

Elektrischer Stellantrieb Typ EA 21/31/42
Electrical Actuator Unit Type EA 21/31/42

Bedienungsanleitung

Instruction Manual

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Modifications to the actuator which have an effect on the technical data given in this instruction manual and its intended use, i.e. significantly alter the actuator, render this manufacturer's declaration null and void.

## 3. Intended use

When mounted on a valve and connected to a system control and provided that the actuator data corresponds to the electrical control and the valve, the purpose of this actuator is:

- to actuate valves with up to $180^{\circ}$ pivoting (ball valves and butterfly valves),
- to indicate the previously calibrated end positions of the valve via electrical signal to the system control (accessory), and
- in case of a power supply interruption the actuator valve remains in its current position (without accessory). Please use emergency manual override or install fail-safe return.
The actuator is not intended for uses other than those listed above. If the instructions contained in this manual are not observed, the manufacturer is excluded from all liability for the above mentioned products.


## 4. Safety Information

### 4.1 Due care required by the operator

The actuator described herein was designed and manufactured with consideration to the respective harmonized European standards. It corresponds to the latest technology and the technical specifications contained under section 6.3.

Safety on the job can, however, only be realized if the operator warrants that

- the actuator is only used as indicated under section 3,
- he is familiar with this instruction manual and the manual of the corresponding valve and adheres to the instructions contained therein and
- he has taken the necessary measures against electrostatic influence.


### 4.2 Special hazards

Under normal conditions, the actuator may only be operated with the cover closed.
If work is performed on the actuator with the cover removed, the supply and control voltage must first be disconnected. Adjustments, which need to be done in the energized state, should be carried out with special insulated tools.

In addition, the operating instructions of the manual valve must be observed. They are an integral component of this manual.

### 4.3 Transport and Storage

$\triangle$
The actuators must be handled, transported and stored with care. Please note the following points:

- The actuators should be transported and/or stored in their original unopened packaging.
- The actuators must be protected from harmful physical influences such as dust, heat (humidity).
- It is important that the connections are neither damaged by mechanical nor by thermal influences.
- Prior to installation, the actuators should be inspected for transport damages. Damaged actuators must not be installed.


## 5. Actuator Design

The standard version of the EA 21/31/42 electrical actuator consists of the following elements: gear unit, direct current motor, electrical board and components for end position limiting.

For special applications, the actuator can be equipped additionally with various supplementary kits (see section 7).


### 5.1 Wiring Diagram for Standard Version

## Position indicator

<br>B<br>B-C<br>A-C<br><br>B<br>A-C<br>$B-C$<br>2-way<br><br>B<br>C<br>A-B<br>closed<br>open

## Installation note

If the actuator is directly connected to the power supply, it is necessary to install a disconnector between the actuator and the power supply (do not disconnect the earth cable). Cross-section of the external cables max. $1,5 \mathrm{~mm}^{2}$. To avoid water flowing into the actuator, make sure the cable entry point is not upturned.

The EA 21/31/42 has a temperature control (ready-tooperate monitoring).

$\triangle$
Due to the loading of the power supply capacitor when first time switching on the actuator current peaks can occur for a few micro seconds. Therefore we recommend to connect the actuator in accordance with accompanying wiring diagram.

### 5.2 Error message

If an error occurs, the red LED (8) on the base board will light up.
If the monitoring print is installed, the LED (7) on the BCD switch (10) which selected value has been exceeded will also light up red.

With all occurring error messages the ready-to-operate signal will be off (terminals 5,6 no passage).

## Eliminating the error message

Check the error cause, if necessary carry out the appropriate maintenance.

To eliminate the message, activate the reset switch (9) on the base board while the supply voltage is still connected or briefly disconnect the actuator from the mains voltage. (Not effective with cycle counter)

i



In case of malfunction the actuator remains on the current position (delivery state)


In case of malfunction the actuator turns to the OPEN position


In case of malfunction the actuator turns to the CLOSED position


The two LEDs will go out and the actuator is ready to operate again.

