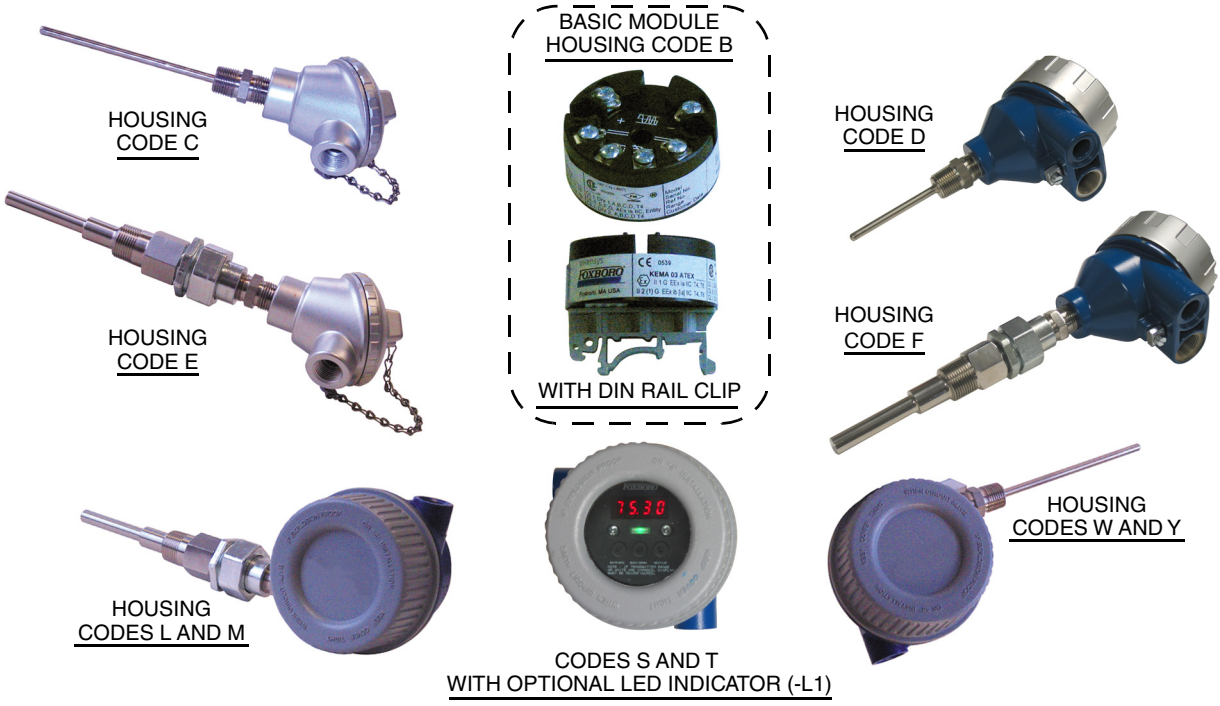
FIELD DEVICES – TEMPERATURE
Product Specifications

PSS 2A-1F5 A

Model RTT15 I/A Series® Temperature Transmitters with HART®, FOUNDATION™ Fieldbus, or PROFIBUS® Protocol



The Model RTT15 is a microprocessor-based temperature transmitter with HART®, FOUNDATION™ Fieldbus H1, or PROFIBUS® 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

- Superior accuracy and long term stability from microprocessor-based technology.
- One unit configurable for TC, RTD, mV, and ohm.
- Supports 2-, 3-, or 4-wire RTDs.
- HART versions allow average or difference measurement; FOUNDATION fieldbus and PROFIBUS versions allow average, difference, or redundant measurement.
- TC cold junction compensation.
- Galvanic isolation for both input and output.
- Automatic self-diagnostics and self-calibration.
- LED Indicator Options offered with HART.
- Basic module can mount to surface or DIN rail.
- Wide selection of bare sensors and thermowells.
- Numerous weatherproof and explosionproof housings for remote mounting, and integral sensor and well mounting.
- FOUNDATION fieldbus with an LAS (Link Access Scheduler), PID (Proportional, Integral, Derivative) function block, and FISCO/FNICO protection.
- Configurable failsafe mA value (HART).
- FMEDA report in support of SIL applications available for HART versions.
- Maximum/minimum temperature logging.

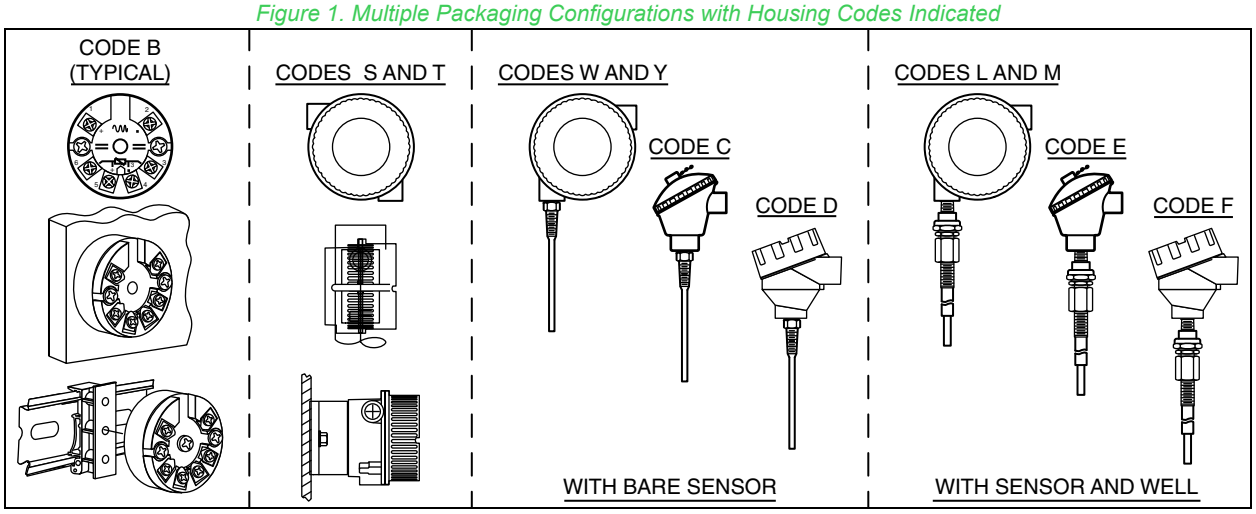
Equipment should be installed, operated, serviced, and maintained only by qualified personnel.
No responsibility is assumed by Schneider Electric for any consequences arising from the use of this material.

- 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.
- 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.

Figure 1. Multiple Packaging Configurations with Housing Codes Indicated



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 for transmitter configurations.

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 2-wire RTDs, two TCs, or two mV inputs (redundant measurement with FOUNDATION fieldbus and PROFIBUS versions only).

EFFICIENT AND DURABLE

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

REMOTE COMMUNICATIONS

Remote digital communication is provided with HART, FOUNDATION fieldbus H1, or PROFIBUS PA communication protocols.

- A single module is used for FOUNDATION fieldbus and PROFIBUS communications. This “bus” module recognizes both FOUNDATION fieldbus and PROFIBUS communications, and automatically switches to the applied protocol.
- The HART 5 and HART 7 electronics versions are separate modules.

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. FOUNDATION fieldbus technology consists of a physical layer, a communication stack, and user application blocks.

The RTT15 can become the Link Master in the event of loss of host communications. A PID function block contains all of the standard parameters required to implement a general purpose, automatic PID control scheme.

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 (Versions -H and -T Electronics)

4 to 20 mA with HART 7 (electronics version -H) or HART 5 (electronics version -T) communications allows direct analog connection to common receivers while still providing full intelligent digital communications using a HART Communicator or PC-based configurator.

The HART 7 (-H) version provides the familiar features of HART 5 as well as features introduced in HART 6 and 7, including long tag support, multivariable support and variable mapping, extended device status, individual sensor calibration, burst mode with event triggers, and trend reporting with time stamps.

HART Device Descriptors (DDs) are available from the corporate website for download. They are also part of the DD library available to registered Model 475 users.

RUGGED SENSORS

These sensors are of high quality and rugged construction, and provide maximum accuracy and longevity. Sensors designed for use with wells include a spring loading mechanism that enables continuous contact between the 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 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 CURRENT (VERSIONS -H AND -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.

NOTE

If the transmitter range is changed, the indicator range must also be changed to match using the indicator pushbuttons (unless the indicator is configured for 0 to 100%.)

LED INDICATOR OPTION - HART ONLY

LED indicator option -L1 is offered for use with the HART electronics versions only. This loop powered indicator is driven from the 4 to 20 mA loop current signal. Three pushbuttons allow configuration between -1999 and +9999, a decimal point position, and a units of measure selection. The display toggles continuously between measurement value and units of measure. For custom units not supported by the indicator, a “stick on” units label may be used. Refer to Figure 2 for indicator configuration, and to Table 1 for application and specifications for the indicator.

Figure 2. LED Indicator Option -L1 Shown with Housing Codes F, L, M, S and T

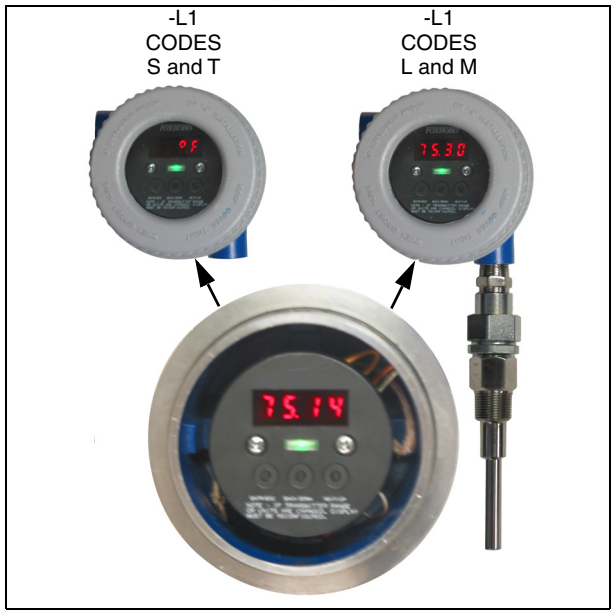


Table 1. LED Indicator Option -L1 Application and Specifications

Parameter	Option -L1
Used with Housing Codes	L, M, S, T, W and Y only
Used with Electronics Versions	HART only: ▸ -H (HART 7) ▸ -T (HART 5)
Intrinsically Safe	Yes (a)
Explosionproof	Yes
Accuracy	±0.01 mA
Units of Measure	°C, °F, °K, %, and mA
Input Signal	4 to 20 mA

Table 1. LED Indicator Option -L1 Application and Specifications (Continued)

Parameter	Option -L1
Operating Current	3.5 mA; minimum required for configuration
Power Supply	4 V dc from the loop
Ambient Temp. Limits	-40 and +85°C (-40 and +185°F)
Relative Humidity Limits	5 and 95% (noncondensing)
Viewing Area	13.7 x 36.3 mm (0.54 x 1.43 in)

a. Certified/Approved with ATEX and FM intrinsically safe versions of the transmitter. See Table 4.

