Positioner SRG 1xx

1 General

The SRG1xx positioner (see Figure 1) is used to control an electric actuator by means of a set point and actual value with current output 0(4)...20mA. The position control of the actuator is carried out using the SRG, i.e. the positioner ensures that the actual value and thus the position of the actuator follows the set point.

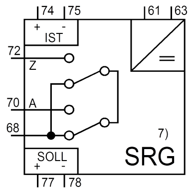

Figure 1: *Symbol*

2 Operation and electrical connection

The position transmitter (e.g. ESM) coupled with the actuator supplies the current I_2 (actual value) proportional to the position of the actuator. This actual value current I_2 reaches the resistor R2 via terminals 74 (+), 75 (-) and a current measuring diode. The set point current I_1 is conducted via terminals 77 (+), 78 (-) and a current measuring diode to the resistor R1. At the measuring points (see figs. 3 and 4) the set point I_1 and the actual value I_2 respectively, can be measured using a measuring device (internal resistance max. 10Ω) without impairing positioner operation. The current I_2 (actual value) is compared with the current I_1 (set point) in the positioner. If both currents are equal except for a residual difference (adjustable with potentiometer D), both relays (K_3 and K_4, see Figure 2) on the positioner remain released.

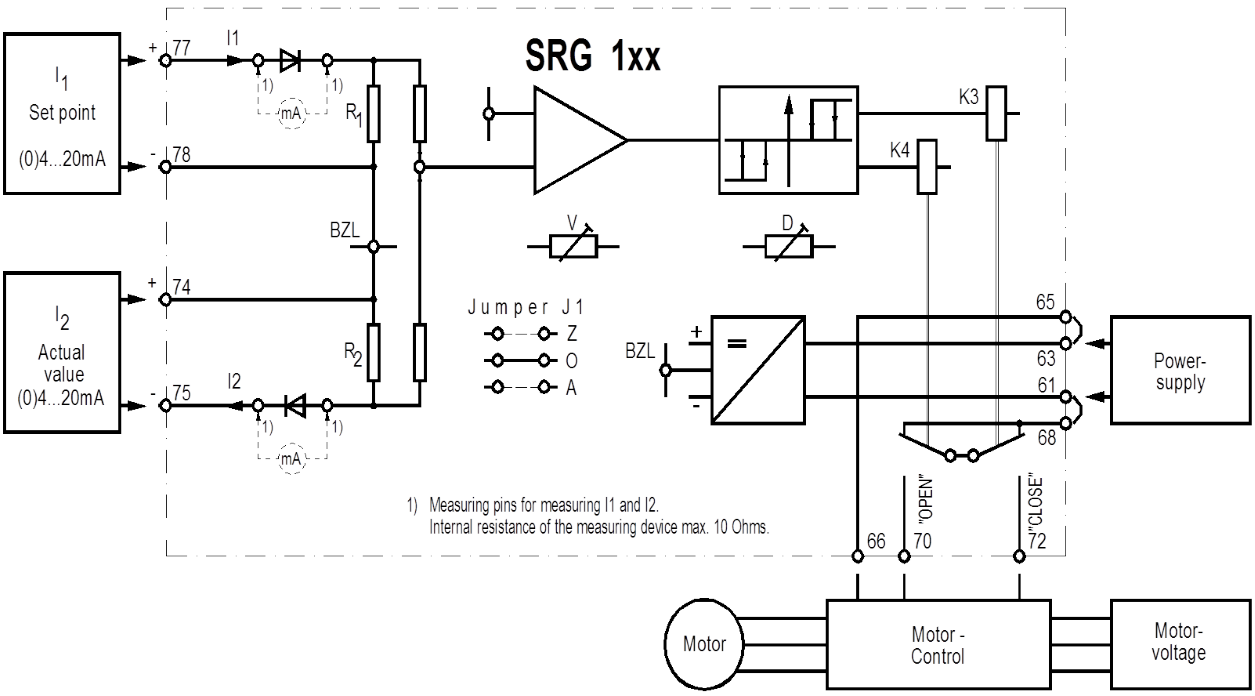

Figure 2: *Basic circuit diagram*

If the current I_1 is larger than I_2, the relay K_4 picks up (the corresponding yellow LED lights), the actuator must open. If the current I_2 is larger than I_1, the relay K_3 picks up (the corresponding yellow LED lights), the actuator must close.

