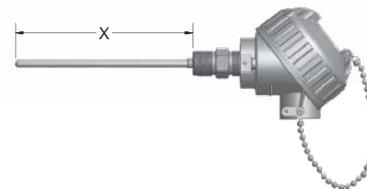
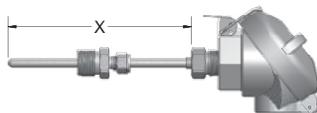


# SENSORS WITH CONNECTION HEADS

## Configuration Code GP01 Fixed-Sheath RTD Assemblies with General-Purpose Connection Heads

Fixed-Sheath RTD Assemblies with General-Purpose Connection Heads are provided with head mounting fittings that are welded or brazed to the sheath for direct immersion into a process. To order an assembly with an optional 4 to 20 mA transmitter, select the assembly below and the transmitter from the back of this section. The RTD assemblies are supplied with a 316 stainless steel sheath in several diameters. They are available in various tolerances and temperature ranges as noted below.



### ORDER CODES

**Example Order Number:** **RBF185L 48 3** - **006(1/2)** - **00** - **8HN 31, SB, T** Select Type and Range from back of section

#### 1-0 100 Ω Platinum RTD Elements $\alpha = 0.00385 \text{ } ^\circ\text{C}^{-1}$

CODE	TOLERANCE <sup>[1]</sup>
<i>LOW RANGE WIRE WOUND (-200 to 200) °C</i>	
<b>SINGLE</b>	<b>DUPLEX</b>
R1T185L	R1T285L
R5T185L	R5T285L
<i>LOW RANGE THIN FILM (-50 to 200) °C</i>	
RBF185L	RBF285L
RAF185L	RAF285L
<i>HIGH RANGE WIRE WOUND (-200 to 600) °C</i>	
R1T185H	R1T285H
RAT185H	RAT285H

[1] Refer to RTD tolerance information in the General Information section for calculations to determine specific tolerance at temperature.

#### 3-0 No Fitting

CODE	TYPE	NPT SIZE (inches)	PRESSURE-RATED	AVAILABLE SHEATH DIAMETERS (inches)
00				
<b>3-1 One-Time Adjustable Fittings</b>				
01A	303 SS	1/8	NO	1/8, 3/16, 1/4
05A	316 SS	1/8	YES	1/8, 3/16, 1/4
05B	316 SS	1/4	YES	1/8, 3/16, 1/4, 3/8
05C	316 SS	1/2	YES	1/8, 1/4, 3/8
15A	Brass	1/8	NO	1/8, 3/16, 1/4
15B	Brass	1/4	NO	3/16, 1/4, 3/8
15C	Brass	1/2	NO	1/4, 3/8
14	Brass/Steel	Flange	NO	1/8, 3/16, 1/4, 3/8

#### 4-0 Head Mounting Fittings

CODE	DESCRIPTION
6HN	1/2" x 1/2" NPT steel hex nipple 1" "E" length
8HN	1/2" x 1/2" NPT stainless steel hex nipple 1" "E" length
9HP	1/2" NPT stainless steel bushing (no process threads)
8RNDC	3/4" x 1/2" NPT stainless steel hex nipple

#### 1-1 Sheath Diameters

CODE	DIAMETERS (inches) 316 SS
28 <sup>[1]</sup>	1/8
38	3/16
48	1/4
68	3/8

[1] Not available in duplex

#### 1-2 Element Connection

CODE	DESCRIPTION
2	2-wire element
3	3-wire element
4 <sup>[1]</sup>	4-wire element

[1] Not available in duplex or with 440 Series Transmitter

#### 2-0 "X" Dimensions

Insert three digit "X" length in inches.

Sheath lengths over 72" will be shipped in a coiled configuration unless otherwise specified.

#### 3-2 Re-Adjustable Compression Fittings

CODE	TYPE	NPT SIZE (inches)	AVAILABLE SHEATH DIAMETERS (inches)
10A	303 SS	1/8	1/8, 3/16
10B	303 SS	1/4	1/4, 3/8
10C	303 SS	1/2	1/4, 3/8
12A	316 SS	1/8	1/8, 3/16, 1/4
12B	316 SS	1/4	1/8, 3/16, 1/4, 3/8
12C	316 SS	1/2	1/8, 1/4, 3/8
11A	Brass	1/8	1/8, 3/16, 1/4
11B	Brass	1/4	1/8, 3/16, 1/4, 3/8
11C	Brass	1/2	1/4, 3/8
19C	Spring-loaded SS well fitting	1/2	3/16, 1/4

FEP gland standard 204 °C [400 °F] max.

#### 3-3 Fixed Bushings<sup>[1]</sup>

CODE	MOUNTING THREAD NPT (inches)	AVAILABLE SHEATH DIAMETERS (inches)
316 SS		
8A __ <sup>[2]</sup>	1/8	1/8, 3/16, 1/4
8B __ <sup>[2]</sup>	1/4	1/8, 3/16, 1/4, 3/8
8C __ <sup>[2]</sup>	1/2	1/8, 3/16, 1/4, 3/8
8D __ <sup>[2]</sup>	3/4	1/8, 3/16, 1/4, 3/8

[1] Requires Table 4, Option 9HP Selection  
[2] When ordering fixed bushings, specify order code above plus insert length "U", as measured from hot tip to bottom of threaded bushing.  
EXAMPLE: order code 8A06 is 1/8" NPT, 316 SS bushing located 6" from hot tip.

#### 4-1 Head and Sheath Terminations

CODE	DESCRIPTION
22	3" Individual fluoropolymer leads with terminal pins
31	Aluminum screw-cover head
34	Cast iron screw-cover head
35T-642A	(4 to 20) mA HART <sup>®</sup> Field Transmitter with aluminum general-purpose housing
36T82-D10	(4 to 20) mA dual input HART <sup>®</sup> transmitter with digital display and general-purpose aluminum housing with glass lid
49	Flip-top aluminum head
63	White polypropylene screw-cover head
91	316 L stainless steel screw-cover head

#### 4-2 Options

W <sup>[1]</sup>	Epoxy Coating
GS	Ground screw
I	Stainless tag
NB	1/2" NPT nylon conduit reducer bushing
SB	1/2" NPT conduit reducer bushing
T-440	(4 to 20) mA head-mounted RTD transmitter
T-441	(4 to 20) mA isolated head-mounted transmitter
T-442	(4 to 20) mA isolated HART <sup>®</sup> head-mounted transmitter
T82-00	(4 to 20) mA dual input HART <sup>®</sup> head-mounted transmitter

See transmitter ordering information in back of section.

