Honeywell

Quick Start Guide for the
WPS Series Wireless Pressure Sensor

Issue 1

50095585

⚠ WARNING
PERSONAL INJURY

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

Failure to comply with these instructions could result in death or serious injury.

⚠ WARNING

Honeywell does not recommend using devices for critical control applications where there is, or may be, a single point of failure or where single points of failure may result in an unsafe condition. It is up to the end-user to weigh the risks and benefits to determine if the products are appropriate for the application based on security, safety and performance. Additionally, it is up to the end-user to ensure that the control strategy results in a safe operating condition if any crucial segment of the control solution fails. Honeywell customers assume full responsibility for learning and meeting the required Declaration of Conformity, Regulations, Guidelines, etc. for each country in their distribution market.

⚠ WARNING
RF EXPOSURE

To satisfy FCC RF exposure requirements for mobile transmitting devices, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during device operation To ensure compliance, operation at closer than this distance is not recommended. The antenna used for this transmission must not be co-located in conjunction with any other antenna or transmitter.

Failure to comply with these instructions could result in death or serious injury.

⚠ WARNING

The WPS must be installed in accordance with the requirements specified in this document in order to comply with the specific Country Communication Agency requirements (i.e., FCC, IC, ETSI, ACMA, etc.). See Section 3 as this requires choosing the correct Country Use Code and thus allowable antenna and/or cable usage.

Notices and Trademarks

About this Document

This document describes mounting, installation and wiring of the WPS Series Wireless Pressure Sensors and antennae. Configuration, authentication and operation are covered in other documents.

Honeywell does not recommend using devices for critical control where there is a single point of failure or where single points of failure result in unsafe conditions. OneWireless is targeted at open loop control, supervisory control, and controls that do not have environmental or safety consequences. As with any process control solution, the end-user must weigh the risks and benefits to determine if the products used are the right match for the application based on security, safety, and performance. Additionally, it is up to the end-user to ensure that the control strategy sheds to a safe operating condition if any crucial segment of the control solution fails.

Revision Information

Document name	Document ID	Publication Date
WPS Series Wireless Pressure Sensor Quick Start Guide	50095585	February 2014
New	50095585, Issue 1	February 2014

References

The following list identifies all documents that may be sources of reference for material discussed in this publication.

Document title	Document No.
Getting Started with Honeywell OneWireless Solutions	OW-CDX010
Wireless Device Manager User's Guide	OW-CC0020
Field Device Access Point User's Guide	OW-CC0030
WPS-Series Professional Install Guide	50095583
WPS-Series User's Manual	50095584
OneWireless Wireless Builder User's Guide	OW-CDX060
OneWireless Builder Parameter Reference	OW-CDX070
OW R210 Hardware Planning and Installation Guide	OW-CC0010
OneWireless R210 Parameter Reference Dictionary	OW-CC0050
OneWireless R210 Migration Users Guide	OW-CC0080
OW R210 Software Change Notice	OW-CCSCN1

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Symbol Definitions

The following table lists those symbols used in this document to denote certain conditions.

Table 1 – Table Symbol Definitions

Symbol	Definition
	**ATTENTION:** Identifies information that requires special consideration.
CAUTION	Indicates a situation which, if not avoided, may result in equipment or work (data) on the system being damaged or lost, or may result in the inability to properly operate the process.
	**CAUTION:** Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.
	**CAUTION** symbol on the equipment refers the user to the product manual for additional information. The symbol appears next to required information in the manual.
	**WARNING:** Indicates a potentially hazardous situation, which, if not avoided, could result in serious injury or death.
	**WARNING** symbol on the equipment refers the user to the product manual for additional information. The symbol appears next to required information in the manual.
	**WARNING, Risk of electrical shock:** Potential shock hazard where HAZARDOUS LIVE voltages greater than 30 Vrms, 42.4 Vpeak, or 60 Vdc may be accessible.
	**ESD HAZARD:** Danger of an electro-static discharge to which equipment may be sensitive. Observe precautions for handling electrostatic sensitive devices.
	**Protective Earth (PE) terminal:** Provided for connection of the protective earth (green or green/yellow) supply system conductor.
	**Functional earth terminal:** Used for non-safety purposes such as noise immunity improvement. NOTE: This connection shall be bonded to Protective Earth at the source of supply in accordance with national local electrical code requirements.
	**Earth Ground:** Functional earth connection. NOTE: This connection shall be bonded to Protective Earth at the source of supply in accordance with national and local electrical code requirements.
	**Chassis Ground:** Identifies a connection to the chassis or frame of the equipment shall be bonded to Protective Earth at the source of supply in accordance with national and local electrical code requirements.
	The **Factory Mutual®** approval mark means the equipment has been rigorously tested and certified to be reliable.
	The **Canadian Standards mark** means the equipment has been tested and meets applicable standards for safety and/or performance.
	The **Ex mark** means the equipment complies with the requirements of the European standards that are harmonized with the 94/9/EC Directive (ATEX Directive, named after the French "ATmosphere EXplosible").
	For radio equipment used in the European Union in accordance with the R&TTE Directive the CE Mark and the notified body (NB) identification number is used when the NB is involved in the conformity assessment procedure. The alert sign must be used when a restriction on use (output power limit by a country at certain frequencies) applies to the equipment and must follow the CE marking.
	The **C-Tick mark** is a certification trade mark registered to ACMA (Australian Communications and Media Authority) in Australia under the Trade Marks Act 1995 and to RSM in New Zealand under section 47 of the NZ Trade Marks Act. The mark is only to be used in accordance with conditions laid down by ACMA and RSM. This mark is equal to the CE Mark used in the European Union. **N314** directly under the logo is Honeywell's unique supplier identification number.
	The **INMETRO (Brazil)** mark means the tested and meets applicable standards for safety.

1 INTRODUCTION

1.1 Site Preparation

Wireless devices require proper site preparation to ensure optimum performance and safety compliance. Do not proceed until you have done the proper planning described in the Wireless Planning Guide.

1.2 European Union Usage Usage

This product may be used in any of the following European Union nations.

Table 1. European Union

Country	ISO 3166 2 letter code	Country	ISO 3166 2 letter code
Austria	AT	Latvia	LV
Belgium	BE	Liechtenstein	LI
Bulgaria	BG	Lithuania	LT
Cyprus	CY	Malta	MT
Czech Republic	CZ	Netherlands	NL
Denmark	DK	Norway	NO
Estonia	EE	Poland	PL
Finland	FI	Portugal	PT
France	FR	Romania	RO
Germany	DE	Slovakia	SK
Greece	GR	Slovenia	SI
Hungary	HU	Spain	ES
Iceland	IS	Sweden	SE
Ireland	IE	Switzterland	CH
Italy	IT	United Kingdom	BG

1.3 Certifications and Approvals

1.3.1 Hazardous Location Certifications

Table 2. Certifications and Approvals

Agency	Type of Protection	Ambient Temperature	Product Applicability*
CSA 1903673 (USA and Canada)	Intrinsically Safe: Class I; Division 1; Groups A, B, C, D; Class II, Division 1, Groups E, F, G; Class III, Division 1; T4 Class I, Zone 0 Ex ia IIC T4 Class I, Zone 0 AEx ia IIC T4	-40 °C to +85 °C : Battery -40 °C to +80 °C : dc Supply	Pressure Temperature/ Discrete Inputs Corrosion High Level INPUT (HLAI) Universal I/O
	Nonincendive: Class I; Division 2; Groups A, B, C, D; Class II, Division 2, Groups F, G; Class III, Division 2, T4 Class I, Zone 2 Ex nA IIC, T4 Class I, Zone 2 AEx nA IIC, T4	-40 °C to +85 °C : Battery -40 °C to +80 °C : dc Supply	Pressure Temperature/ Discrete Inputs High Level INPUT (HLAI) Universal I/O
	Explosion-Proof/ Flameproof: Class I, Division 1; Groups A, B, C, D; Class II, Division 1, Groups E, F, G; Class III, Division 1; T4 Class I, Zone 1 Ex d IIC T4 Class I, Zone 1 AEx d IIC, T4	-40 °C to +85 °C : Battery -40 °C to +80 °C : dc Supply	Pressure Temperature/ Discrete Inputs Corrosion High Level INPUT (HLAI) Universal I/O
	Enclosure Type: Type 4X, IP 66		
	Standards Used: CSA-C22.2 No. 30:M1986 CSA-C22.2 No. 94:M1991 CSA E60079-0: 2002 CSA E60079-15: 2002 FM 3600: 1998 FM 3615: 2006 UL 916:1998	CSA-C22.2 No. 142:M1987 CSA-C22.2 No. 157:M1992 CSA E60079-1: 2002 CSA E61241-0: 2002 FM 3610: 1999 ANSI/ ISA 12.12.02: 2003	CSA-C22.2 No. 213:M1987 CSA-C22.2 No. 60529:2005 CSA E60079-11: 2002 CSA E61241-1: 2002 FM 3611: 2004 UL 50:2003
FM ApprovalsTM 3032450 (USA)	Intrinsically Safe: Class I; Division 1; Groups A, B, C, D; Class II, Division 1, Groups E, F, G; Class III, Division 1; T4 Class I, Zone 0 AEx ia IIC T4	-40 °C to +85 °C : Battery -40 °C to +80 °C : dc Supply	Pressure Temperature/ Discrete Inputs Corrosion High Level INPUT (HLAI) Universal I/O
	Nonincendive: Class I; Division 2; Groups A, B, C, D; Class II, Division 2, Groups F, G; Class III, Division 2, T4 Class I, Zone 2 AEx nA IIC, T4	-40 °C to +85 °C : Battery -40 °C to +80 °C : dc Supply	Pressure Temperature/ Discrete Inputs High Level INPUT (HLAI) Universal I/O
	Explosion-Proof/ Flameproof: Class I, Division 1; Groups A, B, C, D; Class II, Division 1, Groups E, F, G; Class III, Division 1; T4 Class I, Zone 1 AEx d IIC, T4	-40 °C to +85 °C : Battery -40 °C to +80 °C : dc Supply	Pressure Temperature/ Discrete Inputs Corrosion High Level INPUT (HLAI) Universal I/O
	Enclosure Type: Type 4X, IP 66		
	Standards Used: FM 3600:1998 FM 3615:2006 ANSI/ ISA 12.02.01: 2002 ANSI/ IEC 60529: 2004	FM 3610: 2007 FM 3810: 2005 ANSI/ ISA 12.12.02: 2003 ANSI/ NEMA 250: 2003	FM 3611: 2004 ANSI/ ISA 12.00.01: 2002 ANSI/ ISA 12.22.01: 2005

Agency	Type of Protection	Ambient Temperature	Product Applicability*
ATEX- KEMA 08ATEX0062X	Intrinsically Safe: II 1 G Ex ia IIB T4 II 1 D Ex tD A20 IP66 T90 oC	-40 °C to +70 °C: Battery -40 °C to +80 °C : dc Supply	Pressure Temperature/ Discrete Inputs Corrosion High Level INPUT (HLAI) Universal I/O
	Flameproof: II 2 G Ex d [ia] IIB T4 II 2 D Ex tD A21 IP66 T90 oC	-40 °C to +70 °C: Battery -40 °C to +80 °C : dc Supply	Pressure Corrosion High Level INPUT (HLAI) Universal I/O
	Enclosure: IP66		
	Standards Used: EN 60079-0 : 2006 EN 60079-26 : 2007	EN 60079-1 : 2004 EN 61241-0 : 2006	EN 60079-11 : 2007 EN 61241-1 : 2004
ATEX- DEKRA 08ATEX0074	Nonincendive: II 3 G Ex nA [nL] IIC T4 II 3 D Ex tD A22 IP66 T90 oC	-40 °C to +84 °C	Pressure Temperature/ Discrete Inputs Corrosion High Level INPUT (HLAI) Universal I/O
	Enclosure: IP66		
	Standards Used: EN 60079-0 : 2006 EN 61241-1 : 2004	EN 60079-15 : 2005	EN 61241-0 : 2006
IECEx- CSA 09.0001X	Intrinsically Safe: Ex ia IIB T4 Ex tD A20 IP66 T90 oC	-40 °C to +70 oC: Battery -40 °C to +80 °C : dc Supply	Pressure Temperature/ Discrete Inputs Corrosion High Level INPUT (HLAI) Universal I/O
	Flameproof: Ex d [ia] IIB T4 Ex tD A21 IP66 T90 oC	-40 °C to +70 °C: Battery -40 °C to +80 °C : dc Supply	Pressure Corrosion High Level INPUT (HLAI) Universal I/O
	Nonincendive: Ex nA [nL] IIC T4 Ex tD A22 IP66 T90 oC	-40 °C to +84 °C: Battery -40 °C to +80 °C : dc Supply	Pressure Temperature/ Discrete Inputs Corrosion High Level INPUT (HLAI) Universal I/O
	Enclosure: IP66		
	Standards Used: IEC 60079-0 : 2004 IEC 60079-26 : 2007 IEC 60079-15 : 2001	IEC 60079-1 : 2003 IEC 61241-0 : 1999	IEC 60079-11 : 1999 IEC 61241-1 : 1999

*See individual product manuals as defined on page iii for exact Models

** At time of printing, certification was pending.

1.3.2 Electrical Data

1.3.2.1 Battery

The WPS Series Wireless Pressure Sensor uses two each, series connected (D size) Lithium ion batteries, type 5930 manufactured by Tadiran, type XL-205 F manufactured by Zeno Energy or type PT-2300H manufactured by Eagle Picher.

