RTE Series — Analog Timers

NEW DESIGN!

Key features of the RTE series include:

- **20 time ranges and 10 timing functions**
- **Time delays up to 600 hours**
- **Space-saving package**
- **High repeat accuracy of ± 0.2%**
- **ON and timing OUT LED indicators**
- **Standard 8- or 11-pin and 11-blade termination**
- **2 form C delayed output contacts**
- **10A Contact Rating**

TÜV PRODUCT SERVICE Cert. No. E9950913332316 (EMC, RTE)
cert. No. BL960813332355 (LVD, RTE)

c UL us UL Listed
File No. E66043

CE

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	AF20	100-240V AC(50/60Hz)	
	AD24	24V AC(50/60Hz)/24V DC	
	D12	12V DC	
Voltage Tolerance	AF20	85-264V AC(50/60Hz)	
	AD24	20.4-26.4V AC(50/60Hz)/21.6-26.4V DC	
	D12	10.8-13.2V DC	
Input off Voltage		Rated Voltage x10% minimum	
Ambient Operating Temperature		-20 to +65ºC (without freezing)	
Ambient Storage and Transport Temperature		-30 to +75ºC (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 0.5mm2 hours in each of 3 axes	
Shock Resistance		Operating extremes: 98m/sec^2 (10G) Damage limits: 490m/sec^2 (50G) 3 times in each of 3 axes	
Degree of Protection		IP40 (enclosure) (IEC60529)	
Power Consumption (Approx.) TYPE		RTE-P1, -B1	RTE-P2, -B2
AF20	120V AC/60Hz	6.5VA	6.6VA
	240V AC/60Hz	11.6VA	11.6VA
24V AC 60Hz/DC		3.4VA/1.7W	3.5VA/1.7W
D12		1.6W	1.6W
Mounting Position		Free	
Dimensions	RTE-P1, P2	40Hx 36W x 77.9D mm	
	RTE-B1, B2	40Hx 36W x 74.9D mm	

Weight (Approx.)	RTE-P1	RTE-P2	RTE-B1, -B2
	87g	89g	85g

**For the value of the error against a preset time, whichever the largest.*

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
Life	Electrical	500,000 op. minimum (Resistive)
	Mechanical	50,000,000 op. minimum

RTE Table of Contents

Part Numbering Guide

RTE series part numbers are composed of 4 part number codes. When ordering a RTE series part, select one code from each category.
Example: RTE-P1AF20

RTE	—	P	1	—	AF20
① Series		② Terminal Style	③ Function Group		④ Input Voltage

Part Numbers: RTE Series

	Description	Part Number Code	Remarks
① **Series**	RTE series	RTE	For internal circuits, see next page.
② **Terminal Style**	Pin	P	Select one only.
	Blade	B	
③ **Function Group**	ON-delay, interval, cycle OFF, cycle ON	1	Each function group has different timing functions. See page G-4.
	ON-delay, cycle OFF, cycle ON, signal ON/OFF delay, OFF-delay, one-shot	2	
④ **Input Voltage**	100 to 240V AC(50/60Hz)	AF20	
	24V AC(50/60Hz)/24V DC	AD24	
	12V DC	D12	

Part Number List

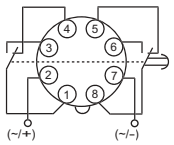
Part Numbers

New Part Number	Voltage	Terminals	Obsolete Part Number
RTE-B1AD24	24V AC/DC	Blade	RTE-B11-24V
			RTE-B12-24V
RTE-B1AF20	100 - 240V AC	Blade	RTE-B11-AC120V
			RTE-B12-AC120V
RTE-B1D12	12V DC	Blade	RTE-B11-12V
			RTE-B12-12V
RTE-B2AD24	24V AC/DC	Blade	RTE-B21-24V
			RTE-B22-24V
RTE-B2AF20	100 - 240V AC	Blade	RTE-B21-AC120V
			RTE-B22-AC120V
RTE-B2D12	12V DC	Blade	RTE-B21-12V
			RTE-B22-12V
RTE-P1AD24	24V AC/DC	8 Pin	RTE-P11-24V
			RTE-P12-24V
RTE-P1AF20	100 - 240V AC	8 Pin	RTE-P11-AC120V
			RTE-P12-AC120V
RTE-P1D12	12V DC	8 Pin	RTE-P11-12V
			RTE-P12-12V
RTE-P2AD24	24V AC/DC	11 Pin	RTE-P21-24V
			RTE-P22-24V
RTE-P2AF20	100 - 240V AC	11 Pin	RTE-P21-AC120V
			RTE-P22-AC120V
RTE-P2D12	12V DC	11 Pin	RTE-P21-12V
			RTE-P22-12V

