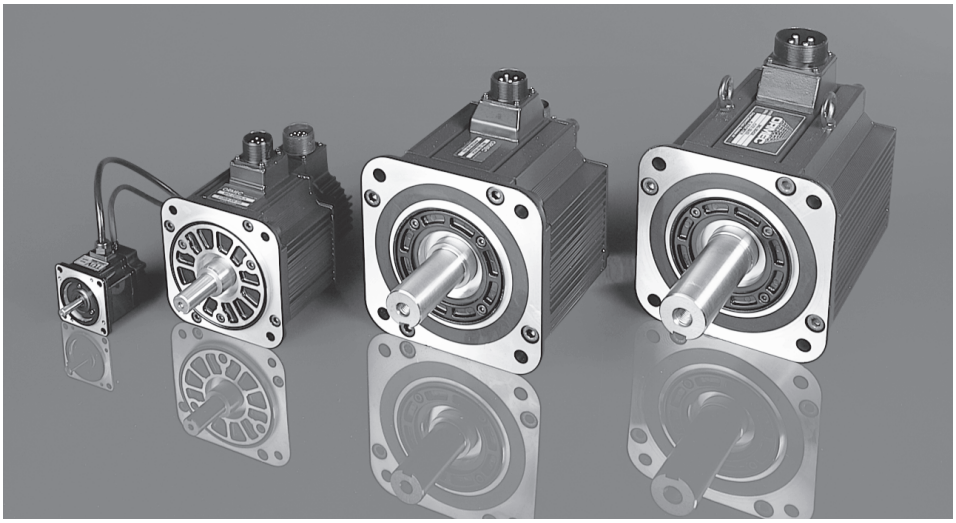
H-Series Servomotors

ORMEC's H-series AC brushless servomotors provide high torque-to-inertia ratios and excellent continuous torque and peak torque performance in a compact design. These industrial-quality servomotors incorporate high-energy, rare earth, neodymium-iron-boron magnets and a highly efficient stator winding design which results in excellent power density.

The H-series servomotors also completely eliminate brush wear maintenance problems, and feature extremely durable construction which includes heavy duty bearings.

Rugged MS connectors provide reliable interconnections to both motor and optical encoder.



ORMEC's H-series servomotors offer continuous stall torques from 3 to 665 lb-in (0.32 to 75 N-m).

Features

- ❒ Continuous stall torques from 3 to 665 in-lb (0.32 to 75 N-m)
- ❒ High peak torques from 8 to 1,000 in-lb (0.96 to 113 N-m)
- ❒ Output power from 100 to 11,000 watts (0.13 to 15 HP)
- ❒ High maximum speeds from 3,000 to 5,000 RPM
- ❒ Incremental encoder resolutions up to 131,072 counts per revolution
- ❒ Optional absolute encoders feature multi-rev operation up to 1,048,576 cts/rev.
- ❒ Class B or F insulation providing long winding life under rated operating conditions
- ❒ Minimum torque ripple & cogging for smooth low-speed performance
- ❒ Totally Enclosed Non-Ventilated (TENV) standard IP-67 except shaft opening, optional shaft oil seal is available.
- ❒ Optional fail-safe holding brakes

Motor/Drive Combinations

The performance of these servomotors is a direct function of the factory-matched servomotor/drive combination.

ORMEC's ServoWire® drives provide software controlled all-digital performance for consistent operation that totally eliminates analog potentiometer adjustments. High bandwidth operation and a quality high resolution encoder provide the response & accuracy for demanding applications. Peak torques up to three times the rated torque are available for a few seconds, allowing the motor/drive to handle high inertial loads & heavy duty cycle requirements. Each drive's motor parameters are configured in software for high performance and RMS current limiting.

Absolute Encoder Option

Cost-effective absolute encoder support provides axis position over a range of 65,536 revolutions. In continuous uni-directional operation, the position count continually "wraps" through the full range while maintaining absolute position within the cycle. Position is maintained through power cycles by a lithium battery (optional) on the ServoWire® digital drive.

Understanding the H-Series Servomotor Model Numbers

MAC - HE 021 A / A B

- HE: *Subgroup Types (HE, HA or HB-Series)*
- 021: *Continuous stall torque (lb-in)*
- A: *A = 110 VAC [1], B = 230 VAC, C = 460 VAC*
- A: *A = Absolute Encoder, I = Incremental Encoder*
- B: *B = 24 VDC Fail-Safe Brake [3]*

[1] *110 VAC operation is only available on MAC-HE003 and HE006 motors.*
[2] *Specify ServoWire drive with absolute encoder support when ordering this motor.*
[3] *Specify cables with the brake option when selecting a motor with a Fail-Safe brake.*

H-Series Compatibility Chart

ORMEC's all-digital drive technology provides the ability to control a variety of servomotors with a single servodrive. The chart (below) provides an overview of ServoWire drive capability with ORMEC's H-series servomotors.

The recommended servodrive (✪) provides sufficient power to provide the continuous torques specified for the corresponding servomotor.

Compatible servodrive (✔) may be used instead of the recommended servodrive to increase the amount or duration of peak torque, and also allow each servodrive model to support a wider range of motors, simplifying the stocking of spare parts.

Servomotor Model Number	Single Phase Drives (No Regen)			Three Phase Drives-230VAC (External Regen)						Three Phase Drives-460VAC (External Regen)						
	SAC-SDM203-S	SAC-SDM205-S	SAC-SDM210-S	SAC-SDM217-S	SAC-SDM220-S	SAC-SDM225-S	SAC-SDM235-S	SAC-SDM260-S	SAC-SDM405-S	SAC-SDM410-S	SAC-SDM417-S	SAC-SDM425-S	SAC-SDM435-S	SAC-SDM450-S	Input Power[1] [2] watts/amps
MAC-HE003A	✪	✔													110 / 1.0
MAC-HE003B	✪	✔													110 / 0.5
MAC-HE006A		✪	✔												210 / 1.9
MAC-HE006B	✪	✔													210 / 0.9
MAC-HE011B		✪	✔												440 / 1.9
MAC-HE021B		✪	✔												825 / 3.6
MAC-HE042B			✪	✔											1,650 / 7.2
MAC-HA030B			✪	✔											1,100 / 4.8
MAC-HA030C								✪	✔						1,100 / 2.4
MAC-HA055B				✪	✔	✔									2,100 / 9.1
MAC-HA055C									✪	✔					2,100 / 4.6
MAC-HA090B						✪	✔								3,300 / 14
MAC-HA090C									✪	✔					3,300 / 7.2
MAC-HA110B						✪	✔	✔							4,290 / 19
MAC-HA110C										✪	✔				4,290 / 9.3
MAC-HA140B							✪	✔							5,390 / 23
MAC-HA140C										✪	✔				5,390 / 12
MAC-HB025B		✪	✔												485 / 2.1
MAC-HB025C								✪	✔						485 / 1.1
MAC-HB055B			✪	✔											940 / 4.1
MAC-HB055C								✪	✔						940 / 2.0
MAC-HB080B				✪	✔										1,430 / 6.2
MAC-HB080C									✪	✔					1,430 / 3.1
MAC-HB100B					✪	✔									1,980 / 8.6
MAC-HB100C									✪	✔					1,870 / 4.1
MAC-HB200B						✪	✔								3,190 / 14
MAC-HB200C										✪	✔				3,190 / 7
MAC-HB300B							✪	✔							4,840 / 21
MAC-HB300C										✪	✔				4,840 / 11
MAC-HB330B								✪							6,050 / 26
MAC-HB330C											✪	✔			6,050 / 13
MAC-HB465B								✪							8,250 / 36
MAC-HB465C											✪	✔			8,250 / 18
MAC-HB700B								✪							12,100 / 53
MAC-HB700C											✪	✔			12,100 / 26

✪ Recommended drive model ✔ Compatible drive model

[1] Power listed is the required incoming line power in watts when the motor is operating at rated output. To determine total incoming power requirements, add up the listed values for each servomotor/drive combination in the system.

[2] Current listed in amps is the recommended slow-blow fuse capacity for each leg of the three phase power. To select fuses for the system, add the recommended fuse capacities for each servomotor/drive combination in the system.

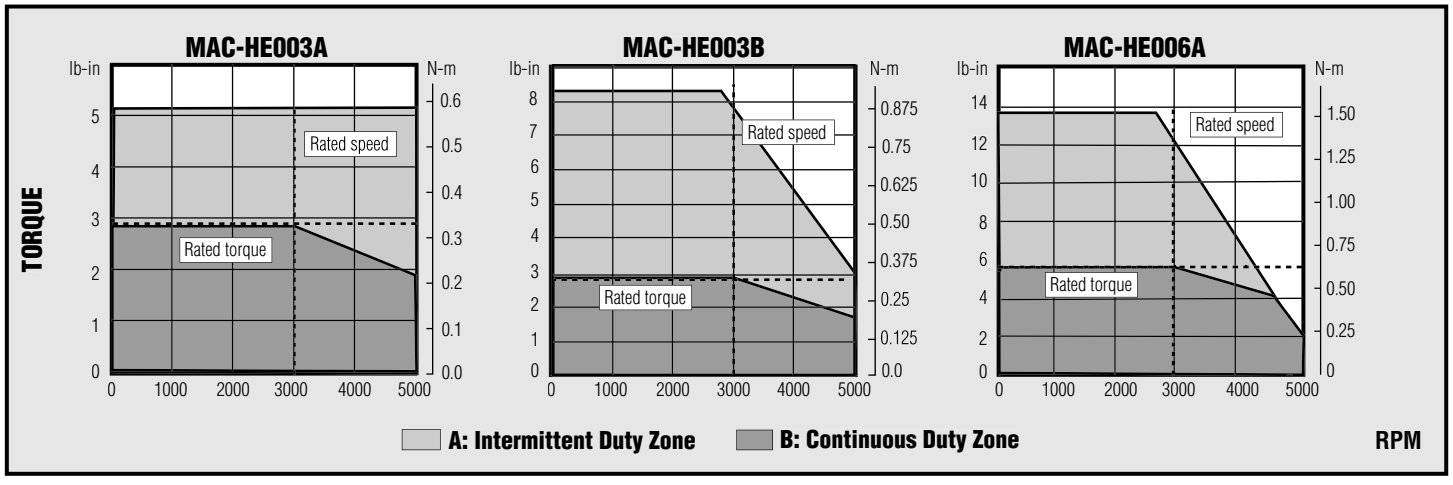
H-Series AC Brushless Servomotors

Inertia specifications for Brake Models on page 37.

