CONVALVE

SPECIALIST IN VALVE AUTOMATION

ELECTRO - PNEUMATIC POSITIONER
USER MANUAL

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REVISION NO: 01

INTRODUCTION

The YT-1000R & YT-1000L are sophisticated electro pneumatic valve controllers designed to work with both single and double acting rotary or linear actuators they offer a versatile solution that requires no additional parts to switch between these types of actuators or from direct to reverse acting

Key features of the YT-1000R & YT-1000L valve controllers include:

- Corrosion-resistant coated aluminum die-cast housing, ensuring durability and resilience in harsh environments.
- Innovative Pilot Valve design, which reduces air consumption by more than 50%, contributing to energy efficiency.
- Vibration-resistant design that maintains superior performance even in poor conditions, with no resonance effects from 5 to 200Hz.
- Optional gauges and offices, providing additional monitoring and control capabilities to meet specific application requirements.
- Overall the YT-1000R & YT-1000L valve controllers offer reliability efficiency and adaptability for a wide range of electro-pneumatic valve control applications

TRANSPORTATION AND STORAGE

- Convalve recommends storing electro Pneumatic positioner in a clean and dry environment. For optimal storage conditions, it is recommended to store the electro Pneumatic positioner indoors, safeguarding them against adverse weather conditions and other potentially harmful elements. At Convalve, we prioritize the longevity and performance of our products, and these storage guidelines are meant to preserve the electro Pneumatic positioner' functionality and reliability throughout their lifecycle.
- Handling the electro Pneumatic positioner with care is of utmost importance to prevent any scratches, damage, or harm to the environment during transportation. Adequate protection should be provided to ensure the pneumatic positioner remain intact throughout the transportation process.

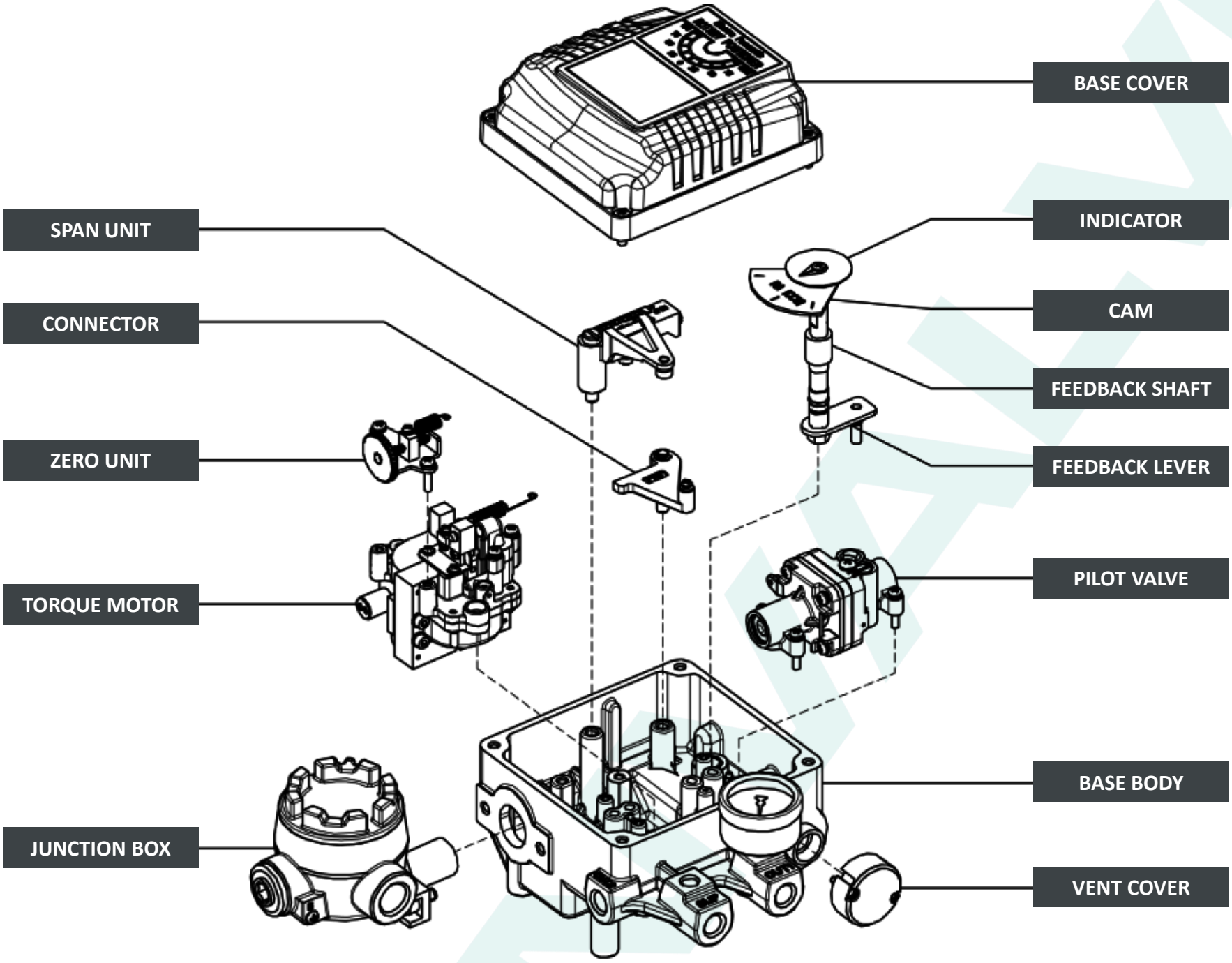
EXPLOSION PROOF WARNING

1. Ensure that the YT-1000 series unit is being used and installed within an explosion-proof certified environment.
2. The YT-1000 series offers two explosion-proof grades: Flameproof - Ex d IIB (IIC) T5 and Intrinsically Safety - Ex ia IIB T6. It is suitable for use in Zone 1 and Zone 2 hazardous areas.
3. When working in areas with explosion gases, use explosion-proof type cables and gaskets during installation.
4. Prior to opening the product's cover, make sure to completely turn off the power to prevent any electrical hazards. Additionally, ensure that there is no remaining power in any nearby electrical components.
5. The YT-1000 series has two ports for power connection. When not in use, a blind plug is required to cover the unused port. Ensure that explosion-proof type wires and packing are used for power connections.
6. Use a cable rug with a surface area of more than 0.195 mm2, along with an M4 spring washer, for connecting the power.
7. For the external ground terminal, utilize a cable rug with a surface area of more than 5.5 mm2.

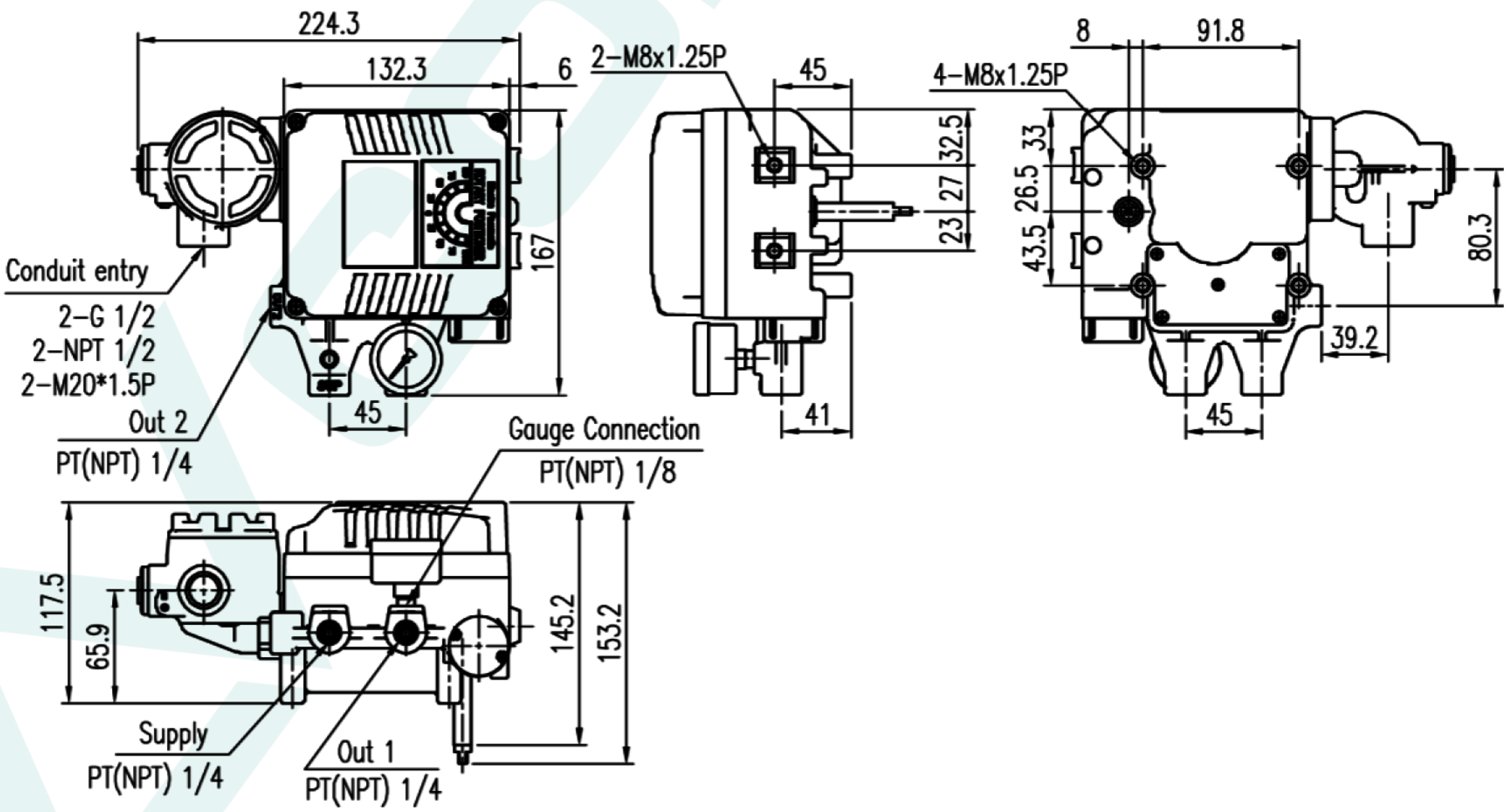
SPECIFICATIONS

INPUT SIGNAL	**4-20mA DC Split Range Available**
SUPPLY PRESSURE	**1,4 to 7 Bar**
STROKE RANGE	**0^0 – 90^0**
CONNECTION	**1/4" NPT 1/8" NPT - Gauges 1/2" NPT Conduit**
PROTECTION	**Dust & Weather Proof (IP66)**
EXPLOSION - PROOF	**ExiaIIBT6, ExdmIIBT6, ExdmIICT6**
OPERATING TEMPERATURE	**-20^0 to $+70^0$ C**
LINEARITY	**+ / - 2% F.S.**
HYSTERESIS	**+ / - 1% F.S.**
SENSITIVITY	**0.5% F.S.**
REPEATABILITY	**+ / - 0.5% F.S.**
AIR CONSUMPTION	**0.19 SCFM / 5,38 l/min**
MAX. FLOW CAPACITY	**7 SCFM / 198,24 l/min**
MATERIAL	**Diecast Aluminum**
WEIGHT	**6.1 Lbs / 2.7 kg**

