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Circuit diagram code list

Published on the CKD website.

<https://www.ckd.co.jp/kiki/en/>



Gas generator

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Gas Generators >>> Page 1



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Gas Generators Nitrogen Gas Extraction Units

System type

Series	Port size (Rc, G, NPT)	Features	Page
NSU	3/8	Easily and stably supplying nitrogen gas	14

Unit type

Series	Port size (Rc, G, NPT)	Features	Page
NS	3/8, 3/4, 1	Extracts nitrogen gas just by supplying compressed air	36



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Gas Generators Inline Oxygen Monitor

Inline oxygen monitor

Series	Port size (Rc, G, NPT)	Features	Page
PNA	3/8	Measures oxygen concentrations while pressurized	50

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Main Line Component Products

Refrigeration Air Dryers

Xeroaqua Dryers

Xeroaqua dryer GX Series ● Contents/Page 83

Series	Applicability Air Compressor	Features	Page
GX3200D	Up to 55 kW	For assembling device, standard inlet air (35°C)	90
GX5200D	Up to 75 kW	For direct compressor connection, high temperature inlet air (55°C)	96

Xeroaqua dryer GT9000 Series ● Contents/Page 107

Series	Applicability Air Compressor	Features	Page
GT9000(D)	75 kW to 450 kW	Standard inlet air (40°C), air-cooling	114
GT9000W(D)	75 kW to 450 kW	Standard inlet air (40°C), water-cooling	122
GT9000WV2	710 kW / 960 kW	Standard inlet air (40°C), inverter-controlled water cooling	130

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● Series variation/Page 142



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Main Line Component Products

Desiccant Air Dryers

Heatless Dryers

Compact heatless dryer

Series	Processing air flow rate	Features	Page
HD-□□	75 to 1235 L/min (ANR)	Stable supply of ultra dry air with atmospheric dew point -72°C.	146

Super heatless dryer

Series	Processing air flow rate	Features	Page
SHD	2.5 to 24m ³ /min(ANR)	Purge flow rate is minimized with the energy-saving dew point monitor.	156

Manual Air Dryers

Manual Air Dryer

Series	Processing air flow rate	Features	Page
4001	280 L/min (ANR) or less	Disposable desiccant, supporting low pressure	164
4002			

Moisture Indicators

Moisture Indicator

Series	Port size	Features	Page
6119-2C	Rc1/4	Ideal for dew point monitor of desiccant air dryer	166

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● Series variation / Page 170



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Main Line Component Products

High Polymer Membrane Air Dryers

■ Super Dryers (High polymer membrane air dryer)

Series	Processing air flow rate	Features	Page
Super Dryer (High polymer membrane air dryer)			
SD300E-W	75 to 450 L/min (ANR)	A high capacity dryer that can be used like a filter, producing ultra dry air easily and stably	174
SD400E-W			
SD300D-W	125 to 750 L/min (ANR)		180
SD400D-W			
SD3000	35 to 890 L/min (ANR)	192	
SD4000			
Super Dryer Combination			
SU300E-W	75 to 450 L/min (ANR)	Super dryer with integrated pre-filter, etc.	174
SU400E-W			
SU300D-W	125 to 750 L/min (ANR)		180
SU400D-W			
SU3000-W	35 to 890 L/min (ANR)	186	
SU4000-W			
SDM4000	1.36 to 12.4m ³ /min (ANR)	Large flow rate achieved with polymer separation membrane	198

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● Series variation / Page 208



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Main Line Component Products

Main Line Filters

■ Medium Main Line Filters

Series	Processing air flow rate	Features	Page
Regular			
AF2-□P	4.95 to 24.1m ³ /min (ANR)	Solids / Oil Removing Filter	222
AF2-□M		High-performance solids/oil removing filter	
AF2-□X		Deodorizing Filter	
For oil-free			
AF4000P	3.7 to 18.8m ³ /min (ANR)	Pre-filter	232
AF4000S		Solids Removing Filter	
AF4000M		Oil Mist Removing Filter	
AF4000X		Deodorizing Filter	

■ Large Main Line Filters

Series	Processing air flow rate	Features	Page
Regular type			
AF3000P	16 to 256m ³ /min (ANR)	Pre-filter	246
AF3000S		Oil Removing Filter	250
AF3000M		High-Performance Oil Removing Filter	254
AF3000X		Deodorizing (activated carbon) filter	258
For oil-free			
AF5000P	16 to 256m ³ /min (ANR)	Pre-filter, stainless steel vessel used	268
AF5000S		Oil removal filter, stainless steel vessel used	272
AF5000M		High-performance oil removal filter, stainless steel vessel used	276
AF5000X		Deodorizing (activated carbon) filter, stainless steel vessel used	280

