

FY301

SMART VALVE POSITIONER
4 to 20 mA + HART® Digital Communication



smar

The FY301 microprocessor based positioner provides fast and accurate positioning of diaphragm or cylinder actuators. The FY301 produces a pressure output as required to position a control valve according to a 4 to 20 mA input signal from a controller.

The FY301 is compact and easy to maintain and to adjust.

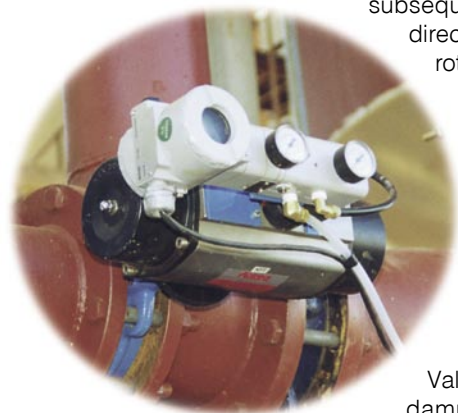
Remote communication based on the Hart® protocol enables an easy interface between the field and the control room besides having connectivity with asset management softwares, reducing considerably installation, operation and maintenance costs. The FY301 is part of Smar's complete 301 series of smart devices. Local calibration and parameter setting may also be done with or external devices.

Reliable and Flexible

By eliminating many mechanical parts seen in other positioners, the FY301 has a number of advantages. The valve position reading uses a magnetic sensor based on the Hall effect, without levers or potentiometers. The FY301 presents higher reliability, since there are less parts that wear, it is also safer since there are less moving parts, and more accurate since there is less deadband from mechanical imprecision.

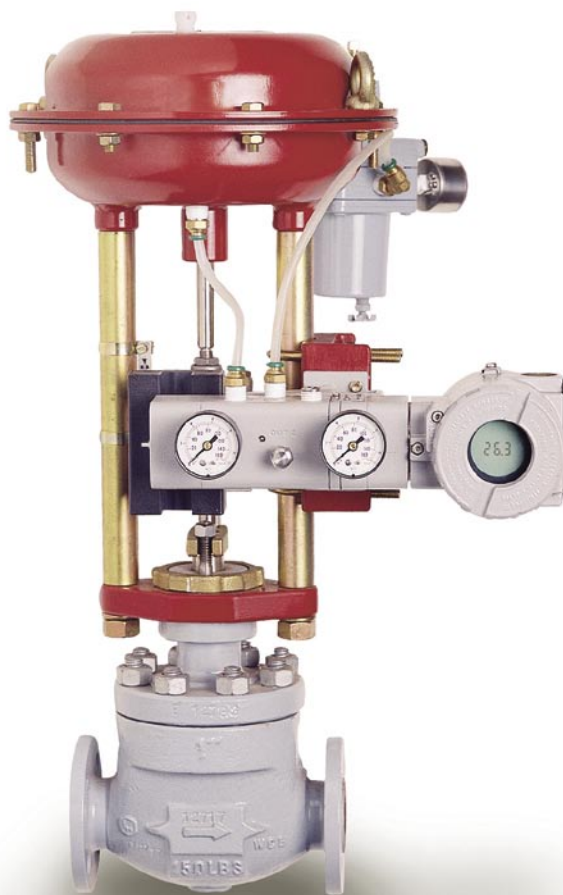
Position sensing is done without any mechanical contact virtually eliminating wear and tear and subsequent degradation. FY301

directly senses longitudinal or rotary movement based on the Hall effect. 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, damping, etc. use software configuration instead of changing mechanical cam and spring.

Changing damping, action or characteristics between linear, equal percentage, hyperbolic (quick opening) makes the FY301 extremely flexible.



- ✓ Compact and modular design.
- ✓ Low air consumption.
- ✓ Easy installation.
- ✓ Direct non-contact position sensor.
- ✓ Operate with rotary or linear motion, single or double acting pneumatic actuators.
- ✓ Easy adjustment and parameter settings with remote Hart® communication or local adjustment and display.
- ✓ Weather proof, explosion proof and intrinsically safe.
- ✓ Flow characteristics changed via software.
- ✓ Self-configured in few minutes.
- ✓ Remote hall sensor ideal for high temperatures and vibration applications.
- ✓ Optional internal pressure sensor for on line valve diagnosis.
- ✓ Connectivity with asset management softwares for maintenance.



