



TECHNICAL BULLETIN

Logix 3200IQ Digital Positioner

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Experience In Motion

Superior Performance and Reliability

Introducing the Flowserve Logix™ 3200IQ Digital Positioner

The Flowserve® Logix™ 3200IQ high-performance digital HART® positioners utilize state-of-the-art piezo technology to provide superior performance and reliability. This is accomplished through the use of a powerful 32-bit microprocessor and a proprietary two-stage electronic relay (patent pending). Among the Logix 3200IQ's more attractive features are the on-board QUICK-CAL™ button, DIP switches, Jog buttons, and variable gain selector. These features allow the user to complete setup and calibration of either diaphragm- or piston-operated valves in a couple of minutes, without the need of additional handheld devices or software.

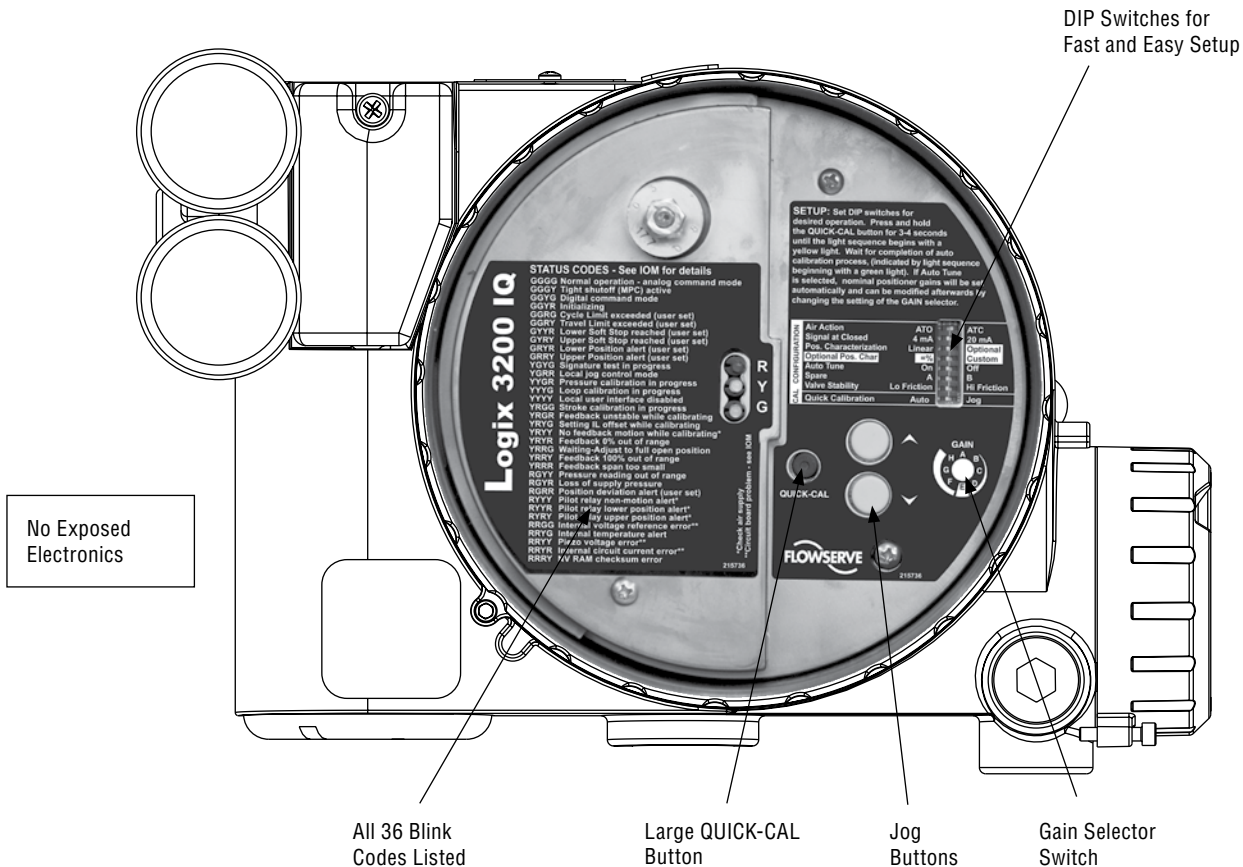
The Logix 3200IQ offers valve status updates at a glance using the highly visible LEDs. Users can easily determine if a valve or

actuator is functioning properly, and quickly diagnose any problems using the 36 smart LED blink codes. This means that maintenance personnel can provide a visual check of the valve status without having to remove the cover or connect a HART hand-held device or maintenance PC/laptop.

