Instruction and Operating Manual

Smart Valve Positioner

ASD-5000 Series

Power-Genex Ltd.

ver 1.0

Contents

REV	DATE	CHANGE	Made by
1.0	20.12.24		Kim. KW

1-1 Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of **"Caution," "Warning"** or **"Danger."** They are all important notes for safety and must be followed in addition to International Standards (IEC) Note 1), and other safety regulations.

Note 1) IEC 60079-0 : 2017 EN 60079-0 : 2018
IEC 60079-11 : 2011 EN 60079-11 : 2012

Caution	**Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
Warning	**Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
Danger	**Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

Warning

1. **The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.**
   Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalogue information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.
2. **Only personnel with appropriate training should operate machinery and equipment. The product specified here may become unsafe if handled incorrectly.**
   The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.
3. **Do not service or attempt to remove product and machinery/equipment until safety is confirmed.**
   1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
   2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
   3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.
4. **Contact POWER-GENEX beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.**
   1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
   2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalogue.
   3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
   4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

1-2 Safety Instructions

Caution

1. The product is provided for use in manufacturing industries.
The product herein described is basically provided for peaceful use in manufacturing industries. If considering using the product in other industries consult POWER-GENEX beforehand and exchange specifications or a contract if necessary. If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer/Compliance Requirements

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements". Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered. Note 2)
Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.

2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided. This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.

3. Prior to using POWER-GENEX products, please read and understand the warranty terms and disclaimers noted in the specified catalogue for the particular products.

Note 2) Vacuum pads are excluded from this 1 year warranty.
A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.
Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the Deterioration of rubber materials are not covered by the limited warranty.

Compliance Requirements

1. The use of POWER-GENEX products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.

2. The exports of POWER-GENEX products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a POWER-GENEX product to another country, assure that all local rules governing that export are known and followed.

1-3 Precautions

Be sure to read before handling.

Operation

Warning

1. **Do not operate the positioner outside the specified range as this may cause problems. (Refer to the specifications.)**
2. **Design the system to include a safety circuit to avoid the risk of danger should the positioner suffer failure.**
3. **Be sure that exterior lead-in wiring to the terminal box is based on the guidelines for explosion-protection of manufactory electric equipment when being used as a flame proof, explosion proof construction.**
4. **Do not remove terminal cover in a hazardous location while the power is on.**
5. **Covers for the terminal and body should be in place while operating.**
6. **When using as an intrinsically safe explosion-proof product, do not wire in a hazardous location while the power is on.**

Caution

1. **Do not touch the actuator or valve's oscillating section when supply pressure has been added, as this is dangerous.**
2. **Make sure fingers do not get caught when mounting and aligning the cam.**
   Cut off the pressure supply and always release the compressed air inside the positioner and actuator before performing this work.
3. **Always use with the body cover unit mounted.**
   Moreover, the positioner may not meet degrees of protection IP66 depending on the body cover mounting conditions. In order to meet degrees of protection IP66, tighten threads using the proper tightening torques (2.8 to 3.0 N·m).
4. **Always flush the pipe's inside before piping to ensure foreign objects such as machining chips do not enter the positioner.**
5. **The actuator opening may become unstable when using the booster relay.**
6. **Always use a ground connection to prevent noise from the input current and to prevent damage because of static electricity.**
7. **Use the pressure reading on the supplied pressure gauge as an indication.**
8. **The supplied pressure gauge's needle will malfunction if the pressure supply to the internal mechanism or positioner freezes. Ensure that the pressure gauge's internal parts do not freeze if using the pressure gauge in an operating environment with an ambient temperature of less than 0°C.**

For users

Caution

1. **Assemble, operate and maintain the positioners after reading the operation manual tho-roughly and understanding the content.**

1-4 Precautions

Be sure to read before handling.

Handling

Caution

1. **Avoid excessive vibration or impact to the positioner body and any excessive force to the armature, as these actions may cause damage to the product. Handle carefully while transporting and operating.**
2. **If being used in a place where vibration occurs, using a binding band is recommended to prevent broken wires because of the vibration.**
3. **When exposed to possible moisture invasion, please take the necessary measures. For example, if the positioner is left onsite for long periods, a plug should be put in the piping port and a body cover unit fitted to avoid water penetration.**
   Take measures to avoid dew condensation inside the positioner if exposed to high temperature and humidity. Take enough measures against condensation especially when packing for export.
4. **Keep magnetic field off the positioner, as this affects its characteristics.**

Air Supply

Caution

1. **Use only dehumidified and dust extracted clean compressed air as the air supply.**
2. **Use only dehumidified and dust extracted clean compressed clean air as the positioner contains extra fine orifices such as restrictor and nozzle.**
   Do not use a lubricator.
3. **Do not use compressed air containing chemicals, organic solvents, salinity or corrosive gases, as this may cause malfunction.**
4. **When operating below the freezing point, protect the positioner from freezing.**

Operating Environment

Caution

1. **Do not operate in locations with an atmosphere of corrosive gases, chemicals, sea water, or where these substances will adhere to the regulator.**
2. **Do not operate out of the indicated operation temperature range as this may cause damage to electronic parts and seal materials to deteriorate.**
3. **Do not operate in locations where excessive vibration or impact occurs.**
4. **If the body cover is being installed in a place where the body cover is exposed to direct sunlight, the use of a standard body cover without the LCD window is recommended.**

1-5 Precautions

Be sure to read before handling.

Maintenance

Warning

1. **After installation, repair or disassembly, connect compressed air and conduct tests to confirm appropriate function and leakage.**
   Do not use the positioner when noise from the bleeder sounds louder compared with the initial state, or when it does not operate normally. If these occur, check immediately if assembled and mounted correctly.
   Never modify electrical construction to maintain explosion-proof construction.

Warning-Potential electrostatic charging hazard

1. **The non-metallic parts incorporated in the enclosure of this equipment may generate an ignition capable level of electrostatic charge. Therefore particularly when it used for applications that specifically require Group IIC, EPL Ga equipment, the equipment shall not be installed in a location where the external conditions are conductive to the build-up of electrostatic charge on such surfaces. Additionally, the equipment shall only be cleaned with a damp cloth.**
2. **The enclosure contains aluminum and is considered to present a potential risk of ignition by impact or friction. Care must be taken during installation and use to prevent impact or friction. Particularly, it must not be used for applications that specifically require EPL Ga equipment.**

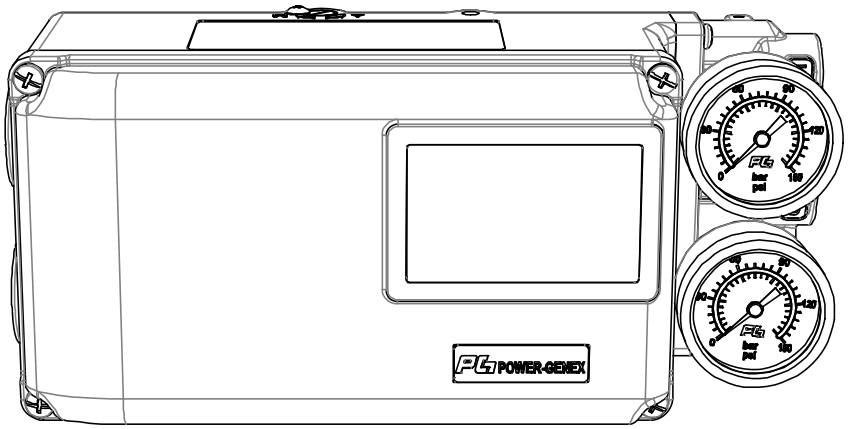
Caution

1. **The insulation between an intrinsically safe circuit and a frame of the equipment is not capable of withstanding a 500V dielectric strength test as defined in Cl.6.3.12 of EN 60079-11:2007. This shall be taken into account during installation.**
2. **The earthing of enclosure is necessary to maintain Intrinsic Safety because the insulation between an intrinsically safe circuit and a frame of the equipment is not capable of withstanding a 500V dielectric strength test. There are two earthing points on the equipment. One is provided as an internal earthing point inside rear cover of the equipment for attaching of a cable screen. The other is provided as an external earthing point on the left side of the enclosure. Their cross-sectional areas should be capable of carrying the maximum possible current of the equipment.(Generally, an insulated wire having a cross-sectional area of at least 4mm^2 is recommended) The cable should be fitted with a spilt ring lock washer to minimize the risk of self-loosening and is of suitable construction for securing of conductors of cross sections up to 4mm^2.**

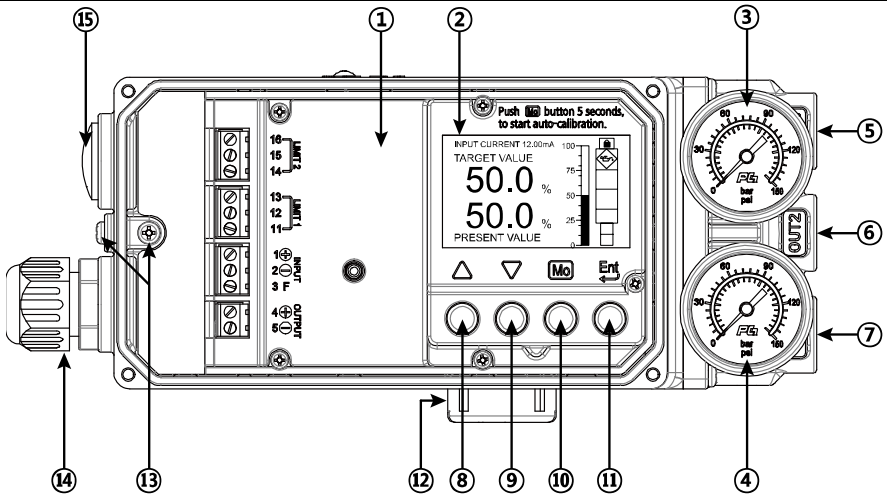
2. Overview of Structure

ASD-5000 positioner consists of the following parts.

- Electronic card with microprocessor, HART modem and LCD
- MPS for position feedback
- Pilot valve, torque motor, pressure gauge and block



Names of External Parts



1	PCB Cover	7	Supply port	13	Ground
2	LCD Display	8	△ Up button	14	Cable gland
3	Out 1 gauge	9	▽ Down button	15	Bland plug
4	Out 2 gauge	10	Mo Mode button		
5	Out 1 port	11	Ent Enter button		
6	Out 2 port	12	Air Vent		

3. Technical data

1. Input

Standard

Supply power :	4 to 20mA, Loop powered
Max. :	50mA
Min. :	3.6mA
Load voltage at 20mA :	6.8V
Impedance at 20mA :	340 Ω

HART Communication ver. 7

- Without advanced diagnostics

Load voltage at 20mA :	7.8V
Impedance at 20mA :	390 Ω

- With advanced diagnostics (with 4 pressure sensor)

Load voltage at 20mA :	9.5V
Impedance at 20mA :	475 Ω

Profibus PA & FOUNDATION fieldbus

Supply power :	Bus power 9 – 32VDC
Current Consumption :	Profibus - 15mA FOUNDATION fieldbus - 16mA

2. Output

Range :	0 – 7 bar (0 – 100 psi)
Air consumption :	2.5 L.P.M at 1.4 bar (20 psi) supply pressure 3.0 L.P.M at 6 bar (90 psi) supply pressure
Air Capacity :	250 L.P.M at 1.4 bar (20 psi) supply pressure 300 L.P.M at 6 bar (90 psi) supply pressure

3. Air Supply

Instrument air :	free of oil, water and dust acc. to DIN/ISO 8573-1 pollution and oil content according to Class 3
Supply pressure :	1.4 to 7 bar (20 to 100 psi)

4. Applicable actuator

Operating type :	Linear, Rotary, Remote
Acting type :	Single, Double
Action :	direct action(DA), reverse action(RA)

Linkage type

Travel range :	Linear : 10 – 180 mm Rotary : 30 – 120 rotation angle

Linkage-less type

Travel range :	Linear : 10 – 125 mm Rotary : 30 – 120 rotation angle Remote : 3, 5, 10, 15, 20, 30M

※ Other travel range on request

5. Characteristic

Linearity	< ±0.5% F.S
Sensitivity	< ±0.3% F.S
Hysteresis	< ±0.3% F.S
Repeatability	< ±0.2% F.S
Performance characteristic	Linear, Shape (EQ%, Quick), User set

6. Enclosure

Material :	Aluminum die-cast + Epoxy painted 316 Stainless steel housing
Protection class :	IP66
Pneumatic connections :	PT 1/4 NPT 1/4
Electrical connections :	PF 1/2 NPT 1/2 M20 x 1.5
Weight :	2.4 kg – Aluminum die-cast 4.5 kg – Stainless steel 316

7. Hazardous Area Approvals

IECEx, ATEX, KCs, CCC, EAC

Intrinsically Safe(Gas), Ex ia IIC T6/T5/T4

Intrinsically Safe(Dust), Ex ia IIIC T85℃/T100℃/T135℃

8. Environmental influences

Ambient temperature :	-30 to 80℃ (-22 to 176˚F)
Operating temperature of LCD :	-20 to 80℃ (-4 to 176˚F)
Vibration :	2G, 5 to 400 Hz
Humidity :	The dew point should be at least 10℃ lower than the temperature of this device.

