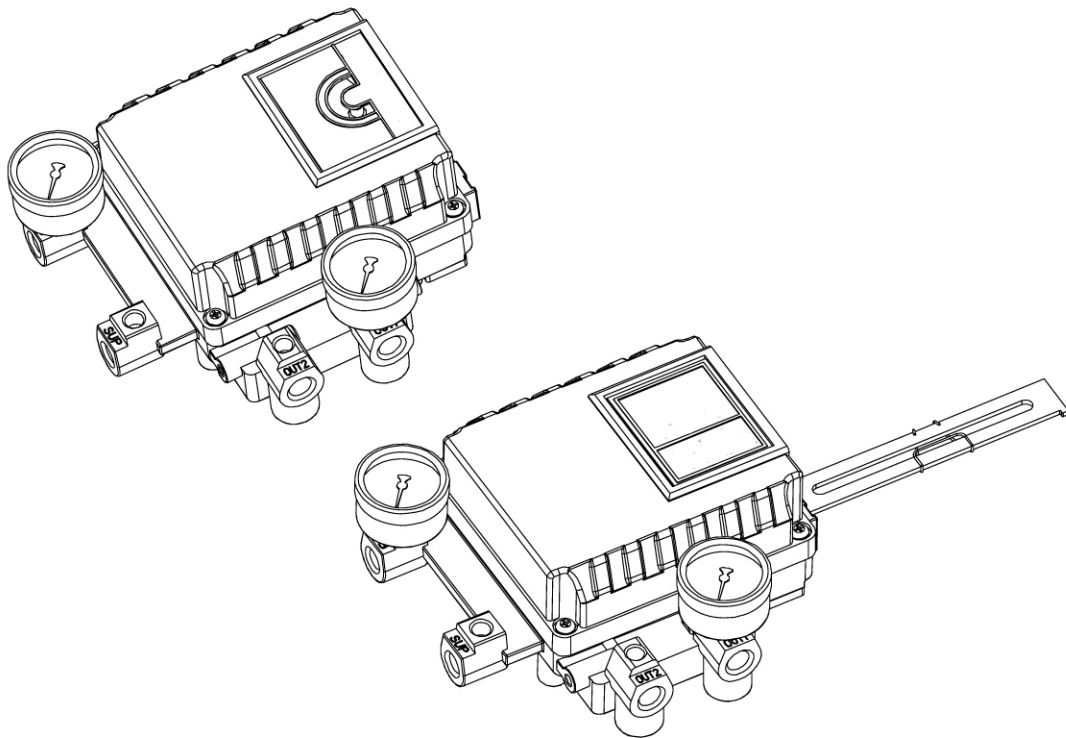


Pneumatic Positioner
PNY Series

USER'S MANUAL



Max-Air Technology
Version 1.0

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Introduction

Thank you for choosing a Max-Air Technology product. Each product is fully inspected after production to offer you the highest quality. In order to fully utilize the product, we strongly recommend users to read this manual carefully and thoroughly.

- This manual should be given to the end user.
- This manual may be changed or revised without any prior notice. Any changes in product's specification, structure, and/or any components may not result in an immediate, revised version of the manual.
- The manual should not be duplicated or reproduced for any purpose without approval from Max-Air Technology, Inc.

Manufacturer Warranty

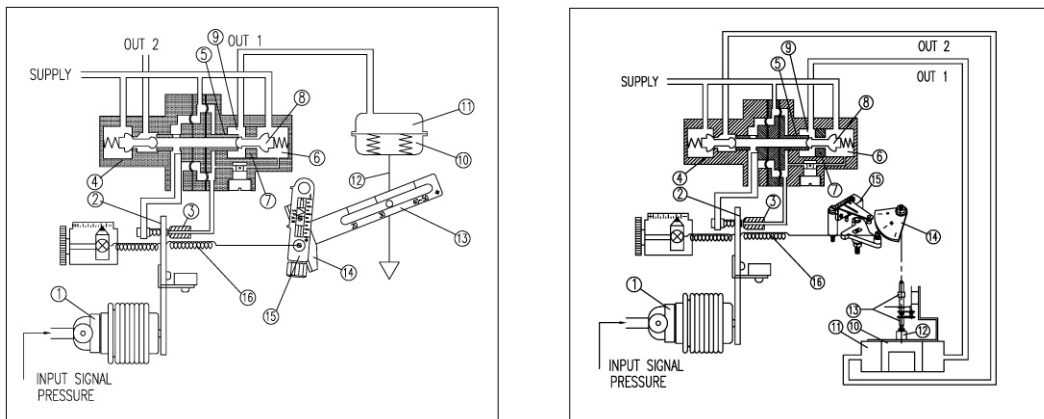
- For safety, it is imperative to follow instructions in the manual. It is not the manufacturer's liability for any damages caused by user negligence.
- It is not the manufacturer's liability for any damages or accidents resulting from any alteration or modification of the product and parts. If alteration or modification is necessary, please contact the manufacturer directly.
- The manufacturer warrants the product from the date of original retail purchase of the product for one (1) year, except as otherwise stated.
- The manufacturer warranty will not cover products that 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 occur in shipment, due to an act of God, failure due to power surge, and cosmetic damage. Improper or incorrectly performed maintenance or reports void this Limited Warranty.

