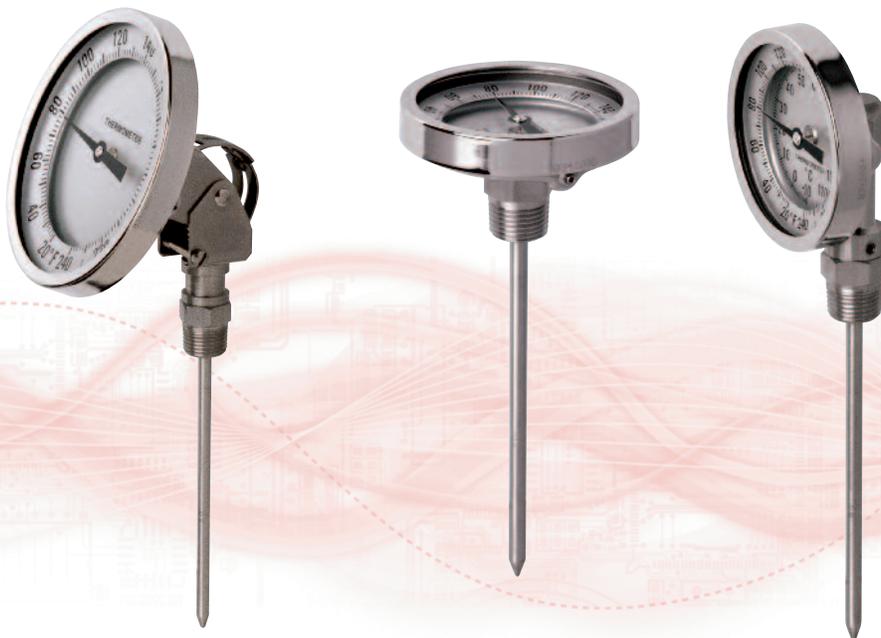


BTG SERIES
Bimetal Thermometers



Manufacturer of Superior Quality Instrumentation



Design Characteristics

Case and Bezel

- 304 stainless steel standard
- 316 stainless steel optional
- All external parts corrosion resistant to most chemicals
- Parts designed for maximum strength to meet requirements of heavy duty industrial applications
- Manufactured with precision tooling on modern OSHA approved stamping equipment
- Statistical Process Control QA methods used to assure component quality and process consistency
- Polished finish identifies Intempco quality
- Cases may be silicone filled for additional dampening of extreme vibration, or to assure consistent performance in low process temperature/high environmental humidity applications

Tagging

- Available for QA tracking or for customer reference information

Hermetic Seal

- Case/Bezel assembly is a precision interference fit
- Silicone gasket provides dustproof and leakproof seal
- Welded construction-Unique 360° TIG weld joins case, stem and threaded connection
- Testing conforms with ASME B40.3 procedures

Threaded Connection

- 304 stainless steel standard
- 316 stainless steel optional
- Precision manufactured on Intempco CNC machines

Lens

- Extra heavy duty instrument glass standard
- Shatterproof glass, tempered glass, and plastics optional

Pointer

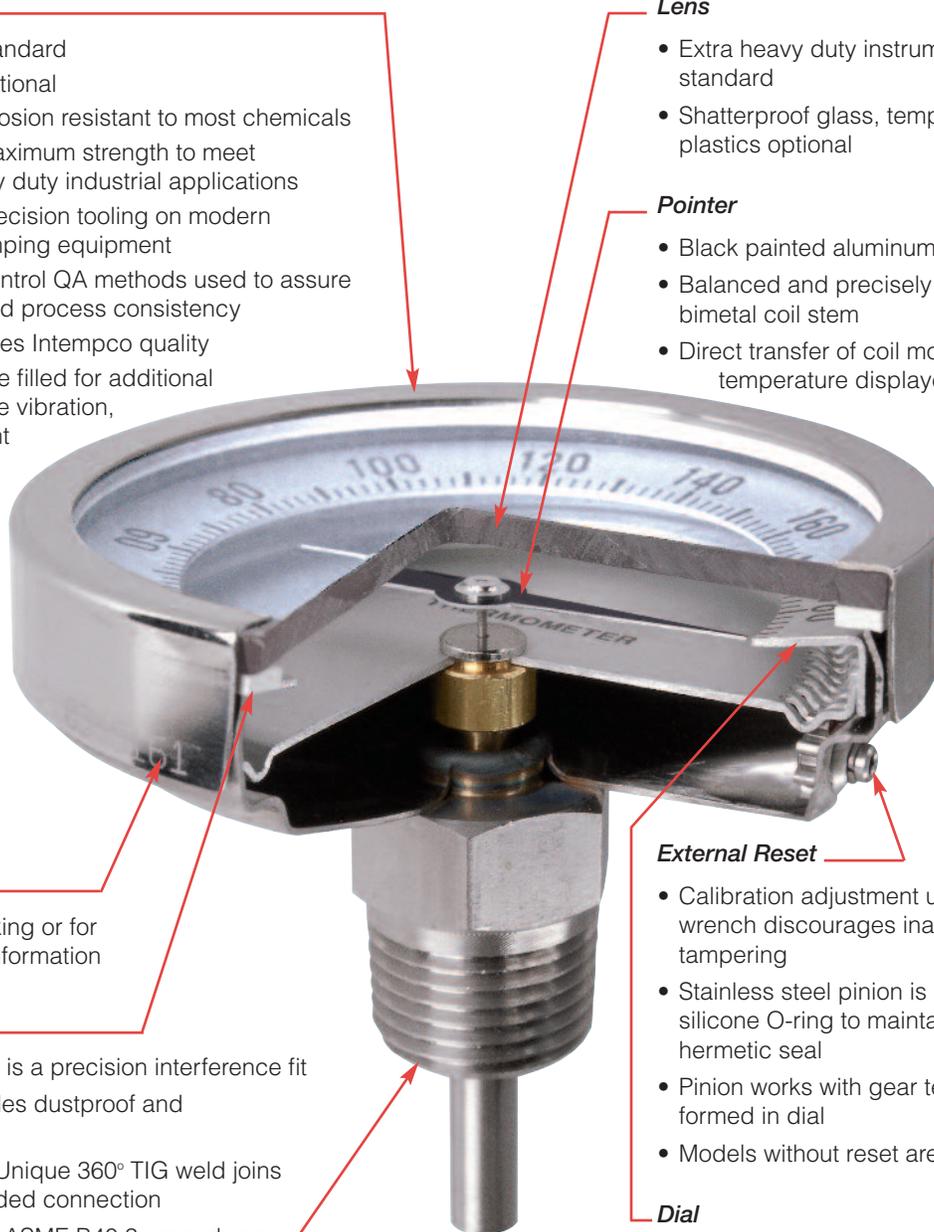
- Black painted aluminum
- Balanced and precisely assembled to bimetal coil stem
- Direct transfer of coil movement to temperature displayed on dial

