Electric Actuators

Type 5824 (without fail-safe action)
Type 5825 (with fail-safe action)

Application

Electric actuators designed for valves used in heating, ventilation and air-conditioning systems as well as in process engineering and industrial energy transfer systems.

The linear actuators are particularly suitable for attachment to SAMSON Types 3260, 3222, 3226, 3213, 3214 and V2001 Valves. In addition, they can be used as additional electric actuators on self-operated differential pressure and flow regulators.

Special features

- Type 5824 Actuator without fail-safe action and Type 5825 with fail-safe action
- Three-step version with synchronous motor and maintenance-free gear or version with digital positioner and stepper motor
- Motor switched off by torque-dependent limit switches
- Type 5824 with manual override (handwheel)
- Optional three-step versions
  - With faster motor (half the standard transit time)
  - With two adjustable limit contacts
  - With resistance transmitter

Digital positioner

- Direction of action reversed by slide switch
- Momentary travel calculated from transit time
- Operating status and errors indicated by LEDs
- Adjustable positioning speeds
- Blocking protection
- Adjustable input and output signal ranges
- Configuration, parameterization, diagnostic function and direct connection for monitoring using the TROVIS-VIEW software
  - Direct data transmission using a connecting cable (direct connection to PC)
  - Data transmission over a memory pen

Accessories for version with digital positioner

(see Table 4 on page 8)

- TROVIS-VIEW software (6661-1059) for Types 5824 and 5825 Electric Actuators
- Hardware package
- Memory pen-64
- Connecting cable
- Modular adapter
- USB adapter

Fig. 1: *Type 5824-10 Electric Actuator*

Type	Valve attachment	Rated travel	Optional version with digital positioner
Versions without fail-safe action			
5824-10	Force-locking	6 (7.5) mm	Yes
5824-13 [1]	Force-locking	6 (7.5) mm	No
5824-20	Force-locking	12 mm	Yes
5824-23 [1]	Force-locking	12 mm	No
5824-30	Form-fit	15 mm	Yes
5824-33	Form-fit	15 mm	No
Versions with fail-safe action "actuator stem extends" or "actuator stem retracts"			
5825-10/-15	Force-locking	6 (7.5) mm	Yes
5825-13 [1]**/ —**	Force-locking	6 (7.5) mm	No
5825-20/-25	Force-locking	12 mm	Yes
5825-23 [1]**/ —**	Force-locking	12 mm	No
5825-30/-35	Form-fit	15 mm	Yes
5825-33 [1]**/ —**	Form-fit	15 mm	No

[1] Version with faster motor (Type 5825-x3 only with fail-safe action "actuator stem extends")

Principle of operation (Fig. 2)

The three-step version consists of a reversible synchronous motor and a maintenance-free gear. The synchronous motor is switched off by torque-dependent limit switches or in case of overload.

In the version with digital positioner, the stepper motor allows for supply by frequency-independent voltages.

The force of the motor is transmitted to the actuator stem (3) via gear and crank disk. When the actuator stem extends, it pushes against the valve's plug stem. When the actuator stem retracts, the return spring in the valve causes the plug stem to follow the movement (force-locking connection).

Actuator and valve are connected by the coupling nut (4).

Form-fit valves without return spring can be combined with a Type 5824-30/-33 or Types 5825-30/-33/-35 Actuators using a yoke or adapter (see Accessories, Table 4 on page 8).

Type 5824

The electric actuator without fail-safe action has a handwheel (2) used to manually position the valve. Travel and direction of action can be read off the travel indication scale (9).

Type 5825

The electric actuator with fail-safe action largely corresponds to the Type 5824 described above. However, it contains a spring assembly (8) and an electromagnet, which move the connected valve to its fail-safe position when de-energized. The Type 5825 Actuator is available with fail-safe action **"actuator stem extends"** or **"actuator stem retracts"**.

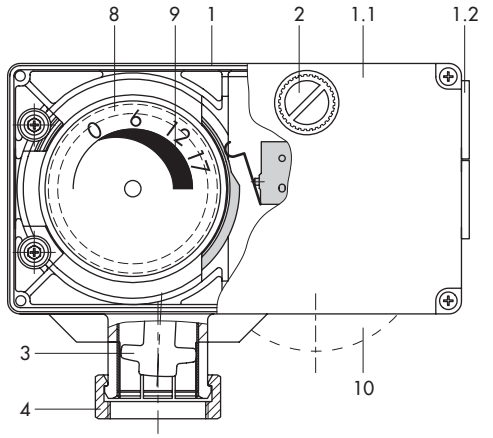
A handwheel (2) is not fitted. After the actuator is switched off and the cover (1.1) removed, manual adjustment with an Allen key is possible. As soon as the Allen key is released, the actuator immediately moves back to its original position.

