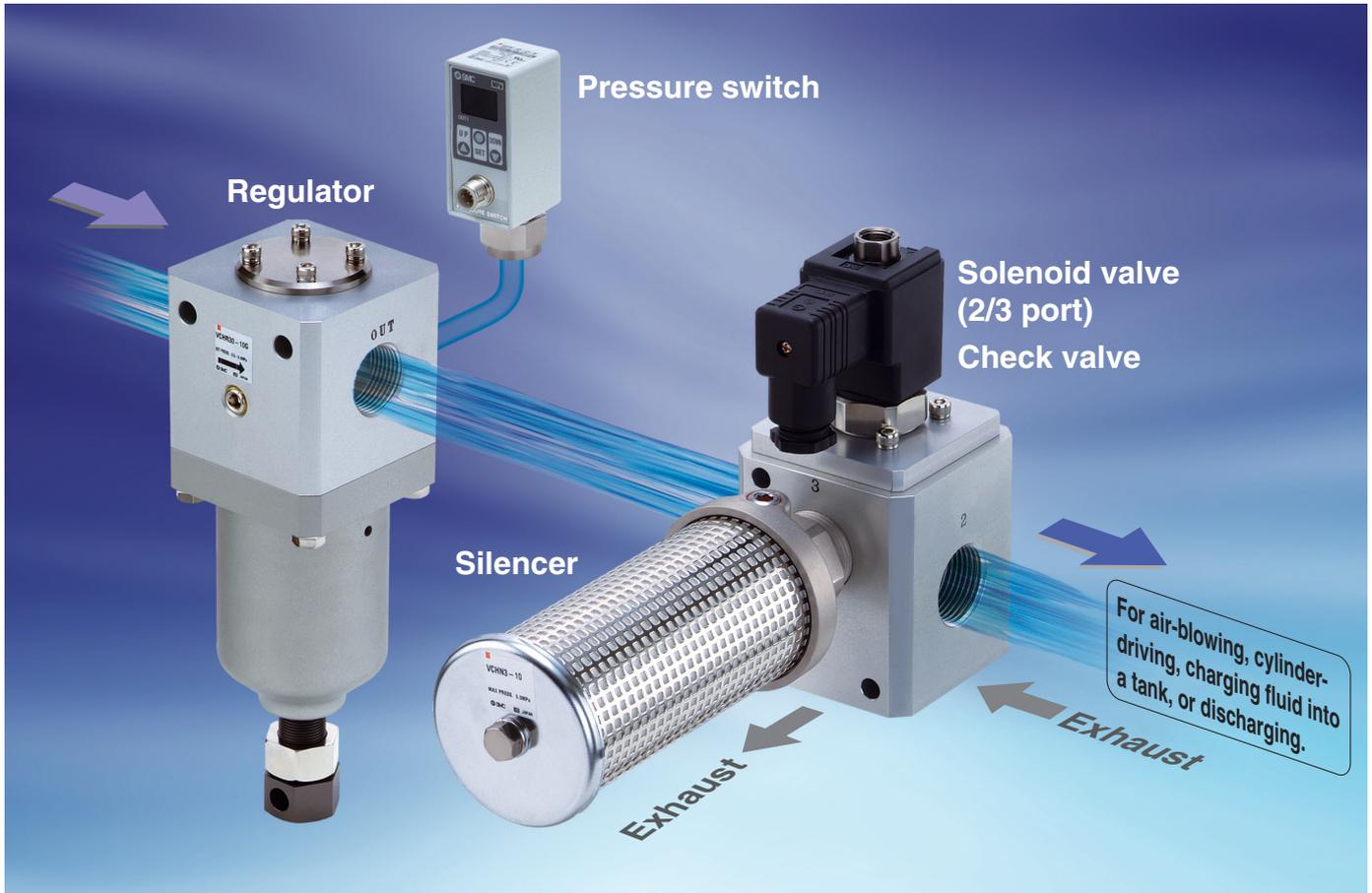




5.0 MPa Pneumatic Equipment Series



5.0 MPa

Pneumatic

Applications include air-blowing, charging fluid into a vessel, or discharging (Blow-molding equipment, etc.)



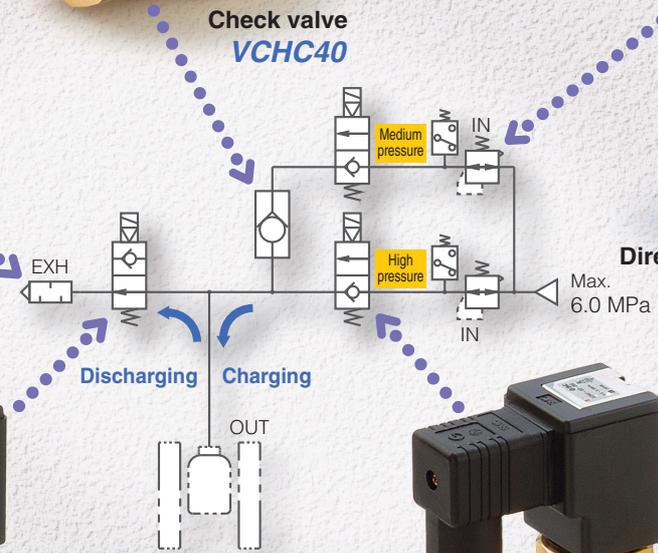
Silencer
VCHN3/4



Check valve
VCHC40



Direct operated regulator
(Relieving type)
VCHR30/40

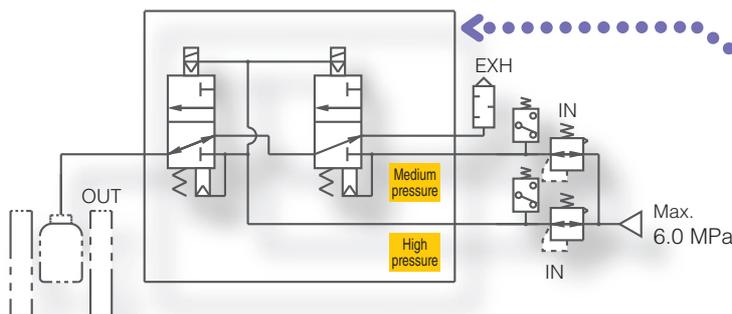


Pilot operated 2 port solenoid valve
Normally open
VCH42



Pilot operated 2 port solenoid valve
Normally closed
VCH41

Made to Order/Manifold Unit



Equipment Variations

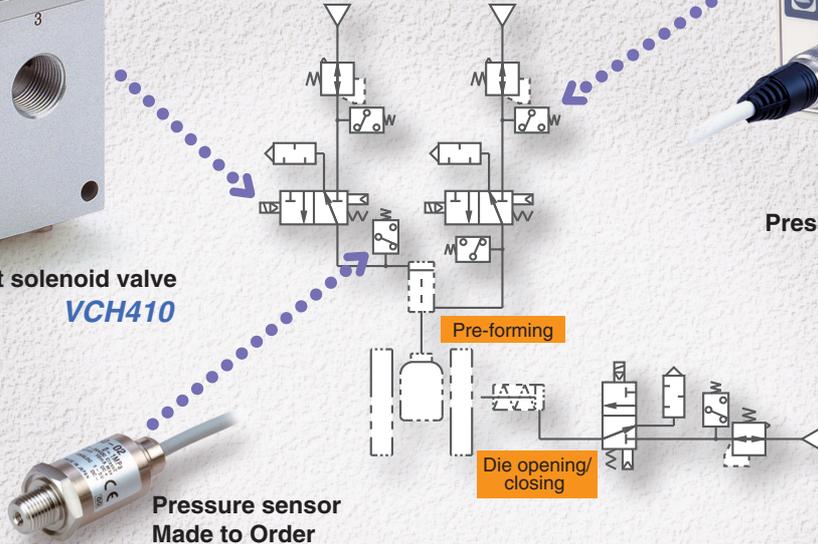
Example of driving a cylinder



Pilot operated 3 port solenoid valve
VCH410



Pressure switch
ISE75(H)



Pressure sensor
Made to Order

	Description	Features	Maximum operating pressure (MPa)	Series	Port size						Page
					1/4	1/2	3/4	1	1 1/4	1 1/2	
	Pilot operated 2 port solenoid valve	Service life: 10 million cycles A polyurethane elastomer poppet is adopted as a valve part. This improves durability under a high pressure environment.	5.0	VCH41(N.C.)			●	●			P.1
				VCH42(N.O.)			●	●			
	Check valve		5.0	VCHC40			●	●			P.5
	Pilot operated 3 port solenoid valve		5.0	VCH410			●	●	●		P.7
	Direct operated regulator (Relieving type)		Inlet pressure 6.0 Set pressure 0.5 to 5.0	VCHR30 VCHR40			●	●		●	P.15
	Silencer	Noise reduction 35 dB(A) (At supply pressure 4.0 MPa, back pressure 2.0 MPa) Reduction of clogging with double-layer construction	5.0 (Relief valve release pressure: 1.8 MPa)	VCHN3			●	●		P.21	
				VCHN4				●	●		●

Related Equipment

	Pressure switch	2-colour display Metal body (Aluminum die-cast)	10.0 15.0	ISE75(H)	●						
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Made to Order P.24

- 1** 6.0 MPa pilot operated regulator (Air operated type) ———
- 2** 22.0 MPa 2 port air operated valve ———
- 3** 5.0 MPa pressure sensor ———



5.0 MPa Pilot Operated 2 Port Solenoid Valve & Check Valve

Series VCH40/VCHC40

For Air



Series VCH40

Stable responsiveness

Response time variation within ± 2 ms

Service life: 10 million cycles

Collision-proof construction between the iron cores keeps equipment free of abrasion.

Construction with reduced variation and improved responsiveness when switching off.

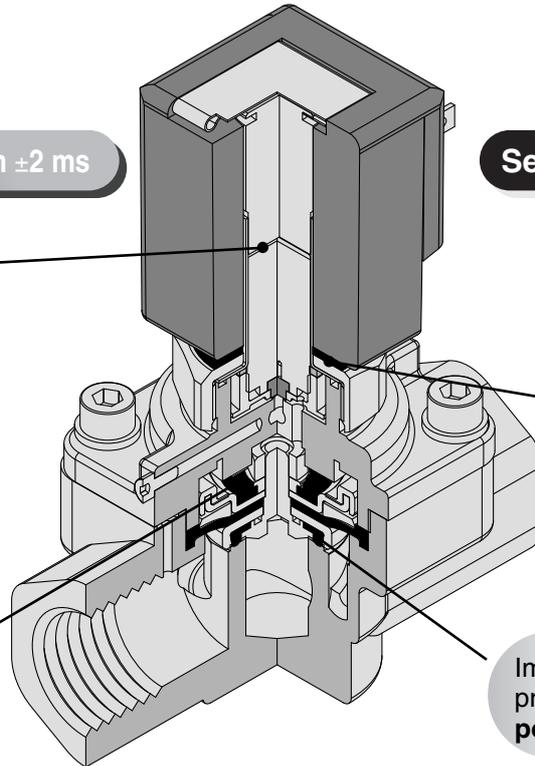
Improved durability by applying a **special surface treatment** to the sliding parts.

