

**Smart performance with innovative and ever-strong coil drive even under harsh working environments**

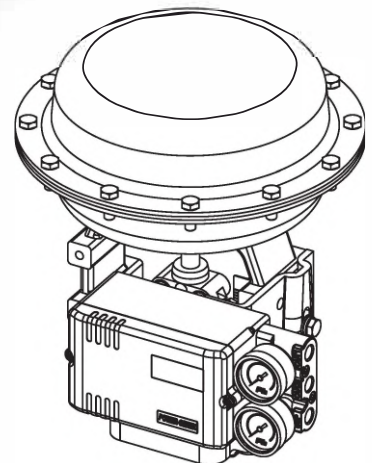


## Features

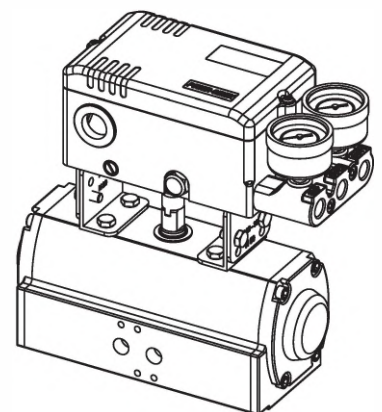
- ▶ Easy and quick auto-calibration
- ▶ Detecting RA (reverse acting) or DA (direct acting) automatically regardless of wrong air connections
- ▶ Available to use for single or double acting without any special adjustments
- ▶ Compact design allowing to be installed on small actuators
- ▶ Providing error 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 ~ +80 °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 VDI/VDE 3845 (IEC 60534-6-2) and providing a multi-size mounting bracket for rotary valves

## Options

- ▶ Output position transmitter (4 - 20 mA)
- ▶ 2 x alarm limit or micro switch (SPDT)
- ▶ Low temperature (- 40°C)
- ▶ Intrinsically safe type (IECEx / ATEX / TR-CU / KC Ex ia IIC T6/T5)
- ▶ HART communication
- ▶ Profibus PA communication
- ▶ Foundation Fieldbus communication