[1] Available with option 31 only.

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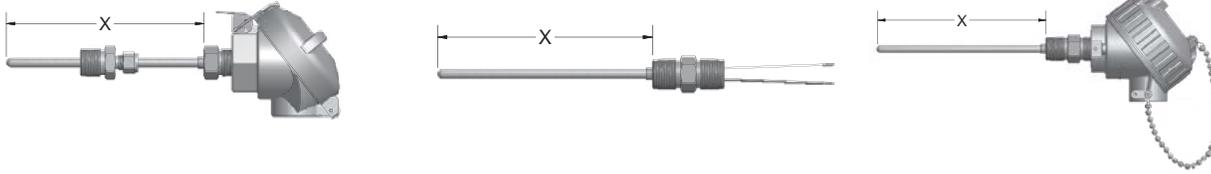


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# SENSORS WITH CONNECTION HEADS

## Configuration Code GP02 Fixed-Sheath Thermocouple Assemblies with General-Purpose Connection Heads

Fixed-Sheath Thermocouple Assemblies with General-Purpose Connection Heads have head mounting fittings that are welded or brazed to the sheath for direct immersion into a process. To order an assembly with an optional 4 to 20 mA transmitter, select the assembly below and the transmitter from the back of this section. The MgO-insulated thermocouple assemblies are offered in a variety of calibrations, sheath diameters, and sheath materials.



### ORDER CODES

**Example Order Number:** **J 3 8 U** - **012** - **01A** - **9HP 49, T** Select Type and Range from back of section

#### 1-0 Thermocouple Types

CODE	
<b>SINGLE</b>	<b>DUPLEX</b>
E	EE
J	JJ
K	KK
T	TT

#### 1-1 Sheath Diameters

CODE	DIAMETER (inches)
2	1/8
3	3/16
4	1/4
6	3/8

#### 1-2 Sheath Materials

CODE	MATERIAL	STANDARD AVAILABLE TYPES
3	Alloy 600	K
4	310 SS	K
5	446 SS	K <sup>[1]</sup>
8	316 SS	E, J, K, T

[1] All sensors with 446SS sheaths must have an ungrounded measuring junction.

#### 1-3 Measuring Junctions

CODE	DESCRIPTION
G	Grounded junction
U	Ungrounded junction
E	Exposed junction

#### 2-0 'X' Dimension

Insert three digit "X" length in inches

Sheath lengths over 72" will be shipped in a coiled configuration unless otherwise specified.

#### 3-0 No Fitting

CODE	DESCRIPTION
00	No fitting

#### 3-1 One-Time Adjustable Fittings

CODE	TYPE	NPT SIZE (inches)	PRESSURE-RATED	AVAILABLE SHEATH DIAMETERS (inches)
01A	303 SS	1/8	NO	1/8, 3/16, 1/4
05A	316 SS	1/8	YES	1/8, 3/16, 1/4
05B	316 SS	1/4	YES	1/8, 3/16, 1/4, 3/8
05C	316 SS	1/2	YES	1/8, 1/4, 3/8
15A	Brass	1/8	NO	1/8, 3/16, 1/4
15B	Brass	1/4	NO	3/16, 1/4, 3/8
15C	Brass	1/2	NO	1/4, 3/8
14	Brass/Steel	Flange	NO	1/8, 3/16, 1/4, 3/8

#### 3-2 Re-Adjustable Compression Fittings

CODE	TYPE	NPT SIZE (inches)	AVAILABLE SHEATH DIAMETERS (inches)
10A	303 SS	1/8	1/8, 3/16
10B	303 SS	1/4	1/4, 3/8
10C	303 SS	1/2	1/4, 3/8
12A	316 SS	1/8	1/8, 3/16, 1/4
12B	316 SS	1/4	1/8, 3/16, 1/4, 3/8
12C	316 SS	1/2	1/8, 1/4, 3/8
11A	Brass	1/8	1/8, 3/16, 1/4
11B	Brass	1/4	1/8, 3/16, 1/4, 3/8
11C	Brass	1/2	1/4, 3/8
19C	Spring-loaded SS well fitting	1/2	3/16, 1/4

FEP gland standard 204 °C [400 °F] max.

#### 3-3 Fixed Bushings<sup>[1]</sup>

CODE	MOUNTING THREAD NPT (inches)	AVAILABLE SHEATH DIAMETERS (inches)
316 SS		
8A __ <sup>[2]</sup>	1/8	1/8, 3/16, 1/4
8B __ <sup>[2]</sup>	1/4	1/8, 3/16, 1/4, 3/8
8C __ <sup>[2]</sup>	1/2	1/8, 3/16, 1/4, 3/8
8D __ <sup>[2]</sup>	3/4	1/8, 3/16, 1/4, 3/8

[1] Requires Table 4, Option 9HP Selection

[2] When ordering fixed bushings, specify order code above plus insert length "U", as measured from hot tip to bottom of threaded bushing. EXAMPLE: order code 8A06 is 1/8" NPT, 316 SS bushing located 6" from hot tip.

#### 4-0 Head Mounting Fittings

CODE	DESCRIPTION
6HN	1/2" x 1/2" NPT steel hex nipple 1" "E" length
8HN	1/2" x 1/2" NPT stainless steel hex nipple 1" "E" length
9HP	1/2" NPT stainless steel bushing (no process threads)
8RNDC	3/4" x 1/2" NPT stainless steel hex nipple

#### 4-1 Head and Sheath Terminations

CODE	DESCRIPTION
22	3" Individual fluoropolymer leads with terminal pins
31	Aluminum screw-cover head
34	Cast iron screw-cover head
35T-642A	(4 to 20) mA HART® Field Transmitter with aluminum general-purpose housing
36T82-D10	(4 to 20) mA dual input HART® transmitter with digital display and general-purpose aluminum housing with glass lid
49	Flip-top aluminum head
63	White polypropylene screw-cover head
91	316 L stainless steel screw-cover head

#### 4-2 Options

CODE	DESCRIPTION
W <sup>[1]</sup>	Epoxy Coating
GS	Ground screw
I	Stainless tag
NB	1/2" NPT nylon conduit reducer bushing
SB	1/2" NPT conduit reducer bushing
T-441	(4 to 20) mA isolated head-mounted transmitter
T-442	(4 to 20) mA isolated Hart® head-mounted transmitter
T82-00	(4 to 20) mA dual input HART® head-mounted transmitter

See transmitter ordering information in back of section.

[1] Available with option 31 only.