### 5.3 DIP switch in case of error

In case of an error the actuator can be set to the CLOSED or the OPEN position with the help of the DIP switch. The DIP switches need to be set as follows:

|  | DIP 1 | DIP 2 |
| :--- | :--- | :--- |
| ON | Position of DIP 2 effec- <br> tive | Actuator turns to the <br> OPEN position |
| OFF | Actuator remains in the <br> current position (DIP 2 <br> not effective) | Actuator turns to the <br> CLOSED position |

(refer to explanation on the left)

## 6. Setting Up the Actuator

## Attention

Check the following before connecting the actuator to the mains:


- Does the main voltage correspond to the specifications given on the type plate
- Has the actuator been connected correctly (see Section 5.1)
- Fuse $\geq 6 \mathrm{~A}$


## Adjustments

If a complete valve is supplied by Georg Fischer, no further adjustments are required. After installation by the customer or after repair, the end positions should be checked and adjusted if necessary.

## Limit switch allocation

Switch S1 (bottom) opens at "open" position
Switch S2 (top) opens at "closed" position

## Procedure

- Set both switching cams (1) to S1 and S2 so that the rotating angle is less than $90^{\circ}$.
- Let the actuator turn until a limit switch is activated.
- By adjusting the respective switching cam, the end position can be set since the actuator follows the cam.


### 6.1 Emergency Manual Override

## Assembly

1. Pull the crank (1) out of the bracket
2. Remove cover screw (2) with the provided crank (1)
3. Insert the crank in the hexagon shaft in the opening

After usage, please screw back on the screw corer (2) to avoid liquids, humidity or dust entering the actuator!

## Function

Push the crank down to the stop. This activates a micro switch that disconnects the actuator from the current. When letting go the crank, the actuator is energized again.
With 9 revolutions, the actuator EA21 turns by $90^{\circ}$
With 27 revolutions the actuator EA31 turns by $90^{\circ}$ With 41 revolutions the actuator EA42 turns by $90^{\circ}$

Direction of rotation

| Clockwise | $=$ CW |
| :--- | :--- |
| Counterclockwise | $=$ CCW |

Note the "open" and "closed" position on

If that is not possible, after usage pull the crank rapidly out of the opening. (Actuator
the optical indicator

Disconnect the connector plug. might start turning)


Counterclockwise = CCW = open



### 6.2 Dimensional drawings of the Electrical Actuator Type EA 21/31/42

|  | L1 | L2 | L3 | L4 | L5 | L6 | L7 | L8 | L9 | H1 | H2 | H3 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| EA21 | 150 | 82.5 | 108 | 64.3 | 122 | 16 | 49 | 33 | 33 | 167 | 20 | 188.5 |
| EA31 | 150 | 82.5 | 108 | 64.3 | 122 | 16 | 49 | 33 | 33 | 190 | 25 | 211.5 |
| EA42 | 150 | 82.5 | 108 | 64.3 | 122 | 16 | 49 | 33 | 33 | 208 | 25 | 229.5 |




EA21/F05


### 6.3 Technical Specifications



## Wiring diagram



## Heating element kit



### 7.2 Fail-safe return

| Description | Technical data | Code |
| :--- | :--- | :--- |
| Fail-safe return | $24 \mathrm{~V}=$ | 199190085 |

The fail-safe return unit is mounted on the base board and is connected electrically via a flat cable.
The fail-safe return unit is connected to the battery via a two-core wire. If the supply voltage is interrupted, the electronics will switch to the storage battery automatically after 5 sec . With the DIP switches ( 5 ), the functions "move to the CLOSED position" or "move to the OPEN position" can be selected.

Both switches ON: Actuator moves to OPEN Both switches OFF: Actuator moves to CLOSED

The storage battery is charged continuously. Full charging takes approximately 15 hours. Expected lifetime approx. 7 years.

## Wiring diagram




Possible cycles per day:
EA 21 : 10
EA 31: 04
EA 42 : 02

## Mounting the fail-safe return (board)

1. Disconnect the actuator from the supply voltage.
2. Take the board out of its packaging and check for damages.

$\triangle$
Do not touch the board itself. Electrostatic discharge can damage the components.
3. Screw the three distance bolts (1) into the assembly bolts. Screw handtight.
4. Fasten the board (3) on the distance bolts with the supplied screws (2) and washers.
5. Plug the flat cable into the X1 connector.
6. Reconnect to supply voltage.


