

tissin

Smart Position Transmitter

TS510/TS515 Series

Instruction manual



Tissin Co.Ltd.

Ver. PM-TS510EN_07/2025

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1 Introduction

1.1 General information for the user

This instruction includes installation, operation, maintenance, and parts information for TS510/TS515 series.

Keep these instructions in a location which is easily accessible to every user and make these instructions available to every new owner of the device.

- Installation, commissioning and maintenance of the product can only be performed by trained specialist personnel who have been authorized by the plant operator to do so.
- To avoid possible injury to the personnel or damage to valve parts, WARNING, CAUTION and NOTICE must be strictly followed.
- Before installing or commissioning, be sure to read and thoroughly understand the product manual and operate the product properly.
- Operators must strictly observe the applicable national regulations with regards to installation, function tests, repairs, and maintenance of electrical products.
- For additional information or if specific problems occur that are not explained in these instructions, contact the manufacturer.

1.2 Limited warranty and disclaimer

- This product has been fully inspected and shipped through a thorough quality inspection procedure. The manufacturer warranty period of the product is 18 months after the product is shipped from Tissin in Korea.
- For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided. This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
- Using the device in a manner that does not fall within the scope of its intended use, disregarding this manual, using under unqualified personnel, or making unauthorized alterations releases the manufacturer from liability for any resulting damage. This renders the manufacturer's warranty null and void.

1.3 Requirements for safety

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. These safety instructions are intended to prevent hazardous situations and/or equipment damage. For the safety, it is important to follow the instructions in the manual.

 **WARNING**

Failure to observe the warning may result in serious injuries or death.

 **CAUTION**

Failure to observe this warning may result in damage to the device or personal injury.

 **NOTICE**

Failure to observe the warning may result in damage to the device or may degrade performance.

Safety notes

 **CAUTION**

- Only trained and authorized person should operate the machinery and the equipment.
- If it is out of the specification range, it may cause a malfunction, so please use it in compliance with the product specification.
- Never handle mechanical equipment or disassemble the device until safety is confirmed.
- Before reaching into the device or the equipment, please switch off the power supply and secure to prevent reactivation.
- Observe applicable accident prevention and the safety regulations for electrical equipment.

1.4 Basic safety instructions for use in Ex area

To prevent the risk of explosion, observe not only the basic safety instructions in the respective operating instructions for operation in the Ex area, but also the following.

 **WARNING**

- Observe applicable safety regulations (National Safety Regulations) and general rules for construction and operating technology.
- Check if the device is suitable for the area of use.
- Check if the range of certified and permitted explosion-proof specifications for the product.
- Close all unnecessary cable glands with lock screws approved for the explosions area.
- TS510/TS515 series have the explosion proof markings for Flame proof(Ex d IIC T5/T6 Gb, Ex tb IIIC T100°C/T85°C Db). Available in Zone 1 and Zone 2.

1.5 Certifications

This product has obtained a variety of explosion-proof certification and safety level certification. For details, please visit our website and download the corresponding explosion-proof certificate for confirmation.

Certificate	Certificate number	Explosion proof grade
 IECEx	IECEx EPS 23.0105X	Ex db IIC T5/T6 Gb Ex tb IIIC T100°C/T85°C Db IP66
 ATEX	EPS 23 ATEX 1 376 X	II 2G Ex db IIC T5/T6 Gb II 2D Ex tb IIIC T100°C/T85°C Db IP66
 KCS	24-KA2BO-0678X	Ex db IIC T5/T6 Gb
	24-KA2BO-0679X	Ex tb IIIC T100°C/T85°C Db
 NEPSI	GYJ24.1289X	Ex db IIC T5/T6 Gb Ex tb IIIC T100°C/T85°C Db
 EAC	In progress	1Ex d IIC T5/T6 Gb Ex tb IIIC T100°C/T85°C Db

2 Product Description

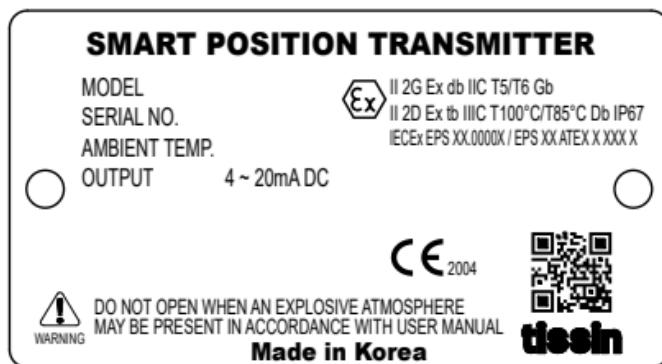
2.1 Function

Smart position transmitter is a device that proportionally changes the valve opening into a 4-20mA DC current signal and transmits this information to DCS room or controller.

2.2 Features

- Flame proof
- Easily check the feedback signal by built-in LCD
- Easy setting by 2 buttons
- High resolution and accuracy
- Improved accuracy of feedback signal by 5-point setting
- Limit switch option

2.3 Label



Item	Description
MODEL.	Model number
SERIAL No.	Serial number
AMBIENT TEMP.	Operating temperature
OUTPUT	Output current signal range

