

Electric Actuators type EA15–250



Product description

The electric actuators type EA15, EA25, EA45, EA120 and EA250 are not only excellent equipped, they also feature very high torques ranging from 20 Nm to 250 Nm. This makes it possible to automate a wide range of valves.

Function

Electric actuators are used to operate valves with a swiveling movement from 90° to 180°.

The actuator can be installed on any common valves with an ISO 5211 interface.

The addition of accessories allows the actuator to be used not only as an open/close actuator, but also in continuously controlled operation.

Applications

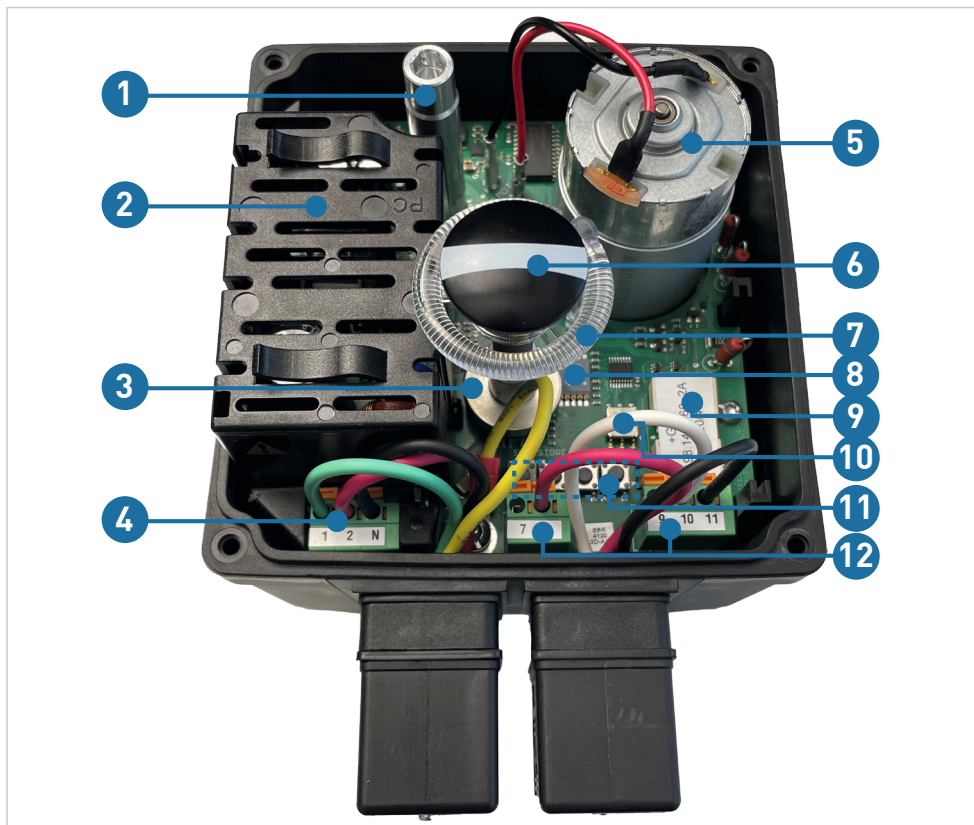
- Chemical process industry
- Water treatment
- Refrigeration

Benefits/features

- Position feedback via relays (open/close/middle)
- Integrated heating element to prevent condensation
- Optical position indicator with LED status monitoring
- Third position between „open“ and „closed“ optional
- Relay output for „ready to operate“ and 7-segment error display
- Integrated emergency manual override with magnetic lock
- Robust PP-GF housing with very good chemical resistance
- Long service life due to robust design and superior electronics
- Flexible configuration thanks to modular concept
- Numerous monitoring and control options
- Simple handling
- Can be used anywhere thanks to universal power supply and standard interfaces

