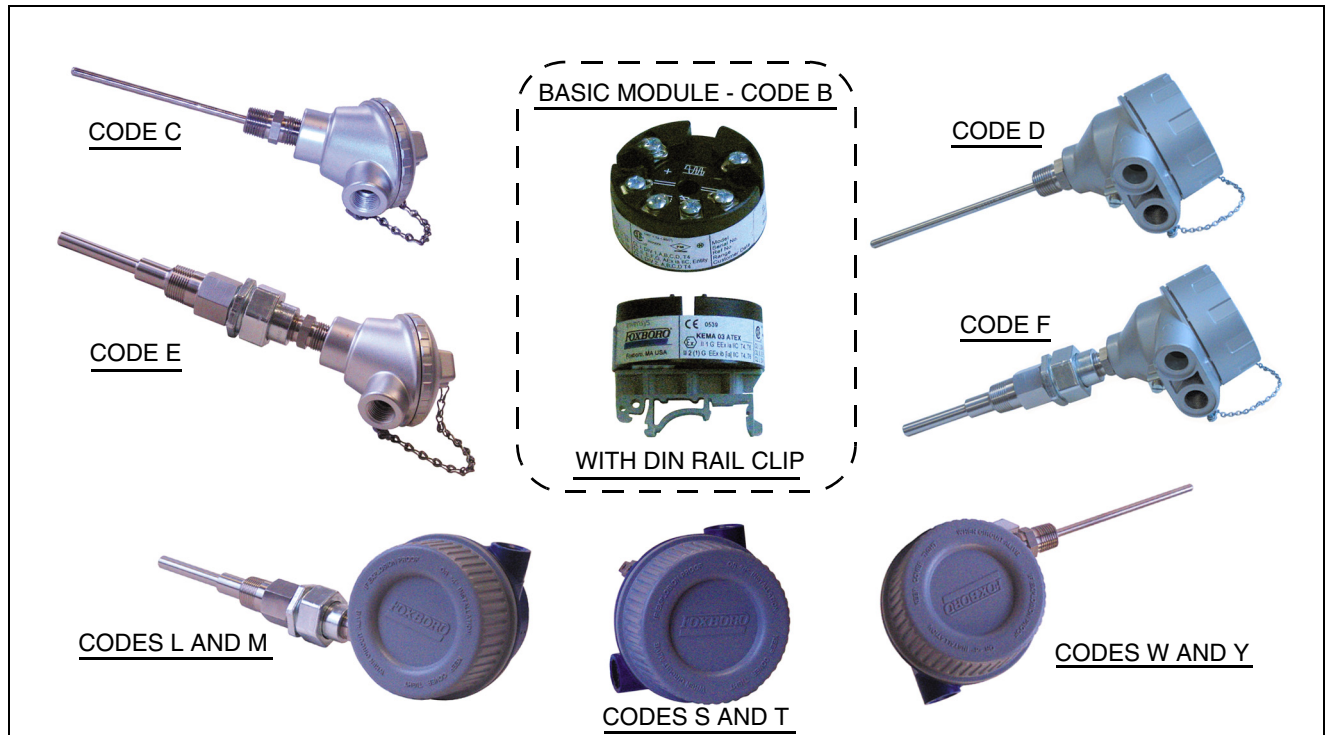


# I/A Series<sup>®</sup> Temperature Transmitters

## Model RTT15 with HART<sup>®</sup>, FOUNDATION<sup>®</sup> Fieldbus, or Profibus<sup>®</sup> Protocol



The RTT15 is a microprocessor based temperature transmitter with HART<sup>®</sup>, FOUNDATION<sup>®</sup> Fieldbus H1, or Profibus<sup>®</sup> PA Communication Protocol. It receives input signals from thermocouples, RTDs, ohm, or millivolt sources. It is available as a basic module, or in numerous housing configurations.

### FEATURES

- Two versions available:
  - 4 to 20 mA with HART digital output
  - FOUNDATION Fieldbus H1 or Profibus PA.
- Microprocessor-based technology means superior accuracy and long term stability.
- One unit configurable for TC, RTD, mV, and ohm.
- Supports 2-, 3-, or 4-wire RTDs.
- HART version allows average or difference measurement using dual 2-wire RTD or TC.
- Fieldbus/Profibus version allows average, difference, or redundant measurement using dual 2-wire RTD or TC, or combinations of 3-wire RTD with TC, or 2-wire RTD with TC.
- TC cold junction compensation via internal measurement, user-entered constant, or external RTD (2-wire for HART and 2- or 3-wire for Fieldbus/Profibus).
- Automatic self-diagnostics and self-calibration.
- Basic module can mount to surface or DIN rail.
- Wide selection of bare sensors and thermowells.
- Variety of weatherproof and explosionproof housings for remote and element mounting.
- Configurable failsafe mA value (HART).
- Input/output isolation.
- Maximum/minimum temperature logging.
- Conforms to applicable European Union Directives (product marked with "CE" logo).
- EMC immunity per EU Directive 89/336/EEC.
- Compliant with NAMUR NE 21 criterion for burst.
- FISCO (Fieldbus Intrinsically Safe Concept) certified for Fieldbus/Profibus version.
- Meets many testing agency requirements for hazardous area installations.
- Standard 5-year warranty.

## GENERAL DESCRIPTION

The RTT15 provides a wide range of packaging, sensor types, and options along with a choice of HART, FOUNDATION Fieldbus H1, or Profibus PA communication protocols, thus making this transmitter suitable for most temperature measurement applications. The microprocessor-based electronics minimizes ambient temperature effects and results in high accuracy, repeatability, and linearization of the sensor signal. Ease of mounting and installation makes these transmitters an extremely attractive offering.

### I/A Series® INTELLIGENT TEMPERATURE TRANSMITTER FAMILY

The RTT15 is part of the Invensys Foxboro intelligent temperature transmitter family, which also includes Models RTT20 and RTT25. The table below lists a few parameters relating to each transmitter model, and the applicable PSSs which give specifications and a more complete description.

PSS No. or Parameter	RTT15	RTT20	RTT25
PSS Number	2A-1F5 A	2A-1F4 A	2A-1F4 C
HART: 4 to 20 mA and Digital	YES	YES	NO
FoxCom: 4 to 20 mA and Digital	NO	YES	NO
4 to 20 mA Analog - No Digital	NO	YES	NO
FOUNDATION Fieldbus, Digital	YES	NO	YES
Profibus, Digital	YES	NO	NO
Thermocouple Input	YES	YES	YES
RTD Input (a)	YES	YES	YES
Milliamp Input	NO	NO	YES
Millivolt Input	YES	YES	YES
Ohm Input	YES	YES	YES
Dew Point Input	NO	YES	NO
Custom Input	NO	YES	YES
Dual Inputs	YES	YES	YES
Indicator	NO	YES	YES

(a) Platinum and nickel RTDs for all Models; copper RTD for RTT20 and RTT25 only.

## EFFICIENT AND DURABLE

Industrial-grade integrated circuits and sealed electronics combine to make this microprocessor-based transmitter an efficient and durable device.

## MULTIPLE PACKAGING CONFIGURATIONS

The transmitter is suitable for use in a variety of applications. A transmitter with an integrally mounted sensor (and well, if desired) is mounted directly to the process. Surface- and pipe-mounted configurations allow the transmitter to be mounted remotely from the process. The DIN B size basic transmitter module is intrinsically safe and is offered for replacement or spare parts purposes, for mounting to a surface, or for mounting to a DIN rail using a simple clip. A selection of weatherproof and explosionproof terminal heads is offered to satisfy hazardous area installations. Built-in protection from vibration and RFI is also provided. See Figure 1.

## INPUT TYPES

This RTT15 Transmitter can be used with a wide variety of temperature sensors, including 2-, 3-, and 4-wire RTDs, most popular thermocouples, and other resistance and millivolt input devices. The following is a general list of transmitter input types:

- Platinum RTDs, 2-, 3-, and 4-wire
- Nickel RTD, 3-wire
- Thermocouples
- Millivolt
- Ohm
- Average, difference, or redundant measurement with two RTDs, two TCs, or two mV inputs (redundant measurement with Fieldbus/Profibus version only).

## REMOTE COMMUNICATIONS

Remote digital communication is provided with either FOUNDATION Fieldbus H1, Profibus PA, or HART communication protocols. One module is used for Fieldbus/Profibus protocols. It has a unique feature of recognizing both Fieldbus and Profibus protocols, and automatically switching to the applied protocol. The HART electronics is in a separate basic module. See the paragraphs that follow.

### Foundation Fieldbus H1 Protocol (Version -F Electronics)

This is an all digital, serial, two-way communication system which interconnects field devices, such as transmitters, actuators, and controllers. It is a Local Area Network (LAN) with built-in capability to distribute control application across the network. Fieldbus technology consists of a Physical Layer, a Communication Stack, and User Application Blocks.

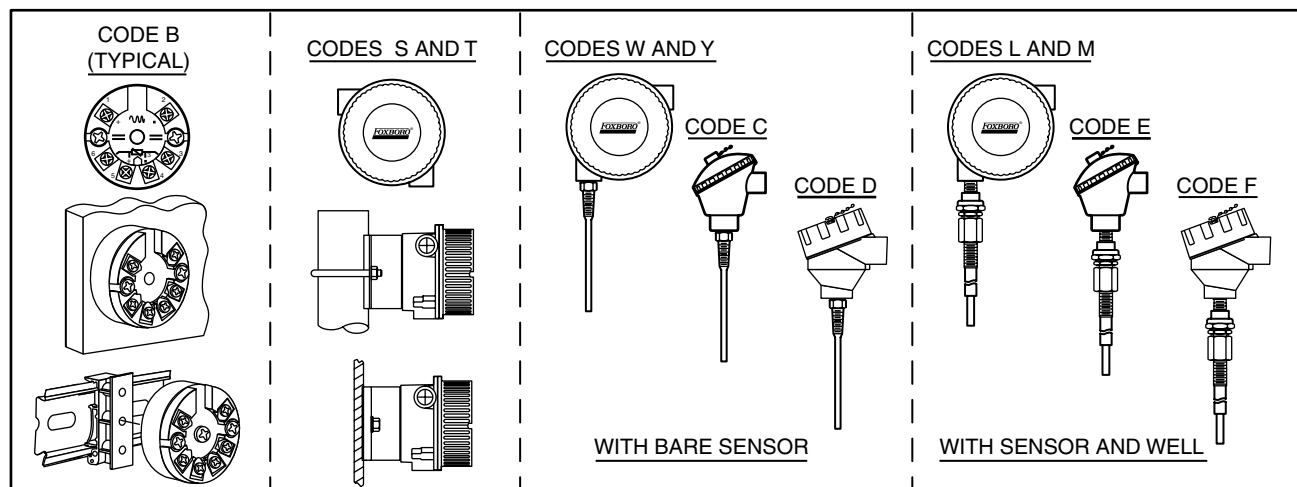


Figure 1. Multiple Packaging Configurations with Housing Codes Indicated

**REMOTE COMMUNICATIONS (Cont.)****Profibus PA Protocol  
(Version -P Electronics)**

This is an all digital, serial, two-way communication system which interconnects field devices, such as transmitters, actuators, and controllers. It is a vendor-independent, open fieldbus standard conforming to international standards. The Profibus PA profile is used with these transmitters. Profibus technology consists of a Physical Layer, a Communication Stack, and User Application Blocks.

