Operating and installation instructions
Electronic positioner ES11

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Rev. 0040601000 2416 english (englisch) - Translated original instructions -
1.0 General information on operating instructions

These operating instructions provide information on mounting and maintaining the electronic positioners. Please contact the supplier or the manufacturer in case of problems which cannot be solved by reference to the operating instructions.

They are binding on the transport, storage, installation, start-up, operation, maintenance and repair.

The notes and warnings must be observed and adhered to.

- Handling and all work must be carried out by expert personnel or all activities must be supervised and checked.

It is the owner’s responsibility to define areas of responsibility and competence and to monitor the personnel.

- In addition, current regional safety requirements must be applied and observed when taking the fittings out of service as well as when maintaining and repairing them.

The manufacturer reserves the right to introduce technical modifications at any time.

These Operating Instructions comply with the requirements of EU Directives.

2.0 Notes on possible dangers

2.1 Significance of Symbols

ATTENTION !

Warning of general danger.

ATTENTION !

Warning of dangerous voltage.

2.2 Explanatory notes on safety information

In these Operating and Installation Instructions dangers, risks and items of safety information are highlighted to attract special attention.

Information marked with the above symbol and “ATTENTION !” describe practices, a failure to comply with which can result in serious injury or danger of death for users or third parties or in material damage to the system or the environment. It is vital to comply with these practices and to monitor compliance.

All other information not specifically emphasised such as transport, installation, operating and maintenance instructions as well as technical data (in the operating instructions, product documentation and on the device itself) must also be complied with to the fullest extent in order to avoid faults which in turn can cause serious injury to persons or damage to property.

3.0 Storage and transport

- At -20° to +70°C dry, free from dirt.
- Do not unpack electronics prior to installation.
- Protect against external force (impact, vibration etc.).
- Do not soil or damage type identification plate and wiring diagram on the controller.
4.0 Description

4.1 Scope of application

The ES11 electronic positioner is used wherever 3-step actuators (servo drives) are to be activated with standardised electrical signals.

The ES11 electronic positioner is suitable for control cabinet installation as well as installation in servo actuators of the series ARI-PREMIO and ARI-CS25 to CS27.

The ambient conditions have to be conform to the actual electromagnetic compatibility directives. Additional the compatibility to this directives has to be maintained in case of expansion or other changings of the ambient conditions.

4.2 Operating principle

The ES11 electronic positioner converts constant input signals (current signals up to 20 mA, voltage signals up to 10 V) into 3-step output signals. Electrical actuators are connected to the 3-step output signal. The electronic positioner and actuator make up a control circuit. The actuating signal is selected by means of corresponding terminal connections. LEDs indicate control direction and operation stand-by.

The red and green LEDs facilitate adaptation of the resistor input to the actuating signal. The settings are made by means of trim potentiometers.

The control stage is galvanically (electrically) isolated from the power input.

ATTENTION!

To facilitate use in 3-conductor wiring, the ground input may be connected to the N contact of the power input only in the 24 V AC version.

The new contact is then referred to as zero potential (0V).

Split range operation is possible in steps of 20%.

The effective direction ratio of the actuating signal input to the actuating signal output can be selected with the effective direction selector switch SW.

4.3 Technical data

<table>
<thead>
<tr>
<th>Operating Voltage UB</th>
<th>U_B (24V 50-60Hz) -20% +10%</th>
<th>115V 50-60Hz -20% +10%</th>
<th>230V 50-60Hz -20% +10%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating current without load IB</td>
<td>150 mA</td>
<td>40 mA</td>
<td>20 mA</td>
</tr>
<tr>
<td>3-step switching current I_S</td>
<td>4A / cos φ 0.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hysteresis</td>
<td>&lt; 0.6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input signal Y_U</td>
<td>....10V DC (R_I =30 kOhm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input signal Y_I</td>
<td>....20mA DC (R_I =125 Ohm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potentiometer input R_P</td>
<td>0....10kΩ, preferably 0....1kΩ (use potentiometer only as a voltage divider)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of enclosure</td>
<td>IP40 (clamps IP20)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>-20....+70 °C</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.4 Split range

In split range mode, it is possible to utilise only part ranges of the entire actuating signal. For example, the actuating signal 0...20 mA sets the part range 50...100%, which corresponds to the range 10...20 mA.

