Solenoid Control Valve Instruction Manual

CV-1000 Series

Safety Precautions

WARNING **Incorrect handling may cause death or injury**

(1) 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 “liquid” or “fluid”).
(2) **DO NOT** apply any fluids corrosive to the wetted materials. Corrosion may cause fluid to leak into the atmosphere. Check the fluid type to be used in advance.
(3) 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**

(1) Observe the precautions listed in the WARNING (above).
(2) Strictly observe the electrical specifications. Not doing so may cause fire, damage to sensors or malfunction.
(3) 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.
(4) **DO NOT** modify this device. It may cause fire or other problems.
(5) This device is not designed to handle hot swap. Please avoid attaching and removing the power supply connector with the power switched on. Attachment and/or removal with the power on may result in failure of the device.
(6) 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.
(7) 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 solenoid control valve CV-1000 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 liquid control valve equipped with a solenoid actuator. It can operate as a liquid mass flow controller by combining it with a liquid mass flow meter (hereinafter referred to as "LM"). This device is separated into 2 types depending on the way of the connector is attached. Because this device does not include a built-in valve control circuit, input is made directly to the solenoid actuator. When using this device in combination with the LM, please check the power supply voltage and current.

3. Features

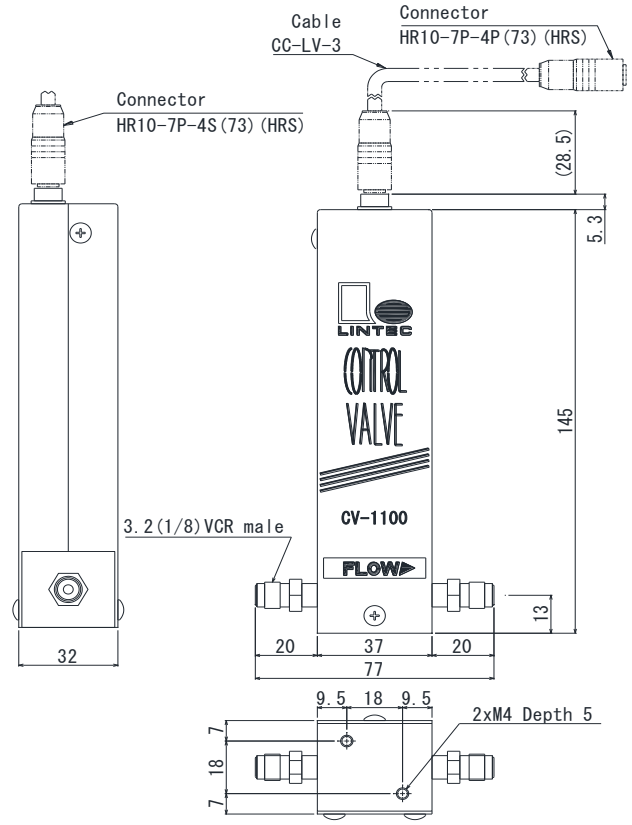
The CV is the following features.
(1) Equipped with a high-speed, high-performance solenoid actuator.
(2) Superior corrosion resistant sealing materials make maintenance easy.
(3) By using a metal case and various types of filters, steady operation can achieve even in an environment of high-frequency noise and stationary magnetic field.
(4) RoHS compliant

4. Specification / Dimensions

(1) Specification

Name		Solenoid Control Valve
Model (Both of models at the right are same spec.)		CV-120*-NC
		CV-1100A (Until 2010)
Flow rate range	C2H5OH	~ 20g/min
	H2O	~ 10g/min
Operating pressure (When pairing with LM)		100 to 300 kPa
Valve operation mode		Normally closed
Maximum operating pressure		300 kPa**(G)**
Withstanding pressure		1 MPa**(G)**
Operating / Storage temperature & Humidity		0 to 50 ℃ / 0 to 80%RH (No dew)
Materials exposed to liquid		Stainless steel 316L, Au, PTFE
Seal Materials / Inner treatment		Au / Machine finish
Leak integrity		Less than 1×10^{-11} Pa･m^3/sec (He)
Connector		HR10-7R-4P (Hirose)
Control voltage / Current		0 to 15 VDC / 200mA Max
Mounting direction		Free
Accessories		CC-LV-3-3M (3000mm) ×1pc
Weight		Approximately 750g

(2) Dimensions (CV-1204-NC-2VR7AAA00)



5. Ordering information

CV-120* – NC – 2VR7 AAA00
[1] [2] [3] [4]

[1] Series model: CV: Control Valve
CV-1204 (Connector : Upward)
CV-1207 (Connector : Downstream side)
[2] Valve mode
NC: Normally close (No treatment)
[3] Fitting
2VR7 : 3.2 mm (1/8”) VCR male Fitting Distance 77 mm
2SW9 : 3.2 mm (1/8”) SWL male Fitting Distance 92.4 mm
4SW9 : 6.35 mm (1/4”) SWL male Fitting Distance 88.4 mm
※ Please consult for more information.
[4] Optional
Default setting is labeled “AAA00”. Please consult for more information.