**- SS2L (Linear Type)**



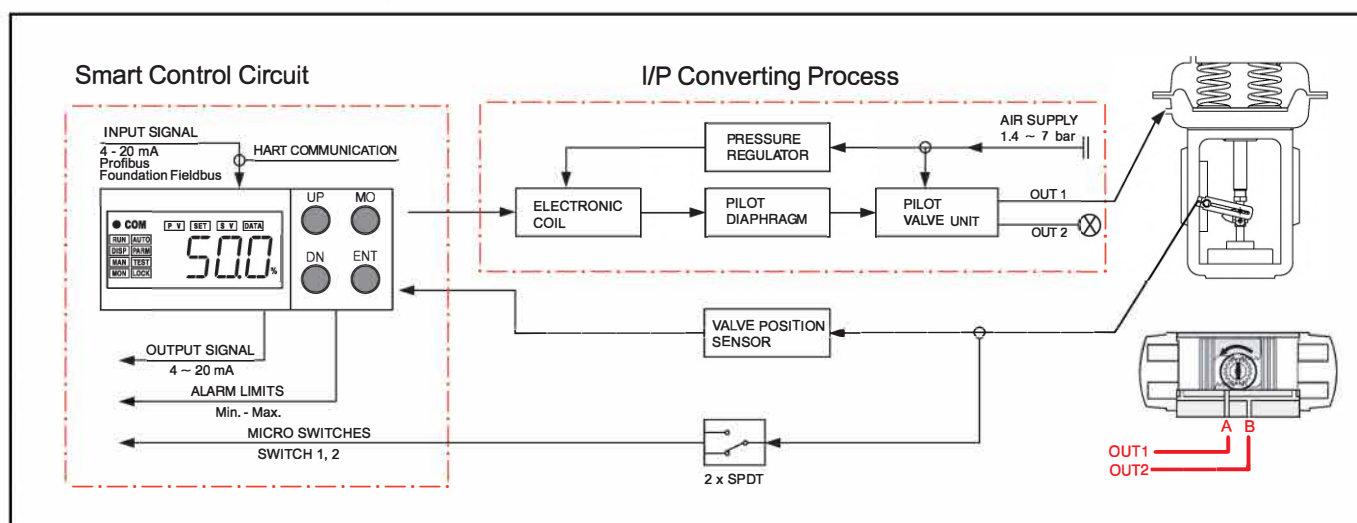
**- SS2R (Rotary Type)**

## 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 *<br>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 <sup>m</sup> /h = 2.8 scfm (Sup = 1.4 bar)<br>233 l/min = 14 N <sup>m</sup> /h = 8.2 scfm (Sup = 6 bar) |               |                                                    |                     |
| Air Consumption            | 2.8 l/min = 0.17 N <sup>m</sup> /h = 0.1 scfm (Sup = 1.4 ~ 6 bar)                                                        |               |                                                    |                     |
| Characteristic             | Linearity < ±0.3% F.S<br>Hysteresis < 0.2% F.S                                                                           |               | Sensitivity < 0.2% F.S<br>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 ~ +80 °C (- 22 ~ +176 °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           | IP66, Intrinsically safe (IECEX / ATEX / KC Ex ia IIC T6/T5)                                                             |               |                                                    |                     |
| Body Material              | Aluminum die-cast / powder-painted                                                                                       |               |                                                    |                     |
| Weight                     | 1.6 kg                                                                                                                   |               |                                                    |                     |

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

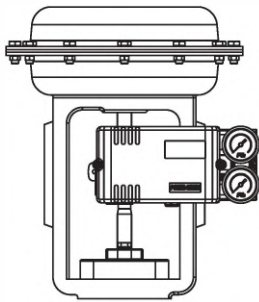
## Principle of Operation



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

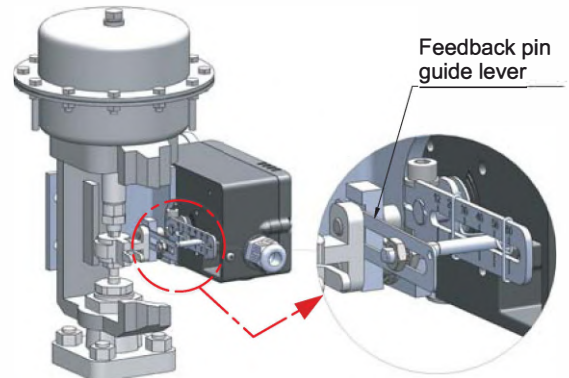
### - SS2L (Linear Type)



