

## Features

- Positioning control via 4-20mA, 1-5V or 2-10V input signal
- 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 and fault codes via LED display
- Remote operation (normal) or local operation via keypad
- Electronic stroke adjustment and calibration
- Non-intrusive wiring installation includes two 1 meter long shielded multi-conductor cables
- Separate motor and control circuits
- 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 electric 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 Electronic Positioning System (EPS) enables precise position control making it suitable for throttling applications.

Default input signal is 4-20mA. Actuator can be programmed to accept 1-5V or 2-10V input signal.

## Construction

<b>Enclosure</b>	Triple layer epoxy polyester powder coated aluminum alloy, Type 4X/ IP67
<b>Output Drive</b>	ISO5211 aluminum alloy, female double square
<b>Visual Position Indicator</b>	High visible multi-color LED indicator
<b>Gear Drive</b>	Heat treated steel. Self locking, additional brake not required
<b>Fasteners</b>	Stainless Steel
<b>Electrical Connections</b>	Conduit cable
<b>Manual Override</b>	Hex wrench (59002X & 59005X); Allen wrench (59006X); Handwheel (59008X & 59009X)
<b>Output Relays</b>	3 Programmable Relays, 0.8A/ 110 VAC, 0.5A/ 250VAC, 1.0A/ 30VDC
<b>Analog Output Confirmation</b>	4-20mA, 1-5v or 2-10v option



## Description

Feature-rich quarter-turn actuators for the most demanding applications, providing reliable operation and feedback. 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 IP67 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

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

ISO 5211 multi-flange mounting pad



### Temperature

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

Note: 0-90° operation

0° Closed

90° Open

### Typical Applications



5912 Series



5958 Series



5942 Series

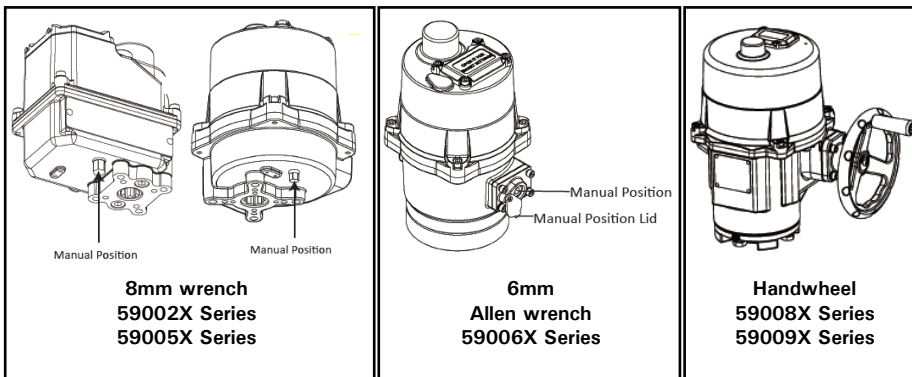
## Operation

Electric actuator with EPS- Electronic Positioning System uses an analog input signal to control the drive to the input position. Changing the input control signal results in a corresponding and proportional change in the position of the actuator output drive. Position feedback is via a corresponding output signal. Upon loss of power the actuator stays in last position. Upon restoration of power, the actuator will cycle to the commanded position. Normal operation is via remote signal, but the actuator can also be operated locally using the push button controls on the digital display.

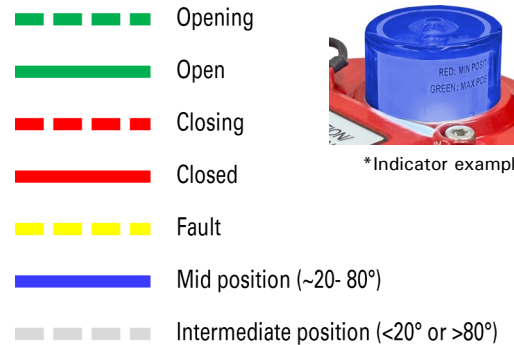
Default input signal is 4-20mA. Actuator can be programmed to accept 1-5v or 2-10v. Contact Valworx technical support for more details

