

Piezo Control Valve Instruction Manual

CV-3000 Series

Safety Precautions

⚠ WARNING Incorrect handling may cause death or injury

- Before connecting the fittings, check that no damage or defects are found on the fittings. Make connections properly and make sure that a leak test is conducted before actual operation to prevent fluid from leaking into the atmosphere (Hereafter, the measured fluid is called "gas" or "fluid").
- DO NOT** apply any corrosive fluid to materials exposed to gas. Corrosion may cause gas to leak into the atmosphere.
- This device is not designed as an explosion proof structure. **DO NOT** use this device in a place where explosion-proof structures are required. Doing so may cause fire or explosion.

⚠ CAUTION Incorrect handling may lead to medium or slight injury or may cause damage to, or loss of, facilities or equipment

- Observe the precautions listed in the WARNING (above).
- Strictly observe the electrical specifications. Not doing so may cause fire, damage to sensors or malfunction.
- This device is not designed to be waterproof. **DO NOT** locate this device outdoors or in a place where it may be splashed with water. Doing so may cause fire, trouble, or malfunction of the device.
- DO NOT** modify this device. It may cause fire or other problems.
- While a power supply is applied to the device, +15VDC and -15VDC must be applied simultaneously. If only +15VDC or -15VDC is applied, electronic circuits will become unstable and it may cause a malfunction.
- This device is not designed to handle hot swap. Please avoid attaching and removing the power supply connector and interface connector with the power switched on. Attachment and/or removal with the power on may result in failure of the device.
- This device is a precious device, please handle it carefully. Dropping down or handling it carelessly will cause damage. Please use assist instrument while moving or setting the device.
- Regular maintenance is recommended for steady use of this device (Recommended proofreading frequency is once a year).

1. Introduction

This manual explains basic operation of the piezo control valve CV-3000 series (Hereafter, it is called "CV"). Please read through this manual carefully to familiarize yourself with the features of this device.

2. Summary

The CV is a high-speed response valve for controlling the flow rate or pressure of gas by the control input from an external device.

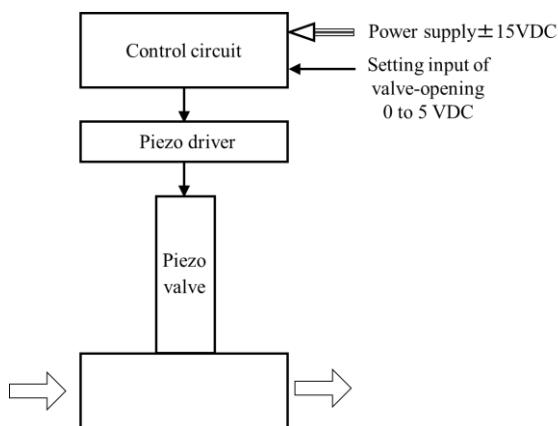
3. Features

The CV is the following features.

- Equipped with a high-speed, high-performance piezoelectric actuator.
- Superior corrosion resistant sealing materials make maintenance easy.
- By using a metal case and various types of filters, steady operation can achieve even in an environment of high-frequency noise and stationary magnetic field.
- RoHS compliant

4. Structure

The CV consists of piezo valve, control circuit, piezo driver.

