FLOWSERVE

TECHNICAL BULLETIN

Logix 3000MD Series
Digital Positioner

Experience In Motion

Superior Performance and Reliability

Introducing the Flowserve Logix™ 3000MD Series Digital Positioner

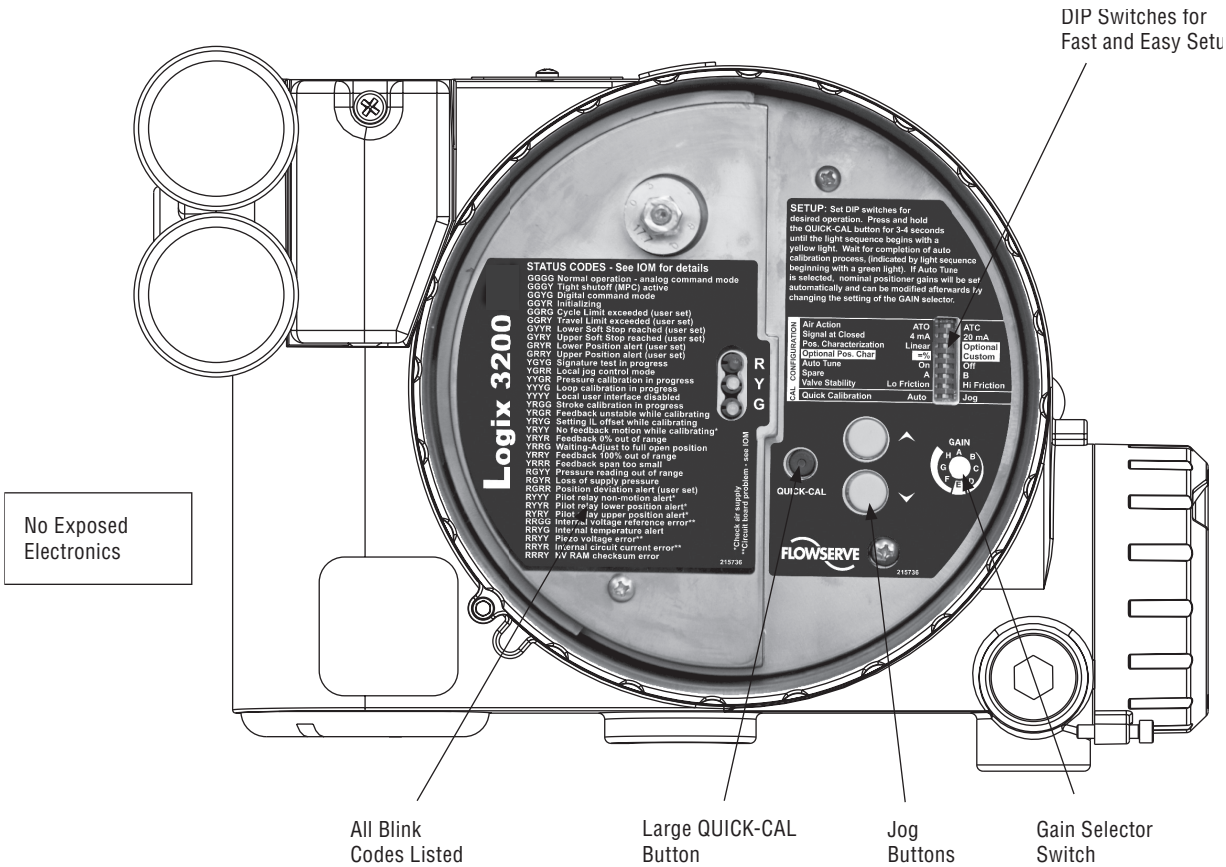
The Flowserve ® Logix™ 3000MD series high-performance digital positioners utilize state-of-the-art piezo technology to provide superior performance and reliability. This is accomplished through the use of a powerful 32-bit microprocessor and a proprietary two-stage electronic relay. Among the Logix 3000MD series 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 3000MD series positioners offer 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 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 handheld device or maintenance PC/laptop.

Predictive diagnostics is available using the ValveSight software available through FDT/DTM technology. ValveSight is a diagnostic solution for control valves that can be seamlessly integrated into most host control and/or plant asset management systems. The power of ValveSight is in the intelligent diagnostic engine which is constantly monitoring the valve, actuator, positioner and control signal for patterns of behavior that may indicate a problem and provides actional advice proactively.

