Temperature Products

- Electronic Products
- Pressure Transducers
- Mechanical Pressure Products
- Valves & Regulators
- Temperature Products
- Level Products
- Air Suspension Valves

Barksdale - the total control solutions partner

At Barksdale, our goal is to help our customers “Control Every Move”. For us, this isn’t simply a motto, but rather a vision that guides the way we do business with our valued customers. At every stage in the process from needs assessment, design and manufacturing to customer support, we provide peace of mind by delivering a total controls solution tailored to meet the specific needs of each customer. We accomplish this by leveraging the following:

A **Highly Experienced Team** of engineers that work closely with customers to meet, exceed and even anticipate their every control need.

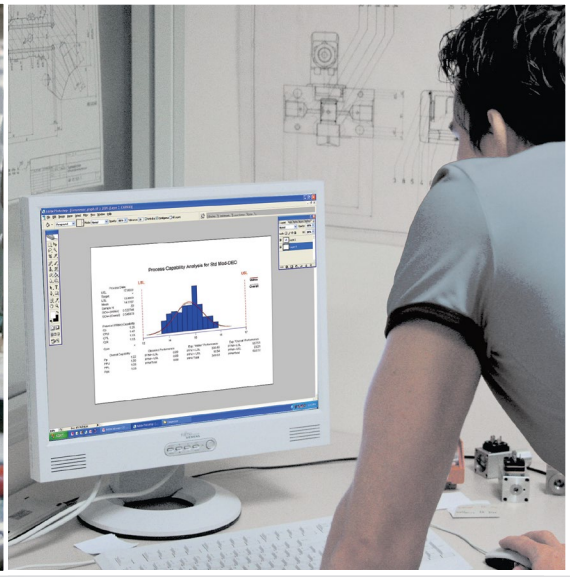
A **Diverse Product Portfolio** of quality standard and custom-tailored product solutions that help control Pressure, Temperature, Level and Flow in the most demanding applications in the industry.

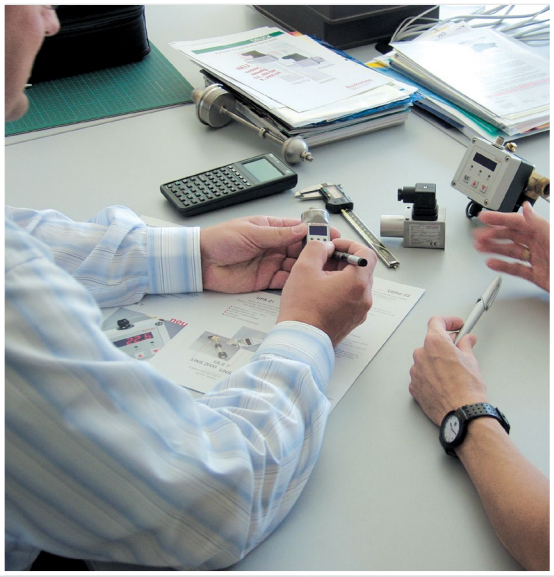
Our **Global Reach and Support** via our:

- Worldwide direct sales force of experts
- Manufacturing facilities in North America and Europe
- Team of highly capable and friendly customer support staff that make it easy to do business with Barksdale anywhere in the world

Dedicated Tools & Processes

- Production Part Approval Process (PPAP) to satisfy the most stringent quality control requirements
- Compliance with ISO 9001:2000 standards
- ATEX / IECx compliant facilities
- 6 Sigma culture / Process Capability





Barksdale®
CONTROL PRODUCTS

Table of Contents

Temperature Switches

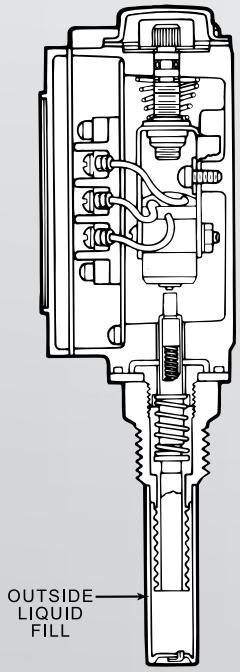
Supplemental Guide

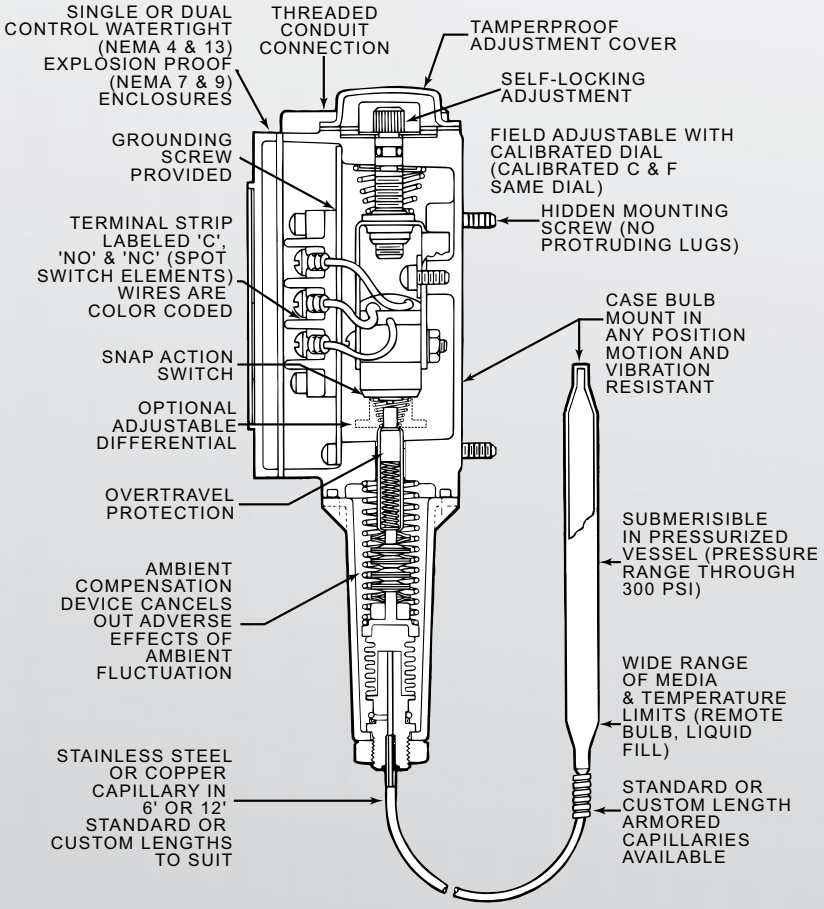
Temperature Switch Products

Sensor Types

Local Mount
Local mount type temperature switches are installed in the pipe or vessel. In this type of sensor, the filling fluid surrounds the bellows. A negative temperature change forces the fluid to contract-expanding the bellows to actuate the switch. Positive temperature changes produce the opposite effect.

Remote Bulb & Capillary
Remote temperature switches allow the switch enclosure to be placed up to 25 feet from the media. These models use a bulb and capillary sensing device which may be ordered in standard six and 12 foot lengths. Extra lengths up to 25 feet are available. Six and 12 foot sensors can be copper or stainless steel with or without protective spiral-wound armor. The 25 foot lengths are armored stainless steel only.





Barksdale offers both remote and local mount temperature switches in housed, NEMA 4 and/or explosion proof designs. All are available with one or two adjustable temperature set points and fixed or adjustable differential.

General Data

Barksdale was the first manufacturer to offer effective ambient compensation in electromechanical switches revolutionizing temperature switch accuracy through extreme temperature changes.

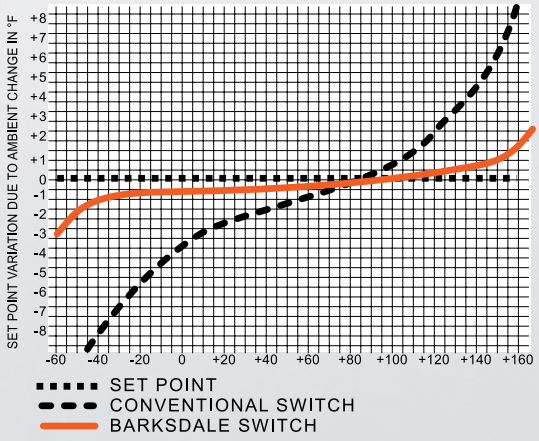
In a liquid-filled bulb and capillary system, ambient temperature changes affect the expansion of the fluid resulting in “false” temperature sensing. An extreme ambient change from -65°F to + 165°F will decrease the accuracy of most switches by 20% or more. Or, if the temperature changes only 70°, accuracy can be decreased by 15%.

±1% Accuracy From Barksdale
Bulb and capillary configurations overcome ambient temperature swings through stacking of precision, concave bimetal washers. An ambient temperature change causes the liquid fill in the bulb, capillary and bellows to expand or contract, an equal and opposite reaction occurs between the washers. This compensates for ambient temperature change assuring high repeatable accuracy even under wide ambient temperature swings.

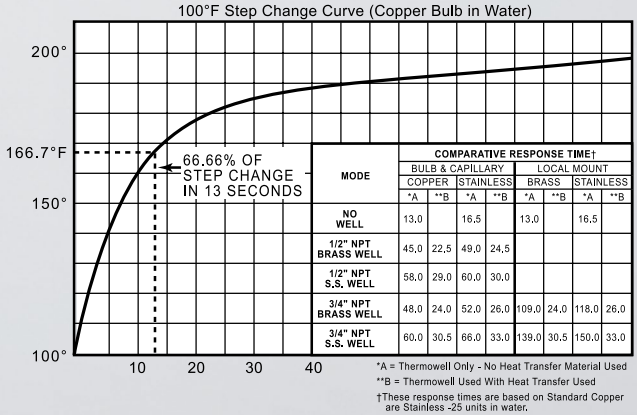
By reacting to ambient temperature changes as extreme as -65°F to + 165°F, the accuracy of the mid-60% of the adjustable range is still within ±1% of full-scale. Accuracy at constant ambient is ±0.5% full scale.

Local mount temperature switches are not affected by ambient temperature changes in the same way as bulb and capillary types. All of the filling fluid is exposed to the media temperature the bulb is sensing. Therefore, there is no ambient temperature influence on the filling fluid.

Ambient Temperature Compensation Comparison Curve



Good Response Time

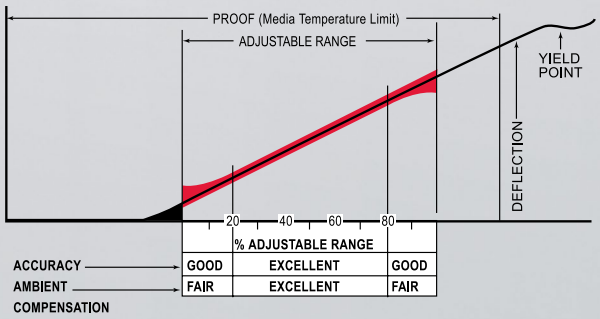


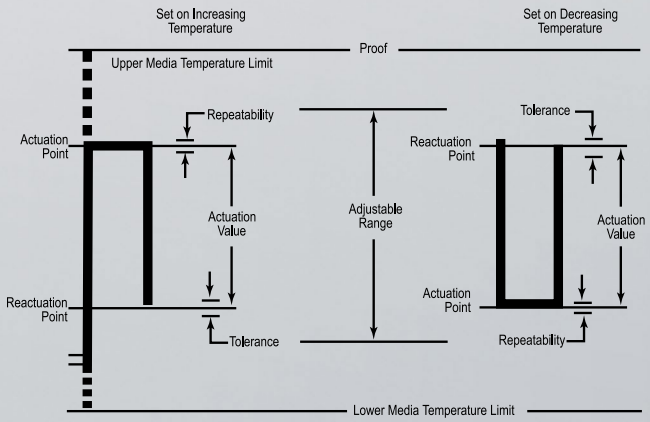
MODE	COMPARATIVE RESPONSE TIME†							
	BULB & CAPILLARY				LOCAL MOUNT			
	COPPER		STAINLESS		BRASS		STAINLESS	
	*A	**B	*A	**B	*A	**B	*A	**B
NO WELL	13.0		16.5		13.0		16.5	
1/2" NPT BRASS WELL	45.0	22.5	49.0	24.5				
1/2" NPT S.S. WELL	58.0	29.0	60.0	30.0				
3/4" NPT BRASS WELL	48.0	24.0	52.0	26.0	109.0	24.0	118.0	26.0
3/4" NPT S.S. WELL	60.0	30.5	66.0	33.0	139.0	30.5	150.0	33.0

*A = Thermowell Only - No Heat Transfer Material Used
**B = Thermowell Used With Heat Transfer Used
†These response times are based on Standard Copper are Stainless -25 units in water.

