Electric Actuator
EA25-250

General

- **Nominal Torque:** 10-100 Nm
- **Peak Torque:** 25-250 Nm
- **Actuator Housing**: Glass-filled PP
- **DIN Plug Connection:** Cable gland
- **Manual Override**: Integrated
- **End Stops**: Open, close, programmable middle position
- **Position Indicator**: LED, optical, integrated
- **Position Feedback**: Open, close, middle
- **Heater**: 10 position adjustable
- **Protection Class:** IP67

Optional Features

- **Positioner**: Current, voltage
- **Network**: Profibus DP
- **Fail Safe Return**: Battery back up, externally powered board
- **Smart Module**: Cycle monitoring, cycle counter, cycle time extension, motor current monitoring
- **Manual Loading Station**: Local control box

Sample Specification

The EA25-250 shall be partial a turn electric actuator utilized in either open/close or modulating applications. Position detection components shall be of solid state design with three programmable end stops available and each end stop shall utilize a monostable relay for position feedback. End stops shall be adjustable via a series of push buttons. An internal adjustable heater shall be integrated and utilize a temperature sensor within the actuator housing. A 7 segment display shall communicate fault status. Optical position indication shall be integrated and reinforced with a color specific LED. All actuators shall be manufactured under ISO9001 for Quality and ISO14001 for Environmental Management.

Actuator Certifications/Compliance

- Machinery Directive 2006/42/EC, Annex II B
- EMV Directive CE 2004/108/CE
- EMV VDE 0843 Section 20
- Low Voltage Directive CE 2006/95/CE
- Vibration Testing EN 60068-2-6
- Actuators for Industrial Valves EN 15714-2

Key Design Features

Overload Protection

The motor's power supply features overload protection by monitoring its current draw, which is directly proportional to applied load and will shut down the actuator if the applied load exceeds the rated torque. The actuator will automatically regain functionality once the applied load is reduced.

Middle Position

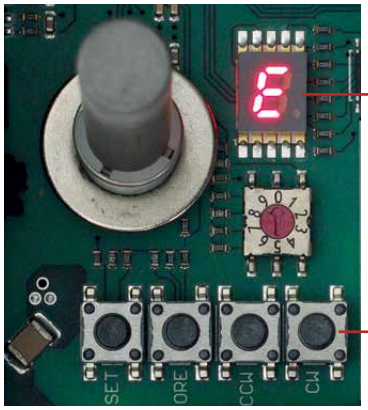
The programmable middle position allows an operator to utilize a third end stop and feedback position. The middle position can be any rotational point between the open/close end stops. The middle position feedback signal and control signal operate independently so the feedback signal can be utilized with two position actuators to alert that a specific point in the actuator's cycle has been reached.

Actuator Status Indication

An LED light tube illuminates in several different colors to communicate different actuator status' to an operator. A list of actuator status indications is shown below, please note that this list does not include some maintenance/setup color patterns.

LED Indication

Color	Indication
Red	Actuator in OPEN position
Green	Actuator in CLOSED position
White	Actuator in MIDDLE position
Flashing White	Actuator cycling
Flashing Yellow	Fault present
Flashing Blue	Actuator in learning mode
Green/Yellow	Positioner setpoint value reached
Turquoise	Adjustment run/color inversion operation



7 Segment Display

A display screen on the actuator's main board clearly communicates actuator and accessory fault status to greatly simply trouble shooting and ease of operation.

Push Buttons

A series of push buttons on the actuator's main board (set, store, CCW and CW) allow an operator to easily adjust end positions, invert LED position indication colors, manually jog the actuator and several other functions with simple, clear programming logic.

Heater

An adjustable heater is integrated into the EA25-250 in order to protect the actuator subcomponents in cold applications and to prevent water from condensing inside the actuator housing in humid environments. The heater will turn on when the actuator's internal temperature reaches a designated value and turn off after it has heated to a designated value. These parameters can be adjusted by rotating the arrow on the dial selector shown below.

Heater Options

Dial Setting	Heater Turned On (°F)	Heater Turned Off (°F)
0 (default)	32	41
1	41	50
2	50	59
3	59	68
4	68	77
5	77	86
6	86	95
7	95	104
8	104	113
9	104	113

