

IR1M and IRN1M

Monnier International Compressed Air Regulators
Installation and Maintenance Instructions



1. Safety information
2. General product information
3. Installation and commissioning
4. Operation
5. Spare parts and Maintenance

1. Safety information

Safe operation of these products can only be guaranteed if they are properly installed, commissioned, used and maintained by qualified personnel (see Section 1.11) in compliance with the operating instructions. General installation and safety instructions for pipeline and plant construction, as well as the proper use of tools and safety equipment must also be complied with.

1.1 Intended use

Referring to the Installation and Maintenance Instructions, name-plate and Technical Information Sheet, check that the product is suitable for the intended use/application. The products comply with the requirements of the European Pressure Equipment Directive 97/23/EC and fall within the category 'SEP'. It should be noted that products within this category are required by the Directive not to carry the CE mark.

- i) The products have been specifically designed for use on compressed air, which is in Group 2 of the above mentioned Pressure Equipment Directive. The products' use on other fluids may be possible but, if this is contemplated, Spirax Sarco should be contacted to confirm the suitability of the product for the application being considered.
- ii) Check material suitability, pressure and temperature and their maximum and minimum values. If the maximum operating limits of the product are lower than those of the system in which it is being fitted, or if malfunction of the product could result in a dangerous overpressure or overtemperature occurrence, ensure a safety device is included in the system to prevent such over-limit situations.
- iii) Determine the correct installation situation and direction of fluid flow.
- iv) Spirax Sarco products are not intended to withstand external stresses that may be induced by any system to which they are fitted. It is the responsibility of the installer to consider these stresses and take adequate precautions to minimise them.
- v) Remove protection covers from all connections and protective film from all name-plates, where appropriate, before installation on steam or other high temperature applications.

1.2 Access

Ensure safe access and if necessary a safe working platform (suitably guarded) before attempting to work on the product. Arrange suitable lifting gear if required.

1.3 Lighting

Ensure adequate lighting, particularly where detailed or intricate work is required.

1.4 Hazardous liquids or gases in the pipeline

Consider what is in the pipeline or what may have been in the pipeline at some previous time. Consider: flammable materials, substances hazardous to health, extremes of temperature.

1.5 Hazardous environment around the product

Consider: explosion risk areas, lack of oxygen (e.g. tanks, pits), dangerous gases, extremes of temperature, hot surfaces, fire hazard (e.g. during welding), excessive noise, moving machinery.

1.6 The system

Consider the effect on the complete system of the work proposed. Will any proposed action (e.g. closing isolation valves, electrical isolation) put any other part of the system or any personnel at risk?

Dangers might include isolation of vents or protective devices or the rendering ineffective of controls or alarms. Ensure isolation valves are turned on and off in a gradual way to avoid system shocks.

1.7 Pressure systems

Ensure that any pressure is isolated and safely vented to atmospheric pressure. Consider double isolation (double block and bleed) and the locking or labelling of closed valves. Do not assume that the system has depressurised even when the pressure gauge indicates zero.

1.8 Temperature

Allow time for temperature to normalise after isolation to avoid danger of burns.

1.9 Tools and consumables

Before starting work ensure that you have suitable tools and/or consumables available. Use only genuine Spirax Sarco replacement parts.

1.10 Protective clothing

Consider whether you and/or others in the vicinity require any protective clothing to protect against the hazards of, for example, chemicals, high/low temperature, radiation, noise, falling objects, and dangers to eyes and face.

1.11 Permits to work

All work must be carried out or be supervised by a suitably competent person. Installation and operating personnel should be trained in the correct use of the product according to the Installation and Maintenance Instructions.

Where a formal 'permit to work' system is in force it must be complied with. Where there is no such system, it is recommended that a responsible person should know what work is going on and, where necessary, arrange to have an assistant whose primary responsibility is safety.

Post 'warning notices' if necessary.

1.12 Handling

Manual handling of large and/or heavy products may present a risk of injury. Lifting, pushing, pulling, carrying or supporting a load by bodily force can cause injury particularly to the back. You are advised to assess the risks taking into account the task, the individual, the load and the working environment and use the appropriate handling method depending on the circumstances of the work being done.

1.13 Residual hazards

In normal use the external surface of the product may be very hot. If used at the maximum permitted operating conditions the surface temperature of some products may reach temperatures of 90°C (194°F).

Many products are not self-draining. Take due care when dismantling or removing the product from an installation (refer to 'Maintenance instructions').

