

## Sensors and Switches in Industrial Manual Process Valves

An Application Note

### Background

Manual process valves in industrial facilities control the flow of liquid, gas, slurry or steam. Eighty percent require operators to manually open, close, or otherwise control the valve. At any given time, users may not know the actual position of the valve. Process plants, including refineries, chemical, pharmaceutical, and water treatment plants as well as power generation installations, all need a better way to verify status with or without human intervention, especially in hazardous or hard-to-reach locations.

### Solutions

Honeywell manufactures a wide range of sensors and switches, from simple on/off switches, to sensors, and wireless sensors with flexible mounting options. Various packages are available, including stainless steel, and those designed for hazardous and harsh-duty applications.

**Figure 1. Hydroelectric Power Station**



**Figure 2. Safety Shower**



**Figure 3. Sensing and Switching Products Used in Manual Process Valves**

- 1 Hazardous Location Position Sensor**  
XYR6000 OneWireless™ Series  
Allows users to remotely monitor valve stem, actuator lever, or wheel position for improved productivity and safety, while reducing total installed cost in hazardous locations. Part of a scalable ISA100 mesh network
- 2 Hazardous Area Limit Switch**  
MICRO SWITCH VPX/LSX/CX/BX/EX Series  
Monitors valve stem, actuator lever, or wheel position, providing real-time position status for improved productivity and safety in hazardous locations
- 3 Limit Switch**  
MICRO SWITCH HDLS and GLS Series  
Monitors valve stem, actuator lever, or wheel position, providing real-time position status for improved productivity and safety
- 4 Wireless Limit Switch**  
Limitless™ Wireless Limit Series  
Allows users to remotely monitor valve stem, actuator lever, or wheel position for improved productivity and safety, while reducing total installed cost with an economical wireless point-to-point solution



*XYR6000  
OneWireless™ Sensor*

### **Wireless Position Sensors and Limit Switches**

These wireless solutions allow users to remotely monitor the valve stem, actuator lever, or wheel position for improved productivity and reduced total installed cost in hazardous locations.

The XYR6000 OneWireless™ Hazardous Area Position Sensor provide real-time measurement and quick information without wires – ideal for remote and hazardous locations. This sensor is part of the scalable ISA100 OneWireless™ network.

These instruments are designed for industrial applications with no access to power, that are remote or difficult to reach, or where manual readings are typically taken. XYR 6000 transmitters are compliant to the ISA100.11a wireless standard, and communicate on the 2.4 GHz ISM band using a IEEE 802.15.4 radio.

Featuring full UL, ATEX, and IEC Ex approvals, the XYR6000 Series has calibration within 270 degrees rotation to apply in most linear and/or rotary position sensing applications. Its analog output provides true position span output in both percentages and degrees.

The sensor installs and is ready for operation in minutes – remotely monitor from anywhere in the plant. It's explosion-proof packaging of the sensor mechanism reduces environmental risk, along with its rugged A380 die-cast alumi-

num alloy construction. Communicates up to 3000 feet with up to ten years battery life, field replaceable,

Limitless™ WGLA, WLS, and WBX limit switches remotely monitor processes and equipment over a 305 m [1000 ft] distance. They offer easy installation, maintenance, and operation with no wires... up and running in minutes. They deliver real-time valve status information via the Limitless™ wireless network.

Limitless™ WGLA switches feature EN50041 characteristics, IP67 sealing, and are well suited for applications requiring a basic wireless switch. The WGLA Series features IP67, NEMA 1, 4, 12, and 13 sealing. It's sealed zinc die-cast and powder coated enclosure are designed to meet the common dimensions and characteristics defined in EN50041 for easy installation and compatibility with other products in the field.

Limitless™ WLS heavy-duty switches feature the EN50041 characteristics, IP67/IP68 sealing, and are well suited for heavy-duty applications where the switch's zinc head and body can stand up to harsh environmental contaminants. The WLS Series offers a broad range of actuator styles available within the product line. Actuator heads on most models can be rotated in 90° increments to allow for flexibility in applications.

The WLS Series operating head has been rotary tested in excess of 50 million cycles for enhanced reliability. There's a diaphragm seal



*WBX Series Wireless Hazardous Area Limit Switch*

between head and body cavity provides sealing protection.

Limitless™ WBX hazardous area switches carry cULus, ATEX (CE), IEC Ex, FCC, IC, and ETSI approvals. Their harsh-duty, explosion-proof packaging is intrinsically safe, and can result in increased efficiencies and improved safety for machines, equipment, and operators.

Designed to be used where other wireless products can not, it's hazardous location approvals allow it to be used in a wide range of classified atmospheres, allowing for greater flexibility, making the Limitless™ WBX product application adaptable. Its powder-coated aluminum housing enhances durability and resistance to corrosion.

