

# BOSS™

**AUTOMATIC NORMALLY CLOSED SOLENOID VALVE FOR GAS**

## **355AA**

**DN 200 - DN 250 - DN 300**

**P.max: 360 mbar**



EN

**MADE IN ITALY**

# INDICE - INDEX

	pag.
English .....	3
Drawings .....	9
Dimensions (table 1) .....	13
Spare actuators (table 2) .....	14
Diagram .....	15

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## 1.0 - GENERAL INFORMATION

This manual shows you how to safely install, operate and use the device.

The instructions for use **ALWAYS** need to be available in the facility where the device is installed.

**ATTENTION: installation/wiring/maintenance need to be carried out by qualified staff (as explained in section 1.3) using appropriate personal protective equipment (PPE).**

For any information pertaining to installation/wiring/maintenance or in any case problems that cannot be solved with the instructions, contact the manufacturer by using the address and phone numbers provided on the last page.

### 1.1 - DESCRIPTION

Normally closed automatic gas shut-off solenoid valve, which open when the actuator is electrically powered and close when the power is cut off. They can be controlled by pressure switches, thermostats, etc. and are intended for industrial use in industrial sites.

Built-in flow regulator with the option of adjustment the opening speed.

They can be equipped with CPI switches to control the valve's obturator position (closed) remotely. Further information regarding the CPI switch is available in 6.0.

Reference standards: EN 161 - EN 13611.

### 1.2 - KEY TO SYMBOLS



**DANGER:** Failure to observe this may cause damage to tangible goods.



**DANGER:** Failure to observe this may cause damage to tangible goods, to people and/or pets.



**ATTENTION:** Attention is drawn to the technical details intended for qualified staff.

### 1.3 - QUALIFIED STAFF

These are people who:

- Are familiar with product installation, assembly, start-up and maintenance;
- Know the regulations in force in the region or country pertaining to installation and safety;
- Have first-aid training.



### 1.4 - USING NON-ORIGINAL SPARE PARTS

- To perform maintenance or change parts (e.g. actuator, connector, etc.) **ONLY** manufacturer-recommended spare parts can be used. Using different parts not only voids the product warranty, it could affect the correct operation of the device.
- The manufacturer is not liable for malfunctions caused by unauthorised tampering or use of non-original spare parts.



### 1.5 - IMPROPER USE

- The product must only be used for the purpose it was built for.
- It is not allowed to use fluids other than those expressly specified.
- The technical data set forth on the rating plate must not, under any circumstances, be exceeded. The end user or installer is in charge of implementing proper systems to protect the device, which ensure the maximum pressure indicated on the rating plate is not exceeded.
- The manufacturer is not responsible for any damage caused by improper use of the device.

## 2.0 - TECHNICAL DATA

· Use	: non-aggressive gases of the three families (dry gases)
· Ambient temperature (TS)	: -20 ÷ +60°C
· Supply voltages (see table 2)	: 24 V/50 Hz - 110 V/50 Hz - 230 V/50 Hz*
· Supply voltage tolerance	: -15% ... +10%
· Electric wiring	: cable gland M20x1.5
· No. cycles/hour**	: ~20 (ON time 30s - OFF time 150s)
· Absorbed power	: see table 2
· Maximum operating pressure	: 360 mbar
· Total obturator opening time ( $t_a = 25^\circ\text{C}$ $V_n = 230\text{ V}$ )	: DN 200: 30s ± 20% - DN 250/DN300: 40s ± 20%
· Protection rating	: IP65
· Class	: A (DN 200) - B (DN 250 - DN 300)
· Mechanical strength	: Group 2
· Flanged connections that can be coupled to PN 16 flanges	: (DN 200 - DN 250 - DN 300) ISO 7005 / EN 1092-1
· ANSI 150 flanged connections	: on request
· In compliance with	: Directive EMC 2014/30/EU - Directive LVD 2014/35/EU RoHS II Directive 2011/65/EU

\* Only single-phase, the device does not work if powered with three-phase voltage.

## 2.1 - MODEL IDENTIFICATION

See Table 2 on page 14.

