Vaporizer Unit Instruction Manual

VU-0450N Series

Safety Precautions

WARNING **Incorrect handling can cause serious injury or death.**

(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 liquid and gas from leaking into the atmosphere.
(2) DO NOT apply any corrosive fluid to materials exposed to liquid and gas. Corrosion may cause liquid or gas to leak into the atmosphere. Please confirm the physical properties of liquid or gas before using.
(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.
(4) Prepare temperature controller unit when operating Vaporizer/Heat Exchanger and do not set the temperature over than maximum operating temperature. Wring temperature setting may cause fire or destruction of the device. It is recommended to add abnormal overheating detector if necessary.
(5) This device must be earthed before use. Otherwise, there is the rink of electric shock.
(6) Thermal switch is equipped in Vaporizer/Heat Exchanger to prevent overheating. However, the operating temperature of thermal switch would vary due to operating conditions and ambient temperature.
(7) Attach/remove connector and terminals, please make sure that power supply turning off. It may cause fire or shock hazard.

CAUTION **Incorrect handling can cause 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) Not using the voltage can cause fire, damage to sensors or malfunction or cause electric shock.
(3) This device is not designed to be waterproof. DO NOT locate this product outdoors or in a place where it may be splashed with water. Doing so may cause fire, trouble or malfunction of this product.
(4) DO NOT modify this product. It may cause fire or other problems.
(5) A warm-up period of 60 minutes is recommended after reaching the set temperature. Otherwise, the output gas temperature will be low.
(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) Depends on the character of the liquid and process condition, the temperature of tube, carrier gas, and the VU, also the flow rate of carrier gas should be set properly.
(8) Please use Helium (He) to pressure liquid. It easily lead to bubbles if use N2, Ar, O2, etc, that have higher than Helium (He) solubility to pressure.
(9) Regular maintenance is recommended for the steady use of this product. This product uses a seal material made from the Kalrez®, in order to reduce leakage, Changing the seals annually is recommended. The maintenance cycle changes according to precursor type and operating conditions, so please consult about the maintenance cycle for the steady use of this device.

1. Introduction

This instruction manual explains the basic operation of Vaporizer unit VU-0450N series(Hereafter called "VU"). Please read through this manual carefully to become familiar with the features of this device.

2. Features

The VU has the following features.
(1) By using the VU in combination with the liquid mass flow meter (Hereafter called "LM") and the gas mass flow controller (Hereafter called "MFC"), precise flow control and effective vaporization can be assured.
(2) The functions details of LM are described in the special function manual.
(3) It is vaporized by carrier gas (atomizer gas). Use a MFC to control the gas flow rate.

3. Specification/ Dimensions

(1) Specification

Product name		Vaporizer
Model name		VU-0450N
Precursor Type		All type of precursor (In corrosive precursor)
Power supply		L01: AC100 to 120V L02: AC200 to 240V
Heater		L01:800W L02:800W
Thermal switch (Note1)		Over 230±10°C OPEN Return operating temperature 200±15°C CLOSE Electrical rating (With resistance load) AC125V/15A,250V/10A Min:1A
Maximum operating temperature of VU		200°C
Withstanding pressure (Gauge pressure)		1 MPa(G)
Leak integrity (External Leak)		Less than 1.0×10^{-11} Pa·m^3/sec (He)
Fittings	Precursor inlet	3.2mm (1/8") VCR female
	Carrier gas inlet	6.35mm (1/4") VCR male
	Vapor outlet	12.7mm (1/2") VCR female
Thermocouple for temperature controller		K Type × 1piece
Recommended temperature controller		PID control
Wetted materials		StainlessSteel316L, Au, Ni-Co, Polyimide (SP-1) or PEEK
Mounting direction		Liquid inlet and gas outlet line : horizontal. Connector vertical and up. (Please confirm the outline dimension drawing)
Standard accessories	Thermocouple connector	CMP01-K (RKC) ×1
	Heater/Thermal switch connector	SRCN6A16-7S (JAE) ×1
	LM-VU connect cable	CC-LV-3-3M ×1

Note1) The temperature of thermal switch may be different from the temperature of a point of controlling of VU.

