Clean Technology Connecting People and Their Dreams

KOGANEI

Catalog No. BK-V0012

http://www.koganei.co.jp

NEW Products

High-speed valve K2·K3·K4

K Series

World's First New Solenoid Technology

IMPACT V

Hi-speed Solenoid Valves

New! K3/K4 series

Full model change!

K2 Series 2-port valves

For high-speed sorting and air blow applications

High-speed response

0.4 to 3.0 ms (ON)

Low power

9 W and higher specifications come with power saving circuit.

24 W→1.5 W, 9 W→1 W

New!

3-, 4-port valves K3/K4 Series

For high-speed suction pickup, air blow, and high-speed cylinder operation applications

High-speed response

1.2 to 4.0 ms (ON)

Low power

24 W specifications come with power saving circuit.

24 W→2 W

All products are RoHS compliant

High-speed 2-port valve K2 Series

Full model change!

NEW

Plug connector

Now attachable/detachable plug connector available.

Compact configuration

10 mm wide

High-speed response

0.4 to 3.0 ms (ON)

IP67 equivalent

IP67 equivalent protection structure enables use in a wide range of environments.

Low power

9 W and higher specifications come with power saving circuit.

24 W→1.5 W

9 W→1 W

High flow rate

Sonic conductance C

0.2 to 0.6 [dm³/(s•bar)]

Flow rate 55 to 160 ℓ/min(ANR)

(at 0.4 MPa)

NEW

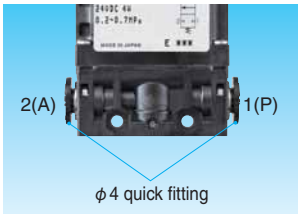
Surge protection Note

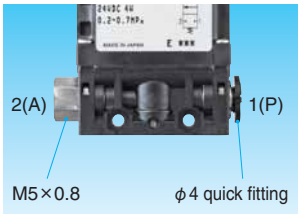
Surge absorption circuit eliminates OFF delay for high-speed response.

Note: Excluding **-N** circuit specification

Non-oil specification

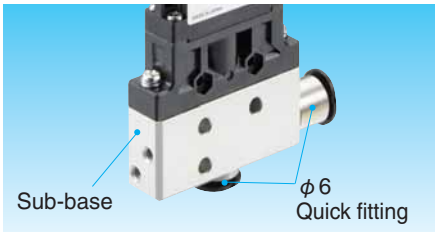
3 types of direct piping specifications





NEW Base piping type

Selecting base piping -25 (sub-base) enables high flow rates.



* Manifold can also be produced under special specifications.

NEW Four additional power specification types! Supports a wide range of electrical control.

No protection circuit type	Surge absorbing type	Power saving type	PLC drive type	Pulsed blow type
Circuit specifications -N	Circuit specifications -Z	Circuit specifications -L	Circuit specifications -R	Circuit specifications -X
●No surge absorbing circuit	●Surge absorbing circuit	●Power saving circuit 24 W→1.5 W 9 W→1 W ●Surge absorbing circuit	●PLC drive circuit ●Power saving circuit (9 W or higher) 24 W→1.5 W 9 W→1 W ●Surge absorbing circuit	●Built-in microprocessor ●Pulse oscillation circuit ●Remote control setting configuration ●Surge absorbing circuit

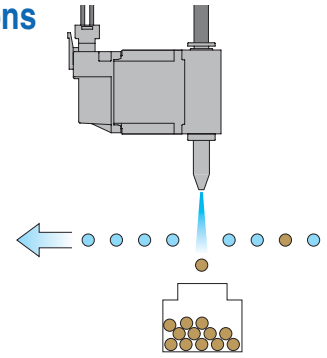
* For internal circuit, see page ❽.

Application examples

High-speed sorting, material handling applications (Supports high cycle time.)

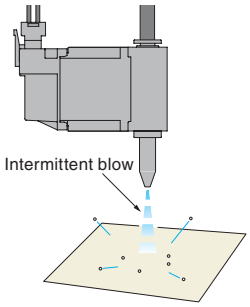
●Chip component manufacturing, taping machines, parts feeders, packaging machines, color sorting machines, etc.

Work sorting applications

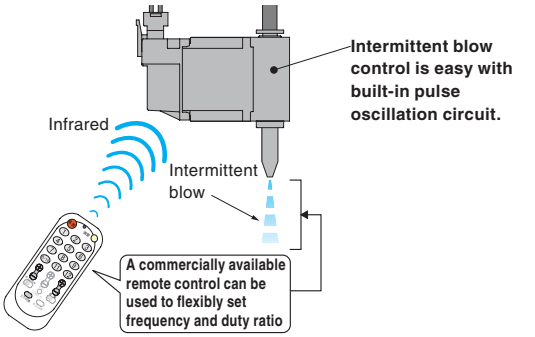


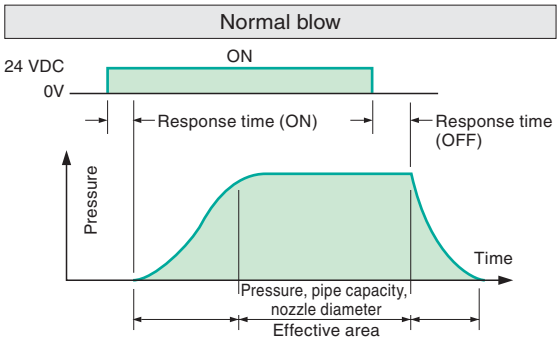
Intermittent blowing applications (Saving energy, reducing air consumption volume)

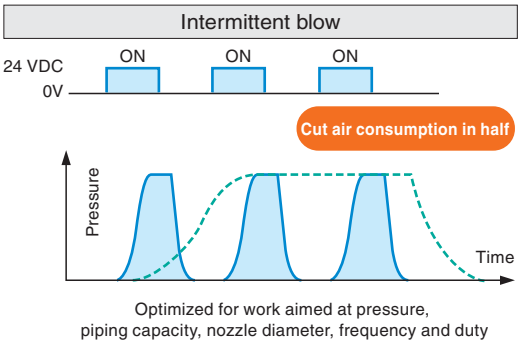
●Air blowing process in assembly, component cleaning process, machining process, cooling process, molding removal, ionizers, etc.



●When pulsed blow type for intermittent blowing applications is used



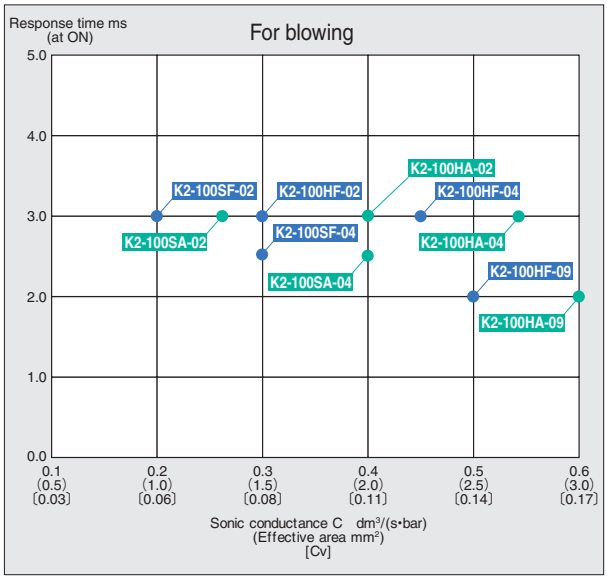


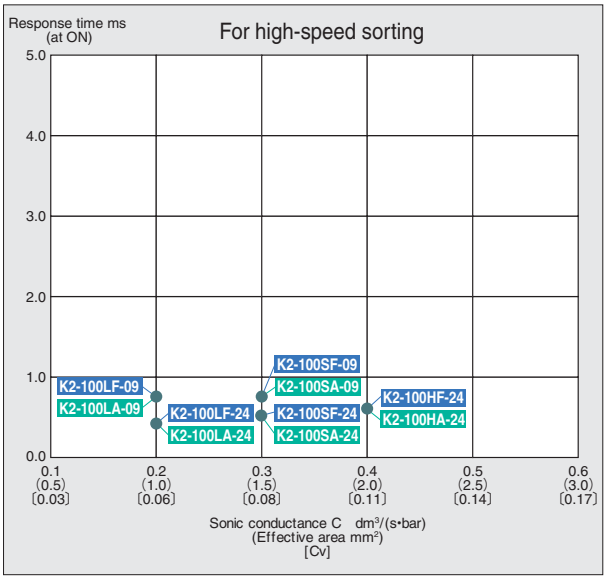


Variations

●A total of 20 type variations are available to provide a choice of response time (ON) and flow rate, and direct piping or base piping.
●A selection for four power specification types: 2 W, 4 W, 9 W (with power saving circuit), and 24 W (with power saving circuit)

Response time (at ON) and flow rate





Safety precautions (K series high-speed valves)

Always read these precautions carefully before use.

Before selecting and using the products, please read all safety precautions carefully to ensure proper product use.
The safety precautions described below are to help you use the product safely and correctly, and to prevent injury or damage to you, other people, and assets.
Always adhere to the following safety regulations: ISO4414 (Pneumatic fluid power - General rules and safety requirements for systems and their components) and JIS B 8370 (General rules relating to pneumatic systems).

Items are ranked as follows according to degree of potential danger or damage: "DANGER", "WARNING", "CAUTION", and "ATTENTION".

⚠ **DANGER**	Indicates situations that can be clearly predicted as dangerous. Failure to avoid the situation creates the risk of death or serious injury. It could also result in damage or destruction of assets.
⚠ **WARNING**	Indicates situations that, while not immediately dangerous, could become dangerous. Failure to avoid the situation creates the risk of death or serious injury. It could also result in damage or destruction of assets.
⚠ **CAUTION**	Indicates situations that, while not immediately dangerous, could become dangerous. Failure to avoid the situation creates the risk of minor or semi-serious injury. It could also result in damage or destruction of assets.
⚠ **ATTENTION**	While there is little chance of injury, this content refers to points that should be observed for appropriate use of the product.

