Series variation

Electro pneumatic regulator

Control method	Model		Wiring method: Terminal block	Wiring method: D sub-connector	Wiring method: Serial transmission	Wiring method: FA connector	Port size: M5	Port size: Rc1/4	Port size: Rc3/8	Port size: Push-in φ4	Port size: Push-in φ6	Input signal: 0 to 10 VDC	Input signal: 0 to 5 VDC	Input signal: 4 to 20 mA	Input signal: Parallel 10 bit	Input signal: 0 to 20 mA	Input signal: Variable resistance input	
Solenoid valve	EVD-1000	Functions include pressure and error display and direct memory. The 10-bit parallel model has been added to the input signal.		●				●				●	●	●	●			
	EVD-3000	Functions include pressure and error display and direct memory. The 10-bit parallel model has been added to the input signal. Larger flow rate than EVD-1000.		●				●	●			●	●	●	●			
	EVR	Feedback control with semiconductor pressure sensor and electronic control circuit is used. This electro pneumatic regulator allows continuous and precise control of air pressure by electrical signal.				●		●				●	●	●				
	EV2100V	Feedback control with semiconductor pressure sensor and electronic control circuit is used. This electro pneumatic regulator allows continuous and precise control of vacuum pressure by electric signal.				●		●				●	●	●			●	
	EVS2	Smaller than conventional models. Body takeout cable is used for this pneumatic proportional pilot valve to achieve ultimate convenience and space saving.				●				●	●	●	●	●		●		
	EVL	Compact electro pneumatic regulator for low pressure that enables flexible and high-precision proportional control from 0 kPa to 50 kPa.				●		●				●	●	●				
	MEVT	Reduced wiring thin shape. Ultimate space saving thanks to the manifold. Thin electro pneumatic regulator with higher accuracy and responsivity than conventional mechanisms.	●	●	●					●	●	●	●	●				

Electro pneumatic regulator

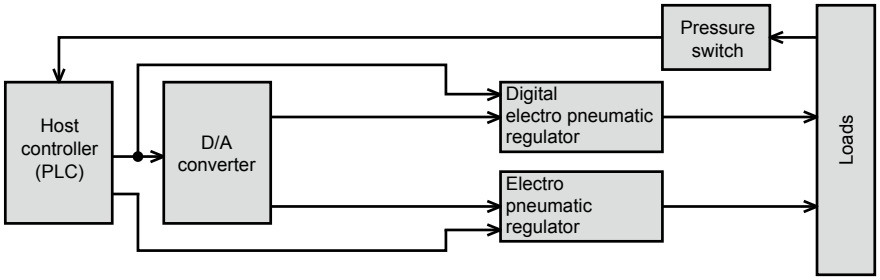
Series variation

◎: Optimum
○: Usable

	Pressure control range						Step response (No load)			Max. flow rate (ℓ/min (ANR))										Linearity (% F.S.)				Hysteresis (% F.S.)				Applications					Page
	-101.3 to 0 kPa	0 to 50 kPa	0 to 100 kPa	0 to 200 kPa	0 to 500 kPa	0 to 900 kPa	0.1 s or less	0.2 s or less	0.6 s or less	2	6	8	100	120	150	400	500	700	800	1500	±0.3 or less	±0.5 or less	±1.5 or less	±2.5 or less	0.3 or less	0.4 or less	0.5 or less	1.0 or less	Pilot pressure control	Tension	Push pressure	Blow	Workpiece suction	
			●		●	●		●								●					●						●		◎	◎	◎		512
			●		●	●		●												●	●						●		◎	◎	◎		516
			●	●	●	●		●											●			●			●				◎	◎	◎		538
	●								●					●	●							●						●				◎	551
			●		●		●			●		●										●				●			◎	○	○			548
		●							●				●									●					●				◎			556
			●		●		●			●	●											●				●			◎	○	○			564

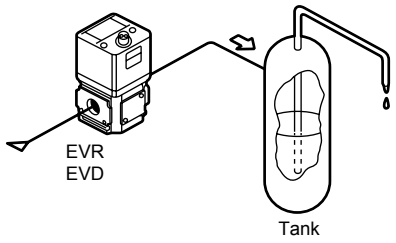
Basic system functions

Pneumatic proportional control components attain an output and flow rate proportional to the input voltage or current. The input voltage and output pressure/flow rate must be linearly proportional. To achieve this, the pressure and flow rate are varied with electric signals, and an electric controller enables variable continuous control. When used as a system, the circuit is configured so signals from the host controller are converted to 0 to 10 VDC signals, etc., by the D/A converter (interface). These signals operate the proportional control valve via the controller, controlling the thrust and speed of each actuator, etc. When needed, highly accurate control is possible through feedback with sensors.

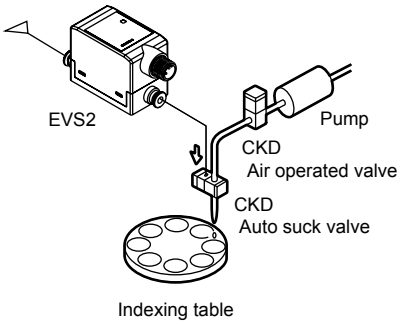


System application examples

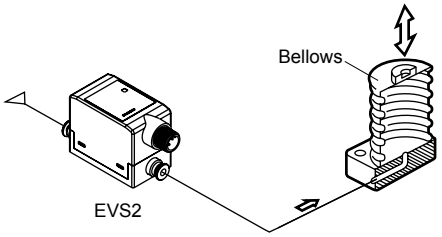
● Fluid discharge control



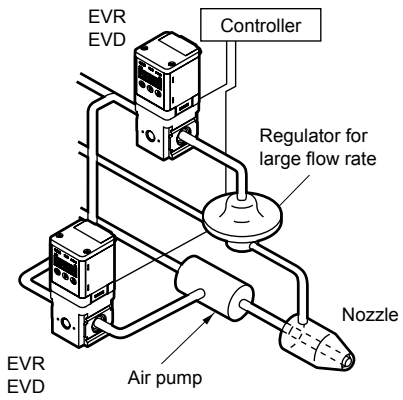
● Chemical liquid drip prevention control



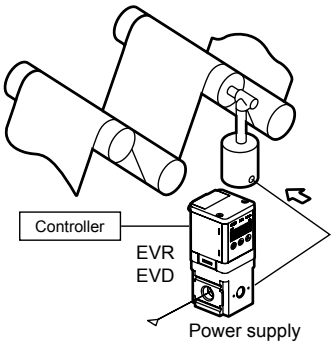
● Micro position control



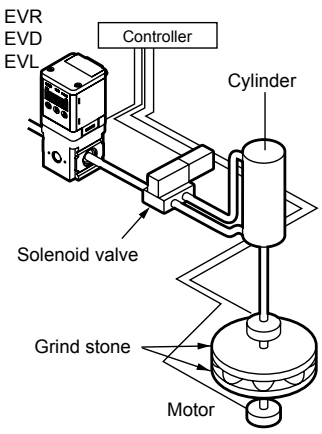
● Fluid pressure control



● Balancer tension control

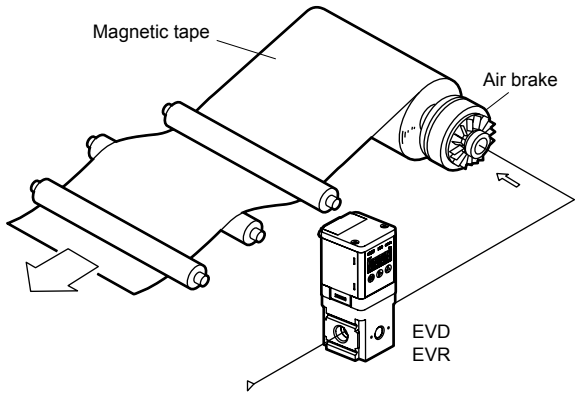


● Grinding force control

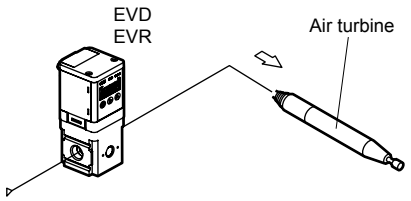


System application examples

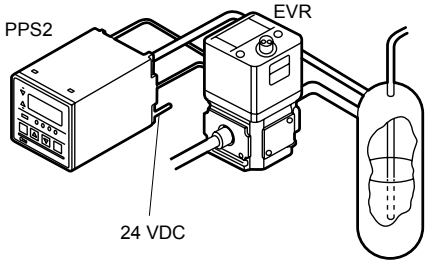
● Tension control using air brakes



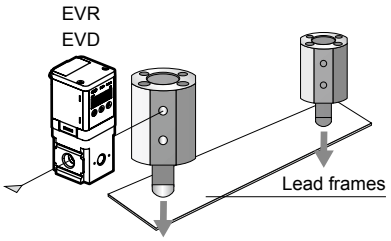
● Air turbine speed control



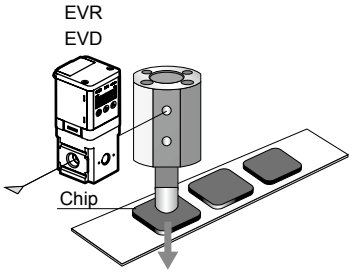
● Applications for fluid pressure feeding



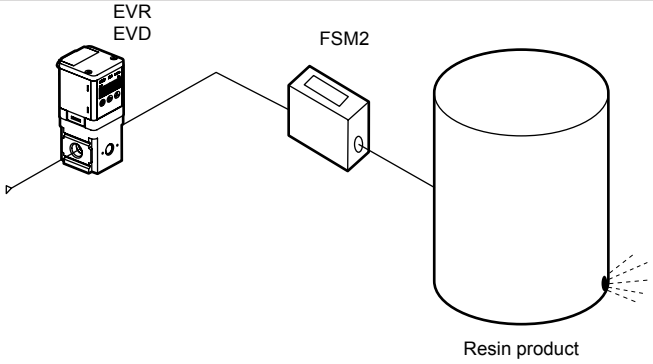
● Fixing lead frames, etc.



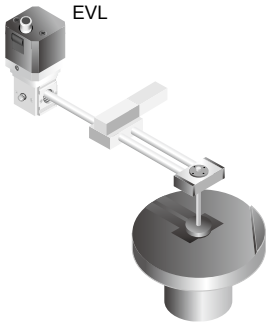
● Chip component assembly



● Leakage inspection



● CMP equipment



Compact, high function, digital control

D-sub connector

Digital indicator

Setting key

Module type

100

□42

EVD-1000

- Port size : Rc1/4
- Flow rate : 60, 400 ℓ/min
- Pressure range : 100, 500, 900 kPa
- Grease free flow path section

Large flow type

EVD-3000

- Port size: Rc1/4 Rc3/8
- Flow rate: 700, 1500 ℓ/min
- Pressure range: 100, 500, 900 kPa

EVD Series

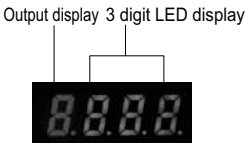
Digital electro pneumatic regulator

EVD Series digital electro pneumatic regulator - realizing various functions and ease-of-use in a compact size with new functions including pressure display, error display and direct memory functions.

User-friendly and easy to install

Digital display shows the control state at a glance

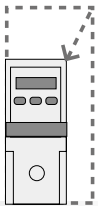
Digital display of output pressure value with three digits. The output state (switch output ON-OFF) is displayed in addition to the error display.



Parallel input type available as standard.

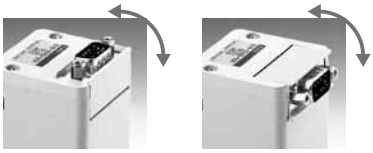
Control directly from PLC.

Compact design, 25% smaller (CKD comparison)



D-sub connector with 2 way connection

The connector can be rotated 90° to the top or to the side providing more flexibility in mounting.



Module type

Filters and regulators such as C1000 Series can be connected.

Realizing multi-functions with microcomputer

Error display function

Errors are displayed and notified with electrical signals.

Zero/span adjustment function

Zero and span can be adjusted according to the usage methods.

Direct memory function

Signals from external sources not required.
Adjust secondary pressure flexibly with keys.

Preset input function

Save up to 8ch of pressure in the main unit and switch with external signals.

Switch output function

Switch output (with built-in overcurrent protection) possible by setting the upper/lower limit pressure.

High accuracy, quick response pressure control

Linearity ±0.3%

Hysteresis 0.5%

Response time 0.2 sec

Proportional value change function (EVD*100 only)

Highly accurate and stable control is possible by adjusting the proportional value upward (one stage) or proportional value downward (ten stages).

Eco-friendly design

Complies with RoHS Directives

All substances, such as lead and hexavalent chrome, which can adversely affect the global environment have been eliminated from the materials.

Energy saving

The auto power OFF function can automatically turn OFF the digital display.

Material indication

Material names are indicated on the main components to facilitate sorting for recycling.

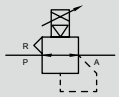
Digital electro pneumatic regulator variation

Series	Pressure range	Input signal	Port size	Output method	Maximum flow rate	Flow path material
EVD-1000	100 kPa, 500 kPa, 900 kPa	10bit Analog, Parallel	Rc1/4	NPN PNP Switch output, Analog output	60 ℓ/min, 400 ℓ/min	Grease free
EVD-3000	100 kPa, 500 kPa, 900 kPa	10bit Analog, Parallel	Rc1/4, Rc3/8	NPN PNP Switch output, Analog output	700 ℓ/min, 1500 ℓ/min	Fluorine grease, Vaseline Custom order

Digital electro pneumatic regulator

EVD-1000 Series

JIS symbol



Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Descriptions		EVD-1100-*08 □ Analog (*...0/1/2)	EVD-1100-P08 □ Parallel	EVD-1500-*08 □ Analog (*...0/1/2)	EVD-1500-P08 □ Parallel	EVD-1900-*08 □ Analog (*...0/1/2)	EVD-1900-P08 □ Parallel
Working fluid		Clean compressed air (JIS B 8392-1: 2012 (ISO 8573-1: 2010) [1:3:2] or equivalent)					
Max. working pressure		160 kPa (≈23 psi, 1.6 bar)		700 kPa (≈100 psi, 7 bar)		1000 kPa (≈150 psi, 10 bar)	
Min. working pressure		Set pressure +50 kPa (≈7.3 psi)		Set pressure +100 kPa (≈15 psi, 1 bar)			
Proof pressure	Inlet	240 kPa (≈35 psi, 2.4 bar)		1050 kPa (≈150 psi, 10.5 bar)		1500 kPa (≈220 psi, 15 bar)	
	Output side	150 kPa (≈22 psi, 1.5 bar)		750 kPa (≈110 psi, 7.5 bar)		1350 kPa (≈200 psi, 13.5 bar)	
Pressure control range *1		0 (≈0 psi) to 100 kPa (≈15 psi)		0 (≈0 psi) to 500 kPa (≈73 psi)		0 (≈0.0 psi) to 900 kPa (≈130 psi)	
Power supply voltage		24 VDC ± 10% (stabilized power supply with ripple rate 1% or less)					
Current consumption		0.15 A or less (0.6 A or less rush current when the power is turned ON)					
Input signal (input impedance)		0 to 10 VDC(6.7 kΩ) 0 to 5 VDC(10 kΩ) 4 to 20 mADC(250 Ω)	10 bit	0 to 10 VDC(6.7 kΩ) 0 to 5 VDC(10 kΩ) 4 to 20 mADC(250 Ω)	10 bit	0 to 10 VDC(6.7 kΩ) 0 to 5 VDC(10 kΩ) 4 to 20 mADC(250 Ω)	10 bit
Preset input		8 points	None	8 points	None	8 points	None
Output signal *2		Output accuracy: ±6% F.S. or less, analog output: 1 to 5 VDC (connecting load impedance 500 kΩ and over)					
		Switch output: NPN or PNP open collector output, 30 V or less and 50 mA or less, voltage drop 2.4 V or less, PLC/relay compatible					
Error output signal		NPN or PNP open collector output, 30 V or less and 50 mA or less, voltage drop 2.4 V or less, PLC/relay compatible					
Direct memory setting		1 to 100 kPa (Min. setting width 1 kPa/setting resolution 1 kPa)		5 to 500 kPa (Min. setting width 1 kPa/setting resolution 1 kPa)		9 to 900 kPa (Min. setting width 1 kPa/setting resolution 2 kPa)	
Pressure display	Display method	7-segment LED 3 digits, indicator accuracy: ±2% F.S. or less					
	Display range	0 (≈0 psi) to 100 kPa (≈15 psi)		0 (≈0 psi) to 500 kPa (≈73 psi)		0 (≈0 psi) to 900 kPa (≈130 psi)	
	Display resolution	1 kPa (≈0.1 psi, 0.01 bar)		1 kPa (≈0.1 psi, 0.01 bar)		1 kPa (≈0.1 psi, 0.01 bar)	
Hysteresis *3		0.5% F.S. or less					
Linearity *3		± 0.3% F.S. or less					
Resolution *3		0.2% F.S. or less					
Repeatability *3		0.3% F.S. or less					
Temperature characteristics	Zero point fluctuation	0.15% F.S./°C or less					
	Span fluctuation	0.07% F.S./°C or less					
Max. flow rate (ANR) *4		60 ℓ/min		400 ℓ/min			
Step response *5	No load	0.2 sec. or less					
Vibration resistance		98 m/s^2 or less					
Ambient temperature		5 (41°F) to 50 (122°F)°C					
Fluid temperature		5 (41°F) to 50 (122°F)°C					
Port size		Rc1/4					
Mounting orientation		Free					
Weight		250 g					
Protection circuit		Power reverse connection protection, switch output reverse connection protection, switch output load short-circuit protection					

*1: There is 1% F.S. or less residual pressure when the input signal is 0%. (EVD-1100: 1 kPa, EVD-1500: 5 kPa, EVD-1900: 9 kPa)
*2: Select the analog output or switch output.
*3: The condition of the values above is: 24 ± 0.1 VDC power supply voltage, 25 ± 3°C ambient temperature, no load, working pressure of +50 kPa max. control pressure (EVD-1100)/+100 kPa (EVD-1500, 1900), and 10 to 90% control pressure.
In addition, when the secondary side is a closed circuit, pressure fluctuations will occur if the product is used for blowing or for similar applications.
*4: The characteristics where working pressure is maximum and control pressure is maximum are shown.
*5: The value above is obtained at the max. working pressure and when the step amount changes from
50% F.S. → 100% F.S.
50% F.S. → 60% F.S.
50% F.S. → 40% F.S.