Data transfer with *SoftTools™* software is substantially faster than other current HART-compatible systems, resulting in a dramatic speed increase in configuration and diagnostic signature acquisition. The Logix 3200IQ communicates using the latest HART communications protocol, which provides additional capabilities (including burst mode) over previous versions of HART.

Inside the Logix 3200IQ

Figure 1 – Logix 3200IQ Controls



Features and Advantages

Table 1

Features	Advantages
Easy commissioning	Commissioning is performed by simply setting a few switches and pressing the QUICK-CAL button. The Direct User Interface allows local access to positioner control without requiring multi-level menus, a handheld communicator or laptop computer.
Local status LEDs	LEDs, visible from a distance, indicate positioner's current status without removing the cover.
Internal diagnostic codes	LEDs provide instant information relating to internal diagnostic codes. These codes indicate to the user positioner status and alarms without the need for a handheld communicator or laptop computer.
Fast and simple configuration	With its unique Direct User Interface, the Logix 3200IQ positioner provides fast and easy configuration. Local configuration switches allow the user to set all basic parameters for positioner operation, such as output characteristic (equal percent, linear or custom), air action, signal direction, gain, tuning, etc.
Jog calibrate	The jog calibrate function allows the user to easily and quickly calibrate the positioner on all actuators without physical stroke stops. These buttons also allow the user to exercise local (manual) control of the valve.
Auto Tune	A simple press of a button starts the self-calibration and auto tune process, speeding up the commissioning procedure and ensuring consistency between one valve and the next (regardless of who performs the procedure). Additionally, a gain selector allows the user to modify the calculated Auto Tune result.
HART communication	Using industry standard HART protocol, the Logix 3200IQ positioner can use existing handheld communicators and supply extensive information to maintenance database software packages.
Low air consumption	State-of-the-art piezo technology combined with inner-loop feedback produces high-performance control with minimal air consumption.
21-point characterization	With <i>SoftTools</i> software or a handheld communicator, a custom 21-point characterization curve can be generated that can be used to change the response of the positioner to meet the process requirements.
Two-stage control design	Positioner uses two-stage control to provide faster response and tighter control.
High-friction algorithm	Improves control of high-friction ball and globe valves by eliminating overshoot and hunting.
Configuration lockout	Local configuration lockout switch permits users to perform automatic quick-calibration procedures without modifying existing configuration and tuning settings.
NAMUR and VDI/VDE mounting kits	NAMUR and VDI/VDE mounting interfaces provides direct standardized mounting to various linear or rotary actuators. Brackets are available for non-NAMUR actuators.
Compact and lightweight	The positioner's compact design allows it to be installed on smaller actuators.
4-20 mA feedback option	Modular design allows reliable position feedback without the need for isolators.

Specifications

Table 2

Electrical Specifications	
Power supply	Two-wire, 4-20 mA input
Compliance voltage	10 VDC @ 20 mA
Effective resistance	500 Ω @ 20 mA
Communications	HART Protocol
Minimum required start-up current	3.6 mA
Minimum operating current	3.6 mA

Table 3

SoftTools Requirements	
Computer	A computer using a Pentium, higher, or compatible processor and running Windows 95, 98, NT, 2000, or XP
Drive	CD-ROM drive
Memory	32MB RAM minimum (64MB RAM recommended)
Hard Drive	Approximately 30MB disk space for installation
Ports	1 minimum available with 8 maximum possible. (Can also communicate via PCMCIA and USB connections)
Modem	HART Compatible RS-232 / PCMCIA / USB Modem



