ACTUMATIC mit SRG2

1 General

ACTUMATIC is an actuator control that can be parameterized. It contains the complete motor control, the processing of the actuating commands from and signals to the control room. Adjustments to final control element (e.g. tight closing) or to the

Furthermore, due to the display of all input and output signals via LEDs, an excellent tool for start-up and diagnosis is available. Figure 1 shows the logic board with the positioner SRG2.

2 Supply

An actuator with ACTUMATIC needs two power supplies, one for the supply of the logic board and the reversing starters, and one for the supply of the motor control. It is possible to interconnect the two supply voltages. A start-up of the motor in the wrong direction due to wrong phase sequence is avoided by the phase sequence detection. Do not connect the phase sequence detection in case of voltages over 3x415V!

ATTENTION: No positioning command has to be activated during the first start up operation!!!
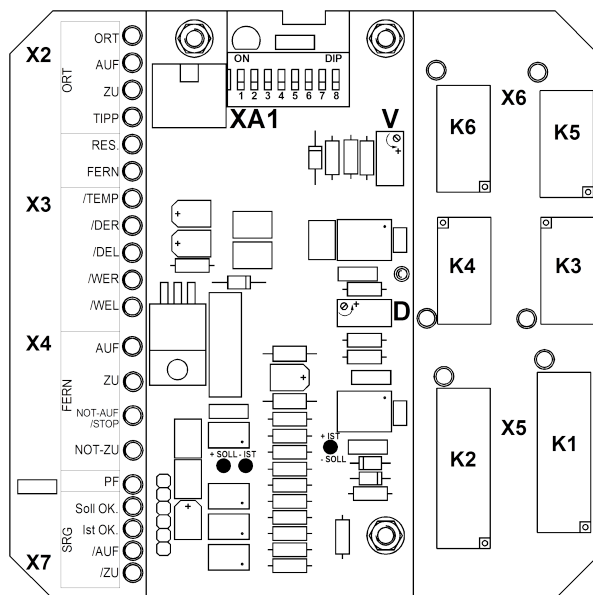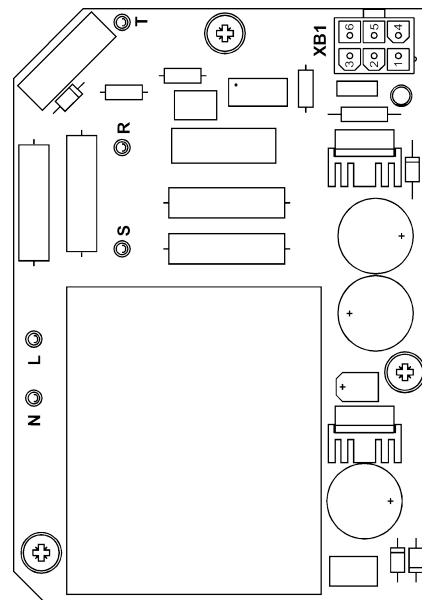

Figure 1: *Logikplatine mit Stellungsregler SRG*

Figure 2: *Spannungsversorgung*

3 Functions

3.1 Selector switch S30

- Stellung Local: The actuator can be actuated locally using the control switch S31 (OPEN-STOP-CLOSE). Using DIP switch no. 5, self-holding for LOCAL operation mode is activated. The external control commands EMERGENCY OPEN (switch 6 to OFF) and EMERGENCY CLOSE are active.

- Stellung Off: Actuator can not be operated whether with local nor with remote commands.

- Stellung Remote: The input for the external control signals are activated.

3.2 Description of DIP switch functions:

- Torque depending closing:
    - OFF: The final position CLOSED is reached if the corresponding travel switch is actuated. If the torque switch is actuated, there is a failure.

- **ON:** The final position CLOSED is reached only if the corresponding travel switch and the torque switch are activated. If the torque switch is actuated before the end position (travel switch), there is a failure.

