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1 Introduction

1.1 General Information for the users

Thank you for purchasing Rotork YTC Limited products. Each product has been fully inspected after its production to offer you the highest quality and reliable performance. Please read the product manual carefully prior to installing and commissioning the product.

- Installation, commissioning, and maintenance of the product may only be performed by trained specialist personnel who have been authorized by the plant operator accordingly.
- The manual should be provided to the end-user.
- The manual can be altered or revised without any prior notice. Any changes in product's specification, design, and/or any components may not be printed immediately but until the following revision of the manual.
- The manual should not be duplicated or reproduced for any purpose without prior approval from Rotork YTC Limited, Gimpo-si, South Korea.
- In case of any other problems that are not stated in this manual, please make immediate contact to Rotork YTC Limited.
- IP Converter is an accessory of the control valve, so please make sure to read the applicable instruction manual of the control valve prior to installation and operation.

1.2 Manufacturer Warranty

- For the safety, it is important to follow the instructions in the manual. Manufacturer will not be responsible for any damages caused by user's negligence.
- Any modifications or repairs to the product may only be performed if expressed in this manual. Injuries and physical damages caused by customer's modifying or repairing the product without a prior consultation with Rotork YTC Limited will not be compensated. If any alterations or modifications are necessary, please contact Rotork YTC Limited directly.
- The warranty period of the product is (18) months from the date of shipment unless stated otherwise. Date of shipment can be checked by providing the LOT NO. or SERIAL NO. to us.
- Manufacturer warranty will not cover products that have been subjected to abuse, accidents, alterations, modifications, tampering, negligence, misuse, faulty installation, lack of reasonable care, repair or service in any way that is not contemplated in the documentation for the product, or if the model or serial number has been altered, tampered with, defaced or removed; damages that occurs in shipment, due to act of God, failure due to power surge, or cosmetic damage. Improper or incorrectly performed maintenance will void this limited warranty.
- For detailed warranty information, please contact the corresponding local Rotork YTC Limited office or main office in South Korea.

1.3 Explosion Proof Warning (Only for Intrinsic safety type positioners)

Please ensure the unit is being used and installed in conformity with local, regional, and national explosion proof within the proper safety barrier environment.

- Refer to “2.6 Explosion Proof Certifications”
- Explosion proof type of cables and gaskets should be used, when explosion gases are present at the installation site.
- Ring terminal with surface area of more than 1.25 mm² with M4 spring washer should be used to connect the power.
- For external ground terminal, ring terminal with surface area of more than 5.5 mm² should be used.
- There is risk of explosion due to static electricity charge. Static electricity charge may develop when cleaning the product with a dry cloth. It is imperative to avoid static electricity charge in the hazardous environment. If cleaning the surface of the product is needed, must use wet clothes.
- Special conditions for safe use of sign “X” of ATEX / IECEx :

The ambient temperature range deviates from the standard temperature range :

Temperature class T5: -40°C to +60 °C

Temperature class T6: -40°C to +40 °C



2 Product Description

2.1 General

YT-930 IP converter receives 4-20 mA DC signal from the control room and outputs 0.02 to 0.1 MPa signal to pneumatic-pneumatic positioner to operate a control valve system. YT-930 is designed to be used in Ex ia IIC T5/T6 intrinsic safety or non-explosion proof environment.

2.2 Main Features and Functions

- Low air consumption level yields to lower plant operating cost.
- A wide range of uses with IP66 protection grade. (excluding the pressure gauges)
- Can be used at low voltage (8.5 V) and can be compatible with most of general controllers.
- Polyester painting makes the product strong against corrosion environment.
- Easy dial adjustment for Zero and Span.
- Modularized inner parts make maintenance easy and simple.
- I/P converter operates normally during sudden changes in supply pressure and / or high vibration environment.
- Air filter regulator <YT-200 series> can be directly installed without any pneumatic piping.
- DA and RA can be set for the output pressure relative to the input current signal by simple switch operation.
- DA and RA can be set for the analog output signal relative to the output pressure by simple switch operation. (Only 4-20 mA Analog Output option)

2.3 Label Description

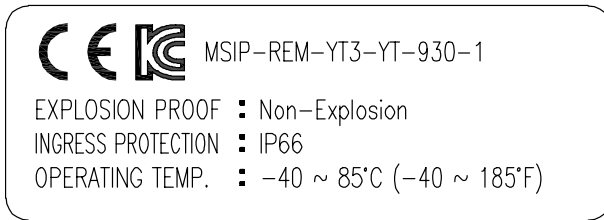


Fig. L-1: Body Label (Non-explosion)

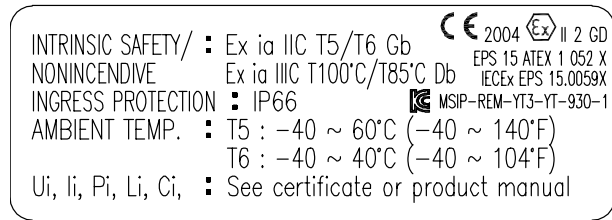


Fig. L-2: Body Label (Intrinsic safety)

- EXPLOSION PROOF RATING : Indicates certified explosion proof grade.
- INGRESS PROTECTION : Indicates protection grade.
- OPERATING TEMPERATURE : Indicates allowed operating ambient temperature range.
- INTRINSIC SAFETY / NONINCENDIVE : Indicates intrinsic safety explosion proof grade.
- AMBIENT TEMPERATURE : Indicates the allowable ambient temperature for explosion proof.
- Ui, li, Pi, Ci, Li : Indicates the allowable electrical data in the certificate. You can see the details in the certificate.

