

**OneWireless Gauge Reader
User's Manual**

**34-XY-25-31
Revision 1
April 2009**

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About This Document

This document describes Safety, Operation and Maintenance of the OneWireless Gauge Reader. Full mounting, installation and wiring are covered in the Installation Manual. There is also the OneWireless Gauge Reader Application Gateway manual that covers the collection of data, the setup of the system.

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.

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Reference Information

Document Name	Document ID	Revision Number	Publication Date
OneWireless Gauge Reader User Manual	34-XY-25-31	1	April 09

References

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

Document Name	Document Part Number
OneWireless Gauge Reader Specification	34-XY-03-37
OneWireless Gauge Reader Installation Manual	34-XY-25-32
OneWireless Gauge Reader Application Gateway Manual	34-XY-25-33
OneWireless Gauge Reader Model Selection Guide	34-XY-16-80

World Wide Web

Honeywell Solution Support Online: <http://www.honeywell.com/ps>

Elsewhere











Call your nearest Honeywell office.

Training Classes

Honeywell Automation College: <http://www.automationcollege.com>

Symbol Definitions

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

Symbol	Definition
	ATTENTION: Identifies information that requires special consideration.
	TIP: Identifies advice or hints for the user, often in terms of performing a task.
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.

continued


Symbol	Description
	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.



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1) Introduction

Thank you for purchasing the Honeywell OneWireless Gauge Reader (WGR). Please read this guide thoroughly before using the WGR. The WGR is not a stand-alone product.

2) Safety Precautions

- ❖ Do not immerse the WGR in water.
- ❖ Always wear personal protective equipment appropriate to the system on which the WGR is being installed.
- ❖ Do not try to repair the WGR yourself as it contains no user-serviceable parts. Contact a qualified service technician for repairs. See the Support section below for details.

3) WGR Overview

The OneWireless Gauge Reader (WGR) is designed to read manual gauges, is battery-powered and transmits measurement data to a data acquisition system. The WGR is designed to be non-invasive. It is attached over the face of an existing analog gauge, as shown in Figure 1. Each WGR comes with an adapter that is sized for the gauge it is reading. Adapters range in size to fit over gauge faces that are 1.5 to 4.5 inches in diameter.



Figure 1 : OneWireless Gauge Reader

The WGR optically reads the gauge face and wirelessly transmits the reading. This value is also displayed locally on the LCD. A representation of the LCD is shown in Figure 2.