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

## Manual Override



## LED Position Indicator



## Digital Display/ Control



Remote Operation- 50% open



Manual Operation- 75° open



Display

## 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 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)
<b>ELECTRIC ACTUATORS (EPS)</b>										
590026	20	177	110 VAC	0.32	11	100	F03/F05	11	4X / IP67	3.1 lb/ 1.4 kg
590027	20	177	24 VDC	0.7	11	100	F03/F05	11	4X / IP67	3.1 lb/ 1.4 kg
590056	50	442	110 VAC	0.65	12	100	F03, F05, F07	14	4X / IP67	4.6 lb/ 2.1 kg
590057	50	442	24 VDC	1.4	12	100	F03, F05, F07	14	4X / IP67	4.6 lb/ 2.1 kg
590066	100	885	110 VAC	0.65	18	100	F05, F07	22	4X / IP67	8.4 lb/ 3.8 kg
590067	100	885	24 VDC	1.4	18	100	F05, F07	22	4X / IP67	8.4 lb/ 3.8 kg
590086	300	2655	110 VAC	2.2	15	100	F07, F10	22	4X / IP67	27.2 lb/ 12.4 kg
590087	300	2655	24 VDC	4.0	15	100	F07, F10	22	4X / IP67	27.2 lb/ 12.4 kg
590096	600	5310	110 VAC	2.2	30	100	F10/F12	36	4X / IP67	52.3 lb/ 23.8 kg
590097	600	5310	24 VDC	4.0	30	100	F10/F12	36	4X / IP67	52.3 lb/ 23.8 kg

## Wiring– EPS

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 analog input signal. Three feedback relays can be programmed to output any one of 17 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.

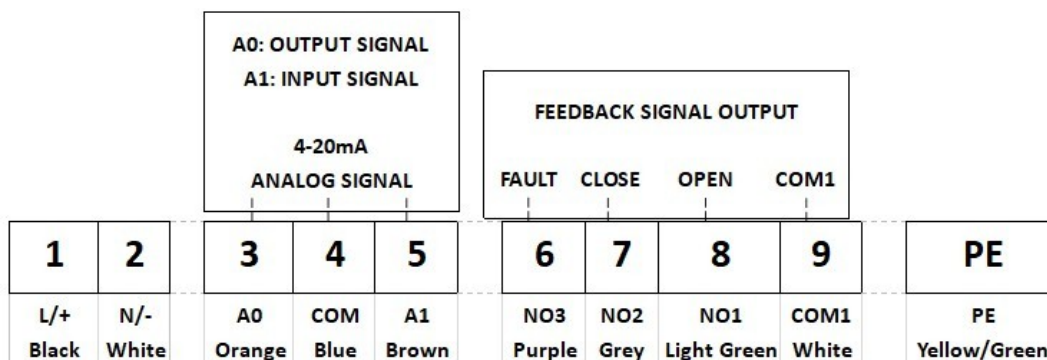
**⚠️ PRIOR TO WIRING, CONFIRM THE ACTUATOR VOLTAGE IS CORRECT. APPLYING THE WRONG VOLTAGE WILL DAMAGE THE ACTUATOR AND VOID THE WARRANTY.**

