

CYCLO[®] HBB HELICAL BUDDYBOX[®] Gearmotor

Premium Efficient Motor Edition



EP.NA Motors

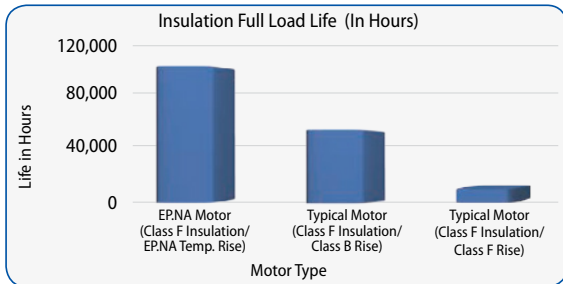
Enhanced Performance (EP.NA) integral motors represent exceptional value to customers. To maximize the performance of the motors, a host of advanced features has been developed providing tangible benefits to the users.

▶ All in one

To simplify transactions throughout the continent, North American version (.NA) features standard multiple listings including DOE, UL and CSA, along with CE marking. Other versions are available for premium performance with European 50 Hz voltages.

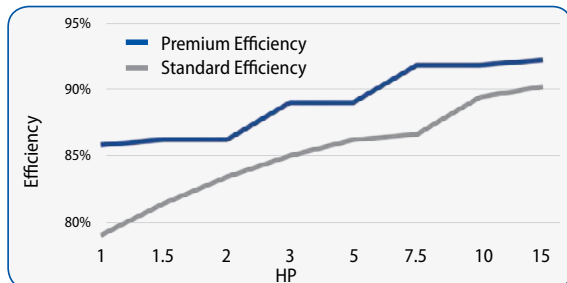
▶ Exceptionally long life

Our Premium Efficient Motors feature lower temperature rise and robust class "F" insulation. The combination of those attributes yield reduced motor operating temperatures that exponentially increase the thermal life of the insulation. In order to match the longer insulation life, deep groove ball bearings have been incorporated to further extend the life of our products.



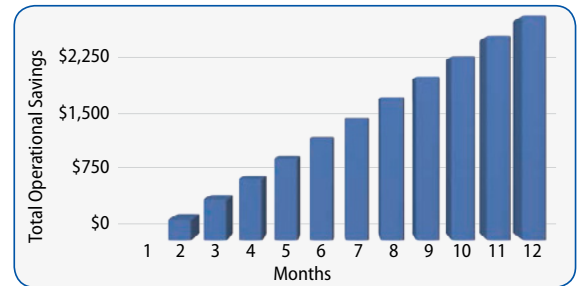
▶ Eco friendly

Premium efficiency, mandated by the DOE (Department of Energy, USA), shrinks the carbon footprint by delivering more torque at the same level of energy consumption. Higher starting torques may allow smaller motors to be selected for some applications.



▶ Cost-effective

The premium efficiency design is cost-effective in reducing energy consumption throughout the full speed range, resulting in a lower total lifecycle cost.



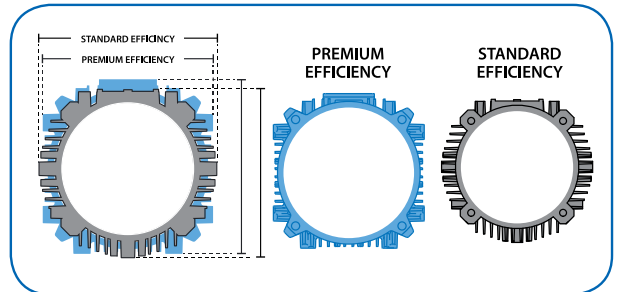
The assumptions for the study are as follows:
 9.8 cents of a dollar per kWh • 8600 operating hours annually • A 7.5 kilowatt motor (10 HP) • IE3 motor costing 25% more than the IE1 motor • IE3 premium efficiency motor being 2.8% more efficient than the IE1 standard efficiency motor

▶ Inverter duty

All of the motors feature corona resistant magnet wire that resists the voltage spikes that are inherent to the widely applied IGBT inverters and extends insulation life. Inverter duty brake motors are also available. The non-brake motors are suitable for a 10:1 turndown. The advanced fan design helps to keep the motor running cool at lower input speeds.

