

2 port pilot operated solenoid valve KZV3 Series



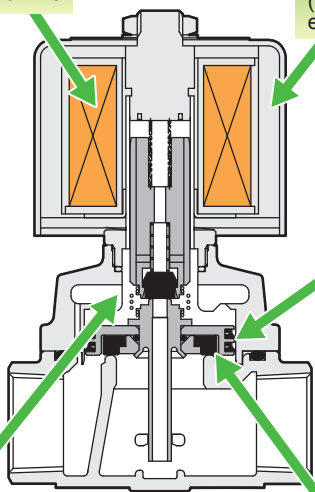
General purpose solenoid valve for steam and water

Features

- Heat-resistance and water-proof molded coil are used (heat resistance class H/IP65)
- Multiple voltages with 100/200 VAC convertible coil
- Compatible with different fluids: steam, water, and oil

Coil for both 100 VAC and 200 VAC.

Molded coil of heat resistance class H (IP code: IP65 equivalent)



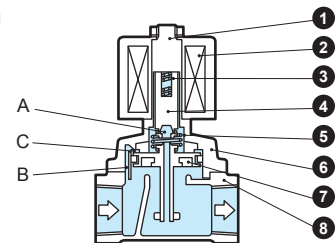
Seal ring structure immune to foreign materials.

Pilot kick type valve structure (15 to 25 A) Available between 0 and 1 MPa.

PTFE (Teflon) seal Various fluids can be controlled

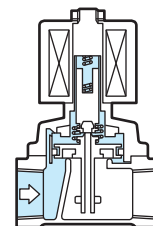
Operational explanation

■ Opening



- 1) Energize coil (2).
- 2) Plunger (4) is attached to core assembly (1), and pilot operated valve A opens.
- 3) The pressure of room C in the upper section of the main valve is released to the OUT side, making its pressure lower than the IN side.
- 4) The differential pressure of (3) above presses main valve (7) upward to open it. When the differential pressure of the IN and OUT sides is not high enough, the kick spring raises main valve (7).

■ Closing



- 1) Stop the power to coil (2).
- 2) Plunger (4) is detached from core assembly (1), and pilot operated valve A closes.
- 3) Bleed orifice B raises the pressure of the IN side, making the pressure of room C in the upper section of the main valve higher than the OUT side.
- 4) The differential pressure of (3) above presses main valve (7) downward closing it. When the differential pressure of the IN and OUT sides is not high enough, Plunger spring (3) lowers main valve (7).



2 port pilot operated solenoid valve

KZV3 Series

- Port size: Rc1/2 to Rc2



JIS symbol



Specifications

Item	KZV3-15A	KZV3-20A	KZV3-25A	KZV3-32A	KZV3-40A	KZV3-50A
Working fluid	Steam, water, and oil (20 mm ² /s or less)			Steam, water, and oil (50mm ² /s or less)		
Port size	Rc1/2	Rc3/4	Rc1	Rc1 1/4	Rc1 1/2	Rc2
Orifice mm	16	23	28	35	43	53
Cv value	4.5	8.6	12	25	34	53
S mm ²	88	162	231	460	625	975
Working pressure differential range MPa	0 to 1 (0 to 0.7 only for oil) (Note 1)			0.05 to 1 (0.05 to 0.6 only for oil)		
Withstanding pressure (water pressure) MPa	4			3.2		
Fluid temperature °C	5 to 180					
Ambient temperature °C	-10 to 60					
Atmosphere	Area without corrosive or explosive gases					
Valve structure	Pilot kick type, poppet-structure piston structure			Pilot type, poppet-structure piston structure		
Installation attitude	The installation orientation is limited from the vertical position, with the coil facing upward, to the horizontal position (Note 2)			The installation orientation is limited from the vertical position, with the coil facing upward, to the horizontal position.		
Weight kg	1.3	1.6	2	4	5	6.5
Electric specifications						
Rated voltage	100/200 VAC connection selection type, 50/60 Hz common					
Apparent power VA	At holding		50 Hz: 36, 60 Hz: 30			
	At starting		50 Hz: 180, 60 Hz: 150			
Power consumption W	50 Hz: 20, 60 Hz: 18					
Heat proof class	H					
Protective structure	IP65 equivalent					

Note 1: Use of this product under 0.05 MPa makes the seal unstable. Contact CKD in such cases.

