# INSTRUCTIONS MANUAL

## FLOWMETERS SERIES
## Rs – Flomed

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**⚠ CAUTION**
**THIS DOCUMENT IS INTENDED FOR THE INSTALLER AND THE SERVICE ENGINEER. IT IS INTEGRATED WITH THE INSTRUCTIONS CONTAINED IN THE INSTRUCTIONS FOR USE IU 024 THAT MUST ACCOMPANY THE EQUIPMENT THROUGH TO THE FINAL USER.**

# Contents



## ⚠ Important

**CAUTION: INDICATION OF DANGER**

**Attention: Important indication**

### General information

- **THE INFORMATION IN THIS DOCUMENT MUST BE READ CAREFULLY BEFORE INSTALLING OR PERFORMING MAINTENANCE ON THE Rs - Flomed, SERIES FLOWMETERS.**
- **AFTER UNPACKING AND CONNECTION, CHECK THE DEVICE IS INTACT AND CARRY OUT THE FUNCTIONAL TEST AS DESCRIBED IN THE CHAPTERS "INSTALLATION" AND "START-UP PROCEDURE".**
- **EACH TIME BEFORE USING THE DEVICE CARRY OUT THE OPERATIONS DESCRIBED IN THE CHAPTER "START-UP PROCEDURE".**
- **INSTALLATIONS THAT ARE NOT ENVISAGED BY THIS MANUAL MAY REDUCE THE SAFETY LEVEL OF THE DEVICE.**
- **The company will not accept any responsibility if the instructions in this manual are not observed, if original spare parts are not used and /or if maintenance is carried out by unauthorized technicians.**
- **The device and its components or accessories do not include parts in natural rubber latex.**

### Connections

- **CONNECT THE UNIT AND CHECK THE SEALS BETWEEN THE COMPONENTS AS DESCRIBED IN "START-UP PROCEDURE" SECTION. FAILURE TO MAKE THESE CONTROLS MAY COMPROMISE THE SAFETY AND FUNCTIONING OF THE DEVICE.**
- **THE CONNECTION HOSES MUST COMPLY WITH EN ISO 5359 STANDARD.**
- **THE DEVICE MUST NOT COME INTO CONTACT WITH OIL OR GREASE.**
- **The type of gas for which the flowmeter is designed is indicated by the chemical symbol and the reference color.**

### Operation

- **THE FLOWMETERS OF THE Rs – Flomed SERIES MUST ALWAYS BE USED WITH CARE AND ONLY BY PERSONNEL WHO ARE AWARE OF THE CONSEQUENCES OF THE ONGOING THERAPY.**
- **When the device is not in use, always close the adjustment valve.**
- **The device must be used in a hospital or equivalent structure in the environmental conditions of use indicated here and is not intended for applications in environments where electromagnetic fields, combustion sources, electrical or electrostatic discharge generators, sources of ionising and non-ionising radiation are present.**

### Service

- **All modifications and repairs must only be performed by personnel authorized by FLOW METER S.p.A., or by hospital technicians approved by the same company.**
- **Only if original spare parts, indicated in the service manual, area used for the maintenance operations, FLOW METER can guarantee the intended functioning of the device.**
- **Check the Rs – Flomed series flowmeter every three years as described in the chapter "Periodic controls".**
- **For periodical updating reasons, the device configuration can be subjected to changes. Therefore, FLOW METER guarantees spare parts to be available for at least 5 years from the manufacturing date.**
- **Any modifications to the device must be approved by FLOW METER S.p.A., and carried out in accordance with the procedures prescribed.**



# Your local dealer and service center

Your local dealer and service centre for FLOW METER S.p.A. products is:

TO BE FILLED IN BY THE LOCAL DEALER OR AGENT



The equipment described in this publication is designed and manufactured by:

FLOW METER S.p.A. - Via del Lino, 6 - 24040 LEVATE (Bg) – Italy – Tel. +39-035-594047 – Fax +39-035-594821 – e-mail: info@flowmeter.it - http://www.flowmeter.it



# Applications

The flowmeter of the Rs - Flomed series are variable area flow instant metering devices suitable for medical gases dosing. All models are provided with a flow adjustment needle valve and have a body and couplings in chrome-plated brass, making them particularly suitable for use under the most heavy conditions. They can be produced both with compensated and uncompensated pressure and both in the single version and with two flow meters to allow double and independent delivery using a single supply source. These flowmeters are also available in the version with extended scale (version L) to allow a better reading of the graduation. The Rs - Flomed series flowmeters are also available with a large number of flow rates, of medical gases and calibration pressures, as well as with different types of connections, both supply and outlet, thus providing an endless variety of combinations to suit all customers' requirements.