Performance Specifications (1)	Units	HE003A	HE003B	HE006A
Maximum Speed	RPM	5,000	5,000	5,000
Continuous Stall Torque	lb-in	2.8	2.8	5.6
	N-m	0.32	0.32	0.64
Rated Speed	RPM	3,000	3,000	3,000
Rated Torque	lb-in	2.8	2.8	5.6
	N-m	0.32	0.32	0.64
Rated Power	HP	0.13	0.13	0.27
	watts	100	100	200
Peak Torque(2)	lb-in	5.1	8.2	14
	N-m	0.58	0.93	1.5
Continuous Stall Torque/Inertia	radians/sec^2	64,437	64,437	32,786
Mechanical Specifications				
Moment of Inertia	lb-in-sec^2 x 10^{-3}	0.043	0.043	0.171
	kg-m^2 x 10^{-4}	0.049	0.049	0.193
Friction Torque, Static	lb-in	0.048	0.048	0.11
	N-m	0.0054	0.0054	0.012
Servomotor Weight	lbs	1.5	1.5	3.1
	kg	0.7	0.7	1.4
Maximum Radial Shaft Load	lbs	17	17	55
(centered at end of shaft)	N	78	78	245
Maximum Axial Shaft Load	lbs	11	11	15
	N	49	49	68
Electrical Specifications				
Torque Sensitivity	lb-in/Amp$_{Rms/Ø}$	1.4	3.5	2.3
	N-m/Amp$_{Rms/Ø}$	0.16	0.39	0.26
Servodrive Model Number	SAC-	SDM203-S	SDM203-S	SDM205-S
Servodrive Input Power	volts AC	115	230	115
Continuous Motor Current	Amps$_{Rms/Ø}$	2.2	0.89	2.7
Peak Motor Current	Amps$_{Rms/Ø}$	7.1	2.8	8.4
Motor Thermal Specifications				
Ambient Temperature	degrees C	40	40	40
Insulation Class		B	B	B
Encoder Specifications				
Incremental Encoder Resolution	counts/revolution	8,192	8,192	8,192
Absolute Encoder Resolution	counts/revolution	65,536	65,536	65,536

(1) Ratings are obtained with servomotor ambient temperature of 40C, and armature winding temperature of 100C. (2) Motor's peak torque is limited by the peak current of the servodrive. The next larger drive may be used to increase the amount of peak torque available. Consult an ORMEC Applications Engineer for details.

Torque vs. Speed Characteristics



H-Series AC Brushless Servomotors

Inertia specifications for Brake Models on page 37.

Performance Specifications (1)	Units	HE006B	HE011B	HE021B
Maximum Speed	RPM	5,000	5,000	4,700
Continuous Stall Torque	lb-in	5.6	11	21
	N-m	0.64	1.3	2.4
Rated Speed	RPM	3,000	3,000	3,000
Rated Torque	lb-in	5.6	11	21
	N-m	0.64	1.3	2.4
Rated Power	HP	0.27	0.54	1.0
	watts	200	400	750
Peak Torque(2)	lb-in	11	28	34
	N-m	1.3	3.2	3.9
Continuous Stall Torque/Inertia	radians/sec^2	32,786	37,551	11,088

Mechanical Specifications				
Moment of Inertia	lb-in-sec^2 x 10^{-3}	0.171	0.293	1.86
	kg-m^2 x 10^{-4}	0.193	0.331	2.10
Friction Torque, Static	lb-in	0.11	0.20	0.32
	N-m	0.012	0.022	0.036
Servomotor Weight	lbs	3.1	4.6	9.3
	kg	1.4	2.1	4.2
Maximum Radial Shaft Load	lbs	55	55	88
(centered at end of shaft)	N	245	245	392
Maximum Axial Shaft Load	lbs	15	15	33
	N	68	68	147

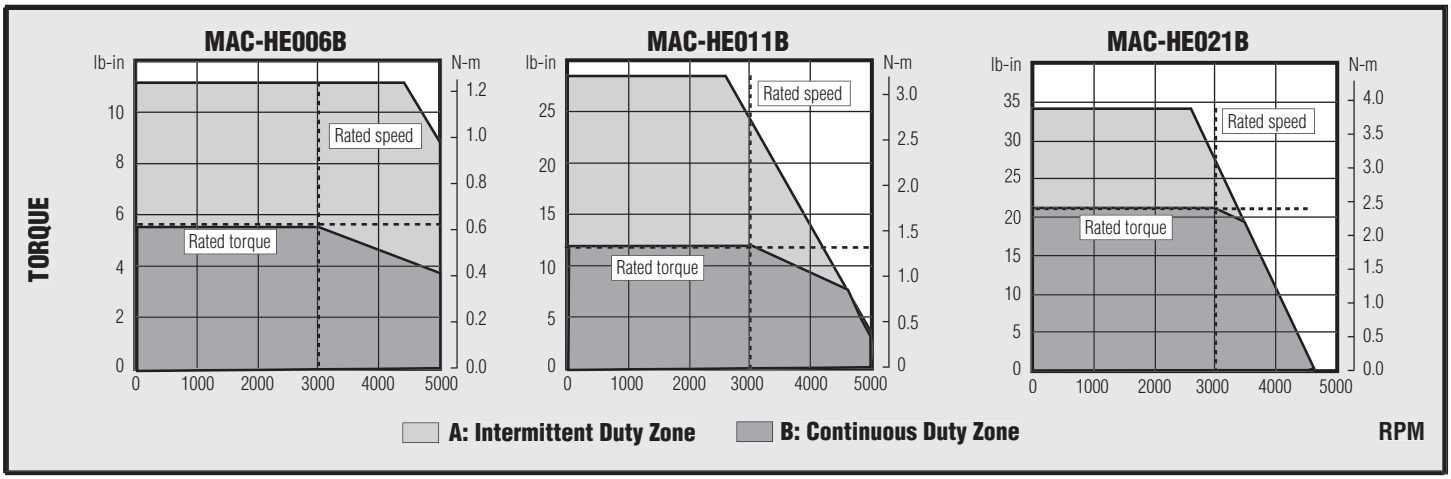
Electrical Specifications				
Torque Sensitivity	lb-in/Amp$_{Rms/Ø}$	3.1	4.7	5.7
	N-m/Amp$_{Rms/Ø}$	0.35	0.54	0.64
Servodrive Model Number	SAC-	SDM203-S	SDM205-S	SDM205-S
Servodrive Input Power	volts AC	230	230	230
Continuous Motor Current	Amps$_{Rms/Ø}$	2.0	2.6	4.1
Peak Motor Current	Amps$_{Rms/Ø}$	6.0	8.0	14

Motor Thermal Specifications				
Ambient Temperature	degrees C	40	40	40
Insulation Class		B	B	B

Encoder Specifications				
Incremental Encoder Resolution	counts/revolution	8,192	8,192	8,192
Absolute Encoder Resolution	counts/revolution	65,536	65,536	65,536

(1) Ratings are obtained with servomotor ambient temperature of 40C, and armature winding temperature of 100C. (2) Motor's peak torque is limited by the peak current of the ServoWire™ drive. The next larger drive may be used to increase the amount of peak torque available. Consult an Ormec Applications Engineer for details.

Torque vs. Speed Characteristics



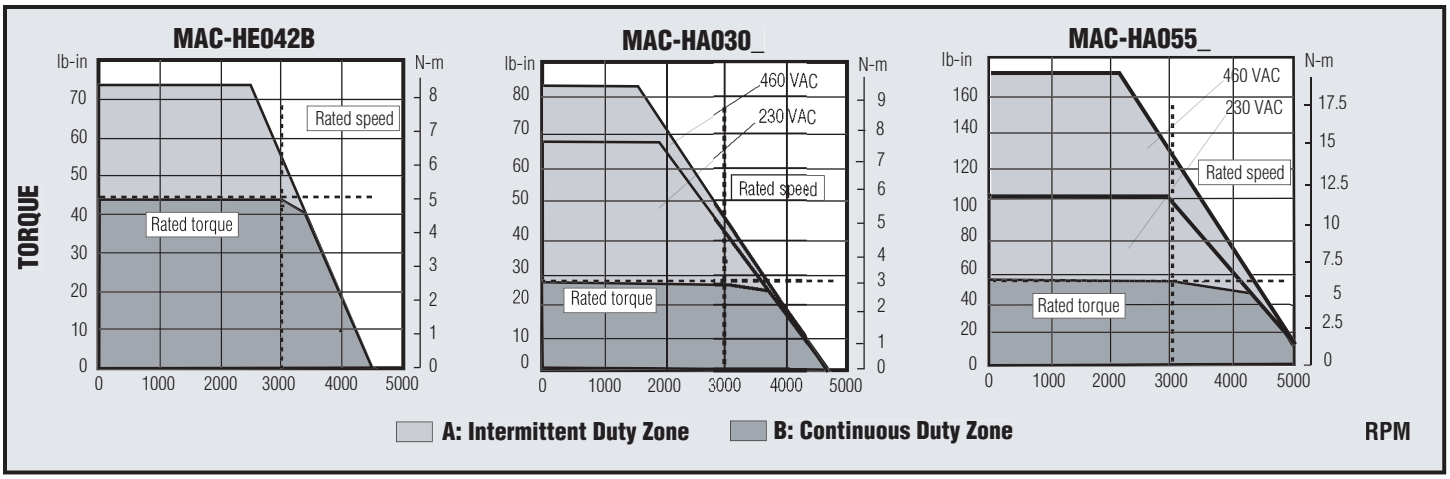
H-Series AC Brushless Servomotors

Inertia specifications for Brake Models on page 37.