Note 2: The product is limited to vertical installation when used in a pressure under 0.05 MPa.

Note 3: When 4M or 4N is selected as terminal box, protective structure is IP21 equivalent.

How to order



Ⓐ Port size

Ⓑ Body material

Ⓒ Option

<Example of model number>

KZV3-15A-F-4M

Model: KZV3

Ⓐ Port size : Rc1/2

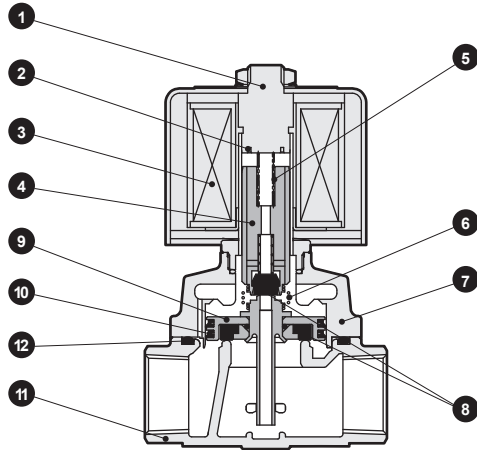
Ⓑ Body material : Stainless steel

Ⓒ Option : Terminal box

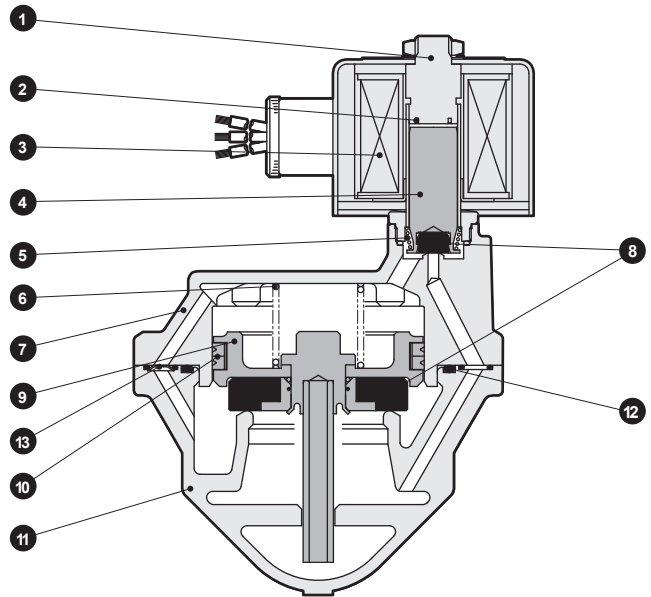
Symbol	Description
Ⓐ Port size	
15A	Rc1/2
20A	Rc 3/4
25A	Rc1
32A	Rc1 1/4
40A	Rc1 1/2
50A	Rc2
Ⓑ Body material	
Blank	Bronze
F	Stainless steel
Ⓒ Option	
Blank	Blank
4M	Terminal box
4N	Terminal box with a lamp