## 3.0 - COMMISSIONING THE DEVICE



### 3.1 - OPERATIONS PRIOR TO INSTALLATION

- It is necessary to close the gas upstream of the valve prior to installation;
- Make sure that the line pressure **DOES NOT EXCEED** the maximum pressure declared on the product label;
- Any protective caps (if any) must be removed prior to installation;
- Valve pipes and insides must be clear of any foreign bodies;
- 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;
- The safety regulations on handling loads in force in the country of installation must be complied with. If the device to be installed exceeds the weight allowed, suitable mechanical equipment and adequate slings must be used. Necessary precautions must be taken during the handling phases in order not to damage/ruin the external surface of the device.
- In accordance with EN 161, a suitable filter must be installed upstream of a gas closing safety device;
- With outdoor installation, it is advisable to provide a protective roof to prevent rain from damaging the electrical parts of the device.
- Prior to carrying out any electrical wiring operations, make sure that the mains voltage matches the supply voltage indicated on the product label;

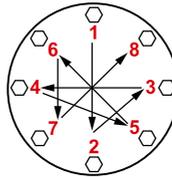


- Cut off power prior to proceeding with wiring;
- According to the plant geometry, check the risk of an explosive mixture arising inside the piping;
- If the solenoid valve is installed near other devices or as part of an assembly, compatibility between the solenoid valve and this other device must be evaluated beforehand;
- Provide protection against impacts or accidental contacts if the solenoid valve is accessible to unqualified personnel.

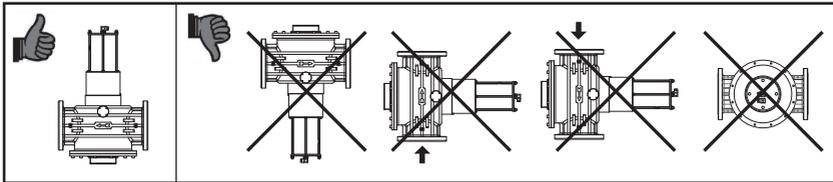


### 3.2 - INSTALLATION (see example in 3.4)

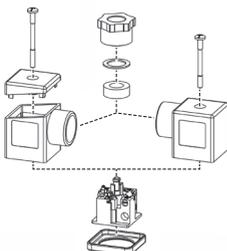
- Assemble the device by flanging it, with suitable seals, onto the plant with pipes whose flanges are consistent with the connection being attached. The gaskets must be free from defects and must be centred between the flanges;
- If, after installing the gaskets, there is still too much space in between, do not try to reduce said gap by excessively tightening the bolts of the device;
- The arrow, shown on the body (**16**) 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 the tightening stage;
- When tightening, be careful not to “pinch” or damage the gasket;
- Tighten the nuts or bolts gradually, in a “cross” pattern (see the example below);
- Tighten them, first by 30%, then by 60% and finally 100% of the maximum torque (see the table below according to EN 13611);
- Tighten each nut and bolt again clockwise at least once, until the maximum torque has been achieved uniformly;
- The device must be installed with the horizontal pipe and actuator facing upwards (see figures below);



Diameter	> DN 150
Max. torque (N.m)	160



- During installation, avoid debris or metal residues from getting into the device;
- To guarantee mechanical tension-free assembly, 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 resting only on the connections (threaded or flanged) of the individual devices;
- In any case, following installation, check the tightness of the plant;
- Wiring cannot have cables connected directly to the actuator. **ALWAYS and ONLY** use the connector identified or supplied by the manufacturer;
- Before wiring the connector (**30**), unscrew and remove the central screw (**32**). Use the designated cable terminals (see figures below). **NOTE:** The connector wiring (**30**) needs to be carried out by ensuring the product's IP65 protection rating;



- Wire the connector (30) with a 3x0.75mm<sup>2</sup> cable with external Ø 6.2 to 8.1 mm. The cable must feature a double sheath, suitable for outdoor use, with a minimum voltage of 500V and a temperature of at least 90°C;
- Connect terminals 1 (L) and 2 (N) to the power supply and the earth cable to the terminal  $\perp$  of the connector marked with "SOLENOID VALVE POWER" (see diagram 1 - fig. 5). **IMPORTANT:** respect the polarity with 24 Vdc power supplies: (normal connectors: pin1 connector = ⊕ / pin2 connector = ⊖);
- Secure the connector (30) by tightening (recommended tightening torque 0.4 N.m ± 10%) the centre screw (32);
- The valve needs to be earthed either through the pipe or through other means (e.g. cable jumpers).

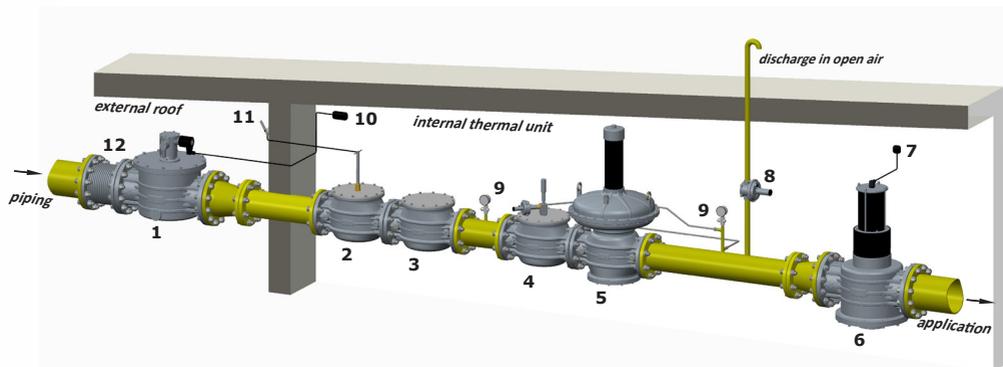
### 3.3 - INSTALLATION IN PLACES WHERE THERE IS THE RISK OF EXPLOSION (DIRECTIVE 2014/34/EU)

