

# SVP3000 Alphaplus

## Smart valve positioner remote type with FOUNDATION™ fieldbus

### Model AVP203/AVP204

#### OVERVIEW

The SVP3000 Alphaplus model AVP203/AVP204 is a FOUNDATION fieldbus equipped smart valve positioners with a separate valve travel detector. The valve detector and positioner are connected by a dedicated cable.

By installing only its valve travel detector on the valve body, positioner maintenance is greatly simplified anti-vibration characteristics will be improved.

The model AVP203 controls and manages the valve through Fieldbus.

The model AVP204 obtains a unique function that is realized by the hybrid technology. The model AVP204 adopts two signals, analog and FOUNDATION fieldbus, that the analog signal is for control loop and FOUNDATION fieldbus is for diagnostic purpose.

The various diagnostic functions and the automatic configuration function of the SVP3000 Alphaplus, as well as PID function blocks, help to optimize the full advantages of Fieldbus technology.



#### FEATURES

##### **Anti-vibration characteristics 10G, 2000Hz**

Vibration resistance has been improved so that it is five times more durable than conventional current -pneumatic positioners.

It is suitable for valves that are located in an environment with strong vibration, where previously only pneumatic positioners could be used.

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

###### • Auto- setup

The auto-setup function is a fully-automatic configuration program that specifies the actuator parameters and adjusts the valves zero and span. The program can be started simply by turning on the external switch so that the adjustments of the valve can be performed quickly and safely in hazardous areas.

##### **Valve diagnostic**

Following parameters can be monitored by Control Valve Maintenance Support System "Valstaff™".

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

##### **High reliability**

###### • Positive seating

The positive seating function completely shuts the valve off when the input signal is lower than that set by user. This allows the user to get the most from the shut-off capability of the valves.

###### • Self-diagnostics

The self-diagnostic function checks the status of the positioner and to alert the failure.

##### **Single model capable of various specifications**

The SVP3000 Alphaplus' settings can be changed without replacement of any parts. A single model can be modified to suit any application's requirements without any parts change.

###### • Input range

Configurable to any range for split range

###### • Flow characteristic

Linear, EQ%, Quick opening or customized characteristics

###### • Actuator type

Double or single acting actuator (optional reversing relay required)

##### **FOUNDATION fieldbus compliance**

The SVP is equipped with a FOUNDATION fieldbus compliant PID function block. It offers the most efficient loop for fieldbus.

**FUNCTIONAL SPECIFICATIONS****Applicable actuator**

- Single and double acting actuator
- Linear and rotary motion actuator

**Approvals****JIS Flameproof approval**

Body: Ex d IIC T6 Approval No.TC17094

Valve travel detector: Ex d IIC T6 Approval No.C16390

**Output characteristics**

Linear, equal percentage, quick opening

Custom configuration - 15 segments

**Stem travel range**Feedback lever angle  $\pm 4^\circ$  to  $\pm 20^\circ$ **Bypass operation**

Auto/Manual external switch

(For single acting type only)

**Air supply pressure**140 to 700 kPa (1.4 to 7.0 kgf/cm<sup>2</sup>)**Air consumption**4 ℓ/min(N) maximum at 140 kPa (1.4 kgf/cm<sup>2</sup>)5 ℓ/min(N) maximum at 280 kPa (2.8 kgf/cm<sup>2</sup>)6 ℓ/min(N) maximum at 500 kPa (5.0 kgf/cm<sup>2</sup>)10 ℓ/min(N) maximum at 400 kPa (4.0 kgf/cm<sup>2</sup>) for double acting type**Maximum air deliver rate**110 ℓ/min(N) at 140 kPa (1.4 kgf/cm<sup>2</sup>)250 ℓ/min(N) at 400 kPa (4.0 kgf/cm<sup>2</sup>) for double acting type**Output balanced pressure**

55±5% for double acting type only

**Lightning protection**

Peak value of voltage surge: 12 kV

Peak value of current surge: 1000A

**Ambient temperature limits**

Waterproof model: -40°C to 80°C

JIS Flameproof model: -20°C to 55°C

**Ambient humidity limits**

10% to 90% RH

**CE conformity****Electromagnetic compatibility**

EN 61326: 1997 (CE marking)

**PERFORMANCE SPECIFICATIONS****Accuracy**

± 1% F.S. (±2.5% with custom output characteristics)

Accuracy varies according to cable length.

Cable length	Accuracy
5 m	± 1.2% F.S.
10 m	± 1.7% F.S.
20 m	± 2.7% F.S.

For 4 mA ≤ input signal span &lt; 8 mA, ± 1.5% F.S.

Note) Depend on the air pipe diameter, or pipe length,  
the auto setup program will not properly operate.

**Travel transmission accuracy**

± 1% F.S. (± 2.5% with custom output characteristics)

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

JIS C0920 watertight, NEMA type 4X, IP66

**Finish**

Baked acrylic

**Color**

Dark blue

**Material****Body case**

Cast aluminum

**Case of valve travel detector**

Stainless steel

**Weight****Body****For single acting type**

Without pressure regulator with filter: 2.5 kg

With pressure regulator with filter: 3.2 kg

**For double acting type**

Without pressure regulator with filter: 2.8 kg

With pressure regulator with filter: 3.5 kg

**Valve travel detector**

0.9 kg

**Cable**

0.2 kg / 1 m

Outer diameter: 10.2 mm

Sheath material: PDC (PVC)

**INSTALLATION****Air connections**

Rc1/4 or 1/4NPT internal thread

**Electrical connections**

G1/2 or 1/2 NPT internal thread

**Conditions of supply air****Particles**

Maximum diameter 3 μm

**Oil mist**

None acceptable

**Dew point**

10°C below ambient temperature

## FIELDBUS SPECIFICATIONS

### Function blocks

PID function block ×2

AO function block ×1

AI function block ×1 (model AVP204 only)

### Period of execution

PID function block: 125 ms

AO function block: 75 ms

AI function block: 75 ms

Standard parameters of FOUNDATION fieldbus

### Diagnostic function block

Yamatake unique parameters defined by device description

### Transducer block

Standard parameters of FOUNDATION fieldbus and Yamatake unique parameters defined by device description

### Resource block

Standard parameters of FOUNDATION fieldbus

### Trend object

Standard parameters of FOUNDATION fieldbus

### Alert object

Standard parameters of FOUNDATION fieldbus

### View object

Standard parameters of FOUNDATION fieldbus

### Link object

7 max.