The part ranges are set with the zero point adjusting screw (N) and with the slope span adjusting screw (S).

Infinitely variable part ranges over 20% are possible.

The smallest possible part ranges are specified in the table below.

<table>
<thead>
<tr>
<th>0-20%</th>
<th>0-40%</th>
<th>0-60%</th>
<th>0-80%</th>
<th>0-100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-40%</td>
<td>20-60%</td>
<td>20-80%</td>
<td>20-100%</td>
<td></td>
</tr>
<tr>
<td>40-60%</td>
<td>40-80%</td>
<td>40-100%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60-80%</td>
<td>60-100%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>80-100%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.5 Dimensions

fig. 1
## 5.0 Installation

<table>
<thead>
<tr>
<th>ATTENTION !</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work on electrical systems or equipment must only be carried out by qualified electricians or by trained individuals under the guidance and supervision of a qualified electrician in compliance with regional electrical requirements and regulations.</td>
</tr>
<tr>
<td>When connecting electronics the supply line must be disconnected from the mains (not live) during connection work. Non-compliance may result in death, serious injury or substantial damage to property.</td>
</tr>
<tr>
<td>- The power supply and data provided on the type identification plate must agree.</td>
</tr>
<tr>
<td>- Do not touch live parts when carrying out adjustments.</td>
</tr>
<tr>
<td>- Take particular caution at voltages above 24 V!</td>
</tr>
<tr>
<td>- Do not disconnect or connect series isolating terminals with the power on!</td>
</tr>
<tr>
<td>- Ground connection between N and ▼ is only permitted in the 24 V version.</td>
</tr>
<tr>
<td>- Only one actuator is to be connected at any one time.</td>
</tr>
<tr>
<td>- Do not overshoot the range of the actuator when carrying out adjustments, danger of damage.</td>
</tr>
<tr>
<td>- Ensure that the motor connected in the actuator switches off in the end positions based on distance or torque.</td>
</tr>
</tbody>
</table>

### 5.1 General notes on installation

The electronic positioner ES11 can be installed in a control cabinet, in the ARI-PREMIO actuator and in the CS25 to CS27 actuators.

The electronic positioner ES11 can be retrofitted in the ARI-PREMIO actuator.

The electronic positioner ES11 can only be retrofitted under certain conditions in the CS25 to CS27 actuators.

Obtain technical details directly from the manufacturer.

- Regional electrical requirements and regulations must be observed when laying electricity lines and making electrical connections.
- The cable cross-section must always correspond to the relevant input current and the cable length.
- The rated mains voltage and mains frequency must agree with the data on the type identification plate.

Mains power fuse protection, installation side: 6 A max.

### 5.2 Installation in Control Cabinet

- The controller is mounted on a profile rail in the control cabinet in accordance with DIN 46277.
- The mounting grid for control panel installation is L 58 mm x W 35 mm.
- A connector which can be mounted on rails is provided to facilitate installation in a control cabinet.

Installation parts:

- 1 Electronic positioner ES11
- 1 Connector for rail mounting
5.3 Installation in ARI-PREMIO actuator

Refer to figures below for installation in ARI-PREMIO actuator.

fig. 2: Installation RI21 / ES11 ARI-PREMIO 2,2 - 15 kN

Installation procedure:

Carefully remove cover.

A  Fit mounting bracket (50.80) at point on gear cover provided for this purpose. Secure with two socket head cap screws (50.81) DIN EN ISO 4762 - M4x8.

B/C Secure the electronic positioner ES11 (50.78/79) with two socket head cap screws (50.82) DIN EN ISO 4762 - M4x12 on mounting bracket (50.80).

ATTENTION!
For potentiometer installation, refer to ARI-PREMIO operating and installation instructions.

