

Application Note - Industrial Sensors and Switches in Sanitary Valves

Background

Sanitary and food and beverage valves, such as the one shown in Figure 1, are engineered for pressure control in sanitary (or “clean”) environments. They are usually manufactured with stainless steel for sanitary and high-purity applications.

These valves are often constructed as a ball valve around a full-bore design that ensures the product passes through the valve with no restrictions on the flow with minimal pressure drop.

Sanitary and food and beverage valves are often found in pharmaceutical, biotechnology, food and beverage, cosmetics, chemical and other industries where sanitary process control is required for steam, gases, and liquids such as water-for-injection systems.

Solutions

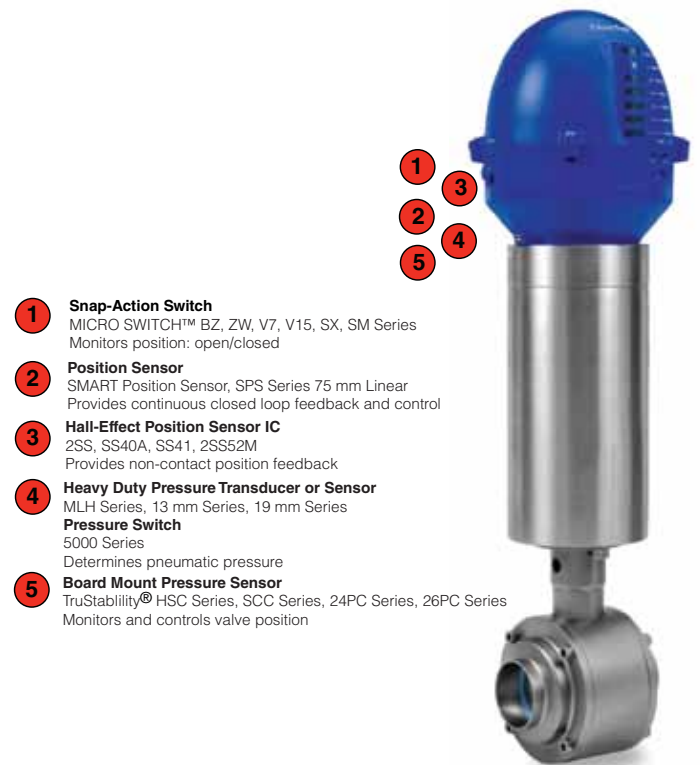
Honeywell’s wide range of sensors and switches offers accurate position control, reduction in overall system and set-up costs, durability, and enhanced reliability. See Figure 2 and Tables 1 through 6.

Figure 1. Sanitary Valve



(Image used with permission from Alfa-Laval.)

Figure 2. Potential Honeywell Products Used in Sanitary Valves.









- 1 Snap-Action Switch**
MICRO SWITCH™ BZ, ZW, V7, V15, SX, SM Series
Monitors position: open/closed
- 2 Position Sensor**
SMART Position Sensor, SPS Series 75 mm Linear
Provides continuous closed loop feedback and control
- 3 Hall-Effect Position Sensor IC**
2SS, SS40A, SS41, 2SS52M
Provides non-contact position feedback
- 4 Heavy Duty Pressure Transducer or Sensor Pressure Switch**
MLH Series, 13 mm Series, 19 mm Series
5000 Series
Determines pneumatic pressure
- 5 Board Mount Pressure Sensor**
TruStability® HSC Series, SCC Series, 24PC Series, 26PC Series
Monitors and controls valve position

Application Note - Industrial

Sensors and Switches in Sanitary Valves

Table 1. MICRO SWITCH™ Snap-Action Switches

MICRO SWITCH™ BZ Series	MICRO SWITCH™ ZW Series	MICRO SWITCH™ V7 Series	MICRO SWITCH™ V15 Series	MICRO SWITCH™ SX Series	MICRO SWITCH™ SM Series
					