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Main Line Component Products

Condensate Drains

■ Automatic Drains

Series	Port size	Features	Page
DT3000-W	Rc/G/NPT	Lightweight and compact automatic drain discharger	290
DT4000-W			
DT3010-W			
DT4010-W	3/8, 1/2		

■ Heavy Duty Drains

Series	Port size	Features	Page
5100-4C	Rc/NPT 1/2	Ideal for Circuits with High Drain Generation	304

■ Super Drains

Series	Port size	Features	Page
DB1000	G1/2", 3/4", 1"	Compressor discharge flow rate 2.5 to 1000m ³ /min (ANR)	298
DB3000		Sensor with high reliability is used.	
DBS1006	G1/2"	High-Reliability Liquid Level Sensor Detects Drain in Pneumatic Circuits	302

CKD How to use CAD data

Pneumatic valve manifold specifications and CAD data are easily available on the Web.

Free download!

This is what makes CKD's CAD great!

Comprehensive list of CKD's leading products



Japanese, English, Chinese (Simplified and Traditional), and Korean are supported.

Simultaneous with new product launch

NEW Model No. **AX1R**
ABSODEX



Supports various data formats

- + PDF DataSheet (2D)
- + CAD-DataSheet (3D)
- + SAT 7.0 (3D)
- + Solid Edge 2019 (3D)
- + Solid Edge 2023 (3D)
- + Solid Edge 2021 (3D)
- + Solid Edge 2022 (3D)
- + AutoCAD (2021~2023)
- + AutoCAD (2018~2020)
- + STEP (AP214) (3D)
- + STEP (AP214) (3D)
- + IFC (3D)
- + JT (3D)
- + TMX (3D model) (3D)
- + Trioxa Trioxa (2017~2020)

More than 25 types of 2D and more than 35 types of 3D
Supports PDF and JPEG formats!

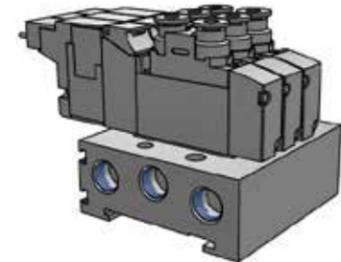
*To use 3D CAD, you must register as a CKD plus member.

Specifications are available



Manifold specifications for pneumatic valves can be prepared and shipped assembled to the customer.

Get CAD data



2D and 3D CAD data available for pneumatic valve manifold assemblies

Specifications and download method of CAD data

CKD plus How to register as a member

STEP 1

From the CKD components product top page, click "New member registration"



STEP 2

Enter your name, company name, contact information, and email address

Registration complete!



Easy registration in 2 STEPS

How to download CAD

STEP 1

Click on "3D CAD" from the product detail page



STEP 2

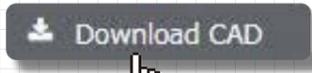
Select model No.

STEP 3

Specify CAD format

Generate CAD data

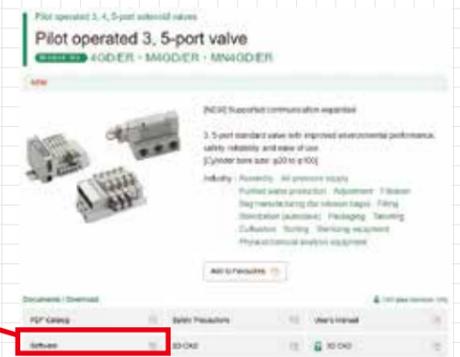
Download CAD



Download complete!

STEP 1

CKD components product TOP page > Product details page > Click "Manifold specifications sheet"

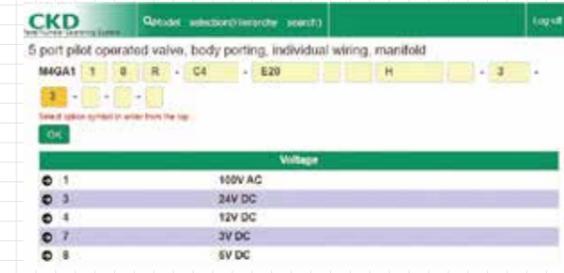


STEP 2

Select model No.