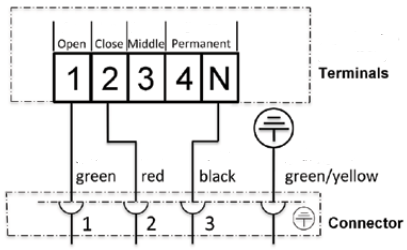
Actuator Technical Data

	EA 25	EA 45	EA 120	EA 250
Nominal Output Torque (Nm)	10	20	60	100
Peak Output Torque (Nm)	25	45	120	250
Rated Voltage	100- 230VAC, 50/60 Hz 24VAC/DC, 50/60Hz			
Cycle Time	5s/90°	6s/90°	15s/90°	20s/90°
Rated Cycles at 70°F	250,000	100,000	100,000	75,000
Weight (lb)	4.6	4.8	7.9	11
Actuating Angle	Standard set at 90°, max. 355°			
Housing Material	Glass-filled PP			
Position Feedback	Monostable, changeover contacts 230V, 6 Amp			
Emergency Manual Override	Integrated			
Fuse	SMD fuse 2A, not replaceable			
Rated Voltage Tolerance	+/- 15%			
Rated Output	35VA @ 100-230VAC 40VA @ 24VAC/DC	55VA @ 100-230VAC 60VA @ 24VAC/DC	50VA @ 100-230VAC 55VA @ 24VAC/DC	60VA @ 100-230VAC 65VA @ 24VAC/DC
Calculated Current Draw	0.35A @ 100VAC 0.15A @ 230VAC 1.7A @ 24VDC	0.55A @ 100VAC 0.24A @ 230VAC 2.5A @ 24VDC	0.5A @ 100VAC 0.22A @ 230VAC 2.3A @ 24VDC	0.55A @ 100VAC 0.26A @ 230VAC 2.7A @ 24VDC
Duty Cycle	100%	50%	50%	35%
Protection Class	IP 67 per EN 60529 UL/CSA: For interior use Nema 4X			
Impact Class	IK06 according to IEC62262			
Overload Protection	Resetting, current-time dependant (1)			
Overvoltage Category	Category II according to DIN EN 61010-1			
Power Connection	Connector plug 3 P+ E per DIN EN 175301-03			
Pollution Grade	Grade 2 according to DIN EN 61010-1			
Maximum Elevation	6561 feet			
Ambient Temperature	14° to 122°F (2)			
Allowable Humidity	90% relative humidity, non condensing			

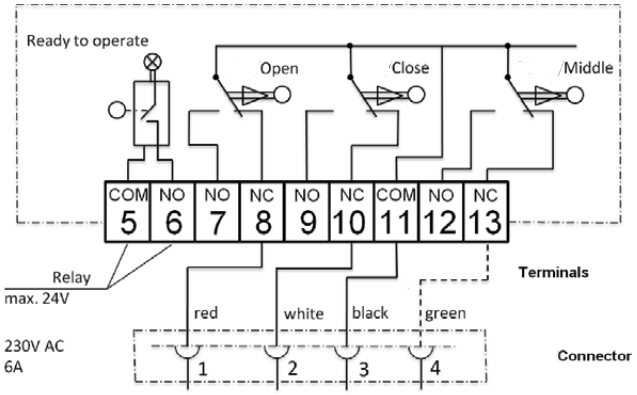
(1) Overload protection of the motor is dimensioned so that the motor and the power supply board are protected. As soon as the load is within the torque range, the actuator will begin operating again.
(2) At temperatures below 14°F and if there is condensation, the heating element should be activated.

Wiring Diagrams

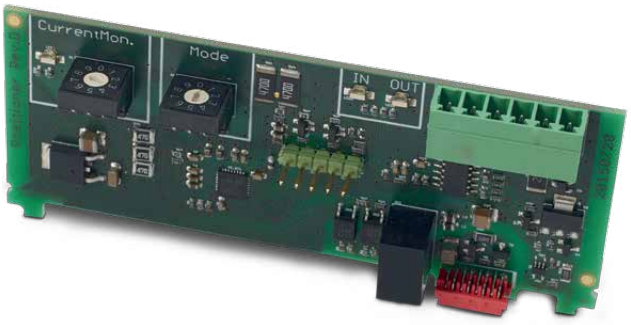
Control



Feedback



Positioner Board



Positioner Board

The EA25-250 Positioner Board is easily installed and does not require the operator to perform a learning run once a new unit is installed or after the ends stops are adjusted because the position sensor within the actuator assembly can automatically span the control signal and self configure the positioner to allow for immediate use. The positioner board also features a current monitor to allow an operator to regulate any increases in operating torque.

Monitor Board

Monitor Board

The EA25-250 Monitor Board allows an operator to set specific parameters under which an actuator will function. It features a current monitor, cycle time monitor and cycle counter, all of which will cause the actuator to communicate a fault when one of the monitor board setpoints has been reached. The monitor board also features a cycle time extension which simply increases the cycle time of an actuator.

