

Features

- Fail safe return upon loss of power
- Programmable fail safe position (open, close, user-defined)
- Super capacitor recharges in seconds
- Quarter-turn operation (90°)
- Faster cycle times
- Highly visible multi-color LED indicator
- 100% duty cycle per IEC 60034-1
- Tested to 70,000+ cycles
- Heavy duty brushless DC motor with over temp/over current/motor stall protection
- Precision non-contact position sensors for precise control and zero wear
- Three programmable relays with OPEN/CLOSE/FAULT and 14 additional output signals
- Valve position, capacitor charge status, and fault codes via LED display
- Remote operation (normal) or local operation via keypad
- Non-intrusive wiring installation includes two 1 meter long shielded multi-conductor cables
- Separate motor and control circuits
- Dry contact circuit control wiring
- Inching or continuous mode operation
- Programmable end-of-stroke speed control to reduce/ eliminate water hammer
- Thermostatically controlled anti-condensation heater
- Manual override
- CSA listed per UL 429 and CSA 22.2
- Type IP 67 weatherproof enclosure
- ISO 5211 multi-flange valve mounting pad
- Corrosion protection per ISO 12944 C3-02

Applications

Valworx Surpass safe return actuators are typically used to automate quarter turn (90°) valves and dampers. The 5900 series is quick and easy to install and wire using the ISO 5211 standard multi-flange mounting and double square output drive and included power/signal cables. Extra deep output shaft bore accommodates stems, bushings and adapters.

The motor circuit wiring is separate from the control and feedback circuits. Dry contact devices are used to control the actuators, making the actuator suitable for use with appropriate float switches, dry contact PLCs, building automation controllers and similar devices.

Construction

Enclosure	Triple layer epoxy polyester powder coated aluminum alloy, Type 4X/ IP67
Output Drive	ISO5211 aluminum alloy, female double square
Visual Position Indicator	High visible multi-color LED indicator
Gear Drive	Heat treated steel. Self locking, additional brake not required
Fasteners	Stainless Steel
Electrical Connections	Conduit cable
Manual Override	Hex wrench (59002X & 59005X); Allen wrench (59006X); Handwheel (59008X & 59009X)
Output Relays	3 Programmable Relays, 0.8A/ 110 VAC, 0.5A/ 250VAC, 1.0A/ 30VDC



Description

Feature-rich programmable fail safe position quarter-turn actuators, including fail closed (default), fail open or fail to a user-defined position. Rated for 100% duty cycle per IEC 60034-1. Tested to over 70,000 cycles. LED position indicator displays R/Y/G for close/fault/open, and Blue/White for mid-stroke/partial stroke position. Actuator can be controlled locally via the included push button panel and digital display. Fault codes can be accessed via the digital display or via three programmable relays. The relays can also be set to output any of 17 different parameters. Default setting is OPEN/CLOSE/FAULT. Control circuit is dry contact only for simpler wiring and improved safety. Weatherproof IP 67 enclosure. Actuators tested and certified to rigorous UL and CSA standards and also comply with CE marking requirements. Vibration tested (1.5g, 5- 1200Hz in X/Y/Z directions for 48 hours). Contactless position sensors for high accuracy and zero wear.

Programmable end-of-stroke speed control to reduce/eliminate water hammer. Self-locking gear drive eliminates the need for an external brake. Thermostatically controlled anti-condensation heater is standard and will help protect against condensation build-up inside the actuator.

Approvals

- CE– EN 60730-1:2016; EN IEX 60730-2-14:2019
- CSA Listed per UL429 and CSA C22.2 No. 139-13
- RoHS Directive (EU) 2015/863– 2011/65/EU



Standards

- Weatherproof IP 67 per NEMA6P
- Corrosion protection per ISO 12944 C3-02
- Duty cycle per 60034-1

Construction Features

Valve position and fault codes via LED display

Highly visible multi-color LED indicator

Thermostatically controlled anti-condensation heater

Triple layer epoxy polyester powder coating on aluminum Type 4X/ IP67 weatherproof enclosure

