

# Electric Actuator Type 3374



Three-point stepping version



## Mounting and Operating Instructions

**EB 8331-3 EN**

Edition September 2012



## Definition of the signal words used in these mounting and operating instructions



### **DANGER!**

*indicates a hazardous situation which, if not avoided, will result in death or serious injury.*



### **WARNING!**

*indicates a hazardous situation which, if not avoided, could result in death or serious injury.*



### **NOTICE**

*indicates a property damage message.*



### **Note:**

*Supplementary explanations, information and tips*

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# 1 General safety instructions

For your own safety, follow these instructions concerning the mounting, start up and operation of the actuator:

- The device is to be assembled, started up or operated only by trained and experienced personnel familiar with the product. According to these mounting and operating instructions, trained personnel refers to individuals who are able to judge the work they are assigned to and recognize possible dangers due to their specialized training, their knowledge and experience as well as their knowledge of the applicable standards.
- Any hazards that could be caused in the valve by the process medium and the operating pressure or by moving parts are to be prevented by means of appropriate measures.
- The actuators are designed for use in low voltage installations. For wiring and maintenance, you are required to observe the relevant safety regulations. Only use protective equipment in which the power supply cannot be reconnected inadvertently.
- Before wiring the actuator, disconnect it from the power supply.

**To avoid damage to any equipment, the following also applies:**

- Proper shipping and storage are assumed.



**Note:**

*Actuators with a CE marking fulfill the requirements of the Directives 2004/108/EC and 2006/95/EC.*

*The Declaration of Conformity is available on request.*

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## 2 Design and principle of operation

The Type 3374 Electric Actuator is used in industrial plants as well as in heating, ventilation and air-conditioning systems.

The actuator is suitable for form-fit attachment to various SAMSON valve series, depending on the version with or without fail-safe action.

The synchronous motor is switched off by torque-dependent limit switches in the end positions or in case of overload. The force of the motor is transmitted to the actuator stem via gearing and ball screw.



### Testing according to DIN EN 14597

The Type 3374 Electric Actuator with fail-action "Actuator stem extends" is tested by the German Technical Inspectorate (TÜV) according to DIN EN 14597 in combination with various SAMSON valves. The register number is available on request.

## 2.1 Additional equipment

The actuator can be equipped with limit contacts and/or resistance transmitters to influence the tasks of control equipment. Refer to sections 6 and 7.

## 2.2 Technical data

Actuator	Type 3374	-10	-11	-15	-21	-26	-31	-36
Version with		Yoke		Ring nut	Yoke	Ring nut	Yoke	Ring nut
Fail-safe action		Without			Stem extends		Stem retracts	
Rated travel	mm	30	15	30	15			
Transit time for rated travel								
Standard	s	240	120	240	120			
Fast	s	120	60	120	60			
in case of fail-safe action	s	-			12			
Stroking speed								
Standard	mm/s	0.125			0.125			
Fast	mm/s	0.25			0.25			
in case of fail-safe action	mm/s	-			1.25			
Actuating force		2.5 kN		2 kN		0.5 kN		
		Stem retracts or extends		Stem extends		Stem retracts		
Power supply		230 V, +10/-15 %, 50 Hz, 230 V, +10/-15 %, 60 Hz, 24 V, +10/-15 %, 50 Hz, 24 V, +10/-15 %, 60 Hz, 120 V (90 to 132 V), 60 Hz						
Power consumption	VA	7.5/13 <sup>2)</sup>			10.5/16 <sup>2)</sup>			
Motor switch-off		Torque-dependent						
Ambient temperature range		5 to 60 °C						
Storage temperature		-20 to +70 °C						
Degree of protection		IP 54 acc. to EN 60529, (IP 65 with three cable glands <sup>1)</sup> ) Suspended mounting position not approved						
Overvoltage category		II according to EN 60664						
Design and testing		EN 61010						
Class of protection		II according to EN 61140						
Noise immunity		EN 61000-6-2, EN 61326						
Noise emission		EN 61000-6-3, EN 61326						

## Design and principle of operation

Actuator	Type 3374	-10	-11	-15	-21	-26	-31	-36
Version with		Yoke		Ring nut	Yoke	Ring nut	Yoke	Ring nut
Fail-safe action		Without			Stem extends		Stem retracts	
Manual override	Hex wrench · Adjustment not possible after fail-safe action has been triggered Manual override of actuators with fail-safe action only possible when power supply is connected (see section 5)							
Weight	kg (approx.)	3.2	3.3	3.9	4.0	3.5	3.6	
Materials	Housing and cover: Plastic (glass-fiber reinforced PPO)							
Additional electrical equipment								
Limit contacts	Two travel-dependent, adjustable changeover switches, perm. load 250 V AC; 3 A							
Resistance transmitters <sup>2)</sup>	0 to 1000 Ω, (0 to 900 Ω at rated travel) max. permissible current 1 mA							

<sup>1)</sup> Cable glands M20 × 1.5 with metal nut (23/24 mm width across flats)

<sup>2)</sup> Actuator with faster motor





## 3 Installation

### 3.1 Mounting position

Installation depends on the mounting position of the valve. The actuator must **not** be suspended to hang downwards.