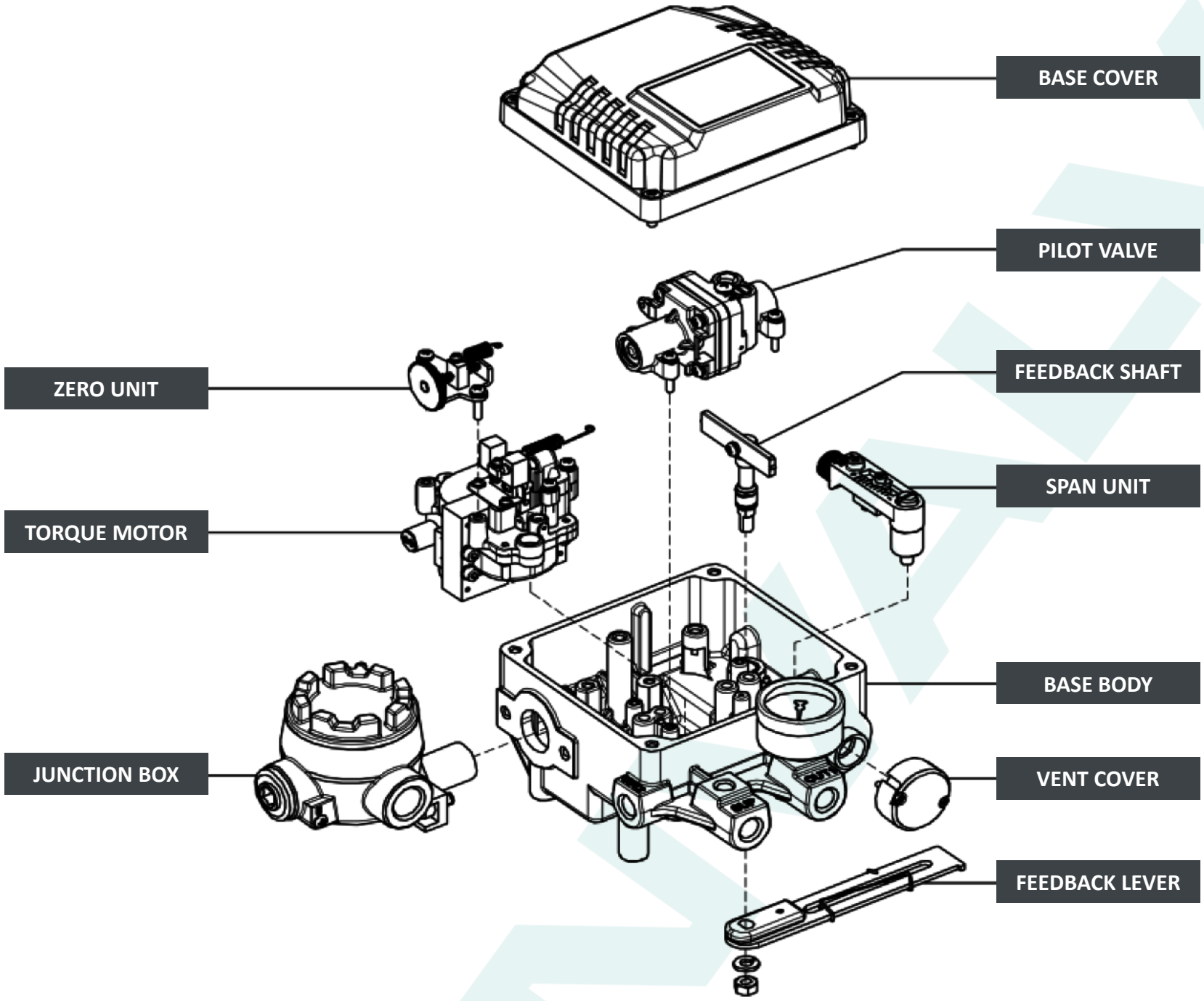
YT-1000R PARTS AND ASSEMBLY



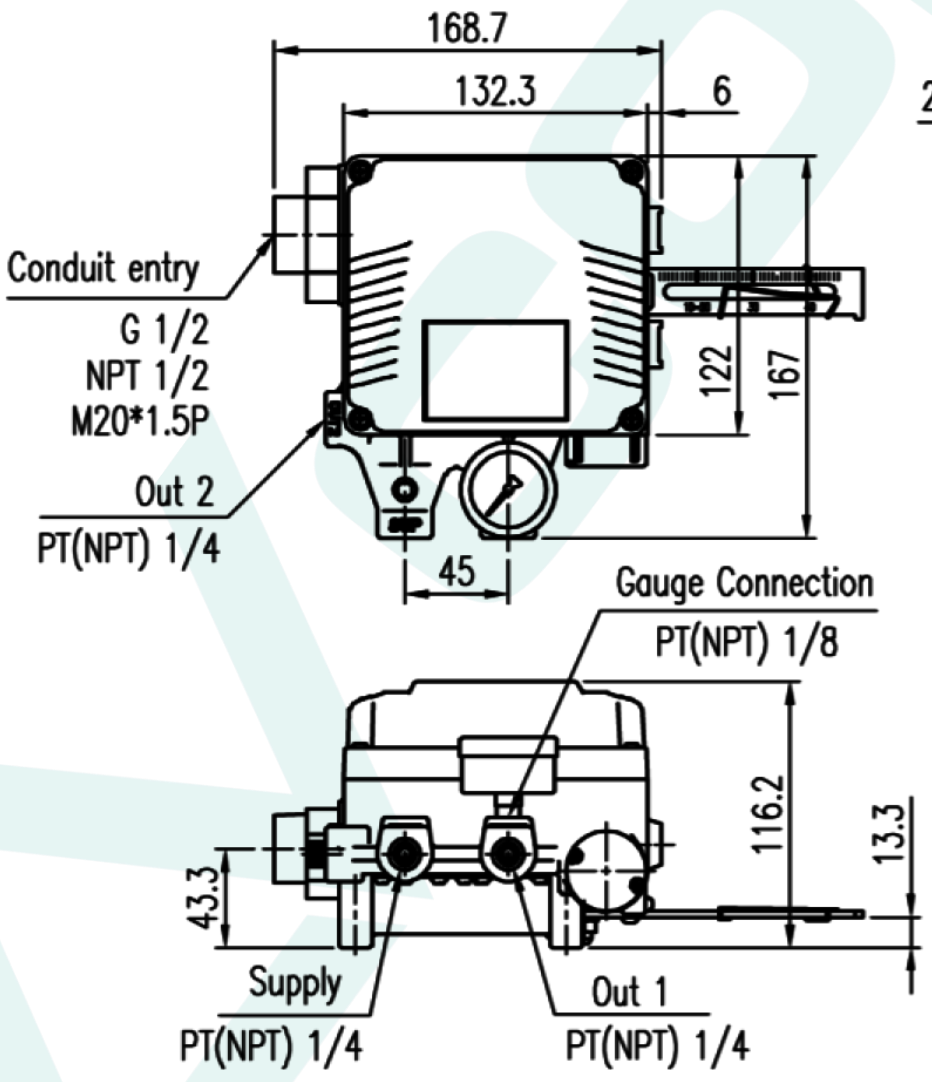
YT-1000R DIMENSION NAMUR TYPE

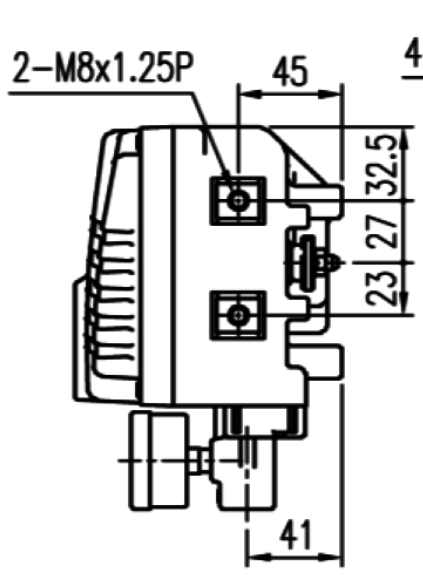


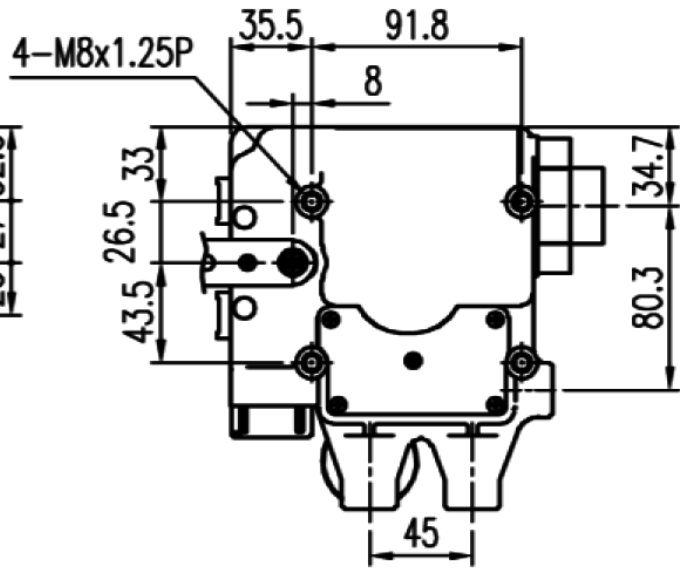
YT-1000L PARTS AND ASSEMBLY



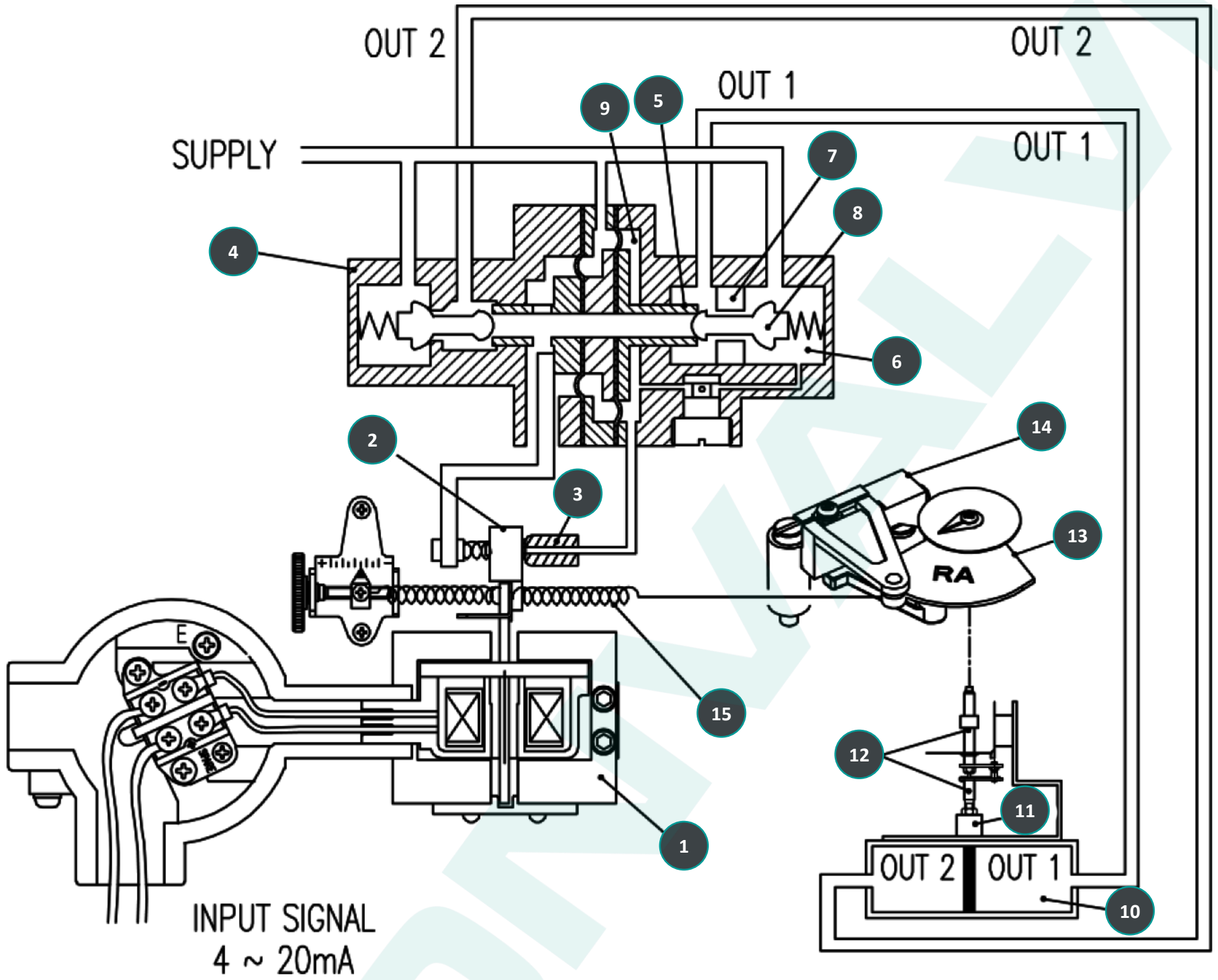
YT-1000L DIMENSION







ROTARY POSITIONER PRINCIPLE OF OPERATION



When an input signal is supplied to the positioner to open the valve, power is generated from the torque motor ①, which pushes the flapper ② to the opposite side of the nozzle ③. As a result, the gap between the nozzle ③ and the flapper ② widens, and air inside the chamber ⑨ from the inner part of the pilot ④, left to the spool ⑤, is exhausted through the nozzle ③.

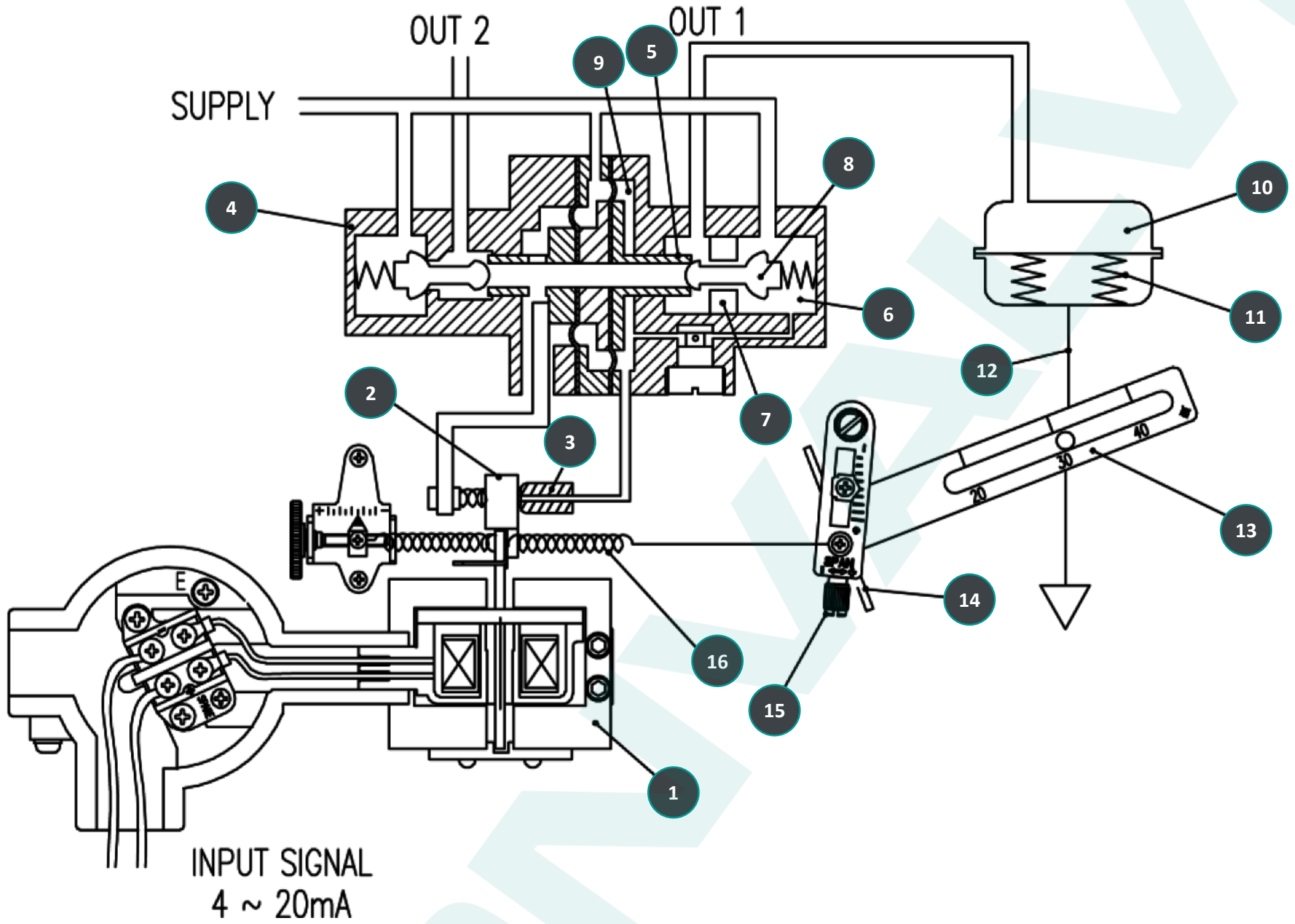
Due to this effect, the spool ⑤ moves to the right. Consequently, the seat ⑦, previously blocked by the poppet ⑧, is pushed away, allowing supplied pressure (air) to flow through the seat and OUT1 Port, entering the chamber ⑩ of the actuator through OUT1. The OUT1 pressure inside the chamber ⑩ will increase, and the actuator's stem ⑪ will rotate, transferring the motion through the feedback shaft ⑫ to the cam ⑬.

The cam's motion will then rotate the span lever ⑭, which pulls the span's spring ⑮. As the valve reaches the given input signal, the pulling force of the span spring ⑮ and the power from the torque motor ① will be balanced, moving the flapper ② back to its original position and reducing the gap between the nozzle ③.

As a result, the amount of air exhausted through the nozzle ③ will decrease, and the chamber pressure to the left of the spool ⑨ will increase again. The spool ⑤ will move back to its original position on the left, and the poppet ⑧ will also move in the same direction, blocking the seat ⑦ to stop the air from coming into the chamber ⑩ through the SUPPLY.

Ultimately, the actuator will stop operating, and the positioner will return to its normal condition, maintaining the desired valve position based on the input signal.

LINEAR POSITIONER PRINCIPLE OF OPERATION



When an INPUT SIGNAL is supplied to the positioner to open the valve, power is generated from the torque motor and pushes the flapper ② to the opposite side of the nozzle ③. This widens the gap between the nozzle ③ and the flapper ②, causing the air inside the chamber ⑨ to exhaust through the nozzle ③ from the inner part of the pilot ④ to the left of the spool ⑤.

Due to this effect, the spool ⑤ moves to the right. Then, the seat ⑦ which was previously blocked by the poppet ⑧ pushes the poppet ⑧ away, allowing supplied pressure (air) to pass through the seat ⑦ and OUT1 Port, entering into the chamber of the actuator ⑩. As a result, the chamber's pressure ⑩ will increase, and when there is enough pressure inside the chamber to push the actuator's spring ⑪, the actuator's stem ⑫ will start to go down.

Through the feedback lever, the stem's linear motion will be converted to the span lever's ⑭ rotary motion. This rotary motion of the span lever ⑭ will, in turn, rotate the span ⑯ and pulls the spring ⑭ When the valve's position reaches the given input signal, the pulling force of the span spring ⑯ and the power from the torque motor ① will be balanced, causing the flapper ② to move back to its original position, reducing the gap between the nozzle ③.

As a result, the amount of air being exhausted through the nozzle ③ will decrease, and the chamber pressure to the left of the spool ⑤ will increase again. The spool ⑤ will move back to its original position on the left, and the poppet ⑧ will also move in the same direction, blocking the seat ⑦ to stop the air from coming into the chamber ⑩ through the SUPPLY.

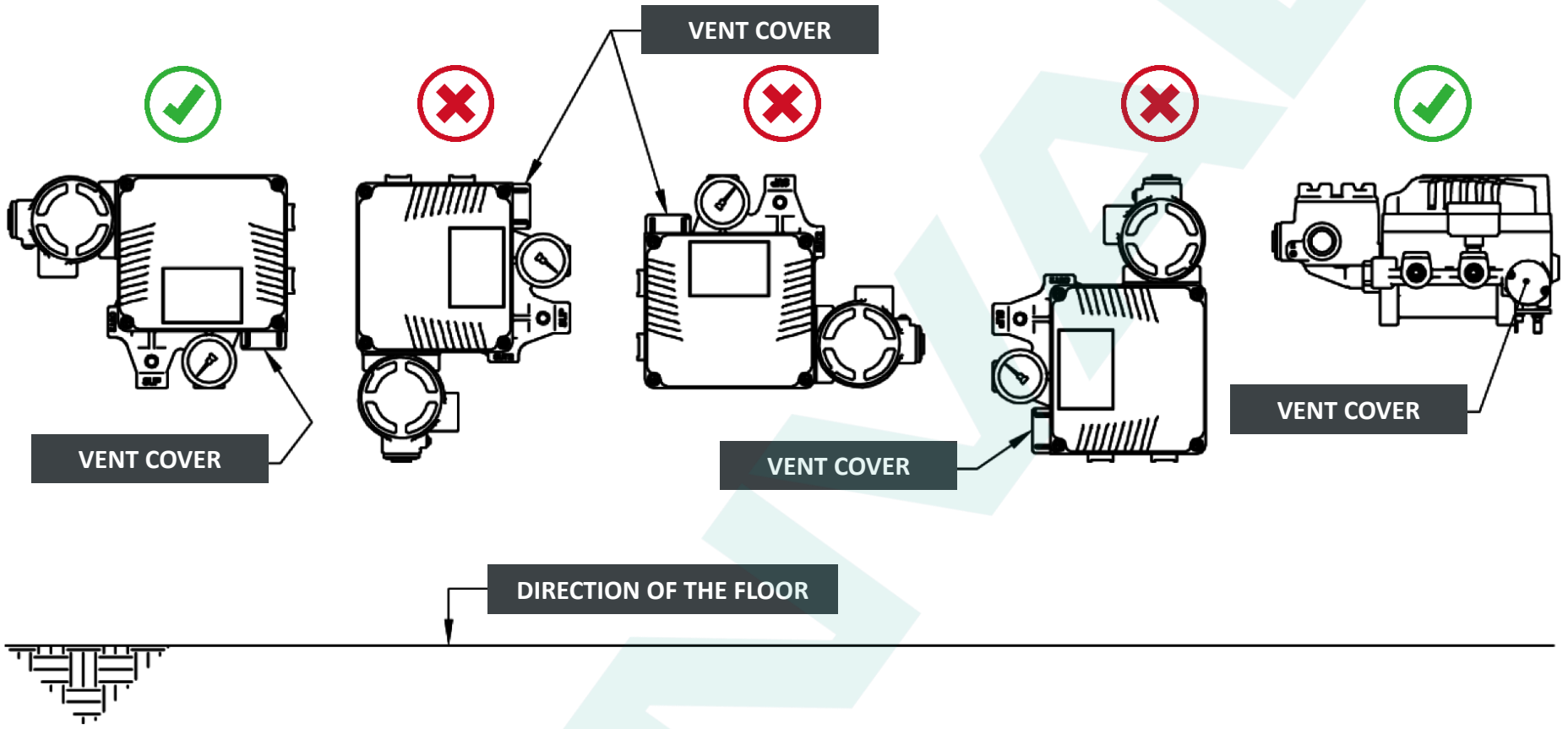
This process ultimately causes the actuator to stop operating, and the positioner will return to its normal condition, maintaining the desired valve position based on the input signal.

INSTALLATION

SAFETY IS OF UTMOST IMPORTANCE WHEN INSTALLING A POSITIONER.

Please read and adhere to the following safety instructions :

1. Before starting the installation process, make sure to turn off all input and supply pressures to the valve, actuator, and any other related devices.
2. To avoid shutting down the entire system, consider using a bypass valve or other supportive equipment during installation.
3. Ensure that there is no remaining pressure in the actuator to prevent any unexpected movements or potential hazards.
4. The positioner is equipped with a vent cover to exhaust internal air and drain condensation water. During installation, ensure that the vent cover is facing downward. This precaution is necessary to prevent any corrosions or damages to internal parts that may result from water accumulation.



Ensure that the installation of the positioner complies with the relevant electrical codes, such as the National Electrical Code (NEC), ANSI/NFPA 70, or CEC Part 1, as applicable.

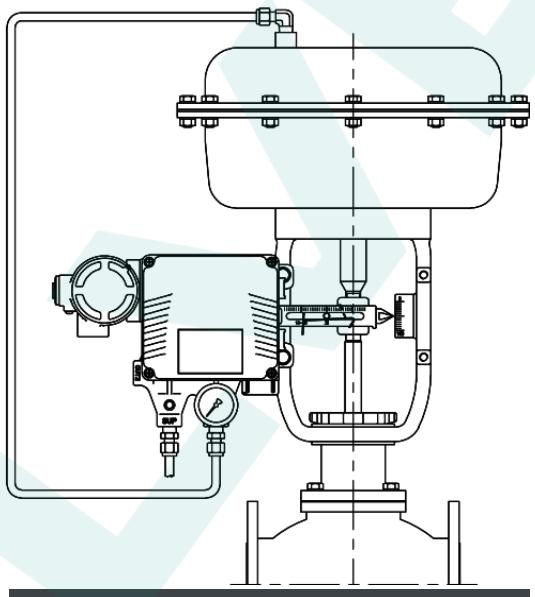
For the installation process, the following tools will be required :

- Hex key set for hex socket cap bolts.
- (+) and (-) screwdrivers.
- Spanners suitable for hexagonal-head bolts.