4) LCD Display and Push Buttons

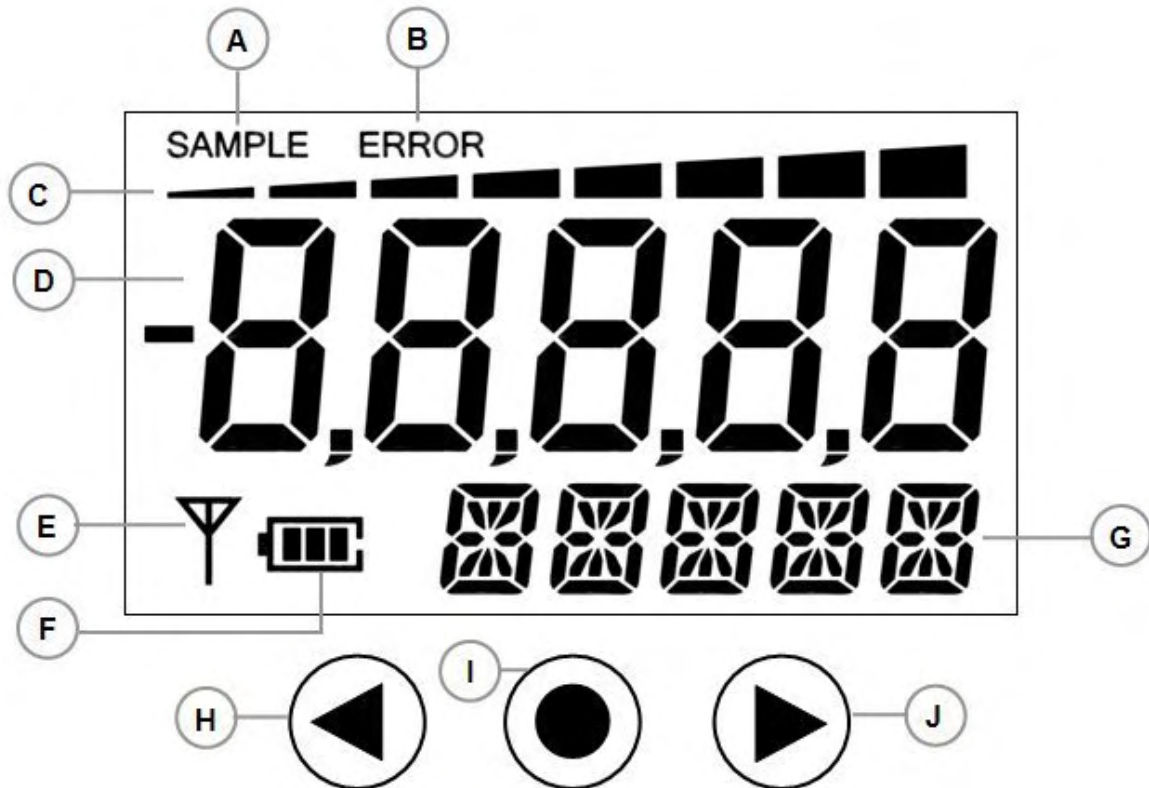


Figure 2 : WGR LCD Display and Control Buttons

A. SAMPLE Icon	Displayed when a new reading is being captured and converted
B. ERROR Icon:	Displayed when an error condition is detected
C. Bar Graph	Indicates percent of full-scale reading
D. Numeric Display	Displays the converted reading value
E. Antenna Icon	Displayed when a wireless connection has been established
F. Battery Level	Displays percentage of battery life remaining
G. Alpha-numeric Display	Displays the reading units or diagnostic messages
H. Left Button	Left or escape button, depending on menu context
I. Center Button	Select/Enter/Sample button, depending on menu context
J. Right Button	Right button to navigate through LCD menus

The WGR is specifically configured to the gauge that it is reading. During installation, the WGR is positioned per the customer specifications. The WGR can be positioned at an offset to the gauge. For example, a gauge could be mounted at an angle for a gas bottle monitoring system, but the WGR could be positioned upright for easier reading. Refer to Figure 3 as an example. Once the WGR is in position, it is secured in place for calibration. The range of the gauge, units of measure, and any offsets are entered into the WGR. The WGR is calibrated by a trained installer, and ready for use.

4.1 Data Sampling

The WGR samples the gauge reading in one of three specified intervals.

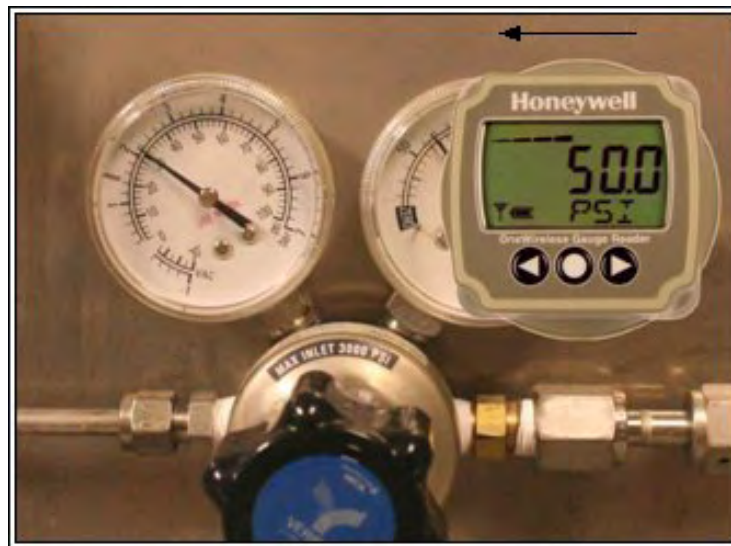


Figure 3 : WGR being placed horizontally on gauge that is mounted at an angle

- 1) Manual instantaneous reading.
 - a) The user can request an instant reading, by pressing the center button of the WGR.
- 2) Routine data collection.
 - a) The WGR is programmed by the installer to sample the gauge reading at a regular interval, usually between 5 minutes and one hour.
 - b) This is referred to as Normal Sample Mode.
- 3) Short-term data collection.
 - a) The WGR supports an increased sample rate for short term high resolution data collection or for diagnostics.
 - b) These modes are referred to as Fast Sample Mode and Medium Sample Mode.
 - i) Fast Sample Mode takes a reading every 5 seconds for a duration of 5 minutes. The WGR then goes back into Normal Sample Mode.
 - ii) Medium Sample Mode takes a reading every 30 seconds for a duration of 8 hours. The WGR then goes back into Normal Sample Mode.
 - c) Refer to the Operation section below for details on enabling each of these short-term modes.

5) Monitoring System Overview

The OneWireless Gauge Reader is part of an overall monitoring system, and integrates seamlessly with other OneWireless components. The WGR Application Gateway collects the data from all of the WGRs in the system. The WGR Application Gateway is connected to the plant network, and the data can be accessed through the Web Server or OPC Server functionality included on the WGR Application Gateway. Refer to Figure 4 for a high level system connection diagram.

