



Installation Instructions

H-Series Brushless Servo Motor

(Catalog Number H-2005, H-3007, H-3016, H-4030, H-4050, H-4075, H-6100, H-6200, H-6300, H-8350, and H-8500)

These *Installation Instructions* describe how to install the H-Series motors. Use this document if you are responsible for designing, installing, or troubleshooting the Allen-Bradley® H-Series motor products. Read all instructions before installing this motor.

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Receiving and Maintenance Information

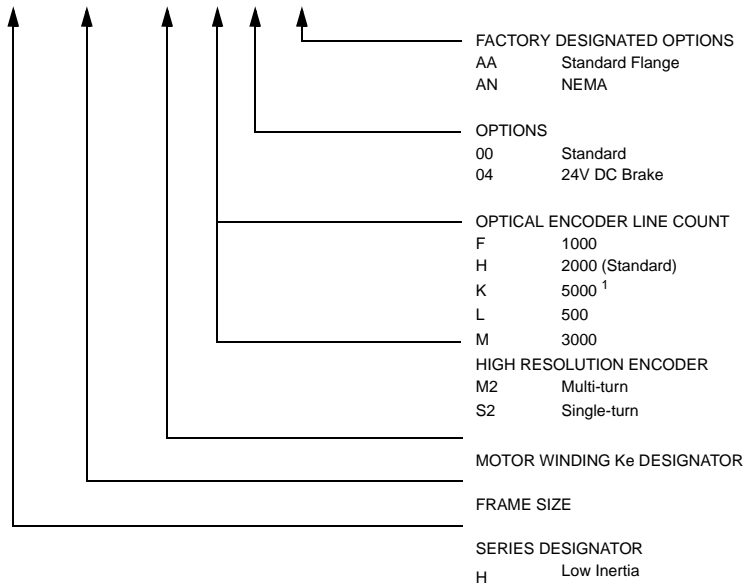
The customer is responsible for inspecting the equipment before accepting the shipment from the freight company. Check the item(s) you receive against your purchase order.

Maintain your motor within the following environmental conditions:

- in a clean, dry location
- within the operating temperature range, 0° to 40° C (32° to 104° F)
- within the storage temperature range, -30° to 70° C (-25° to 158° F)
- within the relative humidity range, 5% to 95% non-condensing
- in a non-corrosive atmosphere

Motor Catalog Number Identification

H - 4030 - P - H 00 AA



¹ The 5000 line count encoder limits the motor's top speed to 3600 RPM due to frequency output limit of the encoder. Check drive system configuration data for additional restrictions imposed by drive input.

Before You Install the Motor

Before installing or storing the motor:

1. Remove the motor carefully from its shipping container.
2. Visually inspect the motor for any damage.
3. Examine the motor frame, front output shaft, and mounting pilot for any defects.
4. Notify the carrier of any shipping damage immediately.

ATTENTION



Do not open or attempt to open the motor.

Only a qualified Allen-Bradley employee can service this type of motor.

Failure to observe these safety procedures could result in personal injury or equipment damage.

Using Shaft Seals

An additional seal is required on the motor shaft near the motor front bearing, if the shaft is exposed to fluids or significant amounts of fine dust. This includes lubricating oil from a gearbox. The motor ingress protection (IP) rating depends on the usage of shaft seals and environmentally sealed connectors/cables. The additional seal is not recommended in applications where the motor shaft area is free of liquids or fine dust. Refer to *Shaft Seal Kits* on page 17 to find the catalog number of the seal kit for your H-Series motor.

Using Couplings and Pulleys

Mechanical connections to the motor shaft, such as couplings and pulleys, require a torsionally rigid coupling or a reinforced timing belt. The high dynamic performance of servo motors can cause couplings, pulleys or belts to loosen or slip over time. A loose or slipping connection will cause system instability and may damage the motor shaft. All connections between the system and the servo motor shaft must be rigid to achieve acceptable response from the system. Periodically inspect connections to verify their rigidity.

When mounting couplings or pulleys to the motor shaft, ensure that the connections are properly aligned and that axial and radial loads are within the specifications of the motor. Refer to *Motor Load Force Ratings* on page 14 for guidelines on how to achieve 20,000 hours of motor bearing life.

ATTENTION

Damage may occur to the motor bearings and the feedback device if sharp impact to the shaft is applied during installation of couplings and pulleys. Damage to the feedback device may result by applying leverage from the motor mounting face to remove devices mounted on the motor shaft.