## Positioner Specifications

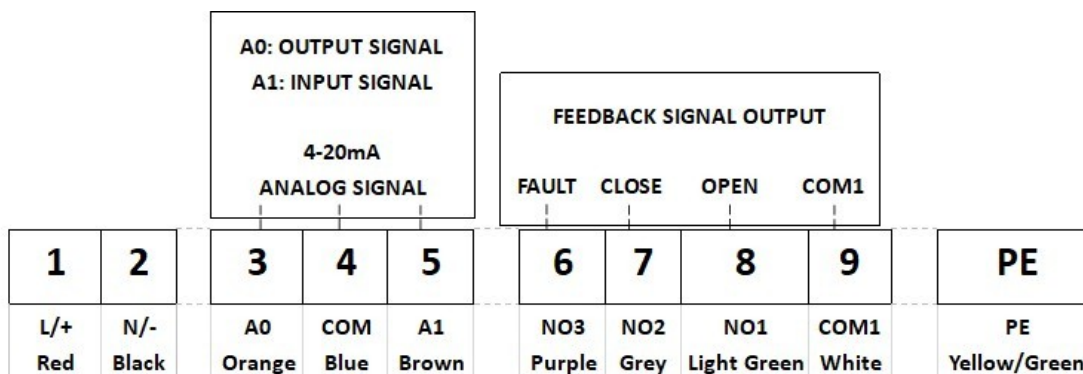
Accuracy	0.63%
Linearity	2%
Deadband	0.8° (minimum, available to set)
Resolution	1%

