

# **ELECTRIC ROTARY GEAR MOTOR SERIES AR2...**

## **INSTALLATION AND OPERATING INSTRUCTIONS**

<b>1. GENERAL FEATURES</b>	<b>2</b>
<b>2. TECHNICAL DATA</b>	<b>2</b>
<b>3. INSTALLATION</b>	<b>3</b>
<b>4. ELECTRIC CONNECTIONS</b>	<b>4</b>
<b>5. CALIBRATION</b>	<b>5</b>
<b>6. CONTROL STATION</b>	<b>7</b>
<b>7. MAINTENANCE AND CHECKS</b>	<b>8</b>
<b>8. REPLACEMENT</b>	<b>8</b>

## 1. GENERAL FEATURES

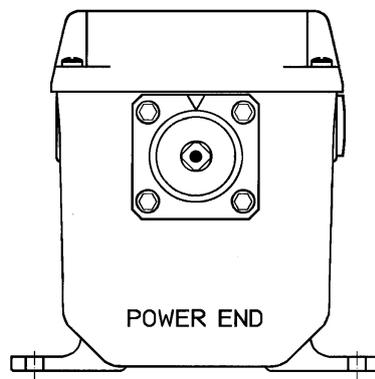
- 1.1 Installation must be performed by properly trained and experienced service technicians only.
- 1.2 Do not attempt to turn the AR2 gear motor shaft by hand or by means of a wrench, otherwise damage to the gear train may occur.
- 1.3 Before servicing make sure that power supply to the gear motor has been disconnected.
- 1.4 Check carefully all instructions before operating the gear motor automatically.
- 1.5 Each AR2 gear motors supplied with a label fixed under the conduit plug.
- 1.6 The main servicing data and technical features of the gear motor are indicated on the label. All technical functions are specified in the relative technical data sheet.
- 1.7 Before installing or operating the AR2 gear motor make sure that its employment complies with the range of performances reported on the label.
- 1.8 When positioning the gear motor consider that it must be easily accessible in order to be able to perform wiring and adjustment of endswitches. Make sure that there is sufficient clearance above the gear motor to remove the cover.
- 1.9 The AR2 gear motor can be installed in any location included in the range of electrical protection IP54, except where acid fumes or other deteriorating vapour might attack its metal parts or where gas leaks or explosive vapours are present in the atmosphere. In environments with high salt percentage, the fastening screws should be zinc or cadmium plated, not made of brass or stainless steel.

## 2. TECHNICAL DATA

Body and cover	die-cast aluminium
Output torque	4 ÷ 20 Nm
Maintaining torque	4 ÷ 20 Nm
Stroking time	7, 15, 30, 60 seconds for 90° at 50 Hz
Output shaft	Ø 12 mm with □ 9,5 mm
Installation	in any position
Ambient temperature	-10 ÷ 60 °C
Weight	~ 2,5 kg
Main supply	24 V, 115 V, 230 Vac / 50-60 Hz
Adsorbed power	7 VA
Rating of el. Contacts limit and auxiliary switches	5 [1] A/250 Vac
Enclosure Rating	IP 54 according to IEC 529
Duty cycle	continuous 100%
Conduit knockouts	2 x Pg 13,5
Local	Auto/Manual Switch and Open/Close/Stop Switch.

### 3. INSTALLATION

- 3.1** The AR2 gear motor must be positioned so that the square shaft (POWER END) is turned towards the device to be put in motion.
- 3.2** If no other adjustment of the rotation angle is expressly requested, the AR2 gear motor is always supplied from the factory with standard adjustment of endswitches for a 90° rotation.
- 3.3** The square shaft on the POWER END side is positioned in the factory as shown in picture n. 1

