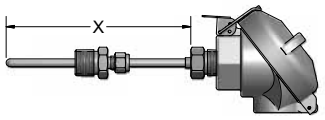
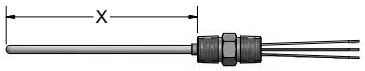
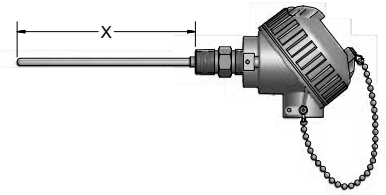
Configuration Code GP01
Fixed-Sheath RTD Assemblies with General-Purpose Connection Heads

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

	1-0	1-1	1-2		2-0		3		4-0	4-1	4-2			
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 α = 0.003 85 °C^{-1}

CODE		TOLERANCE[1]	TEMP. RANGE
SINGLE	*DUPLEX*		
R1T185L	R1T285L	Grade B	(-200 to 200) °C
R5T185L	R5T285L	(1/5) Class B	(-30 to 150) °C
RBF185L	RBF285L	Class B	(-50 to 200) °C
RAF185L	RAF285L	Class A	(-30 to 200) °C
R1T185H	R1T285H	Grade B	(-200 to 600) °C
RAT185H	RAT285H	Class A	(-100 to 450) °C

[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]	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	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	00

3-1 One-Time Adjustable Fittings

CODE	TYPE	NPT SIZE (inches)	AVAILABLE SHEATH DIAMETERS (inches)
05A	316 SS	1/8	1/8, 3/16, 1/4
05B	316 SS	1/4	1/8, 3/16, 1/4, 3/8
05C	316 SS	1/2	1/8, 3/16, 1/4, 3/8
15A	Brass	1/8	1/8, 3/16, 1/4
15B	Brass	1/4	3/16, 1/4, 3/8
15C	Brass	1/2	1/4, 3/8
14	Brass/ Steel	Flange	1/8, 3/16, 1/4, 3/8

3-2 Re-Adjustable Compression Fittings

CODE	TYPE	NPT SIZE (inches)	AVAILABLE SHEATH DIAMETERS (inches)
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, 3/16, 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 ºC [400 ºF] max.

3-3 Fixed Bushings[1]

CODE	MOUNTING THREAD NPT (inches)	AVAILABLE SHEATH DIAMETERS (inches)
316 SS		
8A _ _[2]	1/8	1/8, 3/16, 1/4
8B _ _[2]	1/4	1/8, 3/16, 1/4, 3/8
8C _ _[2]	1/2	1/8, 3/16, 1/4, 3/8
8D _ _[2]	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
35T142A	(4 to 20) mA HART® Field Transmitter with aluminum general-purpose housing
36T71-D10	(4 to 20) mA isolated programmable transmitter with digital display and general purpose aluminum housing with glass lid
36T72-D10	(4 to 20) mA isolated programmable HART® transmitter with digital display and general purpose aluminum housing with glass lid
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[1]	Epoxy Coating
GS	Ground screw
I	Stainless tag
NB	1/2" NPT nylon conduit reducer bushing
SB	1/2" NPT conduit reducer bushing
T31	(4 to 20) mA head-mounted RTD transmitter
T71-00	(4 to 20) mA isolated programmable transmitter
T72-00	(4 to 20) mA isolated programmable HART® 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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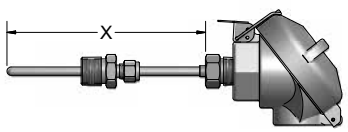
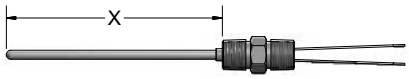
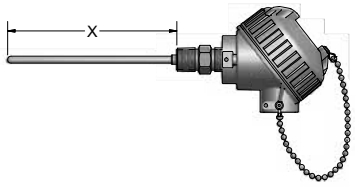
Sensors with Connection Heads

Configuration Code 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:

1-0	1-1	1-2	1-3		2-0		3		4-0	4-1	4-2	
J	3	8	U	-	012	-	05A	-	9HP	49,	T	Select Type and Range from back of section

1-0 Thermocouple Types

CODE		
SINGLE	*DUPLEX*	*TRIPLEX*
E	EE	-
J	JJ	JJJ
K	KK	KKK
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[1]
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	00

3-1 One-Time Adjustable Fittings

CODE	TYPE	NPT SIZE (inches)	PRESSURE-RATED	AVAILABLE SHEATH DIAMETERS (inches)
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, 3/16, 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)
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, 3/16, 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 ºC [400 ºF] max.

