

# Smart Valve eXplorer

## Smart Valve Positioner for Rotary Valve

### Model SVX100 / SVX102

#### **OVERVIEW**

Smart Valve eXplorer (SVX) models SVX100 and SVX102 are microprocessor-equipped, current-pneumatic smart valve positioner for rotary valves.

The SVX receives a DC current signal from control devices and controls pneumatic valves. In addition to this basic function, the SVX has communication capabilities, automatic configuration program, and self-diagnostics functions that will greatly increase productivity and the efficiency of plant operation.

Calibration, configuration and self-diagnostics can be performed by using a HART communicator. (model SVX102 only)

#### **FEATURES**

##### **Easy to use**

###### • Auto setup

The auto-setup function is a fully-automatic configuration program which specifies the actuator and adjusts the zero and span of the rotary valve. The program can be turned on simply from a switch so that adjustments to the rotary valve can be performed quickly and safely in hazardous areas.

##### **Valve diagnostic**

(for model SVX102, software version 4.9 or later)

Following parameters can be monitored by HART communicator or Control Valve Maintenance Support System "Valstaff".

- Stick Slip
- Total Stroke
- Travel Histogram
- Cycle Count
- Shut-off Count
- Max. Travel Speed.

##### **Flexibility in installation**

The models SVX100 and SVX102 are available either as a slide lever type or a stroke lever type to facilitate installation on rotary valves.

###### • Slide lever type

The SVX can avoid vibration chattering with anti-vibration feedback lever.

###### • Stroke lever type

The valve stem can be adjusted with a pipe wrench. (For manual operation)

###### • Direct mounting type

The SVX can be installed to NAMUR cylinder actuator without linkage.



##### **High reliability**

###### • Positive seating

The positive seating function completely shuts off the valve if the input signal becomes lower than previously set. This in turn enhances the full shut-off capabilities of the valves.

###### • Self-diagnostic

The self-diagnostic function provides with the ability to check the status of the positioner at any time and to alert in case of failure.

##### **Single model for multiple specifications**

The SVX settings can be changed without replacing any parts. A single model can be modified to suit any application.

- **Flow characteristic:** Linear, EQ%, quick opening or custom user characteristics (16 points)
- **Actuator type:** Double or single acting actuator

##### **HART communication**

HART communicator model 375 can be used for calibration, configuration and self-diagnostics.

**China RoHS**

This device is used in the Oil & Gas, Petrochemical, Chemical, Pulp & Paper, Food & Beverage, Machinery, Steel/Metal & Mining, and Automobile industries and therefore does not fall under the China RoHS Legislation.

If this device is used in semiconductor manufacturing equipment, labeling on the device and documents for the China RoHS may be required. If such documents are required, consult a Yamatake representative.

**FUNCTIONAL SPECIFICATIONS****Control signal input**

4-20 mA DC

**Input resistance**

Approx. 300  $\Omega$  / 20 mA DC: Model SVX100  
(voltage between terminals 6V DC)

Approx. 600  $\Omega$  / 20 mA DC: Model SVX102  
(voltage between terminals 12V DC)

**Approvals****KEMA/ATEX Intrinsically safe approval  
(Model SVX102 only)**

II 1 G EEx ia IIC T4

Approval No. 04ATEX1176X

The barriers should be ATEX certified types and comply with the following conditions as follows.

Input circuit (terminals I IN)

$U_i=29V$ ,  $I_i=95mA$  (resistively limited),  $P_i=690mW$ ,  
 $C_i=10nF$ ,  $L_i=220\mu H$

From the safety point of view the supply/input circuit shall be considered to be connected to earth.

**FM Intrinsically safe approval (Model SVX102 only)**

Intrinsically safe for Class I, II, III, Division 1, Groups A, B, C, D, E, F and G, T4 Ta=80°C

Intrinsically safe for Class I, Zone 0, AEx ia IIC T4

Nonincendive for Class I, Division 2, Groups A, B, C and D, T4

Suitable for Class II, III, Division 2, Groups F and G, T4

Approval No. 3020628

The barriers should be FM approved types and comply with the following conditions as follows.

Input circuit:  $V_{max}=30V$ ,  $I_{max}=100mA$ ,  $P_i=1W$ ,  
 $C_i=15nF$ ,  $L_i=0.22mH$

Installation should comply with NEC.

**Output characteristics**

- Linear, Equal percentage, Quick opening
- Custom user characteristics (16 points).

**Bypass operation**

Auto/Manual switch (For single acting actuator only)

**Air supply pressure**

140 to 700 kPa (20 to 100 psi)

**Air consumption**

At stable output: 50%

10 l/min.(N) maximum at 400 kPa (60 psi)

**Maximum delivered air flowrate**

250 l/min.(N) at 400 kPa (60 psi)

**Output balanced pressure**

55  $\pm$  5%

**Lightning protection**

Peak value of voltage surge: 12 kV

Peak value of current surge: 1000A

**Vibration tolerance**

2 G (5 to 400 Hz)

(with standard mounting kit on Yamatake HA actuator)

**Feedback lever angle**

$\pm$  4° to  $\pm$  20°

**Ambient temperature limits**

-40°C to 80°C for general model

KEMA/ATEX Intrinsically safe: -40°C to 60°C

FM Intrinsically safe: -40°C to 80°C

**Ambient humidity limits**

10% to 90% RH

**Configuration tools**

Model CFN100 (Smart Field Communicator CommPad)

HART communication model 375 (According to need, please update a software and device description files.)

**CE conformity**

Electromagnetic compatibility

EN 61326: 2006 (CE marking)

**PERFORMANCE SPECIFICATIONS****Accuracy**

$\pm$  1.0% F.S.