### 3.2 Attachment to the valve

#### 3.2.1 Construction with integrated yoke

**Fig. 1A: Attachment to**  
 – Series V2001 Valves (DN 15 to 80)  
 – Type 3260 (DN 65 to 150)  
 – Type 3214 (DN 65 to 100)

1. Remove protective covers and unscrew nut (6) from the valve.
2. Retract actuator stem using the manual override. Refer to section 5.
3. Place actuator on yoke and fasten tight using nut (6, 36 mm width across flats) (tightening torque min. 150 Nm).
4. When the plug stem (5) fits closely onto the actuator stem (3), attach both stem connector clamps (4) and fasten with screws.

#### 3.2.2 Construction with ring nut

**Fig. 1B: Attachment to Series 240 Valves**

1. Push plug stem down to close the valve.
2. Turn the stem connector nut (8) until the measurement  $x = 75$  mm (DN 100 and

larger:  $x = 90$  mm) from the top of the yoke to the head of the stem connector nut (8) is achieved. Lock this position with the lock nut (9).

3. Retract actuator stem using the manual override. Refer to section 5.
4. Place actuator onto the valve and secure using the ring nut (7).
5. When the stem connector nut (8) rests on the actuator stem, attach both stem connector clamps (4) and fasten with screws.
6. Move actuator stem (3) to the end position (valve closed) using the manual override or motor.
7. Align travel indicator scale (10) to the middle of the stem connector (4) and screw tight.

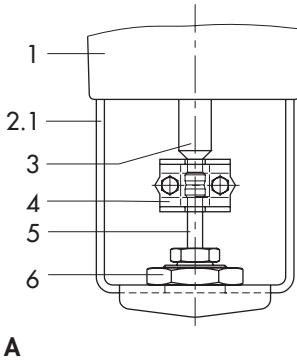
**Fig. 1C:**  
**Attachment to Type 3214 (DN 125 to 250)**

1. Retract actuator stem using the manual override. Refer to section 5.
2. Place actuator onto the valve and secure using the ring nut (7). If necessary, retract the actuator stem slightly beforehand using the manual override.
3. When the plug stem fits closely onto the actuator stem (3), attach both stem connector clamps (4) and fasten with screws.
4. Move actuator stem (3) to the end position (valve closed) using the manual override or motor.
5. Align travel indicator scale (10) to the middle of the stem connector (4) and screw tight.

**Types 3374-10/-11/-21/-31**

**Connection with yoke**

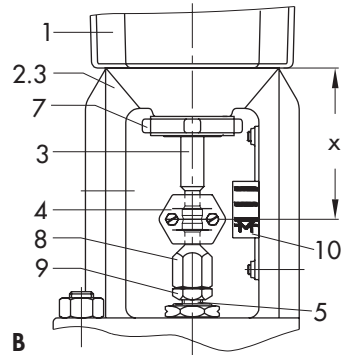
Attachment to Series V2001 Valves,  
Type 3260 (DN 65 to 150),  
Type 3214 (DN 65 to 100)



**Types 3374-15/-26/-36**

**Connection with ring nut**

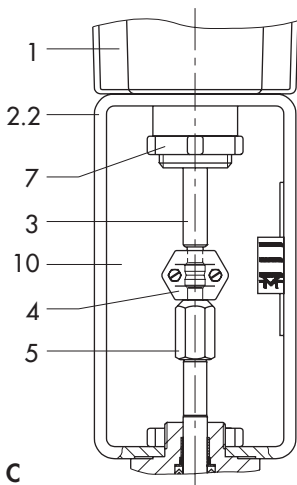
Attachment to Series 240 Valves



**Types 3374-15/-26/-36**

**Connection with ring nut**

Attachment to Type 3214 Valve (DN 125 to 250)



- 1 Actuator
- 2.1 Actuator yoke
- 2.2 Valve yoke
- 2.3 Bonnet
- 3 Actuator stem
- 4 Stem connector
- 5 Plug stem
- 6 Nut
- 7 Ring nut
- 8 Stem connector nut
- 9 Lock nut
- 10 Travel indicator scale

Fig. 1: Attachment to the valve

## 4 Electrical connections

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**DANGER!**

- *Upon installation of the electric cables, you are required to observe the regulations concerning low-voltage installations according to DIN VDE 0100 as well as the regulations of your local power supplier.*
  - *Only connect the actuator to the mains power network when the power is switched off.*
- 

Establish electrical connections as illustrated in the circuit diagram on the next page. A maximum of three cable glands can be attached to the housing for cable entry.

