

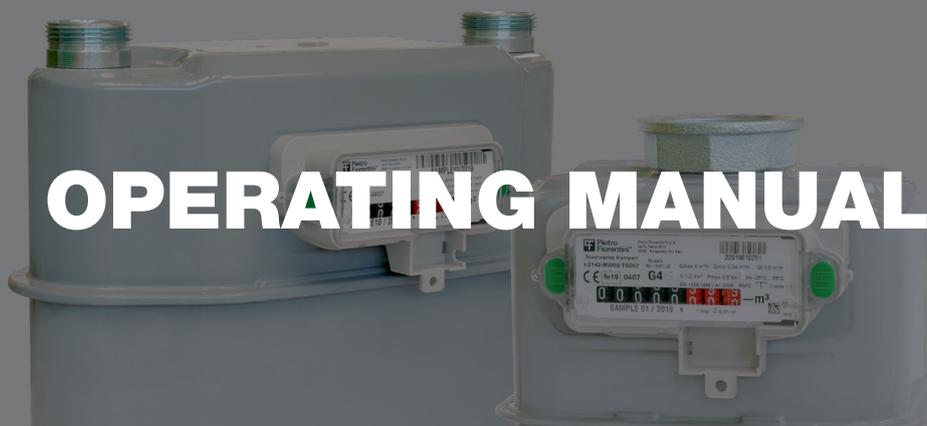
# RS 2.0

# RST 2.0

Diaphragm gas meter



Revision B - Issue 10/2022



# OPERATING MANUAL



# 1 - INTRODUCTION

## FOREWORD

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## GENERAL

The operating instructions described in this manual are recommendations aimed at:

- Achieving the best possible performance of the unit
- Keeping the unit in an efficient condition.

Staff training is of the utmost importance especially for the personnel in charge of:

- properly using and servicing the unit
- adhering to recommended warnings and safety procedures.

Revision: B



## 1.1 - RECORD OF CHANGES

Revision updated as of	Date	Contents of changes
<b>00</b>	10/2021	First issue
<b>A</b>	08/2022	<ul style="list-style-type: none"> <li>• Single pipe drawing added</li> <li>• Punctuation correction</li> </ul>
<b>B</b>	10/2022	<ul style="list-style-type: none"> <li>• Max. tightening torques (Gasfalit) updated in Tab. 4.9</li> <li>• Min. tightening torques (Refalit) updated in Tab. 4.9</li> <li>• General revision of all chapters of the operating manual</li> </ul>

*Tab. 1.1.*

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## 2 - GENERAL NOTES

### 2.1 - MANUFACTURER'S DETAILS

<b>Manufacturer</b>	PIETRO FIORENTINI S.P.A.
<b>Address</b>	Via Enrico Fermi, 8/10 36057 Arcugnano (VI) - ITALY <b>Tel. +39 0444 968511</b> <b>Fax +39 0444 960468</b> <b>www.fiorentini.com</b> <b>sales@fiorentini.com</b>

Tab. 2.2.

### 2.2 - PRODUCT DATA

<b>Device</b>	DIAPHRAGM GAS METER
<b>Series</b>	RS 2.0 RST 2.0
<b>Possible versions</b>	<ul style="list-style-type: none"> <li>• G4</li> <li>• G6</li> </ul>

Tab. 2.3.

### 2.3 - REGULATORY FRAMEWORK

PIETRO FIORENTINI S.P.A., based in Arcugnano (Italy) - Via E. Fermi, 8/10, declares that the RS 2.0 series units covered by this manual have been designed, manufactured, tested and checked in accordance with:

- the requirements of Directive 2014/32/EU
- the requirements of the EN 1359/2017 standards

#### **PLEASE NOTE:**

**The original version of the Declaration of Conformity can be delivered with the unit and this manual if required.**

### 2.4 - SALES CONTACTS

<b>Company</b>	Fiorentini Deutschland GmbH
<b>Address</b>	An der Kulturhalle 7 65529 Waldems-Steinfischbach <b>Tel. +49 6087 9888 0</b> <b>Fax +49 6087 9888 29</b> <b>www.fiorentini-deutschland.com</b> <b>anfrage@fiorentini.com</b>

Tab. 2.4.

