication
Green LED

Output Indication
Red LED

DIP Switch for
Function/Timing

Recessed Potentiometer
for Fine Tuning the
Timing Setting



SELECTING TIME RANGES

TIME RANGE	DIGITAL SWITCH POSITION		
	II	III	IV
0.1 sec - 1 sec	OFF	OFF	OFF
1 sec - 10 sec	OFF	OFF	ON
10 sec - 100 sec	OFF	ON	OFF
0.1 min - 1 min	OFF	ON	ON
1 min - 10 min	ON	OFF	OFF
10 min - 100 min	ON	OFF	ON
0.1 hr - 1 hr	ON	ON	OFF
1 hr - 10 hr	ON	ON	ON

General Specifications

(UL 508)

Output Characteristics		Units	TDRSOX	TDRSRX
Number and type of Contacts			DPDT	DPDT
Contact Material			Silver Alloy	Silver Alloy
Current rating		A	12	12
Switching voltage		V	240 AC, 50/60 Hz	240 AC, 50/60 Hz
		V	30 DC	30 DC
		HP	1/3 @ 120VAC	1/3 @ 120VAC
		HP	1/2 @ 240 VAC	1/2 @ 240 VAC
		Pilot Duty	B300	B300
Minimum Switching Requirement		mA	100	100
Indication		LED	Red	Red
Input Characteristics				
Voltage Range		VAC / VDC	12, 24, 120	12, 24, 120
		VAC	240	240
Operating Range		% of Nominal	80% to 110%	80% to 110%
Maximum consumption		AC	5	5
		DC	2.5	2.5
Indication		LED	Green	Green
Timing Characteristics				
Functions Available			A, C	D, E
Time Scales			8	8
Time Ranges Available		sec	0.1...1	0.1...1
		sec	1...10	1...10
		sec	10...100	10...100
		min	0.1...1	0.1...1
		min	1...10	1...10
		min	10...100	10...100
		hr	0.1...1	0.1...1
		hr	1...10	1...10
Tolerance		Mechanical Setting	%	10
Repeatability		Constant Voltage and Temperature	%	1
Reset Time		Maximum	ms	150
Trigger Pulse Length		Minimum	ms	50
Performance Characteristics				
Electrical Life		Operations @ Rated Current (Resistive)	100,000	100,000
Mechanical Life		Unpowered	10,000,000	10,000,000
Dielectric strength		Input to Contacts	V	2500 AC
		Between Open Contacts	V	1000 AC
Environment				
Product certifications		Standard version	UR, CE	UR, CE
Ambient air temperature		Storage	°C	-20...+85
around the device		Operation	°C	-20...+55
Degree of protection			IP 40	IP 40
Weight		grams	85	85

FUNCTION DEFINITIONS

See Section 5 p.3

SELECTING FUNCTION

FUNCTION SOX	DIGITAL SWITCH POSITION
ON DELAY	OFF
INTERVAL	ON
FUNCTION SRX	
OFF DELAY	OFF
RETRIGGERABLE ONE SHOT	ON



TDRSOX/SRXB



TDRSOX/SRXP

Standard Part Numbers

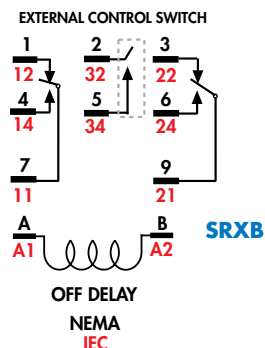
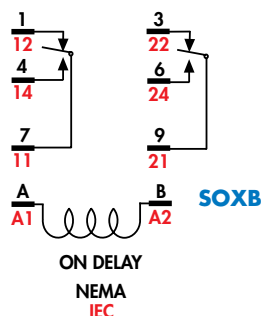
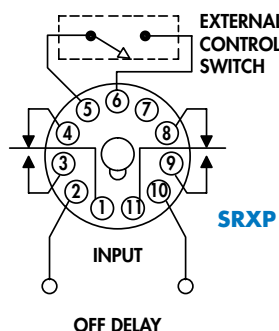
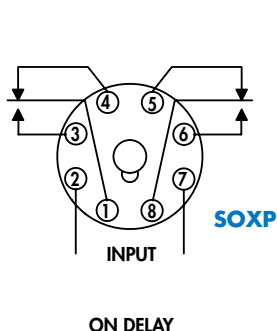
BOLD-FACED PART NUMBERS ARE NORMALLY STOCKED

