Honeywell

OneWireless

XYR 6000 SmartCET Corrosion Transmitter

User's Manual

34-XY-25-18
R100
6/7/07

Release 100

Notices and Trademarks

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About This Document

This document describes preparation, operation and maintenance of the XYR 6000 Wireless Corrosion Transmitters. 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. The initial release of OneWireless (R100) 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.

Release Information

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References

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

Document Title
XYR 6000 Transmitters Quick Start Guide
Getting Started with Honeywell OneWireless Solutions
OneWireless Wireless Builder User’s Guide
OneWireless Builder Parameter Reference

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Elsewhere

Call your nearest Honeywell office.

Training Classes

Honeywell Automation College:

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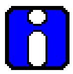
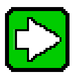
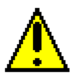
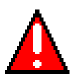
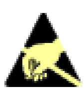
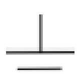
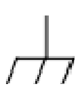
Symbol Definitions

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.

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1. Introduction

1.1 Purpose

This manual describes the Honeywell OneWireless XYR 6000 SmartCET Corrosion Transmitter function, operation and maintenance.

1.2 Scope

The manual includes:

- Details of topics that relate uniquely to the Honeywell XYR 6000 Corrosion Transmitter,
- This manual does not cover installation, mounting, or wiring. See XYR 6000 Transmitter Quick Start Guide (document 34-XY-25-15).

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 transmitter

The XYR 6000 SmartCET Corrosion Transmitter is furnished with OneWireless interface to operate in a compatible distributed OneWireless system. The transmitter will interoperate with any OneWireless-registered device.

The transmitter includes OneWireless electronics for operating in a 2.4GHz network. It features function block architecture.

The transmitter measures the process corrosion and transmits a digital output signal proportional to the measured variable. Its major components are an electronics housing and a meter body as shown in Figure 1.

The XYR 6000 transmits its output in a digital OneWireless protocol format for direct digital communications with systems.

The Process Variable (PV) is available for monitoring and alarm purposes. Available PV update rates: 1, 5, 10, 30 seconds and are set on Wireless Builder. Slower update rates extend battery life.

The probe sample time is 5 minutes and is adjustable in Wireless Builder. Slower sample times extend battery life.

Figure 1 shows a block diagram of the XYR 6000 SmartCET Corrosion transmitter’s operating functions.

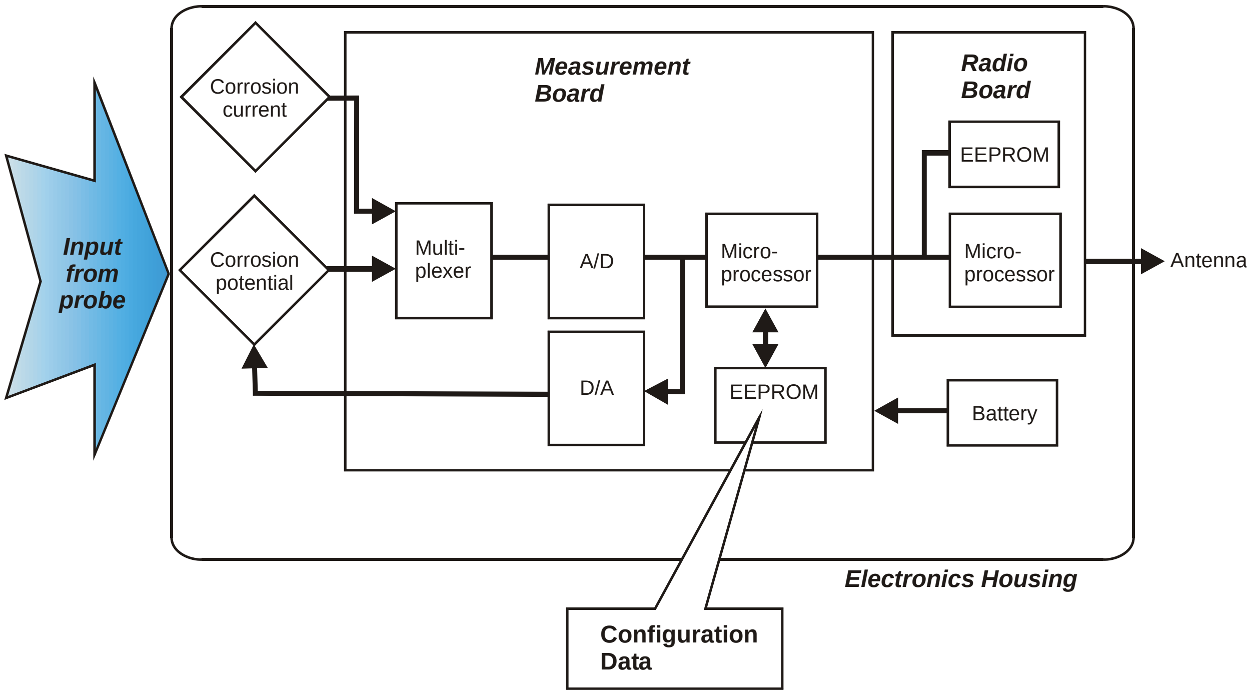
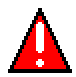


Figure 1 XYR 6000 SmartCET Functional Diagram

2. Specifications

2.1 Certifications and approvals

Transmitter

Approval / Item	Ratings / Description
Nonincendive	Nonincendive, CL I, Div 2, Groups A,B,C & D, CL II & III, Div 2, Groups F & G, T4 Ta = 85°C
Non-Sparking	CL I, Ex/AEx nC IIC T4; Ta = 85°C, Zone 2 Ex II 3 GD, EEx nA IIC T4; Ta = 85°C, Zone 2
Process Connections	 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 66/67

For detailed transmitter specifications see the following Specification and Model Selection Guides.

- XYR 6000 SmartCET Wireless Monitoring Transmitter Corrosion (document 34-XY-03-31)

Authentication Device

Install the Authentication Device application on any PDA having

- Windows Mobile version 4.2+
- infrared port.

2.2 Probes

Electrode area

Three finger electrodes = 4.75 cm^2

Nine interleaved electrodes = 0.32 cm^2

Three flush disks = 0.40 cm^2

Constants for common probe materials

UNS Number	Material	Atomic Mass (grams)	Density (grams/cm^3)	Number of electrons lost on oxidation (typical)
A91100	Aluminum 1100	27.20	2.71	3
A92024	Aluminum 2024	28.97	2.77	3
A95083	5083 Al	27.38	2.66	3
C11000	CDA 110ETP 99.9 Cu	63.54	8.89	2
C12200	DHP Cu	63.53	8.89	2
C27000	Yellow Brass	64.32	8.47	2
C44300	CDA443 (ARS AD. Brass)	64.22	8.52	2
C68700	CDA687 (Al Brass)	63.23	8.33	2
C70600	90-10 Cu-Ni [CDA 706 (Cu/Ni 90/10)]	62.95	8.94	2
C71500	CDA 715 (Cu/Ni 70/30)	61.99	8.94	2
G10100	1010 Carbon Steel	55.77	7.87	2
G10180	1018 Carbon Steel	55.75	7.86	2
G10200	1020 Carbon Steel	55.74	7.86	2
G10800	1080 Carbon Steel	55.46	7.84	2
G41400	4140	55.62	7.85	2
K01200	A179	55.77	7.87	2
K01201	A192	55.70	7.86	2
K02598	ASTM A36	55.71	7.86	2
K02700	A516-70 (A516 Gr70)	55.62	7.86	2
K03005	ASTM A53 [Grade B Carbon Steel]	55.68	7.86	2
K03006	A106, Grade B	55.66	7.86	2
K03006	API 5L-X52	55.71	7.86	2
K03006	API 5L-X70	55.71	7.86	2
L13601	60 Sn / 40 Pb	153.97	8.42	3
N04400	Monel 400	59.62	8.80	2

UNS Number	Material	Atomic Mass (grams)	Density (grams/cm^3)	Number of electrons lost on oxidation (typical)
N08020	Carpenter 20 Cb3	57.30	8.08	2
N10276	C-276 [Hastelloy]	63.43	8.89	2
R50400	Titanium GR2	47.79	4.52	4
R60702	Zr 702	95.08	6.10	4
S30400	AISI 304	55.04	7.94	2
S30403	AISI 304L	55.08	7.94	2
S31600	AISI 316	56.19	7.98	2
S31603	AISI 316L	56.22	7.98	2
S41003	Duracorr	55.12	7.70	2
S41425	Mod. 13Cr	56.13	7.70	2
K03005	A53 Grade B Carbon Steel Pipe	55.68142	7.87	2
K02598	ASTM A36	55.71	7.86	2
K03006	A106, Grade B	55.66	7.86	2

3. Preparation

3.1 Installation

Refer to the XYR 6000 Transmitter Quick Start Guide (document 34-XY-25-21) for installation, mounting and wiring of your XYR 6000 SmartCET transmitter.