Local Mount Type response times apply to Models:
ML1H, ML1H-RD, L2H, L2H-RD & L1X

Select for Mid-Range Setting
For optimum repeat accuracy in areas of extreme temperature change, select the switch range that enables the desired set point to fall in the mid 60% of the adjustable range.





Barksdale® CONTROL PRODUCTS
CRANE Barksdale, Inc./Barksdale GmbH A Subsidiary of Crane Co.

General Data

Differential
(Actuation Value, Dead Band, Hysteresis)
BY CLASS OF ELECTRICAL SWITCH USED IN BARKSDALE TEMPERATURE SWITCHES
Differential tolerances on temperature switches are due to manufacturing tolerances on limit switches and sensing elements. The differential of each temperature switch will remain fixed within the tolerances shown.
Test conditions and media used could affect differential.

Hermetically Sealed Switches
Barksdale Hermetically Sealed Temperature Switches were created for use in hostile environments where exposure to elements such as salt air, hydrogen sulfide and other corrosive agents and atmospheres might cause contact deterioration and switch failure. The switch elements meet the requirements for Class I, Division II hazardous areas.

The Barksdale hermetically sealed switch element is the same size as most nonsealed micro-switches, making this modification of our standard switches simple and inexpensive.

1. Select the standard unit with the desired characteristics.
2. Refer to the catalog sections showing the actuation value (differential) and electrical rating of switch elements by class. (The "Class of Electrical Switch" for Hermetically Sealed switch elements is either AA, CC or HH.) Select the class (AA, CC or HH) desired.
3. Change the standard catalog number as follows: - Prefix the catalog number with "H".
   - Substitute AA or HH for the standard switch element designation.
   - Drop any -UL suffixes.

   Examples:
   - Standard Catalog number T2H-H151
   - Hermetically Sealed numbers are HT2H-AA151, HT2H-CC151 or HT2H-HH151

Sensing Element: Bulb & Capillary Type	Sensing Element: Bulb & Capillary Sensor	Adjustable Range - °F	Approximate Differential (Actuation Value, Deadband, Hysteresis) by class of switch element: B	GH, H	J	K	L	M	S Adjustable to	S Adjustable from	G** Can be reset after	AA	HH	CC
MT1H	-15	- 65 to + 150	3-5	1-2	1-3	4-6	2-4	2-4	4	15	5	1.0-8.0	1.0-7.0	1.0-10.0
T2H	-25	+50 to +250	3-5	1-2	1-3	4-6	2-4	2-4	4	15	5	1.0-8.0	1.0-7.0	1.0-10.0
T1X	-35	+150 to +350	3-5	1-2	1-3	4-6	2-4	2-4	4	15	5	1.0-8.0	1.0-7.0	1.0-10.0
T2X	-60	+300 to + 600	5-7	2-4	3-5	5-8	4-6	4-6	7	25	5	2.0-12.0	2.0-11.0	2.0-14.0
Local Mount														
ML1H	-201 thru 354	-50 thru +350	4-7	1-3	1-4	6-9	3-6	3-6	6	20	5	2.0-11.0	2.0-10.0	2.0-13.0
L2H	-451 thru 454	+150 thru +450	7-10	3-6	4-7	7-12	6-9	6-9	10	30	5	2.0-11.0	2.0-10.0	2.0-13.0
L1X	-451 thru 454	+150 thru +450	7-10	3-6	4-7	7-12	6-9	6-9	10	30	5	2.0-17.0	3.0-16.0	3.0-19.0

*Differential values are the same for copper and stainless steel **-RD Models ***T2H, T2X, L2H Models

Electrical Rating (Current given in Amperes)
(1) For standard models the electrical ratings are listed on each page under Electrical Characteristics.
(2) For other switch ratings, see table below and refer to corresponding Operating Characteristics.
- Class GH switches are SPDT with gold contacts.
- Class J & K switches are SPDT with fine silver contacts and an Elastomer Boot around pin actuators to prevent moisture and foreign matter from affecting contacts.
- Class G switches are manual reset.
- Class R & S switches are SPDT with fine silver contacts and adjustable differentials.
- All other switch classes are SPDT with fine silver contacts and fixed differentials.
- Class H & M switches meet humidity requirements of MIL-S-6743.
- Class AA, CC & HH hermetically sealed.

AC RATINGS		INDUCTIVE LOAD - 50% POWER FACTOR									
CLASS OF SWITCH		MAXIMUM CONTINUOUS CURRENT									
		H,J	B,K	L	M	S	G	GH	AA	HH	CC
VOLTS	125	10	10	15	10	15	10	1.0	4.0	4.0	10.0
AC	250	10	10	15	10	15	10		4.0	4.0	10.0
	480	3	10	15	3	15	10				
	600		2				2				

DC RATINGS		INDUCTIVE LOAD - L/R = .26						
CLASS OF SWITCH		MAXIMUM CONTINUOUS CURRENT						
		H	B,K	L	M	S	G	GH
VOLTS	6	.5	15	8.0	8.0	15	15	1.0
DC	12	.5	10	5.0	5.0	15	15	1.0
	24	.5	5	1.0	1.0	5	10	1.0
	125		.05	.03	.5	.05	.4	
	250		.03	.02	.25	.03	.2	

General Data

Temperature Conversion Table

Find in the center column the number of the known temperature. If the known temperature is in Fahrenheit, the Centigrade equivalent is in the left hand column. If in Centigrade, the Fahrenheit equivalent is in the right hand column. The basic conversion formulas are:

°C = °F - 32 X 5/9, OR °C = $\frac{°F - 32}{1.8}$ **°F = °C X 9/5 + 32, OR °F = °C X 1.8 + 32**

°C	°F/°C	°F	°C	°F/°C	°F	°C	°F/°C	°F	°C	°F/°C	°F
-73.3	-100	-148.0	-3.9	25	77.0	93.3	200	392.0	232.2	450	842.0
-70.6	-95	-139.0	-1.1	30	86.0	98.9	210	410.0	237.8	460	860.0
-67.8	-90	-130.0	1.7	35	95.0	104.4	220	428.0	243.3	470	878.0
-65.0	-85	-121.0	4.4	40	104.0	110.0	230	446.0	248.9	480	896.0
-62.2	-80	-112.0	7.2	45	113.0	115.6	240	464.0	254.4	490	914.0
-59.4	-75	-103.0	10.0	50	122.0	121.1	250	482.0	260.0	500	932.0
-56.7	-70	-94.0	12.8	55	131.0	126.7	260	500.0	265.6	510	950.0
-53.9	-65	-85.0	15.6	60	140.0	132.2	270	518.0	271.1	520	968.0
-51.1	-60	-76.0	18.3	65	149.0	137.8	280	536.0	276.7	530	986.0
-48.3	-55	-67.0	21.1	70	158.0	143.3	290	554.0	282.2	540	1004.0
-45.6	-50	-58.0	23.9	75	167.0	148.9	300	572.0	287.8	550	1022.0
-42.8	-45	-49.0	26.7	80	176.0	154.4	310	590.0	293.3	560	1040.0
-40.0	-40	-40.0	29.4	85	185.0	160.0	320	608.0	298.9	570	1058.0
-37.2	-35	-31.0	32.2	90	194.0	165.6	330	626.0	304.4	580	1076.0
-34.4	-30	-22.0	35.0	95	203.0	171.1	340	644.0	310.0	590	1094.0
-31.7	-25	-13.0	37.8	100	212.0	176.7	350	662.0	315.6	600	1112.0
-28.9	-20	-4.0	43.3	110	230.0	182.2	360	680.0	321.1	610	1130.0
-26.1	-15	5.0	48.9	120	248.0	187.7	370	698.0	326.7	620	1148.0
-23.3	-10	14.0	54.4	130	266.0	193.3	380	716.0	332.2	630	1166.0
20.6	-5	23.0	60.0	140	284.0	198.9	390	734.0	337.8	640	1184.0
-17.8	0	32.0	65.6	150	302.0	204.4	400	752.0	343.3	650	1202.0
-15.0	5	41.0	71.1	160	320.0	210.0	410	770.0	348.9	660	1220.0
-12.2	10	50.0	76.7	170	338.0	215.6	420	788.0	354.4	670	1238.0
-9.4	15	59.0	82.2	180	356.0	221.1	430	806.0	360.0	680	1256.0
-6.7	20	68.0	87.8	190	374.0	226.7	440	824.0	365.6	690	1274.0

Temperature Switch Operation and Safety

WARNING

Product **must** be installed in accordance with applicable NEC, ASME and local regulations as applicable including those that apply to installations in hazardous locations requiring explosion proof enclosures or similar construction.

The temperature limitations shown on the individual catalog pages for the specific switch must not be exceeded. These temperatures must take into consideration the possible maximum system temperatures encountered. **The maximum allowable pressure on the sensor is 300 psi**. Over 300 psi, use suitable thermowell.

The fluid used must be compatible with the materials of construction. Special cleaning and packaging may be required for special media such as oxygen. **Consult factory.**

Temperature switches are not of sanitary construction and the fill fluid is toxic. Therefore, sensors should not be in contact with materials intended for ingestion unless suitable thermowell is used. Sensors listed in this catalog are filled with silicon oil. When silicon oil is combined with strong oxidizing agents, including (but not limited to) chlorine, nitric acid, and hydrogen peroxide, a spontaneous chemical reaction, ignition or explosion can result. When temperature switches containing fluid are used in such service, thermowells must be used.

The electrical load through the temperature switch must not exceed the values shown in the catalog for the specific switch involved.

Shock and vibration may affect the switch performance. Therefore, shock and vibration should be minimized. **Consult factory for assistance.**

Troubleshooting and Maintenance

Troubleshooting of the switch must be in strict compliance with the procedure set forth on the Troubleshooting and Maintenance section of this catalog.

Field repair of UL, CSA or other listed units will void the UL or CSA listing of the repaired unit.

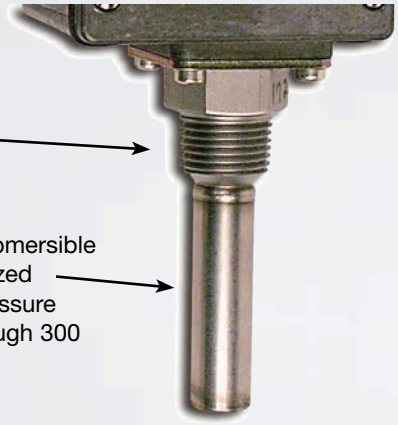
Barksdale, Inc. components must not be used in life support applications of any kind.

Failure to observe these warnings could result in serious injury or damage.

Temperature Switch Accessories

Thermowells, Split Nut, Union Connector, Capillaries

Standard Local Mount



Example:
ML1H-H201S

Standard Local Mount

Example:
ML1H-H201S-WS

NOTE:
Barksdale standard models cannot be field converted to add a Barksdale thermowell.
To order a standard temperature switch with thermowell, add -WS to the model number.

Example: ML1H-H201S-WS
To order replacement temperature switch for thermowell models, less thermowell, add -Z18 to model number.