3-3 Fixed Bushings[1]

CODE *316 SS*	MOUNTING THREAD NPT (inches)	AVAILABLE SHEATH DIAMETERS (inches)
8A _ _[2]	1/8	1/8, 3/16, 1/4
8B _ _[2]	1/4	1/8, 3/16, 1/4, 3/8
8C _ _[2]	1/2	1/8, 3/16, 1/4, 3/8
8D _ _[2]	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
35T142A	(4 to 20) mA HART® Field Transmitter with aluminum general-purpose housing
36T71-D10	(4 to 20) mA isolated programmable transmitter with digital display and general purpose aluminum housing with glass lid
36T72-D10	(4 to 20) mA isolated programmable HART® transmitter with digital display and general purpose aluminum housing with glass lid
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[1]	Epoxy Coating
GS	Ground screw
I	Stainless tag
NB	1/2" NPT nylon conduit reducer bushing
SB	1/2" NPT conduit reducer bushing
T71-00	(4 to 20) mA isolated programmable transmitter
T72-00	(4 to 20) mA isolated programmable HART® 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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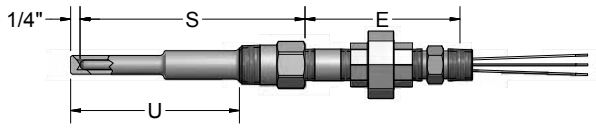
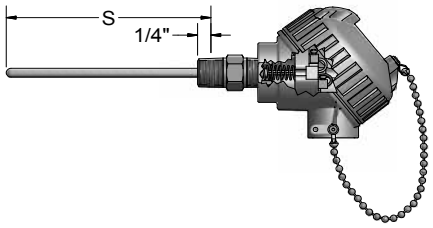
Sensors with Connection Heads

Configuration Code GP03
Spring-Loaded RTD/Thermowell Assemblies with General-Purpose Connection Heads

Spring-Loaded RTD/Thermowell Assemblies with General-Purpose Connection Heads are designed for use with various thermowell types. Complete assemblies can be ordered by selecting the RTD 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 are available in various tolerances and temperature ranges as noted in the tables below.





ORDER CODES

Example Order Number:

1-0	1-1	1-2		2-0		3-0		4-0	4-1	4-2	
R1T185L	48	3	-	Select Thermowell Part # or Insert 3 Digit Length Code	-	SL	-	8HN	31,	T	Select Type and Range from back of section

1-0 100 Ω Platinum RTD Elements α = 0.003 85 °C^{-1}

CODE		TOLERANCE[1]	TEMP. RANGE
SINGLE	*DUPLEX*		
R1T185L	R1T285L	Grade B	(-200 to 200) °C
R5T185L	R5T285L	(1/5) Class B	(-30 to 150) °C
RBF185L	RBF285L	Class B	(-50 to 200) °C
RAF185L	RAF285L	Class A	(-30 to 200) °C
R1T185H	R1T285H	Grade B	(-200 to 600) °C
RAT185H	RAT285H	Class A	(-100 to 450) °C

[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

1-2 Element Connection

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

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[1]	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, 36T, or 37T	

4-0 Head Mounting Fittings

CODE	DESCRIPTION	CODE	DESCRIPTION
STEEL FITTINGS		*316SS FITTINGS*	
6HN	1/2" x 1/2" NPT hex nipple 1" length	8HN	1/2" x 1/2" NPT hex nipple 1" length
6PN_	1/2" NPT pipe nipple (specify "E" length in inches)	8PN_	1/2" NPT pipe nipple (specify "E" length in inches)
6PU_ [1]	1/2" NPT union/nipple (specify "E" length in inches)	8PU_ [1]	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
35T142A	(4 to 20) mA HART® Field Transmitter with aluminum general-purpose housing
36T71-D10	(4 to 20) mA isolated programmable transmitter with digital display and general purpose aluminum housing with glass lid
36T72-D10	(4 to 20) mA isolated programmable HART® transmitter with digital display and general purpose aluminum housing with glass lid
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[1]	Epoxy Coating
GS	Ground screw
I	Stainless tag
NB	1/2" NPT nylon conduit reducer bushing
SB	1/2" NPT conduit reducer bushing
T31	(4 to 20) mA head-mounted RTD transmitter
T71-00	(4 to 20) mA isolated programmable transmitter
T72-00	(4 to 20) mA isolated programmable HART® 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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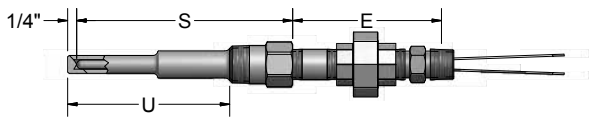
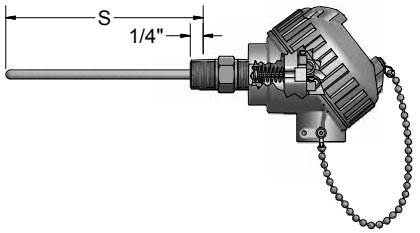
Configuration Code GP04
Spring-Loaded MgO Thermocouple/Thermowell Assemblies with General-Purpose Connection Heads