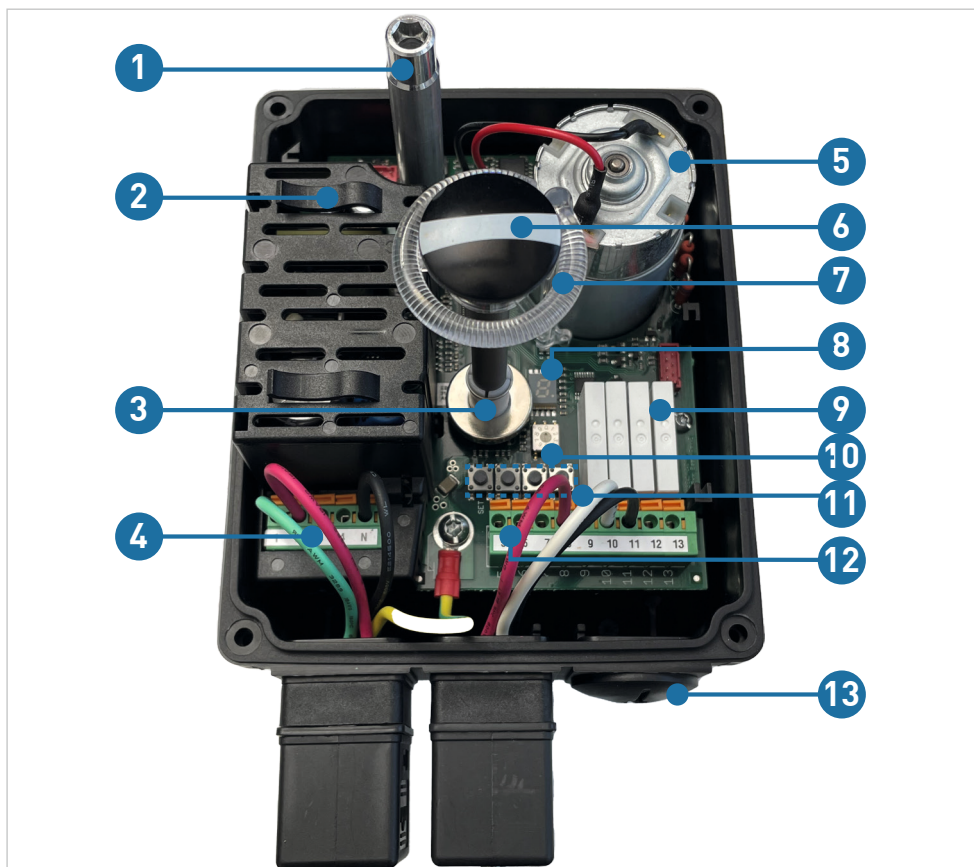
Technical data

The standard version of the EA15 electric actuator consists of the following elements:



- 1 Shaft for emergency manual override
- 2 Power supply unit with contact-protection installed at 230 V version
- 3 Digital position detection
- 4 Control for OPEN/CLOSED
- 5 DC motor
- 6 Optical position indicator
- 7 Light tube for LED status feedback
- 8 7-segment error display
- 9 Feedback via relay for OPEN/CLOSED
- 10 Heating element (temperature threshold regulator)
- 11 Button for end stop adjustment
- 12 Signal output „ready-to-operate“ connection options for DIN plugs (Standard types only) & Cable glands (Standard & cULus types)

The standard version of the EA25/45/120/250 electric actuator consists of the following elements:



- 1 Shaft for emergency manual override
- 2 Power supply unit with contact-protection installed at 230 V version
- 3 Digital position detection
- 4 Control for OPEN/CLOSED/MIDDLE position
- 5 DC motor
- 6 Optical position indicator
- 7 Light tube for LED status feedback
- 8 7-segment error display
- 9 Feedback via relay for OPEN/CLOSED/MIDDLE
- 10 Heating element (temperature threshold regulator)
- 11 Button for end position adjustment
- 12 Terminal block to connect position feedback
- 13 Connection options for DIN plugs (standard types only) or cable glands (standard & cULus types)