Performance Specifications (1)	Units	HE042B	HA030B	HA030C	HA055B	HA055C
Maximum Speed	RPM	4,300	4,700	4,800	5,000	
Continuous Stall Torque	lb-in	42	28		56	
	N-m	4.8	3.2		6.3	
Rated Speed	RPM	3,000	3,000		3,000	
Rated Torque	lb-in	42	28		56	
	N-m	4.8	3.2		6.3	
Rated Power	HP	2.0	1.3		2.7	
	watts	1500	1000		2000	
Peak Torque(2)	lb-in	73	68	84	101	169
	N-m	8.3	7.7	9.5	11	19
Continuous Stall Torque/Inertia	radians/sec^2	11,575	18,183		19,836	
Mechanical Specifications						
Moment of Inertia	lb-in-sec^2 x 10^{-3}	3.56	1.54		2.82	
	kg-m^2 x 10^{-4}	4.02	1.74		3.19	
Friction Torque, Static	lb-in	0.53	0.43		0.62	
	N-m	0.060	0.049		0.070	
Servomotor Weight	lbs	15	10		15	
	kg	6.6	4.6		7.0	
Maximum Radial Shaft Load	lbs	110	154		154	
(centered at end of shaft)	N	490	686		686	
Maximum Axial Shaft Load	lbs	33	44		44	
	N	147	196		196	
Electrical Specifications						
Torque Sensitivity	lb-in/Amp$_{Rms/Ø}$	6.1	5.6	11	4.8	9.9
	N-m/Amp$_{Rms/Ø}$	0.69	0.64	1.7	0.54	1.1
Servodrive Model Number	SAC-	SDM210-S	SDM210-S	SDM405-S	SDM217-S	SDM410-S
Servodrive Input Power	volts AC	230	230	460	230	460
Continuous Motor Current	Amps$_{Rms/Ø}$	7.5	5.7	2.8	13	6.2
Peak Motor Current	Amps$_{Rms/Ø}$	23	17	8.5	42	20
Motor Thermal Specifications						
Ambient Temperature	degrees C	40	40		40	
Insulation Class		B	F		F	
Encoder Specifications						
Incremental Encoder Resolution	counts/revolution	8,192	131,072		131,072	
Absolute Encoder Resolution	counts/revolution	65,536	131,072		131,072	

(1) Ratings are obtained with servomotor ambient temperature of 40C, and armature winding temperature of 100C. (2) Motor's peak torque is limited by the peak current of the ServoWire™ drive. The next larger drive may be used to increase the amount of peak torque available. Consult an Ormec Applications Engineer for details. (3) Load centered at end of shaft.

Torque vs. Speed Characteristics



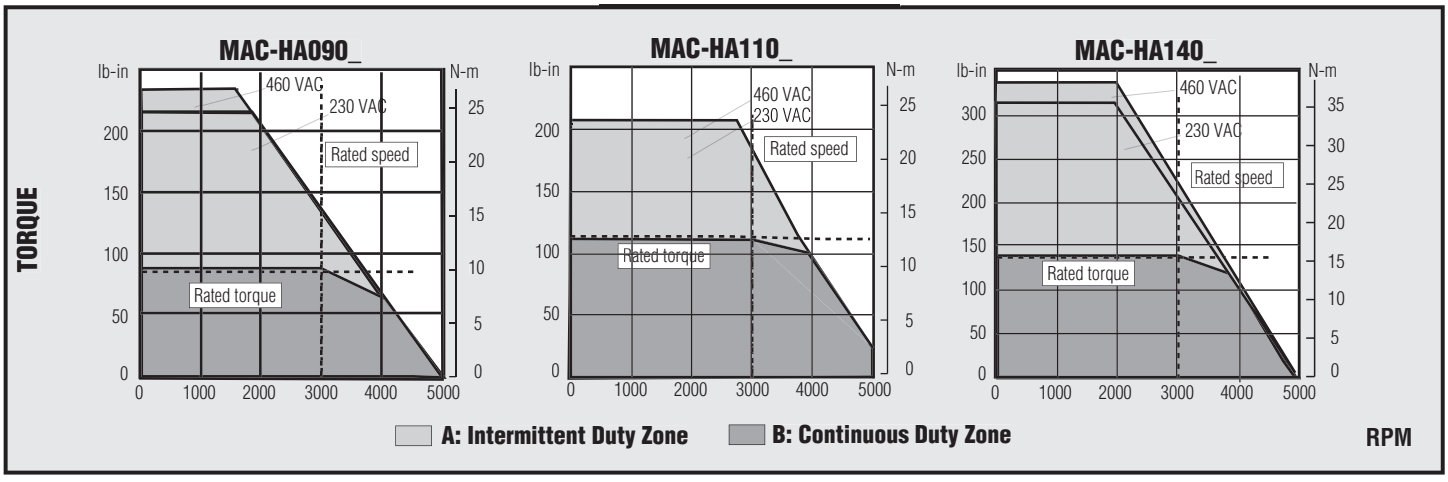
H-Series AC Brushless Servomotors

Inertia specifications for Brake Models on page 37.

Performance Specifications (1)	Units	HA090B	HA090C	HA110B	HA110C	HA140B	HA140C
Maximum Speed	RPM	5,000		5,000		4,900	4,800
Continuous Stall Torque	lb-in	87		112		140	
	N-m	9.8		13		16	
Rated Speed	RPM	3,000		3,000		3,000	
Rated Torque	lb-in	87		112		140	
	N-m	9.8		13		16	
Rated Power	HP	4.0		5.4		6.7	
	watts	3,000		4,000		5,000	
Peak Torque(2)	lb-in	217	179	207	274	321	318
	N-m	24	20	23	31	36	36
Continuous Stall Torque/Inertia	radians/sec^2	14,024		13,183		12,861	
Mechanical Specifications							
Moment of Inertia	lb-in-sec^2 x 10^{-3}	6.20		8.50		10.9	
	kg-m^2 x 10^{-4}	7.00		9.60		12.3	
Friction Torque, Static	lb-in	0.74		0.95		1.1	
	N-m	0.083		0.11		0.13	
Servomotor Weight	lbs	24		31		37	
	kg	11		14		17	
Maximum Radial Shaft Load	lbs	220		264		264	
(centered at end of shaft)	N	980		1,176		1,176	
Maximum Axial Shaft Load	lbs	88		88		88	
	N	392		392		392	
Electrical Specifications							
Torque Sensitivity	lb-in/Amp$_{Rms/Ø}$	5.1	11	4.7	9.5	5.3	11
	N-m/Amp$_{Rms/Ø}$	0.57	1.2	0.53	1.1	0.60	1.2
Servodrive Model Number	SAC-	SDM225-S	SDM410-S	SDM225-S	SDM417-S	SDM235-S	SDM417-S
Servodrive Input Power	volts AC	230	460	230	460	230	460
Continuous Motor Current	Amps$_{Rms/Ø}$	19	8.9	25	13	29	14
Peak Motor Current	Amps$_{Rms/Ø}$	56	28	77	38	84	42
Motor Thermal Specifications							
Ambient Temperature	degrees C	40		40		40	
Insulation Class		F		F		F	
Encoder Specifications							
Incremental Encoder Resolution	counts/revolution	131,072		131,072		131,072	
Absolute Encoder Resolution	counts/revolution	131,072		131,072		131,072	

(1) Ratings are obtained with servomotor ambient temperature of 40C, and armature winding temperature of 100C. (2) Motor's peak torque is limited by the peak current of the ServoWire™ drive. The next larger drive may be used to increase the amount of peak torque available. Consult an Ormec Applications Engineer for details.

Torque vs. Speed Characteristics



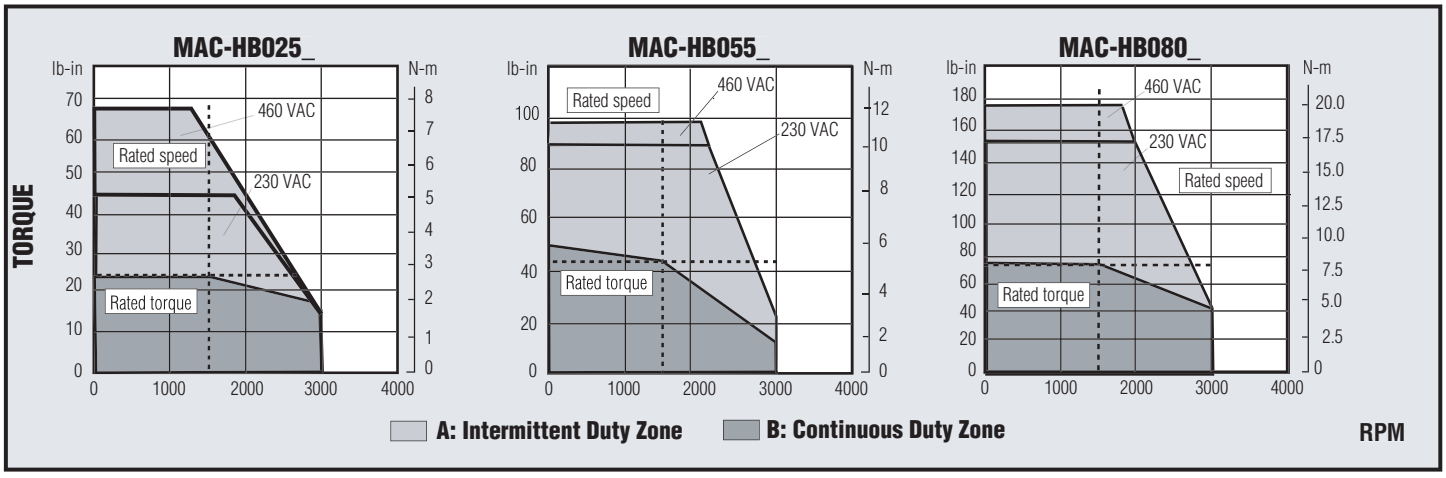
H-Series AC Brushless Servomotors

Inertia specifications for Brake Models on page 37.

