Honeywell

# Precision Thermostats

**DESCRIPTION**

Thermostats can provide either temperature control or over-temperature protection by breaking electrical contact when a specified temperature is reached.

Honeywell manufactures a wide range of thermostats for a variety of potential applications:

- Non-hermetic and hermetically-sealed versions designed to serve infotech, transportation, telecom, industrial, aircraft, medical equipment, radar, communications and electronic control systems needs.
- High reliability military and aerospace versions that meet the unique needs of the military, aerospace and aviation industries.

Honeywell can also integrate these thermostats in higher value cable assemblies, incorporating wire harness and connectors.

Also available are a selection of pre-configured REDI-TEMP Thermostats.

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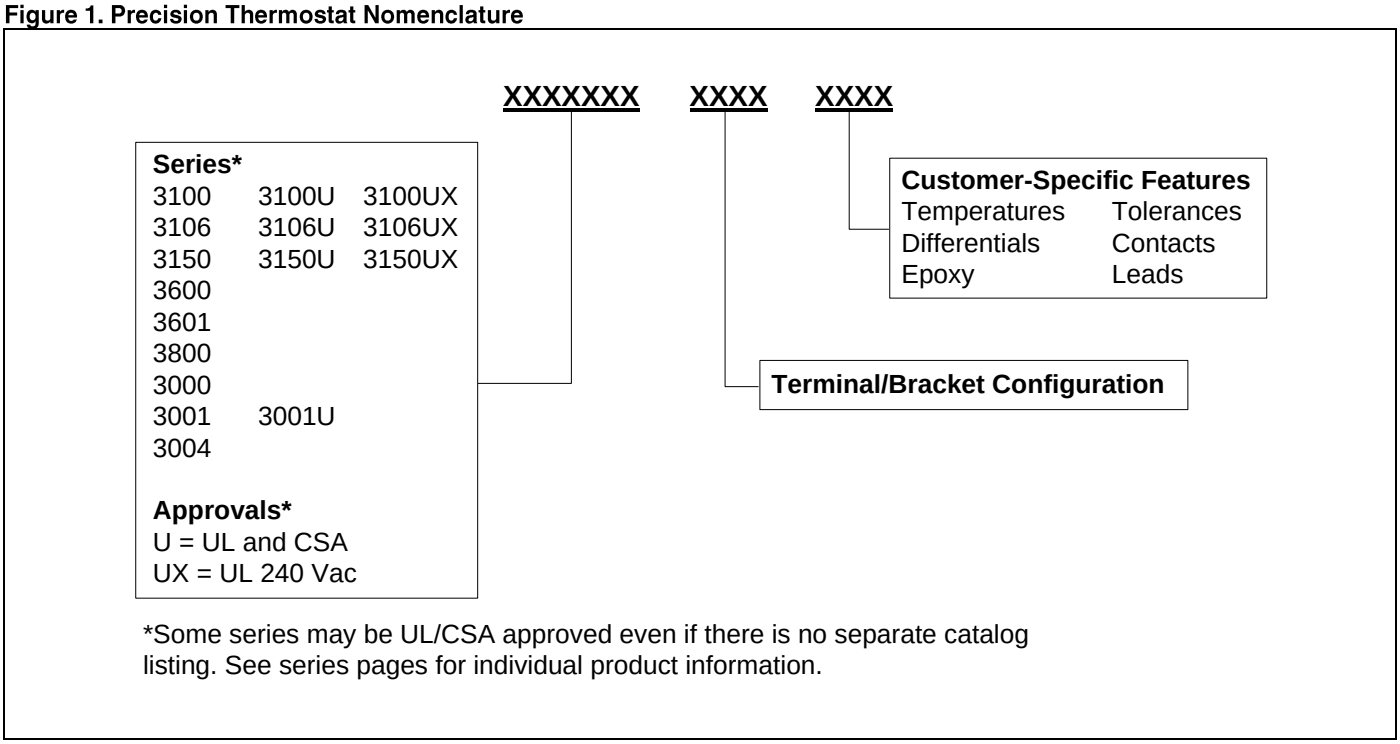
# Precision Thermostats

**NOMENCLATURE**

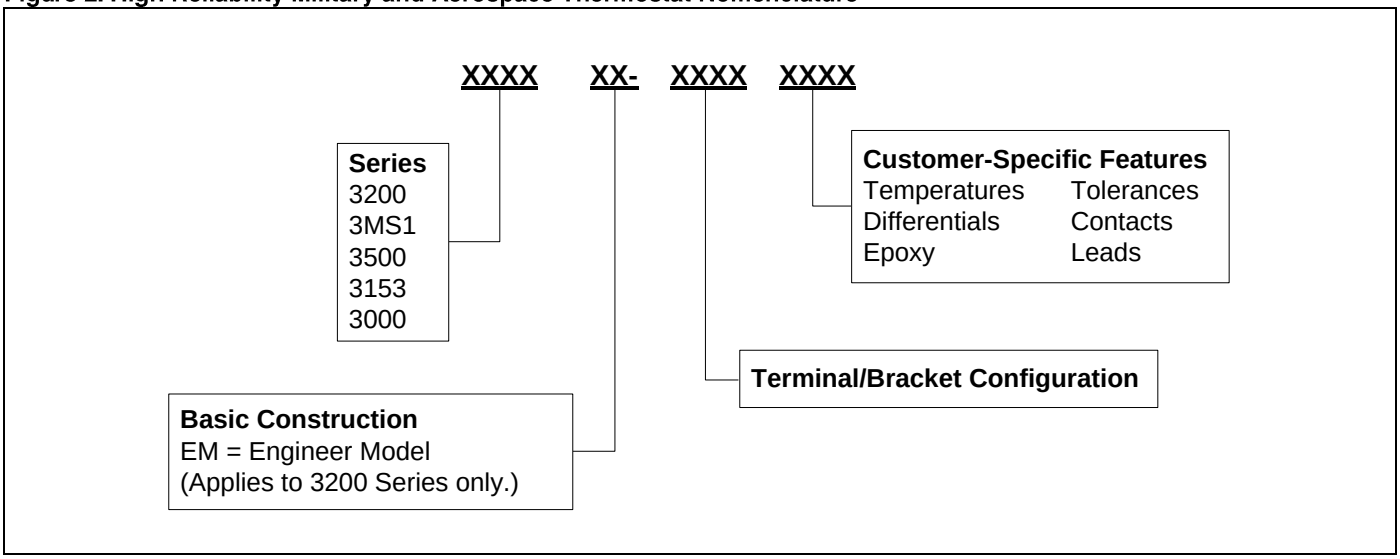
The nomenclature given in Figures 1 and 2 is provided for reference only.

**Figure 1. Precision Thermostat Nomenclature**




*Some series may be UL/CSA approved even if there is no separate catalog listing. See series pages for individual product information.

**Figure 2. High Reliability Military and Aerospace Thermostat Nomenclature**



## DEFINITION OF TERMS

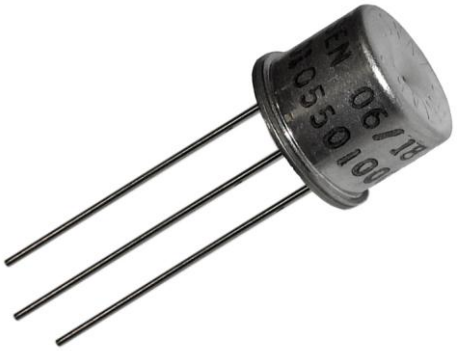
- **Automatic Reset:** A type of thermostat that will automatically reset at a specific temperature (i.e. a thermostat operates at 65,5 ºC [150 ºF] and resets at 48,89 ºC [120 ºF]).
- **Bimetal:** Two dissimilar metals bonded together to form the material for manufacturing thermally-sensitive discs which actuate the thermostat.
- **Close on Rise (COR):** Refers to operation of the contacts. When the temperature rises to its set point, the contacts close or make contact and complete the circuit.
- **Contact Resistance:** The value of resistance measured between the terminals.
- **Dielectric Strength**: The value of insulation between two electrically conducting parts. It may be tested by the application of a predetermined overvoltage for a specified time.
- **Differential:** The temperature difference between the operate and reset set points, also known as operate and reset.
  - **Nominal:** The temperature difference between nominal set points regardless of tolerance.
  - **Maximum:** The temperature difference between the operate and reset points.
  - **Minimum:** Minimum number of degrees between actual open and closing set points.
- **Exposure Temperature:** Thermal environment of a device during application operation.
- **FLA (Full Load Amps):** Current taken from the line by the motor when the motor is yielding the rated hp at the rated voltage and frequency.
- **Life Cycles:** The endurance rating of the thermostat expressed in number of operations with stated electrical load applied. Temperature limit application = open or rise.
- **LRA (Locked Rotor Amps)**: The amount of current the motor can be expected to draw under starting conditions when full voltage is applied, also known as starting inrush current.
- **Manual Reset:** A bimetal thermostat with a reset button that must be pressed to reset the contacts.
- **Open on Rise (OOR):** Refers to the operation of contacts. When the temperature rises to its set point the contacts open, terminating the circuit.
- **Overmold:** Encapsulation with an insulating material.
- **Phenolic:** Thermoset plastic used for the insulating body of the thermostat.
- **Set Point:** The nominal temperature at which the thermostat operates.
- **SPST (Single Pole/Single Throw):** A switch with one current path which can be either open or closed.
- **Tolerance:** The allowable range above and below the set point temperature.
- **Operate:** Change of state when the thermostat reaches its set point.
- **Reset:** Change of state when the thermostat returns to its original condition prior to operation.

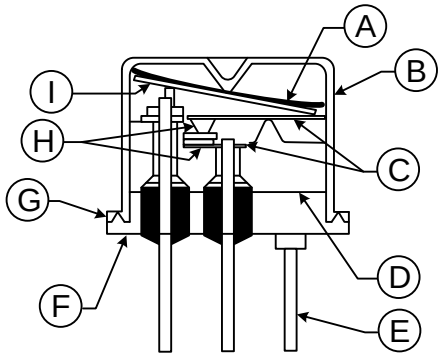
## NOTES

- **Standard Temperature Characteristics Tables:**
  - **Temperatures:** Please consult applications engineering for temperature ranges, tolerances and differentials not noted. The operating temperature ranges include tolerances.
  - **Tolerances:** The ± tolerances given have been established after review of many thermostat applications. Attempts should be made to establish the widest acceptable tolerance possible.
- **UL and CSA Approvals:** 12,7 mm [0.5 in] thermostats are available with multiple agency approval for incorporation into equipment.
- **Fan control applications:** Require thermostat set points to be derated by 20 °C from the equivalent temperature limit application. They also close on rise.

# Precision Thermostats

**Figure 3. 3600/3601 Series TO-5 Thermal Switches**






**A** Bimetal disc
**B** Housing
**C** Contact arms
**D** Base
**E** Case ground lead
**F** Glass header
**G** Resistance weld
**H** Contacts
**I** Insulator

The 3600/3601 Series is a single-pole, single-throw, bimetal snap-action switch that opens (3600) or closes (3601) on temperature rise. This series represents the first hermetically sealed switches in a TO-5 package that is wave solderable, providing increased manufacturing efficiency. They are designed for mounting on printed circuit boards to protect against hazardous temperatures associated with the thermal density of components on backplanes, flexible circuitry and sophisticated time-based circuits. They have WE-1 gold alloy cross point contacts for low voltage applications, and are packaged in a standard JEDEC TO-5 transistor housing with 19 mm [0.75 in] long, 457 mm [0.018 in] diameter leads. They provide both ambient and surface sensing and are preset and tamper-proof. A variety of mounting brackets is available.

Preconfigured REDI-TEMP versions are available. See page 35.

Potential applications:

- Printed circuit boards
- Logic level or dry circuit applications

**Table 1. 3600/3601 Series Standard Temperature Characteristics***

| Series | Operating Temperature Range | Contact Action | Set Point Tolerance |
|---|---|---|---|
| 3600 | 40 °C to 120 °C [104 °F to 248 °F] | open on rise | ±5 °C [±8 °F] |
| 3601 | 40 °C to 120 °C [104 °F to 248 °F] | close on rise | ±7 °C [±12.6 °F] |

*Operating temperatures are available in 5 °C [8 °F] increments between 40 °C to 120 °C [104 °F to 248 °F].

**Table 2. 3600/3601 Series Specifications**

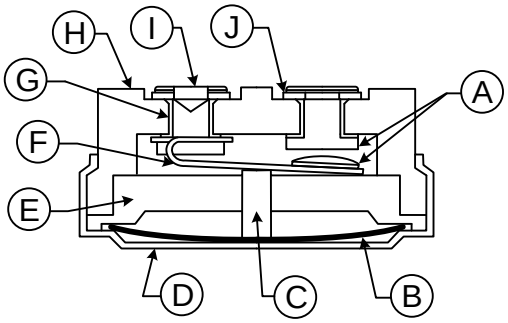
| Characteristic | Parameter |
|---|---|
| Switch type | SPST |
| Reset type | automatic |
| Amperage | 1 A resistive |
| Voltage | 28 Vdc/ac |
| Operating temperature range | 40 °C to 120 °C [104 °F to 248 °F] |
| Environmental exposure range | -50 °C to 150 °C [-58 °F to 302 °F] |
| Dielectric strength | MIL-STD-202 Method 301 – 500 Vac 60 Hz for one second, terminal to case |
| Insulation resistance | MIL-STD-202 Method 302 Cond. B – 20 MOhm, 500 Vdc |
| Contact resistance | MIL-STD-202 Method 307 – 60 mOhm |
| Hermetic seal | MIL-STD-202 Method 112 Cond. $1x10^3$ Atm cc/sec |
| Material: | |
| Base | nickel |
| Contacts | WE-1 gold alloy cross point |
| Terminals | nickel/iron alloy allow, copper core |
| Closure | hermetically sealed |
| Brackets | phosphor bronze |
| Marking | MIL-STD-1285 |
| Weight | 1,6 g [0.06 oz] (brackets and wire leads not included) |

**Table 3. 3600/3601 Series Contact Ratings**

| Life Cycles | 28 Vdc/ac | 5 Vdc/Vac |
|---|---|---|
| 10,000 | 1 A | 5 mA |

# Precision Thermostats

**Figure 4. 3001/3004 Series Non-Hermetic Thermostats**




**A** Contacts
**B** Bimetal disc
**C** Ceramic transfer pin
**D** Metal closure
**E** Phenolic insulator
**F** Contact arm
**G** Metal sleeve (3004 only)
**H** Phenolic base
**I** Rivet (3004 only)
**J** Terminal

The 3001/3004 Series is factory pre-set, single-pole, single-throw thermal switch available to open and close on temperature rise. The 3001 has a low-profile that allows it to be used in most applications where a non-hermetic precision thermostat is required for tight tolerances and the 3004 has a metal sleeve rivet construction. A metal closure makes the phenolic base dustproof and also provides thermal and electrical isolation for the silver contacts.