■ This product was designed and manufactured for use in general industrial machinery.

■ When selecting and handling equipment, the system designer or another person with sufficient knowledge and experience should always read the safety precautions, catalog, instruction manual and other literature before commencing operation. Improper handling is dangerous.
■ After reading the catalog, instruction manual, etc., always keep them in a location where they are readily available for reference to users of this product.
■ If transferring or lending the product to another person, always attach the catalog, instruction manual, etc., to the product where they are easily visible, to ensure that the new user can use the product safely and properly.
■ The danger, warning and caution items listed under these safety precautions do not cover all possible contingencies. Read the catalog and instruction manual carefully, and always keep safety first.

⚠ DANGER

● Do not use the product for the purposes listed below:
1. Medical equipment related to maintenance or management of human lives or bodies.
2. Machines or equipment designed for the purpose of moving or transporting people.
3. Critical safety components in mechanical devices.
This product has not been planned or designed for purposes that require high levels of safety. Using the product in any of the ways described above creates the risk of loss of human life.
● Do not use the product in locations with or near dangerous substances such as flammable or ignitable substances. This product is not explosion-proof. Doing so creates the risk of ignition and fire.
● When mounting the product and workpiece, always make sure they are firmly supported and secured in place. Falling, dropping, or abnormal operation of the product creates the risk of personal injury.
● People using a pacemaker or other similar medical devices should keep a distance of at least one meter away from the product. Getting too close to the product creates the risk of malfunction of a pacemaker due to the strong magnet built into the product.
● Never attempt to modify the product. Abnormal operation can lead to injury, etc.
● Never attempt inappropriate disassembly, assembly or repair of the product relating to basic construction, or to its performance or to functions. Doing so creates the risk of injury, electric shock, fire, etc.
● Do not splash water on the product. Spraying it with water, washing it, or using it under water could result in malfunction of the product leading to injury, electric shock, fire, etc.
● While the product is in operation, avoid touching it with your hands or otherwise approaching too close. Also, do not attempt to make any adjustments to internal or attached mechanisms, or to perform any type of adjustment (manual override, connecting or disconnecting cable connectors, adjusting pressure switches, disconnecting tubes or sealed plugs, etc.) while the product is in operation.
Under such conditions, the actuator may move suddenly, creating the risk of personal injury.

⚠ WARNING

● Because Koganei products are designed for use under a wide variety of conditions, decisions concerning conformance with a particular system should be made upon the careful evaluation by the person in charge of system design.
Assurances concerning expected system performance and safety are the responsibility of the designer who decides system conformity. Be sure to use the latest catalogs and technical materials to study and evaluate specification details, to consider the possibility of machine breakdown, and to configure a system that ensures fail-safe safety and reliability.
● Do not use the product in excess of its specification ranges. Doing so creates the risk of product breakdown, loss of function, or damage. It could also drastically reduce operating life.
● Before supplying air or electricity to the device and before starting operation, always conduct a safety check of the area of machine operation.
Unintentional supply of air or electricity could possibly result in electric shock, or in injury caused by contact with moving parts.
● Do not touch terminals, switches, or other parts, while power is turned on.
Doing so creates the risk of electric shock and malfunction.
● Do not allow the product to be thrown into fire. Doing so creates the risk of explosion and the release of toxic gases.
● Do not sit on the product, place your foot on it, or place other objects on it.
Doing so creates the risk of injury due to tripping or the product tipping over or dropping, resulting in product damage and abnormal, erratic, or runaway operation.
● When conducting any kind of operation for the product, such as maintenance, piping connection and disconnection, inspection, repair, or replacement, always turn off the air supply completely and confirm that residual pressure inside the product or in piping connected to the product is zero before proceeding. In particular, be aware that residual air will still be in the air compressor or air storage tank. The actuator could abruptly move if residual air pressure remains inside the piping, causing injury.
● Before performing any kind of wiring work, be sure to turn off power. Failure to do so creates the risk of electric shock.
● Correctly apply the rated voltage to the solenoid. Applying the wrong voltage will make it impossible to obtain the specified function, and creates the risk of damage to and burnout of the product.
● Do not allow lead wires and other cords to become damaged. Allowing a cord to become cut, bent excessively, pulled, rolled up, placed under heavy objects, or squeezed between two objects creates the risk of current leaks or defective continuity that can lead to fire, electric shock, or abnormal operation.
● Do not connect or disconnect connectors while power is turned on. Also, never apply unnecessary force to connectors. Doing so creates the risk of personal injury, device damage, and electric shock due to abnormal machine operation.
● Always check the catalog and other reference materials for correct product wiring and piping. Improper wiring and piping creates the risk of damage to and abnormal operation of the actuator, etc.

- In initial operations after the equipment has been idle for 48 hours or more, or has been in storage, there is a possibility that contacting parts may have become stuck, resulting in equipment operation delays or in sudden movements. Before these initial operations, always run a test to check that operating performance is normal.
- When the device is not used for long periods (over 30 days), it is possible that the contacting parts may have become stuck leading to slow operation or sudden movements. Check for proper operation a minimum of once every 30 days.
- Do not locate the solenoid valve and the wiring that controls it near power lines running a large current, powerful magnetic fields, or where power surges occur. Doing so could cause erratic operation.
- Solenoid valves generate surge voltage and electromagnetic waves at the OFF operation, which can interfere with the operation of nearby equipment. Use a surge protected solenoid or implement appropriate surge and electromagnetic protection measures for the electrical circuitry.
- Do not use the product at the beach, in direct sunlight, near mercury vapor lamps, or near equipment that generates ozone. Ozone causes rubber components to deteriorate resulting in reduced performance, or a limitation or stop of functions.
- Do not use any type of medium that is not specifically stipulated in the specifications. Using a non-specified medium could lead to short term loss of function, sudden degradation of performance, and a reduced operating life.
- When a solenoid valve is installed within the control panel and when the energizing time is long, implement heat dissipation measures in order to keep the temperature around the solenoid within specifications. Also note that continuous energizing for long periods will result in heat generation by the coil which can lead to deterioration of solenoid valve performance and shortening of its service life, and can adversely affect nearby equipment. Contact Koganei if you need to continuously energize for long periods or if the energizing time in a day needs to be longer than the deenergizing time.
- After completing wiring work, check to make sure that all connections are correct before turning on power.
- Do not use the product in locations subject to direct sunlight (ultraviolet radiation), high temperatures or high humidity, dust, salt, or iron powder. Do not expose the product to fluids or an ambient atmosphere that contains organic solvents, phosphate-based hydraulic fluid, sulfur dioxide gas, chlorine gas, acids, etc. It could lead to early shutdown of some functions, a sudden degradation of performance, and a reduced operating life. For information about materials, see Materials of major parts.

⚠ CAUTION

- When mounting the product, leave room for adequate working space around it. Failure to do so will make it more difficult to conduct daily inspections or maintenance, which could eventually lead to system shutdown or damage to the product.
- Whenever transporting or installing a heavy product, use a lift or supports to securely support it, and use several people to help lift it and take other precautions to ensure personal safety.
- Do not bring any magnetic media or memory media, or other similar items within one meter of an energized solenoid valve. Doing so creates the risk of damage to data on the magnetic media due to magnetism.
- Do not use a solenoid valve in locations subject to large electrical currents or strong magnetic fields. Doing so could result in erratic operation.
- Oil from a compressor (except from the oil free compressor) can greatly reduce product performance and can even cause functional stoppages. Be sure to install a mist filter before pneumatic equipment to remove oil.
- If an electric leakage occurs on control circuit, it may cause the product to operate unintentionally. Take leak current countermeasures against the control circuit so that the leak current do not exceed the allowance in the product specifications.
- While the product is in operation, avoid touching it with your hands or otherwise approaching too close. Heat generated by the coil can cause burn injury.

⚠ ATTENTION

- When considering the possibility of using this product in situations or environments not specifically noted in the catalog or instruction manual, or in applications where safety is an important requirement such as in aircraft eguipment, combustion equipment, leisure equipment, safety equipment, and other places where human life or assets may be greatly affected, take adequate safety precautions such as allowing plenty of margin for ratings and performance, or fail-safe measures. Contact the sales department at Koganei regarding use in such applications.
- Always check the catalog and other reference materials for product wiring and piping.
- When handling the product, wear protective gloves, safety glasses, safety shoes, and other protective clothing.
- When the product can no longer be used, or is no longer necessary, dispose of it appropriately, according to the "Law Regarding the Disposal and Cleaning of Waste" or other local governmental rules and regulations, as industrial waste.
- Pneumatic equipment can exhibit degraded performance and function over its operating life. Always conduct daily inspections of the pneumatic equipment, and confirm that all requisite system functions are satisfied, to prevent accidents from happening.
- Air leakage of the solenoid valves cannot be cut to zero. Take volume and holding time requirements into consideration when designing pressure (including vacuum) retention in the pressure vessel, and other factors.
- For inquiries about the product, consult your nearest Koganei sales office or Koganei Overseas Department. The addresses and telephone numbers are shown on the back cover of this catalog.
- Attach a muffler to the exhaust port. This will reduce exhaust noise.

⚠ Other precautions

- Always observe the following items.
  1. When using this product in pneumatic systems, always use genuine Koganei parts or compatible parts (recommended parts).
     When conducting maintenance and repairs, always use genuine Koganei parts or equivalent parts (recommended parts).
     Always observe the prescribed methods and procedures.
  2. Never attempt inappropriate disassembly or assembly of the product relating to basic configurations, or its performance or functions.

Koganei shall not be held responsible for any problems that occur as a result of these items not being properly observed.