Additionally for ATEX and IECEx certifications, Lithium Battery SL-2780, manufactured by Tadiran, GmbH may be used.

Batteries are also available from Honeywell Sensing & Control (see WPS-Series User's Manual).

1.3.2.2 Wired Connections

There are no wired connections for external power or signal inputs for the WPS Series Wireless Pressure Sensor.

1.4 Conditions of Certification

1.4.1 IECEx Conditions of Certification

Parts of the antenna are non-conducting and the area of the non-conducting part exceeds the maximum permissible areas for Category II 1 G (Zone 0) according to IEC 60079-0. Therefore when the antenna is used within a potentially explosive atmosphere, appropriate measures must be taken to prevent electrostatic discharge.

Impact and friction hazards need to be considered according to IEC 600079-0 when the sensor that is exposed to the exterior atmosphere is made of light metal alloys, and used in Category II 1 G (Zone 0).

1.4.2 ATEX Conditions for Safe Use

Special precautions shall be taken to prevent the surface of the antenna of the WXP-SERIES Wireless Transmitter from being electrostatically charged.

1.5 Maximum Working Pressure

See WPS-Series User's Manual, document 50095584.

1.6 ~~Radio Certifications~~ WPS Certification

~~Table 3. Radio Certifications~~

Agency	Certification	Description
Federal Communications Commission (FCC)	FCC ID: **XJLWPS001**	The WPS Series Wireless Sensors comply with part 15 of the FCC rules. Operation is subject to the following two conditions. (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
Industry Canada (IC)	**IC ID: 9832A-WPS001IC**	*This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.* *Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement*
CE NB0981	0981	For radio equipment used in the European Union in accordance with the R&TTE Directive the CE Mark and the notified body (NB) identification number is used when the NB is involved in the conformity assessment procedure. The alert sign must be used when a restriction on use (output power limit by a country at certain frequencies) applies to the equipment and must follow the CE marking.

1.6.1 Radio Frequency (RF) Statements

To comply with FCC's and Industry Canada's RF exposure requirements, the following antenna installation and device operating configurations must be satisfied.

- Remote Point-to-Multi-Point antenna(s) for this unit must be fixed and mounted on outdoor permanent structures with a separation distance between the antenna(s) of greater than 20 cm and a separation distance of at least 20cm from all persons.
- Remote Fixed Point–to-Point antenna(s) for this unit must be fixed and mounted on outdoor permanent structures with a separation distance between the antenna(s) of greater than 20 cm and a separation distance of at least 100cm from all persons.
- Furthermore, when using integral antenna(s) the WPS Series Wireless Sensor unit must not be co-located with any other antenna or transmitter device and have a separation distance of at least 20 cm from all persons.

1.6.2 European Union Restriction

The WPS Series Wireless Sensors are in conformity with the applicable portions of the ETSI standards as required by the R&TTE Directive 1999/5/EC.

Restriction

France restricts outdoor use to 10mW (10dBm) EIRP in the frequency range of 2,454 MHz to 2,483.5 MHz. Installations in France must limit EIRP to 10dBm, for operating modes utilizing frequencies in the range of 2,454 MHz to 2,483.5 MHz.

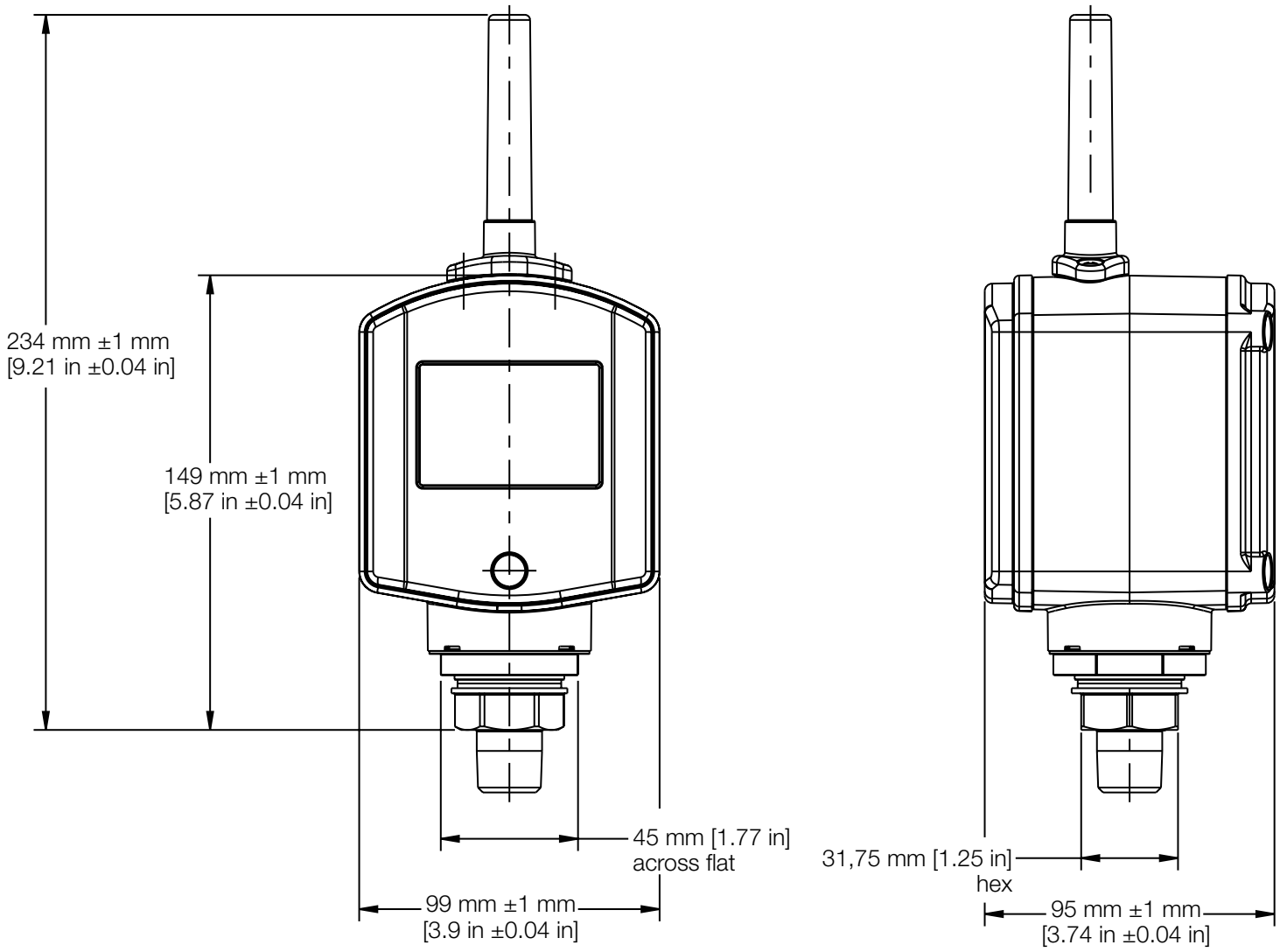
2 SENSOR MOUNTING

2.1 Weight

Model	Weight
WPS-Series	2 lb., 3 oz. (1.0 kg)

2.2 Dimensions

Figure 1. Dimensions of WPS Series Wireless Pressure Sensor



2.3 WPS Series Sensor Location

2.3.1 Recommended Locations

Table 4. WPS Series, GP or AP

Process	Suggested location	Explanation
Gases	Above the gas line	The condensate drains away from the sensor.
Liquids	Below but close to the elevation of the process connection.	This minimizes the static head effect of the condensate.
	Level with or above the process connection	This requires a siphon to protect the sensor from process steam. The siphon retains water as a “fill fluid.”

2.4 Conduit / Cable Entries

There are no conduit/cable entries for the WPS-Series sensor.

2.5 Bracket mounting

There is no bracket mounting for the WPS-Series sensor. It is supported by the pipe fitting on the pressure sensor module.

2.6 Pressure Port

Materials:

- 316L Stainless Steel (pressure port body)
- Hastelloy C-276 (diaphragm)

Process Connection:

- Threads: 1/2” NPT Male thread and 1/4” NPT Female thread
- Swivel: The WPS-Series sensor body will swivel 350 degrees with respect to the pressure port body, to optimize readablilty of the LCD.

3 PROCESS INSERTION

3.1 Pressure Sensing

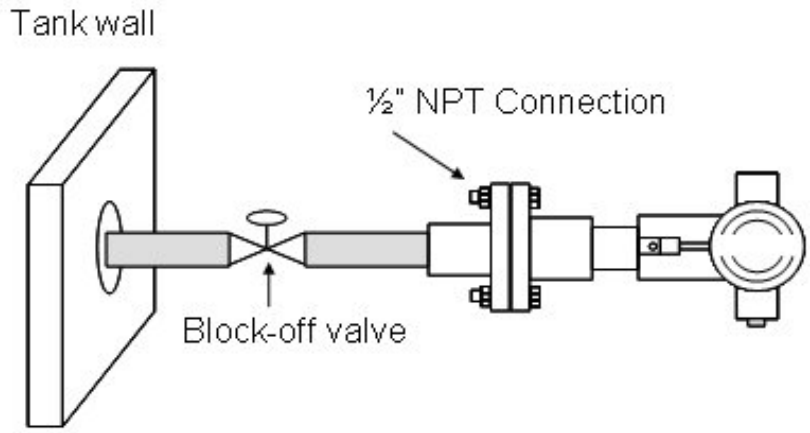
3.1.1 Piping

The actual piping arrangement will vary depending upon the process measurement requirements and the sensor model. Process connections are made to 1/4 inch NPT female or 1/2 inch NPT male connections in the sensor head of the sensor’s body. They can be modified to accept 3/4 inch NPT male through an optional pipe fitting adapter. Elbow fittings may be utilized as required.

The most common type of pipe used is 1/2 inch schedule 80 steel pipe. Many piping arrangements use a three-valve manifold to connect the process piping to the sensor. A manifold makes it easy to install and remove a sensor without interrupting the process. It also accommodates the installation of blow-down valves to clear debris from pressure lines to the sensor.

Another piping arrangement uses a block-off valve and a tee connector in the process piping to the sensor as shown below.

Figure 2. Typical Arrangement for 1/2 NPT Process Connection Piping



ATTENTION

For liquid or steam, the piping should slope a minimum of 25,4 mm [1 in] per 305 mm [1 ft]. Slope the piping down towards the sensor if the sensor is below the process connection so the bubbles may rise back into the piping through the liquid. If the sensor is located above the process connection, the piping should rise vertically above the sensor; then slope down towards the flowline with a vent valve at the high point. For gas measurement, use a condensate leg and drain at the low point (freeze protection may be required here).

⚠ CAUTION

Property damage may result if operating temperature limits of sensor are exceeded. Sensor housing must not exceed 85 °C [185 °F]. To reduce the temperature of the process that comes into contact with the sensor meter body, install impulse piping. As a general rule there is a 56 °C drop [100 °F] in the temperature of the process for every foot (305 mm) of ½ inch uninsulated piping.

3.1.2 Process Connections

Table 5. Process Connections

Sensor Type	Process Connection
Gage	Process head with 1/2 inch NPT male and 1/4” NPT female connection Thread adapter with 3/4” NPT male and 1/2” female connections is optional
Absolute	Process head with 1/2 inch NPT male and 1/4” NPT female connection Thread adapter with 3/4” NPT male and 1/2” female connections is optional

Figure 3. Process Connection - Pipe Fitting

3.1.3 General piping guidelines

When measuring fluids containing suspended solids, install permanent valves at regular intervals to blow-down piping.