Table 4

Physical Specifications	
Operating temperature range	Standard: -4°F to 176°F (-20°C to 80°C) Low: -40°F to 176°F (-40°C to 80°C)
Housing	Cast, powder-painted aluminum or stainless steel
Weight	Aluminum: 8.5 lb. (3.9 kg) Stainless steel: 20.5 lb. (9.3 kg)

Table 5

Performance Specifications	
Response level	≤0.1% full scale
Deadband	≤0.1% full scale
Resolution	≤0.1% full scale
Linearity	±0.5% full scale
Repeatability	≤0.25% full scale
Hysteresis	≤0.5% full scale
Air consumption at 60 psig (4 barg)	≤0.35 SCFM (0.5 Nm ³ /hr)
Max./min. air supply	150 psig/30 psig (10.3 barg/2 barg)

Table 6

Hazardous Area Certifications		
FM/CSA		
Intrinsically Safe		Explosion Proof
Class I, Div 1, Groups A, B, C, D		Class I, Div 1, Groups B, C, D
Class II, Div 1, Groups E, F, G		Class II, Div 1, Groups E, F, G
(See Figure 1 for installation requirements.)		NEMA/Type 4x
ATEX (GENELEC)		
Intrinsically Safe		II 1G EEx ia IIC T4, T5 T4 Ta = -40°C to 80°C T5 Ta = -40°C to 35°C IP-65
Flameproof		II 2 GD EEx d IIB + H ₂ T5, Ta = -40°C to 80°C IP-65
CE Compliant		
IECEX		
Flameproof		Ex d IIB + H ₂ T5 Ta = -20°C to 55°C IP-65

SoftTools Interface

Introduction to SoftTools Software

NOTE: SoftTools can be downloaded from www.flowserve.com

Flowserve's *SoftTools™ Suite* software helps manage field devices by combining the features of field network hardware and the HART communications protocol, with the performance of Logix 3200IQ digital positioners. *SoftTools Suite* is a complete software package, featuring device status, configuration and calibration screens. Additionally, the user can access customized reports for all configuration, calibration and event data. *SoftTools* software opens the 'window' to the device and allows immediate views with live feedback on all active device sensors including valve stem position, control signal, and other important process metrics. Multiple instances of the software can be run simultaneously, addressing unique positioners. Up to 33 field devices can be viewed simultaneously, allowing the control professional to study cause and effect scenarios.

SoftTools software enables communication between the software suite of tools and field device networks using the HART protocol and provides access to the diagnostic information from field devices. Using the MTL or ELCON brand HART multiplexer, users can access more than 63,000 Logix HART positioners from a single workstation. Additionally, the software includes an active database to capture configuration, calibration history and event logging for each digital positioner addressed through the software.

Users can now obtain a new level of detailed diagnostic information with *SoftTools* software. Diagnostic tests and functions (formally available only in strap-on diagnostic testers) are now part of the functionality. The software retains the traditional signature and logging features made popular in previous Flowserve software and adds scheduled polling for device alarms, critical diagnostic tests for friction, and performance analysis of positioners.

Configurator

Logix 3200IQ configurations can be saved securely in a database file. By uploading a positioner configuration, the information is automatically saved and written to disk on the workstation. *SoftTools* software allows the user to selectively query the database to isolate or identify specific configurations. The user can sort by any number

of parameters including tag number, valve size or type, trim type, flow direction, and liquid or gas application. *SoftTools* software also allows the user to easily upload a configuration from the positioner. This means that a new replacement positioner can be identically configured with the simple click of a mouse once the correct configuration has been identified.

The configurator enables users to edit individual configurations, export to word processors and spreadsheets and import from other files. It also allows the user to format and print a positioner configuration report.

21-point Characterization Curve

With *SoftTools* software, the user can adjust a 21-point characterization curve to change the response of the positioner in order to meet the process requirements. The output of each control point is independent, allowing the user to create a custom curve with very high resolution. This customized curve can be saved in the memory of the Logix 3200IQ, and either activated or overridden with a simple on-board selector switch.