Warranty and General Disclaimer

1. Warranty Period
Koganei warrants this product for a period of no more than 180 days from the date of delivery.

2. Scope of Warranty and General Disclaimer

(1) The Koganei product warranty covers individual products. When a product purchased from Koganei or from an authorized Koganei distributor malfunctions during the warranty period in a way that is attributable to Koganei's responsibility, Koganei will repair or replace the product free of charge. Even if a product is still within the warranty period, its durability is determined by its operation cycles and other factors. Contact your nearest Koganei sales office or the Koganei overseas department for details.

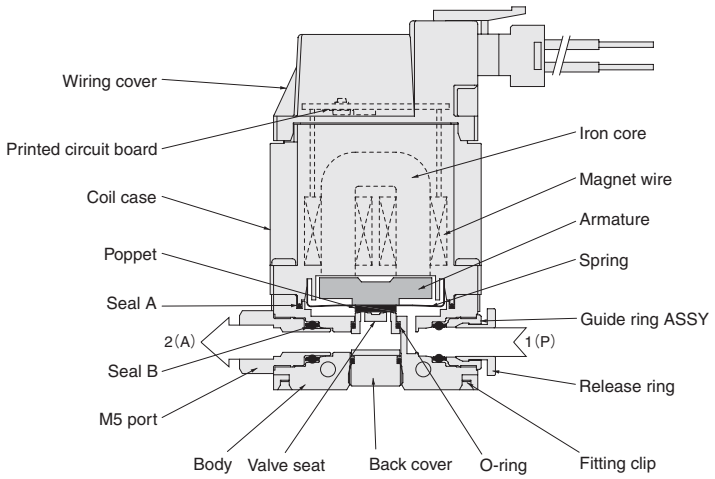
(2) Koganei shall not be held responsible for any losses or for any damage to other machinery caused by breakdown, loss of function, or loss of performance of Koganei products.

(3) Koganei shall not be held responsible for any losses due to use or storage of the product in a way that is outside of the product specifications prescribed in Koganei catalogs and the instruction manual, and/or due to actions that violate the mounting, installation, adjustment, maintenance and other safety precautions.

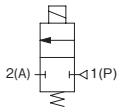
(4) Koganei shall not be held responsible for any losses caused by breakdown of the product due to factors outside the responsibility of Koganei, including but not limited to fire, natural disaster, the actions of third parties, and intentional actions or errors by you.

K2 Series operation principle and symbols

2-port
K2-100SF-□-NL□-JM



Symbol



Materials of major parts

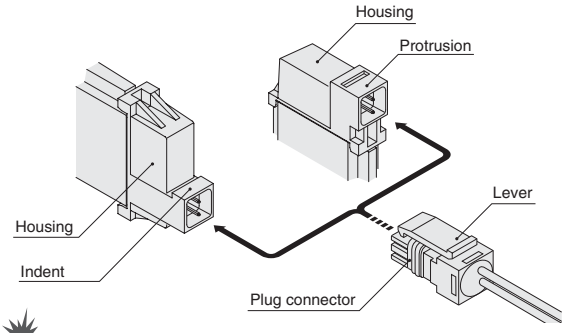
Name	Materials
Iron core	Magnetic steel sheet
Magnet wire	Copper
Coil case	Plastic (PPS)
Wiring cover	Plastic (Polycarbonate)
Printed circuit board	Glass epoxy
Armature	Electromagnetic soft iron (nickel plated)
Spring	Stainless steel
Back cover	
Fitting clip	
Body	Plastic (PPS)
Valve seat	Plastic (PBT)
Poppet	Synthetic rubber (HNBR)
O-ring	
Seal A	
M5 port	Stainless steel
Guide ring ASSY	Brass (electroless nickel plated)
Release ring	Plastic (Polyacetal)
Seal B	Synthetic rubber (FKM)

Handling instructions and precautions

Wiring instructions

Plug connector connection and disconnection

When connecting the connector, use your finger to insert the connector onto the pin, and push in on the connector until the lever's claw catches the indent of the housing.
When removing the connector, squeeze the lever along with the connector making sure that the lever's claw is disengaged from the indent of the housing, and then pull the connector out.



Note: When removing the connector, make sure that the lever's claw is disengaged from the indent of the housing before pulling the connector out. Pulling out the connector while the lever's claw is still engaged will damage the housing.

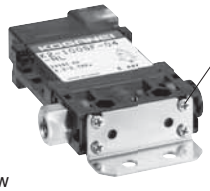
Mounting bracket, sub-base

When attaching a mounting bracket to the valve body, use the long mounting screws when attaching to the side, and the short mounting screws when attaching to the bottom.

Side attachment

Mounting screw
Tightening torque
20 N•cm

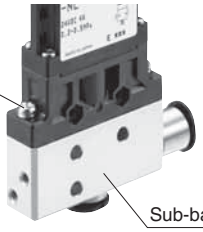
Bottom attachment



Mounting screw
Tightening torque
25 N•cm

The recommended tightening torque for the valve mounting screws when mounting a valve on the sub-base is shown on the right.

Mounting screw
Tightening torque
40 N•cm

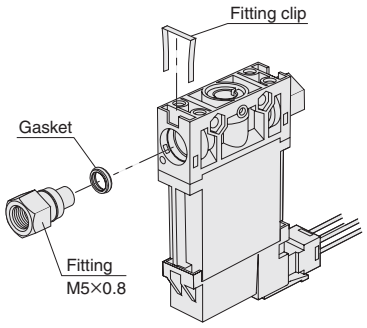


Sub-base

Replacing the input port and output port fittings (M5×0.8)

① Use a flat blade screwdriver (3 mm blade width) to pull the fitting clip on the inner side of the fitting from the back of the valve body.
② Remove the fitting to be replaced and remove any part of the seal that remains inside the valve.
③ Attach the seal that comes with a new fitting (M5×0.8) onto the fitting, and then insert the fitting into the valve body as far as it will go.
④ Push the fitting clip into position as far as it will go. Check to make sure that the fitting clip is pushed in so that at least 1 mm of both of the clips legs are inserted into the bottom of the valve.

Note 1: Failure to securely install the fitting clip creates the risk of the fitting coming off. Take care to install the clip properly and securely.
2: The fitting (M5×0.8) is able to rotate. When connecting piping, use a wrench or other tool to secure the fitting (M5×0.8).



Tubing

Use of both nylon tubes and urethane tubes is supported.
Use tubes with outside diameter precision within 0.1 mm of the nominal dimensions, and with ovality (difference between major axis and minor axis) within 0.2 mm.
(Use of Koganei tubes is recommended.)

Note:
1. Do not use extremely soft tubes, which causes a severe drop in pull-out strength.
2. Do not use tubes whose outside surface is damaged or scratched. If tubes become damaged after repeated use, cut off the damaged portion.
3. Do not subject tubes to sharp bends in the vicinity of fittings. The table below shows minimum bending radius guidelines for nylon tubes.
4. Be sure to stop air supply from the air source before attaching or detaching tubes. Also be sure to check that all of the air within the manifold has been exhausted.

mm

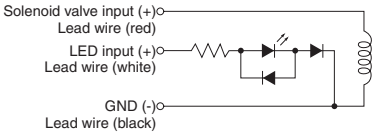
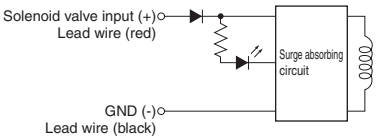
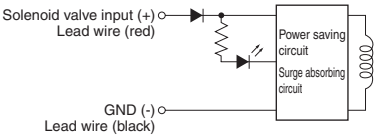
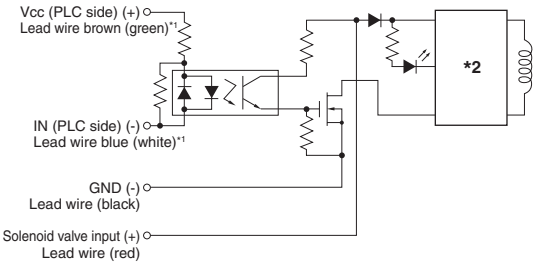
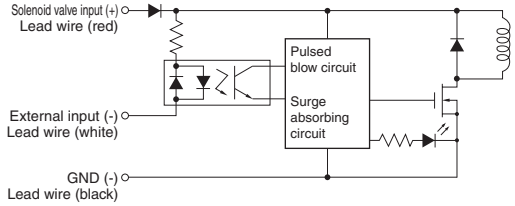
Tube size	Minimum bending radius
φ4	20
φ6	30

Other precautions

Do not rotate screws on the coil portion or on the back cover. Doing so creates the risk of product malfunction, loss of function, or damage.

Handling instructions and precautions

Internal circuit

Circuit specifications	Internal circuit
No-protection circuit type (**-N**)	 ***Refer to "No-protection circuit type (-N) LED usage precautions" on the top right if using LED.**
Surge absorbing type (**-Z**)	
Power saving type (**-L**) See Note 1 to Note 5.	
PLC drive type (**-R**) See Note 1 to Note 5.	 ***1: Lead wire color in ( ) parentheses is when cable is selected** ***2: Surge absorbing circuit for electric power specifications -02 and -04** **Surge absorbing circuit and power saving circuit for electric power specifications -09 and -24**
Pulsed blow type (**-X**)	 ***When the external input is on, the solenoid valve turns on and off according to the set frequency and duty ratio. For details, see pages ❾ and ❿.**

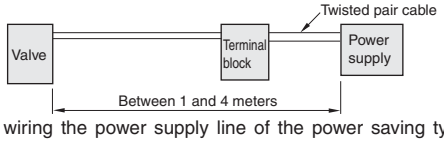
Note Do not perform a megger test between pins.

Note 1: With the power saving type (**-L**) and PLC drive type (**-R**), avoid use with switches that can cause chattering. Such switches can also cause incorrect power saving circuit operation.

2: Noise may be generated in the area around the coil while the valve is energized. This is due to the properties of power saving circuit and does not indicate malfunction of the valve.