STEP 3

Create specifications sheet



STEP 4

Download complete!

- For specifications output, **Specification output** Click
- If downloading CAD data **2D/3D CAD** Click



Significantly reduces work time

Website Guide

Various information is provided on our website.
Please make use of it.

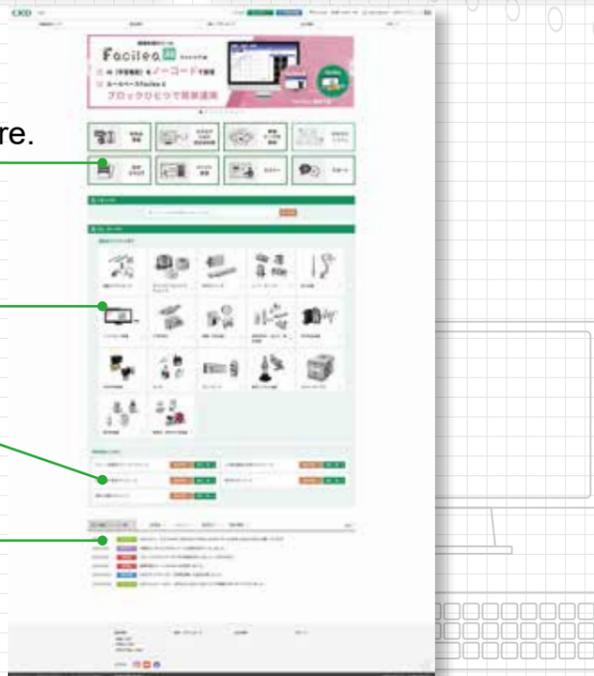
Catalogs	CAD	Instruction Manuals
Maintenance Parts	Software	Model Selection
FAQ	Technical Information	Standard Compliant Product Information
Columns	Event Information	Seminars

You can find the information you need here.

You can search for desired products.

You can find suitable products by application.

You can check the latest news.



Each product page provides various information.



Various information is published by product axis and application.

Model Selection System Guide

About Using the Model Selection System

We provide a system that supports the selection of the following items. Please use it when selecting models and designing.

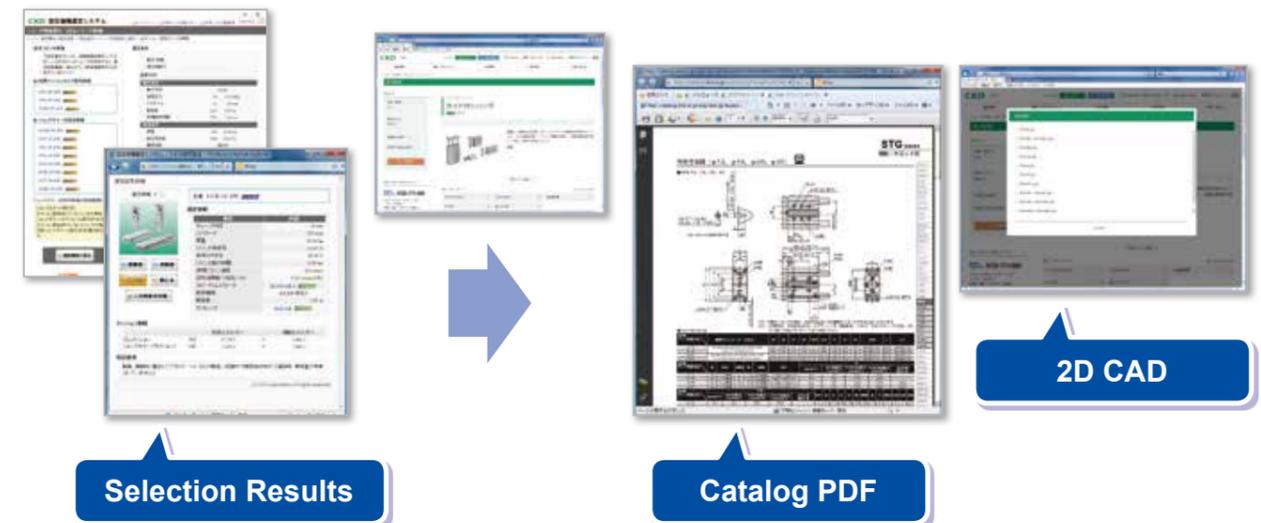
Published on our website

This system is for selecting products according to your application and operating conditions.