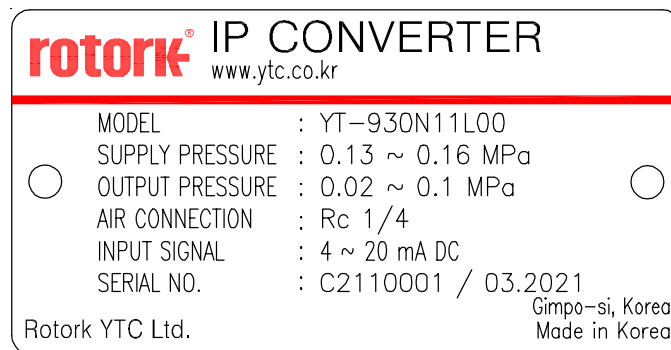


Fig. L-3: Cover Label

- MODEL : Indicates the model number and additional symbols.
- SUPPLY PRESSURE : Indicates the supply pressure range.
- OUTPUT PRESSURE : Indicates output pressure range.
- AIR CONNECTION : Indicates air connection thread type
- INPUT SIGNAL : Indicates input signal range.
- SERIAL NO. : Indicates the unique serial number.
- MONTH.YEAR : Indicates the manufactured month and year.

2.4 Product Code

YT-930		1	2	3	4	5	6
1	Explosion Proof	N : Non-Explosion					
		i : Intrinsic Safety (ATEX, IECEx)					
2	Output Pressure	1 : 0.02 to 0.1 MPa (0.2 to 1 bar)					
		2 : 0 to 0.12 MPa (0 to 1.2 bar)					
		3 : 0.04 to 0.2 MPa (0.4 to 2 bar)					
		4 : 0 to 0.23 MPa (0 to 2.3 bar)					
3	Conduit – Air Connection Type	1 : G 1/2 – Rc 1/4					
		2 : G 1/2 – 1/4 NPT					
4	Operating temp. (Non-explosion proof) ¹⁾	L : -40 to 85 °C (-40 to 185 °F)					
5	Option	0 : None					
		1 : 4-20 mA Analog Output					
6	Gauge	0 : None					
		²⁾ 1 : 0 to 0.2 MPa					
		³⁾ 2 : 0 to 0.4 MPa					

¹⁾ This option is just the normal operating temperature of the product and is not related to explosion proof temperature. See “2.6 Certificates” for explosion proof temperature.

²⁾ Select for 1, 2 in 2 Output Pressure.

³⁾ Select for 3, 4 in 2 Output Pressure.

2.5 Product Specification

Model		YT-930	
Input Signal		4-20 mA DC	
Impedance		Max. 390 Ω @ 20 mA DC	
Supply Pressure – Output Pressure	Standard	① 0.13 to 0.16 MPa (1.2 to 1.6 bar) – 0.02 to 0.1 MPa (0.2 to 1.0 bar)	
	Multi-range	② 0.14 to 0.16 MPa (1.4 to 1.6 bar) – 0.00 to 0.12 MPa (0 to 1.2 bar)	
		③ 0.22 to 0.24 MPa (2.2 to 2.4 bar) – 0.04 to 0.2 MPa (0.4 to 2.0 bar)	
		④ 0.25 to 0.27 MPa (2.5 to 2.7 bar) – 0.00 to 0.23 MPa (0 to 2.3 bar)	
Explosion Proof		1. Non-explosion proof 2. ATEX/IECEx : Ex ia IIC T5/T6 Gb, Ex ia IIIC T100°C /T85°C Db	
Ambient Temperature	Operating	-40 to 85 °C (-40 to 185 °F)	
	Explosion Proof	T5	-40 to 60 °C (-40 to 140 °F)
T6		-40 to 40 °C (-40 to 104 °F)	
Air Consumption		Below 2 LPM (sup. = 0.14 MPa)	
Flow Capacity		70 LPM (sup. = 0.14 MPa)	
Linearity		± 0.5 % F.S.	
Hysteresis		± 0.5 % F.S.	
Sensitivity		± 0.2 % F.S.	
Repeatability		± 0.3 % F.S.	
Air Connection		Rc 1/4 or 1/4 NPT	
Conduit Entry		G 1/2	
Ingress Protection		IP 66 (excluding the pressure gauges)	
Housing Material		Aluminum	
Weight		1.6 kg (3.5 lb)	
Painting		Polyester Powder Coating	



Tested under ambient temperature of 20 °C, absolute pressure of 760 mmHg, and humidity of 65 %.
Please contact Rotork YTC Limited for detailed testing specification.