### Network parameters

- Slot time V(ST): 5 to 100
- Max. Response Delay V(MRD):  $V(MRD) \times V(ST) \geq 20$  and  $V(MRD) \leq 11$
- Min. Inter - Pdu Delay V(MID): 10 to  $(V(MRD)-1) \times V(ST)$ , and  $V(MID) \leq 120$

### Number of VCR

16 max.

### Supply voltage

9 to 32 V (current 20 mA)

### Registration

Interoperability test ITK 4.6 approved.

## Typical installation

Figure 1 shows the wiring for the model AVP203 and Figure 2 shows the wiring for the model AVP204.

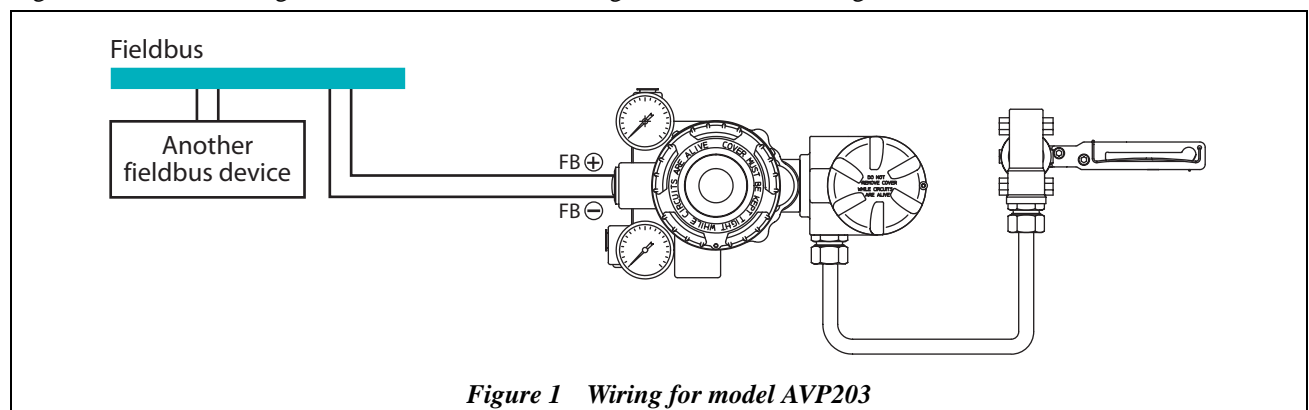


Figure 1 Wiring for model AVP203

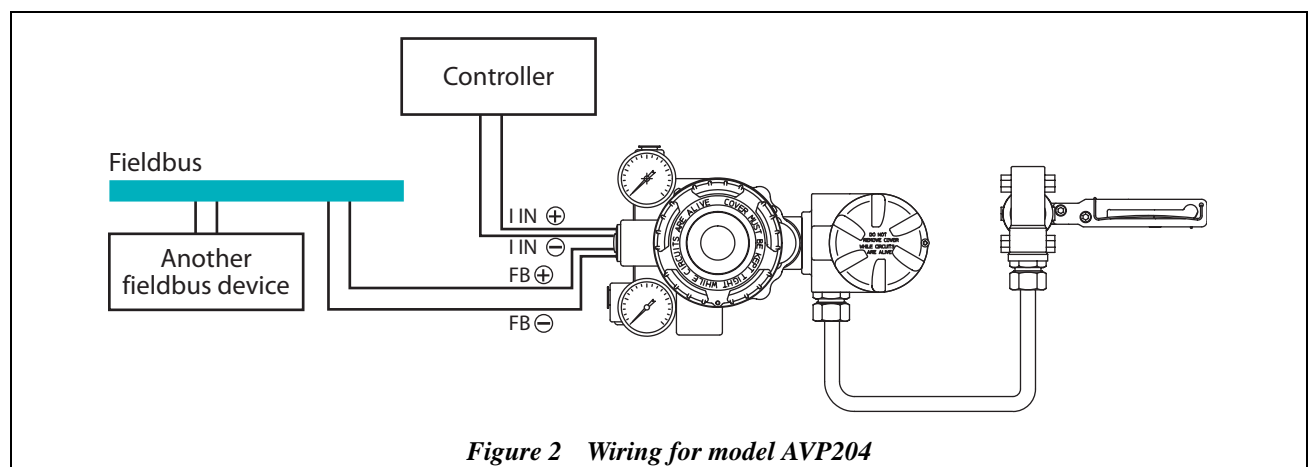


Figure 2 Wiring for model AVP204

## MODEL SELECTION

Model No.	Selections	Optional selections	Operations
<b>AVP203/AVP204</b>	(1) (2) (3) (4) (5)	(6) (7) (8) (9)	(10)

**Notes on quotation**

- \*1 One set of JIS Flameproof cable gland will be attached for model AVP203, two sets are for model AVP204.
- \*2 Standard finish is equivalent to the previous Y138A. Corrosion-proof certification is equivalent to previous Y138B.
- \*3 No domestic sales in Japan due to Non-SI unit.
- \*4 Select model AVP (integral type) only when the direction of drain of the pressure regulator with filter on the control valve is downward (ground).
- \*5 Can be selected if the code selection is "1" for air set (option 6).
- \*6 In case of double acting actuator, a reversing relay unit is required.
- \*7 Select the option with the restoration feedback lever, if GOM manufactured before April, 1998. Select the option '8' (accessory bracket for GOM actuator - Use the case of existing GOP) if the existing control valve assembled with GOP and the accessories such as the Lock-Up valves and solenoid valves.

