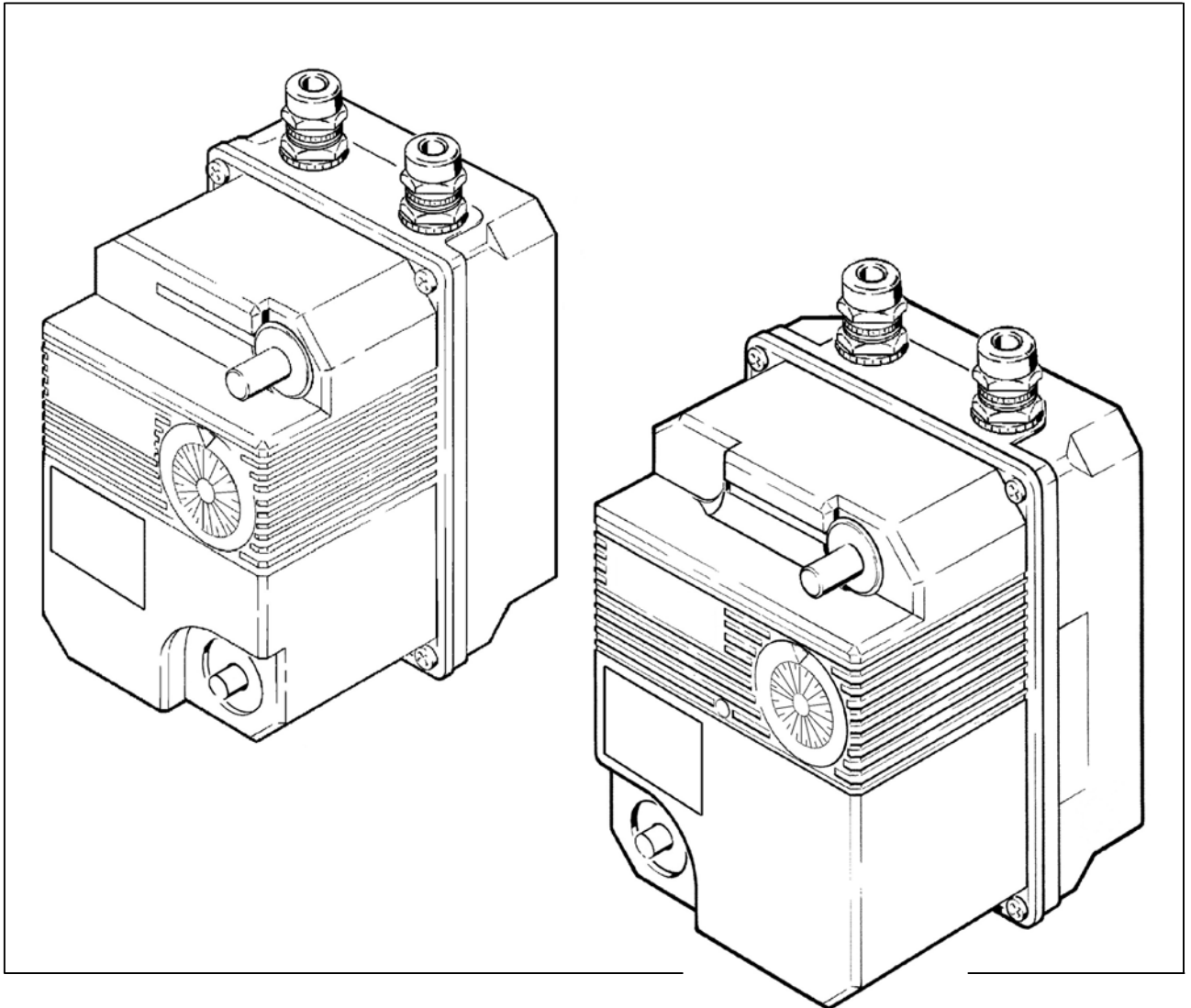


Mounting and Operating Instructions

Electrical position controller

Series ER 20/ER 50





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Documentation overview

The overall documentation on the **ER 20/ER 50 electrical position controllers** comprises the following:

- **Product-specific information**
- **Mounting and operating instructions***

* this is the present documentation.

To request these documents, please apply to **Stegmann GmbH & Co. KG**.

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1 Foreword

These mounting and operating instructions are intended to give you the knowledge which is necessary for you to be able to carry out the mounting and adjustment of an **ER 20/ER 50 position controller** rapidly and correctly.



Please read these instructions through carefully and pay particular attention to the advice and warning notes!

The position controllers bearing the designation ES 20 / ES 50 operate with a motor voltage of 115 or 230 V AC.

The **ER 20/ER 50 position controllers** are supplied in various versions, depending on

- the actuating time for 90° rotation angle in each case,
- the operating voltage,
- the range of adjustment (maximum number of revolutions of the output drive shaft),
- the design of the output drive shaft,
- the direction of rotation of the output drive shaft with increasing setpoint and
- the type of drive.

In addition, the **Options Manual adjustment** and **Position indication** in degrees or per cent are available.



In addition, each individual position controller is set at the manufacturer in accordance with installation-specific conditions!

The fields of use of these position controllers are predominantly

- in industrial fittings
- in chemical installations
- in ventilation and blower construction
- in heating and air-conditioning technology
- in machine and plant construction
- in water treatment, etc.

If you have any questions in relation to the **ER 20/ER 50 position controllers**, we shall be pleased to answer them.

The telephone number will be found on the inside front cover of these mounting and operating instructions.

Stegmann GmbH & Co. KG

2 General Advice

2.1 Validity

These mounting and operating instructions apply to Standard versions of the **ER 20/ER 50 electrical position controllers**.

2.2 Inward monitoring

- Check
 - directly after delivery the position controller for any **transport damage** and deficiencies.
 - with reference to the accompanying **delivery note** the number of parts.
- Do not leave any parts in the packaging.

2.3 Scope of supply

- position controller
- metric screw fittings
- crank for manual adjustment (only with manual adjustment option)

2.4 Complaints

Claims for compensation which relate to transport damage can only be considered valid if the delivery company is notified without delay.

- For returns (because of transport damage/repairs), prepare a damage report immediately and send the parts back to the manufacturing plant, if possible in the original packaging.
- Attach the following information to the return:
 - name and address of the receiver
 - reference/order/part number
 - description of the defect.

2.5 Guarantee

For the **ER 20/ER 50 position controllers** we give a guarantee period in accordance with the general delivery conditions (ALB) of **Stegmann GmbH & Co. KG** which apply at the time of the order.

2.6 Proper use

The ES 20 LC / ES 50 LC actuators must be used only for the purpose corresponding to the construction – the electrical adjustment of actuating elements provided for the purpose.

Any further use going beyond this is deemed to be improper and can lead to personal injury or damage to property.

Warning!

The actuators are not stall-proof.

2.7 Symbols and their meaning



Paragraphs which are identified with this symbol contain very important advice; this also includes advice **for averting health risks**.

Observe these paragraphs without fail.



Paragraphs which are identified with this symbol contain very important advice; this also includes **how to avoid damage to property**.

Observe these paragraphs without fail.



This symbol indicates paragraphs which contain comments/advice or tips.

- This bullet identifies the description of actions which you should carry out.
- This dash identifies lists.

3 Safety Advice



Depending on the technical circumstances and the time under and at which the position controller is mounted, adjusted and commissioned, you must in each case take into account particular safety aspects.

If, for example, the position controller actuates a slide in an operational chemical plant, the potential hazards of commissioning have another dimension from that when this is only being carried out for test purposes on a “**dry**” part of the plant in the assembly room.

Since we do not know the circumstances at the time of the mounting/readjustment/commissioning, you may find advice on hazards in the following descriptions which are not relevant to you.

Please observe (only) the advice which applies to your situation.

3.1 Personal protection

3.1.1 Safety advice for mounting



We wish to point out expressly that the mounting, the electrical installation and the readjustment of the ER 20/ER 50 must be carried out only by trained specialist personnel having sound mechanical and electrical knowledge.

- Switch off all the devices/machines/plant affected by mounting or repair.
If appropriate, isolate the devices/machines/plant from the mains.
- Check (for example in chemical plants) whether the switching off of devices/machines/plant will cause potential danger.
- If appropriate, in the event of a fault in the position controller (in a plant which is in operation) inform the shift foreman/safety engineer or the works manager without delay about the fault, in order, for example, to avoid an outflow/overflow of chemicals or the discharge of gases in good time by means of suitable measures.
- Before mounting or repair, remove the pressure from pneumatic/hydraulic devices/machines/plant.
- If necessary, set up warning signs in order to prevent the inadvertent starting up of the devices/machines/plant.
- Observe the respective relevant professional safety and accident prevention regulations when carrying out the mounting/repair work.
- Check the correct functioning of the safety equipment (for example the emergency off push buttons/safety valves, etc.).
- Before the electrical installation of the actuator, check the voltage-free state of all lines to be connected.



3.1.2 Safety advice for commissioning/readjustment

As a result of the commissioning (electrically or by hand) of the position controller, the position of a slide/valve/flap or the like on which it is flange-mounted - referred to below as the actuating element - will be changed.

As a result, the flow of gases, steam, liquids, etc. may be enabled or interrupted.

- **Satisfy yourself that, as a result of the commissioning or the test adjustments on the position controller, no potential hazards will be produced for personnel or the environment.**
- **If necessary, set up warning signs in order to prevent the inadvertent starting up or shutting down of the devices/machines/plant.**
- **After completing the mounting, check the correct functioning of the position controller.**
- **Check the functioning of the safety limit switches for the minimum and maximum position microswitches (in the uninstalled state).**
- **Check whether the actuating element is actually 100 per cent closed when the controller signals the corresponding setpoint.**
- **Through suitable measures, prevent actuating links being trapped by moving actuating elements.**
- **Check the correct functioning of any safety devices (for example emergency off push buttons/safety valves etc.).**
- **Carry out the commissioning or the readjustment only in accordance with the instructions described in this documentation.**
- **When a position controller is open and ready for use, and if tools are being used (for example small screwdrivers, forceps, etc.), there is the risk that live parts (115 or 230 V AC) on the power supply board can be touched, and therefore deliver a shock.**
- **The readjustment must therefore be carried out only by an electrician or a person having adequate training, who is aware of the potential hazard.**



3.2 Device safety

The **ER 20/ER 50 position controller** is a quality product which is produced in accordance with the recognized industrial regulations and left the manufacturer's works in a perfect safety condition.

In order to maintain this condition, as installer/user you must carry out your task **in accordance with the descriptions in these instructions, technically correctly and with the greatest possible precision.**

We assume that you have, as a trained specialist, sound mechanical and electrical knowledge.

The position controller must be used only for the purpose corresponding to its construction.

The position controller must be used only within the values specified in the technical data – take note of the operating voltage on the type label.

- **Satisfy yourself that, as a result of the mounting, the commissioning or as a result of the test adjustments on the position controller, no potential hazards will be produced for devices/machines/plant.**
- **Open the position controller only to such an extent as described in this documentation.**
- The plastic housing cover has a metallic layer vapour-deposited on the inside in order to shield it against external electromagnetic fields. Do not damage this layer. Electromagnetic fields penetrating into the housing may influence the electronics and trigger malfunctions of the position controller.
- Hold the opened position controller only by the metallic housing and not by the electronic circuit boards or other components. Erroneous handling of the opened position controller may change the setting of the cam disc and/or short-circuit the bare connecting wires of the electronic circuit boards.
- **Do not mount the position controller, commission the position controller or carry out any readjustments on it if the position controller, the supply lines or the part of the plant on which it is flange-mounted is damaged.**
- **Before mounting the position controller, check the free movement of the actuating element. The position controller is not stall-proof.**
- After completing the mounting or the readjustment, check the correct functioning of the position.



3.3 Application-specific safety advice

During the order processing for **position controllers ER 20/ER 50**, the specific use and the installation-specific conditions for each position controller are defined between the customer and the manufacturer.

The manufacturer adjusts each position controller in accordance with these definitions.

It is therefore not possible to replace a (defective) position controller by a position controller which has been preadjusted for other conditions.

Changing the adjustment is complex and must be carried out at the manufacturer or by a person who has been authorized to do this by the manufacturer.

The safety limit switches (cam discs) limit the control range of the drive. For this reason, relatively great readjustment of the output drive shaft on site is possible only in conjunction with the cam discs (safety limit switches).

Any (unauthorized) wrong adjustment may lead to malfunctioning of the position controller.