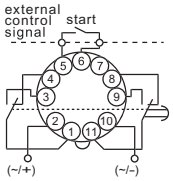
1. *For schematics, see page G-10.*
2. *For timing diagrams, see page G-10.*
3. *All timers have multiple time ranges. For a list of ranges, see page G-13.*
4. *For socket and accessory information, see page G-11.*

Timing Diagrams

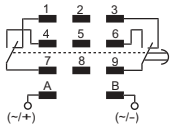
RTE-P1



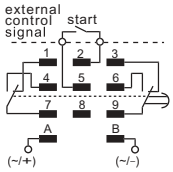
RTE-P2



RTE-B1



RTE-B2

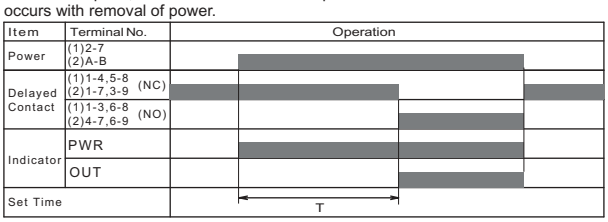


1. RTE-P2: Do not apply voltage to terminals #5, #6 & #7.
2. RTE-B1, -B2: Do not apply voltage to terminals #2, #5 & #8.
3. IDEC sockets are as follows: RTE-P1: SR2P-06 pin type socket, RTE-P2: SR3P-05* pin type socket, RTE-B1, -B2: SR3B-05* blade type socket, (*-may be followed by suffix letter A,B,C or U).*

RTE-P1, -B1

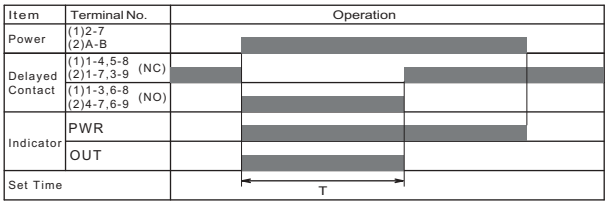
A: ON-Delay 1 (power start)

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.



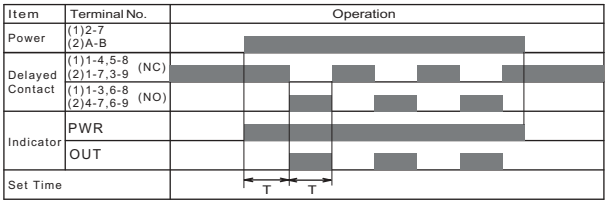
B: Interval (power start)

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.



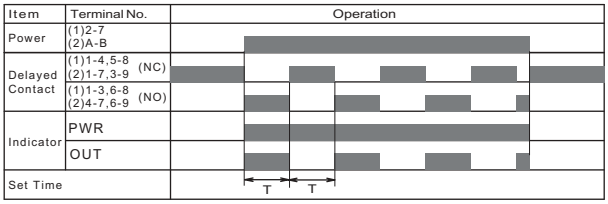
C: Cycle 1 (power start, OFF first)

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)

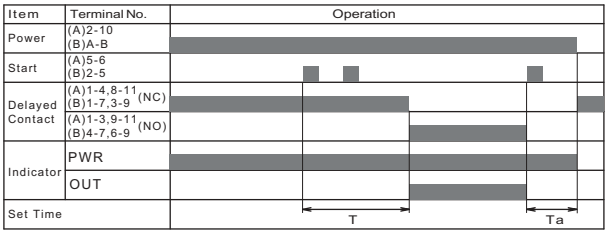
Functions in same manner as Mode C, with the exception that first transfer of contacts occurs as soon as power is applied. The ratio is 1:1. Time On = Time Off



RTE-P2, -B2

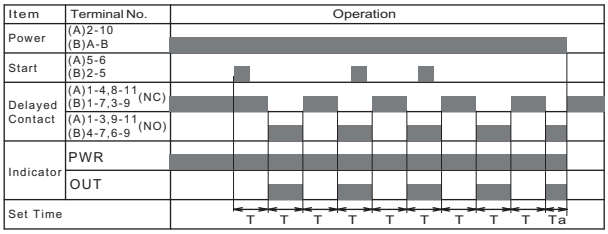
A: ON-Delay 2 (signal start)

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



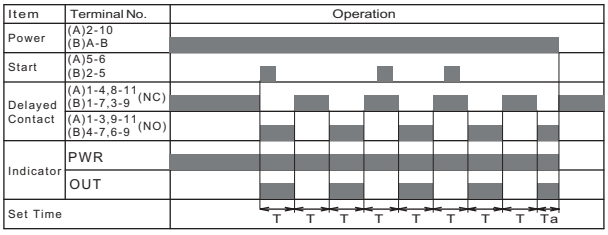
B: Cycle 2 (signal start, OFF first)

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.