Tuning

Unlike other positioners that offer only one gain setting, the Logix 3200IQ positioner provides dual-gain tuning. This allows the positioner to make large step changes with minimal overshoot, while achieving the resolution to respond to very small step changes. The Logix 3200IQ positioner not only provides several preset gain settings, it also allows the user to develop custom settings for a wide range of actuator sizes and types. Tuning sets can be configured, or selected with the HART 275/375 handheld, *SoftTools*, or directly from the user interface on the positioner.

By setting the Auto Tune on/off DIP switch, the tuning mode can be changed from manual to auto. The Auto Tune procedure cycles the actuator to produce a measured response and selects those gain values that provide appropriate actuator performance. The Auto Tune function includes a gain modifier selector that can be used to increase or decrease the calculated gain in order to achieve optimal performance.

SoftTools, Signatures and Performance Testing

Figure 2 – Ramp Open Test

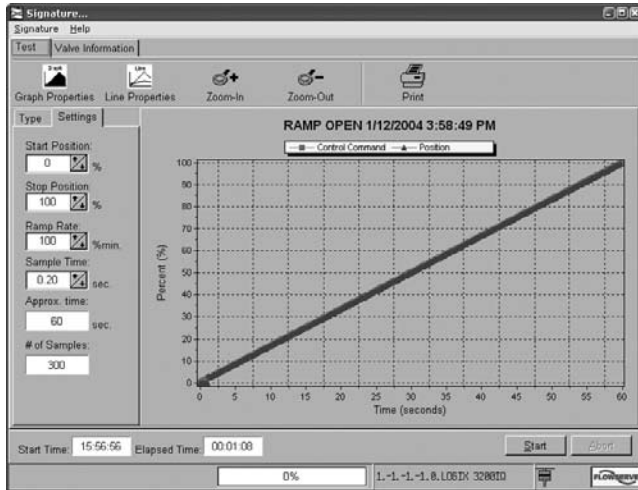


Figure 3 – Signature Comparison

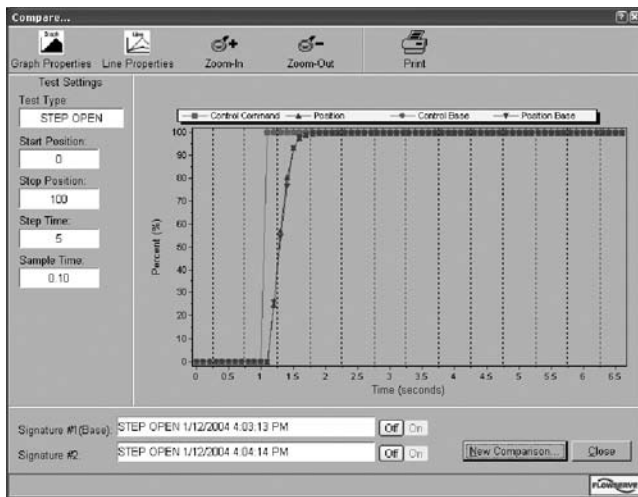
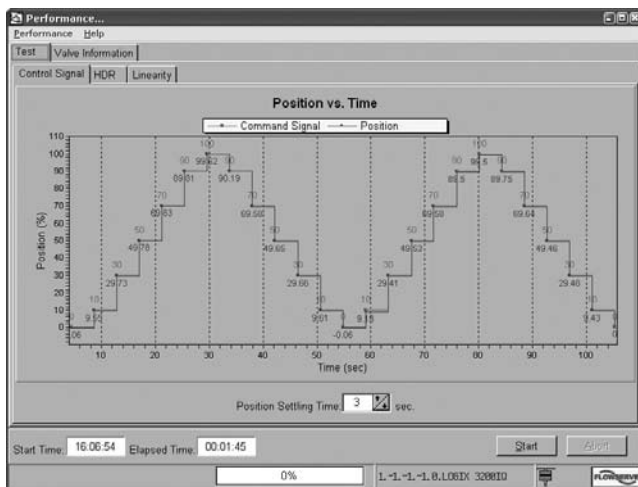


Figure 4 – Performance Test



Signatures

The Logix 3200IQ positioner is designed to assure that data is easily gathered, stored and compared to historical valve data so the user can determine the performance of critical valves.

