CKD

# Electro-pneumatic Regulator

## EVS2 Series

# INSTRUCTION MANUAL

SM-A45884-A


- Read this Instruction Manual before using the product.
- In particular, read the safety notes carefully.
- Keep this Instruction Manual in a safe and convenient place for future reference.

CKD

# PREFACE

Thank you for purchasing CKD's **"EVS2 Series" electro-pneumatic regulator**. This Instruction Manual contains basic matters such as installation and usage instructions in order to ensure optimal performance of the product. Please read this Instruction Manual thoroughly and use the product properly.
Keep this Instruction Manual in a safe place and be careful not to lose it.

Product specifications and appearances presented in this Instruction Manual are subject to change without notice.

- The product is intended for users who have basic knowledge about materials, piping, electricity, and mechanisms of pneumatic components. CKD shall not be responsible for accidents caused by persons who selected or used the product without knowledge or sufficient training.
- Since there are a wide variety of customer applications, it is impossible for CKD to be aware of all of them. Depending on the application or usage, the product may not be able to exercise its full performance or an accident may occur due to fluid, piping, or other conditions. It is the responsibility of the customer to check the product specifications and decide how the product shall be used in accordance with the application and usage.

# SAFETY INFORMATION

When designing and manufacturing any device incorporating the product, the manufacturer has an obligation to ensure that the device is safe. To that end, make sure that the safety of the machine mechanism of the device, the pneumatic control circuit, and the electric system that controls such mechanism is ensured.

Ensure to observe organization’s standards, laws and regulations etc. for safety related to design and management of the equipment.

ISO 4414 and JIS B 8370 (the latest edition of each standard)

In order to use our products safely, it is important to select, use, handle, and maintain the products properly.
Observe the warnings and precautions described in this Instruction Manual to ensure device safety.

Although various safety measures have been adopted in the product, customer's improper handling may lead to an accident. To avoid this: **Thoroughly read and understand this Instruction Manual before using the product.**

To explicitly indicate the severity and likelihood of a potential harm or damage, precautions are classified into three categories: "DANGER", "WARNING", and "CAUTION".

| | |
|---|---|
| ⚠ **DANGER** | Indicates an imminent hazard. Improper handling will cause death or serious injury to people. |
| ⚠ **WARNING** | Indicates a potential hazard. Improper handling may cause death or serious injury to people. |
| ⚠ **CAUTION** | Indicates a potential hazard. Improper handling may cause injury to people or damage to property. |

Precautions classified as "CAUTION" may still lead to serious results depending on the situation.
All precautions are equally important and must be observed.

# Precautions on Product Use

## ⚠ DANGER

**Do not use the product outside of the specified voltage range.**
Applying voltage beyond the specified range may cause a malfunction, damage to the sensor, electric shock, or fire.

**Do not connect a load exceeding the rated output.**
The output circuit may become damaged or a fire may occur.

# Precautions on Design and Selection

## ⚠ WARNING

**Do not supply anything other than compressed air.**

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

**Use "JIS B 8392-1 ISO Class 1.3.2" equivalent oil-free clean dry air.**

**Understand the compressed air characteristics before designing a pneumatic pressure circuit.**

- Note that if the pressure needs to be stopped instantly at an emergency stop, the same functions as those for mechanical, hydraulic, or electrical regulators cannot be expected.
- The air may pop out, flow out, or leak out due to its compression and expansion characteristics.

**Make sure that the product can withstand the working environment before use.**

- The product cannot be used in an atmosphere where corrosive gas, chemical liquid, solvent vapor, water, and water vapor are present. If water drop, oil, or metal chips (such as spatter or cutting chips) may come into contact with the product, provide an appropriate protection.
- The product cannot be used in an explosive gas atmosphere.

**Consider the effects of an emergency stop on the electric circuit and power outages on the cylinder when designing and selecting the product.**

**Install a pressure switch and a residual pressure exhaust valve on the compressed air supply side of the device.**
The pressure switch prevents the product from operating if the set pressure is not reached. The residual pressure exhaust valve discharges compressed air remaining in the pneumatic pressure circuit in order to prevent the residual pressure from causing the pneumatic components to operate and to cause accidents.

**Do not leave the pressure applied to the primary side of the product when the power is not turned on.**
The secondary side pressure may rise to the same level as the primary side pressure. If there are safety concerns, design a system that ensures safety by providing measures such as installing a valve on the primary side or the secondary side.

## ⚠ CAUTION

**Use the product within the working pressure range.**

**Specify maintenance conditions in the instruction manual of the customer's device.**

Depending on the conditions of use, working environment, and maintenance conditions, the functions of the product may decline significantly and the safety may not be ensured. Proper maintenance will deliver optimum performance.

**Use a constant voltage power supply.**

**If a stable reproducibility is necessary for the response time of the system, install a precision regulator before the product.**

The response time is affected by the working pressure and the capacity of the load.

**Take the following measures to prevent malfunctions caused by noise.**

- Insert a line filter in the AC power supply line.
- Use a surge suppressor such as a CR or diode for the inductive load (such as a solenoid valve or a relay) to remove noise at its source.
- Install the wiring for the product away from strong electric fields.
- Wire the power lines as short as possible.
- Do not share the power supply with noise-generating devices such as inverters or motors.
- Do not wire the power cables and the signal cables in parallel with other power lines.

**Consult the PLC manufacturer when using a current input type.**

For the current input type, the power ground and the signal share a common connection due to wiring reasons.

When driving multiple electro-pneumatic regulators with one PLC and a D/A unit, correct signals may not be input due to wiring problems of the circuit type used with the D/A unit.

**When using the current input type, use a signal generator that matches the input impedance.**

The current input type can be used with the input signal of 1 V to 5 V. Since the input impedance of the product is 250 Ω, which is smaller than other voltage input type products, use a signal generator appropriate for the impedance.

**Before applying the power supply (24 VDC), be sure to set the input signal to 0 VDC (current input specification is 0 mA).**

Applying an input signal when the power is off may damage the product board.

