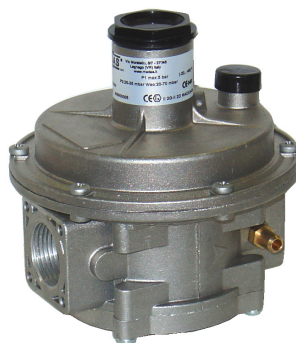


REGOLATORE DI PRESSIONE PER GAS  
 GAS PRESSURE REGULATOR  
 REGULATEUR DE PRESSION POUR GAZ  
 REGULADOR DE PRESIÓN PARA GAS


**FRG/2MCC**

**FRG/2MCS**

CE II 2G - II 2D

CE 0497

**MADE IN ITALY**

	IT	EN	FR	ES
Range pressione di esercizio Operating pressure range Plage de pression de fonctionnement Rango de la presión de funcionamiento	<b>Pe: 0,5÷3 bar</b> <b>0,5÷5 bar</b>			
Attacchi filettati / Threaded connections Raccords filetés / Conexiones roscadas	<b>DN 15 - DN 20 - DN 25</b>			
Attacchi flangiati / Flanged connections Raccords à brides / Conexiones embreadas	<b>DN 25*</b>			
	* su richiesta con flange girevoli	* with swivel flanges on request	* sur demande avec brides tournantes	* bajo petición con bridas locas
Norma di riferimento / Reference standard Norme de référence / Patrón de referencia	EN 88-2			
In conformità a In conformity with Conforme a Conforme	Direttiva PED 2014/68/UE	PED Directive 2014/68/EU	Directive PED 2014/68/UE	Directiva PED 2014/68/UE

## 2.0 - TECHNICAL DATA

• Use	: non-aggressive gases of the three families (dry gases)
• Ambient temperature (TS)	: -20 ÷ +60°C
• Minimum operating pressure	: 0.5 bar
• Max operating pressure	: 3 or 5 bar (see product label)
• Allowable pressure PS	: 3 or 5 bar (see product label)
• Safety lock closing time	: < 1 s
• Accuracy class	: AC=10 - (Pa ± 10%)
• Closing pressure class	: SG=30
• Relief valve	: tested according to the indications in EN 334
• Connecting the vent	: G 1/4
• Mechanical strength	: Group 2 (according to EN 13611)
• Rp threaded connections	: (DN 15 - DN 20 - DN 25) according to EN 10226
• NPT Threaded connections	: on request
• Flanged connections that can couple with PN 16 flanges	: on request DN 25 with swivel flanges
• Standard filter element	: filtering 50µm (on FRG... versions)
• In compliance with	: PED Directive 2014/68/EU - ATEX Directive 2014/34/EU

### 2.1 - MODEL IDENTIFICATION (for configurations see page 41 - 47)

<b>FRG/2MCC:</b> Pressure regulator with filter	- Compact version (up to 25 m <sup>3</sup> /h)
<b>RG/2MCC:</b> Pressure regulator without filter	- Compact version (up to 25 m <sup>3</sup> /h)
<b>FRG/2MCS:</b> Pressure regulator with filter	- Standard version
<b>RG/2MCS:</b> Pressure regulator without filter	- Standard version

## 3.0 - COMMISSIONING THE DEVICE



### 3.1 - OPERATIONS PRIOR TO INSTALLATION

- It is necessary to close the gas upstream of the device prior to installation;
- Make sure that the line pressure **DOES NOT EXCEED** the maximum pressure declared on the product label;
- Protective caps (if any) must be removed prior to installation;
- The pipes and inside of the device must be clear of any foreign bodies;

#### • IMPORTANT:

- to avoid possible pumping and/or disturbances in the gas flow, a straight pipe section equal to at least 5 DN must be installed (downstream of the regulator);
- install manual gas closing devices (e.g. ball valves) upstream and downstream of the regulator to protect it from any pipe leak test;
- do consider that if the regulator is equipped with a relief valve, the latter is suitable for small quantities of gas to be discharged and CANNOT replace the relief valve installed separately as a specific device;

If the device is threaded:

make sure that the pipe thread is not too long, to prevent damaging the body of the device when screwing it on;

If the device is flanged:

- make sure the inlet and outlet counter-flanges are perfectly coaxial and parallel in order to prevent unnecessary mechanical stress to the body. Also calculate the space to insert the seal gasket;
  - With regard to tightening operations, equip yourself with one or two calibrated torque wrenches or other controlled locking tools;
- With outdoor installation, it is advisable to install a protective roof to prevent rain from oxidising or damaging parts of the device.