- Torque depending opening:

  - **OFF:** The final position OPEN is reached if the corresponding travel switch is actuated. If the torque switch is actuated, there is a failure.

  - **ON:** The final position OPEN is reached only if the corresponding travel switch and the torque switch are activated. If the torque switch is actuated before the end position (travel switch), there is a failure.

- Non self-locking worm:

  - **OFF:** For actuators with a single threaded worm (output speeds below $120min^{-1}$).

  - **ON:** For actuators with a triple threaded worm (non self-locking, output speeds from $120min^{-1}$) the torque switches have to be locked additionally to avoid repeated start of the motor in the same direction after torque switch-off.

- Left-closing final control element:

  - **OFF:** Cw rotation of actuator means CLOSING the final control element.

  - **ON:** Cw rotation of actuator means OPENING the final control element.

- Self-holding LOCAL:

  - **OFF:** No self-holding in local operation, i.e. the actuator runs only as long as the control switch S31 is kept in the position OPEN-Tipp or CLOSE-Tipp (Figure 3

  - **ON:** Self-holding in local operation, i.e. the control switch S31 must be turned only once briefly in one of the two positions OPEN-Tipp or CLOSE-Tipp (Figure 3, and the actuator then runs into the final position (push to run). If the actuator should be stopped, control switch S31 must be switched to STO (Figure 3).
    Note: Self-holding responds with delay (approx. 0.3 s), thus very short actuating pulses are possible without switching back to STOP.

Figure 3: *Steuerschalter S31*

- Remote Stop signal:

  - **OFF:** No stop signal in remote operation. The external control signal EMERGENCY OPEN/STOP receives the function EMERGENCY OPEN.

  - **ON:** Additional stop signal in remote operation. The external control signal EMERGENCY OPEN/STOP receives the function STOP. ATTENTION: Due to ACTUMATIC is equipped with positioner SRG1, self holding (push to run) of the remote commands is not active.
    ATTENTION: The external control signal STOP is processed active-low for safety reasons (e.g. wire fracture), i.e. STOP is activated if there is no voltage, the actuator is released, if 24VDC is applied. We advise to deactivate the external control signal STOP only if the actuator has to be activated.

- No function

3.3   External control commands

The selection of the external control commands is carried out with positive 24VDC signals, with minus connected to common. The signals are led via optocoupler and, thus, are separated galvanically from the internal control voltage of the actuator. The command OPEN, STOP and CLOSE is active only in position REMOTE of the selector switch S30. The command EMERGENCY OPEN and EMERGENCY CLOSE is active in the positions LOCAL and REMOTE of the selector switch S30 and overrides all other commands. The function of the external control input EMERGENCY OPEN/STOP is determined by DIP switch no. 6.
Note: If the commands REMOTE OPEN and REMOTE CLOSE and/or EMERGENCY OPEN and EMERGENCY CLOSE are applied at the same time, the actuator stops. The EMERGENCY command again overrides all other commands

3.4   Signalling relays

Four signalling relays with the functions K3 = OPEN, K4 = CLOSED, K5 = READY and
K6 = RUN are mounted on the logic board.
The signalling relay K3 = OPEN picks up in the final position OPEN of the actuator.
The signalling relay K4 = CLOSED picks up in the final position CLOSED of the actuator.
The signalling relay K5 = READY picks up if the actuator is ready for operation. Possible causes for a fall-off of K5 are: excess of motor temperature, supply voltage failure (check fuse), wrong phase sequence (only with three-phase current), torque failure.
The signalling relay K6 = RUN picks up with running actuator if a flashing switch is not connected, and blinks if the flashing switch is led to the reserve input of the logic board.

3.5   Phase sequence detection:

A monitoring mechanism for wrong phase sequence is available in the ACTUMATIC power supply. This monitoring mechanism avoids a start-up of the three-phase motor in case of wrong phase sequence. This monitoring mechanism is separated galvanically from the ACTUMATIC supply. Thus, also a motor voltage can be monitored that is not connected with the ACTUMATIC voltage supply.