Installation parts:

- 1 Electronic positioner ES11
- 1 Mounting bracket ES11/RI21
- 2 Socket head cap screws DIN EN ISO 4762 - M4x8
- 2 Socket head cap screws DIN EN ISO 4762 - M4x12
- 1 1000 Ohm potentiometer
- 1 Potentiometer cable
- 2 PT screws KB 22x8 WN1412-Zi
- 1 Sliding block
- 1 Torsion spring
- 1 Spring washer 5mbo
- 1 Spur gear
  - 16 teeth for 20 mm stroke, or
  - 24 teeth for 30 mm stroke, or
  - 39 teeth for 50 mm stroke, or
  - 49 teeth for 65 mm stroke
5.4 Installation in CS25 to CS27 actuator

Refer to figure below for installation in CS25 to CS27 actuator.

Installation procedure:
- Carefully remove cover.
- Loosen capacitor, for this purpose, release corresponding cable ties.
- Secure capacitor plate with screw DIN EN ISO 4762 - M8x10 on to gearbox cover.
- Install capacitor on capacitor plate
- Secure mounting bracket on gearbox cover with two self-tapping screws M4x8 DIN 7500.
- Secure ES11 to mounting bracket with two socket head cap screws DIN EN ISO 4762 - M4x12.
- Connect cable of CS electronic positioner to terminal block and plug into ES11 cable.
- Tie together newly installed cables with cable ties.
- Remove old circuit diagrams from cover and affix new circuit diagram in cover.

**ATTENTION !**

*For potentiometer installation, refer to operating instructions for CS actuators.*

Mounting parts:
- 1 Electronic positioner ES11
- 1 Mounting bracket ES11/RI21
- 2 Socket head cap screws DIN EN ISO 4762 - M4x12
- 1 Socket head cap screws DIN EN ISO 4762 - M8x10
- 1 Capacitor plate
- 2 Self-tapping screws DIN 7500 - M4x8
- 1 1000 Ohm potentiometer, soldered
- 2 Lock rings for potentiometer
- 1 Pinion for potentiometer
- 1 CS electronic positioner cable
- 1 Circuit diagram ES11 + CS25
- 2 Cable ties
5.5 Electrical connection

5.5.1 Circuit diagram

fig. 4
5.5.2 Terminal assignments

Power input
N........Terminal - power input ..............Neutral conductor
L ..........Terminal - power input ..............Phase

Actuating signal input
Y_I........Terminal - input signal ................+...20 mA DC
Y_U........Terminal - input signal ................+...10 V DC
\( \perp \) ........Terminal - ground, GND ..............0 V

Potentiometer input
R_P ........Potentiometer ..........................0...1000 \( \Omega \)
R_A ........Terminal - potentiometer input .......(yellow wire)
R_B ........Terminal - potentiometer input .......(grey wire)
R_C ........Terminal - potentiometer input .......(red wire)

Three-step actuating signal output
(via cable with isolating terminal to actuator)
L\( \uparrow \)..........black (violet), phase switched in open direction
L\( \downarrow \)..........brown, phase switched in close direction
N ............blue, neutral conductor

AC motor
M ..........AC motor with start-up capacitor

5.5.3 Connection conditions

All electrical terminals are connected to the ES11 by means of series isolating terminals. The suitable conductor cross-sections for connecting the terminals are 0.2 to 2.5 mm\(^2\). To achieve optimal electromagnetic compatibility it is recommended to use shielded cables for connecting potentiometers or standardized active current or voltage signals.

Electromagnetic interference (EMI) on the actuating signal \( Y_I \) or \( Y_U \) can be suppressed to a great extent by subsequently installing a filter to the actuating signal input.

Please contact the manufacturer direct for technical information.

**ATTENTION !**

To facilitate use in 3-conductor technology, the ground input \( \perp \) may be connected to the N contact of the power input only in the 24 V AC version. The new contact is then referred to as zero potential (0V).

If installed in a 3-conductor technology with strong electromagnetic influence this can lead to disturbances. In this case don't join the ground input \( \perp \) with the mainfuse N.

Fuse protection of mains power supply on system side: 6 A max.
5.6 Connection in control cabinet

The voltage supply is connected to terminals N and L in accordance with the type identification plate.

Power input for connection in control cabinet

Actuating signal input for connection in control cabinet

The actuating signal input ...20 mA is connected to terminals \( Y \uparrow \) and \( \perp \).
The actuating signal input ...10 V is connected to terminals \( Y \downarrow \) and \( \perp \).