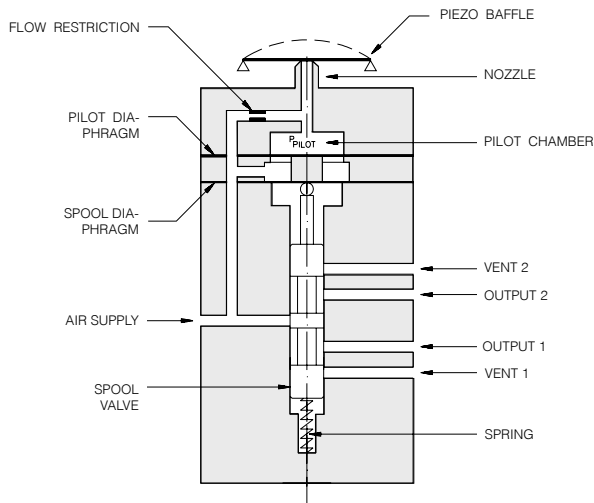
Output Module

The main parts of the output module are the pilot, servo, Hall effect sensor and the output control circuit.

The FY301 CPU produces an electronic setpoint signal for the control circuit. The control circuit receives an actual valve position feedback signal from a Hall Effect sensor. Then it compares both signs, resulting in a voltage for baffle (Piezo) for the right valve positioning.

A piezoelectric disk is used as baffle in the pilot stage. The baffle is deflected when a voltage is applied by the control circuit. If a change in position is demanded, the baffle deflects. A small stream of air flowing through the nozzle is changed, causing a change in pressure in the pilot chamber. This is called the pilot pressure.

The servo amplifies the pilot pressure through a diaphragms set, making the spool valve to move, changing the pressures in output 1 and output 2, until the position is reached.



Once the whole treatment is made digitally, with Hart® Protocol, the FY301 has great information available for proactive maintenance. These information can be monitored and managed for most of the asset management softwares like AssetView, softwares with open protocols (FDT/DTM) and proprietary softwares (consult Smar for softwares list).

On-Board Parameters

Through local adjustments the operator is able to calibrate all parameters without requiring any external device. A magnetic screwdriver is the only tool required for all parameters and special function access. A configurator is available for more sophisticated operation.

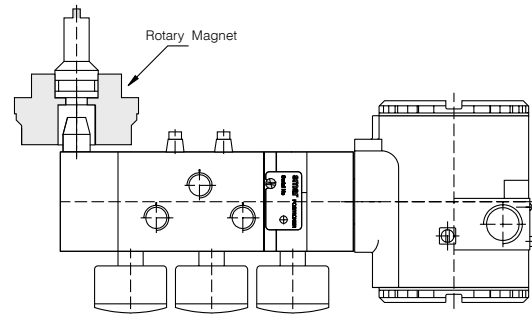
Calibration of the open and close position of the actuator is automatic. If another position is required the fine calibration of zero point and travel is possible using a configurator or a magnetic tool.

Gain and travel time are locally adjustable allowing positioner optimization for the process conditions.

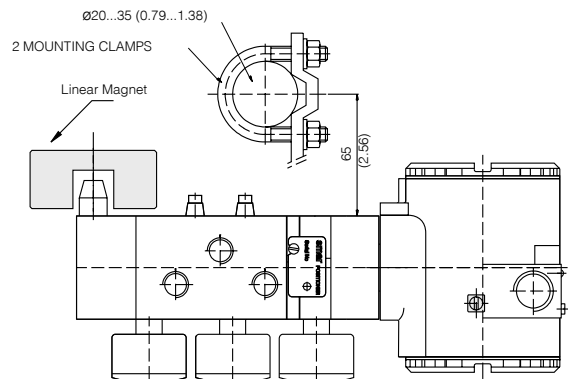
FY301 has combined all these functions in a single unit:

- Direct or reverse action;
- Single or double acting actuators;
- Linear or rotary motion actuators;
- Split range;
- Flow characterization:
 - Linear;
 - Equal percentage 1:50 - 1:25;
 - Hyperbolic 1:50 - 1:25;
 - Control constants adjustments;
 - Diagnosis.

The mounting set for rotary actuators complies with VDI/VDE 3845.



The mounting set for linear actuators complies with IEC534-6 (NAMUR).



Functional Specifications

Travel

Linear Motion: 3 - 100 mm.
Rotary Motion: 30 - 120° Rotation Angle.

Input Signal

Two-wire, 4-20 mA controlled according to NAMUR NE43 Specification, with superimposed digital communication (Hart® Protocol).

Power

Supplied by the 4-20 mA current. No external supply required.