Specifications for components for rechargeable battery production

(Catalog No. CC-1226A)

EVD1500/1900 — [Input specifications/port size/output specifications] — [Option] — **3** — **P4□**

EVD3500/3900 — [Input specifications/port size/output specifications] — [Option] — **3** — **P4□**

Contact your nearest CKD sales office or dealer for details.

How to order

EVD-1 [500] - [0] [08] [AN] - [C1B1] - [3]

- [500] Ⓐ Pressure control range
- [0] Ⓑ Input signal
- [08] Ⓒ Port size
- [AN] Ⓓ Output signal
- [C1B1] Ⓔ Option
- [3] Ⓕ Power supply voltage

Code	Content
Ⓐ Pressure control range *1	
100	0 to 100 kPa
500	0 to 500 kPa
900	0 to 900 kPa
Ⓑ Input signal	
0	0 to 10 VDC
1	0 to 5 VDC
2	4 to 20 mADC
P	Parallel 10 bit
Ⓒ Port size	
08	Rc1/4
Ⓓ Output signal	
AN	1 to 5 V analog, error (NPN)
AP	1 to 5 V analog, error (PNP)
SN	Switch (NPN), error (NPN)
SP	Switch (PNP), error (PNP)
Ⓔ Option	
Cable option	
Blank	None
C1	Analog 9-conductor, 1 m cable
C3	Analog 9-conductor, 3 m cable
P1	Parallel 15-conductor, 1 m cable
P3	Parallel 15-conductor, 3 m cable
Bracket option attached	
Blank	None
B1	B type bracket, floor mounted
L1	L type bracket, wall mounted
Ⓕ Power supply voltage	
3	24 VDC

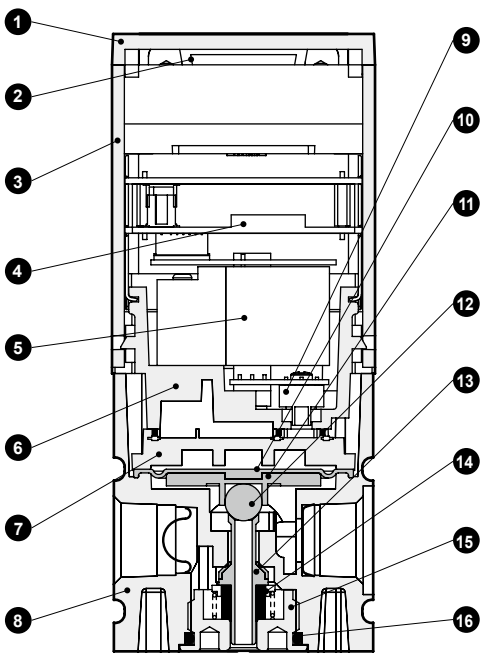
*1: There is a 1% F.S. or less residual pressure when the input signal is 0%.

● Discrete option (cable, bracket) model No.

EVD- [C1]

- [C1] Ⓔ Option

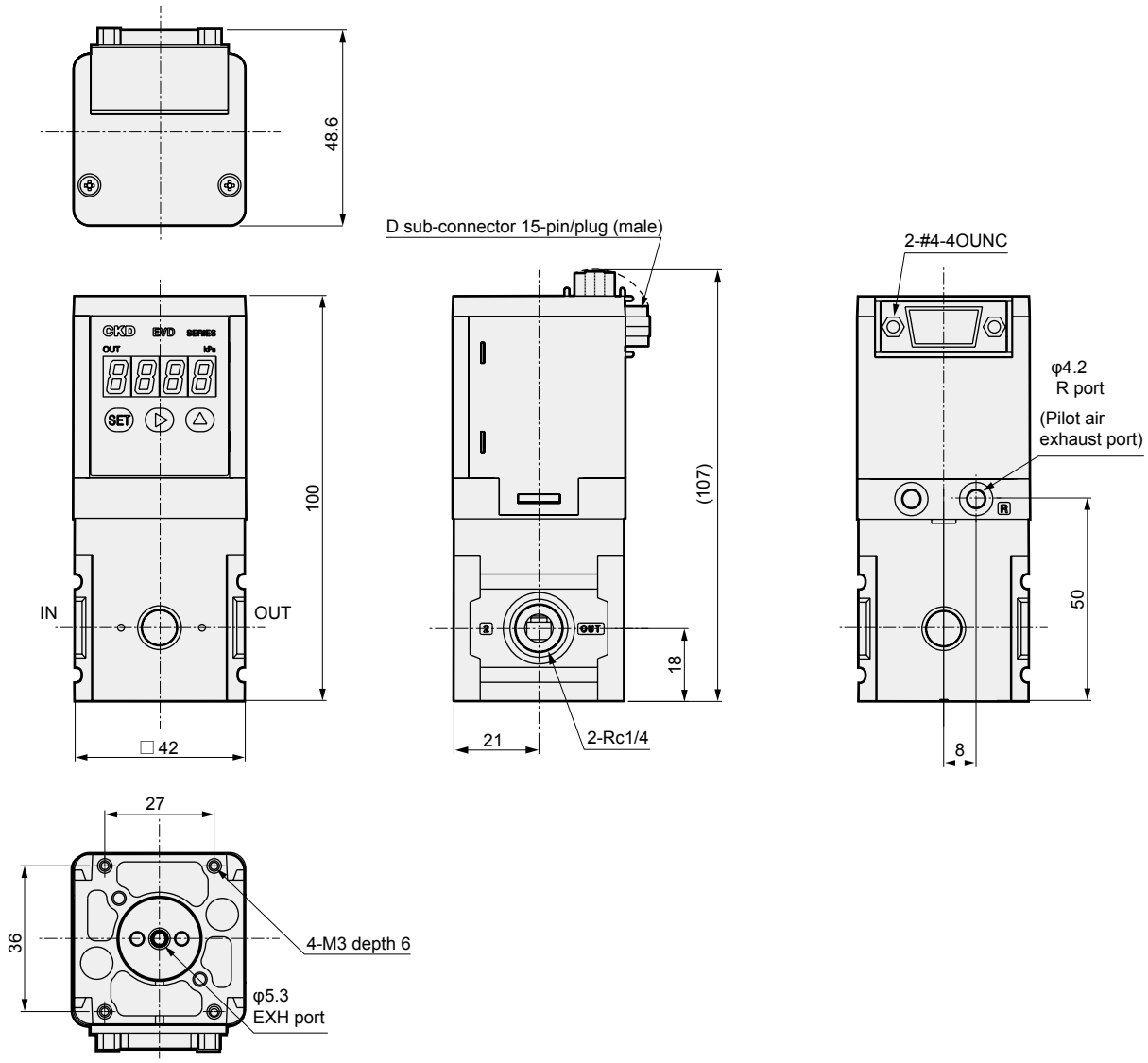
Internal structure and parts list



No.	Part name	Material
1	Lid	PBT resin
2	D sub-connector	-
3	Housing	ABS resin
4	Controller board	-
5	3-way valve	-
6	Valve base	Polyphenylene sulfide resin
7	Pilot chamber	Polyphenylene sulfide resin
8	Body	Aluminum alloy die-casting
9	Pressure sensor	-
10	Diaphragm	Special nitrile rubber
11	Relief seat	Aluminum alloy
12	Steel ball (exhaust valve)	Stainless steel
13	Valve	Special nitrile rubber, stainless steel
14	Bottom rubber	Silicone rubber
15	Bottom plug	Copper alloy, electroless nickeling
16	O-ring	Fluoro rubber

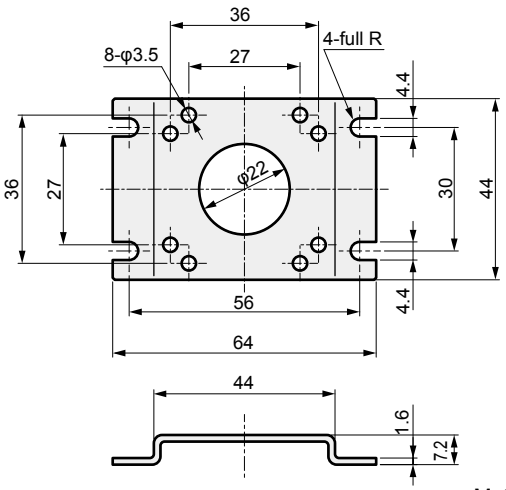
Cannot be disassembled

Dimensions



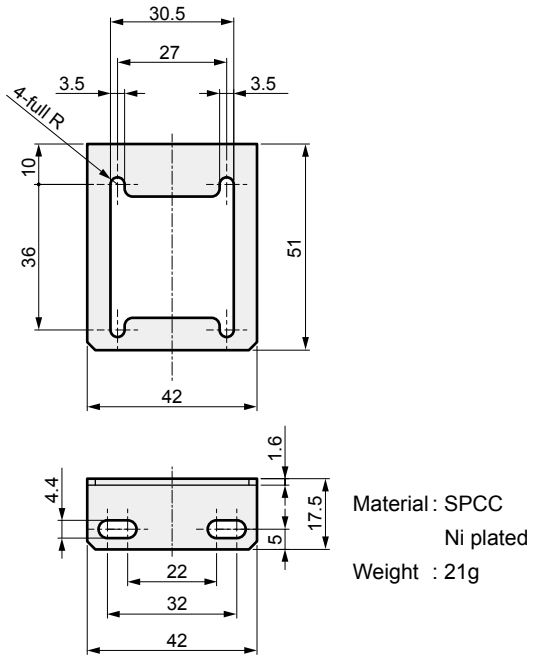
Optional dimensions

● B type bracket (-B1): Floor mounted



Material : SPCC
Ni plated
Weight : 32g

● L type bracket (-L1): Wall mounted

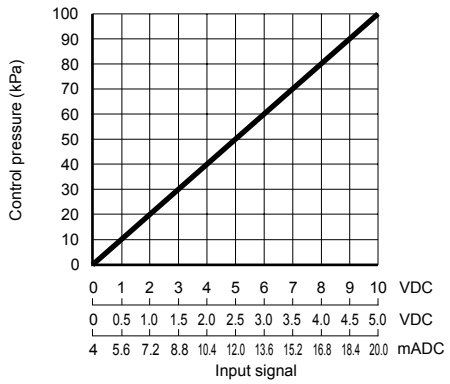


Material : SPCC
Ni plated
Weight : 21g

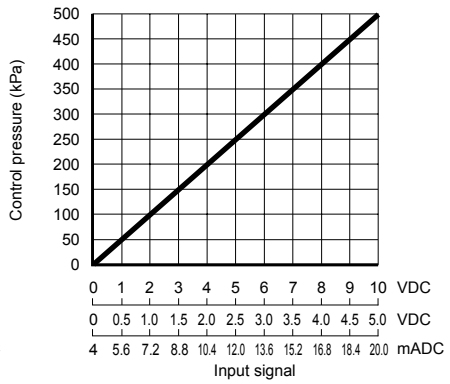
* Refer to page 521 for details of cable option dimensions.

I/O characteristics

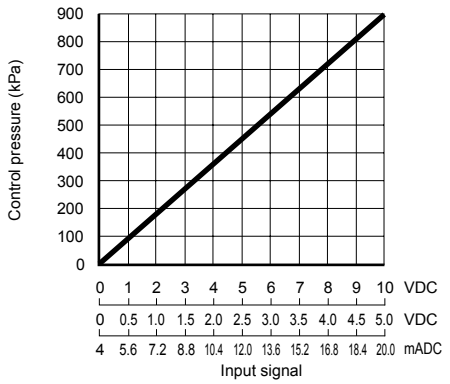
● EVD-1100



● EVD-1500

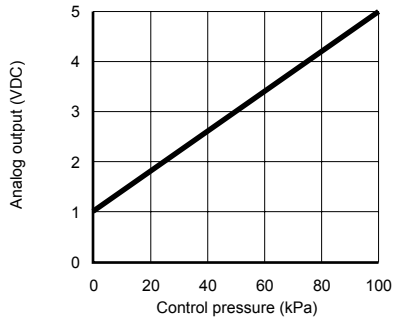


● EVD-1900

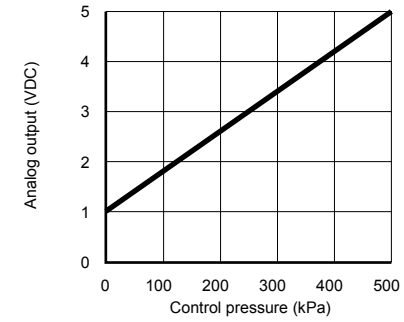


Analog output (analog output only: model No. AN/AP)