**FLOWMETERS FOR MEDICAL GASES**

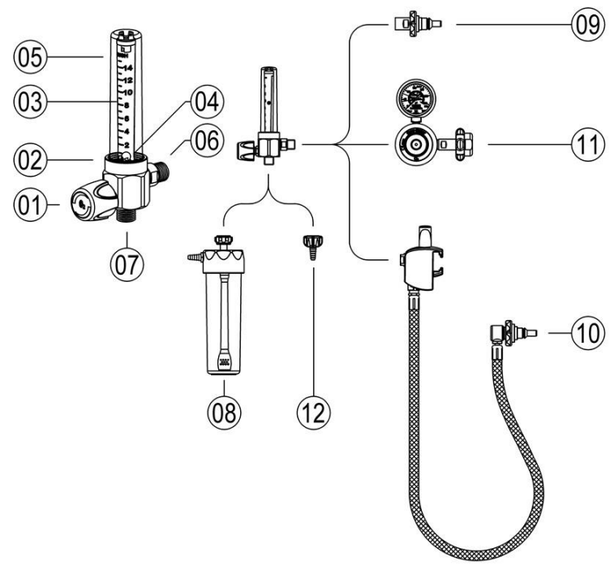

Rs – Flomed
flowmeter



# Controls and connections

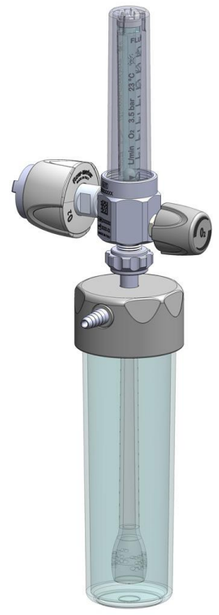
**LEGEND**

01 – Flow adjustment needle valve
02 – Body
03 – Graduated flowmeter tube
04 – Float
05 – External cover
06 – Supply connection
07 – Medical gas outlet connection
08 – Humidifier for oxygentherapy
09 – Specified gas quick coupling
10 – Rail bracket with flexible tube and specified gas quick coupling
11 – Pressure regulator for cylinder
12 – Hose connection






# Working principle



Rs - Flomed flowmeter with humidifier TR/200 and AFNOR NF S 90-116 coupling with position locking nut (optional)
(example of application)

The flowmeters of the Rs – Flomed series allow to dose, through an adjustment needle valve, and to measure the supply gas flow.
When the gas passes through the graduated tube, a spherical float rises until the dynamic equilibrium point is reached. The flow rate can be read on the graduated scale at the centre of the float.
The flowmeters described in this instructions manual consist mainly of:

- A supply connection, suitable for the connection to the specified gas quick coupling or to the bracket for fixing to the rail or to the pressure regulator for cylinder;
- A medical gas outlet connection, suitable for coupling to the flexible hose coupling connector or a respiratory therapy humidifier;
- An adjustment needle valve for dosing the medical gas flow necessary to the ongoing therapy;
- A body in chrome-plated brass, within which the components needed for gas measurement are assembled;
- A graduated flowmeter tube, with float which indicates the flow.

The calibration pressure, for flowmeters with compensated pressure, or the supply pressure, for flowmeters with non-compensated pressure, must be indicated as follows:

- Less than 280 kPa for connecting to pressure regulators;
- Between 280 kPa and 500 kPa for connection to medical gas terminal units or NIST connectors.

# Installation

Check the unit functioning every day or in accordance with the hospital routine. A description of some of the most commonly used methods for connecting the flowmeters of the Rs - Flomed series is given below.

## Alternative 1: fixing to rail and medical gas supplied with flexible hose from distribution outlet

This alternative makes it possible to fix the flowmeter to a wall rail with a bracket.