▶ Optimized Geometry

Increasing motor size is one of several techniques to reduce losses and achieve premium efficiency. Sumitomo optimized its existing external envelope while still accommodating a large motor core. The result is a compact premium efficient motor.



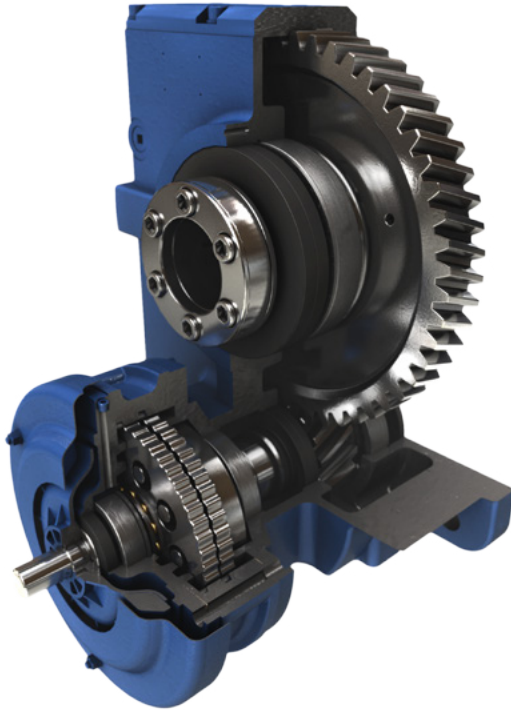


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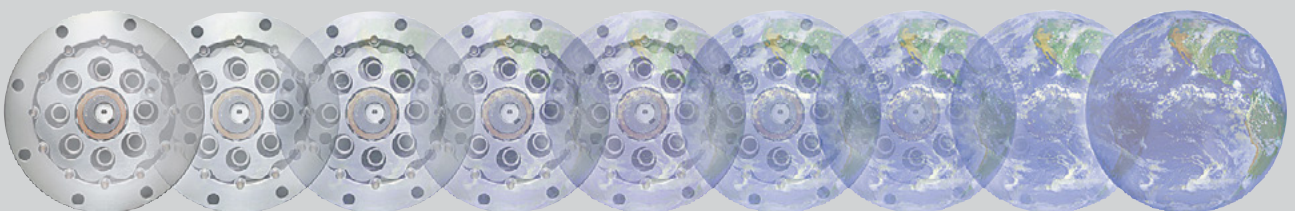
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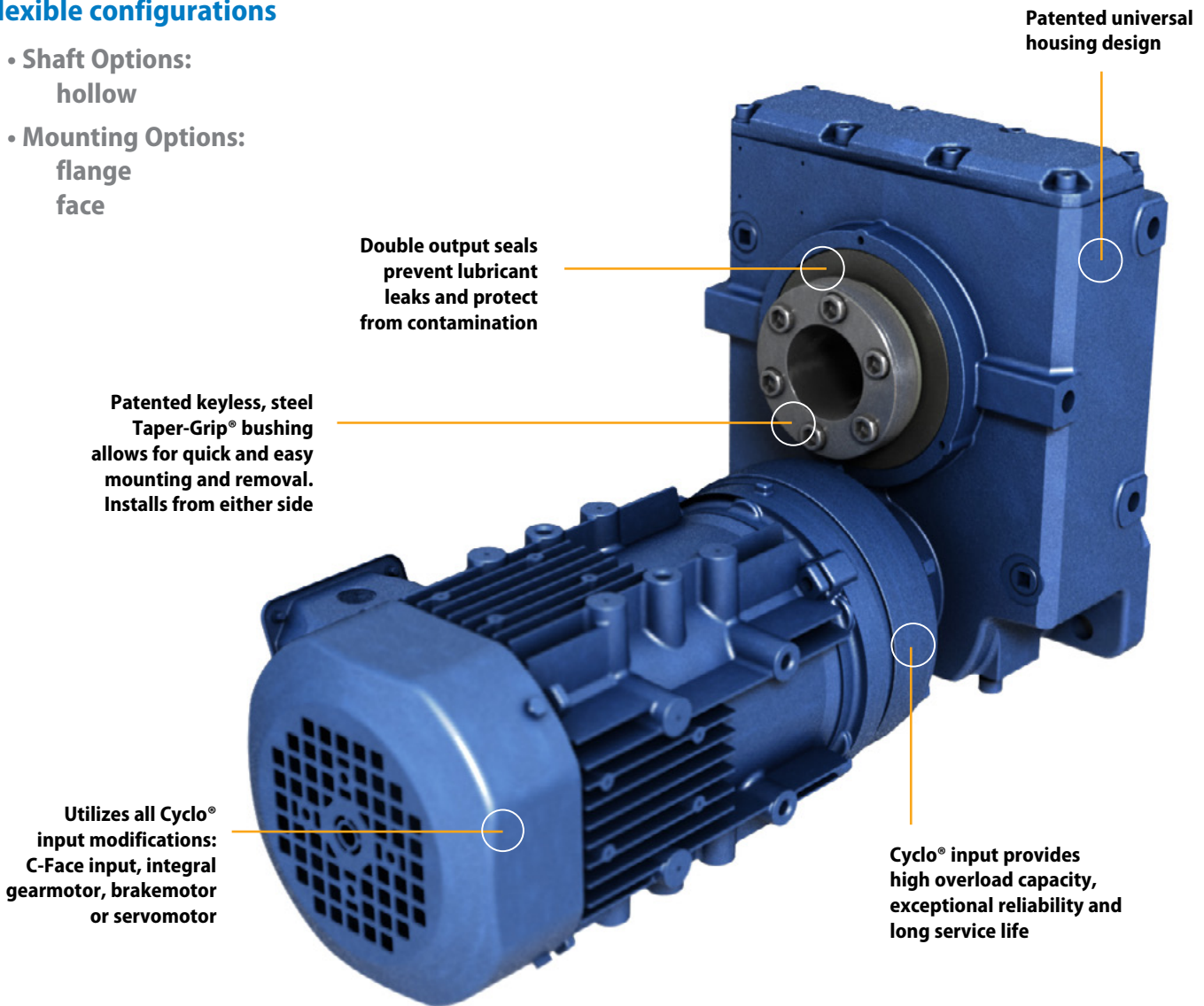
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► Flexible configurations