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.





ORDER CODES

Example Order Number:

1-0	1-1	1-2		2-0		3-0		4-0	4-1	4-2	
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		
SINGLE	*DUPLEX*	*TRIPLEX*
E	EE	-
J	JJ	JJJ
K	KK	KKK
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[1]	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, 36T, or 37T	

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4-0 Head Mounting Fittings

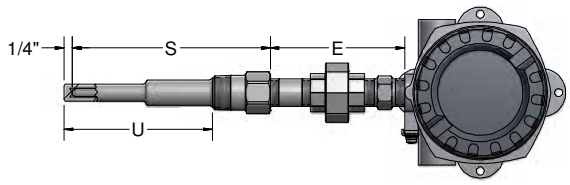
CODE	DESCRIPTION
STEEL FITTINGS	
6HN	1/2" x 1/2" NPT hex nipple 1" "E" length
6PN_	1/2" NPT pipe nipple (specify "E" length in inches)
6PU_ [1]	1/2" NPT union/nipple (specify "E" length in inches)
316 SS FITTINGS	
8HN	1/2" x 1/2" NPT hex nipple 1" "E" length
8PN_	1/2" NPT pipe nipple (specify "E" length in inches)
8PU_ [1]	1/2" NPT union/nipple (specify "E" length in inches)
[1] 4" Minimum length required	

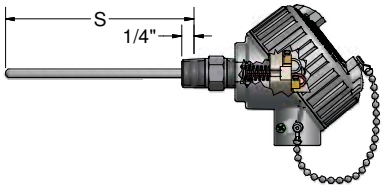
4-1 Head and Sheath Terminations

CODE	DESCRIPTION
22	3" Individual fluoropolymer leads with terminal pins
31	Aluminum screw-cover head
34	Cast iron screw-cover head
35T142A	(4 to 20) mA HART® Field Transmitter with aluminum general-purpose housing
36T71-D10	(4 to 20) mA isolated programmable transmitter with digital display and general purpose aluminum housing with glass lid
36T72-D10	(4 to 20) mA isolated programmable HART® transmitter with digital display and general purpose aluminum housing with glass lid
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[1]	Epoxy Coating
GS	Ground screw
I	Stainless tag
NB	1/2" NPT nylon conduit reducer bushing
SB	1/2" NPT conduit reducer bushing
T71-00	(4 to 20) mA isolated programmable transmitter
T72-00	(4 to 20) mA isolated programmable HART® 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.	

Sensors with Connection Heads

Spring-Loaded RTD/Thermowell Assemblies with Explosion-Proof Connection Heads are designed for use with various thermowell types. Complete assemblies can be ordered by selecting the RTD 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 are available in various tolerances and temperature ranges as noted in the tables below.





ORDER CODES

Example Order Number:

1-0	1-1	1-2		2-0		3-0		4-0	4-1	4-2	
RBF185L	**48**	**3**	**-**	Select Thermowell Part # or Insert 3 Digit Length Code	**-**	**SL**	**-**	**8HN**	**93,**	**T**	Select Type and Range from back of section

1-0 100 Ω Platinum RTD Elements α = 0.003 85 °C^{-1}

CODE		TOLERANCE[1]	TEMP. RANGE
SINGLE	*DUPLEX*		
R1T185L	R1T285L	Grade B	(-200 to 200) °C
R5T185L	R5T285L	(1/5) Class B	(-30 to 150) °C
RBF185L	RBF285L	Class B	(-50 to 200) °C
RAF185L	RAF285L	Class A	(-30 to 200) °C
R1T185H	R1T285H	Grade B	(-200 to 600) °C
RAT185H	RAT285H	Class A	(-100 to 450) °C