3001: Not UL/CSA approved.
3001U Vac only: UL/CSA approved.
3004 Vac and hp only: UL/CSA approved.

Potential applications:

- Computers
- Office equipment
- Blood analyzers

**Table 4. 3001/3004 Series Standard Temperature Characteristics**

| Operating Temperature Range | Tolerance | | Standard Mean Differential °C [°F] | Optional Max. Differential °C [°F] |
|---|---|---|---|---|
| | Open °C [°F] | Close °C [°F] | | |
| -17,8 °C to 0 °C [0 °F to 31 °F] | ±3,9 [±7] | ±5,0 [±9] | 16,7 to 33,3 [30 to 60] | - |
| | ±3,3 [±6] | ±3,9 [±7] | 8,3 to 16,1 [15 to 29] | - |
| 0°C to 26,1 °C [32 °F to 79 °F] | ±3,3 [±6] | ±4,4 [±8] | 16,7 to 33,3 [30 to 60] | - |
| | ±2,8 [±5] | ±3,9 [±7] | 8,3 to 16,1 [15 to 29] | - |
| | ±2,8 [±5] | ±2,8 [±5] | 5,6 to 7,8 [10 to 14] | - |
| 26,7 °C to 93,3 °C [80 °F to 200 °F] | ±2,8 [±5] | ±3,9 [±7] | 16,7 to 33,3 [30 to 60] | - |
| | ±2,8 [±5] | ±3,3 [±6] | 8,3 to 16,1 [15 to 29] | - |
| | ±2,8 [±5] | ±2,8 [±5] | 5,6 to 7,8 [10 to 14] | - |
| | ±2,8 [±5] | - | - | 5,6 [10] |
| | - | ±2,8 [±5] | - | 5,6 [10] |
| | ±2,2 [±4] | - | - | 4,4 [8] |
| | - | ±2,2 [±4] | - | 4,4 [8] |
| 93,9 °C to 148,9 °C [201 °F to 300 °F] | ±3,9 [±7] | ±4,4 [±8] | 16,7 to 44,4 [30 to 80] | - |
| | ±3,9 [±7] | ±3,9 [±7] | 13,9 to 16,1 [25 to 29] | - |
| | ±3,3 [±6] | ±3,9 [±7] | 11,1 to 13,3 [20 to 24] | - |
| | ±3,9 [±7] | - | - | 8,3 [15] |
| | - | ±3,9 [±7] | - | 8,3 [15] |
| | ±3,3 [±6] | - | - | 6,7 [12] |
| | - | ±3,3 [±6] | - | 6,7 [12] |
| 149,4 °C to 168,3 °C [301 °F to 335 °F] | ±5,6 [±10] | ±6,7 [±12] | 22,2 to 44,5 [40 to 80] | - |
| | ±5,6 [±10] | ±5,6 [±10] | 19,5 to 21,7 [35 to 39] | - |
| | ±4,4 [±8] | ±5,6 [±10] | 13,9 to 16,1 [30 to 34] | - |
| | ±5,6 [±10] | - | - | 11,1 [20] |
| | - | ±5,6 [±10] | - | 11,1 [20] |
| | ±4,4 [±8] | - | - | 10,0 [18] |
| | - | ±4,4 [±8] | - | 10,0 [18] |

**Table 5. 3001/3004 Series Specifications**

| Characteristic | Parameter |
|---|---|
| Switch type | SPST |
| Reset type | automatic |
| Amperage | see Tables 6, 7, 8 |
| Voltage | 120 Vac |
| Operating temperature range | -17,8 °C to 150 °C [0 °F to 302 °F] |
| Environmental exposure range | -17,8 °C to 177 °C [0 °F to 350 °F] |
| Dielectric strength | MIL-STD-202 Method 301<br>3001: 1500 Vac 60 Hz, terminal to case<br>3004: 2000 Vac 60 Hz, terminal to case |
| Insulation resistance | MIL-STD-202 Method 302 Cond. B – 500 MOhm, 500 Vdc applied |
| Contact resistance | MIL-STD-202 Method 307 – 50 mOhm |
| Material:<br>Base<br>Contacts<br>Terminals<br>Closure<br>Brackets | <br>phenolic<br>silver alloy<br>plated brass or steel<br>aluminum, stainless steel or brass<br>stainless steel or brass |
| Approvals | UL File E36103, CSA File LR21048 |
| Weight | 4 g [0.14 oz] (brackets and wire leads not included) |

**Table 6. 3001 Contact Ratings**

| Life Cycles | 30 Vac/dc | 120 Vac | 240 Vac |
|---|---|---|---|
| 5,000 | 7 A | 6 A | 3 A |
| 10,000 | 6.5 A | 5 A | 2.5 A |
| 25,000 | 6 A | 4 A | 2 A |
| 50,000 | 5.5 A | 3.3 A | 1.5 A |
| 100,000 | 5 A | 2 A | 1 A |

**Table 7. 3001U Contact Ratings**

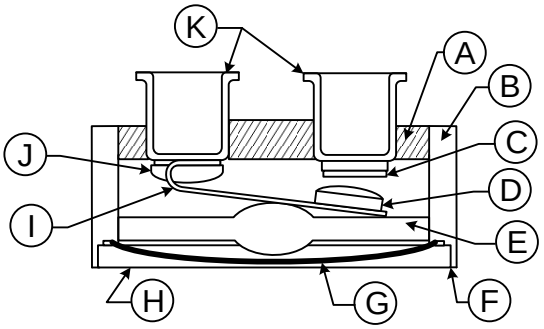
| Life Cycles | 120 Vac | 240 Vac | 250 Vac |
|---|---|---|---|
| 6,000 | 6 A | 1.5 A | 1.5 A |
| 6,000 | 1/10 hp | - | - |
| 100,000 | 3 A | - | - |

**Table 8. 3004 Contact Ratings**

| Life Cycles | 120 Vac | 250 Vac |
|---|---|---|
| 6,000 | 8 A | 1.5 A |
| 6,000 | 1/10 hp | - |
| 100,000 | 4.0 A | - |

# Precision Thermostats

**Figure 5. 3150 Series Low Profile Hermetic Thermostats**




**A** Glass header
**B** Housing
**C** Contact
**D** Movable contact
**E** Actuator
**F** Laser weld
**G** Bimetal disc
**H** Cap
**I** Contact arm
**J** Weld cap
**K** Terminals

The 3150 Series is a single-pole, single-throw switch activated by a snap-action bimetal disc. The case is laser welded to form a hermetically sealed steel housing, with a glass-to-metal seal at the terminal junction. The low profile and compact design allows it to be used in most applications that require miniaturization. Temperature calibrations are pre-set at the factory, and each unit is thermally and mechanically inspected. It is available to open or close on temperature rise. A variety of mounting brackets and terminals is available.

3150: Not UL approved.
3150U 120 Vac max.: UL/CSA approved.
3150UX 240 Vac max.: UL/CSA approved.

Potential applications:
- Office equipment
- Computers
- Aircraft
- Electronic controls

**Table 9. 3150 Series Standard Temperature Characteristics**

| Operating Temperature Range | Tolerance | | Standard Mean Differential °C [°F] | Optional Max. Differential °C [°F] |
|---|---|---|---|---|
| | Open °C [°F] | Close °C [°F] | | |
| -28,89 °C to -12,2 °C [-20 °F to 10 °F] | ±5,6 [±10] | ±4,4 [±8] | 16,7 to 22,2 [30 to 40] | - |
| | ±4,4 [±8] | ±4,4 [±8] | 11,1 to 16,1 [20 to 29] | - |
| | ±3,9 [±7] | ±3,9 [±7] | 7,8 to 10,6 [14 to 19] | - |
| -11,7 °C to 107,2 °C [11 °F to 225 °F] | ±2,8 [±5] | ±2,8 [±5] | 11,1 to 44,4 [20 to 80] | - |
| | ±2,8 [±5] | ±2,8 [±5] | 8,3 to 10,6 [15 to 19] | - |
| | ±2,8 [±5] | ±2,8 [±5] | 5,6 to 7,8 [10 to 14] | - |
| | ±2,2 [±4] | - | - | 4,4 [8] |
| | - | ±2,2 [±4] | - | 4,4 [8] |
| | ±1,7 [±3] | - | - | 3,3 [6] |
| | - | ±1,7 [±3] | - | 3,3 [6] |
| 107,8 °C to 148,9 °C [226 °F to 300 °F] | ±4,4 [±8] | ±3,3 [±6] | 13,9 to 27,8 [25 to 50] | - |
| | 5,6 [±7] | ±3,3 [±6] | 8,3 to 13,3 [15 to 34] | - |
| | ±3,3 [±6] | ±3,3 [±6] | 6,7 to 7,8 [12 to 14] | - |
| | ±2,8 [±5] | - | - | 6,7 [12] |
| | - | ±2,8 [±5] | - | 6,7 [12] |
| | ±2,2 [±4] | - | - | 4,4 [8] |
| | - | ±2,2 [±4] | - | 4,4 [8] |
| 149,4 °C to 176,7 °C [301 °F to 350 °F] | ±6,7 [±12] | ±5,6 [±10] | 19,5 to 27,8 [35 to 50] | - |
| | ±5,6 [±10] | ±5,6 [±10] | 13,9 to 18,9 [25 to 34] | - |
| | ±4,4 [±8] | ±4,4 [±8] | 8,3 to 13,3 [15 to 24] | - |
| | ±3,9 [±7] | - | - | 8,3 [15] |
| | - | ±3,9 [±7] | - | 8,3 [15] |
| | ±2,8 [±5] | - | - | 5,6 [10] |
| | - | ±2,8 [±5] | - | 5,6 [10] |

**Table 10. 3150 Series Specifications**

| Characteristic | Parameter |
|---|---|
| Switch type | SPST |
| Reset type | automatic |
| Amperage | see Tables 11, 12, 13 |
| Voltage | 120 Vac |
| Operating temperature range | -28,89 °C to 177 °C [-20 °F to 350 °F] |
| Environmental exposure range | -54 °C to 260 °C [-65 °F to 500 °F] |
| Dielectric strength | 3150: MIL-STD-202 Method 301 – 750 Vac, 60 Hz terminal to case<br>3150U: MIL-STD-202 Method 301 – 1250 Vac, 60 Hz terminal to case<br>3150UX: MIL-STD-202 Method 301 – 1500 Vac, 60 Hz terminal to case |
| Insulation resistance | MIL-STD-202 Method 302 Cond. B: 50 MOhm, 500 Vdc applied |
| Contact resistance | MIL-STD-202, Method 307: 50 mOhm |
| Hermetic seal | MIL-STD-202, Method 112 Cond. $1x10^5$ Atm cc/sec |
| Moisture resistance | MIL-STD-202, Method 106 |
| Material:<br>Base<br>Contacts<br>Terminals<br>Closure<br>Brackets<br>Plating | <br>cold rolled plated steel<br>silver alloy<br>nickel/iron alloy<br>hermetically sealed<br>cold rolled plated steel<br>copper/nickel QQ-N-290 |
| Marking | MIL-STD-1285 |
| Approvals | UL File E36103, CSA File LR21048 |
| Weight | 5,0 g [0.17 oz] (brackets and wire leads not included) |

**Table 11. 3150 Contact Ratings**

| Life Cycles | 30 Vac/dc | 120 Vac | 240 Vac |
|---|---|---|---|
| 5,000 | 6 A | 6 A | 1.5 A |
| 10,000 | 4 A | 4 A | 1.25 A |
| 25,000 | 3 A | 3 A | 1 A |
| 50,000 | 2 A | 2 A | 1 A |
| 100,000 | 2 A | 2 A | 1 A |

**Table 12. 3150U Contact Ratings**

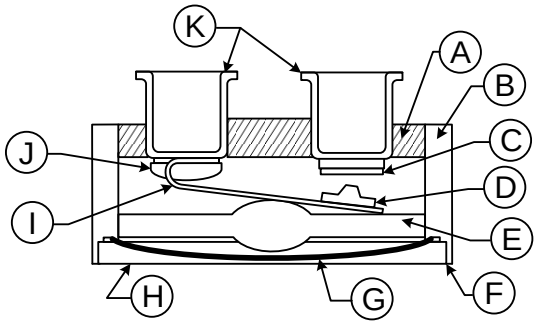
| Life Cycles | 24 Vdc | 120 Vac |
|---|---|---|
| 6,000 | – | 6 A |
| 6,000 | – | 1/10 hp |
| 100,000 | 0.5 A | 3 A |

**Table 13. 3150UX Contact Ratings**

| Life Cycles | 240 Vac |
|---|---|
| 6,000 | 1.5 A |
| 100,000 | 0.25 A |

# Precision Thermostats

**Figure 6. 3156 Series Low Level/Low Profile Hermetic Thermostats**




**A** Glass header
**B** Housing
**C** Contact
**D** Movable contact
**E** Actuator
**F** Laser Weld
**G** Bimetalic disc
**H** Cap
**I** Contact arm
**J** Weld cap
**J** Terminals

The 3156 Series is a single-pole, single-throw switch activated by a snap-action bimetal disc. It has WE-1 gold alloy cross point contacts for use in potential low voltage applications The case is laser welded to form a hermetically-sealed steel housing, with glass-to-metal seal at the terminal junction. Its low silhouette and compact design allows use in most applications that require miniaturization. Temperature calibrations are pre-set at the factory and each unit is thermally and mechanically inspected. It is available to open or close on temperature rise. A variety of mounting brackets and terminals is available.

