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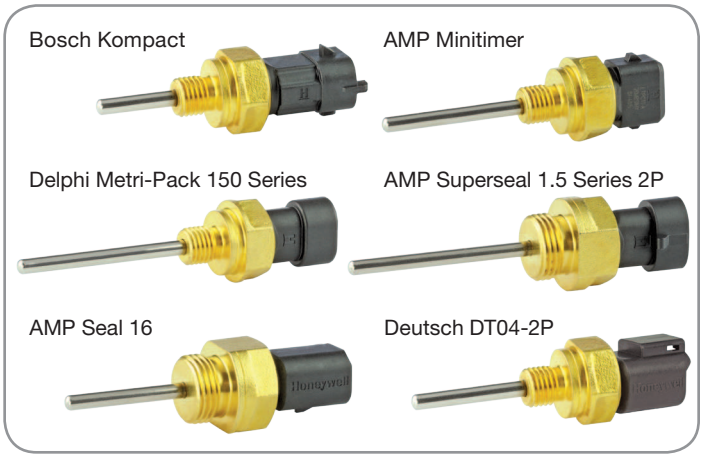
Honeywell

Low Temperature Passive Probes
LTP Series

32309592
Issue E



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: Bosch Kompakt, Delphi Metri-Pack 150 Series, AMP Seal 16, AMP Minitimer, AMP Superseal 1.5 Series 2P, and Deutsch DT04-2P
- Probe length options: 20 mm to 50 mm (other lengths available upon request)
- 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 to 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	• continuous 500 hr at 150 °C • 500 thermal shocks from -40 °C to 150 °C • 100 thermal cycles from -40 °C to 150 °C	-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

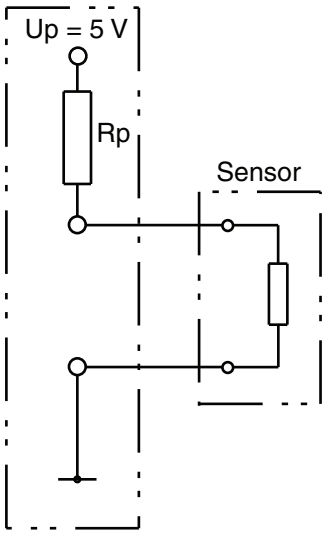
Table 2. Mechanical Specifications

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:	**Material**	**IP Rating**	**Mating Connector**
Bosch Kompakt 1.1a Series (2-way, 1928404226)	tin-plated brass	IP67, IP69K	Bosch Kompakt (1928403874)
Delphi Metri-Pack 150 Series (12191170)	tin-plated brass	IP67	Delphi Metri-Pack (12162193)
AMP Seal 16 (767428-1)	gold-plated brass	IP67	AMP Seal 16 (776427-1)
AMP Minitimer (2 Position, 106462-1)	tin-plated brass	IP64	Junior Power Timer (282189-1)
AMP Superseal 1.5 Series 2P (282104-1)	tin-plated brass	IP67	AMP Superseal (282080-1)
Deutsch DT04-2P (2 position)	gold-plated brass	IP67	Deutsch DT06-2S
Mechanical connector thread size:	**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

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: Up = +5 ±0.1 Vdc (Depends on application system.)

Typical resistance:
Pull-up: Rp = precision resistor (±0.1% typical)

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

Low Temperature Passive Probes, LTP Series

Figure 2. Nomenclature and Order Guide[1]

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 outputut, 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 DT04-2P electrical connector type.

