



Operation Manual

PRODUCT NAME

6. OMPa Direct Operated Regulator
(Relieving Type)

MODEL / Series / Product Number

VCHR Series

SMC Corporation

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Safety Instructions

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

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



Danger

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



Warning

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



Caution

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

Warning

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

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

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

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

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

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

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

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

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



Safety Instructions

Caution

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

Use in non-manufacturing industries is not covered.

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

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

Limited warranty and Disclaimer/Compliance Requirements

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

Limited warranty and Disclaimer

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

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

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

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

Compliance Requirements

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



Regulator Precautions

Be sure to read this before handling.

Caution on Design

⚠ Warning

1. Consult with us 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 when 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 us when using the product outside the specified range of operating pressure, temperature, pressure, etc.

Selection

⚠ Warning

1. Grease may be leaking into the outlet side because it has been applied on inner sliding parts or seals. Confirm us when such cases should be avoided.
2. Contact us when the set pressure of the outlet side may fluctuate when air has not been consumed for a long period of time, or the product is used in the shut-off or balancing circuit of 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 catalog set pressure range has a tolerance. Therefore, the pressure setting may exceed this value.
5. Confirm with us 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 malfunctions.
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 products.

⚠ Caution

1. Adjust after carefully confirming the inlet pressure.
2. Setting pressure with the handle should be conducted in the upper direction. Setting pressure in the lower direction may go 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 self-weight moment will not be applied to the product. Otherwise, it will result in damage. Support the external pipings separately.
3. Inflexible piping such as steel piping is subject to excessive moment load 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 on the adjusting bolt. Support it separately so that 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 fixed 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 a specific tolerance.

6.0 MPa Direct Operated Regulator (Relieving Type)

Series *VCHR*

Service life: 10 million cycles

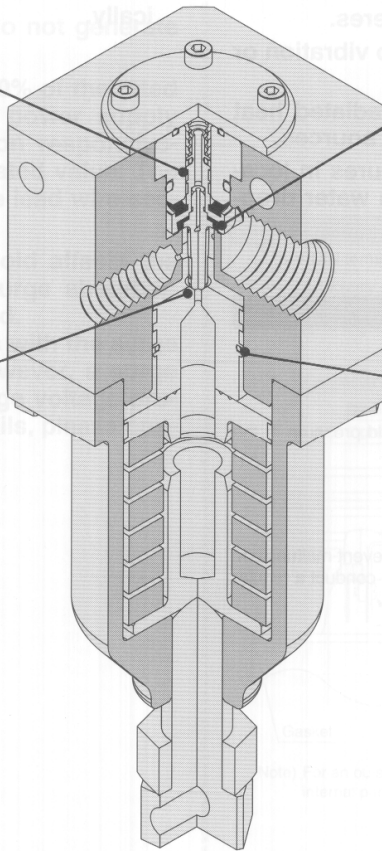
Using **NSF-H1-certified grease** on the guide ring (sliding) part.

Improved durability under a high pressure environment with a **polyurethane elastomer** poppet

Adopting a **metal-sealed relief valve** to improve durability.

Special fluoro-resin sealant is adopted for the sliding part.

Stable responsiveness after extended disuse.
No likely to be subject to a pressure.



How to Order

VCHR 30-06 G

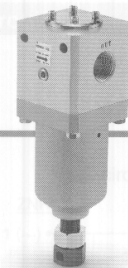
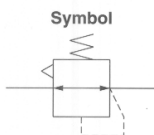
Body size

30
40

Thread type
(Conforming to ISO1179-1 on the pneumatic/hydraulic G thread)

Port size

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

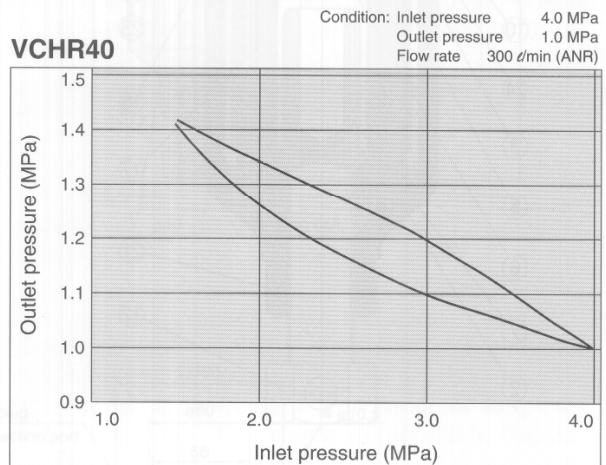
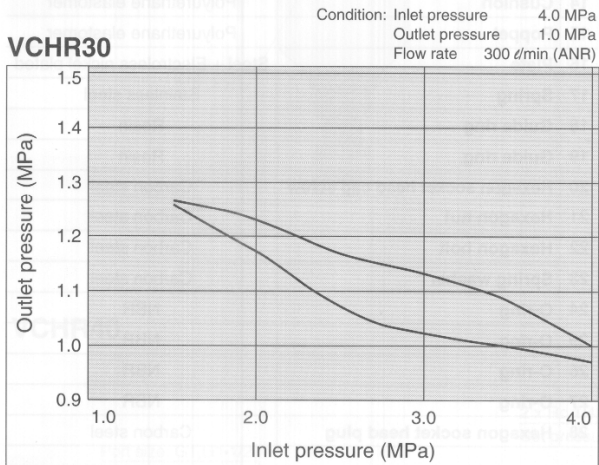