3.2 Configuration

The XYR 6000 SmartCET Transmitter contains the electronics interface compatible for connecting to the OneWireless network. An operator uses the Wireless Builder application to configure blocks, to change operating parameters, and to create linkages between blocks that make up the transmitter's configuration. These changes are written to the transmitter when it is authenticated by a security key.

3.3 Connecting to network

Use Authentication Device to connect your transmitter to the OneWireless network. See page 19.

3.4 Calibrating the transmitter

Overview

The transmitter is calibrated at the factory. User calibration will unlikely improve calibration and is not recommended.

However, calibration is available if desired. For all calibration methods, Wireless Builder must first be used to prepare the channel for calibration. For access to all calibration methods, refer to Wireless Builder.

Calibration choices:

- User calibration
- Restore to factory calibration
- Linear Polarization Resistance check

User calibration

This function calibrates the channel to the default low and high range values for the channel's input type.

Table 1 User calibration

Step	Action
1	In Wireless Builder, set the transmitter's channel to OOS (Out of Service).
2	In Wireless Builder, set the transmitter's Write Lock to Unlocked.
3	Loosen the M3 locking set screw on the transmitter's battery end-cap (opposite end from display). Unscrew and remove the end cap.
4	Disconnect the probe wiring from terminals 1-3. Connect a jumper between TB1-1 and TB1-2.
5	At the transmitter display, verify the channel's PV value is followed by an out of service (OUT SVC) message. Use Authentication Device's Device Local Configuration buttons to navigate to the transmitter's CAL menu. If CAL menu is passcode protected, enter the passcode. If the channel is not out of service a WRONG MODE message will be displayed. Go to step 1. If the transmitter is locked a LOCKED message will be displayed. Go to step 2.
6	Select USER CAL. Follow displayed instructions. • When display says APLY L R apply a low resistance between TB1-2 and TB1-3, such as 10 ohms. • Use the arrow keys to enter the resistance value on the display. • Press Enter to accept the value. Display will say WAIT 60 S (wait 60 seconds). • When display says APLY H R apply a high resistance between TB1-2 and TB1-3, such as 10k ohms. • Use the arrow keys to enter the resistance value on the display. • Apply the high calibration input value indicated on display. • Press Enter to accept the value. Display will say BUSY, then SUCCESS. Otherwise, the display will show one of the calibration error messages listed in Table 2. • Press Enter to return to PV display.
7	Reverse steps 3 and 4.
8	When ready, in Wireless Builder return the transmitter's channel to service and set Write Lock to Locked.

Table 2 Calibration error messages

Message	Meaning
CALIBRATION_FAIL	1. Calibration gain is greater than 5%. 2. Calibration offset is greater than 5% of sensor span.
BAD TRIM POINT	CAL_POINT_HI is greater than sensor high range value OR CAL_POINT_LO is less than greater than sensor low range value.
BAD_USER_CALIBRATION	CAL_SOURCE is user and user calibration constants contain invalid values.
BAD_FACTORY_CALIBRATION	1. CAL_SOURCE is factory and factory calibration constants do not contain valid values. 2. CAL_RESTORE command was issued but factory calibration constants do not contain valid values.
BAD_SENSOR	Sensor is bad or faulty input thermocouple.
BAD UNITS	Units in CAL UNITS parameter are invalid or not supported by the sensor type.
INTERNAL ERROR	An error occurred during calibration that prevents calibration from being completed successfully.
SUCCESS WITH EXCESS	The calibration succeeded but the calculated calibration values are greater that 5 percent beyond the normal calibration values. Typically this indicates that the applied calibration value was significantly different from the expected value or that the sensor is not within expected tolerances for the applied characterization.

Linear polarization resistance check

Use this to check if a known applied resistance is correctly detected. The displayed value should agree with the applied resistance; if not then a problem exists in the probe or in the corrosion parameters.

Table 3 Linear polarization resistance check

Step	Action
1	In Wireless Builder, set the transmitter’s channel to OOS (Out of Service).
2	In Wireless Builder, set the transmitter’s Write Lock to Unlocked.
3	Loosen the M3 locking set screw on the transmitter’s battery end-cap (opposite end from display). Unscrew and remove the end cap.
4	Disconnect the probe wiring from terminals 1-3. Connect a known resistance value (10 – 10k ohms) between TB1-2 and TB1-3. Connect a jumper between TB1-1 and TB1-2.
5	At the transmitter display, verify the channel’s PV value is followed by an out of service (OUT SVC) message. Use Authentication Device’s Device Local Configuration buttons to navigate to the transmitter’s CAL menu. If CAL menu is passcode protected, enter the passcode. If the channel is not out of service a WRONG MODE message will be displayed. Go to step 1. If the transmitter is locked a LOCKED message will be displayed. Go to step 2.
6	• Select LPR CHK. Press Enter to accept the applied resistance. Display will say WAIT 60 S (wait 60 seconds). • After waiting 60 seconds the display should show the applied resistance value. This confirms proper operation. If the displayed resistance value is incorrect, check Wireless Builder for correct probe values. See page 4. • Press Enter to return to PV display.
7	Reverse steps 3 and 4.
8	When ready, in Wireless Builder return the transmitter’s channel to service and set Write Lock to Locked.

Restore calibration to factory default

Table 4 Restore calibration

Step	Action
1	In Wireless Builder, set transmitter's Write Lock to Unlocked.
2	In Wireless Builder, set the transmitter's channel to OOS (Out of Service).
3	Use Authentication Device's Device Local Configuration buttons to navigate to the transmitter's CAL menu. If the transmitter is locked a LOCKED message will be displayed. Go to step 1. If CAL menu is passcode protected, enter the passcode. If the channel is not out of service a WRONG MODE message will be displayed. Go to step 2.
4	• Select CAL RSTR by scrolling through menu. • Press Enter to continue. • Display will say BUSY, then SUCCESS. • If calibration is unsuccessful an error message is displayed. See Table 2. • Press Enter to return to PV display.
5	Exit the menu.
6	When ready, in Wireless Builder return the transmitter's channel to service and set Write Lock to Locked.

4. Function blocks

4.1 Introduction

This section explains the construction and contents of the XYR 6000 SmartCET Corrosion Transmitter Function Blocks.

4.2 Block description

Block types

Blocks are the key elements that make up the transmitter'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 XYR 6000 SmartCET Transmitter 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 transmitter and the multimode(s).

Block diagram

Figure 2 shows the blocks of the XYR 6000 SmartCET Transmitter.

