

INSTRUMENT AREA NETWORK

Product Specifications

PSS 2A-1B5 A

Wireless Instrument Area Network: Central Concentrator with Temperature and Pressure End Nodes



The Instrument Area Network comprises physically separated wireless End Nodes for measurement and control, a wireless Central Concentrator for relaying data from or onto a plant area wireless network (a wireless sensor network or the upstream network), and an Administrative Node, which is a customer-supplied user interface such as a tablet, computer, or smart phone with WiFi capability and a standard web browser.

*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.*

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FEATURES

- ▶ Easy installation, configuration, and activation of a Central Concentrator and up to 8 End Nodes to create the wireless Instrument Area Network
- ▶ End nodes are offered for absolute, gauge, and differential pressure measurements, as well as temperature measurements from an RTD or Thermocouple
- ▶ Ability to remotely communicate with and configure the Central Concentrator and End Nodes with an Administrative Node, a customer-supplied user interface such as a tablet or a computer with WiFi capability and a standard web browser
- ▶ Simple, elegant design with very few mechanical parts
- ▶ The Instrument Area Network uses standard WiFi and Bluetooth LE technology, and communicates with the upstream WirelessHART network.
- ▶ End Node certifications allow devices to meet numerous requirements for hazardous and non-hazardous locations. Contact Global Customer Support for information or status of testing laboratory approvals or certifications.'

JOINING AND UNJOINING THE CENTRAL CONCENTRATOR AND END NODES

Creating a wireless Instrument Area Network is fast and easy. Activate the Central Concentrator by “pushing” the antenna toward the outer edge of the housing and holding for 1.5 seconds. The Central Concentrator’s LEDs flash rapidly for a few seconds while it sets up the wireless Instrument Area Network. Then you can simply “join” the End Nodes to the Central Concentrator one at a time by pushing the End Node’s process fitting toward the edge of the domed housing to “join” 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, but the flashing is not synchronized. When joining is complete, the flashing LEDs in the Central Concentrator and all connected End Nodes synchronize, indicating that the End Node has been successfully joined to the Instrument Area Network. The Central Concentrator is now able to relay measurement data from End Nodes back to the WirelessHART network.

Removing an End Node from the network, a process also known as “unjoining,” is just as easy. After activating the Instrument Area Network group by pushing any connected End Node, the LEDs of the Central Concentrator and all connected End Nodes flash in sync. Before the flashing stops, simply push on the End Node you wish to unjoin, and the LEDs on the End Node leaving the group will flash out-of-sync with the other Instrument Area Network devices. Refer to MI 020-750 for additional information.