Example: ML1H-H201S-WS-Z18

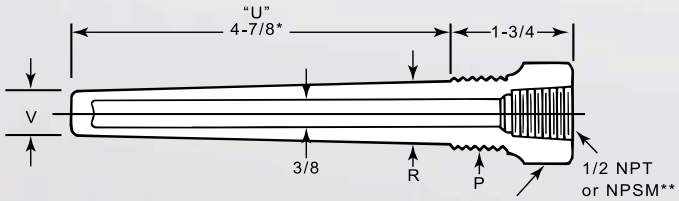
Thermowells for High Pressure and Harsh Environments

All electromechanical temperature switches may be used with a thermowell when pressures exceed 300 psi, if high velocities are present and with corrosive or abrasive medias. Thermowells also allow removal of the temperature switch or sensor without loss of contained media.

When using a thermowell with a local mount temperature switch, two set screws are provided to secure the switch in the well allowing 360° rotation for easier electrical connection and readability.

The use of a thermowell may increase response time to temperature change. By using heat transfer material, the increase can be kept to a minimum.

Thermowells for Remote Bulb and Capillary Models Only



*Additional lengths and configurations available. Low-cost fabricated wells are also available.

**NPSM Internal Thread will accept both NPT and NPS male threads.

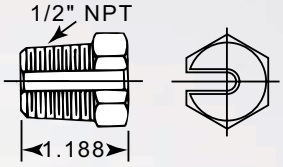
Part Number	Material	P Process Connection NPT	R	V
208129-B	Brass	1/2	.688	.625
208130-B	Brass	3/4	.875	.750
208129-C	316SS	1/2	.688	.625
208130-C	316SS	3/4	.875	.750

Temperature Switch Accessories

Thermowells, Split Nut, Union Connector, Capillaries

Split Nut

Used to hold sensor bulb in standard thermowell.



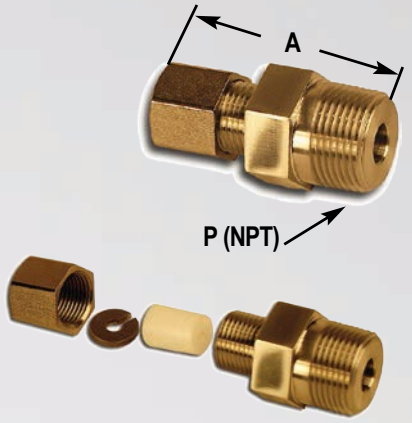
Part Number 208128

Union Connector

Used to hold sensor bulb in extra length thermowell. Seals the process connection where no thermowell is used.

Note: Union contains compression discs and will seal to 300 psi.

Part Number	Material	P NPT	A
40816-B	Brass	1/2	2-1/4
40817-B	Brass	3/4	2-1/2
40816-C	316SS	1/2	2-1/4
40817-C	316SS	3/4	2-1/2
T9692X Models			
40822-B	Brass	1/2	2-1/2
40823-B	Brass	3/4	2-1/2
40822-C	316SS	1/2	2-1/2
40823-C	316SS	3/4	2-1/2



"Thermowell" Pressure-Temperature and Velocity Limitations Maximum Fluid Velocity Feet Per Second

Material	Insertion Length-"U"							
	2-1/2"	4-1/2"	7-1/2"	10-1/2"	13-1/2"	16-1/2"	19-1/2"	22-1/2"
Brass	321 (150)	129 (83.5)	46.8	23.6	14.5	9.6	6.9	5.1
Carbon Steel	410 (270)	249 (150)	90.3	45.6	27.8	18.5	13.2	9.8
A.I.S.1. 304 & 316	483 (350)	272 (208)	97.3	49.7	30.4	20.3	14.5	10.7
Monel	396 (300)	214 (167)	77.5	39.2	23.8	16.0	10.3	7.7

The values in parentheses (00) represent safe values for water flow.
Unbracketed values are for steam, air, gas and similar low density fluids.

Pressure-Temperature Rating Lbs. Per Square Inch

Material	Temperature – °F				
	70°	200°	400°	600°	800°
Brass	5000	4200	1000	*	*
Carbon Steel	5200	5000	4800	4600	3500
A.I.S.I. 304	7000	7000	5600	5400	5200
A.I.S.I. 316	7000	7000	6400	6200	6100
Monel	6500	6000	5400	5300	5200

*Stainless Steel Recommended.

Capillary Variations

Description	Suffix	Examples without Manual Reset	Examples with Manual Reset (-RD)
Copper Units with 302 SS Armor	A (added to any standard catalog)	T1X-H150-A	MT1H-G150-A-RD
Stainless Steel Units With 302 SS Armor		T2H-H601S-12-A	T2H-H601S-12-A-RD
Extra Length Capillaries (over 12" in length)	Available as Special. ConsultFactory for part number, price and delivery.		

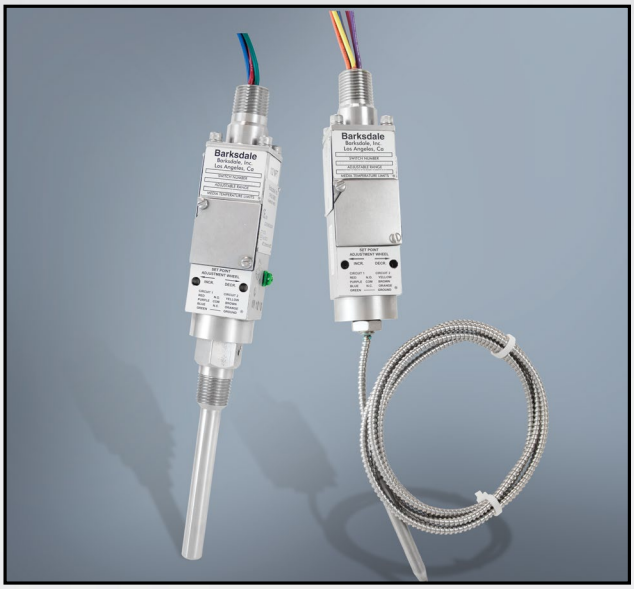
Compact Explosion Proof Temperature Switch T9692X

Features

- IECEx & ATEX approved
- Compact design
- Convenient field adjustability
- NEMA 4X, 7 & 9
- SPDT and DPDT switch
- Class I Div I
- Direct or remote mount
- Panel mount capability
- 316 stainless steel
- NACE compliant
- Armored capillary

Applications

- Offshore platforms
- Safety panels
- Chemical plants & refineries
- Compressor skids
- Instrument panels
- Hazardous location applications



General Specifications*

Accuracy:	±3% of full scale
Typical Life:	1 million cycles
Switch:	SPDT, snap action, Class EE, simulated DPDT (optional)
Electrical Ratings:	11 amps @ 125/250 VAC 5 amps @ 30 VDC (EE class)
Materials: Bulb, Capillary & Armor: Enclosure: Local Mount Element:	 316 stainless steel 316 stainless steel 300 series stainless steel
Electrical Connection:	1/2 inch NPT male conduit connection 18 AWG, 18" (300 mm) free leads
Enclosure Ratings:	NEMA 4X, 7 & 9

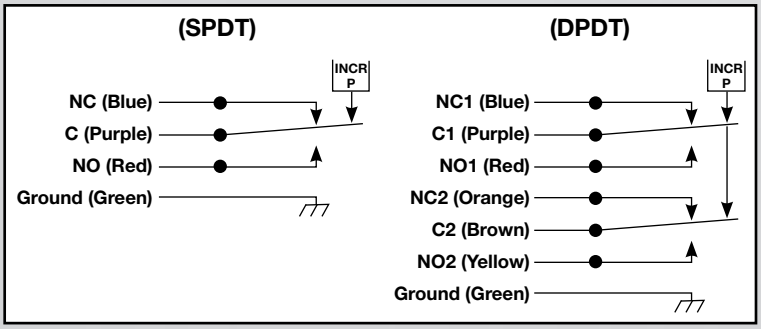
* See Product Configurator for additional options.

Approvals: ATEX/IECEx: UL: CSA:	 CE 0081, LCIE 08 ATEX 6074X Ⓔx II 2 G, Ex d IIC T6 Gb IECEx LCIE 17.0001X, -40°C ⩽ Tamb ⩽ 60°C Listed 366S, Class: I, Groups: A, B, C, D, -25°C ⩽ Tamb ⩽ 60°C Class: I, Groups: B, C, D -40°C ⩽ Tamb ⩽ 60°C
Ambient Operating Temperature: CSA & ATEX: UL:	 -40°F to 140°F (-40°C to 60°C) -13°F to 140°F (-25°C to 60°C)
EMI/RFI:	EN55011
Vibration:	10g's 10-500 Hx, MIL-STD 202°F
Shock:	50g's, 11 ms, MIL-S-901C
Adjustment:	Internal locking adjustment wheel, 1/16 hex set screw
Weight:	3 lbs. maximum

Wiring Code

Lead	Circuit #1	Circuit #2
Normally Closed	Blue	Orange
Common	Purple	Brown
Normally Open	Red	Yellow
Ground	Green	

Wiring Diagram



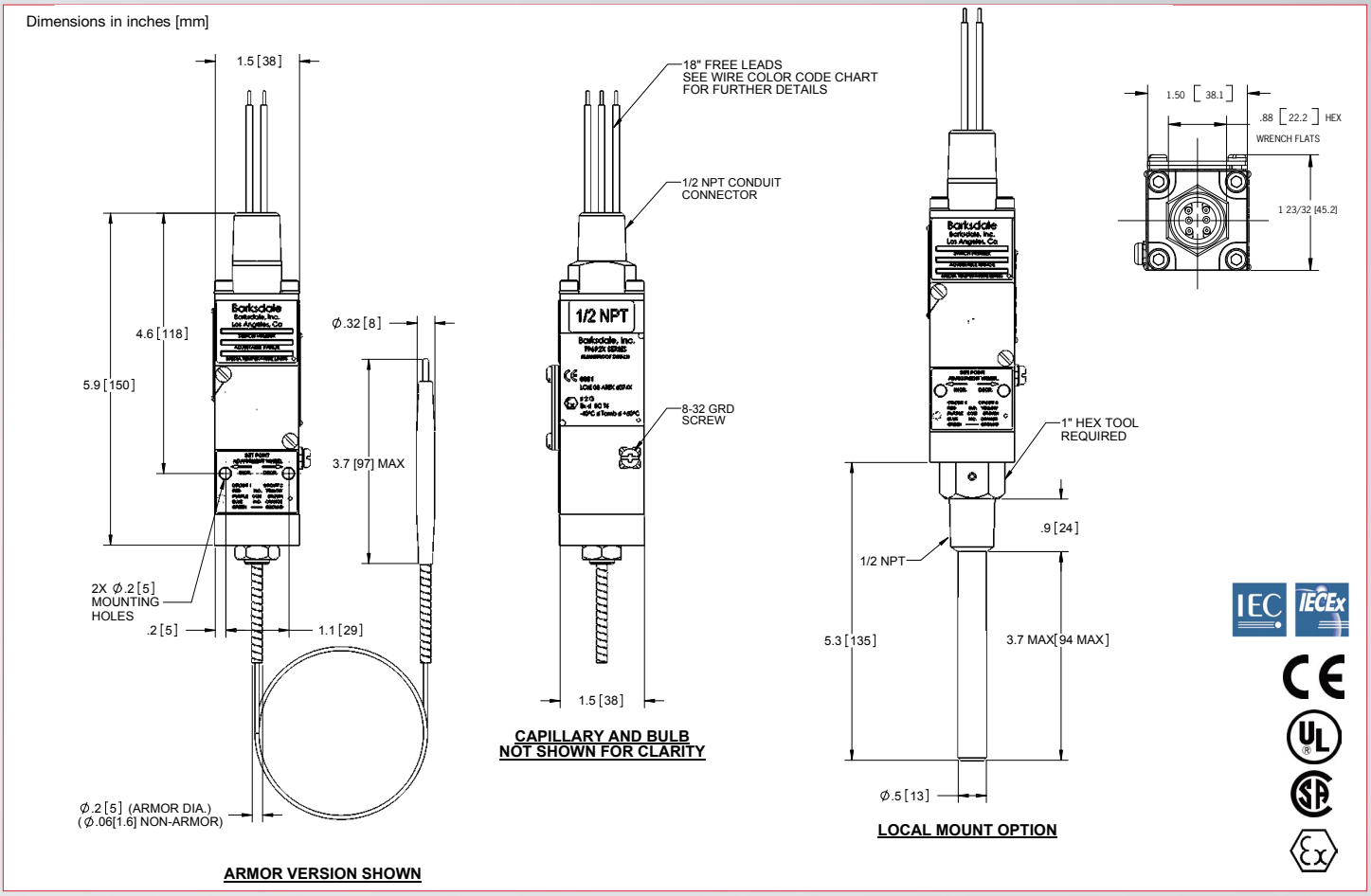
Barksdale® CONTROL PRODUCTS
CRANE Barksdale, Inc./Barksdale GmbH A Subsidiary of Crane Co.