4 Device description

4.1 Device description ER 20

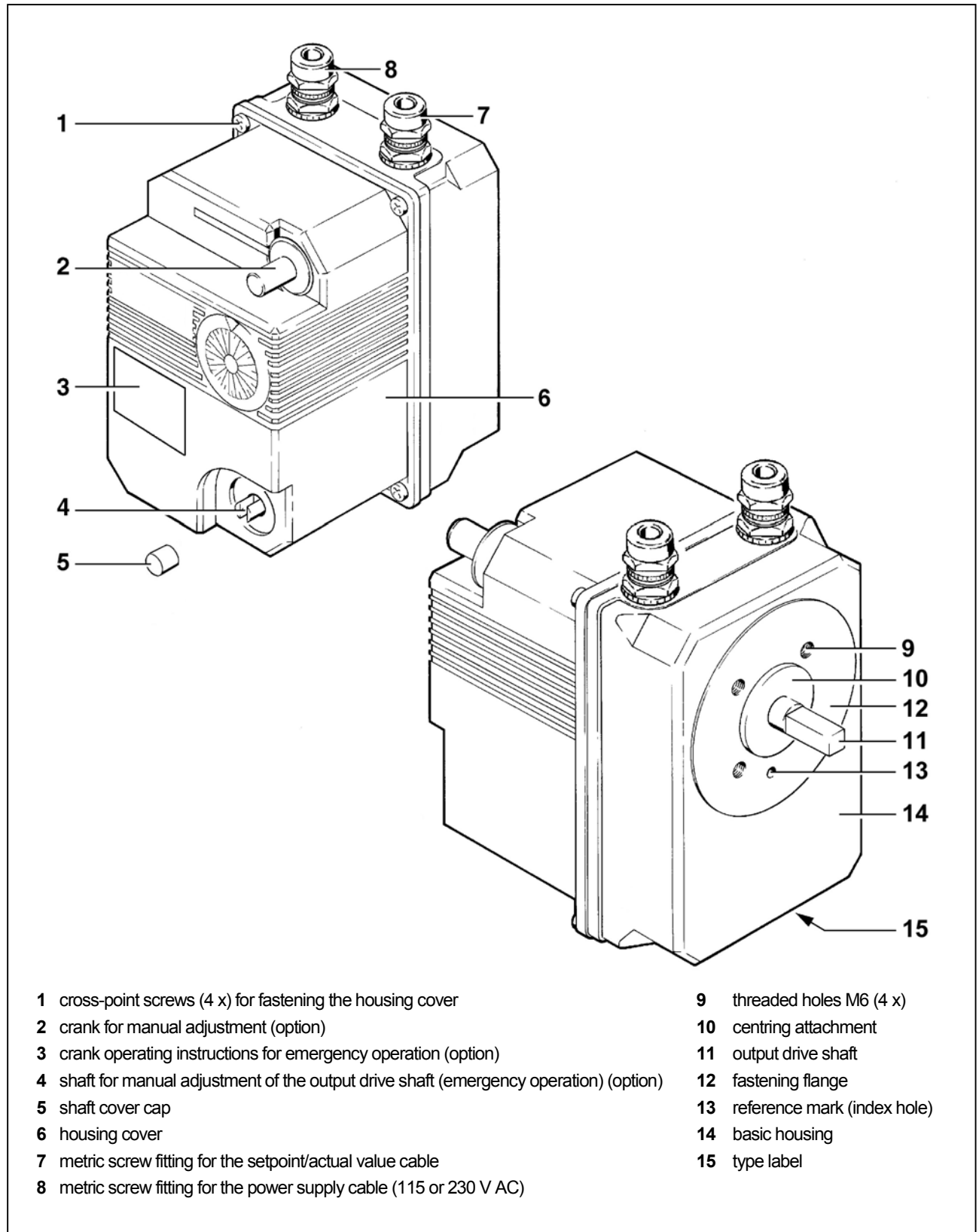
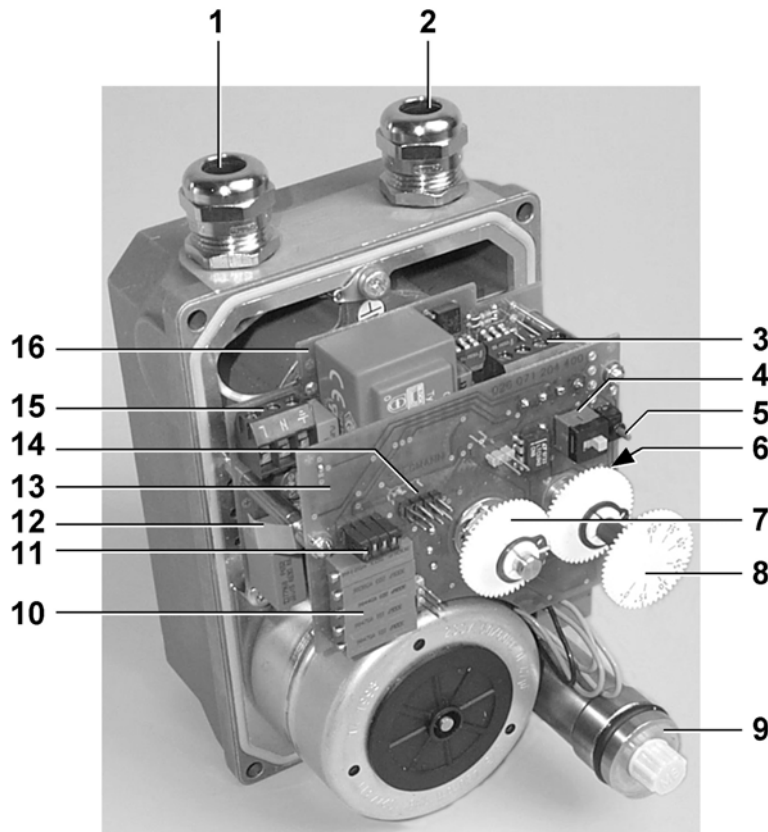


Figure 4-1 ER 20 position controller - front/rear

Device description



- 1** metric screw fitting for the power supply cable (115 or 230 V AC)
- 2** metric screw fitting for the setpoint/actual value cable
- 3** terminal strip X2 (4 terminals), connection for the setpoint/actual value lines
- 4** slide switch S1, change-over switch for automatic/manual operation
- 5** rocker switch S2, change-over switch for the direction of rotation of the output drive shaft in manual operation
- 6** switching cam disc of the safety limit switch (minimum/maximum position)
- 7** drive wheel for position potentiometer P1
- 8** position indicator disc
- 9** shaft for the manual adjustment of the output drive shaft (emergency operation) (option)
- 10** trip potentiometers P2 to P6
- 11** jumper J1, if jumper is fitted
 - drive via 4-20 mA current interface or via voltage interface 2-10 V
- 12** contact tab, connection between housing earth and screen on the inside of the housing cover
- 13** control circuit board
- 14** jumper J2, if jumper is fitted
 - drive via 0-20 mA current interface or 0-10 V voltage interface
- 15** terminal strip X1 (3 terminals), connection for the power supply lines (115 or 230 V AC)
- 16** supply circuit board

Figure 4-2 ER 20 position controller - internal view

4.2 Device description ER 50

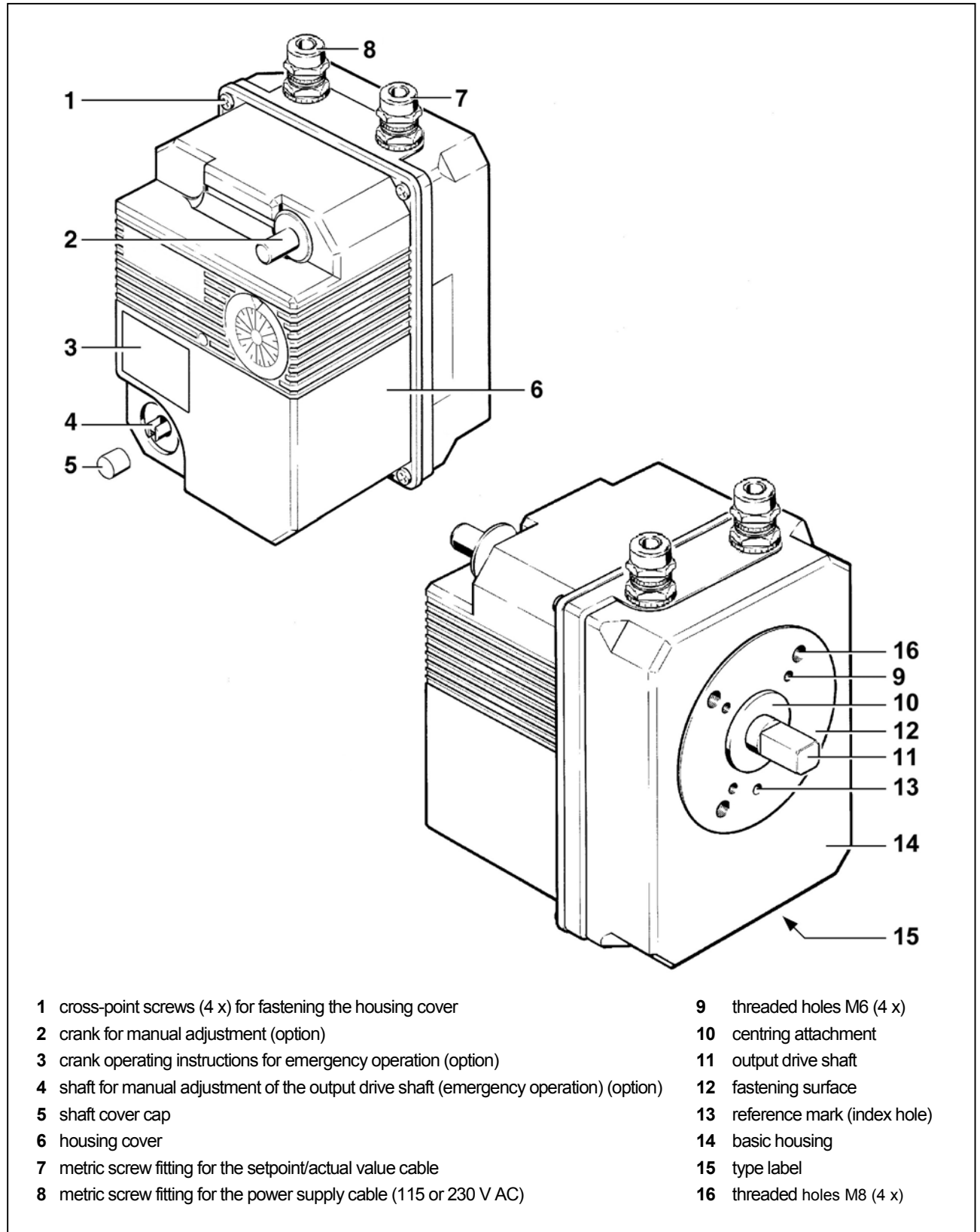
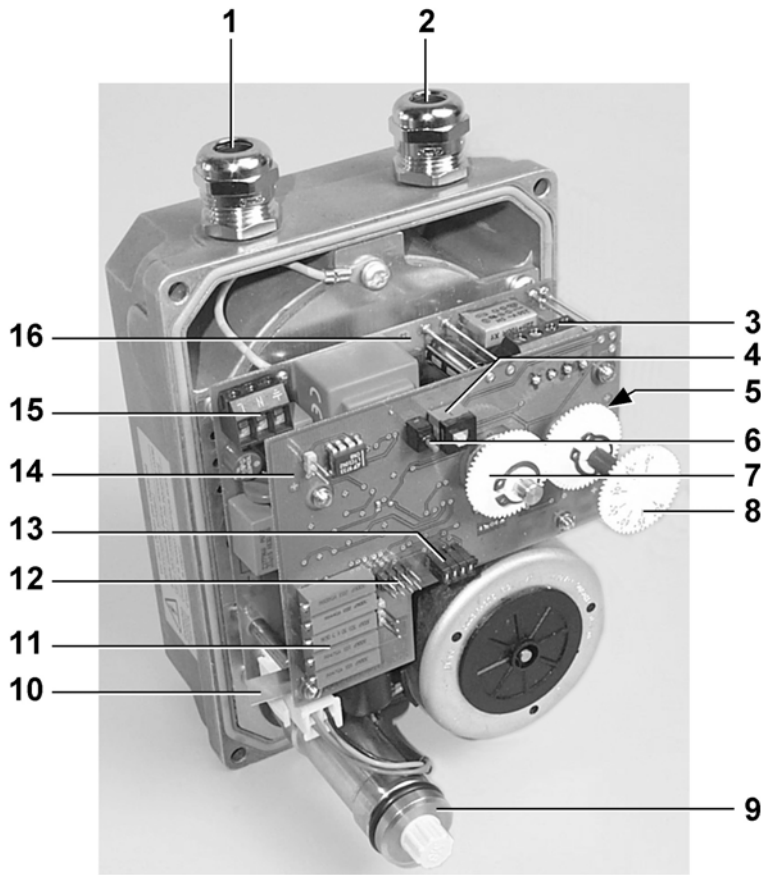


Figure 4-3 ER 50 position controller - front/rear

Device description



- 1 metric screw fitting for the power supply cable (115 or 230 V AC)
- 2 metric screw fitting for the setpoint/actual value cable
- 3 terminal strip X2 (4 terminals), connection for the setpoint/actual value lines
- 4 slide switch S1, change-over switch for automatic/manual operation
- 5 switching cam disc of the safety limit switch (minimum/maximum position)
- 6 rocker switch S2, change-over switch for the direction of rotation of the output drive shaft in manual operation
- 7 drive wheel for position potentiometer P1
- 8 position indicator disc
- 9 shaft for the manual adjustment of the output drive shaft (emergency operation) (option)
- 10 contact tab, connection between housing earth and screen on the inside of the housing cover
- 11 trip potentiometers P2 to P6
- 12 jumper J2, if jumper is fitted
- drive via 0-20 mA current interface or 0-10 V voltage interface
- 13 jumper J1, if jumper is fitted
- drive via 4-20 mA current interface or via voltage interface 2-10 V
- 14 control circuit board
- 15 terminal strip X1 (3 terminals), connection for the power supply lines (115 or 230 V AC)
- 16 supply circuit board

Figure 4-4 ER 50 position controller - internal view

4.4 Installation-specific conditions



The position controller is preadjusted by the manufacturer to the installation-specific conditions.