OPERATING, TRANSPORTATION, AND STORAGE CONDITIONS

Influence	Operative Limits	Transportation and Storage Limits
Ambient Temperature With or without LED Indicator Option -L1	-40 and +85°C (-40 and +185°F) (a)	-54 and +85°C (-65 and +185°F)
Relative Humidity Transmitter Only w/LED Indicator Option -L1	 0 and 95% (Noncondensing) 5 and 95% (Noncondensing)	 0 and 95% (Noncondensing) 5 and 95% (Noncondensing)
Supply Voltage HART (b) Bus (c) LED Indicator	 8 and 30 V dc (d) 9 and 32 V dc (e) 4 V dc Loop Powered	 Not Applicable Not Applicable Not Applicable
Vibration - Housing Code B	0 and 40 m/s^2 (0 and 4 “g”) from 2 to 100 Hz (f)	1070 mm (42 in) Drop in Shipping Container
Vibration - Housing Codes S, T, C, D, W, Y, E, F, L, and M (with or without optional LED Indicator)	19 mm (0.75 in) Double Amplitude from 5 to 9 Hz; 0 and 30 m/s^2 (0 and 3 “g”) from 9 to 500 Hz (g)	1070 mm (42 in) Drop in Shipping Container

a. Refer to “ELECTRICAL Specifications” on page 14 for a restriction in ambient temperature with certain agency approvals/certifications.

b. Refer to Figure 3 for supply voltage vs. external loop load limitations graph.

c. Power supplied by a specific FOUNDATION fieldbus or PROFIBUS power supply, as applicable.

d. Not including additional voltage (4 V dc) required for optional LED Indicator. Maximum voltage not to exceed 30 V.

e. For FISCO installations, the maximum voltage is 17.5 V dc.

f. Per Lloyd’s specification number 1.

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

NOTE

For proper operation, do not exceed the ambient temperature limits at the housing. 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

All performance specifications apply to the transmitter only. Any inaccuracies associated with the thermocouple or RTD sensors, any other millivolt or resistance sensors, or the optional LED indicator, are additive. For performance specifications on thermocouples, refer to PSS 1-B6 A, and for RTDs refer to PSS 1-1B1 A. Refer to Table 1 for LED Indicator specifications.

Transmitter Accuracy and Ambient Temperature Effect are determined by selecting the greater of the general or basic values listed.

Transmitter Accuracy - General Value

BUS: ±0.05% of reading for all input types.
HART: ±0.05% of span for all input types.

Transmitter Accuracy - Basic Values

- **Platinum RTD Input:**
  ±0.1°C (±0.18°F)
- **Nickel RTD Input:**
  BUS: ±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(1), R, S, W3, and W5 Input:**
  ±1.0°C (±1.8°F)
- **Linear Resistance Input:**
  BUS: ±0.05 Ω
  HART: ±0.1 Ω
- **Millivolt Input:**
  ±10 µV

Accuracy - Cold Junction Temperature

BUS: ±0.5°C (±0.9°F)
HART: ±1.0°C (±1.8°F)

Ambient Temperature Effect - General Values

- **Bus:**
  ± 0.002% of reading in °C per °C
  ± 0.0011% of (°F reading - 32) per °F
- **HART:**
  ± 0.005% of span in °C per °C
  ± 0.0028% of span in °F per °F

Ambient Temperature Effect - Basic Values

- **RTD Input:**
  BUS: ±0.002°C/°C (±0.002°F/°F)
  HART: ±0.005°C/°C (±0.005°F/°F)
- **TC Type E, J, K, L, N, T, and U Input:**
  BUS: ±0.010°C/°C (±0.010°F/°F)
  HART: ±0.025°C/°C (±0.025°F/°F)
- **TC Type B(1), R, S, W3, and W5 Input:**
  BUS: ±0.025°C/°C (±0.025°F/°F)
  HART: ±0.1°C/°C (±0.1°F/°F)
- **Linear Resistance Input:**
  BUS: ±0.002 Ω/°C (±0.0011 Ω/°F)
  HART: ±5 mΩ/°C (±2.8 mΩ/°F)
- **Millivolt Input:**
  BUS: ±0.2 µV/°C (±0.11 µV/°F)
  HART: ±0.5 µV/°C (±0.28 µV/°F)

Supply Voltage Effect

The output changes < 0.005% of span for each 1 volt change within the specified voltage range.

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

1. Greater than 400°C (752°F).

FUNCTIONAL SPECIFICATIONS

Span and Range Limits - RTD Input

RTD Type (a)	Span Limits HART (b)		Range Limits	
	°C	°F	°C	°F
Platinum, 100 Ω (c)	10 and 1,050	18 and 1,890	-200 and +850	-328 and +1,562
Nickel, 100 Ω (d)	10 and 310	18 and 558	-60 and +250	-76 and +482

a. Transmitter has configurable RTD factor to allow use of Pt50 through Pt1000 or Ni50 through Ni1000 RTDs. FOUNDATION fieldbus and PROFIBUS versions also accept Cu10 through Cu1000 RTDs.

b. Span limits are not applicable for digital FOUNDATION Fieldbus or PROFIBUS protocol.

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

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

Span and Range Limits - TC Input

TC Type	Span Limits HART (a)		Range Limits	
	°C	°F	°C	°F
B	100 and 1,820	180 and 3,308	0 and 1,820	32 and 3,308
E	50 and 1,100	90 and 1,980	-100 and +1,000	-148 and +1,832
J	50 and 1,300	90 and 2,340	-100 and +1,200	-148 and +2,192
K	50 and 1,552	90 and 2,794	-180 and +1,372	-292 and +2,502
L	50 and 1,100	90 and 1,980	-200 and +900	-328 and +1,652
N	50 and 1,480	90 and 2,664	-180 and +1,300	-292 and +2,372
R	100 and 1,810	180 and 3,258	-50 and +1,760	-58 and +3,200
S	100 and 1,810	180 and 3,258	-50 and +1,760	-58 and +3,200
T	50 and 600	90 and 1,080	-200 and +400	-328 and +752
U	50 and 800	90 and 1,440	-200 and +600	-328 and 1,112
W3	100 and 2,300	180 and 4,140	0 and 2,300	32 and 4,172
W5	100 and 2,300	180 and 4,140	0 and 2,300	32 and 4,172

a. Span limits are not applicable for digital FOUNDATION fieldbus or PROFIBUS protocol.

Span and Range Limits - Ohm Input

Protocol	Span Limits	Range Limits
Bus (a)	N/A	0 and 10,000 Ω
HART	25 and 7,000 Ω	0 and 7,000 Ω

a. Span limits are not applicable for digital FOUNDATION fieldbus or PROFIBUS protocol.

Span and Range Limits - Millivolt Input

Protocol	Span Limits	Range Limits
Bus (a)	N/A	-800 and +800 mV
HART	2.5 and 1,600 mV	-800 and +800 mV

a. Span limits are not applicable for digital FOUNDATION fieldbus or PROFIBUS protocol.

Current Consumption (Bus)

<11 mA

Response Time

1 to 60 s, configurable

Warm-Up Time

30 s

Updating Time - Single Input

BUS: < 400 ms
HART: 440 ms (660 ms for difference)

Thermocouple Cold Junction Compensation

TC cold junction compensated via internal measurement, user-entered constant, or external RTD (2-wire for HART, and 2- or 3-wire for Bus) provided by Pt100 or Ni100.

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 MΩ

Resistance Temperature Detectors (RTDs)(2)

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 help prevent entry of moisture

Minimum Immersion

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

Response Time

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

External Connecting Wire

Color coded leads; stranded 0.50 mm^2 or 22 AWG; PTFE insulation

Thermocouples (TCs)(3)

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 help prevent entry of moisture

2. RTDs listed are available assembled to RTT15 Transmitter. The transmitter can also be configured for 2-wire and Pt1000 RTDs.
3. TCs listed are available assembled to RTT15 Transmitter. The transmitter can also be configured for other TC types.

Minimum Immersion

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

Response Time

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

External Connecting Wire

Color coded leads; stranded 0.080 mm^2 or 20 AWG; fiberglass insulation

Supply Voltage Requirements and External Loop Load Limitations

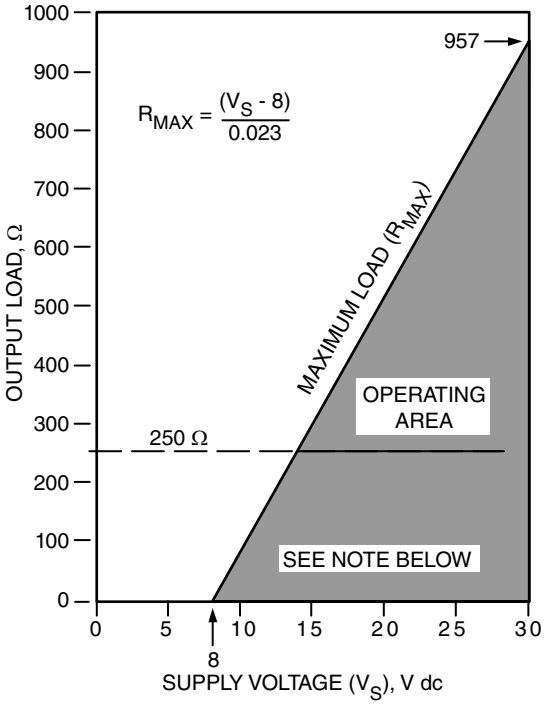
Bus Digital Output

Power supplied by a specific FOUNDATION 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 30 V dc (28 V dc for transmitters certified/approved as intrinsically safe). The Optional LED Indicator requires 4 V, in addition to the supply voltage required by the transmitter, with the upper supply voltage limit not to exceed 30 V. See Figure 3 for a plot of supply voltage vs. output load.