Temperature Range
- **L** -40 °C to 150 °C [-40 °F to 302 °F]

Temperature Probe
- **TP**

Construction Type
- **C** Configurable

Output
- **T** Thermistor, NTC

Thermistor Curve
- **A** NTC-1000 at 25 °C (3947 Beta 0 °C/100 °C)
- **F** NTC-2057 at 25 °C (3520 Beta 0 °C/100 °C)
- **G** NTC-2252 at 25 °C (3947 Beta 0 °C/100 °C)
- **H** NTC-2795 at 25 °C (4073 Beta 0 °C/100 °C)

Accuracy
- **A** ±0.8 °C, 25 °C to 100 °C

Probe Tip Length
- **20** 20 ±1,0 mm
- **25** 25 ±1,0 mm
- **30** 30 ±1,0 mm
- **35** 35 ±1,0 mm
- **40** 40 ±1,0 mm
- **45** 45 ±1,0 mm
- **50** 50 ±1,0 mm

Designation[1]
- **01** Standard

Pigtail Length
- **X** Integral connector

Electrical Connector Type
- **B** Bosch Kompact 1.1a Series (2-way, 1928404226)
- **D** Delphi Metri-Pack 150 Series (12191170)
- **E** Amp Seal 16 (767428-1)
- **M** AMP Minitimer (2 position, 106462-1)
- **S** AMP Superseal 1.5 Series 2P (282104-1)
- **T** Deutsch DT04-2P (2 position)

Electrical Interface
- **I** Integral connector

Mechanical Connector Hex Size
- **S** 19 mm A/F
- **B** 22 mm A/F

Mechanical Connector Thread Size
- **MB** M10 X 1,25
- **MD** M12 X 1,5
- **MF** M14 X 1,5
- **MH** M16 X 1,5
- **MI[2]** M18 X 1,5
- **UE[2]** 3/4 -16 UNF (SAE 8)
- **GB** G 1/4

Notes:
[1] Standard configurations shown, customization available upon request.
[2] **MI** and **UE** Mechanical Connectors available only with Mechanical Connector Hex Size **B** (22 mm A/F).

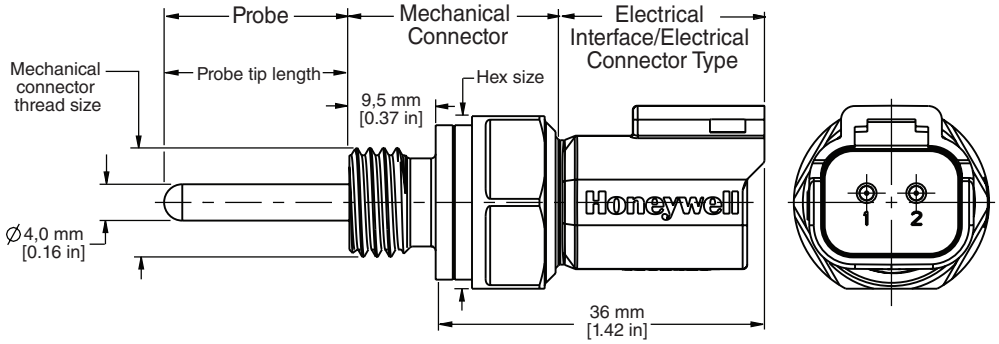
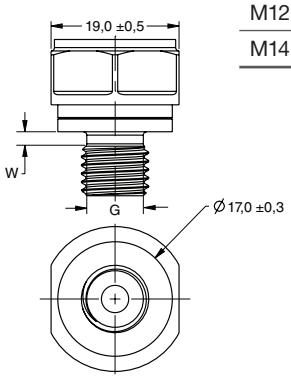


Figure 3. 19 mm Hex Mechanical Connector and Corresponding Installation Port Dimensions (For reference only: mm.)