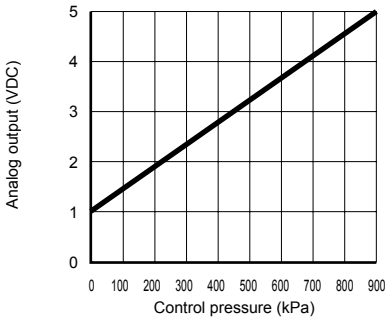
● EVD-1100



● EVD-1500

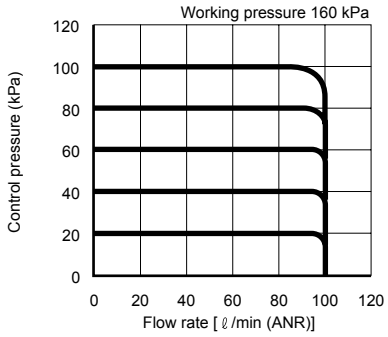


● EVD-1900

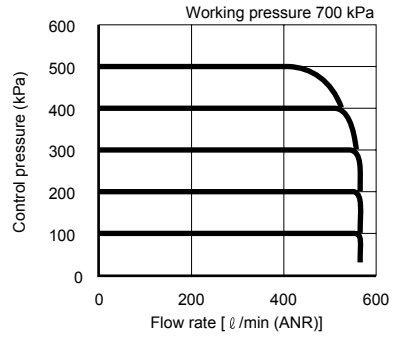


Flow characteristics

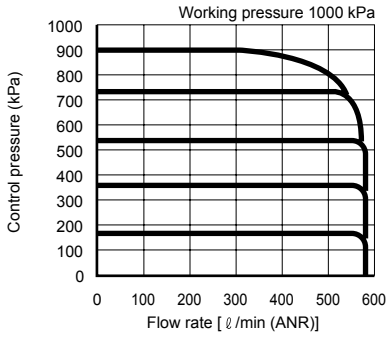
● EVD-1100



● EVD-1500

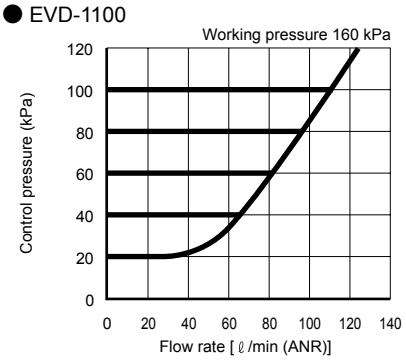


● EVD-1900

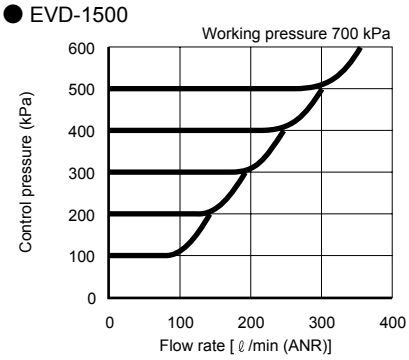


Relief characteristics

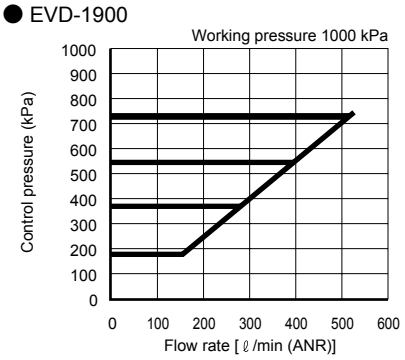
● EVD-1100



● EVD-1500



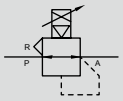
● EVD-1900



Digital electro pneumatic regulator

EVD-3000 Series

JIS symbol



Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Descriptions		EVD-3100-*08 □ EVD-3100-*10 □ Analog (*…0/1/2)	EVD-3100-P08 □ EVD-3100-P10 □ Parallel	EVD-3500-*08 □ EVD-3500-*10 □ Analog (*…0/1/2)	EVD-3500-P08 □ EVD-3500-P10 □ Parallel	EVD-3900-*08 □ EVD-3900-*10 □ Analog (*…0/1/2)	EVD-3900-P08 □ EVD-3900-P10 □ Parallel
Working fluid		Clean compressed air (JIS B 8392-1: 2012 (ISO 8573-1: 2010) [1:3:2] or equivalent)					
Max. working pressure		160 kPa (≈23 psi, 1.6 bar)		700 kPa (≈100 psi, 7 bar)		1000 kPa (≈150 psi, 10 bar)	
Min. working pressure		Set pressure +50 kPa (≈7.3 psi)		Set pressure +100 kPa (≈15 psi, 1 bar)			
Proof pressure	Inlet	240 kPa (≈35 psi, 2.4 bar)		1050 kPa (≈150 psi, 10.5 bar)		1500 kPa (≈220 psi, 15 bar)	
	Output side	150 kPa (≈22 psi, 1.5 bar)		750 kPa (≈110 psi, 7.5 bar)		1350 kPa (≈200 psi, 13.5 bar)	
Pressure control range *1		0 (≈0 psi) to 100 kPa (≈15 psi)		0 (≈0 psi) to 500 kPa (≈73 psi)		0 (≈0 psi) to 900 kPa (≈130 psi)	
Power supply voltage		24 VDC ± 10% (stabilized power supply with ripple rate 1% or less)					
Current consumption		0.15 A or less (0.6 A or less rush current when the power is turned ON)					
Input signal (input impedance)		0 to 10 VDC(6.7 kΩ) 0 to 5 VDC(10 kΩ) 4 to 20 mADC(250 Ω)	10 bit	0 to 10 VDC(6.7 kΩ) 0 to 5 VDC(10 kΩ) 4 to 20 mADC(250 Ω)	10 bit	0 to 10 VDC(6.7 kΩ) 0 to 5 VDC(10 kΩ) 4 to 20 mADC(250 Ω)	10 bit
Preset input		8 points	None	8 points	None	8 points	None
Output signal *2		Output accuracy: ±6% F.S. or less, analog output: 1 to 5 VDC (connecting load impedance 500 kΩ and over)					
		Switch output: NPN or PNP open collector output, 30 V or less and 50 mA or less, voltage drop 2.4 V or less, PLC/relay compatible					
Error output signal		NPN or PNP open collector output, 30 V or less and 50 mA or less, voltage drop 2.4 V or less, PLC/relay compatible					
Direct memory setting		1 to 100 kPa (Min. setting width 1 kPa/setting resolution 1 kPa)		5 to 500 kPa (Min. setting width 1 kPa/setting resolution 1 kPa)		9 to 900 kPa (Min. setting width 1 kPa/setting resolution 2 kPa)	
Pressure display	Display method	7-segment LED 3 digits, indicator accuracy: ±2% F.S. or less					
	Display range	0 (≈0 psi) to 100 kPa (≈15 psi)		0 (≈0 psi) to 500 kPa (≈73 psi)		0 (≈0 psi) to 900 kPa (≈130 psi)	
	Display resolution	1 kPa (≈0.1 psi, 0.01 bar)		1 kPa (≈0.1 psi, 0.01 bar)		1 kPa (≈0.1 psi, 0.01 bar)	
Hysteresis *3		0.5% F.S. or less					
Linearity *3		± 0.3% F.S. or less					
Resolution *3		0.2% F.S. or less					
Repeatability *3		0.3% F.S. or less					
Temperature characteristics	Zero point fluctuation	0.15% F.S./°C or less					
	Span fluctuation	0.07% F.S./°C or less					
Max. flow rate (ANR) *4		700 ℓ/min		1500 ℓ/min			
Step response *5	No load	0.2 sec. or less					
Vibration resistance		98 m/s^2 or less					
Ambient temperature		5 (41°F) to 50 (122°F)°C					
Fluid temperature		5 (41°F) to 50 (122°F)°C					
Port size	IN, OUT port	Port size option 08 Rc1/4, 10 Rc3/8					
	EXH port	Rc3/8					
Mounting orientation		Free					
Weight		450 g					
Protection circuit		Power reverse connection protection, switch output reverse connection protection, switch output load short-circuit protection					

*1: There is 1% F.S. or less residual pressure when the input signal is 0%. (EVD-3100: 1 kPa, EVD-3500: 5 kPa, EVD-3900: 9 kPa)
*2: Select the analog output or switch output.
*3: The condition of the values above is: 24 ± 0.1 VDC power supply voltage, 25 ± 3°C ambient temperature, no load, working pressure of +50 kPa max. control pressure (EVD-3100)/+100 kPa (EVD-3500, 3900), and 10 to 90% control pressure. In addition, when the secondary side is a closed circuit, pressure fluctuations will occur if the product is used for blowing or for similar applications.
*4: The characteristics where working pressure is maximum and control pressure is maximum are shown.
*5: The value above is obtained at the max. working pressure and when the step amount changes from { 50% F.S. → 100% F.S. / 50% F.S. → 60% F.S. / 50% F.S. → 40% F.S.

How to order

EVD-3 500 - 0 08 AN - C1B3 - 3

- Ⓐ Pressure control range
- Ⓑ Input signal
- Ⓒ Port size (IN,OUT)
- Ⓓ Output signal
- Ⓔ Option
- Ⓕ Power supply voltage

Code	Content
Ⓐ Pressure control range *1	
100	0 to 100 kPa
500	0 to 500 kPa
900	0 to 900 kPa
Ⓑ Input signal	
0	0 to 10 VDC
1	0 to 5 VDC
2	4 to 20 mADC
P	Parallel 10 bit
Ⓒ Port size (IN, OUT)	
08	Rc1/4
10	Rc3/8
Ⓓ Output signal	
AN	1 to 5 V analog, error (NPN)
AP	1 to 5 V analog, error (PNP)
SN	Switch (NPN), error (NPN)
SP	Switch (PNP), error (PNP)
Ⓔ Option	
Cable option	
Blank	None
C1	Analog 9-conductor, 1 m cable
C3	Analog 9-conductor, 3 m cable
P1	Parallel 15-conductor, 1 m cable
P3	Parallel 15-conductor, 3 m cable
Bracket option attached	
Blank	None
B3	B type bracket, floor mounted
L3	L type bracket, wall mounted
Ⓕ Power supply voltage	
3	24 VDC

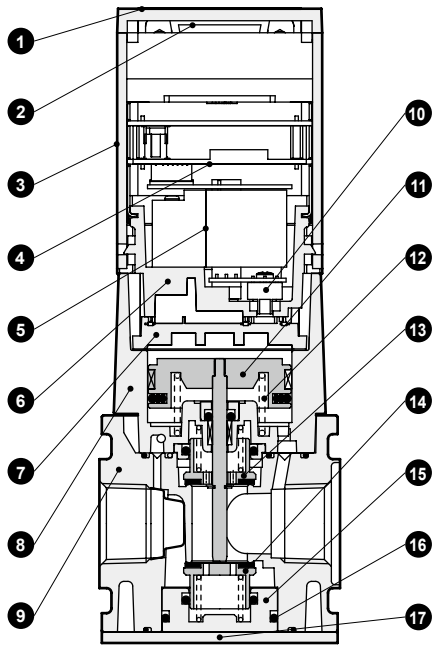
*1: There is 1% F.S. or less residual pressure when the input signal is 0%.

● Discrete option (cable, bracket) model No.

EVD- C1

Ⓔ Option

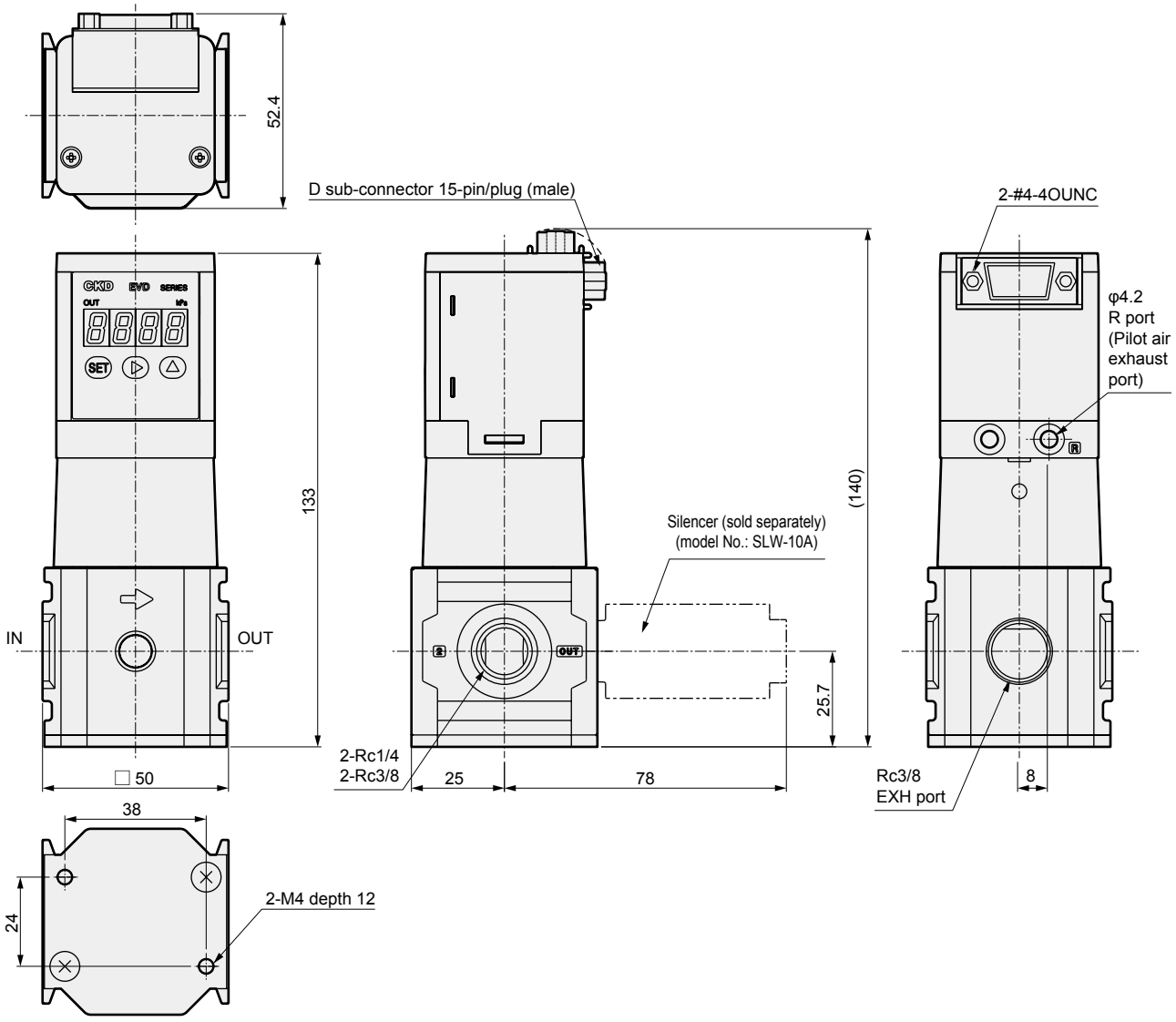
Internal structure and parts list



No.	Part name	Material
1	Lid	PBT resin
2	D sub-connector	-
3	Housing	ABS resin
4	Controller board	-
5	3-way valve	-
6	Valve base	Polyphenylene sulfide resin
7	Pilot chamber	Polyphenylene sulfide resin
8	Piston body assembly	Aluminum alloy die-casting, etc.
9	Body	Aluminum alloy die-casting
10	Pressure sensor	-
11	Piston assembly	Aluminum alloy, stainless steel, etc.
12	Spring	Stainless steel
13	Top valve	Copper alloy, special nitrile rubber
14	Bottom valve	Copper alloy, special nitrile rubber
15	Bottom cap	Copper alloy
16	O-ring	Nitrile rubber
17	Base plate	Steel plate

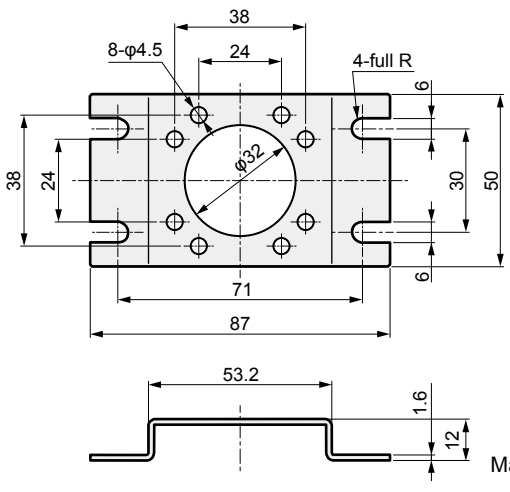
Cannot be disassembled

Dimensions



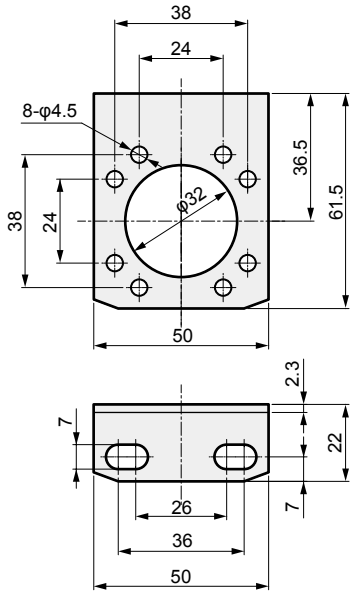
Optional dimensions

● B type bracket (-B3): Floor mounted



Material : SPCC
Ni plated
Weight : 48g

● L type bracket (-L3): Wall mounted

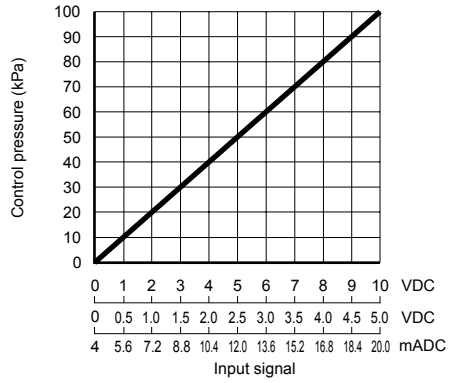


Material : SPCC
Ni plated
Weight : 51g

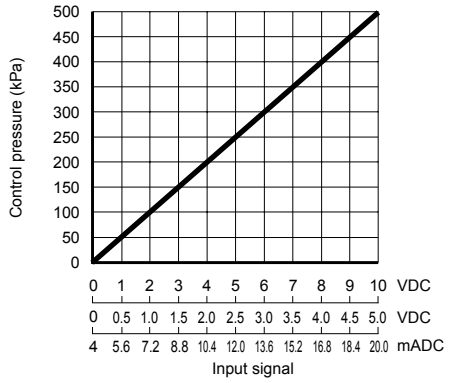
* Refer to page 521 for details of cable option dimensions.