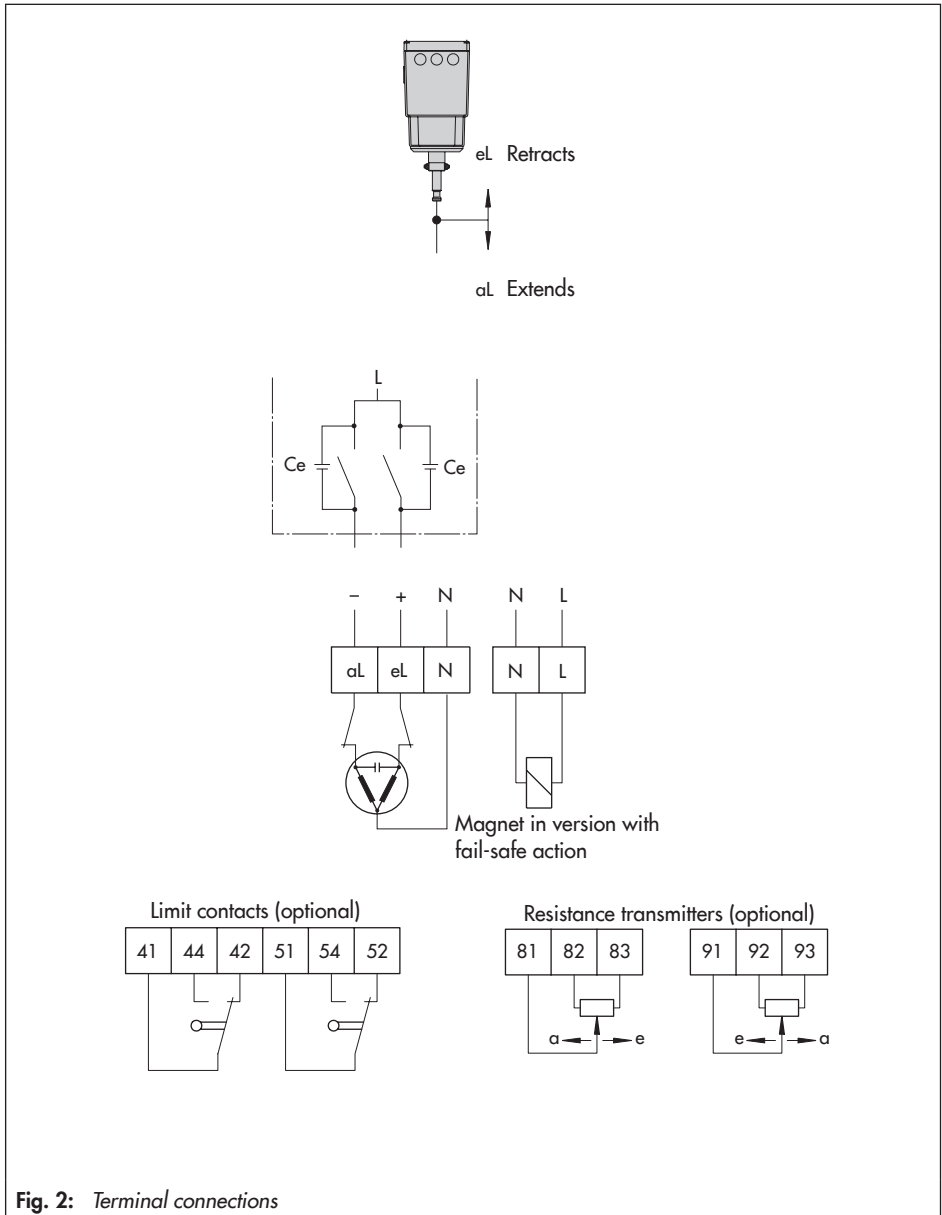


Fig. 2: Terminal connections

### 5 Manual override

To operate the manual override, place a 4 mm hex wrench on the red actuator shaft located at the side of the housing. The hex wrench is included in the scope of delivery. It is attached to the bottom of the housing.

#### **Version with fail-safe action**

Manual override is only possible in actuators with fail-safe action when the power supply (terminals L and N) is connected.

## 6 Limit contacts

### 6.1 Retrofitting the limit contacts

To install the limit contacts, the following retrofit kits are required:

- Basic unit      Order no. **1400-8829**
- Retrofit kit    Order no. **1400-8830**

When ordering, state the configuration ID (Var.-ID) and the type designation of the actuator. Both specifications are written on the nameplate. Refer to section 9 on page 25.



#### **DANGER!**

*When installing electrical equipment, make sure the power supply is switched off and the signal input is disconnected first.*