3: When using a lead wire for the power supply line of the power saving type (**-L**) and PLC drive type (**-R**), use a lead wire that is no more than 1 meter in length. When using a cable, use a cable that is at least 1 meter and no more than 4 meters in length.

4: When wiring the power supply line of the power saving type (**-L**) and PLC drive type (**-R**), be sure to use a twisted pair cable if the terminal block is relayed. The cable should be a total length of at least 1 meter and no more than 4 meters in length from the power supply.



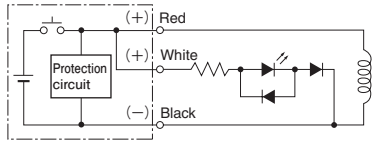
5: When wiring the power supply line of the power saving type (**-L**) and PLC drive type (**-R**), installing a filter or other intermediate device can cause improper power saving circuit operation.

No-protection circuit type (-N) LED usage precautions

Using the same power supply to operate no-protection circuit type solenoid valve's LED indicators and coil operation creates the risk of LED damage due to counter electromotive force generated when the coil is off. In this case, provide protection circuit (Diagram 1).

Note: Response times shown in the catalog specifications are values when LEDs are not used.

External circuit

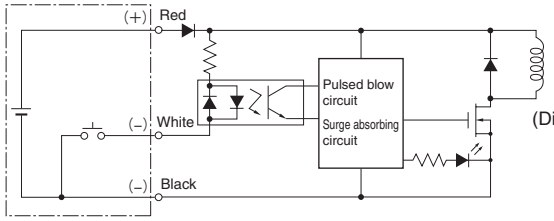


(Diagram 1)

Pulsed blow type (-X) externally connected circuit

Refer to the diagram below (Diagram 2) when wiring to the pulsed blow type.

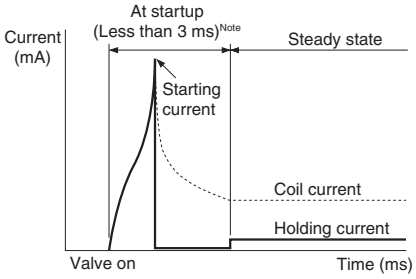
External circuit



(Diagram 2)

Power saving circuit current waveforms

The power line waveform for the power saving type (**-L**) and PLC drive type (**-R**) with **-09**, **-24** power specifications is shown below.



Note: The startup time varies depending on the model.

Installation

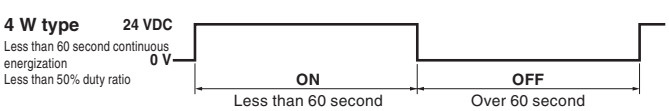
⚠ WARNING

1. Installing valves side-by-side or with a manifold will generate large amounts of coil heat. Provide at least 1 mm of space between coils.
2. Coils generate heat. Avoid energizing coils without applying air. During use in combination with a nozzle or other type of throttling valve, provide an air flow of at least 5 ℓ /min while the valve is energized.
3. Allowing ferromagnetic material to come into contact with the solenoid valve (coil) can cause erratic operation. Keep such materials at least 1 mm away from solenoid valves.

Restrictions on 4 W power specification type continuous energizing time

⚠ WARNING

In the case of the 4 W power specification type, be sure to use a continuous energizing time that is below the voltage waveform shown below. A longer energizing time results in heat build-up due to coil heat generation, which can lead to damage or burnout. Contact Koganei for details.



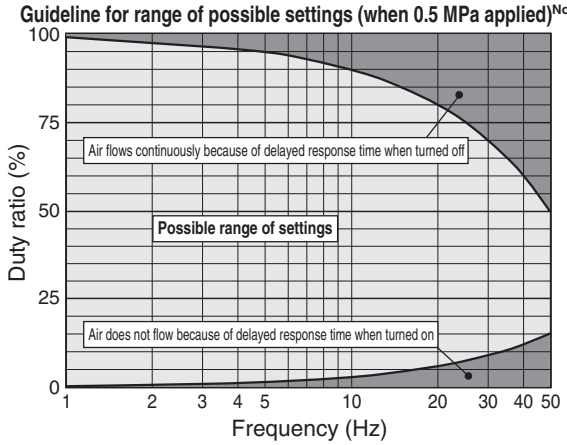
Pulsed blow type (-X) operation method

⚠ DANGER **When configuring frequency and duty ratio settings using a pulsed blow type, always conduct a safety check of the area of machine operation before supplying air or electricity to the device and before starting operation.**
The actuator may move unintentionally and may result in damage or personal injury caused by contact with moving parts.

Setting range of pulsed blow type (-X)

When using a pulsed blow type and configuring frequency and duty ratio settings, there is a range in which settings cannot be configured due to on/off response delay.
Configure frequency and duty ratio settings using the graph of the range where settings can be configured as a guide.

Guideline for range of possible settings (when 0.5 MPa applied)[Note]



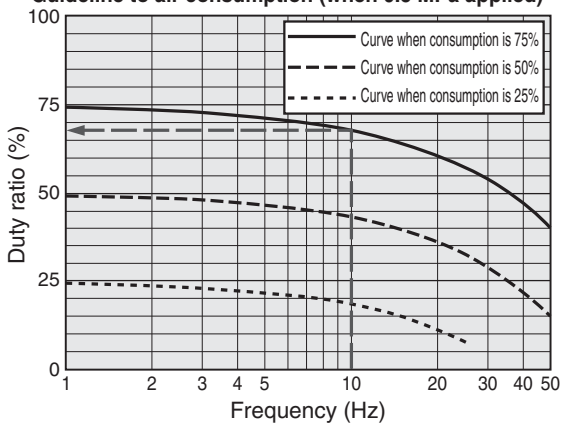
Note: The above two graphs show reference values for K2 Series types with an ON response time of 3.0 ms and an OFF response time of 10 ms.

Air consumption guidelines using the pulsed blow type (-X)

The graph below shows the relationship between the frequency and duty ratio, and the air consumption volume due to ON/OFF response delay, assuming an air consumption volume during continuous energizing (100% duty ratio) of 100%, when a pulsed blow type is used and the air consumption volume is controlled. Configure frequency and duty settings using the graph below as a guide.

*The duty ratio is the ratio of energizing ON time within one cycle (ON and OFF)

Guideline to air consumption (when 0.5 MPa applied)[Note]



Explanation of diagrams

A duty ratio of approximately 68% is required when the frequency is 10 Hz and the air consumption volume is 75%.

Infrared remote control and program specifications

Remote control program

Item	Manufacturer setting
Manufacturer code (remote control setting)	Toshiba (for analog TV)

Remote control functions (Recommended remote control unit: Ohm Electric Inc. ORC-02DG)

Function	Buttons	Description of function
Lock release	Press [0/10][Note 1] four times	Releases infrared receive lock and changes settings. (External input must be OFF to release lock.)
ON/OFF	[Power]	While infrared input is OFF and after releasing lock, valve oscillation can be turned ON or OFF with the remote control.
Settings by value input	[1] to [9], [0/10][Note 1]	Use these buttons to input values when changing frequency (Hz) and duty ratio (%) settings.
	[11] (Frequency)	Press after inputting a value to change the frequency (Hz).
	[12] (Duty ratio)	Press after inputting a value to change the duty ratio (%). A duty ratio of 100% is continuous energizing.
Settings by variable input	[Channel +/-]	Change the frequency (Hz) in units of 1 (Hz). With key repeat[Note 2].
	[Volume +/-]	Change the duty ratio (%) in units of 1 (%). With key repeat[Note 3].
Registration	[Change input]	Registers setting values (frequency (Hz), duty ratio (%)) that have been changed and lock infrared receive. Registering settings causes settings to be saved even if the power supply to the valve is cut off.
Registered value recall	[Mute]	Recalls the most recently registered settings.

Note 1: Though the [0/10] button is used as a [0] button, the marking of the button depends on the remote control being used.
If your remote control does not have a [0] button, the [10] button is used for [0].
2: Holding down a button for more than 0.5 seconds will scroll the frequency value upwards or downwards.
3: Holding down a button for more than 0.5 seconds will scroll the duty ratio value upwards or downwards.

