# RTE Series — Analog Timers

## Key features:

- 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

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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 600 hours | | |
| 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 +65°C (without freezing) | | |
| Ambient Storage and Transport Temperature | | | -30 to +75°C (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/sec² (10G) | | |
| | | | Damage limits: 490m/sec² (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 |

## 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 |

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

## 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. |
| | ON-delay, cycle OFF, cycle ON, signal ON/ OFF delay, OFF-delay, one-shot | 2 | See page 832. |
| ④ Input Voltage | 100 to 240V AC(50/60Hz) | AF20 | |
| | 24V AC(50/60Hz)/24V DC | AD24 | |
| | 12V DC | D12 | |

### Part Numbers

| Voltage | Power Triggered | | Start Input Triggered | |
|---|---|---|---|---|
| | 8-Pin | Blade | 11-Pin | Blade |
| 12V DC | RTE-P1D12 | RTE-B1D12 | RTE-P2D12 | RTE-B2D12 |
| 24V AC/DC | RTE-P1AD24 | RTE-B1AD24 | RTE-P2AD24 | RTE-B2AD24 |
| 100-240V AC | RTE-P1AF20 | RTE-B1AF20 | RTE-P2AF20 | RTE-B2AF20 |

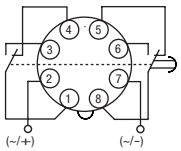
### Time Range Determined by Time Range Selector and Dial Selector

| | Dial | 0 - 1 | 0 - 3 | 0 - 10 | 0 - 30 | 0 - 60 |
|---|---|---|---|---|---|---|
| Range | Second | 0.1 sec - 1 sec | 0.1 sec - 3 sec | 0.2 sec - 10 sec | 0.6 sec - 30 sec | 1.2 sec - 60 sec |
| | Minute | 1.2 sec - 1 min | 3.6 sec - 3 min | 12 sec - 10 min | 36 sec - 30 min | 1.2 min - 60 min |
| | Hour | 1.2 min - 1 hr | 3.6 min - 3 hr | 12 min - 10 hr | 36 min - 30 hr | 1.2 hr - 60 hr |
| | 10 Hours | 12 min - 10 hr | 36 min - 30 hr | 2 hr - 100 hr | 6 hr - 300 hr | 12 hr - 600 hr |

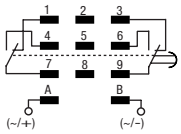
# Timing Diagrams

## RTE-P1, -B1

RTE-P1

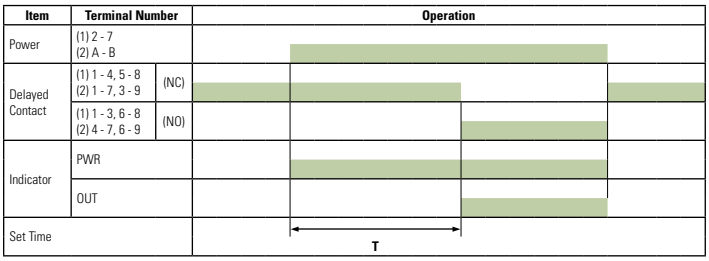



RTE-B1

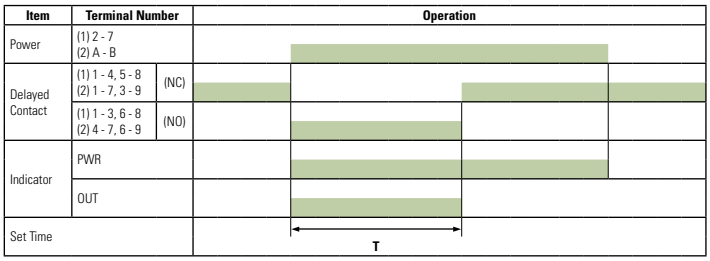



1. RTE-B1: Do not apply voltage to terminals #2, #5 & #8.
2. IDEC sockets are as follows: RTE-P1: SR2P-06* pin type socket, RTE-B1: SR3B-05* blade type socket, (*-may be followed by suffix letter A,B,C or U).