These conditions were defined between the customer and the manufacturer when the order was being processed.

The definition relates (inter alia) to

- the design shape of the output drive shaft and the fitting opening of the actuating element;
- the control range over which the actuating element is to be moved;
- the minimum and maximum position of the output drive shaft (referred to the reference mark on the drive).



The position controller is supplied such that the position of the output drive shaft corresponds to the **minimum position of the actuating element**.

In the case of a **round output drive shaft**, care should be taken when mounting the position controller that the actuating element is also in its minimum position.

The cam discs are set such that they actuate the safety limit switches just outside the control range (min/max position) and therefore limit the range of the actuating element.

The safety limit switches must not switch in the control range of the drive!

Readjustment of the output drive shaft position on site is only minimally possible and only within the setting of the safety limit switches (cam discs).

Readjustment of the control range (range of the actuating element) is possible to a slight extent but only in conjunction with readjustment of the cam discs.

5 Definition of the direction of rotation

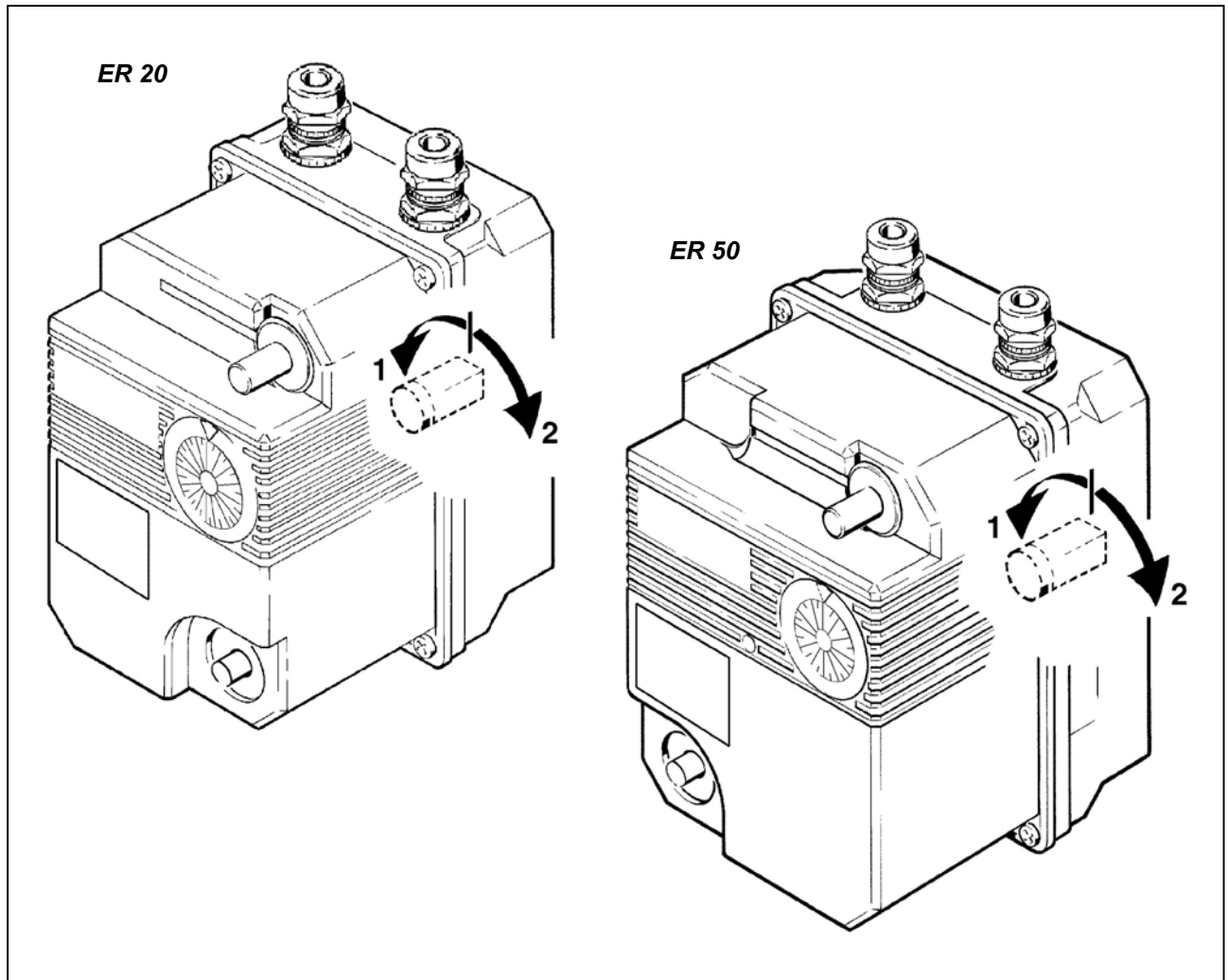


Figure 5-1 Position controller ER 20/ER 50 - directions of rotation

The direction of rotation is defined below as follows:

When viewed **from the front side of the device**, when driven with an increasing setpoint, the output drive shaft moves

- **counterclockwise (1) for left operation** and
- **clockwise (2) for right operation.**

6 Functional description

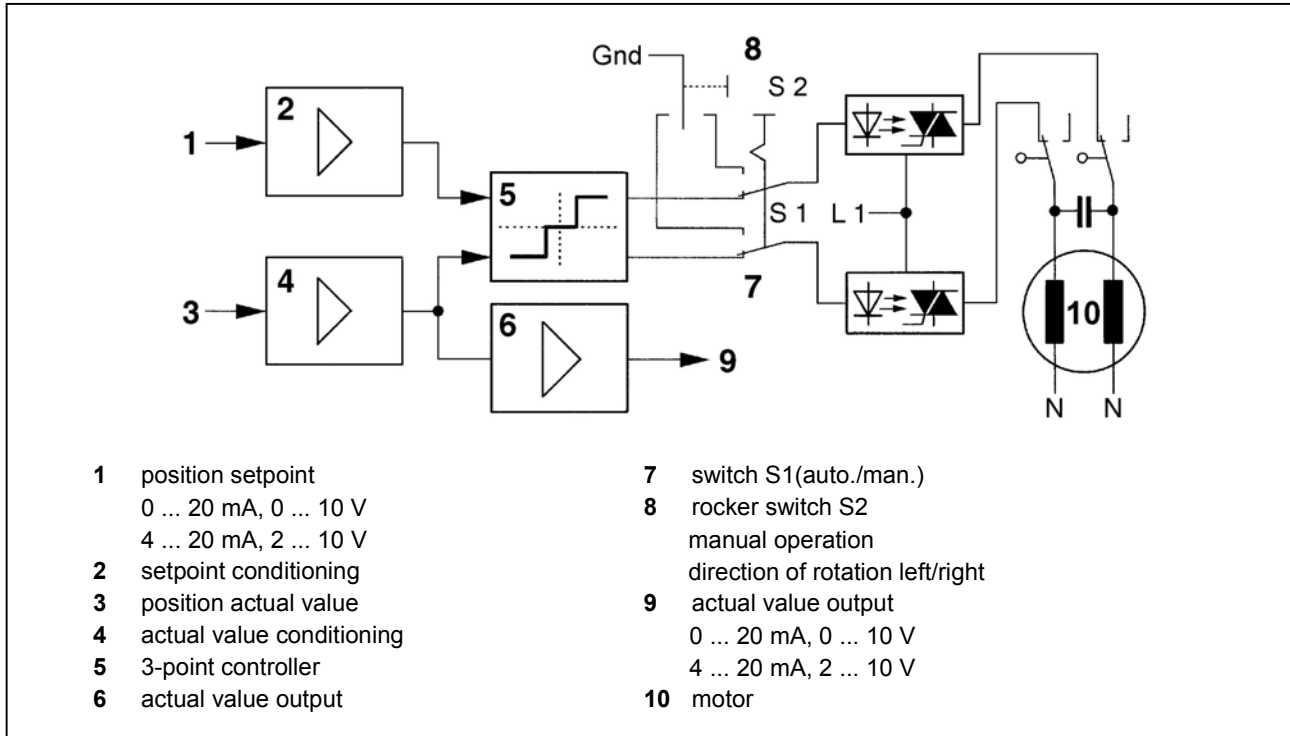


Fig. 6-1 Block diagram

The following functional description relates (as an example) to a position controller with **right operation**.

We assume that the position controller is mounted on the actuating element, connected to the power supply (230 V AC) and to the controller.

If a voltage or a current is applied to the terminals X2-1 and X2-2 with an **increasing setpoint**, the motor drives the output drive shaft - via the reduction gear box - in the clockwise direction.

At the same time, the two cam discs for limiting the direction of rotation (safety limit switch) (or left and right operation) and the position potentiometer P1 are driven via a gear box take-off. The potentiometer P1 produces a voltage (**actual value**) which is proportional to the angular position of the output drive shaft, the electronics connected downstream continuously compares the actual value with the setpoint.

The rotational movement of the output drive shaft continues until either

- the actual value corresponds to the setpoint or
- the switching cam actuates the safety limit switch for maximum position (right operation).



The two switching cams are adjusted by the manufacturer (limit switch adjustment) such that - outside the normal control range of the control electronics - they serve as a safety end off switch.

The functional sequence outlined applies in a similar way to a position controller with left operation.



In the event of any interruption to the setpoint cable, the output drive shaft is rotated into its minimum position or into the minimum position of the actuating element.

The **actual value** can be picked off for measurement at the terminals X2-3 and X2-4, and can be compared with the **setpoint**.

7 Ambient conditions

The **ER 20/ER 50 position controller** is designed for rough operating conditions.

However, some special conditions are to be observed for its mounting and subsequent operation.

- Take care that
 - the position controller is mounted in accordance with the mounting advice listed below.
 - the position controller is used in accordance with the characteristic values specified in the technical data.

The non-observance of the mounting advice or use outside the specified characteristic values can have a negative influence on the functional reliability of the position controller.



The use of the position controller under the influence of radioactive radiation may take place only after discussions with the manufacturer.

8 Mounting/disassembly

The mounting of the **ER 20/ER 50 position controller** is restricted to

- the mechanical mounting of the position controller on the part of the devices/machines/plant which contains the actuating element, and
- the connection of the position controller to the power supply and to the setpoint/actual value line.



The mounting position (for this, please see 4.4 Installation-specific conditions) of the ER 20/ER 50 must follow the position defined during the order processing.

We assume, in the following description, that you have carefully read the previous chapter and that you will observe the safety advice and the warning notes in Chapter 3 during the mounting/disassembly work.

If you have not yet read Chapter 3, please do so now and then return to this point.

The mounting and the electrical installation may be carried out only by trained specialist personnel with sound mechanical and electrical knowledge.

Which variant of the device you have in front of you can be seen from the type label on the underside of the ER 20/ER 50.

The explanation of the designation will be found under

4.3 Device variants.

The **mechanical mounting** and the **electrical installation** are identical in all variants.

For the electrical installation, observe the wiring diagrams at the end of these mounting and operating instructions.