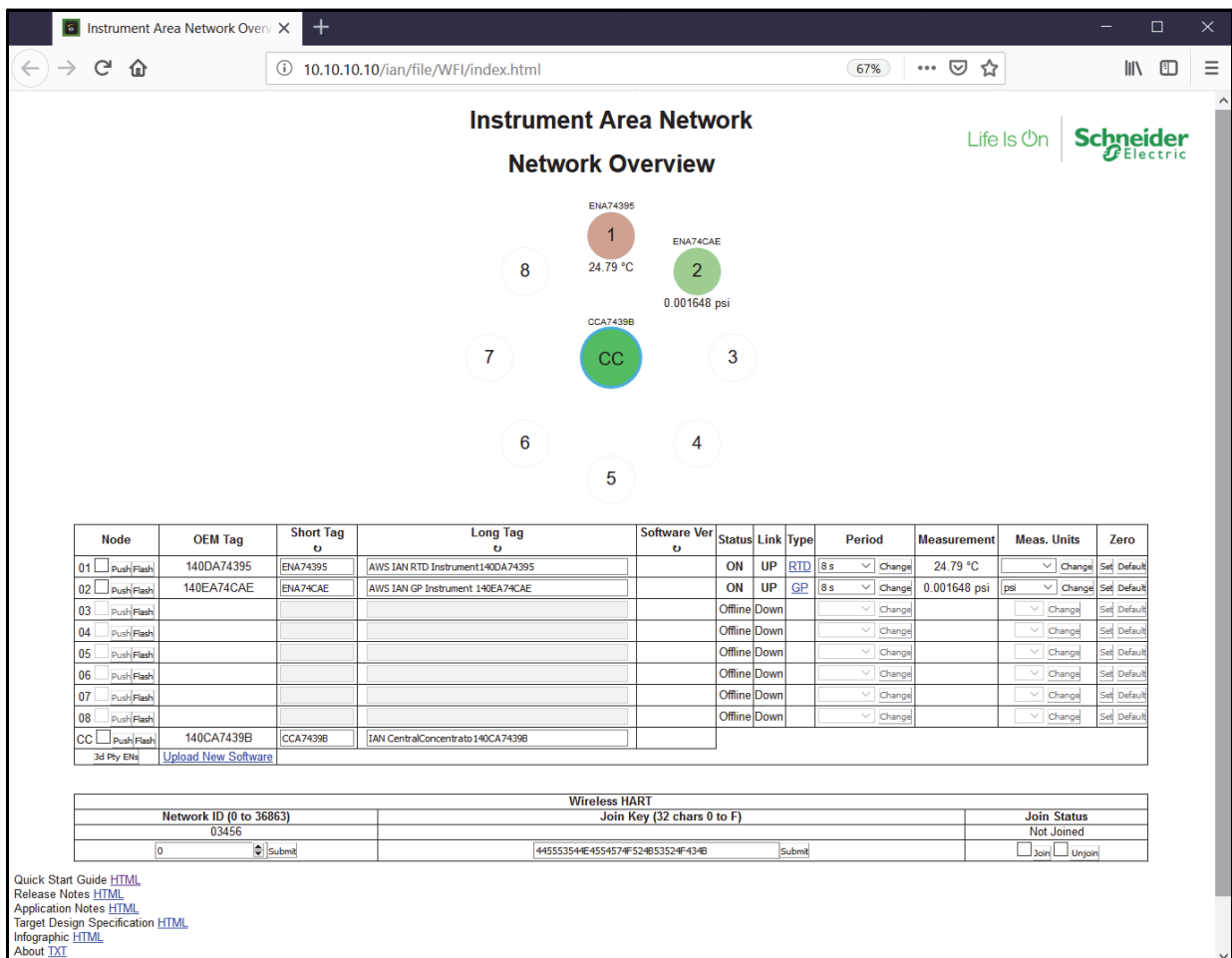
INTUITIVE WEB INTERFACE

An intuitive, easy-to-use web interface allows you to administer, configure, and view the status of the Instrument Area Network from an Administrative Node, a tablet, computer, smart phone, or other device with WiFi capability and a standard web browser. Once the Administrative Node is connected to the Instrument Area Network WiFi interface, you can access the web interface at <http://10.10.10.10/ian/page>.

The main web page shows a visual representation of the Instrument Area Network with the Central Concentrator in the center and up to 8 joined End Nodes around the Central Concentrator. Each End Node also displays its most recent measurement and hardware ID; this data updates approximately once per second.

From the web page, you can configure network parameters, join the WirelessHART network (via text entry of data and buttons on the screen), as well as configure each End Node's sampling period and measurement units. In addition, you can access HTML quick start guide and release notes in HTML format.

Figure 1. Instrument Area Network Overview Page



CALIBRATION CERTIFICATES

Calibration certificates, which provide verification that end nodes meet the reference accuracy specification, are embedded within the End Node and can be accessed from the Instrument Area Network webpage.

BATTERY LIFE

- ▶ Central Concentrator: 5+ years
- ▶ End Node Transmitters: 10+ years

Battery life estimates represent 25°C ambient temperature and 16 seconds update rate reference conditions with 8 End Node Transmitters connected to each Concentrator. Actual battery life may vary depending on ambient temperature, precipitation, configured update rates, and device positioning. Schneider Electric recommends best practice considerations to ensure optimal battery life and ease of use, including selection of optimal update rates, correct field unit positioning for optimal link performance and monitoring of the low battery alarm indicator. Battery life can be optimized by configuring for expanded interval measurement update rates as suitable for various wireless measurement applications.

All Instrument Area Network devices are shipped with a battery installed. The WiFi interface is disabled by default and normally only remains active for five minutes when joining and unjoining End Nodes. The Administrative Node can be any WiFi (802.11) device with a modern web (HTTP) browser.

RECOMMENDED MOUNTING LOCATIONS

The Central Concentrator has an integral antenna that allows communication to the upstream wireless network and to all joined 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. The Central Concentrator can be mounted with the supplied band strap or optional mounting brackets.

Each End Node housing has an integral process related sensor located on the center of the bottom face of the unit's base. Select a mounting location for each housing type based on its use and the process measurement location.

The distance between the Central Concentrator and each End Node should not exceed 15 meters (49.2 feet), although this specification does not imply that the Central Concentrator and the End Node need to be installed in a straight line or without obstruction. End Nodes can communicate with the Central Concentrator even in harsh metal-obstructed environments (TX Power +5 dBm, RX Sensitivity: -97 dBm link at 2.4 GHz).

NOTICE

POTENTIAL EQUIPMENT DAMAGE

Mounting locations should not be exposed to forceful impacts like heavy falling objects that could damage the integrity of the Central Concentrator and End Node enclosures.

Failure to follow these instructions can result in equipment damage.

MOUNTING BRACKETS

In addition to process port threads, Central Concentrator and End Node enclosures allow for mounting to a wall via the band strap groove or with the brackets shown in Figure 6. The Central Concentrator can also be mounted on a two- or three-inch pipe using the bracket shown in Figure 7.

OPERATING CONDITIONS

Description	Operative Limits (a)
Electronics Measurement and Transmission	-40 and +80°C (-40 and +176°F)
Vibration	1 g constant acceleration input over a frequency range of 5 to 200 Hz

a. Operative Limits are defined per ANSI/ISA 51.1-1979 (R1993)

FUNCTIONAL SPECIFICATIONS

RF Characteristics

- ▶ 2.4 GHz spread spectrum, ISM license-free band
- ▶ 58 mW maximum operational RF transmit power
- ▶ BLE RF link margin:
 - ▶ TX Power: +5dBm
 - ▶ RX Sensitivity: -97dBm
- ▶ WiFi:
 - ▶ TX Power: +15dBm
 - ▶ RX Sensitivity: -90dBm
- ▶ WHART:
 - ▶ TX Power: +10dBm
 - ▶ RX Sensitivity: -96dBm

Process Connections

- ▶ WGP10 End Nodes connect directly to the process using an external ½ NPT male thread.
- ▶ WRT10 (thermocouple and RTD) End Nodes without thermowells connect directly to the process using an external ½ NPT male thread.
- ▶ WRT10 (thermocouple and RTD) End Nodes are offered with a thermowell that will connect directly to process.
- ▶ WDP10 End Nodes connect to the process via a ¼ NPT process connection and fixing thread 7/16"-20 UNF at 41.3 mm (1.625 inches) center distance.
- ▶ The WCC10 can be mounted to a horizontal or vertical pole using the included bracket, band strap, and mounting kit.

End Node Connections

Up to 8 End Nodes can be associated, or joined, with the Central Concentrator. The group of End Nodes together with the Central Concentrator is considered an Instrument Area Network.

The End Nodes of the Instrument Area Network relay their measurements to upstream networks such as the WirelessHART network and the WiFi administrator interface.