Unnecessary volume inside the pilot chamber is reduced.

High speed response with reduced variance

Use of **shock absorbing rubber**, results in protection of the pilot valve and electric parts.

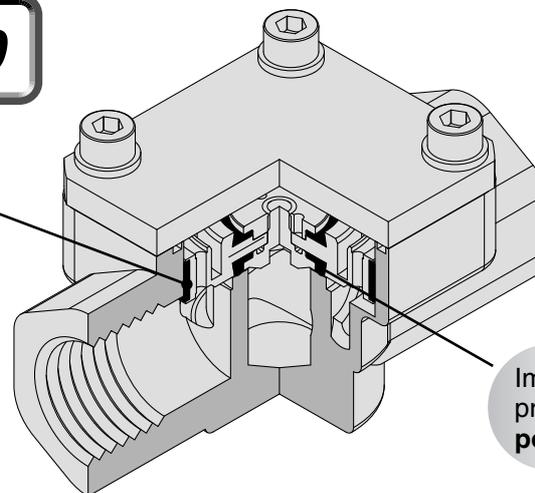
Improved durability under a high pressure environment is due to the **polyurethane elastomer** poppet.



Series VCHC40

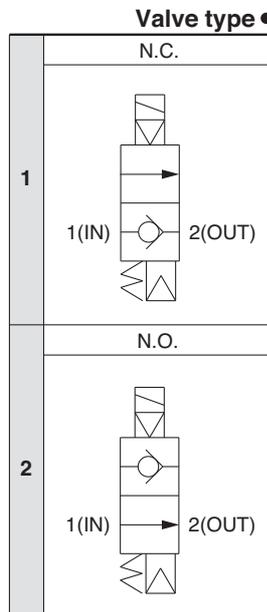
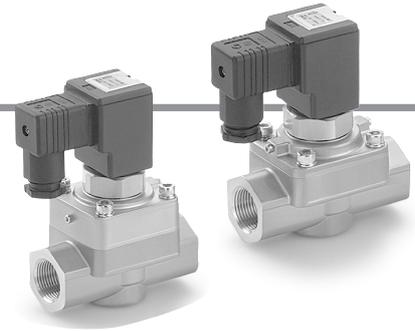
Uses **NSF-H1-certified grease** on the guide ring (sliding part).

Improved durability under a high pressure environment is due to the **polyurethane elastomer** poppet.



How to Order

VCH4 1 - 5 D - 06 G - Q



Voltage

5	24 VDC
6	12 VDC

* Consult with SMC for other voltages. CE marking compliant products are only available with 50 VDC or less.

Thread type
(G thread for hydraulics and pneumatics conforming to ISO1179-1)

Port size

06	3/4
10	1

Electrical entry

D	DIN connector
DL	DIN connector with light

* A surge voltage suppressor is integrated inside the coil as a standard feature.

Specifications

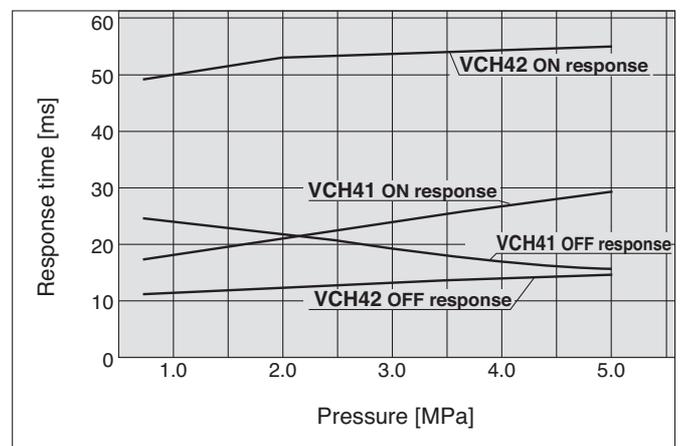
Model	VCH41 (N.C.)	VCH42 (N.O.)
Valve construction	Pilot operated, diaphragm poppet	
Fluid	Air, Inert gas	
Orifice	ø16	ø17.5
Flow characteristics	C value (Effective area)	17 dm ³ /(s·bar) (85 mm ²)
	b	0.08
	Cv	4.5
Max. operating pressure	5.0 MPa	
Operating pressure	0.5 to 5.0 MPa	
Fluid temperature	-5 to 80 °C	
Ambient temperature	-5 to 80 °C	
Body material	Brass	
Main seal material	Polyurethane elastomer	
Enclosure	Drip proof (Equivalent to IP65)	
Port size	G3/4, 1 (G thread for hydraulics and pneumatics conforming to ISO1179-1)	
Impact/Vibration resistance <small>Note 1)</small>	300/100 m/s ² <small>Note 2)</small>	
Mounting orientation	Unrestricted	
Weight	1.67 kg	1.9 kg
Coil specification	Rated voltage	12 VDC, 24 VDC
	Allowable voltage fluctuation	±10 % of rated voltage
	Electrical entry	DIN connector
	Coil insulation type	Class B
	Power consumption	5 W (DC)

Note 1) Impact resistance: No malfunction resulted in an impact test using a drop impact tester. The test was performed one time each in the axial and right angle directions of the main valve and armature, for both energised and de-energised states. (Value in the initial stage)

Vibration resistance: No malfunction resulted in 8.3 to 2000 Hz, a one-sweep test performed in the axial and right angle directions of the main valve and armature for both energised and de-energised states. (Value in the initial stage)

Note 2) Vibration resistance is 50 m/s² when a light/surge voltage suppressor is attached.

Response Time



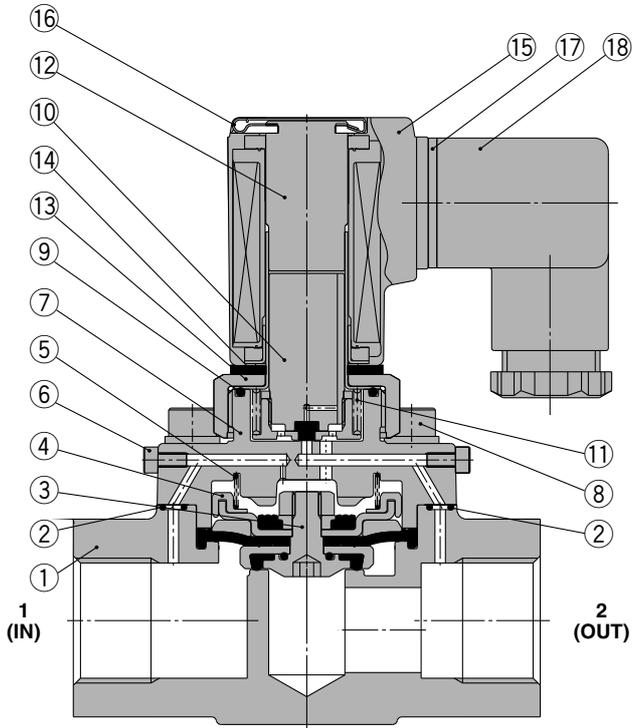
Note 1) DC solenoid without a light/surge voltage suppressor

Note 2) DC solenoid with an indicator light: It will cause delays around 20 to 30 msec in the OFF response time.

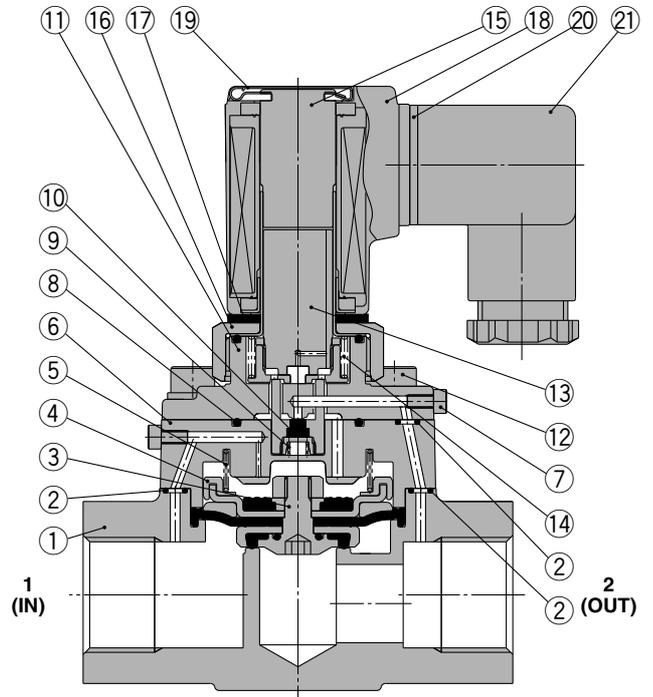
Series VCH40

Construction

Normally closed (N.C.)



Normally open (N.O.)



Component Parts

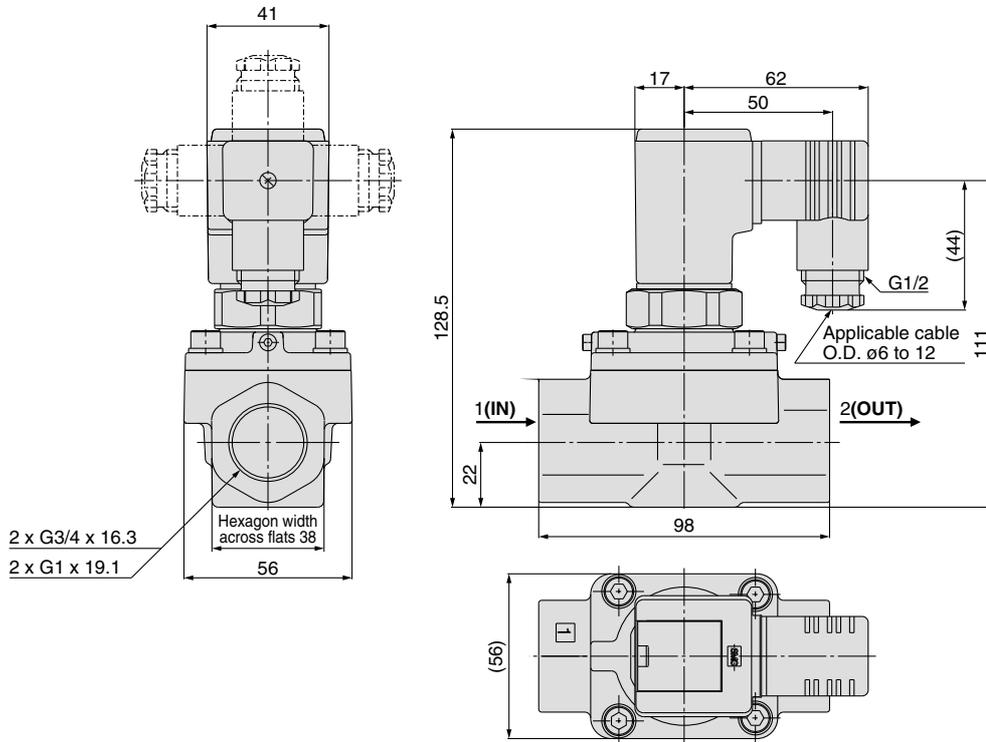
No.	Description	Material
1	Body	Brass
2	O-ring	NBR
3	Diaphragm assembly	Polyurethane elastomer
		Stainless steel
4	Main valve guide	Resin
5	Poppet spring	Stainless steel
6	Hexagon socket head cap screw	Carbon steel
7	Bonnet	Brass
8	Hexagon socket head cap screw (with SW)	Carbon steel
9	O-ring	NBR
10	Armature assembly	—
11	Return spring	Stainless steel
12	Tube assembly	Stainless steel
13	Nut	Brass
14	Rubber mount	NBR
15	DIN connector type solenoid coil	—
16	Clip	Carbon steel
17	DIN terminal gasket	CR
18	DIN connector	—