( $\pm$  2.5% F.S. with custom output characteristics)

**Turning range**

50° to 90°

**PHYSICAL SPECIFICATIONS****Enclosure rating**

JISC 0920 watertight

NEMA type 4X

IP66 FM

**Finish**

Baked acrylic

**Color**

Dark blue

**Material**

Cast aluminum

**Weight**

Without pressure gauge : 1.8 kg

With pressure gauge : 2.2 kg

## INSTALLATION

### Air Connections

Rc1/4 or 1/4NPT internal thread

### Electrical Connections

G1/2 or 1/2NPT

### Conditions of Supply Air (JIS C1805-1 (2006))

#### Particles

Maximum diameter 3 μm

#### Oil Mist

Less than 1 ppm at mass

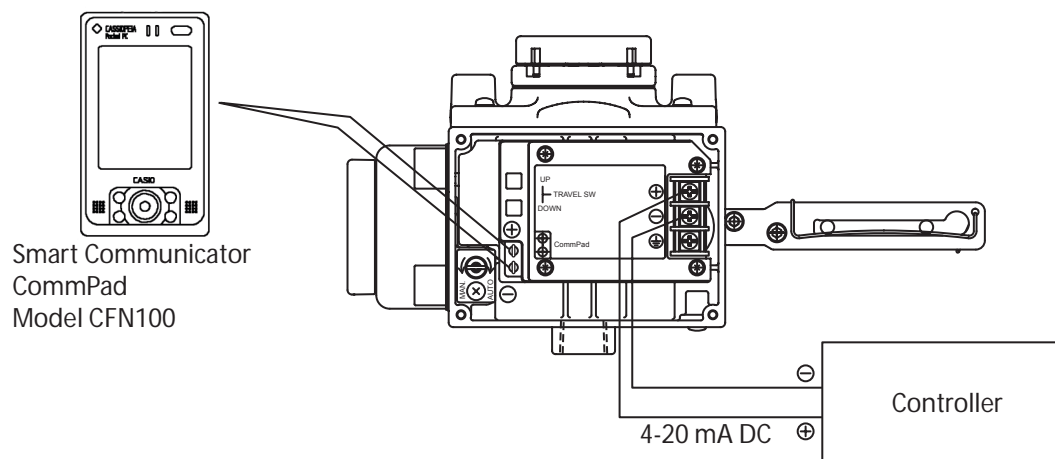
#### Humidity of the air supply

The dew point should be at least 10°C lower than the temperature of this device.

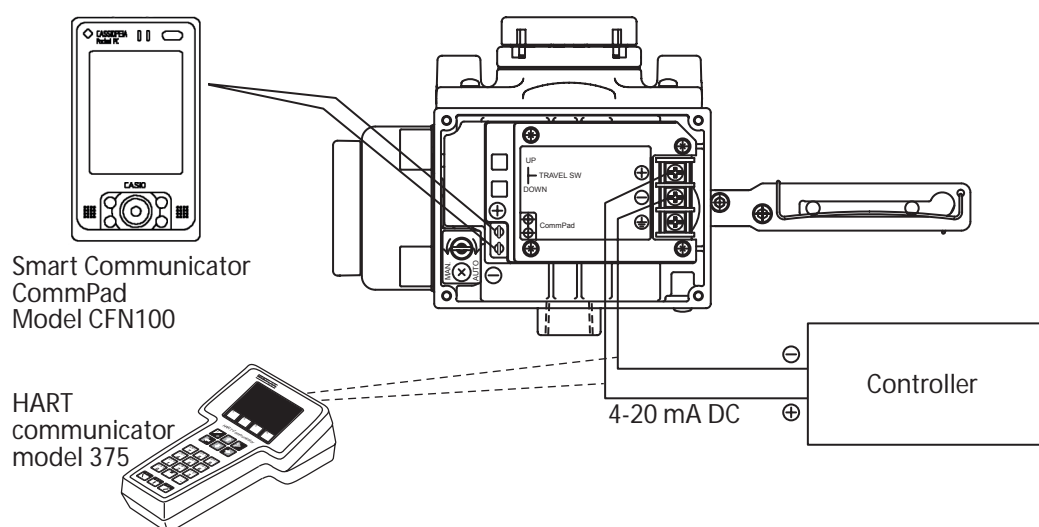
## TYPICAL INSTALLATION

The models SVX100 and SVX102 can be used by connecting the input signal cable (4 - 20 mA) the same as for the conventional type.

Figure 1 shows the wiring for the model SVX100 and Figure 2 shows the wiring for the model SVX102.