Product Description

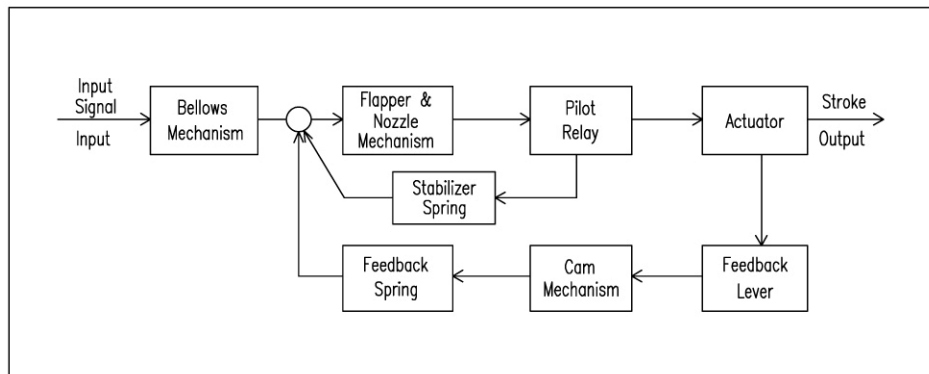
Main Features and Functions

- Normal operation in very extreme environments, such as vibration.
- Proven durability from over 1 million test cases.
- Very short and accurate response times.
- A simple part change can set 1/2 Split Range.
- Product is economical due to less air-consumption.
- Direct/Reverse action can be set easily.
- Zero & Span adjustment process is simple.
- Feedback Connection is easy.

Operation Logic



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



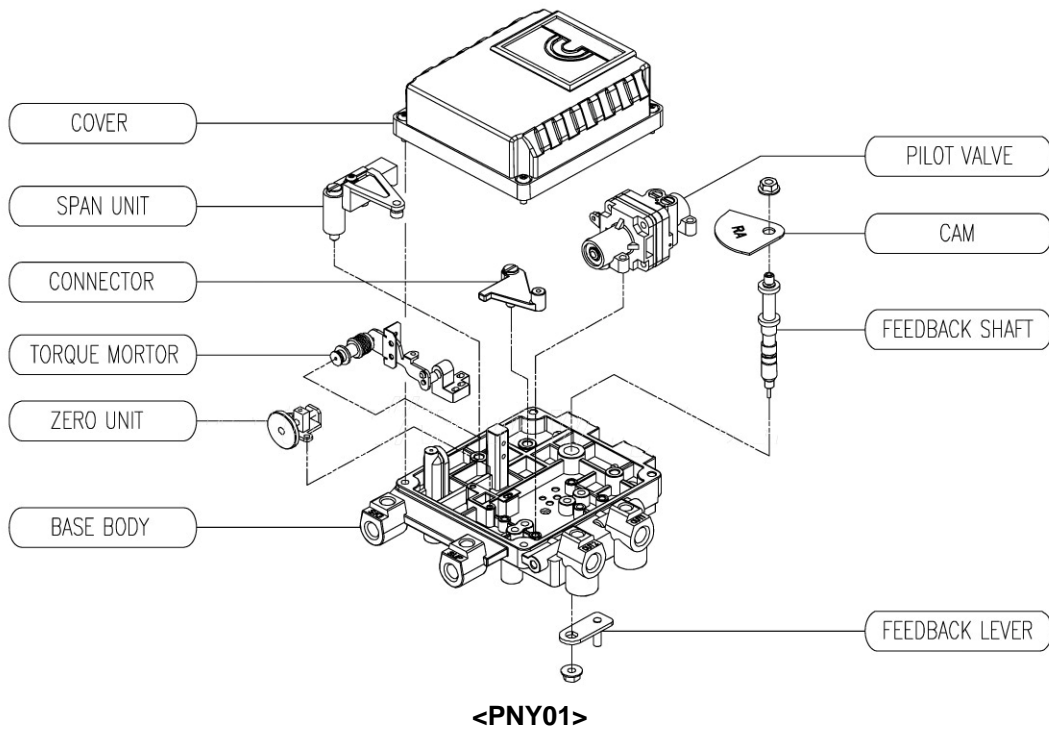
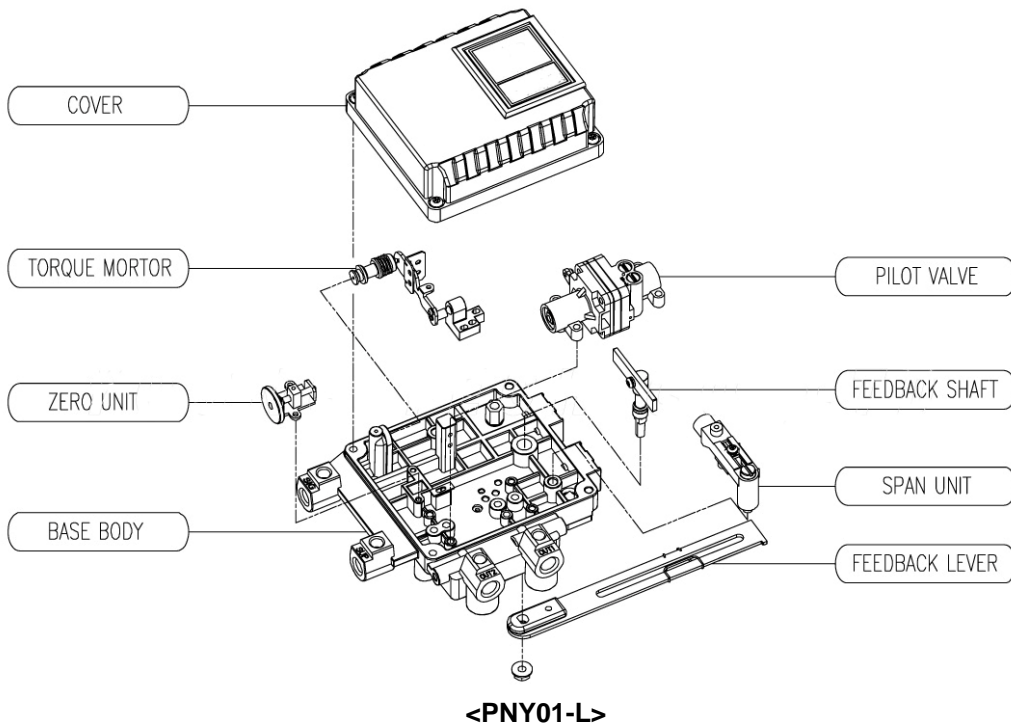
<Figure 1>

