

## Low Temperature Passive Probes LTP Series

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Issue C

Datasheet



### DESCRIPTION

Honeywell's Low Temperature Passive Probes, LTP Series, are a modular range of temperature sensors designed for potential use in transportation applications. The LTP Series feature a durable, closed-tip design that maximizes reliability in harsh applications. The sensor's thermistor sensing element effectively senses liquids and gases because of its enhanced sensitivity, accuracy and reliability. Easy-to-install threaded mounting provides reliable operation in harsh environments. Numerous options—from mechanical and electrical interface—simplify installation, allow customers to meet their specific application needs, and facilitate backwards-compatibility with most existing applications.

### VALUE TO CUSTOMERS

The LTP Series are designed to meet the customer's need for sensors that are configurable, backwards-compatible, durable, and that reduce total cost of ownership. Their flexible design provides over 2,200 standard configurations with an enhanced response time over a wide operating temperature range.

### DIFFERENTIATION

- Seven probe lengths, four NTC thermistor sensor curves, 12 thread options ranging from M10 to M18, 3/4 UNF, and G 1/4, and two hex options
- Zero NRE (non-recurring engineering) costs for configurations
- Reduces cost of ownership due to BOM (bill of materials), engineering, testing, NRE and tooling
- Reduces design costs due to plug-and-play options, backwards integration, flexible offering, customization and non-standard offering

### FEATURES

- Temperature range: -40 °C to 150 °C [-40 °F to 302 °F]
- Response time [T63.2% of 25 °C to 85 °C step]: stirred silicon oil <15 s; stirred water <15 s; air flow 10 m/s <20 s
- Accuracy:
  - -40 °C to 25 °C [-40 °F to 77 °F]: ±2.5 °C
  - 25 °C to 100 °C [77 °F to 212 °F]: ±0.8 °C
  - 100 °C to 125 °C [212 °F to 257 °F]: ±2.0 °C
  - 125 °C to 150 °C [257 °F to 302 °F]: ±3.5 °C
- Electrical interface: Deutsch 2 position (AMP Minitimer, Bosch Kompakt, Delphi Metri-Pack, AMP Seal 16, and AMP Superseal connector style variants available upon request)
- Probe length options: 20 mm to 50 mm
- Mechanical fastening options: M10 to M18, 3/4 UNF, and G 1/4 (other threads available on request)
- Retainer ring with hex: provides complete location for socket wrench in axial and radial directions, enabling the operator to first locate the sensor inside the socket freely and more easily install the sensor
- Insulation resistance between I/O pin and the sensor's housing: >10 MOhm at 250 Vdc, 25 °C [77 °F]
- Ingress protection: IP67
- Vibration: 30 g sine wave, 10 Hz to 2000 Hz
- Mechanical shock: 50 g
- Service pressure: 10 bar
- Burst pressure: 40 bar
- Wire harness (with or without a connector) or other sensing elements (PTC or RTD) available upon request

### POTENTIAL TRANSPORTATION APPLICATIONS

- Ambient air temperature sensor
- Automatic transmission system
- Engine air inlet system
- Engine cooling system
- Engine lubrication system
- Fuel system
- Haldex coupling system
- Hydraulic pump systems

### PORTFOLIO

The LTP Series joins the [R300](#), [500](#), [ES110](#), [ES120](#), and [6655](#) Series that offer a variety of housing materials and styles, terminations and R-T curves, depending on the customers' application needs.

# Low Temperature Passive Probes, LTP Series

**Table 1. Operating and Environmental Specifications**

Characteristic	Condition	Parameter
Sensing element	—	NTC thermistor
Sensed media capability	—	engine coolant, engine oil, fuel, air, hydraulic oil, water
Response time (T63.2%)	—	less than 15 s in stirred silicon oil temperature step 25 °C to 85 °C [77 °F to 185 °F]
Current	—	10 mA max. (self heating)
Insulation resistance	—	>10 MOhm at 250 Vdc, 25 °C [77 °F]
Accuracy	—	±0.8 °C, 25 °C to 100 °C ( See Table 3.)
Operating temperature range	<ul style="list-style-type: none"> <li>• continuous 500 hr at 150 °C</li> <li>• 500 thermal shocks from -40 °C to 150 °C</li> <li>• 100 thermal cycles from -40 °C to 150 °C</li> </ul>	-40 °C to 150 °C [-40 °F to 302 °F]
Storage temperature range	—	-40 °C to 150 °C [-40 °F to 302 °F]
Vibration	—	30 g sine, 10 Hz to 2000 Hz
Operating pressure	—	10 bar max.
Burst pressure	—	40 bar max.
Compliance	—	RoHS, REACH

