



# Operation Manual

## PRODUCT NAME

Valve for Water and Chemical Base Fluids  
(2/3 Port Air Operated Valve)

## MODEL / Series / Product Number

VCC series

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# Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “**Caution**,” “**Warning**” or “**Danger**.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)<sup>\*1)</sup>, and other safety regulations.

\*1) ISO 4414: Pneumatic fluid power - General rules and safety requirements for systems and their components  
ISO 4413: Hydraulic fluid power - General rules and safety requirements for systems and their components  
IEC 60204-1: Safety of machinery - Electrical equipment of machines - Part 1: General requirements  
ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots  
etc.



## **Danger**

**Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.



## **Warning**

**Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.



## **Caution**

**Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

## **Warning**

### **1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.**

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

### **2. Only personnel with appropriate training should operate machinery and equipment.**

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

### **3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.**

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

### **4. Our products cannot be used beyond their specifications. Our products are not developed, designed, and manufactured to be used under the following conditions or environments. Use under such conditions or environments is not covered.**

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Use for nuclear power, railways, aviation, space equipment, ships, vehicles, military application, equipment affecting human life, body, and property, fuel equipment, entertainment equipment, emergency shut-off circuits, press clutches, brake circuits, safety equipment, etc., and use for applications that do not conform to standard specifications such as catalogs and operation manuals.
3. Use for interlock circuits, except for use with double interlock such as installing a mechanical protection function in case of failure. Please periodically inspect the product to confirm that the product is operating properly.



# Safety Instructions

## Caution

**We develop, design, and manufacture our products to be used for automatic control equipment, and provide them for peaceful use in manufacturing industries.**

**Use in non-manufacturing industries is not covered.**

Products we manufacture and sell cannot be used for the purpose of transactions or certification specified in the Measurement Act.

The new Measurement Act prohibits use of any unit other than SI units in Japan.

## Limited warranty and Disclaimer/Compliance Requirements

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”. Read and accept them before using the product.

### Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.\*2)  
Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.  
This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

**\*2) Vacuum pads are excluded from this 1 year warranty.**

A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.

Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty

### Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.



# VCC Series Specific Product Precautions 1

Be sure to read this before handling the products.

Refer to pages 2 and 3 for Safety Instructions and Handling Precautions for SMC Products (M-03-3) for 2 Port Solenoid Valve for Fluid Control Precautions.

## Design

### Warning

- 1. Cannot be used as an emergency shutoff valve, etc.**  
The valves presented in this catalog are not designed for safety applications such as an emergency shutoff valve. If the valves are used in this type of system, other reliable safety assurance measures should also be adopted.
- 2. Maintenance space**  
The installation should allow sufficient space for maintenance activities.
- 3. When an impact, such as water hammer, etc., caused by the rapid pressure fluctuation is applied, the solenoid valve may be damaged. Use care when handling.**

## Selection

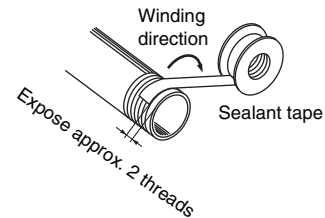
### Warning

- 1. Confirm the specifications.**  
Give careful consideration to the operating conditions such as the application, fluid and environment, and use within the operating ranges specified in this catalog. Also, be sure to carry out an evaluation using an actual product to ensure that problems do not occur under the working conditions.
- 2. Fluid**
  - 1) Applicable fluid on the list may not be used depending on the operating condition.**  
Give adequate confirmation, and then determine a model, just because the compatibility list shows the general case.
- 3. Air quality**
  - 1) Use clean air.**  
Do not use compressed air which includes chemicals, synthetic oils containing organic solvents, salt or corrosive gases, etc., as it can cause damage or malfunction.
  - 2) Install air filters.**  
Install air filters close to valves at their upstream side. A filtration degree of 5  $\mu\text{m}$  or less should be selected.
  - 3) Install an air dryer or after-cooler, etc.**  
Compressed air that includes excessive drainage may cause malfunction of valves and other pneumatic equipment. To prevent this, install an air dryer or after-cooler, etc.
  - 4) If excessive carbon powder is generated, eliminate it by installing mist separators at the upstream side of valves.**  
If excessive carbon powder is generated by the compressor, it may adhere to the inside of the valves and cause a malfunction.  
Refer to Best Pneumatics No.5 for further details on compressed air quality.
- 4. Ambient environment**  
Use within the operable ambient temperature range. Confirm the compatibility between the product's composition materials and the ambient atmosphere. Be sure that the fluid used does not touch the external surface of the product.
- 5. Countermeasures against static electricity**  
Take measures to prevent static electricity since some fluids can cause static electricity.

## Piping

### Caution

- 1. Preparation before piping**  
Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe.  
Install piping so that it does not apply pulling, pressing, bending or other forces on the valve body.
- 2. Winding of sealant tape**  
When connecting pipes, fittings, etc., be sure that chips from the pipe threads and sealing material do not enter the valve.  
Furthermore, when sealant tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.



- 3. Avoid connecting ground lines to piping, as this may cause electric corrosion of the system.**
- 4. Always tighten threads with the proper tightening torque.**

When attaching fittings to valves, tighten with the proper tightening torque shown below.

#### Tightening Torque for Piping

Connection threads	Proper tightening torque N·m
Rc 1/8	7 to 9
Rc 1/4	12 to 14
G 1/4	9 to 11

- 5. Connection of piping to products**  
When connecting piping to a product, refer to its instruction manual to avoid mistakes regarding the supply port, etc.

## Operating Environment

### Warning

- 1. Do not use the valves in an atmosphere having corrosive gases, chemicals, salt water, water, steam, or where there is direct contact with any of these.**
- 2. Do not use in locations subject to vibration or impact.**
- 3. Do not use in locations where radiated heat will be received from nearby heat sources.**
- 4. Employ suitable protective measures in locations where there is contact with water droplets, oil or welding spatter, etc.**



## VCC Series

# Specific Product Precautions 2

Be sure to read this before handling the products.

Refer to pages 2 and 3 for Safety Instructions and Handling Precautions for SMC Products (M-03-3) for 2 Port Solenoid Valve for Fluid Control Precautions.

### Maintenance

#### **Caution**

##### 1. Filters and strainers

- 1) Be careful regarding clogging of filters and strainers.
- 2) Replace filter elements after one year of use, or earlier if the pressure drop reaches 0.1 MPa.
- 3) Clean strainers when the pressure drop reaches 0.1 MPa.

##### 2. Storage

In case of long term storage after use with heated water, thoroughly remove all moisture to prevent rust and deterioration of rubber materials, etc.

##### 3. Exhaust the drain from an air filter periodically.



# VCC Series

## Specific Product Precautions 3

Be sure to read this before handling the products.

Refer to pages 2 and 3 for Safety Instructions and Handling Precautions for SMC Products (M-03-3) for 2 Port Solenoid Valve for Fluid Control Precautions.

### Design

#### ⚠ Warning

##### 1. Leakage detection port

The valve has leak detection area to completely separate the fluid area and pilot pressure area. If leakage is found, valve replacement and maintenance are necessary immediately. Fluids that solidify or being cured may block the leak detection so port and leak may not be detected.

##### 2. If applying high voltage to the fluid, it must be earthed by using the bolt to mount the base.

Do not use sealing tape when piping, as it may insulate.

### Selection

#### ⚠ Caution

##### 1. Operating fluid

Eliminate all solid material larger than 150 μm in the fluid to avoid valve failure.

### Piping

#### ⚠ Caution

##### 1. Piping to pilot port

Condensation may be formed in the piping to the pilot port, due to factors such as its length. The life of the valve will be shortened if condensed moisture enters the pilot port. To prevent condensation, the installation of a quick exhaust is recommended.

##### 2. Tube attachment/detachment for One-touch fittings/stainless steel fittings

###### 1) Attaching of the tubing

a Divide a tube with no external flaws at a right angle. Use tube cutter TK-1, 2, or 3 when dividing the tube. Do not use pliers, nipper pliers, scissors, etc. This may result in flattening and an inability to join, or the tube falling out and air leakage.

b The outer diameter of polyurethane tubing will expand when internal pressure is applied, and so you may not be able to reattach One-touch fittings. Check the tubing outer diameter of all tubing other than for the release bushing, and reattach the One-touch fittings without dividing the tubing if the outer diameter precision is more than ±0.15 mm. When reattaching the One-touch fittings, check whether the tubing can smoothly pass through the release bushing.

c Grasp the tubing, slowly push it straight (0 to 5°) into the One-touch fitting until it comes to a stop.

d Once pushed all the way in, gently pull the tubing back, and check that it hasn't come all the way out. If not firmly inserted all the way in, it may result in air leakage and the tube falling out.

### Piping

#### ⚠ Caution

e If the union nut is loose, tighten it by hand temporarily. Then, fix the body with the tightening tool, and tighten the union nut with an appropriate wrench, applying the torque shown below.

Fitting size	Appropriate tightening rotations	Equivalent tightening torque N·m
VCK□06	1.5 to 2.0	3 to 8
VCK□08	1.5 to 2.0	4 to 9
VCK□10	1.5 to 2.0	6 to 9
VCK□12	1.5 to 2.0	9 to 12

##### 2) Detaching of the tubing

a Push in the release button sufficiently, pushing the collar evenly.

b Pull the tube out while pressing so that the release button is not returned. If the release button is not pressed sufficiently, gripping will instead increase and it will become harder to pull out.

c Before reusing the detached tube, first cut off the portion of tubing that had been gripped. Using the portion of tubing that had been gripped will lead to air leakage and the tube will become harder to detach.

##### 3. Joining a metal rod accessory

After joining a metal rod accessory (KC series, etc.) to a One-touch fitting, do not use a tube, resin plug, reducer, etc, as it may result in the tube falling out.

##### 4. When attaching a tube, resin plug, metal rod, etc., do not attach while pressing on the release bushing.

##### 5. When using another brand tubing, check whether the tubing material and outer diameter precision meet the following specifications.

1) Nylon tubing within ±0.1 mm

2) Soft nylon tubing within ±0.1 mm

3) Polyurethane tubing within ±0.15 mm, -0.2 mm

If tubing outer diameter tolerance is not met, do not use if tubing inner diameter differs from our brand.

This may result in inability to join, leakage, the tube falling out, and damage to the fitting.

### Lubrication

#### ⚠ Caution

##### 1. Do not lubricate the valve.

The valve uses white vaseline as lubricant.



# VCC Series

## Specific Product Precautions 4

Be sure to read this before handling the products.

Refer to pages 2 and 3 for Safety Instructions and Handling Precautions for SMC Products (M-03-3) for 2 Port Solenoid Valve for Fluid Control Precautions.

### Maintenance

#### Caution

##### 1. Removing the product

- 1) Shut off the fluid supply and release the fluid pressure in the system.
- 2) Dismount the product.

##### 2. Low frequency operation

Switch valves at least once every 30 days to prevent malfunction. Also, in order to use it under the optimum state, conduct a regular inspection once a half year.

##### 3. Stoppage of line

When the line is stopped for a long time, clean the valve so that fluid (paint, ink, etc.) does not solidify or being cured.