Internal structure and parts list

● KZV3-15A to 25A



● KZV3-32A to 50A

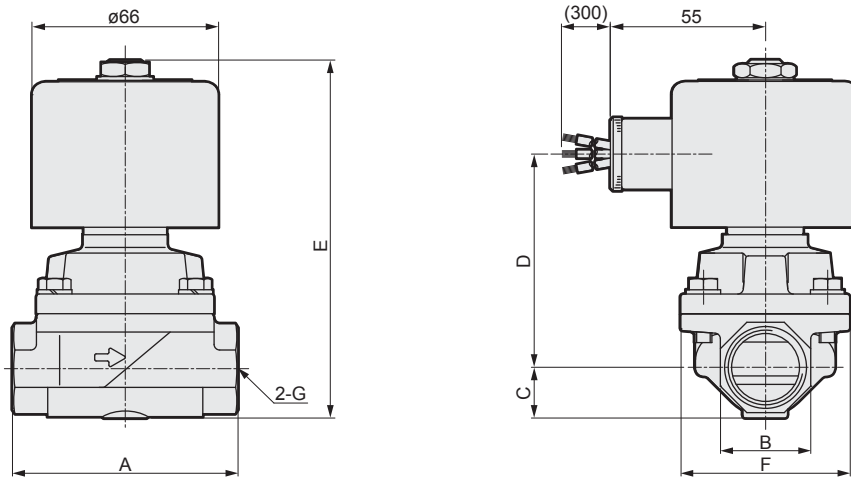


No.	Parts name	Material
1	Core assembly	Stainless steel
2	Shading coil	Copper (silver for stainless steel body)
3	Coil	-
4	Plunger assembly	Stainless steel
5	Plunger spring	Stainless steel
6	Spring	Stainless steel
7	Stuffing	Bronze casting (stainless steel casting)
8	Seal	Tetrafluoroethylene resin
9	Main valve assembly	Brass / stainless steel (stainless steel)
10	Seal ring set	Stainless steel / Tetrafluoroethylene resin
11	Body	Bronze casting (stainless steel casting)
12	O ring	Fluoro rubber
13	Orifice plate	Stainless steel

() shows option.

Dimensions

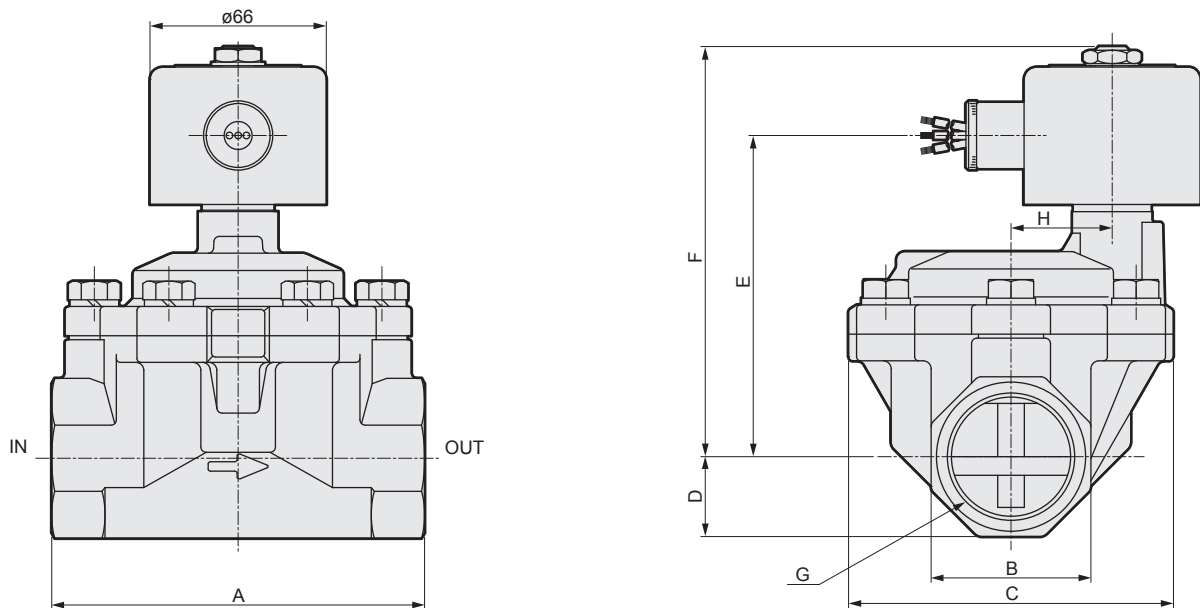
● KZV3-15A to 25A



Model no.	A	B	C	D	E	F	G
KZV3-15A	71	27 (29)	14.5	72	119.5	50	Rc1/2
KZV3-20A	80	32 (35)	17.5	76	126.5	60	Rc3/4
KZV3-25A	90	41 (45)	21.5 (22.5)	82	136.5 (137.5)	71	Rc1

* Note 1: Dimensions in () are for stainless steel bodies.