The solenoid valve is not suitable for use in potentially explosive areas.

### 3.4 - GENERIC EXAMPLE OF AN INSTALLATION

- |  |  |
|--|--|
| 1. 355AM manual reset solenoid valve                       | 7. Solenoid valve control device           |
| 2. Jerk ON/OFF valve                                       | 8. Relief valve                            |
| 3. Gas filter  | 9. Pressure gauge and relative button      |
| 4. OPSO shut off valve                                     | 10. Gas detector                           |
| 5. Pressure regulator                                      | 11. Remote jerk ON/OFF valve lever control |
| <b>6. 355AA automatic solenoid valve with fast opening</b> | 12. Expansion joint/anti-vibration mount   |

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#### 4.0 - FIRST START-UP



- Before start-up make sure that all of the instructions on the rating plate, including the direction of flow, are observed;
- **IMPORTANT:** During the first start-up, energise the valve electrically for about 15-20 seconds and de-energise it. Repeat the step at least 4-5 times to ensure the Air and Oil inside the hydraulic circuit are separated.
- After having gradually pressurised the plant, check the tightness and operation of the solenoid valve by supplying/ cutting off the power.



#### 4.1 - 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 solenoid valve;

The final user or installer is responsible for defining the frequency of these checks based on the severity of the service conditions.



## 4.2 - ADJUSTMENTS



• The flow adjustment must be done with the system stopped and the valve **NOT** electrically powered. It is recommended to wait for the actuator to cool down (if previously powered) and/or to use suitable thermal protection for hands;

- Unscrew the fastening screw (17) and move the protective casing upwards (6) into the position shown in fig. 1.
- Loosen the screw (18) and move the switch (19) by sliding it along its pin. The more the switch is moved upwards, the more the max flow of the solenoid valve is limited. Once the switch (19) has been set in place, secure the position by tightening the screw (18). The setting range is marked with the min and max indications.
- **IMPORTANT:** verify that the switch de-energises the pump at the set position.



## 4.3 - ADJUSTING THE SLOW OPENING (optional)

- The cap (3) must be removed to make the adjustment. The position of fig. 2 corresponds to the maximum opening speed (preset factory value). Increase the opening time (slow down the actuator speed) by rotating the screw (2) clockwise with a 14mm socket wrench. **NOTE** Changes to the inlet pressure and room temperature can affect the valve opening time.



## 5.0 - MAINTENANCE

If the actuator needs to be replaced:



- Before performing any operation, make sure that the device is not electrically powered;
- It is advisable to avoid touching the actuator with bare hands after a continuous power supply lasting longer than 20 minutes. In case of maintenance, wait for the actuator to cool down or, if necessary, use suitable protection;

**NOTE:** The replacement steps of the actuator must be carried out by taking care to ensure the product's IP65 protection rating.



## 5.1 - REPLACING THE ACTUATOR UNIT (24)

- Unscrew the fastening screw (17) and move the protective casing upwards (6) into the position shown in fig. 4;
- Loosen the fastening screws (7) and (18). Rotate both microswitches (8) and (19) by 180° as shown in fig. 4 and secure them temporarily in this position;
- Loosen and remove the fastening screws (5);
- The actuator unit (24) can now be removed (by pulling it upwards);
- Position the new actuator unit (24) in the same position as the previous one and secure it by tightening the screws (5);
- Reposition the microswitches (8) and (19) in the original position (see fig. 1 - microswitch (8) optional);
- If present, position the microswitch (8), rotating it so that when the valve is closed, the disc (20) closes the contact (see Fig. 1);
- Follow the instructions in 4.2 for the flow adjustment switch (19);
- Lower the protective casing (6) and secure it with the screw (5);
- Wire the new actuator unit electrically by following the instructions in 3.2 and 6.2;
- Energise and de-energise the solenoid valve 2 or 3 times, verifying its complete opening and closure, thereby testing it functions correctly after maintenance is performed.

