

03

PRESSURE REGULATORS AND FLOWMETERS, ALL MEDICAL GASES

In this section we propose our **pressure regulators** (FM series, MU and MERCURY®) and our **Rs flowmeters for applications other than oxygen therapy** (presented in the catalogue specific section). The supply of all medical gases through measurement devices requires **accuracy and experience in manufacturing and development**, so we underline once more that all these devices are made in full compliance with European standards and technical regulations, as well as requirements of 93/42/EEC Directive and the approval criteria set by national and international certified bodies.

50TH

The CE marking procedure is carried out according to the requirements of a complete EN ISO 13485 quality system.

DOWNLOAD
PRESSURE REGULATORS AND
FLOWMETERS, ALL MEDICAL GASES



All regulators and flowmeters are rigorously tested, both in **flow-meter™** own quality-assurance laboratories and by independent validated laboratories, to ensure that the products meet all the requirements of the medical applications in any foreseeable therapeutic condition.

PRODUCTS

FM	PRESSURE REGULATORS	90
MU	PRESSURE REGULATORS	92
MERCURY®	PRESSURE REGULATOR WITH AN INTEGRATED CYLINDER VALVE	94
Rs	VARIABLE AREA FLOWMETERS	96

pressure regulators for cylinders,
pressure regulators with integrated
cylinder valve and flowmeters



FM

PRESSURE REGULATORS

The single-stage **FM** pressure regulators are designed for direct fitting on medical gas cylinders in the different reference standards.

They are equipped with single gauge to check the remaining contents of the cylinder or with double gauge to check and adjust the working conditions according to the user requirements. The **FM** type pressure regulators can be supplied with the calibration of the outlet pressure preset or adjustable through a knob.

The body is manufactured of chrome-plated brass, with a pre-calibrated overpressure safety valve to protect against any malfunction of the system. A protective silicone cover prevents gauges damage caused by possible shocks received during transport or use. Appropriate inlet connections are available for all the most commonly used medical gases, according to the various standards used in different Countries.

A special version, made for ambulances applications, fits a pressure gauge with electric signal 4-20 mA or 0.5-4.5 V output for the continuous monitoring of the supplied pressure and with system control panel interface.



01

01 OUTLET FOR FM PRESSURE
REGULATOR (OPTIONAL)

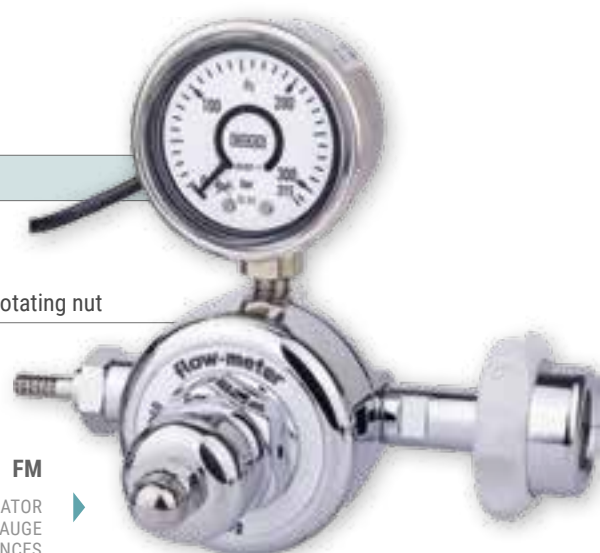
02

02 ONE OF THE SEVERAL
INLET CONNECTIONS
FOR CYLINDER DIRECT FITTING

TECHNICAL SPECIFICATIONS | Pressure regulator for ambulances

GASES OPTIONS	Oxygen
GAUGE ELECTRICAL FINAL	4-20 mA or 0.5-4.5 V output
OUTLET CONNECTOR	hose connector with gas specific rotating nut