##### 4. Prolonged usage

Leakage may occur with fittings and tube material as they change over time. Additionally tighten union nuts. Additional tightening should be 1/6 to 1/4 turn. If leakage occurs even after additional tightening, replace the sleeve with a new one.

##### 5. Due to the characteristics of the material (Special FKM), the compression value of the O-rings of the VCC series is higher. Therefore, when disassembly or rearrangement of the product is performed, leakage may occur if the O-rings are not replaced. If disassembly or rearrangement is performed, replace the O-rings with new O-rings.

##### 6. If disassembly, rearrangement, or maintenance is performed, perform sufficient safety checks before operating the system. In addition, SMC assumes no responsibility concerning damage caused by methods other than those described in the catalog and operation manual.

### Return of Product

#### Warning

If the product to be returned is contaminated or is possibly contaminated with substances that are harmful to humans, for safety reasons, please contact SMC beforehand and then employ a specialist cleaning company to decontaminate the product. After the decontamination prescribed above has been carried out, submit a Product Return Request Sheet or the Detoxification/Decontamination Certificate to SMC and await SMC's approval and further instructions before attempting to return the item.

Please refer to the International Chemical Safety Cards (ICSC) for a list of harmful substances.



# Valve for Water and Chemical Base Fluids (2/3 Port Air Operated Valve)

# VCC Series

## How to Order

### Valve

VCC1 **2** - **00**

#### Passage number

<b>2</b>	2 port valve
<b>3</b>	3 port valve <small>Note 2)</small>
<b>2D</b>	2 port/Diaphragm type (Applicable for 2 liquid paint)

Note 1) Valves must be mounted in the right direction.

Refer to page 19.

Note 2) Pressure cannot be applied from a 3 port valve RETURN port.

#### Port size

<b>00</b>	For manifold mounting
<b>02</b>	Rc1/4 (for single unit) <small>Note)</small>
<b>02F</b>	G1/4 (for single unit) <small>Note)</small>

Note) Part number for sub-base

For 2 port: VCC12-S-02 [Rc1/4]

02F [G1/4]

For 3 port: VCC13-S-02 [Rc1/4]

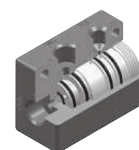
02F [G1/4]



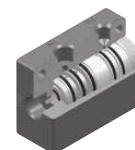
VCC12(D)-00



VCC13-00



VCC12(D)-02(F)



VCC13-02(F)

### Manifold

#### Standard

VV **M** CC1- **06** **06** **C4**

#### Type (Passage number)

<b>2</b>	2 port valve, Cleaning valve
<b>3</b>	3 port valve
<b>M</b>	2/3 port valves mixed mounting

#### Pilot port fitting size

<b>C4</b>	ø4 One-touch fitting (Antistatic)
<b>C6</b>	ø6 One-touch fitting (Antistatic)

#### 2 port valve mountable number

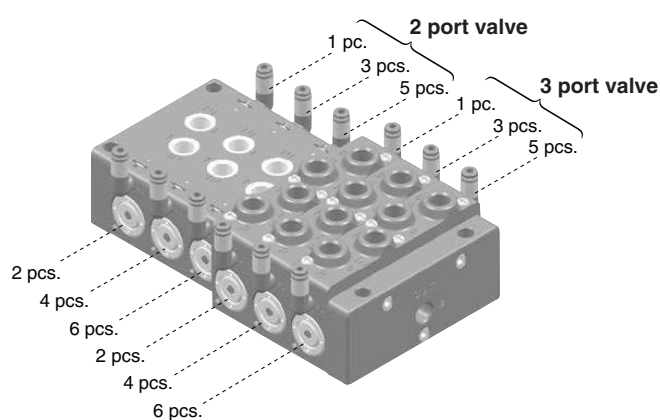
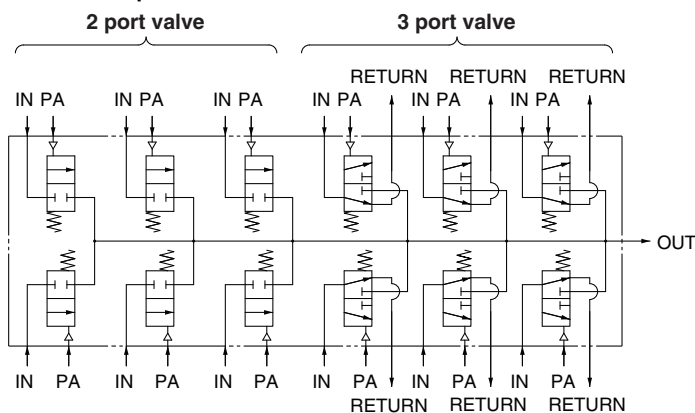
<b>00</b>	No 2 port valves used
<b>02</b>	2 pcs. (colors)
<b>04</b>	4 pcs. (colors)
⋮	⋮

#### 3 port valve mountable number

<b>00</b>	No 3 port valves used
<b>02</b>	2 pcs. (colors)
<b>04</b>	4 pcs. (colors)
⋮	⋮

Note) Maximum mountable valve number: 40 pcs. (in total of 2 port and 3 port valves)

### Circuit example



Refer to page 20 for replacement parts.

**How to Order**

**Manifold**

With gate valve **VV M CC1-02 06 C4-G 04**

**Passage number**

<b>2</b>	2 port valve, Cleaning valve
<b>M</b>	2/3 port valves mixed mounting

**2 port valve mountable number**

<b>00</b>	No 2 port valves used
<b>02</b>	2 pcs. (colors)
<b>04</b>	4 pcs. (colors)
⋮	⋮

**3 port valve mountable number**

<b>00</b>	No 3 port valves used
<b>02</b>	2 pcs. (colors)
<b>04</b>	4 pcs. (colors)
⋮	⋮

Note) Maximum mountable valve number: 40 pcs. (in total of 2 port, 3 port and gate valves)

**Gate valve and cleaning valve mountable number**

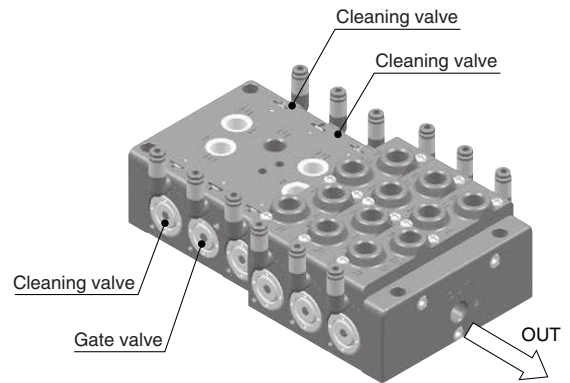
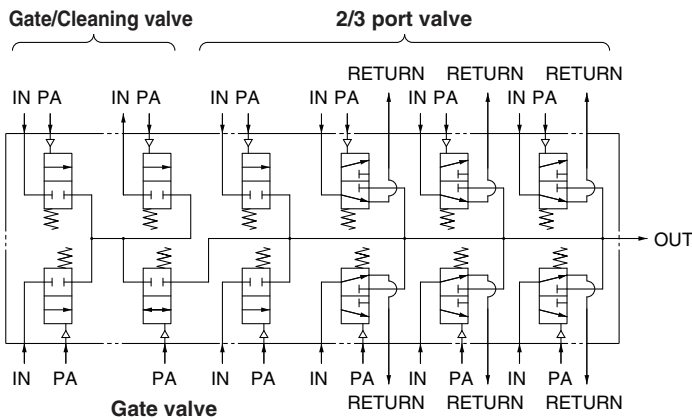
<b>02</b>	Cleaning valve (2 port valve): 1 pc. + Gate valve: 1 pc.
<b>04</b>	Cleaning valve (2 port valve): 3 pcs. + Gate valve: 1 pc.
<b>06</b>	Cleaning valve (2 port valve): 5 pcs. + Gate valve: 1 pc.

**Pilot port fitting size**

<b>C4</b>	ø4 One-touch fitting (Antistatic)
<b>C6</b>	ø6 One-touch fitting (Antistatic)

\* Valve for installation is not included in the manifold model.  
 \* Gate valve and cleaning valve (2 port valve) for installation are not included. They are ordered separately. (Gate valve is equivalent to 2 port valve.)  
 \* When cleaning valve number is an even number, use the blanking plug for 2 port valve.

**Circuit example**



**SUS316L Stainless steel fitting**

**VCK K 0604 -02F**

**Shape**

<b>H</b>	Male connector
<b>K</b>	40° swivel elbow
<b>L</b>	90° swivel elbow

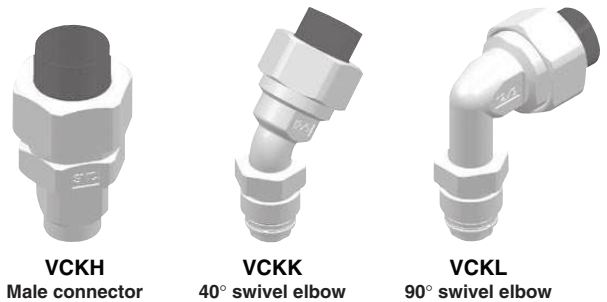
**Port size**

<b>02F</b>	G1/4
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\* G1/4 has special shape of bottom seal. Please refer page 14 for details.

**Applicable tubing (O.D. x I.D.)**

<b>0604</b>	6 x 4
<b>0806</b>	8 x 6
<b>1075</b>	10 x 7.5
<b>1008</b>	10 x 8
<b>1209</b>	12 x 9



Refer to page 20 for replacement parts.

**Option**

**Blanking Plug Assembly**

Type	Model	Description	Qty.
For 2 port valve	<b>VVCC12-10A-1</b>	Blanking plug (with O-ring)	1
		Hexagon socket head plug (R1/4)	1
For 3 port valve	<b>VVCC13-10A-1</b>	Blanking plug (with O-ring)	1
		Hexagon socket head plug (R1/4)	2



# VCC Series

## Specifications

Model	VCC12	VCC13	VCC12D
Passage number	2 port	3 port <sup>Note 3)</sup>	2 port (Diaphragm type)
Construction (Fluid contact material)	Poppet seal (PEEK resin + Stainless steel) + Special fluororesin sliding part		Poppet seal (PEEK resin + Stainless steel) + Special fluororesin diaphragm
Fluid	Water/Chemical base paint, Ink, Cleaning solvent (Water, Butyl acetate), Air		
Operating pressure range (MPa)	0 to 1.0 (Instantaneous pulsation pressure: 1.2)		0 to 0.7 (Instantaneous pulsation pressure: 0.9)
Withstand pressure (MPa)	2		1.5
Pilot pressure (MPa)	0.4 to 0.7		
Orifice diameter (mm)	ø3.8		
Flow rate characteristics Kv(Cv)	IN⇔OUT: 0.28(0.33)	IN⇒OUT: 0.28(0.33) IN⇒RETURN: 0.25(0.3)	IN⇔OUT: 0.28(0.33)
Fluid temperature (°C)	5 to 50		
Ambient temperature (°C)	5 to 50		
Lubrication	Not possible (Initial lubricant: White vaseline is used.)		
Mounting orientation	Unrestricted		
Valve leakage (cm <sup>3</sup> /min)	1 or less (3 port valve IN → RETURN: 20 or less) <sup>Note 1)</sup>		1 or less <sup>Note 2)</sup>

Note 1) Supply pressure: Valve leakage at 1.2 MPa (for air)

Note 2) Supply pressure: Valve leakage at 0.9 MPa (for air)

Note 3) Pressure cannot be applied from a 3 port valve RETURN port.