< Front View >

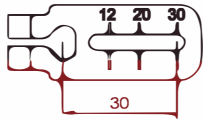


< Side View >

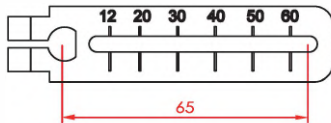


< Feedback Lever Connection >

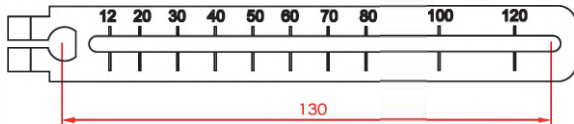
#### "A" Type



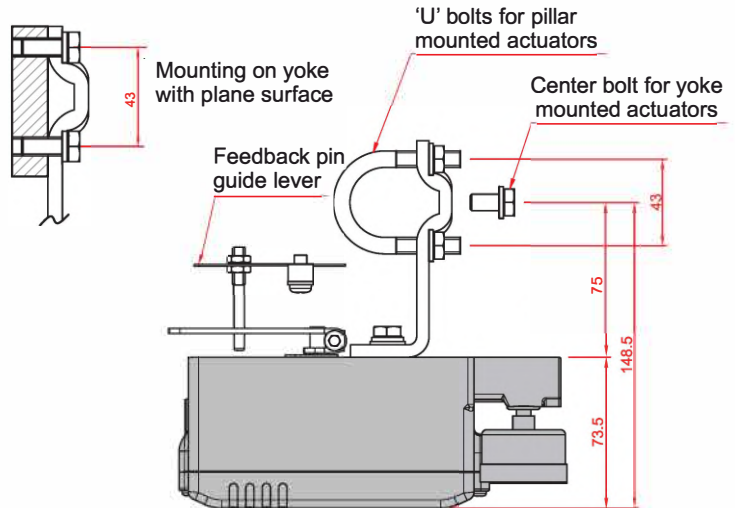
#### "B" Type



#### "C" Type



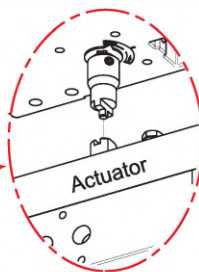
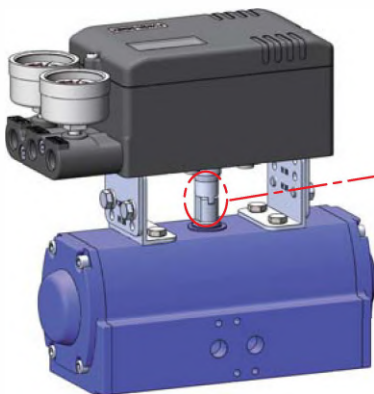
Feedback Lever



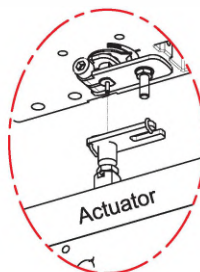
Mounting to linear actuators to IEC 60534 6-1

## Mounting to Rotary Actuator

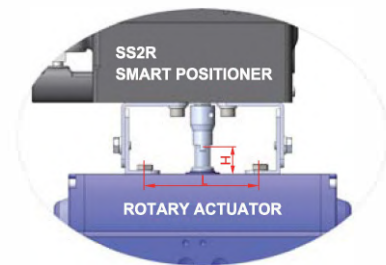
### - SS2R (Rotary Type)



**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 )

## Air Connections

### - SS2L (Linear Type)

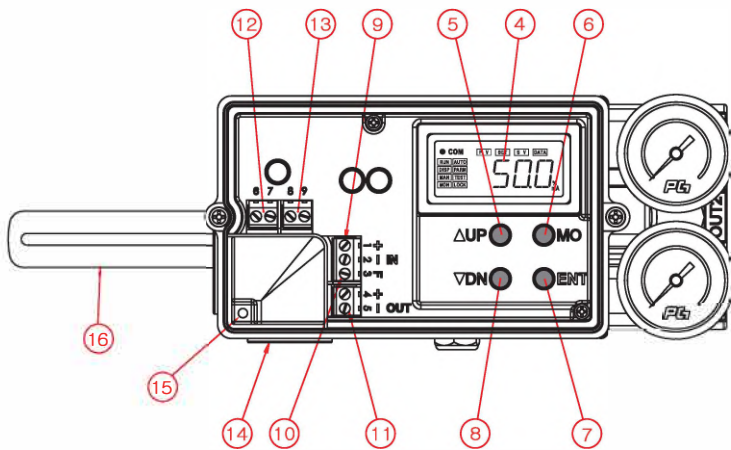
| Direct Acting (DA)                                                                                       |                             | Reverse Acting (RA)                                                                                    |                             |
|-----------------------------------------------------------------------------------------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

### - SS2R (Rotary Type)

| Spring Return                                                                  | Double Acting                                                                  | Double Acting                                                          |
|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------------------------|
| <p>Actuator : RA</p> <p>OUT2 must be plugged</p>                               | <p>Actuator : RA</p>                                                           | <p>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 |

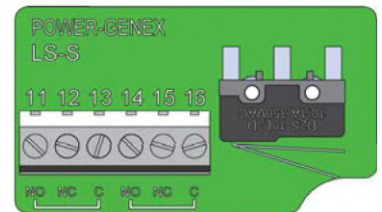
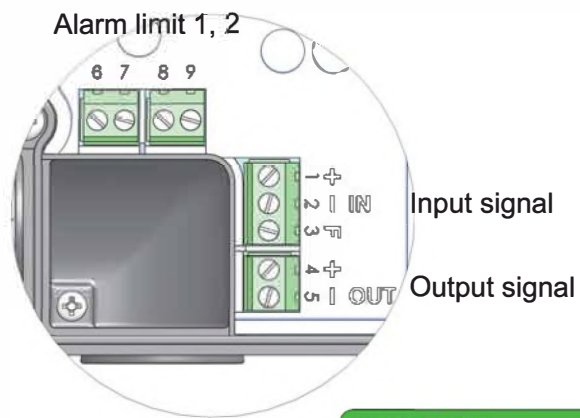
## SS2 Front Cover Removed



