



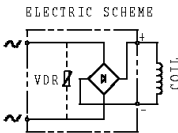
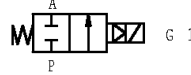
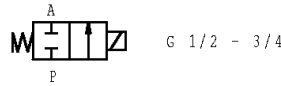
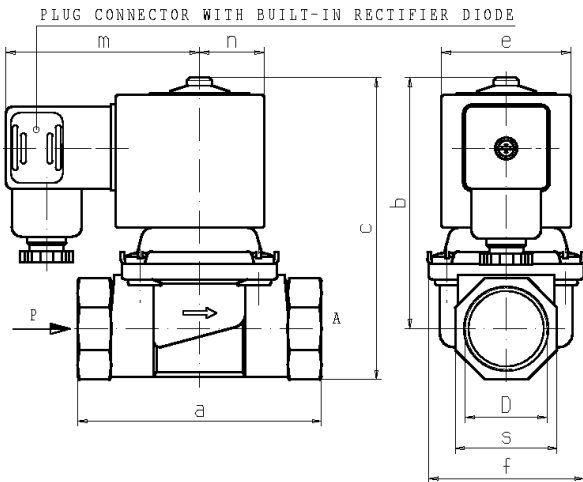
# 2/2 - SOLENOID VALVE – Normally closed (N.C.)

## Series L161 - Coil Z111A - Z911E - G1/2 - 3/4 - 1

# L161

## SILENT MODEL

ISO 9001



| D     | a   | b    | c     | e    | f    | m    | n    | s  |
|-------|-----|------|-------|------|------|------|------|----|
| G 1/2 | 66  | 75,5 | 89    | 42   | 40   | 56,5 | 21   | 27 |
| G 3/4 | 79  | 90   | 106,5 | 48,6 | 50,2 | 60   | 24,3 | 33 |
| G 1   | 105 | 100  | 121   | 48,6 | 71   | 60   | 24,3 | 42 |

**FEATURES** - Direct acting solenoid valves (ports size G1/2 and G 3/4) or forced lifting action (port size G1). Designed so to comply with the requirements of European Standards EN 161 Class "A" group 2 and suitable to shut-off combustible gases I12H3B/P, I12E+3+, I2E+, I12H3+, I12L3B/P, I12ELL3B/P, I3+. In conformity with the essential requirements of gas Directive 90/396/CEE (certificate n° BG/EC-87/98/85).

**MOUNTING** - Vertical with coil upwards: see the relevant instructions of use and maintenance.

**VALVE** - Brass body. Internal parts in stainless steel and brass. Components subject to wearing caused by sliding friction are treated by chemical nickel-plating (Ni-P). Sealings as per table. Medium temperature from -10°C to +60°C. Opening /Closing time = 30 - 50ms.

**COIL** - Rated for continuous duty. Coil in class "F" (+155°C) wound by class "H" wires (+180°C); vacuum impregnated by polyester resin and encapsulated into glass fibre reinforced PBT (polybutylene-terephthalate), assembled with a plug connector with built-in rectifier diode and VDR protection (see the above scheme).

Ambient temperature from -10°C to +60°C.

Standard voltages 24-110-220-230V/50-60Hz 120-240V/60Hz.

Voltage tolerance +10% -15%

Protection degree IP65 as per EN 60529 if the coil is duly fitted with its plug connector.

| Port size ISO 228 | Orifice Size (mm) | Min P (bar) | Max pressure (bar) | Kv (m³/h) | Series and type |       | Absorption (W) | Sealing | Notes | Weight (kg) |
|-------------------|-------------------|-------------|--------------------|-----------|-----------------|-------|----------------|---------|-------|-------------|
|                   |                   |             | Gases AC           |           | Valve           | Coil  |                |         |       |             |
| G 1/2             | 13                | 0           | 0,25               | 2,3       | L161 B07        | Z111A | 13             | NBR     | 1     | 0,600       |
| G 3/4             | 18                |             | 0,20               | 4,3       | L161 B08        | Z911E | 21             |         |       | 1,020       |
| G 1               | 22                |             | 0,40               | 8         | L161 B09        |       |                |         | 2     | 1,430       |

- NOTES**
- Sealings: NBR = Nitrile-butylene elastomer (certified in accordance with DIN 3535).
  - Valves suitable to withstand a back-pressure underneath the sealing equivalent to 150 mbar (0,15 bar)
  - 1 - Direct operated valve.
  - 2 - Forced lifting action valve: the flow rating value is valid for a  $\Delta \geq 50$  mbar. In lower  $\Delta P$  conditions the flow value decreases as compared with the rated value (see flow graph on the back side).