Inside the Logix 3200MD

Figure 1 – Logix 3200MD Controls



The Logix 3000MD Series Digital Positioner - How It Works

Logix 3000MD Positioner Overview

Figure 1: System Positioning Algorithm for Logix 3400MDDigital Positioners

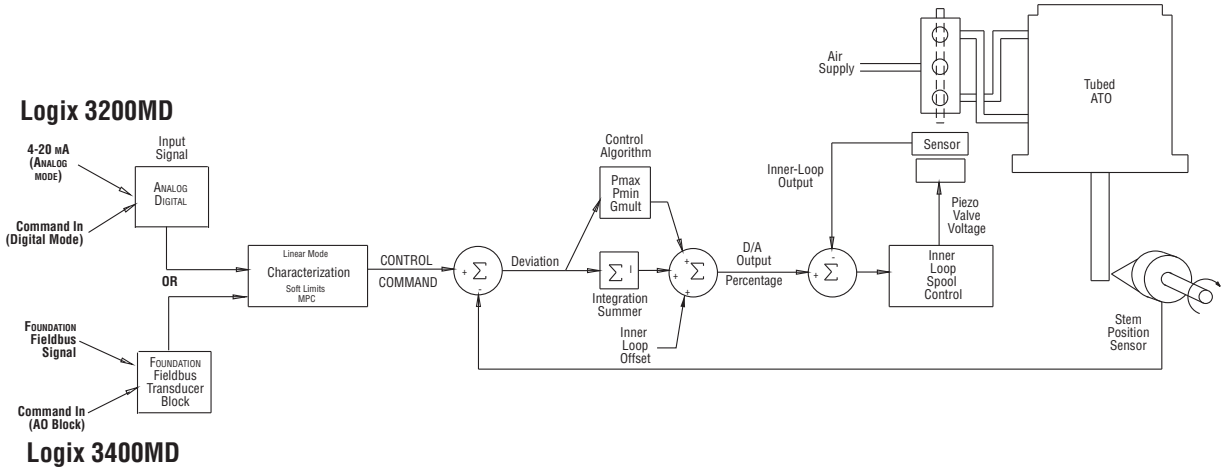
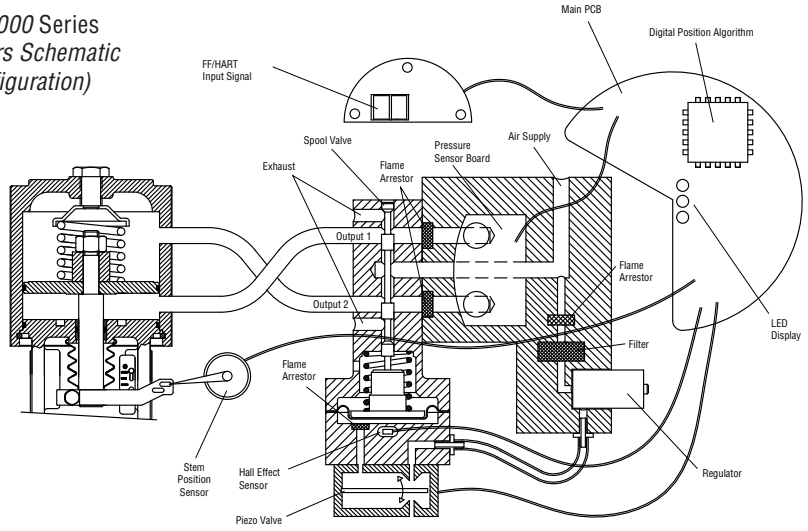


Figure 1: Logix 3000 Series *Digital Positioners Schematic (air-to-open configuration)*



Tuning

Unlike other positioners that have only one set gains to set the response of the positioner, the Logix 3200MD positioner uses a multi-variable variable gain tuning algorithm. This allows the positioner to make large step changes with minimal overshoot, while achieving the resolution to respond to very small step changes.

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.

By setting the Auto Tune on/off DIP switch, the tuning mode can be changed from auto to manual. The Logix 3000MD Series positioners provide several preset gain settings with a locally adjustable gain set selector directly from the user interface on the positioner. If custom settings are desired, tuning sets can be modified with a handheld or ValveSight, to accomodate a wide range of actuator sizes and types.

The Logix 3400MD for FOUNDATION Fieldbus Applications

Complete local configuration, on any valve/actuator and local.

FF Simulate – Run a control strategy without process

FF Write Protect – Locks out unauthorized writes to NVRAM

FOUNDATION Fieldbus made easy.

(In OOS) Calibrate stroke and adjust tuning without entering the Transducer Block —Updates the Block when complete.

36 status and alert and messages displayed locally via three easy-to-read LEDs

Logix 3400MD Features	
RFI/EMI Immunity	✓
FISCO Compliant, User Interface	✓
Polarity Insensitive UI (Potted UI)	✓
AO Block (30mS)	✓
PID Block (6 PID Equations) (90mS)	✓
2 DI Block (20mS)	✓
1 DO Block (30mS)	✓
1 IS Block (50mS)	✓
1 OS Block (50mS)	✓
LAS (Link Master Device)	✓
Auto Tune (Positioner Performance)	✓
High Friction Stability	✓
FF Code Download	✓
Flash Ram (Local Positioner Embedded Code Upgrade)	✓
Local Valve Signature Storage	✓
Local Calibration and Setup (While in OOS)	✓
24/7 Local Fault Monitoring	✓
Local Adjustable Gain	✓
Wizard/Method for On-line Commissioning	✓

Logix 3400MD Features	
Local Jog Buttons to Adjust 100% Command Position (While in OOS)	✓
Linkable Position feedback (AO Read Back)	✓
Four Response Curves (Linear, =%, QO, and Custom) Locally Activated, or Through FF	✓
Multiple View Objects in Transducer Block	✓
Honeywell PKS Partner with FDM	✓
Methods Setup Wizard	✓
DTM Available	✓
Yokogawa VIP Partner & PRM supported	✓
Honeywell PKS Advantage Partner	◊