## Rechargeable battery

Connect the battery via the second plug or cable gland to the terminals 16 and 17 (4). (we recommend $2 \times 1.5 \mathrm{~mm}^{2}$ )


Attention must be given to the polarity. Charge the battery for at least 15 hours.

In case the fail-safe return and the monitoring print are installed both together, make sure that the adjustments will not interfere one another.

### 7.3 Additional Limit Switches

| Description | Technical <br> data | Code |
| :--- | :--- | :--- |
| Kit with 2 additiona** <br> limit switches $\mathrm{Ag}-\mathrm{Ni}$ | $250 \mathrm{~V} \sim, 6 \mathrm{~A}$ | 199190092 |
| Kit with 2 additional* <br> Limit switches Au | $30 \mathrm{~V}=, 100 \mathrm{~mA}$ | 199190093 |
| Kit with 2 additional <br> limit switches NPN | $10-30 \mathrm{~V}=$, <br> 100 mA | 199190096 |
| Kit with 2 additional <br> limit switches PNP | $10-30 \mathrm{~V}=$, <br> 100 mA | 199190095 |
| Mounting set for 4 limit <br> switches |  | 199190097 |

* The switches are wired as openers according to the diagram. It is possible for the customer to convert to closer by rewiring.
(Terminal $8 \rightarrow 7$ and terminal $10 \rightarrow 9$ ).


## Mounting the limit switches

1. Disconnect the actuator from the supply voltage.
2. Remove the screws from the limit switches S 1 and S 2 .
3. Mount the limit switch kit (1) on S 1 and S 2 as shown.
4. Tighten with the new, longer screws.
5. Mount the additional switching cams (2) as well as the spacer rings (3).


## Wiring diagram


B)

Schalter: unten
Switch: below
Contact: en dessous


## Setting the limit switch position

1. Reconnect the actuator to the supply voltage.

$\triangle$
The switch position may only be set with an extra-low voltage under 50 V .
2. Move the actuator to the two end positions and set the respective switching points.
The switching cams can be adjusted with a screwdriver size 2.
3. Disconnect the actuator from the supply voltage.
4. Connect limit switches.
5. Close the actuator with the housing cover and connect to the supply voltage.

### 7.3.1 Additional 4 Limit Switches

Analog to the mounting instructions for the 2 additional limit switches the EA 21/31/42 can be expanded to include 4 limit switches.

The mounting sequence for the individual parts is equal to the 2 additional limit switches.

$\triangle$
For stability purposes additionally the mounting set for 4 limit switches must also be used. The fully assembled unit can be seen in the picture below.


### 7.4 Middle Positioning

| Description | Technical data | Code |
| :--- | :--- | :--- |
| Middle positioning |  | 199190094 |

The kit is mounted on the limit switches S1, S2 and serves to move the actuator to a third position ( e.g. 3-way ball valve into the middle position).

## Wiring diagram



## Mounting the middle positioning kit

1. Disconnect the actuator from the supply voltage.
2. Remove the screws of the limit switches S1 and S2
3. 



Connect the plug of the kit to the four-pole slot (1).
Make sure that the multipoint socket connector of the plug fits into the socket board of the four-pole plug.
4. Attach the two switches S3 and S4 of the kit to S1 and S2. When doing this, switch S3 lassigned to PIN1, 2) must be down and switch S4 (PIN 3, 4) on top. (see wiring diagram).
5. Fasten the two switches S 3 and S 4 with the longer screws supplied.


## Overview on activation

| Actuator moves <br> in position | Terminal <br> under current | Activated <br> switch | Direction of rota- <br> tion of the actuator |
| :--- | :--- | :--- | :--- |
| OPEN | 1 | S1 | CCW* |
| CLOSED | 2 | S2 | CW** |
| MIDDLE | 3 | S3 | CCW |
|  |  | S4 | CW |

* CCW - Counter Clock Wise - Gegen Uhrzeigersinn
** CW - Clock Wise - Im Uhrzeigersin
$\rightarrow$ Move actuator to position "OPEN" (CCW): Put terminal 1 under current $\rightarrow$ Switch S1 is activated.
$\rightarrow$ Move actuator to position "CLOSED" (CW): Put terminal 2 under current $\rightarrow$ Switch S2 is activated.
$\rightarrow$ Move actuator to middle position (CCW / CW): Put terminal 3 under current $\rightarrow$ Switch S3/S4 is activated.