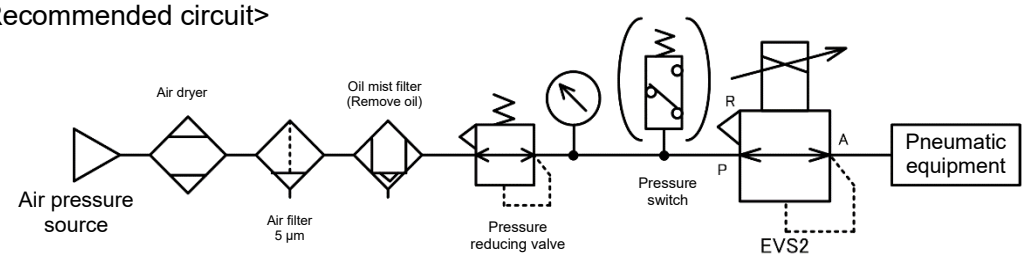
Be sure to apply the input signal after starting the product.

## ⚠ CAUTION

**Do not use air of poor quality.**

● EVS2-100/200/500/900

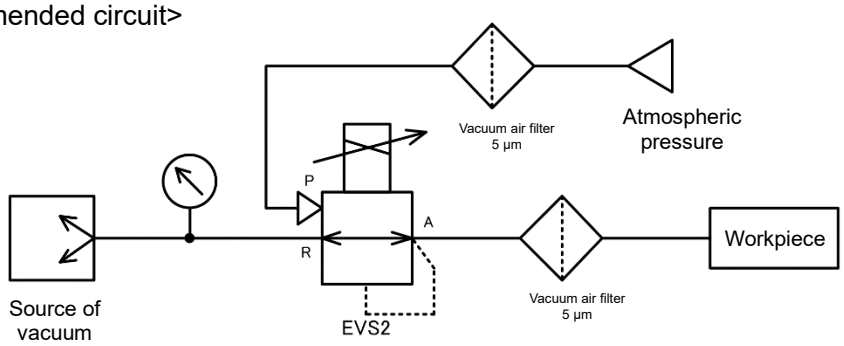
- For the source of pneumatic air, use clean air from which solids, moisture, and oil have been sufficiently removed with a dryer, an air filter, and an oil mist filter. Do not use air containing oil that adversely affects the product characteristics.
  <Recommended circuit>




- When the secondary side pressure is reduced with an input signal, the secondary side air passes through the product and is discharged from the R port. Maintain the inside of the pipes clean since contamination inside the secondary side pipes and the load also has an adverse effect on the product characteristics.

● EVS2-10V

- Since use in an atmosphere with dust etc. will lead to deterioration of characteristics, install an air filter on the atmospheric pressure side as shown in the recommended circuit below.
- During vacuum pressure control, air on the secondary side flows into the vacuum source through the inside of the product. If the inside of the secondary side piping and the load side is dirty, the characteristics will be deteriorated as well. Therefore, keep the inside of the piping clean by installing a filter.
  <Recommended circuit>




**When turning off the power in a pressurized state, ensure that no residual pressure remains.**
The pressure on the secondary side will remain if the power is turned off while the pressure is applied but not for a long period. Reduce the set pressure with an input signal and then turn off the power or discharge the pressure using a residual pressure exhaust valve as necessary.

**Make sure that the primary side pressure does not become lower than the minimum working pressure.**
Not supplying the primary side pressure for a long period while the power is turned on will shorten the product service life.

**Avoid leaks on the secondary side, blow-like controls, and use of the secondary side open to the atmosphere.**
The set pressure cannot be maintained, and the solenoid valve over-operates with a loud growl, shortening the product life.

**Select a dryer, an air filter, an oil mist filter, and a regulator that can accommodate a flow rate higher than the flow rate used for the product.**

**When using the product out of the specified conditions or for a special application, consult CKD about the specifications.**

## ⚠ CAUTION

**Do not use the product where it is exposed to direct sunlight or where water, oil, and other liquids may directly splash onto the product.**

The protection structure of this product is equivalent to IP64, but it is limited to the state where the operation lamp is up.

**If 0 kPa is required, take measures such as installing a three-way valve to release the pressure to the atmosphere.**

Although the pressure control range of the product includes 0 kPa, the pressure on the secondary side will not be completely released (the pressure of 1%FS or less of the maximum control pressure will remain).

**Working conditions for CE compliance**

This product conforms 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:

Condition

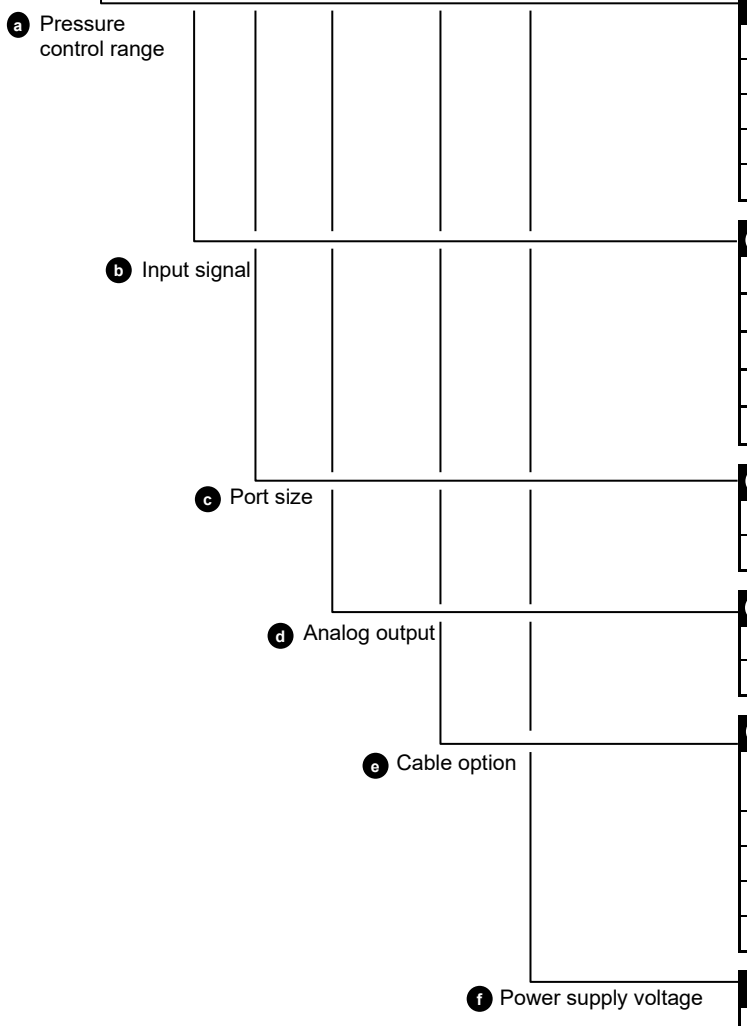
- The evaluation of this product is performed by using a cable that has a power supply line and a signal line, paired to assess the product's performance.
- This product is not resistant to surge immunity. Implement surge protection measures on the device side.