Web version Pneumatic components	Download version Mechanical index / Direct drive mode	Web version Electric actuator	Web version Fluid control components
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*Downloadable software may not be able to be downloaded due to your company's security policy. In that case, please contact us.

Link from selection results to catalog PDFs and CAD data!



No registration required, available anytime!

We offer various services for CKD products, including catalogs, PDFs, CAD data, and model selection. Please take a look.

<https://www.ckd.co.jp/en/>

How Flow Characteristics are Displayed

Effective cross-sectional area for steel pipes and nylon tubes, and recommended max. flow rate for gas pipes

1. Flow Characteristics Display

The catalog specifications indicate the flow rate as follows.

Applicable Components	Indicator	Unit	Standards
Pneumatic Components	New JIS compliant indication	C, b	ISO 6358:1989 "Pneumatic fluid power - components for compressible fluids - test of flow-rate characteristics" JIS B 8390:2000 (ISO 6358 translation)
	Conventional Display	S	JIS B 8373:1993 "Pneumatic 2-port solenoid valves" JIS B 8374:1993 "Pneumatic 3-port solenoid valves" JIS B 8375: 1993 "4- and 5-port solenoid valves for pneumatic applications" JIS B 8379:1995 "Pneumatic noise reduction device"
		Cv	ANSI (NFPA) T3. 21. 3:1990

2. Explanation

The flow characteristic of a solenoid valve has conventionally been indicated by the effective cross-sectional area S. However, the JIS has been revised (JIS B 8390:2000), and it is now indicated by the pair of the sound velocity conductance C and the critical pressure ratio b.

- **Sound velocity conductance C:** The value obtained by dividing the mass flow rate through the equipment in the choke flow state by the product of the upper absolute pressure limit and the density of the standard state. (Sonic Conductance) $S \approx 5.0C$ (C enables sizing as before.)
- **Critical pressure ratio b:** Pressure ratio (downstream / upstream pressures) that result in choke flow when less than this value (critical pressure ratio)
- **Effective cross-sectional area S (mm²):** The value of the ideal cross-sectional area of an aperture without friction or constriction flow, derived by calculation from the pressure change in the air tank when released from a device attached to the air tank in a choke flow condition.

*Choked flow: Flow at which upstream pressure is higher than downstream pressure, and speeds at components sections reach acoustic velocity. The mass flow rate of the gas is proportional to the upstream pressure and independent of the downstream pressure. (Choked flow)

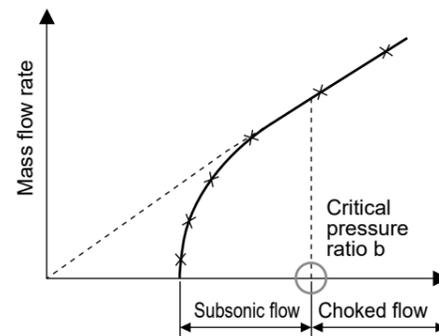


Fig. 1 Mass flow characteristics for upstream pressure

Flow Rate Formula

Depending on the actual unit, they are shown as follows.

$$\frac{P2+0.1}{P1+0.1} \text{ Choked flow when } \leq b$$

$$Q=600 \times C (P1+0.1) \sqrt{\frac{293}{273+t}} \dots\dots (1)$$

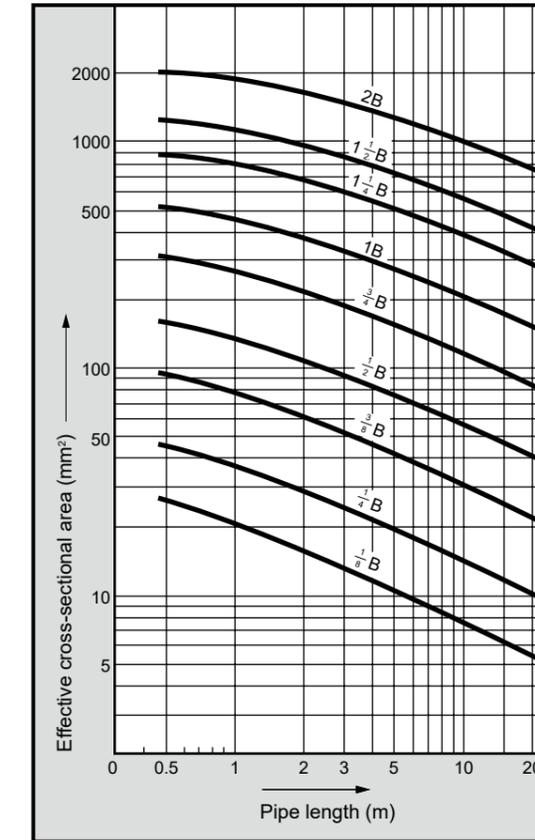
$$\frac{P2+0.1}{P1+0.1} \text{ Subsonic flow when } > b$$

$$Q=600 \times C (P1+0.1) \sqrt{1 - \left[\frac{P2+0.1}{P1+0.1} - b \right]^2} \sqrt{\frac{293}{273+t}} \dots\dots (2)$$

