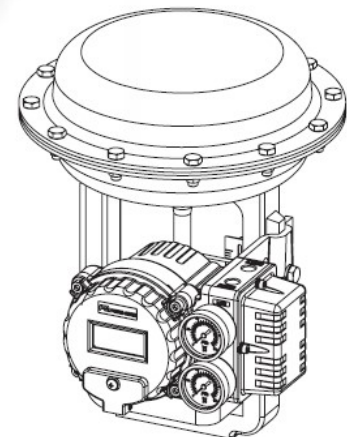


Sturdy explosion proof housing and smart performance with innovative and ever-strong coil drive even under harsh working environments

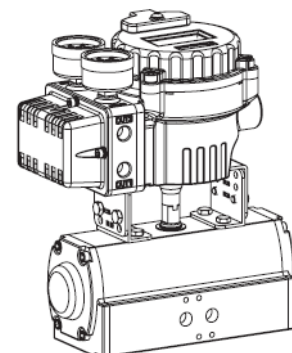


Features

- ▶ Flameproof IECEx / ATEX / TR-CU / KC Ex d IIC T6
- ▶ Easy and quick auto-calibration
- ▶ Detecting RA (reverse acting) or DA (direct acting) automatically regardless of wrong air connections
- ▶ Available to use for single or double acting without any special adjustments
- ▶ Compact design allowing to be installed on small actuators
- ▶ Providing error messages against performance failures
- ▶ Possible to test the actuator with any fixed signal under a test mode
- ▶ Programmable characteristic curve with 17 points
- ▶ Wide operating temperature range -30 ~ +75 °C
- ▶ Improved control of high-friction globe and ball valves by eliminating an overshoot and a hunting
- ▶ Low air consumption
- ▶ Providing a mounting bracket to meet IEC 60534-6-1 for linear valves
- ▶ Supporting a NAMUR mounting pattern IEC 60534-6-2 (VDI/VDE 3845) and providing a multi-size mounting bracket for rotary valves



- SS3L (Linear Type)



- SS3R (Rotary Type)

Options

- ▶ Output position transmitter (4 - 20 mA)
- ▶ 2 x alarm limit
- ▶ Low temperature (-40°C)
- ▶ HART communication
- ▶ Profibus PA communication
- ▶ Foundation Fieldbus communication

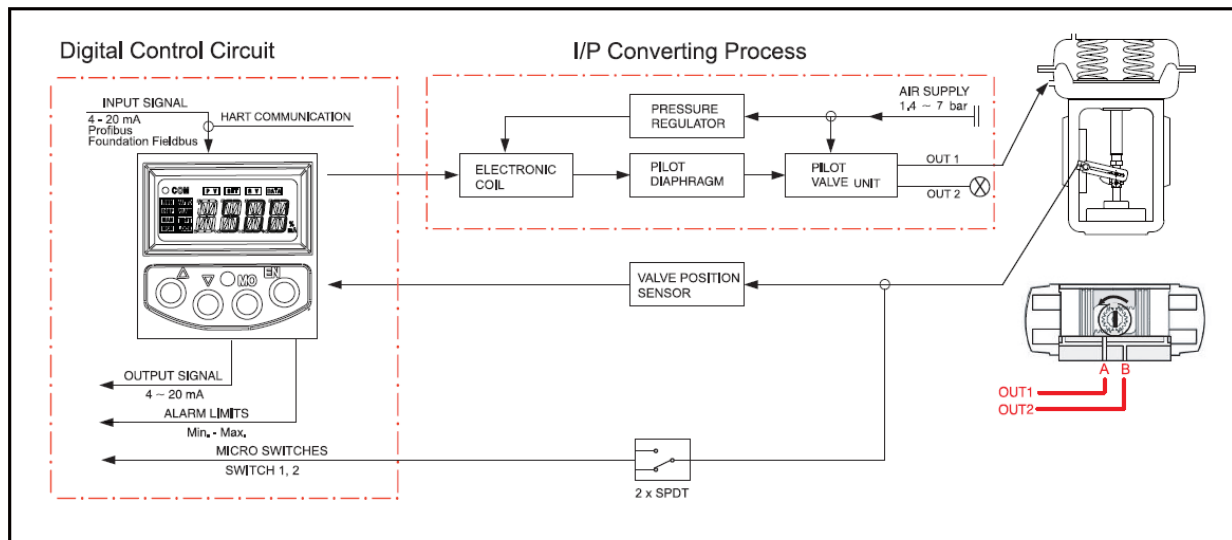
PNEUMATIC ACTUATOR ACCESSORIES

Specifications

| Communication | Without | HART | Profibus - PA | Foundation Fieldbus |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------|---------------|----------------------------------------------------|---------------------|
| Input Signal / Bus voltage | 4 - 20 mA @ 24 VDC | | 9 - 32 VDC | |
| Min. / Max. Current | 3.6 mA / 50 mA | | - | |
| Current Consumption | - | | 15mA | 16mA |
| Voltage Drop (Resistance) | 8.7 VDC(435Ω) | 9.4 VDC(470Ω) | - | |
| Stroke / Angle | Linear type : 5 - 130 mm * Rotary type : 25 - 120° | | | |
| Air Supply Pressure | 1.4 - 7.0 bar (20 - 100 psi), filtered, compressed dry and non-oiled to meet Class 3 of ISO 8573-1 | | | |
| Output Pressure Range | 0 - 100% of supply air pressure | | | |
| Air Capacity | 80 l/min = 4.8 N ^m /h = 2.8 scfm (Sup = 1.4 bar) 233 l/min = 14 N ^m /h = 8.2 scfm (Sup = 6 bar) | | | |
| Air Consumption | 2.8 l/min = 0.17 N ^m /h = 0.1 scfm (Sup = 1.4 ~ 6 bar) | | | |
| Characteristic | Linearity < ±0.3% F.S Hysteresis < 0.2% F.S | | Sensitivity < 0.2% F.S Repeatability < 0.2% F.S | |
| Performance Characteristic | Linear, EQ %, Quick open, User set (17 points) | | | |
| LCD Indication | 4-digit LCD indicator | | | |
| Adjustable Speed | 1 - 1000 (lowest 1, highest 1000) | | | |
| Scan Time | 2ms | | | |
| Shut-off Value | Range 0 - 10% of position signal | | | |
| Valve Action | direct action (DA) / reverse action (RA) | | | |
| Operating Temperature | - 30 ~ +75 °C (- 22 ~ +167 °F) ** | | | |
| Pneumatic Connections | PT(Rc) 1/4 or NPT 1/4 | | | |
| Electrical Connections | 2 x PF(G) 1/2 , NPT 1/2 , M20 x 1.5 | | | |
| Protection Class | Flameproof IECEx / ATEX / KC Ex d IIC T6, IP66 | | | |
| Body Material | Aluminum die-cast / powder-painted | | | |
| Weight | 2.8 kg | | | |