Features and Benefits					
<ul style="list-style-type: none"> • Accepted global standard “Large Basic” switch • Low operating force/ differential travel • Extended life up to 20,000,000 cycles at 95% survival • Elongated mounting hole for accurate, easy mounting • Current rating from 15 A to 25 A • Choice of actuation, termination and operating characteristics • High temperature versions (204 °C [400 °F]) • Momentary or maintained actions • Capable of an IP67 rating 	<ul style="list-style-type: none"> • Small, light weight, low cost, ample electrical capacity, extended life • Choice of low energy or power duty electrical ratings (gold-plated or silver contacts) • Single pole double throw (SPDT) circuitry or single pole single throw (SPST) circuitry available • Choice of ratings, actuation, termination and operating characteristics • PBT polyester housing material • IP67 sealed available 	<ul style="list-style-type: none"> • Premium portfolio for wide range of electrical loads, best suited for higher cost-of-failure applications • Designed for 100 K operations at full load or 10M for mechanical life • Global package size acceptance • Current rating from 0.1 A to 25 A • UL/CSA recognized, ENEC (European) approval available • Choice of actuation, termination and operating characteristics 	<ul style="list-style-type: none"> • Standard portfolio best suited for lower cost-of-failure applications • Designed for 50K operations at full load or 5M for mechanical life • Current ratings 5 A to 26 A • Global approvals (UL/CSA, cUL, ENEC, and CQC) • Limited configuration options available 	<ul style="list-style-type: none"> • Extended life • Elongated mounting hole for easy, accurate mounting • Choice of actuation, electrical termination, operating characteristics • MIL-PFR-8805 qualified listings available • Lower operating force provides for enhanced operation and application versatility • Enhanced precision and repeatability • Covered case construction with molded-in terminals allows for very simple adaptation to the customers’ actuation systems 	<ul style="list-style-type: none"> • Extended life • Elongated mounting hole for easy, accurate mounting • Choice of actuation, electrical termination, operating characteristics (sensitive differential travel 0,0254 mm [0.001 in] max., low operating force to 0,56 N [2.0 oz] max.) • MIL-PFR-8805 qualified listings • Small size, light weight, ample electrical capacity, precision operation, extended life • High precision and repeatability • Options: gold contacts for low energy switching, bifurcated gold contacts for max. reliability, power load switching to 11 A

Application Note - Industrial

Sensors and Switches in Sanitary Valves

Table 2. Position Sensors






SMART Position Sensor SPS Series, 75 mm Linear Configuration	Hall-Effect Magnetic Position Sensor ICs SS351AT/SS451A, SS361CT/SS461C, SS361RT/SS461R, SS400/SS500 Series, SS41/SS51T, SS421, SS42R, SS46, VF526DT, 91SS, SS490/SS491B, SS49E/SS59ET, SS94	
		
Features and Benefits		
<ul style="list-style-type: none"> • Flexible, durable package for specified harsh environments • Reduces costs, increases standardization by 90%, eliminating multiple sensor and switch components • Patented combination of magnetoresistive and ASIC provides accuracy up to 0.05% of full-scale • On-board ASIC provides signal processing and communication with customers' integrated control units • Simple non-contact solution reduces wear and tear 	<ul style="list-style-type: none"> • Small package size (SOT-23 subminiature, flat TO-92-style) allows for use in compact designs with tight space limitations • High magnetic sensitivity allows for the use of small, low-cost magnetics and for a wider gap between the sensor and the magnet than devices with a lower magnetic sensitivity • Standard output simplifies installation and is easy to interface with common electronic control circuits • Wide operating frequency (most operate over 1 kHz) for precise tracking of a fast-moving magnet • Wide operating temperature accommodates a variety of environmental conditions • Solid state, non-contact technology enhances system reliability • Repeatable magnetic characteristics for accurate position monitoring 	

Table 3. Heavy Duty Pressure Sensors and Transducers

MLH Series	13 mm Series	19 mm Series
		
Features and Benefits		
<ul style="list-style-type: none"> • Small package with high integration reduces the number of components needed to implement the sensor • Wide pressure range, including capability up to 8000 psi (MLH Series: 0 psi to 50 psi through 9 psi to 8000 psi; 13 mm Series: 0 psi to 500 psi through 9 psi to 5000 psi; 19 mm Series: 0 psi to 3 psi through 9 psi to 500 psi) allows for varied use • Enhanced accuracy (MLH Series: $\pm 0.25\%$ BFSL, $\pm 0.5\%$ BFSL below 100 psi; 13 mm Series and 19 mm Series: $\pm 0.25\%$ BFSL max.) allows for accurate pressure measurement of the media, enhancing reliability of the calculated flow rate • Allows the user to monitor pressure within the specified range and adjust as needed, enhancing flow rate efficacy • Wetted materials or media isolated packaging enhances resistance to contaminants or media, • Customization that includes various pressure ranges, package styles (ports and connections), and calibrated options minimizes design-in effort • Products are available throughout the customer's product lifecycle, eliminating restarting the design-in process, and requalifying or resubmitting for regulatory approval 		