Component Parts

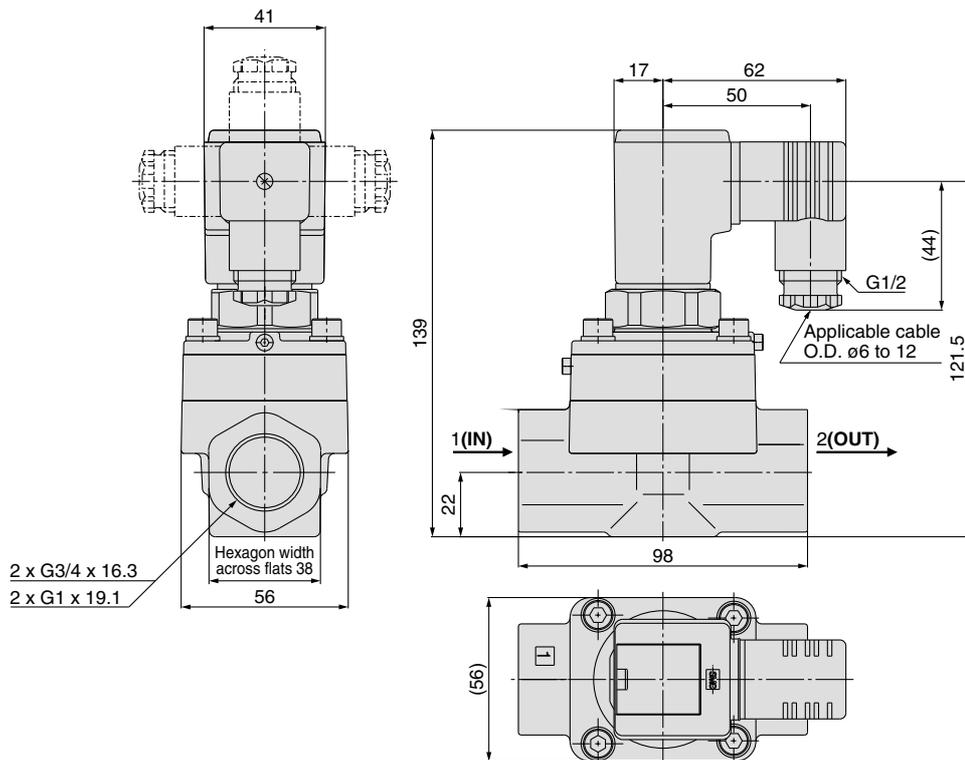
No.	Description	Material
1	Body	Brass
2	O-ring	NBR
3	Diaphragm assembly	Polyurethane elastomer
		Stainless steel
4	Main valve guide	Resin
5	Poppet spring	Stainless steel
6	Bonnet plate	Brass
7	Hexagon socket head cap screw	Carbon steel
8	O-ring	NBR
9	Valve spring	Stainless steel
10	Poppet	H-NBR
11	Bonnet	Brass
12	Hexagon socket head cap screw (with SW)	Carbon steel
13	Armature assembly	—
14	Return spring	Stainless steel
15	Tube assembly	Stainless steel
16	Nut	Brass
17	Rubber mount	NBR
18	DIN connector type solenoid coil	—
19	Clip	Carbon steel
20	DIN terminal gasket	CR
21	DIN connector	—

Dimensions

VCH41 (N.C.)



VCH42 (N.O.)



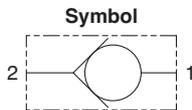
5.0 MPa Check Valve

Series *VCHC40*

How to Order



VCHC40 – **06** **G**



• Thread type
(G thread for hydraulics and pneumatics conforming to ISO1179-1)

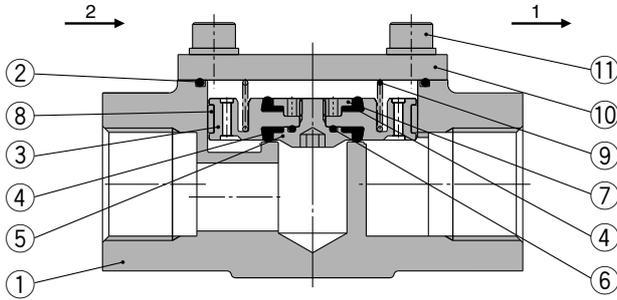
• Port size

06	3/4
10	1

Specifications

Model	VCHC40	
Operating pressure	0.05 to 5.0 MPa	
Cracking pressure	0.05 MPa	
Orifice diameter	ø16	
Flow characteristics	C value (Effective area)	28 dm ³ /(s·bar) (140 mm ²)
	b	0.15
	Cv	7.4
Fluid	Air, Inert gas	
Fluid temperature	–5 to 80 °C	
Ambient temperature	–5 to 80 °C	
Body material	Brass	
Seal material	Polyurethane elastomer	
Port size	G3/4, 1 (G thread for hydraulics and pneumatics conforming to ISO1179-1)	
Mounting orientation	Unrestricted	
Weight	1.02 kg	

Construction

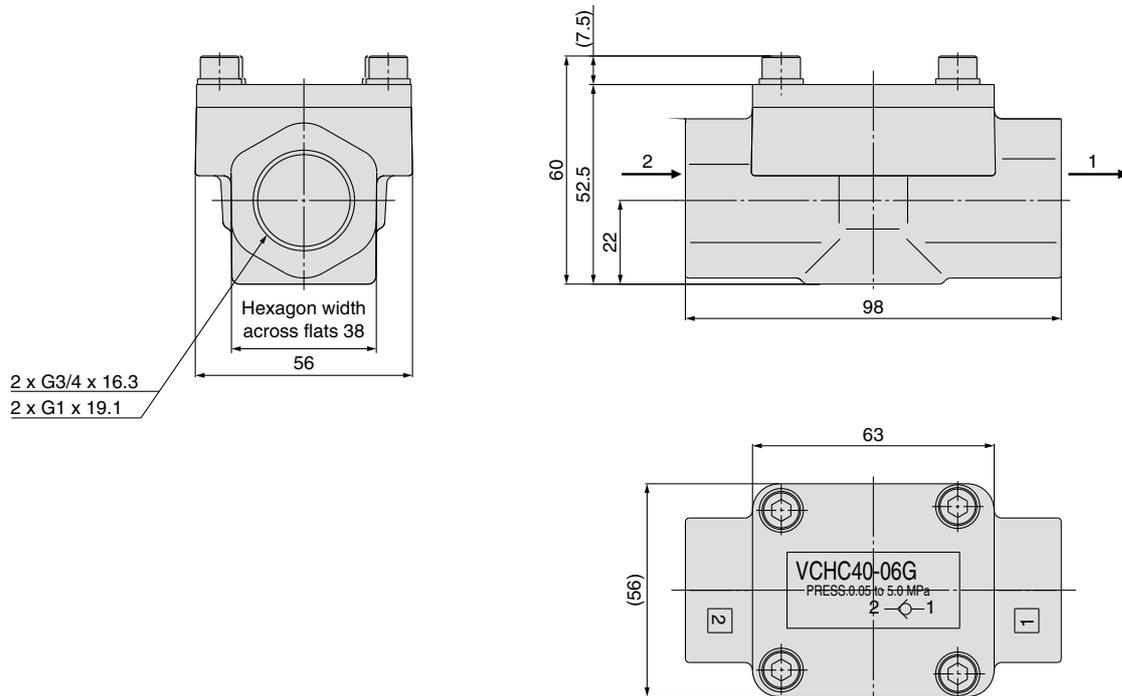


Component Parts

No.	Description	Material
1	Body	Brass
2	O-ring	NBR
3	Piston	Aluminum + Hard anodized
4	Poppet	Polyurethane elastomer
5	Set screw	Stainless steel
6	O-ring	NBR
7	Nut	Stainless steel
8	Guide ring	Resin
9	Spring	Stainless steel
10	Plate	Steel + Electroless nickel plated
11	Hexagon socket head cap screw (with SW)	Carbon steel

Dimensions

VCHC40



5.0 MPa Pilot Operated 3 Port Solenoid Valve

Series VCH400

For Air



Stable responsiveness

Response time variation within ± 2 ms

Service life: 10 million cycles

Collision-proof construction between the iron cores keeps equipment free of abrasion.



Construction with reduced variation and improved responsiveness when switching off.

Use of **shock absorbing rubber**, results in protection of the pilot valve and electric parts.

Improved durability by applying a **special surface treatment** to the sliding parts.

A **special fluoro-resin seal** is adopted for the sliding part.



Stable responsiveness after extended activity. Less likely to subject to a pressure changes.

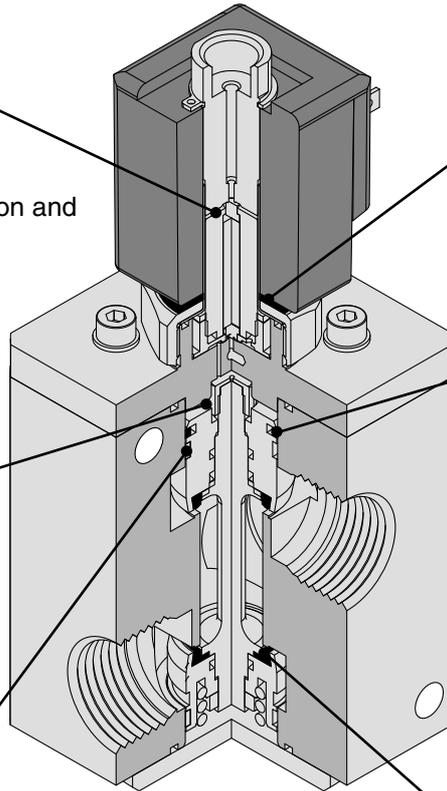
Unnecessary volume inside the pilot chamber is reduced.



High speed response with reduced variance

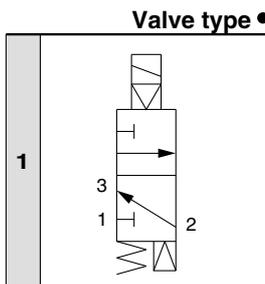
Uses NSF-H1-certified grease on the guide ring (sliding part). Special treatment containing **fluoro-resin is applied** to the body side sliding face.

Improved durability under a high pressure environment is due to the **polyurethane elastomer** poppet.



How to Order

VCH410-5D-06G-Q



Valve type

Voltage

5	24 VDC
6	12 VDC

* Consult with SMC for other voltages. CE marking compliant products are only available with 50 VDC or less.