[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

1-2 Element Connection

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

2-0

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

4-1 Head Terminations

CODE	DESCRIPTION
74	Dual conduit DIN form B aluminum explosion-proof/flame-proof head, NEC, IEC, Atex approved
75T142C	(4 to 20) mA HART® field transmitter with aluminum explosion-proof housing
93	Aluminum explosion-proof/flame-proof head, NEC, IEC, Atex approved
94	316L stainless steel explosion-proof/flame-proof head, NEC, IEC, Atex approved

4-2 Options

SB	1/2" NPT conduit reducer bushing
I	Stainless tag
T31	(4 to 20) mA head-mounted RTD transmitter
T71-00	(4 to 20) mA isolated programmable transmitter
T72-00	(4 to 20) mA isolated programmable HART® transmitter
T82-00	(4 to 20) mA dual input, isolated HART® head-mounted transmitter
See transmitter ordering information in back of section.	

4-0 Head Mounting Fittings

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

3-0 Element Options

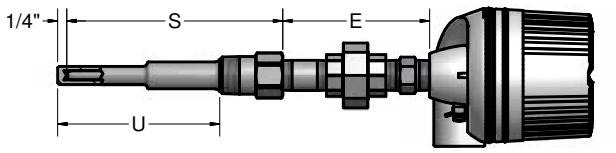
CODE	DESCRIPTION
SL[1]	Spring-loaded element
SC	Self-contained spring-loaded element
SN	Self-contained spring-loaded element with Buna-N oil seal 121°C [250°F] 100 PSI Max.
[1] Not available with option 75T	

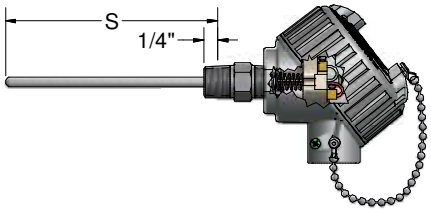
HART® is a registered trademark of HART Communication Foundation.

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.





ORDER CODES

Example Order Number:

1-0	1-1	1-2		2-0		3-0		4-0	4-1	4-2	
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		
SINGLE	*DUPLEX*	*TRIPLEX*
E	EE	-
J	JJ	JJJ
K	KK	KKK
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[1]	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 75T	

4-0 Head Mounting Fittings

CODE	DESCRIPTION
STEEL FITTINGS	
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)
316 SS FITTINGS	
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	Dual conduit DIN form B aluminum explosion-proof/flame-proof head, NEC, IEC, Atex approved
75T142C	(4 to 20) mA HART® field transmitter with aluminum explosion-proof housing
93	Aluminum explosion-proof/flame-proof head, NEC, IEC, Atex approved
94	316L stainless steel explosion-proof/flame-proof head, NEC, IEC, Atex approved
4-2 Options	
SB	1/2" NPT conduit reducer bushing
I	Stainless tag
T71-00	(4 to 20) mA isolated programmable transmitter
T72-00	(4 to 20) mA isolated programmable HART® transmitter
T82-00	(4 to 20) mA Dual input, isolated HART® head-mounted transmitter
See transmitter ordering information in back of section.	

HART® is a registered trademark of HART Communication Foundation.

Configuration Code TM01
T31 Programmable
RTD Temperature Transmitter

The T31 programmable RTD temperature transmitter is a 2-wire transmitter with an analog output. It has measurement input for Pt100 and Pt1000 resistance thermometers (RTD) in 2-, 3- or 4-wire connections. Setting up of the transmitter is done using the communication cable. These transmitters can be mounted in Pyromation connection heads or they can be surface mounted by using a 35 mm DIN-rail mounting clip.

TEMPERATURE HEAD TRANSMITTER

Universal head transmitter for Pt100 and Pt1000 resistance thermometers (RTD), programmable using a PC, for installation in a sensor head.