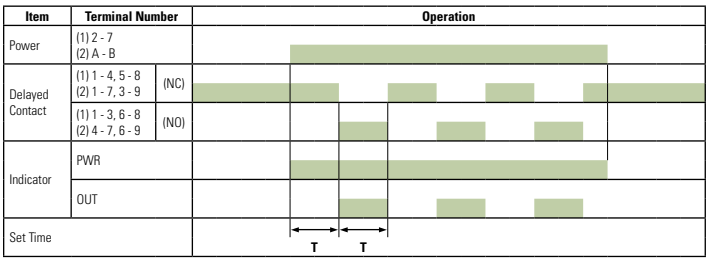
A: ON-Delay 1 (power start)
Set timer for desired delay, apply power to coil. Contacts transfer after preset time has elapsed, and remain in transferred position until timer is reset. Reset occurs with removal of power.



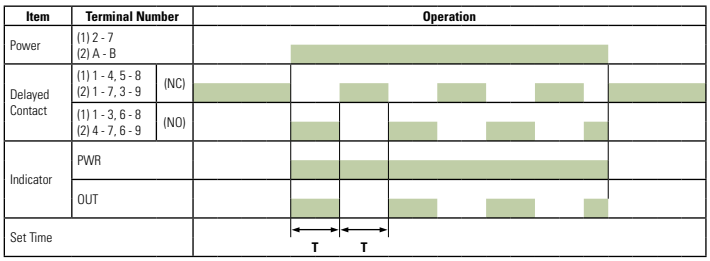

B: Interval (power start)
Set timer for desired delay, apply power to coil. Contacts transfer immediately, and return to original position after preset time has elapsed. Reset occurs with removal of power.




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).

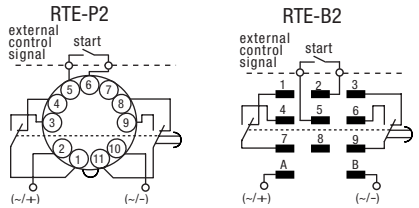



C: Cycle 3 (power start, ON first)
Functions in same manner as Mode C, with the exception that first transfer of contacts occurs as soon as power is applies. The ratio is 1:1. Time On = Time Off



# Timing Diagrams con't

## RTE-P2, -B2




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

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.

| Item | Terminal Number | | Operation |
|---|---|---|---|
| Power | (A) 2 - 10<br>(B) A - B | | |
| Start | (A) 5 - 6<br>(B) 2 - 5 | | |
| Delayed Contact | (A) 1 - 4, 8 - 11<br>(B) 1 - 7, 3 - 9 | (NC) | |
| | (A) 1 - 3, 9 - 11<br>(B) 4 - 7, 6 - 9 | (NO) | |
| Indicator | PWR | | |
| | OUT | | |
| Set Time | | | T |

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.

| Item | Terminal Number | | Operation |
|---|---|---|---|
| Power | (A) 2 - 10<br>(B) A - B | | |
| Start | (A) 5 - 6<br>(B) 2 - 5 | | |
| Delayed Contact | (A) 1 - 4, 8 - 11<br>(B) 1 - 7, 3 - 9 | (NC) | |
| | (A) 1 - 3, 9 - 11<br>(B) 4 - 7, 6 - 9 | (NO) | |
| Indicator | PWR | | |
| | OUT | | |
| Set Time | | | T T T T T T T T T Ta |

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).

| Item | Terminal Number | | Operation |
|---|---|---|---|
| Power | (A) 2 - 10<br>(B) A - B | | |
| Start | (A) 5 - 6<br>(B) 2 - 5 | | |
| Delayed Contact | (A) 1 - 4, 8 - 11<br>(B) 1 - 7, 3 - 9 | (NC) | |
| | (A) 1 - 3, 9 - 11<br>(B) 4 - 7, 6 - 9 | (NO) | |
| Indicator | PWR | | |
| | OUT | | |
| Set Time | | | T T T T T T T T Ta |