2.6 Certifications

※ All certifications below are posted on Rotork YTC Limited homepage(www.ytc.co.kr).

➤ **ATEX**

Type : Intrinsic safety

Rating : II 2G Ex ia IIC T5/T6 Gb, II 2D Ex ia IIIC T100°C/T85°C Db

Certification No. : EPS 15 ATEX 1 052 X

Ambient temperature : -40 to +60°C (T5), -40 to +40°C (T6)

➤ **IECEX**

Type : Intrinsic safety

Rating : Ex II 2G Ex ia IIC T5/T6 Gb, Ex II 2D Ex ia IIIC T100°C/T85°C Db

Certification No. : IECEX EPS 15.0059X

Ambient temperature : -40 to +60°C (T5/T100°C), -40 to +40°C (T6/T85°C)

➤ **Electromagnetic Compatibility (EMC)**

- EMC directive 2014/30/EC from April 2016

- EC Directive for CE conformity marking

2.7 Parts and Assembly and Operation Logic

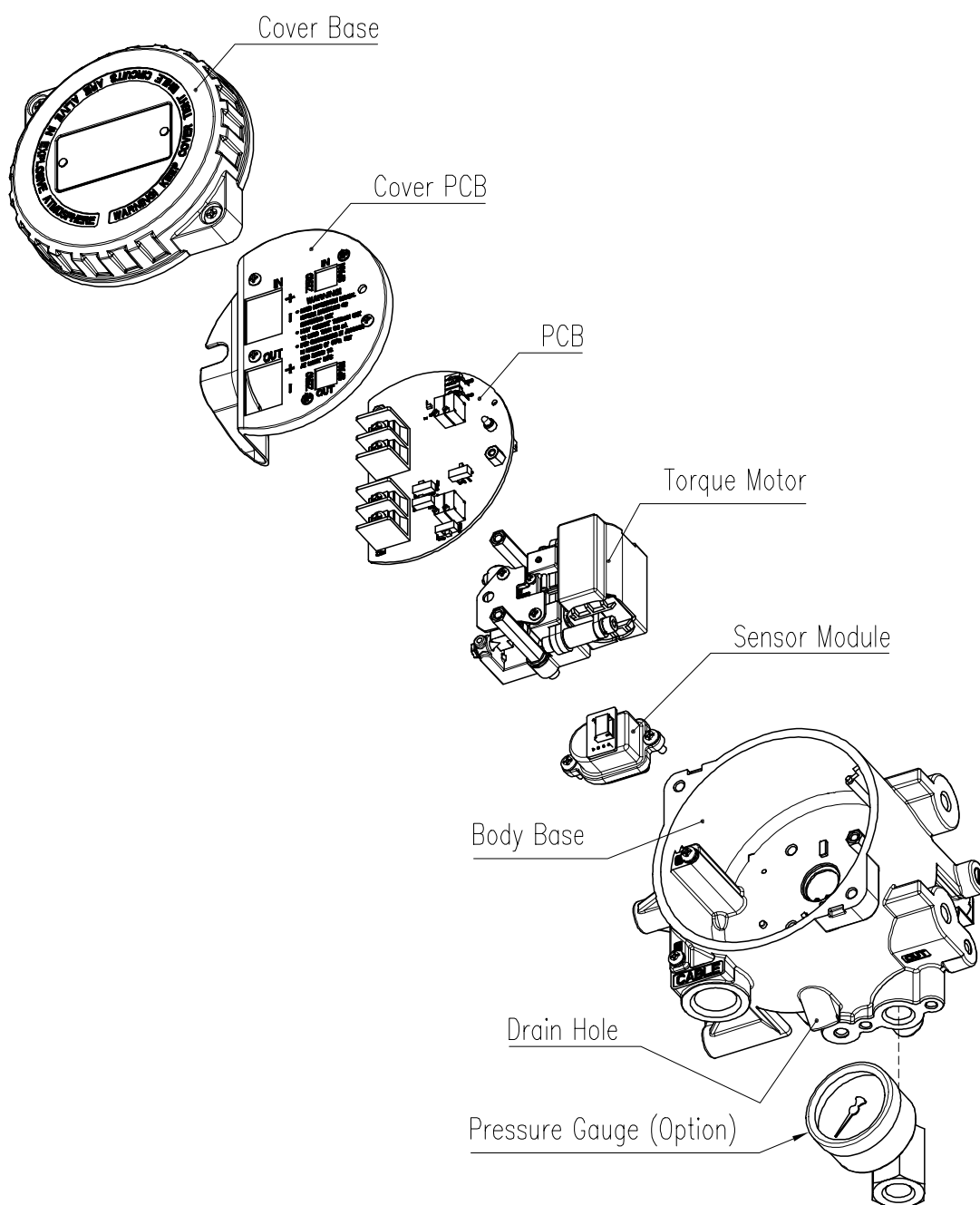


Fig. 2-1: exploded view

As input signal is being supplied to YT-930, the pressure sensor, which is connected to output port, will sense the pressure level. The main PCB will compare the input signal and output pressure level and increase or decrease the electric current of torque motor.

