

Electric Actuators
Type 5824 without fail-safe action
Type 5825 with fail-safe action



Three-step version



	SAMSON	CE 0062
	Electric Actuator	
Var.-ID.	Model	
Serial-No.		
F:	s:	t:
U:	f:	P:
<input type="checkbox"/>		
Made in Germany		

**Mounting and
Operating Instructions**

EB 5824-1 EN

Edition July 2011



Definitions of the signal words used in these 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 actuator may only be mounted, started up or operated 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 relevant standards.
- ▶ Any hazards that could be caused by the process medium, operating pressure or by moving parts are to be prevented by means of the appropriate measures.
- ▶ The actuators has been designed for use in low-voltage installations.
For wiring and maintenance, you are required to observe the relevant safety regulations.
The actuator must be protected against unintentional reconnection of the power supply.
- ▶ Before wiring the electric actuator, disconnect it from the power supply.

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

- ▶ Proper shipping and appropriate 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.

2 Design and principle of operation

The actuator consists of a reversible synchronous motor and a maintenance-free gear. The synchronous motor is switched off by torque switches when the valve has reached one of its end positions or the motor is overloaded.

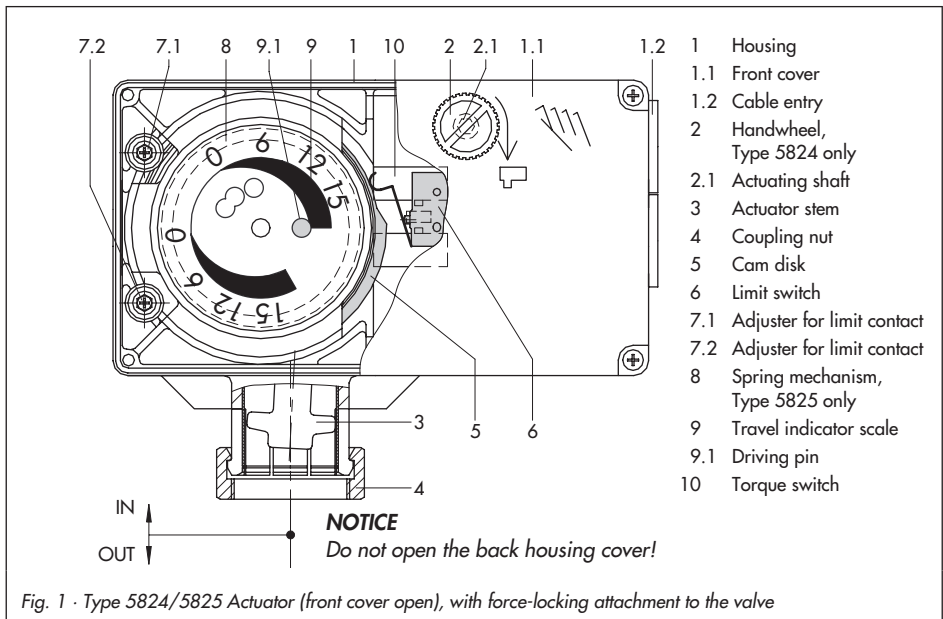
The force of the motor is transferred over a gear and a crank disk to the actuator stem (3). When the actuator stem extends, it pushes the plug stem of the valve downward. When the actuator stem retracts, the return spring in the valve causes the plug stem to follow the motion of the actuator stem (force-locking connection). The actuator is connected to the valve using a coupling nut (4).

Type 5824 without fail-safe action

This actuator without fail-safe action has a handwheel (2) which can be used to move the valve manually to the required position. Travel and direction of action can be read off the travel indicator scale (9).

Type 5825 with fail-safe action

The actuator with fail-safe action contains a spring mechanism (8) and an electromagnet. When the control voltage at the electromagnet is interrupted, the actuator moves to the fail-safe position because the electromagnet voltage drops, causing the coupling between gear and actuator motor to disengage. The actuator stem is completely moved in the OUT or IN direction by the spring mechanism.



