

# Instrument Area Network

## Central Concentrator and End Nodes

### Product Specification Sheet

PSS 2A-1B5 A

Release date May 6, 2021



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# Table of Contents

Features.....	5
Browser Interface.....	5
Establishing an Instrument Area Network.....	6
Calibration Certificates.....	7
Radio Equipment Directive (RED).....	7
Mounting Brackets.....	8
Specifications.....	10
Mounting Locations.....	10
Operating Limits.....	10
Battery Life.....	10
RF Characteristics.....	11
Process Connections.....	11
End Node Connections.....	11
Range Limits.....	11
Maximum Static, Overrange, and Proof Pressure Ratings.....	12
Measurement Update Rate.....	13
Physical Specifications.....	13
Electrical Certifications.....	14
Model Codes.....	15
Nominal Dimensions.....	20
Additional Products.....	26



# Features

The Instrument Area Network consists of up to eight physically separated wireless end nodes for measurement and control; a wireless central concentrator for relaying data to and from a plant area wireless network (either a sensor network or the upstream network); and a customer-supplied device that has a standard web browser and Wi-Fi capability, such as a tablet, computer, or smartphone.

Key features include

- Easy installation, configuration, and activation of a central concentrator and up to eight end nodes to create the wireless Instrument Area Network
- End nodes for absolute, gauge, and differential pressure measurements; temperature measurements from an RTD or thermocouple
- Ability to remotely communicate with and configure the central concentrator and end nodes with a user-supplied device (such as a tablet, computer, or smartphone) with Wi-Fi capability and a web browser
- Simple, elegant design with few mechanical parts
- Wi-Fi and Bluetooth Low Energy technology
- Communication with the upstream WirelessHART network
- Agency certifications to meet numerous requirements for hazardous and non-hazardous locations
- CE marked; meets the requirements of applicable European Union directives: RED, ATEX, RoHS, and PED (WDP10 only)

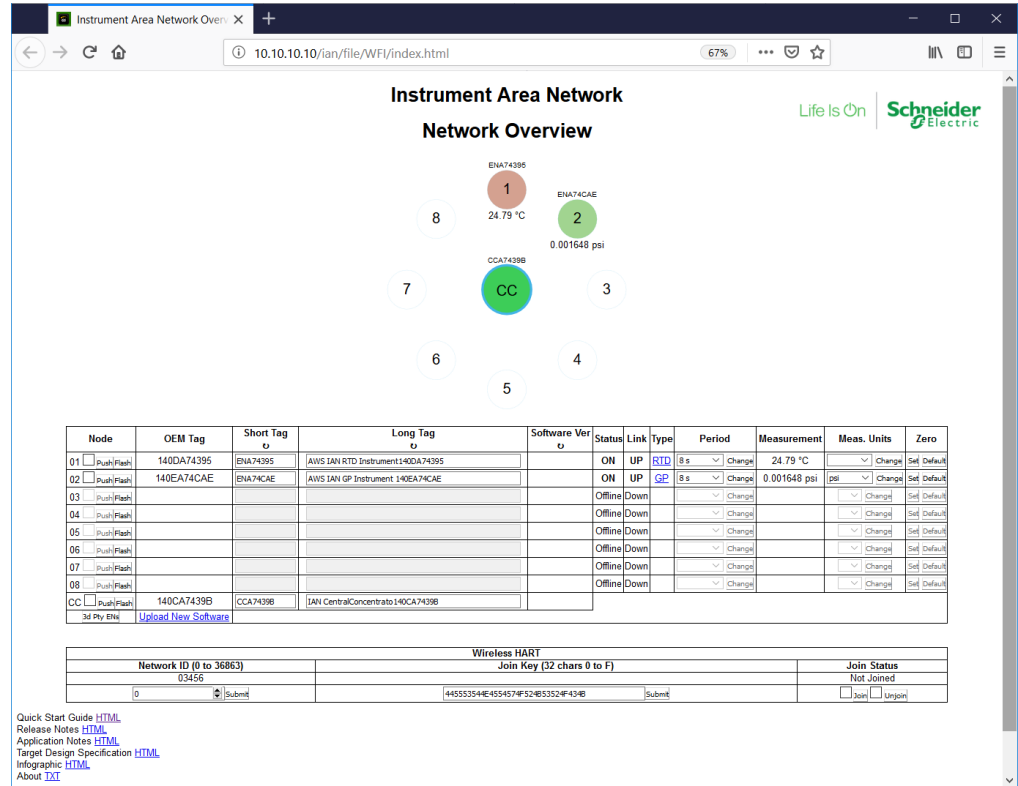
## Browser Interface

A simple web interface allows you to work with the network from a standard web browser with JavaScript enabled. Once you have connected to the network's Wi-Fi signal, you can access the Network Overview web page at <http://10.10.10.10/ian/page>.

The Network Overview page shows a representation of the Instrument Area Network, with the concentrator in the center and all connected end nodes around it. You can read each end node's hardware ID and most recent measurement; the measurements update approximately once per second.

From the Network Overview page, you can configure network parameters, connect the WirelessHART network, and configure each end node's sampling period and measurement units. In addition, you can access release notes, user documentation, and end node calibration certificates.

Figure 1 - Network Overview Page



## Establishing an Instrument Area Network

Creating a wireless Instrument Area Network is fast and easy. If the unit does not have a pushbutton, activate the central concentrator by pushing the antenna toward the outer edge of the housing and holding for two seconds. If the unit does have a pushbutton, “push” refers to pressing the button and holding for two seconds. The central concentrator’s LEDs flash rapidly for a few seconds while it sets up the wireless Instrument Area Network. Then you can connect the end nodes to the central concentrator one at a time by pushing each end node to connect it to the central concentrator.

LEDs on the central concentrator, the newly added end node, and any other end nodes that are connected to the network flash rapidly and out of sync. When connecting is complete, the flashing LEDs in the central concentrator and all connected end nodes synchronize, indicating that the end node has been connected to the Instrument Area Network. The central concentrator can now relay the end nodes’ measurement data to the WirelessHART network.