* Up to 200mm on request ** -40°C on request

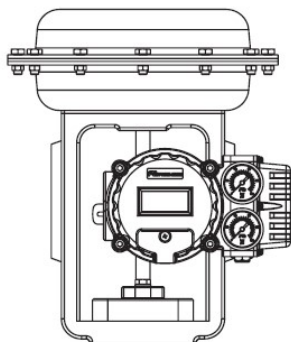
Principle of Operation



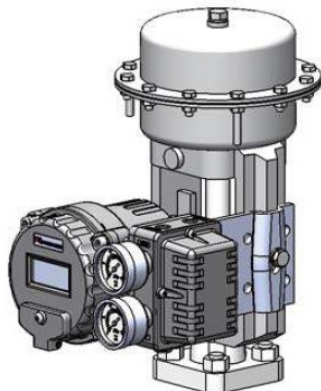
If 4-20 mA input signal(or Bus communication signal) is supplied, the micro processor compares input signal with position feedback and sends control signal to the I/P converting module. Pneumatic signal from the I/P converting module operates the valve and the valve stays at the desired position.

Mounting to Linear Actuator

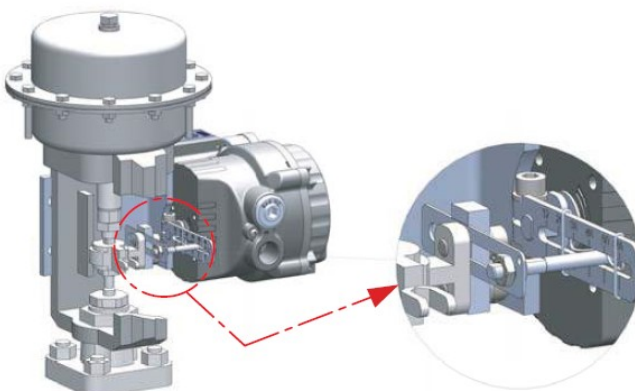
- SS3L (Linear Type)



< Front View >

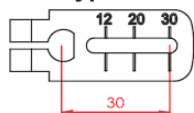


< Side View >

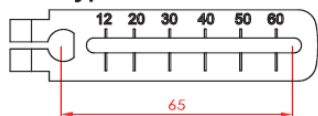


< Feedback Lever Connection >

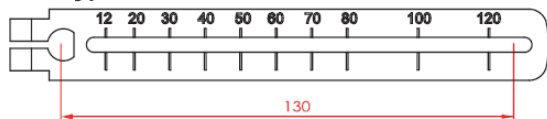
"A" Type



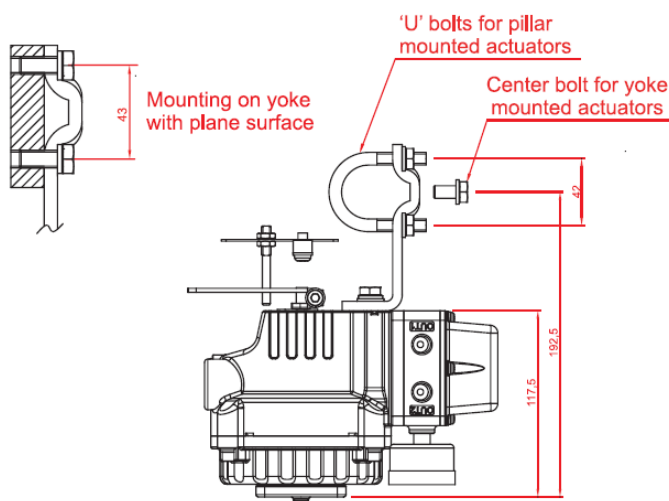
"B" Type



"C" Type



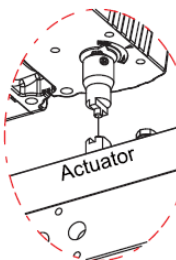
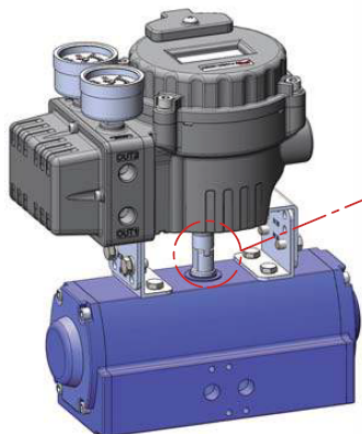
Feedback Lever



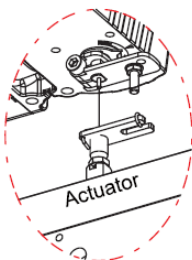
Mounting to linear actuators to IEC 60534 6-1

Mounting to Rotary Actuator

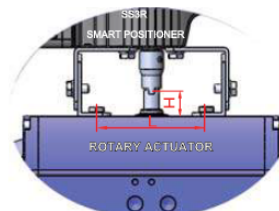
- SS3R (Rotary Type)