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



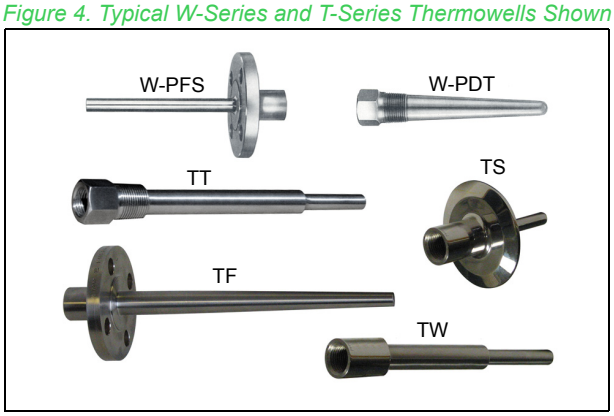
NOTE

The transmitter will function with an output load less than 250 Ω provided that a HART Communicator or PC-based Configurator is not connected to it. Use of a HART Communicator or PC-based Configurator requires 250 Ω minimum load.

Thermowells

The wells listed in the Model Code are popular selections for industrial use. In addition, other high quality, polished wells in a variety of configurations, materials, and sizes are offered. Most application requirements can be met by choosing from the wide selection offered. Specify Thermowell Code TX and see PSS 3-3C1 A for Type W Thermowells, and PSS 3-3D1 A for Type T Thermowells, or contact Global Customer Support. See Figure 4 for a sample of wells available.

Figure 4. Typical W-Series and T-Series Thermowells Shown



HART (Versions -H and -T) Communications

4 to 20 mA Analog Mode

Analog output signal is updated 30 times per second. A minimum loop load of 250 ohms is required. See Table 2 for communication parameters.

Multidrop Mode (Fixed Current)

This mode supports communications with up to 15 transmitters on a single pair of signal/power wires. The output signal is updated 4 times/second. A minimum loop load of 250 ohms is required. See Table 2 for communication parameters.

FOUNDATION Fieldbus (Version -F) Communications

This serial, two-way communication system runs 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 32 V dc, is by a specific FOUNDATION fieldbus power source. Current consumption is 19.5 mA. The maximum number of devices on a non-intrinsically safe bus is 32. For intrinsically safe bus systems the maximum number is 6. See Table 2 for communication parameters.

PROFIBUS (Version -P) Communications

This all digital, serial, two-way communication systems interconnects field devices, such as transmitters, actuators, and controllers. It is a vendor-independent, open fieldbus standard conforming to international standards. The PROFIBUS Process Automation (PA) profile, used with these transmitters, defines the device parameters and behavior of typical field devices, and facilitates device interchangeability and vender independent operation. Supply voltage is 9 to 32 V dc, with a current consumption of 19.5 mA.

As with the FOUNDATION fieldbus, the maximum number of devices on a non-intrinsically safe bus is 32. For intrinsically safe bus systems, the maximum number is 6. See Table 2 for communication parameters.

Functional Block Diagrams and Installation Topologies

Refer to Figure 5 through Figure 8.

Figure 5. Typical FOUNDATION Fieldbus Installation Topology

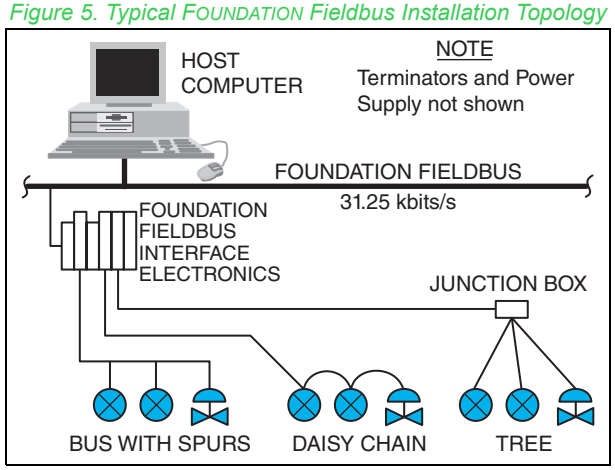


Figure 6. Typical PROFIBUS Installation Topology

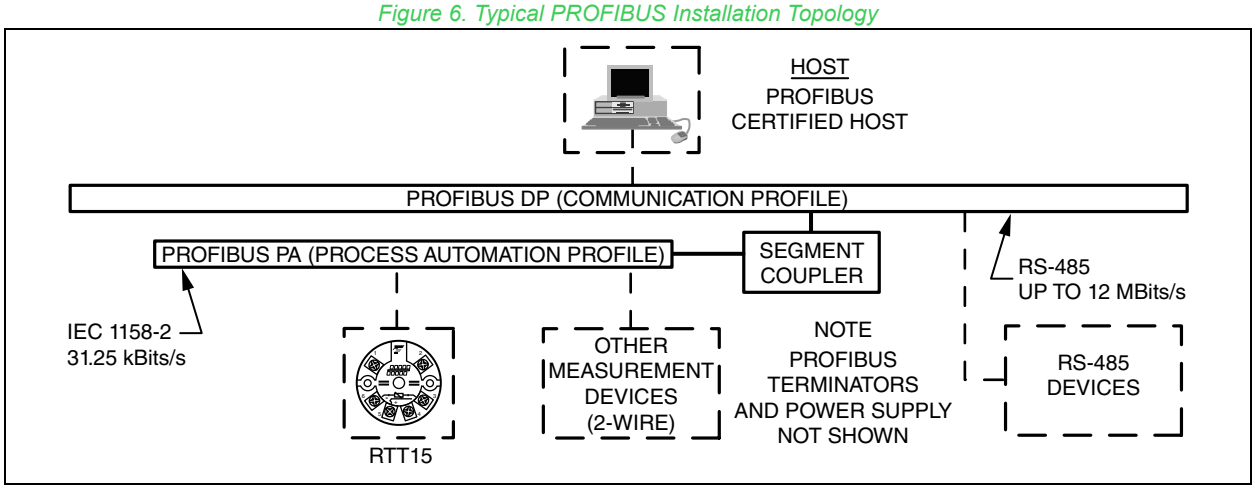


Figure 7. HART 4 to 20 mA Output Block Diagram (One Transmitter)

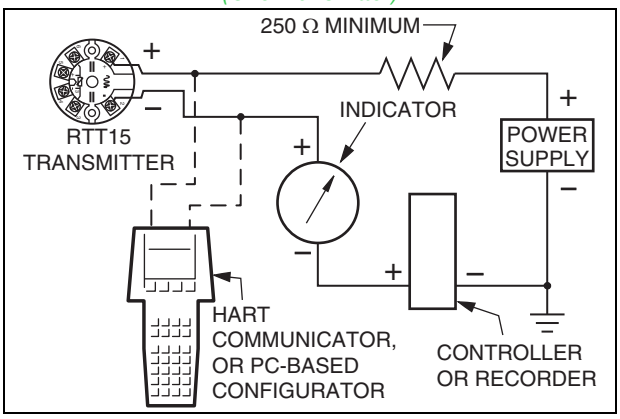


Figure 8. HART Multidrop Block Diagram (Up to Fifteen Transmitters)

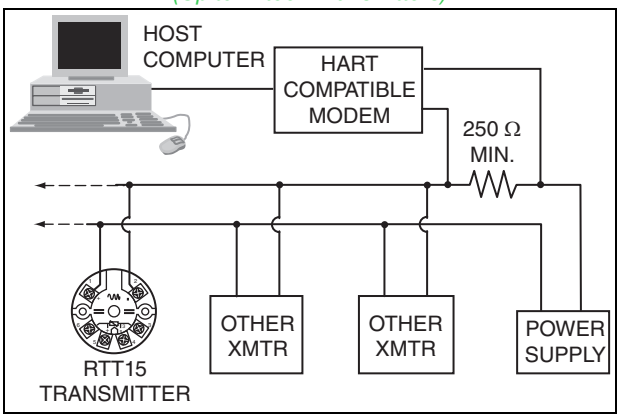


Table 2. Communication Parameters - HART, FOUNDATION Fieldbus, and PROFIBUS Protocols

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

a. Total bus length including all spurs. Maximum spur length is 120 m (395 ft). For hybrid installations, maximum IS spur length is dependant on the field barrier used. For intrinsically safe bus installations, maximum spur length is 30 m (98 ft).

PHYSICAL SPECIFICATIONS

Transmitter Housing Specifications

Housing Code	Material and Finish	IEC/NEMA Rating	Explosionproof & Flameproof	Mounting Configuration	Field Wiring Entrances on Housing (a)
B	Encapsulated plastic	N/A (b)	NO	Basic Module (c) (DIN Form B pkg.)	None
C	Low copper aluminum alloy	IP65 NEMA 4	NO	Weatherproof connection head with integral bare sensor	One entrance 1/2 NPT
D	Low copper aluminum alloy; painted	IP65 NEMA 4X	YES	Explosionproof connection head with integral bare sensor	One entrance 1/2 NPT
E	Low copper aluminum alloy	IP65 NEMA 4	NO	Weatherproof connection head with integral sensor and well	One entrance 1/2 NPT
F	Low copper aluminum alloy; painted	IP65 NEMA 4X	YES	Explosionproof connection head with integral sensor and well	One entrance 1/2 NPT
L	Low copper aluminum alloy; epoxy coated	IP66/67 NEMA 4X	YES	Universal housing with integral sensor and well	One entrance 1/2 NPT
M	Stainless steel	IP66/67 NEMA 4X	YES	Universal housing with integral sensor and well	One entrance 1/2 NPT
S	Low copper aluminum alloy; epoxy coated	IP66/67 NEMA 4X	YES	Universal housing for surface or pipe mounting, remote sensor (d)	Two entrances 1/2 NPT
T	Stainless steel	IP66/67 NEMA 4X	YES	Universal housing for surface or pipe mounting, remote sensor (d)	Two entrances 1/2 NPT
W	Low copper aluminum alloy; epoxy coated	IP66/67 NEMA 4X	YES	Universal housing with integral bare sensor	One entrance 1/2 NPT
Y	Stainless steel	IP66/67 NEMA 4X	YES	Universal housing with integral bare sensor	One entrance 1/2 NPT

a. Optional conduit threads or thread adapters available; see Model Code.

b. Not applicable; the basic module, although encapsulated, has exposed terminals not insulated from the environment.

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

d. Surface or pipe mounted using mounting set options -M1 or -M2.

Mounting

The basic transmitter module can be mounted to a DIN rail using the optional mounting clip and self-tapping screw. The basic module can also be mounted to a surface using user-supplied hardware. See “Dimensions - Nominal” on page 28. Care should be taken to provide adequate environmental protection.

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” on page 28.

The connection head housings are sensor or thermowell mounted. See “Dimensions - Nominal” on page 28.

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 –; on the “bus” module, the two output terminals are polarity independent, and therefore not marked. Refer to “Dimensions - Nominal” on page 28.