1.14 Freezing

Provision must be made to protect products which are not self-draining against frost damage in environments where they may be exposed to temperatures below freezing point.

1.15 Disposal

Unless otherwise stated in the Installation and Maintenance Instructions, this product is recyclable and no ecological hazard is anticipated with its disposal providing due care is taken.

1.16 Returning products

Customers and stockists are reminded that under EC Health, Safety and Environment Law, when returning products to Spirax Sarco they must provide information on any hazards and the precautions to be taken due to contamination residues or mechanical damage which may present a health, safety or environmental risk. This information must be provided in writing including Health and Safety data sheets relating to any substances identified as hazardous or potentially hazardous.



Fig. 1

— 2. General product information —

2.1 General description

The IR1M and IRN1M Monnier international compressed air regulators provide accurate pressure control for general purpose pneumatic systems.

Principal features:

- Good flow characteristics.
- Good regulation characteristics.
- Fast response.
- Dead tight shut-off on no-flow.
- For line, bracket or panel mounting.
- Internal and external high quality black anodised finish.

Available types:

IR1M	Self-relieving
IRN1M	Non-relieving

Optional extras

For further data regarding the following options see Technical Information sheet TI-P504-19:

- Tamper-proof cap.
- Type 21 mounting bracket.
- Mounting ring - Aluminium.
- Pressure gauges.

2.2 Sizes and pipe connections

¼", ⅜" and ½" screwed BSP (BS 21 - Rp).

2.3 Spring range (operating pressure range)

All regulators can be adjusted to zero pressure, or above the figures shown. The operating range is marked on the unit.

Standard spring	0.5 - 10 bar g	(7.2 - 145 psi g)
Optional spring	0.2 - 3.5 bar g	(2.9 - 50.7 psi g)

Note: The IR_M range will be supplied with the standard spring unless an alternative option has been specified when placing an order.

2.4 Operating limits

Maximum working pressure	20 bar g	(290 psi g)
Maximum working temperature	70°C	(158°F)

2.5 Materials

Part	Material
Body	Machined aluminium, anodised
Valve	Brass and nitrile 'O' ring
Diaphragm	Reinforced nitrile rubber

— 3. Installation and Commissioning —

Note: Before actioning any installation observe the 'Safety information' in Section 1. Referring to the Installation and Maintenance Instructions, name-plate and Technical Information Sheet, check that the product is suitable for the intended installation.

3.1 General information

Dimensions/weights (approximate) in mm and kg

A	B	C	D	E	F	Weight
90	117	64	46	18	30	0.45

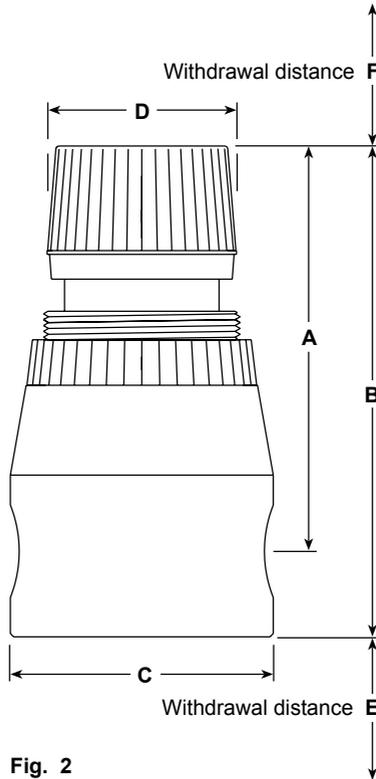


Fig. 2

Optional extras

Tamper-proof cap

An aluminium tamper-proof cap can be fitted to prevent unauthorised pressure adjustment

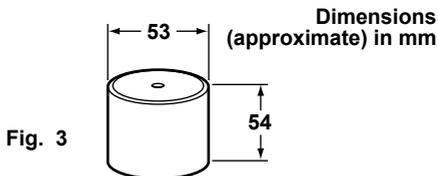


Fig. 3

Type 21 mounting bracket

A zinc plated mild steel bracket can be attached to the regulator, using the plastic mounting ring supplied with the regulator.

Please note: An aluminium mounting ring can be supplied, at extra cost, and must be specified at the time of order placement.

Dimensions (approximate) in millimetres

A	B	C	D	E
44	19	32	12	6

If the regulator is to be panel mounted a hole is required in the panel 48 mm diameter, and the panel thickness must not exceed 8 mm.