8.1 Mechanical mounting

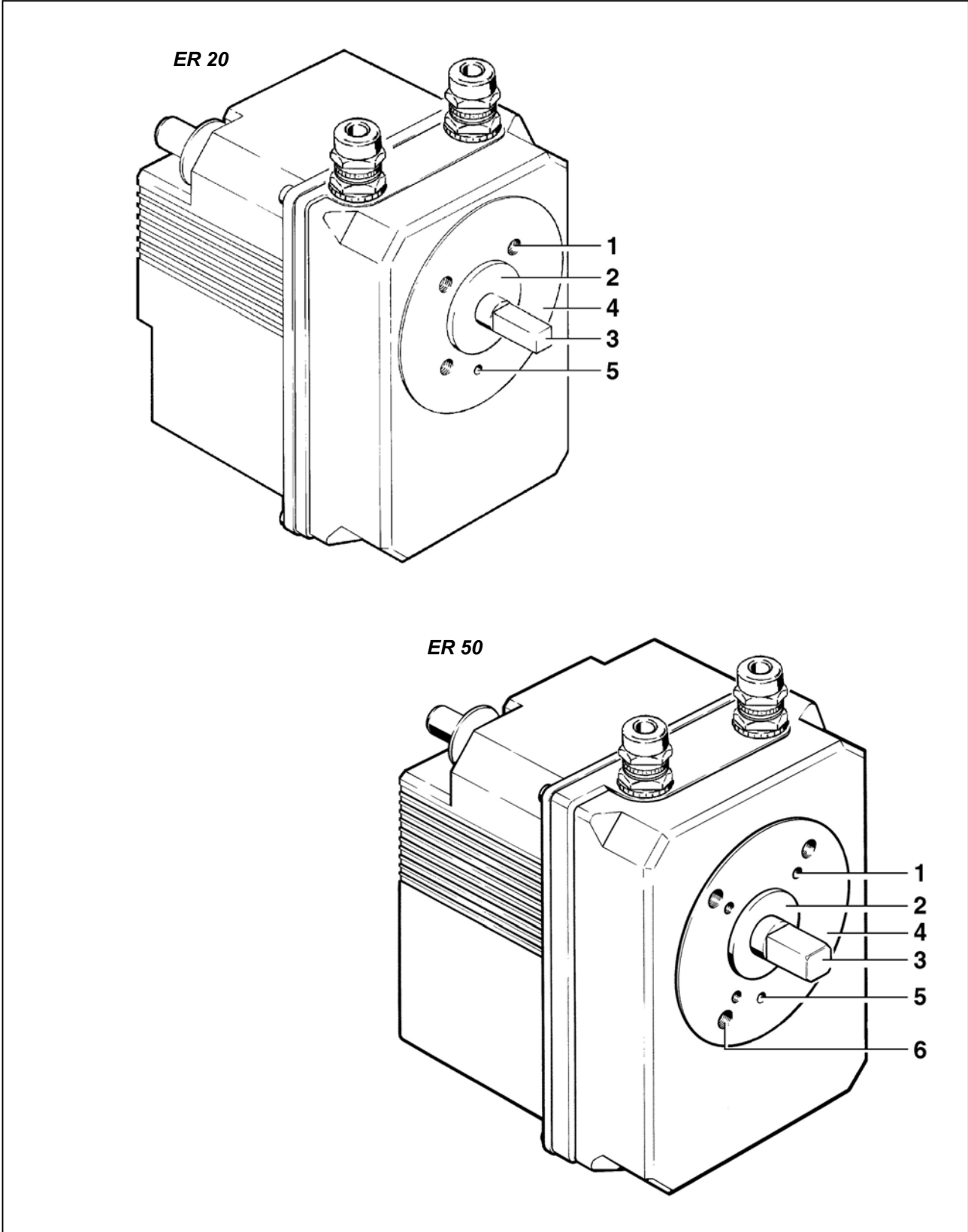


Fig. 8-1 Position controller ER 20/ER 50 - rear view

- Guide the position controller with its rear side against the part of the devices/machines/plant in such a way that the output drive shaft (3) penetrates into the fitting opening in the actuating element.
- Push the position controller so far towards the mounting position that it is centred by the centring attachment (2) and the index hole (5) and finally rests flat on the fastening surface (4).
- Fasten the ER 20 using 4 M6 screws (1) and the ER 50 using 4 M6 screws (1) or 4 M8 screws (6).



The depth of the threaded holes is 13 mm.



In addition to direct mounting of the position controller, it can also be mounted on the part of the devices/machines/plant with the aid of an adapter.

In this case, observe the mounting instructions which are supplied with the adapter.

8.1.1 Offset between output drive shaft and fitting opening in the actuating element

As a result of wrong information about the conditions or as a result of adjustment tolerances, an offset of the output drive shaft in the square or locating-key design in relation to the receiving opening in the actuating element can lead to mounting not being possible. In the case of a slight offset, you can make a readjustment in the region of the safety limit switches with the mechanical manual adjustment (option).

9.2.7 Direction of rotation of the shafts ER 20/ER 50

and

11 Emergency operation (option).

If during the readjustment one or both safety limit switches are actuated (which means that the position controller no longer reaches the minimum and/or the maximum position), the offset is too great and therefore readjustment is impossible. The position controller must be readjusted at the manufacturer, with information about the angle of offset!

8.2 Electrical installation

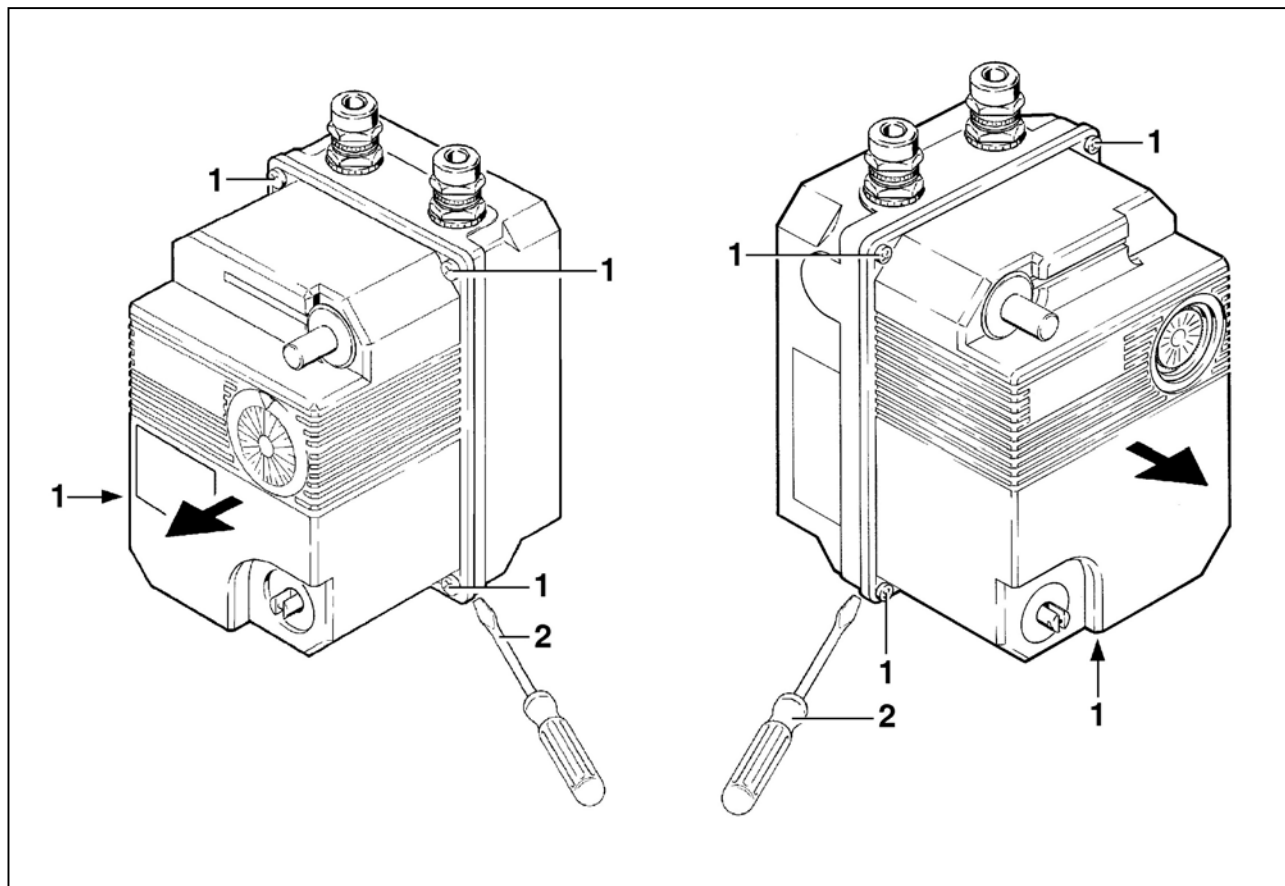


Fig. 8-2 Removing the housing cover

8.2.1 Removing the housing cover

- Loosen the four cross-point screws (1) and pull the housing cover **hard** to remove it! To help with this, it is possible to insert a screwdriver (2) a few millimetres between housing cover and housing at the position shown in the figure, and to lever the cover open.



- **When doing this, do not damage the cover and/or the rubber sealing strip. In this case, the IP 65 degree of protection would no longer be guaranteed.**
- Hold the opened position controller only by the metallic housing and not by the electronic circuit boards or the other components. By holding the opened position controller wrongly, it is possible to change the setting of the cam disc and/or to short-circuit the bare connecting wires of the electronic circuit boards.

8.2.2 Stripping the cables/leads

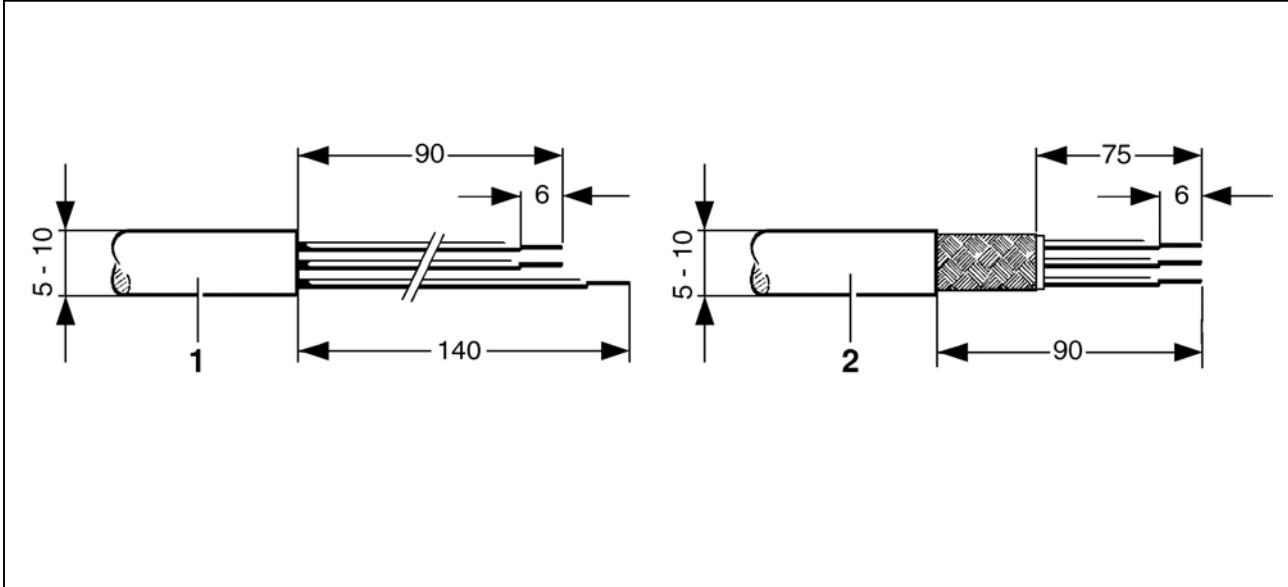


Fig. 8-3 Dimensional information on stripping the cables/leads



In order to avoid a lethal shock or a short circuit, begin with the electrical installation of the position controller. Connect the cables to the position controller first and then to the controller and to the power supply.

- For the electrical installation of the ER 20/ER 50, use the prescribed cable types (corresponding to the environmental conditions and the EMC measures). The setpoint/actual value cable must be screened.
- Remove the sheaths of the power supply cable (1) and of the setpoint/actual value cable (2) and remove the insulation of the leads in accordance with Figure 8-3.



Note that the earth wire must be about 50 mm longer than the power supply lines, for safety reasons, in order that the earth protection is ensured in the event of the leads being torn off.

- In the case of leads with stranded conductors, provide the ends in each case with a wire end sleeve.

8.2.3 Connecting the cables/leads



The position controllers ER 20/ER 50 have been produced and tested in accordance with the European EMC guidelines. These guidelines define limiting values for the line-conducted and non-line-conducted electromagnetic interference immunity or interference emission.

- In order to comply with the guidelines, it is essential to make the earth and screening connections according to Figures 8-3, 8-4 and 14-5.

