Doc. no.VCC1***-OML0002-B

Operation Manual

PRODUCT NAME

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

MODEL / Series / Product Number

VCC series

SMC Corporation

Contents

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)*1) , and other safety regulations.

*1) ISO 4414: Pneumatic fluid power -- General rules relating to systems.
ISO 4413: Hydraulic fluid power -- General rules relating to systems.
IEC 60204-1: Safety of machinery -- Electrical equipment of machines .(Part 1: General requirements)
ISO 10218: Manipulating industrial robots -Safety.
etc.

Caution	**Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
Warning	**Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
Danger	**Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious 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. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.

2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.

3. An application which could have negative effects on people, property, or animals requiring special safety analysis.

4.Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

Safety Instructions

⚠ Caution

The product is provided for use in manufacturing industries.

The product herein described is basically provided for peaceful use in manufacturing industries.
If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.
If anything is unclear, contact your nearest sales branch.

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.

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 regulation 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.

⚠ Caution

SMC products are not intended for use as instruments for legal metrology.
Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country.
Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.

VCC Series
Specific Product Precautions 1

Be sure to read this before handling the products.
Refer to back page 50 for Safety Instructions and pages 17 to 19 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 μm 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.

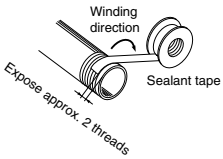
5. Countermeasures against static electricity
Take measures to prevent static electricity since some fluids can cause static electricity.

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 back page 50 for Safety Instructions and pages 17 to 19 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 back page 50 for Safety Instructions and pages 17 to 19 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 back page 50 for Safety Instructions and pages 17 to 19 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.
If you have any further questions, please don't hesitate to contact your SMC sales representative.

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

VCC Series

How to Order

Valve

VCC1 2 – 00

Passage number

2	2 port valve
3	3 port valve Note 2)
2D	2 port/Diaphragm type (Applicable for 2 liquid paint)

Note 1) Valves must be mounted in the right direction. Refer to page 657.
Note 2) Pressure cannot be applied from a 3 port valve RETURN port.

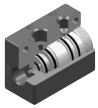
Port size

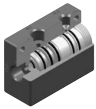
00	For manifold mounting
02	Rc1/4 (for single unit) Note)
02F	G1/4 (for single unit) Note)

Note) Part number for sub-base
For 2 port: VCC12-S-$^{02}_{02F}$ $^{[Rc1/4]}_{[G1/4]}$
For 3 port: VCC13-S-$^{02}_{02F}$ $^{[Rc1/4]}_{[G1/4]}$


VCC12(D)-00


VCC13-00


VCC12(D)-02(F)


VCC13-02(F)

Manifold

Standard **VV M CC1– 06 06 C4**

Type (Passage number)

2	2 port valve, Cleaning valve
3	3 port valve
M	2/3 port valves mixed mounting

Pilot port fitting size

C4	ø4 One-touch fitting (Antistatic)
C6	ø6 One-touch fitting (Antistatic)

2 port valve mountable number

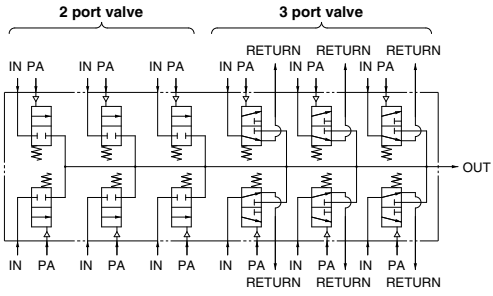
00	No 2 port valves used
02	2 pcs. (colors)
04	4 pcs. (colors)
⋮	⋮

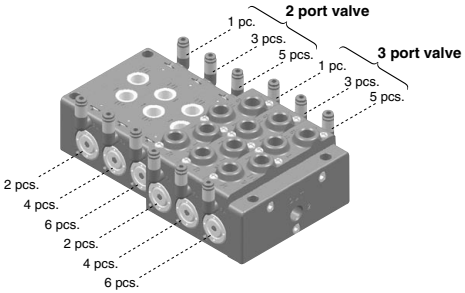
3 port valve mountable number

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

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

Circuit example





How to Order

Manifold

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

Passage number

2	2 port valve, Cleaning valve
M	2/3 port valves mixed mounting

2 port valve mountable number

00	No 2 port valves used
02	2 pcs. (colors)
04	4 pcs. (colors)
⋮	⋮

3 port valve mountable number

00	No 3 port valves used
02	2 pcs. (colors)
04	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

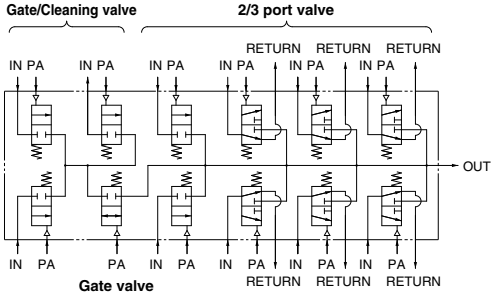
02	Cleaning valve (2 port valve): 1 pc. + Gate valve: 1 pc.
04	Cleaning valve (2 port valve): 3 pcs. + Gate valve: 1 pc.
06	Cleaning valve (2 port valve): 5 pcs. + Gate valve: 1 pc.