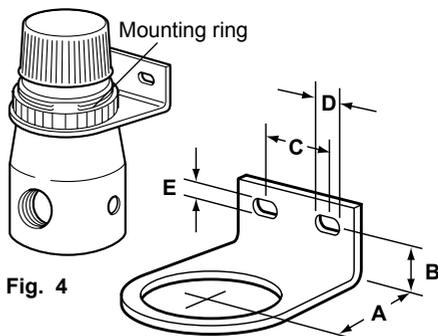


Fig. 4

Pressure gauges

Available in two sizes, with 4 pressure ranges. The face is marked in both bar and psi. Please state, size and pressure range when placing an order.

	0 to 2 bar	0 to 30 psi
Pressure ranges	0 to 7 bar	0 to 100 psi
	0 to 11 bar	0 to 160 psi
	0 to 21 bar	0 to 300 psi (50 mm size only)

Dimensions (approximate) in millimetres

Size	A	B	C
40 mm	40	47	R1/8"
50 mm	49	45	R1/8"

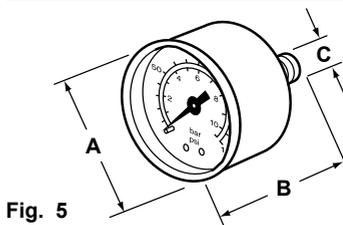


Fig. 5

Pressure gauges for panel mounting

With chromium plated bezel available in two ranges, the face being marked in bar and psi as follows:-

Pressure ranges	0 to 2 bar	0 to 30 psi
	0 to 7 bar	0 to 100 psi

Dimensions (approximate) in mm

A	B	C	D
53	56	48	R1/8"

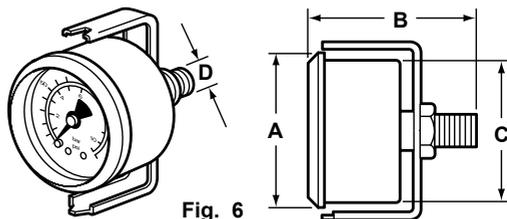


Fig. 6

3.3 Installation

- 3.3.1 The IR1M and IRN1M regulators can be installed in any position.
- 3.3.2 Adequate space should be provided around the unit to allow easy access for routine servicing requirements (see Figure 2 for withdrawal distances).
- 3.3.3 Connect the unit so that the airflow is in the direction indicated by the arrow on the body.
- 3.3.4 The unit should be installed as close as possible to the equipment it is serving.
- 3.3.5 A pressure gauge can be connected to one of the 1/8" ports. The gauge should be selected to cover the maximum pressure range of the main control spring. The gauge will indicate the downstream or controlled pressure.
- 3.3.6 Ensure that the control spring range selected for the regulator fully meets the pressure requirements of the system.

3.4 Commissioning

How to adjust the IR1M:

- Lift the adjustment knob (1) to unlock.
- Turn the adjustment knob (1) clockwise to increase secondary pressure, or anticlockwise to decrease.
- Push down the adjustment knob (1) to relock the unit.
- It is recommended that adjustments are made under flow conditions - there may be a slight increase in set pressure when the flow stops.

4. Operation

4.1 Principle of operation

With system pressure on, the regulator poppet valve assembly is in the closed position when the adjusting knob is turned fully counter clockwise (no spring load). By turning the adjusting knob clockwise, the diaphragm/piston moves downward allowing flow to come in through the orifice created between the poppet assembly and seat. The control diaphragm/piston offsetting the load spring senses pressure downstream. Increasing downstream pressure causes the poppet assembly to move upward until the load of the spring and diaphragm/piston are balanced. The outlet pressure has now been reduced. If a valve is opened downstream, the increased demand for pressure creates a reduced pressure under the control diaphragm/piston. The poppet assembly moves downward due to the load of the control spring opening the seat area and air is allowed to meet the downstream pressure demand. Thus, the area of the opening meters the downstream flow.