External Reset

- Calibration adjustment using an Allen wrench discourages inadvertent tampering
- Stainless steel pinion is sealed with a silicone O-ring to maintain integrity of hermetic seal
- Pinion works with gear teeth cut and formed in dial
- Models without reset are available

Dial

- True anti-parallax dial on 3", 4", 5" models
- Graduations on dial ring are on the same plane as the pointer tip minimizing reading error
- Concave design of dial ring enhances readability
- White appearing anodized aluminum, .032" thick
- Graduations for each temperature range are calculated to match deflection data of bimetallic material
- Large easy to read black numerals and graduations are printed on precision pad printing equipment



Design Characteristics

Bimetal Coil

- Super sensitive bimetallic helix coil
- Fabricated to tight tolerances
- Heat treated for stress relief
- Silicone coated to minimize pointer vibration and maximize heat transfer and response time
- Angular deflection of each coil is tested for perfect match with dial graduation layouts in precision calibration baths designed and built by Intempco with accuracy to $\pm 0,1^{\circ}\text{C}$

Accuracy

- Per ASME B40.3 Grade A $\pm 1\%$ full span is guaranteed
- Calibration is to standards traceable to National Institute of Standards and Testing (NIST)
- Intempco methods :
 - Most careful and precise in the industry
 - Produces typical accuracy better than ASME B40.3 Grade AA (1%-1/2%-1%) full span

Bimetal Bushing

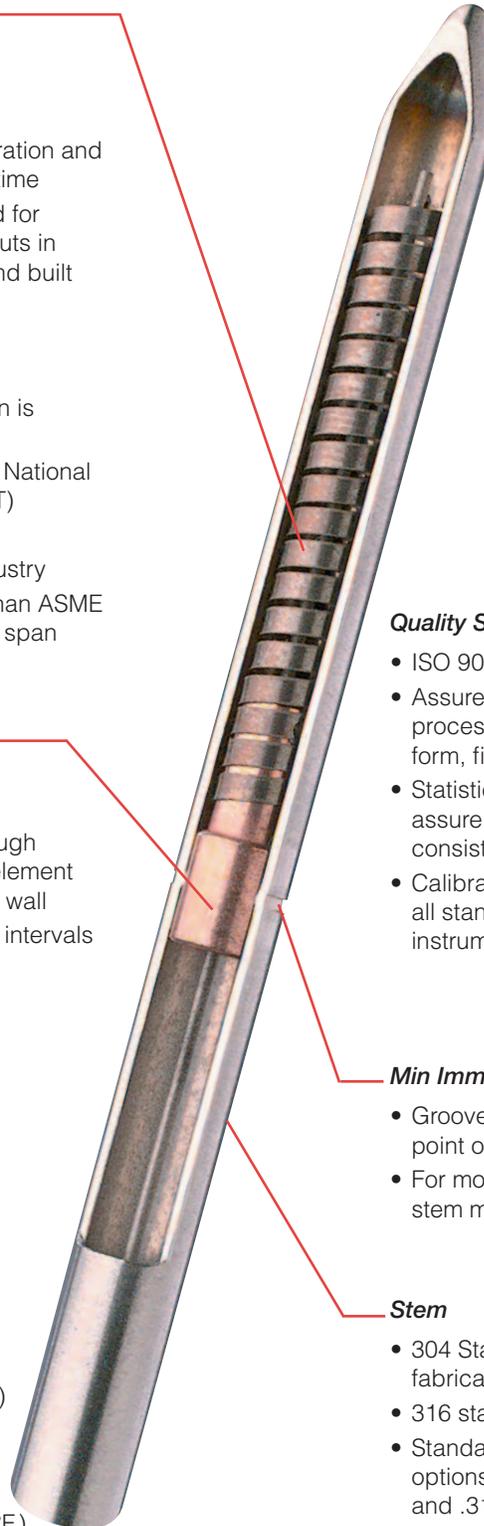
- Pressed into groove on stem
- Centers coil in stem
- 302 stainless steel stem wire goes through center of bushing connecting bimetal element to pointer, minimizes coil touching tube wall
- Centering bearings are used at regular intervals on long stem thermometers