3156: Not UL/CSA approved.
3156U: UL/CSA approved.

Potential applications:
- Dry circuit applications where space is limited

**Table 14. 3156 Series Standard Temperature Characteristics**

| Operating Temperature Range | Tolerance | | Standard Mean Differential °C [°F] | Optional Max. Differential °C [°F] |
|---|---|---|---|---|
| | Open °C [°F] | Close °C [°F] | | |
| -28,89 °C to -12,2 °C [-20 °F to 10 °F] | ±5,6 [±10] | ±4,4 [±8] | 16,7 to 22,2 [30 to 40] | - |
| | ±4,4 [±8] | ±4,4 [±8] | 11,1 to 16,1 [20 to 29] | - |
| | ±3,9 [±7] | ±3,9 [±7] | 7,8 to 10,6 [14 to 19] | - |
| -11,7 °C to 107,2 °C [11 °F to 225 °F] | ±2,8 [±5] | ±2,8 [±5] | 11,1 to 44,4 [20 to 80] | - |
| | ±2,8 [±5] | ±2,8 [±5] | 8,3 to 10,6 [15 to 19] | - |
| | ±2,8 [±5] | ±2,8 [±5] | 5,6 to 7,8 [10 to 14] | - |
| | ±2,2 [±4] | - | - | 4,4 [8] |
| | - | ±2,2 [±4] | - | 4,4 [8] |
| | ±1,7 [±3] | - | - | 3,3 [6] |
| | - | ±1,7 [±3] | - | 3,3 [6] |
| 107,8 °C to 148,9 °C [226 °F to 300 °F] | ±4,4 [±8] | ±3,3 [±6] | 13,9 to 44,4 [25 to 80] | - |
| | ±3,9 [±7] | ±3,3 [±6] | 8,3 to 13,3 [15 to 24] | - |
| | 3,3 [±6] | ±3,3 [±6] | 6,7 to 7,8 [12 to 14] | - |
| | ±2,8 [±5] | - | - | 6,7 [12] |
| | - | ±2,8 [±5] | - | 6,7 [12] |
| | ±2,2 [±4] | - | - | 4,4 [8] |
| | - | ±2,2 [±4] | - | 4,4 [8] |
| 149,4 °C to 176,7 °C [301 °F to 350 °F] | ±6,7 [±12] | ±5,6 [±10] | 19,5 to 27,8 [35 to 50] | - |
| | ±5,6 [±10] | ±5,6 [±10] | 13,9 to 18,9 [25 to 34] | - |
| | ±4,4 [±8] | ±4,4 [±8] | 8,3 to 13,3 [15 to 24] | - |
| | ±3,9 [±7] | - | - | 8,3 [15] |
| | - | ±3,9 [±7] | - | 8,3 [15] |
| | ±2,8 [±5] | - | - | 5,6 [10] |
| | - | ±2,8 [±5] | - | 5,6 [10] |

**Table 15. 3156 Series Specifications**

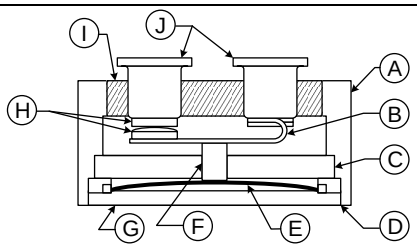
| Characteristic | Parameter |
|---|---|
| Switch type | SPST |
| Reset type | automatic |
| Amperage | 500 mA |
| Voltage | 50 Vdc |
| Operating temperature range | -28,89 °C to 177 °C [-20 °F to 350 °F] |
| Environmental exposure range | -54 °C to 260 °C [-65 °F to 500 °F] |
| Dielectric strength | 3156: MIL-STD-202 Method 301 – 750 Vac, 60 Hz terminal to case<br>3156U: MIL-STD-202 Method 301 – 1250 Vac, 60 Hz terminal to case |
| Insulation resistance | MIL-STD-202 Method 302 Cond. B – 50 MOhm, 500 Vdc applied |
| Contact resistance | MIL-STD-202, Method 307 – 50 mOhm |
| Hermetic seal | MIL-STD-202, Method 112 Cond. $1x10^{5}$ Atm cc/sec |
| Moisture resistance | MIL-STD-202, Method 106 |
| Material:<br>Base<br>Contacts<br>Terminals<br>Closure<br>Brackets<br>Plating | <br>cold rolled plated steel<br>WE-1 gold alloy cross point<br>nickel/iron alloy<br>hermetically sealed<br>cold rolled plated steel<br>copper/nickel QQ-N-290 |
| Marking | MIL-STD-1285 |
| Approvals | UL File E36103, CSA File LR21048 |
| Weight | 5,0 g [0.17 oz] (brackets and wire leads not included) |

**Table 16. 3156 Series Contact Ratings**

| Life Cycles | 50 Vdc | 120 Vac |
|---|---|---|
| 100,000 | 500 mA | 100 mA |

# Precision Thermostats

**Figure 7. 3100 Series Hermetic Thermostats**




**A** Housing
**B** Contact arm
**C** Ceramic insulator
**D** Laser weld
**E** Bimetal disc
**F** Ceramic transfer pin
**G** Cap
**H** Contacts
**I** Glass header
**J** Terminals

The 3100 Series is a single-pole, single-throw switch activated by a snap-action bimetal disc. The case is laser welded to form a hermetically-sealed steel housing, with a glass-to-metal seal at the terminal junction. Temperature calibrations are pre-set at the factory. Each unit is thermally and mechanically inspected and tamperproof. They are available to open or close on temperature rise. A variety of mounting brackets and terminals is available.

Preconfigured REDI-TEMP versions are available. See page 34.

3100 120 Vac max.: Not UL/CSA approved.
3100U 240 V: UL/CSA approved.
3100UX: UL/CSA approved.

Potential applications include high temperature control for:
- Office equipment
- Computers
- Aircraft
- Electronic controls

**Table 17. 3100 Series Standard Temperature Characteristics**

| Operating Temperature Range | Tolerance | | Standard Mean Differential °C [°F] | Optional Max. Differential °C [°F] |
|---|---|---|---|---|
| | Open °C [°F] | Close °C [°F] | | |
| -28,89 °C to -12,2 °C [-20 °F to 10 °F] | ±5,6 [±10] | ±4,4 [±8] | 16,7 to 22, 2 [30 to 40] | - |
| | ±4,4 [±8] | ±4,4 [±8] | 11,1 to 16,1 [20 to 29] | - |
| | ±3,9 [±7] | ±3,9 [±7] | 7,8 to 10,6 [14 to 19] | - |
| | ±3,3 [±6] | - | - | 4,4 [8] |
| | - | ±3,3 [±6] | - | 4,4 [8] |
| -11,7 °C to 93,3 °C [11 °F to 200 °F] | ±2,8 [±5] | ±2,8 [±5] | 11,1 to 44,4 [20 to 80] | - |
| | ±2,8 [±5] | ±2,8 [±5] | 8,3 to 10,6 [15 to 19] | - |
| | ±2,8 [±5] | ±2,8 [±5] | 5,6 to 7,8 [10 to 14] | - |
| | ±2,2 [±4] | - | - | 4,4 [8] |
| | - | ±2,2 [±4] | - | 4,4 [8] |
| | ±1,7 [±3] | - | - | 3,3 [6] |
| | - | ±1,7 [±3] | - | 3,3 [6] |
| 93,9 °C to 148,9 °C [201 °F to 300 °F] | ±4,4 [±8] | ±3,3, [±6] | 13,9 to 44,4 [25 to 80] | - |
| | ±3,9 [±7] | ±3,3 [±6] | 8,3 to 13,3 [15 to 24] | - |
| | ±3,3 [±6] | ±3,3 [±6] | 6,7 to 7,8 [12 to 14] | - |
| | ±2,8 [±5] | ±2,8 [±5] | 5,6 to 7,8 [10 to 14] | - |
| | ±2,2 [±4] | - | - | 4,4 [8] |
| | - | ±2,2 [±4] | - | 4,4 [8] |
| 149,4 °C to 176,7 °C [301 °F to 350 °F] | ±6,7 [±12] | ±5,6 [±10] | 19,4 to 44,4 [35 to 80] | - |
| | ±5,6 [±10] | ±5,6 [±10] | 13,9 to 18,9 [25 to 34] | - |
| | ±4,4 [±8] | ±4,4 [±8] | 8,9 to 13,3 [16 to 24] | - |
| | ±3,9 [±7] | ±3,9 [±7] | 7,8 to 10,0 [14 to 18] | - |
| | ±2,8 [±5] | - | - | 5,6 [10] |
| | - | ±2,8 [±5] | - | 5,6 [10] |
| 177,2 °C to 204,4 °C [351 °F to 400 °F] | ±8,3 [±15] | ±8,3 [±15] | 22,2 to 55,6 [40 to 100] | - |
| | ±8,3 [±15] | ±6,7 [±12] | 16,7 to 21,7 [30 to 39] | - |
| | ±5,6 [±10] | ±5,6 [±10] | 11,1 to 16,1 [20 to 29] | - |
| | ±4,4 [±8] | ±4,4 [±8] | 8,9 to 10,6 [16 to 19] | - |
| | ±3,3 [±6] | - | - | 8,3 [15] |
| | - | ±3,3 [±6] | - | 8,3 [15] |
| 205 °C to 232,20 °C [401 °F to 450 °F] | ±11,1 [±20] | ±8,3 [±15] | 22,2 to 55,6 [40 to 100] | - |
| 232,8 °C to 260 °C [451 °F to 500 °F] | ±13,9 [±25] | ±13,9 [±25] | 33,3 to 66,7 [60 to 120] | - |

**Table 18. 3100 Series Specifications**

| Characteristic | Parameter |
|---|---|
| Switch type | SPST |
| Reset type | automatic |
| Amperage | see Tables 19, 20, 21 |
| Voltage | 30 Vac/dc |
| Operating temperature range | -28,89 °C to 260 °C [-20 °F to 500 °F] |
| Environmental exposure range | -62 °C to 288 °C [-80 °F to 550 °F] |
| Dielectric strength | 3100 and 3100U: MIL-STD-202 Method 301 – 1250 Vac, 60 Hz terminal to case<br>3100UX: MIL-STD-202 Method 301 – 1500 Vac, 60 Hz terminal to case |
| Insulation Resistance | MIL-STD-202 Method 302 Cond. B – 50 MOhm, 500 Vdc applied |
| Contact Resistance | MIL-STD-202, Method 307 – 50 mOhm |
| Hermetic seal | MIL-STD-202, Method 112 Cond. $1x10^5$ Atm cc/sec |
| Moisture resistance | MIL-STD-202, Method 106 |
| Material:<br>Base<br>Contacts<br>Terminals<br>Closure<br>Brackets<br>Plating | <br>cold rolled plated steel<br>silver<br>nickel/iron alloy<br>hermetically sealed<br>cold rolled plated steel<br>copper/nickel QQ-N-290 |
| Marking | Mil-STD-1285 |
| Approvals | 3100U: UL File E36103; CSA File LR21048 |
| Weight | 5,5 g [0.19 oz] (brackets and wire leads not included) |

**Table 19. 3100 Contact Ratings**

| Life Cycles | 30 Vac/dc | 120 Vac | 240 Vac |
|---|---|---|---|
| 5,000 | 7 A | 6 A | 3 A |
| 10,000 | 6.5 A | 5 A | 2.5 A |
| 25,000 | 6 A | 4 A | 2 A |
| 50,000 | 5.5 A | 3 A | 1.5 A |
| 100,000 | 5 A | 2 A | 1 A |

**Table 20. 3100U Contact Ratings**

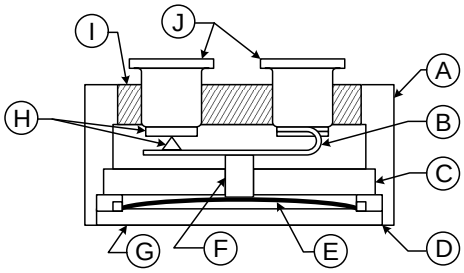
| Life Cycles | 120 Vac |
|---|---|
| 6,000 | 6 A |
| 6,000 | 1/10 hp |
| 100,000 | 3 A |
| 30,000 | 3 A |
| 100,000 | 100 mA |

**Table 21. 3100UX Contact Ratings**

| Life Cycles | 240 Vac |
|---|---|
| 6,000 | 1.5 A |
| 6,000 | - |
| 100,000 | 1.1025 A |
| 30,000 | - |
| 100,000 | - |

# Precision Thermostats

**Figure 8. 3106 Series Low Level Hermetic Thermostats**




**A** Housing
**B** Contact arm
**C** Ceramic insulator
**D** Laser weld
**E** Bimetal disc
**F** Ceramic transfer pin
**G** Cap
**H** Gold alloy contacts
**I** Glass header
**J** Terminals

The 3106 Series is a single-pole, single-throw switch activated by a snap-action bimetal disc. The case is laser welded to form a hermetically-sealed steel housing, with a glass-to-metal seal at the terminal junction. WE-1 gold alloy cross point contacts allow use in potential low voltage applications. Temperature calibrations are pre-set at the factory, and each unit is thermally and mechanically inspected. It is available to open or close on temperature rise. A variety of mounting brackets and terminals is available.

3106: Not UL/CSA approved.
3106U: UL/CSA approved.