Specification

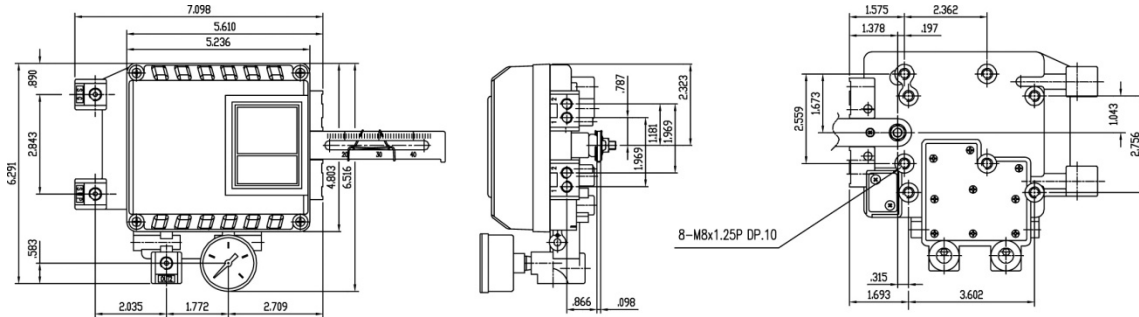
Category	PNY01-L		PNY01	
	Single	Double	Single	Double
Input Signal	3~15 psi			
Supply Pressure	20~100 psi			
Stroke	0.4 ~ 5.9 in		0~90°	
Air Connection	PT (NPT) 1/4			
Gauge Connection	PT (NPT) 1/8			
Protection	IP66			
Cam	Linear			
Ambient Temp	Standard: -4~158°F High: -4~248°F Low: -40~158°F			
Linearity	±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	0.11 CFM (Sup=20 psi), 0.39 CFM (Sup=57 psi)			
Flow Capacity	2.8 CFM (Sup=20 psi), 7.1 CFM (Sup=57 psi)			
Material	Aluminum Diecasting			
Weight	3.7 lbs			

* Test under ambient temperature of 68°F, absolute pressure of 1 atm, and humidity of 65%. Please contact us for the more detailed specification.

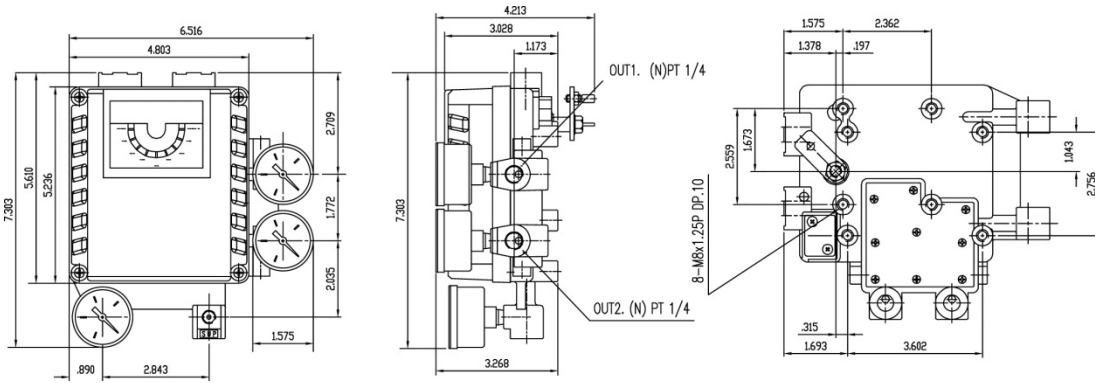
Parts and Assembly



Dimensions



<PNY01-L Dimensions>



<PNY01 Dimensions>

Installation

Safety Warning

- When installing the positioner, please ensure to read and follow the safety instructions.
- All input and supply pressure to the valve, actuator, and other related devices must be turned off.
- Use a 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 (+) & (-)
- (3) Spanners for hexagonal-head bolts

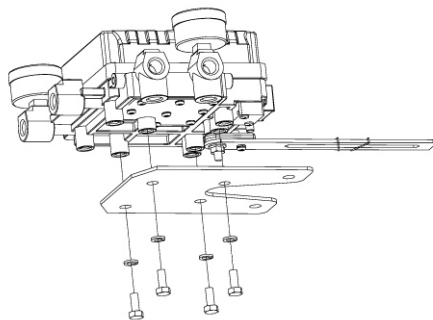
PNY01-L installation

PNY01-L should be installed on linear motion valves such as a globe valve or gate valve using a spring return type diaphragm or piston actuator. Before installation, be sure to check for the following installation components.

- (1) PNY01-L main body
- (2) Feedback lever and lever spring
- (3) Flange nut (bottom side of PNY01-L)
- (4) 4 pcs. of hexagon head bolts (M8 X 1.25P)
- (5) 4 pcs. of M8 plate washer

Installation Steps

- (1) A proper bracket must be made in order to attach the positioner to the actuator yoke.
Please consider the following when making a bracket.
 1. The feedback lever should be leveled at 50% of the valve stroke. (Refer to Step 7)
 2. The feedback lever connection bar of actuator clamp should be installed at the position where the valve stroke and numbers indicated on the feedback lever must be fitted. (Refer to Step 8)
- (2) Attach PNY01-L to the bracket, which was produced in the earlier step, by using bolts. <Figure 1>
Please refer to backside of the product for the correct bolt size. The standard size of bolt is M8 X 1.25P, and other bolt sizes are available.

