

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

Instruction Manual





# English

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## 1. Introduction

This instruction manual contains all the pertinent information on the design, installation and operation of the electrical actuator type EA 21/31/42.

#### **General Information**

#### Hazard notices

Hazard notices are used in this manual to warn you of possible injuries or damages to property. Please read and follow these hazard notices at all times!

#### Meaning

Imminent acute danger! Failure to comply could result in death or extremely serious injury.

**Possible acute danger!** Failure to comply could result in serious injury.

**Dangerous situation!** Failure to comply could lead to injury or damage to property.

# 2. EC Manufacturer's Declaration

The manufacturer, **Georg Fischer Piping Systems Ltd., CH 8201 Schaffhausen**, declares that the **electrical actuator EA 21 / 31 / 42** is not a ready-touse machine in the sense of the EC Machine Directive and therefore cannot meet all the requirements of this directive.

Operation of these actuators is prohibited until conformity of the entire system into which the valve and the actuator have been installed is established according to the EC Directives listed below.

Applied EC Directives:

06/95	EC	EC Low Voltage Directive
89/336	EEC	EC Directive on Electromagnetic
		Compatibility

#### Warning symbols



Danger



Hazard



Caution







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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° 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



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).



- 1. Limit switches S1 and S2
- 2. Direct current motor
- 3. Optical position indicator
- 4. Plug X1 for accessories
- 5. Terminal strip for external connections max. 1.5 mm<sup>2</sup>
- Wide range power supply, without protection against accidental contact
- 7. Shaft for emergency manual override
- 8. Connections for DIN plug or cable gland
- 9. Assembly bolts for accessories

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## 5.1 Wiring Diagram for Standard Version Position indicator



#### 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 mm<sup>2</sup>. 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).



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)





		ON
		OFF
1	2	

In case of malfunction the actuator remains on the

		ON
		OFF
1	2	

current position (delivery state) In case of malfunc-

tion the actuator turns to the OPEN position

		ON
		OFF
1	2	

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- tive	Actuator turns to the OPEN position
OFF	Actuator remains in the current position (DIP 2 not effective)	Actuator turns to the 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 ≥ 6 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°.
- 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° With 27 revolutions the actuator EA31 turns by 90° With 41 revolutions the actuator EA42 turns by 90°

Direction of rotation Clockwise = CW Counterclockwise = CCW = open





Note the "open" and "closed" position on the optical indicator



Disconnect the connector plug. If that is not possible, after usage pull the crank rapidly out of the opening. (Actuator might start turning)



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

	L1	L2	L3	L4	L5	L6	L7	L8	L9	H1	H2	Н3
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



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### **6.3 Technical Specifications**

	EA21		EA31		EA42
Rated voltage	100 - 230V, 50/6 24V = /24V, 50/6	60 Hz 60 Hz			
Rated voltage tolerance	+/- 10%				
Rated output ര 24V AC/DC ര 100 – 230V AC	22 VA 40 VA	32 V/ 40 V/	А А	40 VA 60 VA	
Electric impedance	230V, 100kΩ 24V, 4.7kΩ				
Altitude over NN (UL/CSA)	< 2000m				
Protection class	IP 65 per EN 60	529 *	(3) UL/CSA	indoors us	se
Duty cycle	100% (6)		50%		35%
Overload protection	current/time-dependent (resetting) *(1) temperature dependent				
Electrical connections	Connector plug 3 P+E per DIN EN 175301-803 Cable gland M20 x 1,5 according to ISO 724				03
Nominal torque Mdn	10 Nm		60 Nm		100 Nm
Actuating angle	max. 180°, set t	o 90°			
Control time	5 s / 90° at Mdn		15 s / 90° ;	at Mdn	25 s / 90° at Mdn
Peak torque	20Nm		120 Nm		250 Nm
Ambient temperature	-10° to + 50°C (	2)	-10° to + 5	0°C (2)	
Allowable humidity	max. 90% relat	ive hu	midity, non	condensin	g
Pollution grade (4)	2				
Overvoltage category (4)	П				
Housing material	PP fibreglass reinforced, flame retardant,external stainless steel screws, non-losable				
Position indication	optical, integra	ted			
Emergency manual override	integrated				
Flange pattern (5)	F05		F07		F07

(1) Overload protection of the motor is dimensioned so that the motor and the power supply board are protected. As soon as the load is in the torque range, the actuator runs again. (2) For temperatures below -10°C as well as condensation, the heating element no. 198 190 086 should be built in.