Testing according to DIN EN 14597

The Type 5825 Electric Actuator with fail-safe action "actuator stem extends" is tested by the German technical surveillance association TÜV according to DIN EN 14597 in combination with different SAMSON valves. The registration number is available on request.

Version with faster motor (three-step version)

The Types 5824-13/-23/-33 and Types 5825-13/-23/-33 are equipped with a faster motor in a housing attached to the back of the actuator.



1	Housing	8	Spring assembly (Type 5825)
1.1	Front cover	9	Travel indication scale
1.2	Cable entry	10	Housing for faster motor (optional)
2	Handwheel (Type 5824)		
3	Actuator stem		
4	Coupling nut		

Fig. 2: *Type 5824 and Type 5825*

Additional equipment

Three-step version

- **Resistance transmitter** · The resistance transmitter is linked to the gear and produces a resistance signal between approx. 0 and 1000 Ω (usable range 0 to 900 Ω) proportional to the valve travel.
- **Limit contacts** · Optionally, the actuators can be equipped with two limit contacts, which are actuated by continuously adjustable cam disks.

The two additional limit contacts are not suitable for retrofitting.

Version with digital positioner

- The positioner ensures a predetermined assignment of the valve position to the input signal.
  For position feedback, a 0 to 10 V signal can be picked off at terminals 32 and 33. The version with positioner allows the characteristic to be reversed and is suitable for split-range operation.
- **Limit contacts** · (only with 24 V AC/DC power supply)
  Optionally, the actuators can be equipped with two limit contacts, which are actuated by continuously adjustable cam disks.
  The two additional limit contacts are not suitable for retrofitting.
- **Priority circuit** · When limit contacts are used, the actuator can optionally be equipped with a priority circuit.

Settings of the digital positioner

The digital controller settings can be changed in the TROVIS-VIEW Configuration and Operator Interface.

Configuration	Default setting	Adjustment range
Input variable		
Lower range value	0 V 0 mA	0 to 7.5 V 0 to 15 mA
Upper range value	10 V 20 mA	2.5 to 10 V 5 to 20 mA
Unit	V	V/mA
Position feedback signal		
Lower range value	0.0 V	0.0 to 10.0 V
Upper range value	10.0 V	0.0 to 10.0 V
Input signal		
Detect input signal failure	No	Yes/No
Positioning value upon input signal failure	Internal	Internal/Last position
Internal positioning value	0.0 %	0.0 to 100.0 %
Priority position	No	Yes/No
Priority stem position	Extended	Extended/Retracted
End position guiding (stem extends)	1.0 %	0.0 to 49.9 %
End position guiding (stem retracts)	97.0 %	50.0 to 100.0 %
Functions		
Blocking protection of valve	No	Yes/No
Valve travel		
Travel	100.0 %	30.0 to 130.0 %
Travel adjustment	Absolute	Absolute/Relative
Speed level	Standard	Slow/Standard/Fast
Dead band (switching range)	2.0 %	0.5 to 5.0 %
Characteristic	Linear	Linear/equal percentage/ reverse equal percentage/ user-defined

Mounting position

The control valve can be installed in the pipeline in any desired position. However, a suspended mounting position of the actuator is not permissible (see Fig. 3).

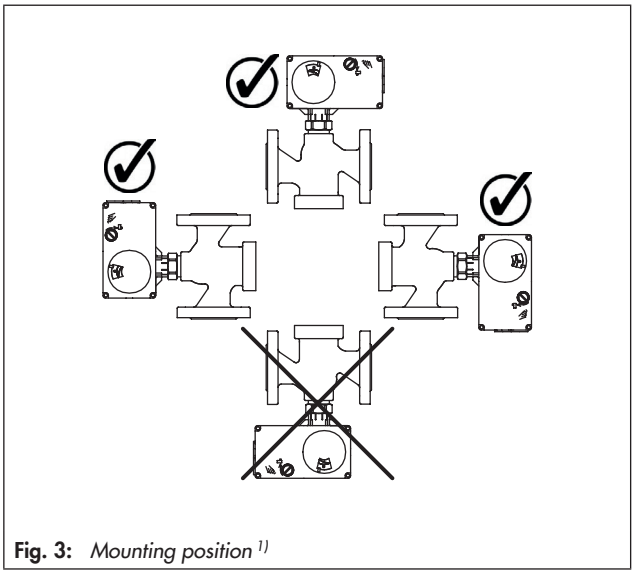


Fig. 3: *Mounting position* [1)]