Having these tools on hand will facilitate a smooth and efficient installation of the positioner. Remember to follow the appropriate electrical codes and safety guidelines during the installation process to ensure a safe and reliable operation.

LINEAR POSITIONER INSTALLATION

Linear positioners are specifically designed for linear motion valves, including globe or gate types, which are equipped with spring return type diaphragm or piston actuators.



INSTALLATION EXAMPLE

Before commencing the installation process, ensure that the following components are readily available and in optimal condition:

1. Positioner
2. Feedback lever and lever spring
3. M6 nut and spring washer to securely fasten the feedback lever to the main shaft
4. Bracket, bolts, and washers (in case they are not provided along with the positioner)
5. Connection bar (if not included with the positioner)

Thoroughly inspect and verify the availability and condition of these components before proceeding with the installation. The correct assembly and installation of these components are of utmost importance to ensure the efficient operation of the linear positioner and the associated valve. It is essential to strictly adhere to the manufacturer's instructions and guidelines to ensure a successful and effective installation process.

When preparing the bracket for the positioner to adapt it on the actuator yoke, it is essential to consider the following important points while designing:

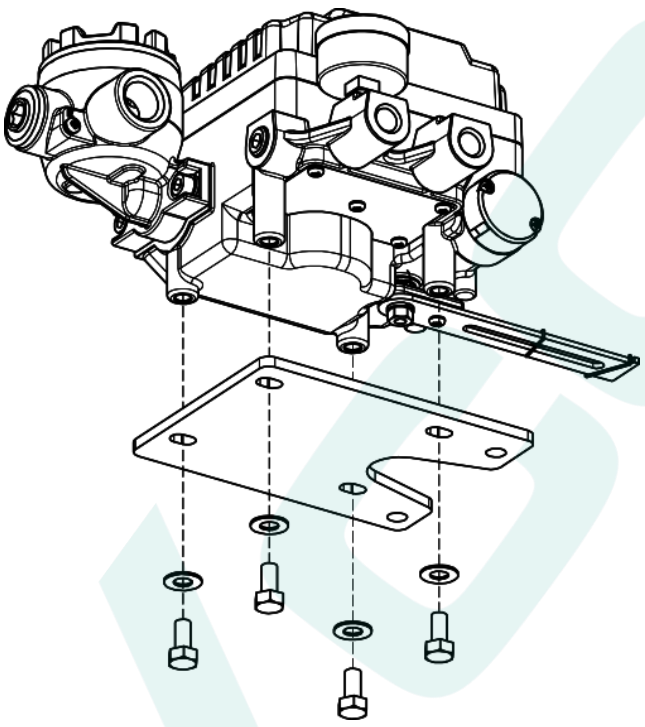
1. Ensure vertical alignment: The positioner's feedback lever must be positioned vertically in relation to the valve stem at 50% of the valve stroke. This alignment is critical for achieving accurate and precise control of the valve's movement.

2. Proper installation of the connection bar: The connection bar of the actuator clamp, which interfaces with the feedback lever, should be installed in a manner that the valve stroke length coincides with the corresponding measurement marked in "mm" on the feedback lever. Proper alignment of the connection bar is necessary to maintain consistent and reliable valve control.

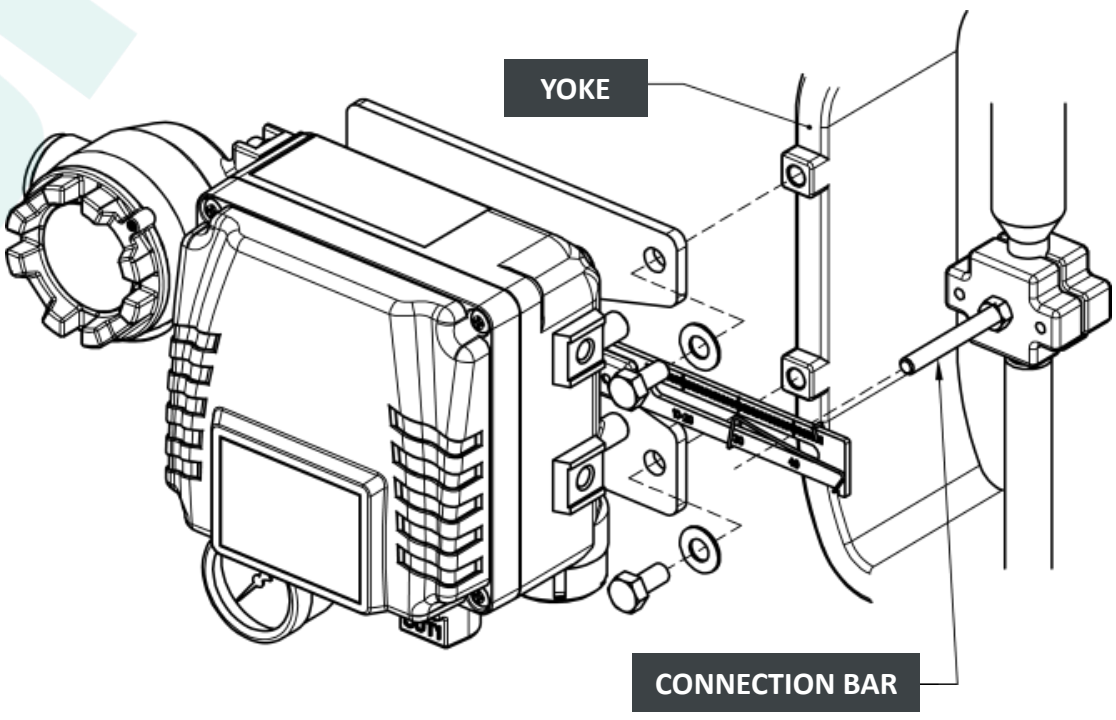
By adhering to these points during the design and preparation of the bracket, you ensure that the positioner is correctly adapted to the actuator yoke. This alignment and proper installation play a significant role in achieving optimal performance and maintaining linearity in the valve's movement. Following these guidelines will result in a bracket that ensures the positioner and actuator work seamlessly together, providing accurate and effective control of the valve.

INSTALLATION STEPS :

1. Following the previous step, attach the positioner to the bracket by securely fastening the bolts (M8 * 1.25P) through the designated mounting holes.



ATTACHING POSITIONER TO BRACKET



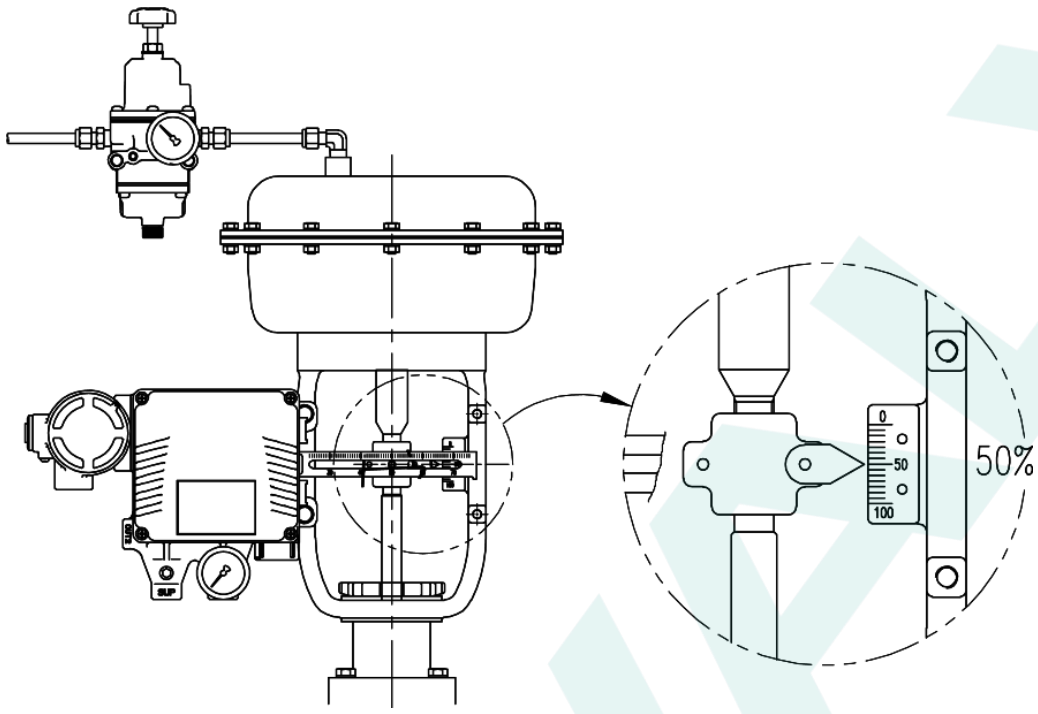
ATTACHING THE BRACKET TO ACTUATOR YOKE

2. Firmly affix the positioner to the bracket on the actuator yoke while being cautious not to fully tighten the bracket at this juncture.

3. Proceed to establish a connection between the connection bar and the actuator clamp. Ensure that the connection bar's outer diameter is less than 6mm to perfectly accommodate the 6.5mm hole gap on the feedback lever.

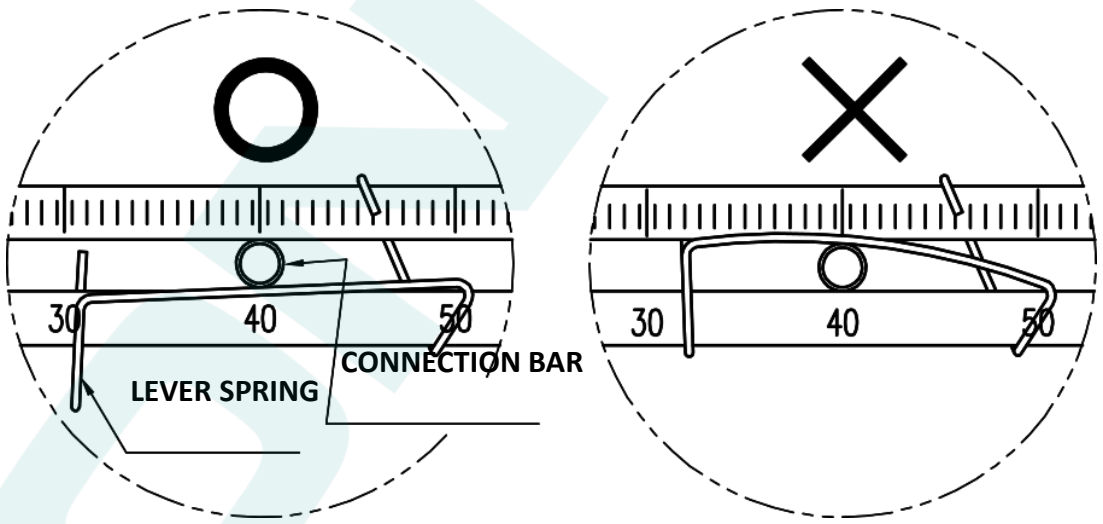
4. Temporarily connect an air-filter regulator to the actuator. Supply sufficient air pressure to the actuator to position the valve stroke at 50% of its total stroke.

POSITIONING THE VALVE AT 50% OF THE TOTAL STROKE



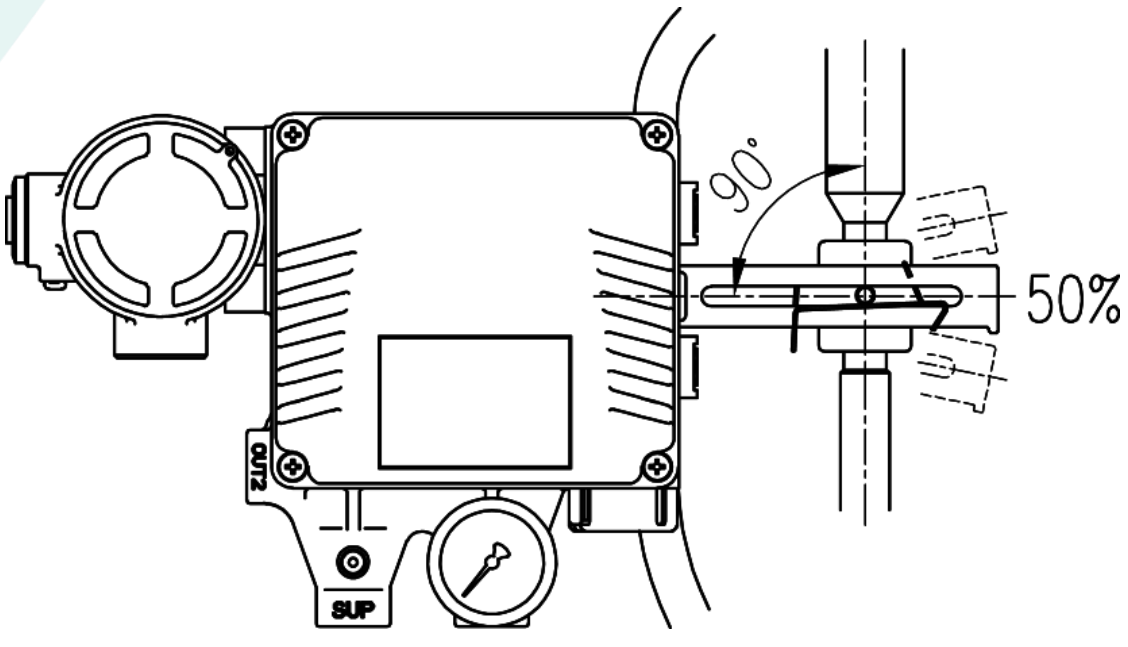
5. Place the connection bar between the feedback lever and the lever spring. Ensure that the connection bar is positioned above the spring lever, as shown in the left figure below. Avoid positioning it below the spring lever, as depicted in the right figure below, to prevent excessive tension that could lead to rapid wear and tear of the connection bar or the spring lever.

PROPER WAY TO INSERT CONNECTION BAR BETWEEN FEEDBACK LEVER AND LEVER SPRING



6. Verify the alignment of the feedback lever with respect to the valve stem at 50% of the valve stroke. If the feedback lever is not perfectly vertical, proceed to adjust either the bracket or the connection bar accordingly to achieve the desired vertical position. It is crucial to ensure proper alignment to avoid any deviation from the intended linear movement, as improper installation may result in poor linearity and adversely affect the valve's performance. Taking the time to perform this adjustment will enhance the overall accuracy and effectiveness of the system, ensuring reliable and precise control of the linear motion valve.

FEEDBACK LEVER AND VALVE STEM

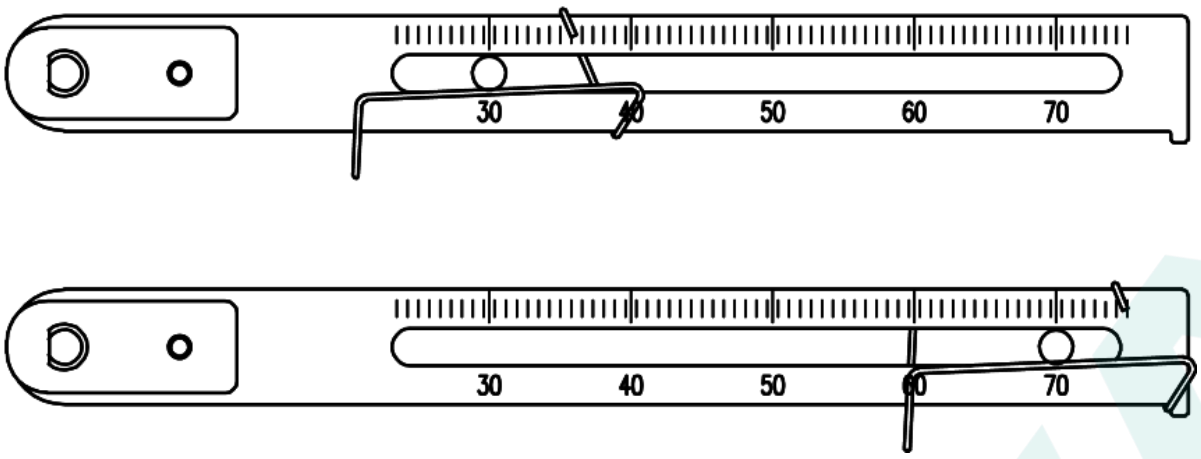


LINEAR POSITIONER INSTALLATION

7. To ensure proper valve stroke, carefully examine the engraved stroke numbers on the feedback lever of the positioner. Locate the number on the feedback lever that corresponds to the desired valve stroke. Adjust the position of the connection bar, either by moving the bracket, the connection bar, or both, to align with the appropriate stroke number on the feedback lever.

It is essential to note that the effective linear lever angle should be set at 23 degrees for optimal performance. Maintaining this angle will ensure accurate and reliable valve stroke control, resulting in precise and efficient operation of the linear motion valve.

