

FM Explosionproof approval

Electro-Pneumatic Valve Positioners

Models HEP18/19, HEP28/29

OVERVIEW

Mounted on control valves, HEP Electro-Pneumatic Valve Positioners model HEP18/19/28/29 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 single-action 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 model KZ03 pressure regulator with filter can be directly attached to the positioner.

China RoHS

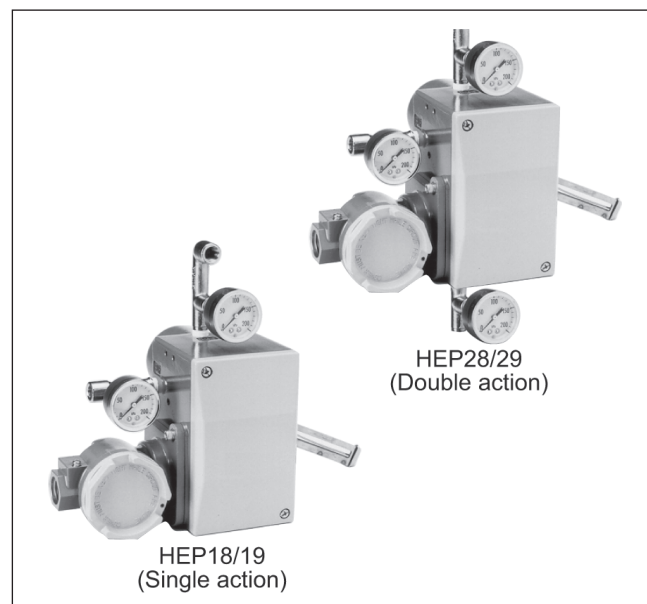
This device is used in the Oil & Gas, Petrochemical, Chemical, Pulp & Paper, Food & Beverage, Machinery, Steel/Metal & Mining, and Automobile industries and therefore does not fall under the China RoHS Legislation.

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 an Azbil Corp. representative.

SPECIFICATIONS

Models

Model HEP18: FM Explosionproof approval (single action)
 Model HEP19: FM Intrinsically safe approval (single action)
 Model HEP28: FM Explosionproof approval (double action)
 Model HEP29: FM Intrinsically safe approval (double action)



Input signals

4 to 20 mA DC,

Half range (4 to 12 mA DC and 12 to 20 mA DC)

Input resistance

250 ± 10 Ω (4 to 20 mA DC input)

Output characteristics

Linear, equal-percentage, and quick-opening

Air supply pressure

Model HEP18/19: 140 to 490 kPa {1.4 to 5.0 kgf/cm²}

Model HEP28/29: 200 to 690 kPa {2.0 to 7.0 kgf/cm²}

Air consumption

Model HEP18/19

4 L/min [N] (steady-state under air supply pressure 140 kPa {1.4 kgf/cm²})

5 L/min [N] (steady-state under air supply pressure 270 kPa {2.8 kgf/cm²})

6 L/min [N] (steady-state under air supply pressure 390 kPa {4.0 kgf/cm²})

Model HEP28/29

15 L/min [N] (steady-state under air supply pressure 490 kPa {5.0 kgf/cm²})

Air connection

1/4 NPT internal thread (standard), Rc1/4

Electrical connection

G1/2, 1/2 NPT (standard)

Ambient temperature range

Model HEP18/19: -30 to +80 °C

Model HEP28/29: -40 to +80 °C

Ambient humidity range

10 to 90% RH

Performance**Accuracy**

± 1% F.S.

Dead band

Within 0.1% F.S. (model HEP18/19)

Within 0.2% F.S. (model HEP28/29)

Travel adjustment range

10 to 100 mm

Operation speed (max.)

Model HEP18/19: 4 mm/s (for HA2D and R actuator)

Maximum voltage and current

$V_{max} = 30V$, $I_{max} = 100 \text{ mA}$ (model HEP19/29)

Type of protection**FM Explosionproof approval** (model HEP18/28)

Explosionproof for Class I, Division 1, Group B, C, D

Dust-ignitionproof for Class II, Division 1, Group E, F, G

Suitable for combustible fibers; Class III, Division 1

Water-tight, corrosion-tight; NEMA type 3, 4X

FM Intrinsically safe approval (model HEP19/29)

Intrinsic Safety for Class I, II, III Division 1 Group A, B, C, D, E, F, G

Nonincendive for Class I, Division 2, Group A, B, C, D

Water-tight, corrosion-tight NEMA 3,4X

Additional mechanism (factory-mounted upon request)

Model KZ03 pressure regulator with filter

Outer dimensions

Refer to Figure 2 and Table 4.