Performance Specifications (1)	Units	HB025B	HB025C	HB055B	HB055C	HB080B	HB080C
Maximum Speed	RPM	3,000		3,000		3,000	
Continuous Stall Torque	lb-in	25		53		74	
	N-m	2.8		6.0		8.4	
Rated Speed	RPM	1,500		1,500		1,500	
Rated Torque	lb-in	25		48		74	
	N-m	2.8		5.4		8.4	
Rated Power	HP	0.60		1.1		1.7	
	watts	450		850		1,300	
Peak Torque(2)	lb-in	44	68	88	105	152	177
	N-m	4.9	7.7	10	12	17	20
Continuous Stall Torque/Inertia	radians/sec^2	3,902		4,308		4,059	
Mechanical Specifications							
Moment of Inertia	lb-in-sec^2 x 10^{-3}	6.41		12.3		18.2	
	kg-m^2 x 10^{-4}	7.24		13.9		20.5	
Friction Torque, Static	lb-in	0.43		0.65		0.87	
	N-m	0.049		0.074		0.098	
Servomotor Weight	lbs	12		17		21	
	kg	5.5		7.6		9.6	
Maximum Radial Shaft Load	lbs	110		110		154	
(centered at end of shaft)	N	490		490		686	
Maximum Axial Shaft Load	lbs	22		22		77	
	N	98		98		343	
Electrical Specifications							
Torque Sensitivity	lb-in/Amp$_{Rms/Ø}$	7.3	15	7.3	15	7.4	15
	N-m/Amp$_{Rms/Ø}$	0.82	1.6	0.83	1.7	0.84	1.7
Servodrive Model Number	SAC-	SDM205-S	SDM405-S	SDM210-S	SDM405-S	SDM217-S	SDM410-S
Servodrive Input Power	volts AC	230	460	230	460	230	460
Continuous Motor Current	Amps$_{Rms/Ø}$	3.8	1.9	7.1	3.5	11	5.4
Peak Motor Current	Amps$_{Rms/Ø}$	11	5.5	17	9	28	14
Motor Thermal Specifications							
Ambient Temperature	degrees C	40		40		40	
Insulation Class		F		F		F	
Encoder Specifications							
Incremental Encoder Resolution	counts/revolution	131,072		131,072		131,072	
Absolute Encoder Resolution	counts/revolution	131,072		131,072		131,072	

(1) Ratings are obtained with servomotor ambient temperature of 40C, and armature winding temperature of 100C. (2) Motor's peak torque is limited by the peak current of the ServoWire™ drive. The next larger drive may be used to increase the amount of peak torque available. Consult an ORMEC Applications Engineer for details.

Torque vs. Speed Characteristics



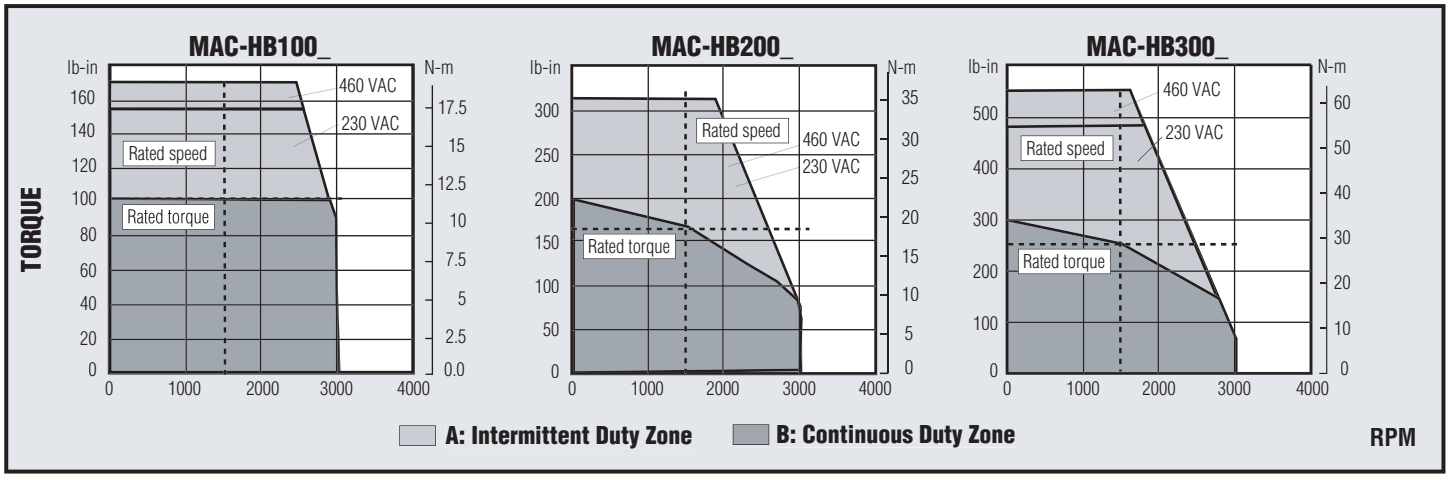
H-Series AC Brushless Servomotors

Inertia specifications for Brake Models on page 37.

Performance Specifications (1)	Units	HB100B	HB100C	HB200B	HB200C	HB300B	HB300C
Maximum Speed	RPM	3,000		3,000		3,000	
Continuous Stall Torque	lb-in	102		196		300	
	N-m	12		22		34	
Rated Speed	RPM	1,500		1,500		1,500	
Rated Torque	lb-in	102		165		252	
	N-m	12		19		28	
Rated Power	HP	2.4	2.3	3.9		5.9	
	watts	1,800	1,700	2,900		4,400	
Peak Torque(2)	lb-in	155	214	350		479	554
	N-m	18	24.2	40		54	63
Continuous Stall Torque/Inertia	radians/sec2	3,624		4,815		5,015	
Mechanical Specifications							
Moment of Inertia	lb-in-sec2 x 10-3	28.1		40.7		59.8	
	kg-m2 x 10-4	31.7		46.0		67.5	
Friction Torque, Static	lb-in	1.0		1.4		2.3	
	N-m	0.12		0.16		0.25	
Servomotor Weight	lbs	31		40		51	
	kg	14		18		23	
Maximum Radial Shaft Load	lbs	264		330		330	
(centered at end of shaft)	N	1,176		1,470		1,470	
Maximum Axial Shaft Load	lbs	110		110		110	
	N	490		490		490	
Electrical Specifications							
Torque Sensitivity	lb-in/AmpRms/Ø	6.5	13	7.3	15	8.0	16
	N-m/AmpRms/Ø	0.73	1.5	0.82	1.7	0.91	1.8
Servodrive Model Number	SAC-	SDM220-S	SDM410-S	SDM225-S	SDM417-S	SDM235-S	SDM417-S
Servodrive Input Power	volts AC	230	460	230	460	230	460
Continuous Motor Current	AmpsRms/Ø	17	8.4	24	12	33	17
Peak Motor Current	AmpsRms/Ø	42	20	56	28	84	41
Motor Thermal Specifications							
Ambient Temperature	degrees C	40		40		40	
Insulation Class		F		F		F	
Encoder Specifications							
Incremental Encoder Resolution	counts/revolution	131,072		131,072		131,072	
Absolute Encoder Resolution	counts/revolution	131,072		131,072		131,072	

(1) Ratings are obtained with servomotor ambient temperature of 40C, and armature winding temperature of 100C. (2) Motor's peak torque is limited by the peak current of the ServoWire™ drive. The next larger drive may be used to increase the amount of peak torque available. Consult an ORMEC Applications Engineer for details.

Torque vs. Speed Characteristics



H-Series AC Brushless Servomotors

Inertia specifications for Brake Models on page 37.

Performance Specifications (1)	Units	HB330B	HB330C	HB465B	HB465C	HB700B	HB700C
Maximum Speed	RPM	3,000		3,000		2,000	
Continuous Stall Torque	lb-in	345		450		665	
	N-m	39		51		75	
Rated Speed	RPM	1,500		1,500		1,500	
Rated Torque	lb-in	310		425		620	
	N-m	35		48		70	
Rated Power	HP	7.4		10		15	
	watts	5,500		7,500		11,000	
Peak Torque(2)	lb-in	728	655	839	978	1,000	
	N-m	82	74	95	111	113	
Continuous Stall Torque/Inertia	radians/sec^2	4,380		4,055		2,670	

Mechanical Specifications							
Moment of Inertia	lb-in-sec^2 x 10^{-3}	78.8		111		249	
	kg-m^2 x 10^{-4}	89.0		125		281	
Friction Torque, Static	lb-in	3.0		4.2		7.2	
	N-m	0.33		0.47		0.81	
Servomotor Weight	lbs	66		88		127	
	kg	30		40		58	
Maximum Radial Shaft Load	lbs	397		397		397	
(centered at end of shaft)	N	1,764		1,764		1,764	
Maximum Axial Shaft Load	lbs	132		132		132	
	N	588		588		588	