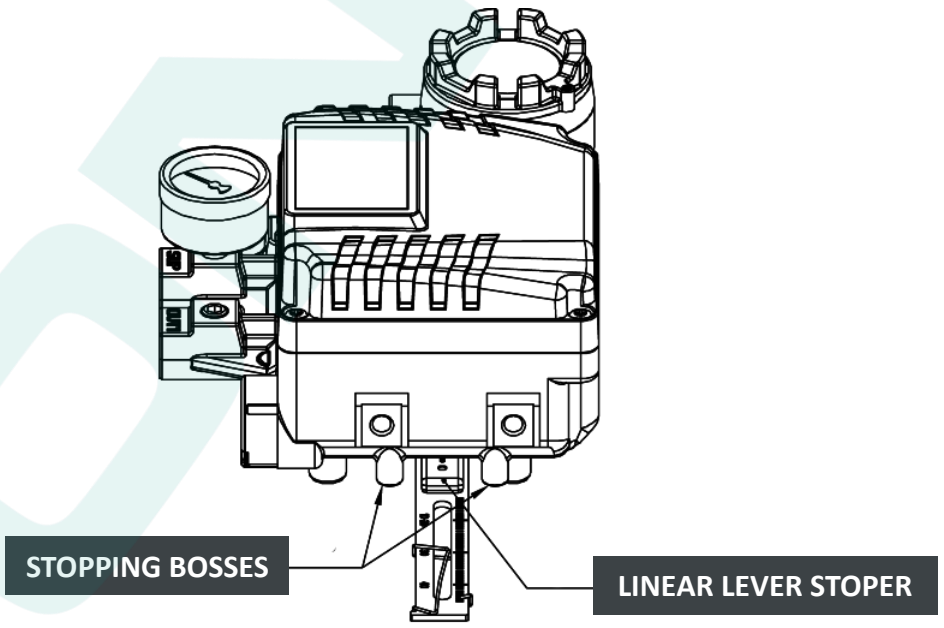
FEEDBACK LEVER AND LOCATION OF THE CONNECTION BAR

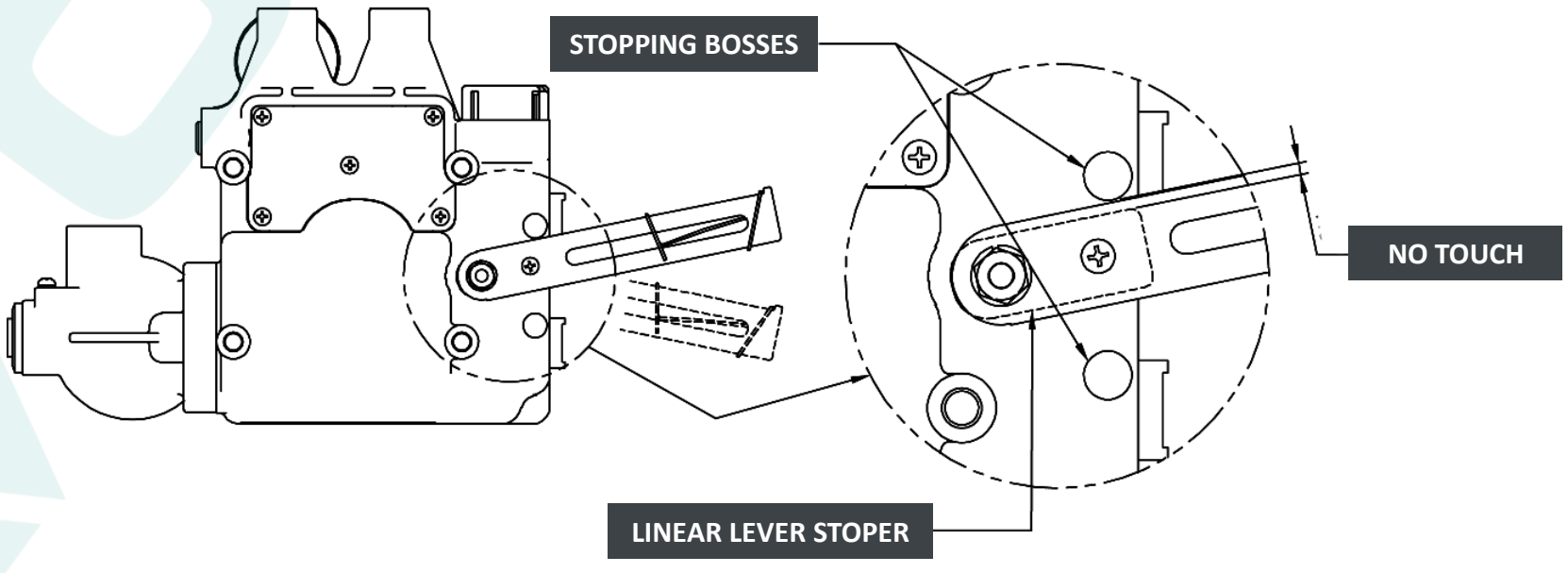


8. Once the positioner is installed, proceed to operate the valve, moving it from 0% to 100% stroke using direct air supplied to the actuator. At both extremes of the stroke (0% and 100%), carefully observe the linear lever stopper's position in relation to the stopping bosses on the backside of the positioner. Ensure that there is no contact between the linear lever stopper and the stopping bosses.

   In the event of contact, it indicates that the positioner is positioned too close to the yoke. To rectify this issue, readjust the positioner's installation by moving it further away from the yoke. This will prevent any interference and facilitate smooth valve operation throughout the entire stroke range. By implementing this adjustment, you can optimize the valve's performance and prolong the lifespan of the linear motion valve system.

LINEAR LEVER STOPPER SHOULD NOT TOUCH STOPPING BOSSES OF POSITIONER ON 0% ~ 100% VALVE STROKE





9. Following the installation, proceed to securely tighten all bolts or nuts on both the bracket and the connection bar. Ensuring proper fastening of these components is vital for the stability and reliable performance of the positioner and the associated linear motion valve.

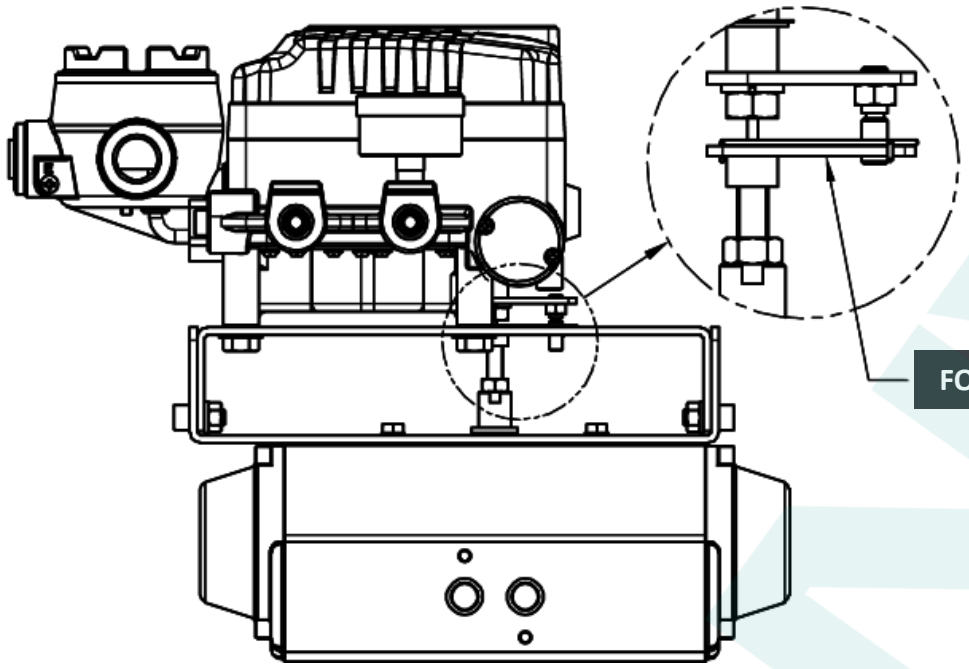
ROTARY POSITIONER INSTALLATION

The rotary positioner is designed for installation on rotary motion valves, such as ball or butterfly types, which utilize rack and pinion, scotch yoke, or other types of actuators that rotate the stem by 90 degrees.

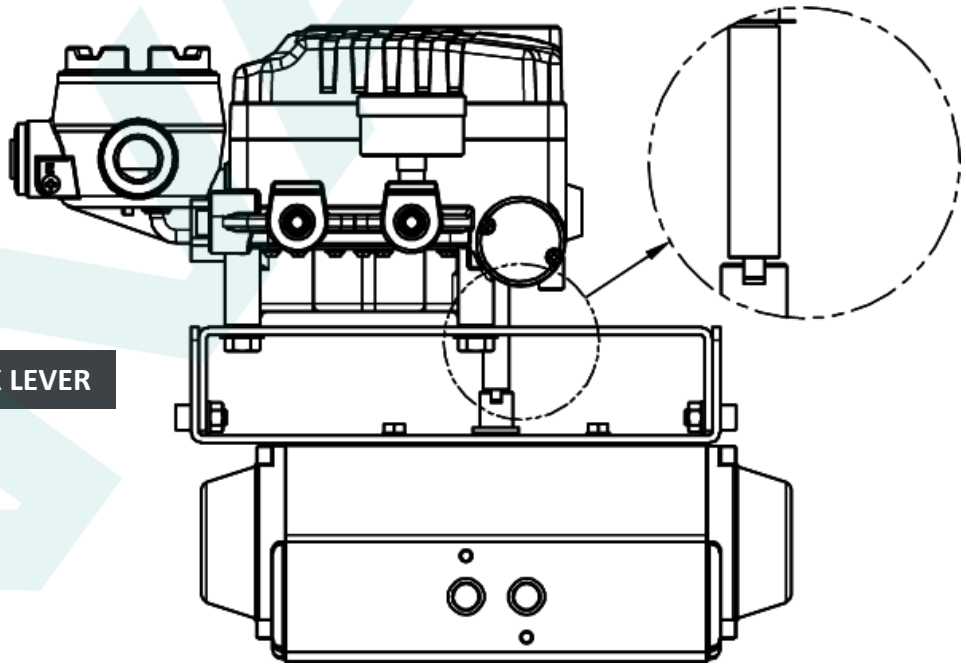
Before proceeding with the installation, ensure that the following components are available:

1. Positioner
2. Fork lever (Only applicable for Fork lever type positioner)
3. Rotary bracket set (2 pieces)
4. 4 pieces of hexagonal headed bolts (M8 x 1.25P)
5. 4 pieces of M8 plate washers
6. 4 pieces of wrench-headed bolts (M6 x 1P x 15L)
7. 4 pieces of M6 nuts
8. 4 pieces of M6 spring washers
9. Bolts and washers to attach the bracket to the actuator – please note that these are not supplied with the positioner.

Prior to installation, ensure all these components are available and in proper condition to ensure a successful and reliable setup of the rotary positioner on the rotary motion valve. Follow the manufacturer's instructions and guidelines for a smooth installation process.



FORK LEVER TYPE

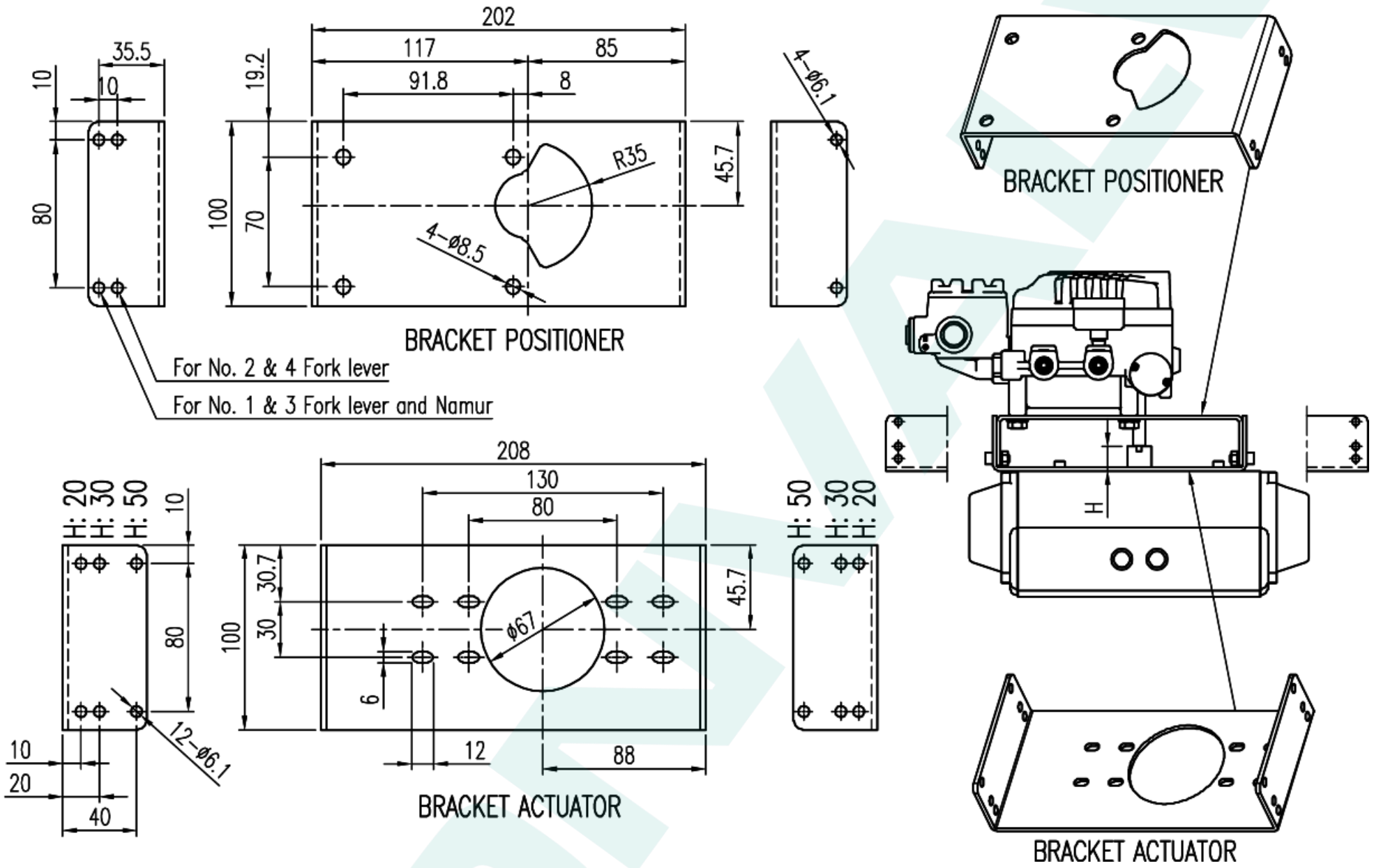


NAMUR TYPE

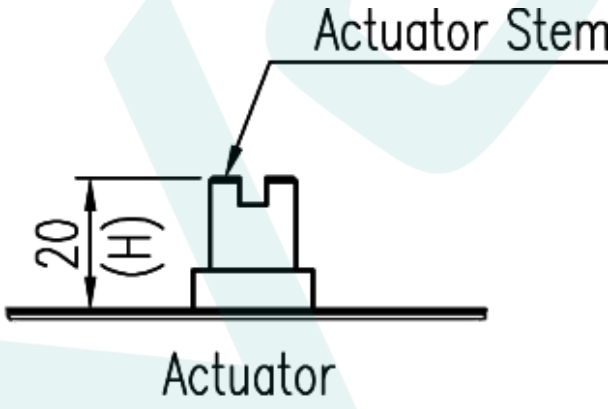
ROTARY POSITIONER INSTALLATION

ROTARY BRACKET INFORMATION :

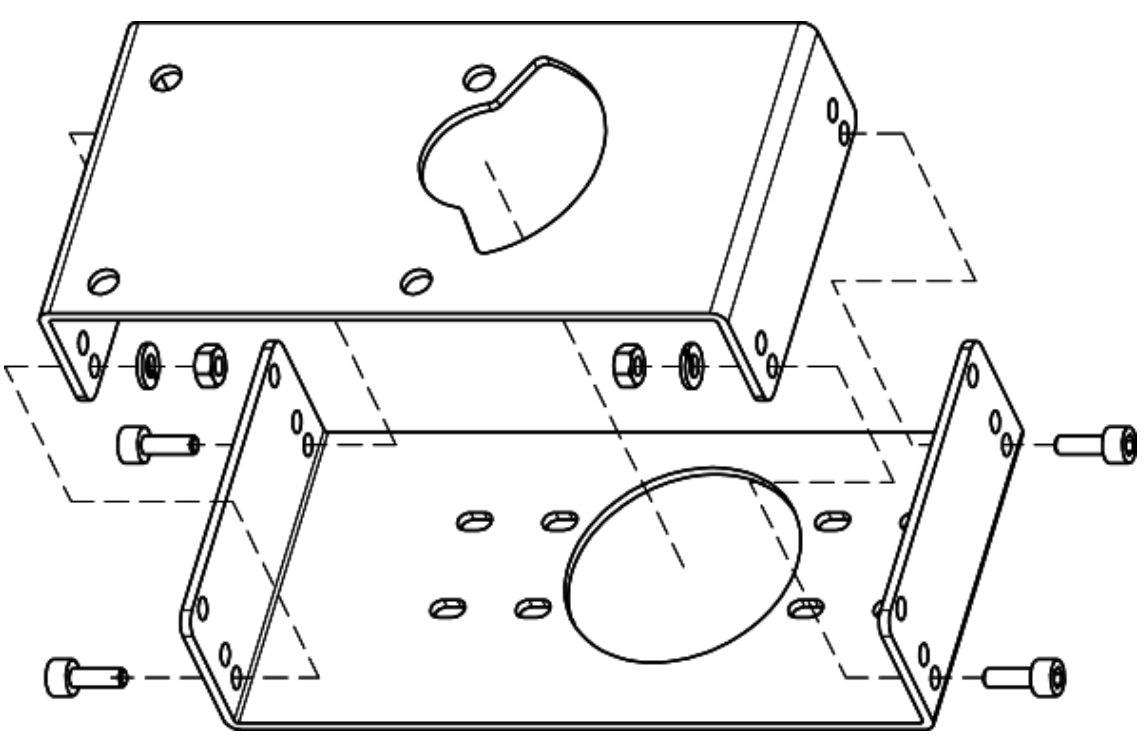
The rotary bracket set, provided with the positioner, is designed to fit onto the actuator stem heights (H) of 20mm, 30mm, and 50mm, adhering to the VDI/VDE 3845 standard. You can adjust the bracket height accordingly to accommodate different actuator stem heights. Carefully follow the instructions for adjusting the bracket to ensure a proper and secure installation of the rotary positioner on the rotary motion valve. This will enable optimal performance and precise control of the valve's movement.