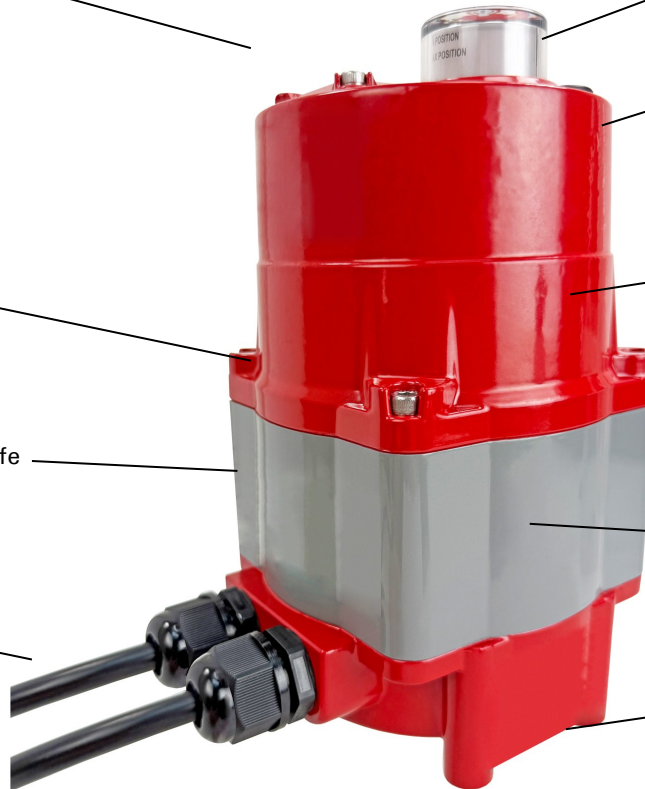
Heavy duty brushless DC motor with over temp/over current/ motor stall protection

Super capacitor bank for fail-safe operation

Super capacitor bank recharges in seconds

Separate power/control and feedback cables for non-intrusive wiring

ISO 5211 multi-flange



Temperature

Temperature Range: -13°F to 149°F (-25°C to 65°C)

Note: 0-90° operation

0° Closed

90° Open



Note: The safe return option returns the valve to a fail-safe position in the event of a loss of electrical power. It is not intended and should not be used for normal operation

Typical Applications



5910 Series



5955 Series



5940 Series

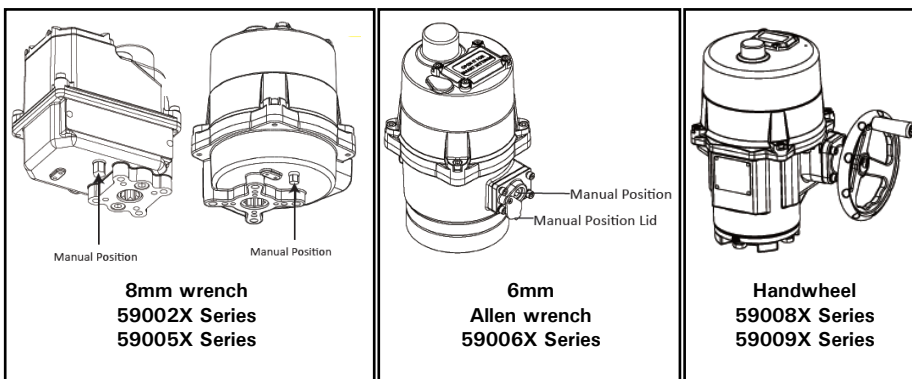
Operation

Safe return actuator fails to closed, open or user-set position upon loss of power. Operation is programmable in continuous mode (a signal pulse triggers continuous operation until full open or close) or inch mode (a signal pulse runs the motor for the duration of the pulse). Factory setting is continuous mode. Upon loss of power the actuator returns to the pre-determined safe position. Upon restoration of power, the actuator remains in the fail-safe position until receipt of an external control signal. The motor circuit is at line voltage and is separate from the control circuit. Open/close control signals are made via dry contacts making the circuit between the appropriate terminal points (see wiring diagram). External control voltage should not be applied to the control terminals. Normal operation is via remote signal, but the actuator can also be operated locally using the push button controls on the digital display.

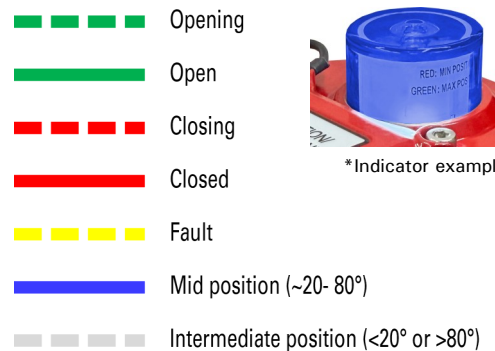
End-of-stroke speed can be slowed to reduce water hammer. Contact Valworx technical support for more details.

