

# Electric Actuators with LON Interface



**Type 5824 without –  
Type 5825 with fail-safe action**



Fig. 1 · Type 5824 Actuator

## **Mounting and Operating Instructions**

**EB 5824-9 EN**

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- ▶ *Assembly, start-up and operation of this device may only be performed 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 hazards due to their specialized training, their knowledge and experience as well as their knowledge of the applicable standards.*
- ▶ *Any hazards which could be caused in the connected valve by the process medium, operating pressure or moving parts are to be prevented by means of the appropriate measures.*
- ▶ *Proper transportation and storage are assumed.*
- ▶ *The actuators have been designed for use in electrical power 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.*
  
- ▶ **Note:** *The device with a CE marking fulfils the requirements of the Directives 94/9/EC and 89/336/EEC. The declaration of conformity can be viewed and downloaded on the Internet at <http://www.samson.de>.*

## Technical data

Actuator Type	Without fail-safe action		With fail-safe action			
	5824-20	5824-30	5825-20	5825-25	5825-30	5825-35
Type of connection to valve	Force-lock.	Form-fit	Force-locking		Form-fit	
Rated travel	12 (6) mm <sup>1)</sup>	15 mm	12 (6) mm <sup>1)</sup>		15 mm	
Actuating time for rated travel	70 s	90 s	70 s		90 s	
Actuating time in case of failure	–		6 s		7 s	
Fail-safe action Actuator stem	–		Extends	Retracts	Extends	Retracts
Nominal thrust	700 N		–			
Nominal thrust of safety spring	–		500 N		280 N	
Operating voltage	24 V AC / 50 Hz					
Power consumption	Approx. 5 VA		Approx. 7 VA			
Transformer	FTT10A Free Topology Transceiver, LTP-10 compatible					
Configuration	LNS™ plug-in for LON binding tools					
Handwheel	Yes		Optional <sup>2)</sup>			
Permissible ambient temperature: Permissible storage temperature: Perm. temp. at connecting stem:			0 to +50 °C –20 to +70 °C 0 to +130 °C			
Degree of protection (vertical installation)	IP 54					
Noise immunity	EN 50082-2					
Noise emission	EN 50081-1					
Weight	0.75 kg		1 kg			

<sup>1)</sup> Travel of 6 mm possible by installing a travel stop according to Fig. 2 in chapter 2.

<sup>2)</sup> Manual adjustment using a 4 mm hexagonal wrench after the housing lid has been removed; after the fail-safe action has been activated, the valve returns to the fail-safe position.



### 1. Design and principle of operation

The electric actuators consist of a reversible synchronous motor and a maintenance-free gear incorporated in a plastic housing.

The actuator is connected to the valve by means of a coupling nut (4), which provides a force-locking connection, or by means of a stem connector, which provides a form-fit connection between the actuator stem and the plug stem.

The rotary motion of the actuator motor is transmitted to the actuator stem (3), and hence to the plug stem of the connected valve via a crank disc.

The motor is disconnected via torque-dependent switches (10) when the valve has reached either of its final positions or an overload occurs.

#### Type 5824 without fail-safe action

In case of a force-locking connection between actuator and valve, the spring installed in the valve causes the plug stem to follow the movement of the actuator stem when the actuator stem retracts.

The valve can be manually moved to the desired position by means of a handwheel (2).

#### Type 5825 with fail-safe action

The actuators with fail-safe action largely comply with the Type 5824 version illustrated in Fig. 2. In addition, they contain a spring mechanism (8) and an electromagnet. If the control voltage applied to the electromagnet is interrupted, the actuator moves to the fail-safe position.

When de-energized in this way, the magnet disengages the coupling between gear and actuator motor. This causes the spring mechanism to move the actuator stem fully in the operating direction OUT (or IN). The connected (globe) valve is moved to the closed position.

**CAUTION!** Do not use the magnet for control tasks.

The Type 5825 is not equipped with a handwheel (2) on the housing cover. Manual adjustment via a hexagonal wrench is only possible after the front cover has been removed.

#### Typetest

The electric actuators with fail-safe action have been typetested by the German Technical Inspectorate TÜV according to DIN 32730.

The register no. is indicated on the name plate.