BRACKETS AND POSITIONER



ACTUATOR STEM HEIGHT



ROTARY BRACKETS ASSEMBLY

ROTARY POSITIONER INSTALLATION

INSTALLATION STEPS :

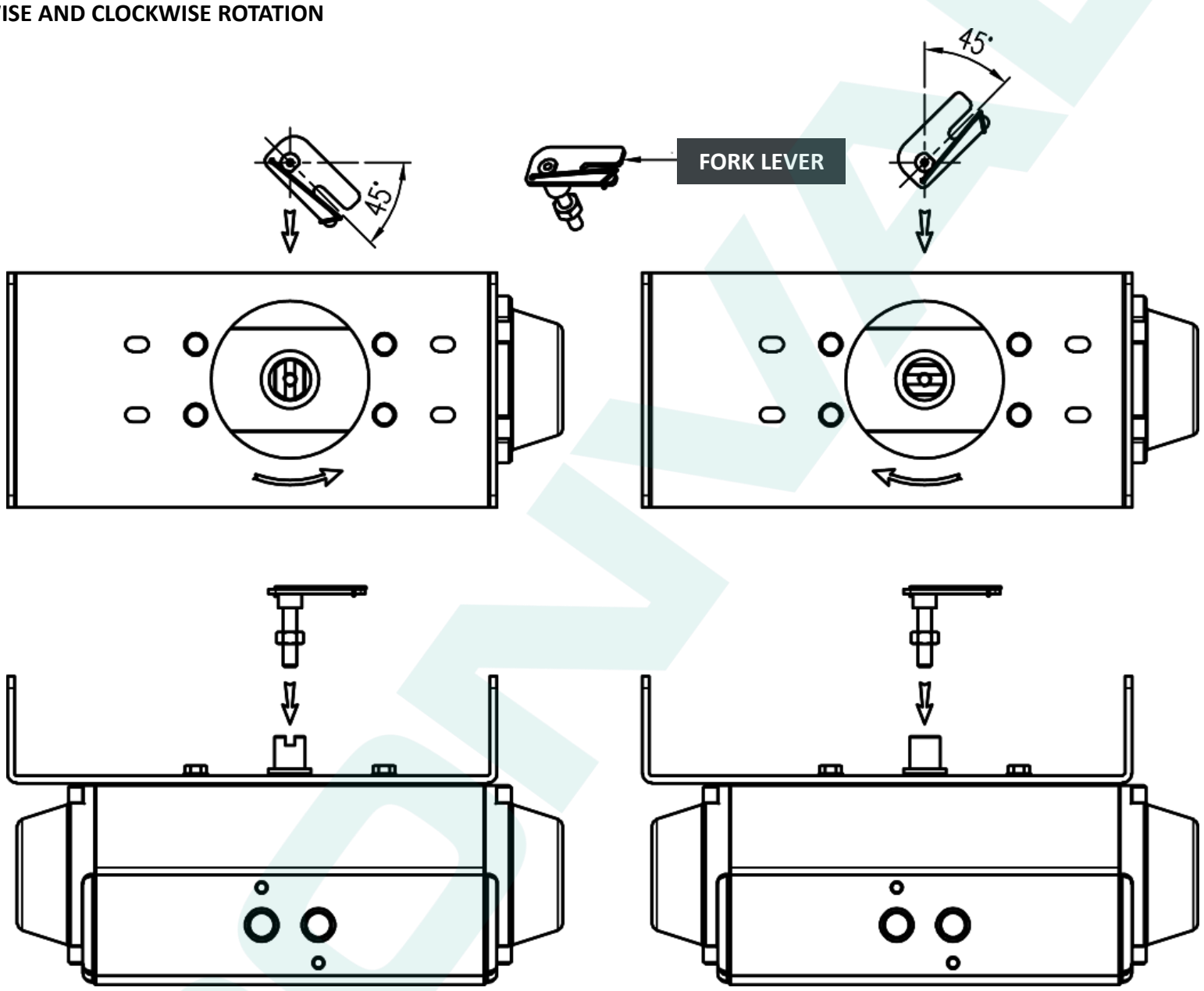
1. Before proceeding with the installation, check the actuator's stem height and adjust the brackets as shown in the bracket figures provided above.

2. Attach the brackets securely onto the actuator, and it is recommended to use spring washers with the bolts to prevent loosening due to vibration.

3. Next, set the rotation position of the actuator stem at 0%. For single-acting actuators, this can be easily checked by supplying no pressure to the actuator. For double-acting actuators, determine the actuator stem's rotation direction (clockwise or counter-clockwise) by supplying pressure to the actuator.

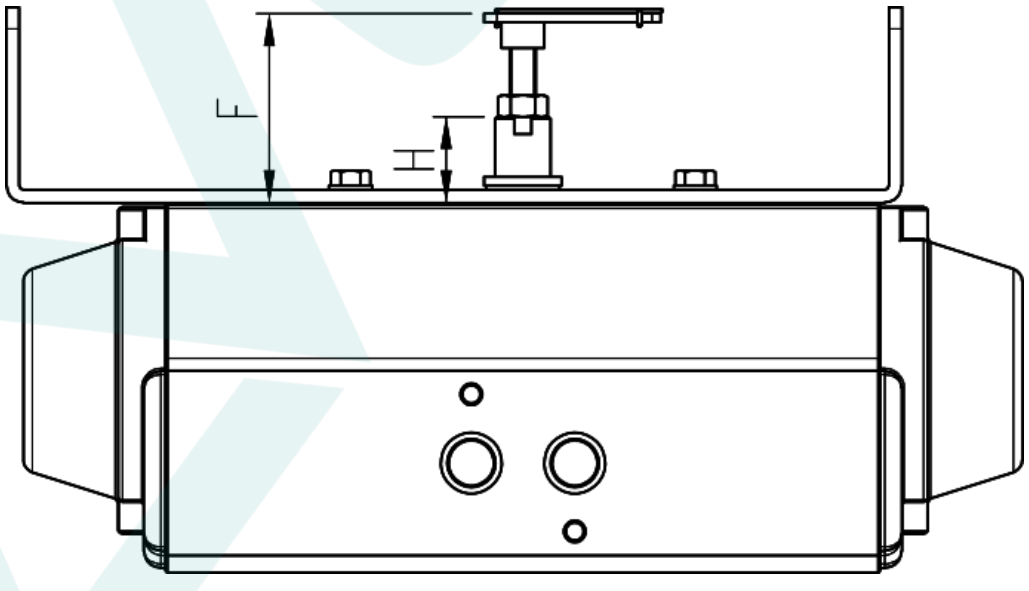
4. If you are using the **Fork lever type** positioner, install the fork lever after setting the actuator's stem at 0%. Ensure to check the actuator stem's rotation direction (clockwise or counter-clockwise) in this case as well.
   The installation angle of the fork lever should be set at 45 degrees relative to the longitudinal direction of the actuator.

COUNTER-CLOCKWISE AND CLOCKWISE ROTATION



5. **(Only Fork lever type)** Once you have determined the fork lever direction (clockwise or counter-clockwise), adjust the distance "F" between the top plate of the fork lever and the top face of the actuator according to the table below. Then, securely fasten the lock nuts located at the bottom of the fork lever to maintain the desired setting.

HEIGHT OF FORK LEVER



H	F (ONLY NO. 1 & 3 FORK LEVER)
20	ABOUT 44
30	ABOUT 54
50	ABOUT 74

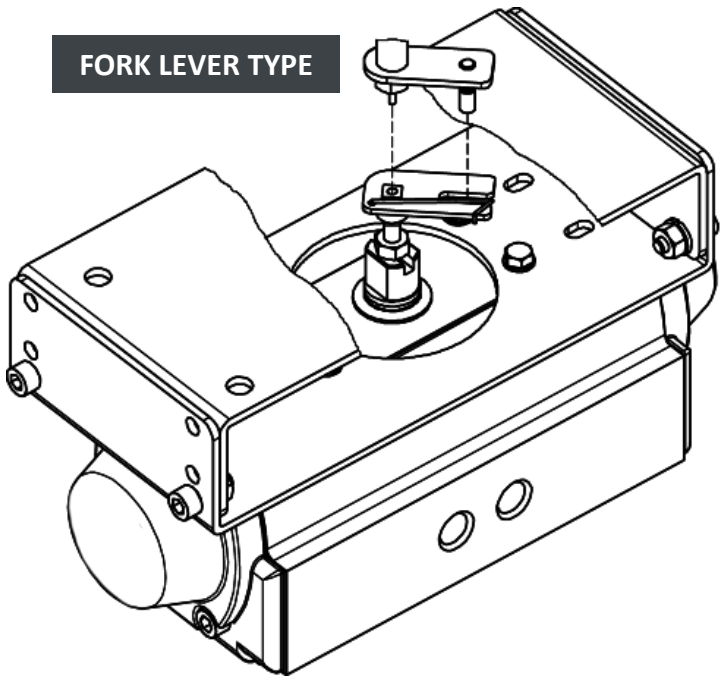
ROTARY POSITIONER INSTALLATION

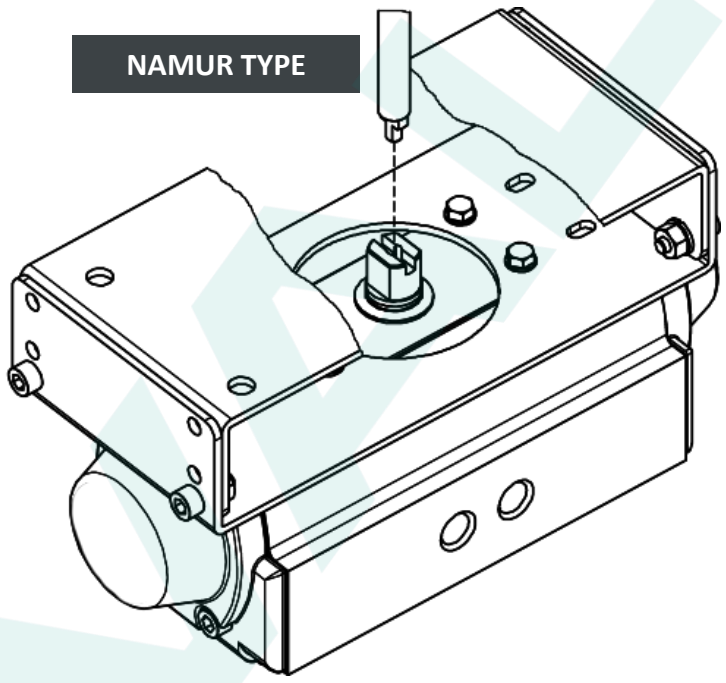
6. Attach the positioner to the bracket. For the "**Only Fork lever type**" perform the additional step below:

Fix the clamping pin (5mm Dia.) into the fork lever slot and insert the center pin (2mm Dia.) of the main shaft of the positioner into the hole at the center of the fork lever. The clamping pin will be locked to the fork lever spring.

It is crucial to ensure precise alignment between the center of the main shaft of the positioner and the center of the actuator's stem. Poor alignment may result in unnecessary forces on the main shaft, leading to decreased durability of the positioner. Taking the time to properly align these components will ensure the longevity and optimal performance of the positioner and the associated actuator.

MAIN SHAFT CENTER ALIGNMENT (FORK LEVER, NAMUR)





7. After verifying the positioner's alignment and completing any necessary adjustments, proceed to securely tighten the positioner and the bracket using the provided bolts. This ensures a firm and stable connection between the positioner and the bracket, contributing to the reliable and precise operation of the positioner with the associated valve. Double-check the tightness of the bolts to ensure everything is properly fastened and ready for operation.

AIR CONNECTION

SAFETY :

Safety is of utmost importance when dealing with the positioner and its operation. Ensure that the supply pressure is provided with clean and dry air, avoiding any presence of moisture, oil, or dust. It is highly recommended to use an air filter regulator, such as the YT-200 series, to maintain the quality of the air supply.

Please be aware that Convalve, the manufacturer of the positioner, has not conducted testing on the operation of the positioner with gases other than clean air. If you have any questions or uncertainties about the appropriate usage or compatibility with different gases, it is essential to reach out to Convave for clarification and further guidance. Always prioritize safety and adhere to the manufacturer's guidelines for the correct and safe operation of the positioner.

SUPPLY PRESSURE CONDITION :

1. Supply dry air with a temperature at least 10℃ lower than the ambient temperature.
2. Avoid using dusty air and use a filter with a rating of 5 microns or smaller to ensure clean air supply.
3. Avoid using oil in the air supply to prevent contamination.
4. Comply with the standards ISO 8573-1 or ISA 7.0.01 to maintain the quality of the air supply.
5. The recommended supply pressure range is between 1.4 to 7 bar.
6. Set the pressure level of the air filter regulator 10% higher than the actuator's spring range pressure.

PIPING CONDITION :

1. Make sure the inside of the pipeline is clean and free of obstructions. Any blockages or debris may hinder the flow of air and affect the performance of the positioner.
2. Avoid using pipelines that are squeezed or show any signs of damage. Damaged pipelines may cause air leaks or disrupt the air supply, leading to inaccuracies in valve positioning.
3. Ensure that the pipeline has an inner diameter of more than 6mm (10mm outer diameter) to maintain the required flow rate of air. Using a pipeline with a smaller diameter may result in reduced air flow and affect the positioner's functionality.
4. Keep the length of the pipeline system reasonably short. Longer pipeline systems may introduce friction, which can impact the flow rate inside the pipeline and potentially affect the overall performance of the positioner and valve.

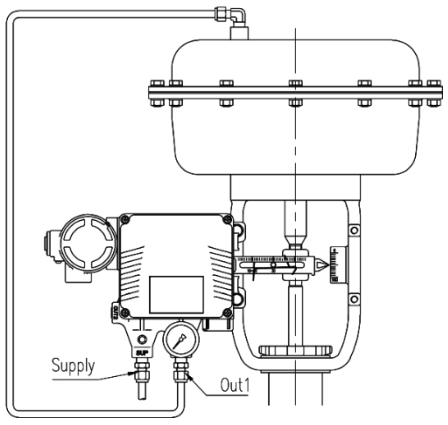
AIR CONNECTION

SINGLE ACTING :

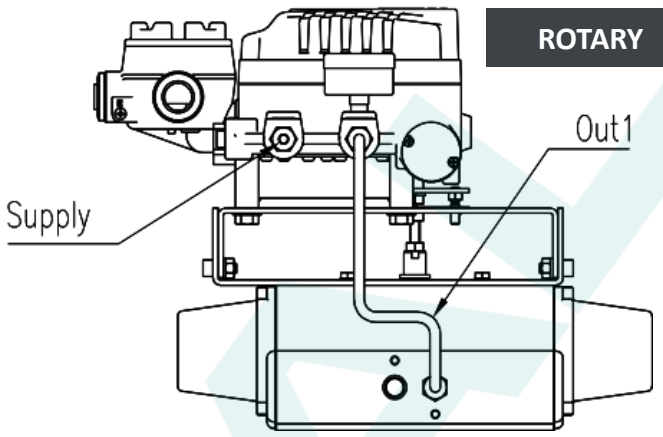
In a single-acting type positioner, the setup is designed to utilize only the Out1 port. This Out1 port should be connected to the corresponding port of the actuator when using a spring return actuator of the single-acting type.
When an input signal with increasing amperage is provided to the positioner, the supply air pressure will be delivered through the Out1 port. This pressure variation in the Out1 port will then actuate the spring return actuator, resulting in the desired positioning of the valve.

SINGLE ACTING LINEAR / ROTARY ACTUATOR

LINEAR



ROTARY



Based on the provided diagrams, it is crucial to ascertain whether the valve operates in a "Reverse Acting" or "Direct Acting" manner. Subsequently, it is necessary to establish the appropriate connections between the positioner's OUT1 port and the actuator's port accordingly. If required, the assembly position of the Span (Linear) and Cam (Rotary) components may be adjusted for optimal performance.

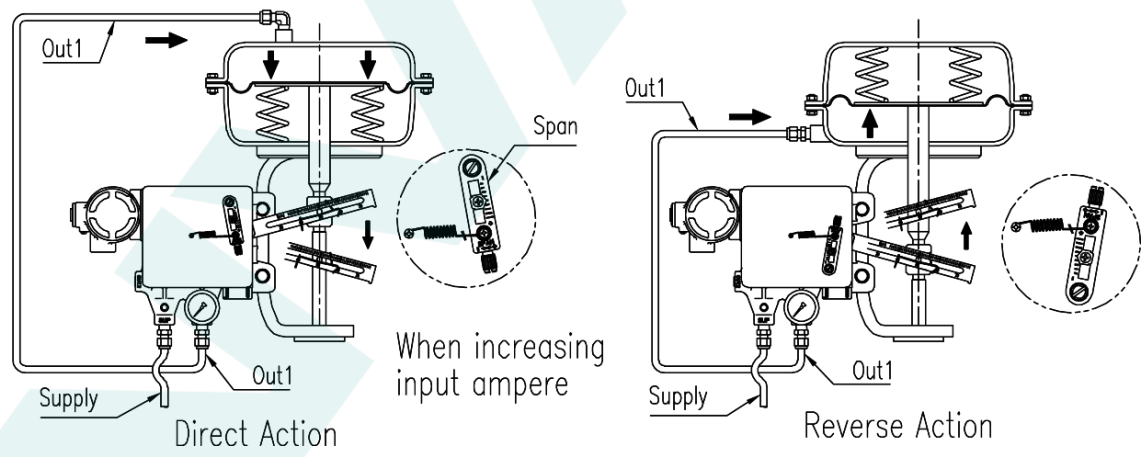
In the case of a "Direct Acting" configuration, the valve's movement aligns with that of the positioner's feedback lever. Consequently, when the positioner's feedback lever moves to increase the valve stroke, the valve also opens in the same direction.

Conversely, for a "Reverse Acting" configuration, the valve's movement opposes the positioner's feedback lever movement. Thus, when the positioner's feedback lever moves to increase the valve stroke, the valve closes or moves in the opposite direction.

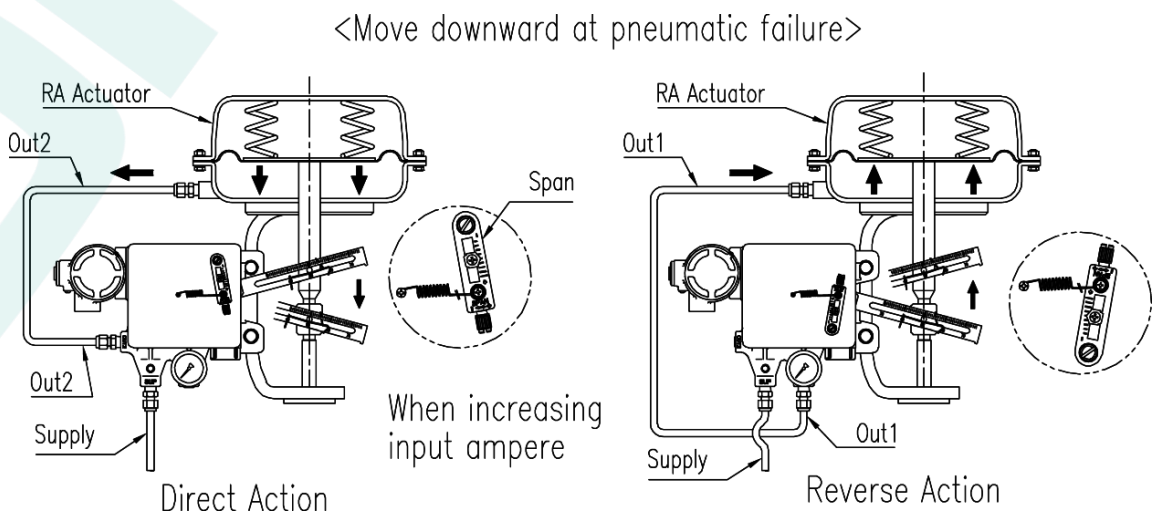
Once the type of valve actuation is determined, ensure that the positioner's OUT1 port connects appropriately to the actuator's port based on the valve's behavior. Should adjustments be necessary for the Span (Linear) and Cam (Rotary) components, refer to the manufacturer's instructions and recommended guidelines.

