Cutler-Hammer

TR series
TRNP, TRNB, TRFP, TRFB Timers
INSTRUCTION SHEET

Read this instruction sheet to make sure of correct operation before starting installation, operation, maintenance, and inspection of the TR series timers. The end user should keep this instruction sheet for future reference.

TIME RANGE Determined by Time Range Selector and Dial Selector

(hr: hours)

Dial / Range	0-1	0-3	0-10	0-30	0-60
s	0.1sec - 1sec	0.1sec - 3sec	0.2sec - 10sec	0.6sec - 30sec	1.2sec - 60sec
min	1.2sec - 1min	3.6sec - 30min	12sec - 10min	36sec - 30min	1.2min - 60min
h	1.2min - 1hr	3.6min - 3hr	12min - 10hr	36min - 30hr	1.2hr - 60hr
10h	12min - 10hr	36min - 30hr	2hr - 100hr	6hr -300hr	12hr -600hr

GENERAL SPECIFICATIONS

Operation System		Solid-state CMOS circuit
Operation Type		Multi-Mode
Time Range		0.1sec to 600hours
Pollution Degree		2 (IE60664-1)
Over voltage category		III (IE60664-1)
Rated Operational Voltage	240AC	100-240V AC(50/60Hz)
	24AD	24V AC(50/60Hz)/24V DC
	12DC	12V DC
Voltage Tolerance	240AC	85-264V AC(50/60Hz)
	24AD	20.4-26.4V AC(50/60Hz)/21.6-26.4V DC
	12DC	10.8-13.2V DC
Input off Voltage		Rated Voltage × 10% minimum
Ambient Operating Temperature		-20 to +65℃ (without freezing)
Ambient Storage and Transport Temperature		-30 to +75℃ (without freezing)
Relative Humidity		35 to 85%RH (without condensation)
Atmospheric Pressure		80kPa to 110kPa (Operating) 70kPa to 110kPa (Transport)
Reset Time		100msec maximum
Repeat Error		±0.2%, ±20msec*
Voltage Error		±0.2%, ±20msec*
Temperature Error		±0.5%, ±20msec*
Setting Error		±10% maximum
Insulation Resistance		100MΩ minimum (500V DC)
Dielectric Strength		Between power and output terminals: 2000V AC, 1 minute Between contacts of different poles: 2000V AC, 1 minute Between contacts of the same pole: 1000V AC, 1 minute
Vibration Resistance		10 to 55Hz amplitude 0.5mm 2 hours in each of 3 axes
Shock Resistance	Operating extremes	98m/sec² (10G) 3 times in each of 3 axes
	Damage limits	TRNP, TRFP: 392m/sec² (40G) TRNB, TRFB: 98m/sec² (10G) 3 times in each of 3 axes
Degree of Protection		IP40 (enclosure), IP20 (socket) (IEC60529)

Power Consumption (Approx.)	TYPE		TRNP, TRNB	TRFP, TRFB
	240AC	120V AC/60Hz	6.5VA	6.6VA
		240V AC/60Hz	11.6VA	12.1VA
	24AD(AC/DC)		3.4VA/1.7W	3.5VA/1.7W
	12DC		1.6W	1.6W

Mounting Position		Free
Dimensions	TRNP, TRFP	40H × 36W × 77.9D mm
	TRNB, TRFB	40H × 36W × 74.9D mm

Weight (Approx.)	TRNP	TRFP	TRNB, TRFB
	87g	89g	85g

* For the value of the error against a preset time, whichever value is larger should be applied.

APPLICABLE STANDARDS

UL508, CSA C22.2 No.14, IEC61812-1, EN61812-1

EMC

Electrostatic Discharge		level 3 Contact±6.0kV, Air±8.0kV	IEC61000-4-2 EN61000-4-2
Electromagnetic Field		level 3 10V/m, AM 80%, 80M-1000MHz	IEC61000-4-3 EN61000-4-3
Fast Transient/Burst		level 3 Power Supply: ±2.0kV	IEC61000-4-4 EN61000-4-4
Surge	240AC	level 3 Power Supply: Line to Line ±1.0kV Line to Ground ±2.0kV	IEC61000-4-5 EN61000-4-5
	24AD 12DC	level 2 Power Supply: Line to Line ±0.5kV Line to Ground ±1.0kV	
Radiated Emission		Group 1 Class A	CISPR 11 EN55011

