



SURESERVO2 SPECIFICATIONS

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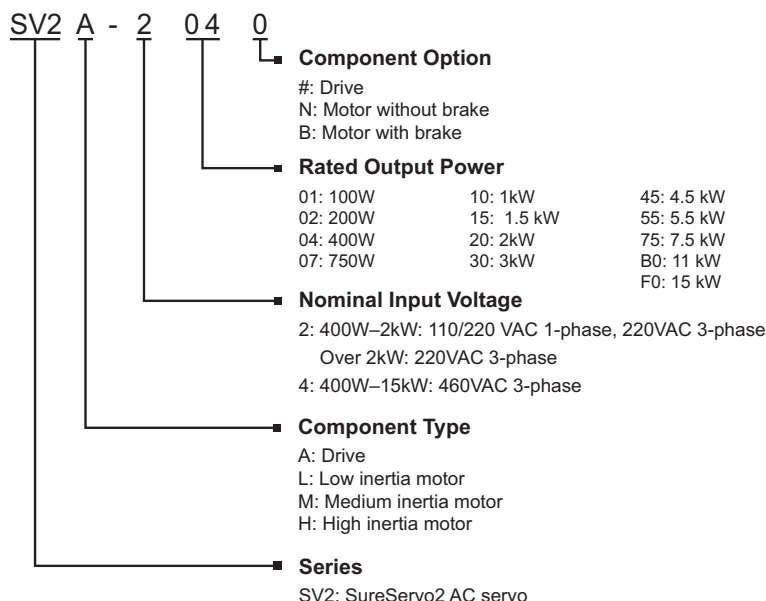
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INTRODUCTION

This appendix covers specifications and dimensions for SureServo2 series drives and motors.

A.1 - MODEL EXPLANATION



A.2 - SURESERVO2 SERIES DRIVE SPECIFICATIONS

230V SURESERVO2 DRIVE SPECIFICATIONS									
Model		SV2A-2040	SV2A-2075	SV2A-2150	SV2A-2200	SV2A-2300	SV2A-2550	SV2A-2750	SV2A-2F00
Power	Power Rating	400W	750W	1.5 kW	2kW	3kW	5.5 kW	7.5 kW	15kW
	Phase/Voltage	Single-phase / Three-phase 110VAC/220VAC				Three-phase 220VAC			
	Permissible Voltage	50/60 Hz, Single-phase / Three-phase 100–120VAC/200–230 VAC, -15% to 10%				50/60 Hz, Three-phase 200–230 VAC, -15% to 10%			
	Input Current 200–230 VAC 3-phase [Amps] rms	2.76	5.09	8.09	11.36	14.52	27.06	37.33	69.95
	Input Current 100–120 VAC 1-phase [Amps] rms	3.98	7.73	12.56	18.03	–	–	–	–
	Input Current 200–230 VAC 1-phase [Amps] rms	4.69	8.71	14.82	20.83	–	–	–	–
	Continuous Output Current [Amps] rms	2.60	5.10	8.33	13.40	17.92	41.33	49.04	78
	Max. Instantaneous Output Current [Amps] rms	8.56	15.43	20.16	40.57	55.93	91.44	127.46	162.04
	Main Circuit Inrush Current [Amps]	1.44	1.40	1.44	4.64	4.42	9.55	28.68	32.0
	Control Circuit Inrush Current [Amps]	37.0	37.40	39.80	32.40	36.40	32.80	40.0	37.0
Short Circuit Current Rating (SCCR)		5000A (see section “2.5 - Specifications for the Circuit Breaker and Fuse” on page 2–6 for information on installing SureServo2 in panels requiring higher SCCR ratings)							
Cooling Method		Air Conv. Cooling	Fan Cooling						
Regenerative Resistor		Built-in					External (optional)		
Weight [kg (lb)]		0.92 (2)	1.3 (2.9)	1.3 (2.9)	2.7 (6)	2.7 (6)	4.9 (10.8)	7.2 (15.9)	13 (29)

460V SURESERVO2 DRIVE SPECIFICATIONS									
Model		SV2A-4040	SV2A-4075	SV2A-4150	SV2A-4200	SV2A-4300	SV2A-4550	SV2A-4750	SV2A-4F00
Power	Power Rating	400W	750W	1.5 kW	2kW	3kW	5.5 kW	7.5 kW	15kW
	Phase/Voltage	Three-phase 460V							
	Permissible Voltage	50/60 Hz, Three-phase 380–480 VAC, -10% to 10%							
	Input Current 460 VAC 3-phase [Amps] rms	1.49	2.31	4.98	6.29	9.92	16.83	23.06	36.65
	Continuous Output Current [Amps] rms	1.6	2.91	5.61	6.7	12.6	23.6	28.7	37.5
	Max. Instantaneous Output Current [Amps] rms	5.4	9.7	13.94	21.35	30.46	47.5	57.69	95.3
	Main Circuit Inrush Current [Amps]	5.6	5.6	5.6	12.5	12.5	12.5	12.5	12.5
	Control Circuit Inrush Current [Amps]	5	5	5	4.8	4.8	5.5	6	6
	Short Circuit Current Rating (SCCR)	5000A (see section "2.5 - Specifications for the Circuit Breaker and Fuse" on page 2–6 for information on installing SureServo2 in panels requiring higher SCCR ratings)							
Cooling Method		Fan Cooling							
Regenerative Resistor		Built-in			External (optional)				
Weight [kg (lb)]		5.96 [13.14]	5.96 [13.14]	5.96 [13.14]	9.71 [21.4]	9.71 [21.4]	12.14 [26.76]	12.14 [26.76]	15.01 [33.1]

GENERAL DRIVE SPECIFICATIONS (All Models)			
Encoder Resolution		24-bit (16777216 p/rev)	
Main Circuit Control		SVPWM control	
Control Mode		Manual / Auto	
Position Control Mode	Pulse Type		Pulse + Direction, CCW pulse + CW pulse, A phase + B phase
	Max. Input Pulse Frequency⁴		Pulse + Direction; CCW pulse + CW pulse; A phase + B phase: Line driver 4 Mpps; Open collector: 200 Kpps
	Command Source		External pulse / Register
	Smoother Method		Low-pass and P-curve filter
	E-Gear Ratio		E-Gear ratio: N/M times, limited to (1/4 < N/M < 262144) N: 1 - 536870911 / M: 1 - 2147483647
	Torque Limit		Parameter settings
	Feed Forward Compensation		Parameter settings
Speed Control Mode	Analog Command Input	Voltage Range	±10VDC
		Resolution	15-bit
		Input Impedance	1MΩ
		Time Constant	25μs
	Speed Control Range^{Note 1}		1 : 6000
	Command Source		External analog command / Register
	Smoother Method		Low-pass and S-curve filter
	Torque Limit		Parameter settings / Analog input
	Bandwidth		Maximum 3.1 kHz (closed-loop)
	Speed Calibration Ratio^{Note 2}		±0.01% at 0% to 100% load fluctuation
			±0.01% at ±10% power fluctuation
			±0.01% at 0°C to 50°C ambient temperature fluctuation
Torque Control Mode	Analog Command Input	Voltage Range	±10VDC
		Input Impedance	1MΩ
		Time Constant	25μs
	Command Source		External analog command / Register
	Smoother Method		Low-pass filter
	Speed Limit		Parameter settings / Analog input
	Analog Monitor Output		Monitor signal can be set by parameters (voltage output range: ±8V); resolution:10-bit

GENERAL DRIVE SPECIFICATIONS (All Models)		
Digital Input / Output	Input	Servo on, Fault reset, Gain switch, Pulse clear, Zero speed clamping, Command input reverse control, Internal position command trigger, Torque limit, Speed limit, Internal position command selection, Motor stop, Speed command selection, Speed / position mode switching, Speed / torque mode switching, Torque / position mode switching, PT / PR command switching, motor override, Forward / reverse limit, Original point, Forward / reverse operation torque limit, Homing activated, E-Cam engage, Forward / reverse JOG input, Event trigger, E-Gear N selection, Pulse input prohibition
	Output	A, B, Z line driver output
	Output	Servo ready, Servo on, Zero speed detection, Target speed reached, Target position reached, Torque limiting, Servo alarm, Magnetic brake control, Homing completed, Early warning for overload, Servo warning, Position command overflows, Software limit (reverse direction), Software limit (forward direction), Internal position command completed, Capture procedure completed, Servo procedure completed, Master position area of E-Cam.
Protection Function		Overcurrent, Overvoltage, Undervoltage, Overheat, Regeneration error, Overload, Excessive speed deviation, Excessive position deviation, Encoder error, Adjustment error, Emergency stop, Forward / reverse limit error, Excessive deviation of full-closed loop control, Serial communication error, RST leak phase, Serial communication timeout, Short-circuit protection for terminals U, V, W and CN1, CN2, CN3
Communication Interface		RS-485 / USB / Optional EtherNet/IP or ModTCP
Environment	Installation Site	Indoors (avoid direct sunlight), no corrosive vapor (avoid fumes, flammable gases, and dust)
	Altitude	Altitude 1000m or lower above sea level
	Atmospheric Pressure	86kPa - 106kPa
	Operating Temperature	0°C to 55°C (If operating temperature is above 45°C, forced cooling is required)
	Storage Temperature	-20°C to 65°C
	Humidity	0–90% RH (non-condensing)
	Vibrating	9.80665 m/s ² (1 G) less than 20 Hz, 5.88 m/s ² (0.6 G) 20 to 50 Hz
	IP Rating	IP20
	Power System	TN system ^{Note3} , ^{Note4}
Approvals		IEC/EN 61800-5-1, UL 61800-5-1, TUV, CE
1 - Within the rated load, the speed ratio is: the minimum speed (smooth operation) / rated speed. 2 - Within the rated speed, the speed calibration ratio is: (rotational speed with no load - rotational speed with full load) / rated speed. 3 - TN system: the neutral point of the power system connects directly to the ground. The exposed metal components connect to the ground through the protective ground conductor. 4 - Use a single-phase three-wire power system for the single-phase power model.		

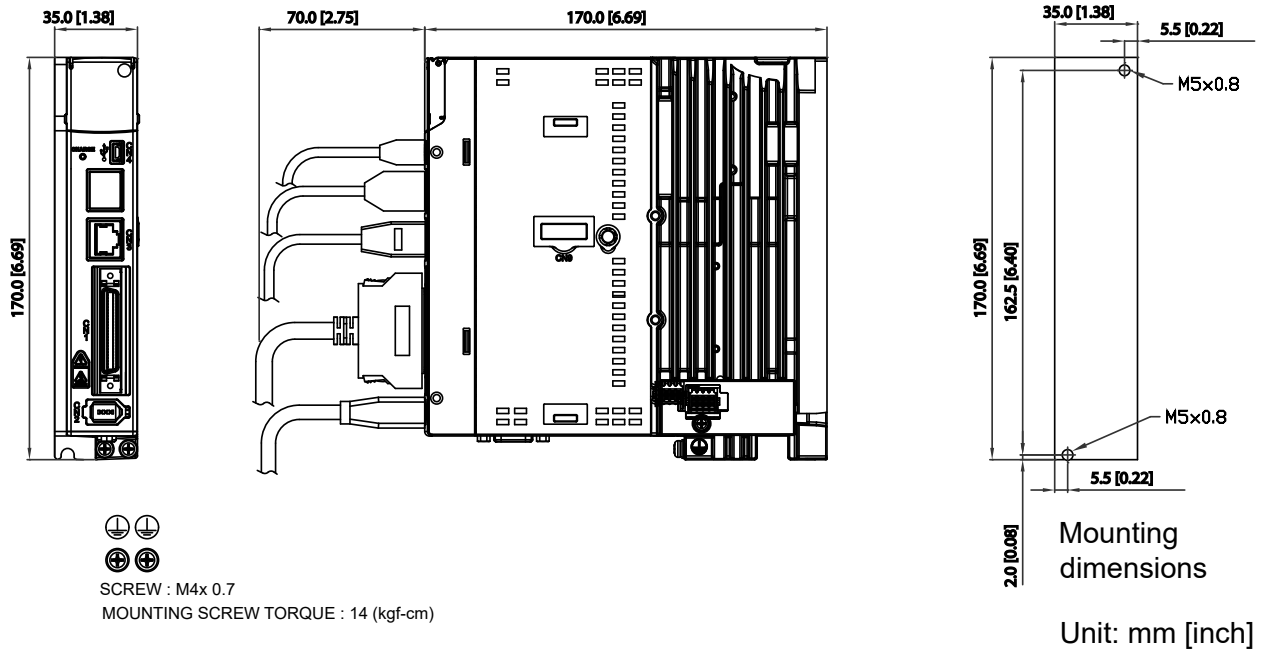
A.2.1 - SAFETY SPECIFICATIONS

The SureServo2 series servo drive conforms to the following safety specifications:

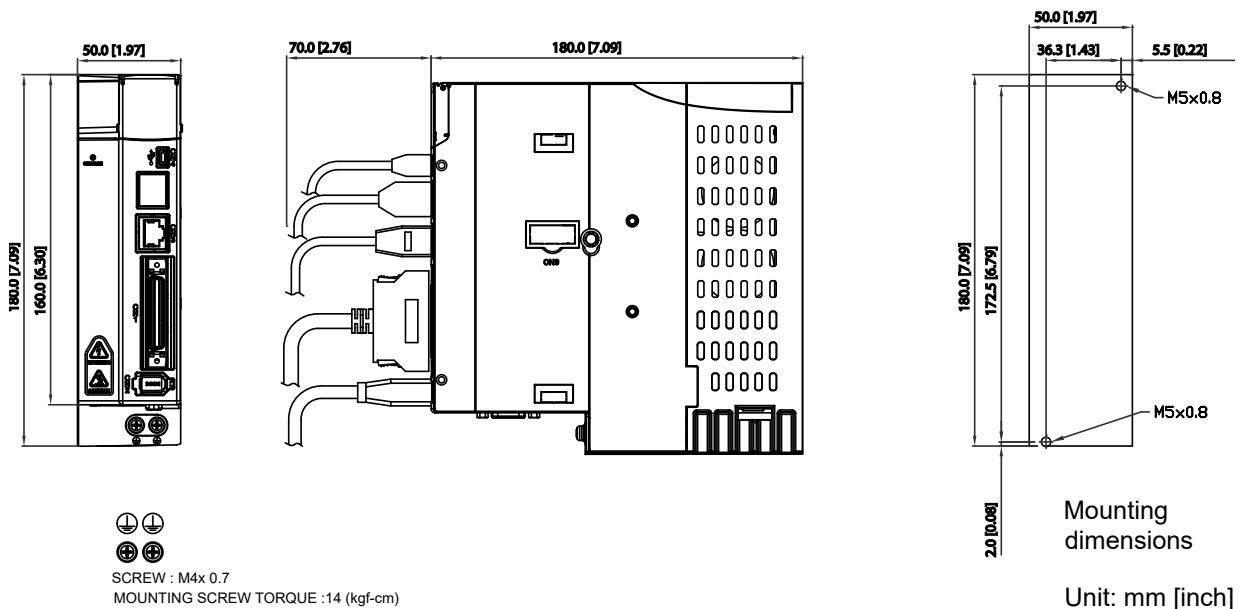
<i>Item</i>	<i>Description</i>	<i>Standard</i>	<i>Safety Data</i>
SFF	Safe failure fraction	IEC61508	Channel1: 80.08% Channel2: 68.91%
HFT (Type A subsystem)	Hardware fault tolerance	IEC61508	1
SIL	Safety integrity level	IEC61508	SIL2
		IEC62061	SILCL2
PFH	Probability of dangerous failure per hour (h ⁻¹)	IEC61508	9.56x10 ⁻¹⁰
PFD _{av}	Average probability of failure on demand	IEC61508	4.18x10 ⁻⁶
Category	Category	ISO13849-1	Category 3
PL	Performance level	ISO13849-1	d
MTTF _d	Mean time to dangerous failure	ISO13849-1	High
DC	Diagnostic coverage	ISO13849-1	Low