Temperature Ranges

- 20 Standard Celsius ranges from -75° to 550°
- 20 Standard Fahrenheit ranges from -100° to 1000°
- 13 Standard Dual scale ranges :
 $^{\circ}\text{F}$ external scale, $^{\circ}\text{C}$ internal scale
- Availability of over 120 ranges developed, may vary by dial size

Over Temperature limits

- 100% : For ranges up to 121°C (250°F)
- 50% : For ranges 121°C to 289°C (250°F to 550°F)
- For ranges 289°C to 538°C (550°F to 1000°F) : Up to 427°C (800°F) for continuous use, intermittent use over 427°C (800°F)



Quality System

- ISO 9000 comparable
- Assures that all materials, methods and processes meet Intempco's highest standards for form, fit, and function
- Statistical Process Control QA methods used to assure component quality and process consistency
- Calibration lab for NIST traceable verification of all standard thermometers and measuring instruments used in manufacturing process

Min Immersion Indicator

- Groove around stem shows minimum immersion point on each thermometer
- For most accurate reading sensitive portion of stem must be completely immersed

Stem

- 304 Stainless steel tubing is welded/drawn and fabricated to exacting tolerances
- 316 stainless steel optional
- Standard stem diameter is $0.250''$ (6.35mm) – options include $.375''$ (9.52mm), $0.236''$ (6mm) and $.315''$ (8mm)
- Stem lengths available from $21/2''$ to $120''$
- Tip is welded and finished for hermetic seal and unique look

Selecting Your Thermometer

Considerations when selecting bimetal thermometers :

MATERIALS

- Application: Continuous process flow, static tank, or laboratory testing etc.
- Environmental conditions: Ambient temperature, humidity, or corrosive atmosphere (salt spray etc.)
- Process conditions: Pressure, temperature, media viscosity, rate of flow, and possible vibration
- Wetted material of thermometer compatible with measured medium?
- Window material?

MODEL TYPE

- Dial size
- Location of fitting connection for maximum readability when thermometer is installed in system– Back, adjustable angle, bottom, top, right side or left side connection location
- Fitting thread size and type

STEM

- Pipe size or depth of tank
- Immersion length required
- Stem length
- Stem diameter

TEMPERATURE RANGE

- Operating temperature of process: High and low
- Overall temperature range required: High and low
- Over-Range possibilities: Minimum and maximum
- Accuracy required
- External reset required
- Scale : °F, °C or dual
- Bimetal thermometers should not be used continuously over 427°C (800°F)

OPTIONS AND ACCESSORIES

- Thermowell
- Silicone filling
- Minimum and/or maximum indicating pointers
- Custom or special dial marking or colors
- Fitting type: Standard threaded, Union, Standard bushing
- Sliding compression fittings– male or female
- Thread size adapters
- Tagging

Safety and applications considerations :

- Use of a thermowell is recommended for pressure, corrosive fluid or high velocity applications.
- Use of a thermowell allows removal of thermometer for calibration check or interchange of instruments without shutting down the process.
- Install thermometers in locations that minimize injury or damage in the event of an accidental breach of stem/thermowell combination.
- Cases may be silicone filled for additional dampening of extreme vibration, or to assure consistent performance in low process temperature/high environmental humidity applications.
- Silicone filled thermometers are limited for use with process temperatures ranging from a minimum of -43°C (-50°F) to a maximum of 260°C (500°F).
- Use of silicone fill should be avoided where strong oxidizing agents such as oxygen, chlorine, nitric acid, and hydrogen peroxide are present.
- Bimetal thermometers should not be exposed continuously to process temperatures over 425°C (800°F) to avoid damaging the bimetal element.
- For 2 1/2" stem industrial thermometers:
 - The connection nut should be immersed or in contact with the process media for most accurate reading.
 - When used with limited space thermowells some reading error may be noticed depending on process and ambient temperatures.
- Operating conditions – It is recommended the temperature of the thermometer head not exceed 149°C (300°F)
- Maximum recommended temperature limit for optional lens materials:

Acrylic plastic

- 82°C (180°F)
- Fair chemical resistance but limited temperature range

Polycarbonate plastic

- 132°C (270°F)
- Higher temperature limit than acrylic but poor chemical resistance

Shatterproof laminated safety glass

- 93°C (200°F)
- High corrosion resistance
- Plastic laminate between two pieces of glass will hold fragments in place if broken but laminate will start to deteriorate above 93°C (200°F)

Tempered glass

- Improved to withstand a broad range of temperature changes
- More impact resistant than regular glass

Recommendations for Checking the Calibration of Bimetal Thermometers

Use of a MASTER THERMOMETER, at least as accurate as a bimetal thermometer, is recommended for making comparisons. For best results, use a precision ASTM type mercury-in-glass thermometer certified directly traceable to NIST. Immersion of the bimetal thermometer stem into the medium must be at least up to the groove on the stem to assure that the entire bimetal coil is immersed.

- In some short stem industrial thermometers, the groove may be hidden by the threaded connection; the entire stem and thread should be immersed in this case.

Calibration Test Equipment Considerations :

Check the stability and accuracy specifications of this instrumentation, and cross-check the read-outs with NIST traceable mercury in glass thermometers. Make certain the test instrument is stabilized at the reading point as initial insertion of thermometer stem into bath/dry block can sometimes have a short-term affect on test device stability.