## 6.0 - CPI SWITCH

If the solenoid valve comes with the CPI switch, the position of the sensor is already calibrated and therefore set for operation. Just connect it electrically to the connector (29) marked with "CPI SWITCH".

Follow the instructions in paragraph 6.2.

### 6.1 - CPI SWITCH TECHNICAL DATA

- |                       |                   |
|-----------------------|-------------------|
| • Ambient temperature | : -20 ÷ +60°C     |
| • Switchable voltage  | : max 250 V (Vac) |
| • Switchable current  | : max 2 A         |
| • Protection rating   | : IP67            |

#### CPI wiring diagram





## 6.2 - CPI SWITCH WIRING

- Before wiring the CPI connector (**29**), fully unscrew and remove the central screw (**31**);
- Connect the CPI connector (**29**) terminals 1 and 2 in series to the signalling device (see diagram 2 - fig. 5).  
Use the proper cable terminals (see figures in 3.2);
- Wire the CPI connector (**29**) with a 3x0.75mm<sup>2</sup> cable with an external Ø measuring 6.2 to 8.1 mm. The cable must be in double sheath, suitable for outdoor use, with a minimum voltage of 500V and a temperature of at least 90°C;
- Secure the CPI connector (**29**) by tightening (recommended tightening torque 0.4 N.m ± 10%) the centre screw (**31**);
- Open and close the solenoid valve (by supplying and cutting off the power) 2-3 times to make sure the microswitch is signalling correctly.

## 7.0 - 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 (e.g. painting, cataphoresis, etc.), it must not be damaged during transport;
- The transport and storage temperatures must match the values provided on the rating plate;
- If the device is not installed immediately after delivery, it must be stored away correctly in a dry and clean place;
- In humid facilities, 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.

## 8.0 - WARRANTY

The warranty conditions agreed with the manufacturer at the time of the supply apply.

For damage caused by:

- Improper use of the device;
- Failure to observe the requirements described in this document;
- Failure to observe installation rules;
- Tampering, modification and use of non-original spare parts;

are not covered by the rights of the warranty or compensation for damage.

The warranty also excludes maintenance work, the assembly of devices of other manufacturers, making changes to the device and natural wear.

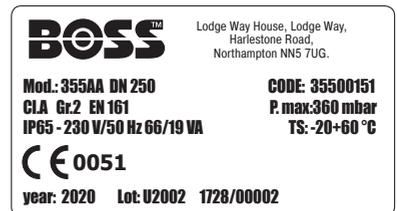
## 9.0 - RATING PLATE DATA

The rating plate data (see example provided here) includes the following:

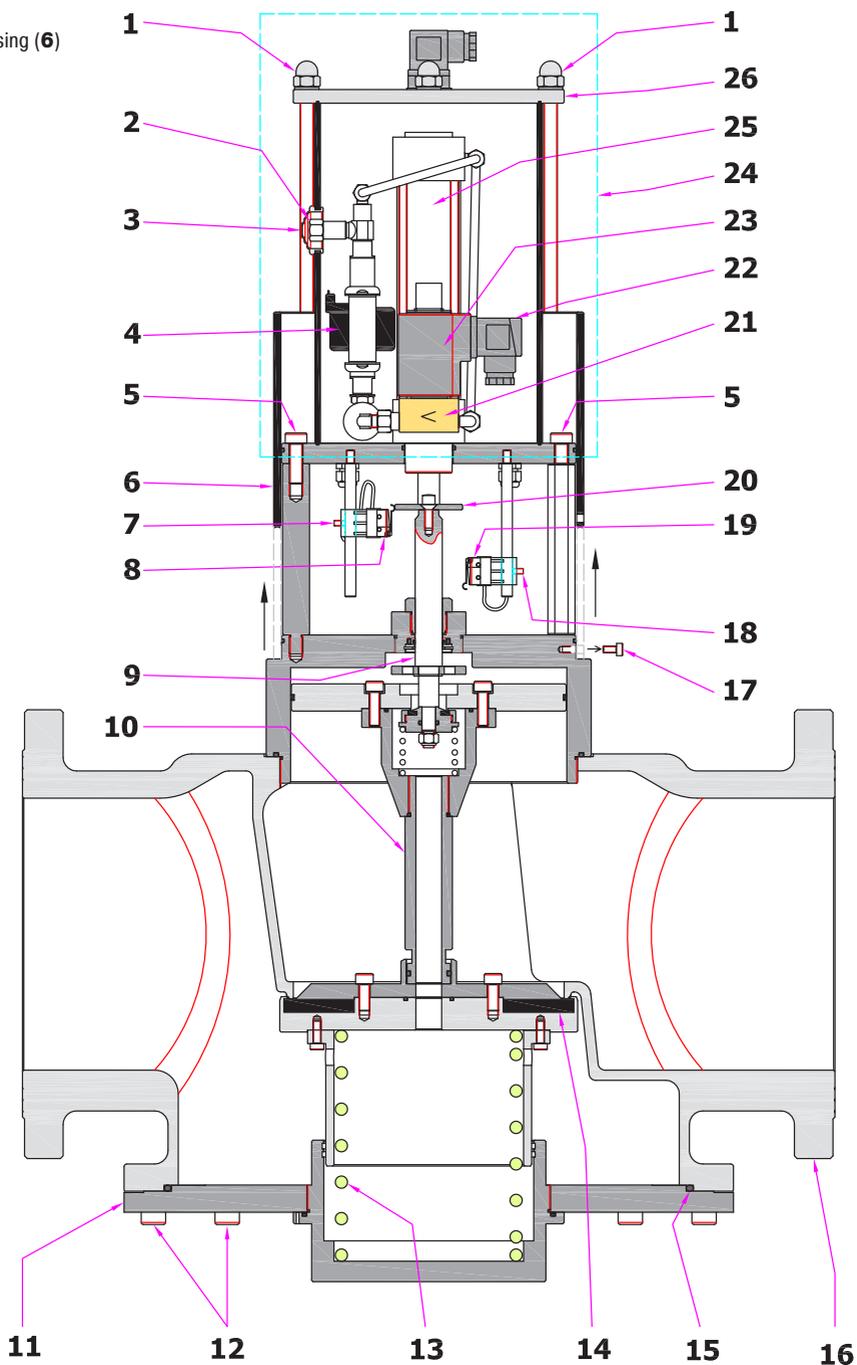
- Manufacturer's name/logo and address
- Mod.: = device name/model followed  
by the connection diameter
- Cl. ... = Backflow seal strength  
(A = 150 mbar - B = 50 mbar) in accordance with EN 161
- Gr. 2 = Mechanical strength of unit 2 in accordance with EN 161
- EN 161 = Product reference regulation
- P.max = Maximum pressure at which product operation is guaranteed
- IP... = Protection rating
- 230V... = Power supply voltage, frequency (if Vac), followed by the electrical absorption