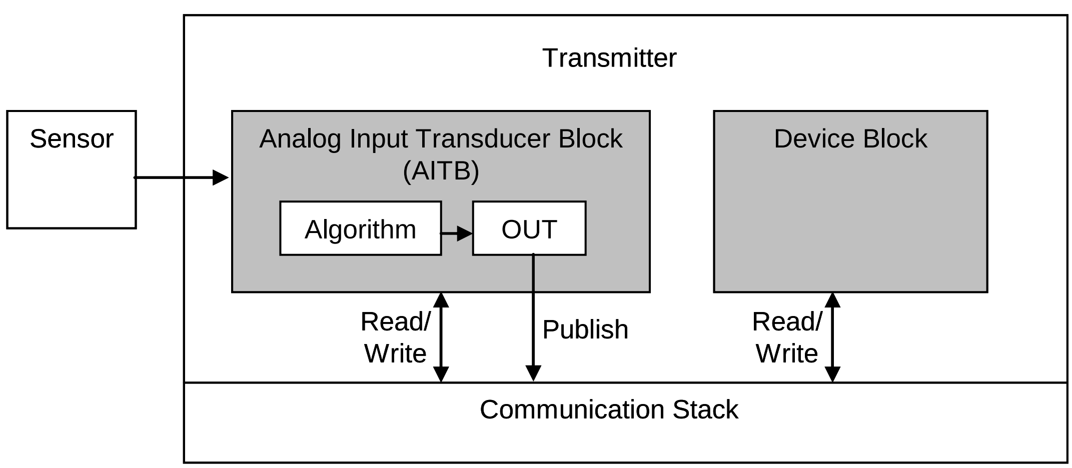


Figure 2 Block Diagram

Each of these blocks contains parameters that are standard WNSIA-transmitter defined parameters. The AITB and device blocks contain standard parameters common to all XYR 6000 transmitter models (that is, pressure, temperature, corrosion, HLAI) as well as corrosion-specific parameters. The radio block contains parameters for communication with the wireless network.

4.3 Parameter details

The transmitter displays a few basic parameters, such as tag, serial number, device revision, build, device address, WF ID.

For more information on parameters, refer to the following documents.

- OneWireless Wireless Builder User’s Guide
- OneWireless Builder Parameter Reference

5. Operation

5.1 Overview

Display modes

The transmitter has the following display modes.

- Test. Appears briefly after power-up to self-test the display.
- PV display. Default mode of the transmitter displays the PV values and any status messages. See below.
- Quick view of parameters. Displays read-only parameters then returns to PV display. See page 16.
- Menu. Displays the menu. See page 17.

Authentication Device

To navigate the transmitter displays and menus, hold the Authentication Device no more than 6” from the transmitter and aim the infrared beam at the transmitter display while tapping the Device Local Configuration buttons (Table 8).

5.2 Transmitter PV display

In the PV display, the following information is displayed sequentially. For detailed descriptions of the PV’s, see page 29.

Item displayed	Example	Details
PV1 value	1 +950	The General Corrosion Rate is the average or general corrosion rate. Range: 0 – 200 mil/year (0 - 5.08 mm/yr.)
PV1 engineering units	mPY	Mils per year (mPY) or millimeters per year (mmPY).
PV1 status	BAD	See Table 5. If no PV status is displayed (blank) then the PV value is good.
Device status	LOW BATT	See Table 6. If no device status is displayed (blank) then the device status is normal. If two or more device status messages are in effect they are displayed alternating with the PV values.
PV2 value	2 +0.50	Pitting Factor (also referred to as localized corrosion indicator). Range: 0 – 1. Unitless.
PV2 status	UNC	See Table 5. If PV status is not displayed then the PV value is good.
PV3 value	3 +26.50	B value, also known as the Stern-Geary constant. Range: 10 to 30 typical.
PV3 units	mV	Millivolts per decade
PV3 status	OUT SVC	See Table 5. If PV status is not displayed then the PV value is good.

Item displayed	Example	Details
PV4 value	4 +404.0	Corrosion monitoring index. Unitless. Normal range is 0 – 2000.
PV4 status		See Table 5. If PV status is not displayed then the PV value is good.

Table 5 PV status

PV status	Cause - Action
(blank)	• PV is normal – no action required
BAD	• Possible calibration error – Clear calibration • AITB can not execute due to internal firmware state – Attempt cold restart of device. • AITB can not execute due to hardware fault – Replace sensor board • Sensor failure – Check input connections • Sensor failure – Check bad probe
BAD CONFIG	• Configuration is bad – Check possible units and range settings for input type and correct AITB configuration.
BAD E FAIL	• Hardware fault detected - Replace sensor board
OUTSVC	• AITB mode is out of service – Restore mode to Auto in Wireless Builder
UNC	• Warning: Input inaccurate due to uncertain input data integrity. • Warning: Input inaccurate due to input conversion limitations or resolution. • Warning: Input outside of characterized range. Value is estimated.

Table 6 Device status

Status	Root Status Bit	Definition	What to do
(blank)		Device status is normal	No action required
E FAIL	DEV_ST_ELEC_FAIL	Electrical Failure detected on Sensor Board. Could be caused by one of the status items marked by *.	Replace sensor board
IP ERR	DEV_ST_INPUT_FAIL	Input Error	Possible meter body sensor failure.
LOW BAT	DEV_ST_LOW_BAT	Batter Voltage Critically Low	Replace batteries as soon as possible.
CFG ERR	DEV_ST_CONF_ERR	Configuration Check Error.	Database is corrupted. Cold start and reload configuration.

Status	**Root Status Bit**	**Definition**	**What to do**
CAL ERR	DEV_ST_CAL_ERR	Calibration Data Invalid or could not be read.	Use Cal Clear, Restore, or User Calibrate.
NO RADIO	DEV_ST_RADIO_ERR	Radio Board is not accessible.	Check radio board installed. Replace radio board.
HEAP ERR*	DEV_ST_HEAP_ERR	Heap Allocation Failure. Software detected heap shortage and some communication packets may have been dropped.	Clear by warm restart of device. If condition persists contact Honeywell service.
FW ERR*	DEV_ST_DEV_FW_ERR	Sensor Board Firmware Error. The software did not pass verification tests.	Contact Honeywell service for replacement module.
WDT ERR*	DEV_ST_WDT_ERR	Sensor Watch Dog Timeout. The processor was restarted due to unexpected operation.	Clear by warm restart of device. If condition persists contact Honeywell service.
ROM ERR*	DEV_ST_ROM_FAULT	Startup diagnostics detected defect in Sensor Read Only Memory	Replace sensor module.
RAM ERR*	DEV_ST_RAM_FAULT	Startup diagnostics detected defect in Processor Random Access Memory	Replace sensor module.
NVM ERR*	DEV_ST_NVM_FAULT	Startup diagnostics detected defect in Sensor Non-Volatile Memory	Replace sensor module.
AD ERR*	DEV_ST_AD_FAULT	Diagnostics detected defect with Analog to Digital Converter.	Replace sensor module.
BAD RADIO SPI	radio diag status Bit 0	Radio detected loss of communication with sensor board over the inter-processor communication link.	The sensor module or radio board is not functioning properly. Reset both the radio and sensor module. If condition persists contact Honeywell service.
BAD RADIO EEPROM	radio diag status Bit 1	Radio EEPROM SPI Communication failure	The radio will not be able to perform firmware upgrades but will operate normally using installed code. Replace radio board.
RADIO WDT RESET	radio diag status Bit 2	Radio Watch Dog Timeout detected	The radio firmware is not operating normally. Restart radio board. If condition persists install new firmware or replace radio module.

Status	Root Status Bit	Definition	What to do
BAD RADIO FHSS	radio diag status Bit 3	Radio Frequency Hopping Spread Spectrum Radio circuitry failure	The radio processor detected error on internal radio circuitry. Replace radio board.

5.3 Transmitter quick view of parameters

If you press the up or down arrow key during the PV display, the following quick view parameters are shown sequentially, then the PV display resumes.

Parameter	Description
Transmitter type	HONEYWELL XYR 6000 CORROSION
Tag	The name given to this transmitter
Serial number	Transmitter serial number
Device revision	This parameter changes whenever objects and parameters are added, deleted, or the data type or range changes. It does not change if the application firmware changes without affecting the device description.
Build	Sensor firmware number

5.4 Transmitter menu

Menu tree

At the PV display, press Enter to access the menus. To interact with the menus use the Device Local Configuration. See page 20.

