



CbN Helical In-line Gearmotors and Speed Reducers

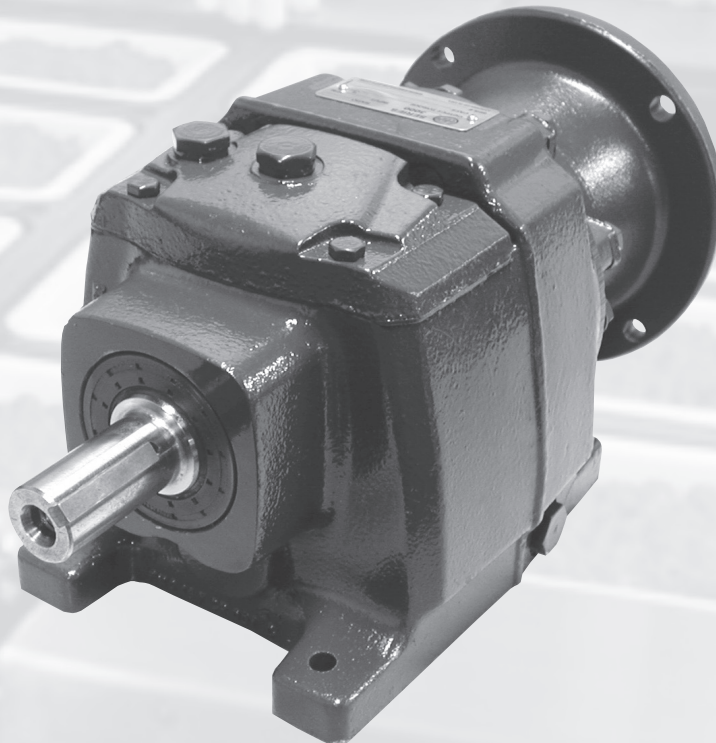
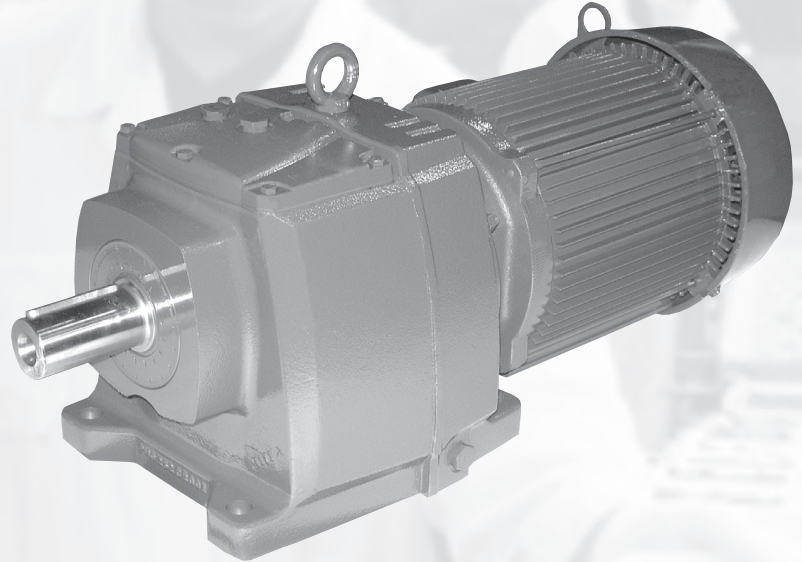
CbN Series

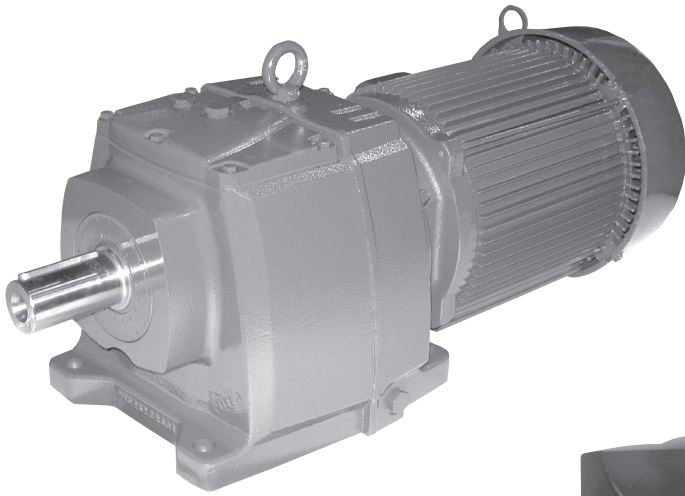
Industries

- Food Processing
- Warehousing
- Parcel and Package Sortation
- Water/Wastewater Treatment

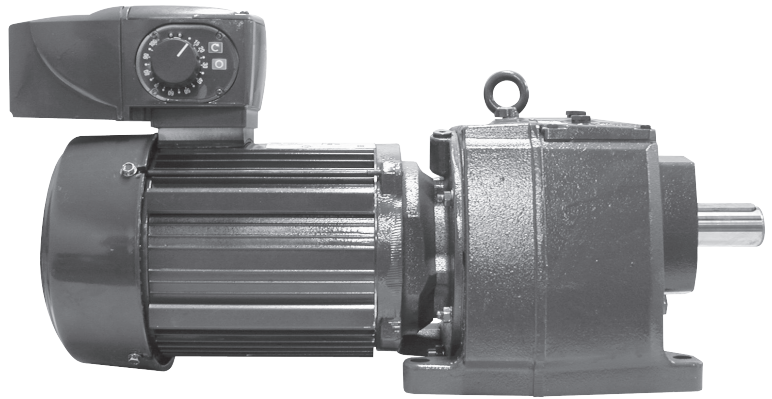
Applications

- Positive Displacement Pumps
- Unit Handling Conveyors
- Oven Conveyors
- Low Speed Fans
- Industrial Door Openers



