

# MODULATING CONTROL VALVE SERIES MPV

## INSTRUCTIONS FOR THE INSTALLATION AND MAINTENANCE

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## 1. MAIN FEATURES

The modulating valves in the MPV [Modulating Plug Valve] series have been designed with a modern concept and they are DVGW approved, with CE identification number. They are suitable to be used in commercial and industrial combustion systems.

They are especially suitable for the proportional adjustment of non corrosive fuel gases from the first, second and third family and air. The MPV valve is an adjustment device without zero closing. The actuator is equipped with a single-pole bi-directional motor with high static torque and holding torque for 3-positional control or electronic modulation with analogic signal current [4 ÷ 20 mA] or tension [0 ÷ 10 Vdc] variation at. The adjustment of flow volume in the valve operates by a delivery adjusting cylinder with linear characteristics. The cylinder rotation changes the passage opening and the flow volume is adjusted according to a linear trend.

Three different orifice sizes are available according to the operating conditions, interchangeable without removing the valve from the plant.



### WARNING

Installation, wiring, adjustment and maintenance of gear motors must be carried out exclusively by skilled and authorized service technicians. Non-proper installation, adjustment, modifications, use and maintenance may cause injuries to the staff or material damages. It is therefore necessary to respect strictly the following instructions and local prescriptions for the installation of electric and gas devices.

## 2. TECHNICAL FEATURES

Operating pressure	:	max. 500 mbar
Valve group	:	2
Ambient temperature	:	from -10 to +60°C
Adjusting ratio	:	25:1
Fittings	:	Rp 1, according to ISO 7-1
Delivery feature	:	linear
Valve	:	without zero closing
Available voltage	:	230 Vac / 50 - 60 Hz 115 Vac / 50 - 60 Hz 24 Vac / 50 - 60 Hz
Nominal load	:	7 VA
Electric protection	:	IP 54 according to EN60529
Duty cycle	:	continuous 100%
Cable fasteners	:	2 x Pg 13.5
Opening/closing times	:	30 ÷ 60 seconds at 50 Hz
Limit - Aux. switches rating	:	5 [1] A 250 Vac
Available potentiometers	:	150, 1000 [standard], 2500 ohm
Control signal	:	4 ÷ 20 mA [only with supply voltage 24 Vac]
	[for electronic version] :	0 ÷ 10 Vdc [only with supply voltage 24 Vac]
Accessories	:	adjustable manual by-pass

### **3. INSTALLATION**

- 3.1** Make sure that all the operating data shown on the valve label comply with the system operating data.
- 3.2** 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 the electrical connections and the calibration of the electric limit switches.
- 3.3** Install a filter before the MPV valve.
- 3.4** Before installing the valve, make sure the piping is clean and free of every impurity, and it is perfectly aligned with the valve body and not subject to vibrations.
- 3.5** Remove the protection plugs installed on the valve body.
- 3.6** The sealant must be applied only on the piping outer threading and not on the valve inner threading. Use gas suitable sealants only.
- 3.7** Comply with the gas flow direction marked by the arrows on the valve body.
- 3.8** The MPV valve installation can be carried out in every position.
- 3.9** The MPV valve can be installed in every premise included in the range of the electric protection IP 54, except for premises with presence of acid fumes or other vapours that can etch the metal parts, in atmosphere with gas or explosive vapour leaks.
- 3.10** For the installation of the MPV valve on the piping do not use the actuator as lever, rather use the suitable wrench.
- 3.11** Install the MPV valve without voltage.