- According to the plant geometry, check the risk of an explosive mixture arising inside the piping;
- If the regulator is installed near other devices or as part of an assembly, compatibility between the regulator and these devices must be evaluated beforehand;
- Provide protection against impact or accidental contact if the device is accessible to unqualified personnel.



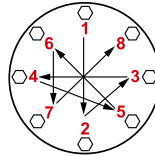
### 3.2 - INSTALLATION (see example in 3.4)

Threaded devices:

- Assemble the device by screwing it, with the due seals, onto the plant with pipes and/or fittings whose threads are consistent with the connection being attached;
- Do not use the neck of the top cover (**3**) as a lever to help you screw it on, but only use the specific tool;
- The arrow, shown on the body (**14**) of the device, needs to be pointing towards the application;

Flanged devices:

- Assemble the device by flanging it, with the due seals, onto the plant with pipes whose flanges are consistent with the connection being attached. The gaskets must be free from defects and must be centred between the flanges;
- If, after installing the gaskets, there is still an excessive space in between, do not try to reduce the said gap by excessively tightening the bolts of the device;
- The arrow, shown on the body (**14**) of the device, needs to be pointing towards the application;
- Insert the relative washers inside the bolts in order to prevent damage to the flanges during tightening;
- When tightening, be careful not to “pinch” or damage the gasket;
- Tighten the nuts or bolts gradually, in a “cross” pattern (see the example at the side);
- Tighten them, first by 30%, then by 60% and finally 100% of the maximum torque (see the example alongside, according to EN 13611);
- Tighten each nut and bolt again clockwise at least once, until the maximum torque has been achieved uniformly;



Diameter	DN 25
Max. torque (N.m)	30

Common procedures (threaded and flanged devices):

- The regulator is normally positioned before the application. Previously evaluate the possibility of installing the regulator as shown in the installation example in 3.4;
- It can be installed in any position even if the installation shown in 3.4 (installation example) is preferred. A pressure outlet (**15**) can be found outside the regulator, downstream from it, to control the regulation pressure (Pa);
- In STANDARD versions, it is recommended to connect the pulse outlet with a G 1/8 connection downstream of the regulator (see installation example) if the gas flow exceeds 40 Nm<sup>3</sup>/h. To do so, remove the cap (**21**);
- Drain the relief valve (if any) outwards (as shown in 3.4) by removing the dust cap (**18**);
- It is always recommended to install a compensation joint;
- During installation, avoid debris or metal residues from getting into the device;
- To guarantee assembly free of any mechanical tension, we recommend using compensating joints, which also adjust to the pipe's thermal expansion;
- If the device is to be installed in a ramp, it is the installer's responsibility to provide suitable supports or correctly sized supports, to properly hold and secure the assembly. Never, for any reason whatsoever, leave the weight of the ramp only on the connections (threaded or flanged) of the individual devices;
- In any case, after installation check the tightness of the system, without subjecting the diaphragm of the regulator (therefore, the downstream pipe section) to a pressure higher than 300 mbar (valid only for versions with standard working diaphragm). For versions with reinforced diaphragm, check the tightness with a pressure equal to 1.5 times the regulator setting pressure.

### 3.3 - INSTALLATION IN PLACES WHERE THERE IS THE RISK OF EXPLOSION (DIRECTIVE 2014/34/EU)

The regulator complies with Directive 2014/34/EU (formerly 94/9/EC) as group II equipment, category 2G and as group II equipment, category 2D; consequently, it is suited for installation in zones 1 and 21 (in addition to zones 2 and 22) as classified in Annex I of Directive 99/92/EC. The regulator is not suited for use in zones 0 and 20 as defined in the aforementioned Directive 99/92/EC. To determine the qualification and size of the danger zones, please refer to standard IEC EN 60079-10-1.

