

# Electric Actuators

## Type SAM Linear Actuator



### Application

Electric actuators designed for control valves used in industrial applications, particularly suitable for attachment to Series 240, 250 and 280 Valves

**Thrusts** 2 kN to 25 kN

**Rated travels** 15 to 120 mm



These electric linear actuators contain reversible AC or three-phase AC motors. The rotary motion of the motor is transferred to the actuator stem by a gear unit and the corresponding transfer elements. Additionally, the actuators are fitted with an anti-rotation fixture. Versions are available with 230 V AC or 400 V three-phase AC motor for connection to three-point stepping controllers. Transit times range from 18 s to 144 s. The standard versions include a mechanical hand-wheel.

The following limit switches and signaling components are included in the standard actuator:

- Two torque-dependent limit switches
- Three travel-dependent limit switches

Optional electrical equipment:

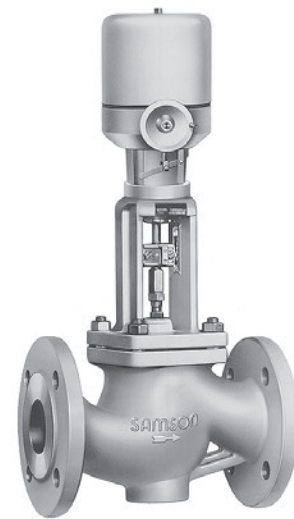
- Brake motors (required for positioners)
- One or two resistance transmitters 100, 200 or 1000  $\Omega$
- One electronic position transmitter with an output signal from 0/4 to 20 mA
- One positioner with input signals from 0/4 to 20 mA or 0 to 10 V

### Versions

Standard version with surface-cooled squirrel-cage motor for 230 V AC or 400 V three-phase alternating current.

Equipped with two torque-dependent limit switches and three travel-dependent limit switches. Motor with temperature monitor (optional for Type SAM -01 to -23).

- **Type SAM -01 and SAM -1x** · Electric actuator with 30 mm rated travel and thrusts from 2 kN (SAM -01 and SAM -10) to 6 kN (SAM -13)
- **Type SAM-2x** · Electric actuator with 30 mm rated travel and thrusts from 6 kN (SAM -20) to 15 kN (SAM -23)
- **Type SAM-3x** · Electric actuator with 60 mm rated travel and thrusts from 6 kN (SAM -30) to 15 kN (SAM -33)
- **Type SAM-4x** · Electric actuator with 60 mm rated travel and thrusts from 15 kN (SAM -40) to 25 kN (SAM -42)



**Fig. 1:** Type SAM Electric Actuator mounted on Type 3241 Globe Valve



**Fig. 2:** Type SAM Electric Actuator mounted on Type 3284 Steam-converting Valve

- **Type SAM-5x** - Electric actuator with 120 mm rated travel and thrusts from 15 kN (SAM -50) to 25 kN (SAM -52)

All actuators are available with the optional electrical equipment described above. See Table 1 to Table 3 for further technical details.

#### Principle of operation

The actuator motor converts the output pulses of the three-step controller into steps of travel. The length of these steps and the direction of rotation depend on the amount and the sign of the control deviation.

The rotary motion of the motor is transferred to the gear wheel by the gearing; the gear wheel is shrunk on a bushing with female thread. The top section of the actuator stem which is provided with the matching male thread engages the female thread. Due to the rotary motion of the gear wheel and bushing, the actuator stem screws into the female thread and performs a lifting, linear motion. The actuators can be adjusted manually after disengagement of the motor.

All versions are equipped with two torque-dependent limit switches and three travel-dependent limit switches. These electrical components are housed below the sealed cover where they are separated from the gearing and protected from moisture and dust. They can be easily accessed after lifting off the cover.

The torque-dependent limit switches (S1 and S2 in Fig. 4) switch off the motor when the adjusted force is reached, e.g. when the valve plug rests against the seat or when the linear motion is obstructed in any way. The three floating travel-dependent limit switches (S3 to S5) issue a limit signal when the adjusted limit values are exceeded. Usually, one switch (S3) is used to limit the travel in the opening direction of the control valve. Whereas the other two switches (S4 and S5) indicate intermediate or end positions.