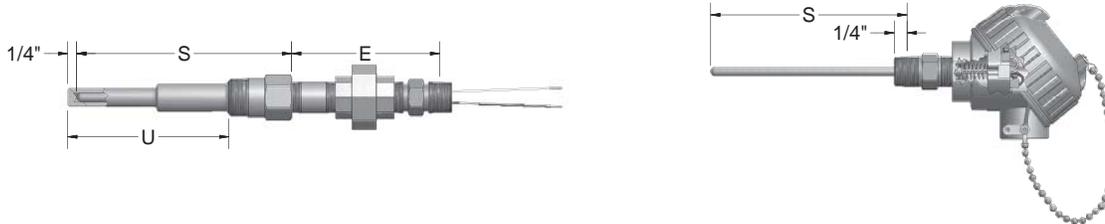
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Spring-Loaded MgO Thermocouple/Thermowell Assemblies with General-Purpose Connection Heads are designed for use with various thermowell types. Complete assemblies can be ordered by selecting the MgO assembly below, the thermowell from the thermowell section of this catalog, and a temperature transmitter from the back of this section. Assemblies without a thermowell can be ordered by selecting the sensor assembly from this page and inserting the "S" length in table 2-0. These sensors are supplied with a 316 stainless steel sheath and as standard limits of error. **Note:** The "S" dimension will measure 1/4" longer than specified when the spring is in the relaxed position. The "S" dimension is calculated when the sensor is compressed or in the installed position. This design allows 1/4" spring compression to ensure positive contact with the bottom of the thermowell.



### ORDER CODES

**Example Order Number:** **J 48 U** - Select Thermowell Part # or Insert 3 Digit Length Code - **SL** - **8PU4 31, T-** Select Type and Range from back of section

#### 1-0 Thermocouple Types

CODE	
<i>SINGLE</i>	<i>DUPLEX</i>
E	EE
J	JJ
K	KK
T	TT

#### 1-1 Sheath Diameters

CODE	DIAMETERS (inches) 316 SS
38	3/16
48	1/4

#### 1-2 Measuring Junction

CODE	DESCRIPTION
G	Grounded junction
U	Ungrounded junction

#### 2-0

Select thermowell part number from Thermowell Section, or specify 3 digit "S" length in inches if no thermowell is required.

#### 3-0 Element Options

CODE	DESCRIPTION
SL <sup>[1]</sup>	Spring-loaded element
SC	Self-contained spring-loaded element
SN	Self-contained spring-loaded element with Buna-N oil seal 121°C [250°F] 100 PSI Max.

[1] Not available with option 35T-642A

#### 4-0 Head Mounting Fittings

CODE	DESCRIPTION
<i>STEEL FITTINGS</i>	
6HN	1/2" x 1/2" NPT hex nipple 1" "E" length
6PN <sub>-</sub>	1/2" NPT pipe nipple (specify "E" length in inches)
6PU <sub>-</sub> <sup>[1]</sup>	1/2" NPT union/nipple (specify "E" length in inches)
<i>316 SS FITTINGS</i>	
8HN	1/2" x 1/2" NPT hex nipple 1" "E" length
8PN <sub>-</sub>	1/2" NPT pipe nipple (specify "E" length in inches)
8PU <sub>-</sub> <sup>[1]</sup>	1/2" NPT union/nipple (specify "E" length in inches)

[1] 4" Minimum length required

#### 4-1 Head and Sheath Terminations

CODE	DESCRIPTION
22	3" Individual fluoropolymer leads with terminal pins
31	Aluminum screw-cover head
34	Cast iron screw-cover head
35T-642A	(4 to 20) mA HART® Field Transmitter with aluminum general-purpose housing
36T82-D10	(4 to 20) mA dual input HART® transmitter with digital display and general-purpose aluminum housing with glass lid
49	Flip-top aluminum head
63	White polypropylene screw-cover head
91	316 L stainless steel screw-cover head

#### 4-2 Options

W <sup>[1]</sup>	Epoxy Coating
GS	Ground screw
I	Stainless tag
NB	1/2" NPT nylon conduit reducer bushing
SB	1/2" NPT conduit reducer bushing
T-441	(4 to 20) mA isolated head-mounted transmitter
T-442	(4 to 20) mA isolated HART® head-mounted transmitter
T82-00	(4 to 20) mA dual input HART® head-mounted transmitter

See transmitter ordering information in back of section.

[1] Available with option 31 only.

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# SENSORS WITH CONNECTION HEADS

## Configuration Code GP04 Spring-Loaded MgO Thermocouple/Thermowell Assemblies with Explosion-Proof Connection Heads

Spring-Loaded MgO Thermocouple/Thermowell Assemblies with Explosion-Proof Connection Heads are designed for use with various thermowell types. Complete assemblies can be ordered by selecting the MgO assembly below, the thermowell from the thermowell section of the catalog, and a temperature transmitter from the back of this section. Assemblies without a thermowell can be ordered by selecting the sensor assembly from this page and inserting the "S" length in table 2-0. These sensors are supplied with a 316 stainless steel sheath and as standard limits or error. **Note:** The "S" dimension will measure 1/4" longer than specified when the spring is in the relaxed position. The "S" dimension is calculated when the sensor is compressed or in the installed position. This design allows 1/4" spring compression to ensure positive contact with the bottom of the thermowell.



### ORDER CODES

**Example Order Number:** **J 48 U** - Select Thermowell Part # or Insert 3 Digit Length Code - **SL** - **8XU4 93, T** - Select Type and Range from back of section

#### 1-0 Thermocouple Types

CODE	
<i>SINGLE</i>	<i>DUPLEX</i>
E	EE
J	JJ
K	KK
T	TT

#### 1-1 Sheath Diameters

CODE	DIAMETERS (inches) 316 SS
38	3/16
48	1/4

#### 1-2 Measuring Junction

CODE	DESCRIPTION
G	Grounded junction
U	Ungrounded junction

#### 2-0

Select thermowell part number from Thermowell Section, or specify 3 digit "S" length in inches if no thermowell is required.

#### 3-0 Element Options

CODE	DESCRIPTION
SL	Spring-loaded element
SC	Self-contained spring-loaded element
SN	Self-contained spring-loaded element with Buna-N oil seal 121°C [250°F] 100 PSI Max.

