MIL 7400

Pneumatic Positioner

MIL

KSB

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Introduction

MIL 7400 positioner ensures that the position of the valve plug is directly proportional to the controller output pressure, regardless of packing box friction, diaphragm actuator hysteresis or off-balance forces on the valve plug.

It is a sensitive, stable, force balance system for standard or non-standard spring ranges.

MIL 7400

Features

Responsive to Small Pressure Changes

When complicated process lags necessitate wide control proportional band, the positioner provides exact means of making the control valve responsive to very small changes in controller output pressure.

Bypass Facility

With bypass set to positioner mode, the signal pressure is directly carried to the bellows and supply is brought to the pilot for normal operation. When set at bypass position mode, the supply is blocked and signal pressure directly goes to the control valve. It can be used when pilot is removed for cleaning or replacement. Bypass facility is suitable only when actuator spring range is compatible with signal range.

Standard, Reduced and High Capacity Pilots

The simple, sensitive pilot of 3-way valve type has sufficient capacity to operate the control valve at required speed and uses relatively little air. Pilots are available for standard, reduced and high capacity to suit actuator size. Pilots are available for inverting the valve action with respect to signal.

Split Range

For sequential operation of 2 or 3 valves by single controller with a 3-15 psi output signal range, each positioner equipped valve is operated through its full spring range by a selected portion of the controller output signal range.

Operates any Standard or Non-standard Spring Ranges

The positioner may be supplied to operate any valve, whether with standard or non-standard spring and for number of signal ranges.

Technical Information

Model Decodification

1st	2nd	3rd	4th	5th	6th	7th
7	4					

Normal Controller Output Span	Positioner Supply	Valve Actuator Action	Stroke Range[1] (inch)	Pilot Action and Capacity
0. 12 psi (3-15 Full)	0. 20 psi	7. Direct	0. 3/8"-3"	0. Direct Standard
1. 24 psi (6-30 Full)	1. 21-40 psi	8. Reverse	1. 3"-4"	1. Reverse Standard
2. 6 psi (3-15 Split)	2. 41-80 psi			2. Direct- High
8. Special Ranges				3. Reverse- High
				4. Direct- Reduced[2]
				5. Reverse- Reduced[2]

[1] Use Shortest range which will cover the maximum stroke of valve
[2] Generally used for valve stroke less than 0.25 inch

General Data

Standard signal range	:	3-15 psi (0.2~1 kg/cm^2)
Split range	:	Available
Supply pressure	:	20 ~ 80 psi
Linearity (Accuracy)	:	± 1% Full stroke[3]
Hysteresis	:	± 1% Full stroke[3]
Sensitivity /Dead band	:	± 0.5% Full scale[3] (signal range)
Ambient temperature	:	-50 °C to +80 °C
Output characteristic	:	Linear
Pneumatic connection	:	1/ 4" NPT (F)
Pressure gauges	:	3 Nos (Supply, Signal & Output)
Weight	:	2.5 kg

[3] For stroke size ≥ to 0.5 inch

Action

Direct pilot : Increasing signal increasing output pressure

Reverse pilot : Increasing signal decreases output pressure

Air Consumption

Standard pilot : 0.40 scfm @ 20 psig
: 0.56 scfm @ 35psig

High capacity pilot : 0.60 scfm @ 20 psig
: 0.84 scfm @ 35psig

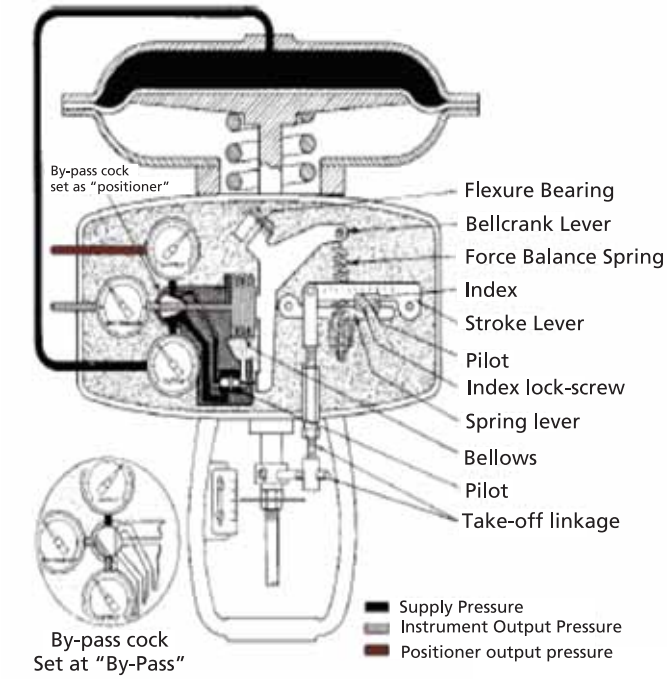
In determining compressor capacity double the above consumption figures, to allow for line leakage and condensate blow down.