- Shaft Options:
hollow
- Mounting Options:
flange
face



Cyclo[®] Quality and Reliability, Shaft Mount Design

- High performance steel gearing components deliver **85-90% efficiency**



Product Description

Sumitomo's Cyclo® Helical Buddybox (Cyclo® HBB) speed reducers and gearmotors provide **innovative shaft mounted drive solutions for demanding services**. The Cyclo® HBB combines the quiet, efficient and reliable performance of the Cyclo® technology input with the **rugged helical gear output**. The **modular design** provides a compact, efficient product and the most flexible range of output speed and torque combinations available. Sumitomo's patented Taper Grip® bushing system enhances the Cyclo® HBB value by offering a simple shaft-mounting device that provides **self-aligning, backlash-free torque transmission** to the driven shaft. The Cyclo® HBB design is flexible and easily adapts to CEMA Screw Conveyor Drive applications with a modular conversion kit.

Features & Benefits

- **Cycloidal speed reduction technology**
 - ~ Quiet, efficient and reliable operation with high torque density and compact size
- **Modular design**
 - ~ Interchangeable cast iron housings in foot, flanged or face mount configurations
- **Double output seals**
 - ~ Virtually leak-free operation and optimal protection from lubrication contamination
- **Taper Grip® Bushing**
 - ~ Simple, steel, keyless shaft mounting system resists fretting and eases unit installation and removal from driven shaft
- **CEMA Screw Conveyor Drive option**
 - ~ Quick and simple conversion for Cyclo® HBB units to fit CEMA standard dimensions

Specifications

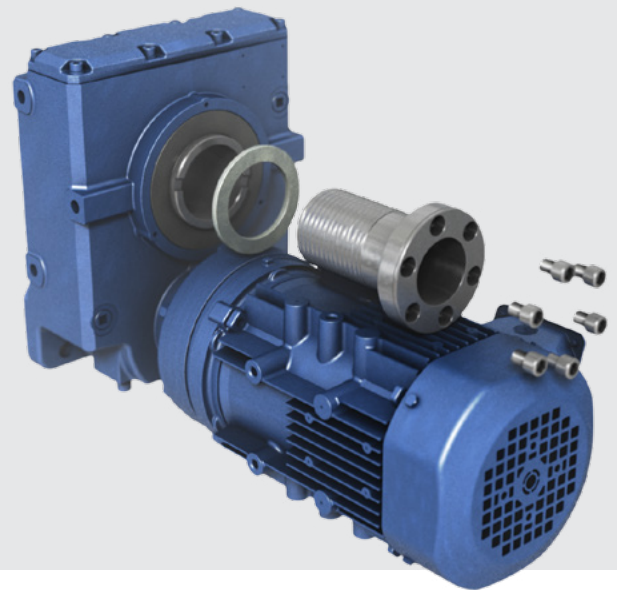
Ratios:	11:1 up to 26,000:1 and greater
Torque Capacity:	Up to 75,800 in. lbs.
HP:	1/8 to 40
Mounting:	Hollow Shaft, Flange, Face
Options:	Integral Motor, C-Face
Motor Standards:	NEMA, IEC, JIS, UL, CSA, CE