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

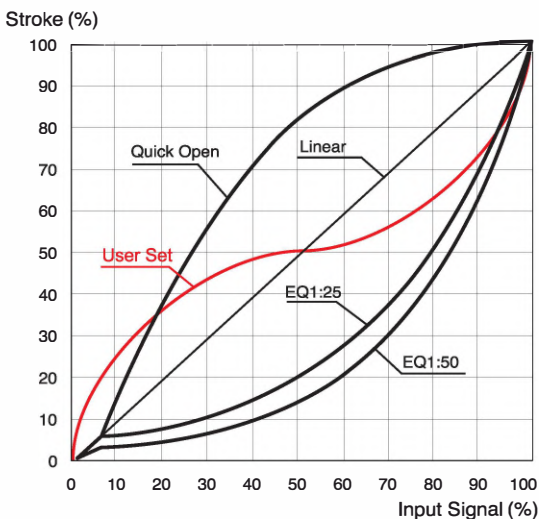
## Electrical Connections

- 1 (+) [ ] IN. 4-20mA input signal
- 2 (-) [ ] Frame Ground
- 3 (FG) [ ]
- 4 (+) [ ] OUT. 4-20mA output signal
- 5 (-) [ ]
- 6 (+) [ ] LS1. (Low) Alarm limit 1
- 7 (-) [ ]
- 8 (+) [ ] LS2. (High) Alarm limit 2
- 9 (-) [ ]



Micro switches 1, 2

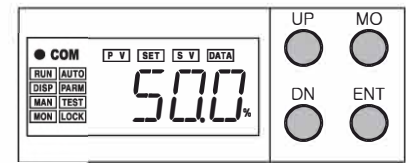
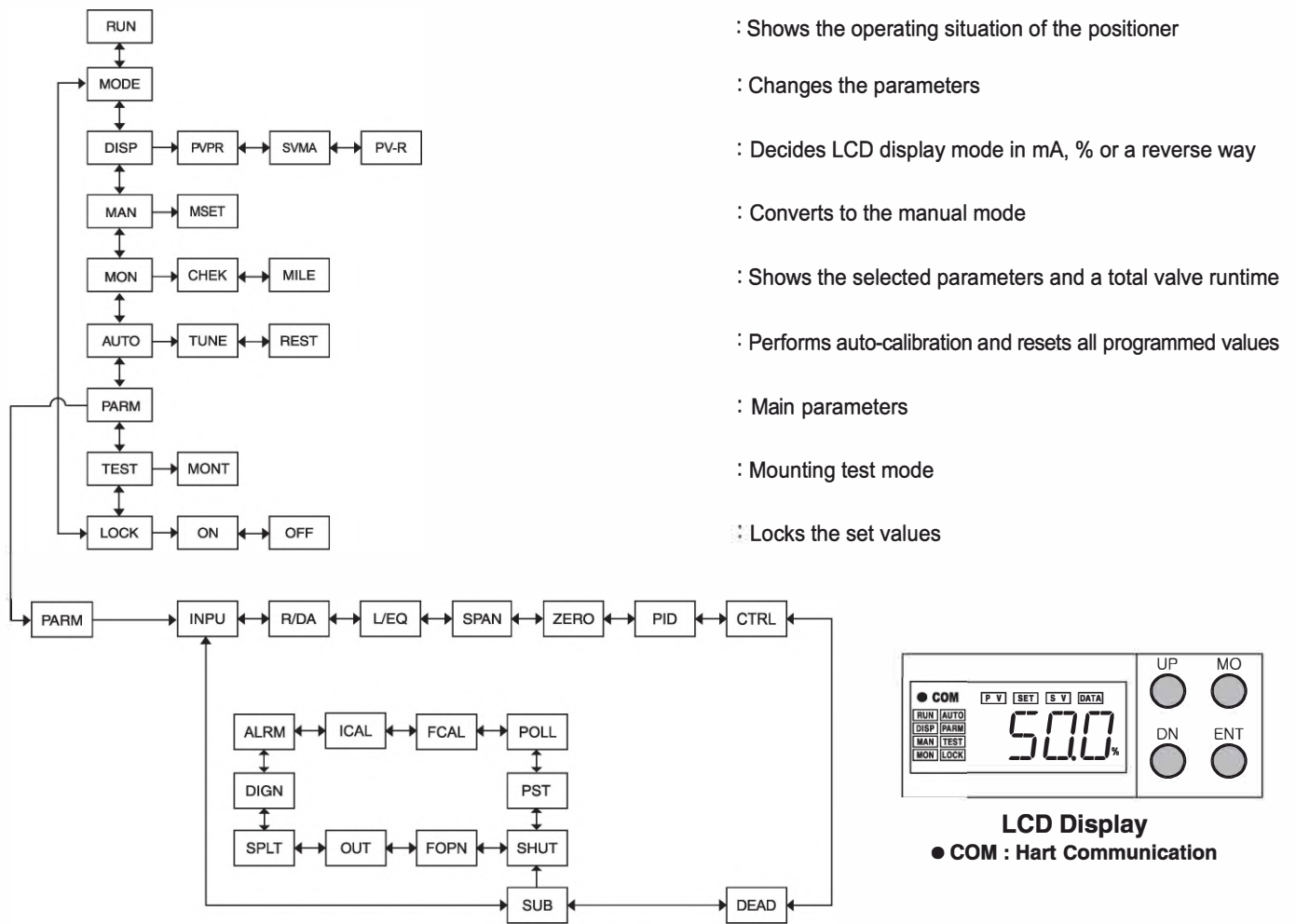
## Characteristic Curves