Dimensions

Refer to “Dimensions - Nominal” on page 28. Also refer to Dimensional Print DP 020-462.

Approximate Transmitter Mass

Housing Code	Housing Material	Approximate Mass			
		Standard		With Optional LED (a)	
		kg	lb	kg	lb
B - Basic Module (b)	N/A	0.05	0.11	N/A	N/A
C - Weatherproof Head (c)	Aluminum	0.4	0.8	N/A	N/A
D - Explosionproof Head (c)	Aluminum	0.7	1.5	N/A	N/A
E - Weatherproof Head (d)	Aluminum	0.4	0.8	N/A	N/A
F - Explosionproof Head (d)	Aluminum	0.7	1.5	N/A	N/A
L - Universal Housing (d)	Aluminum	1.4	3.1	1.6	3.6
M - Universal Housing (d)	316 ss	3.2	7.1	3.7	8.2
S - Universal Housing (e)	Aluminum	1.4	3.1	1.6	3.6
T - Universal Housing (e)	316 ss	3.2	7.1	3.7	8.2
W - Universal Housing (c)	Aluminum	1.4	3.1	1.6	3.6
Y - Universal Housing (c)	316 ss	3.2	7.1	3.7	8.2

a. Optional LED Indicator available with HART versions only.
b. Basic transmitter module.
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.
e. Surface or pipe mount housing; remote sensor.

ELECTRICAL SPECIFICATIONS

- The transmitter has been designed to meet the electrical certification descriptions in the tables below. Contact Global Customer Support for information or status of testing laboratory approvals or certifications.
- Refer to the applicable instruction manual for application conditions and connectivity requirements.
- Refer to Table 4 for certifications with LED Indicator (Option -L1). The L1 option is available only as follows:
  - With HART Output Versions -H and -T.
  - With Universal Housing Codes L, M, S, T, W, and Y.

Table 3. Electronics Versions -H and -T (HART) without Optional L1 Display

Agency Certification, Type of Protection, and Area Classification	With Housing Codes	Application Conditions	Model Code
ATEX intrinsically safe, II 1 GD, Ex ia IIC.	C, E, D, F, L, M, S, T, W, Y	KEMA03ATEX1568 Temperature Class T4, Ta = -40 to +85°C; T6, Ta = -40 to +60°C. (a)	E
ATEX flameproof, II 2 GD, Ex d, IIC, Ex tb IIIC T85C Db.	L, M, S, T, W, Y	FM13ATEX0068X Temperature Class T6. Ta = -40 to +70°C. (b)	D
ATEX flameproof, II 2 GD, Ex d IIC.	D, F	FM06ATEX0002 Temperature Class T6. Ta = -40 to +70°C, T85°C.	
CSA intrinsically safe, Class I, Division 1, Groups A, B, C, and D. Also, zone certified intrinsically safe Class I, Zone 0, Ex ia IIC.	B, C, E	Temperature Class T4 at 85°C maximum ambient. Connect per MI 020-449.	C (c)
CSA Class I, Division 2, Groups A, B, C, and D.		Temperature Class T6 at 60°C maximum ambient.	
CSA Intrinsically safe, Class I, Division 1, Groups A, B, C, and D; Class II, Division 1, Groups E, F, and G; Class III, Division 1. Also zone certified intrinsically safe Class I, Zone 0, Ex ia IIC.	D, F, L, M, S, T, W, Y	Temperature Class T4 at 85°C and T6 at 60°C maximum ambient. Connect per MI 020-449.	
CSA suitable for Class I, Division 2, Groups A, B, C, D, F and G. Also zone certified Class I, Zone 2, Ex nA II.		Temperature Class T4 at 85°C, T5 at 75°C, and T6 at 60°C maximum ambient.	
CSA 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. Also zone certified Class I, Zone 1, Ex d IIC.	D, F, L, M, S, T, W, Y	Temperature Class T4 at 85°C and T6 at 40°C maximum ambient. (b)	

Table 3. Electronics Versions -H and -T (HART) without Optional L1 Display (Continued)

Agency Certification, Type of Protection, and Area Classification	With Housing Codes	Application Conditions	Model Code
FM intrinsically safe for Class I, Division 1, Groups A, B, C, and D.	B, C, E	Temperature Class T4 at 85°C and T6 at 60°C maximum ambient. Connect per MI 020-449.	F (c)
FM Zone certified intrinsically safe Class I, Zone 0, AEx ia IIC.		Temperature Class T4 at 85°C maximum ambient.	
FM nonincendive for Class I, Division 2, Groups A, B, C, and D.		Temperature Class T4 at 85°C maximum ambient.	
FM intrinsically safe for Class I, Division 1, Groups A, B, C, and D; Class II, Division 1, Groups E, F, and G; Class III, Division 1.	D, F, L, M, S, T, W, Y	Temperature Class T4 at 85°C and T6 at 60°C maximum ambient. Connect per MI 020-449. (a)	
FM Zone certified intrinsically safe, Class I, Zone 0, AEx ia IIC.		Temperature Class T4 at 85°C maximum ambient. (a)	
FM nonincendive, Class I, Division 2, Groups A, B, C, and D; Suitable for Class II, Division 2, Groups F and G.		Temperature Class T4 at 85°C maximum ambient.	
FM Explosionproof, Class I, Division 1, Groups B, C, and D; dust-ignitionproof, Class II, Division 1, Groups E, F, and G; Class III Division 1. (d)	D, F, L, M, S, T, W, Y	Temperature Class T5 at 80°C and T6 at 70°C maximum ambient. (b)	
IECEx flameproof, Ex d IIC, Ex tb IIIC T85C Db	L, M, S, T, W, Y	IECEx FMG14.0005X Temperature Class T6. Ta = -40 to +70°C.	V
IECEx Ex ia IIC	B, C, E, D, F, L, M, S, T, W, Y	IECEx DEK13.0057 Temperature Class T4, Ta = -40 to +85°C; T6, Ta = -40 to +60°C.	T
EAC flameproof 1Ex dIIC T6 GbX	B,C, E, S, T, W, Y, L, M	-40°C ≤ Ta ≤ 70°C	R
EAC Intrinsic Safe 0Ex ia IIC T6 X	B, S, T, W, Y, L, M	T6 -20°C < Ta <40°C; T5 -20°C < Ta <50°C; T6 -20°C < Ta <60°C	S
KOSHA Flameproof Ex d IIC T6	D, F, S, T, W, Y, L, M	Tamb= -40°C to +70°C	K
INMETRO Flameproof, Ex d IIC T6 Gb IP66/IP67; Ex tb IIIC T 85°C Db IP66/IP67	D, F, S, T, W, Y, L, M	-40°C ≤ Tamb≤ + 70°C	M

a. Supply and Input Circuit (Terminals 1 and 2): U_i=30 V; I_i=120 mA; P_i=0.84 W; C_i=1.0 nF; L_i=10 µH
Sensor Circuit (Terminals 3, 4, 5, and 6): U_o=9.6 V; I_o=28 mA; P_o=67 mW; C_o=3.5 nF; L_o=35 µH

b. Certifications are not applicable to Housing Codes F, L, or M if thermowell is not supplied with transmitter (Code NA).

c. At the time of printing, the HART 7 (-H) module is certified for Electrical Certification Codes C and F with Housing Code B only. Contact Global Customer Support for availability of additional CSA and FM certifications with HART version 7 (-H).

d. Also includes Group A for Housing Codes D and F.

Table 4. Electronics Versions -H and -T (HART) with Optional L1 Display

Agency Certification, Type of Protection, and Area Classification	With Housing Codes	Application Conditions (a)	Model Code
ATEX intrinsically safe, II 1 GD, Ex ia IIC.	L, M, S, T, W, Y	KEMA03ATEX1568 Temperature Class T4, Ta = -40 to +85°C; T6, Ta = -40 to +60°C.	E
ATEX flameproof, II 2 GD, Ex d, IIC, Ex tb IIIC T85C Db.	L, M, S, T, W, Y	FM13ATEX0068X Temperature Class T6. Ta = -40 to +70°C. (b)	D
CSA 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. Also zone certified Class I, Zone 1, Ex d IIC.	L, M, S, T, W, Y	Temperature Class T4 at 85°C and T6 at 40°C maximum ambient. (b)	C (c)
FM intrinsically safe for Class I, Division 1, Groups A, B, C, and D; Class II, Division 1, Groups E, F, and G; Class III, Division 1.	L, M, S, T, W, Y	Temperature Class T4 at 85°C and T6 at 60°C maximum ambient. Connect per MI 020-449.	F (c)
FM Zone certified intrinsically safe, Class I, Zone 0, AEx ia IIC.		Temperature Class T4 at 85°C maximum ambient.	
FM nonincendive, Class I, Division 2, Groups A, B, C, and D; Suitable for Class II, Division 2, Groups F and G.		Temperature Class T4 at 85°C maximum ambient.	
FM Explosionproof, Class I, Division 1, Groups B, C, and D; dust-ignitionproof, Class II, Division 1, Groups E, F, and G; Class III Division 1.	L, M, S, T, W, Y	Temperature Class T5 at 80°C and T6 at 70°C maximum ambient. (b)	
IECEx flameproof, Ex d IIC, Ex tb IIIC T85C Db.	L, M, S, T, W, Y	IECEx FMG14.0005X Temperature Class T6. Ta = -40 to +70°C.	V
EAC flameproof 1 EX d IIC T6 Gb X	D, F, S, T, W, Y, L, M	Ex d IIC T6 Gb IP66/IP67 Ex tb IIIC T 85°C Db IP66/IP67 (-40°C ≤ Tamb≤ + 70°C) T6 -40°C < ta < 70°C	R
KOSHA Flameproof EX d IIC T6	D, F, S, T, W, Y, L, M	Ex d IIC T6, Tamb = -40°C to +75°C.	K
INMETRO Flameproof, Ex d IIC T6 Gb IP66/IP67 Ex tb IIIC T 85°C Db IP66/IP67	D, F, S, T, W, Y, L, M	-40°C ≤ Tamb ≤ +70°C.	M

a. Supply and Input Circuit (Terminals 1 and 2): U_i=28 V; I_i=120 mA; P_i=0.84 W; C_i=2.0 nF; L_i=10 µH
Sensor Circuit (Terminals 3, 4, 5, and 6): U_o=9.6 V; I_o=28 mA; P_o=67 mW; C_o=3.5 nF; L_o=35 µH

b. Certifications are not applicable to Housing Codes L or M if thermowell is not supplied with transmitter (Code NA).

c. Contact Global Customer Support for availability of CSA and FM certification with HART version 7 (-H).