Weight**Model HEP18/19**

3.5 kg (4.2 kg with pressure regulator with filter)

Model HEP28/29

4.0 kg (4.7 kg with pressure regulator with filter)

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)

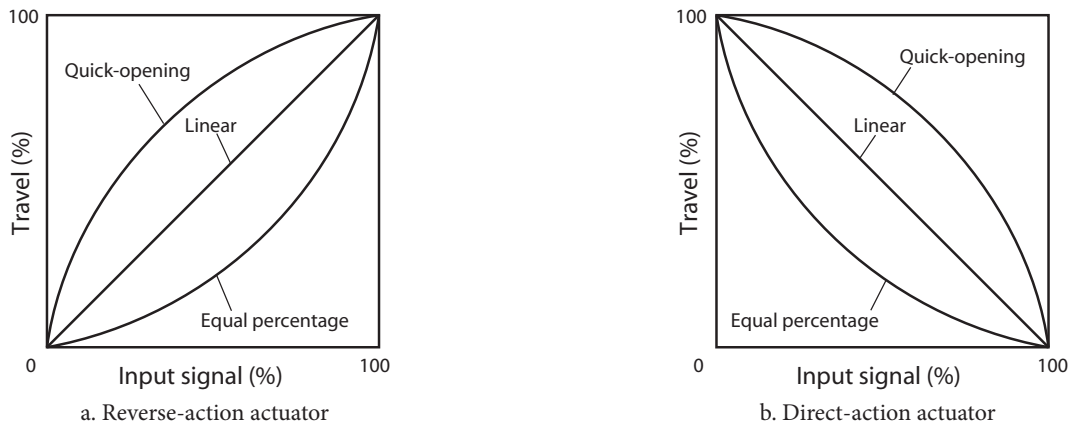


Figure 1. Input/Output characteristics

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 <input type="text" value="1"/>	<input type="text" value="(1)"/> <input type="text" value="(2)"/> <input type="text" value="(3)"/> <input type="text" value="(4)"/> <input type="text" value="(5)"/> <input type="text" value="(6)"/> <input type="text" value="(7)"/> <input type="text" value="(8)"/> <input type="text" value="(9)"/> <input type="text" value="(10)"/>	<input type="text" value="(11)"/> <input type="text" value="(12)"/>	<input type="text" value="(13)"/>

Basic model	Selection		Code
HEP18 (FM Explosionproof)	(1) Input signal	4 to 20 mA (Accuracy ± 1% F.S.)	1
HEP19 (FM Intrinsically safe)		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
<i>Note</i> *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.	(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 ² *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	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 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)	B
	Not applicable to 1/2NPT connection in selection (8)	
	Short travel *5	C
	Auto or manual selector, 3PCB	D
	Stainless filter (SH4040) for pressure regulator with filter	F
	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	14.3, 20, 25	HA4	38, 50, 75
PSA3, 4	20, 38	HK1, PSK1	10, 19
PSA6	38, 50, 75	VA1	14.3, 25
PSA7	50, 75, 100	VA2	25, 37.5
HA1	14.3, 25	VA3, 4	25, 37.5, 50
HA2	14.3, 25, 38	VA5	50, 75, 100
HA3	25, 35, 50	VA6	50

Table 2. Bracket for single acting actuator

Actuator type	Mounting bracket (Mounting plate / bolts)
	Code
PSA1, PSK1	Y1
PSA2	Y2
PSA3	Y3
PSA4	Y4
PSA6	YV
PSA7	YY
HA1	Y5
HA2, HL2	Y6
HA3, HL3	Y7
HA4, HL4	Y8
HK1	YA
VR1, RSA1	YB
VR2	YC
RSA2	R2
VR3	YD

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

*7 VA actuator which produced before Apr. '83.

