

## Safety information.....

The turn actuator here described is an electric appliance:

- it is part of a power plant for industrial application
- it is laid out in accordance with the generally acknowledged rules of engineering

Electrical equipment can – owing to circumstances – cause severest injury to health or material damages because of

- inappropriate application
- false operation
- improper electrical connection
- inappropriate assembly onto a control element
- non-observance of ambient and operating conditions
- inadmissible intervention
- inadmissible removal of an existing coverage
- inappropriate transportation
- inappropriate storage

## Warning.....



*Mount and operate this appliance only, if previously qualified personnel has provided that appropriate power supplies are utilised assuring that during normal operation or in case of plant or plant parts failure no dangerous voltages can reach the appliance. **If you do not observe this warning, there can occur death, severe body injuries or essential material damages.** Pay attention to moving parts during the mounting and adjustment. There exists the danger of being injured and the risk of essential material damages.*

Those persons who are responsible for the safety of the installation must therefore grant that

- only qualified persons are charged with the works on this appliance
- these persons have read and understood the operating instructions and product information attached (we recommend our customers to have this confirmed by the mounting personnel in writing)
- the operating instructions are constantly available and the respective persons are obliged to consistently observe them with all their works (before starting to carry out any works guided by the operating instructions, there should eventually existing complementary instructions and documents about valves and control elements of these instructions be attached)
- with corresponding works a workman-like application of tools, measuring instruments and, if necessary, the use of personal protective equipments is effected
- works on this appliance or in its vicinity are interdicted to not qualified personnel

## Qualified personnel

are persons who are familiar with the set-up, mounting, commissioning and operation of the product and dispose of the respective qualification with regard to their activity, p.e.

- training or instruction respectively authorisation to switch on and off power circuits and appliances/ systems according to the standards of safety technology and to release, earth and mark these
- training or instruction according to the standards of safety technology in the attendance and use of adequate safety equipment
- schooling in first aid

## Electric connection – safety prescriptions.....



*Mains connection and commissioning of this turn actuator require special know-how about the erection of power installations (DIN VDE 0100), the knowledge of accident prevention and of the special commissioning conditions of this turn actuator. These works must only be carried out by qualified personnel. **In case of non-observance of this warning there can death, severe physical injuries or essential material damages be the outcome!***

Observe the safety information of these operating instructions!

- Carry out mains connection only with power supply switched off! Safeguard against unintentional switching on!
- **For installing electric lines and the mains connection the DIN/VDE regulations for the installation of power systems, as well as the provisions of the local Electricity Board must be observed!**
- Check the mains connection voltage and frequency for conformity on the name plate of the turn actuator and also the name plate of the driving motor.
- The conductor cross section must always be laid out according to the respective power consumption of the turn actuator and the required length of the line.
- ☞ Too small conductor cross sections are a frequent cause for supposed “operating disturbances”!
- Minimum cross section of the conductor for this type of turn actuator: 1 mm<sup>2</sup>.
- Mains fuse protection concerning the installation: max. 6 A.
- Disconnection from mains supply concerning the installation: for the separation and voltage release of the mains lead to the actuator for maintenance and adjustment works a respective breaker unit must be utilised granting an all-pole separation (except the earth lead). This breaker unit must be lockable in the state of breaking and be safeguarded against unintentional switch-on.

## Lifting the hood.....



*In case of maintenance and adjustment works switch the supply line to dead state first!*

- Untighten cheese head screws in the hood
- Embrace the hood on the cover and pull it off

## Making the electric connection.....

On principle the wiring diagram glued into the hood is applicable.