With *SoftTools* software a user-defined signature ramp (Figure 2) or step response test can be generated with a Logix 3200IQ positioner. Signatures can be saved and cataloged (and later retrieved) for comparison (Figure 3) with a more recent signature.

SoftTools software allows a user to easily overlay valve signatures and compare current performance with past performance over a particular time period. This allows the user to determine if degradation has occurred over time on critical valves. It also allows the user to compare historical data and determine if a valve needs to be pulled for maintenance. User-defined steps (large or small) can be tested and stored—large steps for speed and small steps for resolution and precision. Internal sensors allow the user to test the response and health of the valve at any time.

Positioner Performance

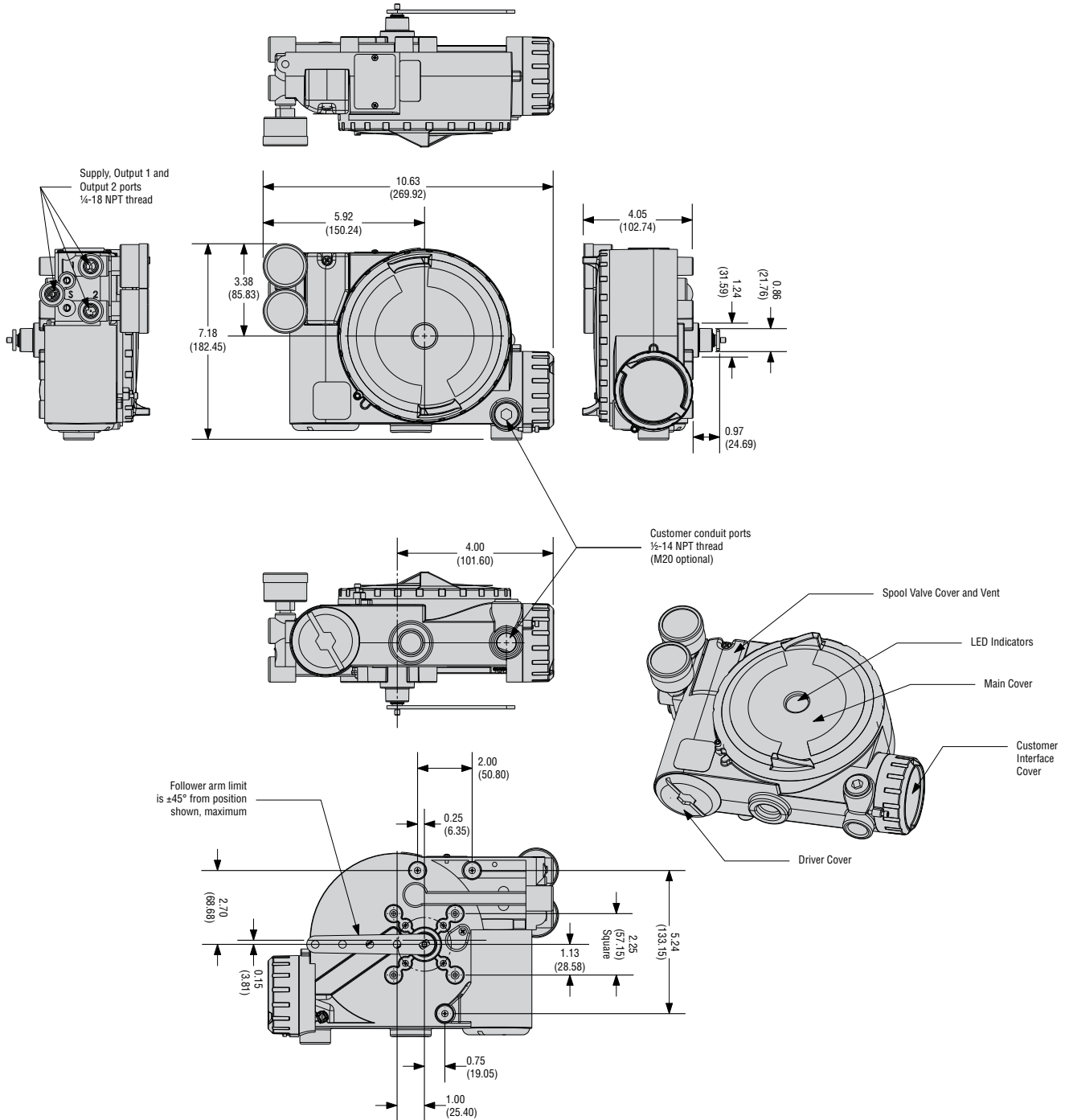
Static performance and accuracy measures such as hysteresis, deadband, linearity, and repeatability can be obtained with the Logix 3200IQ positioner. These values can be graphically depicted, stored and later retrieved for comparative analysis (Figure 4).