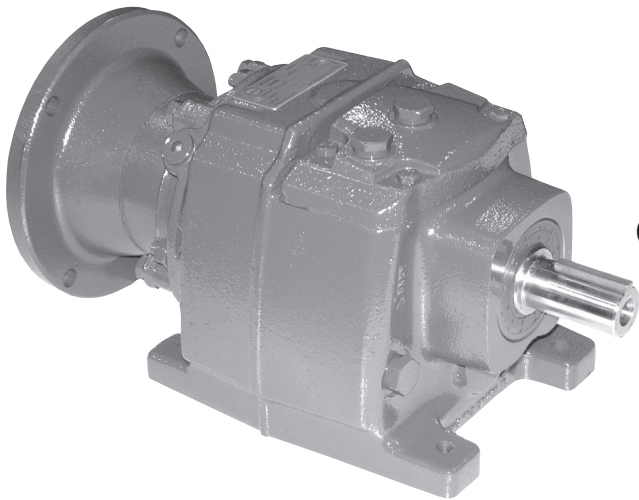


TEFC Three and Single Phase



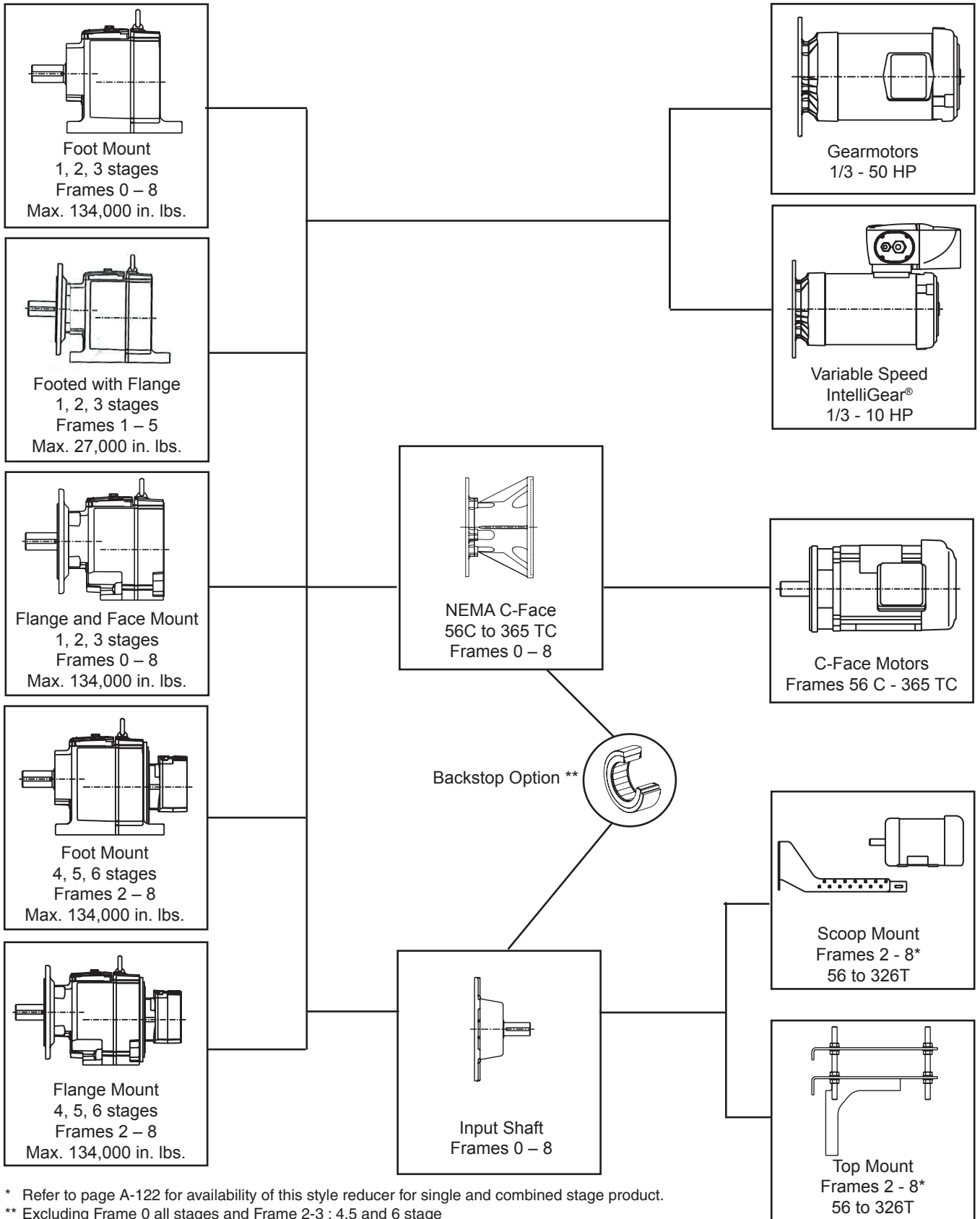
IntelliGear®

Gearmotor SectionPage A-3 - A-112



C-Face Reducer

Reducer SectionPage A-113 - A-223



* Refer to page A-122 for availability of this style reducer for single and combined stage product.

** Excluding Frame 0 all stages and Frame 2-3 : 4,5 and 6 stage

Selection Information

General

CbN 3000 helical gearmotors and speed reducers incorporate the latest in design and manufacturing technologies to deliver an energy efficient, helical, gear train combined with either a constant or variable speed motor. This latest generation of CbN inline gearing is 98 percent efficient per gear stage and boasts total efficiency improvements over previous designs by delivering up to 40 percent more total speed reduction without added gear stages.

Gearmotors

Three phase CbN gearmotors are available with HE type high efficiency motors in non-hazardous enclosures starting 1/3 HP at standard lead-times. These motors comply with requirements in the US and Canada for energy efficiency to deliver superior operating cost savings, reduced motor temperature rise and 5:1 minimum constant torque output (60-11Hz) from PWM power supplies for the End User. There are several motor enclosure options within the HE umbrella including Corro-Duty® cast iron exterior construction for most hostile environments. These features are complimented by the standard use of inverter duty winding materials that comply with NEMA MG1 Part 31. Regal Power Transmission Solutions also offers gearmotors with 1 phase TEFC motors to 5 HP and Explosionproof 3 phase gearmotors to 10 HP.

Housing

One-piece housings replace the classical two-piece designs to improve alignment and overhung load integrity in the most demanding applications. Extremely compact envelopes provide low profiles and the footprint to directly interchange with older CbN products for simple aftermarket replacements. All housings are cast, with frames made with high strength cast iron (frame 0 is aluminum). Motor interfaces are generally shorter than previous CbN designs.

Performance

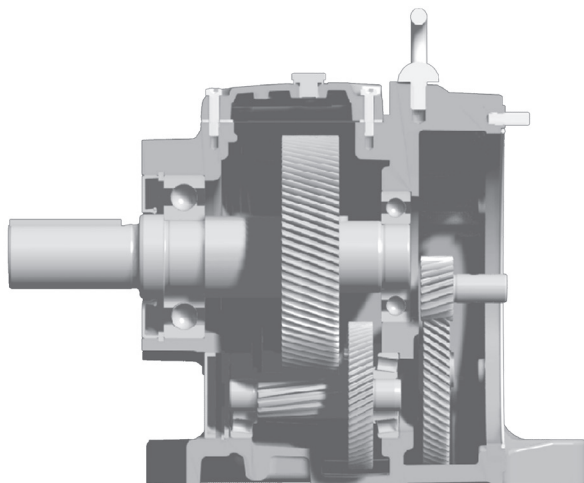
These CbN designs deliver up to 35 percent more capacity than previous CbN products in equivalent frames. For replacements, this means longer life. For new applications, this means cost savings through possible downsizing. Each CbN unit is factory filled with synthetic hydrocarbon lubricant, ready to operate in a wide band of ambient temperatures with minimal in-service maintenance.

Flexibility

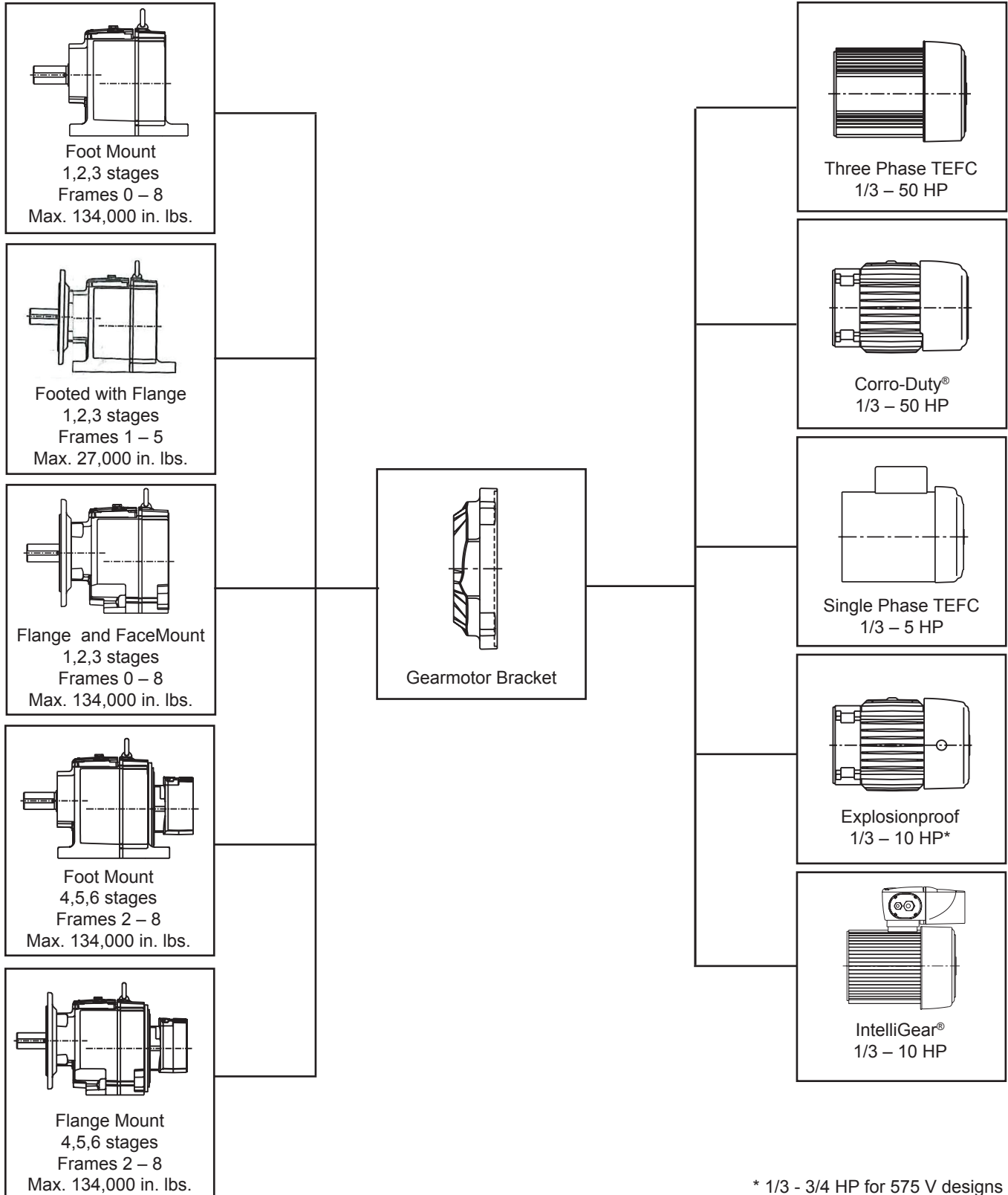
Improvements in CbN designs begin with the expansion of flange mounting options available. Three phase motor designs now incorporate an upgraded wire and varnish treatment called Allguard®, making many of them suitable for inverter applications. C-Face inputs utilize a compact quill design with a non-metallic liner and metal key to eliminate fretting corrosion while delivering a compact length. Each housing can be oriented in different mounting positions by a minor adjustment in oil volume and relocation of breather/drain locations. Varidyne® inverter duty motor designs deliver up to 10:1 constant torque speed range gearmotors off-the-shelf.

