

# RB 2000

## Light Commercial & Commercial Regulator

### Applications

The RB 2000 regulator is designed for applications and for all installations with continuous consumption or rapid flow rate variations, such as burners, industrial ovens, boilers, etc. It is suitable for installation in cabinets, as a space saving regulator.

### Description

The RB 2000 regulator is a direct-acting, spring-loaded regulator (lever type) with a built-in relief valve and optional safety shut-off device.

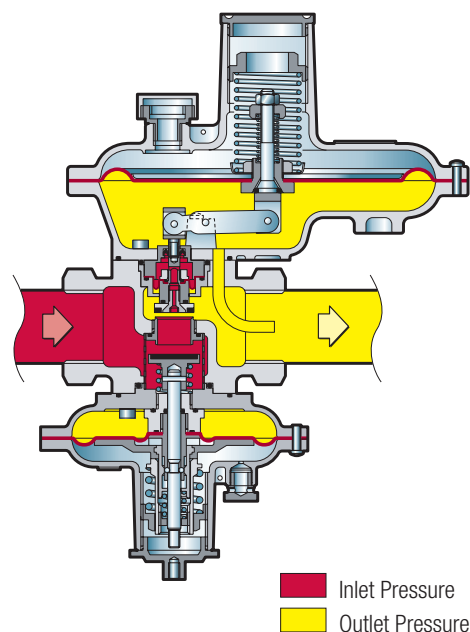
The balanced valve ensures constant outlet pressure when the upstream pressure varies. This eliminates changes to the orifice size arising from different inlet pressure ranges. The regulator is equipped with a built-in filter (filtration grade 0.5 mm).

The safety shut-off valve cuts the gas flow when the outlet pressure exceeds the set pressure (OPSO) or when it drops below the set value (UPSO). It remains closed until the valve is reset manually.

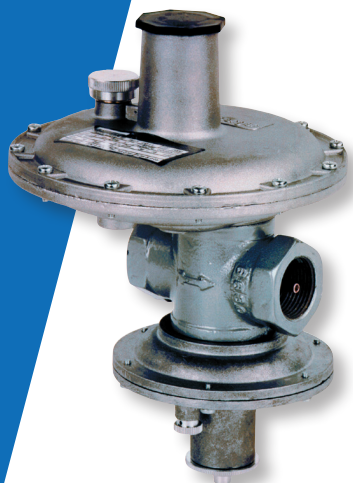
The relief valve avoids triggering the safety shut-off valve in case of thermal expansion, transient surges of pressure, and creep leaks from the regulator. The relief pressure is pre-set at the factory.

### Operational Diagram

> RBI 2312 Type



■ Inlet Pressure  
■ Outlet Pressure



> RB 2011 Pressure Regulator

- > *Balanced valve design eliminates inlet pressure effect*
- > *Rugged construction for durability*
- > *Rapid response to load changes*
- > *Built-in shut-off valve*
- > *Internal relief*
- > *Inlet strainer*

### Technical Features

|                             |                                                                                                                                          |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Maximum inlet pressure      | 10 bar                                                                                                                                   |
| Outlet pressure             | 5 mbar - 180 mbar - Extended range up to 750 mbar                                                                                        |
| Accuracy & lock-up pressure | Up to AC5 / up to SG 10                                                                                                                  |
| Operating temperature       | -20°C to +60°C                                                                                                                           |
| Ambient temperature         | -30°C to +60°C (body material)                                                                                                           |
| Acceptable gases            | Natural gas, town gas, propane, butane, air, nitrogen or any non-corrosive gas                                                           |
| Installation                | Horizontal or vertical                                                                                                                   |
| Safety devices              | Standard relief valve<br>Optional built-in safety shut-off valve:<br>- over-pressure shut-off (OPSO)<br>- under-pressure shut-off (UPSO) |
| Options                     | Internal or external sensing line<br>Monitor version                                                                                     |

### Sizes & Connections

|       |                                                            |
|-------|------------------------------------------------------------|
| Sizes | 1" x 1" - 1" x 1 1/2" only series RB 2600                  |
| Type  | Parallel internal thread according to ISO 228/1 or ISO 7/1 |

### Materials

|                |                                                      |
|----------------|------------------------------------------------------|
| Body           | Spheroidal graphite iron EN 1563 grade EN-GJS-400-15 |
| Head           | Die cast aluminium                                   |
| Internal parts | Stainless steel and brass                            |
| Seals          | Nitrile rubber                                       |
| Diaphragm      | Rubberized fabric                                    |

## Type Designation and Options

To specify the version of the RB 2000 regulator to be ordered, select the options and relevant codes from the table below.