## Wiring Diagrams

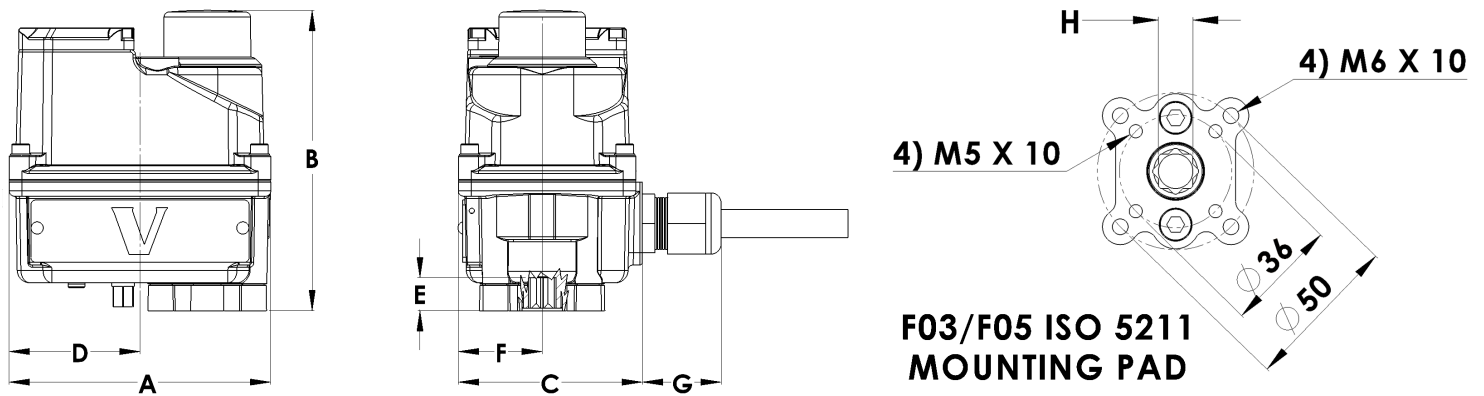
### AC Voltage Wiring Diagram



### DC Voltage Wiring Diagram

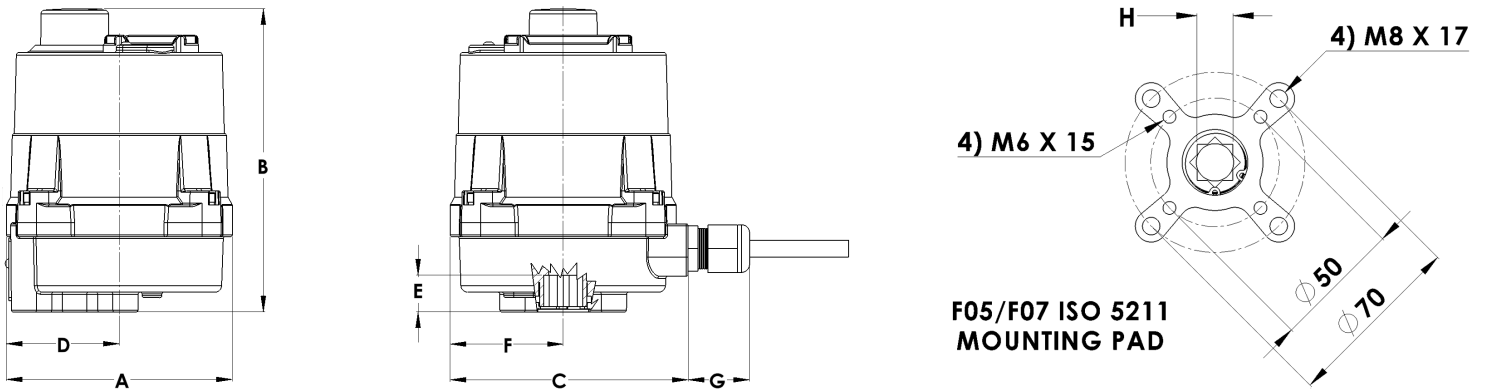


## Dimensions– 20Nm (Series 59002X)



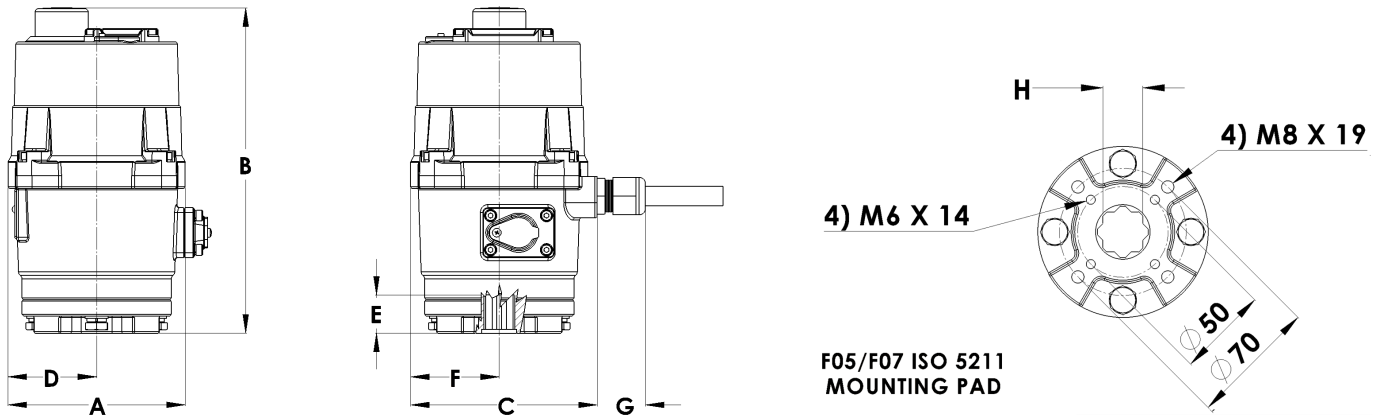
	A	B	C	D	E	F	G	H	Weight
inch	4.1	4.6	2.8	2.0	0.5	1.3	1.1	0.4	3.1 lb
mm	103.0	117.9	70.0	51.5	13.0	33.0	28.5	11.0	1.4 kg