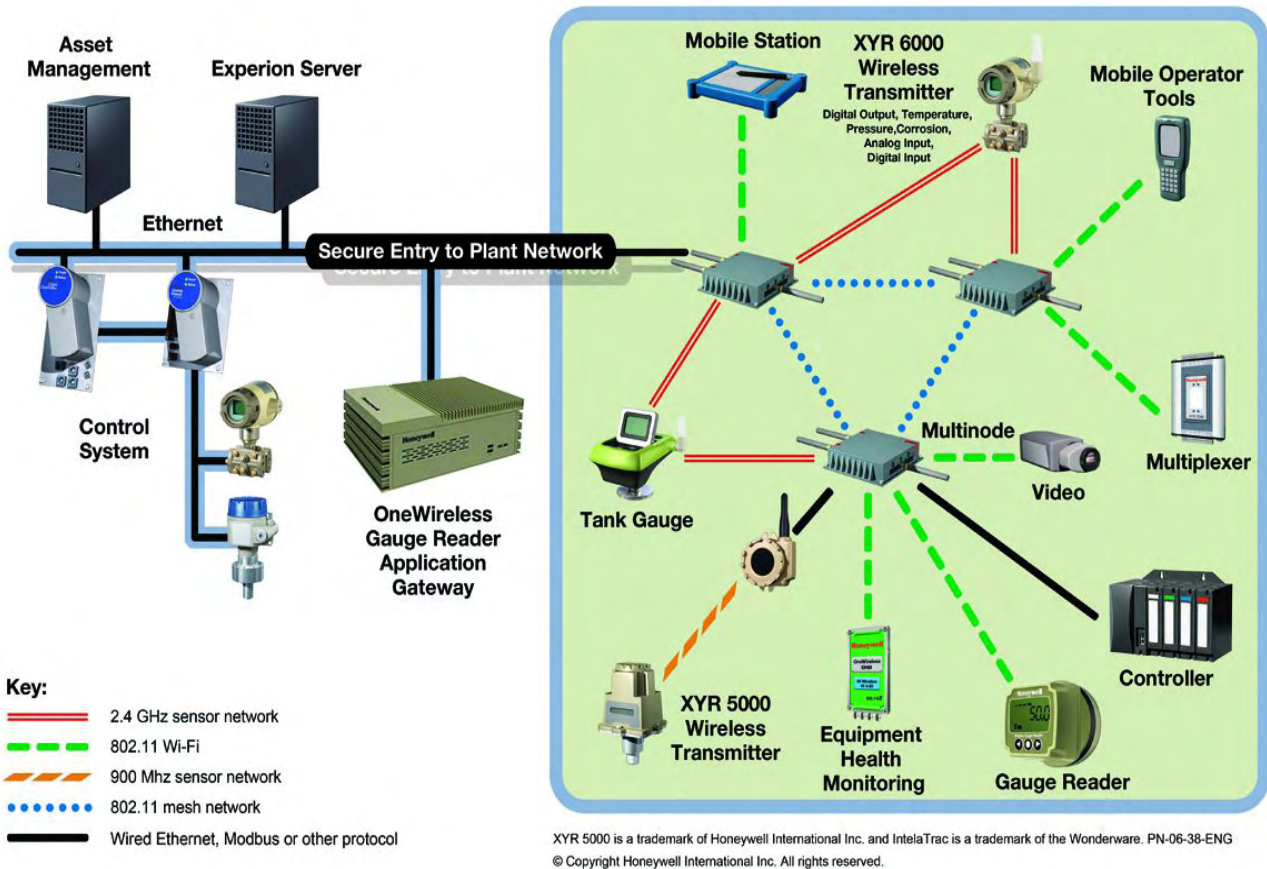


Figure 4 : OneWireless System Diagram Including WGRs and the WGR Application Gateway

The WGR normally communicates through one or more Multinodes in order to send data to the WGR Application Gateway. The data on the WGR Application Gateway can be accessed by any other device on the plant Ethernet using either the supported OPC interface or the Web Server interface.

During installation, the installer will use a Handheld Configuration Tool to calibrate and commission each WGR. The Handheld Tool can talk directly to the WGR, and can also talk through the Multinode if desired, for additional functionality and data access.

6) Installation Considerations

6.1 WGR Installation

The WGR mounts to a gauge using one of several different size and type of mounting adapter. The installer will determine the proper adapter required for each gauge, and the WGR will be ordered with the adapter pre-mated to the WGR main body. Please refer to Figs 6-9 for examples of mounting adapter kits that allow the WGR to support a wide variety of gauges.