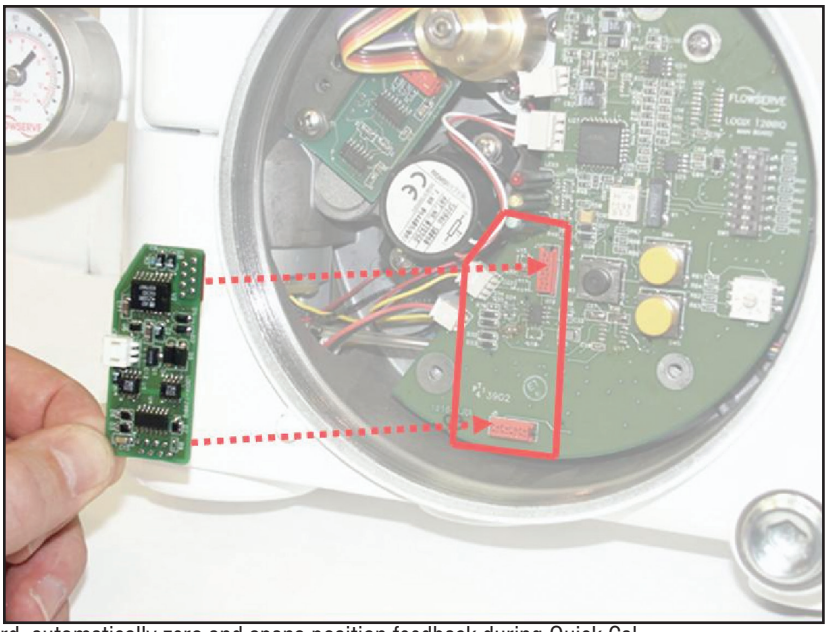
FDT Group Certified

Flowserve is a Honeywell Partner, with Flowserve DTM support pending in the ExperionDCS Field Device Manager. Please contact your Honeywell representative for details.

The Logix 3200MD for HART Applications

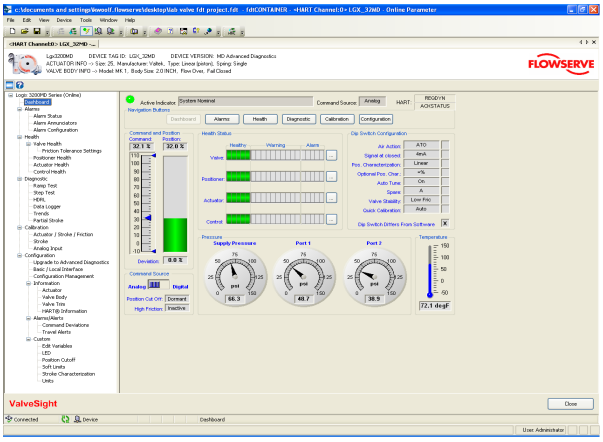
Complete local configuration, just like the Logix 3400MD, but HART protocol

- Local status and alert messages
- Tuning (Auto Tune function and manual adjustment)
- Jog buttons to manually adjust 100% position
- Easy-to-install 4-20 mA analog feedback card option



Simple plug-in AO card, automatically zero and spans position feedback during Quick Cal

Logix 3200MD Features	
RFI/EMI Immunity	✓
Auto Tune (Positioner Performance)	✓
High Friction Stability Tuning	✓
Integral 4-20 mA Feedback Option	✓
Flash RAM (Local Positioner Embedded Code Upgrade)	✓
Local Valve Signature Storage	✓
Local Calibration and Setup	✓
24/7 Local Fault Monitoring	✓
Local Adjustable Gain	✓
Three Response Curves (Linear, =% and custom)	✓
Local Jog Buttons to Adjust 100% Command Position	✓
Valve Signature Diag. “Valve Analysis” AMS SnapOn® Application	✓
AMS Device Manager	✓
DTM Available	✓
Yokogawa VIP Partner	✓
Honeywell PKS Partner with Honeywell HART FDM	✓



ValveSight Dashboard for Logix 3200MD or 3400MD Advanced DTM and Pro diagnostics

FDT Group Certified

The Logix 3000MD Series Positioners – no software or hand-held device required... easy as 1, 2, 3

With the Logix 3400MD, function blocks are no longer required to set up, configure and perform a simple stroke calibration. The 3400MD can be set up with 9-32 VDC supply and 45 psi (min.) air supply on any valve/actuator platform.

Calibration, configuration and tuning parameters from the local interface will be automatically updated in the Transducer Block on the Logix 3400MD. Local setup and calibration that does not require a link to a host controller, PC or hand-held device, as well as local validation that setup is correct, make any FOUNDATION Fieldbus™ installation easy and straightforward.

When the 3400MD is in OOS (Out Of Service mode), the local interface shown to the right is accessible and setup can be carried out through the following steps:

Common Configuration Steps

The Logix 3200MD can be set up with 10 VDC milliamp current supply current and 45 psi (min.) air supply on any valve/actuator platform.

Calibration, configuration and tuning parameters from the local interface will be automatically updated in the HART registers on the Logix 3200MD. Local setup and calibration that does not require a link to a host controller, PC or hand-held device, and local validation that setup is correct make any HART™ installation easy and straightforward.

With the Logix 3200MD, the local interface shown to the right can be used to set up the unit in seconds through the following steps:

1. Make sure the mechanical linkage, air tubing and actuator mounting are correct.

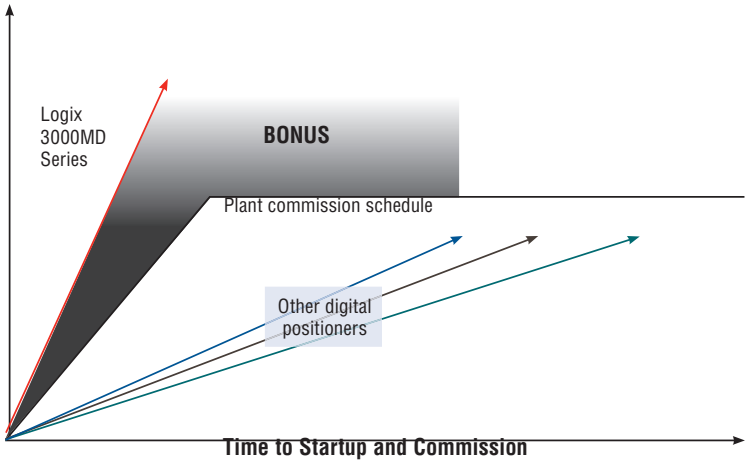
2. Set the configuration switches to the desired operation of the valve/actuator.