► OXYGEN SUPPLY SYSTEMS FOR AMBULANCES, PAGE 46

**FM**PRESSURE REGULATOR
WITH SPECIAL GAUGE
FOR AMBULANCES

FM
PRESSURE REGULATOR
WITH SINGLE GAUGE
FOR N₂O



FM

PRESSURE REGULATOR
WITH SINGLE GAUGE



FM

PRESSURE REGULATOR
WITH DOUBLE GAUGE

TECHNICAL SPECIFICATIONS	FM SINGLE GAUGE		FM DOUBLE GAUGE	
OUTLET	MAX. SIZES (LxWxH)	MAX. WEIGHT	MAX. SIZES (LxWxH)	MAX. WEIGHT
TUBING CONNECTOR Ø 6.5 mm	100x136x120 mm	0.95 Kg	102x136x113 mm	1.14 Kg
TERMINAL UNIT	100x137x120 mm	1.21 Kg	102x137x113 mm	1.40 Kg
THREAD ISO G. 1/4" F.	100x105x120 mm	0.92 Kg	102x105x113 mm	1.11 Kg
MAXIMUM INLET PRESSURE	200 bar (100 bar for N ₂ O and CO ₂)			
INLET CONNECTIONS	UNI 11144 • NF-E 29-650 • BS 341-3 • DIN 477-1			
TERMINAL UNIT TYPE (IF PRESENT)	AFNOR NF-S 90-116 • UNI 9507 • BS 5682 • DIN 13260 • SS 875 24 30			
GASES OPTIONS	O ₂ • AIR • N ₂ O • N ₂ • CO ₂ • Helium • Hydrogen			



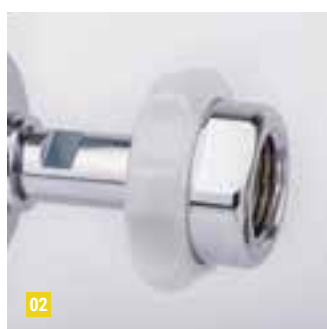
MU

PRESSURE REGULATORS

The **MU** pressure regulators are designed for direct fitting on standard medical gas cylinders.

They are manufactured with body of chrome-plated brass, with a pre-calibrated overpressure safety valve to protect against any malfunction of the system, with an inlet connection for O₂ or Air according to the various standards used in different Countries and with an outlet hose connector.

They are available in a version with preset calibration of the outlet pressure with single gauge to check the cylinder contents, or with adjustable pressure and a flow gauge to check the flow of the supplied gas. A protective silicone cover prevents gauges damage caused by possible shocks received during transport or use.



- 01 CYLINDER GAS PRESSURE GAUGE
- 02 INLET CONNECTION ACCORDING TO INTERNATIONAL STANDARDS
- 03 FLOW ADJUSTING KNOB

MU

PRESSURE REGULATOR



MU

PRESSURE REGULATOR
WITH FRONT FLOW GAUGE



MU

PRESSURE REGULATOR
WITH SIDE FLOW GAUGE

TECHNICAL SPECIFICATIONS | MU

OUTLET	SIZES (LxWxH)	WEIGHT
HOSE CONNECTOR Ø 6.5 mm	127x51x121 mm	0.64 Kg
FRONT FLOW GAUGE	135x87x121 mm	0.72 Kg
SIDE FLOW GAUGE	135x101x121 mm	0.71 Kg
MAXIMUM INLET PRESSURE	200 bar	
INLET CONNECTION	UNI 11144 • EN 850 • NF-E 29-650 • BS 341-3 • DIN 477-1 • ISO 5145	
FLOW GAUGE END OF SCALE VALUE (IF PRESENT)	9 LPM	
FLOW GAUGE ACCURACY (IF PRESENT)	±10% read value or ±0.5 L/min. if greater	

