Positioner SRG2xx

1 General

The SRG1xx positioner (see Figure 1) facilitates the control of an electric actuator by means of a set point with current output 0(4)...20mA. A potentiometer with a resistance value of 100Ω to 10kΩ is used as an actual value in the actuator.The position control of the actuator is carried out using the SRG2xx, i.e. the positioner ensures that the actual value and thus the position of the actuator follows the set point.

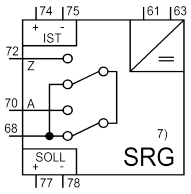

Figure 1: *Symbol*

2 Operation and electrical connection

The set point current I_1 is conducted via terminal 77 and the current measuring diode to the resistor R_1. The set point I_1 (see Figure 3 and 4) can be measured at the measuring points using a measuring device (internal resistance max. 10Ω)) without impairing operation. The actual value (actuator position) is determined in the SRG2xx from the position of the actual value potentiometer (connected to the terminals 74 to 76) coupled with the actuator. This actual value is compared with the set point in the positioner. If both values are equal except for a residual difference (adjustable with potentiometer D), none of the two relays (K3, K4) on the positioner picks up (see Figure 2).

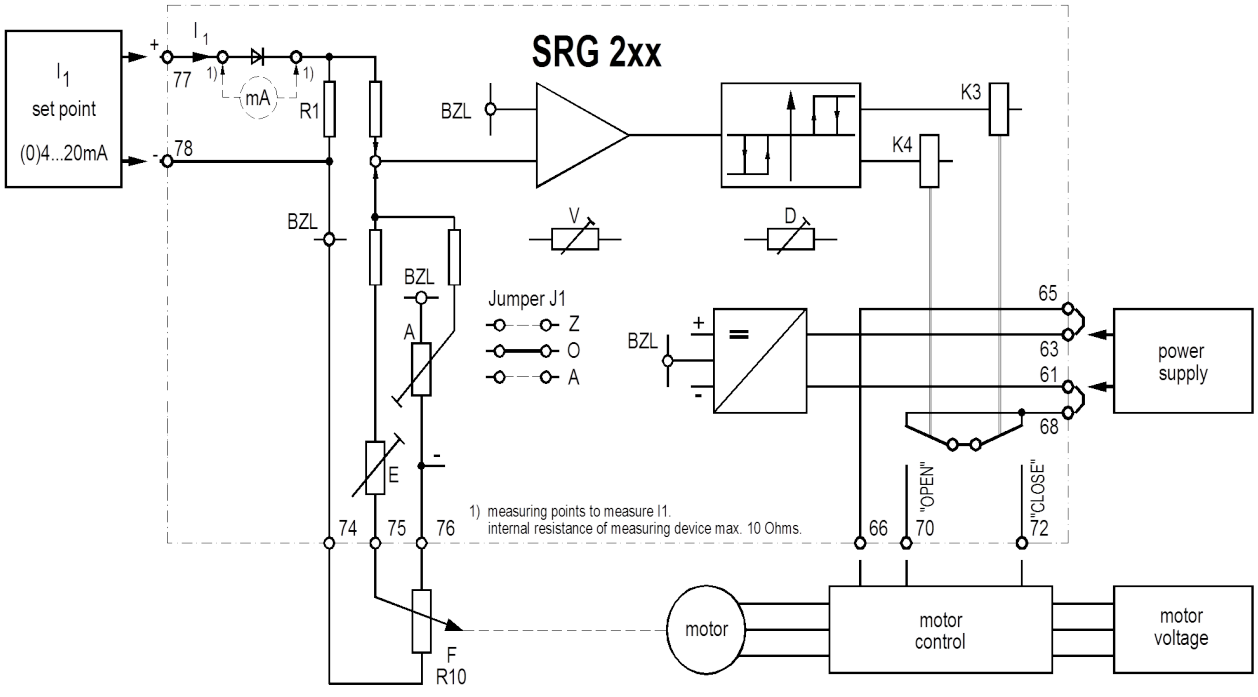

Figure 2: *Basic wiring diagram*

If the set point is larger than the actual value, the K4 relay picks up (the corresponding yellow LED lights), the actuator must open. If the actual value is larger than the set point, the K3 relay 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.
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)).

