Product Data Sheet
September 2017
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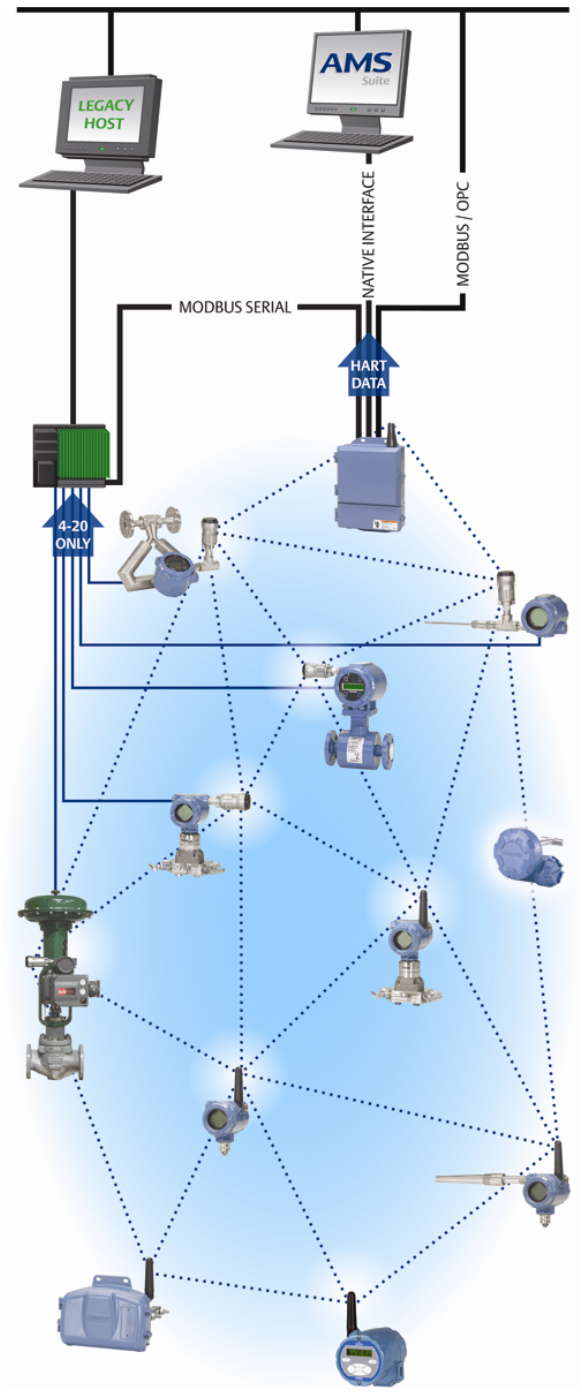
Rosemount™ 705 Wireless Totalizing Transmitter

- An installation-ready solution that provides simple connection to a turbine meter or a pulse output device
- Measure average flow and totalized volume
- Flow and volume are continuously measured between wireless updates
- Self-organizing network delivers information rich data with greater than 99 percent data reliability

Emerson™ Wireless solutions



IEC 62591 (*Wireless*HART®)... The industry standard

Self-organizing, adaptive mesh routing

- No wireless expertise required, network automatically finds the best communication paths
- The self-organizing, self-healing network manages multiple communication paths for any given device. If an obstruction is introduced into the network, data will continue to flow because the device already has other established paths. The network will then lay in more communication paths as needed for that device.

Emerson's Wireless

Reliable wireless architecture

- Standard IEEE 802.15.4 radios
- 2.4 GHz ISM band sliced into 15 radio-channels
- Time Synchronized Channel Hopping to avoid interference from other radios, Wi-Fi, and EMC sources and increase reliability
- Direct sequence spread spectrum (DSSS) technology delivers high reliability in challenging radio environment

SmartPower™ solutions

- Optimized Emerson instrumentation, both hardware and software, to extend power module life
- Intrinsically safe power module allows field replacements without removing the transmitter from the process, keeping personnel safe, and reducing maintenance costs

Contents

Ordering Information

Table 1. Rosemount 705 Wireless Totalizing Transmitter Ordering Information

The starred offerings (★) represent the most common options and should be selected for best delivery. The non-starred offerings are subject to additional delivery lead time.

