Electro-Pneumatic Positioner
YT-1000 / 1050 SERIES

PRODUCT MANUAL

YOUNG TECH Co., Ltd

VERSION 1.01

Contents

1. Introduction

1.1 General Information for the users

Thank you for purchasing Young Tech Co., Ltd products. Each product has been fully inspected after its production to offer you the highest quality and reliable performance. Please read the product manual carefully prior to installing and commission the product.

- For the safety, it is important to follow the instructions in the manual. Young Tech Co., Ltd will not be responsible for any damages caused by user's negligence.
- The manual should be provided to the end-user.
- Any modifications or repairs to the product may only be performed if expressed in this manual.
- The manual can be altered or revised without any prior notice. Any changes in product's specification, design, and/or any components may not be printed immediately but until the following revision of the manual.
- The manual should not be duplicated or reproduced for any purpose without prior approval from Young Tech Co., Ltd, Gimpo-si, South Korea.

1.2 Manufacturer Warranty

- For the safety, it is important to follow the instructions in the manual. Manufacturer will not be responsible for any damages caused by user's negligence.
- Manufacturer will not be responsible for any damages or accidents as a result of any alteration or modification of the product and its parts. If any alteration or modifications are necessary, please contact Young Tech Co., Ltd directly.
- Manufacturer warrants the product from the date of original purchase of the product for eighteen (18) months, except as otherwise stated.
- Manufacturer warranty will not cover products that have been subjected to abuse, accidents, alterations, modifications, tampering, negligence, misuse, faulty installation, lack of reasonable care, repair or service in any way that is not contemplated in the documentation for the product, or if the model or serial number has been altered, tampered with, defaced or removed; damages that occurs in shipment, due to act of God, failure due to power surge, or cosmetic damage. Improper or incorrectly performed maintenance will void this limited warranty.
- For detailed warranty information, please contact Young Tech Co., Ltd – South Korea.

1.3 Explosion Proof Warning

Please ensure the unit is being used and installed within the explosion proof certified environment.

- YT-1000 / 1050 series explosion proof grades are flameproof - **Ex d IIB (IIC) T5** and intrinsically safety – **Ex ia IIB T6,** and it can be used in **zone 1 and 2**.

- For other certification, please visit Young Tech Co., Ltd website (www.ytc.co.kr)
- Explosion proof type of cables and gaskets should be used, when explosion gases are present at the installation site.
- Power should be turned off completely when opening product's cover. When opening the cover, ensure that there is no power remaining in any electrical parts nearby.

- YT-1000 / 1050 series has 2 ports for power connection. Explosion proof type wires and packing should be used. Blind plug is required when any port is not being used.
- Cable rug with surface area of more than 0.195mm^2 with M4 spring washer should be used to connect the power.
- For external ground terminal, cable rug with surface area of more than 5.5mm^2 should be used.

2. Product Description

2.1 General

YT-1000/1050 series Electro-Pneumatic Positioner accurately controls valve stroke in response to an input signal of 4-20mA from the controller.

2.2 Main Features and Functions

- 2 million life cycle guaranteed
- Response time is very fast and accurate.
- Simple part change can set 1/2 split range.
- Low air consumption
- Simple Direct / Reverse Action change.
- Simple Zero & Span adjustment.
- Easy feedback connection.
- Internal options, such as position transmitter (PTM) and/or limit switch (L/S) is available (for non-explosion proof positioner – external options must be installed for explosion proof positioner)
- A/M switch can be used to direct supply air to the actuator or to manually operate the positioner or valve.

2.3 Label Description

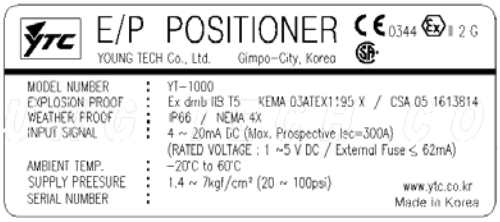


Fig. 1: YT-1000/1050 Body Label

A.	Model:	Indicates the model number of the positioner.
B.	Explosion Proof:	Indicates certified explosion proof grade.
C.	Input Signal:	Indicates input signal range.
D.	Amb. Temp.:	Indicates the allowable ambient temperature.
E.	Supply Pressure:	Indicates the supply pressure range.
F.	Serial Number.:	Indicates the unique serial number.

2.4 Product Number

2.4.1 YT-1000L

YT-1000L [1] [2] [3] [4] [5] [6] [7]

1	Acting Type	S	Single Acting
		D	Double Acting
2	Explosion Proof	n	non-explosion
		m	Ex dmb IIB T5 (ATEX)
		c	Ex dmb IIC T5 (KTL)
		i	Ex ia IIB T6 (KTL)
		f	Ex dm IIB T5 (FM)
		p	Ex ia IIC T6 (NEPSI)
		H	Ex dmb IIC T5/T6 (NEPSI)
3	Lever Type	1	10 ~ 40 mm
		2	20 ~ 70 mm
		3	50 ~ 100 mm
		4	100 ~ 150 mm
4	Orifice Type	1	1 pie
		2	2 pie
		3	None
5	Connection Type	1	PT
		2	NPT
6	Ambient Temp.	S	-20'C ~ 60'C
		H	-20'C ~ 120'C
		L	-40'C ~ 70'C
7	Option	0	None
		2	+ SPTM
		3	+ SPTM with LCD

2.4.2 YT-1000R

YT-1000R	1	2	3	4	5	6	7	8

1	Acting Type	S	Single Acting
		D	Double Acting
2	Explosion Proof	n	non-explosion
		m	Ex dmb IIB T5 (ATEX)
		c	Ex dmb IIC T5 (KTL)
		i	Ex ia IIB T6 (KTL)
		f	Ex dm IIB T5 (FM)
		p	Ex ia IIC T6 (NEPSI)
		H	Ex dmb IIC T5/T6 (NEPSI)
3	Lever Type	1	M6 X 34L
		2	M6 X 63L
		3	M8 X 34L
		4	M8 X 63L
		5	NAMUR
4	Orifice Type	1	1 pie
		2	2 pie
		3	None
5	Connection Type	1	PT
		2	NPT
6	Ambient Temp.	S	-20'C ~ 60'C
		H	-20'C ~ 120'C
		L	-40'C ~ 70'C
7	Option 1	0	None
		1	Dome Indicator
8	Option 2	0	None
		1	+ SPTM (Internal)
		2	+ SPTM (External)
		3	+ L/S (Internal)
		4	+ L/S (External)
		5	+ SPTM + L/S (Internal)
		6	+ SPTM + L/S (External)

2.4.3 YT-1050

YT-1050	1	2	3	4	5	6	7	8

1	Motion Type		L	Linear
			R	Rotary
2	Acting Type		S	Single Acting
			D	Double Acting
3	Explosion Proof		n	Non-explosion
			m	Ex dmb IIB T5 (ATEX)
4	Lever Type	L	1	10 ~ 40 mm
			2	20 ~ 70 mm
			3	50 ~ 100 mm
			4	100 ~ 150 mm
		R	1	M6 X 34L
			2	M6 X 63L
			3	M8 X 34L
			4	M8 X 63L
			5	NAMUR
5	Orifice Type		1	1 pie
			2	2 pie
			3	None
6	Connection		2	NPT
7	Ambient Temp		S	-20'C ~ 60'C
			H	-20'C ~ 120'C
			L	-40'C ~ 70'C

2.5 Product Specification

2.5.1 YT-1000L & R

Model	YT-1000L		YT-1000R	
Acting Type	**Single**	**Double**	**Single**	**Double**
Input Signal	4~20mA DC			
Impedance	250 +/- 15 Ω			
Supply Pressure	0.14~0.7 MPa (1.4~7 bar)			
Stroke	10~150 mm		0~90°	
Air Connection	PT, NPT 1/4			
Gauge Connection	PT, NPT 1/8			
Conduit Entry	PF(G) 1/2			
Protection Grade	IP66			
Explosion Proof	Ex dmb IIB T5 (ATEX) Ex dmb IIC T5 (KTL) Ex ia IIB T6 (KTL) Ex dm IIB T5 (FM) Ex ia IIC T6 (NEPSI) Ex dmb IIC T5/T6 (NEPSI)			
Ambient Temperature	Operating Temp. :-20~70℃ (Standard) Explosion Proof Temp. : -40~60℃			
Linearity	±1.0% F.S.	±2.0% F.S.	±1.0% F.S.	±2.0% F.S.
Hysteresis	±1.0% F.S.			
Sensitivity	±0.2% F.S	±0.5% F.S	±0.2% F.S	±0.5% F.S
Repeatability	±0.5% F.S			
Flow Capacity	80 LPM (Sup.=0.14 MPa)			
Air Consumption	2.5 LPM (Sup.=0.14 MPa @ idle)			
Feedback Signal (Option)	4~20mA (DC 10~30V)			
Material	Aluminum Diecasting			
Weight	2.7 kg		3.5 kg	
Painting	Epoxy Polyestere Powder Coating			

Tested under ambient temperature of 20˚C, absolute pressure of 760mmHg, and humidity of 65%. Please contact Young Tech Co., Ltd for detailed testing specification. * Explosion proof certification is in progress.

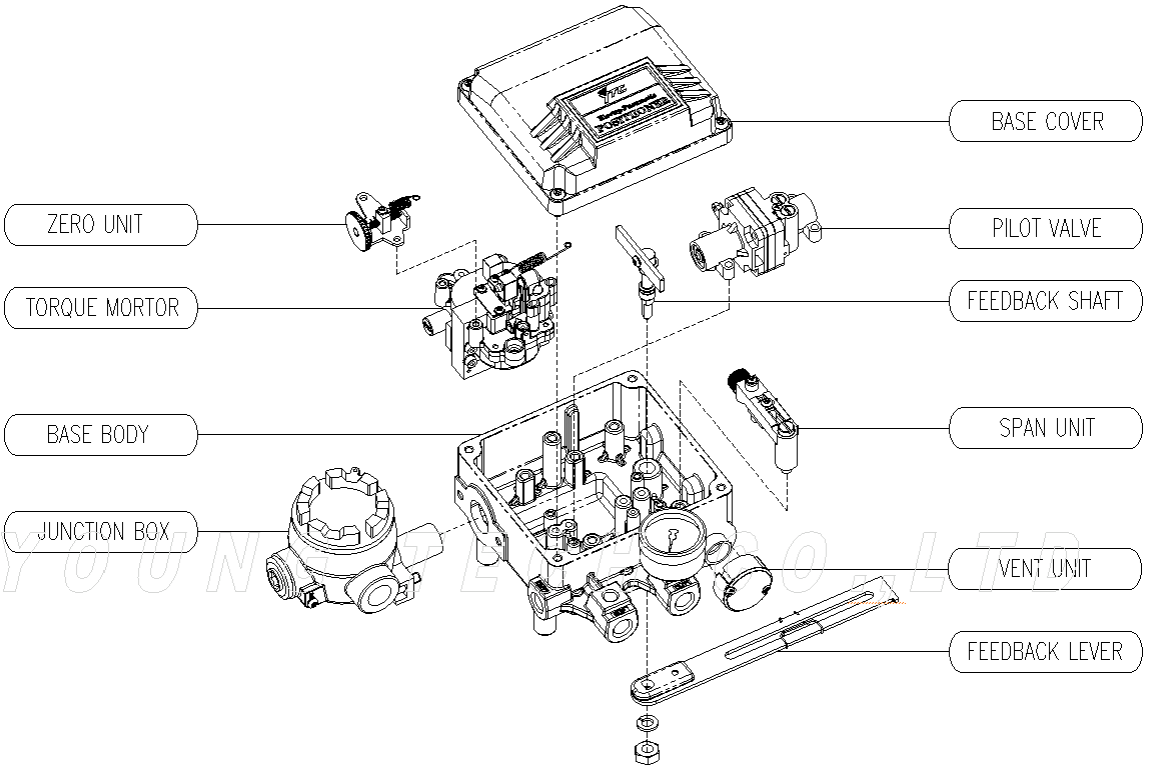
2.5.2 YT-1050L & R

Model	YT-1050L		YT-1050R	
Acting Type	**Single**	**Double**	**Single**	**Double**
Input Signal	4~20mA DC			
Impedance	250 +/- 15 Ω			
Supply Pressure	0.14~0.7 MPa (1.4~7 bar)			
Stroke	10~150 mm		0~90°	
Air Connection	NPT 1/4			
Gauge Connection	NPT 1/8			
Conduit Entry	PF(G) 1/2			
Protection Grade	IP66			
Explosion Proof	Ex dmb IIB T5 (ATEX)			
Ambient Temperature	Operating Temp. :-20~70℃ (Standard) Explosion Proof Temp. : -40~60℃			
Linearity	±1.0% F.S.	±2.0% F.S.	±1.0% F.S.	±2.0% F.S.
Hysteresis	±1.0% F.S.			
Sensitivity	±0.2% F.S	±0.5% F.S	±0.2% F.S	±0.5% F.S
Repeatability	±0.5% F.S			
Flow Capacity	80 LPM (Sup.=0.14 MPa)			
Air Consumption	2.5 LPM (Sup.=0.14 MPa @ idle)			
Feedback Signal (Option)	4~20mA (DC 10~30V)			
Material	Stainless Steel 316			
Weight	5.7 kg		6.0 kg	

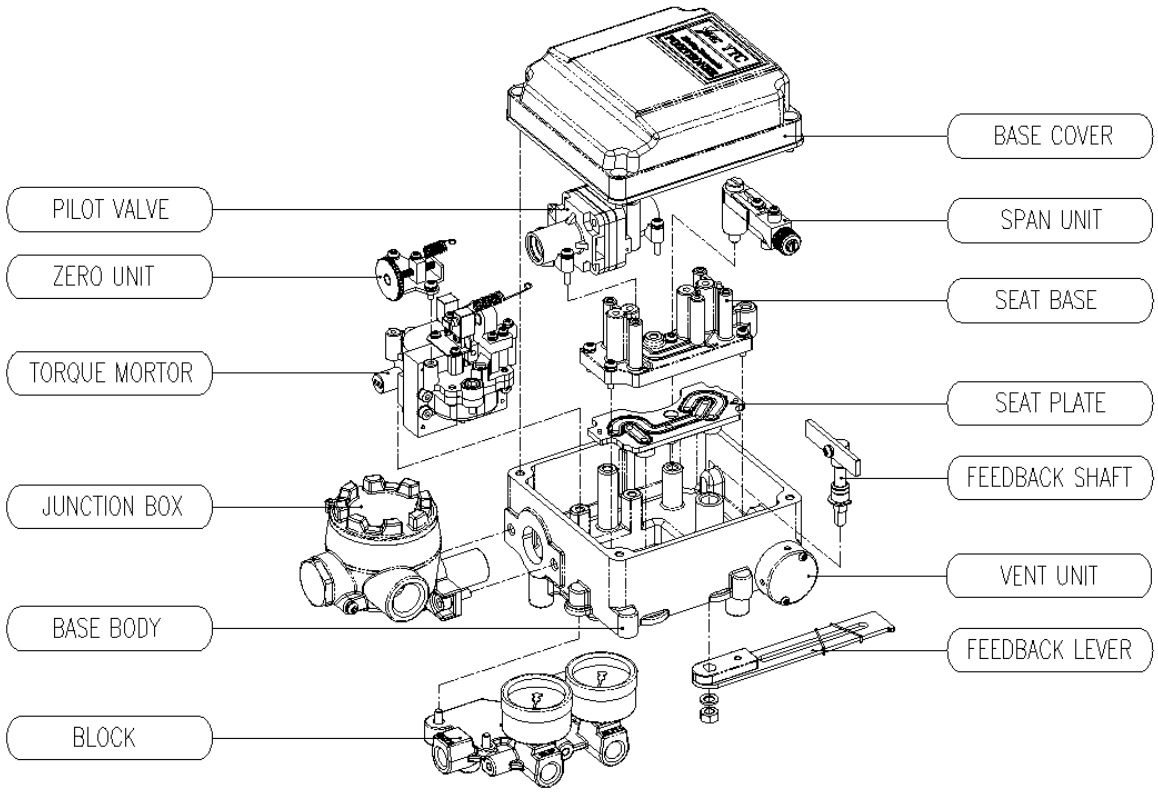
Tested under ambient temperature of 20˚C, absolute pressure of 760mmHg, and humidity of 65%. Please contact Young Tech Co., Ltd for detailed testing specification. * Explosion proof certification is in progress.