Table 5. Electronics Versions -F and -P (FOUNDATION Fieldbus and PROFIBUS)

Testing Laboratory, Type of Protection, and Area Classification	With Housing Codes	Application Conditions	Model Code
ATEX intrinsically safe, II 1 GD or II 2 (1) GD, Ex ia IIC or Ex ib [ia] IIC.	All	Temperature Class T4 to T6. Ta = -40 to +85°C.	E
ATEX flameproof, II 2 GD, Ex d, IIC, Ex tb IIIC T85C Db.	L, M, S, T, W, Y	FM13ATEX0068X Temperature Class T6. Ta = -40 to +70°C. (a)	D
ATEX flameproof, II 2 GD, Ex d IIC.	D, F	FM06ATEX0002 Temperature Class T6. Ta = -40 to +70°C, T85°C. (a)	
CSA intrinsically safe, Class I, Division 1, Groups A, B, C, and D. Also, zone certified intrinsically safe Class I, Zone 0, Ex ia IIC.	B, C, E	Temperature Class T4 at 85°C maximum ambient.	C
CSA suitable for Class I, Division 2, Groups A, B, C, and D.	B, C, E	Temperature Class T4 at 85°C maximum ambient.	
CSA 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. Also, zone certified intrinsically safe, Class I, Zone 0, Ex ia IIC, and Class I, Zone 1, Ex ib IIC.	D, F, L, M, S, T, W, Y	Temperature Class T4 at 85°C, and T6 at 60°C maximum ambient.	
CSA suitable for Class I, Division 2, Groups A, B, C, D, F and G. Also, zone certified Class I, Zone 2, Ex nA II.	D, F, L, M, S, T, W, Y	Temperature Class T4 at 85°C, T5 at 75°C, and T6 at 60°C maximum ambient.	
CSA explosionproof, Class I, Division 1, Groups B, C, and D; dust-ignitionproof, Class II, Division 1, Groups E, F, and G; Class III Division 1. Also, zone certified Class I, Zone 1, Ex d IIC.	D, F, L, M, S, T, W, Y	Temperature Class T4 at 85°C, and T6 at 40°C maximum ambient. (a)	
FM FISCO field device intrinsically safe for Class I, Division 1, Groups A, B, C, and D. Also zone certified intrinsically safe Class I, Zone 0, AEx ia IIC, and Class I, Zone 1, AEx ib IIC.	B, C, E	Temperature Class T4 at 85°C maximum ambient.	F
FM FNICO field device nonincendive for Class I, Division 2, Groups A, B, C, and D.	B, C, E	Temperature Class T4 at 85°C maximum ambient.	
FM FNICO field device intrinsically safe for Class I, Division 1, Groups A, B, C, and D; Class II, Division 1, Groups E, F, and G. Also zone certified intrinsically safe Class I, Zone 0, AEx ia IIC, and Class I, Zone 1, AEx ib IIC.	D, F, L, M, S, T, W, Y	Temperature Class T4 at 85°C maximum ambient.	
FM FNICO field device nonincendive for Class I, Division 2, Groups A, B, C, and D; Class II, Division 2, Groups F and G; Class III, Division 2.	D, F, L, M, S, T, W, Y	Temperature Class T4 at 85°C maximum ambient.	

Table 5. Electronics Versions -F and -P (FOUNDATION Fieldbus and PROFIBUS) (Continued)

Testing Laboratory, Type of Protection, and Area Classification	With Housing Codes	Application Conditions	Model Code
FM explosionproof, Class I, Division 1, Groups B, C, and D; dust-ignitionproof, Class I, Division 1, Groups E, F, and G; Class III, Division 1. Also, zone certified Class I, Zone 1, AEx d IIC. (b)	D, F, L, M, S, T, W, Y	Temperature Class T5 at 85°C, and T6 at 70°C maximum ambient. (a)	F
IECEx flameproof, Ex d IIC, Ex tb IIIC T85C Db.	L, M, S, T, W, Y	IECEx FMG14.0005X Temperature Class T6. Ta = -40 to +70°C.	V
EAC flameproof	D, F, S, T, W, Y, L, M	1Ex dII C T6 Gb, -40°C ≤ Ta ≤ +75°C.	R
KOSHA Flameproof Ex d IIC T6	D, F, S, T, W, Y, L, M	T6, -40°C ≤ Ta ≤ +70°C.	K
INMETRO Flameproof	D, F, S, T, W, Y, L, M	Ex d IIC T6 Gb IP66/IP67; Ex tb IIIC T85°Db IP66/IP67, -40°C ≤ Ta ≤ +70°C.	M

a. Explosionproof/Flameproof certification not available for Housing Codes F, L, or M if thermowell is not supplied with transmitter (Code NA).

b. Also includes Group A for Housing Codes D and F.

MODEL CODE - BASIC MODULE CODE B

Remote sensors not provided, but can be ordered separately

Description	Model
I/A Series® Temperature Transmitter	RTT15
 HOUSING CODE B — HART MODULE SHOWN	
Output Version	
Intelligent; Digital HART® 7 and 4 to 20 mA dc	-H
Intelligent; Digital HART 5 and 4 to 20 mA dc	-T
Intelligent; Digital FOUNDATION Fieldbus™ H1	-F
Intelligent; Digital PROFIBUS® PA	-P
Input Configuration (a)	
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 HART Output Versions -H/-T)	6
Housing and Sensor Mounting (Basic Module - No Housing)	
Basic Module used for Surface Mount, DIN Rail Mount, or Module Replacement. Material Certificate (AS Reference CERT-C) not offered with this selection.	B
Sensor Length	
None - Sensor ordered separately	N
Measurement Input Type (Software Selectable) (c)	
Thermocouple, Type B, Platinum-Rhodium	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	R
Thermocouple, Type S, Platinum-Rhodium	S
Thermocouple, Type T, Copper-Constantan	T
Thermocouple, Type U, Copper-Copper/Low Nickel	U
Thermocouple, Type W3, Tungsten - Rhenium	3
Thermocouple, Type W5, Tungsten - Rhenium	5
RTD, Platinum, 2-wire, 100 Ω, IEC 751 (ASTM-B Standard Accuracy), 316 ss Sheath	2
RTD, Platinum, 3-wire, 100 Ω, IEC 751 (ASTM-B Standard Accuracy), 316 ss Sheath (d)	Q
RTD, Platinum, 4-wire, 100 Ω, IEC 751 (ASTM-B Standard Accuracy), 316 ss Sheath (d)	4
RTD, Platinum, 3-wire, 100 Ω, IEC 751 (ASTM-A High Accuracy), 316 ss Sheath (d)	A
RTD, Platinum, 4-wire, 100 Ω, IEC 751 (ASTM-A High Accuracy), 316 ss Sheath (d)	6
RTD, Nickel, 3-wire, 100 Ω, DIN 43760, 316 ss Sheath (d)	I
Ohm Input	O
Millivolt Input	M
Thermowell Assembled to Housing	
No Well, or Well is supplied separately	NA

MODEL CODE - BASIC MODULE CODE B (CONTINUED)

Remote sensors not provided, but can be ordered separately

Description	Model
Electrical Certifications (see Electrical Specifications section in PSS or MI for details)	
ATEX, Intrinsically Safe, Ex ia IIC	E
CSA, Intrinsically Safe and Division 2 (e)	C
FM, Intrinsically Safe and Division 2 (e)	F
IECEx, Intrinsically Safe (f)	T
EAC Intrinsically Safe	S
Optional Selections	
Custom Database Configuration (requires C2 Form filled out with all data specified)	-C2
Clip and Self-Tapping Screw provided to mount the Basic Module to a DIN Rail (g)	-D1
Adapter Plate and Screws to allow mounting the RTT Basic Transmitter Module into existing E93, E94, 893, and RTT10 Transmitter housings.	-D3
Omit Paper Instruction Manual and CD (h)	-K1
Example: RTT15-T1BNJNAC-C2D1	

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

b. For dual input with different type sensors (Output Versions -F and -P only), specify Input Configuration Code 1 and reconfigure the transmitter after shipment, 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 the 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. User Configuration or -C2 Option can be used for dual input of one three-wire RTD and one TC (Output Versions -F and -P only).

e. At the time of printing, the HART 7 (-H) module is certified for Model Codes C and F with Housing Code B only. Contact Global Customer Support for availability of additional CSA and FM certifications with HART version 7 (-H).

f. Output versions -H and -T only.

g. Basic module is attached to mounting clip with a self-tapping screw, and shipped assembled for snapping onto the DIN rail.

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.

MODEL CODE - HOUSING CODES S AND T

Remote sensors not provided, but can be ordered separately

Description	Model
I/A Series Temperature Transmitter	RTT15
HOUSING CODES S AND T 	
Output Version	
Intelligent; Digital HART 7 and 4 to 20 mA dc	-H
Intelligent; Digital HART 5 and 4 to 20 mA dc	-T
Intelligent; Digital FOUNDATION Fieldbus H1	-F
Intelligent; Digital PROFIBUS PA	-P
Input Configuration (a)	
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 HART Output Versions -H/-T)	6
Housing and Sensor Mounting (Housing for Surface or Pipe Mounting)	
Universal Housing, Aluminum, for use with remote sensor Remote Sensor ordered separately	S
Universal Housing, 316 ss, for use with remote sensor Remote Sensor ordered separately	T
Sensor Length	
None - Sensor ordered separately	N
Measurement Input Type (Software Selectable) (c)	
Thermocouple, Type B, Platinum-Rhodium	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	R
Thermocouple, Type S, Platinum-Rhodium	S
Thermocouple, Type T, Copper-Constantan	T
Thermocouple, Type U, Copper-Copper/Low Nickel	U
Thermocouple, Type W3, Tungsten - Rhenium	3
Thermocouple, Type W5, Tungsten - Rhenium	5
RTD, Platinum, 2-wire, 100 Ω, IEC 751 (ASTM-B Standard Accuracy), 316 ss Sheath	2
RTD, Platinum, 3-wire, 100 Ω, IEC 751 (ASTM-B Standard Accuracy), 316 ss Sheath (d)	Q
RTD, Platinum, 4-wire, 100 Ω, IEC 751 (ASTM-B Standard Accuracy), 316 ss Sheath (d)	4
RTD, Platinum, 3-wire, 100 Ω, IEC 751 (ASTM-A High Accuracy), 316 ss Sheath (d)	A
RTD, Platinum, 4-wire, 100 Ω, IEC 751 (ASTM-A High Accuracy), 316 ss Sheath (d)	6
RTD, Nickel, 3-wire, 100 Ω, DIN 43760 (d)	I
Ohm Input	O
Millivolt Input	M
Thermowell Assembled to Housing	
No Well or Well ordered separately	NA

