

Air Operated Fine Pinch Valve HYA Series

INSTRUCTION MANUAL

SM-A38879-A/3



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

PREFACE

Thank you for purchasing CKD's **"HYA Series" air operated fine pinch valve**.

This Instruction Manual contains basic matters such as installation and usage instructions in order to ensure optimal performance of the product. Please read this Instruction Manual thoroughly and use the product properly.

Keep this Instruction Manual in a safe place and be careful not to lose it.

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

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

SAFETY INFORMATION

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

To ensure the safety of device design and control, observe organization standards, relevant laws and regulations, which include the following:

ISO 4414, JIS B 8370, JFPS 2008 (the latest edition of each standard), the High Pressure Gas Safety Act, the Industrial Safety and Health Act, other safety rules, organization standards, relevant laws and regulations




In order to use our products safely, it is important to select, use, handle, and maintain the products properly.

Observe the warnings and precautions described in this Instruction Manual to ensure device safety.

Although various safety measures have been adopted in the product, customer's improper handling may lead to an accident. To avoid this:

**Thoroughly read and understand this Instruction Manual
before using the product.**

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

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

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

Other general precautions and tips on using the product are indicated by the following icon.



Indicates general precautions and tips on using the product.

Precautions on Product Use

WARNING

The product must be handled by a qualified person who has extensive knowledge and experience.

The product is designed and manufactured as a device or part for general industrial machinery.

Use the product within the specifications.

The product must not be used beyond its specifications. Also, the product must not be modified and additional work on the product must not be performed.

The product is intended for use in devices or parts for general industrial machinery. It is not intended for use outdoors or in the conditions or environment listed below.

- In applications for nuclear power, railroad system, aviation, ship, vehicle, medical equipment, and equipment that directly touches beverage or food.
- For special applications that require safety including amusement equipment, emergency shut-off circuit, press machine, brake circuit, and safety measures.
- For applications where life or properties may be adversely affected and special safety measures are required.

(Exception is made if the customer consults with CKD prior to use and understands the specifications of the product. However, even in that case, safety measures must be taken to avoid danger in case of a possible failure.)

Do not handle the product or remove pipes and devices until confirming safety.

- Inspect and service the machine and devices after confirming the safety of the entire system. Also, turn off the energy source (air supply or water supply) and power to the relevant facility. Release compressed air from the system and use extreme care to avoid water or electric leakage.
- Since there may be hot or live parts even after operation has stopped, use extreme care when handling the product or removing pipes and devices.
- When starting or restarting a machine or device that incorporates pneumatic components, make sure that a safety measure (such as a pop-out prevention mechanism) is in place and system safety is secured.

CAUTION

To export the product, follow the regulations and appropriate export procedures of the exporting country.

When exporting the product from Japan, use the tube recommended by CKD for the product to be assessed as "not applicable" according to the Export Trade Control Order of Japan.

If a tube other than that recommended by CKD is used, depending on the material, the product may be assessed as an "applicable" valve. To export such a valve, a permission from the Minister of Economy, Trade and Industry is required. (Refer to Article 2, paragraph 2, item (vii) in Ordinance of the Ministry Specifying Goods and Technologies Pursuant to Provisions of the Appended Table 1 of the Export Control Order and the Appended Table of the Foreign Exchange Order.)

Precautions on Product Disposal

CAUTION

When disposing of the product, comply with laws pertaining to disposal and cleaning of wastes and have an industrial waste disposal company dispose of the product.

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1. PRODUCT OVERVIEW

1.1 Model Number Indication

HYA - 1 1 1

A Actuation

B Tube outer diameter

C Tube wall thickness

Code		Description		
A Actuation				
1	NC (normally closed)			
2	NO (normally open)			
3	Double-acting			
B Tube outer diameter				
1	1/8" to 7/32" (ϕ 3 to ϕ 6)			
2	1/4" to 3/8" (ϕ 6 to ϕ 10)			
3	7/16" to 9/16" (ϕ 10 to ϕ 15)			
C Tube wall thickness				
		B : Tube outer diameter		
		1	2	3
1	1/32"	●	●	
2	1/16"	●	●	●
3	3/32"		●	●
4	1/8"			●