## Setting the end positions

Setting the opening angle from $90^{\circ}$ to $180^{\circ}$

- Turn switching cam 2 of switch S 2 counter clockwise (top view) by $90^{\circ}$.
- Reconnect the actuator to the supply voltage
- Move the actuator into position "CLOSED" (terminal 2 under current)
- Turn cam 2 until reaching the desired position. (see position of the ball)
- Replace the standard position indicator by the new 3-way position indicator


Standard position indicator 3-way position indicator

## Setting the middle position

- Move the actuator to the OPEN position (terminal 1 under current)
- Place the additional switching cam on the shaft. For this, first remove the position indicator again and put it back on again in the same position afterwards
- Place cam 3 upon cam 2 (cam 4 still stays on top of the switches)
- Put cam 3 into the same position as cam 2 and turn it clockwise by $90^{\circ}$
- Move actuator to the "middle" position (terminal 3 under current)
- Readjust cam 3 until reaching the desired middle position (see position of the valve)
- Now Place cam 4 upon cam 3 in the same position as cam 3. Adjust cam 4 afterwards. Its corner flank should activate switch S4 (S3 and S4 are activated, the two nocks of the cams indicate to the opposite direction).
- Close the actuator with the housing cover. The middle position is now set.


OPEN


MIDDLE


CLOSED

BCD switch DIP switch


1. Cycle time extention (Vario)
2. Cycle time monitoring
3. Cycle counter
4. Current monitoring
5. Position feedback

### 7.5 Monitoring print

| Description | Technical data | Code |
| :--- | :--- | :--- |
| Monitoring print |  | 199190099 |

The monitoring print is mounted on the base board and is connected electrically with a flat cable. The monitoring print enables five functions:

1. Cycle time extension
2. Cycle time monitoring
3. Monitoring a selected maximum number of cycles
4. Monitoring a selected maximum of motor current
5. Position feedback signal $4-20 \mathrm{~mA}$ (see page 26 )

These monitor settings are made via the BCD switches 1 to 4. They are described in the following pages. The switches must be plugged in order for the function to be active. The functions work independently of one another. BCD switches (1 to 4) can be connected individually.

Wiring diagram


## Mounting the monitoring print

1. Disconnect the actuator from the supply voltage.
2. Take the board out of the packaging and check for damages.


Do not touch the board itself. Electrostatic discharge can damage the components.
3. Screw the three distance bolts (1) into the assembly bolts. Hand-tighten.
4. Fasten the board (3) to the distance bolts (1) with the screws (2).
5. Insert the BCD switch (4) for the desired function. Secure it with the help of the nipple supplied.
6. Select the desired switch setting with a screwdriver.
7. Plug the flat cable into the $\mathrm{X} 1(7)$ connector.
8. Reconnect to supply voltage.

The board has been connected correctly, when:

1. The LED (9) above the BCD switches blinks green.
2. The LED (6) lights up green.

3. Cycle time extention (Vario)
4. Cycle time monitoring
5. Cycle counter
6. Current monitoring
7. Position feedback



In case of malfunction the actuator remains in its position (delivery state)


In case of malfunction the actuator moves to the OPEN position


In case of malfunction the actuator moves to the CLOSED position

## Error message

If an error occurs, the red LED (8) on the base board lights up.

In case the monitoring print is installed, the LED (10) on the BCD switch which selected value has been exceeded will also light up red.

With all occurring error messages the ready-to-operate signal will be off.

## Eliminating the error message

Check the error cause, if necessary carry out the appropriate maintenance.

To eliminate the message, activate the reset switch (9) on the base board while the supply voltage is still connected or briefly disconnect the actuator from the mains voltage.

The two LEDs will go out and the actuator is ready to operate again.

$\triangle$
The ready-to-operate module can react the fail-safe mode as well. Resetting the error message does not reset the cycle counter!