#### **NOTICE**

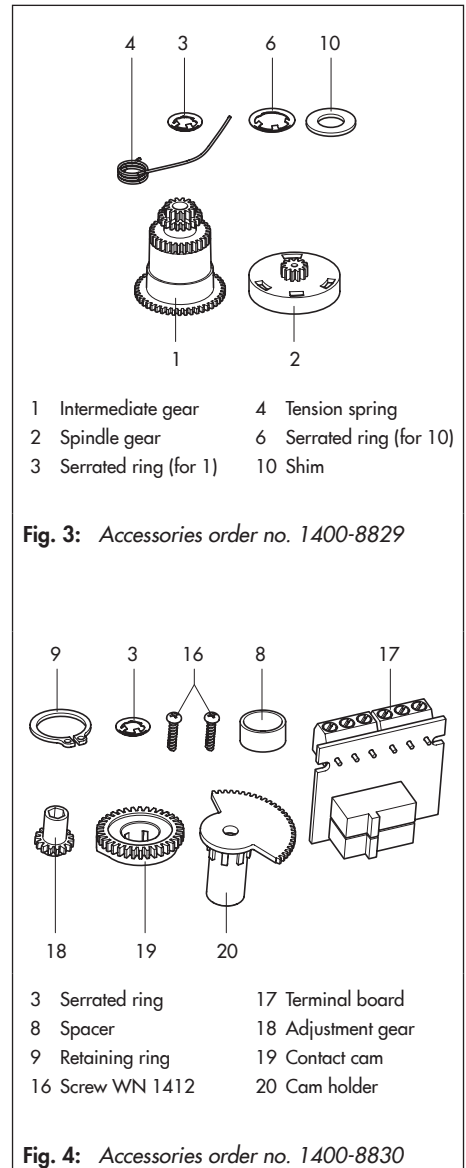
*We recommend to apply a small amount of lubricant (e.g. Vaseline) to the spindles on the gear faces and to the sides of the cogs.*



#### **Note:**

*To undo the screws on the housing cover, use a Pozidriv PZ2 screwdriver to provide enough hold on the screw heads.*

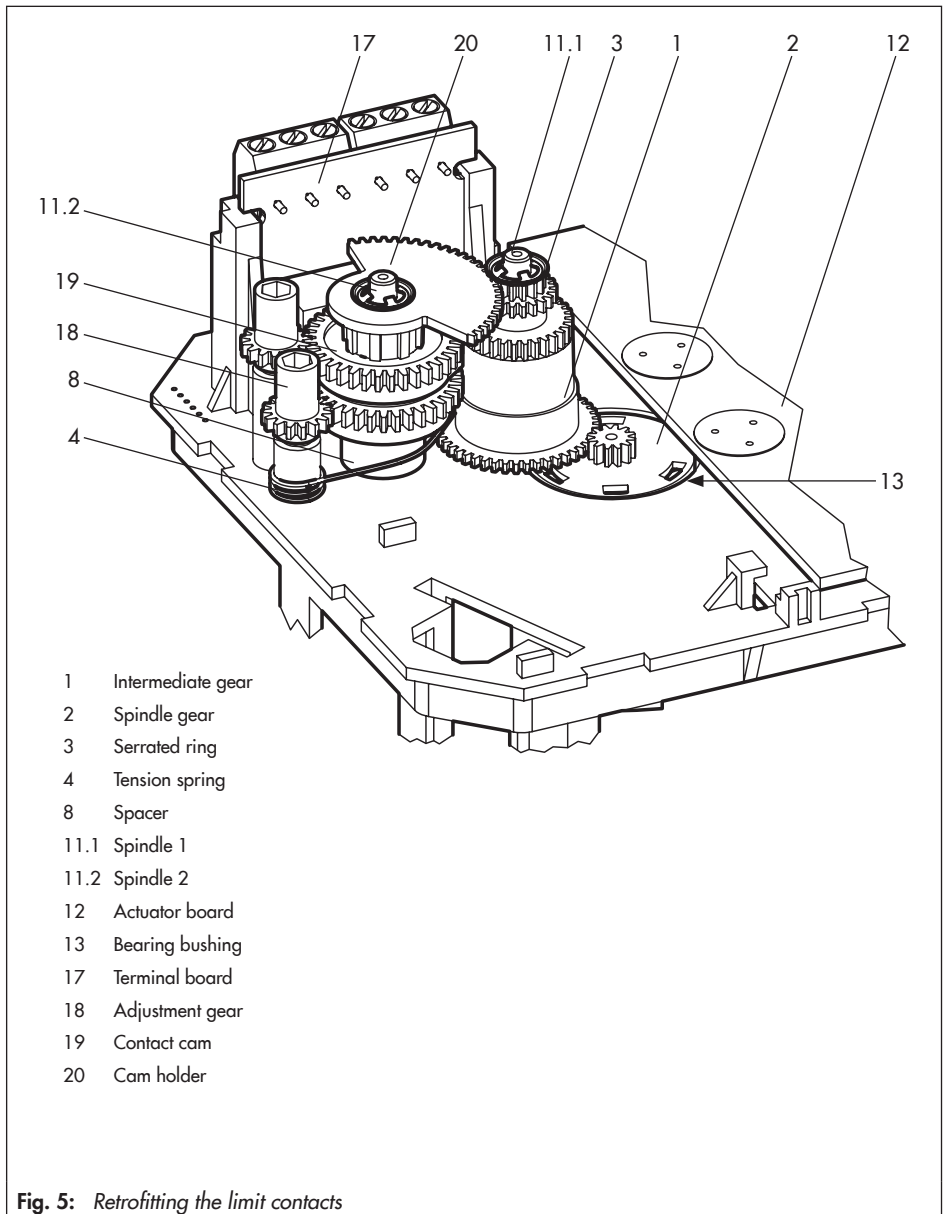
#### Retrofit kits:



### 6.1.1 Retrofitting (without resistance transmitters)

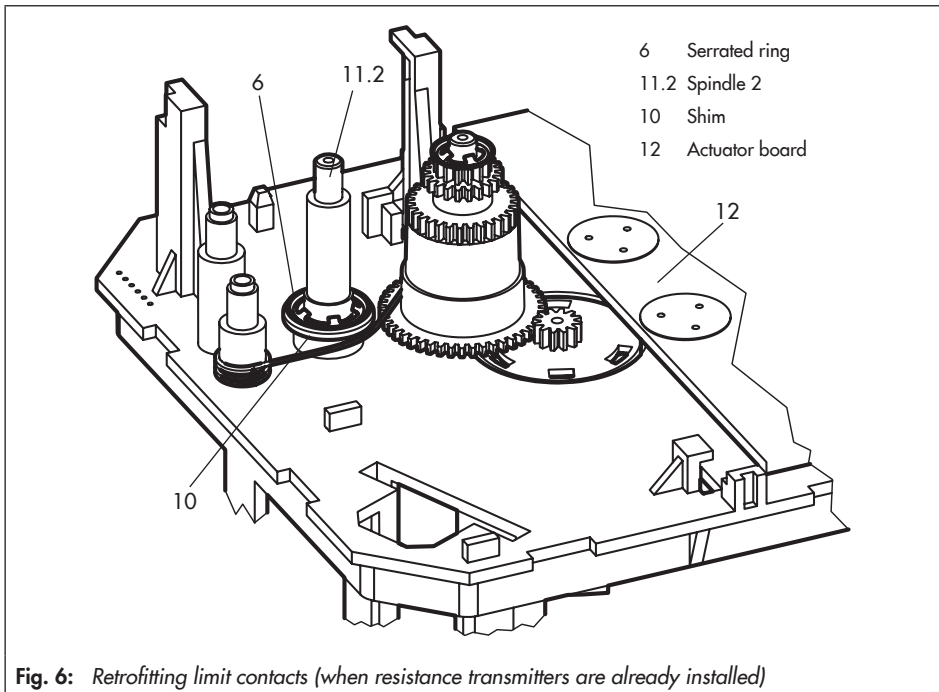
1. Unscrew screws on housing cover and take the cover off the actuator.
2. Move the actuator stem to the end position depending on the fail-safe action "Actuator stem extends" or "Actuator stem retracts". Refer to section 5.
3. Unscrew fastening screws. Push the actuator board (12) from its guiding to the right. Slightly lift the board and continue pushing it further towards the cable entry.
4. Clip the spindle gear (2) onto the sleeve (13). Make sure the side latch is properly engaged in the groove of the sleeve.
5. Push the intermediate gear (1) onto the spindle 1 (11.1), mount the serrated ring (10) and push it down as far as it will go
6. Push the spacer (8) onto the spindle (11.2).
7. Place the tension spring (4) on to the corresponding spindle, ensuring that the long wire of the tension spring rests on the spacer (8) and on the intermediate gear (1).
8. Place both ready-assembled contact cams (19) with the cog first onto the cam holder (20).
9. Push adjustment gears (18) onto their spindles and fasten with one screw each. Check whether the adjustment gears can be turned easily. If not, slightly loosen its screw again.
10. Turn both contact cams (19) as illustrated in Fig. 5 corresponding with the position of the actuator stem on the cam holder (20).
11. Push the cam holder with both contact cams onto the spindle 2 (11.2) corresponding with the position of the actuator stem as illustrated in Fig. 5. Make sure that the outermost cog of the cam support (20) engages in the gearwheel of the intermediate gear (1). In addition, the adjustment gears (18) must engage properly in the corresponding gears of the contact cams (19).
12. Secure the cam holder (20) and intermediate gear (1) with the serrated ring (3); push down the serrated ring as far as it will go.
13. Position the terminal board (17) at the base of the support at a 45° angle (approx.) with the switches pointing towards the gears. Swivel the upper end of the terminal board towards the gears until the board is in a vertical position and properly engaged in the support.
14. Push the actuator board (12) back into its guiding. Make sure that the gears are properly engaged. Fasten the board using screws.
15. Adjust limit contacts as described in section 6.2.
16. Replace cover. Briefly turn the fastening screws counterclockwise with a screwdriver to center them. Then fasten down the cover by tightening the screws.





## 6.1.2 Retrofitting (when resistance transmitters are already installed)

1. Unscrew screws on housing cover and take the cover off the actuator.
2. Move the actuator stem to the end position depending on the fail-safe action "Actuator stem extends" or "Actuator stem retracts". Refer to section 5.
3. Remove serrated ring (6) and shim (10) from spindle 2 (11.2).
4. Continue as described in item 8 on page 16.



## 6.2 Adjusting the limit contacts

1. Unscrew screws on housing cover and take the cover off the actuator.
2. Connect power supply.
3. Use the motor or manual override to move the actuator stem to the point at which the contact should react.
4. Use the 4 mm hex wrench to turn spindle of the adjustment gears (18) for the upper limit contact or for the lower limit contact until the associated contact cam on the cam holder (20) triggers the switch contact of the upper or lower microswitch on the terminal board (17).
5. Replace cover. Briefly turn the fastening screws counterclockwise with a screwdriver to center them. Then fasten down the cover by tightening the screws.