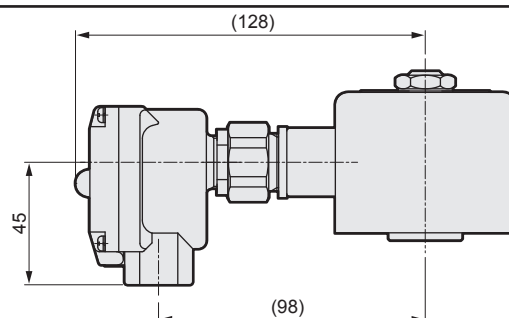
● KZV3-32A to 50A



Model no.	A	B	C	D	E	F	G	H
KZV3-32A	125	54	112	27	115	148	Rc1 1/4	32
KZV3-40A	140	60	122	30	121	154	Rc1 1/2	38
KZV3-50A	160	74	132	37	129	162	Rc2	45

Optional dimensions

● Terminal box KZV3-15A to 50A* -4M 4N





Safety precautions

Always read this section before starting use.

When designing and manufacturing a device using CKD products, the manufacturer is obligated to check that device safety mechanism, pneumatic control circuit, or water control circuit and the system operated by electrical control that controls the devices is secured. It is important to select, use, handle, and maintain the product appropriately to ensure that the CKD product is used safely.

Observe warnings and precautions to ensure device safety.

Check that device safety is ensured, and manufacture a safe device.

Warning

1 This product is designed and manufactured as a general industrial machine part. It must be handled by an operator having sufficient knowledge and experience in handling.

2 Use this product in accordance of specifications.

This product must be used within its stated specifications. Do not attempt to modify or additionally machine the product. This product is intended for use as a general-purpose industrial device or part. It is not intended for use outdoors or for use under the following conditions or environment.

(Note that this product can be used when CKD is consulted prior to use and the customer consents to CKD product specifications. The customer must provide safety measures to avoid risks in the event of problems.)

① Use for special applications including nuclear energy, railway, aircraft, marine vessel, vehicle, medicinal devices, devices or applications coming into contact with beverages or foodstuffs, amusement devices, emergency shutoff circuits, press machine, brake circuits, or for safeguard

② Use for applications where life or assets could be adversely affected, and special safety measures are required.

3 Observe corporate standards and regulations, etc., related to the safety of device design and control, etc.

ISO 4414, JIS B 8370 (Pneumatic system rules)

JFPS2008 (Principles for pneumatic cylinder selection and use)

Including High Pressure Gas Maintenance Law, Occupational Safety and Sanitation Laws, other safety rules, body standards and regulations, etc.

4 Do not handle, pipe, or remove devices before confirming safety.

① Inspect and service the machine and devices after confirming safety of the entire system related to this product.


② Note that there may be hot or charged sections even after operation is stopped.


③ When inspecting or servicing the device, turn off the energy source (air supply or water supply), and turn off power to the facility. Discharge any compressed air from the system, and pay attention to possible water leakage and leakage of electricity.


④ When starting or restarting a machine or device that incorporates pneumatic components, make sure that the system safety, such as pop-out prevention measures, is secured.

5 Observe warnings and cautions on the pages below to prevent accidents.

■ The safety cautions are ranked as “DANGER”, “WARNING” and “CAUTION” in this section.

 **DANGER:** When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries, or when there is a high degree of emergency to a warning.

 **WARNING:** When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries.

 **CAUTION:** When a dangerous situation may occur if handling is mistaken leading to minor injuries or physical damage.

Note that some items described as “CAUTION” may lead to serious results depending on the situation. In any case, important information that must be observed is explained.

Disclaimer

1 Term of warranty

“Warranty Period” is 12 months from the first delivery to the customer.

2 Scope of warranty

In case any defect attributable to CKD is found during the Warranty Period, CKD shall, at its own discretion, repair the defect or replace the relevant product in whole or in part, according to its own judgement.

Note that the following faults are excluded from the warranty term:

(1) Product abuse/misuse contrary to conditions/environment recommended in its catalogs/specifications

(2) Failure caused by other than the delivered product

(3) Use other than original design purposes.