## Dimensions– 50Nm (Series 59005X)



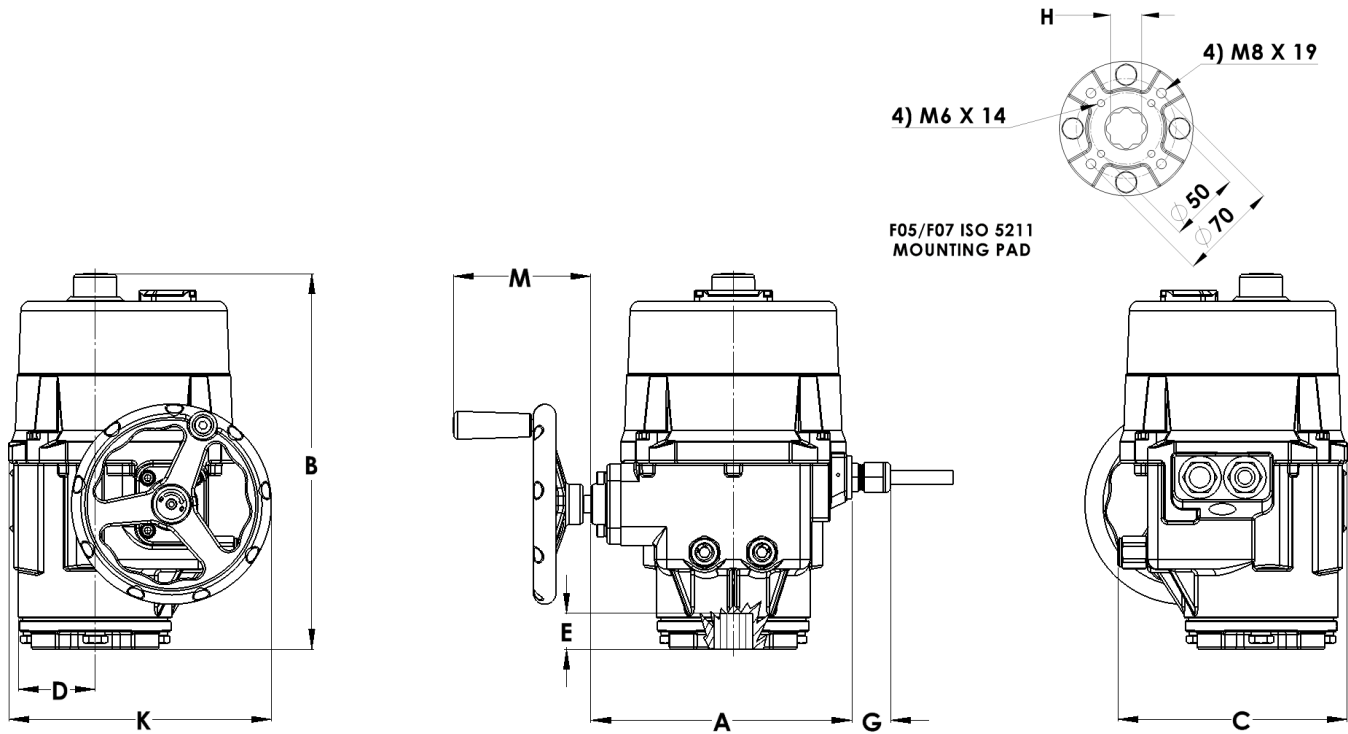
	A	B	C	D	E	F	G	H	Weight
inch	4.5	6.1	4.7	2.5	0.5	2.2	1.2	0.6	4.6 lb
mm	114.0	155.0	120.0	63.2	13.0	57.0	31.0	14.0	2.1 kg