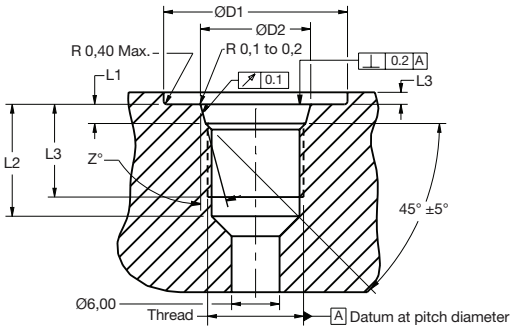
19 mm Hex Mechanical Connector	Corresponding Installation Port

Thread	G (mm)	W (mm)
M10 X 1,25	8,4 ±0,2	2,0 ±0,2
M12 X 1,5	9,7 ±0,2	3,0 ±0,2
M14 X 1,5	11,7 ±0,2	3,0 ±0,2

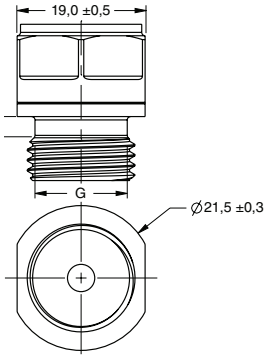


Per BS-ISO-6149-1:2006 for metric threads

Per J1926-1 for UNF threads

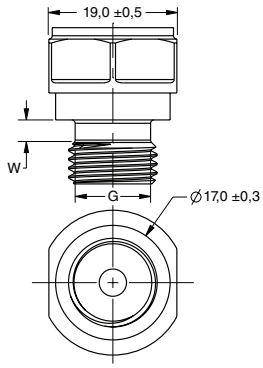


Thread	G (mm)	W (mm)
M16 X 1,5	13,7 ±0,2	3,0 ±0,3

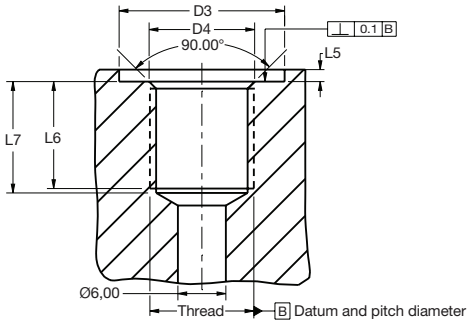


Thread	D1 (mm)	D2 (mm)	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	Z (mm)
M10 X 1,25	20	11,1 (+0,1, -0)	1,6	11,5	1,5	10	12
M12 X 1,5	23	13,8 (+0,1, -0)	2,4	14	1,5	11,5	15
M14 X 1,5	25	15,8 (+0,1, -0)	2,4	14	1,5	11,5	15
M16 X 1,5	28	17,8 (+0,1, -0)	2,4	15,5	1,5	13	15
M18 X 1,5	30	19,8 (+0,1, -0)	2,4	17	2,0	14,5	15
3/4-16-2A UNF (SAE 8)	30	20,6 (+0,13, -0)	2,5	17,5	2,5	14,3	15

Thread	G (mm)	W (mm)
G 1/4	11,2 ±0,2	3,2 ±0,3



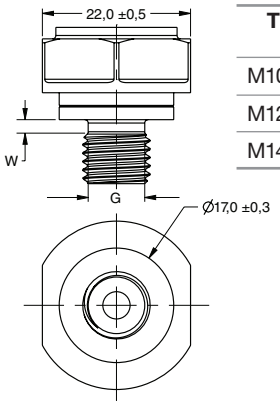
Per BS-ISO-1179-1:2013



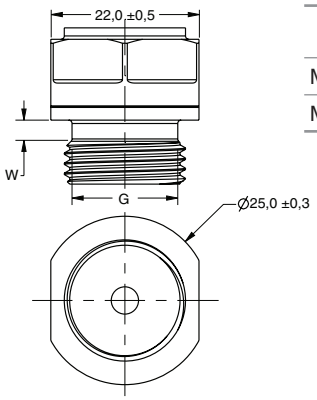
Thread	D3 (mm)	D4 (mm)	L5 (mm)	L6 (mm)	L7 (mm)
G 1/4	20	13,2 (+0,2, -0)	1,5	12,5	15,5

Figure 4. 22 mm Hex Mechanical Connector and Corresponding Installation Port Dimensions (For reference only: mm.)

