

FM Positioner

Series 8400, 830 and 820



FM Positioner

SMART Positioner

Forbes Marshall Series 8400SPN Positioner brings advanced sensor technology with numerous salient features. A simple to use, operator friendly device which is easy to adapt to control valve application. Numerous functions can be easily achieved by simple configuration. The design lends itself for use in all process plants such as power, pharma, chemical, paper etc. It is built in an elegant aluminium pressure die cast case with environmental protection and yet easy to maintain.

Pneumatic Positioner

Forbes Marshall Series 820 pneumatic positioner operates on the force balance principle and is capable of a short response time. These are vibration proof and suitable for split range operation as well.

Electro Pneumatic Positioner

Forbes Marshall Series 830 Electro Pneumatic positioner operates on the force balance principle. Split ranging is possible, if required.

Operating principle

The FM Smart positioner Series 8400 is a two-wire device that uses a 4-20mA signal input as its set point, from which it derives its power. It compares the setpoint with the actual position of the actuator stem and eliminates the positioning error accurately using an internal PID control action.

The heart of the positioner is a small piezo based transducer, which is a low power and low air consumption device. The electrical signal from the micro-controller is converted to precise equivalent pneumatic signals through the transducer, which operates the pilot valve, which in turn supplies the proportional air to the valve actuator.

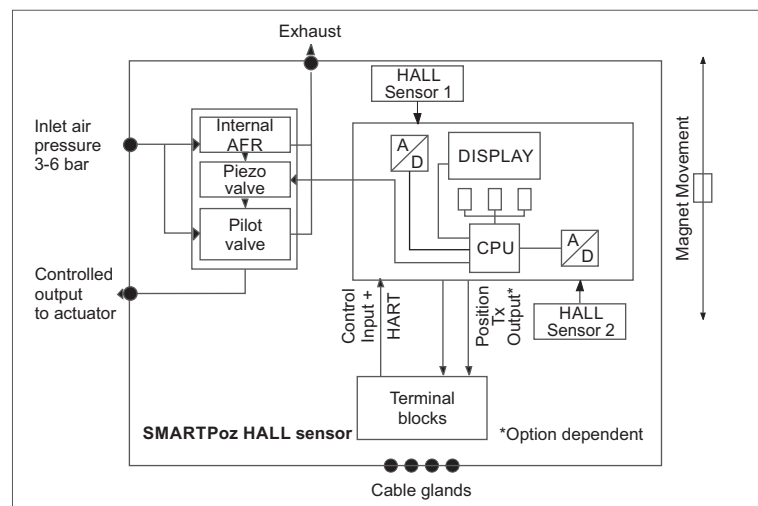
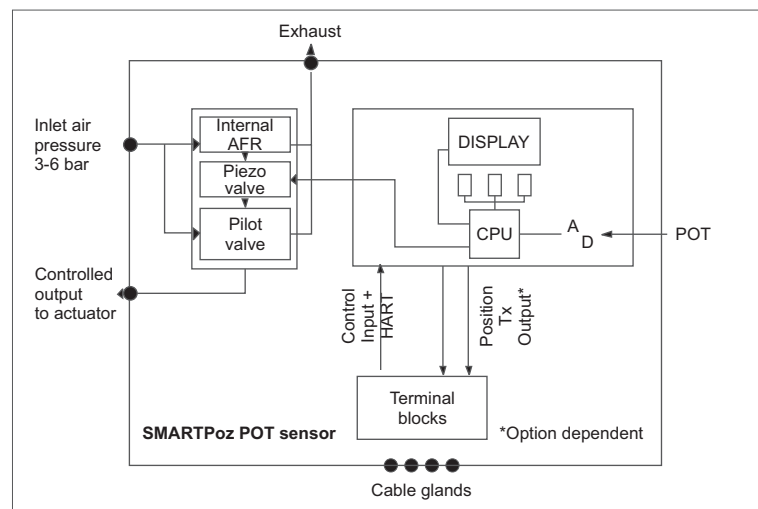
Potentiometric Sensor

This positioner is microprocessor based and provides fast, sensitive and accurate positioning for single acting linear pneumatic actuators. Optionally, we can provide HART communication and a 4-20mA output signal as position feedback. It comes in variants designed for use in both safe and hazardous environments. The positioner uses a highly reliable potentiometric sensor for feedback.