1) The degree of protection IP 54 can only be achieved up to device index .03 when the actuator is installed in the upright position. See the last two figures of the configuration ID (Var.-ID) written on the nameplate for the device index.

Mounting position

Before mounting the actuator on the valve, retract the actuator stem. In order to retract the actuator stem of Type 5825 with fail-safe action "actuator stem extends", remove the cover and turn the actuating shaft counterclockwise using a 4 mm Allen key to retract the actuator stem. Hold the actuator stem in this position, while tightening the coupling nut with 20 Nm at the maximum.

Electrical connection

▶ Page 6

Ordering text

Type 5824-.../5825-... Electric Actuator

– Three-step version
  - Power supply:
    - 230 V, 50 Hz
    - 230 V, 60 Hz (special version)
    - 24 V, 50 Hz
    - 120 V, 60 Hz
  - Limit contacts: with/without
  - Resistance transmitter: with/without

– Version with digital positioner
  - Power supply:
    - 24 V, 50/60 Hz and DC
    - 85 to 264 V, 50 and 60 Hz
  - Limit contacts: with/without [1)]
  - Priority circuit: with/without [2)]

1) Only with 24 V DC/AC power supply
2) Only for version with limit contacts

Table 1: *Technical data · Three-step version*

Three-step version	**Type**	**5824**						**5825**								
		-10	**-13**	**-20**	**-23**	**-30**	**-33**	**-10**	**-13**	**-20**	**-23**	**-30**	**-33**	**-15**	**-25**	**-35**
Fail-safe action		Without						With								
Operating direction		–						Extends						Retracts		
Rated travel	mm	6 [1]	6 [1]	12	12	15	15	6 [1]	6 [1]	12	12	15	15	6 [1]	12	15
Stroking speed	Standard: 0.17 mm/s	•	–	•	–	•	–	•	–	•	–	•	–	•	•	•
	Actuator with faster motor: 0.33 mm/s	–	•	–	•	–	•	–	•	–	•	–	•	–	–	–
Transit time for rated travel	s	35 [1]	18 [1]	70	36	90	45	35 [1]	18 [1]	70	36	90	45	35 [1]	70	90
Transit time for fail-safe action	s	–	–	–	–	–	–	4	4	6	6	7	7	4	6	7
Thrust	Extends N	700	700	700	700	700	700	500	500	500	500	280	280	500	500	280
	Retracts N	–	–	–	–	700	700	–	–	–	–	280	280	–	–	280
Nominal thrust of safety spring	N	–	–	–	–	–	–	500	500	500	500	280	280	– [3]	– [3]	280
Attachment	Force-locking	•	•	•	•	–	–	•	•	•	•	–	–	•	•	–
	Form-fit	–	–	–	–	•	•	–	–	–	–	•	•	–	–	•
Handwheel		Yes						Possible [2]								
Power supply																
24 V, 50 Hz		•	–	•	–	•	–	•	–	•	–	•	–	•	•	•
230 V, 50 Hz/60 Hz [4]		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
120 V, 60 Hz		•	–	•	–	•	–	•	–	•	–	•	–	•	•	•
Power consumption	Approx. VA	3	6	3	6	3	6	4	8	4	8	4	8	4	4	4
Permissible temperatures																
Ambient		0 to 50 °C														
Storage		–20 to +70 °C														
At the actuator stem		0 to 135 °C [6]														
Safety																
Degree of protection		IP 54 [5]														
Class of protection		II (according to EN 61140)														
Overvoltage category		II (according to EN 60664)														
Degree of contamination		2 (according to EN 60664)														
Electromagnetic compatibility		According to EN 61000-6-2, EN 61000-6-3 and EN 61326														
Vibration		According to EN 60068-2-6 and EN 60068-2-27														
Additional electrical equipment (not suitable for retrofitting)																
Two limit contacts max. 230 V, 1 A		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
One resistance transmitter 0 to 1000 Ω ±15 % (90 % of final value at rated travel); max. 1 mA, 5 V		•	–	•	–	•	•	•	–	•	–	•	•	•	•	•
Materials																
Housing, housing cover		Plastic (PPO with glass fiber reinforcement)														
Coupling nut, M30 x 1.5		Brass														
Weight	kg (approx.)	**0.75**	**1.00**	**0.75**	**1.00**	**0.75**	**0.75**	**1.00**	**1.25**	**1.00**	**1.25**	**1.00**	**1.25**	**1.00**	**1.00**	**1.00**