## 2.5 - WARRANTY

PIETRO FIORENTINI S.P.A. warrants that the equipment is manufactured with the best materials and quality workmanship and meets the quality requirements, specifications and performance stated in the purchase order.

The warranty will be void and null and PIETRO FIORENTINI S.P.A. shall not be held liable for the following damage and/or malfunctions:

- acts or omissions of the buyer or end user or any of their transport companies, employees, agents or third parties or bodies;
- in the event that the purchaser or a third party makes changes to the equipment supplied by PIETRO FIORENTINI S.p.A. without the prior written approval of PIETRO FIORENTINI S.p.A.;
- in the event of non-compliance by the purchaser with the instructions in this manual as provided by PIETRO FIORENTINI S.p.A..



### PLEASE NOTE:

**The warranty conditions are specified in the trade agreement.**

## 2.6 - RECIPIENT, DELIVERY AND STORAGE OF THE MANUAL

The manual is intended for the responsible qualified operator who is authorised to use and manage the unit throughout its service life.

It contains the information necessary to properly use the unit and, as a result, keep its functional and qualitative features unchanged over time, as well as instructions for correct and safe use.



### WARNING!

**Do not make any changes to these operating instructions.**

**PIETRO FIORENTINI S.p.A. shall not be held liable for any damage to people, animals and property caused by failure to adhere to the warnings and operating instructions provided in this manual.**

## 2.7 - SYMBOLS IN THE MANUAL

Symbol	Designation
	This symbol refers to important safety instructions for the personnel and/or the unit.
	This symbol refers to important information about staff safety. It is intended for safe use.
	This symbol refers to the obligation to read the operating manual. It is essential that the personnel read (and understand) the operating instructions and directions provided for the unit before working with or on it.

Tab. 2.5.

### HAZARD!

**This signal word refers to an imminent hazard. If not avoided, the result will be death or most severe injury.**

### WARNING!

**This signal word refers to a potential imminent hazard. If not avoided, death or most severe injury can result.**

### CAUTION!

**This signal word refers to a potential imminent hazard. If not avoided, minor or slight injury can result.**

### PLEASE NOTE:

**This signal word refers to a potential harmful situation. If not avoided, the system or something close to it can be damaged.**

## 2.8 - PROFESSIONAL STAFF

All the work to be carried out may only be performed by qualified staff.

Please abide by the national regulations and guidelines of the gas supply company applicable to installation and operation. For Germany, the valid DVGW worksheet G600 (DVGW-TRGI) applies.



## 3 - SAFETY

### 3.1 - GENERAL SAFETY INSTRUCTIONS

#### **WARNING!**

The unit described in this operating manual is:

- a pressurised unit for pressurised systems
- normally installed in systems carrying flammable gases (e.g.: natural gas).

#### **WARNING!**

If the gas used is a flammable gas, the installation area of the unit is defined as a "Hazardous area" because residual risks of explosive atmospheres can arise.

In the "Hazardous Area" and in close proximity:

- no effective ignition sources shall be present
- smoking is not allowed.

#### **CAUTION!**

Authorised employees may not, on their own initiative, perform operations that do not fall within their remit.

Never work on the unit:

- under the influence of stimulating substances such as alcohol.
- under the influence of medication that can prolong reaction times.

#### **PLEASE NOTE:**

**The employer is required to train and inform workers about the conduct to be observed during work and the equipment to be used.**

Before installation or commissioning, the authorised personnel shall:

- Adhere to the safety instructions for the installation site where the equipment is to be operated.
- Provide the necessary operating licences required.
- Equip themselves with the necessary personal protective equipment.
- Ensure that required protective devices and safety instructions are properly in place in the work area.

### 3.2 - SAFETY MEASURES

The following is a list of obligations and prohibitions to be adhered to for the safety of employees:

- read the operating manual carefully and thoroughly;
- check that the downstream equipment is properly dimensioned according to the required performance of the unit under the actual conditions of use;
- before installing the unit, be sure to read the data on the rating plates and in the operating manual;
- avoid violent shocks and vibrations that could damage the unit and cause the pressurised liquid to escape.