## SUS316L Stainless Steel Fitting Specifications

Applicable tubing	Nylon/Fluoro tubing
Fluid	Water/Chemical base paint, Ink, Cleaning solvent (Water, Butyl acetate), Air
Max. operating pressure (at 20°C) (MPa)	1.0
Ambient and fluid temperature (°C)	0 to 60

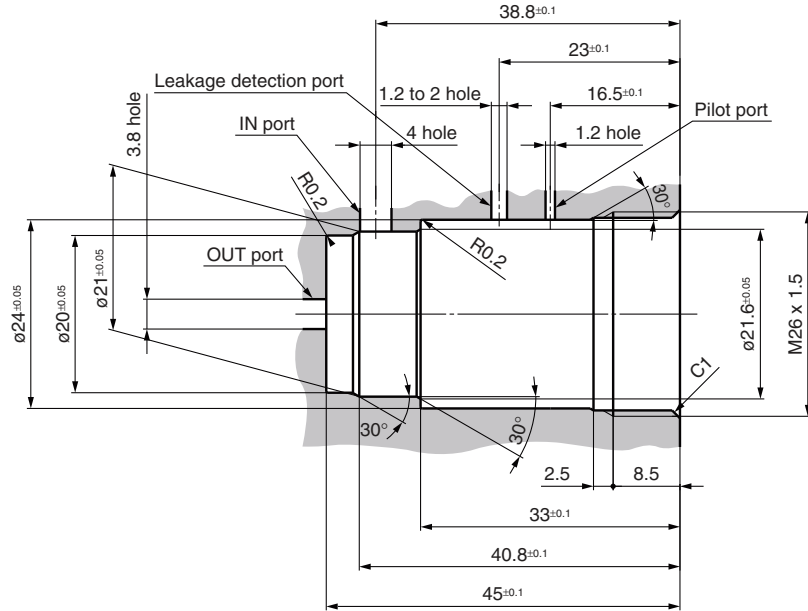
## Weight

Valve	VCC12 (2 port)	37 g	
	VCC13 (3 port)	48 g	
Blanking plug assembly	For 2 port	29 g	
	For 3 port	45 g	
Manifold block * Valves are not attached.	For 2 port (2 stations, one-piece type)	150 g	
	For 3 port (2 stations, one-piece type)	254 g	
	For gate valve	300 g	
End plate	For 2 port	409 g	
	For 3 port	495 g	
	For 2/3 port mixed mounting	452 g	
Fittings	VCKH	ø6	24 g
		ø8	25 g
		ø10	33 g
		ø12	36 g
	VCKK	ø6	25 g
		ø8	26 g
		ø10	32 g
		ø12	37 g
	VCKL	ø6	29 g
		ø8	30 g
		ø10	37 g
		ø12	41 g

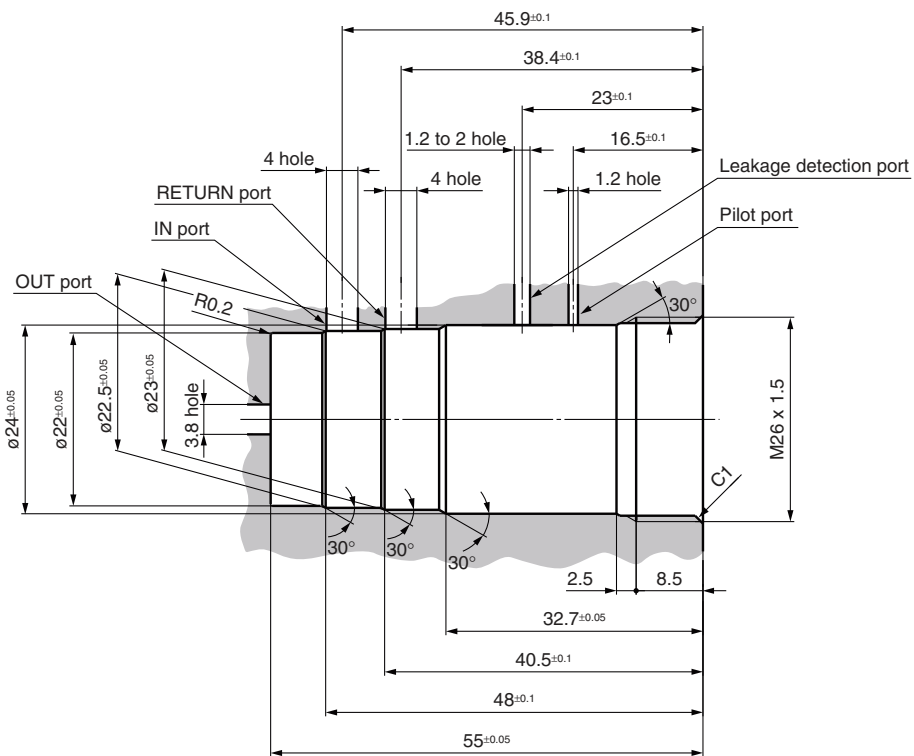
**Dimensions**

Mounting hole dimensions (When valve is built in to the device.)

VCC12(D)-00



VCC13-00

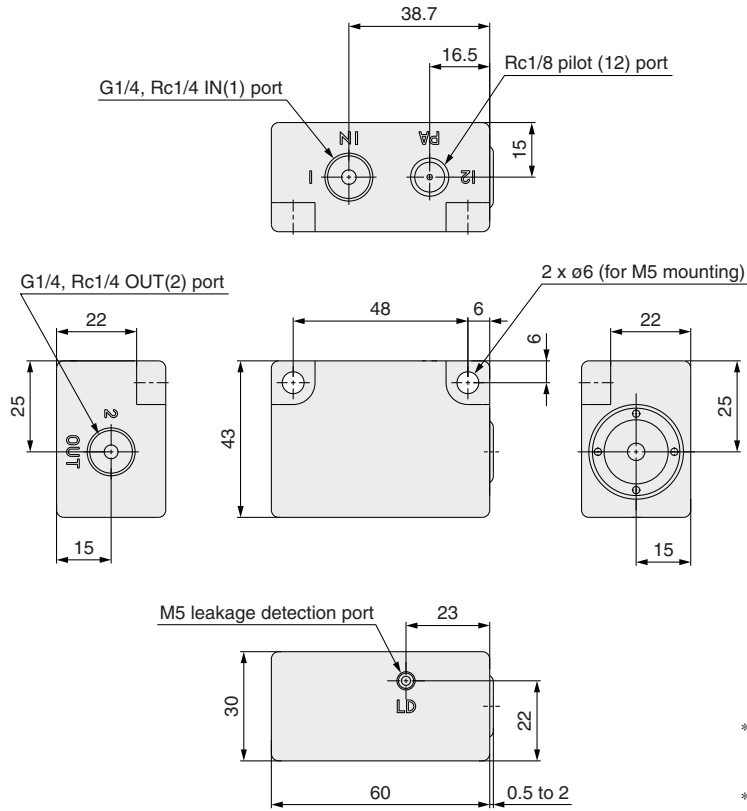


# VCC Series

## Dimensions

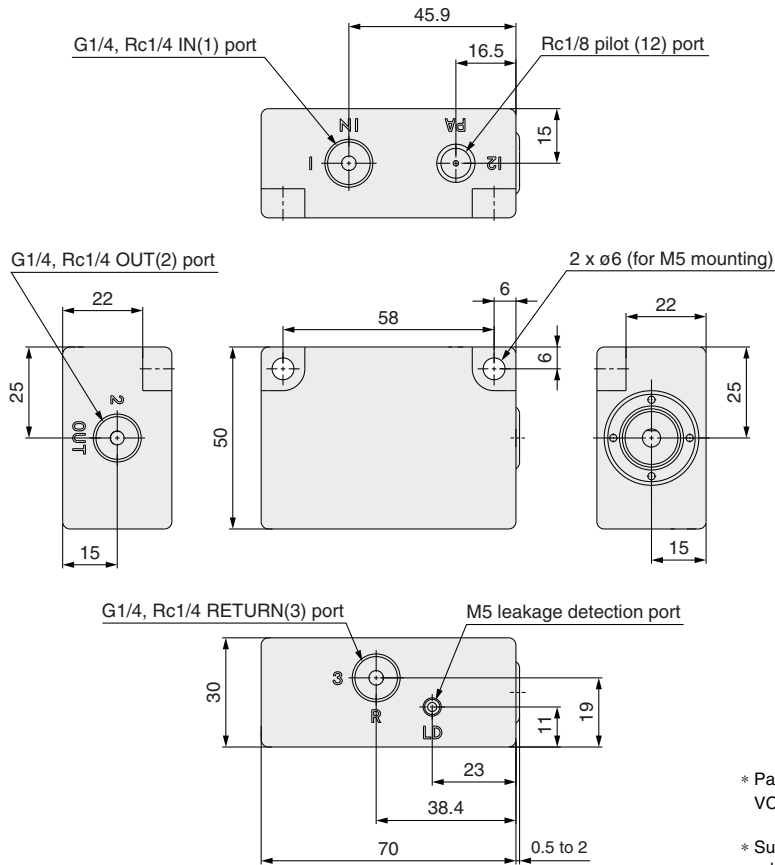
### Single valve unit

#### VCC12(D)-02(F)



\* Part number for sub-base  
 VCC12-S-02 [Rc1/4]  
 02F [G1/4]  
 \* Sub-base material is aluminum  
 + hard anodized containing PTFE.