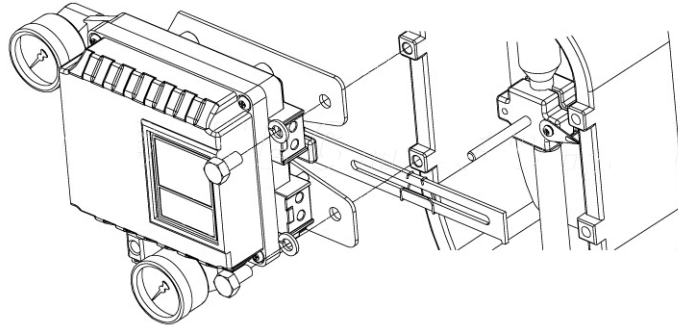


<Figure 1>

- (3) Attach PNY01-L (with bracket) to the actuator yoke

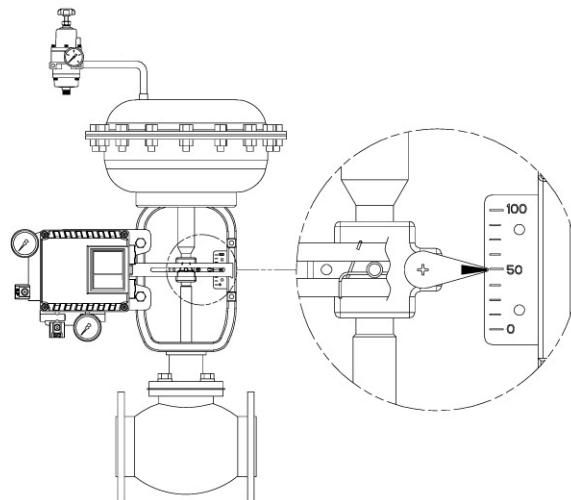
-DO NOT TIGHTEN COMPLETELY.

- (4) Connect the PNY01-L feedback lever to the actuator clamp. The gap on the PNY01-L feedback lever is 0.256 in. The connection bar thickness should be less than 0.248 in. <Figure 2>



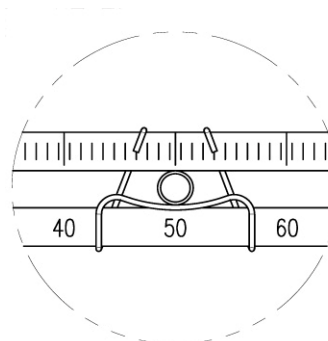
<Figure 2>

- (5) Connect the air filter regulator to the actuator temporarily. Set the supply pressure of the regulator in order to position the actuator clamp at 50% of the valve stroke. <Figure 3>

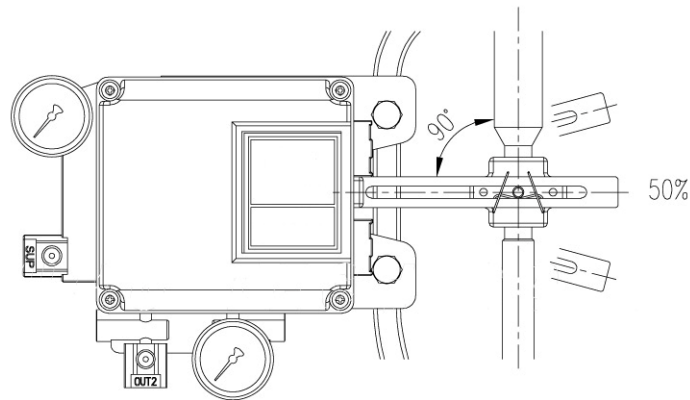


<Figure 3>

- (6) Insert the connection bar into the PNY01-L feedback lever. The connection bar should be inserted at the 50% point on the feedback lever, which helps to reduce hysteresis. <Figure 4>

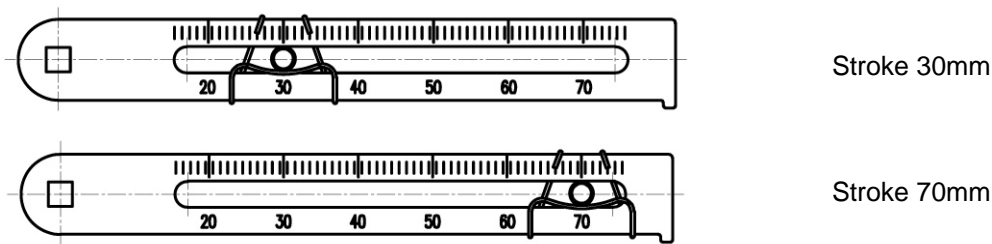


- (7) If the connection bar does not point at the 50% point, then adjust the bracket or feedback link bar position. Failure to position at 50% lowers the linearity of the positioner. <Figure 5>



<Figure 5>

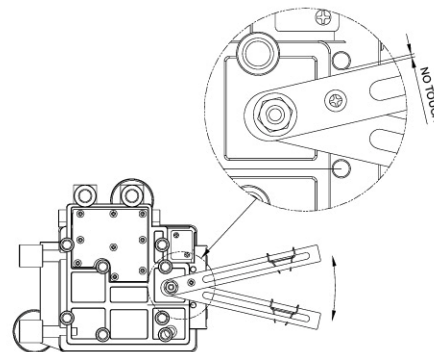
- (8) Check the valve stroke. The stroke numbers are indicated on the feedback lever. Position the connection bar at the number on the feedback lever according to the valve stroke. <Figure 6> To adjust, move the bracket or connection bar.



<Figure 6>

Note

After installing PNY01-L, operate the valve from 0% to 100% stroke by using an air filter regulator on the actuator. At both 0% and 100%, the feedback lever should not touch the lever stopper, which is located on the backside of PNY01-L. <Figure 7> If the feedback lever touches the lever stopper, PNY01-L should be installed further away from the center of the yoke.