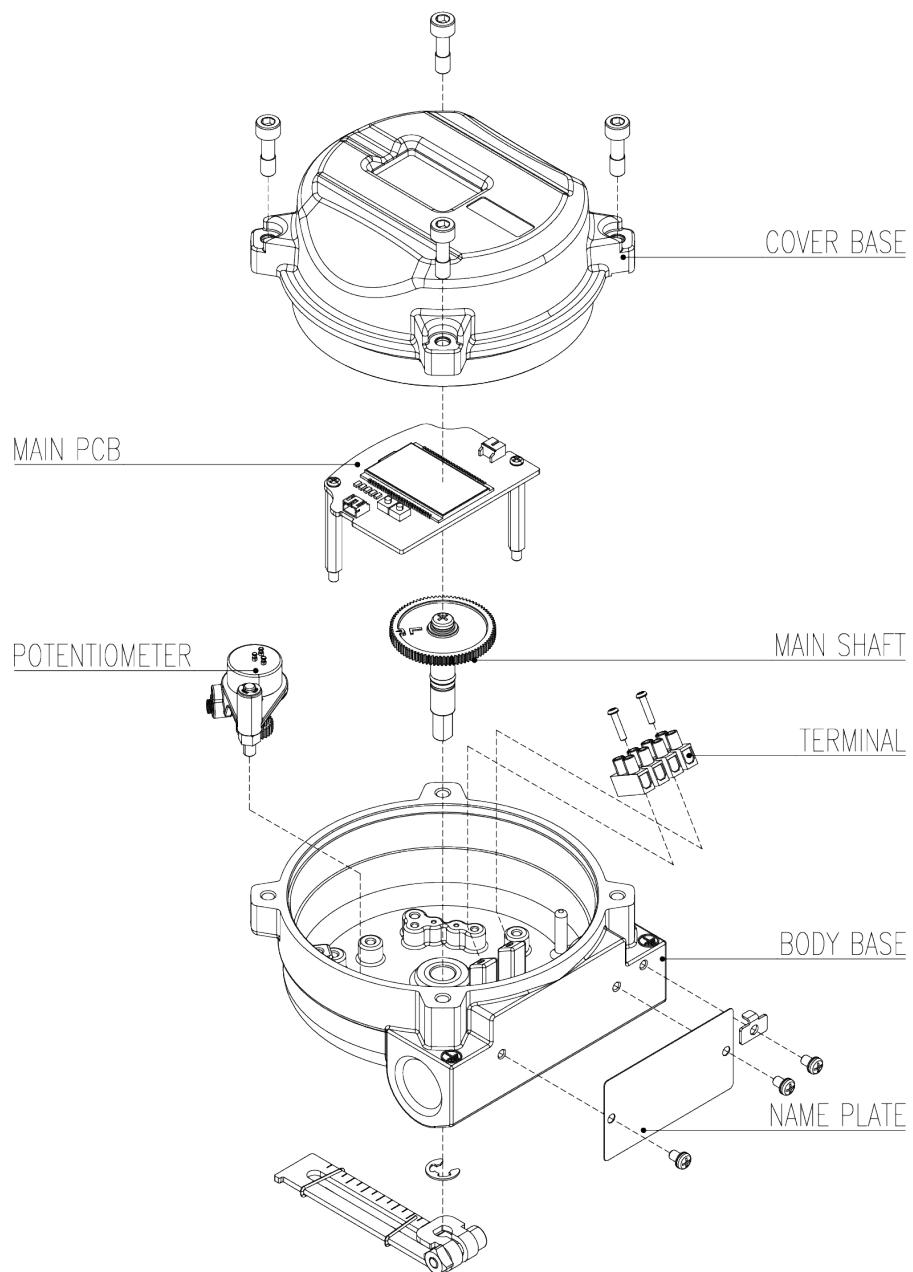
2.4 Product code

Model	TS510					
Material	Aluminum die casting	TS510				
	STS 316	TS515				
Acting type	Linear		L			
	Rotary		R			
Explosion proof type	ATEX&IECEx		A			
	KCS		K			
	NEPSI		C			
	EAC(TR CU)		E			
Conduit entry	NPT1/2		1			
	M20x1.5P		2			
	NPT3/4		3			
	M25x1.5P		4			
Lever type	Stroke 10~80mm (Linear type)		1			
	Stroke 70~150mm (Linear type)		2			
	NAMUR (Rotary type)		5			
Option	With LCD		1			
	Without LCD		2			
	With Limit switch and Dome indicator		3			
	With Limit switch and LCD		4			

