

KT-SERIES TEMPERATURE SWITCHES



KOBOLD Instruments Inc.
1801 Parkway View Drive
Pittsburgh, PA 15205
Ph: (412)788-2830
Fax: (412)788-4890

- Adjustable switchpoint
- Manual reset available
- For piping, tanks or HVAC ducting
- High power handling
- Compact



KOBOLD KT-Series Temperature Switches

Series KT temperature switches provide reliable switching in industrial environments. Application in vessels, boiler plants, pipelines and HVAC are some of the many possible uses for the KT series of switches. A variety of temperature ranges are available along with numerous options to customize the switch behavior to your requirements.

Options:

- Manual reset feature for both rising and falling temperatures
- NAMUR solid-state proximity switch
- Gold plated contacts
- Plug connector with status lamp
- Conformal protective coating on all exterior surfaces

Specifications

Range:	see tables	Connector:	DIN 43650 plug (Pg 11)
Switchpoint:	adjustable over entire range	Optional:	DIN plug with LED status light
Repeatability:	±5% of differential (deadband)	Protection:	NEMA 4
Electrical Data		Housing Material:	aluminum
Switch Type:	SPDT	Optional:	aluminum with conformal protective coating
Reset:	automatic	Ambient Temperature Range:	-15 °C to 70 °C (5 °F to 158 °F)
Optional:	manual	Shock Resistance:	4g sustained
Load Capacity			
AC			
Resistive:	8 A @ 250 VAC		
Inductive:	4 A @ 250 VAC		
DC (Resistive):	0.3 A @ 250 VDC		
	1 A @ 24 VDC		
NOTE:	gold plated contacts recommended for loads below 24 V		



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KTX ROD THERMOSTAT FOR LIQUIDS

The KTX temperature switch is ideal for applications in tanks or larger diameter piping. Thermowell choices of brass or stainless steel allow installation into a wide variety of media.

Additional KTX Specifications

Adjustment of Switchpoint

- Adjustable from the outside via a screwdriver.
- Scale values correspond to the lower switching point (ie. falling temperature). The upper switchpoint is higher by the switching differential (hysteresis or deadband).
- Thermowell required for installation.

Mounting Position: None. Mount as desired.

Temperature Sensing Element

Wetted Parts: Must be used with a thermowell. See thermowell specifications.



KOBOLD KTX Liquid Temperature Switch

KTX Ordering Information

Range	Switching Differential	Max. Temp. @ Sensor	Model Number		Dimensional Drawing
			135 mm Probe	220 mm Probe	
-20 to +30 °C	1.5 °C	110 °C	KTX-023	KTX-023B	5
+10 to +50 °C	1.5 °C	110 °C	KTX-150	KTX-150B	5
+40 to +90 °C	4.0 °C	125 °C	KTX-490	KTX-490B	7
+80 to +130 °C	4.0 °C	150 °C	KTX-813	KTX-813B	7

Options	
Description	Model No. Suffix
Manual reset for maximum temperature	A
Manual reset for minimum temperature	C
Namur solid-state proximity switch	D
Gold plated contacts for voltages < 24V	E
Status light in connector plug : 12-240 VAC/VDC	F
Conformal protective coating on housing	G

KTL AIR DUCT THERMOSTAT



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Need an industrial quality thermostat for air flow in HVAC or open vessel applications? Look no further than our KTL temperature switch. With its detachable mounting flange, the KTL is easily installed into any flat surface.

Additional KTX Specifications

Adjustment of Switchpoint

- Adjustable from the outside via a screwdriver.
- Scale values correspond to the lower switching point (ie. falling temperature). The upper switchpoint is higher by the switching differential (hysteresis or deadband).
- Install with supplied mounting flange, no thermowell required.

Mounting Position: None. Mount as desired.

Temperature Sensing Element

Wetted Parts:

Probe: copper
Flange: Ni-plated brass



KOBOLD KTL Air Duct Thermostat

KTL Ordering Information

Range	Switching Differential	Max. Temp. @ Sensor	Model Number		Dimensional Drawing
			135 mm Probe	220 mm Probe	
-20 to +30 °C	1.5 °C	110 °C	KTL-023	KTL-023B	9
+10 to +50 °C	1.5 °C	110 °C	KTL-150	KTL-150B	9
+40 to +90 °C	4.0 °C	125 °C	KTL-490	KTL-490B	11

Options

Description	Model No. Suffix
Manual reset for maximum temperature	A
Manual reset for minimum temperature	C
Namur solid-state proximity switch	D
Gold plated contacts for voltages < 24V	E
Status light in connector plug : 12-240 VAC/VDC	F
Conformal protective coating on housing	G



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KT TEMPERATURE SWITCH ACCESSORIES

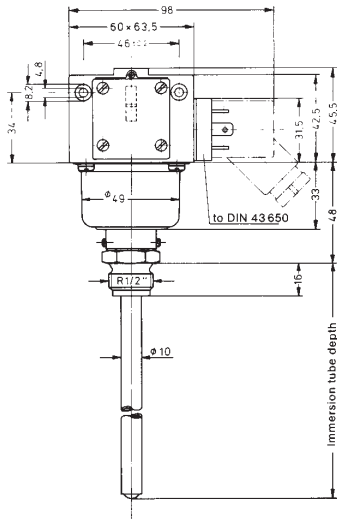
	<p>Thermowells for KTX, 1/2" NPT</p> <table border="1"> <thead> <tr> <th>Length</th> <th>Brass (360 PSIG)</th> <th>Stainless Steel (900 PSIG)</th> </tr> </thead> <tbody> <tr> <td>135 mm</td> <td>KT-PRN10/MS</td> <td>KT-PRN10/NST</td> </tr> <tr> <td>220 mm</td> <td>KT-PRN20/MS</td> <td>KT-PRN20/NST</td> </tr> </tbody> </table>	Length	Brass (360 PSIG)	Stainless Steel (900 PSIG)	135 mm	KT-PRN10/MS	KT-PRN10/NST	220 mm	KT-PRN20/MS	KT-PRN20/NST			
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135 mm	KT-PRN10/MS	KT-PRN10/NST											
220 mm	KT-PRN20/MS	KT-PRN20/NST											
	<p>Retaining Clip for Thermowells – allows quicker heat transfer to element. Part Number: KTX-PFF135</p>												
	<p>Capillary Bushing for 3 mm capillary tubing Part Number: KT-PR5</p>												
	<p>Adjustment Screw Seal Kit Consists of a cover plate and screw to seal the adjustment screw ports. Part Number: KT-PP2</p>												
	<p>Wall Brackets for Thermostats with Capillaries</p> <table border="1"> <thead> <tr> <th>Part Number</th> <th>Drawing Item</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>KT-PH1</td> <td>H1</td> <td>For mounting unit body to a wall. Comes with all required hardware.</td> </tr> <tr> <td>KT-PH2</td> <td>H2</td> <td>For attaching sensor bulbs to walls.</td> </tr> <tr> <td>KT-PH3</td> <td>H3</td> <td>For attaching capillary tubes of frost protection thermostats to protected machine housing.</td> </tr> </tbody> </table>	Part Number	Drawing Item	Description	KT-PH1	H1	For mounting unit body to a wall. Comes with all required hardware.	KT-PH2	H2	For attaching sensor bulbs to walls.	KT-PH3	H3	For attaching capillary tubes of frost protection thermostats to protected machine housing.
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KT-PH3	H3	For attaching capillary tubes of frost protection thermostats to protected machine housing.											
	<p>Saddle Style Mounting Bracket for Attaching Thermowells into Ducting Part Number: KT-PR6</p>												

KT TEMPERATURE SWITCH DIMENSIONS

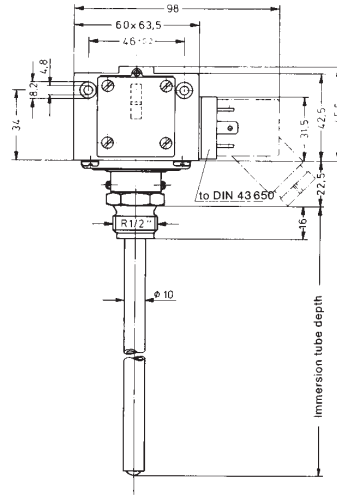


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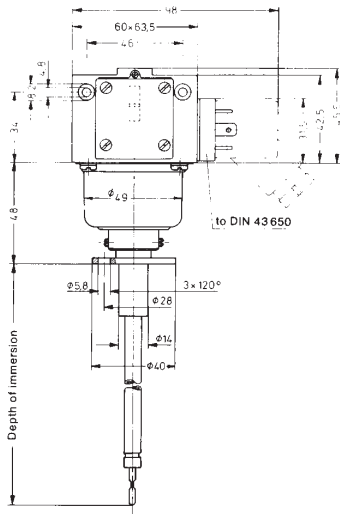
Dimension Drawing #5 (mm)



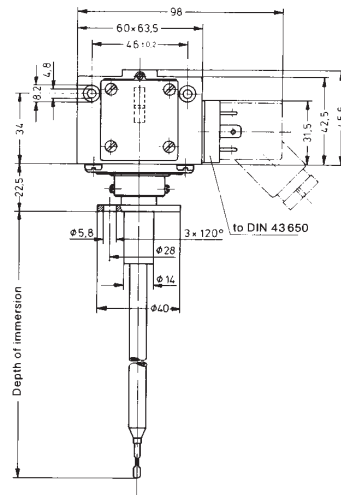
Dimension Drawing #7 (mm)



Dimension Drawing #9 (mm)

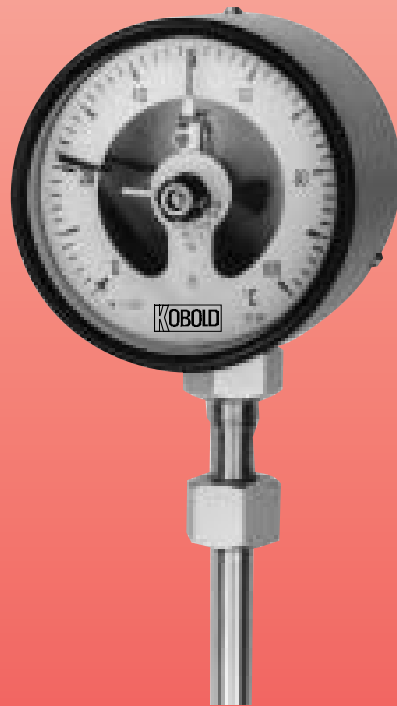
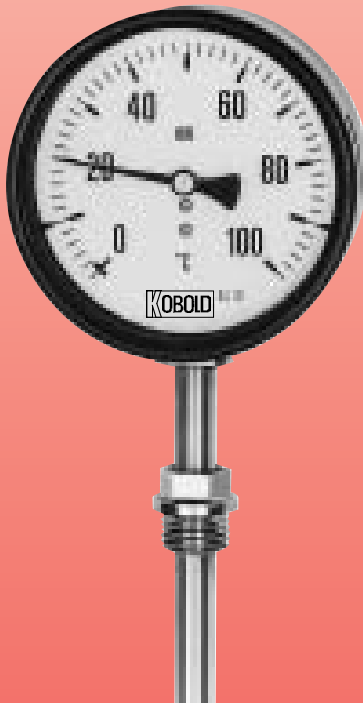


Dimension Drawing #11 (mm)



