

ORIGINAL INSTRUCTIONS



Instruction Manual

Two speed valve with spool position switch

**VZM5-300-CEW20057 with 1 inlet port**

**VZM5-310-CEW20057 with 2 inlet ports**

**Safety component as defined by the Machinery Directive 2006/42/EC article 2c/ The Supply of Machinery (safety) Regulations 2008 part 2.4(2)(c)**

**The intended use** of this product is to control the speed of an actuator by switching between the operating speed (BA1) and the safely limited speed (BA2).

Reasonably foreseeable misuse

Mixing up the throttle and incorrect setting of the two throttles.

Refer to the drawings for additional information.

1 Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of "Caution," "Warning" or "Danger."

They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)<sup>(1)</sup>, and other safety regulations.

- <sup>(1)</sup> 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 10218-1: Manipulating industrial robots -Safety.etc.

- Refer to product catalogue, Operation Manual and Handling Precautions for SMC Products for additional information.
- Read this manual before using the product, to ensure correct handling, and read the manuals of related apparatus before use.
- Keep this manual in a safe place for future reference.
- To ensure safety of personnel and equipment the safety instructions in this manual must be observed, along with other relevant safety practices.

	<b>Caution</b>	Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
	<b>Warning</b>	Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
	<b>Danger</b>	Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

1 Safety Instructions - continued

Warning

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

- 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.
  - When the product is to be removed, confirm 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.
  - Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.
- Do not use this product outside of the specifications.**
  - Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.**
    - Conditions and environments outside of the given specifications or use outdoors or in a place exposed to direct sunlight.
    - Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustions and recreation, or equipment in contact with food or beverages, emergency stop circuits, clutch and brake circuits in press

applications, safety equipment or other applications unsuitable for the specification described in this document.

3) An application which could have negative effects on people, property or animals requiring special safety analysis outside the scope of EN ISO 13849 described in this document.

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.

- Always ensure compliance with relevant safety laws and standards.**
- All electrical work must be carried out in a safe manner by a qualified person in compliance with applicable national regulations.

Caution

- The product is provided for use in manufacturing industries.**  
This product must not be used in residential areas. 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.

Warning

**Always ensure compliance with relevant safety laws and standards.**  
All work must be carried out in a safe manner by a qualified person in compliance with applicable national regulations.

2 Specifications

Warning

Special specification products "-X####" and "-##" might have specifications different from those shown in this Instruction Manual. Refer to individual drawings for special specifications.

2 Specifications - continued

Valve specifications	Modell	VZM5-300-CEW20057 VZM5-310-CEW20057
	Port size	G3/8
	Fluid	compressed air
	Operating pressure range	0.1 to 0.7 MPa
	Proof pressure	1.05 MPa
	Pilot pressure range	0.15 – 0.7 MPa
	Air quality required	5 µm or less
	Min. operating frequency	1 cycle/30days
	Max. operating frequency	30 cycles/min.
	Ambient and fluid temperature	-5 to +60°C (no freezing)
Elect.	Impact resistance <sup>Note 1)</sup>	1000 m/s <sup>2</sup> at 11 ms duration
	Vibration resistance <sup>Note 2)</sup>	50 m/s <sup>2</sup> (0.35 mm)
	Sonic conductance (C)	1.1 dm <sup>3</sup> /(s.bar)
	Rated voltage <sup>Note 3)</sup>	24 V DC +/- 10%
	Rated current (non-inductive load) <sup>Note 4)</sup>	0.5 A (fuse 2AgG)
IP rating		IP67
B10 <sub>D</sub>		9.4 million cycles <sup>Note 5)</sup>

Table 1

Note 1) Two axes (horizontal and vertical) and two directions were tested and no malfunction of the valve occurred (pulse shape: sin shape, axial direction and rectangular to the product, 3 times for each condition (pilot port not pressurised)

Note 2) Two axes (horizontal and vertical) and two directions were tested and no malfunction occurred in a sweep cycle test between 10 to 150 Hz at vibration sweep 0.35mm (pilot port not pressurised). Impact and vibration test performed before lifetest with new product.