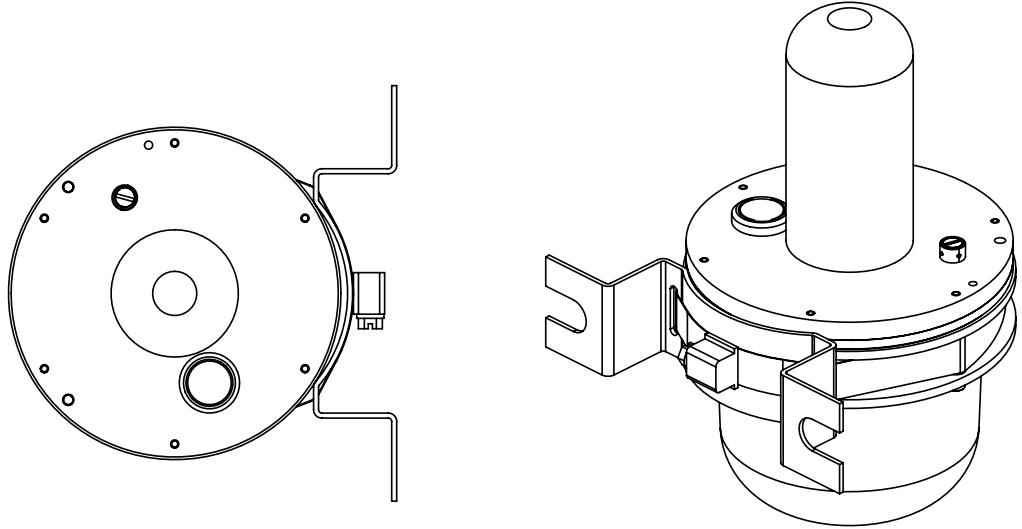
Removing an end node from the network (disconnecting) is just as easy. Push any connected end node to activate the Instrument Area Network; the LEDs of the central concentrator and all connected end nodes flash in sync. Before the flashing stops, simply push the end node you wish to disconnect. The LEDs on the end node leaving the group flash out of sync with the other Instrument Area Network devices to indicate that it is disconnecting. Refer to MI 020-750 for details.



## Mounting Brackets

The device enclosures allow for mounting to a wall or to a two- or three-inch pipe, using the brackets shown in the diagrams. End nodes can also connect directly to the process port threads.

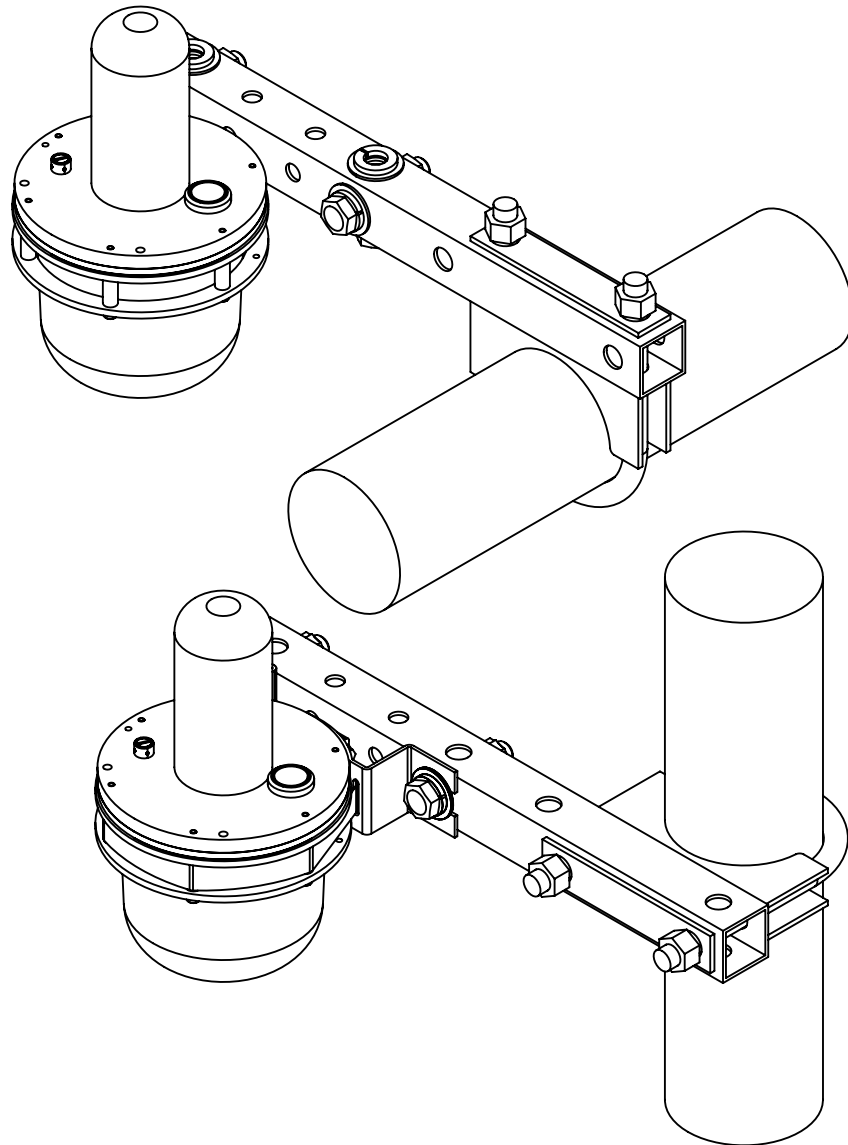
**Figure 4 - Wall Mounting Bracket (Shown with WCC10/WCC15)**





**Figure 5 - Pipe Mounting Bracket (Shown with WCC10/WCC15)**

TWO INCH PIPE SHOWN. THERE IS A  
BOLT PATTERN FOR A THREE INCH PIPE



# Specifications

## Mounting Locations

The central concentrator has an integral antenna that allows communication to the upstream wireless network and to all connected end nodes. Choose a mounting location where the central concentrator is positioned above any metal structures, and where the integral antenna has optimal connectivity to the upstream wireless network. You can mount the central concentrator directly or with an optional mounting bracket. See *Mounting Brackets*, page 8.

Each end node housing has an integral process related sensor located on the bottom center of the unit's base. Select a mounting location for each end node based on the application and the process measurement location.

The distance between the central concentrator and each end node should not exceed 10 m (33 ft). This specification does not require the central concentrator and end node to be installed in a straight line or without obstruction. End nodes can communicate with the central concentrator even in harsh metal-obstructed environments (refer to *RF Characteristics*, page 11).

**NOTICE**

**POTENTIAL EQUIPMENT DAMAGE**

Do not expose mounting locations to forceful impacts like heavy falling objects that could damage the device enclosures.

