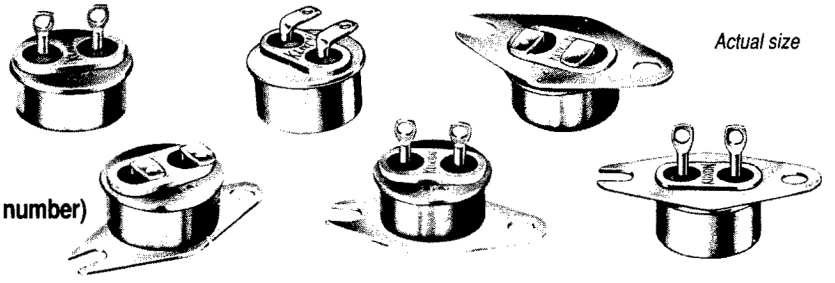
M1/11041 Series
High Reliability, Hermetically Sealed Thermostat

- **Snap-action switching**
- **Rapid thermal response**
- **Single pole, single throw**
- **Normally open or normally closed**
- **Pre-set, non-adjustable calibration**
- **Various mounting configurations available**
- **Qualified to MIL-S-24236/1 (Order by MS24236/1 - number)**
- **GAM-T1**



Actual size

Description

The Klixon M1 precision thermostat is constructed with a snap-acting bi-metal disc which serves as the actuating element. As the temperature reaches a predetermined calibration point, the disc snaps to its reverse curvature producing the crisp, positive switching action inherent to Klixon thermostats. This feature assures reliable, consistent operating temperature over long cycle life. The standard thermostat is copper-nickel plated with silver contacts. Other plating finishes are available upon request. Gold plated contacts can be furnished for the electrical loads listed in the following table to assure reliable circuit switching under low wattage conditions. Gold plated contacts are not suitable for heavier loads.

Gold Contact Ratings (Resistive)

30 VAC/DC	500 mA and below
115 VAC	200 mA and below
230 VAC	100 mA and below

Our most common mounting configurations are depicted on page 29. Many other varieties are available.

Leads can be welded to pin type terminals to form an integral unit.

The switch can be custom packaged into a probe, strap mount, or immersion thermostat. Consult the factory for special requests.

Switching Action

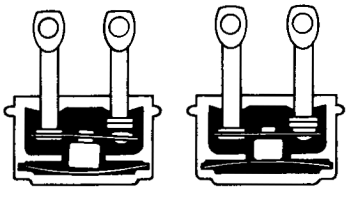
All thermostats are supplied with single pole, single throw switching. The contacts can be constructed as:

Normally closed - limit type application; contacts open on temperature rise at a pre-determined temperature to de-energize the circuit. Contacts automatically re-close as the device cools to a pre-determined temperature.

Normally open - fan type application; contacts close on temperature rise at a pre-determined temperature to energize the circuit. Contacts automatically re-open as the device cools to a pre-determined temperature.

The opening and closing temperatures are pre-set and non-adjustable.

Operation



Open **Close**

When heated, the internal stresses of the bi-metal cause the disc to reverse its curvature with a snap-action at a fixed, preset temperature and operate the electrical contacts.

A decrease in the ambient temperature below the reset temperature of the disc relieves the internal stresses in the disc. The disc returns to its normal curvature and the contacts assume their normal operating position.

Performance Characteristics

Switch Action

SPST (snap-action)

Contact Resistance

0.050 ohms maximum
per MIL-STD-202, Method 307

Contact Ratings (Resistive)

30 VAC/DC	125 VAC	250 VAC	Life Cycles
Amperes			
5.0	2.0	1.0	100,000
5.5	3.0	1.5	50,000
6.0	4.0	2.0	25,000
6.5	5.0	2.5	10,000
7.0	6.0	3.0	5,000

Based on standard differential

Dielectric Strength

1250 VAC, rms,
60 Cycles for 1 minute,
terminal to case,
per MIL-STD-202, Method 301

Vibration Resistance

5-2000 Hz, 20G,
per MIL-STD-202, Method 204,
Condition D, (monitored)
5-1000 Hz, 100G,
Per MIL-STD-202, Method 204,
Condition D (unmonitored)
1000-2000 Hz, 50G,
per MIL-STD-202, Method 204
Condition D (unmonitored)