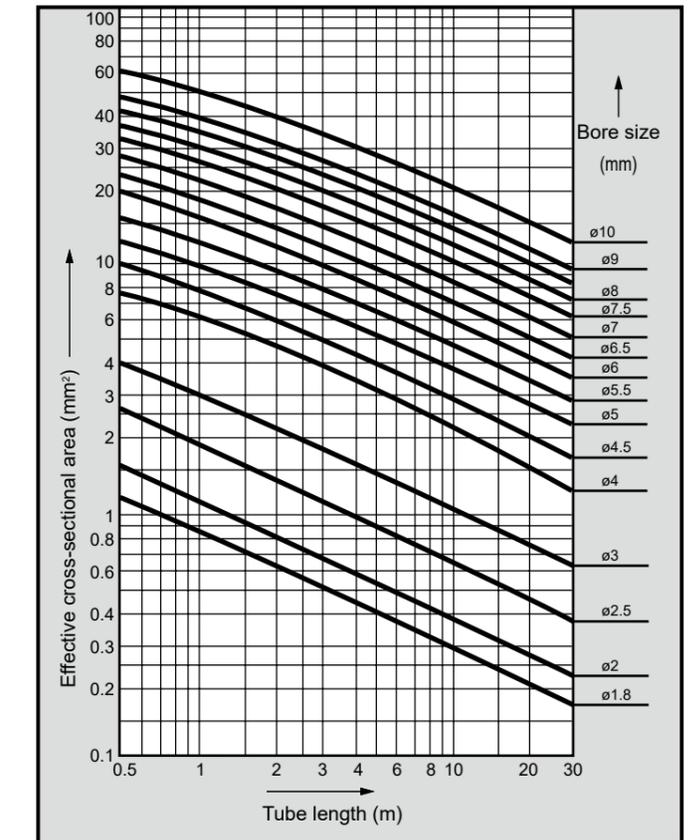
Q : Air flow rate [dm³/min (ANR)], SI unit dm³(deci cubic meter) can also be expressed in L (liter). 1 dm³=1 L
 C :Conductance of sound velocity [dm³/(s·bar)]
 b :Critical pressure ratio [-]
 P1 : Upstream pressure [MPa]
 P2 : Downstream pressure [MPa]
 t : Temperature (°C)

When calculating with an effective cross-sectional area of S, substitute value C obtained by C=S/5 into the above formula to obtain the value.
 For subsonic flow, substitute b=0.5 into the formula (2).

Effective cross-sectional area of steel pipes



Effective cross-sectional area of nylon tubes



Recommended max. flow rate table of gas tube

Nominal size	1/8B	1/4B	3/8B	1/2B	3/4B	1B	1 1/4B	1 1/2B
Pressure drop MPa (*1)	0.124	0.0707	0.0576	0.0425	0.0276	0.0209	0.0133	0.0105
Inlet pressure MPa	Recommended max. flow rate (L/min)							
0.05	127	244	518	838	1,465	2,460	3,870	5,150
0.1	146	282	598	965	1,690	2,828	4,460	5,950
0.15	163	314	668	1,076	1,885	3,150	4,960	6,630
0.2	179	344	730	1,180	2,060	3,450	5,430	7,280
0.3	206	395	840	1,360	2,375	3,900	6,300	8,400
0.4	230	442	940	1,520	2,660	4,450	7,000	9,360
0.5	252	485	1,030	1,660	2,920	4,875	7,700	10,250
0.6	272	523	1,110	1,800	3,140	5,250	8,300	11,050
0.7	292	558	1,185	1,920	3,350	5,620	8,870	11,800
0.8	308	592	1,260	2,035	3,560	5,970	9,430	12,570
0.9	324	623	1,325	2,140	3,745	6,290	9,900	13,220
1.0	340	654	1,395	2,250	3,930	6,600	10,400	13,880
1.2	370	717	1,510	2,450	4,280	7,150	11,250	15,040
1.4	398	763	1,625	2,624	4,590	7,700	12,100	16,200
1.5	410	790	1,680	2,710	4,740	7,930	12,550	16,780

