

# JIS Flameproof approval, Intrinsically Safe approval & Water-proof type Single Acting Electro-Pneumatic Valve Positioner

## Models HEP 15 / 16 / 17

### OVERVIEW

Mounted on control valves, HEP Electro-Pneumatic Valve Positioners HEP15 / 16 / 17 control valve positions swiftly and accurately by supplying or discharging air from pneumatic actuators in response to input signals from controllers.

### FEATURES

- Each model uses a pilot valve that features low air consumption and a high capacity. Each model has a stabilizer with three patterns of holes in a pilot base. By rotation switching, it ensures highly sensitive and extremely stable operation with small- to large-capacity actuators.
- The magnet is a high-precision moving coil. With a terminal box, it forms an explosion-proof structure. To check the inside, the covers of these models can be removed during operation.
- The rare-earth metal magnet has excellent magnetic characteristics. The moving coil is round and energized by a flat spring. It requires no leads.
- Since each model is compact and lightweight, it can be used with even a small actuator. No piping is required because the KZ03 pressure regulator with filter can be directly attached to the positioner.

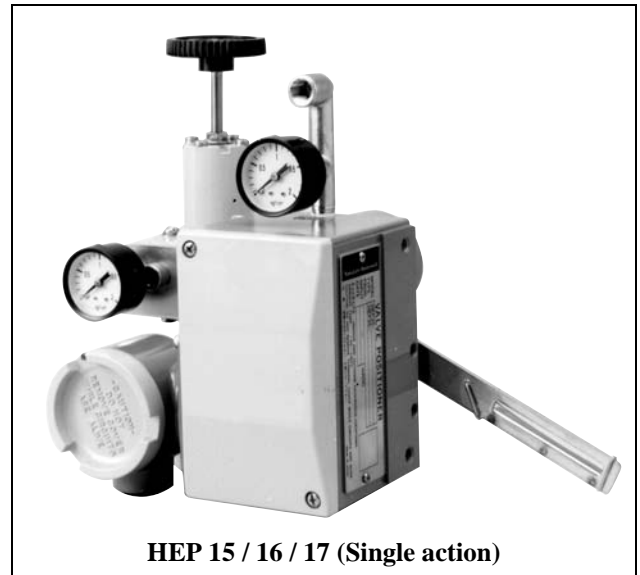
### SPECIFICATIONS

#### Models

HEP15: JIS Flameproof approval  
HEP16: JIS Intrinsically safe approval  
HEP17: JIS Water-proof type

#### Input signals

4 to 20 mA DC, half range  
(4 to 12 mA DC and 12 to 20 mA DC)



HEP 15 / 16 / 17 (Single action)

#### Input resistance

$250 \pm 10 \Omega$  (4 to 20 mA DC input)

#### Output characteristics

linear, equal-percentage, and quick-opening

#### Air supply pressure

140 to 490 kPa { 1.4 to 5.0 kgf/cm<sup>2</sup> }

#### Air consumption

- 4 ℓ/min(N) (steady-state under air supply pressure 140 kPa { 1.4 kgf/cm<sup>2</sup> })
- 5 ℓ/min(N) (steady-state under air supply pressure 270 kPa { 2.8 kgf/cm<sup>2</sup> })
- 6 ℓ/min(N) (steady-state under air supply pressure 390 kPa { 4.0 kgf/cm<sup>2</sup> })

#### Air connection

Rc 1/4 (standard), 1/4 NPT internal thread

#### Electrical connection

G1/2 internal, 1/2 NPT internal  
(Not available with model HEP15)

#### Ambient temperature range

HEP15: -10 to 70°C  
HEP16: -10 to 60°C  
HEP17: -30 to 80°C

**Ambient humidity range**

10 to 90% RH

**Performance**

**Accuracy**

± 1% F.S.

**Dead band**

Within 0.1% F.S.