Compact Explosion Proof Temperature Switch

T9692X

Technical Drawing

Dimensions in inches [mm]



Product Configurator

Example	T9692X	-1	EE	-1	-072	

Base Configurator

T9692X	Temperature switch

Number of Circuits

-1	SPDT switch
-2	Simulated DPDT switch (2 SPDTs)

Limit Switch

EE	Silver contacts 11 amps @ 125V/250 VAC; 5 amps @ 30 VDC
GH	Gold contacts 1 amp @ 125/250 VAC

Temperature Ranges

	Adjustable Range	Approx. Deadband[2] Actuation Value	Media Temperature Limits	Proof Temperature
-1	-10°F to 110°F (-23°C to 43°C)	5°F to 30°F (2.8°C to 16.7°C)	-40°F to 160°F (-40°C to 71°C)	160°F (71°C)
-2	95°F to 220°F (35°C to 104°C)	5°F to 30°F (2.8°C to 16.7°C)	40°F to 270°F (4°C to 132°C)	270°F (132°C)
-3	180°F to 330°F (82°C to 165°C)	5°F to 30°F (2.8°C to 16.7°C)	70°F to 380°F (21°C to 193°C)	380°F (193°C)

Options

Blank	Standard
-A[1]	Stainless steel armor
-SXXX	Factory preset
-WXXX	Extra wire length (XXX=inches)

Capillary Length

-072	6 ft (1.8 meters)
-108	9 ft (2.7 meters)
-144	12 ft (3.7 meters)
-001	Local mount

[1] Not available in local mount

[2] Deadband values indicated when used with the "EE" limit switch

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Barksdale® CONTROL PRODUCTS

Remote Mount Temperature Switches

Series MT1H, T2H

Features

- Reliable & accurate
- Ambient temperature compensated
- NEMA 4, 13
- UL, CSA & CE approved
- Single or dual switching

Applications

- Marine & shipbuilding
- Railroad
- Oil & gas
- Medical
- Compressors
- Water equipment
- Process equipment
- Machine tools and industrial equipment

General Specifications*

Accuracy: (Repeatability)	±1% of mid-60% of full range. At constant ambient ±0.5% of full scale. (Knob indication is reference only)
Switch:	One (1) SPDT or two (2) independent SPDT circuits
Electrical Characteristics:	All models incorporate Underwriters' Laboratories, Inc. and CSA listed single pole double throw snap-action switching elements. Switches may be wired normally open or normally closed.
Wetted Parts:	Copper or 304 stainless steel
Electrical Connection:	Single: 3-Pin terminal strip Dual: 6-Pin terminal strip
Electrical Ratings:	AC value at 50% power factor —10 amps @ 125, 250 volts AC, 3 amps @ 480 volts AC. Automatically reset by snap-action of switch.
Enclosure/Housing:	Watertight and dust-tight indoor and outdoor (NEMA 4)/oil-tight and dust-tight indoor (NEMA 13).

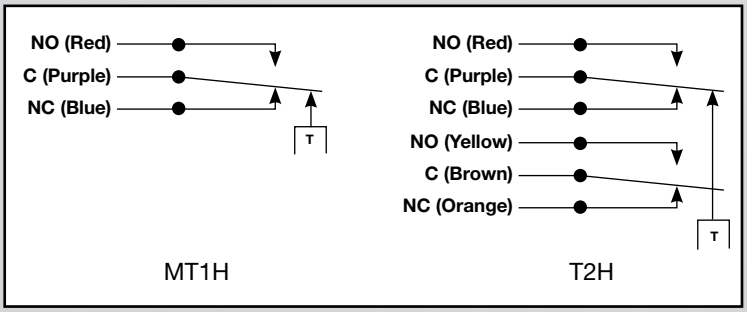
Bulb & Capillary:	6 and 12 foot length standard. See operating characteristics and product configurator.
Approvals:	Underwriters' Laboratories, Inc. and Canadian Standard Assoc. are listed under temperature indicating and regulating equipment.
UL:	File No. E56247, Guide No. XAPX
CSA:	File No. LR34555, Guide 400-E-O Class 4813
Temperature Range:	See product configurator
Adjustment:	Tamper resistant external adjustment. Turn knob clockwise to increase setpoint. (Knob indication is reference only)
Weight:	Single: approximate 1.5 lbs. Dual: approximate 3.0 lbs.

* See Product Configurator for additional options.

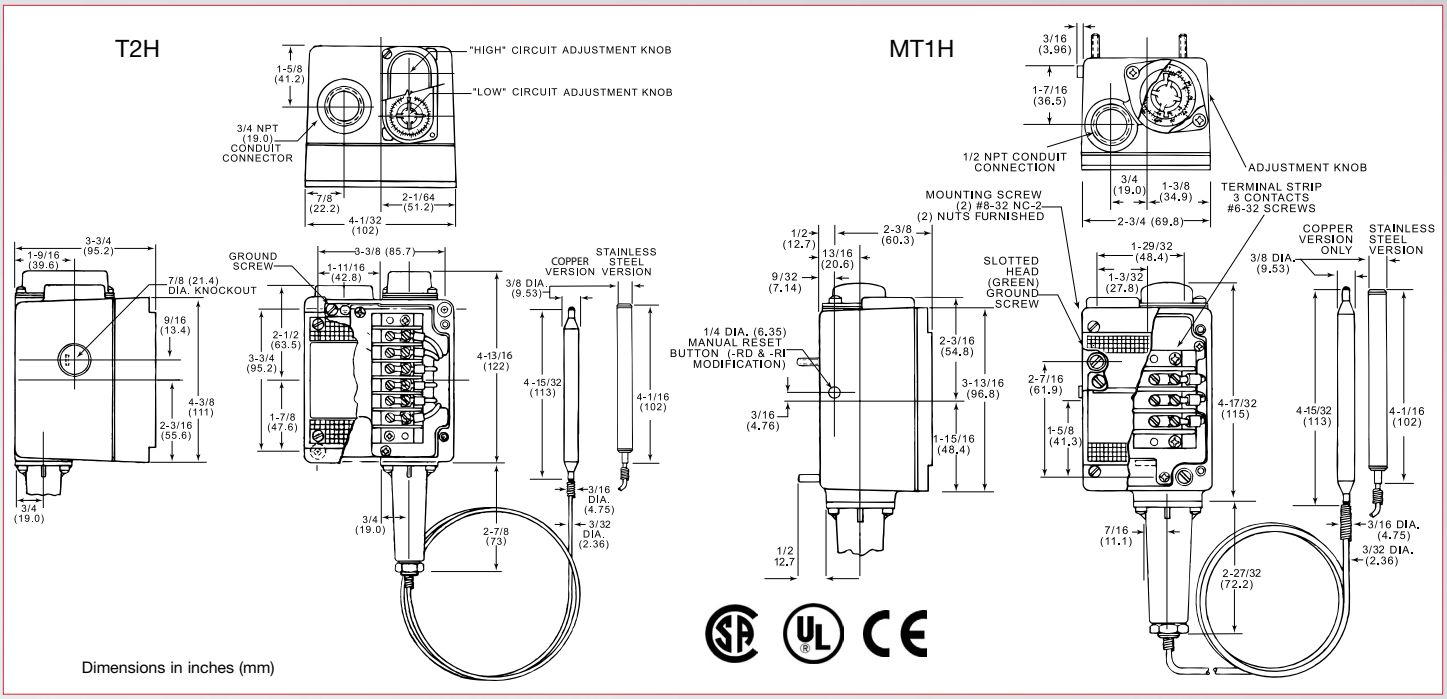
Wiring Code

Lead	Circuit #1	Circuit #2
Normally Closed	Blue	Orange
Common	Purple	Brown
Normally Open	Red	Yellow

Wiring Diagram



Technical Drawing



Dimensions in inches (mm)

Product Configurator

Example	H	M	T1	H	-HH	154	S	-12	-A	-FX

Options

-RD [2]	Manual reset
-FX [3]	NEMA 4X enclosure (consult factory)
-SXXX [5]	Factory pre-set (consult factory)

Armor Options

Blank	Blank if not required
-A	302 stainless steel armor

Capillary Length

Blank	6 foot capillary
-12	12 foot capillary
-25 [4]	25 foot stainless steel capillary

Wetted Material

Blank	Copper sensor
S	304 stainless steel

H	Hermetically sealed limit switch option - Class I, Division II (requires AA, CC, GH or HH limit switch, 60°C Ta max.)
Blank	Standard

M	Single setpoint switch models
Blank	Dual switch models

Switch

T1	Single SPDT
T2	Dual switch 2 independent SPDT

Enclosure

H	NEMA 4 enclosure

Limit Switch [1]

-H	10 amps @ 125/250 VAC; 3 amp @ 480 VAC (standard)
-B	10 amps @ 125/250/480 VAC; 2 amps @ 600 VAC; 0.05 amps @ 125 VDC; 0.03 amps @ 250 VDC
-G [2]	10 amps @ 125/250/480 VAC; 2 amps @ 600 VAC; 0.4 amps @ 125 VDC; MANUAL RESET
-J	10 amps @ 125/250 VAC; 3 amps @ 480 VAC (with elastomer boot)
-L	15 amps @ 125/250/480 VAC; 0.03 amps @ 125 VDC; 0.02 amps @ 250 VDC
-M	10 amps @ 125/250 VAC; 3 amp @ 480 VAC; 0.5 amps @ 125 VDC; 0.25 amps @ 250 VDC
-S	15 amps @ 125/250/480 VAC; 0.05 amps @ 125 VDC; Adjustable differential
-GH	1 amp @ 125VAC; gold contacts
-AA	Hermetically sealed; 4 amps @ 125/250 VAC
-CC	Hermetically sealed; 10 amps @ 125/250 VAC
-HH	Hermetically sealed; 5 amps @ 125/250 VAC
-GH	Hermetically sealed; 1 amp @ 125 VAC; gold contacts

Temperature Range

Range	Adjustable Range °F Low	°F High	°C Low	°C High	Media Temperature Limit (Proof) °F Low	°F High	°C Low	°C High	Differential [1] (Approx.) Liquid °F	°C	Calibrated Dial Adjustment
154	-50	+150	-45	+66	-100	+200	-73	+93	1 to 2	.5 to 1.1	Calibrated 5° Subdivision 200° Span
251	+50	+250	+10	+121	-100	+300	-73	+149	1 to 2	.5 to 1.1	
351	+150	+350	+66	+177	-100	+400	-73	+205	1 to 2	.5 to 1.1	
601	+300	+400	+149	+227	0	+650	-18	+343	2 to 4	1.1 to 2.2	5° Subdivision 140° Span
603	+320	+600	+160	+316	0	+650	-18	+343	2 to 4	1.1 to 2.2	10° Subdivision 280° Span

NOTES:

[1] Changing limit switch will effect dead band; See sales drawing.

[2] Use G limit switch for single setpoint models that need this option. When selecting the manual reset option on dual setting switches (T2H), the manual reset limit switch will be on the high circuit. The low circuit limit switch must be specified by the customer.

[3] Add 'S' wetted material. FX models require stainless steel capillaries. Consult factory; minimum quantities required.

[4] Add 'S' wetted material adder and 'A' armor adder to this. Capillary length '25' requires stainless steel capillary and armor.

[5] Factory preset is available for all ranges, limited to 400°F setpoint(s).