Voltage drop

11 Vdc max / 20 mA (equivalent to 550Ω.)

Minimum current

3.8 mA.

Configuration

By digital communication (Hart® protocol) using the Configuration Interface CONF401 or the Hart® Pocket Configurator HPC301.

Can be done partially, through local adjustment.

Reverse Polarity Protection

No damage occurs from reversal of normal supply current (4-20 mA) or from misapplication of up to 50 mA.

Output

Output to actuator 0 – 100% supply air pressure.
Single or double-action.

Pressure Supply

1.4 - 7 bar (20-100 psi).
Free of oil, dust and water.

Indication

4½-digit LCD indicator and 5 alphanumeric characters.

Hazardous Location Certification

Explosion proof, weather proof and intrinsically safe from CEPEL, FM, CSA, NEMKO and DMT.

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.

Flow Characterization

Linear, Equal Percentage, Quick Opening, 16 freely selectable points .

Gain and Reset Time

Through software or Locally adjustable.

Travel Time

Through software or locally adjustable.

Actual Position Sensing

Sensor Hall effect.

Performance Specifications

Resolution

≤ 0.1% F.S.

Repeatability

≤ 0.1% F.S.

Hysteresis

≤ 0.1% F.S.

Consumption

0.25 Nm³/h (0.15 SCFM) at 1.4 bar (20 psi) supply.
0.70 Nm³/h (0.40 SCFM) at 5.6 bar (80 psi) supply.

Output Capacity

13.6 Nm³/h (8 SCFM) at 5.6 bar (80 psi) supply.

Ambient Temperature Effect

0.8%/20 °C of span.

Supply Pressure Effect

Negligible.

Vibration Effect

± 0.3 % /g of span during the following conditions:
5-15 Hz at 4 mm constant displacement.
15-150 Hz at 2g.
150-2000 Hz at 1g.
Reference SAMA PMC 31.1

Electro-Magnet Interference Effect

Comply with IEC801 and European Standards EN50081 and EN50082.

Physical Specifications

Electrical Connection

½ -14 NPT, Pg 13.5 or M20 x 1.5.

Pneumatic Connections

Supply and output: ¼ -18 NPT.
Gage: ⅛ - 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, IP 67).

Weight

Without display and mounting bracket: 5.8 kg (316 SST). 2.7 kg (aluminum).
Add for digital display: 0.1kg.
For Aluminum FY: Remote sensor: 550g
Cable: 100 g (connectors) plus 45g/m.

Hart is a trademark of Hart® Communication Foundation.

MODEL FY301		SMART VALVE POSITIONER - 4 to 20 mA + Hart® Digital Communication	
CODE	Local Indicator		
0	Without Digital Indicator		
1	With Digital Indicator		
CODE	Mounting Bracket		
0	Without Bracket		
1	With Bracket		
CODE	Electrical Connection		
0	½ - 14 NPT		
A	M20 X 1.5		
B	Pg 13.5 DIN		
CODE	Type of Actuator (Not Included)		
1	Rotary - Single Action		
2	Rotary - Double Action		
3	Linear Stroke up to 15 mm - Single Action		
4	Linear Stroke up to 15 mm - Double Action		
5	Linear Stroke up to 50 mm - Single Action		
6	Linear Stroke up to 50 mm - Double Action		
7	Linear Stroke up to 100 mm - Single Action		
8	Linear Stroke up to 100 mm - Double Action		
A	Linear Stroke up to 30 mm - Single Action		
B	Linear Stroke up to 30 mm - Double Action		
Z	Others (Specify)		
CODE	Indication 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*		
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 (**)		
ZZ	With Special Characteristics		

FY301 - **1** | **0** - **0** | **1** | **0** / * ← TYPICAL MODEL NUMBER

* Leave it blank for no optional items.

** Consult for hazardous areas applications.

*** 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.

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 15 mm		
3	Linear up to 50 mm		
4	Linear up to 100 mm		
5	Linear up to 30 mm		
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		