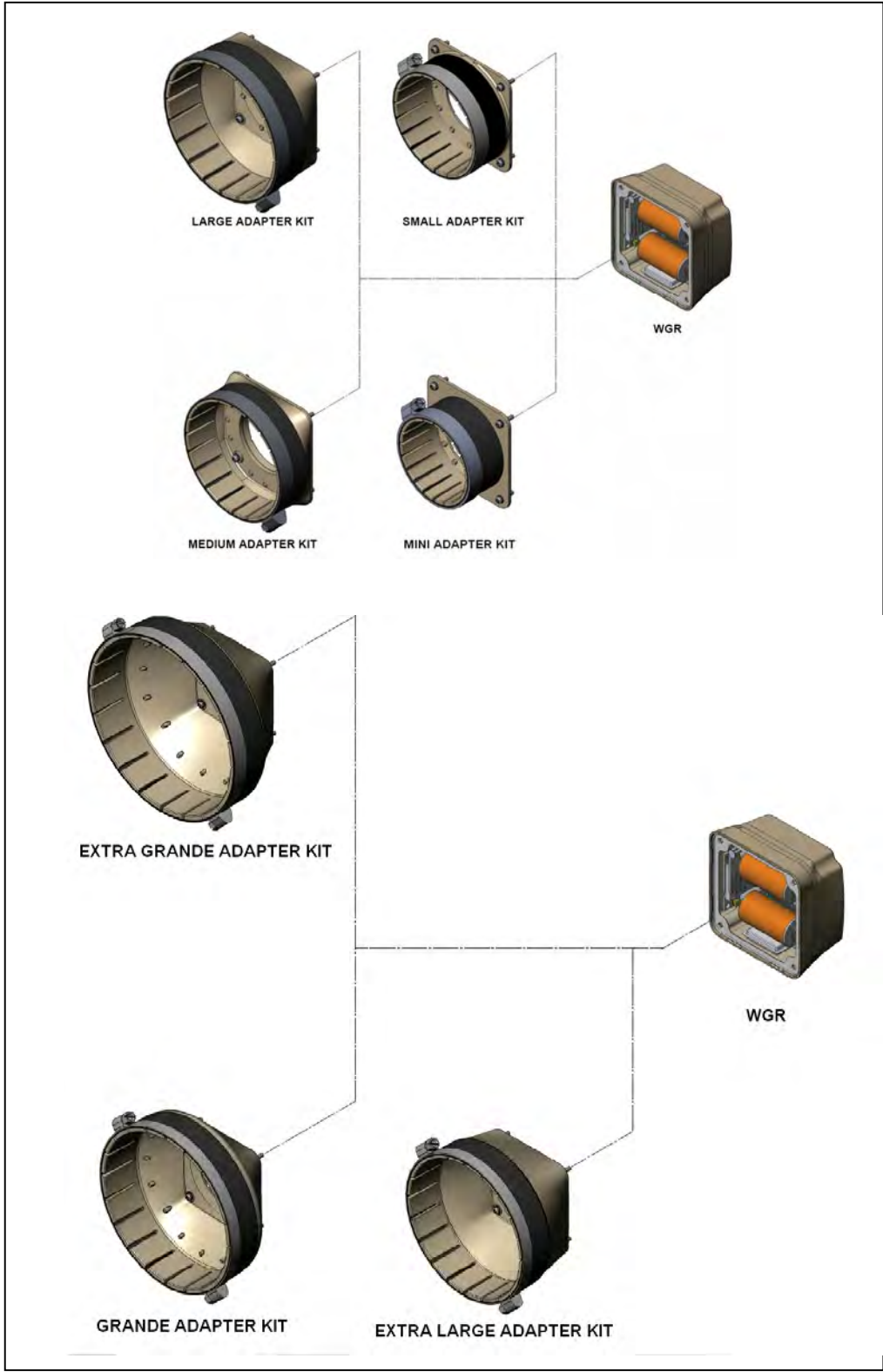


Figure 5 : WGR Mounting Adapters

Figure 6 shows an example of a special additional adapter that is used for Magnehelic and Photohelic gauges, due to their unique shape.



Figure 6 : Exploded View of Magnehelic/Photohelic Mounting Adapter

Figure 7 shows an example of a special adapter that is used to mount to process gauges, since they have a sloped surface along their circumference that would normally be difficult for a standard style adapter to grasp.



Figure 7 : Exploded View of a Process Gauge Mounting Adapter

Figure 8 shows an exploded view of a large adapter mating with a special panel mount adapter. This adapter is used when the gauge is mounted flush in a panel, and there is no way for the regular adapter to grasp the outside of the gauge. The panel mount adapter uses a ring of 3M Dual-Lock Fastener material with VHB (very high bond) adhesive to adhere to the panel surrounding the gauge.