Blow-down all lines on new installations with compressed air or steam and flush them with process fluids (where possible) before connecting these lines to the sensor's meter body.

Be sure all the valves in the blow-down lines are closed tight after the initial blow-down procedure and each maintenance procedure after that.

Mount sensor vertically to assure best accuracy, and to obtain optimum R.F. link performance. Position the spirit balance on pressure connection surface of Sensor body.

3.1.4 Sensor Housing Swiveling

The WPS Series sensor housing will swivel through a 350 degree range to facilitate easy reading of the LCD display. To adjust the swivel mounting:

1. Insure that the process connector (threaded fitting) is in its final position and is fully tightened, using a wrench on the hex-nut area above the threads (do NOT tighten using the sensor body).
2. Loosen the large nut just below the housing using a 1 3/4" wrench.
3. Swivel sensor housing as needed.
4. While holding the sensor body in place, gently tighten the large nut with a 1 3/4" wrench to 7 Nm [5.2 ft-lb].

4 ANTENNA ADJUSTMENT AND MOUNTING

4.1 Requirements

4.1.1 Radio Installation Requirements

ATTENTION

- Professional Installation is required to insure conformity with Federal Communications Commission (FCC) in the USA, Industry Canada (IC) in Canada and the Radio and Telecommunications Terminal Equipment Directive, 1999/5/EC (R&TTE), in the European Union (EU).
- Professional installation is required for the selection and installation of approved antennas and setup of the maximum allowable radiated power from the WPS-Series Wireless Transmitter as configured for the particular installation site.
- The antenna used for this sensor must be installed to provide a separation distance of at least 20 cm (8 inches) from all persons and must not be co-located or operating in conjunction with any other antenna or sensor.
- For remote antenna, see antenna installation requirements to satisfy FCC RF exposure requirements.

ATTENTION

Federal Communications Commission (FCC):

- The WPS Series Wireless Sensors comply with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Industry Canada (IC):

- The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF fields in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from Health Canada's web site www.hc-sc.gc.ca/rpb.

4.2 Direct Mount Antenna

⚠ WARNING

POTENTIAL ELECTROSTATIC CHARGING HAZARD

The direct mount antenna radome is made of plastic and has a surface resistance greater than 1Gohm per square. When the WXP-Series transmitter is installed in potentially hazardous locations care should be taken not to electrostatically charge the surface of the antenna shroud by rubbing the surface with a cloth, or cleaning the surface with a solvent. If electrostatically charged, discharge of the antenna shroud to a person or a tool could possibly ignite a surrounding hazardous atmosphere.

4.2.1 Direct Mount, General Guidelines

A direct mount antenna (either straight or tilt & swivel) can be easily mounted by threading the mating RP-SMA plug of the antenna to the RP-SMA jack on the WPS. Tighten the connection until finger tight. For straight antennas, either 0 dBi or 2.0 dBi, attach the antenna radome with the two screws provided. Insure that the “O” ring is installed in the grove in the sensor housing.

If a radome is not used, and the antenna is in an exposed location, the antenna connector barrel and exposed threads should be protected from the elements with a weathering tape (such as COAX-SEAL #104 from LComm, or Super 88 tape from 3M).

4.2.2 Direct Mount, Straight

Figure 4. Direct Mount Antenna (not consistent...)

Option 01	Option 02	Radome Installed
		
Straight antenna available in 0 dBi or 2 dBi configurations.		

If the sensor is using the direct mount straight antenna you can adjust its position by mounting the sensor with a 45 or 90 degree elbow. Typically, pointed straight up gives best performance but your installation may vary. Generally, the 0 dBi antenna will be less sensitive to antenna orientation, and higher gain antennas will be more sensitive to orientation.

4.2.2 Direct Mount, Tilt and Swivel

If the WP-Series transmitter uses an optional tilt & swivel antenna you can adjust it to improve reception.

Figure 5. Direct Mount Antenna

Option ??only spot this is included

The antenna will tilt through 90 degrees only. Rotating will likely be needed as well, to orient the antenna vertically. Typically, pointed straight up gives best performance but your installation may vary. Swivel and/or tilt antenna for best reception, as viewed on the WDM Interface.

4.3 Remote Antennas

4.3.1 Outdoor Installation Warnings

⚠ WARNING

LIVES MAY BE AT RISK!
Carefully observe these instructions and any special instructions included with the equipment being installed.

⚠ WARNING

CONTACTING POWER LINES COULD BE FATAL
Look over the site before beginning any installation and anticipate possible hazards, especially these:

- Make sure no power lines are near where possible contact can be made. Antennas, masts, towers, guy wires, or cables may lean or fall and contact these lines. People may be injured or killed if they are touching or holding any part of equipment when it contacts electric lines. Make sure there is NO possibility that equipment or personnel can come in contact directly or indirectly with power lines.
- Assume all overhead lines are power lines.
- The horizontal distance from a tower, mast, or antenna to the nearest power line should be at least twice the total length of the mast/antenna combination. This will ensure that the mast will not contact power if it falls during either installation or later.

⚠ WARNING

TO AVOID FALLING, USE SAFE PROCEDURES WHEN WORKING AT HEIGHTS ABOVE GROUND

- Select equipment locations that will allow safe, simple equipment installation
- Don't work alone. A friend or co-worker can save a life if an accident happens.
- Use approved, non-conducting ladders and other safety equipment. Make sure all equipment is in good repair.
- If a tower or mast begins falling, don't attempt to catch it. Stand back and let it fall.
- If anything such as a wire or mast does come in contact with a power line, DON'T TOUCH IT OR ATTEMPT TO MOVE IT. Instead, save a life by calling the power company.
- Don't attempt to erect antennas or towers on windy days.

⚠ WARNING

MAKE SURE ALL TOWERS AND MASTS ARE SECURELY GROUNDED, AND ELECTRICAL CABLES CONNECTED TO ANTENNAS HAVE LIGHTNING ARRESTORS.
This will help prevent fire damage or human injury in case of lightning, static build up, or short circuit within equipment connected to antenna.

- The base of the antenna mast or tower must be connected directly to the building protective ground or to one-or-more approved grounding rods, using 1 AWG ground wire and corrosion-resistant connectors.
- Refer to the National Electrical Code for grounding details.
- Lightning arrestors for antenna feed coaxial cables are available from HyperLink Technologies, Inc.

⚠ WARNING

If a person comes in contact with electrical power, and cannot move
DO NOT TOUCH THAT PERSON OR RISK ELECTROCUTION.

- Use a non-conductive dry board, stick, or rope to push, pull, or drag them so they no longer are in contact with electrical power.
- Once they are no longer contacting electrical power, administer CPR if certified, and make sure emergency medical aid has been requested.

4.3.2 Cable Requirement

Some remote mount SMA connector antennas have an antenna cable permanently attached, with an RP-SMA plug, which is simply connected to the jack on the sensor. Other remote mount antennas do not include cable, and require the use of an extension cable. This extension cable will normally need to have one end with an RP-SMA plug (inside threads), which will connect to the sensor, and one end with an RP-SMA jack (outside threads). The jack of the extension cable will mate with the antenna or the lightning arrestor. If a lightning arrestor is connected this way, the antenna may be directly connected to the arrestor.

Note that at 2.4 gHz., typical antenna cables types have 0.5 dB of loss per meter (almost 5 dB for a ten foot cable, plus connector losses). Excessively long cable runs should be avoided if possible.

Refer to the WPS-Series Professional Install Guide for antenna and cable options.

4.3.3 Lightning Arrestor

The lightning arrestor may be mounted directly on the sensor, or at the far end of the antenna cable, mounted to a sheet of metal in a through-hole. Generally, the choice should be made based on having the shortest, most direct path to a good, solid ground.

If the lightning arrestor is mounted directly on the sensor, use caution when attaching a grounding wire to the arrestor to avoid putting undue stress on the sensor's antenna connector.

If the coax cable is to enter a building, then the lightning arrestor should be mounted as close as possible to where the lead-in wire enters the building. The lightning arrestor recommended by Honeywell features a bulkhead RP-SMA connector with a rubber "O"-ring seal which can be used for mounting through an enclosure wall. Both connector ports of the lightning arrestor provide equal protection no matter which way it is installed. Either port can face the antenna and either port can face the Sensor.

Refer to the WPS-Series Professional Install Guide for further information about lightning arrestors and their installation.

4.3.4 Choosing a Mounting Location

The location of the antenna is important. Objects such as metal columns, walls, etc. will reduce efficiency. Best performance is achieved when antennas for both Multinodes and WPS-Series Sensors are mounted at the same height and in a direct line of sight with no obstructions. If this is not possible and reception is poor, you should try different mounting positions to optimize reception.

Antennas should be mounted clear of any obstructions to the sides of the radiating element. If the mounting location for an omnidirectional antenna is on the side of a building or tower, then the antenna pattern will be degraded on the building or tower side.

4.3.5 Site Selection

Before attempting to install your antenna, think where you can best place the antenna for safety and performance.

Follow these steps to determine a safe distance from wires, power lines, and trees.

Step	Action
1	Measure the height of your antenna.
2	Add this length to the length of your tower or mast and then double this total for the minimum recommended safe distance.

⚠ CAUTION
If you are unable to maintain this safe distance, stop and get professional help.

Generally speaking, the higher your antenna is above the ground, the better it performs. Good practice is to install your antenna about 5 to 10 feet (1.5 to 3 meters) above the roof line and away from all power lines and obstructions. If possible, find a mounting place directly above your wireless device so that the lead-in cable can be as direct as possible.

4.3.6 Antenna Mount Types

Antennas are provided with a variety of mounting options, including magnetic mount, tape mounting, or mast mounting. The standard 0 dBi or 2.0 dBi antennas, normally mounted on the sensor, may also be mounted to an extender cable, if the remote cable end is mounted in a through hole with the nut and lockwasher. These antennas may also be mounted on a lightning arrestor, if the lightning arrestor is properly mounted in a through hole with a nut and lockwasher. Refer to the WPS-Series Professional Install Guide for cable, antenna, and lightning arrestor options.

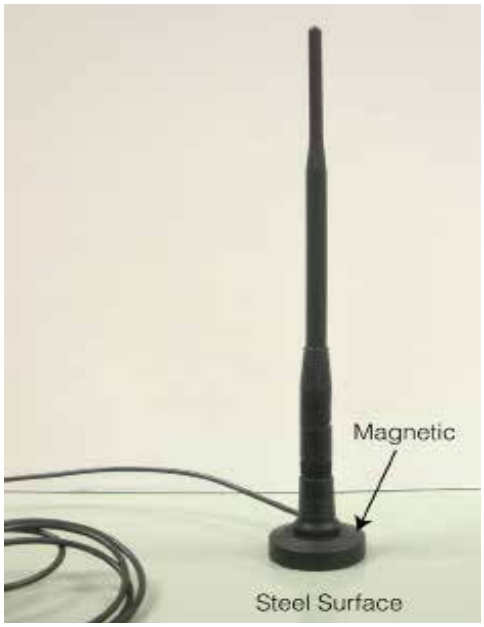
Omnidirectional antennas are vertically polarized and produce a “doughnut” shaped pattern. It is very important to mount the antenna in a vertical (not leaning) position for optimal performance, especially with higher gain antennas. Refer to the WPS-Series Professional Install Guide for further information about antenna patterns.

4.3.7 Magnetic Mounting (only spot this type of antenna mentioned)

If a horizontal steel stuctural member or sheet metal area is available, and there are no severe environmental conditions (wind, vibration, etc...), a magnetic mount antenna may be an easy solution. This also allows the option of easily making small adjustments to optimize R.F. path performance.

Using tie-wraps (cable ties), secure the coax cable to the nearby structural members, using a tie-wrap every ten to twelve inches (25 to 30 cm).

Figure 6. Magnetic Mount Antenna



4.3.8 Adhesive Mounting (only spot this type of antenna mentioned)

The benefit of the remote adhesive mount antenna is mounting flexibility to a number of surfaces and in various orientations. Note that the surface that the antenna is being mounted to will affect the radiation pattern so it is suggested that masking tape be used to temporarily attach the antenna. Evaluate R.F. link performance, as described in the WPS-Series Professional Install Guide before permanently mounting.