NAMUR Type Mounting
(VDI/VDE 3845, IEC 60534-6-2)



Fork Lever Type Mounting



Size Variation of Multi-Size Bracket

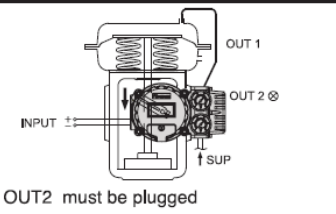
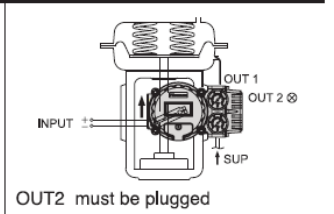
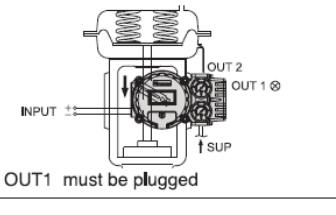
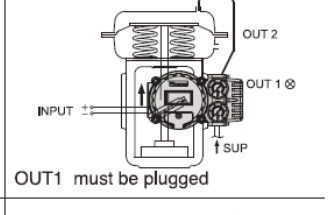
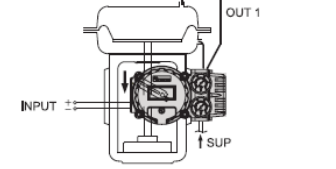
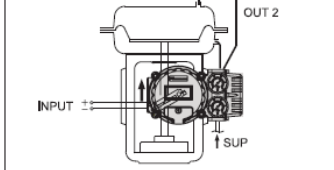
- 1) 80 x 30 x 20 (H) , 4) 130 x 30 x 20 (H)
- 2) 80 x 30 x 30 (H) , 5) 130 x 30 x 30 (H)
- 3) 80 x 30 x 50 (H) , 6) 130 x 30 x 50 (H)

H : Rotary Actuator Shaft Height
L : Length (80 or 130mm)

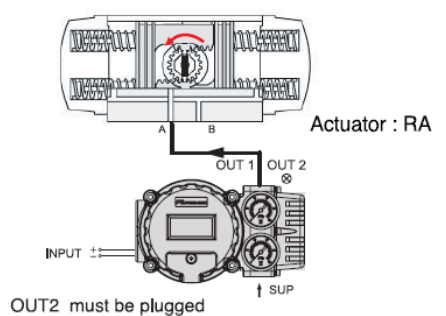
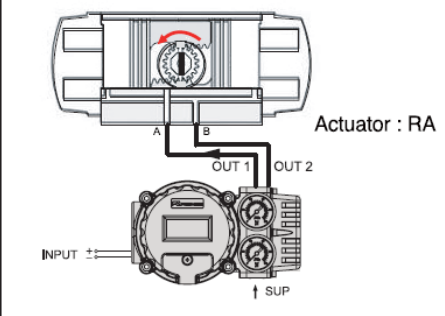
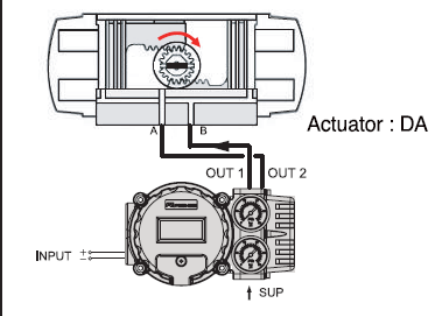
PNEUMATIC ACTUATOR ACCESSORIES

Air Connections

- SS3L (Linear Type)

| Direct Acting (DA) | | Reverse Acting (RA) | |
|---------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <p style="text-align: center;">DA 1</p> <p>As the input signal increases, Valve stem moves downwards Actuator : DA</p> |  <p style="text-align: center;">OUT2 must be plugged</p> | <p style="text-align: center;">RA 1</p> <p>As the input signal increases, Valve stem moves upwards Actuator : RA</p> |  <p style="text-align: center;">OUT2 must be plugged</p> |
| <p style="text-align: center;">DA 2</p> <p>As the input signal increases, Valve stem moves downwards Actuator : DA</p> |  <p style="text-align: center;">OUT1 must be plugged</p> | <p style="text-align: center;">RA 2</p> <p>As the input signal increases, Valve stem moves upwards Actuator : RA</p> |  <p style="text-align: center;">OUT1 must be plugged</p> |
| <p style="text-align: center;">DA 3</p> <p>As the input signal increases, Valve stem moves downwards</p> |  | <p style="text-align: center;">RA 3</p> <p>As the input signal increases, Valve stem moves upwards</p> |  |

- SS3R (Rotary Type)