# CONTENTS

# 1. PRODUCT OVERVIEW

## 1.1 Model Number Indication

EVS2- (10V) - (0) (H4) (AV) - (C11) - (3)




| Code | Description |
|---|---|
| **a Pressure control range** | |
| 10V | -5.3 kPa to -91.2 kPa |
| 100 | 1 kPa to 100 kPa |
| 200 | 2 kPa to 200 kPa |
| 500 | 5 kPa to 500 kPa |
| 900 | 9 kPa to 900 kPa |

| | |
|---|---|
| **b Input signal** | |
| 0 | 0 VDC to 10 VDC |
| 1 | 0 VDC to 5 VDC |
| 2 | 4 mADC to 20 mADC |
| 3 | 0 mADC to 20 mADC |
| 4 | 1 VDC to 5 VDC |

| | |
|---|---|
| **c Port size** | |
| H4 | Cartridge fitting (φ4) |
| H6 | Cartridge fitting (φ6) |

| | |
|---|---|
| **d Analog output** | |
| AV | 1 VDC to 5 VDC |
| AA | 4 mADC to 20 mADC |

| | |
|---|---|
| **e Cable option** | |
| No symbol | Not included |
| C11 | 1-m Straight |
| C13 | 3-m Straight |
| CL1 | 1-m L-type |
| CL3 | 3-m L-type |

| | |
|---|---|
| **f Power supply voltage** | |
| 3 | 24 VDC |

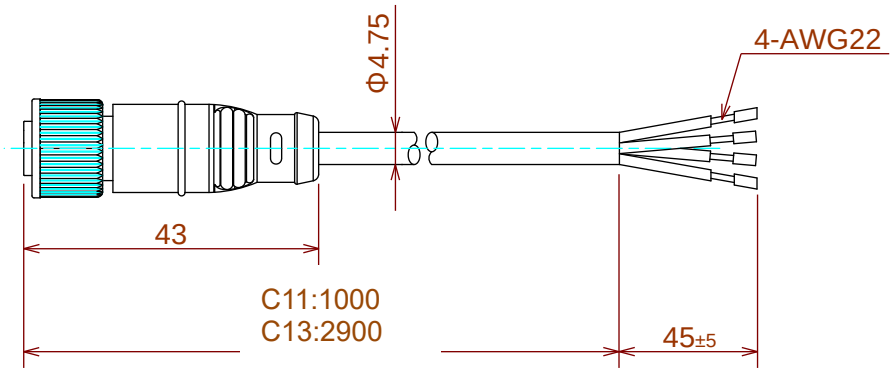
## ■ Optional part model number

• Cable option

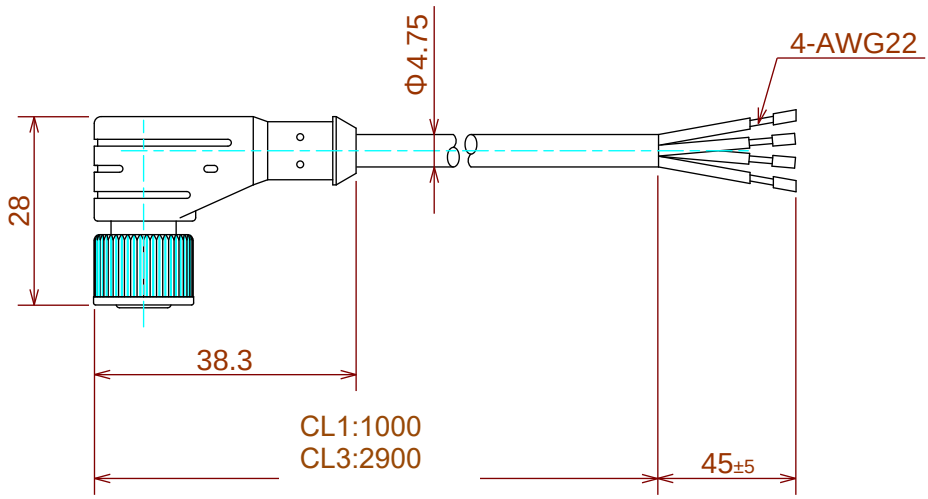
EVR - S1

| Code | Description |
|---|---|
| Cable option | |
| S1 | Straight (1 m) |
| S3 | Straight (3 m) |
| L1 | L type (1 m) |
| L3 | L type (3 m) |

●Straight type "-C11 (EVR-S1)", "-C13 (EVR-S3)"




●L type "-CL1 (EVR-L1)", "-CL3 (EVR-L3)"




| Insulator color | Use | Connection pin No. |
|---|---|---|
| Brown | Power + | 1 |
| Black | Analog output | 2 |
| Blue | Common | 3 |
| White | Input signal | 4 |