The End Nodes are designed to be placed anywhere within 15 m 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**WRT10 RTD End Node (Sensor Type Selection 1)**

RTD range is -200°C to +885°C

WRT10 Thermocouple End Node (Sensor Type Selection 2)

Thermocouple range is -100 mV to +100 mV

WGP10 and WAP10 End Nodes⁽¹⁾

The Gauge and Absolute Pressure End Nodes are available with a range of full scale pressure ranges from 30 psi to 1,000 psi.

Error is 0.25% of full-scale, across -40°C to +80°C

WDP10 End Node⁽²⁾

The WDP10 End Node is available with a range of full scale pressure ranges from 7.2 psi to 300 psi, with a 2000 psi static pressure rating. The DP process connection is a 316 ss flange with ¼-18 NPT female process fittings and fixing threads 7/16"-20 UNF at 41.3 mm (1.625 inches) center distance.

Acquisition Period

Sample acquisition period is configurable to a value between 1 and 60 seconds, inclusive. End Nodes ship with an acquisition period of 16 seconds, corresponding to a report rate of 1/30 Hz.

1. See the model code tables for WGP10 (page 11) and WAP10 (page 12) for Upper Range Limit selections.

2. See the model code table for WDP10 (page 13) for Upper Range Limit selections.

PHYSICAL SPECIFICATIONS

Applies to Central Concentrator and all End Nodes unless specified otherwise:

Description	Specification
Enclosure Materials	300 Series stainless steel and polycarbonate enclosure PTFE antenna cover (WCC10 only)
Process Wetted Materials	316L ss
Sensor Fill Fluid	WAP10, WGP10, and WDP10: Silicone Oil
Environmental Protection	The enclosure has the rating of IP54 as defined by IEC 60529
Mounting Position	See page 4 for recommended mounting locations and mounting bracket options
Approximate Mass	WCC10 (with standard wall mount bracket and clamp only): 0.9 kg (2.0 lbs) WRT10, welded (6-inch probe): 0.9 kg (1.9 lbs) WRT10, spring loaded (6-inch probe): 1.1 kg (2.4 lbs) WGP: 0.8 kg (1.7 lbs) WDP: 3.7 kg (8.2 lbs)

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. See the model codes for availability of electrical safety design codes with particular End Nodes, and refer to MI 020-750 for application conditions and connectivity requirements.

Table 1. Electrical Certifications for WCC10, WRT10, WGP10, WAP10, and WDP10

Device	Agency Certification, Type of Protection, Area Classification, and Application Conditions	Model Code Selection
Central Concentrator (WCC10)	No certification – ordinary locations only	ZZ
Temperature End Node (WRT10) Gauge pressure End Node (WGP10) Absolute pressure End Node (WAP10) Differential pressure End Node (WDP10)	ATEX Intrinsically Safe Certified: II 1 G Ex ia IIC T4 Ga II 1 D Ex ia IIIC T135°C Da -40°C ≤ Ta ≤ +80°C, IP54 North America Intrinsically Safe Certified: Canada: Ex ia IIC T4 Ga Ex ia IIIC T135°C Da -40°C ≤ Ta ≤ +80°C, IP54 United States: Class I Zone 0 AEx ia IIC T4 Ga Zone 20 AEx ia IIIC T135°C Da -40°C ≤ Ta ≤ +80°C, IP54	EU CU

MODEL CODE – CENTRAL CONCENTRATOR (WCC10)

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

- a. WirelessHART gateways can be ordered separately via part numbers 217229 and 252863.
- b. The M2 bracket is required and included with the WCC10.

MODEL CODE – RTD AND THERMOCOUPLE TEMPERATURE END NODES (WRT10)

<u>Description</u>	<u>Model</u>
Temperature Transmitter	WRT10
<u>Wireless Communication</u>	
Wireless Sensor	-W1
<u>Sensor Type</u>	
RTD (Pt100, ASTM A, 4-Wire)	1
Thermocouple (Type J)	2
<u>Sensor Construction</u>	
Fixed 1/2 NPT	W
Spring-Loaded for Thermowell Insertion	S
<u>Sensor Insertion Length (a)</u>	
2.0 inches (50.8 mm)	020
2.5 inches (63.5 mm)	025
3.0 inches (76.2 mm)	030
3.5 inches (88.9 mm)	035
4.0 inches (101.6 mm)	040
4.5 inches (114.3 mm)	045
5.0 inches (127.0 mm)	050
5.5 inches (139.7 mm)	055
6.0 inches (152.4 mm)	060
6.5 inches (165.1 mm)	065
7.0 inches (177.8 mm)	070
7.5 inches (190.5 mm)	075
8.0 inches (203.2 mm)	080
8.5 inches (215.9 mm)	085
9.0 inches (228.6 mm)	090
9.5 inches (241.3 mm)	095
10.0 inches (254.0 mm)	100
10.5 inches (266.7 mm)	105
11.0 inches (279.4 mm)	110
11.5 inches (292.1 mm)	115
12.0 inches (304.8 mm)	120
12.5 inches (317.5 mm)	125
13.0 inches (330.2 mm)	130
13.5 inches (342.9 mm)	135
14.0 inches (355.6 mm)	140
14.5 inches (368.3 mm)	145
15.0 inches (381.0 mm)	150
15.5 inches (393.7 mm)	155
16.0 inches (406.4 mm)	160
16.5 inches (419.1 mm)	165
17.0 inches (431.8 mm)	170
17.5 inches (444.5 mm)	175

MODEL CODE – RTD AND THERMOCOUPLE TEMPERATURE END NODES (WRT10)