Thread type

(G thread for hydraulics and pneumatics conforming to ISO1179-1)

Port size

04	1/2
06	3/4
10	1

Electrical entry

D	DIN connector
DL	DIN connector with light

* A surge voltage suppressor is integrated inside the coil as a standard feature.



Specifications

Model		VCH410	
Valve construction		Pilot operated, diaphragm poppet	
Fluid		Air, Inert gas	
Orifice		ø18	
Flow characteristics	C value (Effective area)	G1/2 1→2:20 dm ³ /(s·bar) (100mm ²) 2→3:22 dm ³ /(s·bar) (110mm ²)	G3/4, 1 1→2:22 dm ³ /(s·bar) (110mm ²) 2→3:24 dm ³ /(s·bar) (120mm ²)
	b	G1/2 0.26	G3/4, 1 0.36
	Cv	G1/2 1→2 5.3 2→3 5.8	G3/4, 1 1→2 5.8 2→3 6.3
Max. operating pressure		5.0 MPa	
Operating pressure <small>Note 1)</small>		0.5 to 5.0 MPa	
Fluid temperature		-5 to 80 °C	
Ambient temperature		-5 to 80 °C	
Body material		Aluminum + Hard anodized	
Main seal material		Polyurethane elastomer	
Enclosure		Drip proof (Equivalent to IP65)	
Port size		G1/2, 3/4, 1 (G thread for hydraulics and pneumatics conforming to ISO1179-1)	
Impact/Vibration resistance <small>Note 2)</small>		300/100 m/s ² <small>Note 3)</small>	
Mounting orientation		Unrestricted	
Weight		G1/2, 3/4: 1.83 kg, G1: 2.11 kg	
Coil specification	Rated voltage	12 VDC, 24 VDC	
	Allowable voltage fluctuation	±10% of rated voltage	
	Electrical entry	DIN connector	
	Coil insulation type	Class B	
	Power consumption	5 W (DC), 13 VA (AC)	

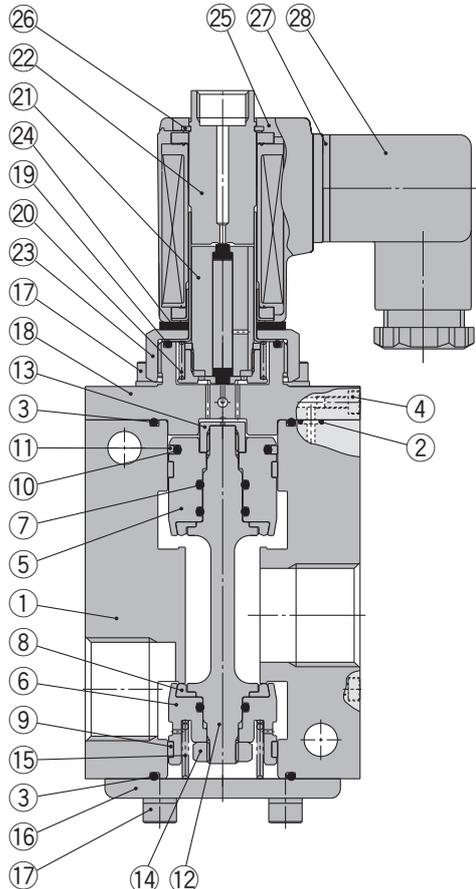
Note 1) When used as a selector valve (pressurising ports 1, 3), the pressure should be within the range of port 1 pressure - port 3 pressure x 2 (2 times).

Note 2) Impact resistance: No malfunction resulted in an impact test using a drop impact tester. The test was performed one time each in the axial and right angle directions of the main valve and armature, for both energised and de-energised states. (Value in the initial stage)

Vibration resistance: No malfunction resulted in 8.3 to 2000 Hz, a one-sweep test performed in the axial and right angle directions of the main valve and armature for both energised and de-energised states. (Value in the initial stage)

Note 3) Vibration resistance is 50 m/s² when a light/surge voltage suppressor is attached.

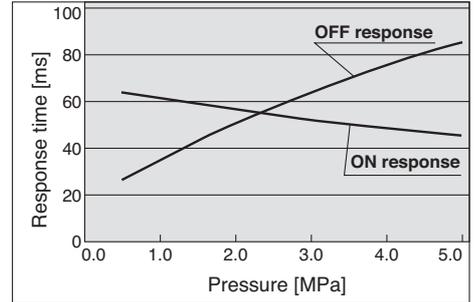
Construction



Component Parts

No.	Description	Material
1	Body	Aluminum + Hard anodized
2	O-ring	NBR
3	O-ring	NBR
4	Hexagon socket head cap screw	Carbon steel
5	Piston A	Aluminum + Hard anodized
6	Piston B	Aluminum + Hard anodized
7	O-ring	NBR
8	Poppet	Polyurethane elastomer
9	Guide ring	Resin
10	O-ring	NBR
11	Ring	Resin
12	Rod	Stainless steel
13	Hexagon nut	Brass
14	Hexagon nut class 3	Stainless steel
15	Poppet spring	Stainless steel
16	Plate	Steel + Electroless nickel plated
17	Hexagon socket head cap screw (with SW)	Carbon steel
18	Bonnet	Aluminum + Hard anodized
19	O-ring	NBR
20	Return spring	Stainless steel
21	Armature assembly	-
22	Tube assembly	Stainless steel
23	Nut	Brass
24	Rubber mount	NBR
25	DIN connector type solenoid coil	-
26	Round S-type retaining ring	Carbon steel
27	DIN terminal gasket	CR
28	DIN connector	-

Response Time



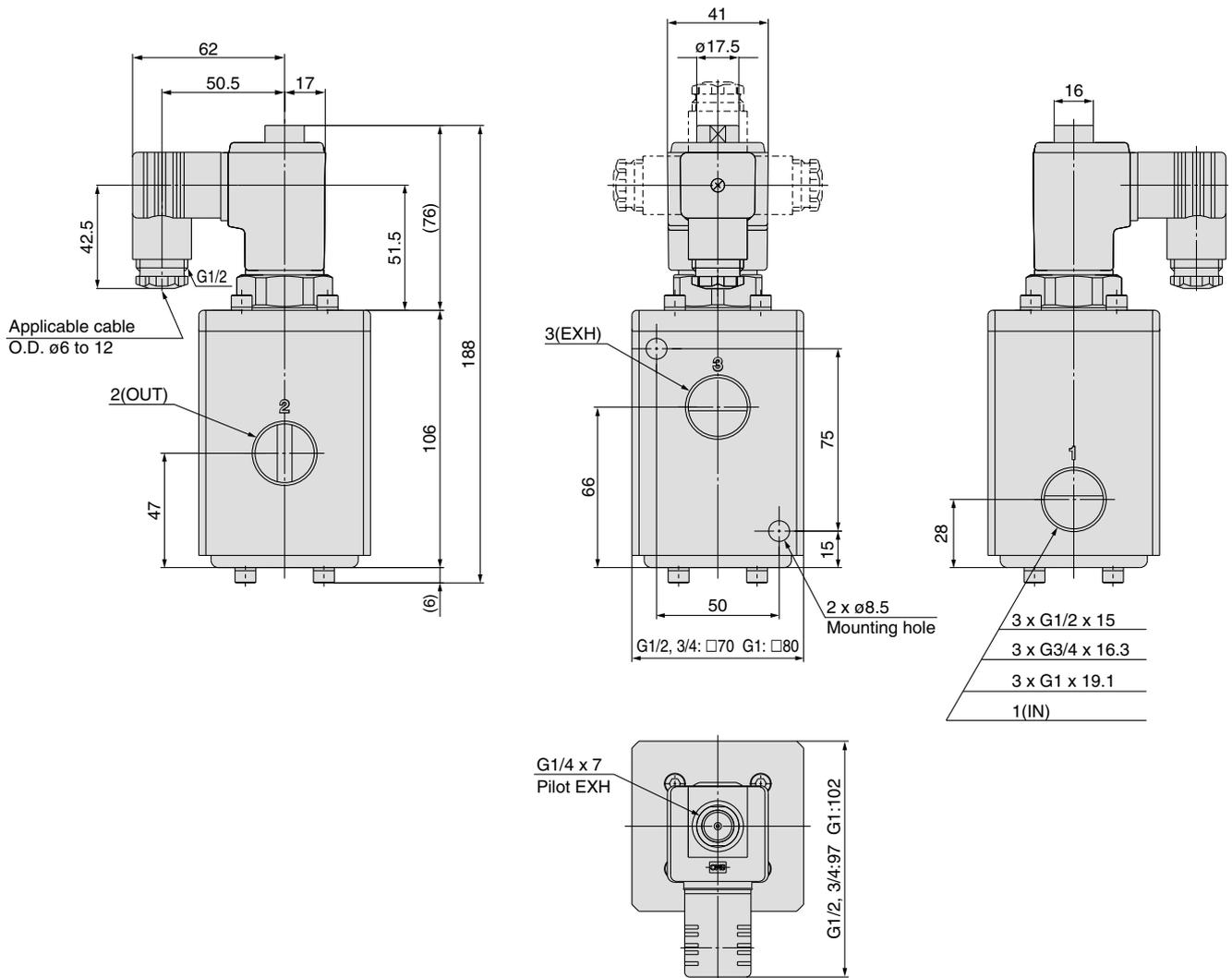
Note 1) DC solenoid without a light/surge voltage suppressor

Note 2) DC solenoid with an indicator light: It will cause delays around 20 to 30 msec in the OFF response time.

Series VCH400

Dimensions

VCH410





Series VCH Safety Instructions

These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by labels of "**Caution**", "**Warning**" or "**Danger**". To ensure safety, be sure to observe ISO 4414 ^{Note 1)}, JIS B 8370 ^{Note 2)} and other safety practices.

 **Caution:** Operator error could result in injury or equipment damage.

 **Warning:** Operator error could result in serious injury or loss of life.

 **Danger :** In extreme conditions, there is a possible result of serious injury or loss of life.

Note 1) ISO 4414: Pneumatic fluid power – General rules relating to systems

Note 2) JIS B 8370: General Rules for Pneumatic Equipment

Warning

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

Since the products specified here are used in various operating conditions, their compatibility with a specific system must be based on specifications or post analysis and/or tests to meet your specific requirements. The expected performance and safety assurance are the responsibility of the person who has determined the compatibility of the system. This person should continuously review the suitability of all items specified, referring to the latest catalogue information and taking into consideration the possibility of equipment failure when configuring a system. Be particularly careful in determining the compatibility with the fluid to be used.

2. Only trained personnel should operate machinery and equipment.

The fluid (high pressure) can be dangerous if handled incorrectly. Assembly, handling or maintenance of the system should be performed by trained and experienced operators.

3. Do not service machinery/equipment or attempt to remove components until the safety is confirmed.

1. Inspection and maintenance of machinery/equipment should only be performed once measures to prevent falling or runaway of the driven object have been confirmed. Measures to prevent danger from a fluid should also be confirmed.

2. When equipment is removed, confirm that safety processes mentioned above, release the fluid pressure and be certain there is no danger from fluid leakage or fluid remaining in the system.