The Type 5825 Actuator is available with the fail-safe action **Actuator stem extends** (the actuator stem extends on failure of the auxiliary power) or **Actuator stem retracts** (the actuator stem retracts on failure of the auxiliary power)

NOTICE

Do not use the magnet for control tasks.

Type 5825 Actuator does not have a handwheel on the housing cover. Manual override is possible, after removing the front cover, using a 4 mm Allen key. The actuator returns to its original position as soon as the Allen key is released.

Versions with faster motor

Types 5824-13/-23 and 5825-13/-23 have a more powerful motor which is housed at the back of the actuator.

Typetesting



The Type 5825 Electric Actuators with fail-safe action "Actuator stem extends" in the force-locking version are typetested by the German Technical Inspectorate (TÜV) according to DIN EN 14597 in conjunction with various SAMSON valves. The register number is available on request.

2.1 Additional electrical equipment

- ▶ The **potentiometer** is connected to the gear and provides a resistance signal between 0 and approx. 1000 Ω in proportion to the travel. The potentiometer cannot be retrofitted.
- ▶ On request, the actuators can be fitted with **two limit switches**. They are activated by continuously adjustable cam disks. The voltage supply, inputs and outputs are not galvanically isolated. The two limit switches cannot be retrofitted.

2.2 Technical data

Type	5824					5825								
	-10	-13	-20	-23	-30	-10	-13	-20	-23	-30	-15	-25	-35	
Fail-safe action	Without					With								
Direction of action	–					Stem extends					Stem retracts			
Rated travel	mm	6 ¹⁾	6	12	12	15	6 ¹⁾	6	12	12	15	6 ¹⁾	12	15
Transit time for rated travel	s	35 ¹⁾	18	70	36	90	35 ¹⁾	18	70	36	90	35 ¹⁾	70	90
Transit time in case of fail-safe action	s	–					4	4	6	6	7	4	6	7
Nominal thrust	Stem extends	N	700	700			500			280	500	280		
	Stem retracts	N	–			700	–			280	–	280		
Nominal thrust of safety spring	N	–					500			280	– ³⁾	280		
Attachment	Force-locking	•	•	•	•		•	•	•	•		•	•	
	Form-fit					•					•			•
Power supply														
	24 V, 50 Hz	•		•		•	•		•		•	•	•	•
	230 V, 50 Hz ⁴⁾	•	•	•	•	•	•	•	•	•	•	•	•	•
	120 V, 60 Hz	•		•		•	•		•		•	•	•	•
Power consumption	approx. VA	3	6	3	6	3	4	8	4	8	4	4	4	4
Manual override		Yes					Optional ²⁾							
Permissible temperatures														
	Ambient	0 to 50 °C												
	Storage	–20 to 70 °C												
	At the connecting stem	0 to 130 °C												
Degree of protection		IP 54 (mounted according to EN 60529)												
Class of protection		II (according to EN 61140)												
Overvoltage category		II (according to VDE 0106)												
Degree of contamination		2 (according to VDE 0110)												
Noise immunity		EN 61000-6-2												
Noise emission		EN 61000-6-3												
Weight	Approx. kg	0.75	1.00	0.75	1.00	0.75	1.00	1.25	1.00	1.25	1.00	1.00	1.00	1.00

Design and principle of operation

Type	5824					5825							
	-10	-13	-20	-23	-30	-10	-13	-20	-23	-30	-15	-25	-35
Fail-safe action	Without					With							
Additional electrical equipment · Cannot be retrofitted!													
2 limit switches · max. 230 V, 3 A	•	•	•	•	•	•	•	•	•	•	•	•	•
1 potentiometer · 0 to 1000 Ω ±15 % (90 % of final value at rated travel); max. 1 mA, 5 V	•		•		•	•		•		•	•	•	•
Materials													
Housing, housing front cover	Plastic (PPO glass fiber reinforced)												
Coupling nut	Brass												

- 1) Actuators with 6 mm travel can also be used for valves with 7.5 mm travel (45 s transit time).
- 2) Manual override using a 4 mm Allen key after removing housing front cover, always returns to fail-safe position after release
- 3) Safety spring pulls the actuator stem into the retracted end position; valve operated over the valve spring
- 4) Special version 60 Hz

3 Attachment to valve

Depending on the version of the valve, the actuator is connected to the valve either directly or over a rod-type yoke (Fig. 2).