## Dimensions– 100Nm (Series 59006X)



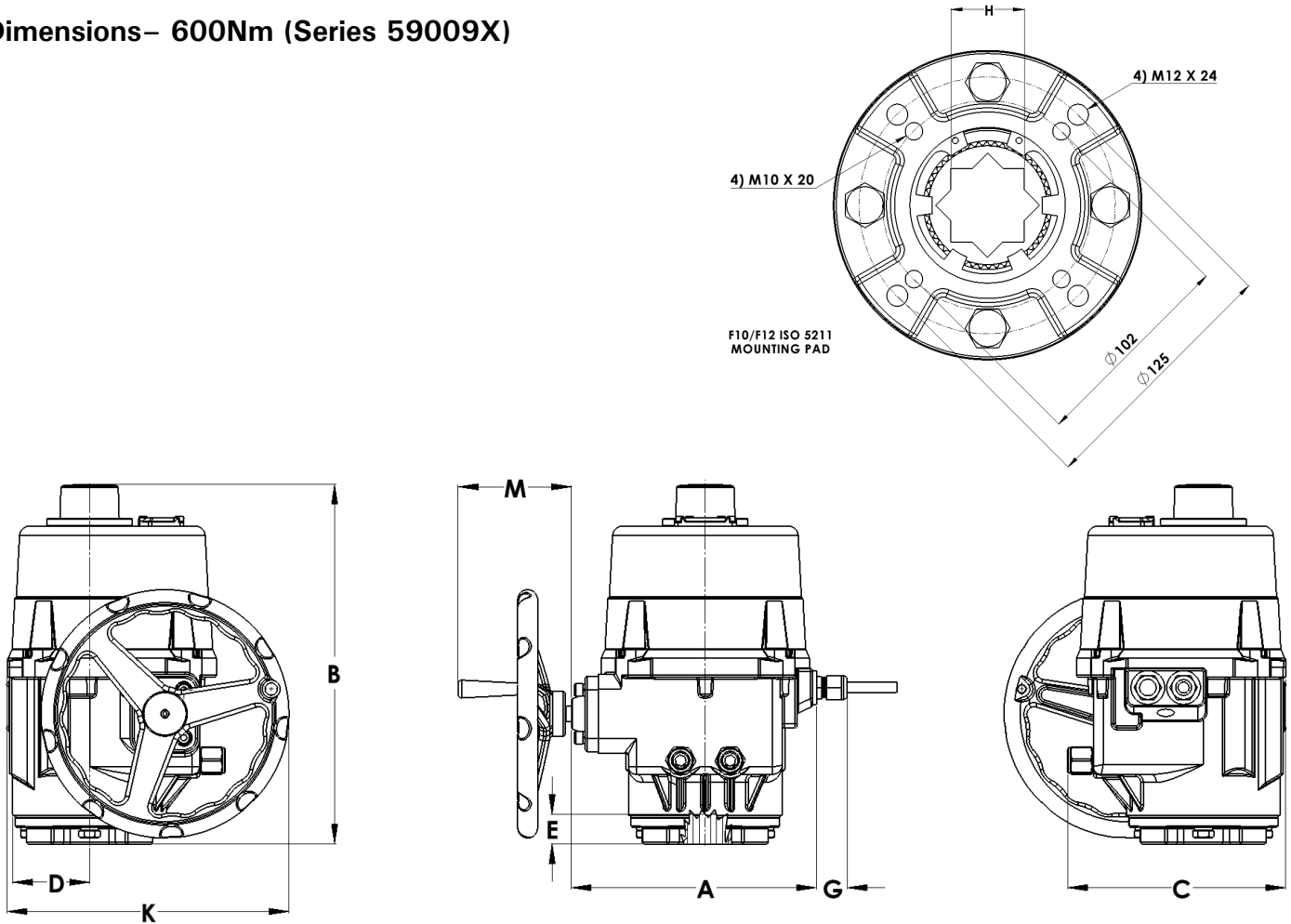
	A	B	C	D	E	F	G	H	Weight
inch	4.5	8.2	4.5	2.2	0.9	2.2	1.2	0.9	8.4 lb
mm	114.0	209.0	114.0	57.0	22.0	57.0	31.0	22.0	3.8 kg

## Dimensions– 300Nm (Series 59008X)



	A	B	C	D	E	G	H	K	M	Weight
inch	7.1	11.8	72.2	2.4	2.1	1.2	0.9	8.3	5.3	30.1 lb
mm	180.0	300.0	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	14.0	8.7	3.1	2.2	1.2	1.4	11.2	5.8	52.8 lb
mm	210.0	356.0	219.9	77.5	56.0	31.0	36.0	284.0	147.0	24.0 kg