

# SS3 Linear / Rotary Smart Valve Positioner



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

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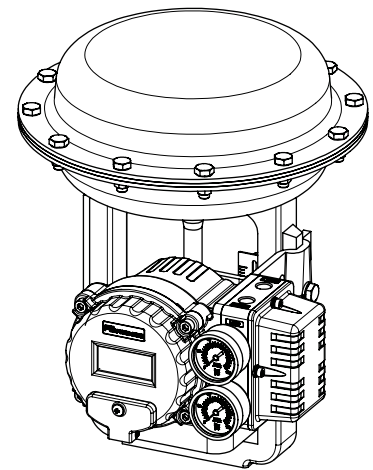


## FEATURES

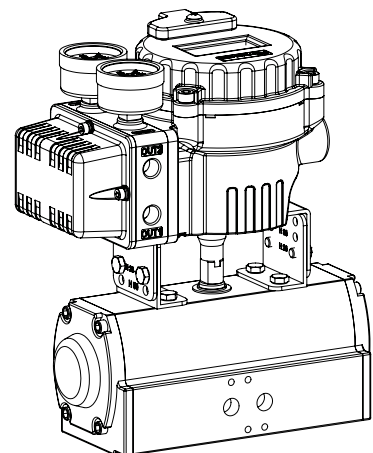
- Flameproof IECEx / ATEX / KC Ex d IIC T6
- Easy and quick auto-calibration
- Detecting RA (reverse acting) or DA (direct acting) automatically regardless of wrong air connections
- Available to use for single or double acting without any special adjustments
- Compact design allowing to be installed 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 -22°F ~ +167°F
- Improved control of high-friction globe and ball valves by eliminating overshoot and 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

## OPTIONS

- Output position transmitter (4 - 20 mA)
- 2 x alarm limit or micro switch (SPDT)
- HART communication
- Profibus communication (in progress)
- Fieldbus Foundation communication (in progress)



SS3L (Linear Type)



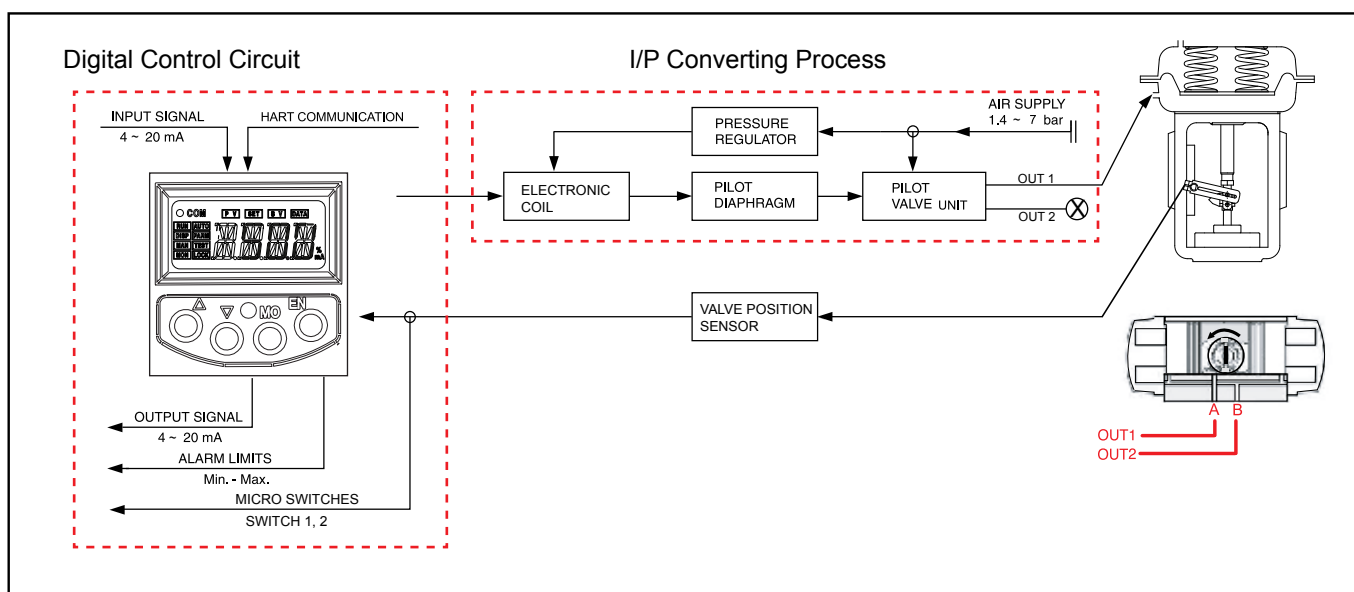
SS3R (Rotary Type)

## SPECIFICATIONS

Input Signal	4 - 20 mA @ 24 VDC
Min. / Max. Current	3.6 mA / 50 mA
Voltage Drop (Resistance)	Without Hart : 8.7 VDC (435Ω @ 20 mA) With Hart : 9.4 VDC (470Ω @ 20 mA)
Stroke / Angle	Linear type : 5 - 130 mm * Rotary type : 25 - 120°
Air Supply Pressure	1.4 - 7 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 Nm <sup>3</sup> /h = 2.8 scfm (Sup = 20 PSIG) 233 l/min = 14 Nm <sup>3</sup> /h = 8.2 scfm (Sup = 90 PSIG)
Air Consumption	2.8 l/min = 0.17 Nm <sup>3</sup> /h = 0.1 scfm (Sup = 20 ~ 90 PSIG)
Characteristic	Linearity < ±0.3% F.S      Sensitivity < 0.2% F.S Hysteresis < 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) / Reverses action (RA)
Operating Temperature	- 30 ~ +75° C (- 22 ~ +167° F)
Pneumatic Connections	NPT 1/4
Electrical Connections	NPT 1/2
Protection Class	Flameproof IECEx / ATEX / KC Ex d IIC T6, IP66
Body Material	Aluminum die-cast / powder-painted
Weight	6.16 LBS.

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

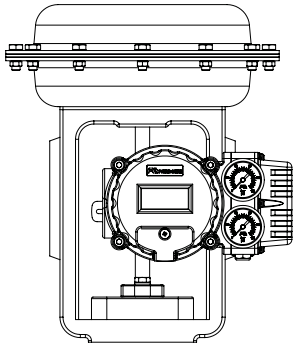
## PRINCIPALS OF OPERATION



If 4-20 mA input 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.

# SS3 Linear / Rotary Smart Valve Positioner

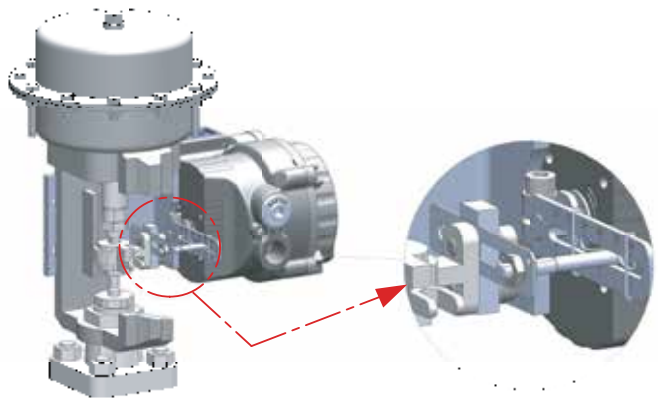
## MOUNTING TO SS3L (Linear Type)



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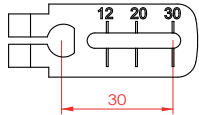


< Side View >

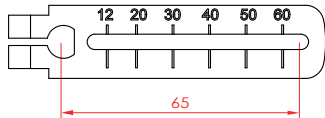


< Feedback Lever Connection >

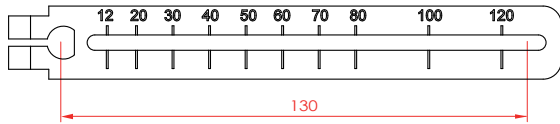
"A" Type



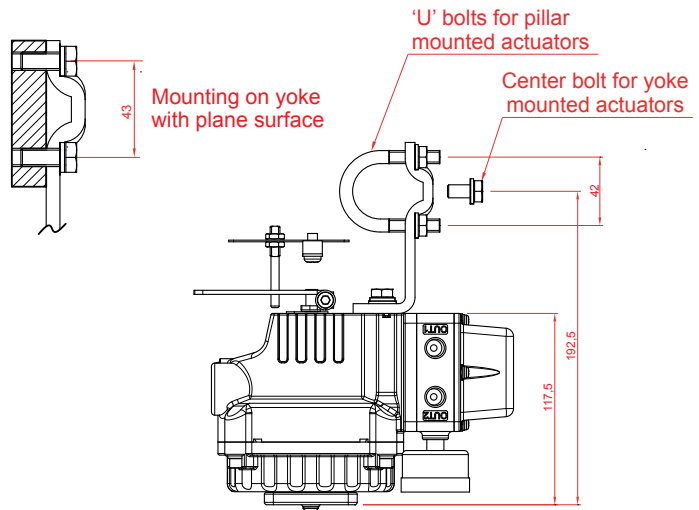
"B" Type



"C" Type

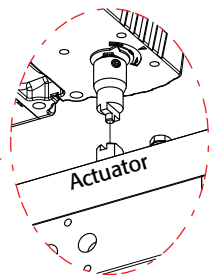
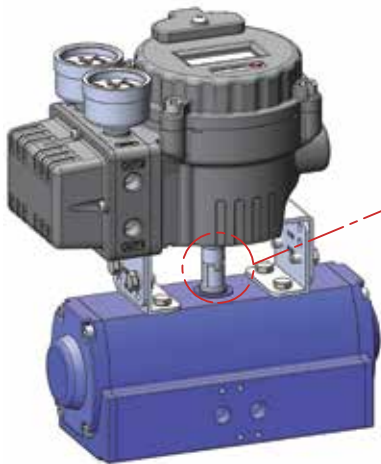


Feedback Lever

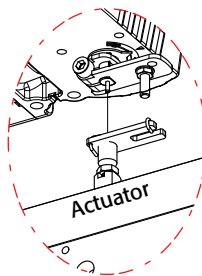


Mounting to linear actuators to IEC 60534 6-1

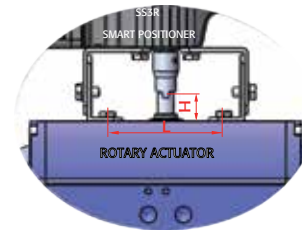
## MOUNTING TO SS3R (Rotary Type)



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



Fork Lever Type Mounting

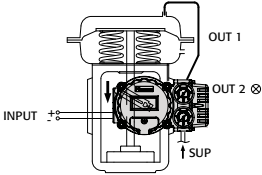
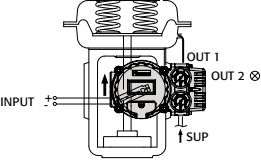
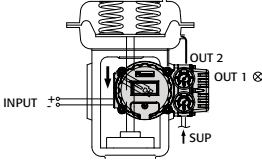
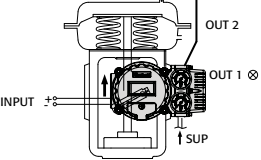
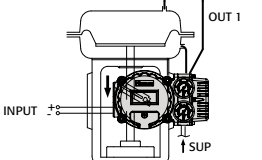
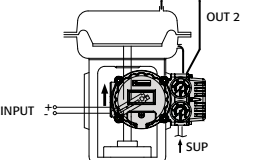


Size Variation of Multi-Size Bracket

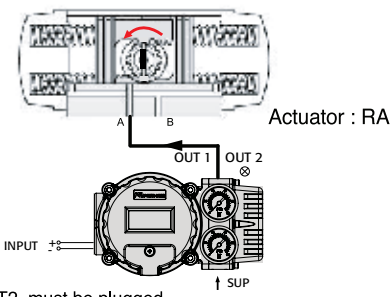
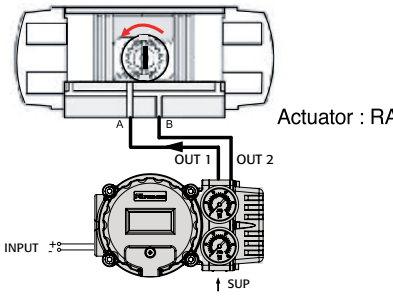
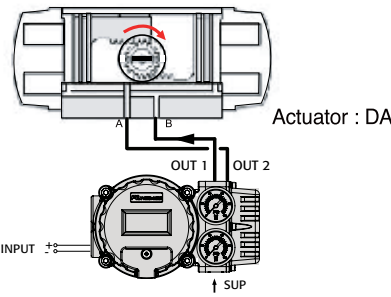
- 1) 80 x 30 x 20 (H) 4) 130 x 30 x 20 (H)
- 2) 80 x 30 x 30 (H) 5) 130 x 30 x 30 (H)
- 3) 80 x 30 x 50 (H) 6) 130 x 30 x 50 (H)

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

**AIR CONNECTIONS SS3L (Linear Type)**

Direct Acting (DA)		Reverse Acting (RA)	
<p><b>DA 1</b></p> <p>As the input signal increases, Valve stem moves downwards 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 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 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 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>	

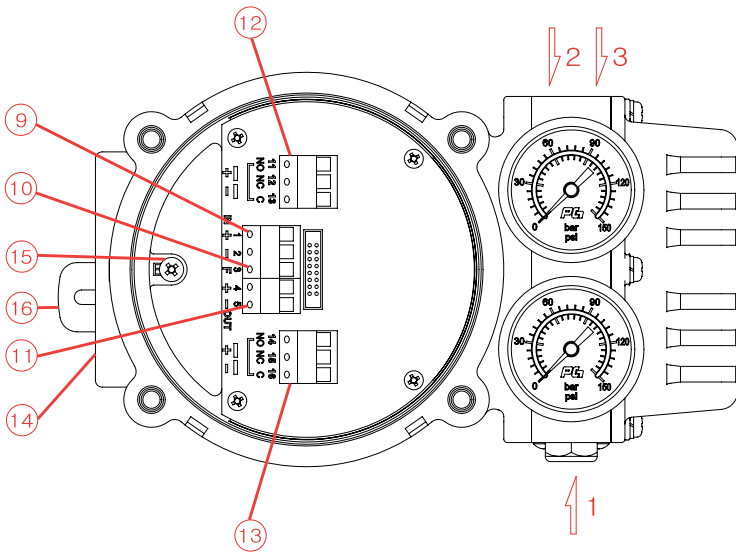
**AIR CONNECTIONS SS3R (Rotary Type)**

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>

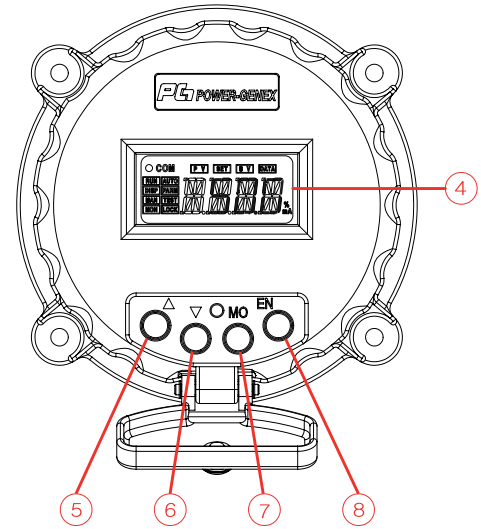
	Spring Return	Double Acting
Reverse Acting	Out 1 : piped, Out2 : plugged	Out 1 : piped to Actuator port A, Out2 : piped to Actuator port B
Direct Acting	Out 1 : plugged, Out2 : piped	Out 1 : piped to Actuator port B, Out2 : piped to Actuator port A

# SS3 Linear / Rotary Smart Valve Positioner

## FRONT COVER REMOVED

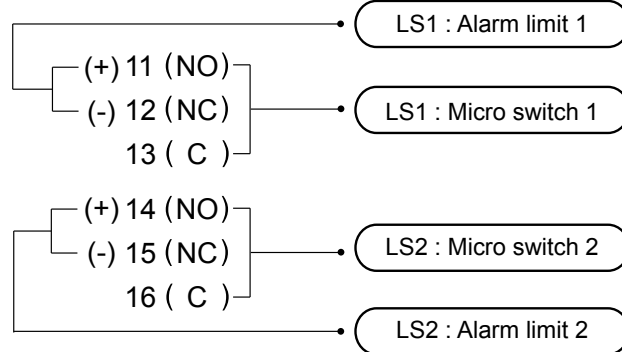
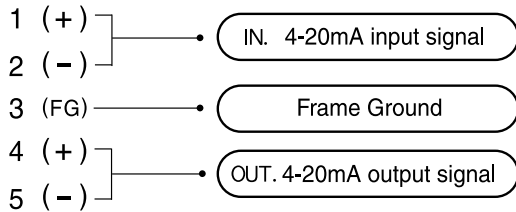


## FRONT COVER

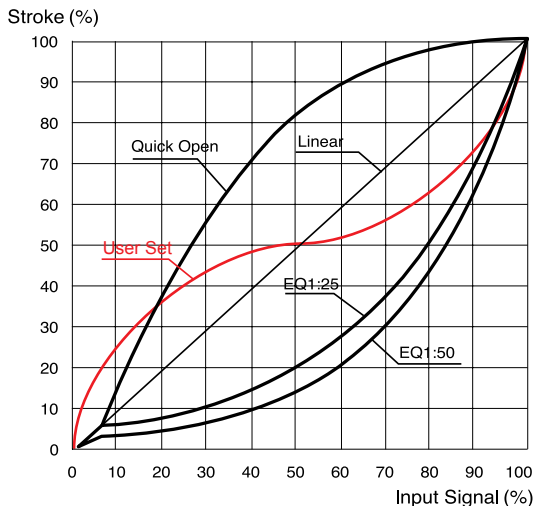


- |                 |               |                           |                             |
|-----------------|---------------|---------------------------|-----------------------------|
| 1 : Air supply  | 5 : Up key    | 9 : Input signal (+, -)   | 13 : Alarm limit            |
| 2 : OUT 1     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

## ELECTRICAL CONNECTIONS



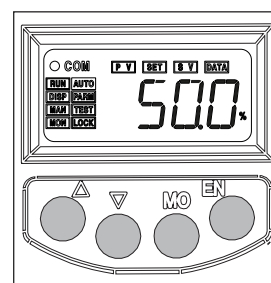
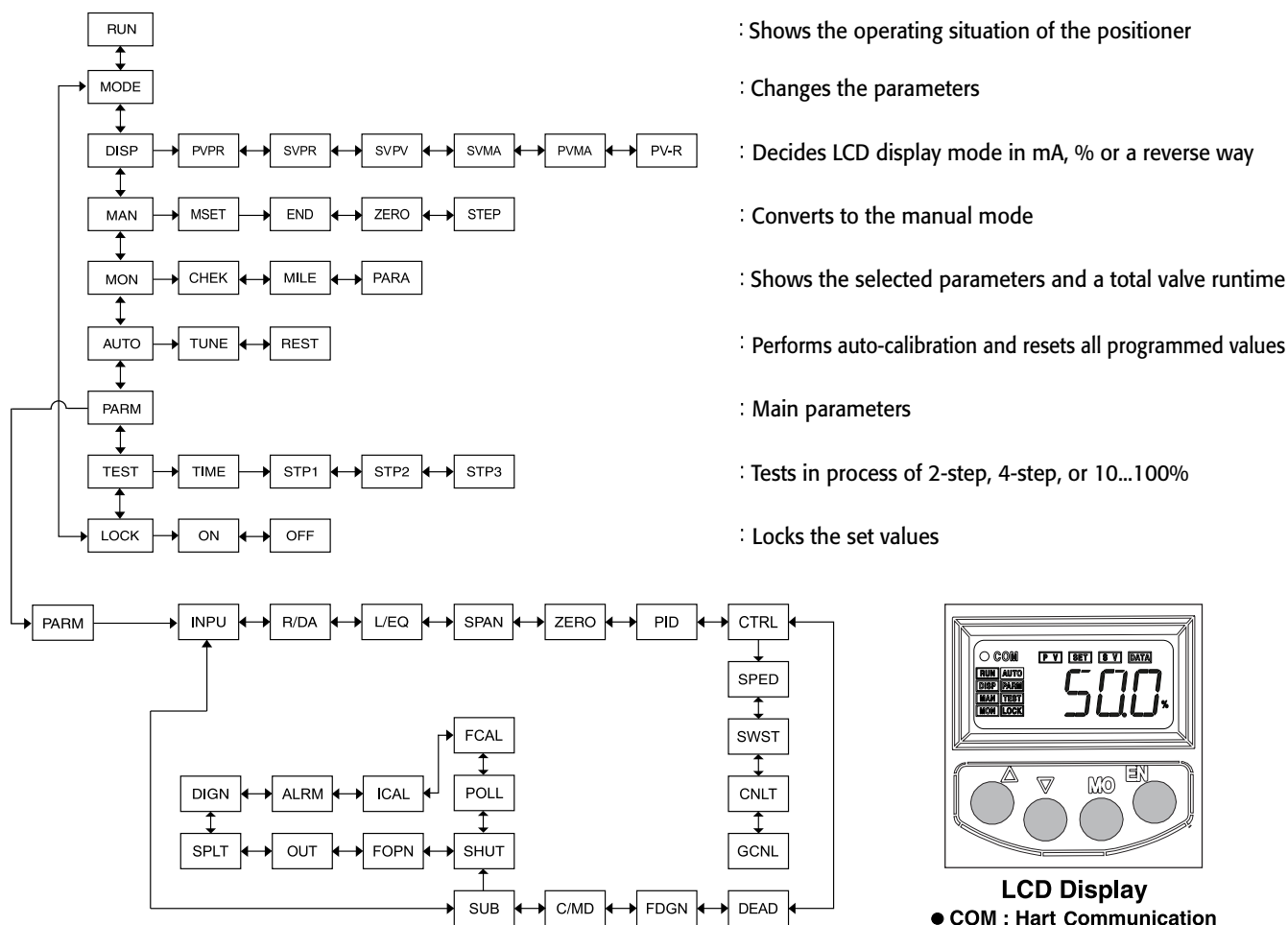
## CHARACTERISTIC CURVES



## QUICK START AND CHECKING

	Button	Action
Auto - Calibration	MO	Push 5 seconds for auto-calibration
Span	$\nabla$ DN or ENT $\rightarrow$ ENT $\Delta$ UP $\nabla$ DN or ENT $\rightarrow$ MO	Push $\nabla$ DN 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**

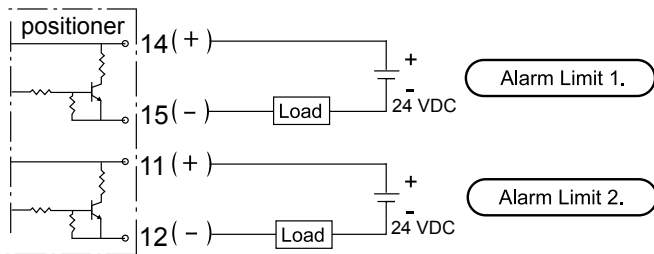


**LCD Display**  
● COM : Hart Communication

Parameter	Description	Function	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

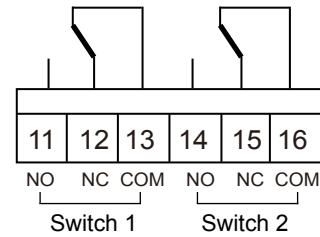
# SS3 Linear / Rotary Smart Valve Positioner

## WIRING ALARM LIMITS



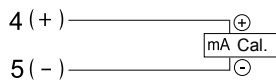
Note that 24 VDC should be supplied for power.

## MICRO SWITCHES (SPDT)

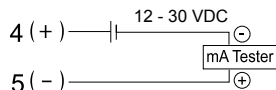


## MEASURING OUTPUT SIGNAL

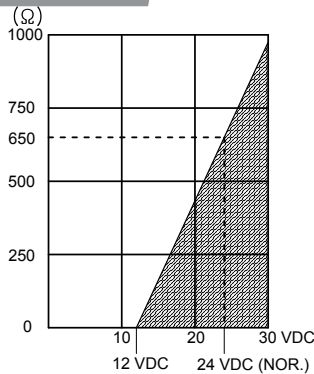
① With mA loop calibrator



② With multimeter (mA)



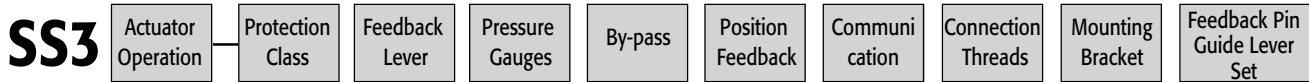
ZERO and SPAN of position feedback are automatically set after auto-calibration process.