Do not:

- work near open flames or bring open flames near the work area;
- smoke near the unit or while working;
- use the unit with parameters other than those indicated on the rating plate;
- use the unit outside the operating temperature range specified in this manual;
- install or use the unit in environments other than those specified in this manual.

#### **WARNING!**

**All work may only be carried out by an approved installation contractor in accordance with DVGW worksheet G600 (DVGW-TRGI). Making technical changes to the unit is not allowed.**

### 3.3 - SAFETY PICTOGRAMS

The following safety pictograms can be displayed on PIETRO FIORENTINI S.p.A.'s equipment and/or packaging:

Symbol	Designation
	This symbol refers to an ELECTRICAL HAZARD.
	This symbol refers to a GENERAL HAZARD.

Tab. 3.6.

#### **HAZARD!**

**Do not remove the safety pictograms on the unit.**

**The user shall replace any safety pictograms that are illegible due to wear, removal or tampering.**

## 4 - DESCRIPTION AND OPERATION

### 4.1 - PRODUCT DESCRIPTION

The RS 2.0 and RST 2.0 series diaphragm gas meters are designed for domestic gas measurement and used to measure the operating volume or the temperature-compensated gas volume.

The gas meter consists of a measuring unit divided into two chambers. The chambers contain a waterproof, flexible plastic membrane, which performs a translatory movement due to the difference between the inlet and outlet pressure.

The housing is filled and the gas flows through the first uncovered space of the measuring unit, whereby:

- the chamber is filled;
- the distribution valve is moved to the next position.

The movement is transmitted to the outside through a transmission system. This system connects the measuring mechanism with the roller counter of the mechanical counter.

The measuring mechanism is housed in a sturdy sealed metal casing. The casing halves are not assembled using screw connections, but by gluing and folding.

RS 2.0	RST 2.0
measure the gas volume at ambient conditions	measure the converted gas volume, based on temperature

Tab. 4.7.

The gas meters can be used for natural gas, air, propane, butane, nitrogen, natural gas-hydrogen mixtures as well as for all non-aggressive gases (in accordance with DVGW G260).

## 4.2 - TECHNICAL DATA

	G4		G6	
Measurement space volume	2.0 dm <sup>3</sup>			
Q <sub>max</sub>	6 m <sup>3</sup> /h		10 m <sup>3</sup> /h	
Q <sub>min</sub>	0.04 m <sup>3</sup> /h		0.06 m <sup>3</sup> /h	
Max. operating pressure	0.5 barg			
Accuracy Class	1.5			
High temperature resistance	0.1 bar			
Gas temperature range	<b>RS 2.0</b> -25 ÷ +55 °C	<b>RST 2.0</b> -10 ÷ +40 °C	<b>RS 2.0</b> -25 ÷ +55 °C	<b>RST 2.0</b> -10 ÷ +40 °C
Ambient temperature range	-25 ÷ +55 °C			

Tab. 4.8.