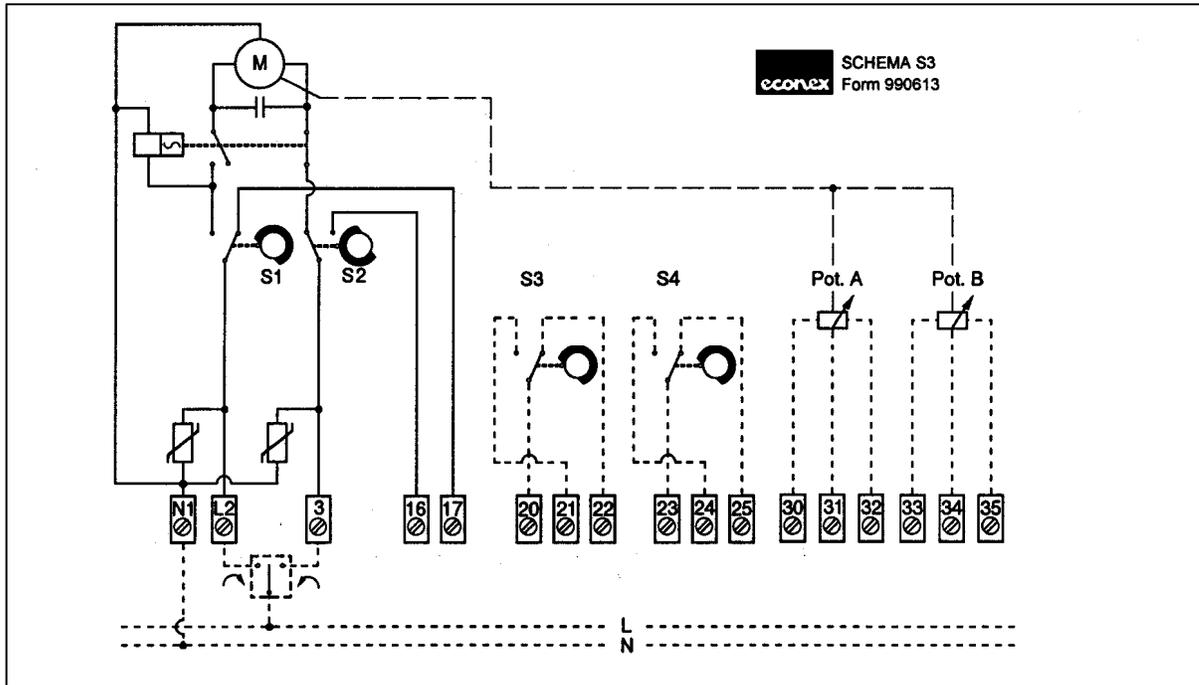
## 4. ELECTRIC CONNECTIONS

- 4.1 Arrange the wiring and the grounding according to the local norms in force.
- 4.2 To access the inner terminal board and for the electric connections, remove the cover loosening the 4 fastening screws.
- 4.3 Two threaded holes for cable pressers Pg 13.5 are already arranged on the base of the electric actuator.
- 4.4 Before servicing make sure, that power supply is disconnected by means of the two-pole-switch [phase and neutral]; in case of non-observance, damages to people and equipments may occur.
- 4.5 All wires must comply with local prescriptions and, in any case, their section must be ranging between 1 and 1.5 mm<sup>2</sup>. Connection piping recommended H07V-U...G1.5 mm<sup>2</sup>.
- 4.6 Wiring diagrams are reported in the attached technical bulletin and on the plate inside the cover.
- 4.7 Auxiliary microswitches are single-pole double through and voltage-free.
- 4.8 If a potentiometer is installed, its resistance value is indicated on the nameplate.
- 4.9 Make sure the supply voltage and the system frequency correspond to those indicated on the valve plate.
- 4.10 Low-tension signalling cable [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.

## 5. WIRING

The wiring schemes refer to the valve in "closed" [0°] position.