The electric actuators can optionally be equipped with two resistance transmitters and/or an electronic position transmitter with a 0/4 to 20 mA output signal. They are used for analog remote transmission of the valve position. It is also possible to install a positioner with 0/4 to 20 mA or 0 to 10 V input signals when AC brake motors for 230 V, 50 Hz are used. The installation and start-up for three-phase AC brake motors involve considerably more work because additional external reversing contactors are required.

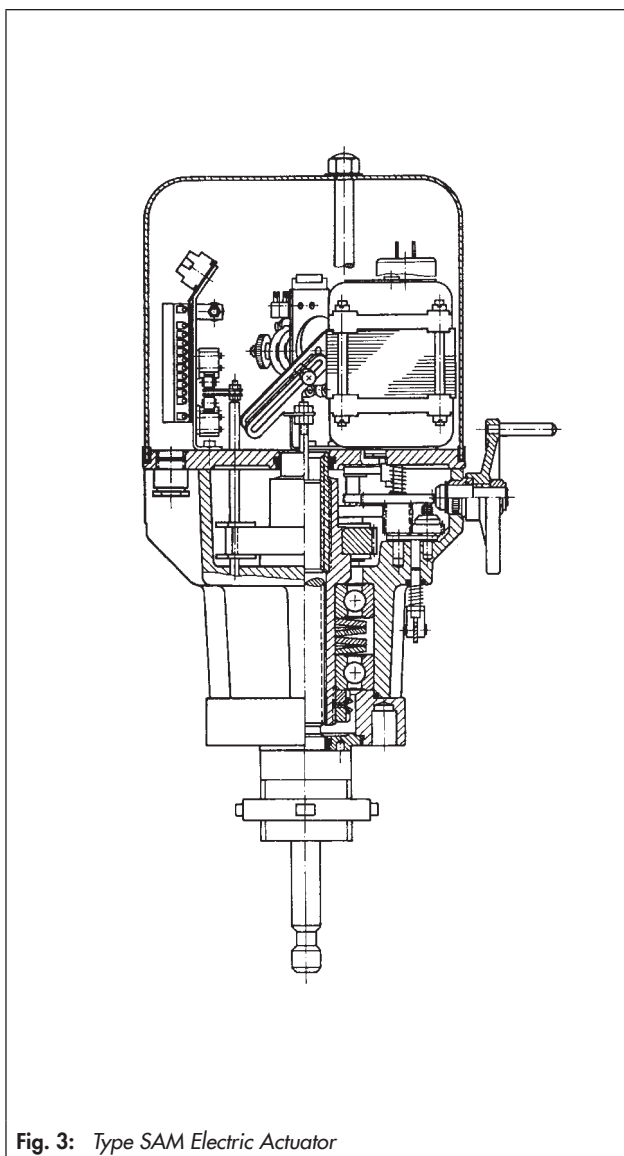


Fig. 3: Type SAM Electric Actuator

**Table 1: Technical data**

Type	SAM-	01	10	11	12	13	20	21	22	23	30	31	32	33	40	41	42	50	51	52
Thrust	kN	2	2	3.5	4.5	6	6	8	12	15	6	8	12	15	15	20	25	15	20	25
Rated travel	Standard	30									60						120			
	Optional	15									30						60			
Stroking speed	mm/min	15	17 · 25 · 50			17 34	13.5 · 25 · 50			13.5 22 40	13.5 · 25 · 50			13.5 22 40	25 · 50					
Connecting thread		M30x1.5									M60x1.5						M100x2			
Degree of protection		IP 65																		
Compliance		<b>CE · EAC</b>																		
Perm. ambient temperature		-20 to +60 °C																		