2.8 Product Dimension

2.8.1 YT-930 series

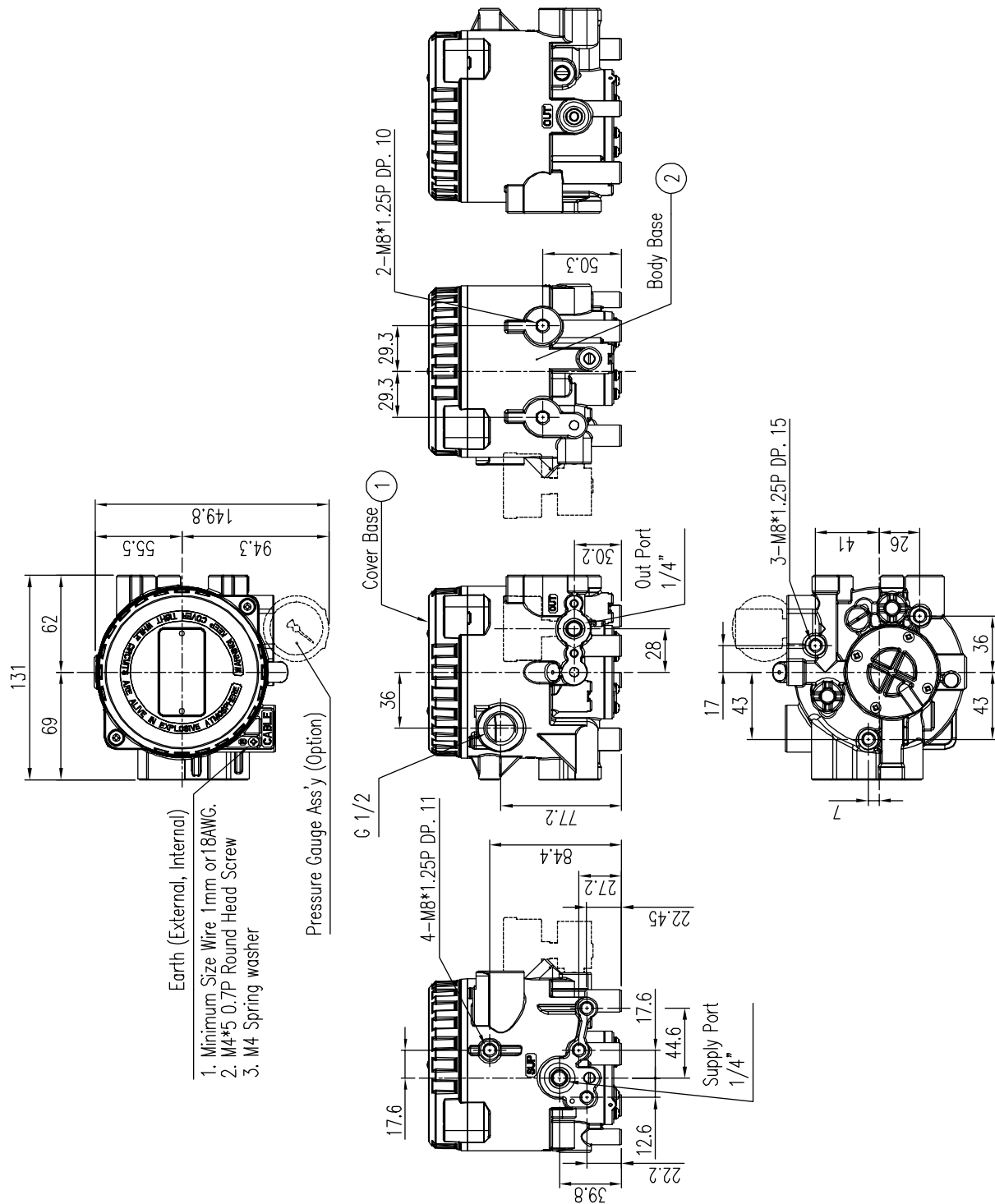


Fig. 2-2: YT-930

2.8.2 YT-930 + YT-200 AFR directly mounted + Pressure gauge

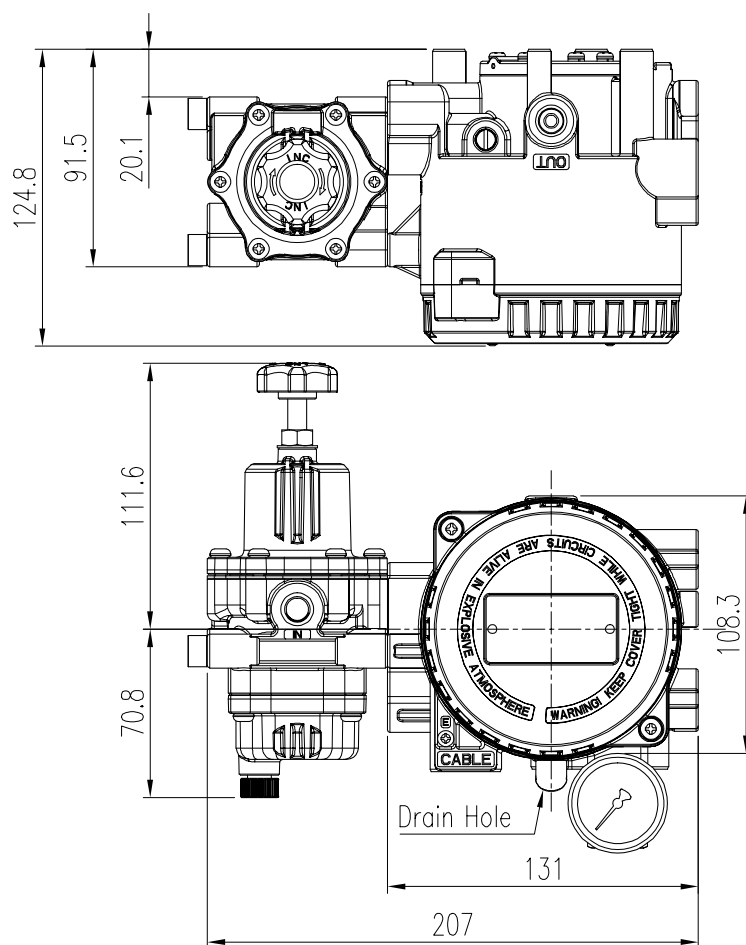


Fig. 2-3: YT-930 + Air filter regulator(YT-200) + Pressure gauge

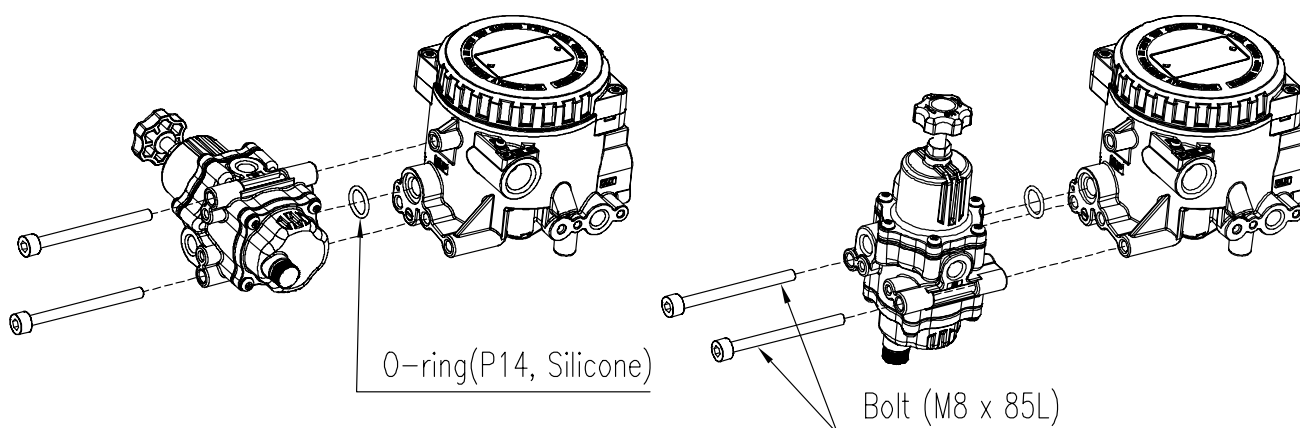


Fig. 2-3: Exploded view

3 Installation

3.1 Safety and Installation Tips

When installing the unit, please ensure to read and follow safety instructions.



- Any input or supply pressures to valve, actuator, and / or to other related devices must be turned off.
- Use bypass valve or other supportive equipment to avoid entire system “shut down”.
- When installing the unit, please ensure the cover base is headed upward or the cover should face front, as shown in section 2.8.2. This will ensure internal dew condensation can leak out through the draining hole.
- When installing the unit, please ensure it is installed in the same directions as shown below. This installation effectively discharges condensate from the inside of the unit through the vent hole to prevent damage to the internal components caused by condensate.