Product description		
705	Totalizing Transmitter (with connector mil-c-5015)	★
Transmitter output		
X	Wireless	★
Transmitter type		
D1	Direct mount	★
R1	Remote mount (10 ft. leads included)	★
Housing		
D	Dual compartment housing - aluminum	★
E	Dual compartment housing - SST	★
Conduit threads		
1	1/2–14 NPT	★
Certifications		
I5	U.S.A Intrinsically Safe	★
I6	Canada Intrinsically Safe	★
N5	U.S.A. Division 2, Non-incendive	★
N6	Canada Division 2, Non-incendive	★
I1	ATEX Intrinsic Safety	★
IU	ATEX Intrinsic Safety for Zone 2	★
I7	IECEx Intrinsic Safety	★
IY	IECEx Intrinsic Safety for Zone 2	★

Wireless options

Wireless update rate, operating frequency and protocol		
WA3	User configurable update rate, 2.4 GHz DSSS, IEC 62591 (*Wireless*HART)	★
Omni directional wireless antenna and SmartPower solutions[(1)]		
WK1	External antenna, adapter for black power module (I.S. Power module sold separately)	★
WM1	Extended range, external antenna, adapter for black power module (I.S. Power module sold separately)	★
WJ1	Remote antenna, adapter for black power module (I.S.Power module sold separately)	
WN1[(2)]	High-gain, remote antenna, adapter for black power module (I.S. Power module sold separately)	

Table 1. Rosemount 705 Wireless Totalizing Transmitter Ordering Information

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Other options (Include with selected model number)

Display		
M5	LCD display	★
Mounting bracket		
B4	Universal L mounting bracket for 2-in. pipe mounting - SST bracket and bolts	★
Configuration		
C1	Calibration factor (k-factor) configuration (factory configure date, descriptor, message fields, and wireless parameters)	★
Typical model number: 705 X D1 D 1 I6 WA3 WM1 M5 C1		

1. Black Power Module must be shipped separately, order model 701PBKKF or part number 00753-9220-0001.
2. Limited availability, consult factory for details.

Spare parts and accessories

Table 2. Spare Parts and Accessories

Spare parts and accessories	
00705-9000-0001	Cable is only 9-in. long
00705-9000-0002	Cable assembly, 10 ft. long for remote mount option
03151-9270-0003	Remote housing bracket kit
701PBKKF	Black power module

Specifications

Functional specifications

Wireless output

IEC 62591 (*Wireless*HART) 2.4 GHz DSSS

Radio frequency power output from antenna

External (WK option) antenna:
Maximum of 10 mW (10 dBm) EIRP

Extended range, External (WM option) antenna:
Maximum of 18 mW (12.5 dBm) EIRP

High Gain, Remote (WN option) antenna:
Maximum of 40 mW (16 dBm) EIRP

Remote (WJ option) antenna:
Maximum of 17 mW (12.3 dBm) EIRP

Local display

The optional integral LCD can display totalized volume, average flow rate, and diagnostic information. Display refresh at each wireless update, option to have the display always on.

Humidity limits

0–99 percent relative humidity

Wireless update rate

User selectable, one second to 60 minutes

Flow rate accuracy

Flow rate accurate of better than ±0.01 percent of reading at reference conditions[(1)] (excluding turbine meter and magnetic pickup).

Totalization accuracy

Totalization accurate of better than ±0.01 percent of reading at reference conditions[(1)] (excluding turbine meter and magnetic pickup).

1. *Reference conditions are 70 °F (21 °C), for frequency 170Hz to 10khz.*

Physical specifications

Electrical connections

Wireless power module

Replaceable, intrinsically safe lithium-thionyl chloride power module with PBT polymer enclosure. Ten year life at reference condition [(2)].

Wiring terminals

Screw terminals fixed to terminal block

Field Communicator connections

Communication terminals clips permanently fixed to terminal block.