2.6 Parts and Assembly

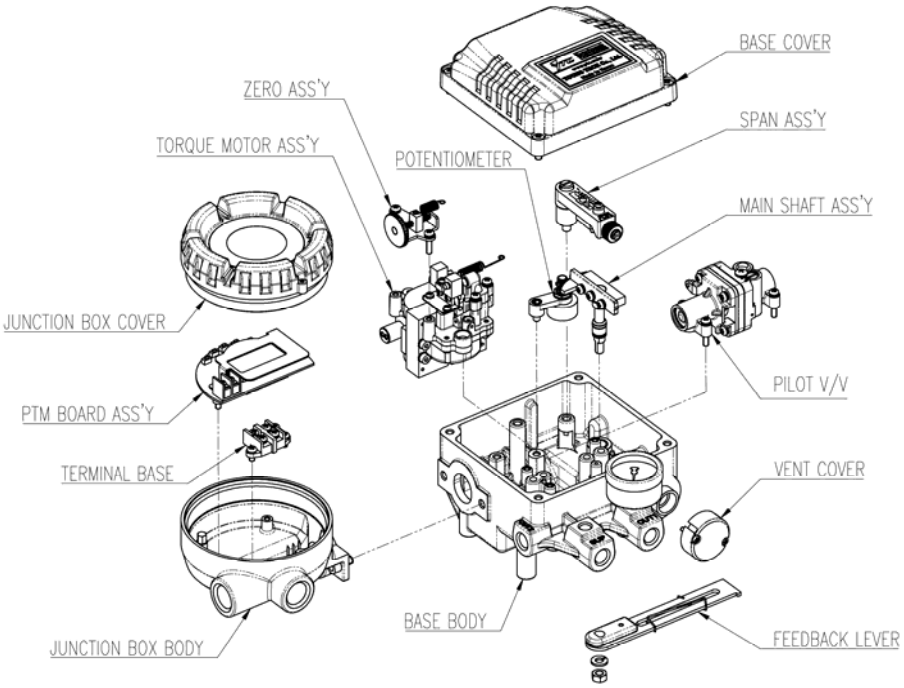
2.6.1 YT-1000/1050L



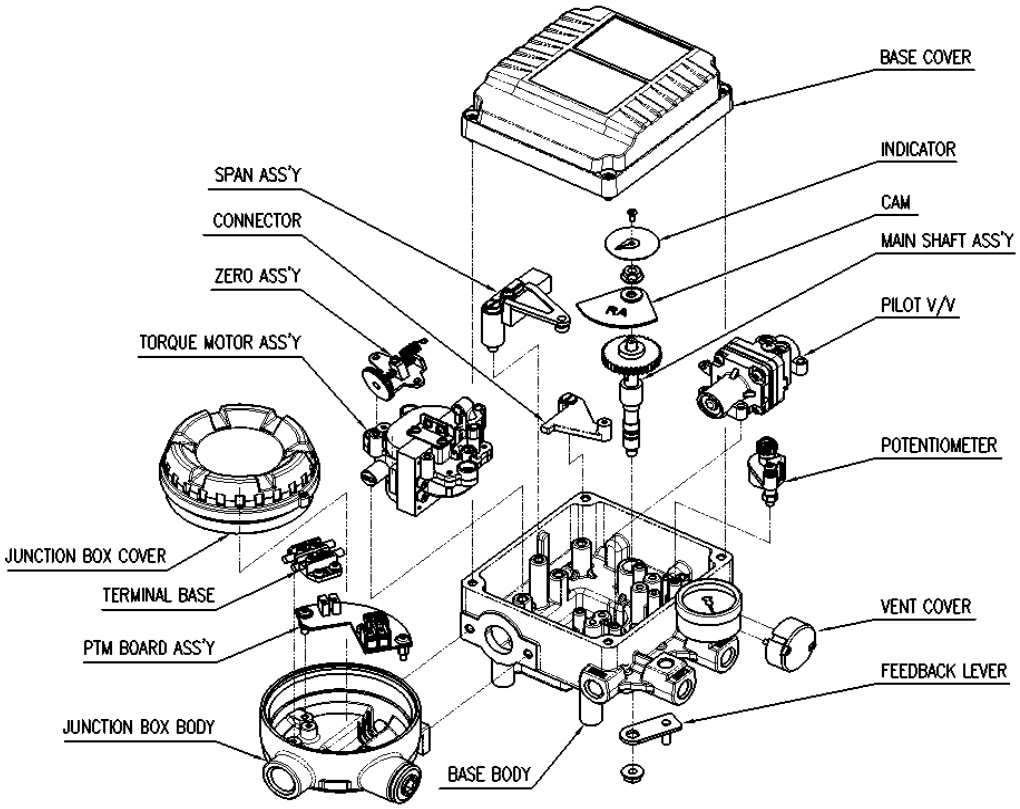
2.6.2 YT-1000/1050R



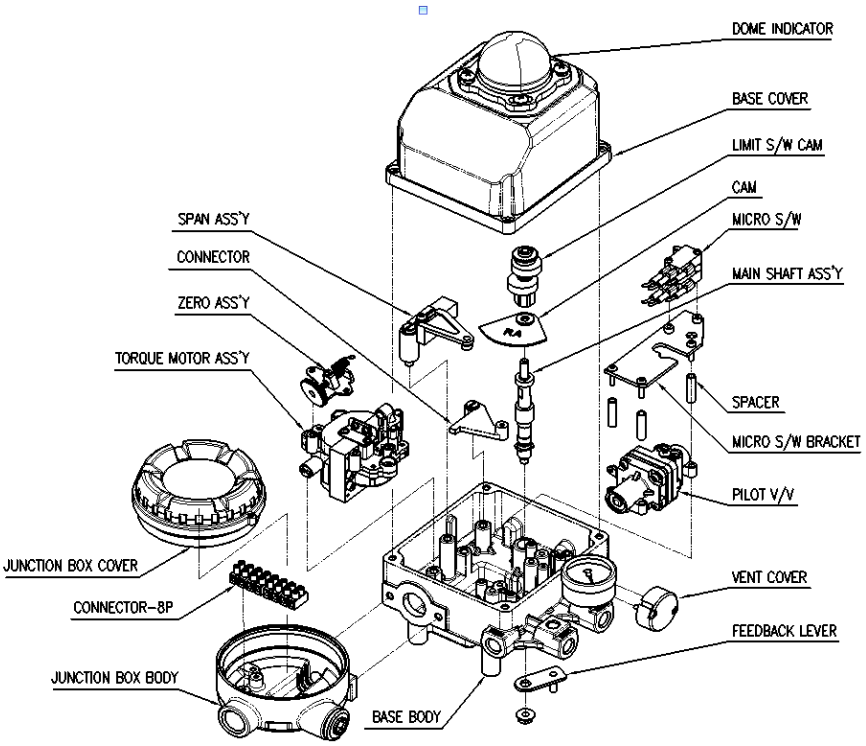
2.6.3 YT-1000L + SPTM (Internal)



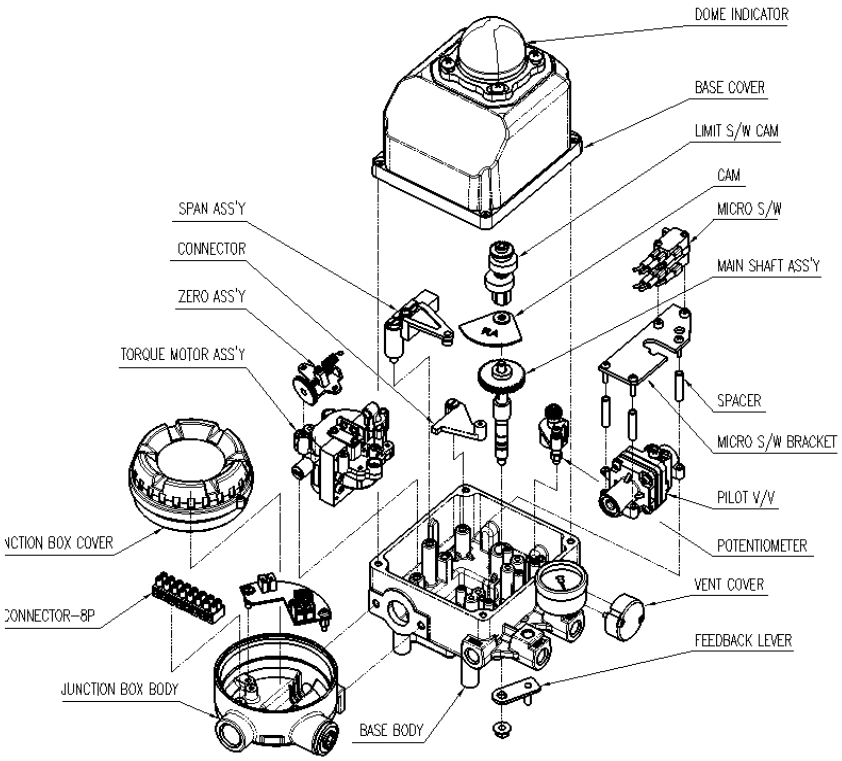
2.6.4 YT-1000R + SPTM (Internal)



2.6.5 YT-1000R + L/S (Internal)

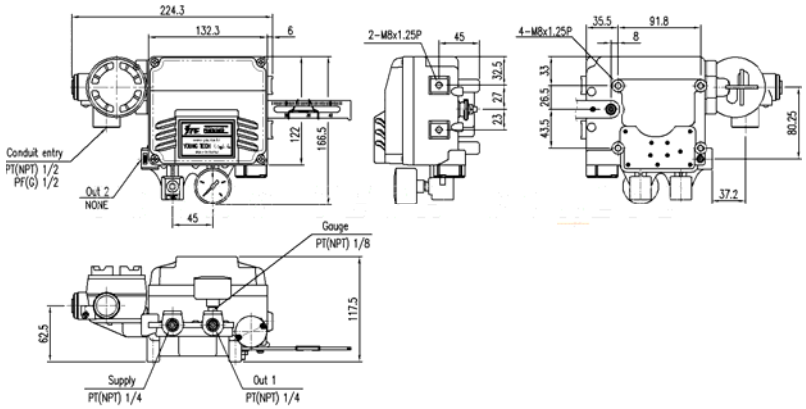


2.6.6 YT-10000R + SPTM + L/S (Internal)

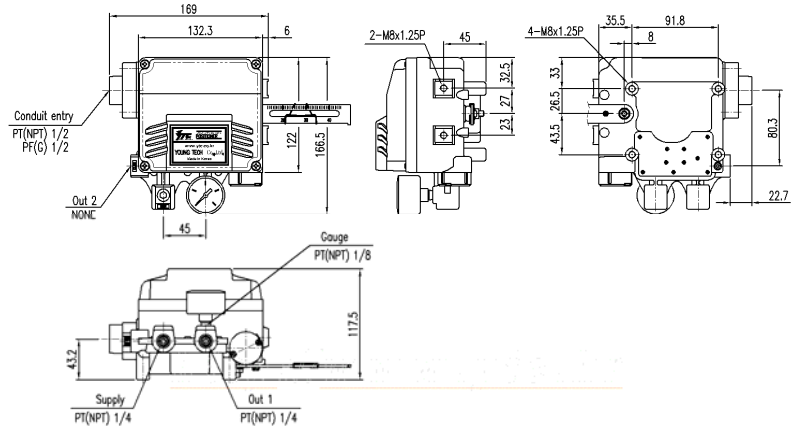


2.7 Product Dimension

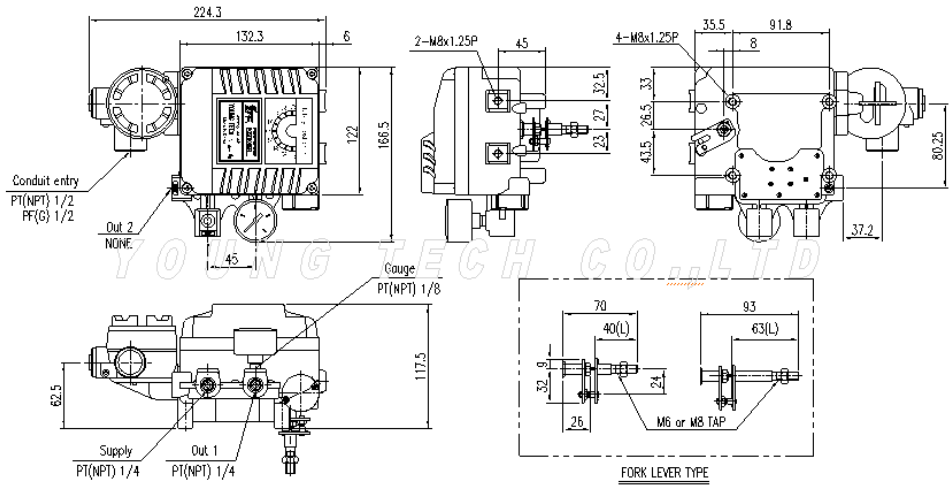
2.7.1 YT-1000L Flameproof Type



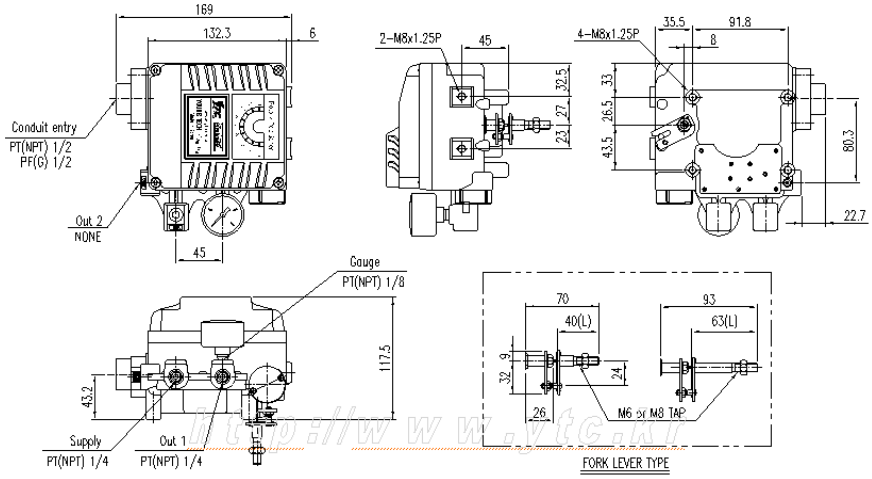
2.7.2 YT-1000L Intrinsically Safety Type