Table 7 Menu tree

Menu item	Description
CAL	Calibration menu. May be password-protected. See Table 8 on page 20 for password number entry.
USER CAL	Lets you set calibrate to custom low and high range values. See page 6.
CAL RSTR	Restores calibration to factory setting. The factory setting is very accurate and should be adequate for most applications. See page 6.
LPR CHK	Linear Polarization Resistance check. Use this to check a known applied resistance. The displayed value should agree with the applied resistance; if not then a problem exists in the probe or in the corrosion parameters. See page 6.
RADIO	Radio menu
PRI RSSI	Primary receive signal strength. Read only. Signal strength 00 is too weak to connect to the network. <u>Displayed Value</u> — <u>Value dBm</u> — <u>Rx Margin dB</u> 00 — < -86 — < 10 01 — -86 to -81 — 10 to 15 02 — -80 to -75 — 16 to 21 03 — -74 to -69 — 22 to 27 04 — -68 to -63 — 28 to 33 05 — -62 to -57 — 34 to 39 06 — -56 to -51 — 40 to 45 07 — -50 to -45 — 46 to 51 08 — -44 to -11 — 52 to 85 09 — ≥ -10 — Saturation
SEC RSSI	Secondary receive signal strength. Same as PRI RSSI. Read only.
NWK STAT	Network status. Read only. CONNECTED means the transmitter radio and a multinode have detected each other. It does not necessarily mean security has been enabled or that the Wireless Builder has sensed the transmitter. NOT CONNECTED means radio communcations with a multinode have not been established, or signal strength is too weak.
WFN ID	Wireless Field Network ID. Read only.
DEV ADD	Device address. Read only.
TX POWER	Radio transmit power. Read only.

5.5 Authentication device menus

Overview

Hold the Authentication Device no more than 6” from the transmitter and aim the infrared beam at the transmitter display while tapping on the screen command or button.

Main menu

The main menu is shown below.

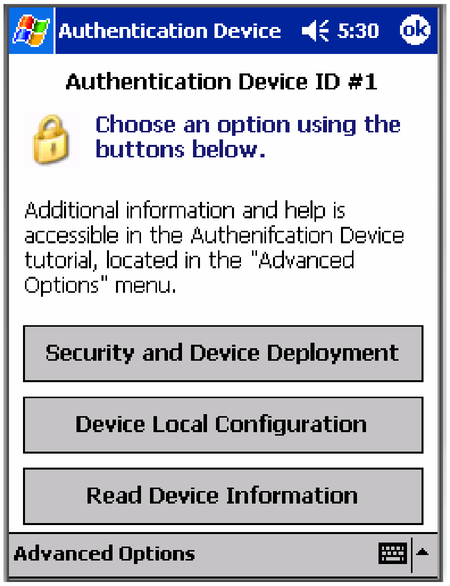


Figure 3 Main menu

Security and Device Deployment

Use this to receive and transmit security keys for connecting the transmitter to the OneWireless network.

Figure 4 Security and Device Deployment

To connect your transmitter to the OneWireless network perform the following steps.

Step	Action
1	If the Authentication Device does not contain any security keys, receive security keys from the PC application Key Server Manager.
2	If the keys in the Authentication Device are not valid or are expired, select Advanced, Clear Keys From Handheld, then repeat step 1 to obtain new keys.
3	When the Authentication Device has valid unexpired keys, aim it at the transmitter and transmit a key to the transmitter. This authenticates the transmitter as a valid device and connects it to the OneWireless network. To verify your transmitter has been authenticated, see Security under Read Device Info (page 21).

For more details on keys, refer to Getting Started with Honeywell OneWireless Solutions.

Device Local Configuration

Use Device Local Configuration buttons (Table 8) to navigate the transmitter menus (Table 7) and to make selections and changes.

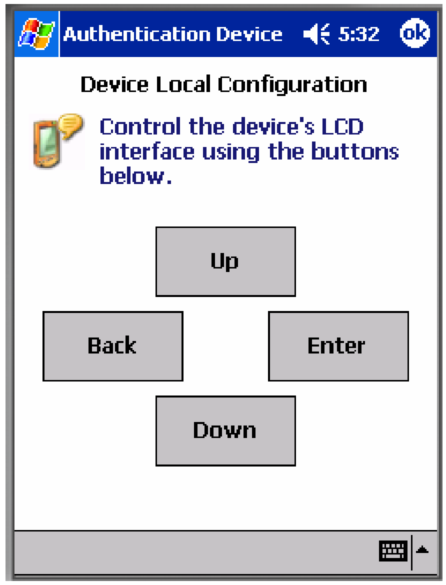


Figure 5 Device Local Configuration screen

Table 8 Buttons for Device Local Configuration

Button	Function
Enter	• Enter the Menu Tree. • Enter submenu of the menu that is appearing on the screen. • Execute action. • Submit the entered number while doing number entry. • Read value of certain displayed parameters.
Up	• Go to the next menu in the same level. • View quick view parameters in Normal Display Sequence (PV Display). • During number entry, increment the digit or change +/- sign.
Down	• Go to the previous menu in the same level. • View quick view parameters in Normal Display Sequence (PV Display). • During number entry, decrement the digit or change +/- sign.
Back	• Go to the upper menu level. • When changing a number value, move cursor to the left/more significant digit, then wrap around to the least significant digit.

Read Device Information

Use this to read the device information shown in Figure 6. Similar to quick view parameters on the transmitter display. (See page 16.)

Figure 6 Read Device Information

Table 9 Details of Read Device Information

Item	Description
Tag	The name given to this transmitter.
Serial	Transmitter serial number.
DevAddr	Device address in hexadecimal.
DevRev	Device revision. This parameter changes whenever objects and parameters are added, deleted, or their data type or range changes. It does not change if the application firmware changes withount affecting the device description. Range: 0 to 65535.
Build	Sensor and radio firmware build numbers.
WFN ID	Wireless Field Network ID. Range: 0 to 255.

Item	Description
FH Mode	Frequency group or frequency channel selection used by the wireless network of the device. The value must match the value set in the gateway and interface nodes to allow communication between the device and the wireless network. Modes: US Channel number 1 US Channel number 6 US Channel number 11 Guard bands outside US Channel number 1, 6 and 11 EU Channel number 1 EU Channel number 7 EU Channel number 13 Guard bands outside EU Channels 1, 7 and 13
FH ID	Frequency hopping pattern used by the wireless network of the device. The value must match the value set in the gateway and interface nodes to allow communication between the device and the wireless network. Range: 0 to 255
Security	Security Disabled - the transmitter has not been authenticated with a security key. Security Establishing - a security key has been sent to the transmitter and the transmitter is waiting for authentication by a multinode. Security Enabled - the transmitter has been authenticated and is connected to the OneWireless network.

Advanced Options

Advanced options are non-typical configuration commands.

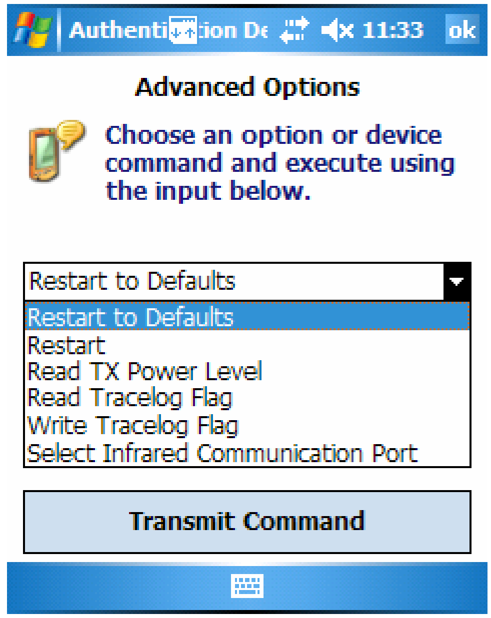


Figure 7 Advanced Options

Table 10 Advanced Options

Item	Description
Restart To Defaults	Commands the transmitter to restart to factory default configuration. Network and security configurations will be cleared.
Restart	Commands the transmitter to restart with the current configuration.
Read TX Power Level	Reads the transmission power level of the transmitter radio.
Read Tracelog Flag	Not available for transmitters. Used with multinodes. Reads conditional tracelog flag value. Tracelog flags are used to enable and disable logging functionality used for field support by development engineering.
Write Tracelog Flag	Not available for transmitters. Used with multinodes. Writes conditional tracelog flag value. Tracelog flags are used to enable and disable logging functionality used for field support by development engineering.
Select Infrared Communication Port	Overrides the detected infrared communication port detected on your PDA. If infrared communication is not functioning, you can override the detected settings using this option.