# 1.2 Specifications

## ■ -100 kPa

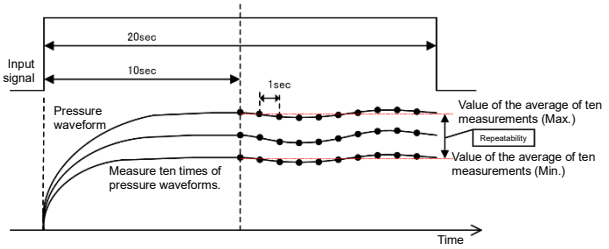
| Item | | EVS2-10V- [*2] [*3] [*4] - [*5]-3 |
|---|---|---|
| Working fluid | | Air (equivalent to JIS B 8392-1 Class 1.3.2: 2012) |
| Max. working pressure | | -101.3 kPa |
| Min. working pressure | | -96.0 kPa |
| Proof pressure | Inlet side | 150 kPa |
| | Output side | 150 kPa |
| Pressure control range * Note 1 | | -5.3 kPa to -91.2 kPa |
| Power supply voltage | | 24 VDC ± 10% (stabilized power supply with ripple rate of 1% or less) |
| Power consumption | | 0.1 A or less (Inrush current is 0.6 A when the power is turned on) |
| Input signal (input impedance) | [*2] = 0 | 0 VDC to 10 VDC (6.7 kΩ) |
| | [*2] = 1 | 0 VDC to 5 VDC (10 kΩ) |
| | [*2] = 2 | 4 mADC to 20 mADC (250 Ω) |
| | [*2] = 3 | 0 mADC to 20 mADC (250 Ω) |
| | [*2] = 4 | 1 VDC to 5 VDC (10 kΩ) |
| Analog output (connecting load impedance) | [*4] = AV | 1 VDC to 5 VDC (50 kΩ or more) |
| | [*4] = AA | 4 mADC to 20 mADC (300 Ω or less) |
| Insulation resistance | | 100 MΩ (500 VDC or more) |
| Withstand voltage | | 1500 VAC 1 minute |
| Accuracy * Note 2 | Hysteresis | 0.3%FS or less |
| | Linearity | ±0.5%FS or less |
| | Resolution | 0.05%FS or less |
| | Repeatability * Note 3 | 0.3%FS or less |
| Step response * Note 4 | No load | 0.6 sec or less |
| Temperature characteristics | Zero point fluctuation | ±0.06%FS / °C or less |
| | Span fluctuation | ±0.06%FS / °C or less |
| Max. flow rate * Note 5 | | 0.3 L/min (ANR) |
| Vibration resistance | | 98 m/s$^2$ (JIS C 60068-2-6) |
| Operating ambient temperature, fluid temperature | | 0°C to 50°C |
| Storage ambient temperature | | -20°C to 60°C |
| Operating ambient humidity | | 45% RH to 90% RH (no condensation) |
| Storage ambient humidity | | 96% RH or less |
| Mounting orientation | | No restriction |
| Degree of protection | | Equivalent to IP64 |
| Port size | | Selective |
| Weight | | 90 g (body weight only) |

*1 The range up to 1%FS of the input signal is an uncontrollable range. In addition, residual pressure is generated in the range of -5.3 kPa.

*2 This is the characteristic under the following conditions: ambient temperature: 25 ± 3°C, power supply voltage: 24.0 ± 0.1 VDC, working pressure: -96.0 kPa to -101.3 kPa, P port: open to atmosphere, secondary side: closed circuit, and control pressure after warming for 30 minutes or more: 10%FS to 90%FS.

*3 The difference between the maximum and minimum when the input signal 50%FS is continuously applied 10 times in a stepped manner at a cycle with a sufficient time to set the control pressure is defined as repeatability. The average value of 10 data sampled at 1-second intervals from 10 seconds after signal input is taken as one data.

<Figure: Repeatability evaluation method>




*4 Working pressure: -100 kPa, step amount: 50%FS → 90%FS
50%FS → 60%FS
50%FS → 40%FS
It will be the time until it falls within ±5% of the set pressure.

*5 This is the characteristic at a working pressure of -100 kPa and a set pressure of 20%FS.

## ■ 100 kPa / 200 kPa / 500 kPa / 900 kPa

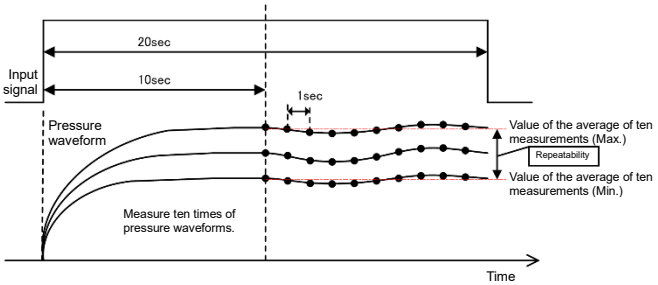
| Item | | EVS2-100-[*2] [*3] [*4]- [*5]-3 | EVS2-200-[*2] [*3] [*4]- [*5]-3 | EVS2-500-[*2] [*3] [*4]- [*5]-3 | EVS2-900-[*2] [*3] [*4]- [*5]-3 |
|---|---|---|---|---|---|
| Working fluid | | Clean compressed air (equivalent to JIS B 8392-1 Class 1.3.2: 2012) | | | |
| Max. working pressure | | 200 kPa | 350 kPa | 700 kPa | 1000 kPa |
| Min. working pressure | | Set pressure + 10 kPa | Set pressure + 50 kPa | | |
| Proof pressure | Inlet side | 300 kPa | 525 kPa | 1050 kPa | 1500 kPa |
| | Output side | 150 kPa | 300 kPa | 750 kPa | 1350 kPa |
| Pressure control range | * Note 1 | 1 kPa to 100 kPa | 2 kPa to 200 kPa | 5 kPa to 500 kPa | 9 kPa to 900 kPa |
| Power supply voltage | | 24 VDC ± 10% (stabilized power supply with ripple rate of 1% or less) | | | |
| Power consumption | | 0.1 A or less (Inrush current is 0.6 A when the power is turned on) | | | |
| Input signal (input impedance) | [*2] = 0 | 0 VDC to 10 VDC (6.7 kΩ) | | | |
| | [*2] = 1 | 0 VDC to 5 VDC (10 kΩ) | | | |
| | [*2] = 2 | 4 mADC to 20 mADC (250 Ω) | | | |
| | [*2] = 3 | 0 mADC to 20 mADC (250 Ω) | | | |
| | [*2] = 4 | 1 VDC to 5 VDC (10 kΩ) | | | |
| Analog output (connecting load impedance) | [*4] = AV | 1 VDC to 5 VDC (50 kΩ or more) | | | |
| | [*4] = AA | 4 mADC to 20 mADC (300 Ω or less) | | | |
| Insulation resistance | | 100 MΩ (500 VDC or more) | | | |
| Withstand voltage | | 1500 VAC 1 minute | | | |
| Accuracy * Note 2 | Hysteresis | 0.3%FS or less | | | |
| | Linearity | ±0.5%FS or less | | | |
| | Resolution | 0.05%FS or less | | | |
| | Repeatability * Note 3 | 0.3%FS or less | | | |
| Step response * Note 4 | No load | 0.1 sec. or less | | | |
| | With 15 $cm^3$ load | 0.5 sec or less | | | |
| Temperature characteristics | Zero point fluctuation | ±0.06%FS / °C or less | | | |
| | Span fluctuation | ±0.06%FS / °C or less | | | |
| Max. flow rate | * Note 5 | 2 L/min (ANR) | 2 L/min (ANR) | 8 L/min (ANR) | 8 L/min (ANR) |
| Vibration resistance | | 98 $m/s^2$ (JIS C 60068-2-6) | | | |
| Operating ambient temperature, fluid temperature | | 0°C to 50°C | | | |
| Storage ambient temperature | | -20°C to 60°C | | | |
| Operating ambient humidity | | 45% RH to 90% RH (no condensation) | | | |
| Storage ambient humidity | | 96% RH or less | | | |
| Mounting orientation | | No restriction | | | |
| Degree of protection | | Equivalent to IP64 | | | |
| Port size | | Selective | | | |
| Weight | | 90 g (body weight only) | | | |