- Slide the supply line through the screwed cable glands (cable inlets) until enough length exists to the corresponding supply terminals
- Strip the line wrapping about 1 cm above the screwed cable glands
- Strip the individual cores at a distance of about 5 mm from the end
- Concerning the cores of stranded wires the end sleeves are to be slid onto the stripped end and be crimped
- Connect the lines to the terminal strips according to the wiring diagram
- Guide and fasten the lines in the actuator in a way that they are protected from moving or rotating parts and are not damaged when taking the hood off or putting it back

*The mains cables must always be laid separate from the control lines!*

## Adjustment of the positioning angle and of the limit switches, type “2 switches”....

The limit switches S1 and S2 are adjusted in the factory to the positioning angle as desired and they delimit the positioning angle. With this type the switches S1 and S2 are arranged one upon another. The positioning angle can be modified via these limit switches.

Concerning actuators with built-in fail-safe potentiometers this is possible only to a slight degree! The adjustment of the limit switches S1 and S2 must only be modified, if the positioning angle of the actuator is to be changed. An existing potentiometer must be adapted to the new positioning angle.

The settings of the switches are modified as follows:

- Travel the actuator electrically to the corresponding position
- Pull position indicator [164] off the camshaft
- Loosen knurled nut [90]

Do not twist self-locking nut [89]! The tripping cams are sluggish when turning!

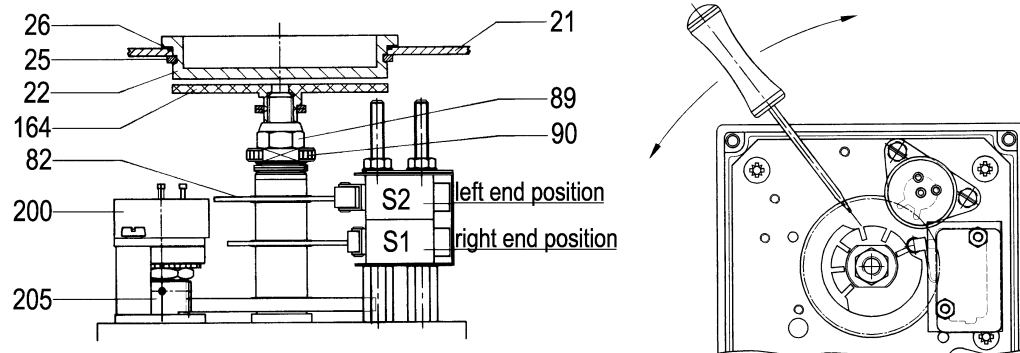
- Adjust corresponding tripping cam [82]; hereto insert an appropriate screw driver (blade thickness 1.2 mm) into one of the slots of the corresponding tripping cam
- Turn tripping cam until the switching roller of the corresponding switch is lifted and will be switching

It is recommendable with a very exact adjustment of the tripping cams to start the adjustment with S1 and to continue with S2. Arrest the already adjusted tripping cam with a second screw driver. In a non-actuated state of the adjusted limit switches S1 and S2 the motor coil receives voltage.

**Check functioning and direction of rotation!** Switch S1 switches off the motor in the end position in clockwise rotation seen on camshaft. Switch S2 switches off the motor in the end position in anti-clockwise rotation seen on camshaft. This is the default position (factory set).

- After the cam adjustment is finished, tighten knurled nut [90], lest the tripping cams turn any more in operation

It must absolutely be observed that the limit switches S1 and S2 will switch off the motor safely in the corresponding end position, before the actuator runs to blockage and before the motor will be blocked. If this is not observed, gear damages are inevitable and **any warranty is excluded**.



- |                     |                              |                          |
|---------------------|------------------------------|--------------------------|
| 21 Hood             | 82 Tripping cam              | 200 Potentiometer        |
| 22 Inspection glass | 89 Hexagon nut, self-locking | 205 Potentiometer pinion |
| 25 Snap ring        | 90 Knurled nut               |                          |
| 26 O-ring           | 164 Position indicator       |                          |

Figure A: Adjustment of turn actuator 6 Nm, type “2 switches”

## Adjustment of the actuator with “fail-safe” potentiometer.....

The installed fail-safe potentiometer is a highly sensitive sensor having resistance tracks of conductive synthetic material for converting and callipering a turn angle into proportional voltage.