**ATTENTION !**

*Only one actuating signal input may be connected at any one time.*

Potentiometer input for connection in control cabinet

A 1000 Ohm potentiometer is connected to terminals \( R_A, R_B, R_C \).
The wiper is connected to \( R_B \).

With extended actuator stem, there are 0 Ohms between \( R_B \) and \( R_C \).

Three-step actuating signal output for connection in control cabinet

The cable with the isolating terminal \( N \downarrow L \uparrow \) is plugged into the enclosed rail-mounted connector. The actuator is connected to the side terminal connections \( N \downarrow L \uparrow \).

\[ L \uparrow \text{.................Phase switched in open direction} \]
\[ L \downarrow \text{.................Phase switched in close direction} \]
\[ N \text{.................Neutral conductor} \]
5.7 Connection in ARI-PREMIO (circuit diagram)

5.7.1 ARI-PREMIO 2,2 - 5 kN

fig. 6
5.7.2 ARI-PREMIO 12 - 15 kN without integrated reversing contactor

![Diagram of electronic positioner ES11 with wiring connections and valve configurations.

Legend:
- Blue
- Brown
- Black

Straight through valve:
- N off
- 11 closed
- 14 open

3-way valve with diverting plug:
- N off
- A-B
- 11 closed
- 14 open

3-way valve with mixing plug:
- N off
- A-B
- 11 open
- 14 open

fig. 7
5.7.3 ARI-PREMIO 12 - 15 kN with integrated reversing contactor

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5.8 Connection in ARI-PREMIIO (description)

Also refer to ARI-PREMIIO operating instructions

**Power input for connection in ARI-PREMIIO**

The voltage supply is connected to terminals N and L in accordance with type identification plate.

**Actuating signal input for connection in ARI-PREMIIO**

ATTENTION!

Only one actuating signal input may be connected at any one time.

The actuating signal input ...20 mA is connected to terminals Y₁ and ⌞.

The actuating signal input ...10 V is connected to terminals Y₂ and ⌞.

**Potentiometer input for connection in ARI-PREMIIO**

ATTENTION!

When installing the potentiometer, observe the operating instructions for the electrical linear actuator ARI-PREMIIO.

Plug connector RA, RB, RC from potentiometer cable into ES11 and connector 25, 26, 27 into ARI-PREMIIO pin block.

**Three-step actuating signal output for connection in ARI-PREMIIO**

Plug connector N L↓ L↑ of electronic positioner ES11 cable into pin block 1, 11, 14 of ARI-PREMIIO.
5.9 Connection in CS25 to CS27 actuator (circuit diagram)
5.10 Connection in CS25 to CS27 actuator (description)

Refer to CS25 to CS27 operating instructions

**Power input for connection in CS actuator**

The voltage supply is connected to terminals N and L in accordance with the type identification plate.

**Actuating signal input for connection in CS actuator**

The actuating signal input ...20 mA is connected to terminals Y₁ and L.  
The actuating signal input ...10 V is connected to terminals Y₂ and L.

**ATTENTION !**  
Only one actuating signal input may be connected at any one time.

**Potentiometer in CS actuator**

**ATTENTION !**  
When installing the potentiometer, refer to operating instructions for electrical linear actuator CS25.

Plug connector RA, RB, RC from potentiometer cable into the electronic positioner ES11.  
Unscrew connector 25, 26, 27 and connect cable in actuator.

RA ...............Terminal - potentiometer input (yellow cable) ..........to terminal 27 (30)  
RB ...............Terminal - potentiometer input (grey cable).............to terminal 26 (29)  
RC ...............Terminal - potentiometer input (red cable) ..............to terminal 25 (28)

**Three-step actuating signal output in CS actuator**

Plug connector N L↓ L↑ from ES11 cable into pin strip of CS electronic positioner cable.  
Connect CS electronic positioner cable to terminal block of CS actuator.

- blue.................... - to terminal 1  
- brown................... - to terminal 11  
- black, (violet) ....... - to terminal 14

**Wire jumpers in CS actuator**

Connect wire jumpers at terminal block of CS actuator.  
Connect jumper between terminals 2 and 13  
Connect jumper between terminals 3 and 10
6.0 Starting up

**ATTENTION !**

- The thrust actuator should only be operated for short periods without a hood when carrying out essential adjustments to potentiometers, directional switches and electrical options. During such activities the thrust actuator has hazardous live, bare parts as well as moving and rotating parts.