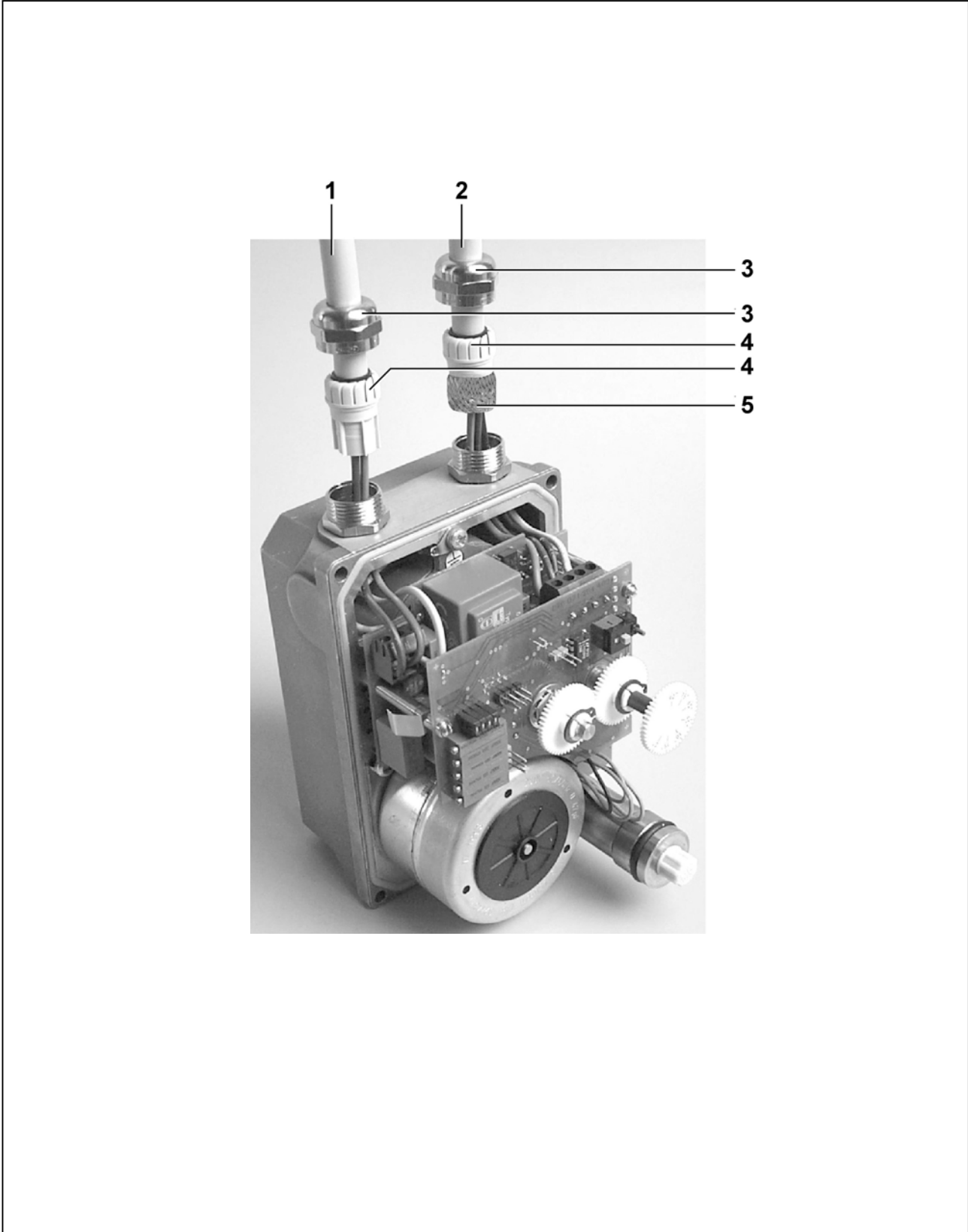


Fig. 8-4 Connecting the cables/leads - for example to the ER 20

- Push the power supply cable (1) through the unscrewed union nut (3) and the plastic support sleeve (4) and insert the cable into the left-hand cable screw fitting in accordance with Figure 8-4. Tighten the union nut, so that the strain relief is effective and the cable lead-through corresponds to the predefined degree of protection (IP 65).
- Push the setpoint/actual value cable (2) through the unscrewed union nut (3) and plastic support sleeve (4), spread out the screen (5) and distribute the wires around the plastic support sleeve in accordance with Figure 8-4. Insert the setpoint/actual value cable into the right-hand cable screw fitting. Tighten the union nut so that the screen is electrically connected to the housing, the strain relief is effective and the cable lead-through corresponds to the predefined degree of protection.
- Feed the stripped ends of the leads into the terminals as far as the stop and then tighten these.
The assignment of the connections can be seen from the wiring diagrams at the end of these mounting and operating instructions.



- **Achten Sie darauf, dass keine blanken Adern aus den Klemmen herausragen und somit die Gefahr eines Stromschlags oder eines Kurzschlusses entsteht!**

- Bend the leads such that they are not trapped when the housing cover is fitted.
- Lay the cables to their starting positions (as appropriate, in conduits or cable ducts).
- Ensure that the cables are not crushed or sheared and that they are not under pressure or tension.
- Connect the setpoint/actual value cables to the controller first and then connect the power supply cable to the power supply.



- **In the case of a position controller which is open and ready to operate, when tools are being used (for example small screwdrivers, forceps etc.), there is the risk that you may touch live parts (115 or 230 V AC) on the supply board and thus receive a shock.**
- Immediately after installation, carry out the commissioning; for this please observe chapter

9 Commissioning/readjustment.

Otherwise re-close the position controller.

- Ensure that the circumferential rubber sealing ring in the housing is not damaged and is correctly seated in the groove.
- Fit the housing cover, push it over the rubber seal of the manual adjuster and screw it tight using the four screws.
- For this, observe without fail

10 Fitting the housing cover.

This completes the mounting and the electrical installation of the position controller.

8.3 Disassembly

Although the disassembly of a position controller in principle proceeds in the reverse sequence to the mounting, some essential points should be clarified beforehand.

In order, for example, for the operational chemical plant which was mentioned at the beginning to remain in operation:

- Will the position controller to be disassembled be replaced immediately by another (of equal value)? If not, in which position should the actuating element be, following the disassembly?
- **Must the actuating element be fixed in its intended position?**
- If appropriate, does the production process of the plant need to be stopped?
- Is it necessary to inform specific personnel about the disassembly?

8.3.1 Electrical disassembly



- **Using the position controller, rotate the actuating element into the intended position.**
- **Switch off first the power supply and then the controller of the position controller. If the control voltage is switched off and the power supply (115 or 230 V AC) is still present on the position controller, the latter will rotate the output drive shaft into the minimum position.**
- **If necessary, set up warning signs in order to prevent**
 - **the inadvertent starting up of the part of the devices/machines/plant which is affected by the disassembly, or**
 - **the switching on of the power supply/the controller of the position controller.**
- Open the housing cover by loosening the four cross-point screws and pulling the housing cover hard to remove it. On this point, see

8.2.1 Removing the housing cover

- Loosen the screws of the terminals and pull the leads out of the terminals. On this point, see Figure 8-4.
- **Insulate the bare lead ends** if the cables are not also being disassembled or are not to be immediately reconnected to another position controller.
- Loosen the cable screw fittings and pull the cable out of the device.

8.3.2 Mechanical disassembly

- Unscrew the four fastening screws of the position controller and pull the position controller from the mounting position. For this, see Figure 8-1.
- If appropriate, screw the housing cover back on.

This completes the disassembly of the position controller.

9 Commissioning/readjustment

As already described in the chapter

4.4 Installation-specific conditions

each position controller **has been preadjusted at the manufacturer for its use.**

In the “normal case”, the position controller can be commissioned following mounting and installation, without the housing having to be opened and readjustment having to be carried out.

9.1 Commissioning



- Before you commission the position controller, you must have read **Chapter 3 Safety advice**

completely. If you have not yet done so, read this important advice now and then return to this point.



The commissioning of a position controller which is mounted on a plant that is ready to operate (for example in a refinery or in a plant in the chemical industry) must be carried out only in compliance with the plant-specific regulations.

- Switch on the power supply to the position controller, drive it via the controller using the minimum and maximum setpoint and check the correct functioning of the position controller:
 - If the position controller is connected only to the power supply (115 or 230 V AC) and no setpoint or the minimum setpoint is applied, the output drive shaft is moved into its minimum position.
 - When the maximum setpoint is applied, the motor moves the output drive shaft into the maximum position.
- Check
 - whether the minimum position of the output drive shaft is also the minimum position of the actuating element (for example, at the minimum position of the output drive shaft, is the flow of the medium actually 100% interrupted?)
 - whether the maximum position is also the maximum position of the actuating element.



If the end positions of the actuating element are not reached because one or both final limit switches has or have been actuated, the position controller is not correctly adjusted for this use.

Slight deviations from the correct minimum or maximum positions of the actuating element may be readjusted as described below.

9.2 Readjustment

The **position controller ER 20/ER 50** offers the capability

- of setting the minimum and maximum position of the position potentiometer P1 and
- of setting the minimum and maximum value of the actual value output.

These settings



- **should be carried out only if particular reasons require it.**
- **may be carried out only by a person who has good electrotechnical knowledge.**
- require the use of a high-resistance multimeter, small, self-locking test prods, a 240 ohm measuring resistor (only if the position controller is driven via a current interface) and a small screwdriver.



A wrong setting may cause the position controller to malfunction.

- **Before you open and readjust the position controller, you must have read Chapter**

3 Safety advice

completely. If you have not yet done so, read this important advice now and then return to this point.



Take care that no liquid, moisture and no foreign bodies (sand, dust or the like) get into the opened position controller.

The following descriptions are based on the assumption that

- **the position controller is connected to the device or the part of the plant which contains the actuating element, and to the power supply (115 or 230 V AC),**
- **the housing cover is fastened to the position controller.**

In order to carry out the readjustment

- you must remove the housing cover. For this, see

8.2.1 Removing the housing cover.

- please take note of the wiring diagrams at the end of these mounting and operating instructions.



- **In the case of a position controller which is open and ready to operate, when tools are being used (for example small screwdrivers, forceps, etc.), there is the risk that you may touch live parts (115 or 230 V AC) on the supply board and thus receive a shock.**

9.2.1 Setting the output drive shaft minimum position ER 20/ER 50

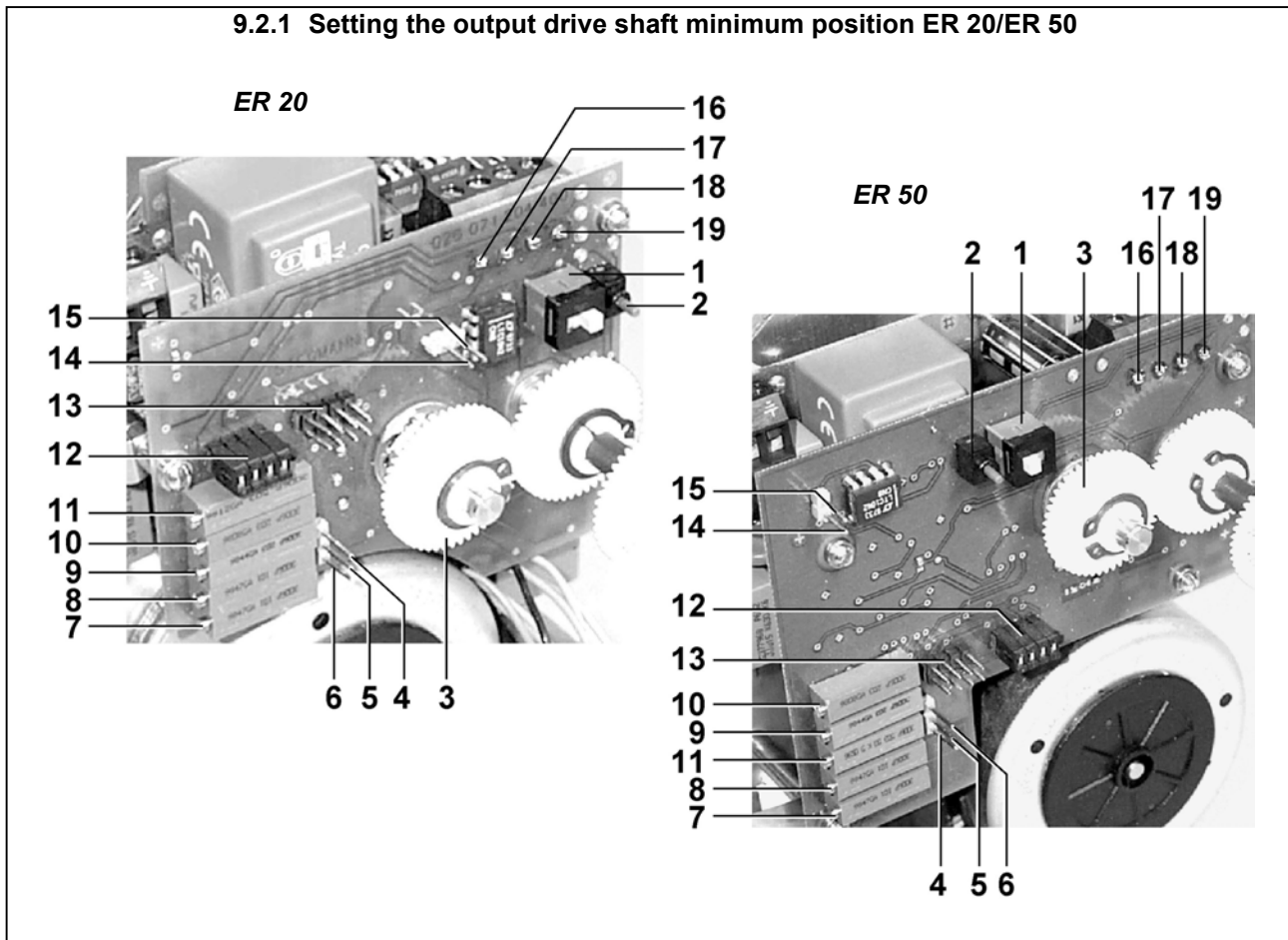


Fig. 9-1 Position controller ER 20/ER 50 - Control circuit board

- Slide the switch S1 (1) into the **right-hand** position in the case of ER 20, and into the **left-hand** position in the case of ER 50 (manual operation).
- Connect the earth terminal of the multimeter to pin ST1-1 (6) and the plus terminal to pin ST1-2 (5).
- Press the rocker switch S2 (2)
 - **upwards** in the case of **right-operating** reduction gear boxes,
 - **downwards** in the case of **left-operating** reduction gear boxes
 until the actuating element is in the desired minimum position.



If the minimum position is not reached because the safety limit switch switches the motor off, the desired setting is not possible. The drive must be readjusted at the manufacturer with information about the angle of offset.

- If appropriate, rotate the gear wheel (3) of the position potentiometer P1 so that the instrument indicates about 60 mV (40-80 mV).
- Connect the plus terminal of the voltmeter to pin ST1-3 (4).
- Use a small screwdriver to rotate the potentiometer P5 (8) until the instrument indicates 0 V (0.00X V).

This completes the setting of the minimum position of the output drive shaft.