Permanent mounting: Pre-clean the surface where the antenna is to be mounted with an alcohol wipe. Peel paper protection from adhesive strip and mount to the cleaned surface. See Figure 7.

Figure 7. Adhesive Mounting Steps

Step 1. Pre-clean the surface

Step 2. Peel Protection from Adhesive Strip

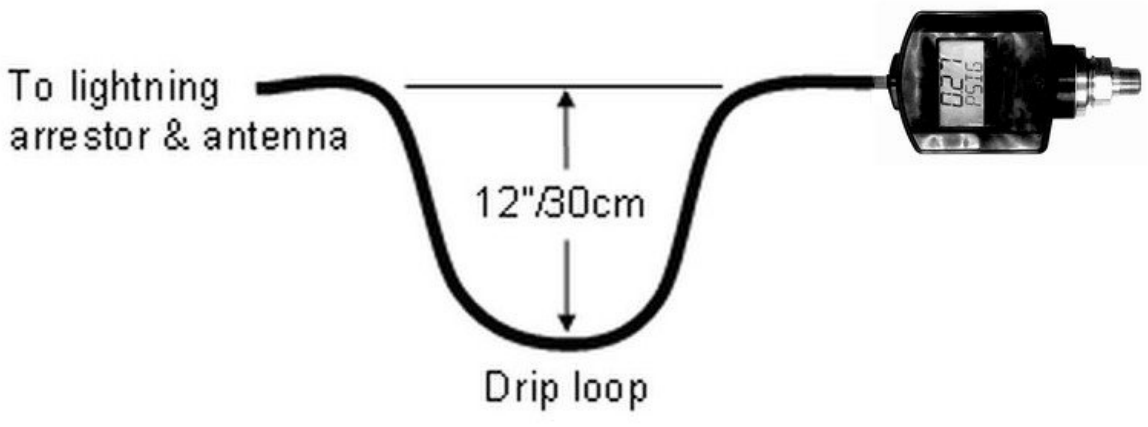
Step 3. Mount the Antenna

4.3.9 Mast Mounting

Mast mounting kits consist of a mounting bracket and one or two U-bolt clamps. These kits allow you to mount the bracket to masts with outside diameters (O.D.) from 3,2 cm [1.25 in] to 5,1 cm [2 in]. Honeywell recommends that a 3,8 cm [1.5 in] or larger tubing mast be used. The antenna is then mounted in a hole on the bracket upper surface. Most standard brackets will have a hole too large for an SMA mount antenna, so a new hole will be needed. For hole dimensions, refer to to the WPS-Series Professional Install Guide.

Follow these steps to mount the antenna on a mast.

Step	Action
1	Assemble your new antenna on the ground at the installation site. For SMA mount antennas, mount the RP-SMA jack of the antenna cable to a hole in the bracket, using the nut and lockwasher supplied. For lightning arrestor mounting, mount the lightning arrestor in the mounting bracket hole, and attach the extension cable to the arrestor.
2	Screw the SMA antenna onto the cable or lightning arrestor. Tighten all cables by hand only; do not use tools or you could overtighten. Make sure that the connections are sealed (if outdoors) the prevent moisture and other weathering elements from effecting performance. Honeywell recommends using a weathering tape (such as COAX-SEAL #104 from LComm, or Super 88 tape from 3M) for outdoor connections. Silicon sealant or ordinary electrical tape is not recommended for sealing out door connections.
3	Attach the antenna bracket to the mast, using the U-Bolts as required.
4	Using tie-wraps (cable ties), secure the coax cable to the mast, using a tie-wrap every ten to twelve inches (25 to 30 cm).
5	Follow standard strain relief practice when installing the antenna cable. Avoid excessive strain, bending, kinks, or crushing (stepping on or placing any weight on cable) before, during or after the coax cable is secured in its final position.
6	Make sure the mast does not fall the “wrong way” should you lose control as you raise or take down the mast. Use a durable non-conductive rope. Have an assistant tend to the rope; ready to pull the mast clear of any hazards (such as power lines) should it begin to fall.
7	If the installation will use guy wires: • Install guy anchor bolts. • Estimate the length of guy wire and cut it before raising the mast. • Attach guy wires to a mast using guy rings.
8	Carefully connect the antenna and mast assembly to its mounting bracket and tighten the clamp bolts. In the case of a guyed installation, you must have at least one assistant to hold the mast upright while the guy wires are attached and tightened to the anchor bolts.
9	Attach a "DANGER" label at eye level on the mast.
10	Install ground rods to remove any static electricity buildup and connect a ground wire to the mast and ground rod. Use ground rods designed for that purpose; do not use a spare piece of pipe.
11	When attaching the coax cable to the WXP-Series, it is recommended that a drip loop with a radius of at least 12 inches (30 cm) be formed close to the WXP-Series. This will minimize ice and water buildup on the sensor itself. Tighten cables by hand only; do not use tools or you could overtighten.



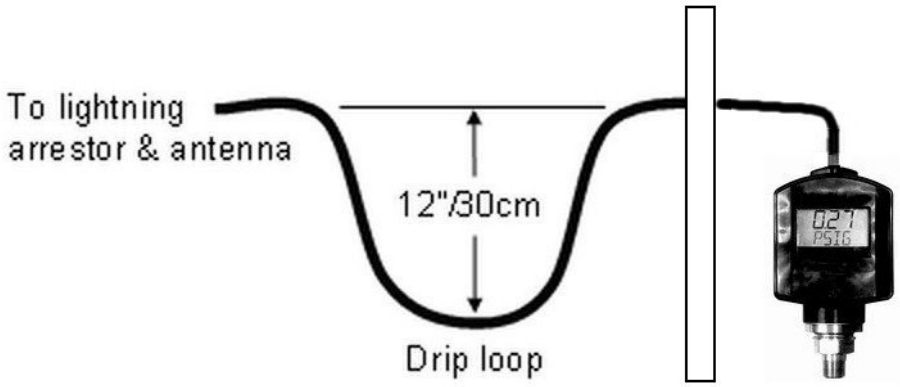
4.3.10 Grounding the Antenna

Follow these guidelines to ground the antenna in accordance with national electrical code instructions.

Step	Action
1	Use No. 10 AWG copper or No. 8 or larger copper-clad steel or bronze wire as ground wires for both mast and lead-in. Securely clamp the wire to the bottom of the mast.
2	Secure the lead-in wire to a lightning arrestor and mast ground wire to the building with stand-off insulators spaced from 4 feet (1.2 meters) to 8 feet (1.8 meters) apart.
3	The lightning arrestor must be bonded to earth ground in order to function properly. Due to the small diameter coaxial cables used with the RP-SMA connectors, the lightning arrestor must be grounded independant of the antennas, using number 10 solid wire. This wire must be connected directly to a solid ground. It may be the same ground as is used for the antenna tower.
4	Refer to the WPS-Series Professional Install Guide for further information about lightning arrestors and their installation. Drill a hole in the building's wall as close as possible to the equipment to which you will connect the lead-in cable. Use a rubber grommet or feedthru tube to protect the cable from abrasion.

⚠ CAUTION

There may be wires in the wall. Before drilling check that the area is clear of any obstructions or other hazards.

5	Pull the cable through the hole and form a drip loop on the outside close to where the cable enters the building. The drip loop should have a radius of at least 12 inches (30 cm). 
6	Thoroughly waterproof the lead-in area.
7	Connect the lead-in cable to the WXP-Series Transmitter. Tighten cables by hand only; do not use tools or you could overtighten.

5 START UP

5.1 Battery Connection

As shipped, the WPS Series Wireless Pressure Sensor contains two each, D-sized batteries, held in a battery holder. The batteries are kept in a disconnected state by a small plastic battery insulator. This insulator must be removed prior to provisioning and operating the sensor.

Suggested policies for battery connection are:

- Do not remove the tab until the unit is ready for use, as battery life will be considerably shortened. The unit will transmit frequently, trying to establish communication with a node. This node establishment will not succeed, if the network has not yet been provisioned for that sensor.
- Do not remove the tab and provision the unit until the unit is in its intended location, as it will try to establish links with whatever AP's are nearby. This will cause unnecessary transmissions through the network to occur, wasting battery power and using bandwidth.
- When a sensor is removed from service, and is to be stored, it is recommended that the insulating tab be installed, or the batteries removed, so as to preserve battery life and avoid unnecessary data transmissions.

⚠ WARNINGS

- Risk of death or serious injury by explosion. Do not open sensor enclosure when an explosive gas atmosphere is present.
- Batteries must not be changed in an explosive gas atmosphere.
- The sensor enclosure must not be opened when an explosive gas atmosphere is present.
- When not in use the batteries must be stored in a non-hazardous area
- The batteries used in this device may present a risk of fire or chemical burn if mistreated. Do not recharge, disassemble, heat above 100 °C [212 °F], or incinerate. Do not expose batteries to water.
- When installing batteries do not snag the battery terminal on the clip or the battery may be damaged. Do not apply excessive force.
- Do not drop. Dropping the battery may cause damage. If a battery is dropped, do not install the dropped battery into the sensor. Dispose of dropped battery promptly per local regulations or per the battery manufacturer's recommendations.

STOP ATTENTION

Both batteries must be the same model from the same manufacturer. Mixing old and new batteries or different manufacturers is not permitted.
Use only the following 3.6V lithium thionyl chloride (Li-SOCl2) batteries (non-rechargeable), size D. No other batteries are approved for use in WXP-Series Wireless Transmitters.

- Xeno Energy XL-205F
- Tadiran TL-5930/s
- Honeywell p/n WBT5 (Two 3.6V lithium thionyl chloride batteries)

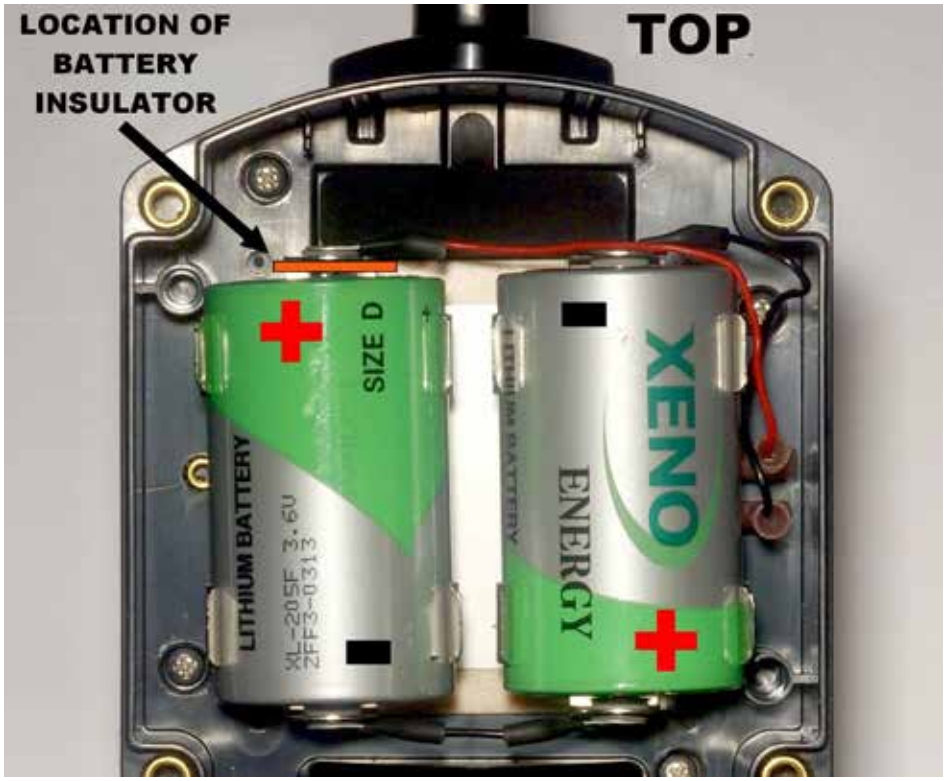
5.1.1 Connect Batteries

Perform the following just prior to connecting a sensor to the network.
The tools required:

- #2 Phillips Screwdriver
- Torque Screwdriver with #2 bit

Step	Action
⚠	**WARNING** DO NOT DISASSEMBLE OR ASSEMBLE WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT
1	On the rear of the WPS Series sensor, Unscrew the four captive screws and remove the cover.
2	Remove the plastic battery insulator from the positive (+) terminal of on battery. Save this insulator for use when removing sensors from the network, before storing them.
3	Verify that batteries are oriented with polarity as shown. Battery polarity is also shown on battery holder, underneath batteries.
4	Re-install the rear sensor cover and tighten screws to 1.5 N-m (13.2 inch-lbs.)