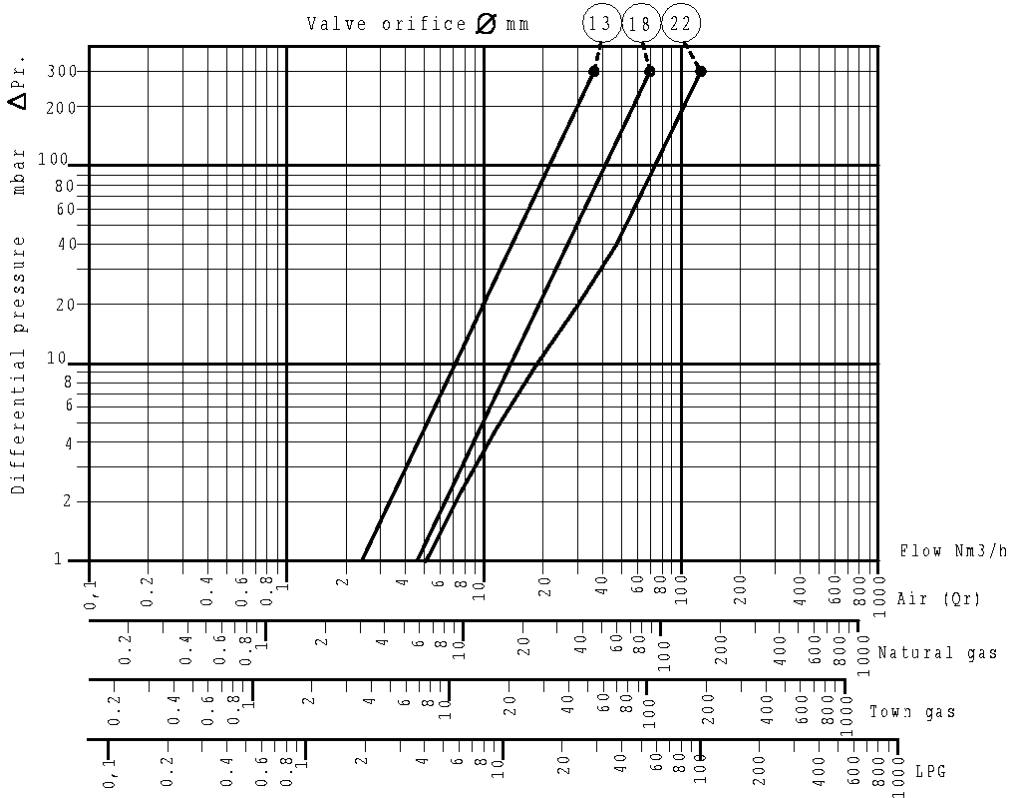
## CHOICE OF THE VALVE MODEL

The solenoid valves of L161 series are similar as to the applications features, and differ only because of the size, seat diameter and flow rate . The flow rate is governed by the following formula:

$$Q = 28 \times K_v \sqrt{\frac{P_2 \times (P_1 - P_2)}{\delta}}$$

- Kv = Flow rate factor in m<sup>3</sup>/h (see the technical specifications)
- Q = Flow in Nm<sup>3</sup>/h
- P2 = Absolute pressure in bar at the outlet.
- P1 = Absolute pressure in bar at the inlet.
- P1 - P2 = Differential pressure in bar (ΔP).
- δ = Relative density of gas (air =1) as at the operating temperature.

The graph shows the variation of the flow rates for each model of valve: such variations are depending on the ΔP by using air as medium (δ = 1), at relative inlet pressure of 250 mbar (absolute pressure Pr = 1,250 bar).