NOTE: DO NOT APPLY VOLTAGE TO CONTROL CIRCUIT TERMINALS. USE DRY CONTACT ONLY.

Manual Override



LED Position Indicator



Digital Display/ Control



Fault Code Table

Error Code	Error Type	Specification	Solution	Remarks
Er-01	Over Temperature	Temperature exceeds the max	Reduce ambient and/or media temperature. Add high temp bracket	
Er-03	Current Overloaded	Current exceeds 1.3x the rated current	Replace with larger size actuator	
Er-06	Motor Stalling	Stalling lasts more than 3 seconds	1) Check if actuator works correctly without valve 2) Check valve torque manually	Replace actuator or valve as appropriate
Er-08	Position Sensor Malfunction	Fail to detect encoder position	Contact Valworx	59006X; 59008X; 59009X Series Ony
Er-13	Mechanical Error	Actuator transmission fail	Contact Valworx	

Programmable Relays

The three feedback relays can be programmed to output any of 17 different parameters (one per relay). Default is OPEN/CLOSE/FAULT. See table for a listing of all parameters. Contact Valworx technical support to change the default settings.

Rated relay output is 0.8A/110 VAC, 0.5A/250 VAC, 1.0A/30 VDC

	Relay	Output Signal	Information
1	Invalid	No output signal	
2	Full Open	Valve is fully open	
3	Full Close	Valve is fully closed	
4	Middle Position	Actuator in middle position	User defined
5	In Service	Actuator is in operation	
6	Error	An error occurs	Set when any error code trips
7	Motor Stalling	Actuator motor stall fault occurs	
8	ESD	N/A	Reserved for units with BUS card control
9	Overheat	Temperature exceeds set protection range	
10	Signal Lost	N/A	Reserved for modulating units
11	Over Torque	Torque has exceeded the rated torque	
12	Open or Close	Valve is fully open or fully closed	
13	Full Open Delay	Delayed after the valve is fully open	Adjustable delay time: 0-1200 seconds
14	Full Close Delay	Delayed after the valve is fully closed	Adjustable delay time: 0-1200 seconds
15	Mid-Position Delay	Delayed when in middle position	Adjustable delay time: 0-1200 seconds
16	Full Battery	Battery is fully charged	
17	Local	Actuator is in local control mode	

Specifications

Stock Number	Torque Nm in lbs		Voltage AC (50/60Hz) or DC	Current F.L. Amps	Cycle Time/90° (seconds)	Duty Cycle	Valve Mounting ISO5211	Output Drive (mm)	Enclosure Type	Weight (lb/kg)
ELECTRIC ACTUATORS (BSR)										
590023	20	177	110 VAC	0.32	11	100	F03/F05	11	4X / IP67	3.1 lb/ 1.4 kg
590024	20	177	24 VDC	0.7	11	100	F03/F05	11	4X / IP67	3.1 lb/ 1.4 kg
590053	50	442	110 VAC	0.65	12	100	F03, F05, F07	14	4X / IP67	4.6 lb/ 2.1 kg
590054	50	442	24 VDC	1.4	12	100	F03, F05, F07	14	4X / IP67	4.6 lb/ 2.1 kg
590063	100	885	110 VAC	0.65	18	100	F05, F07	22	4X / IP67	8.4 lb/ 3.8 kg
590064	100	885	24 VDC	1.4	18	100	F05, F07	22	4X / IP67	8.4 lb/ 3.8 kg
590083	300	2655	110 VAC	2.2	15	100	F07, F10	22	4X / IP67	27.2 lb/ 12.4 kg
590084	300	2655	24 VDC	4.0	15	100	F07, F10	22	4X / IP67	27.2 lb/ 12.4 kg
590093	600	5310	110 VAC	2.2	30	100	F10/F12	36	4X / IP67	52.3 lb/ 23.8 kg
590094	600	5310	24 VDC	4.0	30	100	F10/F12	36	4X / IP67	52.3 lb/ 23.8 kg

Wiring

Valworx 5900 series actuators are supplied with two color-coded multi-conductor cables- one for power/control and one for feedback. The enclosure does not need to be opened to wire the unit. The unit is actuated by an external dry contact relay making a circuit with the appropriate control points. Three feedback relays can be programmed to output any one of 16 parameters. Default is OPEN/CLOSE/FAULT. Refer to the Output Relay table for more information.