**Failure to follow these instructions can result in equipment damage.**

## Operating Limits

Operative Limits for measurement and transmission are defined in accordance with ANSI/ISA 51.1-1979 (R1993).

Description	Operative Limits
Ambient Temperature	-40 and +60°C (-40 and +176°F) <sup>1</sup>
Silicone Fill Fluid	-46 and +121°C (-50 and +250°F)
Relative Humidity	0 and 100%
Vibration	1 g constant acceleration input over a frequency range of 5 to 200 Hz
Mounting Position	No limit

## Battery Life

- Central concentrator: 5+ years
- End node: 10+ years

These estimates assume 25°C (77°F) ambient temperature and 16-second update rates for each end node, with eight end nodes connected to each concentrator. Actual battery life depends on ambient temperature and precipitation, configured update rates, and device positioning. For greater battery efficiency and ease of use, position

1. The new temperature limit for ATEX certified End Nodes is +60°C and the central concentrator will remain at +80°C.

devices for best connectivity, and monitor the low battery alarm feature. You can further optimize battery life by configuring for longer interval measurement update rates if they are suitable for your application.

All Instrument Area Network devices are shipped with a battery installed. The Wi-Fi interface is disabled by default, and normally remains active for only five minutes when connecting and disconnecting end nodes.

## RF Characteristics

- 2.4 GHz spread spectrum, ISM license-free band
- 58 mW maximum operational RF transmit power
- Link margin (LKM):

Wireless Communication Type	Transmitter Power (TxP)	Receiver Sensitivity (RS)
Bluetooth Low Energy	+5 dBm	-97 dBm
Wi-Fi	+15 dBm	-90 dBm
WirelessHART	+10 dBm	-96 dBm

## Process Connections

End Node	Process Connection
Temperature (WRT10)	Without thermowell: Connects directly to the process using an external 1/2 NPT male thread.
	With thermowell: Thermowell connects directly to the process.
Absolute Pressure (WAP10) Gauge Pressure (WGP10)	Connects to the process using an external 1/2 NPT male thread.
Differential Pressure (WDP10)	Connects to the process with a 1/4-18 NPT female process connection and fixing thread 7/16"-20 UNF at 41.3 mm (1.625 inches) center distance.

## End Node Connections

Up to eight end nodes can be wirelessly connected with the central concentrator. Together, the end nodes and the central concentrator comprise an Instrument Area Network. The end nodes of the Instrument Area Network relay their measurements to upstream networks, such as WirelessHART and the Wi-Fi administrator interface.

The end nodes are designed to be placed anywhere within 10 m (33 ft) of the central concentrator in harsh metal-obstructed environments (TX Power +5 dBm, RX Sensitivity -97 dBm link margin at 2.4 GHz).

## Range Limits

End Node	Limits
Temperature with RTD	-200°C and +885°C (-328°F and +1625°F)
Temperature with Thermocouple	-100 mV and +100 mV

End Node	Limits												
Absolute Pressure	Detected error is 0.25% of full scale, across -40°C to +60°C (-40°F to +140°F) <table border="1"> <thead> <tr> <th>Code</th> <th>Range Limits</th> </tr> </thead> <tbody> <tr> <td>C</td> <td>0 and 0.21 MPaa (0 and 30 psia)</td> </tr> </tbody> </table>	Code	Range Limits	C	0 and 0.21 MPaa (0 and 30 psia)								
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F	0 and 41.37 MPag (0 and 6000 psig)												
J	0 and 68.95 MPag (0 and 10000 psig)												
Differential Pressure	Detected error is 0.25% of full scale plus static pressure offset error <table border="1"> <thead> <tr> <th>Code</th> <th>Range Limits</th> </tr> </thead> <tbody> <tr> <td>B</td> <td>-50 and +50 kPa (-7.25 and +7.25 psi)</td> </tr> <tr> <td>C</td> <td>-210 and +210 kPa (-30 and +30 psi)</td> </tr> <tr> <td>D</td> <td>-0.21 and +2.10 MPa (-30 and +300 psi)</td> </tr> </tbody> </table>	Code	Range Limits	B	-50 and +50 kPa (-7.25 and +7.25 psi)	C	-210 and +210 kPa (-30 and +30 psi)	D	-0.21 and +2.10 MPa (-30 and +300 psi)				
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B	-50 and +50 kPa (-7.25 and +7.25 psi)												
C	-210 and +210 kPa (-30 and +30 psi)												
D	-0.21 and +2.10 MPa (-30 and +300 psi)												

## Maximum Static, Overrange, and Proof Pressure Ratings

**⚠ DANGER**

**HAZARD OF EXPLOSION**

Exceeding the proof pressure can cause the sensor to rupture forcefully. Avoid exposing end nodes to the proof pressure limit.

**Failure to follow these instructions will result in death or serious injury.**

**NOTICE**

**POTENTIAL EQUIPMENT DAMAGE**

Exceeding the overrange pressure limit for the end nodes can cause damage to the end nodes, degrading their performance. The end node could become nonfunctional after exceeding the overrange pressure. Avoid exposure to the overrange pressure limit.

**Failure to follow these instructions can result in equipment damage.**

**Table 1 - Absolute Pressure Transmitters**

Code	Maximum Overrange Pressure	Maximum Proof Pressure
C	2.1 MPaa (300 psia)	5.51 MPaa (800 psia)

**Table 2 - Gauge Pressure Transmitters**

Code	Maximum Overrange Pressure	Maximum Proof Pressure
C	2.1 MPag (300 psig)	5.51 MPag (800 psig)
D	20.7 MPag (3,000 psig)	55.1 MPag (8,000 psig)
E	34.5 MPag (5,000 psig)	52.4 MPag (7,600 psig)
F	59.1 MPag (8,580 psig)	152 MPag (22,000 psig)
J	99 MPag (14,300 psig)	180 MPag (26,000 psig)

**Table 3 - Differential Pressure Transmitters**

Code	Maximum Static Pressure	Maximum Proof Pressure
B	25 MPa (3,626 psi)	100 MPa (14,500 psi)
C		
D		

## Measurement Update Rate

1 to 60 seconds, configurable. End nodes ship with a default update rate of 16 seconds, corresponding to a report rate of 1/30 Hz.