► Keyless, steel Taper-Grip® bushing makes mounting of hollow shaft units easy and economical

The Sumitomo **Taper-Grip®** bushing is a keyless, torque transmission device integrated into the shaft mounted, offset parallel Cyclo® HBB reducer and gearmotor product lines.

The **unique, patented design** has a number of benefits :

- Easy mounting and removal of the unit to and from the driven shaft
- Standard bore sizes require no shaft preparation such as a keyway, undercut, or keeper plate
- Backlash free torque transmission
- Works with standard shafting, no special tolerances required
- Automatic shaft center alignment
- Resistant to fretting and corrosion
- Multiple stock bore sizes for quick delivery.



► Applications

- Material Handling
- Conveyors
- Baggage Handling
- Shredders
- Belt Filter Press
- Mixer/Blender
- Rolling Mill Table
- Screw Conveyors
- Elevators
- Hoist Drives
- Climber Screens
- Food Processing

Product Range (Standard Motor and Reducer Combinations)

Reduction Ratios 11 - 417 Combinations with 1450 and 1750 RPM motor

Input Type	Planetary		Cyclo																			
	Nominal Ratio	Actual Ratio	11	18	21	28	39	46	53	60	74	88	102	123	151	179	207	249	305	417		
Actual Output RPM	50 Hz	60 Hz	*	*	21.0	28.0	38.5	45.5	52.5	59.5	73.5	87.5	101.5	122.5	150.5	178.5	206.5	248.5	304.5	416.5		
	50 Hz	60 Hz	*	*	69.0	51.8	37.7	31.9	27.6	24.4	19.7	16.6	14.3	11.8	9.63	8.12	7.02	5.84	4.76	3.48		
	60 Hz		*	*	83.3	62.5	45.5	38.5	33.3	29.4	23.8	20.0	17.2	14.3	11.6	9.80	8.47	7.04	5.75	4.20		
Motor Power HP (kW)	1/8 (0.1)																					
	1/4 (0.2)																					
	1/3 (0.25)																					
	1/2 (0.4)																					
	3/4 (0.55)																					
	1 (0.75)																					
	1.5 (1.1)																					
	2 (1.5)																					
	3 (2.2)																					
	5 (3.7)																					
	7.5 (5.5)																					
	10 (7.5)																					
	15 (11)																					
	20 (15)																					
	25 (18.5)																					
	30 (22)																					
	40 (30)																					

* Refer to the table shown at the bottom of this page

Reduction Ratios 364 - 10658 Combinations with 1450 and 1750 RPM motor

Input Type	Cyclo																	
	Nominal Ratio	Actual Ratio	364	424	501	578	683	809	956	1117	1320	1656	1957	2272	2559	2944	3511	4365
Actual Output RPM	50 Hz	60 Hz	3.98	3.42	2.90	2.51	2.12	1.79	1.52	1.30	1.10	0.876	0.741	0.638	0.567	0.493	0.413	0.332
	60 Hz		4.81	4.13	3.50	3.03	2.56	2.16	1.83	1.57	1.33	1.06	0.894	0.770	0.684	0.595	0.499	0.401
Motor Power HP (kW)	1/8 (0.1)																	
	1/4 (0.2)																	
	1/3 (0.25)																	
	1/2 (0.4)																	
	3/4 (0.55)																	
	1 (0.75)																	
	1.5 (1.1)																	
	2 (1.5)																	
	3 (2.2)																	
	5 (3.7)																	
7.5 (5.5)																		

- Standard efficiency motor
- Premium efficiency or IE3 motor

* Planetary Actual Ratio

Unit Size	Nominal Ratio	Actual Ratio	Actual RPM	
			50 Hz	60 Hz
A6100	11	10.50	138	167
A6105	18	16.80	86.3	104
B6120	11	10.50	138	167
B6125	18	17.13	84.6	102
C6140	11	10.89	133	161
C6145	18	17.50	82.9	100
D6160	11	10.85	134	161
D6165	18	17.77	81.6	98.5
E6170	11	10.86	133	161
E6175	18	17.68	82.0	99.0

How do I select a Cyclo® HBB reducer or gearmotor?

