



TYPE 5370

INSTALLATION, OPERATION AND MAINTENANCE MANUAL



TYPE 5320

Mechanical limit switch with valve and LED



1. Safety

1.1. Operation Manual

This manual includes the most basic instruction, it should be fully performed in installation, operation and maintenance. The information offered is the latest updated data.

The right of modification will be reserved by , without further notice.

1.2. Operating instruction

This manual includes the most basic and practical information in order to make sure the valves could be operated and maintained normally.

Not only the safety instruction in the chapter should be fully complied with, but also the special size and suggestion in other chapter should be fully complied with.

It's vital to put the manual on a fixed place near to installation.

1.3. Safety

1.3.1. Warning symbol



Common danger



Personal injury caused by the rotating parts of equipment



Danger High Voltage



Danger in normal operation of equipment



The stipulation should be complied with in order to ensure safety production.

1.4. General safety instruction



Please read the operation manual carefully before installing and operating Type 5370.
If any question, please contact with DVC.

During installation

The technical specification in chapter 8 should be kept in mind.



It should be complied with health and safety principle in the installation and use of Type 5370 controller.
To inspect and make sure the valve/controller is intalled and the valve shaft placed correctly before powering on. Before positioning the controller, it will lead to serious mechanical fault if there's incorrect installation or operating with overmuch strength.



During installation, all the operation related with electric power should be operated by the professional.

2. Safety of operation

In operation :



Do not touch the operated valve and pipeline filled with liquid.
If there's hot liquid in them, it will lead to burn injury.



The valve/actuator is equipped with rotating part so it should be operated prudently in installing Type 5370. When connecting with compressed air, do not reach your hand or finger into piston or indicated part. Otherwise, it will lead to serious personal injury.



The components and parts in the controller should not be touched with water.
After maintenance, to tighten the screw and cover the lid well.



During maintenance:

It is prohibited to take the controller apart when operating or installing valve. To make sure the compressed air source has been disconnected.

Do not put the detached scattered parts on the floor.



All the operation related with electric power should be operated by the authorised professionals.

Conform to instruction

Any behaviour not comply with instruction will cause danger to operator, environment and machine. Meanwhile you perhaps lose the right to claim for your loss.

It will lead to the following risks if you don't comply with instruction manual:

- Lead to serious operation fault of machine or factory.
- Need special maintenance and debugging.
- Lead to electric, machanical and chemical risks.
- The released substance will endanger the environment.

Guarantee :

In case of the following situations, the guarantee will be invalid. And if there's any third party claims the loss for quality and safety accident, we won't bear any responsibility.

- The installation and maintenance is not operated according to the instruction manual.
- Not only the maintenance is not done by our professionals, but also there's no written authorized
- The original assembled parts from our company are not used.
- The product is changed without our written approval.
- The product is used badly, incorrectly and carelessly or is not used according to the instruction manual.

If there's any question or need for more detailed explanation about special information (on adjustment, assembly, disassembly stc.) , please contact with DVC.

3. Instruction of version features and button operation

3. 1.Description

Type 5370 is a pneumatic controller which is designed for process control of valve. It is compatible with most PLC (programmable logic controller) automatic system, with digital communication or AS-I BUS. It is installed on the top of pneumatic actuator of process valve which will offer remote control on the working position of valve. It has 2 kinds of sensors:

- Displacement continuous sensor

2. Operating principle

Type 5370 is controller including signal transmission and LED position indicating light, used for controlling process valve of all kinds. Information collection is come from PLC or the signal of other automatic control equipment which could turn the valve on and off and reflect the current position of valve simultaneously.

Input signal :

- Digital signal DC24+ (PNP)
- Digital signal DC24- (NPN) Optional

There are three output signals:

- Digital signal DC24+ (PNP)
- Digital signal DC24- (NPN) Optional
- Analog signal 4-20mA

Bus communication :

- AS-INTERFACE BUS

Type 5370 is equipped with 3 kinds of feature versions:

- 1561-22 (Displacement control version)
- 1561-33 (AS-I Bus version)

1561-22 Displacement sensor version is equipped with the following function:

Signal selection

- Position self-adjusting
- Input DC 24V+ (PNP)
- Analog signal output 4-20mA
- Input DC 24V- (NPN)
- Digital signal output DC24V- (NPN)
- Digital signal output DC24V+ (PNP)
- Deviation of positional accuracy $\pm 0.5\text{mm}$
- Warning of positional deviation (prevent valve from slight leak)
- Function of manual operation
- Green LED light: indicating the valve is turned on
- Red LED light: indicating the valve is turned off
- Red LED light flickers: indicating it doesn't reach target position or valve position is deviated by pipeline pressure etc.