9.2.2 Setting the actual value output minimum value

- Please refer to Figure 9-1.
- The switch S1 (1) must be in the manual operation position.
- In the case of
 - a **current interface** drive variant, connect an ammeter in series with a measuring resistor (240 ohm) ...
 - a **voltage interface** drive variant, connect a voltmeter to the terminal strip X2-3 and X2-4 (18 + 19). Terminal (19) is the earth terminal.
- If the jumper
 - is fitted to position J1 (12), rotate potentiometer P6 (7) until the instrument indicates 4 mA or 2 V,
 - is fitted to position J2 (13), the instrument shows 0.0X mA or 0.0X V.

This completes the setting of the actual value output minimum value.

9.2.3 Setting the output drive shaft maximum position

- Please refer to Figure 9-1.
- The switch S1 (1) must be in the manual operation position.
- Press the rocker switch S2 (2)
 - **downwards** in the case of **right-operating** reduction gearboxes,
 - **upwards** in the case of **left-operating** gearboxes,

until the motor has rotated the output drive shaft, the position potentiometer P1 and the actuating element into the desired position, then release the rocker switch S2.



If the minimum position is not reached because the safety limit switch switches the motor off, the desired setting is not possible. The drive must be readjusted at the manufacturer with information about the angle of offset.

- Apply earth to the terminal X2-1 (16) and the maximum setpoint (20 mA or 10 V) to terminal X2-2 (17).
- Connect the voltmeter to the row of pins ST2, pins 1 and 2 (14 and 15).
- Use a small screwdriver to rotate the potentiometer P2 (11) until the instrument indicates 0 V (0.00X V).

This completes the setting of the output drive shaft maximum position.

9.2.4 Setting the actual value output maximum value

- Please refer to Figure 9-1.
- The switch S1 (1) must be in the manual operation position.
- In the case of
 - a **current interface** drive variant, connect an ammeter in series with a measuring resistor (240 ohm) ...
 - a **voltage interface** drive variant, connect a voltmeter to the terminal strip X2-3 and X2-4 (18 + 19). Terminal (19) is the earth terminal.

- If the jumper
 - is fitted to position J1 (12), rotate potentiometer P3 (10) until the instrument indicates 20 mA or 10 V,
 - is fitted to position J2 (13), rotate potentiometer P4 (9) until the instrument indicates 20 mA or 10 V.

This completes the setting of the actual value output maximum value.



Both end positions of the actual value output must always be set (0 – 20 mA and 4 – 20 mA or 0 – 10 V and 2 – 10 V).

9.2.5 Checking automatic operation

- Please refer to Figure 9-1.
- Slide the switch S1(1) in to the **left hand** position in the case of ER 20, and into the **right hand** position in the case of ER 50 (automatic operation).
- In the case of
 - a current **interface** drive variant, connect an ammeter in series with a measuring resistor (240 ohm) ...
 - a voltage **interface** drive variant, connect a voltmeter to the terminal strip X2-3 and X2-4 (18 and 19). Terminal (19) is the earth terminal.
- Input the minimum input setpoint via terminals X2-1 and X2-2 (16 and 17).
 - The position controller must rotate to the minimum position and remain in this position without the safety limit switch being opened.
 - The actual value (indicated on the instrument) and the setpoint must agree (control deviation $< \pm 1\%$).
- Enter the maximum input setpoint via terminals X2-1 and X2-2 (16 and 17).
 - The position controller must rotate to the maximum position and remain in this position without the safety limit switch being opened.
 - It is possible to follow on the instrument how the actual value rises proportionally to the angular position of the output drive shaft.

Once the maximum position has been reached, the actual value must agree with the setpoint (control deviation $< \pm 1\%$).

If the actual values correspond to the setpoints in both measurements, the settings have been carried out correctly and the position controller is operating over the set rotational angle range.

9.2.6 Checking for a line break in the setpoint cable

If the position controller is connected to the power supply (115 or 230 V AC), and if the output drive shaft is at any position greater than the minimum position, the motor rotates the output drive shaft to the minimum position if the input setpoint is interrupted.

9.2.7 Direction of rotation of the shafts ER 20/ER 50

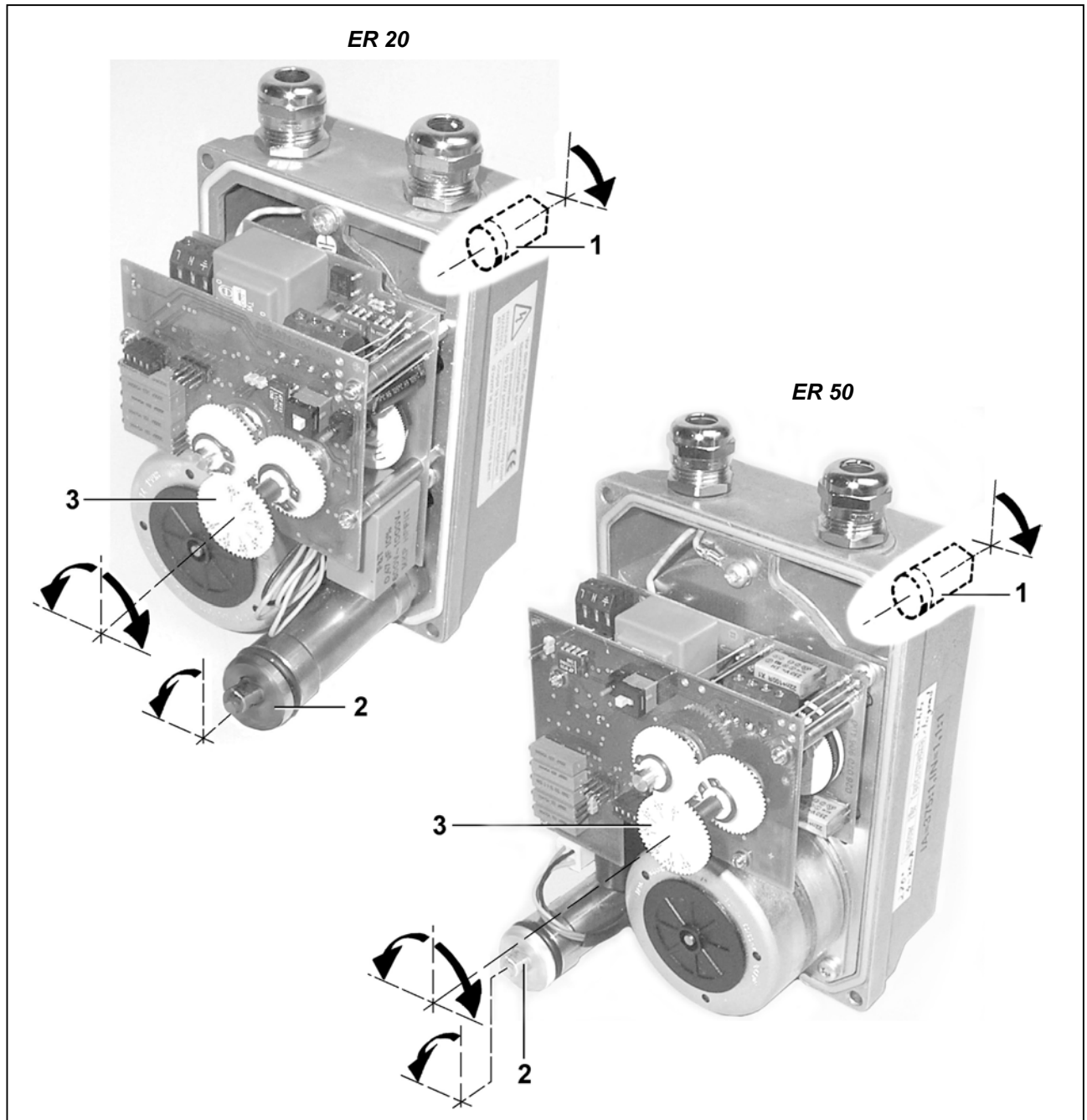


Fig. 9-2 Position controller ER 20/ER 50 - Directions of rotation for manual adjustment (option)

As the figure shows, the output drive shaft (1) and the shaft for manual adjustment of the output drive shaft (2, option) rotate in opposite directions.

In order to adjust the output drive shaft (1) by hand (e.g. in emergency operation), the shaft (2) must always be moved in the direction **counter** to the intended direction of rotation of the output drive shaft (irrespective of the type of reduction gear box).

The position indicator (3) has either the same or the opposite direction of rotation, depending on the reduction gear box installed.

9.2.8 Adjusting the position indicator - Example ER 20/ER 50

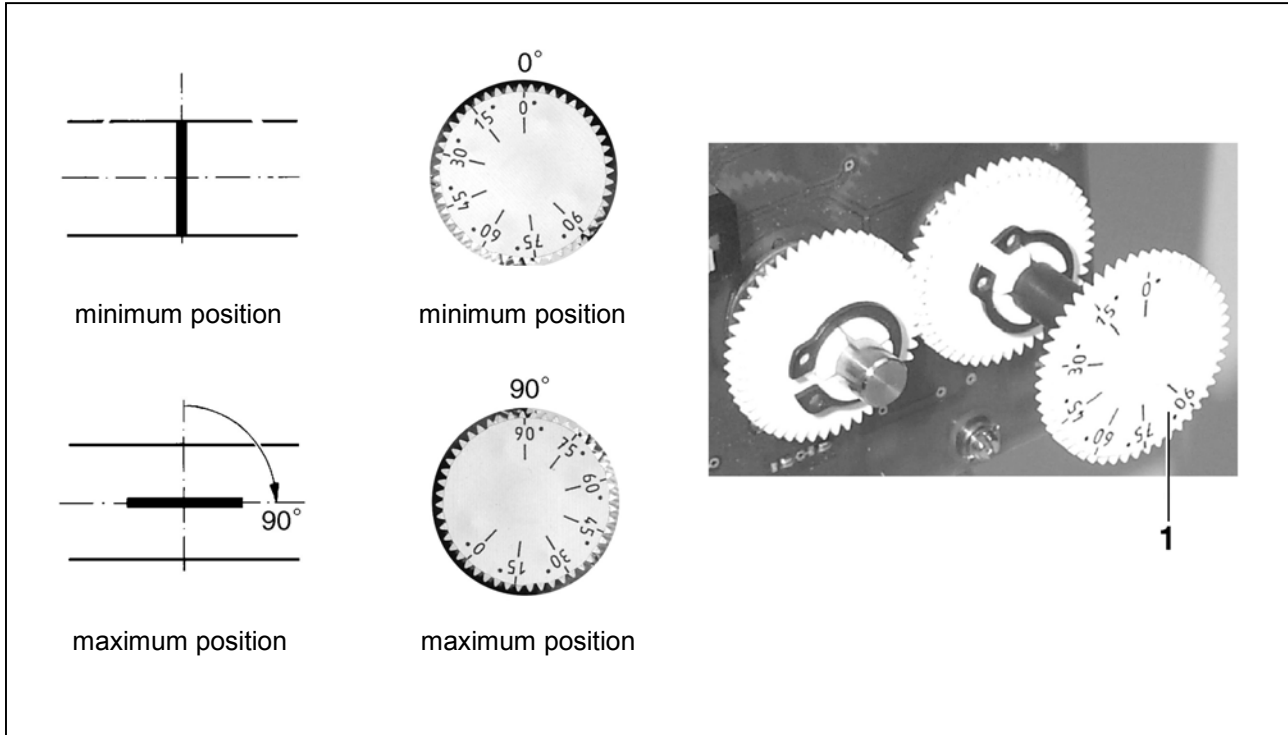


Fig. 9-3 Position controller ER 20/ER 50 - Position indicator



In the case of a position controller which is open and ready to operate, when tools are being used (for example small screwdrivers, forceps etc.), there is the risk that you may touch parts carrying mains voltage (115 or 230 V AC) on the supply circuit board and thus receive a shock.

The position indicator (1) shows - when correctly adjusted - the position of the actuating element. The setting is carried out at the factory. If you wish to correct the setting, please carry out the following instructions.

- Slide the switch S1 (item 1, Figure 9-1) into the **right-hand** in the case of ER 20, and into the **left-hand** position in the case of ER 50 (manual operation).
- Press the rocker switch S2 (item 2, Figure 9-1)
 - **upwards** in the case of a **right-operating** reduction gearbox,
 - **downwards** in the case of a **left-operating** reduction gearbox,until the actuating element is in its minimum position (note the safety limit switch - the safety limit switch must not have been actuated).
- Rotate the position indicator (1) into the minimum position as shown, for example, in Figure 9-3.
- Press the rocker switch S2 in the opposite direction until the actuating element is in the maximum position. The position indicator shows the number of angular degrees (or revolutions or per cent) through which the actuating element has rotated.
- Slide the switch S1 (item 1, Figure 9-1) back into the automatic operation position.

This completes the readjustments, checks and settings.

10 Fitting the housing cover



- Before you fit the housing cover onto the position controller, check the following:
 - the connecting leads are correctly screwed tightly in the terminals.
 - the switch S1 (item 1, Figure 9-1) is in the **left-hand** position in the case of ER 20, and in the **right-hand** position in the case of ER 50 (automatic operation).
 - the jumper is correctly fitted on the right-hand row of pins J1 or J2 (item 12 or 13, Figure 9-1).
 - the connecting wires between the power supply and control circuit boards are not bent or short-circuited.
 - there are no foreign bodies in the position controller.
- Ensure that
 - the leads are not trapped between the housing and the housing cover and
 - the circumferential rubber sealing ring in the housing is not damaged and is correctly seated in the groove.
- Place the housing cover onto the position controller and push it over the rubber seal of the manual adjuster.
- Screw the housing cover tight using the four screws.