(*1: Inlet pressure = 0.5 MPa)
 Gas tube length: 10 m

(Remarks)
 In the main line where the piping distance tends to increase, it is necessary to consider a pressure drop occurring at the end of the main line when air passes. The recommended max. flow rate refers to the max. flow rate that can be recommended in the range of allowable pressure drop with respect to piping length, determined from actual use. This does not mean that a higher flow is not possible, but rather that the pressure will further decrease if the flow exceeds this value.



Degree of Protection

MEMO

●Degree of Protection

■IEC (International Electrotechnical Commission) Standards (IEC60529)

■JIS C 0920 : 2003

IP - □ □

Protection Characteristic Codes
(International Protection)

1st Characteristic No. (degree of protection for foreign solid matter)

2nd Characteristic No. (degree of protection for water entry)

1st Characteristic No.	Degree of protection	
0	No protection	
1	 ○ ϕ 50 mm	Protection against inflow of solids 50 mm and over in diameter
2	 ○ ϕ 12.5 mm	Protection against inflow of solids 12.5 mm and over in diameter
3	 2.5 mm	Protection against inflow of solids 2.5 mm and over in diameter
4	 1 mm	Protection against inflow of solids 1.0 mm and over in diameter
5	 Dust-proof	No inflow of dust at levels adversely affecting normal device operation or safety
6	 Dust resistant	No inflow of dust

2nd Characteristic No.	Degree of protection	
0	No protection	
1	 Protection against water dripping	No harmful effects from water dripping vertically.
2	 Protection against dripping water tilted at an angle of up to 15°	Water dripping vertically has no adverse effect when the product is tilted at an angle of up to 15° from its normal position.
3	 Protection for watering	Water falling as a spray at any angle up to 60° from the vertical has no adverse effect.
4	 Protection against splashing water	Water splashing against the product from any direction has no adverse effect.
5	 Protection against water jets	No harmful effects occur even when water is sprayed with nozzles from all directions.
6	 Protection against powerful water jets	Water projected in powerful jets against the product from any direction has no adverse effect.
7	 Protection against immersion	Water will not enter the product even when it is immersed in water under defined conditions.
8	 Protection against immersion	The product can be used for continuous immersion in water.



Safety Precautions

Be sure to read this section before use.

When designing and manufacturing equipment using CKD wet fine system products, the manufacturer is obligated to ensure that the safety of the mechanism, pneumatic control circuit and/or water control circuit and the system that runs the electrical controls are secured. It is important to select, use, handle and maintain CKD products appropriately to ensure their safe usage.

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.

2 Use this product in accordance with specifications.

This product must be used within its stated specifications. In addition, never modify or additionally machine this product.

This product is intended for use in general industrial machinery equipment or parts. It is not intended for use outdoors (except for products with outdoor specifications) or for use under the following conditions or environments. (Note that this product can be used when CKD is consulted prior to its usage and the customer consents to CKD product specifications. The customer should provide safety measures to avoid danger in the event of problems.)

- ① Use for applications requiring safety, including nuclear energy, railways, aircraft, marine vessels, vehicles, medical devices, devices or applications in contact with beverages or foodstuffs, amusement devices, emergency cutoff circuits, press machines, brake circuits, or safety devices or applications.
- ② Use for applications where life or assets could be significantly affected, and special safety measures are required.

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

ISO4414, JIS B 8370(Pneumatic fluid power - General rules and safety requirements for systems and their components)

JFPS2008 (Principles for pneumatic cylinder selection and use)

Including the High Pressure Gas Safety Act, Industrial Safety and Health Act, other safety rules, organization 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 all systems 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 the warnings and cautions on the following pages to prevent accidents.

■ Precautions are ranked as “DANGER”, “WARNING”, and “CAUTION” in this section.

DANGER: In the case where the product operation is mishandled and/or when the urgency of a dangerous situation is high, it may lead to fatalities or serious injuries.

WARNING: A dangerous situation may occur if handling is mistaken, leading to fatal or serious injuries.

CAUTION: A dangerous situation may occur if handling is mistaken, leading to minor injuries or property damage.

Note that some items indicated with “CAUTION” may lead to serious results depending on the conditions. All items contain important information and must be observed.