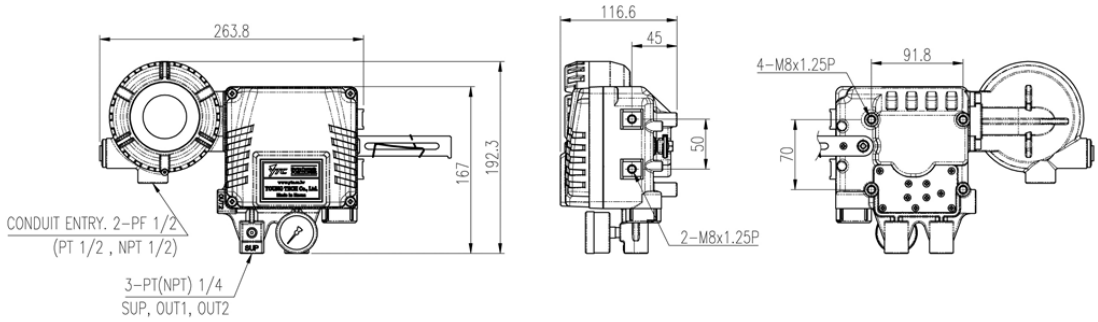
2.7.3 YT-1000R Flameproof Type



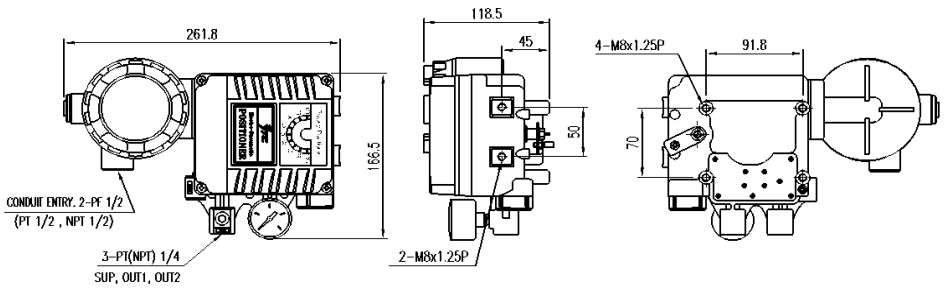
2.7.4 YT-1000R Intrinsically Safety Type



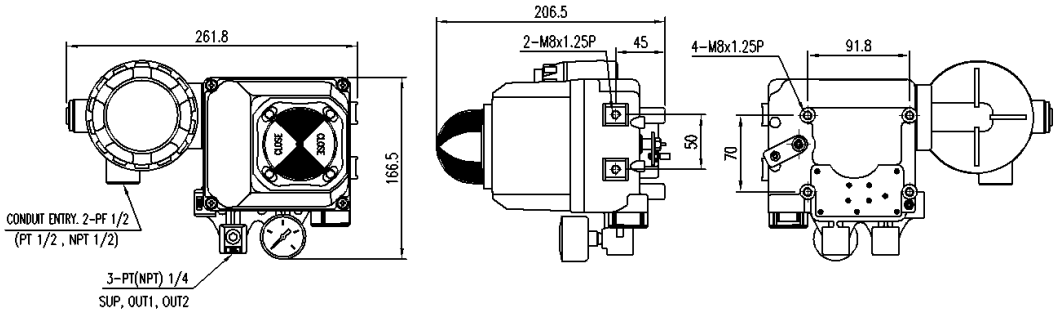
2.7.5 YT-1000L + SPTM (Internal)



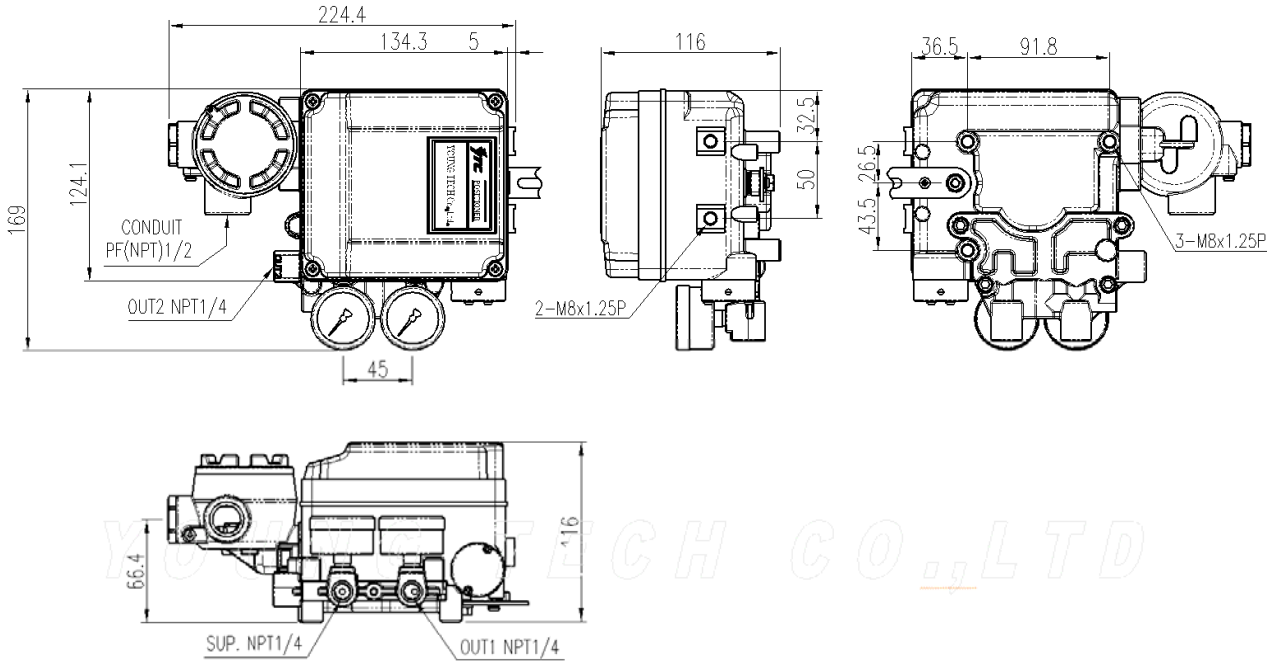
2.7.6 YT-1000R + SPTM (Internal)



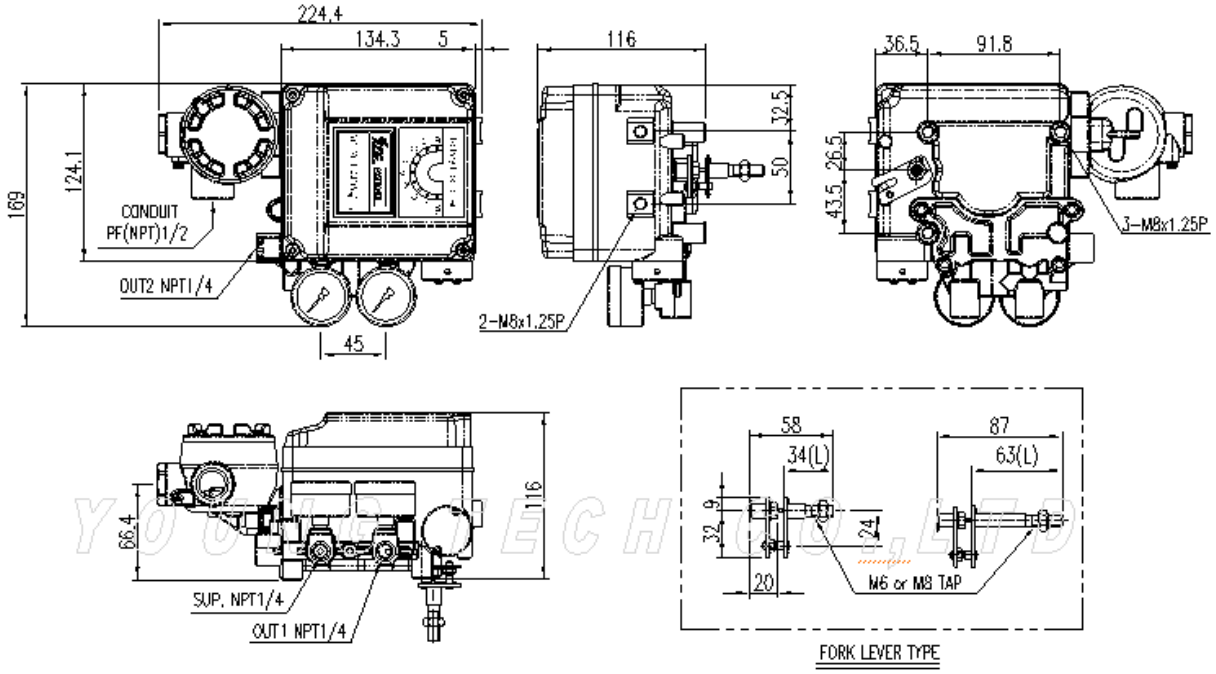
2.7.7 YT-1000R + SPTM + L/S (Internal) & YT-1000R + Dome indicator



2.7.8 YT-1050L



2.7.9 YT-1050R



3. Installation

3.1 Safety

When installing a positioner, please ensure to read and follow safety instructions.

- Any input or supply pressures to valve, actuator, and / or to other related devices must be turned off.
- Use bypass valve or other supportive equipment to avoid entire system “shut down”.
- Ensure there is no remaining pressure in the actuator.

3.2 YT-1000/1050L Installation

YT-1000/1050L should be installed on linear motion valves such as globe or gate type which uses spring return type diaphragm or piston actuators. Before proceeding with the installation, ensure following components are available.

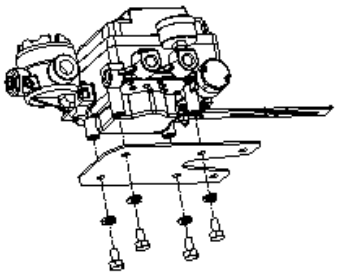
- Positioner unit
- Feedback lever and lever spring
- Flange nut (bottom side of YT-1000/1050L)
- 4 pcs x hexagonal headed bolts (M8 x 1.25P)
- 4 pcs x M8 plate washer

3.2.1 Installation Steps

1. Proper bracket must be made in order to adapt the positioner on the actuator yoke. Please consider following important points when a bracket is being designed.

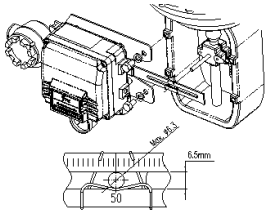
   - Positioner’s feedback lever must be parallel to the ground at 50% of the valve stroke.
   - Feedback lever connection with the pin of the actuator clamp should be installed in such a way that the valve stroke length coincides with the corresponding figure in “mm” marked on the feedback lever. Improper setting may cause poor linearity and may create unnecessary hunting during the operation.

2. Assemble the positioner with the bracket made in previous step by fastening the bolts. Please refer to the backside of the positioner for size of the bolts. The standard bolt size is M8 x 1.25P. Please contact Young Tech Co., Ltd for other bolt sizes.



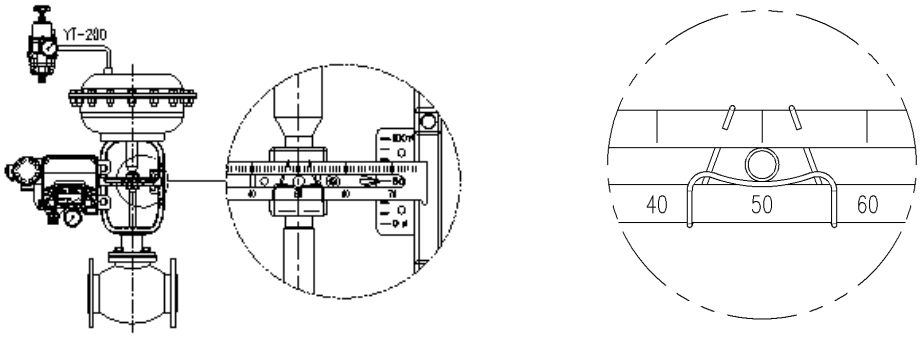
3. Attach the positioner with bracket to the actuator yoke – **DO NOT TIGHTEN POSITIONER COMPLETELY.**

4. Connect positioner’s feedback lever to the actuator clamp. The hole gap on the feedback lever is 6.5mm. The connection pin’s outer diameter should be less than 6.3mm.



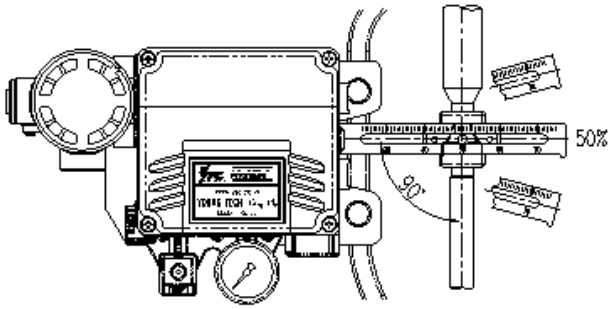
5. Connect supply pressure to the actuator temporarily. Supply enough supply pressure to the actuator in order to position the actuator clamp at 50% of the total valve stroke.

6. Insert connection pin into the feedback lever. The pin should be inserted when the actuator clamp is at 50% of the total valve stroke.



Proper way to connect feedback lever, connection pin, and lever spring

7. Check if feedback lever is parallel to the ground at 50% of the valve stroke. If it is not parallel, adjust the bracket or feedback link bar to make parallel. Improper installation may cause poor linearity and may create unnecessary hunting during the operation.



8. Check the valve stroke. The stroke marks are indicated on the feedback lever of the positioner. Position the connection pin at the number on the feedback lever which corresponds to the desired valve stroke. To adjust, move the bracket, the connection pin or both.

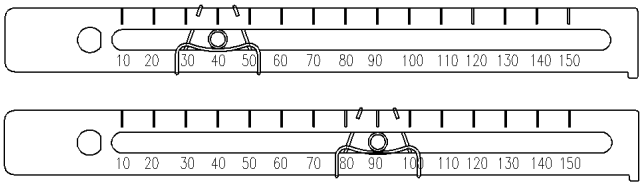


Fig. 3: Pin Insertion when valve stroke is 40mm (up) and is 90mm (bottom)

9. After installing the positioner, operate the valve from 0% to 100% stroke by using direct

air to the actuator (manual position). On both 0% and 100%, the feedback lever should not touch the lever stopper, which is located on the backside of the positioner. If the feedback lever touches the stopper, the positioner should be installed further away from the yoke.

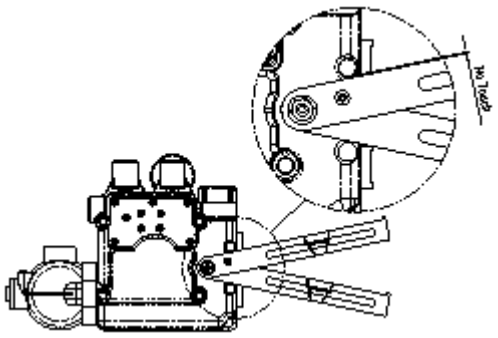


Fig. 4: Feedback lever should not touch lever stopper 0% ~ 100% valve stroke.

10. After the installation, tighten all of the bolts on the bracket, the feedback lever, and the connection pin.

3.3 YT-1000/1050R Installation

YT-1000/1050R should be installed on rotary motion valve such as ball or butterfly type which uses rack and pinion, scotch yoke or other type of actuators which stem rotates 90 degrees. Before proceeding with the installation, ensure following components are available.