Maximum torque on the housing screws: 0.5 Nm ± 10%

11 Emergency operation (Option)

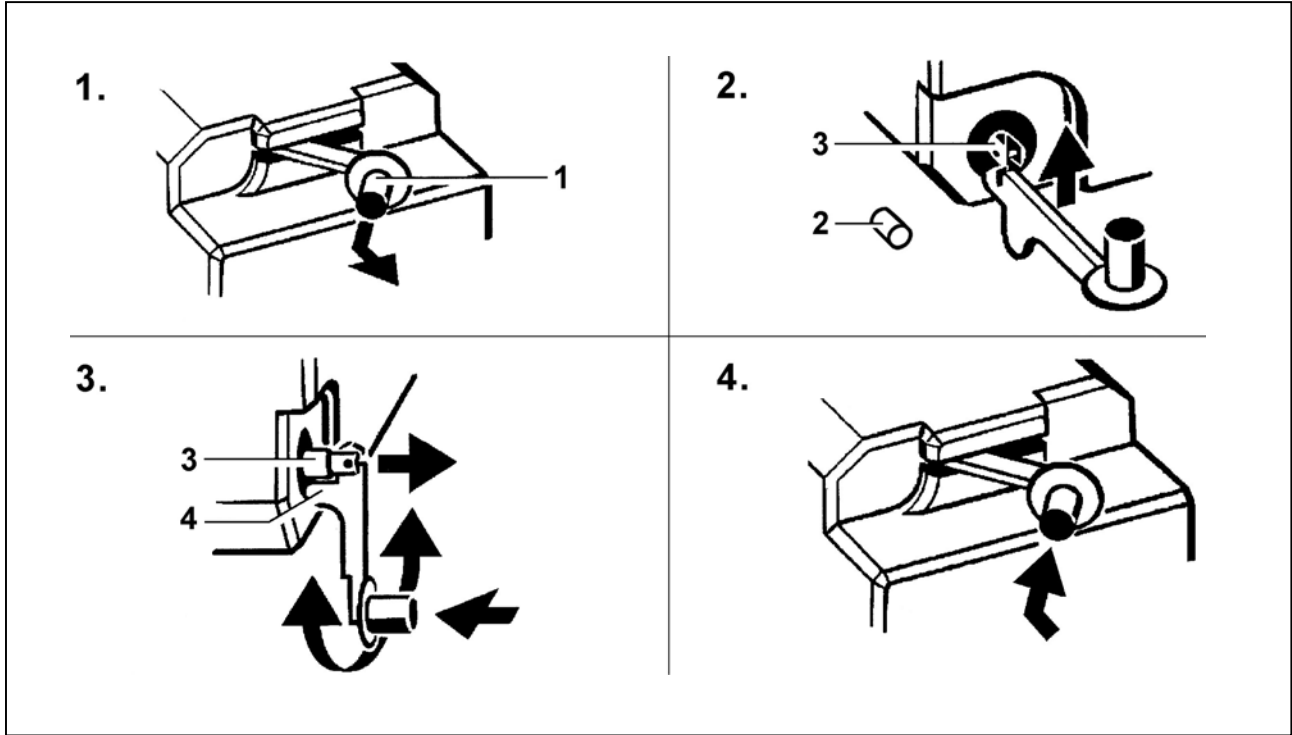


Fig. 11-1



In the case of power or controller failure or a fault in the position controller, in order to be able to adjust the actuating element in an emergency, the position controller has the capability for manual adjustment (option).

- Take note also of the graphic for emergency operation on the housing lid.
- Withdraw the manual adjusting lever (1) from its retainer in the housing cover.
- Pull off the shaft cover cap (2).
- Fit the manual adjusting lever into the groove in the shaft (3).
- Press the manual adjusting lever downwards in the direction of the arrow over the cam (4).
 - This causes the shaft (3) to be pushed out counter to the spring force.
- Rotate the manual adjusting lever (**whilst simultaneously pressing it down to the stop**) to the left or to the right.
 - The output drive shaft of the position controller is simultaneously moved in the opposite direction of rotation.
- Following the manual adjustment, withdraw the manual adjusting lever and press it back once more into its retainer and fit the shaft cover cap to the shaft again..
- **If necessary, inform the shift manager/safety engineer or the manager about the disturbance without delay in order, for example, to avoid an outflow/overflow of chemicals or a discharge of gases in good time by means of suitable measures.**



12 Faults

If, during the test run or during operation, a functional fault of the position controller should occur, you are requested to carry out the adjustment of the actuating element (in an emergency) by hand.

For this, observe

11 Emergency operation (option)

and the corresponding graphic on the housing cover.



- **If necessary, inform the shift manager/safety engineer or the manager about the fault without delay in order, for example, to avoid an outflow/overflow of chemicals or a discharge of gases in good time by means of suitable measures.**
- Next, using the following list, attempt to find the reason for the causes of the fault and, if it lies within your capabilities, to correct this.



- **Do not, however, carry out any repairs on the position controller.**
- **Isolate the defective position controller from the power supply.**
- **In the case of a defect in the position controller, make contact with the manufacturer. The telephone number will be found on the inside front cover of these mounting and operating instructions.**

12.1 Fault causes

- Is the power supply to the position controller and to the controller switched on?
- Are the leads from the controller to the position controller undamaged?
- Is the position controller correctly flange-mounted to the actuating element?
- Does the actuating element move freely?
- Is the switch S1 in the correct position (automatic/manual operation)?
- Is the jumper fitted correctly to the correct row of pins?
- Has the position controller been correctly preadjusted by the manufacturer for the installation-specific conditions?
- Has the wrong position controller possibly been mounted?
- Is it possible to move the position controller into the end positions under manual operation?
- Is the setpoint correct?

13 Maintenance/cleaning

13.1 Maintenance

The **STEGMANN ER 20/ER 50 position controller** is maintenance-free.

- In the event that the position controller is being used outside, check, on an approximately six-monthly cycle, that the device is dry inside.



In the case of a position controller which is open and ready to operate, when tools are being used (for example small screwdrivers, forceps etc.), there is the risk that you may touch live parts (115 or 230 V AC) on the supply board and thus receive a shock.

- In the case of a defect in the position controller, make contact with the manufacturer. The telephone number will be found on the inside front cover of these mounting and operating instructions.
- Remove the housing cover by loosening the four cross-point screws and pulling the housing cover hard to remove it. In this context, see

8.2.1 Removing the housing cover

- If you find moisture in the interior of the device, attempt to find the cause for this and to eliminate it.
 - Is the moisture condensation?
 - Is the circumferential rubber sealing ring damaged?
 - Do the metric screw fittings leak?
 - Are there cracks in the housing or the housing cover?



- If you determine that there is damage to the position controller, isolate the device from the power supply and from the controller. However, before doing this, it is essential to refer to Chapter

3 Safety advice.

13.2 Cleaning

- Clean the housing of the position controller as required using a slightly moistened, soft cloth and a normal household cleaner.



- **Do not use any abrasive, corrosive or flammable cleaning agents.**
- **Do not use any high-pressure cleaning devices.**
- **Prevent moisture or liquid penetrating into the interior of the device.**

