

FY302

FIELDBUS VALVE POSITIONER

Features

- Digital LCD Display (optional).
- Configuration through FIELDBUS communication from, e.g., a PC or by the local adjustment switches.
- Instantiation and deletion of function blocks.
- Self diagnostics.
- Weather proof, Explosion proof and intrinsically safe.
- Low air consumption.
- Direct non-contact position sensing.
- Valve Characteristics change with software cams.
- Wide Range of Function Blocks.
- Network master capability.



Description

The FY302 is from the first generation of Fieldbus devices. It is a control valve positioner for pneumatic valve in a Fieldbus system. The FY302 produces a pressure output as required to position a control valve according to an input received over the Fieldbus network or internal controller. The Fieldbus technology used in the FY302 enables, an easy interface between the field and the control room and several interesting features that considerably reduce the installation, operation and maintenance costs.

The FY302 is part of Smar's complete 302 series of Fieldbus devices.

Reliable and flexible

Elimination of many mechanical parts seen in other positioners has a number of advantages. Higher reliability as there are fewer parts that wear, safer as there are less moving parts, more accurate as there is less dead-band from mechanical imprecision.

Position sensing is done without any mechanical contact virtually eliminating wear and tear and subsequent degradation. [FY302](#) directly senses longitudinal or rotary movement based on the Hall effect. The position signal may also be used in advanced control schemes.

The Hall effect sensor allows a remote mounting, using an up to 20 m length extension cable. Such feature is suitable for high temperatures applications and heavy vibration places.



Valve characteristics, action, absolute and rate-of-change limits, etc. are altered in software instead of a mechanical cam and spring, changing, action or characteristics between linear, equal percentage, hyperbolic (quick opening) or a freely configurable table may be done remotely by the click of a button. These and other software capabilities make the [FY302](#) extremely flexible.

Self diagnostics

The continuous self diagnostics of the positioner issues alerts for a range of hardware and software failures and problems with the positioner or valve immediately, enabling maintenance personnel to pinpoint errors instantly or even before they can cause any harm. The diagnostic data may also be accessed on demand.

The benefit for the operator to get this information without having to bring the valve or positioner in to a workshop for testing is obvious. The time that can be saved by not having to test only a few units is enormous.

Diagnostics enables you to quickly determine if a process problem is due to the valve/positioner or not, without having to do several field visits. Production can get back in operation in minutes.

The diagnostics functions are also suitable for preventive maintenance such as detection of increasing valve dead-band and "stick-slip" operation.

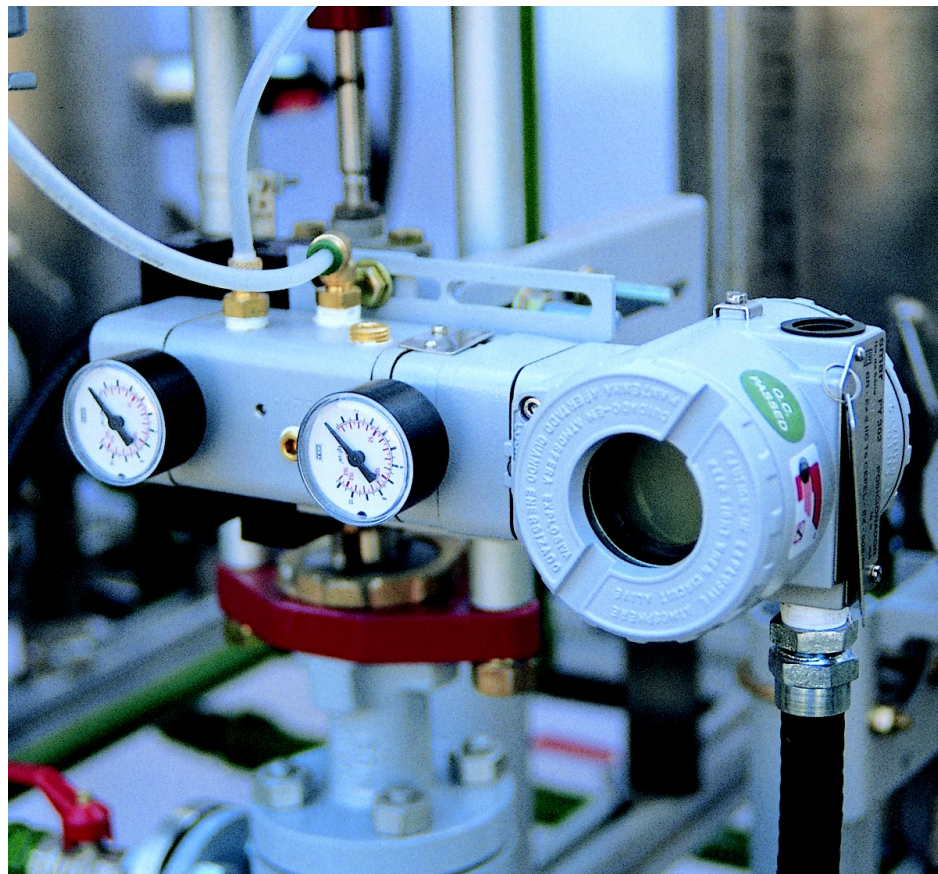
There is also software limit switches for travel, which automatically alerts the operator.