9. Feedback option

Position Transmitter (Output signal)

Output signal :	4-20mA, 2wire
Supply voltage :	12-30VDC
Load Limitation :	0 – 1000 Ω (Normally 650Ω at 24VDC)
Linearity	± 0.5%

Limit switches – Software program limits

Type :	2 x software program limits
Rating :	24VDC

Limit switches – Micro switches

Type :	2 x SPDT
Rating :	5A @ 220VAC
Contact :	Silver alloy
Ambient temperature :	-30 - 85℃

Limit switches – P&F sensor (SJ2-SN)

Type :	NAMUR NC
Supply voltage :	Nominal 8.2VDC (5 – 11 VDC)
Current consumption :	Target not detected > 3mA Target detected < 1mA
Ambient temperature :	-40 - 100℃

10. Mounting bracket

Linear type	IEC 60534-6-1
Rotary type	IEC 60534-6-2

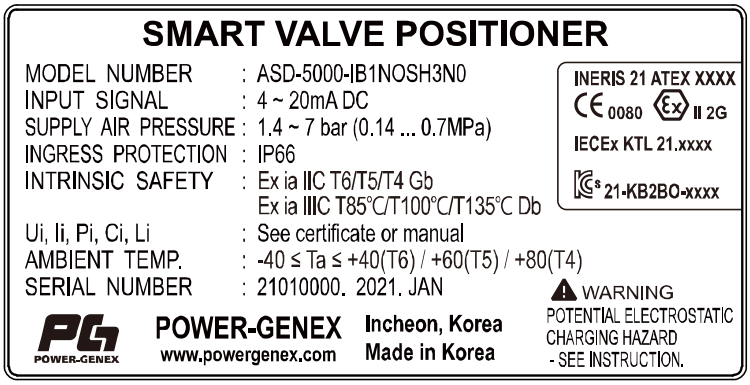
4. How to order code

Model classification code or ordering information or type designation or model schedule or model numbering system

				①	②	③		④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫		⑬	⑭
ASD-5 Series positioner			**ASD - 5**	x	x	x	-	x	x	x	x	x	x	x	x	x	-	xx	x
1. Body material	**Aluminum die-cast**			**0**															
	stainless steel 316			**1**															
2. Actuator operation	**Linear**				0														
	Rotary				**1**														
3. Feedback type	**Linkage type**					**0**													
	Linkage-less type					**1**													
	Remote type					**2**													
4. Hazardous Area & Protection	**Intrinsically Safe Ex ia IIC T6/T5/T4 Gb**							**I**											
	Ex ia IIIC T85/T100/T135 Db																		
	Weatherproof to IP66							**W**											
5. Feedback size	**Linkage type**	**Linear type**	**Stroke 10 – 60mm**						**B**										
			Stroke 10 - 120mm						**C**										
			※Other on request																
		Rotary type	**Fork lever**						**N**										
			NAMUR shaft						**M**										
	Linkage-less type	**Linear type**	**Stroke 10 – 120mm**						**B**										
			※Other on request																
		Rotary type	**M6 Connector**						**N**										
			M8 Connector						**M**										
6. Gauge (Out1, Out2 gauge)	**6 bar (90 psi)**									**1**									
	10bar (150 psi)									**2**									
7. Beacon indicator	**None**										**N**								
	Flat indicator										**F**								
	90˚Beacon indicator										**Y**								
8. Options	**None**											**N**							
	Position Transmitter (4-20mA)											**O**							
	Advanced diagnostics + position transmitter (In pending)											**A**							
9. Limit switches	**None**												**N**						
	2 x Alarm limit												**L**						
	2 x Micro switches (SPDT)												**S**						
	2 x P&F sensors												**P**						
10. Communication	**None**													**N**					
	HART Communication													**H**					
11. Connection Threads	**PT(Rc) 1/4 – PF(G) 1/2**														**3**				
	NPT 1/4 – NPT 1/2														**4**				
	PT(Rc) 1/4 – M20x1.5														**5**				
	NPT 1/4 – M20x1.5														**6**				
	※ Other on request																		
12. Mounting Bracket	**None**															**N**			
	Linear type 5x1x / IEC 60534-6-1															**L**			
	Rotary type 5x2x / IEC 60534-6-2															**R**			
13. Partner identification																		**xx**	
14. Remote Cable (only for ASD-52xx)	**3, 5, 10, 20, 30M**																		**3**
Order example			**ASD - 5**	**0**	**2**	**0**	**-**	**I**	**N**	**2**	**N**	**O**	**N**	**H**	**4**	**R**			

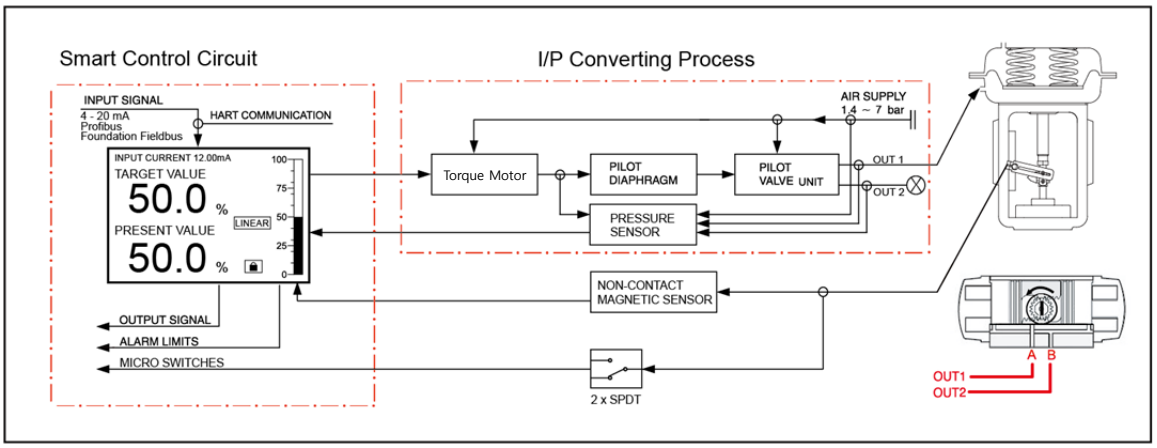
ASD-5 Series, linkage type, rotary, aluminum body, intrinsically Safe, 10bar gauge, position transmitter, HART communication, NPT

4.1. Descriptions on Nameplate



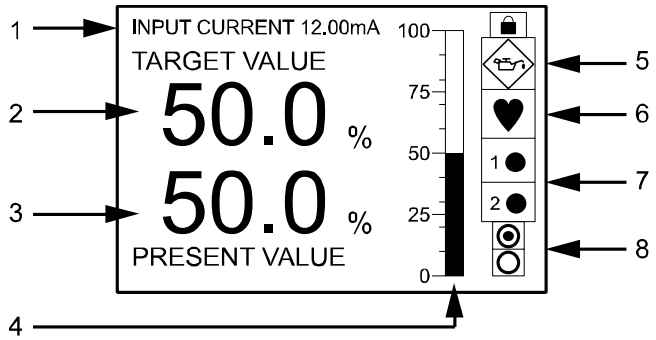
- **Model No:** Model number and options are described.
- **Input signal:** Current input signal is described. 4~20mA current is used. Inquire the head office or the agents if other special input signal is required.
- **Supply air pressure :** operating pressure range indication
- **Intrinsic safety :** Intrinsic safety class
- **Ui, Ii, Pi, Ci, Li :** Intrinsic safety parameters
  - **Input signal** : Ui ≤ 28Vdc, Ii ≤ 93mA, Pi ≤ 651mW, Li ≈ 0, Ci ≤ 23nF
  - **Output signal** : Ui ≤ 28Vdc, Ii ≤ 93mA, Pi ≤ 651mW, Li ≈ 0, Ci ≤ 23nF
  - **2 x Alarm limit switch** : Ui ≤ 28Vdc, Ii ≤ 93mA, Pi ≤ 651mW, Li = 0, Ci = 0nF
  - **2 x SPDT** : Ui ≤ 28Vdc, Ii ≤ 93mA, Pi ≤ 651mW, Li = 0, Ci = 0nF
  - **2 x Proximity sensor** : Ui ≤ 16Vdc, Ii ≤ 25mA, Pi ≤ 64mW, Li ≤ 100μH, Ci ≤ 30nF
- **Ambient Temp. :** ambient temperature
- **Serial number / date:** A serial number and a manufacturing date for tracking are described.
- **Certificate No :**
  Ex ia IIC T6/T5/T4 Gb
  CE XXXX / INERIS ATEX XXXX / IECEx KTL xx.xxxX / 20-KB2BO-XXXX
- **WARNING :**
  POTENTIAL ELECTROSTATIC CHARGING HAZARD SEE INSTRUCTION.
  DO NOT OPEN WHEN AN EXPLOSIVE GAS ATMOSPHERE MAY PRESENT.

5. Principle 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.

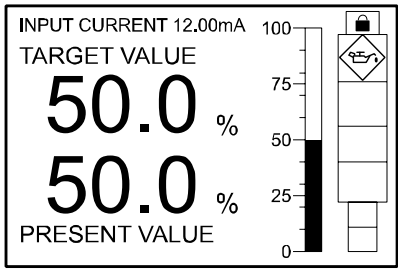
6. Descriptions of LCD Display and Buttons



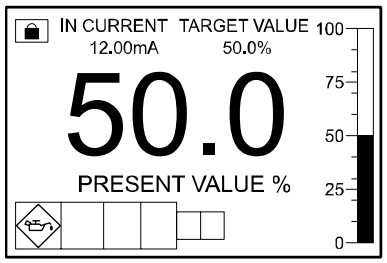
1	Input signal (current)
2	Input signal (%)
3	Present value position (%)
4	Present value position (by colored bar)
5	NAMUR NE107 diagnostic
6	HART Communication status
7	Status of software limit switches
8	Status of control (stable or unstable)

6.1. LCD Display

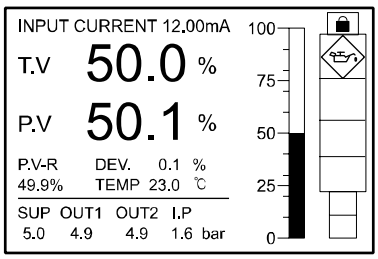
6.1.1. Modes of Display



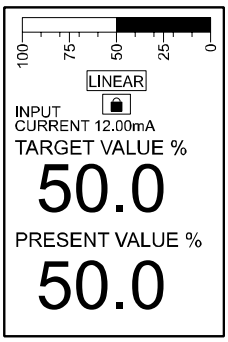
Focusing on target value and present value (basic display)



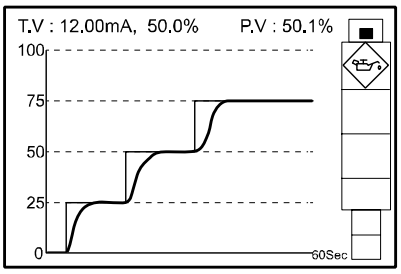
Focusing on present value



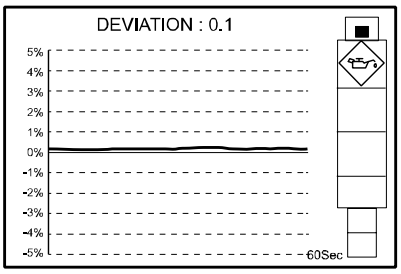
Showing all data



After rotated by 90 / 270°

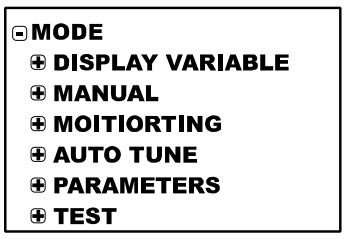


Showing TV and PV by graph

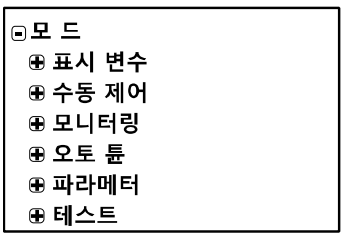


showing trend deviation (±5%)