I/O characteristics

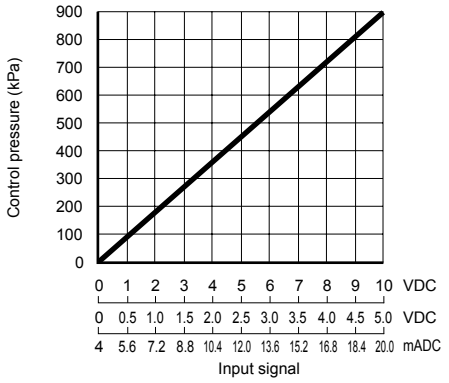
● EVD-3100



● EVD-3500

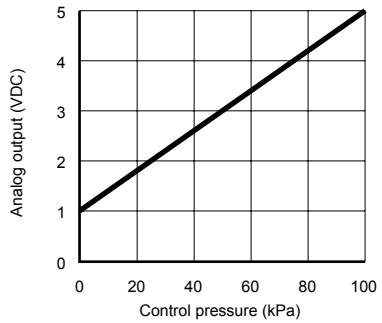


● EVD-3900

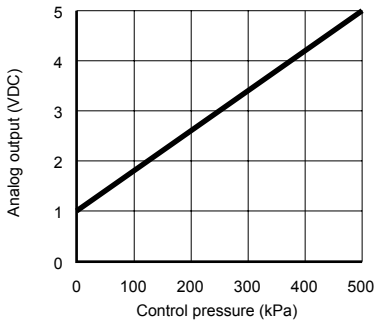


Analog output (analog output only: model No. AN/AP)

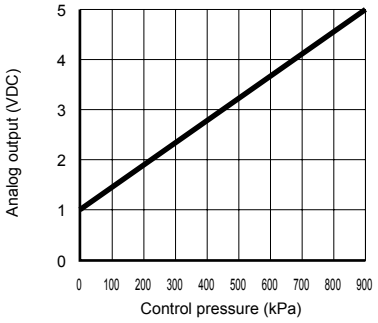
● EVD-3100



● EVD-3500

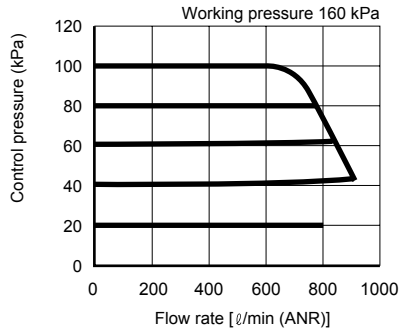


● EVD-3900

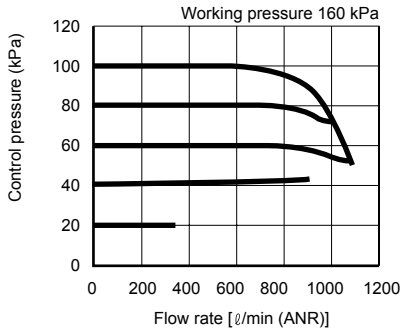


Flow characteristics

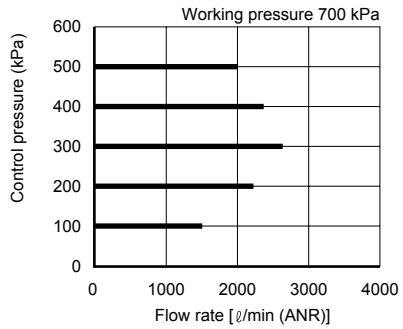
● EVD-3100-□08



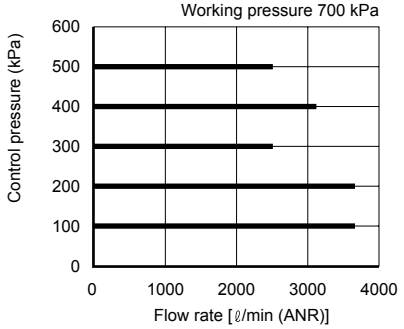
● EVD-3100-□10



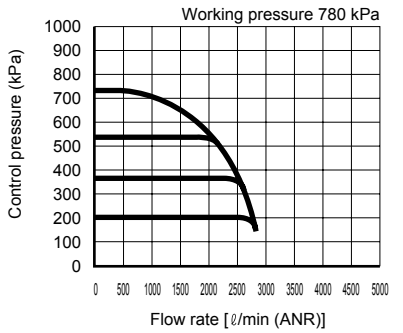
● EVD-3500-□08



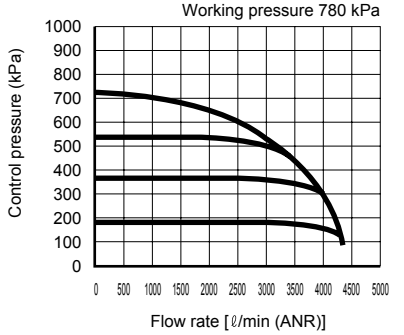
● EVD-3500-□10



● EVD-3900-□08

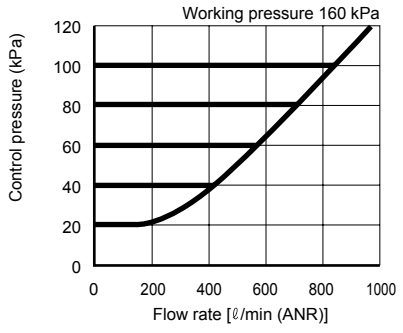


● EVD-3900-□10

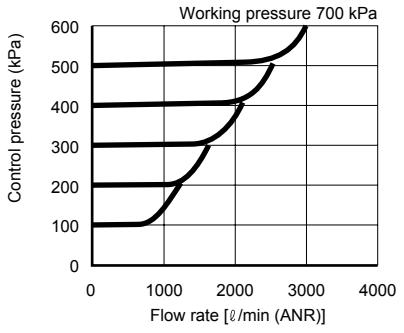


Relief characteristics

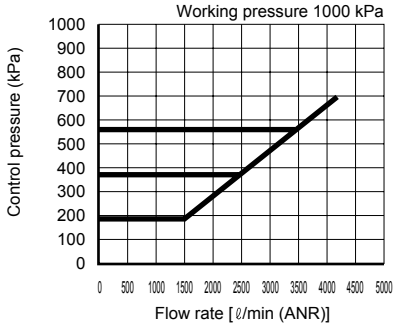
● EVD-3100



● EVD-3500

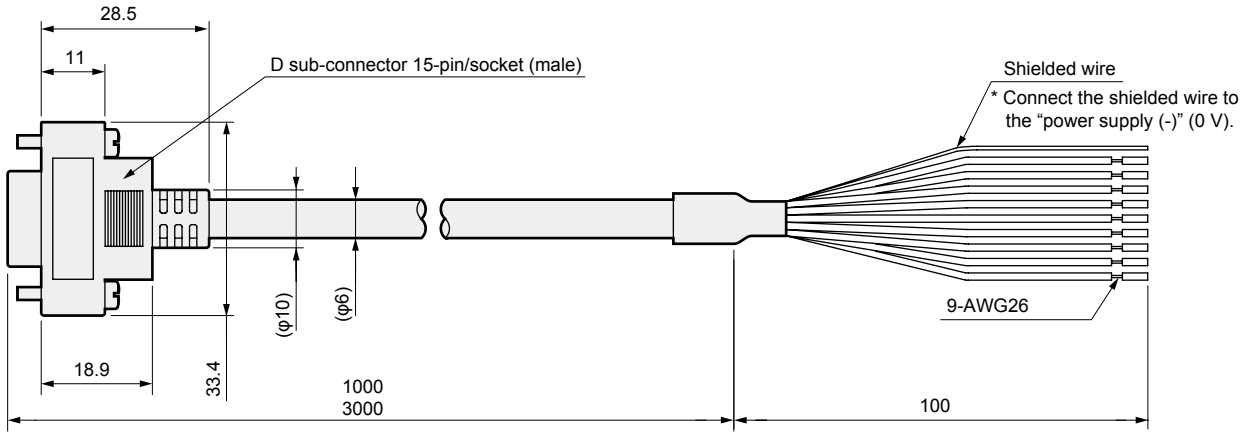


● EVD-3900



Cable optional dimensions

● EVD-C1,EVD-C3

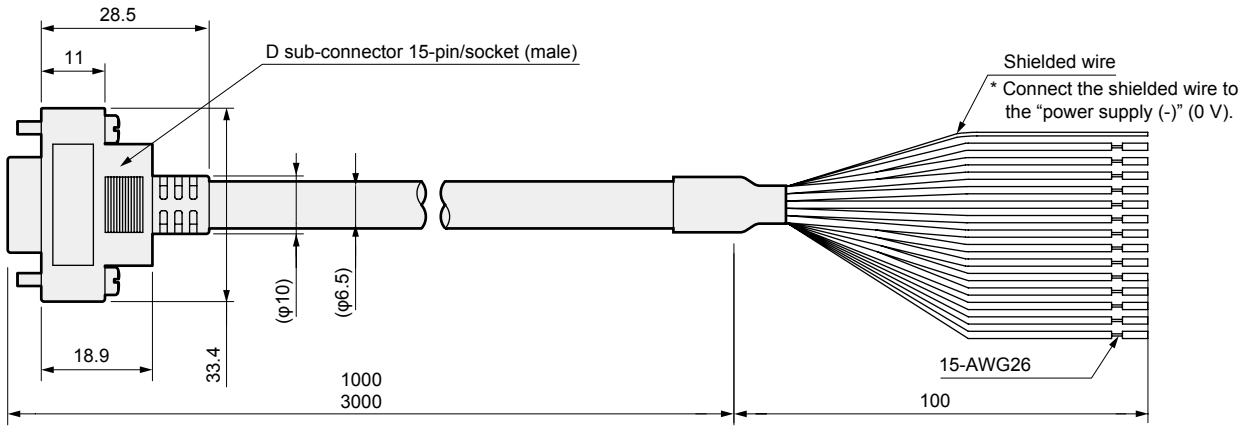


Wire material	Tinned annealed copper wire
Conductor O.D.	Approx. 0.48
Outer diameter of insulator	0.88

D sub-socket pin No.	1	2	3	4	5	6	7	8	9	10	11			12	13		14	15	Weight g
Insulator color	Brown	Orange	Yellow	-	Red	-	-	-	-	Gray	White			-	Green		Blue	Black	C1:67 C3:166
Name	Preset input signal			Vacant	Power supply +	Vacant	Vacant	Vacant	Vacant	Common	Input signal			Vacant	Analog output	Switch output	Error output	Power supply - (0V)	
Input	Bit 1	Bit 2	Bit 3		+24 VDC						0 to 10 VDC	0 to 5 VDC	4 to 20 mADC	Vacant	Output 1 to 5 VDC	NPN or PNP output	NPN or PNP output		

Note: The No. 10 pin common is the common for the preset input (pin No. 1 to 3).

● EVD-P1,EVD-P3



Wire material	Tinned annealed copper wire
Conductor O.D.	Approx. 0.48
Outer diameter of insulator	0.88

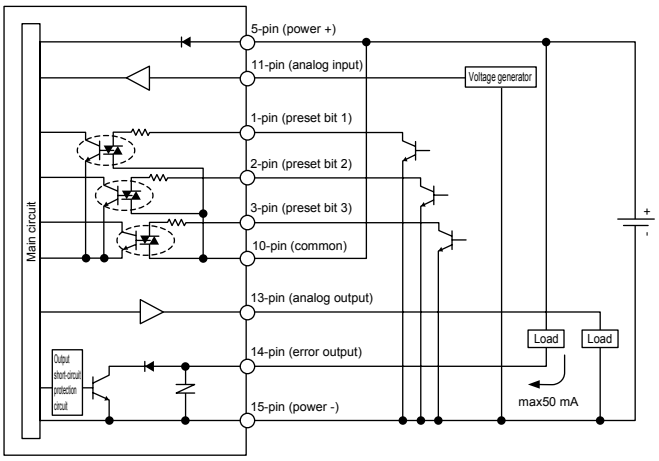
D sub-socket pin No.	1	2	3	4	5	6	7	8	9	10	11	12	13		14	15	Weight g
Insulator color	Brown	Orange	Yellow	Purple	Red	Light blue	Pink	White (with black line)	Red (with black line)	Gray	White	Green (with black line)	Green		Blue	Black	P1:82 P3:205
Name	Parallel input signal				Power supply +	Parallel input signal				Common	Parallel input signal		Analog output	Switch output	Error output	Power supply - (0 V)	
Input	Bit 1	Bit 2	Bit 3	Bit 4	+24 VDC	Bit 5	Bit 6	Bit 7	Bit 8		Bit 9	Bit 10	Output 1 to 5 VDC	NPN or PNP output	NPN or PNP output		

Note: The No. 10 pin common is the common for the parallel input signal (pin No. 1 to 4, 6 to 9, 11, 12).

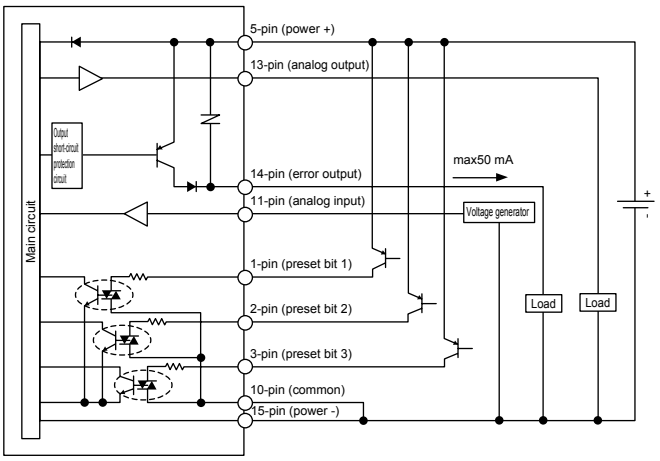
Wiring method

Example of internal circuit and load connection Analog input

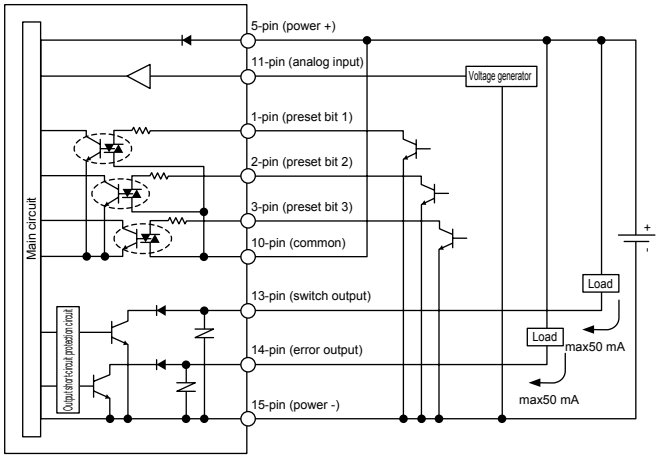
EVD-1□-0□AN-□-□, EVD-1□-1□AN-□, EVD-1□-2□AN-□
EVD-3□-0□AN-□-□, EVD-3□-1□AN-□, EVD-3□-2□AN-□
(Analog input, analog output + error output NPN output)



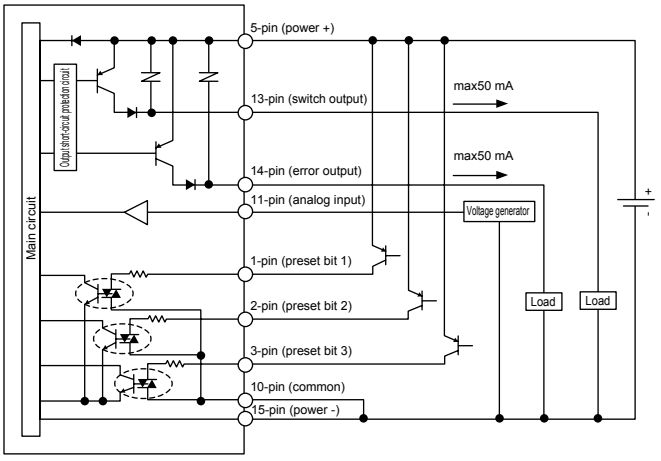
EVD-1□-0□AP-□-□,EVD-1□-1□AP-□,EVD-1□-2□AP-□
EVD-3□-0□AP-□-□,EVD-3□-1□AP-□,EVD-3□-2□AP-□
(Analog input, analog output + error output PNP output)