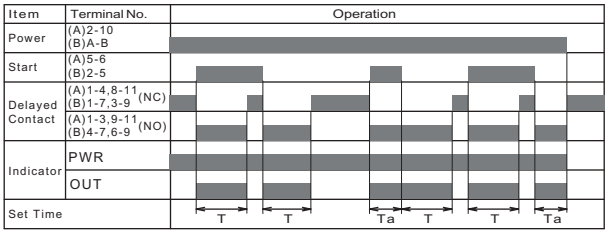
C: Cycle 4 (signal start, ON first)

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).



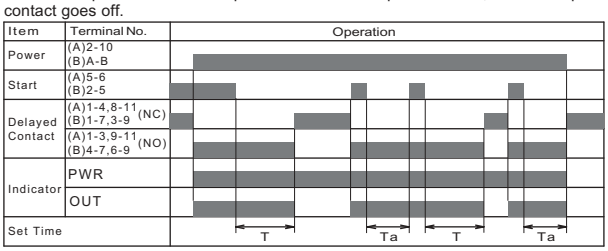
D: Signal ON/OFF-Delay

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.



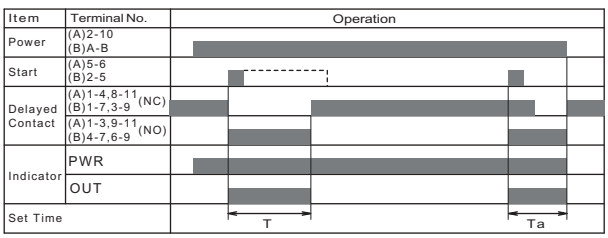
E: Signal OFF-Delay

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): RTE-P1, (2): RTE-B1, (A): RTE-P2, (B): RTE-B2

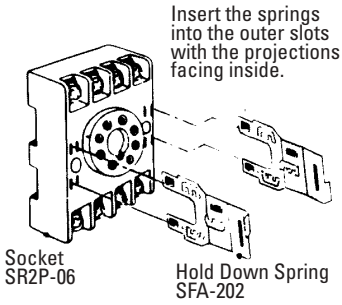
DIN Rail Mounting Accessories

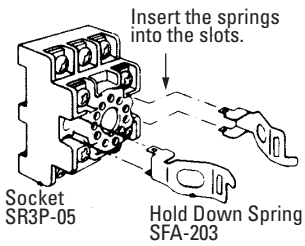
Part Numbers: DIN Rail/Surface Mount Sockets and Hold-Down Springs

DIN Rail Mount Socket				Applicable Hold-Down Springs	
Style	Appearance	Use with Timers	Part No.	Appearance	Part No.
11-Pin Screw Terminal (dual tier)		RTE-P2	SR3P-05		SFA-203
11-Pin FingerSafe Socket		RTE-P2	SR3P-05C		
8-Pin Screw Terminal		RTE-P1	SR2P-06		SFA-202
11-Blade Screw Terminal		RTE-B1 RTE-B2	SR3B-05		
DIN Mounting Rail Length 1000mm		—	BNDN1000		

Installation of Hold-Down Springs

DIN Rail Mount Socket





Once installed into the sockets, the hold-down springs cannot be removed.

G Timers

Panel Mounting Accessories

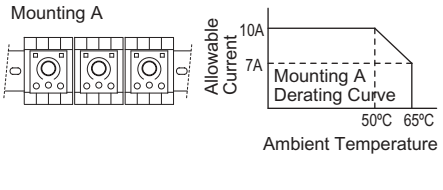
Part Numbers: Flush Panel Mount Adapter and Sockets that use an Adapter

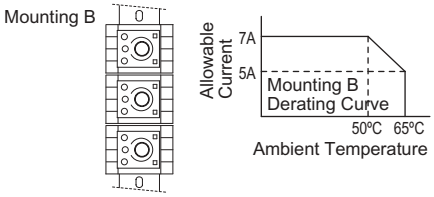
Accessory	Description	Appearance	Use with	Part No.
Panel Mount Adapter	Adaptor for flush panel mounting RTE timers		All RTE timers	RTB-G01
Sockets for use with Panel Mount Adapter	8-pin screw terminal	 (Shown: SR6P-M08G for Wiring Socket Adapter)	RTE-P1	SR6P-M08G
	11-pin screw terminal		RTE-P2	SR6P-M11G
	8-pin solder terminal		RTE-P1	SR6P-S08
	11-pin solder terminal		RTE-P2	SR6P-S11

No hold down clips are available for flush panel mounting applications.