*Figure 1 Wiring for model SVX100*



*Figure 2 Wiring for model SVX102*

**MODEL SELECTION**

| Model                              |   | Selection |           |   |   | Option |     |
|------------------------------------|---|-----------|-----------|---|---|--------|-----|
| <b>SVX100</b>                      | Analog signal (4-20 mA DC)  |           |           |   | X |        |     |
| <b>SVX102</b>                      | Analog signal (4-20 mA DC) with HART protocol                                       |           |           |   |   |        |     |
| Structure                          | Standard  | X         |           |   |   |        |     |
|                                    | FM Intrinsically safe (Model SVX102 only)   | F         |           |   |   |        |     |
|                                    | KEMA/ATEX Intrinsically safe (Model SVX102 only)                                    | L         |           |   |   |        |     |
| Connection                         | Electrical connection   |           |           |   |   |        |     |
|                                    | Air piping connection   |           |           |   |   |        |     |
|                                    | Mounting thread   |           |           |   |   |        |     |
|                                    |   |           |           |   |   |        |     |
|                                    | G1/2  | Rc1/4     | M8        | G |   |        |     |
|                                    | 1/2NPT  | 1/4NPT    | M8        | N |   |        |     |
|                                    | 1/2NPT  | 1/4NPT    | 5/16-8UNC | U |   |        |     |
| Finish                             | Standard  |           |           |   | S |        |     |
| Feedback lever type                | Slide lever type  |           |           |   |   | A      |     |
|                                    | Stroke lever type   |           |           |   |   | S      |     |
|                                    | Direct mounting type  |           |           |   |   | D      |     |
| Pressure gauge joint               | No selection  |           |           |   |   | X      |     |
|                                    | With T type joint (Note 4)  |           |           |   |   | T      |     |
| Supply air pressure classification | No pressure gauge (Note 5)  |           |           |   |   | X      |     |
|                                    | 200kPa (30psi) (Supply air pressure: 130kPa≤Ps≤150kPa (19psi ≤Ps≤22psi)) (Note 4)   |           |           |   |   | 1      |     |
|                                    | 400kPa (60psi) (Supply air pressure: 150kPa<Ps≤300kPa (22psi<Ps≤44psi)) (Note 4)    |           |           |   |   | 2      |     |
|                                    | 600kPa (90psi) (Supply air pressure: 300kPa<Ps≤450kPa (44psi<Ps≤65psi)) (Note 4)    |           |           |   |   | 3      |     |
|                                    | 1000kPa (150psi) (Supply air pressure: 450kPa<Ps≤700kPa (65psi<Ps≤100psi)) (Note 4) |           |           |   |   | 4      |     |
| Scale unit                         | No selection (Note 5)   |           |           |   |   | X      |     |
|                                    | kPa (Note 5)  |           |           |   |   | A      |     |
|                                    | (kgf/cm <sup>2</sup> ) (Note 1) (Note 5)  |           |           |   |   | B      |     |
|                                    | MPa (Note 5)  |           |           |   |   | C      |     |
|                                    | bar (Note 5)  |           |           |   |   | D      |     |
|                                    | (psi) (Note 1) (Note 5)   |           |           |   |   | E      |     |
| Option                             | No selection  |           |           |   |   |        | X X |
|                                    | For single acting actuator (with plug for OUT2) (Note 2)                            |           |           |   |   |        | P D |
|                                    | With mounting bracket (Note 3)  |           |           |   |   |        | B A |
|                                    | With NAMUR joints for direct mounting type (Note 6)                                 |           |           |   |   |        | M D |

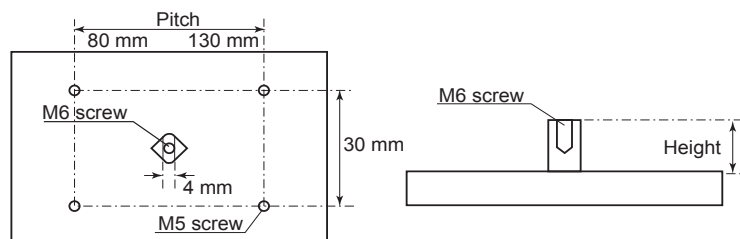
- Note) 1: No domestic sales in Japan due to non-SI unit.  
 2: In the case of using the device as a single acting actuator, close the output air pressure connection plug (OUT2). (The device cannot be used when the output air pressure plug (OUT1) is closed)  
 3: Please select a mounting bracket model (model SVA).  
 4: In the case of selecting the pressure gauge, select with T type joint in pressure gauge joint.  
 5: In the case of selecting "No pressure gauge" in "Supply air pressure classification", select "No selection" in "Scale unit".  
 6: Please select a "code D - Direct mounting type (For rotary valves)" as shown in selection (4) feed back lever type.