## Quick Start and Checking

|                    | Button                                   | Action                                                                                                            |
|--------------------|------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Auto - Calibration | MO                                       | Push 5 seconds for auto-calibration                                                                               |
| Span               | VDN → ENT<br>or<br>VDN → ΔUP<br>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

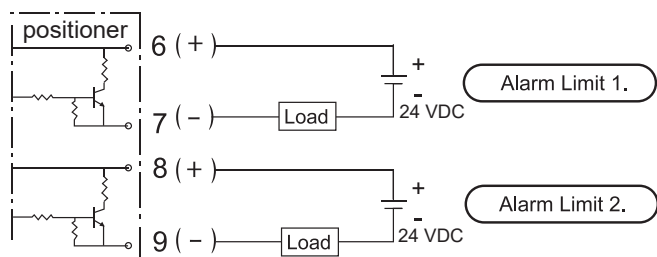


**LCD Display**

● COM : Hart Communication

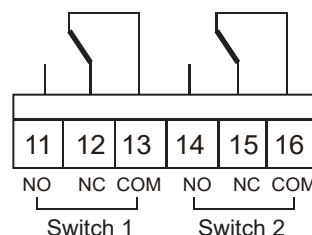
| Parameter | Description                  | Fcution                                                       | Default            |
|-----------|------------------------------|---------------------------------------------------------------|--------------------|
| INPU      | Input signal                 | 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%               |
| HDGP      | D-gain setting for hard mode | D-Gain setting for hard mode                                  | Auto-set           |
| 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



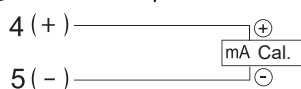
Note that 24 VDC should be supplied for power.

## Micro Switches (SPDT)

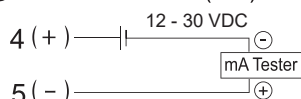


## Measuring Output Signal

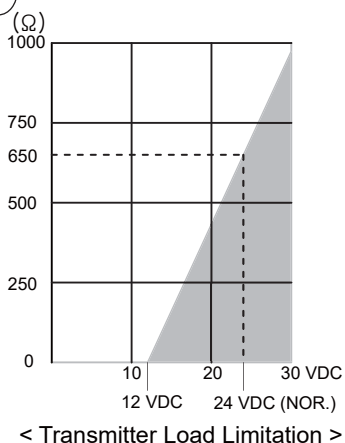
① With mA loop calibrator



② With multimeter (mA)



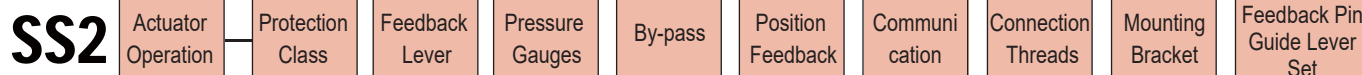
ZERO and SPAN of position feedback are automatically set after auto-calibration process.