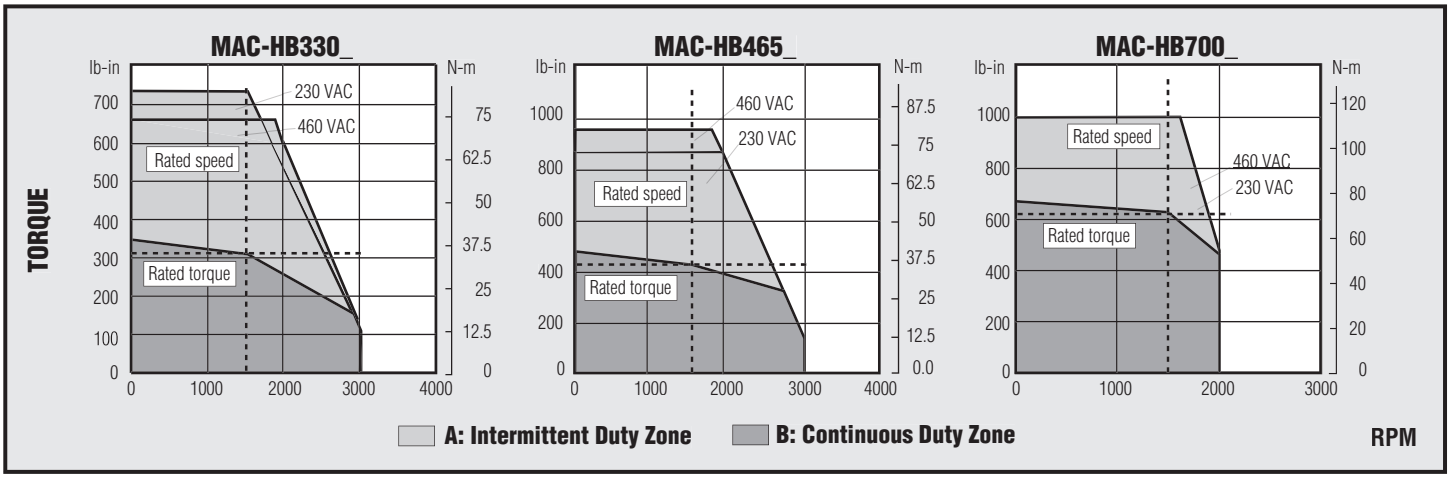
Electrical Specifications							
Torque Sensitivity	lb-in/Amp$_{Rms/Ø}$	7.8	15	8.2	18	11	23
	N-m/Amp$_{Rms/Ø}$	0.88	1.8	0.93	2.0	1.2	2.6
Servodrive Model Number	SAC-	SDM260-S	SDM425-S	SDM260-S	SDM425-S	SDM260-S	SDM435-S
Servodrive Input Power	volts AC	230	460	230	460	230	460
Continuous Motor Current	Amps$_{Rms/Ø}$	42	21	55	25	59	28
Peak Motor Current	Amps$_{Rms/Ø}$	110	55	130	65	140	70

Motor Thermal Specifications				
Ambient Temperature	degrees C	40	40	40
Insulation Class		F	F	F

Encoder Specifications				
Incremental Encoder Resolution	counts/revolution	131,072	131,072	131,072
Absolute Encoder Resolution	counts/revolution	131,072	131,072	131,072

(1) Ratings are obtained with servomotor ambient temperature of 40C, and armature winding temperature of 100C. (2) Motor's peak torque is limited by the peak current of the ServoWire™ drive. The next larger drive may be used to increase the amount of peak torque available. Consult an ORMEC Applications Engineer for details.

Torque vs. Speed Characteristics

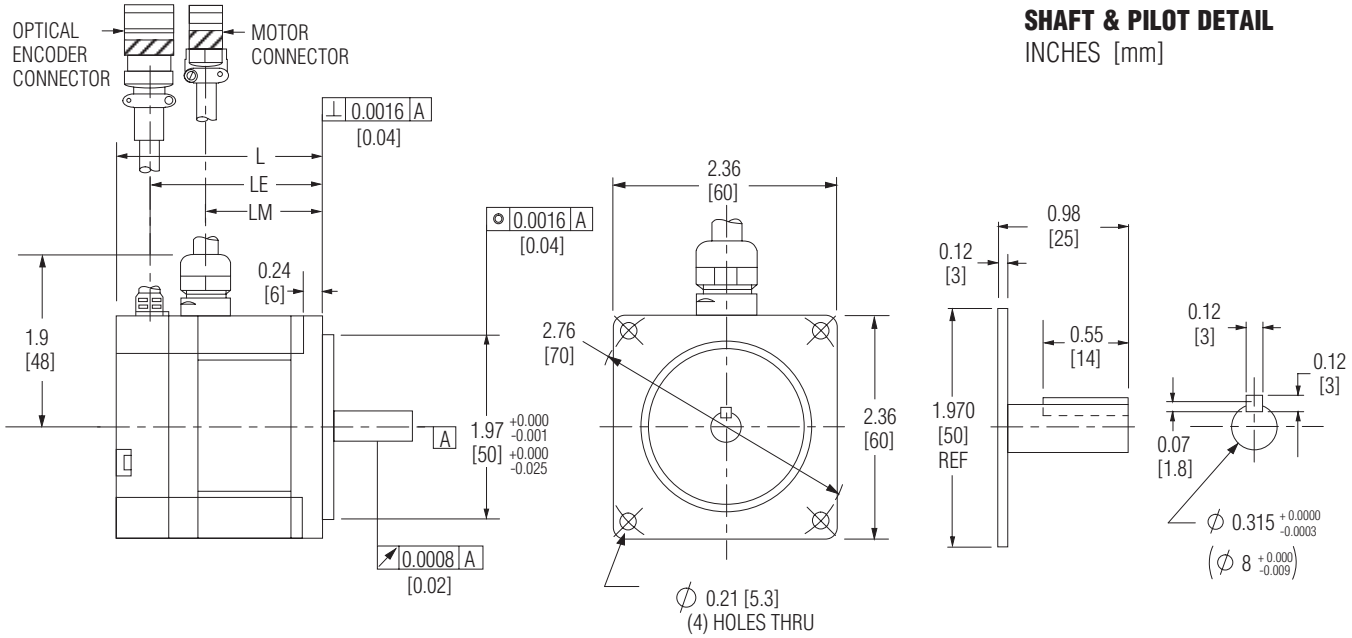


Specifications for H-Series Servomotors with Fail-Safe Brakes

		MODEL with BRAKE					
Servomotor Model Number	Brake Holding Torque[1] (lb-in / N-m)	Continuous Stall Torque to Inertia Ratio (radians/sec^2)	Moment of Inertia (lb-in-sec^2 / kg-m^2)	Motor Length (in / mm)	Motor Weight (lb / kg)	Brake Coil Resistance	Brake Rated Current
MAC-HE003A	4.3 0.49	40,510	0.069×10^{-3} 0.781×10^{-4}	3.6 91	1.5 0.7	96	.25
MAC-HE003B	4.3 0.49	40,510	0.069×10^{-3} 0.781×10^{-4}	3.6 91	1.5 0.7	96	.25
MAC-HE006A	8.7 0.98	20,953	0.267×10^{-3} 0.302×10^{-4}	3.9 99	4.2 1.9	115	.21
MAC-HE006B	8.7 0.98	20,953	0.267×10^{-3} 0.302×10^{-4}	3.9 99	4.2 1.9	115	.21
MAC-HE011B	17 1.9	28,249	0.389×10^{-3} 0.440×10^{-4}	4.7 119	5.7 2.6	76	.32
MAC-HE021B	32 3.6	7,976	2.63×10^{-3} 2.98×10^{-4}	4.8 123	13 5.7	77	.31
MAC-HE042B	63 7.1	9,695	4.33×10^{-3} 4.90×10^{-4}	5.8 148	18 8.1	58	.42
MAC-HA030_	66 7.8	15,310	1.83×10^{-3} 2.07×10^{-4}	7.6 193	13 6.0	82	.29
MAC-HA055_	66 7.8	17,994	3.11×10^{-3} 3.52×10^{-4}	9.5 242	19 8.5	82	.29
MAC-HA090_	177 20	10,749	8.09×10^{-3} 9.15×10^{-4}	9.3 237	31 14	58.5	.41
MAC-HA110_	177 20	10,784	10.4×10^{-3} 11.7×10^{-4}	10.8 274	38 17	58.5	.41
MAC-HA140_	177 20	10,958	12.8×10^{-3} 14.4×10^{-4}	12.4 314	44 20	58.5	.41
MAC-HB025_	39 4.4	3,028	8.26×10^{-3} 9.33×10^{-4}	6.9 176	17 7.5	58.5	.41
MAC-HB055_	112 13	3,745	14.2×10^{-3} 16.0×10^{-4}	7.8 199	21 9.6	58.5	.41
MAC-HB080_	112 13	3,685	20.1×10^{-3} 22.7×10^{-4}	8.8 223	26 12	58.5	.41
MAC-HB100_	380 43	2,842	35.9×10^{-3} 40.6×10^{-4}	8.5 217	42 19	31.1	.77
MAC-HB200_	380 43	4,045	48.4×10^{-3} 54.8×10^{-4}	9.6 243	52 24	31.1	.77
MAC-HB300_	380 43	4,439	67.6×10^{-3} 76.4×10^{-4}	10.9 277	63 29	31.1	.77
MAC-HB330_	646 73	3,988	86.6×10^{-3} 97.8×10^{-4}	12.2 311	77 35	24.5	.98
MAC-HB465_	646 73	3,790	119×10^{-3} 134×10^{-4}	15.2 385	100 46	24.5	.98
MAC-HB700_	744 84	2,502	266×10^{-3} 300×10^{-4}	15.1 383	145 67	18	1.33

[1]Caution: The built-in fail-safe brake is designed for holding and not for decelerating the motor. In normal operation the brake should be applied only after the motor is stopped. Fail-safe brakes are useful in applications when a servomotor is used to control a vertical axis. A servomotor with a fail-safe brake prevents the moveable part from dropping due to gravitation when the system power is turned OFF.