	Connection	Air piping connection	Electrical connection	Mounting thread	Code
<b>(1) Structure</b>	Waterproof	Rc1/4	G1/2	M8	X
	Waterproof	1/4 NPT internal	1/2 NPT internal	5/16-18	P
	JIS Flameproof with cable gland *1	Rc 1/4	G1/2	M8	E
<b>(2) Finish</b>	Standard (Baked acrylic) *2				S
	Corrosion-proof (Baked epoxy) *2				B
	Silver finish (Baked acrylic)				D
<b>(3) Positioner action</b>	Direct Action - Air pressure increases with control signal increase				D
	Reverse Action - Air pressure decreases with control signal increase				R
<b>(4) Supply Air-pressure classification</b>	Air supply range		Pressure gauge scale	Max regulator setting	
	130≤Ps≤150 kPa { 1.3≤Ps≤1.5 kgf/cm <sup>2</sup> }		200 kPa { 2 kgf/cm <sup>2</sup> }	400 kPa { 4 kgf/cm <sup>2</sup> }	1
	150<Ps≤300 kPa { 1.5<Ps≤3.0 kgf/cm <sup>2</sup> }		400 kPa { 4 kgf/cm <sup>2</sup> }	400 kPa { 4 kgf/cm <sup>2</sup> }	2
	300<Ps≤400 kPa { 3.0<Ps≤4.0 kgf/cm <sup>2</sup> }		600 kPa { 6 kgf/cm <sup>2</sup> }	400 kPa { 4 kgf/cm <sup>2</sup> }	3
	400<Ps≤450 kPa { 4.0<Ps≤4.50 kgf/cm <sup>2</sup> }		600 kPa { 6 kgf/cm <sup>2</sup> }	700 kPa { 7 kgf/cm <sup>2</sup> }	4
450<Ps≤700 kPa { 4.5<Ps≤7.0 kgf/cm <sup>2</sup> }		1000 kPa { 10 kgf/cm <sup>2</sup> }	700 kPa { 7 kgf/cm <sup>2</sup> }	5	
<b>(5) Scale Unit (Pressure gauge)</b>	kPa				A
	kgf/cm <sup>2</sup> *3				B
	MPa				C
	bar				D
	psi *3				E
<b>(6) Pressure regulator with filter</b>	No selection				X
	Model KZ03 pressure regulator with filter (Mounted on positioner) *4				1
<b>(7) Cable length</b>	3 m (For ambient temperature -40 to +80°C)				3
	5 m (For ambient temperature -40 to +80°C)				5
	10 m (For ambient temperature -40 to +80°C)				T
	20 m (For ambient temperature -40 to +80°C)				W
<b>(8)(9) Actuators (for bracket)</b>	No selection				XX
	For single acting actuator				Refer to Table 1
	For double acting actuator				Refer to Table 2
<b>(10) Option (Plural selection available)</b>	With terminal box for remote cable assembly (standard)				M
	Universal elbow explosion-proof (SUS304 G1/2) 1 pc.				A
	Stainless steel filter for KZ03 (pressure regulator with filter) *5				K
	Stainless steel mounting kit for a positioner side and pressure regulator with filter				U
	Sealing tape not permitted				J
	Reversing relay for double acting actuator *6				W
Mounting bracket for accessories on GOM actuator (in case of replacing GOP) *7				8	

Configuration Following shows default and optional settings of each configurable parameter.

- |                          |                          |   |
|--------------------------|--------------------------|---|
| 1. Output characteristic | Liner                    | EQ or QO can be ordered or set by user.                 |
| 2. Valve action          | Direct (Plug above seat) | Reverse (Plug below seat) can be ordered or set by user |

Table 1 Mounting bracket for single acting actuator

(8)(9) Mounting bracket for pneumatic actuators	Code
PSA1, PSA2, PSK1	YS
PSA3, PSA4 / VA1 to VA3 produced after Apr.'83 *1	YQ
PSA3, PSA4 for existing valves produced on/before 1999	YY
PSA6 / VA4 to VA6 produced after Apr.'83 *1	YL
HA1	YA
HA2, HA3, HL2, HL3	YT
HA4, HL4	YN
HK1, VM1 (material SS400 zinc plated) *2	YK
VR1 (material SS400 zinc plated)	YV
VR2, VR3 (material SS400 zinc plated)	YR
RSA2	YU
GOM83S, GOM84S, GOM103S	YG
GOM124S	YM
VA1 - VA3 (for old-model motion connectors) produced on/before Apr.'83 800-1, 800-3 *3	YW
VA4, VA5 (for old-model motion connectors) produced on/before Apr.'83 800-4, 800-5 *3	YJ
Motoyama Mfg. 2800 series 240, 280, 330, Nihon Koso A100 series 270, 320 *4	TA
Motoyama Mfg. 2800 series 400, 500S, 500L, Nihon Koso A100 series 400, 500 *4	TB
Motoyama Mfg. 2800 series 650S, 650L *4	TC
Motoyama Mfg. 2800 series 240, 280, 330 (with side manual)	TD
Motoyama Mfg. 2800 series 400, 500S, 500L (with side manual)	TE
Motoyama Mfg. 2800 series 650S, 650L (with side manual)	TF
Motoyama Mfg. 3800 series (multi-spring type) N24, N28, N33S *4	TJ
Motoyama Mfg. 2922 series (Gyrol-I) G.R.I 280H, 330H, 400HS, 400H, 500H	TL
Motoyama Mfg. 3993 series (Gyrol-II) 280, 330, 400, 2911-1M series 280H, 330H, 400H	TG
Masoneilan 37, 38 series #9, #11 *4	MA
Masoneilan 37, 38 series #13 *4	MB
Masoneilan 37, 38 series #15, #18 *4	MC
Masoneilan 37, 38 series #15, #18 (with side manual)	MF
Masoneilan type 35002 series Camflex II #4-1/2, #6, #7	MG
Nihon Koso TC-500 series TC520S	TP
Nihon Koso TC-700 series TC-713S	TS