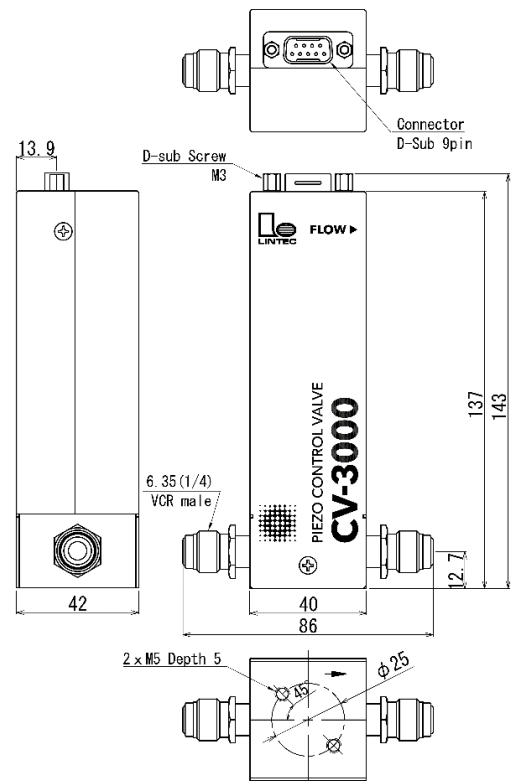


5. Specification / Dimensions

(1) Specification

Name		Piezo Control Valve	
Model	CV-3102	CV-3202	
Standard flow rate in nitrogen	~5LM	~10LM	
Valve operation mode	Normally open valve / Normally closed valve		
Internal surface treatment	No treatment / Precision polishing (LEP)		
Minimum controllable flow rate	2%F.S.		
Setting input of valve-opening	0 to 5VDC		
Response time	Less than 0.5 second		
Operating differential pressure	50 to 300kPa(D)	Normally open 50 to 300kPa(D)	Normally closed 100 to 300kPa(D)
Maximum operating pressure	300kPa(G)		
Withstanding pressure	1MPa(G)		
Operating / Storage temperature & Humidity	0 to 50°C 0 to 80%RH (Condensation should be avoided)		
Leak integrity	Less than $1 \times 10^{-11} \text{Pa} \cdot \text{m}^3/\text{sec}$ (He)		
Mounting direction	Free		
Wetted materials	Stainless steel 316L, PCTFE, Au		
Seal Materials	Au		
Actuator	Piezoelectric actuator		
Fittings	6.35VCR		
Power supply	+15VDC \pm 3% : 50mA -15VDC \pm 3% : 50mA		
Weight	Approx. 700g		

(2) Dimensions



6. Ordering information

CV-3*02 - MO - 4VR5 AAA00 - dd - ee - ff
 [1] [2] [3] [4] [5] [6] [7]

[1] Series model: CV: Control Valve
 CV-3102, CV-3202

[2] Valve mode

NO: Normally open (No treatment), MO: Normally open (LEP)
 NC: Normally close (No treatment), MC: Normally close (LEP)

[3] Fitting

4VR5:6.35mm VCR86

※ Please consult for more information.

[4] Optional

Default setting is labeled "AAA00". Please consult for more information.

[5] Gas type

[6] Full scale flow rate

[7] Flow rate unit

CCM, LM

7. Connection

(1) Analog interface connector

Mounted connector : D-Sub 9 pin(male)

Pair connector : D-Sub 9 pin(female) (Fixed size of screw : M3)

Pin No.	Single name	Function
1	Valve on-off input (Note1)	+15VDC: OPEN, -15VDC: CLOSE
2	N.C.	N.C.
3	Power supply input +15VDC±3%	Power supply (plus) 50mA
4	Power supply COMMON	COMMON ±15VDC
5	Power supply input -15VDC±3%	Power supply (minus) 50mA
6	Setting input of valve-opening voltage (Hi) 0 to 5VDC	Setting voltage plus side 0 to 5VDC
7	N.C.	N.C.
8	Setting input of valve-opening voltage (Lo) 0 to 5VDC	Setting voltage minus side 0 to 5VDC
9	N.C.	N.C.

Note1) Input impedance of flow rate setting signal is 100kΩ. Valve override impedance is 100kΩ.

The initial flow rate setting input is the single end input mode. Please change the side switch into the lower position when you use the quasi-differential input mode.

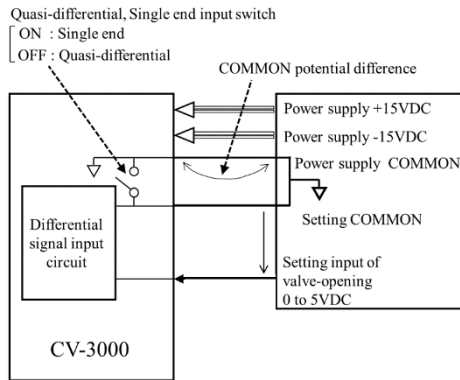
Please do not connect anything with N.C..

(2) Input switch

The toggle switch on the side of the CV is the selection switch for changing the input setting mode. The single end mode is the upper position. The quasi-differential input mode is the lower position.

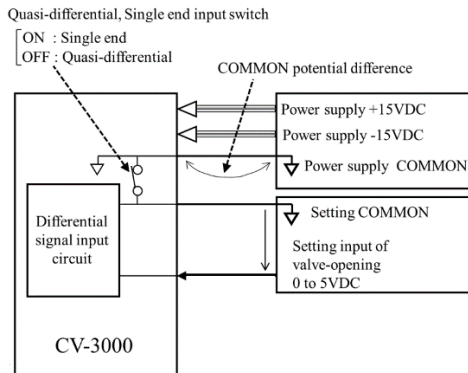
1) Quasi-differential input

Use the quasi-differential input mode when both the COMMON of the power supply and the COMMON of the setting signal make a common. Using the CV in the single end mode will result in voltage error in the COMMON due to signal transportation.