Shock Resistance

100 G, 6 milliseconds,
per MIL-STD-202, Method 213

Hermeticity

1 X 10^{-8} atm cc/sec. max,
per MIL-STD-202, Method 112,
Condition C

Salt Spray

per MIL-STD-202, Method 101,
Condition B, 5% solution

Moisture resistance

per MIL-STD-202, Method 106

Weight

Basic unit ..... 4.8 grams
with bracket ..... 5.9 grams

Temperature (Use table below for common operating temperatures).

Ambient Temperature Range:

-80°F to +550°F, (-62.2°C to 287.8°C)
Maximum ambient exposure while in the closed contact position is 200°F above contact closing temperature.

Operating temperature

Temperature at which normally closed contacts open or normally open contacts close.

Tolerance

Allowable range above and below setpoint and reset temperatures.

Differential

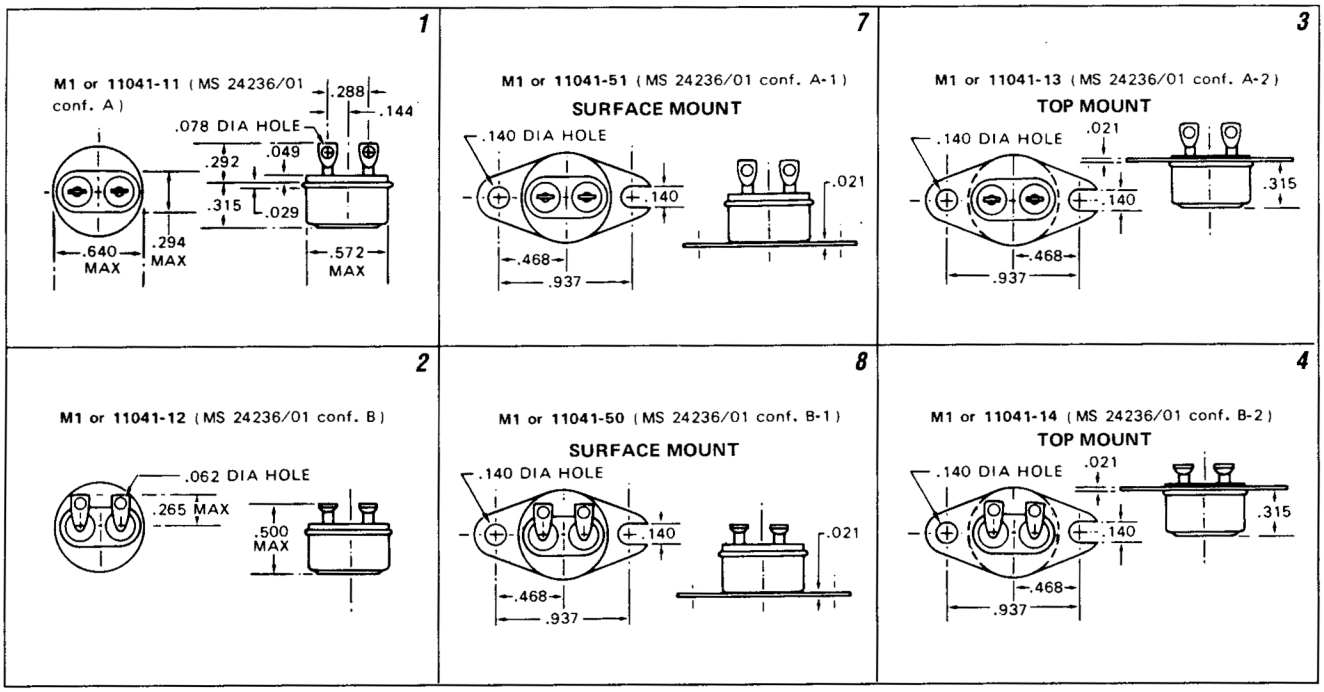
Subtract the differential from the operating temperature to determine the temperature at which the contacts will return to the normal position (reset temperature).