Part Number	Input Voltage	Timing Range	Contact Configuration	Rated Load Current
8 Pin Octal Base - On Delay/Interval				
TDRSOXP-12V	12 VAC/VDC	0.1s...10h	DPDT	12 Amps
TDRSOXP-24V	24 VAC/VDC	0.1s...10h	DPDT	12 Amps
TDRSOXP-120V	120 VAC/VDC	0.1s...10h	DPDT	12 Amps
TDRSOXP-240A	240 VAC	0.1s...10h	DPDT	12 Amps
11 Pin Octal Base - Off Delay/Retriggerable One Shot				
TDRSRXP-12V	12 VAC/VDC	0.1s...10h	DPDT	12 Amps
TDRSRXP-24V	24 VAC/VDC	0.1s...10h	DPDT	12 Amps
TDRSRXP-120V	120 VAC/VDC	0.1s...10h	DPDT	12 Amps
TDRSRXP-240A	240 VAC	0.1s...10h	DPDT	12 Amps
8 Blade Square Base - On Delay/Interval				
TDRSOXB-12V	12 VAC/VDC	0.1s...10h	DPDT	12 Amps
TDRSOXB-24V	24 VAC/VDC	0.1s...10h	DPDT	12 Amps
TDRSOXB-120V	120 VAC/VDC	0.1s...10h	DPDT	12 Amps
TDRSOXB-240A	240 VAC	0.1s...10h	DPDT	12 Amps
11 Blade Square Base - Off Delay/Retriggerable One Shot				
TDRSRXB-12V	12 VAC/VDC	0.1s...10h	DPDT	12 Amps
TDRSRXB-24V	24 VAC/VDC	0.1s...10h	DPDT	12 Amps
TDRSRXB-120V	120 VAC/VDC	0.1s...10h	DPDT	12 Amps
TDRSRXB-240A	240 VAC	0.1s...10h	DPDT	12 Amps

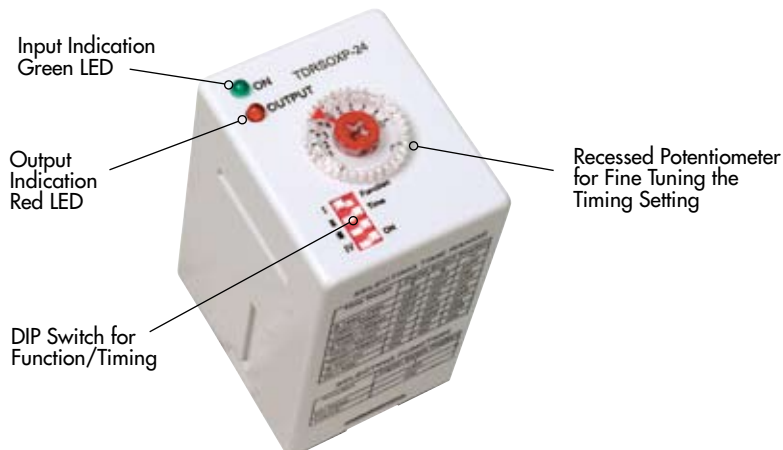
Part Number Builder

Series	Function	Terminal Style	Input Voltage
TDR = Time Delay Relay	SOX = On Delay/Interval	P = Pins Octal	12V = 12 VAC/VDC
	SRX = Off Delay/Retriggerable One Shot	B = Blade Square	24V = 24 VAC/VDC
			120V = 120 VAC/VDC
			240A = 240 VAC

WIRING DIAGRAMS

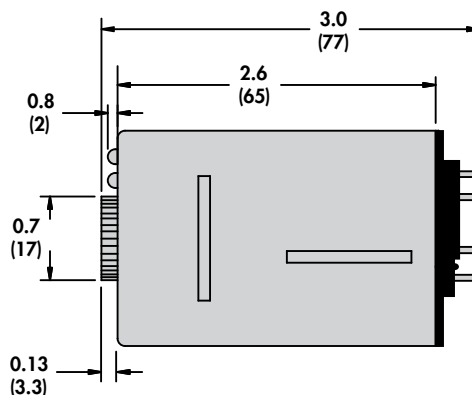
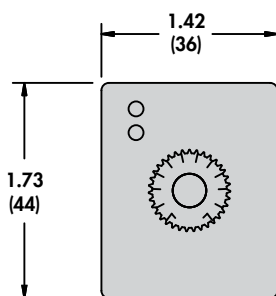