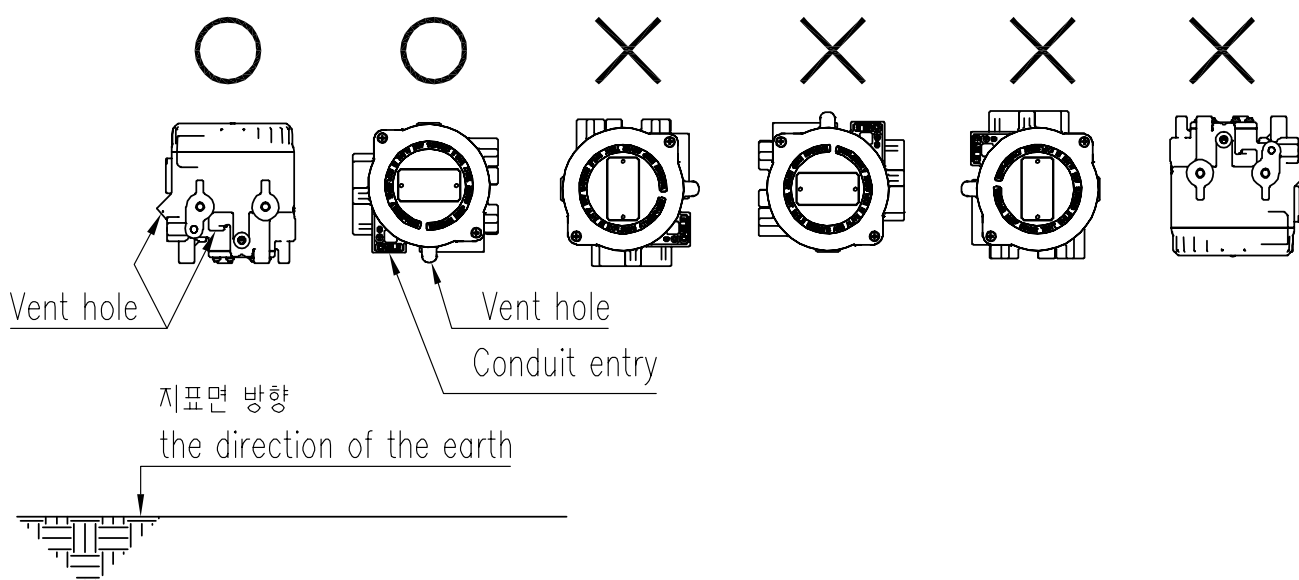


Fig. 3-1: Right installing direction of The product

4 Connections - Air

4.1 Safety

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

4.2 Supply Pressure Condition



- Dry air with dew point of at least 10 °C lower than ambient temperature.
- Avoid from dusty air. If require, we recommend to use air filter regulator which contains 5 micron or lower filter (YT-200)
- Avoid oil.
- Comply with ISO 8573-1 or ISA 7.0.01.
- Is designed to be used with the pressure below 0.24 MPa (2.4 bar).
- Set air filter regulator's pressure level 0.02 MPa (0.2 bar) higher than required max. output pressure.

4.3 Piping Condition



- Ensure inside of pipe is clean of obstructions.
- Do not use pipeline that is squeezed or shows any type of damamges.
- Pipeline should have more than 6mm of inner diameter (10mm outer diameter) to maintain flow rate.
- The length of pipeline system should not be extremely long. Longer pipeline system may affect flow rate due to the friction inside of the pipeline.

5 Connection – Power

5.1 Safety



- There is a conduit entry on the product. Conduit entry thread is G 1/2.
- Before connecting terminal, ensure that the power is off completely.
- Please use ring terminal to protect against vibration or any other external impact.
- YT-930 series should be grounded at outside of terminals or inside of the product.
- Please use twisted cable with conductor section are 1.25 mm² and that is suitable for 600 V (complying with the conductor table of NEC Article 310). The outer diameter of the cable should be between 6.35 to 10 mm. Use shield wire to protect against electro-magnetic field and noise.
- Please do not install the cable near high noise equipment, such as high-capacity transformer or motor. Please use shielded cable if necessary.
- **DO NOT connect Voltage source (9 to 28 V DC) to Input (4-20 mA DC) terminal (IN+, IN-) as it will cause PCB failure.**