Example of electrical absorption indication: 66/19 VA indicates 66 VA at start, 19 VA at steady state

- TS = Temperature range within which product operation is guaranteed
- year = Year of manufacture
- Lot = Product serial number (see explanation below)
  - U2002 = Lot issued in year 2020 in the 2nd week
  - 1728 = progressive job order number for the indicated year
  - 00002 = progressive number referring to the quantity of the lot



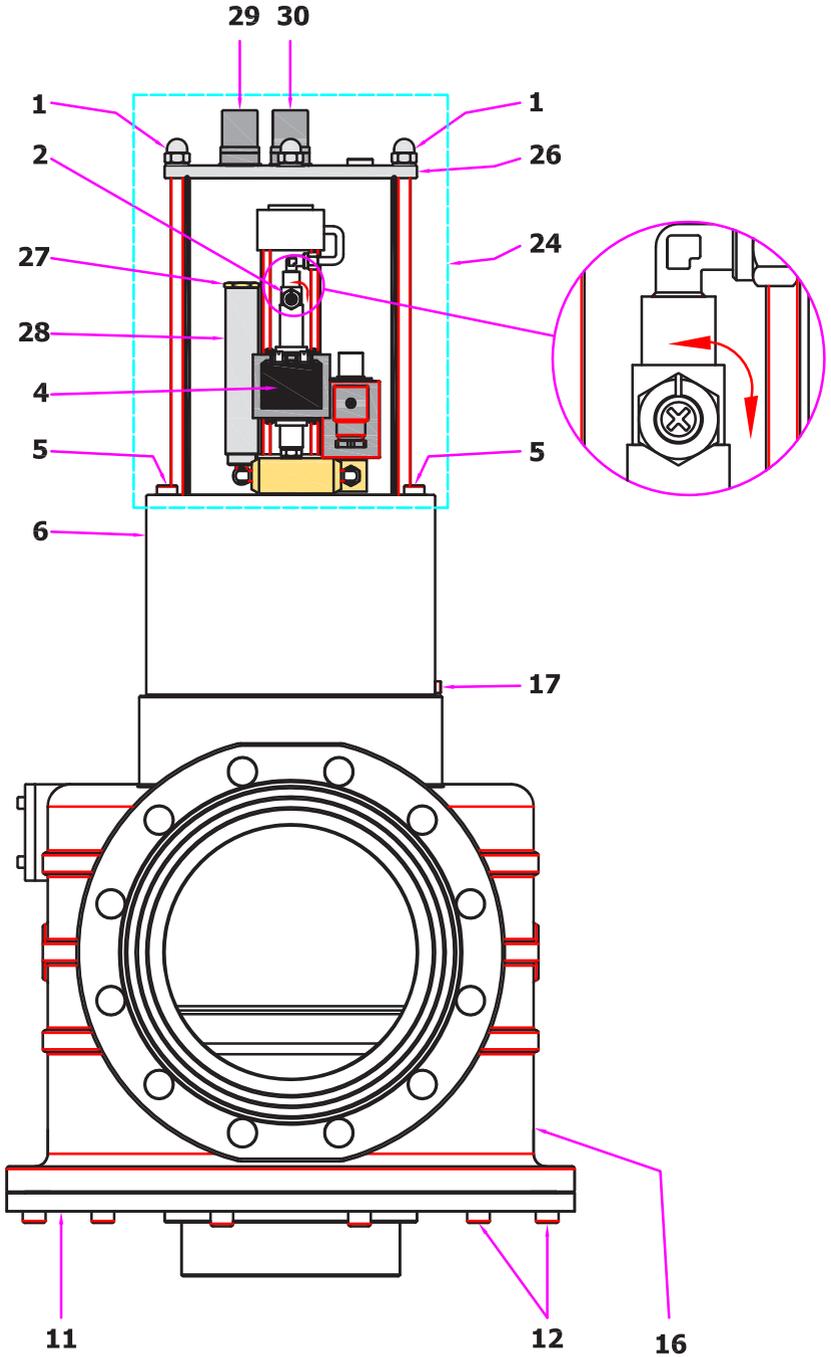
**fig. 1**  
open casing (6)