TDRSOX/SRX Time Delay Relays *continued*

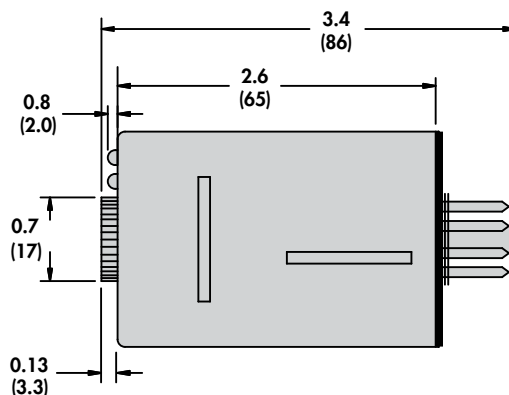
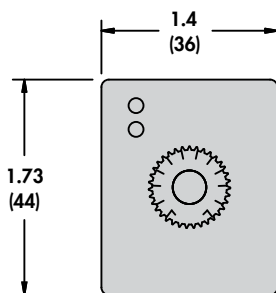


NOTE: Terminal size is 0.187 x 0.020
(4.75 x 0.508)

TDRSOX/SRXB



TDRSOX/SRXP



Relay Adapters



16-711C1
Section 3 p.14-16



16-711C4
Section 3 p.14-16

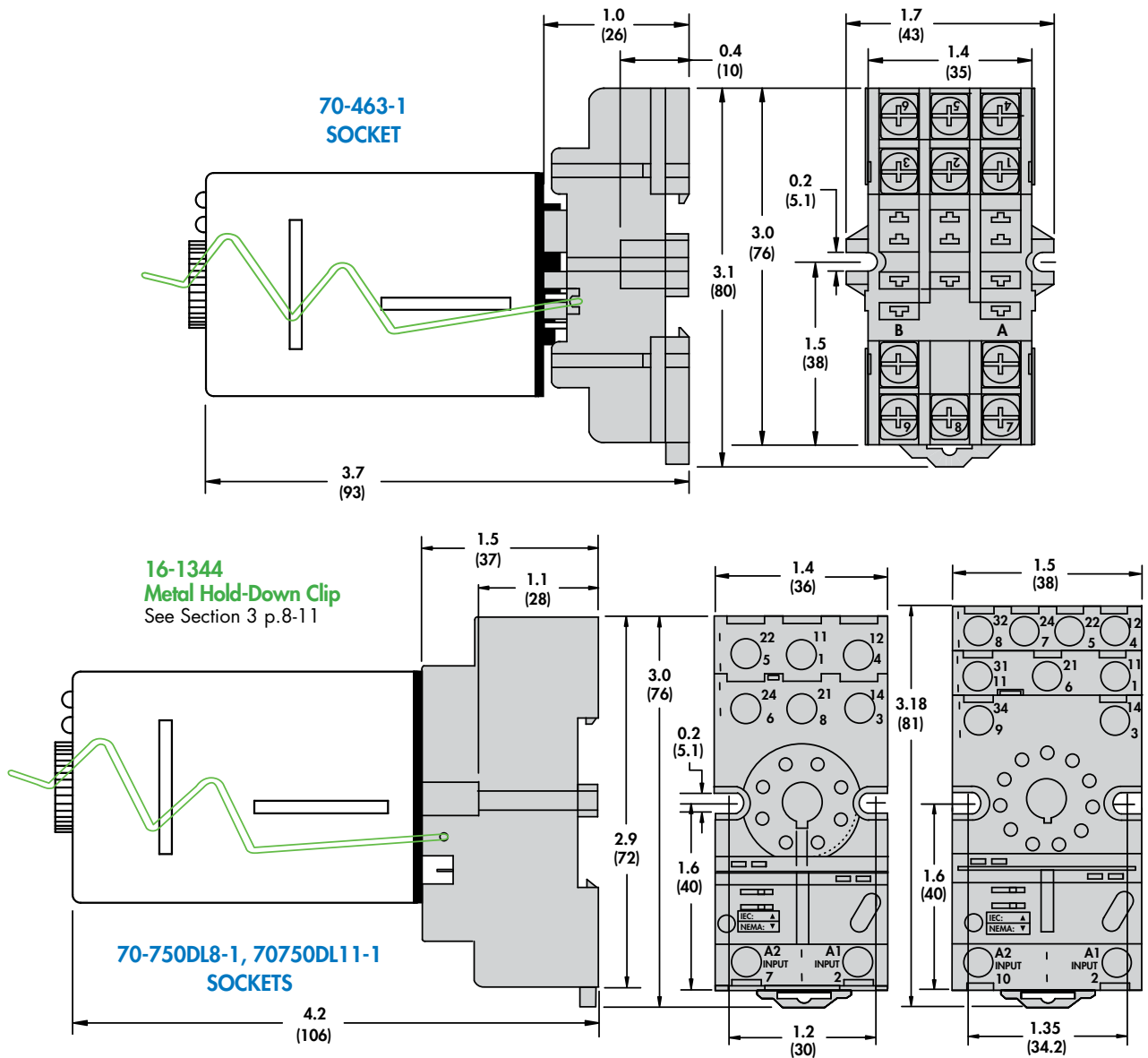


TDRSOX/SRXB



TDRSOX/SRXP

Other mating sockets see Section 2: 70-750E8-1, 70-750E11-1, 70-169-1, 70-170-1, 70-465-1, 70-464-1



Section 5 Cross Reference Guide

Magnecraft	Carlo Gavazzi	Finder	Omron	NCC
821TD10H-UNI	EAAC231M	81.01	H3DS-M-L	DMM-9999M-24M
	EAAC2310H	81.11	H3DS-S-L	
		82.01	H3DS-A-L	
		82.11		
		82.21		
		82.31		
		82.41		
		87.01		
		87.11		
		87.21		
		87.31		
		87.41		
		87.91		
822TD10H-UNI	EAADT231M	82.82	H3DE-M-2	
	EAADT2310H	87.02		
		87.61		
		87.62		
		87.82		

Magnecraft	NAIS	Finder	Omron	IDEC	Fuji	Allen Bradley
TDR782XBXA-12D	S1DX-A2C	85.02	H3YN-2		ST7P-2DE	700HS12
			H3YN-21			
TDR782XBXA-24D	S1DX-A2C	85.02	H3YN-2	GT5Y-2SN1D24	ST7P-2DE	700HS12
			H3YN-21	GT5Y-2SN3D24		
TDR782XBXA-24A	S1DX-A2C	85.02	H3YN-2		ST7P-2A	700HS12
			H3YN-21			
TDR782XBXA-110A	S1DX-A2C	85.02	H3YN-2	GT5Y-2SN3A100	ST7P-2A	700HS12