6. Troubleshooting

6.1 Diagnosis of Transmitter Health from Measurement Data

The output from the corrosion transmitter can provide insight into the health of the transmitter operation. Table 11 shows the output expected for each variable when the transmitter is operating properly and the table also shows an indication when a probe short condition exists and when no probe is connected.

Table 11 Diagnosis of Transmitter Health

Description	Transmitter output variable	General Corrosion	Pitting / Localized Corrosion	Probe short	No probe connected
Corrosion rate	PV	Across range	Across range	Maximum value Note 1.	~ 0 Note 3.
Pitting Factor	SV	<0.1	>0.1	<0.001	~ 1
B value	TV	(Stable) Note 2.	(Unstable) Note 2.	(Unstable) Note 2.	(Unstable) Note 2.
Corrosion Mechanism Indicator	QV	Across the range	Across the range	(~ 0) Note 2.	~ 0

Note 1: Corrosion rate maximum will depend on the material constants and surface area entered. From a measurement perspective, it relates to the absolute value of the polarization resistance of the working electrode. If the polarization resistance is very low (<10 ohms), the instrument will be close to current saturation. For optimal operation it is preferable to maintain the polarization resistance of the working electrode at values of >100 ohms. This may be achieved to some extent by changes to the surface area of the working electrode, thereby optimizing the span of the corrosion measurement.

Note 2: Items shown in brackets are general statements. No specific value can be provided.

Note 3: An exact zero value will not be achieved. It will be almost zero or very small, for example, 0.001 mpy.

Under conditions when general corrosion is prevalent on the material being monitored, the measured corrosion rate observed as the primary variable (PV) may be expected to show evidence of being stationary for a short term. In these cases the corrosion rate will tend to exhibit only slight variation in the short term, perhaps over periods of hours or longer. Any slight process change, such as temperature variability is often reflected in the corrosion rate behavior. Larger excursions in the corrosion rate may be experienced if there are more pronounced changes to the environment, for example due to flow rates or changes in composition.

The secondary variable, Pitting Factor, will typically exhibit a low value under these conditions (for example, <0.01), although it may exhibit some short term response to abrupt changes in the environment, for example sudden changes in temperature, flow rate or fluid composition.

The tertiary variable (the B value) will usually fall in a range of 0.010 to 0.030 volts, and will be stable.

The quaternary variable (Corrosion Mechanism Indicator) is largely dependant on the type of material being studied, but generally, if active corrosion is being observed (>5mpy), it will tend to be significantly larger than the case for very low corrosion rates.

If low general corrosion rates are being observed, which are close to instrument baseline (< 0.05 mpy), the Pitting Factor may appear artificially high (for example, > 0.01).

When localized corrosion is occurring, the observed general corrosion rate values may be in the range 0.1 to 10 mpy or higher, depending on the material and the environment. The Pitting Factor will tend to exhibit higher magnitude peaks of activity during pit initiation events, whereas propagating pits may be associated with a general increase in the observed corrosion rate and lower levels of Pitting Factor (<0.1). The general corrosion rate in the case of propagating pits often exhibits short term variation and is noticeably less stable than the case for general corrosion. Pitting is often accompanied by increased variability in the B value. With increasing degrees of pit propagation, the CMI values will also tend to increase.

6.2 General troubleshooting procedures

The XYR 6000 SmartCET transmitter is designed to operate over a broad range of corrosion rates. However, most problems associated with the corrosion rate calculation arise when the actual corrosion rate is extremely high, and there is likelihood that the instrument is approaching or exceeding its stated operating limits. In some circumstances, this can be remedied by using sensors with a smaller surface area.

Another factor to be considered is severe diffusion limiting or mass transport control of the corrosion processes. In this case the B value determination may become difficult, and erratic behavior with very high values may be observed. Troubleshooting procedures that deal with this condition and general situations are shown in Table 12.

Table 12 Troubleshooting procedures

Symptom	Possible cause	Action
No 4-20 mA output	Check voltage and compare it with the specifications on the nameplate	Connect the correct voltage
Measuring correct voltage but unit does not respond	Check polarity on the terminals.	Check wiring.
Corrosion rate values are very low and do not change	1. Probe or probe cable fault – bad connection to probe electrodes 2. Transmitter fault	1. Check continuity with test cell connected at probe end of cable. May be necessary to remove probe and carry out continuity checks between connecting pins and probe sensing elements. 2. Check with test cell connected directly to transmitter terminals. Consult with the factory for additional information.

Symptom	Possible cause	Action
Corrosion rates are very high, Pitting Factor very low, and B values are very low.	This problem could be due to a shorting condition between probe sensing elements	1a. Disconnect probe and the corrosion rate should fall. 1b. Remove probe and physically check for electrode to electrode contact. 1c. May be caused by the presence of conductive corrosion deposits for example, iron sulfide (B value very low). 2. Use probe with smaller surface area.
Corrosion rate switches abruptly from high to very low levels, Pitting Factor is very high, and the B value goes to the current default value.	This situation is symptomatic of when the (internal) polarization resistance calculation has apparently gone to a negative value, with the result that the corrosion rate is indeterminate and a default low value is returned. Apparent negative polarization resistances may occur in situations where the corrosion rates are very high and the electrode area is incorrect for the process situation.	The electrodes could be too large. Investigate using electrodes with a smaller area. Another possible cause may be due to an asymmetrical response of the electrodes, for example due to crevice corrosion occurring on one of the electrodes. The electrodes should be inspected in this case. All the variables being measured corrosion rate, Pitting Factor, B value and CMI are suspect and could be in error. Consult with the factory for additional information.
All corrosion variables are very unstable exhibiting one or more of the following: Corrosion rate unstable, may drop to very low values Pitting Factor low when corrosion rate high and vice versa. B values unstable switching between ~0.02 and > 0.1 CMI unstable switching from very low value 1e-3 to large value for example, > 0.5.	These systems are typically caused by high and variable corrosion rates in the process environment, hard diffusion limiting processes, and/or electrode surface areas being too large for the application.	Disconnect probe. Corrosion values should return to baseline levels. Check with test cell, transmitter should give a standard response. Electrode surface area could be incorrect for the application. Contact a Honeywell corrosion specialist to review the application. Corroding systems with real diffusion / mass transport limiting scenarios are problematic monitoring situations.

Symptom	Possible cause	Action
Inaccurate readings.	Possible wrong parameter values for the probe's electrode area.	Check the following parameter values in Wireless Builder. • Electrode area • Atomic mass • Density • Electrons See page 4 for probe parameters.

6.3 Recommended operating conditions

The XYR 6000 SmartCET transmitter utilizes electrochemical techniques that are applicable to a wide range of corrosive conditions. The following table provides the applicable operating envelope for XYR 6000 SmartCET with additional comments when the operating range is outside envelope.

Table 13 Recommended operating conditions

Measurement	Range	Comments
Corrosion rate	0-250 mpy dependent upon the electrode surface area, typically in range of 1 to 10 cm^2. (Default URV setting is 100 mpy and the electrode area is 4.75 cm^2.)	Higher sensitivity at low corrosion rates may be achieved by using larger electrodes - consult factory for additional information. The higher corrosion rate range is achieved with appropriately sized electrodes (for example, small areas). If symptoms listed in Table 12 occur, the B value should be fully reviewed and analyzed before providing a corrosion rate estimate. It is recommended to qualify the rate estimate against mass loss from electrodes – consult factory for additional information.
Pitting Factor	0.001 to 1.	With low corrosion rates, the Pitting Factor may appear artificially high due to very low observed general corrosion rates – consult factory for additional information.
B value	Expected range: 5 to 60mV (0.005 to 0.06V).	Low values may be due to formation of surface films having redox behavior (for example, Iron sulfide). The electrode essentially starts to become non-polarizable.