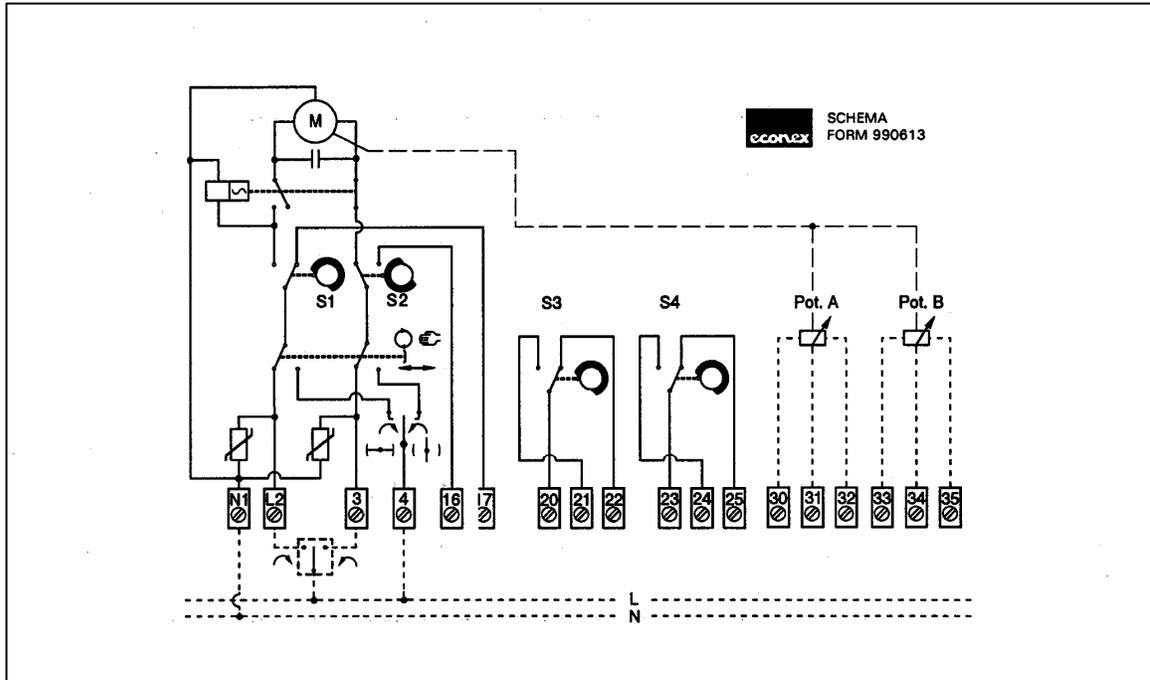
### 5.1 WITHOUT MANUAL/AUTOMATIC CONTROL STATION



#### TERMINAL BOARD

- Terminal  earthing
- Terminal N1 N = neutral
- Terminal L2 by tension the valve closes
- Terminal 3 by tension the valve opens
- Terminal 4 for manual electric operation
- Terminal 16 answer signal when the valve reaches the "open" position
- Terminal 17 answer signal when the valve reaches the "closed" position

## 5.2 WITH MANUAL/AUTOMATIC CONTROL STATION



Terminal 	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 "open" position
Terminal 17	answer signal when the valve reaches the "closed" position

## 6.3 Auxiliary microswitches

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

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

Terminal 30	max. value
Terminal 31	cursor
Terminal 32	min. value
Terminal 33	max. value
Terminal 34	cursor
Terminal 35	min. value

## 6. AUXILIARY MICROSWITCHES

On request, the valve can be equipped with 2 auxiliary microswitches that can be adjusted in any position.

Microswitches are voltage-free.

The contact capacity is 5 A/250 Vac with ohmic load and 1 A/250 Vac with inductive load.

Contact rating is about 5 A/250 with Ohm load and about 1 A/250 with inductive load. For adjusting the cams of auxiliary microswitches, proceed as for cams of endswitches as indicated in paragraph 9.1 chapter 9 "CALIBRATIONS".

## 7. POTENTIOMETER/S

On request, the valve can be equipped with 1 or 2 independent potentiometers [pot. A and/or Pot. B] for the answer signal of the valve position.

Resistance value of the potentiometer is indicated on the identification label.

If the resistance value does not correspond to the wished one, proceed as indicated in paragraph 9.2 of chapter 9 «CALIBRATIONS».

Absorbed power is 2 W for each potentiometer.

## 8. CONTROL STATION

8.1 The control station enables the manual electric activation of the valve.

8.2 Phase L must be connected to the terminal no. 4.

8.3 The AUTO/MAN switch is delivered by the factory in AUTO position .

8.4 Set the AUTO/MAN switch in the manual position indicated by stylized hand .

8.5 Activate the Open/Stopped/Closed switch as follows:

8.5.1 Keeping the lever pushed towards the symbol  the valve opens [the cam S2 adjusts the desired final opening position].

8.5.2 Keeping the lever pushed towards the symbol  the valve closes [the cam S1 adjusts the desired final closing position].

8.5.3 Positioning the lever to the centre, the valve motor is not activated.

8.5.4 ATTENTION: after the operations for manual electric activation of the valve, reset the AUTO/MAN switch onto AUTO position .