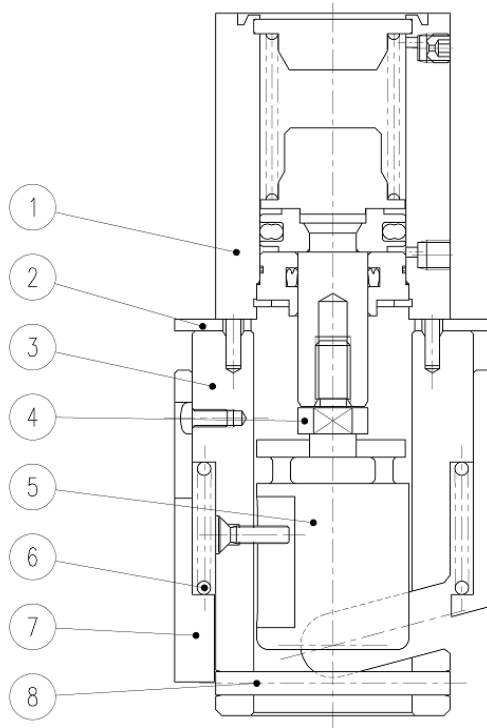
1.2 Specifications

Item	HYA-***		
	HYA-1**	HYA-2**	HYA-3**
Actuation	NC (normally closed)	NO (normally open)	Double-acting
Working pressure MPa	0 to 0.1 Note 1		
Fluid temperature °C	0 to 40 (no freezing)		
Ambient temperature °C	5 to 40		
Frequency times/min	30 or less		
Mounting orientation	No restriction		
Pilot fluid	Compressed air		
Pilot air pressure MPa	0.35 to 0.5		0.2 to 0.4
Recommended tube Note 2	PharMed BPT Tubing TYGON 3350 Tubing		

Note 1: Since the maximum working pressure depends on the tube, check the specifications of the tube to be used.

Note 2: Consult CKD sales staff before using C-Flex tube or other tubes.

1.3 Internal Structure



No.	Part name	Material	
1	Actuator assembly	-	-
2	Bracket	SUS304	Stainless steel
3	Valve A	A5056	Aluminum
4	Joint	SUS303	Stainless steel
5	Valve B	POM	Polyacetal resin
6	Holder spring	SUS304	Stainless steel
7	Holder	POM	Polyacetal resin
8	Parallel pin	SUS303	Stainless steel

2. INSTALLATION

2.1 Environment

WARNING

Consult CKD about the specifications before using the product outside the designated specifications or for special applications.

Do not use the product in the presence of corrosive gas or solvents.

Do not use the product in an environment where corrosive gases such as sulfur dioxide gas or solvents are present.

Do not use the product in a humid environment.

Condensation may occur due to a change in the temperature.

CAUTION

Take measures to prevent dusts from entering the valve.

In a dusty environment, install an elbow fitting facing down or a silencer to the pilot air exhaust port of the valve to prevent dusts from entering.

Use the product in an environment where it is not subject to radiant heat.

Do not paint the product or clean it with water or solvent.

The resin parts can become damaged and this may lead to a failure or malfunction.



- When using in a cold area, take proper measures against freezing.
- The product cannot be used outdoors. Protect the product by installing it inside a cover or a case.
- Do not use the product in an environment where the valve is subject to vibrations or inertia.

2.2 Unpacking

CAUTION

Do not take the product out of the bubble wrap bag until just before piping.

If the product is taken out of the bubble wrap bag, foreign matters may enter from the piping ports and cause a failure or malfunction.

- Check that the model number ordered and the model number indicated on the product are the same.
- Check the exterior of the product for any damage.
- When storing the product, keep it packaged in the individual package box to prevent foreign matters from entering the valve. Take it out of the box when ready to begin piping.

2.3 Mounting

CAUTION

Thoroughly read and understand this Instruction Manual before mounting the product.
Hold the body firmly when handling and mounting the product.
Check for leakage from the pipes after mounting the product and confirm that the product has been mounted properly.