## DIP switch in case of error

With the help of the DIP switch, the actuator can be moved to the CLOSED or OPEN position in case of an error. For this, the DIP switches need to be adjusted as follows:

|  | DIP 1 | DIP 2 |
| :--- | :--- | :--- |
| ON | Position of DIP 2 <br> effective | Actuator moves to the <br> OPEN position |
| OFF | Actuator remains in its <br> position <br> (DIP 2 not effective) | Actuator moves to the <br> CLOSED position |

(please refer to example on the left)

## Cycle time extension (Vario)

| Description | Technical data | Code |
| :--- | :--- | :--- |
| Cycle time extension |  | 199190080 |

The cycle time extension increases the cycle time of the electric actuator. To do this, the actuator rides clocked to the end positions (OPEN or CLOSED).

The corresponding values are contained in the following table. These values apply for $90^{\circ}$ angle. Cycle time without BCD: 5 s for $90^{\circ}(E A 21) ; 15$ s for $90^{\circ}$ (EA31); 25s for $90^{\circ}$ (EA42)

| Switch setting | Cycle time monitoring [s] |  |  |
| :--- | :--- | :--- | :--- |
|  | EA21 | EA31 | EA42 |
| 0 Delivery position | 8 | 20 | 30 |
| 1 | 12 | 25 | 35 |
| 2 | 15 | 30 | 40 |
| 3 | 19 | 35 | 45 |
| 4 | 25 | 40 | 50 |
| 5 | 30 | 50 | 55 |
| 6 | 35 | 60 | 65 |
| 7 | 35 | 60 | 75 |

The switch positions $8-9$ have the function of position 7 .
The extension of the cycle time is also active in case of failure or reset operation.

## Cycle time monitoring

| Description | Technical data | Code |
| :--- | :--- | :--- |
| Cycle time <br> monitoring |  | 199190082 |

Cycle time monitoring monitors the duration of a pre-set cycle time of the electric actuator. If the cycle exceeds the pre-set time, a failure is reported (see error message, page 20). For the corresponding value please refer to the table below (values are valid for $90^{\circ}$ actuation).

| Switch setting | Cycle time monitoring [s] |  |  |
| :---: | :---: | :---: | :---: |
|  | EA21 | EA31 | EA42 |
| 0 | 7 | 10 | 15 |
| 1 | 10 Delivery position | 15 | 20 |
| 2 | 15 | 20 | 25 |
| 3 | 20 | 25 Delivery position | 30 |
| 4 | 25 | 30 | 35 |
| 5 | 30 | 35 | 40 Delivery position |
| 6 | 35 | 40 | 50 |
| 7 | 40 | 45 | 60 |
| 8 | 45 | 55 | 70 |
| 9 | 50 | 70 | 85 |

## Cycle counter

| Description | Technical data | Code |
| :--- | :--- | :--- |
| Cycle counter |  | 199190083 |

This function allows setting a desired number of cycles. As soon as the number of cycles exceeds the set value, an error is reported (see error message, page 20). With the help of the DIP switch (8) on the monitoring print it can be preset, if the actuator should keep moving in this case, or if it should move to its security position and remain there. (refer to section error message).

| Switch setting | Number of cycles |
| :--- | :--- |
| 0 | 1 |
| 1 | 10.000 |
| 2 | 20.000 |
| 3 | $30.000(3)$ |
| 4 | $40.000(2)$ |
| 5 | $50.000(1)$ |
| 6 | 60.000 |
| 7 | 70.000 |
| 8 | 80.000 |
| 9 | 90.000 |

## Current monitoring

| Description | Technical data | Code |
| :--- | :--- | :--- |
| Current <br> monitoring |  | 199190081 |

This function monitors the motor current. If the motor current is greater than the pre-set value, a malfunction is reported.

| Switch setting | Max. motor current/mA |
| :--- | :--- |
| 0 | 200 |
| 1 | 400 |
| 2 | $600 \quad(1)$ |
| 3 | 800 |
| 4 | $1.000(2)$ |
| 5 | 1.200 |
| 6 | $1.400(3)$ |
| 7 | 1.600 |
| 8 | 1.800 |
| 9 | 2.000 |

$\triangle$When setting the BCD switches, make sure that the set function do not block one another.