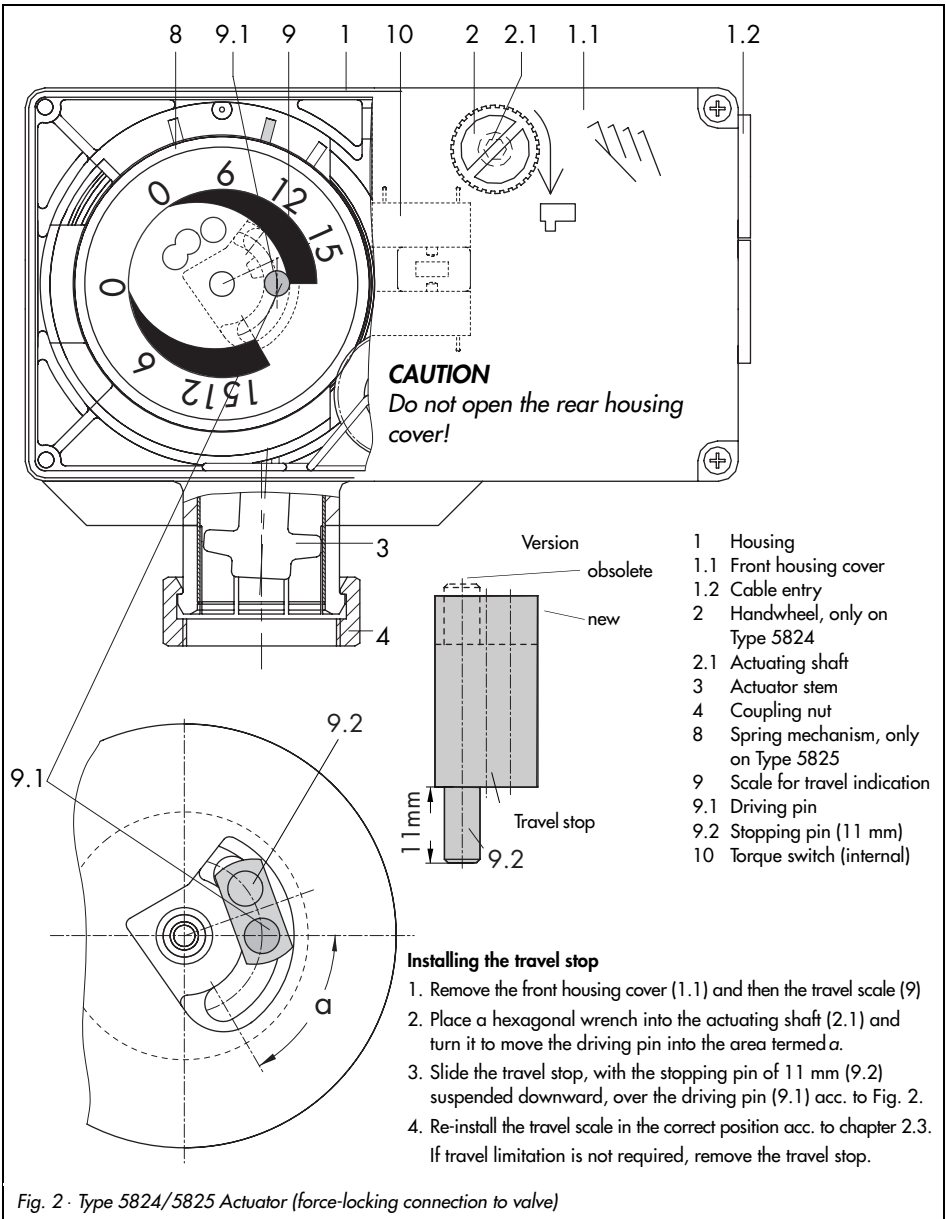


Fig. 2 · Type 5824/5825 Actuator (force-locking connection to valve)

## 2. Connection to the valve

### Note regarding the travel stop:

The rated travel of 12 mm in force-locking actuators can be reduced to 6 mm by installing a travel stop. The travel reduction allows the force-locking actuators to be used for smaller valves. A travel stop is supplied with the device and has to be installed according to Fig. 2.