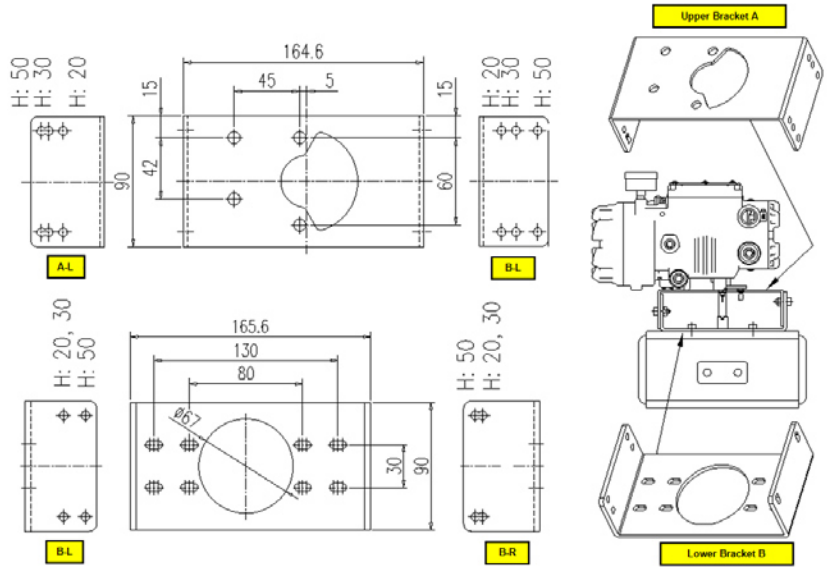
- Positioner unit
- Fork lever and lever spring
- Standard rotary bracket (included with the positioner)
- 4 pcs x hexagonal headed bolts (M8 x 1.25P)
- 4 pcs x M8 plate washer

Fig. 5: Fork lever type (left) and NAMUR lever type (right)

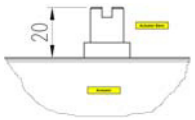
3.3.1 Bracket information

Standard bracket (included with the positioner) contains two components. The bracket can be used for both fork lever and NAMUR lever type. The bracket is designed to fit onto the actuator with 20mm stem height (H). If actuator's stem height (H) is 30mm or 50mm, bracket must be adjusted. Please refer to below table how to adjust the bracket.

Actuator stem height (H)	Markings of bolt holes			
	A-L	B-L	A-R	B-R
20mm	H : 20	H : 20, 30	H : 20	H : 20, 30
30mm	H : 30	H : 20, 30	H : 30	H : 20, 30
50mm	H : 50	H : 50	H : 50	H : 50



3.3.2 Installation Steps



1. Please check the actuator's stem height and adjust the bracket by referring to the bracket table.

2. Attached the bracket onto the actuator. It is recommended to use spring washer so the bolts will not be loosen from vibration.

3. Set rotation position of the actuator stem at 0%. For single acting actuator, it is easy to check 0% point by supplying no pressure to the actuator. For double acting actuator, check actuator stem's rotation direction – clockwise or counter-clockwise - by supplying pressure to the actuator.

4. Install the fork lever after setting actuator's stem at 0%. Check the actuator stem's rotation direction – clockwise or counter-clockwise. Installation angle of the fork lever should be 45 degrees in relation to the linear shaft. For NAMUR shaft installation, the angle does not matter.

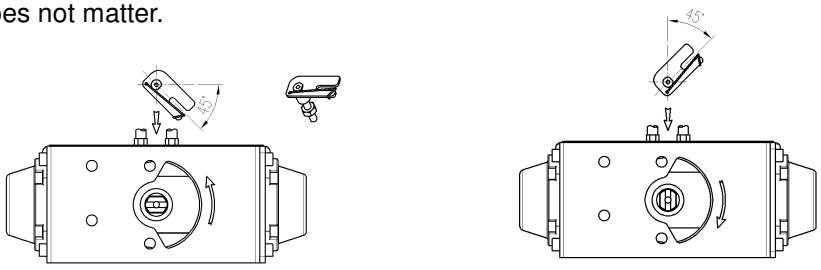
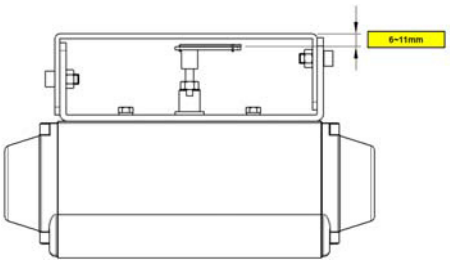
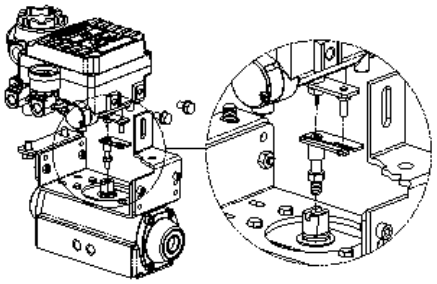


Fig. 6: Counter-clockwise and clockwise rotation.

5. After setting fork lever position, assemble lock nuts which are located on the bottom of the fork lever. Ensure to set the height of the upper fork lever between **6~11mm**, which is lower than the upper bracket's height.



6. Attach the positioner to the bracket. Fix the clamping pin on the main shaft's center of the positioner and insert connection pin into the fork lever slot. This will lock to the fork lever spring. Setting alignment of the main shaft of the positioner and center of the actuator's stem is very important. Poor alignment of the main shaft and the actuator's stem decreases the positioner's durability due to unnecessary forces on the main shaft.



7. Tighten the positioner and the bracket with hexagon-headed bolts and plate washer **after checking the positioner's position.**

4. Connections

4.1 Safety

- Supply pressure should be clean and dry air – avoiding moisture, oil or dust.
- Always recommended to use air filter regulator (i.e. YT-200 series).
- Young Tech Co., Ltd **has not tested positioner's operation with any other gases other than clean air. Please contact Young Tech Co., Ltd for any questions.**

4.2 Supply Pressure Condition

- Dry air with at least 10℃ lower than ambient temperature.
- Avoid from dusty air. Positioner's inner filter can only filter 5 micron or larger.
- Avoid oil.
- Comply with ANSI/ISA-57.3 1975(R1981) or ISA S7.3-1975(R1981).
- Supply pressure range is 1.4 ~ 7 kgf/cm^2 (140-700 kPA)
- Set air filter regulator's pressure level 10% higher than actuator's spring range pressure.

4.3 Piping Condition

- Ensure inside of pipe is clean of obstructions.
- Do not use pipeline that is squeezed or shows any type of damamges.

- Pipeline should have more than 6mm of inner diameter (10mm outer diameter) to maintain flow rate.
- The length of pipeline system should not be extremely long. Longer pipeline system may affect flow rate due to the friction inside of the pipeline.

4.4 Connection – Actuator

4.4.1 Single acting actuator

Singe acting type positioner is set to use OUT1 port. OUT1 port should be connected with supply pressure port from actuator when using single acting type of spring return actuator.

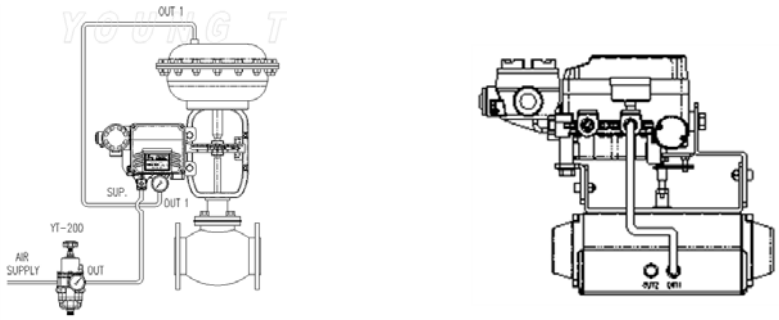


Fig. 7: Singe acting linear (left) and rotary (right) type actuator

4.4.2 Double acting actuator

Double acting type positioner is set to use OUT1 and OUT2 port. As input signal increases, the supply pressure will be supplied through OUT1 port.

Fig. 8: Double acting linear (left) and rotary (right) type actuator

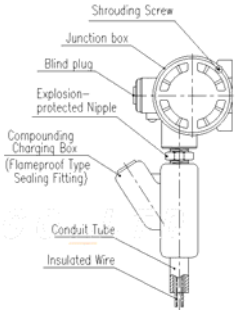
4.5 Connection – Power

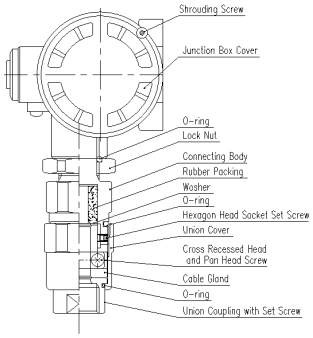
4.5.1 Safety

- When installing in hazardous and explosive gas area, conduit tube or pressure-proof packing union must be used. The compound charging box should be the flameproof type and must be sealed completely.
- Conduit entry connection tap is PF 1/2 or G 1/2.
- Before connecting terminal, ensure that the power is off completely. **Do not open the cover when the power is still alive.**
- Please use ring-type rug to protect against vibration or any other external impact.
- Positioner with PTM options must be supplied 10~28V DC separately. For L/S option, separate 12-24V DC must be supplied. **For both options, it should not exceed 30V**

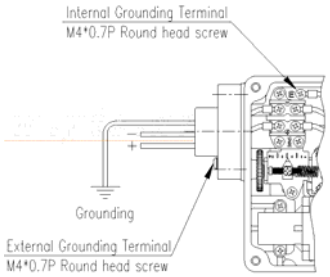
DC.

- Positioner should be grounded.
- Please use twisted cable with conductor section are 1.25mm^2 and that is suitable for 600V (complying to the conductor table of NEC Article 310.) The outer diameter of the cable should be between 6.35 ~ 10mm. Use shield wire to protect against electro-magnetic field and noise.
- Please do not install the cable near high noise equipments, such as high-capacity transformer or motor.

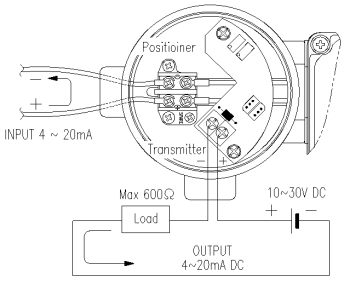




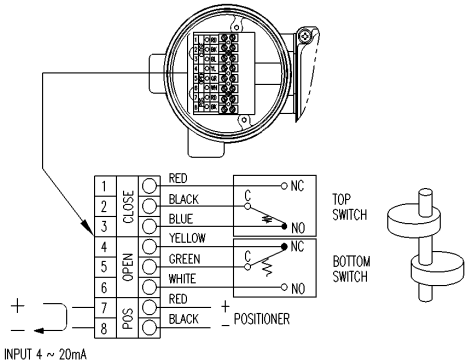
4.5.2 Ground



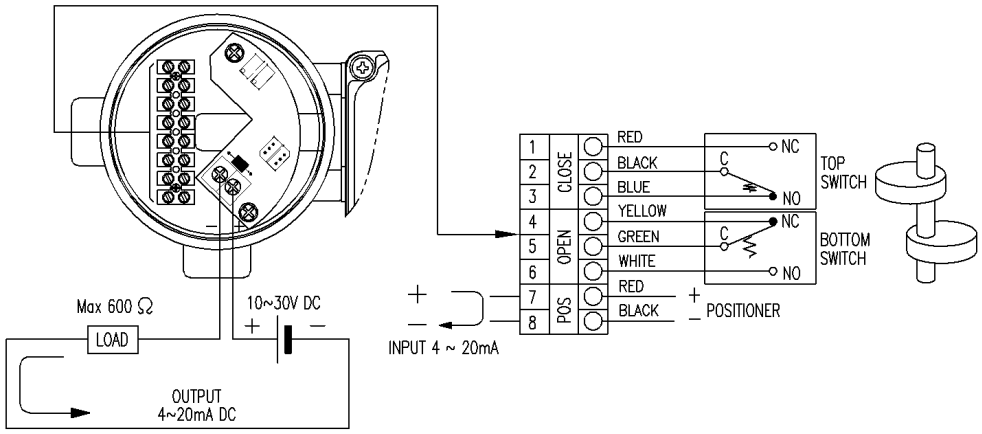
4.5.3 SPTM Internal <Option>



4.5.4 L/S Internal <Option>



4.5.5 SPTM & L/S Internal <Option>

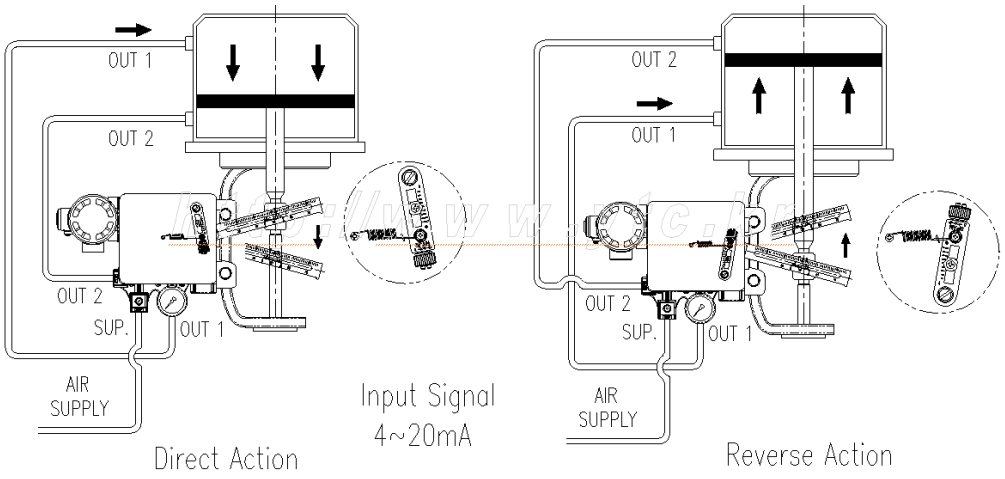


5. Adjustments

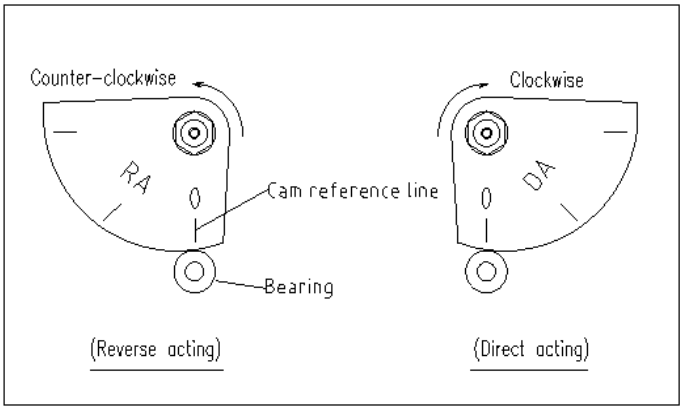
5.1 Adjustment – Cam

YTC sets positioner as Reverse Action <RA> unless specified otherwise when placing an order.

5.1.1 YT-1000/1050L

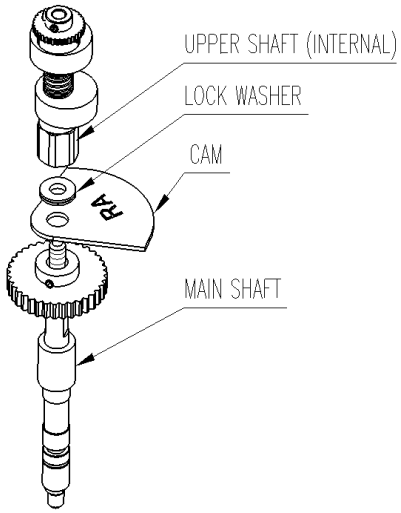


5.1.2 YT-1000/1050R



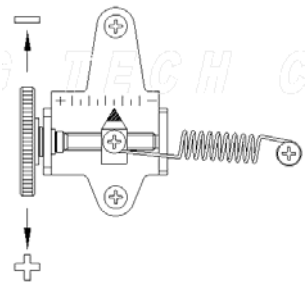
5.1.3 YT-1000/1050R with Internal Options <Option>

Cam can be adjusted for YT-1000/1050R with options by dissembling the cam from the main shaft. After dissembling the cam from the main shaft, please follow 5.1.2 for RA or DA cam.