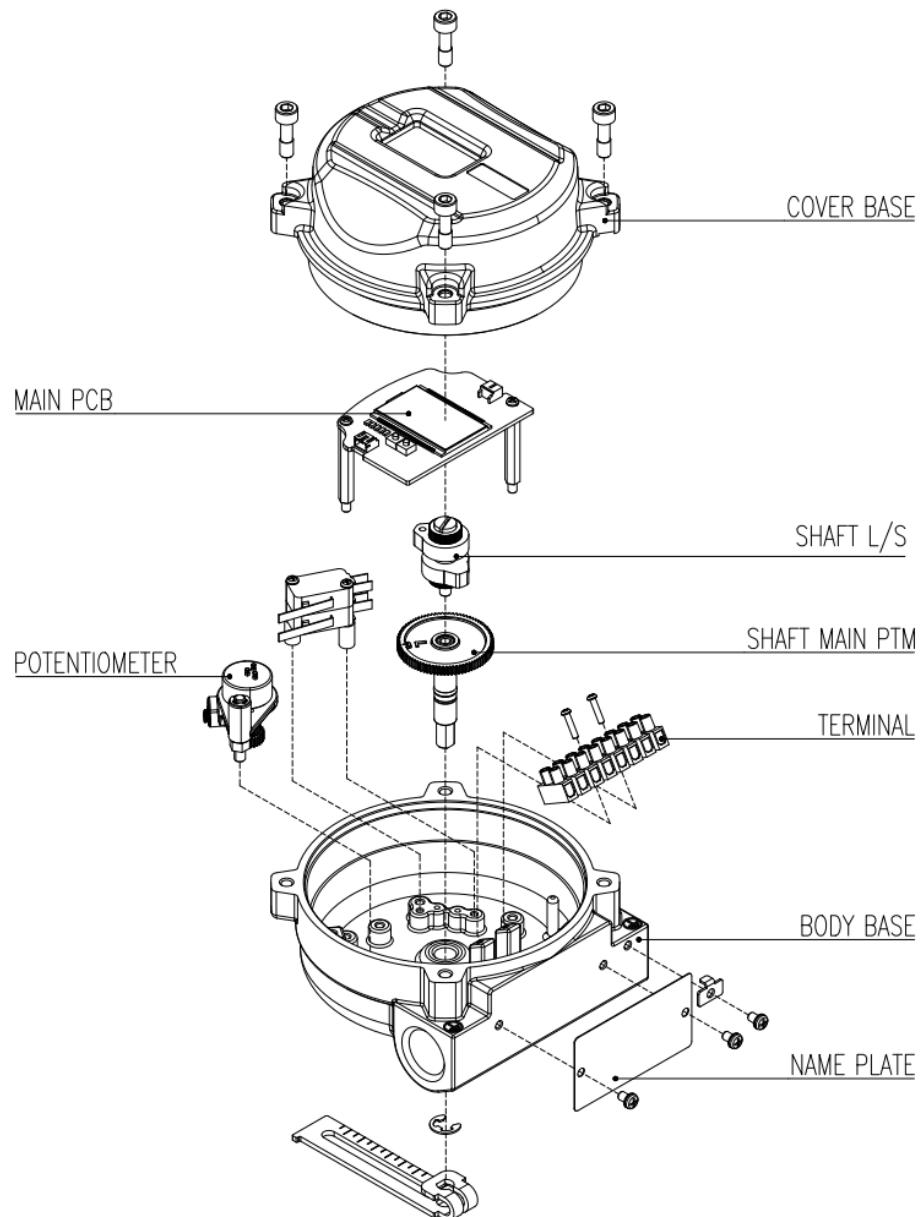
2.5 Specification

Item	TS510	TS515
Connection type	2-Wire	
Supply voltage	9~28V DC	
Output signal	4~20mA DC	
Explosion proof	Ex db IIC T5/T6 Gb Ex tb IIIC 100°C/T85°C Db	
Enclosure	IP67	
Conduit entry	NPT1/2, NPT3/4, M20, M25	
Explosion proof temp.	-40°C~+80°C(T5) / -40°C~+70°C(T6)	
Ambient temp.	-40°C~80°C (standard)	
Linearity	±1.0% F.S	
Hysteresis	±0.2% F.S	
Sensitivity	±0.2% F.S	
Coating	Polyester powder coating	-
Material	Aluminum die casting	Stainless steel 316
Weight	1.4kg	3.3kg