3. Carefully restart the machinery, confirming that safety measures are being implemented.

4. Contact SMC if the product will be used in any of the following conditions:

1. Conditions and environments beyond the given specifications, or if product is used outdoors.

2. With fluids whose application causes concern due to the type of fluid or additives, etc.

3. An application which has the possibility of having a negative effect on people, property, or animals, requiring special safety analysis.

5. This product is not certified according to the High Pressure Gas Safety Law (in Japan).



5.0 MPa Pilot Operated 2/3 Port Solenoid Valve & Check Valve Precautions 1

Be sure to read this before handling.

Design

Warning

1. Cannot be used as an emergency shutoff valve, etc.

The valves presented in this catalogue 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. Extended periods of continuous energisation

The solenoid coil will generate heat when continuously energised. Avoid using in a tightly shut container. Install it in a well-ventilated area. Furthermore, do not touch it while it is being energised or right after it is energised.

3. This solenoid valve cannot be used for explosion proof applications.

4. Maintenance space

The installation should allow sufficient space for maintenance activities.

5. Actuator drive

When an actuator, such as a cylinder, is to be driven using a valve, take appropriate measures to prevent potential danger caused by actuator operation.

6. Use caution regarding exhaust port freezing.

If a high pressure air (more than 1.0 MPa) is quickly exhausted, there may be an occurrence in which the valve will not switch properly or the service life will substantially decrease due to condensation or freezing caused by the substantial temperature change. When condensation or freezing occurs, take measures such as using a freeze-reducing silencer (VCHNF series), etc.

7. Use caution regarding back pressure.

1) When port 3 (EXH) of a 3 port solenoid valve (VCH400 series) is excessively throttled or used as a selector valve (pressurising ports 1, 3), the pressure in the port should be within a range of half the pressure in port 1 (port 1 pressure \geq twice as strong as port 3 pressure). Using a 3 port valve beyond its back pressure and/or supply pressure range may cause the valve switch to malfunction or result in unstable operation.

2) In the case of a 3 port solenoid valve, when the valve is being switched, high pressure air will be introduced into the lower pressure side. Therefore, when using this product as a selector valve for switching between high and medium pressures, a relief type regulator (VCHR series) must be used for the medium pressure side.

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 catalogue.

2. Fluid

Corrosive gas

Cannot be used since it will lead to cracks by stress corrosion or result in other incidents.

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 SMC's Best Pneumatics 2004 catalogue 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. Supply source

If the primary side air is throttled, flow may be reduced resulting in the malfunction of the switch or instability in the response time because of the pilot operated solenoid valve. Conduct piping work suited for the secondary side piping (air consumption).

Also, when a regulator is installed, the air supply will stop right after the solenoid valve is switched due to the response time of the regulator. Thus, when using it below the minimum operating pressure, adjust the pipe size, length or provide an air tank, etc.



5.0 MPa Pilot Operated 2/3 Port Solenoid Valve & Check Valve Precautions 2

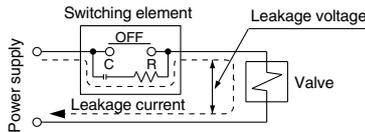
Be sure to read this before handling.

Selection

⚠ Caution

1. Leakage voltage

Particularly when using a resistor in parallel with a switching element and using a C-R element (surge voltage suppressor) to protect the switching element, take note that leakage current will flow through the resistor, C-R element, etc., creating a possible danger that the valve may not turn off.



DC coil: 2% or less of rated voltage

Mounting

⚠ Warning

1. If air leakage increases or equipment does not operate properly, stop operation.

After mounting is completed, confirm that it has been done correctly by performing a suitable function test.

2. Do not apply external force to the coil section.

Be sure to apply the wrench to the external part of the piping connection. (Hexagonal parts or width across flats) Also, use caution when mounting a silencer or piping to the pilot exhaust port (G1/4) on top of the VCH410 series 3 port solenoid valve.

3. Be sure not to position the coil downwards.

When mounting a valve with its coil positioned downwards, foreign objects in the fluid will adhere to the iron core leading to a malfunction.

4. Avoid sources of vibration, or adjust the mounting arm from the body to the minimum length so that resonance will not occur.

Piping

⚠ Caution

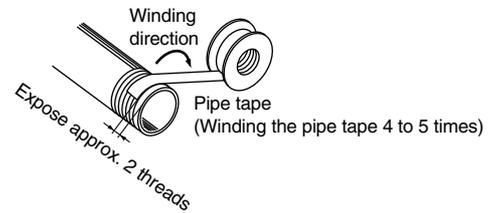
1. Preparation before piping

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.

Avoid pulling, compressing, or bending the valve body when piping.

2. Wrapping of pipe tape

Pipe tape is not necessary since this product uses a pneumatic and hydraulic purpose G thread which conforms to ISO 1179-1. When an R (taper) thread is used, leave 1 to 2 threads at the tip exposed before winding the piping thread around it 4 to 5 times.



Connecting a R thread

3. 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
G, Rc 1/2	28 to 30
G, Rc 3/4	28 to 30
G, Rc 1	36 to 38

4. Connection of piping to products

When connecting piping to a product, refer to its instruction manual to avoid mistakes regarding the supply port, etc.

- Port 1: Supply port
- Port 2: Output port
- Port 3: Exhaust port

Note) Supply port when used as a selector valve.

However, use within the range of port 1 pressure p_{at} 3 pressure x 2 (2 times).



5.0 MPa Pilot Operated 2/3 Port Solenoid Valve & Check Valve Precautions 3

Be sure to read this before handling.

Wiring

⚠ Caution

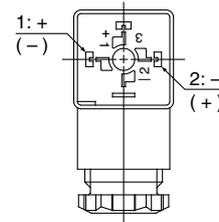
1. As a rule, use electrical wire with a cross sectional area of 0.5 to 1.25 mm² for wiring. Furthermore, do not allow excessive force to be applied to the lines.
2. Use electrical circuits which do not generate chattering in their contacts.
3. Use voltage which is within $\pm 10\%$ of the rated voltage. In cases with a DC power supply where importance is placed on responsiveness, stay within $\pm 5\%$ of the rated value. The voltage drop is the value in the lead wire section connecting the coil.
4. When a surge from the solenoid affects the electrical circuitry, install a surge absorber, etc., in parallel with the solenoid. Or, adopt an option that comes with the surge voltage protection circuit. (However, a surge voltage occurs even if the surge voltage protection circuit is used. For details, please consult with SMC.)

Electrical Connections

⚠ Caution

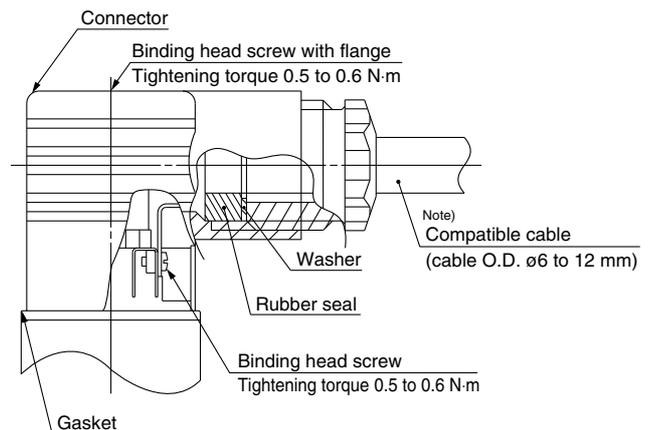
DIN connector

Since internal connections are as shown below for the DIN connector, make connections to the power supply accordingly.



Terminal no.	1	2
DIN terminal	+ (-)	- (+)

- * There is no polarity.
- Use the compatible heavy-duty cords with cable O.D. of $\phi 6$ to 12 mm.
- Use the tightening torques below for each section.



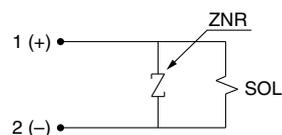
Note) For an outside cable diameter of $\phi 9$ to 12 mm, remove the internal parts of the rubber seal before using.

Electrical Circuits

⚠ Caution

DIN connector

DC circuit





5.0 MPa Pilot Operated 2/3 Port Solenoid Valve & Check Valve Precautions 4

Be sure to read this before handling.

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 explosive atmospheres.
3. Do not use in locations subject to vibration or impact.
4. Do not use in locations where radiated heat will be received from nearby heat sources.
5. Employ suitable protective measures in locations where there is contact with water droplets, oil or welding spatter, etc.

Maintenance

Warning

1. Removing the product

1. Shut off the fluid supply and release the fluid pressure in the system.
2. Shut off the power supply.
3. 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 every six months.

Maintenance

Caution

1. Storage

In the case of long term storage, thoroughly remove all moisture to prevent rust and deterioration of rubber materials, etc.

2. Exhaust the drain from an air filter periodically.

6.0 MPa Direct Operated Regulator (Relieving Type)

Series *VCHR*

Service life: 10 million cycles

Uses **NSF-H1-certified grease** on the guide ring (sliding) part.

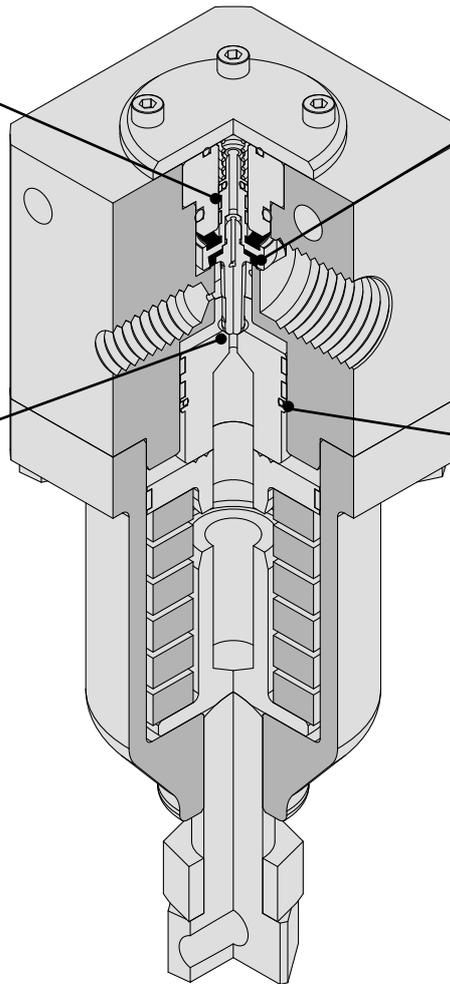
Improved durability under a high pressure environment is due to the **polyurethane elastomer** poppet.

Adopting a **metal-sealed relief valve** improves the durability.

A **special fluoro-resin seal** is adopted for the sliding part.



Stable responsiveness after extended inactivity.
Less likely to subject to a pressure changes.