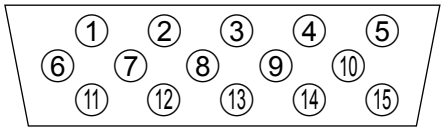
EVD-1□-0□SN-□-□, EVD-1□-1□SN-□, EVD-1□-2□SN-□
EVD-3□-0□SN-□-□, EVD-3□-1□SN-□, EVD-3□-2□SN-□
(Analog input, switch output + error output NPN output)



EVD-1□-0□SP-□-□, EVD-1□-1□SP-□, EVD-1□-2□SP-□
EVD-3□-0□SP-□-□, EVD-3□-1□SP-□, EVD-3□-2□SP-□
(Analog input, switch output + error output PNP output)



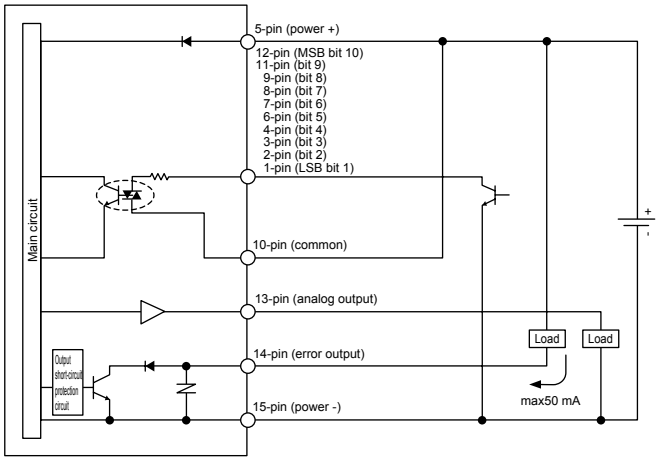
■ Connector pin layout (product body side)
[Analog input type]



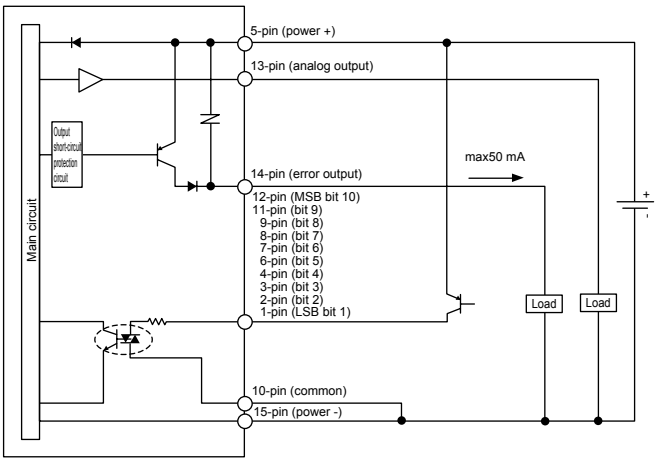
The analog input type
④ does not have the ⑥, ⑦, ⑧, ⑨, ⑫ or pins.

Example of internal circuit and load connection Parallel input

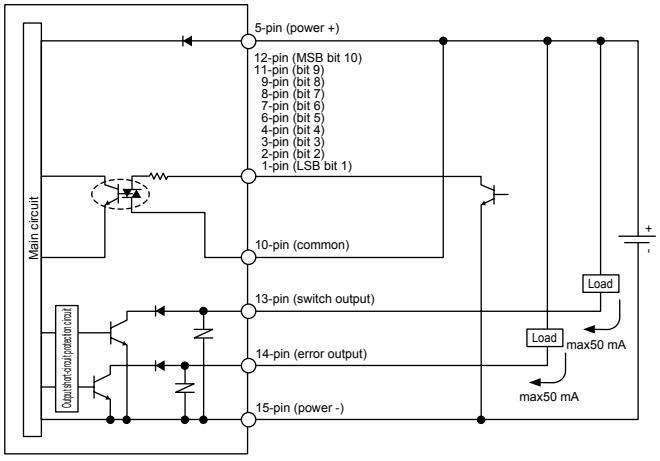
EVD-1□-P□AN-□-□
EVD-3□-P□AN-□-□
(Parallel input, analog output + error output NPN output)



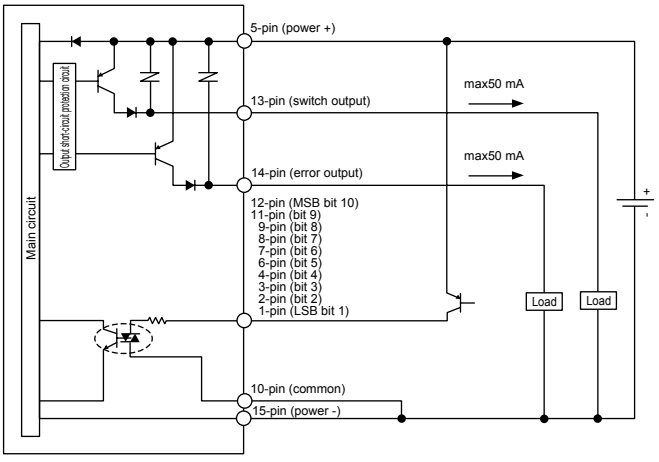
EVD-1□-P□AP-□-□
EVD-3□-P□AP-□-□
(Parallel input, analog output + error output PNP output)



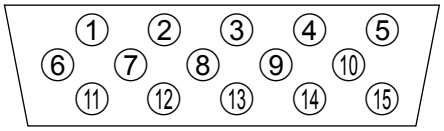
EVD-1□-P□SN-□-□
EVD-3□-P□SN-□-□
(Parallel input, switch output + error output NPN output)



EVD-1□-P□SP-□-□
EVD-3□-P□SP-□-□
(Parallel input, switch output + error output PNP output)



■ Connector pin layout (product body side)
[Parallel input type]



Input method

■ Relation of parallel input signal and control pressure

The parallel input signal has 10 bits, and when converted into a decimal is 0-1023.
Input signal = EVD setting pressure (kPa)/maximum control pressure x 1023 The maximum control pressure is 100 kPa for EVD-1100
500 kPa for EVD-1500
900 kPa for EVD-1900.

Example: When setting 300 kPa with EVD-1500
300(kPa)/500(kPa) × 1023=613.8 → 614

(When back calculating with a setting of 614, it will be
500(kPa) × 614/1023≈300(kPa))

When 614 (decimal) is converted into binary, the result is 1001100110. 1 sets the input signal to ON, and 0 sets the input signal to OFF. (Refer to table below)

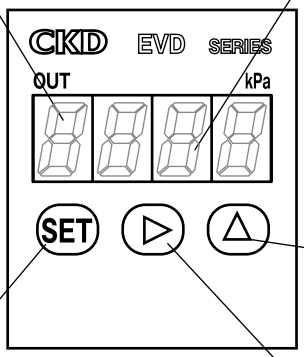
D sub-socket pin No.	12	11	9	8	7	6	4	3	2	1
Cable option insulator color	Green (with black line)	White	Red (with black line)	White (with black line)	Pink	Light blue	Purple	Yellow	Orange	Brown
Input type	Bit 10 MSB	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1 LSB
Binary [for 614 (decimal)]	1	0	0	1	1	0	0	1	1	0
Input signal	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF

■ Relation of preset memory and input signal

D sub-socket pin No.	3	2	1	Preset memory
Cable option insulator color	Yellow	Orange	Brown	
Input type	Bit 3	Bit 2	Bit 1	
Input signal	OFF	OFF	OFF	P1
	OFF	OFF	ON	P2
	OFF	ON	OFF	P3
	OFF	ON	ON	P4
	ON	OFF	OFF	P5
	ON	OFF	ON	P6
	ON	ON	OFF	P7
	ON	ON	ON	P8

MEMO

Names and functions of display/operation section



Output display (Red)

- "F" is displayed when confirming the function setting.
- "-" lights up when switch output is ON. (Only when using switch output specifications)
  * Blinks when overcurrent is detected.
- "E" lights up when error output is ON.
  * Blinks when overcurrent is

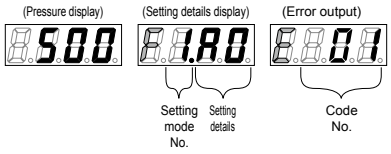
* If +/- should be specified or upper/lower limits have been set, H or L is displayed.

SET Key

- Use to enter each setting mode.
- When setting each data, this key is used to confirm the values, etc.

3-digit number LED display (green)

- Displays the pressure display and function setting details during RUN mode (pressure display).
  * The setting mode No. and setting details are displayed when displaying details of function settings.
- When setting each data, the values, etc., are displayed.
- Error code No. is displayed at error output.



△ Key

- Setting details are sequentially displayed during RUN mode (pressure display).
- Use to select the setting when setting data.
- When setting each data, it is used to increase the values, etc.

▷ Key

- When setting each data, this key is used to select the numbers to each value, etc.

Function list

Screen display	Name	Display content (RUN mode)	Settings (Setting mode)	Setting Method
	Pressure Display	Secondary pressure is confirmed with the 3-digit numerical display LED. Unit: kPa		
Screen F1	Input Signal Selection	The selected input signal and current target value (pressure conversion value) are confirmed. * When preset input (8-point) is selected, the currently selected preset No. and setting value are displayed.	For analog input: Analog input, preset memory input, or direct memory input is selected. For preset input/direct memory input, input the setting or this mode. For parallel input: Parallel input or direct memory input is selected. For direct memory input, input the setting for this mode.	P.529
Screen F2	Zero /Span adjustment	The validity of the zero/span adjustment and the setting value are confirmed. When "valid," the F2.on - zero point adjustment value (L) and span point adjustment value (H) are alternately displayed. * The default setting is set with the full scale (--).	Select whether to use with full scale or zero/span adjustment. When zero/span adjustment is selected, the adjustment value for this mode can be set randomly.	P.530
Screen F3	Auto-power OFF	Auto-power OFF enabled/disabled can be confirmed. * The default setting is invalid (--).	Auto-power OFF enabled/disabled can be selected. Note) The auto-power OFF time is set to approx. one minute. The time cannot be changed.	P.530
Screen F4	Switch Output * Switch Output Specifications only	The switch output enabled/disabled and setting value can be confirmed. When "Mode 1 enabled" is selected, the F4.0-- tolerance range setting value (L) and - + tolerance range setting value (H) are alternately displayed. When "Mode 2 enabled" is selected, the F4.1 - min. setting value (L) and - max. setting value (H) are alternately displayed. * The default setting is invalid (--).	Switch output enabled/disabled can be selected. When enabled, mode 1 or 2 can be selected. +/- tolerance values and max./min. values can be set as desired. Note) The hysteresis width cannot be set.	P.530
Screen F5	Proportional value Change	Changes in the proportional value and its set level can be confirmed. When "Proportional Value Up" is selected, F5.H is displayed. When "Proportional Value Down" is selected, the F.5L - setting value is alternately displayed. * The default setting is standard (--).	Select whether to use the standard value or whether to change the proportional value. The proportional value level is set in this mode only when "Proportional Value Down" is selected. (10 stages)	P.531

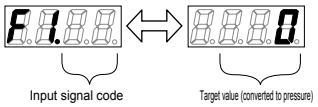
* EVD-□100 only

Operating method

RUN mode List of displayed contents

■ F1 (input signal selection) screen F1 display descriptions

The input signal and target value are alternately displayed.



[Analog input]
EVD- □ -0 □□ - □ - □ , EVD- □ -1 □□ - □ - □ , EVD- □ -2 □□ - □ - □

Input signal code	Content
F1.A0	Analog 0 to 10 VDC input *
F1.A1	Analog 0 to 5 VDC input *
F1.A2	Analog 4 to 20 mADC input *
F1.P1 to F1.P8	Preset memory input The selected preset No. is displayed.
F1.dr	Direct memory input

[Digital input]
EVD- □ -P □□ - □ - □

Input signal code	Content
F1.PA	Parallel 10 bit input
F1.dr	Direct memory input

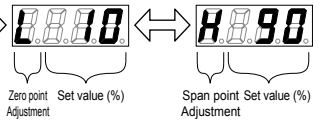
* One of [F1.A0], [F1.A1] and [F1.A2] is displayed based on the model.

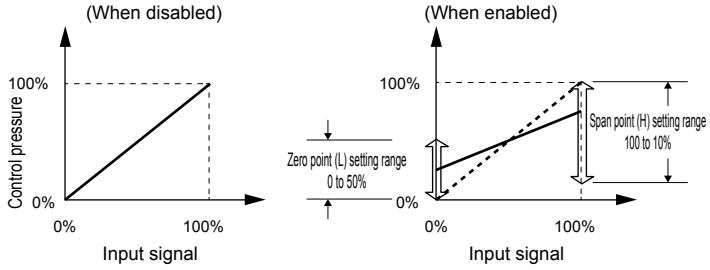
■ F2 (zero/span adjustment) screen F2 display descriptions

The validity of the zero/span adjustment and the setting value are confirmed.
Note: This function is invalid if preset memory input or direct memory input is selected for F1 mode.

When disabled F2.--

When enabled F2.on ⇔ L.10 ⇔ H.90





■ F3 (auto-power OFF) screen F3 display descriptions

Auto-power OFF enabled/disabled can be confirmed.

When disabled F3.--

When enabled F3.on

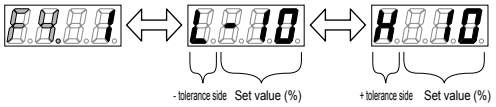
RUN mode List of displayed contents

■ F4 (switch output function) screen F4 display description (compatible model: EVD-□□-□□SN, EVD-□□-□□SP)

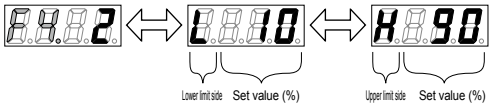
The switch output enabled/disabled and setting value can be confirmed.
Note) This is invalid with analog output specifications. (--) is displayed on the screen but cannot be used.

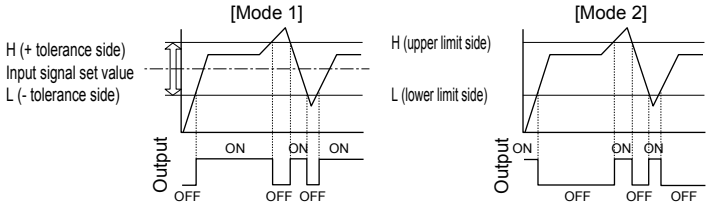
When disabled

When in Mode 1



When in Mode 2





■ F5 (proportional value change) screen F5 display descriptions

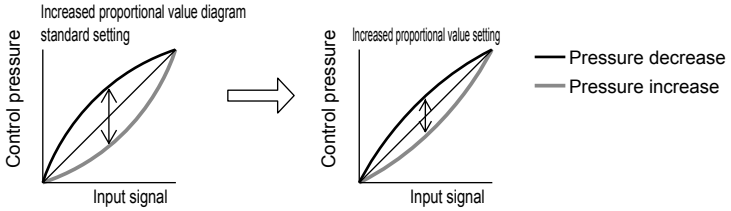
⚠ Compatible models: EVD-1100-□□□-□-□, EVD-3100-□□□-□-□
Note) The screen is not displayed in EVD-□500/EVD-□900.

The validity of the proportional value and the set level are confirmed.

- When disabled: Control is applied with standard values (default value).
- When enabled: "Proportional value up" or "proportional value down" is selected.
  The set level is selected from ten stages only when "proportional value down" is selected.

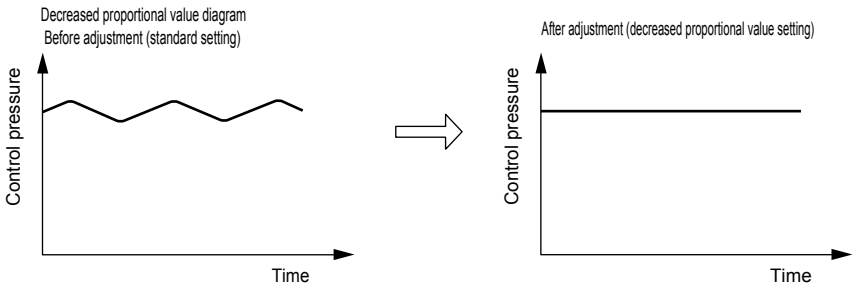
[Effect of increasing proportional value]

While the effect varies with piping and load capacity conditions, a higher accuracy in control is achieved. Hunting occurs easily, requiring care during use.



[Effect of decreasing proportional value]

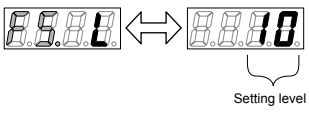
If vibration occurs during blow applications or during a leakage test, stable control is ensured by decreasing the proportional value as shown below.