Position Board Input/Output Options

Dial Setting	Input	Output
0 (default)	4 - 20mA	4 - 20mA
1	0 - 10V	4 - 20mA
2	4 - 20mA (Inverted)	4 - 20mA
3	0 - 10V (Inverted)	4 - 20mA
4	4 - 20mA	4 - 20mA (Inverted)
5	0 - 10V	4 - 20mA (Inverted)
6		No function
7	-	4 - 20mA
8	-	4 - 20mA (Inverted)
9		No function

Positioner Board Current Monitor Setpoints

Dial Setting	EA25 (mA)	EA45 (mA)	EA120 (mA)	EA250 (mA)
0	25	25	50	50
1	100	300	300	400
2	150	350	400	500
3	200	400	500	600
4	250	450	600	700
5	300	500	700	800
6	400	600	800	1000
7	500	700	900	1200
8	600	900	1000	1500
9 (factory)	700	1100	1200	1800

Current Monitor Setpoints

Dial Setting	EA25 (mA)	EA45 (mA)	EA120 (mA)	EA250 (mA)
0	25	25	50	50
1	100	300	300	400
2	150	350	400	500
3	200	400	500	600
4	250	450	600	700
5	300	500	700	800
6	400	600	800	1000
7	500	700	900	1200
8	600	900	1000	1500
9 (factory)	700	1100	1200	1800

Cycle Time Monitor Setpoints

Dial Setting	EA25 (sec)	EA45 (sec)	EA120 (sec)	EA250 (sec)
0	8	7	20	30
1	11	10	30	40
2	14	13	35	45
3	17	16	40	50
4 (factory)	20	19	45	55
5	23	22	50	60
6	26	25	55	65
7	29	28	60	70
8	32	31	65	80
9	36	34	70	90

Cycle Time Extension Options (per 90°)

Dial Setting	EA25 (sec)	EA45 (sec)	EA120 (sec)	EA250 (sec)
0 (default)	7	7	25	27
1	10	10	28	35
2	13	13	32	40
3	15	15	38	45
4	18	18	42	50
5	20	20	48	55
6	23	23	52	60
7	25	25	58	65
8	28	28	62	70
9	30	30	67	75

Cycle Counter Setpoints

Dial Setting	EA25-250 (Count)
0	1
1	10,000
2	20,000
3	30,000
4 (factory)	40,000
5	50,000
6	75,000
7	100,000
8	150,000
9	200,000

Profibus Board

- **Actuator Voltage:** 100-230VAC, 24V
- **Protocol:** DP-V0
- **Baud Rate:** 9600-1.5M
- **Connection:** M12 (male and female)
- **Factory Address:** 126
- **Optional Addresses:** 1-125

Digital Output: Master→Slave

Signal Type/Byte	Bit	Action	Parameter
EACON Electric Actuator Control Byte	Bit 0	Off	close
	Bit 1	On	open
	Bit 2	Middle	middle
	Bit 3	Stop	stop
	Bit 4	Positioner active	positioner_enabled
	Bit 5-7	Reserved	reserved
ACKRST	Bit 0	Confirm error	err_ack
	Bit 1	Reset cycle counter	cycle_cntr_reset
	Bit 2-7	Reserved	reserved
POSSET	Bit 0-7	Setpoint for positioner from 0-100%, when position regulator is active	0... 100 setpoint range 0= close, 100= open 101... 255= invalid value