**Digital HART and 4 to 20 mA dc Protocol  
(Version -T Electronics)**

4 to 20 mA with HART communications. Allows direct analog connection to common receivers while still providing full intelligent digital communications using a HART Communicator or PC-based configurator.

Users having the HART Communicator for other devices can have them upgraded with Invensys Foxboro software to accommodate these transmitters. Also, Invensys Foxboro will make use of the HART Foundation library of registered DDs, and reload the HART Communicator if the user desires to keep another supplier's DD along with the Invensys Foxboro DD.

**RUGGED AND RELIABLE SENSORS**

Invensys Foxboro supplied integral sensors are of high quality and rugged construction, designed for maximum accuracy and longevity. Sensors provided for use with thermowells include a spring loading mechanism to assure contact between sensor tip and well.

**GALVANIC ISOLATION**

Galvanic isolation is provided for both input and output.

**AUTOMATIC SELF-CALIBRATION**

This transmitter has an advanced automatic self-calibration routine. Several times per minute, the transmitter checks the zero and full scale output against highly accurate and stable internal voltage signals that are referenced back to the factory calibration stored in nonvolatile EEPROM memory. Any necessary adjustments are made automatically without interrupting the output signal.

**OUT-OF-RANGE AND FAILURE CURRENT  
(VERSION -T ELECTRONICS)**

Low out-of-range and high out-of-range output values are user configurable between 3.5 and 23 mA. A configuration selection for NAMUR 43 (3.8 and 20.5 mA) is also provided.

The transmitter can also be configured for sensor error detection. Output values are independently configurable between 3.5 and 23 mA for both shorted and open sensor conditions. Configuration selections are also provided for direct selection of NAMUR 43 low (3.5 mA) and NAMUR 43 high (23 mA), both independently selectable for either shorted or open sensor conditions. Shorted sensor detection not applicable for thermocouples.

**OPERATING, TRANSPORTATION, AND STORAGE CONDITIONS**

<b>Influence</b>	<b>Operative Limits</b>	<b>Transportation and Storage Limits</b>
Ambient Temperature	-40 and +85°C (-40 and +185°F)	-54 and +85°C (-65 and +185°F)
Relative Humidity	0 and 95% (noncondensing)	0 and 95% (noncondensing)
Supply Voltage <ul style="list-style-type: none"> <li>• HART (a)</li> <li>• FOUNDATION Fieldbus (b)</li> <li>• Profibus (b)</li> </ul>	<ul style="list-style-type: none"> <li>• 8 and 28 V dc</li> <li>• 9 and 30 V dc (c)</li> <li>• 9 and 30 V dc (c)</li> </ul>	<ul style="list-style-type: none"> <li>• Not Applicable</li> <li>• Not Applicable</li> <li>• Not Applicable</li> </ul>
Vibration - Housing Code B	0 and 40 m/s <sup>2</sup> (0 and 4 "g") from 2 to 100 Hz (d)	107 mm (42 in) Drop in shipping container
Vibration - Housing Codes S, T, L, M, W, and Y	19 mm (0.75 in) Double Amplitude from 5 to 9 Hz. 0 and 30 m/s <sup>2</sup> (0 and 3 "g") from 9 to 500 Hz (e)	107 mm (42 in) Drop in shipping container

(a) Refer to Figure 3 for supply voltage vs. external loop load limitations graph.

(b) Power supplied by a specific Fieldbus or Profibus power supply, as applicable.

(c) For FISCO (Fieldbus Intrinsically Safe Concept) installations, the maximum voltage is 17.5 V dc.

(d) Per Lloyd's specification number 1.

(e) 10 m/s<sup>2</sup> (1 g) maximum with Housing Codes M, T, or Y (316 ss housings).

**NOTE**

To ensure proper operation, the ambient temperature limits at the housing should not be exceeded. This is particularly relevant when sensors/wells are direct-connected to the housing and very high process temperatures are being measured. The transfer of heat from the process to the housing can be minimized by use of thermowell extensions, or in extreme cases, by using a remote housing installation.

**PERFORMANCE SPECIFICATIONS****Transmitter Accuracy<sup>(1)</sup> - General Value**

FIELDBUS/PROFIBUS

±0.05% of reading for all input types.

HART

±0.05% of span for all input types.

**Transmitter Accuracy<sup>(1)</sup> - Basic Values**

PLATINUM RTD INPUT

±0.1°C (±0.18°F)

NICKEL RTD INPUT

Fieldbus/Profibus: ±0.15°C (±0.27°F)

HART: ±0.2°C (±0.36°F)

TC TYPE E, J, K, L, N, T, AND U INPUT

±0.5°C (±0.9°F)

TC TYPE B, R, S, W3, AND W5 INPUT

±1.0°C (±1.8°F)

LINEAR RESISTANCE INPUT

Fieldbus/Profibus: ±0.05 Ω

HART: ±0.1 Ω

MILLIVOLT INPUT

±10 μV

**Temperature Coefficient - General Value**

FIELDBUS/PROFIBUS

±0.002% of reading per °C for all input types

±0.0036% of reading per °F for all input types

HART

±0.005% of span per °C for all input types

±0.009% of span per °F for all input types

**Temperature Coefficient - Basic Values**

RTD AND THERMOCOUPLE INPUT

Fieldbus/Profibus: ±0.002°C/°C (±0.0036°F/°F)

HART: ±0.005°C/°C (±0.009°F/°F)

TC TYPE E, J, K, L, N, T, AND U INPUT

Fieldbus/Profibus: ±0.010°C/°C (±0.018°F/°F)

HART: ±0.025°C/°C (±0.045°F/°F)

TC TYPE B, R, S, W3, AND W5 INPUT

Fieldbus/Profibus: ±0.025°C/°C (±0.045°F/°F)

HART: ±0.1°C/°C (±0.18°F/°F)

LINEAR RESISTANCE INPUT

Fieldbus/Profibus: ±0.002 Ω/°C (±0.0036 Ω/°F)

HART: ±5 mΩ/°C (±9 mΩ/°F)

MILLIVOLT INPUT

Fieldbus/Profibus: ±0.2 μV/°C (±0.36 μV/°F)

HART: ±0.5 μV/°C (±0.9 μV/°F)

(1) Transmitter accuracy is the greater of the general or basic values listed. This value does not include specific sensor effects.

**PERFORMANCE SPECIFICATIONS (Cont.)****Accuracy - Cold Junction Temperature**

FIELD BUS/PROFIBUS

±0.5°C (±0.9°F)

HART

±1.0°C (±1.8°F)

**EMC Immunity Effect**

±0.1% of reading per EU (European Union)

Directive 89/336/EEC

**NAMUR NE 21 A Burst Criterion**

±1% of span with a test voltage of 2 kV

**Supply Voltage Effect**

The output changes < 0.005% of span for each

1 volt change within the specified voltage range.

**FUNCTIONAL SPECIFICATIONS****Span and Range Limits - RTD Input**

RTD Type	Span Limits HART (a)		Range Limits	
	°C	°F	°C	°F
Platinum, 100 Ω (b)(d)	10 and 1050	18 and 1890	-200 and +850	-328 and +1562
Nickel, 100 Ω (c)(d)	10 and 310	18 and 558	-60 and +250	-76 and +482

(a) Span limits do not apply with digital Fieldbus or Profibus protocol.

(b) Platinum, 100 Ω; 2-, 3-, or 4-wire RTDs (also see Model Code).

(c) Nickel, 100 Ω; 3-wire RTD (also see Model Code).

(d) Transmitter has configurable RTD factor to allow use of Pt 25 through Pt 1000 or Ni 25 through Ni 1000 RTDs (Fieldbus/Profibus version also accepts Cu 10 through Cu 1000 RTDs).

**Span and Range Limits - TC Input**

TC Type	Span Limits HART (a)		Range Limits	
	°C	°F	°C	°F
B	100 and 1420	180 and 2556	400 and 1820	752 and 3308
E	50 and 1100	90 and 1980	-100 and +1000	-148 and +1832
J	50 and 1300	90 and 2340	-100 and +1200	-148 and +2192
K	50 and 1552	90 and 2794	-180 and +1372	-292 and +2502
L	50 and 1100	90 and 1980	-200 and +900	-328 and +1652
N	50 and 1480	90 and 2664	-180 and +1300	-292 and +2372
R	100 and 1810	180 and 3258	-50 and +1760	-58 and +3200
S	100 and 1810	180 and 3258	-50 and +1760	-58 and +3200
T	50 and 600	90 and 1080	-200 and +400	-328 and +752
U	50 and 800	90 and 1440	-200 and +600	-328 and 1112
W3	100 and 2300	180 and 4140	0 and 2300	32 and 4172
W5	100 and 2300	180 and 4140	0 and 2300	32 and 4172

(a) Span limits do not apply with digital Fieldbus or Profibus protocol.

**Span and Range Limits - Linear Resistance Input**

Protocol	Span Limits	Range Limits
Fieldbus	(a)	0 and 10 000 Ω
Profibus	(a)	0 and 10 000 Ω
HART	25 and 7 000 Ω	0 and 7 000 Ω

(a) Span limits do not apply with Fieldbus or Profibus protocol.

**Span and Range Limits - Millivolt Input**

Protocol	Span Limits	Range Limits
Fieldbus	(a)	-800 and +800 mV
Profibus	(a)	-800 and +800 mV
HART	2.5 and 1600 mV	-800 and +800 mV

**Current Consumption (Fieldbus/Profibus)**

<11 mA

**Response Time**

1 to 60 s, configurable

**Warm-Up Time**

30 s

**Updating Time - Single Input**

FIELD BUS/PROFIBUS

< 400 ms

HART

440 ms (660 ms for difference)

## FUNCTIONAL SPECIFICATIONS (Cont.)

### RTD Cable Resistance Compensation – Transmitter-to-Sensor

#### 4-WIRE RTD

Transmitter compensates for cable resistance changes due to ambient temperature changes.