The control of the motor may be carried out directly via the relays of the SRG or via an additional reversing starter unit depending on the motor type.
ATTENTION! Currents I_1 and I_2 have a common reference line BZL in the positioner. Signal processing is carried out without internal signal separation. The reference voltage required for control and the BZL reference line are separated galvanically from the supply. Thus, various positioners can be connected in series to the same set point (synchronization control, split-range control).

3 Connection model

The positioner can be supplied in sub-unit terminal screw block (see Figure 3) or in insert card block (see Figure 4) version. The connection model is determined by the third digit of the designation (SRGxx1 for insert card block (see Figure 4) and SRGxx2 for sub-unit terminal screws (see Figure 3)).

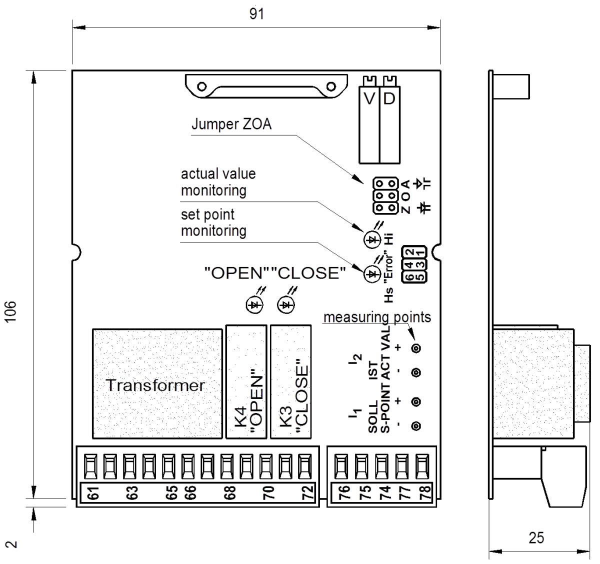

Figure 3: *SRG 1x2*

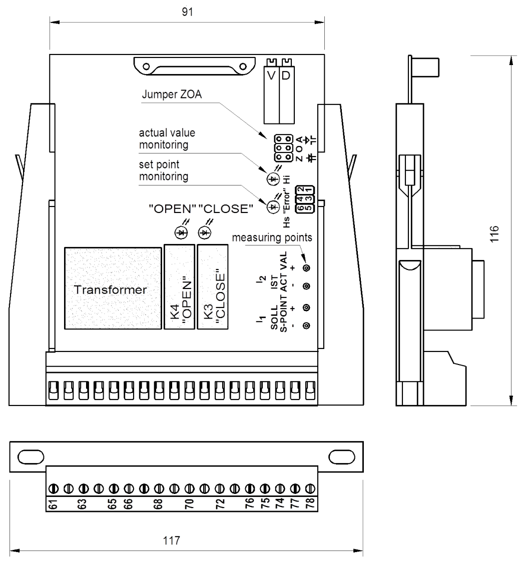

Figure 4: *SRG 1x1*

4 Instructions for adjustment

Jumper J1:
You can determine the behaviour of the positioner in case of failure of the set point and the actual value (e.g. wire fracture), respectively, by means of the J1 jumper. This function becomes active if an input signal is lower than a certain threshold (see technical data). A response of the control is signalled by the red LED Hs (set point monitoring) and Hi (actual value monitoring), respectively.
When operating the SRG1xx with current signals 0...20mA this control has to be switched off.
The following functions are possible:
Jumper at Z (see Figure 5): with the response of the monitoring the K3 relay picks up. This corresponds to the control command "CLOSE". Jumper at 0 (see Figure 6): with the response of the monitoring both relays are released, the actuator stops. Jumper at A (see Figure 7): with the response of the monitoring the K4 relay picks up. This corresponds to the control command "OPEN". Jumper slanted (see Figure 8): The monitoring is switched off (necessary with 0...20mA).

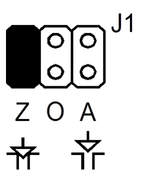

Figure 5: *„CLOSE"*

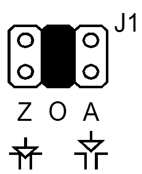

Figure 6: *„STOP"*

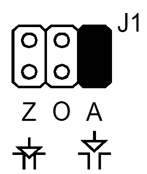

Figure 7: *„OPEN"*

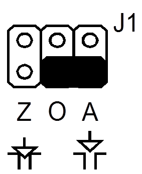

Figure 8: *„0. . . 20mA"*

Switching difference D:

The switching difference (see Figure 9) is adjusted using potentiometer D (see Figure 3 and 4). If a more exact positioning of the actuator is desired, then the switching difference must be reduced. If the switching difference is too small, the actuator will start to oscillate. In case of actuator oscillation, the switching difference must be increased. This is achieved by turning potentiometer D in a counter-clockwise direction.