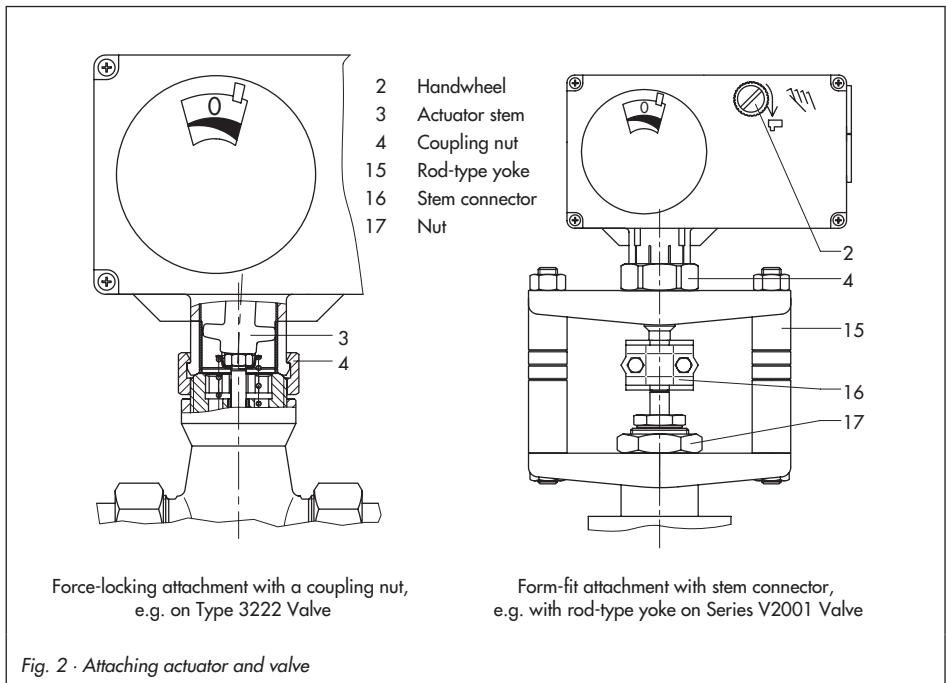
3.1 Type 5824 Actuator

3.1.1 Force-locking attachment

1. Retract the actuator stem by turning the handwheel (2) counterclockwise.
2. Place the actuator on the valve connection and tighten coupling nut (4) with a tightening torque of 20 Nm.

3.1.2 Form-fit attachment

1. Place actuator on the rod-type yoke and tighten the coupling nut (4) with a tightening torque of 20 Nm.
2. Place actuator with yoke (15) on the valve and tighten the nut (17) with a minimum tightening torque of 150 Nm.
3. Pull plug stem until it reaches the actuator stem or extend actuator stem using the handwheel (2).
4. Position the clamps of the stem connector (16) included in the accessories on the ends of the actuator stem and plug stem and screw tight.



3.2 Type 5825 Actuator

3.2.1 Force-locking attachment

Fail-safe action "Actuator stem extends"

The actuator stem must be retracted before the actuator can be mounted onto the valve. The stem can be retracted either mechanically or electrically. Both methods are described below.

Retracting the actuator stem mechanically

1. Unscrew front cover and place a 4 mm Allen key on the red actuating shaft.
2. Retract the actuator stem:
Turn Allen key counterclockwise only and **only up to** the final travel value which is at the point where the torque switch is activated (switching off the motor, Fig.).