Figure 8 : Exploded View of Panel Mount Adapter

6.1.1 Verify gauge functionality

- 1) Prior to installation, ensure that there are no visual obstructions between the WGR and gauge face (stickers, marks, etc.).
 - a) Use an appropriate cleaning agent, such as isopropyl alcohol to clean the gauge face prior to installing the WGR.
 - b) Also, make sure there are no deep scratches on the gauge window that could affect the WGR's imaging system.
 - c) For liquid filled gauges, please make sure the gauge is filled as completely as possible, so that the liquid level line does not obscure the needle, and so there are no liquid droplets on the gauge face.



Figure 9 : Examples of a Clean Gauge and Two Visually Impaired Gauges

- 2) Calibrate the mechanical gauge itself, if required.
 - a) The WGR reading is only as accurate as the gauge it is reading, since the WGR views the gauge needle position.

6.1.2 Considerations for Mounting the WGR

- 1) Determine if the gauge is a free-standing gauge or a panel mounted gauge, since this will determine the type of mounting adapters and mounting method required.
- 2) For a panel mounted gauges, there are a few options depending on the size and type of panel mounted gauge.
 - a) For Magnehelic and Photohelic panel mounted gauges, a special adapter is provided to securely fasten to these gauges.
 - i) The gauge will need to be loosened slightly from its current mount in order to provide room to fasten the mounting adapter to the front lip of the gauge.
 - b) For other panel mounted gauges, different adapters are provided that adhere to the panel surface around the circumference of the gauge.
 - i) Make sure that the panel surface is clean (use isopropyl alcohol), smooth, and that there is enough available surface area for the adapter without interference from neighboring gauges or other objects.
 - ii) Generally an area of at least 5/8 in. (16mm) wide is required around the gauge's outside circumference.
 - (1) Consult with your installer for specific mechanical information for the panel mount adapter.
- 3) For normal free-standing gauges, there are a variety of WGR mounting adapters available
 - a) Refer to the sizing chart below to determine if the desired gauge falls between the Min and Max Outside Diameter specified in the table.
 - b) The adapters are able to flex to accommodate minor variations in diameter for each adapter size.
 - c) Silicone shim bands can also be used by the installer to help create a proper fit.
 - d) Silicone shim bands can also be used on gauges that have a very narrow lip, in order to provide a larger surface area for the adapter to grasp.

Adapter size	Dimensions		
	ID @ Gauge Interface	Max OD of Gauge	Min OD of Gauge
Mini	1.955"	1.995"	1.600"
	[49.66mm]	[50.67mm]	[40.64mm]
Small	2.350"	2.390"	1.995"
	[59.69mm]	[60.71mm]	[50.67mm]
Medium	2.782"	2.822"	2.390"
	[70.66mm]	[71.68mm]	[60.71mm]
Large	3.245"	3.285"	2.820"
	[82.42mm]	[83.44mm]	[71.63mm]
Extra Large	3.675"	3.715"	3.285"
	[93.35mm]	[94.36mm]	[83.44mm]
Grande	4.083"	4.123"	3.715"
	[103.71mm]	[104.72mm]	[94.36mm]
Extra Grande	4.600"	4.680"	4.181"
	[116.84mm]	[118.87mm]	[106.20mm]

Figure 10 : Table of Gauge Adapter Sizes

6.2 WGR Application Gateway Installation

- 1) Application Gateway location
 - a) The WGR Application Gateway will need to be located in a climate controlled room, preferably where other servers are housed.
 - b) The Application Gateway can be mounted on the wall with an optional wall mounting bracket, or it can be placed on a sturdy horizontal surface.
- 2) The Application Gateway will need access to a power outlet and an Ethernet connection.
- 3) The WGR Application Gateway requires a static IP Address assignment from the IT department, so that the Application Gateway can be easily accessed by both the WGRs and by any clients retrieving data from the Application Gateway.
- 4) You can optionally connect the Application Gateway to an uninterruptable power source (UPS) in order to ensure that there is no loss or corruption of data in the event of a facilities power outage.
- 5) Please refer to the Installation Guide and OneWireless Gauge Reader Application Gateway User's Manual for additional installation and operating instructions.

7) WGR Configuration, Calibration, and Commissioning

After the WGR is properly mounted to a gauge, it must be configured, calibrated, and commissioned. These steps must be performed by a qualified service technician, and are not covered in this manual. Please see the *Support* section below for contact information.

7.1 WGR Node Identification

Each WGR has various identifiers used for different purposes.