### **MICRO SWITCH Hazardous Location Switches**



*VPX Series Valve Position Indicator*

Hazardous-location limit switches in explosion-proof housings provide on-off position on manual process valves, monitoring the valve stem, actuator lever or wheel position, providing real-time valve status information for improved productivity and safety. As these limit switches are enclosed in an explosion-proof housing, any flame path is extinguished inside which mitigates the risk of causing an explosion at the switch part. These switch components provide feedback for user to take action in order to prevent explosions in hazardous environments. Hazardous-location switches are employed in valves in outdoor, above-ground, potentially explosive environments such as oil and gas or water treatment applications.

Honeywell's hazardous location switches are designed specifically for dangerous indoor and outdoor locations – where reliability and repeatability are essential.

MICRO SWITCH VPX valve position indicators are built especially for outdoor use in potentially hazardous atmospheres as they are rated to IP66, NEMA 4, 4X, 6, and 13. The switch enclosures are constructed to withstand the pressure of an internal explosion. Flame paths cool the exploded gases to a point less than the lowest safe operating temperature of the surrounding gas. The VPX Series versions equipped with the inductive proximity switches has the Intrinsical-

ly Safe (IS) rating. VPX indicators carry cULus, ATEX (CE), IEC Ex, NEPSI, and KOSHA global approvals.

MICRO SWITCH CX switches are built especially for outdoor use in hazardous atmospheres as they are sealed to NEMA 1, 3, 4, 4X, 6, 6P, 13, and IP66. Flame paths cool the exploded gases to a point less than the lowest safe operating temperature of the surrounding gas. Suitable for global use, these switches have UL, CSA, ATEX (CE), IEC Ex, and IN METRO certifications.

The MICRO SWITCH BX enclosure is sealed for protection against corrosion, water, dust and oil as defined in NEMA 1, 3, 4, 6, 7, 9 and 13 and IP67 as defined in IEC 529. The MICRO SWITCH BX is ideal for outdoor use or in adverse environments where a combination of explosion proof plus sealing requirements is needed. BX Series switches are suitable for global applications: ATEX (CE), IEC Ex, NEPSI, IN METRO, KOSHA, EAC, and cULus approvals.

The MICRO SWITCH LSX withstands pressure of an internal explosion and cools the exploding gases below the kindling temperature of the explosive atmosphere. MICRO SWITCH LSX switches carry the same sealing rating as the BX Series, and are UL/CSA approved. They are for use either indoors or outdoors in hazardous atmospheres as they are a completely sealed, explosion-proof device.

MICRO SWITCH EX switches feature the smallest UL-listed housings available for use in hazardous locations and carry UL, CSA, ATEX (CE), and IEC Ex approvals. They are sealed to NEMA 1, 7, and 9, provide ample wiring space, and mount from four sides.

### **MICRO SWITCH Limit Switches**

Limit switches are employed to provide on-off position on manual process valves, monitoring the valve stem, actuator lever or wheel position, providing real-time valve status information for improved productivity and safety. Primarily used on valves in non-explosive environments such as waste water treatment plants, power generation plant or other factory applications.



*BX Series Hazardous Area Limit Switch*



GLS Series Global  
Limit Switch

LSA Series heavy-duty limit switches boss- and-socket head design delivers secure head-to-body retention and unique all-metal drive train for consistent operating characteristics even at high temperature. These switches last longer without the need for frequent adjustment. The self-lifting pressure plate terminals save wiring time. Standard switches are sealed to IP65/66/67, NEMA 1, 3, 4, 4X, 6, 6P, 12, 13, and carry UL, CE, CSA, CCC, EN60947-1, and EN60947-5-1 approvals. Stainless steel (NEMA 4X) and epoxy-filled washdown (NEMA 6P) types also available.

GLS Series switches offer a complete range of approved products and are suitable for valve applications. The IP66/67 standard product EN50041 features switch mounting centers as 30 mm x 60 mm. The miniature EN50047 offers users the choice of plastic, metal, and three conduit versions – all are mounting (20 mm x 22 mm) compatible with each other. GLS Series has global approvals: UL, CE, CSA, CCC, IEC 947-5-1, EN60947-5-1, and UL508.

### 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 acknowledgment 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 that Honeywell, in its sole discretion, 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 Honeywell may provide application assistance personally, through our literature and the Honeywell web site, it is customer's sole responsibility 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 writing. However, Honeywell assumes no responsibility for its use.

### **⚠️ WARNING IMPROPER INSTALLATION**

- Consult with local safety agencies and their requirements when designing a machine control link, interface and all control elements that affect safety.
- Strictly adhere to all installation instructions.

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

### For more information

To learn more about Honeywell's sensing and switching products, call 1.800.537.6945, visit [sensing.honeywell.com](http://sensing.honeywell.com), or e-mail inquiries to [info.sc@honeywell.com](mailto:info.sc@honeywell.com)

### Honeywell Sensing and Internet of Things

9680 Old Bailes Road  
Fort Mill, SC 29707  
[www.honeywell.com](http://www.honeywell.com)