Measurement	Range	Comments
		High values predominantly may be due to diffusion limiting processes. As the electrochemical processes become more diffusion limiting, the B value may not achieve a stable value. Applying the B value from this type of situation (for example, updating the default value) is not recommended. Consult with the factory for additional information.
Corrosion Mechanism Indicator	Expected range: 0 to 2 µA/cm^2.	Values are dependent on material and environment.

7. Corrosion measurements

7.1 Overview

The XYR 6000 SmartCET corrosion transmitter outputs four corrosion measurements.

- General Corrosion Rate - average or general corrosion rate, and is generally expressed in mils per year (mpy) or millimeters per year (mmpy).
- Pitting Factor - dimensionless number that indicates the presence of a pitting (localization) corrosion environment.
- B value - expressed in millivolts per decade, and is commonly also known as the Stern Geary constant.
- Corrosion Mechanism Indicator – indicator representing health of the probe in regard to fouling or wear.

The values are all updated every 30 seconds, which is the total measurement cycle time of the instrument. The values for the General Corrosion Rate, the Pitting Factor and the Corrosion Mechanism Indicator are set to output the most recent values.

The B value is slightly different in that the output value is an average of the values over the last 2-3 hour period. This averaging provides a more stable representation of the B value. If there is a large change in the B value, for example, from a high value, for example, 0.15 volts to a low value, for example, 0.015V, the new value will be approached asymptotically over a period of approximately three hours. This is normal behavior and will only be noticeable if there are large sustained changes in the B value – such as may occur during commissioning of the device or when switching from a test cell to a corrosion probe.

7.2 General corrosion rate

The Linear Polarization Resistance (LPR) technique is used to calculate the General Corrosion Rate. This calculation is usually the prime variable of interest since it reflects the overall rate of metallic corrosion. Corrosion may be directly related to operational parameters such as temperatures, flow, chemical composition, etc.

The XYR 6000 SmartCET uses three electrodes that are referred to as the working, counter and reference electrodes. A low frequency sinusoidal voltage excitation is applied to the working electrode with respect to the reference electrode, and the current is measured and analyzed (on the counter electrode) synchronously with the applied signal.

Given a sinusoidal pattern, the working electrode becomes positively charged and then negatively charged (in other words, polarized positively and negatively). It is a DC voltage applied in a sinusoidal pattern and resembles an AC pattern. The peak-to-peak value of the sinusoidal wave is 50mV.

Strictly, this is a measurement of the real part of the low frequency impedance of the working electrode. This method of analysis is selected due to its superior noise rejection, which is particularly useful when studying corroding systems since they exhibit varying degrees of intrinsic noise. The result is equivalent to measuring the linear polarization resistance of the working electrode. With this measurement, the corrosion current (hence, the corrosion rate) is inversely proportional to the polarization resistance.

This measurement also employs the Stern-Geary approximation where the Stern-Geary constant (or B value) is the proportionality constant. In practice, with no prior knowledge of the system, the “default” value of B for this type of measurement is typically chosen to be in the range 25 to 30 mV; in reality, the value of B is system-dependent.

Use of the default B value may result in the absolute corrosion rate being somewhat in error, but in some instances, it is the general trend of the corrosion rate that could be of interest instead of the absolute value.

Working method summary

There are three electrodes in use, which are designated working electrode (WE), counter electrode (CE) and reference electrode (RE). A sinusoidal DC voltage is applied on the WE (voltage is varied).

In turn, the current response is measured between the CE and WE. The ratio of voltage to current provides the polarization resistance. The polarization resistance is not a true resistance in the traditional sense, but can be treated as such in describing the LPR technology.

The corrosion current is inversely proportional to the polarization resistance. How does an electrical model represent a corrosion process? What makes corrosion look like an electrical system?

Corrosion comprises an anodic process and a cathodic process, i.e. electrochemical processes that occur at anodic and cathodic sites on the metal surface. When corrosion is occurring, there is an increase of ionic flow between the anodic and cathodic sites (i.e. Faradaic process). A non-corrosive system would not exhibit any ionic flow.

Table 14 shows the relationship between corrosion rate, environment characterization and the recommendation for getting accurate General Corrosion Rate measurements.

Table 14 Corrosion Rate and Environment Characterization

Corrosion Rate	Environment	Comments
>200 mpy	Highly conductive, highly corrosive	This could be at upper level of XYR 6000 accuracy range. If used in this environment, electrodes with small area should be used (for example, 1cm2).
1-200mpy	Average corrosion rate	Use correct probe type according to process application.
0.01-1mpy	Low conductivity or passive system	Electrodes with large area should be used (for example, 10cm2).
<0.01mpy	Extreme passivity or low conductivity (for example, organic medium)	This could be at lower level of XYR 6000 accuracy range. If used in this environment, electrodes with large area should be used (for example, 10cm2).

7.3 B value

The B value represents a correction factor ‘constant’ that is determined by the mechanism and kinetics of the corrosion process. In a dynamic process, research has shown that the B value is not constant. For example, the B value for a sour system with a microbiological influence on corrosion activity could be 4mV. The average “industry-accepted” default B value is typically between 25 and 30mV. Houston tap water gives a B value of 15mV. A severely scaled system (i.e. inorganic scale deposits on the metal surface) would show a B value of around 100 mV.

By evaluation of the non-linearities in the current response from the LPR measurement, it is possible to determine a B value for the system being studied. This involves the analysis of the higher order harmonic content of the current response, and computation of a value of B for the system being studied.

With knowledge of the B value it is possible to refine the LPR-generated corrosion rate estimate, since the uncertainty regarding the standard (default) B value is removed. The B value is directly related to the mechanistic properties of the component anodic and cathodic corrosion processes.

The anodic process is essentially the metal oxidation and the cathodic process is, for example, the oxygen reduction or hydrogen evolution. These are essentially non-linear processes, and the current will typically (but not always) have a logarithmic dependence on the applied voltage.

The B value is a composite of the individual anodic and cathodic Tafel slopes.

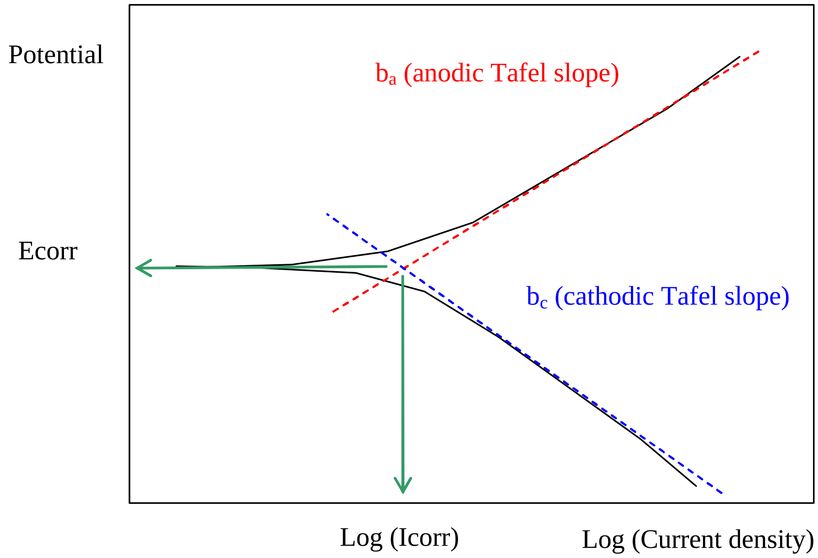


Figure 8 Individual Anodic and Cathodic Tafel Slopes

The B value is calculated using the following equation: B = ba*bc/2.303*(ba+bc)

So these individual slopes are representative of non-linear processes. In the calculation of the general corrosion rate, the B value approximation assumes that the processes are essentially linear for a small applied potential, for example: 10 – 20 mV away from the corrosion potential and only takes into account the first order (linear) processes. The harmonic distortion analysis takes into account the second and third order processes, i.e. it is similar to fitting a polynomial to x3, but we use the higher frequency harmonic components to analyze rather than trying to fit a polynomial – it's a much better analysis route.