Note 3) The derate factor of 2.5 has already been used for the rated voltage.

Note 4) The system designer should derate the rated current according to safety requirements.

Note 5) The B10<sub>D</sub> figure is estimated from SMC life tests under SMC test conditions.

2.1 Schematic diagram (M12) - IP-Rating Electrical limit switch (IP67)

Electrical symbol	Connector	Safety switch	
		Pin no.	Wire color
		1	BN (brown)
		4	BK (black)
		2	WH (white)
		3	not connected

Table 2

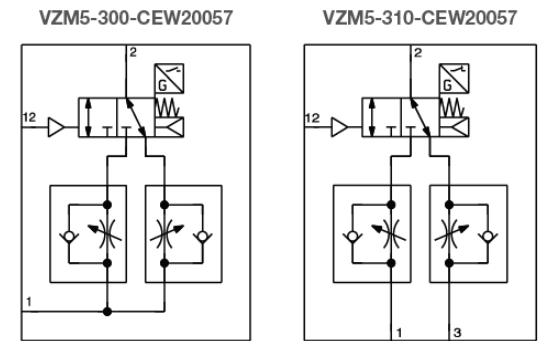
The switch is connecting pin 1 and 2 in the safe state.

2.2 Safe and unsafe state

The de-energized air operated pilot valve (safe state) enables the air flow for the safely limited speed of the actuator and the switch is connecting pin 1 and 2. The energized air operated pilot valve (unsafe state) enables the air flow for the operating speed of the actuator and the switch is connecting pin 1 and 4. The switch is activated by positive mechanical action from "safe state" to "unsafe state".

The valve spool is spring/air returned. A malfunction of the valve spool non-returning into the safe state will be detected by the PLC according to the signal of the switch.

2.3 Pneumatic symbols



2 Specifications - continued

2.4 Declaration of Conformity - CE

Original declaration

Doc. No. CEAB2TF001

**EU DECLARATION OF CONFORMITY**

EC Декларация за съответствие  
EU Prohlášení o shodě  
EU-överensstämmeiserklärning  
EU-Konformitätserklärung  
Δήλωση συμμόρφωσης ΕΕ  
Declaración UE de conformidad  
EU vastavusdeklaratsioon

EU-vaatimustenmukaisuusvakuutus  
Déclaration UE de conformité  
EU izjava o skladnosti  
EU-megfelelőségi nyilatkozat  
Dichiarazione UE di conformità  
ES atbilstības deklarācija  
ES atbilstības deklarācija

EU-coformiteitsverklaring  
Deklaracja zgodności UE  
Declaração UE de conformidade  
Declarația de conformitate ue  
Vyhlasenie o zhode EU  
Izjava EU o skladnosti  
EU-försäkran om överensstämmelse

**SMC Deutschland GmbH**, Boschring 13-15, 63329 Egelsbach, Germany,  
declares under its sole responsibility, that the following equipment:

**Two-Speed-Valve**  
**VZM5-###-CEW20057**  
**bearing H mark on the product or packaging**

is in conformity with the relevant Union harmonisation legislation and has been demonstrated to fulfil the requirements with reference to the harmonised standard(s) or applied standard(s) as listed below:

Directive	Requirements	Harmonised/applied standards
2006/42/EC [Machinery Directive]	Annex I	EN ISO 12100:2010 EN ISO 13849-1:2015 EN ISO 13849-2:2012
2011/65/EU* [RoHS Directive]	Annex II	EN IEC 63000:2018

\* Including substances added by Commission Delegated Directive (EU) 2015/863.