- Connect the flowmeter to a bracket suitable for the wall rail (e.g. for a 30x10 bar), with an ISO G 1/4" F threaded inlet coupling;
- Connect to the rail bracket inlet hose a suitable flexible tube and secure it with an appropriate permanent hose clamp;
- Connect the other end of the flexible tube to a medical gas quick coupling designed for central hospital systems (e.g. AFNOR NF-S 90-116 type) with a hose inlet connector, securing it with an appropriate permanent hose clamp (10);
- Fit to the flowmeter user connector (7) a tubing connector (12) or a humidifier for oxygentherapy (8) with a coupling of suitable dimensions;
- Connect the gas supply to the wall outlet on the hospital central system.

## Alternative 2: direct connection to the medical gas distribution outlet

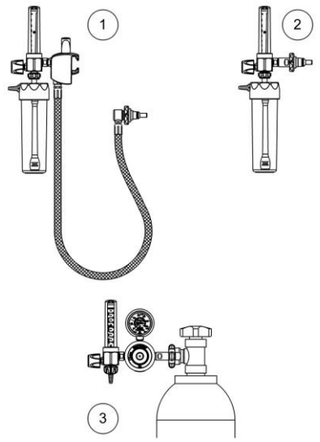
This alternative makes it possible to connect the flowmeter directly to the hospital distribution system outlets.

- Connect the flowmeter to a coupling fitting (9) the hospital central system (e.g. AFNOR NF-S 90-116 type) with an ISO G 1/4" F. threaded inlet connection;
- Fit to the flowmeter user connector (7) a tubing connector (12) or a humidifier for oxygentherapy (8) with a coupling of suitable dimensions;
- Connect the gas supply to the wall outlet of the hospital central system.

## Alternative 3: connection to a pressure regulator with cylinder coupling

This alternative makes it possible to connect the flowmeter to a pressure regulator for medical gas with cylinder coupling.

- Connect the flowmeter to the outlet of a pressure regulator (11) suitable for the same medical gas (e.g. FM type) with an ISO G 1/4" F threaded connector;
- Fit to the flowmeter user connector (7) a tubing connector (12) or a humidifier for oxygentherapy (8) with a coupling of suitable dimensions;
- Screw the regulator nut (11) onto the cylinder valve outlet coupling, taking first care to keep the controlling gauge in vertical position;
- Proceed in accordance with instructions prescribed by the manufacturer of the pressure reduction device.






# Start-up procedure

To start-up the device, proceed as follows:

- Make sure that the flowmeter user fitting (7) is connected to a tubing connector (12) or to a humidifier for oxygentherapy (8) with a coupling of suitable dimensions;
- Check that the flow adjusting needle valve (1) is completely closed (turn in clockwise direction);
- Connect the medical gas supply to the wall outlet on the hospital central system or, using a pressure regulator, to the cylinder valve, checking that the flowmeter calibration pressure corresponds to the supply pressure indicated on the device;
- Turn in an anti-clockwise direction the knob (1) placed on the flowmeter body (2) to increase the gas supply and in a clockwise direction to decrease or stop it.

⚠ **WITH THE INDICATOR ELEMENT OUT OF SCALE (FLUSH POSITION) THE FLOWMETER IS ABLE TO DELIVER A FREE FLOW OF GAS EXCEEDING THE LIMIT VALUE INDICATED IN THE GRADUATED SCALE.**

After using the device, it is essential to proceed as follows:

- Turn the knob (1) placed on the flowmeter body (2) in a clockwise direction until the gas supply is stopped.
- Disconnect the medical gas supply from the wall outlet on the hospital central system or, if the flowmeter is connected to a pressure regulator, close the cylinder valve (turn in a clockwise direction) and discharge all gas contained in the device (supply controlling gauge index must show a residual pressure of 0 bar).

⚠ **CAUTION**

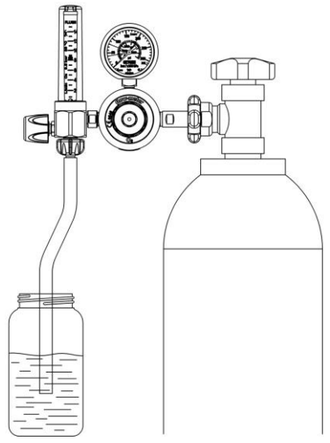
- **DO NOT DISCHARGE $O_2$ OR $N_2O$ IN THE PROXIMITY OF NAKED FLAMES, SOURCES OF COMBUSTION OR HIGHLY INFLAMMABLE MATERIALS.**