A.3 - SURESERVO2 DRIVE DIMENSIONS

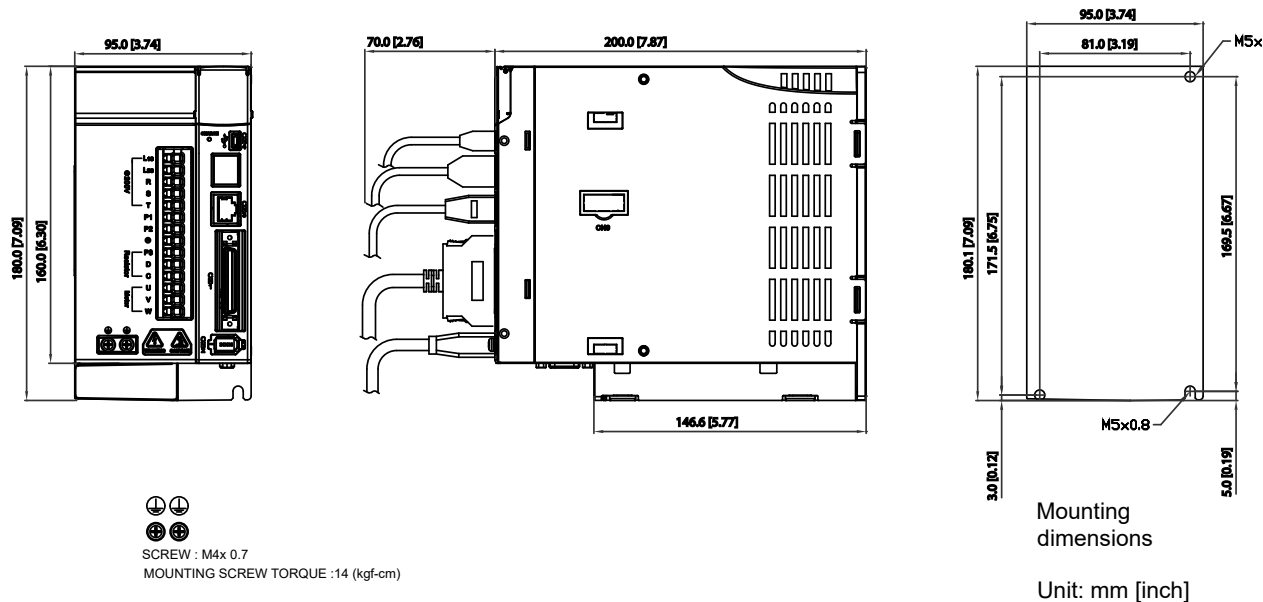
SV2A-2040



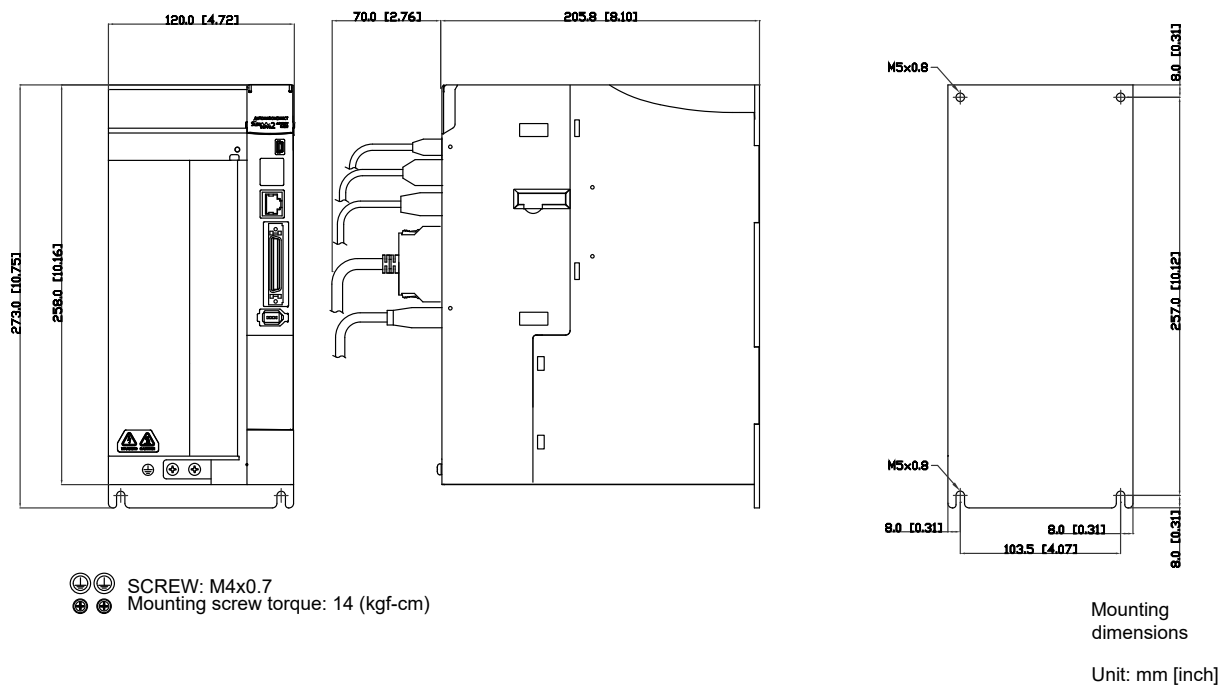
SV2A-2075, SV2A-2150



SV2A-2200, SV2A-2300

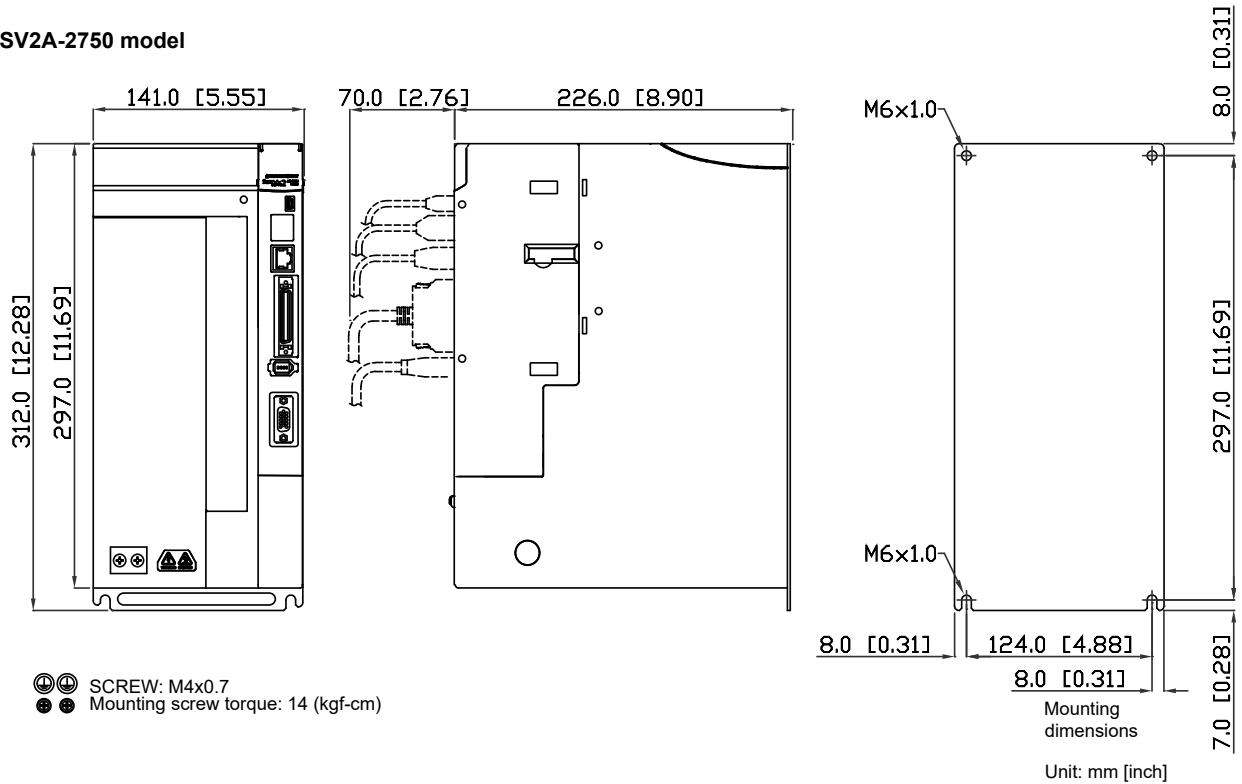


SV2A-2550



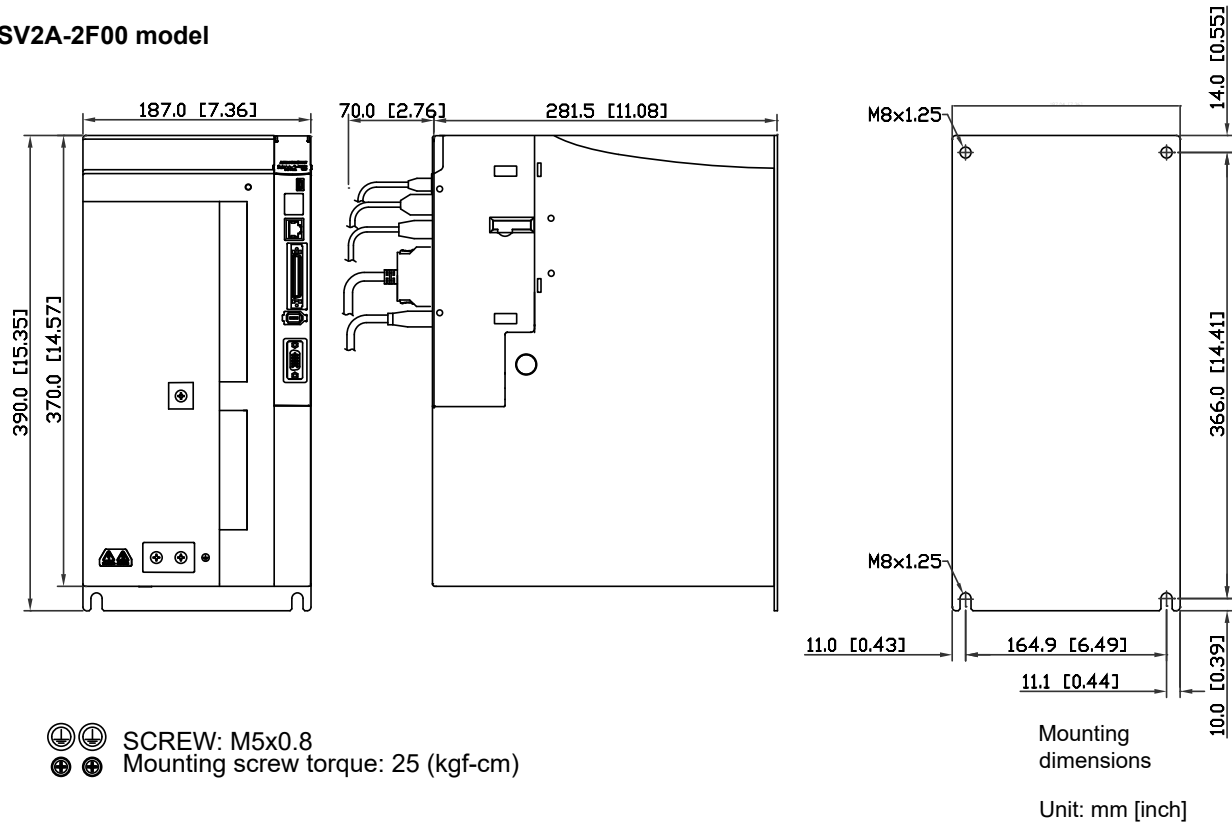
SV2A-2750

SV2A-2750 model

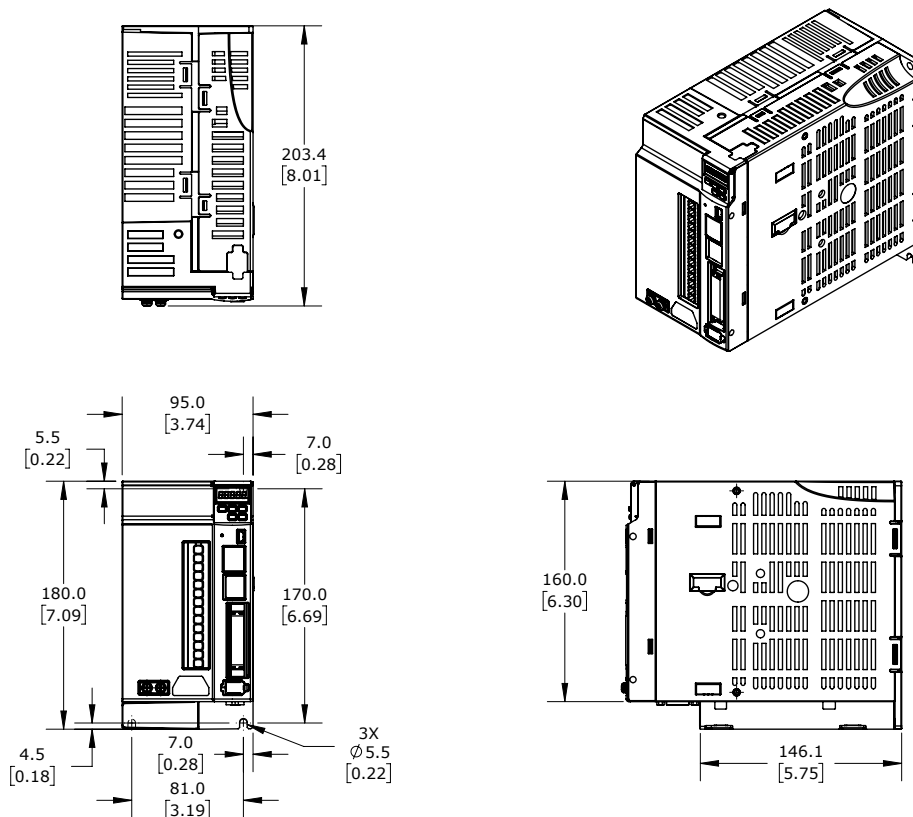


SV2A-2F00

SV2A-2F00 model

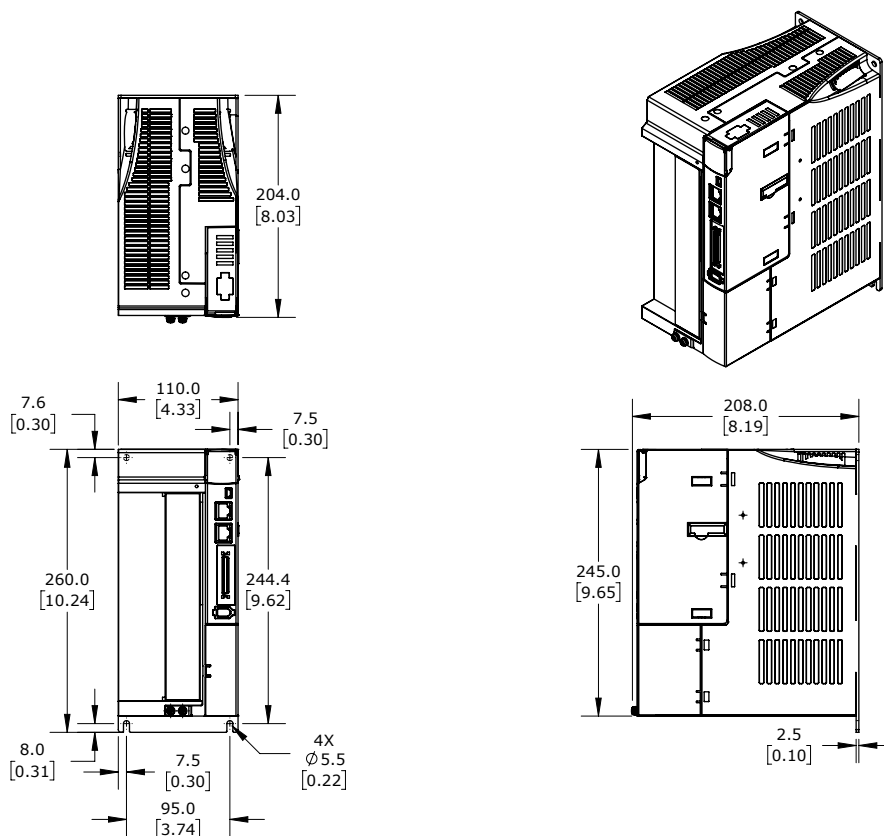


SV2A-4040, SV2A-4075, SV2A-4150

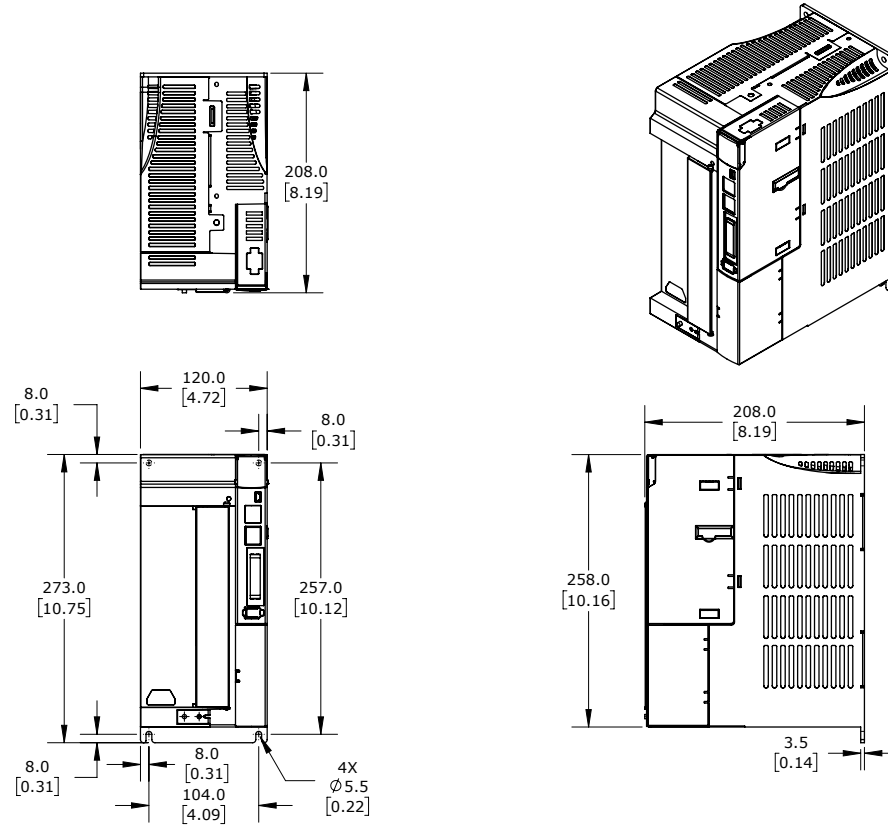


Units: mm [inches]

SV2A-4200, SV2A-4300

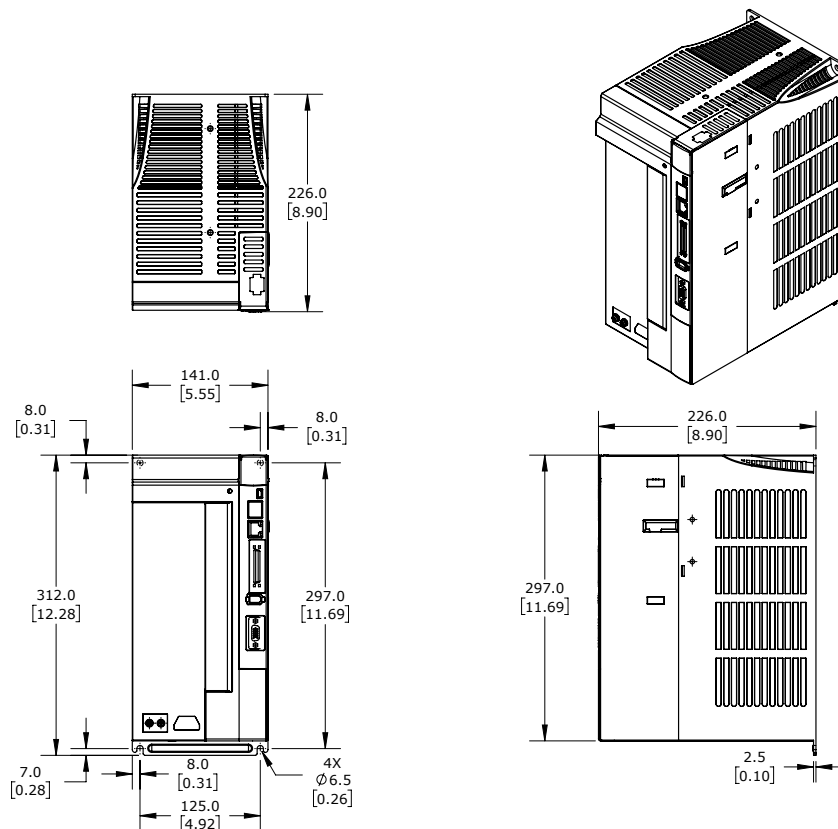


SV2A-4550

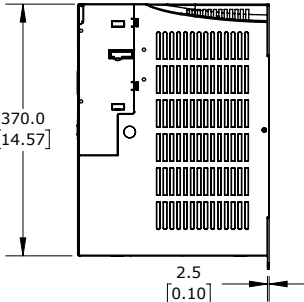
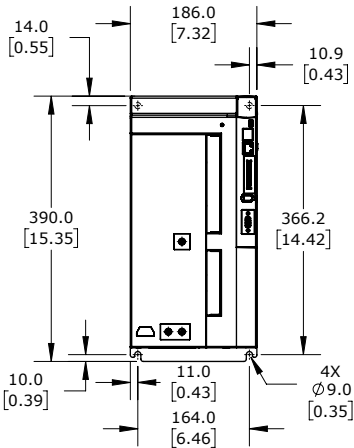
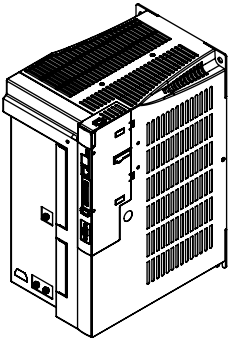
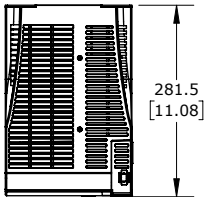


Units: mm [inches]

SV2A-4750



SV2A-4F00



Units: mm [inches]

A.4 - SURESERVO2 MOTOR SPECIFICATIONS
A.4.1 - SURESERVO2 230V MOTOR SPECIFICATIONS

230V Motor Specifications										
Model	SV2L-201N	SV2L-201B	SV2L-202N	SV2L-202B	SV2L-204N	SV2L-204B	SV2L-207N	SV2L-207B	SV2L-210N	SV2L-210B
Rated Power [kW]	0.1	0.1	0.2	0.2	0.4	0.4	0.75	0.75	1.0	1.0
Rated Torque [N·m]^{Note1}	0.32	0.32	0.64	0.64	1.27	1.27	2.39	2.39	3.18	3.18
Max. Torque [N·m]	1.12	1.12	2.24	2.24	3.96	3.96	7.86	7.86	8.12	8.12
Rated Speed [rpm]	3000									
Max. Speed [rpm]	6000								5000	
Rated Current [Amps] rms	0.9	0.9	1.45	1.45	2.60	2.60	4.5	4.5	8.04	8.04
Max. Instantaneous Current [Amps] rms	3.3	3.3	5.4	5.4	8.56	8.56	15.41	15.41	20.16	20.16
Change of Rated Power [W/s]	16.3	14.90	16.4	14.60	35.8	33.60	37.8	34.40	38.2	30.40
Rotor Inertia [$\times 10^{-4}$ kg m²]	0.0627	0.0689	0.25	0.28	0.45	0.48	1.51	1.66	2.65	3.33
Mechanical Time Constant [ms]	1.13	1.24	1.38	1.54	0.94	1.01	0.91	1.00	0.83	1.05
Torque Constant-KT [N·m/A]	0.356	0.356	0.441	0.441	0.488	0.488	0.531	0.531	0.396	0.396
Voltage Constant-KE [mV/rpm]	13.66	13.66	16.4	16.4	17.2	17.2	18.7	18.7	16.8	16.8
Armature Resistance [Ohm]	8.34	8.34	3.8	3.8	1.68	1.68	0.57	0.57	0.20	0.20
Armature Inductance [mH]	9.85	9.85	8.15	8.15	4.03	4.03	2.2	2.2	1.81	1.81
Electrical Time Constant [ms]	1.18	1.18	2.14	2.14	2.40	2.40	3.86	3.86	9.05	9.05
Insulation Class	Class A (UL), Class B (CE)									
Insulation Resistance	> 100MΩ, 500VDC									
Insulation Strength	1.8 kVAC, 1 second									
Weight [kg]	0.5	0.8	1.1	1.6	1.4	1.9	2.8	3.6	4.3	4.7
Max. Radial Loading [N]^{Note3}	78	78	245	245	245	245	392	392	490	490
Max. Axial Loading [N]	54	54	74	74	74	74	147	147	98	98
Brake Holding Torque [N·m (min)]^{Note2}	n/a	0.32	n/a	1.3	n/a	1.3	n/a	2.5	n/a	8
Brake Power Consumption (at 20°C) [W]		6.1		7.2		7.2		8		18.7
Brake Release Time [ms (max)]		20		20		20		20		10
Brake Pull-in Time [ms (max)]		35		50		50		60		70

1–The rated torque is the continuous permissible torque between the 0°C and 40°C operating temperature which is suitable for a servo motor mounted with the heat sink dimension shown below. The heat sink should be attached to the motor's mounting surface. For operating temperatures above 40°C, see section A.4.4.

Motor Face Direction	Heat Sink Dimension
40mm, 60mm, and 80mm	250mm x 250mm x 6mm

2–The built-in servo motor brake is only for keeping the object in a stopped state. Do not use it for deceleration or as a dynamic brake.

3–Max radial force is specified at 5mm from the end of the shaft.

230V Motor Specifications								
Model	SV2M-210N	SV2M-210B	SV2M-215N	SV2M-215B	SV2M-220N	SV2M-220B	SV2M-230N	SV2M-230B
Rated Power [kW]	1.0	1.0	1.5	1.5	2.0	2.0	3.0	3.0
Rated Torque [N·m] Note1	4.77	4.77	7.16	7.16	9.55	9.55	17.55	17.55
Max. Torque [N·m]	14.32	14.32	14.88	14.88	24.54	24.54	48.29	48.29
Rated Speed [rpm]	2000						1700	
Max. Speed [rpm]	3000							
Rated Current [Amps] rms	5.66	5.66	8.33	8.33	12.1	12.1	17.9	17.9
Max. Instantaneous Current [Amps] rms	19.73	19.73	20.16	20.16	33.66	33.66	55.93	55.93
Change of Rated Power [W/s]	27.1	24.90	45.8	43.10	26.3	24.10	56.0	53.90
Rotor Inertia [x10 ⁻⁴ kg m ²]	8.41	9.14	11.2	11.9	34.7	37.8	55	57.1
Mechanical Time Constant [ms]	1.54	1.67	1.12	1.18	1.75	1.90	1.29	1.34
Torque Constant-KT [N·m/A]	0.843	0.843	0.860	0.860	0.789	0.789	0.980	0.980
Voltage Constant-KE [mV/rpm]	31.9	31.9	31.8	31.8	31.4	31.4	35	35
Armature Resistance [Ohm]	0.47	0.47	0.26	0.26	0.119	0.119	0.077	0.077
Armature Inductance [mH]	5.99	5.99	4.01	4.01	2.84	2.84	1.27	1.27
Electrical Time Constant [ms]	12.74	12.74	15.42	15.42	23.87	23.87	16.49	16.49
Insulation Class	Class A (UL), Class B (CE)							
Insulation Resistance	> 100MΩ, 500VDC							
Insulation Strength	1.8 kVAC, 1 second							
Weight [kg]	7.0	8.4	7.5	8.9	13.5	17.5	18.5	22.5
Max. Radial Loading [N] Note3	490				1176		1470	
Max. Axial Loading [N]	98				490			
Brake Holding Torque [N·m (min)] Note2	n/a	10	n/a	10	n/a	25	n/a	25
Brake Power Consumption (at 20°C) [W]		19		19		20.4		20.4
Brake Release Time [ms (max)]		10		10		10		10
Brake Pull-in Time [ms (max)]		70		70		70		70

1—The rated torque is the continuous permissible torque between the 0°C and 40°C operating temperature which is suitable for a servo motor mounted with the heat sink dimensions shown below. The heat sink should be attached to the motor's mounting surface. For operating temperatures above 40°C, see section A.4.4.