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Barksdale® CONTROL PRODUCTS

Local Mount Temperature Switches

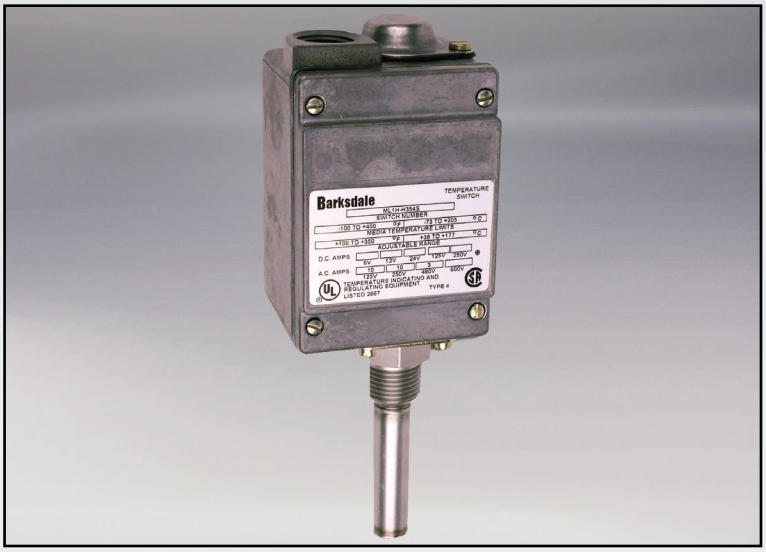
ML1H, L2H

Features

- Reliable & accurate
- Local sensing
- NEMA 4
- UL, CSA & CE approved
- Single or dual switching

Applications

- Oil & gas
- Mining
- Tanks and reservoirs
- Compressors
- Plastic machinery
- Factory automation
- Process equipment
- Machine tools and industrial equipment



General Specifications*

Accuracy: (Repeatability)	±1% of mid-60% of full range. At constant ambient ±0.5% of full scale. (Knob indication is reference only)
Switch:	Single: 1 SPDT Dual switching: 2 independent SPDT circuits
Electrical Characteristics:	All models incorporate Underwriters' Laboratories, Inc. and CSA listed single pole double throw snap-action switching elements. Switches may be wired normally open or normally closed.
Wetted Parts:	Brass or 304 stainless steel
Electrical Connection:	Single: 3-pin terminal strip Dual: 6-pin terminal strip
Electrical Ratings:	AC value at 50% power factor —10 amps 125, 250 volts AC, 3 amps 480 volts AC. Automatically reset by snap-action of switch.
Enclosure/Housing:	Water-tight and dust-tight indoor and outdoor (NEMA 4) / oil-tight and dust-tight indoor (NEMA 13).
Local Mount:	Immersion length 2-1/16 inches

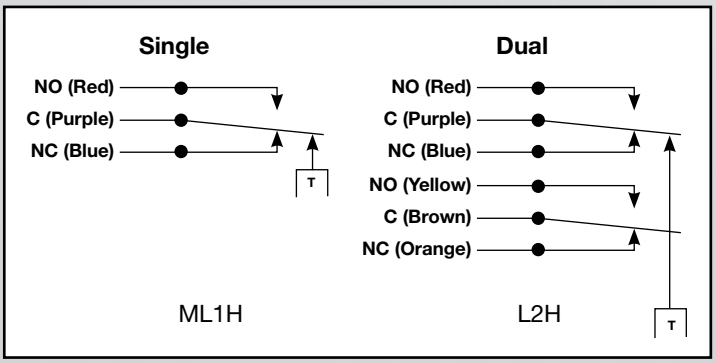
Approvals/Listings:	Underwriters' Laboratories, Inc. and Canadian Standard Assoc. are listed under temperature indicating and regulating equipment.
UL:	File No. E56247, Guide No. XAPX
CSA:	File No. LR34555, Guide 400-E-O Class 4813
Temperature Range:	See product configurator.
Adjustment:	Tamper resistant external adjustment. Turn knob clockwise to increase setpoint. (Knob indication is reference only)
Weight:	Single: approximate 1.5 lbs. Dual: approximate 3.0 lbs.

* See Product Configurator for additional options.

Wiring Code

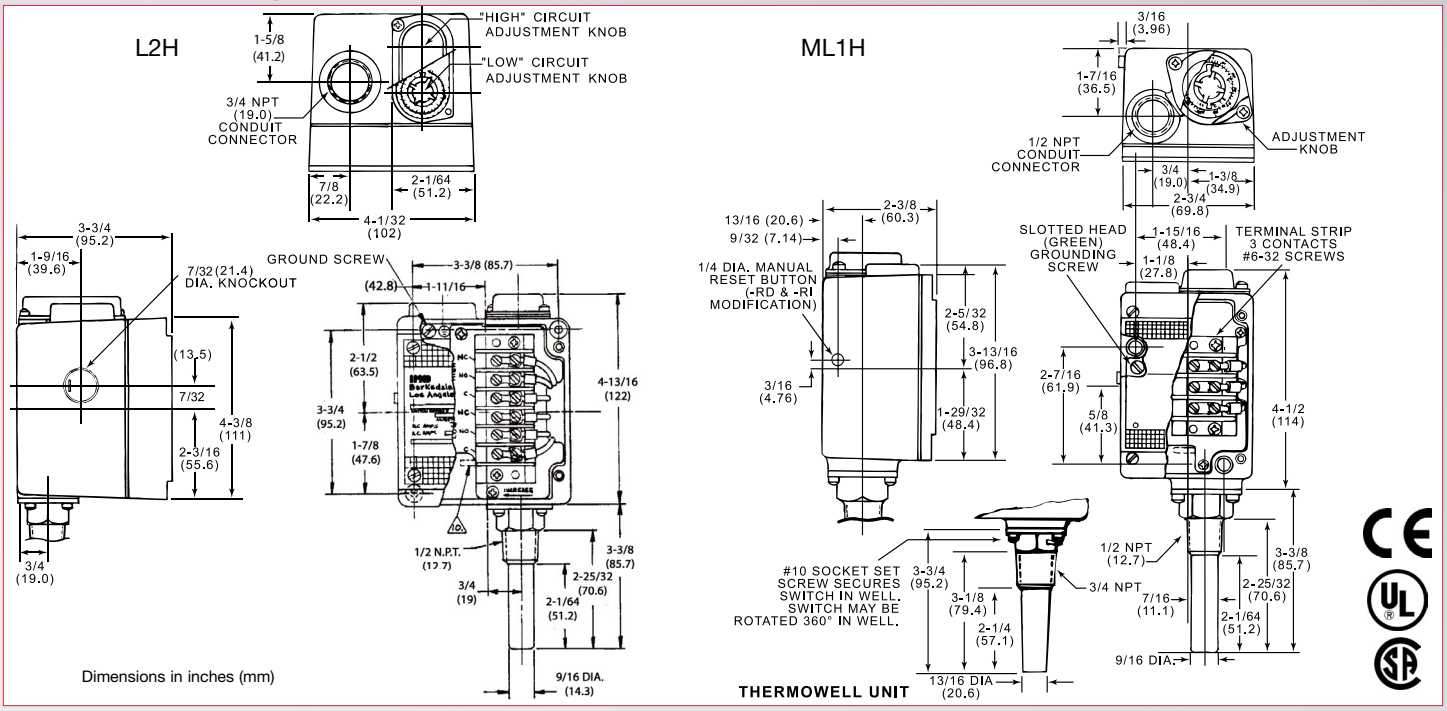
Lead	Circuit #1	Circuit #2
Normally Closed	Blue	Orange
Common	Purple	Brown
Normally Open	Red	Yellow

Wiring Diagram



Barksdale® CONTROL PRODUCTS
CRANE Barksdale, Inc./Barksdale GmbH A Subsidiary of Crane Co.

Technical Drawing



Product Configurator

Example	H	M	L1	H	-HH	202	S	-WS	-FX

Options

-RD[2,3]	Manual reset (use with "G" limit switch)
-FX[4]	NEMA 4X enclosure
-SXXX	Factory preset

Thermowell

-W	Brass local mount thermowell
-WS	316 stainless steel local mount thermowell
-Z18	Replacement temperature switch for thermowell models, without the thermowell.

Wetted Material

Blank	Blank if brass
S	304 stainless steel sensor

H	Hermetically sealed limit switch option - Class I, Division II (requires AA, CC, GH or HH limit switch 60° Ta max)
Blank	Standard

M	Single switch models
Blank	Dual switch models

Limit Switch [1]

-H	10 amps @ 125/250 VAC; 3 amp @ 480 VAC (standard)
-B	10 amps @ 125/250/480 VAC; 2 amps @ 600 VAC; 0.05 amps @ 125 VDC; 0.03 amps @ 250 VDC
-G[2]	10 amps @ 125/250/480 VAC; 2 amps @ 600 VAC; 0.4 amps @ 125 VDC; MANUAL RESET
-J	10 amps @ 125/250 VAC; 3 amps @ 480 VAC (with elastomer boot)
-L	15 amps @ 125/250/480 VAC; 0.03 amps @ 125 VDC; 0.02 amps @ 250 VDC
-M	10 amps @ 125/250 VAC; 3 amp @ 480 VAC; 0.5 amps @ 125 VDC; 0.25 amps @ 250 VDC
-S	15 amps @ 125/250/480 VAC; 0.05 amps @ 125 VDC; Adjustable differential
-GH	1 amp @ 125VAC; Gold Contacts
-AA	Hermetically sealed; 4 amps @ 125/250 VAC
-CC	Hermetically sealed; 10 amps @ 125/250 VAC
-HH	Hermetically sealed; 5 amps @ 125/250 VAC
-GH	Hermetically selaed; 1 amp @ 125 VAC; gold contacts

Sensor Switch

L1	Single set point (SPDT)
L2	Dual set point (2 SPDT)

Enclosure

H	NEMA 4 enclosure

Range

	Adjustable Range				Media Temperature Limit (Proof)				Differential (Approx.) [1]	
	Low	High	Low	High	Low	High	Low	High	°F	°C
201	-50°F	+75°F	-45°C	+24°C	-100°F	+250°F	-73°C	+121°C	1° to 3°	.5° to 1.6°
202	+15°F	+140°F	-9°C	+60°C	-100°F	+250°F	-73°C	+121°C	1° to 3°	.5° to 1.6°
203	+75°F	+200°F	+24°C	+93°C	-100°F	+250°F	-73°C	+121°C	1° to 3°	.5° to 1.6°
351	+100°F	+225°F	+38°C	+107°C	-100°F	+400°F	-73°C	+205°C	1° to 3°	.5° to 1.6°
204	-50°F	+200°F	-45°C	+93°C	-100°F	+250°F	-73°C	+121°C	1° to 3°	.5° to 1.6°
354	+100°F	+350°F	+38°C	+177°C	-100°F	+400°F	-73°C	+205°C	1° to 3°	.5° to 1.6°
454	+150°F	+450°F	+66°C	+232°C	0°F	+500°F	-18°C	+260°C	3° to 6°	1.6° to 3.3°

NOTES:
[1] Changing limit switch will effect dead band; See sales drawing.
[2] Use G limit switch for single set point models that need this option. When selecting the manual reset option on dual setting switches (L2H), the manual reset limit switch will be on the high circuit. The low circuit limit switch must be specified by the customer.
[3] Not available with hermetically sealed limit switches.
[4] Add 'S' wetted material. FX models require stainless steel sensor.