Materials of construction

Enclosure

Housing: Low-copper aluminum, or stainless steel
Paint: Polyurethane
Cover O-ring: Buna-N

Terminal block

PBT

Antenna

PBT/PC integrated omni directional antenna

Conduit entries

1/2–14 NPT

Weight

Low-copper aluminum:
705 without LCD display - 4.6 lb (2.0 kg)
705 with M5 LCD display - 4.7 lb (2.1 kg)

Stainless steel:
705 without LCD display - 8.0 lb (3.6 kg)
705 with M5 LCD display - 8.1 lb (3.7 kg)

Enclosure ratings

NEMA® 4X and IP66/67

Mounting

Transmitters may be attached directly to pulse output device or turbine meters. Brackets also permit remote mounting. See "Dimensional drawings" on page 10.

2. *Continuous exposure to ambient temperature limits (-40 °F or 185 °F) (–40 °C or 85 °C) may reduce specified power module life by less than 20 percent and routing data for three additional network devices.*

Performance specifications

Electro Magnetic Compatibility (EMC)

All models

Meets all industrial environment requirements of EN61326 and NAMUR NE-21. Maximum deviation less than 1 percent span during EMC disturbance[1].

Vibration effect

Wireless output unaffected when tested per the requirements of IEC60770-1 field or pipeline with high vibration level (10–60 Hz 0.21 mm displacement peak amplitude/60–2000 Hz 3 g).

Temperature limits

Description	Operating limit	Storage limit
Without LCD display	–40 to 185 °F –40 to 85 °C	–40 to 185 °F –40 to 85 °C
With LCD display	–4 to 175 °F –20 to 80 °C	–40 to 185 °F –40 to 85 °C

Input parameter

One input channel available. The device operates at pulse inputs from 3–10,000 Hz and at a minimum sensitivity of 10 mV and maximum sensitivity up to 42.2 V.

Output parameter

The device will output specified average pulse (flow) rate and total pulse accumulation (volume) by user-selected units based on the calibration factor of the pulse input device or the k-factor.

Calibration factor or k-factor

The device requires a calibration factor that can be input via a HART® hand held, AMS Device Manager or factory inputs (requires C1 option). The k-factor is typically supplied by the manufacturer of the pulse generation source.

1. *During surge event device may exceed maximum EMC deviation limit or reset; however, device will self-recover and return to normal operation within specified start-up time.*

Product Certifications

Rev 1.1

European Directive Information

A copy of the EC Declaration of Conformity can be found at the end of the Quick Start Guide. The most recent revision of the EC Declaration of Conformity can be found at Emerson.com/Rosemount.

Telecommunication Compliance

All wireless devices require certification to ensure that they adhere to regulations regarding the use of the RF spectrum. Nearly every country requires this type of product certification.

Emerson is working with governmental agencies around the world to supply fully compliant products and remove the risk of violating country directives or laws governing wireless device usage.

FCC and IC

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: This device may not cause harmful interference. This device must accept any interference received, including interference that may cause undesired operation. This device must be installed to ensure a minimum antenna separation distance of 20 cm from all persons.

Ordinary Location Certification from CSA

The transmitter has been examined and tested to determine that the design meets the basic electrical, mechanical, and fire protection requirements by CSA, a nationally recognized test laboratory (NRTL) as accredited by the Federal Occupational Safety and Health Administration (OSHA).

Installing in North America

The US National Electrical Code® (NEC) and the Canadian Electrical Code (CEC) permit the use of Division marked equipment in Zones and Zone marked equipment in Divisions. The markings must be suitable for the area classification, gas, and temperature class. This information is clearly defined in the respective codes.

USA

I5 U.S.A. Intrinsically Safe (IS)
Certificate: CSA 70011131
Standards: FM 3600 – 2011, FM 3610 – 2010,
UL Standard 50 – Eleventh Edition,
UL 61010-1 – 3rd Edition,
ANSI/ISA-60079-0 (12.00.01) – 2013,
ANSI/ISA-60079-11 (12.02.01) – 2013,
ANSI/IEC 60529 – 2004
Markings: IS CL I, DIV 1, GP A, B, C, D T4; Class 1, Zone 0, AEx ia IIC T4 Ga; T4 (–50 °C ≤ T_a ≤ +70 °C) when installed per Rosemount drawing 00705-1020; Type 4X; IP66

See the table at the end of this section for entity parameters.