TYPES

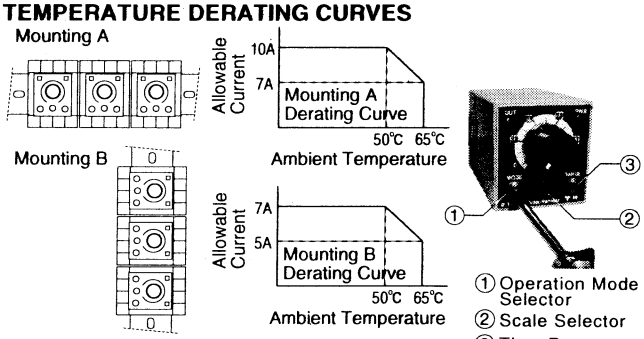
TRNP240AC

- Power Voltage
  - 240AC: 100 to 240V AC(50/60Hz)
  - 24AD: 24V AC(50/60Hz)/24V DC
  - 12DC: 12V DC
- Connection type
  - P: Pin
  - B: Blade
- Operation Mode
  - N: No Control Signal
  - A: ON-Delay 1
  - B: Interval
  - C: Cycle 1
  - D: Cycle 3
  - F:Control Signal
    - A: ON-Delay 2
    - B: Cycle 2
    - C: Cycle 4
    - D: Signal ON/OFF-Delay
    - E: Signal OFF-Delay
    - F: One-Shot

CONTACT RATINGS

Contact Configuration		2 Form C, DPDT (Delay output)
Allowable Voltage / Allowable Current		240V AC, 30V DC / 10A
Maximum Permissible Operating Frequency		1800 cycles per hour
Rated Load	Resistive	10A 240V AC, 30V DC
	Inductive	7A 240V AC, 30V DC
	Horse Power Rating	1/6 HP 120V AC, 1/3 HP 240V AC
Conditional Short Circuit		Fuse 10A, 240V
Life	Electrical	500,000 op. minimum (Resistive)
	Mechanical	50,000,000 op. minimum

TEMPERATURE DERATING CURVES

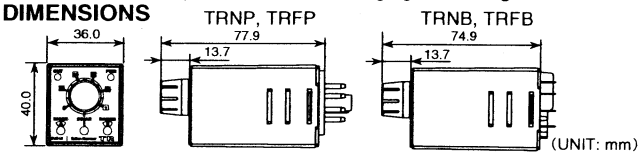


SWITCH SETTING

(1)Turn the selectors securely using a flat screwdriver 4mm wide maximum. Note that incomplete setting may cause malfunction. Do not turn the selectors beyond the limits.

(2)Since changing the setting during timer operation may cause malfunction, turn power off before changing the setting.

DIMENSIONS



Safety Precautions

Special expertise is required to use the Electronic Timer.

- **All Electronic Timers are manufactured under Eaton Electrical's rigorous quality control system, but users must add a backup or fail safe provision to the control system using the Electronic Timer in applications where heavy damage or personal injury may be caused in case the Electronic Timer should fail.**
- Install the Electronic Timer according to instructions described in this instruction sheet and the catalog.
- Make sure that the operating conditions are as described in the catalog. If you are uncertain about the specifications, contact Eaton Electrical in advance.
- In this instruction sheet, safety precautions are categorized in order of importance to Warning and Caution.

⚠Warning Warning notices are used to emphasize that improper operation may cause severe personal injury or death.

- Turn power off to the Electronic timer before starting installation, removal, wiring, maintenance, and inspection on the Electronic Timer. Failure to turn power off may cause electrical shocks or fire hazard.
- Do not use the Electronic Timer for an emergency stop circuit or interlocking circuit. If the Electronic Timer should fail, a machine disorder, breakdown, or accident may occur.

⚠Caution Caution notices are used where inattention might cause personal injury or damage to equipment.