Power should be maintained to activate the internal heater. The internal heater will help prevent condensation build-up inside the actuator.

The feedback cable may be replaced with a plug (P/N 591890) if it is not used.



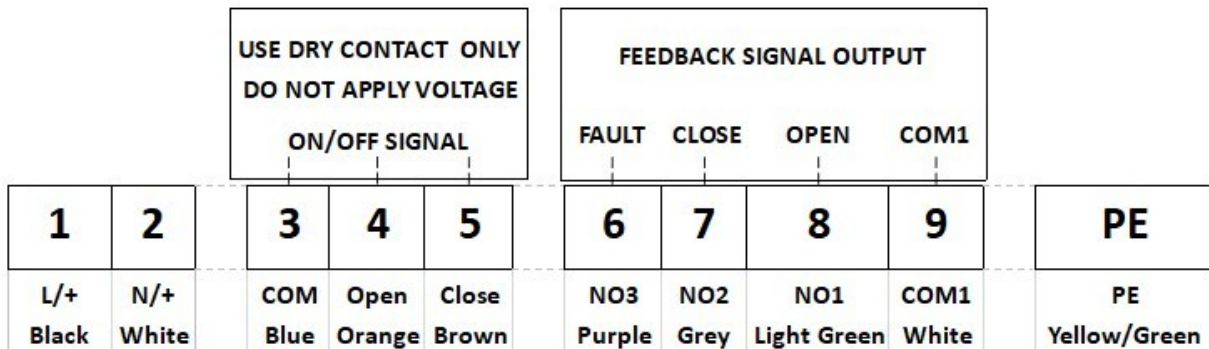
PRIOR TO WIRING, CONFIRM THE ACTUATOR VOLTAGE IS CORRECT. APPLYING THE WRONG VOLTAGE WILL DAMAGE THE ACTUATOR AND VOID THE WARRANTY



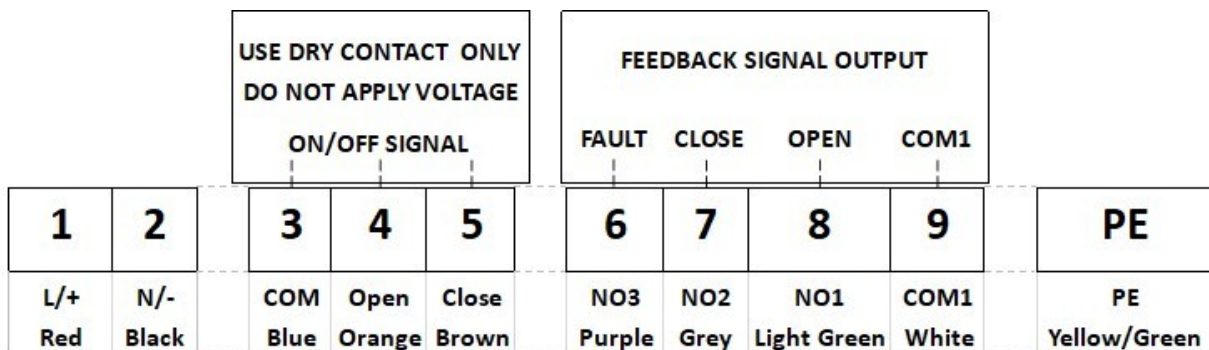
NOTE: THE CONTROL CIRCUIT WIRING IS DRY CONTACT ONLY. DO NOT APPLY VOLTAGE TO THE CONTROL CIRCUIT TERMINALS. DOING SO WILL DAMAGE THE UNIT AND VOID THE WARRANTY.