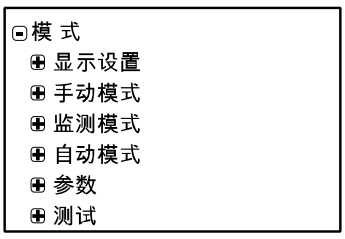
6.1.2. Multi-lingual Display



English



한국어



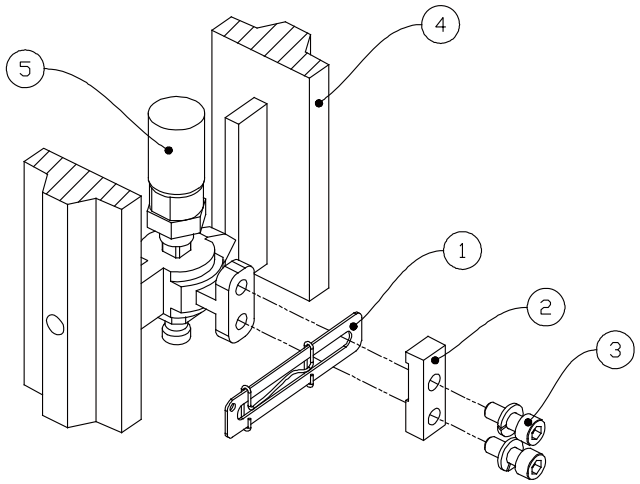
中國語

7. Installation

Be sure to install the air filter regulator before the positioner and check a supply air pressure required to move the valve.

7.1. Mounting onto Linear Actuator

7.1.1. Installation of Follower Guide



① Follower guide

② Clamp plate

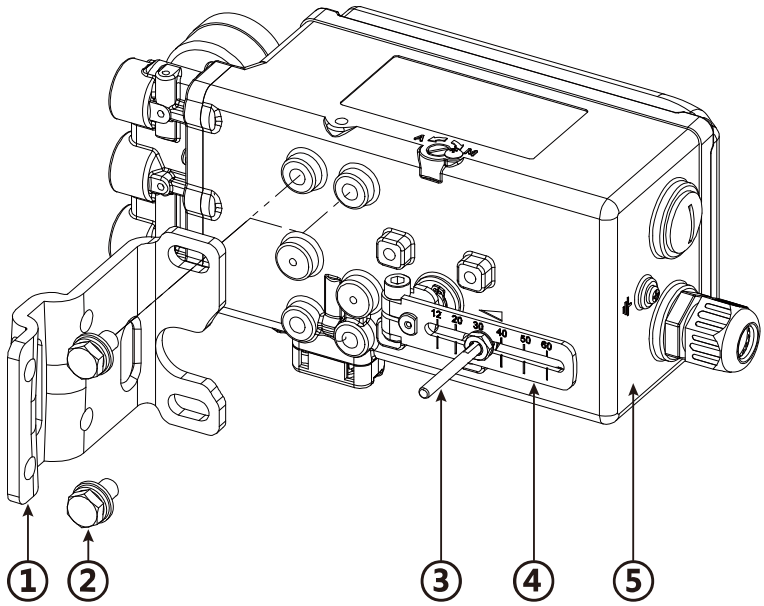
③ Screws(M6)

④ Valve yoke

⑤ Valve stem

7.1.2. Installation of Feedback Lever and Mounting Bracket

Mounting bracket for ASD-5000 positioner is designed to support IEC 60534-6-1.



① Mounting bracket

② Screws(M8)

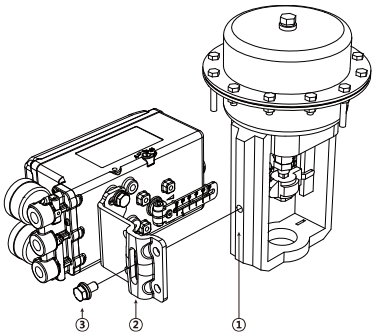
③ Feedback pin

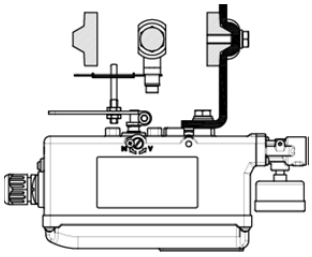
④ Feedback lever

⑤ ASD-5000 positioner

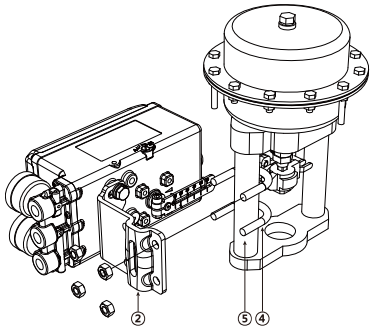
7.1.3. Mounting onto Cast Yoke or Pillar Yoke

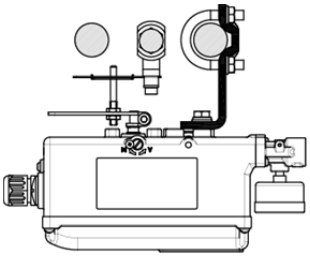
< Cast yoke type >





< Pillar yoke type >





① Cast yoke

② Mounting bracket

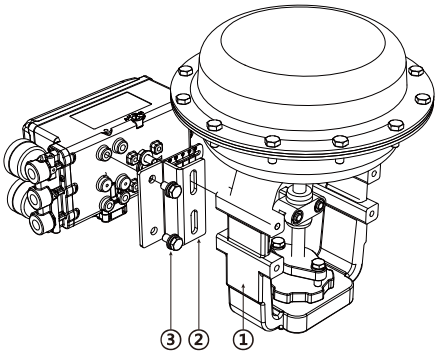
③ Screws(M8)

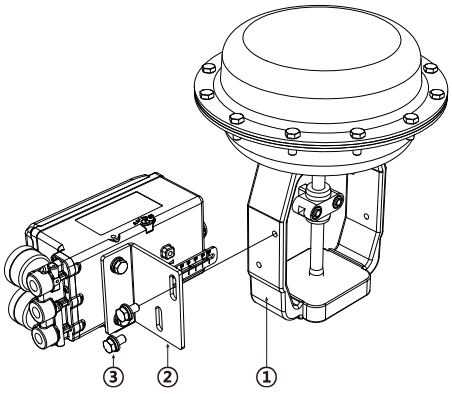
④ U-bolts

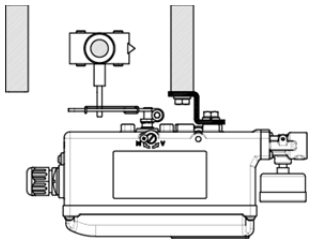
⑤ Pillar yoke

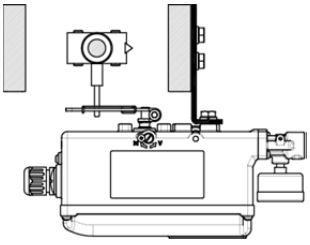
7.1.4. Mounting on Other Kind of Cast Yoke

< Cast yoke type >







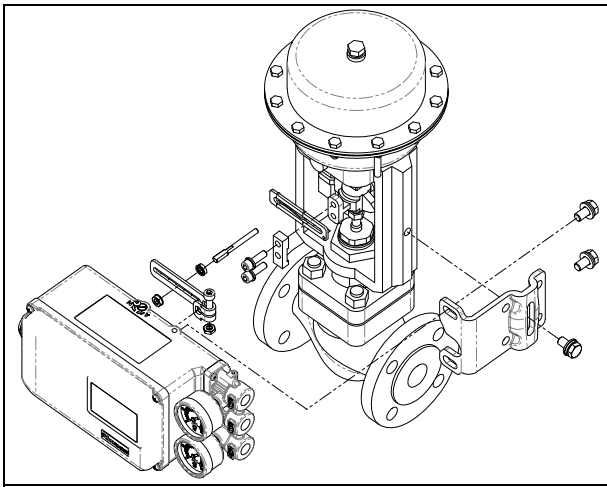


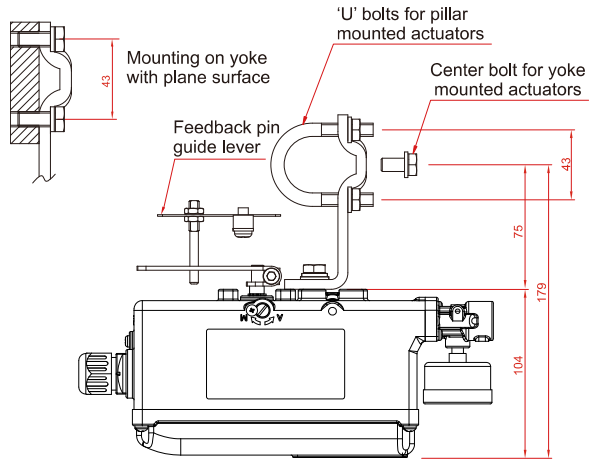
① Cast yoke

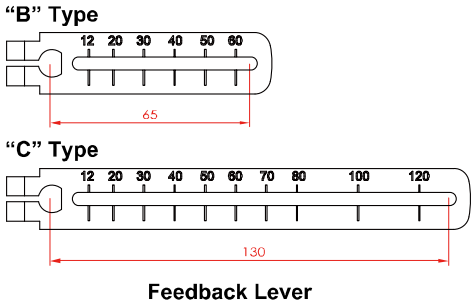
② Mounting bracket

③ Screws(M8)

7.1.5. Mounting on Diaphragm Actuator







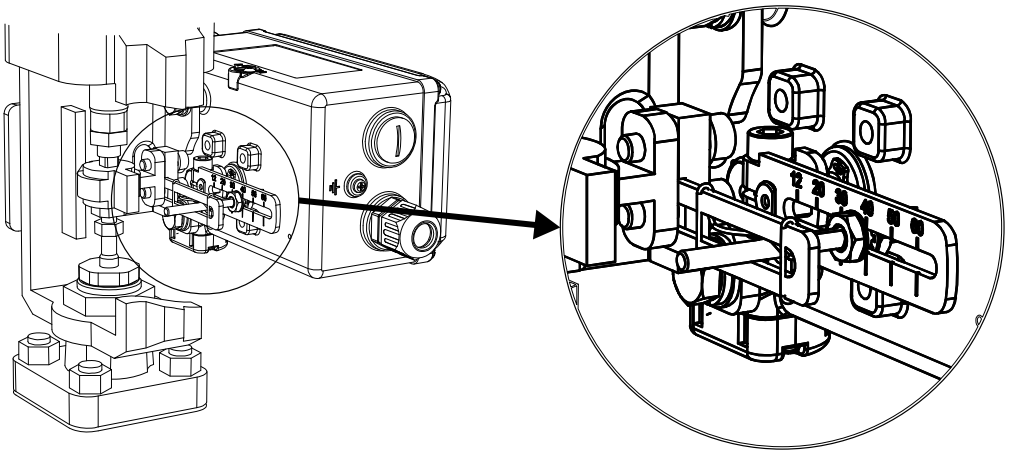
Feedback Lever

Feedback Levers

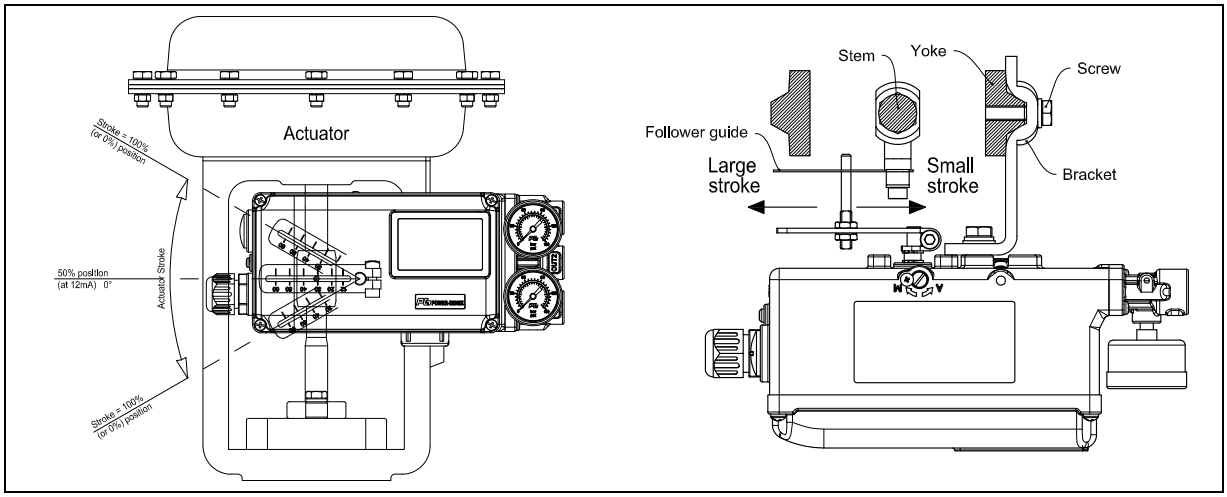
"B" type: 8 ~ 70mm stroke

"C" type: 8 ~ 130mm stroke

7.1.6. Installation of Feedback Pin Follower Guide



7.1.7. Standard Installation



① Supply air directly to the actuator, adjust the air filter regulator and set air when the valve reaches to 50% stroke.