Reliability

Gear housings 1 to 5 are fitted with normally closed breathers, excluding outside contaminants and preserving low internal operating pressure. Gear housings 6 to 8 are fitted with a combination breather and dipsticks. The dipstick makes periodic maintenance of proper oil volume easy and accurate. All oil seals operate on plunge ground shaft surfaces to deliver extended life. Enhanced insulating materials and other standard features of our Varidyne Inverter duty motors carry a 3 year warranty when operating with PWM inverter power up to 575 VAC.

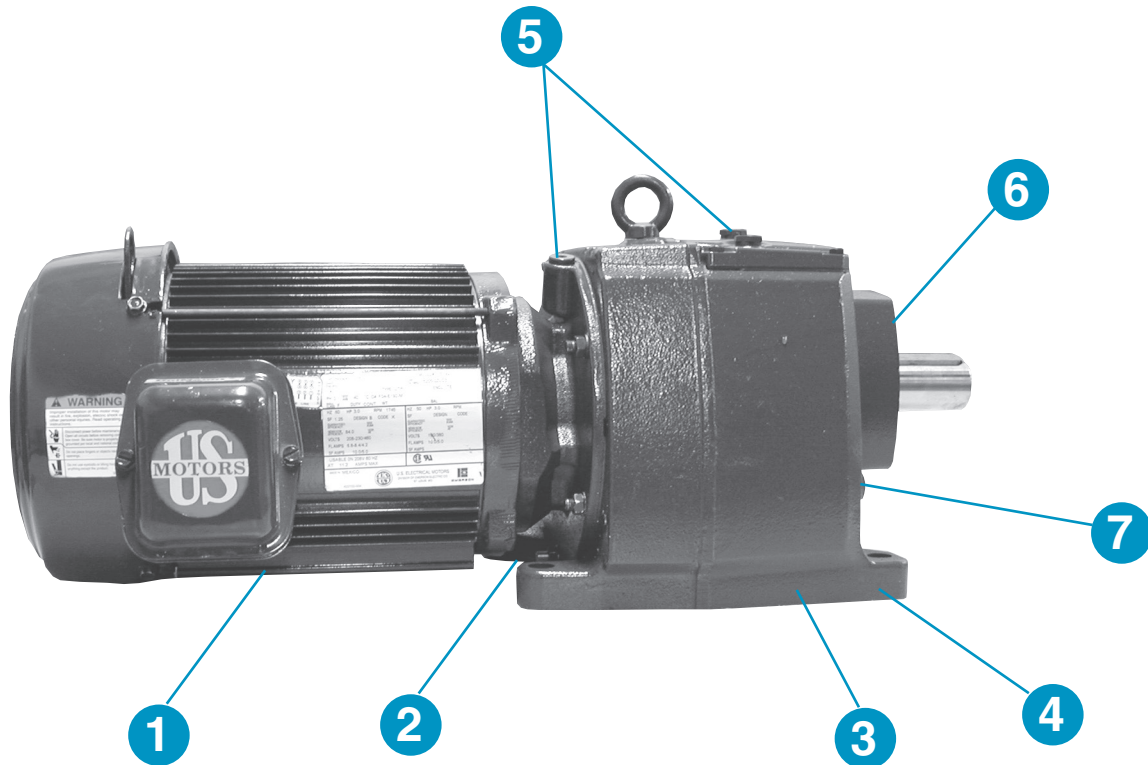


Mounting Versatility and Size Range



* 1/3 - 3/4 HP for 575 V designs

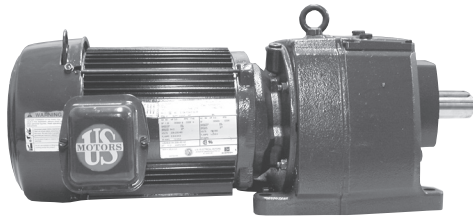
**Type CbN In-line Helical
Series 3000 Gearmotors Features...**



Design Features

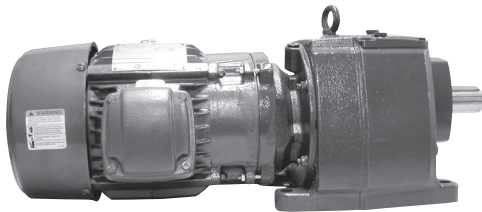
- 1.** High Efficiency Motor Design Available
 - Any non-XP 3 phase gearmotor
- 2.** Innovative, self-locking, taper shaft connection (motor to gear) allows on-site replacement without removing oil, primary pinion, or disconnecting the load.
- 3.** Gearbox is delivered filled with synthetic oil, ready to use.
- 4.** Corrosion resistant, cast iron housings are one piece and ribbed for extra strength. (Size 0 housings are cast aluminum housings.)
- 5.** Gears are made of 8620, heat treated, nickel chromium, molybdenum steel. Helical gearing is skived, superfinished, or ground after case hardening to 58-62 Rc.
- 6.** Multiple breather locations. Breathers are normally closed during construction to exclude contaminants.
- 7.** Double lip seals are installed on plunge ground shafts.
- 8.** Magnetic drain plug is supplied as standard.