(4) Third-party repair/modification

(5) Failure caused by reason that is unforeseeable with technology put into practical use at the time of delivery

(6) Failure attributable to force majeure.

In no event shall CKD be liable for business interruptions, loss of profits, personal injury, costs of delay or for any other special, indirect, incidental or consequential losses, costs or damages.

3 Scope of warranty

In no event shall CKD be liable for merchantability or fitness for a particular purpose, notwithstanding any disclosure to CKD of the use to which the product is to be put.



Safety precautions

Fluid control components: Warnings, cautions

Always read this section before starting use.

Design & Selection

1. Design for Safety

⚠ WARNING

■ Cannot be used for emergency shutoff circuits.

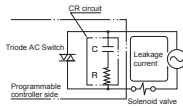
Valves in this catalog are not designed to ensure safety such as emergency shutoff. When using in such a system, provide other measures to ensure safety.

■ Take measures to protect personnel and equipment against injury or damage if this product fails.

⚠ CAUTION

■ Leakage current from other control components

When using a programmable controller, etc., with CR circuits to absorb the surge voltage generated by switching elements, leakage current could pass and adversely affect the operation of the solenoid valve. Make sure that the leakage current is within the following specification:



Model no.	Voltage	
	100 V	200 V
KZV3	6 mA or less	3 mA or less

■ Minimum working pressure differential

The pilot valve must be used at the minimum working pressure difference or higher listed in specifications in this catalog.

■ Liquid ring

In fluid flow, if a liquid ring circuit is created, pressure could rise when temperature fluctuates and prevent operation. Provide a relief valve so that a liquid ring circuit is not created.

■ Vibration

Install the product at a place without vibration.

2. Working fluid

⚠ WARNING

■ Working fluid

- (1) Do not use this product for fluids other than applicable fluids in catalog specifications.
- (2) Wear powder could be generated when internal parts are worn through valve operation. This could flow to the secondary side of the valve.
- (3) A device in which metal does not touch the fluid is recommended if rust needs to be avoided.
- (4) Active gases are not applicable.
- (5) Flammable fluid is not applicable.
- (6) Use with dry air or inert gas could greatly shorten life through wear. Use a valve for dry air.
- (7) This valve can not be used for vacuum retention.

■ Quality of fluid

Iron rust and dirt, etc., in fluid can cause operation faults or leaks, and lowering product performance. Eliminate such substances.

■ Fluid temperature

Fluid temperature must be kept within the specified fluid temperature range.

⚠ CAUTION

■ Viscosity of fluid

Use a liquid with viscosity of 50 mm²/s or less. Malfunctions could occur if the viscosity is 50 mm²/s or higher. (The limit is 20 mm²/s for 15 A to 25 A.)

3. Working environment

⚠ WARNING

■ Only explosion-proof solenoid valves and air-operated valves can be used in an explosion-proof atmosphere. For use in an explosive environment, select an explosion proof solenoid valve or an air operated valve.

■ When using AC voltage, a large noise may be generated, depending on working conditions.

■ Do not use the product in an atmosphere with corrosive gas or that damages constituent material.

■ Do not use this product near heat-generating elements or where it may be subject to radiated heat.

■ Use the product within the specified ambient temperature range.

■ Take appropriate antifreeze measures when using in a cold district.

When insulating the solenoid valve, etc., do not treat the coil.

■ Install the product at a location without a direct exposure of rain or water.

■ Take appropriate safeguards when using this product in places where oil or spatter from welding, etc., could come in contact.

■ Protection property (IPX5)

IP X5 (IEC 60529 [IEC 529: 1989-11]) standards are applied to the test. Avoid using in condition which water or coolant could directly contact the valve.