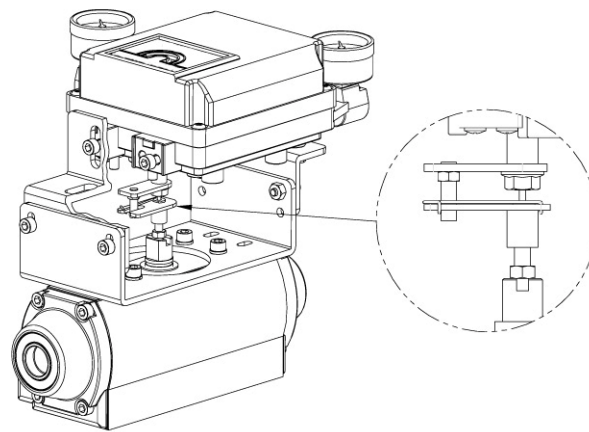
- (9) After proper installation, tighten all of the bolts on the bracket, the feedback lever, and the connection bar.

PNY01 Installation

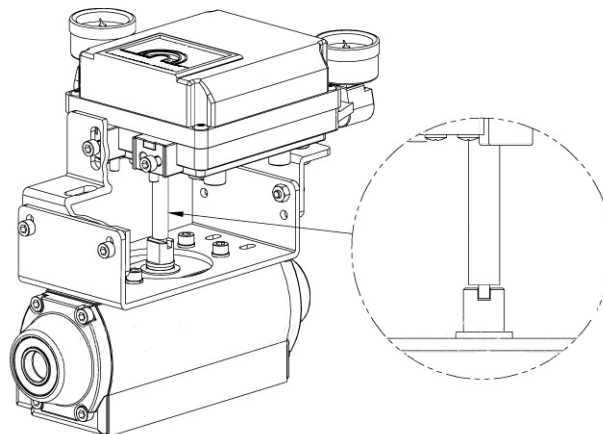
PNY01 should be used for rotary motion valves, that is ball valves, butterfly valves using a rack and pinion, scotch yoke or complex type actuators, with stems that rotate 90 degrees. Before installation, be sure to check for following installation components.

1. PNY01 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

PNY01 Install Layout



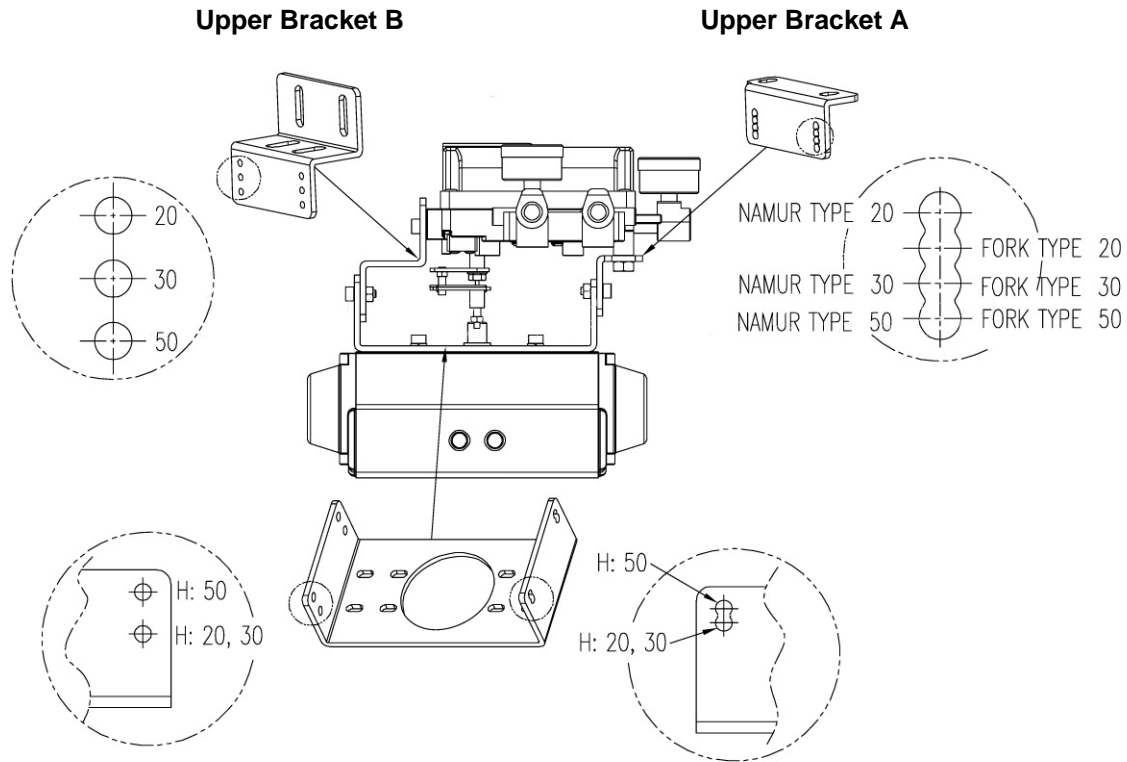
PNY01 on Fork Lever



PNY01 on NAMUR Lever

Bracket Information

PNY01 is supplied with a standard bracket. The bracket can be used for the Fork lever and the NAMUR bracket. Please see <Figure 8> for more detailed information.