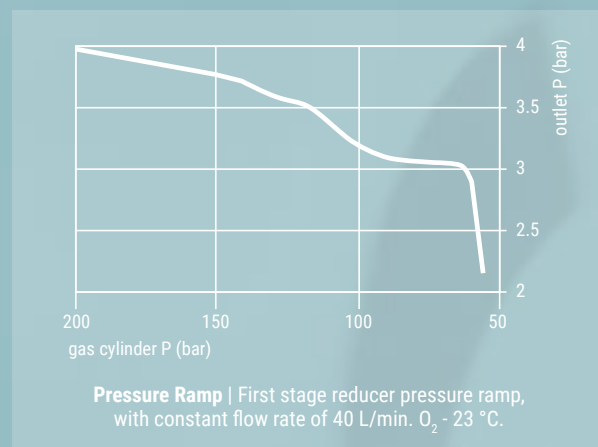


MERCURY®

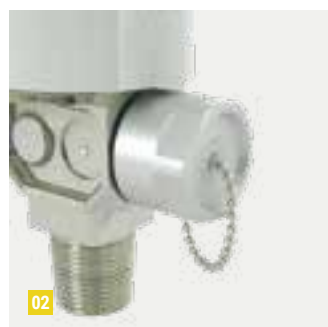
PRESSURE REGULATOR WITH AN INTEGRATED CYLINDER VALVE

The **MERCURY®** pressure regulators, complete with an integrated cylinder valve, are suitable for direct mounting on oxygen cylinders using the threaded connector 25E (EN 629-1) or 17E (EN ISO 11116-1).

The **MERCURY®** pressure regulators have a refilling valve appropriate to the required standards of the country of destination. An ergonomic knob allows the user to quickly open and close the cylinder flow, and gives a clear indication about the status of the system (ON-OFF). This device has a double stage preset output pressure, with a control gauge to indicate the pressure in the gas cylinder. The **MERCURY®** pressure regulator has a chrome-plated brass structure and is equipped with a preset overpressure valve as a protection against any malfunction in the system. A flowmeter with calibrated orifices supplies the gas through a hose connector with flow adjustable from 2 to 14 L/min., in intervals of 2 L/min. A terminal unit (optional) can be integrated to supply emergency apparatus.



PERFORMANCE FEATURES | The **MERCURY®** pressure regulator may be opened and quickly and easily closed; the high pressure closure is obtained through a bistable, two-way drum valve with outlet, controlled by a knob which houses a lever directly connected to the drum enabling movement from the closed to the open position. The knob has two stable positions obtained through a ball and spring system. The rotary movement of the ring covers or uncovers the ON-OFF symbols, and the window which appears has a red background corresponding with the closed position, or a green background corresponding with the open position, enabling the status of the device to be visible at a distance. The gas cylinder is recharged through a one-way valve with a protective cap. The first stage reducer has been sized to guarantee the flow of gas to the patient and those necessary for the operation of any equipment connected to the specific gas outlet. The overpressure valve is set during manufacture and is non-modifiable. First and second stage regulations are also set during manufacture. A calibrated orifice flowmeter forms part of the regulator valve body and cannot be detached without opening and disabling the valve itself.



01 MERCURY® WITH EXTERNAL PROTECTION

02 CYLINDER REFILLING VALVE WITH SCREWED PROTECTIVE CAP





WORKING PRINCIPLE | The **MERCURY®** pressure regulators basically consist of:

- a coupling with conical threading 25E or 17E for connection of the valves to the gas cylinder;
- a gas recharging coupling of the residual pressure type, with a shutter (dimensions comply with the different reference standards of the country of destination);
- a hose coupling for supply of the gas necessary for the therapy being performed;
- a control gauge, to display the gas cylinder pressure value, with external metal protection against accidental blows;
- a general open/close knob, with visual indication via a colored plate of the system functioning status (ON-OFF);
- an overpressure valve, pre-calibrated to a value of twice the nominal operating pressure, able to guarantee adequate protection against any system anomalies;
- a calibrated orifice flowmeter enabling regulation of the gas flow supplied through a suitably graduated adjusting knob;
- a chrome-plated brass body, within which are assembled the components necessary to reduce pressure with a piston system;
- a plant terminal unit, connected after the first stage pressure reducer (optional accessory in substitution of the appropriate stopper), enables supply of a medical device for emergency resuscitation.