Table 1 Mounting bracket for single acting actuator

(8)(9) Mounting bracket for pneumatic actuators	Code
Nihon Koso TC-700 series TC-722SS	TT
Kitamura Valve AK05S, AK09S, AK12S, AK15S	KA
Kitamura Valve AG06S	KG
Kitamura Valve AG09S	KH
Kitamura Valve AG13S	KJ
Kitamura Valve AW13S	KV
Kitamura Valve AW17S	KW
Tomoe Valve Z series Z-06S, 08S, 11S, 13S	EA
Tomoe Valve T-matic 3Q-1, 2, 3, 4	E3
Fisher 657, 667 series 50	FC
Fisher 657, 667 series 60	FD

Note) If no suitable mounting bracket can be found, contact a sales representative.

Note) \*1 Select "YW" or "YJ" for old-type motion connectors. (Produced on/before Apr.'83)

\*2 In case "VM" type actuator is required following conditions, 1. select model "VCT" for the body, 2. the existing positioner should be HEP or VPE, 3. yoke should be model HK. If another specification is required, contact your sales representative.

\*3 Consult a sales representative in case of no mounting hole on the side of valve yoke.

\*4 Select in the case of without manual handle or with manual handle mounted on top of the actuators.

**Table 2 Mounting bracket for double acting actuator**

(8)(9) Mounting bracket for pneumatic actuators		Code
VP5, 6	*1	Y1
SLOP560, 1000, 1000X	*1	Y2
SLOP1500, 1500X	*1	Y3
DAP560, 1000, 1000X	*1	Y4
DAP560, 1500, 1500X	*1	Y5
GOM44L, 44LM (Springless horizontal)		G1
GOM410L, 410LM (Springless horizontal)		G2
GOM64L, 64LM (Springless horizontal)		G3
GOM66L, 66LM (Springless horizontal)		G4
GOM610L, 610LM (Springless horizontal)		G5
GOM84L, 84LM (Springless horizontal)		G6
GOM86L, 86LM (Springless horizontal)		G7
GOM810L, 810LM (Springless horizontal)		G8
GOM1210L, 1210LM (Springless horizontal)		GT
GOM1510L, 1510LM (Springless horizontal)		GU
GOM44L, 44LM (Springless horizontal) with restoration feedback lever	*2	GE
GOM410L, 410LM (Springless horizontal) with restoration feedback lever	*2	GF
GOM64L, 64LM (Springless horizontal) with restoration feedback lever	*2	GG
GOM66L, 66LM (Springless horizontal) with restoration feedback lever	*2	GH
GOM610L, 610LM (Springless horizontal) with restoration feedback lever	*2	GJ
GOM84L, GOM84LM (Springless horizontal) with restoration feedback lever	*2	GK
GOM86L, GOM86LM (Springless horizontal) with restoration feedback lever	*2	GL
GOM810L, GOM810LM (Springless horizontal) with restoration feedback lever	*2	GM
GOM1210L, GOM1210LM (Springless horizontal) with restoration feedback lever	*2	GN
GOM1510L, GOM1510LM (Springless horizontal) with restoration feedback lever	*2	GP
GOM84LM (Springless vertical)		GB
GOM124LM (Springless vertical)		GC
Nihon Koso 6300 series 63A2, AT series AT20		T2
Nihon Koso 6300 series 63A3, B2, BA, B3, BB, B5, AT series AT-30, 200, 250, 300, 350, 500		T3
Nihon Koso 6300 series 63A4, A5, A6, AT series AT40, AT50, AT60		T4
Nihon Koso 6300 series AT series AT25		T5
Nihon Koso TC-500 series TC-520W	*3	TP
Nihon Koso TC-700 series TC-713W		TS
Kitamura Valve AK05, AK09, AK12, AK15		KA
Kitamura Valve AG06		KG

**Table 2 Mounting bracket for double acting actuator**

(8)(9) Mounting bracket for pneumatic actuators	Code
Kitamura Valve AG09	KH
Kitamura Valve AG13	KJ
Kitamura Valve AW13	KV
Kitamura Valve AW17	KW
KITZ B series BS-2, BSW-2, B-2	B2
KITZ B series BS-3, BSW-3, B-3	B3
KITZ B series BS-4, BSW-4, B-4	B4
KITZ B series BS-5, BSW-5, B-5	B5
KITZ B series BS-6, BSW-6, B-6	B6
Tomoe Valve Z series Z-06, 08, 11, 13	EA
Tomoe Valve T-matic 3I-1, 2, 3, 4	E3
NELES BC series BC/BIC11	NB

Note) For the double acting actuator, a reversing relay unit is required.

Note) \*1 If the valve body is for VFR (FloWing) or a butterfly valve, for the mounting bracket requirement consult with our sales.