Name and address of the person authorised to compile the technical file<sup>(2)</sup>:

Mr Lucio Moriggi, General Manager, SMC Italia S.p.A.  
Via delle Donne Lavoratrici, 21-20861 BRUGHERIO (MB), ITALY

Importer/Distributor contact details [www.smc.eu/de-de](http://www.smc.eu/de-de)

Egelsbach, Date: 07.02.2023

*i.V. F. Rein*  
[i.V. F. Rein \(Feb 8, 2023 09:15 GMT+1\)](#)  
i.V. Ferdinand Rein  
Manager R&D 2 (CE-Representative)

2.5 Declaration of Conformity – UK CA

Original declaration

Doc. No. CEAB2TF002

**UK DECLARATION OF CONFORMITY**

**SMC Deutschland GmbH**, Boschring 13-15, 63329 Egelsbach, Germany,  
declares under its sole responsibility, that the following equipment:

**Two-Speed-Valve**  
**VZM5-###-CEW20057**  
**bearing H mark on the product or packaging**

is in conformity with relevant statutory regulations (including amendments) and has been demonstrated to fulfil the requirements with reference to the designated standards as listed below:

Statutory Instrument	Requirements	Designated Standards/ Technical Specifications
Supply of Machinery (Safety) Regulations 2008	Schedule 2	EN ISO 12100:2010 EN ISO 13849-1:2015 EN ISO 13849-2:2012
The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012	Schedule 2	EN IEC 63000:2018

Importer/Distributor contact details:

Vincent Avenue  
Milton Keynes  
MK8 0AN

[www.smc.eu](http://www.smc.eu), [www.smcworld.com](http://www.smcworld.com)

The person authorised to compile the technical file is the person named at the address below:

Egelsbach, Date: 07.02.2023

*i.V. F. Rein*  
[i.V. F. Rein \(Feb 8, 2023 09:17 GMT+1\)](#)  
i.V. Ferdinand Rein  
Manager R&D 2 (CE-Representative)

3 Installation

3.1 Installation

Warning

- Do not install the product unless the safety instructions have been read and understood.
- Do not disassemble this product or make any modifications.
- Warnings or specifications printed or affixed to the product should not be erased, removed or covered up.
- The system designer should determine the effect of the possible failure states on the system.
- Do not paint this product.
- Protect electrical limit switch against short circuit with a fuse (2 AgG).
- Ensure correct protective bonding in accordance with the requirements of EN 60204-1
- The switch does not have a suppressor. If required, take countermeasures.
- Conductors are not individually screened. If required, take countermeasures.
- The use of a SELV/PELV power supply is required.
- The circuit designer should take precautions to limit the voltage supply to the specified operating value, provide protection against over current and to limit the effect of any short circuit of the output.

3.2 Environment

Warning

- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not use in an explosive atmosphere.
- Do not expose to direct sunlight. Use a suitable protective cover.
- Do not install in a location subject to vibration or impact. Check the product specifications.
- Do not mount in a location exposed to radiant heat that would result in temperatures in excess of the product's specifications.
- Incorrect mounting of the product violates the IP67 rating. Be sure to read the precautions of mounting for each product.
- If the product is used in an environment where it may come into contact with oil, welding spatter, etc., suitable protective measures must be taken.
- Be sure to read the precautions of mounting for each product.

3.3 Piping

Caution

- Before connecting piping make sure to clean up chips, cutting oil, dust etc.
- When installing piping or fittings, ensure sealant material does not enter inside the port. When using seal tape, leave 1 thread exposed on the end of the pipe/fitting.
- Tighten fittings to the specified tightening torque.

3.4 Lubrication

Caution

- SMC products have been lubricated for life at manufacture, and do not require lubrication in service.

3.5 Valve Mounting

Warning

- Stop operation if air leakage increases and the equipment do not operate properly:
- Check mounting conditions after air and power supplies are connected.
- Initial function and leakage tests should be performed after installation.

Caution

- Mount it so that there is no slippage or deformation in gaskets and tighten with the tightening torque as shown below.