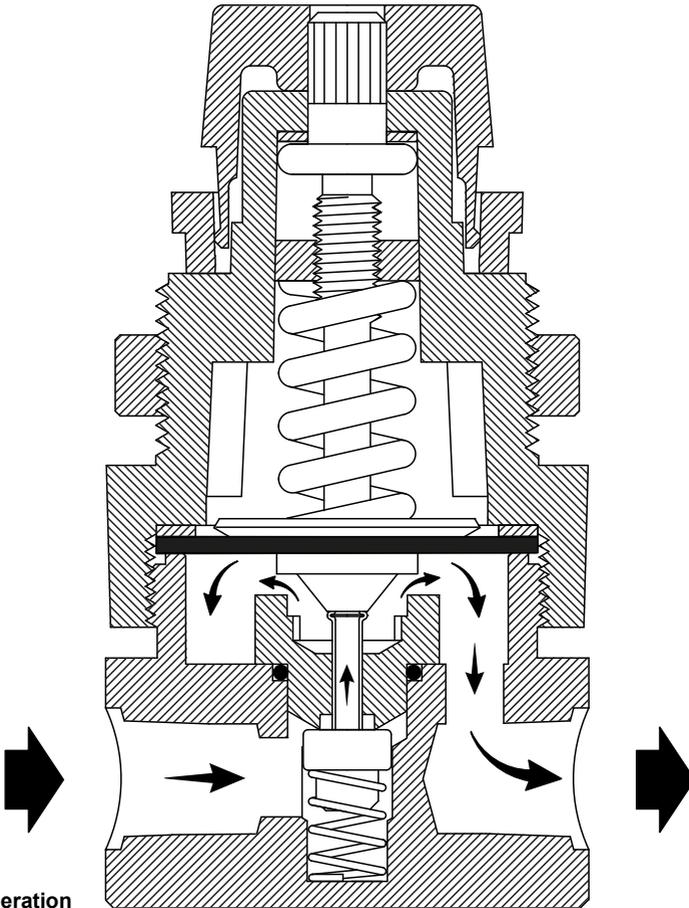


Fig. 7 Operation

4.2 Performance selection (with primary pressure 10 bar)

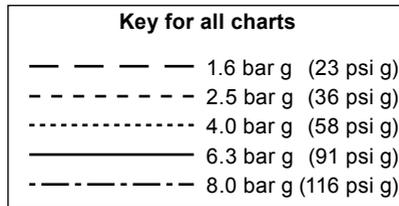
For any specified primary filtration pressure, there is a maximum recommended air flowrate. Keeping within this, will ensure that the element performance maintains the stated high efficiency levels.

4.3 Capacities

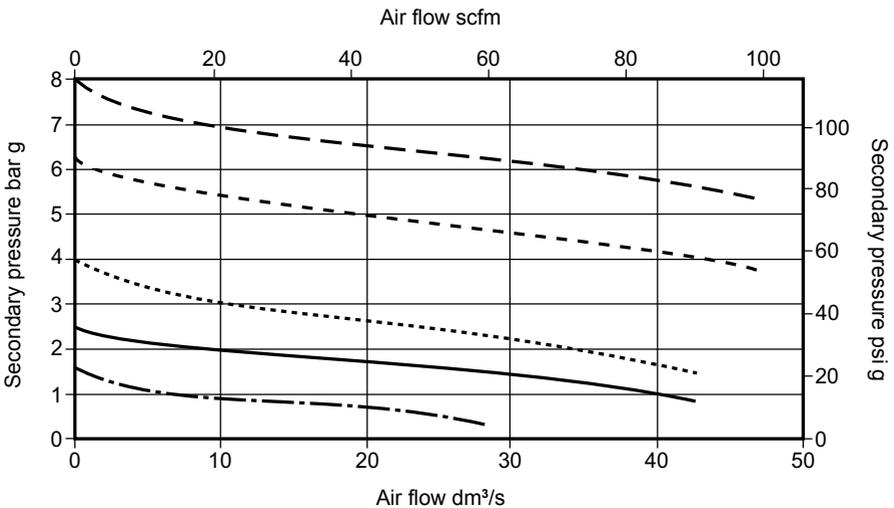
The full lift capacities for safety valve sizing purposes is 0.21 Kvs.

The following graphs utilise some typical values for secondary flow/pressure to demonstrate droop