Wiring Diagrams

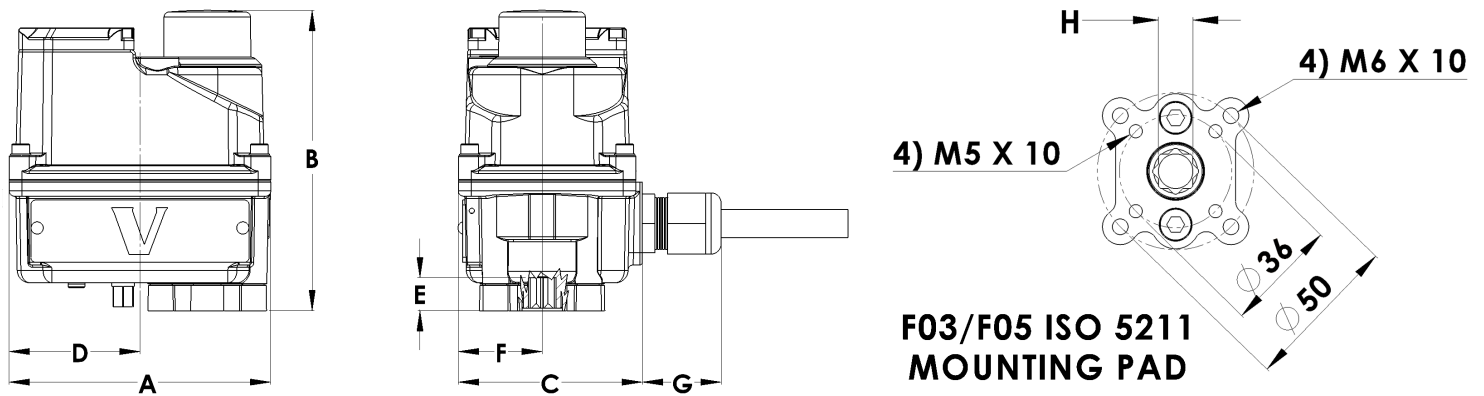
AC Voltage Wiring Diagram



DC Voltage Wiring Diagram

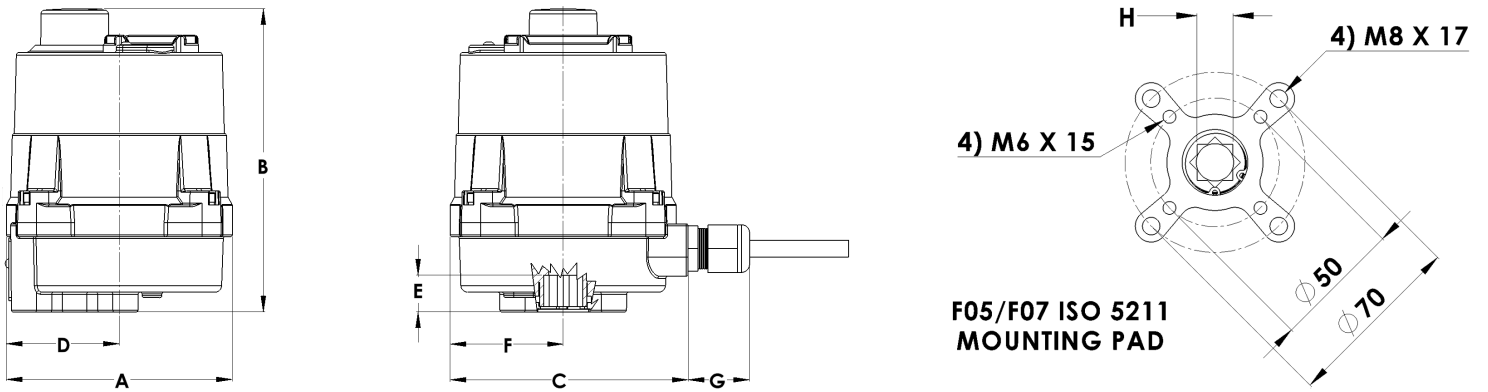


Dimensions– 20Nm (Series 59002X)