*1 The range up to 1%FS of the input signal is an uncontrollable range.

*2 This is the characteristic under the following conditions: ambient temperature: 25 ± 3°C, power supply voltage: 24.0 ± 0.1 VDC, working pressure: 110 kPa to 200 kPa (EVS2-100) / 250 kPa to 350 kPa (EVS2-200) / 550 kPa to 700 kPa (EVS2-500) / 950 kPa to 1000 kPa (EVS2-900), R port: open to atmosphere, secondary side: closed circuit, and control pressure after warming for 30 minutes or more: 10%FS to 100%FS.

*3 The difference between the maximum and minimum when the input signal 50%FS is continuously applied 10 times in a stepped manner at a cycle with a sufficient time to set the control pressure is defined as repeatability. The average value of 10 data sampled at 1-second intervals from 10 seconds after signal input is taken as one data.

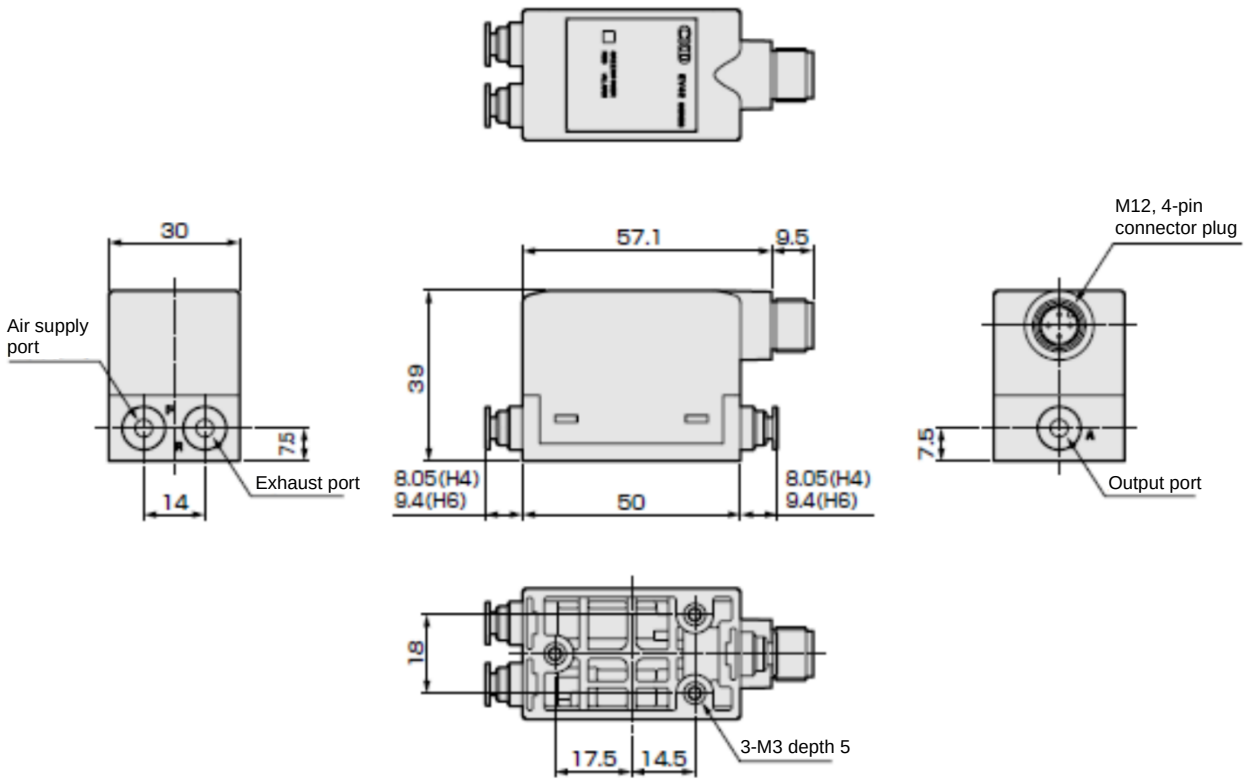
<Figure: Repeatability evaluation method>




*4 Working pressure: Max. working pressure, step amount: 50%FS → 100%FS
50%FS → 60%FS
50%FS → 40%FS
It will be the time until it falls within ±5% of the set pressure.