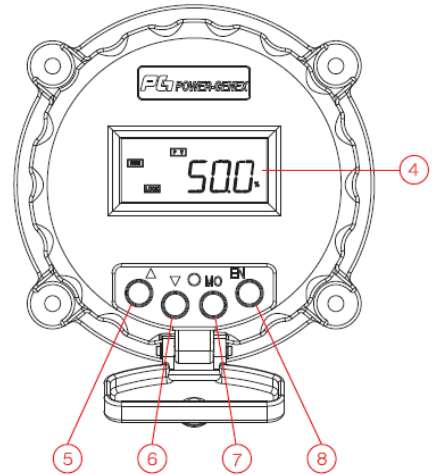
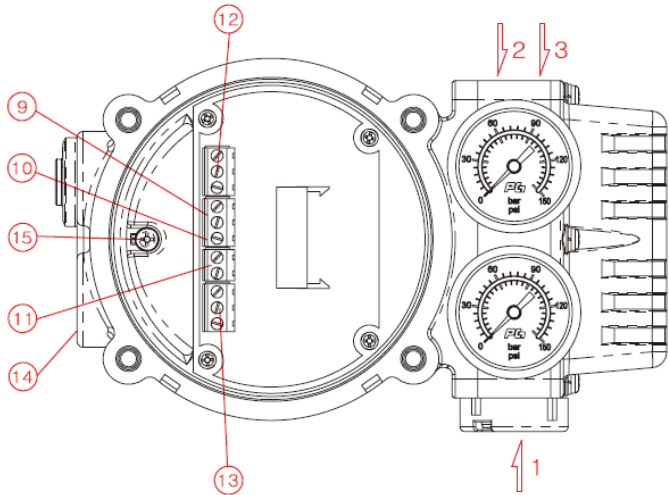
| Spring Return | Double Acting | Double Acting |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
|  <p style="text-align: right;">Actuator : RA</p> <p style="text-align: center;">OUT2 must be plugged</p> |  <p style="text-align: right;">Actuator : RA</p> |  <p style="text-align: right;">Actuator : DA</p> |
| <p>As the input signal increases, Actuator shaft rotates counter-clockwise</p> | <p>As the input signal increases, Actuator shaft rotates counter-clockwise</p> | <p>As the input signal increases, Actuator shaft rotates clockwise</p> |

| | Spring Return | Double Acting |
|----------------|-------------------------------|-------------------------------------------------------------------|
| Reverse Acting | Out 1 : piped, Out2 : plugged | Out 1 : piped to Actuator port A, Out2 : piped to Actuator port B |
| Direct Acting | Out 1 : plugged, Out2 : piped | Out 1 : piped to Actuator port B, Out2 : piped to Actuator port A |

PNEUMATIC ACTUATOR ACCESSORIES

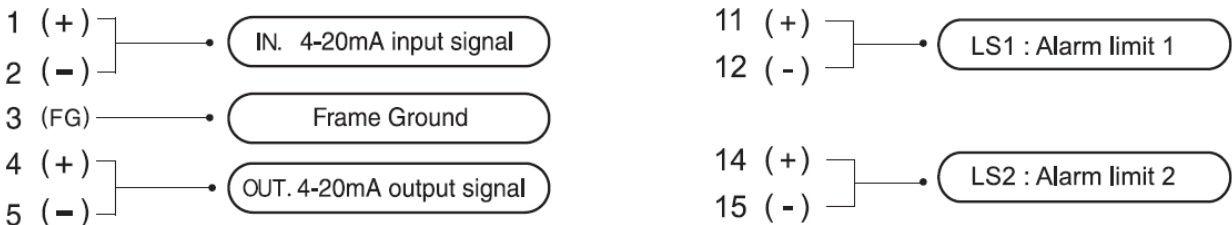
SS3 Front Cover Removed

SS3 Front Cover



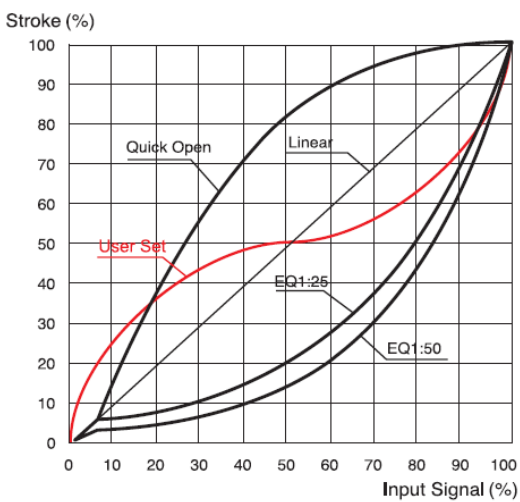
- 1 : Air supply
- 2 : OUT 1
- 3 : OUT 2
- 4 : Display LCD
- 5 : Up key
- 6 : Down key
- 7 : Mode key
- 8 : Enter key
- 9 : Input signal (+, -)
- 10 : Frame ground
- 11 : Output signal (+, -)
- 12 : Alarm limit
- 13 : Alarm limit
- 14 : Electrical connections
- 15 : Ground
- 16 : Feedback lever