Features and Benefits

- PC programmable temperature head transmitter for converting the resistance input signal into a scalable (4 to 20) mA analog output signal
- Platinum resistance thermometer (RTD)
- Online configuration using PC with communication cable
- Universally PC programmable for Pt100 and Pt1000 signals
- 2-wire technology, (4 to 20) mA analog output
- High accuracy in total ambient temperature range
- Fault signal on sensor break or short circuit
- CE mark meets EMC Directive
- For use in ordinary locations for US and Canada meets 61010-1
- For use in hazardous locations
  Ex ec IIC Gc
  Class I, Zone 2, AEx ec IIC Gc
  Class I, Division 2, Groups A, B, C, D
- All materials are RoHS compliant

ORDER CODES

Unconfigured Order Number: **T31-00[1]**

Example Configured Order Number:

		1-0	2-0	3-0			4-0	5-0	
T 3 1	-	3	85	U	-	S (50-300)		F	

1-0

CODE	DESCRIPTION
2	RTD (2-wire)
3	RTD (3-wire)
4	RTD (4-wire)

2-0

CODE	DESCRIPTION
85	100 ohm platinum (α = 0.003 85 ºC^{-1})
92	100 ohm platinum (α = 0.003 92 ºC^{-1})
95	1000 ohm platinum (α = 0.003 85 ºC^{-1})

[1] Default setting for unconfigured transmitter is 4-wire Pt100 (0 -100) °C.

3-0

CODE	DESCRIPTION
U	Upscale Burnout ≥ 21.0 mA
D	Downscale Burnout ≤ 3.6 mA

4-0

RANGE
S (lower limit – upper limit)

5-0

CODE	DESCRIPTION
C	Celsius
F	Fahrenheit

Accessories

CODE	DESCRIPTION
10303	Communication Cable
10307	35 mm DIN-rail mounting clip

Complete Specifications are listed in the T31 Manual available at www.pyromation.com/TechInfo/Docs/aspx or scan QR code

Resistance Thermometer Input (RTD)

AS PER STANDARD	DESIGNATION	MEASURING RANGE LIMITS	MIN. SPAN
IEC 60751	Pt100 (α = 0.003 85 °C^{-1}) Pt1000 (α = 0.003 85 °C^{-1})	(–200 to 850) °C [–328 to 1562] °F (–200 to 250) °C [–328 to 482] °F	(10) °C [18] °F
JIS C1604:1984	Pt100	(–200 to 510) °C [–328 to 950] °F	(10) °C [18] °F
	Pt100 (Callendar van Dusen)	The measuring range limits are specified by entering the limit values that depend on the coefficients A to C and R0.	(10) °C [18] °F
	• Type of connection: 2-wire, 3-wire or 4-wire connection, sensor current: ≤ 0.3 mA • With 2-wire circuit, compensation of wire resistance possible (0 to 30 Ω) • With 3-wire and 4-wire connection, sensor wire resistance up to max. 50 Ω per wire		

Output

Analog Output Signal	4 to 20 mA, 20 to 4 mA (can be inverted)
Failure Information (per NAMUR NE43)	Failure information is created if the measuring information is missing or not valid. The error with the highest priority is displayed. Underranging: Linear drop from 4.0 to 3.8 mA Overranging: Linear increase from 20.0 to 20.5 mA Failure e.g. sensor failure; sensor short circuit: ≤ 3.6 mA ("Low") or ≥ 21 mA ("High"), can be selected
Switch-on delay	≤ 5 s, until the first valid measured value singal is present at the current output. While switch-on delay = I_a ≤ 3.8 mA

Power Supply

Supply Voltage	Values for non-hazardous areas, protected against polarity reversal: 10 V ≤ Vcc ≤ 36 V (standard)
Current Consumption	3.5 to 22.5 mA