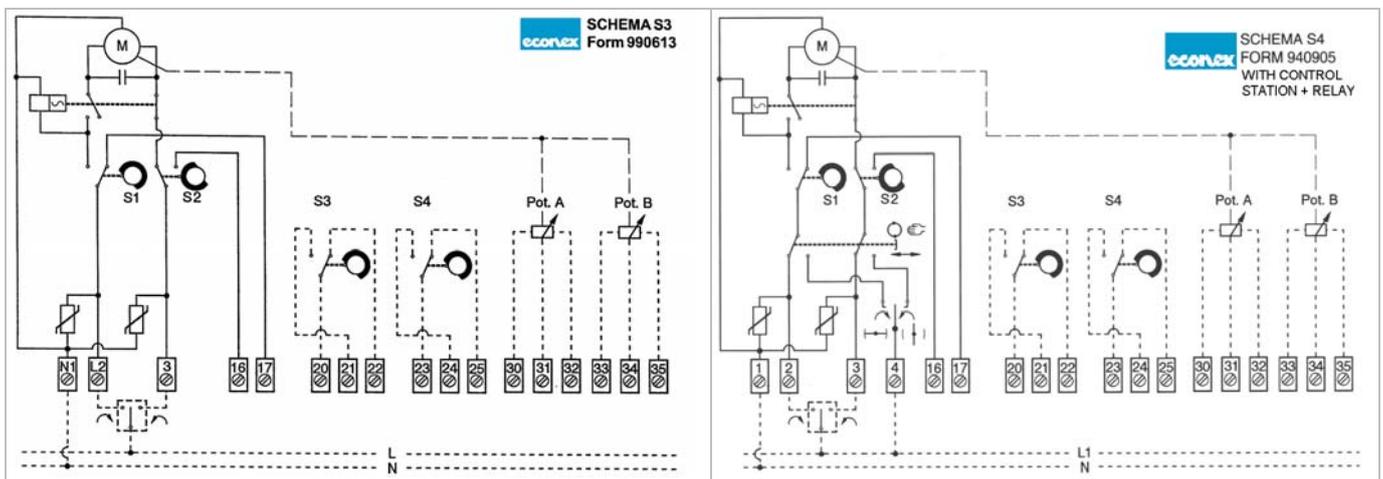


Picture n. 1

- 3.4** Viewing the POWER END side square shaft rotates:
- clockwise  $\cup$  (closes) feeding the terminals n. 1 – 2
  - counter clockwise  $\cup$  (opens) feeding the terminals n. 1 – 3
- 3.5** The AR2 gear motor must be free to be stopped by its electric endswitches; the installation of mechanical locks or the presence of other retainers can damage it.

## 4. ELECTRIC CONNECTIONS

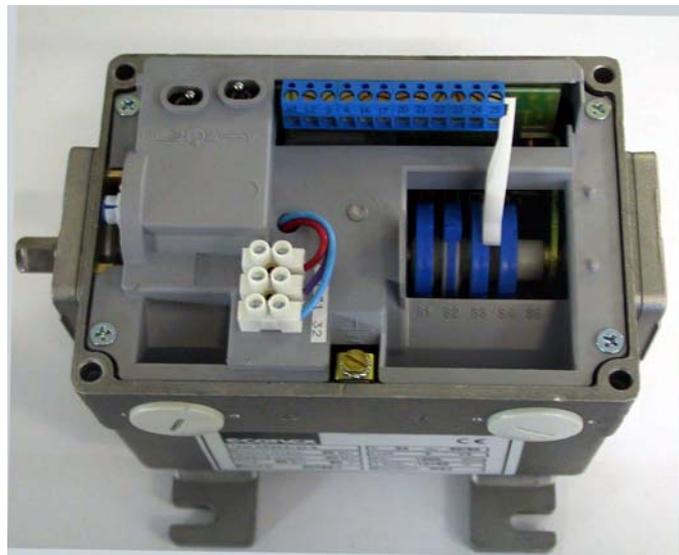
- 4.1** After having installed the AR2 gear motor and before fastening it mechanically to the device to be controlled, proceed with wiring and earthing.
- 4.2** The wiring diagrams are reported both in the attached technical bulletin and on the plate inside the cover.
- 4.3**  **Warning!** Before servicing 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 to the equipment may occur.
- 4.4** To accede to the internal wiring terminal board remove the cover by loosening the 4 fastening screws.
- 4.5** 2 threaded holes for the fitting of the conduit plug PG 13.5 are present on the frame of the AR2 gear motor.
- 4.6** 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 HO7V-U...G 1.5 mm<sup>2</sup>.
- 4.7** The wiring diagrams show the AR2 gear motor at end position closed (0°).
- 4.8** The auxiliary microswitches are single-pole double through and are voltage-free.
- 4.9** The auxiliary microswitches rating is 5(1)A/250 Va.c.
- 4.10** If a potentiometer is installed, its resistance value is indicated on the label.
- 4.11** Make sure that power supply and system frequency corresponds to the values indicated on the AR2 gear motor's plate.
- 4.12** The low-tension signalling 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.



## 5. CALIBRATION

### 5.1 ENDSWITCHES

- 5.1.1** As already reported in chapter 3 paragraph 3.2, the AR2 electric gear motor is supplied by the factory with adjustment foreseen for a 90° rotation angle; if rotation angles higher or lower than 90° are requested proceed as follows.
- 5.1.2** Disconnect the control lever system from the gear motor shaft and remove the cover.
- 5.1.3** For "CLOSED" position adjustment it is necessary to operate on cam "S1".  
For "OPEN" position adjustment, it is necessary to operate on cam "S2".
- 5.1.4** For cam adjustment the proper key supplied with the AR2 gear motor equipment and installed inside is to be used.
- 5.1.5** Use the key from the right side, introducing the pin into one of the holes on the sides of the blue cam of cam "S1" or "S2" according to the need and lever it to the desired angle position. (See picture 2).
- 5.1.6** 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.
- 5.1.7** Cam adjustment is possible in both directions and along the whole rotation angle of the camshaft.



Picture n. 2

- 5.1.8** Remove the key before servicing.
- 5.1.9** Run the AR2 gear motor for a few cycles making sure that the right cam adjustment has been achieved.
- 5.1.10** Once all adjustment have been carried out return the key inside the AR2 gear motor and reinstall the cover by fastening the 4 screws.
- 5.1.11** Reinstall the control lever system of the AR2 gear motor and test functioning of the whole system.