- Careless or unprofessional adjustments can lead to death, serious physical injury or substantial damage to property.

- Operating the thrust actuator without a hood is prohibited for any purpose other than that described above.

- Electronics must be moisture-free.

Before starting up a new system or restarting a system following repair or modification check:

- that regional safety instructions have been complied with as a matter of principle

- that the data on power supply, actuating signal and ambient temperature are consistent with the technical data on the electronics.

- that all work has been properly completed!

**ATTENTION !**

- The adjustment to the ES11 can only be performed when the actuator is mounted onto a valve.

  - Observe the order of the settings:
    1. Potentiometer (refer to 6.2)
    2. Effective direction (refer to 6.4)
    3. Zero point (refer to 6.5)
    4. Slope span (refer to 6.6)

- In case of subsequent changes to a setting, the following settings must be readjusted!

  - **Example:**
    If the type of control signal (point 2) is changed, the zero point (point 3) and the slope span (point 4) must be readjusted.

The hood must be installed after completing the adjustments!
6.1 Factory setting
Upon delivery of the ES11 with a cpl. control device (valve and actuator), the potentiometer and the ES11 are adjusted by factory to its valve travel. The factory setting is indicated with a waterproof marker or a sticker on the nameplate.
If the order was given without indication of a special control signal, the default is 4-20mA. 4mA for a closed valve.

6.2 Setting of potentiometer
To adjust the potentiometer in the actuator, the operating instructions of the corresponding actuator have to be observed.
a) Switch-off mains voltage and secure against unintentional reconnection.
b) Move the actuator stem with the handwheel to the fully extended position

c) Turn the potentiometer to 0 Ohm position.
   - At PREMIO-actuator turn the potentiometer spindle counter-clockwise until it stops (0 Ohm position).
   - For inspection, the resistance of the potentiometer must be measured with an ohmmeter.
   For resistance measurement disconnect the potentiometer from the ES11 positioner.
   First measurement contact .................RB - grey cable...... - PREMIO terminal 26 (29)
   Second measurement contact .................RC - red cable........ - PREMIO terminal 25 (28)
   With completely extended actuator spindle, it must be approx. 0 Ohm between the first and second measuring contact.

d) Turn thrust actuator with manual handwheel into cpl. retracted position and read the corresponding resistance value at the Ohmmeter.
   - With cpl. retracted actuator stem, 750th...1100 Ohm must lie between the first and second measuring contact.

e) Connect the potentiometer with the ES11 positioner again.

6.3 Type of control signal
The selection of the required control signal, is done by corresponding clamp connection.

<table>
<thead>
<tr>
<th>Type of control signal</th>
<th>clamp connection at:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage signal</td>
<td>Y_U and GND</td>
</tr>
<tr>
<td>max. 10 V DC for e.g. 0-10V</td>
<td></td>
</tr>
<tr>
<td>Current signal</td>
<td>Y_I and GND</td>
</tr>
<tr>
<td>max. 20mA DC for e.g. 4-20mA</td>
<td></td>
</tr>
</tbody>
</table>

It may be only one control signal connected.

6.4 Setting of effective direction SW
At the switch SW, the effective direction of the control signal is adjusted to the thrust direction.
Take the switch to the desired position.  

Fig. 10
6.5 Zero point setting

**ATTENTION !**

- Observe the order of the settings:
  1. Potentiometer (refer to 6.2)
  2. Effective direction (refer to 6.4)
  3. Zero point (refer to 6.5)
  4. Slope span (refer to 6.6)

- In case of subsequent changes to a setting, the following settings must be readjusted!

a) The voltage supply must be disconnected before carrying out any setting work.
b) Turn the valve stem with the handwheel for the min. control signal in the desired position, e.g. 4mA or 0V, (according to the switch position SW and as shown in Fig. 11: Effective direction). Typically this will be the closed valve.
c) Set the input signal to the minimum required value, e.g. 4mA or 0V.
d) Disconnect the line separating terminal X25 or X28 to the motor and let it be separated.
e) Connect voltage at L and N from the 2-pin series isolating terminal, the yellow LED must be lit.
f) Turn zero point adjusting screw N until the green and the red LEDs are no longer lit (the slip clutch cuts in after 25 turns).
   If the green LED lights, turn in clockwise direction.
   If the red LED lights, turn in anticlockwise direction.
g) If the actuator is at an end position and should it be switched-off by actuating force at this position, turn the zero point adjusting screw N, so that the green LED lights up just before it’s release operating point.
6.6 Slope span setting