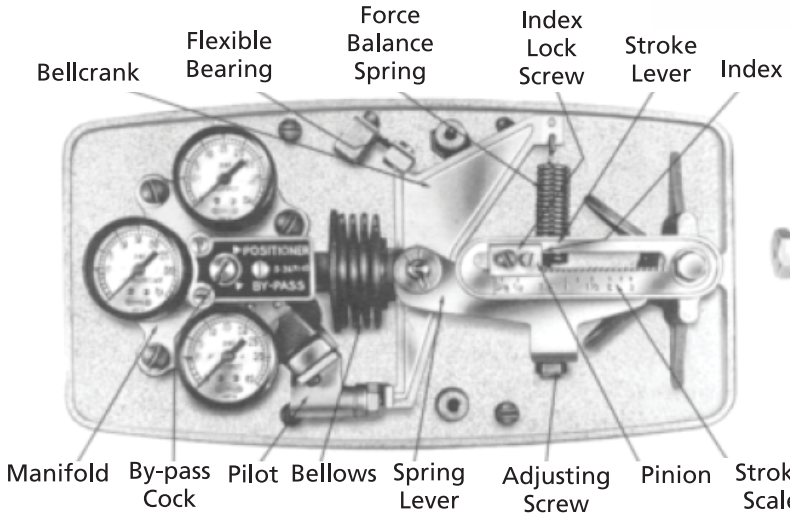
Construction

Working Principle

The force balance system employed provides a linear relationship between valve position and controller output signal by converting stroke (a length) and force (pressure on a given area) to a common proportionality. The linear relationship is obtained by the comparison of the force derived from the controller output signal operating on the bellows and that derived from the effect of the valve stem movement on the force balance spring. The resultant of these two forces as interpreted by a beam balance lever, throttles the pilot to maintain the proportionality.

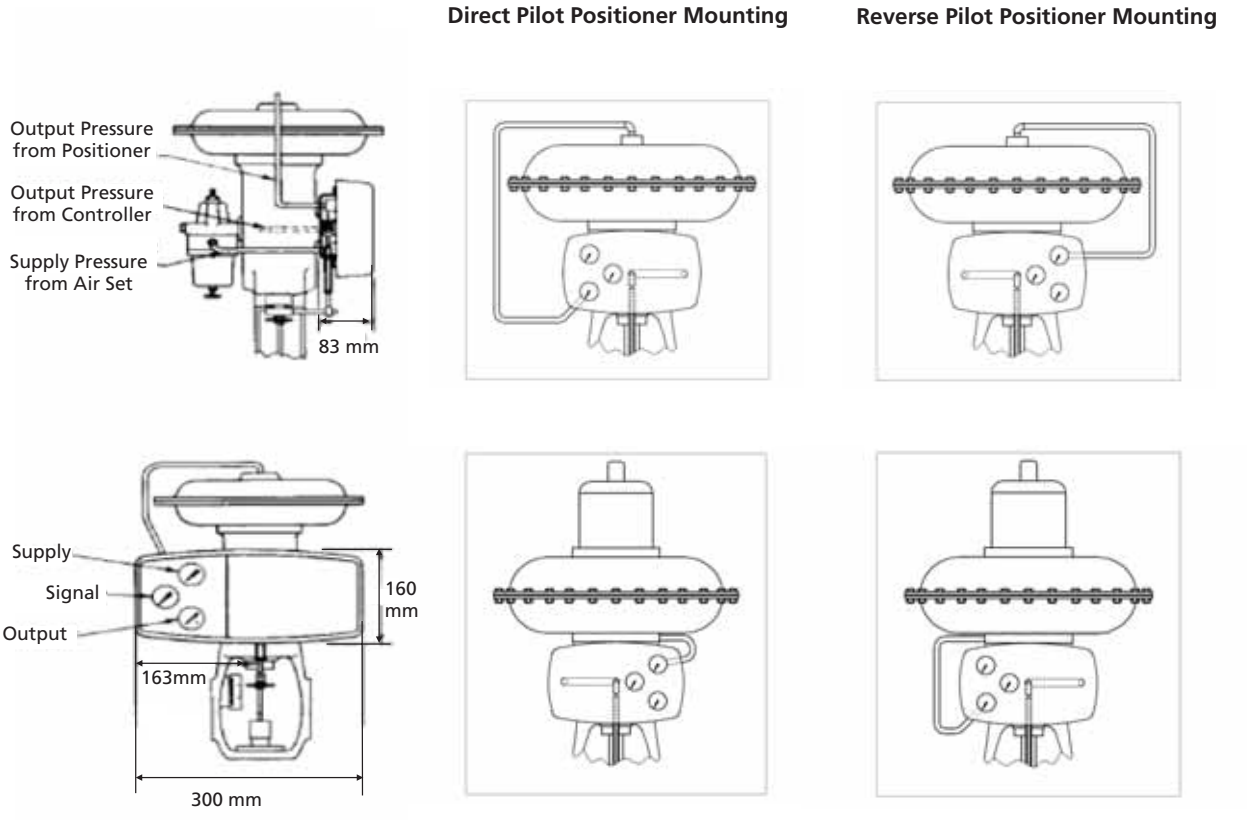
With the bypass set to positioner mode the controller output pressure is applied to the bellows. When this pressure is increased, the bellows rotate the bell crank lever on a frictionless flexure bearing, causing the pilot to increase the positioner output pressure (direct action pilot) or to decrease output pressure (reverse action pilot). The resultant valve stem motion is transmitted through the take off linkages and positioner levers, to the force balancing spring, loading or unloading it until the spring tension on the bell crank lever balances the opposing force of the bellows. When these two forces are in balance, the system is in equilibrium, with the pilot throttling the output pressure to maintain equilibrium as the controller signal changes.





Exploded view of Pilot S/A

Dimensions and Mounting Orientations



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