## 9. CALIBRATIONS

### 9.1 LIMIT SWITCH

- 9.1.1 The MPV valve is delivered by the factory in closed position. The limit switches are adjusted to reach the positions of closed valve and completely open valve.
- 9.1.2 For "OPEN" position adjustment, it is necessary to operate on cam "S2".
- 9.1.3 For cam adjustment, use the proper "half-moon" key, supplied with the actuator and installed inside it.
- 9.1.4 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 required position.
- 9.1.5 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 adjustment [picture 1].



Picture 1

- 9.1.6 To calibrate, refer to the mechanical position indicator disc; the valve is closed when the mechanical pointer is in the 0 position, the valve is completely open when the mechanical pointer is in the 90° position.
- 9.1.7 The cam adjustment is possible in both directions.
- 9.1.8 The lever roller operates the microswitch when it is on the bottom of the cam groove, stopping the motor rotation.
- 9.1.9 Remove the wrench before starting the actuator.
- 9.1.10 The movable crown can be driven also by a small screwdriver, acting on the suitable notches.
- 9.1.11 Avoid valve rotation over 90°, in order to prevent damage on the adjusting cylinder, and/or force the potentiometer shaft rotation.

## 9.2 POTENTIOMETER/S

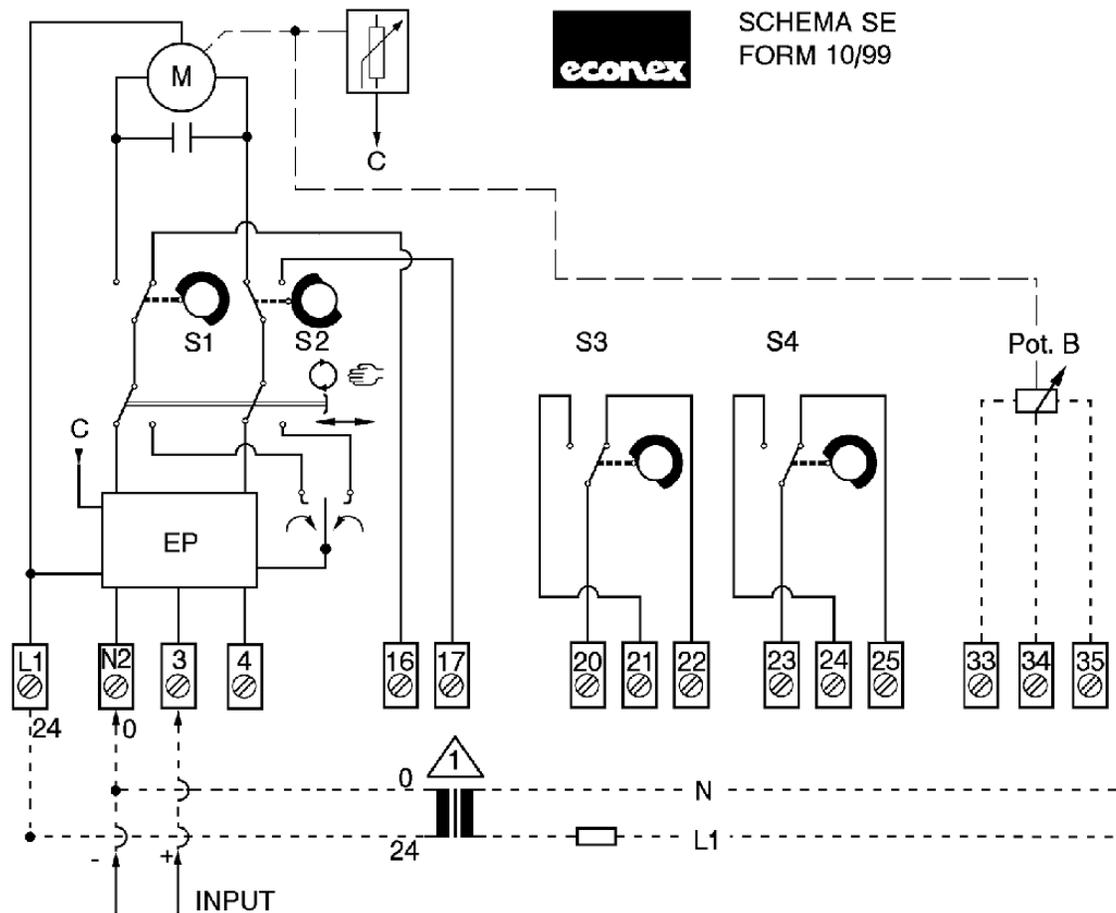
- 9.2.1 The potentiometer shaft is frictioned and is accessible from the upper side inside the gear motor.
- 9.2.2 Disconnect the cables connected with the regulation system from the respective terminals n. 30, 31 and 32 [Pot. A] and, if necessary, n. 33, 34 and 35 [Pot. B].
- 9.2.3 By means of a suitable screwdriver with 5 mm cut rotate the potentiometer shaft and measure the resistance value of 0 Ohm between terminals n. 31 and 32 and, if necessary, also between terminals n. 34 and 35 when the valve is closed [picture 2].