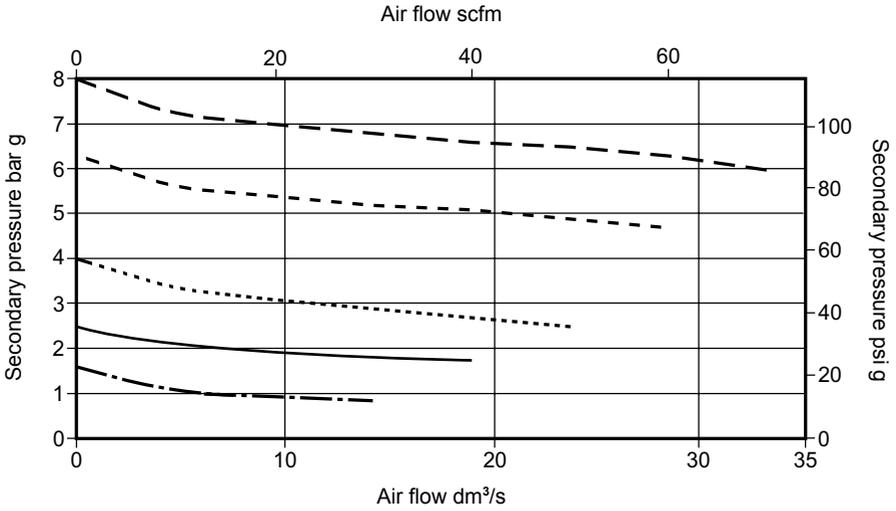
$$\text{Droop} = \frac{\text{Pressure droop}}{\text{Set point}} \quad @ \text{ Relevant flowrate}$$



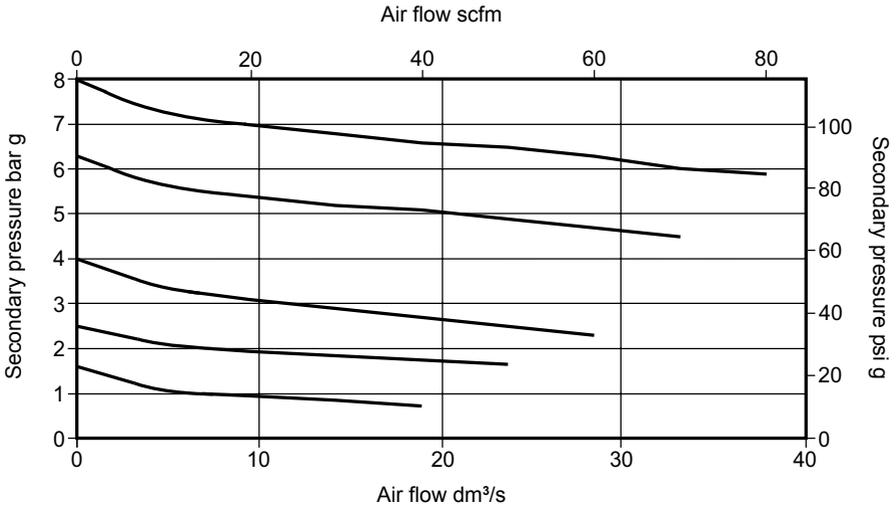
1/4"



3/8"



1/2"



— 5. Spare parts and Maintenance —

5.1 Spare parts

The spare parts available are detailed below. No other parts are supplied as spares.

Available spares

- Repair kit consisting of:**
- Diaphragm assembly
 - Poppet valve seat
 - Valve seat 'O' ring
 - Valve stem and poppet assembly
 - Poppet valve spring

How to order spares

Always order spares by using the description given in the column headed 'Available spares' and state the size and type of unit.

Example: 1 off repair kit for a ½" IR1M Monnier international compressed air regulator.

5.2 Maintenance

5.2.1 How to remove or replace the pressure control spring assembly:

- Shut off the main air supply.
- Lift the adjustment knob to unlock.
- Rotate the adjustment knob fully anticlockwise until the stop is felt, continue rotating until the knob is free.
- Remove the adjuster nut from inside the adjustment knob.
- Remove the control spring and spring plate and replace with a new control spring, spring plate and screw in the adjuster nut, making sure that the recess is facing upwards, until it is flush with the regulator body.
- Snap on the adjustment knob, being careful to line up the four driving lugs on the locking ring with the corresponding slots on the adjustment knob. - Change the pressure indicator to reflect the new pressure range, if required.

5.2.2 How to replace the valve and diaphragm assembly:

- Shut off the main air supply.
- Rotate the adjustment knob fully anticlockwise until the stop is felt.
- Release the mounting ring and unscrew the complete bonnet assembly from the main body.
- Remove the diaphragm assembly and replace using new 'O' rings.
- The diaphragm sealing ring fits on the top of the diaphragm.
- Replace the complete bonnet assembly and torque to 25 N m (18.5 lbf ft), using a 42 mm spanner.

5.2.3 How to replace the valve and return spring:

- Shut off the main air supply.
- Vent by rotating the adjustment knob fully anticlockwise.
- Unscrew the end cap and replace the components using new 'O' rings.
- The unit should be firmly hand tightened.