#### 3-WIRE RTD

Transmitter compensates for cable resistance changes due to temperature, as long as cables are exposed to the same ambient temperature.

#### 2-WIRE RTD

Transmitter compensates for constant cable resistance. User may enter resistance value, or transmitter will measure it during setup.

### Sensor Error Detection

Available for RTD, TC, and Ohms Inputs (Open and shorted for RTD and Ohms Inputs and open for TC inputs).

### Input Resistance

10 M $\Omega$  for Fieldbus, Profibus, and HART

### Resistance Temperature Detectors (RTDs)<sup>(1)</sup>

#### RTD TYPE

Pt100; 3-wire; ASTM-B Standard

Accuracy,  $\alpha = 0.00385$

Pt100; 3- and 4-wire; ASTM-A High Accuracy,  $\alpha = 0.00385$

Ni100; 3-wire; DIN 43760

#### RTD SHEATH

316 ss, -200 and +480°C (-320 and +900°F)

Inconel, -200 and +650°C (-320 and +1200°F)

#### SHEATH SEALANT

Epoxy compound applied at open end of sheath to prevent entry of moisture

#### MINIMUM IMMERSION

90 mm (3.5 in) is required to minimize thermal conduction errors

#### RESPONSE TIME

5 s maximum for a 63% recovery; based on a step change in temperature of the bare sensor starting at an ambient room temperature of 25°C (77°F) to being immersed in 100°C (212°F) water stirred at 1 m/s (3 ft/s)

#### EXTERNAL CONNECTING WIRE

Color coded leads; stranded 0.50 mm<sup>2</sup> or 22 AWG; ptfe insulation

### Thermocouples (TCs)<sup>(2)</sup>

TC TYPE (FOXBORO TCs PER ASTM E608)

Base metal types E, J, K, L, N, T, and U

Platinum metal types B, R, and S

Tungsten metal types W3 and W5

#### TC SHEATH

316 ss, -200 and +900°C (-320 and +1650°F)

Inconel, -200 and +1150°C (-320 and +2100°F)

#### SHEATH SEALANT

Epoxy compound applied at open end of sheath to prevent entry of moisture

#### MINIMUM IMMERSION

90 mm (3.5 in) is required to minimize thermal conduction errors

#### RESPONSE TIME

5 s maximum for a 63% recovery; based on a step change in temperature of the bare sensor starting at an ambient room temperature of 25°C (77°F) to being immersed in 100°C (212°F) water stirred at 1 m/s (3 ft/s)

#### EXTERNAL CONNECTING WIRE

Color coded leads; stranded 0.080 mm<sup>2</sup> or 20 AWG; fiberglass insulation

### Thermowells

The wells listed in the Model Code are popular selections for industrial use. In addition, Invensys Foxboro offers other high quality, polished wells in a variety of configurations, materials, and sizes. Most application requirements (including special applications such as the dairy industry and pulp digester applications) can be met by choosing from the wide selection offered. Specify Code TX and see PSS 3-3C1 A for complete Thermowell specifications and ordering instructions. See Figure 2 for a small sample of wells available.

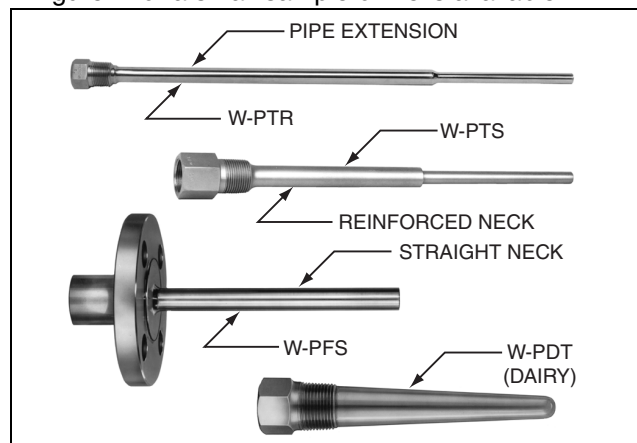


Figure 2. Typical W-Series Thermowells

(1) RTDs listed are available assembled to RTT15 Transmitter. The transmitter can also be configured for 2-wire and Pt 1000 RTDs. See RTD Span and Range Limits table on previous page.

(2) TCs listed are available assembled to RTT15 Transmitter. The transmitter can also be configured for other TC types. See PC Span and Range Limits table on previous page.

## FUNCTIONAL SPECIFICATIONS (Cont.)

### Supply Voltage Requirements and External Loop Load Limitations

#### FIELDBUS/PROFIBUS DIGITAL OUTPUT

Power supplied by a specific Fieldbus or Profibus power supply connected to the bus.

#### HART 4 TO 20 mA OUTPUT WITH A SUPERIMPOSED DIGITAL SIGNAL

Nominal minimum supply voltage is 8 V dc, and maximum is 28 V dc. See Figure 3 for a plot of supply voltage vs. output load.

### FOUNDATION Fieldbus H1 (Version -F) and Profibus PA (Version-P) Communications

Fieldbus and Profibus are both serial, two-way communication systems that run at 31.25 kbits/s. The digital output signal is superimposed on the dc power signal on the bus, and controlled by a strict cycle schedule and protocol. Supply voltage, 9 to 30 V dc, is by a specific Fieldbus or Profibus power source. For FISCO installations, the maximum voltage is 17.5 V dc. See Table 1 for communication parameters and Figures 4 and 5 for typical installation topologies.

### HART (Version-T) Communications

#### 4 TO 20 mA ANALOG MODE

A minimum loop load of 250 ohms is required when using a HART Communicator or PC-based Configurator. See Table 1 for communication parameters and Figure 6 for 4 to 20 mA output block diagram.

#### MULTIDROP MODE (FIXED CURRENT)

This mode supports communications with up to 15 transmitters on a single pair of signal/power wires. A minimum loop load of 250 ohms is required when using a HART Communicator or PC-based Configurator. See Table 1 for communication parameters and Figure 7 for a typical multidrop block diagram.

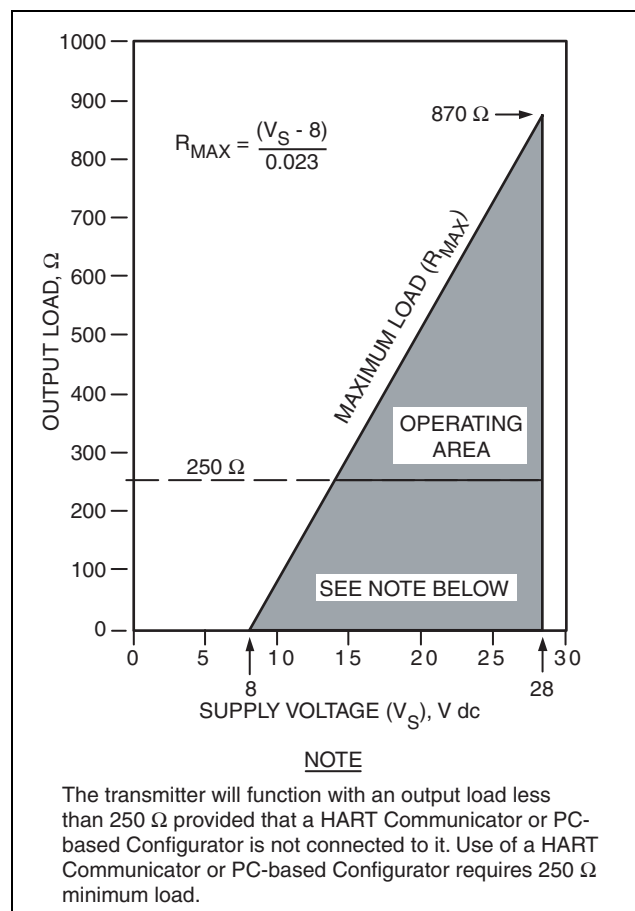


Figure 3. HART 4 to 20 mA Output Supply Voltage vs. Output Load

Table 1. Communication Parameters - FOUNDATION Fieldbus, Profibus, and HART Protocols

Parameter	Fieldbus	Profibus	HART	
	Digital	Digital	Analog Mode	Multidrop Mode
Remote Configurator	PC or Fieldbus Host	PC or Profibus Host	HART Communicator or PC-based Configurator	
Communication Rate	31.25 kbits/s	31.25 kbits/s	1200 baud	1200 baud
Communication Distance (Rated)	1900 m (6235 ft) (a)	1900 m (6235 ft) (a)	3050 m (10 000 ft)	1525 m (5000 ft)

(a) Total cable length includes spur length. Maximum spur length is 120 m (395 ft). Minimum spur length is 1 m (3.3 ft).

FUNCTIONAL SPECIFICATIONS (Cont.)

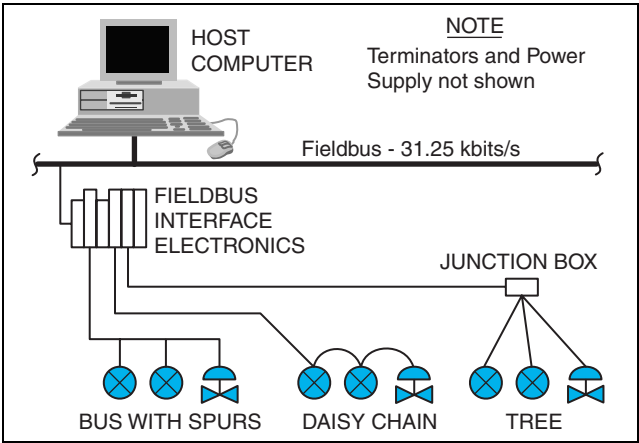


Figure 4. Typical Installation Topologies (FOUNDATION Fieldbus)