N2T RIGID STEM THERMOMETER

Model
N2T



- Gas filled temperature sensors
- Ranges: -40°F to 1100°F
-40°C to 600°C
- 4" or 6" Dial faces (100 mm, 160 mm)
- ±1% accuracy
- Oil damping available
- Probe located at bottom or rear of dial
- Up to four switches per gauge possible

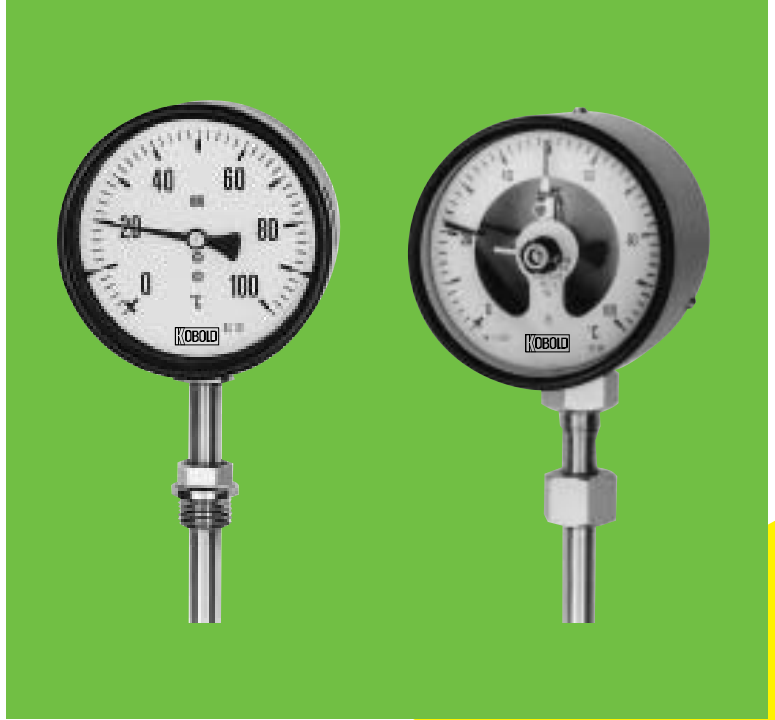


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N2T RIGID STEM THERMOMETER

- Gas filled temperature sensors
- Ranges: -40°F to 1100°F
-40°C to 600°C
- 4" or 6" Dial faces (100 mm, 160 mm)
- ±1% accuracy
- Oil damping available
- Probe located at bottom or rear of dial
- Up to four switches per gauge possible

The KOBOLD N2T is a highly versatile gas-filled temperature gauge. It is available as a simple temperature sensing device, or as a controller with up to four independent setpoint switches. The N2T is equipped with a thermowell of either brass, or 316-Ti SS, depending on customer preference. In case of high vibration applications, the indicator may be damped with an oil filling to minimize extraneous pointer movement.



KOBOLD N2T Temperature Gauge

Specifications

Range: -40°F to 1100°F
(-40°C to 600°C)

Accuracy: ±1% of full scale

Diameter: 4" or 6.3"
(100mm or 160mm)

Fittings

Standard: 1/2" NPT
Optional: 1/4" or 3/4" NPT

Materials of Construction

Standard Version

Wetted Parts: 316-Ti SS
Housing: enameled steel, aluminum, 304 SS
Movement: brass & 316-Ti SS

Stainless Steel Version

Wetted Parts: 316-Ti SS
Housing: 304 SS
Movement: 304 SS & 316-Ti SS

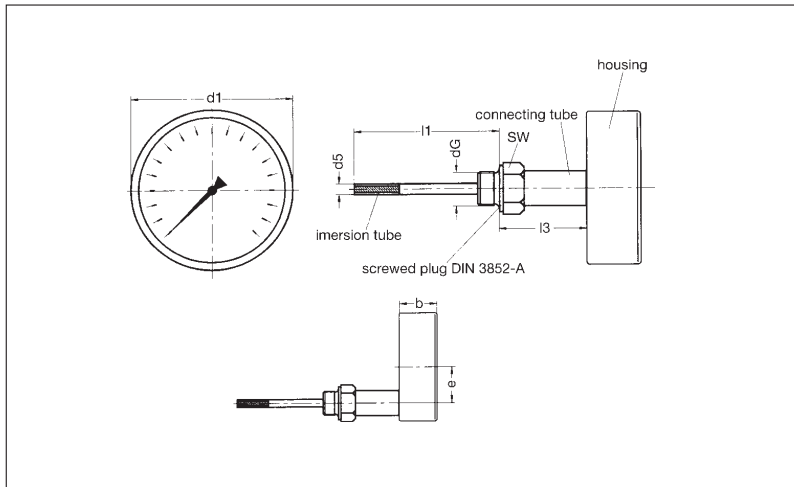
All Versions

Pointer: anodized aluminum

Housing Window

Standard: glass
Optional: plexiglass, safety glass

N2T-386 Dimensions

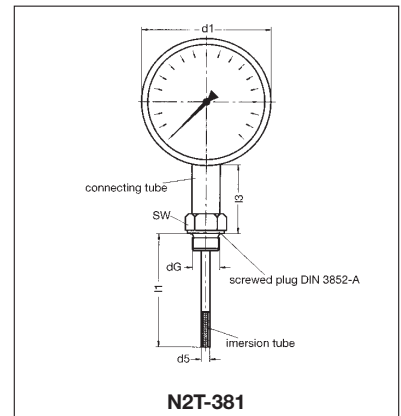


N2T RIGID STEM THERMOMETER











N2T Ordering Information																																	
N2T-381 N2T-386	Probe Geometry and Positioning = Dial Thermometer with probe at bottom, facing down = Dial Thermometer with probe at center back, facing rear																																
0 6	Dial Face Size = 100 mm (4") Dial Rigid Stem Thermometer = 160 mm (6.3") Dial Rigid Stem Thermometer																																
Range	Available Measuring Ranges and Scales = Temperature Range Abbreviation <table border="0"> <tr> <td>810F = -40 to 100 °F</td> <td>609F = -20 to 85 °F</td> <td>214F = 32 to 140 °F</td> <td>221F = 32 to 210 °F</td> </tr> <tr> <td>225F = 32 to 250 °F</td> <td>232F = 32 to 320 °F</td> <td>239F = 32 to 390 °F</td> <td>248F = 32 to 480 °F</td> </tr> <tr> <td>257F = 32 to 570 °F</td> <td>275F = 32 to 750 °F</td> <td>293F = 32 to 925 °F</td> <td>311F = 32 to 1100 °F</td> </tr> <tr> <td>640C = -20 to 40 °C</td> <td>660C = -20 to 60 °C</td> <td>750C = -30 to 50 °C</td> <td>840C = -40 to 40 °C</td> </tr> <tr> <td>860C = -40 to 60 °C</td> <td>160C = 0 to 60 °C</td> <td>180C = 0 to 80 °C</td> <td>210C = 0 to 100 °F</td> </tr> <tr> <td>212C = 0 to 120 °C</td> <td>216C = 0 to 160 °C</td> <td>220C = 0 to 200 °C</td> <td>225C = 0 to 250 °F</td> </tr> <tr> <td>230C = 0 to 300 °C</td> <td>235C = 0 to 350 °C</td> <td>240C = 0 to 400 °C</td> <td>250C = 0 to 500 °F</td> </tr> <tr> <td>260C = 0 to 600 °C</td> <td></td> <td></td> <td></td> </tr> </table>	810F = -40 to 100 °F	609F = -20 to 85 °F	214F = 32 to 140 °F	221F = 32 to 210 °F	225F = 32 to 250 °F	232F = 32 to 320 °F	239F = 32 to 390 °F	248F = 32 to 480 °F	257F = 32 to 570 °F	275F = 32 to 750 °F	293F = 32 to 925 °F	311F = 32 to 1100 °F	640C = -20 to 40 °C	660C = -20 to 60 °C	750C = -30 to 50 °C	840C = -40 to 40 °C	860C = -40 to 60 °C	160C = 0 to 60 °C	180C = 0 to 80 °C	210C = 0 to 100 °F	212C = 0 to 120 °C	216C = 0 to 160 °C	220C = 0 to 200 °C	225C = 0 to 250 °F	230C = 0 to 300 °C	235C = 0 to 350 °C	240C = 0 to 400 °C	250C = 0 to 500 °F	260C = 0 to 600 °C			
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N1 N2 N3	Fittings = 1/4" NPT = 1/2" NPT = 3/4" NPT																																
(switch)	Switches (Optional) = Type of switch required (if any) See table on next page for part number																																
D V	Indicator Housing Options = Oil Filled Indicator Mechanism = 304 Stainless Steel Housing and Movement																																
Pxx	= Probe Length in inches (2 inch min.)																																
Lxxx	Capillary Length (Optional) = Capillary Mechanism for remote sensing. (L= capillary length in inches)																																
N2T-386 0 225F N2 S11 D P02 L010	Sample N2T Specification																																

N2T Dimensions (mm)

Housing Ø d ₁ (±1)	b	b ₁	b ₂	l ₁	l ₃	d ₅	SW	e
100	57	90	—	specify	50/100	specify	32/36	32
160	65	96	123	specify	50/100	specify	32/36	54



N2T RIGID STEM THERMOMETER

Switching Options			
Functional Description		Contact Type	
		Sliding	Magnetic
Sliding and Magnetic Contacts with 2 Switches			
	Both contacts closed when temperature above setpoint	S11	M11
	First contact closed when temperature above setpoint Second contact open when temperature above setpoint	S12	M12
	First contact open when temperature above setpoint Second contact closed when temperature above setpoint	S21	M21
	First contact open when temperature above setpoint Second contact open when temperature above setpoint	S22	M22
Sliding and Magnetic Contacts with 3 and 4 Switches			
	First contact open when temperature above setpoint Second contact open when temperature above setpoint Third contact closed when temperature above setpoint	S221	M221
	First contact closed when temperature above setpoint Second contact open when value above setpoint Third contact closed when temperature above setpoint Fourth contact open when temperature above setpoint	S1212	M1212
Inductive Contacts with 2 Switches			
	Both contacts non-conducting when temperature above setpoint	L11	
	First contact non-conducting when temperature above setpoint Second contact conducting when temperature above setpoint	L12	
	First contact conducting when temperature above setpoint Second contact non-conducting when temperature above setpoint	L21	
	Both contacts conducting when temperature above setpoint	L22	

Switch Electrical Characteristics

Slide Contacts

Form: SPST
Repeatability: ±0.5% of full scale
Ratings
Max. Voltage: 250 V
Max. Current: 0.6 A
Max. Power: 10 W, 18 VA
Protection: NEMA 3

Magnetic Spring Contacts

Form: SPST
Repeatability: ±5% of full scale
Ratings
Max. Voltage: 250 V
Max. Current: 0.6 A
Max. Power: 30 W, 50 VA
Protection: NEMA 3

Inductive Contacts

Form: SPST
Repeatability: ±0.5% of full scale
Logic: NAMUR
On: > 3 mA
Off: < 1 mA
Power Requirements
Voltage: 5-25 VDC
Current: 20 mA max.
Protection: NEMA 3

MINI INFRARED THERMOMETER



Model
ST

Special Features

- Easy to Use
- Rugged Design
- Temperature Range:
 - 0 to 750°F ST-2000
 - ST-3000
 - 4 to 932°F ST-6000
- Large Easy-To-Read Display
- Battery Powered
- Affordably Priced



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MINI INFRARED THERMOMETER

The ST Mini Infrared Thermometer is a low cost noncontact temperature measurement tool. The ST can spot heat problems early in your electrical and mechanical systems, machinery and equipment, and help you avoid costly repairs, downtime and ruined product.