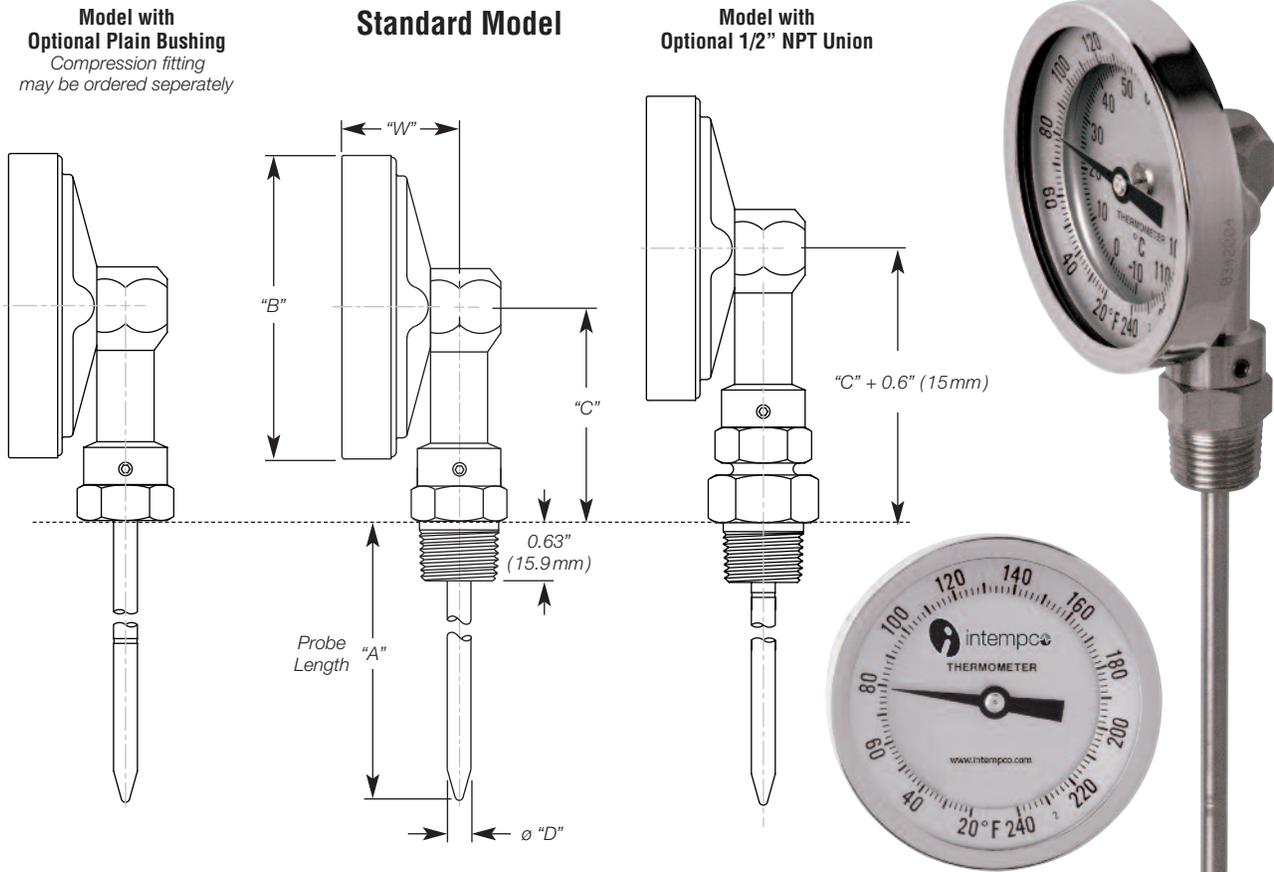
- Take reading of Bimetal Thermometer when the pointer has stabilized and stopped moving. Typical immersion time may vary from approximately 1 to 3 minutes depending on type of thermometer, temperature point and calibration test equipment used.

Use of a laboratory grade CONSTANT TEMPERATURE BATH, with agitation to provide uniform temperature throughout, is recommended.

- Controls and read-out (if provided) should be properly calibrated and at least as accurate as the bimetal thermometer being tested.
- Confirm upper and lower limits of bath operating range as accuracy and stability may not be as consistent at those points.

If using a DRY BLOCK calibration device consider:

- The hole into which thermometer is inserted should allow for minimal air space around stem.
- The temperature profile of the "hole" may affect the reading of the tested bimetal thermometer - if the heat source is only at the bottom of hole or is not uniform over the length of the bimetal coil. This is compounded with short stem thermometers.



Head Diameter	"W"	"B"	"C"
3"	1.19" (30.2mm)	3.19" (81.0mm)	2.30" (58.4mm)
4"	1.19" (30.2mm)	4.12" (104.5mm)	3.00" (76.2mm)
5"	1.63" (41.3mm)	5.04" (128.0mm)	3.00" (76.2mm)

Specifications

Stem Lengths :	2.5", 4", 6", 9", 12", 15" and 24" are standard (available up to 120")
Stem Diameter :	0.250" for "U" ≤ 42", 0.375" for "U" > 42"
Connection :	1/2" NPT standard
Construction :	304 stainless steel external parts. Welded construction. SS316 available Corrosion resistant to most chemicals.
Hermetic Seal :	Per ASME B40.3 dusproof and leakproof
Dial :	True Anti-Parallax dial, easy-to-read from any angle, minimizes reading errors. Anodized aluminum with large black numbers and graduations.
Lens :	Glass standard
Bimetal Coil :	Helix coil is silicone coated on ranges below 500°F for vibration dampening and to maximize heat transfer and response time.
Accuracy :	± 1% of full span per ASME B40.3 Grade A
Calibration Feature :	Standard on BTG01 Series
External Reset :	Easy to calibrate by inserting Allen wrench into reset opening
Over Temperature Limits :	<ul style="list-style-type: none"> • 100% : For ranges up to 121°C (250°F) • 50% : For ranges 121°C to 289°C (250°F to 550°F) • For ranges 289°C to 538°C (550°F to 1000°F): up to 427°C (800°F) for continuous use, intermittent use over 427°C (800°F)

