



# MODULATING VALVE SERIES MDV

## ASSEMBLING AND SERVICING INSTRUCTIONS

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## 1. GENERAL FEATURES

Modulating valves of the Series **MDV (Modulating Disc Valve)** are newly conceived and are approved DIN DVGW - EN161 specifications in order to be used in residential and industrial combustion systems.

They are particularly suitable for the proportional regulation of the quantities of non-corrosive combustible gases such as natural gas, town gas, LPG and all other combustibles belonging to the first, second and third family and air.

The gear motor is provided with a single phase, bidirectional electric motor with high static and maintaining torque for 3-position control or electronic control with input signal 0÷10 V or 4÷20 mA.

The linear rating is obtained thanks to the patented particular shutter disks, rotating on the same axis.

The linear rating is obtained by the linear ratio between the adjustment run and the stream volume according to the geometry of the adjustment disk's opening.

12 orifice sizes are available, according to the servicing functions. They are all interchangeable without removing the valve from the pipeline.

## 2. WARNING

Installation, wiring, adjustment and maintenance of the valve must be carried out exclusively by skilled and authorized service technicians.

Non proper installation, adjustment, changes, use and maintenance may cause damages to the personnel or to the equipment.

Consequently it is necessary to respect strictly the following instructions and local prescriptions for both the installation of electrical devices and gas systems.

## 3. TECHNICAL DATA

|   |   |
|---|---|
| Max. pressure   | : 1 bar   |
| Nominal servicing pressure                              | : see coding according to section                         |
| Valve group   | : 2   |
| Ambient temperature                                     | : -10°C to + 60° C  |
| Ratio   | : 25:1  |
| Threaded flanges  | : 3/4 to 2 ISO 7-1: 1982                                  |
| Rating feature  | : linear  |
| Valve   | : without zero closure                                    |
| Standard supply voltage                                 | : 230 V - 50/60 Hz<br>110 V - 50/60 Hz<br>24 V - 50/60 Hz |
| Electrical protection                                   | : IP 54 according to EC 529                               |
| Duty cycle  | : continuous 100%   |
| Terminal head   | : 2 x Pg 13.5   |
| Opening/closing time                                    | : 60 seconds for 90° at 50 Hz                             |
| Electric contacts' rating of end and auxiliary switches | : 5 (1) A/250 V a.c.                                      |
| Available feedback potentiometers                       | : 150,1000,2500 Ohm                                       |

## 4. INSTALLATION

- 4.1 Make sure that all operating data indicated on the valve plates correspond to those of the system.
- 4.2 When installing the valve be sure that there is sufficient clearance above the gear cover and that it can be easily accessible in order to perform wiring and switches adjustment.
- 4.3 The installation of a filter behind the valve **MDV** must be also foreseen.
- 4.4 Remove the protection plugs from the threaded flanges.
- 4.5 Screw the threaded flanges to the entry and exit pipes by using exclusively sealing materials suitable for gas.
- 4.6 Install the valve without electric tension.
- 4.7 Respect the gas flow direction indicated by the arrow on the valve body.

- 4.8 The installation of the valve **MDV** can be performed in any position.
- 4.9 The valve **MDV** can be installed in any location included in the range of electrical protection IP 54 except where acid fumes or other deteriorating vapour might attack the metal parts or where gas leaks or explosive vapours are present in the atmosphere.

Do not use the valve as lever.

## 5. WIRING

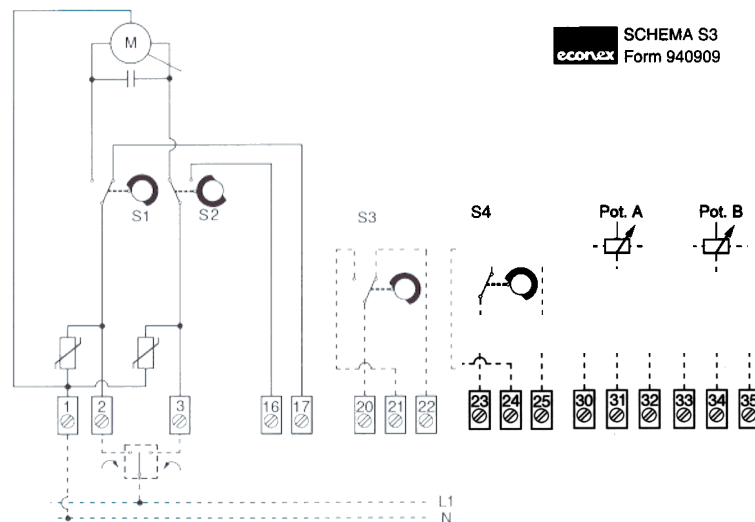
- 5.1 Wiring and earthing are to be performed according to local prescriptions.
- 5.2 For accessing to the internal terminal board and for wiring remove the cover by loosening the 4 fixing screws.
- 5.3 Before servicing ensure that power supply is disconnected by means of the two-pole-switch (phase and neutral); in case of non-observance, damages to people and to the equipment may occur.
- 5.4 2 threaded holes for the fitting of the conduit plug PG 13.5 are present at the bottom of the gear motor.
- 5.5 All wires must comply with local prescription and, in any case, their section must not be smaller than 1.5 mm<sup>2</sup>.
- 5.6 The wiring diagrams are reported on the plate inside the cover.
- 5.7 The auxiliary microswitches are S.P.D.T. (single-pole double through) and are voltage-free.
- 5.8 The resistance values of the potentiometers installed are indicated on the identification plate.
- 5.9 Ensure that power supply and system frequency correspond to the values indicated on the valve plate.