Figure 8. Battery Connection



5.1.2 Install Batteries

If batteries are not installed, perform the following.
The tools required:

- #2 Phillips Screwdriver or a 1/8 in slotted screwdriver
- Torque Screwdriver with #2 bit

Step	Action
⚠	**WARNING** DO NOT DISASSEMBLE OR ASSEMBLE WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT
1	On the rear of the WPS Series sensor, Unscrew the four captive screws and remove the cover.
2	Orient two new batteries with polarity as shown. Battery polarity is also shown on battery holder. Press two new batteries into the battery clips, starting on one end, then pressing in the other end. **Caution! Do not scratch the battery outside covering on the sharp edges of the battery clips.**
3	Re-install the rear Sensor cover and tighten screws to 1.5 N-m (13.2 inch-lbs.)
4	Reset battery life counter (see WPS-Series User's Manual, Section 5.4) using the WDM Interface.

5.2 Display Sequence

After power up, the sensor does a brief self-test of the A/D hardware, and NVRAM (program and data memory). Then it proceeds to display the process value (PV) and units for 3 seconds. This sequence will repeat at a rate determined by the publication rate and the LCD display rate.

5.3 Provisioning

Before the sensor can join the network, it must be provisioned. For the WPS Series Wireless Pressure Sensor, this must be done over the air (OTA), using the WDM Interface.

There is no provision for handheld provisioning devices using IR transmitters.

The Wireless Device Manager (WDM) provisions the access points, and the access points that are enabled to function as provisioning devices can then provision the sensors. To enable the over-the-air provisioning capability, you must first enable this feature in the Onewireless User Interface. For more information, please reference the Wireless Device Manager User's Guide (OW-CC0020).

See Getting Started with Honeywell OneWireless Solutions for more information.

6. CERTIFICATION INSTALLATION REQUIREMENTS

6.1 Certification Drawings

Use the following drawings and accompanying notes and text for hazardous locations. Any deviation from the installation requirements could void the certification. For non-hazardous locations you can use the same drawings without the accompanying notes and text.

Figure 8. EC Declaration of Conformity

Figure 9. Schedule

Figure 10. Schedule

Figure 11. CSA Installation Drawings

WPS Series Wireless Pressure Sensor

ISSUE 1 ***50095585***

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

SALES AND SERVICE

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office or:

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Honeywell

User Manual for the
WPS Series Wireless Pressure Sensor

Issue 1

50095584

⚠ WARNING
PERSONAL INJURY

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

Failure to comply with these instructions could result in death or serious injury.

⚠ WARNING

Honeywell does not recommend using devices for critical control applications where there is, or may be, a single point of failure or where single points of failure may result in an unsafe condition. It is up to the end-user to weigh the risks and benefits to determine if the products are appropriate for the application based on security, safety and performance. Additionally, it is up to the end-user to ensure that the control strategy results in a safe operating condition if any crucial segment of the control solution fails. Honeywell customers assume full responsibility for learning and meeting the required Declaration of Conformity, Regulations, Guidelines, etc. for each country in their distribution market.

⚠ WARNING
RF EXPOSURE

To satisfy FCC RF exposure requirements for mobile transmitting devices, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during device operation To ensure compliance, operation at closer than this distance is not recommended. The antenna used for this transmission must not be co-located in conjunction with any other antenna or transmitter.

Failure to comply with these instructions could result in death or serious injury.

⚠ WARNING

The WPS must be installed in accordance with the requirements specified in this document in order to comply with the specific Country Communication Agency requirements (i.e., FCC, IC, ETSI, ACMA, etc.). See Section 3 as this requires choosing the correct Country Use Code and thus allowable antenna and/or cable usage.

Notices and Trademarks

About this Document

This document describes preparation, operation and maintenance of the WPS Series Wireless Pressure Sensors. Mounting, installation and wiring are covered in other documents.

Honeywell does not recommend using devices for critical control where there is a single point of failure or where single points of failure result in unsafe conditions. OneWireless is targeted at open loop control, supervisory control, and controls that do not have environmental or safety consequences. As with any process control solution, the end-user must weigh the risks and benefits to determine if the products used are the right match for the application based on security, safety, and performance. Additionally, it is up to the end-user to ensure that the control strategy sheds to a safe operating condition if any crucial segment of the control solution fails.

Revision Information

Document name	Document ID	Publication Date
WPS Series Wireless Pressure Sensor User Manual	50095584	February 2014
New	50095584, Issue 1	February 2014

References

The following list identifies all documents that may be sources of reference for material discussed in this publication.

Document title	Document No.
Getting Started with Honeywell OneWireless Solutions	OW-CDX010
Wireless Device Manager User's Guide	OW-CC0020
Field Device Access Point User's Guide	OW-CC0030
WPS Series Quick Start Guide	50095585
WPS Series Professional Installation Guide	50095583
OneWireless Network Planning and Installation Guide	OWDOC-X253-en-220

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Symbol Definitions

The following table lists those symbols used in this document to denote certain conditions.

Table 1 – Table Symbol Definitions

Symbol	Definition
	**ATTENTION:** Identifies information that requires special consideration.
CAUTION	Indicates a situation which, if not avoided, may result in equipment or work (data) on the system being damaged or lost, or may result in the inability to properly operate the process.
	**CAUTION:** Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.
	**CAUTION** symbol on the equipment refers the user to the product manual for additional information. The symbol appears next to required information in the manual.
	**WARNING:** Indicates a potentially hazardous situation, which, if not avoided, could result in serious injury or death.
	**WARNING** symbol on the equipment refers the user to the product manual for additional information. The symbol appears next to required information in the manual.
	**WARNING, Risk of electrical shock:** Potential shock hazard where HAZARDOUS LIVE voltages greater than 30 Vrms, 42.4 Vpeak, or 60 Vdc may be accessible.
	**ESD HAZARD:** Danger of an electro-static discharge to which equipment may be sensitive. Observe precautions for handling electrostatic sensitive devices.
	**Protective Earth (PE) terminal:** Provided for connection of the protective earth (green or green/yellow) supply system conductor.
	**Functional earth terminal:** Used for non-safety purposes such as noise immunity improvement. NOTE: This connection shall be bonded to Protective Earth at the source of supply in accordance with national local electrical code requirements.
	**Earth Ground:** Functional earth connection. NOTE: This connection shall be bonded to Protective Earth at the source of supply in accordance with national and local electrical code requirements.
	**Chassis Ground:** Identifies a connection to the chassis or frame of the equipment shall be bonded to Protective Earth at the source of supply in accordance with national and local electrical code requirements.
	The **Factory Mutual®** approval mark means the equipment has been rigorously tested and certified to be reliable.
	The **Canadian Standards mark** means the equipment has been tested and meets applicable standards for safety and/or performance.
	The **Ex mark** means the equipment complies with the requirements of the European standards that are harmonized with the 94/9/EC Directive (ATEX Directive, named after the French "ATmosphere EXplosible").
	For radio equipment used in the European Union in accordance with the R&TTE Directive the CE Mark and the notified body (NB) identification number is used when the NB is involved in the conformity assessment procedure. The alert sign must be used when a restriction on use (output power limit by a country at certain frequencies) applies to the equipment and must follow the CE marking.
	The **C-Tick mark** is a certification trade mark registered to ACMA (Australian Communications and Media Authority) in Australia under the Trade Marks Act 1995 and to RSM in New Zealand under section 47 of the NZ Trade Marks Act. The mark is only to be used in accordance with conditions laid down by ACMA and RSM. This mark is equal to the CE Mark used in the European Union. **N314** directly under the logo is Honeywell's unique supplier identification number.
	The **ISA100 Wireless Compliant logo** indicates the device has received ISA100.11a conformance certification and is registered with the Wireless Compliance Institute, assuring device interoperability.
CRN	Canadian Registration Number

1 INTRODUCTION

1.1 Purpose

This manual describes the Honeywell WPS Series Wireless Pressure Sensor function, operation and maintenance.

1.2 Scope

The manual includes:

- Details of topics that relate uniquely to the Honeywell WPS Series Wireless Pressure Sensor.
- This manual does not cover installation, mounting, or process insertion. See WPS Series Quick Start Guide (document 50095585).

1.3 OneWireless Network Overview

OneWireless is an all digital, serial, two-way communication mesh network that interconnects industrial field sensors to a central system.

OneWireless has defined standards to which field devices and operator stations communicate with one another. The communications protocol is built as an “open system” to allow all field devices and equipment that are built to OneWireless standard to be integrated into a system, regardless of the device manufacturer. This interoperability of devices using OneWireless technology is to become an industry standard for automation systems.

1.4 About the Sensor

The WPS Series Sensor is furnished with an ISA100.11a-compliant wireless interface to operate in a compatible distributed ISA100.11a wireless system. The sensor will interoperate with any ISA100.11a wireless network.

The sensor includes ISA100.11a-compliant electronics for operating in a 2.4GHz wireless network. It features function block architecture and instantiable input channels.

1.4.1 Power

The sensor is powered by two each, D-sized Lithium Thyonal Chloride cells. Battery life is estimated to be as much as 7.5 years, depending on user settings. There is no external power available for this sensor.

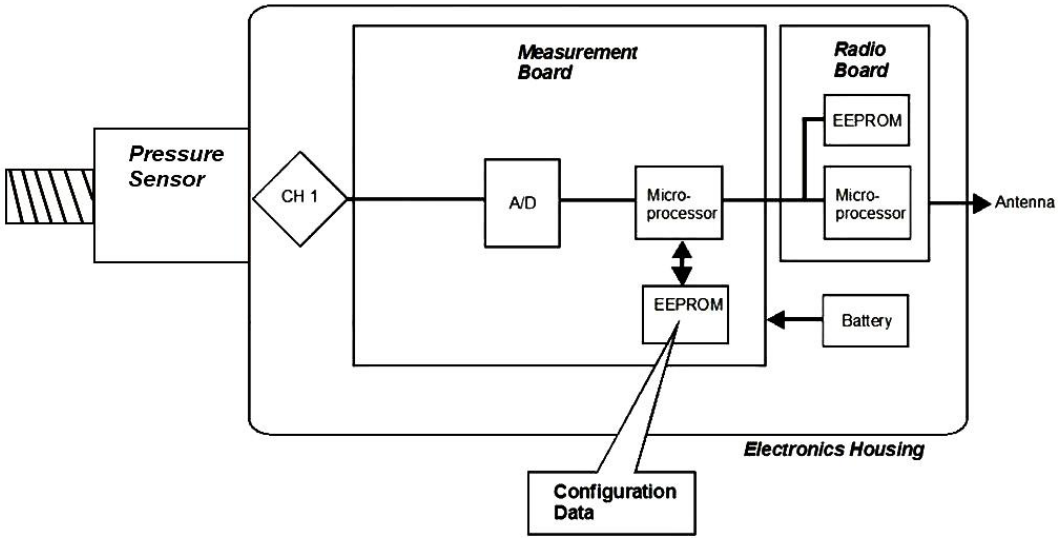
1.4.2 Input

The sensor supports one input channel. This channel is available as either:

- Gauge Pressure
- Absolute Pressure

The sensor measures this analog pressure and transmits a digital output signal proportional to the measured value. Several pipe thread options are available. See Figure 1 for the functional diagram.