- The MAC (Media Access Control) Address can be considered a unique identification number for each WGR.
 - The MAC address is shown in the LCD Data menu, and is also printed on a label on the bottom of the WGR.
- The IP (Internet Protocol) Address, is another identifier for the WGR, but it is not guaranteed to be universally unique.
 - It is used to address network messages to the WGR.
- There is also a NodeID which is only used on the WGR Application Gateway, and is a short and simple ID number that is assigned to reference each unique MAC Address for more convenient data access.
 - The NodeID can only be viewed on the Application Gateway, and is not used on the WGR itself.

8) WGR Operation

There are various functions that can be performed both through the web interface and at the WGR using the push-buttons and LCD. This section describes how to perform functions at the WGR.

Please refer to Figure 11 for information about navigating through the WGR's LCD Menus.

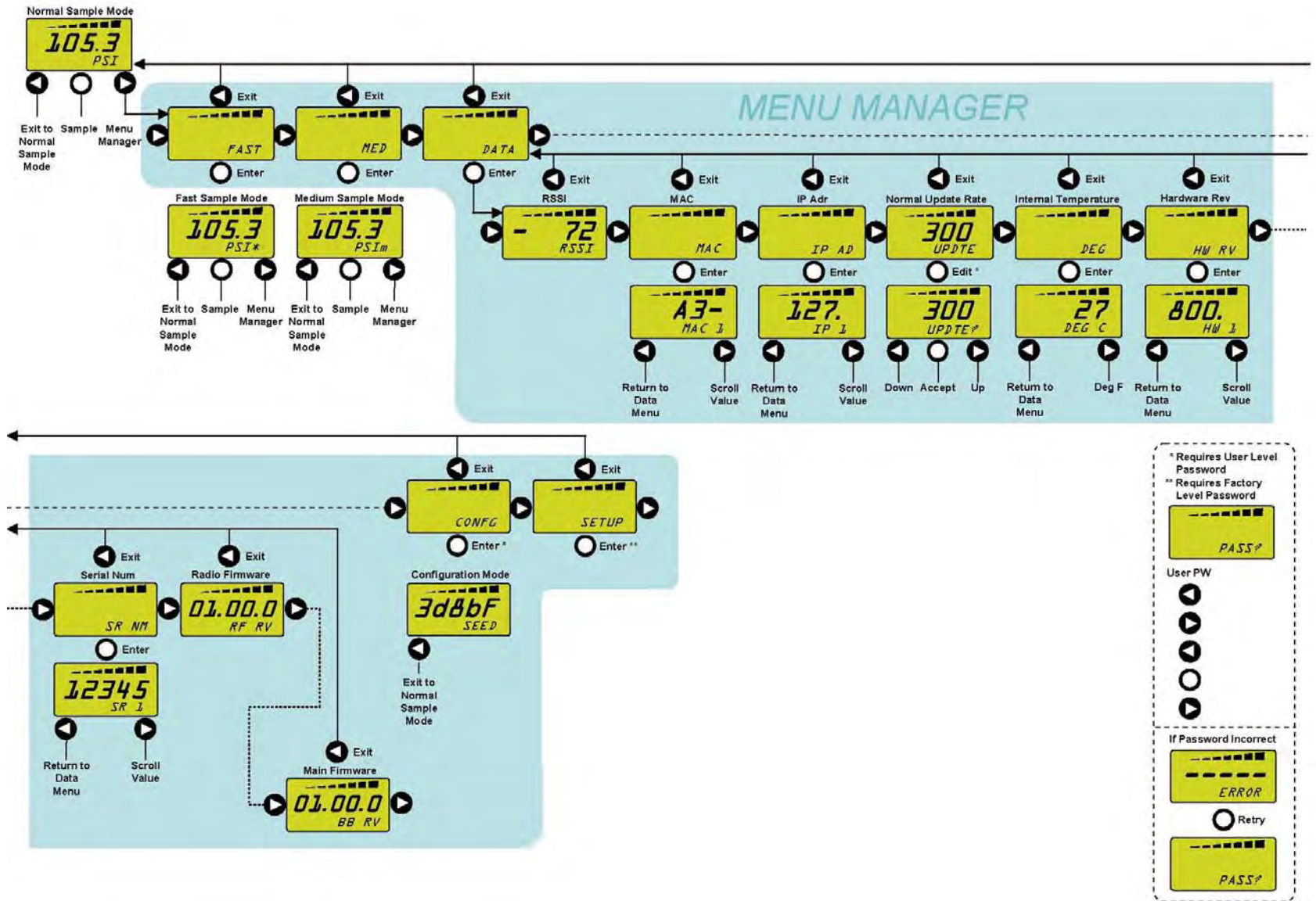


Figure 11 : WGR LCD Menu Navigation

8.1 Turning the WGR On and Off

After installation, the WGR should never be turned off. The off state is only provided to save additional battery power during shipping and before the WGR is installed on a gauge.