The low-tension signal cables (tension lower than 48V) must be laid separately from the higher tension conduits (tension higher than 48V). In case they are laid in a single channel, screened cables must be used.

## 6. CABLE CONNECTIONS

The wirings diagrams refer to the valve in position "closed"

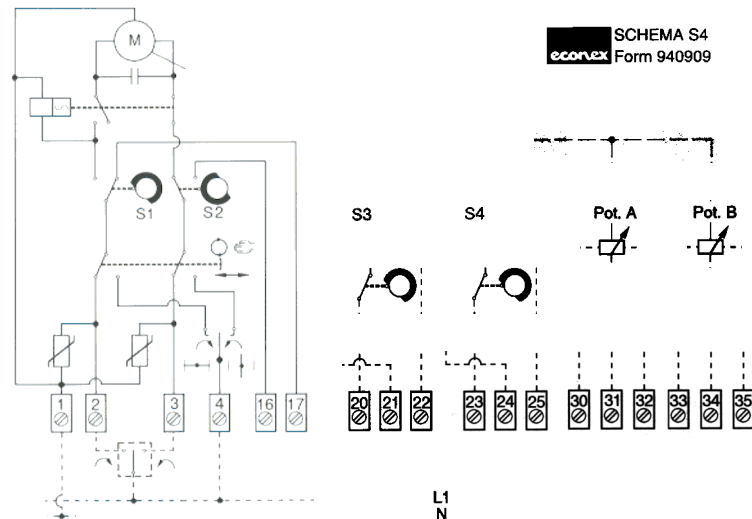
- 6.1 Without manual/automatic control station.



### Terminal board

- Terminal  $\perp$  : earthing
- Terminal 1 : N = neutral
- Terminal 2 : by tension the valve closes
- Terminal 3 : by tension the valve opens
- Terminal 16 : answer signal when the valve reaches the position "open"
- Terminal 17 : answer signal when the valve reaches the position "closed"

## 6.2 With manual/automatic control station



### 6.2.1 Terminal board

- Terminal  $\text{⏏}$  : earthing
- Terminal 1 : N=neutral
- Terminal 2 : by tension the valve closes
- Terminal 3 : by tension the valve opens
- Terminal 4 : for manual electric control
- Terminal 16 : answer signal when the valve reaches the position "open"
- Terminal 17 : answer signal when the valve reaches the position "closed"

## 6.3 Auxiliary microswitches

### 6.3.1 Terminal board

- Terminal 20 : common contact of the auxiliary microswitch S3
- Terminal 21 : contact normally open of the auxiliary microswitch S3
- Terminal 22 : contact normally closed of the auxiliary microswitch S3
- Terminal 23 : common contact of the auxiliary microswitch S4
- Terminal 24 : contact normally open of the auxiliary microswitch S4
- Terminal 25 : contact normally closed of the auxiliary microswitch S4

## 6.4 Potentiometer /s for answer signal of Pot. A and/or Pot. B position

### 6.4.1 Terminal board

- Terminal 30 : max. value
  - Terminal 31 : slider
  - Terminal 32 : min. value
  - Terminal 33 : max. value
  - Terminal 34 : slider
  - Terminal 35 : min. value
- The schema refers to the valve in position "closed"

## 7. AUXILIARY MICROSWITCHES

- 7.1 On request the valve can be supplied with 2 auxiliary microswitches which can be adjusted in any position.
- 7.2 The microswitches are voltage-free.
- 7.3 The contact rating is 5 A/250 A.c. with for Ohm load and 1 A/250 V c.a. for inductive load.
- 7.4 For adjusting the auxiliary microswitches' cams proceed as for endswitches' cams as indicated in paragraph 10.1 chapter 10 "SETTINGS"

## 8. FEEDBACK POTENTIOMETER/S

- 8.1 On request the valve can be supplied with 1 or 2 independent feedback potentiometers (Pot. A and/or Pot. B) provides indication of the valve position.

8.2 The resistance value of the potentiometer is indicated on the identification plate.

If the resistance value does not correspond to the one wished, procede as indicated in paragraph 10.2 of chapter 10 "SETTINGS".

8.4 Power consumption is 2 W per potentiometer.

## 9. CONTROL STATION

9.1 The control station allows the manual electric control of the valve.

9.2 Phase L1 must be connected to terminal No. 4.

9.3 The switch AUTO/MAN is supplied by the factory set on position AUTO 


9.4 Position the switch AUTO/MAN on manual position shown by the hand picture .

9.5 Switch-ON/switch-OFF as follows:

By pushing the switch towards the symbol ▼ the valve opens (cam 2 regulates the desired end position "OPEN").