**Table 2. Mechanical Specifications**

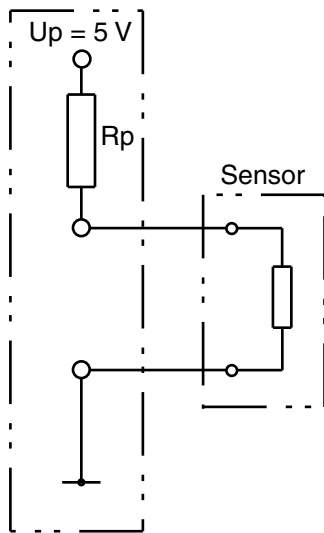
Characteristic	Parameter	
Storage temperature range	-40 °C to 150 °C [-40 °F to 302 °F]	
Probe tip static side load	80 N	
Electrical connector:		
type	Deutsch 2 position, DT04-2P	
terminal material	gold-plated brass	
mating connector	Deutsch DT Series, DT06-2S	
Threads:	Standard	Torque
M10 X 1,25	ISO 261	8 ±1 N m
M12 X 1,5	ISO 261	15 ±1 N m
M14 X 1,5	ISO 261	15 ±1 N m
M16 X 1,5	ISO 261	20 ±1 N m
M18 X 1,5	ISO 261	20 ±1 N m
3/4-16-2A UNF (SAE 8)	ISO J1926-3	20 ±1 N m
G 1/4	ISO 228-2	15 ±1 N m

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**Table 3. Resistance vs Temperature Curve and Sensor Accuracy**

Thermistor Curve	Temperature (°C)	Resistance (Ohm)			Temperature Tolerance (°C)
		Minimum	Nominal	Maximum	
NTC-1000 at 25 °C (3947 Beta 0 °C/100 °C)	-40	28141.68	33487.40	38833.11	±2.5
	25	964.88	1000.0	1035.12	±0.8
	100	67.63	69.24	70.86	±0.8
	150	17.75	19.31	20.87	±3.5
NTC-2057 at 25 °C (3520 Beta 0 °C/100 °C)	-40	41061.23	48032,75	55004.26	±2.5
	25	1993.09	2057.00	2120.91	±0.8
	100	183.7	187.53	191.37	±0.8
	150	52.59	56.57	60.55	±3.5
NTC-2252 at 25 °C (3947 Beta 0 °C/100 °C)	-40	63419.83	75491.04	87562.26	±2.5
	25	2172.92	2252.00	2331.08	±0.8
	100	149.32	152.90	156.47	±0.8
	150	36.89	41.70	46.51	±3.5
NTC-2795 at 25 °C (4073 Beta 0 °C/100 °C)	-40	85718.02	102530.35	119342.68	±2.5
	25	2694.40	2795.00	2895.6	±0.8
	100	173.36	177.62	181.88	±0.8
	150	43.07	46.95	50.83	±3.5

**Figure 1. Schematic**



**Typical voltages:**

Power supply:  $U_p = +5 \pm 0.1\text{ Vdc}$  (Depends on application system.)