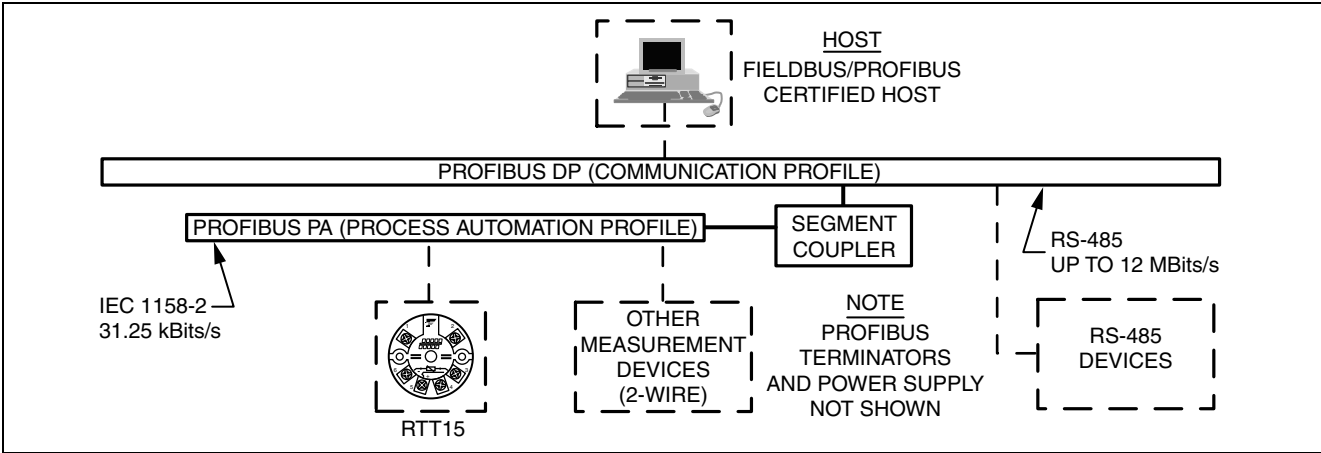


Figure 5. Typical Profibus Installation Topology

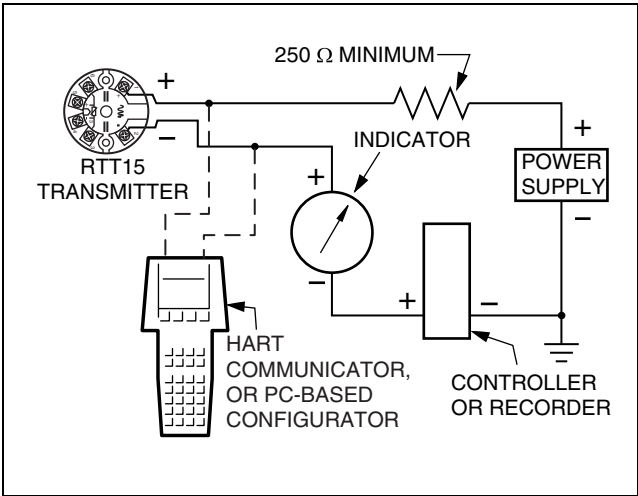


Figure 6.  
HART 4 to 20 mA Output Block Diagram  
(One Transmitter)

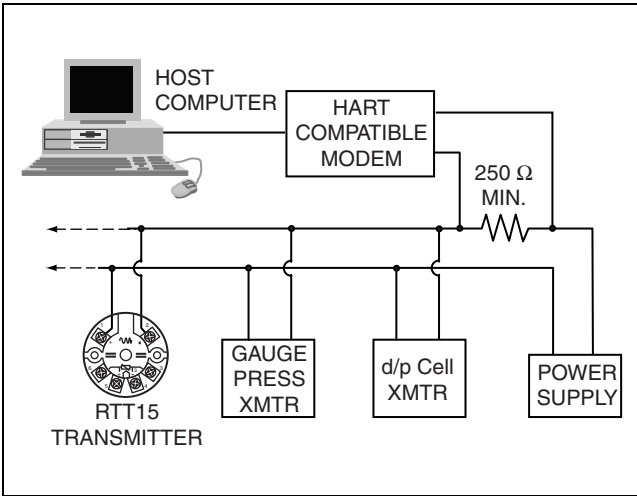


Figure 7.  
HART Multidrop Block Diagram  
(Up to Fifteen Transmitters)



## PHYSICAL SPECIFICATIONS

### Transmitter Housings

Housing Code	Material and Finish	IEC/NEMA Rating	Explosionproof and Flameproof	Mounting Configuration	Field Wiring Connections on Housing	Housing Cover Gasket
B	Encapsulated plastic	IP68 (a)	NO	Basic Module (b) (DIN Form B pkg.)	None	Not Applicable
C	Low copper aluminum alloy	IP65 NEMA 4	NO	Weatherproof connection head with integral bare sensor	1/2 NPT (c)	O-Ring Buna N
D	Low copper aluminum alloy; painted	IP66 NEMA 4X	YES	Explosionproof connection head with integral bare sensor	1/2 NPT (c)	Gasket Buna N
E	Low copper aluminum alloy	IP65 NEMA 4	NO	Weatherproof connection head with integral sensor and well	1/2 NPT (c)	O-Ring Buna N
F	Low copper aluminum alloy; painted	IP66 NEMA 4X	YES	Explosionproof connection head with integral sensor and well	1/2 NPT (c)	Gasket Buna N
L	Low copper aluminum alloy; epoxy coated	IP66 NEMA 4X	YES	Universal housing with integral sensor and well	1/2 NPT (c)	O-Ring Buna N
M	Stainless steel	IP66 NEMA 4X	YES	Universal housing with integral sensor and well	1/2 NPT (c)	O-Ring Buna N
S	Low copper aluminum alloy; epoxy coated	IP66 NEMA 4X	YES	Universal housing for surface or pipe mounting, remote sensor (e)	1/2 NPT (c)(d)	O-Ring Buna N
T	Stainless steel	IP66 NEMA 4X	YES	Universal housing for surface or pipe mounting, remote sensor (e)	1/2 NPT (c)(d)	O-Ring Buna N
W	Low copper aluminum alloy; epoxy coated	IP66 NEMA 4X	YES	Universal housing with integral bare sensor	1/2 NPT (c)	O-Ring Buna N
Y	Stainless steel	IP66 NEMA 4X	YES	Universal housing with integral bare sensor	1/2 NPT (c)	O-Ring Buna N

(a) IEC IP68 applies to the encapsulated electronics only, and not to the six protruding input/output terminals.

(b) The basic module is typically used for replacement and spares purposes; it can also be mounted to a surface or to a DIN rail using a clip (Option -D1).

(c) Optional conduit thread adapters available; see Model Code.

(d) Two wiring connections on housing.

(e) Surface or pipe mounted using mounting set options -M1 or -M2.

**PHYSICAL SPECIFICATIONS (Cont.)****Electrical Connections**

There are six terminals on the basic module for input and output connections. Four terminals are for RTD, TC, ohm, or mV sensor inputs, and two terminals are for measurement output. With HART, the two output terminals are marked + and –; while with Fieldbus/Profibus, the two output terminals are polarity independent, and therefore not marked. Refer to DIMENSIONS - NOMINAL section.

**Mounting**

The basic transmitter module can be mounted to a DIN rail using the optional mounting clip and self-tapping screw provided by Invensys Foxboro. The basic module can also be mounted to a surface using user-supplied hardware. See DIMENSIONS - NOMINAL section.

The universal housing (without sensor) can be remote mounted to a surface or nominal DN 50 or 2-in pipe using the optional mounting bracket. See DIMENSIONS - NOMINAL section.

The connection head housings are sensor or thermowell mounted. See DIMENSIONS - NOMINAL section.

**Approximate Transmitter Mass**

Housing Code	Approximate Mass	
	kg	lb
B - Basic Module (a)	0.05	0.11
C - Weatherproof Head (c)	0.4	0.8
D - Explosionproof Head (c)	0.7	1.5
E - Weatherproof Head (d)	0.4	0.8
F - Explosionproof Head (d)	0.7	1.5
L - Universal Housing/Alum (d)	1.4	3.1
M - Universal Housing/ss (d)	3.2	7.1
S - Universal Housing/Alum (b)	1.4	3.1
T - Universal Housing/ss (b)	3.2	7.1
W - Universal Housing/Alum (c)	1.4	3.1
Y - Universal Housing/ss (c)	3.2	7.1

(a) Basic transmitter module.

(b) Surface or pipe mount housing; remote sensor.

(c) Includes module, but bare sensor mass and connecting hardware not included.

(d) Includes module, but sensor and well mass and connecting hardware not included.

**Dimensions - Nominal**

Refer to DIMENSIONS - NOMINAL section.

Table 2. Electrical Safety Specifications (See Note at end of table)

Testing Laboratory, Type of Protection, and Area Classification	Available with Housing Codes	Application Conditions	Electrical Safety Design Code
<b>ATEX (KEMA)</b> intrinsically safe, Zone 0, II 1 G, EEx ia, IIC; hazardous locations	All	Temperature Class T4 to T6. Available with HART version only.	E
<b>ATEX (KEMA)</b> intrinsically safe, Zone 0, II 1 G or II 2(1) G, EEx ia IIC or EEx ib [ia] IIC.		Temperature Class T4 to T6. Available with Bus versions only.	
<b>ATEX (KEMA)</b> flameproof, Zone 1, II 2 G, EEx d, IIC; hazardous locations.	D, F, L, M, S, T, W, and Y	Temperature Class T6. Flameproof certification not available for Housing Codes L or M if thermowell is supplied by others (Code NA).	D
<b>CSA</b> intrinsically safe, Class I, Division 1, Groups A, B, C, and D; and Class I, Zone 0, AEx ia IIC	B	Temperature Class T4 at 85°C (185°F). Connect per MI 020-449.	C
<b>CSA</b> Class I, Division 2, Groups A, B, C, and D hazardous locations. Division 2, Groups A, B, C, and D hazardous locations		Temperature Class T6 at 60°C (140°F) for Division 2 HART versions.	
<b>CSA</b> intrinsically safe, Class I, Division 1, Groups A, B, C, and D; dust-ignitionproof, Class II, Division 1, Groups E, F, and G; Class III, Division 1 hazardous locations;	C and E	Temperature Class T4 at 85°C (185°F). Connect per MI 020-477.	C
<b>CSA</b> Class I, Zone 0, AEx ia IIC; Type 4X		Temperature Class T6 at 60°C (140°F) for Division 2 HART versions.	
<b>CSA</b> nonincendive, Class I, II, and III, Division 2, Groups A, B, C, D, F, and G hazardous locations.			