When disabled

When the proportional value is increased (H)

When the proportional value is decreased (L)

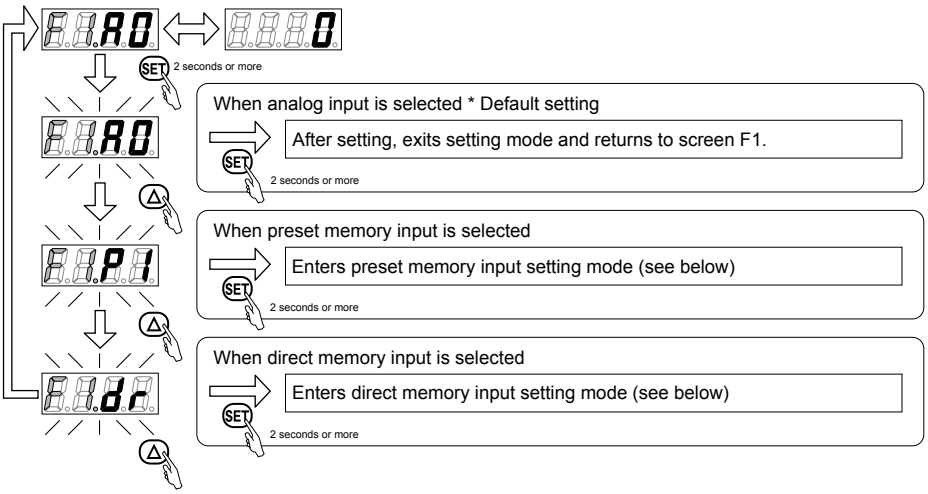


How to set setting mode

CAUTION **Release the key lock before changing setting details. (Refer to page 532)**

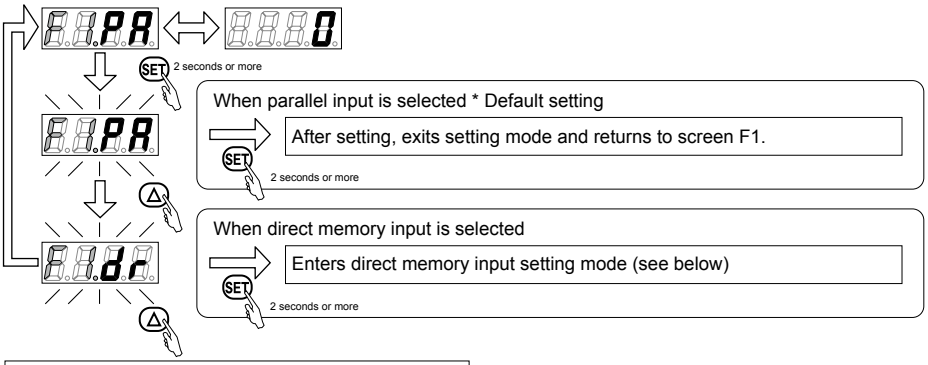
■ F1 (input signal selection function) Hold down the SET key for two seconds or more with the screen F1 displayed. F1 setting mode is entered.

● Changing the analog input signal selection
Note: Analog input specifications cannot be changed.



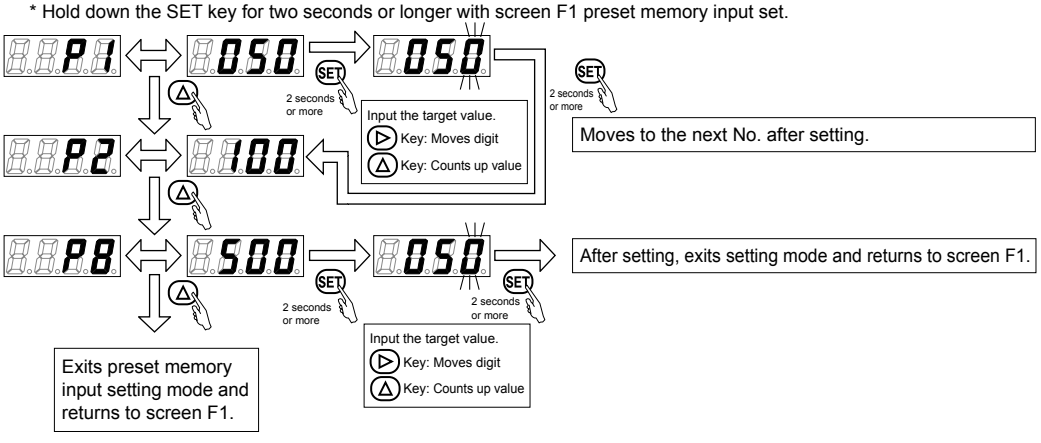
Exits input signal selection setting mode, and returns to screen F1.

● Changing parallel input signal selection

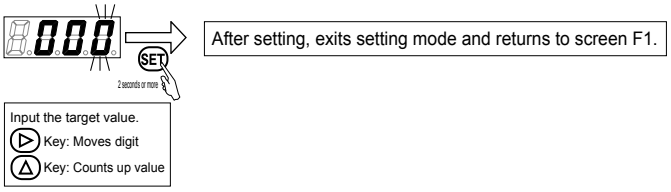


Exits input signal selection setting mode, and returns to screen F1.

● Using preset memory input setting mode
* Hold down the SET key for two seconds or longer with screen F1 preset memory input set.



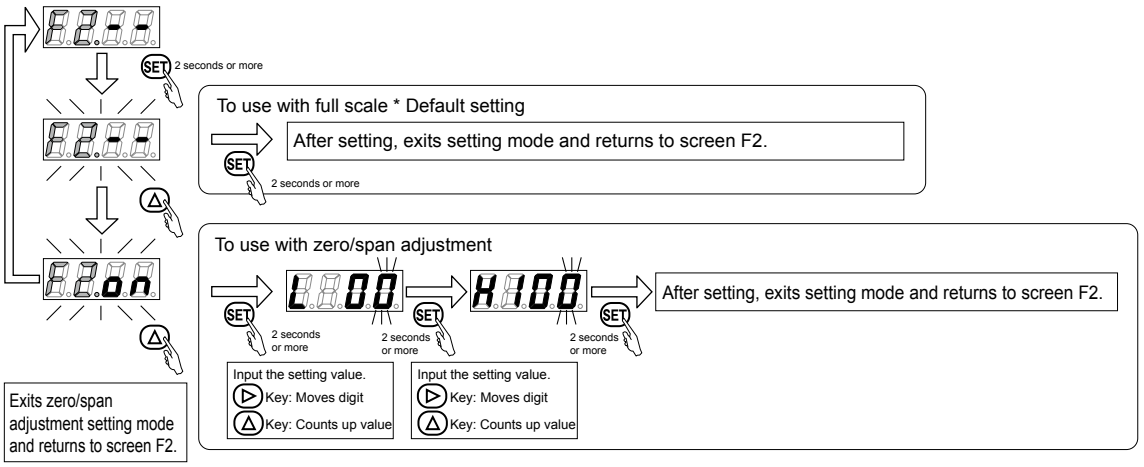
● Using direct memory input setting mode
* Hold down the SET key for two seconds or longer with screen F1 preset memory input set.



How to set setting mode

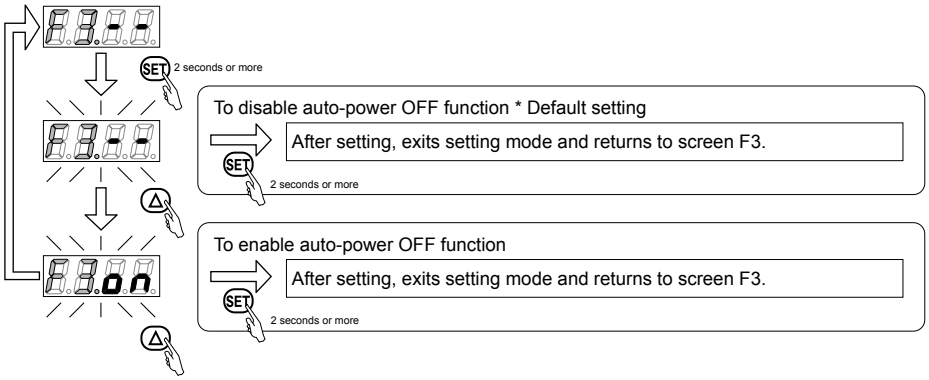
CAUTION Release the key lock before changing setting details. (Refer to page 532)

■ F2 (zero/span adjustment function) Hold down the SET key for two seconds or more with the screen F2 displayed. F2 setting mode is entered.



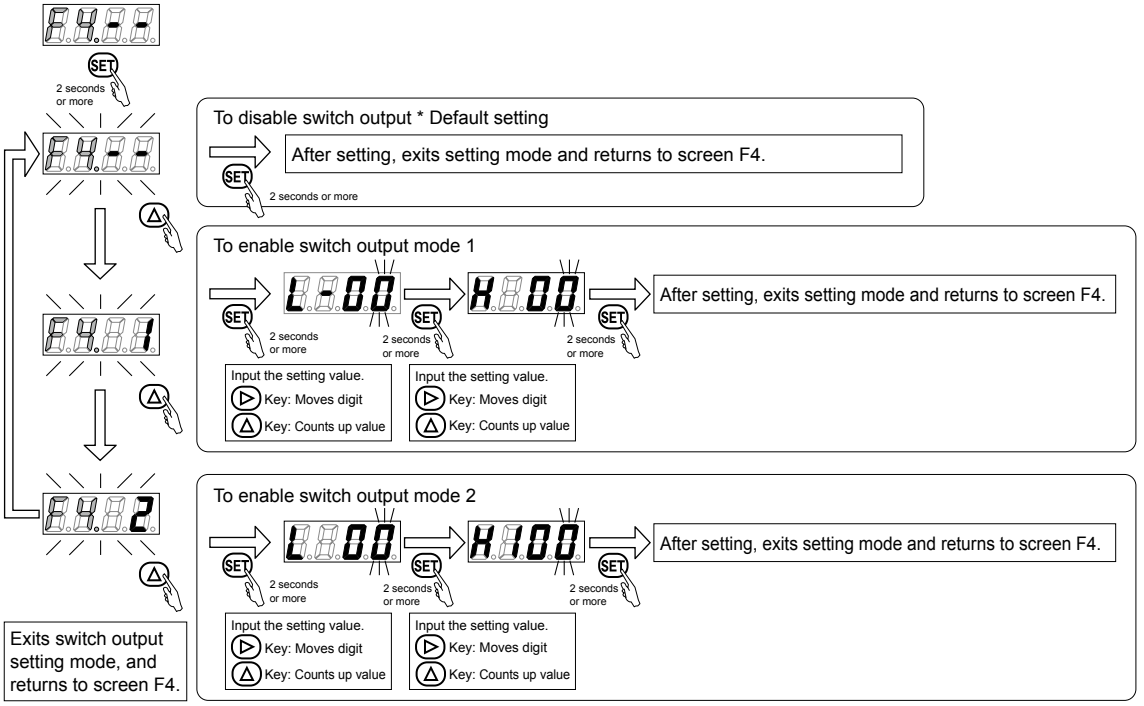
* This function cannot be used when preset memory input or direct memory input is selected with F1 (input signal selection function). Only full scale can be used.

■ F3 (auto-power OFF function) Hold down the SET key for two seconds or more with the screen F3 displayed. F3 setting mode is entered.



* If any key is pressed during auto-power OFF, the display illuminates.
* The auto-power OFF time is set to approx. one minute. The time cannot be changed.

■ F4 (switch output function) Hold down the SET key for two seconds or more with the screen F4 displayed. F4 setting mode is entered.
(Compatible models: EVD- □□ - □□ SN, EVD- □□ - □□ SP)
Note: This is invalid with analog output. (--) is displayed on the screen but cannot be used.

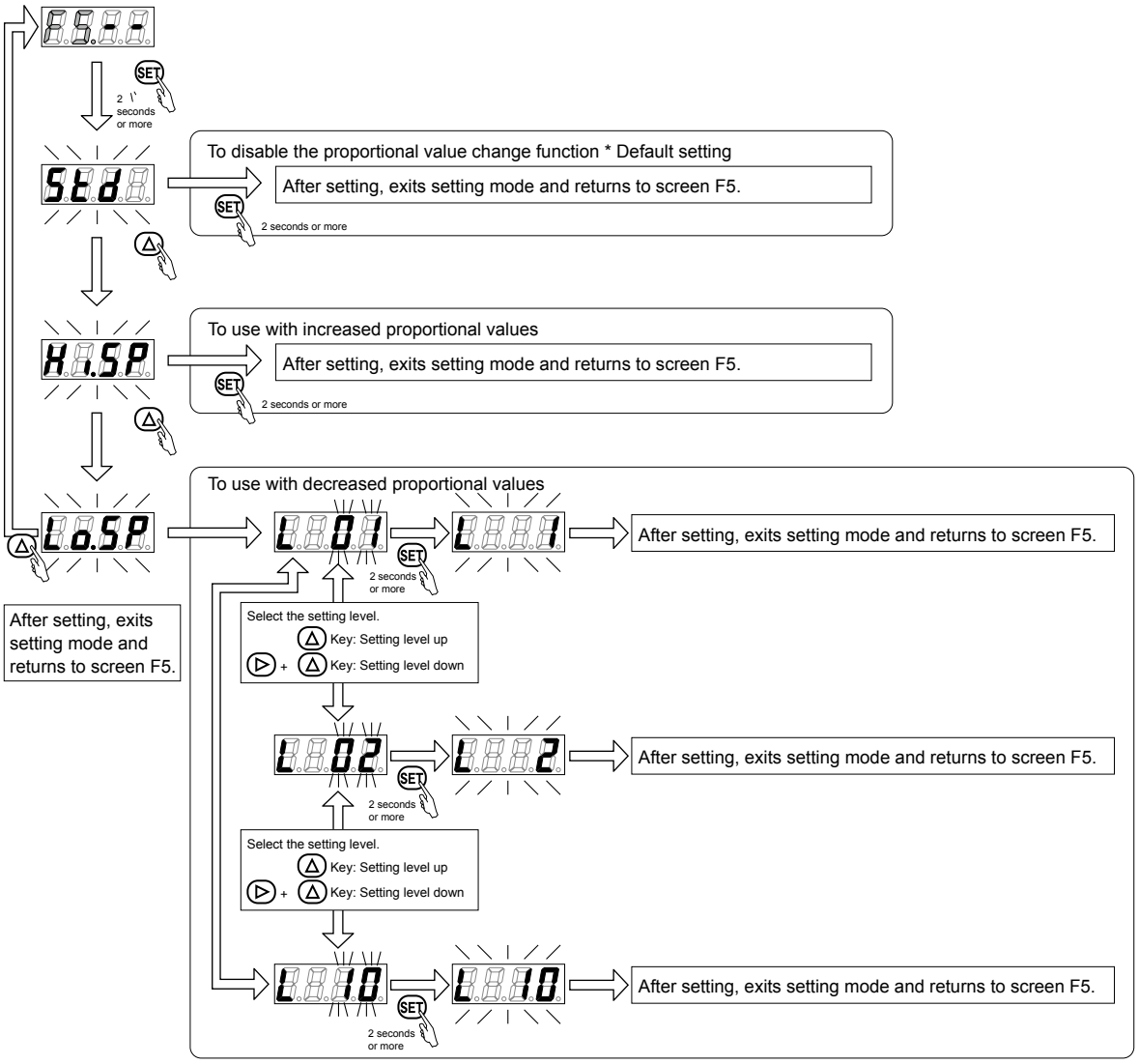


How to set setting mode

CAUTION **Release the key lock before changing setting details. (Refer to page 532)**

■ F5 (Proportional value change function) Hold down the SET key for two seconds or more with the screen F5 displayed. F5 setting mode is entered.

⚠ Compatible models: EVD-1100-□□□-□-□, EVD-3100-□□□-□
-□ Note) The screen is not displayed in EVD-□500/EVD-□900.

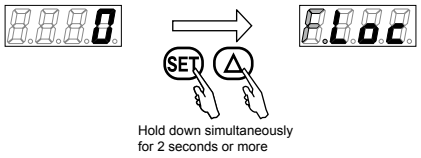


* When used with a decreased proportional value, operation takes place with the set level displayed on the screen when the set level is selected. When the set level is decided, press the "SET key" for two seconds or longer to enter the value.

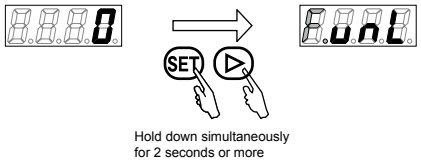
Key lock

This function prevents incorrect operation. Release the key lock before changing settings.