## 5.2 AUXILIARY MICROSWITCHES

**5.2.1** On the request the AR2 gear motor can be supplied with 2 or 3 auxiliary microswitches that can be adjusted in any position of the rotation angle.

**5.2.2** For adjusting the auxiliary microswitches' cams proceed as for endswitches' cams as indicated in paragraphs from 4.1.4 to 4.1.11.

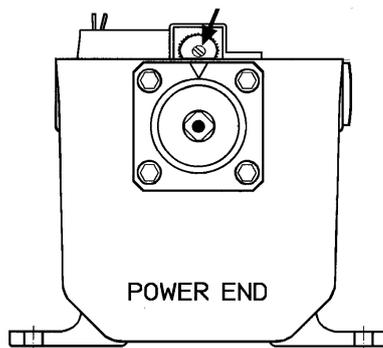
## 5.3 FEEDBACK POTENTIOMETER/S

**5.3.1** On request the AR electric rotary gear motor can be supplied with 1 or 2 feedback potentiometers (Pot. A and pot. B).

**5.3.2** The resistance value of the potentiometer is indicated on the label.

**5.3.3** If the resistance value does not correspond to the one wished in the shaft position, it is necessary to operate on the potentiometer shaft. During this operation the gear motor not run.

**5.3.4** The potentiometer shaft is frictioned and is accessible from the POWER END side. (See picture 3).



Picture n. 3

**5.3.5** Disconnect the cables connected with the regulation system from the respective terminals No. 30, 31, 32 (Pot. A) and, if necessary, from terminals No. 33, 34, 35 (Pot. B).

**5.3.6** By means of a cut screwdriver rotate the potentiometer shaft and measure the resistance value or 0 ohm in position "CLOSED" and the max. value in position "OPEN".

**5.3.7** The gearbox between the AR2 gear motor shaft and the potentiometer shaft is foreseen for a 90° rotation angle. Hence, should the rotation angle of the gear motor shaft be adjusted for a rotation lower than 90°, and then the variation of the resistance value will be proportionally reduced.

If, on the contrary, the rotation angle has been adjusted for an angle higher than 90° there will be no further increase in resistance when the gear motor shaft is over 90°.

**5.3.8** By rotating the potentiometer:

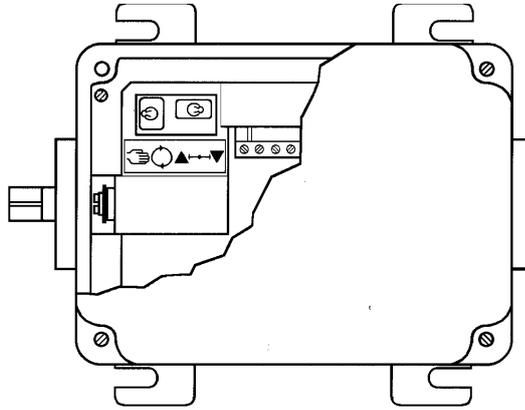
- clockwise ↻ the resistance value increase

- counter clockwise ↻ the resistance value decreases.

## 6. CONTROL STATION

For the AR2 gear motors equipped with control station proceed as follows.

### 6.1 Connect phase L1 to terminal n. 4.



Picture n. 4

### 6.2 Position the switch AUTO/MAN on manual position shown by hand picture

### 6.3 Switch on / switch off as follows:

- 6.3.1 By positioning the switch on the symbol: ▲ (open) the square shaft rotates counter clockwise  $\curvearrowright$  and the motor opens (cam S2 adjusts end position "open");
- 6.3.2 By positioning the switch on the symbol: ▼ (closed) the square shaft rotates clockwise  $\curvearrowleft$  and the motor closes (cam S1 adjusts end position "closed").
- 6.3.3 By positioning the switch in the middle the motor does not run.

## **7. MAINTENANCE AND CHECKS**

### **7.1 MAINTENANCE**

The AR2 gear motor does not require any particular current maintenance.

The AR2 gear motor does not require any lubrication since the gear mechanism is immersed in a grease bath.

It is not advisable to perform any repair on field.

Do not disassemble any internal part of the AR2 gear motor. In case of non-functioning, after having performed all possible checks on field, the gear motor must be returned to the factory for any possible repair.

Any replacement must be carried out by qualified technicians only.

### **7.2 CHECKS**

After installation and adjustment of the control lever system check that switch and wiring of the circuit are correct.

Check that the AR rotary gear motor duly controls the device it is meant for.

Check that the AR2 gear motor runs in accordance with the given manual input.

Check that the AR2 gear motor, the lever system and the controlled device are mechanically connected in a correct and safe way.

Check that the levers' movements occur smoothly without jamming or blocking due to other objects.

## **8. REPLACEMENT**

In case replacement of the AR2 gear motor is necessary, proceed as follows:

- disconnect power supply from the AR motor
- remove the gear motor's cover
- disconnect electric wiring
- remove the levers between the AR2 gear motor and the controlled device
- install the new gear motor proceeding as per instructions given in the foregoing chapters