6. Connection

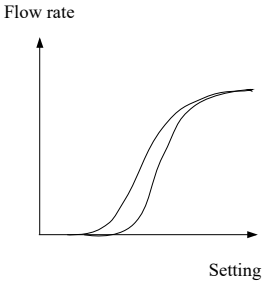
The solenoid valve used in this device is connected directly with the connector. There is no polarity.

Mounted connector: HR10-7R-4P (Hirose)
Pair connector: HR10-7R-4S (Hirose)

Pin No.	Signal name
1	Solenoid terminal
2	
3	N.C.
4	

7. Flow rate characteristics

Hysteresis due to magnetic saturation is a characteristic of solenoid valves. For this reason, the voltage/flow rate characteristics are, as shown in the figure below, not linear. This does not pose a problem when used in combination with the LM as a feedback system, but care needs to be taken when using this device singularly in an open loop.

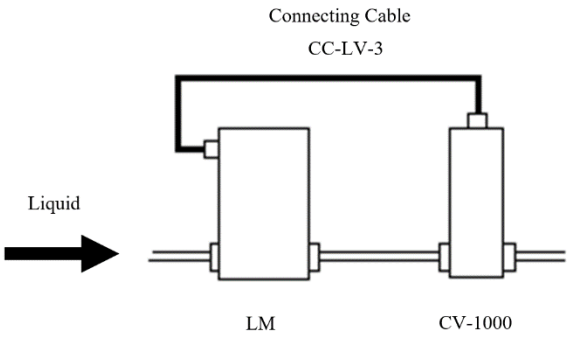


8. Operation

(1) When using in combination with the LM (liquid control)

When using with the LM liquid mass flow meter please connect this device and the LM with the cable provided. The LM has built-in control circuitry for the control of the CV so that additional wiring is not necessary.

Please refer to “Instruction manual of LM” for details.



(2) When using this device only

When using this device in combination with LM or singularly, please take note of the following items.

1) Use a control voltage of within 15VDC. The current consumption at an applied voltage of 15VDC is a maximum 200mA.
2) The control valve is a solenoid actuator. Because this results in an inductance load, please install a reverse current prevention circuit where necessary.
3) The voltage/flow rate characteristics are not linear. Additionally, hysteresis is also present.

(3) Procedure

1) This product is packaged in a clean room before shipment. Please break seals in a clean room after taking it out of packing box.
2) Check the liquid type and flow rate, and the direction of the liquid flow before installation.
3) Check the leaks from tubing with a helium leak detector.
4) Connect the analog interface connectors according to the connector table in “Instruction manual of LM”. Please use CC-LV-3 to connect LM and CV.
5) Power requirements are +15VDC:150mA and -15VDC:200mA. Check the voltage, polarity and capacitance of power supply voltage.
6) Turn on the power supply and let the equipment warm up for 5 minutes (Recommended time : 30min.).
7) Adjust the zero point by pressing the zero-adjustment switch located on the top of the equipment. **Before zero adjustment, check that liquid is not being supplied and the device was warmed up for 30 minutes or more in order to ensure sensor stability.**
8) Input the flow rate setting signal and supply liquid with required differential pressure to the LM. The LM will begin to control the liquid flow in proportion to the preset voltage. Full-scale voltage is 5VDC. Maximum input voltage is ±15.5VDC.
9) When the output flow rate signal is used, the tolerance voltage of the external device should be more than ±15.5VDC. When it’s connected, the output valve may be within the range of the maximum voltage ±15.5VDC.
10) When a highly reactive liquid is used, please thoroughly purge the tubing and the LM before operation.
11) When contaminated liquid is used, install a filter at the equipment inlet.
12) Use the LM within the range of the operating temperature (15 to 35°C), and keep it at the same temperature with the fluid. If used in any other environments that do not meet the above-mentioned requirements, it is unable to measure the flow rate accurately. And it may cause a failure.
13) Do not switch the power supply on and off within one second. It may cause a failure.
14) Helium gas is recommended for pushing the liquid. If any other gas is used, the dissolved gas will produce bubbles, and it may make the control unstable.

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