Do not strike the shaft, couplings, or pulleys with tools during installation or removal. Use a wheel puller applying pressure from the user end of the shaft to remove any friction fit or stuck device from the motor shaft.

Failure to observe these safety procedures result in damage to the motor and its components.

Preventing Electrical Noise

ElectroMagnetic Interference (EMI), commonly called noise, may adversely impact motor performance by inducing stray signals. Effective techniques to counter EMI include filtering the AC power, shielding and separating signal carrying lines, and practicing good grounding techniques.

Effective AC power filtering can be achieved by using isolated AC power transformers or properly installed AC line filters.

To help avoid EMI:

- 1.** Physically separate signal lines from motor cabling and power wiring. Do not route signal wires with motor and power wires, or over the vent openings of servo drives.
- 2.** Ground all equipment using a single-point parallel ground system that employs ground bus bars or large straps. If necessary, use additional electrical noise reduction techniques to reduce EMI in noisy environments.

Building and Installing Cables

Knowledgeable cable routing and careful cable construction improves system ElectroMagnetic Compatibility (EMC).

To build and install cables, perform the following steps:

1. Keep wire lengths as short as possible.
2. Route signal cables (encoder, serial, analog) away from motor and power wiring.
3. Separate cables by a minimum of 0.3 m (1 ft) for every 9 m (30 ft) of parallel run.
4. Ground both ends of the encoder cable shield, and twist the signal wire pairs to prevent electromagnetic interference (EMI) from other equipment.

ATTENTION



High voltage can be present on the shield of a power cable if the shield is not grounded.

Ensure there is a connection to ground for any power cable shield.

Failure to observe these safety procedures could result in personal injury or equipment damage.

ATTENTION



H-Series motors with high resolution encoders require the use of Allen-Bradley power and feedback cables.

H-Series connector kits do not provide the necessary connector grounding for use with high resolution encoders.

Failure to observe these safety procedures could result in personal injury or equipment damage.

Installing Your Motor

The installation must comply with all local regulations and use of equipment and installation practices that promote electromagnetic compatibility (EMC) and safety. Preferred fasteners are stainless steel.

ATTENTION



Unmounted motors, disconnected mechanical couplings, and/or disconnected cables are dangerous if power is applied.

Disassembled equipment should be appropriately identified (tagged-out) and access to electrical power restricted (locked-out).

Before applying power to the motor, remove the shaft key and other mechanical couplings which could be thrown from the shaft.

Failure to observe these safety procedures could result in personal injury or equipment damage.

ATTENTION



An H-Series Personality Module must be installed on servo drives requiring a Personality Module.

Rapid shaft rotation up to one revolution may occur when the drive is enabled, if an H-Series Personality Module is not installed.

Failure to observe these safety procedures could result in personal injury or equipment damage.

Guidelines for Installation

Observe the following for installing the motor:

1. Allow sufficient clearance around the motor to keep it within its specified operating temperature range. Refer to *Receiving and Maintenance Information* on page 2 for operating range. Do not enclose the motor unless forced air is blown across the motor for cooling. A fan blowing air across the motor will improve its performance. Keep other heat-producing devices away from the motor.
2. Refer to *Mounting Dimensions* on page 9 to determine the mounting dimensions of your motor.
3. Place the motor with connectors pointing downward.
4. Properly mount and align the motor.
5. Attach all power and encoder cables after the motor is mounted, and use a drip loop in the cable to keep liquids flowing away from the connectors.

ATTENTION



Outer surfaces of motor can reach high temperatures, 100° C (212° F) during motor operation.

Take precautions to prevent accidental contact with hot surfaces. Consider motor surface temperature when selecting motor mating connections and cables.

Failure to observe these safety procedures could result in personal injury or equipment damage.

Mounting Dimensions

The dimension symbols and actual dimensions of the different models in the H-Series are referenced in tables on pages 9 and 10.