Some simplifications enable with acceptable approximation to get from the above graph the values of real performances in use. See the examples below:

|  |  |   |   |
|--|--|---|---|
| <p>A = Under the same conditions of ΔP and inlet pressure to determine the flow of a gas different from air</p> $Q_{e.} = \frac{Q_r}{\sqrt{\delta_c}}$ | <p>B = Under the same conditions of ΔP to determine the flow depending on the inlet pressure</p> $Q_{e.} = Q_r \sqrt{\frac{P_e}{P_r}}$ | <p>C = Under the same conditions of flow to determine how the differential pressure varies when the inlet pressure changes:</p> $\Delta P_{e.} = \frac{\Delta P_r \times P_r}{P_e}$ | <p>Relative density of main gases in normal operating conditions:</p> <p>AIR = 1<br/>                 NATURAL GAS = 0,62<br/>                 TOWN GAS = 0,45<br/>                 LPG = 1,56</p> |
|--|--|---|---|

- |  |   |
|--|---|
| <p>Qr. = Air flow read on the graph</p> <p>Pr. = Reference absolute pressure of graph (1,250 bar)</p> <p>δr. = Gas density used in the graph (air = 1)</p> <p>ΔPr. = Differential pressure read on the graph</p> | <p>Qe. = Real flow of gas at operating conditions</p> <p>Pe. = Real absolute inlet pressure</p> <p>δe. = Density of gas in use</p> <p>ΔPe. = Differential pressure in use</p> |
|--|---|

NB - THE VALIDITY OF REPORTED DATA IS REFERRED TO THE DATE OF ISSUE. POSSIBLE UPDATING ARE AVAILABLE ON REQUEST



ISO 9001

The solenoid valves L 161 series have been designed and are produced by SIRAI Elettromeccanica specifically to shut-off combustible gases belonging to the families: I12H3B/P, I12E+3+, I2E+, I12H3+, I12L3B/P, I12ELL3B/P, I3+. These solenoid valves fulfil the requirements of the harmonized standard EN 161 and in the relevant context they are defined as:

- "A" class = the sealing capacity in back-pressure conditions is equal or higher than 150 mbar and it is not reduced by the inlet pressure of gas.
- Group 2 = solenoid valves suitable in all the situations outside and/or inside the user equipment without the need of any support.

As to the general features of these products please refer to relevant data sheet (e.g. operating pressure, temperatures range, energizing voltages and so on).

Since 1991 SIRAI Elettromeccanica is ISO 9001 assessed, tests the 100% of production and guarantees the full compliance of products with the specifications. Beside that SIRAI guarantees the compliance of solenoid valves with the directives 73/23 CEE and subsequent modification 93/68 CEE: such a compliance is certified by the CE marking which is printed on the products.

Despite of what above mentioned, it is of primary importance that the user follows very carefully some simple instructions about the installation, use and maintenance of the product so to guarantee the correct operation.

INSTALLATION

- The solenoid valves L161B07-B08-B09 must be installed in vertical position with the coil upwards and they can work only with the plug connector with a built-in rectifier diode, part of our supply.
- This solenoid valves are not fitted with any inlet filter: **it is essential to fit a filter at the inlet of the solenoid valve** so to prevent that solid particles larger than 1 mm diameter can penetrate into the solenoid valve. It is advisable the use of filters with 0,3 mm mesh or even smaller as well as to clean it regularly: if needed replace the filter.
- During the installation keep the maximum cleaning by avoiding to insert either tools or foreign bodies in the solenoid valve
- During the installation avoid to use either bending moments or torques higher than the ones here below stated

| PORT SIZE | TORQUE<br>Nm | BENDING MOMENT<br>Nm |
|-----------|--------------|----------------------|
| G 1/2"    | 50           | 70                   |
| G 3/4"    | 85           | 90                   |
| G 1"      | 125          | 160                  |

In no case the coil and/or the core tube can be used as handle for screwing the solenoid valve on the pipe: use always wrenches or other tools suitable for the flat faces provided on the valve body.