By diligently adhering to these technical procedures, the proper functioning and precise control of the valve using the positioner can be ensured.

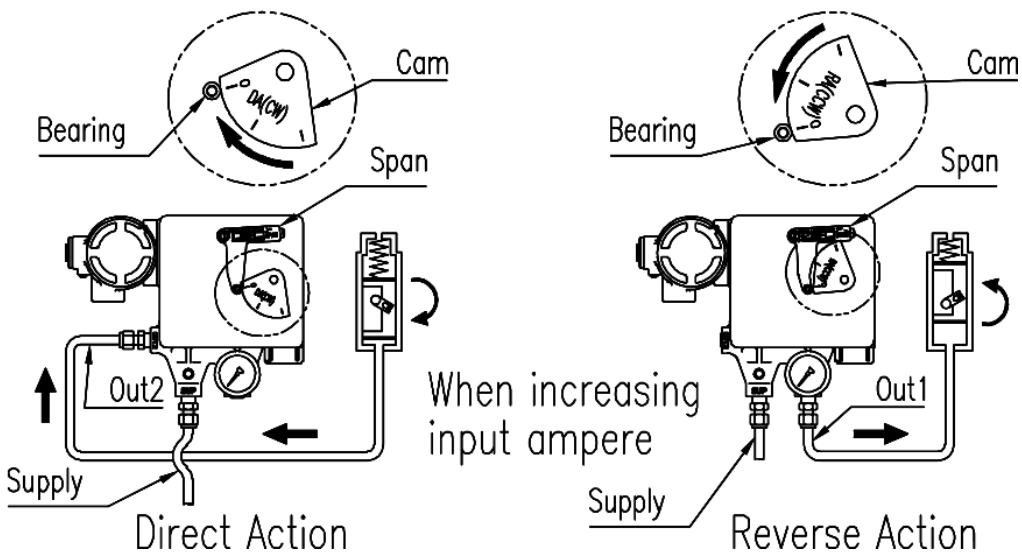
SETTING DIRECTIONS OF PIPING AND SPAN FOR LINEAR DA SINGLE ACTUATOR



SETTING DIRECTIONS OF PIPING AND SPAN FOR LINEAR RA SINGLE ACTUATOR



SETTING DIRECTIONS OF PIPING AND CAM FOR ROTARY SINGLE ACTUATOR



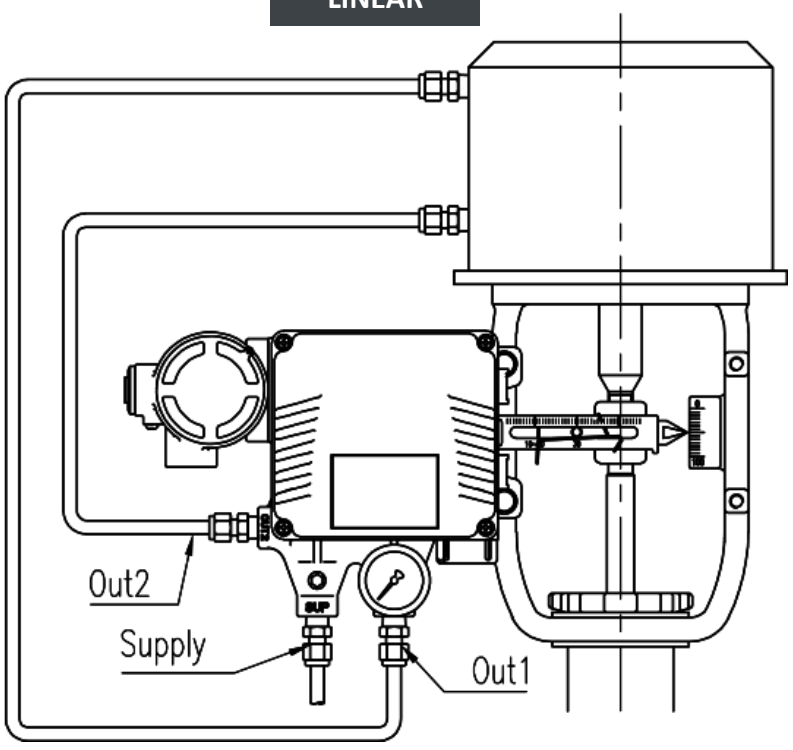
AIR CONNECTION

DOUBLE ACTING :

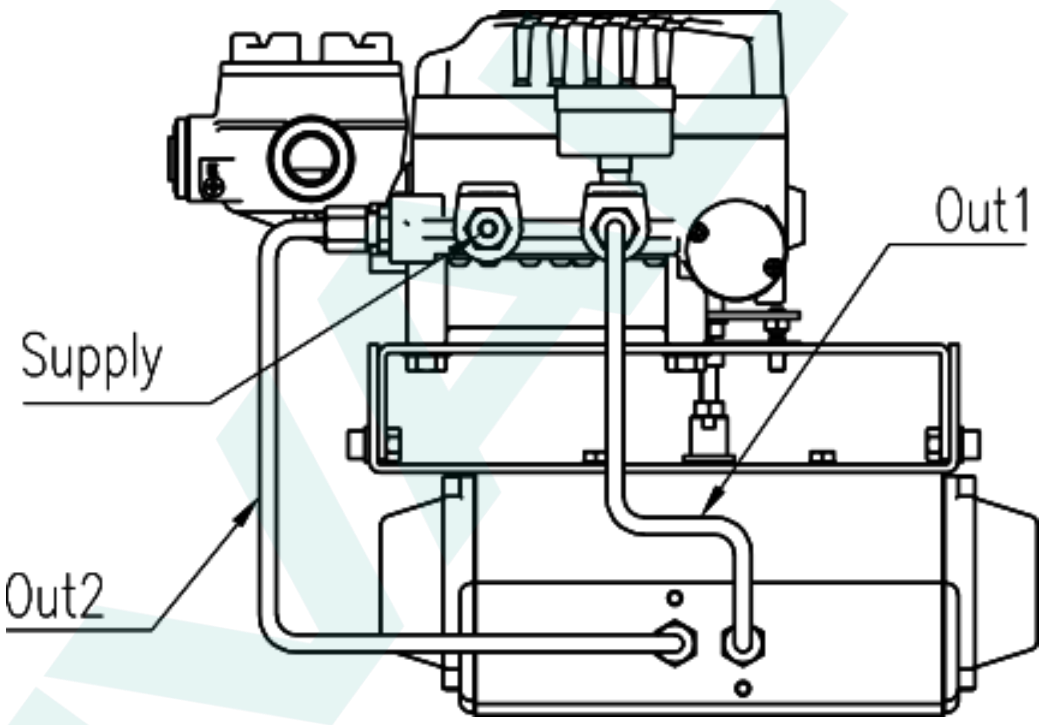
Double-acting type positioners are equipped with both Out1 and Out2 ports for efficient operation. As the input signal increases, the positioner supplies pressurized air through the Out1 port to activate the actuator in one direction. Simultaneously, the exhaust air from the actuator is released through the Out2 port, facilitating movement in the opposite direction. This comprehensive setup empowers the positioner to precisely control the double-acting actuator, precisely responding to changes in the input signal.

DOUBLE ACTING LINEAR / ROTARY ACTUATOR

LINEAR



ROTARY



Based on the provided diagram, analyze the valve's behavior to determine if it is "Reverse Acting" or "Direct Acting."

"Reverse Acting" Valve:

If the valve closes (moves in the opposite direction) as the input signal increases, it is a "Reverse Acting" valve.

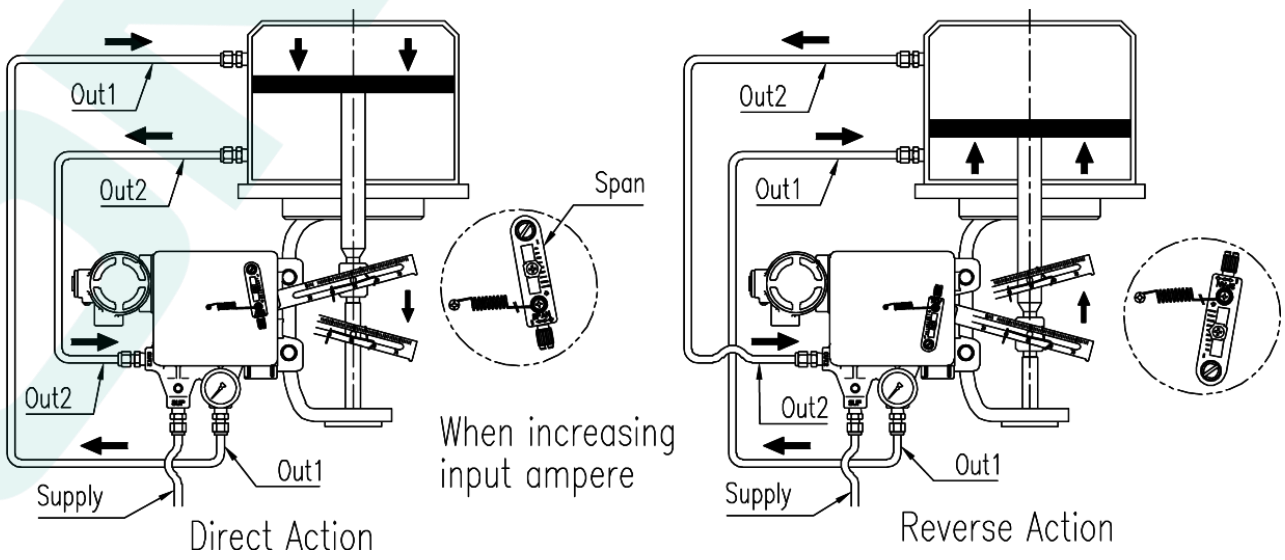
"Direct Acting" Valve:

If the valve opens (moves in the same direction) as the input signal increases, it is a "Direct Acting" valve.

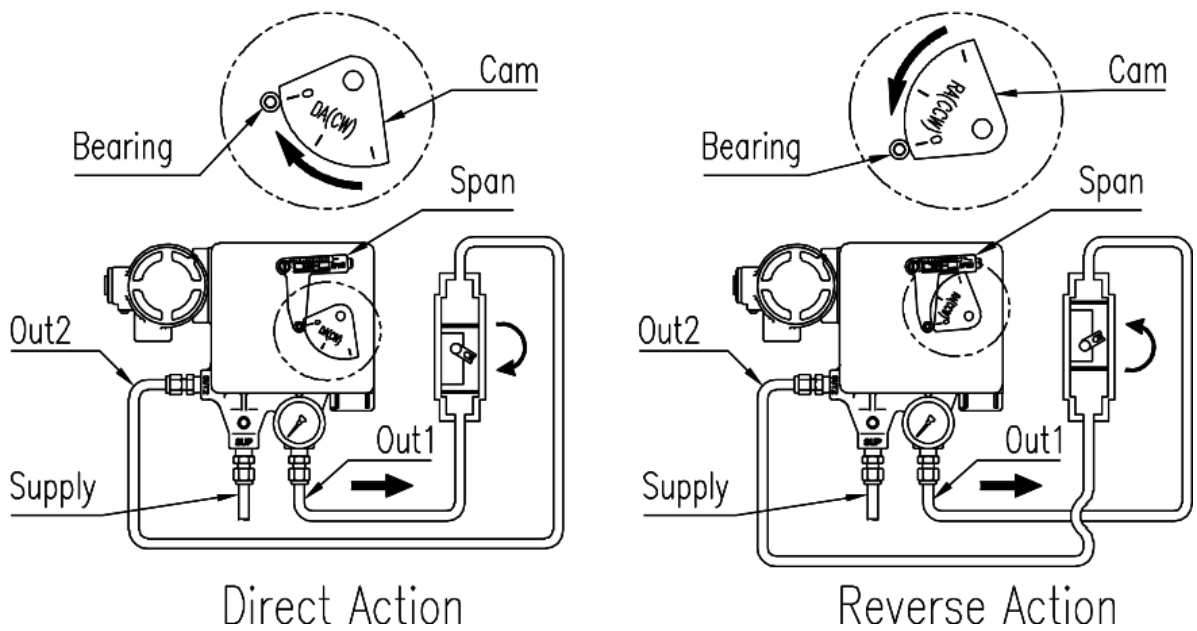
Once the actuation type is determined, make the appropriate connection by connecting the positioner's OUT1 port to the proper actuator's port. If necessary, consider switching the assembly position of the Span (linear) and Cam (Rotary) components for optimized performance.

Ensure you follow the manufacturer's technical instructions and guidelines to maintain accurate control and efficient operation of the valve using the positioner.

SETTING DIRECTIONS OF PIPING AND CAM FOR LINEAR DOUBLE ACTUATOR



SETTING DIRECTIONS OF PIPING AND CAM FOR ROTARY DOUBLE ACTUATOR



POWER CONNECTION

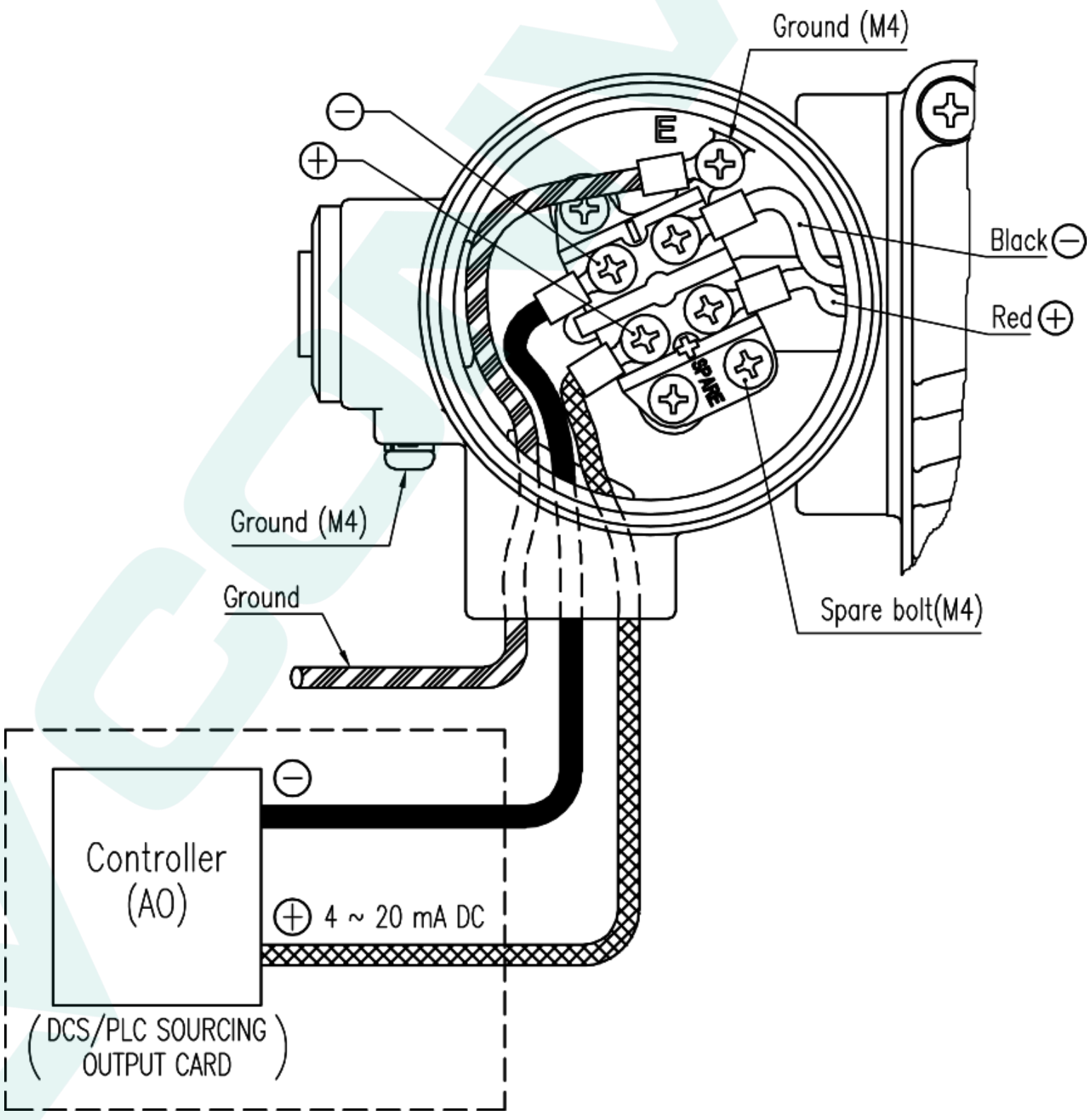
GENERAL :

- The positioner is typically operated using a 4~20mA DC signal. However, if the positioner includes PTM (Position Transmitter Module) options, it requires a separate power supply of 9~28V DC.
- It is essential to ground the positioner for proper operation and safety.
- When installing the positioner's cable, ensure to keep it away from high-noise equipment, such as high-capacity transformers or motors, to avoid interference and ensure reliable signal transmission.
- To maintain the Type 4 and IP66 rating (protection against water and dust ingress) of the positioner, use type PTFE tape as per the instructions when installing threaded conduit.

CONNECTION :

1. To access the junction box, first, unscrew the M3 set screw and open the junction box cover.
2. Next, connect the external wires to the corresponding polarities within the junction box terminal block. To ensure secure connections and prevent poor contacts, tighten all bolts on the terminal block.
3. Once the wiring is complete, close the junction box cover and firmly fix it in place by tightening all M3 set screws.