② Install the feedback pin at around 30% higher point of the stroke indicated on the feedback lever than the required stroke of the control valve and fix with a screw tightly. For example,

Control valve stroke	Stroke indicated on feedback lever
15mm	15mm
20mm	20mm
30mm	30mm

③ Install the feedback lever horizontally at 50% stroke position.

④ If the feedback lever is not installed horizontally, move the mounting bracket up and down little by little so that it can be positioned horizontally.

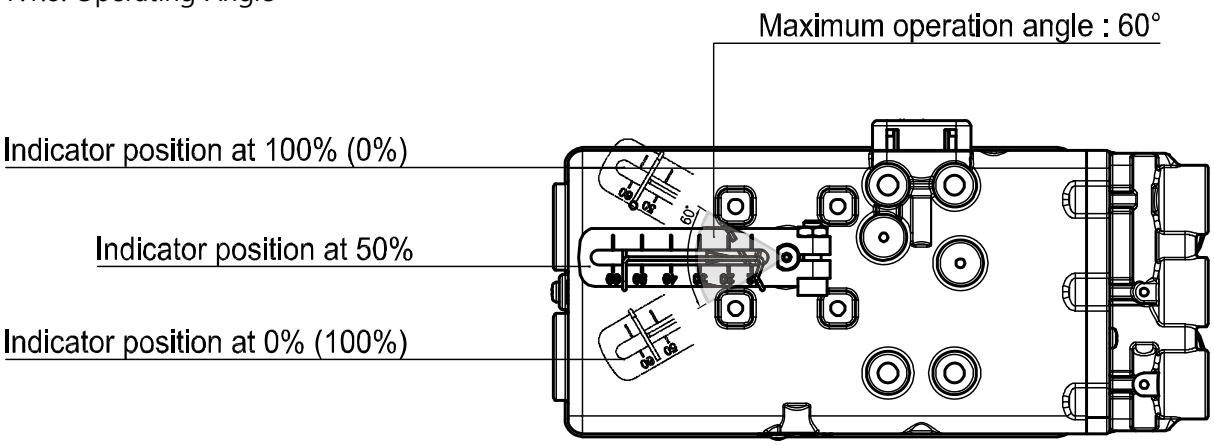
⑤ Fix the mounting bracket with screws (M8).

⑥ Connect air lines between the ASD-5000 positioner and the actuator and supply air to the positioner and perform auto-calibration by pushing Mode button for 5 seconds.

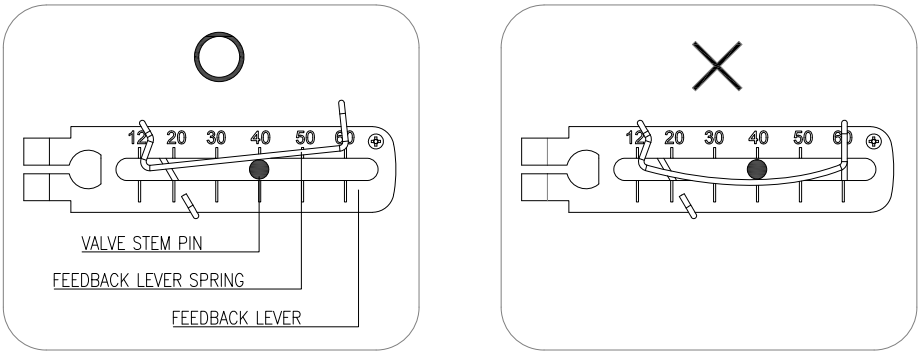
⑦ The operating angle from 0% to 100% stroke should be within the range of ±30°. In case of the over-range of 30°, move the valve stem pin to left or right and make the ASD-5000 positioner stay within the operating angle of ±30°.

Make sure that the ASD-5000 positioner works within the operating range of ±30°. See the below pictures. Otherwise, the error message of 'MONT' appears on LCD and the auto-calibration process fails. Take action as advised in the above ⑦ and get the ASD-5000 positioner feedback lever positioned horizontally at 12mA (50%).

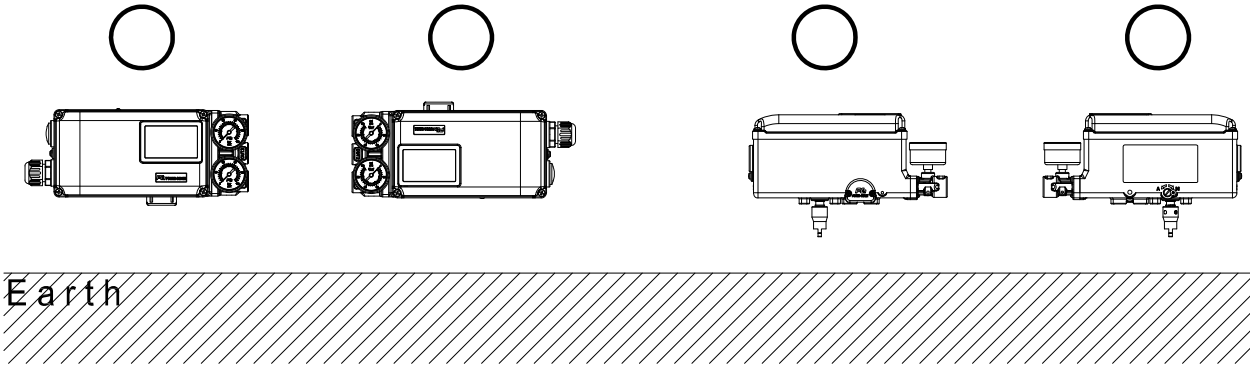
7.1.8. Operating Angle



7.1.9. Proper Installation of Valve stem pin on Feedback Lever

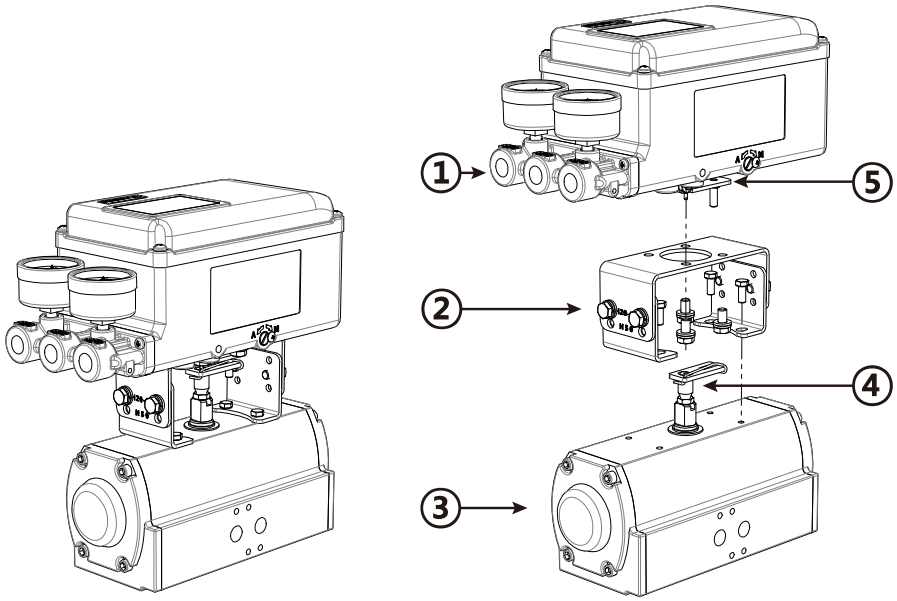


7.1.10. Proper Directions of Installation



7.2. Mounting onto Rotary Actuator

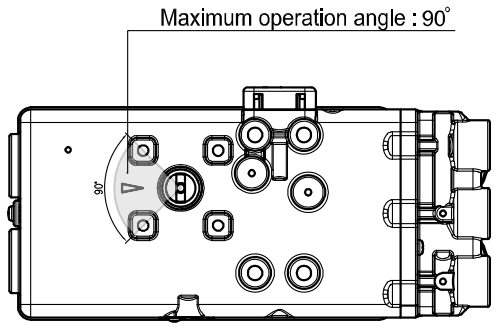
7.2.1. The ASD-5000 positioner supports NAMUR mounting standard (VDI/VDE 3835, IEC 60534-6-2).



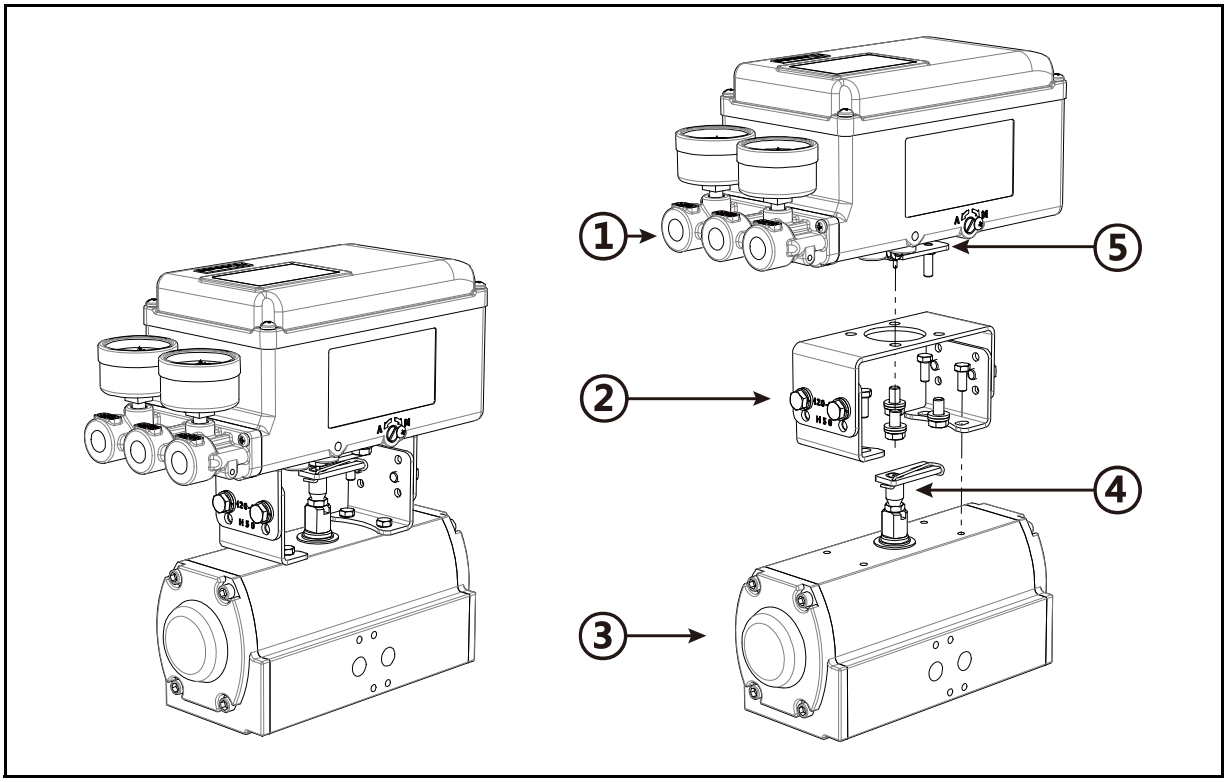
① ASD-5000 positioner ② Multi-size bracket ③ Rotary pneumatic actuator

- Assemble the multi-size bracket to the ASD-5000 positioner with 4 pcs M6 screw. The multi-size bracket is assembled for 80x30x20mm as standard at the factory. If you have other size bracket, see '7.2.4 Re-assembling Multi-size Bracket according to Rotary Actuator.
- Mount the ASD-5000 positioner onto the rotary pneumatic actuator with 4 pcs M5 screw.
- Connect air lines between the ASD-5000 positioner and the rotary pneumatic actuator.
- Perform auto-calibration by pushing MODE button for 5 seconds.