**Travel adjustment range**

10 to 100 mm. 6 to 10 mm (option)

**Operation speed (max.)**

4 mm/s (for HA2D and R actuator)

**Type of protection**

**Flameproof approval (model HEP15)**

With explosion-proof terminal box or one with cable gland Complies with JIS C0903 Class d2G4

**Intrinsically safe approval (model HEP16)**

Complies with JIS C0903 Class i3aC5  
(With signal line supply voltage of 23.5 to 27.5V DC)  
Zener Barrier No.: 8907/51-24/45 (Certificate No.: 29911)

**Water-proof (model HEP17)**

JIS F8001 Class 3 Splash-proof construction

**Additional mechanism** (factory-mounted upon request)

- Model KZ03 pressure regulator with filter
- Universal elbow of Flameproof construction
- A/M bypass transfer switch
- Cable gland

**Outer dimensions**

Refer to Figure 2 and Table 3.

**Weight**

3.5 kg (4.2 kg with pressure regulator with filter attached)

**Housing**

Aluminum alloy

**Finish**

- Standard finish (acrylic-baked)
- Corrosion-proof finish (epoxy-baked, Y138B)
- Corrosion-proof silver finish (acrylic-baked, Y138D)

*Note) Silver finish is not suitable in alkaline atmospheres.*

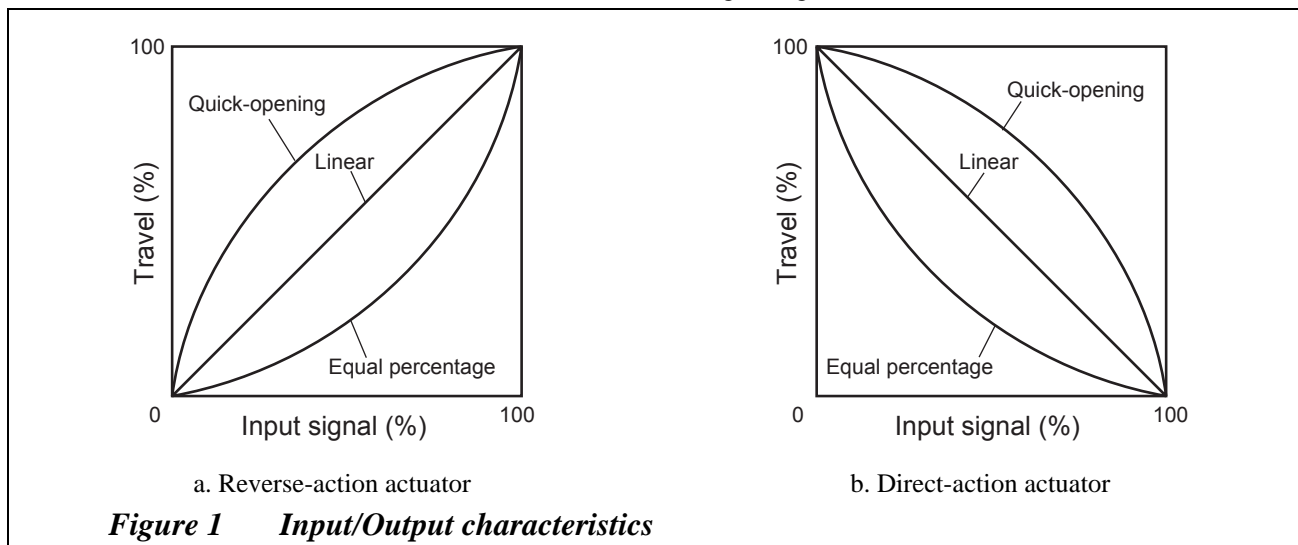
**Standard finish colors**

**Case**

Dark beige (Munsell 10YR 4.7/0.5)

**Cover**

Light beige (Munsell 4Y 7.2/1.3)



**Selection of input / output characteristics**

Since control valve flow rate characteristics are set by the selection of valve plug characteristics, select linear as the input/output characteristics of the positioner. However, if the valve plug's flow rate characteristics, which are determined by the valve type and structure, are not what is required, select equal-percentage or quick-opening. Overall flow rate characteristics of control valve can then be adjusted with the positioner.