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.

| Item | Terminal Number | | Operation |
|---|---|---|---|
| Power | (A) 2 - 10<br>(B) A - B | | |
| Start | (A) 5 - 6<br>(B) 2 - 5 | | |
| Delayed Contact | (A) 1 - 4, 8 - 11<br>(B) 1 - 7, 3 - 9 | (NC) | |
| | (A) 1 - 3, 9 - 11<br>(B) 4 - 7, 6 - 9 | (NO) | |
| Indicator | PWR | | |
| | OUT | | |
| Set Time | | | T T Ta T T Ta |

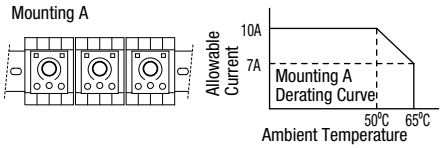
E: Signal OFF-Delay
When power is turned on while the start input is on, the NO output contact goes on. When a preset time has elapsed after the start input turned off, the NO output contact goes off.

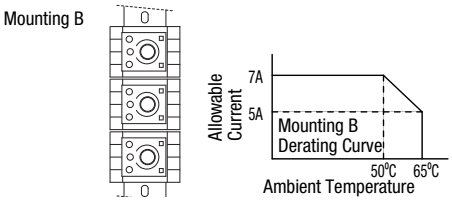
| Item | Terminal Number | | Operation |
|---|---|---|---|
| Power | (A) 2 - 10<br>(B) A - B | | |
| Start | (A) 5 - 6<br>(B) 2 - 5 | | |
| Delayed Contact | (A) 1 - 4, 8 - 11<br>(B) 1 - 7, 3 - 9 | (NC) | |
| | (A) 1 - 3, 9 - 11<br>(B) 4 - 7, 6 - 9 | (NO) | |
| Indicator | PWR | | |
| | OUT | | |
| Set Time | | | T Ta T Ta |

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.

| Item | Terminal Number | | Operation |
|---|---|---|---|
| Power | (A) 2 - 10<br>(B) A - B | | |
| Start | (A) 5 - 6<br>(B) 2 - 5 | | |
| Delayed Contact | (A) 1 - 4, 8 - 11<br>(B) 1 - 7, 3 - 9 | (NC) | |
| | (A) 1 - 3, 9 - 11<br>(B) 4 - 7, 6 - 9 | (NO) | |
| Indicator | PWR | | |
| | OUT | | |
| Set Time | | | |

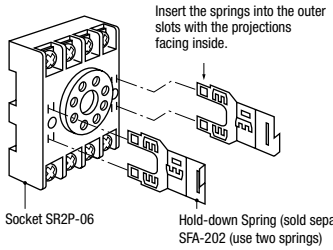
## Temperature Derating Curves

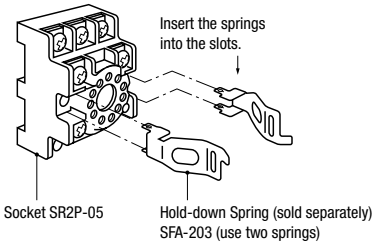



## Instructions

### Installation of Hold-Down Springs DIN Rail Mount Socket




### Switch Settings


①Operator Mode Selector
②Scale Selector
③Time 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.