Motor Face Direction	Heat Sink Dimension
40mm, 60mm, and 80mm	250mm x 250mm x 6mm

2—The built-in servo motor brake is only for keeping the object in a stopped state. Do not use it for deceleration or as a dynamic brake.

3—Max radial force is specified at 5mm from the end of the shaft.

230V Motor Specifications						
Model	SV2H-245N	SV2H-245B	SV2H-255N	SV2H-255B	SV2H-275N	SV2H-275B
Rated Power [kW]	4.5	4.5	5.5	5.5	7.5	7.5
Rated Torque [N·m] ^{Note1}	28.65	28.65	35.01	35.01	47.74	47.74
Max. Torque [N·m]	71.62	71.62	87.53	87.53	119.36	119.36
Rated Speed [rpm]	1500					
Max. Speed [rpm]	3000					
Rated Current [Amps] rms	32.5	32.5	40.12	40.12	47.5	47.5
Max. Instantaneous Current [Amps] rms	91.4	91.4	108.0	108.0	127.46	127.46
Change of Rated Power [W/s]	105.6	101.8	122.8	119.3	159.7	156.6
Rotor Inertia [x10 ⁻⁴ kg m ²]	77.75	80.65	99.78	102.70	142.7	145.55
Mechanical Time Constant [ms]	0.93	0.96	0.97	0.99	0.84	0.85
Torque Constant-KT [N·m/A]	0.878	0.878	0.873	0.873	1.005	1.005
Voltage Constant-KE [mV/rpm]	32.0	32.0	31.0	31.0	35.5	35.5
Armature Resistance [Ohm]	0.032	0.032	0.025	0.025	0.02	0.02
Armature Inductance [mH]	0.89	0.89	0.71	0.71	0.6	0.6
Electrical Time Constant [ms]	27.81	27.81	28.4	28.4	30.0	30.0
Insulation Class	Class A (UL), Class B (CE)					
Insulation Resistance	> 100MΩ, 500VDC					
Insulation Strength	1.8 kVAC, 1 second					
Weight [kg]	23.5	29	30.5	36	40.5	46
Max. Radial Loading [N] ^{Note3}	1470		1764			
Max. Axial Loading [N]	490		588			
Brake Holding Torque [N·m (min)] ^{Note2}	n/a	55.0	n/a	55.0	n/a	55.0
Brake Power Consumption (at 20°C) [W]		19.9		19.9		19.9
Brake Release Time [ms (max)]		10		10		10
Brake Pull-in Time [ms (max)]		70		70		70
1–The rated torque is the continuous permissible torque between the 0°C and 40°C operating temperature which is suitable for a servo motor mounted with the heat sink dimensions shown below. The heat sink should be attached to the motor's mounting surface. For operating temperatures above 40°C, see section A.4.4.						
Motor Face Direction			Heat Sink Dimension			
100mm			300mm x 300mm x 12mm			
130mm			400mm x 400mm x 20mm			
180mm			550mm x 550mm x 30mm			
All made from aluminum.						
2–The built-in servo motor brake is only for keeping the object in a stopped state. Do not use it for deceleration or as a dynamic brake.						
3–Max radial force is specified at 5mm from the end of the shaft.						

230V Motor Specifications (cont'd)				
Model	SV2H-2B0N	SV2H-2B0B	SV2H-2F0N	SV2H-2F0B
Rated Power [kW]	11	11	15	15
Rated Torque [N·m] ^{Note1}	70	70	95.4	95.4
Max. Torque [N·m]	175	175	224.0	224.0
Rated Speed [rpm]	1500			
Max. Speed [rpm]	2000			
Rated Current [Amps] rms	51.1	51.1	67	67
Max. Instantaneous Current [Amps] rms	129.5	129.5	162	162
Change of Rated Power [W/s]	145.0	141.4	201.8	197.1
Rotor Inertia [x10 ⁻⁴ kg m ²]	338	346.5	451	461.8
Mechanical Time Constant [ms]	1.38	1.41	1.22	1.25
Torque Constant-KT [N·m/A]	1.370	1.370	1.424	1.424
Voltage Constant-KE [mV/rpm]	49	49	50	50
Armature Resistance [Ohm]	0.0261	0.0261	0.0184	0.0184
Armature Inductance [mH]	0.65	0.65	0.48	0.48
Electrical Time Constant [ms]	24.9	24.9	26.09	26.09
Insulation Class	Class F (UL), Class F (CE)			
Insulation Resistance	> 100MΩ, 500VDC			
Insulation Strength	1.8 kVAC, 1 second			
Weight [kg]	56.4	68.4	75	87
Max. Radial Loading [N] ^{Note3}	3300			
Max. Axial Loading [N]	1100			
Brake Holding Torque [N·m (min)] ^{Note2}	n/a	115	n/a	115
Brake Power Consumption (at 20°C) [W]		28.8		28.8
Brake Release Time [ms (max)]		10		10
Brake Pull-in Time [ms (max)]		70		70

1—The rated torque is the continuous permissible torque between the 0°C and 40°C operating temperature which is suitable for a servo motor mounted with the heat sink dimensions shown below. The heat sink should be attached to the motor's mounting surface. For operating temperatures above 40°C, see section A.4.4.

Motor Face Direction	Heat Sink Dimension
100mm	300mm x 300mm x 12mm
130mm	400mm x 400mm x 20mm
180mm	550mm x 550mm x 30mm

All made from aluminum

2—The built-in servo motor brake is only for keeping the object in a stopped state. Do not use it for deceleration or as a dynamic brake.

3—Max radial force is specified at 5mm from the end of the shaft.

A.4.2 - SURESERVO2 460V MOTOR SPECIFICATIONS

460V Motor Specifications						
Model	SV2L-404N	SV2L-404B	SV2L-407N	SV2L-407B	SV2L-410N	SV2L-410B
Rated Power [kW]	0.4	0.4	0.75	0.75	1.0	1.0
Rated Torque [N·m] ^{Note1}	1.27	1.27	2.24	2.24	3.18	3.18
Max. Torque [N·m]	4.45	4.45	7.58	7.58	9.54	9.54
Rated Speed [rpm]	3000		3200		3000	
Max. Speed [rpm]	6000				5000	
Rated Current [Amps] rms	1.43	1.43	2.90	2.90	4.36	4.36
Max. Instantaneous Current [Amps] rms	5.25	5.25	9.70	9.70	13.74	13.74
Change of Rated Power [W/s]	35.8	33.6	33.2	30.2	38.2	30.40
Rotor Inertia [x10 ⁻⁴ kg m ²]	0.45	0.48	1.51	1.66	2.65	3.33
Mechanical Time Constant [ms]	1.05	1.12	1.02	1.12	0.81	1.02
Torque Constant-KT [N·m/A]	0.888	0.888	0.772	0.772	0.729	0.729
Voltage Constant-KE [mV/rpm]	31.83	31.83	27.83	27.83	29.00	29.00
Armature Resistance [Ohm]	6.28	6.28	1.38	1.38	0.617	0.617
Armature Inductance [mH]	13.34	13.34	4.78	4.78	6.03	6.03
Electrical Time Constant [ms]	2.12	2.12	3.46	3.46	9.77	9.77
Insulation Class	Class A (UL), Class B (CE)					
Insulation Resistance	>100MΩ, 500VDC					
Insulation Strength	2.3 kVAC, 1 second					
Weight [kg]	1.4	1.9	2.8	3.6	4.3	4.7
Max. Radial Loading [N] ^{Note3}	245	245	392	392	490	490
Max. Axial Loading [N]	74	74	147	147	98	98
Brake Holding Torque [N·m (min)] ^{Note2}	n/a	1.3	n/a	2.5	n/a	8
Brake Power Consumption (at 20°C) [W]		7.2		8		18.7
Brake Release Time [ms (max)]		20		20		10
Brake Pull-in Time [ms (max)]		50		60		70

1–The rated torque is the continuous permissible torque between the 0°C and 40°C operating temperature which is suitable for a servo motor mounted with the heat sink dimensions shown below. The heat sink should be attached to the motor's mounting surface. For operating temperatures above 40°C, see section A.4.4.

Motor Face Direction	Heat Sink Dimension
40mm, 60mm, and 80mm	250mm x 250mm x 6mm

2–The built-in servo motor brake is only for keeping the object in a stopped state. Do not use it for deceleration or as a dynamic brake.
3–Max radial force is specified at 5mm from the end of the shaft.

460V Motor Specifications						
Model	SV2M-410N	SV2M-410B	SV2L-415N	SV2L-415B	SV2L-420N	SV2L-420B
Rated Power [kW]	1.0	1.0	1.5	1.5	2.0	2.0
Rated Torque [N·m] ^{Note1}	4.77	4.77	7.16	7.16	9.55	9.55
Max. Torque [N·m]	14.32	14.32	18.1	18.1	28.65	28.65
Rated Speed [rpm]	2000		2000			
Max. Speed [rpm]	3000		3000			
Rated Current [Amps] rms	3.6	3.6	5.1	5.1	6.7	6.7
Max. Instantaneous Current [Amps] rms	11.41	11.41	13.28	13.28	21.35	21.35
Change of Rated Power [W/s]	27.1	24.90	45.9	43.10	62.5	57.4
Rotor Inertia [x10 ⁻⁴ kg m ²]	8.41	9.14	11.18	11.9	14.59	15.88
Mechanical Time Constant [ms]	1.85	2.01	1.26	1.34	1.11	1.21
Torque Constant-KT [N·m/A]	1.325	1.325	1.404	1.404	1.425	1.425
Voltage Constant-KE [mV/rpm]	53.20	53.20	55.00	55.00	55.00	55.00
Armature Resistance [Ohm]	1.477	1.477	0.83	0.83	0.57	0.57
Armature Inductance [mH]	17.79	17.79	11.67	11.67	8.29	8.29
Electrical Time Constant [ms]	12.04	12.04	14.06	14.06	14.54	14.54
Insulation Class	Class A (UL), Class B (CE)					
Insulation Resistance	> 100MΩ, 500VDC					
Insulation Strength	2.3 kVAC, 1 second					
Weight [kg]	7.0	8.4	7.5	8.9	7.8	9.2
Max. Radial Loading [N] ^{Note3}	490		490	490	490	490
Max. Axial Loading [N]	98		98	98	98	98
Brake Holding Torque [N·m (min)] ^{Note2}	n/a	10	n/a	10	n/a	10
Brake Power Consumption (at 20°C) [W]		19		19		19
Brake Release Time [ms (max)]		10		10		10
Brake Pull-in Time [ms (max)]		70		70		70
1–The rated torque is the continuous permissible torque between the 0°C and 40°C operating temperature which is suitable for a servo motor mounted with the heat sink dimensions shown below. The heat sink should be attached to the motor's mounting surface. For operating temperatures above 40°C, see section A.4.4.						
Motor Face Direction			Heat Sink Dimension			
40mm, 60mm, and 80mm			250mm x 250mm x 6mm			
2–The built-in servo motor brake is only for keeping the object in a stopped state. Do not use it for deceleration or as a dynamic brake.						
3–Max radial force is specified at 5mm from the end of the shaft.						

460V Motor Specifications						
Model	SV2H-430N	SV2H-430B	SV2H-445N	SV2H-445B	SV2H-455N	SV2H-455B
Rated Power [kW]	3.0	3.0	4.5	4.5	5.5	5.5
Rated Torque [N·m] ^{Note1}	19.1	19.1	28.65	28.65	35	35
Max. Torque [N·m]	49.38	49.38	64.61	64.61	73.48	73.48
Rated Speed [rpm]	1500					
Max. Speed [rpm]	3000					
Rated Current [Amps] rms	12.2	12.2	21.9	21.9	23.6	23.6
Max. Instantaneous Current [Amps] rms	30.46	30.46	47.5	47.5	47.5	47.5
Change of Rated Power [W/s]	66.4	63.9	105.6	101.8	122.8	119.3
Rotor Inertia [x10 ⁻⁴ kg m ²]	54.95	57.1	77.75	80.65	99.78	102.7
Mechanical Time Constant [ms]	1.20	1.24	1.06	1.10	0.84	0.86
Torque Constant-KT [N·m/A]	1.566	1.566	1.308	1.308	1.483	1.483
Voltage Constant-KE [mV/rpm]	64.4	64.4	53.00	53.00	58.9	58.9
Armature Resistance [Ohm]	0.21	0.21	0.09	0.09	0.07	0.07
Armature Inductance [mH]	4.94	4.94	2.36	2.36	2.20	2.20
Electrical Time Constant [ms]	23.52	23.52	26.22	26.22	31.43	31.43
Insulation Class	Class A (UL), Class B (CE)					
Insulation Resistance	> 100MΩ, 500VDC					
Insulation Strength	1.8 kVAC, 1 second					
Weight [kg]	18.5	22.5	23.5	29	30.5	36
Max. Radial Loading [N] ^{Note3}	1470				1764	
Max. Axial Loading [N]	490				588	
Brake Holding Torque [N·m (min)] ^{Note2}	n/a	25	n/a	55	n/a	55
Brake Power Consumption (at 20°C) [W]		20.4		19.9		19.9
Brake Release Time [ms (max)]		10		10		10
Brake Pull-in Time [ms (max)]		70		70		70
1–The rated torque is the continuous permissible torque between the 0°C and 40°C operating temperature which is suitable for a servo motor mounted with the heat sink dimensions shown below. The heat sink should be attached to the motor's mounting surface. For operating temperatures above 40°C, see section A.4.4.						
Motor Face Direction		Heat Sink Dimension				
100mm		300mm x 300mm x 12mm				
130mm		400mm x 400mm x 20mm				
180mm		550mm x 550mm x 30mm				
All made from aluminum						
2–The built-in servo motor brake is only for keeping the object in a stopped state. Do not use it for deceleration or as a dynamic brake.						
3–Max radial force is specified at 5mm from the end of the shaft.						

460V Motor Specifications (cont'd)						
Model	SV2H-475N	SV2H-475B	SV2H-4B0N	SV2H-4B0B	SV2H-4F0N	SV2H-4F0B
Rated Power [kW]	7.5	7.5	11	11	15	15
Rated Torque [N·m] ^{Note 1}	47.74	47.74	70	70	95.4	95.4
Max. Torque [N·m]	93.71	93.71	175	175	224.0	224.0
Rated Speed [rpm]	1500		1500			
Max. Speed [rpm]	3000		2000			
Rated Current [Amps] rms	28.7	28.7	26.8	26.8	37.5	37.5
Max. Instantaneous Current [Amps] rms	57.69	57.69	67.7	67.7	95.3	95.3
Change of Rated Power [W/s]	159.7	156.6	145.0	141.4	201.8	197.1
Rotor Inertia [x10 ⁻⁴ kg m ²]	142.7	145.5	338	346.5	451	461.8
Mechanical Time Constant [ms]	0.81	0.83	1.40	1.44	1.21	1.23
Torque Constant-KT [N·m/A]	1.663	1.663	2.612	2.612	2.544	2.544
Voltage Constant-KE [mV/rpm]	66.40	66.40	96.00	96.00	83.90	83.90
Armature Resistance [Ohm]	0.06	0.06	0.0994	0.0994	0.0545	0.0545
Armature Inductance [mH]	1.70	1.70	2.51	2.51	1.43	1.43
Electrical Time Constant [ms]	28.33	28.33	25.25	25.25	26.24	26.24
Insulation Class	Class A (UL), Class B (CE)		Class F (UL), Class F (CE)			
Insulation Resistance	> 100MΩ, 500VDC					
Insulation Strength	1.8 kVAC, 1 second					
Weight [kg]	40.5	46	56.4	68.4	75	87
Max. Radial Loading [N] ^{Note 3}	1764		3300			
Max. Axial Loading [N]	588		1100			
Brake Holding Torque [N·m (min)] ^{Note 2}	n/a	55	n/a	115	n/a	115
Brake Power Consumption (at 20°C) [W]		19.9		28.8		28.8
Brake Release Time [ms (max)]		10		10		10
Brake Pull-in Time [ms (max)]		70		70		70

1–The rated torque is the continuous permissible torque between the 0°C and 40°C operating temperature which is suitable for a servo motor mounted with the following heat sink dimensions (the heat sink should be attached to the motor's mounting surface):

Motor Face Dimension	Heat Sink Dimension
40mm, 60mm, and 80mm	250mm x 250mm x 6mm
100mm	300mm x 300mm x 12mm
130mm	400mm x 400mm x 20mm
180mm	550mm x 550mm x 30mm
220mm	650mm x 650mm x 35mm

2–The built-in servo motor brake is only for keeping the object in a stopped state. Do not use it for deceleration or as a dynamic brake.

3–Max radial force is specified at 5mm from the end of the shaft.

A.4.3 - SURESERVO2 MOTOR ENVIRONMENTAL SPECIFICATIONS

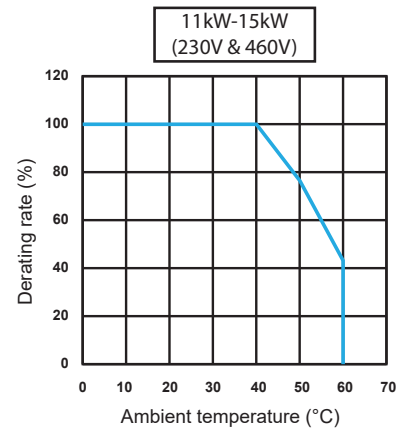
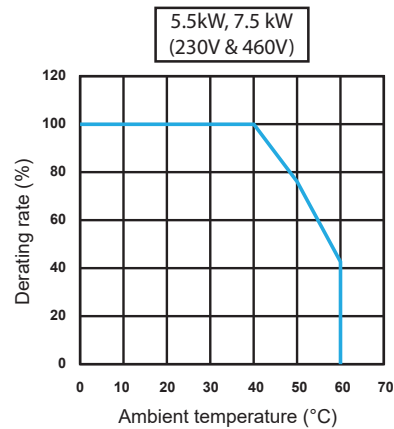
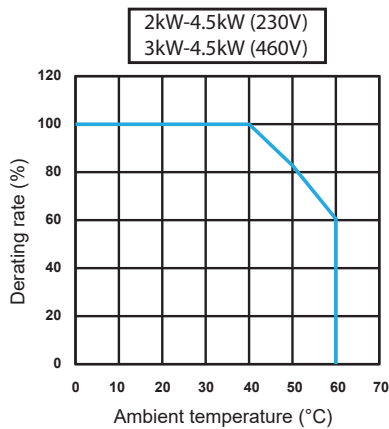
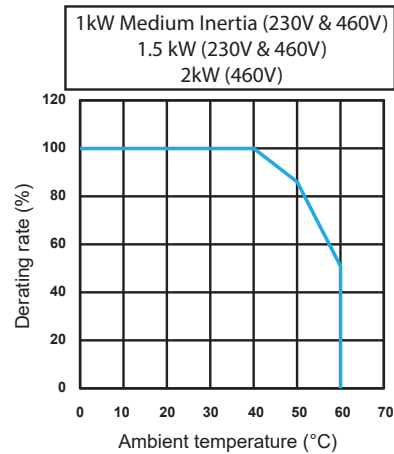
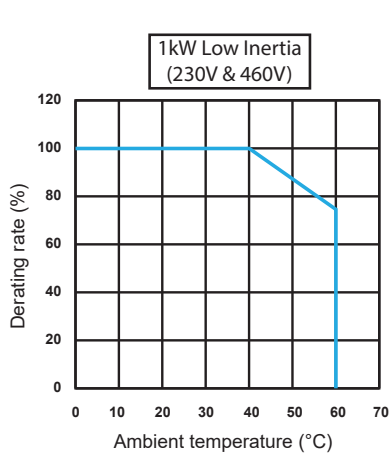
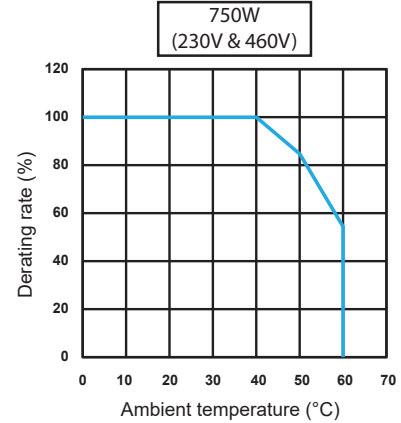
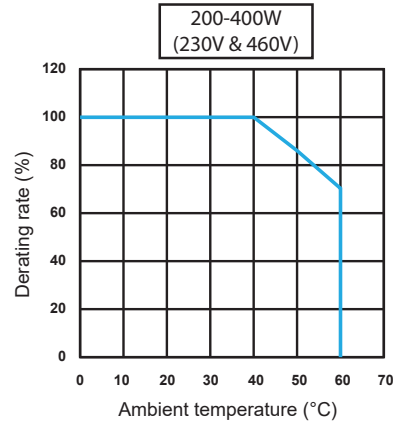
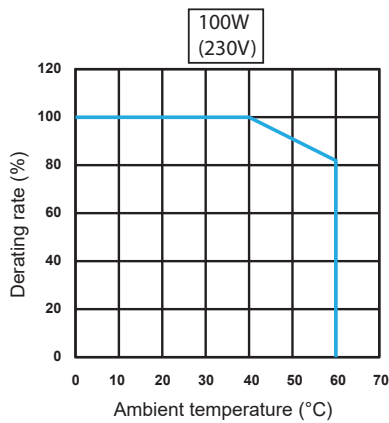
Model	All 230V and 460V SureServo2 Motors
Vibration Grade [μm]	V15
Operating Temperature [$^{\circ}\text{C}$]	0–40 $^{\circ}\text{C}$ ** (32–104 $^{\circ}\text{F}$)
Storage Temperature [$^{\circ}\text{C}$]	-10 $^{\circ}\text{C}$ to 80 $^{\circ}\text{C}$ (-14 $^{\circ}\text{F}$ to 176 $^{\circ}\text{F}$)
Operating Humidity	20–90% relative humidity (non-condensing)
Storage Humidity	20–90% relative humidity (non-condensing)
Vibration Capacity	2.5 G
IP Rating	IP67* or IP65 (when using waterproof connectors) All SureServo2 motors are shipped with oil seals installed.
Encoder Resolution	24-bit (16777216 p/rev)
Agency Approvals	cUR _{US} , CE

* SV2L-201x, SV2L-202x, SV2L-204x, SV2L-207x, SV2L-404x, and SV2L-407x are IP67 when using waterproof connectors. All other SureServo2 motors are IP65.