(2) Dimensions (This figure is for "Valve type C: Control valve stand-alone type")

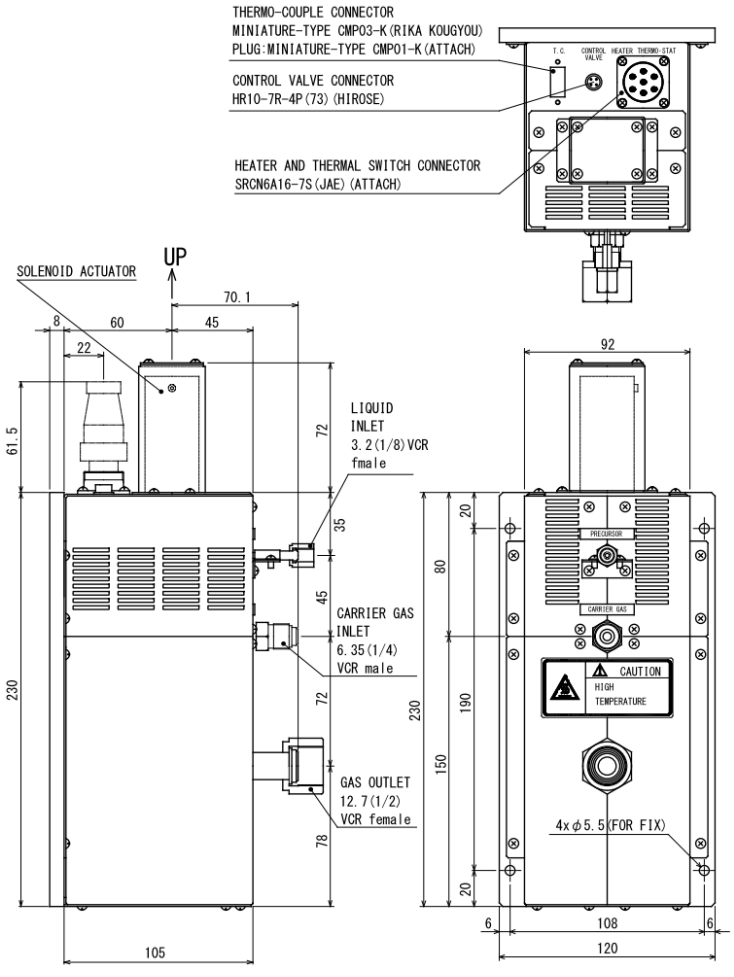


Figure1 External dimensions and components

4. Ordering Information

VU – 0450N	-	C	01	-	03	P	N	N	L01	T23	NNN
[1]		[2]	[3]		[4]	[5]	[6]	[7]	[8]	[9]	[10]

[1] Series model VU: Vaporizer
[2] Valve type
A: Control valve and Shut-off valve all-in-one type
C: Control valve stand-alone type
F: Shut-off valve stand-alone type
[3] Carrier gas
01: Carrier gas type 1 to 09: Carrier gas type 9
[4] Capillary
03: Capillary type 3 05: Capillary type 5
10: Capillary type 10
[5] Valve
P: Polyimide E: PEEK
[6] Seal
N: Au K: Kalrez®
[7] Internal surface treatment
N: No treatment M: Electrical polishing(EP)
[8] Heater
L01: AC100 to 120V L02: AC200 to 240V
[9] Thermal switch
T23: 230±10°C
[10] Option
NNN: Standard specifications
※Notation other than NNN means customer options. The specification will be different from this specification sheet, please refer to specific specification sheet. Please notice that the pin assignment may be different as well.

5. Electrical Connection

(1) Heater/Thermal switch connector
Mounted connector : SRCN2A16-7P (JAE)
Pair connector : SRCN6A16-7S (JAE)

Pin No.	Signal name
1	Heater power supply
2	Heater power supply
3	N.C.
4	N.C.
5	Thermal switch
6	Thermal switch
7	Case Gnd.