			H3YN-21	GT5Y-2SN6A100		
TDR782XBXA-230A	S1DX-A2C	85.02	H3YN-2	GT5Y-2SN1A200	ST7P-2A	700HS12
			H3YN-21	GT5Y-2SN3A200		
				GT5Y-2SN6A200		
TDR782XDXA-12D	S1DX-A4C	85.04	H3YN-4	GT5Y-4SN1D12		
			H3YN-41			
TDR782XDXA-24D	S1DX-A4C	85.04	H3YN-4	GT5Y-4SN1D24		
			H3YN-41	GT5Y-4SN3D24		
TDR782XDXA-24A	S1DX-A4C	85.04	H3YN-4			
			H3YN-41			
TDR782XDXA-110A	S1DX-A4C	85.04	H3YN-4	GT5Y-4SN1A100		
			H3YN-41	GT5Y-4SN3A100		
				GT5Y-4SN6A100		
TDR782XDXA-230A	S1DX-A4C	85.04	H3YN-4			
			H3YN-41			



Magnecraft	Supercedes Magnecraft	Potter & Brumfield	Square D	Omron
TDRPRO-5100	TDRPRO-5000	CNM5	9050JCK70V14	H3CA-A
		CNS-35-96		
		CNS-35-76		
TDRPRO-5101	TDRPRO-5001			H3CA-8H
TDRPRO-5102	TDRPRO-5102	CN1		H3CA-8
		CNS-35-92		
		CNS-35-72		
Magnecraft	Allen Bradley	NCC	IDEC	
TDRSOXP-24	700HRM12TU24	T2K-xxxxx-466	RTE-P1AD24	
TDRSOXP-120	700HRM12TA17	T2K-xxxxx-467/462	RTE-P1AF20	
TDRSOXP-240	700HRM12TA17	T2K-xxxxx-461	RTE-P1AF20	
TDRSRXP-12			RTE-P2D12	
TDRSRXP-24			RTE-P2AD24	
TDRSRXP-120			RTE-P1AF20	
TDRSOXB-12			RTE-B1D12	
TDRSOXB-24			RTE-B1AD24	
TDRSOXB-120			RTE-B1AF20	
TDRSRXB-12			RTE-B2D12	
TDRSRXB-24			RTE-B2AD24	
TDRSRXB-120			RTE-B2AF20	

NOTES: