

## 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 * 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) 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 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 ~ +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 R : Rotary type
<b>Protection Class :</b>	I : Intrinsically safe IECEx / ATEX / TR-CU Ex ia IIC T6/T5 K : Intrinsically safe KC - Ex ia IIC T6/T5 W : Weatherproof to IP66
<b>Feedback Lever :</b>	
- 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)
<b>Gauge Block :</b>	0 : Not mounted 1 : 6 bar (90 psi) 2 : 10 bar (150 psi)
<b>By-pass :</b>	N : None Y : Yes (auto/manual screw)

Description	Code
<b>Position Feedback :</b>	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
<b>Communication :</b>	N : None H : HART P : Profibus PA F : Fieldbus Foundation
<b>Connection Threads :</b> (pneumatic - electrical)	4 : NPT 1/4 - NPT 1/2
<b>Mounting Bracket :</b>	N : None L : IEC 60534-6-1 (for SS2SL) R : IEC 60534-6-2 (for SS2SR) VDI/VE 3845
<b>Feedback Pin Guide Lever Set :</b> (only for linear type SS2SL)	0 : Not included 1 : Included

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

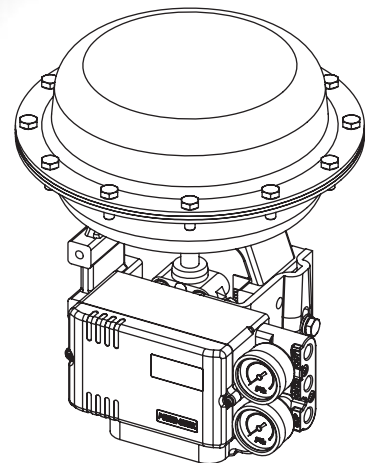


## Features

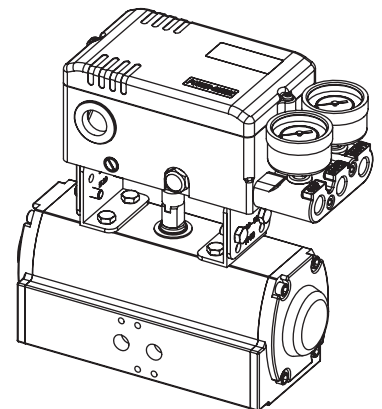
- ▶ Easy and quick auto-calibration
- ▶ Detecting RA (reverse acting) or DA (direct acting) automatically regardless of wrong air connections
- ▶ Available to use for single or double acting without any special adjustments
- ▶ Compact design allowing to be installed on small actuators
- ▶ Providing error 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)**



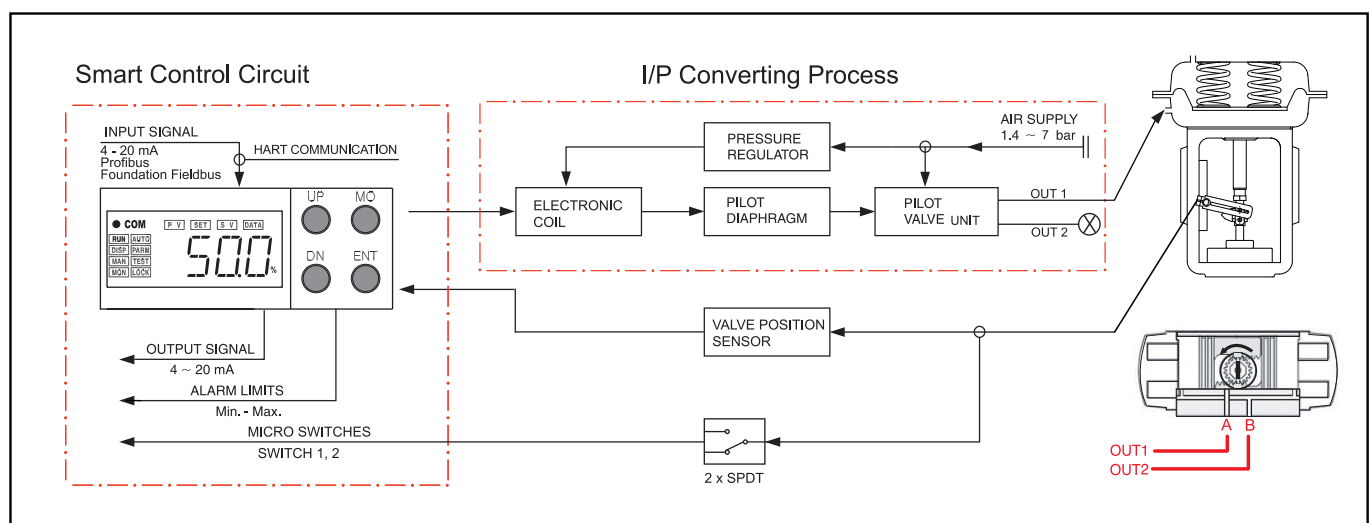
**- SS2R (Rotary Type)**

## 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 * 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) 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 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 ~ +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

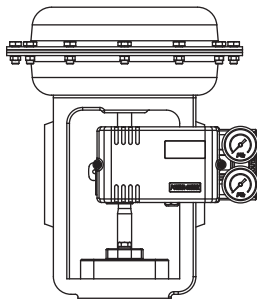
## Principle of Operation



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.

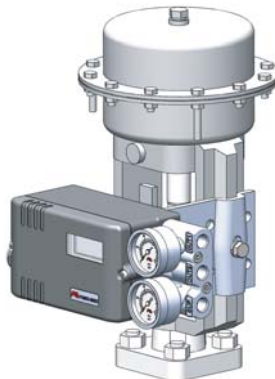
## Mounting to Linear Actuator

### - SS2L (Linear Type)

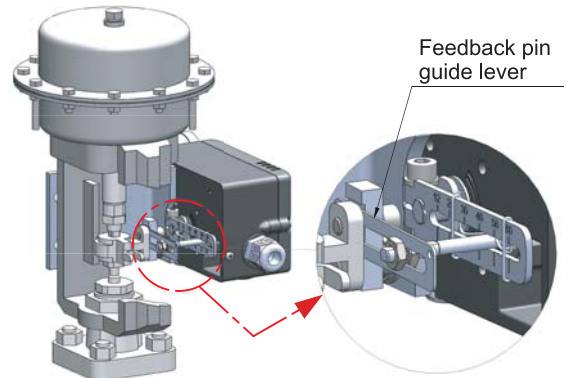


< Front View >

OUT1  
OUT2  
SUP

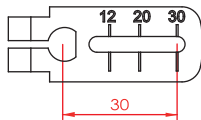


< Side View >

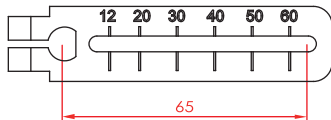


< Feedback Lever Connection >

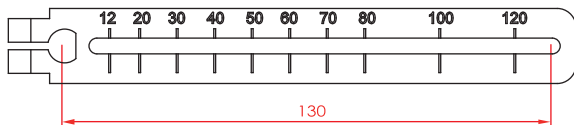
#### "A" Type



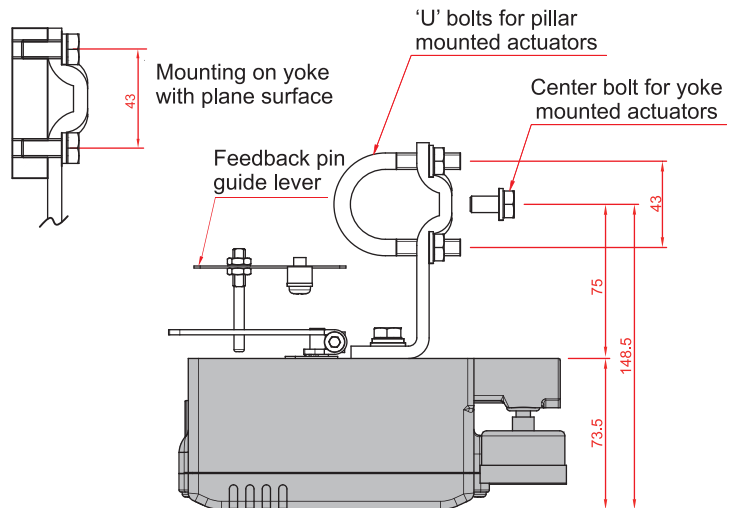
#### "B" Type



#### "C" Type



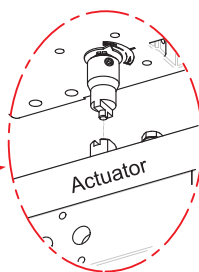
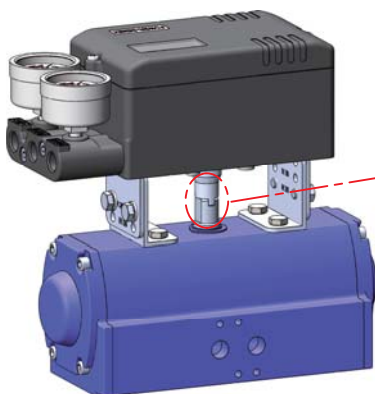
Feedback Lever



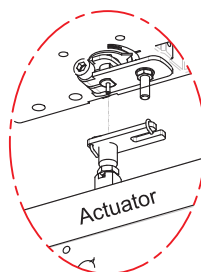
Mounting to linear actuators to IEC 60534 6-1

## Mounting to Rotary Actuator

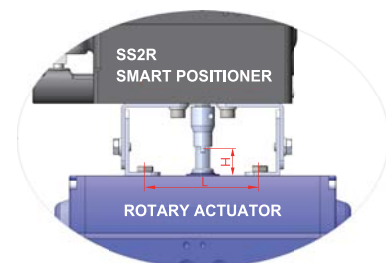
### - SS2R (Rotary Type)



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



Fork Lever Type Mounting

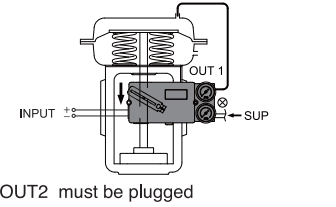
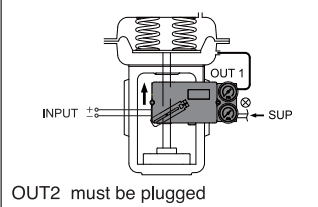
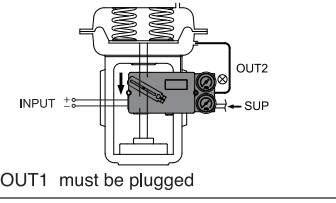
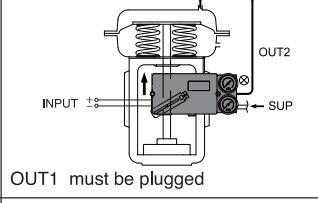
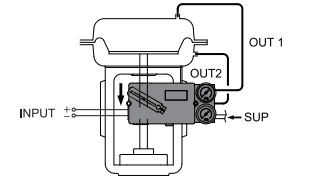
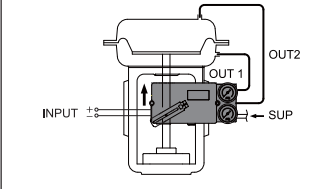


Size Variation of Multi-Size Bracket

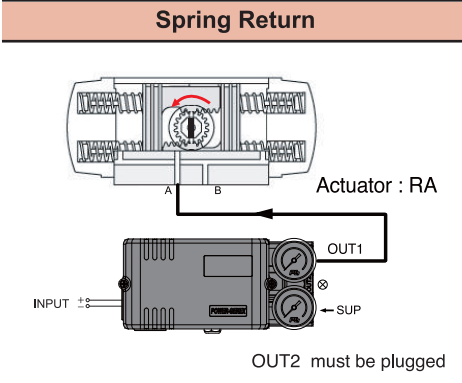
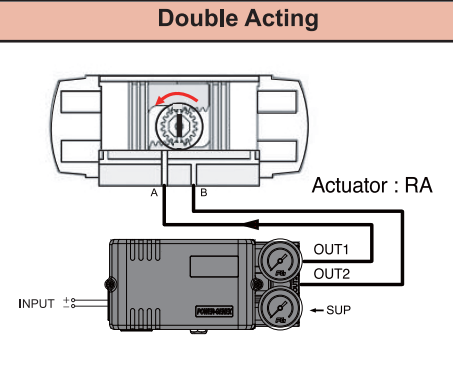
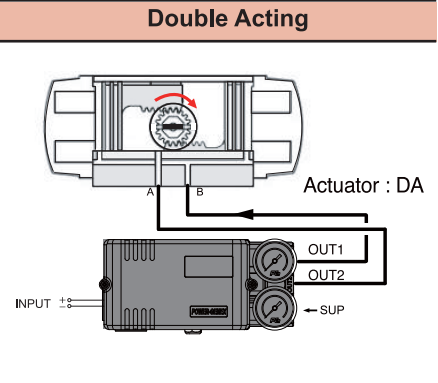
- 1) 80 x 30 x 20 (H) , 4) 130 x 30 x 20 (H)
  - 2) 80 x 30 x 30 (H) , 5) 130 x 30 x 30 (H)
  - 3) 80 x 30 x 50 (H) , 6) 130 x 30 x 50 (H)
- H : Rotary Actuator Shaft Height  
L : Length ( 80 or 130mm )

## Air Connections

### - SS2L (Linear Type)

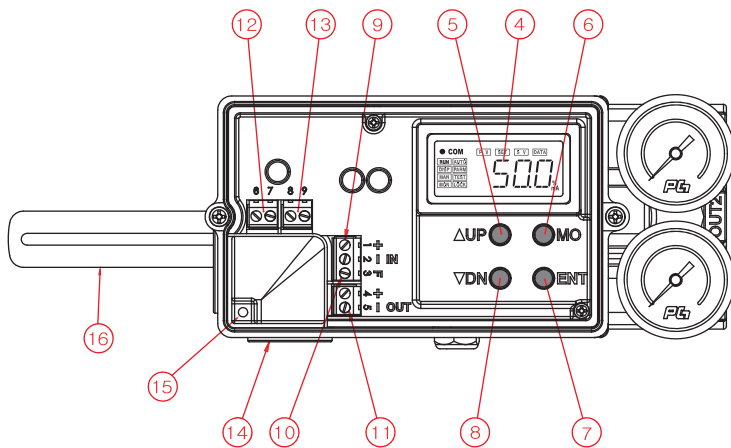
Direct Acting (DA)		Reverse Acting (RA)	
<p><b>DA 1</b></p> <p>As the input signal increases, Valve stem moves downwards</p> <p>Actuator : DA</p>	 <p>OUT2 must be plugged</p>	<p><b>RA 1</b></p> <p>As the input signal increases, Valve stem moves upwards</p> <p>Actuator : RA</p>	 <p>OUT2 must be plugged</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>
As the input signal increases, Actuator shaft rotates counter-clockwise	As the input signal increases, Actuator shaft rotates counter-clockwise	As the input signal increases, Actuator shaft rotates clockwise

	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

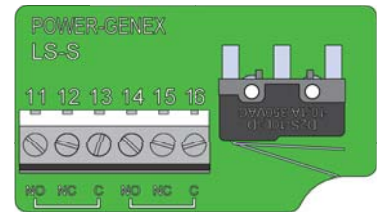
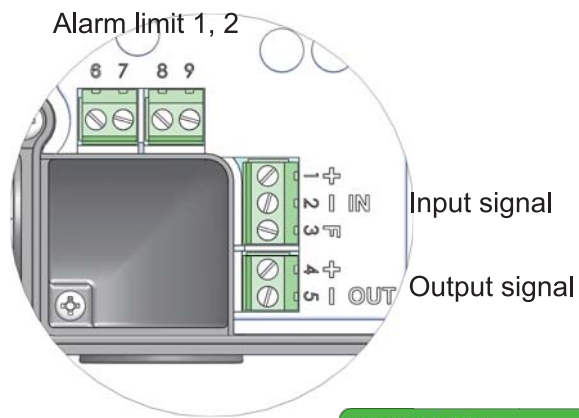
## SS2 Front Cover Removed



- 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

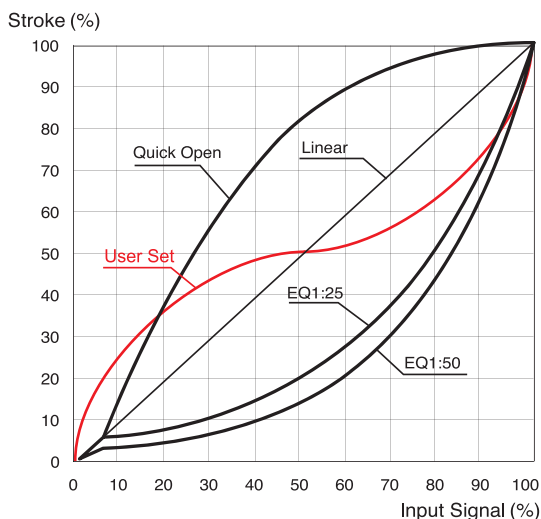
## Electrical Connections

- 1 (+) } IN. 4-20mA input signal
- 2 (-) }
- 3 (FG) } Frame Ground
- 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

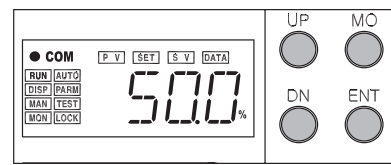
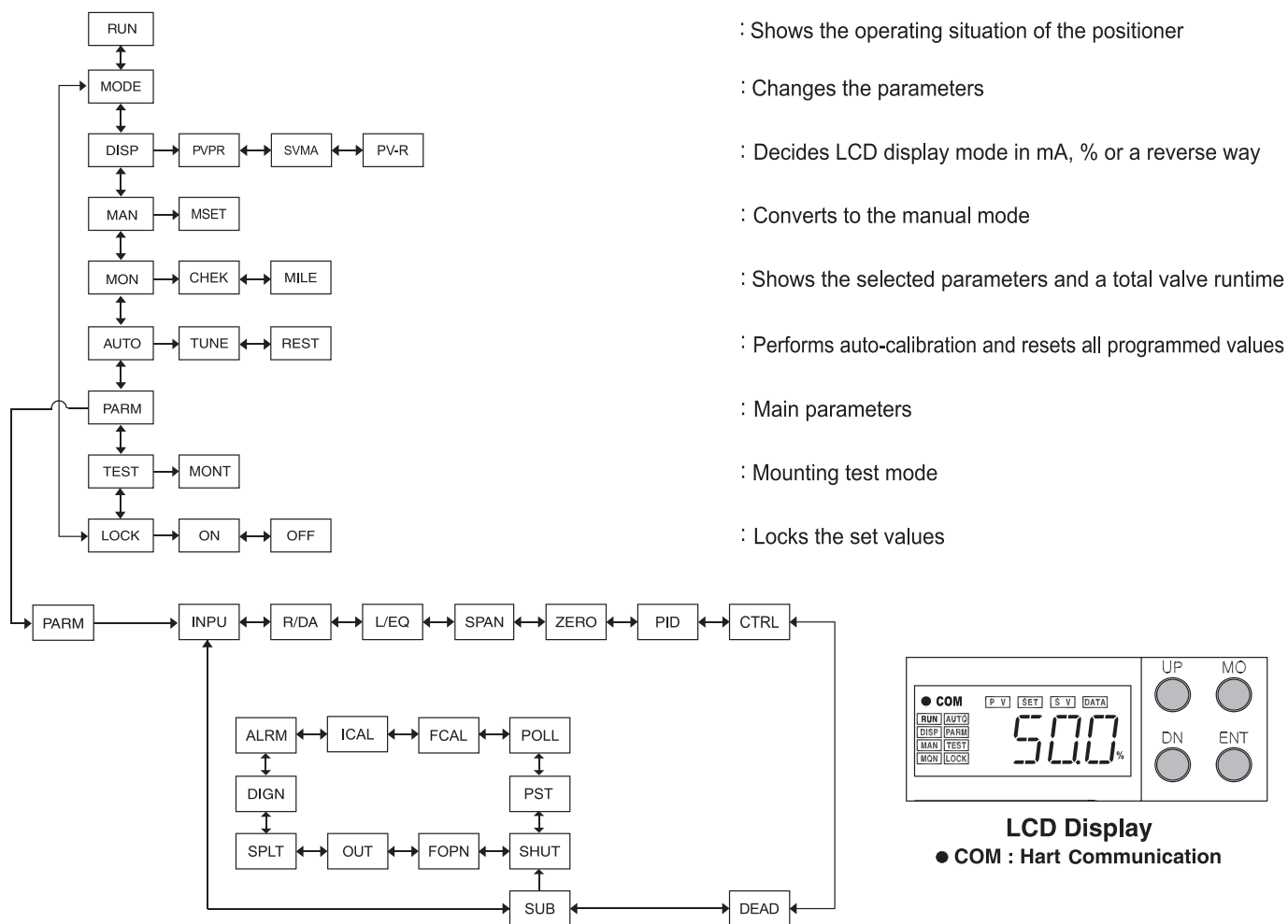
## Characteristic Curves



## Quick Start and Checking

	Button	Action
Auto - Calibration	MO	Push 5 seconds for auto-calibration
Span	VDN → ENT 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

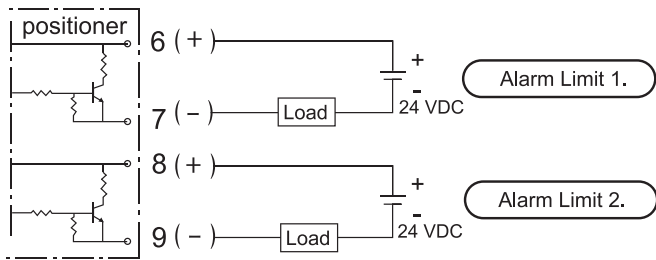


**LCD Display**

● COM : Hart Communication

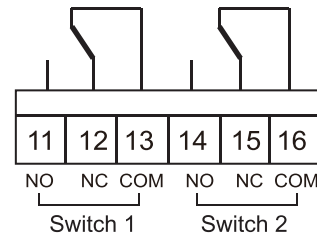
Parameter	Description	Fcution	Default
INPU	Input signal	4 ~ 20mA or 20 ~ 4mA	4 ~ 20mA
R/DA	RA/DA	Reverse acting or direct acting	Auto-set
L/EQ	Characteristic	Linear, E.Q.%(1:25 or 1:50), Quick open or User set(17points)	Linear
SPAN	Span adjustment	0 ~ 100%	100%
ZERO	Zero adjustment	0 ~ 99%	0%
PID	P-GN / 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%
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



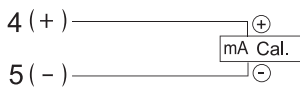
Note that 24 VDC should be supplied for power.

## Micro Switches (SPDT)

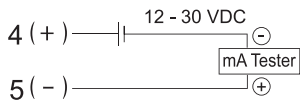


## Measuring Output Signal

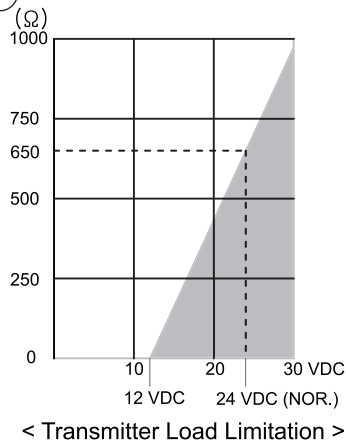
① With mA loop calibrator



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

# SS2

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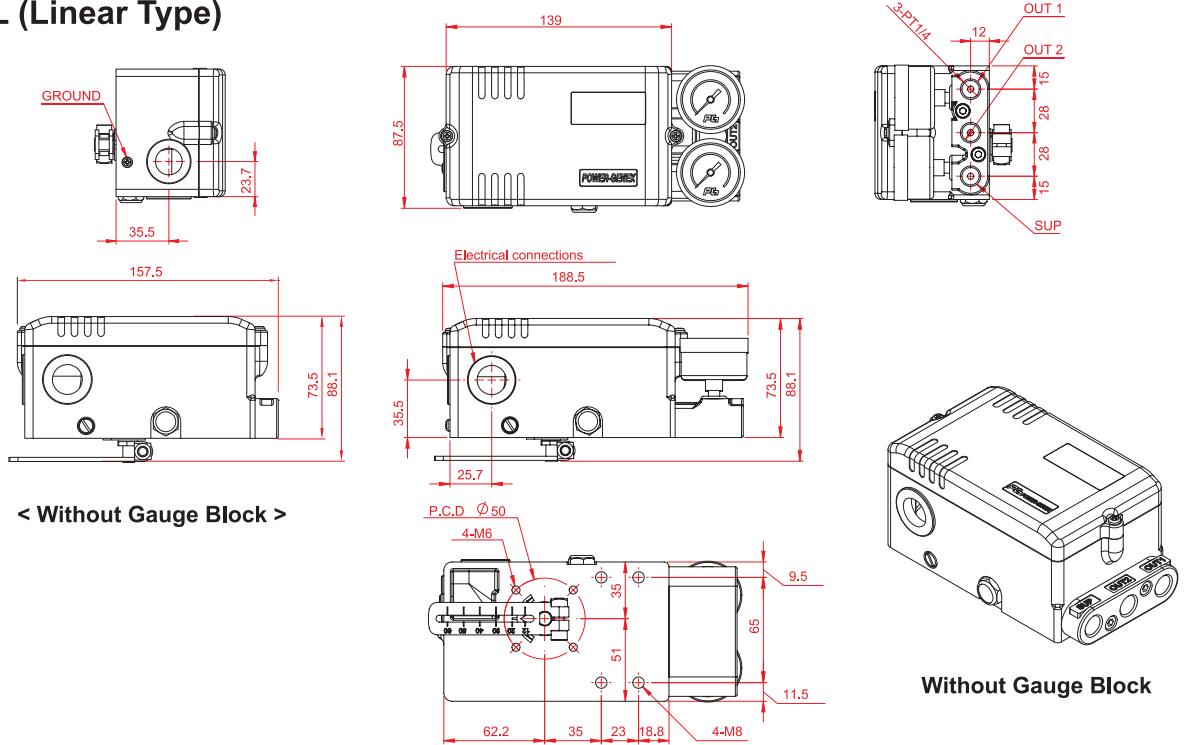
Description	Code
<b>Actuator Operation :</b>	L : Linear type R : Rotary type
<b>Protection Class :</b>	I : Intrinsically safe IECEX / ATEX / TR-CU Ex ia IIC T6/T5 K : Intrinsically safe KC - Ex ia IIC T6/T5 W : Weatherproof to IP66
<b>Feedback Lever :</b> - Linear type :	A : Stroke (5~30mm) B : Stroke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

Description	Code
<b>Position Feedback :</b>	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
<b>Communication :</b>	N : None H : HART P : Profibus PA F : Foundation Fieldbus
<b>Connection Threads :</b> (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
<b>Mounting Bracket :</b>	N : None L : IEC 60534-6-1 (for SS2L) R : IEC 60534-6-2 (for SS2R) VDI/VDE 3845
<b>Feedback Pin Guide Lever Set :</b> (only for linear type SS2L)	0 : Not included 1 : Included

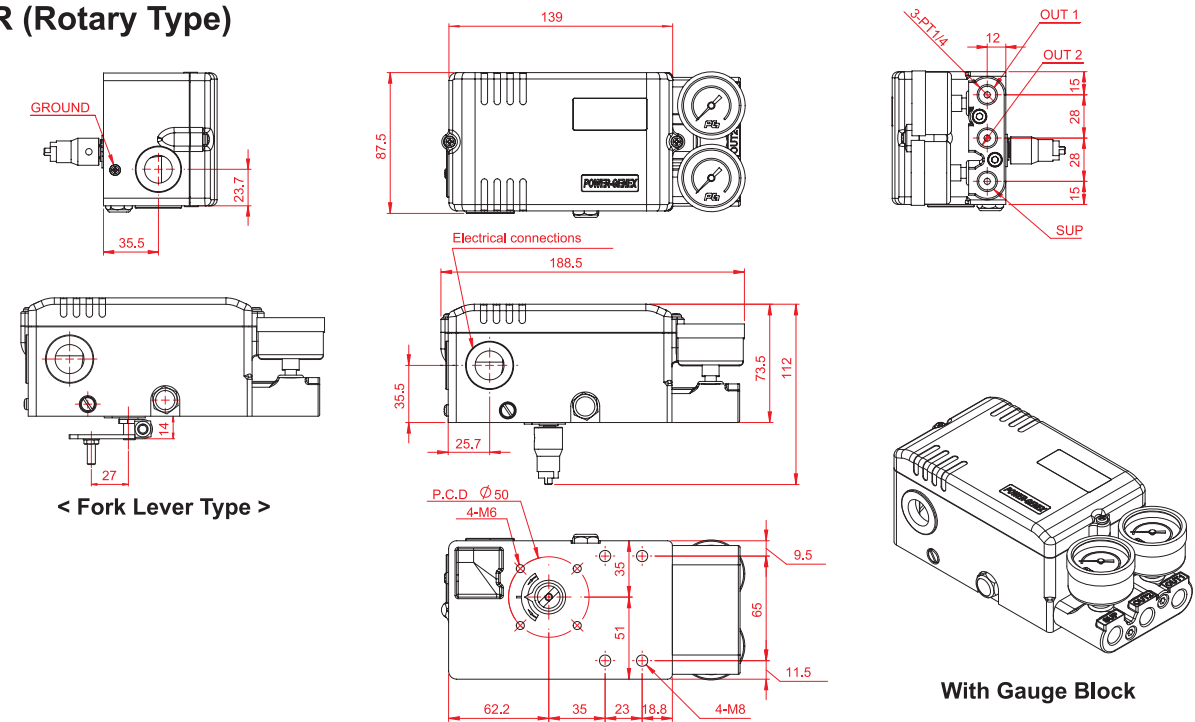


## Dimensions

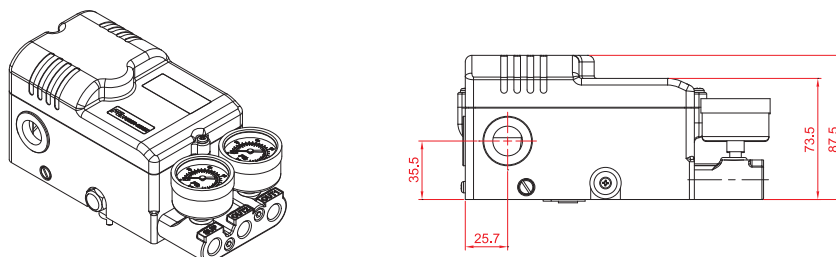
### - SS2L (Linear Type)



### - SS2R (Rotary Type)



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



# Smart Valve Positioner ( remote type )

# SS2 Linear / Rotary

## How to Order

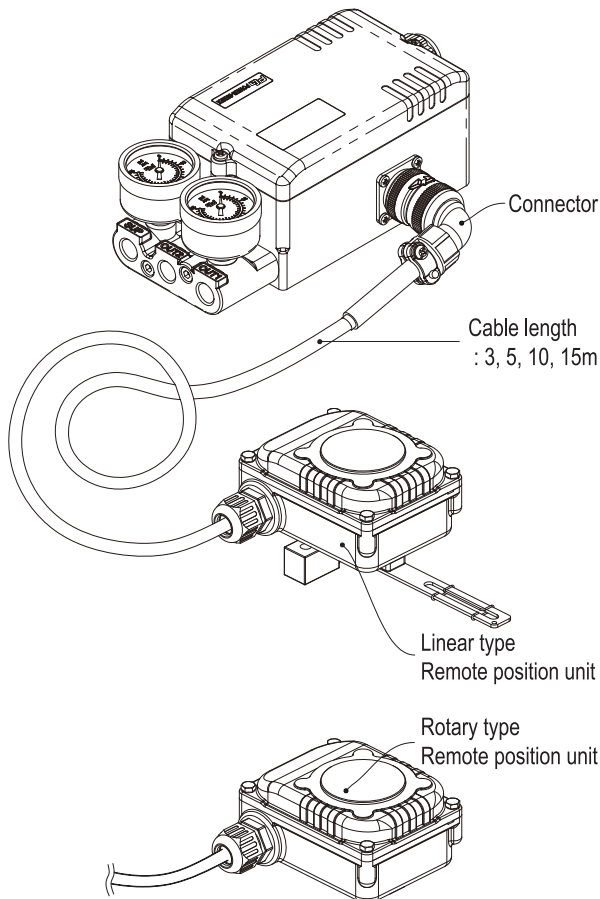
# SS2

Actuator Operation	Protection Class	Feedback Lever	Pressure Gauges	By-pass	Position Feedback	Communi-cation	Connection Threads	Mounting Bracket	Feedback Pin Guide Lever Set	Cable Length
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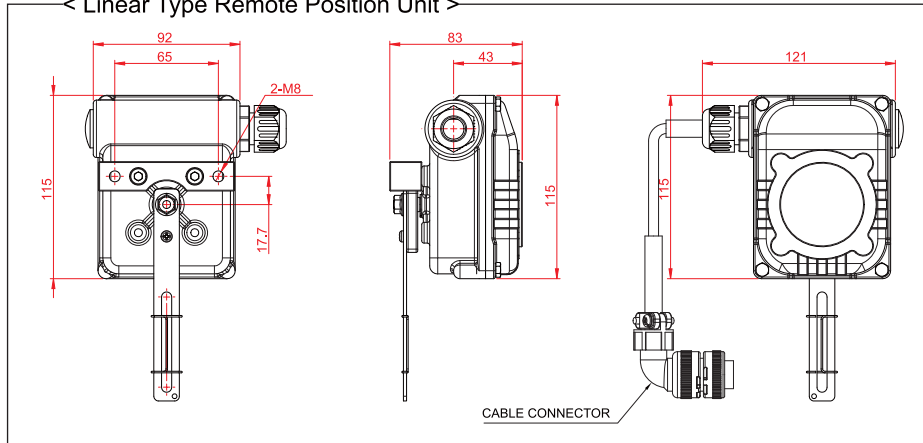
Description	Code
Cable Length :	3 : 3 m 5 : 5 m 10 : 10 m 15 : 15 m * Other on request

\* Please see "How to Order" on page 13 to select more options.

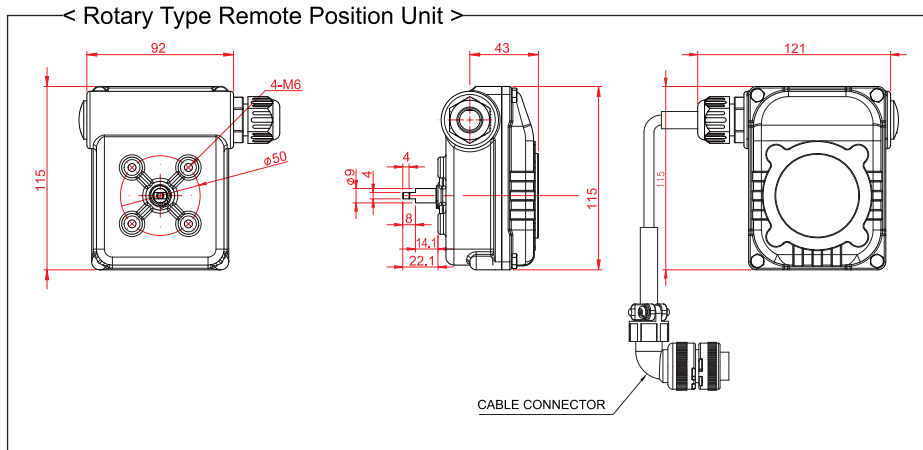
## Dimensions



< Linear Type Remote Position Unit >



< Rotary Type Remote Position Unit >



# Smart Valve Positioner

( Linear Sensor Positioner for Cylinder )

# SS2 Linear / Rotary



< Cylinder type >



< Angle Seat Valve type >



## Specifications

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)		
Stroke	Up to 1000 mm			
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) 233 ℓ/min = 14 N <sup>m</sup> /h = 8.2 scfm (Sup = 6 bar)			
Air Consumption	2 ℓ/min = 0.12 N <sup>m</sup> /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, 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, 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 / power-painted			
Weight	1.6 kg (without bracket & sensor)			

\* - 40°C on request

## How to Order

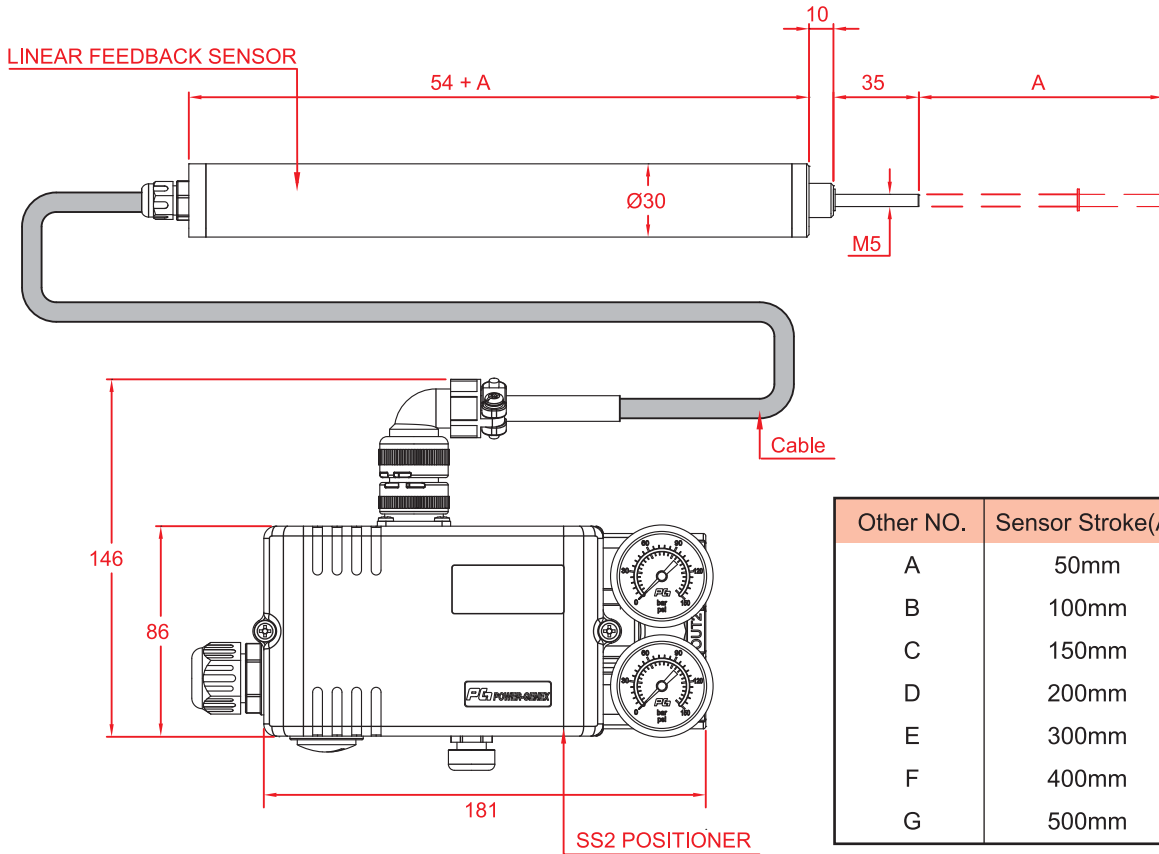
# SS2C

Protection Class	Cylinder Stroke	Pressure Gauges	By-pass	Position Feedback	Communication	Connection Threads	Mounting Bracket	Cable Length
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Description	Code
Protection Class :	I : Intrinsically safe IECEX / ATEX / TR-CU Ex ia IIC T6/T5 K : Intrinsically safe KC - Ex ia IIC T6/T5 W : Weatherproof to IP66
Cylinder Stroke :	A : Cylinder stroke 10 ~ 30mm B : Cylinder stroke 30 ~ 80mm C : Cylinder stroke 80 ~ 125mm D : Cylinder stroke 125 ~ 165mm E : Cylinder stroke 165 ~ 260mm F : Cylinder stroke 260 ~ 350mm x : Other on request
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 M : O + L
Communication :	N : None H : HART P : Profibus PA F : Foundation Fieldbus
Connection Threads : (pneumatic - electrical)	3 : PT(Rc) 1/4 - PF 1/2 4 : NPT 1/4 - NPT 1/2 5 : PT(Rc) 1/4 - M20 x 1.5
Mounting Bracket :	N : None Actuator Model NO.
Cable Length :	Standard, 3, 5, 10, 15m Other : On request

## Dimensions



## Applications