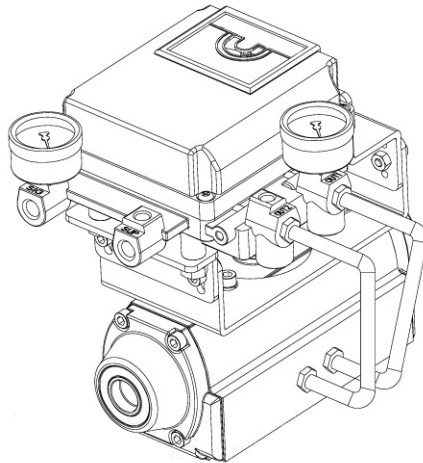
<Figure 8>

- (1) Standard actuator stem height (H) is 0.787, 1.181, or 1.969in. After checking "H", assemble with the bracket as shown in <Figure 8 & 9>



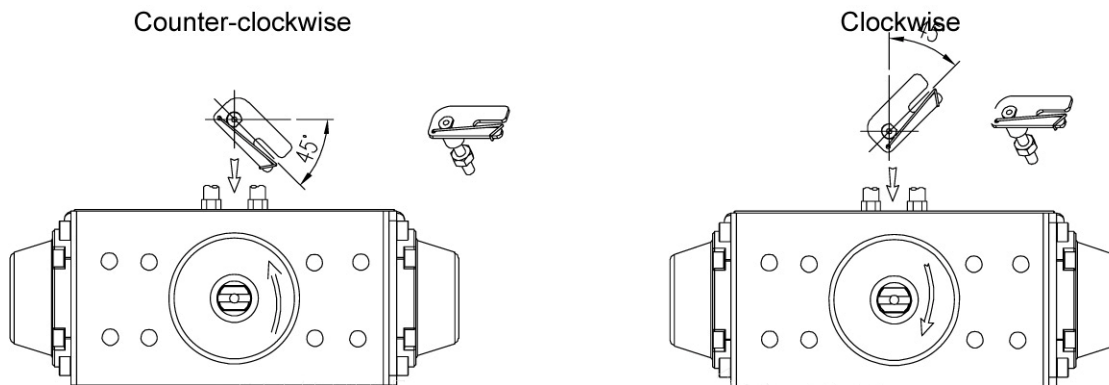
<Figure 9>

- (2) Attach bracketed PNY01 to the actuator by using hexagon-headed and wrench bolts. The size of the bracket hole is 0.236in. When tightening bolts, use spring washers or an equivalent fastener for firm attachment to the actuator, so PNY01 will not shake by vibration or any other impact. The direction of bracket is different by the operating condition, but normally, the positioner is installed as shown in <Figure 10>.



<Figure 10>

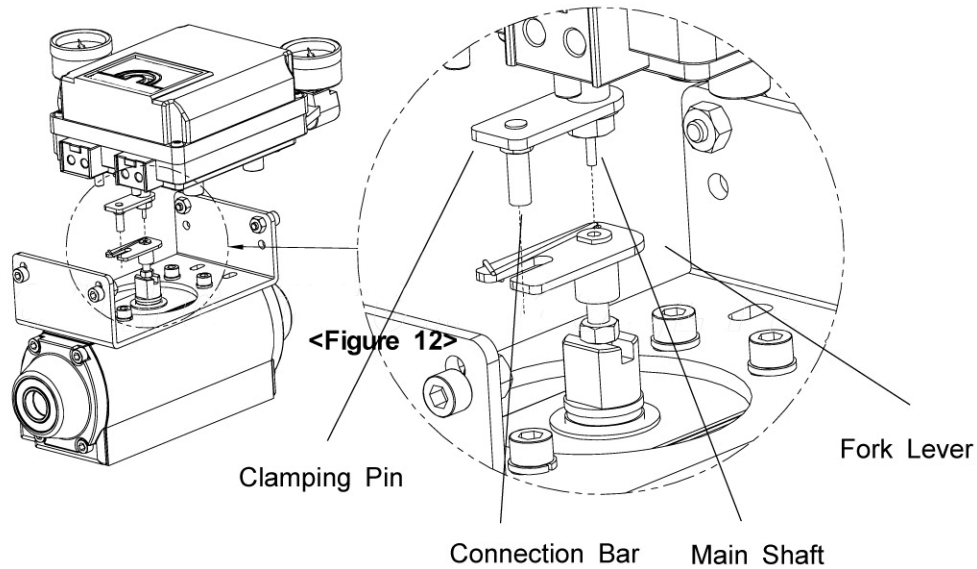
- (3) Set the rotation position of the actuator stem at zero point, "0%." For a single type of actuator, it is easy to check the zero point, because the actuator stem is positioned at zero point when there is no supply pressure. If a double acting actuator is used, check the actuator stem's rotation direction (clockwise or counter-clockwise) by supplying pressure.
- (4) Install the fork lever as shown in <Figure 11> after setting actuator stem at the zero point. Check the direction of the actuator stem - clockwise or counter-clockwise. The installation angle of the fork lever should be 45 degrees based on the linear shaft. For NAMUR shaft, the angle does not matter.



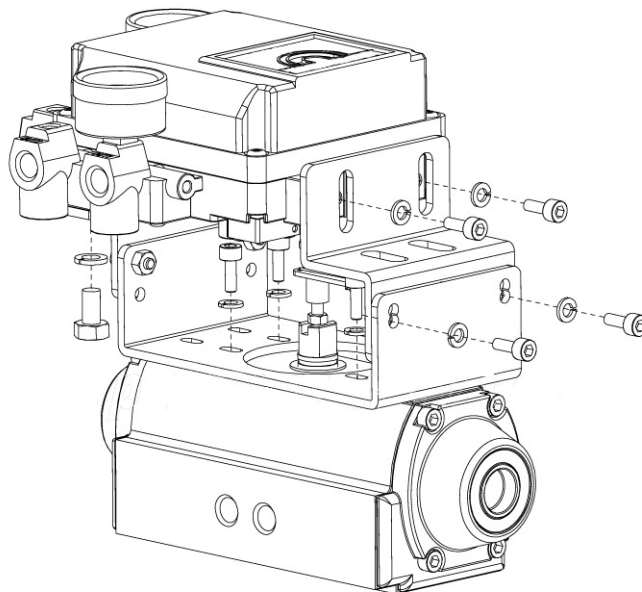
<Figure 11>

- (5) After setting the fork lever position, tighten the nuts which are assembled on bottom of the fork lever.