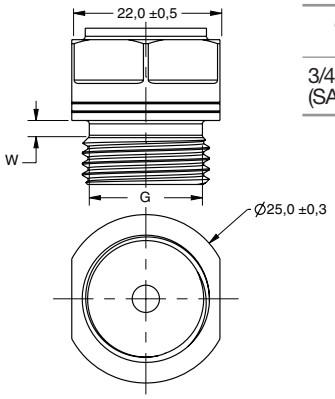
22 mm Hex Mechanical Connector



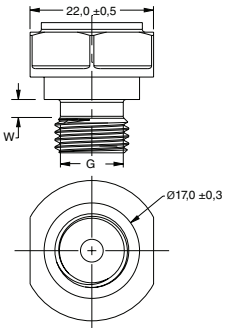
Thread	G (mm)	W (mm)
M10 X 1,25	8,4 ±0,2	2,0 ±0,2
M12 X 1,5	9,7 ±0,2	3,0 ±0,2
M14 X 1,5	11,7 ±0,2	3,0 ±0,2



Thread	G (mm)	W (mm)
M16 X 1,5	13,7 ±0,2	3,0 ±0,2
M18 X 1,5	15,7 ±0,2	3,0 ±0,2



Thread	G (mm)	W (mm)
3/4-16-2A UNF (SAE 8)	16,76 ±0,1	2,4 ±0,3

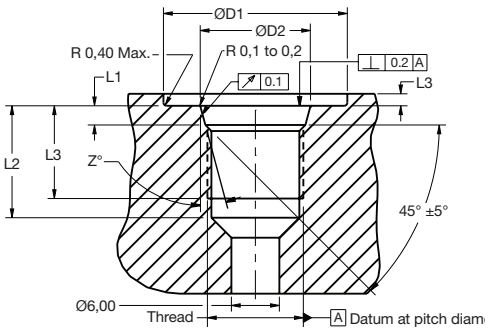


Thread	G (mm)	W (mm)
G 1/4	11,2 ±0,2	3,2 ±0,3

Corresponding Installation Port

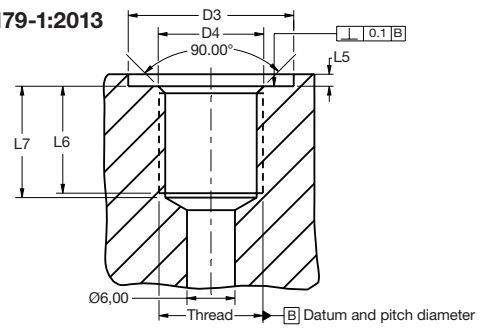
Per BS-ISO-6149-1:2006 for metric threads

Per J1926-1 for UNF threads



Thread	D1 (mm)	D2 (mm)	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	Z (mm)
M10 X 1,25	20	11,1 (+0,1, -0)	1,6	11,5	1,5	10	12
M12 X 1,5	23	13,8 (+0,1, -0)	2,4	14	1,5	11,5	15
M14 X 1,5	25	15,8 (+0,1, -0)	2,4	14	1,5	11,5	15
M16 X 1,5	28	17,8 (+0,1, -0)	2,4	15,5	1,5	13	15
M18 X 1,5	30	19,8 (+0,1, -0)	2,4	17	2,0	14,5	15
3/4-16-2A UNF (SAE 8)	30	20,6 (+0,13, -0)	2,5	17,5	2,5	14,3	15