**ATTENTION !**

- Observe the order of the settings:
  1. Potentiometer (refer to 6.2)
  2. Effective direction (refer to 6.4)
  3. Zero point (refer to 6.5)
  4. Slope span (refer to 6.6)

- In case of subsequent changes to a setting, the following settings must be readjusted!

a) Turn the valve stem with the handwheel for the max. control signal in the desired position, e.g. 20mA or 10V (according to the switch position SW and as shown in Fig. 11 : Effective direction). Typically this will be the opened valve.

b) Set the input signal to the maximum required value, **e.g. 20 mA or 10 V**.

c) Then turn the slope span adjusting screw S until the **green** and **red** LEDs are no longer lit (the slip clutch cuts in after 25 turns).

   If the **green** LED is lit, turn in **clockwise** direction.

   If the **red** LED is lit, turn in **anticlockwise** direction.

d) If the actuator is at an end position and should it be switched-off by actuating force at this position, turn the slope span adjusting screw S, so that the red LED lights up just before it’s release operating point.

e) Switch-off the power supply at ES11, and plug in the series isolating terminal X25 or X28 to the motor again.

f) The electronic positioner ES11 is now ready for operation after connecting the actuating signal and the voltage supply.

7.0 Care and maintenance

The electronic positioner ES11 requires little maintenance so that specific maintenance tasks are not specified at set intervals. Dirt which may build up on the outside should be cleaned from the electronic positioner ES11 corresponding to operating conditions.

**ATTENTION !**

Before cleaning electronics the supply line must be disconnected from the mains (not live). It must be impossible to switch the power on unintentionally while the mains are disconnected in this way.

*Failure to comply may result in death, serious injury or substantial damage to property.*

The electronic positioner ES11 must not be cleaned with watery liquids or with solvents or detergents which are aggressive, harmful or highly flammable.

Before cleaning, the detergent should preferably be applied to a cleaning cloth. Liquids must not penetrate into the inside of the electronic positioner.
8.0 Troubleshooting

In the event of malfunction or faulty operating performance check that the installation and adjustment work has been carried out and completed in accordance with these Operating Instructions.

ATTENTION!
- It is essential that the safety regulations are observed when identifying faults.

If malfunctions cannot be eliminated with the help of the following table “9.0 Troubleshooting table”, the supplier or manufacturer should be consulted.

9.0 Troubleshooting table

ATTENTION!
- read point 10.0 and 11.0 prior to dismantling and repair work!
- read point 6.0 before restarting the plant!