Hall Sensor

The series 8400SHH smart positioner uses a unique contactless magnetic position sensing technique in combination with a pair of Hall sensors. This mechanism is free from backlash and friction and helps achieve a fast and accurate position. The position sensing is contact-less and achieved by a combination of a shaft-mounted magnet and Hall-effect sensors mounted within the control unit.

Block diagram



Operating Specifications				
	SPN	SPH	SHN	SHH
Position sensing	Potentiometric sensor		HALL sensor : magnetic link-free sensing	
Controller type	Microprocessor based	SMART	Microprocessor based non-contact type	Microprocessor based non-contact type SMART
Stroke length	10 - 200 mm 0.4 - 8 inch		16, 20, 30, 60, 100 mm 0.64, 0.80, 1.2, 2.4, 4 inch	
Valve characteristics	Linear, Equal %, Modified Equal%, free adjustment			
Actuator type	Single-acting, linear pneumatic actuator • Forbes Marshall make (MSP/SSP series) • Any other make		Single-acting, linear pneumatic actuator. • MSP series • SSP series	
Control input (SP)	4-20mA	4-20mA with HART	4-20mA	4-20mA with HART
Display	Custom alphanumeric LCD with bar graph			
User input	Via Tactile keys : require opening of lid		Via Tactile keys : require opening of lid HALL-effect switches: externally operable using bar magnet	
Operating power	Powered from the 4-20mA control input signal Current to maintain ≥ 3.4 mA at compliance voltage of 10 VDC at 500 ohms			
Operating temperature	[-] 20°C to [+] 80°C		[-] 4°F to [+] 176°F	
Pneumatic input	1.5 – 6 bar(g)		22 – 87 psi(g)	
Air quality	Filtered with 5 microns, Oil Class : 3 (< 1 ppm), Dried according to ISO8573-1 Class 3 Humidity – Class I			
Air consumption	< 0.017 Nm³/hr		< 0.01 SCFM	

Position transmitter (optional)				
Position feedback signal	Passive 4-20mA output			
External power supply	$V_s = 12 \text{ to } 30 \text{ VDC max}$ $RI = [V_s - 5V]/20\text{mA}$			
Temperature stability	0.2% /10° K of full scale			
Accuracy of position feedback	$\pm 0.5\%$ of Span			
Communication	4-20 mA	HART over control input signal	4-20 mA	HART over control input signal

Connections		
	Standard	Specially for Ex-Proof / Intrinsically Safe
Terminations	Screw type, for 1sqmm conductor termination	Additional stud for EARTH connection
Cable gland	M20 x 1.5mm single compression 1/2" NPT	
Cable construction	2 core, Conductor 7-12mm OD	2 core, Conductor 1/4"-1/2" OD
Cable specs	Cable inductance : 3.05mH max Cable capacitance : 0.083 µF max	Cable inductance : 3.05mH max Cable capacitance : 0.083 µF max
Cable type	Control input : Unshielded 2 core Feedback : Unshielded 2 core	Control input : Armored 3 core (input+EARTH) Feedback : Armored 2 core
Pneumatic connection	1/4" NPT(F)	

Enclosure	
Housing	Aluminium pressure die cast (same for safe & hazardous area)
Weight	3 kgs 6.7 Lbs

Area Classification and Approvals		
Ingress protection	IP 66 Conforms to IEC60529	
Certification EMC, EMI	Conforms to IEC 61000-4-2, 4-3, 4-4, 4-5, 4-6 and 4-8, CISPR 22	
Certification Ex Proof (IS/IEC)	—	Ex d IIC T6 (-20°C ≤ Ta ≤ +55°C) Gb (-4°F ≤ Ta ≤ +131°F) *Ex d IIC T6 [Ex ia] IIC (-20°C ≤ Ta ≤ +60°C) Gb (-4°F ≤ Ta ≤ +140°F)
CE Declaration	Declaration of Conformity	
Tests	Vibration Test : IEC 60068-2-6. Bump Test : IEC 60068-2-29	