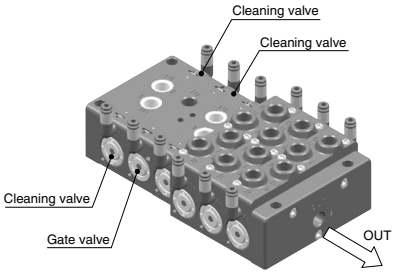
Pilot port fitting size

C4	ø4 One-touch fitting (Antistatic)
C6	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

H	Male connector
K	40° swivel elbow
L	90° swivel elbow

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

0604	6 x 4
0806	8 x 6
1075	10 x 7.5
1008	10 x 8
1209	12 x 9

Port size

02F	G1/4

* G1/4 has special shape of bottom seal. Please refer page 652 for details.

VCKH
Male connector

VCKK
40° swivel elbow

VCKL
90° swivel elbow

Option

Blanking Plug Assembly

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

Specifications

Model	VCC12	VCC13	VCC12D
Passage number	2 port	3 port [Note 3]	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^3/min)	1 or less (3 port valve IN → RETURN: 20 or less) [Note 1]		1 or less [Note 2]

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

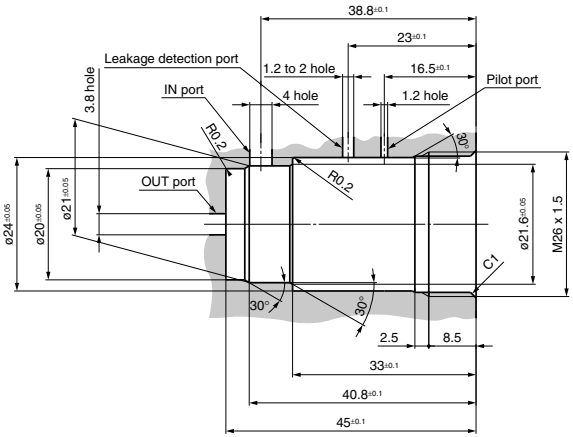
Weight

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

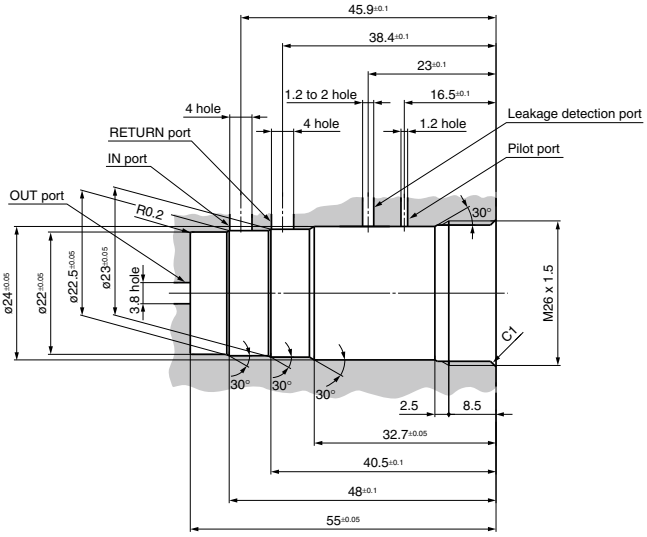
Mounting hole dimensions (When valve is built in to the device.)

VCC12(D)-00



∗ Recommended surface roughness of inner surface where the valve is inserted is Rz6.3.

VCC13-00

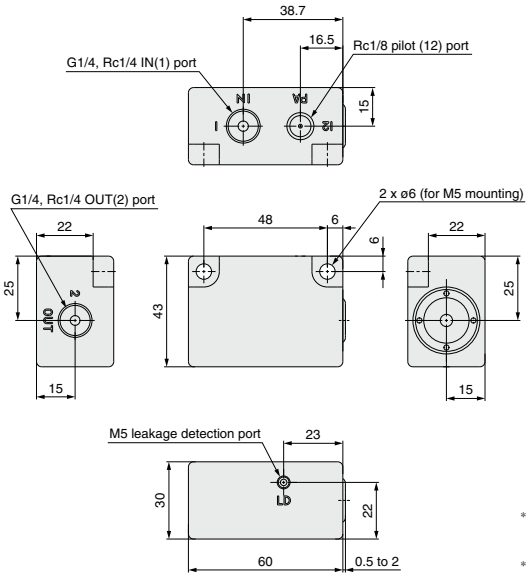


∗ Recommended surface roughness of inner surface where the valve is inserted is Rz6.3.