< Transmitter Load Limitations >

Micro Switches	
Type	SPDT
Rating	10.1A @ 250 VAC
Ambient Temperature	-30 ~ 85° C
Position Transmitter	
Output Signal	4 - 20 mA, 2-wire
Power Supply	12 - 30 VDC
Output Current Limit	30 mA DC
Linearity	±0.5% F.S
Operating Temp.	-30 ~ +80° C

## HOW TO ORDER

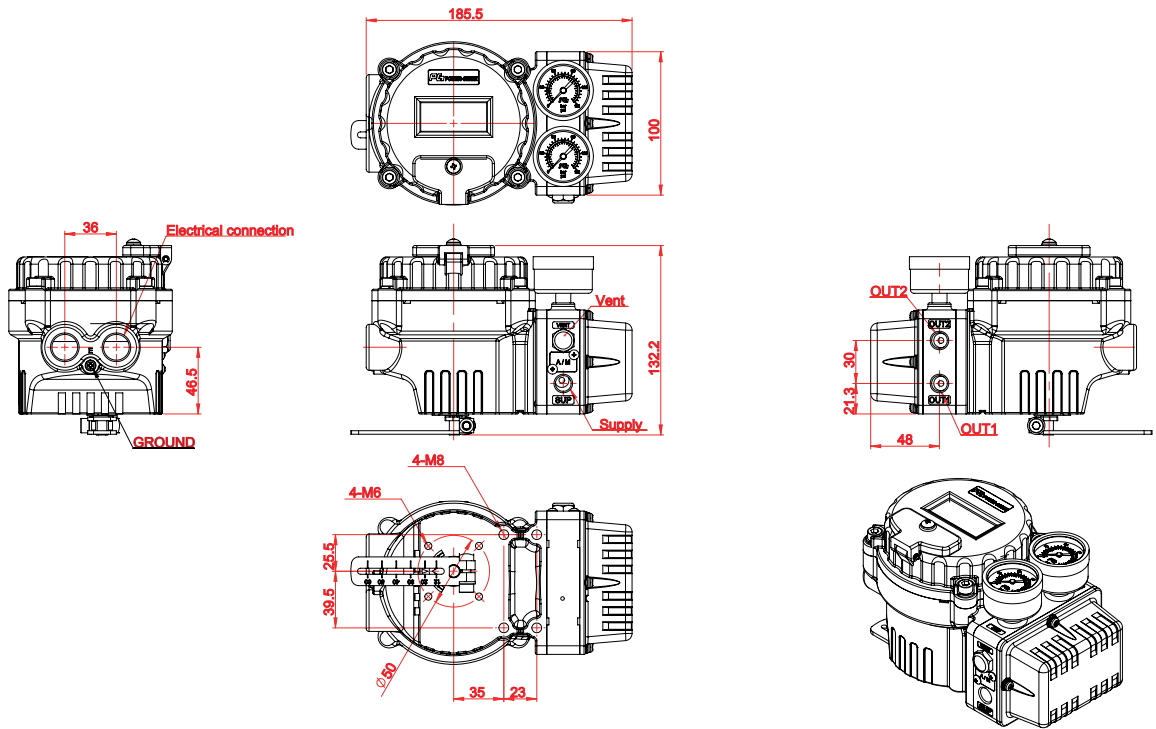


Description	Code
Actuator Operation :	L : Linear type R : Rotary type
Protection Class :	F : Flameproof (IECEX Ex d IIC T6 / ATEX Eex d IIC T6) K : Flameproof (KC Ex d IIC T6)
Feedback Lever :	
- Linear type :	A : Stroke (5~30mm) B : Stroke (5~65mm) C : Stroke (5~130mm) D : Stroke (80~200mm)
- Rotary 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)