** For operating temperatures above 40 $^{\circ}\text{C}$, see section A.4.4.

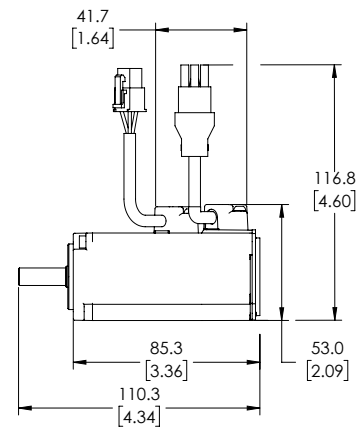
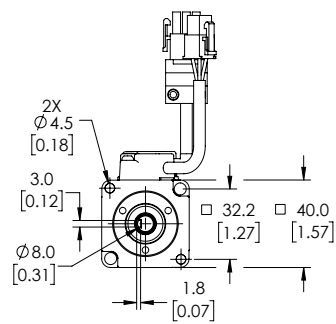
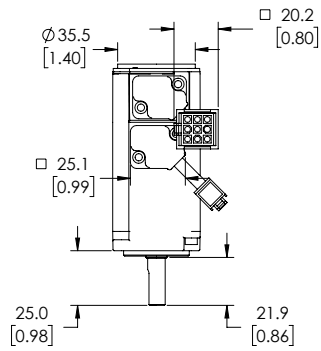
A.4.4 - SURESERVO2 MOTOR TEMPERATURE DERATING

Refer to the below graphs for operating different motor sizes in environments from 40-60°C.
The derated percent torque shown is continuous torque.



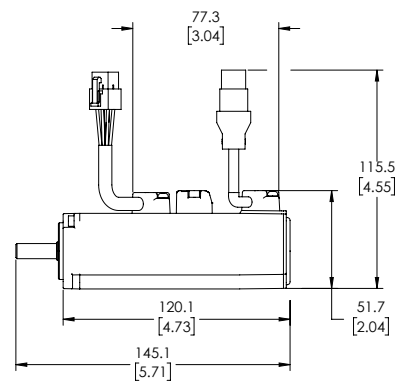
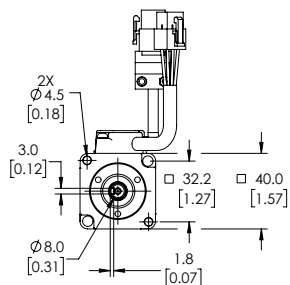
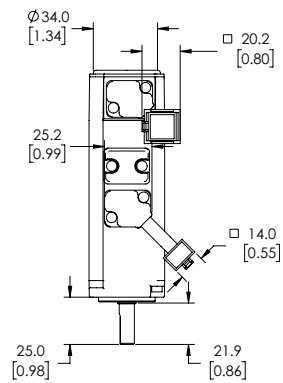
A.5 - SURESERVO2 MOTOR DIMENSIONS

SV2L-201N

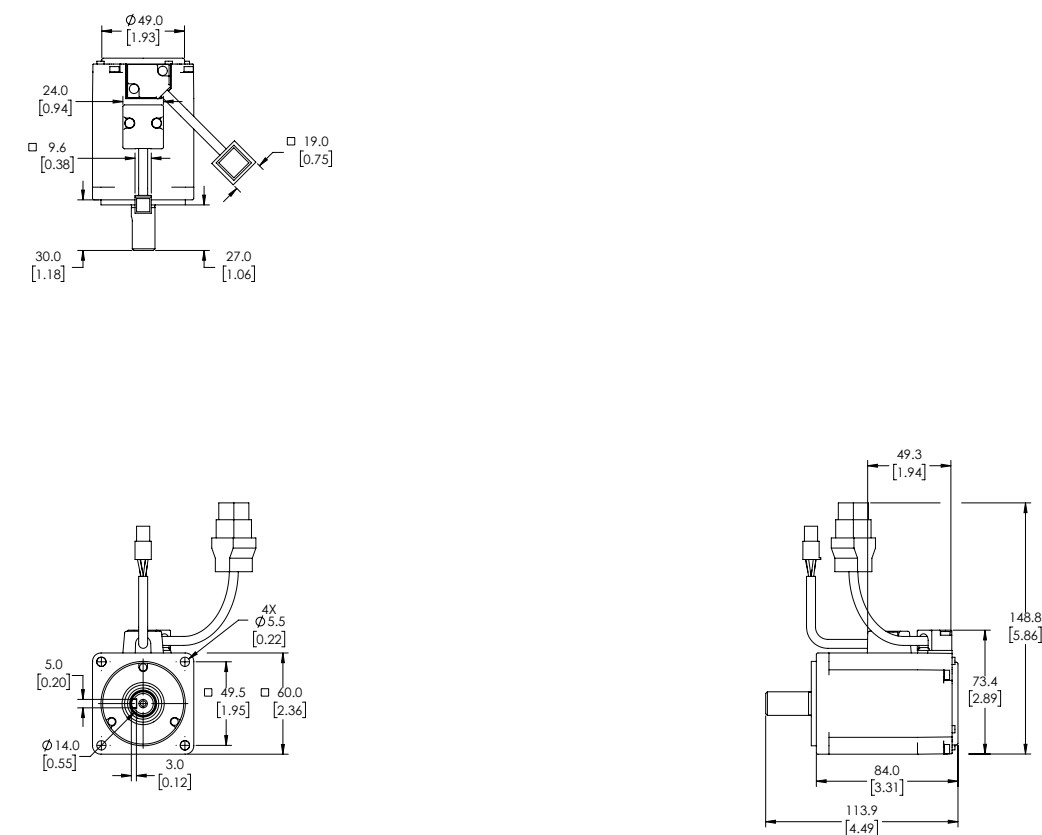


Units: mm [inches]

SV2L-201B

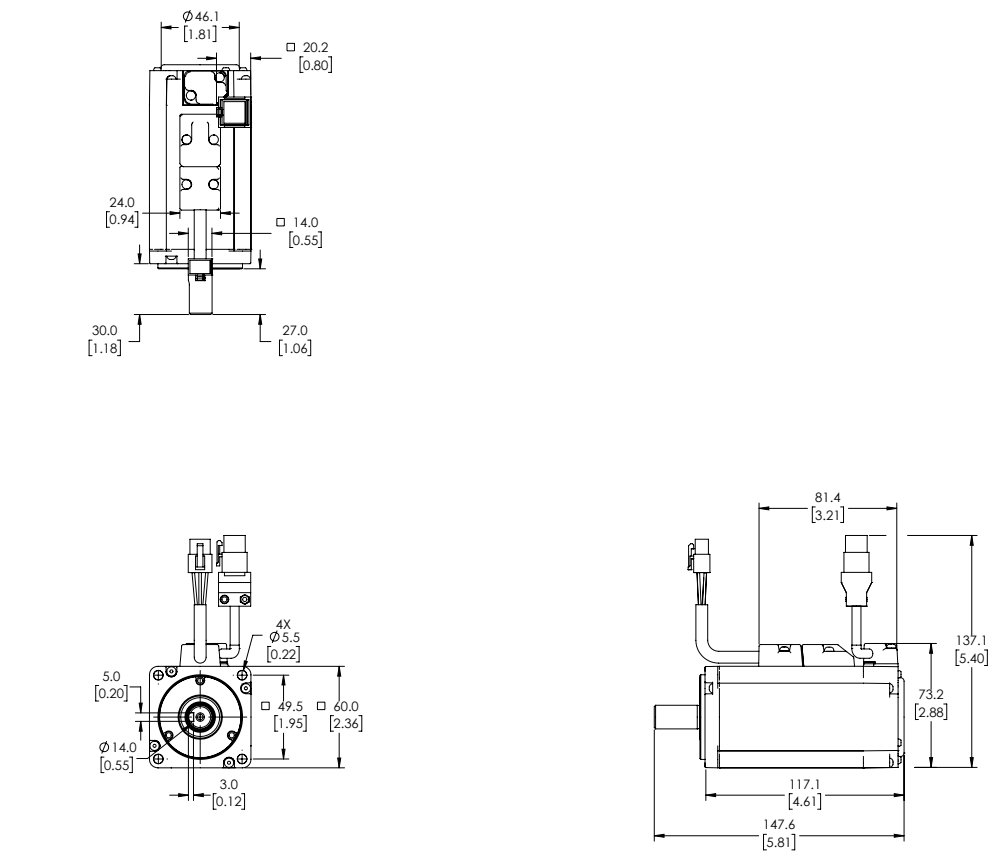


SV2L-202N

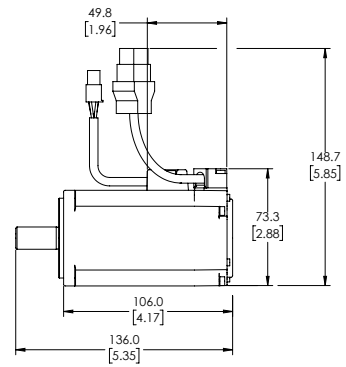
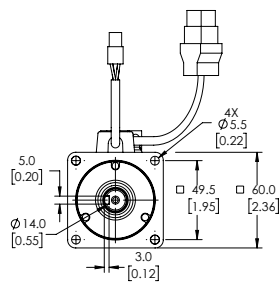
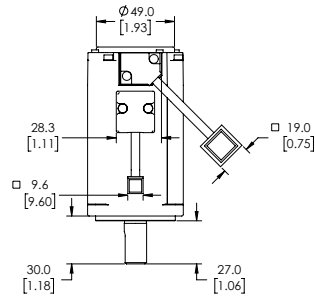


Units: mm [inches]

SV2L-202B

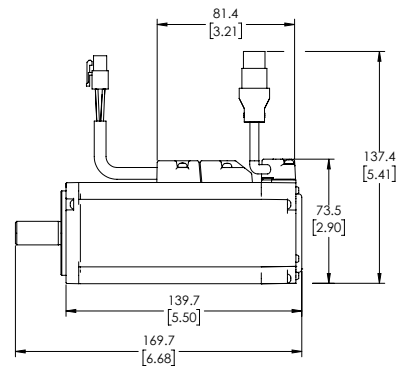
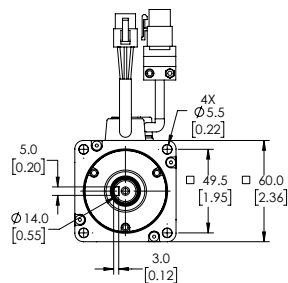
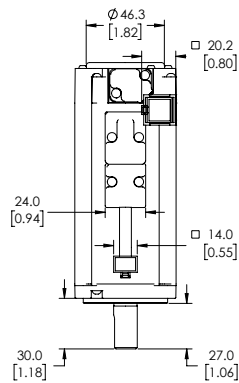


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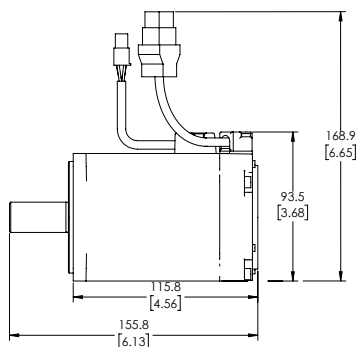
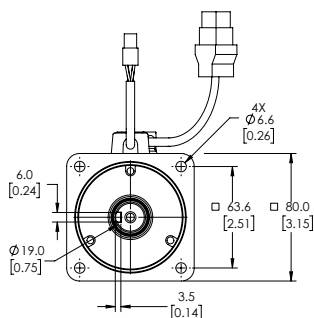
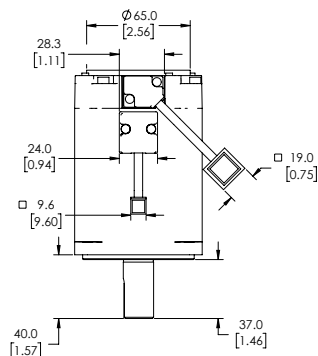


Units: mm [inches]

SV2L-204B

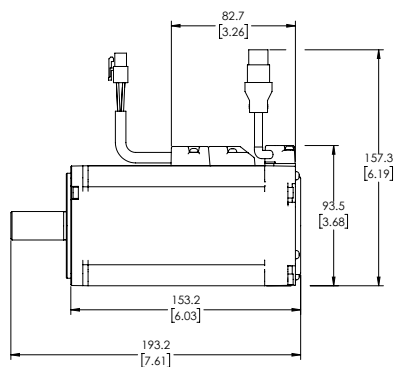
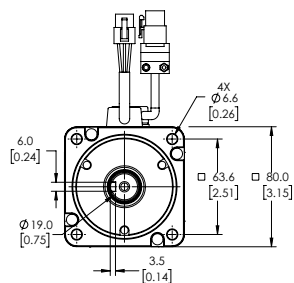
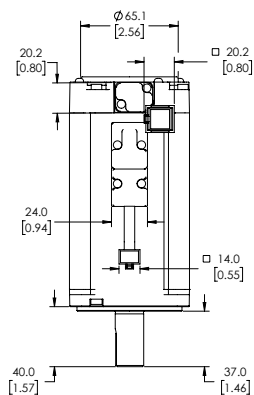


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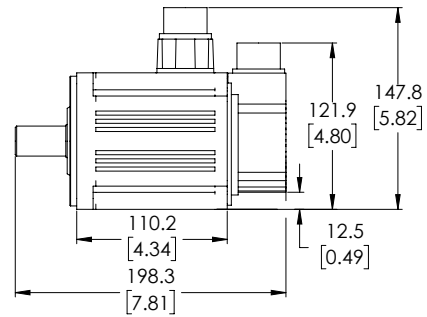
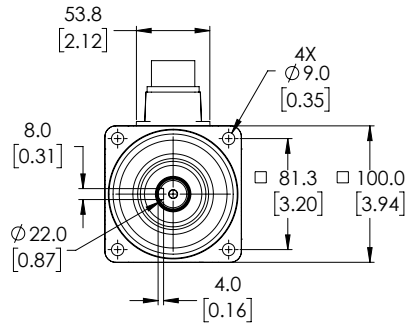
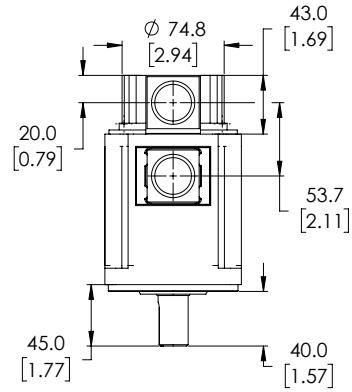


Units: mm [inches]

SV2L-207B

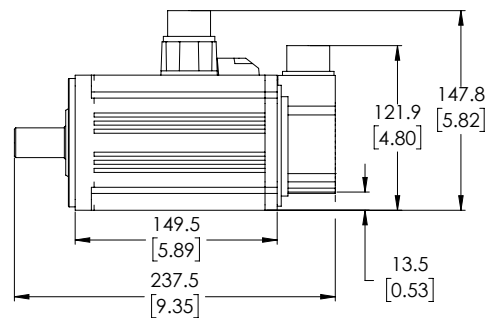
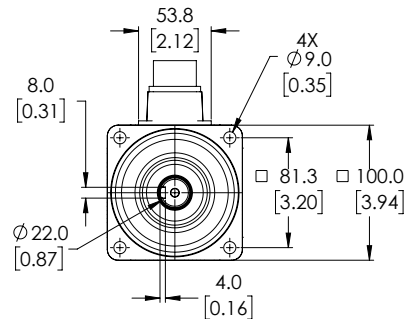
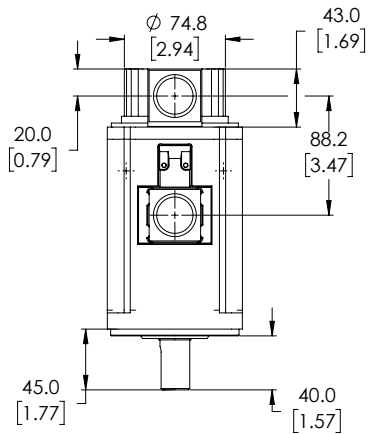


SV2L-210N



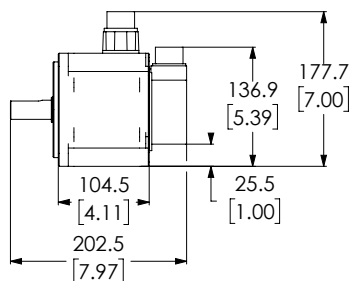
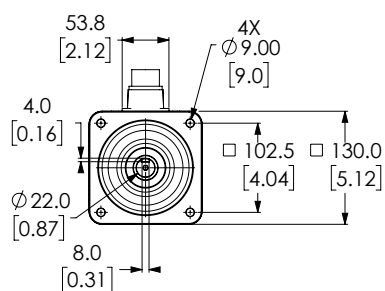
Units: mm [inches]

SV2L-210B

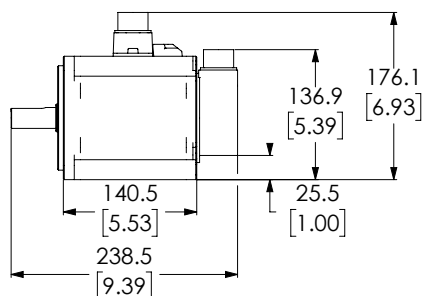
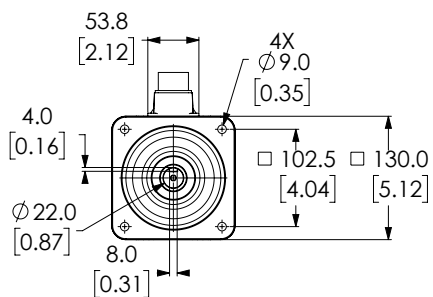
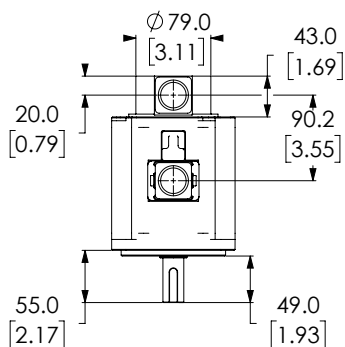


Technical drawing of a mechanical part with dimensions in mm and inches:

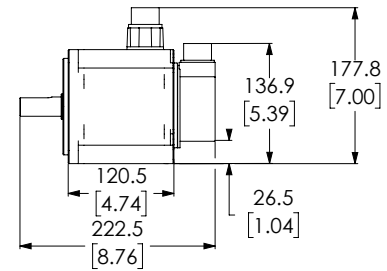
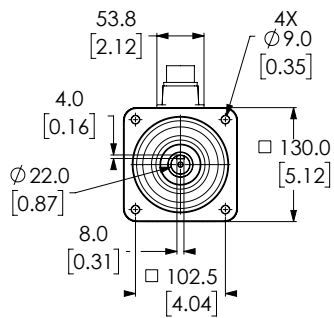
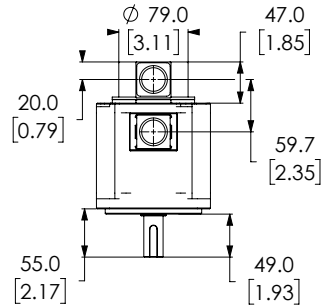
- Top diameter: $\phi 79.0$ [3.11]
- Top flange thickness: 20.0 [0.79]
- Top flange outer diameter: 43.0 [1.69]
- Top flange inner diameter: 55.7 [2.19]
- Bottom flange thickness: 55.0 [2.17]
- Bottom flange outer diameter: 49.0 [1.93]



SV2M-210B

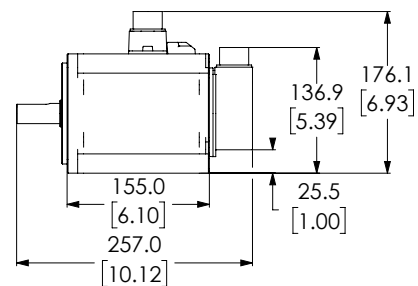
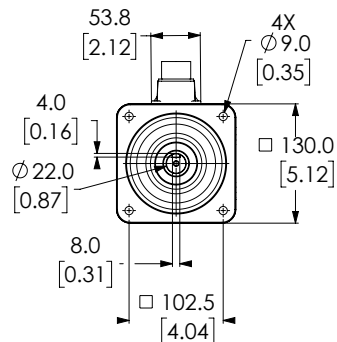
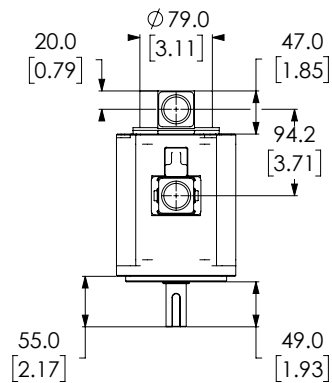