MODEL CODE - HOUSING CODES S AND T (CONTINUED)

Remote sensors not provided, but can be ordered separately

Description	Model
Electrical Certifications (see Electrical Specifications section in PSS or MI for details)	
ATEX, Intrinsically Safe, Ex ia IIC	E
ATEX, Flameproof, Ex d IIC	D
CSA Intrinsically Safe, Explosionproof, and Division 2 (e) (f)	C
FM, Intrinsically Safe, Explosionproof, and Nonincendive (e)	F
IECEx, Flameproof, Ex d IIC	V
IECEx, Intrinsically Safe (g)	T
EAC Intrinsically Safe	S
EAC Flameproof	R
KOSHA Flameproof (h)	K
INMETRO Flameproof (h)	M
Optional Selections - Housing Features	
Custody Transfer Lock and Seal	-A1
PG 13.5 Conduit Thread (in lieu of 1/2 NPT) (i) (Not available with Option -A3)	-A2
Metric Conduit Thread Adapter (1/2 NPT to M20 x 1.5) (i) (Not available with Option -A2)	-A3
Optional Selections - Mounting Sets (j)	
Carbon Steel (with finish) Mounting Set	-M1
Stainless Steel (with finish) Mounting Set	-M2
Optional Selection - LED Indicator (with HART Output Versions -H/-T only)	
Loop Powered Indicator	-L1
Optional Selections - Miscellaneous	
Custom Database Configuration (Requires C2 Form filled out with all data specified)	-C2
Omit Paper Instruction Manual and CD (k)	-K1
Example: RTT15-T1SNJNAC-A2M2C2	

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

b. For dual input with different type sensors (Output Versions -F and -P only), specify Input Configuration Code 1 and reconfigure the transmitter after shipment, 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 the 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. User Configuration or -C2 Option can be used for dual input of one three-wire RTD and one TC (Output Versions -F and -P only).

e. For HART version 7 (-H), contact Global Customer Support for availability of CSA and FM certification.

f. With Option -L1, CSA is explosionproof only.

g. Output versions -H and -T only.

h. Not available with output F and P.

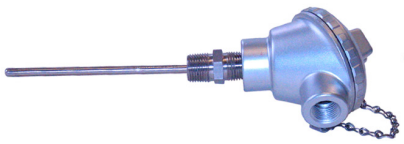
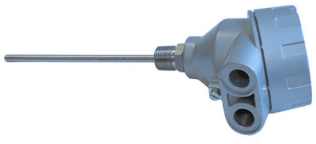
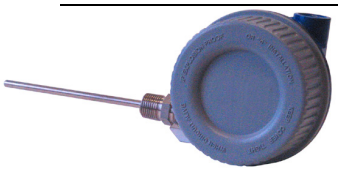
i. Options -A2 and -A3 not available with Model Codes C and F explosionproof installations.

j. For mounting transmitter to a surface or nominal DN 50 or 2-in pipe.

k. 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 CODE - HOUSING CODES C, D, W, AND Y

Integral bare sensors provided

Description	Model
I/A Series Temperature Transmitter	RTT15
HOUSING CODE C  HOUSING CODE D  HOUSING CODES W AND Y 	
Output Version	
Intelligent; Digital HART 7 and 4 to 20 mA dc	-H
Intelligent; Digital HART 5 and 4 to 20 mA dc	-T
Intelligent; Digital FOUNDATION Fieldbus H1	-F
Intelligent; Digital PROFIBUS PA	-P
Input Configuration (a)	
Single Input; Configured for One Sensor	1
Housing and Sensor Mounting (Integral Bare Sensors)	
Weatherproof Connection Head, aluminum; with Integral Bare Sensor	C
Explosionproof Connection Head, aluminum; with Integral Bare Sensor	D
Universal Housing, aluminum; with Integral Bare Sensor	W
Universal Housing, 316 ss; with Integral Bare Sensor	Y
Sensor Length - Dimension A (b)	
2 in (50 mm), Sensor included	A
2.5 in (64 mm), Sensor included	B
3 in (76 mm), Sensor included	C
3.5 in (89 mm), Sensor included	D
4 in (102 mm), Sensor included	E
4.5 in (114 mm), Sensor included	F
5 in (127 mm), Sensor included	G
5.5 in (146 mm), Sensor included	H
6 in (152 mm), Sensor included	J
7 in (178 mm), Sensor included	K
8 in (203 mm), Sensor included	L
9 in (229 mm), Sensor included	M
10 in (254 mm), Sensor included	P
11 in (279 mm), Sensor included	Q
12 in (305 mm), Sensor included	R
18 in (457 mm), Sensor included	S
24 in (610 mm), Sensor included	T
30 in (762 mm), Sensor included	U
36 in (914 mm), Sensor included	V
Custom Lengths between 2 and 120 in (50 mm and 3 m), Sensor included	X
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 Ω, IEC 751 (ASTM-B Standard Accuracy), 316 ss Sheath	Q
RTD, Platinum, 4-wire, 100 Ω, IEC 751 (ASTM-B Standard Accuracy), 316 ss Sheath	4
RTD, Platinum, 3-wire, 100 Ω, IEC 751 (ASTM-A High Accuracy), 316 ss Sheath	A
RTD, Platinum, 4-wire, 100 Ω, IEC 751 (ASTM-A High Accuracy), 316 ss Sheath	6
Ohm Input	O
Millivolt Input	M

MODEL CODE - HOUSING CODES C, D, W, AND Y (CONTINUED)

Integral bare sensors provided

Description	Model
Measurement Input Type (Software Selectable) (c)	
Thermowell Assembled to Housing	
No Well	NA
Electrical Certifications (see Electrical Specifications section in PSS or MI for details)	
Supplied without Agency Approval/Certification (with Housing Codes C and D only)	Z
ATEX, Intrinsically Safe; Ex ia IIC	E
ATEX, Flameproof; Ex d IIC (d)	D
CSA, Intrinsically Safe, Explosionproof, and Division 2 (e) (f)	C
FM, Intrinsically Safe, Explosionproof, and Nonincendive (e)	F
IECEx, Flameproof, Ex d IIC (d)	V
IECEx, Intrinsically Safe (g)	T
EAC Intrinsically Safe	S
EAC Flameproof (d)	R
KOSHA Flameproof (g)	K
INMETRO Flameproof (d) (g)	M
Optional Selections - Housing Features	
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) (h) (Not available with Option -A3)	-A2
Metric Conduit Thread Adapter (1/2 NPT to M20 x 1.5) (Not available with Option -A2)	-A3
Optional Selections - Mounting Sets for Surface or Pipe Mounting	
Carbon Steel (with finish) Mounting Set (with Housing Codes W and Y only)	-M1
Stainless Steel (with finish) Mounting Set (with Housing Codes W and Y only)	-M2
Optional Selection - LED Indicator (with HART Output Versions -H/-T only)	
Loop Powered Indicator (with Housing Codes W and Y only) With ATEX and FM intrinsically safe versions of the transmitter, and ATEX, CSA, FM, and IECEx Explosionproof/flameproof versions of the transmitter.	-L1
Optional Selections - Miscellaneous	
Custom Database Configuration (Requires C2 Form filled out with all data specified)	-C2
Omit Paper Instruction Manual and CD (i)	-K1
Inconel Sheath on Sensor (Not available with Measurement Input Types 4 and 6) (j)	-S1
Example: RTT15-T1WLJNAC-A2S1	

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

b. Quantity of one sensor that is listed under Measurement Input Type. Length is Dimension A as shown in the Dimensions-Nominal section of PSS 2A-1F5 A and in DP 020-462. 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 the appropriate configurator for selected protocol.

d. Not available with Housing Code C.

e. For HART version 7 (-H), contact Global Customer Support for availability of CSA and FM certification.

f. With Option -L1, CSA is explosionproof only.

g. Output (Communication Protocol) Options -H and -T (HART) only.

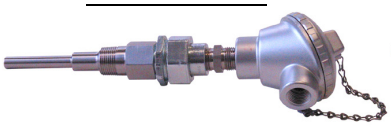
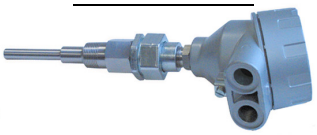
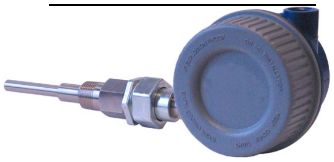
h. Option -A2 only available with Model Codes D and E.

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

j. 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 CODE - HOUSING CODES E, F, L, AND M

Housing provided with sensor and thermowell (or user-supplied thermowell)

Description	Model
I/A Series Temperature Transmitter	RTT15
HOUSING CODE E 	
HOUSING CODE F 	
HOUSING CODES L AND M 	
Output Version	
Intelligent; Digital HART 7 and 4 to 20 mA dc	-H
Intelligent; Digital HART 5 and 4 to 20 mA dc	-T
Intelligent; Digital FOUNDATION Fieldbus H1	-F
Intelligent; Digital PROFIBUS PA	-P
Input Configuration (a)	
Single Input; Configured for One Sensor	1
Housing and Sensor Mounting (Integral Sensor and Well)	
Weatherproof Connection Head, aluminum; with Integral Sensor and Well	E
Explosionproof Connection Head, aluminum; with Integral Sensor and Well	F
Universal Housing, aluminum; with Integral Sensor and Well	L
Universal Housing, 316 ss; with Integral Sensor and Well	M
Sensor Length - Dimension U or U + T (b)	
2 in (50 mm), Sensor included	A
2.5 in (64 mm), Sensor included	B
3 in (76 mm), Sensor included	C
3.5 in (89 mm), Sensor included	D
4 in (102 mm), Sensor included	E
4.5 in (114 mm), Sensor included	F
5 in (127 mm), Sensor included	G
5.5 in (146 mm), Sensor included	H
6 in (152 mm), Sensor included	J
7 in (178 mm), Sensor included	K
7.5 in (191 mm), Sensor included	W
8 in (203 mm), Sensor included	L
9 in (229 mm), Sensor included	M
10 in (254 mm), Sensor included	P
11 in (279 mm), Sensor included	Q
12 in (305 mm), Sensor included	R
13 in (330 mm), Sensor included	Y
13.5 in (343 mm), Sensor included	Z
14 in (356 mm), Sensor included	1
14.5 in (368 mm), Sensor included	2
16 in (406 mm), Sensor included	3
18 in (457 mm), Sensor included	S
19 in (483 mm), Sensor included	4
20 in (508 mm), Sensor included	5
24 in (610 mm), Sensor included	T
30 in (762 mm), Sensor included	U
36 in (914 mm), Sensor included	V
Custom Lengths between 2 and 120 in (50 mm and 3 m), Sensor included	X