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Per regolare la portata bisogna svitare la vite (17) e spostare il carter (6) verso l'alto come in figura sopra.  
Adjust the door by loosening the screw (17) and moving the casing (6) upwards as shown in the above figure.

**fig. 2**  
closed casing (6)



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fig. 3

view from above without cover (26)

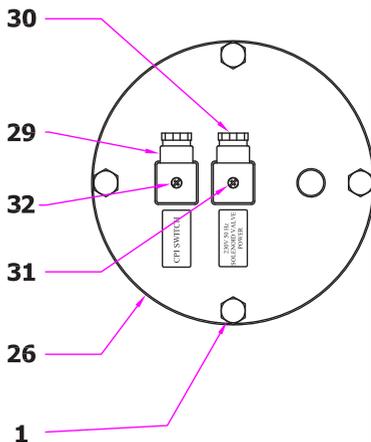
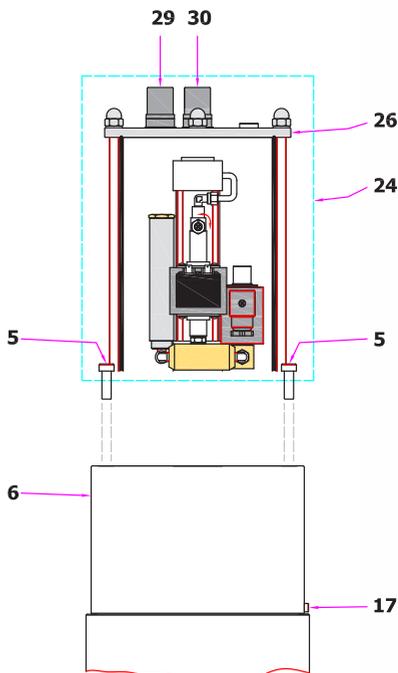
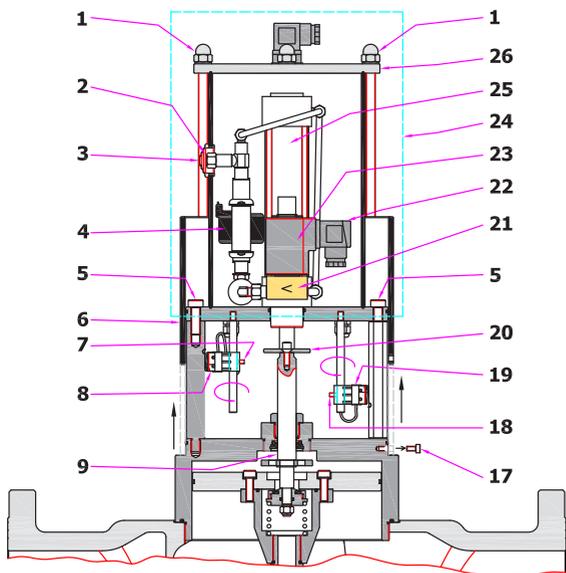


fig. 4

Actuator assembly (24) with open sump (6) mounted on the valve



Actuator assembly (24) with closed sump (6) unmounted on the valve

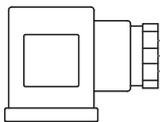
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fig. 5