SV2M-215N

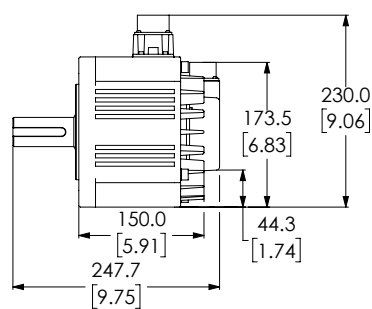
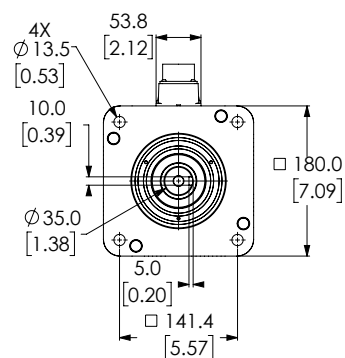
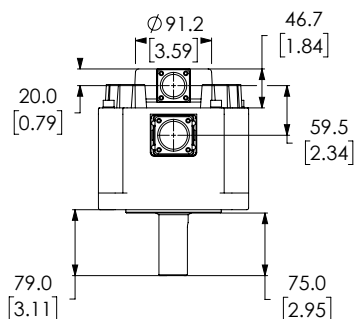


Units: mm [inches]

SV2M-215B

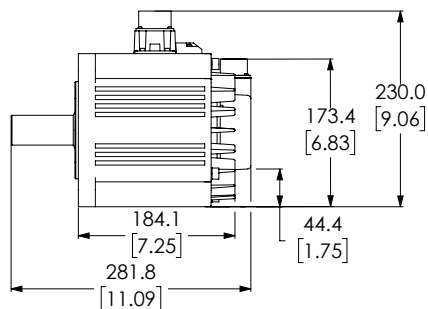
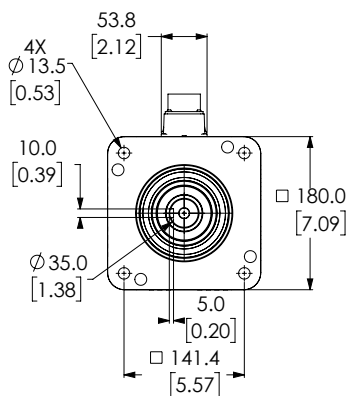
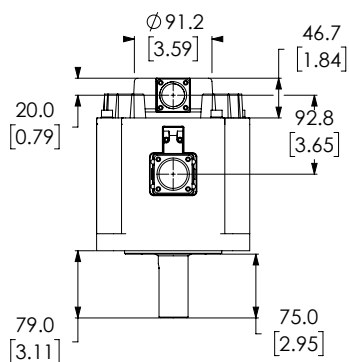


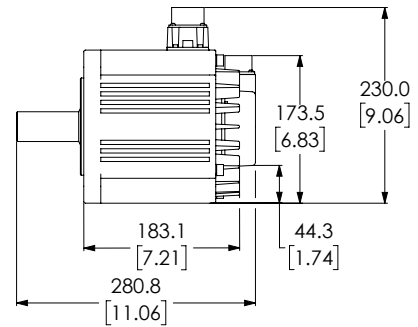
SV2M-220N



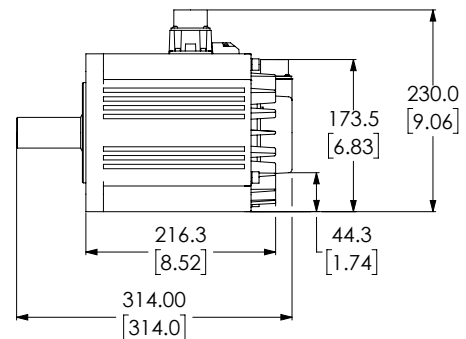
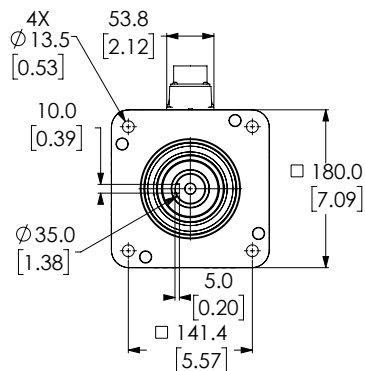
Units: mm [inches]

SV2M-220B

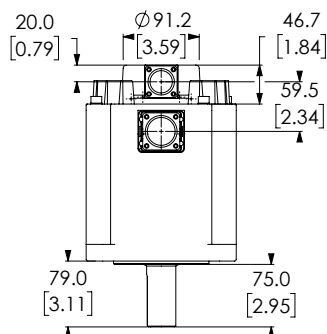




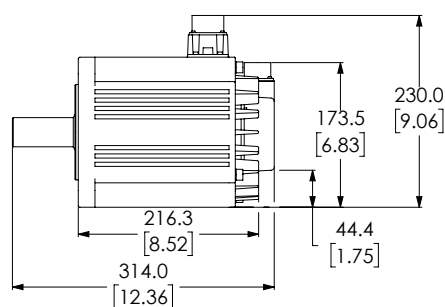
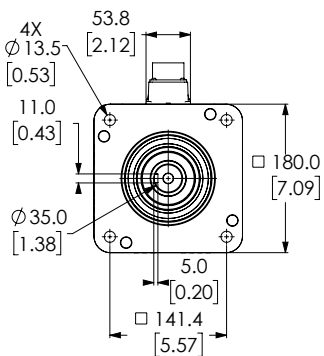
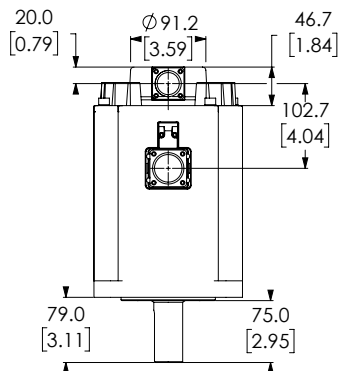
Units: mm [inches]



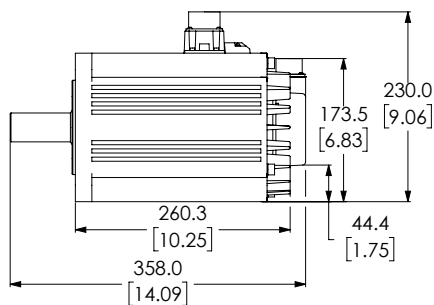
SV2H-245N



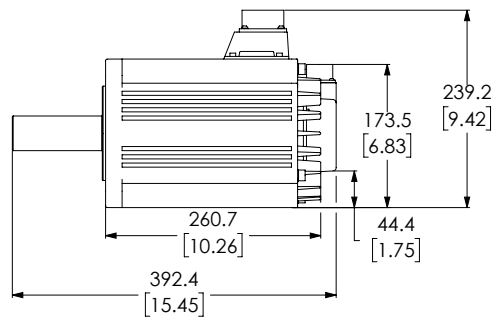
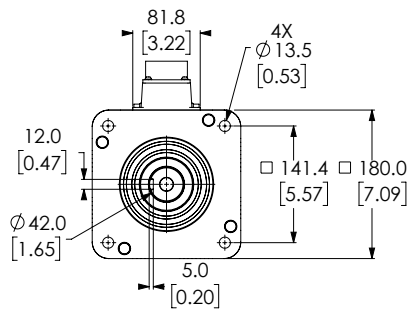
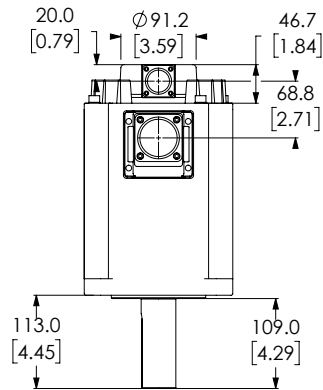
SV2H-245B



Units: mm [inches]

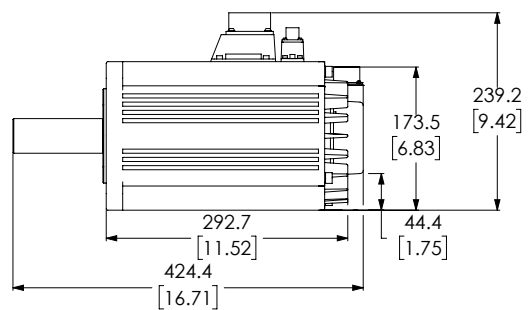
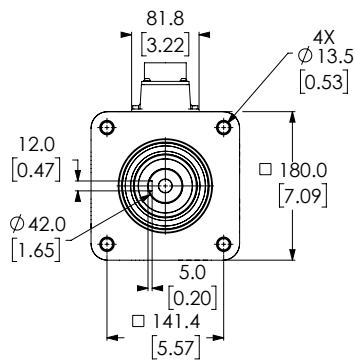
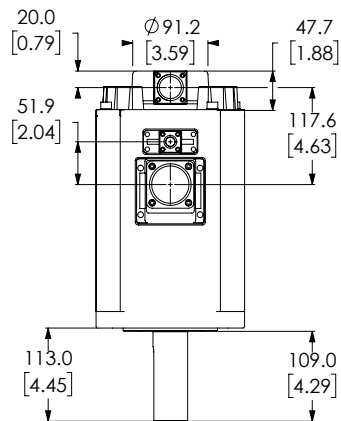


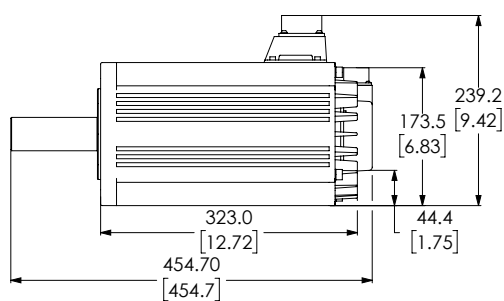
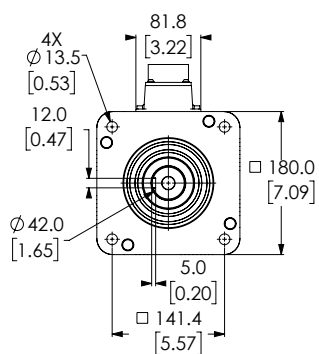
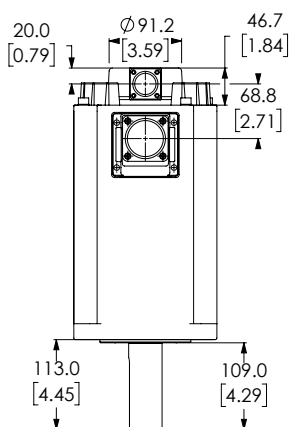
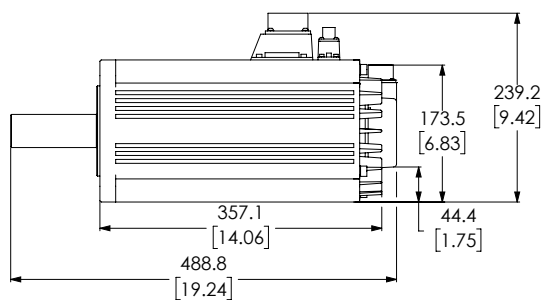
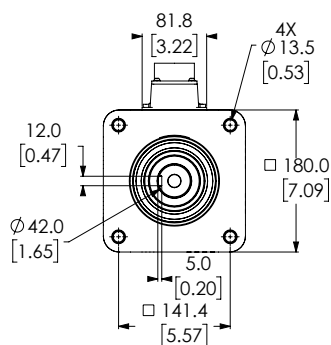
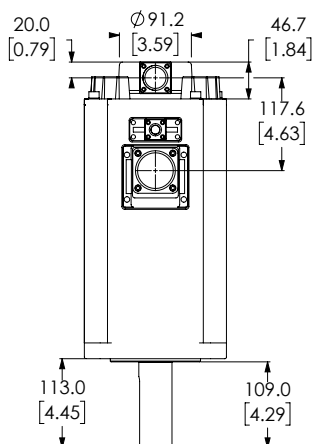
SV2H-255N



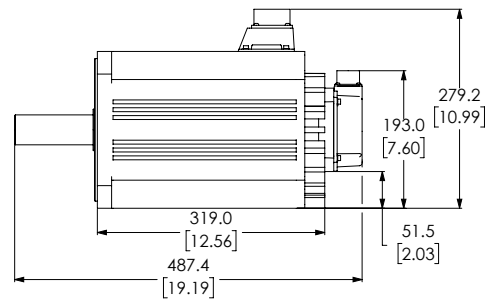
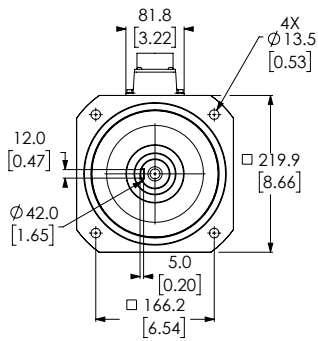
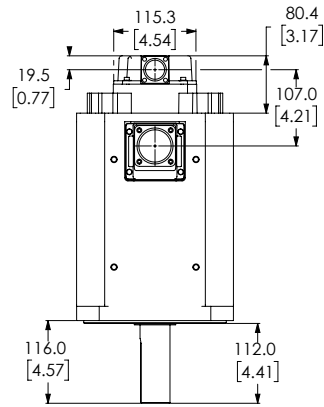
Units: mm [inches]

SV2H-255B



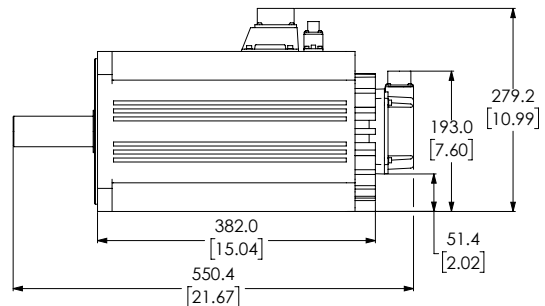
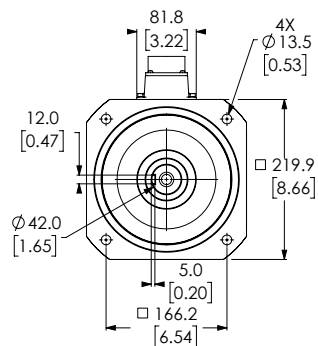
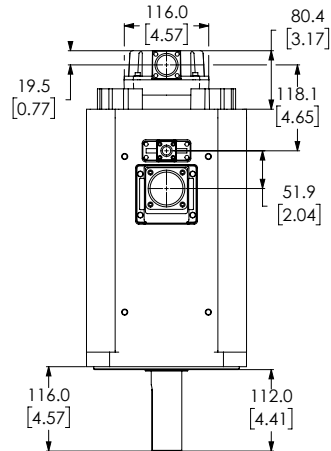
SV2H-275N**Units: mm [inches]****SV2H-275B**

SV2H-2B0N

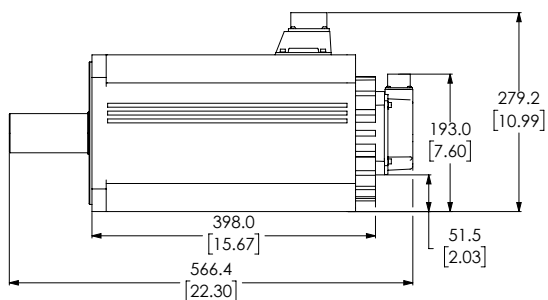
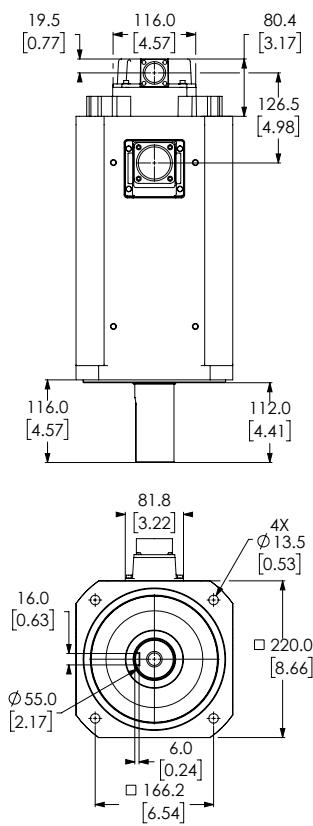


Units: mm [inches]

SV2H-2B0B

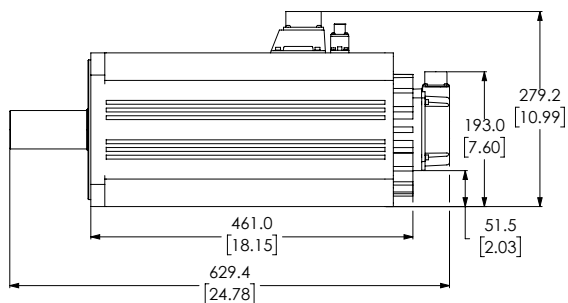
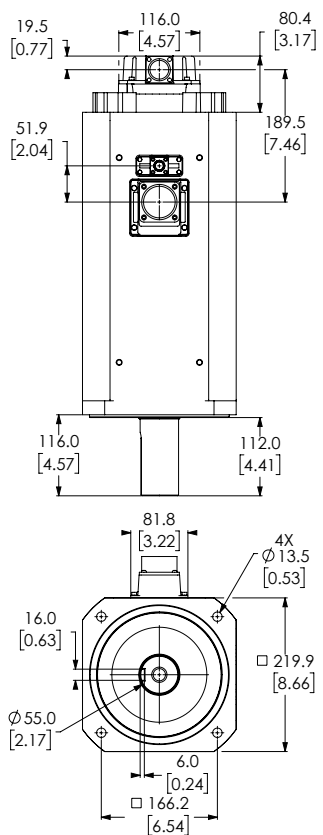


SV2H-2F0N

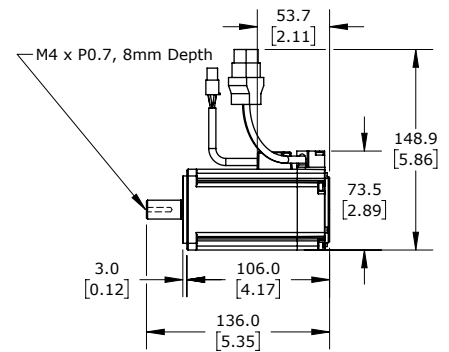
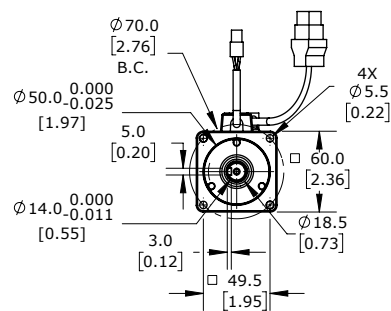
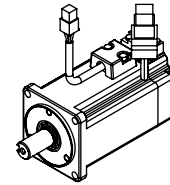
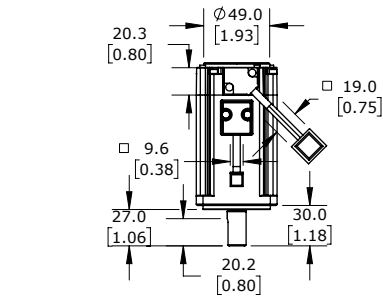


Units: mm [inches]

SV2H-2F0B

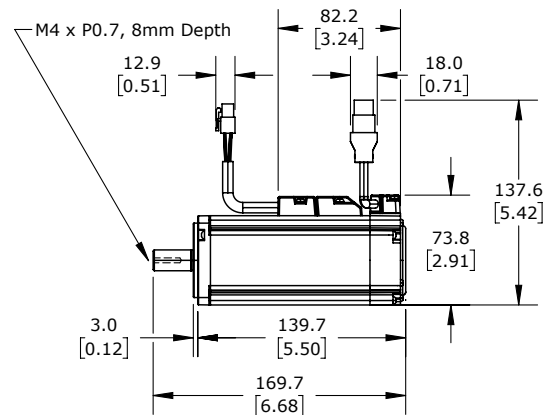
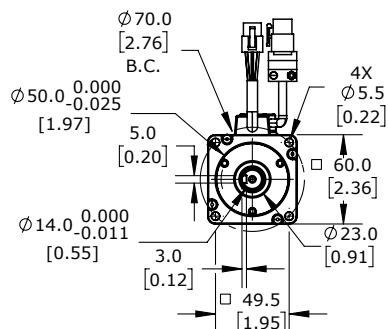
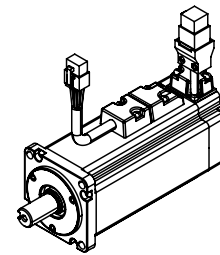
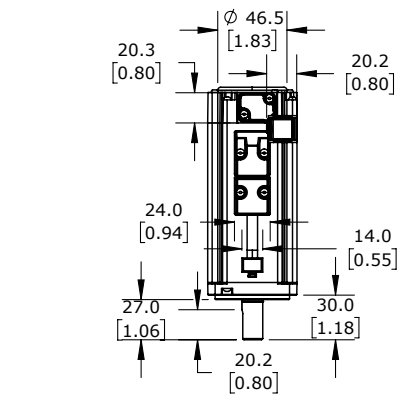