(2) LM-VU connector
Mounted connector : HR-10-7R-4P (73) (Hirose)
Pair connector : HR-10-7P-4S (73) (Hirose)

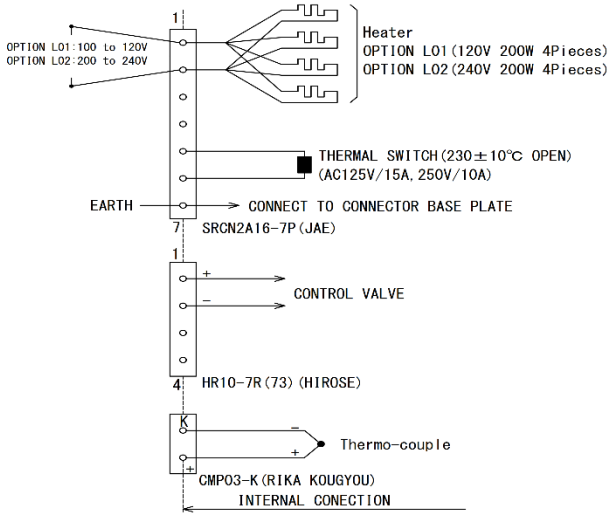
Pin No.	Signal name
1	Valve control signal
2	Valve control signal (-15VDC)
3,4	N.C.

Cable: CC-LV-3-3M

(3) Thermocouple connector
Mounted connector : CMP03-K (RKC Instrument Inc.)
Pair connector : CMP01-K (RKC Instrument Inc.)

Pin No.	Signal name
K	K Type Thermo-couple (-)
+	K Type Thermo-couple (+)

6. Connection diagram



7. Preparation and Operational Procedure

(1) Check the liquid type and install the VU according to the mounting direction, then attach the VU fittings in the direction of the fluid flow.
(2) Attach filters to liquids and carrier gases lines.
(3) Prepare a LM and attach to the upstream of the VU.
(4) Prepare a MFC including a power supply indicator and cables etc. for carrier gas and attach to the carrier gas line of the VU.
If preheating of the carrier gas is required, attach the LINTEC heat exchanger HX-10A between the MFC and the VU.
(5) Prepare all of the temperature control units and connect to the VU and the outlet tubing heaters.
(6) Electrical connections should be made correctly, taking account of power source voltage, polarity and capacity.
(7) Check that there are no leaks from the fittings using a helium (He) leak detector.
(8) Supply power to the LM and the MFC, and warm-up for 30 minutes.
(9) Turn on the VU and the HX-10A heaters, and 30 to 60 minutes later check that the temperature has reached the set temperature.
(10) Evacuate and purge the tubing line, the LM and the VU to remove moisture, thoroughly.
(11) Control the LM and MFC and introduce the liquid, then vaporized gas will be transported from the outlet. (Note2)

※Please refer to Figure3 for the example of tube connecting.

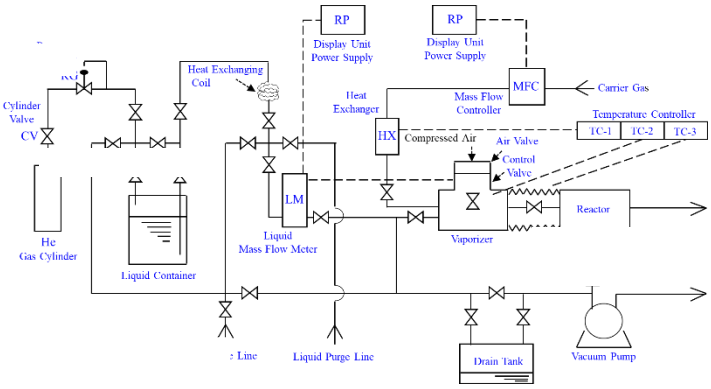


Figure3 An example of tube connection

Note2) It is necessary to set the temperature of the VU and the line and carrier gas flow rates to appropriate values according to the physical properties of the liquid and the process conditions.
·Helium (He) gas is recommended for the pushing gas of the liquid container.

8. Product Warranty

(1) Period
This product is guaranteed for a period of 1 year from the 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 liquid or gas used.
2) Failure caused by misuse (including careless operation), incorrect repair or modification.
3) Failure cause by falling or dropping after purchase.
4) Failure caused by fire, earthquake, flood, lightning or other natural disasters.

Even if the warranty period is still in effect, repair service may not be provided in the following cases.
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 instruction manual is subject to revision without notice.

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