Model selection of mounting bracket

| Model                     |  |   | Selection |   |   |   |
|---------------------------|--|---|-----------|---|---|---|
| SVA                       | 1  |   |           |   |   |   |
| Mounting bracket material | 0  | SUS304  |           |   |   |   |
|                           | 1  | SS400 standard zinc plated (bolt and nut is SUS304)                   |           |   |   |   |
| Mounting thread           | 0  | Metric thread (Select when SVX thread connection code is "G" or "N.") |           |   |   |   |
|                           | 1  | Unify thread (Selection when SVX thread connection is "U".)           |           |   |   |   |
| Mounting bracket (Note 2) |  | KITZ B series B-1, BS-1, BSW-1 (Note 4)                               | B         | K | T | 1 |
|                           |  | KITZ B series B-2, BS-2, BSW-2 (Note 4)                               | B         | K | T | 2 |
|                           |  | KITZ B series B-3, BS-3, BSW-3 (Note 4)                               | B         | K | T | 3 |
|                           |  | KITZ B series B-4, BS-4, BSW-4 (Note 4)                               | B         | K | T | 4 |
|                           |  | KITZ B series B-5, BS-5, BSW-5 (Note 4)                               | B         | K | T | 5 |
|                           |  | KITZ B series B-6, BS-6, BSW-6 (Note 4)                               | B         | K | T | 6 |
|                           |  | Kitamura Valve AK09, 09S, 12, 12S, 15, 15S (Note 4)                   | K         | A | K | 1 |
|                           |  | Kitamura Valve AG06, 06S (Note 4)                                     | K         | A | G | 1 |
|                           |  | Kitamura Valve AG09, 09S (Note 4)                                     | K         | A | G | 2 |
|                           |  | Kitamura Valve AG13, 13S (Note 4)                                     | K         | A | G | 3 |
|                           |  | Kitamura Valve AW13, AW13S (Note 4)                                   | K         | A | W | 1 |
|                           |  | Kitamura Valve AW17, 17S (Note 4)                                     | K         | A | W | 2 |
|                           |  | Kitamura Valve AW20, 20S (Note 4)                                     | K         | A | W | 3 |
|                           |  | Zomox (EL-O-MATIC) E25, 40, 65, 100, 200, 350 (Note 4)                | E         | M | E | 1 |
|                           |  | Zomox (EL-O-MATIC) E600, 950, 1600, P2500, 4000 (Note 4)              | E         | M | E | 2 |
|                           |  | Tomoe Valve Z series Z-06, 08, 11, 13 (Note 4)                        | C         | B | F | 1 |
|                           |  | Tomoe Valve T-matic 3Q-1, 2, 3, 4, 3I-1, 2, 3, 4 (Note 4)             | C         | B | T | 1 |
|                           |  | KITZ B series B-1, BS-1, BSW-1 (Note 1)                               | B         | K | T | G |
|                           |  | KITZ B series B-2, BS-2, BSW-2 (Note 1)                               | B         | K | T | H |
|                           |  | KITZ B series B-3, BS-3, BSW-3 (Note 1)                               | B         | K | T | J |
|                           |  | KITZ B series B-4, BS-4, BSW-4 (Note 1)                               | B         | K | T | K |
|                           |  | KITZ B series B-5, BS-5, BSW-5 (Note 1)                               | B         | K | T | L |
|                           |  | KITZ B series B-6, BS-6, BSW-6 (Note 1)                               | B         | K | T | M |
|                           |  | Kitamura Valve AK09, 09S, 12, 12S, 15, 15S (Note 1)                   | K         | A | K | B |
|                           |  | Kitamura Valve AG06, 06S (Note 1)                                     | K         | A | G | D |
|                           |  | Kitamura Valve AG09, 09S (Note 1)                                     | K         | A | G | E |
|                           |  | Kitamura Valve AG13, 13S (Note 1)                                     | K         | A | G | F |
|                           |  | Kitamura Valve AW13, AW13S (Note 1)                                   | K         | A | W | G |
|                           |  | Kitamura Valve AW17, 17S (Note 1)                                     | K         | A | W | H |
|                           |  | Kitamura Valve AW20, 20S (Note 1)                                     | K         | A | W | J |
|                           |  | Kitamura Valve AW28, 28S (Note 1)                                     | K         | A | W | K |
|                           |  | Tomoe Valve Z series Z-06, 08 (Note 1)                                | C         | B | F | D |
|                           |  | Tomoe Valve Z series Z-11 (Note 1)                                    | C         | B | F | E |
|                           |  | Tomoe Valve Z series Z-13 (Note 1)                                    | C         | B | F | F |
|                           | Tomoe Valve T-matic 3Q-1, 2, 3, 4, 3I-1, 2, 3, 4 (Note 1)    | C   | B         | T | B |   |
|                           | NAMUR STANDARD (pitch 80 mm, height 20 mm) (Note 1, Note 3)  |   |           |   |   |   |
|                           | Zomox (EL-O-MATIC) E-25, 40, 65, 100, 200, 350               | R   | U         | M | 1 |   |
|                           | Nihon Koso 6300 series 63A2, AT series AT20                  |   |           |   |   |   |
|                           | NAMUR STANDARD (pitch 80 mm, height 30 mm) (Note 1, Note 3)  | R   | U         | M | 2 |   |
|                           | NAMUR STANDARD (pitch 130 mm, height 30 mm) (Note 1, Note 3) |   |           |   |   |   |
|                           | Zomox (EL-O-MATIC) E600, 950, 1600, P2500, 4000              | R   | U         | M | 3 |   |
|                           | Nihon Koso 6300 series 63A4, AT series AT40                  |   |           |   |   |   |
|                           | NAMUR STANDARD (pitch 130 mm, height 50 mm) (Note 1, Note 3) | R   | U         | M | 4 |   |
|                           | Nihon Koso 6300 series 63A5, AT series AT50                  |   |           |   |   |   |
|                           | NAMUR STANDARD (pitch 80 mm, height 20 mm) (Note 3, Note 5)  | R   | U         | M | A |   |
|                           | NAMUR STANDARD (pitch 80 mm, height 30 mm) (Note 3, Note 5)  | R   | U         | M | B |   |
|                           | NAMUR STANDARD (pitch 130 mm, height 30 mm) (Note 3, Note 5) | R   | U         | M | C |   |
|                           | NAMUR STANDARD (pitch 130 mm, height 50 mm) (Note 3, Note 5) | R   | U         | M | D |   |