Figure 1
H-2000 Standard Mounting Dimensions

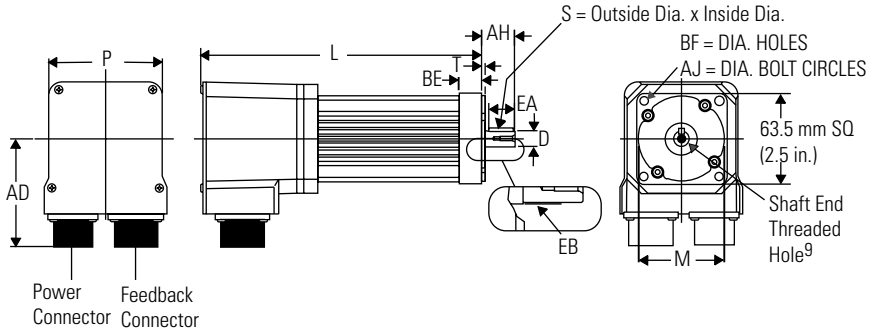
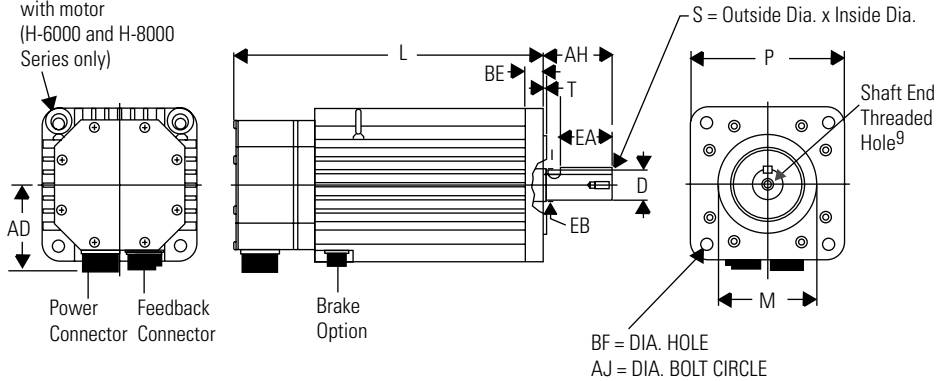