Description	Model
Thermowell Attached to Sensor	
No Thermowell	N
Threaded ¾ NPT	T
Socket Weld 1.05 inches	S
Weld In 1.5 inches	W
Thermowell Insertion Length (a)	
0.0 inches (0 mm)	000
2.0 inches (50.8 mm)	020
2.5 inches (63.5 mm)	025
3.0 inches (76.2 mm)	030
3.5 inches (88.9 mm)	035
4.0 inches (101.6 mm)	040
4.5 inches (114.3 mm)	045
5.0 inches (127.0 mm)	050
5.5 inches (139.7 mm)	055
6.0 inches (152.4 mm)	060
6.5 inches (165.1 mm)	065
7.0 inches (177.8 mm)	070
7.5 inches (190.5 mm)	075
8.0 inches (203.2 mm)	080
8.5 inches (215.9 mm)	085
9.0 inches (228.6 mm)	090
9.5 inches (241.3 mm)	095
10.0 inches (254.0 mm)	100
10.5 inches (266.7 mm)	105
11.0 inches (279.4 mm)	110
11.5 inches (292.1 mm)	115
12.0 inches (304.8 mm)	120
Thermowell Lagging Length (a)	
0.0 inches (0 mm)	000
2.0 inches (50.8 mm)	020
2.5 inches (63.5 mm)	025
3.0 inches (76.2 mm)	030
3.5 inches (88.9 mm)	035
4.0 inches (101.6 mm)	040
Electrical Certifications (b)	
ATEX Intrinsically Safe Certified	EU
II 1 G Ex ia IIC T4 Ga	
II 1 D Ex ia IIIC T135°C Da	
-40°C ≤ Ta ≤ +80°C, IP54	
North America Intrinsically Safe Certified:	CU
Canada:	
Ex ia IIC T4 Ga	
Ex ia IIIC T135°C Da	
-40°C ≤ Ta ≤ +80°C, IP54	
United States:	
Class I Zone 0 AEx ia IIC T4 Ga	
Zone 20 AEx ia IIIC T135°C Da	
-40°C ≤ Ta ≤ +80°C, IP54	

MODEL CODE – RTD AND THERMOCOUPLE TEMPERATURE END NODES (WRT10)

<u>Description</u>	<u>Model</u>
Optional Selections Wake Frequency Calculation (c) Example: WRT10-W1S055T020020CU-WF	-WF

- The Sensor Insertion Length must equal Thermowell Insertion Length + Thermowell Lagging Length + 1.5 inches
- 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.
- Requires that you fill out a wake frequency data form; obtain this form by typing “wake frequency” in the search box at <http://www.schneider-electric.com/en/download/>

MODEL CODE – ABSOLUTE PRESSURE END NODE (WAP10)

<u>Description</u>	<u>Model</u>
Absolute Pressure End Node	WAP10
<u>Wireless Communication</u> Wireless Sensor	-W1
<u>Structure Code, Materials, and Type</u> 316L ss Process Connection, 316L ss Diaphragm, Silicone Fill Fluid, FKM O-ring, 1/2 NPT External Thread Connection Type	22
<u>Upper Range Limits</u> 0.21 MPa, 30 psia, 2.1 bar or kg/cm ²	C
<u>Electrical Certifications (a)</u> North America Intrinsically Safe Certified: Canada: Ex ia IIC T4 Ga Ex ia IIIC T135°C Da -40°C ≤ Ta ≤ +80°C, IP54 United States: Class I Zone 0 AEx ia IIC T4 Ga Zone 20 AEx ia IIIC T135°C Da -40°C ≤ Ta ≤ +80°C, IP54	CU
<u>Optional Selections</u> None	-00
Example: WAP10-W122CCU	

- a. 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.

MODEL CODE – GAUGE PRESSURE END NODE (WGP10)

<u>Description</u>	<u>Model</u>
Gauge Pressure End Node	WGP10
<u>Wireless Communication</u>	
Wireless Sensor	-W1
<u>Structure Code, Materials, and Type</u>	
316L ss Process Connection, 316L ss Diaphragm, Silicone Fill Fluid, FKM O-ring, 1/2 NPT External Thread Connection Type	22
<u>Upper Range Limits</u>	
0.21 MPa, 30 psi, 2.1 bar or kg/cm ²	C
2.1 MPa, 300 psi, 21 bar or kg/cm ²	D
7 MPa, 1000 psi, 70 bar or kg/cm ²	E
<u>Electrical Certifications (a)</u>	
North America Intrinsically Safe Certified:	CU
Canada:	
Ex ia IIC T4 Ga	
Ex ia IIIC T135°C Da	
-40°C ≤ Ta ≤ +80°C, IP54	
United States:	
Class I Zone 0 AEx ia IIC T4 Ga	
Zone 20 AEx ia IIIC T135°C Da	
-40°C ≤ Ta ≤ +80°C, IP54	
<u>Optional Selections</u>	
None	-00
Example: WGP10-W122CCU	

- a. 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.

MODEL CODE – DIFFERENTIAL PRESSURE END NODE (WDP10)

Description	Model
Differential Pressure End Node	WDP10
Wireless Communication Wireless Sensor	-W1
Structure Code, Materials, and Type 316L ss Process Connection, 316L ss Sensor, Silicone Fill Fluid	22
Upper Range Limits 50 kPa, 200 inH ₂ O, 500 mbar 210 kPa, 30 psi, 2100 mbar 2.1 MPa, 300 psi, 21 bar	B C D
Process Connector (a) No Connectors, Both Covers Tapped For ¼ NPT ¼ NPT ½ NPT	0 1 2
Electrical Certifications (b) North America Intrinsically Safe Certified: Canada: Ex ia IIC T4 Ga Ex ia IIIC T135°C Da -40°C ≤ Ta ≤ +80°C, IP54 United States: Class I Zone 0 AEx ia IIC T4 Ga Zone 20 AEx ia IIIC T135°C Da -40°C ≤ Ta ≤ +80°C, IP54	CU
Optional Selections Painted Steel Mounting Bracket With Plated Steel Bolts 316 ss Bracket with 316 ss Bolts	-M1 -M2
Example: WDP10-W122C0CU-M1	