The ST is rugged, simple and safe to use. It is an everyday maintenance tool which can be used by anyone. There's no need to focus or calibrate, and no need for special training. You simply aim, pull the trigger, and read the temperature. Since there is no need to touch what you're measuring, temperatures of hard-to-reach, moving or hazardous materials can be taken without getting burned or shocked, and without contamination. The ST is also designed to be held away from the eye so vision isn't blocked in a dangerous environment.

ST-6000 with laser sighting



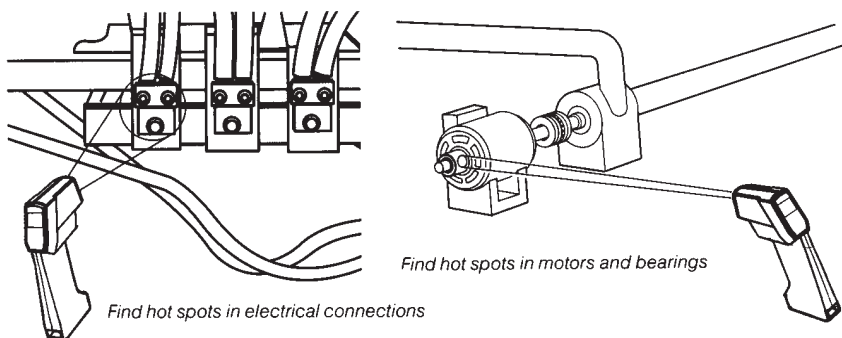
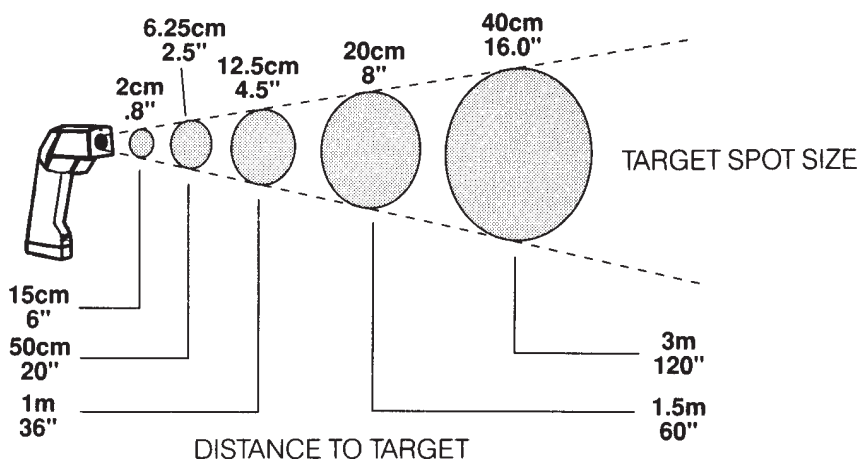
Proven circuitry assures accuracy and repeatability, even for targets as small as 1" (2.5 cm) in diameter. The rugged optics are environmental sealed so the ST can be used in the harshest conditions.

The ST is powered by a single 9 Volt battery. The temperature range is 0 to 750 °F (-18 to 400 °C). The ST-2000 and ST-3000 have a pre-set emissivity of 0.95. The ST-3000 also offers precision laser sighting that pinpoints the spot you're measuring. The ST-6000 offers adjustable emissivity plus an adjustable high alarm, temperature recall and MaxScan, a useful feature that tracks the highest temperature measured. The ST-6000 also offers precision laser sighting.

SPECIFICATIONS	ST-2000/ST-3000	ST-6000
Temperature range	0-750°F	-4-932°F
Accuracy	± 2% of Reading or ± 3°F (± 2°C), whichever is greater at ambient 77°F (25°C) at 12" (30 cm) distance	
Repeatability	± 1% of reading ± 1 digit	
Response time	500 m sec	
Spectral response	7-18 microns nominal	
Max Scan with audible alarm	No	Yes
Recall last reading	No	Yes
High audible & visual alarm	No	Yes
Emissivity	pre set 0.95	0.3-1.0 digitally adjustable
Temperature display	1°F or °C, switch selectable	
Laser Sighting	Standard on ST-3000 and ST-6000	
Ambient operating range	32-120°F (0 to 50°C)	
Battery life	9 V Alkaline - ~ 50 hrs Use of backlight reduces battery life	
Dimensions	5.4" (13.5 cm) L x 1.6" (4 cm) W x 7.7" (19.5 cm) H.	
Weight	9.5 oz (270 gm)	
Accessories	Pouch/wrist strap/belt hook kit, waterproof toolbox	

Note: Waterproof case included with ST-3000 and ST-6000

Target sighting and spot sizes



Ordering Information

Model	Description
ST-2000	
ST-3000	
ST-6000	
Options	Description
-N	NIST Calibration
ST-8000	Carrying Pouch
ST-9000	Waterproof Case

TBW BI-METAL THERMOMETERS

Features

- 3" or 5" Dials
- Ranges -40 to +160°F Through 150 to 750°F
- Center Back or Adjustable Angle Connections
- Brass or Stainless Steel Thermowells Available
- Standard Stem Lengths 2.5" Through 12"

Bi-metal thermometers are an economical solution to industrial temperature measurement applications where only indication is required. The TBW series thermometers are available with 1/2" NPT fittings with either a center back or adjustable angle connection. Measuring probes are 304 stainless steel and are available in standard lengths of 2.5, 4, 6, 9 and 12 inches. Glycerin filled indicators are available for installations where vibrations exist. Indicators are graduated with dual scales in °F and °C. Thermowells are available in brass or 304 stainless steel. Thermowells protect the thermometer from the process medium and allow for thermometer removal without system shutdown. Thermowells all have 1/2" NPT female fitting to accommodate the thermometer and a 3/4" NPT process connection.



TBW Series Bi-Metal Thermometers

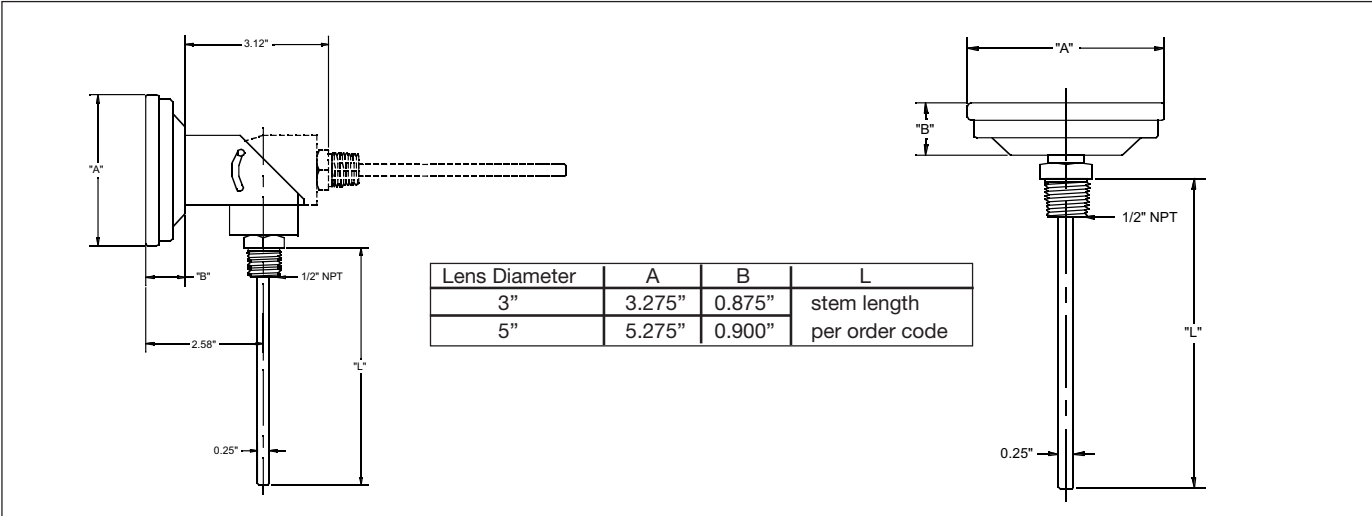
Specifications

Temperature Ranges: -40 to +160°F through 150 to 750°F, dual scale °F/°C

Process Fitting Thermometer: 1/2" NPT center back or adjustable angle
Thermowell: 3/4" NPT (sold separately)
Indicator Diameters: 3" or 5" depending on model code

Housing/Stem Material: 304 stainless steel
Max. Pressure Thermometers: 125 PSIG
Thermowells: 350 PSIG

DIMENSIONS



Specifications subject to change without notice.

TBW BI-METAL THERMOMETERS

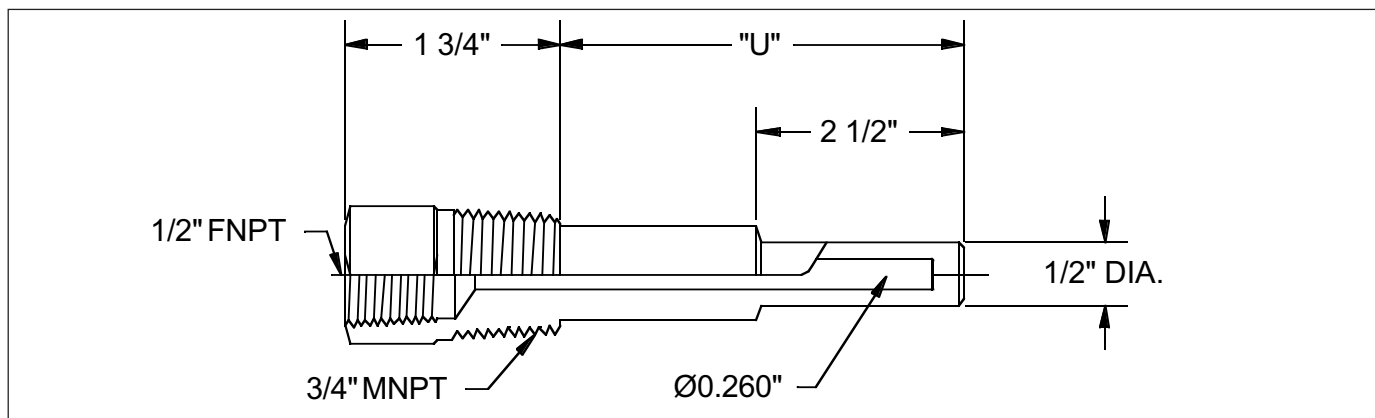
Ordering Information for Bi-metal Thermometers

TBW	= Bi-metal Thermometer		
	Dial/Connection		
T30	= 3" Dial, 1/2" NPT, center back		
T32	= 3" Dial, 1/2" NPT, adjustable angle		
T50	= 5" Dial, 1/2" NPT, center back		
T52	= 5" Dial, 1/2" NPT, adjustable angle		
	Stem Length		
025	= 2.5"	090	= 9"
040	= 4"	120	= 12"
060	= 6"		
	Measuring Range (all dials are dual scale °F/°C)		
B3	= 0 to 140°F	B9	= 50 to 300°F
B4	= -40 to +160°F	B10	= 50 to 400°F
B7	= 20 to 240°F	B11	= 50 to 500°F
		B12	= 150 to 750°F
	Options		
	Glycerin Filled Indicator - add suffix " G "		
TBW - T32- 040- B7	Example TBW Part Number		

Order Numbers for Thermowells 3/4" NPT

For Thermometer Stem Length "L"	Immersion Depth "U"	Material	
		Brass	304 SS
2.5"	1.4"	TBW-B25	TBW-B251
4"	2.5"	TBW-B35	TBW-B351
6"	4.5"	TBW-BR6	TBW-BR61
9"	7.5"	TBW-BR9	TBW-BR91
12"	10.5"	TBW-BR12	TBW-BR121

DIMENSIONS



TDD DIGITAL TEMPERATURE SWITCH

Features

- 0-250°F Switching Range
- Fully Programmable with Setpoint, Reset Point and Window Capability
- Large Easy-to-Read LED Display
- All Stainless Steel Construction
- Rugged and Reliable

The TDD series digital temperature switch integrates the latest solid state sensing technology into a very versatile, simple to operate package. Programming features include setpoint, reset point, window mode, dampening, switch logic and user selectable lockout code. The Pt-100 RTD sensing system and solid state transistor switch ensure an exceptionally long cycle life with virtually no calibration drift. These features along with the compact, robust stainless steel package make the TDD an ideal choice for OEM applications.