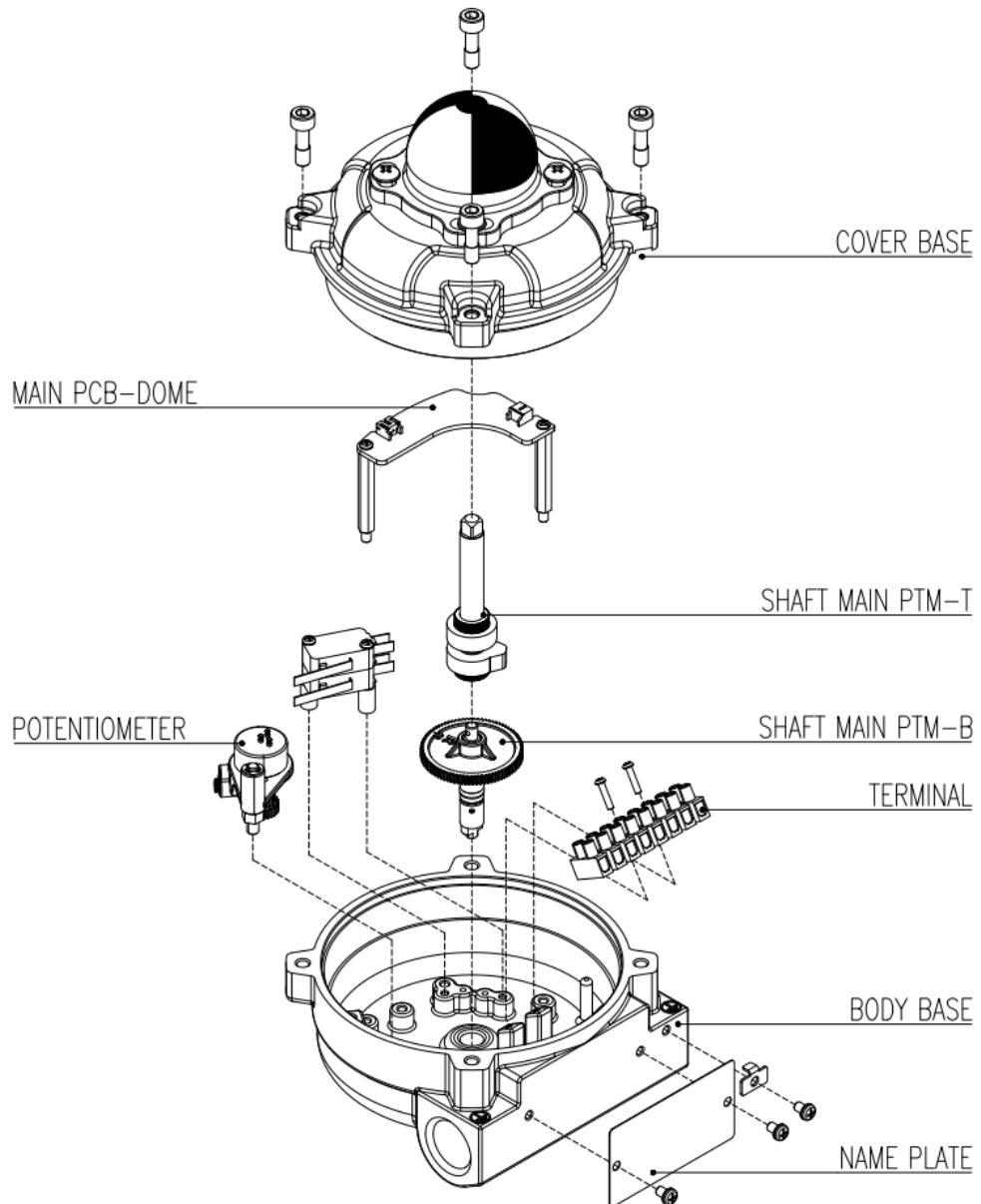
2.6 Exploded view



<TS510 with LCD>



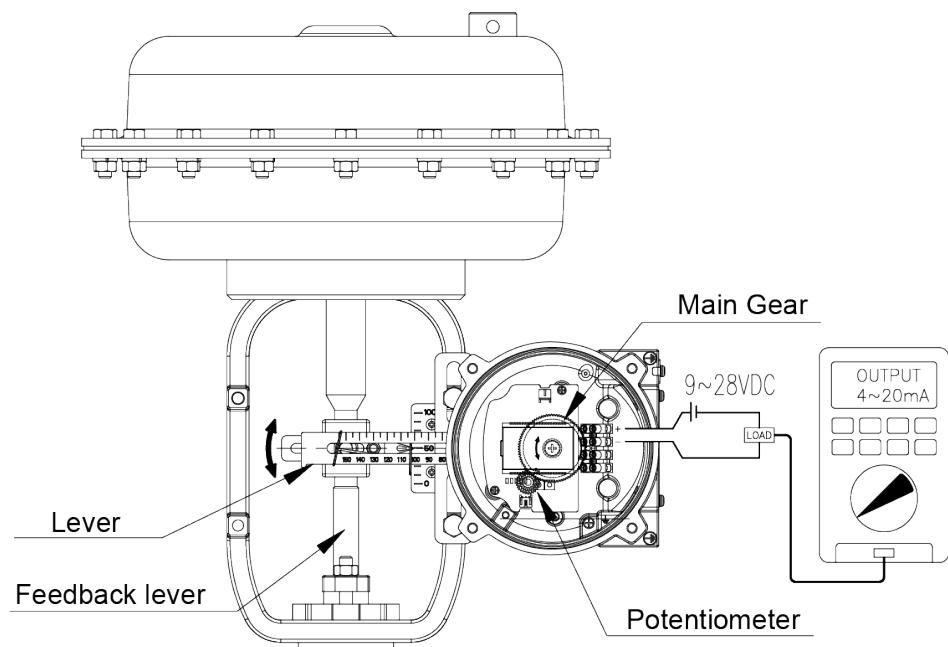
<TS510 with LCD and Limit switch>



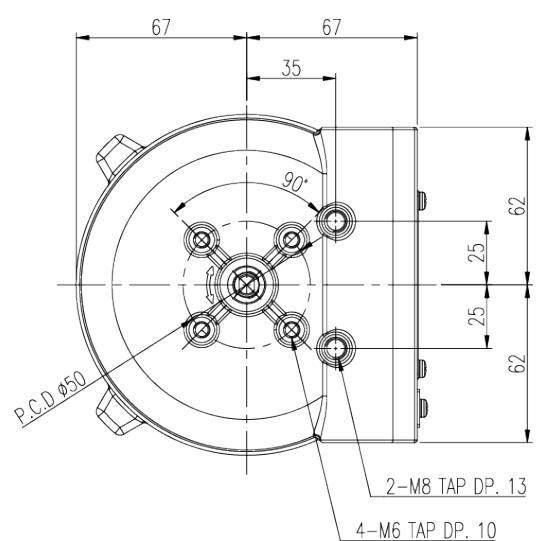
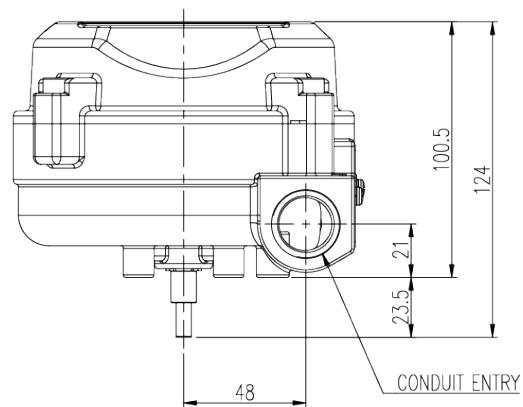
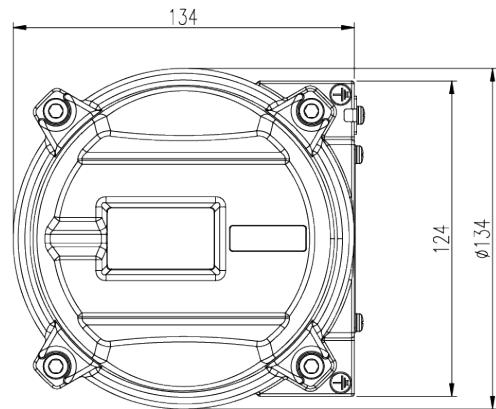
<TS510 with Limit switch and Dome>

2.7 Principle of operation

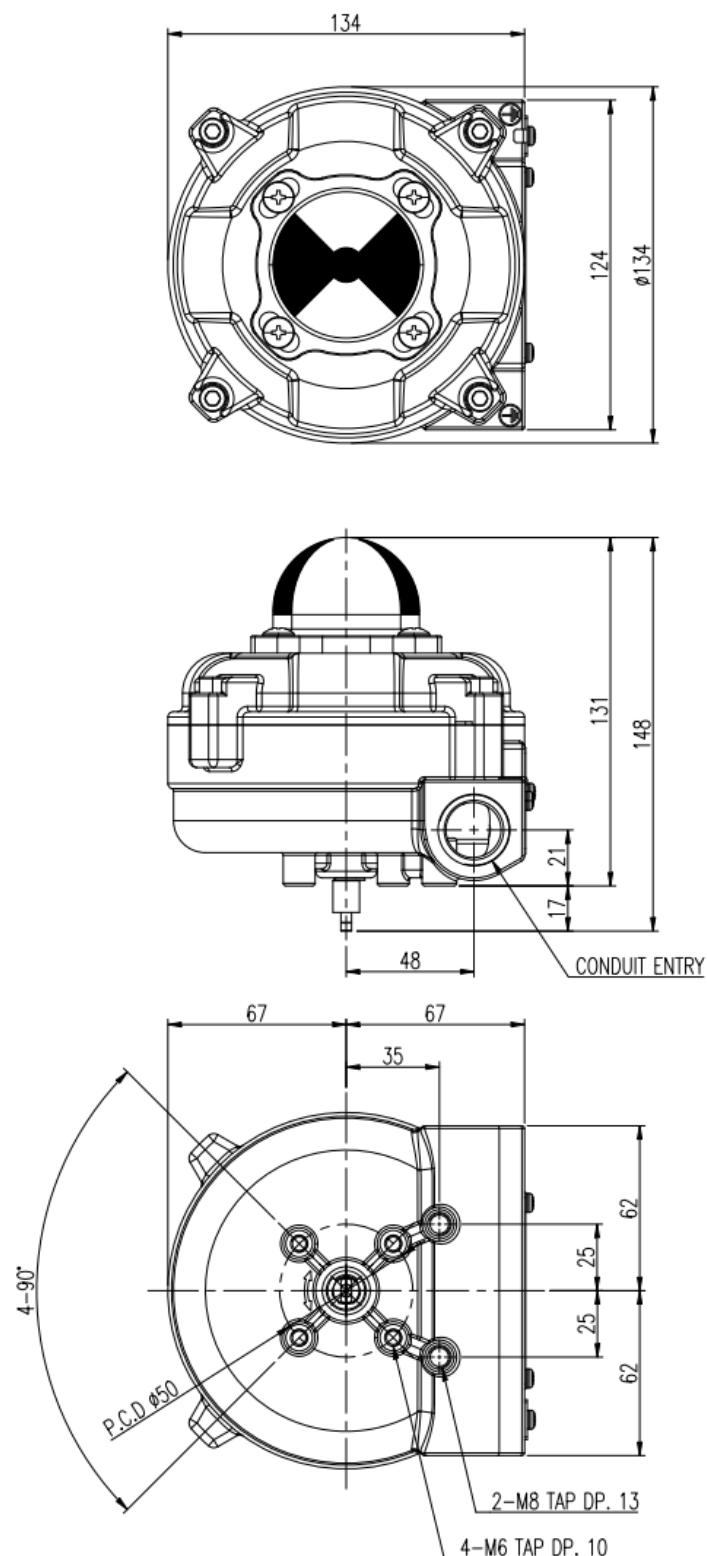
If the position of valve stem changed, this change makes the main gear of main shaft rotate by the connected lever, and it also make the resistance value of potentiometer change. The change in resistance value proportionally changes the current value in the circuit, and this information is transmitted to Calibrator or DCS.