**Table 1 Adjustment of control valve flow rate characteristics using positioner**

Valve plug characteristics	I/O characteristics of positioner	Overall flow rate characteristics of control valve
Linear	Quick-opening	Quick-opening
Linear	Equal-percentage	Equal-percentage
Equal-percentage	Quick-opening	Linear

**MODEL SELECTION**

Basic model                      Selection                      Option I                      Option II  
 HEP    

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
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(11)	(12)
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(13)
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**Basic model**

HEP15 (JIS Flameproof)
HEP16 (JIS Intrinsically safe)
HEP17 (JIS Water-proof type)

*Note)*

\*1 Not for Japanese local market due to SI unit

\*2 When replacement, the finish of the existing HEP is corrosion resistant (Y138A), select this code of "S".

\*3 When replacement, the finish of the existing HEP is silver paint (Y138C), select this code of "D".

\*4 Specification of pressure regulator are selected by supply air pressure, painting and pressure gauge. The pressure regulator with filter must be separated with HEP (on selection 12, choose code "2") when any of following conditions are matched.

- In case, the mounting position of actuator is not vertical.
- In case, other equipments are put between pressure regulator and HEP.
- In case, there are conjunction between pressure regulator and HEP.
- In case, code "D" on selection 13, on Option II is chosen.

**Selection**

			Code
(1)	Input signal	4 to 20 mA (Accuracy ± 1% F.S.)	1
		4 to 12 mA (Accuracy ± 2% F.S.)	3
		4 to 12 ± 1 mA (Accuracy ± 2% F.S.)	4
		12 to 20 mA (Accuracy ± 2% F.S.)	5
		12 ± 1 to 20 mA (Accuracy ± 2% F.S.)	6
		10 to 50 mA (Accuracy ± 1% F.S.)	2
(2)	Air supply pressure	130 ≤ Ps ≤ 150 kPa (Suitable press. gauge scale 200 kPa)	1
		150 ≤ Ps ≤ 300 kPa (Suitable press. gauge scale 400 kPa)	2
		300 ≤ Ps ≤ 400 kPa (Suitable press. gauge scale 600 kPa)	3
		400 ≤ Ps ≤ 450 kPa (Suitable press. gauge scale 600 kPa)	4
		450 ≤ Ps ≤ 500 kPa (Suitable press. gauge scale 1000 kPa)	5
(3)	Unit of pressure gauge	kPa	A
		kgf/cm <sup>2</sup> *1	B
		MPa	C
		bar	D
		psi *1	E
(4)	Input/output character	Linear (Standard)	L
		Equal % (EQ%)	E
		Quick opening (QO)	Q
(5)	Actuator action	Direct action	D
		Reverse action	R
(6)	Actuator type	---	Refer to Table 2
(7)	Air connection	Rc1/4 (Standard)	R
		1/4NPT	N
		1/4NPT (with Rc1/4 - 1/4NPT adaptor)	A
(8)	Electrical connection	G1/2 internal	G
		1/2NPT internal (Not available to model HEP15)	N
		1/2NPT internal with G1/2 - 1/2NPT adaptor	A
(9)	Finish	Standard finish *2	S
		Corrosion-proof finish (Baked epoxy paint Y138B)	B
		Silver corrosion-resistant finish (Baked acrylic paint Y138D) *3	D
(10)	Positioner action	Direct action (Standard)	D
		Reverse action	R

**Option I**

(11)	Material of Bracket / bolt	Not attached	X
		SS400 Zinc plated / S30C Zinc plated	A
		SS400 Melted zinc coated / SUS304	B
		SS400 Zinc plating / SUS304	C
		SUS304 / SUS304	D
(12)	Pressure regulator with filter	Regulator type KZ03 (assemble to HEP) *4	1
		Regulator type KZ03 (not assemble to HEP) *4	2
		No option	X

**Option II**

(13)	No selection	X
	Universal elbow, Explosion-proof (G1/2, SUS304)	A
	Press-tight cable packing adaptor (G1/2) Not applicable to 1/2NPT connection in selection (8)	B
	Short travel *5	C
	Auto or manual selector, 3PCB	D
	Cold area type (Not available for model HEP15/16)	E
	Stainless filter (SH4040) for pressure regulator with filter	F
	Using neoprene rubber for pressure regulator with filter	K
	Pressure regulator with filter for high temperature	L
	Tropicalization (SP0039)	N