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

DIMENSIONS

Figure 2. Dimensions for Central Concentrator (WCC10)

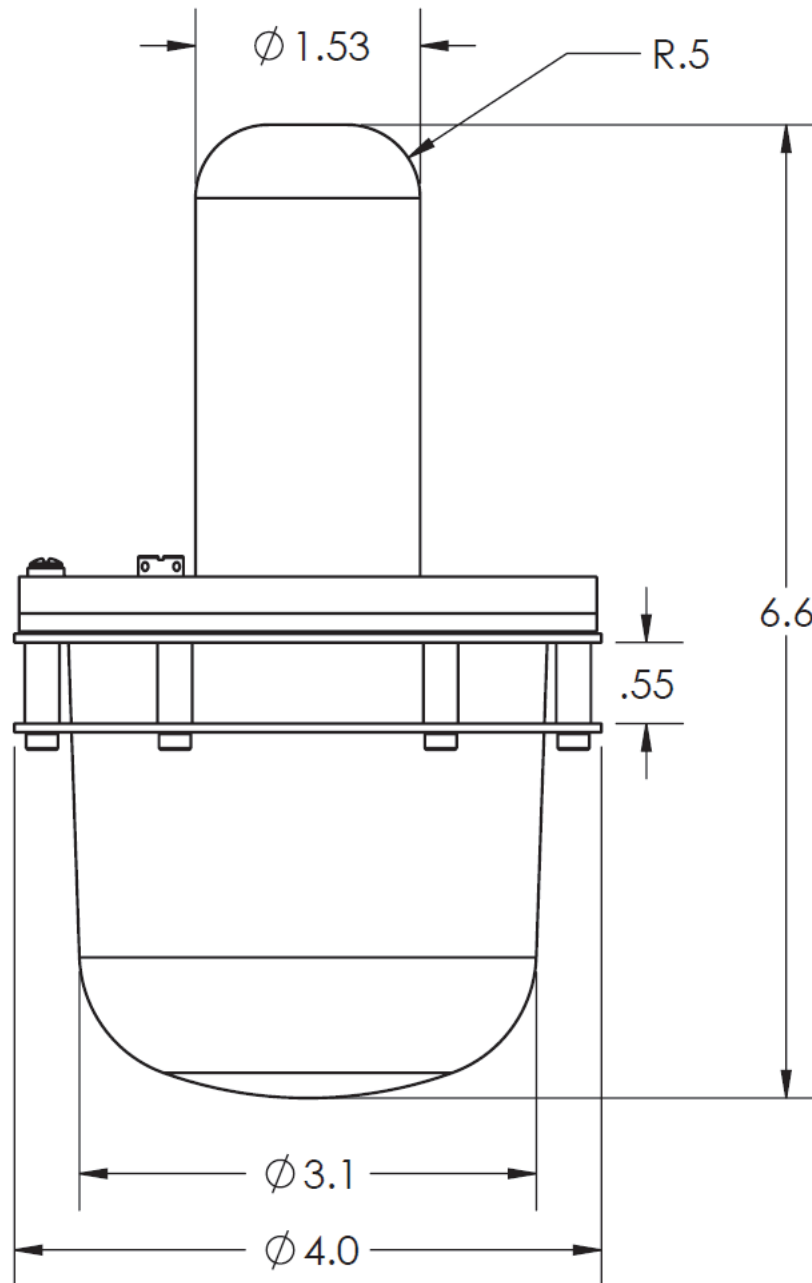


Figure 3. Dimensions for Absolute Pressure (WAP10) and Gauge Pressure (WGP10) End Nodes