Tacit approval

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Options

Options

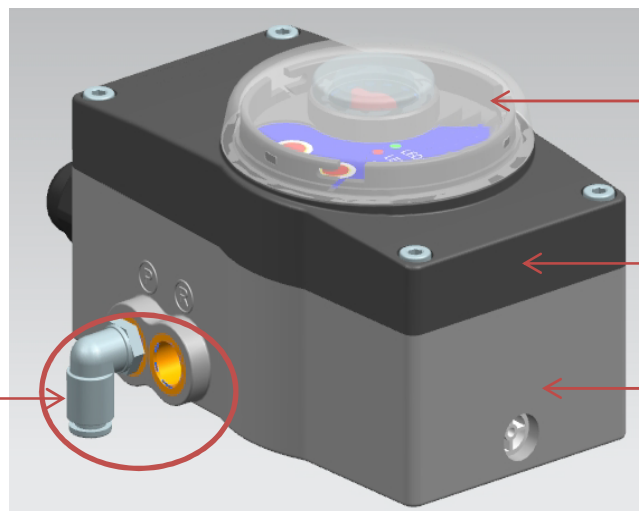
C-TOP-1561-33 AS-I Bus version is equipped with the following function :

Signal selection

- Position self-adjusting
- IO (PNP)
- Deviation of positional accuracy $\pm 0.5\text{mm}$
- Warning of positional deviation (prevent valve from slight leak)
- Function of manual operation
- Blue LED light: indicating the valve is turned on
- Red LED light: indicating the valve is turned off
- Red LED light flickers: indicating it doesn't reach target position or valve position is deviated by pipeline pressure etc.
- Bus communication : AS-I BUS

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3. 3. COMPONENTS

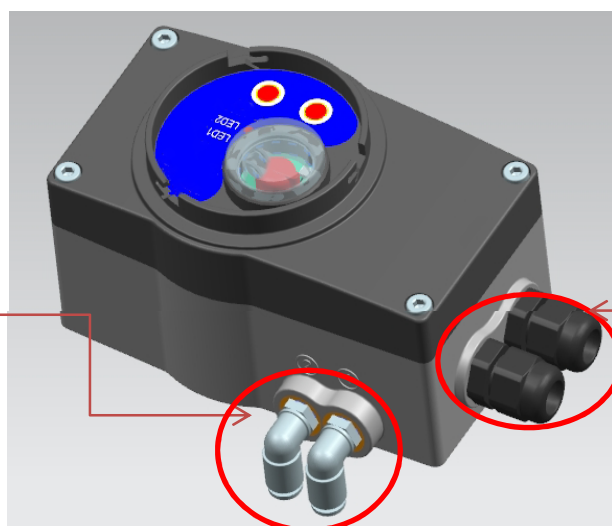


Transparent cover

Gland cover

Bottom seat

Air supply
connector , BSPT
1/8 , 1-PC



Junction Box

BSPT 1/8"

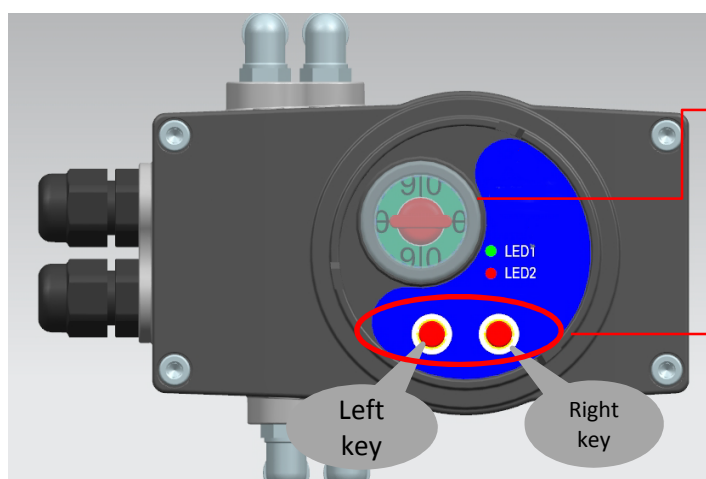


Note: 1561 control the internal setting of two 3-way solenoid valve;

1) When a single acting pneumatic valve, with a plug plug one of the working mouth;

2) double acting pneumatic valve is no need to plug the working mouth;

3.3.1 Function setting and button operation



LED lights (2 colors)

Manual operation

3.4. Function setting and button operation

156123 & 156133 Version

Self-tuning function :

While pressing two buttons for about 8 / S, the system will start the auto-tuning position function, the tuning process takes about 5 minutes. Note When the auto tuning function is activated, the button will automatically fail until the setting is complete.

1561 version :

Note: This function is suitable for initial use and also for routine maintenance.

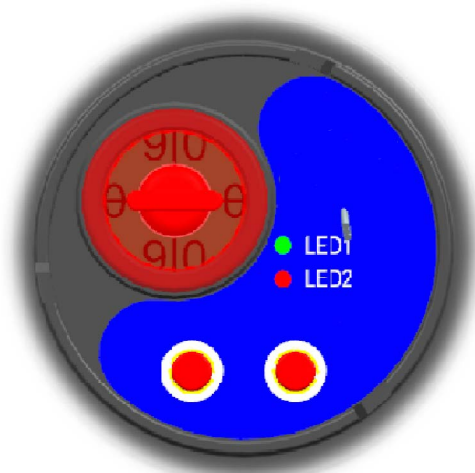
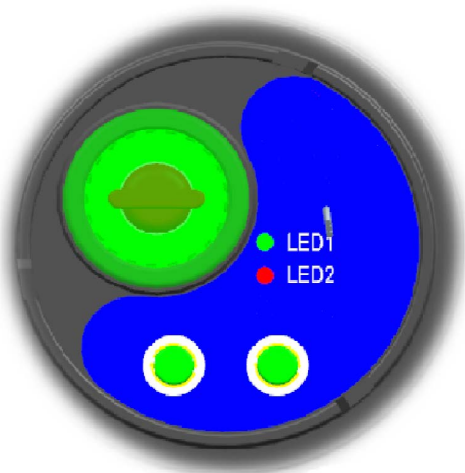
Manual operation function:

Triggering the right button will immediately start the solenoid valve (valve position). The LED lights up when the valve position reaches the target valve position;

Position feedback signal can be output, S1 ... S2 such as DC 24V + (PNP) & 4-20mA analog output signal

Note: The 156133 ASI bus version does not have an independent signal output function, only the bus communication, in addition to other functions and 156122 version of the same.