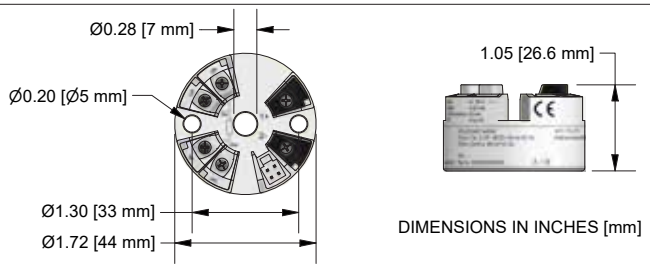
Performance Characteristics

Response Time	≤ 0.5 s			
Reference operating conditions	Calibration temperature: 25 °C ±3 °C (77 °F ±5.4 °F) • Supply voltage: 24 V DC • 4-wire circuit for resistance adjustment			
Maximum measured error	In accordance with DIN EN 60770 and the reference conditions specified above. The measured error data correspond to ±2 σ (Gaussian distribution). The data include non-linearities and repeatability. MV = measured value			
Transmitter measured error	±0.015 °C or 0.07% of span (whichever is higher) The measured error data correspond to 2 σ (Gaussian distribution)			
Operating Influences	**DESIGNATION**	**STANDARD**	**AMBIENT TEMPERATURE INFLUENCE (±) PER 1 °C (1.8 °F) CHANGE**	**SUPPLY VOLTAGE INFLUENCE (±) PER V CHANGE**
	Pt100	IEC 60751:2008	(0.04) °C [0.07] °F	(0.02) °C [0.04] °F
	Pt1000		(0.02) °C [0.03] °F	(0.01) °C [0.02] °F
	Pt100	JIS C1604:1984	(0.03) °C [0.05] °F	(0.02) °C [0.03] °F
	Pt100	GOST 6651-94	(0.04) °C [0.07] °F	(0.02) °C [0.04] °F
Long Term Drift (±) (based on measured value, whichever is higher)	After 1 year		(0.05) °C or 0.03% of span	
	After 3 years		(0.06) °C or 0.04% of span	
	After 5 years		(0.07) °C or 0.05% of span	
Calculation of the maxinum measured error of the analog value (current output): √(Measured error^2 + Influence of ambient temperature^2 + Influence of supply voltage^2 + Long Term Drift^2)				

Environment

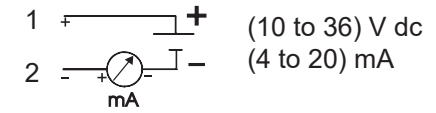
Ambient temperature	(-40 to 85) °C [-40 to 185] °F
Storage temperature	(-50 to 100) °C [-58 to 212] °F
Climatic class	C1 according to IEC 60654-1
Humidity	Condensation Permitted • Max. rel. humidity: 95% as per IEC 60068-2-30
Shock and Vibration resistance	Vibration resistance as per DNVGL-CG-0339 : 2015 and DIN EN 60068-2-27 8.6 to 150 Hz at 3g Shock resistance as per KTA 3505
Electromagnetic Compatibility (EMC)	CE conformity Electromagnetic compatibility in accordance with all the relevant requirements of the IEC/EN 61326 series and NAMUR Recommendation EMC (NE21) Maximum measured error <1% of measuring range Interference immunity as per IEC/EN 61326 series, industrial requirements Interference emission as per IEC/EN 61326 series (CISPR 11), Class B, group 1 equipment

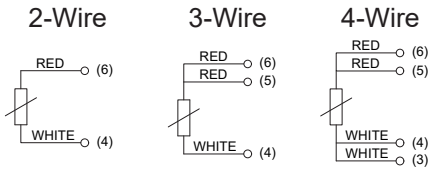
Mechanical Construction

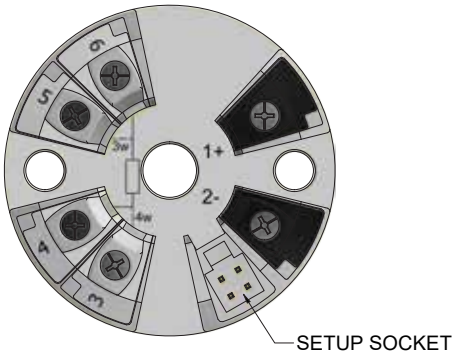
Dimensions	
Weight	Approximately 44 g
Materials	Housing: Polycarbonate • Potting: Polyurethane
Terminals	16 AWG (maximum)

Terminal Connections

Power supply and current output



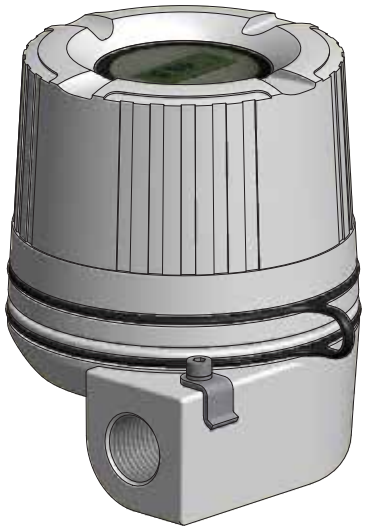


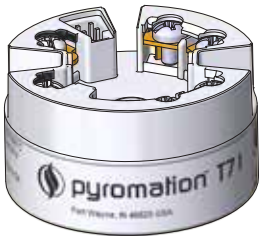


The T71 programmable temperature transmitter is a 2-wire transmitter with an analog output. It has measurement input for resistance thermometers (RTD) in 2-, 3- or 4-wire connections, thermocouples, resistance and voltage inputs. Setting up of the transmitter is done using the communication cable. These small units can be mounted in Pyromation DIN (Form B) connection heads or they can be used for surface mounting by using a 35 mm DIN-rail mounting clip.