Dimensions

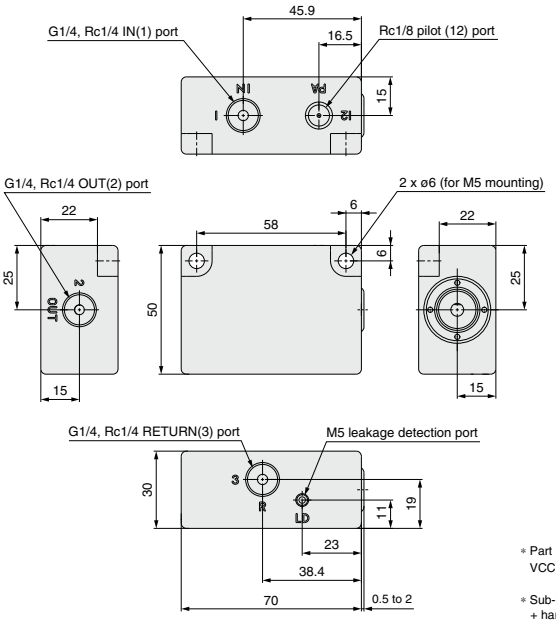
Single valve unit

VCC12(D)-02(F)



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

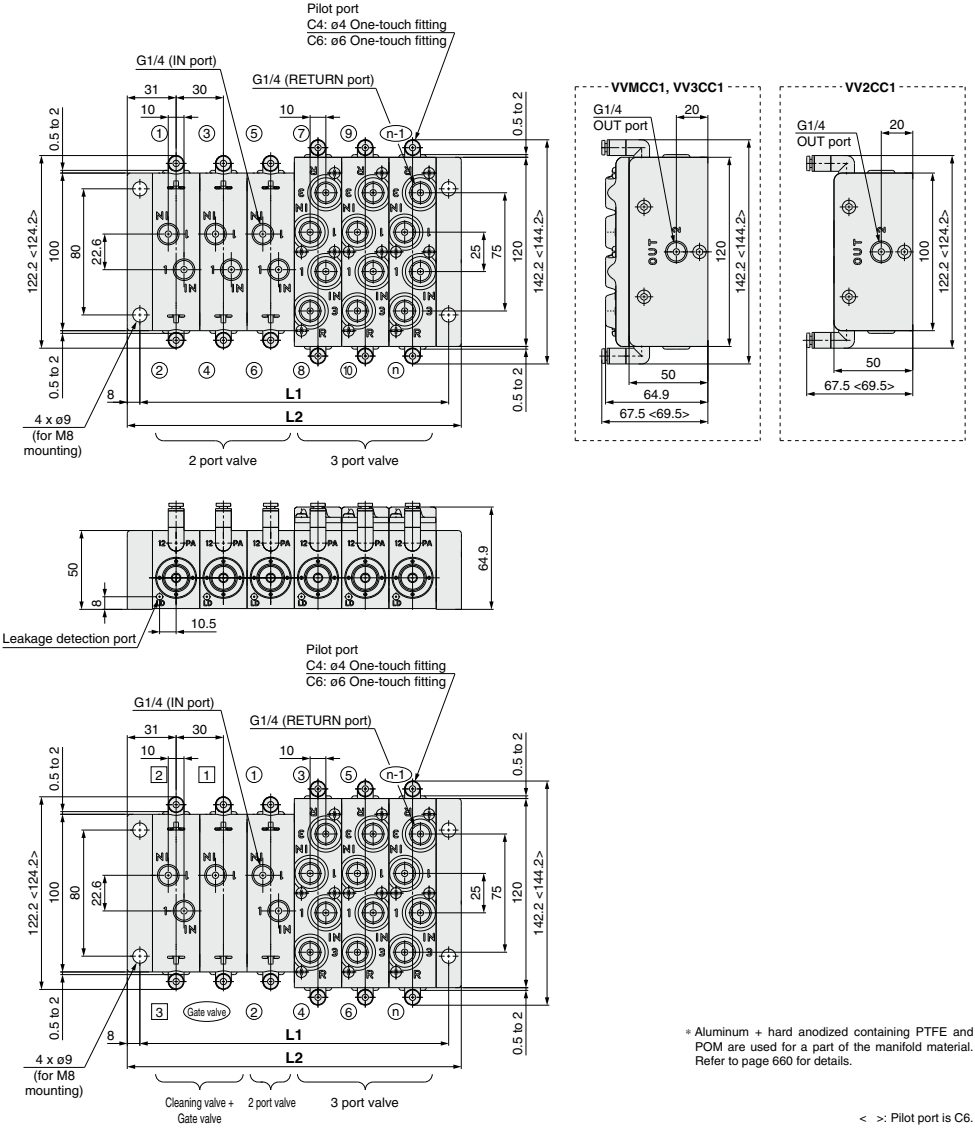
VCC13-02(F)



* Part number for sub-base
  VCC13-S-$^{02}_{02F}$ $^{[Rc1/4]}_{[G1/4]}$
* 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 660 for details.

< >: Pilot port is C6.