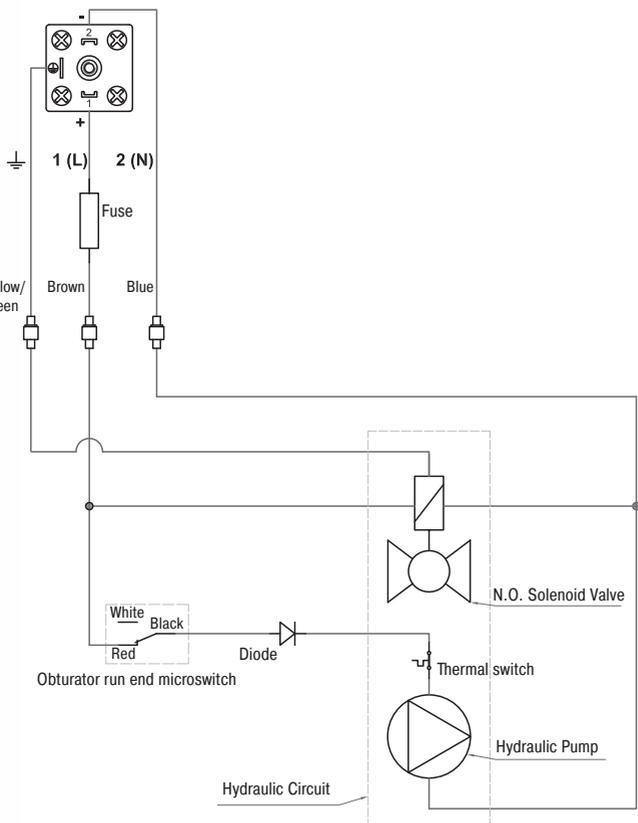
**SCHEME NO. 1**



SOLENOID VALVE POWER

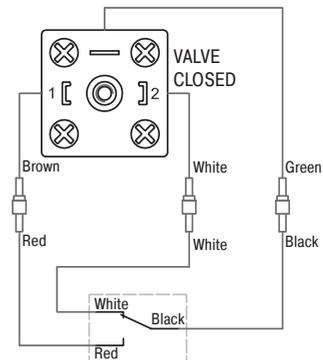
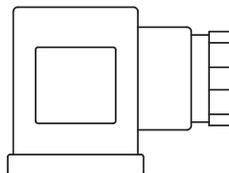


Both schemes are referred to not powered valve



**SCHEME NO. 2**

*CPI SWITCH*



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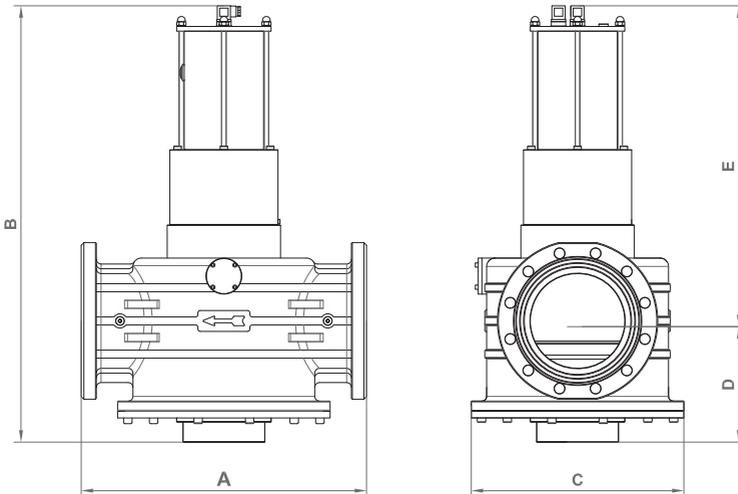
**fig. 1, 2, 3 and 4**

- |   |  |
|---|--|
| 1. Top cover clamping nuts                                | 17. Casing fastening screw                 |
| 2. Opening speed adjustment (optional only slow versions) | 18. Flow adjustment switch fastening screw |
| 3. Adjustment access cap                                  | 19. Flow adjustment switch                 |
| 4. Actuator pump  | 20. Disc for contacts on microswitch       |
| 5. ACTUATOR UNIT fastening screws                         | 21. Automatic NO valve (oil circuit)       |
| 6. Adjustment protective casing                           | 22. Valve connector (oil circuit)          |
| 7. CPI Switch adjustment fastening screw (optional)       | 23. Valve coil (oil circuit)               |
| 8. Closed Position Indicator Switch (optional)            | 24. Actuator unit                          |
| 9. Top pin  | 25. Hydraulic cylinder                     |
| 10. Centre pin  | 26. Top cover                              |
| 11. Bottom  | 27. Oil tank cap                           |
| 12. Bottom fastening screws                               | 28. Oil tank                               |
| 13. Closing spring  | 29. CPI Switch connection connector        |
| 14. Obturator   | 30. Solenoid valve supply connector        |
| 15. Bottom sealing O-Ring                                 | 31. CPI connector centre screw             |
| 16. Valve body  | 32. Coil supply connector central screw    |