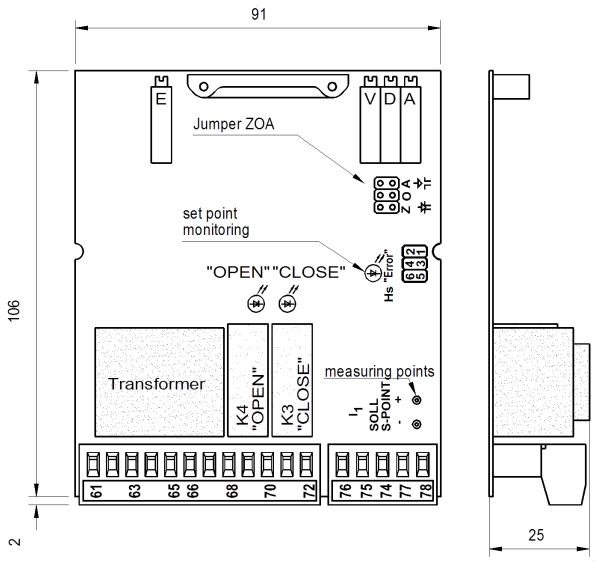

Figure 3: *SRG 2x2*

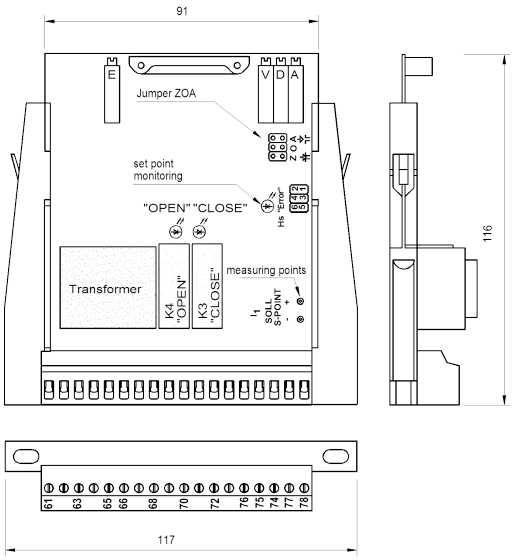

Figure 4: *SRG 2x1*

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).

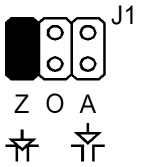

Figure 5: *„CLOSE"*

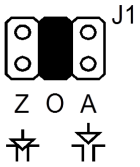

Figure 6: *„STOP"*

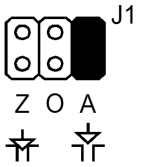

Figure 7: *„OPEN"*

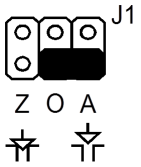

Figure 8: *„0. . . 20mA"*

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.