XYR 6000 SmartCET uses Harmonic Distortion Analysis (HDA) to calculate the 'true' B value. With an accurately computed B value, the default B value used in the LPR calculation can be changed thus enabling a more accurate corrosion rate calculation to be made.

Table 15 Corrosion Rate based on B value, anodic and cathodic values

ba	bc	B	Comments
60mV	60mV	13mV	Both processes activation controlled (for example, sulfide film)
60mV	∞	26mV	Anodic process activation, cathodic diffusion, controlled (for example, aerated system)
120mV	∞	52mV	Anodic process activation, cathodic diffusion, controlled (anodic slope different), for example, multiphase system
∞	∞	∞	Severe anodic and cathodic diffusion limiting, for example, vapor phase. B value indeterminate.

7.4 Pitting factor

The Pitting Factor is a measure of the overall stability of the corrosion process, and is obtained from a measurement of the intrinsic current noise of the working electrode, and comparing this measurement to the general corrosion current obtained from the LPR measurement (for example, general corrosion rate calculation).

General corrosion processes typically have low levels of intrinsic noise, with the ratio of noise to the general corrosion current typically being ≤1% (Pitting Factor ≤0.01). With the onset of instability (pit initiation), localized corrosion occurrence leads to increasingly higher levels of current noise with respect to the general corrosion current such that the Pitting Factor may reach a value of 1. The Pitting Factor can be viewed as the probability that the corrosion mechanism is localized.

Spontaneous changes in the environment may also cause the instantaneous value of the Pitting Factor to approach a value of 1 in the short term; however, for localized corrosion, the Pitting Factor will remain unstable and secondary evidence may be observed in terms of the overall stabilities of both the general corrosion rate estimate and the B value.

XYR 6000 uses electrochemical noise (ECN) to calculate the Pitting Factor.

A useful analogy to explain the difference between general corrosion and localized corrosion (Pitting Factor) is that of a flashlight with its beam constantly ON (general corrosion) and one that is flickering (localized corrosion).

Table 16 Pitting Factor Values

PF Value	Comments
0.1 or higher	Pitting/localized corrosion – initiation (Note: check corrosion rate value; if very low, PF could be misleading).
0.01 to 0.1	Intermediate level; general corrosion but check PF does not increase above 0.1.
0.01 or lower	General corrosion.

7.5 Corrosion mechanism indicator

The metallic corroding interface is complex and dynamic. The general corrosion rate, the B value, and the Pitting Factor all help to characterize the Faradaic corrosion processes (current flow that is the result of electrochemical process) quite thoroughly. However, in order to be more complete in the analysis of the electrochemical response there is at least one more factor which needs to be taken into account.

During the measurement of the low frequency impedance, a reactive, phase shifted component of the current response may be detected. This is a consequence of the physical nature of the metal/environment (electrolyte) interface, and may reflect mechanistic properties such as the presence of films, film formation and surface adsorption processes.

The values obtained are likely to be characteristic of a particular system being studied. For example sulfide filming may cause the reactance to become more positive, whereas adsorption processes may cause the values to go negative. The absolute values obtained may provide the corrosion expert with extra knowledge regarding the corrosion behavior of any particular system.

Understanding CMI values

The CMI is a qualitative indicator of whether a surface film is present or not. If there is no film and only corrosion is present, the CMI will have an intermediate value. Inorganic scale, or thick passive oxide films with little or no conductivity, will show a low CMI value.

Analysis of the Corrosion Mechanism Indicator is shown in Table 17.

Table 17 CMI values

CMI Value	Comments
> 2000	Possible redox film, for example, sulfide
20 - 200	Freely corroding system
0-20	Passive material, for example, Al, Zr, Ti
Negative	Adsorption processes, for example, some corrosion inhibitors

8. Maintenance/Repair

8.1 Replacing display/sensor module

Tools required

- #1 Phillips Screwdriver or 1/8" Slotted Screwdriver
- Torque Screwdriver
- 1.5 mm hex key

Procedure

WARNING

Risk of death or serious injury by explosion. Do not open transmitter enclosure when an explosive gas atmosphere is present.

CAUTION

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

Table 18 Display/sensor module replacement

Step	Action
1	Honeywell recommends that the transmitter be removed from service and moved to a clean area before servicing.
2	Loosen the M3 locking set screw on the display end-cap. See item 1 in Figure 9. Unscrew and remove the end cap.
3	Loosen the two screws on the display/sensor module. See items 2 in Figure 9.
4	Disconnect each connector on the display/sensor module. See items 3 in Figure 9.
5	Install new sensor module. Be sure to orient display/sensor module in the proper viewing orientation before tightening two sensor compartment screws. Reverse steps 1-4. Torque screws to 0,4 – 0,6 N-M (3.5 – 5.3 Lb-in). Honeywell recommends lubricating the end cap O-ring with a Silicon Grease such as Dow Corning #33 or equivalent before replacing the end cap. Return transmitter to service.

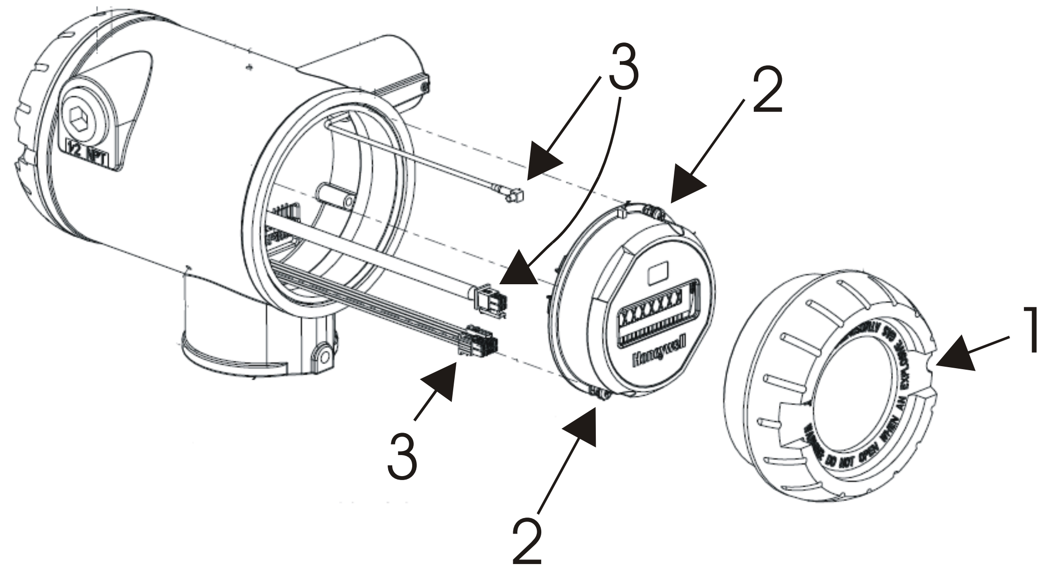


Figure 9 Display/sensor module removal and replacement

8.2 Replacing batteries

When to replace

When the transmitter displays a LO BATT message you have 2-4 weeks to replace both batteries before they expire. When batteries are removed or expired, all transmitter data is retained in the transmitter's non-volatile memory.

Tools required

- #1 Phillips Screwdriver or 1/8" Slotted Screwdriver
- Torque Screwdriver
- 1.5 mm hex key

Procedure

ATTENTION

Batteries must be replaced only by a trained service technician.

WARNINGS

- Risk of death or serious injury by explosion. Do not open transmitter enclosure when an explosive gas atmosphere is present.
- The battery 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.

Table 19 Battery replacement procedure

Step	Action
	ATTENTION You must replace both batteries. 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 XYR 6000 Wireless Transmitters. • Xeno Energy XL-205F • Eagle Picher PT-2300H • Tadiran TL-5930/s • Honeywell p/n 50026010-001 (Two 3.6V lithium thionyl chloride batteries) • Honeywell p/n 50026010-002 (Four 3.6V lithium thionyl chloride batteries) • Honeywell p/n 50026010-003 (Ten 3.6V lithium thionyl chloride batteries)
1	Loosen the M3 locking set screw on the battery end-cap (opposite end from display). See item 1 in Figure 10. Unscrew and remove the end cap.
2	Using thumb and forefinger, squeeze the battery connector at top and bottom to disengage the locking mechanism, then pull to disconnect. See item 2 in Figure 10.