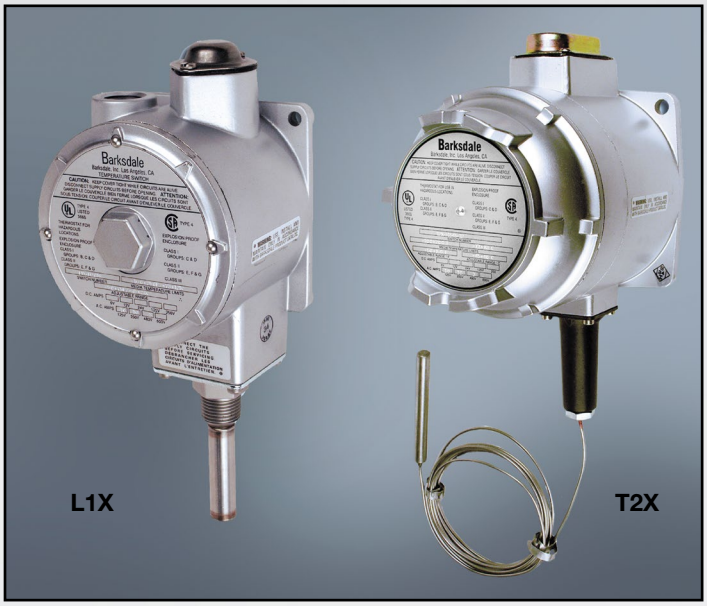
Explosion Proof Temperature Switches *Series T1X, T2X, L1X*

Features

- Explosion-proof for hazardous locations
- High accuracy
- Remote, local or ambient sensing
- UL, CSA & ATEX approved
- NEMA 4, 7, 9 & IP66

Applications

- Oil & gas
- Heat tracing
- Printing machinery
- Compressors
- Process equipment
- Machine tools and industrial equipment



General Specifications*

Accuracy: (Repeatability)	±1% of mid-60% of full range. At constant ambient +/- 0.5% of full scale. (Knob indication is reference only)
Switch: Single Setting: Dual Setting:	 One (1) single pole double throw (SPDT) circuit. Two (2) independent single pole double throw (SPDT) circuits.
Electrical Characteristics:	All models incorporate Underwriters' Laboratories, Inc. and CSA listed single pole double throw snap-action switching elements. Switches may be wired normally open or normally closed.
Wetted Parts:	304 stainless steel
Electrical Connection:	Single: 3-pin terminal strip Dual: 6-pin terminal strip
Electrical Ratings:	AC value at 75% power factor —10 amps 125, 250 volts AC, 3 amps 480 volts AC. Automatically reset by snap-action of switch.
Enclosure/Housing:	Class I, Division 1 & 2 NEMA 4, 7, & 9 Tamper-proof external adjustment, enclosed terminal strip.

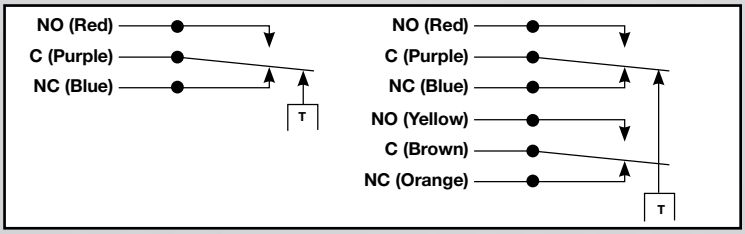
Local Mount:	Immersion length 2-1/16 inches
Bulb & Capillary:	6 foot length standard.
Approvals: UL (standard): CSA (standard): ATEX (optional):	Underwriters' Laboratories, Inc. and Canadian Standard Assoc. are listed under Temperature indicating and regulating equipment, for use in hazardous locations, Class I, Groups B, C and D; Class II, Groups E, F and G. File No. E58658, Guide No. XBDV File No. LR34556, Guide 400-E-O.8. Class 4868. EX models are ATEX marked as follows: CE 0081, ISSeP 08 ATEX024X Ⓔx II 2 G D, Ex db II C T6 Gb Ex tb IIIC T80°C Db IP66 -40°C ≤ Tamb ≤ +75°C
Temperature Range:	See product configurator
Adjustment:	Tamper resistant external adjustment. Turn knob clockwise to increase setpoint. (Knob indication is reference only)
Standard Options/ Modifications:	For thermowels, split nuts and union connections, see accessory pages.
Weight:	Single - approximate 4.0 lbs. Dual - approximate 4.5 lbs.

* See Product Configurator for additional options.

Wiring Code

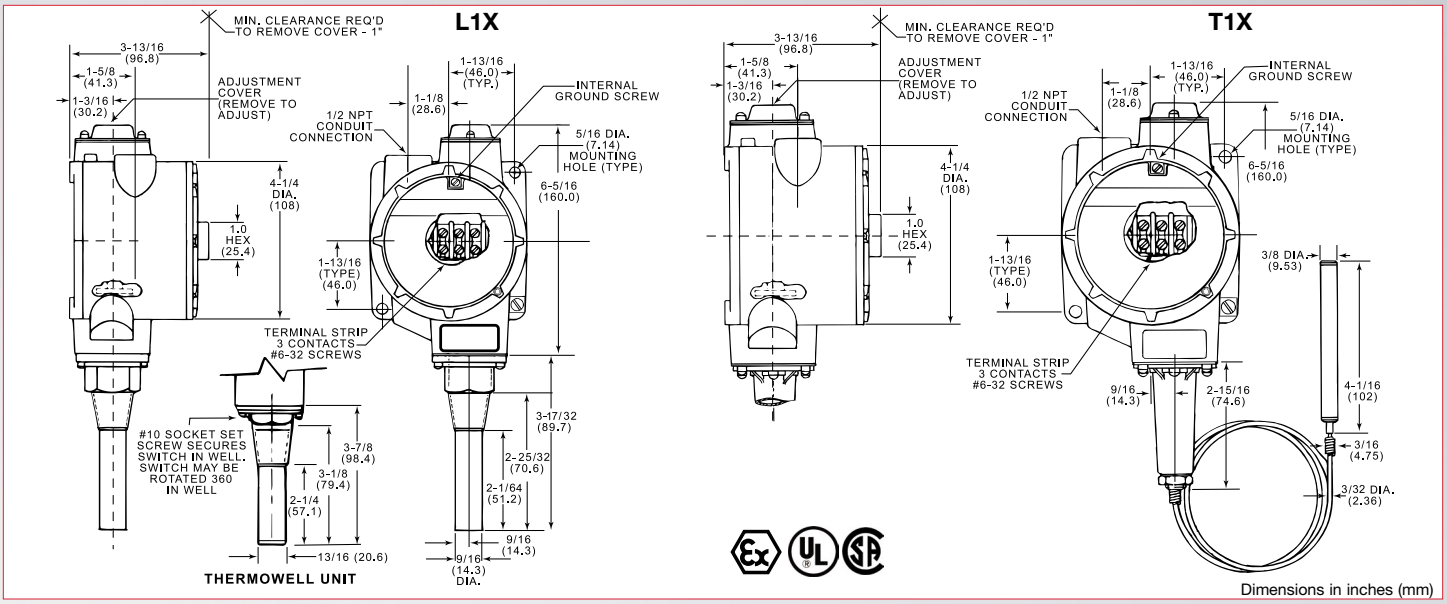
Lead	Circuit #1	Circuit #2
Normally Closed	Blue	Orange
Common	Purple	Brown
Normally Open	Red	Yellow

Wiring Diagram



Barksdale® CONTROL PRODUCTS
CRANE Barksdale, Inc./Barksdale GmbH A Subsidiary of Crane Co.

Technical Drawing



Dimensions in inches (mm)

Product Configurator

Example	H	T	1	X	-HH	251	S	-12	-A		

Hermetically Sealed

H	Hermetically sealed limit switch option - Class I, Division II (requires AA, CC, or HH limit switch)

Sensing Type

T	Remote bulb & capillary
L	Local mount

Set Point

1	Single setpoint (SPDT)
2[1]	Dual setpoint (2 SPDT)

Enclosure

X	NEMA 4, 7, & 9 explosion proof enclosure (Standard)

Limit Switch[2]

-H	10 amps @ 125/250 VAC; 3 amps @ 480 VAC (standard)
-B	10 amps @ 125/250/480 VAC; 2 amps @ 600 VAC; 0.05 amps @ 125 VDC; 0.03 amps @ 250 VDC
-G[3]	10 amps @ 125/250/480 VAC; 2 amps @ 600 VAC; 0.4 amps @ 125 VDC; MANUAL RESET (only available for T2X)
-J	10 amps @ 125/250 VAC; 3 amps @ 480 VAC (with elastomer boot)
-L	15 amps @ 125/250/480 VAC; 0.03 amps @ 125 VDC; 0.02 amps @ 250 VDC
-M	10 amps @ 125/250 VAC; 3 amp @ 480 VAC; 0.5 amps @ 125 VDC; 0.25 amps @ 250 VDC
-S	15 amps @ 125/250/480 VAC; 0.05 amps @ 125 VDC; adjustable differential [4]
-GH	1 amp @ 125VAC; gold contacts
-AA	Hermetically sealed; 4 amps @ 125/250 VAC
-CC	Hermetically sealed; 10 amps @ 125/250 VAC
-HH	Hermetically sealed; 5 amps @ 125/250 VAC

Wetted Material

Blank	Copper sensor
S	304 stainless steel

Capillary Length

Blank	6 foot capillary
-12	12 foot capillary
-25[5]	25 foot stainless steel capillary

Options

-RD[3]	Manual reset (must use when selecting "G" limit switch option) Only available on T2X
-EX[6]	ATEX certification
-Sxxx	Factory pre-set (consult factory)

Thermowell (Local Mount only)

-WS	316 stainless steel thermowell (local mount only)
-W	Brass local mount Thermowell

Armor Option (Bulb & Capillary only)

Blank	Blank if not required
-A	302 stainless steel armor

Temperature Range

Remote sensor ranges

Range	Adjustable Range				Media Temperature Limit (Proof)				Differential (Approx.) [2]	
	Low	High	Low	High	Low	High	Low	High	°F	°C
154	-50°F	+150°F	-45°C	+66°C	-100°F	+200°F	-73°C	+93°C	1° to 2°	.5° to 1.1°
251	+50°F	+250°F	+10°C	+121°C	-100°F	+300°F	-73°C	+149°C	1° to 2°	.5° to 1.1°
351	+150°F	+350°F	+66°C	+177°C	-100°F	+400°F	-73°C	+205°C	1° to 2°	.5° to 1.1°
601	+300°F	+440°F	+149°C	+227°C	0°F	+650°F	-18°C	+343°C	2° to 4°	1.1° to 2.2°
603	+320°F	+600°F	+160°C	+316°C	0°F	+650°F	-18°C	+343°C	2° to 4°	1.1° to 2.2°

Local mount sensor ranges

Range	Adjustable Range				Media Temperature Limit (Proof)				Differential (Approx.) [2]	
	Low	High	Low	High	Low	High	Low	High	°F	°C
201	-50°F	+75°F	-45°C	+24°C	-100°F	+250°F	-73°C	+121°C	1° to 3°	.5° to 1.6°
202	+15°F	+140°F	+9°C	+60°C	-100°F	+250°F	-73°C	+121°C	1° to 3°	.5° to 1.6°
203	+75°F	+200°F	+24°C	+93°C	-100°F	+250°F	-73°C	+121°C	1° to 3°	.5° to 1.6°
351	+100°F	+225°F	+38°C	+107°C	-100°F	+400°F	-73°C	+205°C	6° to 9°	3.3° to 5.0°
204	-50°F	+200°F	-45°C	+93°C	-100°F	+250°F	-73°C	+121°C	1° to 3°	.5° to 1.6°
354	+100°F	+350°F	+38°C	+177°C	-100°F	+400°F	-73°C	+205°C	6° to 9°	3.3° to 5.0°
454	+150°F	+450°F	+66°C	+232°C	0°F	+500°F	-18°C	+260°C	3° to 6°	1.6° to 3.3°

[1] Not available with local mount version.

[2] Changing limit switch will effect deadband; See sales drawing

[3] When selecting the manual reset option on dual setting switches (T2X), the manual reset limit switch will be on the high circuit. The low circuit limit switch must be specified by the customer. Only available with T2X.

[4] When selecting the 'S' adjustable differential limit switch option on a dual setting switch (T2X), a standard 'H' switch will be paired with an 'S' switch. Dual 'S' pricing will apply.

[5] Add 'S' wetted material adder and 'A' armor adder to this. Capillary length '25' requires stainless steel capillary and armor.