SV2L-404N

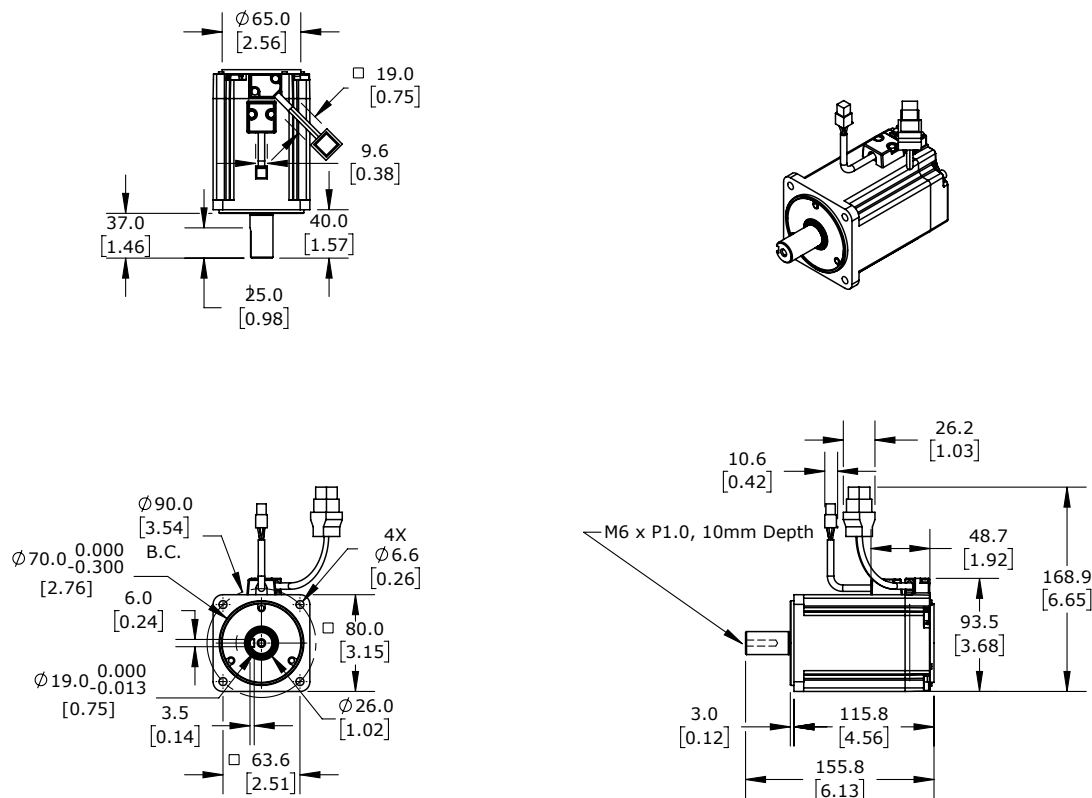


Units: mm [inches]

SV2L-404B

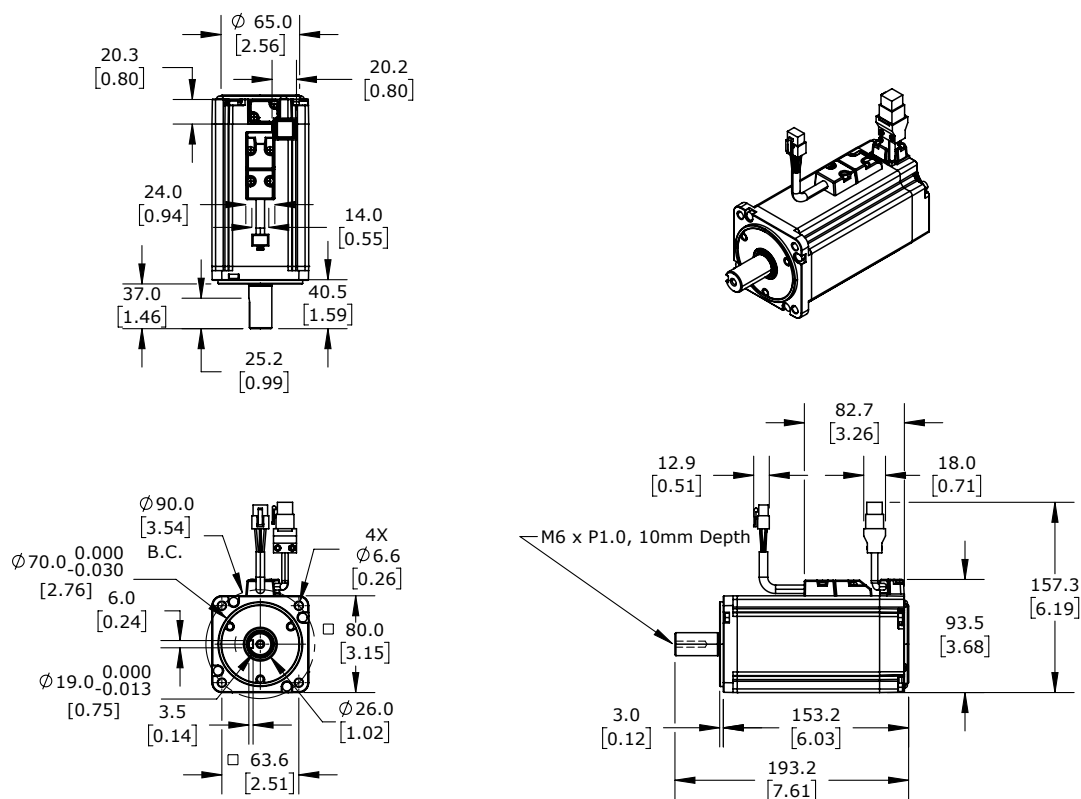


SV2L-407N

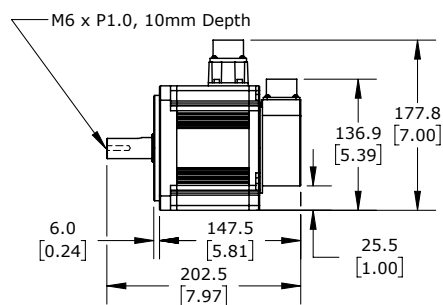
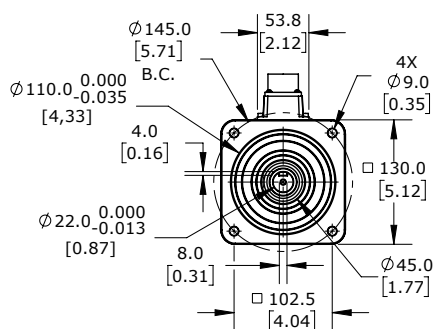
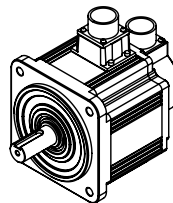
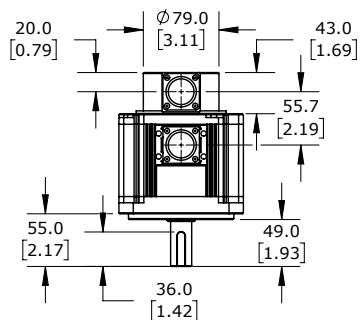


Units: mm [inches]

SV2L-407B

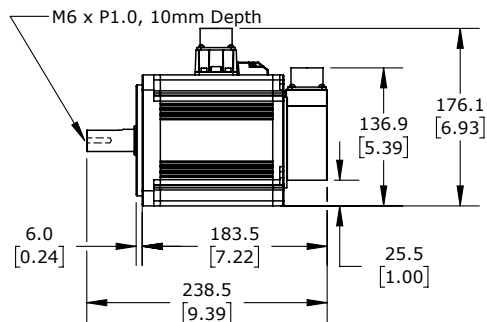
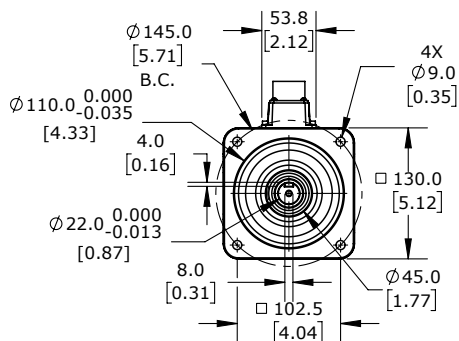
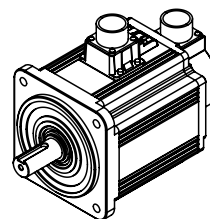
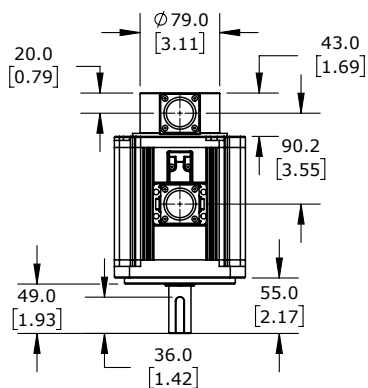


SV2M-410N

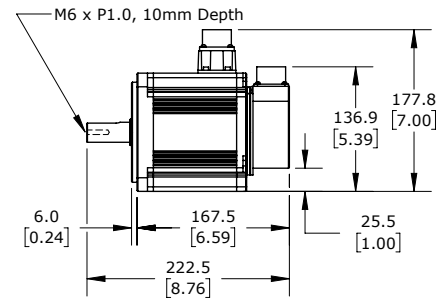
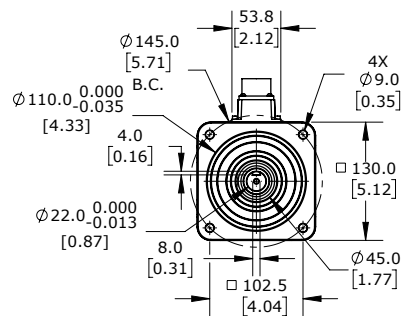
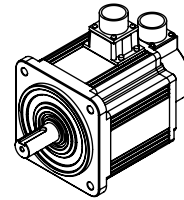
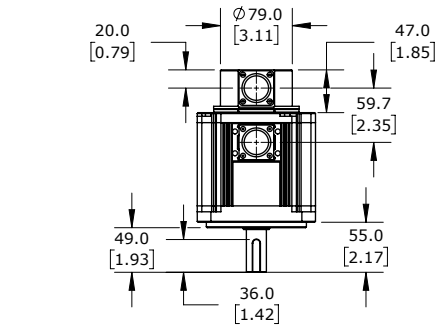


Units: mm [inches]

SV2M-410B

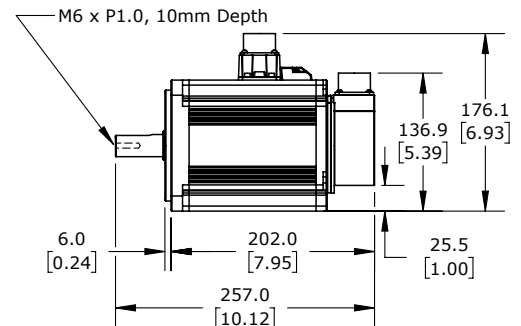
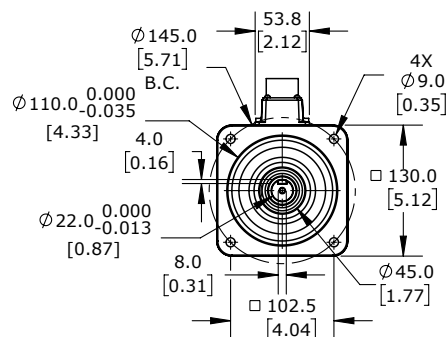
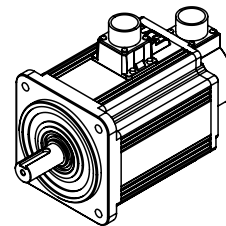
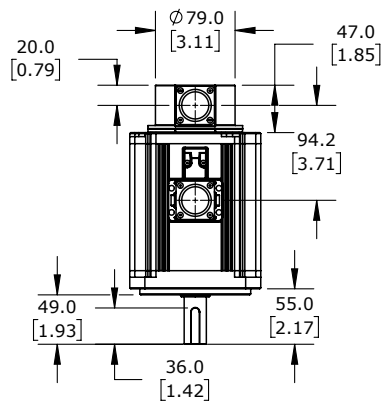


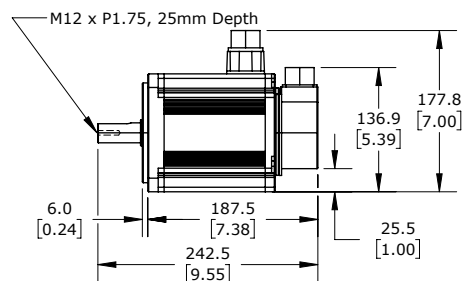
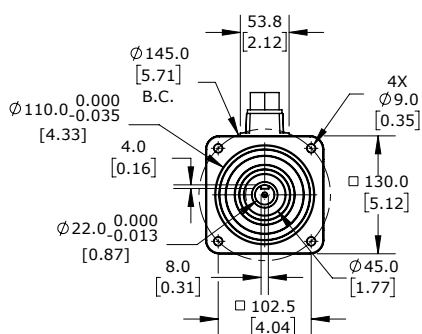
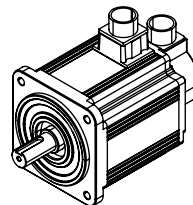
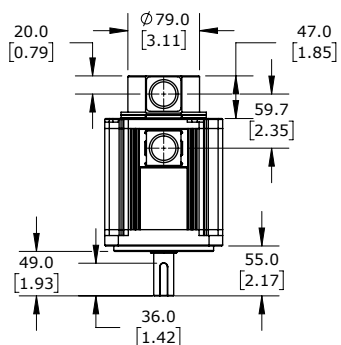
SV2L-415N



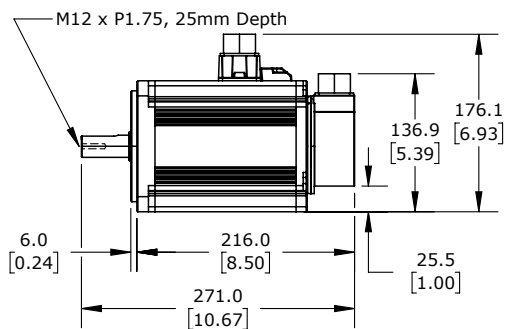
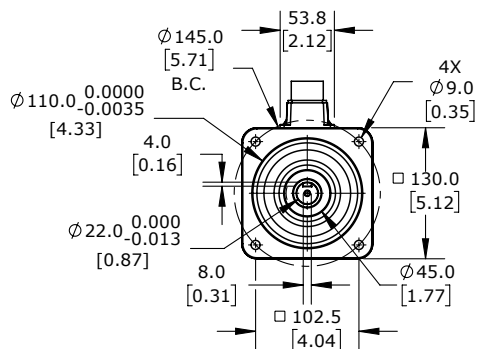
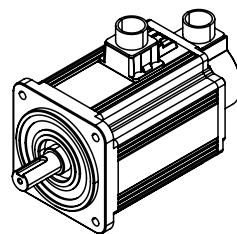
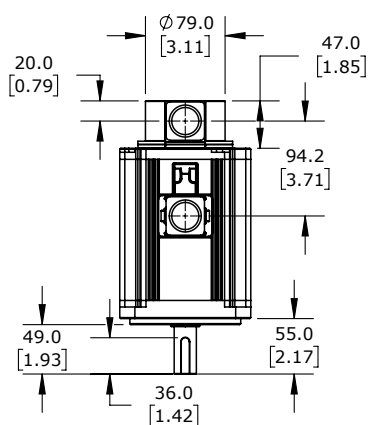
Units: mm [inches]

SV2L-415B

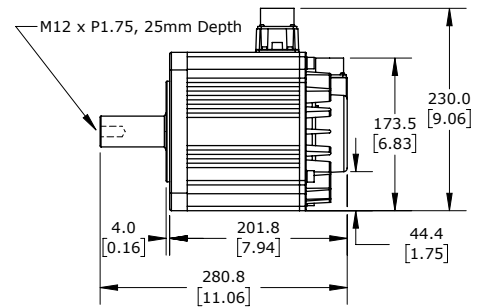
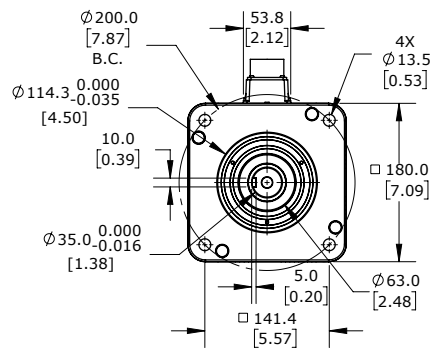
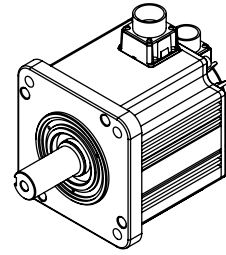
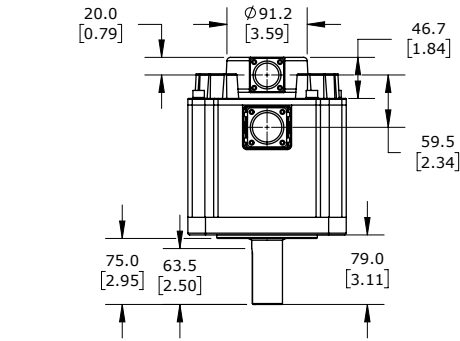


SV2L-420N

Units: mm [inches]

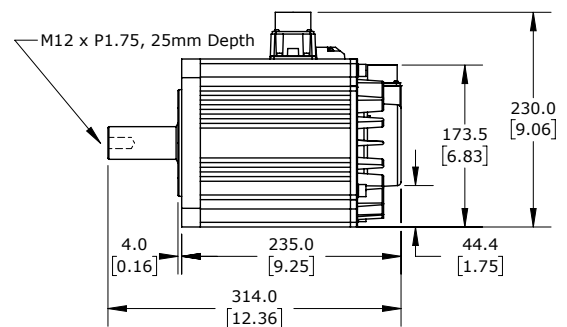
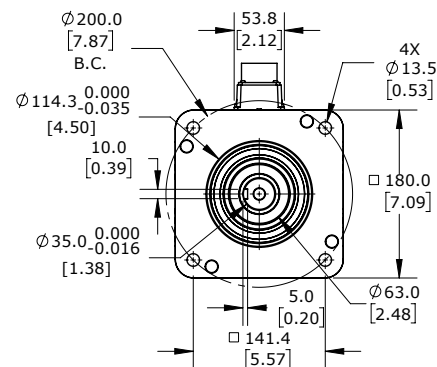
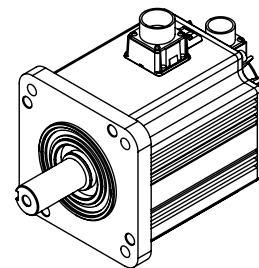
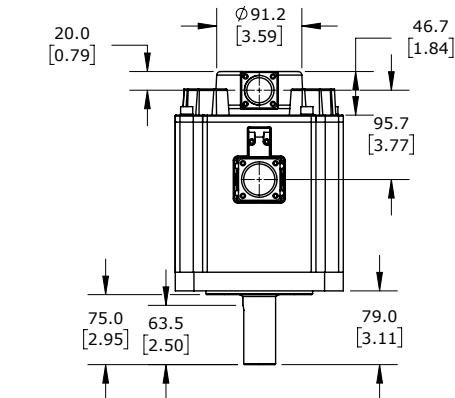
SV2L-420B

SV2H-430N

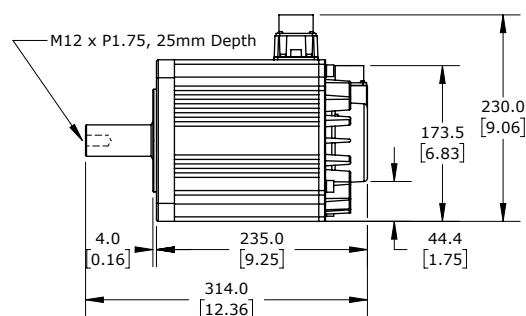
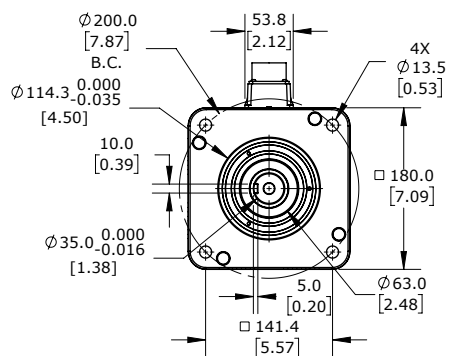
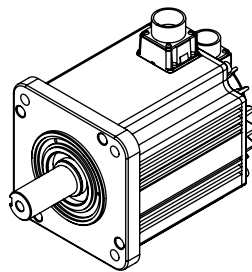
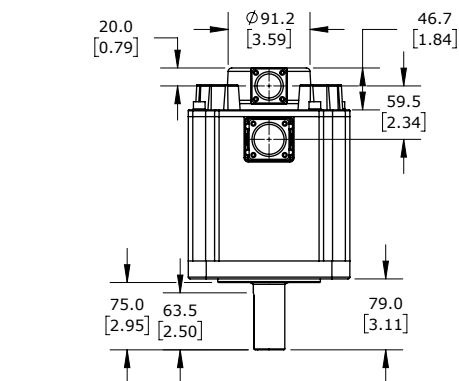


Units: mm [inches]