5.2 Terminal Overview

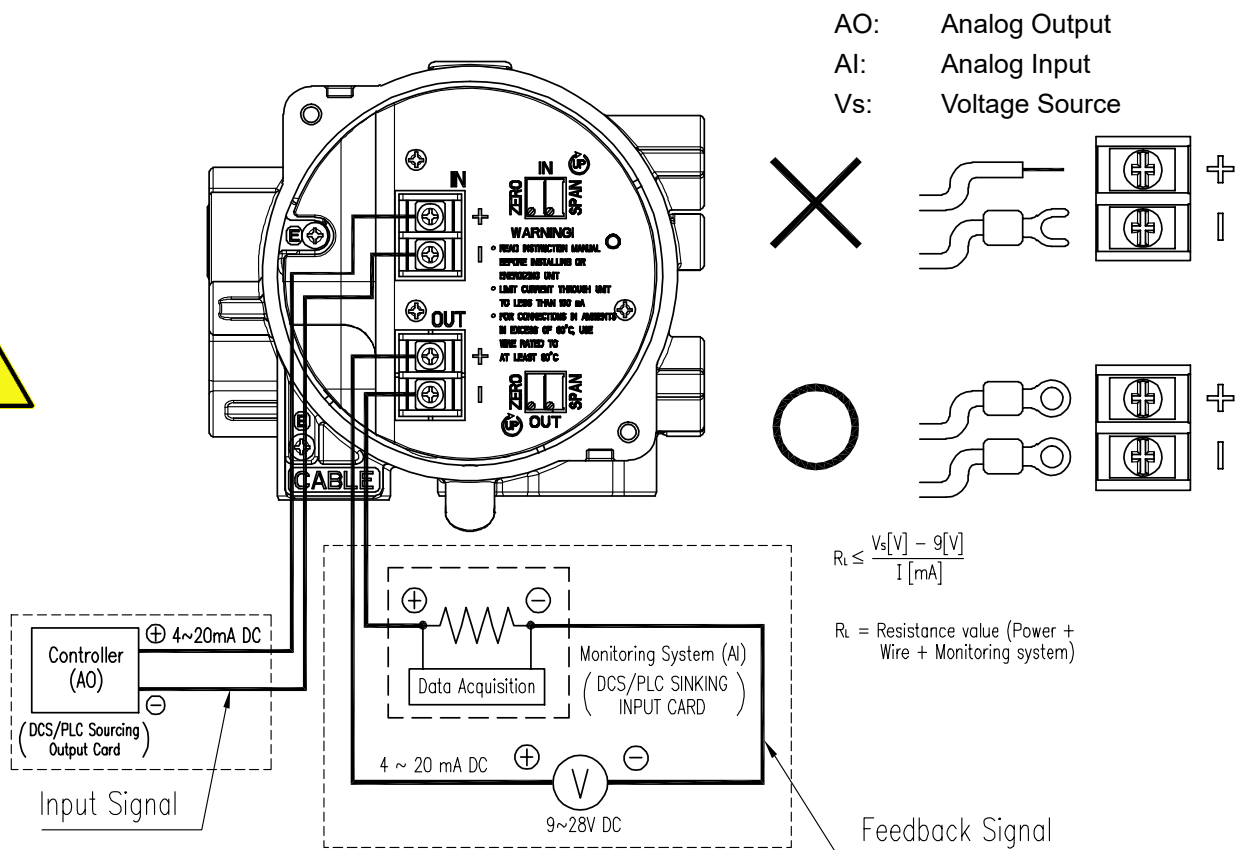


Fig. 5-1 Terminal Overview

5.2.1 Input Signal Terminal

- 1) Open cover base.
- 2) Please use appropriate union by considering the operating condition. Insert cable with using proper flameproof type packing union
- 3) Locate cable entry of input signal on the left hand and bottom side of the product.
Insert cables into the conduit entry and secure them with (+) and (-) terminals on the plate. Make sure to tighten bolts with $1.5 \text{ N} \cdot \text{m}$ ($15 \text{ kgf} \cdot \text{cm}$) torque. Please check the polarity of the terminals.
- 4) There are one terminal inside and one outside for grounding.
- 5) Ground resistance must be below 100 ohm.
- 6) Close the cover base completely before using the product.

6 Adjustments

Before our product is dispatched from our factory, input signal against supply pressure or supply pressure against input signal will be set correctly. But, if additional setting requires, please see below.

6.1 Zero and Span Adjustments of Output pressure

(Based on 4-20 mA / 0.02 to 0.1 MPa)

- 1) After wirings have been completed, please supply 4mA as input signal to YT-930. Please check output pressure and adjust zero adjustment bolt by using small (-) screw driver. In general, zero should be set at 0.02 MPa
- 2) Supply 20mA. Please check output pressure and adjust span adjustment bolt to required end output. In general, span should be set at 0.1 MPa.
- 3) Supply 4mA again. Please check the output pressure and repeat step 1 and 2 until required point have been set completely.
- 4) Close the cover base completely

6.2 Zero and Span Adjustments of Analog Output

(Based on 4-20 mA / 0.02 to 0.1 MPa)

- 1) Analog output requires DC 9 to 28 V. Supply 4 mA. Please check if the output pressure is at zero point and receive analog output signal correctly. If not, adjust zero adjustment bolt by using small (-) screw driver until the receiving analog output signal is set as 4 mA.
- 2) Supply 20 mA. Please check if the output pressure is at end point and receive analog output signal correctly. If not, adjust span adjustment bolt by using small (-) screw driver until the receiving analog output signal is set as 20 mA
- 3) Supply 4 mA again. Please check the analog output signal and repeat step 1 and 2 until required point have been set completely.
- 4) Close the cover base completely before using the product.