6.0 MPa Direct Operated Regulator
(Relieving Type) **Series VCHR**

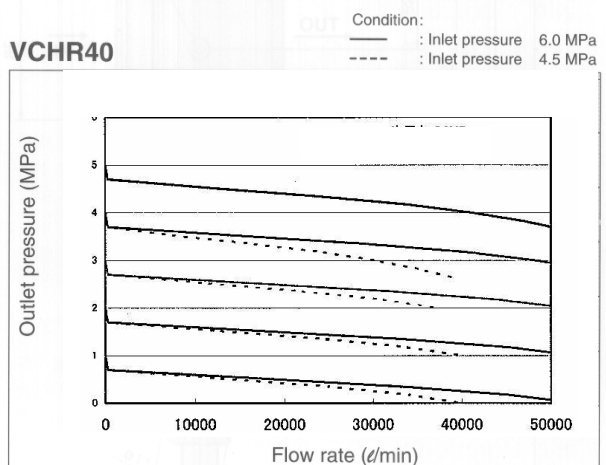
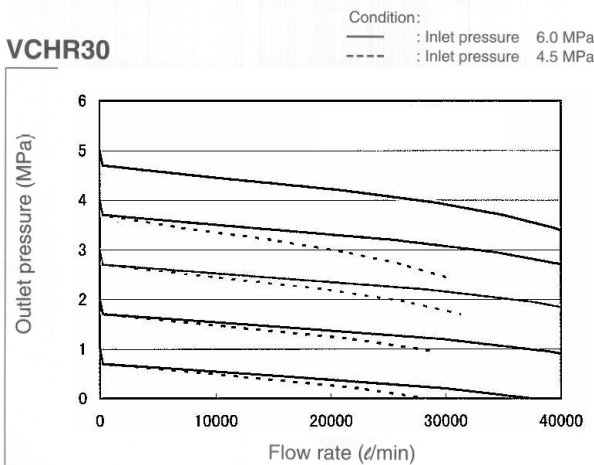
Specifications

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	Conforming to ISO1179-1 on the pneumatic/hydraulic G thread	
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