SV2H-430B

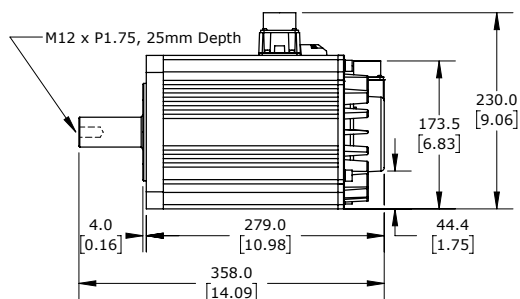
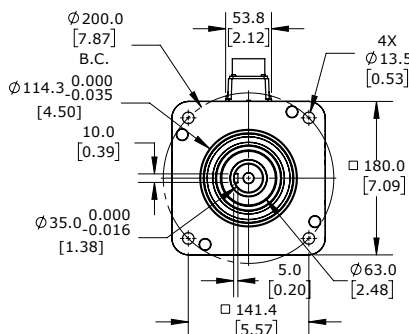
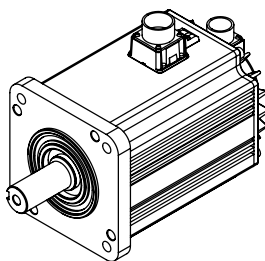
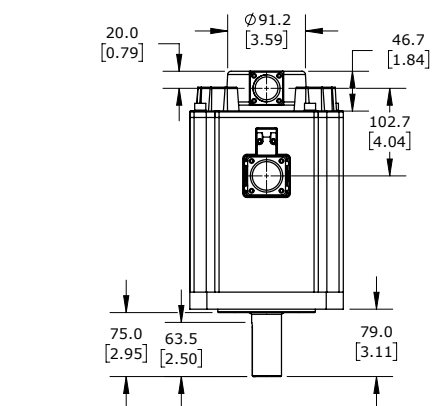


SV2H-445N

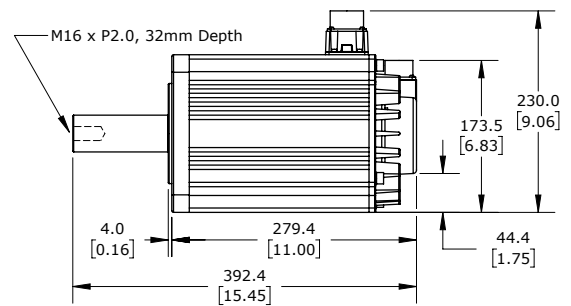
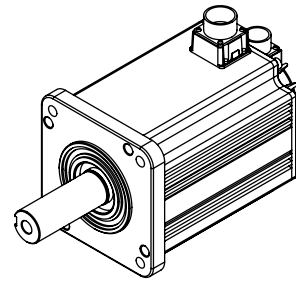
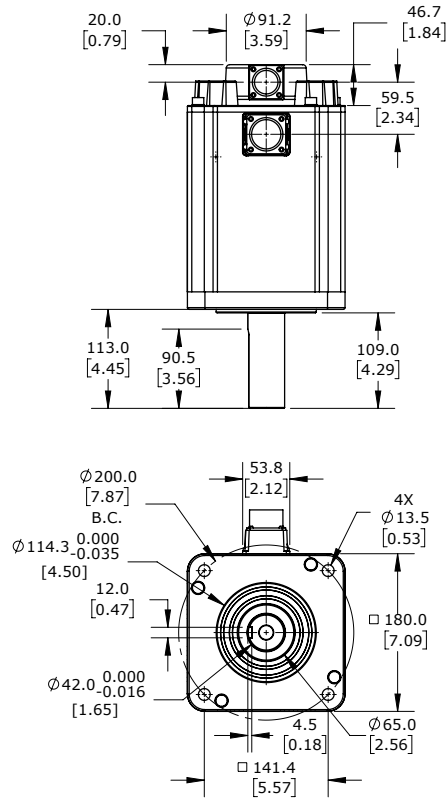


Units: mm [inches]

SV2H-445B

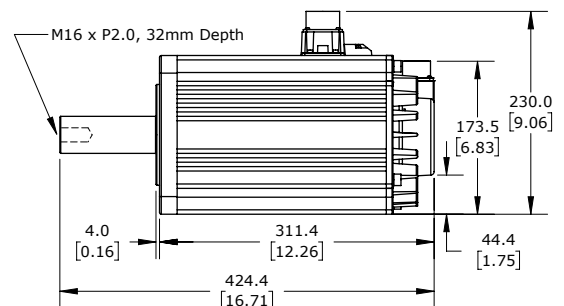
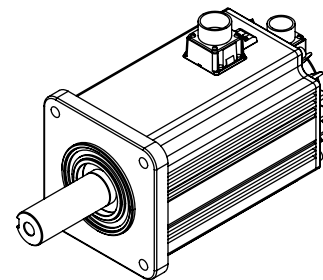
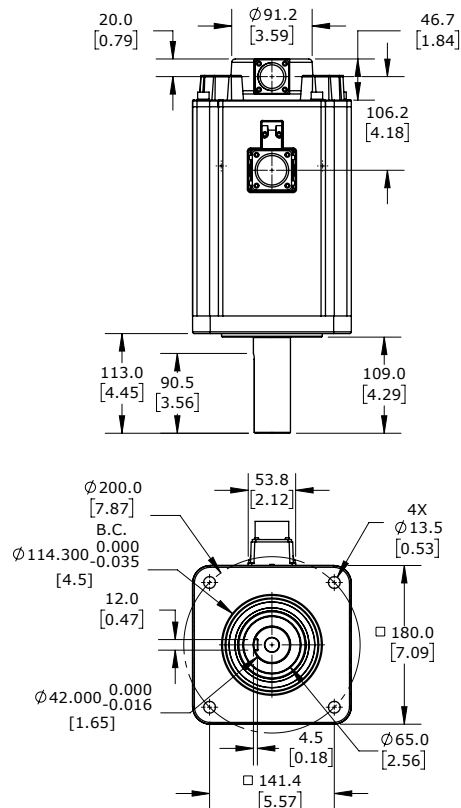


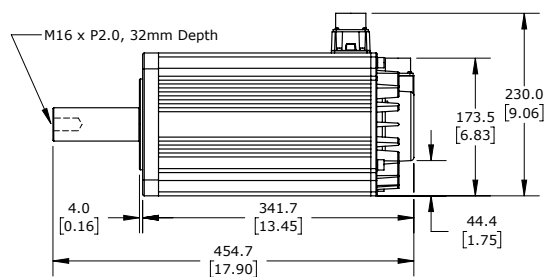
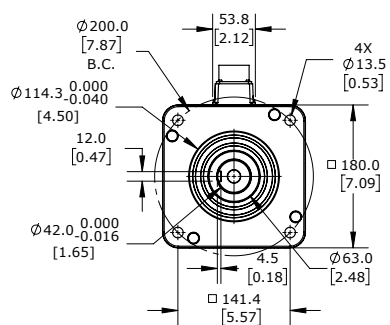
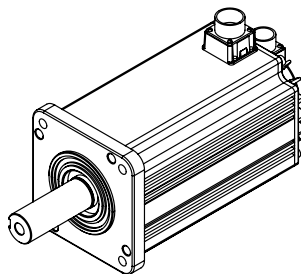
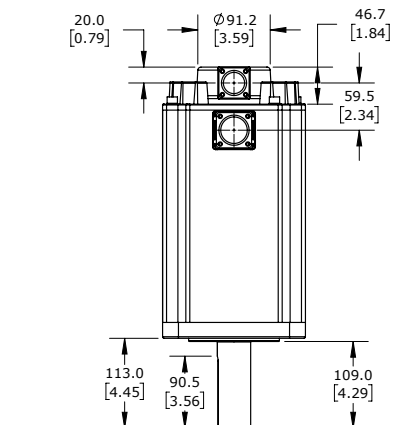
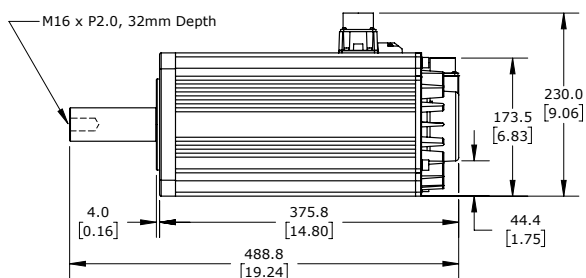
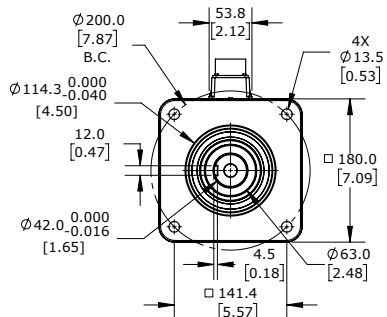
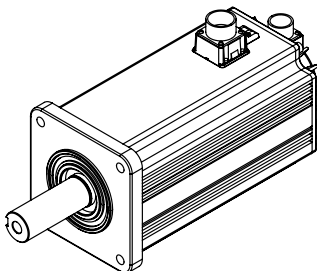
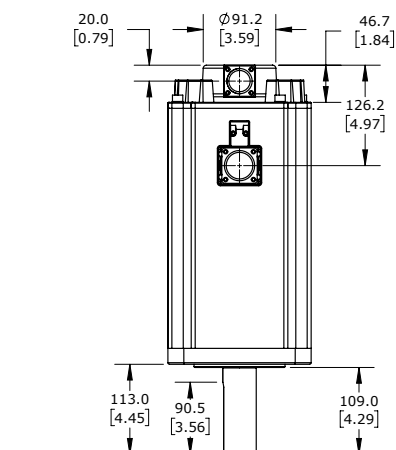
SV2H-455N



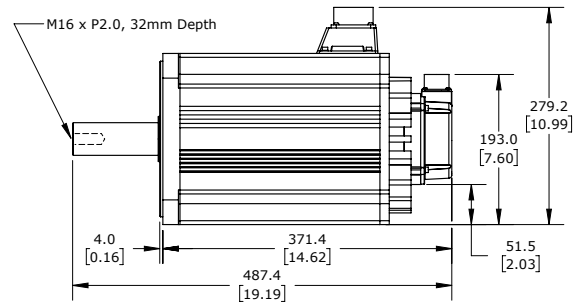
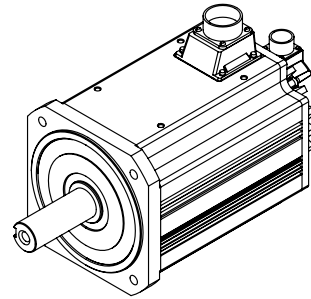
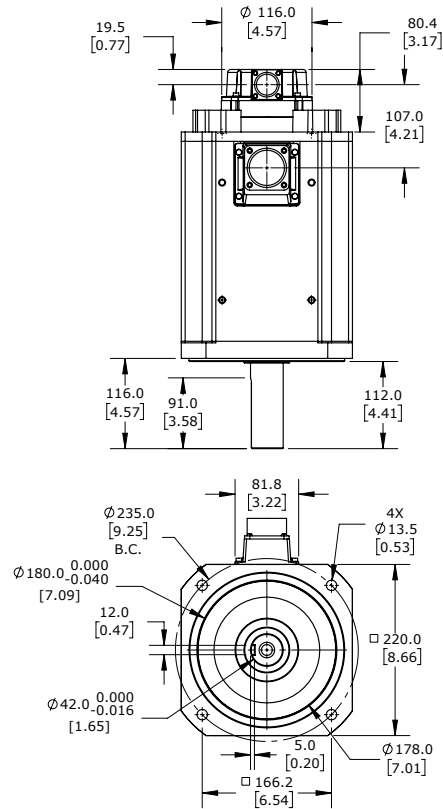
Units: mm [inches]

SV2H-455B



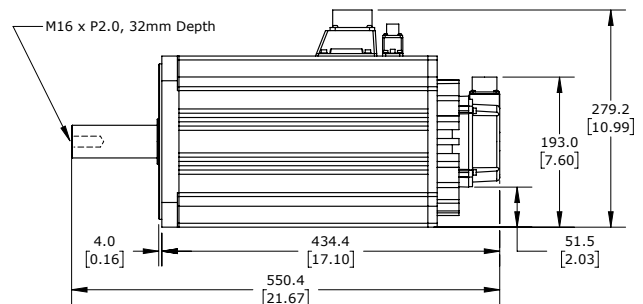
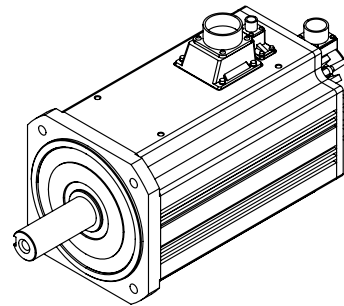
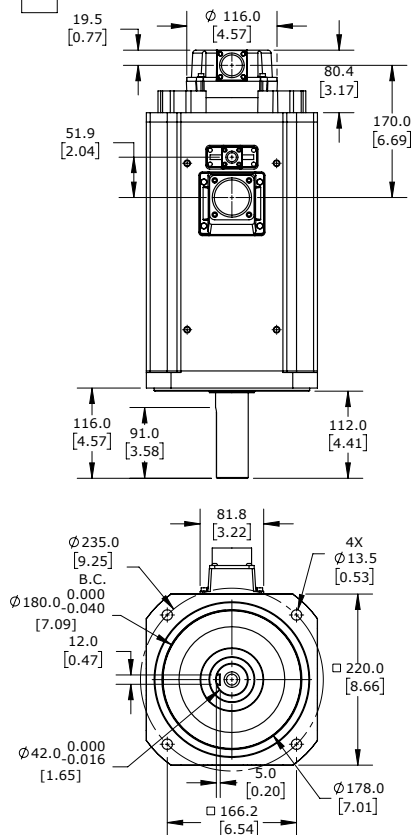
SV2H-475N**Units: mm [inches]****SV2H-475B**

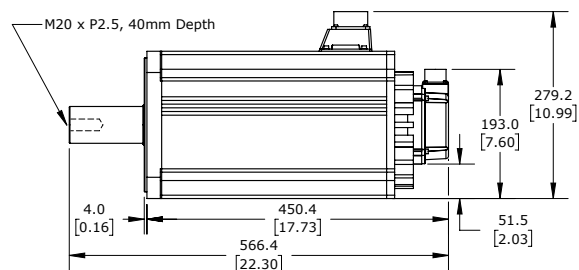
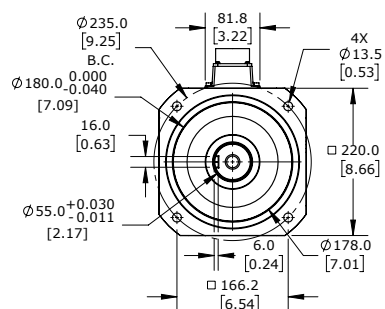
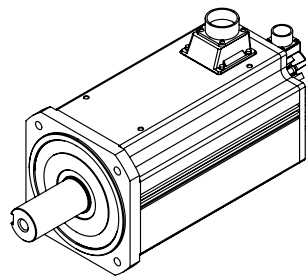
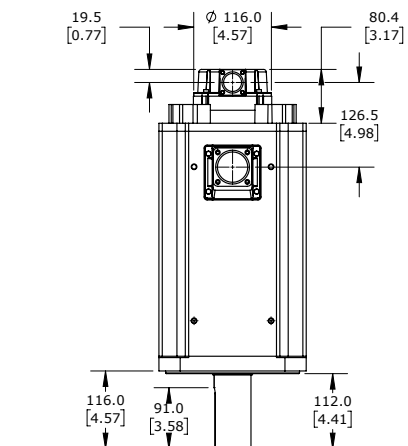
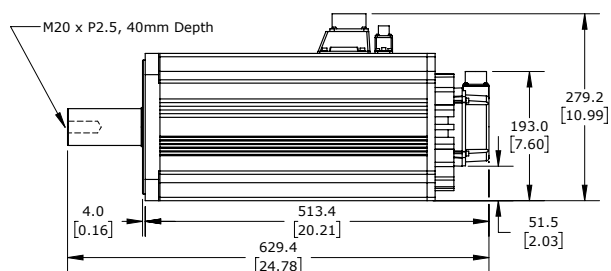
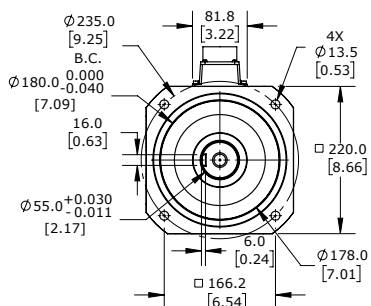
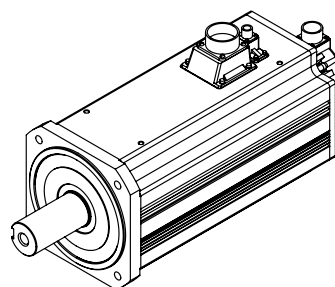
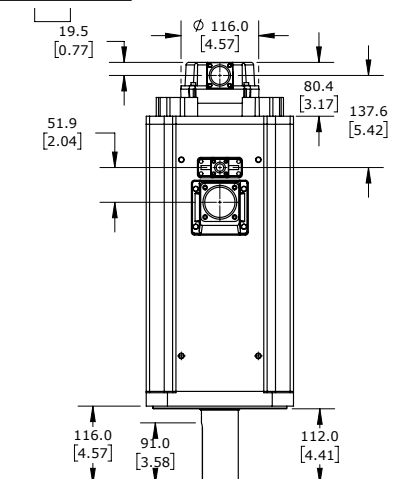
SV2H-4B0N



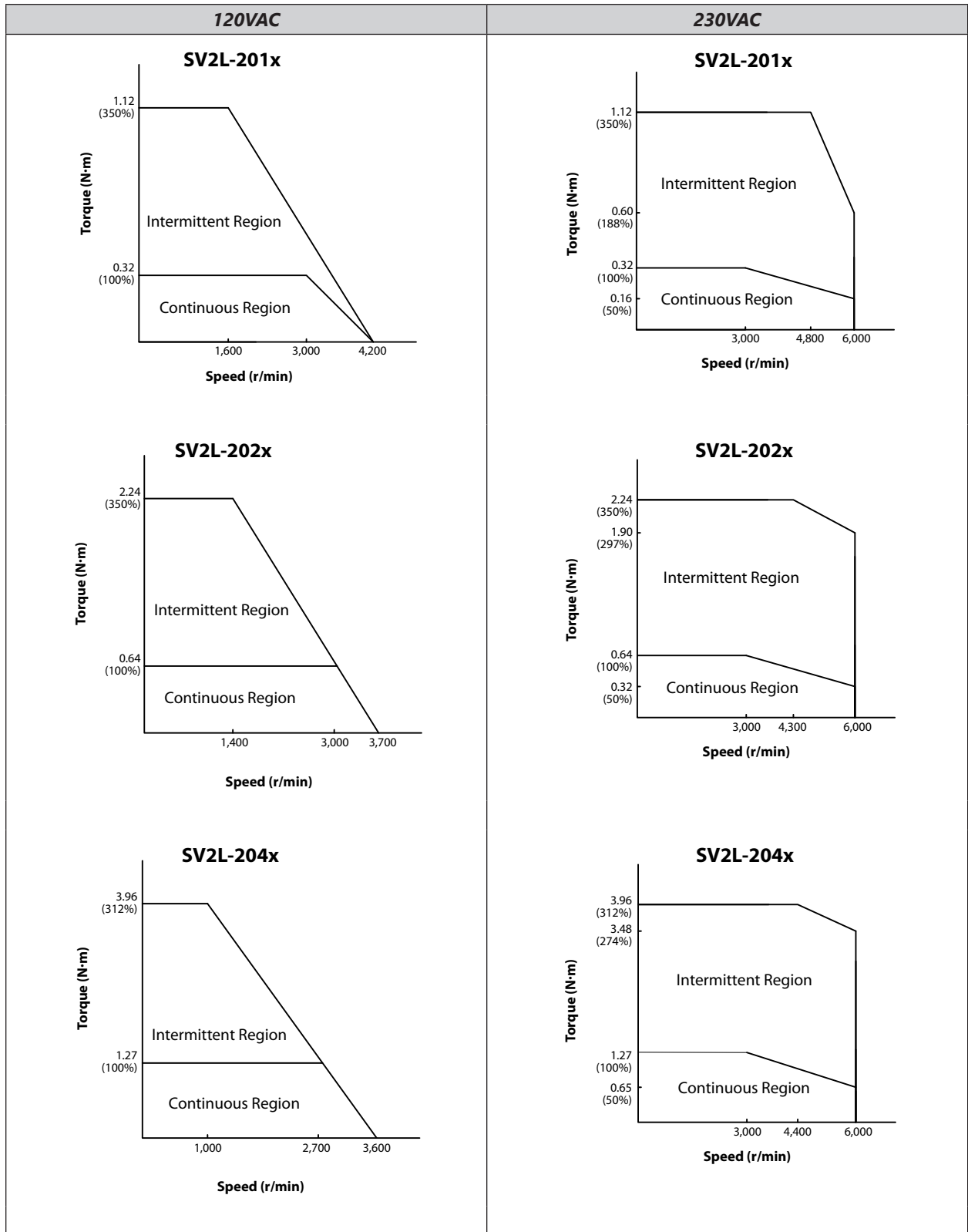
Units: mm [inches]