**Function
Blocks Table**

BLOCK	
RES	RESOURCE - This block contains data that is specific to the hardware that is associated with the resource.
TRD	TRANSDUCER BLOCK - This block converts the primary variables of the physical I/O devices into the proper engineering value requested by the function blocks.
DSP	DISPLAY TRANSDUCER - This configures what process variables of the function block will be displayed in the device LCD panel.
DIAG	DIAGNOSTICS TRANSDUCER - It provides online measurement of block execution time, check of links between blocks and other features.
PID	PID CONTROL - This standard block has a lot of valuable features as setpoint treatment (value and rate limiting), filtering and alarm on PV, feed-forward, output tracking and others.
EPID	ENHANCED PID - It has all the standard features plus: bumpless or hard transfer from a "manual" mode to an "automatic" mode and bias.
AO	ANALOG OUTPUT - The AO block provides a value to an output transducer block. It provides value and rate limiting, scaling conversion, fault state mechanism and other features.
ARTH	ARITHMETIC - This calculation block provides some pre-defined equations ready for use in applications as flow compensation, HTG, ratio control and others.
INTG	INTEGRATOR - It integrates a variable in function of the time. There is a second flow input that may be used for the following applications: net flow totalization, volume/mass variation in vessels and precise flow ratio control.
ISEL	INPUT SELECTOR - This block has four analog inputs that may be selected by an input parameter or according to a criterion as first good, maximum, minimum, middle and average.
CHAR	SIGNAL CHARACTERIZER - It has capability for two signal characterization based on the same curve. The second input has an option for swapping "x" to "y", providing an easy way to use the inverse function, that may be used in signal characterization of read-back variables.
SPLT	SPLITTER - This block is used in two typical applications: split ranging and sequencing. It receives the output of PID block that is processed according to the selected algorithm then it generates the values for the two analog output blocks.
AALM	ANALOG ALARM - This alarm block has dynamic or static alarm limits, hysteresis, temporary expansion of alarm limits on step setpoint changes to avoid nuisance alarms, two levels of alarm limits and delay for alarm detection.
SPG	SETPOINT RAMP GENERATOR - This block generates setpoint following a profile in function of the time. Typical applications are temperature control, batch reactors, etc.

TIME	TIMER - This block has four discrete inputs that are processed by combination logic. The selected timer processing type operates on the combined input signal to produce a measurement, delay, extension, and pulse or debounce.
LLAG	LEAD-LAG - This block provides dynamic compensation of a variable. It is used normally in a feed-forward control.
OSDL	OUTPUT SELECTOR / DYNAMIC LIMITER – It has two algorithms: <ul style="list-style-type: none"> • Output selector – selection of output by a discrete input. • Dynamic limiter – this algorithm was developed specially for double cross limit in combustion control.
CT	CONSTANT - It provides analog and discrete output parameters with constant values.



Technical Characteristics

Functional Specifications

Travel	Linear Motion: 10 - 100 mm. Rotary Motion: 30 - 120° Rotation Angle.
Input Signal	Digital only. FOUNDATION™Fieldbus, 31.25 Kbits/s voltage mode with bus power.
Output	Output to actuator 0 -100% supply air pressure. Single or double-action.
Power Supply	Bus powered: 9-32 Vdc. Quiescent current consumption 12 mA.
Pressure Supply	1.4 - 7 bar (20-100 psi) free of oil, dust and water.
Indication	Optional 4½-digit numerical and 5-character alphanumeric LCD indicator.
Hazardous Location Certification	Explosion proof, weather proof and intrinsically safe (CENELEC and FM standards pending).
Temperature Limits	Operation: -40 to 85°C (-40 to 185°F). Storage: -40 to 90°C (-40 to 194°F). Display: -10 to 60°C (14 to 140°F) operation. -40 to 85°C (-40 to 185°F) without damage.
Remote Hall	Operation: -40 to 150°C (-40 to 302°F).
Humidity Limits	0 to 100% RH.
Turn-on Time	Approximately 10 seconds.
Update Time	Approximately 0.2 second.
Flow Characterization	Linear, equal percentage, quick opening and customer configuration through fieldbus communication from, e.g., a PC or by the local adjustment switches.
Gain	Through software or locally adjustable.
Travel Time	Through software or locally adjustable.
Actual Position Sensing	Magnet (Non-contact) via Hall Effect.