Please consult with your authorized installer for powering the WGR on and off.

8.2 Setting the Sampling Rate of the WGR

8.2.1 Manual instantaneous reading

- 1) To request a one-time instant reading, press the “●” button on the WGR.
- 2) The WGR will show SAMPLE in the top left corner briefly.
- 3) Then SAMPLE disappears, then the reading on the LCD will be updated with the latest value.

8.2.2 Normal Sample Mode

Whenever the WGR is on and operating in Normal Sample Mode, it samples based on the routine data collection rate. This rate is between 0 and 65535 seconds (approximately 18 hours). This value is defined by the installer or user, and can be changed at the WGR.

- 1) Press “▶” to access the WGR menu.
- 2) Press “▶” until the bottom right side of the display reads DATA.
- 3) Press “●” to select this option.
 - a) Press “◀” if you need to cancel and return to the main screen.
- 4) Once in the DATA menu, press “▶” until you reach the UPDTE submenu.
- 5) Press “●” to edit the update rate.
 - a) ** This feature is password protected. **
- 6) Enter the WGR user password sequence: “◀,▶,◀,●,▶”.
- 7) The bottom right side of the display should now read UPDTE?
- 8) Use the “◀” and “▶” buttons to change the update rate and press “●” to save the change and return to the UPDTE menu.

8.2.3 Default short term data collection intervals.

In addition to the routine data collection rate, there are two pre-programmed short term data collection intervals associated with the WGR: FAST and MED (medium).

8.2.3.1 FAST

The FAST sample mode collects data at a 5-second interval for a 5-minute duration. While the WGR is in the FAST sample mode, the units of data will have an “*” at the end.

- 1) Press “▶” to access the WGR menu.
 - a) The bottom right side of the display should read FAST.
- 2) Press “●” to select this option.
 - a) Press “◀” to cancel and return to the main screen.
- 3) Press “◀” at any time during this modified sample mode to cancel and return to the normal sample mode.
- 4) Otherwise, the mode will timeout after 8 hours and automatically return to normal sample mode.

8.2.3.2 MED

The MED sample mode collects data at a 30-second interval for an 8-hour duration. While the WGR is in the MED sample mode, the units of data will have an “m” at the end.

- 1) Press “▶” to access the WGR menu.
- 2) Press “▶” again.
 - a) The bottom right side of the display should read MED.
- 3) Press “●” to select this option.
 - a) Press “◀” to cancel and return to the main screen.
- 4) Press “◀” at any time during this modified sample mode to cancel and return to the normal sample mode.
- 5) Otherwise, the mode will timeout after 8 hours and automatically return to normal sample mode.

Accessing Informative Data Parameters in the WGR

Several data parameters can be viewed, but not edited in the WGR's DATA menu. The following parameters are available:

- Receive Signal Strength Indicator (RSSI)
- WGR MAC Address
- WGR IP Address
- Internal Temperature
- Firmware Version
- Serial Number
- Hardware Version

8.3.1 MAC Address

- 1) Press “▶” to access the WGR menu.
- 2) Press “▶” until the bottom right side of the display reads DATA.
- 3) Press “●” to select this option.
- 4) Press “▶” until the bottom right side of the display reads MAC.
- 5) Press “●” to view the MAC Address
- 6) Use the “▶” button to scroll through the 6 screens of MAC Address digits.
- 7) Press “◀” at any time to return to the DATA menu.

8.3.2 IP Address

- 1) Press “▶” to access the WGR menu.
- 2) Press “▶” until the bottom right side of the display reads DATA.
- 3) Press “●” to select this option.
- 4) Press “▶” until the bottom right side of the display reads IP Ad.
- 5) Press “●” to view the IP Address
- 6) Use the “▶” button to scroll through the 4 screens of IP Address digits.
- 7) Press “◀” at any time to return to the DATA menu.

8.3.3 All other Data Menu Items

Follow these steps in order to access all of the other parameters available in the DATA menu:

- 1) Press “▶” to access the WGR menu.
- 2) Press “▶” until the bottom right side of the display reads DATA.
- 3) Press “●” to select this option.
- 4) Press “▶” to scroll through different data parameters until you reach the desired parameter.
- 5) The value of the parameter will appear on the LCD display.
- 6) Press “◀” to exit the menu and return to the normal operating display screen.
- 7) If no button is pressed for 10 seconds, the WGR will automatically return to the normal operating display screen

Configuration and Setup Menus

The CONFIG and SETUP menus are primarily restricted and for use by qualified service technicians to configure and install the WGR.