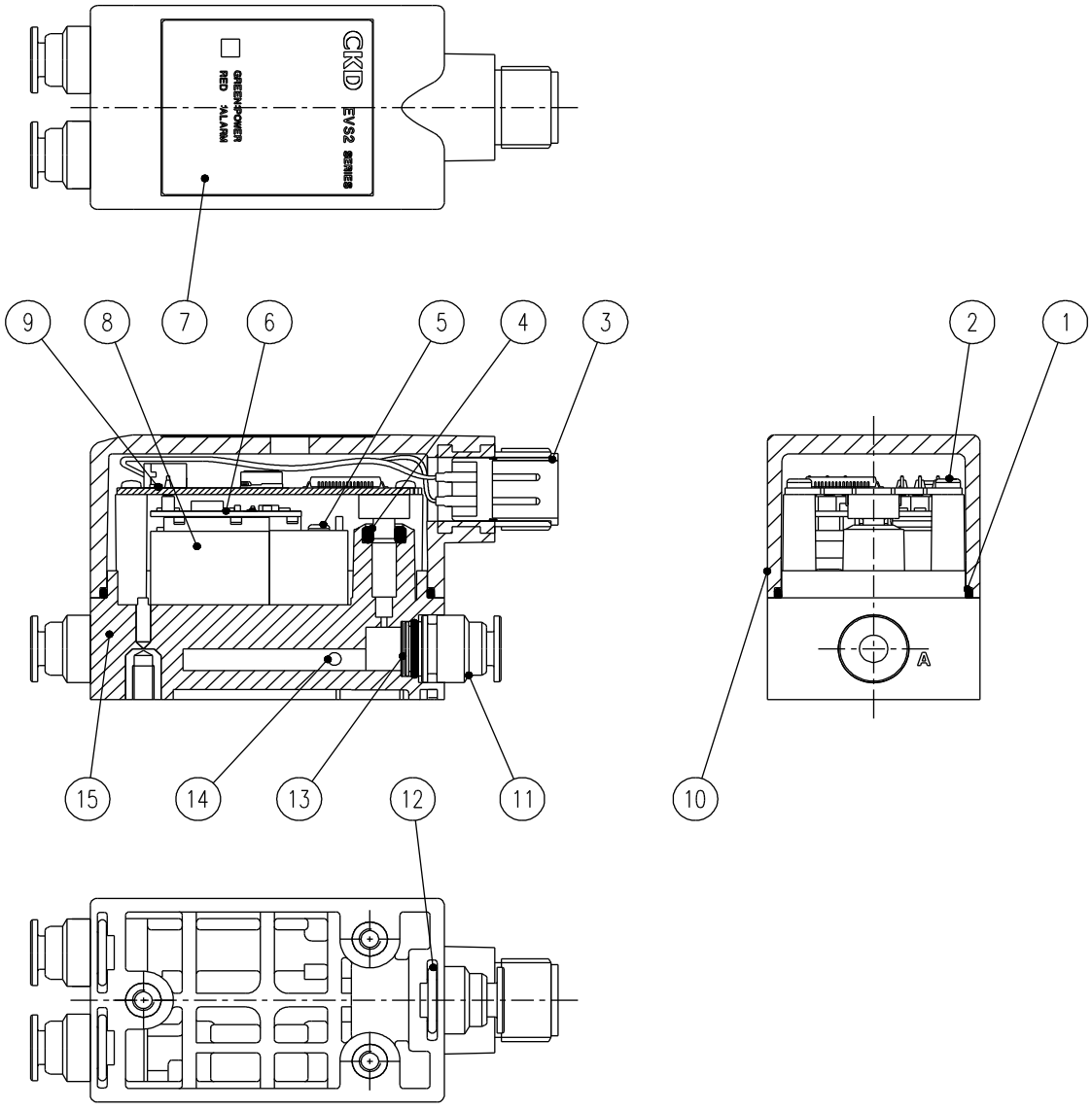
*5 This is the characteristic at the maximum working pressure and a set pressure of 100%FS.

# 1.3 Dimensions




* About the operation indicator
Lit green: When the power is turned on
Lit red: The secondary pressure has not reached the set value ±11%FS
Note: The operation display is for reference only and does not guarantee accuracy.

# 1.4 Internal Structure




| Part No. | Part name | Material | Part No. | Part name | Material |
|---|---|---|---|---|---|
| 1 | Gasket | H-NBR | 8 | Solenoid valve | |
| 2 | Taptite | Steel | 9 | Electron circuit board | |
| 3 | Connector plug | | 10 | Housing | ABS resin |
| 4 | O-ring | Fluoro-rubber | 11 | Push-in fitting | |
| 5 | Screw | Steel | 12 | Fitting hook | Stainless steel |
| 6 | Drive board | | 13 | Port filter | Stainless steel |
| 7 | Surface sheet | PET film | 14 | Steel ball | Stainless steel |
| | | | 15 | Body | Polyamide resin, brass |

# 2. INSTALLATION

## 2.1 Installing

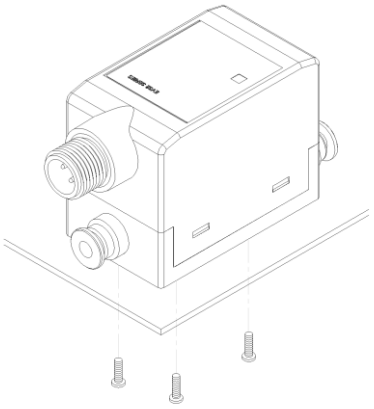
### ⚠CAUTION

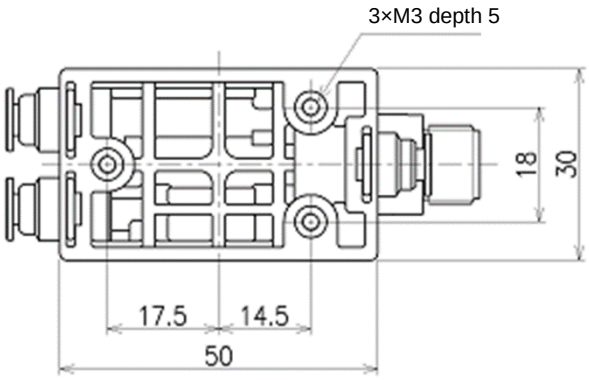
**Install a pneumatic filter immediately before the circuit in which pneumatic components are used.**

**Install the product so that the exhaust port is not blocked and there is sufficient space for exhaust.**

**Do not install the product so that it is supported by piping.**
Please install the product body so that it is fixed.

**There are no restrictions on the mounting posture, but in principle, it should be mounted with the operation lamp facing up.**
* Recommended tightening torque: 0.5 N•m to 1.0 N•m





# 2.2 Piping

## ⚠ WARNING

**Check the position of the piping port on the product display, etc., and pipe correctly.**
Incorrect piping may cause a malfunction.