MODEL CODE - HOUSING CODES E, F, L, AND M (CONTINUED)

Housing provided with sensor and thermowell (or user-supplied thermowell)

Description	Model
Measurement Input Type (Software Selectable) (c)	
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 Ω, IEC 751 (ASTM-B Standard Accuracy), 316 ss Sheath	Q
RTD, Platinum, 4-wire, 100 Ω, IEC 751 (ASTM-B Standard Accuracy), 316 ss Sheath	4
RTD, Platinum, 3-wire, 100 Ω, IEC 751 (ASTM-A High Accuracy), 316 ss Sheath	A
RTD, Platinum, 4-wire, 100 Ω, IEC 751 (ASTM-A High Accuracy), 316 ss Sheath	6
Ohms Input	O
Millivolts Input	M
Thermowell Assembled to Housing	
Well Type / **Well Connection** / **Well Material** / **Available with Sensor Length Codes**	
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 / Nickel Alloy (e) / 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
Other Types of Thermowells Assembled to Housing (f)	TX
Thermowell Supplied by User (g)	NA
Electrical Certifications (see Electrical Specifications section in PSS or MI for details)	
Supplied without Agency Approval/Certification (with Housing Codes E and F only)	Z
ATEX, Intrinsically Safe, Ex ia IIC	E
ATEX, Flameproof, Ex d IIC (g) (h)	D
CSA, Intrinsically Safe, Explosionproof, and Division 2 (g) (i) (j)	C
FM, Intrinsically Safe, Explosionproof, and Nonincendive (g) (i)	F
IECEx, Flameproof, Ex d IIC (h)	V
IECEx, Intrinsically Safe (k)	T
EAC Intrinsically Safe	S
EAC Flameproof (h)	R
KOSHA Flameproof (h) (k)	K
INMETRO Flameproof (h) (k)	M
Optional Selections - Housing Features	
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) (l) (Not available with Option -A3)	-A2
Metric Conduit Thread Adapter (1/2 NPT to M20 x 1.5) (Not available with Option -A2)	-A3
Optional Selections - Mounting Sets for Surface or Pipe Mounting	
Carbon Steel (with finish) Mounting Set (with Housing Codes L and M only)	-M1
Stainless Steel (with finish) Mounting Set (with Housing Codes L and M only)	-M2
Optional Selections - Housing Connection to Well	
Stainless Steel union and fittings, with Housing Codes E, F, and L; standard on Housing Code M	-S3
Union with 3/4 NPT External Thread instead of 1/2 NPT External Thread (m)	-D4

MODEL CODE - HOUSING CODES E, F, L, AND M (CONTINUED)

Housing provided with sensor and thermowell (or user-supplied thermowell)

Description	Model
Optional Selection - LED Indicator (with HART Output Versions -H/-T only)	
Loop Powered Indicator (with Housing Codes L and M only) With ATEX and FM intrinsically safe versions of the transmitter, and with ATEX, CSA, FM, and IECEx explosionproof/flameproof versions of the transmitter.	-L1
Optional Selections - Miscellaneous	
Custom Database Configuration (Requires C2 Form filled out with all data specified)	-C2
Omit Paper Instruction Manual and CD (n)	-K1
Inconel Sheath on Sensor (Not available with Measurement Input Types 4 and 6) (o)	-S1
Example: RTT15-T1FGTTAF-N2C2	

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

b. Quantity of one sensor that is listed under Measurement Input Type. Length is Dimension U or U + T as shown in the Dimensions-Nominal section of PSS 2A-1F5 A and in DP 020-462, where U is the insertion length, and T is the 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 the appropriate configurator for selected protocol.

d. Lagging wells have a lagging length T of 76 mm (3 in). If a different lagging length is required, select Code TX and specify Well Model or Part Number. Refer to PSS 3-3C1 A for W-Series Wells, and PSS 3-3D1 A and PSS 3-3D1 B for T-Series Wells.

e. Equivalent to Hastelloy® C. Hastelloy is a registered trademark of Haynes International, Inc.

f. Specify Well Model Number or Part Number. Refer to PSS 3-3C1 A, PSS 3-3D1 A, and PSS 3-3D1 B for other well types.

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

h. Not available with Housing Code E.

i. For HART version 7 (-H), contact Global Customer Support for availability of CSA and FM certification.

j. With Option -L1, CSA is explosionproof only.

k. Output (Communication Protocol) Options -H and -T (HART) only.

l. Option -A2 only available with Model Codes D and E.

m. For use with customer's thermowell having 3/4 NPT internal thread. Available only with Housing Codes E, F, L, or M, and thermowell Code NA (thermowell by others). Not available with Option -S3.

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

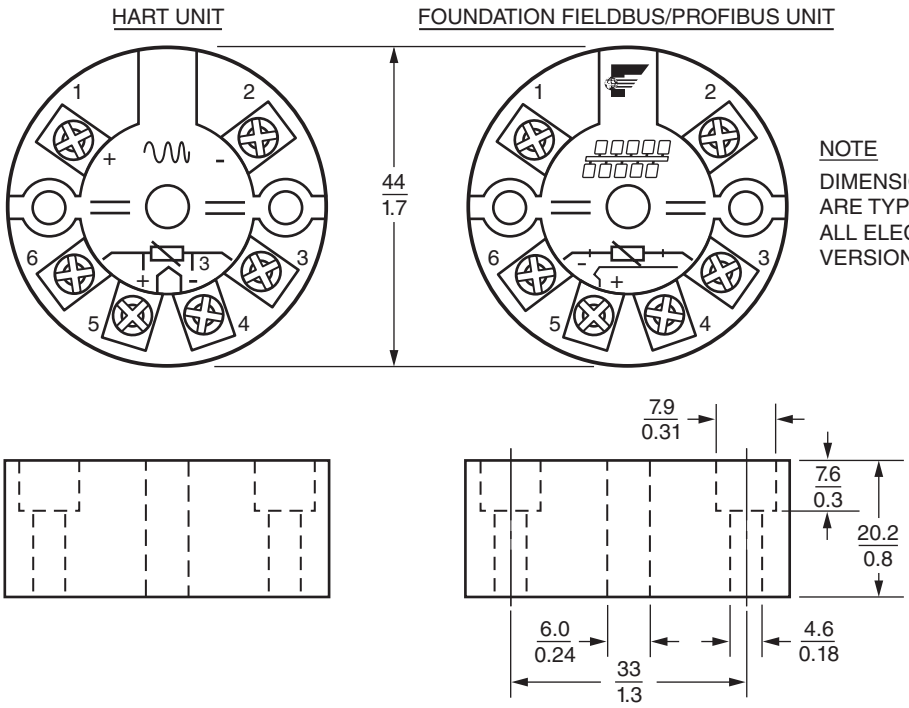
o. Inconel sheath is 0.250 in (6.35 mm) outside diameter, and provides a moisture resistant assembly. The sheath O.D. is designed to fit into a well I.D. of 0.260 in (6.60 mm).

DIMENSIONS - NOMINAL

Figure 9. Basic Transmitter Module

mm
in

BASIC TRANSMITTER MODULE - HOUSING CODE B



BASIC TRANSMITTER MODULE MOUNTED TO SURFACE OR DIN RAIL

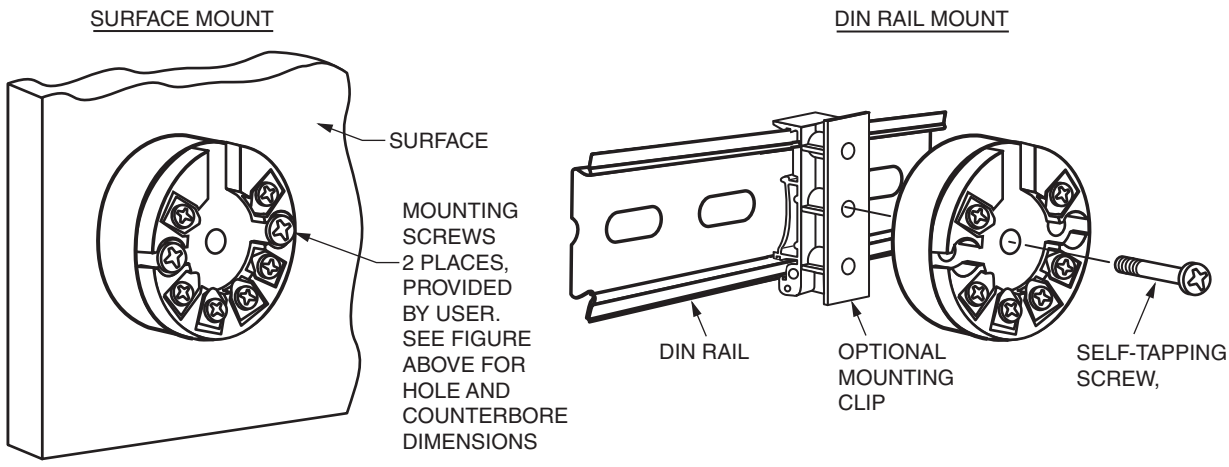
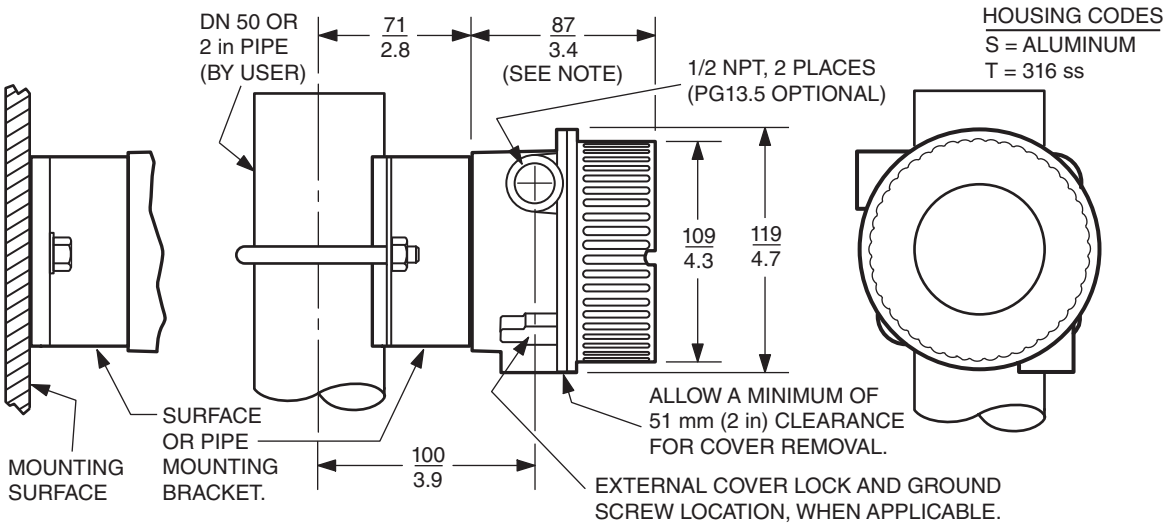