**Table 1**

Overall dimensions in mm

Flanged connections	holes	A	B=(D+E)	C	D	E
PN 16 DN 200	12	600	920	450	255	665
ANSI 150 DN 200	8	600	920	450	255	665
PN 16 - ANSI 150 DN 250	12	673	1020	510	295	725
PN 16 - ANSI 150 DN 300	12	737	1160	552	320	840



The dimensions are provided as a guideline, they are not binding

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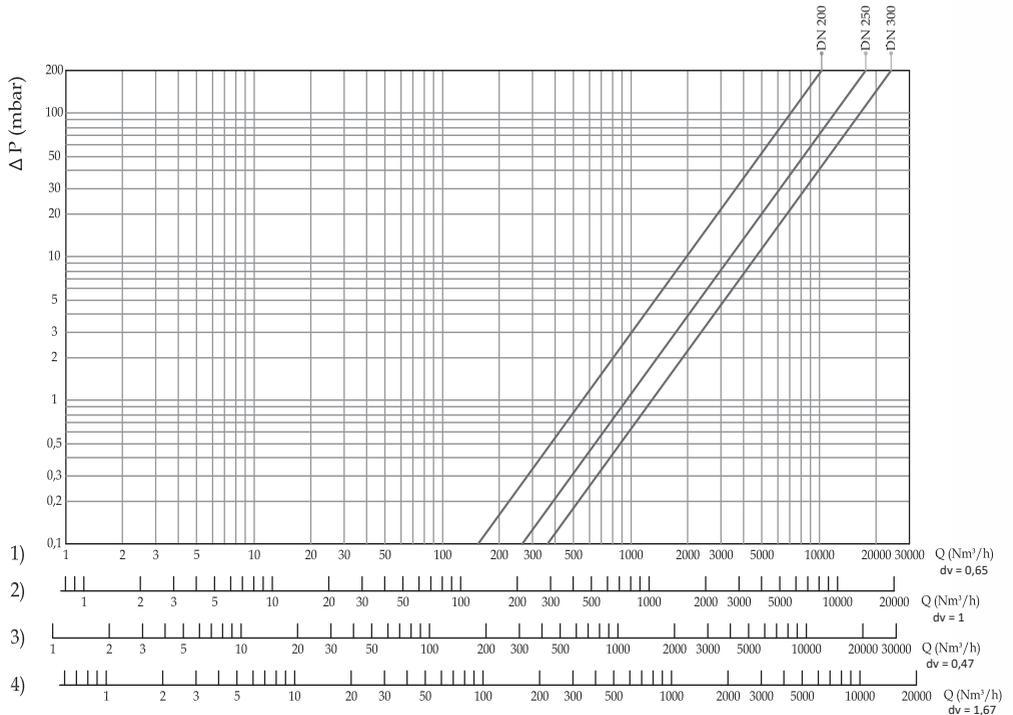
**Table 2**

## Actuators

Ø	Voltage	Valve model	Fast opening valve actuator code (available as special order)	Absorbed power
			With CPI	VA*
<b>DN 200</b>	24 V/50 Hz	<b>35500310</b>	B13119	75 / 16
	110 V/50 Hz	<b>35500771</b>	B13095	53 / 14
	230 V/50 Hz	<b>35500140</b>	B13120	66 / 19
<b>DN 250</b>	24 V/50 Hz	<b>35500321</b>	B13086	75 / 16
	110 V/50 Hz	<b>35500782</b>	B13096	53 / 14
	230 V/50 Hz	<b>35500151</b>	B13085	66 / 19
<b>DN 300</b>	24 V/50 Hz	<b>35500332</b>	B13088	96 / 33
	110 V/50 Hz	<b>35500793</b>	B13097	70 / 30
	230 V/50 Hz	<b>35500162</b>	B13087	84 / 38

\* Example of electrical absorption indications: 75/16 VA indicates 75 VA on PTO, 16 VA at full speed

**Pressure drop diagram (calculated with P1 = 50 mbar)**



$dv$  = density relative to the air

- 1) methane
- 2) air
- 3) town gas
- 4) lpg

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We reserve the right to any technical and construction changes.



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