3. Set the quick calibration switch to Jog or Auto. In Jog, the 100% position can be manually adjusted using the yellow up and down buttons after Re-Cal is pressed. In Auto, the positioner finds the 100% position and calibration is complete. LED blink codes will guide the user through the process. Four green blinks (GGGG) or (GGGY) at the end of the sequence confirm that the calibration was successful.

4. If needed, the GAIN switch located to the right of the jog buttons will speed up or slow down the positioner's response to command changes. With the Auto Tune configuration switch set to "On", the positioner's algorithm will select a gain with no over-shoot. The 'E" position of the rotary GAIN dial indicates "neutral" with respect to gain adjustment. Turning clockwise from E to H and will speed up the response. Tuning counter-clockwise from E will slow it down, with A being the slowest response.

Time is Money

Shorter commissioning time gets you up and running, making money faster



3000MD Series Facts

The local interface in the 3000MD series positioners and the two way communication capability allows the user to quickly commission loops.

3400

- Three versions: Basic, Advanced (Advanced includes pressure sensors), and Pro (Pro includes pressure sensors and full featured valve diagnostics)
- ITK - CFF 5.1, 6.1.2
- DD available at www.fieldbus.org or www.flowserve.com
- Stores a valve signature onboard in NVRAM
- Linkable Position Feedback as part of the AO Function block.
- Contains: AO, PID, 2-DI, DO, OS, IS function blocks.
- Onboard temperature sensor to measure local positioner ambient
- Stroke speed limiter (configurable in transducer block)
- Stainless steel version available
- DTM Available

3200

- Three versions: Basic, Advanced (Advanced includes pressures), Pro (Pro includes pressure sensors and full featured valve diagnostics)
- HART Command 1, 3, 9, 33 & 48
- Burst Mode available to continuously transmit
  - Position command analog loop current
  - Final value of command after characterization
  - Supply pressure (advanced), Temperature (basic)
  - Stem position in percent
- Onboard temperature sensor to measure local positioner ambient
- Stroke speed limiter (configurable through HART)
- Stainless steel version available
- Enhanced Device Description for advanced signature diagnostics
  - Step test, friction test, HRL, data logger
- DTM Available

There's a Flowserve Expert Inside - ValveSight FDT/DTM Technology

Flowserve's ValveSight DTM software helps manage field devices by combining the features of field network hardware and the Hart (3200MD) or Foundation Fieldbus (3400MD) communication protocols using FDT/DTM technology with the Logix 3000MD series positioners. ValveSight is a complete software package, featuring a unique and easy to understand health status of the device that shows not only problems, but the magnitude of developing problems as well. ValveSight also has configuration and calibration screens to fully support the Logix 3000MD positioner family. Additionally, the user can access customized reports for all configuration, calibration and event data. Flowserve's ValveSight DTM opens the 'window' to the device and allows immediate views with live feedback on all active device sensors including valve stem position, control signal, friction, response time and other important system metrics.

ValveSight DTM software enables communication between the software and field device networks using the HART or FF protocol and provides access to the 24/7 diagnostic information from field devices. Using FDT/DTM technology maintenance personnel can access any Logix 3000MD series positioner on the network from a single workstation. Additionally, the software has capability to store configuration and calibration history and view event logs for each digital positioner accessible through the network.

Diagnostic Engine

Users can now obtain a new level of detailed real time diagnostic information with ValveSight DTM software. ValveSight features an "Expert Inside' performing real time on-line diagnostics 24 hours a day, 7 days a week. The diagnostic assessment of the 'expert inside' is instantly displayed on the local interface and through the ValveSight DTM software. The 'health bars' in the Dashboard view instantly indicate any developing issues and quickly direct the user to the implications and solutions for each problem. The system automatically prioritizes alarms to direct the user to the root cause.

Configuration Management

ValveSight DTM 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. ValveSight enables users to edit individual configurations and print a positioner configuration report.

21-Point Characterization Curve

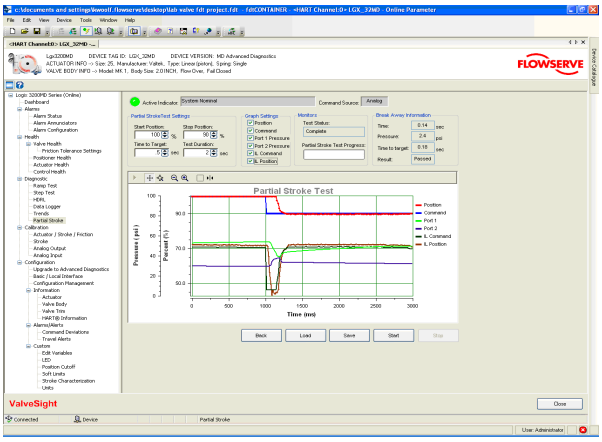
With ValveSight DTM software, the user can adjust a 21-point characterization curve to change the response of the positioner in order to meet the process requirements. The output of each control point is independent, allowing the user to create a custom curve with very high resolution. This customized curve can be saved in the memory of the Logix 3000MD positioners, and either activated or overridden with a simple on-board selector switch.

Signatures

The Logix 3000MD positioners are 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 ValveSight DTM software a user-defined signature ramp or step response test can be generated with a Logix 3000MD positioner. Signatures can be saved and cataloged (and later retrieved) for comparison with a more recent signature.

A special partial stroke signature function wil automatically test the valve/actuator and give a pass/fail indication.



Positioner Performance

Static performance and accuracy measures such as hysteresis, deadband, linearity, and repeatability can be obtained with the Logix 3000MD positioners. These values can be graphically depicted, stored and later retrieved for comparative analysis.