[4] Per EN 61010-1

(5) Per ISO 5211

 $\left( 3\right)$  Protection rating IP 67 for use of cable glands and vertical installation

[6] Reduced Duty cycle for UL certification





## 7. Mounting and Connecting Supplementary Kits

## 7.1 Heating Element

Description	Technical data	Code
Heating element	24 V=	199 190 086

The heating element is mounted on the base board and is connected electrically via a flat cable (X1). The temperature is measured with a temperature sensor, which is mounted on this element, and between approx. 0 - 5°C the heating element is switched on.

## Mounting the heating element (board)

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



Do not touch the board itself. Electrostatic discharge can damage the components.

- 4. Screw the three distance bolts (1) into the assembly bolts. Screw hand-tight.
- 5. Fasten the board (3) on the distance bolts with the supplied screws (2).
- 6. Plug the flat cable into the X1 (4) connector.
- 7. Put the cover back onto the actuator.
- 8. Reconnect to supply voltage.

The heating element may not heat at temperatures over + 5 °C, but in case it is switched on it might heat up to 10-15 °C.

## 7.2 Fail-safe return

Description	Technical data	Code
Fail-safe return	24 V=	199 190 085

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 OPENBoth 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





#### 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.



Do not touch the board itself. Electrostatic discharge can damage the components.

- 3. Screw the three distance bolts (1) into the assembly bolts. Screw hand-tight.
- 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 2x1.5mm<sup>2</sup>]



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 data	Code
Kit with 2 additional* limit switches Ag-Ni	250 V ~, 6 A	199 190 092
Kit with 2 additional* limit switches Au	30 V =, 100 mA	199 190 093
Kit with 2 additional limit switches NPN	10-30 V=, 100 mA	199 190 096
Kit with 2 additional limit switches PNP	10-30 V=, 100 mA	199 190 095
Mounting set for 4 limit switches		199 190 097

\* 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 S1 and S2.
- 3. Mount the limit switch kit (1) on S1 and S2 as shown.
- 4. Tighten with the new, longer screws.
- 5. Mount the additional switching cams (2) as well as the spacer rings (3).





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#### Setting the limit switch position

1. Reconnect the actuator to the supply voltage.



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.



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		199 190 094

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



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 (assigned to PIN1, 2) must be down and switch S4 (PIN 3, 4) on top. (see wiring diagram).
- 5. Fasten the two switches S3 and S4 with the longer screws supplied.



#### Overview on activation

Actuator moves in position	Terminal under current	Activated switch	Direction of rota- 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.
- → Move actuator to middle position [CCW / CW]: Put terminal 3 under current → Switch S3/S4 is activated.

#### Setting the end positions

Setting the opening angle from 90° to 180°

- Turn switching cam 2 of switch S2 counter clockwise (top view) by 90°.
- 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.









- 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		199 190 099

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 4-20mA (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 X1 (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.







		ON
		OFF
1	2	

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

In case of malfunc-

tion the actuator moves to the OPEN

position

		ON
		OFF
1	2	

		ON
		OFF
1	2	

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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.



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 effective	Actuator moves to the OPEN position
OFF	Actuator remains in its position (DIP 2 not effective)	Actuator moves to the CLOSED position

(please refer to example on the left)

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#### Cycle time extension (Vario)

Description	Technical data	Code
Cycle time extension		199 190 080

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° angle. Cycle time without BCD: 5s for 90° (EA21); 15s for 90° (EA31); 25s for 90° (EA42)

Switch setting	Cycle time monitoring [s]		
	EA21	EA31	EA42
O 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 monitoring		199 190 082

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° 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		199 190 083

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).



		ON
		OFF
1	2	

2

Both switches on ON - Error message without stopping the actuator

 ON
 Both switches on OFF

 - Error message with stopping the actuator (delivery position)

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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 monitoring		199 190 081

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 (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 ano-ther.

Example	BCD1	cycle timeposition	position 3 = 19s
EA21:	BCD2	cycle time monitoring	position 0 = 7s

Delivery position EA21
 Delivery position EA31
 Delivery position EA42

#### Reset "Number of Cycles"

Turn the BCD-Switch in the Position 0 (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 signalization		199 190 084

The position signalization enables determining the exact mechanical position of a valve. Output signal is a current of 4 – 20 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 S1 and S2.
- 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° 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° or if it happens between the end positions.

Jumper connects both PINs: Jumper doesn't connect the PINs: learning run bet

learning run 360° ween the end positions



When position signalization is mounted ex factory, a learning run with 360° 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° 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° (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.