Valve LED indicators

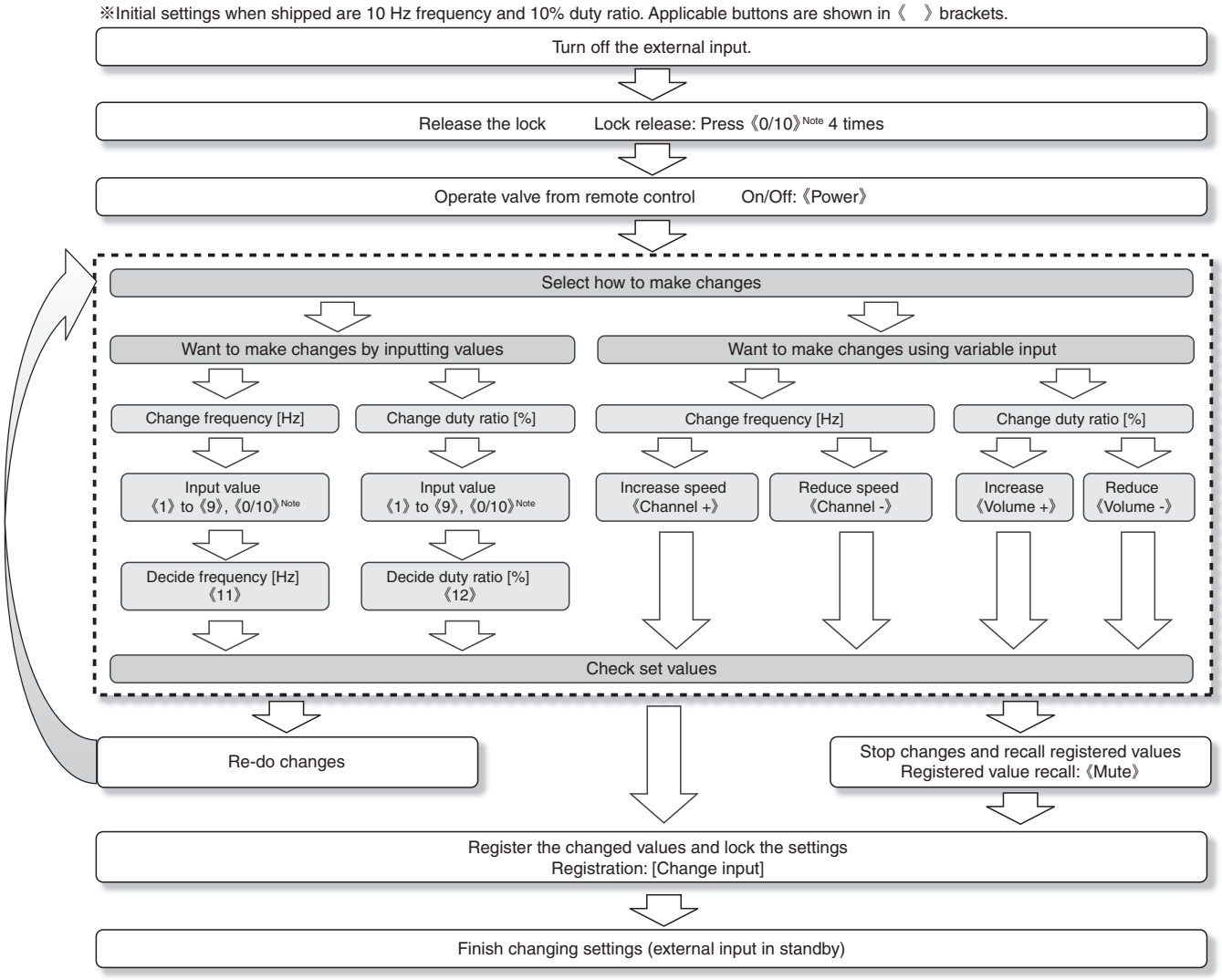
During valve operation	The valve LED light timing is the same as the oscillation frequency and duty ratio.
During remote control input	When lock is released, aiming the remote control at the valve and operating a button causes the valve LED to light or go out for 0.1 seconds.
During lock release	Valve LED does not light with the first press of [0/10], does not light with the second press of [0/10], does not light with the third press of [0/10], and lights for 0.1 seconds with the fourth press of [0/10].

Operation precautions

1	When configuring settings, make sure that 24 VDC of power is supplied between the solenoid valve input (+) and GND (-).
2	Make sure that the remote control signal emitter is aimed at the valve when operating remote control buttons. Settings will not be configured if you operate the remote control without aiming at the valve.
3	Another pulsed blow type valve that is near the valve whose settings are being configured can cause interference in the infrared signal during remote control input. To avoid interference, be sure to disconnect the connectors and cut off the power supply of all valves except for the one being configured.
4	Perform remote control input slowly and carefully. Due to delay in the receive process, quick operation may result in incorrect input.
5	Input each value within 10 seconds. Input will be ignored after 10 seconds.
6	If you make a mistake during value input, wait for more than 10 seconds after the last input and then input it again.
7	Remote control input is not supported while a valve is ON by external input (lock release is also not supported).
8	The infrared receive lock function is automatically operational when power is turned on, so release the lock before configuring settings.
9	Executing "Registration" while configuring settings with a remote control automatically executes [Valve stop], performs memory registration, and locks infrared reception.
10	Inputting from an external source while configuring settings with the remote control automatically locks memory registration and infrared reception, and then switches to operation by external input.
11	If the power supply is cut while settings are being configured with a remote control but have not been registered yet, the unregistered settings are discarded and previously registered settings are restored.

Operational flow with a remote control

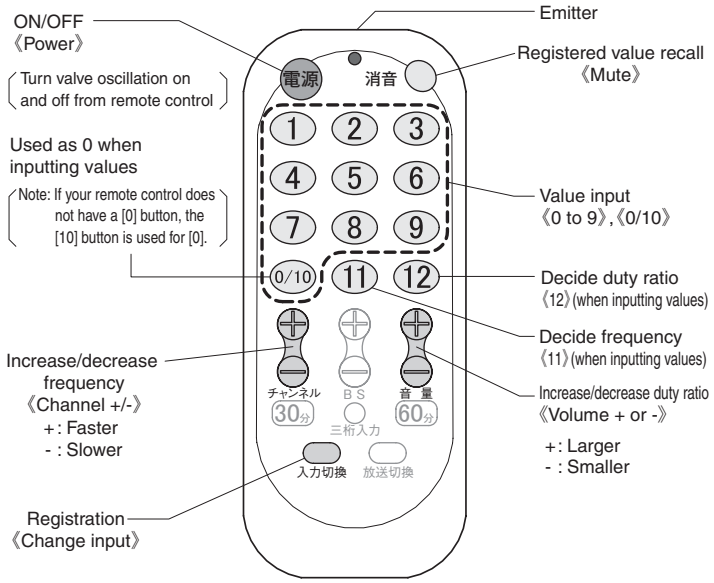
※Initial settings when shipped are 10 Hz frequency and 10% duty ratio. Applicable buttons are shown in 《 》brackets.



Note: Though the《0/10》button is used as a "0" button, the marking of the button depends on the remote control being used. If your remote control does not have a "0" button, the "10" button is used for "0".

Recommended remote control buttons

⚠ CAUTION Make sure that the remote control signal emitter is aimed at the valve when operating remote control buttons.



(Recommended remote control unit: Ohm Electric Inc. ORC-02DG)

To input values to do settings

Example 1: To set 5 Hz as the operating frequency of the valve.

(5) ➡ (11)

(Decide frequency)

Example 2: To set 10 Hz as the operating frequency of the valve.

(1) ➡ (0/10) ➡ (11)

(Decide frequency)

Example 3: To set the duty ratio of the valve to 25%.

(2) ➡ (5) ➡ (12)

(Decide duty ratio)

K2 series specifications

Direct piping

Applications		For air blow																For high-speed sorting									
Item \ Basic model		K2-100SF-02				K2-100SF-04 Note 5				K2-100HF-02				K2-100HF-04 Note 5				K2-100HF-09		K2-100LF-09		K2-100LF-24		K2-100SF-09		K2-100SF-24		K2-100HF-24 (Special specifications) Note 6	
Item \ Circuit specifications		-N	-Z	-R	-X	-N	-Z	-R	-X	-N	-Z	-R	-X	-N	-Z	-R	-X	-L	-R	-L	-R	-L	-R	-L	-R	-L	-R	-L	-R
Media		Air/inert gas																		Air/inert gas									
Operation system		Direct operated																		Direct operated									
Number of ports		2																		2									
Number of positions		2																		2									
Valve function		Normally closed (NC)																		Normally closed (NC)									
Flow rate characteristics	Sonic conductance C dm³/(s•bar)	0.2				0.3				0.3				0.45				0.5		0.2		0.2		0.3		0.3		0.4	
	Effective area [Cv] Note 1 mm²	1.0 [0.06]				1.5 [0.08]				1.5 [0.08]				2.3 [0.13]				2.5 [0.14]		1.0 [0.06]		1.0 [0.06]		1.5 [0.08]		1.5 [0.08]		2.0 [0.11]	
Port size		φ4 mm quick fitting, M5×0.8																		φ4 mm quick fitting, M5×0.8									
Lubrication		Not required																		Not required									
Operating pressure range	MPa	0.2 to 0.7								0.2 to 0.5										0.2 to 0.5								0.2 to 0.4	
Proof pressure	MPa	1.05																		1.05									
Response time Note 2, Note 3	ON ms	3.0				2.5				3.0				3.0				2.0		0.8		0.4		0.8		0.5		0.5	
	OFF Max ms	1	1.5	10		1	1.5	10		1	1.5	10		1	1.5	10		8		1.5		1		1		1		1	
Maximum operating frequency Note 4	Hz	200	100	50		200	100	50		200	100	50		200	100	50		50		300		400		300		400			
Operating temperature range (atmosphere and media)	°C	0 to 50 (non-condensation)																		0 to 50 (non-condensation)									
Shock resistance	m/s²	100																		100									
Mounting direction		Any																		Any									
Protection structure		IP67 equivalent																		IP67 equivalent									
Operating life	Operations	500 million (under Koganei test conditions)																		1 billion (under Koganei test conditions)									
Mass	g	33 for piping specifications **-J4**, 37 for **-M5**, 35 for **-JM** (When lead wire length is 300 mm.)																		33 for piping specifications **-J4**, 37 for **-M5**, 35 for **-JM** (When lead wire length is 300 mm.)									