Picture 2

- 9.2.4 By rotating the potentiometer:
- clockwise ↻ the resistance value increases
  - counter dock wise ↻ the resistance value decreases
- 9.2.5 The gearbox between the gear motor shaft and the potentiometer shaft is foreseen for a 90° rotation angle between closed valve and totally open valve. Hence should the gear motor opening be reduced with a rotation angle lower than 90°, the variation of the potentiometer resistance value will be proportionally reduced. If, vice versa, the rotation angle had been wrongly adjusted over 90° there will be no increase in the resistance value beyond the plate maximum value.

### 9.3 ELECTRONIC CARD



 External supply voltage transformer with load > 15 VA protected against overloading.

- 9.3.1 Supply the servocontrol as per schema SE.
- 9.3.2 Select the MAN function. 
- 9.3.3 Position the adjustment instrument on 4 mA [or on 0 Vdc].
- 9.3.4 Turn the servocontrol manually till reaching the mechanical zero.
- 9.3.5 Adjust the closing cam «S1» at few degrees before microswitch involvement.
- 9.3.6 Turn the potentiometer shaft clockwise  till it stops mechanically.
- 9.3.7 Select the AUTO position 
- 9.3.8 Set the adjustment device on 6 mA [or on 2 Vdc] and wait up the servocontrol moves, then take it back to 4 mA [or on 0 Vdc] and check it reaches 0 degrees.
- 9.3.9 If it does not exactly come back to 0 degrees, turn the potentiometer shaft counterclockwise  till 0 degrees.
- 9.3.10 Set the adjustment device at 20 mA [or on 10 Vdc] and check the max. opening, then calibrate the opening cam «S2» at few degrees before the microswitch involvement.
- 9.3.11 Set the adjustment device on 4 mA [or on 0 Vdc] regulating the servocontrol back to 0 degrees.

## **9.4 MAX. CAPACITY ADJUSTMENT**

**9.4.1** To reduce the max. capacity fit a 3 mm hexagon socket screw in the suitable seat on the lower part of the valve body and rotate it counterclockwise ∩.

**9.4.2** The MPV valves are supplied by the factory adjusted for the max. capacity.

## **10. START-UP**

**10.1** Before starting the system up, carefully check the following points of the MPV valve:

- correct installation according to the flow direction
- gas outer seals
- correct electric connections and grounding
- perfect electric and mechanical operation by opening and closing with closed gas main cock.

Once preliminary conditions compliance, the gas main cock can be opened and the operating test can be carried out.

## **11. MAINTENANCE AND CHECKS**

**11.1** The MPV valve does not require any special maintenance.  
Both the valve body and the actuator do not need any lubrication.

**11.2** At least once a year, and above all for systems subject to vibrations, it is recommended to check the harness for faulty contacts of the terminal board and to tighten the screws.

## **12. REPLACEMENT**

For replacement of MPV valve, operate as follows:

- 12.1** Close the gas main cock.
- 12.2** Cut off the supply voltage to the valve.
- 12.3** Remove the actuator cover.
- 12.4** Disconnect all the electric connections, noting the cable numbers.
- 12.5** Remove the valve body from the piping.
- 12.6** Install the new valve according to the instructions of the previous chapters.

These instructions can be subject to possible variations without notice.