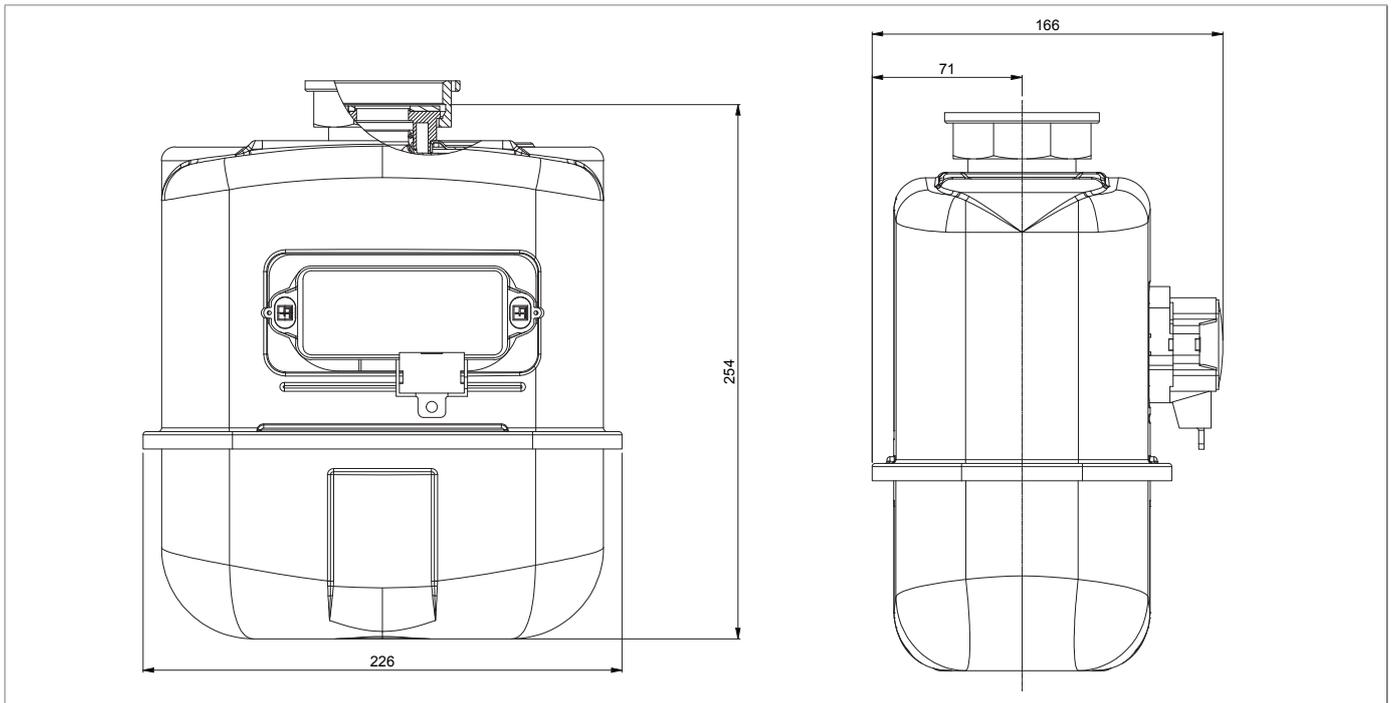
	Single-pipe	Double-pipe	
Connections	2"	1" ¼	5/4"
DN threads	DN 25	DN 25	DN 32
Distance between connections	-	250 mm	280 mm
<b>Other sizes on request</b>			
Max. tightening torque (Gasfalit)	115 Nm	75 Nm	100 Nm
Min. tightening torque (Gasfalit)	95 Nm	55 Nm	80 Nm
Max. tightening torque (Refalit)	65 Nm	55 Nm	65 Nm
Min. tightening torque (Refalit)	45 Nm	25 Nm	45 Nm

Tab. 4.9.