1) Actuators with 6 mm travel can also be used for valves with 7.5 mm travel (45 s transit time, 22.5 s for actuator with faster motor).
2) Manual override using 4 mm Allen key (after removing the cover); actuator always returns to fail-safe position after release.
3) Safety spring pulls actuator stem to retracted end position; valve operated by valve spring.
4) Special version
5) The degree of protection IP 54 can only be achieved up to device index **.03** when the actuator is installed in the upright position. See last two figures of the configuration ID (Var.-ID) written on the nameplate, e.g. Var.-ID xxxxxxx**.xx**, for the device index.
6) Maximum 130 °C up to device index **.03**. See last two figures of the configuration ID (Var.-ID) written on the nameplate, e.g. Var.-ID xxxxxxx**.xx**, for the device index.

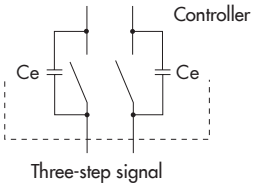
Table 2: *Technical data · Actuator with digital positioner*

Actuators with digital positioner	Type	5824			5825					
		-10	-20	-30	-10	-20	-30	-15	-25	-35
Fail-safe action		Without			With					
Operating direction		–			Extends			Retracts		
Rated travel	mm	6 [1]	12	15	6 [1]	12	15	6 [1]	12	15
Stroking speed [2, 3] Slow	mm/s	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Standard	mm/s	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**
Fast	mm/s	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36
Transit time for rated travel (depending on the stroking speed) Slow	s	45	89	111	45	89	111	45	89	111
Standard	s	**31**	**61**	**76**	**31**	**61**	**76**	**31**	**61**	**76**
Fast	s	17	33	41	17	33	41	17	33	41
Transit time for fail-safe action	s	–	–	–	4	6	7	4	6	7
Thrust Extends	N	700	700	700	500	500	280	500	500	280
Retracts	N	–	–	700	–	–	280	–	–	280
Nominal thrust of safety spring	N	–	–	–	500	500	280	– [4]	– [4]	280
Attachment Force-locking		•	•	–	•	•	–	•	•	–
Form-fit		–	–	•	–	–	•	–	–	•
Handwheel		Yes			Possible [5]					
Power supply										
24 V DC (–10 %, + 20 %), 24 V, 50 and 60 Hz		•	•	•	•	•	•	•	•	•
85 to 264 V, 50 and 60 Hz		•	•	•	•	•	•	•	•	•
Input signal		0 to 10 V, R_i = 20 kΩ · 0 to 20 mA, R_i = 50 Ω								
Output signal		0 to 10 V, R_B = 1 kΩ								
Power consumption										
24 V DC (–10 %, 20 %)	W	5			8					
24 V, 50 and 60 Hz	VA	5			8					
85 to 264 V, 50 and 60 Hz [6]	VA	8			10					
Permissible temperatures										
Ambient		0 to 50 °C								
Storage		–20 to +70 °C								
Medium		0 to 135 °C [8]								
Safety										
Degree of protection		IP 54 [7]								
Class of protection		II (according to EN 61140)								
Overvoltage category		II (according to EN 60664)								
Degree of contamination		2 (according to EN 60664)								
Noise immunity		According to EN 61000-6-2								
Noise emission		According to EN 61000-6-3								
Vibration		According to EN 60068-2-6 and EN 60068-2-27								
Additional electrical equipment (not suitable for retrofitting)										
Two limit contacts [6], max. 230 V, 1 A		•			•					
Materials										
Housing, housing cover		Plastic (PPO with glass fiber reinforcement)								
Coupling nut, M30 x 1.5		Brass								
Weight	kg (approx.)	**0.75**			**1.00**					