## Micro Switches

|                             |                   |
|-----------------------------|-------------------|
| Type                        | SPDT              |
| Rating                      | 10.1A @ 250 VAC   |
| Ambient Temperature         | -30 ~ +85°C       |
| <b>Position Transmitter</b> |                   |
| Output Signal               | 4 - 20 mA, 2-wire |
| Power Supply                | 12 - 30 VDC       |
| Output Current Limit        | 30 mA DC          |
| Linearity                   | 1% F.S            |
| Operating Temperature       | -40 ~ +80°C       |

## How to Order

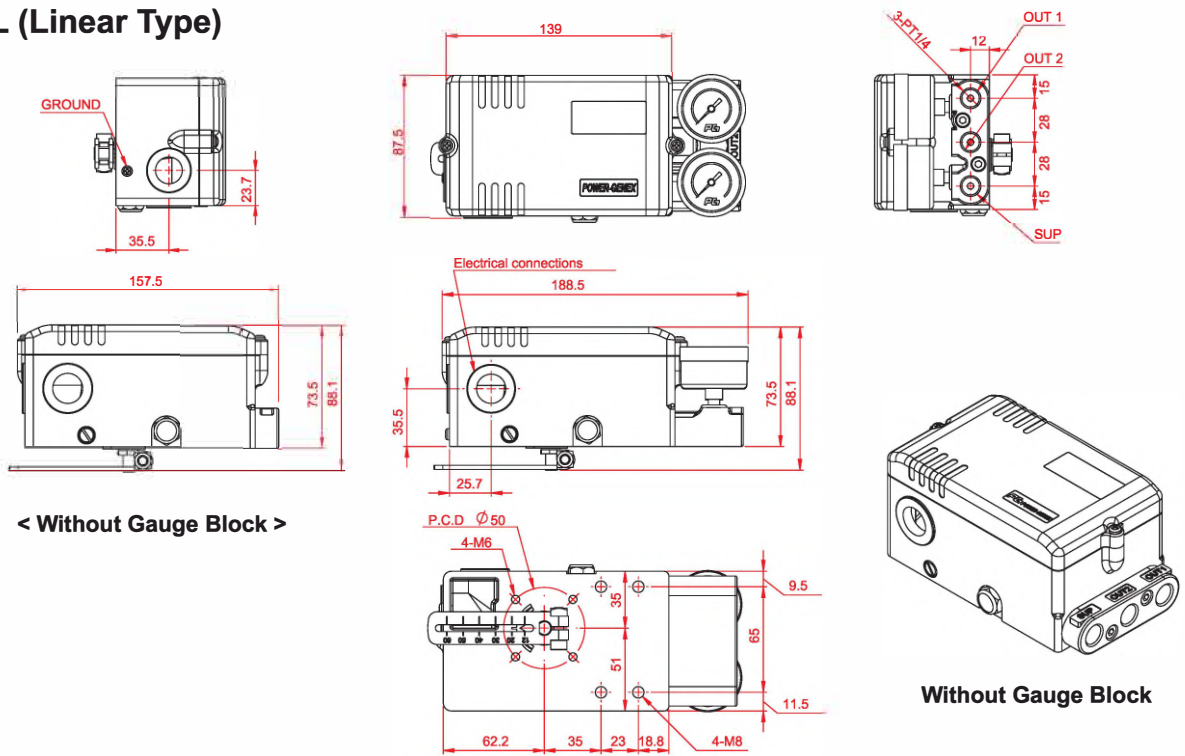


| Description                 | Code                                                                                                                                            |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Actuator Operation :</b> | L : Linear type<br>R : Rotary type                                                                                                              |
| <b>Protection Class :</b>   | I : Intrinsically safe<br>IECEX / ATEX / TR-CU<br>Ex ia IIC T6/T5<br>K : Intrinsically safe<br>KC - Ex ia IIC T6/T5<br>W : Weatherproof to IP66 |
| <b>Feedback Lever :</b>     |                                                                                                                                                 |
| - Linear type :             | A : Stroke (5-30mm)<br>B : Stroke (5-65mm)<br>C : Stroke (5-130mm)<br>D : Stroke (80-200mm)                                                     |
| - Rotary type :             | F : Fork lever<br>N : NAMUR shaft (direct mounting)                                                                                             |
| <b>Gauge Block :</b>        | 0 : Not mounted<br>1 : 6 bar (90 psi)<br>2 : 10 bar (150 psi)                                                                                   |
| <b>By-pass :</b>            | N : None (standard)<br>Y : Yes (auto/manual screw)                                                                                              |