TDD Series Digital Temperature Switch

Specifications

Switching Range: 0 to 250° F or -20 to 120°C

Display Type: 3-digit LED

Display Resolution: ±0.5° below 100°F
±1° at 100°F and above

Switch Status Indicator: Single red LED, on when temperature is above setpoint

Accuracy:
32°F to 160°F: ±1°F
0°F to 31°F: +6°F/-2°F
161°F to 230°F: +2°F/-4°F
231°F to 250°F: +2°F/-5°F

Max. Pressure: 1150 PSIG

Ambient Temp Range: -4°F to 140°F

Sensor Element: Pt-100 RTD

Housing and Probe Material: 316L Stainless Steel

Electrical Data

Power: 24 VDC ±20%
Switch Type: Transistor NPN or PNP based on model number

Switch Rating: 300 mA Max. short circuit protected

Switch Logic: User programmable N/O or N/C

Response Time: 0.5 Sec.

Dampening: Programmable averaging over 2, 4, 8, 16, 32, or 64 samples

Electrical Connection: 4-Pin Micro-DC male plug

Electrical Protection: NEMA 4/IP 65

Programmable Functions

- Lockout Code
- Setpoint
- Switching Hysteresis
- Window Switching
- Switch Logic
- Dampening

TDD SERIES DIGITAL TEMPERATURE SWITCH

TDD Series Ordering codes

TDD = Compact Electronic Temperature Switch

153 = PNP Transistor Switch **Output Type**

353 = NPN Transistor Switch

N4 = 1/2" NPT **Fitting**

N5 = 3/4" NPT

F2 = 0°F to 250°F **Range**

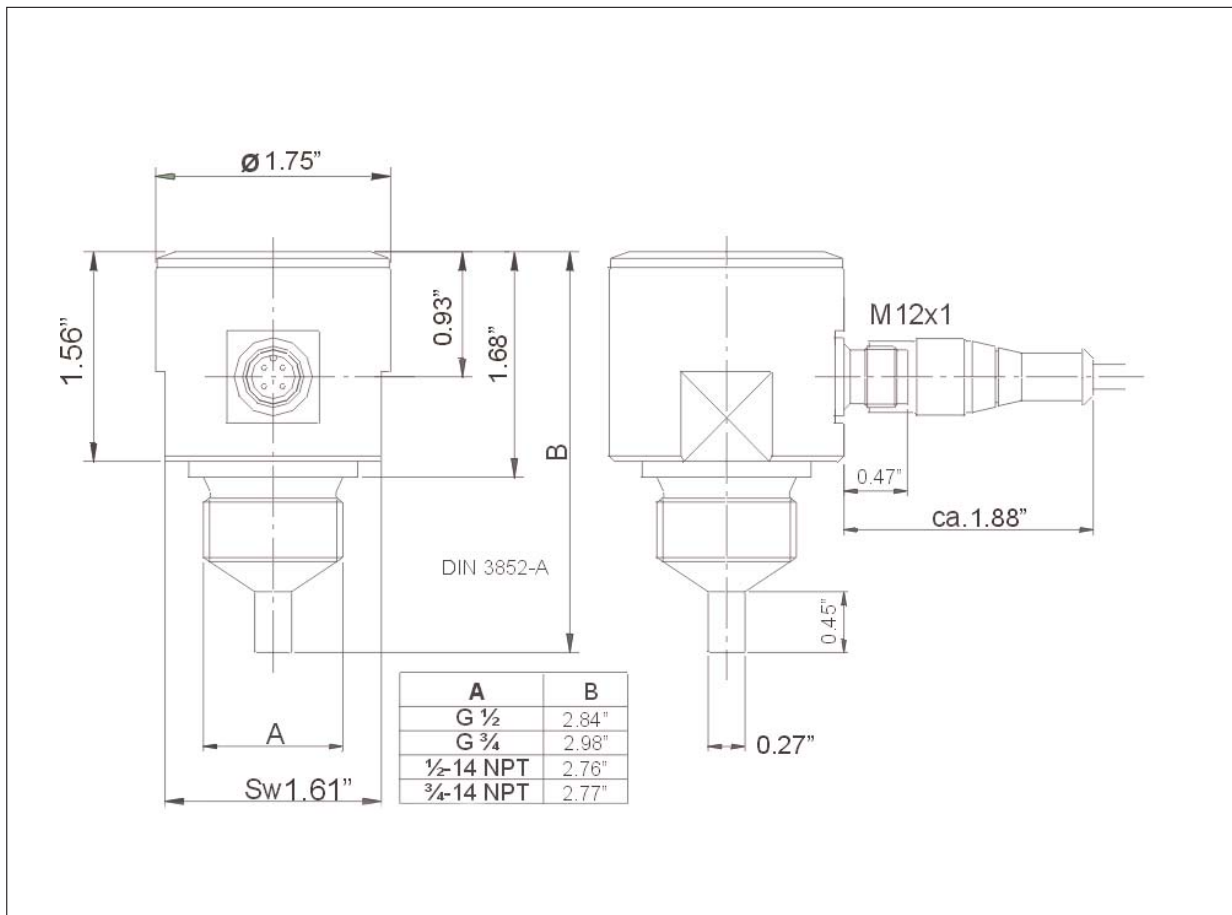
H2 = -20°C to 120°C

TDD - 353 - N4 - F2 Example

Accessories

Part# 807.037 - Mating 4-Pin Micro-DC plug with 6 ft. cable.

Dimensions



TMA 4-20 mA OUTPUT TEMPERATURE SENSORS

Features

- High accuracy
- 4-20 mA loop powered
- Rugged, all 316 SS construction
- -200 to 600°C temperature range
- Custom designs available
- Accessible zero & span

KOBOLD TMA temperature sensor employs a Pt100 class B resistive temperature detector (RTD) combined with an integrated loop powered 4-20 mA output transmitter. Optional digital indicator, model AUF, plugs directly to the Hirschmann (DIN 43650) plug. This sensor is rugged and all 316 SS construction. Fittings, 1/4" and 1/2" NPT welded to tube, are available for mounting purposes. An adjustable bore-through compression fitting option is also available. This allows for easy adjustment of desired immersion depth. The unit is factory calibrated to customer temperature requirements. Re-calibration via zero and span potentiometers, at the connector, is possible.

Temperature Specifications

Temperature Sensor

Operating

Temperature: -200 to +600°C
(-328°F to +1112°F)

Ambient Operating

Temperature Range: -40°C to +70°C
(-40°F to +158°F)

Sensing Element: Pt100 Class B
per DIN 43670

Max. Pressure: 1450 PSIG
Wetted Parts: 316 SS
Fittings: 1/4", 1/2" NPT
standard welded or adjustable

Connector: Hirschmann plug
per (DIN 43650)

Electronic Data

Output: 4-20 mA, 2-wire
Supply Voltage: 12-36 VDC
Accuracy: 0.1 % of span
Zero/Span Drift: 0.025%/F

Protection

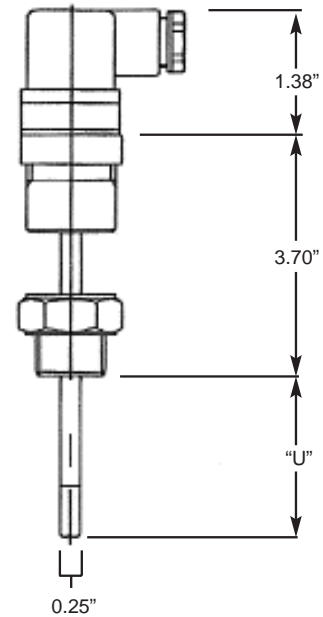
Environmental: NEMA 4X/IP65
Fault: Reverse polarity
protected

Digital Display:

See AUF Series



Temperature Range	CODE xx
0 to 50°C (32°F/122°F)	05
0 to 100°C (32°F/212°F)	10
0 to 150°C (32°F/302°F)	15
0 to 200°C (32°F/392°F)	20
0 to 400°C (32°F/752°F)	40
0 to 600°C (32°F/1112°F)	60
-50 to 50°C (-58/122°F)	55
-50 to 150°C (-58/302°F)	51
-200 to 400°C (-328/752°F)	24
-200 to 600°C (-328/1112°F)	26
Custom (Specify range)	E



Order Numbers for TMA Sensors

U Dim.	1/4 Welded	1/2 Welded	1/4 Adjustable	1/2 Adjustable
2 1/2"	TMA-S2514F025xx	TMA-S2512F025xx	TMA-S2514A025xx	TMA-S2512A025xx
4"	TMA-S2514F040xx	TMA-S2512F045xx	TMA-S2514A045xx	TMA-S2512A045xx
6"	TMA-S2514F060xx	TMA-S2512F075xx	TMA-S2514A075xx	TMA-S2512A075xx
9"	TMA-S2514F090xx	TMA-S2512F105xx	TMA-S2514A105xx	TMA-S2512A105xx
12"	TMA-S2514F120xx	TMA-S2512F120xx	TMA-S2514A120xx	TMA-S2512A120xx

Example: TMA-S2514F02505 = 0-50°C Range, 1/4" NPT welded, 2-1/2" insertion

TNF CAPILLARY THERMOMETERS

The KOBOLD TNF capillary thermometers are highly versatile and rugged gas filled thermometers for industrial applications. The capillary design allows for mounting of the indicator remote from the sensing probe. The TNF is available as a simple temperature indicating device or as a controller with up to four adjustable setpoints. The thermometer operates on the nitrogen gas principle. The sensing bulb is filled with inert nitrogen gas. Any temperature change at the bulb will result in a change in nitrogen pressure. This pressure is sensed in the indicating mechanism and displayed as a change in temperature.

Capillaries are available in stainless steel and stainless steel with flexible stainless steel armor sheath. A variety of indicator housings are available with wall mounting brackets or flanges. The TNF is available with glycerin filling for applications in which vibration is present. The TNF is also available with dial sizes ranging from 2.5 to 10 inches. A variety of fittings are available to suit almost any application.