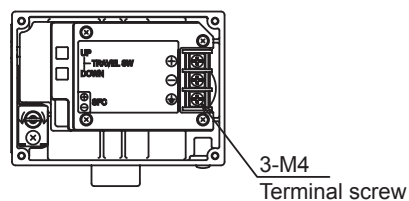
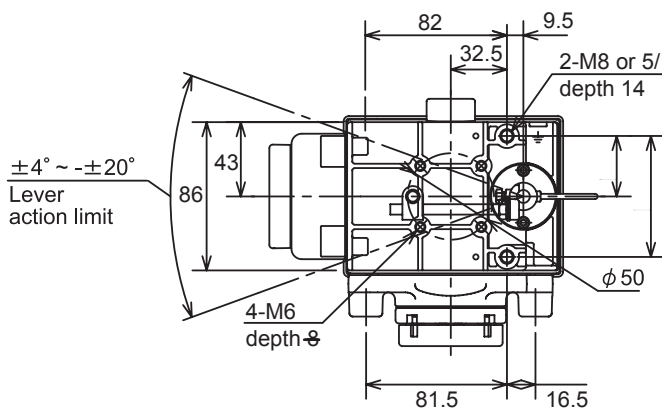
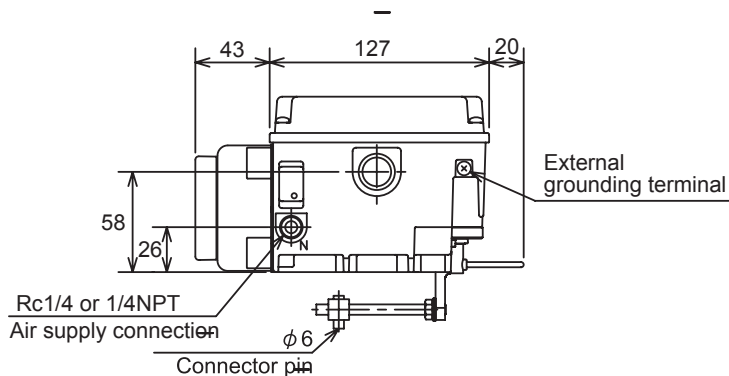
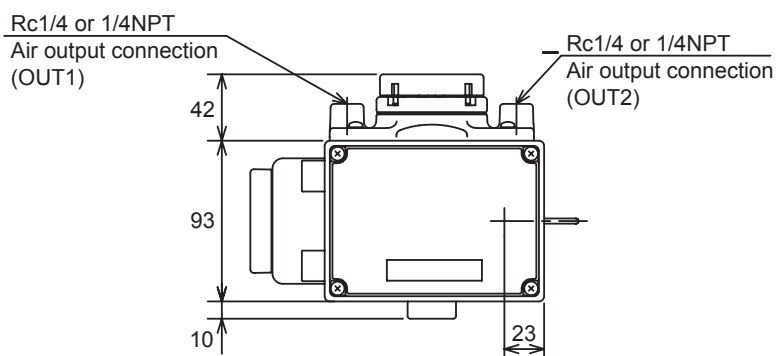
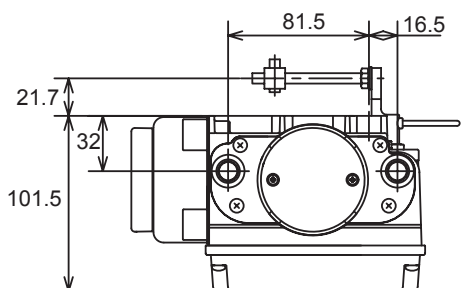
Note) 1: For slide lever type. (Mounting bracket material is only SUS304) 4: For stroke lever type.  
 2: Select mounting bracket depend on the feedback lever type. 5: For direct mounting type.  
 3: Confirm the pitch and height for NAMUR standard actuator.

|        |       |       |        |        |
|--------|-------|-------|--------|--------|
| Pitch  | 80 mm | 80 mm | 130 mm | 130 mm |
| Height | 20 mm | 30 mm | 30 mm  | 50 mm  |

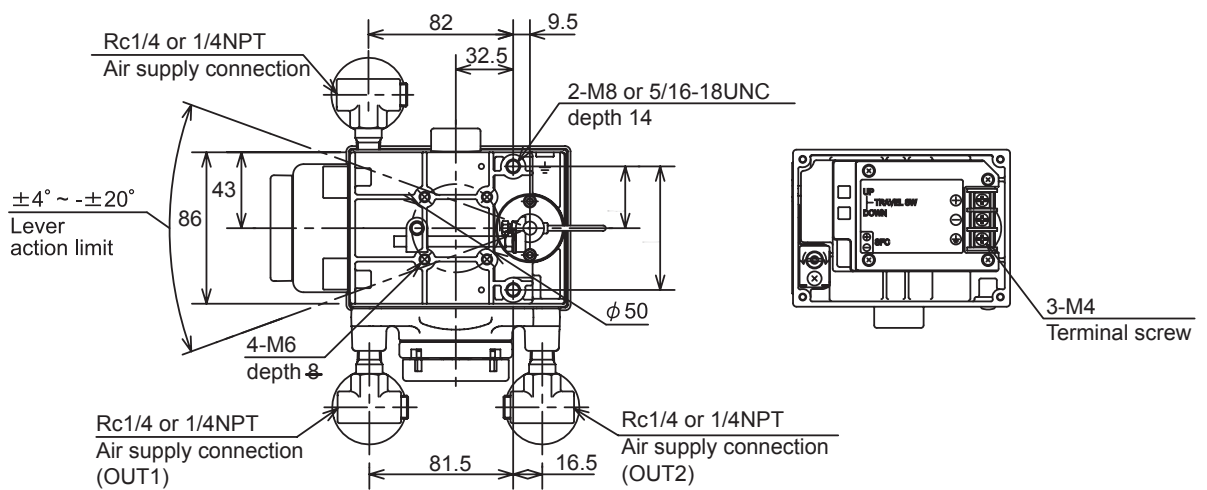
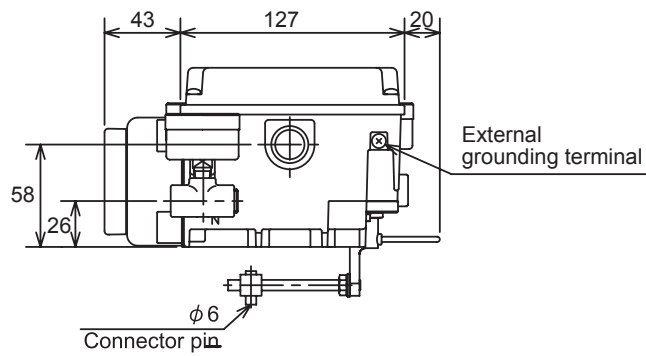
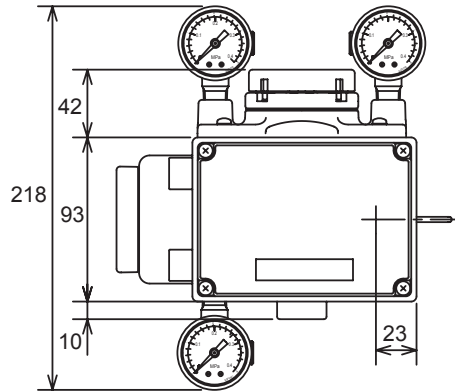
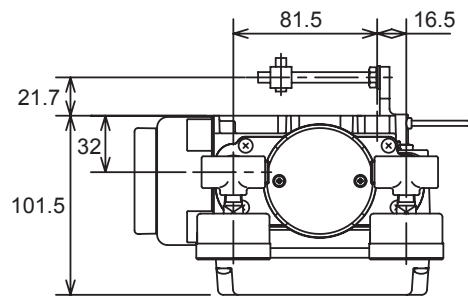