Selection is based on the actual horsepower and/or torque requirements at the output shaft. The Cyclo® HBB speed reducer has particularly high efficiencies over a wide range of reduction ratios, which frequently permits the use of reduced input power requirements (smaller HP motor) without sacrificing output shaft torque. The selection procedures in this catalog, will guide you in choosing the most efficient reducer for your application.

What information do I need to get started in the selection process?

To select the proper reducer for your application, you will need to know:

- Application: type of driven machine
- Hours of operation per day
- Motor horsepower (HP) and speed (RPM)
- Loading Conditions
- Mounting Position

If there are any special environmental factors or operation requirements, they must also be noted. This information will be important in determining the Service Factor of your application.

What are service factors and how are they used?

In general, reducers and gearmotors are rated for specific conditions and operating requirements of the application by the use of AGMA-defined Service Factors. There are three AGMA load classifications for gearmotors: I, II, and III (pages 3.6 - 3.7). The Service Factors are used in the product selection process to adjust for the specific conditions and operating requirements of your application.

What do I do if my application has particularly severe operating conditions?

The standard ratings for Cyclo® HBB are based on 10-hour daily service under conditions of uniform loads (equivalent to AGMA service factor 1.0). By following the product selection process, you will determine and apply the Service Factors to compensate for severe operating conditions.

How can I be sure that the reducer can withstand periodic excessive overloads?

Cyclo® HBB speed reducers provide 300% momentary intermittent shock loads capacity. For applications with shock loads greater than 300%, consult an SMA Application Engineer.

What are the standard input speeds?

In general terms, the speeds are 1750 and 1165 RPM at 60Hz, and 1450 and 980 RPM at 50Hz. The selection tables in this catalog are based on 1750 RPM. When other input speeds are used, the horsepower and torque ratings will vary.

What are the thermal limitations of the Cyclo® HBB?

The Cyclo® speed reducer, by virtue of its smooth, almost frictionless operation (unlike traditional helical gears), has a thermal rating that far exceeds its mechanical capacity and all but eliminates the conventional limitations due to heat.

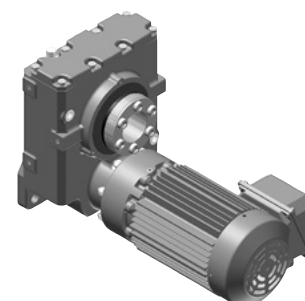
Why is a Taper-Grip® bushing used? What is its material?

The Taper-Grip® bushing is integral to the Cyclo® HBB and provides for easy mounting and removal to and from the shaft of the driven machine. Because it requires no keyway, the shaft isn't weakened and maximum torque is transmitted. With the added strength of steel, the Taper-Grip® bushing can be used in reversing and/or high start-up applications. The steel Taper-Grip® bushing can be used on all Taper-Grip® products.

What kind of torque arm do you supply? At what position should it be mounted?

The standard torque arm assembly is shown in the gearmotor dimensions, pages 2.52 - 2.63. The torque arm should be mounted at 90 degrees to a line from the point of attachment to the reducer and the center of the output bore with plus or minus 15 degrees variance. It should always be mounted in tension, not compression. T-type and flange-mount (banjo) torque arms are also offered as options.