Logix 3000MD Series Features List for ValveSight DTM

		ValveSight DTM		Logix 3200MD Positioners			Logix 3400MD Positioners		
		ValveSight Basic	ValveSight Advanced	Logix 3200MD	Logix 3210MD	Logix 3220MD	Logix 3400MD	Logix 3410MD	Logix 3420MD
Overview	Dashboard	✓[1]	✓	✓[1,3]	✓[1]	✓	✓[1,3]	✓[1]	✓
	All-Alarm Annunciator	✓	✓	✓[2,3]	✓[2]	✓	✓[2,3]	✓[2]	✓
Configuration	Configuration Management	✓	✓	✓	✓	✓	✓	✓	✓
	Local Interface Control	✓	✓	✓	✓	✓	✓	✓	✓
	Position Cutoff	✓	✓	✓	✓	✓	✓	✓	✓
	Soft Limits	✓	✓	✓	✓	✓	✓	✓	✓
	Custom Stroke Characterization	✓	✓	✓	✓	✓	✓	✓	✓
	Counters and Travel Settings	✓	✓	✓	✓	✓	✓	✓	✓
	Command Deviation Settings	✓	✓	✓	✓	✓	✓	✓	✓
	Custom Units of Measure	✓	✓	✓[3]	✓	✓	✓[3]	✓	✓
	All-Variable Editor	✓	✓	✓	✓	✓	✓	✓	✓
Calibration	Analog Output Calibration	✓	✓	✓	✓	✓			
	Analog Input Calibration	✓	✓	✓	✓	✓			
	Stroke Calibration	✓	✓	✓	✓	✓	✓	✓	✓
	Pressure and Friction Calibration	✓	✓		✓[2]	✓		✓[2]	✓
Off-Line Diagnostics	Ramp Test	✓	✓	✓[3]	✓	✓	✓[3]	✓	✓
	Step Test	✓	✓	✓[3]	✓	✓	✓[3]	✓	✓
	HDRL Test		✓	✓	✓	✓	✓	✓	✓
	Data Logger		✓	✓[3]	✓	✓			
On-Line Diagnostics	Supply Pressure	✓	✓		✓	✓		✓	✓[4]
	Friction		✓			✓			✓
	Actuation Ratio		✓			✓			✓
	Pneumatic Leak		✓			✓			✓
	Long-Term Trends		✓			✓			✓
	Partial Stroke Test		✓			✓			✓
	Valve Health View		✓			✓			✓
	Positioner Health View		✓			✓			✓
	Actuator Health View		✓			✓			✓
	Control Health View		✓			✓			✓
Foundation Fieldbus Function Blocks	AO						✓	✓	✓
	PID						✓	✓	✓
	DO						✓	✓	✓
	DI						✓	✓	✓
	OS						✓	✓	✓
	IS						✓	✓	✓

1. Limited Function. No health information.
2. Limited function. No friction or force monitoring.
3. Limited function. No pressure monitoring or information.
4. DCS Function

The Logix 3000MD Positioner Specifications

Specifications for Logix 3400MD

Table I: Electrical Specifications

Power Supply	Two-wire, 9-32 VDC FF compatible
IS	Fisco compliant
Communications	FF Protocol ITK 5.1, 6.1.2
Operating Current	23 mA
Maximum Voltage	36.0 VDC

Table II: Environmental Conditions

Operating Temperature Range	Standard	-61° to 176°F (-52° to 80°C)
Transport and Storage Temperature Range	-61° to 176°F (-52° to 80°C)	
Operating Humidity	0 - 100% non-condensing	

Note: Performance may degrade at temperatures below -40° C

Note: The air supply must conform to ISA Standard ISA 7.0.01 (a dew point at least 18 degrees Fahrenheit below ambient temperature, particle size below five microns—one micron recommended—and oil content not to exceed one part per million).

Table III: Physical Specifications

Housing Material	Cast, powder-painted aluminum or stainless steel
Soft Goods	Buna-N / Florosilicone
Weight	8.3 pounds (3.9 kg) aluminum 20.5 pounds (9.3 kg) stainless steel

Table IV: Positioner Specifications

Deadband	<0.1% full scale
Repeatability	<0.05% full scale
Linearity	<0.5% (rotary), <0.8%, (sliding stem) full scale
Air Consumption	<0.3 SCFM (0.5 Nm^3/hr) @ 60 psi (4 bar)
Air Supply	30-150 psig (ISA 7.0.0.1 compliant)
Air Delivery	12 SCFM @ 60 psi (0.27 Cv)

Specifications for Logix 3200MD

Table I: Electrical Specifications

Power Supply	Two-wire, 4-20 mA 10.0 to 30.0 VDC
Compliance Voltage	10.0 VDC @ 20 mA
Effective Resistance	495 Ω @ 20 mA Typical Add 20 Ω when HART communication active
Communications	HART Protocol ITK 5
Minimum Operating Current	3.6 mA without AO board 3.7 mA with AO board
Maximum Voltage	30.0 VDC

Table II: Environmental Conditions

Operating Temperature Range	Low	-61° to 176°F (-52° to 80°C)
Transport and Storage Temperature Range	-52° to 176°F (-40° to 80°C)	
Operating Humidity	0 - 100% non-condensing	

Note: Performance may degrade at temperatures below -40° C

Note: The air supply must conform to ISA Standard ISA 7.0.01 (a dew point at least 18 degrees Fahrenheit below ambient temperature, particle size below five microns—one micron recommended—and oil content not to exceed one part per million).