Motor Options



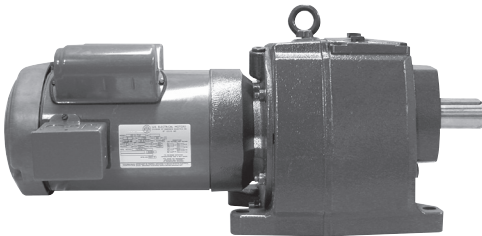
TEFC – Three Phase

- Suitable for general purpose industrial applications
- High Energy efficient design standard
- Premium efficiency design available > 2 HP
- 1.25 service factor through 5 HP; 1.15 service factor above 5 HP
- Premium class F Allguard® insulation standard
- 40°C ambient, NEMA B design, continuous duty
- Inverter duty motor per NEMA MG1 part 31 stocked
- Washdown gearmotors available to 2 HP



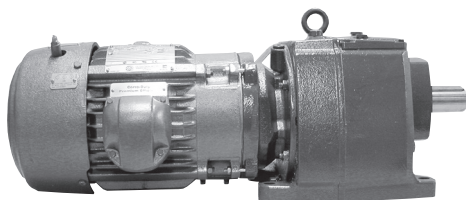
Corro-Duty®

- Designed for wet, corrosive applications and industries including waste treatment, mining and lumber.
- All cast iron construction (56 and 140 frames are rolled steel)
- High efficiency standard 1/3 HP and larger
- Premium efficiency option 3 HP and larger
- 1.15 service factor, class F Allguard® insulation
- Condensation drains in motor and conduit box
- 40°C ambient, NEMA design B, continuous duty
- Inverter duty version per NEMA MG1 part 31 stocked to 50 HP



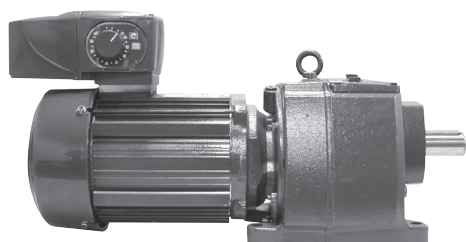
TEFC – Single Phase

- For agricultural, light material handling, textile, and light pumping applications
- 1.25 service factor
(1.0 service factor, 2 HP)
(1.15 service factor, 3-5 HP)
- Capacitor start
(capacitor run above 1/2 HP)
- Class B insulation, continuous duty, reversible



Explosionproof

- Ideal for the petro-chemical, grain, mining, and chemical industries
- Class I, group D, class II, groups F and G
- All cast iron construction (plastic fan cover)
- 1.0 service factor, class B insulation
- 40°C ambient, NEMA B design, continuous duty
- UL approved Inverter duty per NEMA MG1 part 31 available



IntelliGear®

- Variable speed gearmotor with NEMA 4/12 enclosure
- "Onboard" push button and remote speed changing options
- Pre-programmed 6:1 constant torque speed range
- Versions for 3/460V input power supplies from 1/3 to 10 HP
- 1/230V to 2 HP, 3/230V to 5 HP
- 1/115 V through 3/4 HP
- UL, CUL and CE
- Optional 10:1 and 15:1 speed ranges

Selection Information

1. Input HP
 - Based on application data.
2. Speed / ratio
 - Obtain either desired output speed (rpm) or gearbox ratio based on application.
3. Mechanical service factors - gears
 - There are three standard classifications for gearmotor applications:

Class I - Uniform loading, 3-10 hours per day, service factor 1.0 (minimum).

Class II - Uniform loading over 10 hours per day or moderate shock loading up to 10 hours per day; service factor 1.4 (minimum).

Class III - Moderate shock loading over 10 hours per day or heavy shock loading up to 10 hours per day; service factor 2.0 (minimum).

- The tables on pages A-21 through A-23 are based on past operating experience within the industries listed and information gathered by AGMA. If the user has data reflecting greater severity than normal industry usage, then the AGMA class should be increased.
- Choose the AGMA class for your given application based on this criteria. If your application cannot be found, use the following table to determine the service factor.

Duty Cycle	Hours Operation	Uniform Load	Moderate Shock Load	Heavy Shock Load
		U	M	V
Continuous	0 - 3	0.80	1.00	1.50
	3 - 10	1.00	1.25	1.75
	10 - 24	1.25	1.50	2.00
Frequent Starts/Stops*	0 - 3	1.00	1.25	1.75
	3 - 10	1.25	1.50	2.00
	10 - 24	1.50	1.75	2.25

*Greater than 10 per hour.

Size Selection

Step 1 - Locate gearmotor selection tables (pages A-24 - A-67) based on input HP.

Step 2 - Choose the appropriate nominal speed required.

Step 3 - Select the correct gearmotor based on AGMA class or service factor determined in selection information.

Step 4 - Verify overhung load ratings where required (see below).

Overhung Load

When a sprocket, sheave, pulley, or pinion is mounted on the take-off shaft of a gearmotor, it is necessary to calculate the overhung load. This calculated load must be compared with the gearbox capacity listed to make sure the gearbox will not be overloaded. To calculate the overhung load you need to know the torque or horsepower at the take-off shaft and the location along the shaft at which the load is applied.

A. If torque is known:

$$OHL = \frac{T \times K \times LLF}{r}$$

B. If horsepower is known:

$$OHL = \frac{63025 \times HP \times K \times LLF}{rpm \times r}$$

Where:

- OHL = Overhung load (pounds)
- T = Torque (in. lbs.)
- r = Radius of driving member (in.)
- HP = Horsepower
- K = Drive type factor
- LLF = Load location factor

Driving Member	Value of K
Chain Drive	1.00
Pinion	1.25
V-Belt	1.50
Timing Belts	1.25

Load Location	Value of LLF
End of shaft extension	1.20
Center of shaft extension	1.00
Shaft extension shoulder	0.80

Example

A horizontal, foot mounted gearmotor is required to operate a uniformly loaded, assembly conveyor at 44 rpm, 24 hours per day. An 8" diameter sprocket is mounted at the end of the shaft and drives the conveyor with a chain. The load is 3 HP and the customer requests a 230/460 volt, High Efficiency TEFC motor end.

Step 1...

The AGMA service classification table on page A-21 indicates that this is a Class II application.

Step 2...

The CbN gearmotor table on page A-44 indicates that a gear frame 3363 will do the job.

Output rpm	AGMA Class	Service Factor	Output Torque in-lb	OHL Δ lb	Nominal Ratio	Frame Size Gear	Motor	Std. Motor Types ◇
44	I,II	1.4	4099	2305	40	3363	182T	T,S,C,X,IG

Step 3...

To check overhung load for the example:

$$r = \frac{\text{Sprocket Diameter}}{2} = \frac{8}{2} = 4$$

$$K = 1.0 \text{ (chain drive)}$$

$$LLF = 1.2 \text{ (sprocket on end of shaft)}$$

$$HP = 3$$

Torque formula:

$$\text{OHL} = \frac{63025 \times \text{HP} \times K \times \text{LLF}}{\text{rpm} \times r}$$

$$\text{OHL} = \frac{63025 \times 3 \times 1.0 \times 1.2}{44 \times 4} = 1289 \text{ lbs.}$$

The overhung load capacity of 2305 lbs. listed is greater than the calculated overhung load value of 1289 lbs.

Step 4...

Confirm that no modification is required.

Step 5...

Catalog designation (see "Ordering" page A-13):

CbN • 3363 • S • B3 • 40 • HT24 • 182T • 3

Selection Information

1. Determine installation environment
 - Control enclosure is NEMA 4/12
2. Input HP
 - For constant torque loads this is at maximum speed of range
3. Speed range
 - Confirm maximum and minimum of needed range.
4. Determine control power supply
 - Phase and voltage

Power Supply	Input HP's
1 ph / 115 v	.33 to .75
1 ph / 230 v	.33 to 2
3 ph / 230 v	.33 to 5
3 ph / 460 v	.33 to 10
3 ph / special	R. O.