Base piping

Applications		For air blow																For high-speed sorting									
Item \ Basic model		K2-100SA-02				K2-100SA-04 Note 5				K2-100HA-02				K2-100HA-04 Note 5				K2-100HA-09		K2-100LA-09		K2-100LA-24		K2-100SA-09		K2-100SA-24		K2-100HF-24 (Special specifications) Note 6	
Item \ Circuit specifications		-N	-Z	-R	-X	-N	-Z	-R	-X	-N	-Z	-R	-X	-N	-Z	-R	-X	-L	-R	-L	-R	-L	-R	-L	-R	-L	-R	-L	-R
Media		Air/inert gas																		Air/inert gas									
Operation system		Direct operated																		Direct operated									
Number of ports		2																		2									
Number of positions		2																		2									
Valve function		Normally closed (NC)																		Normally closed (NC)									
Flow rate characteristics	Sonic conductance C dm³/(s•bar)	0.26				0.4				0.4				0.54				0.6		0.2		0.2		0.3		0.3		0.4	
	Effective area [Cv] Note 1 mm²	1.3 [0.07]				2.0 [0.11]				2.0 [0.11]				2.7 [0.15]				3.0 [0.17]		1.0 [0.06]		1.0 [0.06]		1.5 [0.08]		1.5 [0.08]		2.0 [0.11]	
Port size		φ6mm quick fitting (**-25** specification)																		φ6mm quick fitting (**-25** specification)									
Lubrication		Not required																		Not required									
Operating pressure range	MPa	0.2 to 0.7								0.2 to 0.5										0.2 to 0.5								0.2 to 0.4	
Proof pressure	MPa	1.05																		1.05									
Response time Note 2, Note 3	ON ms	3.0				2.5				3.0				3.0				2.0		0.8		0.4		0.8		0.5		0.5	
	OFF Max ms	1	1.5	10		1	1.5	10		1	1.5	10		1	1.5	10		8		1.5		1		1		1		1	
Maximum operating frequency Note 4	Hz	200	100	50		200	100	50		200	100	50		200	100	50		100		300		400		300		400			
Operating temperature range (atmosphere and media)	°C	0 to 50 (non-condensation)																		0 to 50 (non-condensation)									
Shock resistance	m/s²	100																		100									
Mounting direction		Any																		Any									
Protection structure		IP67 equivalent																		IP67 equivalent									
Life	Operations	500 million (under Koganei test conditions)																		1 billion (under Koganei test conditions)									
Mass	g	34, 56 (with sub-base) (When lead wire length is 300 mm.)																		34, 56 (with sub-base) (When lead wire length is 300 mm.)									

Note 1: Effective area values are calculated values. They are not measured values.

2: Values when air pressure is 0.5 MPa. 0.4 MPa in the case of **K2-100H□-24** (special specifications).

3: No-protection circuit type (**-N**) response times are values when LEDs are not used.

4: Contact Koganei when you wish to operate a valve in excess of this maximum operating frequency.

5: Continuous energizing time is limited. For details, see page ❽.

6: For operating conditions and ordering procedures, you will need to consult with Koganei. Contact your nearest Koganei sales office.

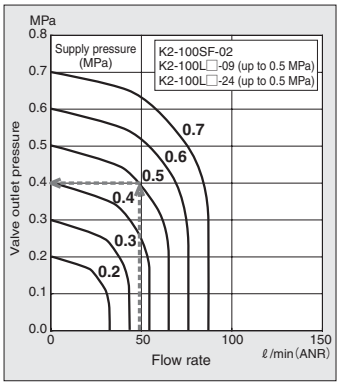
K2 series electrical specifications

Item \ Circuit specifications			No-protection circuit type -N		Surge absorbing type -Z		Power saving type -L[Note 1]			PLC drive type -L[Note 1]					Pulsed blow type -X[Note 1]	
Power specifications (Flow rate type)			-02	-04[Note 3]	-02	-04[Note 3]	-09 (Standard) (Low flow rate)	-09 (High flow rate)	-24	-02	-04[Note 3]	-09[Note 2] (Standard) (Low flow rate)	-09[Note 2] (High flow rate)	-24[Note 2]	-02	-04[Note 3]
Rated voltage			24 VDC													
System			DC solenoid (parallel)													
Operating voltage range		V	21.6 to 26.4 (24.0±10%)				22.8 to 25.2 (24.0±5%)			21.6 to 26.4 (24.0±10%)		22.8 to 25.2 (24.0±5%)			21.6 to 26.4 (24.0±10%)	
Power specifications -02, -04	Current value (when rated voltage is applied)	mA	84	167	84	167	—			84	167	—			90	170
	Power consumption	W	2.0	4.0	2.0	4.0	—			2.0	4.0	—			2.2	4.1
Power specifications -09, -24	Current value (when rated voltage is applied)	Starting mA	—		—		380	1000		—	—	380	1000		—	
		Holding mA	—		—		42 or less	63 or less		—	—	42 or less	63 or less		—	
	Power consumption	Starting W	—		—		9.1	24		—	—	9.1	24		—	
		Holding W	—		—		1 or less	1.5 or less		—	—	1 or less	1.5 or less		—	
Vcc current value (standby)		mA	—		—		—			—					6 (24 VDC)	
External input	PLC input Rated voltage	V	—		—		—			5 to 24 DC ±10%					Shorted within valve	
	PLC input Rated current	mA	—		—		—			23 (24 VDC)					5 (24 VDC)	
	Contact type		—		—		—			NPN open collector						
Allowable circuit leak current		mA	3.5	7	3		3			1					0.25	
LED circuit consumption current (when connected)		mA	4		(as standard)											
Insulation resistance		MΩ	100 or greater													
LED indicator color			Red													
Surge protection			None		Surge absorbing transistor										Flywheel diode	

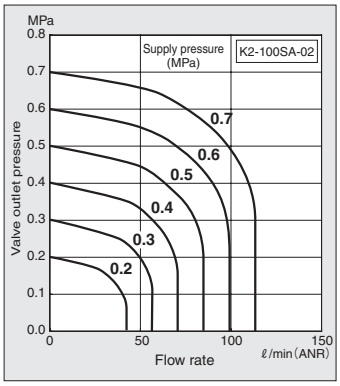
Note 1: Surge absorbing circuit is provided as standard in the case of circuit specifications **-L**, **-R**, and **-X**.
2: Power saving circuit is built-in in the case of power specifications **-09** and **-24** of circuit specifications **-R** (PLC drive type).
3: Continuous energizing time is limited. For details, see page ❽.

K2 series flow rate

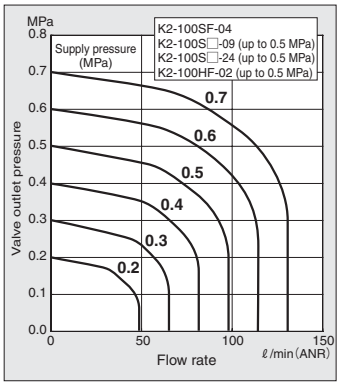
Effective area S = 1.0 mm²



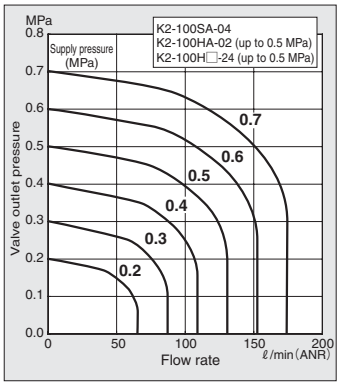
Effective area S = 1.3 mm²



Effective area S = 1.5 mm²

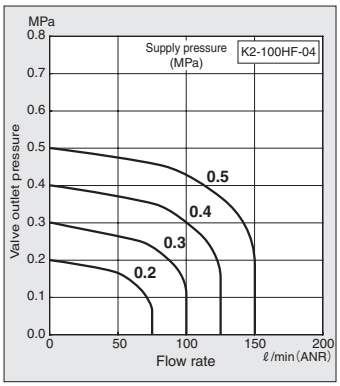


Effective area S = 2.0 mm²

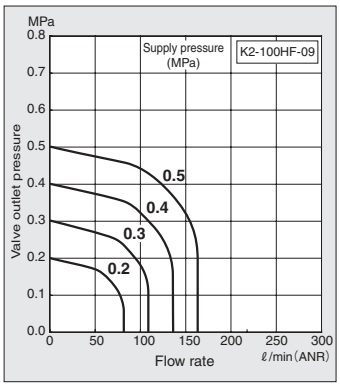


Explanation of diagrams
At supply pressure of 0.5 MPa, and flow rate of 49 ℓ/min (ANR),
valve outlet pressure becomes 0.4 MPa.

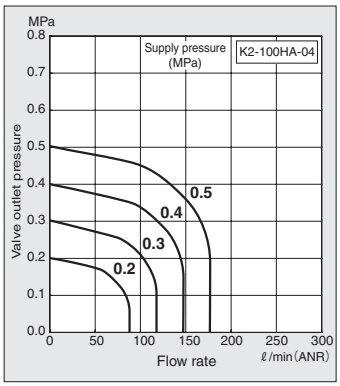
Effective area S = 2.3 mm²



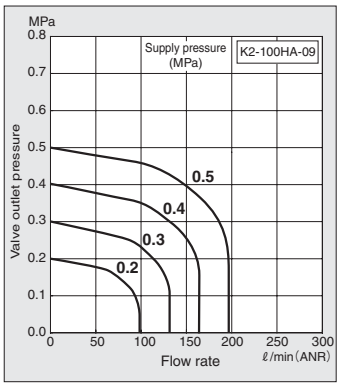
Effective area S = 2.5 mm²



Effective area S = 2.7 mm²



Effective area S = 3.0 mm²



K2 Series order codes

Basic model

K2-100SF: Direct piping, 2-port normally closed (NC), standard flow rate type
K2-100HF: Direct piping, 2-port normally closed (NC), high flow rate type
K2-100LF: Direct piping, 2-port normally closed (NC), low flow rate type

K2-100SA: Base piping, 2-port normally closed (NC), standard flow rate type
K2-100HA: Base piping, 2-port normally closed (NC), high flow rate type
K2-100LA: Base piping, 2-port normally closed (NC), low flow rate type

Power specifications

-02: 2 W
-04: 4 W[Note 1]
-09: 9 W (with power saving circuit)
-24: 24 W (with power saving circuit)

Circuit specifications

-N: No-protection circuit type (3-wire)
(Without surge absorbing circuit)
-Z: Surge absorbing type (2-wire)
(With surge absorbing circuit)
-L: Power saving type (2-wire)
(With surge absorbing circuit)
-R: PLC drive type (4-wire)
(With surge absorbing circuit)
-X: Pulsed blow type (3-wire)
(With surge absorbing circuit)

Wiring specifications

S0: IP67 S-type plug connector, 300 mm lead wire
S1: IP67 S-type plug connector, 1000 mm lead wire
S3: IP67 S-type plug connector, 3000 mm lead wire[Note]
Note: Cable length is 3000 mm in the case of power saving type **-L** and PLC drive type **-R**.
SN: IP67 S-type plug connector, no connector

L0: IP67 L-type plug connector, 300 mm lead wire
L1: IP67 L-type plug connector, 1000 mm lead wire
L3: IP67 L-type plug connector, 3000 mm lead wire[Note]
Note: Cable length is 3000 mm in the case of power saving type **-L** and PLC drive type **-R**.
LN: IP67 L-type plug connector, no connector

Piping specifications

-J4: ϕ4 quick fitting
-J4B: ϕ4 quick fitting, with mounting bracket
-M5: M5×0.8
-M5B: M5×0.8, with mounting bracket
-JM: 1 (P) port ϕ4 quick fitting, 2 (A) port M5×0.8
-JMB: 1 (P) port ϕ4 quick fitting, 2 (A) port M5×0.8, with mounting bracket

Blank: No sub-base
-25: With sub-base (ϕ6 quick bracket)[Note]
Note: Contact your nearest Koganei sales office concerning use in an ozone environment.