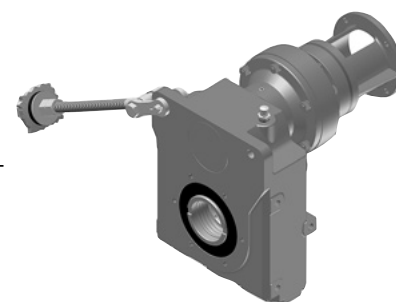
Common Configurations



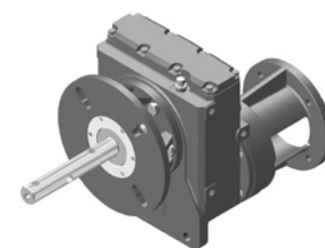
Single Reduction Gearmotor



Single Reduction Reducer with C-Face Adapter



Double Reduction, C-Face Reducer with Torque Arm



C-Face Reducer with Screw Conveyor Adapter

Enhanced Performance (EP) Motors FAQs

What efficiency level are these Enhanced Performance (EP) motors?

The EP motor is a Premium efficiency class, or International Efficiency 3 (IE3) design.

What standards do these motors meet?

This motor line is compliant with the Energy Policy and Conservation Act (EPA), as recently amended by the Department of Energy with a new ruling. The DOE expands the scope of covered motor products to include previously exempt motors, such as gearmotors and brakemotors. Compliance to the new ruling starts on June 1, 2016.

These Sumitomo motors met the efficiency levels promoted by the Consortium for Energy Efficiency (CEE) and exceed the Canadian efficiency levels specified by NRCAN.

The IE3 efficiency ratings conform to both the IEC Standard 60034-30:2009 and eco-design directive 2005/32/EC.

Will these motors work with inverters?

All current SMA motors feature corona resistant magnet wire that extends the life of the insulation and enables the motors to resist the voltage spikes common with IGBT variable frequency drives.

What agency listings apply?

All motors in this product line are UL recognized, CSA certified and CE marked.

Can the EP motors be nameplated to operate at 50 hertz?

The EP.NA motor can be nameplated and will operate at 50 hertz, but depending on the export destination, it may not meet that country's energy efficiency requirements. For areas requiring IE3 performance at 50 hertz, like Asia and Europe, other 50 hertz specific versions of the EP motors can be provided.

Is the selection procedure the same as previous gearmotors?

Similar, the difference is restricted to applications with a large number of across the line starts and stops. Because the EP motors have more inertia and higher inrush current than previous integral motors, a supplemental service factor is applied to these applications using EP motors.

Are the brakes the same?

The brakes are the same direct acting, fast response types used previously. They are a new larger model that has been redesigned to match the new motor profiles. Because the EP motor inertia is significantly higher, it may be necessary to adjust external trigger points or limit switches. Since the brake assembly shapes are different, old and new parts are not interchangeable.

What is the standard insulation system?

The EP motors continue with the Class F system, which limits the temperature rise to a Class B rise, where it bounds the allowable temperature rise to 80°C. It utilizes an insulation system capable of handling a 105°C rise to significantly extend insulation life.

Are EP motors interchangeable with old AF-motors?

The new EP motors without brake have the same 10:1 constant torque speed range as the AF-motor. Motors are dimensionally and performance-wise different so VFD re-programming will be required. For EP brakemotor with use on VFDs, the applicable speed range may be limited. Please consult the factory for options for EP brakemotors.

Will old motors continue to be available?

EP motors will eventually replace the older motors. Older motors do not meet the federally mandated efficiency requirements that go into effect on June 1, 2016. Non-compliant motors after that date cannot be manufactured or imported into the United States.

Should I be concerned if I am replacing an older motor with the new EP motor?

For most applications, the use of the new EP motor will result in a more efficient, cooler-running and energy-saving motor. However, for applications with certain performance constraints, you may need to review the impact of the following:

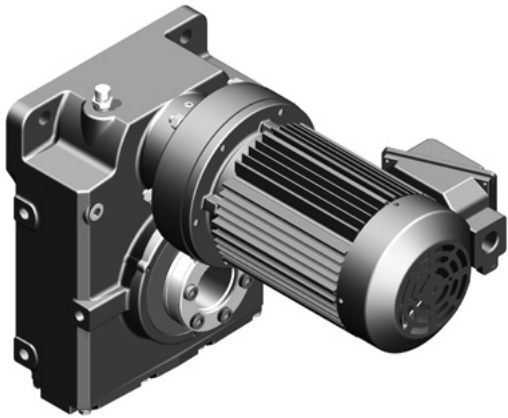
- larger dimension and weight
- larger moment of inertia
- higher starting current and torque.