Electrical Connections



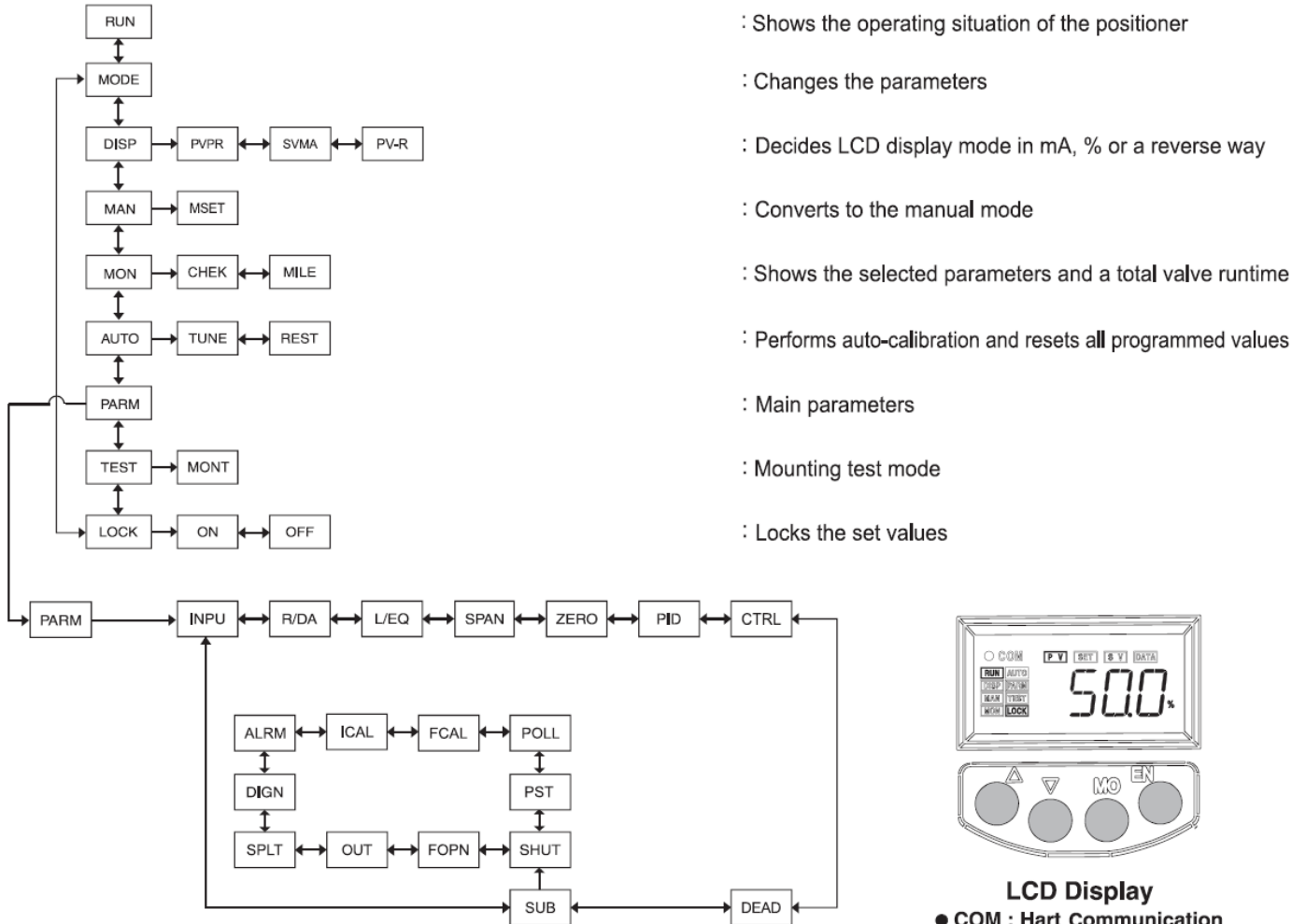
Characteristic Curves

Quick Start and Checking



| | Button | Action |
|--------------------|------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Auto - Calibration | MO | Push 5 seconds for auto-calibration |
| Span | VDN → ENT or VDN → ΔUP ENT → MO | Push VDN 5 seconds to change a measured span (Try this option only when a valve doesn't reach a desired position) |
| Ambient Temp. | ENT | Confirm an ambient temperature surrounding this smart valve positioner |

Parameters Diagram

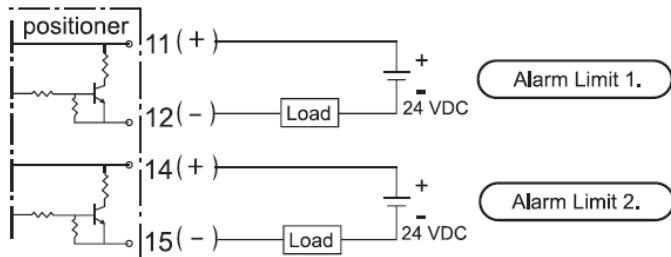


LCD Display

● COM : Hart Communication

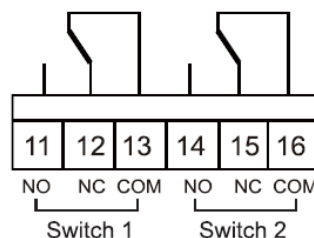
| Parameter | Description | Fcution | Default |
|-----------|------------------------------|------------------------------------------------------------------|--------------------|
| INPU | Input signal | 4 ~ 20mA or 20 ~ 4mA | 4 ~ 20mA |
| R/DA | RA/DA | Reverse acting or direct acting | Auto-set |
| L/EQ | Characteristic | Linear, E.Q.%(1:25 or 1:50), Quick open or User set(17points) | Linear |
| SPAN | Span adjustment | 0 ~ 100% | 100% |
| ZERO | Zero adjustment | 0 ~ 99% | 0% |
| PID | P-GN / I-GN / D-GN | Proportional / Integral / Differential gain value | Auto-set |
| SPED | Response speed | 1 ~ 1000 | 1000 |
| SWST | Slow start | Smooth operation (ON or OFF) | Auto-set |
| CNLT | Control limit | 50 ~ 1250 | Auto-set |
| GCNL | Gap control limit | 50 ~ 1250 | Auto-set |
| DEAD | Dead band | 0 ~ 9,99% | 0,5% |
| FDGN | D-gain setting for hard mode | D-Gain setting for hard mode | Auto-set |
| C/MD | NORM / HARD / SMAL | Standard actuator, strong valve packing friction, small actuator | NORM |
| SHUT | Shut-off | 0 ~ 9.9% | 0.3% |
| FOPN | Full-open | 0 ~ 9.9% | 0.3% |
| OUT | Output signal | 4 ~ 20mA or 20 ~ 4mA | 4 ~ 20mA |
| SPLT | Split range | 4 ~ 12mA or 12 ~ 20mA | 4 ~ 20mA |
| DIGN | Display place | Movement to one or two decimal places | 1 |
| ALAM | Alarm limit low, high | AL1L / AL1H / AL2L / AL2H | 0 ~ 10%, 90 ~ 105% |
| ICAL | IN4M / IN20 | Internal match with 4~20mA input signals from a calibrator | Factory setting |
| FCAL | FB4M / FB20 | Internal match with 4~20mA output signals to a calibrator | Factory setting |
| POLL | Polling address | HART Communication polling address (0 ~ 15) | 0 |
| PST | Partial stroke test | Checks a valve status | OFF |

Wiring Alarm Limits



Note that 24 VDC should be supplied for power.