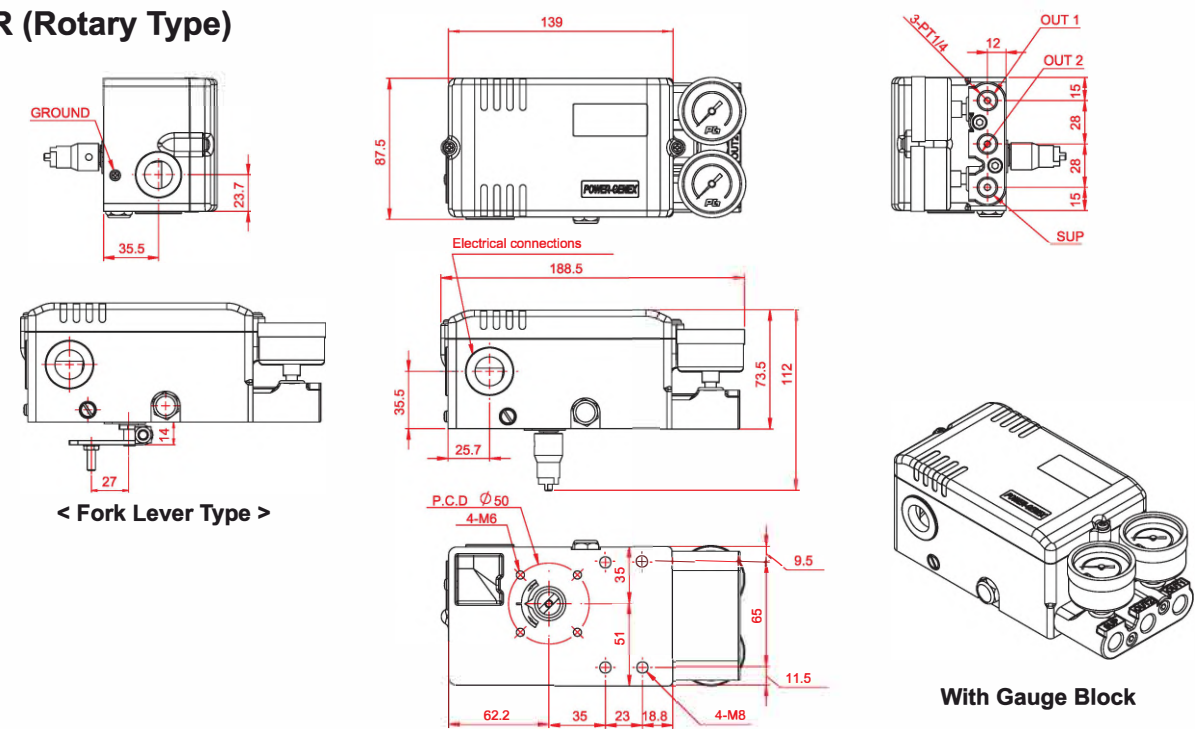
| Description                                                          | Code                                                                                                                                           |
|----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Position Feedback :</b>                                           | N : None<br>O : Position transmitter<br>(4-20mA output signal)<br>L : 2 x alarm limit<br>S : 2 x micro switch (SPDT)<br>M : O + L<br>Q : O + S |
| <b>Communication :</b><br>(only for weatherproof type)               | N : None<br>H : HART<br>P : Profibus PA<br>F : Foundation Fieldbus                                                                             |
| <b>Connection Threads :</b><br>(pneumatic - electrical)              | 3 : PT(Rc) 1/4 - PF(G) 1/2<br>4 : NPT 1/4 - NPT 1/2<br>5 : PT(Rc) 1/4 - M20 x 1.5                                                              |
| <b>Mounting Bracket :</b>                                            | N : None<br>L : IEC 60534-6-1 (for SS2L)<br>R : IEC 60534-6-2 (for SS2R)<br>VDI/VDE 3845                                                       |
| <b>Feedback Pin Guide Lever Set :</b><br>(only for linear type SS2L) | 0 : Not included<br>1 : Included                                                                                                               |