Figure 2
H-3000, -4000, -6000, and -8000 Standard Mounting Dimensions

2 Eyebolts provided with motor (H-6000 and H-8000 Series only)



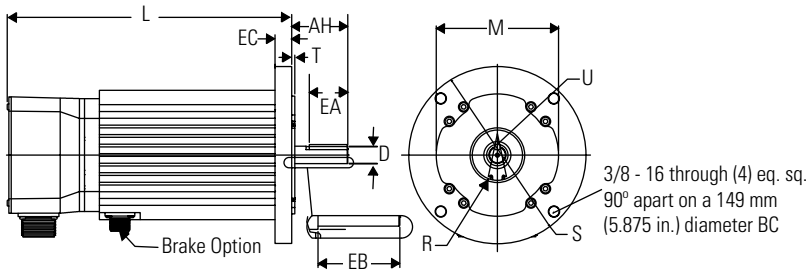
Dimension (Refer to drawing)		H-Series Motor										
		2005	3007	3016	4030	4050	4075	6100	6200	6300	8350	8500
AD	mm	75	75	75	76	76	76	101	101	101	112	112
	(in.)	(2.95)	(2.95)	(2.95)	(3)	(3)	(3)	(4)	(4)	(4)	(4.41)	(4.41)
AH	mm	23	30	30	50	50	50	80	80	80	85	85
	(in.)	(0.9) ³	(1.18) ³	(1.18) ³	(1.97) ³	(1.97) ³	(1.97) ³	(3.15) ³	(3.15) ³	(3.15) ³	(3.35) ³	(3.35) ³
AJ	mm	75	100	100	145	145	145	200	200	200	265	265
	(in.)	(2.95)	(3.94)	(3.94)	(5.71)	(5.71)	(5.71)	(7.87)	(7.87)	(7.87)	(10.43)	(10.43)
BE	mm	15.2	10.9	10.9	15.5	15.5	15.5	21.3	21.3	21.3	22.4	22.4
	(in.)	(0.6)	(0.43)	(0.43)	(0.61)	(0.61)	(0.61)	(0.84)	(0.84)	(0.84)	(0.88)	(0.88)
BF	mm	5.8	7	7	10	10	10	13.5	13.5	13.5	15	15
	(in.)	(0.23)	(0.28)	(0.28)	(0.39)	(0.39)	(0.39)	(0.53)	(0.53)	(0.53)	(0.59)	(0.59)
D	mm	11	14	14	19	19	19	35	35	35	42	42
	(in.)	(0.43) ²	(0.55) ²	(0.55) ²	(0.75) ²	(0.75) ⁶	(0.75) ⁶	(1.38) ⁷	(1.38) ⁷	(1.38) ⁷	(1.65) ⁷	(1.65) ⁷
EA	mm	18	20	20	40	40	40	60	60	60	60	60
	(in.)	(0.71)	(0.79)	(0.79)	(1.57)	(1.57)	(1.57)	(2.36)	(2.36)	(2.36)	(2.36)	(2.36)
EB	mm	12	15	15	20	20	20	38	38	38	45	45
	(in.)	(0.47)	(0.59)	(0.59)	(0.79)	(0.79)	(0.79)	(1.5)	(1.5)	(1.5)	(1.77)	(1.77)
L (see Note a)	mm	197	172	223	213	264	315	277	353	429	375	426
	(in.)	(7.7)	(6.77)	(8.77)	(8.39)	(10.39)	(12.4)	(10.91)	(13.9)	(16.89)	(14.76)	(16.77)
L (see Note b)	mm	—	211	262	266	317	368	330	406	482	478	529
	(in.)	—	(8.31)	(10.31)	(10.47)	(12.48)	(14.49)	(12.99)	(15.98)	(18.98)	(18.82)	(20.83)
L (see Note c)	mm	—	—	—	—	—	—	272	348	424	369	420
	(in.)	—	—	—	—	—	—	(10.71)	(13.70)	(16.69)	(14.53)	(16.54)
L (see Note d)	mm	—	—	—	—	—	—	325	401	477	472	523
	(in.)	—	—	—	—	—	—	(12.80)	(15.79)	(18.78)	(18.58)	(20.59)
M	mm	60	80	80	110	110	110	114.3	114.3	114.3	230	230
	(in.)	(2.36) ¹	(3.15) ¹	(3.15) ¹	(4.33) ⁵	(4.33) ⁵	(4.33) ⁵	(4.5) ⁵	(4.5) ⁵	(4.5) ⁵	(9.06) ⁸	(9.06) ⁸
P	mm	80	89	89	121	121	121	178	178	178	241	241
	(in.)	(3.15)	(3.5)	(3.5)	(4.76)	(4.76)	(4.76)	(7.01)	(7.01)	(7.01)	(9.49)	(9.49)
S	mm	4 x 4	5 x 5	5 x 5	6 x 6	6 x 6	6 x 6	10 x 8	10 x 8	10 x 8	12 x 8	12 x 8
	(in.)	(0.16 x 0.16)	(0.2 x 0.2)	(0.2 x 0.2)	(0.24 x 0.24)	(0.24 x 0.24)	(0.24 x .24)	(0.39 x 0.31)	(0.39 x 0.31)	(0.39 x 0.31)	(0.47 x 0.31)	(0.47 x 0.31)
T	mm	2.4	3	3	3	3	3	4	4	4	4	4
	(in.)	(0.09) ⁴	(0.12) ⁴	(0.12) ⁴	(0.12) ⁴	(0.12) ⁴	(0.12) ⁴	(0.16) ⁴	(0.16) ⁴	(0.16) ⁴	(0.16) ⁴	(0.16) ⁴

Tolerances:

- ¹ Tolerance is -0.03 mm (-0.0012 in.).
 - ² Tolerance is -0.01 mm (-0.0004 in.).
 - ³ Tolerance is ±0.5 mm (±0.0196 in.).
 - ⁴ Tolerance is ±0.2 mm (±0.0079 in.).
 - ⁵ Tolerance is -0.035 mm (-0.0014 in.).
 - ⁷ Tolerance is -0.16 mm (-0.0006 in.).
 - ⁸ Tolerance is -0.46 mm (-0.0181 in.).
- ⁹ H-2000 Thread = M3 x 0.5 mm (0.0197 in.), Thread Depth = 10 mm (0.39 in.).
 H-3000 Thread = M3 x 0.5 mm (0.0197 in.), Thread Depth = 10 mm (0.39 in.).
 H-4000 Thread = M6 x 1 mm (0.0394 in.), Thread Depth = 15 mm (0.59 in.).
 H-6000 and H-8000 Thread = M8 x 1.25 mm (0.0492 in.), Thread Depth = 20 mm (0.79 in.).