#### 4-0 Head Mounting Fittings

CODE	DESCRIPTION
<i>STEEL FITTINGS</i>	
6HN	1/2" x 1/2" NPT hex nipple 1" "E" length
6PN_	1/2" NPT pipe nipple (specify "E" length in inches)
6XU_ [1]	1/2" NPT union/nipple (specify "E" length in inches)
<i>316 SS FITTINGS</i>	
8HN	1/2" x 1/2" NPT hex nipple 1" "E" length
8PN_	1/2" NPT pipe nipple (specify "E" length in inches)
8XU_ [1]	1/2" NPT union/nipple (specify "E" length in inches)
[1] 3 1/2" Minimum length required	

#### 4-1 Head Terminations

CODE	DESCRIPTION
74	DIN form B aluminum explosion-proof head, Group A
75T-642C	(4 to 20) mA HART® field transmitter with aluminum explosion-proof housing, Group A
93	Aluminum explosion-proof head, Group B
94	316L stainless steel explosion-proof head, Group A

#### 4-2 Options

SB	1/2" NPT conduit reducer bushing
I	Stainless tag
T-441	(4 to 20) mA isolated head-mounted transmitter
T-442	(4 to 20) mA isolated HART® head-mounted transmitter
T82-00	(4 to 20) mA Dual input, isolated HART® head-mounted transmitter
<b>See transmitter ordering information in back of section.</b>	

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# SENSORS WITH CONNECTION HEADS

## Configuration Code GP01 Fixed-Sheath RTD Assemblies with Explosion-Proof Connection Heads

Fixed-Sheath RTD Assemblies with Explosion-Proof Connection Heads are provided with head mounting fittings that are welded or brazed to the sheath for direct immersion into a process. To order an assembly with an option 4 to 20 mA transmitter, select the assembly below and the transmitter from the back of this section. The RTD assemblies are supplied with a 316 stainless steel sheath in several diameters. They are available in various tolerances and temperature ranges as noted below.



### ORDER CODES

**Example Order Number:** **RAF185L 48 3 - 012(1/2) - 00 - 8HN 94, SB, T-** Select Type and Range from back of section

**1-0 100 Ω Platinum RTD Elements  $\alpha = 0.00385 \text{ } ^\circ\text{C}^{-1}$**

CODE		TOLERANCE <sup>[1]</sup>
LOW RANGE WIRE WOUND (-200 to 200) °C		
<b>SINGLE</b>	<b>DUPLEX</b>	
R1T185L	R1T285L	Grade B
R5T185L	R5T285L	(1/5) Class B
LOW RANGE THIN FILM (-50 to 200) °C		
RBF185L	RBF285L	Class B
RAF185L	RAF285L	Class A
HIGH RANGE WIRE WOUND (-200 to 600) °C		
R1T185H	R1T285H	Grade B
RAT185H	RAT285H	Class A

[1] Refer to RTD tolerance information in the General Information section for calculations to determine specific tolerance at temperature.

#### 1-1 Sheath Diameters

CODE	DIAMETERS (inches) 316 SS
28 <sup>[1]</sup>	1/8
38	3/16
48	1/4
68	3/8

[1] Not available in duplex

#### 1-2 Element Connection

CODE	DESCRIPTION
2	2-wire element
3	3-wire element
4 <sup>[1]</sup>	4-wire element

[1] Not available in duplex or with 440 Series Transmitter

#### 2-0 "X" Dimensions

Insert three digit "X" length in inches.  
Sheath lengths over 72" will be shipped in a coiled configuration unless otherwise specified.

#### 3-0 No Fitting

CODE	DESCRIPTION
00	No fitting

#### 3-1 One-Time Adjustable Fittings

CODE	TYPE	NPT SIZE (inches)	PRESSURE-RATED	AVAILABLE SHEATH DIAMETERS (inches)
01A	303 SS	1/8	NO	1/8, 3/16, 1/4
05A	316 SS	1/8	YES	1/8, 3/16, 1/4
05B	316 SS	1/4	YES	1/8, 3/16, 1/4, 3/8
05C	316 SS	1/2	YES	1/8, 1/4, 3/8
15A	Brass	1/8	NO	1/8, 3/16, 1/4
15B	Brass	1/4	NO	3/16, 1/4, 3/8
15C	Brass	1/2	NO	1/4, 3/8
14	Brass/Steel	Flange	NO	1/8, 3/16, 1/4, 3/8

#### 3-2 Re-Adjustable Compression Fittings

CODE	TYPE	NPT SIZE (inches)	AVAILABLE SHEATH DIAMETERS (inches)
10A	303 SS	1/8	1/8, 3/16
10B	303 SS	1/4	1/4, 3/8
10C	303 SS	1/2	1/4, 3/8
12A	316 SS	1/8	1/8, 3/16, 1/4
12B	316 SS	1/4	1/8, 3/16, 1/4, 3/8
12C	316 SS	1/2	1/8, 1/4, 3/8
11A	Brass	1/8	1/8, 3/16, 1/4
11B	Brass	1/4	1/8, 3/16, 1/4, 3/8
11C	Brass	1/2	1/4, 3/8
19C	Spring-loaded SS well fitting	1/2	3/16, 1/4

FEP gland standard 204 °C [400 °F] max.

#### 3-3 Fixed Bushings<sup>[1]</sup>

CODE	MOUNTING THREAD NPT (inches)	AVAILABLE SHEATH DIAMETERS (inches)
316 SS		
8A __ <sup>[1]</sup>	1/8	1/8, 3/16, 1/4
8B __ <sup>[1]</sup>	1/4	1/8, 3/16, 1/4, 3/8
8C __ <sup>[1]</sup>	1/2	1/8, 3/16, 1/4, 3/8
8D __ <sup>[1]</sup>	3/4	1/8, 3/16, 1/4, 3/8

[1] Requires Table 4, Option 9HP Selection

[2] When ordering fixed bushings, specify order code above plus insert length "U", as measured from hot tip to bottom of threaded bushing. EXAMPLE: order code 8A06 is 1/8" NPT, 316 SS bushing located 6" from hot tip.

#### 4-0 Head Mounting Fittings

CODE	DESCRIPTION
6HN	1/2" x 1/2" NPT steel hex nipple 1" "E" length
8HN	1/2" x 1/2" NPT stainless steel hex nipple 1" "E" length
9HP	1/2" NPT stainless steel bushing (no process threads)
8RND	3/4" x 1/2" NPT stainless steel hex nipple

#### 4-1 Head Terminations

CODE	DESCRIPTION
74	DIN form B aluminum explosion-proof head, Group A
75T-642C	(4 to 20) mA HART <sup>®</sup> field transmitter with aluminum explosion-proof housing, Group A
93	Aluminum explosion-proof head, Group B
94	316L stainless steel explosion-proof head, Group A

#### 4-2 Options

SB	1/2" NPT conduit reducer bushing
I	Stainless tag
T-440 <sup>[1]</sup>	(4 to 20) mA head-mounted RTD transmitter
T-441	(4 to 20) mA isolated head-mounted transmitter
T-442	(4 to 20) mA isolated HART <sup>®</sup> head-mounted transmitter
T82-00	(4 to 20) mA dual input, isolated HART <sup>®</sup> head-mounted transmitter

See transmitter ordering information in back of section.