9) WGR Application Gateway Operation

Please refer to the WGR Application Gateway ver User Manual for information about accessing the data from the WGR Application Gateway using the Web or OPC interface.

10) Care and Maintenance

10.1 Calibration

Calibration is performed when the WGR is configured during installation. Calibration is performed based on the position of the WGR with respect to the gauge face.

Re-calibration is not required if the WGR is not removed from gauge or the position of the WGR with respect to the gauge face has not shifted.

If the WGR is removed from gauge face, contact a service technician to re-calibrate the WGR. Simply repositioning the WGR on the gauge may result in erroneous readings. See the Support section below for contact information.

10.2 Battery Life

Each WGR comes with two lithium batteries. Battery status can be monitored on the LCD of the WGR, or through the OPC or Web interface connected to the WGR Application Gateway. Battery change-out must be performed by a qualified service technician, since calibration must be verified after the batteries are replaced to ensure reliable operation. See the *Support* section below for contact information.

The battery life of the WGR is dependent on the sampling frequency and operating environment. Typical ranges for room temperature applications are listed below. Extended operation at cold temperatures will reduce the expected battery life.

Sampling Frequency	Estimated Battery Life	
	2.0V	3.0V
1 sample per minute	0.3 years (@ -20C)	0.6 years
1 sample per 5 minutes	0.5 years (@ -20C)	1 year
1 sample per 15 minutes	1 year (@ -20C)	2 years
1 sample per 18 hours	1.5 years (@ -20C)	3 years

11) Troubleshooting

The most common problems with the WGR are listed below:

11.1 The WGR screen is blank and will not turn on.

Please contact a qualified service technician. See the *Support* section below for contact information.

11.2 The WGR display shows ERROR in the upper left corner.

The ERROR message appears on the LCD when the WGR is having a problem obtaining a reading from the gauge. Common causes for this are:

- 1) The WGR has been moved from its configured position.
 - a. If you think the WGR has been moved or knocked out of place, contact a qualified service technician to re-calibrate the WGR.
 - b. If the WGR is installed on equipment that is prone to vibration, the WGR may have slipped out of place. Contact a qualified service technician to re-secure and re-calibrate the WGR.
- 2) The WGR is having difficulty reading the gauge due to obstruction or vibration
 - a. If the gauge is installed outdoors, condensate buildup inside the gauge itself may impact the WGR from obtaining a good reading. If possible, install a liquid-filled gauge and have the WGR re-installed and re-calibrated.
 - b. If the gauge has multiple needles, the WGR may have an issue identifying which needle to read. Try to install a gauge with only one needle. This issue should be raised by the service technician during installation.
 - c. If the gauge only has one needle, but there is nothing to distinguish one end of the needle from the other, the WGR may have problems obtaining a reading. If possible, install a gauge that has a different type of pointer. This issue should be raised by the service technician during installation.
 - d. If the equipment that the gauge is monitoring causes the gauge needle to vibrate very rapidly (such as some compressors), then the WGR may have difficulty capturing a clean reading from the gauge. In this case, please replace the gauge with a dampened or liquid-filled gauge to slow the motion of the needle. Then have the WGR re-installed and re-calibrated by a qualified service technician.
- 3) The pointer of the gauge has broken.
 - a. In some cases, gauges that are installed on equipment that are prone to vibration can break needles. If you suspect this is the problem, contact a qualified service technician. If you remove the WGR yourself to determine if this is the issue, you will still need to have the WGR re-calibrated.
- 4) The wireless connectivity of the WGR to the Application Gateway is weak.
 - a. In some cases, the wireless signal strength of a WGR to the Application Gateway is affected by facility changes. Weak connectivity from the WGR to the Application Gateway will cause an error message. The ERROR message should also be associated with a missing ANTENNA icon in the lower right hand corner of the LCD. Contact a qualified service technician if this problem occurs.

If you have additional problems, please contact us. See the *Support* section below for contact information.

12) Product Disposal

The WGR is recycled by Honeywell. See the *Support* section below for contact information.

13) Warranty Information

Every product comes with a full one-year parts and labor warranty.

14) Support Services / Contact Information

For application assistance, current specifications, pricing, or name of the nearest Authorized Distributor, contact one of the offices below.

ASIA PACIFIC

Control Products

Asia Pacific Headquarters
Phone: +(65) 6355-2828
Fax: +(65) 6445-3033

Asia Pacific Global Technical Support Field Instruments

Phone: +65 6580 3156
Fax: +65 6445-3033
Process Instruments
Phone: (603) 76950 4777
Fax: (603) 7958 8922

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