NOTICE

Turning the actuator too far will destroy it.

3. Hold Allen key in place and fasten valve and actuator together using the coupling screw (tightening torque 20 Nm). Remove Allen key and carefully screw the front cover back on.

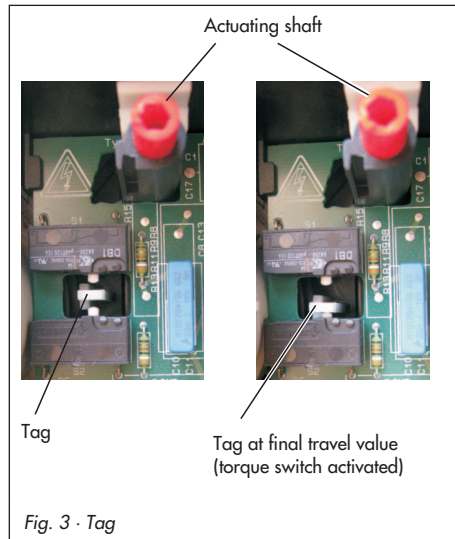


Fig. 3 · Tag

Retracting the actuator stem electrically

1. Unscrew front cover.
2. Perform electrical wiring according to Fig. 5 and carefully screw the front cover back on.
3. Retract the actuator stem:
Switch on supply voltage and retract the actuator stem electrically until it reaches the end position (voltage applied to eL and N or using controller).

NOTICE

Never apply voltage to eL and aL at the same time!

4. Fasten valve and actuator together using the coupling screw (tightening torque 20 Nm).

Fail-safe action "Actuator stem retracts"

Place the actuator on the valve connection and tighten coupling nut with a tightening torque of 20 Nm.

3.2.2 Form-fit attachment

For fail-safe action "Actuator stem retracts" or "Actuator stem extends", attach actuator as described in section 3.1.2.

3.3 Mounting position

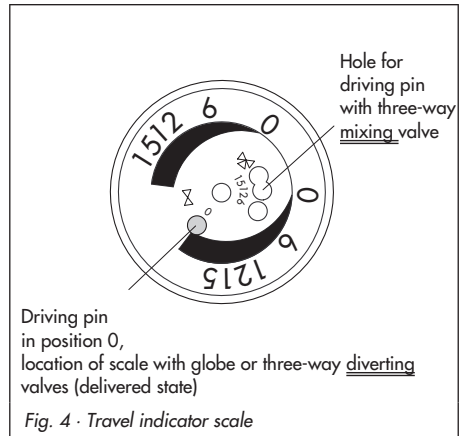
The control valve must be mounted in the pipeline with the Type 5824/5825 Actuator located on top to achieve the stated degree of protection.

3.4 Travel indicator scale

The travel indicator scale has two opposed scales for adaptation to different valve versions. Which scale is to be used depends on the valve version (Fig. 4).

Globe and three-way diverting valves · The driving pin is in position 0 (delivered state)

Three-way mixing valves · Remove scale, turn it and replace it so that the pin is positioned over the appropriate hole (6, 12 or 15) corresponding to the rated travel (6 mm, 12 mm or 15 mm travel).



4 Electrical connection



Risk of electric shock!

When installing electric cables, you are required to observe the regulations governing electrical power plant installation according to DIN VDE 0100 as well as the regulations of your local power supply company.

Use a suitable power supply which guarantees that no dangerous voltages reach the device in standard operation or in case of a fault in the system or any other system parts.

Connect the actuator to the electrical network only after the power supply is first switched off. Make sure the power cannot be switched on unintentionally!

Especially when a 24 V voltage supply is used, wires with sufficiently large wire cross-sections must be used to guarantee that the permissible voltage tolerances of $\pm 10\%$ are not exceeded.

1. Route the leads through the cable entries (1.2, Fig. 1) and connect wiring as illustrated in Fig. 5 while observing the following **important instructions**.