## Physical Specifications

Description	Specification
Enclosure Materials	304 ss; polycarbonate; PTFE antenna cover (WCC10 only)
Process Wetted Materials (End Nodes only)	316L ss
Sensor Fill Fluid (Pressure End Nodes only)	Silicone oil
Ingress Protection	The enclosure has the rating of IP66/67 as defined by IEC 60529
Dimensions (including Mass)	See Nominal Dimensions, page 20
Mounting Position	See Mounting Brackets, page 8

# Electrical Certifications

This equipment has been designed to meet the electrical safety descriptions listed in this table. Contact Global Customer Support for information or status of testing laboratory approvals or certifications.

Refer to Model Codes, page 15 for availability of electrical safety design codes with each device, and refer to MI 020-750 for connectivity requirements.

**Table 4 - Electrical Certifications for End Nodes and Central Concentrator (WCC10)**

Agency Certification, Types of Protection, and Area Classification	Application Conditions	Model Code Option
<b>North America Intrinsically Safe Certified</b> (ETL Listed by Intertek) Canada: Ex ia IIC T4 Ga Ex ia IIIC T135°C Da United States: Class I Zone 0 AEx ia IIC T4 Ga Zone 20 AEx ia IIIC T135°C Da	End Nodes = $-40^{\circ}\text{C} \leq \text{Ta} \leq +60^{\circ}\text{C}$ , IP54 Central Concentrator = $-40^{\circ}\text{C} \leq \text{Ta} \leq +80^{\circ}\text{C}$ , IP54 <sup>2</sup>	CU
<b>ATEX Intrinsically Safe Certified</b> (ITS16ATEX201373X) II 1 G Ex ia IIC T4 Ga II 1 D Ex ia IIIC T135°C Da	End Nodes = $-40^{\circ}\text{C} \leq \text{Ta} \leq +60^{\circ}\text{C}$ , IP54 Central Concentrator = $-40^{\circ}\text{C} \leq \text{Ta} \leq +80^{\circ}\text{C}$ , IP54 <sup>2</sup>	EU
<b>No certification (ordinary locations only)</b>	$40^{\circ}\text{C} \leq \text{Ta} \leq +80^{\circ}\text{C}$ , IP66/67 (all models)	ZZ

**Table 5 - Electrical Certifications for Central Concentrator (WCC15)**

Agency Certification, Types of Protection, and Area Classification	Application Conditions	Model Code Option
<b>North America Certified for Increased Safety (Ex ec) and Protection by Enclosure (Ex tc)</b> (ETL Listed by Intertek) Canada: Ex ec IIC T5 Gc Ex tc IIIC T100°C Dc United States: Class I Zone 2, AEx ec IIC T5 Gc Zone 22, AEx tc IIIC T100°C Dc	$-40^{\circ}\text{C} \leq \text{Ta} \leq +80^{\circ}\text{C}$ ; IP64	CU
<b>ATEX Certified for Increased Safety (Ex ec) and Protection by Enclosure (Ex tc)</b> II 3 G Ex ec IIC T5 Gc II 3 D Ex tc IIIC T100°C Dc	$-40^{\circ}\text{C} \leq \text{Ta} \leq +80^{\circ}\text{C}$ ; IP64	EU
<b>IECEx Certified for Increased Safety (Ex ec) and Protection by Enclosure (Ex tc)</b> Ex ec IIC T5 Gc Ex tc IIIC T100°C Dc	$-40^{\circ}\text{C} \leq \text{Ta} \leq +80^{\circ}\text{C}$ ; IP64	CU or EU <sup>3</sup>

2. This product was tested according to requirements of both IEC 60079-0 and IEC 60529 and meets the minimum rating of IP54 for Hazardous Area Gas and Dust applications.  
 3. IECEx is included with both the CU and EU certifications.

# Model Codes

**Table 6 - Central Concentrator (WCC10)**

Code	Description
<b>Model</b>	
WCC10	Central Concentrator <sup>4</sup>
<b>Wireless Communication</b>	
-WH	WirelessHART
<b>Electrical Certifications<sup>5</sup></b>	
ZZ	No certification (ordinary locations only)
<b>Optional Selections</b>	
-M2	304 ss Bracket, Clamps, and Bolts <sup>6</sup>
Example: WCC10-WHZZ-M2	

**Table 7 - Central Concentrator with Push button (WCC15)**

Code	Description
<b>Model</b>	
WCC15	Central Concentrator with Push Button <sup>4</sup>
<b>Wireless Communication</b>	
-WH	WirelessHART
<b>Electrical Certifications<sup>5</sup></b>	
CU	North America Certified for Increased Safety (Ex ec) and Protection by Enclosure (Ex tc) <sup>7</sup>
EU	ATEX Certified for Increased Safety (Ex ec) and Protection by Enclosure (Ex tc) <sup>7</sup>
<b>Optional Selections</b>	
-M2	304 ss Bracket, Clamps, and Bolts <sup>8</sup>
Example: WCC15-WHCU-M2	

**Table 8 - Temperature End Node (WRT10)**

Code	Description
<b>Model</b>	
WRT10	Temperature End Node
<b>Wireless Communication</b>	
-W1	Wireless Sensor
<b>Sensor Type</b>	
1	RTD (Pt100, ASTM A, 4-Wire)
2	Thermocouple (Type J)

4. Order WirelessHART gateways separately with part number 217229 or 252863.

5. Refer to Electrical Certifications, page 14 for details. Contact Global Customer Support for availability.

6. This bracket is required and included with the WCC10.

7. IECEx is included with both the CU and EU certifications.

8. This bracket is required and included with the WCC10/WCC15.

**Table 8 - Temperature End Node (WRT10) (Continued)**

Code	Description
<b>Sensor Construction</b>	
W	Fixed 1/2 NPT
S	Spring-Loaded for Thermowell Insertion
<b>Sensor Insertion Length<sup>9</sup></b>	
020	2.0 inches (50.8 mm)
025	2.5 inches (63.5 mm)
030	3.0 inches (76.2 mm)
035	3.5 inches (88.9 mm)
040	4.0 inches (101.6 mm)
045	4.5 inches (114.3 mm)
050	5.0 inches (127.0 mm)
055	5.5 inches (139.7 mm)
060	6.0 inches (152.4 mm)
065	6.5 inches (165.1 mm)
070	7.0 inches (177.8 mm)
075	7.5 inches (190.5 mm)
080	8.0 inches (203.2 mm)
085	8.5 inches (215.9 mm)
090	9.0 inches (228.6 mm)
095	9.5 inches (241.3 mm)
100	10.0 inches (254.0 mm)
105	10.5 inches (266.7 mm)
110	11.0 inches (279.4 mm)
115	11.5 inches (292.1 mm)
120	12.0 inches (304.8 mm)
125	12.5 inches (317.5 mm)
130	13.0 inches (330.2 mm)
135	13.5 inches (342.9 mm)
140	14.0 inches (355.6 mm)
145	14.5 inches (368.3 mm)
150	15.0 inches (381.0 mm)
155	15.5 inches (393.7 mm)
160	16.0 inches (406.4 mm)
165	16.5 inches (419.1 mm)
170	17.0 inches (431.8 mm)
175	17.5 inches (444.5 mm)