2.8 Product Dimension



<TS510 with Standard cover>



<TS510 with Dome cover>

3 Installation

3.1 Before installation

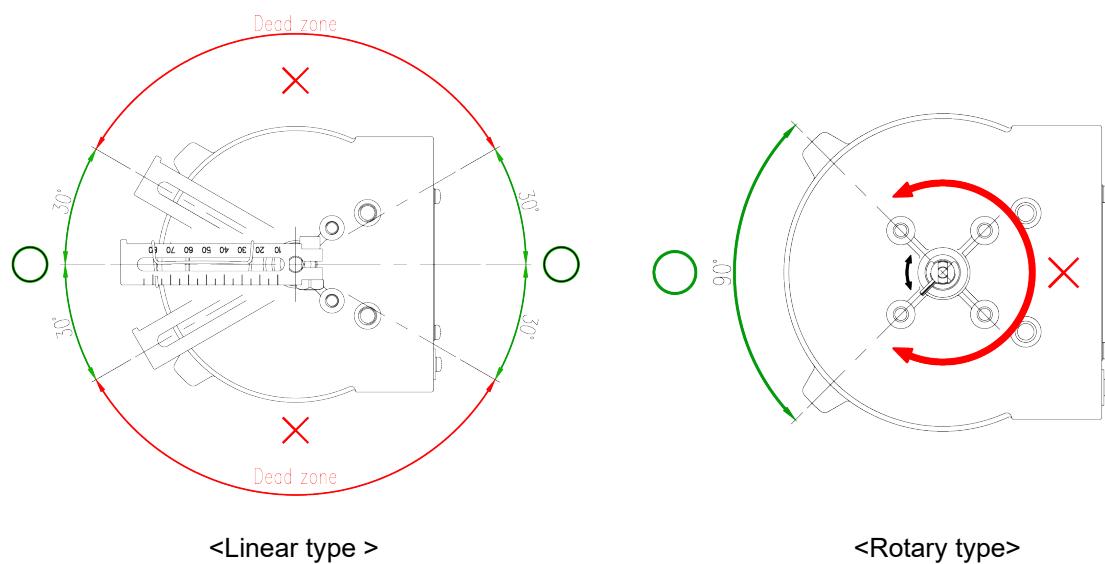
 **WARNING**

- In explosion proof area, be sure to shut off all connected power before installation.
- Before installation, shut off the air pressure and make sure that no air pressure remains inside the actuator.

3.2 Effective angle of operation

 **NOTICE**

- When install the product, the feedback lever must move within the effective angle range in figure below.
- If exceed the effective angle, the feedback signal can't be received normally.



3.3 Linear type installation

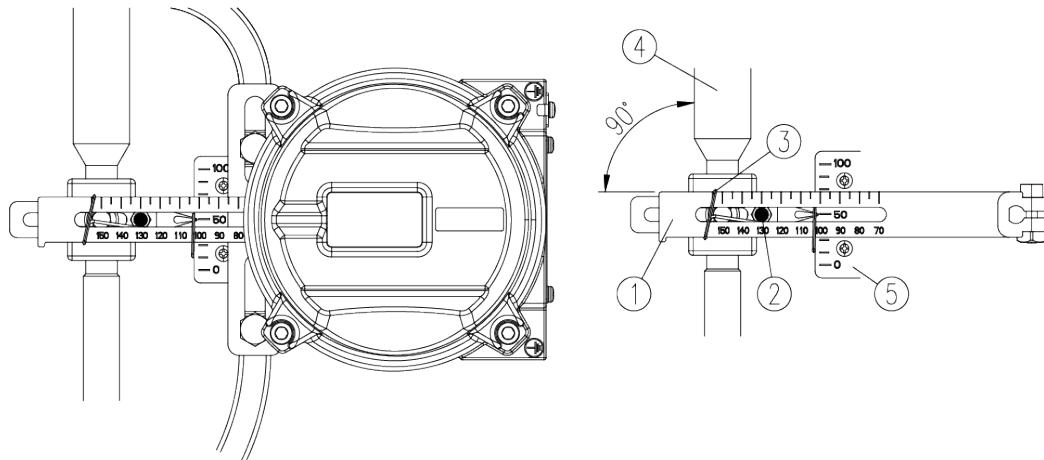
3.3.1 Before installation

When make the mounting bracket and connecting the lever to the stem connection pin, be sure to observe the following two points.

If don't comply, it will affect the product performance such as linearity.