L1 = n / 2 x 30 + 16 L2 = n / 2 x 30 + 32

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

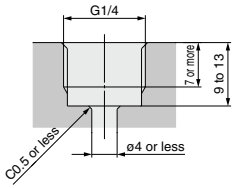
n: Stations (mm)

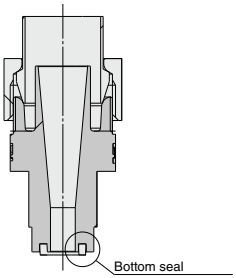
n	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
L1	46	76	106	136	166	196	226	256	286	316	346	376	406	436	466	496	526	556	586	616
L2	62	92	122	152	182	212	242	272	302	332	362	392	422	452	482	512	542	572	602	632

Dimensions

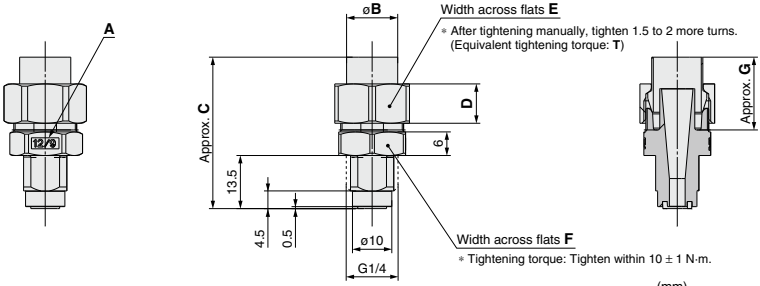
SUS316L Stainless steel fittings

Mounting female thread recommended dimensions





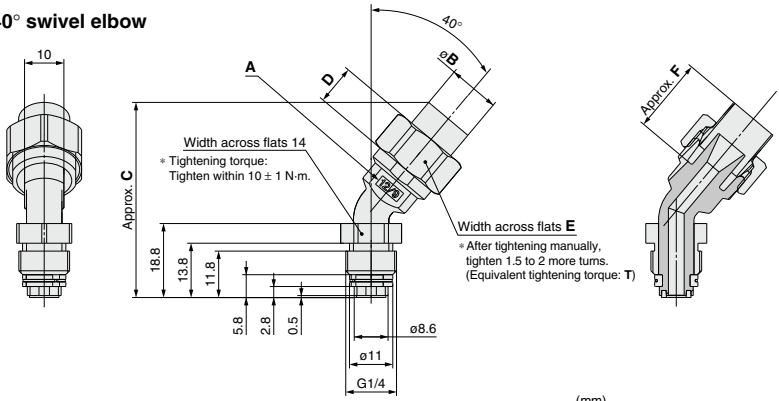
VCKH Male connector



(mm)

Part no.	Indication of **A**	ø**B**	**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

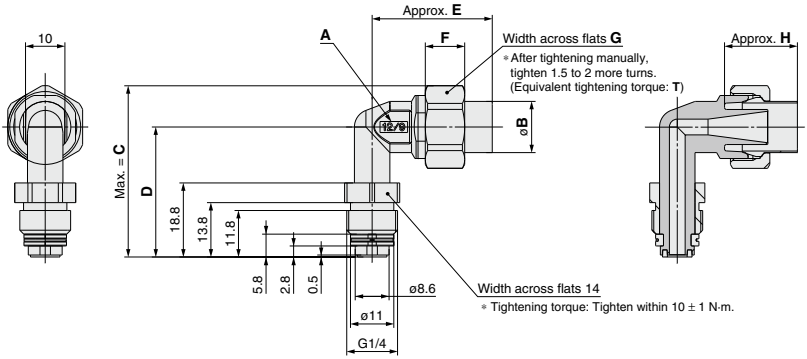


(mm)

Part no.	Indication of **A**	ø**B**	**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

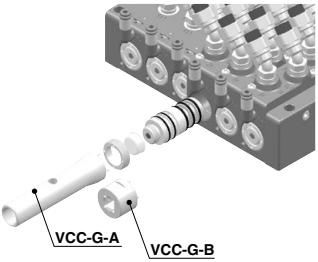


(mm)

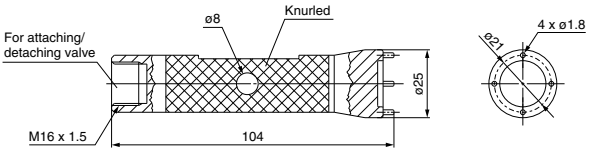
Part no.	Indication of **A**	ø**B**	**C**	**D**	**E**	**F**	**G**	**H**	**T**
VCKL1209-02F	12/9	13	43.5	33	30.5	10	19	18.5	9 to 12 N·m
VCKL1008-02F	10/8	11	42.5	33	30	9	17	18.5	6 to 9 N·m
VCKL1075-02F	10·75	11	42.5	33	30	9	17	18.5	6 to 9 N·m
VCKL0806-02F	8/6	9	40	32	27.5	8	14	16	4 to 9 N·m
VCKL0604-02F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