3. 5.indicator light instruction



Green LED lights

Green light on, mean valve opened or closed Note: valve opened and closed according to the design of actuator and valve If use Std. valve and actuator, Green lights on default valve opened

Red LED lights

Red light on, mean valve opened or closed Note: valve opened and closed according to the design of actuator and valve If use Std. valve and actuator, blue lights on default valve closed



Note: LED color can be reset as needed

Note: There are three cases where the red light flashes:

Not reached the target position / deviation position

During exercise of the actuator

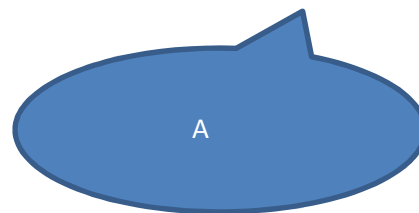
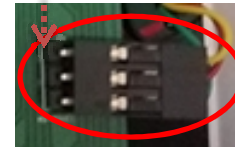
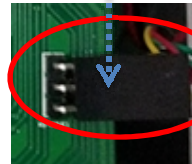
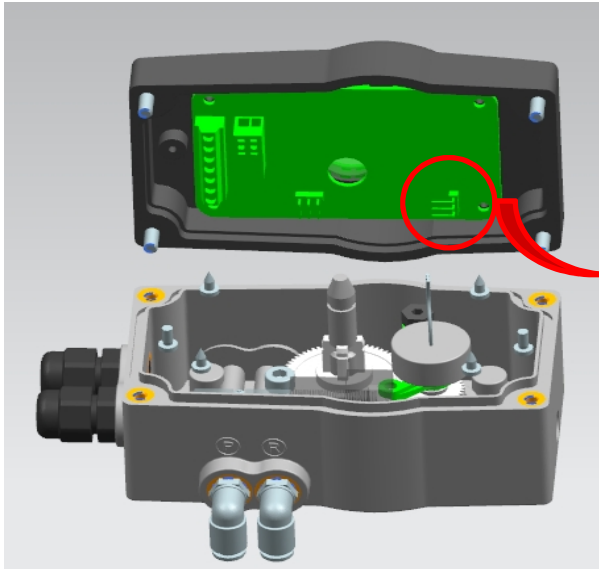
Was externally or piped to the valve position

Note: The display light color reset, the following steps:

1) loosen the 4 screws until the housing is open;

2) the default sensor plug plastic outward, as shown in the figure

3) Unplug the plug, reinsert it, and plug the metal face outwards.



4. Receive and install

4. 1. Delivery check

It should be checked all the details whether same as delivery list after receiving locator. Donjoy will check all the spare parts before packing. Despite all this, there is no guarantee that the goods to the destination is intact. So, received the Type 5370 and other items, must be check. If the product is not good, or spare parts not neat, the consignee should be in the shortest possible time (7 days) notify DVC.

4.2. Delivery and disassembly



DVC is not accepted Type 5370, and accessories, and other components may be provided with inappropriate responsible for the loss of custody.

4. 2. 1. Delivery:

Check whether all parts in the delivery list is complete:

- Delivery list
- Control head inside a plastic bag contain gasket and screw
- Pneumatic actuator bracket mounting kit (if ordered)
- operating instruction

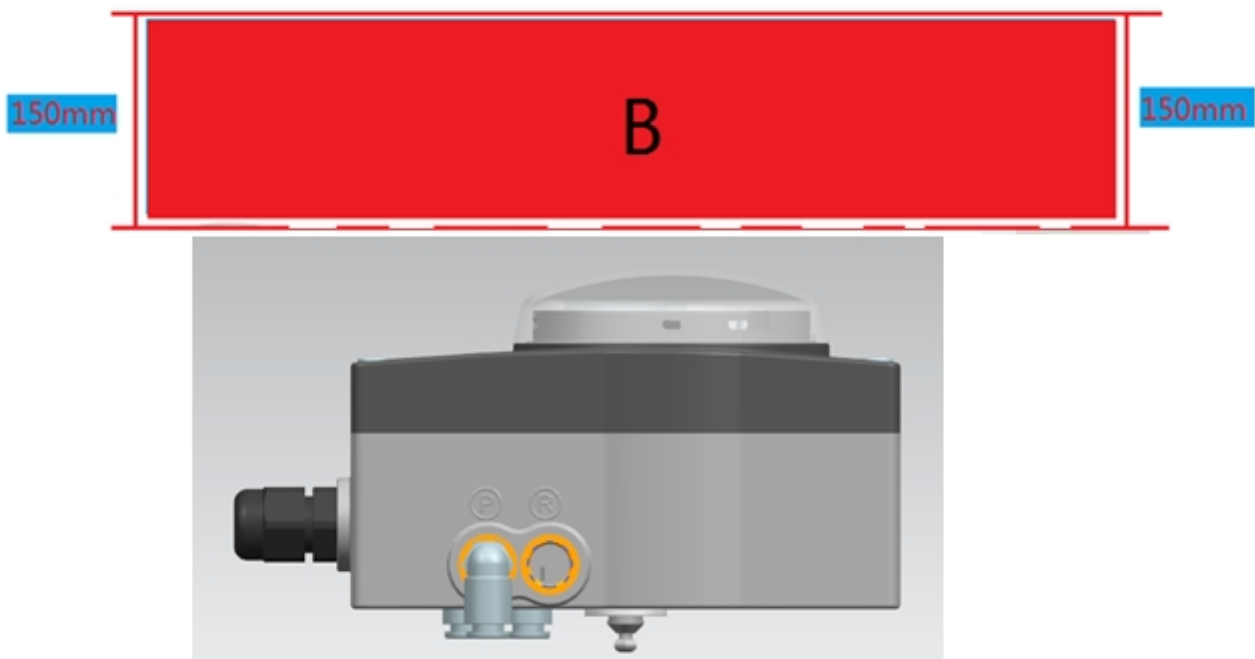
4. 2. 2. Disassembly:

- Remove possible exit packaging residues
- Check Type 5370 and accessories, , to ensure that it has not been damaged during the transportation.

5. 3. Installation space

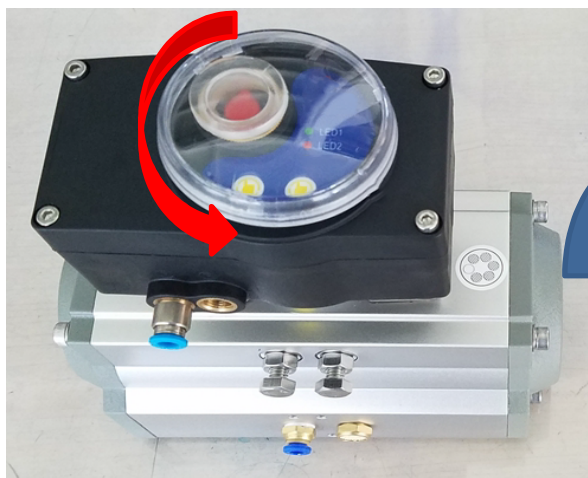


- When the positioner and the valve installed in the pipe or equipment, be sure to leave enough space for valve maintenance and disassembly. And also easy to Type 5370 maintenance work, the recommended minimum distance as the size in diagram B



4.4.disassembly and assembly

Hand rotates counterclockwise, and remove the transparent cover



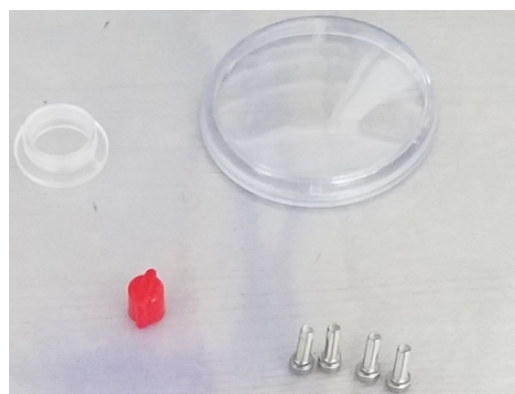
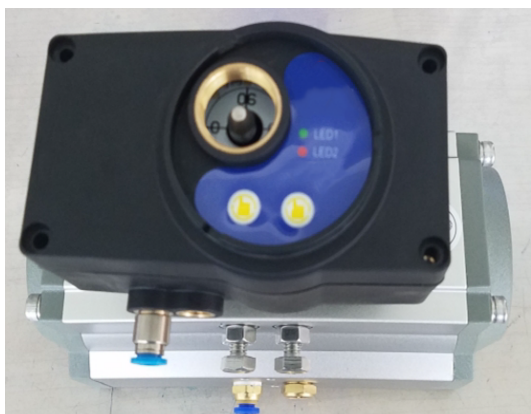
Rotate counterclockwise by hand and remove the transparent cover



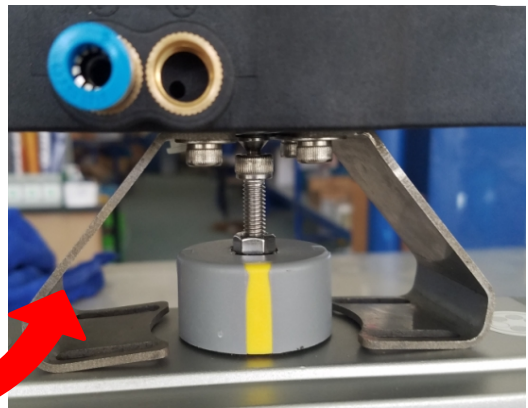
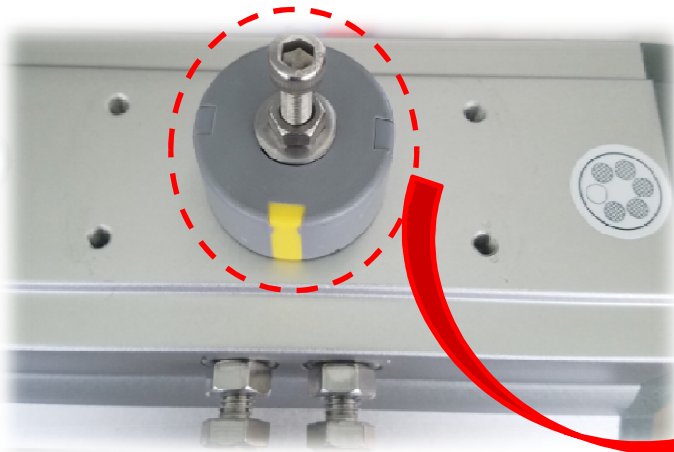
Remove the rubber position indicator with the appropriate tool