<table>
<thead>
<tr>
<th>Faults</th>
<th>Possible causes</th>
<th>Corrective measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow LED is not lit</td>
<td>- Mains failure</td>
<td>- Check power supply</td>
</tr>
<tr>
<td></td>
<td>- Incorrect operating voltage</td>
<td>- Connect operating voltage in accordance with type identification plate</td>
</tr>
<tr>
<td></td>
<td>- Electronic positioner burnt out</td>
<td>- Check whether mains voltage agrees with the voltage specified on type identification plate. Replace electronic positioner.</td>
</tr>
<tr>
<td></td>
<td>- Connection terminal not connected correctly or cable has no contact in connection terminal</td>
<td>- Firmly plug in connection terminal and check connection cable</td>
</tr>
<tr>
<td>Electronic positioner cannot be adjusted</td>
<td>- Potentiometer not connected correctly</td>
<td>- Check connections</td>
</tr>
<tr>
<td></td>
<td>- Potentiometer has incorrect value rating</td>
<td>- Replace potentiometer by 1000 Ω potentiometer</td>
</tr>
<tr>
<td></td>
<td>- Potentiometer connected to incorrect terminal</td>
<td>- Correct connection in accordance with circuit diagram</td>
</tr>
<tr>
<td></td>
<td>- Actuating signal not applied</td>
<td>- Connect actuating signal</td>
</tr>
<tr>
<td></td>
<td>- Actuating signal connected to incorrect terminal</td>
<td>- Correct connection in accordance with circuit diagram</td>
</tr>
<tr>
<td></td>
<td>- Adjusting screws <strong>N</strong> (zero point) and <strong>S</strong> (slope span) are out of range</td>
<td>- Carry out settings as described under 6.0 to 6.6</td>
</tr>
<tr>
<td></td>
<td>- Effective direction switch <strong>SW</strong> switched incorrectly</td>
<td>- Switch effective direction switch in accordance with 6.4</td>
</tr>
<tr>
<td></td>
<td>- Switching outputs to motor burnt out</td>
<td>- Check whether motor or supply line has a short.Replace electronic positioner</td>
</tr>
<tr>
<td>Outputs swing at short intervals between clockwise and counter-clockwise</td>
<td>- Adjusting screws not set in standard control range</td>
<td>- Carry out settings as described under 6.0 to 6.6</td>
</tr>
<tr>
<td>- Potentiometer not OK.</td>
<td>- Replace potentiometer</td>
<td></td>
</tr>
<tr>
<td>- Electromagnetic interference of actuating signal</td>
<td>- Install filter to actuating signal input</td>
<td></td>
</tr>
<tr>
<td>Motor in actuator does not operate but LEDs are lit</td>
<td>- Electrical connection from electronic positioner to actuator not OK.</td>
<td>- Check electrical connections and terminals</td>
</tr>
<tr>
<td>- Electronic positioner outputs are burnt out</td>
<td>- Check whether motor voltage agrees with the voltage specified on the type identification plate. Check whether the motor or supply line has a short. Replace electronic positioner</td>
<td></td>
</tr>
<tr>
<td>- Cable connection not OK.</td>
<td>- Check cable connection for correct wiring and electrical contact.</td>
<td></td>
</tr>
<tr>
<td>- Motor burnt out.</td>
<td>- Check whether motor or supply line has a short. Replace motor.</td>
<td></td>
</tr>
<tr>
<td>Motor in actuator operates in only one direction</td>
<td>- The positioner switch in the actuator limits the control range</td>
<td>- Check cable connection for correct wiring and contact</td>
</tr>
<tr>
<td>- Cable connection not OK</td>
<td>- Check whether motor or supply line has a short.</td>
<td></td>
</tr>
<tr>
<td>- Only one electronic positioner output burnt out - Adjust position switch</td>
<td>- Replace electronic positioner.</td>
<td></td>
</tr>
<tr>
<td>Actuator does not cover entire control range</td>
<td>- Spur gear transmission ratio at potentiometer incorrect</td>
<td>- Adapt spur gear transmission ratio to control range</td>
</tr>
<tr>
<td>- Adjusting screws N (zero point) and S (slope span) out of range</td>
<td>- Carry out settings as described under 6.0 to 6.6</td>
<td></td>
</tr>
</tbody>
</table>
10.0 Dismantling of the electronic positioner

**ATTENTION!**
- Before dismantling the electronics the supply line must be disconnected from the mains (not live). It must be impossible to switch the power on unintentionally while the mains are disconnected in this way.
- The actuating signal must be switched off.

11.0 Warranty / Guarantee

The extent and period of warranty cover are specified in the "Standard Terms and Conditions of Albert Richter GmbH & Co. KG" valid at the time of delivery or, by way of departure, in the contract of sale itself.

We guarantee freedom of faults in compliance with state-of-the-art technology and the confirmed application.

No warranty claims can be made for any damage caused as the result of incorrect handling or disregard of operating and installation instructions, datasheets and relevant regulations.

This warranty also does not cover any damage which occurs during operation under conditions deviating from those laid down by specifications or other agreements.

Justified complaints will be eliminated by repair carried out by us or by a specialist appointed by us.

No claims will be accepted beyond the scope of this warranty. The right to replacement delivery is excluded.

The warranty shall not cover maintenance work, installation of external parts, design modifications or natural wear.

Any damage incurred during transport should not be reported to us but rather to the competent cargo-handling depot, the railway company or carrier company immediately or else claims for replacements from these companies will be invalidated.