*Note) \*5: The following table shows the standard travel of single type HEP positioner. In case of out of range, please consult with us.*

Actuator	Travel (mm)	Actuator	Travel (mm)
PSA1, 2	20	HK1	19
PSA3, 4	38	VA1	14.3, 25
PSA6	38, 50, 75	VA2	25, 37.5
HA1	14.3, 25	VA3	25, 37.5, 50
HA2	14.3, 25, 38	VA4	25, 37.5, 50
HA3	25, 35, 50	VA5	50, 75, 100
HA4	38, 50, 75	VA6	50

Table 2 Bracket for single acting actuator

Actuator type	Mounting bracket (Mounting plate / bolts)
	Code
PSA1	Y1
PSA2	Y2
PSA3	Y3
PSA4	Y4
PSA6	YV
HA1	Y5
HA2, HL2	Y6
HA3, HL3	Y7
HA4, HL4	Y8
HK1	YA
VR1	YB
VR2	YC
RSA2	R2
VR3	YD

Actuator type	Mounting bracket (Mounting plate / bolts)
	Code
VA1 *6	YE
VA2 *6	YF
VA3 *6	YG
VA4 *6	YH
VA5 *6	YJ
VA6 *6	YK
VA1 *7	V1
VA2 *7	V2
VA3 *7	V3
VA4 *7	V4
VA5 *7	V5
VA6 *7	V6
GOM83S	YL
GOM84S	YM
GOM103S	YN
GOM124S	YP

Note) \*6 VA actuator which produced on/after Apr. '83. \*7 VA actuator which produced before Apr. '83.

**DIMENSIONS**

[Unit: mm]

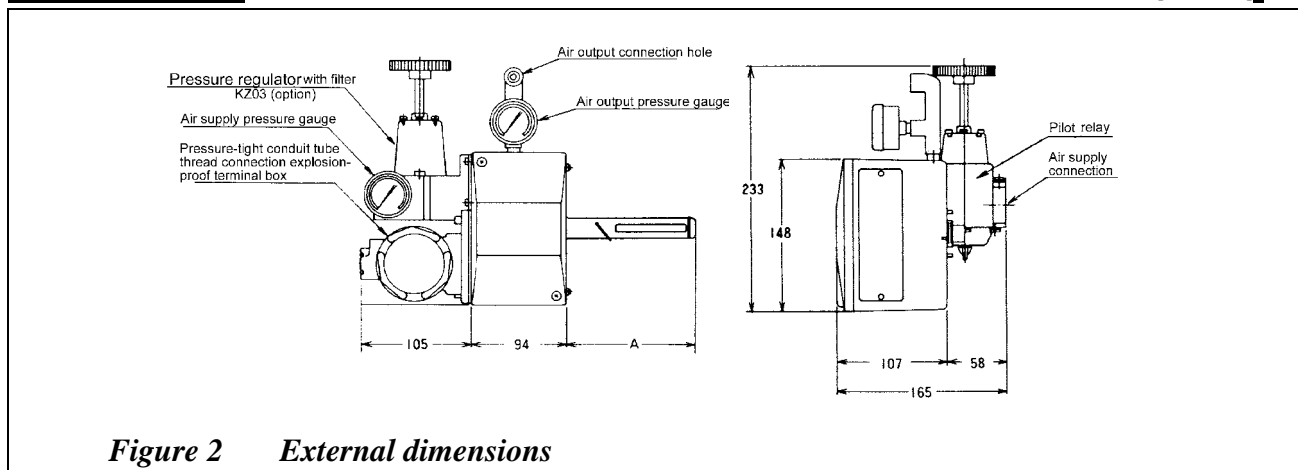


Figure 2 External dimensions

Table 3

Actuator operation	A
HA1, 2, 3, HK 1, VA1, 2, 3	131
Others	201

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