Table 2. Electrical Safety Specifications (See Note at end of table) (Continued)

Testing Laboratory, Type of Protection, and Area Classification	Available with Housing Codes	Application Conditions	Electrical Safety Design Code
<b>CSA</b> Intrinsically safe, Class I, Division 1, Groups A, B, C, and D; dust-ignitionproof; Class II, Division 1, Groups E, F, and G; and Class III, Division 1 hazardous locations  <b>CSA</b> Class I, Zone 0, AEx ia IIC; Type 4X  <b>CSA</b> Class I, II, and III, Division 2, Groups A, B, C, D, F, and G hazardous locations.  <b>CSA</b> Explosionproof, Class I, Division 1, Groups B, C, and D; dust-ignitionproof, Class II, Division 1, Groups E, F, and G; and Class III Division 1 hazardous locations; and Type 4X	D, F, L, M, S, T, W, and Y	Temperature Class T4 at 85°C (140°F). Connect per MI 020-477.  Temperature Class T6 at 60°C (140°F) for Division 2 HART versions.  Temperature Class T6 at 80°C (176°F); T5 at 85°C (185°F) for explosionproof rating. Explosionproof certification not available for Housing Codes L or M if well is supplied by others (Code NA).	C
<b>FM</b> intrinsically safe, Class I, Division 1, Groups A, B, C, and D; and Class I, Zone 0, AEx ia IIC and AEx ib IIC.  <b>FM</b> nonincendive, Class I, Division 2, Groups A, B, C, and D hazardous locations	B	Temperature Class T4 at 85°C (185°F). Connect per MI 020-449.  Temperature Class T6 at 60°C (140°F) for nonincendive HART versions.	F
<b>FM</b> intrinsically safe, Class I, Division 1, Groups A, B, C, and D; dust-ignitionproof, Class II, Division 1, Groups E, F, and G, and Class III, Division 1 hazardous locations;  <b>FM</b> Class I, Zone 0, AEx ia IIC; Type 4X  <b>FM</b> nonincendive, Class I, II, and III, Division 2, Groups A, B, C, D, F, and G hazardous locations.	C and E	Temperature Class T4 at 85°C (185°F). Connect per MI 020-477  Temperature Class T6 at 60°C (140°F) for nonincendive HART versions.	F
<b>FM</b> Intrinsically safe, Class I, Division 1, Groups A, B, C, and D; dust-ignitionproof; Class II, Division 1, Groups E, F, and G; and Class III, Division 1 hazardous locations,  <b>FM</b> Class I, Zone 0, AEx ia IIC; Type 4X  <b>FM</b> Class I, II, and III, Division 2, Groups A, B, C, D, F, and G hazardous locations.  <b>FM</b> Explosionproof, Class I, Division 1, Groups B, C, and D; dust-ignitionproof, Class II, Division 1, Groups E, F, and G; and Class III Division 1 hazardous locations; and Type 4X	D, F, L, M, S, T, W, and Y	Temperature Class T4 at 85°C (140°F). Connect per MI 020-477.  Temperature Class T6 at 60°C (140°F) for nonincendive HART versions.  Temperature Class T6 at 80°C (176°F); T5 at 85°C (185°F) for explosionproof rating. Explosionproof certification not available for housing Codes L or M if thermowell is supplied by others (Code NA).	F

**NOTE**

This transmitter has been designed to meet the Electrical Safety descriptions listed above. Requests for approvals or certifications have been made (or in process) to the testing laboratories listed above. For detailed information, or status of testing laboratory approvals or certification, contact Invensys Foxboro.

## MODEL CODES

## Model Code - Basic Module Code B

Remote sensors not provided but can be ordered separately



HOUSING  
CODE B  
HART MODULE  
SHOWN

Description	Model
I/A Series Temperature Transmitter	RTT15
<b>Output Signal and Communication Protocol</b>	
Intelligent; Digital HART and 4 to 20 mA dc (Version -T)	-T
Intelligent; Digital FOUNDATION Fieldbus H1 (Version -F)	-F
Intelligent; Digital Profibus PA (Version -P)	-P
<b>Input Configuration (a)</b>	
Single Input; Configured for One Sensor	1
Dual Input; Configured for Average of two 2-wire sensors of same type (b)	4
Dual Input; Configured for Difference of two 2-wire sensors of same type (b)	5
Dual Input; Configured for Redundancy of two 2-wire sensors of same type (b) (Not available with Output Version -T/HART)	6
<b>Housing and Sensor Mounting (Basic Module - No Housing)</b>	
Basic Module used for Surface Mount, DIN Rail Mount, or Module Replacement	B
<b>Sensor Length</b>	
None - Sensor ordered separately	N
<b>Measurement Input Type (Software Selectable) (c)</b>	
Thermocouple, Type B, Platinum-Rhodium (Pt30Rh - Pt6Rh)	B
Thermocouple, Type E, Chromel-Constantan	E
Thermocouple, Type J, Iron-Constantan	J
Thermocouple, Type K, Chromel-Alumel	K
Thermocouple, Type L, Iron-Copper/Nickel	L
Thermocouple, Type N, Nicrosil-Nisil	N
Thermocouple, Type R, Platinum-Rhodium (Pt13Rh - Pt)	R
Thermocouple, Type S, Platinum-Rhodium (Pt10Rh - Pt)	S
Thermocouple, Type T, Copper-Constantan	T
Thermocouple, Type U, Copper-Copper/Low Nickel	U
Thermocouple, Type W3, Tungsten - Rhenium (K3Re-K25Re)	3
Thermocouple, Type W5, Tungsten - Rhenium (K5Re-K26Re)	5
RTD, Platinum, 2-wire, 100 $\Omega$ IEC 751 (ASTM-B Standard Accuracy)	2
RTD, Platinum, 3-wire, 100 $\Omega$ IEC 751 (ASTM-B Standard Accuracy) (d)	Q
RTD, Platinum, 4-wire, 100 $\Omega$ IEC 751 (ASTM-B Standard Accuracy) (d)	4
RTD, Platinum, 3-wire, 100 $\Omega$ IEC 751 (ASTM-A High Accuracy) (d)	A
RTD, Platinum, 4-wire, 100 $\Omega$ IEC 751 (ASTM-A High Accuracy) (d)	6
RTD, Nickel, 3-wire, 100 $\Omega$ DIN 43760 (d)	I
Ohm Input	O
Millivolt Input	M

Model Code continued on next page

**MODEL CODES (Continued)****Model Code - Basic Module Code B****Remote sensors not provided but can be ordered separately (Continued)**

<b><u>Description</u></b>	<b><u>Model</u></b>
<b><u>Thermowell Assembled to Housing</u></b> No Well, or Well is supplied separately	NA
<b><u>Electrical Safety (See Electrical Safety Specifications Section for Application Conditions)</u></b> Supplied without Agency Approval/Certification ATEX, Intrinsically Safe CSA, Intrinsically Safe and Division 2 FM, Intrinsically Safe and Nonincendive	Z E C F
<b><u>Optional Selections</u></b> Custom Database Configuration (requires C2 Form filled out with all data specified) Clip and Self-Tapping Screw provided to mount the Basic Module to a DIN Rail (e) Adapter Plate and Screws to allow mounting the RTT Basic Transmitter Module into existing E93, E94, 893, and RTT10 Transmitter housings. Omit Paper Instruction Manual and CD (f)	-C2 -D1 -D3 -K1
Example: RTT15-T1BNJNAC-C2D1	

- (a) Input configuration can be changed in the field by changing wiring terminations and reconfiguring.
- (b) For dual sensors of different types including 2- or 3-wire RTDs with a TC (Fieldbus and Profibus versions only), rely on user configuration or specify the -C2 option for custom configuration.
- (c) Transmitter is configured for measurement type specified, whether sensor is included or not. User can change configuration to a different type using appropriate configurator for selected protocol.
- (d) Measurement input types Q, 4, A, 6, and I not available with Dual Input Configuration Codes 4, 5, and 6.
- (e) Basic module is attached to mounting clip with a self-tapping screw, and shipped assembled for snapping onto the DIN rail.
- (f) Standard transmitter is shipped with a paper instruction manual that describes installation, operation, and configuration, and a CD that includes all pertinent documentation such as Parts Lists, Dimensional Prints, and more detailed instructions.

**MODEL CODES (Continued)****Model Code - Housing Codes S and T**

Remote sensors not provided but can be ordered separately

HOUSING  
CODES S AND TNOTE  
OPTIONAL  
MOUNTING  
SET NOT SHOWN

<b>Description</b>	<b>Model</b>
I/A Series Temperature Transmitter	RTT15
<b>Output Signal and Communication Protocol</b>	
Intelligent; Digital HART and 4 to 20 mA dc (Version -T)	-T
Intelligent; Digital FOUNDATION Fieldbus H1 (Version -F)	-F
Intelligent; Digital Profibus PA (Version -P)	-P
<b>Input Configuration (a)</b>	
Single Input; Configured for One Sensor	1
Dual Input; Configured for Average of two 2-wire sensors of same type (b)	4
Dual Input; Configured for Difference of two 2-wire sensors of same type (b)	5
Dual Input; Configured for Redundancy of two 2-wire sensors of same type (b)	6
(Not available with Output Version -T/HART)	
<b>Housing and Sensor Mounting (Housing for Surface or Pipe Mounting)</b>	
Universal Housing, Epoxy Coated Aluminum, for use with remote sensor	S
Remote Sensor ordered separately	
Universal Housing, 316 ss, for use with remote sensor	T
Remote Sensor ordered separately	
<b>Sensor Length</b>	
None - Sensor ordered separately	N
<b>Measurement Input Type (Software Selectable) (c)</b>	
Thermocouple, Type B, Platinum-Rhodium (Pt30Rh - Pt6Rh)	B
Thermocouple, Type E, Chromel-Constantan	E
Thermocouple, Type J, Iron-Constantan	J
Thermocouple, Type K, Chromel-Alumel	K
Thermocouple, Type L, Iron-Copper/Nickel	L
Thermocouple, Type N, Nicrosil-Nisil	N
Thermocouple, Type R, Platinum-Rhodium (Pt13Rh - Pt)	R
Thermocouple, Type S, Platinum-Rhodium (Pt10Rh - Pt)	S
Thermocouple, Type T, Copper-Constantan	T
Thermocouple, Type U, Copper-Copper/Low Nickel	U
Thermocouple, Type W3, Tungsten - Rhenium (K3Re-K25Re)	3
Thermocouple, Type W5, Tungsten - Rhenium (K5Re-K26Re)	5
RTD, Platinum, 2-wire, 100 $\Omega$ IEC 751 (ASTM-B Standard Accuracy)	2
RTD, Platinum, 3-wire, 100 $\Omega$ IEC 751 (ASTM-B Standard Accuracy) (d)	Q
RTD, Platinum, 4-wire, 100 $\Omega$ IEC 751 (ASTM-B Standard Accuracy) (d)	4
RTD, Platinum, 3-wire, 100 $\Omega$ IEC 751 (ASTM-A High Accuracy) (d)	A
RTD, Platinum, 4-wire, 100 $\Omega$ IEC 751 (ASTM-A High Accuracy) (d)	6
RTD, Nickel, 3-wire, 100 $\Omega$ DIN 43760 (d)	I
Ohm Input	O
Millivolt Input	M