Potential applications:
- Logic level
- Dry circuit applications

**Table 22. 3106 Series Standard Temperature Characteristics**

| Operating Temperature Range | Tolerance | | Standard Mean Differential °C [°F] | Optional Max. Differential °C [°F] |
|---|---|---|---|---|
| | Open °C [°F] | Close °C [°F] | | |
| -28,89 °C to -12,2 °C [-20 °F to 10 °F] | ±5,6 [±10] | ±4,4 [±8] | 16,7 to 22, 2 [30 to 40] | - |
| | ±4,4 [±8] | ±4,4 [±8] | 11,1 to 16,1 [20 to 29] | - |
| | ±3,9 [±7] | ±3,9 [±7] | 7,8 to 10,6 [14 to 19] | - |
| | ±3,3 [±6] | - | - | 4,4 [8] |
| | - | ±3,3 [±6] | - | 4,4 [8] |
| -11,7 °C to 93,3 °C [11 °F to 200 °F] | ±2,8 [±5] | ±2,8 [±5] | 11,1 to 44,4 [20 to 80] | - |
| | ±2,8 [±5] | ±2,8 [±5] | 8,3 to 10,6 [15 to 19] | - |
| | ±2,8 [±5] | ±2,8 [±5] | 5,6 to 7,8 [10 to 14] | - |
| | ±2,2 [±4] | - | - | 4,4 [8] |
| | - | ±2,2 [±4] | - | 4,4 [8] |
| | ±1,7 [±3] | - | - | 3,3 [6] |
| | - | ±1,7 [±3] | - | 3,3 [6] |
| 93,9 °C to 148,9 °C [201 °F to 300 °F] | ±4,4 [±8] | ±3,3, [±6] | 13,9 to 44,4 [25 to 80] | - |
| | ±3,9 [±7] | ±3,3 [±6] | 8,3 to 13,3 [15 to 24] | - |
| | ±3,3 [±6] | ±3,3 [±6] | 6,7 to 7,8 [12 to 14] | - |
| | ±2,8 [±5] | ±2,8 [±5] | 5,6 to 7,8 [10 to 14] | - |
| | ±2,2 [±4] | - | - | 4,4 [8] |
| | - | ±2,2 [±4] | - | 4,4 [8] |
| 149,4 °C to 176,7 °C [301 °F to 350 °F] | ±6,7 [±12] | ±5,6 [±10] | 19,4 to 44,4 [35 to 80] | - |
| | ±5,6 [±10] | ±5,6 [±10] | 13,9 to 18,9 [25 to 34] | - |
| | ±4,4 [±8] | ±4,4 [±8] | 8,9 to 13,3 [16 to 24] | - |
| | ±3,9 [±7] | ±3,9 [±7] | 7,8 to 10,0 [14 to 18] | - |
| | ±2,8 [±5] | - | - | 5,6 [10] |
| | - | ±2,8 [±5] | - | 5,6 [10] |
| 177,2 °C to 204,4 °C [351 °F to 400 °F] | ±8,3 [±15] | ±8,3 [±15] | 22,2 to 55,6 [40 to 100] | - |
| | ±8,3 [±15] | ±6,7 [±12] | 16,7 to 21,7 [30 to 39] | - |
| | ±5,6 [±10] | ±5,6 [±10] | 11,1 to 16,1 [20 to 29] | - |
| | ±4,4 [±8] | ±4,4 [±8] | 8,9 to 10,6 [16 to 19] | - |
| | ±3,3 [±6] | - | - | 8,3 [15] |
| | - | ±3,3 [±6] | - | 8,3 [15] |

**Table 23. 3106 Series Specifications**

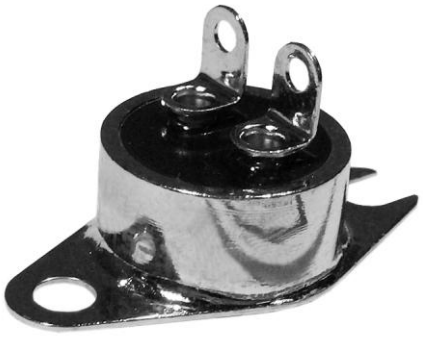
| Characteristic | Parameter |
|---|---|
| Switch type | SPST |
| Reset type | automatic |
| Amperage | 500 mA |
| Voltage | 50 Vdc |
| Operating temperature range | -29 °C to 204,4 °C [-20 °F to 400 °F] |
| Environmental exposure range | -62 °C to 260 °C [80 °F to 500 °F] |
| Dielectric strength | MIL-STD-202 Method 301 – 1250 Vac 60 Hz, terminal to case |
| Insulation resistance | MIL-STD-202 Method 302 Cond. B – 50 MOhm, 500 Vdc applied |
| Contact resistance | MIL-STD-202, Method 307 – 25 mOhm |
| Hermetic seal | MIL-STD-202, Method 112 Cond. $1x10^{5}$ Atm cc/sec |
| Moisture resistance | MIL-STD-202, Method 106 |
| Material:<br>Base<br>Contacts<br>Terminals<br>Closure<br>Brackets<br>Plating | <br>cold rolled plated steel<br>WE-1 gold alloy cross point<br>nickel/iron alloy<br>hermetically sealed<br>cold rolled plated steel<br>copper/nickel QQ-N-290 |
| Marking | MIL-STD 1285 |
| Approvals | UL File E36103, CSA File LR21048 |
| Weight | 5,5 g [0.19 oz] (brackets and wire leads not included) |

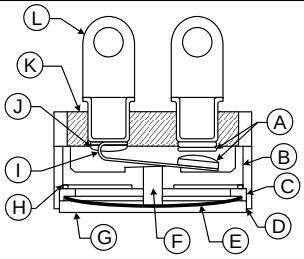
**Table 24. 3106 Series Contact Ratings**

| Life Cycles | 24 Vdc | 50 Vdc | 120 Vac |
|---|---|---|---|
| 100,000 | 500 mA | 500 mA | 100 mA |

# Precision Thermostats

**Figure 9. 3800 Series Industrial Grade Thermostats for Severe Duty Applications**






**A** Contacts
**B** Ceramic insulator
**C** Disc retainer
**D** Laser weld
**E** Bimetal disc
**F** Ceramic transfer pin
**G** Cap
**H** Capping washer
**I** Contact arm
**J** Weld cap
**K** Glass header
**L** Terminal

The 3800 Series uses the same materials and manufacture as Honeywell's military-grade thermostats, allowing them to be used where high levels of vibration and mechanical shock are common but a military device is not required. Originally designed for use in motor protection applications, the 3800 Series is now used in commercial aircraft, such as the Boeing 737, 747, 757, 767 and 777, and other applications where severe duty may be encountered.

Available in UL and CSA versions. Please contact Honeywell.

Potential applications:
- Commercial aircraft
- Industrial
- HVAC

**Table 25. Standard Temperature Characteristics**

| Operating Temperature Range | Tolerance | | Standard Mean Differential °C [°F] | Optional Max. Differential °C [°F] |
|---|---|---|---|---|
| | Open °C [°F] | Close °C [°F] | | |
| -28,9 °C to -12.2 °C [-20 °F to 10 °F] | ±5,6 [±10] | ±4,4 [±8] | 16,7 to 22,2 [30 to 40] | - |
| | ±4,4 [±8] | ±4,4 [±8] | 11,1 to 16,1 [20 to 29] | - |
| | ±3,9 [±7] | ±3,9 [±7] | 7,8 to 10,6 [14 to 19] | - |
| | ±3,3 [±6] | - | - | 4,4 [8] |
| | - | ±3,3 [±6] | - | 4,4 [8] |
| -11.7°C to 93.3 °C [11 °F to 200 °F] | ±2,8 [±5] | ±2,8 [±5] | 11,1 to 44,4 [20 to 80] | - |
| | ±2,8 [±5] | ±2,8 [±5] | 8,3 to 10,6 [15 to 19] | - |
| | ±2,8 [±5] | ±2,8 [±5] | 5,6 to 7,8 [10 to 14] | - |
| | ±2,2 [±4] | - | - | 4,4 [8] |
| | - | ±2,2 [±4] | - | 4,4 [8] |
| | ±1,7 [±3] | - | - | 3,3 [6 |
| | - | ±1,7 [±3] | - | 3,3 [6 |
| 93,9 °C to 148,9 °C [201 °F to 300 °F] | ±4,4 [±8] | ±3,3 [±6] | 13,9 to 44,4 [25 to 80] | - |
| | ±3,9 [±7] | ±3,3 [±6] | 8,3 to 13,3 [15 to 24] | - |
| | ±3,3 [±6] | ±3,3 [±6] | 6,7 to 7,8 [12 to 14] | - |
| | ±2,8 [±5] | ±2,8 [±5] | 5,6 to 7,8 [10 to 14] | - |
| | ±2,2 [±4] | - | - | 4,4 [8] |
| | - | ±2,2 [±4] | - | 4,4 [8] |
| 149,4 °C to 176,7 °C [301 °F to 350 °F] | ±6,7 [±12] | ±5,6 [±10] | 19,4 to 44,4 [35 to 80] | - |
| | ±5,6 [±10] | ±5,6 [±10] | 13,9 to 18,9 [25 to 34] | - |
| | ±4,4 [±8] | ±4,4 [±8] | 8,9 to 13,3 [16 to 24] | - |
| | ±3,9 [±7] | ±3,9 [±7] | 7,8 to 10,0 [14 to 18] | - |
| | ±2,8 [±5] | - | - | 5,6 [10] |
| | - | ±2,8 [±5] | - | 5,6 [10] |
| 177,2 °C to 204,4 °C [351 °F to 400 °F] | ±8,3 [±15] | ±8,3 [±15] | 22,2 to 55,6 [40 to 100] | - |
| | ±8,3 [±15] | ±6,7 [±12] | 16,7 to 21,7 [30 to 39] | - |
| | ±5,6 [±10] | ±5,6 [±10] | 11,1 to 16,1 [20 to 29] | - |
| | ±4,4 [±8] | ±4,4 [±8] | 8,9 to 10,6 [16 to 19] | - |
| | ±3,3 [±6] | - | - | 6,7 [12] |
| | - | ±3,3 [±6] | - | 6,7 [12] |
| 205 °C to 232,2 °C [401 °F to 450 °F] | ±11,1 [±20] | ±8,3 [±15] | 22,2 to 55,6 [40 to 100] | - |
| 232,8 °C to 260 °C [541 °F to 500 °F] | ±13,9 [±25] | ±13,9 [±25] | 33,3 to 66,7 [60 to 120] | - |

**Table 26. 3800 Series Specifications**

| Characteristic | Parameter |
|---|---|
| Switch type | SPST |
| Reset type | automatic |
| Amperage | see Table 27 |
| Voltage | 120 Vac |
| Operating temperature range | -28.9 °C to 260 °C [-20 °F to 500 °F] |
| Environmental exposure range | -62 °C to 288 °C [-80 °F to 550 °F] |
| Dielectric strength | MIL-STD-202 Method 301, 1250 Vac 60 Hz, terminal to case |
| Insulation resistance | MIL-STD-202 Method 302 Cond. B, 50 MOhm, minimum terminal to case |
| Contact resistance | MIL-STD-202 Method 307, 50 mOhm max. |
| Hermetic seal | MIL-STD-202, Method 112, Cond. A, A x $10^{-5}$ atm cc/sec |
| Vibration (random) | MIL-STD-202, Method 214, 30 Grms, 20 Hz to 2,000 Hz |
| Vibration (sinusoidal) | MIL-STD-202, Method 204, Cond. D 20 G, 20 Hz to 2,000 Hz |
| Mechanical shock | MIL-STD-202, Method 213, 400 G |
| Thermal shock | MIL-STD-202, Method 107, Cond. B |
| Acceleration | MIL-STD-202, Method 212, 20 G |
| Moisture resistance | MIL-STD-202, Method 106 |
| Material:<br>Base<br>Contacts<br>Terminals<br>Closure<br>Brackets | <br>cold plated steel<br>silver alloy<br>Ni/Fe Alloy<br>hermetically sealed<br>cold rolled plated steel |
| Marking | MIL-STD-1285 |
| Weight | 7.5 g [0.26 oz] (brackets and wires not included) |

**Table 27. 3800 Series Contact Ratings**

| Life Cycles | 30 Vac/dc | 120 Vac | 240 Vac |
|---|---|---|---|
| 5,000 | 7 A | 6 A | 3 A |
| 10,000 | 6.5 A | 5 A | 2.5 A |
| 25,000 | 6 A | 4 A | 2 A |
| 50,000 | 5.5 A | 3 A | 1.5 A |
| 100,000 | 5 A | 2 A | 1 |

# Precision Thermostats

**Figure 10. 3000 Series (345X Series Internal) Custom Packaged Thermostats**

The 3000 Series is customizable. Features include internal and external design options, all-welded hermetically sealed stainless steel construction, customized probe length (152 mm [6 in]) and a hermetic connector or potted construction.

A typical 3000 Series configuration includes:
- 345X Series thermostat
- Termination selection
- Housing selection
- Customized part number

Potential applications:
- HVAC
- Automotive
- Liquid bath control

**Table 28. 3000 Series (345X Series Internal) Specifications**

| Characteristic | Parameter |
|---|---|
| Switch type | custom |
| Reset type | automatic |
| Amperage | custom |
| Voltage | custom |
| Operating temperature range | -40 °C to 204 °C [-40 °F to 400 °F] |
| Environmental exposure range | -65 °C to 260 °C [-85 °F to 500 °F] |
| Dielectric strength | MIL-STD-202, Method 301, 1250 Vac |
| Insulation Resistance | MIL-STD-202, Method 302, 500 MOhm |
| Contact Resistance | MIL-STD-202, Method 307, 50 mOhm max. |
| Hermetic seal | MIL-STD-202, Method 112 Cond. A |
| Moisture resistance | MIL-STD-202, Method 106 |
| Shock | MIL-STD-202, Method 213, 100 G |
| Vibration | MIL-STD-202, Method 204, 20 G |
| Thermal shock | MIL-STD-202, Method 107, Cond. B |
| Salt spray | MIL-STD-202, Method 101, Cond. B |
| Housing material | stainless steel and brass |
| Weight | 72 g [2.5 oz] |

## HIGH RELIABILITY THERMOSTATS

Tables 29 and 30 provide overall performance qualifications for the High Reliability Thermostats. Figure 11 indicates potential applications.