Micro Switches (SPDT)

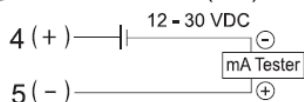


Measuring Output Signal

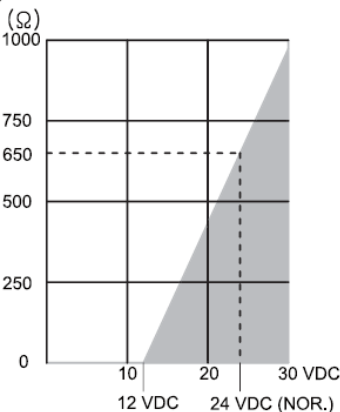
① With mA loop calibrator



② With multimeter (mA)



ZERO and SPAN of position feedback are automatically set after auto-calibration process.



< Transmitter Load Limitations >

| Position Transmitter | |
|----------------------|-------------------|
| Output Signal | 4 - 20 mA, 2-wire |
| Power Supply | 12 - 30 VDC |
| Output Current Limit | 30 mA DC |
| Linearity | 1% F.S |
| Operating Temp. | -30 ~ +80 °C |

How to Order

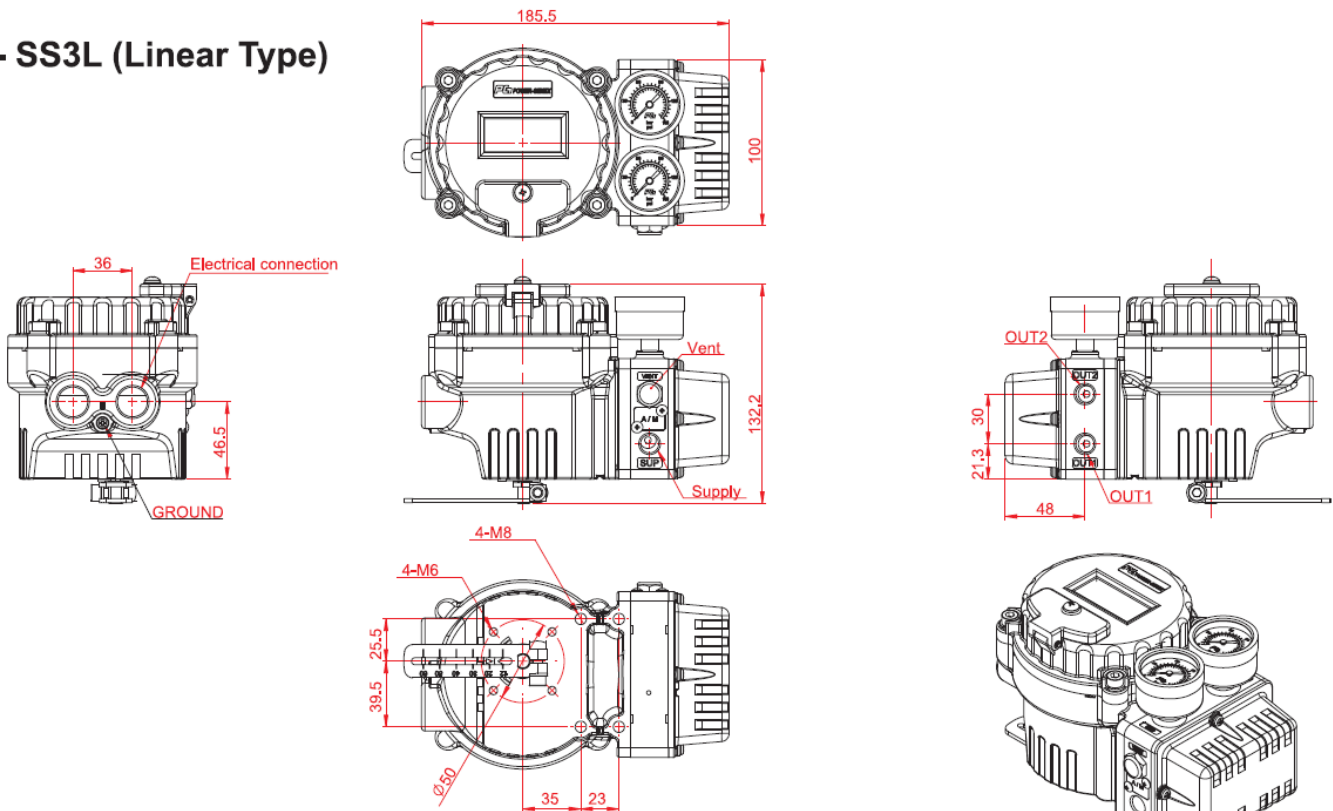
SS3 Actuator Operation Protection Class Feedback Lever Pressure Gauges By-pass Position Feedback Communication Connection Threads Mounting Bracket Feedback Pin Guide Lever Set

| Description | Code |
|-----------------------------|---------------------------------------------------------------------------------------------|
| Actuator Operation : | L : Linear type R : Rotary type |
| Protection Class : | F : Flameproof IECEX / ATEX / TR-CU Ex d IIC T6 K : Flameproof KC - Ex d IIC T6 |
| Feedback Lever : | |
| - Linear type : | A : Stroke (5~30mm) B : Stroke (5~65mm) C : Stroke (5~130mm) D : Stroke (80~200mm) |
| - Rotary type : | F : Fork lever N : NAMUR shaft (direct mounting) |
| Gauge Block : | 0 : Not mounted 1 : 6 bar (90 psi) 2 : 10 bar (150 psi) |
| By-pass : | N : None (standard) Y : Yes (auto/manual screw) |