The control signals of the controller are connected to the terminals **eL** and **aL**:

- ▶ If voltage is applied to **eL**, the actuator motor retracts the actuator stem.
- ▶ Voltage applied to **aL** causes the actuator stem to extend.

Important instructions:

- ▶ **The interference suppression capacitors C_e installed in the output circuit of the connected controller may not exceed a value of 2.5 nF** to guarantee the proper functioning of the actuator.
When actuators are to be connected to controllers with larger interference suppression capacitors, a special version is available on request.
- ▶ Actuators operated in parallel must be connected over separate contacts to prevent the actuators hunting in the end positions due to a shared OPEN or CLOSED contact.
- ▶ **Type 5825:** To operate the actuator, the power supply must be connected to the terminals N and L.

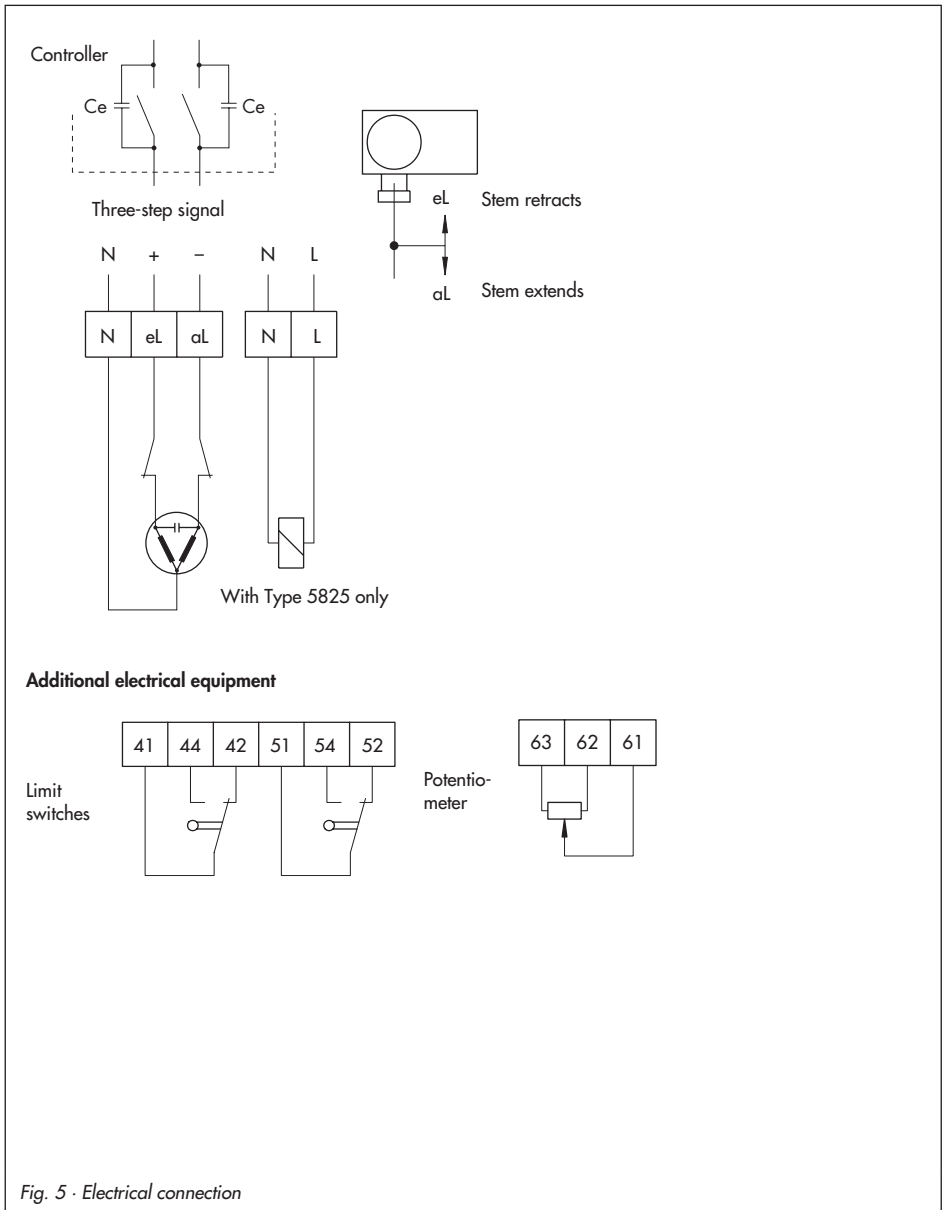
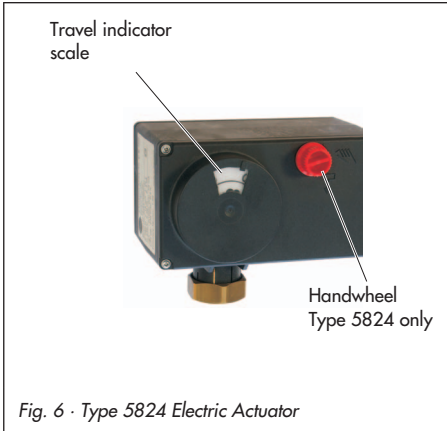