VCC Series
Special Tools

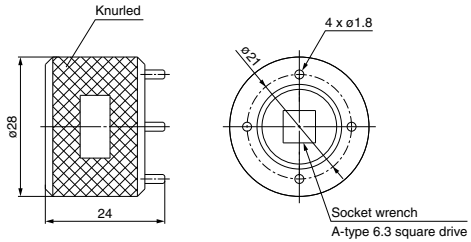
Tool for Attaching/Detaching Valve



VCC-G-A

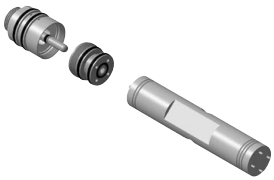


VCC-G-B (for socket wrench)

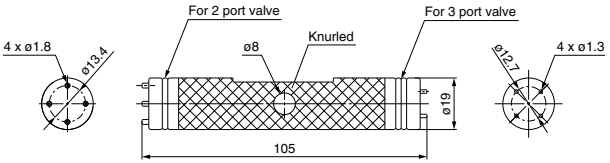


Tool for Disassembling/Cleaning Valve Element

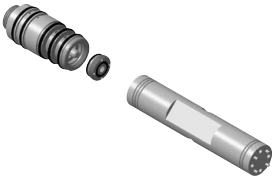
VCC12(D) 2 port valve



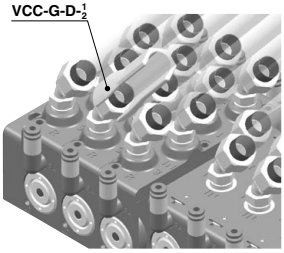
VCC-G-C



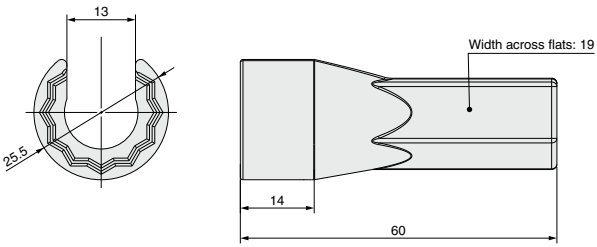
VCC13 3 port valve



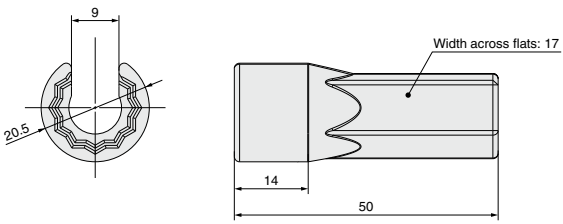
Union Nut Socket



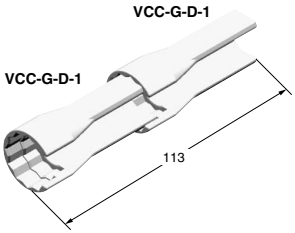
VCC-G-D-1 (Applicable fitting VCK□ 1209 / 1008 / 1075)

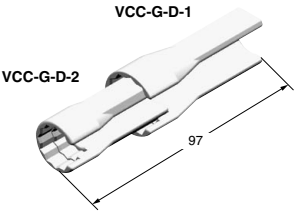


VCC-G-D-2 (Applicable fitting VCK□ 0806 / 0604)



For extending the socket



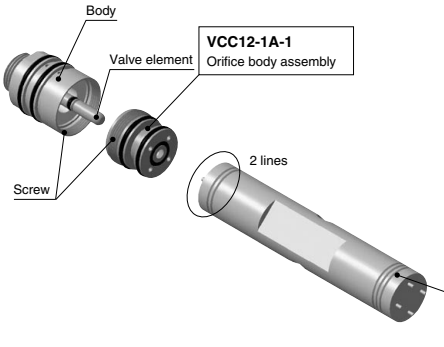


Disassembly/Assembly/ Maintenance Procedure

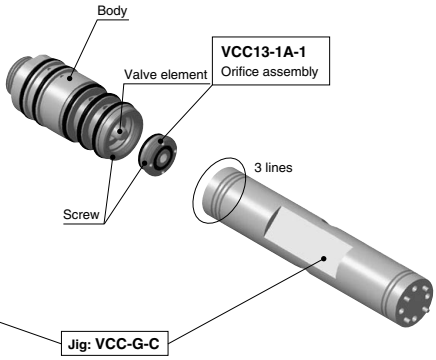
Cleaning Valve Element

Special tool part no.: VCC-G-C

VCC12-00 (2 port valve)



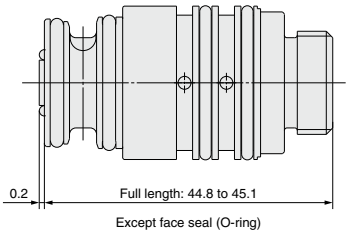
VCC13-00 (3 port valve)