* Use appropriately approved associated intrinsically safe barrier

Model de-codification								
Model	Sensor		Communication		Position Transmitter		Enclosure	
8400S	P	POT	H	HART	N	Without POS. Tx	W	Weather proof
			N	4-20 mA				
	H	HALL	H	HART	T	With POS. Tx	E	Ex-proof *
			N	4-20 mA				

Ordering code : 8 4 0 0 S - - - -

* Intrinsically safe version available on request

Example : Model 8400SPHTW : Smart Positioner with POT sensor, HART, Position transmitter and Weather Proof

Electro Pneumatic - 830-WP



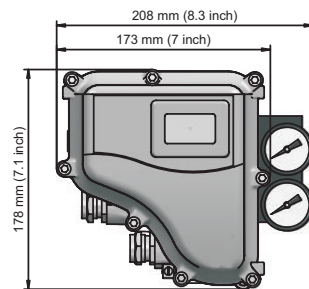
Pneumatic - 820-PP



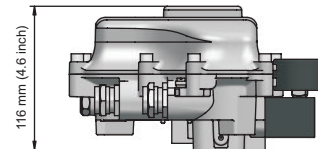
Technical Data

Type	820-PP Pneumatic	830-WP Electro Pneumatic
Input	0.2 - 1 Bar (3 - 15 psig)	4-20mA
Working resistance	—	Approx -200ohms
Impedence	—	250+/- 15 OHM
Supply Pressure	1.4 - 6 kg/cm ² (20 - 85 psig)	
Air consumption	3 lpm at 1.4 Bar (6.35 ft ³ /hr at 20 psig)	
Air flow capacity	80 lpm at 1.4 Bar (170 ft ³ /hr at 20 psig)	
Linearity	+/- 1% of F.S	
Hyserisis	+/- 1% of F.S	
Repeatability	+/- 0.5%	
Air connection	1/4" NPT(F)	
Gauge connection	1/8" NPT(F)	
Ambient Temp	-20° C to + 70° C (-4° F to 158°F)	
Protection	IP 66	
Weight	2.2 Kg (4.9 Lbs)	2.8 Kg (6.2 Lbs)
Ex. proof	—	IIB & IIC
Electric Connection	—	G 1/2 (PF 1/2)

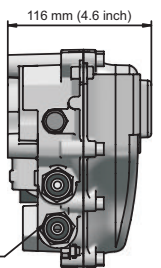
Dimensions - SMART Positioners



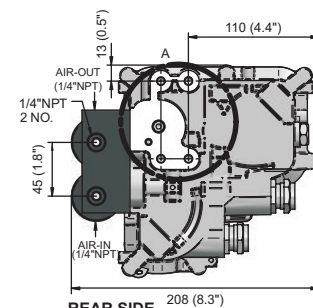
FRONT VIEW



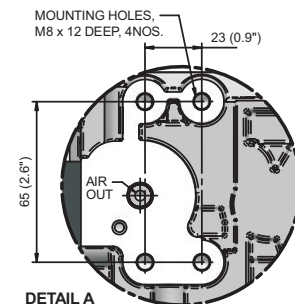
BOTTOM VIEW



SIDE VIEW



REAR SIDE



DETAIL A



Forbes Marshall
Krohne Marshall
Forbes Marshall Arca
Codel International
Forbes Solar
Forbes Vyncke
Forbes Marshall Steam Systems

480, California Avenue,
Suite 102, P.O. Box 60670
Palo Alto CA 94306
California, USA
Tel: +1 650 327 4227/ +1 650 321 4224
Fax: +1 650 327 4127/ +1 650 321 4454

Email : fm.usa@forbesmarshall.com, ccmidc@forbesmarshall.com

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Forbes Marshall Canada Inc.
2425 Matheson Blvd East, 8th Floor
Mississauga, ON L4W 5K4
Tel: +1 905 361 2880
Fax: +1 905 361 6401

A-34/35, MIDC H Block
Pimpri, Pune - 411 018. INDIA.
Tel : 91(0)20-27442020, 39851199
Fax : 91(0)20-27442040

CIN No.: U28996PN1985PTC037806
www.forbesmarshall.com