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

Basic model Selection Option I Option II
 HEP

2	
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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)

Basic model

HEP28 (FM Explosionproof)
HEP29 (FM Intrinsically safe)

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
(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 ² *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 3
(7)	Air connection	Rc1/4 (Standard)	R
		1/4NPT	N
		1/4NPT (with Rc1/4 - 1/4NPT adaptor)	A
(8)	Electrical connection	G1/2	G
		1/2NPT	N
		1/2NPT (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

Table 3. Bracket for double acting actuator

Actuator type	Mounting bracket (Mounting plate/bolts)
	Code
VP5	H1
VP6	H2
VP7	H3
SLOP560	H4
SLOP1000	H5
SLOP1500	H6
SLOP1000X	H7
SLOP1500X	H8

Option I

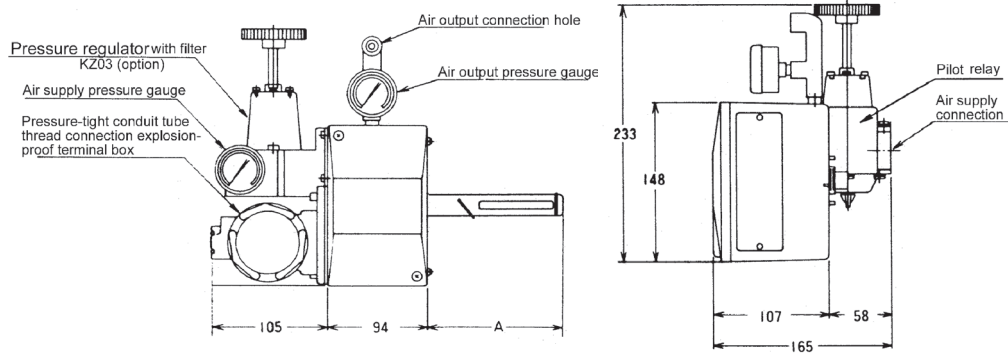
(11)	Material of Bracket / bolt	Not attached	X
		SS400 Zinc plating / SUS304	C
		SUS304 / SUS304	D
(12)	Pressure regulator with filter	Regulator type KZ03 (assemble to HEP) *4	1
		Regulator type KZ03 (not assemble to HEP) *4	2
		No option	X

Option II

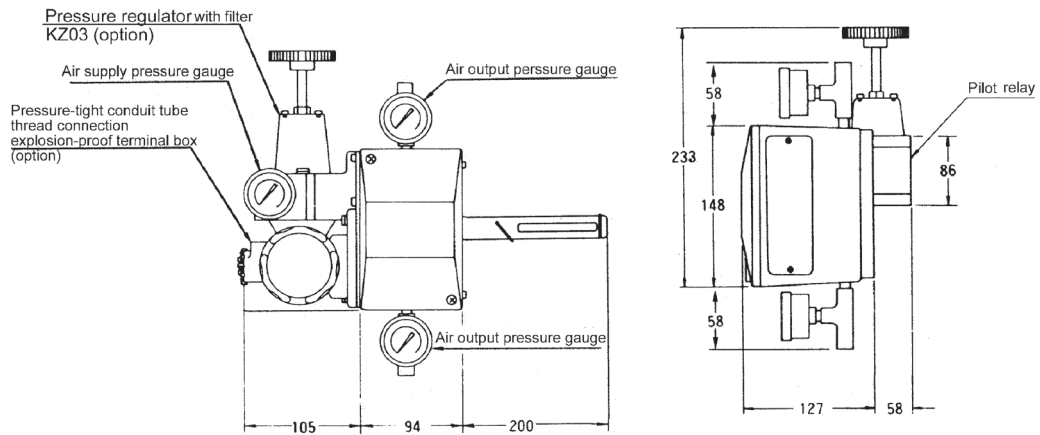
(13)	No selection	X
	Universal elbow, Explosion-proof (G1/2, SUS304)	A
	Press-tight cable packing adaptor (G1/2)	B
	Not applicable to 1/2NPT connection in selection (8)	F
	Stainless filter (SH4040) for pressure regulator with filter	F
	Tropicalization (SP0039)	N

DIMENSIONS

[Unit: mm]



a. External dimensions (model HEP18/19)



b. External dimensions (model HEP28/29)

Figure 2. External dimensions

Table 4.

Actuator operation	A
PSA1, 2, HA1, 2, 3 PSK1, HK1 VA1, 2, 3 RSA1, 2 VR1, 2	131
Others	201

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