CONNECTING CABLES



ADJUSTMENTS

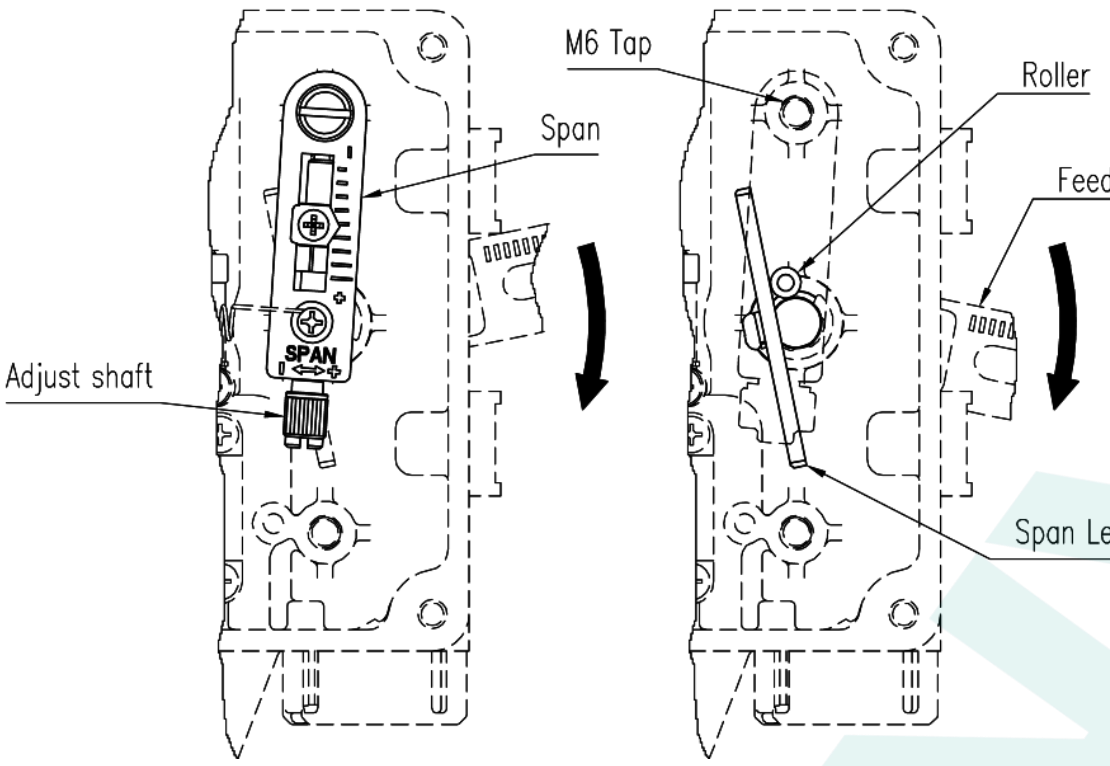
RA OR DA SETTING :

LINEAR POSITIONER

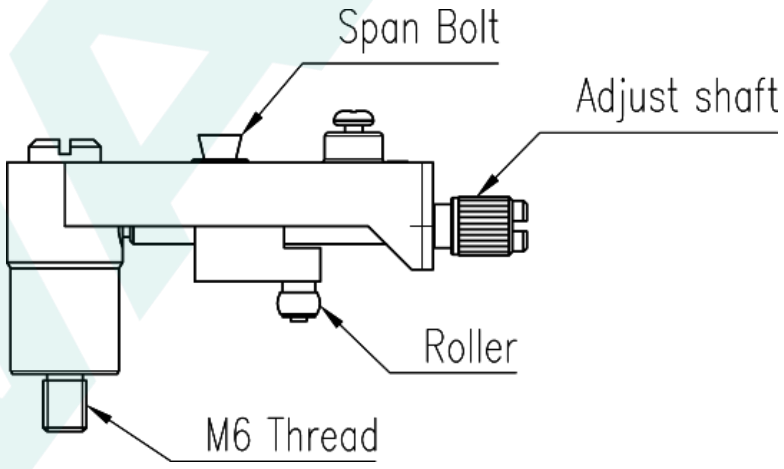
1. If the actuator axis moves down when the input signal is increased, follow the assembly instructions for the "Span" component as shown in the figure below:

- Locate the upper M6 tap hole on the positioner or actuator.
- Align the "Span" component with the upper M6 tap hole.
- Insert the appropriate fastening hardware (such as screws or bolts) into the upper M6 tap hole to secure the "Span" in place.

SPAN INSTALLATION (DA)



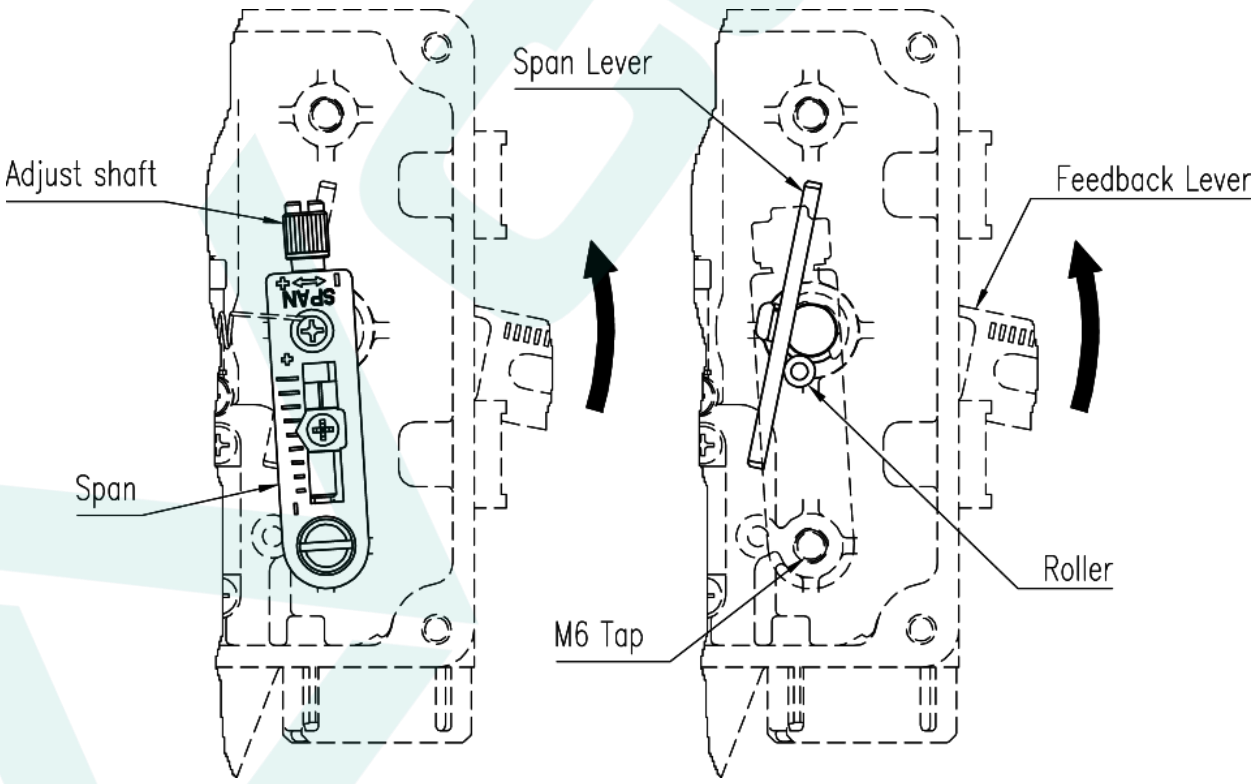
LINEAR SPAN ASSEMBLY



2. If the actuator axis moves up when the input signal is increased, follow the assembly instructions for the "Span" component as shown in the figure below:

- Locate the lower M6 tap hole on the positioner or actuator.
- Align the "Span" component with the lower M6 tap hole.
- Insert the appropriate fastening hardware (such as screws or bolts) into the lower M6 tap hole to secure the "Span" in place.

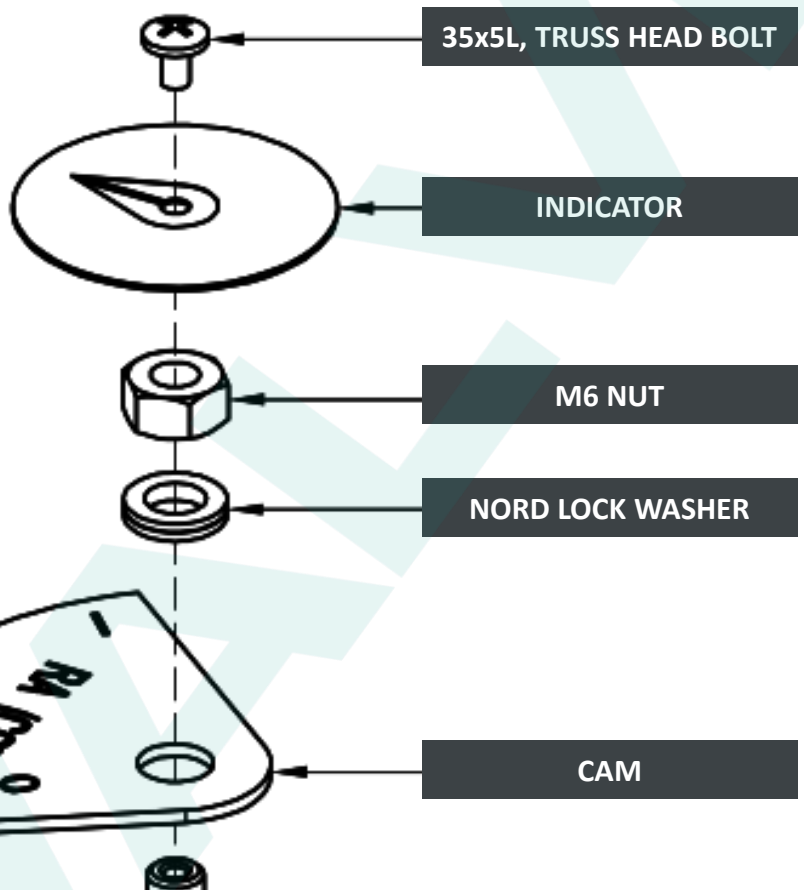
SPAN INSTALLATION (RA)



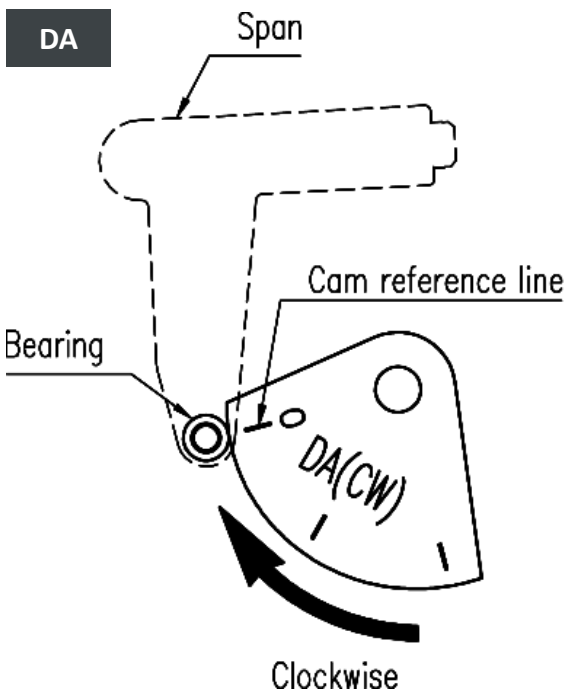
ADJUSTMENTS

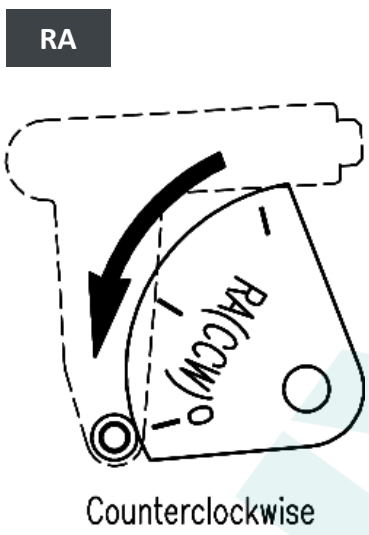
ROTARY POSITIONER

1. If the actuator axis rotates clockwise when the input signal is increased, adjust the CAM by reassembling it so that the surface labeled "DA (Direct Acting)" faces upward.
2. If the actuator axis rotates counterclockwise when the input signal is increased, adjust the CAM by reassembling it so that the surface labeled "RA (Reverse Acting)" faces upward.
3. Position the actuator to its initial point.
4. Adjust the CAM so that the engraved CAM reference line marked with "0" aligns with the center of the span bearing.
5. Tighten the nut to secure the CAM in place.



CAM INSTALLMENT DA / RA

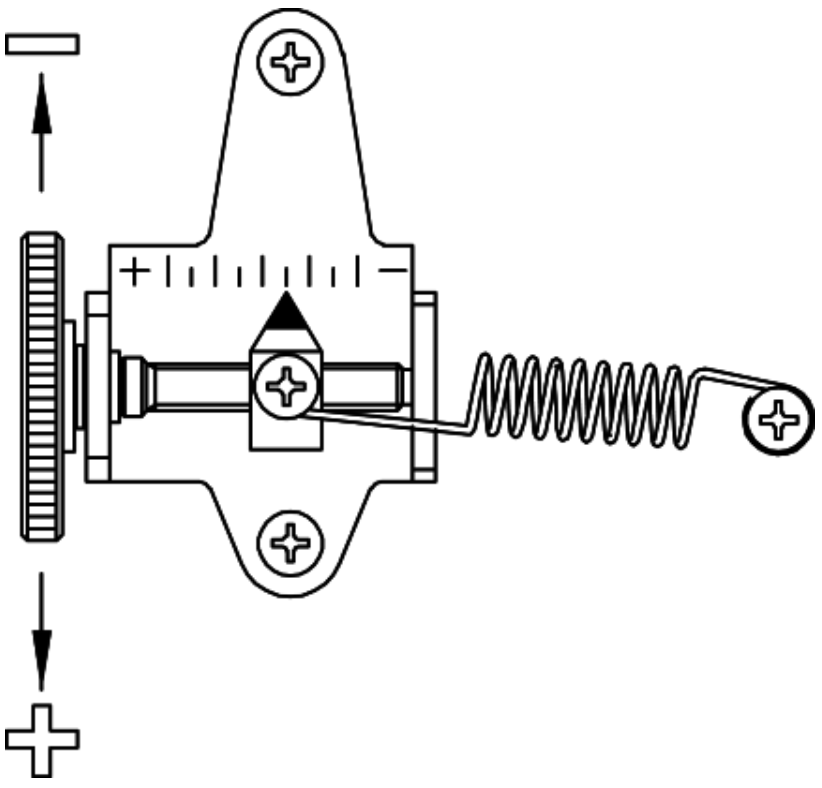




ADJUSTMENT - ZERO POINT :

1. Set the input signal at 4mA (or 20mA) as the initial ampere.
2. Locate the adjuster of the zero unit handle on the positioner or actuator.
3. Rotate the adjuster upward or downward, as shown in the diagram, to adjust the actuator's zero point.
4. Refer to the diagram for guidance on how to increase or decrease the zero point as needed.

ZERO UNIT



ADJUSTMENTS

ADJUSTMENT – SPAN :

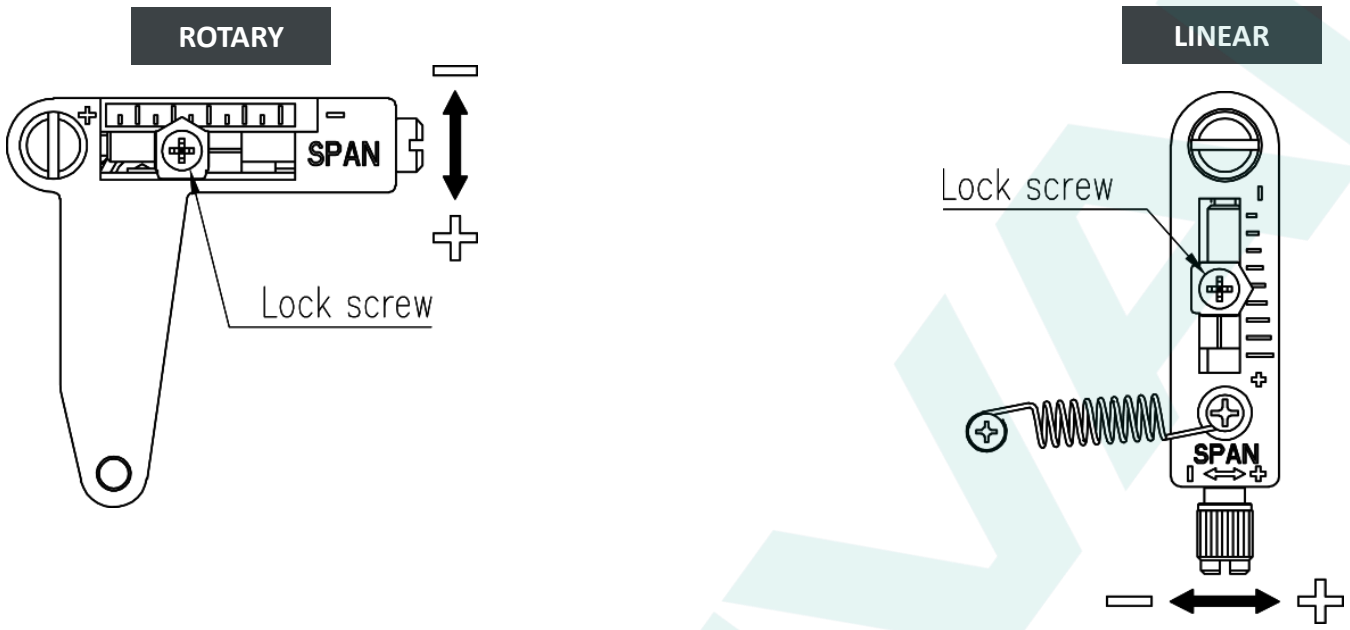
1. After setting the zero point, supply an input signal at 20mA (or 4mA) as the end ampere and observe the actuator stroke. If the stroke is too low, increase the span. If the stroke is too high, decrease the span.

2. Note that changing the span will affect the zero point setting. Therefore, after adjusting the span, set the zero point again to ensure accuracy.

3. Repeat the above two steps several times until both the zero and span are properly adjusted to achieve the desired actuator stroke.