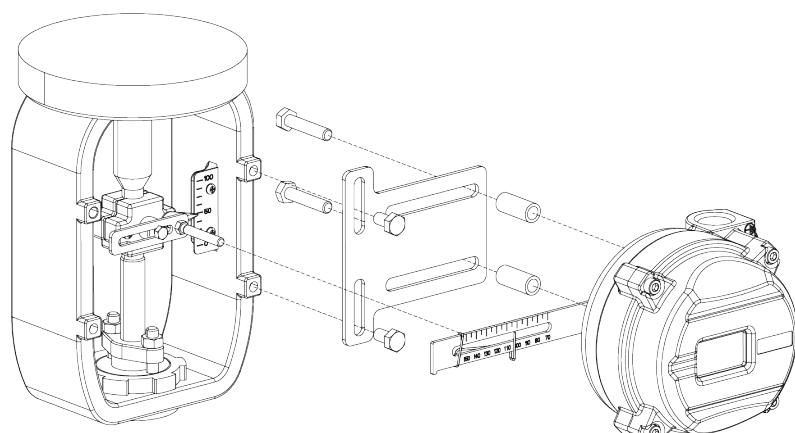
 **NOTICE**

- ① When the valve stroke is 50%, the feedback lever (1) should be horizontal.
- ② When the valve stroke is 50%, the stem connection pin (2) must be located at the numeric position marked on the feedback lever (1) that is corresponding to the valve stroke.



3.3.2 Linear bracket installation

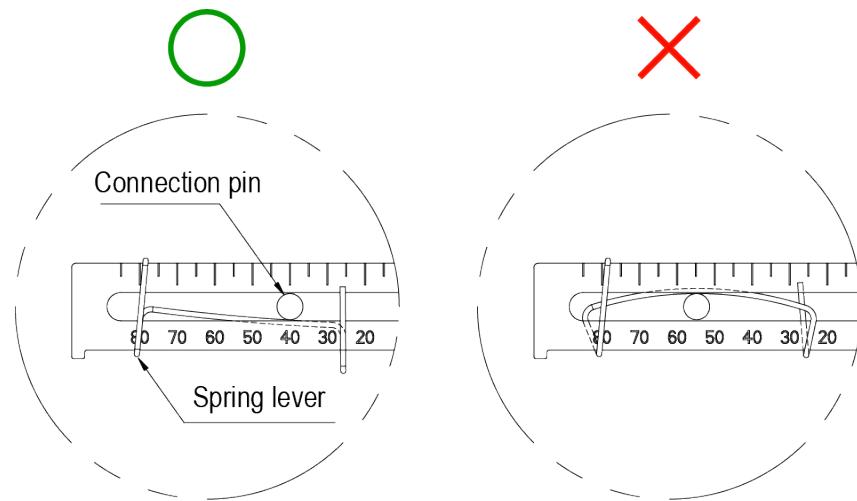
Check the above two notices and refer to product dimensions and figure below to make/install the appropriate bracket to actuator.



3.3.3 How to connect Spring lever and Stem connection pin

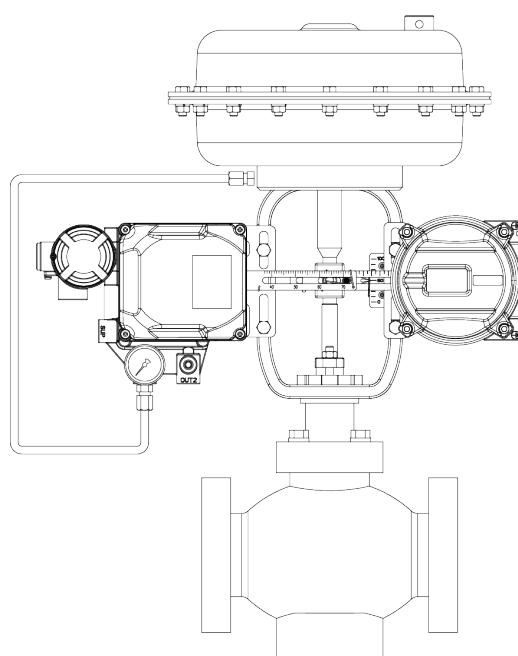
When connecting the stem connecting pin, make sure to install the engraved position and spring lever accurately.

Below figure is a connection example for 40 mm valve stroke.



3.3.4 Install with Positioner

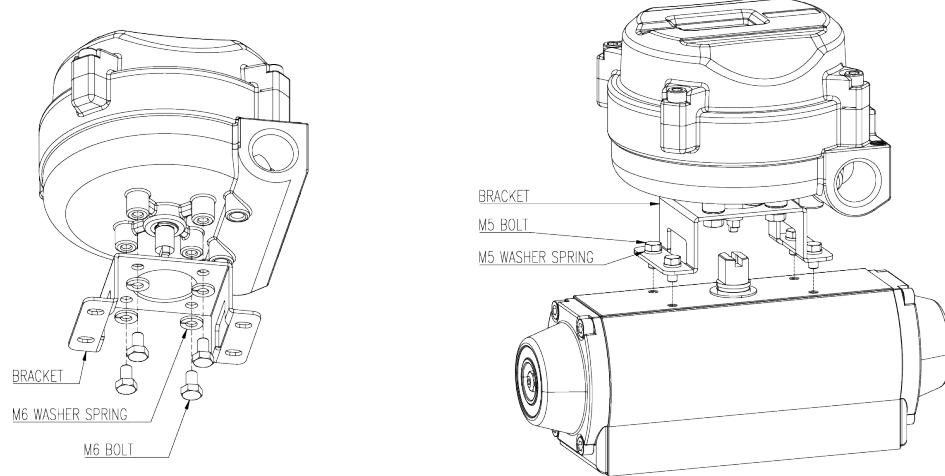
When mount it together with Positioner on the valve, please install them as below figure and connect the lever with same Stem connection pin.



3.4 Rotary type installation

3.4.1 NAMUR type

Please mount bracket to the product using bolts. And mount the product's feedback shaft on Actuator's stem and fix it using bolts.