Model Code continued on next page

**MODEL CODES (Continued)****Model Code - Housing Codes S and T****Remote sensors not provided but can be ordered separately (Continued)**

<b>Description</b>	<b>Model</b>
<b><u>Thermowell Assembled to Housing</u></b> No Well or Well ordered separately	NA
<b><u>Electrical Safety (See Electrical Safety Specifications Section for Application Conditions)</u></b> Supplied without Agency Approval/Certification ATEX, Intrinsically Safe ATEX, Flameproof CSA Intrinsically Safe, Explosionproof, and Division 2 FM, Intrinsically Safe, Explosionproof, and Nonincendive	Z E D C F
<b><u>Optional Selections - Housing Features</u></b> Custody Transfer Lock and Seal PG 13.5 Conduit Thread (in lieu of 1/2 NPT) (e) (Not available with Option -A3) Metric Conduit Thread Adapter (1/2 NPT to M20 x 1.5) (e) (Not available with Option -A2)	-A1 -A2 -A3
<b><u>Optional Selections - Mounting Sets</u></b> Carbon Steel (with finish) Mounting Set (f) Stainless Steel (with finish) Mounting Set (f)	-M1 -M2
<b><u>Optional Selections - Miscellaneous</u></b> Custom Database Configuration (Requires C2 Form filled out with all data specified) Omit Paper Instruction Manual and CD (g)	-C2 -K1
Example: RTT15-T1SNJNAC-A2M2C2	

(a) Input configuration can be changed in the field by changing wiring terminations and reconfiguring.

(b) For dual sensors of different types (Fieldbus and Profibus versions only), rely on user configuration, or specify the -C2 option for custom configuration.

(c) Transmitter is configured for measurement type specified, whether sensor is included or not. User can change configuration to a different type using appropriate configurator for selected protocol.

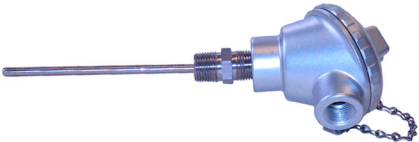
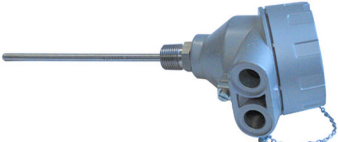
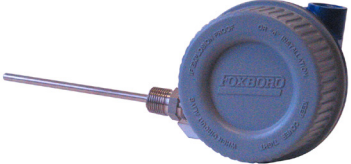
(d) Measurement input types Q, 4, A, 6, and I not available with Dual Input Configuration Codes 4, 5, and 6.

(e) Options -A2 and -A3 not available with Electrical Safety Codes C and F explosionproof installations.

(f) For mounting transmitter to a surface or nominal DN 50 or 2-in pipe.

(g) Standard transmitter is shipped with a paper instruction manual that describes installation, operation, and configuration, and a CD that includes all pertinent documentation such as Parts Lists, Dimensional Prints, and more detailed instructions.

**MODEL CODES (Continued)****Model Code - Housing Codes C, D, W, and Y**  
**Integral bare sensors provided**

HOUSING CODE C	HOUSING CODE D	HOUSING CODES W AND Y
		
<b>Description</b> I/A Series Temperature Transmitter	<b>Model</b> RTT15	
<b>Output Signal and Communication Protocol</b> Intelligent; Digital HART and 4 to 20 mA dc (Version -T) Intelligent; Digital FOUNDATION Fieldbus H1 (Version -F) Intelligent; Digital Profibus PA (Version -P)	-T -F -P	
<b>Input Configuration (a)</b> Single Input; Configured for One Sensor	1	
<b>Housing and Sensor Mounting (Integral Bare Sensors)</b> Weatherproof Connection Head, aluminum, weatherproof Explosionproof Connection Head, aluminum, explosionproof/flameproof Universal Housing, aluminum, explosionproof/flameproof Universal Housing, 316 ss, explosionproof/flameproof	C D W Y	
<b>Sensor Length - Dimension A (b)</b> 2 in (50 mm), Sensor included 2.5 in (64 mm), Sensor included 3 in (76 mm), Sensor included 3.5 in (89 mm), Sensor included 4 in (102 mm), Sensor included 4.5 in (114 mm), Sensor included  5 in (127 mm), Sensor included 5.5 in (146 mm), Sensor included 6 in (152 mm), Sensor included 7 in (178 mm), Sensor included 8 in (203 mm), Sensor included 9 in (229 mm), Sensor included 10 in (254 mm), Sensor included  11 in (279 mm), Sensor included 12 in (305 mm), Sensor included 18 in (457 mm), Sensor included 24 in (610 mm), Sensor included 30 in (762 mm), Sensor included 36 in (914 mm), Sensor included Custom Lengths between 2 and 120 in (50 mm and 3 m), Sensor included	A B C D E F  G H J K L M P  Q R S T U V X	

**Model Code continued on next page**



**MODEL CODES (Continued)****Model Code - Housing Codes C, D, W, and Y**  
**Integral bare sensors provided (Continued)**

<b>Description</b>	<b>Model</b>
<b>Measurement Input Type (Software Selectable) (c)</b>	
Thermocouple, Type E, Chromel-Constantan	E
Thermocouple, Type J, Iron-Constantan	J
Thermocouple, Type K, Chromel-Alumel	K
Thermocouple, Type T, Copper-Constantan	T
RTD, Platinum, 3-wire, 100 $\Omega$ IEC 751 (ASTM-B Standard Accuracy)	Q
RTD, Platinum, 4-wire, 100 $\Omega$ IEC 751 (ASTM-B Standard Accuracy)	4
RTD, Platinum, 3-wire, 100 $\Omega$ IEC 751 (ASTM-A High Accuracy)	A
RTD, Platinum, 4-wire, 100 $\Omega$ IEC 751 (ASTM-A High Accuracy)	6
Ohm Input	O
Millivolt Input	M
<b>Thermowell Assembled to Housing</b>	
No Well	NA
<b>Electrical Safety (See Electrical Safety Specifications Section for Application Conditions)</b>	
Supplied without Agency Approval/Certification	Z
ATEX, Intrinsically Safe	E
ATEX, Flameproof	D
CSA, Intrinsically Safe, Explosionproof, and Division 2	C
FM, Intrinsically Safe, Explosionproof, and Nonincendive	F
<b>Optional Selections - Housing Features</b>	
Custody Transfer Lock and Seal (with Housing Codes W and Y only)	-A1
PG 13.5 Conduit Thread (in lieu of 1/2 NPT), (with Housing Codes W and Y only) (d)	-A2
(Not available with Option -A3)	
Metric Conduit Thread Adapter (1/2 NPT to M20 x 1.5) (e)	-A3
(Not available with Option -A2)	
<b>Optional Selections - Miscellaneous</b>	
Custom Database Configuration (Requires C2 Form filled out with all data specified)	-C2
Omit Paper Instruction Manual and CD (e)	-K1
Inconel Sheath on Sensor (Not available with Measurement Input Types 4 and 6) (f)	-S1
Example: RTT15-T1WLJNAC-A2S1	

(a) Input configuration can be changed in the field by changing wiring terminations and reconfiguring.

(b) Quantity of one (1) sensor. Length is Dimension A as shown in the Dimensions-Nominal section. Dimension A is bare element insertion length.

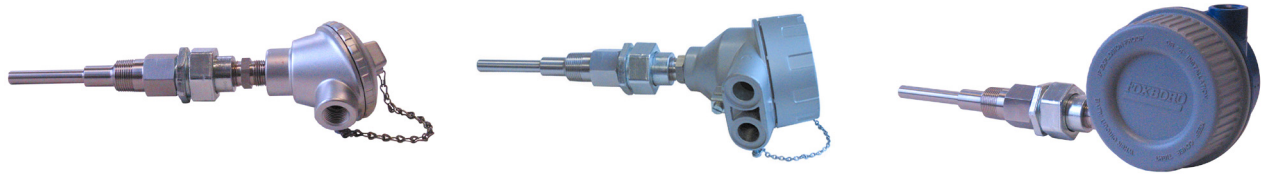
(c) Transmitter is configured for measurement type specified, whether sensor is included or not. User can change configuration to a different type using appropriate configurator for selected protocol.

(d) Options -A2 and -A3 not available with Electrical Safety Codes C and D explosionproof installations.

(e) Standard transmitter is shipped with a paper instruction manual that describes installation, operation, and configuration, and a CD that includes all pertinent documentation such as Parts Lists, Dimensional Prints, and more detailed instructions.

(f) Inconel sheath is 0.250 in (6.35 mm) outside diameter, and provides a moisture resistant assembly. The sheath O.D. is designed to fit into a well I.D. of 0.260 in (6.60 mm).

**MODEL CODES (Continued)****Model Code - Housing Codes E, F, L, and M****Housing provided with sensor and thermowell (or user-supplied thermowell)**

	
<b>Description</b> I/A Series Temperature Transmitter	<b>Model</b> RTT15
<b>Output Signal and Communication Protocol</b> Intelligent; Digital HART and 4 to 20 mA dc (Version -T) Intelligent; Digital FOUNDATION Fieldbus H1 (Version -F) Intelligent; Digital Profibus PA (Version -P)	-T -F -P
<b>Input Configuration (a)</b> Single Input; Configured for One Sensor	1
<b>Housing and Sensor Mounting (Integral Sensor and Well)</b> Weatherproof Connection Head, aluminum, weatherproof Explosionproof Connection Head, aluminum, explosionproof/flameproof Universal Housing, aluminum, explosionproof/flameproof Universal Housing, 316 ss, explosionproof/flameproof	E F L M
<b>Sensor Length - Dimension U or U plus T (b)</b> 2 in (50 mm), Sensor included 3.5 in (89 mm), Sensor included 5 in (127 mm), Sensor included 6 in (152 mm), Sensor included  8 in (203 mm), Sensor included 9 in (229 mm), Sensor included 10 in (254 mm), Sensor included 11 in (279 mm), Sensor included  12 in (305 mm), Sensor included 18 in (457 mm), Sensor included Custom Lengths between 2 and 120 in (50 mm and 3 m), Sensor included	A D G J  L M P Q  R S X
<b>Measurement Input Type (Software Selectable) (c)</b> Thermocouple, Type E, Chromel-Constantan Thermocouple, Type J, Iron-Constantan Thermocouple, Type K, Chromel-Alumel Thermocouple, Type T, Copper-Constantan  RTD, Platinum, 3-wire, 100 $\Omega$ IEC 751 (ASTM-B Standard Accuracy) RTD, Platinum, 4-wire, 100 $\Omega$ IEC 751 (ASTM-B Standard Accuracy) RTD, Platinum, 3-wire, 100 $\Omega$ IEC 751 (ASTM-A High Accuracy) RTD, Platinum, 4-wire, 100 $\Omega$ IEC 751 (ASTM-A High Accuracy)  Ohms Input Millivolts Input	E J K T  Q 4 A 6  O M