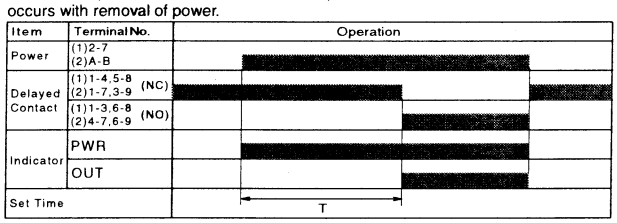
- The Electronic Timer is designed for installation in equipment. Do not install the Electronic Timer outside equipment.
- Install the Electronic Timer in environments described in this instruction sheet and the catalog. If the Electronic Timer is used in places where the Electronic Timer is subjected to high-temperature, high-humidity, condensation, corrosive gases, excessive vibrations, and excessive shocks, then electrical shocks, fire hazard, or malfunction will result.
- Use an IEC60127-approved fuse and circuit breaker on the power and output line outside the Electronic Timer.
- Do not disassemble, repair, or modify the Electronic Timer.
- When disposing of the Electronic Timer, do so as an industrial waste.

OPERATION CHART

TRNP, TRNB

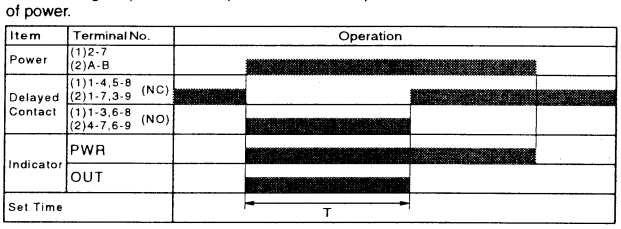
A: ON-Delay 1 (power start)

Set timer for desired delay, apply power to coil. Contacts transfer after preset time has elapsed, and remain in transferred position until timer is reset. Reset occurs with removal of power.



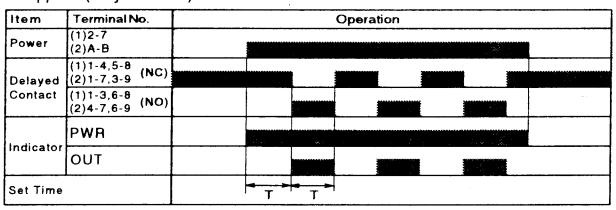
B: Interval (power start)

Set timer for desired delay, apply power to coil. Contacts transfer immediately, and return to original position after preset time has elapsed. Reset occurs with removal of power.



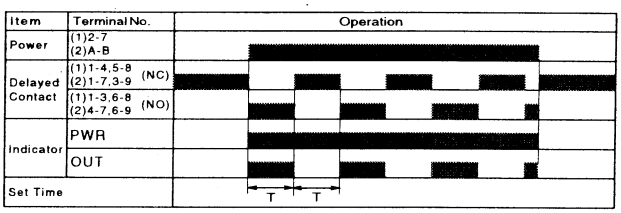
C: Cycle 1 (power start, OFF first)

Set timer for desired delay, apply power to coil. First transfer of contacts occurs after preset delay has elapsed, after the next elapse of preset delay contacts return to original position. The timer now cycles between on and off as long as power is applied.(duty ratio 1:1).



D: Cycle 3 (power start, ON first)

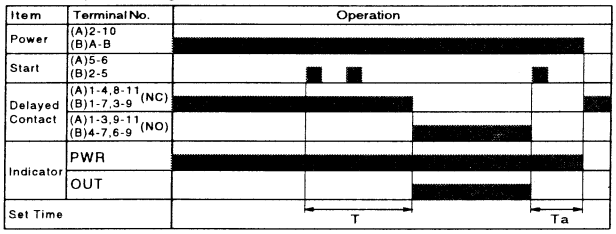
Functions in same manner as Mode C, with the exception that first transfer of contacts occurs as soon as power is applied. The ratio is 1:1. Time On = Time Off



TRFP, TRFB

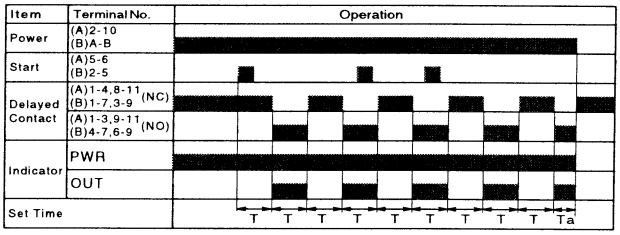
A: ON-Delay 2 (signal start)

When a preset time has elapsed after the start input turned on while power is on, the NO output contact goes on.