## ⚠ CAUTION

**Do not remove the product packaging bag until just before the plumbing.**
Foreign matters may enter the product from the piping port and cause a failure or malfunction.

**Fully flush and clean the air pipe before connection.**

**Open the R port to the atmosphere. (EVS2-10V opens the P port to the atmosphere.)**

**Do not apply high pressure suddenly when supplying the compressed air for the first time after connecting the pipes.**

**When supplying compressed air for the first time after piping is complete, make sure that there is no air leakage at all joints.**
Apply leak detection agent to the joints in the piping using a brush to check for air leakage.

**Do not narrow down the input port.**
The supply pressure drops when the device is operating, which may cause malfunction.

**Use the output port side with a volume of 1 $cm^3$ or more as a guide.**
If the secondary volume is too small, it may cause oscillation.

**Cut the tube perpendicular to the axis.**
Using diagonally cut tubes can cause air leaks.

# 2.3 Wiring Method

## ⚠ WARNING

**Check the connector pins and the cable conductor colors before wiring.**
Incorrect wiring may cause damage, failure, and malfunctions of the product. Check the wire color described in the Instruction Manual before wiring.

**Check the wiring insulation.**
Make sure that the wires do not contact other circuits and there is no ground fault and insulation failure between terminals. Overcurrent may flow into the product and result in damage.

**Use a DC stabilized power supply for the product that is within the rating and insulated from the AC power.**
Uninsulated power may cause an electric shock.
If the power is not stabilized, the peak value may exceed the rating. This may damage the product or lead to poor accuracy.

**Stop the control device and the machinery and turn off the power before wiring.**
Operating the product suddenly may cause an unexpected behavior and a dangerous situation. Perform an electrical current test with the control device and the machinery stopped and set the required data. Discharge static electricity from your body, tools, and devices before and during work. For movable sections, use wiring material with the same level of bending resistance as the robot wire.

**Do not apply AC power.**
If AC power (100 VAC) is applied, the product may burst or an electric shock or a fire may occur.

**Do not short-circuit the load.**
The product may burst or burn.

## ⚠ CAUTION

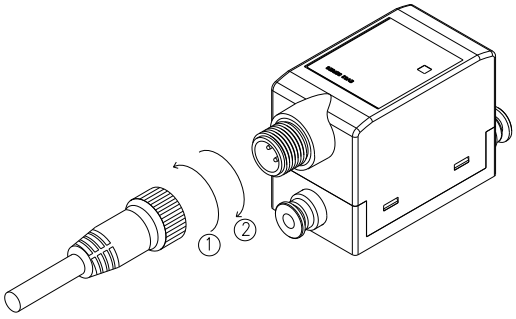
**Insulate unused wires to avoid contact with other wires.**
Connecting unused wiring to ground, etc. by mistake may cause damage or malfunctions of the product.

## 2.3.1 Cable connector

### ⚠CAUTION

**Align the convex part of the main body side terminal with the concave part of the cable side terminal and insert it securely.**

After inserting the connector, turn it in the direction of [1], and after confirming that it fits in with a clicking sound, turn it in the direction of [2] and screw it in sufficiently.



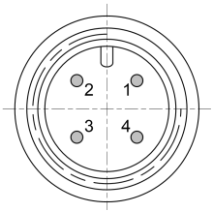

**When screwing in the connector, screw in the knurled part instead of the cable body.**

Do not screw in excessively as the connector on the main body side may be damaged.

**When the analog output is not used, process it so that it does not come into contact with other wires.**

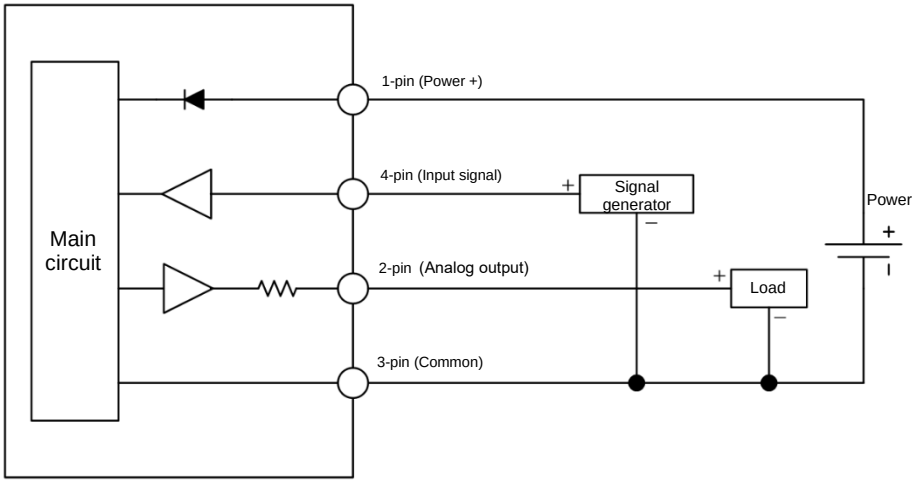
## 2.3.2 Cable connection

<Connector pin layout> (Product body side)

| Connector plug | Pin No. | Use | Type of signal |
|---|---|---|---|
|  | 1 | Power + | 24 VDC |
| | 2 | Analog output | Selective |
| | 3 | Common | 0 VDC |
| | 4 | Input signal | Selective |



## 2.3.3 Example of internal circuit and load connection



# 3. MAINTENANCE AND INSPECTION

**⚠WARNING**

**Turn off the power, stop the supply of compressed air and make sure that there is no residual pressure before maintenance.**

**⚠CAUTION**

**Plan and conduct daily and periodic inspections so that maintenance can be managed correctly.**
If maintenance is not properly managed, the product's functions may deteriorate significantly and this may lead to faults (such as short service life, damage, and malfunctions) or accidents.

