



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 Postioner

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 microcontroller 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.

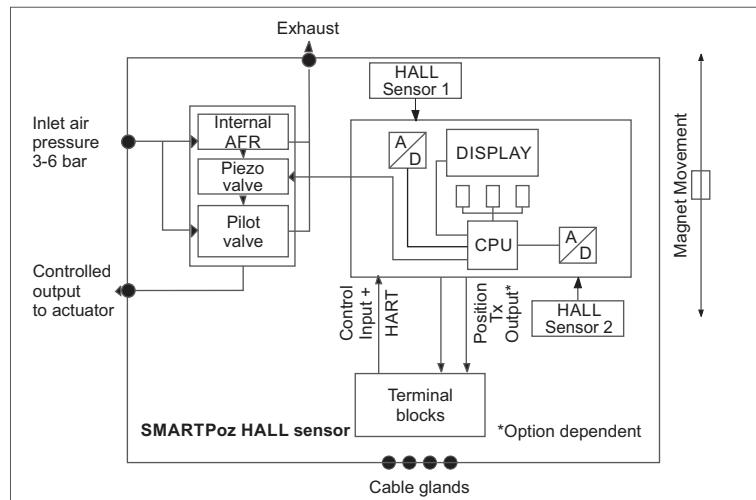
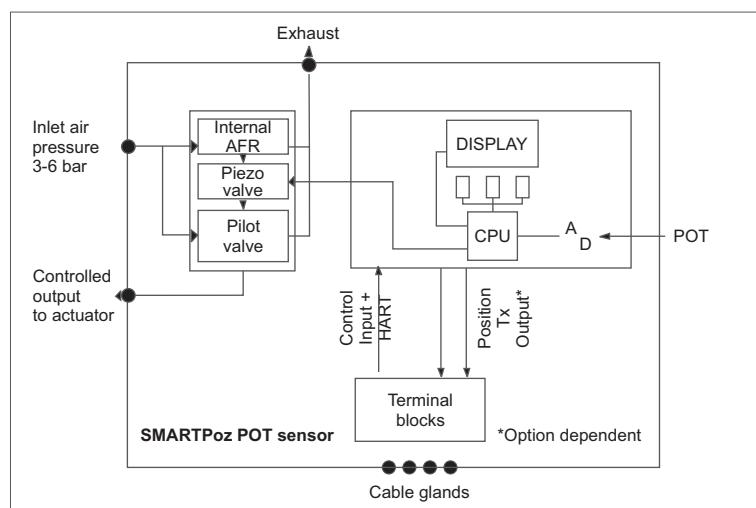
Potentiometric Sensor

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 $\geq 3.4\text{mA}$ 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	Vs = 12 to 30 VDC max $RI = [Vs-5V]/20\text{mA}$			
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 $\leq Ta \leq +55^\circ\text{C}$) Gb (-4°F $\leq Ta \leq +131^\circ\text{F}$) *Ex d IIC T6 [Ex ia] IIC (-20°C $\leq Ta \leq +60^\circ\text{C}$) Gb (-4°F $\leq Ta \leq +140^\circ\text{F}$)			
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	
			N	4-20 mA		W	
	H	HALL	H	HART	T	With POS. Tx	
			N	4-20 mA		E	

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



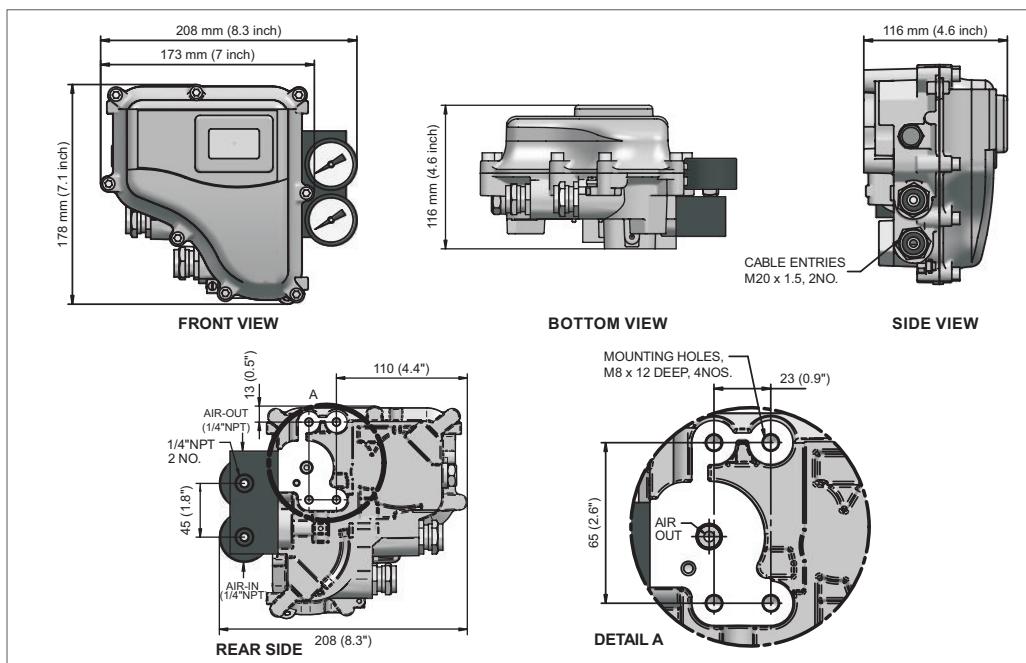
Pneumatic - 820-PP



Technical Data

Type	820-PP Pneumatic	830-WP Electro Pneumatic
Input	0.2 - 1 Bar (3 - 15 psig)	4-20mA
Working resistance	—	Approx -200ohms
Impedance	—	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



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

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