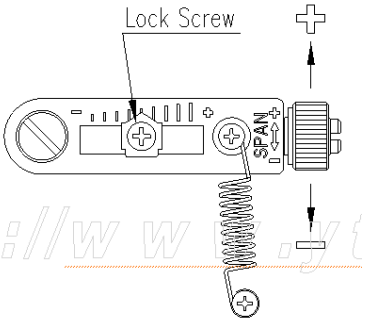
5.2 Adjustment – Zero Point

1. Set supply signal at 4mA or 20mA – according to RA or DA – and rotate the adjuster up or downward to adjust actuator's initial point. As zero point is being set, the specification of the valve system must be considered. Please refer to diagram on the right to increase or decrease the zero point.



5.3 Adjustment – Span

1. After setting zero, supply signal at 20mA or 4mA – according to RA or DA – and check the actuator stroke. If the stroke is too low, the span should be increased. If the stroke is too high, the span should be decreased.
2. Changing span point will affect zero point setting. Zero point should be set again after span has been adjusted. This step is required until both zero and span are properly set.
3. After proper setting, tighten lock screw.



5.4 Adjustment – SPTM <Option>

5.4.1 Setting Point Switch

There are two types of calibration of SPTM / feedback signal.

1. 2 Point Setting

   This setting only set minimum and maximum point (0% and 100%). In between points

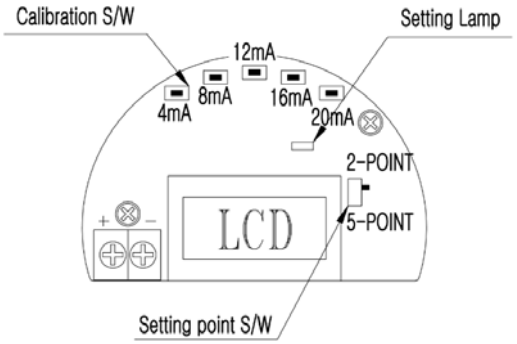
will be calculated automatically.

2. 5 Point Setting

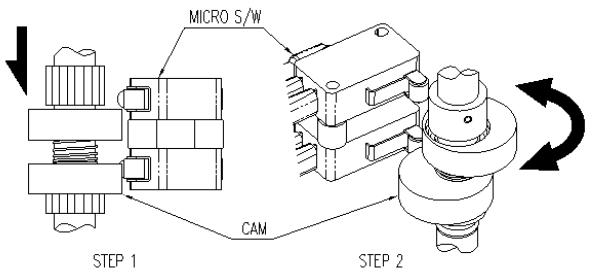
   This setting set 5 points (0%, 25%, 50%, 75%, and 100%). This requires more setting, but feedback setting will be more accurate than 2 point setting.

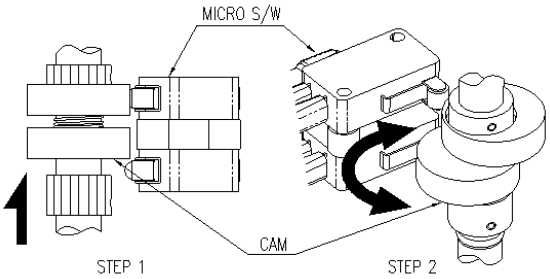
5.4.2 Calibration

1. Supply 4mA input signal to the positioner and check if valve position made to its target position. For Direct Action (DA), supply 20mA instead of 4mA for input signal.
2. Press 4mA button on the PCB for 3~4 seconds. LED lamp will blink indicating that the PCB has calibrated the specific position to give 4mA as feedback.
3. Repeat above step for 8mA, 12mA, 16mA, and 20mA. For 2 point setting, only 4mA and 20mA should be set.



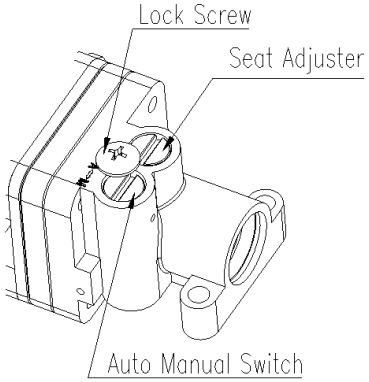
5.5 Adjustment – L/S <Option>





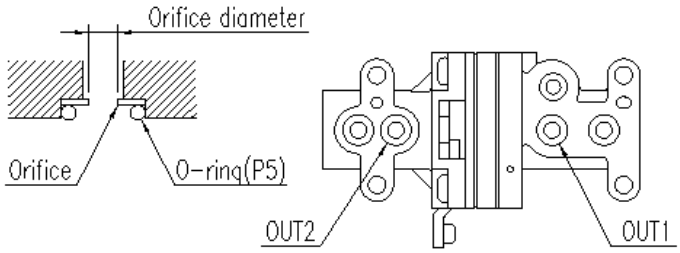
5.6 Adjustment – A/M Switch (Auto/Manual)

1. A/M switch is used when the valve needs to be operated manually.
2. If switch is set as “A”, the positioner will respond to input signal. If switch is set as “M”, the positioner will act as bypass and supply pressure to the positioner will directly go to the actuator.
3. **Please make sure to set back to “A” after manual operation. Also, please DO NOT TOUCH SEAT ADJUSTER BOLT ON THE PILOT RELAY.**



5.7 Adjustment - Orifice

If the actuator size is too small relative to the flow rate, positioner can have hunting / oscillation. In order to avoid hunting, the orifice must be inserted.

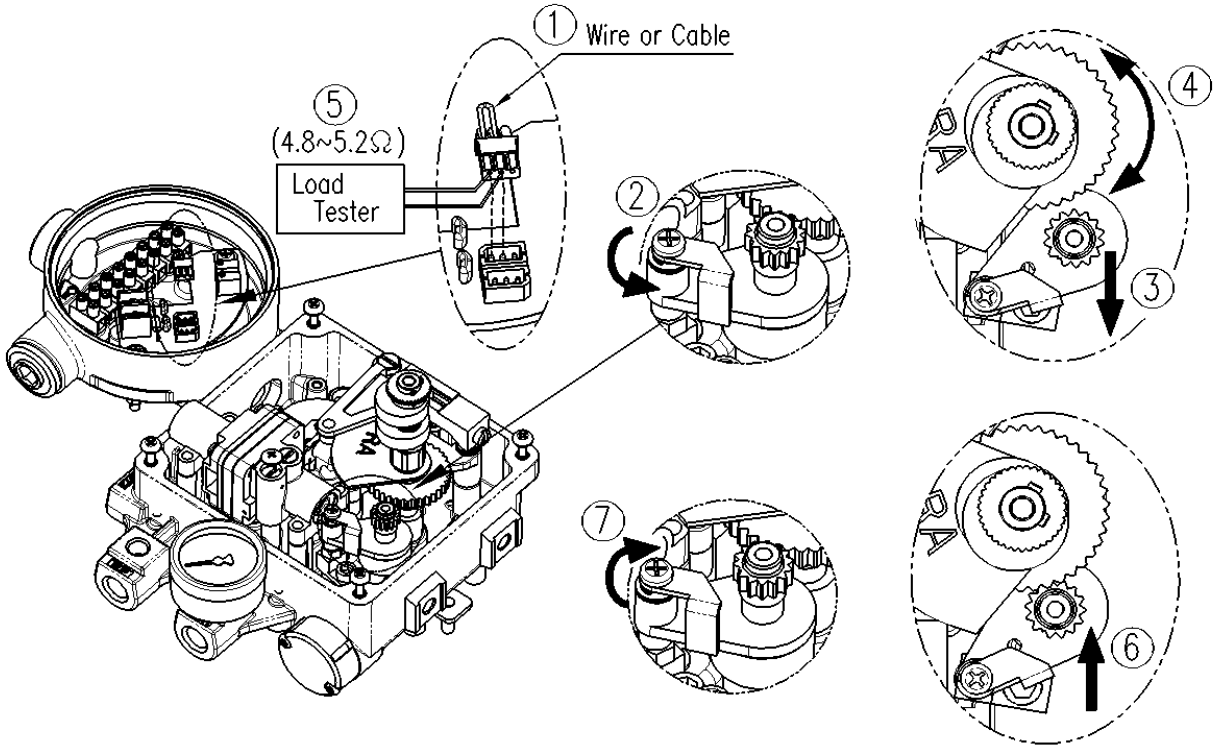


1. Remove the pilot relay assembly from the positioner.
2. Remove the o-rings from OUT1 and OUT2 port per above diagram, and insert proper orifice. Before re-assemble the o-rings, please make sure there is no dust or particles remain on the ports.

5.8 Adjustment - Potentiometer

External damage or physical shock can dislocate potentiometers factory setting. Potentiometer must be re-calibrated when dislocation of the potentiometer or after cam adjustment. **PLEASE REFER BELOW INSTRUCTION AND DIAGRAM.**

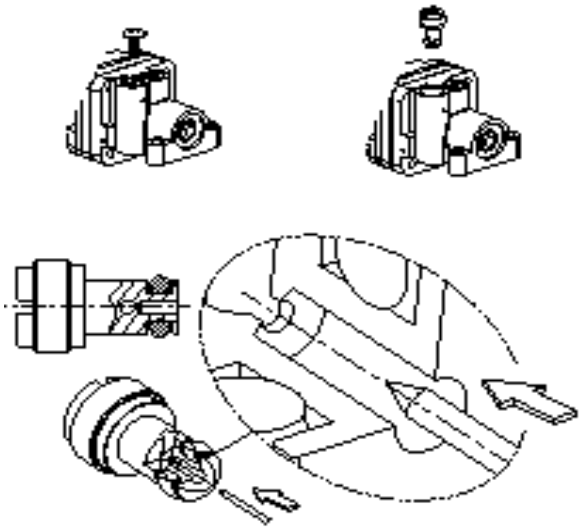
1. Please set actuator position to 50% of the valve stroke. **PLEASE MAKE SURE THAT THE ACTUATOR DOES NOT MOVE DURING THE RE-CALIBRATION.**
2. In the junction box, please pull out the potentiometer connector from potentiometer PCB. **DO NOT PULL WITH TOO MUCH FORCE AS WIRES CAN BE DAMAGED.**
3. On the potentiometer connector, there are three holes. Out of three holes, please measure resistance level by plugging two holes <**one of right or left and one of center>.** The potentiometer resistance level should be between 0~10 K Ω and please adjust measurement equipment to measure between above mentioned range.
4. Using "+" screw driver, loosen potentiometer stopper bolt. **DO NOT LOOSEN COMPLETELY.**
5. Pull potentiometer behind and potentiometer will be separated from potentiometer gear. This will make user to turn potentiometer gear.
6. Since current actuator position is 50% of the valve stroke, the resistance level should be measure around 5K Ω (4.8 ~ 4.2 K Ω) by turning potentiometer gear.
7. After the setting, assemble back the stopper and the bolt.



6. Maintenance

Maintenance on pilot relay valve is recommended to perform at least once a year of with or without operation. When dissembling the pilot relay valve, please be careful not to loose any o-rings or stabilizer spring. Please refer to below instruction and diagram.

1. Please remove pilot relay lock bolts.
2. Unlock Auto/Manual (A/M) Switch from the pilot relay. **PLEASE MAKE SURE TO REMOVE A/M SWITCH.**
3. Remove any particles or dust by blowing air.



7. Troubleshooting

▶ **Positioner does not respond to the input signal.**

(1) Check supply pressure level. The lever must be at least 1.4 kgf/cm$^{2.}$ For spring-return type of actuator, the supply pressure level has to be larger than the spring's specification.
(2) Check if input signal is properly supplied to the positioner. The signal should be 4~20mA DC.
(3) Check if zero point or span point is properly set.
(4) Check if the positioner's nozzle has been blocked. Also, check if the pressure is supplied to the positioner and the pressure is being exhausted through the nozzle. If the nozzle has been block by any substances, please send the product for repair.
(5) Check if feedback lever has been installed properly.

▶ **The pressure of OUT1 reaches exhausting pressure level and does not come back down.**

(1) Check A/M Switch. If the switch has been damaged, replace the switch or pilot relay valve.
(2) Check for a gap or damages between the nozzle and the flapper. If damaged, please send the product to YTC for repair.

▶ **The pressure is exhausted only by A/M Switch.**

(1) Check if the positioner's nozzle has been blocked. Also, check if the pressure is supplied to the positioner and the pressure is being exhausted through the nozzle. If the nozzle has been blocked by any substances, please send the product to YTC for repair.

▶ **Hunting occurs.**

(1) Check if safety spring has been displaced. (Next to Pilot relay valve)
(2) Check if the size of actuator is too small. If so, insert an orifice in order to reduce the pressure flow rate.
(3) Check if there is any friction between the valve and the actuator. If so, increase actuator's size or reduce the friction level.

▶ **Actuator only operates by On/Off.**

(1) Check actuator and positioner's acting type. Air pressure exhausts from YT-1000L's OUT1 port as input signal level increases. Therefore, it is standard to connect to OUT1 port when single actuator is used. Make sure the span adjustment is properly set according to the valve system.

▶ **Linearity is too low.**

(1) Check if positioner is properly positioned. Especially check if the feedback lever is parallel to the ground at 50% point.
(2) Check if zero and span point have been properly adjusted. If either one of values is being adjusted, another one must be re-adjusted as well.
(3) Check if supply air pressure level is stable from the regulator. If the level is unstable, the regulator must be replaced.

▶ **Hysteresis is too low.**

(1) In case of double acting actuator, check if seat adjustment has been properly performed. Please contact YTC for any further inquiries regarding the seat adjustment.
(2) Backlash can occur when the feedback lever and lever spring are loosen. To avoid backlashing, please adjust the lever spring.
(3) Check if the connection bar to the feedback lever is tightly fastened.

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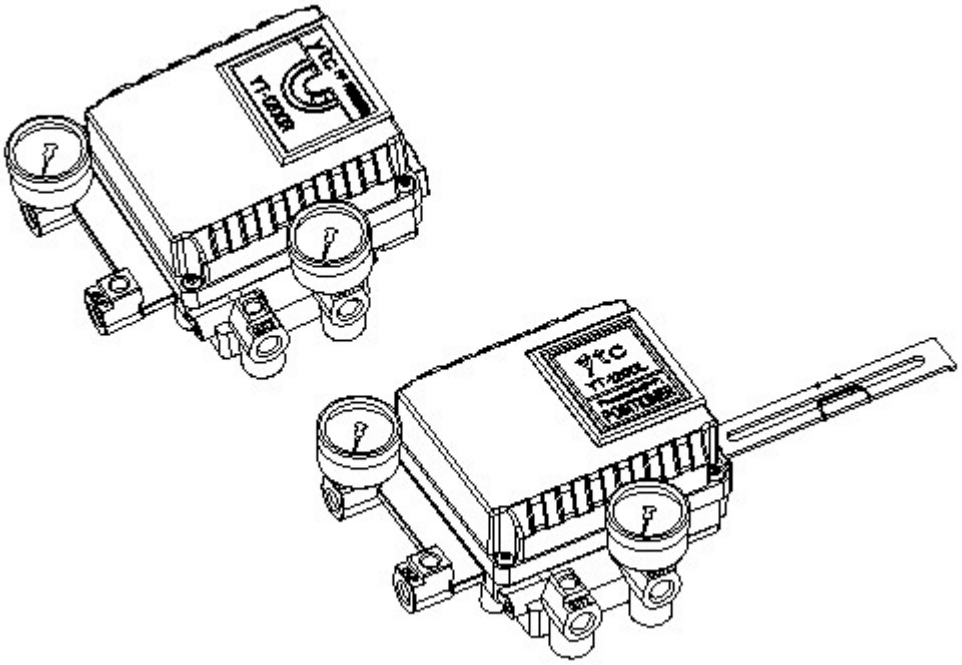
Pneumatic Positioner

YT-1200 Series

USER'S MANUAL



YTC

Ver 1.01

Introduction

Thank you for choosing YTC product. Each product is fully inspected after the production to offer you the highest quality. In order to fully utilize the product, we strongly recommend users to read this manual carefully and understood.