Figure 1. WPS Functional Diagram



2 SPECIFICATIONS

2.1 Intended Country Usage

2.1.1 – North America

Country	ISO 3166 2 letter code
UNITED STATES	US
CANADA	CA

2.1.2 – European Union

Country	ISO 3166 2 letter code	Country	ISO 3166 2 letter code
Austria	AT	Latvia	LV
Belgium	BE	Liechtenstein	LI
Bulgaria	BG	Lithuania	LT
Cyprus	CY	Malta	MT
Czech Republic	CZ	Netherlands	NL
Denmark	DK	Norway	NO
Estonia	EE	Poland	PL
Finland	FI	Portugal	PT
France	FR	Romania	RO
Germany	DE	Slovakia	SK
Greece	GR	Slovenia	SI
Hungary	HU	Spain	ES
Iceland	IS	Sweden	SE
Ireland	IE	Switzterland	CH
Italy	IT	United Kingdom	BG

2.2 Certifications and Approvals

2.2.1 Sensor

See the product label for applicable approvals and ratings

Approval/Item	Ratings/Description
CSAcus Intrinsically Safe	CL I, Div 1, Groups A, B, C, & D; CL II, Div 1, Groups E, F & G; CL III, T4 CL I, Zone 0: Ex ia IIC, T4; CL I, Zone 0: AEx ia IIC, T4
CSAcus Explosionproof	CL I, Div 1, Groups A, B, C, & D; CL II, Div 1, Groups E, F & G; CL III, T4 CL I, Zone 1: Ex d IIC, T4; CL I, Zone 1: AEx d IIC, T4
CSAcus Nonincendive	CL I, Div 2, Groups A, B, C & D; CL II, Div 2, Groups F & G; CL III, Div 2, T4 CL I, Zone 2: Ex nA IIC, T4; CL I, Zone 2: AEx nA IIC, T4
FM Approvals Intrinsically Safe	CL I, Div 1, Groups A, B, C, & D; CL II, Div 1, Groups E, F & G; CL III, T4 CL I, Zone 0: AEx ia IIC, T4
FM Approvals Explosionproof	CL I, Div 1, Groups A, B, C, & D; CL II, Div 1, Groups E, F & G; CL III, T4 CL I, Zone 1: AEx d IIC, T4
FM Approvals Nonincendive	CL I, Div 2, Groups A, B, C & D; CL II, Div 2, Groups F & G; CL III, Div 2, T4 CL I, Zone 2: AEx nA IIC, T4
KEMA 08 ATEX0062X Intrinsically Safe Flameproof **KEMA 08 ATEX0074 Non-Sparking**	EX II 1 GD: Ex ia IIB; T4 Ta = 70°C; Ex tD A20 IP66 T90°C EX II 2 GD: Ex d [ia] IIB; T4 Ta = 70°C; Ex tD A21 IP66 T90°C EX II 3 GD: Ex nA [nL] IIC; T4 Ta = 84°C; Ex tD A22 IP66 T90°C
IECEx CSA 09.0001X Intrinsically Safe Flameproof Non-Sparking	Ex ia IIB; T4 Ta = 70°C; DIP A20 IP66 T90°C Ex d [ia] IIB; T4 Ta = 70°C; DIP A21 IP66 T90°C Ex nA [nL] IIC; T4 Ta = 84°C; DIP A22 IP66 T90°C
Process Connections in Division 2 / Zone 2	⚠ Division 2 / Zone 2 apparatus may only be connected to processes classified as non-hazardous or Division 2 / Zone 2. Connection to hazardous (flammable or ignition capable) Division 1 / Zone 0, or 1 process is not permitted.
Enclosure Type	Type 4X, IP 66
Class II and III installations and Type 4X/IP66 applications require that all cable and unused entries be sealed with a NRTL (National Recognized Testing Laboratory) listed cable gland or conduit plug. Cable glands and conduit plugs are not supplied with the product.	

2.2.2 Provisioning Device

Provisioning the WPS Series Wireless Pressure Sensor is accomplished over the air, using the WDM Interface. A device description file (.DD), supplied with Sensor, is loaded into the WDM system as part of the provisioning process. Handheld infrared provisioning devices are not supported.

2.3 Agency Compliance Information

This section contains the Federal Communications Commission (FCC), Industry Canada (IC) and Radio Frequency compliance statements for the Honeywell WPS Series Wireless Pressure Sensor.

STOP ATTENTION

WPS Series units must be professionally installed in accordance with the requirements specified in the OneWireless WPS Series Agency Compliance Professional Installation Guide.

2.3.1 FCC Compliance Statements

- This device complies with Part 15 of FCC Rules and Regulations. Operation is subject to the following two conditions: (1) This device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.
- This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radiofrequency energy and, if not installed and used in accordance with these instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
- Intentional or unintentional changes or modifications must not be made to the WPS Series Wireless Sensor unless under the express consent of the party responsible for compliance. Any such modifications could void the user's authority to operate the equipment and will void the manufacturer's warranty.

2.3.2 IC Compliance Statements

- To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropic radiated power (EIRP) is not more than that permitted for successful communication.
- Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.
- This Class A digital apparatus complies with Canadian ICES-003.
- French: Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

2.3.3 Radio Frequency (RF) Statements

To comply with FCC's and Industry Canada's RF exposure requirements, the following antenna installation and device operating configurations must be satisfied.

- Remote Point-to-Multi-Point antenna(s) for this unit must be fixed and mounted on outdoor permanent structures with a separation distance between the antenna(s) of greater than 20cm and a separation distance of at least 20cm from all persons.
- Remote Fixed Point–to-Point antenna(s) for this unit must be fixed and mounted on outdoor permanent structures with a separation distance between the antenna(s) of greater than 20cm and a separation distance of at least 100cm from all persons.
- Furthermore, when using integral antenna(s) the WPS Series Wireless Sensor unit must not be co-located with any other antenna or transmitter device and have a separation distance of at least 20cm from all persons.

2.3.4 European Union Restriction

France restricts outdoor use to 10mW (10dBm) EIRP in the frequency range of 2,454 MHz to 2,483.5 MHz. Installations in France must limit EIRP to 10dBm, for operating modes utilizing frequencies in the range of 2,454 MHz to 2,483.5MHz.

Restriction

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2.4 Honeywell European (CE) Declaration of Conformity

This section contains the European Declaration of Conformity (DoC) statement, for the OneWireless product line.

R&TTE Directive	1999/5/EC	**LVD Directive**	73/23/EEC	**EMC Directive**	2004/108/EC	**ATEX Directive**	94/9/EC

	Harmonized Standards
EN 300 328 V1.7.1	Emissions Specification and Method
EN 301 893 V1.4.1	Emissions Spec and Method
EN 301 489-17 V1.2.1	Immunity Specification
EN 301 489-1 V1.6.1	Immunity Method
IEC61326-1 : 2006	Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements
EN 60079-0 : 2006	Electrical apparatus for explosive gas atmospheres - Part 0: General requirements
EN 60079-1 : 2004	Electrical apparatus for explosive gas atmospheres - Part 1: Flameproof enclosure ‘d’
EN 60079-11 : 2007	Electrical apparatus for explosive gas atmospheres - Part 11: Intrinsic safety ‘i’
EC 60079-15 : 2005	Electrical apparatus for explosive gas atmospheres - Part 15: Type of protection ‘n’
EN 61241-0 : 2007	Electrical apparatus for use in the presence of combustible dust - Part 0: General Requirements
EN 61241-1 : 2004	Electrical apparatus for use in the presence of combustible dust - Part 1-1: Electrical apparatus for use in the presence of combustible dust – Part 1: Protection by enclosures “tD”
Manufacturer’s Name and Address	Honeywell Process Solutions 525 East Market Street, York, PA 17403 USA
Compliance Statement	The product herewith complies with the harmonized standards listed above. Typical product line systems and configurations have been tested, for compliance.

2.5 European (CE) Declaration of Conformity Statements

Language	Statement
Česky (Czech):	Honeywell tímto prohlašuje, že tento WPS Series Wireless Transmitters je ve shodě se základními požadavky a dalšími příslušnými ustanoveními směrnice 1999/5/ES.
Dansk (Danish):	Undertegnede Honeywell erklærer herved, at følgende udstyr WPS Series Wireless Transmitters overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF.
Deutsch (German):	Hiermit erklärt Honeywell, dass sich das Gerät WPS Series Wireless Transmitters in Übereinstimmung mit den grundlegenden Anforderungen und den übrigen einschlägigen Bestimmungen der Richtlinie 1999/5/EG befindet.
Eesti (Estonian):	Käesolevaga kinnitab Honeywell seadme WPS Series Wireless Transmitters vastavust direktiivi 1999/5/EÜ põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.
English	Hereby, Honeywell, declares that this WPS Series Wireless Transmitters is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.
Español (Spanish):	Por medio de la presente Honeywell declara que el WPS Series Wireless Transmitters cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE.
Ελληνική (Greek):	ΜΕ ΤΗΝ ΠΑΡΟΥΣΑ Honeywell ΔΗΛΩΝΕΙ ΟΤΙ WPS Seriese ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 1999/5/ΕΚ.
Français (French):	Par la présente Honeywell déclare que l'appareil WPS Seriese est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 1999/5/CE.
Italiano (Italian):	Con la presente Honeywell dichiara che questo WPS Series Wireless Transmitters è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE.
Latviski (Latvian):	Ar šo Honeywell deklarē, ka WPS Series Wireless Transmitters atbilst Direktīvas 1999/5/EK būtiskajām prasībām un citiem ar to saistītajiem noteikumiem.
Lietuvių (Lithuanian):	Šiuo Honeywell deklaruoja, kad šis WPS Series Wireless Transmitters atitinka esminius reikalavimus ir kitas 1999/5/EB Direktyvos nuostatas.
Nederlands (Dutch):	Hierbij verklaart Honeywell dat het toestel WPS Series Wireless Transmitters in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 1999/5/EG.
Malti (Maltese):	Hawnhekk, Honeywell, jiddikjara li dan WPS Series Wireless Transmitters jikkonforma mal-ħtiġijiet essenzjali u ma provvedimenti oħrajn relevanti li hemm fid-Dirrettiva 1999/5/EC.
Magyar (Hungarian):	Alulírott, Honeywell nyilatkozom, hogy a WPS Series Wireless Transmitters megfelel a vonatkozó alapvetõ követelményeknek és az 1999/5/EC irányelv egyéb elõírásainak.
Polski (Polish):	Niniejszym Honeywell oświadcza, że WPS Series Wireless Transmitters jest zgodny z zasadniczymi wymogami oraz pozostałymi stosownymi postanowieniami Dyrektywy 1999/5/EC.
Português (Portuguese):	Honeywell declara que este WPS Series Wireless Transmitters está conforme com os requisitos essenciais e outras disposições da Directiva 1999/5/CE.
Slovensko (Slovenian):	Honeywell izjavlja, da je ta WPS Series Wireless Transmitters v skladu z bistvenimi zahtevami in ostalimi relevantnimi določili direktive 1999/5/ES.
Slovensky (Slovak):	Honeywell týmto vyhlasuje, že WPS Series Wireless Transmitters spĺňa základné požiadavky a všetky príslušné ustanovenia Smernice 1999/5/ES.
Suomi (Finnish):	Honeywell vakuuttaa täten että WPS Series Wireless Transmitters tyyppinen laite on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.
Svenska (Swedish):	Härmed intygar Honeywell att denna WPS Series Wireless Transmitters står I överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 1999/5/EG.
Íslenska (Icelandic):	Hér með lýsir Honeywell yfir því að WPS Series Wireless Transmitters er í samræmi við grunnkröfur og aðrar kröfur, sem gerðar eru í tilskipun 1999/5/EC.
Norsk (Norwegian):	Honeywell erklærer herved at utstyret WPS Series Wireless Transmitters er i samsvar med de grunnleggende krav og øvrige relevante krav i direktiv 1999/5/EF.

For more information about the R&TTE Directive

The following website contains additional information about the Radio and Telecommunications Terminal Equipment (R&TTE) directive:
http://ec.europa.eu/enterprise/rtte/faq.htm

2.6 IECEx Conditions of Certification

Parts of the antenna are non-conducting and the area of the non-conducting part exceeds the maximum permissible areas for Category II 1 G (Zone 0) according to IEC 60079-0. Therefore when the antenna is used within a potentially explosive atmosphere, appropriate measures must be taken to prevent electrostatic discharge.

Impact and friction hazards need to be considered according to IEC 600079-0 when the sensor that is exposed to the exterior atmosphere is made of light metal alloys, and used in Category II 1 G (Zone 0).

2.6.1 ATEX Conditions for Safe Use

Special precautions shall be taken to prevent the surface of the antenna of the WPS Series Wireless Sensor from being electrostatically charged.

3 PREPARATION

3.1 Installation

Refer to the WPS Series Quick Start Guide (document 50095585) for installation and mounting of your WPS Series sensor.

Note: The sensors are shipped with batteries installed, but with an insulating tab at one battery terminal, so as to keep the sensor inactive. This insulating tab must be removed prior to connecting to the network. (See Section 6)

3.2 Configuration

The WPS Series Sensor contains an electronics interface compatible for connecting to the OneWireless network. An operator uses the OneWireless WDM Interface to configure the sensor, to change operating parameters, and to create linkages between blocks that make up the sensor's configuration. These changes are written to the sensor when it is authenticated by a security key.