5. Mechanical service factoring of gear
 - Refer to page A-9 for this procedure.

Note: IntelliGear application for 1 phase power supply is limited to 10 starts per hour.
6. Determine speed adjustment (see Section D)
 - Select from:
 - PD = Digital keypad with forward/reverse/stop/speed up/speed down/speed display on IntelliGear enclosure*
 - P1 = Run/stop/speed pot. mounted on IntelliGear enclosure
 - P2 = Forward/reverse/stop/speed pot. mounted on IntelliGear enclosure
 - P3 = Speed pot. (only) mounted on IntelliGear enclosure (start/stop by others)
 - P4 = Speed pot. (only) mounted inside IntelliGear enclosure (start/stop by others)
 - R = Remote signal following (0-10VDC or 4-20mA supplied by others)

* PD option not available at 3/4 HP with 1 ph, 115v power supply and 1.5 or 2 HP with 1 ph; 230V power supply

Size Selection

- Step 1 - Determine the maximum motor rpm from the following table based on the whether the application requires a speed range of 6:1, 10:1 or 15:1.

$$\text{Speed Range} = \frac{\text{Maximum Output Speed Required}}{\text{Minimum Output Speed Required}}$$

HP	IntelliGear Motor Speed Range		
	6:1 Speed Range	10:1 Speed Range	15:1 Speed Range
1/3 - 3/4 HP	1760 - 293 rpm	1760 - 176 rpm	2625 - 175 rpm
1 - 1 1/2 HP	1750 - 291 rpm	1750 - 175 rpm	2620 - 175 rpm
2 HP	1750 - 291 rpm	2585 - 255 rpm	N. A.
3 HP	1750 - 291 rpm	2630 - 263 rpm	N. A.
5 HP	2150 - 358 rpm	2605 - 260 rpm	N. A.
7.5 HP	2150 - 358 rpm	2670 - 267 rpm	N. A.
10 HP	2100 - 350 rpm	2600 - 260 rpm	N. A.

- Step 2 - Determine the gear ratio required. Use the maximum motor rpm from the table above.
- $$\text{Gear Ratio} = \frac{\text{Maximum Motor Speed}}{\text{Maximum Output Speed Req'd}}$$
- Step 3 - Locate gearmotor selection tables based on the input HP required at the ratio calculated in Step 2. Select the nominal gear ratio closest to the one calculated.
- Step 4 - Select correct gearmotor that meets or exceeds the AGMA class or service factor determined in the selection information.
- Step 5 - Verify overhung load rating where applicable per formulas on Page A-9.
- Step 6 - Confirm input power supply is compatible with HP of selection and record speed adjustment option desired for the application.
- Step 7 - Referring to Page A-17, determine if an alternate controller location is required for the application. Default location is "FO" (at 12 o'clock).

Gearmotor Selection

Selection Example

A foot mounted gearmotor is required to operate a positive displacement pump from 220 to 40 rpm, 16 hours a day in a waste treatment plant. The output shaft will be coupled to the pump. The customer required approximately 4.7 HP at the maximum rpm. The job site power supply is 3 phase and 460 VAC. The control of speed requires the IntelliGear to follow a 4-20 mA signal supplied by a process control system.

Step 1...

The closest gearmotor HP to meet this application is a 5 HP design.

Step 2...

Determine the specific selection output rpm and ratio for 5 HP IntelliGear

$$\text{Maximum Speed} / 1.2 = \text{"selection table" rpm}$$

$$220 / 1.2 = \text{approx. 183 rpm}$$

Step 3...

The AGMA service classification indicates this is an AGMA Class II (1.4 minimum S.F.) application. From this information, on page A-66 a CbN 3242 and motor frame 184T with 10:1 nominal ratio is the correct gearmotor.

Output rpm	AGMA Class	Service Factor	Output Torque in-lb	OHL Δ lb	Nominal Ratio	Frame Size Gear	Motor	Std. Motor Types \diamond
181	I	1.3*	1804	782	10	3242	184T	T,S,C,X,IG

* The catalog "service factor" is @ 60 Hz. The 5 HP IntelliGear maximum rpm is @ 74 Hz. Adjust the "service factor" by (x 1.2) to calculate the service factor @ 74 Hz.

Step 4...

This application does not involve any OHL calculations due to coupling connection.

Step 5...

The power supply of 3 phase / 460 VAC is ok for 5 HP IntelliGear and the speed changing option will be "R" per table on the preceding page.

Step 6...

Catalog designation (see also "Ordering" on page A-13) will be

CbN • 3242 • S • B3 • 10 • IG4 • 184T • 5 w/"R" speed option

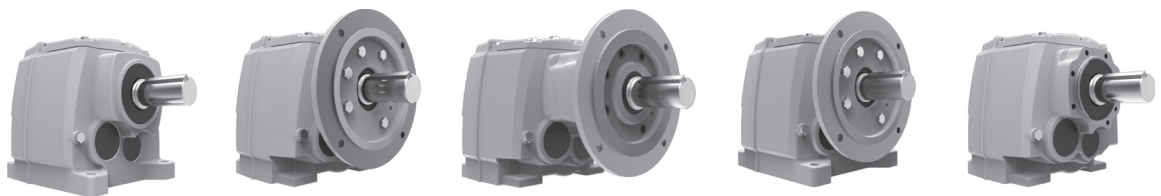
Catalog Nomenclature

CbN • 3122 • S • B3 • 40 • HT5 • 145T • 1.5

See Table Below
Prior to Ordering

See Page A-16
Prior to Ordering

Series	Gear Frame	Number of Reductions	Mounting Configuration For Gear (Housing and Shaft Extension)	Mounting Plane	Nom. Gear Ratio	Motor Design	Motor Frame	Motor HP
3 = 3000	0	1 = 1 stage	<p>Refer to the illustrations below of the basic mounting options based on gear frame and stages of reduction.</p> <p>For Flanged gear mounting, refer to details for options that are available based on frame size, flange dimensions, and thrust loads for the application on page A-14.</p>	See Page A-15	Determine from selection pages	Select motor based on enclosure, power supply, and the poles required	56	1/3
	1	2 = 2 stages					B56	1/2
	2	3 = 3 stages					143T	3/4
	3	4 = 4 stages					145T	1
	4	5 = 5 stages					182T	1 1/2
	5	6 = 6 stages					184T	2
	6						213T	3
	7						215T	5
	8						254T	7 1/2
			256T	10				
			284T	15				
			286T	20				
			324T	25				
			326T	30				
				40				
				50				



Gear Output	Foot Mounted	Foot Mount w/ Flange	Flange Mount (footless)		Face Mount (footless)
			Std. Thrust	High Thrust	
Configuration Code (inches)	S¹	See Page A-14	See Page A-14	See Page A-14	B14
Frame(s) Available	All	See Page A-14	All	See Page A-14	30 - 35

¹Inch output shaft. For output with metric shaft, insert "M" following last alpha character (i.e. metric footmount, S becomes SM).

Flange - No Feet

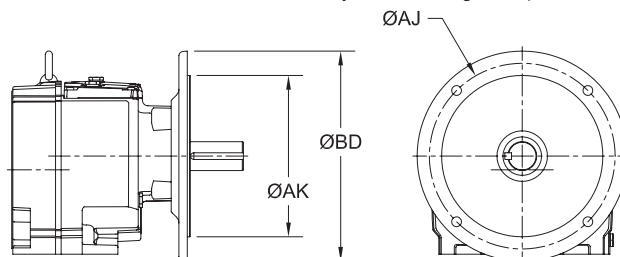
		Output Flange Dimensions Available												
			Inches	MM										
			BD	120	140	160	200	250	300	350	400	450	550	650
Reduction Stages	AK	4.50	80	95	110	130	180	230	250	300	350	450	550	
	AJ	5.875	100	115	130	165	215	254	300	350	400	500	600	
	Gear Frame													
Normal Thrust	Single	30	56C	BD1	BS	BD2	BD3							
		31			BD2	BS								
		32				BD2	BS							
		33					BD2	BS						
		34						BD2	BS					
	Multiple	35							BD2	BS				
		30	56C	BD1	BS	BD2	BD3							
		31		BD3	BD2	BD1	BS							
		32				BD2	BD1	BS						
		33					BD2	BD1	BS					
		34						BD2	BD1	BS				
		35							BD2	BD1	BS			
		36										BD1	BS	
		37										BD1	BS	
38											BD1	BS		
High Thrust	Multiple	33						BR						
		34							BR					
		35								BR				