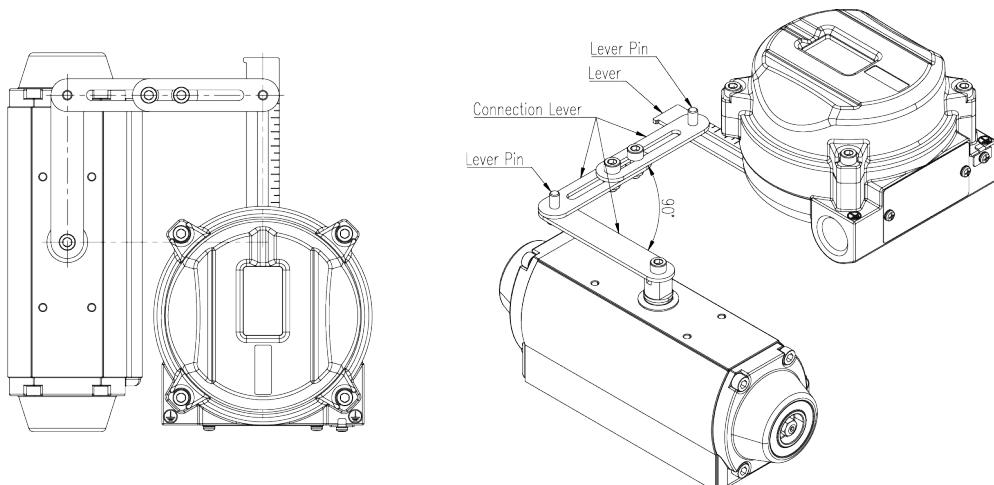


3.4.2 Lever type

Refer to the figure below, please mount an appropriate bracket and Connection Lever on the product.

 **NOTICE**

- The length between Actuator's stem and Connection Lever must be the same as the length between Position transmitter's shaft and Connection Lever.
- If both lengths are not the same, the rotation angle of Actuator may not be transmitted accurately to Position transmitter, and it may affect the accuracy.



4 Electrical connection

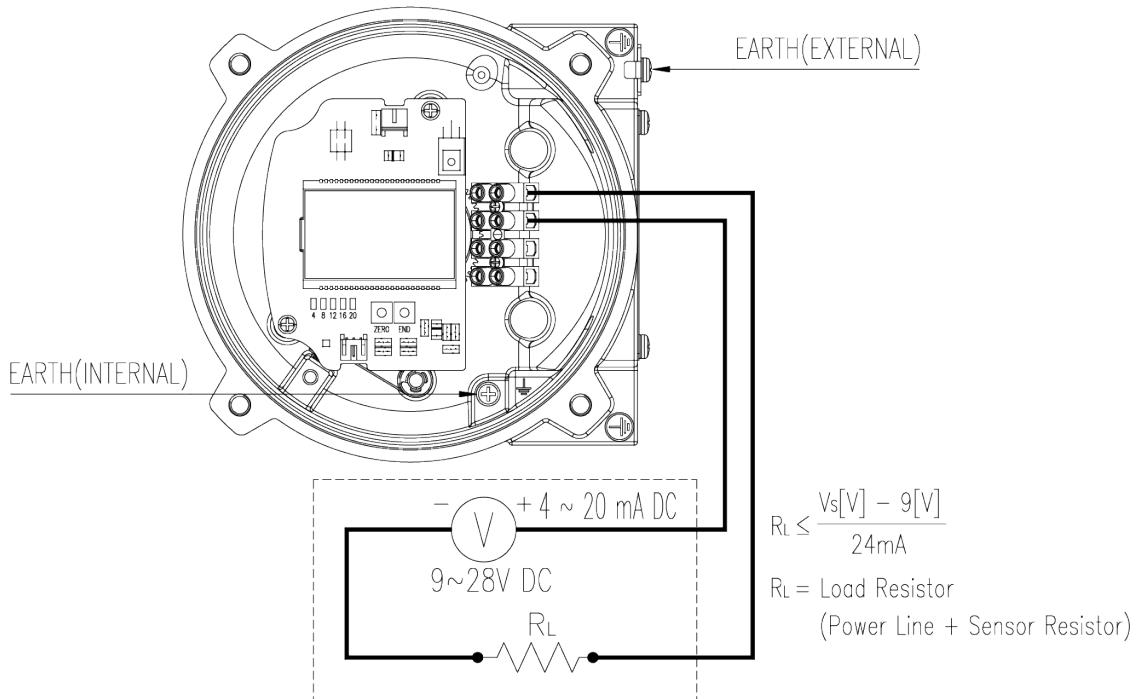
WARNING

- When open the terminal cover, be sure to shut off the power first.
- When connect the power using a Flame proof type packing cable connector, use an Flame proof approved product that is suitable for use at the site.
- There are two conduit entry in the product, and be sure to block the unused conduit entry with an explosion proof blind plug.

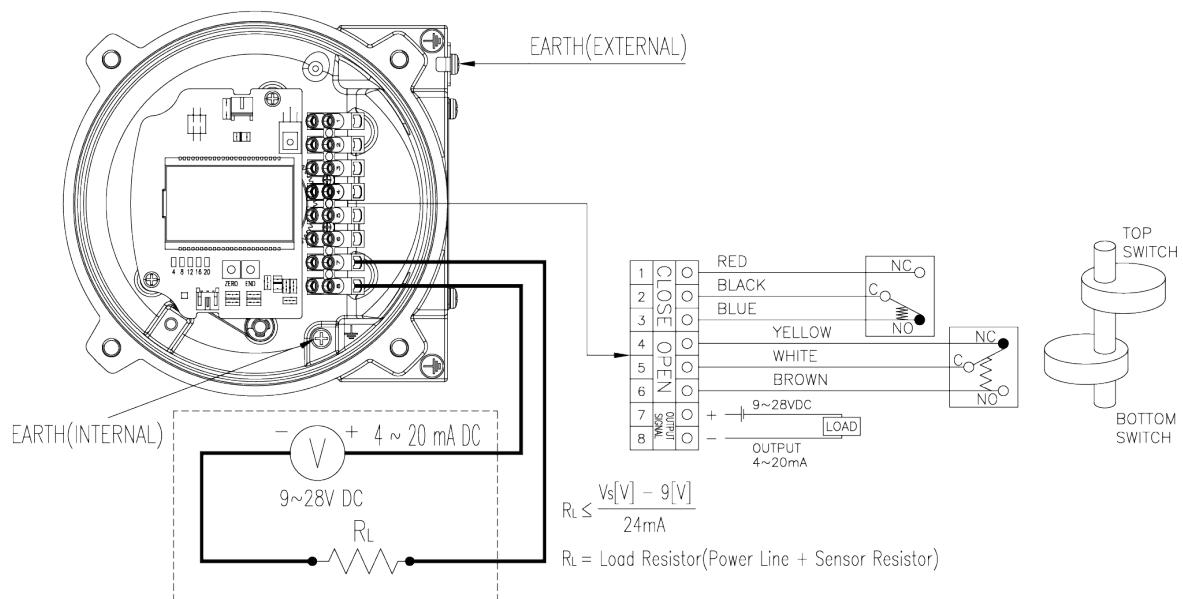
NOTICE

- Please supply 9~28V DC to Output terminals
- To protect the product, ground it to the ground terminal inside and outside the product.