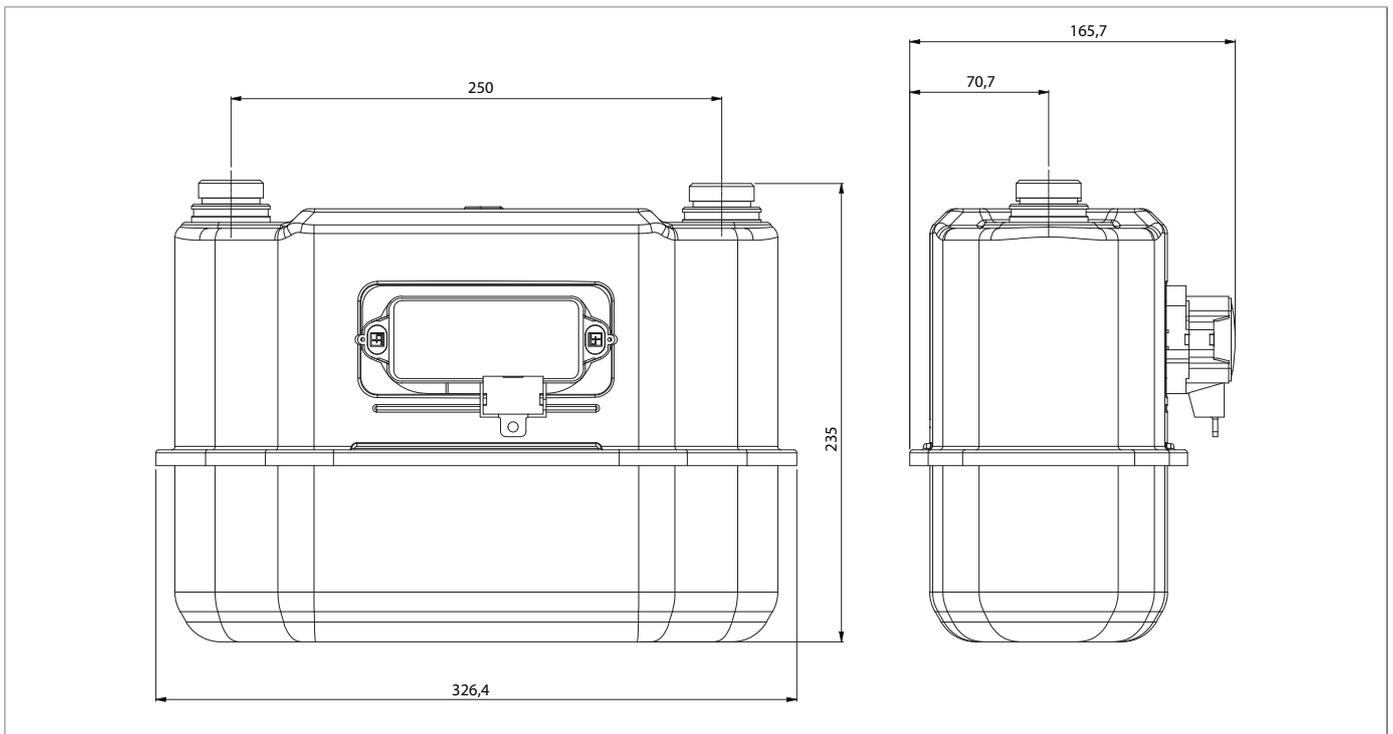
The table shows tightening torques and screw connections based on different sealing materials.

After tightening the seal, check the connection for tightness/serviceability. Ensure proper torsion resistance (single-spout counter). Gas meters must be installed free of voltage.

### 4.3 - GAS METER DIMENSIONS AND WEIGHT



Picture 4.1. Single-pipe size



Picture 4.2. Double-pipe size 250mm

Weight [kg]	
Single-pipe	2.7
Double-pipe 250 mm	2.9

Tab. 4.10.



## 5 - INSTALLATION AND COMMISSIONING

### 5.1 - GENERAL NOTES

#### WARNING!

The installation must be carried out by approved installation contractors in accordance with DVGW worksheet G600 (DVGW-TRGI) and in compliance with the applicable safety regulations.

To safely use the unit, please adhere to:

- the permissible ambient conditions
- the data on the rating plate.

Have all work carried out by a qualified gas specialist. Making technical changes to the unit is not allowed.

**PIETRO FIORENTINI S.p.A. shall not be held liable for any damage caused by improper installation of the unit and/or, in any case, deviating from the information in this manual.**

### 5.2 - PREREQUISITES FOR THE INSTALLATION

#### 5.2.1 - PERMISSIBLE ENVIRONMENTAL CONDITIONS

Install the unit in accordance with the following requirements:

##### Permissible environmental conditions

Min. ambient temperature during installation	- 25°C
Max. ambient temperature during installation	+ 55°C

Tab. 5.11.

#### WARNING!

**PIETRO FIORENTINI S.p.A. shall not be held liable for any damage and/or malfunctions due to installation in environments other than those permitted.**

### 5.3 - TESTS BEFORE INSTALLATION

The installation site must be suitable for the safe use of the unit.

The installation area of the unit must have lighting that ensures good visibility for the installer during installation.

Before installation, check whether:

- the installation area complies with the applicable safety regulations and is protected from any mechanical damage and installed away from heat sources or open flames, in a dry place without any external influences;
- the upstream and downstream pipes are at the same height and can bear the weight of the gas meter;
- the inlet and outlet connections of the unit are clean and undamaged;
- the inside of the inlet pipe is clean and free of machining residues such as welding slag, sand, paint residues, water, etc.