Specifications

Available Ranges

Celsius:	-20 to +40 through 0 to +600°C
Fahrenheit:	-40 to +100 through 32 to +1100°F

Over-range Limit: 1.3X Full Scale
Maximum Pressure: 350 PSIG
Available Dial Sizes: 2.5", 3", 4", 6", 10"

Accuracy:

2.5" and 3":	±1.6% of full scale @ 70°F ambient
4", 6" and 10":	±1% of full scale @ 70°F ambient

Materials of Construction

Measuring Probe

2.5", 3" and 10"	
Dial:	304 stainless steel
4" and 6" Dial:	316-Ti stainless steel
Capillaries:	316-Ti stainless steel or 316-Ti stainless steel with 304 stainless steel armor

Indicator Housing

2.5", 3" and 10"	
Dial:	Black painted steel or stainless steel depending on model code



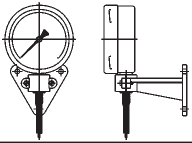
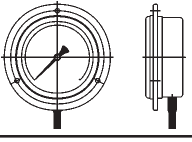
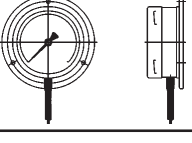
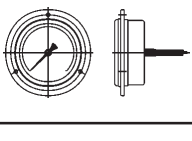
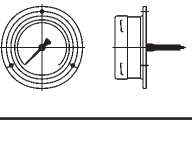
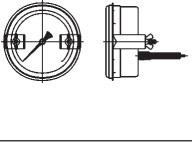
TNF Series Capillary Stem Thermometers

4" and 6" Dial:	Aluminum or stainless steel depending on model code	Sliding Contact Ratings:	250 VAC/VDC, 10 watts, 0.6 amps Max
Indicator Movement:	304 and 316-Ti stainless steel	Magnetic Spring Contact Ratings:	250 VAC/VDC, 30 watts, 0.6 amps. Max
Dial & Pointer:	Aluminum	Inductive Contact Ratings:	NAMUR according to DIN 19234
Protection		Note:	switches available for 4" and 6" housings only
Aluminum & SS Housing:	NEMA 4X/IP 65		
Steel Housing:	NEMA 3R/IP 54		
Switch Specifications (optional)			
Available Switch Types:	Sliding contact, magnetic spring contact, inductive		

TNF Model Code Key

TNF -	1	-	D	-	1	-	24	-	E	-	1A	-	K	-	M11	L=XXX
Model	↑		↑		↑		↑		↑		↑		↑		↑	↑
Diameter																
Case material																
Range																
Capillary																
Probe/Connection																
Options																
Switch																
Measuring Probe Length																
Use Table 1 through 6 on the following pages to completely specify your model number.																

TNF Rigid Stem Thermometer
Ordering information
Table 1: Housing Style

Style	Housing Diameter				
	2.5" (63mm)	3" (80 mm)	4" (100 mm)	6" (160 mm)	10" (250 mm)
	TNF-0D...	TNF-0E...	TNF-0F...	TNF-0G...	TNF-0I...
	TNF-1D...	TNF-1E...	TNF-1F...	TNF-1G...	TNF-1I...
	TNF-2D...	TNF-2E...	TNF-2F...	TNF-2G...	TNF-2I...
	TNF-5D...	TNF-5E...	TNF-5F...	TNF-5G...	TNF-5I...
		TNF-6E...	TNF-6F...		
	TNF-8D...	TNF-8E...	TNF-8F...	TNF-8G...	TNF-8I...

* For 100 mm and 160 mm housings, this style available only in aluminum.

Table 2: Housing Material

1... = Black Painted Steel (for 2.5", 3" and 10" housing only)	A... = Aluminum (for 4" and 6" housing only)
2... = Stainless Steel	

Table 3: Measuring Ranges

41... = -40 to +100°F	28... = -20 to +85°F	31... = 32 to 140°F	21... = 32 to 210°F
32... = 32 to 250°F	33... = 32 to 320°F	23... = 32 to 390°F	34... = 32 to 480°F
57... = 32 to 570°F	37... = 32 to 750°F	39... = 32 to 925°F	11... = 32 to 1100°F
24... = -20 to +40°C	26... = -20 to +60°C	35... = -30 to +50°C	44... = -40 to +40°C
46... = -40 to +60°C	06... = 0 to 60°C	08... = 0 to 80°C	10... = 0 to 100°C
12... = 0 to 120°C	16... = 0 to 160°C	20... = 0 to 200°C	25... = 0 to 250°C
30... = 0 to 300°C	40... = 0 to 400°C	50... = 0 to 500°C	60... = 0 to 600°C
E... = Special Scale (low end to high end of range must be >140°F)			

TNF CAPILLARY THERMOMETERS

Table 4: Capillaries
(Specify capillary length when ordering)

Description	Order Code
316-Ti Stainless Steel Capillary	...E
316-Ti Stainless Steel Capillary with Flexible 304 Stainless Steel Armor	...F

Table 5: Probe/Fitting Style
(Specify probe length "L" when ordering)

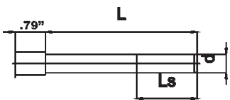
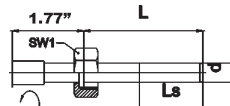
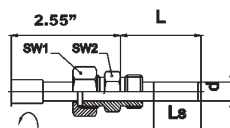
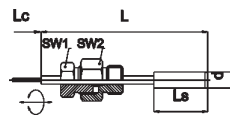
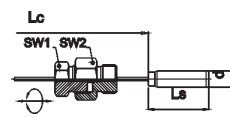










	Description	Thread	Order Code
	Smooth bore probe 12 mm diameter standard (9 or 10 mm optional)	none	...AO
	Union nut, for insertion into TSH series thermowell. Allows indicator to rotate	1/2" BSP 3/4" BSP 1" BSP	...B1 ...B2 ...B3
	Union nut and shoulder nipple, allows indicator to rotate when thermowell not used	1/2" NPT 3/4" NPT 1" NPT	...1A ...1B ...1C
	Bore through compression nut or sensing bulb, allows indicator rotation and adjustment of probe insertion depth	1/2" NPT 3/4" NPT 1" NPT	...9A ...9B ...9C
	Bore through compression nut on capillary, allows indicator rotation and adjustment of probe insertion depth	1/2" NPT 3/4" NPT 1" NPT	...8A ...8B ...8C

Table 6: Options

Option Code	Description
...D	Glycerin Filled Indicator Housing
...K	Max. Temperature Pointer
...G	Max. Temperature Pointer and Glycerine Fill
...R	Adjustable Temperature Pointer
...V	Adjustable Temperature Pointer and Glycerine Fill

Table 7: Switches

Switching Options			
Functional Description		Contact Type	
		Sliding	Magnetic
Sliding and Magnetic Contacts with 2 Switches			
	Both contacts closed when temperature above setpoint	S11	M11
	First contact closed when temperature above setpoint Second contact open when temperature above setpoint	S12	M12
	First contact open when temperature above setpoint Second contact closed when temperature above setpoint	S21	M21
	First contact open when temperature above setpoint Second contact open when temperature above setpoint	S22	M22
Sliding and Magnetic Contacts with 3 and 4 Switches			
	First contact open when temperature above setpoint Second contact open when temperature above setpoint Third contact closed when temperature above setpoint	S221	M221
	First contact closed when temperature above setpoint Second contact open when value above setpoint Third contact closed when temperature above setpoint Fourth contact open when temperature above setpoint	S1212	M1212
Inductive Contacts with 2 Switches			
	Both contacts non-conducting when temperature above setpoint	L11	
	First contact non-conducting when temperature above setpoint Second contact conducting when temperature above setpoint	L12	
	First contact conducting when temperature above setpoint Second contact non-conducting when temperature above setpoint	L21	
	Both contacts conducting when temperature above setpoint	L22	

TNS RIGID STEM THERMOMETERS

The KOBOLD TNS series rigid stem thermometers are highly versatile and rugged gas filled thermometers for industrial applications. The TNS is available as a simple temperature indicating device or as a controller with upto four adjustable setpoints. The thermometer operates on the nitrogen gas principle. The sensing bulb is filled with inert nitrogen. Any temperature change at the bulb will result in a change in nitrogen pressure. This pressure is sensed in the indicating mechanism and displayed as a change in temperature.

The TNS is available with glycerin filling for applications in which vibration is present. The TNS is also available with dial sizes ranging from 2.5 to 10 inches. A variety of fittings are available to suit almost any application.



TNS Series Rigid Stem Thermometers

Specifications

Available Ranges

Celsius:	-20 to +40 through 0 to +600°C
Fahrenheit:	-40 to +100 through 32 to +1100°F

Over-range Limit:	1.3X Full Scale
Max. Pressure:	350 PSIG
Available Dial Sizes:	2.5", 3", 4", 6", 10"

Accuracy:	
2.5" and 3":	±1.6% of full scale @ 70°F ambient
4", 6" and 10":	±1% of full scale @ 70°F ambient

Materials of Construction

Measuring Probe	
2.5", 3" and 10" Dial:	304 stainless steel
4" and 6" Dial:	316-Ti stainless steel

Housing

2.5", 3" and 10" Dial:	painted steel or stainless steel
4" and 6" Dial:	aluminum or stainless steel

Indicator

Movement:	304 and 316-Ti stainless steel
Dial & Pointer:	Aluminum

Protection

Aluminum & SS Housing:	NEMA 4X/IP 65
Painted Steel Housing:	NEMA 3R/IP 54

Switch Specifications (optional)

Available Switch Types:	Sliding contact, magnetic spring contact, inductive
--------------------------------	---

Sliding Contact

Ratings:	250 VAC/VDC, 10 watts, 0.6 amps Max
-----------------	---

Magnetic Spring

Contact Ratings:	250 VAC/VDC, 30 watts, 0.6 amps. Max
-------------------------	--

Inductive Contact

Ratings:	NAMUR according to DIN 19234
-----------------	---------------------------------

Note: switches available for 4" and 6" housings only

TNS Model Code Key

	TNS -	1 -	D -	1 -	24 -	0CB -	K -	M11	L=XXX
Model	→								
Case Diameter		→							
Case material			→						
Range				→					
Probe/Connection					→				
Options						→			
Switch							→		
Measuring Probe Length								→	

Use Table 1 through 6 on the following pages to completely specify your model number.

TNS RIGID STEM THERMOMETERS

Table 1: Housing Style

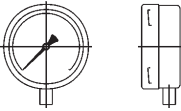
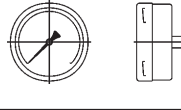
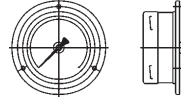
Style	Housing Diameter				
	2.5" (63mm)	3" (80 mm)	4" (100 mm)	6" (160 mm)	10" (250 mm)
	TNS-0D...	TNS-0E...	TNS-0F...	TNS-0G...	TNS-0I...
	TNS-1D...	TNS-1E...	TNS-1F...	TNS-1G...	TNS-1I...
	TNS-8D...	TNS-8E...	TNS-8F...	TNS-8G...	TNS-8I...