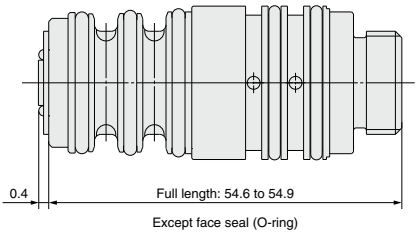
Procedure

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

VCC12(D)-00 (2 port valve)



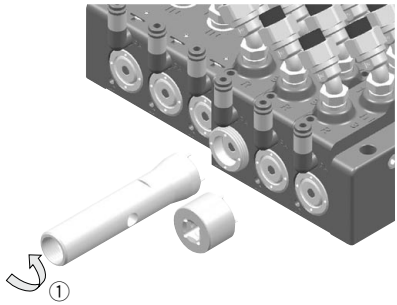
VCC13-00 (3 port valve)

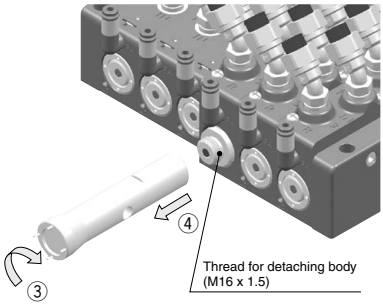


Tighten the screw until it hits the body by pressing the orifice body with approx. 100 to 200 N of force.
(∗ Additional tightening is not necessary.)
Control dimension with full length. (2 port valve: 44.8 to 45.1 mm, 3 port valve: 54.6 to 54.9 mm)
Reference tightening torque is approx. 1 to 2 N·m for 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 654.)

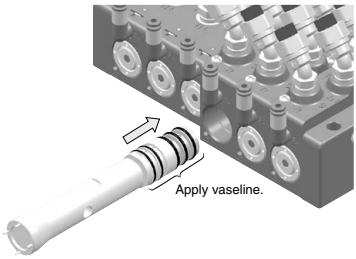


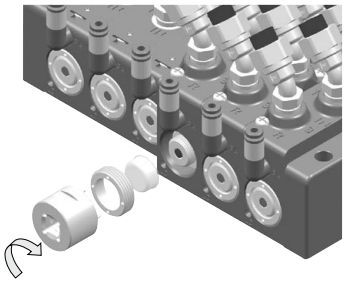


Procedure

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 658.)

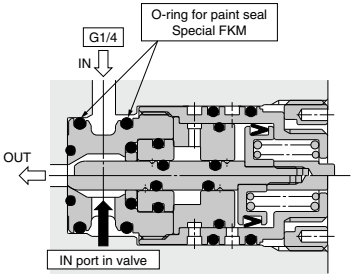
How to Attach the Valve



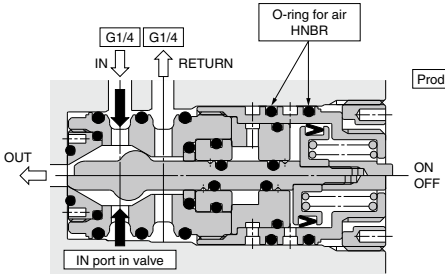


Apply vaseline (commercially available) on the O-ring surface, and insert straight. (Note the direction shown on the label.)

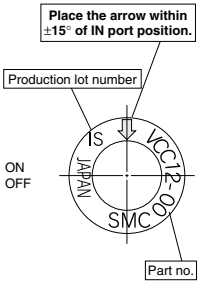
After mounting the indicator lamp cover, tighten the mounting nut to a tightening torque of 2.5 to 3.5 N·m of tightening torque.