Explanation of protection property symbols and examination method of IPX5

● Protective structure

Note: IP-X5 is a test based on the following standard

■ IEC (International Electrotechnical Commission) Standards

IP-□□

Protection property symbols (International Protection)

1st characteristic number (protective class against external solids)

2nd characteristic number (Protective class against entry of water)

Grade	Degree of protection	Overview of test method (fresh water is used.)
5	Protection for jet No harmful effects occur even when water is sprayed with nozzles from all directions.	Using the following test device, spray water for 1 minute per 1 m ² of test sample (exterior) surface area from all directions, for a total of 3 minutes or more. Spray nozzle inner diameter: ø6.3mm

4. Securing space

⚠ CAUTION

■ Securing maintenance space

Secure sufficient space for maintenance and inspection.

Installation & Adjustment

1. Installation

⚠ CAUTION

- Always thoroughly read the Instruction Manual before installing this product.
- Do not apply external force to the coil section.
- Install in a manner in which tension will not be applied to the coil section lead wire.
- Hold the product body when carrying the product. (Do not hold onto the lead wire.)
- After installing, check for leaks from pipes and for wire connections, and check that the product is correctly installed.

2. Piping

⚠ CAUTION

- Observe the effective thread length for piping. Chamfer the end of the screw a half-pitch.
- Before piping, flush the inside of the pipe with 0.3 MPa of air, and remove foreign matter such as dirt, metal chips, rust, and sealing tape.
- If excessive sealant (tape, gel) is applied when piping, it could enter the product and cause operation faults.
- When applying or wrapping sealant on piping material, apply it or wind it from the pipe end along the screw and leave 1.5 to 2 threads uncovered.
- Dirt or foreign matter in fluid may prevent the product from functioning correctly. Install an 80 mesh or higher filter for water.
- Do not mistake the supply port when piping to the product.
- Install the by-pass circuit, and use the elbow union when piping to simplify the maintenance or repair work.
- When controlling the fluid in a tank, set the pipe a little higher than the base of the tank so that foreign materials deposited on the base will not spill.
- If the pipe vibrates when the solenoid valve is opened and closed, secure piping.
- When used for steam flow, steam generated by the boiler includes a large amount of drain. Please be sure to install a drain trap.
- When used for the steam flow, the water supplied to the boiler includes substances such as "calcium salt" and "magnesium salt", which react with oxygen and carbon gas to become scale/sludge; please be sure to install a "water softener" and a filter for steam.
- When the regulator and solenoid valve are directly connected, the parts could mutually vibrate causing resonance and chattering.
- If the piping cross section on the fluid supply side is restricted, operation may become unstable because of a differential pressure fault when the valve functions. Use a pipe that matches the port size on the supply side.

■ Thermal insulation cover

When putting a thermal insulation cover around the pipe, make it possible to be disassembled considering the maintenance.

Avoid putting a thermal insulation cover thoroughly over the solenoid valve or on the coil section. It will lead to coil burning.

■ Tighten the piping with the following torques.

Nominal diameter of pipe	Recommended value of pipe tightening torque (Nm)
Rc1/4	23 to 25
Rc3/8	31 to 33
Rc1/2	41 to 43
Rc3/4	62 to 65
Rc1	83 to 86
Rc1 1/4	97 to 100
Rc1 1/2	104 to 108
Rc2	132 to 136

3. Wiring

⚠ CAUTION

- In the case of 200 VAC wiring, do never connect to the blue wire (100 VAC). It will lead to coil burning.
- Use within the allowable voltage range. Use outside of the allowable voltage range may lead to operation faults or coil damage.
- Provide a circuit breaker, such as a fuse, on the control circuit to protect electrical equipment.
- If electrical circuitry is susceptible to solenoid surges, provide measures such as inserting a surge absorber parallel to the solenoid.
- Use a wire having thickness of reference nominal section area 0.5 mm² or more. Check that no excessive force is applied to lead wire.
- Use of a switching circuit that does not cause contact chatter will lengthen the life of the solenoid valve and motorized valve.

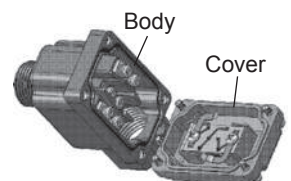
■ How to connect HP terminal box

● Mounting

- Install the product at a place without vibration.
- Secure a sufficient space for maintenance and repair.