4. Once the proper settings are achieved, tighten the lock screw to secure the adjustments in place.

ROTARY / LINEAR SPAN UNIT



ADJUSTMENT – A/M SWITCH (AUTO/MANUAL) :

The auto-manual switch is located on the top of the pilot unit. By using the switch, the positioner can function as a bypass. Here's how it works:

1. Counter-Clockwise (Towards "M", Manual):

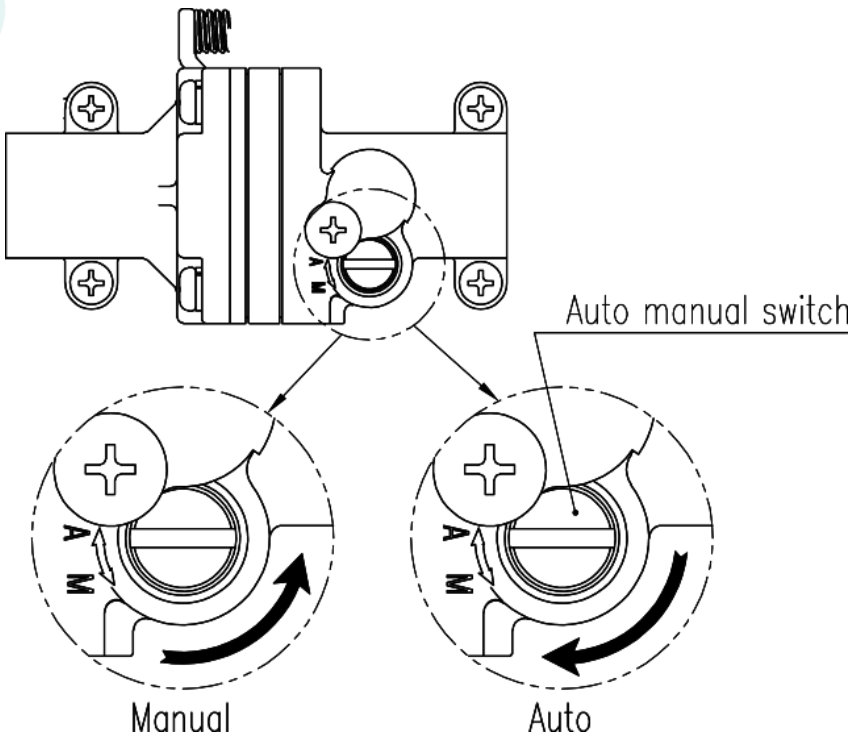
- If the switch is turned counter-clockwise and loosened, the supply pressure will be directly supplied from the OUT1 port of the positioner to the actuator, regardless of the input signal ampere.
- It is essential to check the allowed pressure level of the actuator when using the "Manual" mode to prevent any issues related to excessive pressure.

2. Clockwise (Towards "A", Auto):

- If the switch is turned clockwise and tightly fastened, the positioner will operate normally based on the input signal ampere.
- After using the "Manual" function, it is crucial to return the auto-manual switch to the "Auto" position to ensure that the positioner functions as intended.

Always check the actuator's pressure levels and follow the manufacturer's guidelines for proper use of the auto-manual switch to maintain the safety and efficiency of the system.

A/M SWITCH ADJUSTMENT



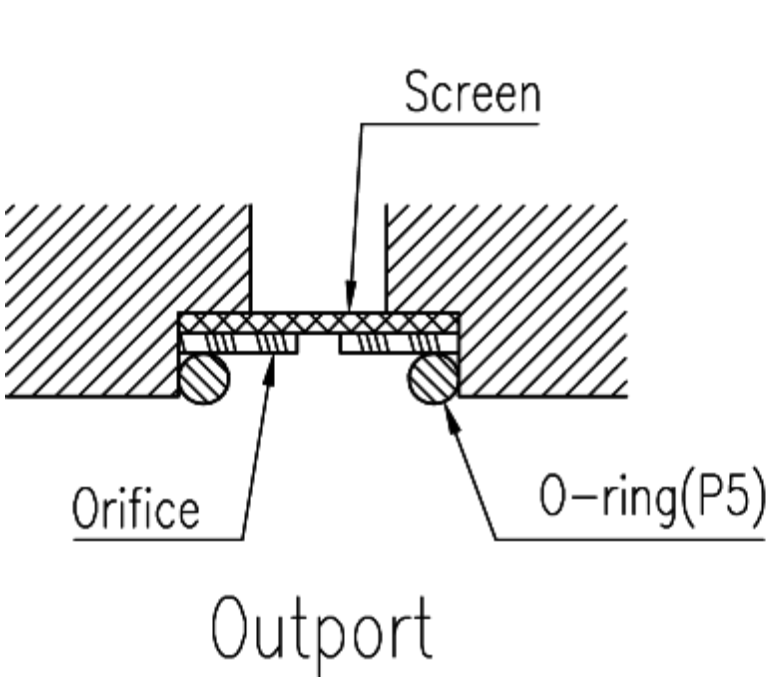
ADJUSTMENTS

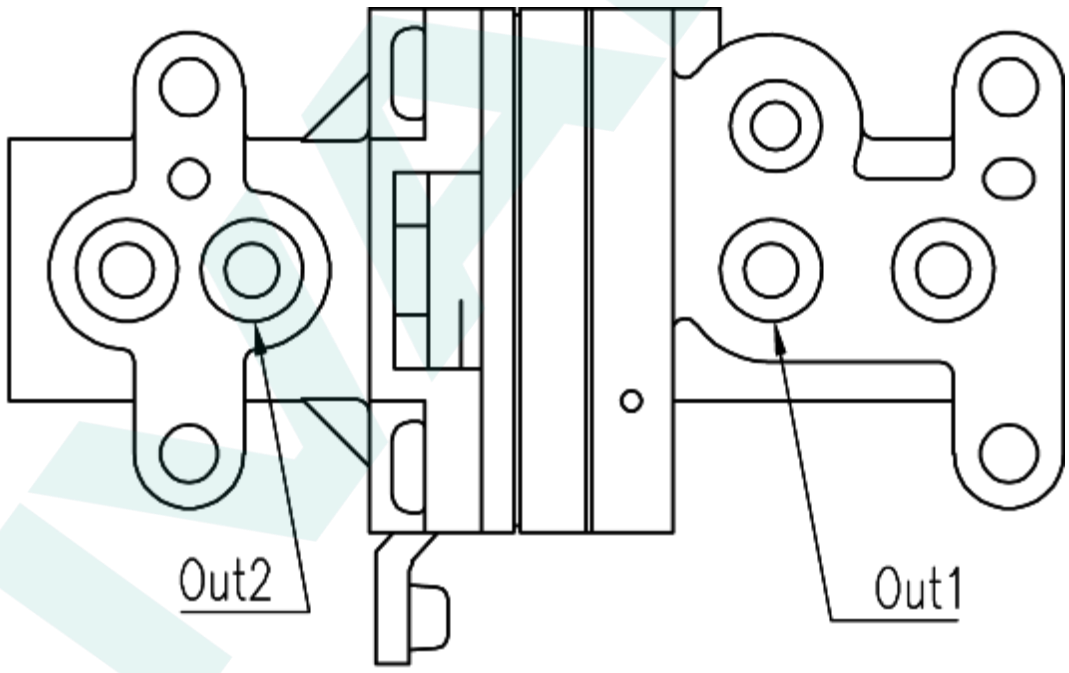
ORIFICE INSTALLMENT :

To prevent hunting issues caused by an actuator size that is too small relative to the flow rate of the positioner, you can install orifices in the outports. Follow these steps for installation:

1. Separate the pilot unit from the positioner.
2. Carefully remove the o-rings from Out1 and Out2 ports.
3. Insert the orifices into the respective outports. The standard diameter of the orifice hole is 1mm. If needed, you can order orifices with a 2mm diameter.
4. Before reassembling the o-rings, ensure that there are no remaining dust or particles on the ports to ensure a proper seal.

INSTALLING ORIFICES





RESET – POTENTIOMETER :

When external damage or physical shock occurs, it can dislocate the factory setting of the potentiometer. In such cases, it is necessary to re-calibrate the potentiometer to ensure accurate performance. Additionally, recalibration is also required after cam adjustment.

TO RE-CALIBRATE THE POTENTIOMETER, FOLLOW THESE STEPS :

1. Set the actuator position to 50% of the valve stroke. Ensure that the actuator remains stable and does not move during the re-calibration process.
2. In the junction box, gently pull out the potentiometer cable connector from the potentiometer PCB. Be careful not to apply too much force to avoid damaging the wires.
3. Examine the potentiometer cable connector; you will find three holes. Using a resistance tester, measure the resistance level by plugging two holes (one on the right or left and one in the center). The potentiometer resistance level should be within 0 ~ 10KΩ for a rotary positioner and within 0 ~ 5KΩ for a linear positioner during the full stroke of the actuator.
4. Use a "+'' screwdriver to loosen the potentiometer stopper bolt, but do not loosen it completely.
5. Pull out the potentiometer slightly, allowing the gear of the potentiometer to separate from the main shaft gear. This will enable you to turn the gear of the potentiometer.
6. As the current actuator position is set to 50% of the valve stroke, the resistance level should measure around 5KΩ (4.8 ~ 5.2KΩ) for rotary positioners and 2.5KΩ (2.4 ~ 2.6KΩ) for linear positioners. Adjust the gear of the potentiometer accordingly.
7. After making the appropriate setting, re-assemble the stopper and tighten the bolt securely.

MAINTENANCE

PILOT VALVE :

Regularly checking and maintaining the air quality and supply pressure is crucial for the proper functioning of the positioner. Here are some important points to consider:

1. Ensure that the supply air pressure is stable and clean. Irregular or contaminated air may cause the positioner to malfunction.

2. Check the air quality and pressure regularly to ensure that it meets the required standards for proper operation.

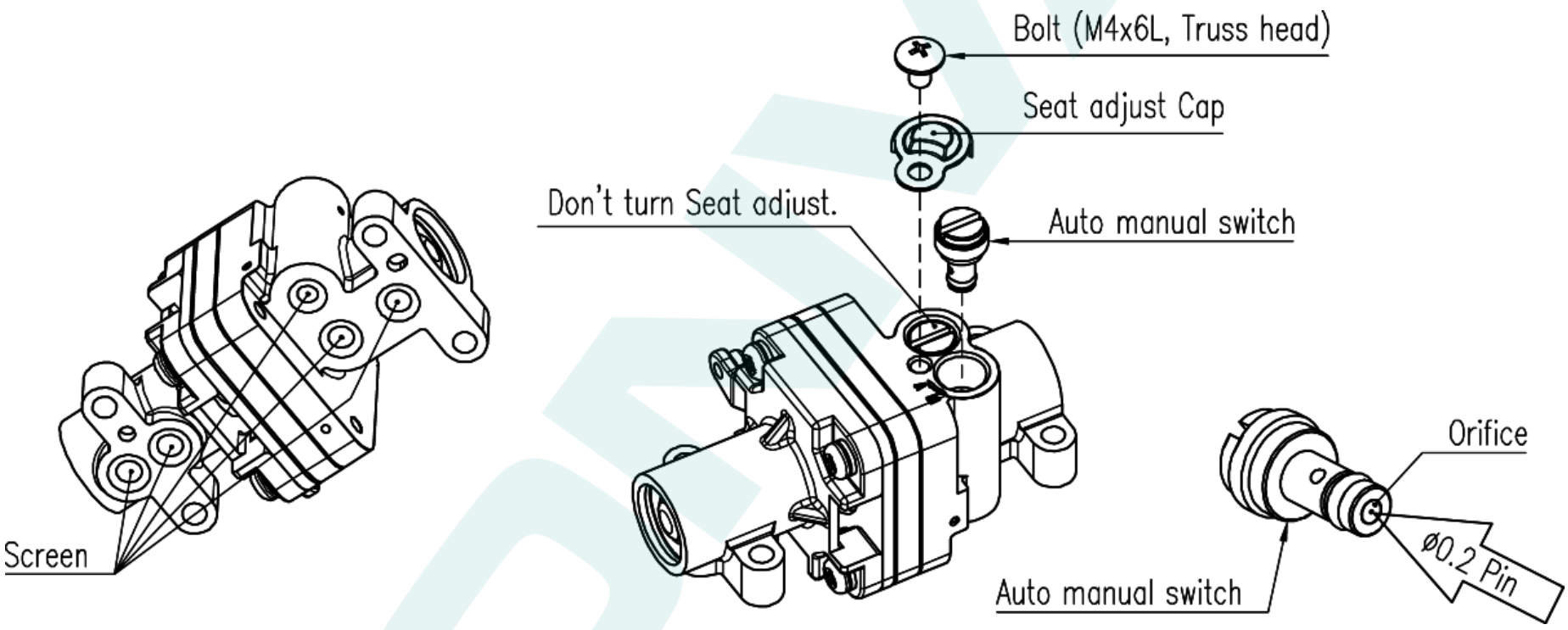
3. When removing the pilot valve from the unit, be cautious not to lose the O-ring attached to the rear side of the pilot valve and the stabilizing spring between the pilot valve and the torque motor.

4. On the back of the Auto Manual switch, there is a fixed orifice (0.3 pie) that can become clogged with dust and other substances, leading to positioner malfunction. If the positioner is not functioning properly, first remove the pilot valve and check if the holes on the screens are clogged. Clean the screens if necessary.

5. If the positioner still does not function properly, remove the Auto-Manual switch and check the back of the switch to see if the orifice is clean. Clean the orifice with air and reassemble the switch and the pilot valve to the positioner and test it again.

6. If the unit is still not working, use a 0.2 pie drill or pin and insert it into the orifice hole at the back of the Auto-Manual switch to clear any blockages.

PILOT UNIT AND AUTO MANUAL SWITCH



SEALS :

Seals play a critical role in the proper functioning of the positioner, and it is essential to inspect them regularly to ensure their integrity. As part of routine maintenance, it is recommended to perform the following checks on the seals at least once a year:

1. Diaphragms: Examine the diaphragms for any signs of damage, such as tears, cracks, or wear. Damaged diaphragms can lead to air leakage and affect the positioner's performance. If any diaphragms are found to be damaged, replace them with new ones.

2. O-Rings: Check the o-rings for any signs of wear, deformation, or deterioration. Damaged o-rings can cause air or fluid leaks, leading to inaccurate valve positioning. If any o-rings are found to be damaged, replace them with new ones of the appropriate size and material.

3. Packings: Inspect the packings for wear or damage. Packings are used to prevent leakage in various parts of the positioner. If any packings are found to be damaged or worn out, replace them with new ones to ensure proper sealing.

4. Lubrication: Ensure that the seals are adequately lubricated to maintain their flexibility and prevent friction-related damage. Follow the manufacturer's guidelines for the appropriate lubrication procedure and intervals.

TROUBLESHOOTING

THE POSITIONER DOES NOT RESPOND TO THE INPUT SIGNAL :

1. Verify the supply pressure level, ensuring that it is at least 1.4 Kgf/cm2. For spring-return type actuators, the supply pressure should exceed the spring's specification.

2. Ensure that the input signal is correctly supplied to the positioner and that it is within the range of 4~20mA DC.

3. Check the proper setting of the zero point and span point in the positioner. These settings are crucial for accurate valve positioning.

4. Inspect the positioner's nozzle for any blockages and ensure that pressure is supplied to the positioner and properly exhausted through the nozzle. If the nozzle is blocked by any substances, send the product for repair.

5. Verify that the feedback lever has been installed correctly. Proper installation of the feedback lever is essential for the positioner to accurately sense and control the valve position.

THE PRESSURE OF OUT1 REACHES SUPPLY PRESSURE LEVEL AND DOES NOT COME BACK DOWN :

1. Inspect the auto manual switch to ensure it is functioning correctly. If the switch is damaged, replace it with a new one or replace the pilot relay valve if needed.

2. Check for any gaps or damages between the nozzle and the flapper in the positioner. If any damage is found, please send the product to the nearest Convalve BV office or the main office in the Netherlands for repair.

THE PRESSURE IS EXHAUSTED ONLY BY AUTO MANUAL SWITCH :

Ensure that the positioner's nozzle is not blocked and that the pressure is correctly supplied to the positioner, and that it is being exhausted through the nozzle. Blocked nozzles can hinder the proper functioning of the positioner and affect valve positioning accuracy.

HUNTING OCCURS :

1. Examine the safety spring next to the Pilot unit to ensure it has not been displaced or damaged. The safety spring is crucial for the safe operation of the positioner, and any issues with it should be addressed immediately.

2. Evaluate if the size of the actuator is adequate for the application. If the actuator is too small relative to the required flow rate, consider inserting an orifice to reduce the pressure flow rate and prevent potential issues with hunting or unstable operation.

3. Check for any friction between the valve and the actuator. Friction can negatively impact the positioner's performance and result in inaccurate valve positioning. If friction is present, consider increasing the size of the actuator or taking measures to reduce the friction level.

THE ACTUATOR MOVES ONLY TO FULL OPEN AND FULL CLOSE POSITIONS :

1. Verify whether the Span or Cam of the positioner is correctly installed based on the actuator's direct or reverse acting behavior. If it is not installed correctly, please refer to page 19 in the product manual for guidance on proper installation procedures.

LINEARITY IS TOO LOW :

1. Verify if the positioner is correctly positioned, and specifically, check if the feedback lever is parallel to the ground when the valve is at the 50% point of its stroke. Proper positioning is essential for accurate valve control and reliable performance.

2. Check if the zero and span points have been correctly adjusted. If any adjustments are made to one of these values, the other one must be re-adjusted as well to maintain the proper calibration of the positioner.

3. Verify the stability of the supply air pressure level from the regulator. If the pressure level is found to be unstable, it may indicate a faulty regulator. In such cases, the regulator should be replaced to ensure a consistent and reliable air supply to the positioner.

HYSTERESIS IS TOO LOW :

1. In the case of a double-acting actuator, it is important to verify that the seat adjustment has been correctly carried out. If you have any inquiries or require additional guidance regarding the seat adjustment process, we recommend reaching out to Convalve for further assistance.

2. Backlash can be a concern if there is looseness in the feedback lever and lever spring. To mitigate the risk of backlash, it is crucial to properly adjust the lever spring to ensure a stable and precise operation.

3. Ensure that the connection bar to the feedback lever is securely fastened. A tight and reliable connection will contribute to smooth and accurate functioning of the system.