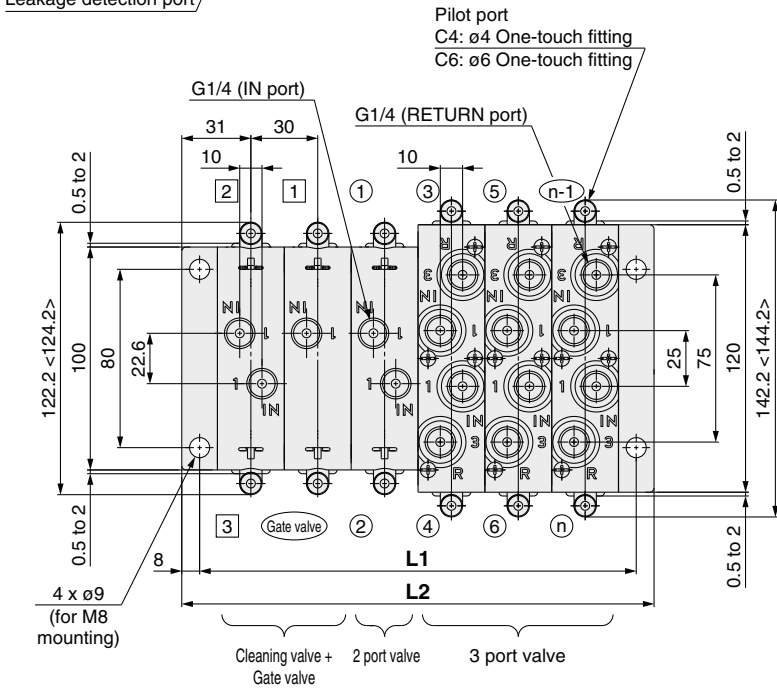
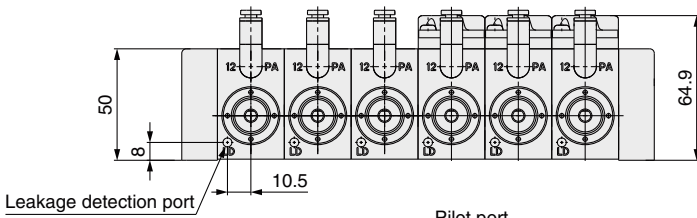
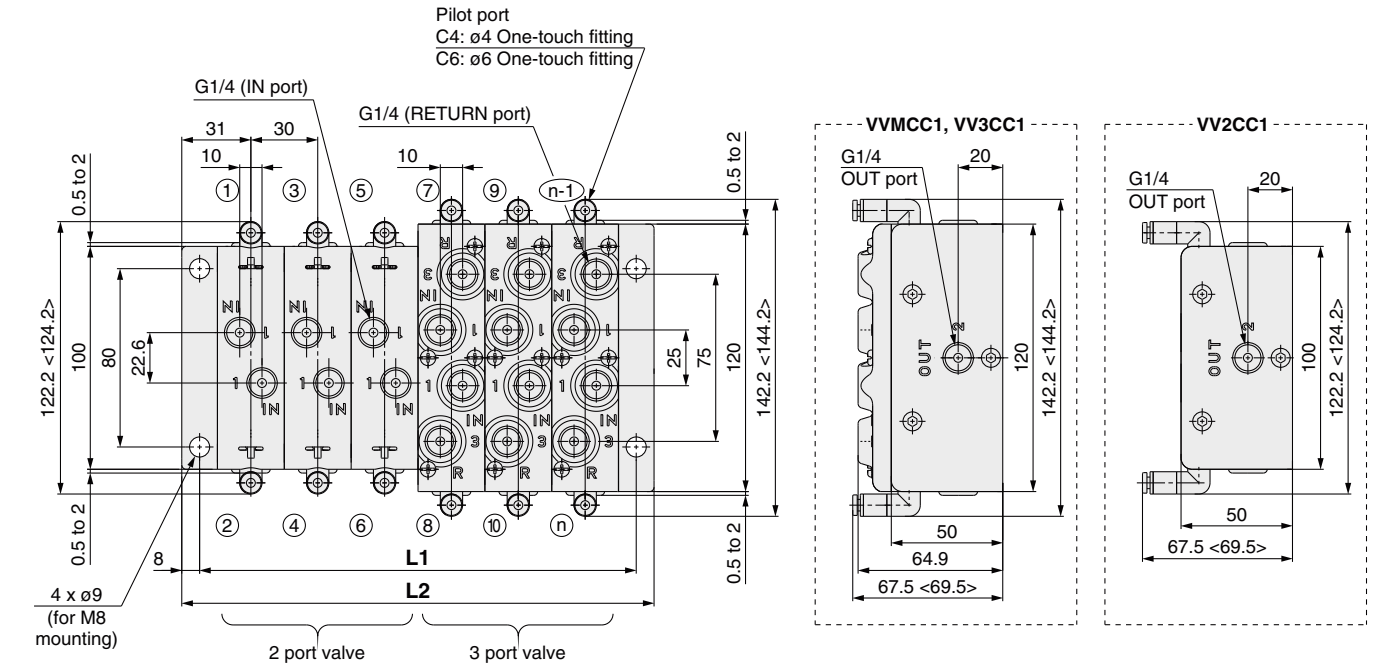
#### VCC13-02(F)



\* Part number for sub-base  
 VCC13-S-02 [Rc1/4]  
 02F [G1/4]  
 \* Sub-base material is aluminum  
 + hard anodized containing PTFE.

## Dimensions

### Manifold



\* Aluminum + hard anodized containing PTFE and POM are used for a part of the manifold material. Refer to page 22 for details.

< >: Pilot port is C6.

$L1 = n / 2 \times 30 + 16$      $L2 = n / 2 \times 30 + 32$

\* n = Number of valves (cleaning valve + gate valve + other valves)

n: Stations (mm)

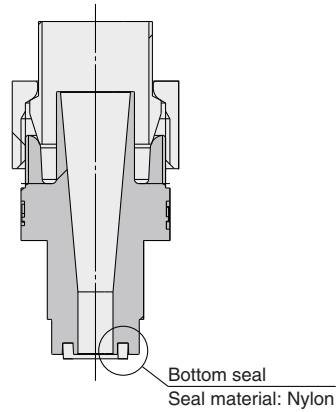
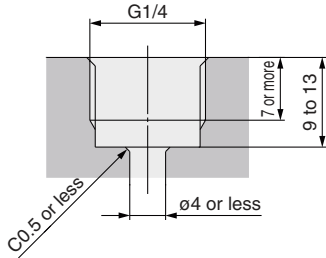
n	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
L1	46	76	106	136	166	196	226	256	286	316	346	376	406	436	466	496	526	556	586	616
L2	62	92	122	152	182	212	242	272	302	332	362	392	422	452	482	512	542	572	602	632

# VCC Series

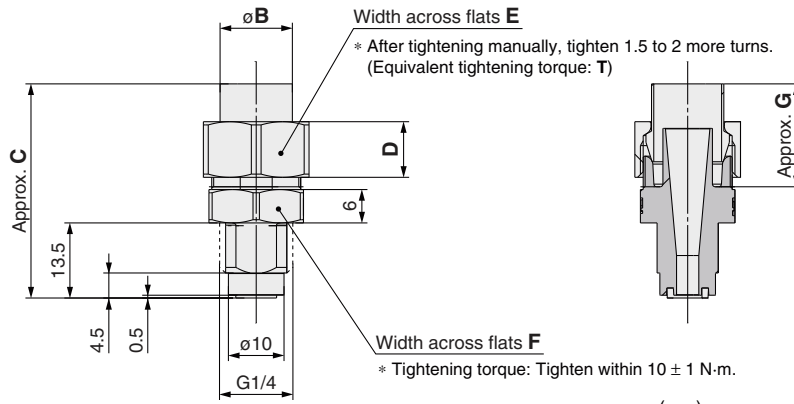
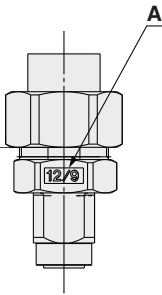
## Dimensions

### SUS316L Stainless steel fittings

#### Mounting female thread recommended dimensions

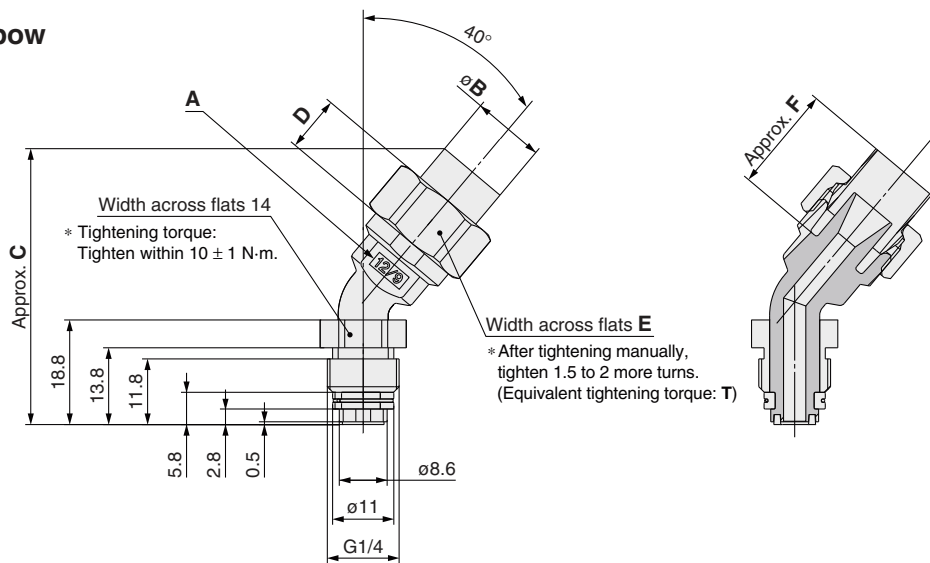
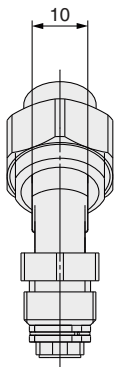


### VCKH Male connector



Part no.	Indication of A	øB	C	D	E	F	G	T
VCKH1209-02F	12/9	13	38.5	10	19	17	18.5	9 to 12 N·m
VCKH1008-02F	10/8	11	38	9	17	17	18.5	6 to 9 N·m
VCKH1075-02F	10-75	11	38	9	17	17	18.5	6 to 9 N·m
VCKH0806-02F	8/6	9	36.5	8	14	14	16	4 to 9 N·m
VCKH0604-02F	6/4	7	36.5	8	12	14	15	3 to 8 N·m

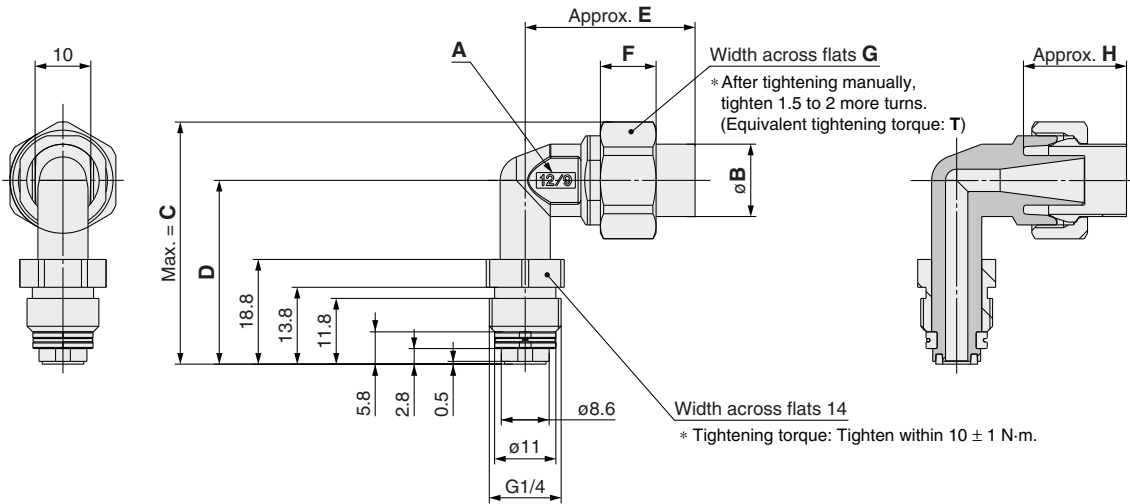
### VCKK 40° swivel elbow



Part no.	Indication of A	øB	C	D	E	F	T
VCKK1209-02F	12/9	13	49.5	10	19	18.5	9 to 12 N·m
VCKK1008-02F	10/8	11	48.5	9	17	18.5	6 to 9 N·m
VCKK1075-02F	10-75	11	48.5	9	17	18.5	6 to 9 N·m
VCKK0806-02F	8/6	9	46	8	14	16	4 to 9 N·m
VCKK0604-02F	6/4	7	45.5	8	12	15	3 to 8 N·m