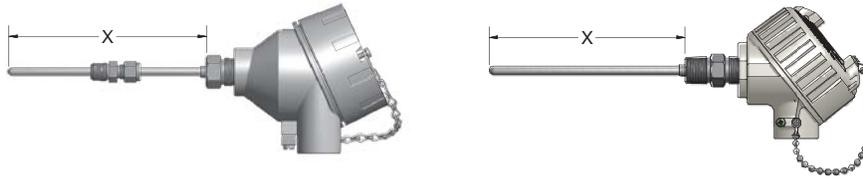
[1] Not available with option 74.

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# SENSORS WITH CONNECTION HEADS

## Configuration Code GP02 Fixed-Sheath Thermocouple Assemblies with Explosion-Proof Connection Heads

Fixed-Sheath Thermocouple Assemblies with Explosion-Proof Connection Heads are provided with head mounting fittings that are welded or brazed to the sheath for direct immersion into a process. To order an assembly with an optional 4 to 20 mA transmitter, select the assembly below and the transmitter from the back of this section. The MgO-insulated thermocouple assemblies are offered in a variety of calibrations, sheath diameters, and sheath materials.



### ORDER CODES

**Example Order Number:** **J 2 8 U** - **012** - **01A** - **9HP 74, T** Select Type and Range from back of section

#### 1-0 Thermocouple Types

CODE	
SINGLE	DUPLEX
E	EE
J	JJ
K	KK
T	TT

#### 1-1 Sheath Diameters

CODE	DIAMETER (inches)
2	1/8
3	3/16
4	1/4
6	3/8

#### 1-2 Sheath Materials

CODE	MATERIAL	STANDARD AVAILABLE TYPES
3	Alloy 600	K
4	310 SS	K
5	446 SS	K <sup>[1]</sup>
8	316 SS	E, J, K, T

[1] All sensors with 446SS sheaths must have an ungrounded measuring junction.

#### 1-3 Measuring Junctions

CODE	DESCRIPTION
G	Grounded junction
U	Ungrounded junction
E	Exposed junction

#### 2-0 'X' Dimension

Insert three digit "X" length in inches

Sheath lengths over 72" will be shipped in a coiled configuration unless otherwise specified.

#### 3-0 No Fitting

CODE	DESCRIPTION
00	No fitting

#### 3-1 One-Time Adjustable Fittings

CODE	TYPE	NPT SIZE (inches)	PRESSURE-RATED	AVAILABLE SHEATH DIAMETERS (inches)
01A	303 SS	1/8	NO	1/8, 3/16, 1/4
05A	316 SS	1/8	YES	1/8, 3/16, 1/4
05B	316 SS	1/4	YES	1/8, 3/16, 1/4, 3/8
05C	316 SS	1/2	YES	1/8, 1/4, 3/8
15A	Brass	1/8	NO	1/8, 3/16, 1/4
15B	Brass	1/4	NO	3/16, 1/4, 3/8
15C	Brass	1/2	NO	1/4, 3/8
14	Brass/Steel	Flange	NO	1/8, 3/16, 1/4, 3/8

#### 3-2 Re-Adjustable Compression Fittings

CODE	TYPE	NPT SIZE (inches)	AVAILABLE SHEATH DIAMETERS (inches)
10A	303 SS	1/8	1/8, 3/16
10B	303 SS	1/4	1/4, 3/8
10C	303 SS	1/2	1/4, 3/8
12A	316 SS	1/8	1/8, 3/16, 1/4
12B	316 SS	1/4	1/8, 3/16, 1/4, 3/8
12C	316 SS	1/2	1/8, 1/4, 3/8
11A	Brass	1/8	1/8, 3/16, 1/4
11B	Brass	1/4	1/8, 3/16, 1/4, 3/8
11C	Brass	1/2	1/4, 3/8
19C	Spring-loaded SS well fitting	1/2	3/16, 1/4

FEP gland standard 204 °C [400 °F] max.

#### 3-3 Fixed Bushings<sup>[1]</sup>

CODE	MOUNTING THREAD NPT (inches)	AVAILABLE SHEATH DIAMETERS (inches)
8A __ <sup>[1]</sup>	1/8	1/8, 3/16, 1/4
8B __ <sup>[1]</sup>	1/4	1/8, 3/16, 1/4, 3/8
8C __ <sup>[1]</sup>	1/2	1/8, 3/16, 1/4, 3/8
8D __ <sup>[1]</sup>	3/4	1/8, 3/16, 1/4, 3/8

[1] Requires Table 4, Option 9HP Selection

[2] When ordering fixed bushings, specify order code above plus insert length "U", as measured from hot tip to bottom of threaded bushing. EXAMPLE: order code 8A06 is 1/8" NPT, 316 SS bushing located 6" from hot tip.

#### 4-0 Head Mounting Fittings

CODE	DESCRIPTION
6HN	1/2" x 1/2" NPT steel hex nipple 1" "E" length
8HN	1/2" x 1/2" NPT stainless steel hex nipple 1" "E" length
9HP	1/2" NPT stainless steel bushing (no process threads)
8RNDC	3/4" x 1/2" NPT stainless steel hex nipple

#### 4-1 Head Terminations

CODE	DESCRIPTION
74	DIN form B aluminum explosion-proof head, Group A
75T-642C	(4 to 20) mA HART® field transmitter with aluminum explosion-proof housing, Group A
93	Aluminum explosion-proof head, Group B
94	316L stainless steel explosion-proof head, Group A

#### 4-2 Options

CODE	DESCRIPTION
SB	1/2" NPT conduit reducer bushing
I	Stainless tag
T-441	(4 to 20) mA isolated head-mounted transmitter
T-442	(4 to 20) mA isolated HART® head-mounted transmitter
T82-00	(4 to 20) mA dual input, isolated HART® head-mounted transmitter

See transmitter ordering information in back of section.

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# SENSORS WITH CONNECTION HEADS

## Thermocouple and RTD Spring-Loaded Replacement Elements

Thermocouple and RTD spring-Loaded Replacement elements are designed for spring-loaded thermowell assemblies. The replacement elements can be ordered by selecting the sensor type below and inserting the "X" length in table 2-0. The RTD assemblies are supplied with a 316 stainless steel sheath and are available in various tolerances and temperature ranges as noted in the tables below. The MgO-insulated thermocouple assemblies are supplied with a 316 stainless steel sheath, various calibrations, and as standard limits of error.