\*2 Select the option with the restoration feedback lever, if GOM manufactured before April, 1998. Select the option '8' (Accessory bracket for GOM actuator - User the case of existing GOP) if the existing control valve assembled with GOP and the accessories such as the Lock-up valves and solenoid valves.

\*3 Confirm that boss's pitch of the actuator side is 69 mm, if it is required to assemble the mounting bracket to the actuator.

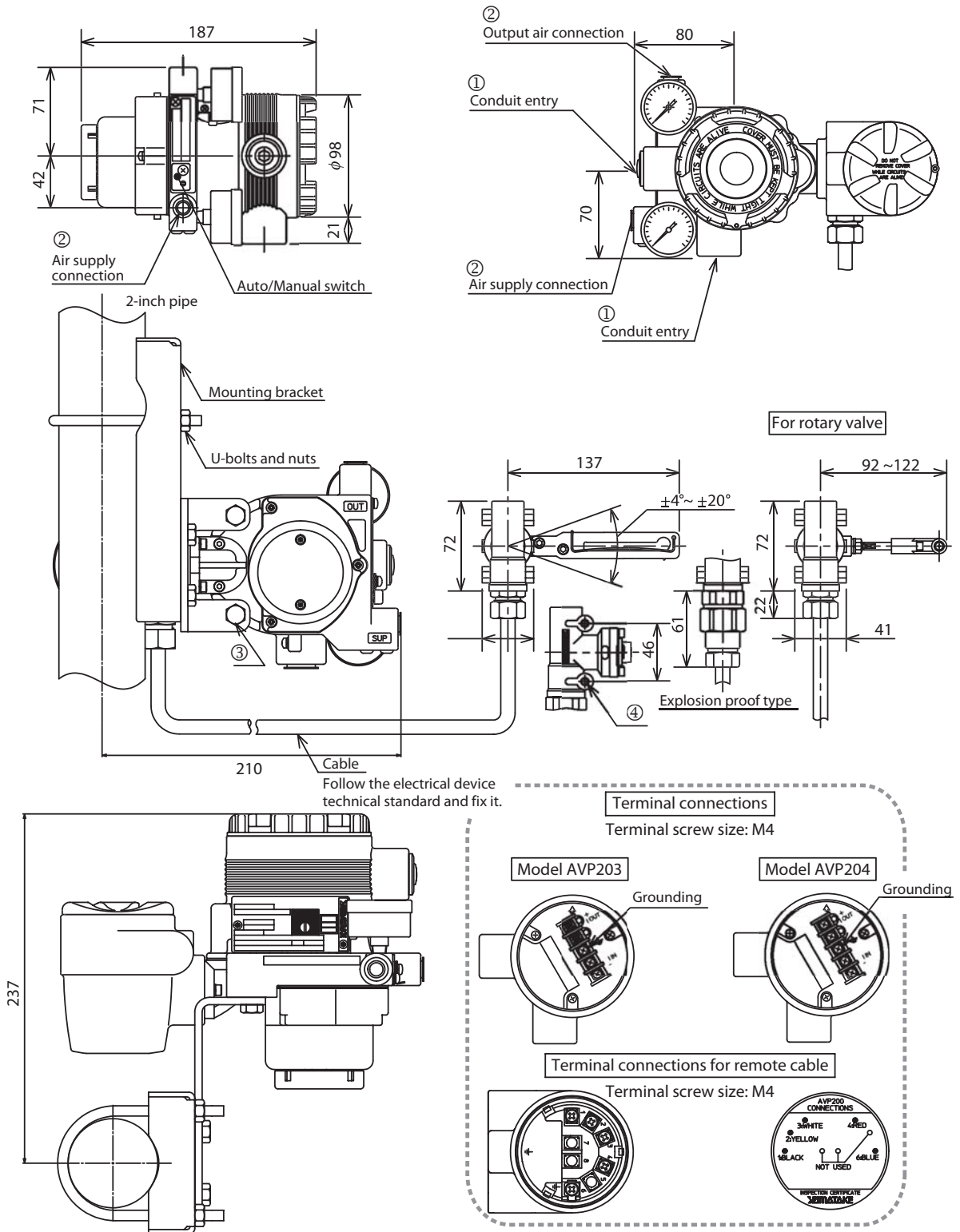
**Table 3 Standard travel range and accuracy**

Actuator	Travel (mm)	Accuracy [% F.S.]
HA1	6, 8, 10	3
	14.3, 25	1
HA2	10	3
	14.3, 25, 38	1
HA3	14.3	3
	25, 38, 50	1
HA4	14.3	3
	25, 38, 50, 75	1
VA5	25, 37.5, 50, 75, 100	1
VA6	14.3	3
PSA6	25, 37.5, 50	1
PSA1, 2, PSK1	20	1
PSA3, 4	38	1
HK1	10	3
	19	1

**DIMENSIONS**

For single acting actuator without pressure regulator with filter

[Unit: mm]