- The manual should be given to the end-user.
- The manual can be changed or revised without any prior notice. Any changes in product's specification, structure, and/or any components may not result immediate revised version of the manual.
- The manual should not be duplicated or reproduced for any purpose without any approvals from Young Tech Co., Ltd, South Korea / YTC.

Manufacturer Warranty

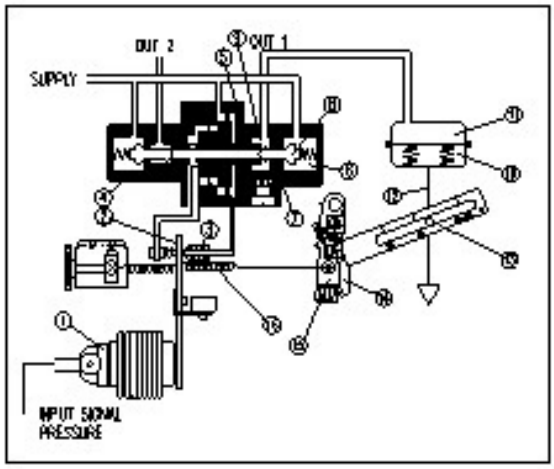
- For the safety, it is imperative to follow instructions in the manual. It is not manufacturer's liability for any damages which caused by users' negligence.
- It is not manufacturer's liability for any damages or accidents which resulted by any alteration or modification of the product and parts. If alteration or modification is necessary, please contact the manufacturer directly.
- Manufacturer warrants the product from the date of original retail purchase of the product for eighteen (18) months, except as otherwise stated.
- Manufacturer warranty will not cover the products that the product have been subjected to abuse, accident, alteration, modification, tampering, negligence, misuse, faulty installation, lack of reasonable care, repair or service in any way that is not contemplated in the documentation for the product, or if the model or serial number has been altered, tampered with, defaced or removed; damages that occurs in shipment, due to act of God, failure due to power surge, and cosmetic damage. Improper or incorrectly performed maintenance or report voids this Limited Warranty.
- For detailed warranty information, please contact the corresponding local Young Tech Co., Ltd office or main office in South Korea.

Product Description

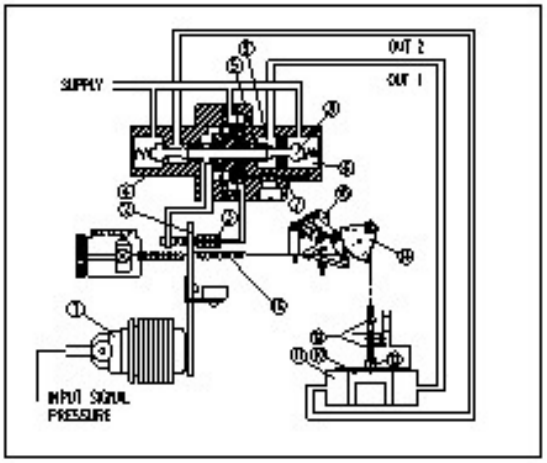
Main Features and Functions

- The product can operate normally in very extreme environment, such as vibration and temperature.
- The durability has been proven after testing 2 million cycles at the minimum.
- Response time is very short and accurate.
- Simple part change can set 1/2 Split Range.
- It is economical due to less air-consumption.
- Direct / Reverse action can be set easily.
- Zero & Span adjustment processes are simple.
- Feedback connection is easy.

Operation Logic

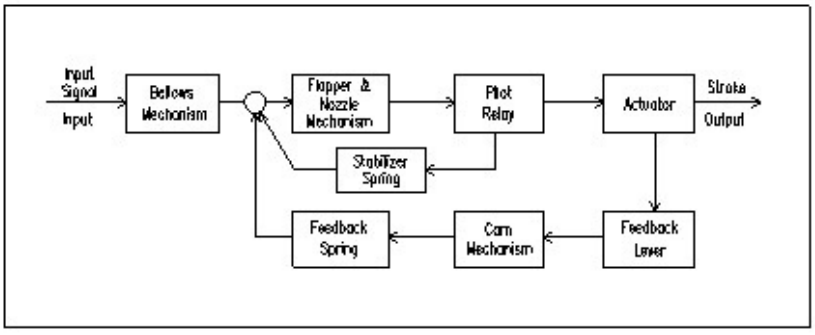


<YT-1200L>



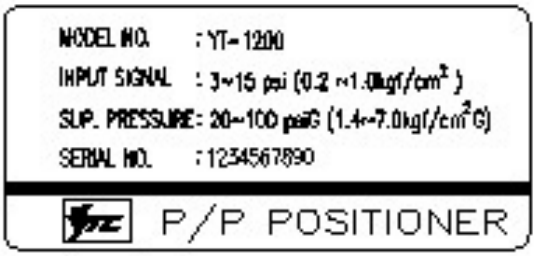
<YT-1200R>

Bellows(①) push flapper(②) if input pressure increases. Then the gap between nozzle(③) and flapper(②) increases, which results pressure in upper spool(⑤) exhaustion. This would cause spool(⑤) to rise upward. As the spool(⑤) rises, it pushes format(⑧), and the air pressure will be supplied to the actuator(⑩). As the actuator's inner pressure increases, the actuator stem(⑫) will move. For graphical diagram, please refer to <Figure 1>.



<Figure 1>

Label Description



Model:	Indicates model name and any options (if any)
Input Signal:	Indicates current input signal range.
Supply Pressure:	Indicates the range of supply pressure.
Serial Number:	Indicates unique serial number.

Suffix Symbol

YT-1200 series follows suffix symbols as below.

YT-1200 [1] [2] [3] [4] [5]

[1] Motion Type:	L	: Linear
	R	: Rotary
[2] Acting Type:	S	: Single
	D	: Double
[3] Feedback Lever (YT-1200L)	1	: 10 ~ 40mm
	2	: 30 ~ 70mm
	3	: 60 ~ 100mm
	4	: 100 ~ 150mm
Feedback Lever (YT-1200R)	1	: M6 x 40L
	2	: M6 X 63L
	3	: M8 X 40L
	4	: M8 X 63L
	5	: NAMUR
[4] Connection Type	1	: PT
	2	: NPT
[5] Ambient Temp.	S	: -20℃ ~ 70℃
	H	: -20℃ ~ 120℃
	L	: -40℃ ~ 70℃

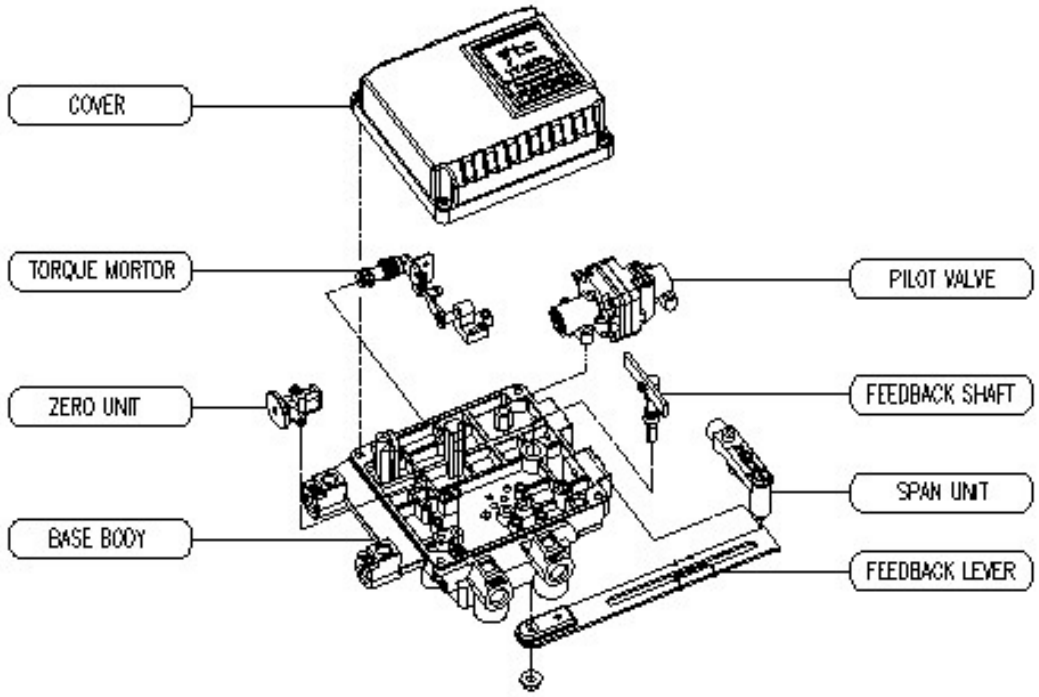
* For special specification, please contact our sales department.

Specification

Category	YT-1200L		YT-1200R	
	Single	Double	Single	Double
Input Signal	0.2~1.0kgf/cm^2 (3~15psi)			
Supply Pressure	1.4~7.0kgf/cm^2 (20~100psi)			
Stroke	10 ~ 150mm		0~90^0	
Air Connection	PT (NPT) 1/4			
Gauge Connection	PT (NPT) 1/8			
Protection	IP66			
Cam	Linear			
Ambient Temp	Standard: -20~70℃ High: -20~120℃ Low: -40~70℃			
Linearity	±1.0% F.S		±2.0% F.S	
Hysteresis	±0.75% F.S		±1.0% F.S	
Sensitivity	±0.2% F.S		±0.5% F.S	
Repeatability	±0.3% F.S		±0.5% F.S	
Air Consumption	3.0LPM(Sup=1.4kgf/cm^2), 11LPM(Sup=4.0kgf/cm^2)			
Flow Capacity	80LPM(Sup=1.4kgf/cm^2), 200LPM(Sup=4.0kgf/cm^2)			
Material	Aluminum Diecasting			
Weight	1.7kg			

* Test under ambient temperature of 20℃, absolute pressure of 760mmHg, and humidity of 65%. Please contact us for the more detailed specification.

Parts and Assembly



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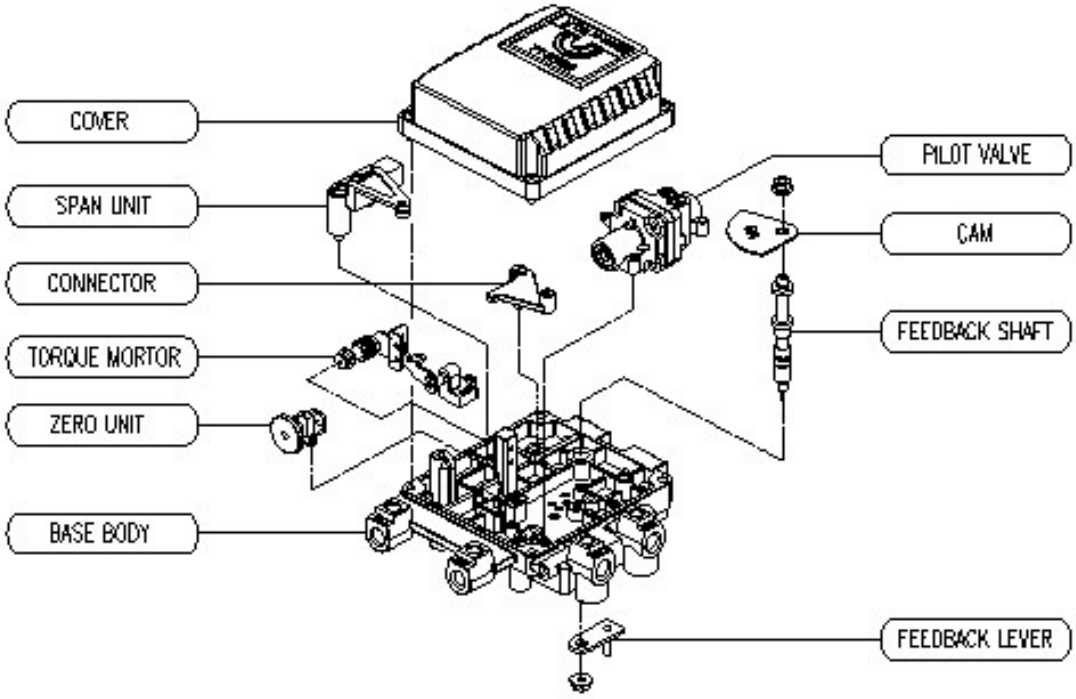
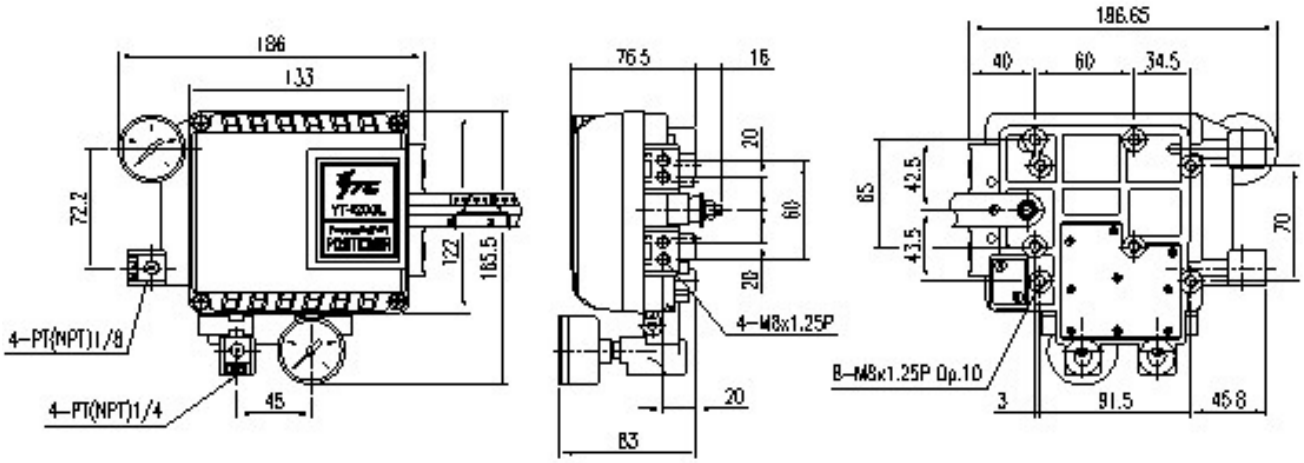
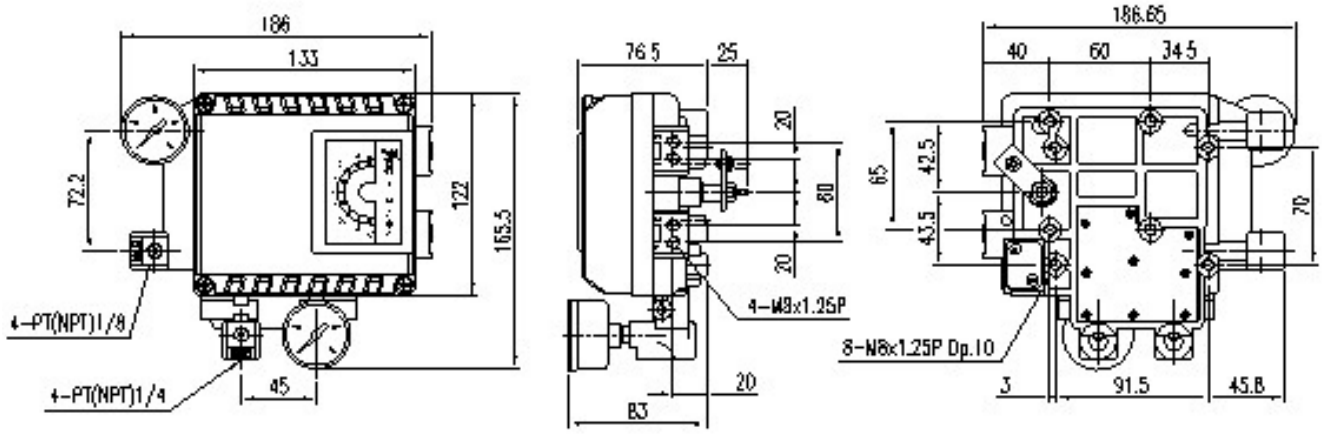


<YT-1200R>

Dimensions



<YT-1200L Dimension>



<YT-1200R Dimension>

Installation

Safety Warning

When installing a positioned, please ensure to read and follow safety instruction.