N5 U.S.A. Division 2, Nonincendive
Certificate: CSA 70011131
Standards: FM 3600 – 2011, FM 3611 – 2004,
UL Standard 50 – Eleventh Edition,
UL 61010-1 (3rd Edition),
ANSI/IEC 60529 – 2004
Markings: NI CL I, DIV 2, GP A, B, C, D T4;
T4 (–50 °C ≤ T_a ≤ +70 °C);
Type 4X; IP66

Special Conditions for Safe Use (X):

1. For use only with the Model 701P or Rosemount P/N 753-9220-XXXX Smart Power Battery Module.
2. The surface resistivity of the antenna is greater than 1 GΩ. To avoid electrostatic charge build-up, it must not be rubbed or cleaned with solvents or a dry cloth.

Canada

I6 Canada Intrinsically Safe (IS)
Certificate: CSA 70011131
Standards: CAN/CSA C22.2 No. 0-10,
CAN/CSA C22.2 No. 94-M91,
CSA Std C22.2 No.142-M1987,
CAN/CSA-60079-0 - 2011,
CAN/CSA-60079-11 - 2014,
CSA Std C22.2 No. 60529 - 2005,
CAN/CSA-C22.2 No. 61010-1 - 2012
Markings: IS CL I, DIV 1, GP A, B, C, D T4;
Ex ia IIC T4 Ga, T4; T4 (-50 °C ≤ T_a ≤ +70 °C) when installed per Rosemount drawing 00705-1020; Type 4X; IP66

See the table at the end of this section for entity parameters.

N6 Canada Division 2, Nonincendive
Certificate: CSA 70011131
Standards: CAN/CSA C22.2 No. 0-10,
CAN/CSA C22.2 No. 94-M91,
CSA Std C22.2 No. 213-M1987 (R2013),
CAN/CSA-60079-0 - 2011,
CAN/CSA Std C22.2 No. 60529 - 2005,
CAN/CSA-C22.2 No. 61010-1 - 2012
Markings: Suitable for Class 1, Division 2,
Groups A, B, C, D T4;
T4 (–50 °C ≤ T_a ≤ +70 °C);
Type 4X; IP66

Special Conditions for Safe Use (X):

1. For use only with the Model 701P or Rosemount P/N 753-9220-XXXX Smart Power Battery Module.
2. The surface resistivity of the antenna is greater than 1 GΩ. To avoid electrostatic charge build-up, it must not be rubbed or cleaned with solvents or a dry cloth.

Europe

I1 ATEX Intrinsic Safety
Certificate: Baseefa14ATEX0375X
Standards: EN 60079-0: 2012, EN 60079-11: 2012
Markings: Ⓔx II 1 G Ex ia IIC T4 Ga, T4(–60 °C ≤ T_a ≤ +70 °C)

For use with Rosemount SmartPower power module part number 753-9220-0001, or for use with Emerson SmartPower option 701PBKKF.

See the table at the end of this section for entity parameters.

Special Conditions for Safe Use (X):

1. The surface resistivity of the antenna is greater than 1 GΩ. To avoid electrostatic charge build-up, it must not be rubbed or cleaned with solvents or a dry cloth.
2. The Model 701PBKKF Power Module may be replaced in a hazardous area. The Power Modules have a surface resistivity greater than 1 GΩ and must be properly installed I the wireless device enclosure. Care must be taken during transportation to and from the point of installation to prevent electrostatic charge build-up.
3. The 705 enclosure may be made of aluminum alloy and given a protective polyurethane paint finish; however, care should be taken to protect it from impact or abrasion if located in a Zone 0 area.