## MAINTENANCE L161B07 - B08 - B09

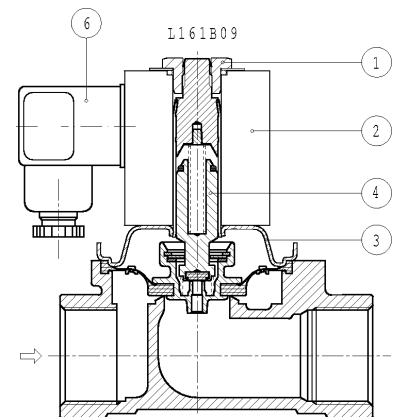
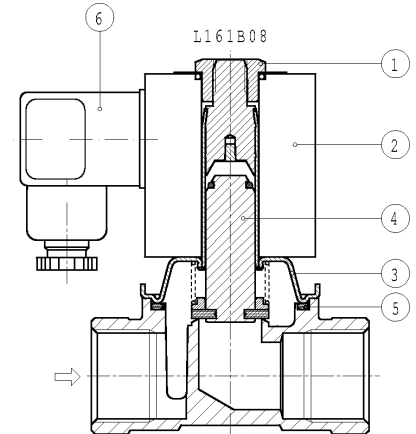
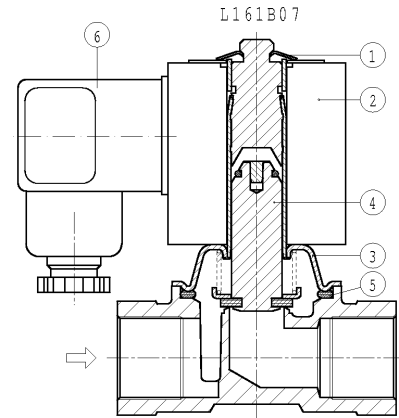
A good maintenance keeps reliability and functioning during the years. It is recommended to clean periodically the valve and to replace sealing elements as well as the parts subject to wearing.

It is recommended a careful inspection every 500.000 cycles by replacing the worn parts: these operations are more than sufficient to guarantee the good operation.

During the maintenance pay particular attention to the cleaning, always disconnect the power supply: don't energize the coil in any case unless it is correctly fitted on the complete valve.

Always use original SIRAI spare parts and don't modify arbitrarily any component of the valve.

Check carefully the integrity of the sealing components before re-assembling the valves.



- A) Disconnect the power supply to the coil
- B) Remove either the elastic washer or the fixing nut of the coil (1).
- C) Remove the coil (2).
- D) Unscrew the fixing screws (n°4 pcs.) of the core tube (3), check if it is internally worn, check the integrity of the internal surface of the plugnut: replace the core tube if needed.
- E) Check the conditions of gasket 5: replace it if needed.
- F) Check the wearing conditions of the core (4) on the flat surfaces, on the diameter of sliding and on the conical surface where is fitted the O-ring operating as a shock absorber: replace the core if needed.
- G) Clean carefully all the components and re-assemble the valve following contrarywise the a.m. instructions.
- H) Be sure the plug provided of diode rectifier it's well fitted on the coil before to energize the solenoid valve.

## SPARE PARTS L161B07 – B08 – B09

| Pos. | Description   | Type B07   | Type B08     | Type B09 |
|------|---|--|--------------|----------|
| 2    | Coil with plug connector with built-in rectifier diode: specify voltage and frequency | Z111A  | Z911E        | Z911E    |
| 3    | Core tube kit   | 2993901  | 3016701      | 3019301  |
| 4    | Core/sealing kit<br>Core return spring  | G2994601   | G3017201     | G3020601 |
| 5    | Gasket for core tube (10 pcs bag)   | GU2431000065   | GU2431000070 | -        |
| 6    | Plug connector with built-in rectifier diode  | GU4124000001 (220V-230V-240V c.a.)<br>GU4124000002 (110V-120V c.a.)<br>GU4124000003 (24V c.a.) |              |          |

The use of solenoid valves not in compliance with the specifications stated in the data sheet or the non observance of the instructions for use and maintenance release the manufacturer from any responsibility and/or damage caused by wrong operation of the device.

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