**Typical resistance:**

Pull-up:  $R_p = \text{precision resistor } (\pm 0.1\% \text{ typical})$

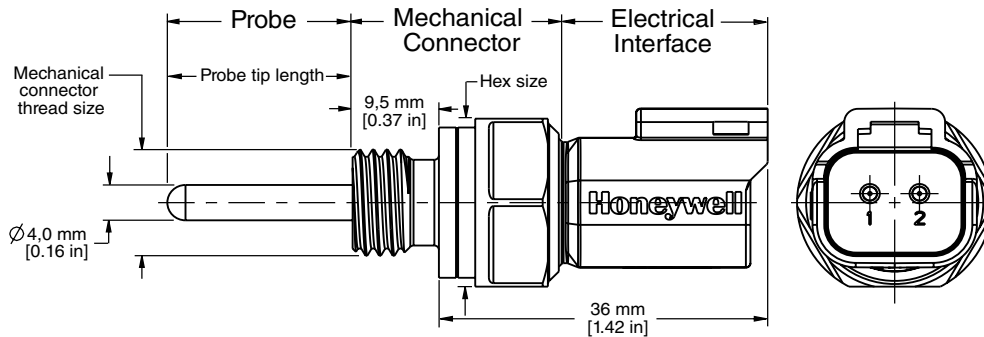
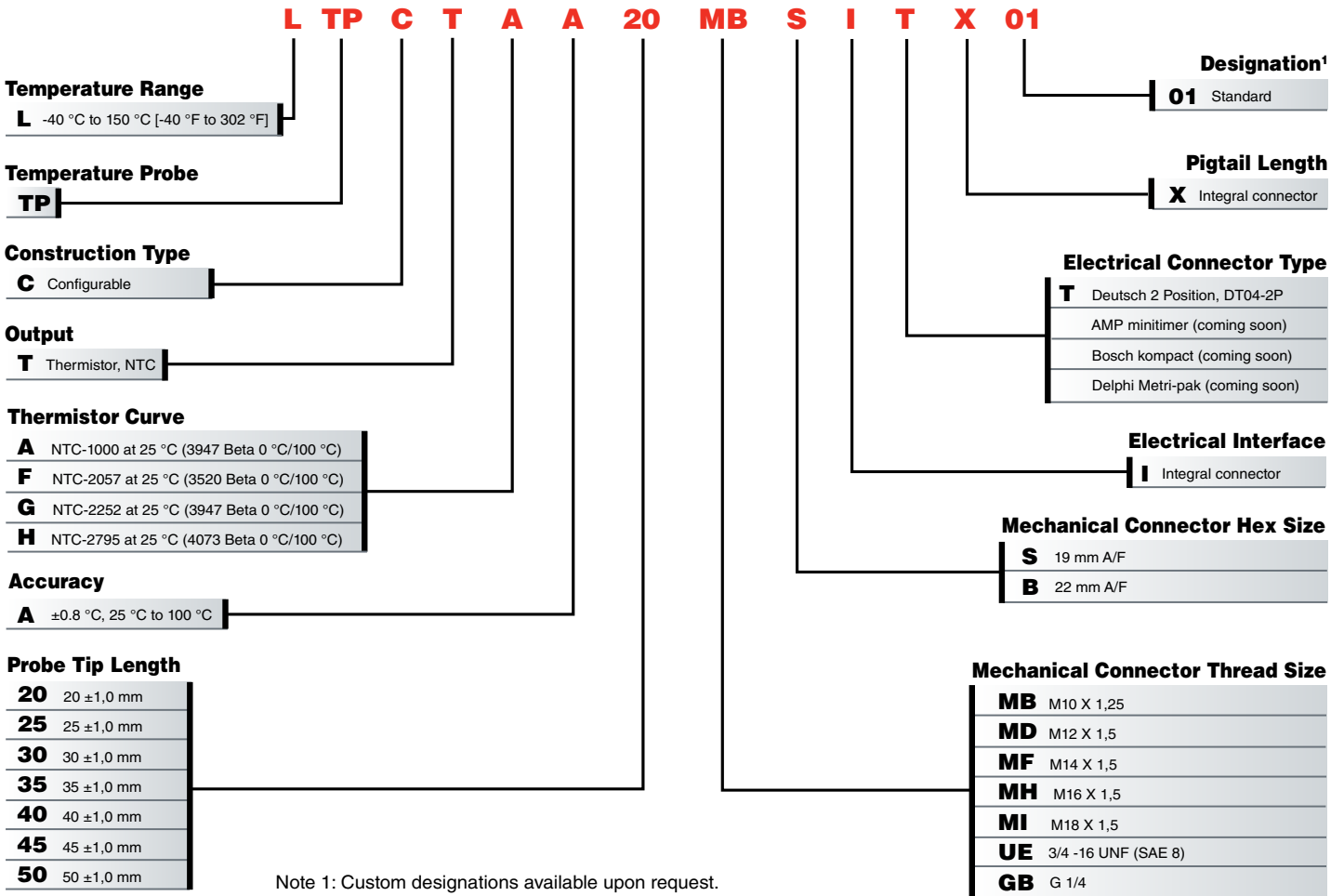
**Notes:**

1. Maximum current through the circuit: 10 mA
2. Self heating error needs to be considered and is additional to sensor basic accuracy