By pushing the switch towards the symbol ▲ the valve closes (cam S1 regulates the desired end position "CLOSED").

By positioning the switch in the middle the valve motor does not run.

**IMPORTANT:** once the operations for the manual electric control of the valve are over, reset the switch AUTO/MAN on position AUTO .

## 10 SETTINGS

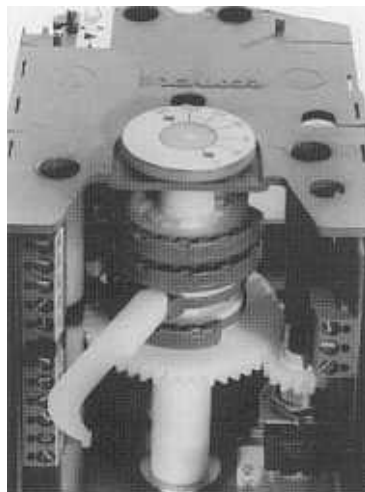
10.1 Endswitches

The valve **MDV** is supplied by the factory set on position "CLOSED". The endswitches are adjusted in such a way to reach valve position "CLOSED" and valve position completely "OPEN".

10.1.2 If a smaller opening of the valve is desired it is necessary to operate on cam S2.

For cam adjustment the proper key supplied with the valve equipment and installed inside the gear motor is to be used.

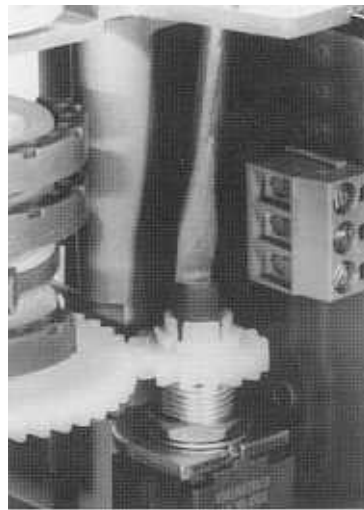
10.1.4 Use the key from the right side, introducing the pin into one of the holes on the sides of the blue cam of the cam involved and lever it to the desired position.





- 10.1.5 If the blue cam is in a behind position use at first the lever on its curved side to move the blue cam to a more suitable position to perform the adjustment.
- 10.1.6 In order to make the adjustment easier it is recommendable to refer to the mechanic position indicator disk; the valve is closed when the mechanic indicator is on position 0, the valve is completely open when the mechanic indicator is on position 90.
- 10.1.7 Cam adjustment is possible in both directions.
- 10.1.8 When the lever roller for switching the microswitch is at the bottom of the cam housing the rotation of the electric motor stops.
- 10.1.9 Remove the key before running the gear motor.
- 10.1.10 The blue cam can be also dragged by means of a small screwdriver by operating on the proper notches.
- 10.1.11 A valve rotation higher than 90° is absolutely to be avoided not to damage the adjustment disks and/or not to force the rotation of the potentiometer shaft.

Potentiometer/s

- 10.2.1 The potentiometer shaft is frictioned and is accessible from the upper side inside the gear motor
- 10.2.2. Disconnect the cables connected with the modulating system from the respective terminals No. 30, 31 and 32 (Pot. A) and, if necessary, No. 33, 34 and 35 (Pot. B).
- 10.2.3 By means of a suitable screwdriver with 5 mm cut rotate the potentiometer shaft and measure the resistance value of 0 Ohm between terminals No. 31 and 32 and, if necessary, also between terminals No. 34 and 35 when the valve is closed.



- 10.2.4 By rotating the potentiometer:
  - clockwise  : the resistance value increases
  - counter clockwise  : the resistance value decreases

The gear box between the gear motor shaft and the potentiometer shaft is foreseen for a 90° rotation angle between valve position "closed" and completely "open". Hence should the valve opening be reduced with a rotation angle lower than 90°, the variation of the potentiometer resistance value will be proportionally reduced. If, on the contrary, the rotation angle has been wrongly adjusted over 90° there will be no increase in the resistance value beyond the plate maximum value.

## 11. OPERATING

11.1 Before operating the following points of the **MDV** valve must be carefully checked:

- correct installation with respect to the flow direction
- tightness of the external gas pipes
- correct wiring and earthing
- perfect electric and mechanic functioning by means of openings and closures with main gas tap closed.
- tightness of the whole pipeline .

Once these preliminary checks have been performed, the main gas tap can be opened and the functioning test can be carried out.

## 12. MAINTENANCE AND CHECKS

12.1 The **MDV** valve does not require any particular current maintenance. Both the valve body and the gear motor do not require any lubrication.

It is recommendable to check wiring to avoid defective terminal board contacts and to fasten screws at least once a year, especially by systems which do not function vibration-free.

## 13. REPLACEMENT

In case replacement of the valve **MDV** is necessary, procede as follows:

Close the main gas tap.

Disconnect tension supply to the valve.

13.3 Remove the gear motor cover.

13.4 Disconnect all electric wiring taking note of cable numeration.

Remove the valve body from the entrance and exit flange by loosening the fastening screws from the respective nuts.

13.6 Install the new valve proceding as per instructions reported in the previous chapters.