4   Positioner

4.1   General:

The positioner SRG2 is used for controlling the electric actuator with ACTUMATIC by means of a set point with current 0(4)...20 mA. With the SRG2 positioner a potentiometer with a resistor value from 1k to 10k is used as actual value (position value of the actuator). The position control of the actuator is carried out via the SRG2, i.e. the positioner provides that the actual value (position of the actuator) follows the set point. **NOTE:** The potentiometer inside of the actuator is only for intended feedback of the SRG2, there is no external feedback.

4.2   Adjustment:

Mechanical Preadjustment:
Drive the actuator locally (switch S30 in LOCAL position) to the "CLOSED" position. Turn carefully the shaft on the position transmitter (fig. 4) counterclockwise with a screwdriver to the end. (In case of counterclockwise closing actuators turn the shaft clockwise to the end)
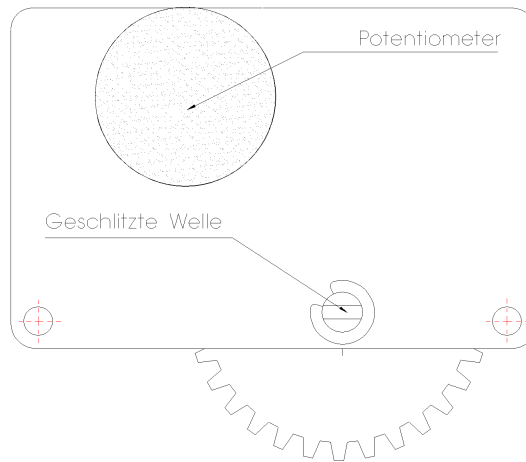
Figure 4: *Potentiometer with position transmitter*

Adjustment Procedure:
Reduce the filter effect to its minimum by turning the potentiometer V in clockwise direction.

Initial value: Feed 0mA at set point input. Move the actuator into the final position "CLOSED". Turn potentiometer A on SRG2 in clockwise direction until the LED SRG/CLOSE lights on, then once again in counterclockwise direction until the SRG/CLOSE-LED just lights off.

Final value with set point 0...20mA: Feed 20mA at set point input. Move the actuator into the final position
"OPENED". Turn potentiometer E in counterclockwise direction until the LED SRG/OPEN lights on, then once again in clockwise direction until the SRG/OPEN-LED just lights off.

Final value with set point 4...20mA: Feed 16mA at set point input. Move the actuator into the final position "OPENED". Turn potentiometer E in counterclockwise direction until the LED SRG/OPEN lights on, then once again in clockwise direction until the SRG/OPEN-LED just lights off. Increase set point value to 20mA. Turn potentiometer A in counterclockwise direction until the LED SRG/OPEN lights on, then once again in clockwise direction until the SRG/OPEN-LED just lights off.
Finally increase the switching difference, when turning the potentiometer D in a counterclockwise direction. 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 counterclockwise direction.

Control and correction of adjustment:

Selector switch S30 in REMOTE position:
Inital value: Feed minimum set point (0 bzw. 4mA). The actuator moves into final position "CLOSED". If the final position does not get reached, turn potentiometer A in clockwise direction until the final position gets reached and the LED SRG/CLOSE does not light anymore. If the final position gets reached too early, turn potentiometer A in counterclockwise direction until the actuator moves off from the final position, then proceed as previous described.
Final value: Feed set point 20mA. The actuator moves into final position "OPENED". If the final position does not get reached, turn potentiometer E in counterclockwise direction until the final position gets reached and the LED SRG/OPEN does not light anymore. If the final position gets reached too early, turn potentiometer E in clockwise direction until the actuator moves off from the final position, then proceed as previous described.