Thread size	Tightening torque [N·m]
G 3/8	22 to 24

Table 3

3.6 Wiring

Caution

1. **Applied voltage.**  
When electric power is connected to the switch, be careful to apply the proper voltage. Improper voltage may cause malfunction.
2. **Confirm the connections.**  
After completing the wiring, confirm that the connections are made correctly.

3 Installation

3.7 Settings

1. Adjust operating speed and safely limited cylinder speed by using slotted screwdriver.
2. Electrical signal of contacts 1-2 at safely limited speed: HIGH signal is safe state. LOW signal is a malfunction.
3. Speed controller for safely limited speed: After setting the speed the setting screw is to lock by locking varnish and to secure against misuse with a pin in the hole Ø3 mm.

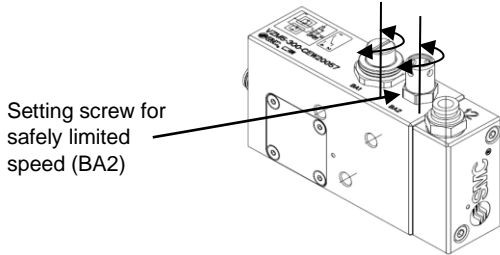


Figure 1 – adjusting safely limited cylinder speed

4. The change between the operating speed (BA1) and the safely limited speed (BA2) is only allowed in the stroke end position of the actuator.

4 How to Order

Thread	Model No.
G 3/8 with 1 inlet port	VZM5-300-CEW20057
G 3/8 with 2 inlet ports	VZM5-310-CEW20057

Table 4

5 Outline Dimensions (mm)

Refer to drawings.

6 Maintenance

6.1 General Maintenance

Caution

- Not following proper maintenance procedures could cause the product to malfunction and lead to equipment damage.

- If handled improperly, compressed air can be dangerous.
- Maintenance of pneumatic systems should be performed only by qualified personnel.
- Before performing maintenance, turn off the power supply and be sure to cut off the supply pressure. Confirm that the air is released to atmosphere.
- After installation and maintenance, apply operating pressure and power to the equipment and perform appropriate functional and leakage tests to make sure the equipment is installed correctly.
- If any electrical connections are disturbed during maintenance, ensure they are reconnected correctly and safety checks are carried out as required to ensure continued compliance with applicable national regulations.
- Do not make any modification to the product.
- Do not disassemble the product.
- When the equipment is operated after remounting or replacement, first confirm that measures are in place to prevent lurching of actuators, etc. Then, confirm that the equipment is operating normally.
- If the volume of air leakage increases or the valve does not operate normally, do not use the valve.

7 Limitations of Use

7.1 Limited warranty and Disclaimer/Compliance Requirements

Refer to Handling Precautions for SMC Products.

Caution

7.2 Low temperature operation

Unless otherwise indicated in the specifications for each valve, operation is possible to -5 °C, but appropriate measures should be taken to avoid solidification or freezing of drainage and moisture, etc.

8 Product Disposal

This product shall not be disposed of as municipal waste. Check your local regulations and guidelines to dispose this product correctly, in order to reduce the impact on human health and the environment.

9 Failure modes

Failure mode	Cause	Solution
The actuator is not moving.	Insufficient pressure.	Pressure supplied should at least 0.1 MPa or above.
Actuator does not perform reduced speed.	The throttles are damaged.	Please replace the product.
	Air is leaking from the Two speed valve.	Please replace the product.
	The valve is not switching from operating speed to safely limited speed	Please replace the product.
There is no signal change from spool position switch	The connector is loose or not installed properly.	Check that the connector is properly inserted.
	The spool position switch is damaged	Please replace the product.

Table 5

10 Contacts

Refer to [www.smcworld.com](http://www.smcworld.com) or [www.smc.eu](http://www.smc.eu) for contacts.

SMC Deutschland GmbH

URL : [http:// www.smc.de](http://www.smc.de)  
'SMC Deutschland GmbH, Boschring 13-15, 63329 Egelsbach, Germany

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