Custom Builder

MODEL 1 2 3 4 5 6 7 8

BTG01 - - - - - - - -

BOX1 CODE	Single Scale Deg. C		BOX1 CODE	Single Scale Deg. F		BOX1 CODE	Dual Scale Deg. F/C	
	Celcius	%Div.		Farenheit	%Div.		Celcius	Farenheit
87	-75/175	5°	51	-100/100	2°	01	-75/40	-100/100
EA	-70/70	1°	52	-50/120	2°	02	-40/70	-40/160
71	-50/100	1°	53	-40/160	2°	13	-18/60	0/140
72	-50/25	1°	54	0/140	1°	03	-18/82	0/180
73	-50/50	1°	55	0/180	2°	04	-10/100	0/220
84	-40/70	1°	50	0/200	2°	14	-20/120	0/250
86	-20/120	1°	56	0/220	2°	05	-10/110	20/240
74	-10/110	1°	67	0/250	2°	06	-5/50	25/125
75	0/50	1/2°	57	0/300	5°	07	10/150	50/300
95	0/60	1°	58	0/500	10°	08	0/200	50/400
EI	0/80	1/2°	59	20/240	2°	09	10/260	50/500
76	0/100	1°	60	25/125	1°	10	50/400	150/750
77	0/150	1°	61	50/250	2°	11	100/550	200/1000
78	0/200	2°	62	50/300	2°			
79	0/250	2°	63	50/400	5°			
80	0/300	5°	64	50/500	5°			
81	0/400	5°	68	50/550	5°			
90	0/450	5°	44	100/800	10°			
82	100/400	5°	65	150/750	10°			
83	100/550	5°	66	200/1000	10°			

BOX4 CODE	Probe Length "A"
025	2.5" (64 mm)
040	4" (102 mm)
060	6" (152 mm)
090	9" (229 mm)
120	12" (305 mm)
150	15" (381 mm)
180	18" (457 mm)
240	24" (610 mm)

BOX5 CODE	Fitting Type
EN	1/2" NPT (Standard)
ER	R 1/2" (BSPT)
CN	1/4" NPT
U20	1/2" NPT Union
N	Straight Bushing*

* Optional compression fitting ordered seperately

BOX6 CODE	Lens Material
GL	Glass (Standard)
GS	Glass, Shatterproof
GT	Glass, Tempered
PA	Plastic, Acrylic
PP	Plastic, Polycarbonate

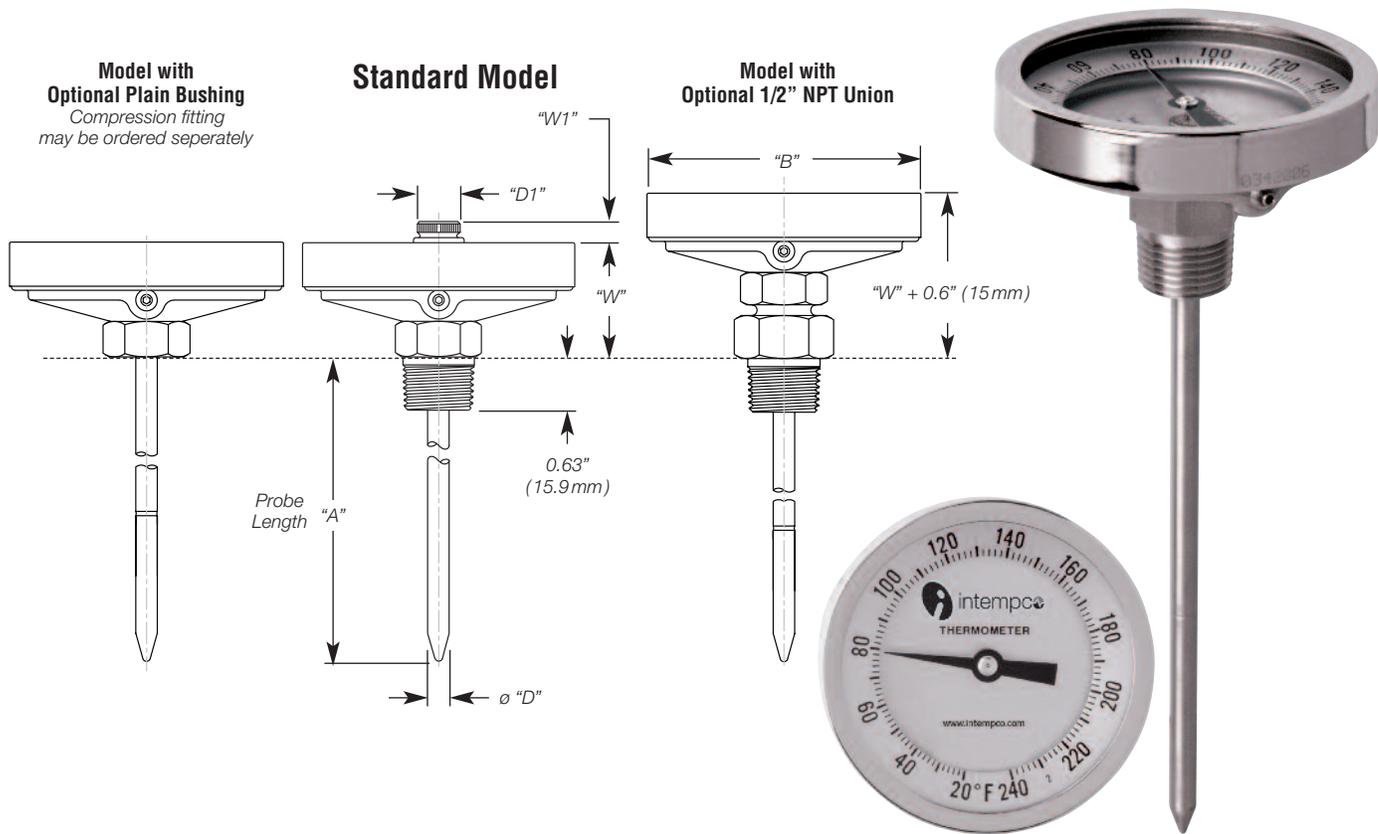
BOX7 CODE	Calibration Certificate
N	None
C1	Calibration certificate, NIST tracable, 1 point, 0°C (32°F)
C2	Calibration certificate, NIST tracable, 2 points, 0.0°C (32.0°F) & 100.0°C (212.0°F)
C3	Calibration certificate, NIST tracable, specify 3-points