**Dimensions**

**VCKL 90° swivel elbow**



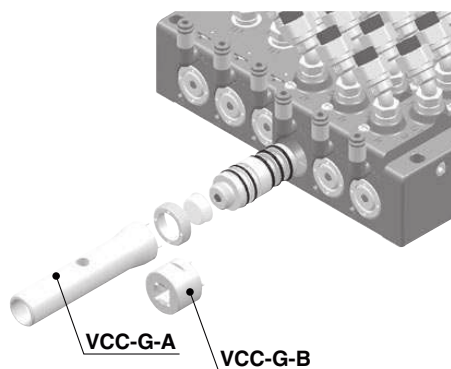
Part no.	Indication of A	øB	C	D	E	F	G	H	T
VCKL1209-02F	12/9	13	43.5	33	30.5	10	19	18.5	9 to 12 N·m
VCKL1008-02F	10/8	11	42.5	33	30	9	17	18.5	6 to 9 N·m
VCKL1075-02F	10·75	11	42.5	33	30	9	17	18.5	6 to 9 N·m
VCKL0806-02F	8/6	9	40	32	27.5	8	14	16	4 to 9 N·m
VCKL0604-02F	6/4	7	38.5	32	27.5	8	12	16	3 to 8 N·m

(mm)

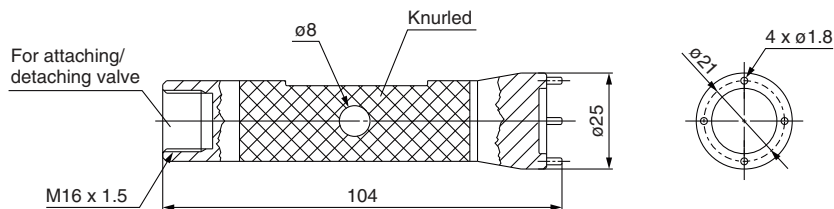


# VCC Series Special Tools

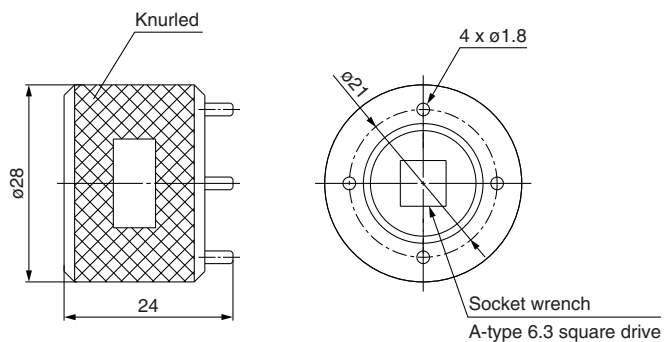
## Tool for Attaching/Detaching Valve



VCC-G-A

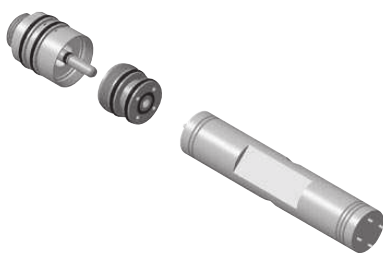


VCC-G-B (for socket wrench)

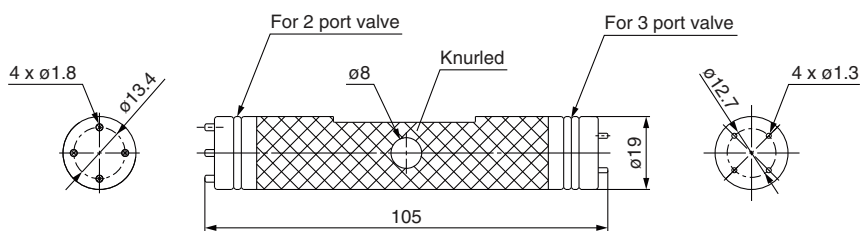


## Tool for Disassembling/Cleaning Valve Element

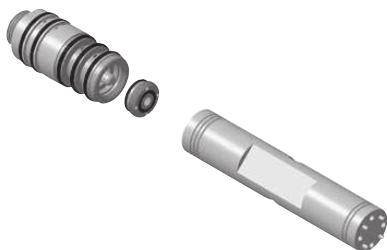
VCC12(D) 2 port valve



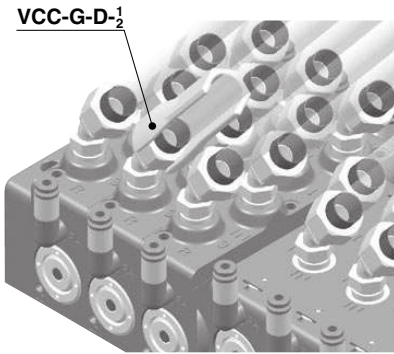
VCC-G-C



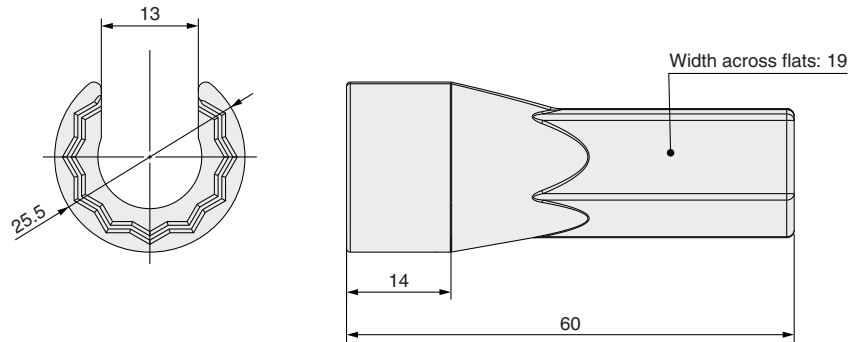
VCC13 3 port valve



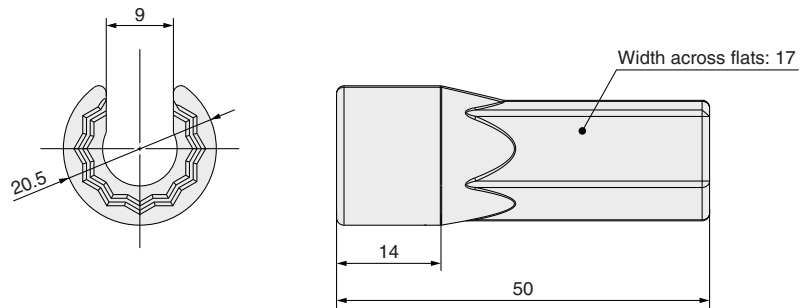
**Union Nut Socket**



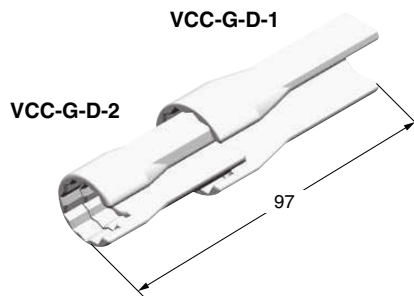
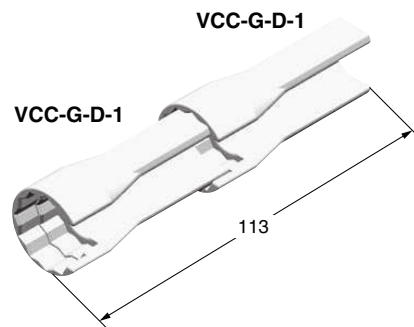
**VCC-G-D-1 (Applicable fitting VCK□<sup>1209</sup><sub>1008</sub><sup>1075</sup>)**



**VCC-G-D-2 (Applicable fitting VCK□<sup>0806</sup><sub>0604)</sub>**



**For extending the socket**

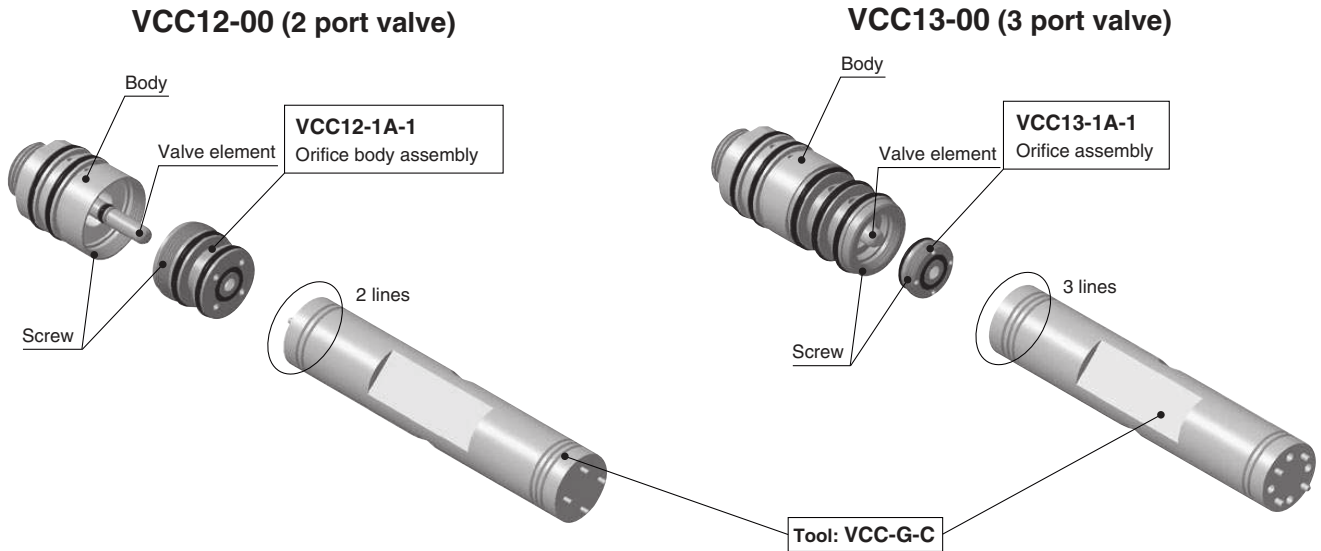


# VCC Series

# Disassembly/Assembly/ Maintenance Procedure

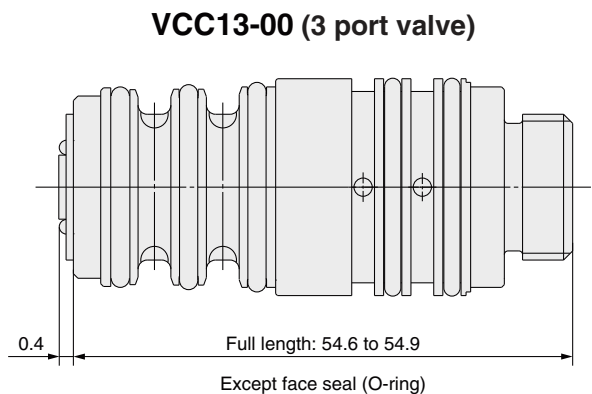
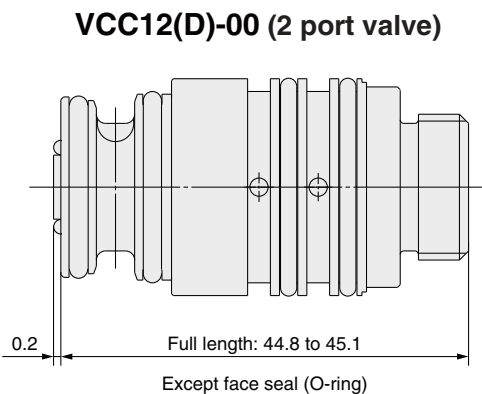
## Cleaning Valve Element

Special tool part no.: VCC-G-C



### Procedure

- ① Loosen the orifice body with a tool and remove it.
- ② Clean the valve.
- ③ Assemble a new orifice body.