- There is no restriction on the mounting orientation.
- Secure sufficient space for working safely during maintenance and troubleshooting.

2.4 Piping

CAUTION

Secure the product when tightening or piping again.
Secure and support the pipes to prevent the valve from being subjected to pipe loads and vibrations directly.

■ Pipe cleaning

Before piping, flush with air of more than 0.3 MPa to remove foreign matters such as dust, metal powder, rust, and seal tape.

■ Removal of foreign matters

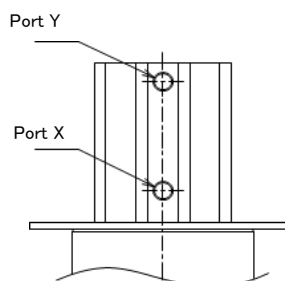
- Dusts and foreign matters in the fluid and rust in the piping may cause an operation fault or leakage. Install a filter of 5 μm or less in the pilot air circuit.

■ Fluid supply port when piping

Pipe the pilot air side supply ports as indicated in the following table.

Pilot air side supply port

Model	Pilot air side supply port
HYA-1**	X
HYA-2**	Y
HYA-3**	X, Y



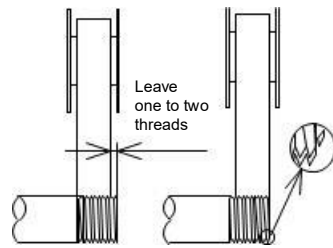
■ Seal material

Apply a seal tape or seal material to the screw threads leaving two or more threads at the pipe end uncovered or uncoated. If the pipe end is fully covered or coated, a shred of seal tape or residue of seal material may enter inside of the valve and cause a failure.

When using a seal tape, wind it around the screw threads in the direction opposite from the screw threads and press it down with your fingers to attach it firmly.

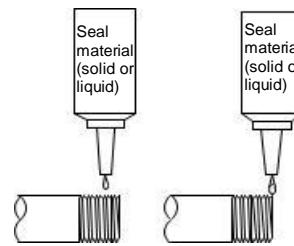
When using a liquid seal material, be careful not to apply it to resin parts. The resin parts can become damaged and this may lead to a failure or malfunction. Also, do not apply seal material to the internal threads.

● Seal tape



Incorrect Correct

● Seal material (solid or liquid)



Incorrect Correct

■ Tightening

For the pipe tightening torque, refer to the following table.

Recommended tightening torque for pilot air port

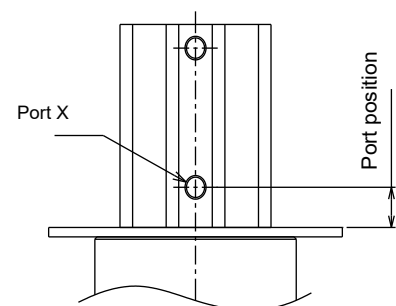
Pipe port size	Recommended tightening torque (N·m)
M5	1 to 1.5
Rc1/8	3 to 5

■ Piping fittings

Since there are restrictions on the piping fittings that can be used on the X port side, refer to the following table.

Piping fittings

Model	Port size	Port position	Outer diameter of usable fitting	Unusable fitting
HYA-11*	M5	8	φ 15 or less	-
HYA-12*		11		
HYA-13*	Rc1/8	8	φ 15 or less	GWS10-6 GWL8-6 GWL10-6
HYA-21*	M5	5.5	φ 11 or less	GWS6-M5
HYA-22*		8	φ 15 or less	-
HYA-23*		11		
HYA-31*		5.5	φ 11 or less	GWS6-M5
HYA-32*		8	φ 11 or less	-
HYA-33*		11		



■ Lubrication

This valve can also be used without lubrication. Although a lubricator is not required, when lubricating, use Class 1 ISO VG32 turbine oil (additive-free).

An operation fault may occur due to the loss of the initial lubricant if lubrication is not continued. Make sure to continue lubrication so as not to run out the lubricant.