[6] ATEX certification is only available with 'S' stainless steel wetted material

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Barksdale® CONTROL PRODUCTS

General Purpose Switch

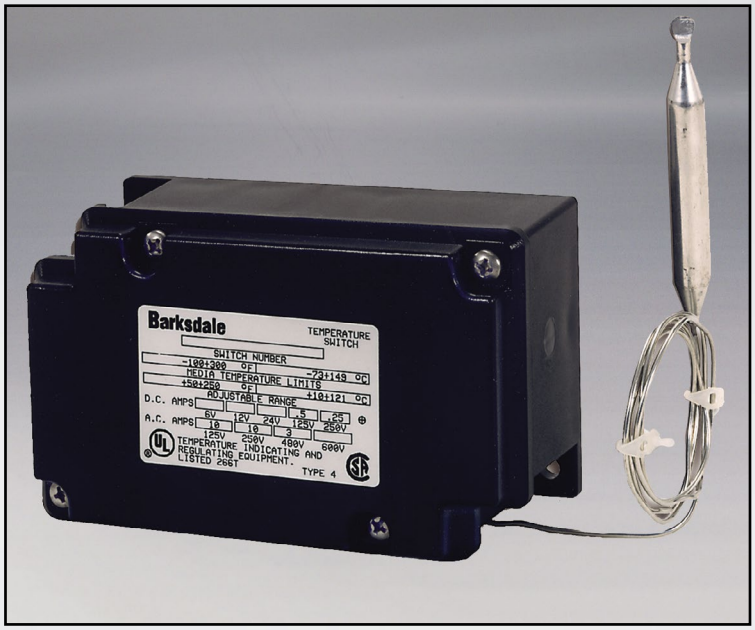
Series TPR

Features

- High accuracy
- NEMA 4X & IP 65
- UL, CSA and CE approved
- Low cost

Applications

- Heat trace
- Water equipment
- Process equipment
- Machine tools and industrial equipment
- Freeze protection



General Specifications*

Accuracy:	±4°F
Switch: Type: Rating:	 Single pole double throw (SPDT), prewired snap action 22 amp @ 125/250/480 VAC
Electrical Characteristics:	All models incorporate Underwriters' Laboratories, Inc. and CSA listed single pole double throw snap-action switching elements. Switches may be wired normally open or normally closed.
Wetted Parts:	Tin plated copper sensor & capillary
Electrical Connection:	1-1/8" (28mm) hole for 3/4" NPT conduit hub 12", 14 AWG stranded copper wire
Enclosure Rating:	NEMA 4X
Enclosure/Housing:	Polycarbonate (black)

* See Product Configurator for additional options.

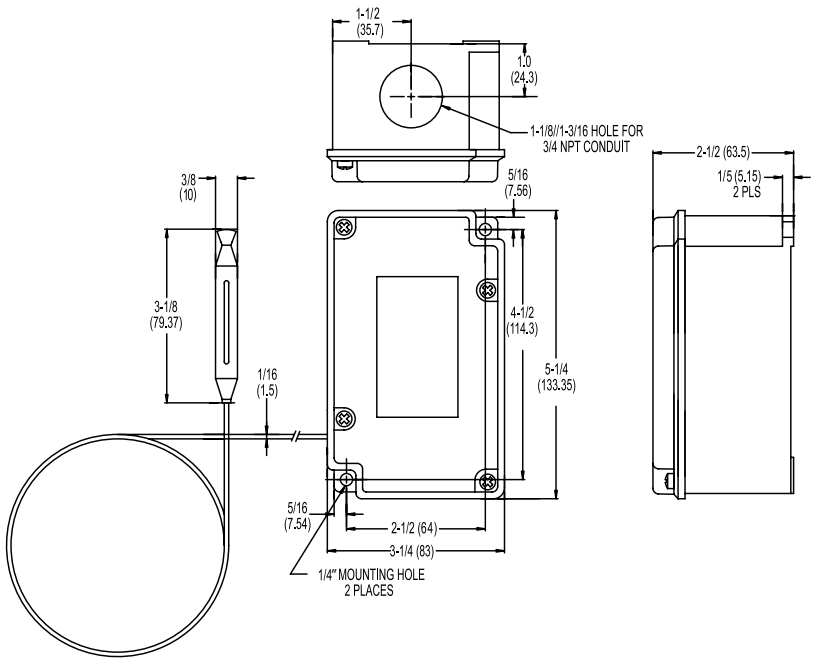
Bulb and Capillary: Bulb: Capillary Length: System Pressure (max): Fill:	 3-1/8" (79mm), 1/16" (10mm) dia. 30" (762mm) or 120" (3048mm) 300 psi without thermowell Silicone oil-filled
Approvals:	UL listed, file E56247 CSA certified, file LR 58658 EN/RFi: to EN 5011
Temperature Range:	-40° to 160°F (-40° to 71°C) Fixed setpoint factory set at 40°F Contact closes on decreasing temperature
Ambient Temperature:	-30° to 140°F (-34° to 60°C)
Vibration:	10 g's 10-500 Hz, MIL-STD 202F
Shock:	50 g's, 10 mS, MIL-STD 901C
Weight:	1.1 lbs. (0.5 kg)

Wiring Code

Lead	Circuit
Normally Closed	Blue
Common	Purple
Normally Open	Red

Media Temperature Limits	Factory Preset	Differential (approximate)	Catalog Number
-40 to 160°F (-40 to 71°C)	40°F (4.4°C)	10°F (5.6°C)	TPR-L1N-3X-Q10

Technical Drawing



Dimensions in inches (mm)

Product Configurator

Example	T	P	R	-L	1	N	-3X	-Q10

Basic Configurator

T	Temperature switch

Basic Configurator

P	Polycarbonate plastic NEMA 4X enclosure

Basic Configurator

R	Remote bulb & capillary

Limit Switch

-L	22 amp @ 125/250/480 VAC; standard

Temperature Range

Range	Fixed Set-point (Decreasing)		Media Temperature Limit (Proof)				Differential (Approx.) Liquid	
	°F	°C	°F Low	°F High	°C Low	°C High	°F	°C
1	40°	4.4°	-40°	+160°	-40°	+71°	10°	5.6°

Bulb & Capillary Length

-3X	3 foot bulb & capillary sensor
-10X	10 foot bulb & capillary sensor

Wetted Material

N	Tin plated copper sensor

-Q10	Heat tracing model

Temperature Switch

Series THR, THL

Features

- High accuracy
- Line or ambient sensing
- NEMA 4X & IP 65
- UL, CSA and CE approved

Applications

- Heat tracing
- Process equipment
- Machine tools and industrial equipment

General Specifications*

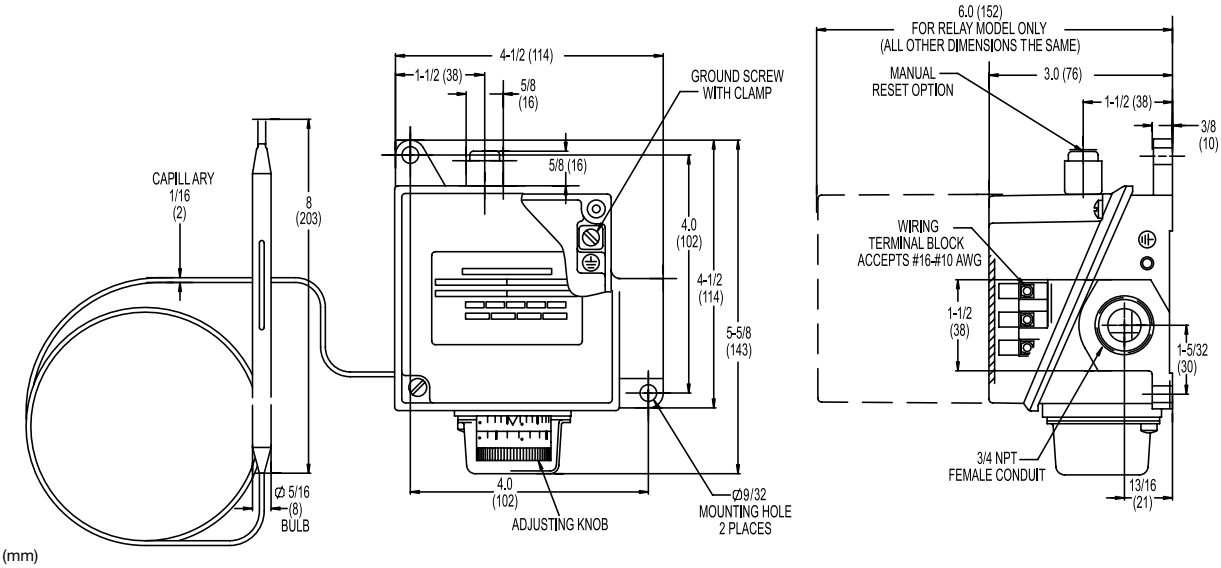
Accuracy:	±1% of full scale
Switch: Type: Rating:	 SPDT, prewired snap action 22 amp @ 125/250/480 VAC
Electrical Characteristics:	All models incorporate Underwriters' Laboratories, Inc. and CSA listed single pole double throw snap-action switching elements. Switches may be wired normally open or normally closed.
Electrical Connection:	3/4" NPT female conduit connection. 3 pole terminal block accepts 14-10 AWG wire.
Electrical Ratings:	22 amps @ 125/250/480 VAC
Enclosure Rating:	NEMA 4X
Enclosure/Housing:	Anodized die cast aluminum Green polyurethane coated Other exposed parts: stainless steel
Bulb and Capillary: Material: Bulb: Capillary Length: System Pressure (max): Fill:	 316L stainless steel 7-3/4" (197mm), 5/16" (8mm) dia. 10' (3m), remote mount 300 psi without thermowell Silicone oil-filled

* See Product Configurator for additional options.
** Must specify; close on rising or falling temperature

Approvals:	UL listed, file 56247 CSA certified, file LR 34555 EMI/RFI: to EN 55011
Temperature Range:	15°F - 325°F (-9°C - 163°C)
Ambient Temperature:	See table below (media temperature limit)
Adjustment:	External adjustment knob. Turn clockwise to decrease setpoint
Vibration:	10 g's 10 - 500 Hz, MIL-STD 202F
Shock:	50 g's, 10 mS, MIL-STD 901C
Standard Options: R**(Option): R2 (Option):	 DPST relay switch 22 amp @120/240/277 VAC Relay coil: 120 VAC, 4VA 120/240/277 VAC Relay coil: 240 VAC, 4VA
Weight:	1.9 lbs. (0.9 kg)

Media Temperature Limits	Adjustabl Range	Differential (approximate)	Sensing Location	Catalog Number	Factory Set Point
-40° to 420°F (-40° to 215°C)	25° to 325°F (-4° to 163°C)	10°F (5.6°C)	Line Sensing T-stat	THR-L2S-10X-Q10	125°F ± 5° decreasing
-40° to 160°F (-40° to 71°C)	15° to 140°F (-9° to 60°C)	10°F (5.6°C)	Ambient Sensing T-stat	THL-L1S-X-Q10	40°F ± 4° decreasing

Technical Drawing



Dimensions in inches (mm)

Product Configurator

Example	TH	R	-L	2	S	-10X	-Q10

Base Configurator

TH	Aluminum NEMA 4X enclosure

-Q10	Heat tracing model (standard)

L[1]	Local mount for ambient sensing
R[2]	Remote bulb & capillary

Bulb & Capillary Length; Switch

-X	For THL models (with NEMA 4X enclosure)
-10X	10 ft bulb & capillary for THR models
-10R2X	22A DPST relay[3], 10 ft bulb & capillary for THR models

Limit Switch

-L	22 amp @ 125/250/480 VAC

Temperature Range

Range	Adjustable Range				Media Temperature Limit (Proof)				Differential (Approx.) Liquid	
	°F		°C		°F		°C		°F	°C
	Low	High	Low	High	Low	High	Low	High		
1	+15°	+140°	-9°	+60°	-40°	+160°	-40°	+71°	10°	5.6°
2	+25°	+325°	-4°	+163°	-40°	+420°	-40°	+215°	10°	5.6°

Wetted Material

S	Stainless steel sensor

[1] Use Temperature Range "1" for local sensing applications
[2] Use Temperature Range "2" for remote sensing applications
[3] DPST switch, 22 amps @ 120/240/277 VAC. Relay Coil: 240 Vac, 4 VA. Contacts close on falling temperature.