HE003A & HE003B Outline Drawings



SHAFT & PILOT DETAIL
INCHES [mm]

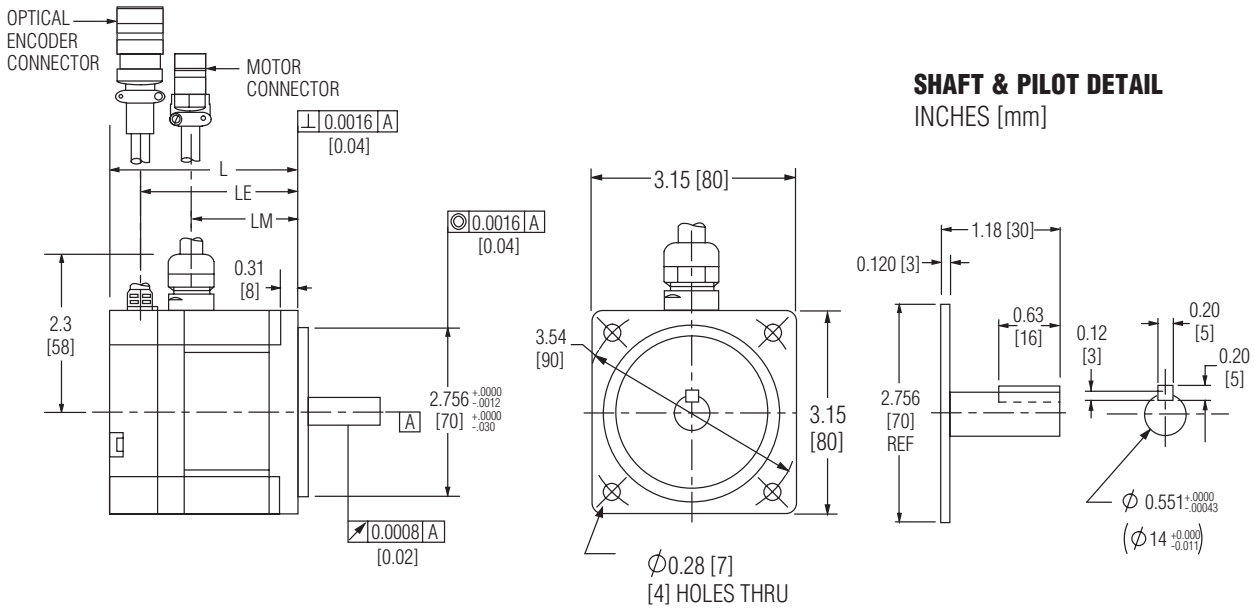
Dimensions	L	LE	LM
MAC-HE003A	2.4 [62]	1.9 [48]	1.3 [32]
MAC-HE003B	2.4 [62]	1.9 [48]	1.3 [32]

Note: Minimum cable clearance from motor centerline for encoder cable is 2.8 inches 71 mm); for motor cable is 3.8 inches (97 mm). Cable lengths to connector approximately 11 inches [280 mm].

For length of models with brake option selected, see page 37. Call for design details.

All dimensions in inches [millimeters]

HE006A, HE006B, & HE011B Outline Drawings

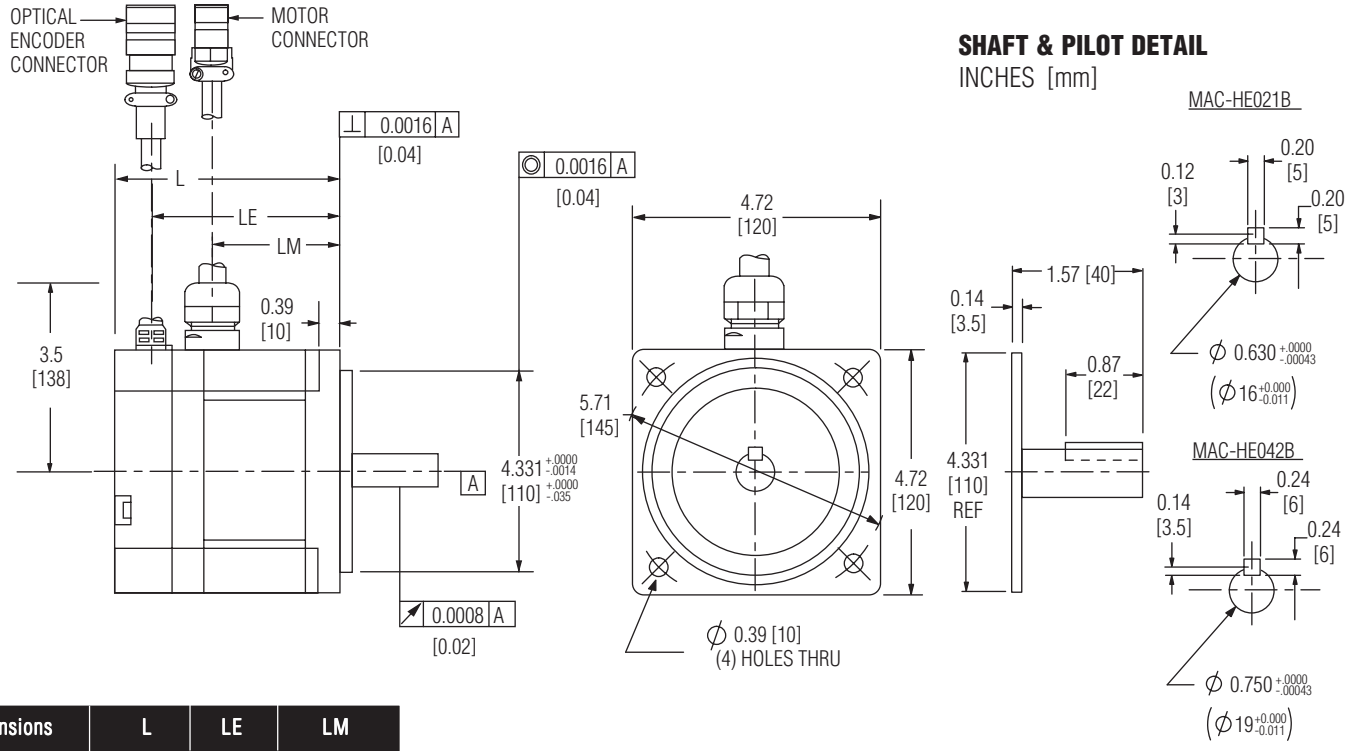


SHAFT & PILOT DETAIL
INCHES [mm]

Dimensions	L	LE	LM
MAC-HE006A	2.6 [67]	2.1 [53]	1.6 [40]
MAC-HE006B	2.6 [67]	2.1 [53]	1.6 [40]
MAC-HE011B	3.4 [87]	2.9 [73]	2.4 [60]

Note: Minimum cable clearance from motor centerline for encoder cable is 3.2 inches (81 mm); for motor cable is 4.2 inches (107 mm). Cable lengths to connector approximately 11 inches [280 mm].

HE021B & HE042B Outline Drawings



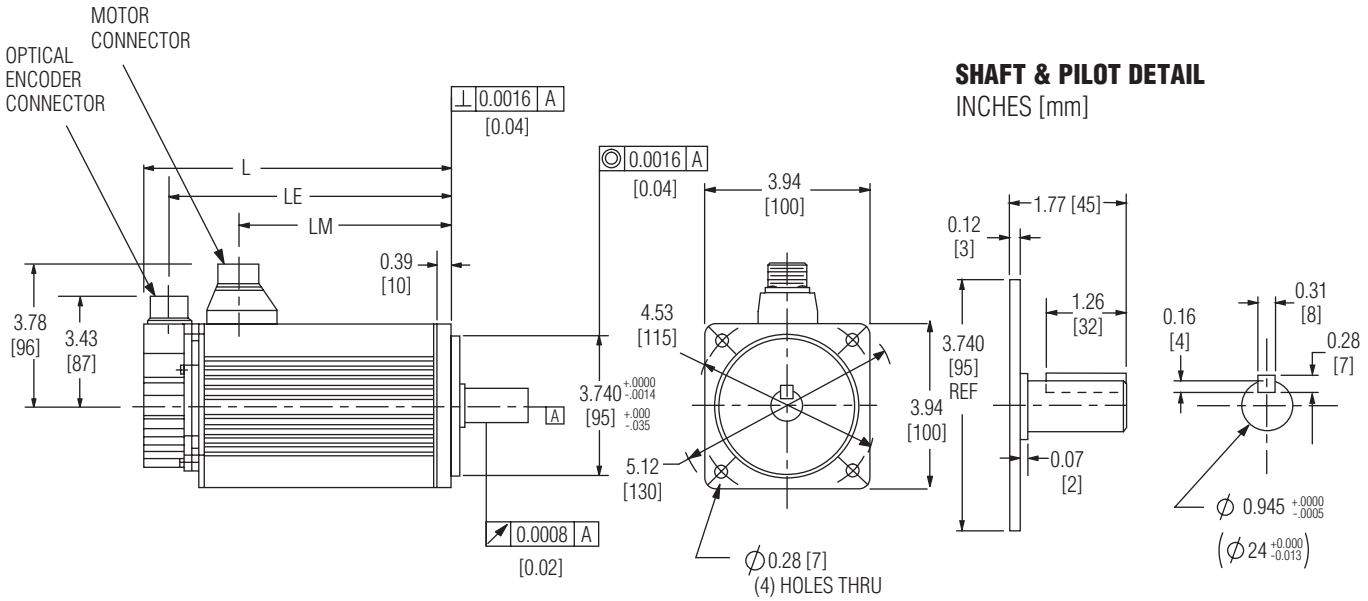
Dimensions	L	LE	LM
MAC-HE021B	3.4 [87]	2.9 [73]	2.2 [56]
MAC-HE042B	4.5 [115]	3.9 [100]	3.3 [84]

Note: Minimum cable clearance from motor centerline for encoder cable is 4.0 inches (102 mm); for motor cable is 5.0 inches (127 mm). Cable lengths to connector approximately 11 inches [280 mm].

For length of models with brake option selected, see page 37. Call for design details.