Specifications	EA15	EA25	EA45	EA120	EA250
Power input max.*	45 VA	50 VA	70 VA	65 VA	75 VA
Current (calculated)	0.3A at 100V	0.35A at 100V	0.55A at 100V	0.5A at 100V	0.55A at 100V
	0.13A at 230V	0.15A at 230V	0.24A at 230V	0.22A v 230V	0.26A at 230V
	1.7A at 24V	1.7A at 24V	2.5A at 24V	2.3A at 24V	2.7A at 24V
Nominal torque Mdn (peak)**	10 (20) Nm	10 (25) Nm	20 (45) Nm	60 (120) Nm	100 (250) Nm
Duty cycle	40% @ 25°C/ 15min	100 %	50 %	50 %	35 %
Cycle time s/90° at Mdn	5 s	5 s	6 s	15 s	20 s
Flange fitting	F05	F05	F05	F07	F07
Tested cycles (at 20 °C and Mdn)	150 000	250 000	100 000	100 000	75 000
Weight	1.9 kg	2.1 kg	2.2 kg	3.3 kg	5.0 kg
Feedback relays	Bistable change-over contacts; max. 2A at 30V DC	Mono-stable change-over contacts Either max 6A @ 230VAC or 24VDC, no mixed voltage potentials allowed!			
Actuating angle	Max. 355°, set to 90°				
Power Supply	AC: 100 – 230 V, 50/60 Hz				
	AC/DC: 24 V, 50/60 Hz				
Supply voltage tolerance	+15 % / -10 %				
Protection class	IP68 per EN 60529*** Designed for wet & dry locations (NEC), designed for indoor use (UV light may cause discoloration).				
Pollution degree	Operation: Pollution Level 3 Commissioning (open cover): Only in controlled environments of pollution level 2				
Overload protection	Current/time dependent, resetting				
Overvoltage category	II				
Fuse	Internal: SMD fuse 2 A, not replaceable. Req. external breakers on all live wires: Rated Current: max. 16A Trip Curve: C, Standards Compliance: cUL 489, CSA C22.2 No. 5.1, IEC 60947-2				
Ambient temp.	-10 °C to +50 °C (14°F to 122°F)				
Max. installation altitude	2000m above sea level (AMSL)				
Required connecting cable	AWG 18-16, UL/cUL AWM 4486 min. 125°C 600V				
	Cable glands (UL)	Outside diameter 7-12 mm. Mounting torque: 6-8 Nm. Mounting torque: 7 mm cable diameter: 6 Nm; 8 mm cable diameter: 5.5 Nm; 9 mm cable diameter: 4.2 Nm.			
	DIN-connector	Outside diameter 4-9mm.			
Allowable humidity	Max. 90 % relative humidity, non condensing				
Housing material	Housing: PP-GF (POLYFLAM, RPP 4225 CS1) Inspection glass: Udel P-1700 (CL2611)				


* Only for EA25-250: Operating the electric actuator with a charged battery pack and without using an Ethernet interface card will result in a reduction of the maximum input power of 5VA. EA25: 45VA, EA45: 65VA; EA120: 60VA, EA250: 70VA

** EA15-250 electric actuators meet the requirements for a load profile of more than 30% of the maximum torque according to EN ISO 22153 at rated voltage. According to the standard, the duration of the peak torque is 9% of the rotation cycle.

*** Immersion in water with 1m depth for 2 hours.

Compatibility with valves

The actuators have a standard ISO 5211 interface, and can therefore be mounted on all valves that are provided with this interface and the appropriate torques. The assembly using valves from GF Piping Systems with suitable coupling piece and adapter is possible in accordance with the following table:

Valve type	Nominal diameter (mm)	d (mm)	Nominal diameter (inch)	EA15	EA25	EA45	EA120	EA250
								