Fig. 5 - Electrical connection

5 Handwheel

Direction of action and travel can be read off the travel indicator scale (Fig. 6).



Type 5824 Actuator

Use the handwheel to adjust the travel (approx. 4 turns for 1 mm):

- ▶ Turn clockwise ⇒ Actuator stem extends
- ▶ Turn counterclockwise ⇒ Actuator stem retracts

Type 5825 Actuator



Risk of electric shock!

1. Unscrew front cover and place a 4 mm Allen key on the red actuating shaft.
2. Turn Allen key: For version with fail-safe action "Actuator stem extends", turn Allen key **counterclockwise only**. For version with fail-safe action "Actuator stem retracts", turn the Allen key **clock-**

wise only. Only turn it up to the final travel value which is at the point where the torque switch is activated (switching off the synchronous motor).

NOTICE

Turning the actuator too far will destroy it.

After the safety release of the magnet, the actuator cannot hold the position. The spring assembly pushes the actuator stem back into the fail-safe position.

3. Remove Allen key and carefully screw the front cover back on.

6 Additional equipment

6.1 Limit switches

The limit switches (6, Fig. 1) can optionally be used as double-throw, make or break contacts.

Terminal assignment (Fig. 5):

Terminals 41, 44, 42: Bottom cam disk,
Adjuster 7.1

Terminals 51, 54, 52: Top cam disk,
Adjuster 7.2



Risk of electric shock!

1. Unscrew front cover.
2. Move the actuator to the travel position at which switching point is to be set.
3. Use a 4 mm Allen key to turn the adjusters (7.1 or 7.2 in Fig. 1) up to the point where the contact is triggered. The angle of rotation of the cam disks is limited. Therefore, the top adjuster (7.1) should preferably be used for the upper travel range and the bottom adjuster (7.2) for the lower travel range.

6.2 Potentiometer

As the valve passes through its travel range, the resistance value changes from 0 Ω to max. 80 % of its nominal value.

Place a screwdriver on the slotted shaft to calibrate the potentiometer.

Calibrating actuator with extended actuator stem at 0 Ω

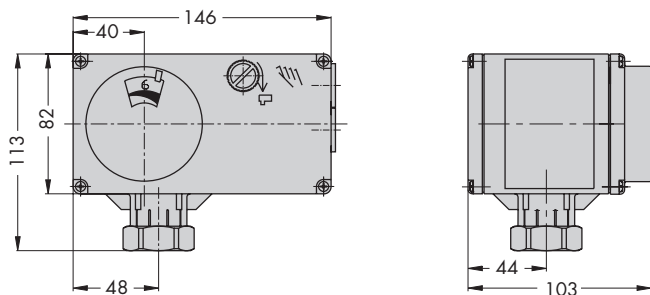
1. Connect ohmmeter to terminals 61 and 62.
2. Extend actuator stem to its end position.
3. Turn the potentiometer counterclockwise as far as it will go. The ohmmeter indicates the initial value of approx. 0 Ω .