4		
	U	

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 mA  $\rightarrow$  CLOSED / 20 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		199 190 100

The positioner type PE 25 controls a user-defined valve position proportional to a given set value. This can be 0-10V or 4-20mA. **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 V	OFF	OFF
4-20 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



Description	Technical data	Code
Positioner type PE 25	galvanic isolated	199 190 101

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

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					
	ON				
				OFF	
S1	S2	S3	S4		



#### Switch combination

DIP switch Block 1	Image: S1         S2         S3         S4	ON OFF	All swit be set t	tches must to OFF	
DIP switch	Signal type	S1	S2		
DIUCK Z	0-10 V	OFF	OFF		
	4-20 mA	ON	ON		
	S3: ON: OFF S4: ON: OFF	input ir : input i use S3 : use S3	nverted not inver L Master 3L Slave	ted	
DIP switch Block 3 OFF S1 S2 S3 S4 S1 must be set to ON S2-S4 must be set to OFF					
Example: Set signal value 4 – 20 mA, not inverted, use S3L Slave					
	DIP Sv	vitch Bl	ock 1	LED's	
DIP Switch Block 3 DIP Switch Block 2					





#### Mounting the positioner



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. 1.5mm<sup>2</sup>.

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

#### Terminal assignment Positioner 199 190 100:

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

27	•				• • • • • •
21   DE	T value i	nput cur	rent /	voltage	
28 Ou	utput 12 V	/ DC			
29 SE	SET value input ground				
30 Pc	Position signalization signal				
31 Pc	sition sig	gnalizatio	on gro	und	
he 4 – 2 valuate	0 mA cur d, if nece	Mind t rrent sign ssary.	t <b>he co</b> n	<b>nfigurat</b> the term	ion of the set value
he posit reen LE the LEI ED com heck th oling of	ioner ha Ds 1,2, a D 3 lights bination e connec the set in	s been co nd 4 ligh red, the tions if r nput is co	onnec t up gr contr necess orrect	ted corr reen. oller is i ary and	ectly, when the not working (see make sure the
		areen	rod	areen	
	1	2	2	yreen 4	
fter the	position	er is cori	rectlv		



#### Setting the position signalization

For the position sensor [4] to recognize the OPEN and CLOSED positions, a single learning run with 360° 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° or if it happens between the end positions.

Jumper (7) connects both PINs: Jumper doesn't connect the PINs: learning run 360° learning run between the end positions



When position signalization is mounted ex factory, a learning run with 360° 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° 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° (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

Possible causes	Remedy
no mains voltage available	error at customer side
(terminals 1,2,3)	
internal wiring error	check wiring of actuator
switching cams S1 and S2	see point 6
set incorrectly	
motor blocked	use emergency manual override, check the valve
limit switch defective	replace limit switch
torque of valve too high	clean and lubricate valve
duty cycle too high	increase cycle time
	reduce ambient temperature
switching cams S1 and/or S2 not adjustedt	see point 6
	Possible causes no mains voltage available [terminals 1,2,3] internal wiring error switching cams S1 and S2 set incorrectly motor blocked limit switch defective torque of valve too high duty cycle too high switching cams S1 and/or S2 not adjustedt

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	Code
Actuator EA21 100-230 V~	198 150 182
Actuator EA21 24 V=/~	198 150 183
Actuator EA31 100-230 V~	198 150 184
Actuator EA31 24 V=/~	198 150 185
Actuator EA42 100–230 V~	198 150 186
Actuator EA42 24 V=/~	198 150 187
Limit switch kit Ag-Ni	199 190 092
Limit switch kit Au	199 190 093
Limit switch kit Middle Position	199 190 094
Limit switch kit PNP	199 190 095
Limit switch kit NPN	199 190 096
Mounting set for 4 limit switches	199 190 097
Fail-safe return incl. battery kit	199 190 085
Heating element	199 190 086
Heating element + fail-safe return incl. battery kit	199 190 087
Monitoring print	199 190 099
Cycle time extension	199 190 080
Cycle time monitoring	199 190 082
Cycle counter	199 190 083
Motor current monitoring	199 190 081
Position signalization	199 190 084
Positioner PE 25	199 190 100
Positioner PE 25 galvanic isolated	199 190 101
Testing adaptor kit for RS 232 interface	198 151 426
Battery kit (spare)	198 151 317
Crank	198 151 307
Cover screw kit	198 000 503
Kit of plugs	198 000 502
Adaptor Set for F05 SW14/11	198 000 587
Adaptor SW14 for F05	198 204 057
Reduction SW11 for F05	198 803 145

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Notizen/Notice/Note	

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