Warranty

1 Warranty period

The product specified herein is warranted for one and a half (1.5) years from the date of delivery to the location specified by the customer.

2 Warranty coverage

If the product specified herein fails for reasons attributable to CKD within the warranty period specified above, 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:

- 1) 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 the Instruction Manual.
- 2) Failure caused by use of the product exceeding its durability (cycles, distance, time, etc.) or caused by consumable parts.
- 3) Failure not caused by the product.
- 4) Failure caused by use not intended for the product.
- 5) Failure caused by modifications/alterations or repairs not carried out by CKD.
- 6) Failure caused by reasons unforeseen at the level of technology available at the time of delivery.
- 7) 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.

Note: For details on the durability and consumable parts, contact your nearest CKD sales office.

3 Compatibility check

The customer is responsible for confirming the compatibility of CKD products with the customer's systems, machines and equipment.

Precautions for export

1 Security Trade Control

The products in this catalog and their related technologies may require approval before export or provision. For the sake of maintaining world peace and safety, there may be cases in which approval under the Foreign Exchange and Foreign Trade Control Law is required in advance, depending on the country to where the product or related technology is being exported or provided.

The scope of products and related technologies requiring approval is listed in the Export Trade Control Order Appendix Table 1 or Foreign Exchange Order Appendix Table.

The Export Trade Control Order Appendix Table 1 and Foreign Exchange Order Appendix Table contain the following two types of information:

- List controls, which are specified for items 1 to 15
- “Catch-all controls” that do not indicate specifications by item, but restrict by application (Section 16)

Scope of products or related technologies requiring approval

List controls, which are specified for items 1 to 15

Listed in the “Export Trade Control Order Appendix Table 1” or “Foreign Exchange Order Appendix Table”

Catch-all controls restricted by application (item 16)

Listed in the “Export Trade Control Order Appendix Table 1” or “Foreign Exchange Order Appendix Table”

An application for approval is received by the Security Export Licensing Division of the Ministry of Economy, Trade and Industry or local bureaus of the Ministry of Economy, Trade and Industry.

2 Products and related technologies in this catalog

The products and related technologies in this catalog are subject to the list controls of the Foreign Exchange and Foreign Trade Control Law.

For information on the products or related technologies subject to the list controls of the Foreign Exchange and Foreign Trade Control Law, refer to the applicable product page.

If exporting or providing products or related technologies that fall under the list controls, be sure to obtain export permission under the Foreign Exchange and Foreign Trade Control Law.

In addition, when exporting or providing the products or related technologies in this catalog, ensure that they are not used for arms or weapons.

3 Contact

Contact your local CKD Sales Office for information on the Security Trade Control of products and related technologies in this catalog.

1. Checking the specifications

⚠ WARNING

- Use the product in the range of conditions specified for the product. The product in this catalog is designed for use only in a compressed air system. Use with pressures or temperatures outside the specifications range may result in damage or operation failure. (Refer to specifications) Contact CKD when using fluids other than those specified in the specifications for each component.

2. Safety Design

⚠ WARNING

- Take measures to prevent physical harm or property damage in the event of breakdown.

⚠ CAUTION

- Understand compressed air features before designing a pneumatic circuit.
 - The same functions as mechanical, hydraulic and electrical methods cannot be anticipated if instantaneous service interruption and holding are required during an emergency stop.
 - Pop-out, air discharge, or leakage due to air compression and expansion may occur.
 - Design the circuit so that compressed air in the system is exhausted.
- Decide on a method of lubricating the pneumatic components, and provide correct maintenance.
 - Is it a lubrication type? Is it a no-lubrication type? Specify either of the above for control of lubricant.
- Check for leakage current to avoid malfunction caused by the leakage current.
 - When using a programmable controller, leakage current may cause malfunction.

3. Design by Application

⚠ CAUTION

- Exerts no influence on performance as it uses compressed air and a small amount of leakage is tolerable. Contact CKD if no-leakage is required.

4. Working Environment

⚠ WARNING

- Install the product where it will not be exposed to rain, water or direct sunlight.
- Do not use this product in a corrosive environment. Use in such an environment could lead to damage or operation failure.
- Avoid using this product in environments where ozone is generated. Consult with CKD if ozone is generated in the air supply, as an ozone-resistant series is available.
- If ambient temperature is less than 5°C, moisture in the circuit could freeze and lead to misoperations, etc. Remove moisture to prevent freezing.