Example BCD1 cycletimeposition position $3=19 \mathrm{~s}$ EA21: BCD2 cycle time monitoring position $0=7 \mathrm{~s}$
(1) Delivery position EA21
(2) Delivery position EA31
(3) Delivery position EA42

## Reset „Number of Cycles"

Turn the BCD-Switch in the Position O (Position corresponding to 1 Cycle). Drive the actuator into CLOSE Position and back to OPEN Position. The LED lights up. Press the reset button on the basic print and the cycle counter will be cleared. Now the BCD Switch can be set to the desired number of cycles again. (refer to table)


### 7.6 Position Signalization

| Description | Technical data | Code |
| :--- | :--- | :--- |
| Position <br> signalization |  | 199190084 |

The position signalization enables determining the exact mechanical position of a valve. Output signal is a current of $4-20 \mathrm{~mA}$. (4mA-CLOSED, 20mA-OPEN).
The position signalization can be combined with the positioner or the monitoring print.
The position signalization board is mounted on the limit switches S1, S2 and is connected electrically to the positioner or the monitoring print via a system cable.

## Mounting the position signalization

1. Disconnect the actuator from the supply voltage.
2. Remove the screws of the limit switches S 1 and S 2 .
3. Remove the position indicator (1).
4. Place the position signalization board in the position shown on S1 and S2 and fasten with the longer screws.
5. Insert the toric magnet (3) so that the notches are on the top.
Again place the position indicator (1) on the axis in one of the end positions.
6. Connect the position signalization board to the controller or monitoring print via the system cable (2).

Reconnect to the power supply.
The board has been connected correctly when the LED (4) lights up green.

If the position signalization is used together with additional limit switches, the position signalization as to be in stalled above the limit switches.

## Setting the position signalization

For the position sensor (4) to recognize the OPEN and CLOSED positions, a single learning run with $360^{\circ}$ must be done. After the learning run, the OPEN and CLOSED positions are set.
Further learning runs can be done between the end positions (depending on the switching cams S1 and S2).
The way how the jumper is placed on the position signalization determines if the learning run happens with $360^{\circ}$ or if it happens between the end positions.

Jumper connects both PINs: Jumper doesn't connect the PINs:
learning run $360^{\circ}$ learning run bet ween the end positions

When position signalization is mounted ex factory, a learning run with $360^{\circ}$ has been already done. In this case the jumper is placed on only one PIN. When the position signalization is mounted by the customer a $360^{\circ}$ learning run has to be done. Therefore the two PINs need to be connected by the jumper.


Subsequent modifications on the switching cams requires a new learning run.

## Learning run $360^{\circ}$ (Position signalization

 kit subsequently installed)It is necessary to separate the actuator from the valve, to avoid damage to the valve. Before doing the learning run set the jumper so it connects the two PINs. Complete learning run. Then reset the jumper to its original position and remount the actuator.

## Doing a learning run

Press the button (5) on the board for ca. 2s. (The LED (6) will go out briefly. As soon as the LED lights up again, release the button). The actuator will do a learning run with several longer pauses.


During this run, the LED (6) will blink. While the LED (6) is blinking, the actuator is in the learning mode. The learning run is only finished when the LED lights continuously.

If the position signalization is combined with the monitoring print, the output signal 4 - 20 mA can be processed on the terminals 18, 19 (7) on the board of the monitoring print. ( $4 \mathrm{~mA} \rightarrow$ CLOSED / $20 \mathrm{~mA} \rightarrow$ OPEN).

If the position signalization is connected to the positioner, the latter will process the signal.

### 7.7 Positioner

| Description | Technical data | Code |
| :--- | :--- | :--- |
| Positioner type PE 25 |  | 199190100 |

The positioner type PE 25 controls a user-defined valve position proportional to a given set value. This can be $0-10 \mathrm{~V}$ or $4-20 \mathrm{~mA}$.
Power supply needs to be galvanically isolated.


The return of the valve position (actual value) is realized with the position signalization.
The control parameters are pre-set ex factory and do not need to be changed.

## Signal configuration

The four DIP switches on the controller print serve for the configuration of the signals.

