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).

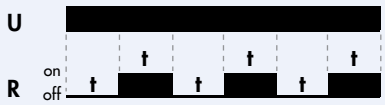
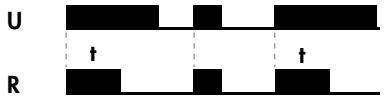
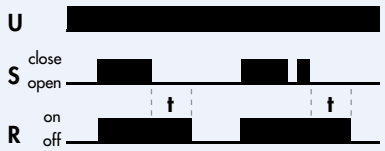
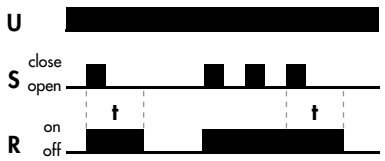
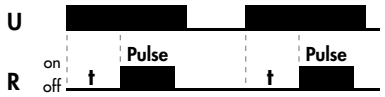
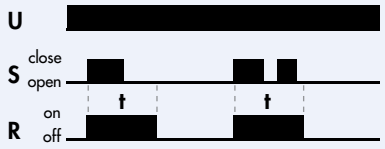
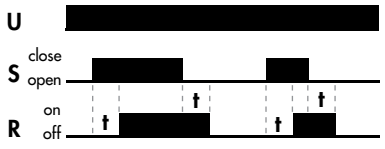
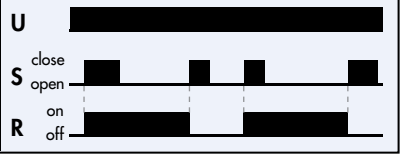
To help understand, some definitions are important:
Input Voltage: Control voltage applied to the input terminals (see wiring diagrams below). Depending on the function, input voltage will either initiate the unit or make it ready to initiate when a trigger signal is applied.

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.

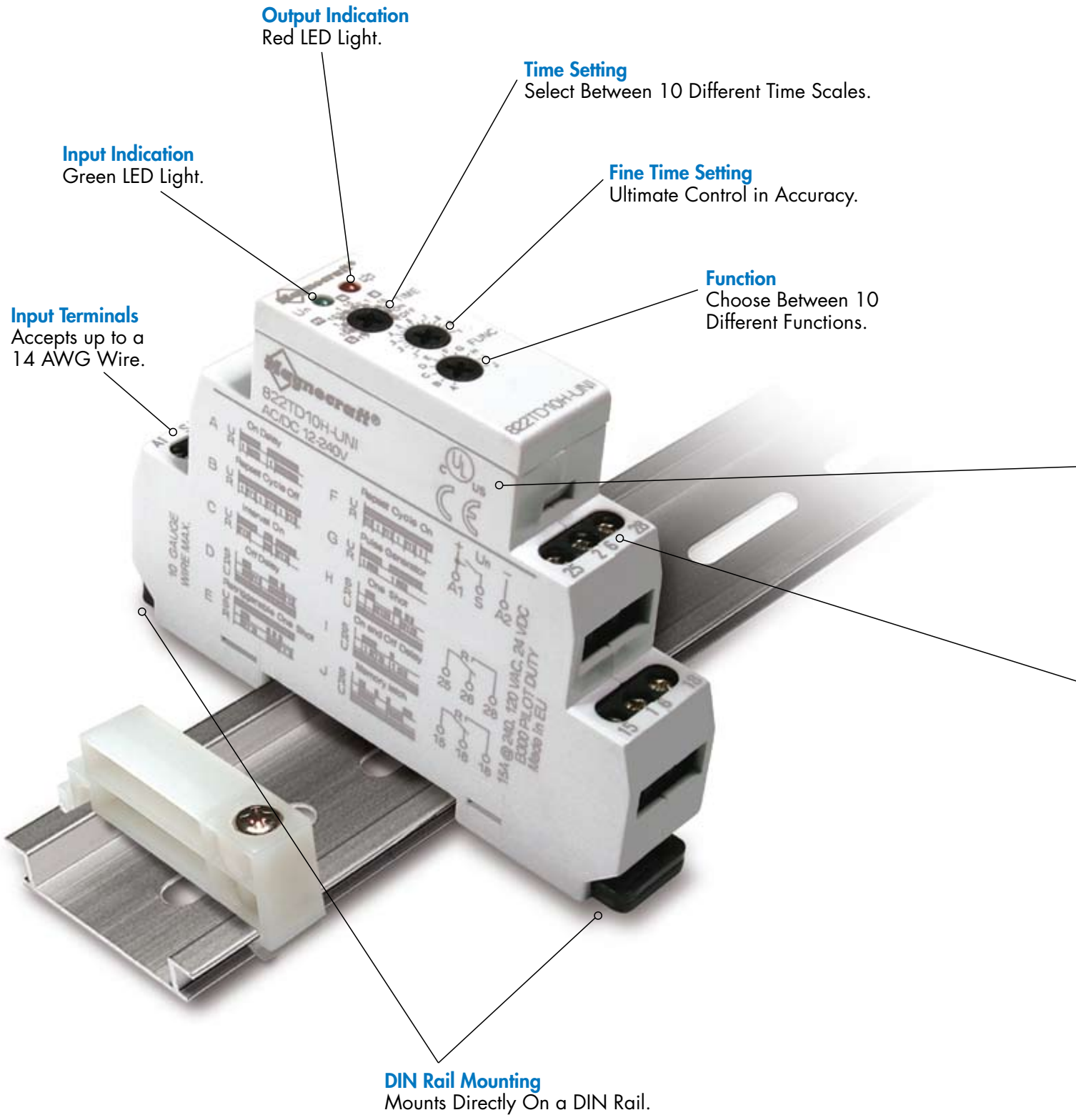
The following tables contain both written and visual descriptions on how the common timing functions operate. A Timing Chart shows the relationship between Input Voltage, Trigger Signal (if present) and Output Contacts.