### ORDER CODES

Configuration Code GP06

#### Thermocouple

Example Order Number:

1-0 1-1 2-0 3-0 4-0  
**J48 U - 012 - SL - 22(06)**

#### 1-0 Thermocouple Types

CODE		AVAILABLE SHEATH DIAMETERS (316 SS)	
SINGLE	DUPLEX	3/16" O.D.	1/4" O.D.
E	EE	38	48
J	JJ	38	48
K	KK	38	48
T	TT	38	48

#### 1-1 Measuring Junction

CODE	DESCRIPTION
G	Grounded junction
U	Ungrounded junction

#### 4-0 Sheath Terminations

CODE	DESCRIPTION
22 <sup>[1]</sup>	3" Individual fluoropolymer leads with terminal pins

[1] For longer leads, insert 2 digit length in inches. Example: 22(06)

#### 3-0 Element Style

CODE	DESCRIPTION
SL	Spring-loaded element

#### 2-0 Length

CODE
Insert 3 Digit "X" length in inches

### ORDER CODES

Configuration Code GP05

RTD Example Order Number:

1-0 1-1 1-2 2-0 3-0 4-0  
**R1T185L 48 3 - 012(1/2) - SL - 22**

#### 1-0 100 Ω Platinum RTD Elements $\alpha = 0.00385 \text{ } ^\circ\text{C}^{-1}$

CODE		TOLERANCE <sup>[1]</sup>
LOW RANGE WIRE WOUND (-200 to 200) °C		
SINGLE	DUPLEX	
R1T185L	R1T285L	Grade B
R5T185L	R5T285L	(1/5) Class B
LOW RANGE THIN FILM (-50 to 200) °C		
RBF185L	RBF285L	Class B
RAF185L	RAF285L	Class A
HIGH RANGE WIRE WOUND (-200 to 600) °C		
R1T185H	R1T285H	Grade B
RAT185H	RAT285H	Class A

[1] Refer to RTD tolerance information in the General Information section for calculations to determine specific tolerance at temperature.

#### 1-1 Sheath Diameters

CODE	DIAMETERS (inches) 316 SS
38	3/16
48	1/4

#### 4-0 Sheath Terminations

CODE	DESCRIPTION
22 <sup>[1]</sup>	3" Individual fluoropolymer leads with terminal pins

[1] For longer leads insert 2 digit length in inches. Example: 22(06)

#### 3-0 Element Style

CODE	DESCRIPTION
SL	Spring-loaded element

#### 2-0 Length

CODE
Insert 3 Digit "X" length in inches

#### 1-2 Element Connection

CODE	DESCRIPTION
2	2-wire element
3	3-wire element
4	4-wire element



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## ORDER CODES

**Example Order Number:** 440 - [ ] - 3 85 U - S(0-200) C

### 1-0 Transmitter Type

CODE	DESCRIPTION
440 <sup>[1]</sup>	(4 to 20) mA programmable head-mounted RTD Transmitter
441	(4 to 20) mA programmable head-mounted universal Transmitter
442	(4 to 20) mA HART® programmable head-mounted universal Transmitter
35T-642A	(4 to 20) mA HART® Field Transmitter with general-purpose aluminum housing
75T-642C	(4 to 20) mA HART® Field Transmitter with explosion-proof aluminum housing FM/ CSA / XP Class I / Div 1 / Groups A,B,C,D / DIP Class II / Div 1 / Groups E,F,G / Class III / NI Class I / Div 2 / Groups A,B,C,D
T82-00 <sup>[2]</sup>	(4 to 20) mA dual input, isolated HART® head-mounted transmitter
36T82-D10 <sup>[2]</sup>	(4 to 20) mA dual input HART® transmitter with digital display and general-purpose aluminum housing with glass lid

[1] Only available with 2- or 3-wire input connection and Pt100 sensor type  
 [2] See transmitter section for ordering information

### 1-1 Options (For 642 Series only)

CODE	DESCRIPTION
T	Solid cover
D	Glass cover with digital display
Leave blank if using 440, 441, or 442	

### 1-2 Input Type

CODE	DESCRIPTION
00 <sup>[1]</sup>	Unconfigured
1	Thermocouple (TC)
2	RTD (2-wire)
3	RTD (3-wire)
4	RTD (4-wire)

[1] Default setting supplied as 3-wire Pt100 (0-100) °C

### 1-6 Unit of Measure

CODE	DESCRIPTION
C	Celsius
F	Fahrenheit

### 1-5 Range

CODE	DESCRIPTION
S	(lower limit – upper limit)

### 1-4 Failure Mode

CODE	DESCRIPTION
U	Upscale Burnout ≥ 20.5 mA
D	Downscale Burnout ≤ 3.8 mA

### 1-3 Sensor Type

CODE	DESCRIPTION
J	Type J thermocouple
K	Type K thermocouple
T	Type T thermocouple
N	Type N thermocouple
E	Type E thermocouple
85	100 ohm platinum ( $\alpha = 0.00385 \text{ } ^\circ\text{C}^{-1}$ )

**For complete transmitter specifications see Transmitter Section.**

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Fixed-sheath RTD assemblies with miniature heads are offered with mounting fittings that are welded or brazed to the sheath for direct immersion into a process. The miniature heads offer a compact design and are ideal for laboratory applications or applications where space is limited. The RTD assemblies are supplied with a 316 stainless steel sheath in several diameters. They are offered in various tolerances and temperature ranges as noted below.



### ORDER CODES

**Example Order Number:** **1-0** **1-1** **1-2** **2-0** **3** **4-0** **4-1**  
**RBF185L 48 3 - 006(1/2) - 00 - 8HPB 25**

#### 1-0 100 Ω Platinum RTD Elements α = 0.003 85 °C<sup>-1</sup>

CODE	TOLERANCE <sup>[1]</sup>
LOW RANGE WIRE WOUND (-200 to 200) °C	
<b>SINGLE</b>	
R1T185L	Grade B
R5T185L	(1/5) Class B
LOW RANGE THIN FILM (-50 to 200) °C	
RBF185L	Class B
RAF185L	Class A
HIGH RANGE WIRE WOUND (-200 to 600) °C	
R1T185H	Grade B

[1] Refer to RTD tolerance information in the General Information section for calculations to determine specific tolerance at temperature.