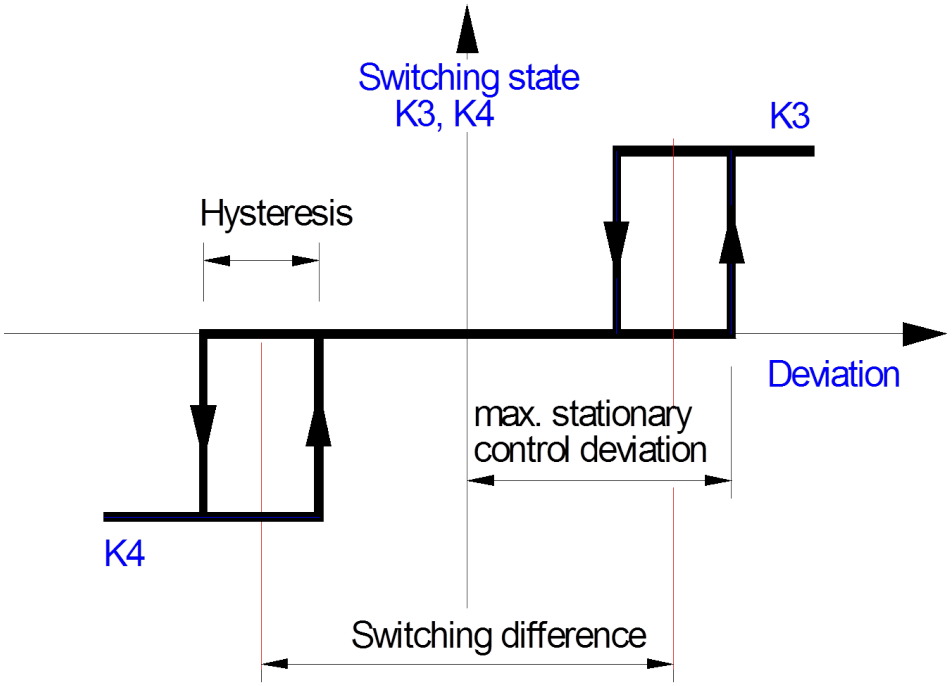

Figure 9: *Switchpoints of 3-point controller*

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:
Adjust actuator according to operating instructions for the actuator and set jumper J1 to position 0...20mA (see Figure 8). Set filter effect to minimum position by turning potentiometer V in clockwise direction.
Initial value: Feed 0mA (terminals 77 and 78) at set point input. The actuator moves into final position "CLOSED" and is switched off via microswitches S1 (torque depending closing) or S3 (travel depending closing). Turn potentiometer A on SRG in clockwise direction until relay K3 is released (can be seen on LED).
Final value with set point 0...20mA: Feed 20mA (terminal 77 (plus) and terminal 78 (minus) at set point input. The actuator moves in direction "OPEN" and the travel switch S4 (travel depending opening) and torque switch S2 (torque depending opening), respectively, should switch. If S4 or S2 have not already switched, turn potentiometer E in clockwise direction until S4 or S2 responds and relay K4 remains picked up. Then turn potentiometer E slowly in counter-clockwise direction until relay K4 is released and K3 does not pick up yet (switching difference).
Final value at set point 4...20mA: Feed 16mA (terminal 77 (plus) and terminal 78 (minus)) at set point input. The actuator moves in direction "OPEN" and the travel switch S4 (travel depending opening) and torque switch S2 (torque depending opening), respectively, should switch. If S4 or S2 have not already switched, turn potentiometer E in clockwise direction until S4 or S2 responds and relay K4 is released. Increase nominal value to 20mA, K4 picks up. Turn potentiometer A in counter-clockwise direction until relay K4 is released and K3 does not pick up yet.

Control and correction of adjustment: Initial value: Feed minimum set point (0 or 4mA). The actuator moves into final position "CLOSED". If S3 or S1 switches and K3 remains picked up, turn potentiometer A in clockwise direction until K3 is released and K4 does not pick up yet. If K3 is released and S3 or S1 has not switched yet, turn potentiometer A in counter-clockwise direction until S3 or S1 switches. If K3 remains picked up, turn potentiometer A in clockwise direction until K3 is released and K4 does not pick up yet.
Final value: Feed set point 20mA. The actuator moves into final position "OPEN". If S4 or S2 switches and K4 remains picked up, turn potentiometer E in counter-clockwise direction until K4 is released and K3 does not

pick up yet. If K4 is released and S3 or S1 has not switched yet, turn potentiometer E in clockwise direction until S3 or S1 switches. If K4 remains picked up, turn potentiometer E in counter-clockwise direction until K4 is released and K3 does not pick up yet.

Finally, 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. Finally, adjust behaviour in case of set point failure using jumper J1.

5 Technische Daten

Supply voltage:	
SRG 21X	220V AC, +10%/-15%, 47...63 Hz
SRG 22X	20...30V DC, smoothed;(+...63, -...61)
SRG 23X	110V AC, +10%/ -15%, 47...63Hz
Power consumption	approx. 1,5VA
Ambient temperature	-20...+60°C
Set point signal	0(4)...20 mA
Actual value potentiometer	100Ω...10kΩ
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 life	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.