3.3 Connecting to Network

Use the WDM User Interface to connect your sensor to the OneWireless network. Refer to the Wireless Device Manager User's Guide OW-CC0020 for procedures. Note that handheld provisioning devices are not applicable to the WPS Series Wireless Pressure Sensor.

3.4 Calibrating the Sensor

The WPS Series Wireless Pressure Sensor is factory calibrated at time of manufacture. The calibration parameters are permanently stored in NVRAM in the measurement board. There is no user calibration routine available.

4 FUNCTION BLOCKS

4.1 Introduction

This section explains the construction and contents of the WPS Series Sensor Function Blocks

4.2 Data Block Description

4.2.1 Data Block types

Data Blocks are the key elements that make up the sensor's configuration. The blocks contain data (block objects and parameters) which define the application, such as the inputs and outputs, signal processing and connections to other applications. The WPS Series Wireless Pressure Sensor contains the following block types.

Block Type	Function
Device	Contains parameters related to the overall field device rather than a specific input or output channel within it. A field device has exactly one device block.
AITB	Contains parameters related to a specific process input or output channel in a measurement or actuation device. An AITB defines a measurement sensor channel for an analog process variable represented by a floating-point value. There is one AITB per sensor.
Radio	Contains parameters related to radio communication between the sensor and the multimode(s).

Each of these blocks contains parameters that are standard OneWireless-sensor defined parameters. The AITB and device blocks contain standard parameters common to all ISA100.11a-compliant sensors as well as modell-specific parameters. The radio block contains parameters for communication with the wireless network.

The WDM system manages the data flow to and from the sensors. It is aware of the relevant data blocks for the various sensors in the system through the use of the DD files (Device Description Files). As part of the provisioning process, a DD file for the WPS Series sensors is loaded into the WDM system. This is must be done prior to connecting the first WPS Series sensor to the system. Refer to the Wireless Device Manager User's Guide OW-CC0020 for procedures.

4.3 Hardware Description

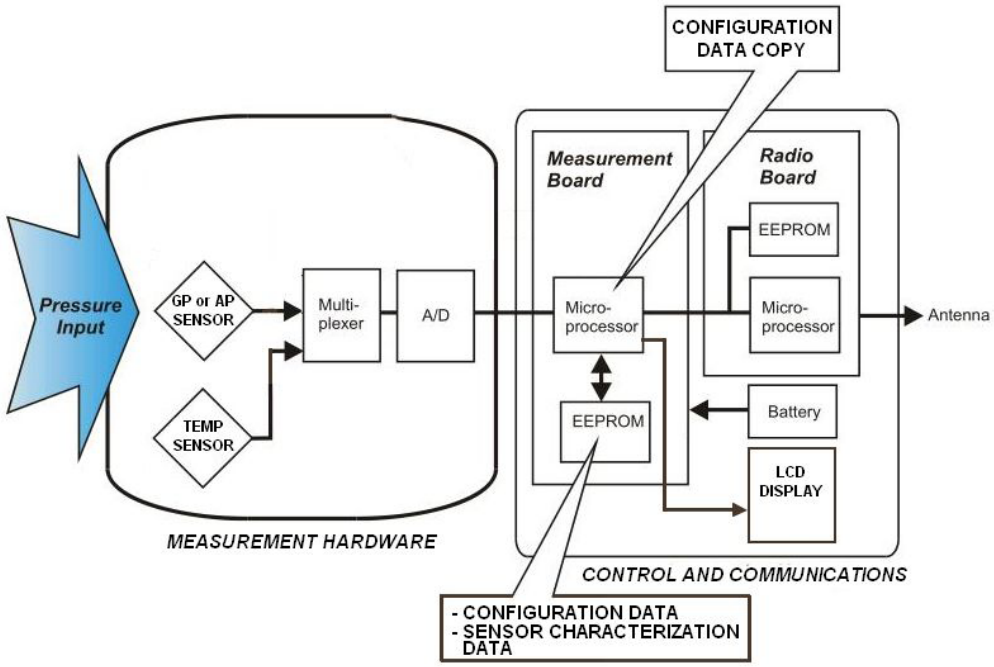
4.3.1 Detailed Block Diagram

The WPS Series Wireless Pressure Sensor contains the following functional components:

1. Sensor Module
2. Measurement board
3. Radio board
4. LCD display
5. Battery

Figure 2 shows the detailed block diagram of the WPS Series Sensor.

Figure 2. WPS Functional Block Diagram



4.3.2 Sensor Module

Two versions are available, GP (gage pressure), or AP (absolute pressure). For the gage pressure models, a vent tube is connected internally between the pressure sensor module and a front cover mounted vent with gore membrane cover. Electrical signals from the sensor connect to A/D converter through a multuplexer switch.

4.3.3 Measurement Board

The microprocessor is connected to a non-volatile random access memory (NVRAM) containing:

- Characterization Data, loaded at time of manufacture, which identifies the specific measurement hardware installed, pressure range, burst pressure, GP or AP type, etc... Also stored here are the default user settings. After a hard reset (cold restart), any User Settings are replaced with the default User Settings. None of the characterization data is user changeable.
- Calibration data, from the factory calibration procedure. This data is not user-eraseable or changeable.
- Program code, loaded or updated over the air, through the WDM Interface
- User settings, selected through the WDM interface, such as publication rate, LCD display timing, measurement units, etc...

A small reset button and green led are mounted on the measurement board, used to cause a hard reset (cold restart) of the microprocessor program. Refer to the WPS Series Professional Install Guide for reset procedures.A multiplexer (electronic switch) is connected between the inputs to be measured and the A/D converter, allowing the microprocessor to measure the pressure signal, the battery voltage, or the internal unit temperature sensor, as required.

A/D (Analog-to-Digital) hardware on the measurement board provides 12 bits of precision.

4.3.4 Radio Board

The radio board contains a microprocessor with NVRAM to store its program code and operating parameters. These parameters include channel selection, link options, and other mode options, as set though the WDM interface. A small R.F. connector on the Radio Board is connected to a short cable assembly containing the sensor external antenna connector.

⚠ CAUTION

Applying power to the sensor with no antenna connected to the radio board could permanent damage to the sensor on the radio board.

4.3.5 LCD Display

The optional LCD display is connected through a cable assembly to the measurement board. It is activated as required, by the measurement board, in accordance with the LCD timing User Options.

4.3.6 Battery

The battery consists of two each, D-sized Lithium Thyonal Chloride cells. Each cell provides 3.6 Vdc and the two cells are wired in series to provide 7.2 Vdc to operate all circuits in the sensor. There is no on/off switching, so when the batteries are installed, the sensor is active. See Section 5 for battery considerations and Section 6 for battery replacement procedures.

4.3.7 Battery Life

The battery life depends on three factors:

- Publication Rate - Setting a higher publication rate increases battery consumption
- LCD display timing - Setting the LCD to display continuously or for longer periods will increase battery consumption.
- R.F. Link Data Retransmissions - When the WPS Series Wireless Pressure Sensor needs to send a packet of data to the nearest AP (publish), it transmits the packet and waits for an acknowledgement. Normally, it receives the acknowledgement immediately, stops, and waits for the next scheduled transmission time. A long R.F. path, interfering materials (metal structures, etc.), or R.F. interference from other nearby transmitters, may cause the transmitted packet to be “dropped”. If this occurs, the Sensor will re-try to send the packet. It will re-try two more times, waiting for an acknowledgement. These extra re-transmissions will greatly increase the battery useage and reduce battery life.

Typical battery life is estimated to be as much as 7.5 years for 60 sec. publication rates, to as low as 2 years for 1 sec. publication rates.

5 OPERATION

5.1 Overview

5.1.1 Display Modes

The sensor has the following display modes.

- PV display: Displays the Process Value and units
- Connection (Link) status: Displays a label calculated from the link signal amplitude

5.2 Sensor PV Display

On the LCD display, the following information is displayed in sequence. First, the PV will be displayed for 3 seconds, then the Link Status will be displayed for 2 seconds. This sequence will repeat at a rate determined by the Publication Rate and the LCD Display Rate.

Table 2. PV Display

Item Displayed	Example	Details
PV value	50.0	Latest PV value.
PV engineering units	psig	See Error! Reference source not found.
Link Status	GOOD	Received Signal strength - See Table 5 3 Sensor Link Status Display

Table 3. PV Engineering Units

Item Displayed	Details
Pa	Pascals
kPa	KiloPascals
Bar	Bar
Psia	Pounds per square inch absolute
Psig	Pounds per square inch gauge

Table 4. Sensor Link Status Display

Display	Meaning	Suggested Action
BEST	Best strength – approx.-75 to -25 dBm	No action required
GOOD	Good strength – approx. -75 to -85 dBm	No action required
BAD	Very weak signal – approx. -100 to -85 dBm	Troubleshoot antenna, antenna cables Evaluate signal path and distance to nearest FDAP Substitute other provisioned sensor into same location
NoRF	Unuseable signal level - no link possible	Troubleshoot antenna, antenna cables Evaluate signal path and distance to nearest FDAP Verify sensor is properly provisioned w/ WDM UI Substitute other provisioned sensor into same location
DWLD	Not a failure, indicates that a software download is in progress.	No action required, normal indications will resume after download is complete

Table 5. Sensor Error Codes

Sensor Display	OneWireless UI Display	Definition	What to do
OOS	OOS	All channels are out of service.	Insure sensor has been properly provisioned with the WDM UI.Restore mode to Auto in OneWireless WDM UI.
E1	A/D Failure	Diagnostics detected defect with analog-to-digital converter	Perform cold restart per WPS Series Professional Install Guide. If condition persists, measurement board has failed, sensor must be replaced.
E2	Low Battery	Battery voltage critically low, below 4.3 Vdc	Replace batteries as soon as possible. See Section 6.
E3	NVRAM Fault, Characterization Memory data corrupted	Startup diagnostics detected invalid sensor non-volatile memory characterization data	Perform cold restart per WPS Series Professional Install Guide. If condition persists, measurement board has failed, sensor must be replaced.
E4	NVRAM Fault, program memory data corrupted	Startup diagnostics detected invalid sensor non-volatile memory program data	Perform cold restart per WPS Series Professional Install Guide. If condition persists, measurement board has failed, sensor must be replaced.
E5	Sensor Overpressure Warning	The input pressure has crossed the sensor maxumum limit as stored in the characterization data. Note: this error will clear when the input pressure is measured as 1 % or more below the maximum limit.	Crosscheck input pressure with other means, if actual pressure is less than the sensor maximum limit, the pressure sensor within the unit has probably failed, sensor must be replaced.

5.3 Battery Considerations

As shipped from the factory, the sensor will have two battery cells installed. There will be a small battery insulator tab installed over the positive terminal of one cell, to inactivate the sensor electronics (see Figure 6 1). The following are suggested policies:

- Do not remove the tab until the unit is ready for use, as battery life will be considerably shortened. The unit will transmit frequently, trying to establish communication with a node. This node establishment will not succeed, if the network has not yet been provisioned for that sensor.
- Do not remove the tab and provision the unit until the unit is in its intended location, as it will try to establish links with whatever AP's are nearby. This will cause unnecessary transmissions through the network to occur, wasting battery power and using bandwidth.
- When a sensor is removed from service, and is to be stored, it is recommended that the insulating tab be installed, or the batteries removed, so as to preserve battery life and avoid unnecessary data transmissions.

Refer to Section 6 for battery replacement procedures.

5.4 Battery Life Remaining

The WDM Interface will calculate and display the estimated remaining battery life in years. (This is not the same as the E2 error code, which simply means the battery voltage is below 4.3 V)

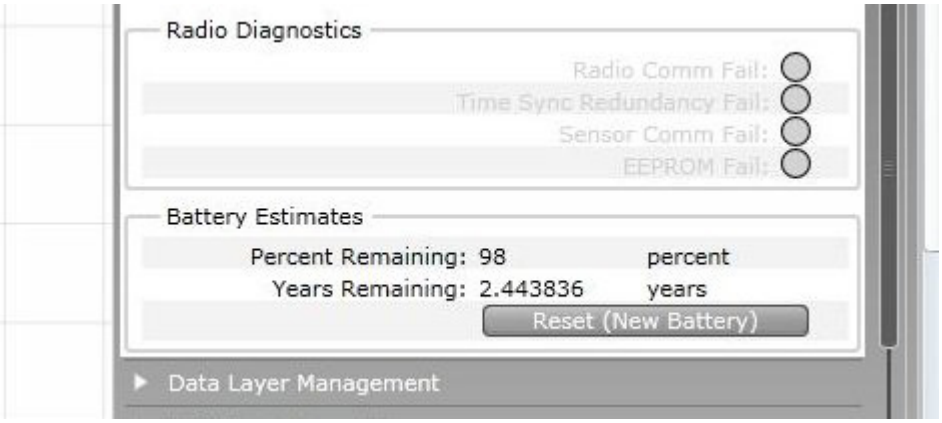
The battery life remaining is calculated by precisely measuring the battery voltage, under current conditions of publication rate, display timing and network activity, and recording the battery voltage decrease over an 8 hour period. By extrapolating this data, and knowing the battery type, the WDM can calculate in how many years the battery voltage will reach 4.3 Vdc.