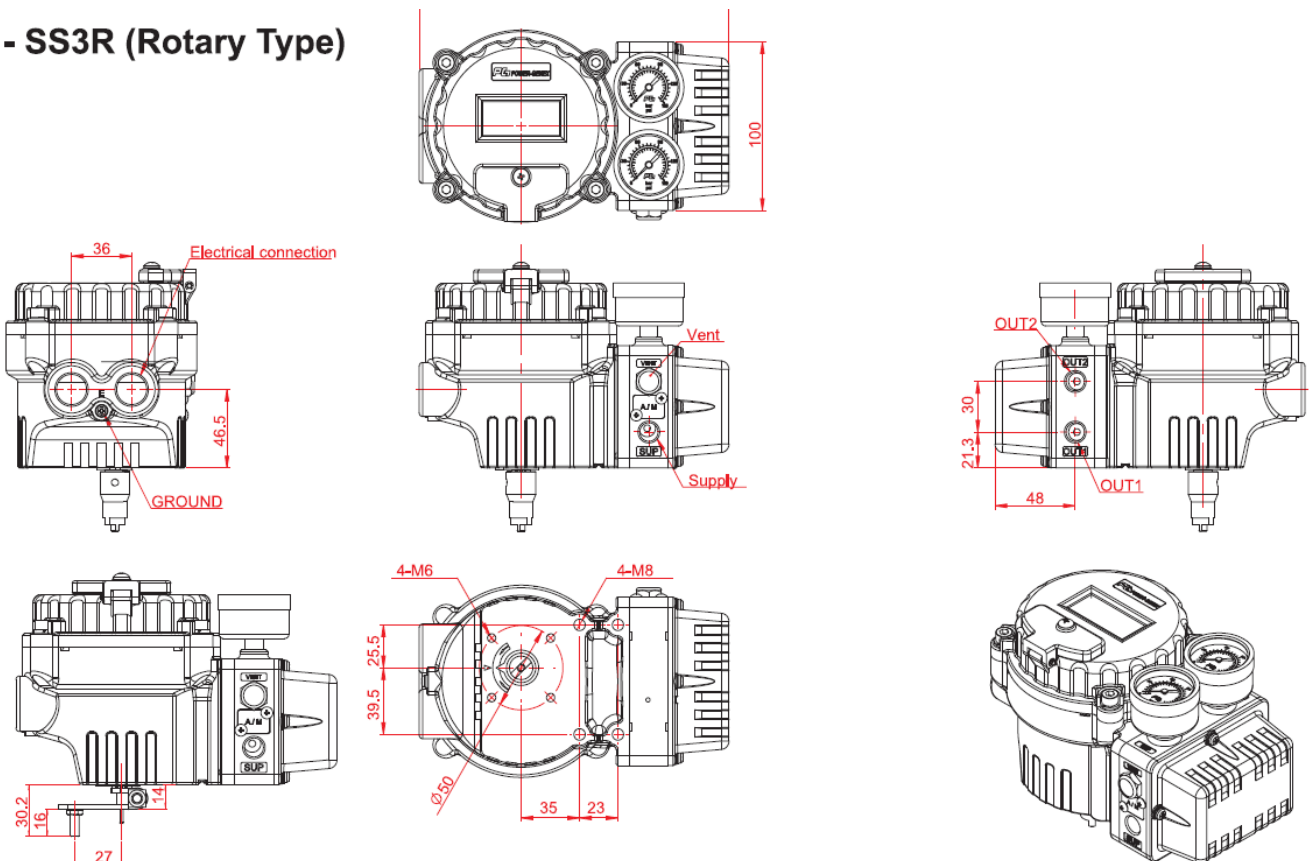
| Description | Code |
|----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Position Feedback : | N : None O : Position transmitter (4~20mA output signal) L : 2 x alarm limit S : 2 x SPDT (only for rotary type) M : O + L Q : O + S (only for rotary type) |
| Communication : | N : None H : HART P : Profibus PA F : Foundation Fieldbus |
| Connection Threads : (pneumatic - electrical) | 3 : PT(Rc) 1/4 - PF(G) 1/2 4 : NPT 1/4 - NPT 1/2 5 : PT(Rc) 1/4 - M20 x 1.5 |
| Mounting Bracket : | N : None L : IEC 60534-6-1 (for SS3L) R : IEC 60534-6-2 (for SS3R) VDI/VDE 3845 |
| Feedback Pin Guide Lever Set : (only for linear type SS3L) | 0 : Not included 1 : Included |

Dimensions

- SS3L (Linear Type)



- SS3R (Rotary Type)



< Fork Lever Type >

PNEUMATIC ACTUATOR ACCESSORIES
Specifications


< SS3SL & SS3SR >



| | | | | |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------|---------------|----------------------------------------------------|----------|
| Communication | Without | HART | Profibus-PA | Fieldbus |
| Input Signal | 4 - 20 mA @ 24 VDC | | 9 - 32 VDC | |
| Min. / Max. Current | 3.6 mA / 50 mA | | - | |
| Current Consumption | - | | 15mA | 16mA |
| Voltage Drop (Resistance) | 8.7 VDC(435Ω) | 9.4 VDC(470Ω) | | |
| Stroke / Angle | Linear type : 5 - 130 mm * Rotary type : 25 - 120° | | | |
| Air Supply Pressure | 1.4 - 7.0 bar (20 - 100 psi) | | | |
| Output Pressure Range | 0 - 100% of supply air pressure | | | |
| Air Capacity | 80 ℓ/min = 4.8 N ^m /h = 2.8 scfm (Sup = 1.4 bar) 233 ℓ/min = 14 N ^m /h = 8.2 scfm (Sup = 6 bar) | | | |
| Air Consumption | 2.8 ℓ/min = 0.17 N ^m /h = 0.1 scfm (Sup = 1.4 ~ 6 bar) | | | |
| Characteristic | Linearity < ±0.3% F.S Hysteresis < 0.2% F.S | | Sensitivity < 0.2% F.S Repeatability < 0.2% F.S | |
| Performance Characteristic | Linear, EQ %, Quick open, User set (17 points) | | | |
| LCD Indication | 4-digit LCD indicator | | | |
| Adjustable Speed | 1 - 1000 (lowest 1, highest 1000) | | | |
| Scan Time | 2ms | | | |
| Shut-off Value | Range 0 - 10% of position signal | | | |
| Valve Action | Direct action(DA) / Reverse action(RA) | | | |
| Operating Temperature | - 30 ~ +75 °C (- 22 ~ +167 °F) ** | | | |
| Pneumatic Connections | NPT 1/4 (other on request) | | | |
| Electrical Connections | NPT 1/2 (other on request) | | | |
| Protection Class | Flameproof (IECEX / ATEX / KC Ex d IIC T6) | | | |
| Body Material | Stainless steel 316 | | | |
| Weight | 6.5 kg (without bracket) | | | |