Standard Specifications

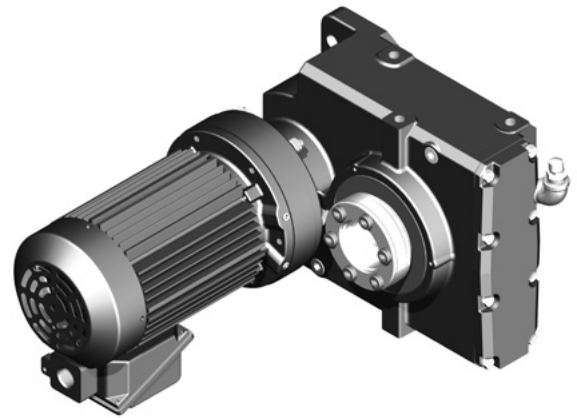
	Standard Specifications	Standard Specifications with Built-In Brake
3 Phase Integral Motor EP-NA Motor	<p>Capacity Range: 1 ~ 75HP (0.75 ~ 55 kW), 4P Power Supply: Motor Power: 230/460V, 60Hz, 3Phase 575V, 60Hz, 3Phase</p> <p>Motor Standard: NEMA Efficiency: Premium Efficiency (IE3), DOE CC305B, NRCAN Protection: IP55</p> <p>Certification: CE Mark, UL Recognition, CSA Approval Conduit Box: Diecast Aluminum, NPT Conduit Thread Inverter Operation: 10:1 Constant Torque Speed Range Insulation Meets NEMA MG1, Part 31</p>	<p>1 ~ 40HP (0.75 ~ 30 kW), 4P, FB Brake Brake Power: 1 ~ 15HP (0.75 ~ 11kW): 230/460V, 60Hz, 1Ph 575V, 60Hz, 1Ph 20 ~ 40HP (15 ~ 30kW): 200 ~ 240V, 60Hz, 1Ph 380 ~ 480V 60Hz, 1Ph 575V, 60Hz, 1Ph</p> <p>NEMA Premium Efficiency (IE3), DOE CC305B, NRCAN IP55 (1 ~ 15HP) IP54 (20 ~ 40HP)</p> <p>CE Mark, UL Recognition, CSA Approval Diecast Aluminum, NPT Conduit Thread 4:1 Constant Torque Speed Range or better. Insulation Meets NEMA MG1, Part 31</p>
3 Phase Integral Motor IE3 CE Motor	<p>Capacity Range: 0.75 ~ 55 kW (1 ~ 75HP), 4P</p> <p>Power Supply: Motor Power: 0.75 ~ 4kW (1 ~ 6HP): 220/380V, 50Hz, 3Phase 230/400V, 50Hz, 3Phase 240/415V, 50Hz, 3Phase 5.5 ~ 55kW (1 ~ 75HP): 380V, 50Hz, 3Phase 400V, 50Hz, 3Phase 415V, 50Hz, 3Phase</p> <p>Motor Standard: IEC Efficiency: IE3 Protection: IP55 Certification: CE Mark, (UL Recognition Pending) Conduit Box: Diecast Aluminum, Metric Conduit Thread Inverter Operation: 5:1 Constant Torque Speed Range or better Insulation Meets NEMA MG1, Part 31</p>	<p>0.75 ~ 30 kW (1 ~ 40HP), 4P, FB Brake 37 ~ 45 kW (50 ~ 60HP), 4P, ESB Brake Brake Power: 0.75 ~ 4kW (1 ~ 6HP): 220 ~ 380V, 50Hz, 1Ph 5.5 ~ 30kW (1 ~ 40HP): 380 ~ 415V, 50Hz, 1Ph 37 ~ 45kW (50 ~ 60HP): 200 ~ 220V, 50Hz, 1Ph</p> <p>IEC IE3 IP44 CE Mark, (UL Recognition Pending) Diecast Aluminum, Metric Conduit Thread 3:1 Constant Torque Speed Range or better. Insulation Meets NEMA MG1, Part 31</p>
3 Phase Integral Motor - Common	<p>Enclosure: Totally Enclosed Fan Cooled Type Motor Type: Induction Motor, Squirrel Cage Rotor Frame Material: 1 ~ 20HP (0.75 ~ 15kW), 4P: diecast Al 25HP ~ 75HP (18.5 ~ 55kW), 4P: cast iron Bearings: Deep Groove, Ball Bearing, CM Clearance Insulation: Class F Time Rating: Continuous</p>	<p>Totally Enclosed Fan Cooled Type Induction Motor, Squirrel Cage Rotor 1 ~ 20HP (0.75 ~ 15kW), 4P: diecast Al 25HP ~ 60HP (18.5 ~ 45kW), 4P: cast iron Deep Groove, Ball Bearing, CM Clearance Motor: Class F Brake: Class F Continuous</p>
HBB Reducer	<p>Reduction: Combination of Cyclo or Planetary input and helical gear output Lubrication: Cyclo portion is grease or oil, planetary and helical portions are oil lubricated. Seals: Nitrile material, dual lipped, tandem output seals Material: Rugged cast iron housings in all sizes Paint Color: Blue, Munsell color number 6.5PB 3.6/8.2 Bearings: "Deep groove ball bearings on geared output; ball bearings on Cyclo/Planetary input. Output tapered roller bearings optional."</p>	
Ambient Conditions	<p>Installation Location: Indoor (Minimal dust and humidity) Ambient Temperature: 14° ~ 104° F (-10° ~ 40° C) Ambient Humidity: Under 85% Elevation: Under 3300 feet (1000 meters) Atmosphere: Well ventilated location, free of corrosive gases, explosive gases, vapors, and dust</p>	