**Table 2: Electrical connection data**

Type	SAM-	01	10 · 11 · 12		13		20 · 21 30 · 31		22 · 23 32 · 33		23 33	20 · 21 · 22 30 · 31 · 32		23 33	40 · 41 · 42 50 · 51 · 52	
Stroking speed	mm/min	15	17 · 25	50	17	34	13.5	25	13.5	22	50	40	25	50		
Motor and power consumption [A]	230 V/50 Hz	0.029	0.16	0.18	0.16	0.18	0.1	0.225	0.145	0.225	0.7	0.7	0.66	0.93		
	400 V/50 Hz	0.015	0.11	0.08	0.11	0.08	0.062	0.11	0.85	0.11	0.29	0.29	0.4	0.7		
Version		Synchronous motor									Asynchronous motor <sup>1)</sup>					
Temperature monitoring		Only on request, not required									Bimetallic switch					

<sup>1)</sup> Actuators with positioner require brake motors

**Table 3: Electrical equipment**

Standard version	Two torque-dependent limit switches Three travel-dependent limit switches Motor coil with temperature monitor (see Table 2)
Options	One or two resistance transmitters 100, 200 or 1000 Ω One position transmitter with 0/4 to 20 mA output One positioner, 0/4 to 20 mA input; 0 to 10 V input (only with brake or synchronous motor) One heating resistor with temperature monitor

## Electrical connection

The electric actuators can be connected in three ways: 1) internal terminal blocks (standard version), 2) 32-pin terminal blocks in a terminal box or 3) a compact connector. A 10-pin plug insert (silver-plated sockets and pins) is used to connect the motor; a 24-pin unit containing either silver or gold-plated contacts is used to connect the limit switches and signaling equipment.

When a plug connector is used, only one resistance transmitter (R1) can be provided in the event that a fourth travel-dependent limit switch (S6) is required. The travel-dependent limit switch S3 must be adjusted in such a way that the valve travel is restricted in the opening direction by switching off the motor.