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Air Delivery	12 SCFM @ 60 psi (0.27 Cv)

The Logix 3000MD E.O.M. Mounting Kits

Brand	Model	Size	Mounting Kit	
Fisher	657 & 667	30	213905	0.5" – 1.5" stroke
		34	141410	
		40		
		50	171516	0.5" – 1.5" stroke
			171517	2" stroke
		60	171516	0.5" – 1.5" stroke
			171517	2" stroke
		70	171518	4" stroke
		80	171519	
	1250	225	173371	
		450		
		675		
	1052	33	171549	Rotary
	657-8	40	173798	
Neles	RC		171512	
	RD		178258	
Foxboro	Slid-Std		173567	
	Linear		178258	
Honeywell	VST-VA3R	17-in. dia.	173798	
	VSL-VA1D	12-in. dia.	173798	
Masoneilan (Linear Actuators)	37	9	171721	
		11		
		13	171720	
		18	173382	
		24	173896	
	38	11	173235	
		13	173234	
		15	186070	
		18	173382*	
		24	173896	
	71 Domotor	25	173325	
		50	173335	
		100	173336	
	88	6	171722	
		16	173827	
	47	B	173361	
	48	B	173361	
	"D" Domotor	200	175141	
	71-2057AB-D		176179	
	71-40413BD		176251	

Brand	Model	Size	Mounting Kit	
Masoneilan (Rotary Actuators)	33	B	173298	
	35	4	173298	
		6		
		7		
	70	10	173298	
Valtek	Trooper		166636	0.75" – 1.50" Std
Automax	R314		141180	HD
	SNA115		NK313A	
Vangard	37/64		175128	
Air-Torque	AT Series	AT0 – AT6	Consult factory	
Automax	SNA Series	SNA3 – SNA2000		
	N Series	N250.300		
	R Series	R2 – R5		
Bettis	RPC Series	RP – TPC11000		
	G Series	G2009-M11 – G3020-M11		
EL-O-Matic	E Series	E25 – E350		
	P Series	P35 – P4000		
Hytork	XL Series	XL45 – XL4580		
Unitorq	M Series	M20 – M2958		
Worcester	39 Series	2539 - 4239		

**Adjustable mounting kit 173798 may be needed if handwheels are used.*

NAMUR Accessory Mounting Kit Part Numbers

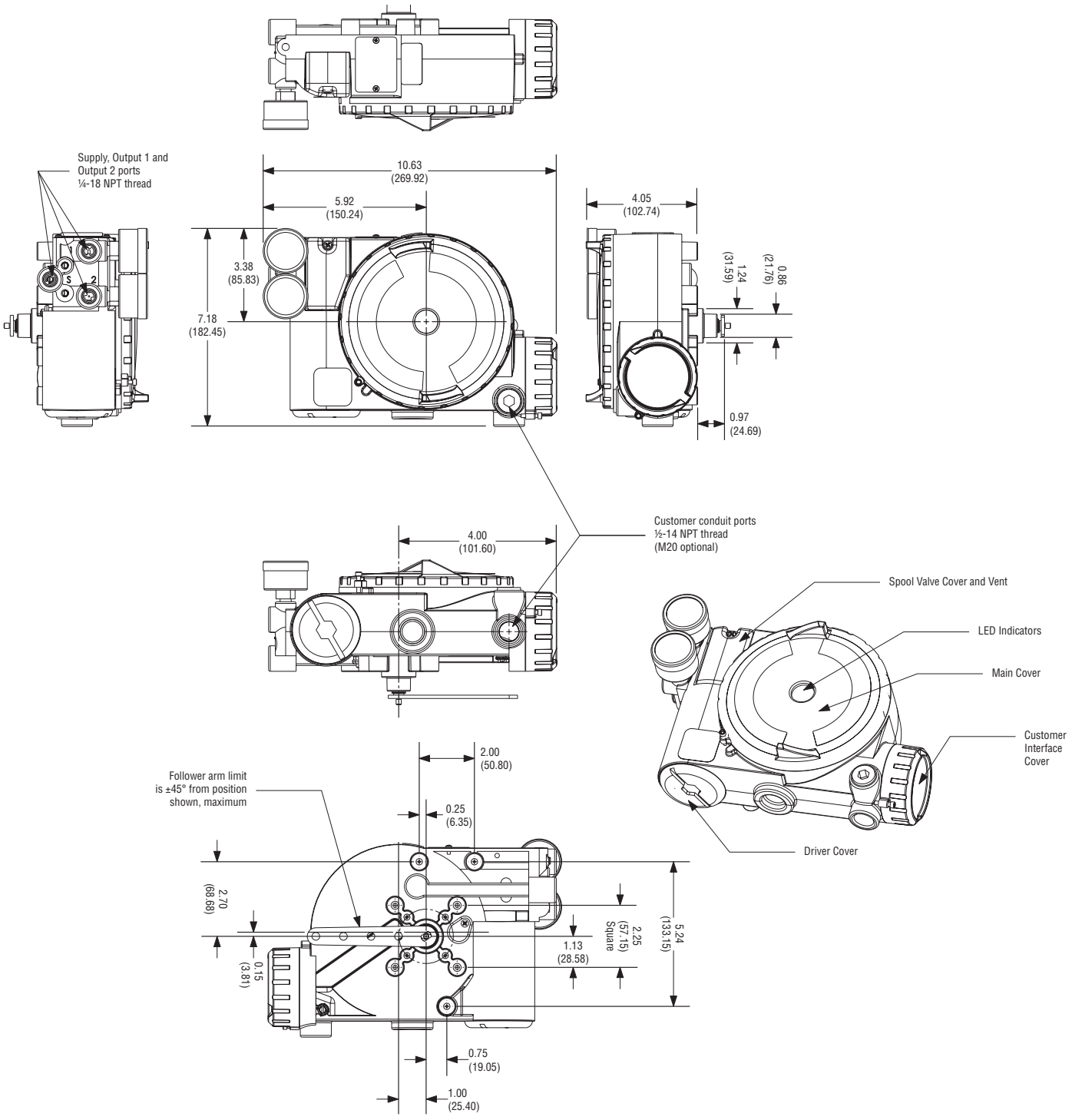
Bracket Option	Description
28	20 mm pinion x 80 mm bolt spacing
28	38 mm pinion x 80 mm bolt spacing
313	30 mm pinion x 80 mm bolt spacing
513	50 mm pinion x 130 mm bolt spacing
Bolt Option	**Description**
A	10-24 UNC bolting
B	10-32 UNF bolting
L	M5-.8 metric bolting