## 2.1 Type 5824 Actuator

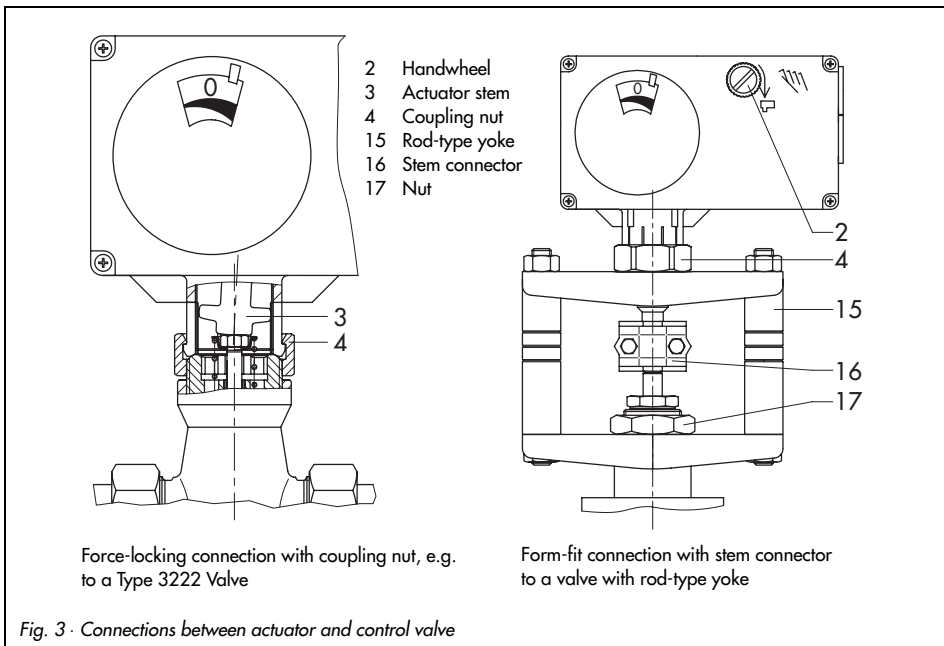
### 2.1.1 Force-locking connection

1. Turn handwheel (2) counterclockwise to retract the actuator stem.

2. Position the actuator on the valve connection and tighten coupling nut (4) using a tightening torque of 20 Nm.

### 2.1.2 Form-fit connection

1. Position actuator on the yoke and tighten coupling nut (4) using a tightening torque of 20 Nm.
2. Position actuator with yoke (15) on the valve and tighten nut (17) using a minimum tightening torque of 150 Nm.
3. Pull plug stem all the way up to the actuator stem or extend actuator stem using the handwheel (2).
4. Position coupling clamps of the stem connector (16) included in the accessories and screw tight.





## 2.2 Type 5825 Actuator

### 2.2.1 Force-locking connection

#### Fail-safe action "Actuator stem extends":

1. Unscrew front cover and place 4 mm hexagonal wrench into the red actuating shaft (Fig. 2, 2.1).
2. Use the wrench to retract the actuator stem. However, turn counterclockwise only and only to the point where the internal torque switch (Fig. 2, 10) is activated.
3. Keep the wrench positioned and connect valve and actuator using the coupling nut (tightening torque 20 Nm). Reinstall the front cover and carefully fix it using the screws.

#### Fail-safe action "Actuator stem retracts":

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

### 2.2.2 Form-fit connection

Proceed as described in chapter 2.1.2 for versions both with fail-safe action "Actuator stem retracts" and "Actuator stem extends."

## 2.3 Travel indicator scale

The travel indicator scale has two opposing scales to satisfy different valve versions.

Upon delivery (default), the scale is placed so that the driving pin is at position 0. This position is used for globe valves and three-way diverting valves.

For three-way mixing valves, remove the scale, turn it by roughly 180° and reposition it so that the appropriate bore (12 or 15 according to the rated travel) is placed over the driving pin.

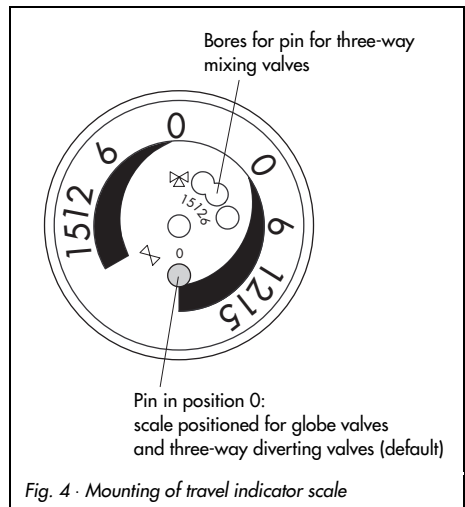


Fig. 4 · Mounting of travel indicator scale

## 3. Installing the control valve

The control valve must be installed in the pipeline with the actuator on top so as to ensure the stated degree of protection.