2 port valve



3 port valve



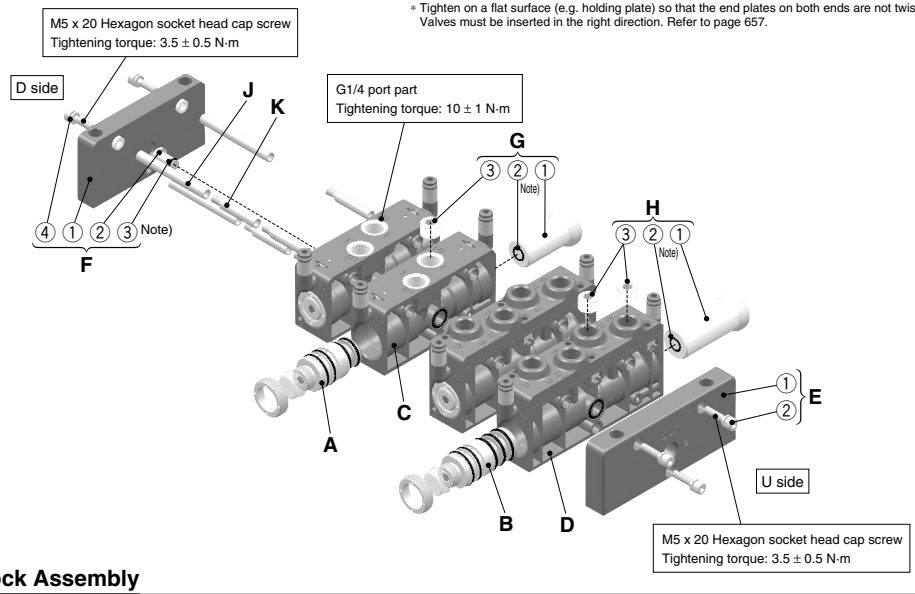
Model label

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

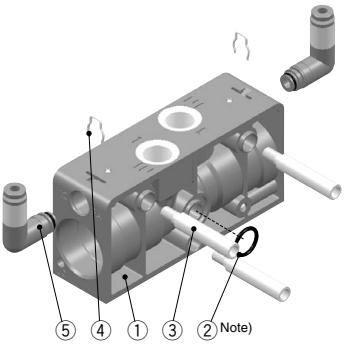
VV□CC1□: Manifold

∗ Tighten on a flat surface (e.g. holding plate) so that the end plates on both ends are not twisted. Valves must be inserted in the right direction. Refer to page 657.



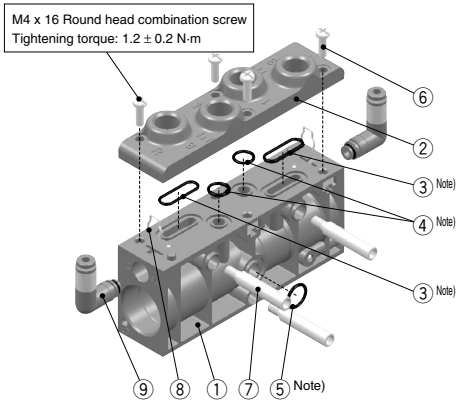
Block Assembly

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

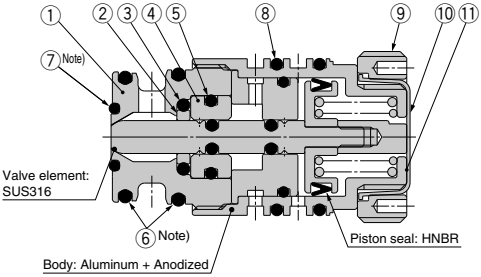
Model	Part no.	Description	Symbol	Component	Material	Qty.	Order qty.
VV2CC1 VV3CC1 VVMCC1 (common)	VVCC12-OR-1	**O-ring between manifold blocks**	**C**-②	O-ring	Special FKM	1	1 set unit
			D-⑤				
	VVCC12-50A-L1C4	**ø4 One-touch fitting**	**C**-⑤	One-touch fitting	—	1	1 set unit
	VVCC12-50A-L1C6	**ø6 One-touch fitting**	**D**-⑨	O-ring	HNBR	1	
	VVCC12-OR-3	**O-ring**	**F**-③	O-ring	Special FKM	1	1 set unit
VV3CC1 VVMCC1	VVCC13-OR-1	**O-ring assembly between port blocks**	**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 665)

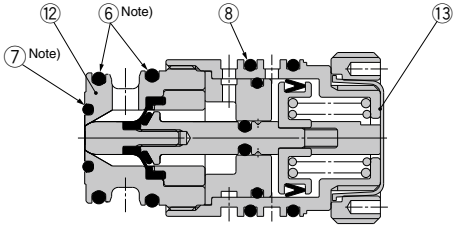
2/3 Port Valve

A: 2 port valve

Standard VCC12-00

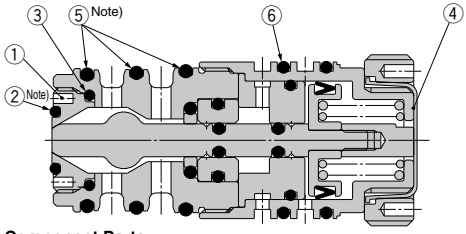


Diaphragm / 2 liquid paint type VCC12D-00



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)	**Orifice body assembly** 	**A-**①	Orifice body	PEEK resin	1	1 set unit
			A-②	PTFE seal	Special PTFE	1	
			A-③	O-ring	Special FKM	1	
			A-④	Sleeve	POM	1	
			A-⑤	O-ring	Special FKM	1	
			A-⑥	O-ring	Special FKM	2	
			A-⑦	O-ring	Special FKM	1	
			A-⑪	Name plate	—	1	
	VCC12D-1A-1 (for VCC12D-00)	**Orifice body assembly** 	**A-**⑥	O-ring	Special FKM	2	1 set unit
			A-⑦	O-ring	Special FKM	1	
			A-⑫	Orifice body	PEEK resin	1	
			A-⑬	Name plate	—	1	
	VCC12-OR-1	**O-ring assembly**	**A-**⑥	O-ring	Special FKM	2	1 set unit
			A-⑦	O-ring	Special FKM	1	
			A-⑧	O-ring	HNBR	2	
	VCC12-OR-4	**O-ring assembly**	**A-**⑥	O-ring	Special FKM	2	1 set unit
VCC13-00 (dedicated)	VCC13-1A-1	**Orifice assembly** 	**B-**①	Orifice	PEEK resin	1	1 set unit
			B-②	O-ring	Special FKM	1	
			B-③	O-ring	Special FKM	1	
			B-④	Name plate	—	1	
	VCC13-OR-1	**O-ring assembly**	**B-**②	O-ring	Special FKM	1	1 set unit
			B-⑤	O-ring	Special FKM	3	
			B-⑥	O-ring	HNBR	2	
	VCC13-OR-2	**O-ring assembly**	**B-**⑤	O-ring	Special FKM	3	1 set unit
VCC12(D)-00 VCC13-00 (common)	VCC12-2A-1	**Mounting nut assembly** 	**A-**⑨	Mounting nut	Aluminum	1	1 set unit
			A-⑩	Switching display cover	A-PET	1	
	VCC12-OR-5	**O-ring assembly**	**A-**⑦	O-ring	Special FKM	1	1 set unit
			B-②				
			G-②				
			H-②				
	VCC10-30A-1	**Switching display cover**	**A-**⑩	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)