2) Single end input

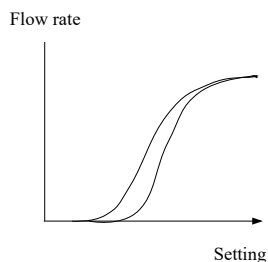
Use the single end mode when both the COMMON terminal of the CV power supply and the COMMON terminal of the setting signal are in a floating condition.



8. Valve characteristics

(1) Flow rate Characteristics

The relation between the setting voltage and the flow rate of the CV is not linear, as shown in the figure. Also, the piezoelectric actuator exhibits hysteresis. Therefore care should be taken if the CV is used in the open-loop mode. The valve fully closes with zero 0VDC, and fully opens with five 5VDC of the valve setting voltage, for both normally open and normally closed valves.



(2) Flow range

The maximum flow range is not accurate. It changes greatly depending on the type of fluid, the pressure, and the environmental temperature, etc.

10. Operation

(1) Procedure

- 1) This product is packed in a clean room before shipment. Please break the seals in a clean room after taking it out of its box.
- 2) Check the gas type and flow rate, and check the direction of the gas flow and the CV before installation.
- 3) Check for gas leaks from the tubing with a helium (He) leak detector.
- 4) Connect the interface connectors according to the Connector tale.
- 5) Power requirements are +15VDC: 50mA and -15VDC: 50mA. Check the voltage, polarity, and capacitance of the power supply voltage.
- 6) Turn on power supply and let the equipment warm up for at least 5 minutes (Recommended time: 30min).
- 7) Complete shut off cannot be achieved with the CV. If complete shut off is desired, a shut-off valve should be installed.
- 8) When a highly reactive gas is used, thoroughly purge all foreign matter from the tubing and the CV before operation.
- 9) When contaminated gas is used, install a filter at the equipment inlet.
- 10) Use the CV within the range of the operating temperature (5 to 50°C).
- 11) Do not switch the power supply on and off within one second. It may cause failure.
- 12) When it is used as a feedback control of flow rate and pressure, the operation output voltage of the PID controller should be 0 to 5 VDC. Choose a device with output voltage of 0 to 5 VDC.
- 13) When using the Lintec MFC power supply, the built-in power supply and signal setting generator make it easy to set up a system like an MFC.

(2) Valve control signal

The CV features a forced valve open/close input function.

The connector pin No.1 is used to input the internal valve open/close signal.

By inputting this signal, a forced opening/closing of the internal valve can be performed without depending on the value of the flow rate preset signal.

When +15VDC is input: fully open

When -15VDC is input: fully closed.

11. Product warranty

(1) Period

This product is guaranteed for a period of 1 year from date of shipment. Defects are repaired according to the following regulations.

(2) Scope

Warranty coverage is restricted to this product only. Any other damage caused by this product is not covered.

(3) Disclaimer facts

The following repairs are not covered by the warranty:

- 1) Failure caused by by-product of fluid used.
- 2) Failure caused by misuse (including careless operation) or incorrect repair or modification.
- 3) Failure caused by dropping after purchasing.
- 4) Failure caused by a natural disasters.

Even if the warranty period is still in effect, the following items may not be repaired.

- 1) When the kind of fluid used in the product is unclear.
- 2) The product is returned with fluid remaining inside and safety cannot be confirmed.

This device is a precision instrument. Control may become unstable if electric noise, temperature change of fluid, pulsation of fluid pressure etc. occurs. Please be forewarned.

This instruction manual is subject to revision without notice.

LINTEC CO., LTD.

<http://www.lintec-mfc.co.jp>

Corporate Headquarters

4-1-23 Sekinotsu, Otsu City, Shiga Pref. 520-2277, Japan
TEL. +81-(0)77-536-2210 FAX. +81-(0)77-536-2215

Tokyo Branch Office

3F Hattoni Build., 4-30-14 Yotsuya Shinjyuku-ku Tokyo 160-0004, Japan
TEL. +81-(0)3-5366-2801 FAX. +81-(0)3-3341-3513