Tighten the screw until it hits the body by pressing the orifice body with approx. 100 to 200 N of force.

(\* Additional tightening is not necessary.)

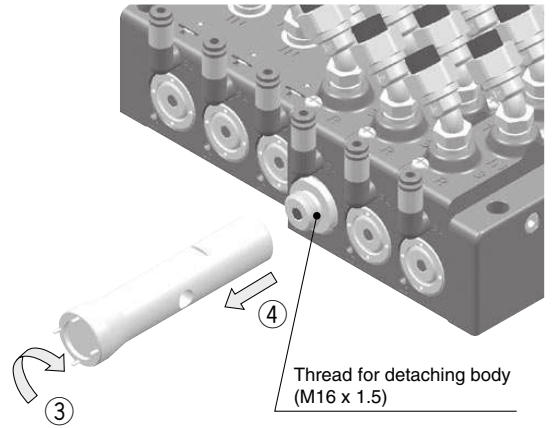
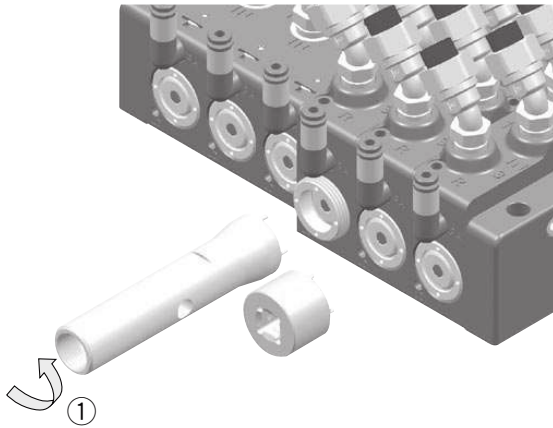
Control dimension with full length. (2 port valve: 44.8 to 45.1 mm, 3 port valve: 54.6 to 54.9 mm)

Reference tightening torque is approx. 1 to 2 N·m for VCC12(D)-00 (2 port valve), and 0.5 to 1 N·m for VCC13-00 (3 port valve).

There is a possibility of damaging threads if tightening exceeds the tightening torque range.

## How to Remove the Valve

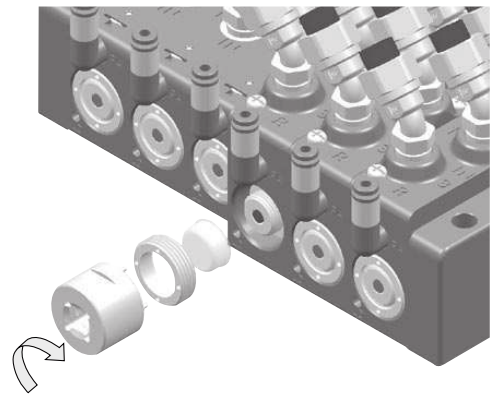
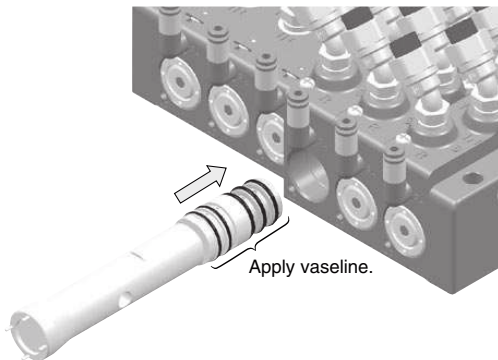
Special tool part no.: VCC-G-A, VCC-G-B (Refer to page 16.)



### Procedure

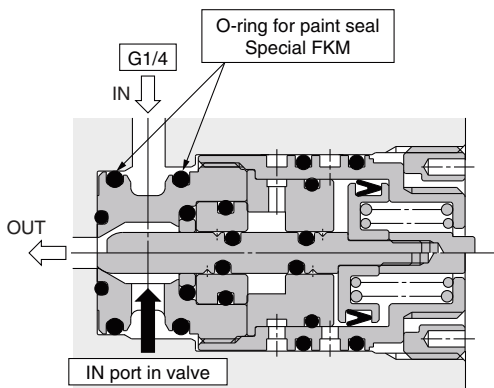
- ① Loosen the mounting nut with a tool to remove.
- ② Remove the indicator lamp cover.
- ③ Turn 45 to 90° (idle turn) clockwise with a tool (to avoid O-ring adhesion).
- ④ Pull out the valve straight.
- ⑤ Wipe off residual paint on inner surface of the base with a cleaning material.
- ⑥ Replace the O-ring mounted to the valve. (O-ring part number: See page 20.)

## How to Attach the Valve

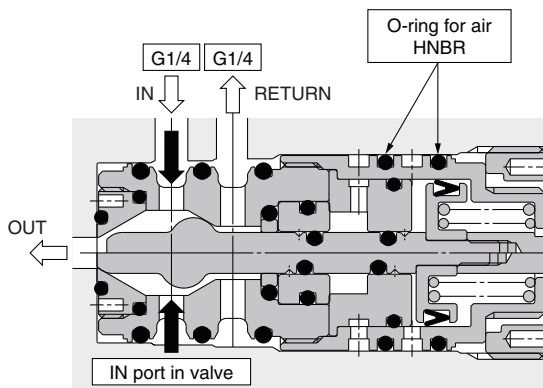


Apply vaseline (commercially available) on the O-ring surface, and insert straight. (Note the direction shown on the label.)

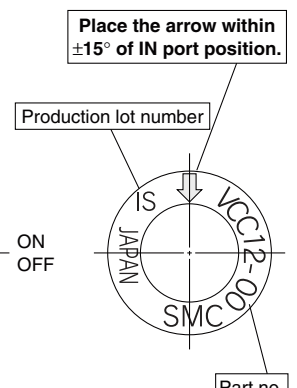
After mounting the indicator lamp cover, tighten the mounting nut to a tightening torque of 2.5 to 3.5 N·m of tightening torque.



2 port valve



3 port valve

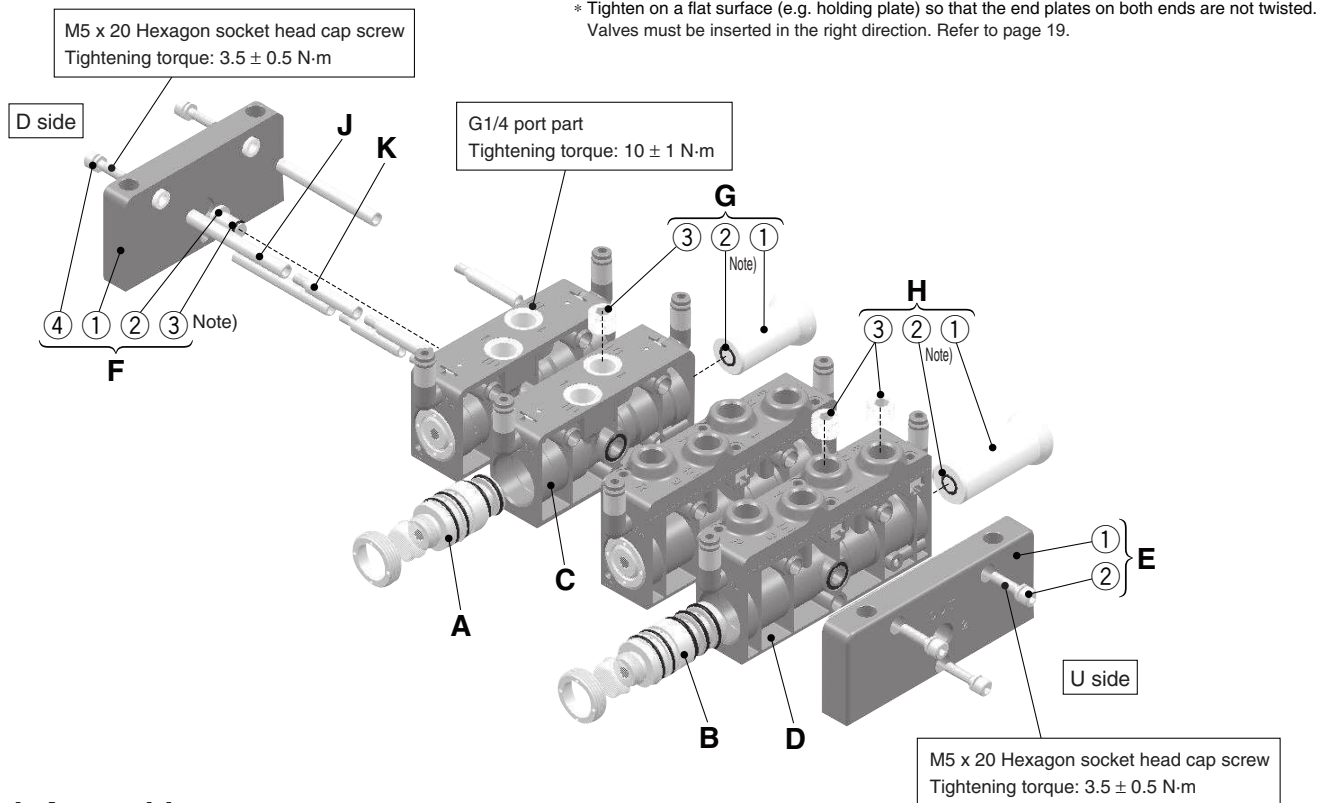


Model label

Attach and remove the valve straight. If the paint applied to the O-ring for paint adheres to the pneumatic passage, clean it. When inserting, apply vaseline to the O-ring and the inner surface of the base and insert slowly so that the O-ring is not twisted or cut. The arrow shown on the model label of the valve is set for the optimum direction for cleaning. Mount the valve so that the arrow comes to IN port position.