## 7 Resistance transmitters

### 7.1 Retrofitting the resistance transmitters

An actuator board with corresponding resistance transmitters and gear wheels is required for resistance transmitter retrofit. Which actuator board is to be used depends on the actuator type designation as well as the power supply and transit time specifications (see Appendix, Table 1 on page 26).

If the actuators does not have limit contacts, an additional retrofit kit (see Fig. 3 on page 15) is required.

#### 7.1.1 Retrofitting (without limit contacts)

1. Unscrew fastening screws. Push the actuator board (12) from its guiding to the right. Remove the actuator board and replace it with a board carrying resistance transmitters.
2. Clip the spindle gear (2) onto the sleeve (13). Make sure the latch is properly engaged in the groove of the sleeve. Place the intermediate gear (1) on the spindle 1 (11.1). Mount the serrated ring (3) and push it down as far as it will go.
3. Place the tension spring (4) onto the spindle 3 (11.3), ensuring that the long wire of the tension spring rests on the intermediate gear (1) and that the short wire of the spring is located between spindle 3 (11.3) and spindle 4 (11.4). Mount the shim (10) on spindle 2 (11.2). Mount the serrated ring (6) and push it down as far as it will go.
4. The resistance transmitter gears (22 and 23) fitted with serrated rings must be put onto their shafts to correspond with the rated travel of the valve. The rated travel inscription 'A' for 30 mm rated travel or 'B' for 15 mm rated travel must be legible (see also Fig. 9 on page 23).
5. Push the actuator board (12) back into its guiding. Make sure that the gears are properly engaged. Fasten the board using screws.