The maximum wiper current in a disturbance case must not exceed 10 mA!

The recommended wiper current should be  $\leq 0.1 \mu\text{A}$  as a rule. The maximum admissible voltage via the potentiometer – with a resistance value of  $5 \text{ k}\Omega$  – must not surpass the value of 50 V. The resistance course is linear with a deviation of  $\pm$  approx. 1%. The resistance tolerance is  $\pm 20\%$ .

Depending on the ordering the actuator is set to  $90^\circ$  or  $120^\circ$  turn angle. The initial value of the fail-safe potentiometer is  $80\text{--}130 \Omega$ . The initial value can slightly be corrected by adjusting the tripping cams (see chapter 4.1 and 4.2 Adjustment of the tripping cams).

When correcting the tripping point by adjusting the tripping cams attention must be paid that the adjusted turn angle of the actuator is not bigger than the value of the turn angle indicated on the name plate, as the fail-safe potentiometer is actuated via a fixed transmission from the output shaft and – due to the form-fit – the transmission of the rotary motion is effected without friction clutch. Therefore only a slight adjustment of the tripping cams and thus also a slight shifting of the initial and final values of the fail-safe potentiometer is possible.

For verifying the resistance course of the fail-safe potentiometer during the rotary motion of the actuator a highly resistive ohmmeter must be utilised.

When connecting the instrument leads coming from the outside via screwed cable glands to the terminal strips in the actuator the wiring diagram glued into the actuator hood must be observed.

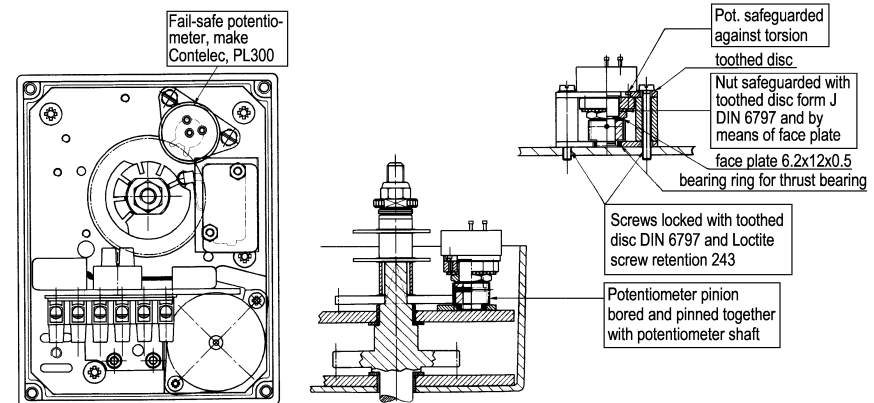


Figure B: Turn actuator 6 Nm with fail-safe potentiometer

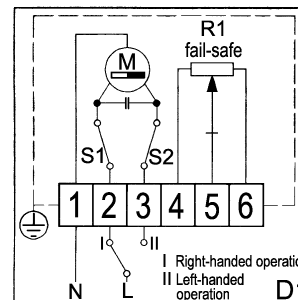


Figure C: Wiring diagram D1 for turn actuator 6 Nm “fail-safe” potentiometer, type “2 switches”

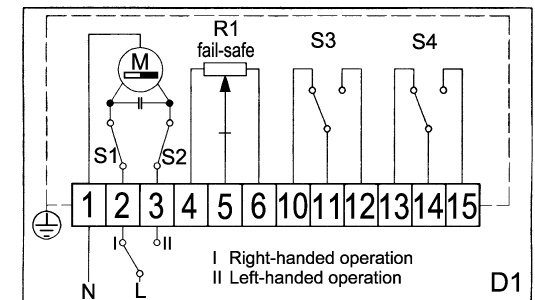


Figure D: Wiring diagram D1 for turn actuator with 6 Nm with “fail-safe” potentiometer, type “4 switches”