14 Technical data

14.1 Dimensional drawing ER 20

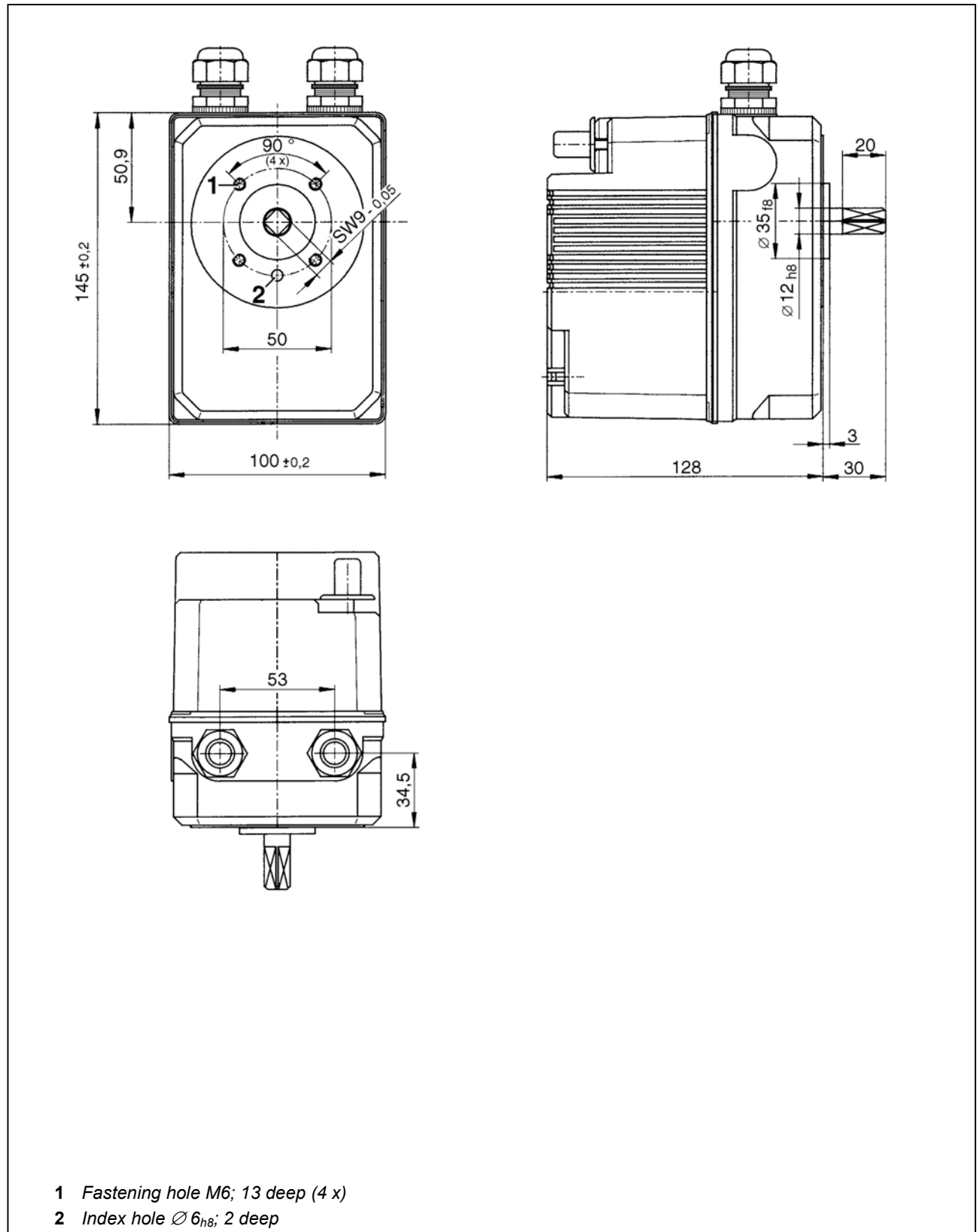


Fig. 14-1

14.2 Dimensional drawing ER 50

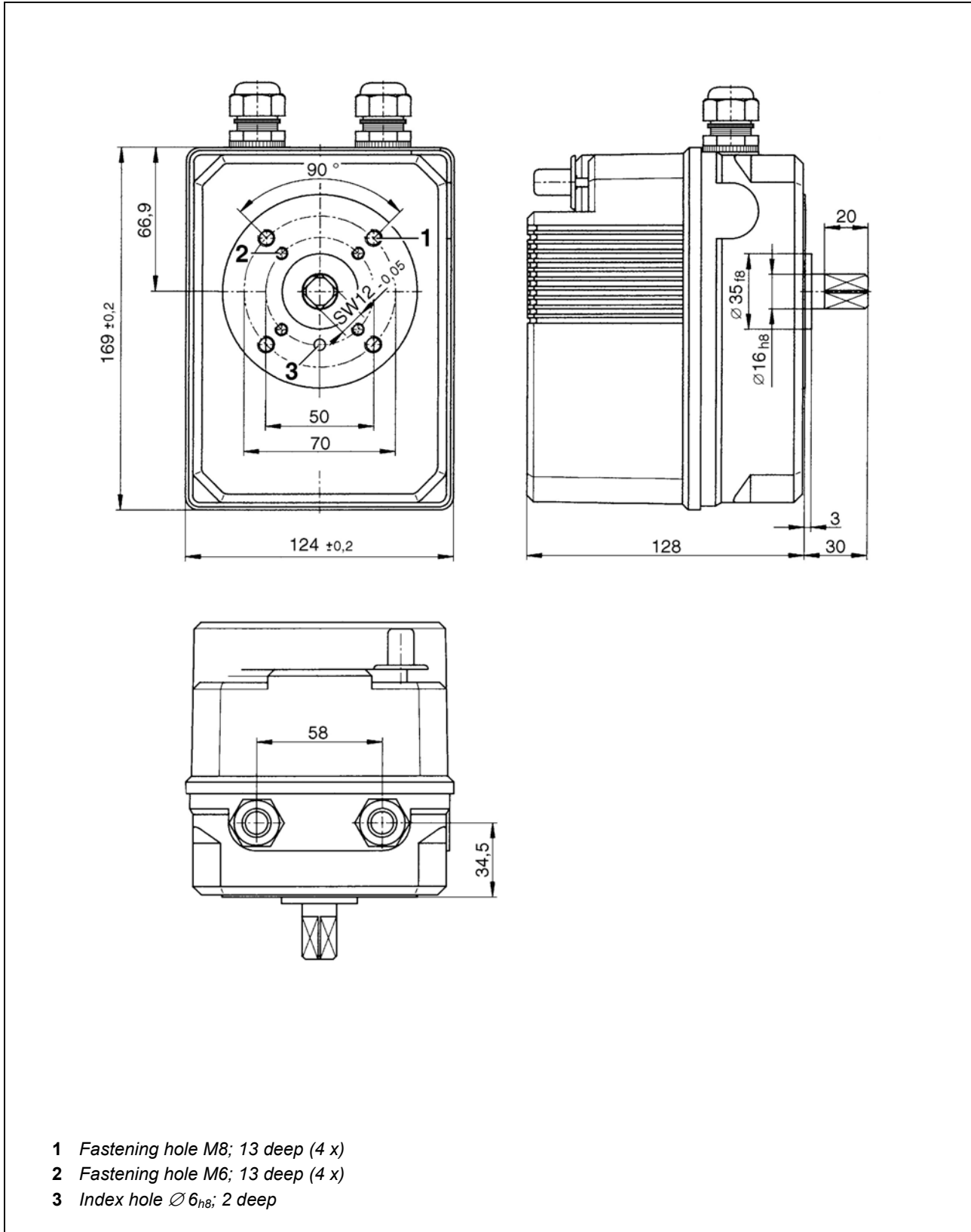


Fig. 14-2

14.3 Wiring diagram ER 20

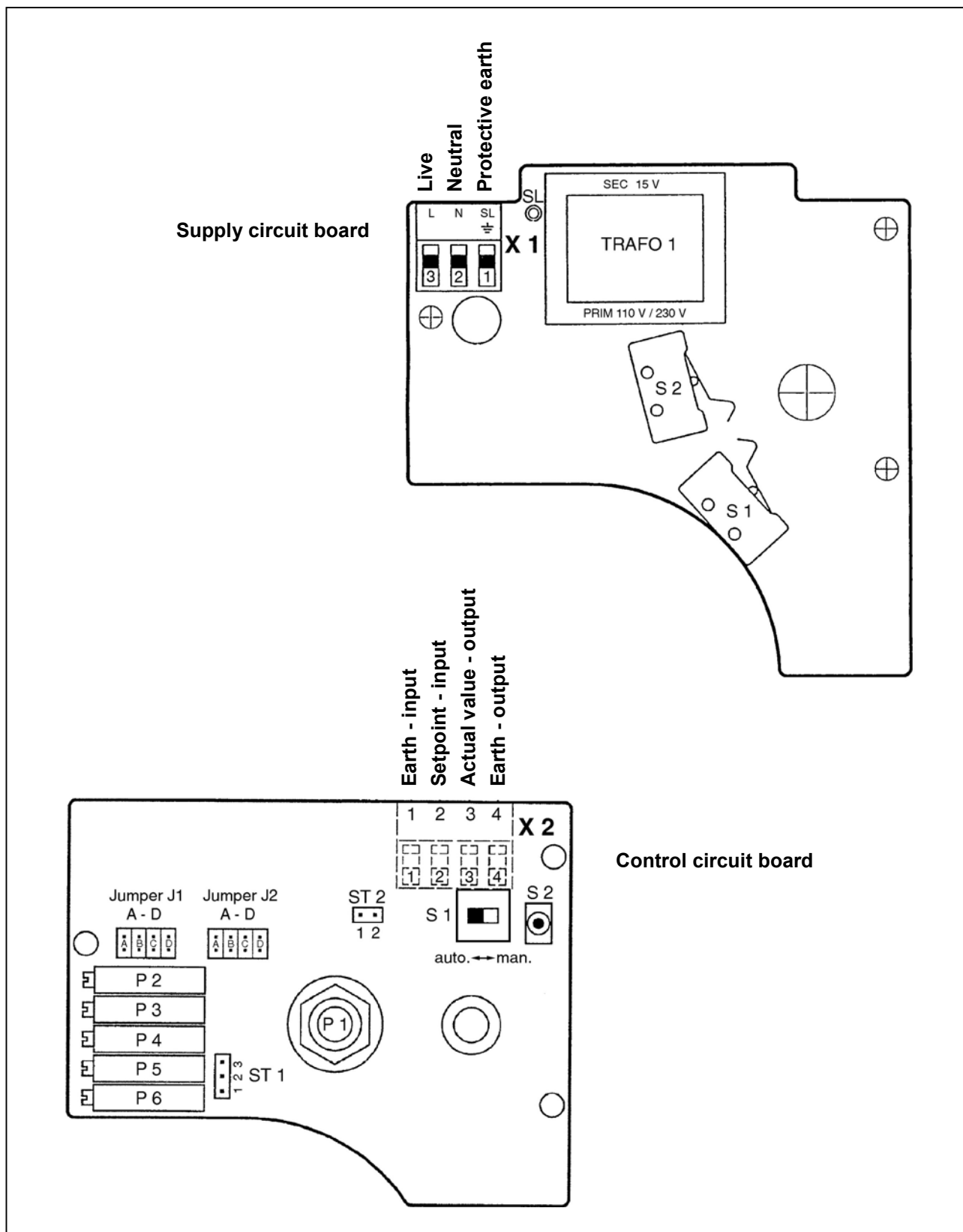


Fig. 14-3 Position controller ER 20 - Supply/control circuit board

14.4 Wiring diagram ER 50

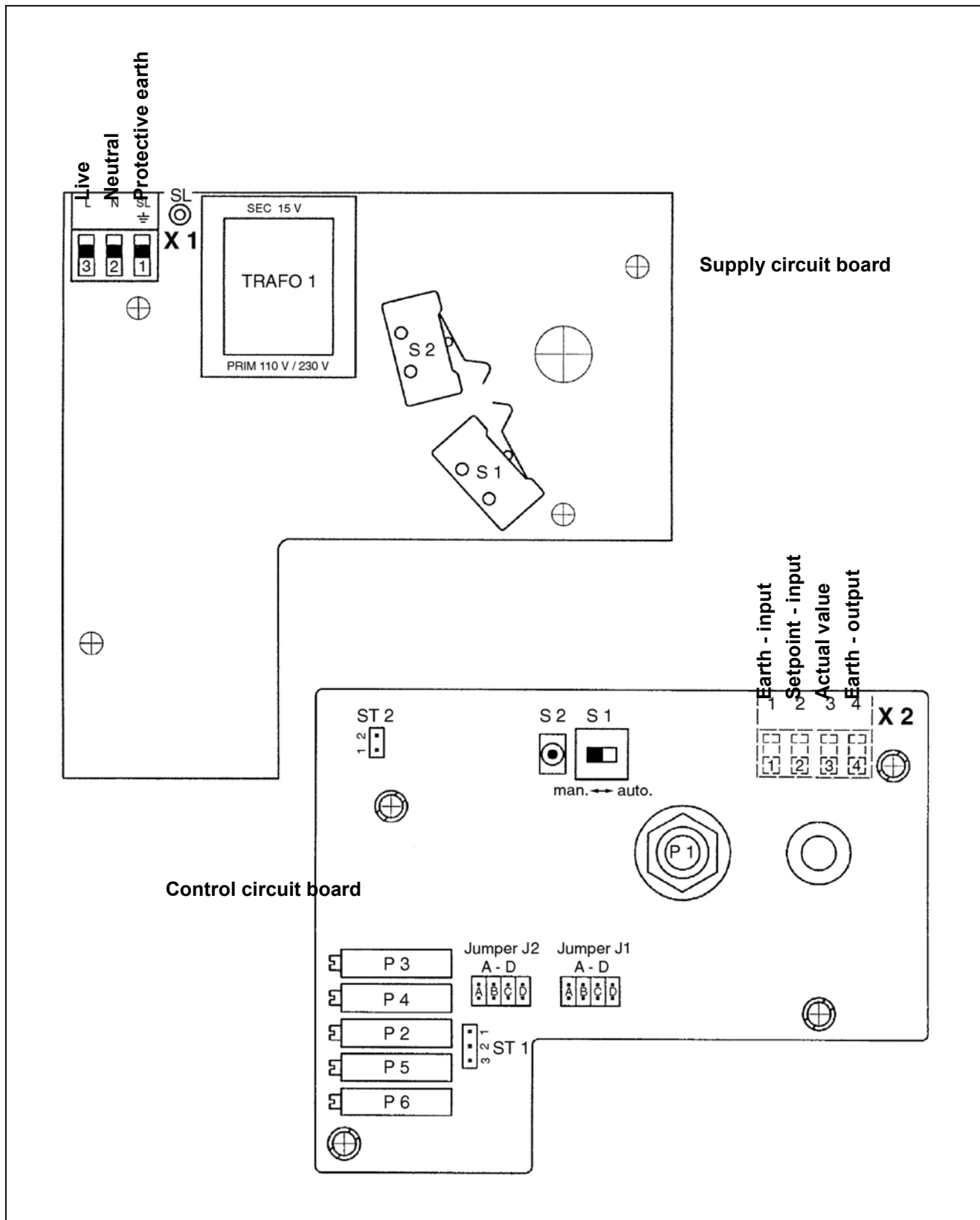


Fig. 14-4 Position controller ER 50 - Supply/control circuit board

14.5 Terminal connection diagram ER 20/ER 50

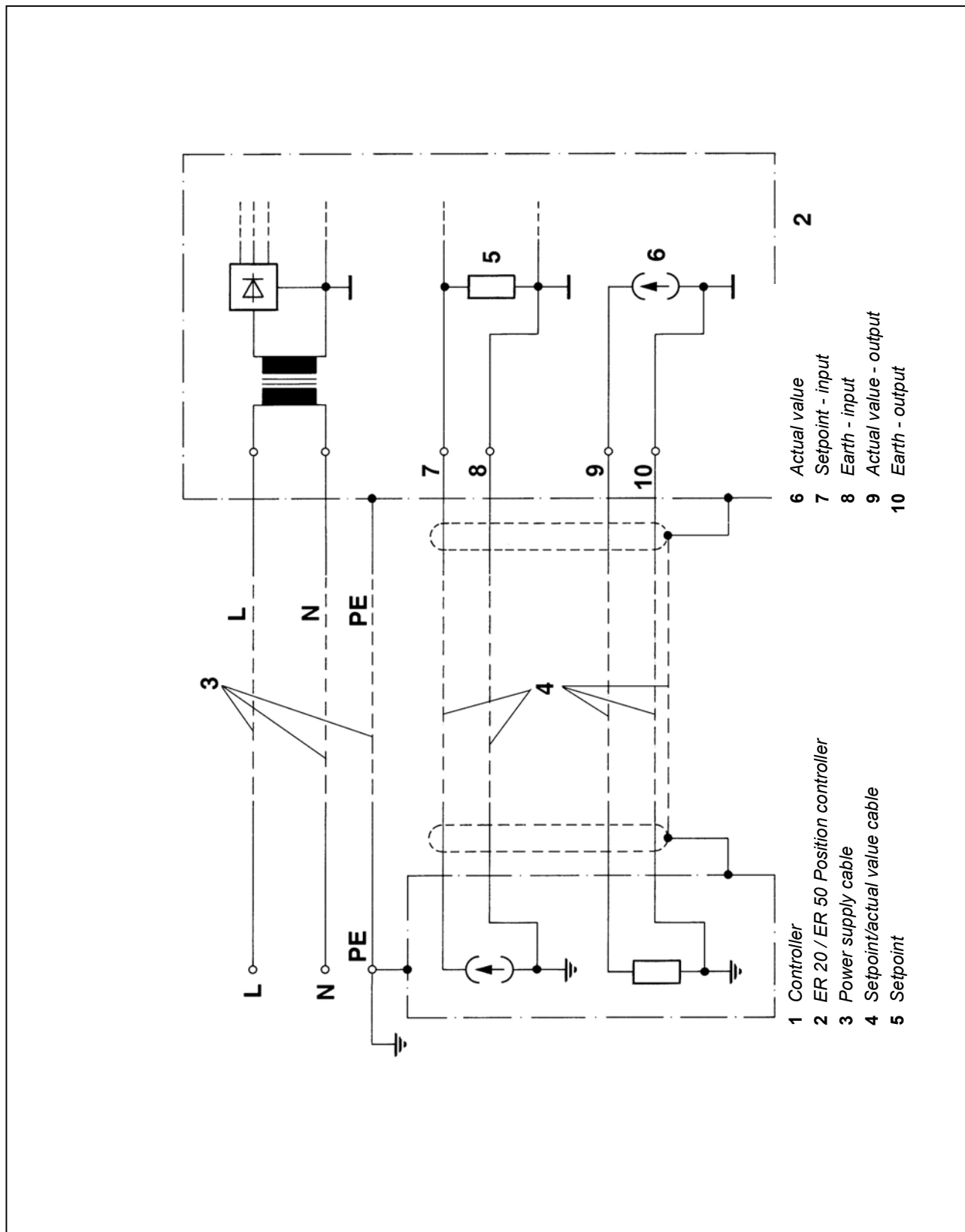


Fig. 14-5 Terminal connection diagram: power supply and setpoint/actual value cables ER 20/ER 50

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