IU ATEX Intrinsic Safety for Zone 2
Certificate: Baseefa15ATEX0059X
Standards: EN 60079-0: 2012, EN 60079-11: 2012
Markings: Ⓔx II 3 G Ex ic IIC T4 Gc, T4(-60 °C ≤ T_a ≤ +70 °C)

For use with Rosemount SmartPower power module part number 753-9220-0001, or for use with Emerson SmartPower option 701PBKKF.

See the table at the end of this section for entity parameters.

Special Conditions for Safe Use (X):

1. The surface resistivity of the antenna is greater than 1 GΩ. To avoid electrostatic charge build-up, it must not be rubbed or cleaned with solvents or a dry cloth.
2. The Model 701PBKKF Power Module may be replaced in a hazardous area. The Power Modules have a surface resistivity greater than 1 GΩ and must be properly installed I the wireless device enclosure. Care must be taken during transportation to and from the point of installation to prevent electrostatic charge build-up.
3. The 705 enclosure may be made of aluminum alloy and given a protective polyurethane paint finish; however, care should be taken to protect it from impact or abrasion if located in a Zone 0 area.

International

I7 IECEx Intrinsic Safety
Certificate: IECEx BAS 14.0173X
Standards: IEC 60079-0: 2011, IEC 60079-11: 2011
Markings: Ex ia IIC T4 Ga, T4 (–60 °C ≤ T_a ≤ +70 °C)

For use with Rosemount SmartPower power module part number 753-9220-0001, or for use with Emerson SmartPower option 701PBKKF.

See the table at the end of this section for entity parameters.

Special Conditions for Safe Use (X):

1. The surface resistivity of the antenna is greater than 1 GΩ. To avoid electrostatic charge build-up, it must not be rubbed or cleaned with solvents or a dry cloth.
2. The Model 701PBKKF Power Module may be replaced in a hazardous area. The Power Modules have a surface resistivity greater than 1 GΩ and must be properly installed I the wireless device enclosure. Care must be taken during transportation to and from the point of installation to prevent electrostatic charge build-up.
3. The 705 enclosure may be made of aluminum alloy and given a protective polyurethane paint finish; however, care should be taken to protect it from impact or abrasion if located in a Zone 0 area.

IY IECEx Intrinsic Safety for Zone 2
Certificate: IECEx BAS 14.0173X
Standards: IEC 60079-0: 2011, IEC 60079-11: 2011
Markings: Ex ic IIC T4 Gc, T4 (–60 °C ≤ T_a ≤ +70 °C)

For use with Rosemount SmartPower power module part number 753-9220-0001, or for use with Emerson SmartPower option 701PBKKF.

See the table at the end of this section for entity parameters.

Special Conditions for Safe Use (X):

1. The surface resistivity of the antenna is greater than 1 GΩ. To avoid electrostatic charge build-up, it must not be rubbed or cleaned with solvents or a dry cloth.
2. The Model 701PBKKF Power Module may be replaced in a hazardous area. The Power Modules have a surface resistivity greater than 1 GΩ and must be properly installed I the wireless device enclosure. Care must be taken during transportation to and from the point of installation to prevent electrostatic charge build-up.
3. The 705 enclosure may be made of aluminum alloy and given a protective polyurethane paint finish; however, care should be taken to protect it from impact or abrasion if located in a Zone 0 area.
4.

Brazil

I2 INMETRO Intrinsic Safety
Certificate: UL-BR 17.0019X
Standards: ABNT NBR IEC 60079-0:2008 + Errata 1:2011, ABNT NBR IEC 60079-11:2009
Markings: Ex ia IIC T4 Ga, T4 (–60 °C ≤ T_a ≤ +70 °C); See the table at the end of this section for entity parameters.

Special Condition for Safe Use (X):

1. See certificate for special conditions.

EAC - Belarus, Kazakhstan, Russia

IM Technical Regulation Customs Union (EAC) Intrinsic Safety
Certificate: TC RU C-US.MIO62.B.03122
Markings: 0Ex ia IIC T4 Ga X, T4 (–60 °C ≤ T_a ≤ +70 °C); See the table at the end of this section for entity parameters.