Table 2: Housing Material

1... = Black painted steel (for 2.5", 3" and 10" housing only) A... = Aluminum (for 4" and 6" housing only)
2... = Stainless steel

Table 3: Measuring Ranges

41... = -40 to +100°F	28... = -20 to +85°F	31... = 32 to 140°F	21... = 32 to 210°F
32... = 32 to 250°F	33... = 32 to 320°F	23... = 32 to 390°F	34... = 32 to 480°F
57... = 32 to 570°F	37... = 32 to 750°F	39... = 32 to 925°F	11... = 32 to 1100°F
24... = -20 to +40°C	26... = -20 to +60°C	35... = -30 to +50°C	44... = -40 to +40°C
46... = -40 to +60°C	06... = 0 to 60°C	08... = 0 to 80°C	10... = 0 to 100°C
12... = 0 to 120°C	16... = 0 to 160°C	20... = 0 to 200°C	25... = 0 to 250°C
30... = 0 to 300°C	40... = 0 to 400°C	50... = 0 to 500°C	60... = 0 to 600°C
E... = Special Scale (low end to high end of range must be >140°F)			

**Table 4: Probe/Fitting Style
(Specify probe length "L" when ordering)**

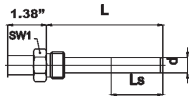
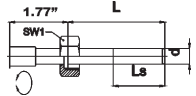
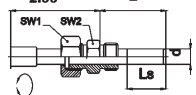
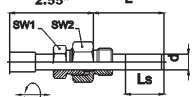










	Description	Thread	Order Code
	Simple rigid nipple	1/2" NPT 3/4" NPT 1" NPT	...0CA ...0CB ...0CC
	Union nut, for insertion into TSH series thermowell. Allows indicator to rotate	1/2" BSP 3/4" BSP 1" BSP	...0B1 ...0B2 ...0B3
	Union nut and shoulder nipple, allows indicator to rotate when thermowell not used	1/2" NPT 3/4" NPT 1" NPT	...01A ...01B ...01C
	Bore through compression nut, allows indicator rotation and adjustment of probe insertion depth	1/2" NPT 3/4" NPT 1" NPT	...0SA ...0SB ...0SC

Table 5: Options

Option Code	Description
...D	Glycerin filled indicator housing
...K	Max. temperature pointer
...G	Max. temperature pointer and glycerin fill
...R	Adjustable temperature pointer
...V	Adjustable temperature pointer and glycerin fill

Table 6: Switches

Switching Options			
Functional Description		Contact Type	
		Sliding	Magnetic
Sliding and Magnetic Contacts with 2 Switches			
	Both contacts closed when temperature above setpoint	S11	M11
	First contact closed when temperature above setpoint Second contact open when temperature above setpoint	S12	M12
	First contact open when temperature above setpoint Second contact closed when temperature above setpoint	S21	M21
	First contact open when temperature above setpoint Second contact open when temperature above setpoint	S22	M22
Sliding and Magnetic Contacts with 3 and 4 Switches			
	First contact open when temperature above setpoint Second contact open when temperature above setpoint Third contact closed when temperature above setpoint	S221	M221
	First contact closed when temperature above setpoint Second contact open when value above setpoint Third contact closed when temperature above setpoint Fourth contact open when temperature above setpoint	S1212	M1212
Inductive Contacts with 2 Switches			
	Both contacts non-conducting when temperature above setpoint	L11	
	First contact non-conducting when temperature above setpoint Second contact conducting when temperature above setpoint	L12	
	First contact conducting when temperature above setpoint Second contact non-conducting when temperature above setpoint	L21	
	Both contacts conducting when temperature above setpoint	L22	



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TSA

TEMPERATURE SENSOR FOR LIQUIDS & GASES

Kobold USA Temperature Sensors are used for monitoring, measuring and controlling the temperature of gases and liquids. control and indication equipment, a wide range of applications can be handled. Typical applications include heat exchangers and heating, ventilation and airconditioning systems

The TSA Temperature Sensor offers quick response in the range of -40°F to 300°F. An RTD (resistive thermal device) serves as the measuring element. Durable metal construction makes the unit suitable for harsh environments.

The laser trimmed sensing element achieves a high output signal in response to temperature change. This makes compensation unnecessary for installations with transmission cable up to 65 feet in length. Sensor output is linear over its range. The accuracy at room temperature (68°F) is $\pm 1.3^\circ\text{F}$ and $\pm 4.5^\circ\text{F}$ over the total measuring range.

The TSA comes with the female NPT threads in sizes of $1/4"$ to $1"$. Five feet of silicone cable is included



Special Features

- Quick Response
- Linear Temperature Sensitivity
- High Long-Term Stability
- No Compensation Required (for cable lengths up to 65)
- Replace Probe without Compensation
- Brass or Stainless Steel Housing

Specifications

Accuracy: $\pm 1.3^\circ\text{F}$ at 68°F , $\pm 4.5^\circ\text{F}$ over total range
Housing: Brass or Stainless Steel
Seals: Viton
Cable: 5 ft silicone clad
Media Temperature Range: -75°F to 350°F
Maximum Pressure: 230 PSIG for Brass, 360 PSIG for Stainless Steel
Maximum Supply Current
 1 mA

Ordering Data			
	Brass TSA-.1..	St. Steel TSA-.2..	Fitting Female NPT
TSA-5.05	TSA-5105	TSA-5205	$1/4$
TSA-5.10	TSA-5110	TSA-5210	$3/8$
TSA-5.15	TSA-5115	TSA-5215	$1/2$
TSA-5.20	TSA-5120	TSA-5220	$3/4$
TSA-5.25	TSA-5125	TSA-5225	1

Accesorios para Sensores de Temperatura TSA

A wide variety of transducers is available for processing the output signals of TSA Temperature Sensors. These convert the signal, a displayed value or an alarm signalling function. the transducers are adjusted at the our factory to the following temperature ranges.

Please make a selection when ordering:

Standard:
 32°F to 212°F

Special
 -40°F to 300°F ,
 32°F to 300°F ,
 -40°F to 32°F ,
 212°F to 300°F

For more information on transmitters see Controllers/Transmitters.

TSF26 DIGITAL TEMPERATURE GAUGE

Model
TSF26



- Highly visible green LED temperature readout
- High-contrast, backlit LCD readout for switch settings
- Standard & custom ranges available
- Analog outputs standard
- Up to four SPDT switches available
- 316-Ti SS wetted parts
- Programming lockout via password



KOBOLD Instruments Inc.
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Pittsburgh, PA 15205
Phone: (412)788-2830
Fax: (412)788-4890
www.koboldusa.com

TSF26 DIGITAL TEMPERATURE GAUGE

- **Highly visible green LED readout**
- **Standard & custom ranges available**
- **Analog output standard**
- **Up to four SPDT switches**
- **316 SS construction**

With the TSF26, KOBOLD addresses all the fundamental issues of industrial temperature sensing. A digital display, built-in transmission capability, and optional set-point switches, cover all aspects of indication and control. The TSF26 is designed as a direct replacement for gas or liquid bulb thermometers.

Constructed for industrial use, these meters feature 316-Ti SS wetted parts and 304 stainless steel enclosures. We offer a number of standardized temperature sensing ranges in units of Fahrenheit or Celsius. However, because of its electronic nature, any desired units or temperature ranges are possible (within the device's operating limits). If you don't see what you want, give us a call, and we'll customize the range for you at no extra cost.

The KOBOLD TSF26 comes standard with a local digital display and analog output . . . ideal for remote monitoring. Setpoint relays are available as options. These SPDT relays come in pairs of either two or four switches. Setpoints and hysteresis are fully adjustable via the front keypad. Once switch parameters have been selected, tampering may be prevented with a password lock-out feature.



KOBOLD TSF26 Digital Temperature Gauge

Specifications

Ranges:	-20°F to 390°F (see table)
Sensor Type:	Pt-100
Accuracy:	±0.5% FS ±1 digit
Linearity:	±0.2% FS
Repeatability:	±0.1% FS ±1 digit
Response Time:	0.1 to 99.99 sec. (factory set)
Operating Temperature	
Medium:	-20°F to 390°F
Ambient:	-5°F to 140°F
Storage:	-40° to 160°F
Fittings:	1/2" NPT
Displays	
Temperature:	4 digit, 1/2" green LED
Switches:	4 digit backlit LCD
Materials of Construction	
Wetted Parts:	316-Ti SS
Housing:	304 SS, Nylon®

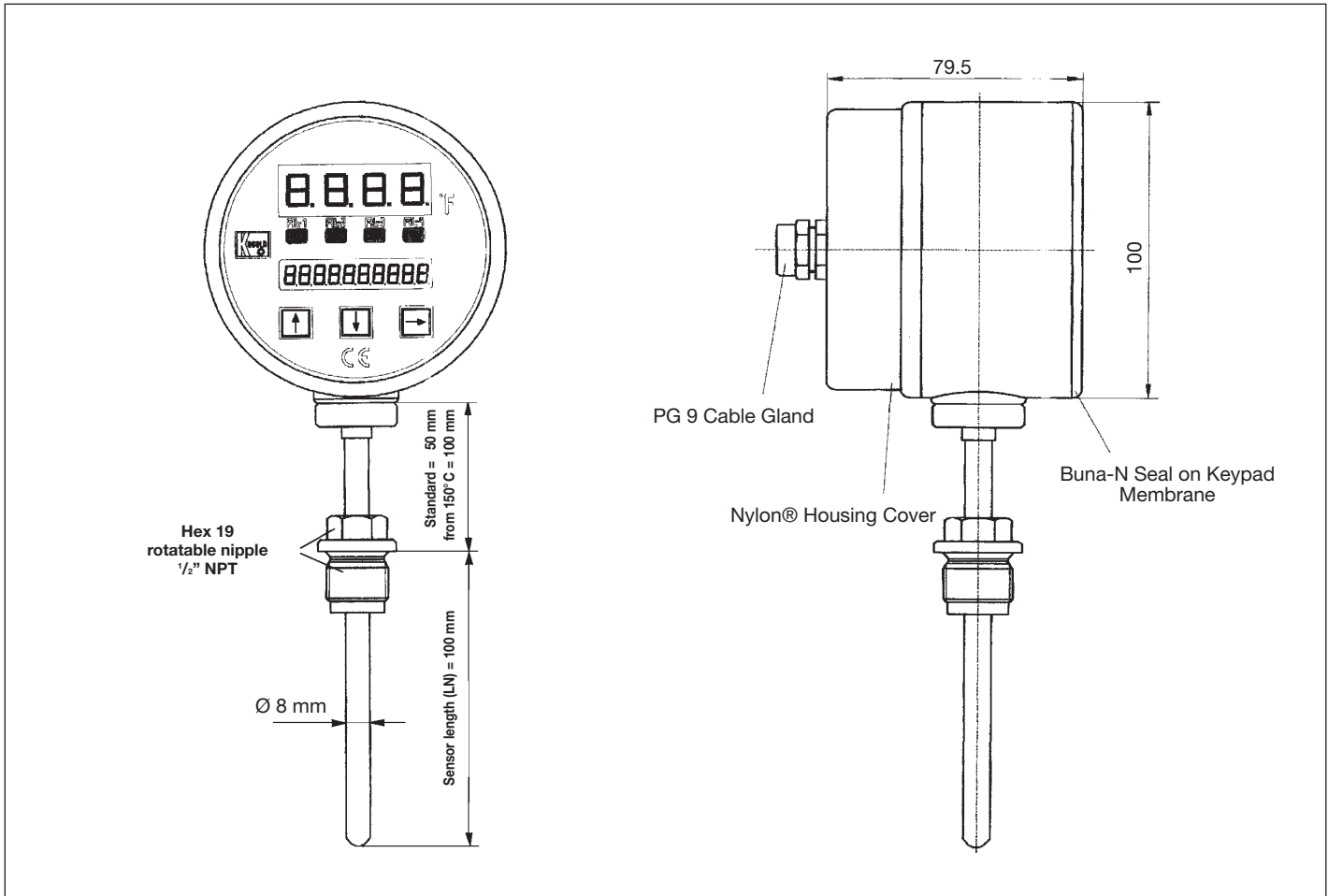
Electrical Information

Supply:	15-30 VDC @ 200 mA
Analog Output	
Current:	0-20 mA, 4-20 mA into 500 Ω max.
Voltage:	0-10 VDC into 500 Ω min.
Zero Adjust:	±25% of full scale
Relays	
Type:	SPDT, Qty. 0, 2 or 4
Setpoints:	fully adjustable
Hysteresis:	fully adjustable
Switch Delay:	0.02 to 99.99 sec. (factory set)
Max. Voltage:	250 VAC, 220 VDC
Max. Current:	3 A
Max. Power:	50 VA, 60 W
Connections:	via terminal strip
Protection:	NEMA 4