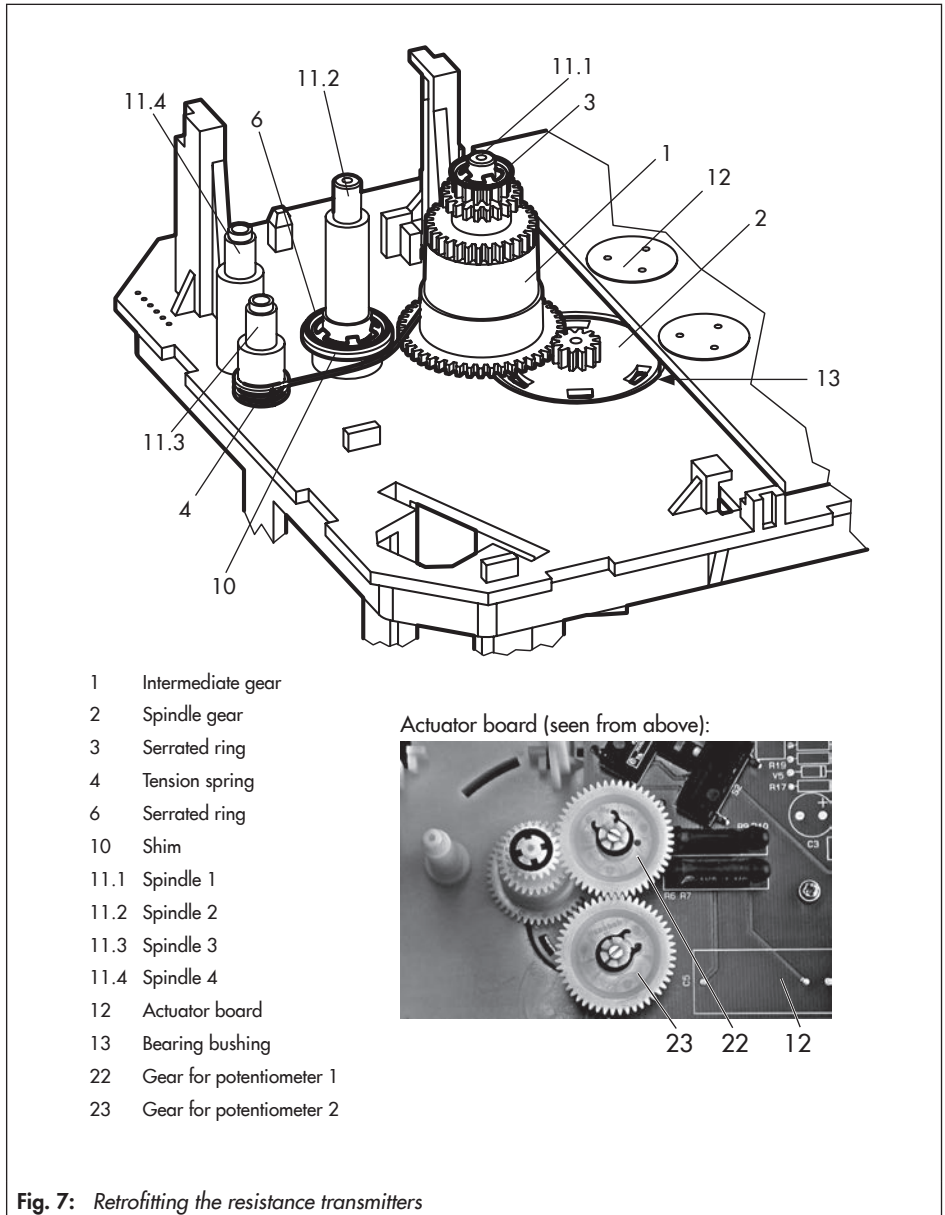


Fig. 7: Retrofitting the resistance transmitters

### 7.1.2 Retrofitting (when limit contacts are already installed)

1. Unscrew screws on housing cover and take the cover off the actuator.
2. Move the actuator stem to the end position depending on the fail-safe action "Actuator stem extends" or "Actuator stem retracts". Refer to section 5.
3. Unscrew fastening screws. Push the actuator board (12) from its guiding to the right. Remove the actuator board and replace it with a board carrying resistance transmitters.
4. Push the new actuator board into its guiding. Make sure that the gears are properly engaged. Fasten the board using screws.

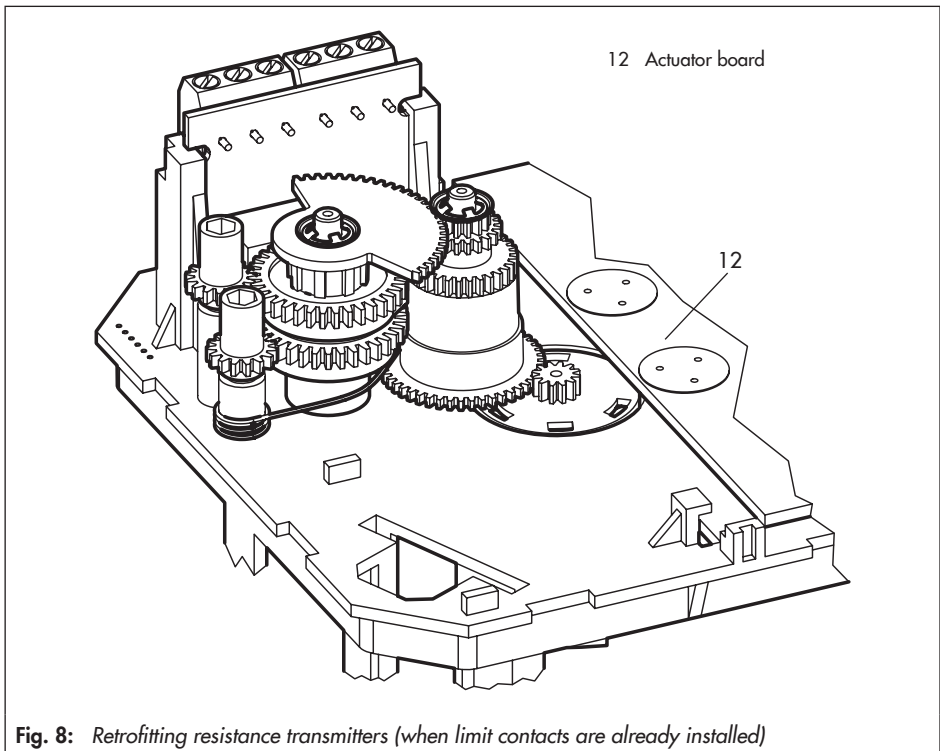


Fig. 8: Retrofitting resistance transmitters (when limit contacts are already installed)

## 7.2 Calibrating the resistance transmitters

The gears of the potentiometers (22) and (23) must be put onto their shafts to correspond with the rated travel of the valve. The rated travel inscription 'A' 30 mm for rated travel or 'B' for 15 mm rated travel must be legible.

If this is not the case, pull both potentiometer gears off their shafts and put them back on again with the reverse side of the wheel facing upwards, ensuring they are aligned fairly flush with the potentiometer shaft.