4.1 Standard type



4.2 With Limit switch type



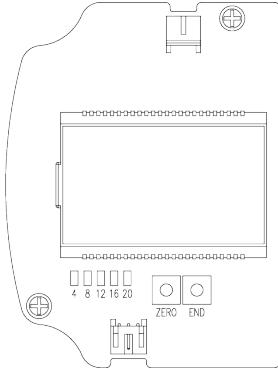
5 How to setup

NOTICE

In general, please set 2-Point setting corresponding to the valve position 0% and 100%.
If you want a more precise feedback signal, please set 5-Point setting.

5.1 2-Point setting

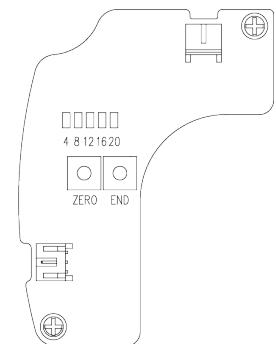
- ① Supply 4mA to make the valve stroke 0%
- ② Press ZERO button for 2 seconds. Then the lamps are turned on and off sequentially.
(※ If you want DA setting: Press END button for 2 seconds)
- ③ Supply 20mA to make the valve stroke 100%
- ④ Press END button for 2 seconds. Then the lamps are turned on and off sequentially.
(※ If you want DA setting: Press ZERO button for 2 seconds)



5.2 5-Point setting

<Standard PCB>

- ① Supply 4mA to make the valve stroke 0% and press ZERO and END buttons at the same time for 2 seconds. Then No.4 lamp blinks.
※ If you want DA setting output:
 - (1) Input 20mA to make the valve stroke 100% and press ZERO and END buttons at the same time for 2 seconds.
 - (2) Please proceed ②~⑤ in order of 20mA, 16mA, 12mA, 8mA, 4mA.
- ② Press ZERO button. Then the data is saved, and then it moves to No.8 lamp automatically and blinks.
- ③ Supply 8mA to make the valve stroke 25% and press ZERO button. The data is saved and it moves to No.12 lamp automatically and blinks.
- ④ In the same way, please set them in order of output 12mA, 16mA and 20mA according to each position of the valve 50%, 75% and 100%.
- ⑤ The lamps are turned off when the setting is complete.



<Limit switch type PCB>

5.3 RA/DA setting

- RA setting: Input 4mA, output 4mA / Input 20mA, output 20mA
- DA setting: Input 4mA, output 20mA / Input 20mA, output 4mA

※ Factory setting: RA setting

6 How to correct Potentiometer gear position

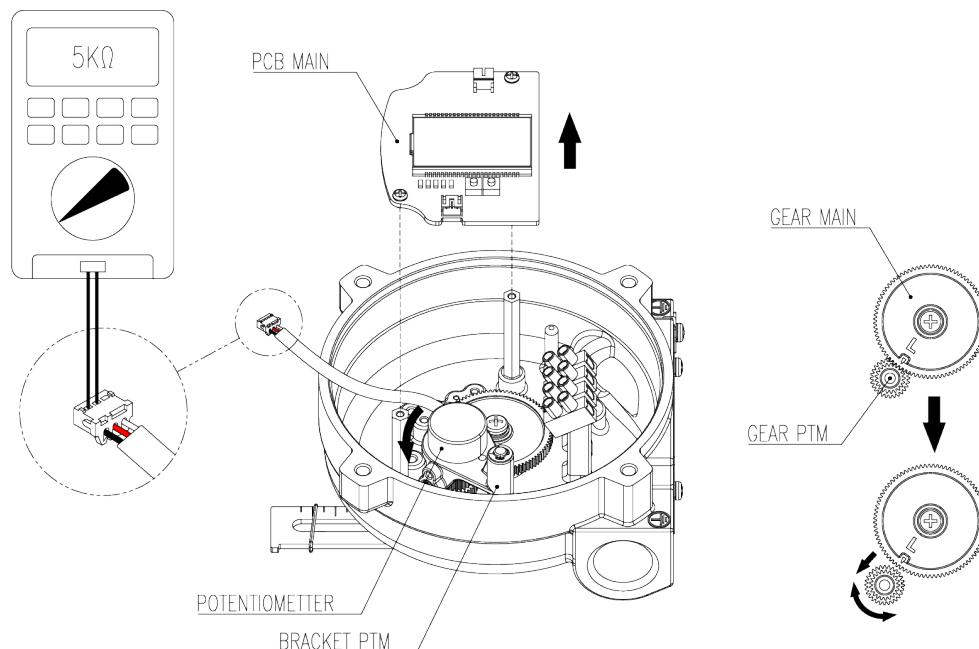
During transportation or installation, Potentiometer gear could be separated from Main gear due to strong shock or vibration, and the set position value could be changed. In this case, please correct the position of Potentiometer gear in the following way.

 **WARNING**

- When open the terminal cover, be sure to shut off all power sources first.
- Before installation, shut off the air pressure and make sure that no air pressure remains inside the actuator.

How to correct

- ① Open the cover, loosen PCB fixing bolts, and unplug the two connection cables connected to PCB.
- ② Do not unplug the cable too hard.
- ③ There are three cables from Potentiometer (Black, Red, White). Please measure the resistance between Red cable and Black cable (or White cable) using 0.2mm metal pins.
- ④ Move the feedback lever to 50% position, and pushing Potentiometer gear and rotate the gear until the resistance is $5\text{k}\Omega$.
- ⑤ After correct the position, please release Potentiometer gear to meet Main gear.





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