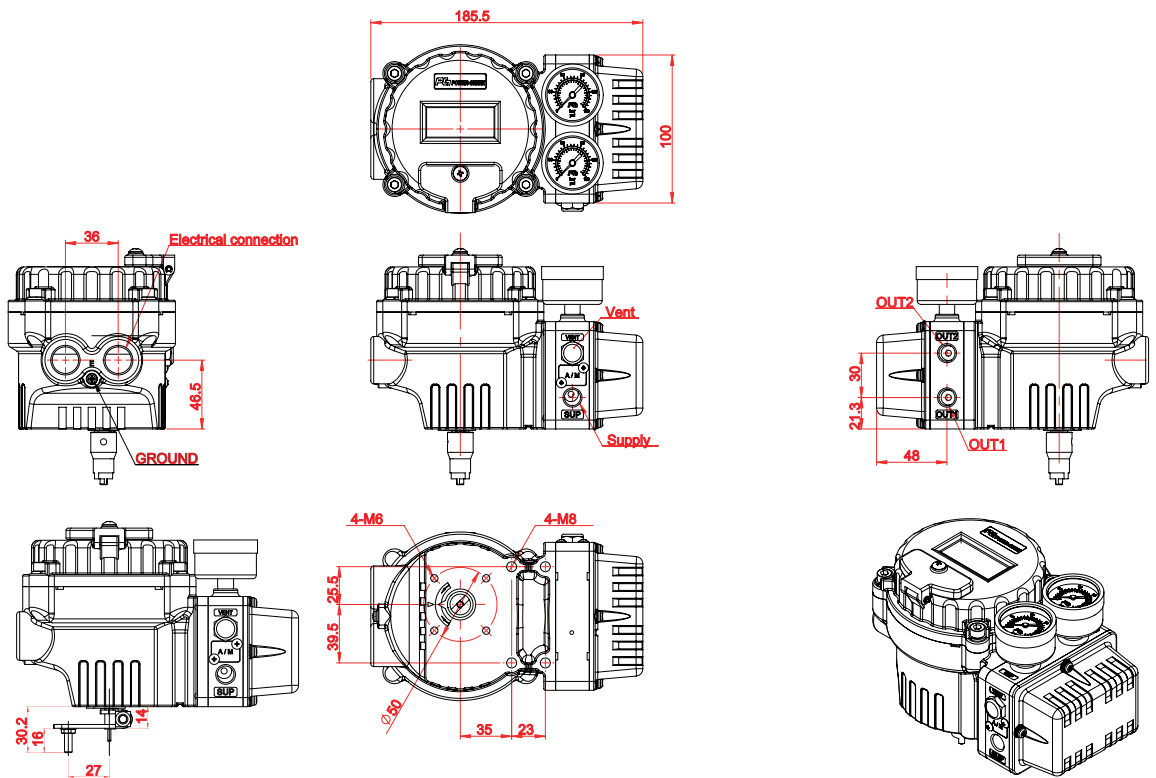
Description	Code
Position Feedback :	N : None O : Position transmitter (4~20mA output signal) L : 2 x alarm limit S : 2 x micro switch (SPDT) M : O + L Q : O + S
Communication :	N : None H : HART P : Profibus (in progress) F : Fieldbus (in progress)
Connection Threads :	3 : PT(Rc) 1/4 - PF(G) 1/2 (pneumatic - electrical) 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 :	0 : Not included 1 : Included (only for linear type SS3L)



**DIMENSIONS SS3L (Linear Type)**

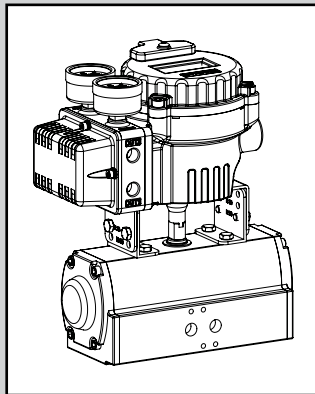
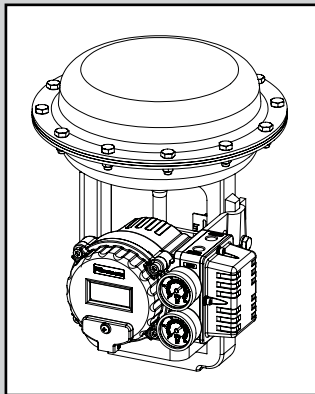


**DIMENSIONS SS3R (Rotary Type)**



< Fork Lever Type >

# SS3 Linear / Rotary Smart Valve Positioner



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