BOX8 CODE	Additional Option
-	None, leave blank
SL	Silicone filled (requires polycarbonate lens, code PP)
WS	316SS, wetted parts

BOX2 CODE	Head Diameter	Mounting Position
3B	3"	Bottom (std.)
3T		Top
3R		Right
3L	Left	
4B	4"	Bottom (std.)
4T		Top
4R		Right
4L	Left	
5B	5"	Bottom (std.)
5T		Top
5R		Right
5L	Left	

Position available

BOX3 CODE	Probe Dia. "D"
D	0.250" (6.35 mm), standard
6	0.236" (6 mm)
8	0.315" (8 mm)
F	0.375" (9.5 mm)



Models with Optional Limit Indicator						
		Min. or Max.		Min. and Max.		
Head Diameter	"W"	"B"	"W1"	"D1"	"W1"	"D1"
3"	1.38" (34.9mm)	3.19" (81.0mm)	0.50" (12.7mm)	0.28" (7.0mm)	0.63" (15.9mm)	0.44" (11.1mm)
4"	1.38" (34.9mm)	4.12" (104.5mm)	N/A	N/A	N/A	N/A
5"	1.72" (43.7mm)	5.04" (128.0mm)	0.50" (12.7mm)	0.28" (7.0mm)	0.63" (15.9mm)	0.44" (11.1mm)

Specifications

Stem Lengths :	2.5", 4", 6", 9", 12", 15" and 24" are standard (available up to 120")
Stem Diameter :	0.250" for "U" ≤ 42", 0.375" for "U" > 42"
Connection :	1/2" NPT standard
Construction :	304 stainless steel external parts. Welded construction. SS316 available Corrosion resistant to most chemicals.
Hermetic Seal :	Per ASME B40.3 dusproof and leakproof
Dial :	True Anti-Parallax dial, easy-to-read from any angle, minimizes reading errors. Anodized aluminum with large black numbers and graduations.
Lens :	Glass standard
Bimetal Coil :	Helix coil is silicone coated on ranges below 500°F for vibration dampening and to maximize heat transfer and response time.
Accuracy :	± 1% of full span per ASME B40.3 Grade A
Calibration Feature :	Optional on BTG02 Series
External Reset :	On model with calibrate feature, easy to calibrate by inserting Allen wrench into reset opening
Over Temperature Limits :	<ul style="list-style-type: none"> • 100% : For ranges up to 121°C (250°F) • 50% : For ranges 121°C to 289°C (250°F to 550°F) • For ranges 289°C to 538°C (550°F to 1000°F): up to 427°C (800°F) for continuous use, intermittent use over 427°C (800°F)

Custom Builder

MODEL 1 2 3 4 5 6 7 8

BTG02 - - - - - - - - -

BOX1 CODE	Single Scale Deg. C		BOX1 CODE	Single Scale Deg. F		BOX1 CODE	Dual Scale Deg. F/C	
	Celcius	%/Div.		Farenheit	%/Div.		Celcius	Farenheit
87	-75/175	5°	51	-100/100	2°	01	-75/40	-100/100
EA	-70/70	1°	52	-50/120	2°	02	-40/70	-40/160
71	-50/100	1°	53	-40/160	2°	13	-18/60	0/140
72	-50/25	1°	54	0/140	1°	03	-18/82	0/180
73	-50/50	1°	55	0/180	2°	04	-10/100	0/220
84	-40/70	1°	50	0/200	2°	14	-20/120	0/250
86	-20/120	1°	56	0/220	2°	05	-10/110	20/240
74	-10/110	1°	67	0/250	2°	06	-5/50	25/125
75	0/50	1/2°	57	0/300	5°	07	10/150	50/300
95	0/60	1°	58	0/500	10°	08	0/200	50/400
EI	0/80	1/2°	59	20/240	2°	09	10/260	50/500
76	0/100	1°	60	25/125	1°	10	50/400	150/750
77	0/150	1°	61	50/250	2°	11	100/550	200/1000
78	0/200	2°	62	50/300	2°			
79	0/250	2°	63	50/400	5°			
80	0/300	5°	64	50/500	5°			
81	0/400	5°	68	50/550	5°			
90	0/450	5°	44	100/800	10°			
82	100/400	5°	65	150/750	10°			
83	100/550	5°	66	200/1000	10°			