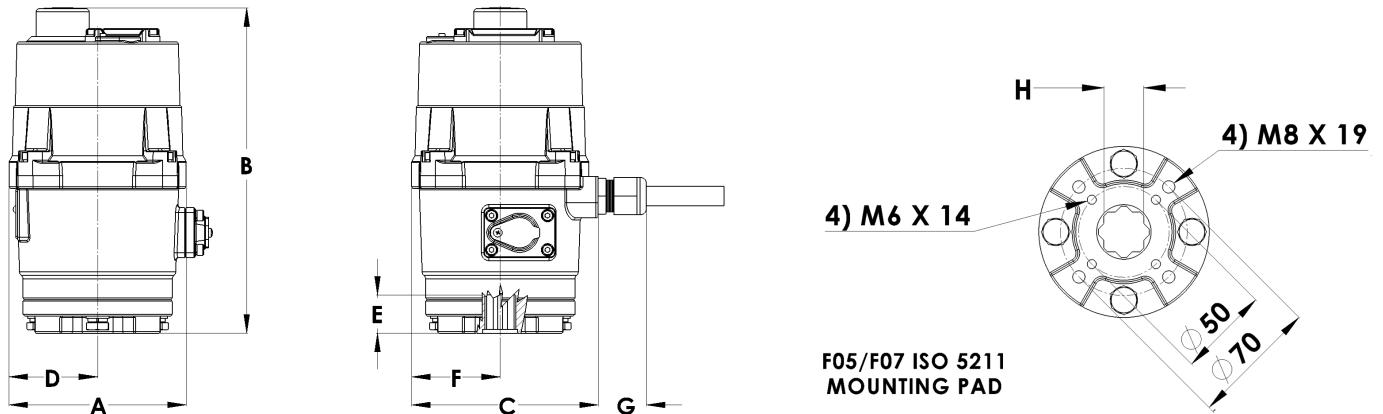
	A	B	C	D	E	F	G	H	Weight
inch	4.1	6.4	2.8	2.0	0.5	1.3	1.1	0.4	3.1 lb
mm	103.0	162.6	70.0	51.5	13.0	33.0	28.5	11.0	1.4 kg

Dimensions– 50Nm (Series 59005X)



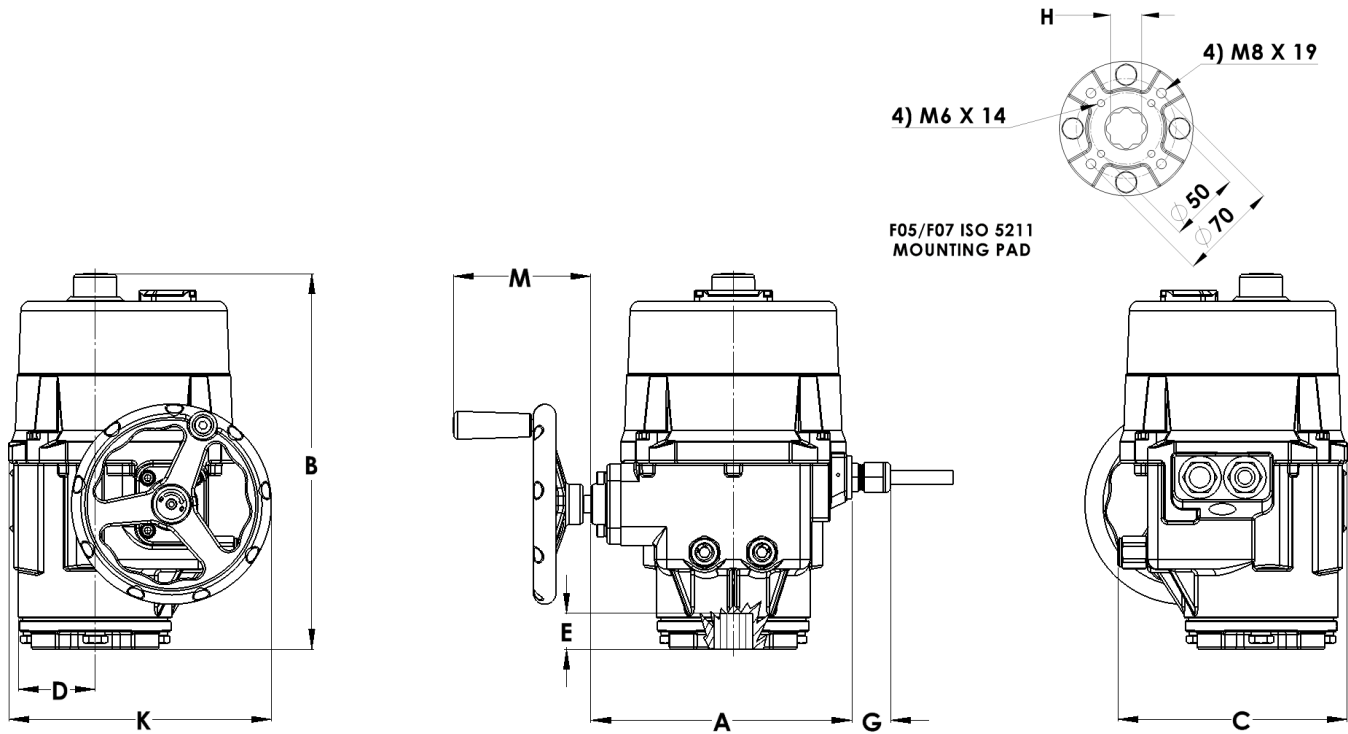
	A	B	C	D	E	F	G	H	Weight
inch	4.5	8.3	4.7	2.5	0.5	2.2	1.2	0.6	4.6 lb
mm	114.0	210.8	120.0	63.2	13.0	57.0	31.0	14.0	2.1 kg