- **DO NOT EXCHANGE THE SPECIFIED GAS CONNECTIONS: THE SUPPLY OF GASES DIFFERENTS FROM THOSE FORESEEN FOR THE DEVICE CAN LEAD TO EXTREME HAZARD CONDITIONS FOR THE PATIENT AND/OR THE USER.**
- **CLOSING TOO STRONG COULD DAMAGE THE FLOW ADJUSTMENT NEEDLE VALVE AND HINDER THE FLOW SUPPLY.**
- **KEEP THE FLOWMETER IN VERTICAL POSITION DURING THE USE, TO GUARANTEE THE DECLARED ACCURACY VALUE.**
- **NO PART OF THE FLOWMETER SHOULD BE LUBRICATED; THE LUBRICANTS, WHEN THEY COME INTO CONTACT WITH OXYGEN AND NITROUS OXIDE UNDER PRESSURE, CAN LEAD TO COMBUSTION AND EXPLOSIONS.**

- **DO NOT DISASSEMBLE THE FLOWMETER IN PRESSURE.**
- **THE FLOW CAN BE READ ON THE GRADUATED SCALE AT THE CENTRE OF THE FLOAT.**
- **FOR THE COMPENSATED PRESSURE VERSIONS, IF THE SUPPLY PRESSURE DIFFERS OF A VALUE EXCEEDING 10% FROM THE FLOWMETER CALIBRATION PRESSURE, THE FLOW MEASURE ACCURACY IS NOT GUARANTEED.**
- **FOR THE NON-COMPENSATED PRESSURE VERSIONS, IF THE DOWM-STREAM PRESSURE IS MORE THEN 15 KPA, THE FLOW MEASURE ACCURACY IS NOT GUARANTEED.**
- **THE FLOW MEASURE ACCURACY IS GUARANTEED IN THE RANGE OF TEMPERATURE FORESEEN FOR DEVICE USE.**
- **ANY LEAKAGE CAN REDUCE THE DECLARED ACCURACY VALUE.**



# Periodic controls



Check the device every three years or in accordance with the hospital procedures to guarantee functionality and perfect efficiency of the Rs - Flomed series flowmeter for medical gases.

## 1. Checking for leakage from flowmeter knob

- Stop the gas flow, turning in a clockwise direction the flow adjustment knob (1).
- Connect to the gas outlet (7) a fit threaded hose connector of suitable dimensions (e.g. braid-reinforced hose, Øi 6, thickness 2.5, L 1 m).
- Place the free end of the hose in a jar containing water.
- Supply with a pressure of 1000 kPa the tested flowmeter with medical compressed air using for example a pressure regulator with suitable outlet pressure regulation.
- Count the number of bubbles released in an hour inside the jar of water: if this is less than 3, the adjustment needle valve leaks are within acceptable limits. If the level of leaks is greater, the adjustment needle valve must be replaced following the instructions described in the Service Manual.

At the end of the test disconnect the device to the supply and the tubing connector with the tube to the gas outlet (7).

## 2. Checking the leakage towards the outside

The test described in this paragraph can't measure the leaks towards the outside and therefore it is limited to check for obvious gas leaks.

- Close the gas outlet (7) by a fit threaded cap.
- Close the flow acting on the flowmeter knob (1) (turn in a clockwise direction).
- Supply with a pressure of 1000 kPa the tested flowmeter with medical compressed air using for example a pressure regulator with suitable outlet pressure regulation.
- Open very slowly the flow acting on the flowmeter knob (1) (turn in an anti-clockwise direction).
- Check the possible leakage using a gas leak detector.

At the end of the test remove the cap from the gas outlet (7), disconnect the device from the supply and clean with care the surfaces following the instructions described in chapter "Cleaning and disposal".



# Maintenance

The Rs - Flomed series flowmeter is designed and manufactured using materials that ensure a long working period and does not require particular maintenance.
However, when the periodic controls made by the user indicate the need for repairs (e.g. replacement of components), this must be done by FLOW METER authorised technicians and according with instructions described in the product Service Manual.
Whatever the circumstances, to ensure a prolonged efficiency of the system described in this publication it is necessary to:

- Clean the surfaces regularly and accurately as described in the chapter "Cleaning and disposal".
- Replace any worn-out, damaged or faulty parts always using original spare parts following the instructions prescribed by the manufacturer.