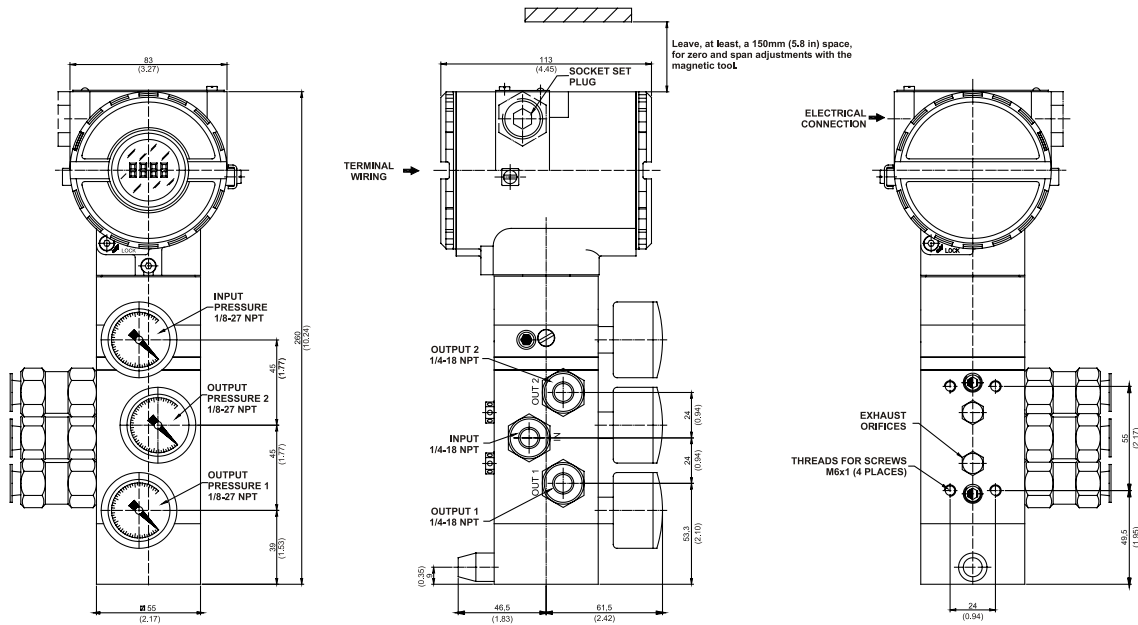
BFY - **1** | **0** | **C** / * ← TYPICAL MODEL NUMBER

* Leave it blank for no optional items.

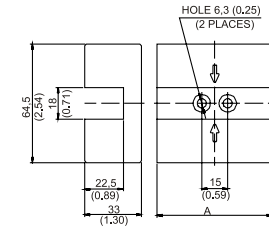
**Consult www.smar.com for customized mounting brackets selection.

VALVE POSITIONER

All dimensions are in mm (in)

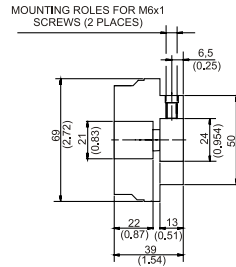


LINEAR MAGNET



TRAVEL	DIMENSION A
UP TO 15mm (0.59)	43mm (1.7)
UP TO 30mm (1.18)	67mm (2.64)
UP TO 50mm (1.97)	105mm (4.13)
UP TO 100mm (3.94)	181mm (7.12)

ROTARY MAGNET



USA
Tel.: +1 713 849-2021
Fax: +1 713 849-2022
e-mail: sales@smar.com

Smar Research Corporation
Tel.: +1 631 737-3111
Fax: +1 631 737-3892
e-mail: sales@smarresearch.com

Smar Laboratories Corporation
Tel.: +1 713 849-2021
Fax: +1 713 849-2022
e-mail: sales@smar.com

SINGAPORE
Tel.: +65 6324-0182
Fax: +65 6324-0183
e-mail: info@smar.com.sg

BRAZIL
Tel.: +55 16 3946-3510
Fax: +55 16 3946-3554
e-mail: insales@smar.com.br

GERMANY
Tel.: +49 671-794680
Fax: +49 671-7946829
e-mail: infoservice@smar.de

MEXICO
Tel.: +53 78-4600 al 02
Fax: +53 78-4603
e-mail: ventas@smar.com

NETHERLANDS
Tel: +31 172 494 922
Fax: +31 172 479 888
e-mail : info@smarnederland.nl

FRANCE
Tel.: +33 1 41 15-0220
Fax: +33 1 41 15-0219
e-mail: smar.adm@wanadoo.fr

CHINA
Tel.: +86 10 6849-8643
Fax: +86 10 6894-0898
e-mail: info@smar.com.cn

UNITED KINGDOM
Phone: +44 (0)797 0094138
Fax: +44 (0)797 4747502
mail: info@smarUK.co.uk

Plus a network of representatives in 58 countries. For your nearest representative please contact: insales@smar.com.br



Quality Management System Certified according to ISO 9001:2000



www.smar.com