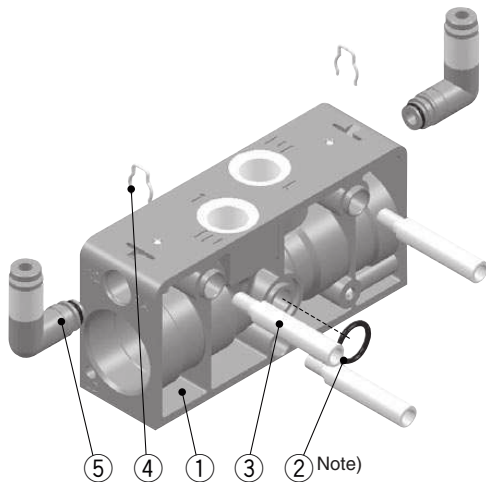
# VCC Series Replacement Parts

## VV□CC1□: Manifold



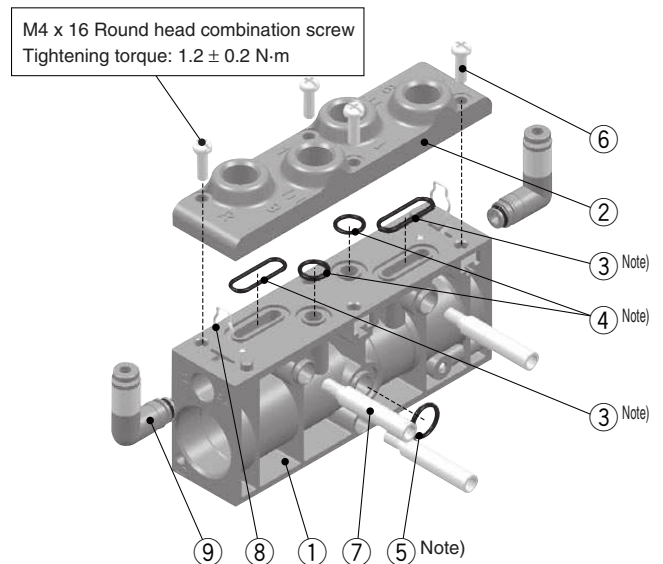
## Block Assembly

### C: 2 port valve manifold block assembly Manifold block assembly for gate valve



\* The figure shows the 2 port valve manifold block assembly.

### D: 3 port valve manifold block assembly



## Component Parts

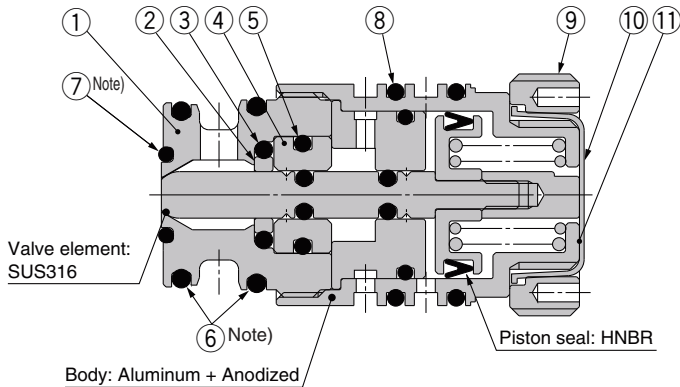
Model	Part no.	Description	Symbol	Component	Material	Qty.	Order qty.
VV2CC1 VV3CC1 VVMCC1 (common)	VVCC12-OR-1	<b>O-ring between manifold blocks</b>	C-②	O-ring	Special FKM	1	1 set unit
			D-⑤				
	VVCC12-50A-L1C4	<b>ø4 One-touch fitting</b>	C-⑤	One-touch fitting	—	1	1 set unit
			D-⑨				
	VVCC12-50A-L1C6	<b>ø6 One-touch fitting</b>	D-⑨	O-ring	HNBR	1	1 set unit
			F-③	O-ring	Special FKM	1	1 set unit
VV3CC1 VVMCC1	VVCC12-OR-3	<b>O-ring</b>	D-③	O-ring	Special FKM	2	1 set unit
			D-④	O-ring	Special FKM	2	

Note) If the manifold is disassembled or rearranged, replace the O-rings with new O-rings. (Specific Product Precautions 4/Maintenance 5 on page 7)

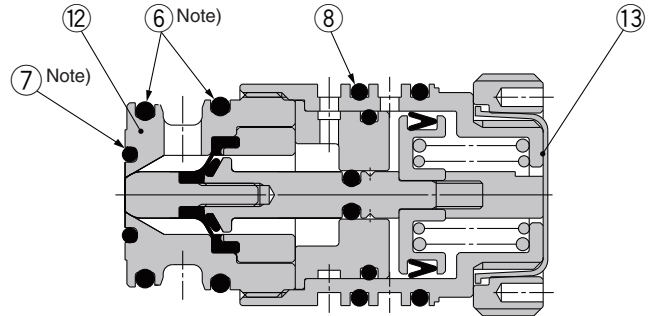
**2/3 Port Valve**

**A: 2 port valve**

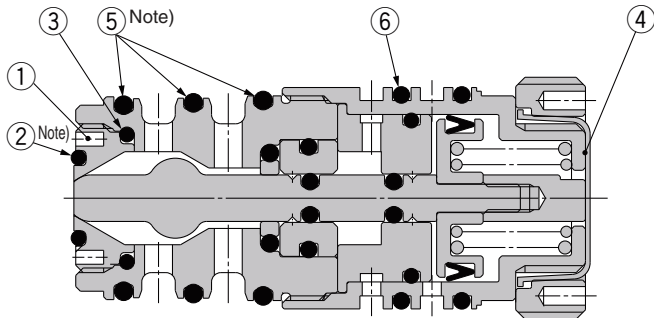
**Standard VCC12-00**







**Diaphragm / 2 liquid paint type VCC12D-00**



**B: 3 port valve  
VCC13-00**



**Component Parts**

Model	Part no.	Description	Symbol	Component	Material	Qty.	Order qty.				
VCC12(D)-00 (dedicated)	VCC12-1A-1 (for VCC12-00)		<b>A-①</b>	Orifice body	PEEK resin	1	1 set unit				
			<b>A-②</b>	PTFE seal	Special PTFE	1					
			<b>A-③</b>	O-ring	Special FKM	1					
			<b>A-④</b>	Sleeve	POM	1					
			<b>A-⑤</b>	O-ring	Special FKM	1					
			<b>A-⑥</b>	O-ring	Special FKM	2					
	VCC12D-1A-1 (for VCC12D-00)		<b>Orifice body assembly</b>	<b>A-⑥</b>	O-ring	Special FKM	2	1 set unit			
				<b>A-⑦</b>	O-ring	Special FKM	1				
				<b>A-⑫</b>	Orifice body	PEEK resin	1				
				<b>A-⑬</b>	Name plate	—	1				
				VCC12-OR-1	<b>O-ring assembly</b>	<b>A-⑥</b>	O-ring		Special FKM	2	1 set unit
						<b>A-⑦</b>	O-ring		Special FKM	1	
<b>A-⑧</b>	O-ring	HNBR	2								
<b>A-⑥</b>	O-ring	Special FKM	2								
VCC12-OR-4	<b>O-ring assembly</b>	<b>A-⑥</b>	O-ring	Special FKM	2	1 set unit					
VCC13-00 (dedicated)	VCC13-1A-1		<b>Orifice assembly</b>	<b>B-①</b>	Orifice	PEEK resin	1	1 set unit			
				<b>B-②</b>	O-ring	Special FKM	1				
				<b>B-③</b>	O-ring	Special FKM	1				
				<b>B-④</b>	Name plate	—	1				
	VCC13-OR-1	<b>O-ring assembly</b>	<b>B-②</b>	O-ring	Special FKM	1	1 set unit				
			<b>B-⑤</b>	O-ring	Special FKM	3					
VCC13-OR-2	<b>O-ring assembly</b>	<b>B-⑥</b>	O-ring	HNBR	2	1 set unit					
		<b>B-⑤</b>	O-ring	Special FKM	3						
VCC12(D)-00 VCC13-00 (common)	VCC12-2A-1		<b>Mounting nut assembly</b>	<b>A-⑨</b>	Mounting nut	Aluminum	1	1 set unit			
				<b>A-⑩</b>	Switching display cover	A-PET	1				
	VCC12-OR-5	<b>O-ring assembly</b>	<b>A-⑦</b>	O-ring	Special FKM	1	1 set unit				
			<b>B-②</b>								
VCC10-30A-1	<b>Switching display cover</b>	<b>A-⑩</b>	Switching display cover	A-PET	10	1 set unit					

Note) If the manifold is disassembled or rearranged, replace the O-rings with new O-rings. (Specific Product Precautions 4/Maintenance 5 on page 7)

# VCC Series

## Parts Description

Model	Symbol	Part no.	Description	Symbol	Description	Material	Surface treatment	Note
For 2 port valve	A	VCC12(D)-00	2 port valve	—	—	—	—	—
	C	VVCC12-1A-02F <sup>C4</sup> <sub>C6</sub> * Pilot port C4: ø4 piping C6: ø6 piping	Manifold block assembly for 2 port valve	①	Manifold block	PPS resin	—	For VVCC12-1A-02F <sup>C4</sup> <sub>C6</sub>
				②	O-ring	Aluminum	Hard anodized containing PTFE	For VVCC12-1G-02F <sup>C4</sup> <sub>C6</sub>
				③	Tie-rod for adding stations	Special FKM	—	—
				④	Clip	Stainless steel	—	For adding stations
				⑤	One-touch fitting	Stainless steel	—	—
	E	VVCC12-2A-02F	U-side end plate assembly for 2 port valve	①	U-side end plate	Aluminum	Hard anodized containing PTFE	When neighboring valve is a 2 port valve.
				②	Hexagon socket head cap screw with M5 x 20 SW	Stainless steel	—	
	F	VVCC12-3A-1	D-side end plate assembly for 2 port valve	①	D-side end plate	Aluminum	Hard anodized containing PTFE	When neighboring valve is a 2 port valve.
				②	Plug	POM	—	
				③	O-ring	Special FKM	—	
				④	Hexagon socket head cap screw with M5 x 20 SW	Stainless steel	—	
	G	VVCC12-10A-1	Blanking plug assembly for 2 port valve	①	Blanking plug	POM	—	—
				②	O-ring	Special FKM	—	—
				③	R1/4 Hexagon socket head plug	Stainless steel	—	—
For 3 port valve	B	VCC13-00	3 port valve	—	—	—	—	—
	D	VVCC13-1A-02F <sup>C4</sup> <sub>C6</sub> * Pilot port C4: ø4 piping C6: ø6 piping	Manifold block assembly for 3 port valve	①	Manifold block	PPS resin	—	—
				②	Port block	Aluminum	Hard anodized containing PTFE	—
				③	O-ring	Special FKM	—	—
				④	O-ring	Special FKM	—	—
				⑤	O-ring	Special FKM	—	—
				⑥	Round head combination screw with M4 x 16 SW	Stainless steel	—	—
				⑦	Tie-rod for adding stations	Stainless steel	—	For adding stations
				⑧	Clip	Stainless steel	—	—
				⑨	One-touch fitting	—	—	Refer to "Replacement Parts."
	E	VVCC13-2A-02F	U-side end plate assembly for 3 port valve	①	U-side end plate	Aluminum	Hard anodized containing PTFE	When neighboring valve is a 3 port valve.
				②	Hexagon socket head cap screw with M5 x 20 SW	Stainless steel	—	
	F	VVCC13-3A-1	D-side end plate assembly for 3 port valve	①	D-side end plate	Aluminum	Hard anodized containing PTFE	When neighboring valve is a 3 port valve.
				②	Plug	POM	—	
				③	O-ring	Special FKM	—	
④				Hexagon socket head cap screw with M5 x 20 SW	Stainless steel	—		
H	VVCC13-10A-1	Blanking plug assembly for 3 port valve	①	Blanking plug	POM	—	—	
			②	O-ring	Special FKM	—	—	
			③	R1/4 Hexagon socket head plug	Stainless steel	—	—	
Common	J	VVCC12-20A-□	Tie-rod	—	—	Stainless steel	—	□ = Three manifold blocks make up one set.
	K	VVCC12-21A	Tie-rod for adding stations	—	—	Stainless steel	—	3 pcs. make up one set. <sup>Note)</sup>

Note) When the manifold is shipped out, tie-rods for two extra stations are used. You can add or reduce 2 stations of manifold block (4 valves in total).