Digital Output: Slave→Master

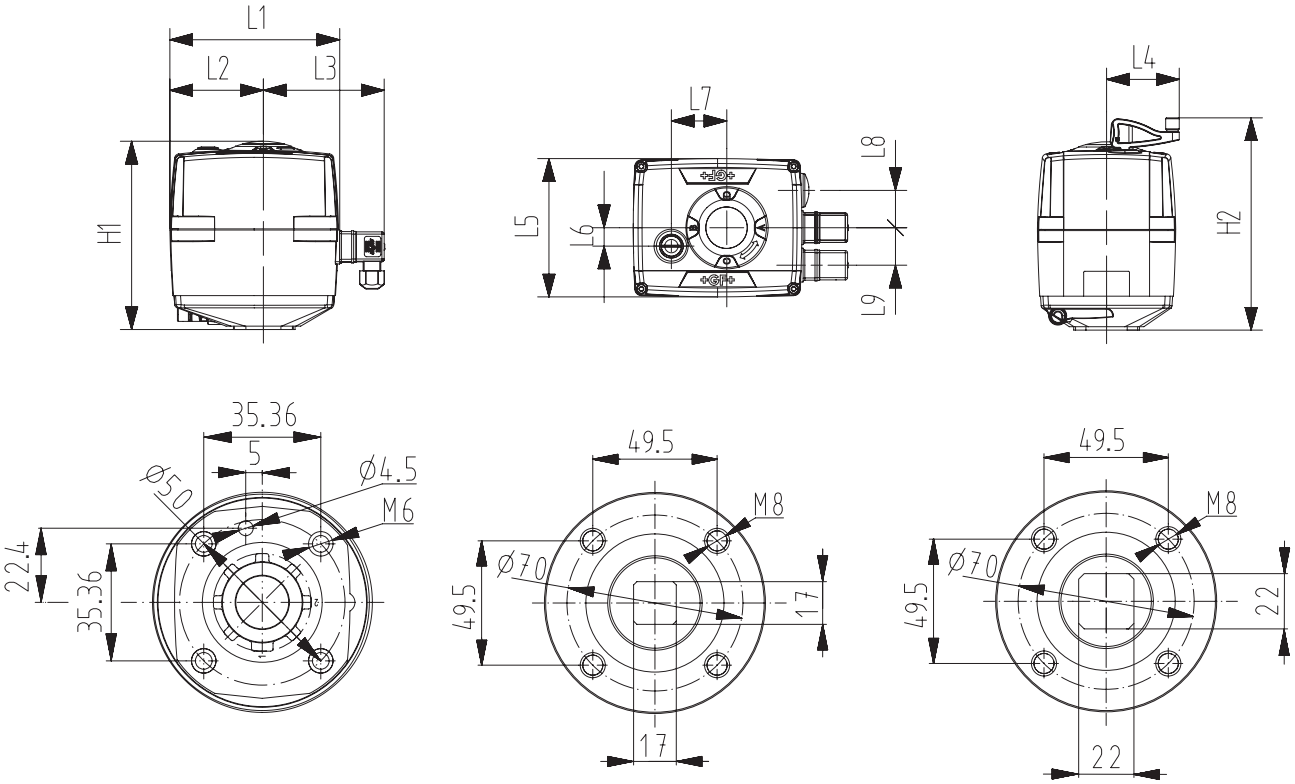
Signal Type/Byte	Bit	Action	Parameter
TYPVLT	Bit 0-3	0= EA25, 1= EA45, 2= EA120, 3= EA250	ea_type
	Bit 4-7	0= 24V, 1= 100-230VAC	ea_voltage
STATE	Bit 0	Feedback close	limit_switch_close
	Bit 1	Feedback open	limit_switch_open
	Bit 2	Feedback middle	limit_switch_middle
	Bit 3	Actuator moving	actuator_moving
	Bit 4	Teaching active	teaching_active
	Bit 5	Ready to operate	ready_relay
	Bit 6-7	Reserved	reserved
POSACT	Bit 0-7	Actuator value from 0-100% 0= closed, 100= open, 101...255= not valid	position_actual_value
CURRENT	Bit 0-15	Absolute value motor current (mA)	motor_current
TEMP	Bit 0-7	Temperature at sensor in actuator (°C)	temperature_base
CYCLES	Bit 0-31	Numbers plug-in cycles since last reset	cycle_counter
ERRFLAGS	Bit 0	Voltage too low	undervoltage
	Bit 1	Temp too high	over_temp_case
	Bit 2	Cycle too long	max_positioning_time
	Bit 3	Heating out of order	heating
	Bit 4	Error position detected	position_detection_fail
	Bit 5	Position not specific	position_out_of_range
	Bit 6	Override is activated	manual_actuation
	Bit 7	No communication with accessory	accessory_no_reply
	Bit 8	Fail-safe unit activated	powerfail_action
	Bit 9	Battery voltage <50%	powerfail_accu_lvl_warn
	Bit 10	Battery defect	powerfail_accu_defect
	Bit 11	Restard EA via Watchdog recovery	watchdog_recovery
	Bit 12	Motor current monitor tripped	motor_current_overflow
	Bit 13	Error motor driver	mot_driver_overload
	Bit 14-31	Reserved	reserved

Fail-safe Return Module

The EA25-250 Fail-safe Return Module is available with or without an integrated battery pack. The version with the battery pack features two small but powerful batteries that are secured to a module board that easily fits inside the actuator housing. No external wiring is required and the batteries charge by utilizing the actuator power. The batteries hold enough power to cycle the actuator several times but it is not recommended to use the Fail-safe Return Module as the main power source to cycle an actuator. The version without the battery pack is designed so that several actuators can be powered by a single external 24VDC battery bank. Both module types are installed on the actuator the same way and feature a dip switch so that the operator can choose between fail-safe to open or fail-safe to close functionality.

Dimensions

The following tables are shown in millimeters unless otherwise specified



EA25/45 Base **EA120 Base** **EA 250 Base**

EA25-250

Type	ISO	H1	H2	L1	L2	L3	L4	L5	L6	L7	L8	L9
EA25	F05	167	189	150	83	108	64	122	16	49	33	33
EA45	F05	167	189	150	83	108	64	122	16	49	33	33
EA120	F07	190	212	150	83	108	64	122	16	49	33	33
EA250	F07	208	230	150	83	108	64	122	16	49	33	33