Remove the four screws with an Allen wrench

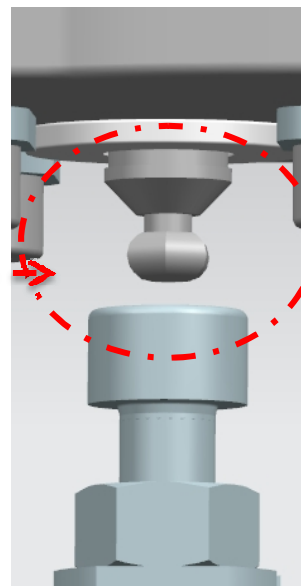
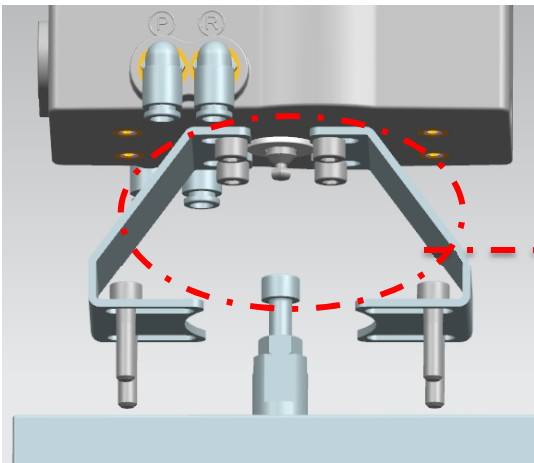


4.4.1. Connection of the controller to the actuator

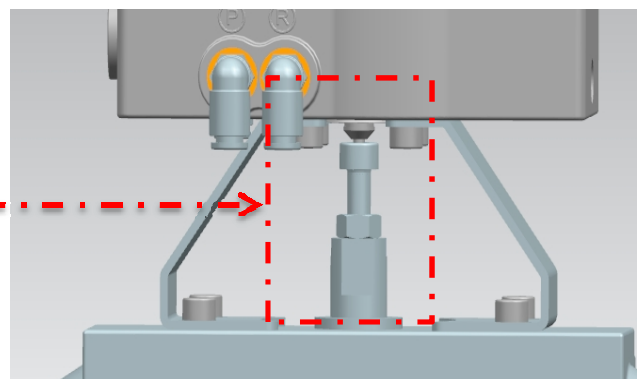
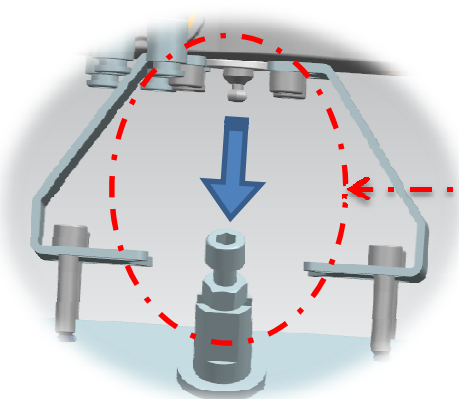


4.Type 5370 is connected to the actuator

5.1. 1561 & 156133 Version is connected to the actuator



Note: We use a very simple way to connect, only in accordance with the standard M6 hex screws can be connected;



4. 6. Circuit connection

Main voltage

Type 5370 controller could be connected with different voltage:

Power: DC24 V (standard)

AC 110V,220V (optional)

Electronic component

All of the electronic components in the control device of Type 5370 are equipped with built-in pin connectors which avoid unnecessary wiring and interference. According to standard, a PCB could be connected with 3 solenoid valves (V1, V2, V3) at most and with 4 output of position feedback.

Default setting as follows:

Output :

156123-Displacement version

S1 , S2 Output DC24V+ (standard configuration)

A + Analog signal output 4-20mA positive electrode +

A - Analog signal output 4-20mA negative electrode -

156133 -AS-I Bus protocol version

S1 , S2 , Output DC24V+ (standard configuration)

AS-INTERFACE BUS protocol communication

Input:

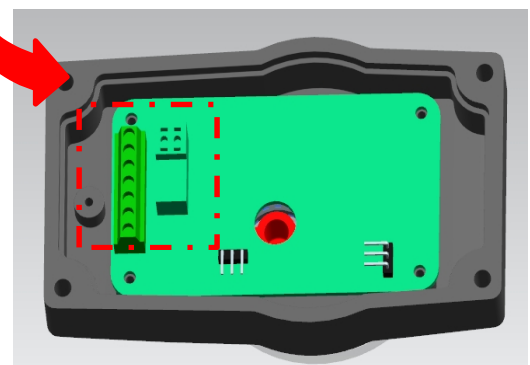
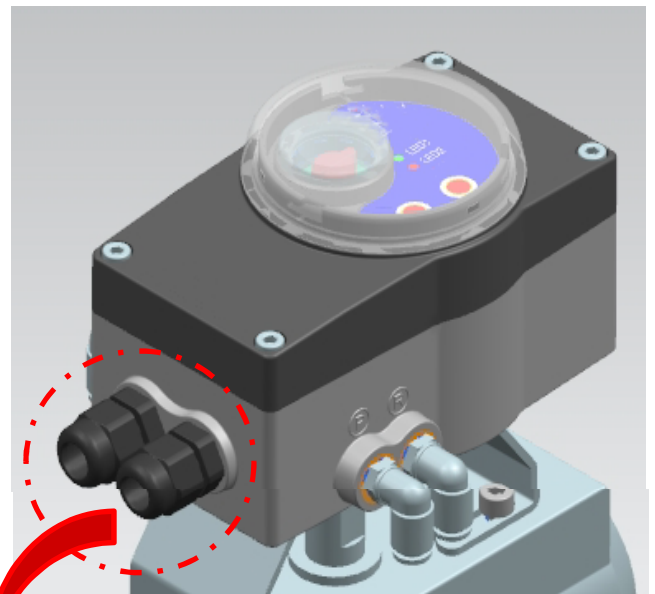
Signal input 24V+ , control panel or PLC

V1 - the 1st solenoid valve (driving by single-acting

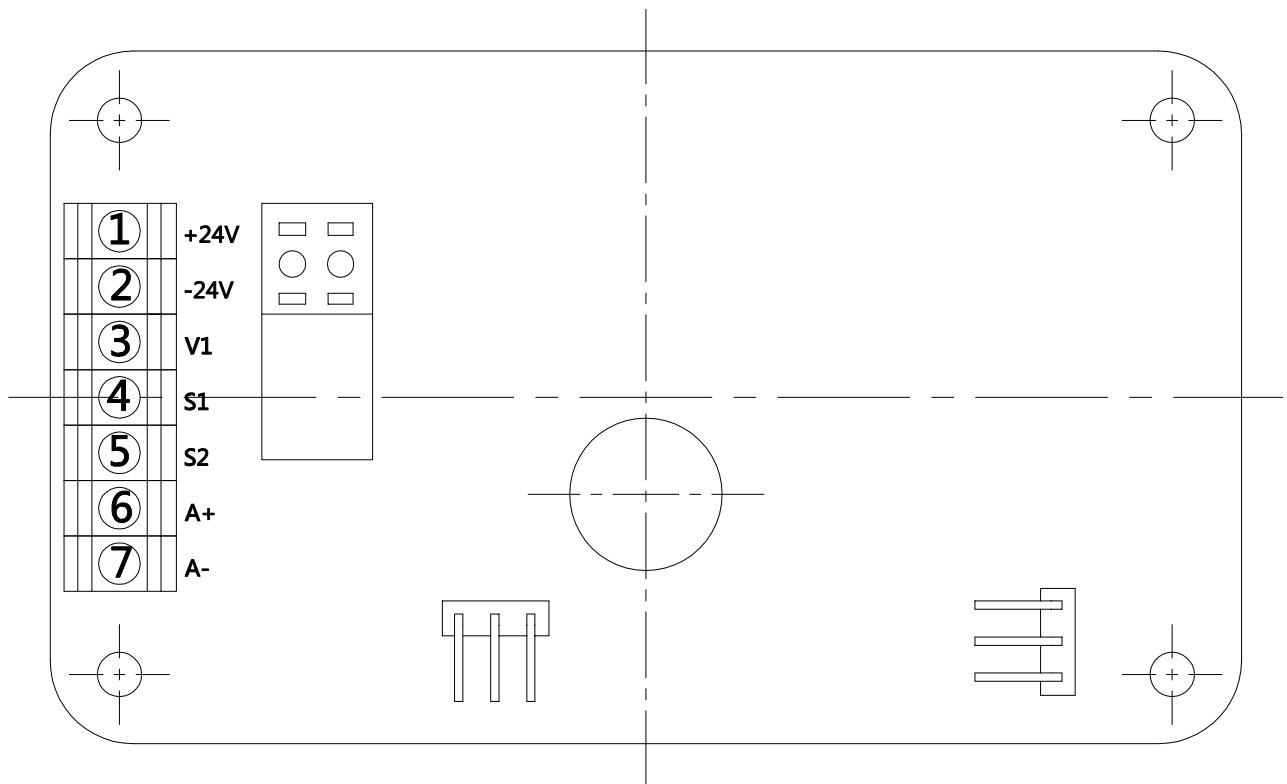
Signal light :

S1 - turning on the detecting position of valve (Green LED light)

S2 - turning off the detecting position of valve (red LED light)



4.6.1 PCB



PCB-Terminal Features:

- 1= +24V DC
- 2= - 24V DC
- 3=V1 : INPUT PNP 24V
- 4=S1 : Output PNP 24V
- 5=S2 : Output PNP 24V
- 6=A+ : Analog signal output 4-20mA
- 7=A - : Analog signal output 4-20mA

4. 7. AS-I Bus connection

AS-I is a kind of field bus system. It could interconnect the controller, binary sensor (subordinate device) with the control equipment of a upper computer (master control). The connection is conducted to communicate by a flat cable which supply power to solenoid valve and sensor.