G Timers

Temperature Derating Curves





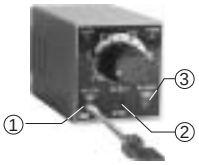
Instructions

Types

RTE-P1AF20

- Power Voltage: AF20: 100 to 240V AC(50/60Hz); AD24: 24V AC(50/60Hz)/24V DC; D12: 12V DC
- Connection type: P: Pin; B: Blade
- Operation Mode: 1: No Control Signal (A: ON-Delay 1; B: Interval; C: Cycle 1; D: Cycle 3); 2: Control Signal (A: ON-Delay 2; B: Cycle 2; C: Cycle 4; D: Signal ON/OFF-Delay; E: Signal OFF-Delay; F: One-Shot)

Switch Settings



① Operation Mode Selector
② Scale Selector
③ Time Range Selector

1. Turn the selectors securely using a flat screwdriver 4mm wide (maximum). Note that incorrect setting may cause malfunction. Do not turn the selectors beyond their limits.
2. Since changing the setting during timer operation may cause malfunction, turn power off before changing.

Safety Precautions

Special expertise is required to use Electronic Timers.

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

Warnings

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

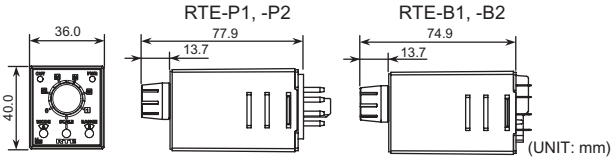
- Turn power off to the Electronic timer before starting installation, removal, wiring, maintenance, and inspection on the Electronic Timer.
- Failure to turn power off may cause electrical shocks or fire hazard.
- Do not use the Electronic Timer for an **emergency stop circuit** or **interlocking circuit**.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

Caution

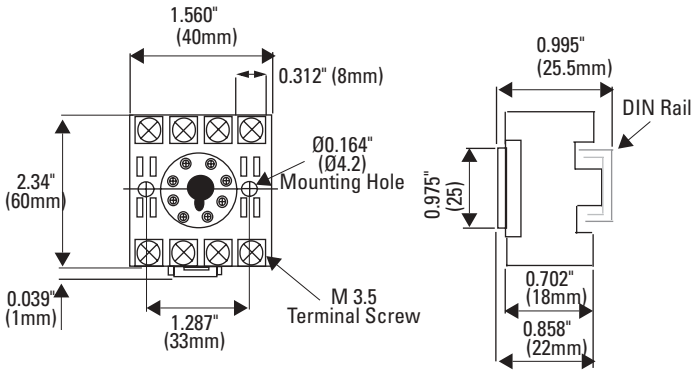
Caution notices are used where inattention might cause personal injury or damage to equipment.

- 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 the specifications. If the Electronic Timer is used in places where it will be subjected to high-temperature, high-humidity, condensation, corrosive gases, excessive vibrations, or excessive shocks, then electrical shocks, fire hazard, or malfunction could 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 industrial waste.