9. The Sensor Insertion Length must equal the Thermowell Insertion Length + Thermowell Lagging Length + 1.5 inches.



**Table 8 - Temperature End Node (WRT10) (Continued)**

Code	Description
<b>Thermowell Attached to Sensor</b>	
N	No Thermowell
T	Threaded 3/4 NPT
S	Socket Weld 1.05 inches
W	Weld-In 1.5 inches
<b>Thermowell Insertion Length<sup>10</sup></b>	
000	0.0 inches (0 mm)
020	2.0 inches (50.8 mm)
025	2.5 inches (63.5 mm)
030	3.0 inches (76.2 mm)
035	3.5 inches (88.9 mm)
040	4.0 inches (101.6 mm)
045	4.5 inches (114.3 mm)
050	5.0 inches (127.0 mm)
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105	10.5 inches (266.7 mm)
110	11.0 inches (279.4 mm)
115	11.5 inches (292.1 mm)
120	12.0 inches (304.8 mm)
<b>Thermowell Lagging Length<sup>10</sup></b>	
000	0.0 inches (0 mm)
020	2.0 inches (50.8 mm)
025	2.5 inches (63.5 mm)
030	3.0 inches (76.2 mm)
035	3.5 inches (88.9 mm)
040	4.0 inches (101.6 mm)

10. The Sensor Insertion Length must equal the Thermowell Insertion Length + Thermowell Lagging Length + 1.5 inches.

**Table 8 - Temperature End Node (WRT10) (Continued)**

Code	Description
<b>Electrical Certifications<sup>11</sup></b>	
CU	North America Intrinsically Safe Certified
EU	ATEX Intrinsically Safe Certified
ZZ	No certification (ordinary locations only), IP66/67
<b>Optional Selections</b>	
-WF	Wake Frequency Calculation <sup>12</sup>
Example: WRT10-W1S055T020020CU-WF	

**Table 9 - Absolute Pressure End Node (WAP10)**

Code	Description
<b>Model</b>	
WAP10	Absolute Pressure End Node
<b>Wireless Communication</b>	
-W1	Wireless Sensor
<b>Structure Code, Materials, and Type</b>	
22	316L ss Process Connection, 316L ss Diaphragm, Silicone Fill Fluid, FKM O-ring, 1/2 NPT External Thread Connection Type
<b>Upper Range Limits</b>	
C	0.21 MPaa, 30 psi, 2.1 bar or kg/cm <sup>2</sup>
<b>Electrical Certifications<sup>11</sup></b>	
CU	North America Intrinsically Safe Certified
ZZ	No certification (ordinary locations only), IP66/67
<b>Optional Selections</b>	
-00	None
Example: WAP10-W122CCU-00	

**Table 10 - Gauge Pressure End Node (WGP10)**

Code	Description
<b>Model</b>	
WGP10	Gauge Pressure End Node
<b>Wireless Communication</b>	
-W1	Wireless Sensor
<b>Structure Code, Materials, and Type</b>	
22	316L ss Process Connection, 316L ss Diaphragm, Silicone Fill Fluid, FKM O-ring, 1/2 NPT External Thread Connection Type

11. Refer to Electrical Certifications, page 14 for details. Contact Global Customer Support for availability.

12. Requires a completed wake frequency data form. Obtain this form by typing "wake frequency" in the Search box at <http://www.schneider-electric.com/en/download/>.

**Table 10 - Gauge Pressure End Node (WGP10) (Continued)**

Code	Description
<b>Upper Range Limits</b>	
C	0.21 MPag, 30 psig, 2.1 bar or kg/cm <sup>2</sup>
D	2.1 MPag, 300 psig, 21 bar or kg/cm <sup>2</sup>
E	13.79 MPag, 2000 psig, 138 bar or kg/cm <sup>2</sup>
F	41.37 MPag, 6000 psig, 414 bar or kg/cm <sup>2</sup>
J	68.95 MPag, 10000 psig, 690 bar or kg/cm <sup>2</sup>
<b>Electrical Certifications<sup>13</sup></b>	
CU	North America Intrinsically Safe Certified
ZZ	No certification (ordinary locations only), IP66/67
<b>Optional Selections</b>	
-00	None
Example: WGP10-W122CCU-00	

**Table 11 - Differential Pressure End Node (WDP10)**

Code	Description
<b>Model</b>	
WDP10	Differential Pressure End Node
<b>Wireless Communication</b>	
-W1	Wireless Sensor
<b>Structure Code, Materials, and Type</b>	
22	316L ss Process Connection, 316L ss Sensor, Silicone Fill Fluid
<b>Upper Range Limits</b>	
B	50 kPa, 200 inH <sub>2</sub> O, 500 mbar
C	210 kPa, 30 psi, 2100 mbar
D	2.1 MPa, 300 psi, 21 bar
<b>Process Connector<sup>14</sup></b>	
0	No Connectors; Both Covers Tapped for 1/4 NPT
1	1/4 NPT
2	1/2 NPT
<b>Electrical Certifications<sup>13</sup></b>	
CU	North America Intrinsically Safe Certified
ZZ	No certification (ordinary locations only), IP66/67
<b>Optional Selections</b>	
-M1	Painted Steel Mounting Bracket with Plated Steel Bolts <sup>15</sup>
-M2	316 ss Bracket with 316 ss Bolts
Example: WDP10-W122C0CU-M1	

13. Refer to *Electrical Certifications*, page 14 for details. Contact Global Customer Support for availability.

14. The material used for the process connector is the same material used for the process cover.

15. Contact Global Customer Support for availability.

# Nominal Dimensions

For dimensional information specific to your sales order, contact your sales representative to order a Certified Dimensional Print (CDP).

All dimensions in diagrams are shown in millimeters over inches ( $\frac{mm}{in}$ ).