TSF26 DIGITAL TEMPERATURE GAUGE

TSF26 Ordering Information	
TSF26	= Thermometer
-Range	= Temperature Range Abbreviation 140820 = -20 to 40 239820 = -20 to 390 218000 = 0 to 180 216132 = 32 to 160 210820 = -20 to 100 160000 = 0 to 60 222000 = 0 to 220 222132 = 32 to 220 216820 = -20 to 160 180000 = 0 to 80 230000 = 0 to 300 230132 = 32 to 300 222820 = -20 to 220 210000 = 0 to 100 239000 = 0 to 390 239132 = 32 to 390 230820 = -20 to 300 214000 = 0 to 140 210132 = 32 to 100 Uxxxxx = Custom
F	= Fahrenheit Scale (°F)
C	= Celsius Scale (°C: +200°C maximum)
4	= 4-20 mA output
0	= 0-20 mA output
1	= 0-10 VDC output
G	= Qty. 2 SPDT Limit Switches
H	= Qty. 4 SPDT Limit Switches
Sample TSF26 Specification	
TSF26	-230820 F 1 G

Dimensions (mm)



TSH THERMOWELLS FOR STEM AND CAPILLARY THERMOMETERS

Features

- NPT Threaded or Weld-On Versions
- 304 Stainless Steel Standard, Other Materials on Request
- Allows for Rotation of Thermometer Indicator
- Maximum Pressure 360 PSIG

Thermometer thermowells are made of thermally conductive material and serve to separate the thermometer from the process. Standard thermowells are made of 304 stainless steel. Other materials are available on request. The use of a thermowell is recommended when a thermometer is to be used in a pressurized system to protect the thermometer against aggressive process media and to allow for replacement of the thermometer without system shutdown. Thermowells have a 1/2" BSP male thermometer connection to accommodate TNS and TNF series thermometers with union nut fitting styles. Process connections are NPT thread or weld-stub.



TSH Series Thermowells

Specifications

Material: 304 stainless steel, other materials on request

Process Connection:

NPT: 1/2", 3/4" or 1"

Weld-on: 1 1/16" (18mm) diameter weld stub

Thermometer Connection:

1/2" BSP male, accommodates TNF series thermometer with fitting style OB1 and TNS series with fitting style B1

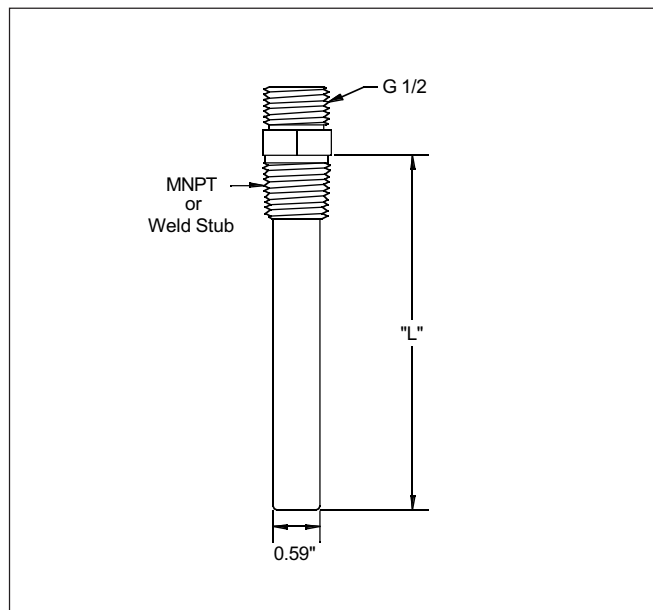
Maximum Pressure:

350 PSIG, higher pressures available upon request

Thermowell I.D.: 0.5"/13 mm

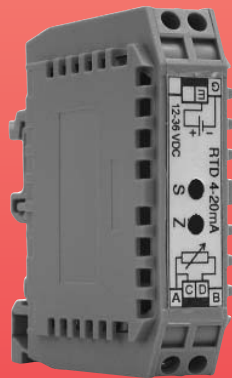
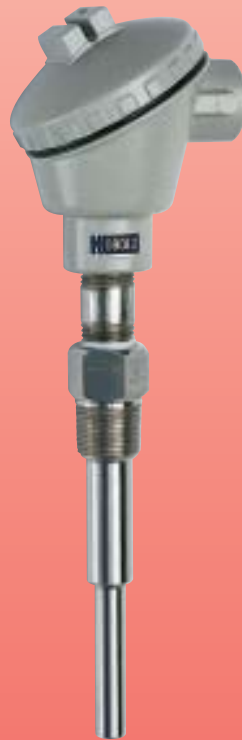
Thermowell O.D.: 0.59"/15 mm

Ordering Information	
Model Number	Process Connection
TSH-2F32NPT	1/2" NPT Male
TSH-2F33NPT	3/4" NPT Male
TSH-2F34NPT	1" NPT Male
TSH-4F32NPT	1 1/16" (18mm) Weld Stub
Note: Specify insertion depth L when ordering	

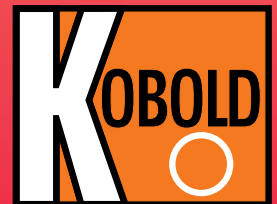


TSR RTD TEMPERATURE PROBES

Model
TSR



- Low Cost
- Rugged Design
- Factory Calibrated
- Tri-Clamp® or NPT Threaded Connections
- 4–20 mA Transmitter Available



TSR RTD TEMPERATURE PROBES

The KOBOLD series TSR employs a resistive thermal device (RTD) to measure process temperature. Utilizing the relationship between resistance and temperature change in metals, RTDs provide a very stable and repeatable output. This makes them well suited for industrial applications which require a high degree of measuring accuracy over a wide range of temperatures. The probes employ a Pt100 RTD element which is hermetically sealed in a 316 stainless steel probe. The TSR is available in an RTD only version or RTD with head-mounted 2-wire 4-20 mA transmitter. NPT or Tri-Clamp® connections are standard.

Specifications

Temperature Range

Normal Range: -58°F to +390°F
Extended Range: -320°F to +1100°F
Maximum Pressure: 1450 PSIG
Wetted Parts: 316 SS

Electrical Specifications

RTD Type: Pt100 Class B per DIN 43670
 $\alpha = 0.00385$
RTD Accuracy: $\pm 0.55^\circ\text{F}$ at 32°F
Temperature Drift: $0.003^\circ\text{F}/^\circ\text{F}$

Connection Housing

Threaded Probes: Aluminum, NEMA 4
Tri-Clamp® Probes: Polypropylene, NEMA 4

Transmitter Specifications

Output: 4-20 mA 2-wire
Supply Voltage: 10-36 VDC
Loop Resistance: $R_{\text{max}} = 50(V_{\text{supply}} + 10)$
Accuracy: $\pm 0.1\%$ of Span
Zero Drift: $\pm 0.025\%/^\circ\text{F}$
Span Drift: $\pm 0.025\%/^\circ\text{F}$

Order Numbers for 1½" Tri-Clamp® RTD Probes

Immersion Depth	Model Number
2½"	TSR-32035
4"	TSR-32040
6"	TSR-32060



KOBOLD TSR RTD Temperature Probes

Order Numbers for Threaded RTD Probes

Immersion Depth	Connection Size NPT		Options
	½"	¾"	
2½"	TSR-12025	TSR-22025	Suffix "-ET" Extended Temperature Range -320 to 1100°F
4½"	TSR-12045	TSR-22045	
6"	TSR-12060	TSR-22060	
7½"	TSR-12075	TSR-22075	
10½"	TSR-12105	TSR-22105	

Order Numbers for RTD Transmitters

Range °F	Transmitter Only	Mounted in RTD Probe
-58 to +120	TSR-8101	TSR-8201
32 to 120	TSR-8102	TSR-8202
32 to 212	TSR-8103	TSR-8203
32 to 400	TSR-8104	TSR-8204
32 to 600	TSR-8105	TSR-8205
32 to 750	TSR-8106	TSR-8206
32 to 1100	TSR-8107	TSR-8207
32 to 1500	TSR-8108	TSR-8208

Non-standard range add model number suffix "-E"
 (Specify desired range when ordering)

RTD thermoelements consist of a 1/4 inch diameter smooth bore measuring probe made of 316 stainless steel. An attached cable connects the thermoelement to the user's data acquisition system or to a signal conditioner to convert the RTD output to a linear analog signal. The cable is available in a variety of materials to match the environmental conditions and temperature measuring requirements. Both the thermoelement and attached cable can be ordered in any length based on the requirements of the application. In addition to the thermoelements, KOBOLD offers a DIN rail mounted analog temperature transmitter providing a complete temperature measurement solution.