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$^{C4}_{C6}$ ∗ Pilot port C4: ø4 piping C6: ø6 piping	**Manifold block assembly for 2 port valve**	①	**Manifold block**	PPS resin	—	For VVCC12-1A-02F$^{C4}_{C6}$
						Aluminum	Hard anodized containing PTFE	For VVCC12-1G-02F$^{C4}_{C6}$
				②	**O-ring**	Special FKM	—	—
		VVCC12-1G-02F$^{C4}_{C6}$ ∗ Pilot port C4: ø4 piping C6: ø6 piping	**Manifold block assembly for gate valve**	③	**Tie-rod for adding stations**	Stainless steel	—	For adding stations
				④	**Clip**	Stainless steel	—	
				⑤	**One-touch fitting**	—	—	Refer to "Replacement Parts."
	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$^{C4}_{C6}$ ∗ 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. Note)

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).

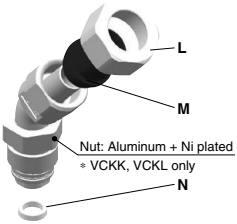
Example) For manifold block 4 stations (8 valves)

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)

SUS316L Stainless Steel Fitting



Component Parts

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

Troubleshooting (Valve)

Failure	Check the failure seen on the valve referring to the following, and take appropriate measure.	Cause	Remedy
Switching failure	The valve does not switch. →	**1) Reduction of pilot pressure** 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)
		2) Failure of pilot signal source (solenoid valve, etc.) The source of a pilot signal (solenoid valve, etc.) fell in the operation failure.	Check the pilot signal source (solenoid valve, etc.).
		3) Sticking of valve body 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)
Leakage	Check the part leaking air. 1. The OUT port has a leakage. →	**1) Gelling or clogging of paint** 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)
		2) Insufficient tightening of mounting nut 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)
		3)The permanent deformation compressed of O-ring (material: special FKM) 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 pats list P21)
	2. The RETURN port has a leakage. (When the 3 port valve is turned on.) →	**1) Gelling or clogging of paint** 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.
		2) Twist and cut of O-ring (external face) 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 pats 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)
		3) Insufficient tightening of mounting nut 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)
		4)The permanent deformation compressed of O-ring (material: special FKM) 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 pats list P21)

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. →	**1) Twist and cut of O-ring (external face)** 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 pats 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 P21)
		2) Internal sealing failure of valve 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.
		3)The permanent deformation compressed of O-ring (material: special FKM) 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 pats list P21)
	4. The leak detecting port has a leakage which can happen for pilot air leakage. →	**1) Twist and cut of O-ring (external face)** 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 pats 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))
		2) Internal sealing failure of valve The sealing failure of the sliding part of the valve piston causes the pilot air leakage from the leak detecting port.	Replace the valve with new one.
Insufficient flow rate	The flow rate from the OUT port has reduced. →	**1) Gelling or clogging of paint** 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)
		2) Reduction of pilot pressure 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)
		3) Excessive tightening of mounting nut 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. →	**1) Incorrect mounting direction of valve**	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	Check the part leaking air. 1. Any of the OUT, RETURN and leak detecting port has a leakage. →	Troubleshooting (valve): Refer to 1 through 4 for **leakage**.	
	2. Between the manifold blocks has a leakage. →	**1) Insufficient tightening or looseness of manifold tie-rod** 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)
		2)The permanent deformation compressed of O-ring (material: special FKM) 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 P20)
	3. Between the port block and manifold block has a leakage. →	**1) Insufficient tightening or looseness of port block mounting screw** 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)
		2)The permanent deformation compressed of O-ring (material: special FKM) 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. →	**1) Insufficient tightening or looseness of union nut** 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. →	**1) Insufficient tightening or looseness of fitting** 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

SMC Corporation

4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021 JAPAN
Tel: + 81 3 5207 8249 Fax: +81 3 5298 5362
URL https://www.smcworld.com