Step	Action
3	Loosen the two battery holder retaining screws (closest to the batteries). See item 3 in Figure 10. The screws are captive.
4	Pull the battery holder out of the transmitter.
5	Remove the old batteries from the battery holder. If needed, pry out the batteries by using a slotted screwdriver as a lever in the holder's side slots. See item 4 in Figure 10.
6	Insert the new batteries using correct polarity shown on the battery holder.
7	Insert the battery holder into the transmitter. Reattach the screws and tighten to 0,4 – 0,6 N-M (3.5 – 5.3 Lb-in). Re-connect battery connector. Honeywell recommends lubricating the end cap O-ring with a Silicon Grease such as Dow Corning #33 or equivalent before replacing the end cap.
8	Screw the end cap back on and tighten the M3 locking screw.
9	Dispose of used battery promptly per local regulations or the battery manufacturer's recommendations. Keep away from children. Do not disassemble and do not dispose of in fire.

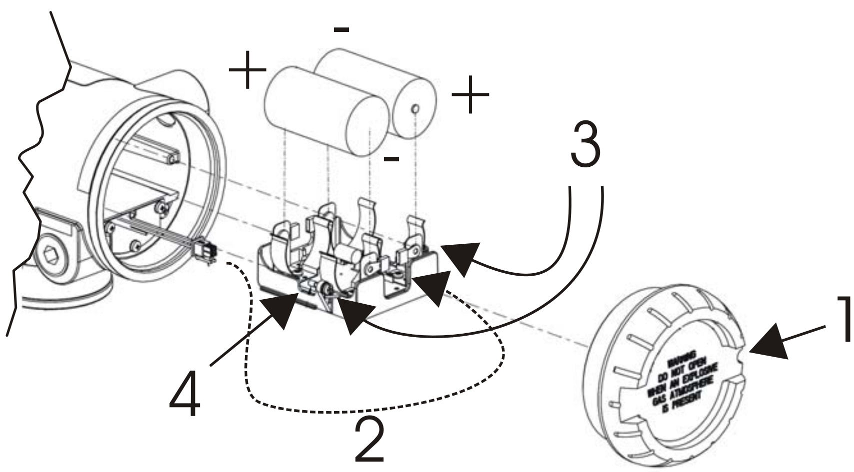


Figure 10 Battery replacement

8.3 Replacing antenna

Tools required

- #1 Phillips Screwdriver or 1/8" Slotted Screwdriver
- Torque Screwdriver
- 1.5 mm hex key

Procedure

ATTENTION

You must replace your antenna with the same type, 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 display/sensor module.

WARNING

POTENTIAL ELECTROSTATIC CHARGING HAZARD

The integrally mounted antenna shroud is made of Teflon® and has a surface resistance greater than 1Gohm per square. When the XYR 6000 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.

Table 20 Antenna replacement procedure

Step	Action
1	Honeywell recommends that the transmitter be removed from service and moved to a clean area before servicing.
2	Loosen the M3 locking set screw on the display end-cap. See item 1 in Figure 11. Unscrew and remove the front end cap.
3	Loosen the two screws on the display/sensor module. See items 2 in Figure 11.
4	Remove the display/sensor module from the transmitter body and disconnect the antenna connector from CN2 connector on the display/sensor module. See item 3 in Figure 11.
5	Loosen the locking set screw at the antenna base. Unscrew the antenna from the transmitter. Remove the antenna and its connector from the transmitter. See Figure 11.
6	Feed the new antenna’s connector through the antenna hole to the front of the transmitter. Do not connect to display/sensor module yet. Screw new antenna into transmitter body until finger-tight, then back off 180 degrees to permit adjustment later.
7	Attach antenna connector to CN2 connector on display/sensor module. See item 3 in Figure 11.
8	Insert display/sensor module. Orient in the proper viewing orientation before tightening two sensor compartment screws. See items 2 in Figure 11. Torque screws to 0,4 – 0,6 N-M (3.5 – 5.3 Lb-in).
9	Replace the front end cap. Honeywell recommends lubricating the front end cap O-ring with a Silicon Grease such as Dow Corning #33 or equivalent before replacing the end cap.
10	Adjust antenna for best reception. Don’t rotate antenna more than 180 degrees either direction or you could twist and break the antenna wiring inside. Tighten the antenna locking set screw.

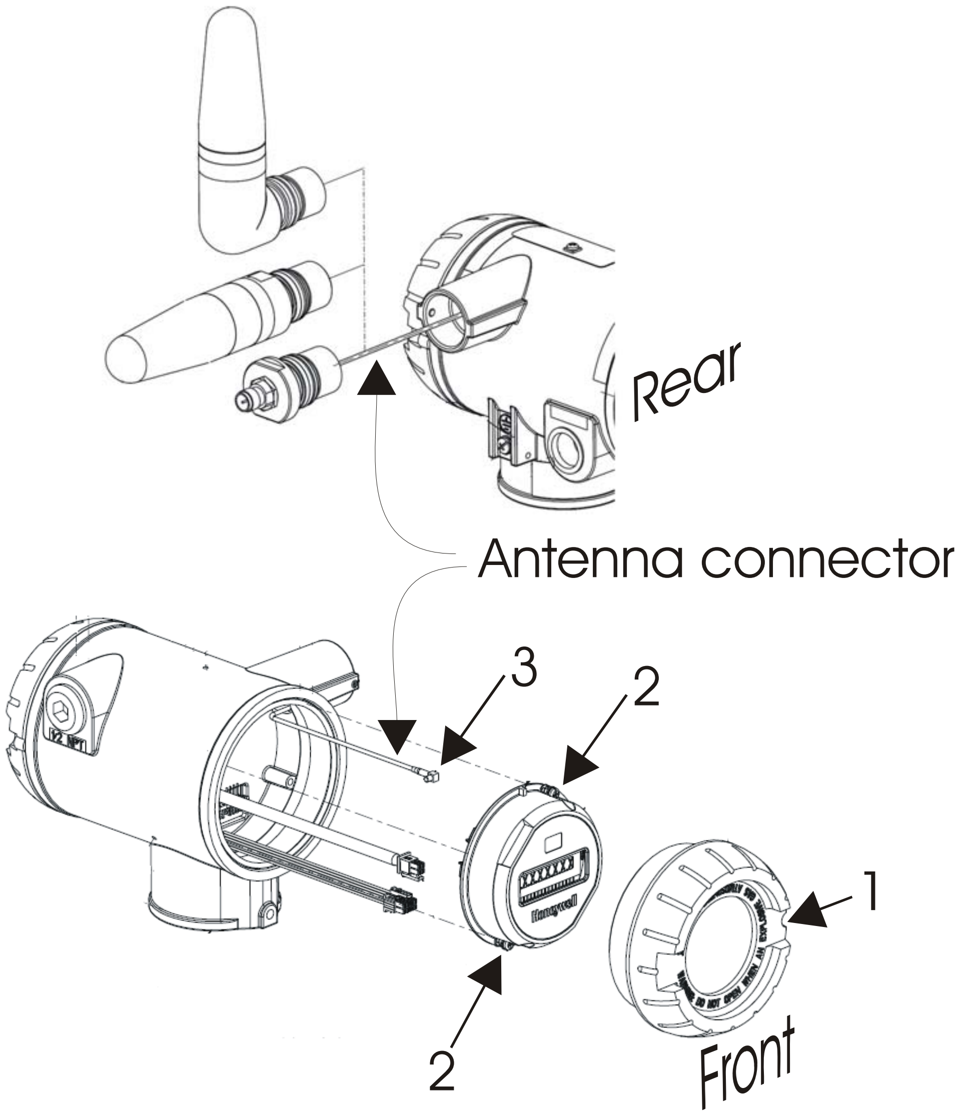


Figure 11 Antenna replacement

8.4 Parts

For other replacement parts such as probes, refer to XYR 6000 Wireless Transmitter Corrosion Specification (document 34-XY-03-31).