| R | B | X | 2 | X | 1 | X | X  | X | Vars                                                |
|---|---|---|---|---|---|---|----|---|-----------------------------------------------------|
|   |   | E |   |   |   |   |    |   | External sensing line                               |
|   |   | I |   |   |   |   |    |   | Internal sensing line                               |
|   |   |   | 0 |   |   |   |    |   | Orifice (Ø 7 mm)                                    |
|   |   |   | 1 |   |   |   |    |   | Orifice (Ø 11 mm)                                   |
|   |   |   | 2 |   |   |   |    |   | Orifice (Ø 13 mm)                                   |
|   |   |   | 3 |   |   |   |    |   | Orifice (Ø 14 mm)                                   |
|   |   |   | 6 |   |   |   |    |   | Orifice (Ø 14 mm)                                   |
|   |   |   |   |   | 0 |   |    |   | Relief valve                                        |
|   |   |   |   |   | 1 |   |    |   | Relief valve + Over-pressure shut-off valve         |
|   |   |   |   |   | 2 |   |    |   | Relief valve + Over and low-pressure shut-off valve |
|   |   |   |   |   |   | M |    |   | Monitor version                                     |
|   |   |   |   |   |   |   | TR |   | Reduced head (see spring selection tables)          |

Example : RBE 2312/TR is a 2300 regulator with a balanced valve, an external sensing line, a reduced head and an OPSO / UPSO shut-off valve.

## Outlet Pressure Range

### Regulator

#### Spring characteristics:

d : wire diameter

De: external diameter

Lo : height

Lt : no. of spires

| Spring Code | Spring Characteristic |      |      |      | Spring Range                    |                            |                               |
|-------------|-----------------------|------|------|------|---------------------------------|----------------------------|-------------------------------|
|             | d                     | De   | Lo   | Lt   | 2000-2100-2200<br>Ø 180<br>mbar | 2300-2600<br>Ø 180<br>mbar | 2000-2600 TR<br>Ø 180<br>mbar |
|             | (mm)                  | (mm) | (mm) |      |                                 |                            |                               |
| 20564241    | 1.5                   | 30   | 80   | 9.5  | -                               | 6 - 10                     | -                             |
| 20564141    | 1.6                   | 30   | 80   | 9.5  | 5 - 12                          | 8 - 13                     | -                             |
| 20564142    | 1.8                   | 30   | 80   | 8.5  | 8 - 18                          | 13 - 25                    | -                             |
| 20564050    | 1.8                   | 30   | 100  | 10   | 15 - 25                         | 20 - 28                    | -                             |
| 20564051    | 2                     | 30   | 100  | 11.5 | 22 - 33                         | 26 - 39                    | -                             |
| 20564044    | 2.2                   | 30   | 80   | 9    | 20 - 50                         | 36 - 50                    | -                             |
| 20564042    | 2.5                   | 30   | 80   | 9    | 36 - 78                         | 46 - 80                    | 95 - 215                      |
| 20564043    | 2.5                   | 30   | 80   | 7    | 70 - 105                        | 80 - 110                   | 180 - 260                     |
| 20564143    | 3                     | 30   | 80   | 9    | 75 - 150                        | 100 - 180                  | 260 - 400                     |
| 20564144    | 3.5                   | 30   | 80   | 9    | -                               | -                          | 450 - 750                     |

### Safety Shut-off Valves

#### Over-Pressure Shut-off Springs (OPSO)

When Also Fitted  
With UPSO Spring\*

| Spring Code | Spring Characteristics |      |      |     | Spring Range               |                               | Spring Range               |                               |
|-------------|------------------------|------|------|-----|----------------------------|-------------------------------|----------------------------|-------------------------------|
|             | d                      | De   | Lo   | Lt  | 2011-2611<br>Ø 120<br>mbar | 2011-2611 TR<br>Ø 120<br>mbar | 2012-2612<br>Ø 120<br>mbar | 2012-2612 TR<br>Ø 120<br>mbar |
|             | (mm)                   | (mm) | (mm) |     |                            |                               |                            |                               |
| 20563022    | 1.5                    | 25   | 35   | 5.5 | 20 - 60                    | -                             | 28 - 60                    | -                             |
| 20563023    | 1.7                    | 25   | 35   | 5.5 | 30 - 90                    | 90 - 130                      | 40 - 90                    | 90 - 130                      |
| 20563014    | 1.9                    | 25   | 35   | 5.5 | 60 - 130                   | 120 - 180                     | 70 - 130                   | 120 - 180                     |
| 20563124    | 2.2                    | 25   | 35   | 5.5 | 70 - 220                   | 160 - 330                     | 120 - 220                  | 160 - 330                     |
| 20563121    | 2.5                    | 25   | 35   | 5.5 | 150 - 400                  | 300 - 600                     | 220 - 420                  | 300 - 600                     |
| 20563115    | 3                      | 25   | 35   | 5.5 | -                          | 580 - 1000                    | -                          | 580 - 1000                    |