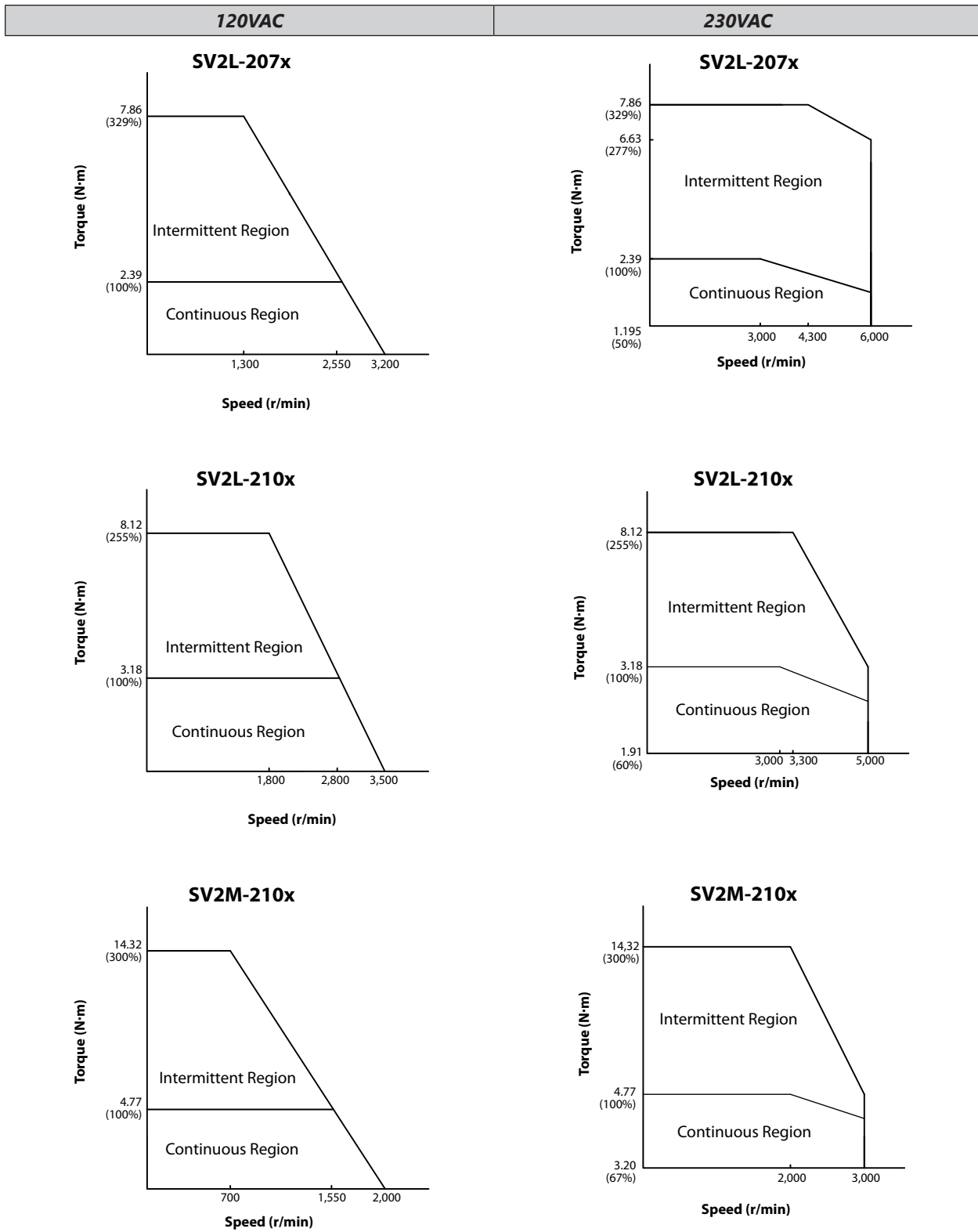
SV2H-4B0B



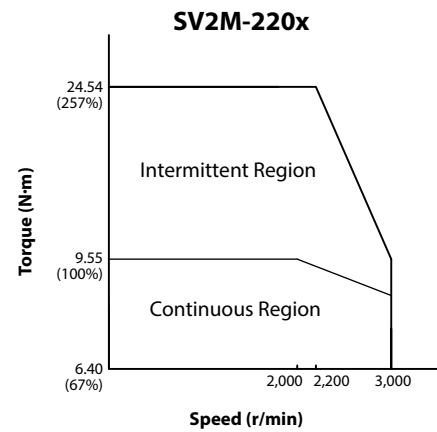
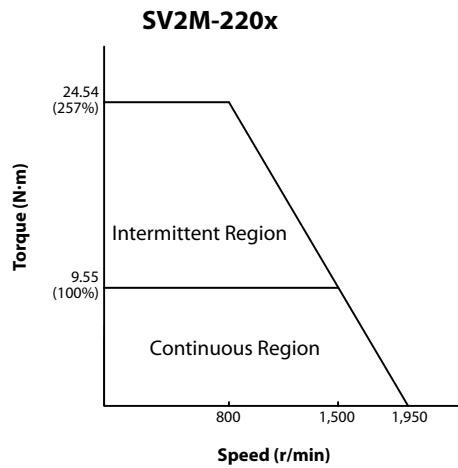
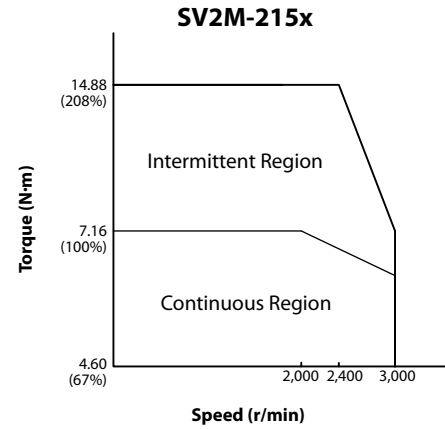
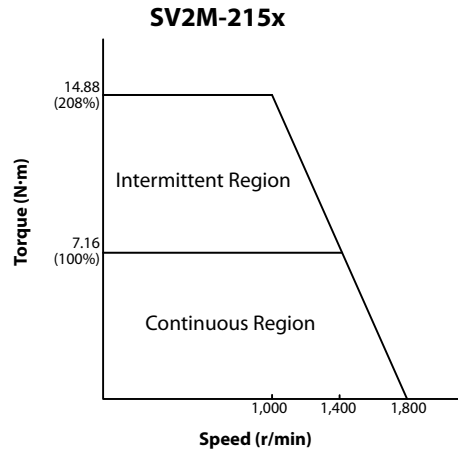
SV2H-4F0N**Units: mm [inches]****SV2H-4F0B**

A.6 - TORQUE FEATURES (T-N CURVES)

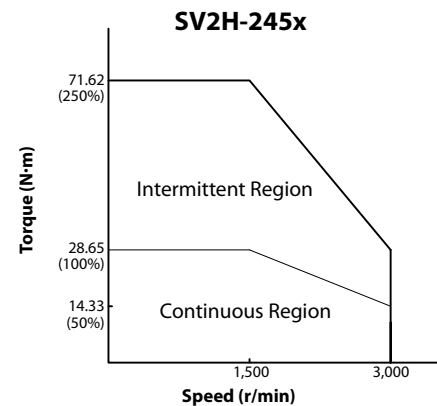
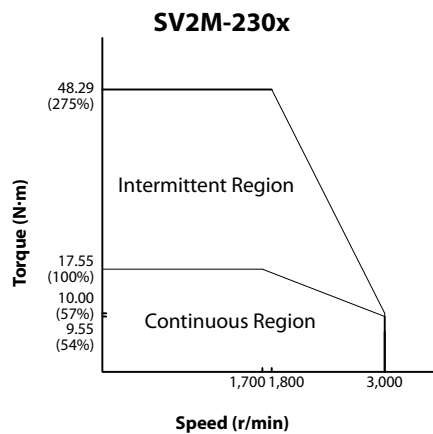




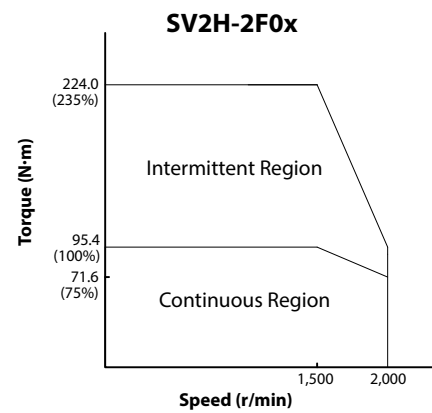
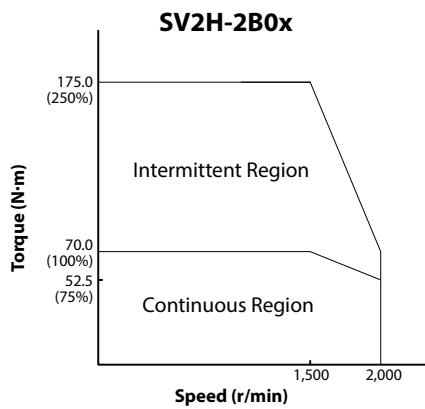
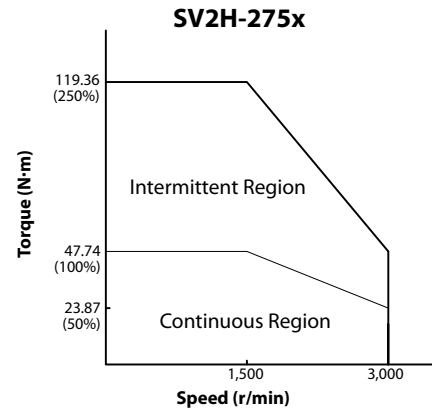
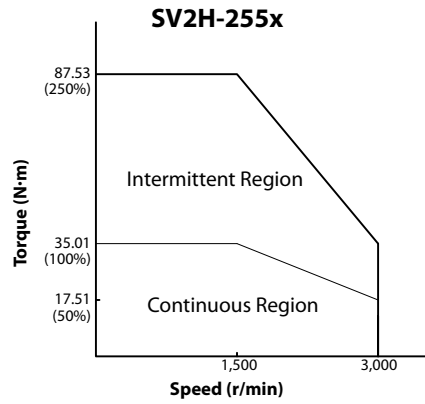
120VAC	230VAC
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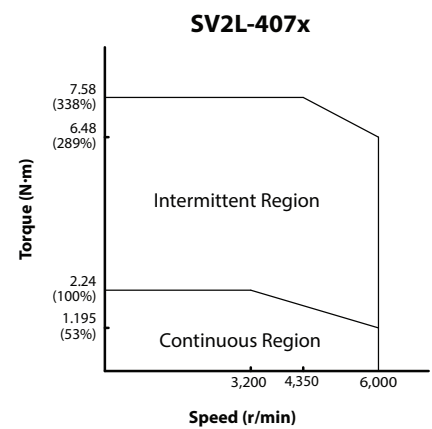
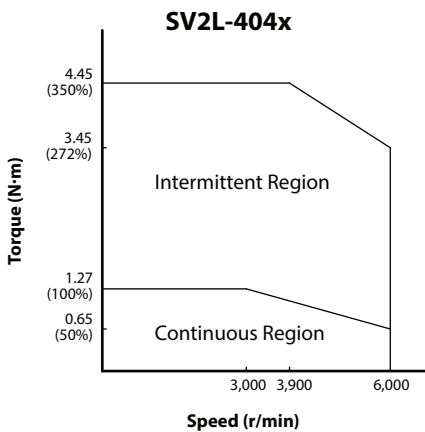
230VAC



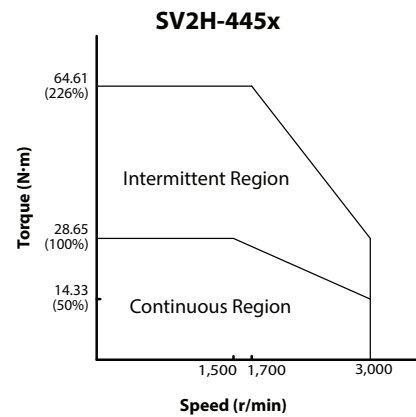
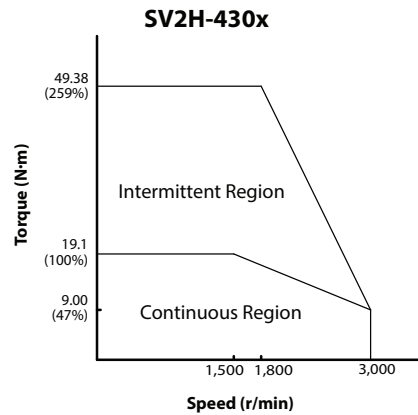
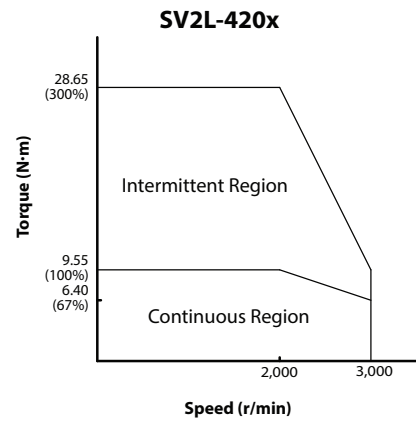
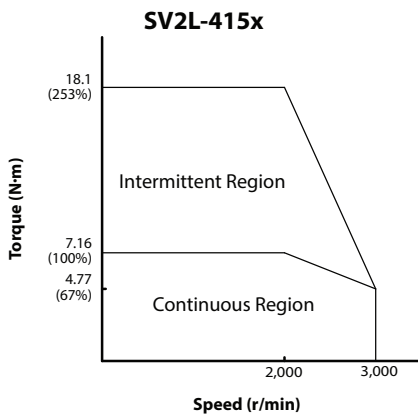
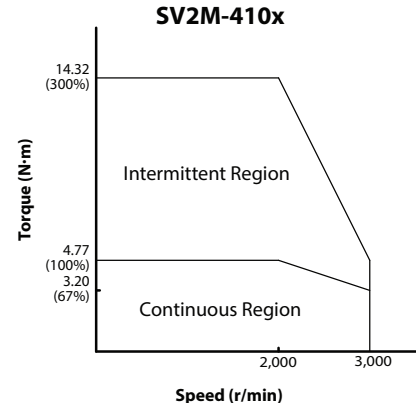
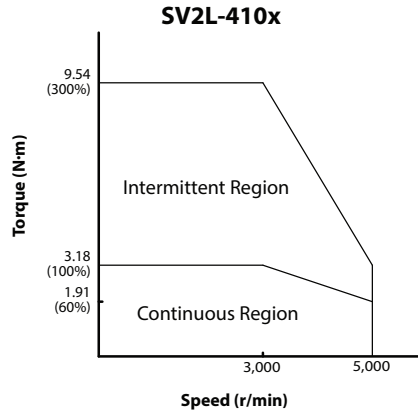
230VAC



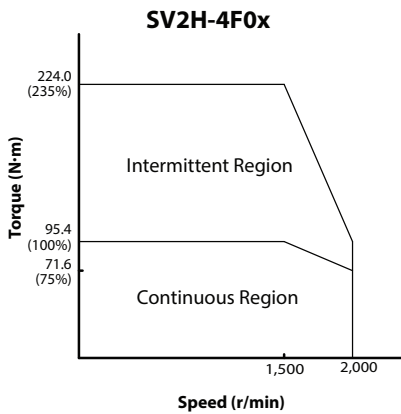
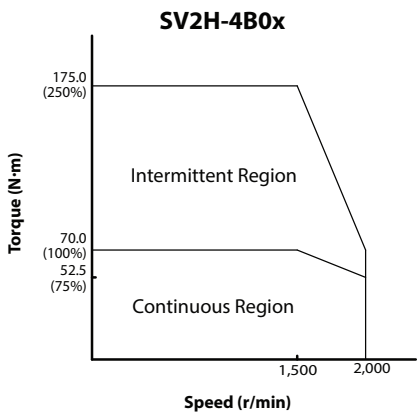
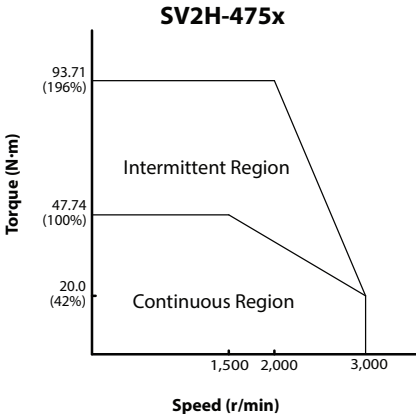
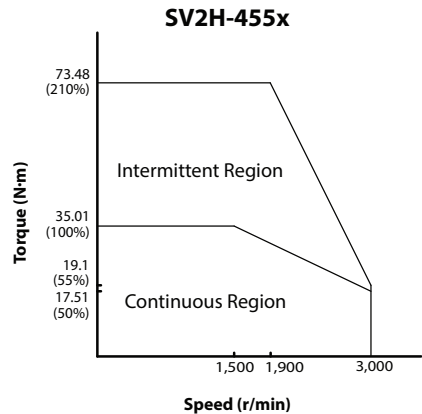
460VAC



460VAC



460VAC



A.7 - OVERLOAD FEATURES

Overload protection prevents the motor from overheating. Common causes of overloading include:

- 1) The motor's rated torque exceeds the rated range and the operation time is too long.
- 2) The inertia ratio is too high and the motor frequently accelerates and decelerates.
- 3) An incorrect connection between the power cable and the encoder wiring.
- 4) Incorrect servo gain setting causes resonance in the motor.
- 5) A brake equipped motor is operated without releasing the brake.

A.7.1 - LOAD AND OPERATING TIME

Low Inertia Motors (SV2L Series)

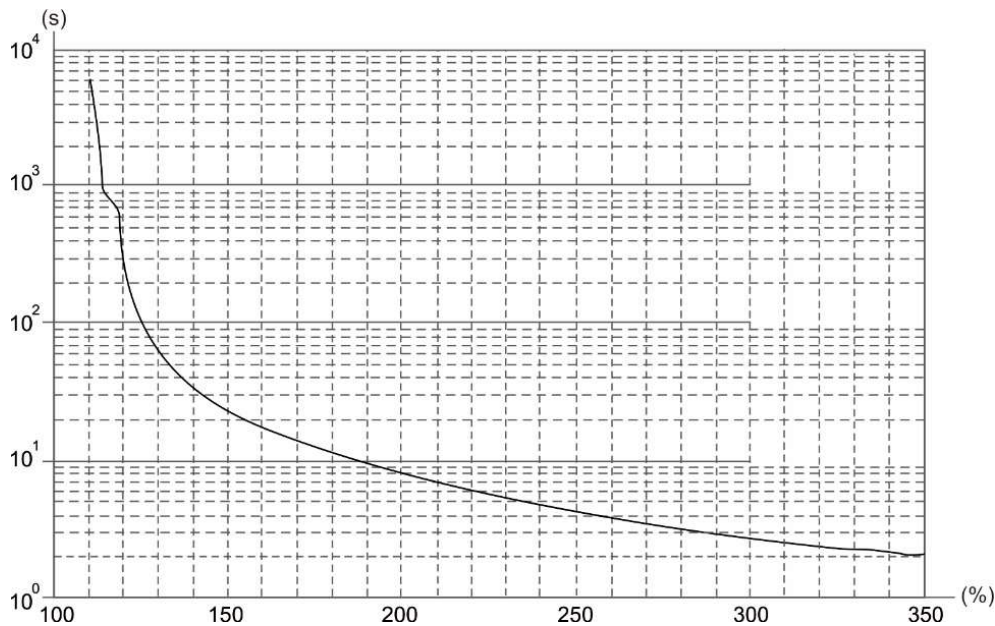
This graph applies to the following motors:

230V:

- SV2L-201x
- SV2L-202x
- SV2L-204x
- SV2L-207x
- SV2L-210x

460V:

- SV2L-404x
- SV2L-407x
- SV2L-410x



Load (%)	Operating Time (Seconds)
120	263.8
140	35.2
160	17.6
180	11.2
200	8
220	6.1
240	4.8
260	3.9
280	3.3
300	2.8
350	2.1

Medium and High Inertia Motors (SV2M Series, SV2H Series)

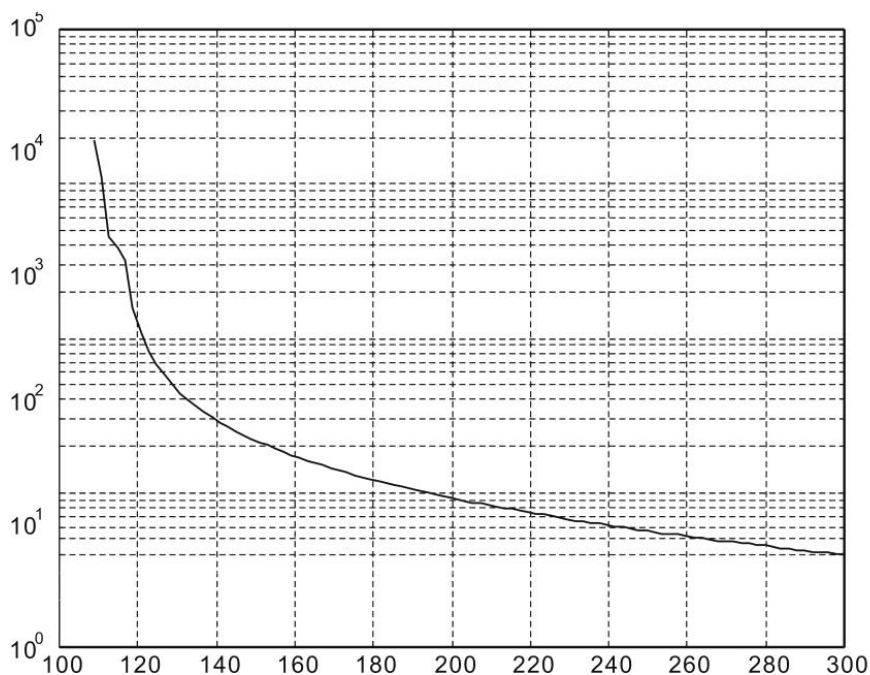
This graph applies to the following motors:

230V:

- SV2M-210x
- SV2M-215x
- SV2M-220x
- SV2M-230x
- SV2H-245x
- SV2H-255x
- SV2H-275x
- SV2H-2B0x
- SV2H-2F0x

460V:

- SV2M-410x
- SV2M-415x
- SV2M-420x
- SV2H-430x
- SV2H-445x
- SV2H-455x
- SV2H-475x
- SV2H-4B0x
- SV2H-4F0x



Load (%)	Operating Time (Seconds)
120	527.6
140	70.4
160	35.2
180	22.4
200	16
220	12.2
240	9.6
260	7.8
280	6.6
300	5.6