	Basic model	Power specifications	Circuit specifications	Wiring specifications	Piping specifications	Voltage
Direct piping	**K2-100SF** **K2-100HF**[Note 2]	**-02** **-04**[Note 1]	**-N** **-Z** **-R**	**S0** **L0** **S1** **L1** **S3** **L3** **SN** **LN**	**-J4** **-J4B** **-M5** **-M5B** **-JM** **-JMB**	**24 VDC**
			-X	**S0** **S3** **S1** **SN**		
		-09 **-24**[Note 2]	**-L** **-R**	**S0** **L0** **S1** **L1** **S3** **L3** **SN** **LN**		
	K2-100LF	**-09** **-24**				
Base piping	**K2-100SA** **K2-100HA**[Note 2]	**-02** **-04**[Note 1]	**-N** **-Z** **-R**	**S0** **L0** **S1** **L1** **S3** **L3** **SN** **LN**	**Blank** **-25**	**24 VDC**
			-X	**S0** **S3** **S1** **SN**		
		-09 **-24**[Note 2]	**-L** **-R**	**S0** **L0** **S1** **L1** **S3** **L3** **SN** **LN**		
	K2-100LA	**-09** **-24**				

Note 1: Continuous energizing time is limited. For details, see page ❽.
2: **K2-100HF-24** and **K2-100HA-24** are special specification products. For operating conditions and ordering procedures, you will need to consult with Koganei. Contact your nearest Koganei sales office.

K2 Series additional parts order codes

Mounting bracket

K210-21: Mounting bracket (with screws), 1 set

M5 port

K210-M5: Two M5×0.8 fittings (with gaskets and fitting clips)

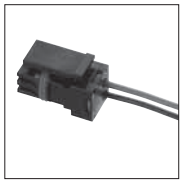
Sub-base

K210-25: Sub-base (with ϕ6 quick fitting), 1 set
*Contact your nearest Koganei sales office concerning use in an ozone environment.

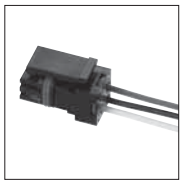
Block-off plate

K210-BP: Block-off plate (with o-ring and screws), 1 set

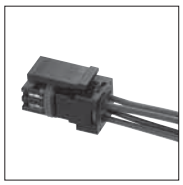
Connector, lead wire type



K210-P20: IP67 plug connector, lead wire (2-wire) length: 300 mm
K210-P21: IP67 plug connector, lead wire (2-wire) length: 1000 mm
K210-P23: IP67 plug connector, lead wire (2-wire) length: 3000 mm[Note 1]
Note 1: Use a cable type for a 3000 mm length for the power saving type (**-L**).

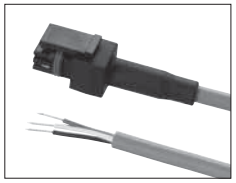


K210-P30: IP67 plug connector, lead wire (3-wire) length: 300 mm
K210-P31: IP67 plug connector, lead wire (3-wire) length: 1000 mm
K210-P33: IP67 plug connector, lead wire (3-wire) length: 3000 mm

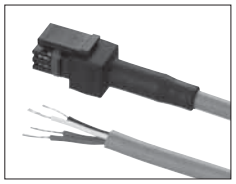


K210-P40: IP67 plug connector, lead wire (4-wire) length: 300 mm
K210-P41: IP67 plug connector, lead wire (4-wire) length: 1000 mm

Connector, cable type



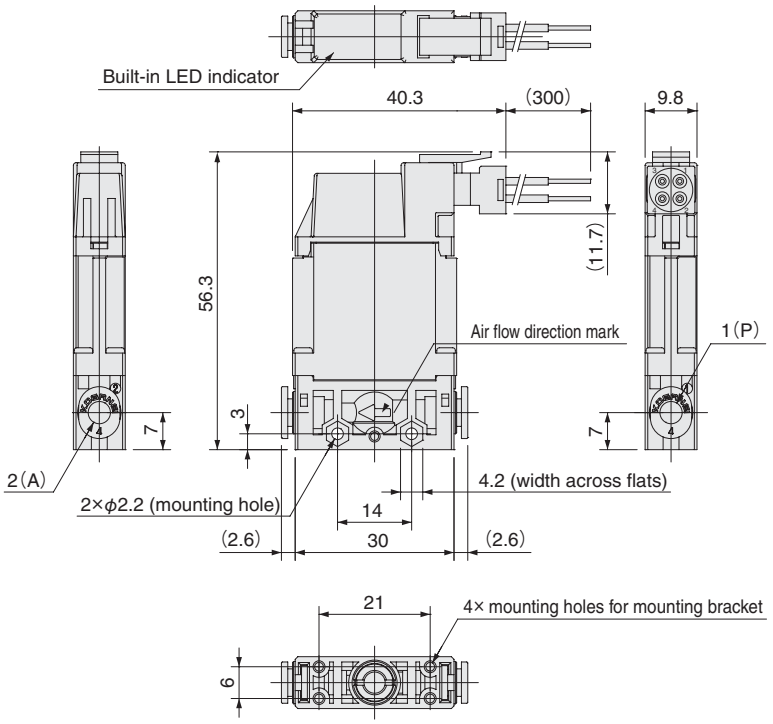
K210-C31: IP67 plug connector, cable (3-wire) length: 1000 mm[Note 2]
K210-C33: IP67 plug connector, cable (3-wire) length: 3000 mm[Note 2]
K210-C35: IP67 plug connector, cable (3-wire) length: 5000 mm[Note 2]
Note 2: In the case of 2-wire specifications (**-L**, **-Z**), cut the white lead wire to use.

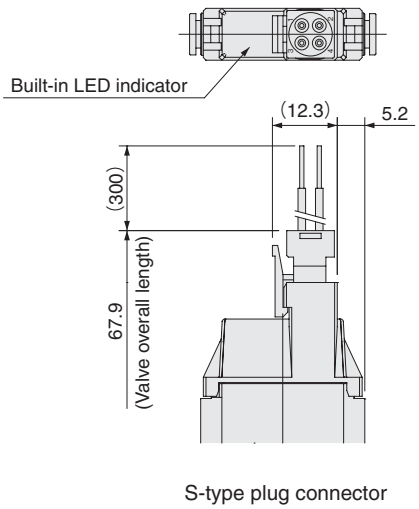


K210-C41: IP67 plug connector, cable (4-wire) length: 1000 mm
K210-C43: IP67 plug connector, cable (4-wire) length: 3000 mm

K2 series dimensions (mm)

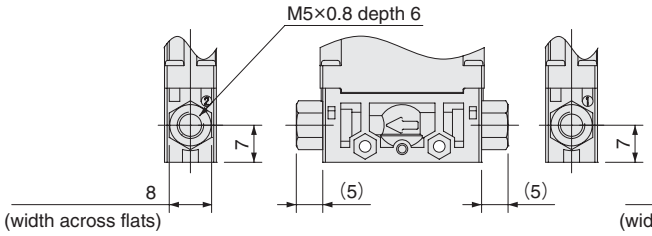
K2-100□F-□-□L0-J4 (direct piping type)



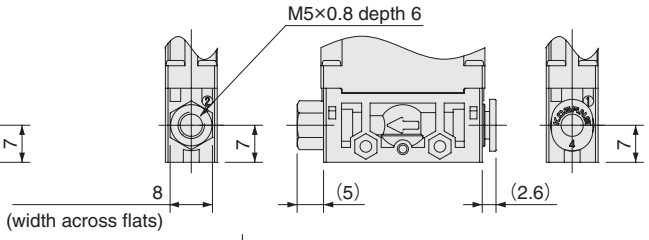


S-type plug connector

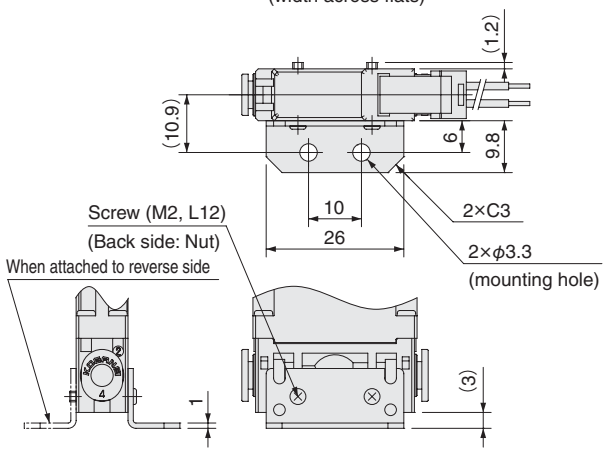
-M5 (when using M5 port)