⚠ Make sure that the ASD-5000 positioner works within the operating range indicated on the bottom. See the below pictures. Otherwise, the error message of 'MONT' appears on LCD and the auto-calibration process fails.



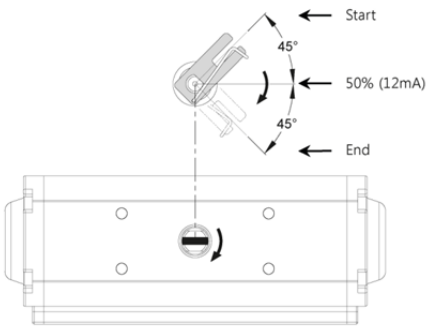
7.2.2. Mounting with Fork Lever Type



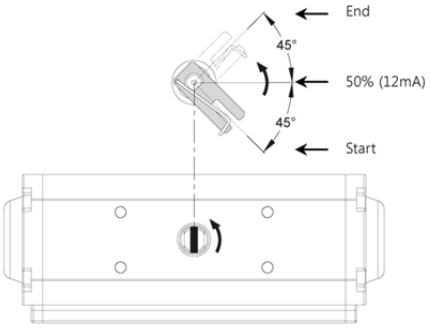
① ASD-5000 positioner ② Multi-size bracket ③ Rotary pneumatic actuator

④ Fork lever ⑤ Positioner feedback lever

7.2.3. Position of Fork Lever

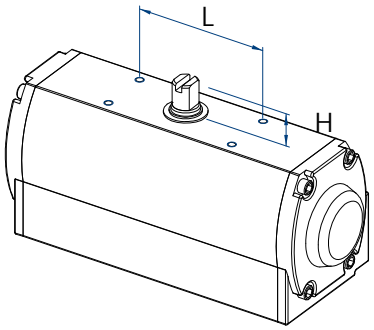


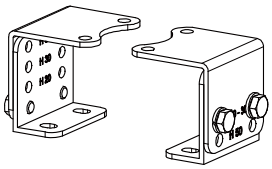
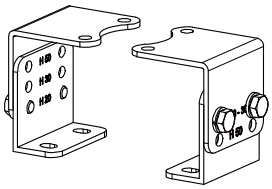
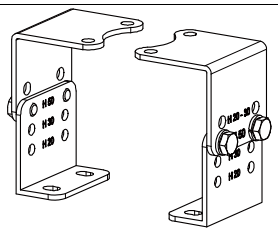
Clockwise movement

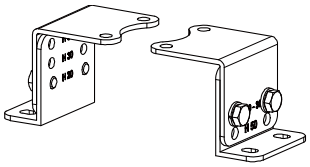
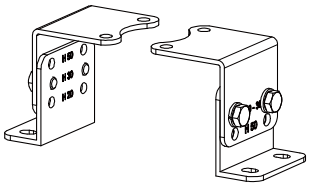
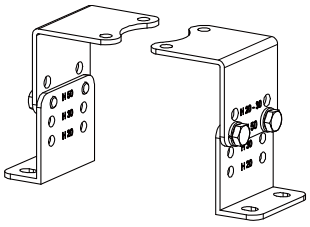


Counter-clockwise Movement

7.2.4. Re-assembling Multi-size Bracket according to Rotary Actuator



L (mm)	H (mm)	
80	20	
80	30	
80	50	

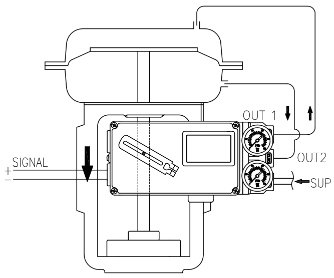
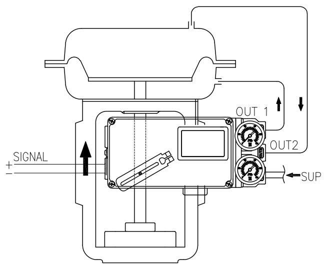
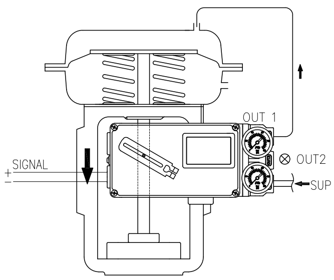
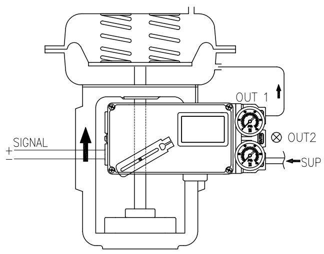
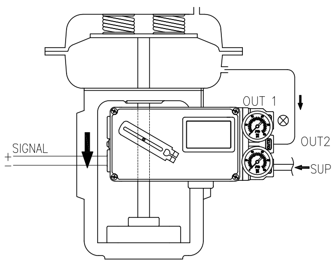
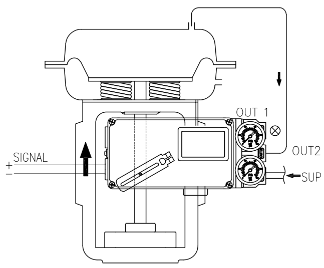
L (mm)	H (mm)	
130	20	
130	30	
130	50	

Check L and H on the actuator and re-assemble the multi-size bracket to fit your actuator mounting configuration.

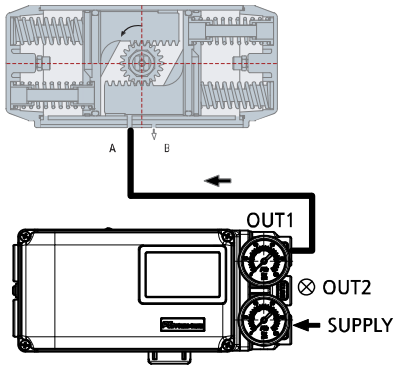
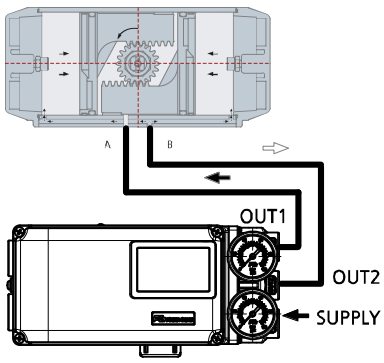
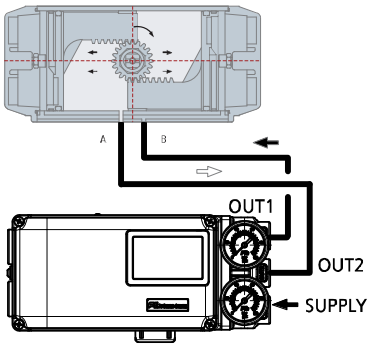
8. Air Connections

① Be sure to install the air filter regulator before the positioner.
② Supply air should not contain water, oil or moisture.
③ It is recommended to set a supply air pressure 10% higher than the actual operating Pressure of the actuator.

8.1. ASD-5000 (linear type)

Direct Acting (DA)		Reverse Acting (RA)	
As input signal increases, valve stem moves downwards		As input signal increases, valve stem moves upwards	
As input signal increases, valve stem moves downwards		As input signal increases, valve stem moves upwards	
As input signal increases, valve stem moves downwards		As input signal increases, valve stem moves upwards	

8.2. ASD-5000 (rotary type)

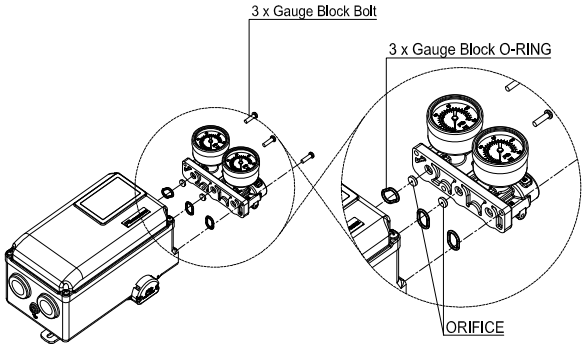
Spring return	Double Acting	Double Acting
		
As input signal increases, actuator shaft rotates counter-clockwise	As input signal increases, actuator shaft rotates counter-clockwise	As input signal increases, actuator shaft rotates clockwise
Actuator : RA	Actuator : RA	Actuator : DA

	Spring Return	Double Acting
Reverse Acting	Out1 : piped, Out2 : plugged	Out1 : piped to Actuator port A, Out2 : piped to Actuator port B
Direct Acting	Out1 : plugged, Out2 : piped	Out1 : piped to Actuator port B, Out2 : piped to Actuator port A

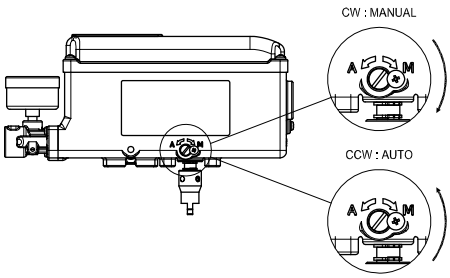
8.3. Orifice Installment

Small actuators can cause hunting. Use an orifice

Orifice size: Ø0.5, Ø1.0



8.4. Auto / Manual



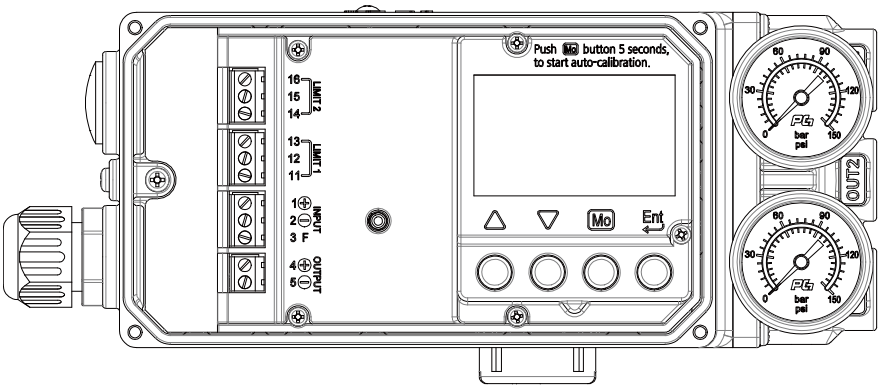
9. Electrical Connections

① Be sure to supply the rated voltage and current stated on this manual. Otherwise, it may cause a serious damage or malfunctions.

② Check polarity of + and – exactly and connect wires.

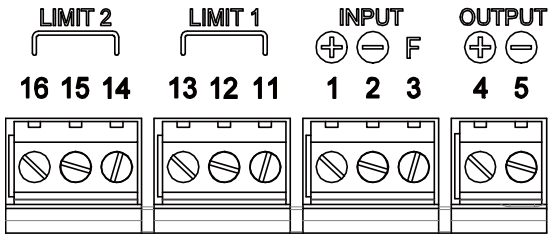
③ When it is necessary to open the positioner cover at a humid place, more attention is required. It may cause a serious damage or malfunctions.