2-way ball valve Type 546 Pro	DN10-50	20-63	¾"-2"	X	X			
	DN65	75	2½"			X		
	DN80	90	3"			X		
	DN100	110	4"				X	
3-way ball valve Type 543 Pro	DN10-50	20-63	¾"-2"	X	X			
Plastic butterfly valve Type 565	DN50	63	2"			X		
	DN50-125	63-140	2"-5"				X	
	DN150-300	160-315	6"-12"					X
Plastic butterfly valve Type 567/578	DN50-65	63-75	2"-2½"			X		
	DN80-150	90-160	3"-6"				X	
	DN200-300	225-315	8"-12"					X
Metal butterfly valve Type 038/039	DN50-65	63-75	2"-2½"			X		
	DN80-125	90-140	3"-5"				X	
	DN150-300	160-315	6"-12"					X

Electric actuated ball valve types

Type 127

Type 127 ball valves are based on the type 546 Pro ball valve and the EA15 (DN10 – DN50).

Ball valve, electric	Actuator, electric	Ball valve, manually operated	Dimensions	Materials	Standards
Type 127	EA15	Type 546 Pro	DN10 – DN50	PVC-U, PVC-C, PP-h, ABS, PVDF	ISO/DIN, BS ASTM/ANSI, JIS

Type 179 – 184

Type 179 – 184 ball valves are based on the type 546 Pro ball valve and the EA25 (DN10 – DN50), EA45 (DN65 – DN80) or EA120 (DN90 – DN100) electric actuator. The 179 – 184 series is designed for applications with special process requirements.

Ball valve, electric	Actuator, electric	Ball valve, manually operated	Dimensions	Materials	Standards
Type 179	EA25/45/120	Type 546 Pro	DN10 – DN100	PVC-U, PVC-C, ABS	ISO/DIN
Type 180	EA25/45/120	Type 546 Pro	DN10 – DN100	PP	ISO/DIN
Type 181	EA25/45/120	Type 546 Pro	DN10 – DN100	PVDF	ISO/DIN
Type 182	EA25/45/120	Type 546 Pro	DN10 – DN100	PVC-U, PVC-C	ASTM/ANSI
Type 183	EA25/45/120	Type 546 Pro	DN10 – DN100	PVC-U	BS
Type 184	EA25/45/120	Type 546 Pro	DN10 – DN100	PVC-U	JIS

Type 167 – 170

Type 167 – 170 ball valves are based on the type 543 Pro ball valve and the EA25 electric actuator.

Ball valve, electric	Actuator, electric	Ball valve, manually operated	Dimensions	Materials	Standards
Type 167	EA25	Type 543 Pro, horizontal	DN10 – DN50	PVC-U, ABS	ISO/DIN, ASTM/ANSI, JIS
Type 168	EA25	Type 543 Pro, horizontal	DN10 – DN50	PP	ISO/DIN
Type 170	EA25	Type 543 Pro, vertical	DN10 – DN50	PVC-U	ISO/DIN, JIS

Electric actuated butterfly valve types

Type 145 – 147

The type 145 electric butterfly valve is intended for wafer style installation and is adaptable to a variety of applications. With the optional positioner, its functional options range from a simple open/close valve to a precise flow control device.

The type 146/147 electric butterfly valve is intended for lug type or wafer style installation and is adaptable to a variety of applications. With the optional positioner, its functional options range from a simple open/close valve to a precise flow control device.

Butterfly valve, electric	Actuator, electric	Butterfly valve, manually operated	Dimensions	Materials	Standards
Type 145	EA45/120/250	Type 567	DN50 – DN300	All	All standards
Type 146	EA45/120/250	Type 578	DN50 – DN300	All	ISO/DIN
Type 147	EA45/120/250	Type 578	DN50 – DN300	All	ASTM/ANSI

Technical basics

Differentiation of actuators

Compared to the basic EA15 model, the actuator type EA25 has a ready-to-operate signal and a duty cycle of 100 %. The standard version of the EA15 is only equipped with the necessary, but can be complemented with a Fail-safe return unit as an accessory. For the EA25, EA45, EA120 and EA250 is also a monitoring board (with cycle time extension, cycle time monitoring, cycle counter, motor current monitoring) and positioner as accessories available. In addition the EA45, EA120 and EA250 electric actuators are not only well equipped with extras, but also feature very high torques. This makes it possible to automate a wide range of valves. While the EA45 features a peak torque of up to 45 Nm, the EA120 goes up to 120 Nm, and the EA250 peaks at 250 Nm. All actuators are ideally equipped for all kinds of control tasks. The EA25, EA45, EA120 and EA250 can also be equipped with a Profibus and thus easily be integrated into an existing Profibus network.