**Table 12 - Approximate Mass**

Model	Mass
WCC10, with standard wall mount bracket and clamp only	0.9 kg (2.0 lbs)
WCC15, with standard wall mount bracket and clamp only	1.1 kg (2.35 lbs)
WRT10, welded (6" probe)	0.9 kg (2.0 lbs)
WRT10, spring-loaded (6" probe)	1.1 kg (2.4 lbs)
WAP10	0.8 kg (1.7 lbs)
WGP10	
WDP10	3.7 kg (8.2 lbs)

**Figure 6 - Central Concentrator (WCC10/WCC15)**

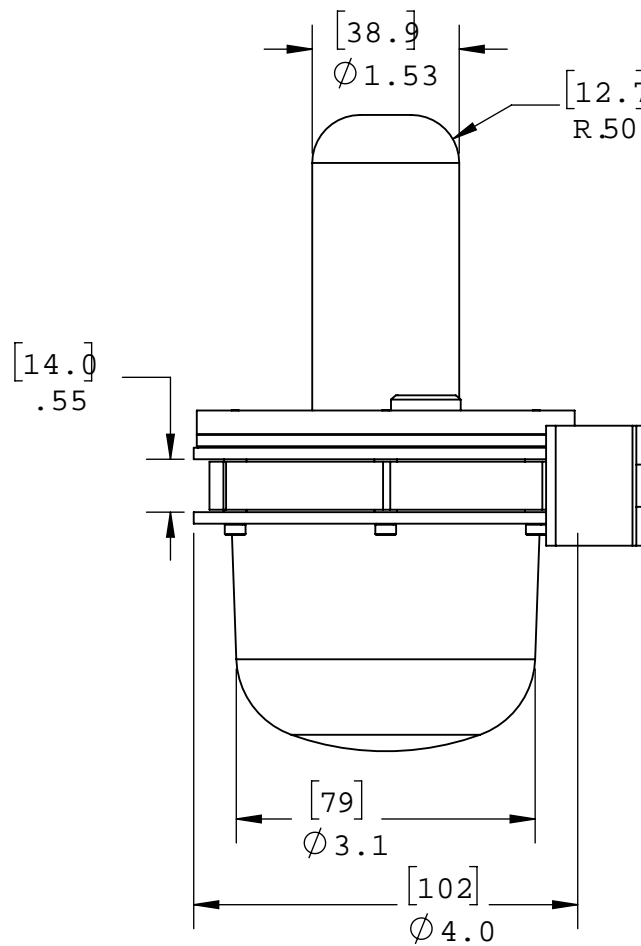
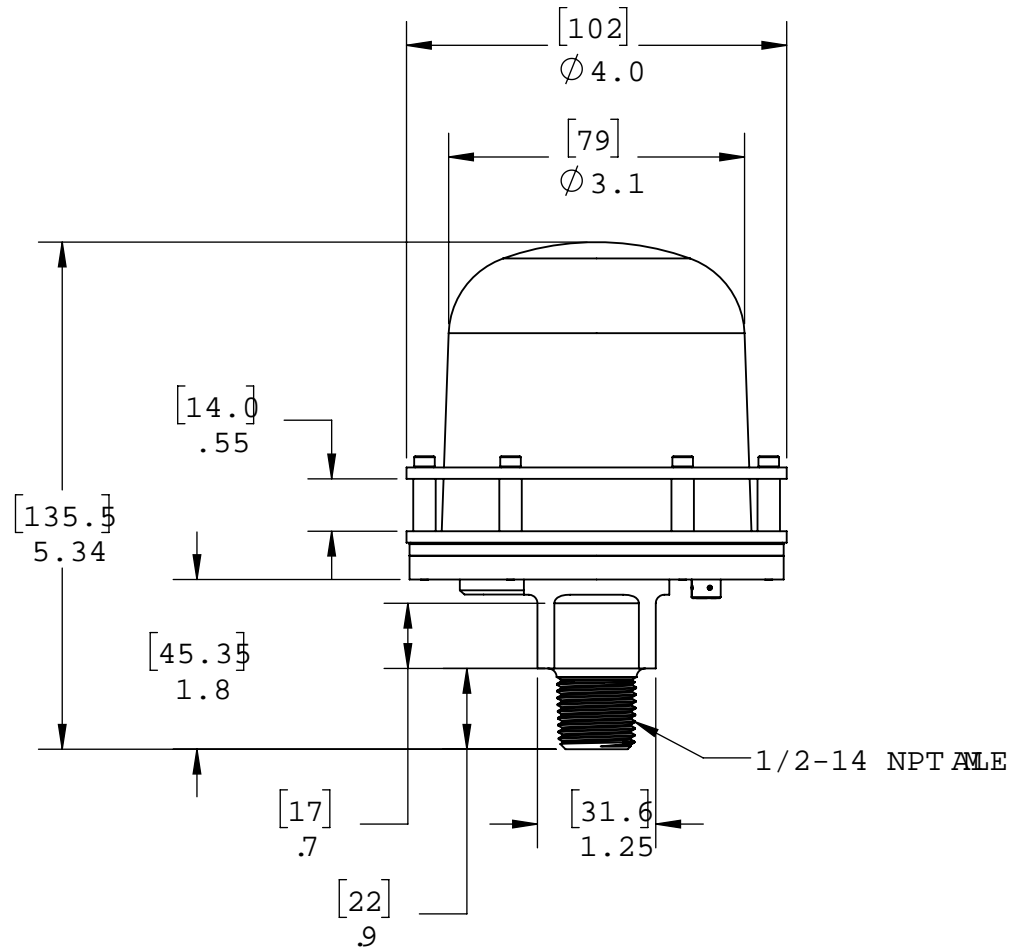


Figure 7 - End Node: Absolute Pressure (WAP10) or Gauge Pressure (WGP10)