Calibrating actuator with retracted actuator stem at 0 Ω

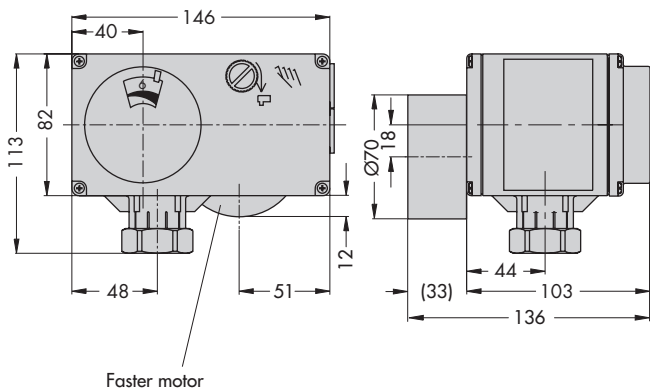
1. Connect ohmmeter to terminals 61 and 63.
2. Retract actuator stem to its end position.
3. Turn the potentiometer clockwise as far as it will go. The ohmmeter indicates the initial value of approx. 0 Ω .
4. **Only for actuators with 6 or 12 mm travel:** Slowly turn the potentiometer counterclockwise up to the point where the resistance changes from 0 Ω .

7 Dimensions in mm

Type 5824-10 and Types 5825-10/-15/-25

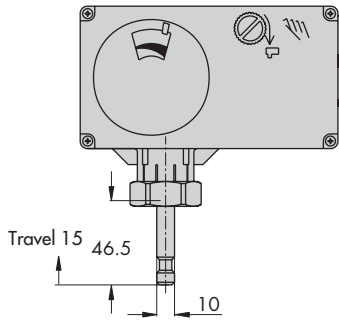


Types 5824-13/-23/-33 and Types 5825-13/-23 (version with faster motor)

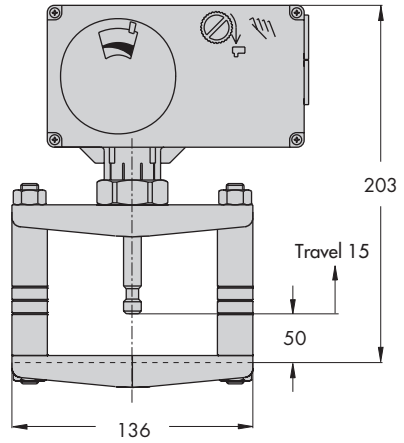


Type 5824-30 and Types 5825-30/-35




Actuator without yoke



Actuator with yoke 1400-7414







8 Nameplate

	SAMSON	1		2	0062
	Electric Actuator				
Var.-ID.	3	Model	4		
Serial-No.	5			6	
F:	7	s:	8	t:	9
U:	10	f:	11	P:	12
					13
					<input type="checkbox"/>
	14				
	15				
					Made in Germany

9 Customer inquiries

Please submit the following details:

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

- 1 Type designation
- 2 Year of manufacture
- 3 Configuration ID (Var.-ID)
- 4 Model designation (for Type 5825 only)
- 5 Serial number
- 6 DIN registration number (for Type 5825 only)
- 7 Nominal thrust
- 8 Rated travel
- 9 Nominal transit time
- 10 Supply voltage
- 11 Rated frequency
- 12 Power consumption
- 13 Fail-safe action (for Type 5825 only)
 -  Stem extends
 -  Stem retracts
- 14  Potentiometer
- 15  Limit switch



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EB 5824-1 EN

2011-07