**If an abnormality occurs during operation, immediately stop using the product, turn off the power, and shut off the pneumatic pressure source.**

**Conduct periodic inspections at least once a year to confirm that the product operates properly.**

**Do not use materials such as solvents, alcohol, or detergent to remove dirt or stains.**
The case is made of resin and resin can be damaged by these materials. Use a waste cloth that is soaked in a diluted neutral detergent and wrung out well to wipe off dirt.

## 3.1 Periodic Inspection

Conduct periodic inspections at least once a year to prevent accidents or problems, such as functional deterioration, short service life, damage, or malfunctions.

### ■ Pressure of supplied compressed air

- Is the set pressure supplied?
- Does the pressure gauge indicate the set pressure during operation of the device?

### ■ Pneumatic filter

- Is drainage correctly discharged?
- Is the bowl or element clean enough to use?

### ■ Leakage of compressed air from piping connections

- Are all connections, especially at movable sections, correctly connected?
  (The product may not operate properly if leakage occurs from piping.)

### ■ Operational status

- Is there any delay in operation?
- Are the valves exhausting properly?

### ■ Operation of pneumatic actuator

- Are operations smooth?
- Is the actuator reaching the end stop properly?
- Are loads connected properly?

If an abnormality is found, contact your nearest CKD sales office or distributor.

# 4. TROUBLESHOOTING

## 4.1 Problems, Causes, and Solutions

| Problem | Cause | Countermeasure |
|---|---|---|
| Loud noise is generated. | There is leakage on the secondary side piping. | Using the product in this state will shorten the service life extremely. Reconsider the usage. |
| | There is air entering from the secondary side piping which exceeds relief performance. | Using the product in this state will shorten the service life extremely. Reconsider the usage. |
| | Power is turned on and input signal is set with no primary side pressure supplied. | Supply the primary side pressure and then turn on the power supply and set the input signal. |
| | Primary side pressure is less than minimum working pressure. | Maintain the primary side supply pressure so that it is at least the minimum working pressure. |
| | An input signal outside the specification range is applied. | Apply an input signal within the specification range. |
| 1%FS or more pressure is output even if power is turned off. | Power is turned off while input signal is set. | Turn on the power and set the input signal to 0%. |
| | Product has been left with power turned off and with primary side pressure supplied for a long period. | If the product has been left unused for a long period, set the primary side pressure to zero.<br>If the secondary side pressure rises, turn on the power and set the input signal to 0%. |
| Primary side pressure is output as it is. | There is a failure in EVS2. | Make sure that there is no abnormality in piping and wiring and then replace the product. |
| Pressure cannot be controlled. | Input signal is abnormal. | Check if the input signal and the power supply GND are wired in common. |
| | There is a failure in the pressure sensor inside the product. | Replace the product. |
| | | Make sure that excessive pressure does not apply on the secondary side due to pressure entering from other pipes. |
| Pressure is not output. | Primary side pressure is not supplied. | Check that the primary side pressure is at least the minimum working pressure. |
| | Wiring is abnormal. | Check that the wiring is normal.<br>In addition, check that the connector is properly connected. |
| Pressure does not reach set pressure. | Primary side pressure is insufficient. | Maintain the primary side supply pressure so that it is at least the minimum working pressure. |
| The pressure does not drop to the set pressure. | Passage of exhaust port is blocked. | Mount the product so that the air can be exhausted from port R. |
| Pressure is unstable. | Power supply voltage is unstable. | Use a stabilized power supply that satisfies the product specifications. |
| | Input signal is unstable. | Check whether the noise is affecting the signal. |
| | Primary side pressure is unstable. | Install a regulator on the primary side of the EVS2. |
| | There is leakage on the secondary side piping. | Check leakage from the secondary side. |
| Pressure oscillates. | There is a mismatch or leakage of the piping volume on the secondary side. | Oscillation may be avoided by changing the piping condition. Reconsider the diameter of the piping, increase or decrease the load capacity, or check leakage on the secondary side. |
| | Primary side pressure is too high against control pressure. | Reduce the primary side supply pressure as much as possible but maintain at least the minimum working pressure. |
| Differential indicator lights red. | There is leakage on the secondary side piping. | Check leakage from the secondary side piping. |

If you have any other questions or concerns, contact your nearest CKD sales office or distributor.

# 5. WARRANTY PROVISIONS

## 5.1 Warranty Conditions

### ■ Warranty coverage

If the product specified herein fails for reasons attributable to CKD within the warranty period specified below, CKD will promptly provide a replacement for the faulty product or a part thereof or repair the faulty product at one of CKD's facilities free of charge.
However, following failures are excluded from this warranty:

- Failure caused by handling or use of the product under conditions and in environments not conforming to those stated in the catalog, the Specifications, or this Instruction Manual.
- Failure caused by incorrect use such as careless handling or improper management.
- Failure not caused by the product.
- Failure caused by use not intended for the product.
- Failure caused by modifications/alterations or repairs not carried out by CKD.
- Failure that could have been avoided if the customer's machinery or device, into which the product is incorporated, had functions and structures generally provided in the industry.
- Failure caused by reasons unforeseen at the level of technology available at the time of delivery.
- Failure caused by acts of nature and disasters beyond control of CKD.

The warranty stated herein covers only the delivered product itself. Any loss or damage induced by failure of the delivered product is excluded from this warranty.

### ■ Confirmation of product compatibility

It is the responsibility of the customer to confirm compatibility of the product with any system, machinery, or device used by the customer.

### ■ Others

The terms and conditions of this warranty stipulate basic matters.
When the terms and conditions of the warranty described in individual specification drawings or the Specifications are different from those of this warranty, the specification drawings or the Specifications shall have a higher priority.

## 5.2 Warranty Period

The product is warranted for one (1) year from the date of delivery to the location specified by the customer.