Explosion Proof Temperature Switch

Series TXR, TXL

Features

- Explosion-proof
- High accuracy
- Line or ambient sensing
- UL, CSA & ATEX approved

Applications

- Heat tracing
- Hydraulic power units
- Combustion engines
- Compressors
- Machine tools and industrial equipment
- Process equipment

General Specifications*

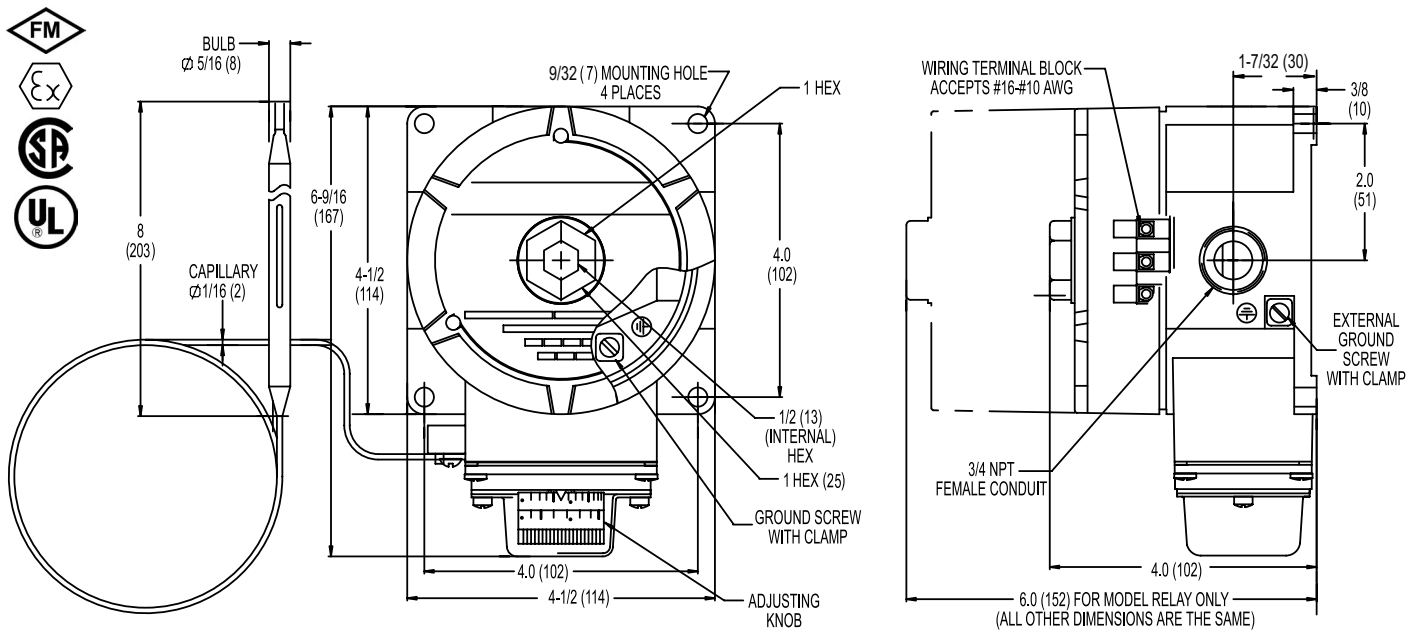
Accuracy:	±1% of full scale
Switch: Type: Rating:	 Single pole double throw (SPDT), prewired snap action 22 amp @ 125/250/480 VAC
Electrical Characteristics:	All models incorporate Underwriters' Laboratories, Inc. and CSA listed single pole double throw snap-action switching elements. Switches may be wired normally open or normally closed.
Electrical Connection:	3/4" NPT female conduit connection. 3 pole terminal block accepts 16-10 AWG wire.
Enclosure Ratings:	NEMA 4, 7, 9, & IP65
Enclosure/Housing:	Anodized aluminum, explosion proof, painted silver
Bulb and Capillary: Material: Bulb: Capillary Length: System Pressure (max): Fill:	 316L stainless steel 8" (203mm), 5/16" (8mm) dia. 10' (3m), remote mount only 300 psi without thermowell Silicone oil-filled

* See Product Configurator for additional options.

Approvals:	FM, UL file E58658, CSA - file LR 34556 Division 1 and 2, Class I, Group B, C & D Class II, Group E, F & G, Class III. CE 0081, LCIE 07 ATEX 6092X Ⓔx II 2 G D, Ex d IIC T6, Ex tD A21 IP6X T80°C -40°C ⩽ Tamb ⩽ +60°C (EX NEPSI, GOST-R)
Temperature Range:	-40° to 160°F (-40° to 71°C)
Ambient Temperature:	-40° to 140°F (-40° to 60°C)
Adjustment:	External adjustment knob. Turn knob clockwise to decrease setpoint
ENI/RFI:	to EN 55011
Vibration:	10 g's 10-500 Hz, MIL-STD 202F
Shock:	50 g's, 10 mS, MIL-STD 901C
Standard Options: -R (suffix):	 Double pole single throw (DPST) relay 22 amp @ 120/240/277 VAC. Contacts close on falling temperature. Relay Coil: 120 VAC, 4VA. Example: TXR-L2S-10R-Q10
Weight:	3.8 lb (1.7 kg)

Media Temperature Limits	Adjustable Range	Differential (approximate)	Sensing Location	Catalog Number
-40° to 420°F (-40° to 215°C)	25° to 325°F (-4° to 163°C)	10°F (5.6°C)	Line Sensing T-stat	TXR-L2S-10-Q10
-40° to 160°F (-40° to 71°C)	15° to 140°F (-9° to 60°C)	10°F (5.6°C)	Ambient Sensing T-stat	TXL-L1S-Q10

Technical Drawing



Dimensions in inches (mm)

Product Configurator

Example	TX	R	-L	2	S	-10	-Q10

Base Configurator

T	Temperature switch
X	NEMA 4, 7, 9 & IP65 explosion proof enclosure

-Q10

-Q10	Heat tracing model (standard)

Bulb & Capillary Length & Switch

	For TXL models
-10	10 ft bulb & capillary for TXR models
-10R2	22A DPST relay[3] with 10 ft bulb & capillary. (For TXR models)

R

R[1]	Remote bulb & capillary
L[2]	Local mount for ambient sensing

Wetted Material

S	Stainless steel sensor

Limit Switch

-L	22 amp @ 125/250/480 VAC

Temperature Range

Range	Adjustable Range				Media Temperature Limit (Proof)				Differential (Approx.) Liquid	
	°F		°C		°F		°C			
	Low	High	Low	High	Low	High	Low	High	°F	°C
1	+15°	+140°	-9°	+60°	-40°	+160°	-40°	+71°	10°	5.6°
2	+25°	+325°	-4°	+163°	-40°	+420°	-40°	+215°	10°	5.6°

NOTES:
[1] Use temperature range "2" for remote sensing applications
[2] Use temperature range "1" for local sensing applications
[3] DPST switch, 22 amps @ 120/240/277 VAC. Relay Coil: 240 Vac, 4 VA. Contacts close on falling temperature.

Bi-Metallic Switch

Series ML1S

Features

- Bi-metallic sensor
- Compact design
- NEMA 4
- One piece design

Applications

- Air compressors
- Medical compressors
- Process equipment
- Water treatment
- Mining
- Machine tools and industrial equipment

General Specifications*

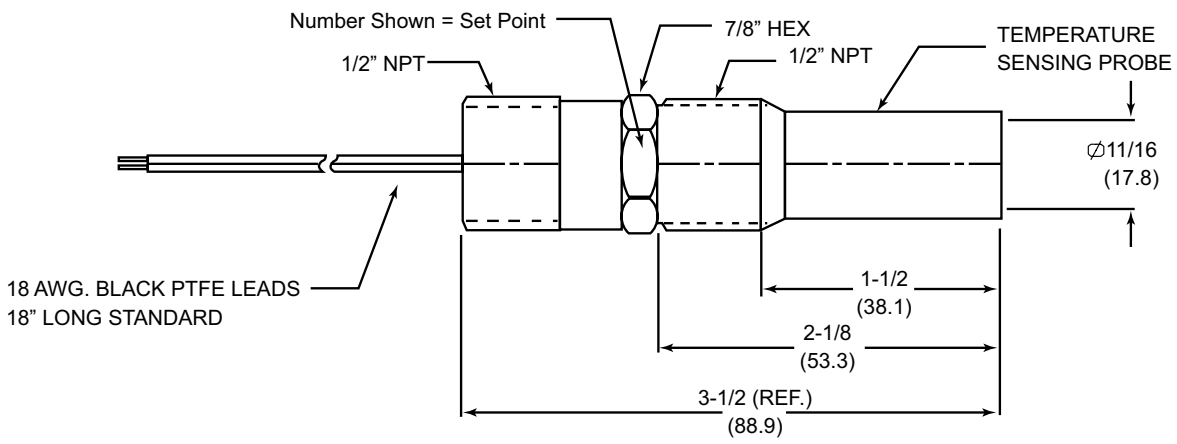
Accuracy:	See adjacent table
Switch:	SPST-NO or SPST-NC
Wetted Parts:	Brass
Electrical Connection:	18", 18 AWG PTFE free leads
Electrical Ratings:	15A @ 125 Vac; 10A @ 250 Vac
Enclosure/Housing	NEMA 4
Process Connection:	1/2" NPT
Conduit Connection:	1/2" NPT
Proof Pressure:	500 psi
Cycle Life:	100,000 cycles
Approvals:	CE qualified UL and CSA (cURus)
Temperature Range:	50°F - 300°F
Proof Temperature:	340°F
Warranty:	1 year
Weight:	0.15 lb.

* See product configurator for additional options.

Catalog Number	Set Point	Accuracy	Differential (Fixed)[1]
ML1S-50-I-C	50°F (Inc.)	± 10°F	27°F (15°C)
ML1S-70-I-C	70°F (Inc.)	± 10°F	27°F (15°C)
ML1S-75-I-C	75°F (Inc.)	± 10°F	27°F (15°C)
ML1S-125-I-C	125°F (Inc.)	± 10°F	18°F (10°C)
ML1S-130-I-C	130°F (Inc.)	± 10°F	18°F (10°C)
ML1S-165-I-C	165°F (Inc.)	± 10°F	18°F (10°C)
ML1S-200-I-C	200°F (Inc.)	± 10°F	18°F (10°C)
ML1S-235-I-C	235°F (Inc.)	± 10°F	18°F (10°C)
ML1S-275-I-C	275°F (Inc.)	± 10°F	27°F (15°C)
ML1S-300-I-C	300°F (Inc.)	± 13°F	36°F (20°C)
ML1S-75-D-C	75°F (Dec.)	± 10°F	27°F (15°C)
ML1S-130-D-C	130°F (Dec.)	± 10°F	18°F (10°C)
ML1S-200-D-C	200°F (Dec.)	± 10°F	18°F (10°C)

[1] Differential depends on service conditions and test methods

Technical Drawing



Dimensions in inches (mm)

Product Configurator

Example	ML	1	S	-130	-I	-C	-W36

Prefix

ML	Miniature local thermowell

Switch

1	Single SPST switch point

Housing

S	Stripped model

Setpoint*

-50	50°F setpoint
-70	70°F setpoint
-75	75°F setpoint
-125	125°F setpoint
-130	130°F setpoint
-165	165°F setpoint
-200	200°F setpoint
-235	235°F setpoint
-275	275°F setpoint
-300	300°F setpoint

Set Point Direction

-D	Decreasing (falling) temperature
-I	Increasing (rising) temperature

Contact Form

-O	Normally open
-C	Normally closed

Option

-WXXX	Extra wire length (XXX = inches)

*** NOTE:**

Consult factory for ranges not listed.

Minumum order quantity - 20 pieces for non-standard ranges.

Ranges specified in 5° increments. Example: -250 = 250°F

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