Footed - with Flange

		Output Flange Dimensions Available												
			Inches	MM										
			BD	120	140	160	200	250	300	350	400	450	550	650
Reduction Stages	AK	4.50	80	95	110	130	180	230	250	300	350	450	550	
	AJ	5.875	100	115	130	165	215	254	300	350	400	500	600	
	Gear Frame													
Normal Thrust	Single	31			SBD2	SBS								
		32				SBD2	SBS							
		33					SBD2	SBS						
		34						SBD2	SBS					
		35							SBD2	SBS				
	Multiple	30A		SBD1	SBS									
		31		SBD3	SBD2	SBD1								
		32					SBD1	SBS						
		33						SBD1	SBS					
		34							SBD1	SBS				
		35								SBD1	SBS			
		36										SBD1	SBS	
		37										SBD1	SBS	
		38											SBD1	SBS

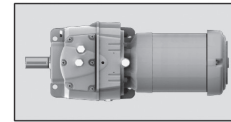
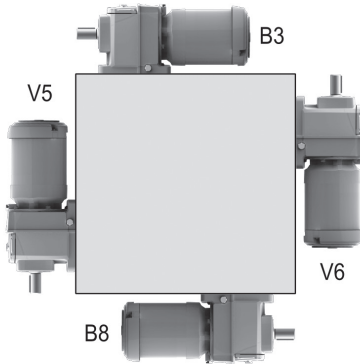
Shaded fields indicate factory lead-time applies

Note: For metric output shaft on any output nomenclature above, add "M" before any numeric designator. (i.e. metric shaft with BD1 flange = BDM1)

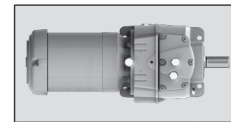


Mounting Positions

**Foot Mounted
(with/without flange)
Any Reduction**

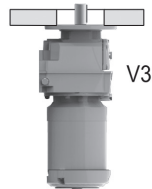


B6



B7

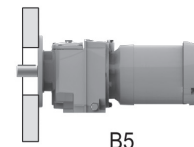
**Flange Mounted (footless)
Multiple Reductions**



V3

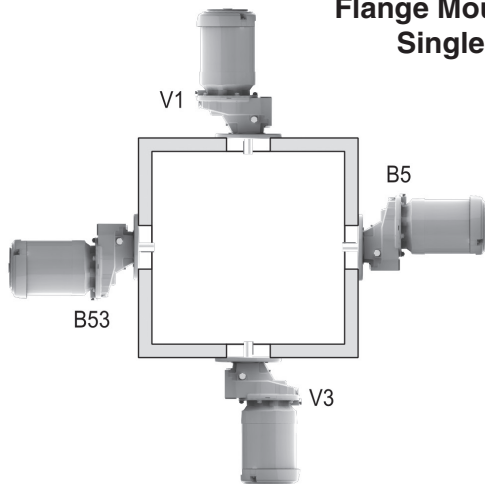


V1



B5

**Flange Mounted (footless)
Single Reduction**

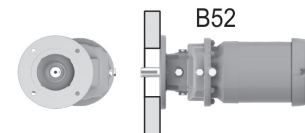


V1

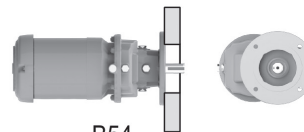
B5

B53

V3



B52



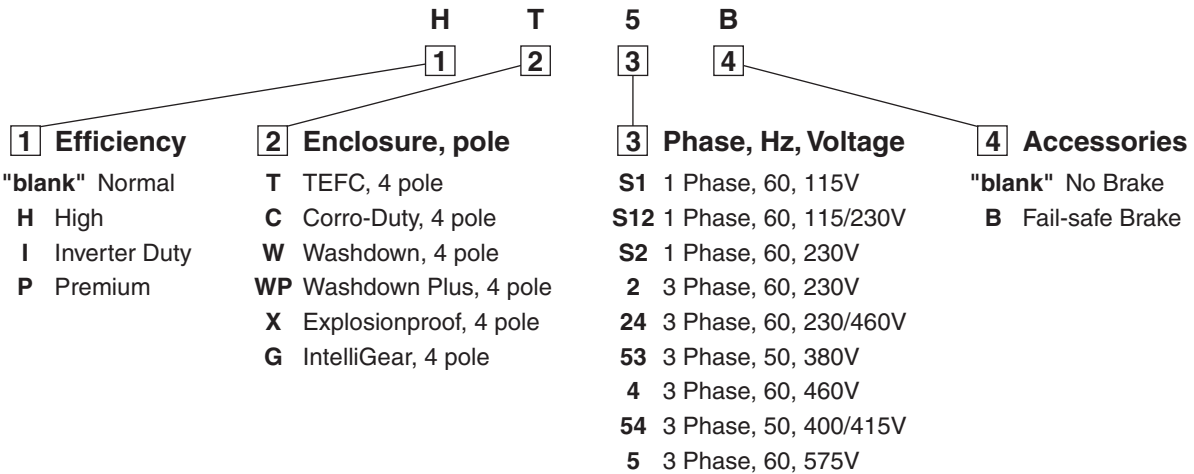
B54



Standard Motor Input Types

CbN
SERIES 3000

Example: High Efficiency, TEFC, 3 phase 60 Hz, 575V, with Fail-safe Brake



Base Design	Input Code	Motor HP															
		0.33	0.50	0.75	1	1.5	2	3	5	7.5	10	15	20	25	30	40	50
S Single Phase TEFC	TS12	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	-	-	-
	TS12B	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	-	-	-
	TS2	-	-	-	-	-	-	Y	Y	-	-	-	-	-	-	-	-
T 3 Phase TEFC	TS2B	-	-	-	-	-	-	Y	Y	-	-	-	-	-	-	-	-
	HT24	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	HT24B	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-
	HT5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	HT5B	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-
	T24	Y	Y	Y	Y ¹	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-
	T24B	Y	Y	Y	Y ¹	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-
	T5	Y	Y	Y	Y ¹	-	-	-	-	-	-	-	-	-	-	-	-
	T5B	Y	Y	Y	Y ¹	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-
	• T53	Y	Y	Y	Y ¹	Y	Y	Y	Y	Y	P	P	P	P	P	P	P
	• T53B	Y	Y	Y	Y ¹	Y	Y	Y	Y	Y	-	-	-	-	-	-	-
	T54	Y	Y	Y	Y	Y	Y	Y	Y	Y	P	P	P	P	P	P	P
	IT24	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	IT24B	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-
	IT5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	IT5B	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-
	PT24	-	-	-	-	-	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	PT5	-	-	-	-	-	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	W24	Y	Y	Y	Y ¹	Y	Y	-	-	-	-	-	-	-	-	-	-
	W5	Y	Y	Y	Y ¹	Y	Y	-	-	-	-	-	-	-	-	-	-
WP24	Y	Y	Y	Y ¹	Y	Y	-	-	-	-	-	-	-	-	-	-	
WP5	Y	Y	Y	Y ¹	Y	Y	-	-	-	-	-	-	-	-	-	-	
C 3 Phase Corro-Duty	HC24	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
	HC5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
	IC24	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
	IC5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
	PC24	-	-	-	-	-	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	
X 3 Phase Explosionproof	PC5	-	-	-	-	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
	X24	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	
	X5	Y	Y	Y	-	-	-	-	-	-	-	-	-	-	-	-	
IG IntelliGear®	IX24	P	P	P	P	P	P	P	P	P	-	-	-	-	-	-	
	IGS1	Y	Y	Y	-	-	-	-	-	-	-	-	-	-	-	-	
	IGS2	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	-	-	
	IG2	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	
	IG4	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	

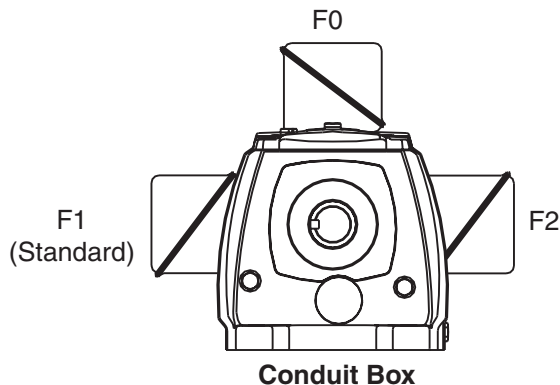
P = Production lead-time Y = Available from stock Y¹ = Motor frame is B56 - = not available

• Refer to page A-19 if CCC motor certification is required on gearmotor

Electrical Connection Options

Conduit Box Location

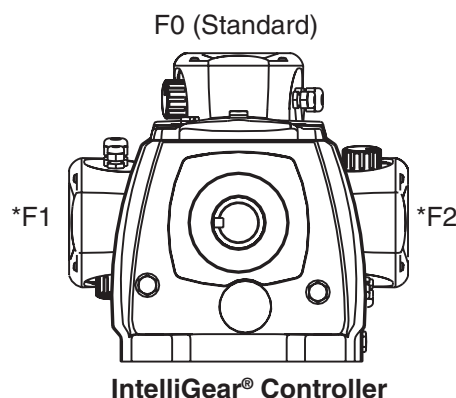
When ordering a conventional CbN gearmotor, specify the desired conduit box location when viewing unit output shaft in B3 or B5 position. If no option is specified, the "F1" location will be supplied.