Operating Temperature		Differential		Tolerance	
°F	°C	°F	°C	±°F	±°C
-65	-53.9	30	16.7	10	5.6
-40	-40.0	30	16.7	10	5.6
-15	-26.1	30	16.7	10	5.6
0	-17.8	20	11.1	5	2.8
10	-12.2	20	11.1	5	2.8
20	-6.7	20	11.1	5	2.8
30	-1.1	20	11.1	5	2.8
40	4.4	20	11.1	5	2.8
50	10.0	20	11.1	5	2.8
60	15.6	20	11.1	5	2.8
70	21.1	20	11.1	5	2.8
80	26.7	20	11.1	5	2.8
90	32.2	20	11.1	5	2.8
100	37.8	20	11.1	5	2.8
110	43.3	20	11.1	5	2.8
120	48.9	20	11.1	5	2.8
130	54.4	20	11.1	5	2.8
140	60.0	20	11.1	5	2.8
150	65.6	20	11.1	5	2.8
160	71.1	20	11.1	5	2.8
170	76.7	20	11.1	5	2.8
180	82.2	20	11.1	5	2.8
190	87.8	20	11.1	5	2.8
200	93.3	20	11.1	5	2.8

Operating Temperature		Differential		Tolerance	
°F	°C	°F	°C	±°F	±°C
210	98.9	30	16.7	8	4.4
220	104.4	30	16.7	8	4.4
230	110.0	30	16.7	8	4.4
240	115.6	30	16.7	8	4.4
250	121.1	30	16.7	8	4.4
260	126.7	30	16.7	8	4.4
270	132.2	30	16.7	8	4.4
280	137.8	30	16.7	8	4.4
290	143.3	30	16.7	8	4.4
300	148.9	30	16.7	8	4.4
310	154.4	40	22.2	12	6.7
320	160.0	40	22.2	12	6.7
330	165.6	40	22.2	12	6.7
340	171.1	40	22.2	12	6.7
350	176.7	40	22.2	12	6.7
375	190.6	40	22.2	12	6.7
400	204.4	40	22.2	12	6.7
425	218.3	40	22.2	12	6.7
450	232.2	40	22.2	12	6.7
475	246.1	70	38.9	25	13.9
500	260.0	70	38.9	25	13.9
525	273.9	70	38.9	25	13.9
550	287.8	70	38.9	25	13.9

Consult factory if desired operating temperature does not appear in the table.

Common Configurations



All dimensions nominal/inches. Line terminal is marked for grounded AC line voltage applications.

Order by Coded Part Number

To facilitate the ordering of M1 thermostats to your specifications use the part number code below. The code permits you to call out a complete production part number at the time of component selection.

Standard configurations are available as the M1 series and are shown. A complete part number can be originated at the inception of an application by using the "Order By Part Number" code at left. Many other versions are available as the 11041 series. Consult the factory for the availability of different styles.

M1 110 090 2 8 2

BASIC TYPE

TOP TEMPERATURE NOMINAL SETTING (°F)
Use 3 digits (insert minus sign and 2 digits for temps below 0°F)

BOTTOM TEMPERATURE NOMINAL SETTING (°F)
Use 3 digits (insert minus sign and 2 digits for temps below 0°F)

PLATING
2 - Copper/nickel
4 - Tin
6 - Zinc with olive drab chromate

MOUNTING BRACKETS & TERMINALS *(see numbered drawings above)*
Odd Nos. - flattened and pierced terminals
Even Nos. - right angle terminals
1 & 2 - no mounting bracket
3 & 4 - top mounting bracket (as shown)
7 & 8 - surface mounting bracket (as shown)

OPERATION
1 - Open on temp rise (fine silver contacts)
2 - Close on temp rise (fine silver contacts)
3 - Open on temp rise (gold plated contacts)
4 - Close on temp rise (gold plated contacts)