Notes:

- a = Optical encoder, without Brake
- b = Optical encoder with Brake
- c = High Resolution Encoder without Brake
- d = High Resolution with Brake



Dimension (Refer to drawing)	Motor		
	H-4030 NEMA 56C	H-4050 NEMA 56C	H-4075 NEMA 56C
AH	mm 52 (in.) (2.06) ¹	mm 52 (in.) (2.06) ¹	mm 52 (in.) (2.06) ¹
D	mm 15.9 (in.) (0.625) ⁴	mm 15.9 (in.) (0.625) ⁴	mm 15.9 (in.) (0.625) ⁴
EA	mm 36 (in.) (1.41) full depth	mm 36 (in.) (1.41) full depth	mm 36 (in.) (1.41) full depth
EB	mm 50.8 (in.) (2)	mm 50.8 (in.) (2)	mm 50.8 (in.) (2)
EC	mm 15.5 (in.) (0.61)	mm 15.5 (in.) (0.61)	mm 15.5 (in.) (0.61)
L (see Note a)	mm 213 (in.) (8.39)	mm 264 (in.) (10.39)	mm 315 (in.) (12.4)
L (see Note b)	mm 266 (in.) (10.47)	mm 317 (in.) (12.48)	mm 368 (in.) (14.49)
M	mm 114.3 (in.) (4.5) ²	mm 114.3 (in.) (4.5) ²	mm 114.3 (in.) (4.5) ²
R	mm 47 x 20 (in.) (1.85 x 0.788)	mm 47 x 20 (in.) (1.85 x 0.788)	mm 47 x 20 (in.) (1.85 x 0.788)
S	mm 165 (in.) (6.5)	mm 165 (in.) (6.5)	mm 165 (in.) (6.5)
T	mm 3 (in.) (0.12) ³	mm 3 (in.) (0.12) ³	mm 3 (in.) (0.12) ³
U	mm 4.8 x 35 (in.) (0.1875 x 1.375)	mm 4.8 x 35 (in.) (0.1875 x 1.375)	mm 4.8 x 35 (in.) (0.1875 x 1.375)

Tolerances:¹ Tolerance is ± 0.508 mm (± 0.02 in.)² Tolerance is -0.762 mm (-0.003 in.)³ Tolerance is ± 0.254 mm (± 0.01 in.)⁴ Tolerance is -0.0127 mm (-0.0005 in.)**Notes:**

a = Optical encoder without Brake

b = Optical encoder with Brake

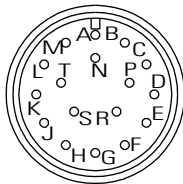
Connector Data

The tables below list the signal descriptions for the feedback, power and brake connector pins.

Feedback Connectors

Encoder	
Pin	Signal
A	A+
B	A-
C	B+
D	B-
E	I+
F	I-
G	Encoder Case
H	ABS
J	+5V DC
K	+5V DC
L	COM
M	COM
N	Hall B
P	Hall C
R	TS+
S	TS-
T	Hall A

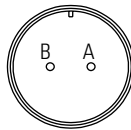
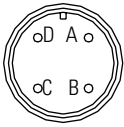
High Resolution	
Pin	Signal
A	Sin+
B	Sin-
C	Cos+
D	Cos-
E	Data+
F	Data-
G	Reserved
H	
J	
K	+5V DC
L	Common
M	Reserved
N	
P	
R	TS+
S	TS-
T	Reserved



Power Connector and Brake Connector

Power Connector	
Pin	Signal
A	U
B	V
C	W
D	Motor Case

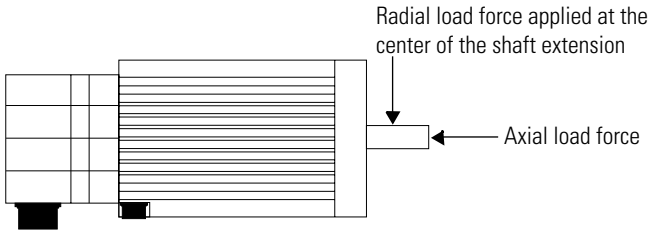
Brake Connector	
Pin	Signal
A	BR+
B	BR-



Motor Load Force Ratings

Motors are capable of operating with sustained maximum radial or maximum axial shaft loads. The measurement points for maximum radial and axial load forces are shown in the figure below.