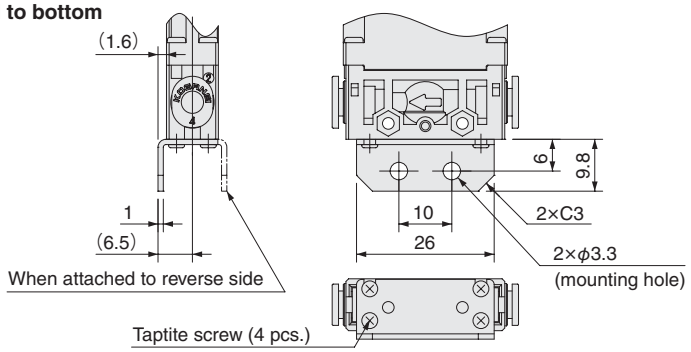
When -JM selected (when using φ4 quick fitting and M5 port)



Bracket (K210-21): Attached to side

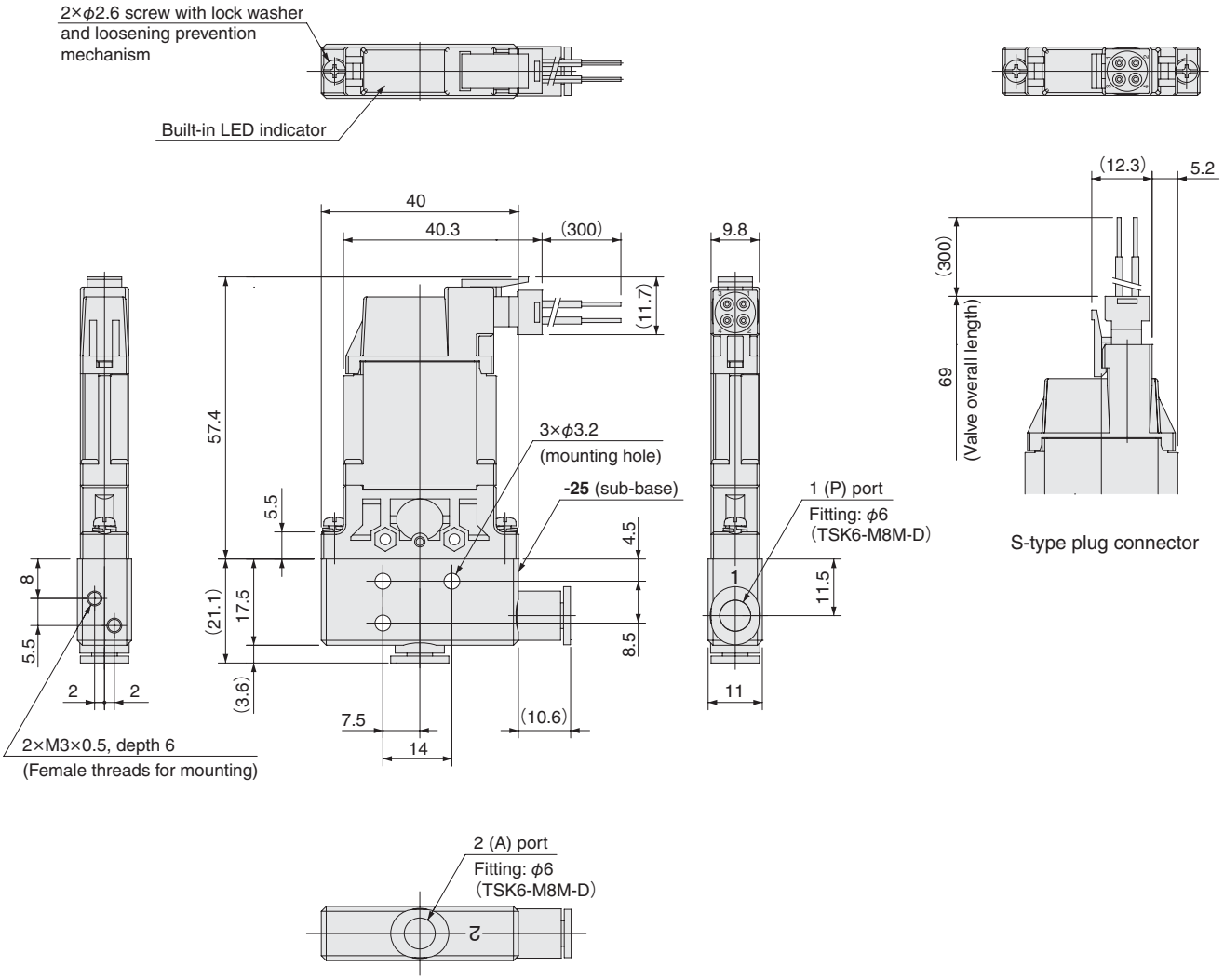


Bracket (K210-21): Attached to bottom

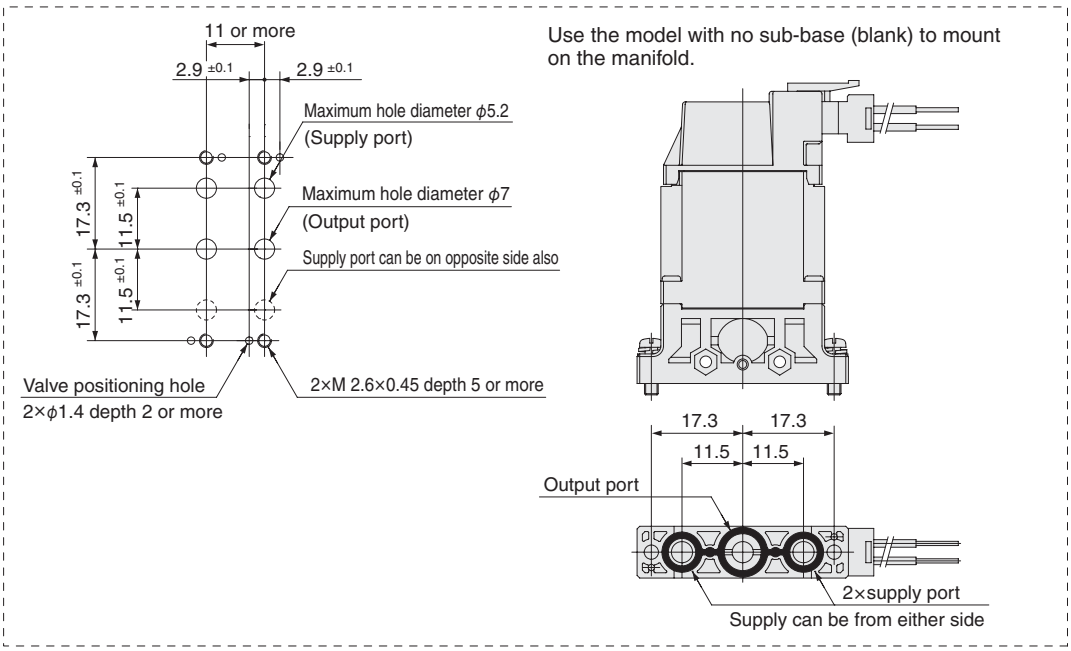


K2 series dimensions (mm)

K2-100□A-□-□L0-25 (base piping type)



Manifold installation dimensions
(11 mm minimum pitch for valve installation when mounted on manifold)



Limited Warranty

KOGANEI CORP. warrants its products to be free from defects in material and workmanship subject to the following provisions.

Warranty Period The warranty period is 180 days from the date of delivery.

Koganei Responsibility If a defect in material or workmanship is found during the warranty period, KOGANEI CORP. will replace any part proved defective under normal use free of charge and will provide the service necessary to replace such a part.

Limitations

- This warranty is in lieu of all other warranties, expressed or implied, and is limited to the original cost of the product and shall not include any transportation fee, the cost of installation or any liability for direct, indirect or consequential damage or delay resulting from the defects.
- KOGANEI CORP. shall in no way be liable or responsible for injuries or damage to persons or property arising out of the use or operation of the manufacturer's product.
- This warranty shall be void if the engineered safety devices are removed, made inoperative or not periodically checked for proper functioning.
- Any operation beyond the rated capacity, any improper use or application, or any improper installation of the product, or any substitution upon it with parts not furnished or approved by KOGANEI CORP., shall void this warranty.
- This warranty covers only such items supplied by KOGANEI CORP. The products of other manufacturers are covered only by such warranties made by those original manufacturers, even though such items may have been included as the components.

The specifications are subject to change without notice.

Attention users of the old type K2 Series!

Protection structure

Though the old type K2 Series was equivalent to IP65, note that the protection structure is now IP67 equivalent.

URL http://www.koganei.co.jp

E-mail: overseas@koganei.co.jp

KOGANEI CORPORATION

OVERSEAS DEPARTMENT
3-11-28, Midori-cho, Koganei City, Tokyo 184-8533, Japan
Tel: 81-42-383-7271 Fax: 81-42-383-7276

KOGANEI INTERNATIONAL AMERICA, INC.
39300 Civic Center Dr., Suite 280, Fremont, CA 94538, U.S.A.
Tel: 1-510-744-1626 Fax: 1-510-744-1676

SHANGHAI KOGANEI INTERNATIONAL TRADING CORPORATION
Room 2606-2607, Tongda Venture Building No.1, Lane 600, Tianshan Road,
Shanghai, 200051, China
Tel: 86-21-6145-7313 Fax: 86-21-6145-7323

KOGANEI KOREA CO., LTD.
KT&G Cosmo Bldg., 3F, 40-13, Maesanno 2-ga, Paldal-gu, Suwon-si, Gyeonggi-do,
442-847, Korea
Tel: 82-31-246-0414 Fax: 82-31-246-0415

KOGANEI-PORNCHAI CO., LTD.
89/174 Moo 3, Vibhavadee Rangsit Road, Talad Bangkhen, Laksi, Bangkok,
10210, Thailand
Tel: 66-2551-4025 Fax: 66-2551-4015

KOGANEI ASIA PTE. LTD.
12 Arumugam road #03-12, Lion Building B, 409958, Singapore
Tel: 65-6293-4512 Fax: 65-6293-4513

07/'12 30 ABAB