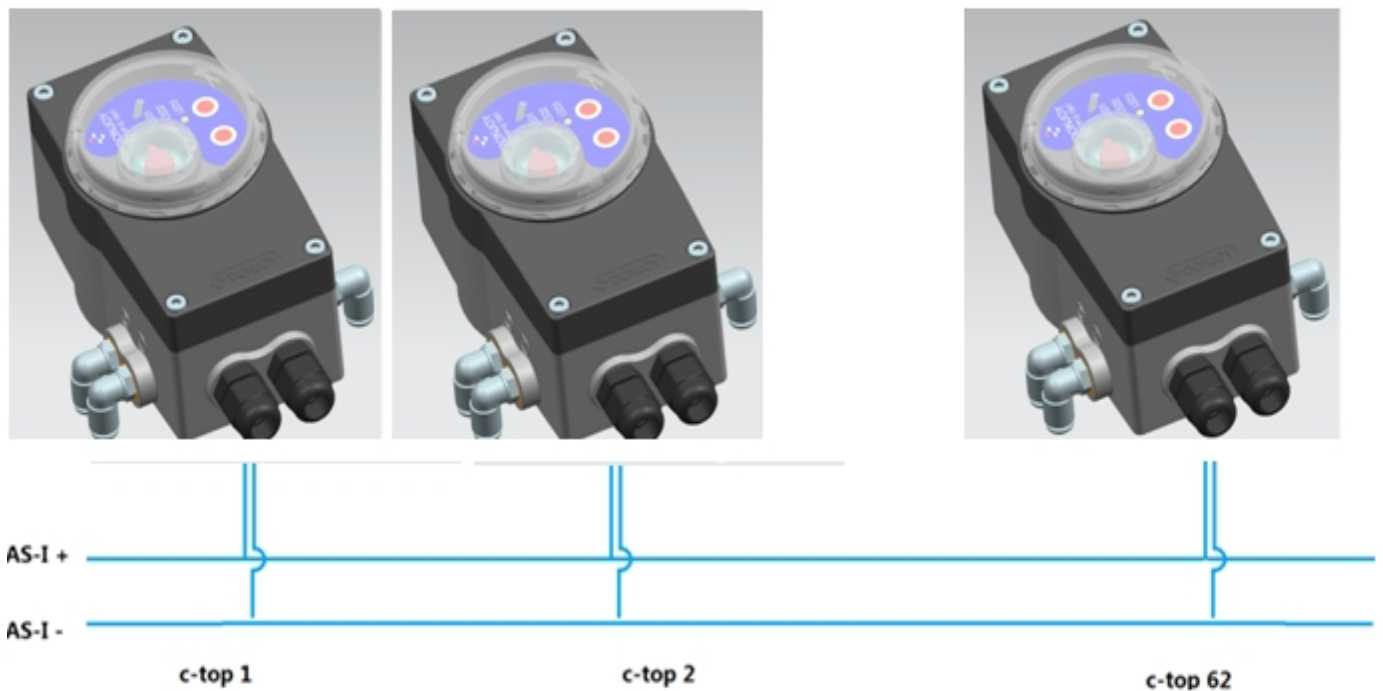
Type 5370 with AS-I must be equipped with flat cable, avoiding any interference.

The standard connection of Bus is to be connected with insulated tapping point with 2m cable.

The AS-I equipped with PCB could be connected with 4 solenoids and proximity switches at most.

4. 7. 1 . The connecting quantity of Type 5370 unit and the max. length of Bus Circuits

Each master controller could be connected with 62 AS-I control units at most (support model A and B).



In default situation, configuration as follows:

Programming: in default situation, the address is 1. And the address could be edited at will by master controller or address editor.

Before using Type 5370, please note the following matters:

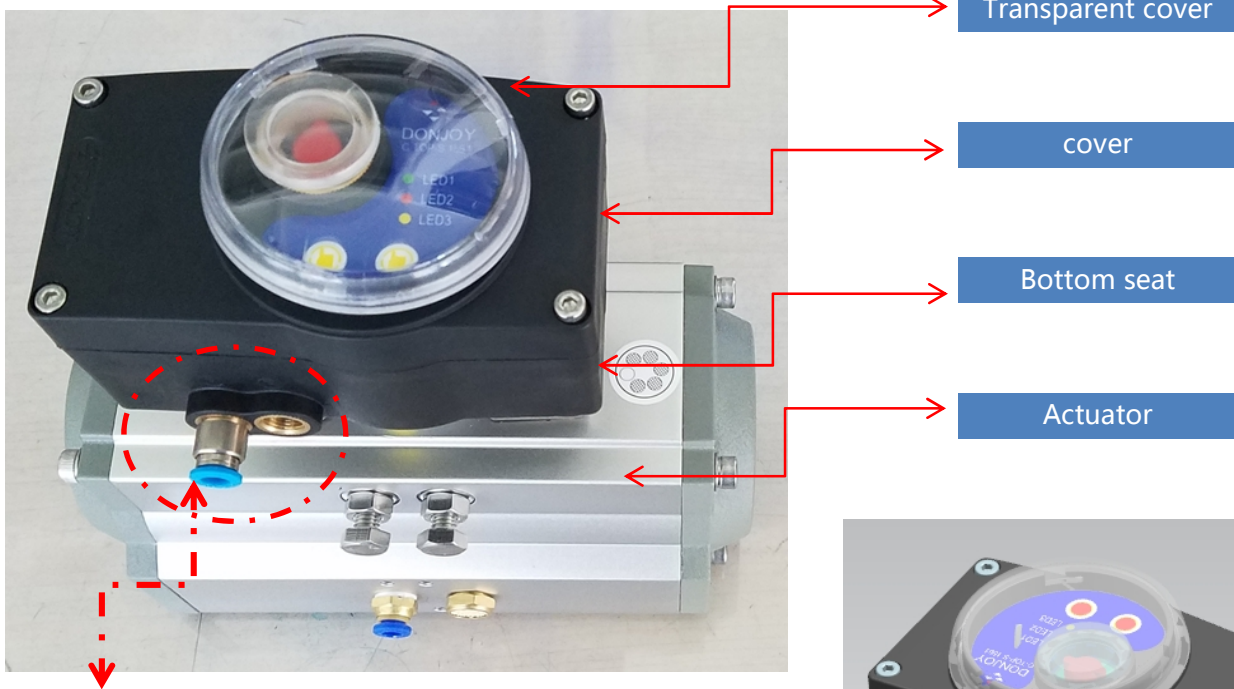
- Type 5370 should be installed on the valve/actuator correctly and tightly. Otherwise, water will be infiltrated into equipment which will lead to the damage of device or be unable to be used normally.
- To inspect if all electric wires are OK in order to avoid influencing signal.
- To inspect piston and indicator could be moved by not touching with position detector. To make sure the detector is set on the correct detecting height.
- To inspect if the compressed air in controller interface is eligible.
- To make sure the power is on. At least there's one LED light is lightened.

6. Debugging: reason and solution

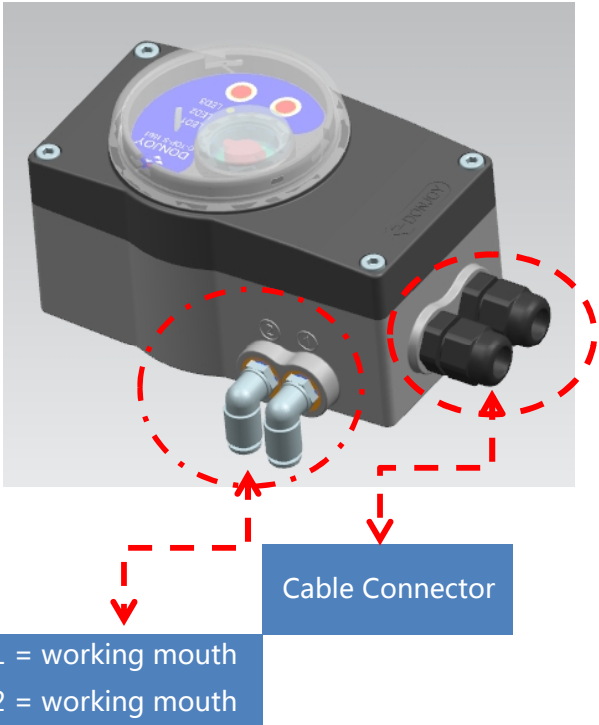
Problem	Reason	Solution
Valve is moved slowly	Lack of air source	•To inspect if the circuit of compressed air in valve is opened.
		•To inspect the supplied pressure.
		•The flow is not enough.
	The valve is not controlled by the actuator effectively.	•To inspect the supplied pressure of compressed air
		•To replace with a pneumatic actuator of higher specification.
	The exhaust hole is clogged or the exhaust velocity is too slow.	•To inspect exhaust hole to clean clogging, and to change silencer.
Valve couldn't be turned on/off	Compressed air source connection is not opened.	•To inspect the compressed air source passage of controller.
	Air pressure is not enough.	•To increase supplied air pressure.
	With air, but the solenoid doesn't work.	•To inspect if the power is on.
	The interior of actuator is polluted.	•To inspect compressed air pressure and pipeline.
Without position signal	The position of valve shaft hasn't been detected by the detector.	•To adjust the height of detector.
		•To inspect if the detector is normally connected with inductive pole.
Air leakage	Air source leaks from controller continuously.	•To inspect all the pneumatic connection of the internal components in controller.
Knocking sound	The globe valve is closed too fast.	•To install a throttle valve on the air supply interface of actuator to control the speed of air
Filled with water	There's something wrong with gasket seal.	•To tighten lid and the screw on the base.
		•If necessary, to change base, lid and gasket.

8. Technical specification

8. 1. Technical specification



P = air inlet
R = vent



Material

Transparent lid	ABS
cover	Engineering plastics
Bottom seat	Engineering plastics

Pneumatic specification

Connection: Interface of air source:

Air hole:

Vent of air source:

Air source : Lubricant compressed air,
inert gas

Max. content of oil :1 ppm

Max. temperature
of air source : 50°C (155°F)

Working pressure : 1.5 to 7 bar (22 to 102 PSI)

Standard flow : 200 l/min (to 6 bar , 20 °C , the pressure difference is 1bar)
(to 87 PSI , 74°F , the pressure difference is 87 PSI)

M5 - The commonly used plug equipped with 6/4 pipes will be supplied together with it.

G1/8" - The silencer will be supplied together with it.

M5 - The commonly used plug equipped with 6/4 pipes will be supplied together with it.