If installed and subject to maintenance in full compliance with all conditions and technical instructions provided in this manual, the device does not pose a source of specific hazards: in particular, under conditions of normal operation, the regulator is expected to emit a flammable substance into the atmosphere only occasionally, and specifically:

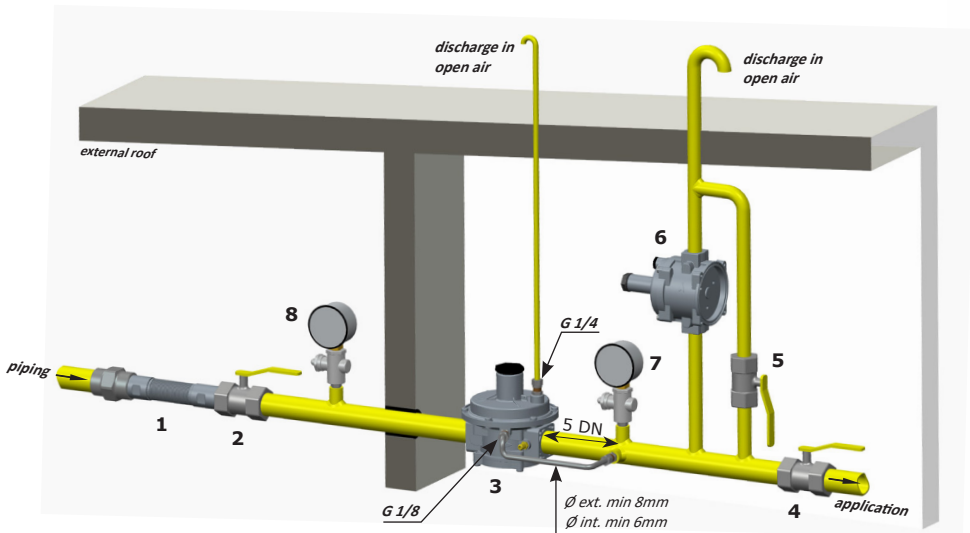
The regulator can be dangerous with respect to the presence of other devices nearby if the integrated relief valve is triggered or if the working diaphragm (17). If the diaphragm fails, the regulator becomes a source of explosive atmosphere emission of continuous degree and, as such, it can generate hazardous areas 0 as defined in Directive 99/92/EC.

In particularly critical installation conditions (unattended areas, poor maintenance or poor ventilation) and especially if there are potential sources of ignition and/or hazardous equipment near the regulator in regular operation, as they may generate electric arcs or sparks, a preliminary assessment of the compatibility between the regulator and such equipment must be carried out.

In any case, every useful precaution must be adopted so as to prevent the regulator from generating zones 0: for example, annually verify regular operation, possibility of changing the degree of emission of the source or intervening on the explosive substance discharge by directing it outwards. To do so, simply remove the dust cap (18) by connecting the specific pipe (G 1/4) conveyed to the outside (see example of installation in 3.4).

### 3.4 - GENERIC EXAMPLE OF AN INSTALLATION

1. Expansion joint/anti-vibration mount
2. Upstream ball valve
3. FRG/2MCS pressure regulator filter
4. Ball valve downstream of the regulator
5. Vent valve
6. Relief valve MVS/1
7. Low pressure gauge and relative button
8. High pressure gauge and relative button



NOTE: The 5DN pipe connection can only be carried out on STANDARD versions (2MB).



## 4.0 - FIRST START-UP

Before commissioning, verify that:

- all of the instructions on the rating plate, including the direction of flow, are observed;
- the hole of the dust cap (**18**) is not clogged;



- **IMPORTANT:** The leak test of the piping must be performed without subjecting the diaphragm of the regulator (therefore, the downstream pipe section) to a pressure higher than 300 mbar (for reinforced diaphragm 1.5 times the regulator setting pressure). Use special manual gas closing devices to avoid damaging the regulator;
- The pressurisation manoeuvre of the equipment must be carried out very slowly so as to avoid possible damage.

**NOTE:** under no circumstances should a blind cap be placed instead of the dust cap (**18**) as the regulator may not work;

- Open the downstream vent valve partially;
- Slowly open the upstream shut-off devices (e.g. solenoid valves, OPSO shut-off valve, etc.);
- Wait until the downstream pressure stabilises at the calibration value Pa of the spring (indicated on the rating plate);
- Close the vent valve;
- Check the tightness of all the system gaskets and check the internal/external tightness of the regulator;
- Open the downstream shut-off valve very slowly;
- Check the operation of the regulator.