## Dimensions

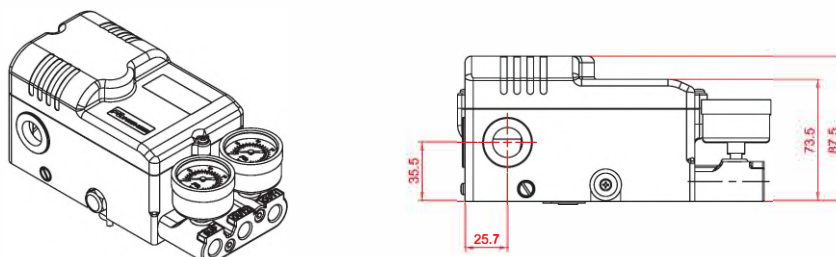
### - SS2L (Linear Type)



### - SS2R (Rotary Type)



### - SS2 with 2 x SPDT Micro S/W





## Specifications



< SS2SL & SS2SR >

|                            |                                                                                                                          |               |                                                    |          |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------|---------------|----------------------------------------------------|----------|
| 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 *<br>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 <sup>m</sup> /h = 2.8 scfm (Sup = 1.4 bar)<br>233 l/min = 14 N <sup>m</sup> /h = 8.2 scfm (Sup = 6 bar) |               |                                                    |          |
| Air Consumption            | 2.8 l/min = 0.17 N <sup>m</sup> /h = 0.1 scfm (Sup = 1.4 ~ 6 bar)                                                        |               |                                                    |          |
| Characteristic             | Linearity < ±0.3% F.S<br>Hysteresis < 0.2% F.S                                                                           |               | Sensitivity < 0.2% F.S<br>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 ~ +80 °C (- 22 ~ +176 °F) **                                                                                        |               |                                                    |          |
| Pneumatic Connections      | NPT 1/4 (other on request)                                                                                               |               |                                                    |          |
| Electrical Connections     | NPT 1/2 (other on request)                                                                                               |               |                                                    |          |
| Protection Class           | IP66, Intrinsically safe (IECEX / ATEX / KC Exia IIC T6/T5)                                                              |               |                                                    |          |
| Body Material              | Stainless steel 316                                                                                                      |               |                                                    |          |
| Weight                     | 3.8 kg (without bracket)                                                                                                 |               |                                                    |          |



## How to Order

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

# SS2S

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

| Description                 | Code                                                                                                                                            |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Actuator Operation :</b> | L : Linear type<br>R : Rotary type                                                                                                              |
| <b>Protection Class :</b>   | I : Intrinsically safe<br>IECEX / ATEX / TR-CU<br>Ex ia IIC T6/T5<br>K : Intrinsically safe<br>KC - Ex ia IIC T6/T5<br>W : Weatherproof to IP66 |
| <b>Feedback Lever :</b>     |                                                                                                                                                 |
| - Linear type :             | A : Stroke (5-30mm)<br>B : Stroke (5-65mm)<br>C : Stroke (5-130mm)<br>D : Stroke (80-200mm)                                                     |
| - Rotary type :             | F : Fork lever<br>N : NAMUR shaft (direct mounting)                                                                                             |
| <b>Gauge Block :</b>        | 0 : Not mounted<br>1 : 6 bar (90 psi)<br>2 : 10 bar (150 psi)                                                                                   |
| <b>By-pass :</b>            | N : None<br>Y : Yes (auto/manual screw)                                                                                                         |

| Description                                                           | Code                                                                                                                                           |
|-----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Position Feedback :</b>                                            | N : None<br>O : Position transmitter<br>(4-20mA output signal)<br>L : 2 x alarm limit<br>S : 2 x micro switch (SPDT)<br>M : O + L<br>Q : O + S |
| <b>Communication :</b><br>(only for weatherproof type)                | N : None<br>H : HART<br>P : Profibus PA<br>F : Fieldbus Foundation                                                                             |
| <b>Connection Threads :</b><br>(pneumatic - electrical)               | 4 : NPT 1/4 - NPT 1/2                                                                                                                          |
| <b>Mounting Bracket :</b>                                             | N : None<br>L : IEC 60534-6-1 (for SS2SL)<br>R : IEC 60534-6-2 (for SS2SR)<br>VDI/VDE 3845                                                     |
| <b>Feedback Pin Guide Lever Set :</b><br>(only for linear type SS2SL) | 0 : Not included<br>1 : Included                                                                                                               |