All dimensions in inches [millimeters]

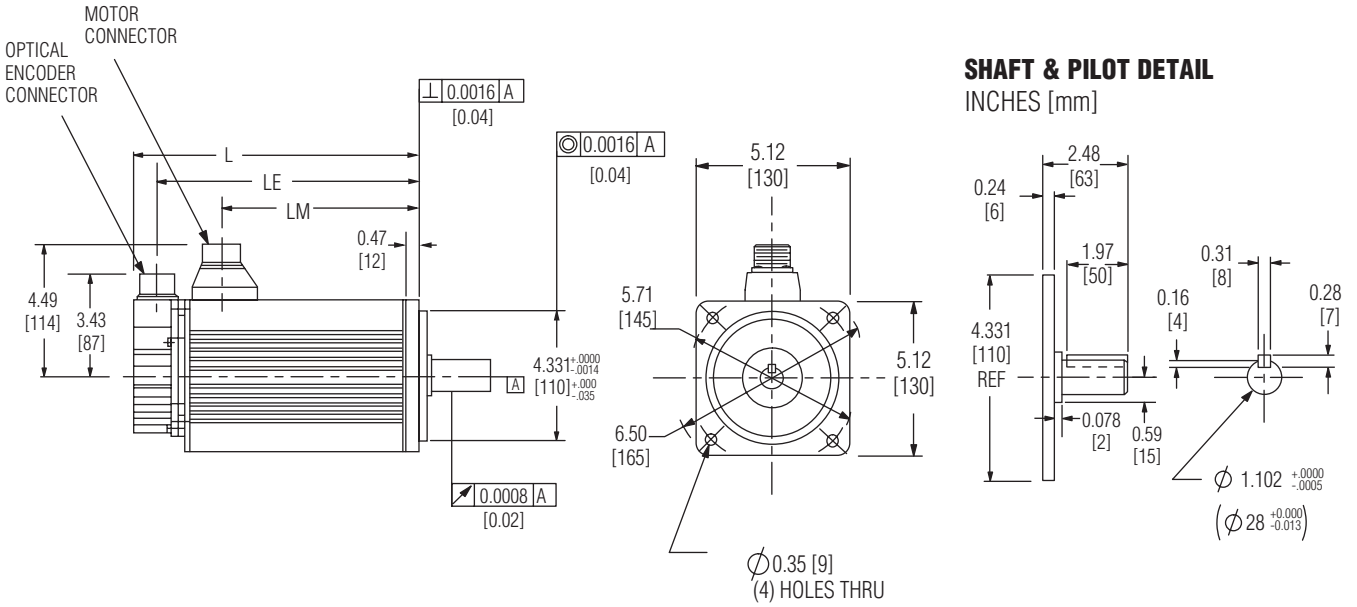
HA030_ & HA055_ Outline Drawings



Dimensions	L	LE	LM
MAC-HA030_	5.9 [149]	5.0 [128]	3.0 [76]
MAC-HA055_	7.8 [198]	7.0 [178]	4.9 [125]

Note: Minimum cable clearance from motor centerline for Encoder Cable is 6.2 inches (157 mm); for Motor Cable is 6.6 inches (168 mm).

HA090_, HA110_ & HA140_ Outline Drawings



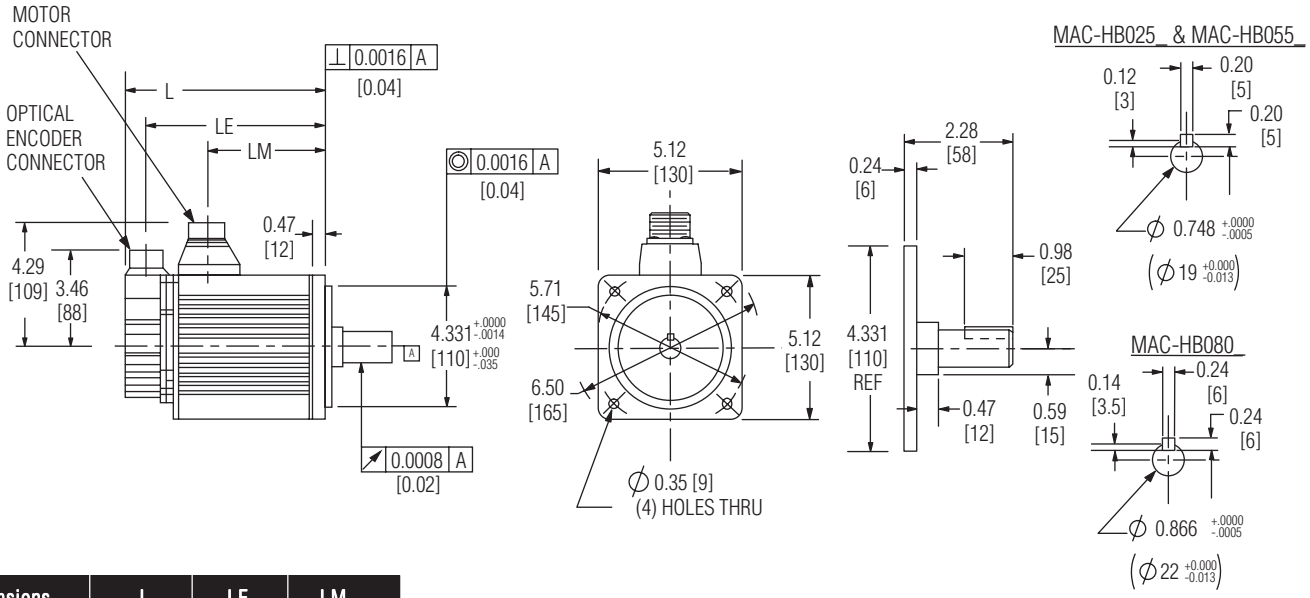
Dimensions	L	LE	LM
MAC-HA090_	7.8 [199]	7.0 [177]	4.8 [122]
MAC-HA110_	9.3 [236]	8.5 [215]	6.3 [159]
MAC-HA140_	10.9 [277]	10.0 [255]	7.8 [199]

Note: Minimum cable clearance from motor centerline for encoder cable is 6.2 inches (157 mm); for motor cable is 7.5 inches (191 mm).

For length of models with brake option selected, see page 37. Call for design details.

All dimensions in inches [millimeters]

HB025_, HB055_ & HB080_ Outline Drawings

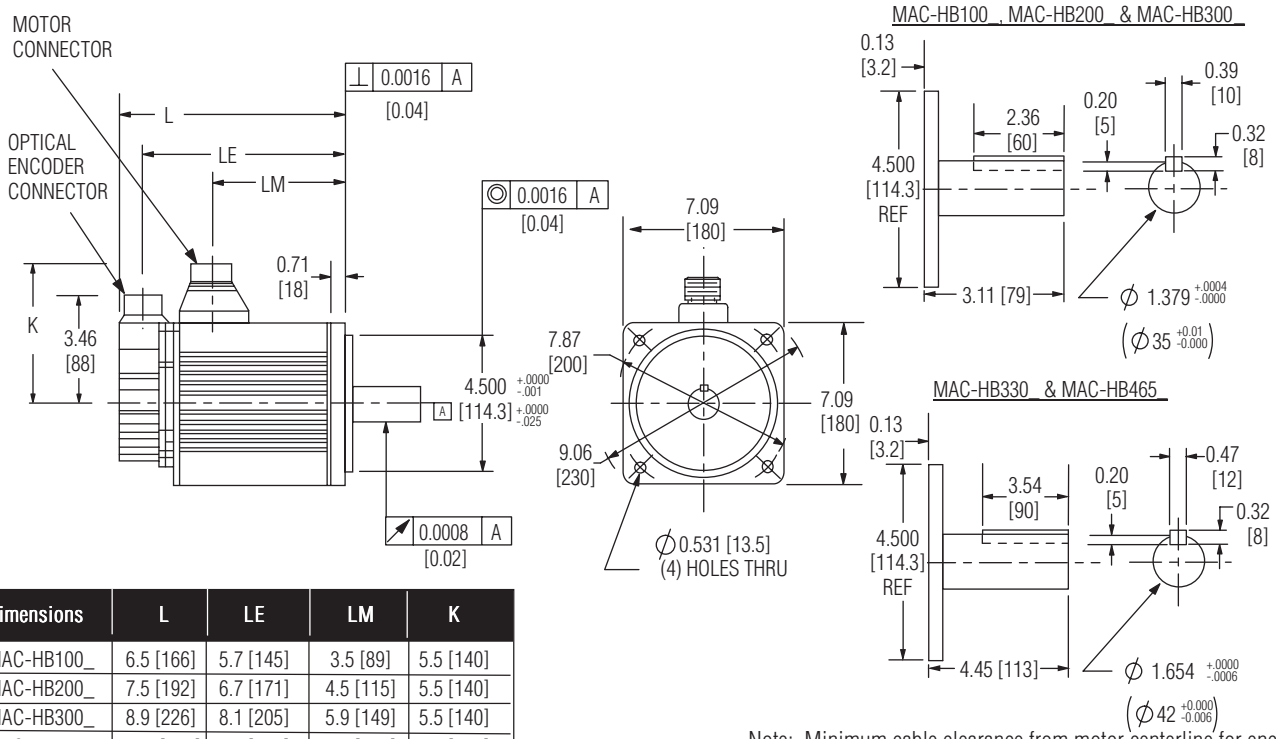


Dimensions	L	LE	LM
MAC-HB025_	5.4 [138]	4.6 [117]	2.5 [64]
MAC-HB055_	6.3 [161]	5.5 [140]	3.4 [88]
MAC-HB080_	7.3 [185]	6.5 [164]	4.4 [112]

Note: Minimum cable clearance from motor centerline for encoder cable is 6.3 inches (160 mm); for motor cable is 7.0 inches (178 mm).