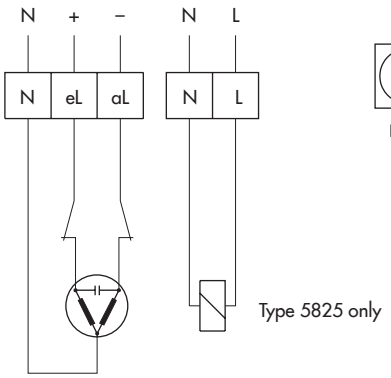
1) Actuators with 6 mm travel can also be used for valves with 7.5 mm travel.
2) Adjustable (default settings in bold print)
3) With a fast stroking speed and 24 V DC power supply, make sure the voltage does not fall below the specified value.
4) Safety spring pulls actuator stem to retracted end position; valve operated by valve spring.
5) Manual override using 4 mm Allen key (after removing the cover); actuator always returns to fail-safe position after release.
6) Actuators for 85 to 264 V power supply cannot be fitted with limit contacts.
7) The degree of protection IP 54 can only be achieved up to device index **.03** when the actuator is installed in the upright position. See last two figures of the configuration ID (Var.-ID) written on the nameplate, e.g. Var.-ID xxxxxxx**.xx**, for the device index.
8) Maximum 130 °C up to device index **.03**. See last two figures of the configuration ID (Var.-ID) written on the nameplate, e.g. Var.-ID xxxxxxx**.xx**, for the device index.

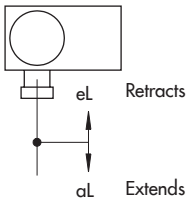
Electrical connection

Three-step version



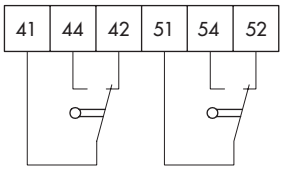
NOTE! The interference suppression capacitors Ce in the output circuit of the connected controller must not exceed a value of 2.5 nF to ensure the proper functioning of the actuator. A special actuator version is available on request for connection to controllers with larger interference suppression capacitors.



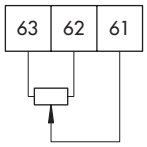


Additional equipment for actuators in three-step version

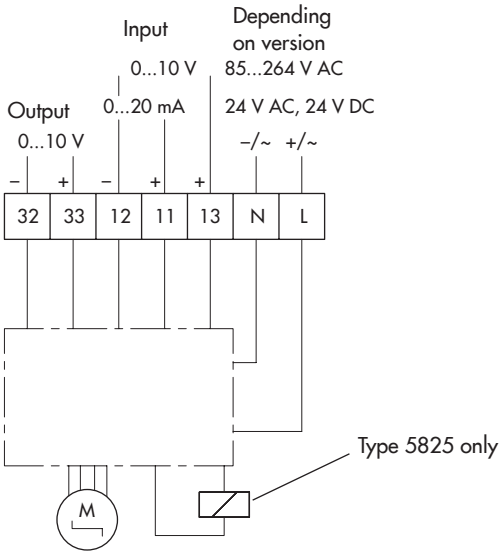
Limit contacts



Resistance transmitter

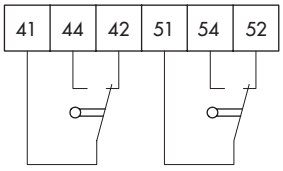


Actuator with digital positioner

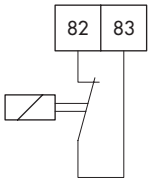


Additional electrical equipment for actuators with digital positioner
(only with 24 V DC/AC power supply)