● Mounting

- Use a fuse or other shutdown item for the control circuit.
- Use a wire having thickness of reference nominal section area 0.5 mm² or more.
- Protect the wiring by a conduit as necessary. When attaching a conduit joint, fix it by pinching two surfaces of the terminal box frame.
- For connection to the terminal box, use a round crimp terminal (JIS C2805 R1.25-3) for copper wire.
- The tightening torque for terminal screws and cover set screws are 0.5 Nm.
- The structure assures that the cover will not fall off the body. Please be noted that putting a load on the cover when it is open may damage it.



During Use & Maintenance

1. In use

⚠ CAUTION

■ Instantaneous leakage phenomenon

When using the 2 port pilot operated solenoid valve, sudden application of pressure (e.g. starting up pump) could momentarily open a closed valve and cause fluid to leak.

■ Operation

Do not apply a back pressure. There is a risk of malfunction.

■ Water-hammer

If problematic water-hammer occurs, consider use of a CKD WHL-type or RSV-type solenoid valve or a motor valve.

2. Maintenance Inspection

⚠ WARNING

■ Do not touch coils or actuators with hands or otherwise while power is on or immediately after turning power on.

The solenoid valve's coil and actuator will heat up when electricity is passed through them. Depending on the product, directly touching these sections could cause burns.

■ Do not touch electric wiring connections with hands or otherwise (bare charged sections) while power is on. There is a risk of electrical shock.

Touching electrical wire connections while power is on could lead to electrical shocks. Turn the power OFF before assembling or disassembling.

■ Use within the maximum service pressure and maximum working pressure difference range.

■ To ensure that the product is used optimally, regularly inspect the product every six months. This frequency varies with the frequency of use.

⚠ CAUTION

■ Do not step the valve, nor put the heavy things on it.

■ When using the product with continuous energizing and low frequency, consult with CKD.

■ If the product has not been used for more than a month, carry out trial operation.

- Read the instruction manual thoroughly before starting maintenance to ensure correct operation.
- Turn power off and release fluids or pressure before starting maintenance.
- Care must be taken not to clog the strainer-filter.

3. Assembling & Disassembling

⚠ CAUTION

■ When cleaning the product, use a low-polluting cleaning agent such as a neutral detergent. (However, rubber parts must be replaced since it may swell)

■ When not using the product for one or more months after using water or hot water, remove any water or hot water left in the product. Water or hot water residue will cause rusting and may lead to operation faults or leaks.

If residual water cannot be removed, operate the valve several times a days to ensure correct use.

■ Consult with CKD on questions about consumables, etc.

■ Tightening torque

When disassembling or assembling, tighten body bolts, the core assembly, and nuts with the following tightening torques.

		Body bolt tightening torque	Core assembly tightening torque	Nut tightening torque
KZV3	8A	3 to 4 Nm	45 to 60 Nm	8 to 16 Nm
	10A			
	15A	5 to 7 Nm		
	20A			
	25A	18 to 28 Nm		
	32A			
40A				
50A				

If the goods and their replicas, or the technology and software in this catalog are to be exported, laws require the exporter to make sure they will never be used for the development or the manufacture of weapons for mass destruction.

CKD Corporation

<Website>
<http://www.ckd.co.jp/>

Head Office • Plant
 Sales And Marketing Div. 2-250, Uji, Komaki, Aichi 485-8551
 Overseas Sales Administration dept. 2-250, Uji, Komaki, Aichi 485-8551
 Overseas Business div.
 Tokyo Branch Office 4F, Bunkahousou Media Plus, 1-31-1, Hamamatsu-cho, Minato-ku, Tokyo 105-0013
 Nagoya Branch Office 2-250, Uji, Komaki, Aichi 485-8551
 Osaka Branch Office 1-3-20, Tosabori, Nishi-ku, Osaka 550-0001

TEL(0568)77-1111 FAX(0568)77-1123
 TEL(0568)74-1303 FAX(0568)77-3410
 TEL(0568)77-1338 FAX(0568)77-3461
 TEL(03)5402-3620 FAX(03)5402-0120
 TEL(0568)77-1356 FAX(0568)77-3317
 TEL(06)6459-5770 FAX(06)6446-1945