**DIMENSIONS**

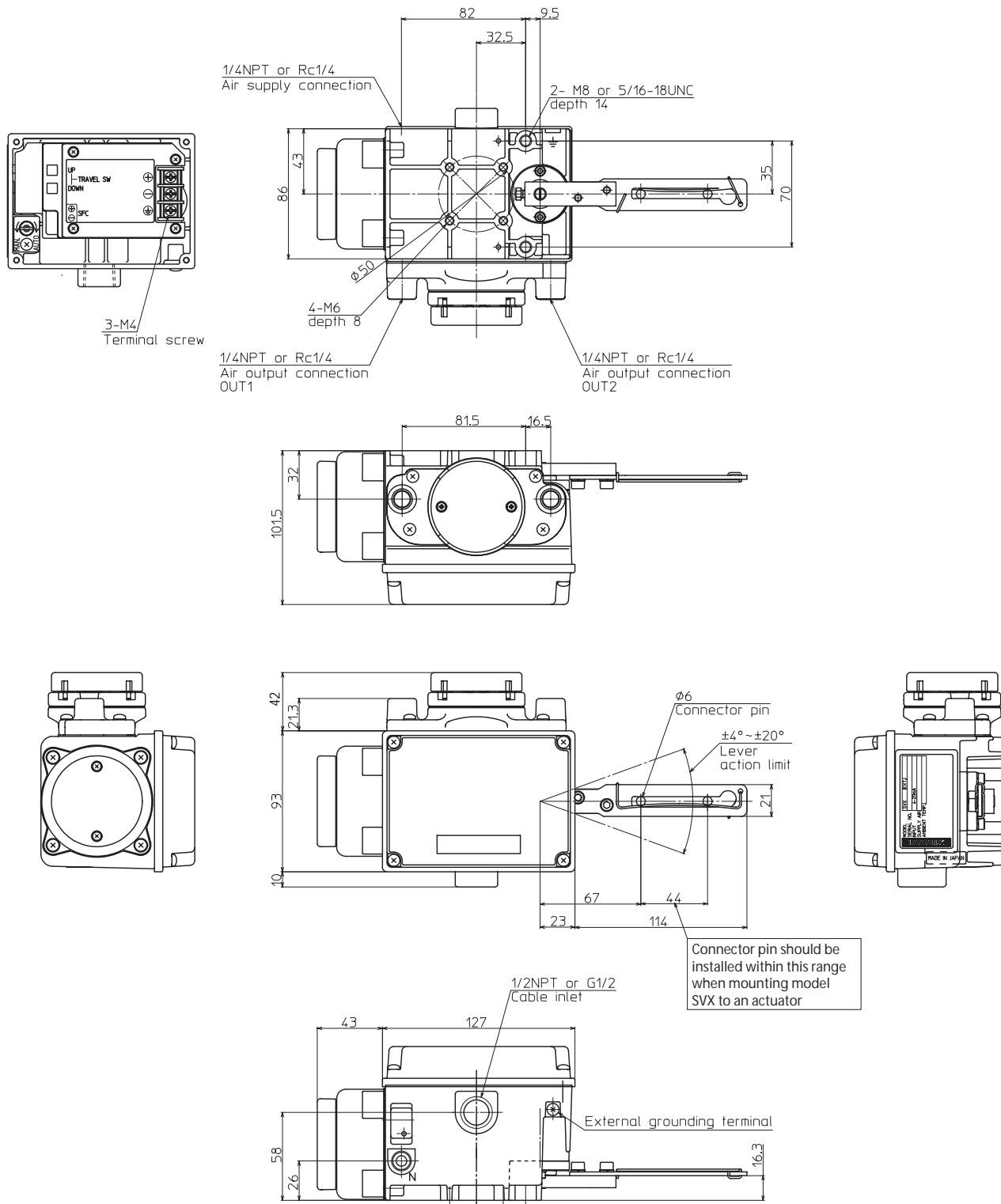
Slide lever type (without pressure gauge) (Under development)