#### 1-1 Sheath Diameters

CODE	DIAMETERS (inches) 316 SS
28	1/8
38	3/16
48	1/4
68	3/8

#### 1-2 Element Connection

CODE	DESCRIPTION
2	2 wire element
3	3 wire element
4	4 wire element

#### 2-0 "X" Dimensions

Insert three digit "X" length in inches.

Sheath lengths over 72" will be shipped in a coiled configuration unless otherwise specified.

#### 3-0 No Fitting

CODE	DESCRIPTION
00	No fitting

#### 3-1 One-Time Adjustable Fittings

CODE	TYPE	NPT SIZE (inches)	PRESSURE-RATED	AVAILABLE SHEATH DIAMETERS (inches)
01A	303 SS	1/8	NO	1/8, 3/16, 1/4
05A	316 SS	1/8	YES	1/8, 3/16, 1/4
05B	316 SS	1/4	YES	1/8, 3/16, 1/4, 3/8
05C	316 SS	1/2	YES	1/8, 1/4, 3/8
15A	Brass	1/8	NO	1/8, 3/16, 1/4
15B	Brass	1/4	NO	3/16, 1/4, 3/8
15C	Brass	1/2	NO	1/4, 3/8

#### 3-2 Re-Adjustable Compression Fittings

CODE	TYPE	NPT SIZE (inches)	AVAILABLE SHEATH DIAMETERS (inches)
10A	303 SS	1/8	1/8, 3/16
10B	303 SS	1/4	1/4, 3/8
10C	303 SS	1/2	1/4, 3/8
12A	316 SS	1/8	1/8, 3/16, 1/4
12B	316 SS	1/4	1/8, 3/16, 1/4, 3/8
12C	316 SS	1/2	1/8, 1/4, 3/8
11A	Brass	1/8	1/8, 3/16, 1/4
11B	Brass	1/4	1/8, 3/16, 1/4, 3/8
11C	Brass	1/2	1/4, 3/8
19C	Spring-loaded SS well fitting	1/2	3/16, 1/4

FEP gland standard 204 °C [400 °F] max.

#### 3-3 Fixed Bushings

CODE	MOUNTING THREAD NPT (inches)	AVAILABLE SHEATH DIAMETERS (inches)
316 SS		
8A __ <sup>[1]</sup>	1/8	1/8, 3/16, 1/4
8B __ <sup>[1]</sup>	1/4	1/8, 3/16, 1/4, 3/8
8C __ <sup>[1]</sup>	1/2	1/8, 3/16, 1/4, 3/8
8D __ <sup>[1]</sup>	3/4	1/8, 3/16, 1/4, 3/8

[1] When ordering fixed bushings, specify order code above plus insert length "U", as measured from hot tip to bottom of threaded bushing. EXAMPLE: order code 8A06 is 1/8" NPT, 316 SS bushing located 6" from hot tip.

#### 4-0 Head Mounting Fittings

CODE	DESCRIPTION
9HNB	1/4" x 1/4" stainless steel hex nipple
8HPB	1/4" stainless steel hex bushing (no process threads)
8CFB	1/4" NPT 316 stainless steel compression fitting (no process threads)
22CFB	1/4" NPT brass compression fitting (no process threads)

#### 4-1 Miniature Head Terminations

CODE	DESCRIPTION
17	Miniature plastic head (3/8" NPT conduit opening)
25	Miniature nickel-plated head

# SENSORS WITH CONNECTION HEADS

## Configuration Code GP08 Fixed-Sheath Thermocouple Assemblies with Miniature Connection Heads

Fixed-Sheath Thermocouple Assemblies with miniature connection heads are offered with mounting fittings that are welded or brazed to the sheath for direct immersion into a process. The miniature heads offer a compact design and are ideal for laboratory applications or applications where space is limited. The MgO-insulated thermocouple assemblies are offered in a variety of calibrations, sheath diameters, and sheath materials.



### ORDER CODES

**Example Order Number:** J 3 8 U - 012 - 01A - 8HPB 25

#### 1-0 Thermocouple Types

CODE	
SINGLE	DUPLEX
E	EE
J	JJ
K	KK
T	TT

#### 1-1 Sheath Diameters

CODE	DIAMETER (inches)
2	1/8
3	3/16
4	1/4
6	3/8

#### 1-2 Sheath Materials

CODE	MATERIAL	STANDARD AVAILABLE TYPES
3	Alloy 600	K
4	310 SS	K
5	446 SS	K <sup>[1]</sup>
8	316 SS	E, J, K, T

[1] All sensors with 446SS sheaths must have an ungrounded measuring junction.

#### 1-3 Measuring Junctions

CODE	DESCRIPTION
G	Grounded junction
U	Ungrounded junction
E	Exposed junction

#### 2-0 'X' Dimension

Insert three digit "X" length in inches

Sheath lengths over 72" will be shipped in a coiled configuration unless otherwise specified.

#### 3-0 No Fitting

CODE	DESCRIPTION
00	No fitting

#### 3-1 One-Time Adjustable Fittings

CODE	TYPE	NPT SIZE (inches)	PRESSURE RATED	AVAILABLE SHEATH DIAMETERS (inches)
01A	303 SS	1/8	NO	1/8, 3/16, 1/4
05A	316 SS	1/8	YES	1/8, 3/16, 1/4
05B	316 SS	1/4	YES	1/8, 3/16, 1/4, 3/8
05C	316 SS	1/2	YES	1/8, 1/4, 3/8
15A	Brass	1/8	NO	1/8, 3/16, 1/4
15B	Brass	1/4	NO	3/16, 1/4, 3/8
15C	Brass	1/2	NO	1/4, 3/8

#### 3-2 Re-Adjustable Compression Fittings

CODE	TYPE	NPT SIZE (inches)	AVAILABLE SHEATH DIAMETERS (inches)
10A	303 SS	1/8	1/8, 3/16
10B	303 SS	1/4	1/4, 3/8
10C	303 SS	1/2	1/4, 3/8
12A	316 SS	1/8	1/8, 3/16, 1/4
12B	316 SS	1/4	1/8, 3/16, 1/4, 3/8
12C	316 SS	1/2	1/8, 1/4, 3/8
11A	Brass	1/8	1/8, 3/16, 1/4
11B	Brass	1/4	1/8, 3/16, 1/4, 3/8
11C	Brass	1/2	1/4, 3/8
19C	Spring-loaded SS well fitting	1/2	3/16, 1/4

FEP gland standard 204 °C [400 °F] max.