**Table 29. Performance Qualifications, Part 1**

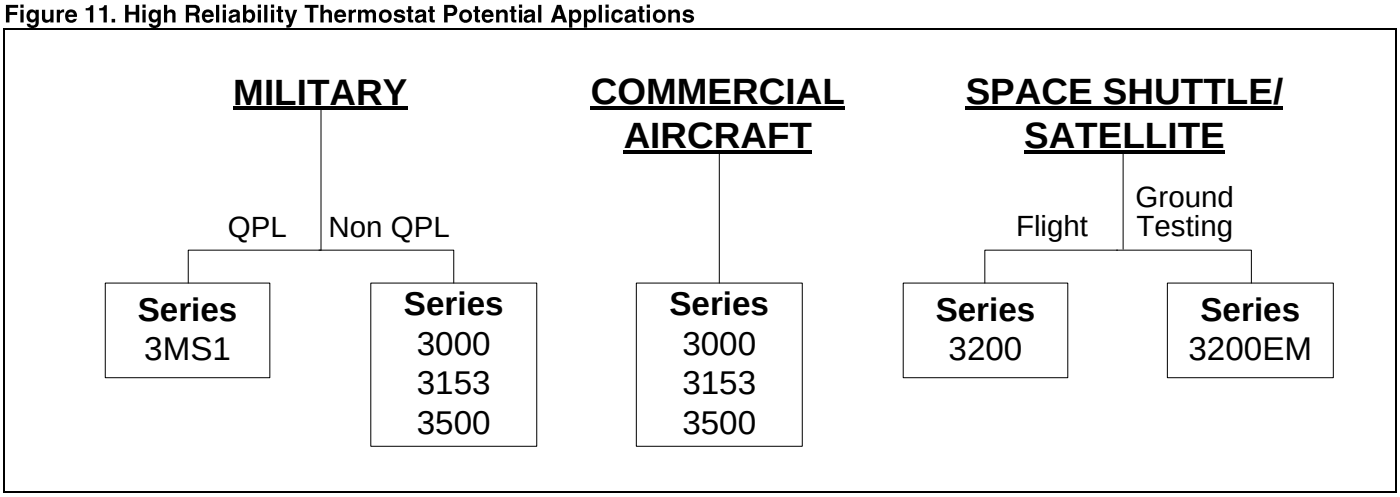
| Series Name | Shock | Vibration | Acceleration | Thermal Shock | Dielectric Strength |
|---|---|---|---|---|---|
| 3200<br>3200EM | MIL-STD-202<br>Method 213 – 750 G | MIL-STD-202<br>Method 204 – 30 G<br>MIL-STD-202<br>Method 21 – 50 G | MIL-STD-202<br>Method 212 – 20 G | MIL-STD-202<br>Method 107 – Cond. B | MIL-STD-202<br>Method 301 – 1250 Vac |
| 3MS1 QPL | MIL-STD-202<br>Method 213 – 100 G | MIL-STD-202<br>Method 204 – 20 G | | | |
| 3500 | MIL-STD-202<br>Method 213 – 400 G | | | | |
| 3153<br>3000 | MIL-STD-202<br>Method 213 – 100 G | | N/A | | |

**Table 30. Performance Qualifications, Part 2**

| Series Name | Insulation Resistance | Contact Resistance | Hermetic Seal | Moisture Resistance | Salt Spray* |
|---|---|---|---|---|---|
| 3200 | MIL-STD-202<br>Method 302 – 500 MOhm | MIL-STD-202<br>Method 307 –<br>0.025 Ohm max. | MIL-STD-202<br>Method 112 – Cond. C | MIL-STD-202<br>Method 106 | MIL-STD-202<br>Method 101 – Cond. B |
| 3MS1 QPL<br>3500<br>3153<br>3000 | | MIL-STD-202<br>Method 307 –<br>0.055 Ohm max. | | | |

*Not applicable to 3153 and 3500 Series with mounting brackets and operating temperatures exceeding 162,8 °C [325 °F].

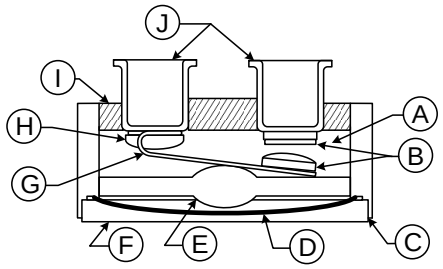
**Figure 11. High Reliability Thermostat Potential Applications**



# Precision Thermostats

## HIGH RELIABILITY MILITARY AND AEROSPACE THERMOSTATS

**Figure 12. 3153 Series Low Profile Thermostats**




**A** Backfill dry gas
**B** Contacts
**C** Laser weld
**D** Bimetal disc
**E** Ceramic transfer pin
**F** Cap
**G** Contact arm
**H** Weld cap
**I** Glass header
**J** Terminals

The 3153 Series is a single-pole, single-throw switch activated by a snap-action bimetal disc. The case is laser welded to form a hermetically-sealed steel housing, with a glass-to-metal seal at the terminal junction. The low profile and compact design allow use in most applications that require miniaturization. Temperature calibrations are pre-set at the factory and each unit is thermally and mechanically inspected. It is available to open or close on temperature rise.

Potential applications:
- Non QPL military
- Commercial aircraft
- Aircraft batteries

**Table 31. 3153 Series Standard Temperature Characteristics**

| Temperature Setpoint Range | Tolerance | | Nominal Differential °C [°F] | Max. Differential °C [°F] |
|---|---|---|---|---|
| | Open °C [°F] | Close °C [°F] | | |
| -28,89 °C to -12,2 °C [-20 °F to 10 °F] | ±5,6 [±10] | ±4,4 [±8] | 16,7 to 22,2 [30 to 40] | - |
| | ±4,4 [±8] | ±4,4 [±8] | 11,1 to 16,1 [20 to 29] | - |
| | ±3,9 [±7] | ±3,9 [±7] | 11,1 to 16,1 [20 to 29] | - |
| -11,7 °C to 9,4 °C [11 °F to 49 °F] | ±2,8 [±5] | ±2,8 [±5] | 11,1 to 22,2 [20 to 40] | - |
| | ±2,8 [±5] | ±2,8 [±5] | 8,3 to 10,6 [15 to 19] | - |
| | ±2,8 [±5] | ±2,8 [±5] | 6,1 to 7,8 [11 to 14] | - |
| | **Open or Close Only** | | | |
| | ±2,2 [±4] | ±2,2 [±4] | - | 4,4 [8] |
| 10 °C to 107,2 °C [50 °F to 225 °F] | ±2,8 [±5] | ±2,8 [±5] | 11,1 to 22,2 [20 to 40] | - |
| | ±2,8 [±5] | ±2,8 [±5] | 8,3 to 10,6 [15 to 19] | - |
| | ±2,8 [±5] | ±2,8 [±5] | 6,1 to 7,8 [11 to 14] | - |
| | **Open or Close Only** | | | |
| | ±2,2 [±4] | ±2,2 [±4] | - | 4,4 [8] |
| 107,8 °C to 148,9 °C [226 °F to 350 °F] | ±4,4 [±8] | ±3,3 [±6] | 13,9 to 27,8 [25 to 50] | - |
| | ±3,9 [±7] | ±3,3 [±6] | 11,1 to 13,3 [20 to 24] | - |
| | ±3,3 [±6] | ±3,3 [±6] | 8,3 to 10,6 [15 to 19] | - |
| | **Open or Close Only** | | | |
| | ±2,8 [±5] | ±2,8 [±5] | - | 6,7 [12] |
| 149,4 °C to 176,7 °C [301 °F to 350 °F] | ±6,7 [±12] | ±5,6 [±10] | 19,5 to 27,8 [35 to 50] | - |
| | ±5,6 [±10] | ±5,6 [±10] | 13,6 to 18,9 [25 to 34] | - |
| | ±4,4 [±8] | ±4,4 [±8] | 8,3 to 13,3 [15 to 24] | - |
| | **Open or Close Only** | | | |
| | ±3,9 [±7] | ±3,9 [±7] | - | 8,3 [15] |

**Table 32. 3153 Series Specifications**

| Characteristic | Parameter |
|---|---|
| Switch type | SPST |
| Reset type | automatic |
| Amperage | 5 A resistive |
| Voltage | 28 Vac/dc |
| Operating temperature range | -29 °C to 177 °C [-20 °F to 350 °F] |
| Environmental exposure range | -65 °C to 260 °C [-85 °F to 500 °F] |
| Dielectric strength | MIL-STD-202, Method 301, 1250 Vac |
| Insulation resistance | MIL-STD-202, Method 302, 500 MOhm |
| Contact resistance | MIL-STD-202, Method 307, 50 mOhm max. |
| Hermetic seal | MIL-STD-202, Method 112, Cond. A |
| Moisture resistance | MIL-STD-202, Method 106 |
| Shock | MIL-STD-202, Method 213, 100 G |
| Vibration | MIL-STD-202, Method 204, 20 G |
| Thermal shock | Mil-STD-202, Method 107, Cond. B |
| Salt spray* | Mil-STD-202, Method 101, Cond. B |
| Housing material | cold rolled plated steel |
| Marking | MIL-STD-1285 |
| Weight | 6 g [0.12 oz] (brackets not included) |
| Approvals | Acceptance testing performed in accordance with MIL-PRF-24236, Table III. |

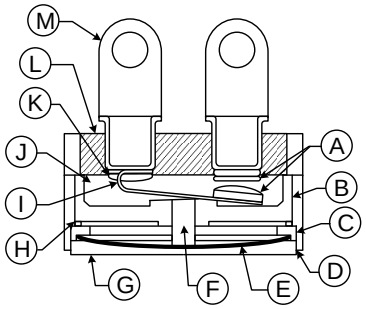
*Not applicable to thermostats with brackets or those operating at temperatures above 162,8°C [325 °F].

**Table 33. 3153 Series Contact Ratings**

| Load Type | Life Cycles | 28 Vac/dc | 115 Vac |
|---|---|---|---|
| Resistive | 100,000 | 5 A | 2 A |
| Inductive | 100,000 | 2.5 A | 1 A |
| Lamp | 100,000 | 1 A | 0.5 A |

# Precision Thermostats

**Figure 13. 3500 Series Military Thermostats**




**A** Contacts
**B** Ceramic insulator
**C** Disc retainer
**D** Laser weld
**E** Bimetal disc
**F** Ceramic transfer pin
**G** Cap
**H** Capping washer
**I** Contact arm
**J** Backfill dry gas
**K** Weld cap
**L** Glass header
**M** Terminals

The 3500 Series is a single-pole, single-throw switch activated by a snap-action bimetal disc. It meets or exceeds the requirements of MIL-PRF-24236 and is designed for potential military and commercial aircraft applications. It is not QPL listed (see the 3MS1 QPL Series). The case is laser welded to form a hermetically sealed steel housing, with a glass-to-metal seal at the terminal junction. Temperature calibrations are pre-set at the factory, and each unit is thermally and mechanically inspected. It is available to open or close on temperature rise.

Potential applications:
- Military aircraft
- Commercial aircraft
- Military vehicles

**Table 34. 3500 Series Standard Temperature Characteristics**

| Temperature Setpoint Range | Tolerance | | Nominal Differential °C [°F] | Max. Differential °C [°F] |
|---|---|---|---|---|
| | Open °C [°F] | Close °C [°F] | | |
| -45,6 °C to 17,8 °C [-50 °F to 0 °F] | ±8,3 [±15] | ±8,3 [±15] | 16,7 to 33,3 [30 to 60] | - |
| | ±5,6 [±10] | ±5,6 [±10] | 16,7 to 33,3 [30 to 60] | - |
| | ±4,4 [±8] | ±4,4 [±8] | 11,1 to 27,8 [20 to 50] | - |
| -17,2 °C to 93,3 °C [1 °F to 200 °F] | ±8,3 [±15] | ±8,3 [±15] | 16,7 to 33,3 [30 to 60] | - |
| | ±5,6 [±10] | ±5,6 [±10] | 16,7 to 33,3 [30 to 60] | - |
| | ±4,4 [±8] | ±4,4 [±8] | 11,1 to 27,8 [20 to 50] | - |
| | ±2,8 [±5] | ±2,8 [±5] | 5,6 to 22,2 [10 to 40] | - |
| | ±2,2 [±4] | - | - | 4,4 [8] |
| | - | ±2,2 [±4] | - | 4,4 [8] |
| 93,9 °C to 148,9 °C [201 °F to 300 °F] | ±8,3 [±15] | ±8,3 [±15] | 16,7 to 33,3 [30 to 60] | - |
| | ±5,6 [±10] | ±5,6 [±10] | 16,7 to 33,3 [30 to 60] | - |
| | ±4,4 [±8] | ±4,4 [±8] | 11,1 to 27,8 [20 to 50] | - |
| | ±2,8 [±5] | ±2,8 [±5] | 5,6 to 22,2 [10 to 40] | - |
| | ±2,2 [±4] | - | - | 4,4 [8] |
| | - | ±2,2 [±4] | - | 4,4 [8] |
| 149,4 °C to 176,6 °C [301 °F to 350 °F] | ±8,3 [±15] | ±8,3 [±15] | 16,7 to 33,3 [30 to 60] | - |
| | ±5,6 [±10] | ±5,6 [±10] | 16,7 to 33,3 [30 to 60] | - |
| | ±4,4 [±8] | ±4,4 [±8] | 11,1 to 27,8 [20 to 50] | - |
| | ±2,8 [±5] | - | - | 5,5 [10] |
| | - | 2,8 [±5] | - | 5,5 [10] |
| 177,2 °C to 204,4 °C [351 °F to 400 °F] | ±8,3 [±15] | ±8,3 [±15] | 16,7 to 44,4 [30 to 80] | - |
| | ±5,6 [±10] | ±5,6 [±10] | 16,7 to 33,3 [30 to 60] | - |
| | ±4,4 [±8] | ±4,4 [±8] | 8,3 to 10,6 [15 to 19] | - |
| | ±3,3 [±6] | - | - | 8,3 [15] |
| | - | ±4,4 [±8] | - | 8,3 [15] |

**Table 35. 3500 Series Specifications**

| Characteristic | Parameter |
|---|---|
| Switch type | SPST |
| Reset type | automatic |
| Amperage | 5 A resistive |
| Voltage | 28 Vdc |
| Operating temperature range | -51 °C to 204 °C [-60 °F to 400 °F] |
| Environmental exposure range | -65 °C to 260 °C [-85 °F to 500 °F] |
| Dielectric strength | MIL-STD-202, Method 301, 1250 Vac |
| Insulation resistance | MIL-STD-202, Method 302, 500 MOhm |
| Contact resistance | MIL-STD-202, Method 307, 50 mOhm max. |
| Hermetic seal | MIL-STD-202, Method 112, Cond. C |
| Moisture resistance | MIL-STD-202, Method 106 |
| Shock | MIL-STD-202, Method 213, 400 G |
| Vibration | MIL-STD-202, Method 204, 20 G |
| Acceleration | MIL-STD-202, Method 212, 20 G |
| Thermal shock | MIL-STD-202, Method 107, Cond. B |
| Salt spray* | MIL-STD-202, Method 101, Cond. B |
| Housing material | cold rolled plated steel |
| Marking | MIL-STD-1285 |
| Weight | 7,5 g [0.26 oz] (brackets and lead wire not included) |

*Not applicable to thermostats with brackets or those operating at temperatures above 162,8°C [325 °F].