Dimensions– 100Nm (Series 59006X)



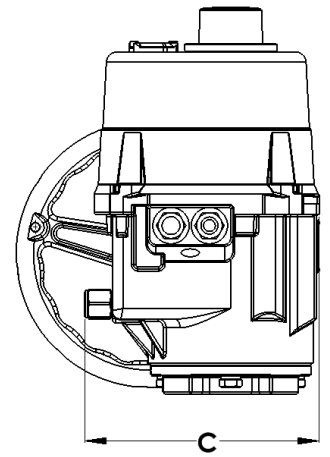
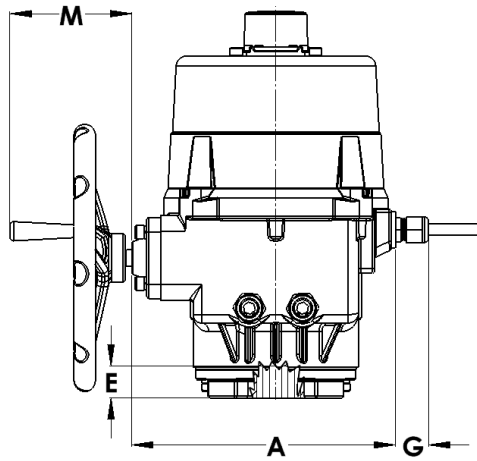
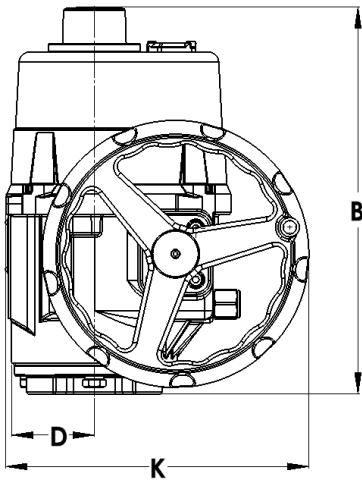
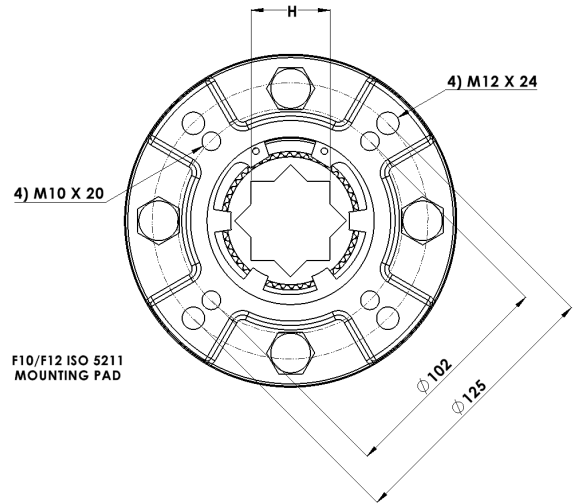
	A	B	C	D	E	F	G	H	Weight
inch	4.5	10.4	4.5	2.2	0.9	2.2	1.2	0.9	8.4 lb
mm	114.0	264.2	114.0	57.0	22.0	57.0	31.0	22.0	3.8 kg

Dimensions– 300Nm (Series 59008X)



	A	B	C	D	E	G	H	K	M	Weight
inch	7.1	15.4	72.2	2.4	2.1	1.2	0.9	8.3	5.3	30.1 lb
mm	180.0	391.2	183.5	61.5	53.0	31.0	22.0	210.0	135.0	13.7 kg

Dimensions– 600Nm (Series 59009X)



	A	B	C	D	E	G	H	K	M	Weight
inch	8.3	17.4	8.7	3.1	2.2	1.2	1.4	11.2	5.8	52.8 lb
mm	210.0	442.0	219.9	77.5	56.0	31.0	36.0	284.0	147.0	24.0 kg