Model Code continued on next page

**MODEL CODES (Continued)****Model Code - Housing Codes E, F, L, and M****Housing provided with sensor and thermowell (or user-supplied thermowell) (Continued)**

<b>Description</b>				<b>Model</b>
<b>Thermowell Assembled to Housing</b>				
<b>Well Type</b>	<b>Well Connection</b>	<b>Well Material</b>	<b>Available with Sensor Length Codes</b>	
Plain	3/4 NPT External	304 ss	A, D, G, J, L, P, and R	TA
Plain	3/4 NPT External	316 ss	A, D, G, J, L, P, and R	TB
Lagging (d)	3/4 NPT External	316 ss	G, L, M, and Q	TC
Plain	1 NPT External	316 ss	A, D, G, J, and L	TD
Plain	1 NPT External	Hastelloy C	A, D, G, J, and L	TE
Lagging (d)	1 NPT External	304 ss	G, L, M, and Q	TF
Lagging (d)	1 NPT External	316 ss	G, L, M, and Q	TG
Plain	1 in ANSI Cl. 150 RF	316 ss	A, D, G, J, L, P, and R	TH
Plain	1.5 in Cl. 150 RF	316 ss	A, D, G, J, L, P, R, and S	TI
Thermowell Type W Series Assembled to Housing (e)				TX
Thermowell Supplied by User (f)				NA
<b>Electrical Safety (See Electrical Safety Specifications Section for Application Conditions)</b>				
Supplied without Agency Approval/Certification				Z
ATEX, Intrinsically Safe				E
ATEX, Flameproof (f)				D
CSA, Intrinsically Safe, Explosionproof, and Division 2 (f)				C
FM, Intrinsically Safe, Explosionproof, and Nonincendive (f)				F
<b>Optional Selections - Housing Features</b>				
Custody Transfer Lock and Seal (with Housing Codes L and M only)				-A1
PG 13.5 Conduit Thread (in lieu of 1/2 NPT), (with Housing Codes L and M only) (g)				-A2
(Not available with Option -A3)				
Metric Conduit Thread Adapter (1/2 NPT to M20 x 1.5) (g)				-A3
(Not available with Option -A2)				
<b>Optional Selections - Housing Connection to Well</b>				
1/2 NPT zinc plated union (instead of standard 3/4 NPT) to fit user-supplied well with 1/2 NPT internal thread				-D5
Nipple instead of union; zinc plated steel; with Housing Codes E, F, and L only				-N1
Nipple instead of union; 316 ss; with Housing Codes E, F, L, and M				-N2
Stainless Steel union and fittings, with Housing Codes E, F, and L; standard on Housing Code M				-S3
<b>Optional Selections - Miscellaneous</b>				
Custom Database Configuration (Requires C2 Form filled out with all data specified)				-C2
Omit Paper Instruction Manual and CD (h)				-K1
Inconel Sheath on Sensor (Not available with Measurement Input Types 4 and 6) (i)				-S1
Example: RTT15-T1FGTTAF-N2C2				

(a) Input configuration can be changed in the field by changing wiring terminations and reconfiguring.

(b) Quantity of one (1) sensor. Length is Dimension U or U + T as shown in the Dimensions-Nominal section, where U is the thermowell insertion length, and T is the thermowell lagging length of 76 mm (3 in). See Note (d) below.

(c) Transmitter is configured for measurement type specified, whether sensor is included or not. User can change configuration to a different type using appropriate configurator for selected protocol.

(d) Lagging type wells have a lagging length T dimension of 76 mm (3 in). If a lagging length other than 76 mm (3 in) is required, then select Code TX and specify Well Model Number or Part Number. Refer to PSS 3-3C1 A.

(e) Specify Well Model Number or Part Number. Refer to PSS 3-3C1 A for other well types or other well lagging lengths.

(f) Flameproof and explosionproof approvals and certifications not available with Thermowell Code NA (user-supplied thermowell).

(g) Options -A2 and -A3 not available with Electrical Safety Codes C and D explosionproof installations.

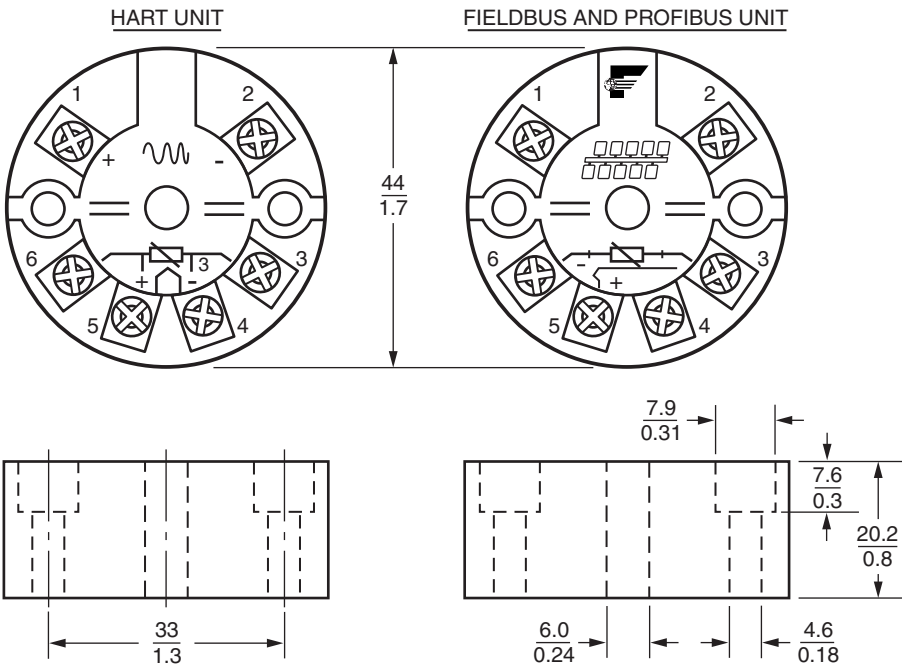
(h) Standard transmitter is shipped with a paper instruction manual that describes installation, operation, and configuration, and a CD that includes all pertinent documentation such as Parts Lists, Dimensional Prints, and more detailed instructions.

(i) Inconel sheath is 0.250 in (6.35 mm) outside diameter, and provides a moisture resistant assembly. The sheath O.D. is designed to fit into a well I.D. of 0.260 in (6.60 mm).