How to Order

VCHR 30-06 G

● Body size

30
40

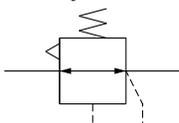
● Thread type

(G thread for hydraulics and pneumatics conforming to ISO1179-1)

● Port size

Symbol	Port size	VCHR30	VCHR40
06	3/4	●	
10	1	●	●
14	1-1/2		●

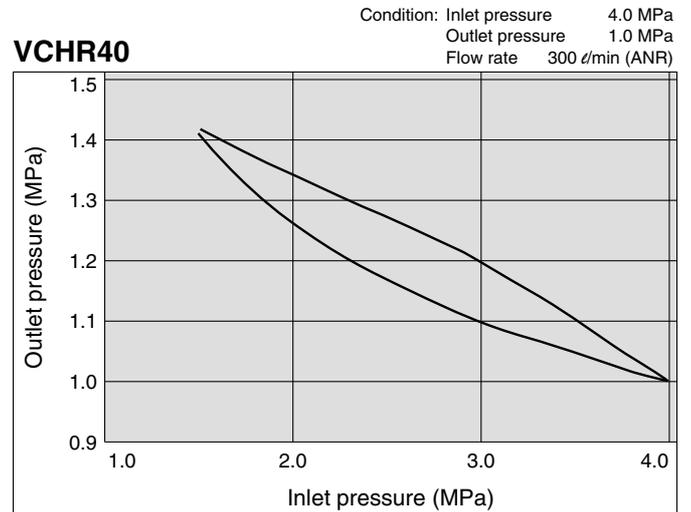
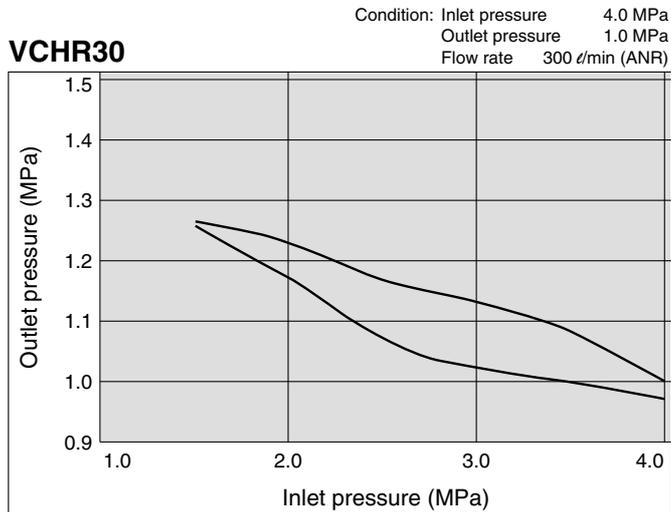
Symbol



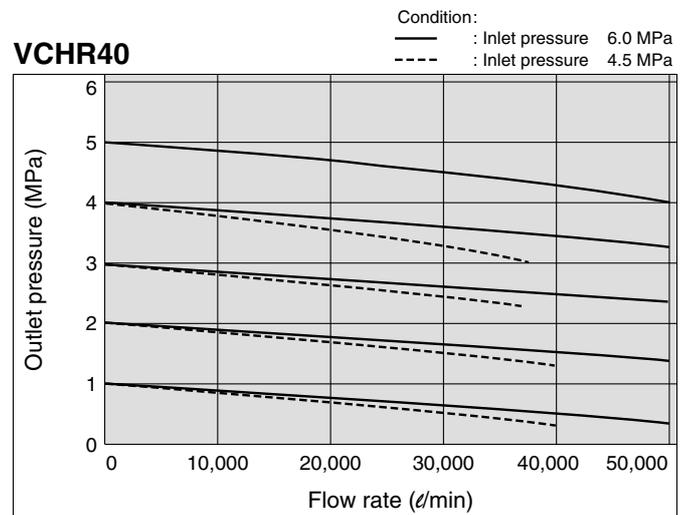
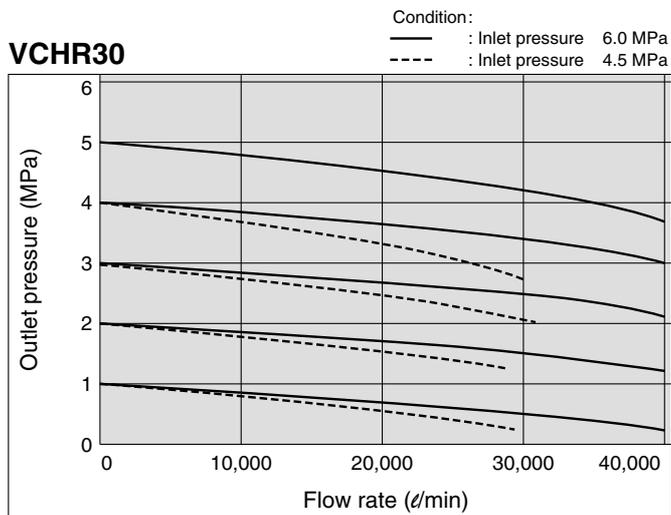
Specifications

Model	VCHR30	VCHR40
Valve construction	Piston type	
Valve material	Polyurethane elastomer	
Relief mechanism	Relieving type	
Port size	G3/4, G1	G1, G1•1/2
Thread type	G thread for hydraulics and pneumatics conforming to ISO1179-1	
Fluid	Air	
Max. operating pressure	6.0 MPa	
Set pressure range	0.5 to 5.0 MPa	
Fluid temperature	-5 to 60°C	
Ambient temperature	-5 to 60°C	
Weight	4.4 kg	6.2 kg