**Figure 8 - End Node: Differential Pressure (WDP10)**

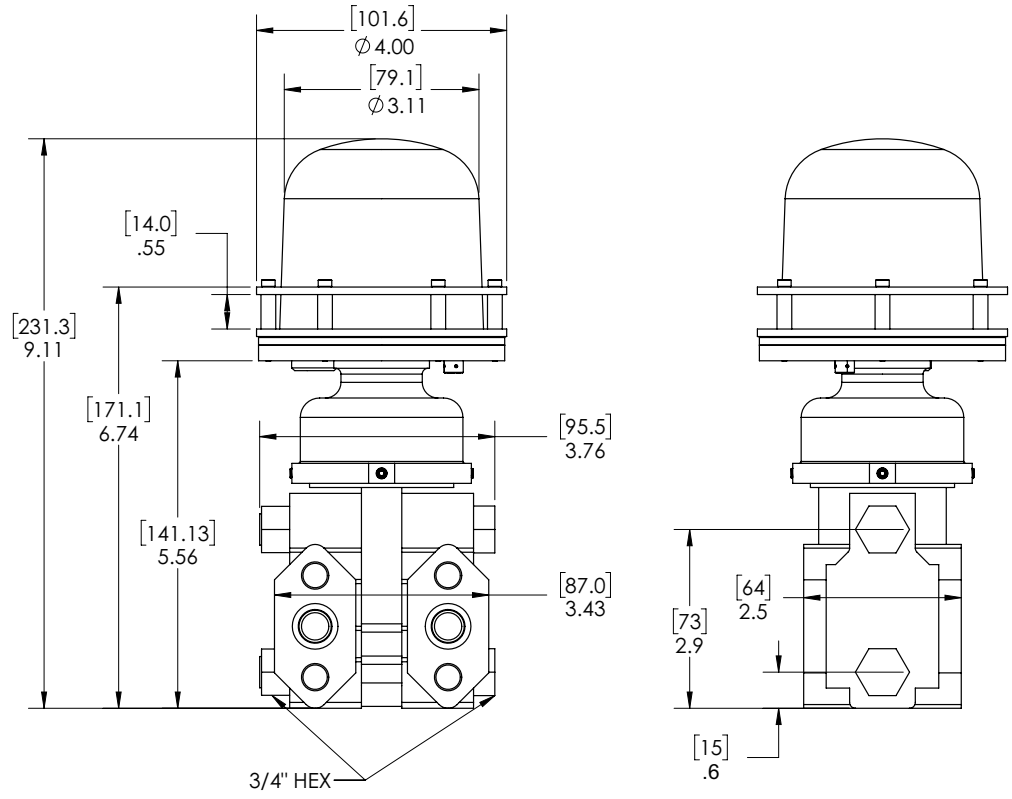


Figure 9 - End Node: Temperature (WRT10)