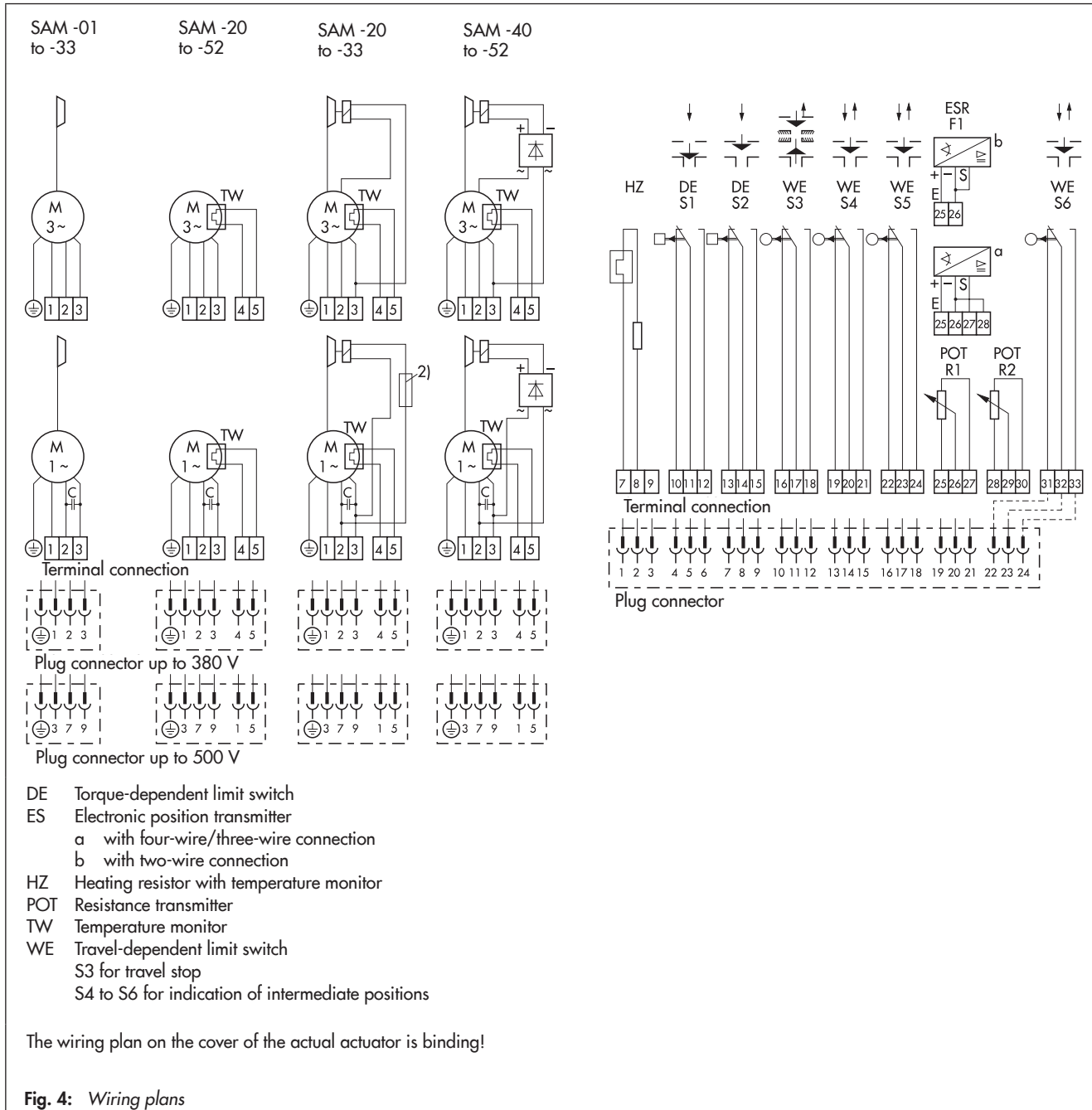


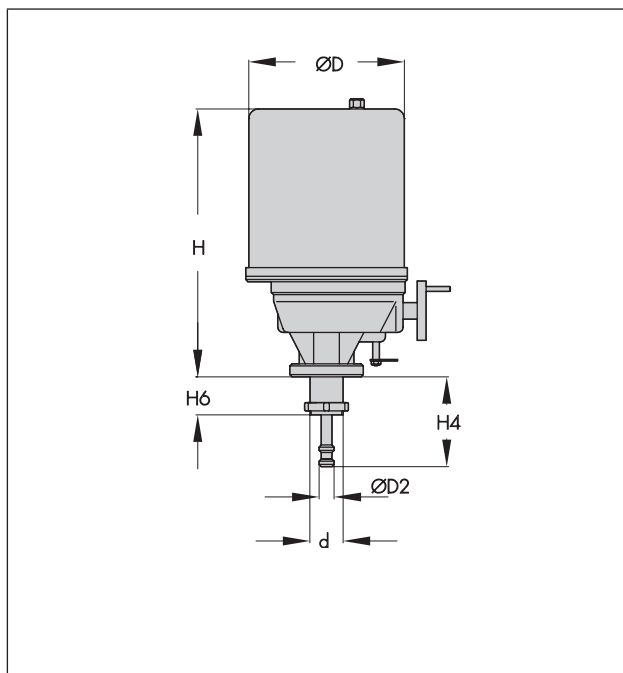
Fig. 4: Wiring plans

**Table 4: Dimensions and weights**

Type	SAM -01 to -13 <sup>1)</sup>	SAM -20 to -23	SAM -30 to -33	SAM -40 to -42	SAM -50 to -52	
Rated travel	30	30	60	60	120	
H	248	319	304	385	395	
H4 max.	90	90	165	165	315	
H6	34	34	54	54	92	
ØD	144	188	188	216	216	
ØD2	16	16	22	22	40	
Ø d (thread)	M30x1.5	M30x1.5	M60x1.5	M60x1.5	M100x2	
Weight (approx.)	kg	5	6	7	15	19

<sup>1)</sup> Without positioner and position transmitter ES, otherwise the same as data for SAM -20

**Dimensional drawing**



**Ordering data**

Electric Actuator	Type SAM-...
AC motor	230 V, 50 Hz
AC brake motor	230 V, 50 Hz
Three-phase AC motor	400 V, 50 Hz
Three-phase AC brake motor	400 V, 50 Hz
Mounted on valve	Type ...
Valve travel	15/30/60/120 mm

**Options**

Resistance transmitter	1 or 2
	100, 200 or 1000 Ω
One electronic position transmitter	
Output	0/4 to 20 mA
One positioner	
Input	0 to 10 V





Specifications subject to change without notice



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