TEMPERATURE HEAD TRANSMITTER

Universal head transmitter for resistance thermometers (RTD), thermocouples, resistance and voltage inputs, programmable using a PC, for installation in a sensor head (Form B)





Features and Benefits

- PC programmable temperature transmitter for converting various input signals into an scalable (4 to 20) mA analog output signal
- Universally programmable for Input types:
  Resistance thermometer (RTD)
  Thermocouple (TC)
  Resistance (Ω)
  Voltage (mV)
- High Accuracy in total ambient temperature range
- Fault signal on sensor break or short circuit
- Optional Display with direct mount or remote mount housing
- CE Marked meets EMC and ROHS Directive
- For use in ordinary locations for US and Canada meets 61010-1
- Galvanic isolation
- Intrinsically safe for hazardous locations
- Ex ia IIC T6...T4Ga
- Ex ia IIC T6...T4Gb
- Class I, Zone 0, AEx ia IIC T6...T4Ga
- Class I, Zone 1, AEx ia IIC T6...T4Gb
- IS Class I, Division 1, Groups A,B,C,D T6...T4
- IS Class I, Division 2, Groups A,B,C,D T6...T4
- Explosion-proof for hazardous locations
- With 79 enclosure
- Class I, Division 1, Groups A,B,C,D; T6...T4
- Class II, Division 1, Groups E, F, G; Class III

ORDER CODES

Example Configured Order Number:

1-0		2-0	3-0	4-0		5-0	6-0	7-0
T71-00	-	3	85	U	-	S (50-300)	F,	I

1-0 Transmitter Type

CODE	DESCRIPTION
T71-00	(4 to 20) mA isolated programmable transmitter
T71-D10	(4 to 20) mA isolated programmable transmitter with digital display
36T71-D10	(4 to 20) mA isolated programmable transmitter with digital display and general purpose aluminum housing with glass window
79T71A-D10	(4 to 20) mA isolated remote mount programmable transmitter with digital display aluminum housing with glass window. Intrinsic Safety: Class I, Division 2, Groups A,B,C,D;T6…T4 – NIFW and Associated Apparatus for Class I, Division 1, Groups A,B,C,D
79T71B-D10	(4 to 20) mA isolated remote mount programmable transmitter with digital display: Explosion-proof, Dust Ignition proof aluminum housing with glass window. Class I, Division 1, Groups A,B,C,D; Class II, Division 1 Groups E,F,G; Class III

3-0 Sensor Input

CODE	DESCRIPTION
J	Type J thermocouple
K	Type K thermocouple
T	Type T thermocouple
N	Type N thermocouple
E	Type E thermocouple
R	Type R thermocouple
S	Type S thermocouple
B	Type B thermocouple
85	100 ohm platinum (α = 0.003 85 $^{\circ}C^{-1}$)
55	500 ohm platinum (α = 0.003 85 $^{\circ}C^{-1}$)
95	1000 ohm platinum (α = 0.003 85 $^{\circ}C^{-1}$)
mV	Millivolts
W	Resistance

4-0 Fault Condition

CODE	DESCRIPTION
U	Upscale Burnout ≥ 21.0 mA
D	Downscale Burnout ≤ 3.5 mA

2-0 Configuration Input

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

[1] Default setting for unconfigured transmitter is 4-wire Pt100 (0 - 100) °C.