- All input and supply pressure to valve, actuator, and other related devices must be turned off.
- Use bypass valve or other equipment to avoid entire system "shut down."
- Make sure there is no remaining pressure in the actuator.

Tools for Installation

① Hexagonal wrench
② Screw Drivers (+) and (-)
③ Spanners for hexagonal-head bolts

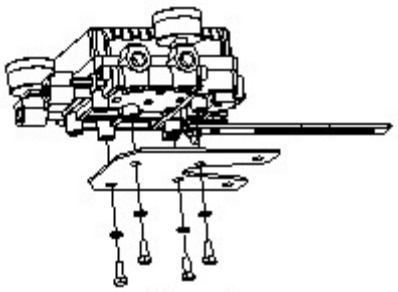
YT-1200 Installation

YT-1200L should be installed on linear motion valve such as globe valve or gate valve using spring return type diaphragm or piston actuator. Before installation, be sure to check for following installation components.

① YT-1200L main body
② Feedback lever and lever spring
③ Flange nut (bottom side of YT-1200L)
④ 4 pcs of hexagon head bolts (M8 x 1.25P)
⑤ 4 pcs of M8 plate washer

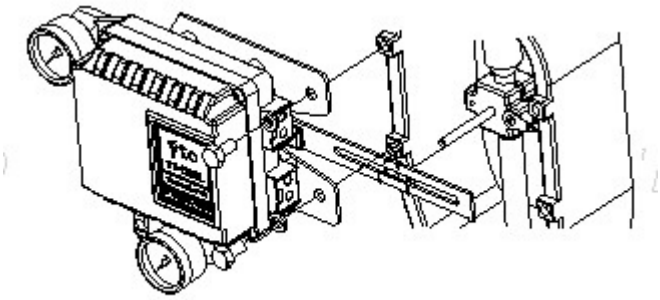
Installation Steps

1. Proper bracket must be made in order to attach positioned on the actuator yoke. Please consider following when making a bracket.
   A. Feedback lever should be leveled at 50% of the valve stroke. (refer to step G)
   B. Feedback lever connection bar of the actuator damp should be installed at the positioned that the valve stroke and numbers which indicated on the feedback lever must be fitted. (refer to step H)
2. Attached YT-1200L to the bracket, which was produced in previous step, by using bolts. <Fig 1> Please refer to backside of the unit for size of the bolts. The standard size of bolt is M8 x 1.25P and other bolts sizes are available. Please contact YTC sales department.
3. Attach YT-1200L (with bracket) to the actuator yoke – DO


<Figure 1>

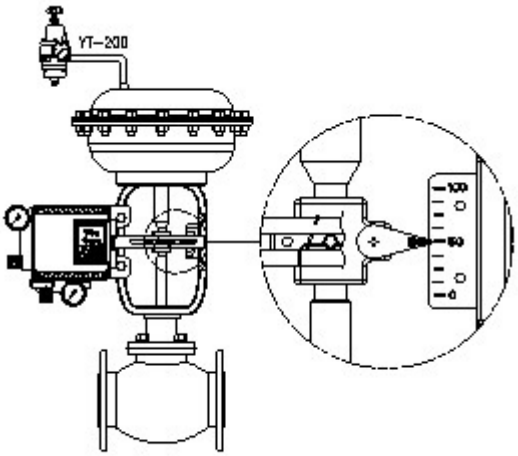
NOT TIGHTEN COMPLETELY.

4. Connect YT-1200L feedback lever to the actuator clamp. The gap on the YT-1200L feedback lever is 65mm. The connection bar thickness should be less than 6.3mm. <Fig 2>



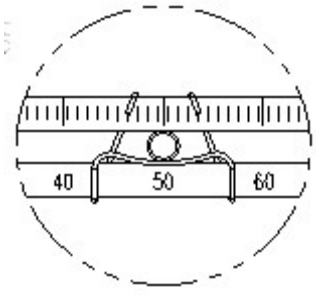
<Figure 2>

5. Connect air filter regulator to the actuator temporarily. Set supply pressure of the regulator in order to position the actuator damp at 50% of valve stroke. <Fig 3>



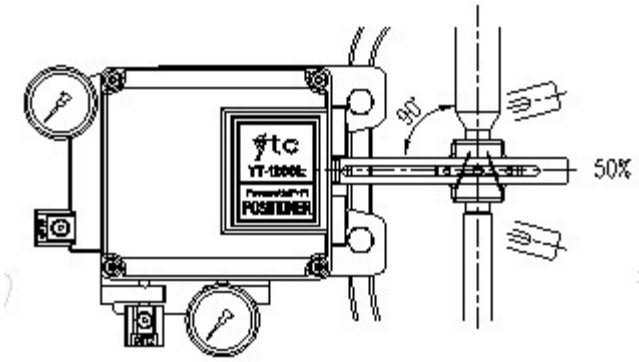
<Figure 3>

6. Insert connection bar into the YT-1200L feedback lever. The connection bar should be inserted at the 50% point on the feedback lever, which would help to reduce hysteresis. <fig 4>



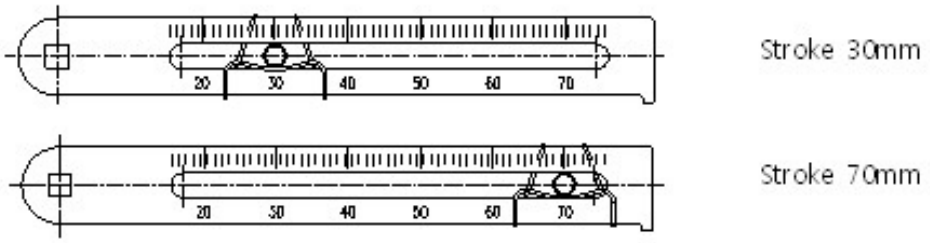
<Figure 4>

7. If connection bar does not point at 50% point, then adjust bracket or feedback link bar position. Failure to position at 50% would lower the linearity of the positioner. <fig 5>



<Figure 5>

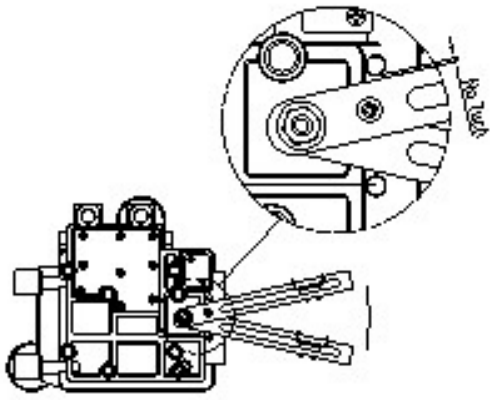
8. Check valve stroke. The stroke numbers are indicated on the feedback lever. Position connection bar at the number on the feedback lever according to the valve stroke. <fig 6> To adjust, move the bracket or the connection bar.



<Figure 6>

NOTE

After installing YT-1200L, operate the valve from 0% to 100% stroke by using air filter regulator. Both of 0% and 100%, the feedback lever should not touch the lever stopper, which is located on the backside of YT-1200L. <fig 7> If the feedback lever touches the stopper, YT-1200L should be installed further away from the center of the yoke.



<Figure 7>

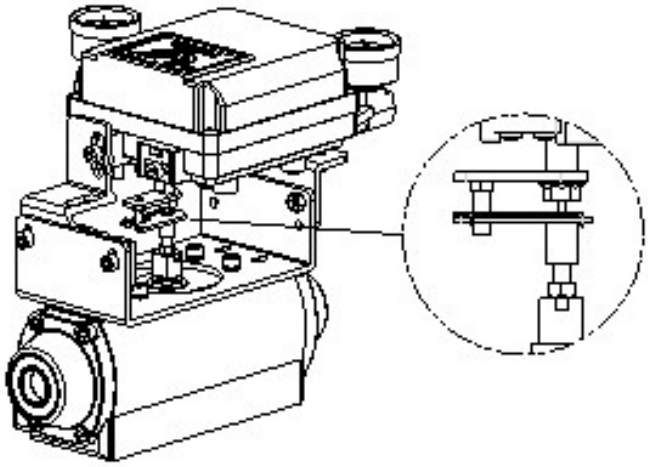
9. After the proper installation, tighten all of the bolts on the bracket, the feedback lever, and the connection bar.

YT-1200R Installation

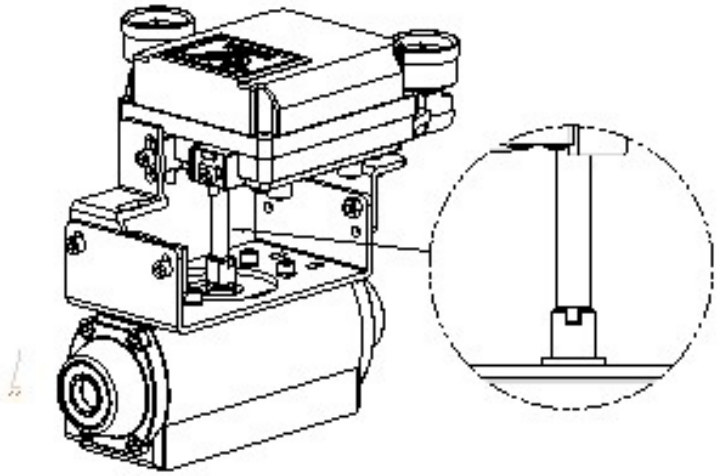
YT-1200R should be used for rotary motion valve, that is ball valve, butterfly valve using rack and pinion, scotch yoke or complex type actuator, which its stem rotates 90 degrees. Before installation, be sure to check for following installation components.

① YT-1200R main body
② Fork lever and lever spring
③ 1 set of bracket (3 pcs)
④ 4 pcs of hexagon head bolt M8 x 1.25P
⑤ 4 pcs of M8 plate washer

YT-1200R Install Example



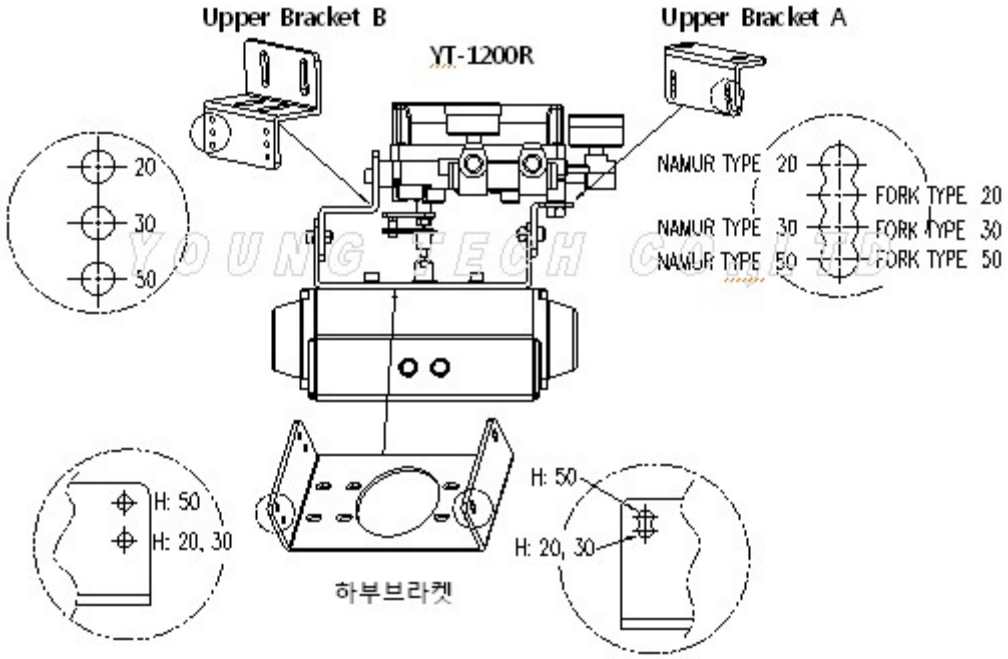
YT-1200R on Fork Lever



YT-1200R on NAMUR Lever

Bracket Information

YT-1200R is supplied with standard bracket. The bracket can be used for fork lever and NAMUR bracket. Please see <fig 8> for more detailed information.

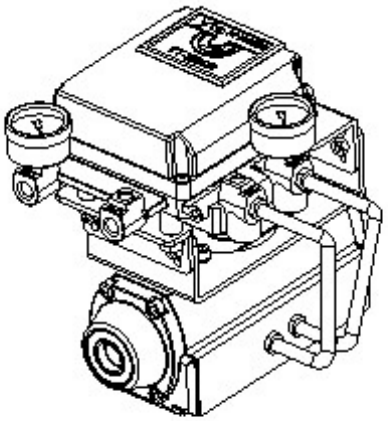


<Figure 8>

1. Standard actuator stem height (H) is 20, 30, or 50 mm. After check "H", assemble with the bracket as shown in <fig 8 & 9>

<Figure 9>

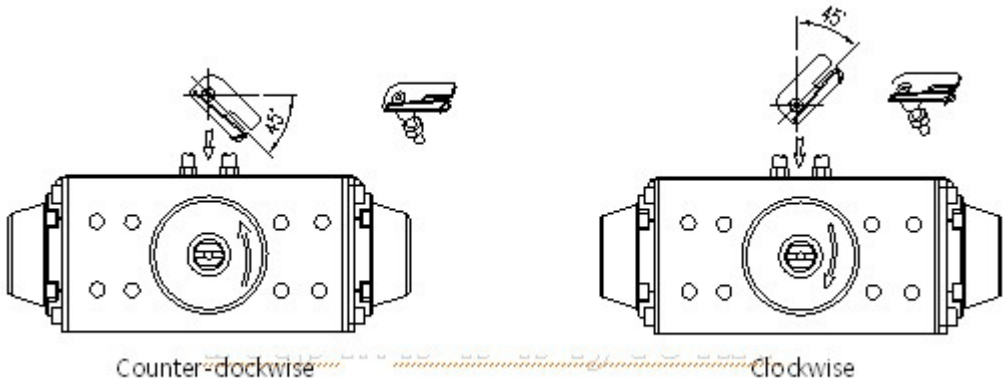
2. Attached bracketed YT-1200R to the actuator by using hexagonal-headed and wrench bolts. Size of the bracket hole is 6mm. When tightening bolts, use spring washer or similar for complete attachment to the actuator, so YT-1200R will not be shaken by vibration or any other impact. The direction of bracket is different by the operating condition, but in general, the positioned is installed as shown. <fig 10>



<Figure 10>

3. Set rotation position of the actuator stem at zero point, "0%". For a single type of actuator, it is easy to check zero point, because the actuator stem is positioned at zero point when there is no supply pressure. If double acting actuator is used, check actuator stem's rotation direction (clockwise or counter-clockwise) by supplying pressure.