Figure 10. Universal Housing with Remote and Integral Sensor

mm
in

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



NOTE: When the LED Indicator is used with the HART Version, add approximately 10 mm (0.4 in) to the dimension shown.

mm
in

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

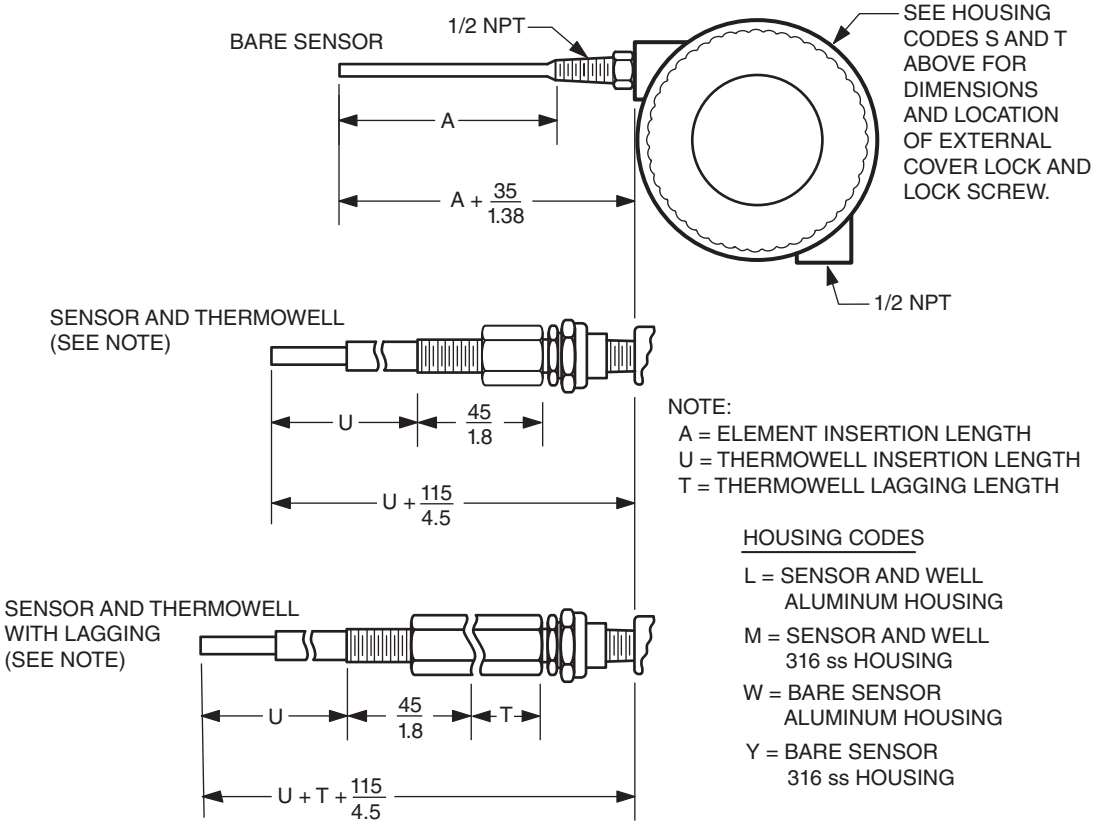


Figure 11. Weatherproof Connection Head

WEATHERPROOF CONNECTION HEAD WITH INTEGRAL SENSOR
HOUSING CODES C AND E

mm
in

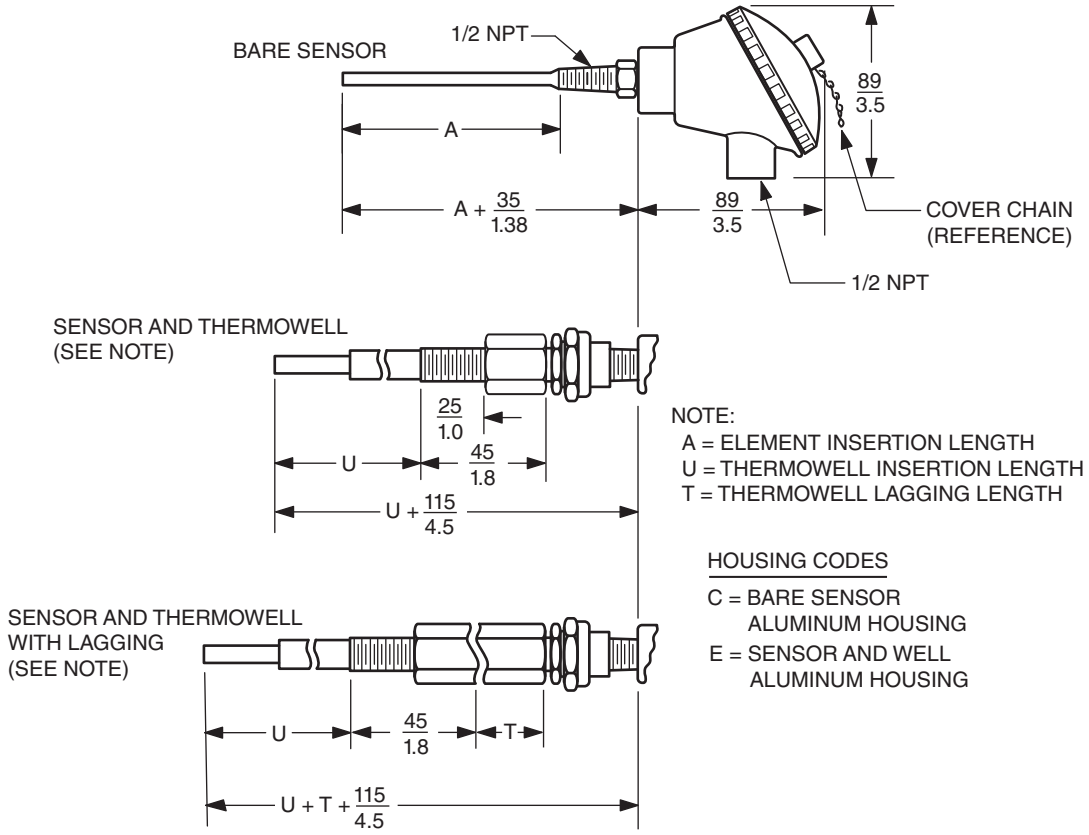
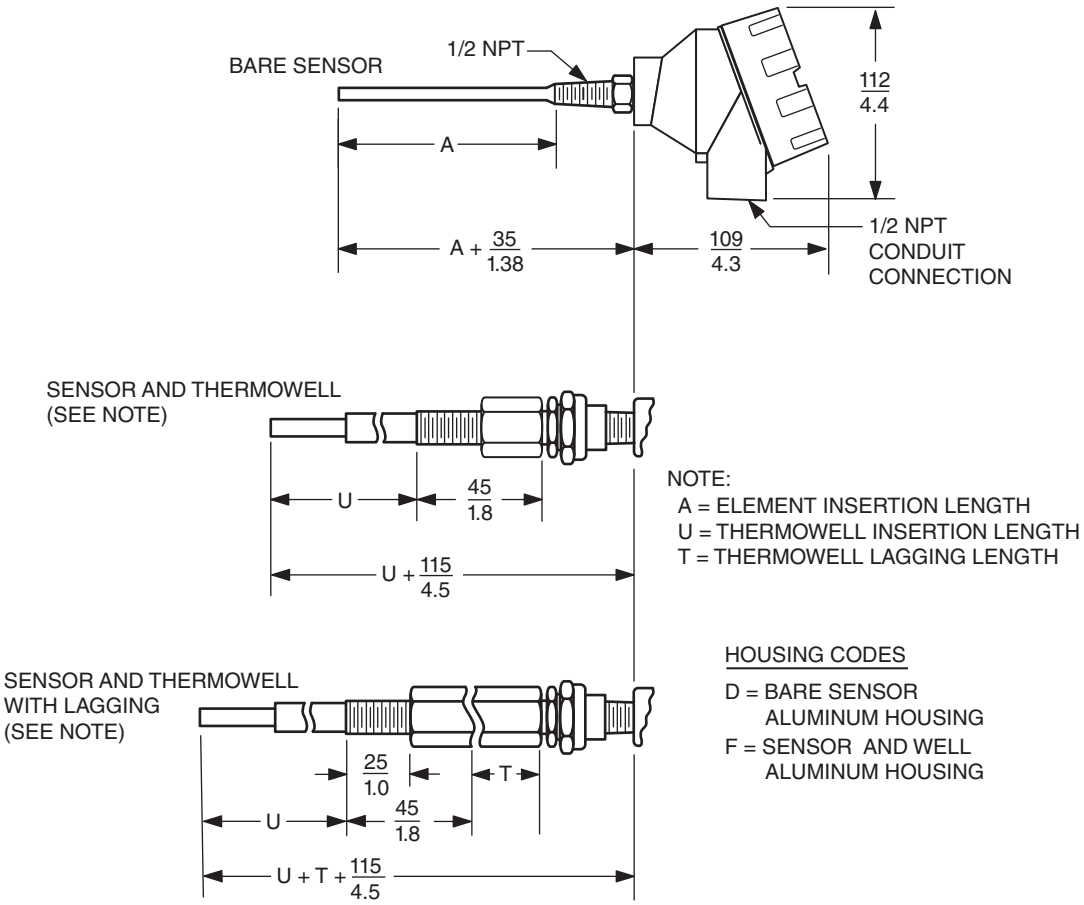


Figure 12. Explosionproof Connection Head

EXPLOSIONPROOF CONNECTION HEAD WITH INTEGRAL SENSOR HOUSING CODES D AND F

mm
in



ORDERING INSTRUCTIONS

1. Model Number
2. Electrical Certification Model Code Option
3. Accessories
4. User Tag Information

ADDITIONAL PRODUCTS

These product lines offer a broad range of measurement and instrument products, including solutions for pressure, flow, analytical, temperature, positioning, controlling, and recording. For a list of these offerings, visit our web site at:

www.schneider-electric.com

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United States of America
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Inside U.S.: 1-866-746-6477
Outside U.S.: 1-508-549-2424
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