## 5.4 - INSTALLATION SAFETY INSTRUCTIONS

### WARNING!

Before starting installation, ensure that the upstream and downstream gas shut-off valves installed in the pipes are closed.

Installation can also be carried out in potentially explosive environments. This requires that all necessary preventive and protective measures be taken. Always comply with the regulations applicable at the installation site!

Smoking is not allowed in close proximity to the unit.

Before connecting, make sure that the maximum system pressure is lower than the maximum operating pressure allowed for the meter (0.5 bar).

Mount the gas meter in a horizontal position, not in direct contact with walls and above the floor.

When installing the unit:

- do not exert any mechanical stress on the inlet/outlet connections;
- Take protective measures against electrostatic discharges.

## 5.5 - INSTALLATION PROCEDURE

Work step	Contents
1	Place the unit in the prepared area, in the section of the pipe used for this purpose. <b>PLEASE NOTE:</b> <b>The gas flow direction is marked with an arrow on the meter casing.</b>
2	Place the gaskets between the connections of the pipe and the threaded connections of the unit.
3	Connect the upstream and downstream pipes to the unit. <b>PLEASE NOTE:</b> <ul style="list-style-type: none"> <li>• use suitable connections (if necessary);</li> <li>• tighten with suitable hand tools to a torque not exceeding the data given in table 4.11.</li> </ul>
4	Slightly open the upstream valve of the pipe to introduce pressure into the unit and check for tightness. <b>PLEASE NOTE:</b> <b>Do not open the valve too quickly and excessively! The internal components of the unit may be damaged.</b>
5	After the leak test, the unit is ready for use.

Tab. 5.12.

## 6 - DISASSEMBLY AND DISPOSAL

### 6.1 - GENERAL SAFETY INSTRUCTIONS

 **HAZARD!**

Ensure that there is no effective ignition source in the work area set up for the disassembly and/or disposal of the unit.

 **WARNING!**

Before disassembly and disposal, secure the unit and disconnect it from the power supply.

### 6.2 - DISASSEMBLY

 **CAUTION!**

Before disassembling the unit, completely drain the liquid in the reduction pipe and inside the unit.

 **PLEASE NOTE:**

For the disassembly procedure of the unit, please refer to the installation procedures (chap. 5 "Installation and commissioning") and proceed in reverse order.

### 6.3 - NECESSARY INFORMATION IN THE EVENT OF REASSEMBLY

 **PLEASE NOTE:**

In case of new installation after disassembly, please refer to chapter 5 "Installation and commissioning".

## 6.4 - DISPOSAL INFORMATION

### PLEASE NOTE:

Comply with the laws in force in the installation site.

In the event of unauthorised or improper disposal, the legislation in force in the country of installation shall be enforced.

Proper disposal prevents people and the environment from being harmed and fosters the reuse of valuable raw materials.



If the unit is removed, it shall not be disposed of with normal waste.

The unit shall be disposed of in accordance with the provisions of Italian Legislative Decree no. 49 of 14 March 2014 "Implementation of Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE)".

The unit is made of materials that can be recycled by specialised companies.  
For proper disposal of the unit, please refer to Tab. 6.13:

Work step	Contents
1	Prepare a wide and undisturbed working area in order to be able to carry out disassembly safely.
2	Separate the different components by material type for easier recycling through separate collection.
3	Have the materials in step 2 collected by a specialised company.

Tab. 6.13.

The unit in all its possible versions is made of the following materials:

Material	Disposal and recycling instructions
Plastic	Dismantle and dispose of separately. Recycle through the appropriate collection points.
Lubricants/oils	Collect and hand over to specialised and authorised collection and disposal centres.
Steel	Dismantle and dispose of separately. Recycle through the appropriate collection points.
Stainless steel	Dismantle and dispose of separately. Recycle through the appropriate collection points.
Aluminium	Dismantle and dispose of separately. Recycle through the appropriate collection points.
Pneumatic/electrical components	Disassemble for reuse. If they are still in good condition, or if possible, service and recycle.

Tab. 6.14.