\* the space available for the OPSO spring is reduced by the UPSO spring assembly

#### Under-Pressure Shut-off Springs (UPSO)

| Spring code | Spring Characteristics |      |      |     | Spring Range               |                               |
|-------------|------------------------|------|------|-----|----------------------------|-------------------------------|
|             | d                      | De   | Lo   | Lt  | 2012-2612<br>Ø 120<br>mbar | 2012-2612 TR<br>Ø 120<br>mbar |
|             | (mm)                   | (mm) | (mm) |     |                            |                               |
| 20560522    | 0.7                    | 10   | 20   | 7   | 4 - 14                     | -                             |
| 20560511    | 0.8                    | 10   | 20   | 7   | 10 - 25                    | -                             |
| 20560515    | 0.8                    | 10   | 30   | 10  | 20 - 27                    | -                             |
| 20560518    | 0.9                    | 10   | 30   | 10  | 37 - 45                    | -                             |
| 20560516    | 1                      | 10   | 30   | 10  | -                          | 26 - 57                       |
| 955-201-17  | 0.9                    | 10.4 | 28   | 7   | -                          | 13 - 50                       |
| 20560520    | 1                      | 10.3 | 25   | 7.5 | 45 - 75                    | -                             |
| 20560521    | 1.3                    | 15   | 40   | 9.5 | -                          | 60 - 90                       |
| 20560517    | 1.2                    | 10   | 30   | 10  | -                          | 85 - 170                      |
| 20560519    | 1.4                    | 10   | 30   | 10  | -                          | 150 - 300                     |

### Relief Valve

The built-in relief valve is set 15 mbar (head 180) or 50 mbar (head 180 TR) above the outlet pressure setting. Other settings on request.