**Table 36. 3500 Series Contact Ratings**

| Load Type | Life Cycles | 28 Vac/dc | 115 Vac |
|---|---|---|---|
| Resistive | 100,000 | 5 A | 2 A |
| Inductive | 100,000 | 2.5 A | 1 A |
| Lamp | 100,000 | 1 A | 0.5 A |

# Precision Thermostats

**Figure 14. 3000 Series (3500 Series or Other Internal) Custom Packaged Thermostats**

The 3000 Series is customizable. Features include internal and external design options, all-welded hermetically sealed stainless steel construction, customized probe length (152 mm [6 in]) and a hermetic connector or potted construction.

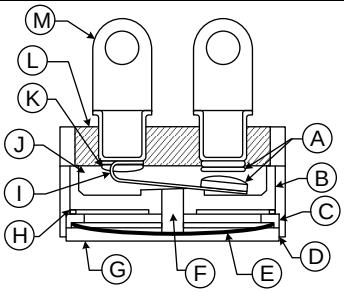
A typical 3000 Series configuration includes:
- 3500 Series or other thermostat
- Termination selection
- Housing selection
- Customized part number

Potential applications:
- HVAC
- Liquid bath control
- Transportation

**Table 37. 3000 Series (3500 Series or Other Internal) Specifications**

| Characteristic | Parameter |
|---|---|
| Switch type | Custom |
| Reset type | Automatic |
| Amperage | Custom |
| Voltage | Custom |
| Operating temperature range | -40 °C to 204 °C [-40 °F to 400 °F] |
| Environmental exposure range | -65 °C to 260 °C [-85 °F to 500 °F] |
| Dielectric strength | MIL-STD-202, Method 301, 1250 Vac |
| Insulation Resistance | MIL-STD-202, Method 302, 500 MOhm |
| Contact Resistance | MIL-STD-202, Method 307, 50 mOhm max. |
| Hermetic seal | MIL-STD-202, Method 112 Cond. A |
| Moisture resistance | MIL-STD-202, Method 106 |
| Shock | MIL-STD-202, Method 213, 100 G |
| Vibration | MIL-STD-202, Method 204, 20 G |
| Thermal shock | MIL-STD-202, Method 107, Cond. B |
| Salt spray | MIL-STD-202, Method 101, Cond. B |
| Housing material | stainless steel |
| Weight | 72 g [2.5 oz] |

**Figure 15. 3MS1 QPL Series Military Thermostats**




**A** Contacts
**B** Ceramic insulator
**C** Disc retainer
**D** Laser weld
**E** Bimetal disc
**F** Ceramic transfer pin
**G** Cap
**H** Capping washer
**I** Contact arm
**J** Backfill dry gas
**K** Weld cap
**L** Glass header
**M** Terminal

The 3MS1 QPL Series is a single-pole, single-throw switch activated by a snap-action bimetal disc. It is qualified to MIL-PRF-24236, Type 1, Class 4, and is QPL listed for military applications. The case is laser welded to form a hermetically-sealed steel housing, with a glass-to-metal seal at the terminal junction. Temperature calibrations are pre-set at the factory and each unit is thermally and mechanically inspected. It is available to open or close on temperature rise. Available mounting brackets and terminal configurations are in accordance with the M-24236/1 Military Specification Sheet.

Potential applications:
- Military aircraft
- Military vehicles

**Table 38. 3MS1 QPL Series Standard Temperature Characteristics**

| Temperature Setpoint Range | Tolerance | | Nominal Differential °C [°F] |
|---|---|---|---|
| | Open °C [°F] | Close °C [°F] | |
| -45,6 °C to 17,8 °C [-50 °F to 0 °F] | ±13,9 [±25] | ±13,9 [±25] | 33,3 to 55,5 [60 to 100] |
| | ±8,3 [±15] | ±8,3 [±15] | 22,2 to 44,4 [40 to 80] |
| | ±5,6 [±10] | ±5,6 [±10] | 16,7 to 33,3 [30 to 60] |
| | ±4,4 [±8] | ±4,4 [±8] | 11,1 to 27,8 [20 to 50] |
| -17,2 °C to 93,3 °C [1 °F to 200 °F] | ±13,9 [±25] | ±13,9 [±25] | 33,3 to 55,5 [60 to 100] |
| | ±8,3 [±15] | ±8,3 [±15] | 22,2 to 44,4 [40 to 80] |
| | ±5,6 [±10] | ±5,6 [±10] | 16,7 to 33,3 [30 to 60] |
| | ±4,4 [±8] | ±4,4 [±8] | 11,1 to 27,8 [20 to 50] |
| | ±2,8 [±5] | ±2,8 [±5] | 5,6 to 22,2 [10 to 40] |
| | ±1,7 [±3] | ±1,7 [±3] | 5,6 to 11,1 [10 to 20] |
| 93,9 °C to 148,9 °C [201 °F to 300 °F] | ±13,9 [±25] | ±13,9 [±25] | 33,3 to 55,5 [60 to 100] |
| | ±8,3 [±15] | ±8,3 [±15] | 22,2 to 44,4 [40 to 80] |
| | ±5,6 [±10] | ±5,6 [±10] | 16,7 to 33,3 [30 to 60] |
| | ±4,4 [±8] | ±4,4 [±8] | 11,1 to 27,8 [20 to 50] |
| | ±2,8 [±5] | ±2,8 [±5] | 5,6 to 22,2 [10 to 40] |
| 149,4 °C to 191 °C [301 °F to 375 °F] | ±13,9 [±25] | ±13,9 [±25] | 33,3 to 55,5 [60 to 100] |
| | ±8,3 [±15] | ±8,3 [±15] | 22,2 to 44,4 [40 to 80] |
| | ±5,6 [±10] | ±5,6 [±10] | 16,7 to 33,3 [30 to 60] |
| | ±4,4 [±8] | ±4,4 [±8] | 11,1 to 27,8 [20 to 50] |

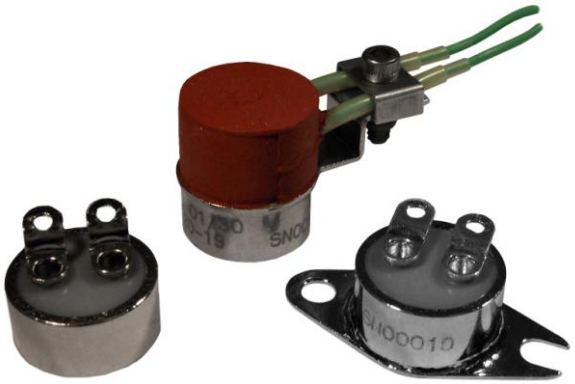
**Table 39. 3MS1 QPL Series Specifications**

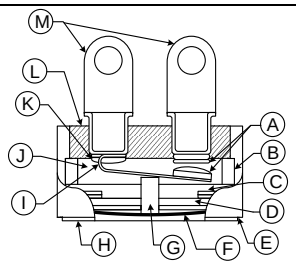
| Characteristic | Parameter |
|---|---|
| Switch type | SPST |
| Reset type | automatic |
| Amperage | 5 A resistive |
| Voltage | 28 Vac/Vdc |
| Operating temperature range | -20 °C to 350 °C [-50 °F to 177 °F] |
| Environmental exposure range | -65 °C to 260 °C [-85 °F to 500 °F] |
| Dielectric strength | MIL-STD-202, Method 301, 1250 Vac |
| Insulation resistance | MIL-STD-202, Method 302, 500 MOhm |
| Contact resistance | MIL-STD-202, Method 307, 50 MOhm max. |
| Hermetic seal | MIL-STD-202, Method 112, Cond. C |
| Moisture resistance | MIL-STD-202, Method 106 |
| Shock | MIL-STD-202, Method 213, 100 G |
| Vibration | MIL-STD-202, Method 204, 20 G |
| Acceleration | MIL-STD-202, Method 212, 20 G |
| Thermal shock | MIL-STD-202, Method 107, Cond. B |
| Salt spray | MIL-STD-202, Method 101, Cond. B |
| Housing material | cold rolled plated steel |
| Marking | MIL-STD-1285 |
| Approvals | QPL Mil-PRF-24236/1 |
| Weight | 7,5 g [0.26 oz] |

**Table 40. 3MS1 QPL Series Contact Ratings**

| Load Type | Life Cycles | 28 Vac/dc | 115 Vac |
|---|---|---|---|
| Resistive | 100,000 | 5 A | 2 A |
| Inductive | 100,000 | 2.5 A | 1 A |
| Lamp | 100,000 | 1 A | 0.5 A |

**Figure 16. 3200 Series High Reliability Aerospace Thermostats**






**A** Contacts
**B** Ceramic insulator
**C** Ceramic pin guide
**D** Disc retainer
**E** Laser weld
**F** Bimetal disc
**G** Ceramic transfer pin
**H** Cap
**I** Contact arm
**J** Backfill dry gas
**K** Weld cap
**L** Glass header
**M** Terminals

The 3200 Series is a single-pole, single-throw switch activated by a snap-action bimetal disc. It is manufactured and tested to meet or exceed critical military and aerospace specifications for spaceflight use, including temperature stability, shock, vibration and cleanliness. The case is laser welded to form a hermetically-sealed steel housing, with a glass-to-metal seal at the terminal junction. Temperature calibrations are pre-set at the factory and each unit is thermally and mechanically inspected. It is available to open or close on temperature rise.

The 3200EM (Engineering Model) version is produced using the same components as the 3200, but is not subjected to the rigors of extensive flight testing. It is specifically designed for ground and experimental testing.

Potential applications:
- Satellites
- Rockets
- Missiles

**Table 41. 3200 Series Standard Temperature Characteristics**

| Temperature Setpoint Range | Tolerance | | Nominal Differential °C [°F] |
|---|---|---|---|
| | Open °C [°F] | Close °C [°F] | |
| -51,1 °C to -29,4 °C [-60 °F to -21 °F] | consult factory | | consult factory |
| -28,9 °C to 17,8 °C [-20 °F to 0 °F] | ±4,4 [±8] | ±3,9 [±7] | 10,6 to 16,7 [19 to 30] |
| | ±3,9 [±7] | ±3,3 [±6] | 9,4 to 15,0 [17 to 27] |
| | ±3,3 [±6] | ±3,3 [±6] | 8,9 to 14,5 [16 to 26] |
| | ±3,3 [±6] | ±2,8 [±5] | 8,3 to 13,9 [15 to 25] |
| | ±2,8 [±5] | ±2,8 [±5] | 8,3 to 13,9 [15 to 25] |
| 17,2 °C to 37,8 °C [1 °F to 100 °F] | ±3,9 [±7] | ±3,3 [±6] | 9,4 to 15,0 [17 to 27] |
| | ±3,3 [±6] | ±3,3 [±6] | 8,9 to 13,9 [16 to 25] |
| | ±3,3 [±6] | ±2,8 [±5] | 8,3 to 13,9 [15 to 25] |
| | ±2,8 [±5] | ±2,8 [±5] | 7,8 to 13,9 [14 to 25] |
| | ±2,8 [±5] | ±2,2 [±4] | 7,2 to 13,9 [13 to 25] |
| | ±2,2 [±4] | ±2,2 [±4] | 6,7 to 13,9 [12 to 25] |
| 38,3 °C to 93,3 °C [101 °F to 200 °F] | ±5,0 [±9] | ±4,4 [±8] | 11,7 to 16,7 [21 to 30] |
| | ±3,9 [±7] | ±3,3 [±6] | 9,4 to 16,7 [17 to 30] |
| | ±3,3 [±6] | ±2,8 [±5] | 8,3 to 16,75 [15 to 30] |
| | ±2,8 [±5] | ±2,8 [±5] | 7,8 to 13,9 [14 to 25] |
| 93,9 °C to 162,8 °C [200 °F to 325 °F] | ±5,6 [±10] | ±5,0 [±9] | 12,8 to 19,4 [23 to 35] |
| | ±4,4 [±8] | ±3,3 [±6] | 10,0 to 19,4 [18 to 35] |
| | ±3,9 [±7] | ±3,3 [±6] | 9,4 to 19,4 [17 to 35] |
| | ±3,3 [±6] | ±3,3 [±6] | 8,9 to 19,4 [16 to 35] |

**Table 42. 3200 Series Specifications**

| Characteristic | Parameter |
|---|---|
| Switch type | SPST |
| Reset type | automatic |
| Amperage | 5 A resistive |
| Voltage | 28 Vac/Vdc |
| Operating temperature range | -51 °C to 162,8 °C [-60 °F to 325 °F] |
| Environmental exposure range | -65 °C to 177 °C [-85 °F to 350 °F] |
| Dielectric strength | MIL-STD-202, Method 301, 1250 Vac |
| Insulation resistance | MIL-STD-202, Method 302, 500 MOhm |
| Contact resistance | MIL-STD-202, Method 307, 25 mOhm max. |
| Hermetic seal | MIL-STD-202, Method 112, Cond. C |
| Moisture resistance | MIL-STD-202, Method 106 |
| Shock | MIL-STD-202, Method 213, 750 G |
| Vibration | MIL-STD-202, Method 204, 30 G, MIL-STD-202, Method 214, 50 G |
| Acceleration | MIL-STD-202, Method 212, 20 G |
| Thermal shock | MIL-STD-202, Method 107, Cond. B |
| Salt spray | MIL-STD-202, Method 101, Cond. B |
| Housing material | cold rolled plated steel |
| Marking | MIL-STD-1285 |
| Approvals | NASA GSFC S-311-641, S-311-641/01 |
| Weight | 8,5 g [0.30 oz] (brackets and lead wires not included) |

