

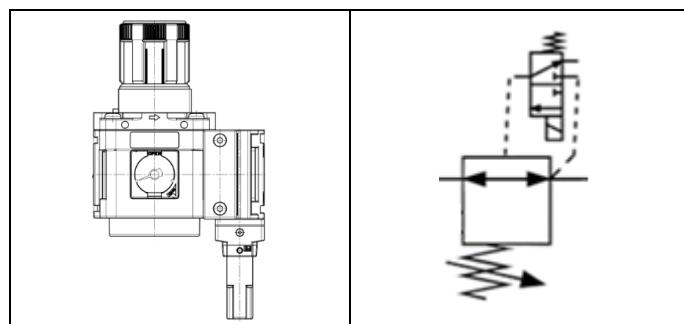


ORIGINAL INSTRUCTIONS

## Instruction Manual

## Regulator with Backflow Function

## AR#0S、AR#0K-D-X2331



The intended use of this product is to be installed in a compressed air line. When the pilot valve is OFF the product operates similar to a fixed orifice. When the pilot valve is ON the product works like a conventional regulator.

## 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>(\*)</sup>), and other safety regulations.

<sup>(\*)</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: Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots.

- Refer to product catalogue, Operation Manual and Handling Precautions for SMC Products for additional information.
- Keep this manual in a safe place for future reference.

<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.

**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

## 2.1 Mechanical Specifications

Series	AR#0S/ AR#0K-D
Construction	Non-relieving Type
Fluid	Air
Ambient and Fluid Temperature	0 to 50°C
Proof Pressure	1.05 MPa
Max. Operating Pressure	0.7 MPa
Set Pressure Range	0.2 to 0.4 MPa
Lubrication	Not required (Refer to 3.4)
Filtration	5µm filtration or smaller
Weight	See Table 2
Port Size	See Table 2 <sup>Note 1</sup>
Impact / Vibration resistance	150 / 30 m/s <sup>2</sup> <sup>Note 2</sup>
Pilot exhaust	Individual exhaust
Mounting orientation	Unrestricted

Table 1.

## 2 Specifications – continued

Note 1) Pipe threads are not provided on the out port. Product must be used with a spacer, sold separately.

Note 2) **Impact resistance:** No malfunction occurred when it was tested with a drop tester in the axial direction and at right angles to the main valve & armature; in both energized & de-energized states and for every time in each condition. (Values at the initial period.)

**Vibration resistance:** No malfunction occurred in a one-sweep test between 45 and 2000 Hz. Tests are performed at both energized and de-energized states in the axial direction and at right angles to the main valve & armature. (Values at the initial period.)

## 2.2 Weight and Port Size

Model	Weight (Kg)	Port Size
AR20S	0.30kg	1/4"
AR30S/ AR30K-D	0.49Kg	3/8"
AR40S/ AR40K-D	0.77Kg	1/2"
AR50S	1.49Kg	1"

Table 2.

## 2.3 Electrical Specification

Coil Rated Voltage	24 VDC
Coil Insulation Class	Class B Equivalent
Allowable Voltage Fluctuation	±10% of Rated Voltage
Power Consumption	0.4 W
Enclosure (based on IEC60529)	IP65
Minimum operating frequency	1 cycle / 30 days
Duty cycle	Continuous
Surge Voltage Suppressor	Diode

Table 3.

## 2.4 Selection

- Inlet pressure to the regulator should be at least 0.05 MPa greater than the set pressure. Any lower may lead to unstable operation.  
 **$P_1 \geq P_2 + 0.05 \text{ MPa}$**

## 3 Installation

## 3.1 Installation

**Warning**

- Do not install the product unless the safety instructions have been read and understood.

## 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 in excess of the product's specifications.
- Do not mount in a location exposed to radiant heat that would result in temperatures in excess of the product's specifications.

## 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.

Pipe Thread	Torque (Nm)
1/8"	7 to 9
1/4"	8 to 12
3/8"	15 to 20
1/2"	20 to 25
3/4"	28 to 30
1"	36 to 38

Table 4.