Pressure Characteristics

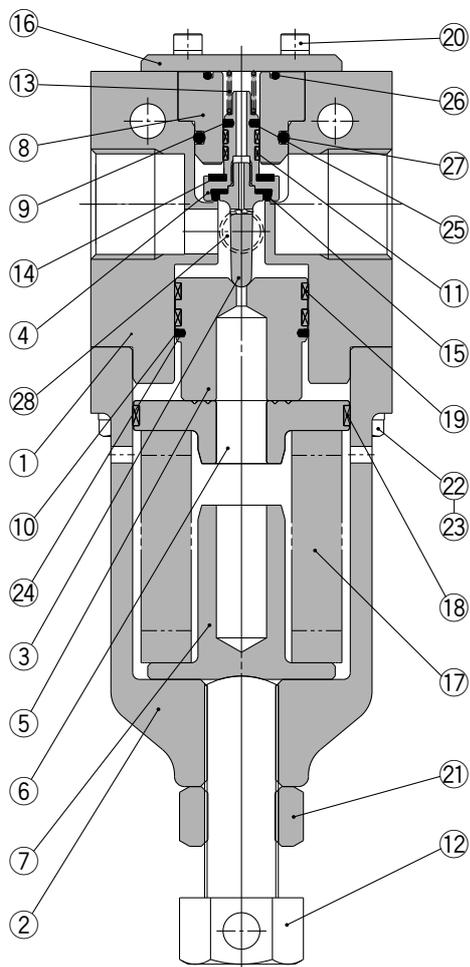


Flow Characteristics



Series VCHR

Construction

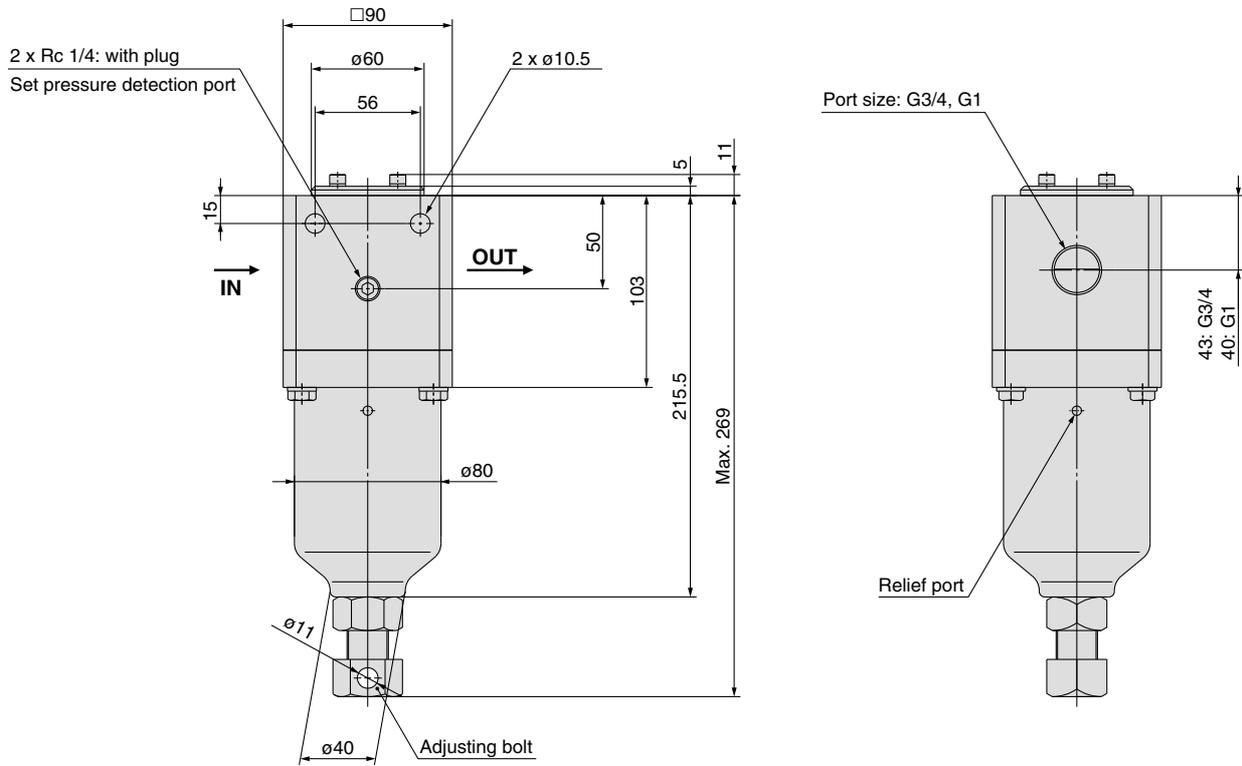


Component Parts

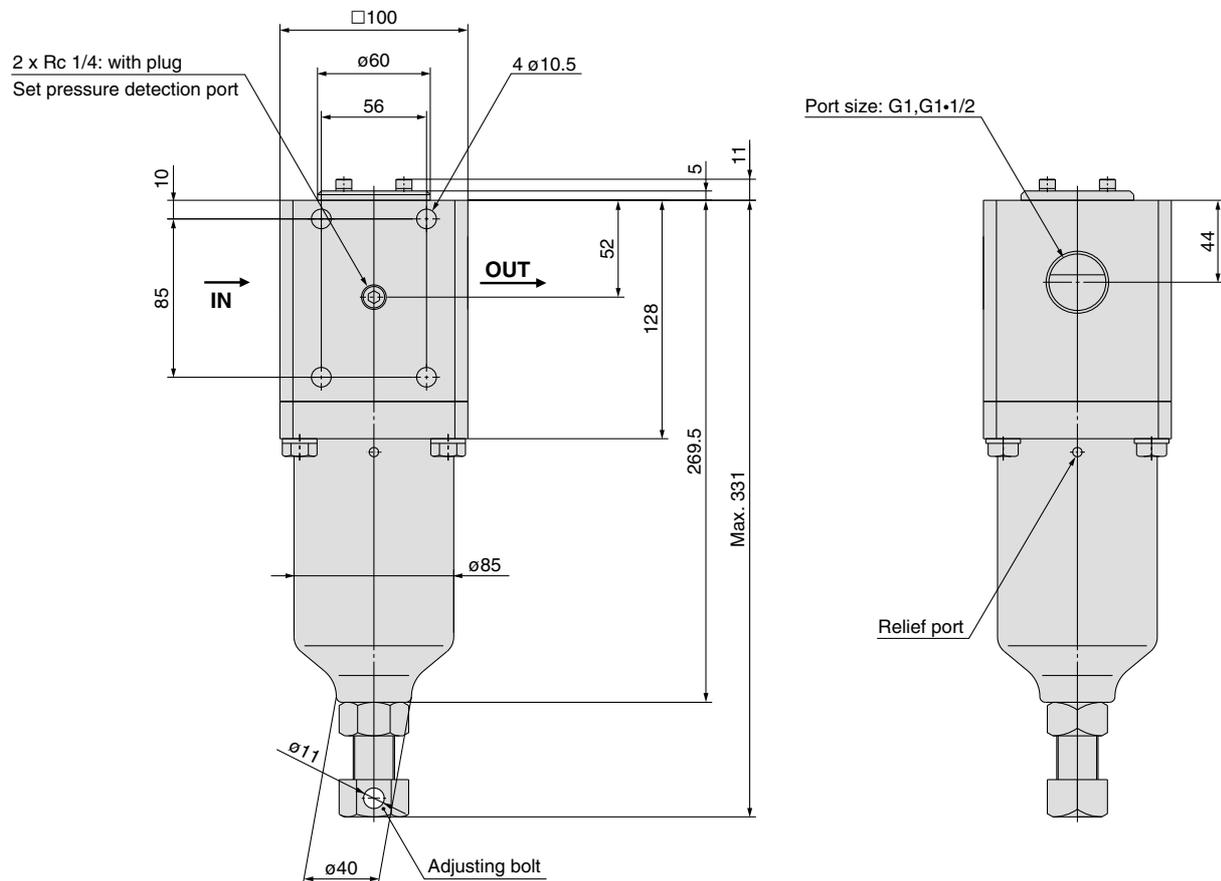
No.	Description	Material
1	Body	Aluminum + Hard anodized
2	Bonnet	Aluminum + Hard anodized
3	Valve	Stainless steel
4	Valve spool	Stainless steel
5	Piston	Steel + Electroless nickel plated
6	Spring guide	Steel + Electroless nickel plated
7	Spring seat	Steel + Electroless nickel plated
8	Spool guide	Aluminum + Hard anodized
9	Seal A	Resin
10	Seal B	Resin
11	Guide ring	Resin
12	Adjusting bolt	Stainless steel
13	Return spring	Stainless steel
14	Cushion	Polyurethane elastomer
15	Poppet	Polyurethane elastomer
16	Plate	Steel + Electroless nickel plated
17	Spring	Stainless steel
18	Guide ring	Resin
19	Guide ring	Resin
20	Hexagon socket head cap screw	Carbon steel
21	Hexagon nut	Carbon steel
22	Hexagon bolt	Carbon steel
23	Spring washer	Carbon steel
24	O-ring	NBR
25	O-ring	NBR
26	O-ring	NBR
27	O-ring	NBR
28	Hexagon socket head plug	Carbon steel

Dimensions

VCHR30



VCHR40





Regulator Precautions

Be sure to read this before handling.

Caution on Design

Warning

1. Consult with SMC when leakage is never permitted because of the operating environment, or if fluids other than air will be used.
2. Be sure to install a safety device as output pressure exceeding the set pressure value could cause equipment damage or malfunctions on the outlet side.

Caution

1. Using the product outside the specified range is not allowed. Consult with SMC when using the product outside the specified range of operating pressure, temperature, pressure, etc.

Selection

Warning

1. Grease may leak into the outlet side because it has been applied to the inner sliding parts and seals. Contact SMC when such cases should be avoided.
2. Contact SMC as the set pressure of the outlet side may fluctuate when air has not been consumed for a long period of time, or when the product is used in a shut-off or balancing circuit on the outlet side.
3. The set outlet side pressure range should be less than 85% of the inlet side pressure. Setting a pressure exceeding 85% may be subject to fluctuation of flow or pressure in the inlet side, resulting in unstable operation.
4. The maximum value in catalogue set pressure range has a tolerance. Therefore, the pressure setting may exceed this value.
5. Confirm with SMC when the product will be used in circuits, requiring highly precise relief sensitivity or setting precision.

Mounting

Caution

1. Confirm the “IN” and “OUT” showing the inlet/outlet of the air flow or arrow mark before connection. Reverse connections will result in malfunction.
2. Provide adequate space for maintenance or operation in the upper, lower and front of each product. Regarding this space, refer to the dimensions of each product.

Adjustment

Warning

1. Adjust while confirming the pressure gauge value in the inlet and outlet sides. Overrotating the handle will damage the inner components.

Caution

1. Adjust after carefully confirming the inlet pressure.
2. Setting the pressure with the handle should be conducted in the upper direction. Setting the pressure in the lower direction may result in the pressure to drop below the original set pressure. Turning the handle clockwise will increase the outlet side pressure. Meanwhile, turning counterclockwise will decrease the pressure.

Piping

Warning

1. When tightening a screw on the piping material, use the recommended torque, holding the female side.
Insufficient torque will cause looseness or inferior sealing. However, overtightening will cause damage to the thread. Also, tightening without holding the female side will put excessive direct stress on brackets, etc., resulting in damage, etc.
2. Use caution so twisting or bending other than the self-weight moment will not be applied to the product. Otherwise, it will result in damage. Support the external piping separately.
3. Inflexible piping such as steel piping is subject to excessive moment loads or transmission of vibrations from the piping side. Use flexible tubing, etc. between them to avoid it.



Series VCHR Specific Product Precautions

Be sure to read this before handling.

Adjustment

Caution

1. When adjusting the outlet side pressure, moment is applied to the adjusting bolt. Support it separately so that any moment is not applied to the external pipings.

Reference for Handle Moment

Unit: N·m

Set pressure	1 MPa	2 MPa	3 MPa	4 MPa	5 MPa
Torque	3	6	9	12	15

2. When adjusting the outlet side pressure, the adjusting bolt (32 mm width across flats) can be rotated with a wrench. A screwdriver of approximately 20 to 30 mm can also be used for easy adjustments, using the (ø11) hole on the width across flats.

Piping

Warning

1. When tightening a screw on the piping material, use the recommended torque, holding the female side.

Insufficient torque will cause looseness or inferior sealing. However, overtightening will cause damage to the thread. Also, tightening without holding the female side will put excessive direct stress on brackets, etc., resulting in damage, etc.

Recommended Tightening Torque

Unit: N·m

Connecting thread	3/4	1	1·1/2
Torque	28 to 30	36 to 38	48 to 50

Disassembly

Caution

1. This product cannot be disassembled since it is made of precision components with specific tolerances.

5.0 MPa Silencer Series *VCHN*

35 dB(A) to noise reduction

(At supply pressure of 4.0 MPa, back pressure 2.0 MPa)

* 45 dB(A) noise reduction model can be "Made to Order".

1/10 M clogging reduction
(SMC comparison)

Double-layer sound absorbing material
with different filtration reduces clogging.

Standard integrated relief valve

The relief valve will activate when
the silencer's internal pressure
exceeds 1.8 MPa.

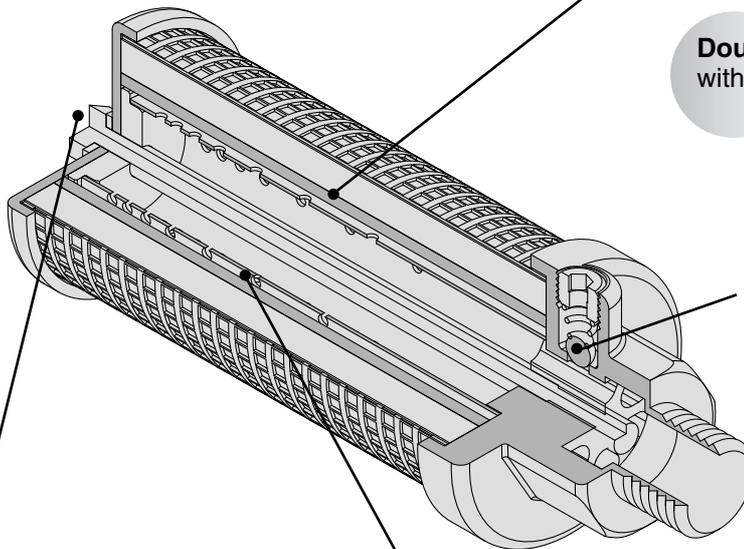
* The error indicator and the pressure switch, etc.
can be mounted as "Made to Order".

Improved maintenance

By removing the bolt, the sound
absorbing material can be replaced
without removing the silencer.

30-40% reduction in freezing
(SMC comparison) (Optional)

Freezing is reduced by a high pressure
sleeve and quick exhaust.



How to Order

VCHN 3 - 06

Option

Nil	None
F	With freeze reduction

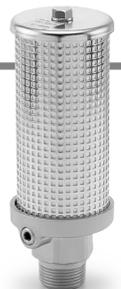
Body size

3
4

Port size

Symbol	Port size	VCHN□3	VCHN□4
06	R3/4	●	
10	R1	●	●
12	R1•1/4		●
14	R1•1/2		●

Symbol

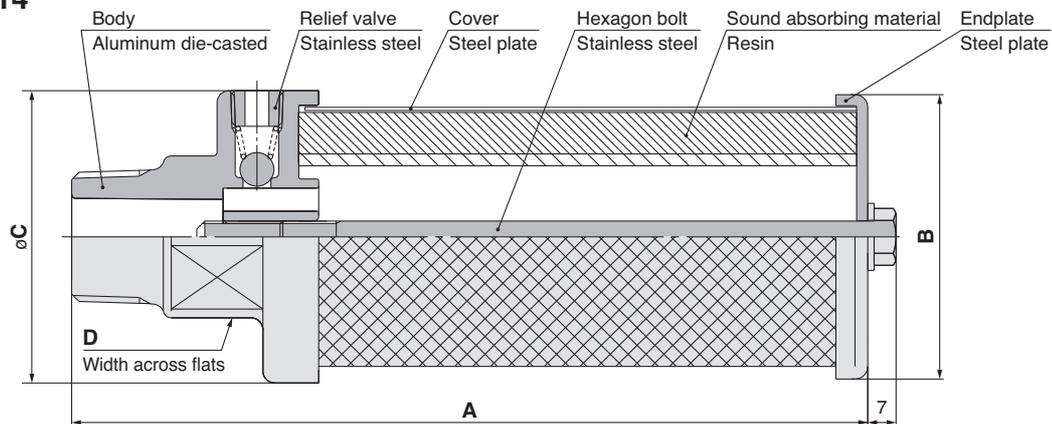


Specifications

Model	VCHN3		VCHNF3		VCHN4			VCHNF4		
Fluid	Air, Inert gas									
Max. operating pressure (MPa)	5.0 (Solenoid valve inlet pressure)									
Relief valve opening pressure (MPa)	1.8									
Port size	R3/4	R1	R3/4	R1	R1	R1•1/4	R1•1/2	R1	R1•1/4	R1•1/2
Effective area (mm ²)	200	280	160	180	280	370	370	180	320	320
Sound absorbing material effective area (Single) (mm ²)	420					500				
Fluid temperature (°C)	5 to 80									
Ambient temperature (°C)	5 to 80									
Noise reduction dB(A)	35 (Supply pressure 4.0 MPa, Back pressure 2.0 MPa)									