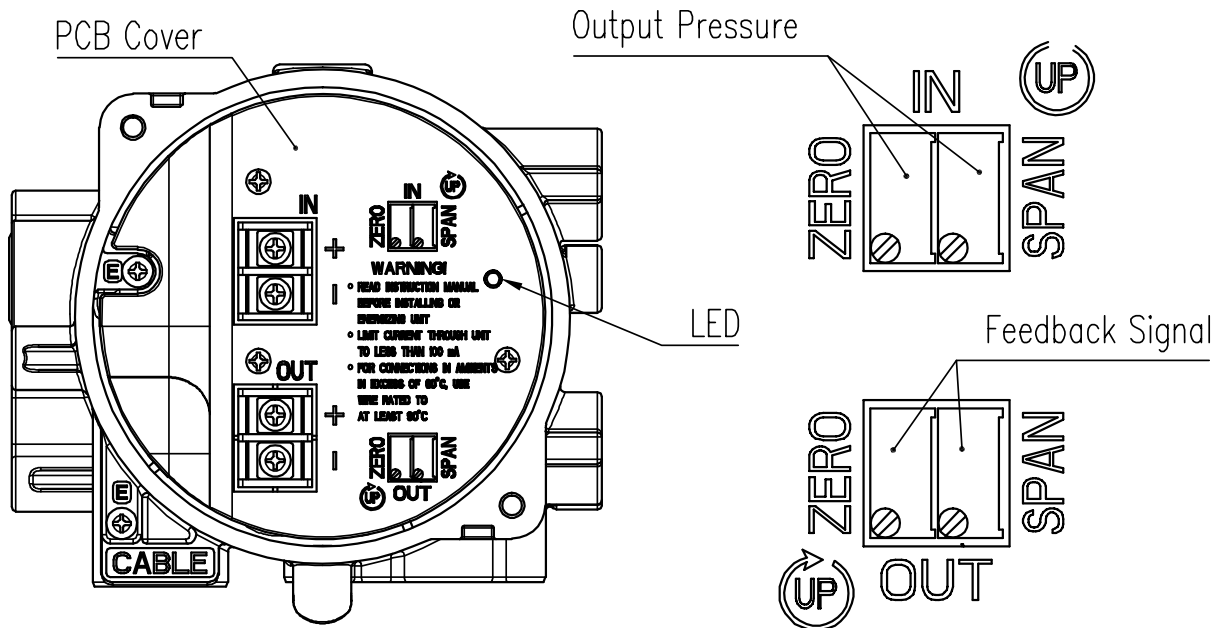


Fig. 6-1: Zero, Span

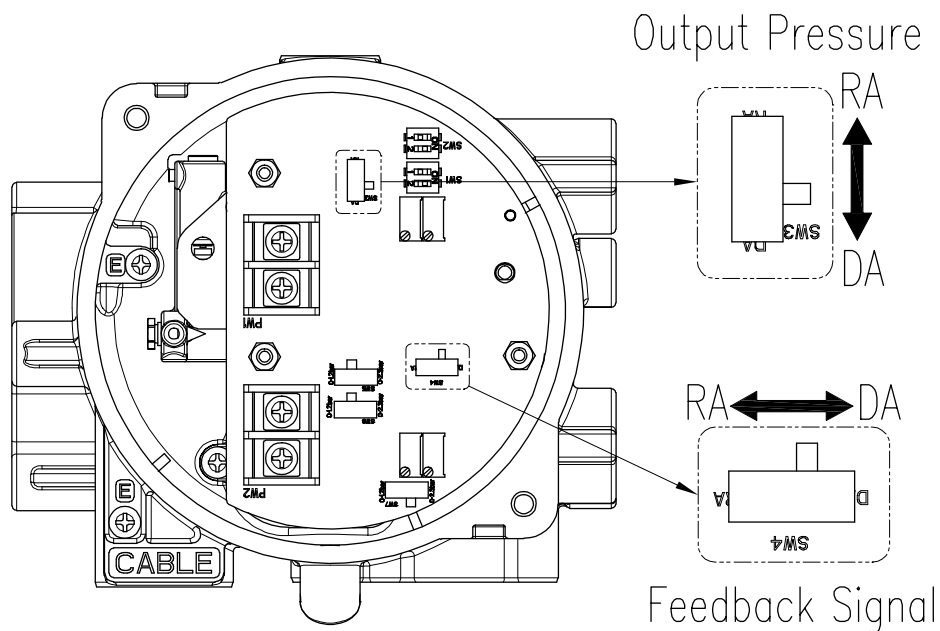


Fig. 6-2: DA, RA setting (without PCB cover)

6.3 DA and RA setting relative to the input signal

The above figure shows a PCB with plastic PCB cover removed. If the “Output Pressure” switch is switched to DA direction, the output pressure increases when the current increases. If it is switched to RA direction, the output pressure decreases when the current increases.

6.4 DA and RA setting relative to analog output (Only analog output option)

If the “Analog Output” switch is switched to DA direction, the analog output current increases when the output pressure increases. If it’s switched to RA direction, the analog output current decrease when the output pressure increase.

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