## Flow Capacity

| Inlet Pressure                    | Capacities in m³/h at Standard Conditions<br>Outlet Pressure Setting |         |          |          |          |
|-----------------------------------|----------------------------------------------------------------------|---------|----------|----------|----------|
| RBI 2012 - 1" x 1" (with SSV)     | 20 mbar                                                              | 50 mbar | 100 mbar | 300 mbar | 400 mbar |
| 0.35 bar                          | 25                                                                   | 20      | 15       | -        | -        |
| 0.5 bar                           | 35                                                                   | 28      | 22       | 20       | -        |
| 0.7 bar                           | 35                                                                   | 30      | 24       | 22       | 18       |
| 1 bar                             | 35                                                                   | 27      | 25       | 22       | 20       |
| 1.5 bar                           | 32                                                                   | 28      | 25       | 23       | 23       |
| 2 bar                             | 30                                                                   | 30      | 28       | 25       | 22       |
| 4 bar                             | 30                                                                   | 32      | 30       | 26       | 25       |
| 5 bar                             | 28                                                                   | 28      | 26       | 25       | 25       |
| 8 bar                             | 25                                                                   | 24      | 22       | 22       | 20       |
| 10 bar                            | 25                                                                   | 25      | 24       | 20       | 20       |
| RBI 2112 - 1" x 1" (with SSV)     | 20 mbar                                                              | 50 mbar | 100 mbar | 300 mbar | 400 mbar |
| 0.35 bar                          | 30                                                                   | 25      | 20       | -        | -        |
| 0.5 bar                           | 40                                                                   | 30      | 25       | 22       | -        |
| 0.7 bar                           | 40                                                                   | 32      | 30       | 26       | 22       |
| 1 bar                             | 45                                                                   | 60      | 68       | 55       | 45       |
| 1.5 bar                           | 45                                                                   | 56      | 65       | 65       | 41       |
| 2 bar                             | 40                                                                   | 36      | 32       | 28       | 27       |
| 4 bar                             | 38                                                                   | 35      | 32       | 30       | 27       |
| 5 bar                             | 35                                                                   | 38      | 35       | 32       | 30       |
| 8 bar                             | 35                                                                   | 36      | 36       | 34       | 34       |
| 10 bar                            | 35                                                                   | 37      | 35       | 33       | 33       |
| RBI 2212 - 1" x 1" (with SSV)     | 20 mbar                                                              | 50 mbar | 100 mbar | 300 mbar | 400 mbar |
| 0.35 bar                          | 35                                                                   | 30      | 28       | -        | -        |
| 0.5 bar                           | 45                                                                   | 35      | 32       | 30       | -        |
| 0.7 bar                           | 55                                                                   | 42      | 38       | 35       | 32       |
| 1 bar                             | 60                                                                   | 48      | 48       | 46       | 45       |
| 1.5 bar                           | 60                                                                   | 52      | 50       | 48       | 45       |
| 2 bar                             | 58                                                                   | 58      | 55       | 52       | 50       |
| 4 bar                             | 60                                                                   | 60      | 58       | 55       | 55       |
| 5 bar                             | 65                                                                   | 64      | 64       | 62       | 60       |
| 8 bar                             | 65                                                                   | 65      | 63       | 62       | 60       |
| 10 bar                            | 65                                                                   | 64      | 62       | 62       | 60       |
| RBI 2312 - 1" x 1" (with SSV)     | 20 mbar                                                              | 50 mbar | 100 mbar | 300 mbar | 400 mbar |
| 0.35 bar                          | 35                                                                   | 36      | 32       | -        | -        |
| 0.5 bar                           | 65                                                                   | 60      | 62       | 65       | -        |
| 0.7 bar                           | 65                                                                   | 62      | 60       | 55       | 55       |
| 1 bar                             | 65                                                                   | 65      | 70       | 60       | 53       |
| 1.5 bar                           | 65                                                                   | 64      | 64       | 65       | 61       |
| 2 bar                             | 75                                                                   | 80      | 90       | 85       | 70       |
| 4 bar                             | 70                                                                   | 68      | 65       | 62       | 59       |
| 5 bar                             | 68                                                                   | 70      | 65       | 63       | 60       |
| 8 bar                             | 65                                                                   | 65      | 60       | 58       | 55       |
| 10 bar                            | 65                                                                   | 62      | 55       | 52       | 50       |
| RBI 2612 - 1" x 1 1/2" (with SSV) | 20 mbar                                                              | 50 mbar | 100 mbar | 300 mbar | 400 mbar |
| 0.35 bar                          | 38                                                                   | 35      | 30       | -        | -        |
| 0.5 bar                           | 65                                                                   | 60      | 55       | 52       | -        |
| 0.7 bar                           | 70                                                                   | 68      | 65       | 63       | 60       |
| 1 bar                             | 110                                                                  | 110     | 117      | 95       | 87       |
| 1.5 bar                           | 110                                                                  | 105     | 105      | 115      | 110      |
| 2 bar                             | 105                                                                  | 104     | 130      | 120      | 110      |
| 4 bar                             | 80                                                                   | 80      | 78       | 80       | 75       |
| 5 bar                             | 75                                                                   | 80      | 78       | 75       | 75       |
| 8 bar                             | 72                                                                   | 70      | 65       | 60       | 58       |
| 10 bar                            | 70                                                                   | 65      | 62       | 60       | 55       |

Maximum capacities at 10% drop.

- > The values given are those for appropriately sized pipe work.
- > The flow capacity of the regulator without a safety shut-off device is 5% higher.

## Wide-open Flow Coefficient

The wide-open flow capacity may be calculated using the following formula:

- > In critical flow conditions: If  $(P_u/P_d) > 2$   $Q = K_G P_u / 2$
- > In non-critical flow conditions: If  $(P_u/P_d) \leq 2$   $Q = K_G \sqrt{P_d(P_u - P_d)}$

| Orifice Size | 7 mm | 11 mm | 13 mm | 14 mm |
|--------------|------|-------|-------|-------|
| $K_G$        | 40   | 100   | 140   | 160   |

### Standard conditions:

- Absolute pressure of 1.013 bar
- Temperature of 15°C

### Correction factor for non-natural gas applications:

The flow rates are indicated for a 0.6 specific gravity gas.

To determine the volumetric flow rate for gases other than natural gas, multiply or calculate the values in the capacity tables using the sizing equations with a correction factor.