**Table 43. 3200 Series Contact Ratings**

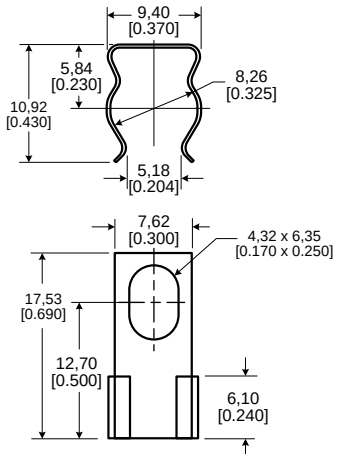
| Load Type | Life Cycles | 28 Vac/dc | 115 Vac |
|---|---|---|---|
| Resistive | 100,000 | 5 A | 2 A |
| Inductive | 100,000 | 2.5 A | 1 A |
| Lamp | 100,000 | 1 A | 0.5 A |

## MOUNTING HARDWARE

### 3600/3601 Series

**Figure 17. 3600/3601 Series Brackets**

**B252**




**B253**

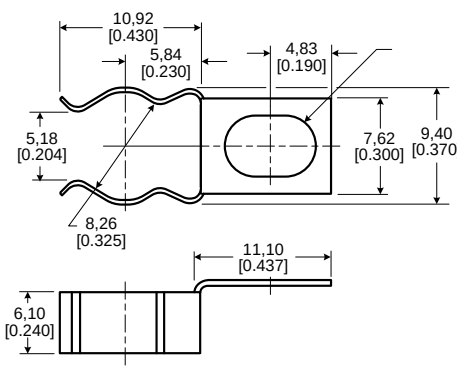
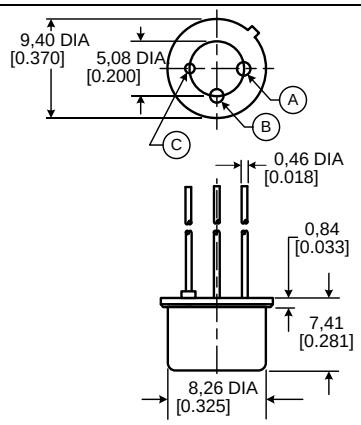



**Figure 18. 3600/3601 Series Terminals**

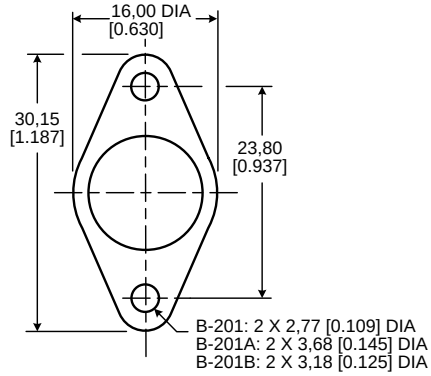



**A** Moveable contact
**B** Fixed contact
**C** Case ground

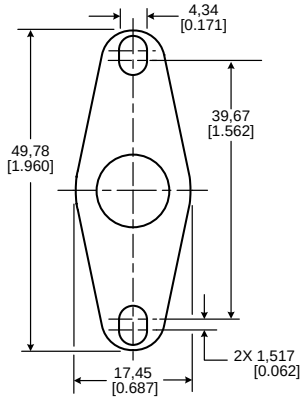
### 3001/3004 Series

**Figure 19. 3001/3004 Brackets**

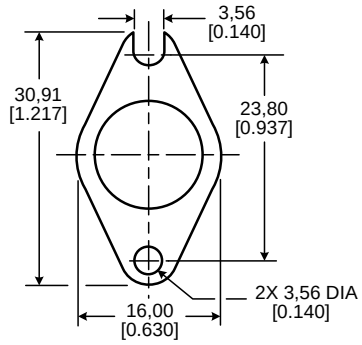
**B-201, B-201A, B-201B**



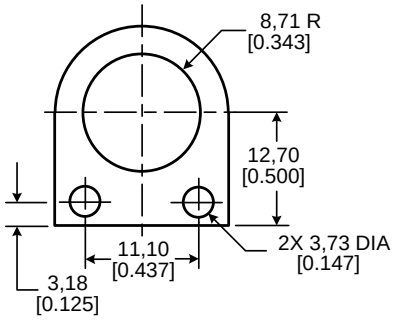

**B-206**



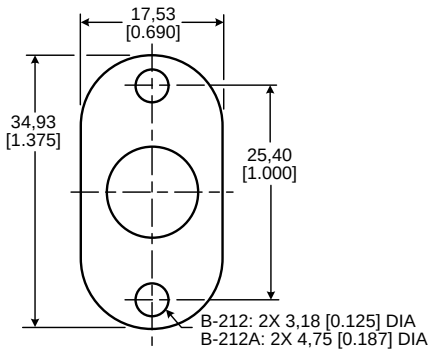

**B-209**




**B-210**




**B212**




**B-213**

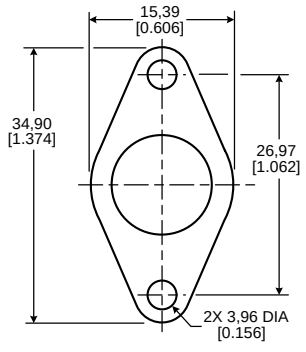
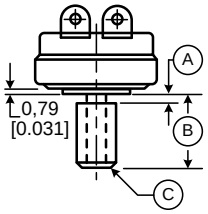


**Figure 20. 3001/3004 Series Cap Studs**

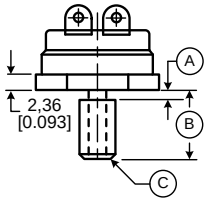
**Round**

**S334:** 4-40
**S337:** 6-32
**S340:** 8-32
**S343:** 10-32
**S346:** M3 x 0.5
**S349:** M4 x 0.7



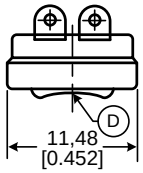

**Hex**

**HS367:** 6-32
**HS370:** 8-32
**HS373:** 10-32
**HS376:** M3 x 0.5
**HS379:** M4 x 0.7
**HS382:** M5 x 0.8




**A** Undercut to minor diameter **B** Specify length **C** Specify thread

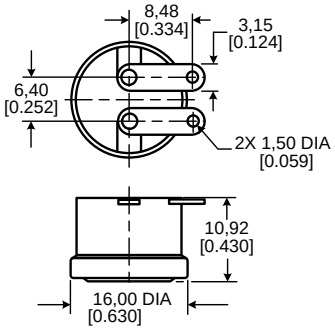
**Figure 21. 3001/3004 Series Radius Cap**



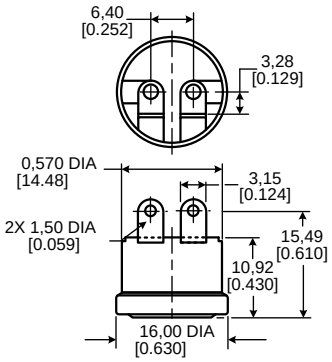

**A** Various radii available

**Figure 22. 3001/3004 Series Terminals**

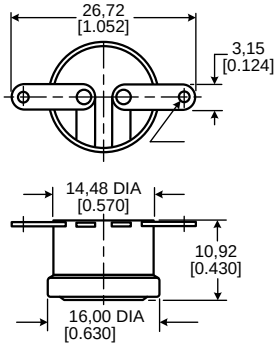
**T123**



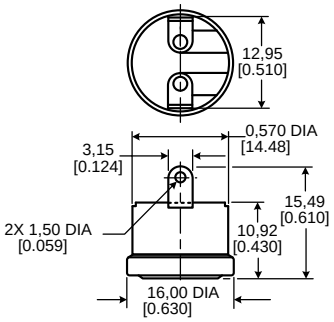

**T124**



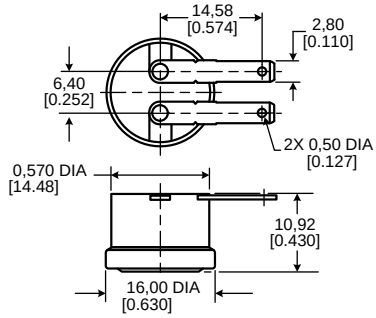

**T125**



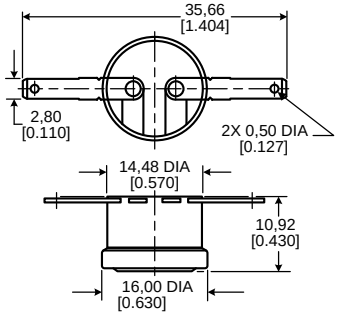

**T126**



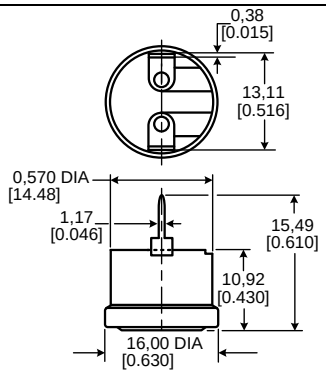

**T127**




**T128**



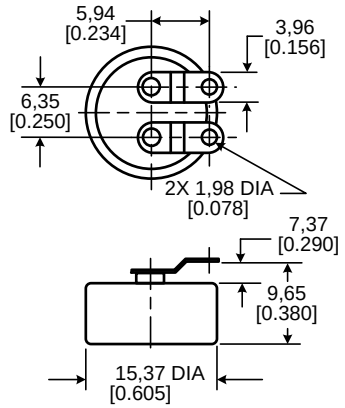

**T177 (3001 only)**



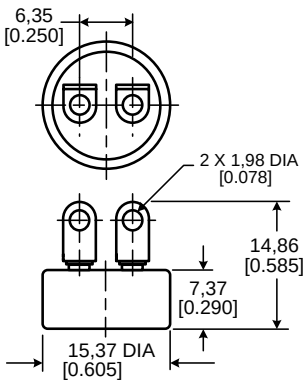
## 3100/3106 Series

**Figure 23. 3100/3106 Terminals**

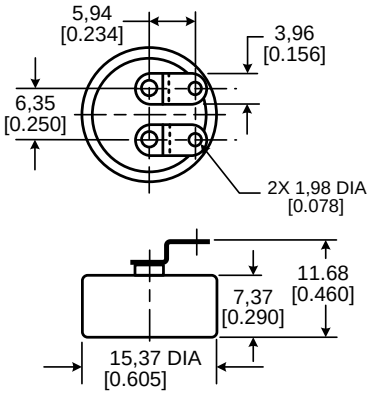
**T116**




**T117**



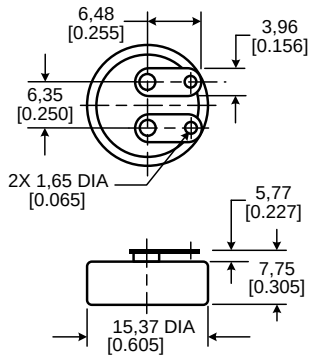

**T120**



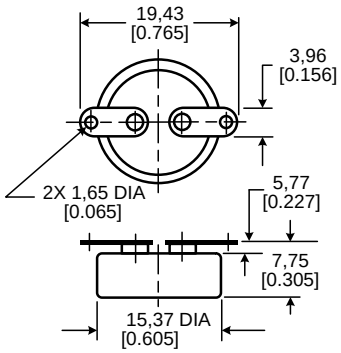

## 3150/3156 Series

**Figure 24. 3150/3156 Terminals**

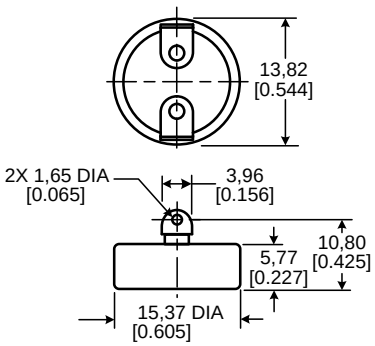
**T109**




**T110**



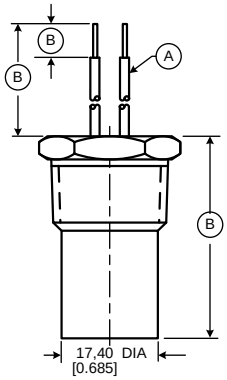

**T111**



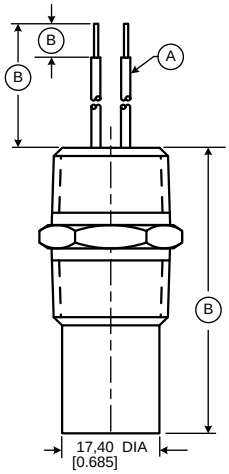

## 3000 Series

**Figure 25. 3000 Series**

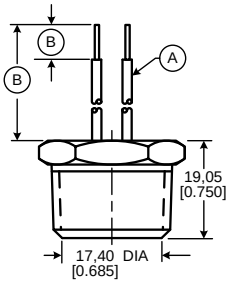
**3000-59** 1/2-14 NPT




**3000-105** 1/2-14 NPT




**3000-53** 1/2-14 NPT




**A** Specify wire gauge and insulation

**B** Specify dimension

**Figure 26. 3000 Series Terminations**

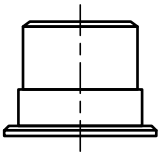
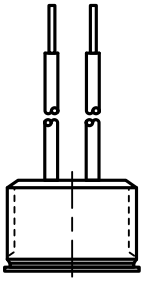
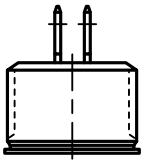
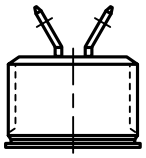
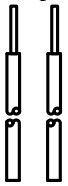
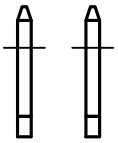
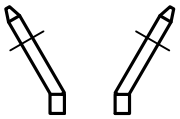
| | | | |
|---|---|---|---|
| **0** Hermetic connector, bayonet or threaded  | **3** ½-1/4 NPT thread, wire leads and lengths as required  | **4a** ½-1/4 NPT thread, 0.25 in male quick connect terminals  | **4b** ½-1/4 NPT thread 60° 0.25 in male quick connect terminals  |
| **1** Wire leads and lengths as required  | **2a** 0.25 in male quick connect terminals  | **2b** 60° 0.25 in male quick connect terminals  | |

**Figure 27. 3000 Series Housings:Used with Terminations 0, 3, 4a, 4b, 1, 2a, 2b only.**

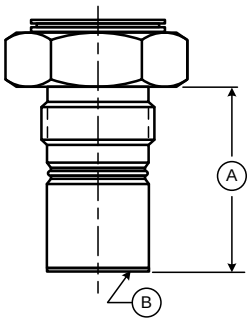
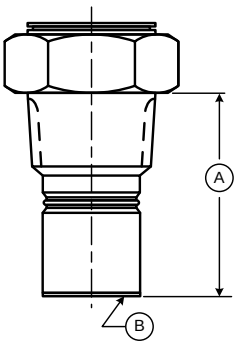
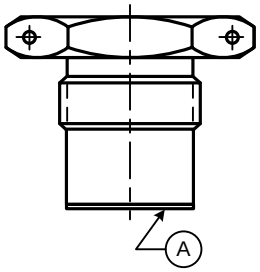
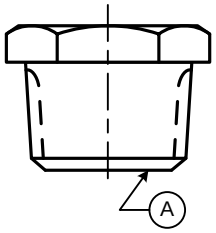
| | |
|---|---|
| **3000-45X** 3/4-16 UNF-3A thread, 1 in hex.   | **3000-55X** 1/2-14 NPT thread, 7/8 in hex.   |
| **A** Probe length<br>**B** Sensing surface | |

**Figure 28. 3000 Series Housings: Used with Terminations 0, 3, 4a, 4b only.**

| | |
|---|---|
| **3000-141** 3/4-16 UNF-3A thread, 1 in hex.   | **3000-53X** 1/2-14 NPT thread, 7/8 in hex.   |
| **A** Sensing surface | |

**Used on All Series**

Overmolds provide electrical isolation. Examples in Fig. 29 use the 3100/3106 Series; however, overmolds may be used on other series. Please consult Honeywell.