#### 3-3 Fixed Bushings

CODE	MOUNTING THREAD NPT (inches)	AVAILABLE SHEATH DIAMETERS (inches)
316 SS		
8A __ <sup>[1]</sup>	1/8	1/8, 3/16, 1/4
8B __ <sup>[1]</sup>	1/4	1/8, 3/16, 1/4, 3/8
8C __ <sup>[1]</sup>	1/2	1/8, 3/16, 1/4, 3/8
8D __ <sup>[1]</sup>	3/4	1/8, 3/16, 1/4, 3/8

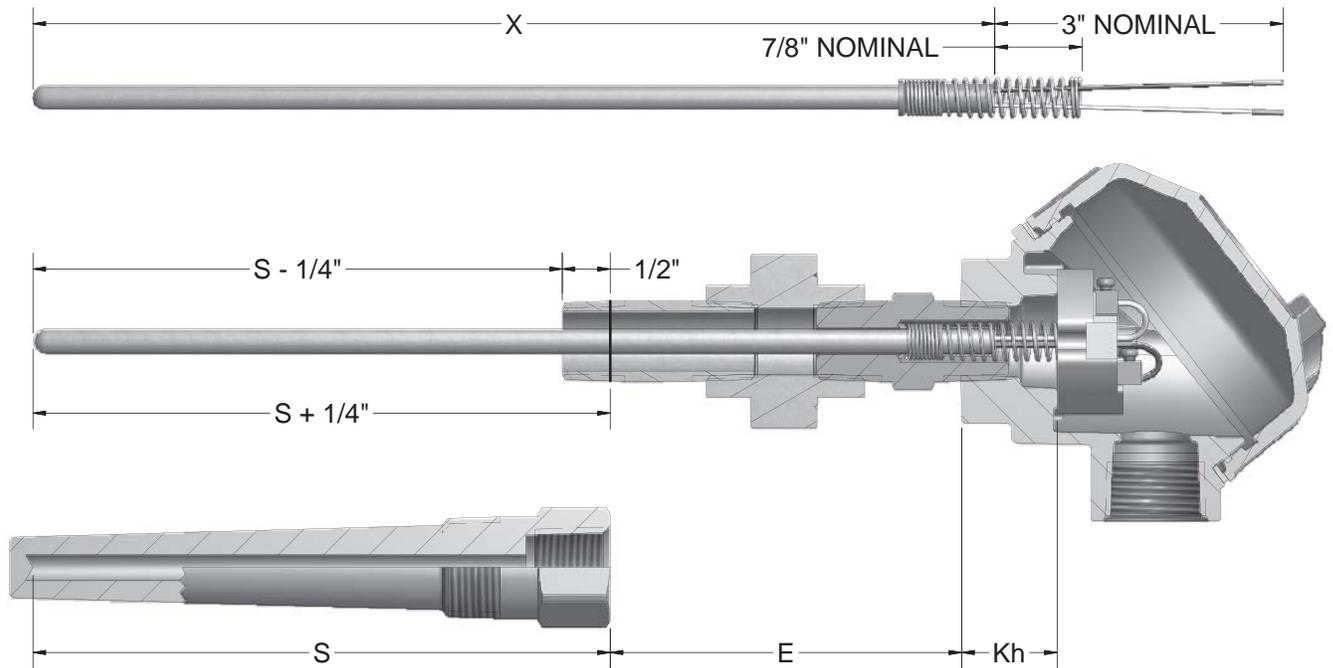
[1] When ordering fixed bushings, specify order code above plus insert length "U", as measured from hot tip to bottom of threaded bushing. EXAMPLE: order code 8A06 is 1/8" NPT, 316 SS bushing located 6" from hot tip.

#### 4-0 Head Mounting Fittings

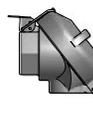
CODE	DESCRIPTION
9HNB	1/4" x 1/4" stainless steel hex nipple
8HPB	1/4" stainless steel hex bushing (no process threads)
8CFB	1/4" NPT 316 stainless steel compression fitting (no process threads)
22CFB	1/4" NPT brass compression fitting (no process threads)

#### 4-1 Miniature Head Terminations

CODE	DESCRIPTION
17	Miniature plastic head (3/8" NPT conduit opening)
25	Miniature nickel-plated head



Pyromation Head Order Code	Kh Dimension in inches	Formula for SL option	Formula for SC option
31	1.00	$X = S + E + 5/8"$	$X = S + E$
34	1.00	$X = S + E + 5/8"$	$X = S + E$
49	1.00	$X = S + E + 5/8"$	$X = S + E$
63	1.00	$X = S + E + 5/8"$	$X = S + E$
74	1.625	$X = S + E + 1\ 1/4"$	$X = S + E$
91	1.00	$X = S + E + 5/8"$	$X = S + E$
93	1.00	$X = S + E + 5/8"$	$X = S + E$
94	1.00	$X = S + E + 5/8"$	$X = S + E$
71	1.00	$X = S + E + 5/8"$	$X = S + E$
72	1.125	$X = S + E + 3/4"$	$X = S + E$
81	1.00	$X = S + E + 5/8"$	$X = S + E$
82	1.00	$X = S + E + 5/8"$	$X = S + E$

<p><i>Complete Transmitter Specifications are located in the Transmitter Section.</i></p> <p><i>Complete Connection Head Specifications are located in the Accessories Section.</i></p>				Connection Heads					
				31	34	35	49	63	91
									
Temperature Transmitters				Aluminum Screw-Cover Head	Cast Iron Screw-Cover Head	Aluminum Field Transmitter Housing	Flip-Top Aluminum Head	White Polypropylene Screw-Cover Head	316L Stainless Steel Screw-Cover Head
T-440		Input: Pt100 RTD Only	Programmable head-mounted transmitter, (4 to 20) mA analog output	X	X		X	X	X
T-441		Input: Thermocouple, RTD, Other	Programmable head-mounted transmitter, isolated, (4 to 20) mA analog output	X	X		X	X	X
T-442		Input: Thermocouple, RTD, Other	Programmable head-mounted transmitter, isolated, HART® protocol, (4 to 20) mA analog output	X	X		X	X	X
T-82		Input: Thermocouple, RTD, Other	(4 to 20) mA dual input, isolated HART® head-mounted transmitter	X	X		X	X	X
T-642		Input: Thermocouple, RTD, Other	Programmable field transmitter, isolated, HART® protocol, (4 to 20) mA analog output			X			
T-642 w/ display		Input: Thermocouple, RTD, Other	Programmable field transmitter, isolated, HART® protocol, (4 to 20) mA analog output with digital display			X			
36T82-D10		Input: Thermocouple, RTD, Other	(4 to 20) mA dual input, HART® transmitter with digital display and general purpose aluminum housing, Group A	Unit includes housing and transmitter.					

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