Application Note - Industrial

Sensors and Switches in Sanitary Valves

Table 4. TruStability® Board Mount Pressure Sensors

HSC Series and SSC Series	Features and Benefits (★ = competitive differentiator)
	<ul style="list-style-type: none"> ★ Industry-leading stability: Often eliminates the need for calibration after board mount, and periodically over time ★ Industry-leading accuracy: Calibrated to optimize accuracy ★ Industry-leading miniature package: <ul style="list-style-type: none"> – 10 mm x 10 mm [0.39 in x 0.39 in] package is small when compared to most board mount pressure sensors – Occupies less area on the PCB – Typically allows for easy placement on crowded PCBs or in small devices ★ Industry-leading flexibility: <ul style="list-style-type: none"> – Modular, flexible design with many package styles, pressure ports and custom calibration options, simplifies integration into device manufacturer's application – Single side wet media option allows the end customer to use one port of the sensor with condensing humidity or directly with non-corrosive liquid media ★ Industry-leading repeatability: Provides excellent repeatability, high accuracy and reliability under many demanding conditions • Total Error Band (TEB): <ul style="list-style-type: none"> – HSC Series: ±1.0% of full scale span max – SSC Series: ±2.0 % of full scale span max – TEB is the most comprehensive and clear measurement that provides the sensor's true accuracy over the compensated temperature range – Honeywell lists TEB so that our customers can implement the sensors quickly and easily without having to calculate the effects of individual errors that might be encountered in their application • Efficient: Allows pressure monitoring within the specified range so that the appropriate adjustments can be made • Sensitive: Meets specified pressure level requirements, providing enhanced sensitivity and accuracy over the range • Output: Analog output or I²C- or SPI-compatible 14-bit digital output (min. 12-bit sensor resolution) accelerates performance through reduced conversion requirements and convenience of direct interface to microprocessors/microcontrollers • Compensated temperature range: <ul style="list-style-type: none"> – Precision ASIC conditioning/temperature compensated – HSC Series: 0 °C to 50 °C [32 °F to 122 °F] – SSC Series: -20 °C to 85 °C [-4 °F to 185 °F] • On-board signal conditioning: Typically allows for the removal of signal conditioning components from the PCB • Insensitive to mounting orientation: <ul style="list-style-type: none"> – Allows customers to position the sensor in the most optimal point in the system, eliminating concern for positional effects – Increases flexibility of use within the application • Internal diagnostic functions: Increases system reliability • Pressure types: Absolute, differential, gage • Standard calibration units: psi, mbar, bar, kPa • Pressure ranges: 1 psi to 150 psi [60 mbar to 10 bar] • Supply voltage: 3.3 Vdc or 5.0 Vdc • Mounting: Lead through SIP, DIP or SMT • Media: Dry gases only • RoHS-compliant

Application Note - Industrial

Sensors and Switches in Sanitary Valves

Table 5. Pressure Switches


5000 Series	Features and Benefits
	<ul style="list-style-type: none"> • Long life (2 million cycles or more) provide enhanced reliability, lower warranty costs, fewer service calls, long life, less corrosion and equipment uptime • Switch repeatability offers best-in-class accuracy and set-point integrity • Environmentally sealed electrical connectors • Mechanical: external hex fitting, various pressure ports • Electrical: various integral connectors available • MICRO SWITCH™ capabilities provide improved performance specifications • Standard mechanical and electrical connections reduce tooling costs • Easy, rapid assembly lowers production costs and provides a faster cycle time

Table 6. Other Board Mount Pressure Sensors

24PC Series and 26PC Series		
Features		
	24PC Series	26PC Series
Pressure range	0.5 psi to 250 psi (SIP, DIP) 1 psi to 15 psi (SMT)	1 psi to 250 psi (SIP, DIP) 1 psi to 15 psi (SMT)
Signal conditioning	unamplified, uncompensated	unamplified and temperature compensated and calibrated
Device type	absolute, differential, wet-wet differential, gage, vacuum gage	differential, wet-wet differential, gage, vacuum gage
Calibrated/compensated	no/no	no/yes
Operating temperature	-40 °C to 85 °C [-40 °F to 185 °F]	0 °C to 50 °C [32 °F to 122 °F]
Accuracy	linearity and hysteresis 0.5% typ.	
Mounting options	SIP, DIP, SMT	

Find out more

To learn more about Honeywell's sensing and control products, call **1-800-537-6945**, visit **sensing.honeywell.com**, or e-mail inquiries to **info.sc@honeywell.com**

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

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

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

Sensing and Control
Honeywell
1985 Douglas Drive North
Golden Valley, MN 55422
sensing.honeywell.com