Special Condition for Safe Use (X):

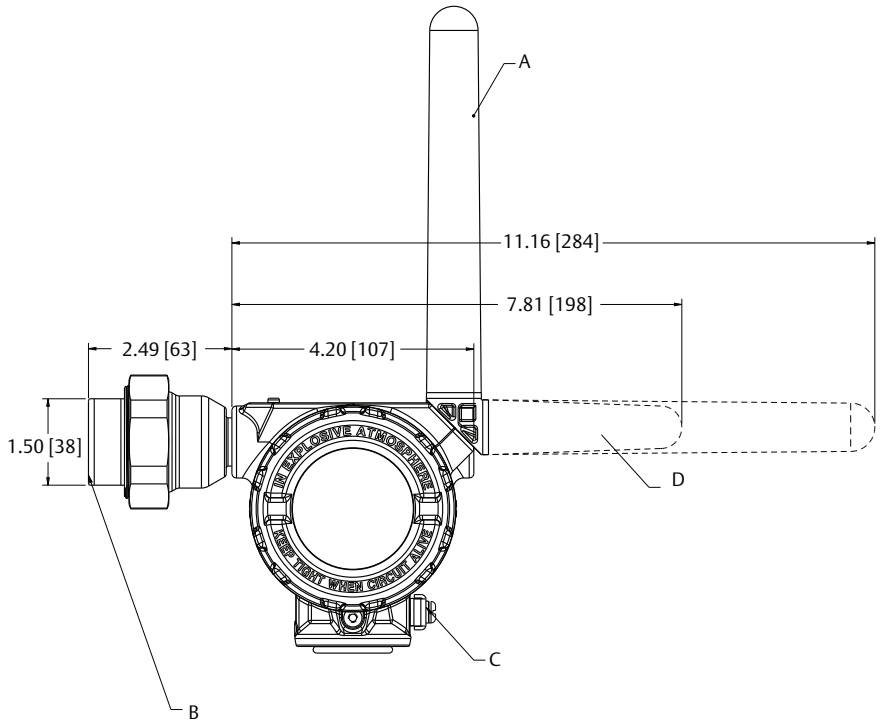
1. See certificate for special conditions.

Turbine meter terminal output parameters	Turbine meter terminal input parameters
V_{oc}/U_o = 2.5 V	V_{max}/U_i = 10 V
I_{sc}/I_o = 253 µA	I_{max}/I_i = 1 mA
P_{max}/P_o = 640 µW	P_{max}/P_i = 1 mW
C_a/C_o = 2.9 µF	C_i = 2.2 nF
L_a/L_o= 500 mH	L_i = 4.7 mH

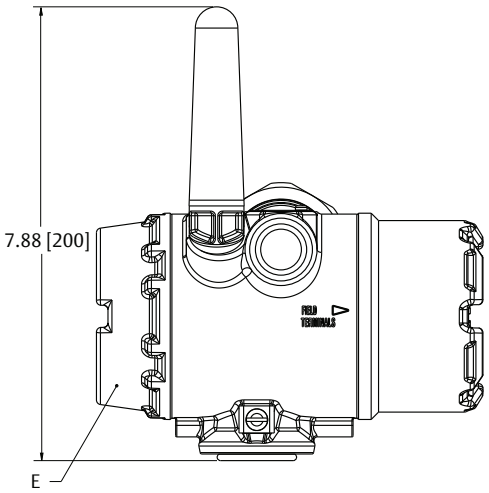
Dimensional drawings

Figure 1. Rosemount 705 Transmitter

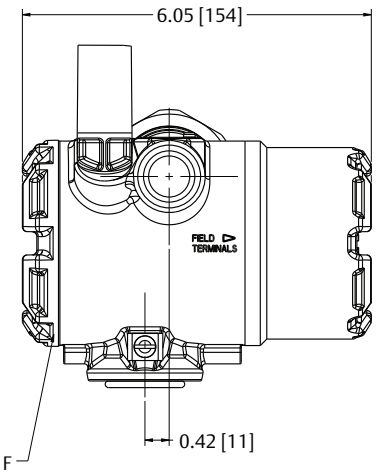
Shown with 2.4 GHz/extended range antenna