■ Measures against drainage of pilot air

Compressed air contains a large amount of drainage such as water, oxidized oil, tar, and foreign matters. Such drainage may cause a significant reduction in the accuracy of the pneumatic component. Take measures against drainage (such as dehumidifying with an aftercooler or a dryer, removing foreign matters with an appropriate filter, or installing a tar removing filter) in order to improve the quality of air.

■ Prevention of entry of dusts

In a dusty environment, install a silencer or a filter to the exhaust port and the breathing hole of pilot air to prevent dusts from entering and causing an operation fault and fluid leakage.

3. USAGE

WARNING

Do not use the product as a valve for ensuring safety such as an emergency shut-off valve.

The product is not designed to be used as a valve for ensuring safety such as an emergency shut-off valve. If using the product for such a system, take appropriate measures in advance to secure safety.

Take necessary measures for preventing people and properties from being affected by a failure of the product.

CAUTION

Use the product within the specified pressure range.

Carry out a test operation before starting an operation if the product has been left unused for more than one month.

3.1 Checks to Make Before Use (Checks Made After Mounting)

WARNING

Close the main cock and discharge the fluid in the tube before performing an appearance check.

■ Appearance check

- Check that the valve is securely fixed to the mounting hole by pressing it by hand.
- Check that the threaded parts such as hexagon socket head bolts are not loose.

■ Leakage check

- Pressurize the pilot air to check for leakage from the piping connection.
- It is recommended to check for leakage by supplying compressed air (0.3 MPa to 0.5 MPa) and applying soapy water to see if bubbles form.

3.2 Safety Instructions

- Make sure to insert the tube into the designated position.
- Use the recommended tube. If using a tube other than the recommended tube, the performance may not be satisfied.

Recommended tube: PharMed BPT Tubing, TYGON 3350 Tubing



- Observe the working pressure, fluid temperature, and ambient temperature.

If the tube is left attached for a long period, the tube can stick shut and may not open due to the nature of the tube and the characteristics of the working fluid. If the tube sticks shut and cannot be opened, replace the tube or take measures such as pressurizing the tube to open or manually unsticking the tube.

- When an abnormality is found, refer to "5 TROUBLESHOOTING".

4. MAINTENANCE AND INSPECTION

WARNING

Thoroughly read and understand this Instruction Manual before maintenance and inspection.

4.1 Maintenance Parts

There are no maintenance parts for this product. If an abnormality such as leakage or failure is found while using the product, contact your nearest CKD sales office or distributor.

4.2 Periodic Inspection

- In order to use the product under optimum conditions, perform a periodic inspection every six months.
- For details on inspection, refer to "3.1 Checks to Make Before Use (Checks Made After Mounting)" in this Instruction Manual.
- Check that there are no dusts or foreign matters adhering to the inside of the tube.
- Make sure that the tube is securely attached.

4.3 Disassembling and Assembling

WARNING

Do not disassemble or modify the product.

It is very dangerous, as a spring is incorporated.

Disassembling the product will void the warranty.

5. TROUBLESHOOTING

5.1 Problems, Causes, and Solutions

If the product does not operate as intended, check the table below for a possible solution.

Problem	Cause	Solution
Valve does not open.	Fluid pressure is outside the specified pressure range.	Adjust the pressure.
	Flow path is clogged with foreign matters.	Replace the product.
	Foreign matters are stuck in actuator.	Replace the product.
	Tube is stick shut.	Replace the tube.
Valve does not close.	Fluid pressure is outside the specified pressure range.	Adjust the pressure.
	Flow path is clogged with foreign matters.	Replace the product.
	Foreign matters are stuck in actuator.	Replace the product.
	Tube is stick shut.	Replace the tube.
There is external leakage.	Tube is damaged or deformed.	Replace the tube.
There is internal leakage.	Fluid pressure is outside the specified pressure range.	Adjust the pressure.
	There are abrasions and scratches on tube.	Replace the tube.
	There are foreign matters caught inside tube.	Replace the tube.

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

6. WARRANTY PROVISIONS

6.1 Warranty Conditions

■ Warranty coverage

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

However, following failures are excluded from this warranty:

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

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

■ Confirmation of product compatibility

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

■ Others

The terms and conditions of this warranty stipulate basic matters.

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

6.2 Warranty Period

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