9.1. Terminal block



Standard				Position transmitter			
INPUT ⊕ ⊖ F 1 2 3	1	+	4-20mA Input signal	INPUT ⊕ ⊖ F OUTPUT ⊕ ⊖ 1 2 3 4 5	1	+	4-20mA Input signal
	2	-			2	-	
	3	F	Frame ground		3	F	Frame Ground
					4	+	4-20mA Output signal
					5	-	

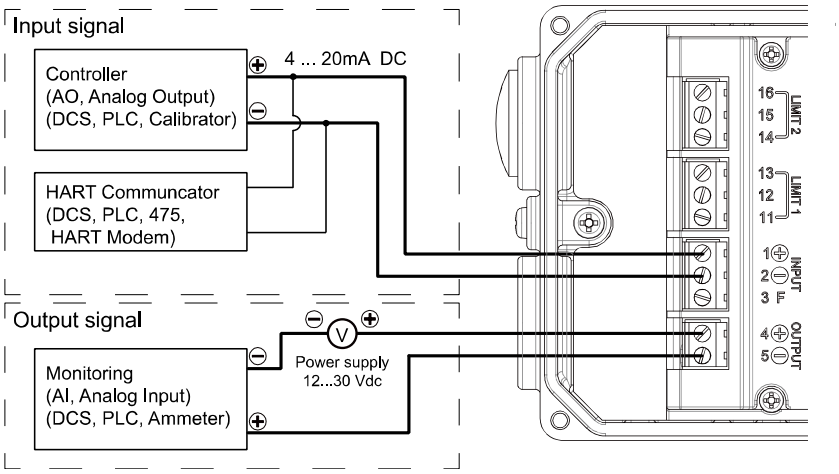
Limit switch (Alarm limit, 2 x SPDT, 2 x Proximity sensor(P&F)

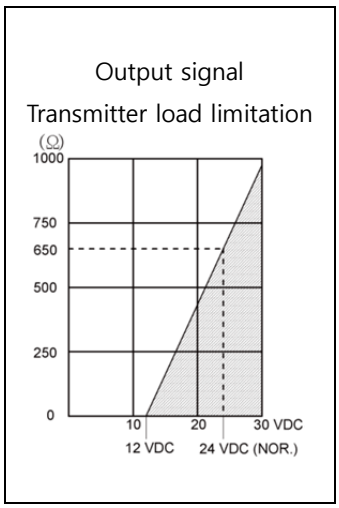


Alarm limit				2 x SPDT Switches				2 x Proximity Sensor		
11	+	Alarm 1		11		Switch 1, NO		11	+	Sensor 1
12	-	Alarm 1		12		Switch 1, NC		12	-	Sensor 1
13				13		Switch 1, COM		13		
14	+	Alarm 2		14		Switch 2, NO		14	+	Sensor 2
15	-	Alarm 2		15		Switch 2, NC		15	-	Sensor 2
16				16		Switch 2, COM		16		

9.2. Wiring

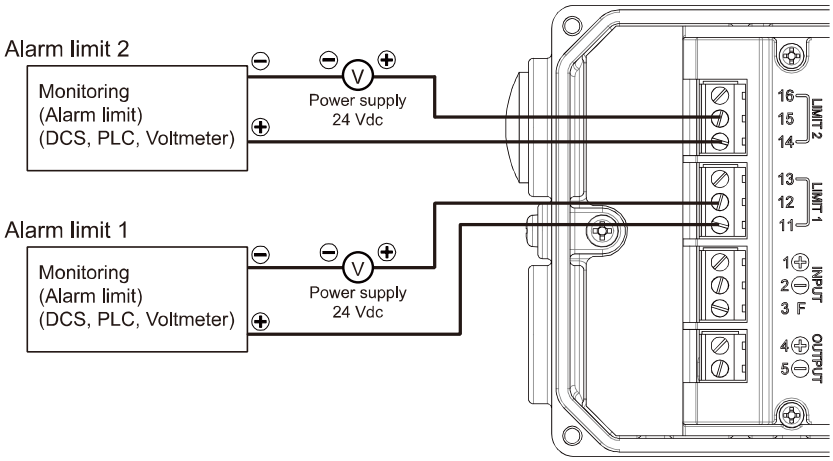
9.2.1. Input signal and Output signal

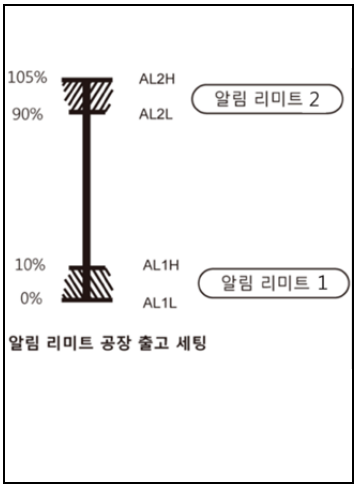




Zero and span of position feedback (4-20mA output signal) are set automatically during auto-calibration process.

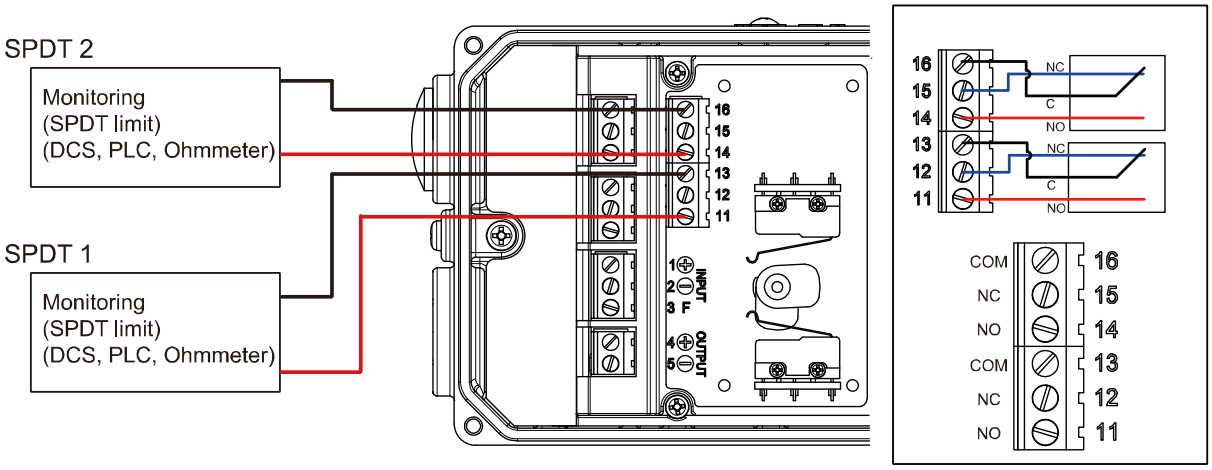
9.2.2. Alarm limit (Wet contact)



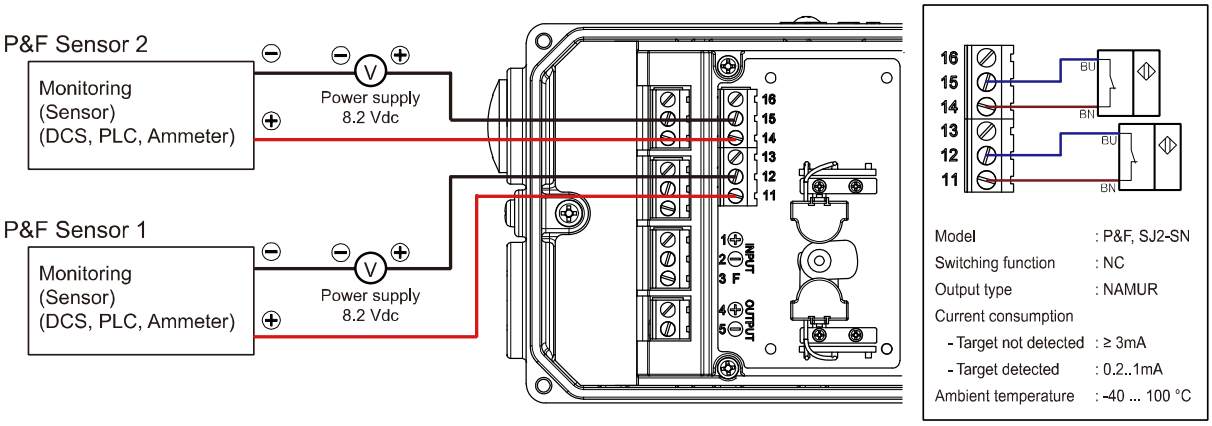


24VDC should be supplied for software limit switches.

9.2.3. Limit switch (Dry contact)



9.2.4. Proximity sensor (P&F, SJ2-SN)

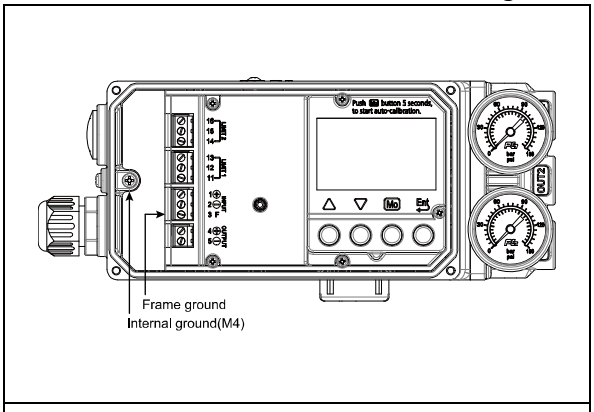


9.3. Earthing

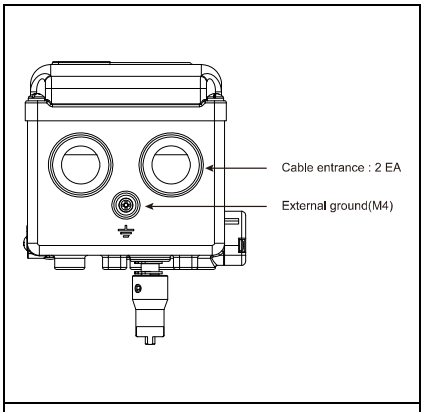
The earthing of enclosure is necessary to maintain Intrinsic safety because the insulation between an intrinsically safe circuit and a frame of the equipment is not capable of withstanding a 500V dielectric strength test. There are two earthing points on the equipment. One is provided ad an internal earthing point near terminal compartment inside the equipment. The other is provided as an external earthing point on the side of the enclosure.

Their cross-sectional areas should be capable of carrying the maximum possible current of the equipment. (Generally, an insulated wire having a cross-sectional area of at least 4mm^2 is recommended)

To be suitable for securing of conductors, the cables should be fitted with ring spring lock washers to minimize the risk of self-loosening.



Internal ground



External ground

9.4. Wiring for Intrinsic Safety

The ASD-5 positioner is designed to meet the intrinsic safety standards of IEC/EN 60079-0, IEC/EN 60079-11, EN 13463-1, EN 13463-5. But the ASD-5 positioner can be affected by the electrical or magnetic energy from other electric products. So please make a note of the instructions below.

1. Distinguish the intrinsic safety circuit and the non-intrinsic safety circuit, and separate the intrinsic safety circuit from other electrical circuit.
2. Install the proper safety device to block the static or electromagnetism.
3. If possible, minimize inductance and capacitance of wires. If the operating conditions are specified, try to keep inductance and capacitance as low as possible.
4. Protect wires from the external damage.
5. Ground in order to meet the operating regulations of the installation area.

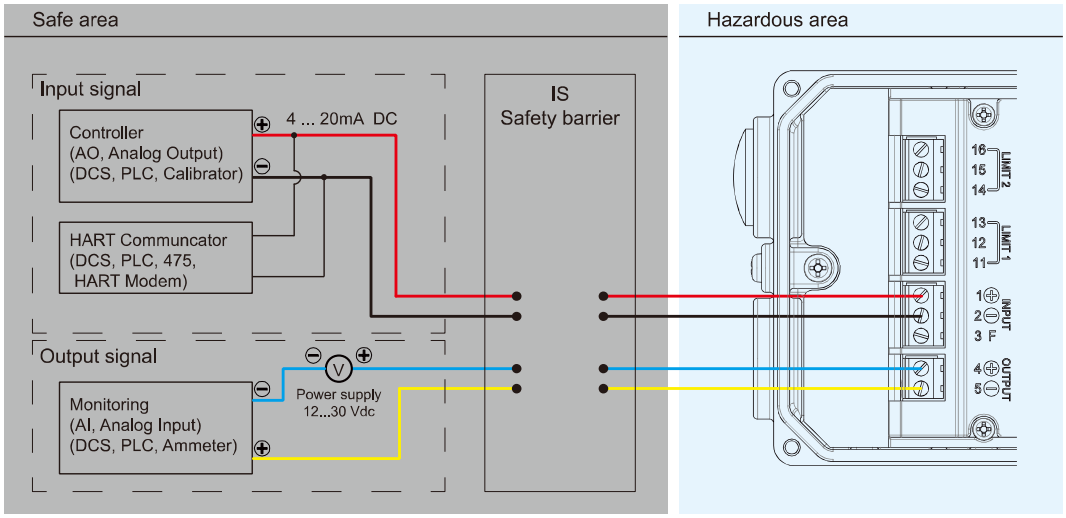
1) The electronic card and the internal coils can be damaged in case of the input signals improper to the specifications of the ASD-5 positioner.