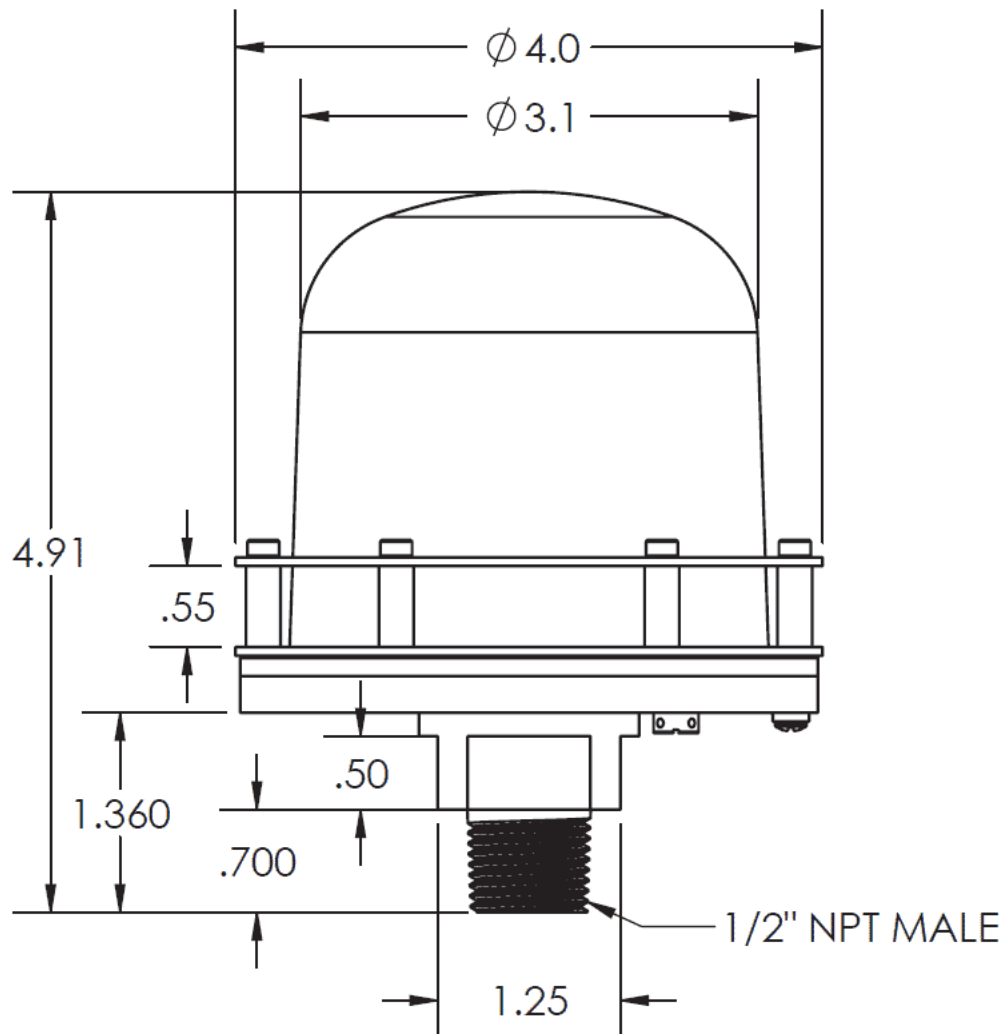


Figure 4. Dimensions for Differential Pressure (WDP10) End Nodes

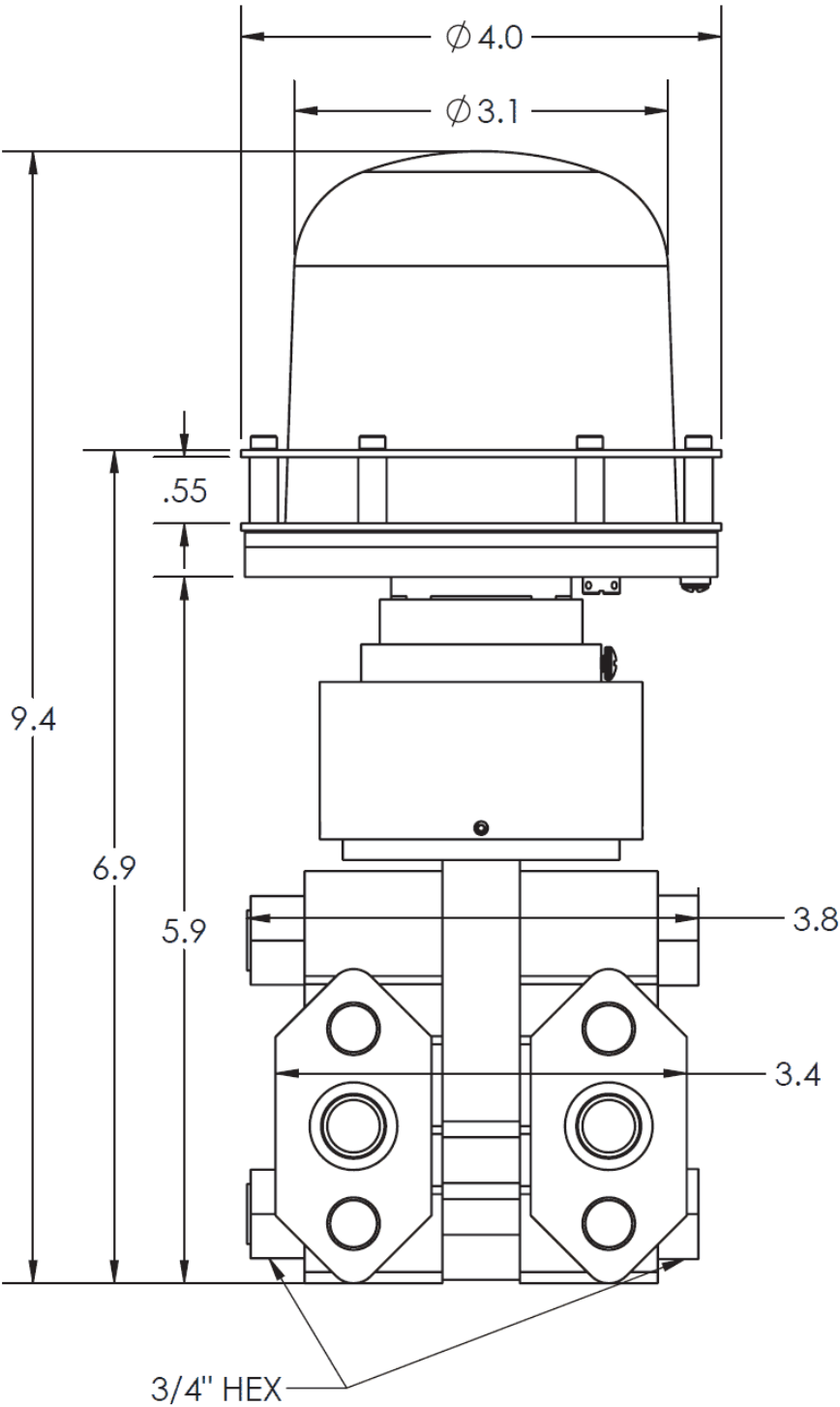


Figure 5. Dimensions for RTD