Figure 3
Load Forces on Shaft



Motor Radial Load Force Ratings

Motor		500 RPM	1000 RPM	2000 RPM	3000 RPM	4000 RPM	5000 RPM	6000 RPM
H-2005	kg	63.5	50.8	39.9	34.9	31.8	29.5	20.4
	(lb)	(140)	(112)	(88)	(77)	(70)	(65)	(45)
H-3007	kg	68	54.4	43.1	37.6	34	31.8	–
	(lb)	(150)	(120)	(95)	(83)	(75)	(70)	–
H-3016	kg	76.2	60.8	47.6	41.7	38.1	35.4	–
	(lb)	(168)	(134)	(105)	(92)	(84)	(78)	–
H-4030-M	kg	102.1	91.6	72.6	63.5	57.6	–	–
	(lb)	(225)	(202)	(160)	(140)	(127)	–	–
H-4030-P	kg	102.1	91.6	72.6	63.5	57.6	–	–
	(lb)	(225)	(202)	(160)	(140)	(127)	–	–
H-4050	kg	123.8	98.9	78.0	68.0	62.1	–	–
	(lb)	(273)	(218)	(172)	(150)	(137)	–	–
H-4075	kg	129.7	104.3	82.6	71.2	65.3	–	–
	(lb)	(286)	(230)	(182)	(156)	(144)	–	–
H-6100	kg	263.1	208.7	165.6	145.2	–	–	–
	(lb)	(580)	(460)	(365)	(320)	–	–	–
H-6200	kg	283.5	226.8	179.2	156.5	–	–	–
	(lb)	(625)	(500)	(395)	(345)	–	–	–
H-6300	kg	299.4	235.9	188.2	163.3	–	–	–
	(lb)	(660)	(520)	(415)	(360)	–	–	–
H-8350	kg	299.4	238.1	188.2	–	–	–	–
	(lb)	(660)	(525)	(415)	–	–	–	–
H-8500	kg	313.0	249.5	197.3	–	–	–	–
	(lb)	(690)	(550)	(435)	–	–	–	–

With no radial load, the axial load rating is 100% of the radial load rating from the table above. With a radial and an axial load, the axial load rating is 44% of the radial load rating from the table above.

Cables and Connector Kits

CE compliant cables are available from Allen-Bradley in standard cable lengths. Contact your nearest Allen-Bradley sales office or refer to your drive's installation manual for a complete listing of available cables.

If you choose to build your own cables, the following non-CE compliant connector kits are available for H-Series motors with optical encoders.

ATTENTION



H-Series motors with high resolution encoders require the use of Allen-Bradley power and feedback cables.

H-Series connector kits do not provide the necessary connector grounding for use with high resolution encoders.

Failure to observe these safety procedures could result in personal injury or equipment damage.

Catalog Number	Description
2090-HPC-S2000	Straight Power Connector Kit Compatible with 500W, 1 and 2 kW Drives
2090-HPC-R2000	Right-Angle Power Connector Kit Compatible with 500W, 1 and 2 kW Drives
2090-HPC-S3000	Straight Power Connector Kit Compatible with 500W, 1 and 2 kW Drives
2090-HPC-R3000	Right-Angle Power Connector Kit Compatible with 500W, 1 and 2 kW Drives
2090-HPC-S4000	Straight Power Connector Kit Compatible with 2 and 3 kW Drives
2090-HPC-R4000	Right-Angle Power Connector Kit Compatible with 2 and 3 kW Drives
2090-HPC-S6000	Straight Power Connector Kit Compatible with 7.5 kW Drives
2090-HPC-R6000	Right-Angle Power Connector Kit Compatible with 7.5 kW Drives
2090-HPC-S8000	Straight Power Connector Kit Compatible with Drives >7.5 kW
2090-HPC-R8000	Right-Angle Power Connector Kit Compatible with Drives >7.5 kW

Shaft Seal Kits

H-Series motors can attain an IP65 (dust tight, protected against water jet) environmental rating when equipped with a shaft seal (and cables and with appropriate connectors). The following shaft seal kits are available for H-Series motors.

Catalog Number	Description
0041-5056	Shaft Seal Kit for H-2000 Series Motors
0041-5065	Shaft Seal Kit for H-3000 Series Motors
0041-5058	Shaft Seal Kit for H-4000 Series Motors
0041-5059	Shaft Seal Kit for H-6000 Series Motors
0041-5053-005	Shaft Seal Kit for H-8000 Series Motors

Notes

For more information refer to our web site at: www.ab.com/motion

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Publication 1398-IN517A-EN-P — August 2001

PN 0013-1061-001 Rev B

Supersedes Publication 1398-5.7 — April 1999

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