2) The ASD-5 positioner doesn't work in case of a wrong connection of '+' and '-'. Be sure to check the proper terminals before connection.

3) Ground internally and externally, if possible.

4) Try to keep the intrinsic safety parameters of the ASD-5 positioner as low as possible.(Ui, Ii, Ci, Li)

5) Be sure to install the safety barrier between the ASD-5 positioner and a power supply source.



9.4.1. Input signal (4-20mA @ VDC)

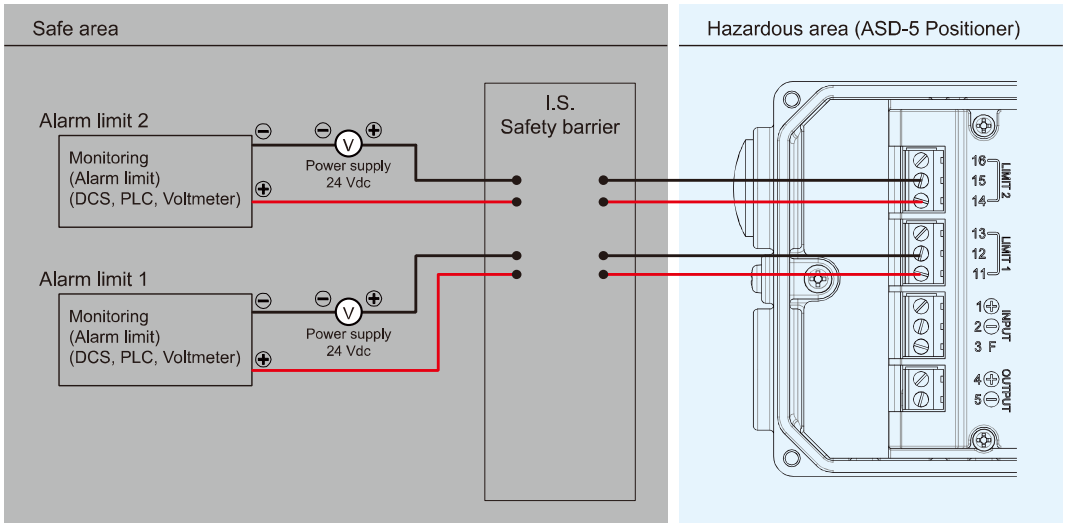
Terminal No. : 1(+), 2(-)

Safety parameters: Ui ≤ 28Vdc, Ii ≤ 93mA, Pi ≤ 651mW, Li ≈ 0, Ci ≤ 23nF

9.4.2. Output signal (24VDC)

Terminal No. : 4(+), 5(-)

Safety parameters : Ui ≤ 28Vdc, Ii ≤ 93mA, Pi ≤ 651mW, Li ≈ 0, Ci ≤ 23nF

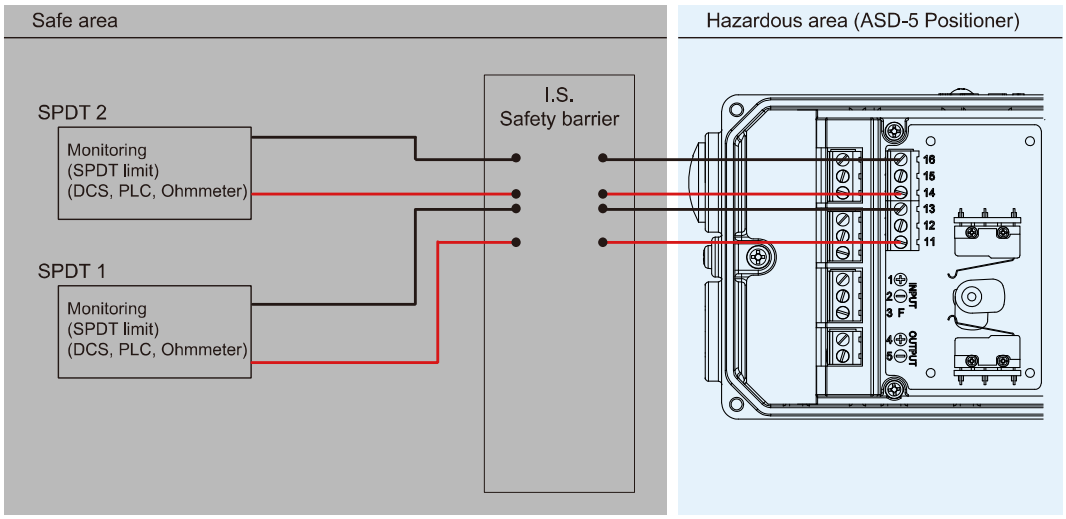


9.4.3. Alarm limit (24VDC)

Terminal No.

- Alarm 1(Low) : 11(+), 12(-)
- Alarm 2(high) : 14(+), 15(-)

Safety parameters : Ui ≤ 28Vdc, Ii ≤ 93mA, Pi ≤ 651mW, Li = 0, Ci = 0nF

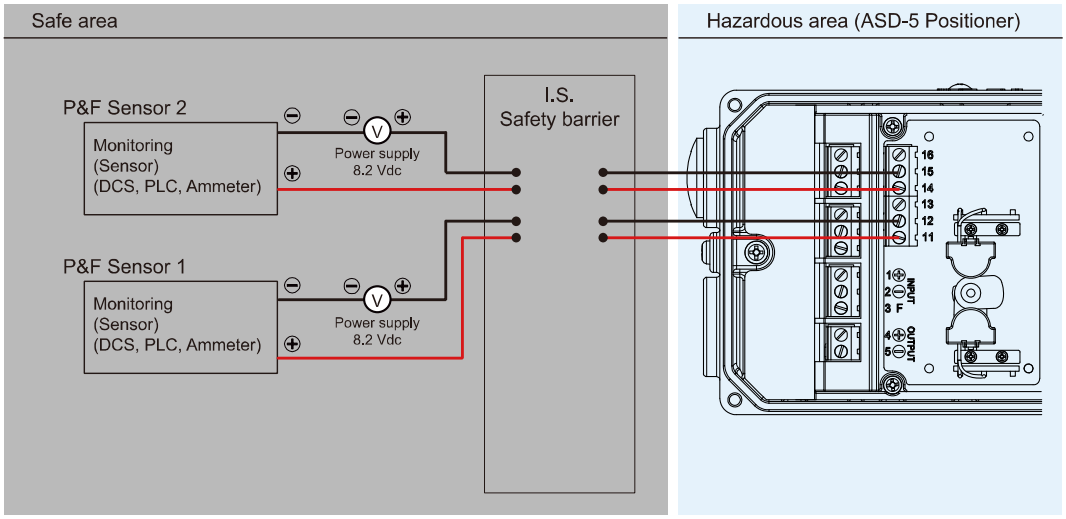


9.4.4. 2 x SPDT

Terminal No.

- SPDT 1(lower) : 11(NO), 12(NC), 13(COM)
- SPDT 2(upper) : 14(NO), 15(NC), 16(COM)

Safety parameters : Ui ≤ 28Vdc, Ii ≤ 93mA, Pi ≤ 651mW, Li = 0, Ci = 0nF



9.4.5. 2 x P&F, SJ2-SN

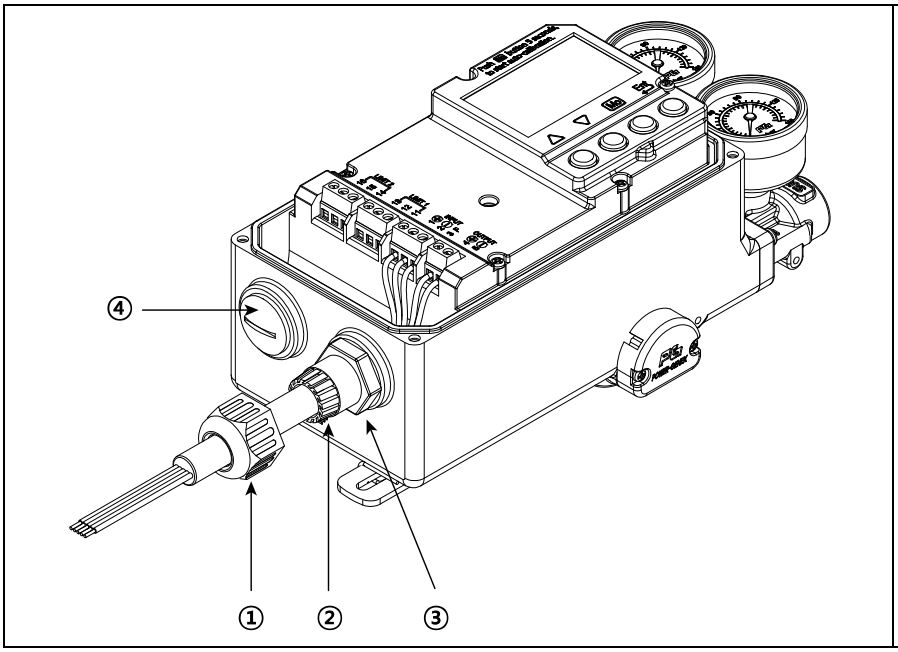
Terminal No.

- P&F sensor 1(lower) : 11(+), 12(-)
- P&F sensor 2(upper) : 14(+), 15(-)

Safety parameters : Ui ≤ 16Vdc, Ii ≤ 25mA, Pi ≤ 64mW, Li ≤ 100μH, Ci ≤ 30nF

9.5. Cable Gland / Blind Plug

9.5.1. Cable Gland



1. Cable Gland Cover
2. Cable Gland Sealing
3. Cable Gland Body
4. Blind Plug

1. The cable gland is installed as above before delivery. Change the positions of the cable gland and the blind plug for installation on other side.
2. Turn the cover of the cable gland counter-clockwise to open, and insert wires.
3. Connect wires to terminals and tighten the cable gland.

1) Use the cable with diameter of Max. Ø 12.5 to Min. Ø 9.

2) Be sure to disconnect a power supply before the above process.

9.5.2. Blind Plug

1. Use the blind plug for the cable entry not used.
2. Install or dis-install the blind plug with the "–" screw driver.

10. Maintenance / Service

10.1. Preliminary Check Points

10.1.1. Voltage

- The positioner commonly requires 4-20mA @ 24VDC for operation.
- Voltage drop (impedance): Without HART – 6.8VDC (340Ω @ 20mA)
  With HART – 7.8VDC (390Ω @ 20mA)
  With HART+Advanced diagnostics – 9.5VDC (475Ω @ 20mA)

10.1.2. Electrical Connections

Check polarities (+, -) of 4-20mA input signal definitely and make the electrical connections.