- (6) Attach PNY01 to the bracket. Fix the clamping pin on the main shaft of PNY01 and insert the 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 PNY01 and center of the actuator stem. Bad alignment of the main shaft and the actuator stem lowers PNY01's durability, because too much force will be on the main shaft of PNY01. <Figure 12>



- (7) Tighten the PNY01 base and the bracket with hexagon-headed bolts and plate washers. It is recommended to tighten four bolts after checking PNY01's position. <Figure 13>



<Figure 13>

Piping Connection

Note

- To avoid moisture, oil, or dust entering into the product, make sure to carefully select the air supply compressor.
- It is recommended to attach air filter regulator before supply port of PNY01.

Supply Pressure Condition

1. Dry air with at least 50°F lower than ambient temperature.
2. Avoid dusty air. Filters can only sort 5 microns or larger.
3. Avoid any oil.
4. Comply with ANSI/ISA-57.3 1975(R1981) ISA S7.3-1975(R1981).
5. Not to be used beyond the range of 20 – 100 psi.
6. Set the air filter regulator's supplied pressure 10% higher than actuator's spring range pressure.

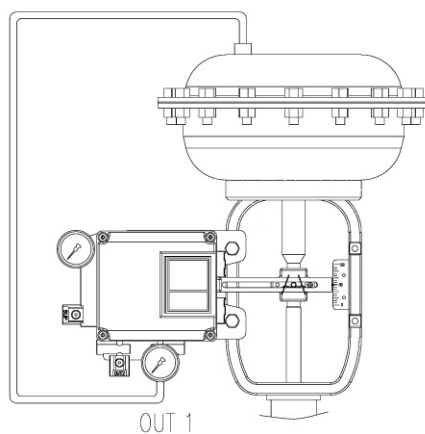
Pipe Condition

1. Make sure the inside of the pipe is emptied.
2. Do not use pipeline that is squeezed or has holes.
3. To maintain the flow rate, use pipeline that has more than a 0.236 in inner diameter. (0.394 in outer diameter)
4. Do not use an extremely long pipeline system. It may affect the flow rate due to the friction inside of the pipeline.

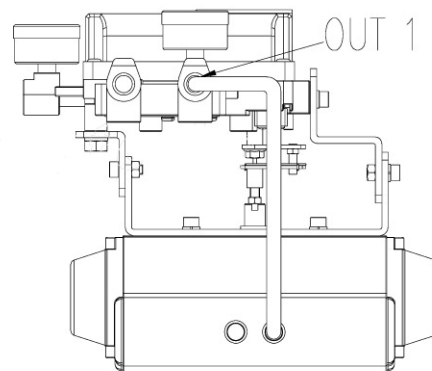
Piping connection with actuator

Single acting actuator

The PNY series single acting type is set to use the OUT1 port. The OUT1 port should be connected with the supply pressure port from actuator when using a single acting type spring return actuator. <Figure 14 & 15>



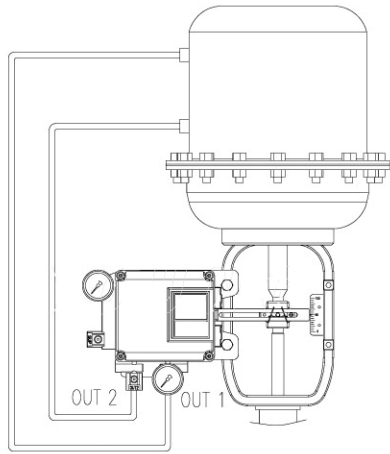
<Figure 14: PNY01-L>



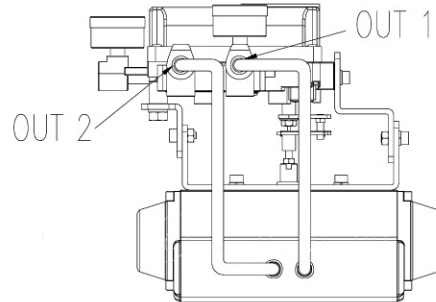
<Figure 15: PNY01>

Double acting actuator

For the PNY series double acting type, when inputting a current signal, the supply pressure is out from OUT1. Please refer to <Figure 16 & 17>