IntelliGear Controller Location

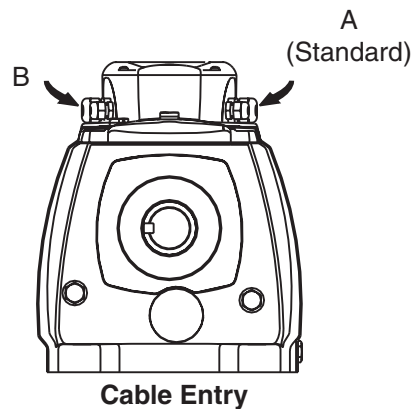
When ordering an IntelliGear® CbN gearmotor, you can specify the controller location and conduit entry location when viewing the unit output shaft in B3 or B5 position. If no options are specified, the "F0" controller location will be supplied.

* Refer to Application Engineering for de-rating guidance.



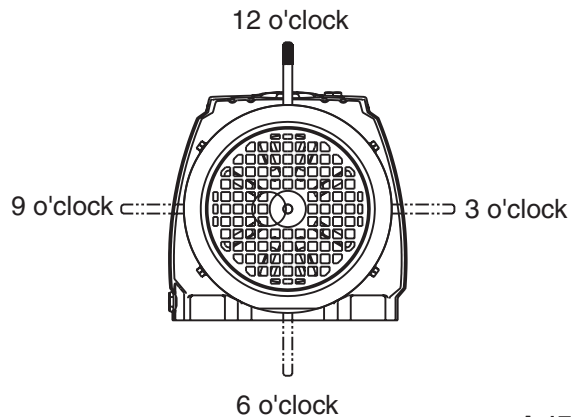
Cable Entry

IntelliGear cable entry can be from either side of the enclosure. If no option is specified, "A" will be supplied.



FCR DC Brake Manual Release Lever Location

Unit Type	Default Location	Optional Location(s)
CbN less IntelliGear	12 o'clock	3, 6, or 9 o'clock
CbN with IntelliGear	9 o'clock	3, 6, or 12 o'clock (lever can not be in same position as IntelliGear)



Modifications, Options and Accessories

Inverter Duty Gearmotors

Improvements in the motors for CbN gearmotors include an upgrade in the wire and varnish treatment used in all non-explosionproof three phase motors called Allguard. This makes the three phase gearmotor suitable for use with PWM inverters in many applications. A one year warranty will be extended for standard efficiency motors on constant torque applications over 3:1 range from 60-20 Hz. The same warranty is extended for high efficiency design motors on constant torque applications over 5:1 range from 60-12 Hz providing the following conditions are met:

- Motor is non-hazardous 3 phase > 48 frame
- Cable length to controller < 100 feet
- Line voltage is < 480 VAC
- Thermal protectors are not required

For all other conditions of operation (including 575 VAC) that exceed these parameters and all hazardous motor applications, select the inverter duty motor design under the motor Type required by the application. These designs include winding thermostats and will be covered by a three (3) year limited warranty of the motor as covered in the Standard Terms and Conditions, and full compliance with NEMA MG1 Part 31.

Motor Modifications

M1 Brakes

Design

These motor mounted brakes have a direct acting, spring set, electromagnetically released disc design. When power to the brake is interrupted, the brake will immediately set and hold. When power is restored to the brake then the brake will be released automatically.

Brake Enclosures

IP23 – suitable for indoors with relatively dry, clean and non-hazardous applications

IP55 – suitable for outdoor or indoor where gearmotor can be exposed to splashing liquids, dusts, and chemicals that are non-hazardous. Not suitable for washdown applications

Non-Hazardous Motor Types	Motor Frame Size(s)	
	56-180T	210T
S	IP23	N/A
T	IP55	IP23
IG	IP55	N/A

Motor Modifications Continued

Operating Voltage

Brakemotors for fixed frequency operation will be arranged for operating with motor power as standard. If another lower voltage like 115 VAC is to be used for the brake on a 3 phase motor, state this voltage at order entry

Brakes for inverter duty brakemotors require a separate fixed frequency AC power source for the brake, but interlocked with starting of the motor. The standard brake design for inverter duty gearmotors will be arranged for single phase 115/230 VAC.

Mounting

Brakes for CbN gearmotors are suitable for the mounting ordered for the gearmotor. The standard brake will have a manual release included. Refer to the table on A-17 for the manual release mounting options available on the FCR type IP 55 brake design.

Ordering

Refer to page A-16. Motor Input Types with a "B" suffix denote a brake mounted at the factory to the end. Define the voltage that will be powering the brake to release it.

M2 Premium Efficiency Motors

High efficiency motor design is a standard option for three phase motors on 56 frames and larger motors in types "T" and "C" to meet the energy legislation in Canada and most end user specifications.

Premium efficiency motors are also optional starting at 3 HP.

M3 Washdown Duty Motors

See GM1 under Gearmotor Modifications

M4 Canopy Cap/Drip Cover

A canopy cap can be supplied for protection from dripping liquids entering the fan end of a gearmotor. It is recommended but not standard when gearmotor mounting is ordered to be "V"

M5 Frequency – 50 Hz

Motors for operation at 50 Hz are available. Refer all 3 phase requirements for 50 Hz to motor code T53 (380V) or T54 (400/415V). The published output speed in catalogs are based on 60 Hz. When operating or selecting a 50 Hz gearmotor, catalog output speed must be reduced by 5/6 for a given ratio. The service factor must also be reduced by 5/6 if the HP is maintained.

For all other 50 Hz voltages, refer to application engineering.

Modifications, Options and Accessories

Motor Modifications Continued

M6 Voltage (3 phase only)

Standard voltages are listed in the table below. 200 VAC will be handled by 208-230/460V motors up to 10 HP. Refer all other voltages to the Pricing Group to confirm availability.

Frequency	3 Phase Voltages Thru 30 HP
60 Hz	200, 230, 460, 575
50 Hz	380, 400/415

M7 Motor Insulation

Regal Power Transmission Solutions' 3 phase motors are built with a premium Class F insulation system for "T", "C" and "IG" types. All "S" and "X" type motors use a Class B insulation.

Tropical insulation treatment is available as a modification on any motor designs noted above

Class H insulation systems require production lead-times and are not available on explosions proof "X" designs.

M8 Space Heaters

Space heaters are recommended for gearmotors installed in very damp locations to prevent condensation from forming on the motor windings when the motor is not operating. Leads will be brought out to the standard motor conduit box. Space heater voltages (115, 230, and 460V) must be specified when an order is entered. This is available on motors > ¾ hp.

M9 Thermal Protection – Thermostats

This protection uses a bi-metallic disc thermostat embedded each phase of the motor winding and then connected by others into the holding circuit of the motor starter or VFD drive. The sensor is normally closed, and opens the control circuit to shut the motor down if the motor achieves over-temperature conditions based on the motor insulation class or design code. Thermostats give protection for running overloads, abnormally high ambient, voltage imbalance, high or low voltage, and ventilation failure. Thermostats do not give protection for locked rotor, starting overloads or single phasing.