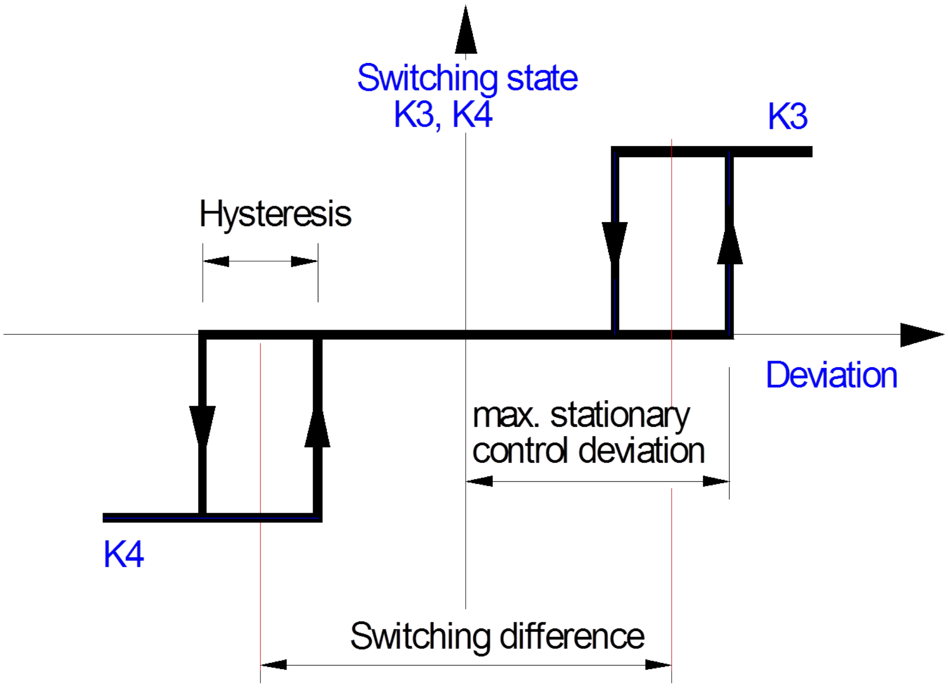

Figure 9: *Switchpoints of 3-point controller*

Filter V:
The filter type used is a phase-zero filter. This filter limits the increase speed of the control deviation. The effect of disturbances (high increase speed) is reduced effectively without impairing the control behaviour.
ATTENTION! A too large filter effect will cause the actuator to oscillate.
The filter effect is reduced by turning the potentiometer V in a clockwise direction.

Adjustment procedure:
Set filter effect to minimum position by turning potentiometer V in a clockwise direction and determine the optimum adjustment of the switching difference with set point jumps. When turning potentiometer D in a counter-clockwise direction, the switching difference is increased. The set point jumps should be in the opposite direction (reverse clearance) and their size selected so that the actuator is able to reach its nominal speed. Then the filter effect can be increased to the desired stability reserve again by turning potentiometer V in a counter-clockwise direction.

5 Technical data

Supply voltage:
- SRG 11X .... 220V AC, +10%/-15%, 47...63 Hz
- SRG 12X .... 20...30V DC, geglättet;(+...63, -...61)
- SRG 13X .... 110V AC, +10%/ -15%, 47...63Hz

Power consumption .... approx. 1,5VA
Ambient temperature .... -20...+60°C
Input signal (set point and actual value) .... 0(4)...20 mA
Input burden .... 100Ω + Diode (2,7V typ. at 20mA)
Switching threshold of the monitoring .... max. 2,8mA
Switching difference .... 0,5...5% of final value
Hysteresis .... approx. 25% of switching difference
Relay:
- Switching capacity 4A, 250V AC1

Mechanical lifer . . . . 20 mill. cycles

Electromagnetic compatibility:
The function of the SRG can be influenced by heavy electro-magnetic disturbances. After interference decay, the original function is restored and new alignment is not necessary. We advise to use shielded cables for the signal lines of the SRG.