## 4. Electrical connections



When installing electric lines, 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. We recommend installing a disconnector (e.g. automatic circuit breaker). This allows the actuator to be connected separately from the power supply network. Once the installation has been completed, the actuator can be started up via switch-box or similar equipment. Make sure the power cannot be switched on unintentionally.

### 4.1 Connecting the supply voltage

The electrical connection must be established via the cable entries (see Fig. 2, 1.2) in such a manner that the actuator is supplied with 24 VAC / 50 Hz via terminals L1 and N1.

### 4.2 Connection to the LON<sup>®</sup> bus

The LON<sup>®</sup> Free Topology Transceiver (FTT10A) provides a polarity insensitive connection to the bus.

The LON<sup>®</sup> bus cables must be connected to the two actuator terminals marked "LON" on the board (see Fig. 5). Note that specific LON<sup>®</sup> bus cables are available to meet different requirements.

**NOTE:**

The "LONWORKS<sup>™</sup> FTT-10A Transceiver User's Guide" lists a number of cables qualified by Echelon<sup>®</sup> to work with the TP/FT-10 network. The guide also specifies the physical properties of the cables.

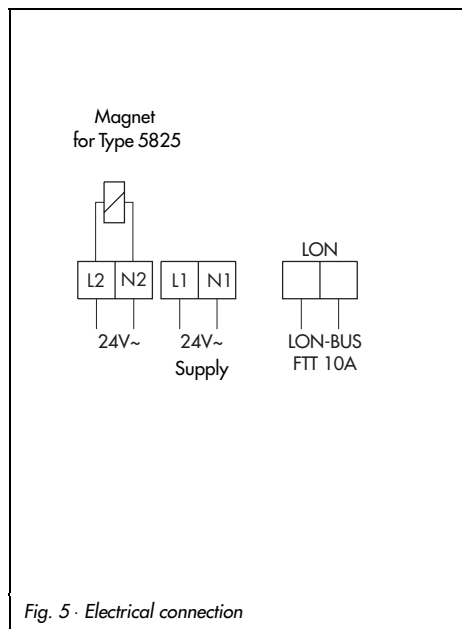


Fig. 5 · Electrical connection



### 5.2.1 Form-fit actuators

With form-fit actuators, the clamped connection between the actuator stem and the valve eliminates the possibility of lost motion.

To start the initialization, press the initialization button for 3 seconds.

The green operation LED indicates the current status as follows:

- LED off     Actuator stem extends,  
                  final position = 0 %
- LED on     Actuator stem retracts,  
                  final position = 100 %

LED blinks   Standard operation

When initialization is activated, the operation LED goes out and the actuator moves the actuator stem to the final position (0 %).

When the final position is reached, the operation LED lights up, the operating direction is reversed and the actuator moves the actuator stem to the final position (100 %).

Shortly after completion of the initialization routine, the actuator is reset to standard operation, and the operation LED blinks.

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#### **CAUTION!**

*Changes in the position of the white potentiometer gear lead to an incorrect position feedback and thus to a faulty initialization. If you have changed the position of the gear, proceed as follows for correction: Extend the actuator stem fully (zero position). Using a screwdriver, turn the potentiometer shaft counterclockwise until it does not go any further, then turn back clockwise by approx. 10°. Following this, a new initialization routine is required to determine the final positions.*