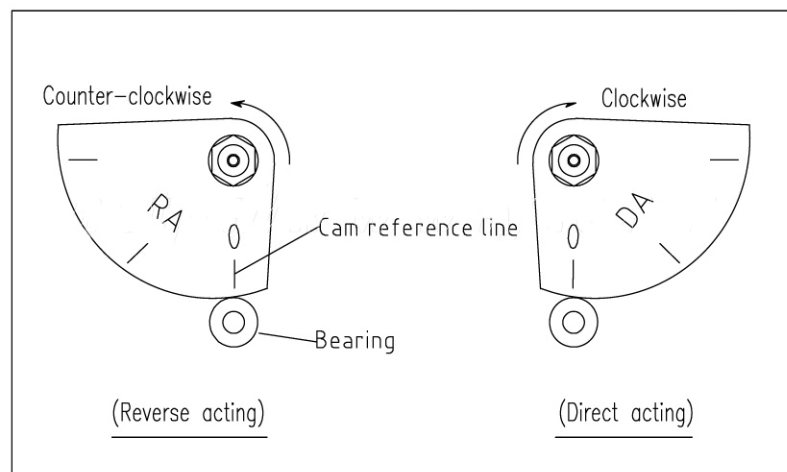
<Figure 16: PNY01-L>



<Figure 17: PNY01>

Adjustments**Adjustment - Cam**

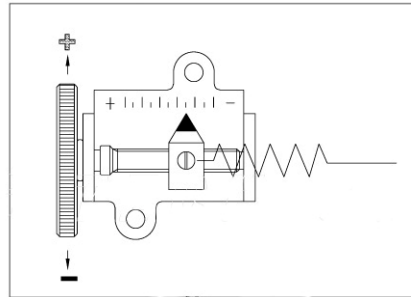
1. The direction of the actuator's stem rotation must be checked when the supply signal is supplied. When the actuator's stem rotates clockwise, the face of the cam must show "DA." Similarly, when the stem rotates counter-clockwise, adjust the cam so "RA" shows on the face of cam.
2. Check whether the 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 the 0 point. <Figure 18>
4. When produced, the cam is set as RA.



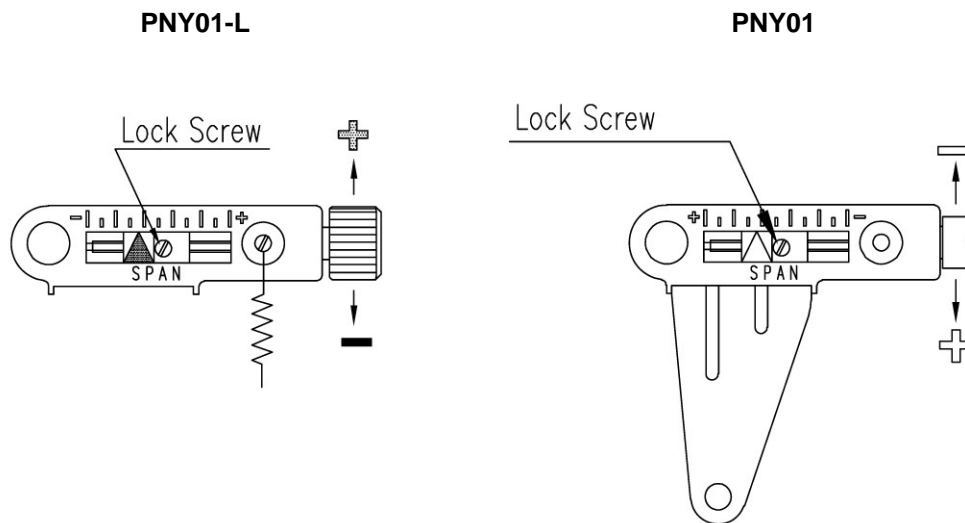
<Figure 18>

Adjustment - Zero Point

1. Set the supply signal at 3 psi and rotate the adjuster clockwise or counter-clockwise to adjust the actuator's rotation angle. <Figure 19>
2. When adjusting the zero for a single actuator, the rotation angle is equal to the positioner's pressure gauge.



<Figure 19>

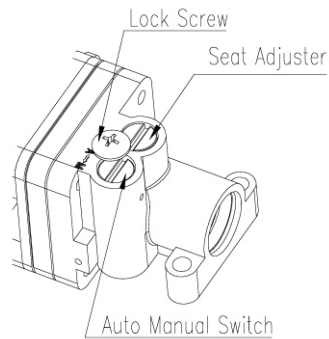
Adjustment - Span

<Figure 20>

- (1) After setting the zero, rotate the Span screw so the supply signal reaches the span point on the indicator.
- (2) Changing the span point affects the zero point setting. So, the zero setting must be set again. After setting the zero point, confirm the span point. This step must be repeated until both points are properly set.
- (3) If a 1/2 split range is used, PNY01-L can be used after the span and zero point are set. For PNY01 with a 1/2 split range, the span spring must be changed.
- (4) After setting is complete, tighten the Lock Screw. <Figure 20>

Adjustment - A/M Switch (Auto/Manual)

1. The A/M switch adjusts the valve operation to automatic or manual.
2. When produced, the PNY series is set at "A(Automatic)". If the user prefers the positioner's setting as "M(Manual)," the setting can be changed by turning the switch counter-clockwise. <Figure 21>
3. If it is set as "M(Manual)", the air pressure will be supplied to the actuator directly. Always set back to "A(Automatic)" after a setting change.
4. If the OUT2 in a single acting actuator or double acting actuator is used, the A/M Switch will not operate.



<Figure 21>

Adjustment - Seat Adjuster

1. The Seat Adjuster is set according to the customer's request before the positioner is delivered. Please do not adjust the Seat Adjuster.
2. The Seat Adjuster is used for double acting actuator always. 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 the supply pressure level. The level must be at least 20 psi.
- (2) Check if the input signal is properly supplied to the positioner. 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 positioner and the pressure is being exhausted through the nozzle. If the nozzle has been blocked by any substances, please send the product to Max-Air Technology for repair.

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

- (1) Check the 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 Max-Air Technology 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 Max-Air Technology for repair.

► **Hunting occurs.**

- (1) Check if the safety spring has been displaced. (Next to Pilot relay valve)
- (2) Check if the size of the 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 the actuator's size or reduce the friction level.

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

- (1) Check the pipe connection.
- (2) Check the 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 ground at the 50% point.
- (2) Check if the zero and span have been properly adjusted, that is not too low or not too high.
- (3) Check if the 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 a double acting actuator, check if the seat adjustment has been properly done. Please contact Max-Air Technology for any further inquiries regarding the seat adjustment.
- (2) Backlash can occur when the feedback lever and lever spring are loose. To avoid backlash, adjust the lever spring.
- (3) Check if the connection bar to the feedback lever is tightly fastened.

MAX-AIR TECHNOLOGY

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