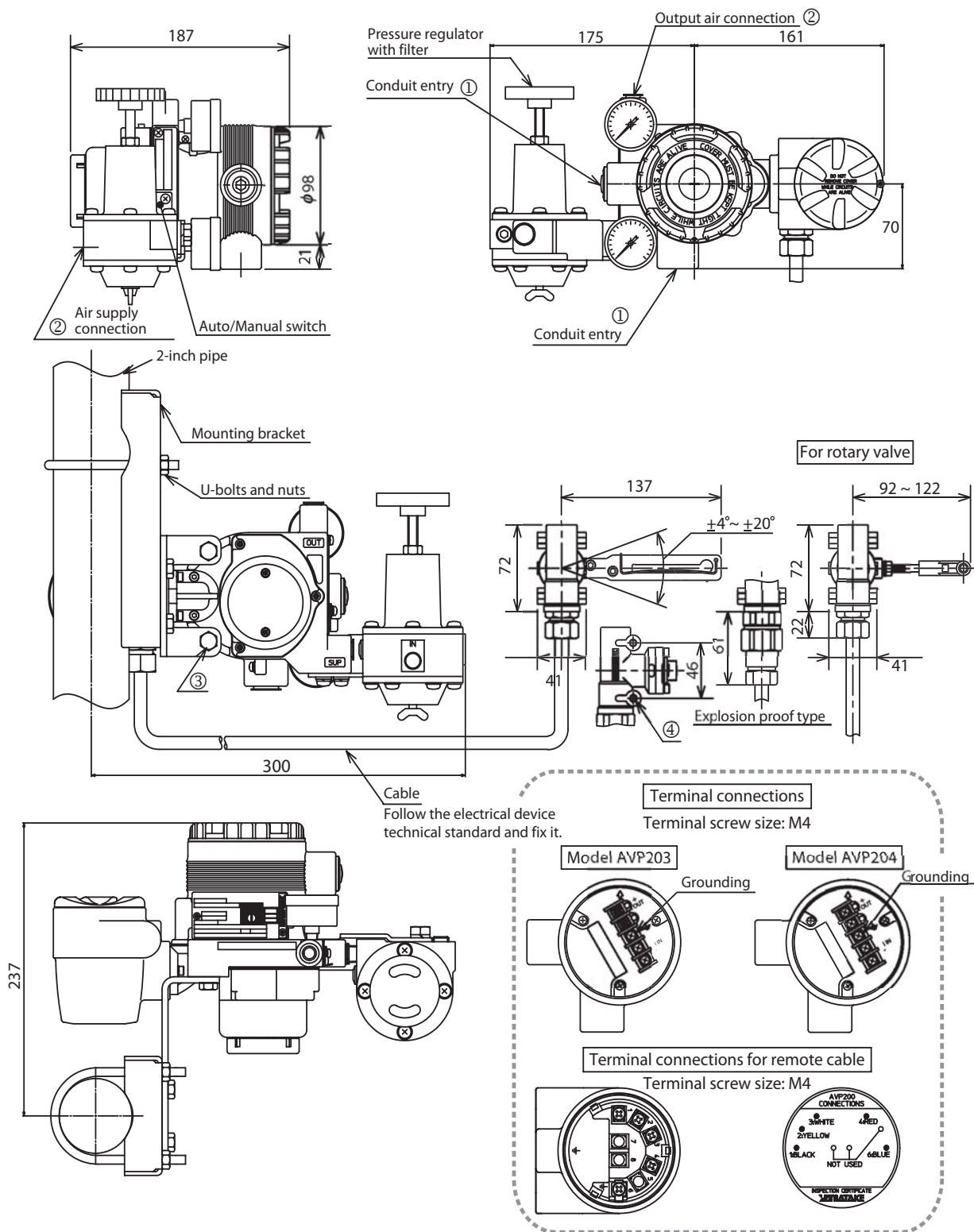


Note1: Rotary angle should never exceed  $\pm 30^\circ$ .

Type	Electrical connection	Air piping connection	Mounting thread	
			AVP body	Valve travel detector
Water-proof / JIS Flameproof	G1/2	Rc1/4	M8	M6
Water-proof	1/2NPT	1/4NPT	5/16-18UNC	1/4-20UNC
Parts on drawings	①	②	③	④

For single acting actuator with pressure regulator with filter

[Unit: mm]