Performance Specifications

Resolution	≤ 0.1% F.S.
Repeatability	≤ 0.1% F.S.
Hysteresis	≤ 0.1% F.S.
Consumption	0.25 Nm ³ /h (0.15 scfm) at 1.4 bar (20 psi) supply. 0.70 Nm ³ /h (0.40 scfm) at 5.6 bar (80 psi) supply.
Output Capacity	13.6 Nm ³ /h (8 scfm) at 5.6 bar (80 psi) supply
Ambient Temperature Effect	0.8%/20°C do span.
Supply Pressure Effect	Negligible.
Vibration Effect	15-150 Hz at 2 g. 150-2000 Hz at 1g. Reference SAMA PMC 31.1 - 1980, Sec. 5.3, Condition 3, Steady State.
Electro-Magnetic Interference Effect	Designed to comply with IEC 801 and European Standards EN50081 and EN50082.

Physical Specifications

Electrical Connection	1/2 -14 NPT, Pg 13,5 or M20 x 1,5.
Pneumatic Connections	Supply and output: 1/4 - 18 NPT. Gage: 1/8 - 27 NPT.
Material of Construction	Injected low copper aluminum with polyester painting or 316 Stainless Steel housing, with Buna-N O-rings on cover (NEMA 4X, IP67).
Weight	Without display and mounting bracket: 2.7 kg. Add for digital display: 0.1 kg.
For Aluminum FY:	Remote sensor: 550g cable: 100 g (connectors) plus 45g/m

Ordering Code

MODEL FY302 FIELDBUS VALVE POSITIONER

CODE	Digital	Local	Indicator
0	Without Digital Indicator		
1	With Digital Indicator		

CODE	Mounting Bracket**
0	Without Bracket
1	With Bracket

CODE	Electrical Connections
0	½ - 14 NPT
A	M20 x 1,5
B	Pg 13,5 DIN

CODE	Type of Magnet Coupling
1	For Rotary – Single Action
2	For Rotary – Double Action
3	For Linear Stroke Up to 15mm - Single Action
4	For Linear Stroke Up to 15mm - Double Action
5	For Linear Stroke Up to 50mm - Single Action
6	For Linear Stroke Up to 50mm - Double Action
7	For Linear Stroke Up to 100mm – Single Action
8	For Linear Stroke Up to 100mm – Double Action
Z	Others Specify
A	Linear Stroke up to 30 mm - Single Action
B	Linear Stroke up to 30 mm - Double Action

CODE	Pressure Gage ***
0	Without Gage
1	With Gage – Input
2	With Gage – Output 1
3	With 2 Gages - Input and Output 1
4	With 2 Gages - Output 1 and 2
5	With 3 Gages
Z	Others Specify

CODE	Optional Items *
ZZ	Special Options - Specify
H1	316 SST housing
K1	With pressure sensors for air input and output
R1	Remote sensor: 5m (****)
R2	Remote sensor: 10m (****)
R3	Remote sensor: 15m (****)
R4	Remote sensor: 20m (****)

FY302 - **1** **0** - **I** **1** **0** /

◀ TYPICAL MODEL NUMBER

* Leave it blank for no optional items.

** Use separate ordering code.

*** The pressure gauges for supply pressure, output 1 or output 2, when specified in stainless steel, will be supplied with the external housing in SS316 and the wet parts in brass.

**** Consult for hazardous areas applications.

BFY BRACKET

CODE	Positioner Mounting	Bracket
0	Without Positioner Bracket	
1	Universal Rotary	
2	Universal Linear (Yoke and Pillar)	
3	Linear – Yoke Type	
4	Linear – Pillar Type	
z	Others Specify	

CODE	Magnet Mounting Bracket
0	Without Magnet Mounting Bracket
1	Rotary
2	Linear Up to 15mm
3	Linear Up to 50mm
4	Linear Up to 100mm
S	Linear Up to 30mm
Z	Others Specify

CODE	Mounting Bracket Material
C	Carbon Steel Bracket
I	316 SST Bracket
7	Carbon Steel Bracket and Accessories in SST
Z	Others – Specify