● Operating the key lock

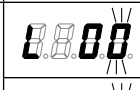
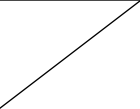


● Releasing the key lock



* The key is locked every time the power is turned ON.

Setting range of functions

Function	Settings display screen	Setting details	Setting specifications
F1: Input signal selection function Preset memory input		Set the target value (pressure).	Range: *1 □100 / 000 to 100 □500 / 000 to 500 □900 / 000 to 900 Min. set unit: 1 kPa
F1: Input signal selection function Direct memory input		Set the target value (pressure).	Range: *1 □100 / 000 to 100 □500 / 000 to 500 □900 / 000 to 900 Min. set unit: 1 kPa
F2: Zero/span adjustment function		Set the zero point adjustment value.	Range: 00 to 50 *2 Min. set unit: 1%
		Set the span point adjustment value.	Range: 100 to 010 *2 Min. set unit: 1%
⚠ F4: Switch output function When in Mode 1		Set the "-" tolerance value.	Range: -00 to -50 Min. set unit: -1%
		Set the "+" tolerable value.	Range: 00 to 50 Min. set unit: 1%
⚠ F4: Switch output function When in Mode 2		Sets the min. value.	Range: 00 to 90 *2 Min. set unit: 1%
		Sets the max. value.	Range: 100 to 010 *2 Min. set unit: 1%
⚠ F5: Proportional value change function Increased proportional value		The level cannot be set.	
⚠ F5: Proportional value change function Decreased proportional value		Set the level.	Range: 01 to 10 Min. set unit: 1

*1: If set to a pressure of 1% F.S. or less, it may not be possible to control pressure due to the effect of residual pressure.
*2: The setting range may be limited depending on the setting value.

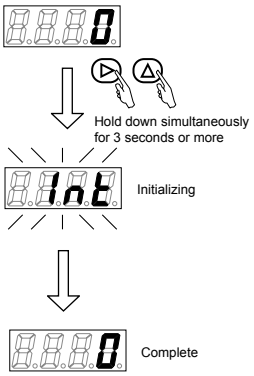
⚠ F4: The switch output function is for the switch output only. Cannot be used with the analog output.
Compatible models: EVD-□□-□□SN, EVD-□□-□□SP

⚠ F5: The proportional value change function is limited to the pressure range 100 kPa.
Compatible model: EVD-1100-□□□

Default mode settings (Initialization)

Screen display	Name	Settings display	Setting details
Screen F1	Input signal selection	Analog Parallel A0.A1.A2	Analog/ parallel input
Screen F2	Zero/span adjustment		Full scale (zero/span adjustment disabled)
Screen F3	Auto-power OFF		Auto-power off disabled
Screen F4	Switch output * Switch output specifications only		Switch output disabled
Screen F5	Proportional value change * EVD-□100 only		Standard setting (Proportional value change disabled)

[Initializing]



Error code

Error display	Cause	Countermeasures
E.01	The power voltage is not within the rating. Detected at 19.5 VDC or less detection accuracy ±10%	Check the product's specifications, set the power voltage within the rated range, then turn the power ON again.
E.02	The input signal exceeded the rating range. Detected at input 110% and over detection accuracy ±1%	Check the product's input signal, set the input signal within the rated range, then turn the power ON again.
E.03	An error occurred during EEPROM reading or writing.	Contact your nearest CKD branch or dealer.
E.04	An error occurred during memory reading or writing.	Contact your nearest CKD branch or dealer.
E.05	Secondary pressure did not reach the set value for five seconds or more consecutively. (20% F.S. or less of the set value was not attained Detection accuracy ±6% F.S.)	Check primary pressure provide pressure within the rating range, then turn the power ON again. Check that there are no leaks from pipes, fitting, or other devices. Correctly connect, then turn power ON again. If the error is not resolved, contact your nearest CKD branch or dealer.
	The switch output's overcurrent protection circuit has operated.	Check whether load current exceeds the rating. Correctly connect, then turn the power ON again.

When the above errors occur, the error displays and error output turns ON.

■ Glossary

Max. working pressure

Maximum value of primary side pressure which can satisfy the specifications. Differs according to the pressure specifications.

Min. working pressure

The primary pressure value required to control up to the full scale pressure. Differs according to the pressure specifications.

Proof pressure

Pressure value under which the electro pneumatic regulator will not break even if momentarily applied. The supply side and output side guaranteed values are given separately to limit the withstand pressure of the pressure sensor mounted on the secondary side.

Pressure control range

Indicates the pressure which can be controlled. Depending on the product, residual pressure may be generated. With the EVD, 1% F.S. or less residual pressure is generated when the input signal is 0% F.S.

Note: This is different from the guaranteed accuracy range. Refer to the hysteresis and linearity items below.

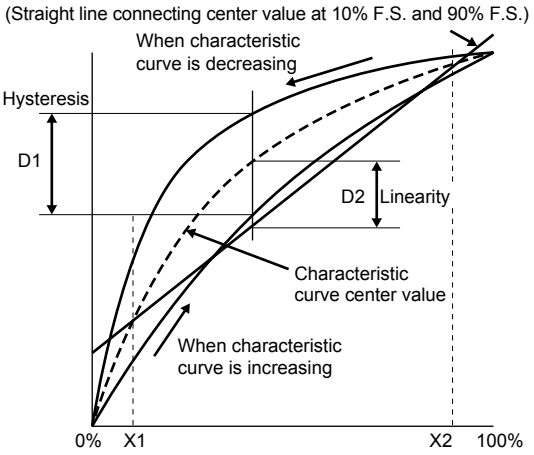
Hysteresis (measurement circuit 1)

The difference (D1) of the rise curve and lower curve when the input signal is reciprocated once between 0% and 100%, indicated as a percentage of the full scale (F.S.).

(Hysteresis) = Maximum value of D1/FS control pressure x 100 [%]

Note: The scope of warranty will differ according to the product.

For EVD, 10% to 90% F.S. is the scope of warranty.



Linearity (measurement circuit 1)

The input signal (X1)% F.S. and (X2)% F.S. when the input signal is reciprocated once between 0% F.S. and 100% F.S. The difference (D2) from the reference line connecting the % F.S. is indicated as a percentage of the full scale (F.S.). (Linearity) = Maximum value of D2/FS control pressure x 100 [%]

Note: The scope of warranty will differ according to the product.

For EVD, it is X1=10% F.S., X2=90% F.S.

Resolution (measurement circuit 1)

The min. value of the input signal generated when the control pressure changes, indicated as a percentage of the full scale (F.S.). The input signal is pressurized from 0% F.S. to 15% F.S. and held for 10 seconds or longer and the input signal is

The value is indicated as the difference with the input signal obtained, then gradually increased until the control pressure starts to rise again. Conducted in the same way for input signal 50% F.S. and 85% F.S.

Repeatability (measurement circuit 1)

The maximum value of the control pressure variation when the same setting value is repeatedly applied is indicated as a percentage of the full scale (F.S.).

The value is calculated with the variation of the control pressure (D3) when the input signals 0% F.S. and 50% F.S. are repeatedly applied.

(Repeatability) = D3 / FS control pressure x 100 [%]

Temperature characteristics

Indicates the fluctuation of the control pressure according to changes in the ambient temperature (reference temperature 25°C) converted per 1°C.

The characteristics are indicated for the zero point and span width.

Maximum flow rate (measurement circuit 2)

Indicates flow rate possible at control pressure 100% F.S.

Relief characteristics (measurement circuit 3)

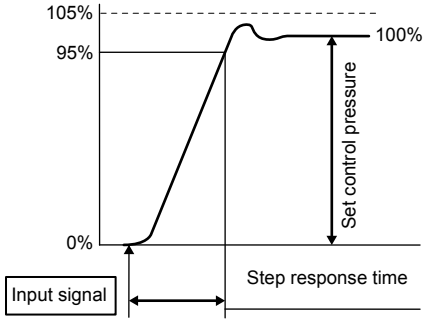
Indicates the relation of the control pressure and exhaust flow rate when back pressure is applied on the secondary side from an external source in the pressure control state.

The relief flow rate when the back pressure is gradually increased is measured.

Step response (measurement circuit 1)

Indicates the time for the control pressure to reach the set pressure in respect to a stepped input signal.

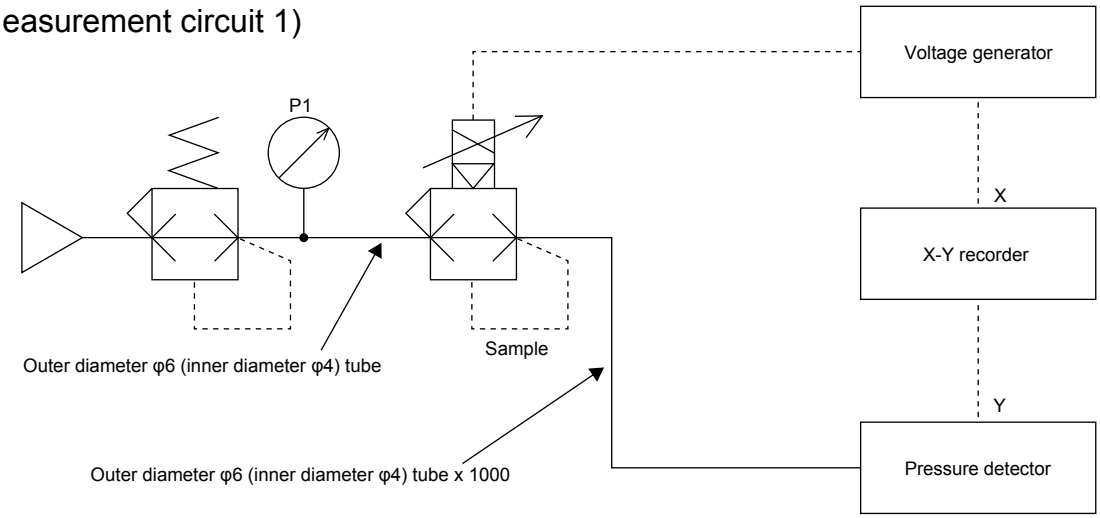
Measures the time for the control pressure to reach the setting value ±5% F.S. range after the input signal is applied.



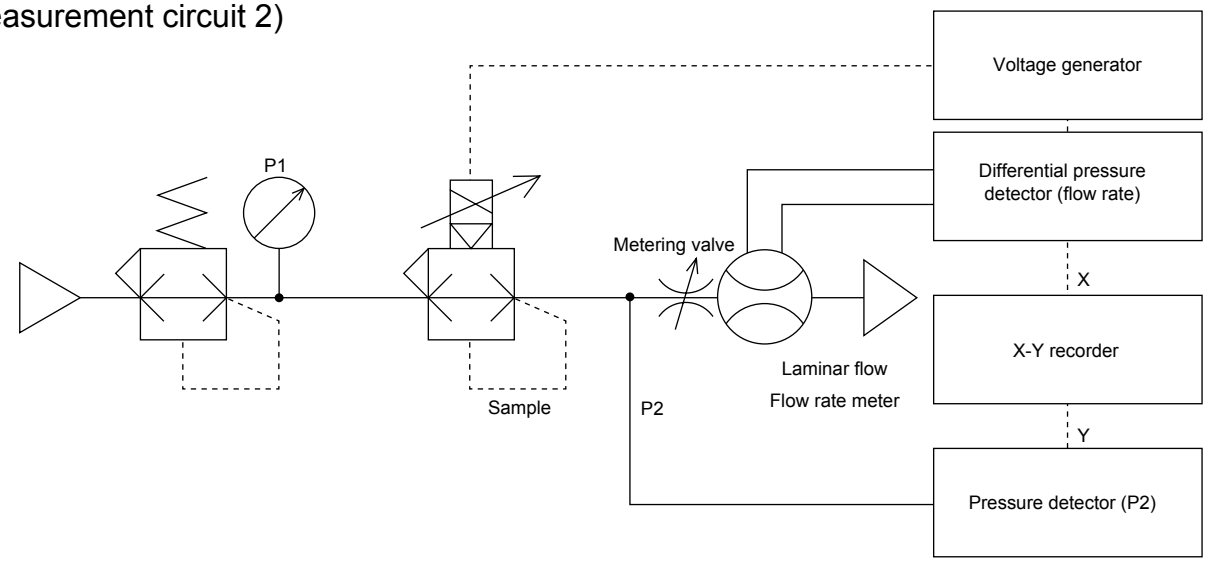
(Response time) = Time to reach within ±5% of final value

CKD measurement circuit

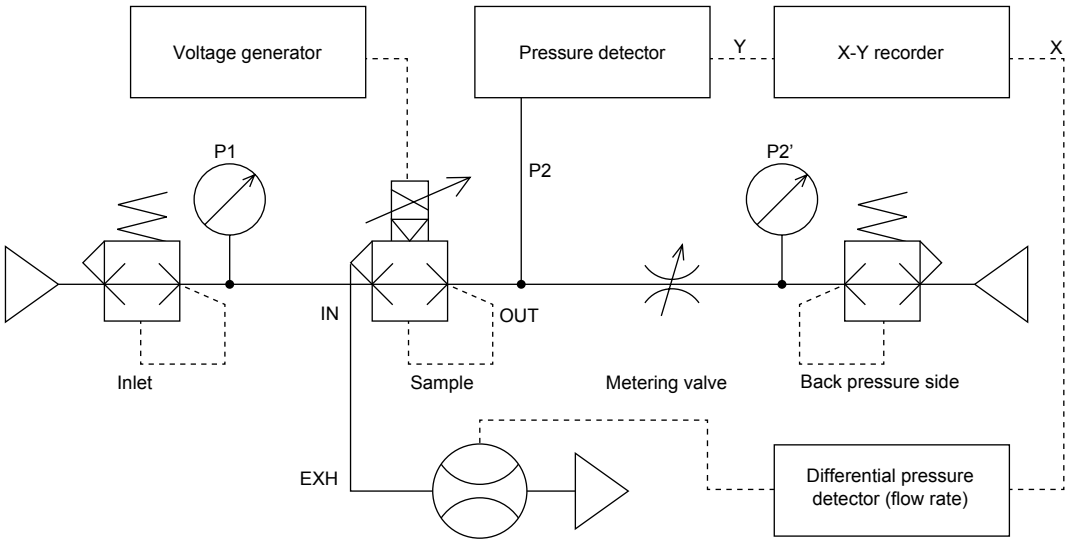
(Measurement circuit 1)



(Measurement circuit 2)



(Measurement circuit 3)



Safety Precautions

Be sure to read this section before use.

Product-specific cautions: Electro pneumatic regulator

Design/selection

⚠CAUTION

■ Response is affected by working pressure and load volume. Also fluctuation of the working pressure affects the secondary side control pressure. If reproducibility with stable responsiveness is required, install a regulator in the preceding stage.

■ Take the following countermeasures to prevent malfunction caused by noise.
- Install a line filter in the AC power supply line.
- Use a surge suppressor such as a CR or diode on the inductive load (solenoid valve, relay, etc.) and remove noise from the source.
- Keep wiring to devices separate from strong magnetic fields.
- Connect wiring to proportional pressure controls with a shield wire.
- Ground the shield wire on the power supply side. Note that the shielding wire for the serial transmission communication cable must be treated based on communication system specifications.

■ When releasing the secondary control pressure, such as air blowing, into the atmosphere, the pressure could fluctuate depending on the piping and flow conditions. Test under actual working conditions, or contact CKD before using this method.

■ When selecting the dryer, air filter, oil mist filter or regulator, select a device with a flow rate higher than that used by proportional pressure controls.

■ This product has moving parts due to its operation and structure, the accuracy, etc., of which can change over time. Before use, evaluate the part in the system. Depending on the operation frequency, use this product as a periodic maintenance part, etc.

■ Working conditions for CE compliance
CKD electro pneumatic regulators (EVD, EVR, EV, EVS2 and MEVT Series) conform to the EMC Directive and CE standard. The standard for the immunity for industrial environments applied to this product is EN61000-6-2; the following requirements must be satisfied in order to conform to this standard:
Conditions
- The evaluation of this product is performed by using a cable that has a power supply line and a signal line, paired to assess the product's performance.
- This product is not equipped with surge protection. Implement surge protection measures on the system side.

Mounting, installation and adjustment

⚠CAUTION

■ Do not use the product where the product is exposed to direct sunlight or may come in contact with water, oil, etc.

■ Sufficiently flush the piping with air before connecting to proportional pressure controls. Prevent pipe from catching on parts of the sealing tape when piping.