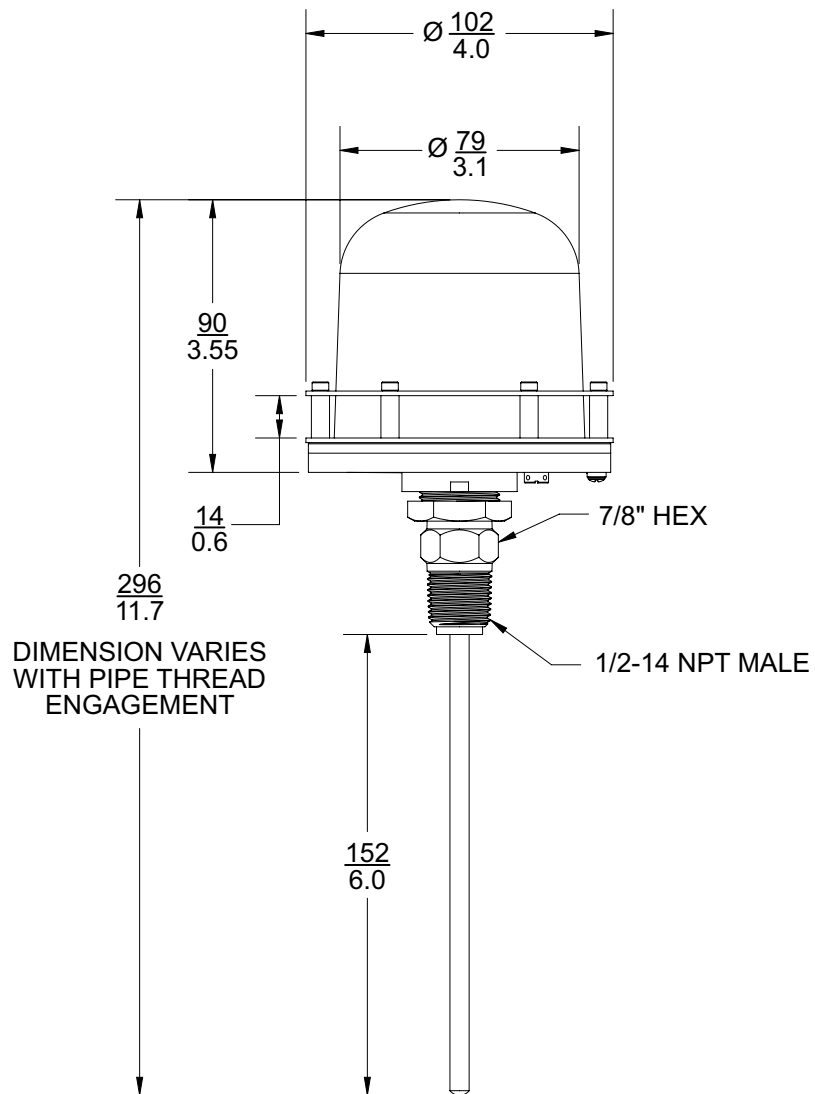
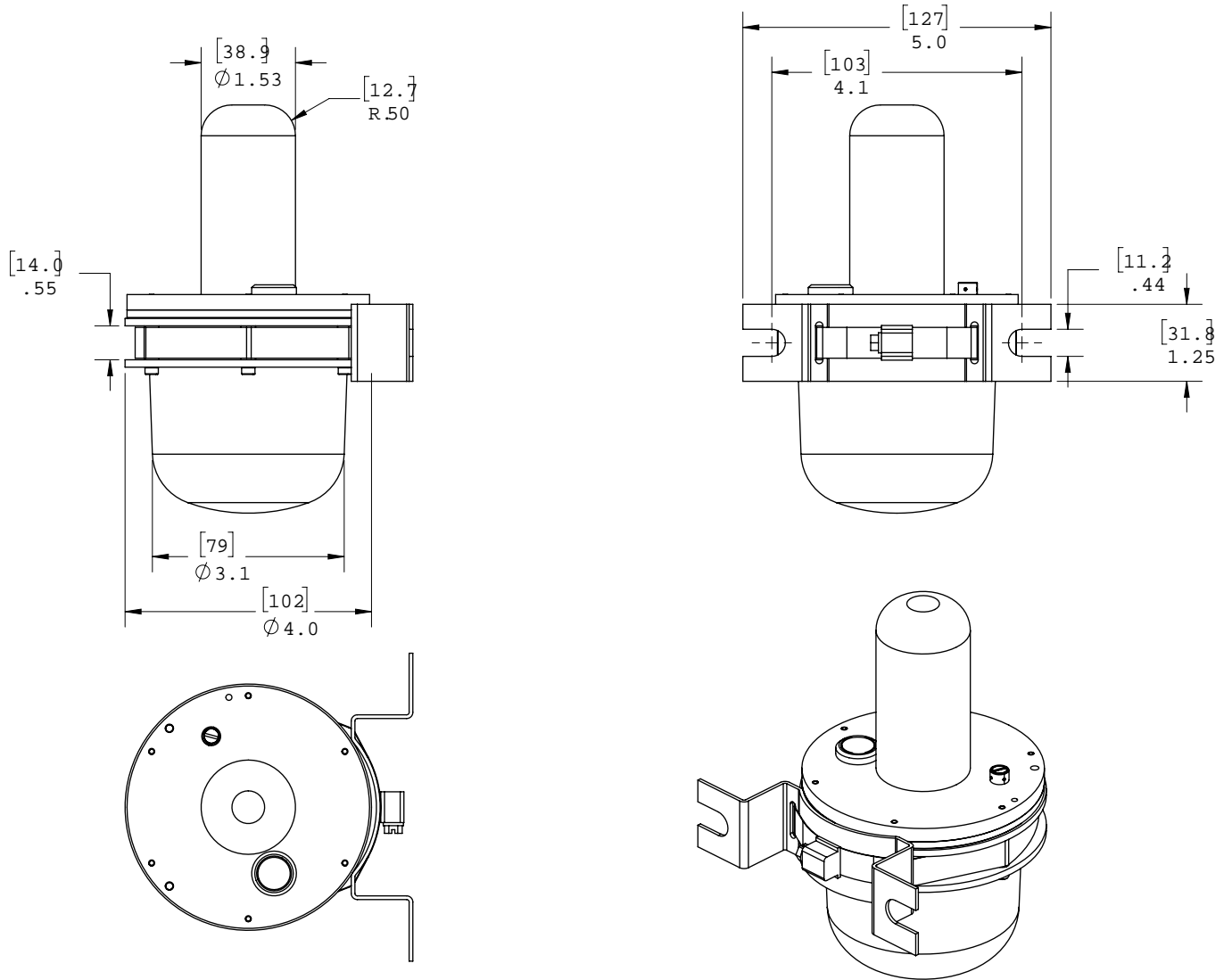
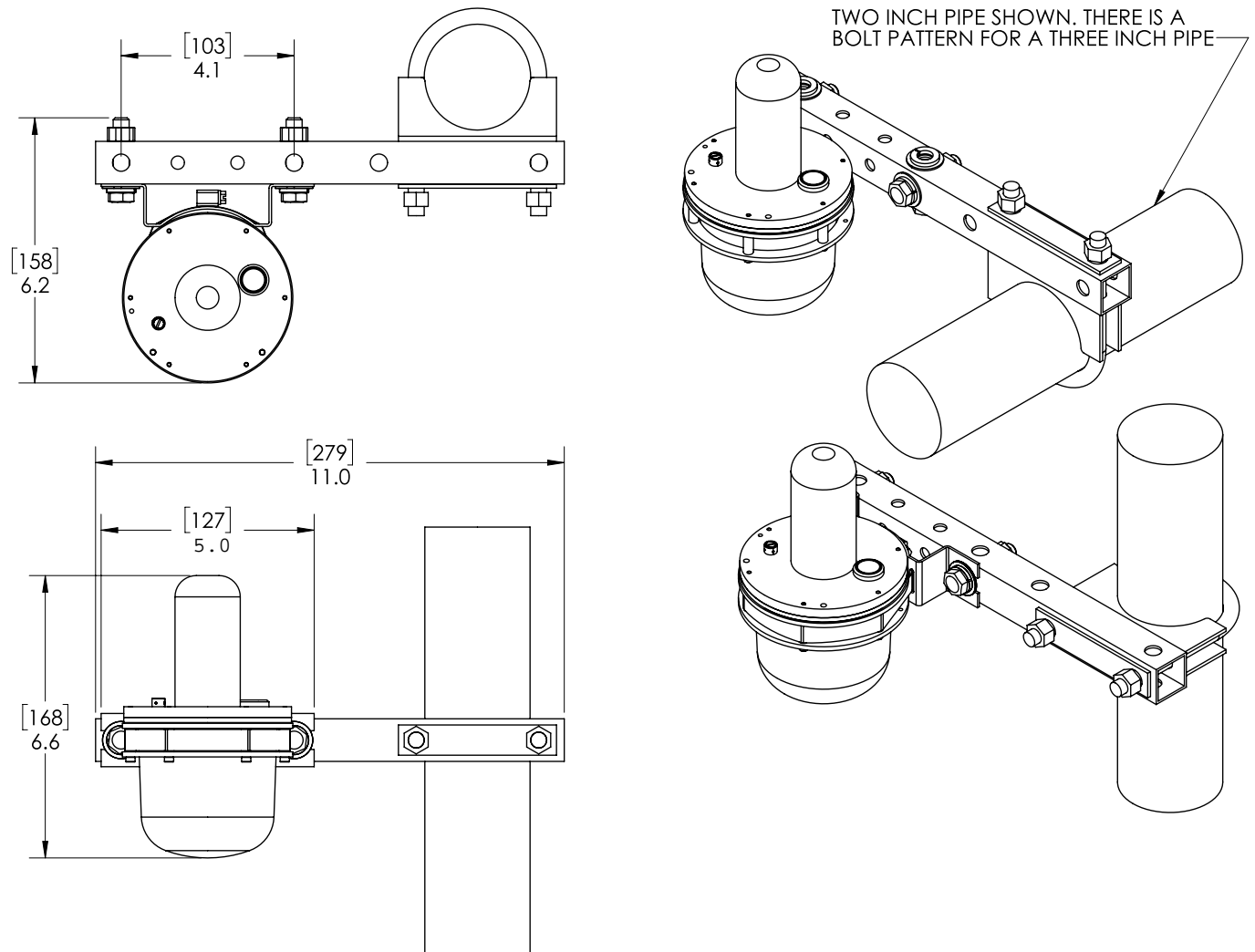


Figure 10 - Wall Mounting Bracket (Shown with WCC10/WCC15)





**Figure 11 - Pipe Mounting Bracket (Shown with WCC10/WCC15)**



# Additional Products

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

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