Thermoelement Specifications

TSR-100K Series, PVC Cable

RTD Type: Pt-100, 3-wire
 $\alpha=0.00385$
 Measuring Range: -10 to 212°F
 Probe Diameter: 1/4"
 Wire Material: PVC jacketed
 3-conductor,
 22 AWG

TSR-100L Series, Teflon Cable

RTD Type: Pt-100, 3-wire
 $\alpha=0.00385$
 Measuring Range: -58 to 390°F
 Probe Diameter: 1/4"
 Wire Material: Teflon jacketed
 3-conductor,
 22 AWG

TSR-120H Series, Teflon Cable, Temperature Isolated

RTD Type: Pt-100, 3-wire
 $\alpha=0.00385$
 Measuring Range: -320 to 1100°F
 Probe Diameter: 1/4"
 Wire Material: Teflon jacketed
 3-conductor,
 22 AWG

TSR-140H Series, Teflon Cable, Temperature Isolated

RTD Type: Pt-100, 3-wire
 $\alpha=0.00385$
 Measuring Range: -320 to 1100°F
 Probe Diameter: 1/4"
 Wire Material: SS Armored
 Teflon,
 3-conductor,
 22 AWG

Temperature Transmitter Specifications (TSR-9000 Series)

Input Type:	Pt-100 RTD	Open Circuit	
Output:	4-20 mA, 2-wire	Detection:	Current output > 23mA
Power Requirement:	10-36 VDC	Packaging:	DIN Rail, NEMA 1
Accuracy:	0.1% of span	Dimensions	
Zero Drift:	$\pm 0.0025\%/^{\circ}\text{F}$	(L x W x H):	2.50" x .71" x 2.44"
Span Drift:	$\pm 0.0025\%/^{\circ}\text{F}$		

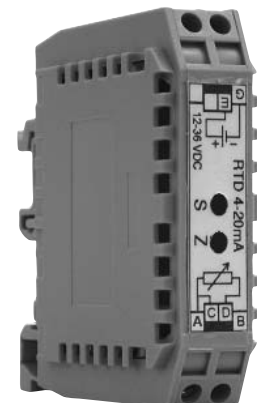
TSR Thermoelement Ordering Information

Part Number	Description
TSR-100KS3450	PVC cable, -10 to 212°F
TSR-100LS3450	Teflon cable, -58 to 390°F
TSR-120HS3450	Teflon cable, -320 to 1100°F
TSR-140HS3450	SS armored cable, -320 to 1100°F
Accessories	
TSR-FT44FH4BZSS	1/4" 316 SS bore through compression fitting x 1/4" NPT male
TSR-FT48FH4BZSS	1/4" 316 SS bore through compression fitting x 1/2" NPT male

***When ordering, specify desired cable and probe length.**

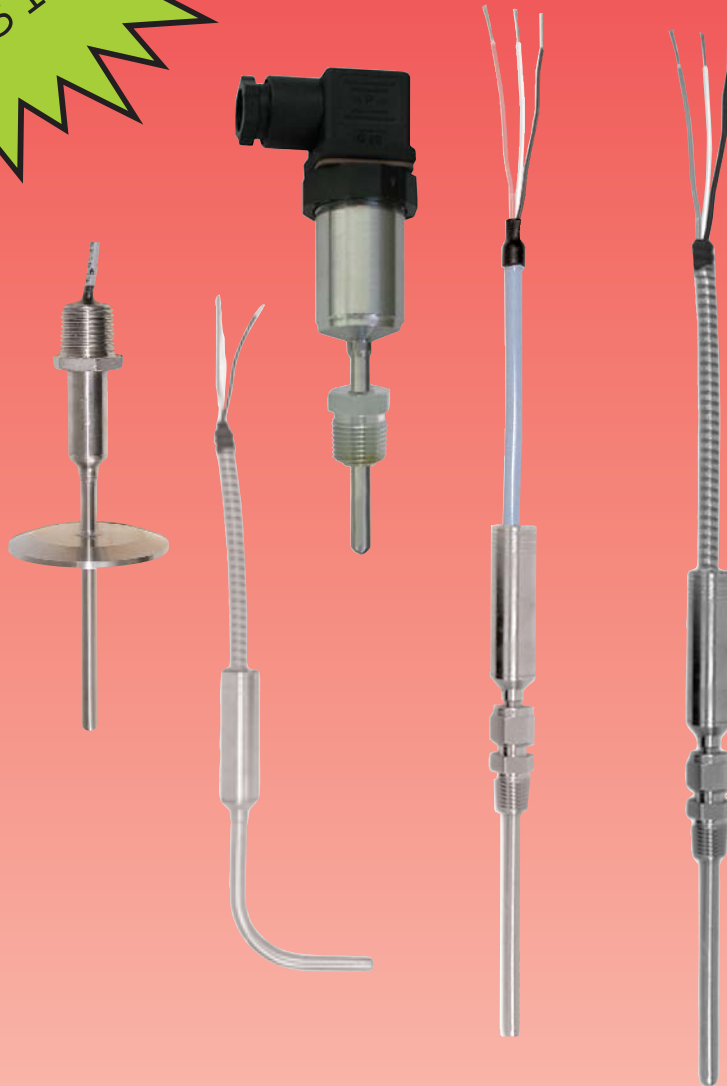
TSR DIN Rail Transmitter Ordering Information

Part Number	Description
TSR-9101	-58 to 120°F
TSR-9102	32 to 120°F
TSR-9103	32 to 212°F
TSR-9104	32 to 400°F
TSR-9105	32 to 600°F
TSR-9106	32 to 750°F
TSR-9107	32 to 1100°F
Non-standard range, add suffix "-E", specify desired range.	

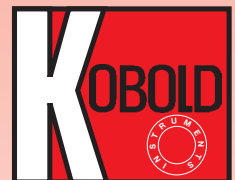


TST INTEGRATED TEMPERATURE TRANSMITTER

Model
TST



- Factory calibrated
- Low cost and easy installation
- Microprocessor based design
- Compact size and hermitically sealed
- Field calibrate or re-span via PC interface
- RTD sensor outputs linearized 4-20 mA signal



TST INTEGRATED TEMPERATURE TRANSMITTER

- 4-20 mA transmitter integrated into temperature sensor
- Hermetically sealed electronics
- Easily re-programmable via PC or factory calibrated
- Low cost and easy installation
- Highly stable and accurate microprocessor based design

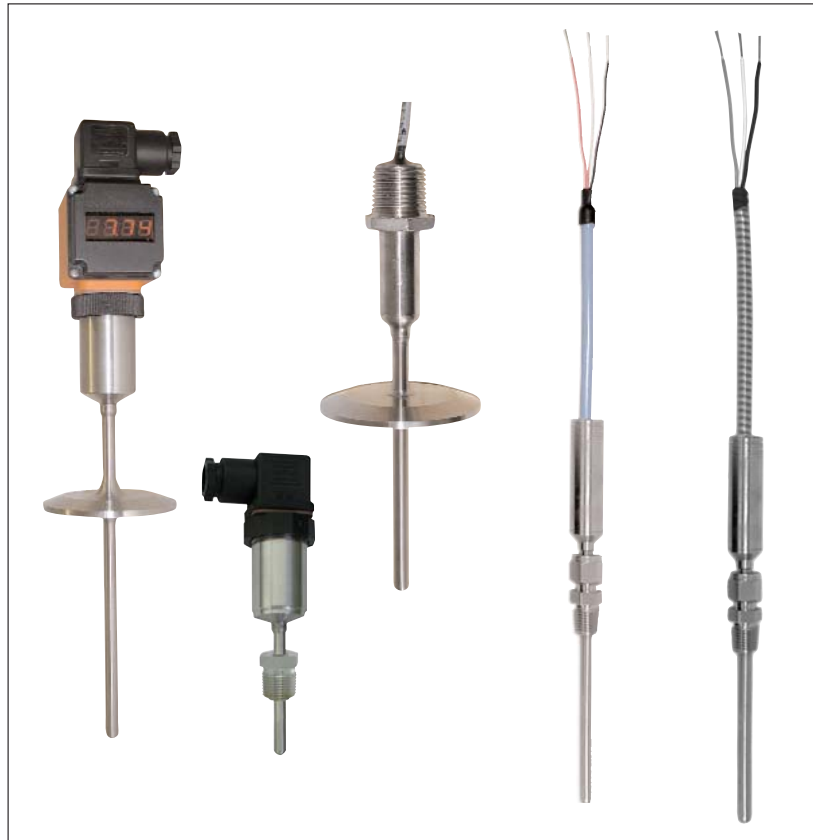
The TST series integrated temperature transmitter is one of the most advanced designs in the market today. The transmitter section is integrated and hermetically sealed into the head of the sensor. For this reason, the TST does not require a separate transmitter housing. The micro-miniature transmitter assembly fits into a low profile socket which is only 2 inches long!

Calibration and re-calibration

The TST comes factory calibrated to a standard measuring range or any customer specified range. The unique feature of the hermetically sealed transmitter is that it is able to be calibrated in the field, using a cable and Windows™ compatible software package. Temperature range, temperature offset, burnout options and other features can be selected without the need for recalibration. Of course, software also allows for calibration features. The ability to field calibrate a sealed integrated temperature transmitter is the place where the TST leaves the competition behind.

Industrial and Sanitary Versions

The TST is available in either NPT threaded or Tri-clamp versions. Special finishes for food and dairy industry are standard. The hermetically sealed transmitter and external cables will withstand the harshest washdowns.



TST Series Integrated Temperature Transmitter

Specifications

Available Measuring Ranges: -58 to 120°F to 0 to 1100°F

Maximum Pressure
Threaded Version: 1500 PSIG
Tri-clamp Version: 500 PSIG

Measuring Probe
Material: 316 stainless steel
Probe Finish: Ra 32 compliant with 3A standard 09-08 #4 finish
Cable Materials: PVC, teflon or stainless steel armored teflon
RTD Type: Pt-100, class B, $\alpha=0.00385$

Electrical Specifications

Output Type: 4-20 mA 2-wire
Power Requirement: 9-30 VDC loop powered

Max. Loop Resistance: 50(V_{supply} + 10)

Accuracy: ±0.1% of Span

Zero Drift: ±0.025%/°F

Span Drift: ±0.025%/°F

Ambient Temperature Range: -40 to 158°F

Electrical Connection Standard: 6 ft. jacketed cable

Optional: DIN 43650, Hirschmann Plug or 6 ft. jacketed cable with 1/2" NPT conduit hub

Electrical Protection: NEMA 6P

TST INTEGRATED TEMPERATURE TRANSMITTER

TST Ordering Information

TST = Integrated Temperature Transmitter

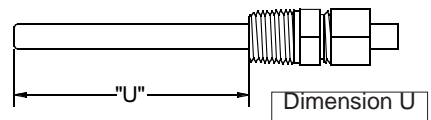
Fitting Style

- A2** = 1/4" NPT, Adjustable Probe Immersion Depth
- A4** = 1/2" NPT, Adjustable Probe Immersion Depth
- F2** = 1/4" NPT, Fixed Probe Immersion Depth
- F4** = 1/2" NPT, Fixed Probe Immersion Depth
- T15** = 1-1/2" Tri-Clamp
- T2** = 2" Tri-Clamp
- T25** = 2-1/2" Tri-Clamp
- T3** = 3" Tri-Clamp

Immersion Depth

Available Immersion Depth (see dimension U)

- 025** = 2.5" **012** = 12"
- 040** = 4" **018** = 18"
- 060** = 6" **024** = 24"
- 090** = 9" **EP** = Custom Immersion Depth, Specify Depth When Ordering



Cable

- PV** = 6 Foot PVC Jacketed (220°F Max. Process Temperature)
- TF** = 6 Foot Teflon Jacketed
- TA** = 6 Foot 316 SS Armored
- TB** = 6 Foot 316 SS Braided
- 0** = None (use if specifying option -H below)

Range

Available Measuring Ranges

- 02** = 0-120°F **12** = 0-750°F
- 04** = 0-200°F **14** = 0-950°F
- 06** = 0-300°F **16** = 0-1100°F
- 08** = 0-400°F **18** = -58 to 120°F
- 10** = 0-500°F **E** = Custom Scaling, Specify Desired Range

Options

- C** = 1/2" NPT conduit hub
- H** = DIN 43650 Hirschmann Plug in Place of Cable
- EC** = Extended cable length, specify length with order

TST - A4 - 040 - PV - 06 - C Example TST Part Number

Accessory Item - Field Calibration Kit includes: 9-pin serial cable, 110 VAC Power-pack and Windows™ Compatible Software: Part Number TST-PKIT