DIP switch:

|  |  |  |  | ON |
| :--- | :--- | :--- | :--- | :--- |
|  |  |  |  | OFF |
| S1 | S2 | S3 | S4 |  |



Switch combination

| Signal type | S1 | S2 |
| :--- | :--- | :--- |
| $0-10 \mathrm{~V}$ | OFF | OFF |
| $4-20 \mathrm{~mA}$ | ON | ON |

S3: ON: input inverted
OFF: input not inverted
S4: ON: use S3L Master OFF: use S3L Slave

Example:
Set signal value 4-20 mA, not inverted, use S3L Slave

|  |  |  |  | ON |
| :--- | :--- | :--- | :--- | :--- |
|  |  |  |  | OFF |
| S1 | S2 | S3 | S4 |  |



| Description | Technical data | Code |
| :--- | :--- | :--- |
| Positioner type PE 25 | galvanic isolated | 199190101 |

The positioner type PE 25 controls a user-defined valve position proportional to a given set value. This can be $0-10 \mathrm{~V}$ or $4-20 \mathrm{~mA}$.

The return of the valve position (actual value) is realized with the position signalization. The control parameters are pre-set ex factory and do not need to be changed.


The return of the valve position (actual value) is realized with the position signalization.
The control parameters are pre-set ex factory and do not need to be changed.

## Signal configuration

The four DIP switches on each of the three switch blocks on the controller print serve for the configuration of the signals.

DIP Schalter Block 1-3:

|  |  |  |  | ON |
| :--- | :--- | :--- | :--- | :--- |
|  |  |  |  | OFF |
| S1 | S2 | S3 | S4 |  |



Switch combination

| DIP switch Block 1 |  |  |  |  | ON | All switches must be set to OFF |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  | OFF |  |
|  | S1 | S2 | S3 | S4 |  |  |
| DIP switch Block 2 | Signal type |  |  |  | S1 | S2 |
|  | 0-10 V |  |  |  | OFF | OFF |
|  | 4-20 mA |  |  |  | ON | ON |
|  | S3: <br> S4: |  | ON: input inverted OFF: input not inverted ON: use S3L Master OFF: use S3L Slave |  |  |  |
| DIP switch Block 3 |  |  |  |  | ON | S1 must be set to ON S2-S4 must be set to OFF |
|  |  |  |  |  | OFF |  |
|  | S1 | S2 | S3 | S4 |  |  |

Example:
Set signal value 4-20mA, not inverted, use S3L Slave

|  |  |  |  | ON |
| :--- | :--- | :--- | :--- | :--- |
|  |  |  |  | OFF |
| S1 | S2 | S3 | S4 |  |




## Mounting the positioner

$\triangle$
Disconnect the actuator from the supply voltage.
2. Take the controller board out of the packaging and check for damages.


Do not touch the board itself. Electrostatic discharge can damage the components.
3. Place the board vertically on the back side of the base board on plug X1. (see page 47)


Make sure that the board is inserted exac tly in the guides at the side.

Setting the position signalization see Section 9.6

## Connecting the positioner

For the positioner to receive the set value signal, connect the terminals of the set value inputs 20 to 23 for the corresponding values. (see table below) Cable cross-sectional area max. $1.5 \mathrm{~mm}^{2}$

Mind the configuration of the set value (see signal configuration):

Terminal assignment Positioner 199190 100:

| 20 | SET value input current |
| :--- | :--- |
| 21 | SET value input voltage |
| 22 | - |
| 23 | SET value input ground |
| 30 | Position signalization signal |
| 31 | Position signalization ground |

EA 21 mit montiertem Stellungsregler und Positionserfassung.

Terminal assignment Positioner 199190 101:

| 27 | SET value input current / voltage |
| :--- | :--- |
| 28 | Output 12 V DC |
| 29 | SET value input ground |
| 30 | Position signalization signal |
| 31 | Position signalization ground |



Mind the configuration of the set value

The 4 - 20 mA current signal at the terminals 30,31 can be evaluated, if necessary.
( $4 \mathrm{~mA}:$ CLOSED; $20 \mathrm{~mA}:$ OPEN)

When the set value and the position indicator have been connected, reconnect the actuator to the supply voltage (see wiring diagram).