# Low Temperature Passive Probes, LTP Series

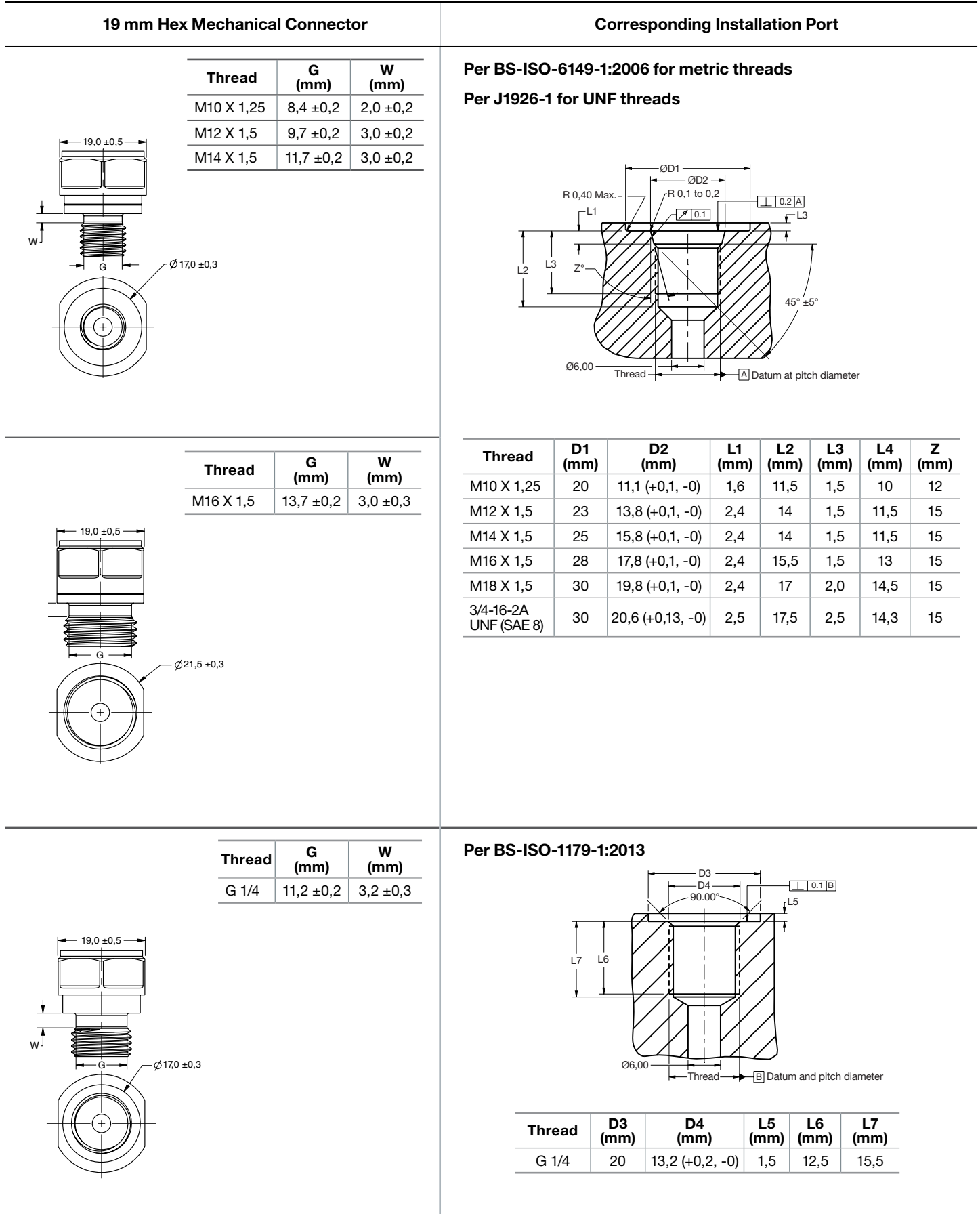
Figure 2. Nomenclature and Order Guide<sup>1</sup>

For example, **LTPCTAA20MBSITX01** defines an LTP Series Low Temperature Passive Probe, -40 °C to 150 °C [-40 °F to 302 °F] temperature range, configurable construction type, NTC Thermistor output, NTC-1000 at 25 °C (3947 Beta 0 °C/100 °C) thermistor curve, ±0.8 °C, 25 °C to 100 °C accuracy, 20 mm probe tip length, M10 X 1,25 mechanical connector thread size, 19 mm mechanical connector hex size, integral connector electrical interface, Deutsch 2 Position, DT04-2P electrical connector type.