How to Order

* Up to 200mm on request ** -40 °C on request

SS3S
Actuator Operation
Protection Class
Feedback Lever
Pressure Gauges
By-pass
Position Feedback
Communication
Connection Threads
Mounting Bracket
Feedback Pin Guide Lever Set

| Description | Code |
|-----------------------------|---------------------------------------------------------------------------------------------|
| Actuator Operation : | L : Linear type R : Rotary type |
| Protection Class : | F : Flameproof IECEX / ATEX / TR-CU Ex d IIC T6 K : Flameproof KC - Ex d IIC T6 |
| Feedback Lever : | |
| - Linear type : | A : Stroke (5~30mm) B : Stroke (5~65mm) C : Stroke (5~130mm) D : Stroke (80~200mm) |
| - Rotary type : | F : Fork lever N : NAMUR shaft (direct mounting) |
| Gauge Block : | 0 : Not mounted 1 : 6 bar (90 psi) 2 : 10 bar (150 psi) |
| By-pass : | N : None Y : Yes (auto/manual screw) |

| Description | Code |
|-----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Position Feedback : | N : None O : Position transmitter (4~20mA output signal) L : 2 x alarm limit S : 2 x SPDT (only for rotary type) M : O + L Q : O + S (only for rotary type) |
| Communication : | N : None H : HART P : Profibus PA F : Fieldbus Foundation |
| Connection Threads : (pneumatic - electrical) | 4 : NPT 1/4 - NPT 1/2 |
| Mounting Bracket : | N : None L : IEC 60534-6-1 (for SS3SL) R : IEC 60534-6-2 (for SS3SR) VDI/VDE 3845 |
| Feedback Pin Guide Lever Set : (only for linear type SS3SL) | 0 : Not included 1 : Included |

PNEUMATIC ACTUATOR ACCESSORIES
Specifications


< SS3L-IPC >



| | | | | |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------|---------------|----------------------------------------------------|----------|
| Communication | Without | HART | Profibus-PA | Fieldbus |
| Input Signal | 4 - 20 mA @ 24 VDC | | 9 - 32 VDC | |
| Min. / Max. Current | 3.6 mA / 50 mA | | - | |
| Current Consumption | - | | 15mA | 16mA |
| Voltage Drop (Resistance) | 8.9 VDC(445Ω) | 9.4 VDC(470Ω) | | |
| Air Supply Pressure | 1.4 - 7.0 bar (20 - 100 psi) | | | |
| Air Capacity | 80 ℓ/min = 4.8 N ^m /h = 2.8 scfm (Sup = 1.4 bar) 233 ℓ/min = 14 N ^m /h = 8.2 scfm (Sup = 6 bar) | | | |
| Air Consumption | 2 ℓ/min = 0.12 N ^m /h = 0.07 scfm (Sup = 1.4 ~ 6 bar) | | | |
| Characteristic | Linearity < ±0.3% F.S Hysteresis < 0.2% F.S | | Sensitivity < 0.2% F.S Repeatability < 0.2% F.S | |
| Performance Characteristic | Linear | | | |
| LCD Indication | 4-digit LCD indicator | | | |
| Scan Time | 2ms | | | |
| Valve Action | Direct action(DA) / Reverse action(RA) | | | |
| Operating Temperature | - 30 ~ +75 °C (- 22 ~ +167 °F) * | | | |
| Pneumatic Connections | PT 1/4, NPT 1/4 | | | |
| Electrical Connections | PF 1/2, NPT 1/2 | | | |
| Protection Class | Flameproof (IECEX / ATEX / KC Ex d IIC T6) | | | |
| Body Material | Aluminum die-cast / Stainless steel 316 | | | |
| Weight | 2.8 kg | | | |

* -40°C on request

SS3

| | | | | | | | | | |
|--------------------|------------------|----------------|-----------------|---------|-------------------|---------------|--------------------|------------------|-----------------|
| Actuator Operation | Protection Class | Feedback Lever | Pressure Gauges | By-pass | Position Feedback | Communication | Connection Threads | Mounting Bracket | Output Pressure |
|--------------------|------------------|----------------|-----------------|---------|-------------------|---------------|--------------------|------------------|-----------------|

| Description | Code |
|-------------------------------------------------|---------------------------------------------------------------------------------------------|
| Actuator Operation : | L : Aluminum die-cast SL : Stainless steel 316 |
| Protection Class : | F : Flameproof IECEX / ATEX / TR-CU Ex d IIC T6 K : Flameproof KC - Ex d IIC T6 |
| Feedback Lever : | X : Not applicable |
| Gauge Block : (Supply pressure gauge) | 1 : 6 bar (90 psi) 2 : 10 bar (150 psi) |
| By-pass : | N : None Y : Yes (auto/manual screw) |

| Description | Code |
|---------------------------------------------------------|--------------------------------------------------------------------|
| Position Feedback : | N : None O : Position transmitter (4~20mA output signal) |
| Communication : | N : None H : HART P : Profibus PA F : Fieldbus Foundation |
| Connection Threads : (pneumatic - electrical) | 3 : PT 1/4 - PF 1/2 4 : NPT 1/4 - NPT 1/2 |
| Mounting Bracket : | N : None |
| Output Pressure : | 21 : 3...15 psi |