The positioner has been connected correctly, when the green LEDs 1,2, and 4 light up green.
If the LED 3 lights red, the controller is not working (see LED combination).
Check the connections if necessary and make sure the poling of the set input is correct.

## LED combination

| Colour | green | green | red | green |
| :--- | :--- | :--- | :--- | :--- |
| LED | 1 | 2 | 3 | 4 |

After the positioner is correctly connected, do a learning run.


## Setting the position signalization

For the position sensor (4) to recognize the OPEN and CLOSED positions, a single learning run with $360^{\circ}$ must be done. After the learning run, the OPEN and CLOSED positions are set.
Further learning runs can be done between the end positions (depending on the switching cams S1 and S2).
The way how the jumper is placed on the position signalization determines if the learning run happens with $360^{\circ}$ or if it happens between the end positions.

Jumper (7) connects both PINs: Jumper doesn't connect the PINs:
learning run $360^{\circ}$ learning run between the end positions


When position signalization is mounted ex factory, a learning run with $360^{\circ}$ has been already done. In this case the jumper is placed on only one PIN. When the position signalization is mounted by the customer a $360^{\circ}$ learning run has to be done. Therefore the two PINs need to be connected by the jumper.


Subsequent modifications on the switching cams requires a new learning run.

$\triangle$Learning run $360^{\circ}$ (Position signalization kit subsequently installed)
It is necessary to separate the actuator from the valve, to avoid damage to the valve.
Before doing the learning run set the jumper so it connects the two PINs. Complete learning run. Then reset the jumper to its original position and remount the actuator.

## Doing a learning run

Press the button (5) on the board for ca. 2s. (The LED (6) will go out briefly. As soon as the LED lights up again, release the button). The actuator will do a learning run.

During this run, the LED (6) will blink. While the LED (6) is blinking, the actuator is in the learning mode. The learning run is only finished correctly when the LED lights continuously.


## 8. TROUBLESHOOTING

| Problem | Possible causes | Remedy |
| :---: | :---: | :---: |
| Motor does not run | no mains voltage available (terminals 1,2,3) | error at customer side |
|  | internal wiring error | check wiring of actuator |
|  | switching cams S1 and S2 set incorrectly | see point 6 |
|  | motor blocked | use emergency manual override, check the valve |
| Motor only runs in one direction | limit switch defective | replace limit switch |
| Overload protection reacts (self-resetting) | torque of valve too high | clean and lubricate valve |
|  | duty cycle too high | increase cycle time |
|  |  | reduce ambient temperature |
| Valve does not close or open correctly | switching cams S1 and/or S2 not adjustedt | see point 6 |

For service please contact the specialist at your Georg Fischer sales company.
In case an end position is not reached, the actuator shuts off automatically after 2 minutes and reports error message.

## Ordering Information

## Description

Actuator EA21 100-230 V~ 198150182
Actuator EA21 24 V=/~ 198150183
Actuator EA31 100-230 V~ 198150184
Actuator EA31 $24 \mathrm{~V}=/ \sim \quad 198150185$
Actuator EA42 100-230 V~ 198150186
Actuator EA42 24 V=/~ 198150187
Limit switch kit Ag-Ni 199190092
Limit switch kit Au 199190093
Limit switch kit Middle Position 199190094
Limit switch kit PNP 199190095
Limit switch kit NPN 199190096
Mounting set for 4 limit switches 199190097
Fail-safe return incl. battery kit 199190085
Heating element 199190086
Heating element + fail-safe return incl. battery kit 199190087
Monitoring print 199190099
Cycle time extension 199190080
Cycle time monitoring 199190082
Cycle counter 199190083
Motor current monitoring 199190081
Position signalization 199190084
Positioner PE $25 \quad 199190100$
Positioner PE 25 galvanic isolated 199190101
Testing adaptor kit for RS 232 interface 198151426
Battery kit (spare) 198151317
Crank 198151307
Cover screw kit 198000503
Kit of plugs 198000502
Adaptor Set for F05 SW14/11 198000587
Adaptor SW14 for F05 198204057
Reduction SW11 for F05 198803145

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