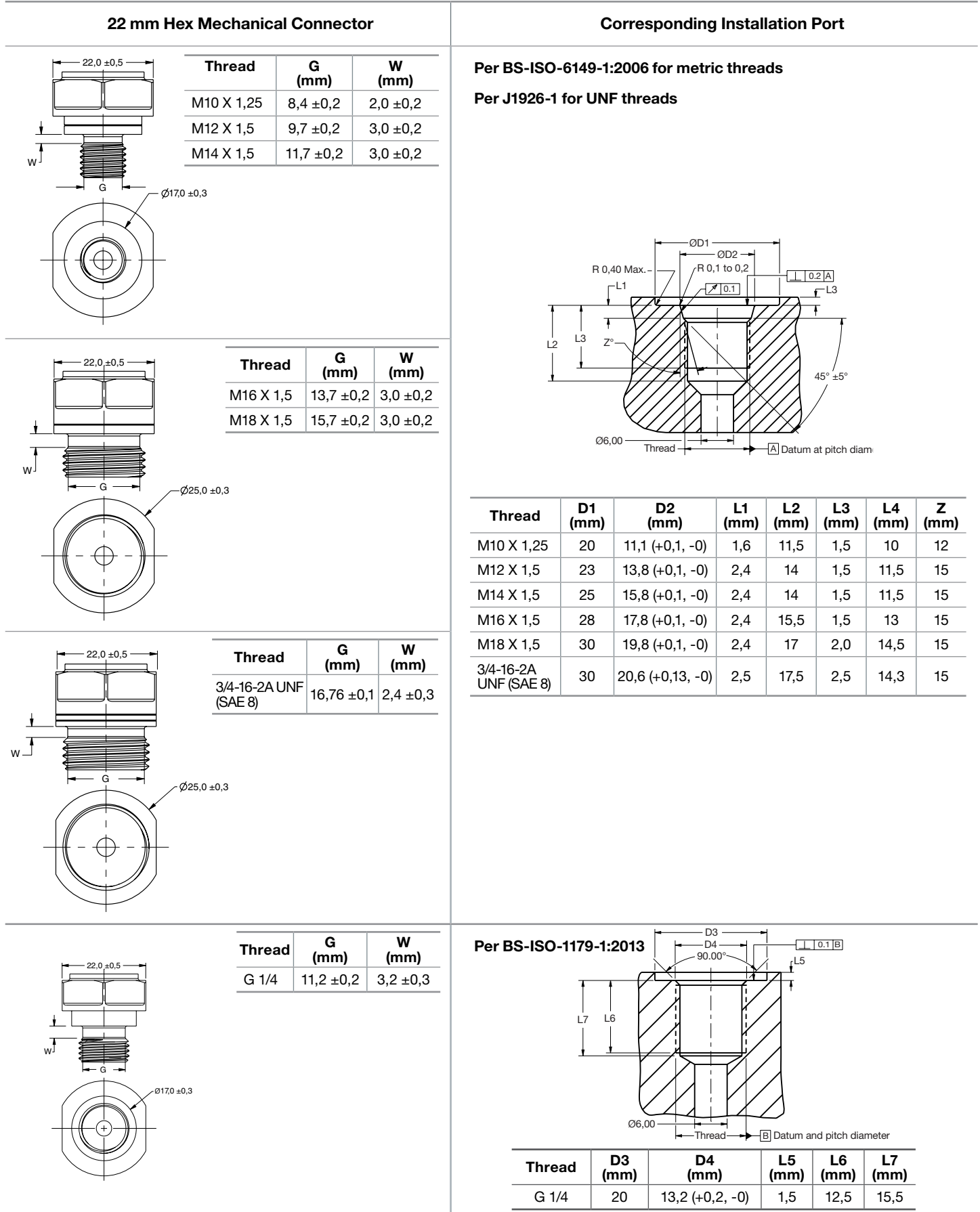
# Low Temperature Passive Probes, LTP Series

Figure 3. 19 mm Hex Mechanical Connector and Corresponding Installation Port Dimensions



# Low Temperature Passive Probes, LTP Series

Figure 4. 22 mm Hex Mechanical Connector and Corresponding Installation Port Dimensions



## ADDITIONAL INFORMATION

The following associated literature is available on the Honeywell web site at [sensing.honeywell.com](http://sensing.honeywell.com):

- Product Range Guide
- Product Line Guide
- Product Installation Instructions
- Technical Information: Detailed resistance vs temperature curves

### **⚠ WARNING** **PERSONAL INJURY**

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

**Failure to comply with these instructions could result in death or serious injury.**

### **⚠ WARNING** **MISUSE OF DOCUMENTATION**

- The information presented in this datasheet is for reference only. Do not use this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

**Failure to comply with these instructions could result in death or serious injury.**

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