CODE	Optional Items*
ZZ	Specify Actuator Model / Company

BFY - **1** **0** **C** / *****

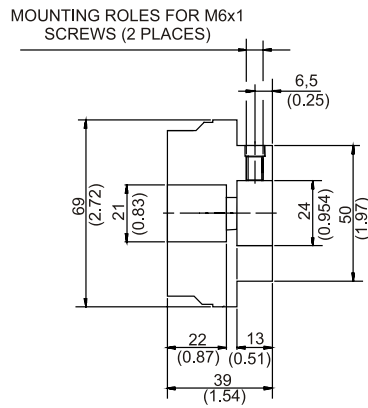
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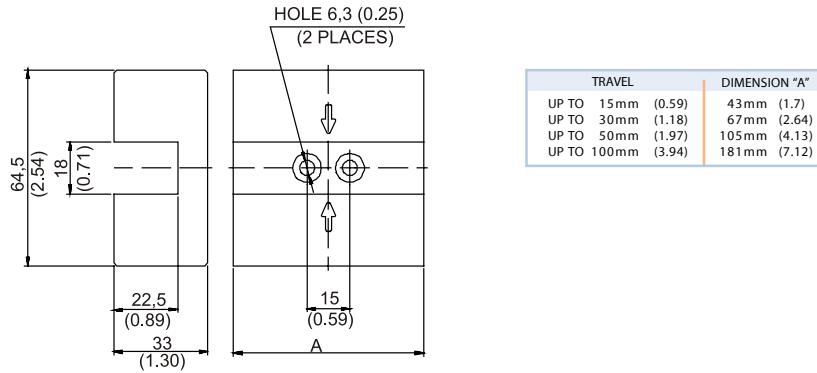
Dimensions

Dimensions are mm (in)

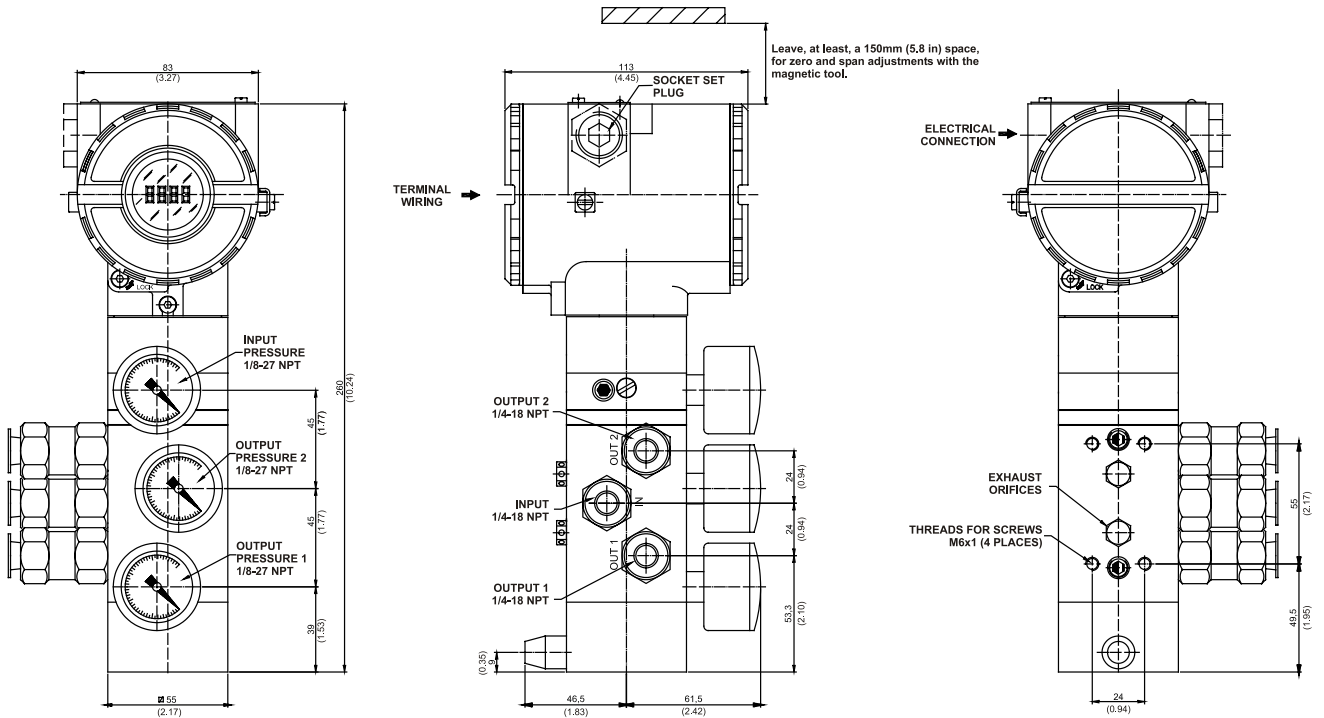
Rotary Magnet



Linear Magnet



Valve Positioner



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