⚠ CAUTION

- Confirm before use that the product will withstand the working environment.
 - This product cannot be used in environments where functional obstacles could occur. Such environments include high temperatures, chemical atmospheres, or those where chemical liquids, vibration, moisture, dripping water, coolant or gas are present. Environments where ozone is generated.

5. Securing of space

⚠ CAUTION

- Secure sufficient space around the pneumatic components for installation, removal, wiring, and piping work.

6. Clearly state in the instruction manual

⚠ CAUTION

- Indicate the maintenance conditions in the device's instruction manual.
 - The product's performance may drop too low to maintain an appropriate safety level depending on usage conditions, working environment and maintenance status. With correct maintenance, the product functions can be used to the fullest.

⚠ CAUTION

1. Mounting

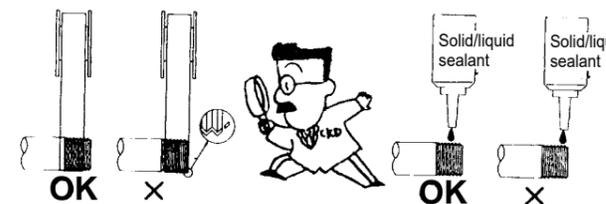
- Do not remove the pneumatic components packaging and the piping port seat cap until just before starting to pipe.
 - If the piping port cap is removed from the piping port before piping work is started, foreign matter could enter the pneumatic component from the piping port and result in faults or faulty operation.
- When mounting a pneumatic components, do not use a mounting method that relies on support from the piping.
- Remove the dust-proof seal of piping port just before starting to pipe.
 - Removing it before starting piping work may cause foreign matter to enter the inside from the piping port, resulting in breakdown malfunction.

2. Pre-operation confirmation

- After connecting the pipes, check pipe connections for air leaks before supplying compressed air.
 - Apply a leakage detection agent on pipe connections with a brush and check for air leaks. Make sure that the leak detection agent does not adhere to the plastic bowl. The plastic bowl could break, which is dangerous.

3. Piping

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



When using a liquid sealant, make sure that it does not adhere to the plastic bowl. The plastic bowl could break, which is dangerous.

- Check that the piping connected to the pneumatic components is not dislocated due to vibration, looseness, or tension.
 - Piping dislocation is dangerous.
- Observe the following precautions when using nylon or urethane tubes as the piping material.
 - Use flame-resistant tubes or metal steel pipes in an environment where spattering may occur.
 - Use a hydraulic hose for common piping for hydraulic and pneumatic specifications.

- When using the standard push-in fitting on the spiral tube, fix the base of the tube with a hose clamp. Rotation may occur, causing a reduction in holding force.
- When using for hot liquids, use a spigot fitting. The push-in fitting cannot be used.

- Connect the piping so that connections are not dislocated by equipment movement, vibration, tension, etc.

- Always flush just before piping pneumatic component.
 - Any foreign matter that has entered the pneumatic components during piping must not enter the valve.

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

[Recommended values]

Port thread	Tightening torque N·m
M3	0.3 to 0.6
M5	1 to 1.5
Rc1/8	3 to 5
Rc1/4	6 to 8
Rc3/8	13 to 15
Rc1/2	16 to 18
Rc3/4	19 to 40
Rc1	41 to 70

Note: If a specific tightening torque is recommended for the model, use the torque.



4. Pneumatic source

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

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

- The pipe connection could dislocate causing the pipe to fly off and result in accidents.
- CAUTION: If compressed air is supplied too slowly, sealing pressure may not be generated depending on the internal sealing mechanism of the solenoid valve and may cause air leaks.

■ Air Quality

- Use CKD clean air system components appropriate for your application.
- Use compressed air that does not contain oil oxides, tar, carbon, etc., from the air compressor.
- Use compressed air that does not contain solid foreign matter.

CAUTION

1. Disassembly / Assembly

- Pneumatic components products must be disassembled and assembled by qualified personnel.
 - Personnel involved in this step must have passed the Pneumatic Pressure Skill Test Class 2 or higher.
- Read the relevant product's instruction manual thoroughly and fully familiarize yourself with the work before disassembling or assembling the pneumatic components.
 - Personnel must be fully familiar with pneumatic component structure and operational principles and safety requirements.

2. Maintenance / Inspection

- Be sure to turn power OFF, stop the compressed air supplied, and check that there is no residual pressure before starting maintenance.
 - This is required to ensure safety.