HB100_, HB200_, HB300_, HB330_ & HB465_ Outline Drawings

SHAFT & PILOT DETAIL INCHES [mm]



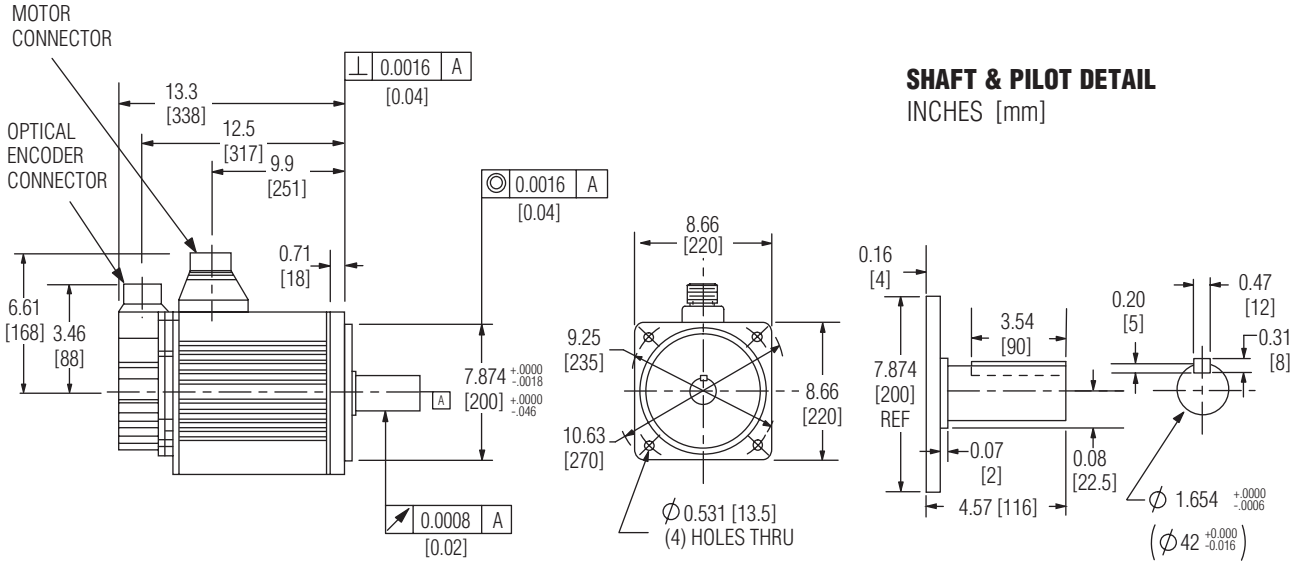
Dimensions	L	LE	LM	K
MAC-HB100_	6.5 [166]	5.7 [145]	3.5 [89]	5.5 [140]
MAC-HB200_	7.5 [192]	6.7 [171]	4.5 [115]	5.5 [140]
MAC-HB300_	8.9 [226]	8.1 [205]	5.9 [149]	5.5 [140]
MAC-HB330_	10.2 [260]	9.4 [239]	6.8 [174]	5.9 [150]
MAC-HB465_	13.2 [334]	12.3 [313]	9.8 [248]	5.9 [150]

Note: Minimum cable clearance from motor centerline for encoder cable is 6.3 inches (160 mm); for motor cable is 9.5 inches (241 mm)

For length of models with brake option selected, see page 37. Call for design details.

All dimensions in inches [millimeters]

HB700_ Outline Drawing



Note: Minimum cable clearance from motor centerline for encoder cable is 6.3 inches (160 mm); for motor cable is 9.5 inches (241 mm)

Servomotor Connectors

MOTOR / POWER RECEPTACLES

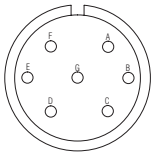


Fig. W

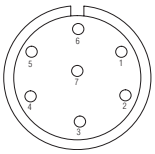


Fig. Y

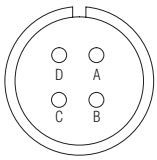


Fig. X

A	1	Phase U	RED
B	2	Phase V	WHT
C	3	Phase W	BLU
D	6	Ground	GRN
E	5	Brake Term	RED
F	4	Brake Term	BLK

BRAKE CONNECTOR (Figure B)

A	Brake Term
B	Brake Term
C	--

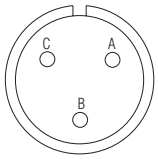


Fig. B

ENCODER FEEDBACK RECEPTACLES (Figure U & Z)

S	1	BAT-
T	2	BAT+
C	3	DATA+
D	4	DATA-
H	8	+5VDC
G	9	0V
J	Shell	Case Ground

Connector Type	Manufactured by
MS....	Amphenol
FIN....	Yaskawa
SRU....	Interconnectron

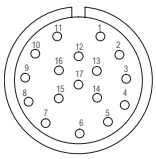


Fig. Z

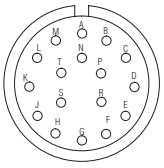


Fig. U

MOTOR / FEEDBACK / OPTION -- MATING CONNECTOR CHART

MOTOR TYPE	FIG	MOTOR/POWER	MATING	FIG	FEEDBACK	MATING
115,230 & 460 VAC Motors (incremental or absolute feedback)						
All of MAC-HE series motors	Y	SRUC06JMSCN236	FIN075-B2	Z	SRUC17GMRCN087	FIN17CA2[2]
MAC-HA030B, HA055B, HB025B, DB055B, HB080B	X	MS-3102A18-10P	MS-3106F18-10S	U	MS-3102A20-29P	MS-3106F20-29S
MAC-HA090B, HA110B, HA140B, HB100B, HB200B, HB300B	X	MS-3102A22-22P	MS-3106F22-22S	U	MS-3101A20-29P	MS-3106F20-29S
MAC-HB330B, HB465B & HB700B	X	MS-3102A32-17P	MS-3106F32-17S	U	MS-3101A20-29P	MS-3106F20-29S
115 & 230 VAC Motors with Fail-safe Brake						
All of MAC-HE series motors	Y	SRUC06JMSCN236	FIN075-B2	Z	SRUC17GMRCN087	FIN17CA22
MAC-HA030B, HA055B, HB025B, HB055B, HB080B	W	MS-3102A20-15P	MS-3106F20-15S	U	MS-3101A20-29P	MS-3106F20-29S
MAC-HA090B, HA110B, HA140B, HB100B, HB200B, HB300B	W	MS-3102A24-10P	MS-3106F24-10S	U	MS-3101A20-29P	MS-3106F20-29S
MAC-HB330B, HB465B & HB700B	X	MS-3102A32-17P[1]	MS-3106F32-17S[1]	U	MS-3101A20-29P	MS-3106F20-29S
	B	MS-3102A10SL-3P[1]	MS-3106F10SL-3S[1]			
460 VAC Motors with Fail-safe Brake						
MAC-HA030C, HA055C, HB025C, HB055C, HB080C	W	MS-3102A20-15P	MS-3106F20-15S	U	MS-3101A20-29P	MS-3106F20-29S
MAC-HA090C, HA110C, HA140C, HB100C, HB200C, HB300C	W	MS-3102A24-10P	MS-3106F24-10S	U	MS-3101A20-29P	MS-3106F20-29S
MAC-HB330C, HB465C & HB700C	X	MS-3102A32-17P[1]	MS-3106F32-17S[1]	U	MS-3101A20-29P	MS-3106F20-29S
Brake connector for all 460 VAC H-Series motors	B	MS-3102A10SL-3P[1]	MS-3106F10SL-3S[1]			

[1] Brake option requires separate motor and brake cables. [2] Requires Crimp tool B150 and positioner.

H-Series Encoder and Motion Cables (115 VAC and 230 VAC)

Standard	Flex Option[3]	IP-67 Sealing	Brake Option	Brake w/IP-67 Sealing	
CBL-HEMSW/X	CBL-HEMSWF/X	N/A	N/A	N/A	Encoder cable for HE-Series motors, 1-150 ft.
CBL-HEMSW1/X	CBL-HEMSWF1/X	N/A	CBL-HEMSWB1/X	N/A	Motor Cable for all MAC-HE motors , 1-150 ft.
CBL-HMSW/X	CBL-HMSWF/X	CBL-HMSWV/X	N/A	N/A	Encoder cable for HA & HB-Series motors, 1-150 ft.
CBL-HMSW1/X	CBL-HMSWF1/X	CBL-HMSWV1/X	CBL-HMSWB1/X	CBL-HMSWVB1/X	Motor cable for MAC-HA030, HA055, HB025-HB080 motors, 1-150 ft.
CBL-HMSW2/X	CBL-HMSWF2/X	CBL-HMSWV2/X	CBL-HMSWB2/X	CBL-HMSWVB2/X	Motor cable for MAC-HA090, HA110 & HB200 motors, 1-150 ft.
CBL-HMSW3/X	CBL-HMSWF3/X	CBL-HMSWV3/X	CBL-HMSWB3/X	CBL-HMSWVB3/X	Motor cable for MAC-HA140 & HB300 motors, 1-150 ft.
CBL-HMSW4/X	CBL-HMSWF4/X	CBL-HMSWV4/X	CBL-HMSWB4/X	CBL-HMSWVB4/X	Motor cable for MAC-HB100 motors, 1-150 ft.
CBL-HMSW5/X	CBL-HMSWF5/X	CBL-HMSWV5/X	***Note: CBL-HMSWB/X is in addition***		Motor cable for MAC-HB330 motors, 1-150 ft.
CBL-HMSW6/X	CBL-HMSWF6/X	CBL-HMSWV6/X	***to motor cable.***		Motor cable for MAC-HB465 & HB700 motors, 1-150 ft.
			CBL-HMSWB/X	CBL-HMSWVB/X	Brake cable for MAC-HB330, HB465 & HB700 motors, 1-150 ft.

H-Series Encoder and Motion Cables (460 VAC)

Standard	Flex Option[3]	IP-67 Sealing	Brake Option	Brake w/IP-67 Sealing	
CBL-HMSW/X	CBL-HMSWF/X	CBL-HMSWV/X	N/A	N/A	Encoder cable for HA & HB-Series motors, 1-150 ft.
CBL-HMSW1/X	CBL-HMSWF1/X	CBL-HMSWV1/X	***Note: CBL-HMSWB/X is in addition***		Motor cable for MAC-HA030, HA055, HB025-HB080 motors, 1-150 ft.
CBL-HMSW2/X	CBL-HMSWF2/X	CBL-HMSWV2/X	***to motor cable.***		Motor cable for MAC-HA090, HA110 & HB200 motors, 1-150 ft.
CBL-HMSW3/X	CBL-HMSWF3/X	CBL-HMSWV3/X			Motor cable for MAC-HA140 & HB300 motors, 1-150 ft.
CBL-HMSW4/X	CBL-HMSWF4/X	CBL-HMSWV4/X			Motor cable for MAC-HB100 motors, 1-150 ft.
CBL-HMSW5/X	CBL-HMSWF5/X	CBL-HMSWV5/X			Motor cable for MAC-HB330 motors, 1-150 ft.
CBL-HMSW6/X	CBL-HMSWF6/X	CBL-HMSWV6/X			Motor cable for MAC-HB465 & HB700 motors, 1-150 ft.
			CBL-HMSWB/X	CBL-HMSWVB/X	Brake cable for all 460 VAC H-Series motors, 1-150 ft.

[3] Consult factory for flex cables beyond 100 feet.

Note: For all cables above, specify length of the cable by adding the numerical length in the "X" placeholder in the Model Number.