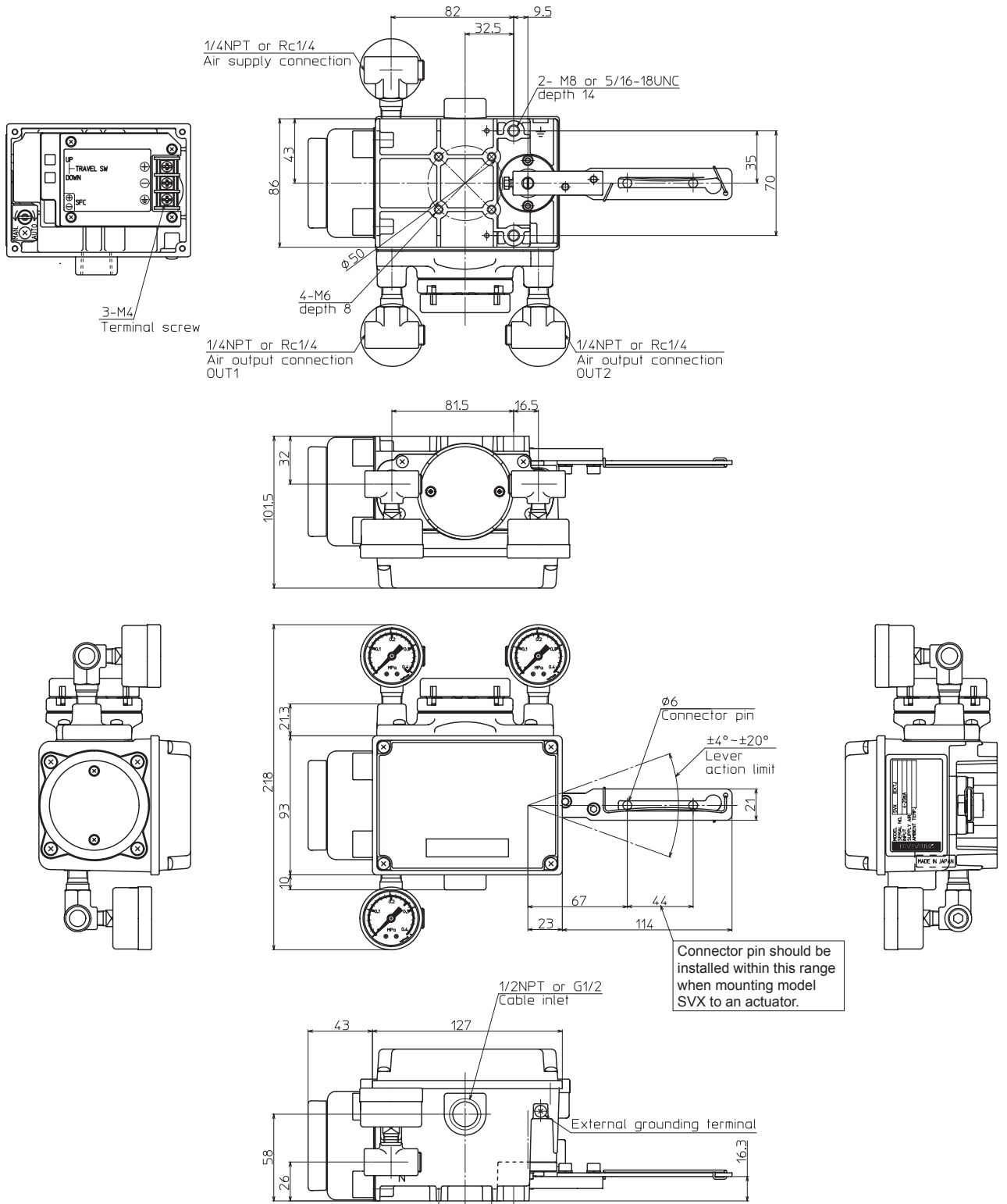
Slide lever type (with pressure gauge) (Under development)



Stroke lever type (without pressure gauge)

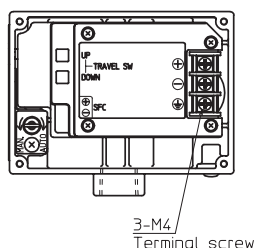
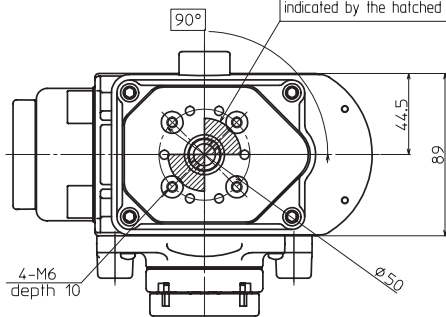


Stroke lever type (with pressure gauge)

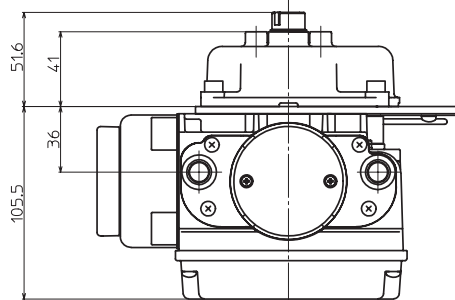


Direct mounting type (without pressure gauge)

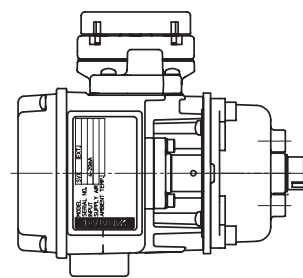
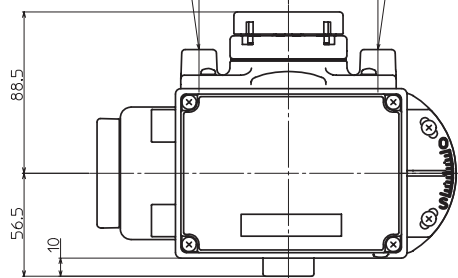
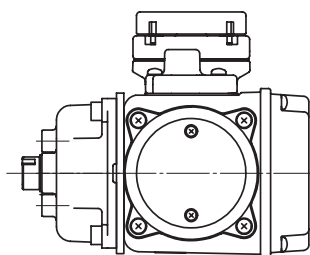
Ensure that the direction of rotation matches the travel quadrant of the positioner.  
Slot of the positioner can only rotate in the range indicated by the hatched area.