**Figure 29. Overmolds used on All Series (3100/3106 Series Shown).**

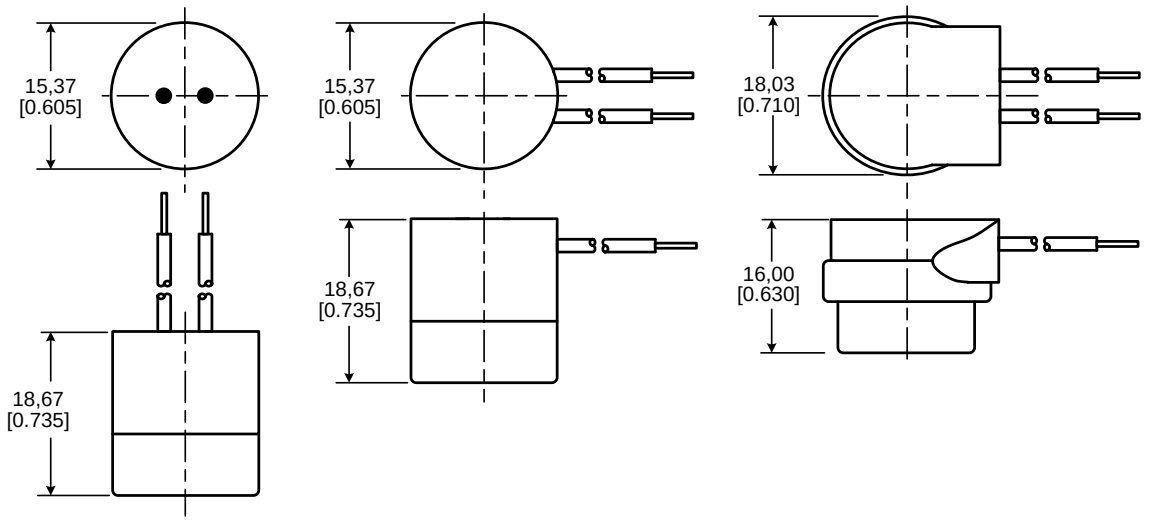
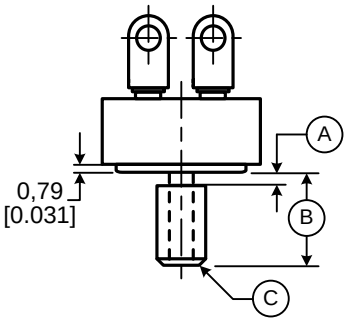



**Figure 30. Cap Studs Used on All Series**

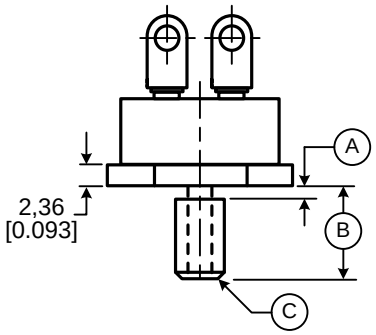
**Round**

**S303:** 4-40
**S306:** 6-32
**S330:** 6-40
**S309:** 8-32
**S312:** 10-24
**S315:** 10-32
**S324:** 1/4-28
**S318:** M3 x 0.5
**S321:** M4 x 0.7
**S327:** M5 x 0.8




**Hex**

**HS303:** 4-40
**HS306:** 6-32
**HS330:** 6-40
**HS309:** 8-32
**HS312:** 10-24
**HS315:** 10-32
**HS324:** 1/4-28
**HS318:** M3 x 0.5
**HS321:** M4 x 0.7
**HS327:** M5 x 0.8

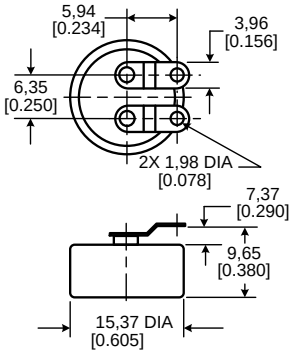



**A** Undercut to minor diameter **B** Specify dimension **C** Specify thread

# Precision Thermostats

**Figure 31. 3100U REDI-TEMP Series (See pages 12 for specifications and applications.)**

**Terminal T116**




**Bracket 209**

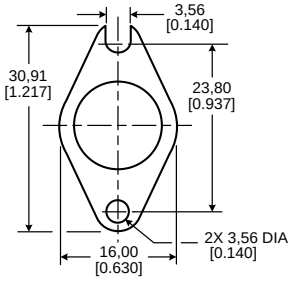


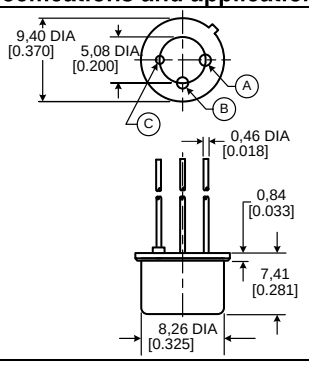

**Table 44. 3100U REDI-TEMP Series Open on Rise**

| Catalog Listing | Open Temp. °C [°F] | Open Tolerance °C [°F] | Close Temp. °C [°F] | Close Tolerance °C [°F] |
|---|---|---|---|---|
| **3100U-3-1431** | 4 [40] | ±3 [±5] | -7 [20] | ±3 [±5] |
| **3100U-3-1432** | 10 [50] | ±3 [±5] | -1 [30] | ±3 [±5] |
| **3100U-3-1433** | 16 [60] | ±3 [±5] | 4 [40] | ±3 [±5] |
| **3100U-3-1434** | 21 [70] | ±3 [±5] | 10 [50] | ±3 [±5] |
| **3100U-3-1435** | 27 [80] | ±3 [±5] | 16 [60] | ±3 [±5] |
| **3100U-3-1436** | 32 [90] | ±3 [±5] | 21 [70] | ±3 [±5] |
| **3100U-3-1437** | 38 [100] | ±3 [±5] | 27 [80] | ±3 [±5] |
| **3100U-3-1438** | 43 [110] | ±3 [±5] | 32 [90] | ±3 [±5] |
| **3100U-3-1439** | 49 [120] | ±3 [±5] | 38 [100] | ±3 [±5] |
| **3100U-3-1440** | 54 [130] | ±3 [±5] | 43 [110] | ±3 [±5] |
| **3100U-3-1441** | 60 [140] | ±3 [±5] | 49 [120] | ±3 [±5] |
| **3100U-3-1446** | 88 [190] | ±3 [±5]] | 77 [170] | ±3 [±5] |
| **3100U-3-1447** | 93 [200] | ±3 [±5] | 82 [180] | ±3 [±5] |
| **3100U-3-1448** | 99 [210] | ±5 [±8] | 85 [185] | ±4 [±6] |
| **3100U-3-1449** | 104 [220] | ±5 [±8] | 91 [195] | ±4 [±6] |
| **3100U-3-1450** | 110 [230] | ±5 [±8] | 96 [205] | ±4 [±6] |
| **3100U-3-1451** | 116 [240] | ±5 ± [8] | 102 [215] | ±4 [±6] |
| **3100U-3-1452** | 121 [250] | ±5 [±8] | 107 [225] | ±4 [±6] |

**Table 45. 3100U REDI-TEMP Series Close on Rise**

| Catalog Listing | Close Temp. °C [°F] | Close Tolerance °C [°F] | Open Temp. °C [°F] | Open Tolerance °C [°F] |
|---|---|---|---|---|
| **3100U-3-1453** | 4 [40] | ±5 [±5] | -7 [20] | ±3 [±5] |
| **3100U-3-1454** | 10 [50] | ±5 [±5] | -1 [30] | ±3 [±5] |
| **3100U-3-1455** | 16 [60] | ±5 [±5] | 4 [40] | ±3 [±5] |
| **3100U-3-1456** | 27 [80] | ±5 [±5] | 16 [60] | ±3 [±5] |
| **3100U-3-1457** | 38 [100] | ±5 [±5] | 27 [80] | ±3 [±5] |
| **3100U-3-1458** | 49 [120] | ±5 [±5] | 38 [100] | ±3 [±5] |
| **3100U-3-1459** | 60 [140] | ±5 [±5] | 49 [120] | ±3 [±5] |
| **3100U-3-1460** | 71 [160] | ±5 [±5] | 60 [140] | ±3 [±5] |
| **3100U-3-1461** | 82 [180] | ±5 [±5] | 71 [160] | ±3 [±5] |
| **3100U-3-1462** | 93 [200] | ±5 [±5] | 82 [180] | ±3 [±5] |
| **3100U-3-1463** | 104 [220] | ±4 [±6] | 91 [195] | ±5 [±8] |

**Figure 32. 3600/3601 REDI-TEMP Series (See pages 4 and 5 for specifications and applications.)**




**A** Moveable contact
**B** Fixed contact
**C** Case ground

**Table 46. 3600/3601 REDI-TEMP Series Open on Rise**

| Catalog Listing | Open Temperature °C [°F] | Open Tolerance °C [°F] | Close Temperature °C [°F] | Close Tolerance °C [°F] | Minimum Differential Temperature °C [°F] |
|---|---|---|---|---|---|
| **3600040010001** | 40.0 [104] | ±5 [±8] | N/A | N/A | ±2 [±3.6] |
| **3600045010001** | 45.0 [113] | ±5 [±8] | N/A | N/A | ±2 [±3.6] |
| **3600050010001** | 50.0 [122] | ±5 [±8] | N/A | N/A | ±2 [±3.6] |
| **3600055010001** | 55.0 [131] | ±5 [±8] | N/A | N/A | ±5 [±8] |
| **3600060010001** | 60.0 [140] | ±5 [±8] | N/A | N/A | ±5 [±8] |
| **3600065010001** | 65.0 [149] | ±5 [±8] | N/A | N/A | ±5 [±8] |
| **3600070010001** | 70.0 [158] | ±5 [±8] | N/A | N/A | ±5 [±8] |
| **3600075010001** | 90.0 [194] | ±5 [±8] | N/A | N/A | ±5 [±8] |
| **3600080010001** | 80.0 [176] | ±5 [±8] | N/A | N/A | ±5 [±8] |
| **3600085010001** | 75.0 [167] | ±5 [±8] | N/A | N/A | ±7 [±12.6] |
| **3600090010001** | 90.0 [194] | ±5 [±8] | N/A | N/A | ±7 [±12.6] |
| **3600095010001** | 95.0 [203] | ±5 [±8] | N/A | N/A | ±7 [±12.6] |
| **3600100010001** | 100.0 [212] | ±5 [±8] | N/A | N/A | ±7 [±12.6] |

**Table 47. 3600/3601 REDI-TEMP Series Close on Rise**

| Catalog Listing | Close Temperature °C [°F] | Close Tolerance °C [°F] | Open Temperature °C [°F] | Open Tolerance °C [°F] | Minimum Differential Temperature °C [°F] |
|---|---|---|---|---|---|
| **3601040010001** | 40.0 [104] | ±7 [±12.6] | N/A | N/A | ±2 [±3.6] |
| **3601045010001** | 45.0 [113] | ±7 [±12.6] | N/A | N/A | ±2 [±3.6] |
| **3601050010001** | 50.0 [122] | ±7 [±12.6] | N/A | N/A | ±2 [±3.6] |
| **3601055010001** | 55.0 [131] | ±7 [±12.6] | N/A | N/A | ±5 [±8] |
| **3601060010001** | 60.0 [140] | ±7 [±12.6] | N/A | N/A | ±5 [±8] |
| **3601065010001** | 65.0 [149] | ±7 [±12.6] | N/A | N/A | ±5 [±8] |
| **3601070010001** | 70.0 [158] | ±7 [±12.6] | N/A | N/A | ±5 [±8] |
| **3601075010001** | 90.0 [194] | ±7 [±12.6] | N/A | N/A | ±5 [±8] |
| **3601080010001** | 80.0 [176] | ±7 [±12.6] | N/A | N/A | ±5 [±8] |
| **3601085010001** | 75.0 [167] | ±7 [±12.6] | N/A | N/A | ±7 [±12.6] |
| **3601090010001** | 90.0 [194] | ±7 [±12.6] | N/A | N/A | ±7 [±12.6] |
| **3601095010001** | 95.0 [203] | ±7 [±12.6] | N/A | N/A | ±7 [±12.6] |
| **3601100010001** | 100.0 [212] | ±7 [±12.6] | N/A | N/A | ±7 [±12.6] |

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