## 5.0 - CALIBRATION

Before carrying out the operations, make sure that the supplied spring/s is/are suitable for the desired Pa and differential relief valve fields.

### 5.1 - Adjusting the relief valve (differential DfRv)

**NOTE:** The relief valve (if any) in these regulators is differential, therefore the range value (DfRv) indicated must be added to the range value of the outlet pressure (Pa).

Example: Pa=20-30 mbar - DfRv=10-60 mbar.

Means that the relief valve can be calibrated from: (Pa min + DfRv min) = 20+10=30 mbar to: (Pa max + DfRv max) = 30+60=90 mbar

Therefore the effective range of the relief valve (in this case) is 30-90 mbar.

- Start the system and set the shut off as described in point 4.0;
- Slowly close the valve downstream of the regulator;
- Loosen and remove the cap (**1**);
- Use the 8 mm socket spanner (see fig. 1 and 2) to fully tighten the nut (**20**);
- Use the 8 mm socket spanner to press the adjustment nut (**20**) and increase the pressure Pa, reading it on the pressure gauge, up to the desired setting value;
- Without pressing further, slowly loosen the adjustment nut (**20**) until the pressure Pa begins to decrease, shown on the pressure gauge;
- In this case, the relief valve is set to the desired value;
- Remove the socket spanner and close the cap (**1**).

## 5.2 - Adjusting the outlet pressure (Pa)

The outlet pressure Pa (unless specifically requested) is factory-set with the regulator installed as indicated in 3.4 and with the adjustment screw (2) set approximately at the minimum setting value. The relief valve is set accordingly.

If the regulator is installed in different positions, check and reset the outlet pressure Pa, and consequently the devices incorporated in the regulator;

Adjust the outlet pressure as follows:

- Unscrew the cap (1);
- Unscrew the adjustment screw (2) and set it to the minimum setting allowed (threaded end of the top cover (3));
- Start the system or make sure there is a minimum flow downstream of the regulator;
- To increase the pressure calibration downstream of the regulator, tighten the adjustment screw (2) to the desired value. Perform the reading with a calibrated pressure gauge, installed downstream of the regulator to at least 5 DN (see example in 3.4);
- Screw the cap (1) back on and if necessary, seal it in that position using the appropriate seal holes (if any);
- Use pressure outlets (15) on the device only for zero flow or very low flow measurements.



## 6.0 - RECOMMENDED PERIODIC CHECKS

- Use a suitable calibrated tool to ensure the bolts are tightened as indicated in 3.2;
  - Check the tightness of the flanged/threaded connections on the system;
  - Check the tightness and operation of the regulator/relief valve;
- The final user or installer is responsible for defining the frequency of these checks based on the severity of the service conditions.

### 6.1 - CHECK THAT THE RELIEF VALVE IS WORKING PROPERLY

- Start the system as described in point 4.0;
- Slowly close the valve downstream of the regulator;
- Loosen and remove the cap (1);
- Use an 8 mm socket spanner to press the adjustment nut (20) to increase the pressure Pa above the preset value. Use a calibrated pressure gauge for the reading;
- Remove the socket spanner. The generated overpressure will be discharged outwards and the Pa will begin to decrease to the relief valve setting value. Relief valve operation is verified;
- Close the cap (1);
- Open the relief valve to discharge the created overpressure;
- Close the relief valve (the regulator goes to the closing pressure) and open the ball valve downstream of the regulator.



## 7.0 - MAINTENANCE



- No maintenance operations need to be carried out inside the device. If operations must be carried out inside the device (changing the spring, replacing the filter, etc.), it is advisable to contact the Technical Department. In any case, before carrying out any dismantling operation on the device, make sure that there is no pressurised gas inside.

## 8.0 - TRANSPORT, STORAGE AND DISPOSAL

- During transport the material needs to be handled with care, avoiding any impact or vibrations to the device;
- If the product has any surface treatments (ex. painting, cathaphoresis, etc) it must not be damaged during transport;
- The transport and storage temperatures must observe the values provided on the rating plate;
- If the device is not installed immediately after delivery it must be correctly placed in storage in a dry and clean place;
- In humid facilities, it is necessary to use driers or heating to avoid condensation;
- At the end of its service life, the product must be disposed of in compliance with the legislation in force in the country where this operation is performed.