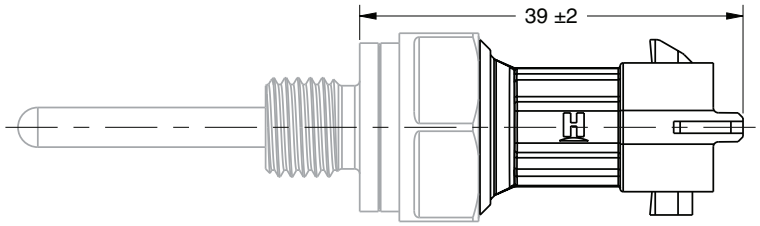
Per BS-ISO-1179-1:2013



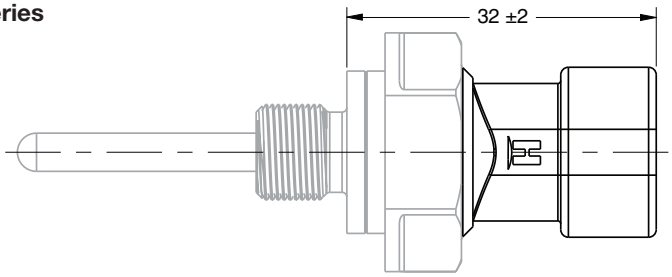
Thread	D3 (mm)	D4 (mm)	L5 (mm)	L6 (mm)	L7 (mm)
G 1/4	20	13,2 (+0,2, -0)	1,5	12,5	15,5

Figure 5. Electrical Connector Type Dimensions (For reference only: mm.)

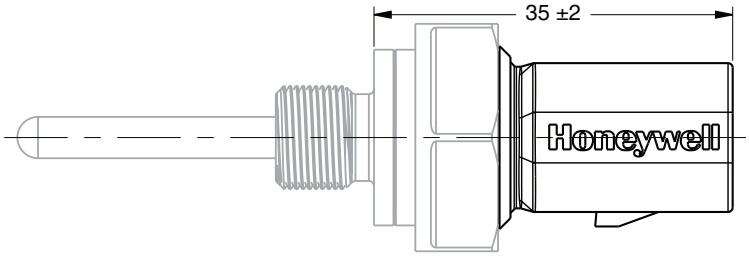
B: Bosch Kompact



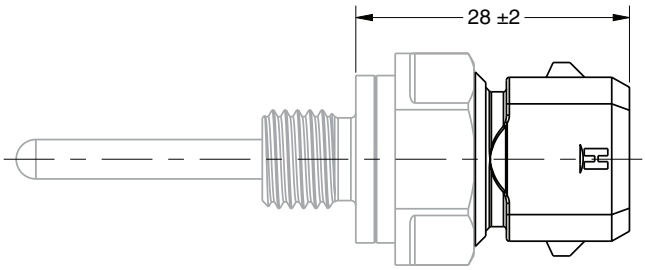
D: Delphi Metri-Pack 150 Series



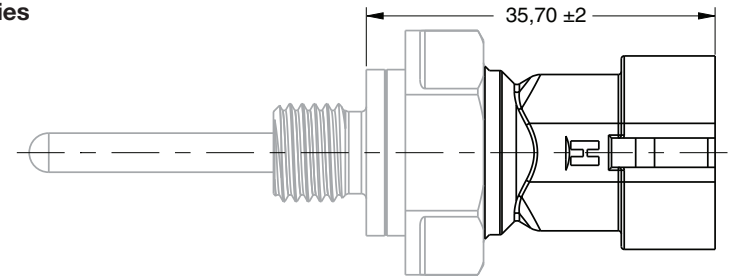
E: Amp Seal 16



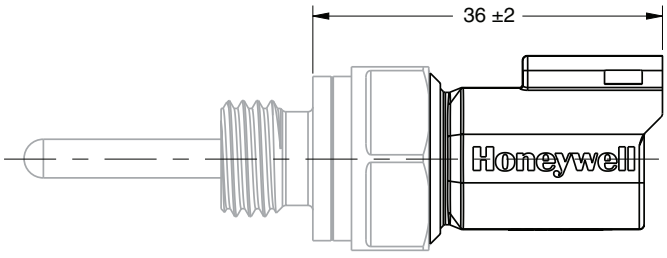
M: Amp Minitimer



S: Amp Super Seal 1.5 Series



T: Deutsch DT04-2P



ADDITIONAL INFORMATION

The following associated literature is available on the Honeywell web site at 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.

Warranty/Remedy

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Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

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