and Thermocouple Temperature (WRT10) End Nodes

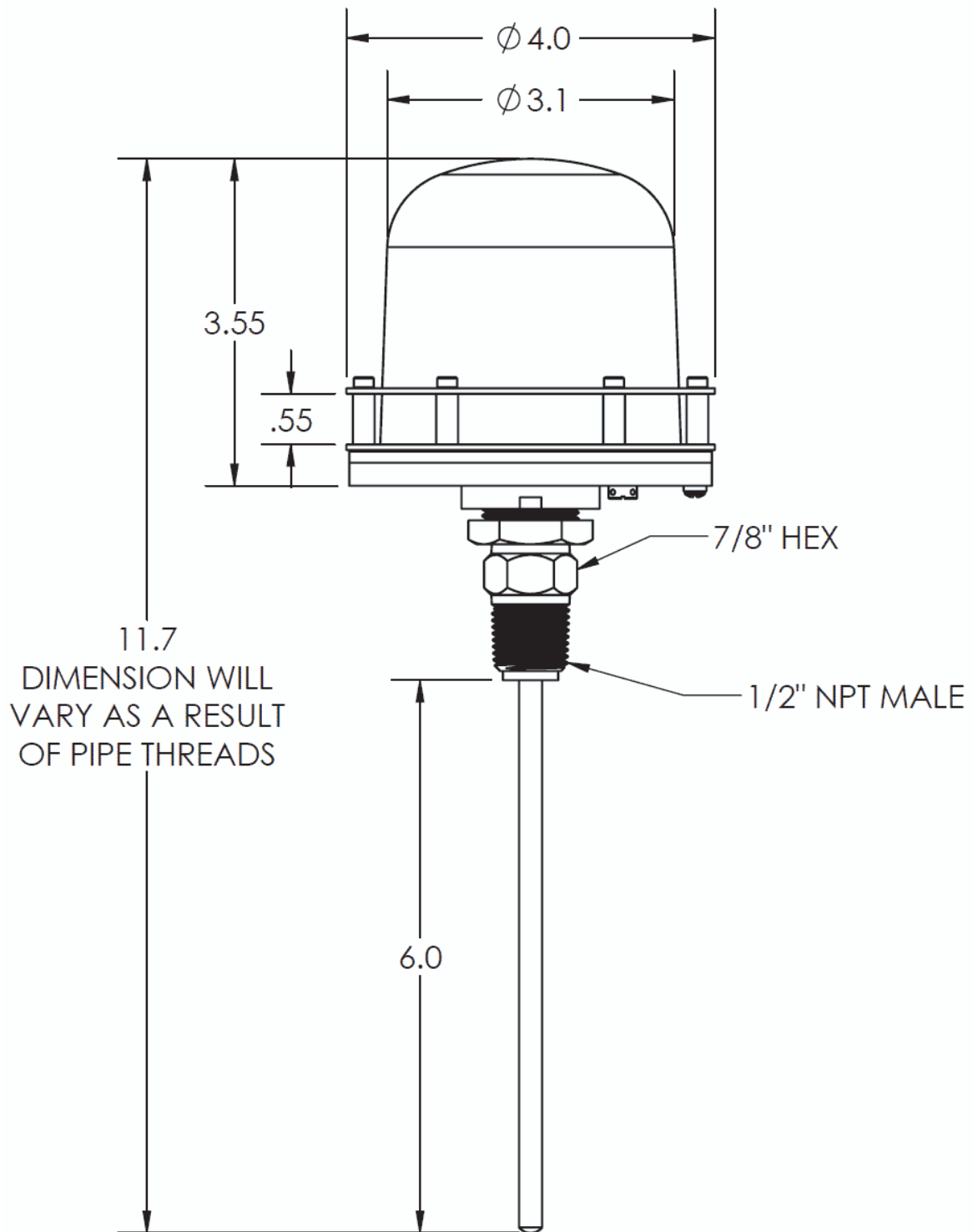


Figure 6. Dimensions for Central Concentrator and End Nodes with Wall Mounting Bracket