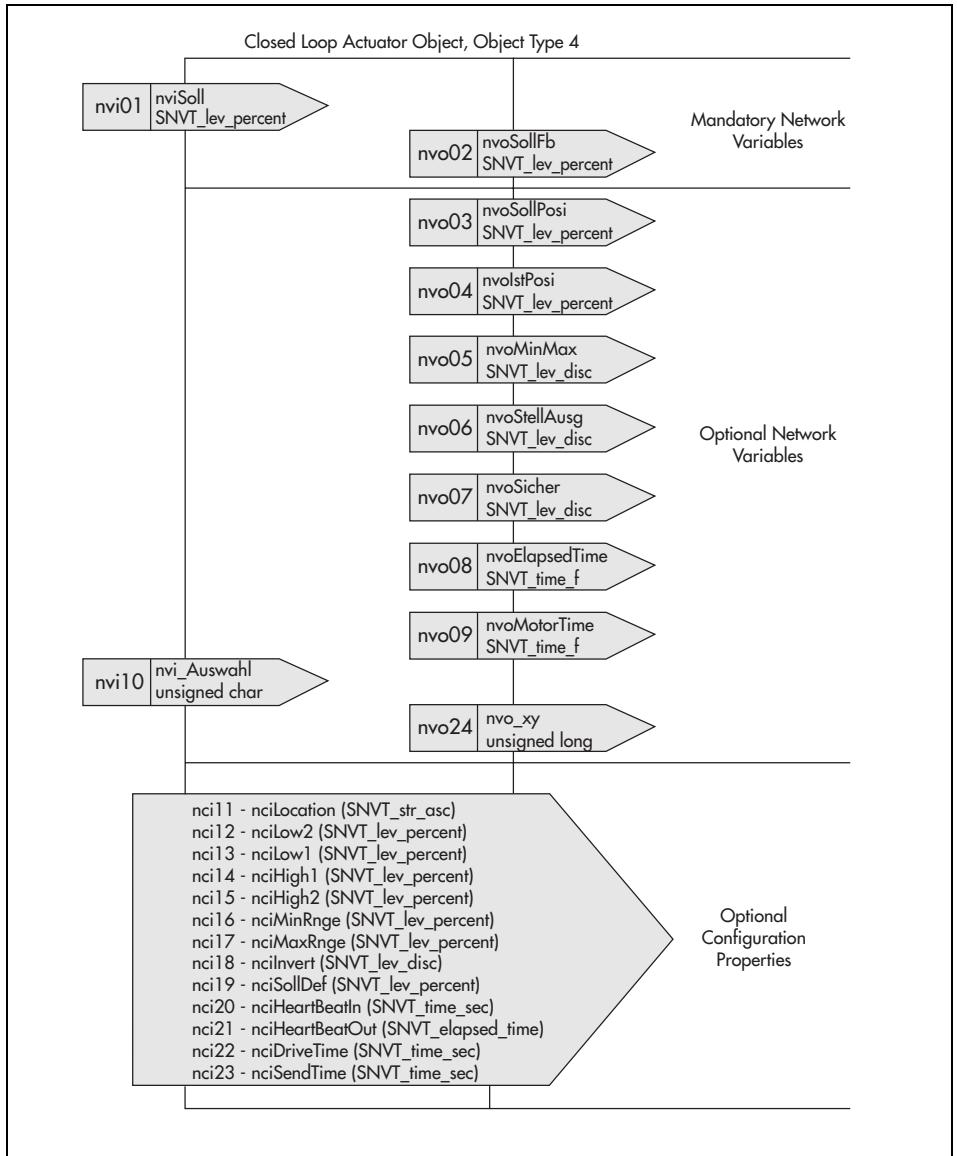
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### 5.2.2 Force-locking actuators

In case of a force-locking connection between actuator and valve via a coupling nut, the actuator stem is not firmly connected to the plug stem, but only contacts it. If the travel range of the actuator is wider than the valve travel, the actuator stem is lifted off the valve stem during the initialization. As a result, the final positions are not determined correctly. Therefore, it is imperative that the actuator be moved manually to the valve's final positions of 0 % and 100 % travel.

The initialization procedure is explained in chapter 6.1. For LNS-based configuration tools, the actuator can also be initialized conveniently by means of software using a plug-in such as Plug-in Version 1.5 as described in TV-SK 6328.

## 6. Description of closed loop actuator object



## 6.1. Description of network variables

Variable	Type	Function
<b>nviSoll</b>	SNVT_lev_percent	Set point input of position 0 to 100 %
<b>nvoSollFb</b>	SNVT_lev_percent	Feedback of set point input
<b>nvoSollPosi</b>	SNVT_lev_percent	Set position calculated from data points nciMinRnge, nciMaxRnge and nciInvert
<b>nvolstPosi</b>	SNVT_lev_percent	Actual status of actuator
<b>nvoMinMax</b> ST_OFF ST_LOW ST_MED ST_HIGH ST_ON	SNVT_lev_disc	Output variable of limit value monitoring istPosi < nciLow2 istPosi < nciLow1 istPosi < nciHigh1 istPosi < nciHigh2 istPosi ≥ nciHigh2
<b>nvoStellAusg</b> ST_OFF ST_HIGH ST_LOW	SNVT_lev_disc	Actual status of actuator Down Up Stop
<b>nvoSicher</b> ST_OFF ST_ON	SNVT_lev_disc	Feedback of safety monitoring
<b>nvoElapsedTime</b>	SNVT_time_sec	Absolute uptime of the actuator (s)
<b>nvoMotorTime</b>	SNVT_time_sec	Absolute uptime of the motor (s)
<b>nviAuswahl</b>  0 1 2 3 77 88 99	unsigned char	Input variable for start-up /manual adjustment Note: manual adjustment has priority over standard operation Automatic Manual stop Manual up Manual down Acceptance 100 % initialization value Acceptance 0 % initialization value Start initialization routine