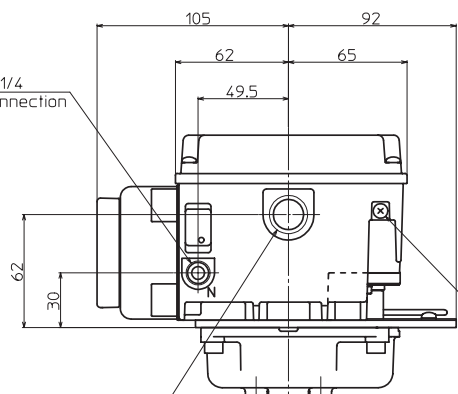
3-M4  
Terminal screw



1/4NPT or Rc1/4  
Air output connection  
OUT1  
49  
49  
1/4NPT or Rc1/4  
Air output connection  
OUT2



1/4NPT or Rc1/4  
Air supply connection

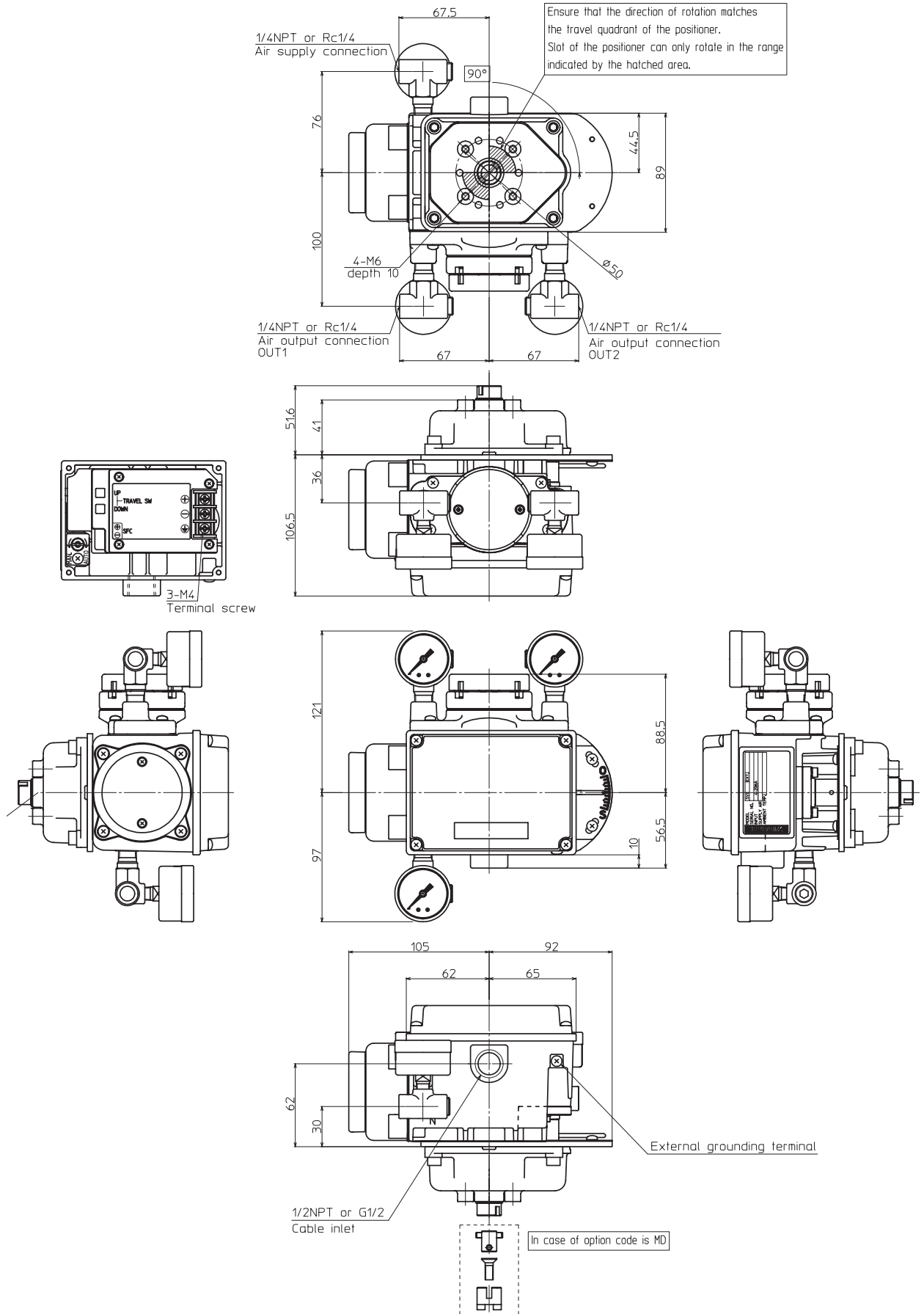


External grounding terminal

1/2NPT or G1/2  
Cable inlet

In case of option code is MD

Direct mounting type (with pressure gauge)



*Specifications are subject to change without notice.*

**azbil**

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