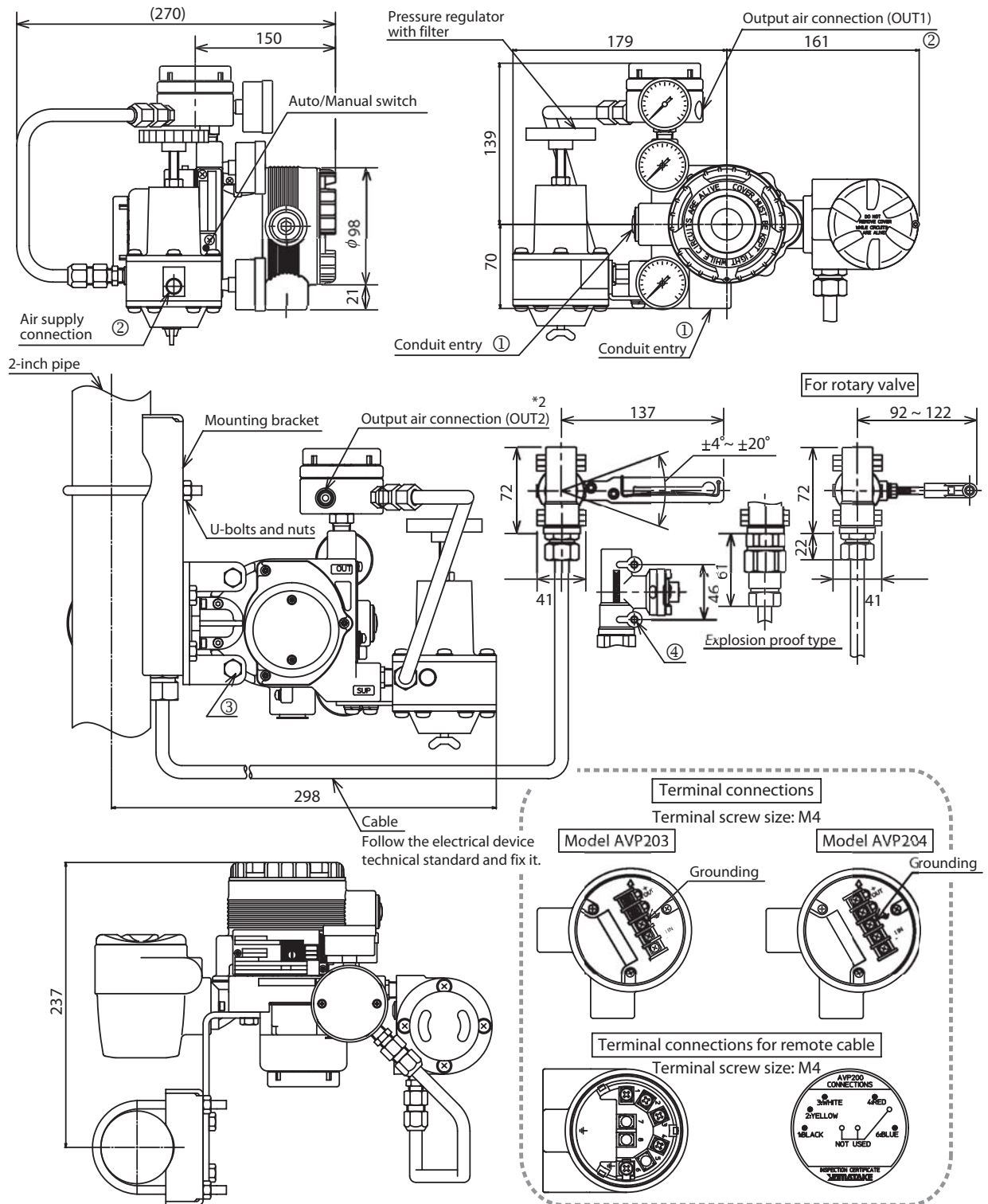


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Type	Electrical connection	Air piping connection	Mounting thread	
			AVP body	Valve travel detector
Water-proof / JIS Flameproof	G1/2	Rc1/4	M8	M6
Water-proof	1/2NPT	1/4NPT	5/16-18UNC	1/4-20UNC
Parts on drawings	①	②	③	④

For double acting actuator without pressure regulator with filter

[Unit: mm]

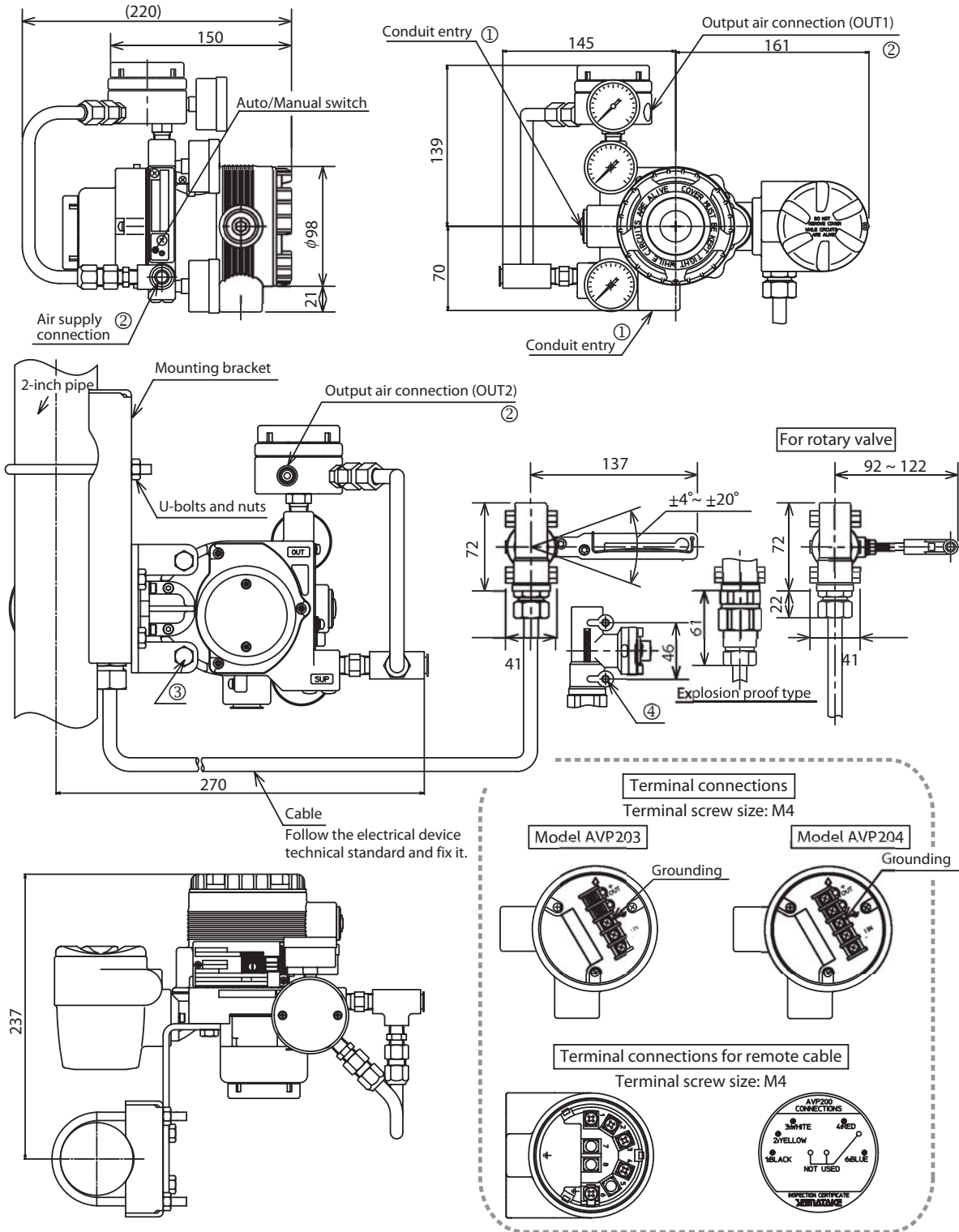


Note1: Rotary angle should never exceed  $\pm 30^\circ$ .