### 6.1.1 Initialization procedure for force-locking actuators

1. Select variable, enter value "3" for command "manual down", press the return key and wait for the actuator to move to zero position.
2. Enter value "1" for command "manual stop" and press the return key.
3. Enter value "88" for command "initialization 0 %" and press the return key.
4. Enter value "2" for command "manual up" and press the return key. Wait until the actuating time of the actuator has elapsed (6 mm = 35 s, 12 mm = 70 s).
5. After the actuating time has elapsed, enter value "1" for command "manual stop" and press the return key.
6. Enter value "77" for command "initialization 100 %" and press the return key.

### 6.1.2 Initialization procedure for form-fit actuators

1. Enter "99" and press the return key or press the initialization button of the actuator.

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**Note:**

*The activation of any of the initialization commands "77, 88 and 99" causes the operating mode to be automatically set to **automatic operation**.*

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## 6.2 Description of configuration properties

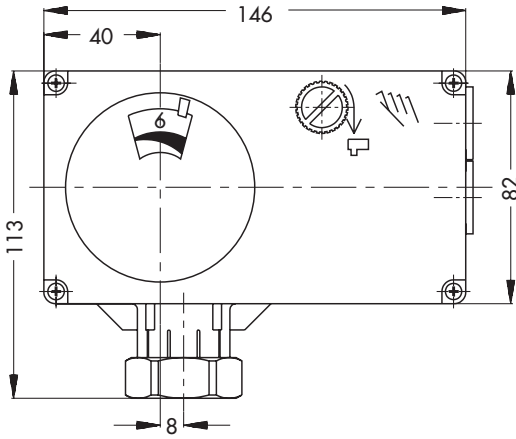
Variable	Type	Function
<b>nciLocation</b>	SNVT_str_asc	Description (location etc.)
<b>nciMinRnge</b> <b>nciMaxRnge</b> <b>nciInvert</b>	SNVT_lev_percent SNVT_lev_percent SNVT_lev_disc	Minimum and maximum values and reversion of the "split range" function
<b>nciSollDef</b>	SNVT_lev_percent	Standard set point input if the bus does not provide any set point input. Is also used after "HeartBeatIn" time has elapsed
<b>nciHeartBeatIn</b>	SNVT_time_sec	Heartbeat time of the set point input (0 = no HeartBeat)
<b>nciHeartBeatOut</b>	SNVT_elapsed_time	Time needed to output the actual position if there has been no change in the position
<b>nciDriveTime</b>	SNVT_time_sec	Actuating time of the actuator (for monitoring purposes)
<b>nciSendTime</b>	SNVT_time_sec	Time needed to update the uptimes (see nvoElapsedTime and nvoMotorTime)
<b>nvo_xy</b>	unsigned char	Actual measured value (position feedback) for manufacturing test only



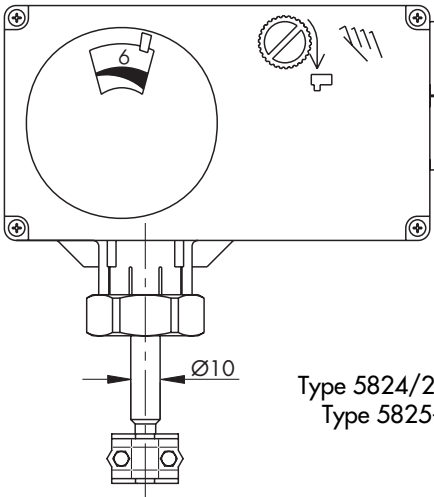
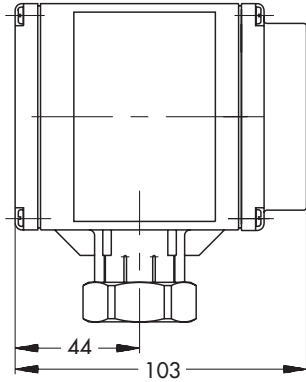
## **7. Convenient start-up using a plug-in**

A plug-in can be used to supplement an LNS-based configuration tool. This allows for a more convenient start up of the LON actuators. The plug-in software can be viewed and downloaded on the Internet at <http://www.samson.de>.

## 8. Dimensions in mm



Type 5824-20 / Type 5825-20/25



Type 5824/25 -30  
Type 5825-30





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