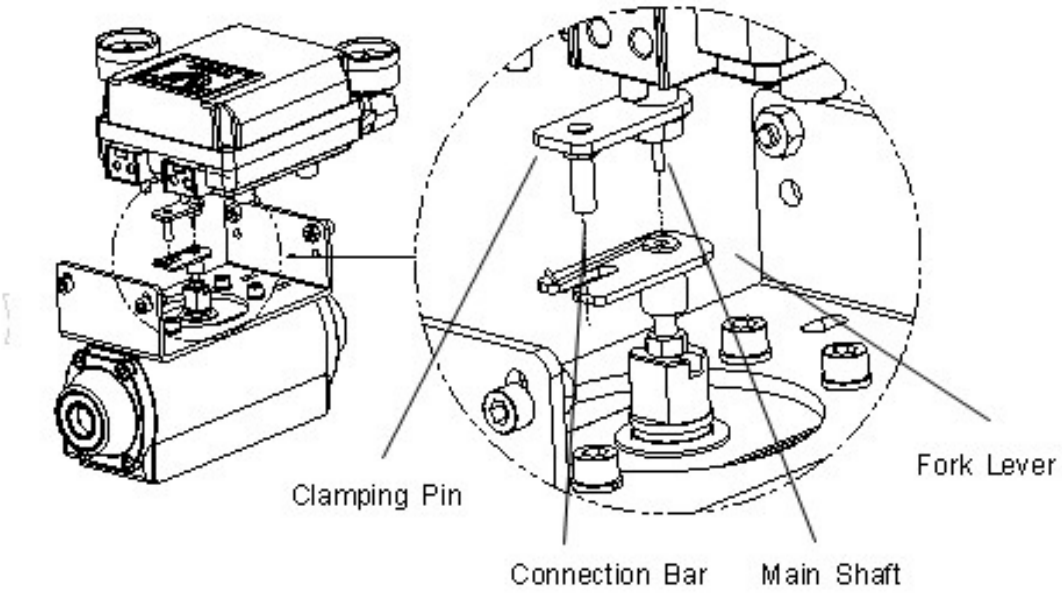
4. Install the fork lever as shown in <fig11> after setting actuator stem at zero point. Check the direction of the actuator stem – clockwise or counter-clockwise. Installation angle of the fork lever should be 45 degrees based on the linear shaft. For NAMUR shaft, the angle does not matter.



<Figure 11>

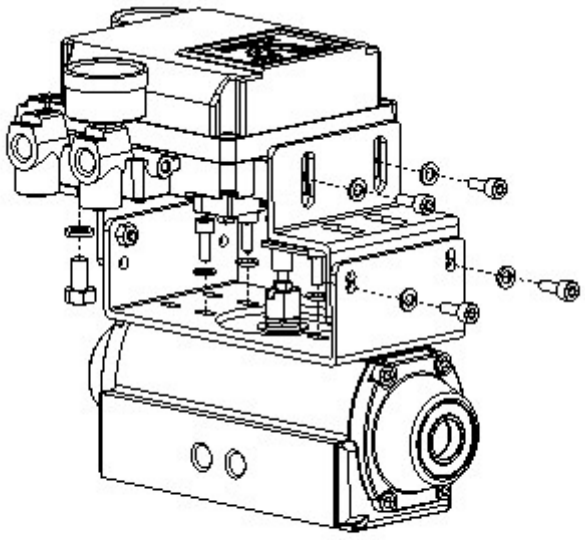
5. After setting fork lever position, lock nuts which are assembled on bottom of the fork lever.

6. Attach YT-1200R to the bracket. Fix the damping pin on the main shaft of YT-1200R and insert connection bar into the fork lever slot, so it can be locked to the fork lever spring. This sets the alignment of the main shaft of YT-1200R and center of the actuator stem. Bad alignment of the main shaft and the actuator stem lowers YT-1200R's durability, because too much force will be on the main shaft of YT-1200R. <fig 12>



<Figure 12>

7. Tighten YT-1200R base and the bracket with hexagon-headed bolts and plate washer. It is recommended to tighten four bolts after checking YT-1200R's position. <fig 13>



<Figure 13>

Piping Connection

Note

- To avoid entering moisture, oil, or dust into the product, please carefully make selection of supply pressure compressor.
- It is recommended to attach air filter regulator <YT-200> before supply port of YT-1200.

Supply Pressure Condition

① Dry air with at least 10℃ lower than ambient temperature.

② Avoid from dusty air. Filter can only sort 5 micron or larger.

③ Avoid any oil.

④ Comply with ANSI/ ISA-573 1975(R1981) and ISA S73-1975(R1981).

⑤ Not to be used beyond the range of 1.4 – 7 kgf/cm^2 (140 – 700 kPA).

⑥ Set air filter regulator's supplied pressure 10% higher than actuator's spring range pressure.

Pipe Condition

① Make sure inside of pipeline is emptied.

② Do not use pipeline that has been squeezed or has hole.

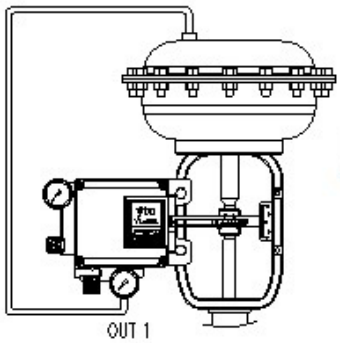
③ To maintain flow rate, use the pipeline that has more than 6mm inner diameter. (10mm outer diameter)

④ Do not use extremely long pipeline system. It may affect flow rate due to the friction inside of the pipeline.

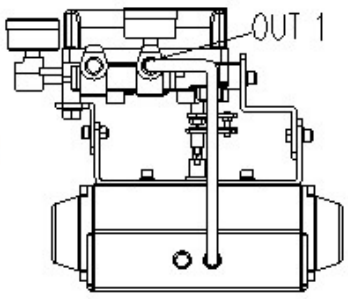
Piping connection with actuator

- Single Acting Actuator

  YT-1200 series single acting type is set to use OUT1 port. OUT1 port should be connected with supply pressure port from actuator when using single acting type of spring return actuator. <fig 14 & 15>



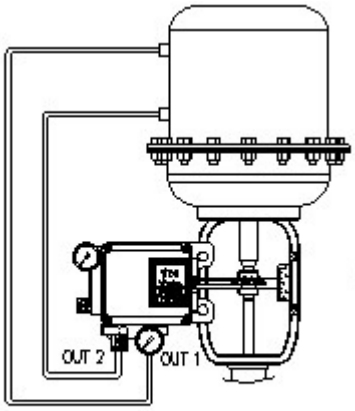
<Figure 14: YT-1200L>



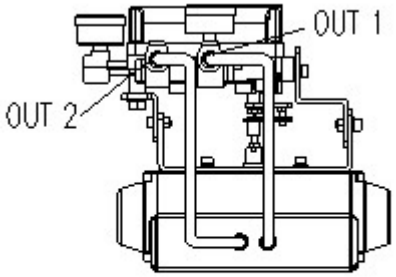
<Figure 15: YT-1200R>

- Double Acting Actuator

  For YT-1200 series double acting type, when inputting current signal, supply pressure is our from OUT1 port. Please refer to <fig 16 & 17>



<Figure 16: YT-1200L>



<Figure 17: YT-1200R>

Adjustment

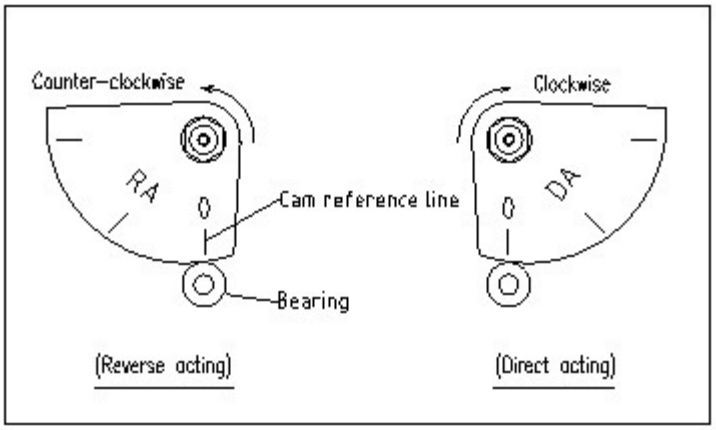
Adjustment – Cam

① Direction of actuator's stem rotation must be checked when supply signal is supplied. When actuator's stem rotates clockwise, the face of cam must be shown "DA." On the other hand, when the stem rotates counter-clockwise, adjust cam so "RA" shows on the face of cam.

② Check whether actuator's angle is at the initial point.

③ After checking the initial point, release the hexagonal flange nut and adjust the position of the bearing so it is at 0 point. <Figure 18>

④ When produced, the cam is set as RA.

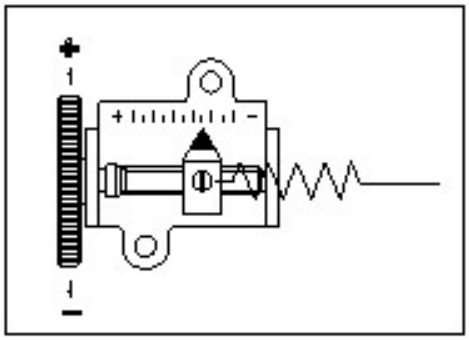


<Figure 18>

Adjustment – Zero Point

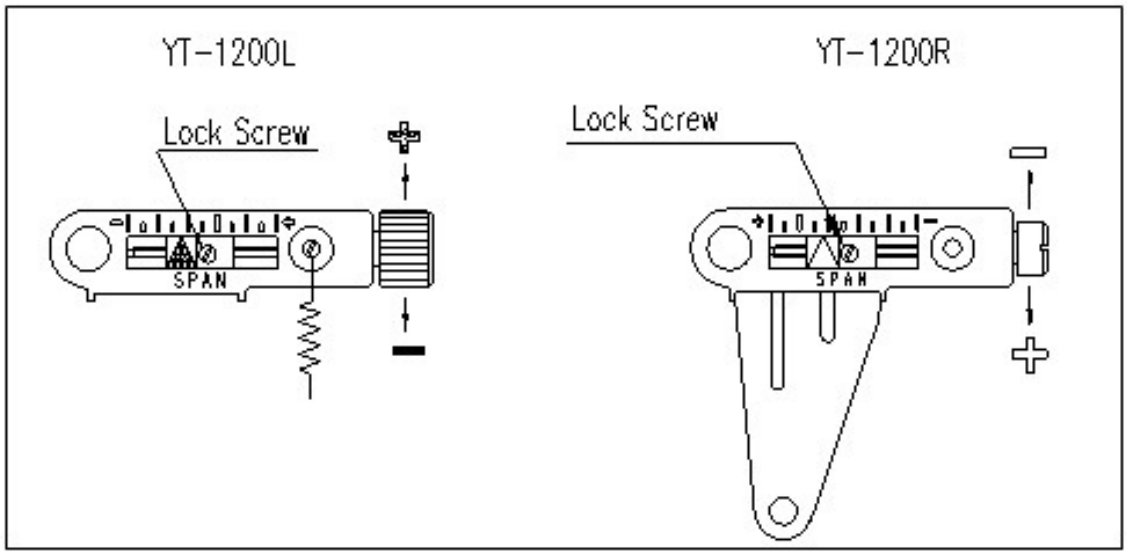
① Set supply signal at 3 psi and rotate adjuster clockwise or counter-clockwise to adjust actuator's rotation angle. <Figure 19>

② When adjusting zero for single actuator, rotation angle is equal to positioner's pressure gauge.



<Figure 19>

Adjustment – Span



<Figure 20>

① After setting zero, rotate Span screw so supply signal reaches at the span point on the indicator.

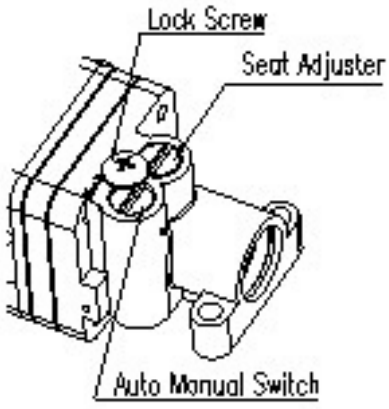
② Changing span point affects zero point setting. So zero setting must be set again. After setting zero point, confirm the span point. This step must be repeated until both points are properly set.

③ If 1/2 split range is used, YT-1200L can be used after span and zero point are set. For YT-1200R with 1/2 split range, the span spring must be changed.

④ After setting is completed, tighten Lock Screw. <Figure 20>

Adjustment – A / M Switch <Auto / Manual>

1. A / M switch adjusts the valve operation to automatic or manual.
2. YT-1200 series is set as "A" / Automatic as default. If user wants to set as "M" / Manual, the setting can be adjusted by turning the switch counter-clockwise. <fig 21>
3. If the setting is at "M", the air pressure will be supplied to the actuator directly. Always set the setting back to "A" after any change.
4. If OUT2 in single acting actuator or double acting actuator is used, A / M switch will not operate.



<Figure 21>

Adjustment – Seat Adjuster

① Seat adjuster is set according to the customer's request before the positioned is delivered. Please do not adjust the seat adjuster.

② Seat adjuster is used for double acting actuator. Please do not touch the seat adjuster, because it can affect the positioner's performance.

Troubleshooting

- **Positioner does not respond to the input signal.**
  - ① Check supply pressure level. The level must be at least 1.4 kgf/cm^2
  - ② Check if input signal is properly supplied to the positioned. The signal should be 3-15 psi.
  - ③ Check if the positioner's nozzle has been blocked. Also, check if the pressure is supplied to the positioned and the pressure is being exhausted through the nozzle. If the nozzle has been blocked by any substances, please send the unit to YTC for repair.
  - ④ Check if feedback lever has been installed properly.
- **The pressure of OUT1 reaches exhausting pressure level and does not come back down.**
  - ① Check A / M switch. If the switch has been damaged, replace the switch or pilot relay valve.
  - ② Check for a gap or damages between the nozzle and the flapper. If damaged, please send the unit to YTC for repair.
- **The pressure is exhausted only by A / M switch.**
  - ① Check if the positioner's nozzle has been blocked. Also, check if the pressure is supplied to the posiioner and the pressure is being exhausted trough the nozzle. If the nozzle has been blocked by any substances, please send the unit to YTC for repair.
- **Hunting occurs.**
  - ① Check if safety spring has been displaced. <Next to pilot relay valve>
  - ② Check if the size of actuator is too small. If so, insert an orifice in order to reduce the pressure flow rate.
  - ③ Check if there is any friction between the valve and the actuator. If so, increase actuator's size or reduce the friction level.
- **Actuator only operates by on / off.**
  - ① Check pipe connection
  - ② Check cam direction
- **Linearity is too low.**
  - ① Check if the feedback lever is properly installed. Especially check if the feedback lever is parallel to the around at 50% point.
  - ② Check if zero and span has been properly adjusted, that is not too low or not too

high.

③ Check if supply air pressure level is stable from the regulator. If the level is unstable, replace the regulator.

- **Hysteresis is too low.**

① In case of double acting actuator, check if seat adjustment has been properly done. Please contact YTC for any further inquiries regarding the seat adjustment.

② Backlash can occur when feedback lever and lever spring is loosen. To avoid backlash, adjust the lever spring.

③ Check if the connection bar to the feedback lever is tightly fastened.

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