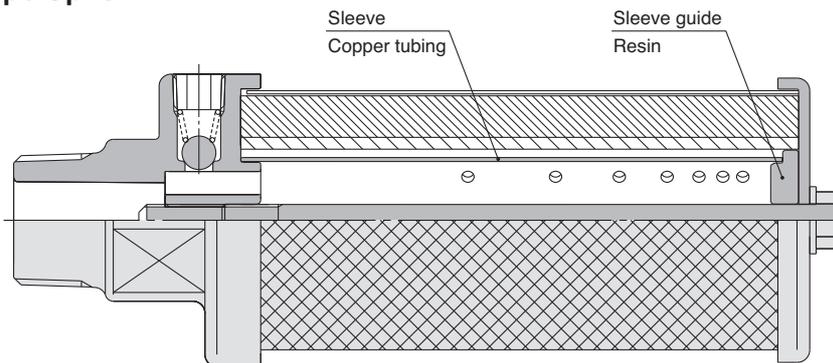
Construction/Dimensions

VCHN₄³-06 to 14



Freeze reduction type/Option

VCHNF₄³-06 to 14



(mm)

Model	Port size (R)	A	B	C	D	Weight (g)
VCHN3-06	3/4	200	ø72	ø74	41	590
VCHNF3-06	3/4	200	ø72	ø74	41	710
VCHN3-10	1	200	ø72	ø74	41	605
VCHNF3-10	1	200	ø72	ø74	41	725
VCHN4-10	1	230	ø72	ø74	41	665
VCHNF4-10	1	230	ø72	ø74	41	810
VCHN4-12	1•1/4	240	ø72	ø74	54	765
VCHNF4-12	1•1/4	240	ø72	ø74	54	910
VCHN4-14	1•1/2	240	ø72	ø74	54	790
VCHNF4-14	1•1/2	240	ø72	ø74	54	935



Series VCHN Specific Product Precautions

Be sure to read this before handling.

Caution on Design

Warning

1. The exhaust port can clog due to a clogged or frozen silencer.

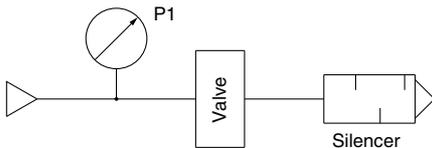
Consider design safety to avoid malfunctions of the entire system. Also, under conditions conducive to freezing, use a freeze reduction model. (VCHNF series)

Caution

1. A silencer reduces compressed air exhaust noise from the pneumatic equipment.

Noise other than that generated by the exhaust assembly (noise generated inside piping, due to equipment vibration, solenoid valve switching, etc.) cannot be reduced. As for noise generated by sources other than the exhaust, locate the cause and take measures.

2. Silencer inlet side pressure shows the solenoid valve supply pressure (P1). (See below.)



3. Noise reduction may vary, depending on the pneumatic circuit or pressure, etc. exhausted from solenoid valves.

Adjustment

Caution

1. Select a silencer with a larger effective area (including the synthetic effective area) than the solenoid valve.

Mounting

Caution

1. Tighten the silencer, using an appropriate wrench on the width across flats, within the range of the recommended tightening torque as shown below.

Do not use a pipe wrench. Otherwise, the silencer will be damaged.

Recommended Tightening Torque (Unit: N·m)

Connecting thread	3/4	1	1-1/4	1-1/2
Torque	28 to 30	36 to 38	40 to 42	48 to 50

2. Do not apply a lateral load on the main body during or after mounting.

3. When the silencer becomes loose due to vibrations from the mounted equipment, re-mount the silencer after applying an anti-loosening agent to the thread.

Maintenance

Caution

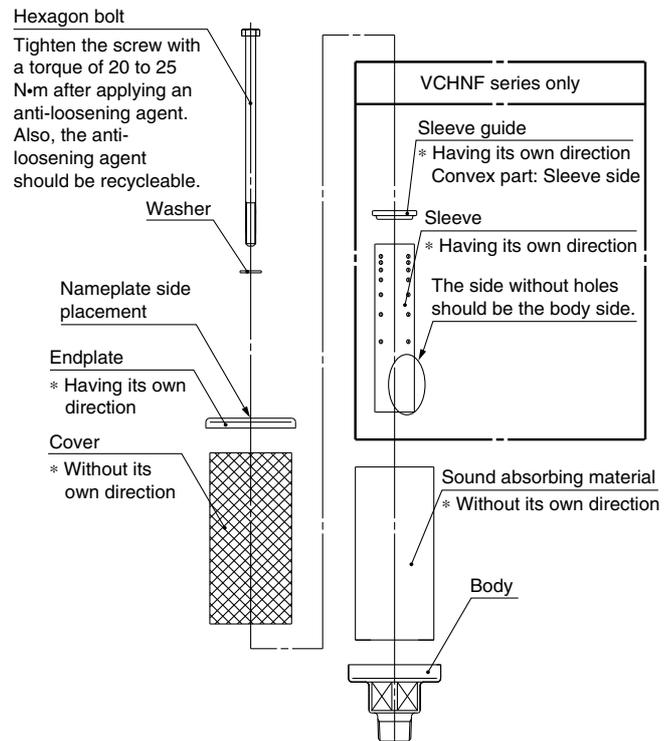
1. When exhaust speed begins to slow from clogging and system functionality begins to degrade, replace with a new silencer or sound-absorbant material.

Also, be sure to confirm the actuator's operation status once per day.

How to Replace the Sound Absorbing Material

Caution

1. When replacing the sound absorbing material, please follow the instructions below.



Replacement Parts

Sound Absorbing Material Part No.

Part no.	Description	Applicable model
VCHN3-EL	Sound absorbing material	For VCHN(F)3
VCHN4-EL	Sound absorbing material	For VCHN(F)4

Made to Order

For detailed dimensions, specifications and delivery, please contact SMC.

1 6.0 MPa piloted regulator (Air operated type)

VCHRA

Remote control is possible with electro-pneumatic regulator series ITV.

VCHRA **30** — **06** **G**

Body size

30
40

Thread type
 (G thread for hydraulics and pneumatics conforming to ISO1179-1)

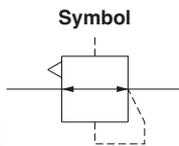
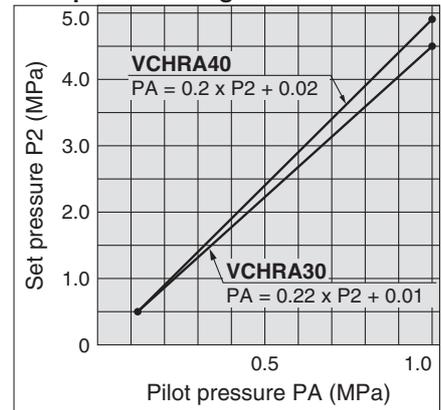
Port size

Symbol	Port size	VCHRA30	VCHRA40
06	3/4	●	
10	1	●	●
14	1•1/2		●

Specifications

Model	VCHRA30	VCHRA40
Valve construction	Piston type	
Valve material	Polyurethane elastomer	
Relief mechanism	Relieving type	
Port size	G3/4, G1	G1, G1•1/2
Port size Thread standard	G thread for hydraulics and pneumatics conforming to ISO1179-1	
Fluid	Air	
Max. operating pressure	6.0 MPa	
Pilot pressure range	Refer to the graph.	
Set pressure range	0.5 to 4.5 MPa	
Fluid temperature	-5 to 60 °C	
Ambient temperature	-5 to 60 °C	
Weight	2.9 kg	4.1 kg

Pilot pressure range



2 22.0 MPa 2 port air operated valve

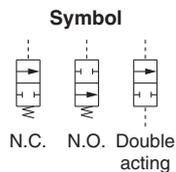
AXT836 **A**

Specifications

Symbol	Passage	Piping size
A	N.C.	1/4" fitting integrated type
B	N.O.	1/4" fitting integrated type
C	N.C.	Flange type
D	N.O.	Flange type
E	Double acting	1/4" fitting integrated type



Integrated fitting type Flange type



Specifications

	A, C (N.C. type)	B, D (N.O. type)	E (Double acting)
Fluid	Air/Inert gas		
Fluid temperature	-10 to 60 °C (with no freezing)		
Ambient temperature	-10 to 60 °C (with no freezing)		
Operating pressure range	0 to 22.0 MPa	0 to 20.0 MPa	
Proof pressure	35.0 MPa		
Pilot pressure range	0.45 to 0.7 MPa	0.3 to 0.5 MPa	
Valve leakage	0.1 cm ³ /min or less		
Orifice size	2.8 mm		

3 5.0 MPa pressure sensor

Specifications

Model	PSE560-X512
Rated pressure range	0 to 5.0 MPa
Proof pressure	10.0 MPa



Related Equipment

2-colour display digital pressure switch *Series ISE75/75H*

- 10.0 MPa: ISE75
- 15.0 MPa: ISE75H
- 2-colour display
- Metal body (Aluminum die-cast)
- IP67



Specifications

Model	ISE75	ISE75H
Rated pressure range	0 to 10.0 MPa	0 to 15.0 MPa
Set pressure range	0.4 to 10.0 MPa	0.5 to 15.0 MPa
Proof pressure	30.0 MPa	45.0 MPa
Set pressure resolution	0.1 MPa	
Fluid	Fluids that will not corrode stainless steel 430 and 630	
Power supply voltage	12 to 24 VDC, Ripple (p-p) 10% or less (with power supply polarity protection)	
Current consumption	55 mA or less (at no load)	
Switch output	Output -43: 1 setting; NPN open collector 1 output (Pin no. 4) + PNP open collector 1 output (Pin no. 2) ^{Note)} Output -65: PNP open collector 1 output (Pin no. 4)	
Max. load current	80 mA	
Max. applied voltage	30 V (with NPN output)	
Residual voltage	1 V or less (with load current of 80 mA)	
Response time	2.5 ms (Response time selections with anti-chattering function: 20 ms, 160 ms, 640 ms, 1000 ms, 2000 ms)	
Short circuit protection	With short circuit protection	

Note) The NPN and PNP outputs activate with a single set value.

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.

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.

- 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.

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 catalogue 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 catalogues 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.

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 catalogue 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.

Safety Instructions

Be sure to read “Handling Precautions for SMC Products” (M-E03-3) before using.

SMC Corporation (Europe)

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Croatia	+385 (0)13707288	www.smc.hr	office@smc.hr
Czech Republic	+420 541424611	www.smc.cz	office@smc.cz
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