Shown with optional digital display and 2.4 GHz/antenna



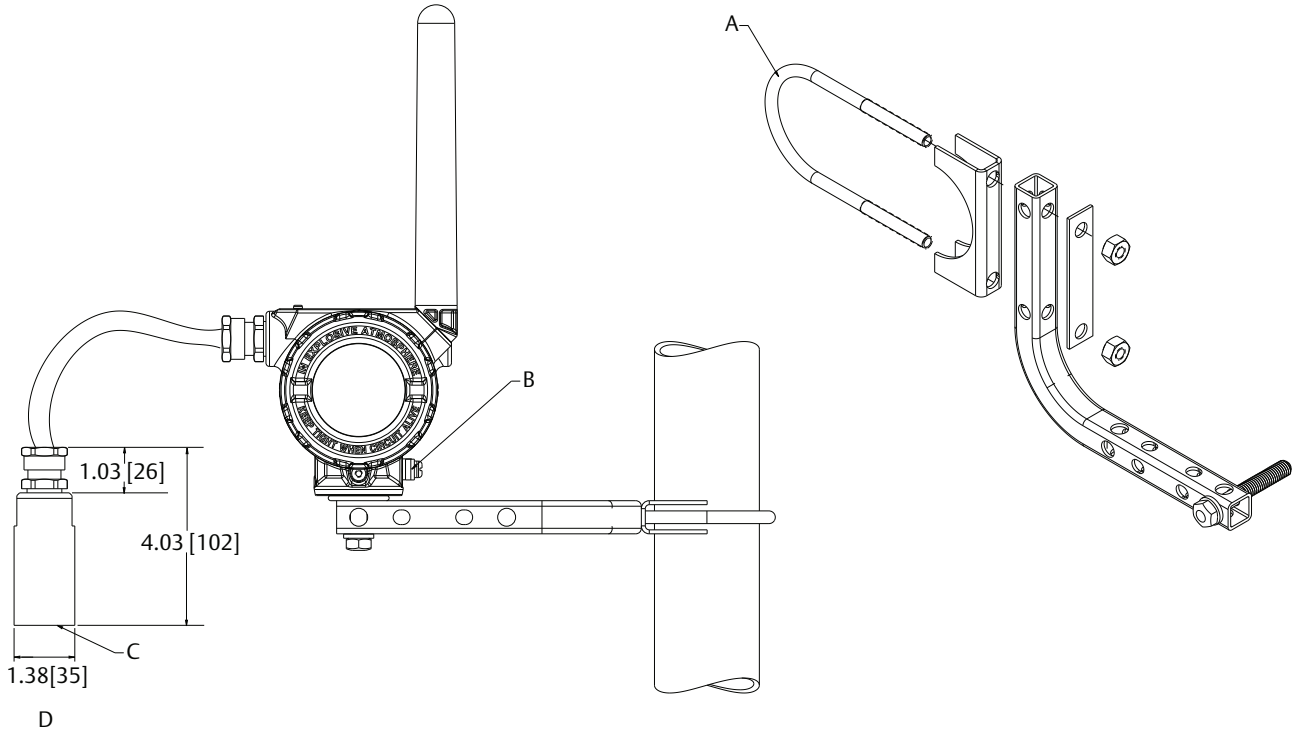
Shown without optional digital display



A. 2.4 GHz/extended range antenna
B. 1-in. NPT connection to flow meter
C. Ground screw assembly
D. Possible antenna rotation
E. Digital display cover
F. Transmitter electronics

Dimensions are in inches (millimeters).

Figure 2. Rosemount 705 Transmitter Mounting Configurations with Optional Mounting Bracket



A. Pipe mounting
B. 2-in. U-bolt for pipe mounting
C. Ground screw assembly
D.1-in. NPT connection to flow meter
E. Turbine meter connection

Dimensions are in inches (millimeters).

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