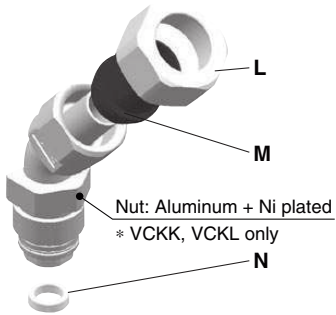
Example) For manifold block 4 stations (8 valves)

Tie-rod for 2 stations (VVCC12-20A-2)	Tie-rod for adding stations (VVCC12-21A)	Tie-rod for adding stations (VVCC12-21A)
--	---	---

Example) For manifold block 5 stations (10 valves)

Tie-rod for 3 stations (VVCC12-20A-3)	Tie-rod for adding stations (VVCC12-21A)	Tie-rod for adding stations (VVCC12-21A)
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**SUS316L Stainless Steel Fitting**






**Component Parts**

Model	Symbol	Part no.	Description	Conforming item	Material	Qty.	Order qty.
K VCKL□□□□-02F H	<b>L</b>	KFN-06-X2	<b>Union nut</b>	K VCKL0604-02F H	C3604BD + Ni plated	1	1 set unit
		KFN-08-X2		K VCKL0806-02F H			
		KFN-10-X2		K VCKL1075-02F H			
		KFN-12-X2		K VCKL1008-02F H			
		KFN-12-X2		K VCKL1209-02F H			
	<b>M</b>	KFS-06	<b>Sleeve</b>	K VCKL0604-02F H	Nylon	1	1 set unit
		KFS-08		K VCKL0806-02F H			
		KFS-10		K VCKL1075-02F H			
		KFS-12		K VCKL1008-02F H			
		KFS-12		K VCKL1209-02F H			
	<b>N</b>	VCKK-4-1	<b>Gasket</b>		Nylon	1	10 set unit







**Troubleshooting (Valve)**

Failure		Cause	Remedy
<b>Switching failure</b>	The valve does not switch. 	<b>1) Reduction of pilot pressure</b> The pressure of a pilot signal (air pressure) reduced and caused the operation failure.	Adjust the pilot signal pressure to a specified range. (Specified pilot signal pressure range: 0.4~0.7MPa)
		<b>2) Failure of pilot signal source (solenoid valve, etc.)</b> The source of a pilot signal (solenoid valve, etc.) fell in the operation failure.	Check the pilot signal source (solenoid valve, etc.).
		<b>3) Sticking of valve body</b> The valve body stuck to paint, and became unable to move, which caused the switching failure of the valve.	- Disassemble and clean the valve body. (Cleaning of the valve P18) - Replace the orifice body with new one. (Maintenance parts list P21)
<b>Leakage</b>	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Check the part leaking air.</div>  1. The OUT port has a leakage. 	<b>1) Gelling or clogging of paint</b> Paint gelled or clogged, which caused the sealing failure of the valve body and leakage from the OUT port.	- Disassemble and clean the valve body. (Cleaning of the valve P18) - Replace the orifice body with new one. (Maintenance parts list P21)
		<b>2) Insufficient tightening of mounting nut</b> The mounting nut to tighten the valve was not given enough torque, which caused the seating failure at the OUT port between the base and valve and leakage from the OUT port.	Tighten the mounting nut at the specified torque. (Specified torque P19: 2.5~3.5Nm)
		<b>3) The permanent deformation compressed of O-ring (material: special FKM)</b> The permanent deformation compressed is large due to the characteristics of the O-ring, so the compression is reduced, leading to leakage of fluid from the OUT port.	- Replace the O-ring with new one. (Maintenance parts list P21)
	2. The RETURN port has a leakage. (When the 3 port valve is turned on.) 	<b>1) Gelling or clogging of paint</b> Paint gelled or clogged, which caused the sealing failure of the valve body and leakage from the RETURN port.	- Disassemble and clean the valve body. (Cleaning of the valve P18) - Replace the valve with new one.
		<b>2) Twist and cut of O-ring (external face)</b> The O-ring at the external face of the valve was twisted or cut during the assembly or operation of the valve, which caused the sealing failure and leakage from the RETURN port.	- Replace the O-ring with new one. (Maintenance parts list P21) - Apply Vaseline to the O-ring at the external face of the valve and to the inside of the base. (Disassembly/Assembly procedure P19)
		<b>3) Insufficient tightening of mounting nut</b> The mounting nut to tighten the valve was loosened, which displaced the valve so much as to let the O-ring come off, and caused the leakage from the RETURN port.	Tighten the mounting nut at the specified torque. (Specified torque P19: 2.5~3.5Nm)
		<b>4) The permanent deformation compressed of O-ring (material: special FKM)</b> The permanent deformation compressed is large due to the characteristics of the O-ring, so the compression is reduced, leading to leakage of fluid from the RETURN port.	- Replace the O-ring with new one. (Maintenance parts list P21)

# VCC Series

## Troubleshooting (Valve)

Failure	Check the failure seen on the valve referring to the following, and take appropriate measure.	Cause	Remedy
Leakage	3. The leak detecting port has a leakage which can happen for fluid (paint) leakage. 	<b>1) Twist and cut of O-ring (external face)</b> The O-ring at the external face of the valve was twisted or cut during the assembly or operation of the valve, which caused the sealing failure and fluid (paint) leakage from the leak detecting port.	- Replace the O-ring with new one. (Maintenance parts list P21) - Apply Vaseline to the O-ring at the external face of the valve and to the inside of the base. (Disassembly/Assembly procedure P19)
		<b>2) Internal sealing failure of valve</b> The sealing failure of the sliding part of the valve or broken diaphragm caused the fluid (paint) leakage from the leak detecting port.	Replace the valve with new one.
		<b>3) The permanent deformation compressed of O-ring (material: special FKM)</b> The permanent deformation compressed is large due to the characteristics of the O-ring, so the compression is reduced, leading to leakage of fluid (paint etc.) from the leakage detection port.	- Replace the O-ring with new one. (Maintenance parts list P21)
	4. The leak detecting port has a leakage which can happen for pilot air leakage. 	<b>1) Twist and cut of O-ring (external face)</b> The O-ring at the external face of the valve was twisted or cut during the assembly or operation of the valve, which caused the sealing failure and pilot air leakage from the leak detecting port.	- Replace the O-ring with new one. (Maintenance parts list P21) - Apply Vaseline to the O-ring at the external face of the valve and to the inside of the base. (Disassembly/Assembly procedure P19))
Insufficient flow rate	The flow rate from the OUT port has reduced. 	<b>1) Gelling or clogging of paint</b> Paint gelled or clogged, which narrowed the fluid path and reduced the flow rate.	- Disassemble and clean the valve body. (Cleaning of the valve P18) - Replace the orifice body with new one. (Maintenance parts list P21)
		<b>2) Reduction of pilot pressure</b> The pressure of pilot signal (air pressure) reduced and prevented the valve to achieve the minimum operating pressure, which reduced the valve stroke and narrowed the fluid path resulting in the reduction of flow rate.	Adjust the pilot signal pressure to a specified range. (Specified pilot signal pressure range: 0.4~0.7MPa)
		<b>3) Excessive tightening of mounting nut</b> The mounting nut was excessively tightened, which reduced the valve stroke and narrowed the flow path resulting in the reduction of flow rate.	Tighten the mounting nut at the specified torque. (Specified torque P19: 2.5~3.5Nm)
Liquid pool Insufficient cleaning	The cleaning effect is unstable and takes a time. Paint has gelled and hardened. Air has intruded. 	<b>1) Incorrect mounting direction of valve</b>	Remount the valve referring to the direction of the IN port of the valve. (Mounting direction of valve P19)

**Troubleshooting (Manifold)**

Failure	Check the failure seen on the manifold referring to the following, and take appropriate measure.	Cause	Remedy
Leakage	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Check the part leaking air.</div> 1. Any of the OUT, RETURN and leak detecting port has a leakage.	Troubleshooting (valve): Refer to 1 through 4 for <b>leakage</b> .	
	2. Between the manifold blocks has a leakage.	<b>1) Insufficient tightening or looseness of manifold tie-rod</b> Insufficient tightening of the manifold tie-rod lost the sealing capability between the manifold blocks and allowed the leakage to happen there.	Tighten the hexagon socket head bolt for the tie-rod at the specified torque. (Specified torque P20: 3.5+/-0.5Nm)
	3. Between the port block and manifold block has a leakage.	<b>2)The permanent deformation compressed of O-ring (material: special FKM)</b> The permanent deformation compressed is large due to the characteristics of the O-ring, so the compression is reduced, leading to leakage of fluid from the between the manifold.	- Replace the O-ring with new one. (Maintenance pats list P21)
		<b>1) Insufficient tightening or looseness of port block mounting screw</b> Insufficient tightening of the port block mounting screw lost the sealing capability between the port block and manifold block and allowed the leakage to happen there.	Tighten the round head combination screw for the port block at the specified torque. (Specified torque P20: 1.2+/-0.2Nm)
		<b>2)The permanent deformation compressed of O-ring (material: special FKM)</b> The permanent deformation compressed is large due to the characteristics of the O-ring, so the compression is reduced, leading to leakage of fluid from the between the port block.	- Replace the O-ring with new one. (Maintenance pats list P21)

The permanent deformation compressed of the VCC series O-ring is large due to the property of the material (special FKM). Therefore, leakage may occur if the O-ring is not replaced when disassembling and reassembling the product.

Please replace the O-ring with a new one when disassembling and reassembling the parts.

**Troubleshooting (Fitting)**

Failure	Check the failure seen on the fitting referring to the following, and take appropriate measure.	Cause	Remedy
Leakage	1. The joint part between the tube and fitting has a leakage.	<b>1) Insufficient tightening or looseness of union nut</b> Insufficient tightening of the fitting union nut caused the sealing failure between the fitting and tube and leakage between them.	Tighten the union nut 1.5 to 2 turns further after manual tightening. (Tighten 1.5 to 2 turns further after manual tightening P6 and specific product precautions P14)
	2. Between the fitting and manifold has a leakage.	<b>1) Insufficient tightening or looseness of fitting</b> Insufficient tightening of the fitting lost the sealing capability between the manifold blocks and allowed the leakage to happen there.	Tighten the fitting at the specified torque. (Specified torque P14: 10+/-1Nm)

#### Revision history

A:Exchange part addition  
B:Complete Revision  
C:Safety Instructions changed.

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Note: Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.  
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