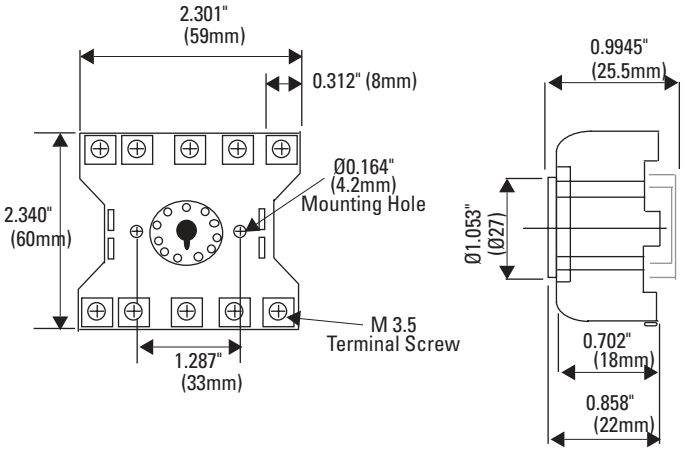
Dimensions



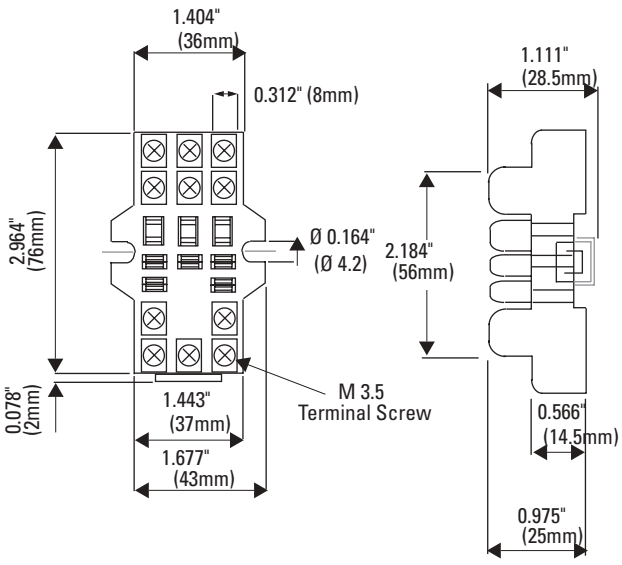
SR2P-06 Socket



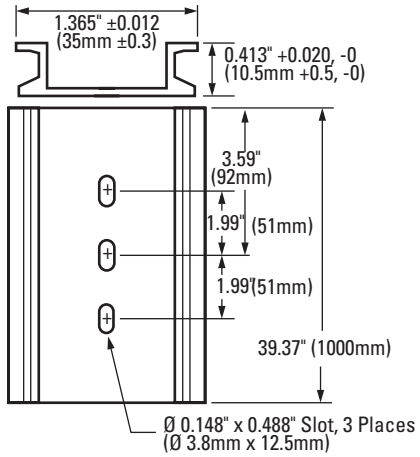
SR3P-06 Socket



SR3B-05 Socket



BNDN1000 DIN Rail



G

Timers

General Instructions for All Timer Series

Load Current
With inductive, capacitive, and incandescent lamp loads, inrush current more than 10 times the rated current may cause welded contacts and other undesired effects. The inrush current and steady-state current must be taken into consideration when specifying a timer.

Contact Protection
Switching an inductive load generates a counter-electromotive force (back EMF) in the coil. The back EMF will cause arcing, which may shorten the contact life and cause imperfect contact. Application of a protection circuit is recommended to safeguard the contacts.

Temperature and Humidity
Use the timer within the operating temperature and operating humidity ranges and prevent freezing or condensation. After the timer has been stored below its operating temperature, leave the timer at room temperature for a sufficient period of time to allow it to return to operating temperatures before use.

Environment
Avoid contact between the timer and sulfurous or ammonia gases, organic solvents (alcohol, benzine, thinner, etc.), strong alkaline substances, or strong acids. Do not use the timer in an environment where such substances are prevalent. Do not allow water to run or splash on the timer.

Vibration and Shock
Excessive vibration or shocks can cause the output contacts to bounce, the timer should be used only within the operating extremes for vibration and shock resistance. In applications with significant vibration or shock, use of hold down springs or clips is recommended to secure a timer to its socket.

Time Setting
The time range is calibrated at its maximum time scale; so it is desirable to use the timer at a setting as close to its maximum time scale as possible. For a more accurate time delay, adjust the control knob by measuring the operating time with a watch before application.

Input Contacts
Use mechanical contact switch or relay to supply power to the timer. When driving the timer with a solid-state output device (such as a two-wire proximity switch, photoelectric switch, or solid-state relay), malfunction may be caused by leakage current from the solid-state device. Since AC types comprise a capacitive load, the SSR dielectric strength should be two or more times the power voltage when switching the timer power using an SSR.

Generally, it is desirable to use mechanical contacts whenever possible to apply power to a timer or its signal inputs. When using solid state devices, be cautious of inrushes and back-EMF that may exceed the ratings on such devices. Some timers are specially designed so that signal inputs switch at a lower voltage than is used to power the timer (models designated as "B" type).

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Timing Accuracy Formulas

Timing accuracies are calculated from the following formulas:

Repeat Error

$$= \pm \frac{1}{2} \times \frac{\text{Maximum Measured Value} - \text{Minimum Measured Value}}{\text{Maximum Scale Value}} \times 100\%$$

Voltage Error

$$= \pm \frac{Tv - Tr}{Tr} \times 100\%$$

T_v: Average of measured values at voltage V
T_r: Average of measured values at the rated voltage

Temperature Error

$$= \pm \frac{Tt - T20}{T20} \times 100\%$$

T_t: Average of measured values at °C
T_{20}: Average of measured values at 20°C

Setting Error

$$= \pm \frac{\text{Average of Measured Values} - \text{Set Value}}{\text{Maximum Scale Value}} \times 100\%$$