Example: NK313A, NAMUR Accessory Mounting Kit with 30 mm pinion x 80 mm bolt spacing and 10-24 UNC bolting.

Please contact your Flowserve representative for additional mounting kit availability.

3000MD Series dimensions

NOTE: Dimensions in inches (mm)



Selection		3200 Code	3400 Code	Example
		3	3	3
Protocol	HART	2		4
	Foundation Fieldbus		4	
Diagnostics	Standard (No Sensors)	0	0	1
	Advanced (With Sensors)	1	1	
	Pro Diagnostics (with sensors and full ValveSight dianostics)	2	2	
Material	Aluminum, White Paint (Valtek)	0	0	0
	Stainless Steel, No Paint (Valtek)	1	1	
	Aluminum, Black Paint (Automax)	2	2	
	Aluminum, Food-Grade White Paint (Automax)	3	3	
	Aluminum, Black Paint (Accord)	4	4	
	Aluminum, Food-Grade White Paint (Accord)	5	5	
Design Version				MD
Certifications	Explosion Proof Class I, Div. 1, Groups B,C,D (FM)	-01	-01	14
	Intrinsically Safe Class I, Div. 1, Groups A,B,C,D (FM)	-02	-02	
	INMETRO BR-EX ia IIC T4/T5; BR-Ex d IIB+H_2 T5 (South America)	-06	-06	
	Explosionproof Ex d IIB + H_2, Ex tD A21 T95^{0}C, ATEX II 2 G (CENELEC) (GOST GGTN Ex d IIB+H_2)	-07	-07	
	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	-14	
	Intrinsically Safe Ex ia IIC, T4 Tamb -40^{0}C to +85^{0}C, T5 Tamb -40^{0}C to +55^{0}C; Ex ia D 20, T95^{0}C -40^{0}C to +80^{0}C, ATEX II 1 G D (CENELEC) (GOST GGTN Ex i Intrinsically Safe IIC)	-15	-15	
	IECEx Explosionproof	-16	-16	
	IECEx Intrinsically Safe	-21	-21	
	ATEX: Explosion Proof: II2G Ex d IIB+H_2 T5; II2D Ex tD A21 T_{amb} -40^{0}C to +80^{0}C Intrinsically Save: II1G Ex ia IIC, T4 T_{amb} -40^{0}C to +85^{0}C, T5 T_{amb} -40^{0}C to +55^{0}C II1D Ex iaD 20 T95^{0}C -40^{0}C to + 80^{0}C Nonincendive: II3G Ex nL nA IIC, T4 T_{amb} -40^{0}C to +85^{0}C, T5 T_{amb} -40^{0}C to +55^{0}C II3D Ex tD A22 T95^{0}C -40^{0}C to + 80^{0}C	-28	-28	
	IECEx Explosionproof and Intrinsically safe (Mylar Nameplate)	-33		
	FM/CSA Explosionproof and Intrinsically Safe (Mylar Nameplate)	-34	-34	
	KOSHA*	-35		
	TRCU	-44	-44	
Shaft	DD 316 Stainless Steel Shaft (Valtek Standard)	-D6	-D6	D6
	NAMUR 316 Stainless Steel (VDI/VDE 3845)	-N6	-N6	
Conduit Connections	½" NPT	-E	-E	M
	M20	-M	-M	
Action	Four-way (Double-Acting)	-04	-04	4V
	Three-way (Single-Acting)	-03	-03	
	Three-way Purge (Single-Acting) not for use with natural gas. (used to purge spring side with instrument air)	-3P	-3P	
	Four-way Vented (Double-Acting)	-4V	-4V	
	Three-way Vented (Single-Acting)	-3V	-3V	
Temperature	Low Temperature (-61°F to 176°F; -52°C to 80°C)	-40	-40	40
Gauges	SS with brass internals, psi (bar/kPa) (Valtek Standard)	-0G	-0G	KS
	SS with SS internals, psi (bar/kPa)	-0S	-0S	
	SS with brass internals, psi (kg/cm2)	-KG	-KG	
	SS with SS internals, psi (kg/cm2) KS	-KS	-KS	
	No Gauges	-0U	-0U	
Special Options	No special options	-00	-00	OF
	4-20 mA Position Feedback	-0F	**	
	Remote Mount Feedback (Available with Certication Option -01,-02 & -14)	-RM	-RM	
	Fail Option Feedback*	-SF	-SF	

For each category, select the code for one of the options.
** Contact factory before specifying this option*