Operation

The electric actuators are available in 24 V AC/DC versions as well as versions equipped with a 100 to 230 V DC universal power supply. Since everything is transformed to 24 V within the device, accessories are equally suited for all actuators. The end positions are defined via digital position monitoring. If the actuator is to be placed at a 180° opening angle instead of a 90° opening angle, this can simply be redefined by the buttons on the base board.

Overload protection

The power supply unit for the EA15, EA25, EA45, EA120 and EA250 is equipped with overload protection to protect the DC motor and the power supply circuit board from overheating. The overload protection is activated as soon as the load exceeds the torque range. As soon as the load returns to the allowable torque range and the temperature has dropped, the actuator returns to operation.

Heating element

The integrated heating element prevents condensation or icing inside the housing. It starts heating from a preset value depends on the ambient temperature, at which the actuator is operated, and can be set manually.

By default the heating element starts heating from a device temperature of 0°C and switches off at 5 °C. The switch-on threshold can be set within steps of 5 °C up to 40 °C. Then the heating switches off again at 45 °C.

Safety position

In the event of power outage, the actuator remains in whatever position it is in at the time. If in this case the actuator is equipped with the „failsafe return unit“ accessory, it automatically returns to a previously defined safe position (OPEN/CLOSE).

Handling

Installation notes

- If the actuator is connected directly to the power supply, an isolating switch must be installed on site (do not disconnect the ground cable). The wire gauge of the supply line must be between 0.75mm² and 1.5 mm². To prevent water from penetrating into the actuator, make sure that the cable entry is not facing upward.
- The EA25/45/120/250 actuators are equipped with healthy monitoring (ready-to-operate signal).
- When the actuator is first switched on, the power supply capacitor charging may cause current surges for a few microseconds.
- Don't switch power off in end positions. Use e.g. changeover contacts.
- For EA25/45/120/250 only: Actuators must be permanently powered to maintain feedback (otherwise feedback relay will be de-energized).

Maintenance notes

- Inspect regularly to ensure all housing screws are properly installed.
- Ensure that the emergency override cover is installed.
- Check whether the control signal and the visual display match, if not, readjust the end positions.



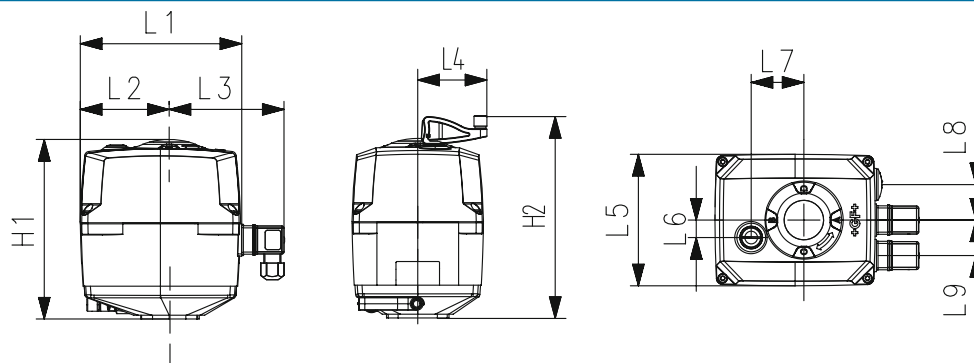
Installation and maintenance must be performed as specified in the installation manual. The document is provided with the product, see also the online catalog at www.gfps.com