Note: The battery life remaining, as displayed on the WDM UI, will not be valid until eight (8) hours after the latest change to the publication rate or LCD timing.

To display the life remaining, and to reset the calculation following a battery replacement, perform the following:

1. Log into the WDM One Wireless User Interface with a user account and password having suitable Access Privileges.
2. Ensure that the WPS device to be set has been successfully provisioned.
3. On the left panel, click the sensor name (not the channel name).
4. On the right panel, click on **"Device Management"**, and scroll down to **"Battery Estimates"**.
5. Observe the **"Percent Remaining"** and **"Years Remaining"**.
6. If the batteries have just been replaced, click on the **"Reset (New Battery)"** box.
7. Log off the WDM One Wireless User Interface account.

Figure 3. Battery Estimates



5.5 Other User Settings

The following user settings may be set over the air, using the WDM Interface. Refer to the WPS Series Professional Install Guide, (document 50095583) for a complete explanation and instructions for performing these settings.

- Measurement Units - Psig (default), Pa, kPa, or bar
- Scaling - Settings which determine alarm trigger points, EU at 100%, EU at 0%
- Publication rate - Frequency of transmitting data packets, 1, 5, 10, 30, or 60 seconds
- LCD display options - LCD display "on" time, periodicity

The WDM Interface also permits the setting of numerous alarms for PV measurements, link status, etc... For alarm settings and procedures, refer to the Wireless Device Manager User's Guide.

6 MAINTENANCE/REPAIR

6.1 Parts

The following replacement parts may be ordered from Honeywell Sensing & Control.

Table 6. Replacement Parts

Part number	Qty.	Description
WBT5	2	3.6V LITHIUM THIONYL CHLORIDE (Li-SOCI2) BATTERY, D size

The above batteries are also available from the Xeno company under part number XL-205F.

For other available antennas, antenna cables, and lightning arrestors, refer to the WPS Series Professional Install Guide.

6.2 Replacing Batteries

6.2.1 When to Replace

When the sensor displays an E2 message or the WDM Interface displays a low battery warning message, there are 2-4 weeks of operation remaining before the batteries expire, unless the publication rate is operating at 1 update per second, then there is only one week of operation remaining.

When batteries are removed or expired, all sensor configuration data, calibration data, and program data is retained in the sensor's non-volatile memory (NVRAM).

Batteries may be replaced while the Sensor remains connected to the pressure being measured.

6.2.2 Battery Storage

Batteries should be kept in pairs, not mixed together with others from different vendors or of different shipments.

6.2.3. Transporting Batteries

When transporting or shipping Lithium Thionyl Chloride batteries, be aware that many regulations and restrictions apply. These batteries are not permitted for transport aboard passenger aircraft. For shipping purposes, two "D" sized Lithium Thionyl Chloride cells contain approximately 10 grams of lithium.

6.2.4 Tools required

- #2 Phillips Screwdriver
- Torque Screwdriver with #2 bit

Should we include warning that batteries must be replaced at the same time?

ATTENTION

Batteries must be replaced only by a trained service technician.

⚠ WARNINGS

- Risk of death or serious injury by explosion. Do not open sensor enclosure when an explosive gas atmosphere is present.
- Batteries must not be changed in an explosive gas atmosphere.
- The sensor enclosure must not be opened when an explosive gas atmosphere is present.
- When not in use, the batteries must be stored in a non-hazardous area.
- The batteries used in this device may present a risk of fire or chemical burn if mistreated. Do not recharge, disassemble, heat above 100 °C [212 °F], or incinerate. Do not expose batteries to water.
- When installing batteries do not snag the battery terminal on the clip or the battery may be damaged. Do not apply excessive force.
- Do not drop. Dropping the battery may cause damage. If a battery is dropped, do not install the dropped battery into the sensor. Dispose of dropped battery promptly per local regulations or per the battery manufacturer's recommendations.

Figure 4. Sensor Battery Replacement

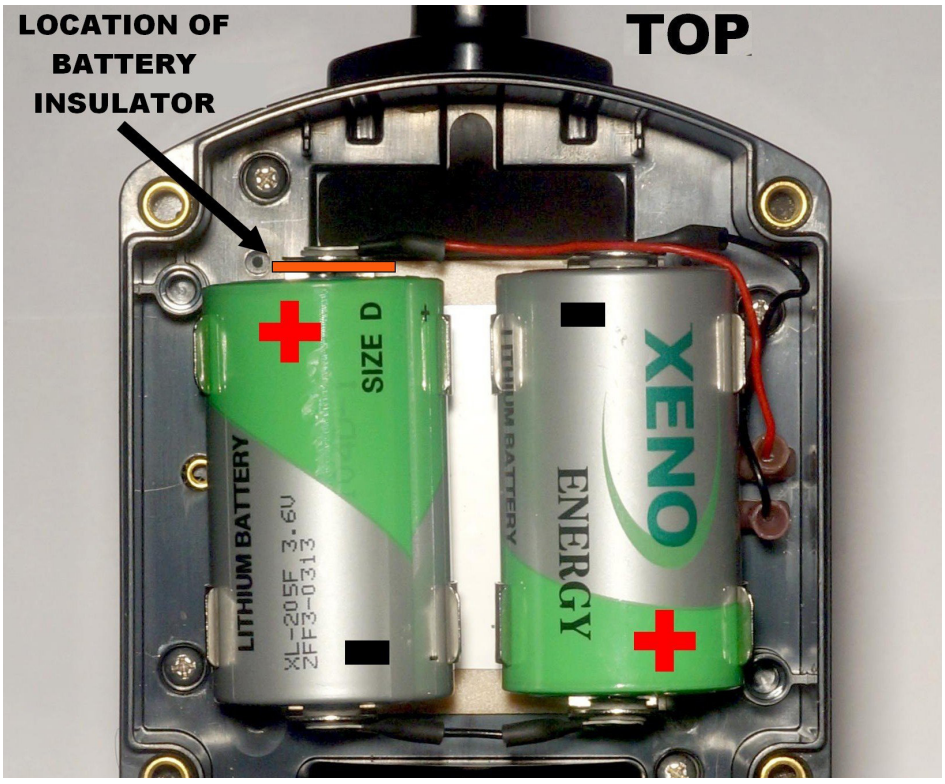


Table 7. Battery Replacement Procedure

Step	Action
⚠	**WARNING** DO NOT DISASSEMBLE OR ASSEMBLE WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT
1	On the rear of the WPS Series sensor, Unscrew the four captive screws and remove the cover.
2	Using thumb and forefinger, carefully pry each battery out, lifting first one end, then the other. **Caution! Do not scratch the battery outside covering on the sharp edges of the battery clips. Do not use sharp tools, knives or screwdrivers.**
3	Remove the old batteries and dispose of them promptly according to local regulations or the battery manufacturer's recommendations.
4	Orient two new batteries with polarity as shown. Battery polarity is also shown on battery holder. Press two new batteries into the battery clips, starting on one end, then pressing in the other end. **Caution! Do not scratch the battery outside covering on the sharp edges of the battery clips.**
5	Re-install the rear sensor cover and tighten screws to 1,5 Nm [13.2 in-lb].
6	Reset battery life counter (see Section 5.4) using the WDM Interface.

6.3 Replacing Antenna

6.3.1 Tools required

- #1 Phillips Screwdriver
- Torque Screwdriver with #1 bit

ATTENTION

You must replace your antenna with the same type and gain, that is, elbow, straight, or remote. Changing to a different antenna type is not permitted by approval agencies..

⚠ CAUTION

Take precautions against electrostatic discharge to prevent damaging the sensor module.

Figure 5. Antenna Replacement

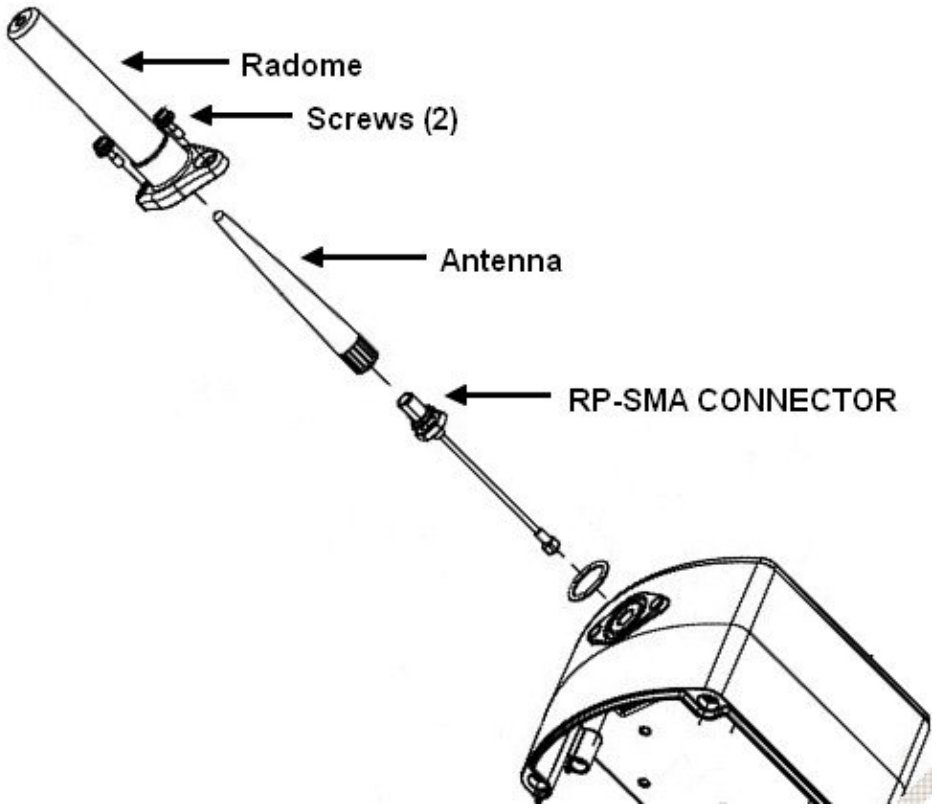


Table 8. Antenna Replacement Procedure

Step	Action
1	Honeywell recommends that the sensor be removed from service and moved to a clean area before servicing.
2	Remove the two screws holding the antenna radome to the sensor housing.
3	Unthread the antenna from the RP-SMA connector.
4	Inspect both antenna and sensor RP-SMA connectors for damage or debris, clean as needed.
5	Thread the new antenna's connector on to the antenna jack on the sensor housing.
6	Hand tighten antenna connector and tighten snugly with open-end wrench. **Caution! Do not overtighten antenna as it could twist in the housing and damage the antenna cable, or separate it from the R.F. board.**
7	Re-install antenna radome, fastening it with two screws, and tighten screws to 0,8 Nm [7.0 in-lb].

6.4 Software Updates

As required, new software may be uploaded over the air, into the sensor. This procedure may be performed while the sensor is in service, and physically still connected to its process input. No disassembly of the sensor is required.

Software updating, if required, may be performed in the field, utilizing the WDM Interface. These procedures are described in the Wireless Device Manager User's Guide. Software updating will require image files for the specific part number of sensor device, and are downloadable from the relevant Honeywell support pages.

WPS Series Wireless Pressure Sensor

ISSUE 1 ***50095584***

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

SALES AND SERVICE

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office or:

E-mail: info.sc@honeywell.com
Internet: sensing.honeywell.com

Phone and Fax:

Asia Pacific	+65 6355-2828
	+65 6445-3033 Fax
Europe	+44 (0) 1698 481481
	+44 (0) 1698 481676 Fax
Latin America	+1-305-805-8188
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