If the external leak tests require tightening of the stuffing box on the flow regulation valve, operate in accordance with what is described in the following paragraphs:

- Open the regulation valve completely, turning the knob in an anti-clockwise direction.
- Loosen the blocking ring nut using a 12 mm wrench with appropriate thickness (Figure 2.1).
- Tighten the nut on the needle valve stuffing box to a value of 3.5 Nm using a dynamometric wrench, in order to guarantee sealing of the device (Figure 2.2).
- Block the ring nut again using a 12 mm wrench with an appropriate thickness and close the regulation valve knob.

After completing maintenance operations, conduct all the checks described in the "Periodic controls" section.

⚠ **CAUTION**

- **THE USE OF FLOW METER NON-ORIGINAL SPARE PARTS MAY INTERFERE WITH THE FUNCTIONING AND SAFETY OF THE DEVICE, REPRESENTING A HAZARD FOR THE USER AND THE PATIENT.**

Figure 2.1

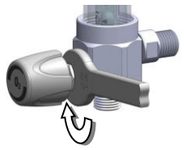


Figure 2.2



# Cleaning and disposal

- **CLEAN THE DEVICE EVERY DAY OR IN ACCORDANCE WITH THE HOSPITAL ROUTINE.**
- **CAREFULLY CLEAN ALL THE SURFACES OF THE DEVICE USING A SOFT DAMP COTTON CLOTH RINSED IN NEUTRAL DETERGENT DILUTED AT 10% IN WATER.**

⚠ **CAUTION**

**DO NOT USE SOLVENTS OR ABRASIVE PRODUCTS FOR CLEANING: THESE CAN SERIOUSLY DAMAGE THE SURFACES OF THE APPLIANCE AND THE PLASTIC PARTS.**

- **DO NOT IMMERSE THE UNIT IN DISINFECTANT;**
- **DO NOT PLACE THE UNIT IN AN AUTOCLAVE;**
- **DO NOT USE INFLAMMABLE PRODUCTS.**

**THE NECESSARY CLEANING AND DISINFECTION OPERATIONS MUST BE CARRIED OUT BY HOSPITAL QUALIFIED PERSONNEL.**

**THE DEVICES DESCRIBED IN THIS DOCUMENT ARE REUSABLE. THEIR SHELF LIFE RELIES ON THE PERFORMANCE OF A REGULAR PREVENTIVE AND PERIODIC MAINTENANCE PLAN. DISPOSAL OF REPLACED COMPONENTS AND/OR OF THE WHOLE DEVICE MUST COMPLY WITH THE LOCAL CURRENT REGULATIONS FOR POTENTIALLY CONTAMINATED HOSPITAL WASTE.**



# Technical features

Sales description ..... Rs - Flomed series flowmeter

Physical features (version with threaded supply connector G ¼" M.) .....

| Model | Rs - Flomed | RsL |
|---|---|---|
| Height (mm) | 136 | 156 |
| Width (mm) | 33 | 33 |
| Depth (mm) | 83 | 83 |
| Weight (Kg) | 0.23 | 0.24 |

Supply maximum pressure ..... 600 kPa

Accuracy ..... ±10% of value read or ±0.5 L/min if greater (±10% V.F.S. for flows F.S. ≤1 L/min)

Standard supply connections ..... ISO G 1/8" F • ISO G 1/4" M • 1/4"NPT M • 3/8" ISO 3253 F

Standard gas outlet connections ..... 1/4" ISO 3253 M • 3/8" ISO 3253 M • M 12x1.25 M • 1/2" GAS M 9/16" UNF M • 1/2" BSF F

Supply gas type ..... Medical gases and their mixtures (EN ISO 9170-1)

Standard full-scale flows (400 kPa) ..... 5 L/min. • 10 L/min. • 15 L/min. • 20 L/min. • 30 L/min.

FLUSH maximum flow value (adjustment valve completely open - supply P: 400 kPa) ..... > 80 L/min.

Flow adjustment knob ..... Needle

Measure principle ..... Variable area system

Environmental storage conditions ..... -40 °C ± 2 °C / +60 °C ± 5 °C and 40%÷70% relative humidity

Environmental working conditions ..... +5 °C ± 2 °C / +35 °C ± 5 °C

Check the device every three years following the instructions in the section "Periodic controls".

Useful lifetime upon first installation: 10 years.

Warranty: the manufacturer provides a two-year warranty for concealed defects which are not caused by wear and tear of materials, starting from the date when the device is first placed on the market.