### Zero calibration

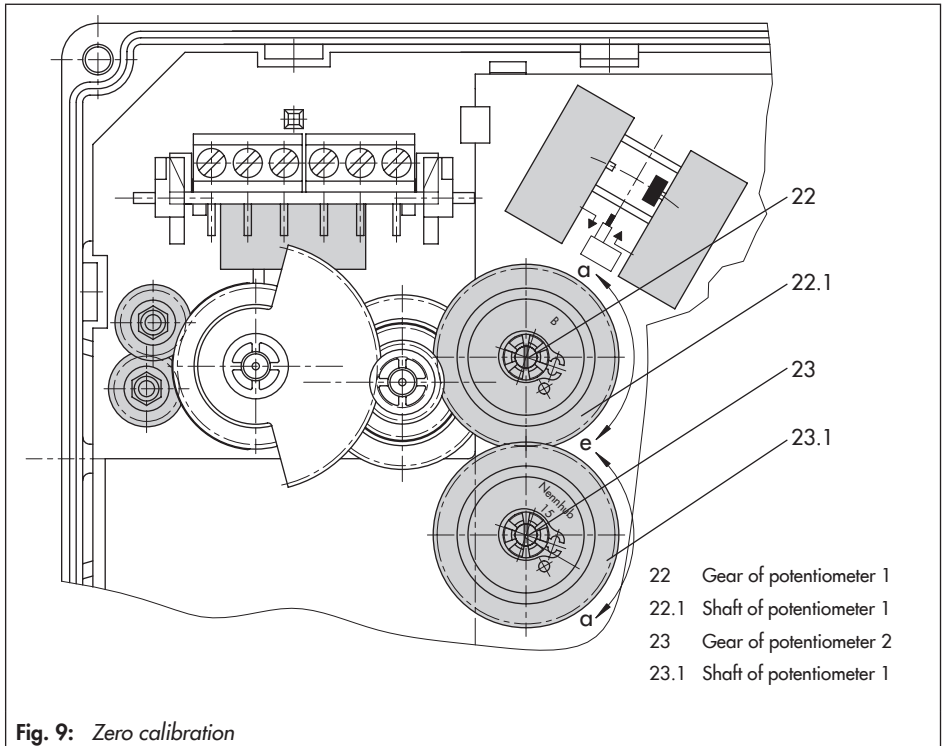
1. Use the motor or manual override to move the valve to the desired end position.
2. Use a screwdriver to adjust the potentiometer shafts (22.1) and (23.1).
3. Calibrate resistance transmitters with an ohmmeter correspondingly.

Actuator stem retracts:

81/82 = 0 Ω; 91/93 = 0 Ω;

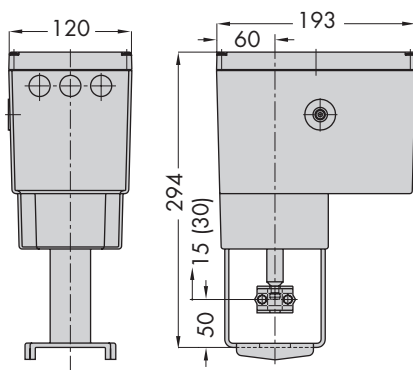
Actuator stem extends:

81/83 = 0 Ω; 91/92 = 0 Ω.

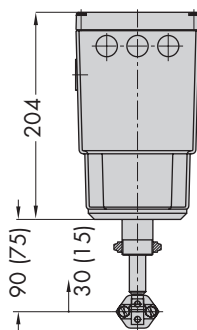


## 8 Dimensions in mm

**Types 3374-10/-11/-21/-31**  
**Connection with yoke**



**Types 3374-15/-26/-36**  
**Connection with ring nut**



**Fig. 10:** Dimensions in mm



## 9 Nameplate

**SAMSON 3374-15**  
Elektrischer Antrieb  
Electric Actuator  
Servomoteur électrique

Var-ID **1** Serial no. **2**

U: **4** P: **5**  
f: **6** F↑: **9**  
s: **7** F↓: **10**  
v: **8**

Digital positioner  
0(4)...20 mA DC;  $R_i=50\Omega$   
0(2)...10 V DC;  $R_i=20k\Omega$

Firmware V **11**

V AC  A    $\Omega$  mA

V AC  A    $\Omega$  mA

CE 2011 0062 Made in Germany

1 Configuration ID (Var.-ID)  
2 Serial number  
3 Typetesting   
4 Power supply  
5 Power consumption  
6 Power line frequency  
7 Nominal transit time  
8 Stroking speed  
9 Actuating force (stem retracts)  
10 Actuating force (stem extends)  
11 Firmware version  
12 Positioner (yes/no)  
13 Mechanical limit contacts  
a: Installed/not installed  
b: Voltage  
c: Current  
14 Electronic limit contacts  
a: Installed/not installed  
b: Voltage  
c: Current  
15 Resistance transmitters  
a: Installed/not installed  
b: Resistance  
c: Current  
16 Fail-safe action (stem retracts)  
17 Fail-safe action (stem extends)

## 10 Customer inquiries

Please submit the following details:

- Type designation
- Configuration ID (Var.-ID)
- Serial number

## 11 Appendix

**Table 1:** Actuator boards (order number 1180-96xx) available for retrofitting resistance transmitters

Type	3374	-10	-11	-15	-21	-26	-31	-36	
Power supply	230 V/50 Hz	60 s	–	1180-9604	–	1180-9610			
		120 s	1180-9604	1180-9601	1180-9604	1180-9607			
		240 s	1180-9601	–	1180-0901	–			
	230 V/60 Hz	120 s	–	1180-9637	–	1180-9643			
		240 s	1180-9637	–	1180-9637	–			
	24 V/50 Hz	Transit time	60 s	–	1180-9606	–	1180-9612		
			120 s	1180-9606	1180-9603	1180-9606	1180-9609		
			240 s	1180-9603	–	1180-9603	–		
	24 V/60 Hz	120 s	–	1180-9639	–	1180-9645			
		240 s	1180-9639	–	1180-9639	–			
	120 V/60 Hz	120 s	–	1180-9638	–	1180-9644			
		240 s	1180-9638	–	1180-9638	–			





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