Installation tips

- Max. connection wire gauge: 1.5 mm²; Min. connection wire gauge 0.75mm²
- Fuse rating: > 6 A
- Install control and signal lines in separate cable conduits

Dimensions

Actuator dimensions



EA	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	L5 (mm)	L6 (mm)	L7 (mm)	L8 (mm)	L9 (mm)	H1 (mm)	H2 (mm)
EA15	122	83	77	64	122	16	49		33	137	158
EA25	150	83	108	64	122	16	49	33	33	167	189
EA45	150	83	108	64	122	16	49	33	33	167	189
EA120	150	83	108	64	122	16	49	33	33	190	212
EA250	150	83	108	64	122	16	49	33	33	200	221

	2-way	3-way horizontal (L)	3-way vertical (L)
Actuating angle	0° - 90°	0° - 90°	0° - 180°
Valve position 1	A - B (OPEN) See image	A - C (Flow right side, outlet to the front) See image	B - C (Flow left side, bottom outlet) See image
Valve position 2	C - D (CLOSE)	B - C (Flow left side, outlet to the front)	A - C (Flow right side, bottom outlet)

By teaching in a „Middle position“ different possibilities can be achieved depending on the valve and the application. For example:

- 2-way ball valve: Middle position describes a position, permitting no 100% flow but for instance only half as strong.
- 3-way ball valve: Middle position describes a position of the ball in which both passages are slightly opened.
- 3-way ball valve: Middle position describes a position of the ball which closes both passages.

Ball valve and ball-type	3-way horizontal (L-ball)	3-way horizontal (L-ball)	3-way vertikal (L-ball)
Function of the middle position	CLOSE (on both sides no flow)	„Mixing“ (both passages slightly opened)	CLOSE (on both sides no flow)
Actuating angle	0° - 180°	0° - 90°	0° - 180°
Position 1	A - C (OPEN right)	A - C (OPEN right)	B (-C) (OPEN left)
Position 2	B - C (OPEN left) 90°	A/C - B/C (partly opened) 45°	(C-) D (CLOSE) 90°
Position 3	B - D (CLOSE) 180°	B - C (OPEN left) 90°	A (-C) (OPEN right) 180°

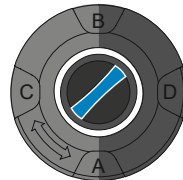
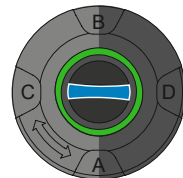
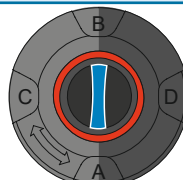
(Function of the middle position as „Mixing“ with the 3-way ball valve vertical is only possible with the T-ball)

LED status feedback

The LED status feedback shows the valve positions and the current status of the actuator.

The following table shows the colour assignment of the LED:

Color	Meaning
Red	Open
Green	Closed
White	Middle
Flashes white	Actuator moves
Flashes yellow	Error
Flashes blue	Adjustment mode
Green/yellow	Setpoint value reached (at positioner)
Turquoise	Adjustment run / operation of colour inversion



If the plant standard requires an inversion of the colour assignment, the customer can adjust this afterwards.

Accessories

EA15 / EA25 / EA45 / EA120 / EA250:

- Failsafe return unit
Battery incorporated into the housing for moving to a safe position in case of power outage (open or closed).

EA25 / EA45 / EA120 / EA250:

- Positioner
For continuous valve control with 4 – 20 mA or 0 – 10 V and 4-20mA Feedback
- Monitoring board
 - Cycle time extension
 - Cycle time monitoring
 - Cycle counter
 - Motor current monitoring
- Fieldbus connection
 - Modbus RTU Interface board
 - Profibus DP auxiliary card
 - AS interface module



For further information on accessories, refer to Planning Fundamentals, chapter on “Accessories for Electrical Actuators”, and the online product catalog at www.gfps.com