Limit contacts

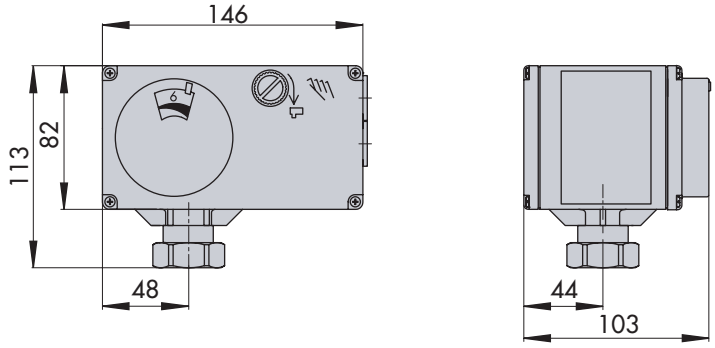


Priority circuit

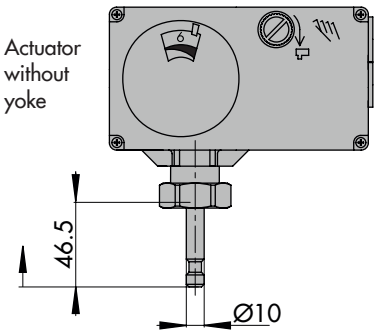


Dimensions in mm

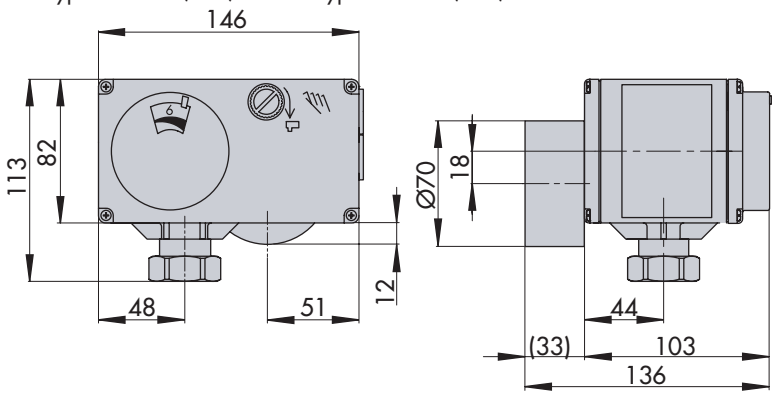
Types 5824-10/-20 and Types 5825-10/-15/-20/-25



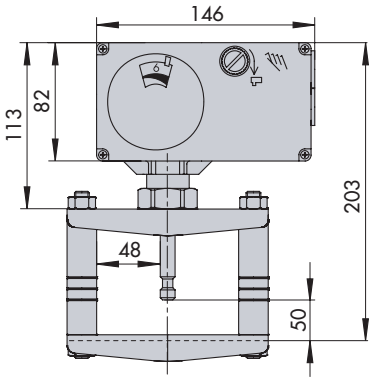
Type 5824-30 and Types 5825-30/-33/-35



Types 5824-13/-23/-33 and Types 5825-13/-23/-33



Type 5824-30 Actuator with yoke (1400-7414)



Replacement of old actuators with new updated actuators (three-step version)

- Type 5824 Actuator supersedes Type 5821 Actuator.
- Type 5825 Actuator supersedes Type 5822 Actuator.

Table 3: *Overview: replacement of old actuators with new actuators (valve remains unchanged!)*

Old actuator		**New actuator**		Adapter
Type	5821-1	Type	**5824-30**	1400-7415
	5821-2		**5824-30**	1400-7415
	5821-3		**5824-30**	1400-7415
	5821-5		**5824-10**	Without
	5821-6		**5824-10**	Without
Type	5822-10	Type	**5825-30**	1400-7415
	5822-11		**5825-35**	1400-7415
	5822-20		**5825-30**	1400-7415
	5822-21		**5825-35**	1400-7415
	5822-30		**5825-30**	1400-7415
	5822-40		**5825-30**	1400-7415
	5822-41		**5825-35**	1400-7415
	5822-50		**5825-10**	Without
	5822-60		**5825-10**	Without
	5822-70		**5825-10**	Without

Table 4: *Accessories*

Accessories for version with digital positioner	**Order no.**
Hardware package consisting of: – Memory pen-64 – Connecting cable – Modular adapter	1400-9998
Memory pen-64	1400-9753
Connecting cable	1400-7699
Modular adapter	1400-7698
USB 1.1 serial adapter	8812-2001
For mounting on form-fit valves without return spring [1]	**Order no.**
Yoke for V2001 Valves	1400-7414
Adapter for other valve types	1400-7415

[1] With Types 5824-30/-33 and Types 5825-30/-33/-35 Actuators

Specifications subject to change without notice

SAMSON AG · MESS- UND REGELTECHNIK
Weismüllerstraße 3 · 60314 Frankfurt am Main, Germany
Phone: +49 69 4009-0 · Fax: +49 69 4009-1507
samson@samson.de · www.samson.de