FUNCTION DEFINITION TABLE

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 **R** return to their shelf state when input voltage **U** is removed. Trigger switch is not used in this function.	
B. **REPEAT CYCLE** Starting Off	When input voltage **U** is applied, time delay **t** begins. When time delay **t** is complete, relay contacts **R** change state for time delay **t**. This cycle will repeat until input voltage **U** is removed. Trigger switch is not used in this function.	
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 will also return to their shelf state. Trigger switch is not used in this function.	
D. **OFF DELAY** S Break	Input voltage **U** must be applied continuously. When trigger switch **S** is closed, relay contacts **R** change state. When trigger switch **S** is opened, delay **t** begins. When delay **t** is complete, contacts **R** return to their shelf state. If trigger switch **S** is closed before time delay **t** is complete, then time is reset. When trigger switch **S** is opened, the delay begins again, and relay contacts **R** remain in their energized state. If input voltage **U** is removed, relay contacts **R** return to their shelf state.	
E. **RETRIGGERABLE ONE SHOT**	Upon application of input voltage **U**, the relay is ready to accept trigger signal **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 switch **S** is opened and closed prior to time out **t** (before preset time elapses). Continuous cycling of the trigger switch **S** at a rate faster than the preset time will cause the relay contacts **R** to remain closed. If input voltage **U** is removed, relay contacts **R** return to their shelf state.	
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. Trigger switch is not used in this function.	
G. **PULSE GENERATOR**	Upon application of input voltage **U**, a single output pulse of 0.5 seconds is delivered to relay after time delay **t**. Power must be removed and reapplied to repeat pulse. Trigger switch is not used in this function.	
H. **ONE SHOT**	Upon application of input voltage **U**, the relay is ready to accept trigger signal **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 relay resets by applying the trigger switch **S** when the relay is not energized.	
I. **ON/OFF DELAY** S Make/Break	Input voltage **U** must be applied continuously. When trigger switch **S** is closed, time delay **t** begins. When time delay **t** is complete, relay contacts **R** change state and remain transferred until trigger switch **S** is opened. If input voltage **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 trigger switch **S** closure. If input voltage **U** is removed, relay contacts **R** return to their shelf state.	

U = Input Voltage **S** = Trigger 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.

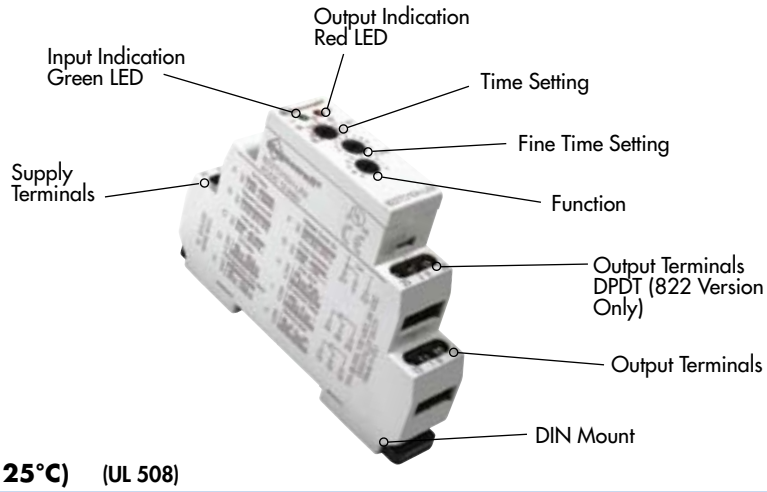
Solid State Circuitry
Used for Time and function Control.