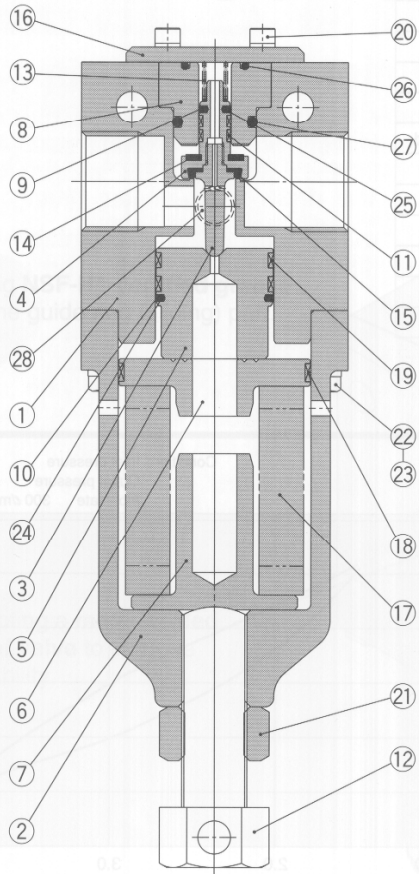
Flow Characteristics



Series VCHR

6.0 MPa Direct Operated Regulator (Relieving Type)

Construction



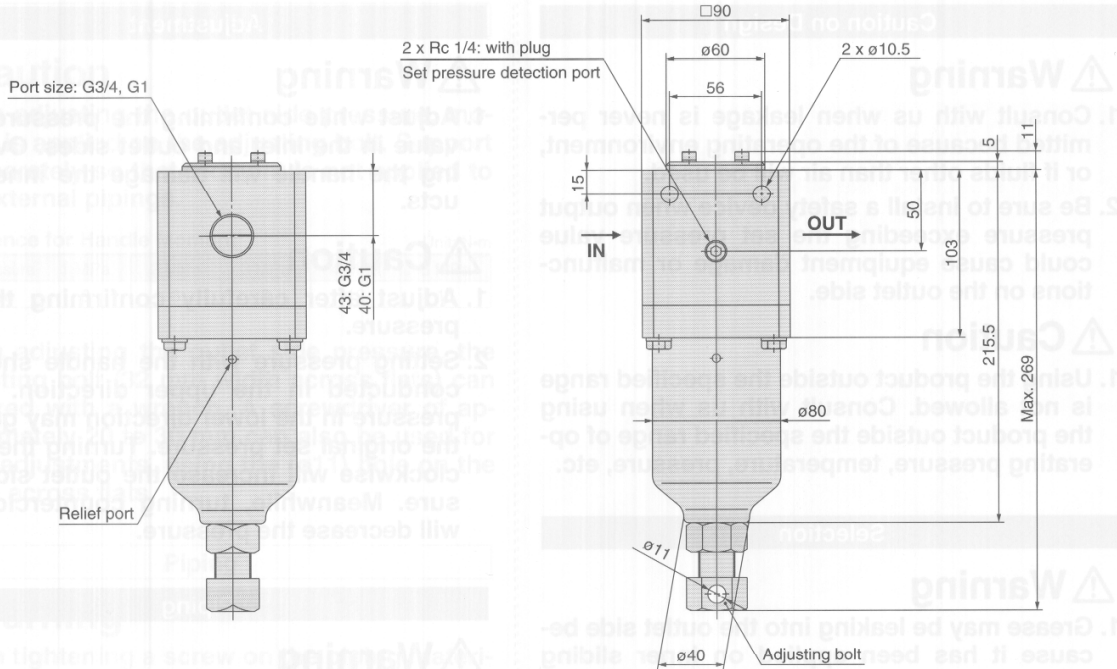
Component Parts

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

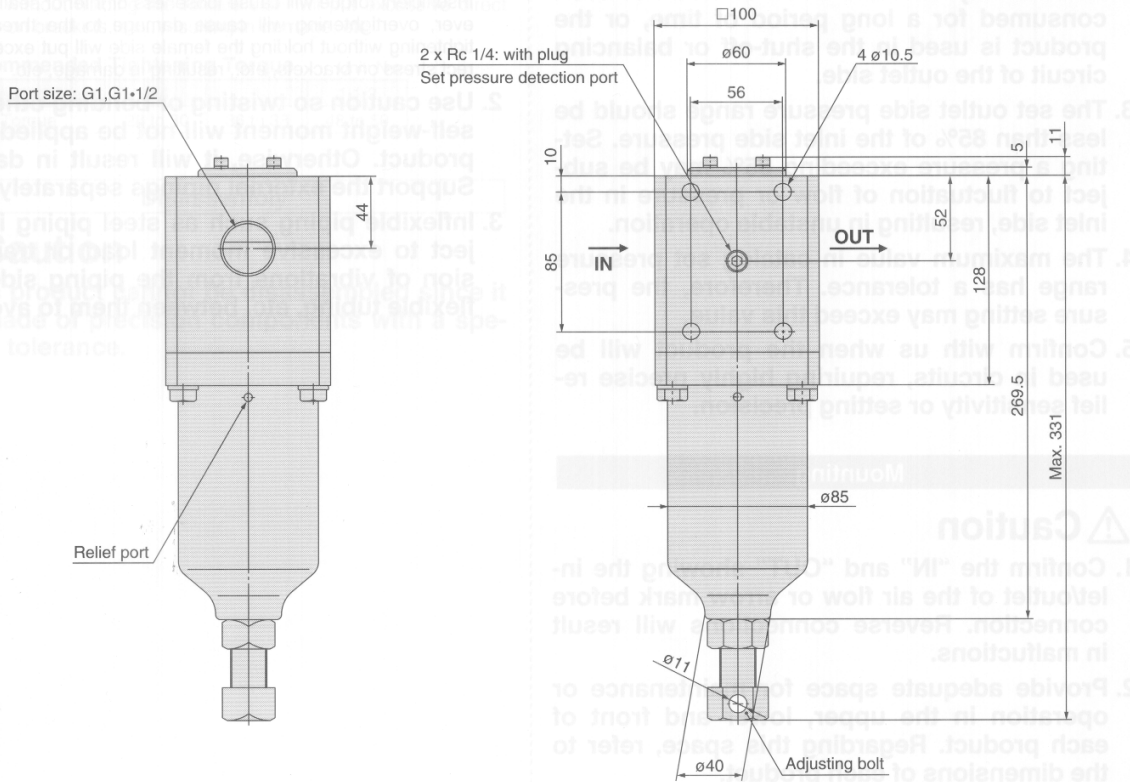
6.0 MPa Direct Operated Regulator
(Relieving Type) **Series VCHR**

Dimensions

VCHR30



VCHR40



Troubleshooting

This product can not be disassembled. (Refer to “Specific Product Precautions” on page 4.)

Failure		Possible cause	Remedy
Category	Phenomenon		
Pressure	The pressure can not be adjusted.	1. The product is mounted reversely to the flow	1. Check the flow direction and correct the mount direction of the product.
		2. The foreign matters get caught in the body seating part of the valve.	2. Consume the secondary pressure as an air blow to remove the foreign matters in the seating part.
Air leakage	The pressure can not be returned to zero by loosening the handle.	1. The foreign matters get caught in the body seating part of the valve.	1. Consume the secondary pressure as an air blow to remove the foreign matters in the seating part.
	The air leaks from the exhaust hole on the bonnet.	1. The foreign matters get caught in the piston seating part of the valve.	1. Consume the secondary pressure as an air blow to remove the foreign matters in the seating part.
		2. The back pressure over the set pressure is applied to the secondary side.	2. Review the pneumatic system to keep the backpressure over the set pressure from being applied.

Revision history
A: Change to latest format

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