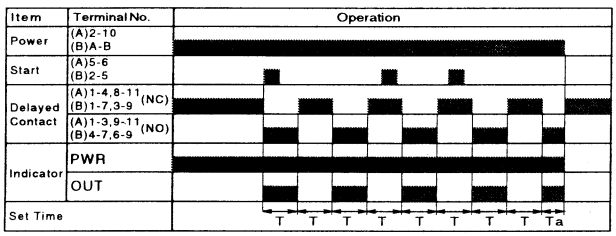
B: Cycle 2 (signal start, OFF first)

When the start input turns on while power is on, the output oscillates at a preset cycle (duty ratio 1:1), starting while the NO contact off.



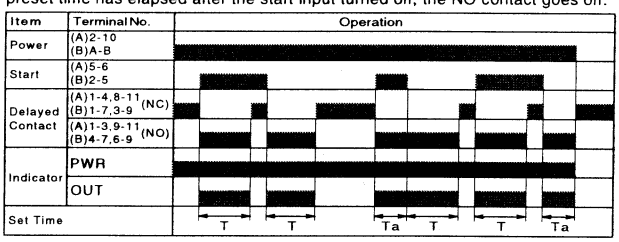
C: Cycle 4 (signal start, ON first)

When the start input turns on while power is on, the NO contact goes on. The output oscillates at a preset cycle (duty ratio 1:1).



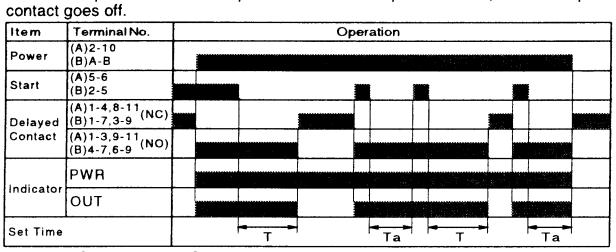
D: Signal ON/OFF-Delay

When the start input turns on while power is on, the NO output contact goes on. When a preset time has elapsed while the start input remains on, the output contact goes off. When the start input turns off, the NO contact goes on again. When a preset time has elapsed after the start input turned off, the NO contact goes off.



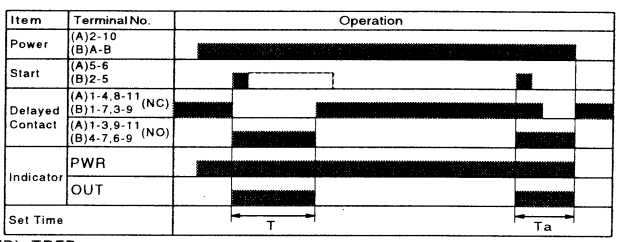
E: Signal OFF-Delay

When power is turned on while the start input is on, the NO output contact goes on. When a preset time has elapsed after the start input turned off, the NO output contact goes off.



F: One-Shot (signal start)

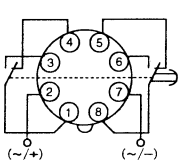
When the start input turns on while power is on, the NO output contact goes on. When a preset time has elapsed, the NO output contact goes off.



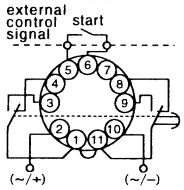
Note : T=Set Time, Ta=Shorter than set time, (1): TRNP, (2): TRNB, (A): TRFP, (B): TRFB

INTERNAL CONNECTIONS

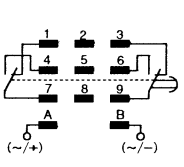
TRNP



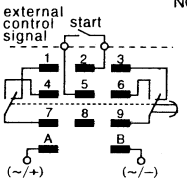
TRFP



TRNB



TRFB



CAUTION:
TRFP: Do not apply voltage to terminals #5, #6 and #7.
TRNB, TRFB: Do not apply voltage to terminals #2, #5 and #8.

NOTE: UL ratings for Eaton Electrical's sockets to be used with these timers are "Conductor temperature rating 60°Cmin., use copper conductors only, solid 12AWG max. (3.5mm²max.) Terminal torque 8 to 10lb.·in (0.9 to 1.1 N·m)."

Eaton Electrical's sockets are as follows.
TRNP: D3PA2 pin type socket.
TRFP: D3PA3-A2 pin type socket.
TRNB, TRFB: D5PA2 blade type socket.

UL Ambient Temperature: 0 to 40°C