*** Not available on the Logix 3400*

Logix 3400MD Hazardous Area Certifications

Notified Body	Approval	Temperature Code	Enclosure Rating
FM APPROVED	Explosionproof: Class I, Div 1, Groups B,C,D Dust Ignition Proof: Class II, III, Div 1, Groups E,F,G	T6 T_{amb} ≤= -40ºC to 60ºC	Type 4X
	Intrinsically Safe: Class I, II, III, Div 1, Groups A,B,C,D,E,F,G Class 1, Zone 0, AEx ia IIC	T4 T_{amb} =-55ºC to 60ºC	TYPE 4X
	Non-Incendive: Class I, II, III, Div 2, Groups A,B,C,D,E,F,G	T6 T_{amb} -20ºC to 60º C	TYPE 4X
CSA®	Explosionproof: Class I, Div 1, Groups B,C,D Class II, Div 1, Groups E,F,G Class III Ex d IIB+H2	T5=-55º ≤ Ta ≤ 80ºC T6=-55º ≤ Ta ≤ 60ºC	Type 4X
	Intrinsically Safe: Class I, II, III, Div 1, Groups A,B,C,D Class 1, Zone 0, Ex ia IIC	T4 T_{amb} -55ºC to 60ºC	Type 4X
ATEX	Explosionproof (Flameproof): II 2 GD Ex d IIB + H_2 Ex tD A21 T95ºC	Gas T5= T_{amb}-52º to 80ºC Dust T_{amb}=-52º to 55ºC	IP65
	Intrinsically Safe: II 1 G Ex ia IIC	T4 (T_{amb} -52ºC to 60ºC)	IP65
	Non-Incendive: II 3 G Ex nL nA IIC	T6 T_{amb} -52ºC to 60ºC)	IP65
TRCU	Explosionproof (Flameproof): 1Ex d IIB+H_2T4/T6 Gb / Ex tD IIIC T95ºC X		IP65
	Intrinsically Safe: 0Ex ia IICT4 X		IP65
	Non-Incendive Ex nL IIC T6 Ex nA IIC T6		IP65
INMETRO	Explosionproof (Flameproof): BR-Ex d IIB + H_2	T5=(-40º ≤ Ta ≤ +55ºC)	IP65
	Intrinsically Safe: BR-Ex ia IIC	T4= (-40º ≤ Ta ≤ +60ºC)	IP65
IECEx	Explosionproof: Ex d IIB+H2 Gb Ex tb IIIC T95ºC Db FMC 10.0032X - Pending	Gas T5= T_{amb}-55º to 80ºC Dust T_{amb}=-55º to 55ºC	IP65
	Intrinsically Safe: Ex ia IIC T4 Ga	T4 (T_{amb} -40ºC to +60ºC)	IP65

Logix 3200MD Hazardous Area Certifications

Notified Body	Approval	Temperature Code	Enclosure Rating
FM APPROVED	Intrinsically Safe: Class I, II, III, Div 1, Groups A,B,C,D Class 1, Zone 0, AEx ia IIC	T4 T_{amb} ≤ = 85°C T5 T_{amb} ≤ = 55°C	NEMA 4X
	Non-Incendive: Class I, Div 2, Groups A,B,C,D	T4 T_{amb} ≤ = 85°C T5 T_{amb} ≤ = 55°C	
	Explosionproof: Class I, Div 1, Groups B,C,D Dust Ignition Proof: Class II, III, Div 1, Groups E,F,G	T6 T_{amb}≤ = -40°Cto 60°C	NEMA 4X
CSA®	Explosionproof: Class I, Div 1, Groups B,C,D Class II, Div 1, Groups E,F,G Class III Ex d IIB+H2	T5 T_{amb}=-40°C to +80°C T6 T_{amb}=-40°C to +60°C	TYPE 4X
	Intrinsically Safe: Class I, II, III, Div 1, Groups A,B,C,D Class II, E,F,G; Class III	T4 T_{amb}=-55°C to +85°C T5 T_{amb}=-55°C to +55°C	Type 4X
	Non-Incendive: Class I, II, Div 2, Groups A,B,C,D	T4 T_{amb}=-55°C to +85°C T5 T_{amb}=-55°C to +55°C	Type 4X
ATEX	Explosionproof (Flameproof): II 2 GD Ex d IIB + H_2 Ex tD A21 T95°C	T5 (T = -40°C to + 80°C)	IP65
	Intrinsically Safe: II 1 G D Ex ia IIC Ex iaD 20 T95°C	T4 T_{amb} -52°C to + 85°C T5 T_{amb} -52°C to + 55°C	IP65
	Non-Incendive: II 3 G Ex nL nA IIC Ex tD A22 T95°C	Ex nL nA T4 T_{amb} -52°C to + 85°C T5 T_{amb} -52°C to + 55°C Ex tD T_{amb} -52°C to + 80°C	IP65
IECEx	Explosionproof (Flameproof): Ex d IIB + H_2	T5 (T_{amb} -20°C to + 55°C) T5 (T_{amb} -40°C to + 55°C)	IP65
	Intrinsically Safe: Ex ia IIC Ex iaD 20 T95°C	Ex ia T4 Ta = -40°C to +85°C T5 Ta = -40°C to 55°C Ex ia D Ta = -40° to +80°C	IP65
INMETRO	Explosionproof (Flameproof): BR-Ex d IIB + H_2	T5 (-40°C ≤ Ta ≤ + 80°C)	IP65
	Intrinsically Safe: BR- Ex ia IIC	T5 (-40°C ≤ Ta ≤ + 50°C)	IP65
TRCU	Explosionproof (Flameproof): 1Ex d IIB+H_2T5 Gb / Ex tD A21 T95°C		IP65
	Intrinisically Safe: 0Ex ia IICT4/T5 Ga		IP65
	Non-Incendive ExnLnAIICT4/T5 / Ex tD A22 T95°C		
KOSHA	Explosionproof (Flameproof): Ex d IIB + H_2	T5 (T = -40°C to +50°C)	IP65

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