BOX2 CODE	Head Diameter	Features
3	3"	Standard model
3A		Calibration adjustment
3B		Calibration adjustment with Min. or Max. indicator
3C		Calibration adjustment with Min. and Max. indicator
4	4"	Standard model
4A		Calibration adjustment
5	5"	Standard model
5A		Calibration adjustment
5B		Calibration adjustment with Min. or Max. indicator
5C		Calibration adjustment with Min. and Max. indicator

BOX3 CODE	Probe Dia. "D"
D	0.250" (6.35 mm), standard
6	0.236" (6 mm)
8	0.315" (8 mm)
F	0.375" (9.5 mm)

BOX4 CODE	Probe Length "A"
025	2.5" (64 mm)
040	4" (102 mm)
060	6" (152 mm)
090	9" (229 mm)
120	12" (305 mm)
150	15" (381 mm)
180	18" (457 mm)
240	24" (610 mm)

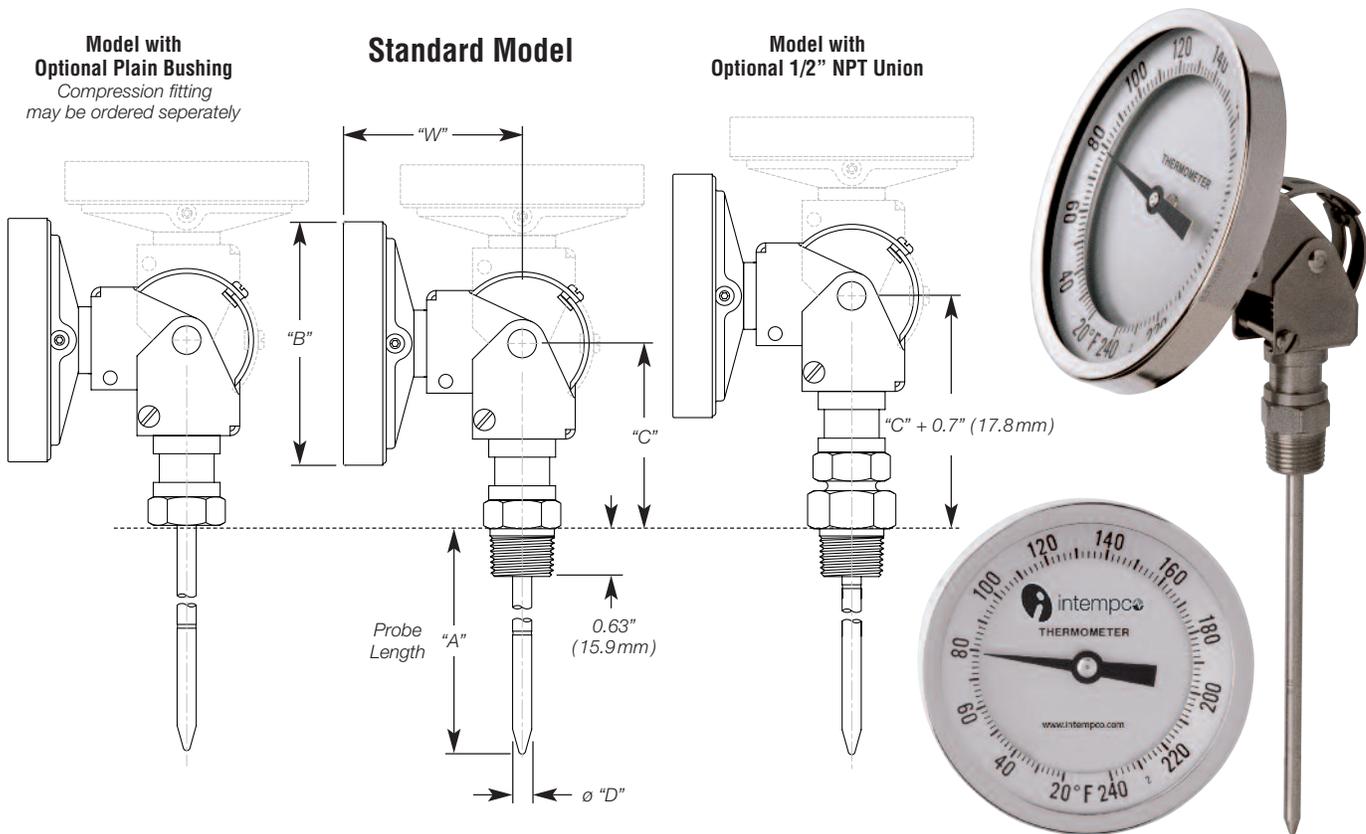
BOX5 CODE	Fitting Type
EN	1/2" NPT (Standard)
ER	R 1/2" (BSPT)
CN	1/4" NPT
U20	1/2" NPT Union
N	Straight Bushing*

* Optional compression fitting ordered separately

BOX6 CODE	Lens Material
GL	Glass (Standard)
GS	Glass, Shatterproof
GT	Glass, Tempered
PA	Plastic, Acrylic
PP	Plastic, Polycarbonate

BOX7 CODE	Calibration Certificate
N	None
C1	Calibration certificate, NIST traceable, 1 point, 0°C (32°F)
C2	Calibration certificate, NIST traceable, 2 points, 0.0°C (32.0°F) & 100.0°C (212.0°F)
C3	Calibration certificate, NIST traceable, specify 3-points