Type	Electrical connection	Air piping connection	Mounting thread	
			AVP body	Valve travel detector
Water-proof / JIS Flameproof	G1/2	Rc1/4	M8	M6
Water-proof	1/2NPT	1/4NPT	5/16-18UNC	1/4-20UNC
Parts on drawings	①	②	③	④

For double acting actuator with pressure regulator with filter

[Unit: mm]

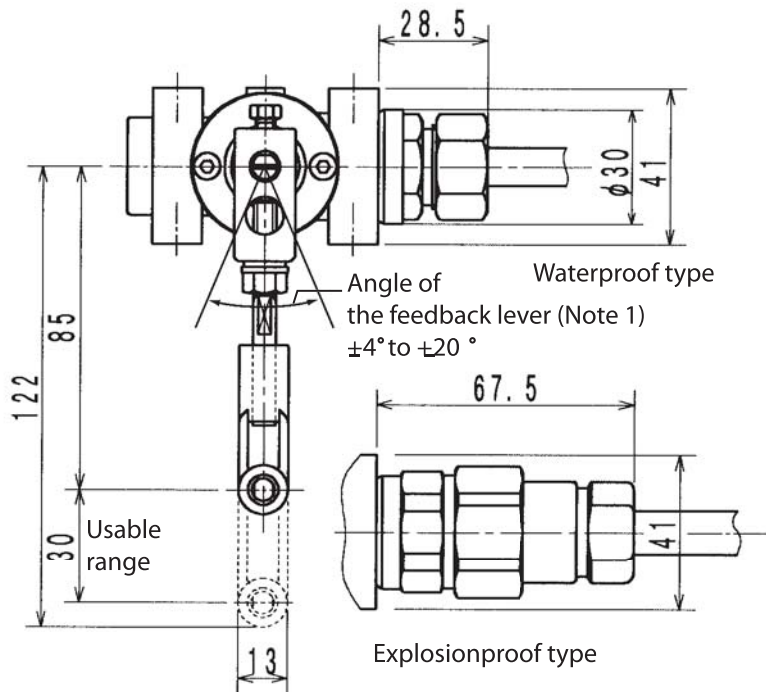


Note1: Rotary angle should never exceed  $\pm 30^\circ$ .

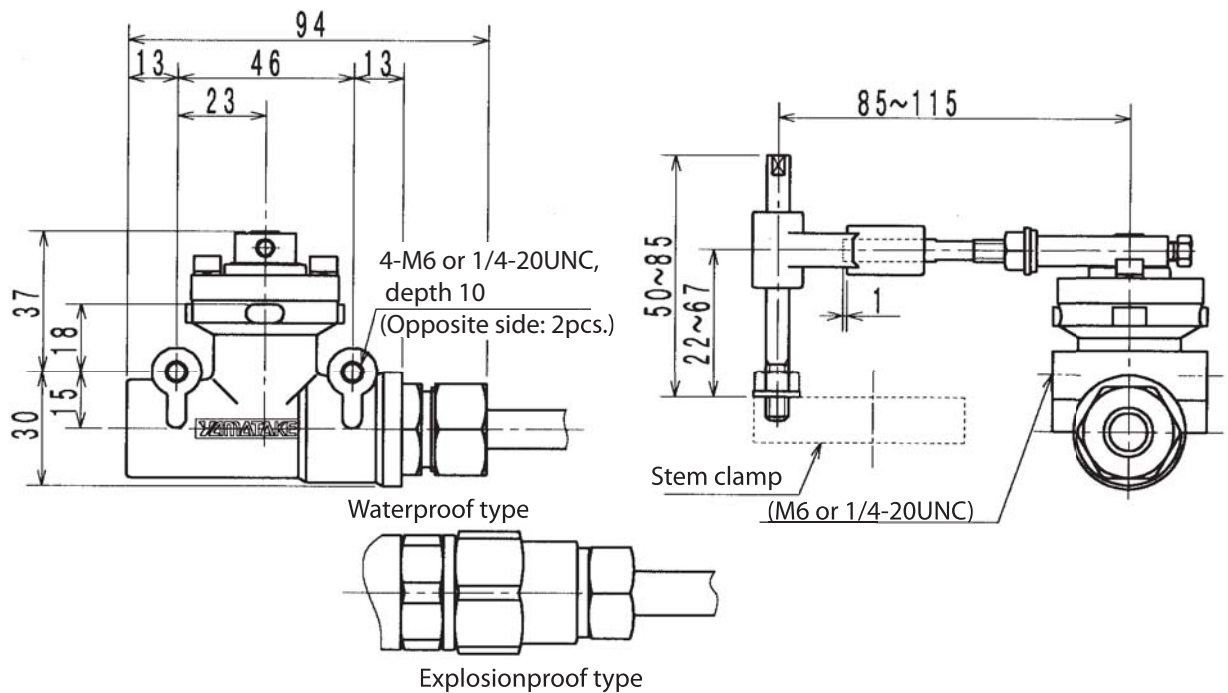
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			AVP body	Valve travel detector
Water-proof / JIS Flameproof	G1/2	Rc1/4	M8	M6
Water-proof	1/2NPT	1/4NPT	5/16-18UNC	1/4-20UNC
Parts on drawings	①	②	③	④

For rotary valve actuator

[Unit: mm]



Note) 1: Rotary angle should never exceed ±30°.



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