DIMENSIONS - NOMINAL

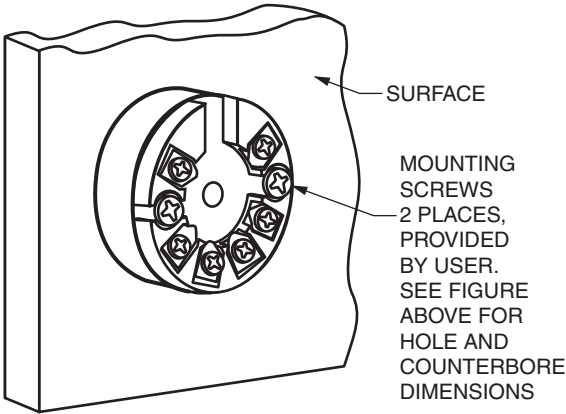
mm  
in

BASIC TRANSMITTER MODULE - HOUSING CODE B

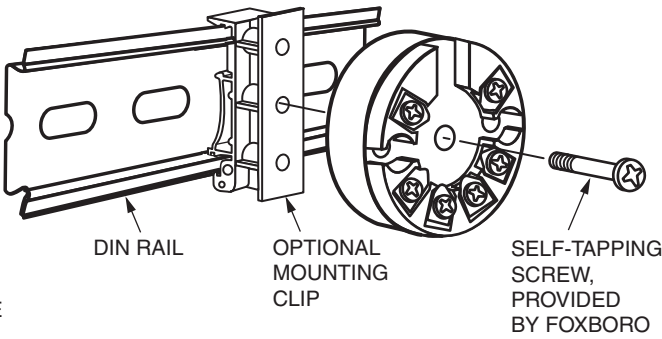


BASIC TRANSMITTER MODULE MOUNTED TO SURFACE OR DIN RAIL

SURFACE MOUNT

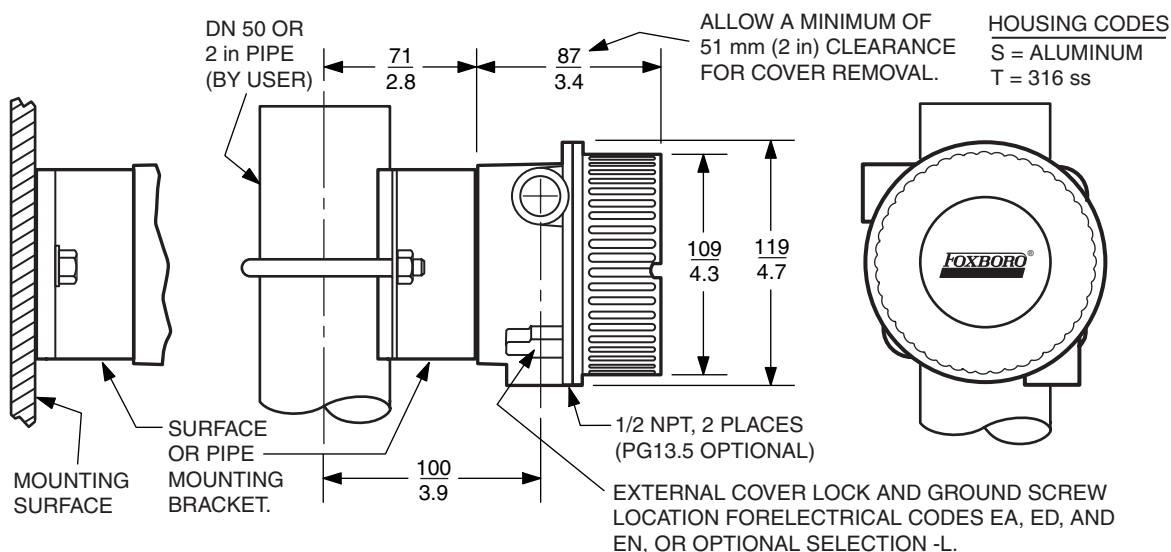
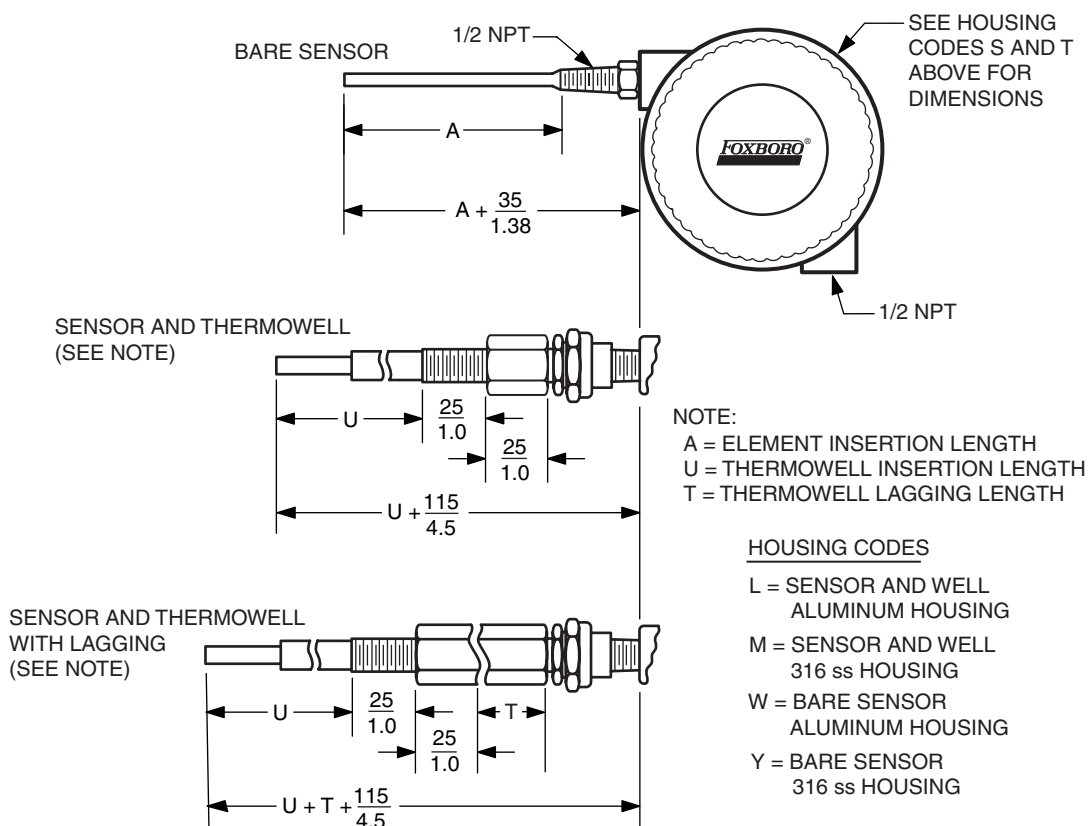


DIN RAIL MOUNT



## DIMENSIONS - NOMINAL (Cont.)

$$\frac{\text{mm}}{\text{in}}$$

 UNIVERSAL HOUSING FOR SURFACE OR PIPE MOUNT WITH REMOTE SENSOR  
 HOUSING CODES S AND T

 UNIVERSAL HOUSING WITH INTEGRAL SENSOR  
 HOUSING CODES L, M, W, OR Y


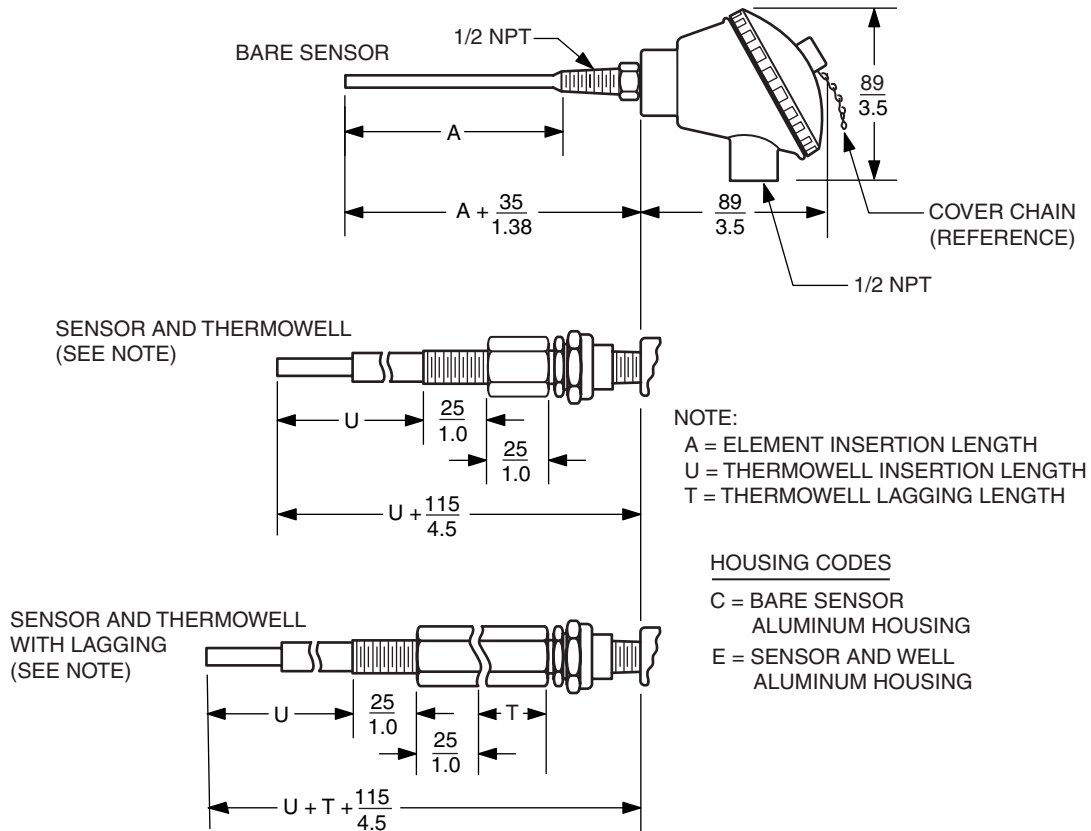
## NOTE

Housing Codes L and M are shown with a standard union coupler. The coupler can be replaced with an optional nipple (Option -N1, steel, or Option -N2, 316 ss) without changing the overall length shown.

**DIMENSIONS - NOMINAL (Cont.)**

$\frac{\text{mm}}{\text{in}}$

**WEATHERPROOF CONNECTION HEAD WITH INTEGRAL SENSOR  
HOUSING CODES C AND E**



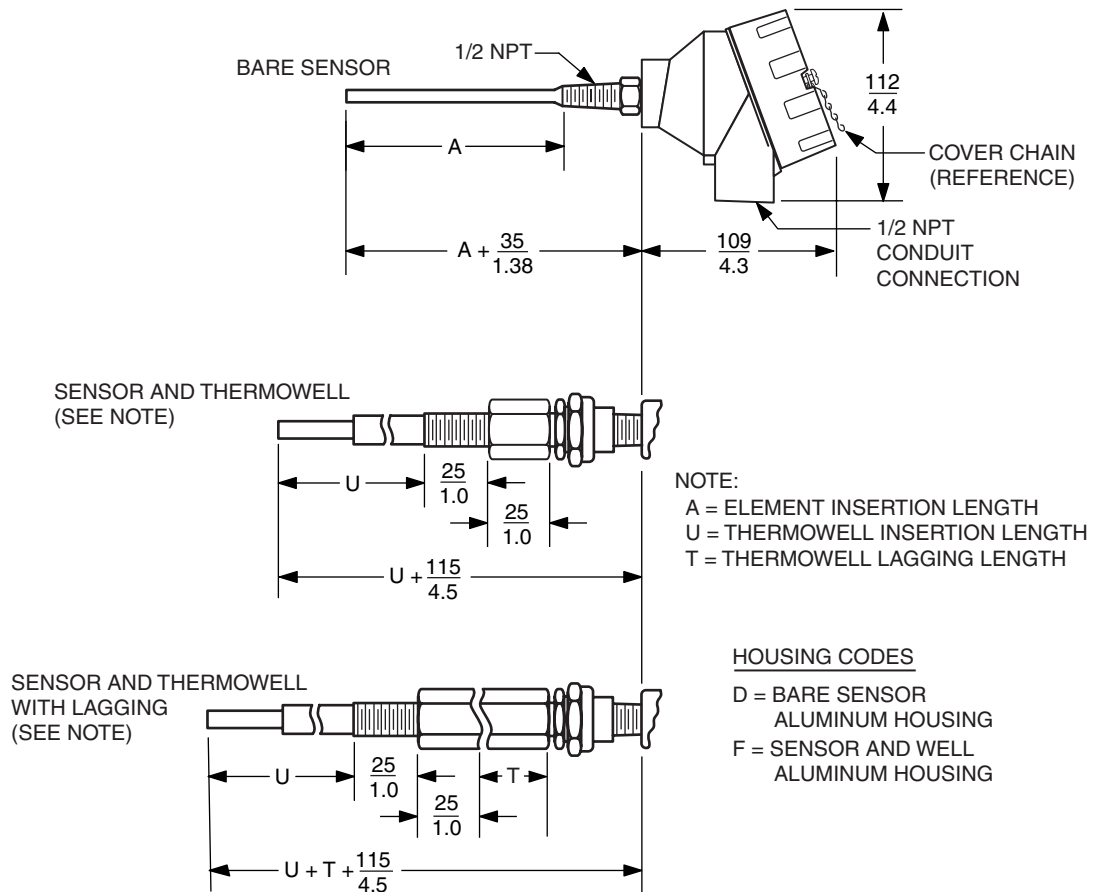
**NOTE**

Housing Code E is shown with a standard union coupler. The Coupler can be replaced with an optional nipple (Option -N1, steel, or -N2, 316 ss) without changing the overall length shown.

**DIMENSIONS - NOMINAL (Cont.)**

$\frac{\text{mm}}{\text{in}}$

**EXPLOSIONPROOF CONNECTION HEAD WITH INTEGRAL SENSOR  
HOUSING CODES D AND F**



**NOTE**

Housing Code F is shown with a standard union coupler. The coupler can be replaced with an optional nipple (Option -N1, steel, or Option -N2, 316 ss) without changing the overall length shown.

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