Mounting Positions

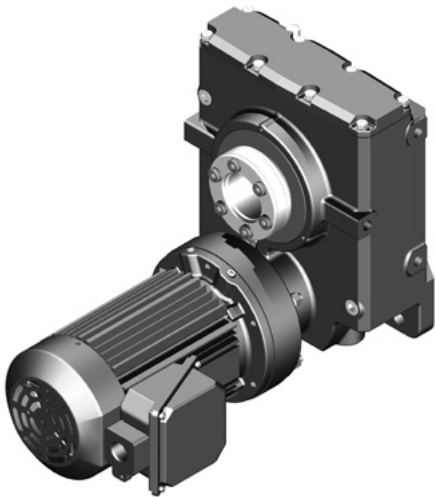
Please see the Appendix (Section 5) for additional mounting configurations.



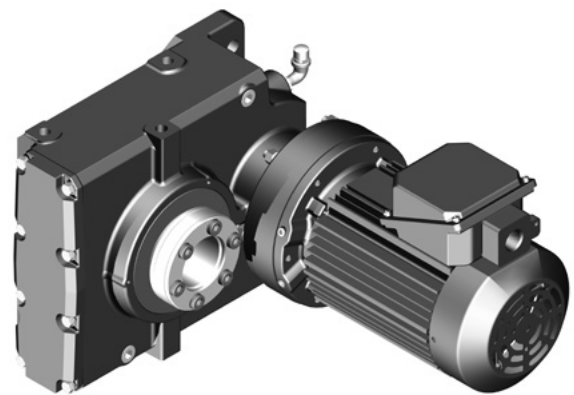
Y1



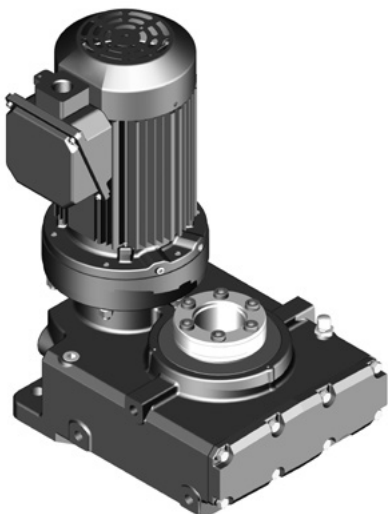
Y2



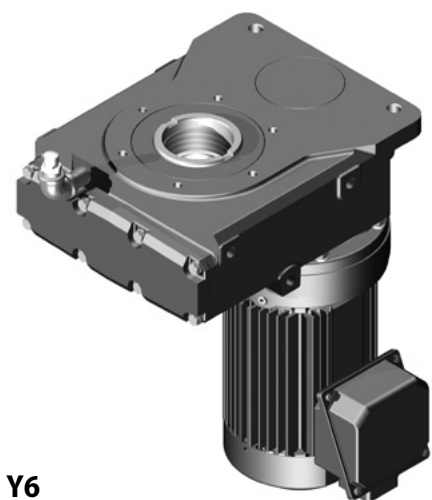
Y3



Y4



Y5



Y6