5-0

RANGE
S (lower limit – upper limit)

6-0 Unit of Measure

CODE	DESCRIPTION
C	Celsius
F	Fahrenheit

Accessories

CODE	DESCRIPTION	CODE	DESCRIPTION
10303	Communication cable	22808	Wall Mount Bracket (Option 79 only)
10307	35 mm DIN-rail mounting clip	22809	Pipe Mount Bracket (Option 79 only)

7-0

OPTIONS	
I [1]	Stainless Steel Tag

[1]Only available with 36 and 79 option

INPUT

Complete Specifications are listed in the T71 Manual available at www.pyromation.com/TechInfo/Docs/aspx or scan QR code

Resistance Thermometer (RTD)

AS PER STANDARD	DESIGNATION	MEASURING RANGE LIMITS	MINIMUM SPAN
IEC 60751	Pt100 (α = 0.003 85 °C^{-1}) Pt1000 (α = 0.003 85 °C^{-1})	(-200 to 850) °C [-328 to 1562] °F (-200 to 250) °C [-328 to 482] °F	(10) °C [18] °F (10) °C [18] °F
JIS C1604:1984	Pt100 (α = 0.003 92 °C^{-1})	(-200 to 510) °C [-328 to 950] °F	(10) °C [18] °F
	Pt100 (Callendar van Dusen)	The measuring range limits are specified by entering the limit values that depend on the coefficients A to C and R0.	(10) °C [18] °F
	Connection Type: 2-, 3- or 4-wire connection, sensor current: ≤ 0.3 mA With 2-wire circuit, compensation of wire resistance possible (0 to 30 Ω) With 3- and 4-wire connection, sensor wire resistance up to maximum 50 Ω per wire		
Resistance Transmitter	Resistance Ω	(10 to 400) Ω (10 to 2000) Ω	10 Ω 10 Ω

Thermocouples (TC)

AS PER STANDARD	DESIGNATION	MEASURING RANGE LIMITS	RECOMMENDED TEMPERATURE RANGE	MINIMUM SPAN
IEC 60584, Part 1 ASTM E230	B (PtRh30-PtRh6) E (NiCr-CuNi) J (Fe-CuNi) K (NiCr-Ni) N (NiCrSi-NiSi) R (PtRh13-Pt) S (PtRh10-Pt) T (Cu-CuNi)	(40 to 1820) °C [104 to 3308] °F (-250 to 1000) °C [-482 to 1832] °F (-210 to 1200) °C [-346 to 2192] °F (-270 to 1372) °C [-454 to 2501] °F (-270 to 1300) °C [-454 to 2372] °F (-50 to 1768) °C [-58 to 3214] °F (-50 to 1768) °C [-58 to 3214] °F (-200 to 400) °C [-328 to 752] °F	(500 to 1820) °C [932 to 3308] °F (-150 to 1000) °C [-238 to 1832] °F (-150 to 1200) °C [-238 to 2192] °F (-150 to 1200) °C [-238 to 2192] °F (-150 to 1300) °C [-238 to 2372] °F (50 to 1768) °C [122 to 3214] °F (50 to 1768) °C [122 to 3214] °F (-150 to 400) °C [-238 to 752] °F	(50) °C [90 °F] (50) °C [90 °F] (50) °C [90 °F] (50) °C [90 °F] (50) °C [90 °F] (50) °C [90 °F] (50) °C [90 °F] (50) °C [90 °F]
DIN 43710	U (Cu-CuNi)	(-200 to 600) °C [-328 to 1112] °F	(-150 to 600) °C [-238 to 1112] °F	(50) °C [90 °F]
	Internal reference junction (Pt100) External preset value: Configurable value (-40 to 85) °C [-40 to 185] °F Maximum sensor wire resistance 10 kΩ (If the sensor wire resistance is greater than 10 kΩ, an error message is output in accordance with NAMUR NE89.)			
Voltage transmitter (mV)	Millivolt transmitter (mV)	(-20 to 100) mV	-	5 mV

OUTPUT

Output Signal

Analog Output	(4 to 20) mA or (20 to 4) mA (can be inverted)
Transmission as	Temperature linear, resistance linear, voltage linear
Filter 1st	1st order digital filter: (0 to 120) s
Current Consumption	3.6 to 23 mA
-	Minimum Current Consumption 3.5 mA
-	Current Limit ≤ 23 mA
Switch on delay	7 s (during power up I_a ≤ 3.8 mA)
Electronic response time	1 s

Failure Mode per NAMUR NE43

Undershooting measurement range	Linear decrease from 4.0 to 3.8 mA
Exceeding measurement range	Linear increase from 20.0 to 20.5 mA
Sensor breakage/short circuit [1]	≤ 3.6 mA or ≥ 21.0 mA

Electrical Connection

Supply Voltage[1]	Values for non-hazardous areas, protected against polarity reversal: 10 V ≤ Vcc ≤ 36 V
Galvanic isolation (In/out)	Û = 2 kV AC for 1 minute (input/output)
[1] Values for hazardous area, see Ex Documentation	