- Pipe threads are not provided on the out port. Product must be used with a spacer, sold separately.

## 3 Installation – continued

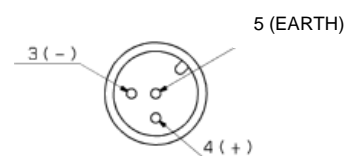
## 3.1 Lubrication

**Caution**

- SMC products have been lubricated for life at manufacture, and do not require lubrication in service.
- If a lubricant is used in the system, refer to catalogue for details.

## 3.5 Electrical connection

## 3.5.1 M12 connector

 **Caution**

- Tighten the connector by hand, not with a tool which may damage the connector.
- Do not apply repeated bending force, tensile force or heavy load to the cable.
- Do not pull the connector or cable unnecessarily.
- When installing the valve, do not bend the cable at the root from the connector body.

## 3.6 Electrical circuits

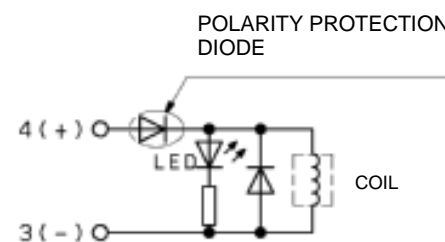


Figure 2. M12 connector

## 4 Settings

## 4.1 Settings

- With the product powered ON, Turning the regulator knob in the clockwise direction will increase the set pressure.
- Turning the regulator knob anti-clockwise when there is air consumption on the outlet side with the product powered ON reduces the set pressure.
- Set the regulator while verifying the displayed values of the inlet and outlet pressure gauges. Turning the regulator knob excessively can cause damage to the internal parts.
- Do not use tools on the pressure regulator knob as this may cause damage. It must be operated manually.
- When there is no power to the product it is in an OFF state. In this state the feedback pressure to the regulator is removed and the regulator operates like a fixed orifice.
- When there is power to the product it is in an ON state. In this state the feedback pressure is applied to the regulator and it operates like a conventional regulator.

**Caution**

- Be sure to unlock the knob before adjusting the pressure and lock it after setting the pressure. Failure to follow this procedure can cause damage to the knob and the outlet pressure may fluctuate.
- Pull the pressure regulator knob to unlock. (You can visually verify this with the "orange mark" that appears in the gap)
- Push the pressure regulator knob to lock. When the knob is not easily locked, turn it left and right a little and then push it (when the knob is locked, the "orange mark", i.e., the gap will disappear).
- Pulsation will be generated when the difference between the inlet and the outlet pressure is large. In this case, reduce the pressure difference between the inlet and the outlet. Please consult with SMC if the pulsation problem is not resolved.

## 4 Settings – Continued

## 4.2 Manual Override

**Warning**

- Regardless of an electric signal for the valve, the manual override is used for switching the main valve. Since connected equipment will operate when the manual override is activated, confirm that conditions are safe prior to activation.
- Locked manual overrides might prevent the valve responding to being electrically de-energized or cause unexpected movement in the equipment.

## 5 How to Order

Refer to drawings or catalogue for 'How to Order'.

## 6 Outline Dimensions

Refer to drawings or catalogue for outline dimensions.

## 7 Maintenance

## 7.1 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, unless required by installation or maintenance instructions.

## 8 Limitations of Use

## 8.1 Limited warranty and disclaimer/compliance requirements

Refer to Handling Precautions for SMC Products.

**Caution**

## 8.2 Leakage Voltage

Ensure that any leakage voltage caused by the leakage current when the switching element is OFF causes  $\leq 3\%$  of the rated voltage for DC coils across the valve.

## 8.3 Return of the valve to the de-energised position

When electricity is cut, the valve returns to the de-energised position by spring force.

## 9 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.

## 10 Contacts

Refer to [www.smcworld.com](http://www.smcworld.com) or [www.smc.eu](http://www.smc.eu) for your local distributor/importer.

## SMC Corporation

URL : <https://www.smcworld.com> (Global) <https://www.smc.eu> (Europe)  
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Specifications are subject to change without prior notice from the manufacturer.  
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