Switching differnce D:
The switching difference (Figure **??**) is adjusted using potentiometer D. The more precise the actuator is to be positioned, the smaller the switching difference must be. 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.
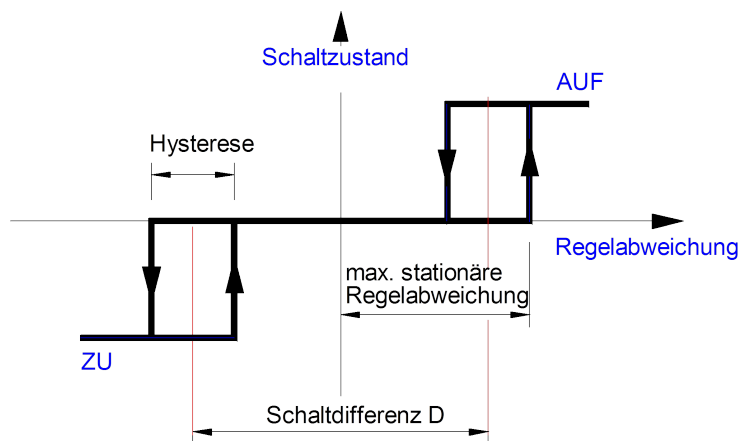
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Figure 5: *Schaltpunkte des 3-Punktereglers*

Filter V:
The filter type used is a phase-zero filter. This filter limits the increase speed of the standard deviation. The effect of disturbances (high increase speed) is reduced effectively without impairing the behaviour in control. 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.

5   Electromagnetic compatibility

The function of ACTUMATIC 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 SRG2.

6   Diagnosis

The LEDs on the logic board have the following meaning:

Local	Selector switch S30 in position LOCAL
Local Open	Control switch S31 in position OPEN
Local Close	Control switch S31 in position CLOSE
Local TIPP	Control switch S31 in one of the two extreme resilient positions
RES.	used with flashing switch
Remote	Selector switch S30 in position REMOTE
/TEMP.	Thermal switch OK
/DER	Torque switch cw rotation not actuated (active low)
/DEL	Torque switch ccw rotation not actuated (active low)
/WER	Torque switch cw rotation not actuated (active low)
/WEL	Torque switch ccw rotation not actuated (active low)
Remote Open	External command OPEN is applied
Remote Close	External command CLOSE is applied
Remote EM.-Open /Close	External command EMERGENCY OPEN or STOP (active low) is applied
Remote EM.-Close	External command EMERGENCY CLOSE is applied
PS	Phase sequence error
SRG SP Ok.	No function
SRG AV Ok.	No function
SRG /Open	SRG does not issue command OPEN (active low)
SRG /Close	SRG does not issue command CLOSE (active low)

7 Technical Data:

7.1 General

Program number: P1.0
Program version: V1.51s
Product number:
Logic board: SE160120 HEKR29626
Power supply board: SE160134 CLSC39635
Positioner board: SE160121 HEKR29626
Ambient temperature . . . . -25...+60°C

7.2 Power pack:

Supply voltage (L, N) 230V, 50Hz, 10VA
Phase sequence monitoring (L1, L2, L3) . . . . 3 x 400V, 50Hz
Internal supply for ESM 24VDC, 30mA

7.3 Logic board:

External control commands . . . . OPEN, CLOSE, EM.-Open /STOP, EM.-Close
Input signal 24VDC
Signalling relay (change-over contact) . . . . K3: OPEN,
. . . . K4: CLOSED,
. . . . K5: READY,
. . . . K6: RUN
Braking capacity (resistive load) . . . . 3A, 125VAC, 2x 10^5 cycles
. . . . 2A, 250VAC, 2x 10^4 cycles
mechanical life . . . . 10^7 cycles

7.4 Positioner 2:

Set point . . . . 0(4)...20mA
Voltage loss at set point input . . . . max. 2,8V bei 20mA
Actual value . . . . Potentiometer 1k..10k
Switching differnce . . . . ca. 0,075..1,5mA (0,38..7,5% bez. auf 20mA)
Hysteresis . . . . ca. 0,0075..0,15mA (0,038..0,75% bez. auf 20mA)