Third Party Configuration Devices

While no handheld device or software is required to commission and calibrate the Logix IQ, a Fisher-Rosemount® HART 275/375 can also be used to perform configurations and calibration. The Logix IQ is “AMS™ Aware”, and has complete configuration, alarm and calibration functionality with this software platform. Unique in the AMS™ Suite of HART instrumentation is the ease of calibration of the Logix IQ. Since the Logix IQ self-calibrates, there is no need for a calibration “wizard” or a script to guide the user through this operation. AMS simply initiates the QUICK-CAL on the Logix IQ, then awaits confirmation from the Logix IQ that calibration is complete. Most positioners on the market today require a script or “wizard” that resides on a handheld device or PC-based software to perform a calibration because their on-board microprocessors require it.

Dimensions

NOTE: Dimensions in inches (mm)



How to Order

Selection		Code	Example
		3	3
Protocol	HART	2	2
Diagnostics	Standard	0	1
	Advanced	1	
Material	Aluminum, White Paint (Valtek)	0	0
	Stainless Steel, No Paint (Valtek)	1	
	Aluminum, Black Paint (Automax)	2	
	Aluminum, Food-Grade White Paint (Automax)	3	
	Aluminum, Black Paint (Accord)	4	
	Aluminum, Food-Grade White Paint (Accord)	5	
Design Version		IQ	IQ
Certifications	Explosionproof EEx d IIB + H ₂ , ATEX II 2 G (GENELEC)	07	10
	Explosionproof Class I, Div 1, Groups B, C, D Intrinsically Safe Class I, Div 1, Groups A through G (FM, CSA) FM Nonincendive. CSA Class I, Div 2, Class I, Zone 1, Group IIB + H ₂ and Exia Class 1, Zone 0, Group IIC (CSA Only)	10	
	General Purpose	14	
	Intrinsically Safe EEx ia IIC T4, Standard Temp: -40°F (-40°C) ≤ Ta ≤ 176°F (80°C)/131°F (55°C), ATEX II 1 G (GENELEC)	15	
	IECEX Ex d IIB + H ₂	16	
Shaft	DD 316 Stainless Steel Shaft (Valtek Standard)	D6	D6
	NAMUR 316 Stainless Steel (VDI/VDE 3845)	N6	
Conduit Connections	½" NPT	E	E
	M20	M	
Action	Four-way (Double-Acting)	04	04
	Three-way (Single-Acting)	03	
	Four-way Vented (Double-Acting)	4V	
	Three-way Vented (Single-Acting)	3V	
Temperature	Operating Temperature (-40°F to 176°F; -40°C to 80°C)	40	40
Gauges	Gauges (Valtek standard)	0G	0G
	Stainless Steel Gauges	OS	
	Stainless Steel with Brass Internals (kg/cm ²)	KG	
	Stainless Steel with Stainless Steel Internals (kg/cm ²)	KS	
	No Gauges	OU	
Special Options	4-20 mA Position Feedback	OF	OF
	No Specials	00	



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