BOX8 CODE	Additional Option
-	None, leave blank
SL	Silicone filled (requires polycarbonate lens, code PP)
WS	316SS, wetted parts
SS	All 316SS (3" and 5" head dia. only)



Head Diameter	"W"	"B"	"C"
3"	2.43" (61.7 mm)	3.19" (81.0 mm)	2.02" min. (51.3 mm)
4"	2.43" (61.7 mm)	4.12" (104.5 mm)	2.02" min. (51.3 mm)
5"	2.66" (67.6 mm)	5.04" (128.0 mm)	2.02" min. (51.3 mm)

Specifications

Stem Lengths :	2.5", 4", 6", 9" 12", 15" and 24" are standard (available up to 120")
Stem Diameter :	0.250" for "U" ≤ 42", 0.375" for "U" > 42"
Connection :	1/2" NPT standard
Construction :	304 stainless steel external parts. Welded construction. SS316 available Corrosion resistant to most chemicals.
Hermetic Seal :	Per ASME B40.3 dusproof and leakproof
Harness :	All stainless steel brackets with screws that loosen to allow 360° rotation of head and 180° adjustment of stem position
Bellows :	Heavy-duty flexible stainless steel. Hermetically sealed at case and connection. Protects mechanism that transfers temperature change from bimetal coil to pointer
Dial :	True Anti-Parallax dial, easy-to-read from any angle, minimizes reading errors. Anodized aluminum with large black numbers and graduations.
Lens :	Glass standard
Bimetal Coil :	Helix coil is silicone coated on ranges below 500°F for vibration dampening and to maximize heat transfer and response time.
Accuracy :	± 1% of full span per ASME B40.3 Grade A
Calibration Feature :	Standard on BTG03 Series
External Reset :	Easy to calibrate by inserting Allen wrench into reset opening
Over Temperature Limits :	<ul style="list-style-type: none"> • 100% : For ranges up to 121°C (250 °F) • 50% : For ranges 121°C to 289 °C (250 °F to 550 °F) • For ranges 289 °C to 538 °C (550 °F to 1000 °F): up to 427 °C (800 °F) for continuous use, intermittent use over 427 °C (800 °F)

Custom Builder

MODEL 1 2 3 4 5 6 7 8

BTG03 - - - - - - - -

BOX1 CODE	Single Scale Deg. C		BOX1 CODE	Single Scale Deg. F		BOX1 CODE	Dual Scale Deg. F/C	
	Celcius	°/Div.		Farenheit	°/Div.		Celcius	Farenheit
87	-75/175	5°	51	-100/100	2°	01	-75/40	-100/100
EA	-70/70	1°	52	-50/120	2°	02	-40/70	-40/160
71	-50/100	1°	53	-40/160	2°	13	-18/60	0/140
72	-50/25	1°	54	0/140	1°	03	-18/82	0/180
73	-50/50	1°	55	0/180	2°	04	-10/100	0/220
84	-40/70	1°	50	0/200	2°	14	-20/120	0/250
86	-20/120	1°	56	0/220	2°	05	-10/110	20/240
74	-10/110	1°	67	0/250	2°	06	-5/50	25/125
75	0/50	1/2°	57	0/300	5°	07	10/150	50/300
95	0/60	1°	58	0/500	10°	08	0/200	50/400
EI	0/80	1/2°	59	20/240	2°	09	10/260	50/500
76	0/100	1°	60	25/125	1°	10	50/400	150/750
77	0/150	1°	61	50/250	2°	11	100/550	200/1000
78	0/200	2°	62	50/300	2°			
79	0/250	2°	63	50/400	5°			
80	0/300	5°	64	50/500	5°			
81	0/400	5°	68	50/550	5°			
90	0/450	5°	44	100/800	10°			
82	100/400	5°	65	150/750	10°			
83	100/550	5°	66	200/1000	10°			

BOX2 CODE	Head Diameter	Mounting Position
3A	3"	Adjustable
4A	4"	Adjustable
5A	5"	Adjustable

BOX3 CODE	Probe Dia. "D"
D	0.250" (6.35 mm), standard
6	0.236" (6 mm)
8	0.315" (8 mm)
F	0.375" (9.5 mm)

BOX4 CODE	Probe Length "A"
025	2.5" (64 mm)
040	4" (102 mm)
060	6" (152 mm)
090	9" (229 mm)
120	12" (305 mm)
150	15" (381 mm)
180	18" (457 mm)
240	24" (610 mm)

BOX5 CODE	Fitting Type
EN	1/2" NPT (Standard)
ER	R 1/2" (BSPT)
CN	1/4" NPT
U20	1/2" NPT Union
N	Straight Bushing*

* Optional compression fitting ordered seperately

BOX6 CODE	Lens Material
GL	Glass (Standard)
GS	Glass, Shatterproof
GT	Glass, Tempered
PA	Plastic, Acrylic
PP	Plastic, Polycarbonate

BOX7 CODE	Calibration Certificate
N	None
C1	Calibration certificate, NIST tracable, 1 point, 0°C (32°F)
C2	Calibration certificate, NIST tracable, 2 points, 0.0°C (32.0°F) & 100.0°C (212.0°F)
C3	Calibration certificate, NIST tracable, specify 3-points

BOX8 CODE	Additional Option
-	None, leave blank
SL	Silicone filled (requires polycarbonate lens, code PP)
WS	316SS, wetted parts
SS	All 316SS (5" head dia. only)