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

UL Listed
File No. E234203



General Specifications (@ 25°C) (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 DC	VA W	3 1.7	3 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
	Between Open Contacts		V	1000 AC	1000 AC
Terminal Wire Capacity			AWG (mm2)	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	65	65

821

822

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

Standard Part Numbers

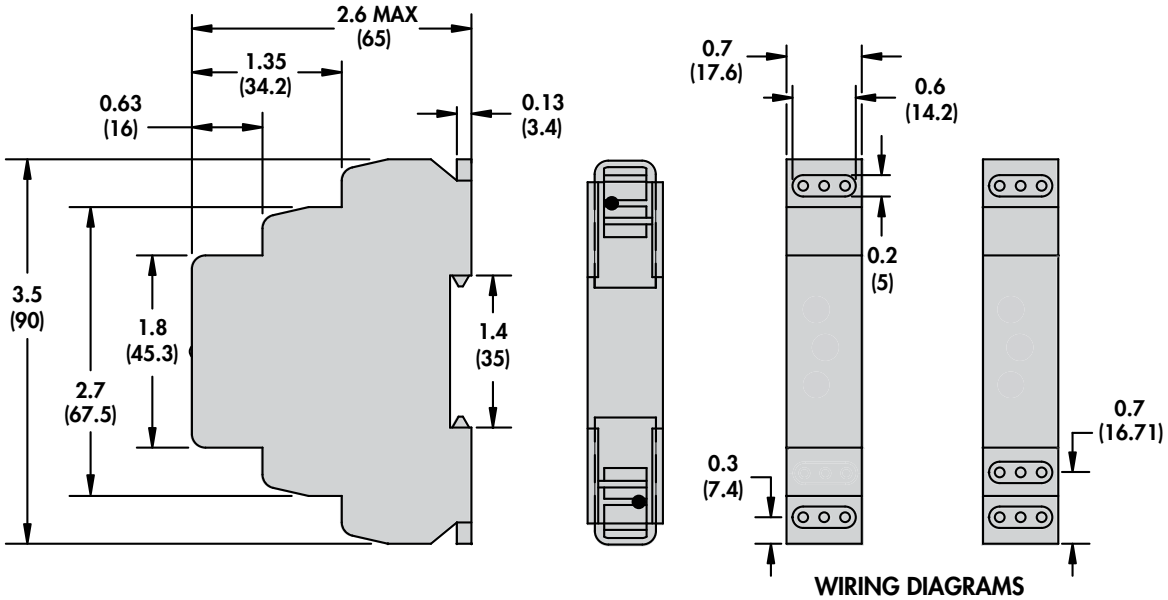
BOLD-FACED PART NUMBERS ARE NORMALLY STOCKED

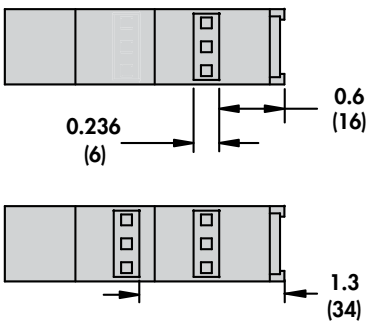
Part Number	Input Voltage	Timing Range	Functions Available	Contact Configuration	Rated Load Current
821TD10H-UNI	12...240 VAC/VDC	0.1s...10d	A,B,C,D,E,F,G,H,I,J	SPDT	15 Amps
822TD10H-UNI	12...240 VAC/VDC	0.1s...10d	A,B,C,D,E,F,G,H,I,J	DPDT	15 Amps

FUNCTION DEFINITIONS
See Section 5 p.3

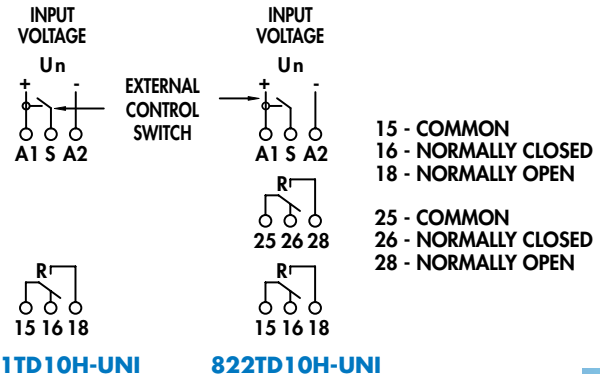
Part Number Builder

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



821TD10H-UNI 822TD10H-UNI

SECTION 5

Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001
Адрес: 105318, г.Москва, ул.Щербаковская д.3, офис 1107

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В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

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