■ Mount the product as indicated in the product-specific cautions.

■ When connecting pipes, wrap sealing tape in the opposite direction to the threading, from the inside position to within 2 mm from the pipe end.

- If sealing tape protrudes from the pipe threads, it could be cut when screwing the bolts in. This could cause the tape to enter the pneumatic components, causing failures.

■ Correct pressure control is not possible if the exhaust port is plugged. Release this port to the atmosphere.

■ Use appropriate torque to tighten the pipes when connecting them.
- The purpose is to prevent air leakage and damage to bolts.
- First tighten the bolts by hand to ensure that the threads are not damaged, then use a tool.

[Recommended tightening torque]

Port thread	Tightening torque N·m
M5	1 to 1.5
Rc1/4	6 to 8
Rc3/8	13 to 15

■ Tighten with an appropriate torque when using CKD cable option M12 connector. Recommended tightening torque: 0.4 to 0.49 N·m

Use/maintenance

⚠CAUTION

■ Do not disassemble the product. Doing so may cause product failure. Operation after disassembly cannot be guaranteed.

■ Do not use with the cover and housing removed.
- An electronic circuit board is assembled inside. Using the product with the cover or housing removed could result in unexpected accidents or trouble.

Product-specific cautions: EVD Series

Design/selection

⚠ WARNING

■ Understand the characteristics of compressed air before designing a pneumatic circuit.
- The same functions as mechanical, hydraulic, and electrical methods cannot be anticipated.
- The product cannot be used for immediate stopping and holding in case of emergency stop.
- Pop-out, air discharge, or leakage due to air compression and expansion may occur.
- Design the circuit so that compressed air in the system is exhausted.

■ Confirm before use that the product will withstand the working environment.
- This product cannot be used in an atmosphere containing corrosive gas, chemical liquids, solvents, water or steam. If water, oil, or metal chips (spatter or cutting chips, etc.) could come in contact with the product, provide appropriate protection.
- A gauge pressure sensor is built in. To protect the sensor, do not seal the product, and make sure that air can be introduced.
- This product cannot be used in an explosive gas atmosphere.

■ Pay attention to the electric circuit during emergency stop and to the cylinder operation during power outages.

■ Install a “pressure switch” and “shut-off valve” on the device’s compressed air supply side.
- The pressure switch will disable operation until the set pressure is reached. The shut-off valve releases compressed air into the pneumatic pressure circuit to prevent accidents caused by operation of pneumatic components under residual pressure.

■ If the regulator is left with the power OFF and the primary pressure applied, the secondary pressure could rise to the primary pressure level. Due to the structure, a small amount of air is consumed from the EXH port when the secondary pressure is generated.
Set the primary regulator to 0 or use a valve on the primary side to shut off the supply source when not using the regulator.

⚠ CAUTION

■ Indicate the maintenance conditions in the device’s instruction manual.
- The product’s performance may drop too low to maintain an appropriate safety level depending on usage conditions, working environment and maintenance status. With correct maintenance, the product functions can be used to the fullest.
  1. Control of supplied compressed air pressure
  2. Control of pneumatic filter
  3. Control of compressed air leakage at piping connections
  4. Operational status control
  5. Control of current consumption

■ Use a constant voltage power supply.

■ Check for leakage current to avoid malfunction caused by leakage current from other fluid control components.
- When using a programmable controller, etc., leakage current may affect the electro pneumatic regulator and cause malfunction.

24 VDC	1.8 mA or less

■ Response is affected by working pressure and load volume. If reproducibility with stable response time is required, install a regulator in the proceeding stage.

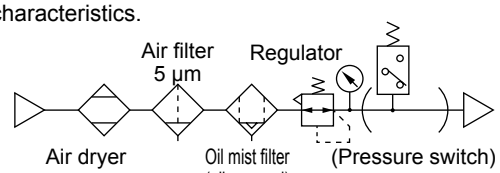
■ Take the following countermeasures to prevent malfunction caused by noise.
- Install a line filter in the AC power supply line.
- Use a surge suppressor such as a CR or diode on the inductive load (solenoid valve, relay, etc.) and remove noise from the source.
- Keep wiring to device separate from strong magnetic fields.
- Connect wiring to device with a shield wire.
- Ground the shield wire on the power supply side.
- Keep the power supply cable as short as possible.
- Do not share power with an inverter or components causing motor noise, etc.
- Do not lay the power wire, signal wire, and other power cables in parallel.

■ When the current input is wired, the power ground and signal common are shared.
- When driving several electro pneumatic regulators with one PLC and D/A unit, depending on the D/A unit circuit, wiring could prevent the correct signal from being input. Contact the PLC manufacturer.

■ The current input can be used with an input signal of 1 to 5 V. However, because input impedance is small (250 Ω) when compared to other voltage input, use an appropriate voltage generator.

■ Poor air quality will cause poor characteristics and adversely affect the durability.

■ Use clean dry air of JIS B 8392-1:2012 (ISO 8573-1: 2010) [1:3:2] or equivalent.
- For the pneumatic source, always supply clean air, from which solids, moisture and oils have been sufficiently removed with a dryer, air filter and oil mist filter.
Do not use lubricated air as it will adversely affect the characteristics.



[Recommended air circuit]

- When the secondary pressure is lowered with an input signal, etc., the secondary air passes through the product and is discharged from the EXH port. Contamination on the secondary piping and on the inside of the load will have an adverse effect on the characteristics, etc., Thus, keep the inside of the piping as clean as possible.

■ If power is turned OFF under pressure, secondary pressure is held.
- To discharge pressure, lower set pressure with an input signal and then turn OFF, or use a shut-off valve, etc. This holding state is not guaranteed for extended periods of time.

Design/selection

⚠CAUTION

■ Primary pressure:
- ● For 100 kPa pressure specifications, make sure that the pressure is not less than “set secondary pressure + 50 kPa”.
- ● For 500/900 kPa pressure specifications, make sure that the pressure is not less than the “set secondary pressure + 100 kPa”.
- ● Product life is shortened if primary pressure is not supplied for a long period while power is ON. Avoid this type of usage.

■ When releasing the secondary control pressure, such as air blowing, into the atmosphere, the pressure could fluctuate depending on the piping and flow conditions. Test under actual working conditions, or contact CKD before using this method.

■ When selecting the dryer, air filter, oil mist filter or regulator, select a device with a flow rate higher than that used by proportional pressure controls.

■ Working environment
Do not use the product where the product is exposed to direct sunlight or may come in contact with water, oil, etc. The product cannot be used with large temperature variations or high temperature/humidity since condensation may occur inside the body. Consult with CKD on specifications for use outside the designated specifications or for special applications.

■ Drip-proof environments
The degree of protection of this product is equivalent to IP40. Do not install this product where water, salt, dust, or swarf is present or in a pressurized or depressurized environment. The product cannot be used with large temperature variations or high temperature/humidity since condensation may occur inside the body.

■ Apply a signal to offset the residual pressure (1% F.S. or equivalent) in the waiting status where the input signal is set to 0 MPa. If an offset signal is not applied, unnecessary operation of the solenoid valve will occur, resulting in shorter service life.

■ Even when pressure is set to 0 MPa at 1% F.S. or less of max. control pressure, secondary pressure is not completely released. If precise 0 MPa is required, bleed the secondary side or install a 3-way valve on the secondary side to switch the secondary side to atmospheric pressure.

■ The processing performance of EVD-1000 Series is intended for small control targets. If pressure rises and falls frequently with large secondary side load capacity or with long piping to the control target, reducing the pressure will take a long time and the service life may become shorter since load is applied to the diaphragm and other exhaust side components.
In such applications, use EVD-3000 Series with higher supply and exhaust port performance.

Mounting, installation and adjustment

⚠DANGER

Installation

■ Use power supply voltage and output within the specified voltage. Using voltage that exceeds the specified voltage could cause malfunctions, controller damage, electrical shock, or fire.
Do not use any load that exceeds the rated output. Otherwise, output damage or fire may result.

⚠WARNING

Wiring

■ Check the connector pin and cable conductor wire color when wiring. Incorrect connections could cause damage, failures, or malfunctions. Check the wire color against instructions and precautions before wiring.

■ Ensure that wires are properly insulated.
Check that wires do not come into contact with other circuits, that no ground faults occur, and that the insulator between terminals is not defective. Overcurrent could damage the product.

■ Use a stabilized DC power supply within the specified rating that has been insulated from the AC power supply. A non-insulated power supply could result in electrical shock. If power is not stabilized, the peak value could exceed the rating and damage the product or reduce precision.

■ Stop the control device and equipment and turn power OFF before wiring. Starting operation suddenly could cause unpredictable and dangerous operation. Conduct an energized test with control devices and equipment stopped. Be sure to discharge any accumulated electrostatic charge among personnel, tools, or equipment before and during work. Connect and wire bending resistant material, such as robot wire material for movable sections.

■ Do not use at levels exceeding the power supply voltage range. The product could rupture or burn if voltage exceeding the working range is applied or if an AC power supply (100 VAC) is applied.

■ Do not short-circuit the load. Failure to observe this could result in rupture or burning.

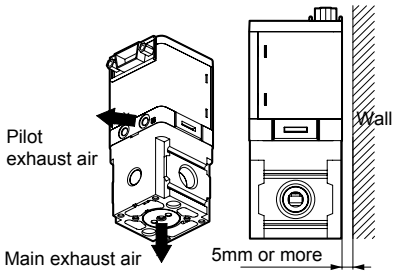
Mounting, installation and adjustment

⚠CAUTION
Installation

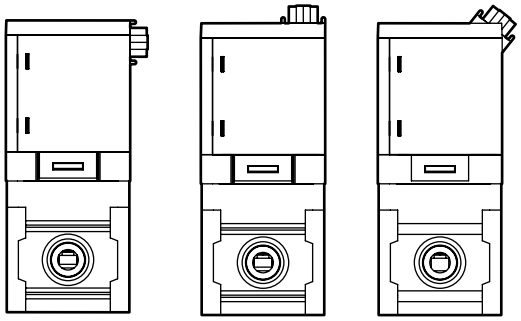
■ Mounting orientation
There are no restrictions to the mounting direction or mounting attitude, but provide sufficient space around the product for operation, mounting, removal, wiring and piping work.

■ Install a pneumatic filter just before the pneumatic component in the circuit.

■ Install so that the exhaust port is not blocked and provide sufficient space for exhaust.
When mounting this product, do not use a mounting method that relies on support from the piping.



■ The D sub-connector's rotating mechanism is not designed for use in moving applications. Keep it facing upward or sideways (not obliquely) when using. If the cable may move, fix the cable or connector.

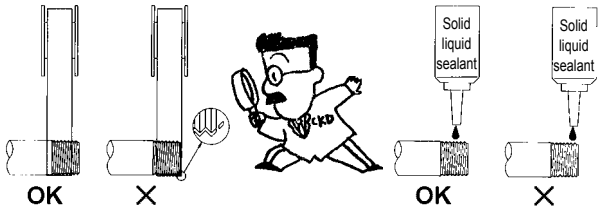


⚠CAUTION
Piping

■ Do not remove the port seal until just before piping the product.
- Removing the dust-proof seal of the piping port before the piping work starts could allow foreign matter to enter from the port seal and cause failure or misoperation.

■ Sufficiently flush the piping with air before connecting.
Prevent pipe from catching on parts of the sealing tape when piping.

■ When connecting pipes, wrap sealing tape in the opposite direction to the threading, from the inside position to within 2 mm from the pipe end.
- If sealing tape protrudes from the pipe threads, it could be cut when screwing the bolts in. This could cause the tape to enter the pneumatic components, causing failures.

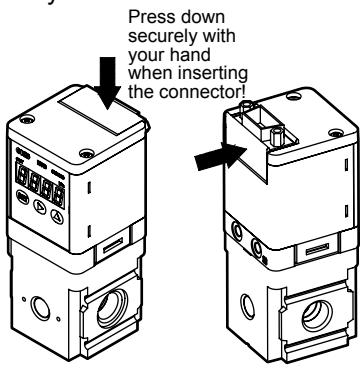


Wiring

■ The optional shield cable connector is a shielded wire.
- Insulate wires that are not being used so that they do not come into contact with other wires, including shielded wires. Unintended connection to the ground, etc., could cause malfunction or damage the product.

■ Insert and fit the D sub-connector securely on the back.

■ The D sub-connector has a 90° rotating mechanism. When fitting the D sub-connector, press it in by hand so that it faces the top or side.



■ Correct pressure control is not possible if the exhaust port is plugged. Release this port to the atmosphere.

■ Use appropriate torque to tighten the pipes when connecting them.
- The purpose is to prevent air leakage and damage to bolts.
- First tighten the bolts by hand to ensure that the threads are not damaged, then use a tool.

■ The wiring part is mounted to the body with two hooks on the side of the housing. Be careful not to apply excessive force to the housing since doing so may cause the hooks to disengage and be damaged.

(Recommended tightening torque)

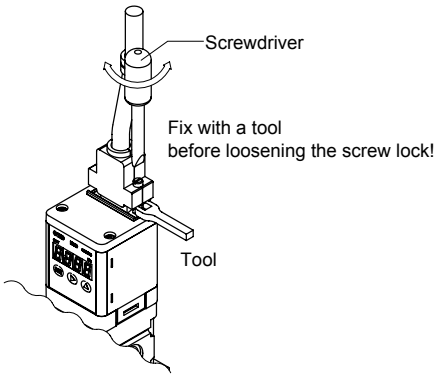
Port thread	Tightening torque N·m
Rc1/4	6 to 8
Rc3/8	13 to 15

Mounting, installation and adjustment

■ When supplying compressed air after connecting pipes, do not suddenly apply high pressure.

■ Before supplying compressed air after connecting pipes, check that there are no air leaks at any pipe connections.
- Apply a leakage detection agent on pipe connections with a brush, and check for air leaks.

■ Lock the D sub-connector so that it will not be dislocated. Before loosening the lock, fix the fixing block with a tool, etc.



Use/maintenance

⚠WARNING

■ Do not supply anything other than compressed air.

■ Use clean compressed air that does not contain corrosive gases.

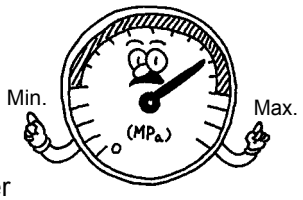
■ Use oil-free clean dry air of JIS B 8392-1:2012 (ISO 8573-1: 2010) [1:3:2] or equivalent.

■ Before conducting maintenance, turn the power OFF, stop the supply of compressed air and make sure that there is no residual pressure.
- Observe the conditions to ensure safety.

⚠CAUTION

■ Conduct daily inspections and regular inspections to ensure that maintenance control is done correctly.
- If maintenance is not correctly managed, the product's functions could deteriorate markedly and lead to a shortened service life, faults and accidents.

1. Control of supplied compressed air pressure
- Is the set pressure supplied? Does the pressure gauge indicate the set pressure while the equipment is operating?



2. Control of pneumatics filter
- Is the drain correctly discharged?
  Is the bowl or element clean enough to use?

3. Control of compressed air leaks from piping connections
- Is the state of the connection, especially at movable sections, normal? Leakage in piping could cause incorrect operation.

4. Operational status control
- Are operations delayed? Is exhaust normal?

5. Control of pneumatic actuator operation
- Is operation smooth? Is the end stop state normal?
  Is coupling with the load normal?

■ If abnormal operation occurs, turn power and pneumatic source OFF immediately and stop use.

■ Use this product within the working pressure.

■ Immediately after power is turned ON, this product does not start pressure control for approximately 2 seconds to complete self-diagnosis. Provide a control circuit/program that ignores signals for at least two seconds after power is turned ON.

■ When changing the output set value, turn OFF the equipment first in order to prevent unexpected operation in the control system equipment.

■ Regularly inspect the product at least once a year to check that it operates correctly.
- This product uses a small solenoid valve as an actuator. The service life may change depending on the frequency of operation triggered by pressure switching, the working conditions, etc.

■ The term of warranty is set as one year or 3,000,000 repeated operations, whichever is earlier, so use this as an inspection guideline.
* The conditions for the 3,000,000 operations listed in the term of warranty are as follows.
When repeatedly applying a stepped input signal which causes the control pressure to rise from zero to the maximum control pressure. The working air quality in this case shall be clean compressed air from the recommended air circuit. The secondary side load capacity shall be 300 cm^3.

■ The case is made of resin. Do not use solvent, alcohol or detergent in cleaning, or resin could absorb it. There is a risk of affecting the resin. Wipe off dirt with a rag soaked in a diluted neutral detergent solution and wrung out well.