# Accessories

## DIN Rail Mounting Accessories

### DIN Rail/Surface Mount Sockets and Hold-Down Springs

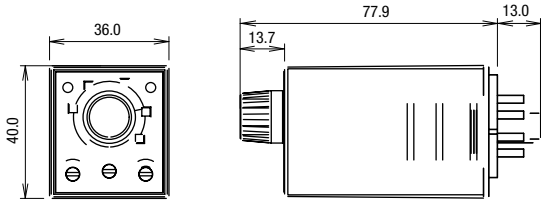
| DIN Rail Mount Socket | | | | Applicable Hold-Down Springs | |
|---|---|---|---|---|---|
| Style | Appearance | Use with Timers | Part Number | Appearance | Part Number |
| 11-Pin Screw Terminal (dual tier) |  | RTE-P2 | SR3P-05 |  | SFA-203 |
| 11-Pin FingerSafe Socket |  | RTE-P2 | SR3P-05C | | |
| 8-Pin Screw Terminal |  | RTE-P1 | SR2P-06 |  | SFA-202 |
| 8-Pin Fingersafe Socket |  | | SR2P-05C | | |
| 11-Blade Screw Terminal |  | RTE-B1 RTE-B2 | SR3B-05 | | |
| DIN Mounting Rail Length 1000mm |  | — | BNDN1000 | | |

## Panel Mounting Accessories

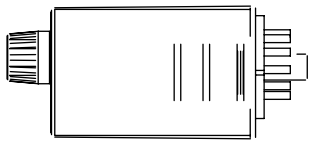
### Flush Panel Mount Adapter and Sockets that use an Adapter

| 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 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 |

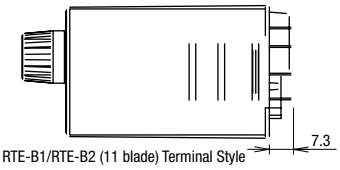
## Dimensions




RTE-P1 (8 pin) Terminal Style



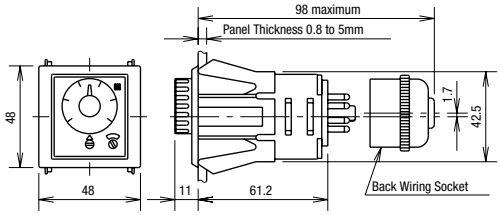
RTE-P2 (11 pin)Terminal Style



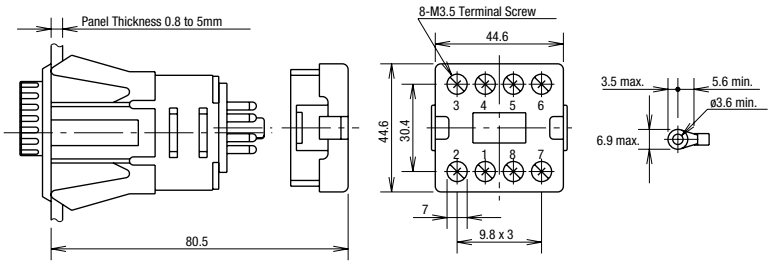

RTE-B1/RTE-B2 (11 blade) Terminal Style

### Panel Mount Adapter

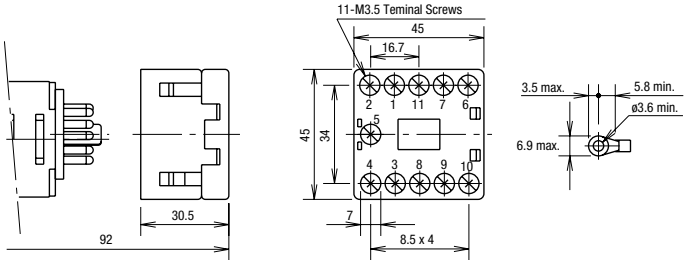
RTE Timer, 8-Pin and 11-Pin with SR6P-S08 or SR6P-S11




RTE Timer, 8-Pin with SR6P-M08G




RTE Timer, 11-Pin with SR6P-M11G



# 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).

## Timing Accuracy Formulas

Timing accuracies are calculated from the following formulas:

**Repeat Error**

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

**Voltage Error**

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

Tv: Average of measured values at voltage V
Tr: Average of measured values at the rated voltage

**Temperature Error**

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

Tt: Average of measured values at °C
T20: Average of measured values at 20°C

**Setting Error**

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