The table below lists correction factors for some common gases:

| Gas type              | Specific gravity | Correction factor |
|-----------------------|------------------|-------------------|
| Air                   | 1.00             | 0.77              |
| Butane                | 2.01             | 0.55              |
| Carbon dioxide (dry)  | 1.52             | 0.63              |
| Carbon monoxide (dry) | 0.97             | 0.79              |
| Natural gas           | 0.60             | 1.00              |
| Nitrogen              | 0.97             | 0.79              |
| Propane               | 1.53             | 0.63              |
| Propane-Air mix       | 1.20             | 0.71              |

Specific gravity or relative density  
(air = 1, non-dimensional value)

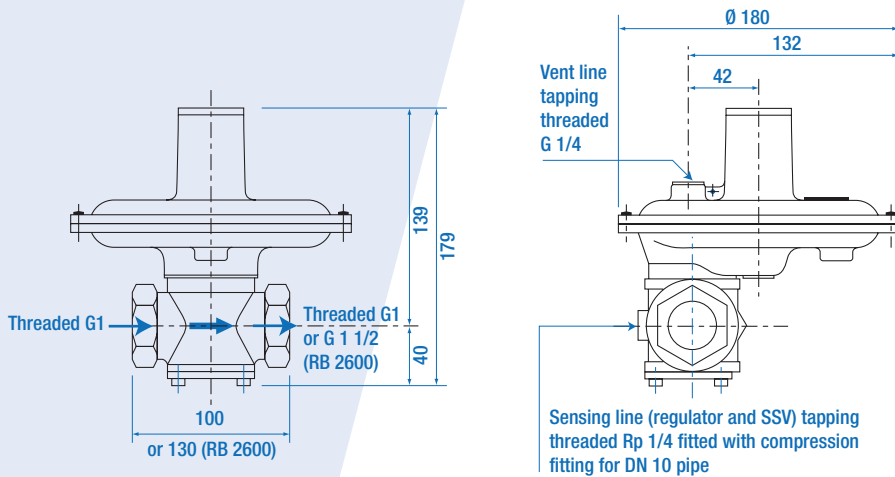
Use the following formula to calculate the correction factor for gases not listed above. In the formula, d is the specific gravity of the gas.

$$\text{Correction factor} = \sqrt{\frac{0.6}{d}}$$

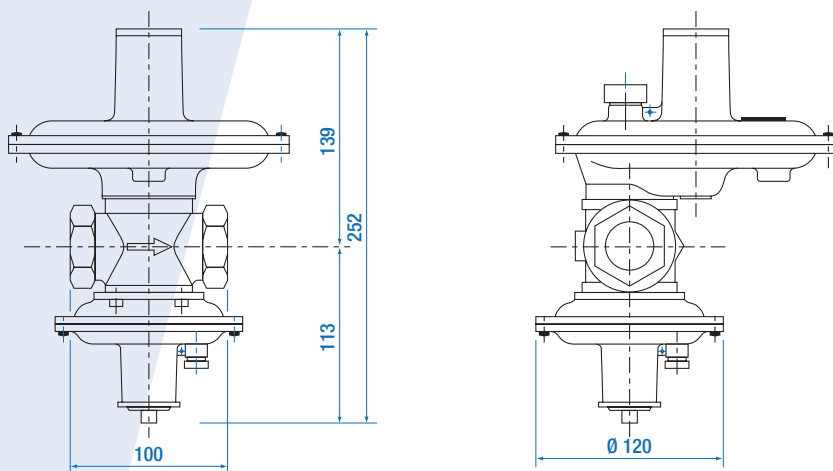
### where:

Q = maximum flow capacity (Sm³/h)  
 $P_u$  = absolute inlet pressure in bar  
 $P_d$  = absolute outlet pressure in bar  
 $K_G$  = flow coefficient

## Overall Dimensions (mm)



> **RB 2000 Without Safety Shut-off Valve - Weight 2 kg**



> **RB 2000 With Safety Shut-off Valve - Weight 2.5 kg**

## Installation

- > The RB 2000 regulator can be mounted in any horizontal or vertical position
- > RB 2000 can be used as monitor regulator, upstream from an active regulator.  
In that case, the external sensing line must be connected downstream from the regulator to be controlled.

### Information to be specified when ordering:

- Regulator type code
- Minimum and maximum inlet pressures
- Outlet pressure range
- Outlet pressure setting
- Maximum flow rate
- OPSO setting\*
- UPSO setting\*
- \* (if requested)

## About Itron Inc.

Itron Inc. is a leading technology provider to the global energy and water industries. Our company is the world's leading provider of metering, data collection and utility software solutions, with nearly 8,000 utilities worldwide relying on our technology to optimize the delivery and use of energy and water. Our products include electricity, gas and water meters, data collection and communication systems, including automated meter reading (AMR) and advanced metering infrastructure (AMI); meter data management and related software applications; as well as project management, installation, and consulting services. To know more, start here: [www.itron.com](http://www.itron.com)

For more information, contact your local sales representative or agency.

**Itron**

**Itron GmbH.**  
Hardeckstraße 2  
D-76185 Karlsruhe  
Germany  
Phone: +49-721 5981 0  
Fax: +49-721 5981 189  
[www.itron.com](http://www.itron.com)