The first and second stage pressure reducers on the **MERCURY®** pressure regulator ensure that the medical gas supply pressure in the cylinder is reduced and maintained within the following values:

- 400 ± 50 kPa after the first stage, to enable gas supply through the terminal unit (optional accessory);
- 200 ± 10 kPa before the flowmeter.

TECHNICAL SPECIFICATIONS | MERCURY®

SIZES (LXWXH)	without outlet: 105x65x162 mm with AFNOR NF-S 90-116 outlet: 108x65x162 mm with UNI 9507 outlet: 119x65x162 mm
WEIGHT	without outlet: 1.600 Kg with AFNOR NF-S 90-116 outlet: 1.680 Kg with UNI 9507 outlet: 1.72 Kg
MAXIMUM OPERATING PRESSURE	200 bar
MANOMETER	end of scale 315 bar with indication of the cylinder charge status, even when the valve is closed
GAS CYLINDER COUPLING	25E (EN 629-1) • 17E (EN ISO 11116-1)
RECHARGE VALVE SUPPLY COUPLING	UNI 11144 • NF-E 29-656 • BS 341-3 • DIN 477-1 • ISO 5145
TERMINAL UNITS (OPTIONAL)	AFNOR NF-S 90-116 • UNI 9507 • BS 5682 • DIN 13260 • SS 875 24 30
TERMINAL UNITS SUPPLY PRESSURE (IF PRESENT)	400 kPa ± 50 kPa (with cylinder pressure from 160 to 60 bar)
OUTLET HOSE CONNECTOR	Ø 6.5÷8.5 mm
FLOWMETER	standard full scale flow rate: 14 L/min. • 30 L/min. accuracy: ±10% of value read or ±0.5 L/min. if greater



Rs

VARIABLE AREA FLOWMETERS

The flowmeters type **Rs** are instant flow measuring devices suitable for the dosage of all medical gases.

They can be produced in version with pressure compensated or not compensated and manufactured both with single or twin flow tubes in order to allow a double and independent gas supply using a single gas source. The flowmeters type **Rs** fit a needle valve with a knob in color code for the immediate identification of the supplied gas.

The body is manufactured in chrome-plated brass with metal fittings and the measurement group is made of high resistance polycarbonate, making them ideal for the toughest applications.

They are also available in different solutions of pressure calibration, various options of scale, normal or extended (L version) to allow a better reading of the indicated values. Several options are proposed concerning the threaded connections, inlet or outlet, offering an endless variety of combinations to meet all application requirements.



Rs twin

CHROME-PLATED BRASS BODY
TWIN CONSTRUCTION



RS ABS KNOBS, COLOR CODED
FOR GAS SPECIFICITY



Rs

CHROME-PLATED BRASS BODY
SINGLE CONSTRUCTION

TECHNICAL SPECIFICATIONS | Rs

SIZES (LxWxH)	80x33x136 mm
WEIGHT	0.24 Kg
SUPPLY MAX. PRESSURE	600 kPa
END OF SCALE VALUES - 350 kPa	1 L/min. • 4 L/min. • 5 L/min. • 10 L/min. • 15 L/min. • 20 L/min. • 30 L/min. • 50 L/min.
FLUIDS	O ₂ • AIR • N ₂ • CO ₂ • N ₂ O
ACCURACY	±10% read value or ±0.5 L/min. (±0.2 L/min. for flow < than 1 L/min.) if greater
INLET CONNECTION	ISO G 1/8" F. • ISO G 1/4" M. • 1/4"NPT M. • 3/8" ISO 3253 F. • M 12x1 F.
OUTLET CONNECTION	1/4" ISO 3253 M. • 3/8" ISO 3253 M. • M 12x1.25 M. • 9/16" UNF EN 13544-2 M. • 1/2" BSF F.