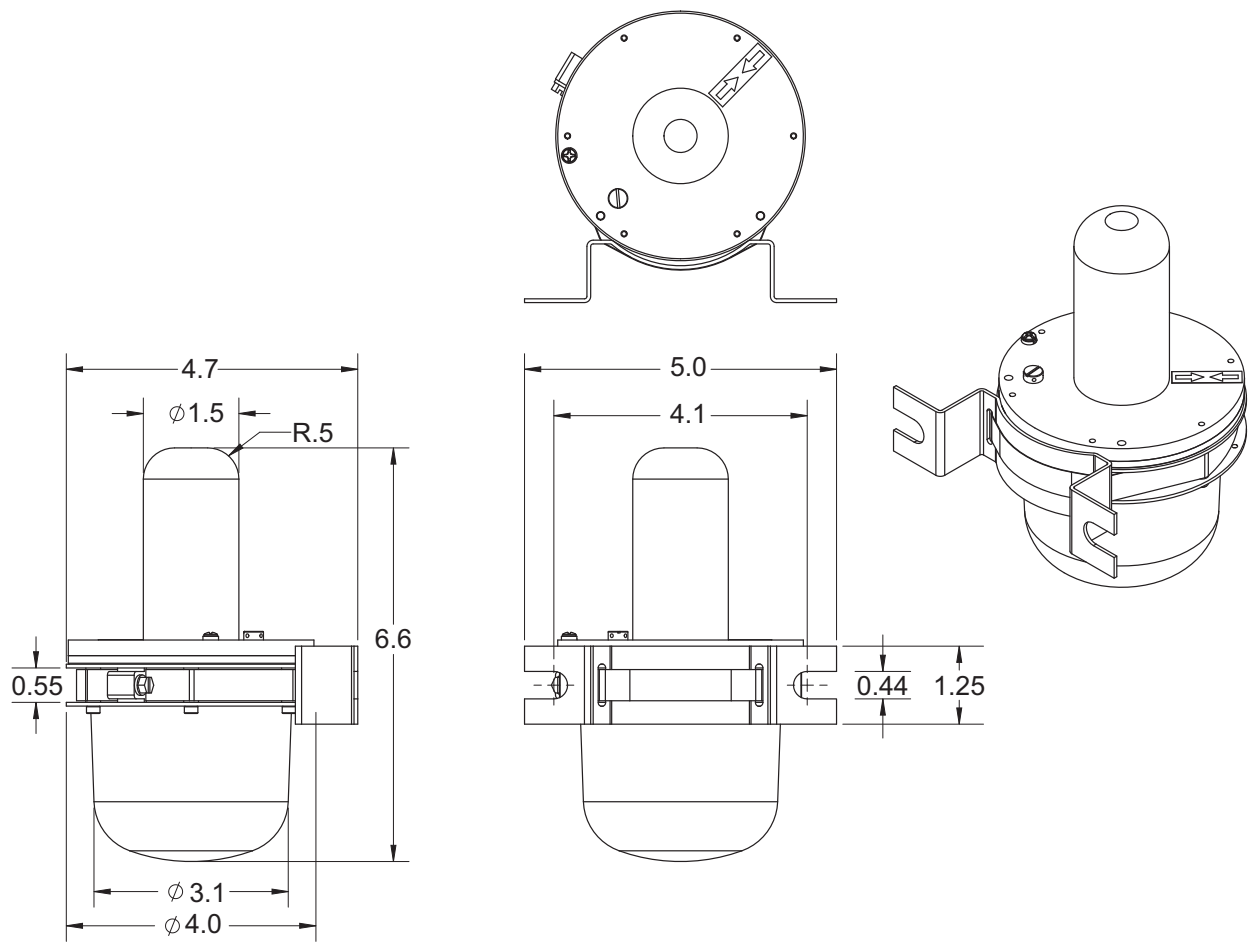
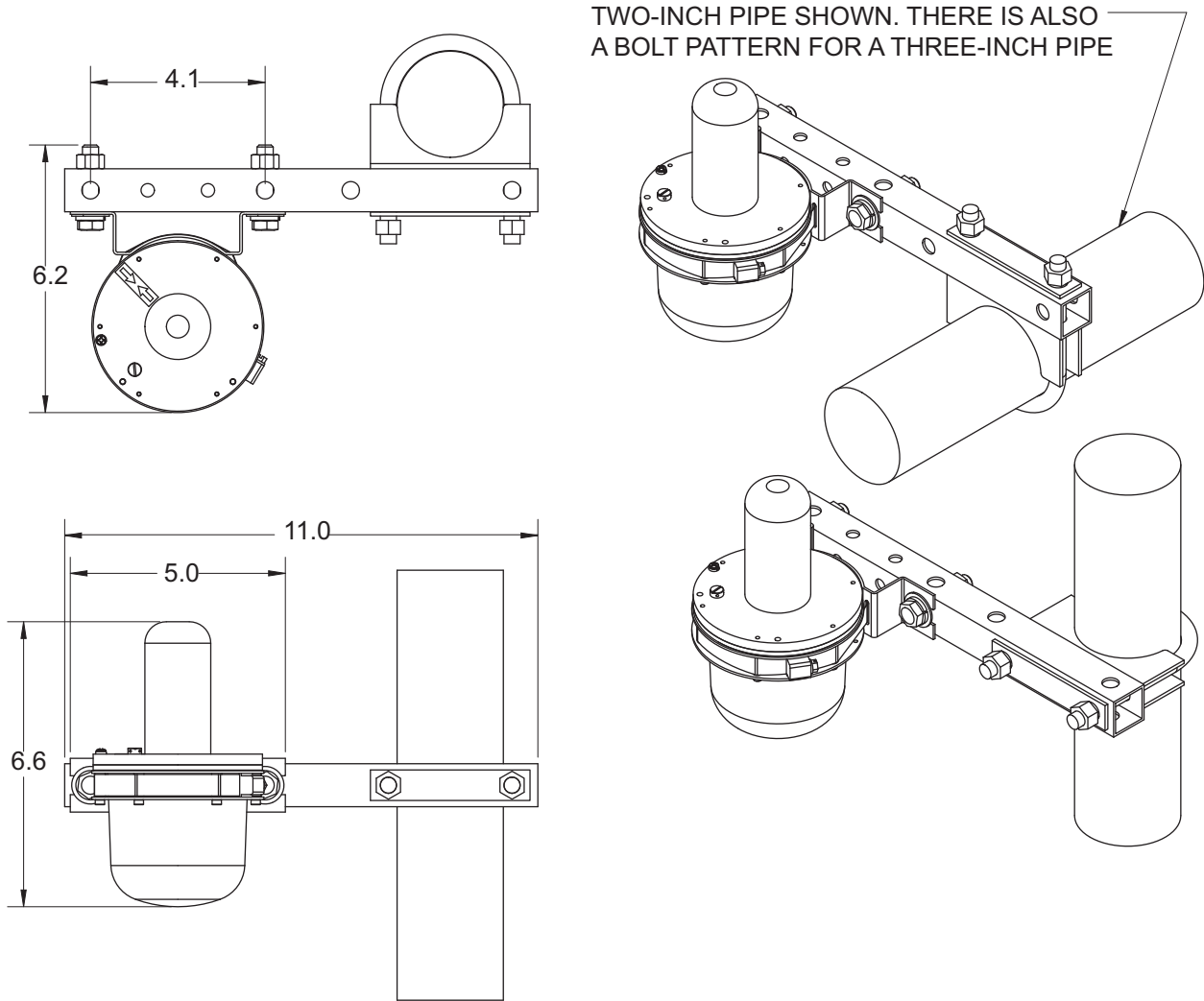


Figure 7. Dimensions for Central Concentrator with Bracket for Mounting on a 2- or 3-inch Pipe

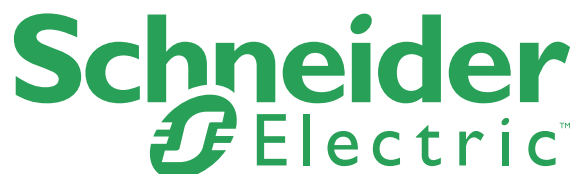


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