10.1.3. Pneumatic Connections (see 8.1, 8.2)

10.1.4. Supply Air Quality

free of oil, water and dust acc. to DIN/ISO 8573-1 pollution and oil content according to Class 3

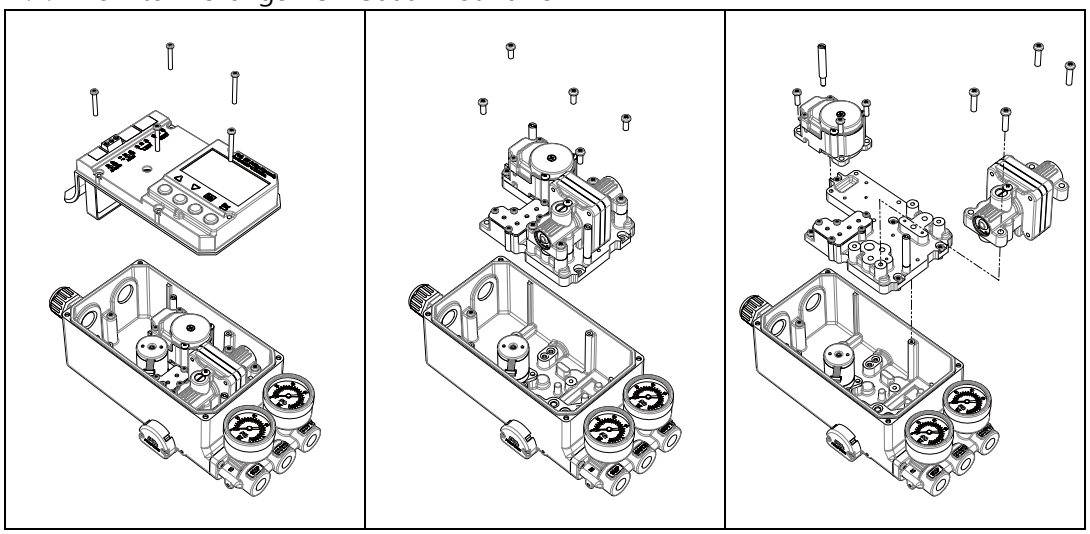
10.2. Spare parts

① torque motor Coil Assembly (spare part "**PG-ASD-5000-08**")
② Pilot Valve Assembly (spare part "**PG-ASD-5000-07**")
③ PCB Control Board Assembly (spare part "**PG-ASD-5000-12**")

12.4 Exchanging the Positioner Spare Parts

① Begin procedure after complete removal of supply air.
② Re-start auto-calibration procedure after exchanging spare parts

12.4.1 How to Exchange ASD-5000 Pilot Valve

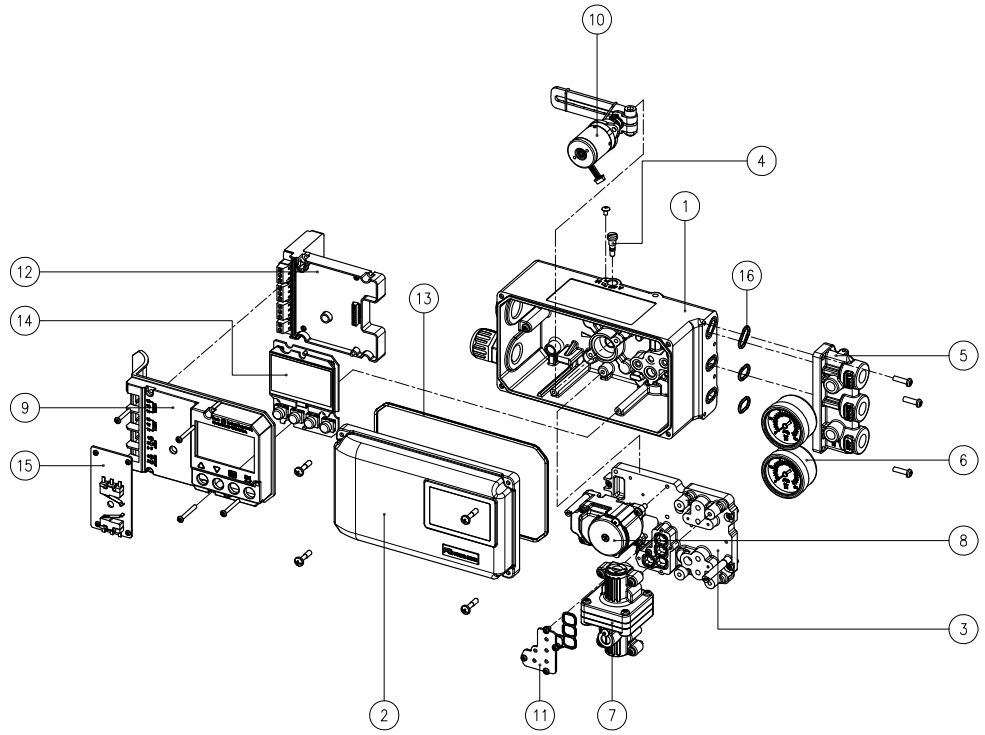


① Disassemble the Pilot valve cover.
② Disassemble the fixing bolts (4EA) after removing the pilot valve cover
③ Disassemble the pilot Valve
④ Re-assemble using the new pilot valve by following above steps reversely.
⑤ Re-start auto-calibration after completing assembly

12.4.2 How to Exchange ASD-5000 torque motor

① Disassemble the pilot valve cover
② Disassemble the fixing bolts (4 pcs) fastened on airline body after removing the pilot valve cover
③ Detach airline body from the positioner body
④ Disassemble the torque motor bolt removing the seal on torque motor cover bolts
⑤ Disassemble the torque motor fixing bolt (4 pcs)
⑥ Disassemble the torque motor
⑦ Re-assemble using new torque motor by following above steps reversely.
⑧ Re-start auto-calibration after completing assembly

11. Parts list

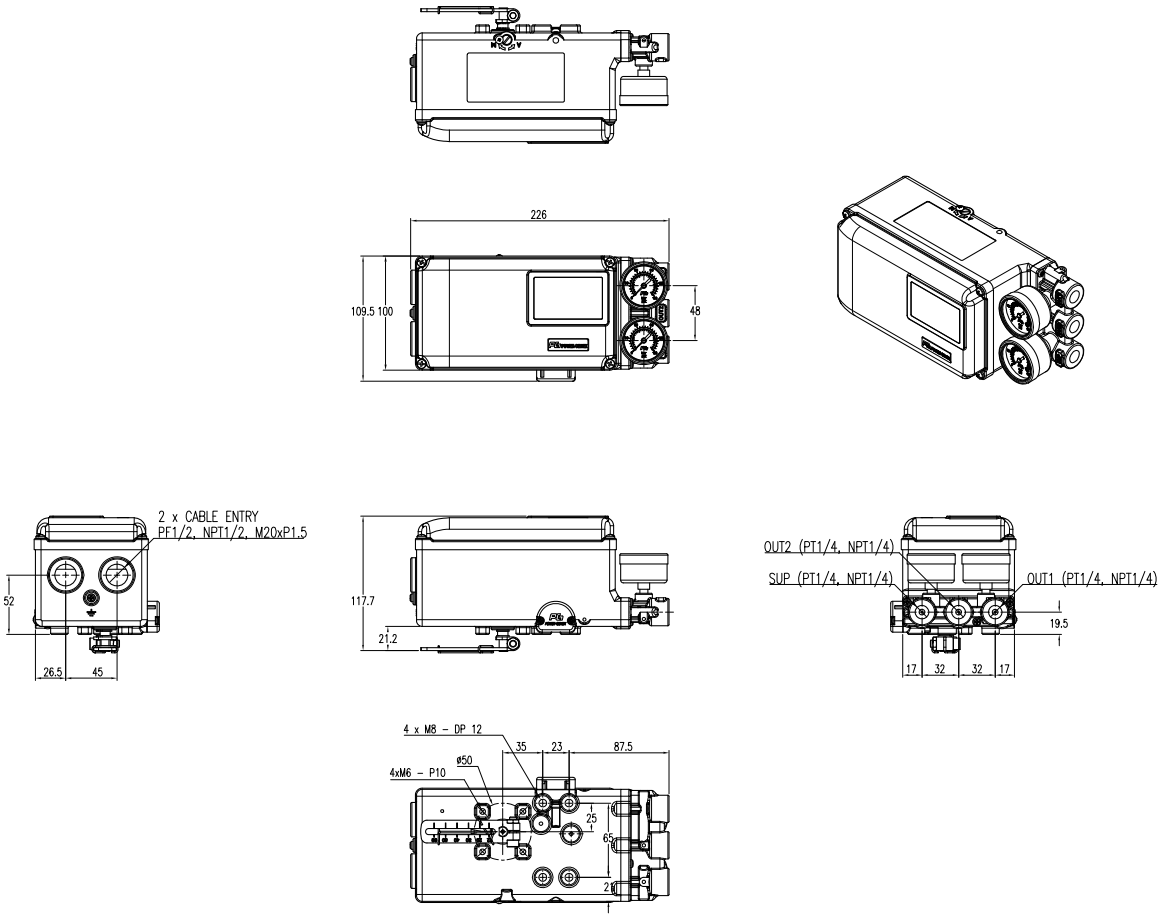


List of Spare Parts

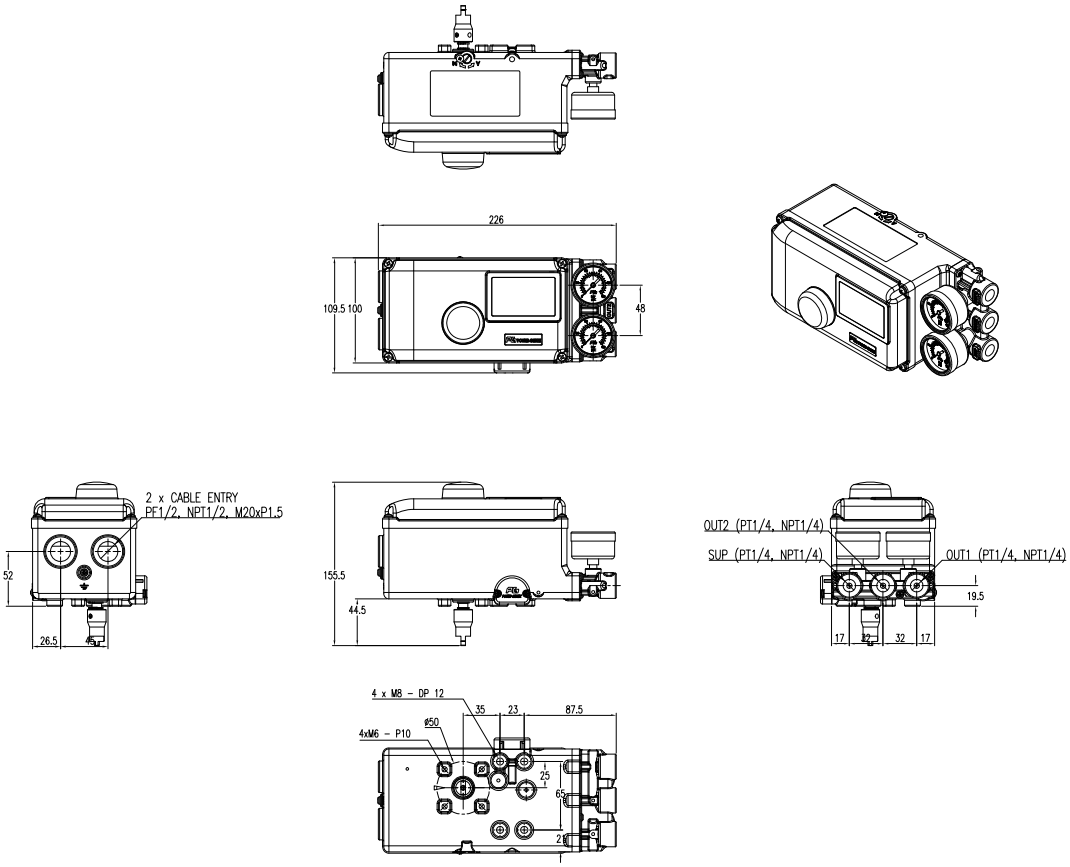
No.	Part No.	Description
1	PG-ASD-7000-01	Main Body
2	PG-ASD-7000-02	Main Cover
3	PG-ASD-7000-03	Airline Body
4	PG-ASD-7000-04	Auto / Manual screw
5	PG-ASD-7000-05	Gauge Block
6	PG-ASD-7000-06	Gauge
7	PG-ASD-7000-07	Pilot Valve
8	PG-ASD-7000-08	Torque motor Coil
9	PG-ASD-7000-09	Board Cover
10	PG-ASD-7000-10	MPS Module
11	PG-ASD-7000-11	IP Sensor Board
12	PG-ASD-7000-12	Main Board
13	PG-ASD-7000-13	Cover O-ring
14	PG-ASD-7000-14	LCD BOARD
15	PG-ASD-7000-15	Limit Switch
16	PG-ASD-7000-16	Gauge Block O-ring

12. Dimensions

12.1. ASD-5000 (linear type)



12.2. ASD-5000 (rotary type)



Warranty

1. The warranty period of the product is 1 years after the product is shipped from Power-Genex in Korea.

2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided. This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.

3. If a problem happens with the following reasons, please note that the reasonable repairing costs will be charged even during a warranty period.

- In case that customers retro-fit the products improperly without any instructions from Power-Genex
- In case that the products are damaged by a bad delivery, storage or handling beyond design conditions
- In case that the products are used beyond specifications
- In case that the products are damaged by an improper installation
- In case that the products are damaged by fire, earthquake, storm, flood, thunder, lighting, other natural disasters, riot, war, exposure to radioactivity

4. If maintenance is required, please contact distributors or Power-Genex directly. A proper and satisfactory customer service will be provided.

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Subject to change without prior notice