Thermostats are standard in inverter duty motor designs (including IG) as well as explosionproof dual label motors type "X".

Motor Options

Certification or Approvals For Gearmotors

Hertz	Phase	Motor Voltage	Approvals ¹	
			Standard	Optional
60 Hz	1	115/230V	UL, CSA	-
	3	230/460	UL, CSA	-
		575	UL, CSA	-
50 Hz	3	380	CE	CCC ²
		415	CE	-

¹ Corresponding logo(s) will be displayed on motor nameplate

² CCC is available for TEFC 3 phase gearmotors 1/3 to 1.5hp, 50/380V for export to China. Motor nameplate will be in Chinese, with metric performance values (i.e motor power=kW). To order with CCC, add "C" to either T38 or T38B input codes i.e. T38C or T38BC will have CCC

Gear Modifications

G11 Corro-Duty®

Corro-Duty treatment can be applied to a gearmotor or reducer when corrosive chemicals are present or unit will be operated outside in adverse environmental conditions. For gearmotors, the unit should start with specification of the Corro-Duty® type "C" motor design. Other special features of this treatment include:

- Normally closed breather design
- Corro-Duty exterior paint treatment (entire unit)
 - o Grey Option
 - 316 stainless steel paint (2 step)
 - Light grey semigloss finish
 - USDA and FDA approved
 - o White Option
 - Two step epoxy paint system
 - White gloss finish
 - USDA and FDA approved

For washdown application for gearmotors, refer to GM1 Washdown Duty Gearmotors and/or Washdown Duty Gearmotor PLUS.

G12a Foodgrade Synthetic Lubricant

When this modification is specified, the CbN oil sump is filled with the required volume of an FDA approved H1 rated synthetic lubricant for helical gearing (refer to page A-224).

G15 Export Boxing

Export boxing can be provided for "under-deck" transport. When the quantity of CbN gearmotors or reducers exceeds five (5) units, refer to international sales for most economical accommodations.

Modifications, Options and Accessories

Gear Modifications Continued

Accessories

G16 Extra or Special Nameplate

Units can be provided with limited additional special information on the standard product nameplate. When required, an extra nameplate may be provided, stamped with custom markings.

The following accessories can be ordered along with gearmotors and will be supplied loose for mounting by others

Gearmotor Modifications

GM1 Washdown Duty Gearmotors

This three phase gearmotor design combines special features of the gear and motor required for washdown duty. These include:

- Special treatment of motor interior and windings
- Drains at low point(s) of the motor frame
- Labyrinth seal at motor SE bracket/shaft extension
- Special “protected” breather for gearcase
- Corro-Duty exterior multi-application paint treatment (see Corro-Duty® Reducer for color options).

Description	Gear Frames	Part #
NPT Adapter (1/4" NPFT)	31 to 35	0436216
NPT Adapter (3/4" NPFT)	36 to 38	0436218
Oil Level View Port	31 to 35	0435936
	36 to 38	0435938

Motor types “W24” or “W5” are used to order this design based on motor voltage. This is available from 1/3 to 2 HP.

GM2 Washdown Duty Gearmotor PLUS

This three phase gearmotor design includes all the special features noted under GM1 above plus the oil sump of the reducer will be filled before shipment with a FDA approved H1 rated synthetic lubricant as shown on page A-224 for helical gearing. Volume of the oil will be dictated by the mounting position specified on the order.

Motor types “WP24” or “WP5” are used to order this design based on motor voltage. This is available from 1/3 to 2 HP.

AGMA Application Classifications

U: Uniform load M: Moderate shock load V: Heavy shock load

Application	Load	Class		Application	Load	Class		Application	Load	Class	
		Up to 10 hrs/day	Over 10 hrs/day			Up to 10 hrs/day	Over 10 hrs/day			Up to 10 hrs/day	Over 10 hrs/day
Agitators				Bucket				Conveyors - Uniformly Loaded or Fed: Apron, Assembly, Belt, Bucket, Chain, Flight, Oven, Screw	U	I	II
Paper Mills	M	II	II	Conveyors, Uniform	U	I	II	Conveyors - Heavy Duty Not Uniformly Fed: Apron, Assembly, Belt, Bucket, Chain, Flight, Oven, Screw	M	II	II
Pure Liquids	U	I	II	Conveyors, Heavy Duty	M	II	II	Live Roll (Package)	U	I	II
Liquids & Solids	M	II	II	Elevators Cont.	U	I	II	Reciprocating, shaker	V	III	III
Liquids - Variable Density	M	II	II	Elevators Uniform	U	I	II	Cookers (Brewing & Distilling) (Food)	U	I	II
				Elevators, Heavy Duty	M	II	II	Cooling Tower Fans			
Apron Conveyors				Calenders				Induced Draft	M	II	II
Uniformly Loaded or Fed	U	I	II	Paper	U	-	II	Forced Draft	Refer to Application Engr.		
Heavy Duty	M	II	II	Super (Paper)	U	-	II	Couch (Paper)	M	-	II
Apron Feeders	M	II	II	Rubber	M	II	II	Cranes and Hoists			
Assembly Conveyors				Textile	M	II	II	Main Hoists			
Uniformly Loaded or Fed	U	I	II	Cane Knives	M	II	II	Heavy Duty	V	III	III
Heavy Duty	M	II	II	Can Filling Machines	U	I	II	Medium Duty	M	II	II
Ball Mills	V	III	III	Card Machines (Textile)	M	II	II	Reversing	V	II	II
Barking				Car Dumpers	V	III	-	Skip Hoists	M	II	II
Drums	V	-	III	Car Pullers	M	II	-	Trolley Drive	M	II	II
Hydraulic Auxiliaries	V	-	III	Cement Kilns	Refer to Application Engr.			Bridge Drive	M	II	II
Mechanical	V	-	III	Centrifugal				Crushers			
Barscreens (Sewage)	U	I	II	Blowers, Compressors, Discharge Elevators or Pumps	U	I	II	Ore or Stone	V	III	III
Batchers (Textile)	M	II	II	Chain Conveyors				Cutters (Paper)	V	-	III
Beaters and Pulpers (Paper)	U	-	II	Uniformly Loaded or Fed	U	I	II	Cylinders (Paper)	M	-	II
Belt Conveyors				Heavy Duty	M	II	II	Dewatering Screens (Sewage)	M	II	II
Uniformly Loaded or Fed	U	I	II	Chemical Feeders (Sewage)	U	I	II	Disc Feeders	U	I	II
Heavy Duty	M	II	II	Clarifiers	U	I	II	Distilling	(See Brewing)		
Belt Feeders	M	II	II	Classifiers	M	II	II	Double Acting Pumps			
Bending Rolls (Machine)	M	II	II	Clay Working Industry				2 or more Cylinders	M	II	II
Bleachers (Paper)	M	-	II	Brick Press	V	III	III	Single Cylinder	Refer to Application Engr.		
Blowers				Briquette Machine	V	III	III	Dough Mixer (Food)	M	II	II
Centrifugal	U	I	II	Clay Working Machinery	M	II	II	Draw Bench (Metal Mills)			
Lobe	M	II	II	Pug Mill	M	II	II	Carriage & Main Drive	V	III	III
Vane	U	I	II	Collectors (Sewage)	U	I	II	Dredges			
Bottling Machinery	U	I	II	Compressors				Cable Reels	M	II	-
Brewing and Distilling				Centrifugal	U	I	II	Conveyors	M	II	II
Bottling Machinery	U	I	II	Lobe	M	II	II	Cutter Head Drives	V	III	III
Brew Kettles, Cont. Duty	U	-	II	Reciprocating,				Jig Drives	V	III	III
Can Filling Machines	U	I	II	Multi - Cylinder	M	II	II	Maneuvering Winches	M	II	-
Cookers - Cont. Duty	U	-	II	Single - Cylinder	V	III	III	Pumps	M	II	II
Mash Tubs - Cont. Duty	U	-	II	Concrete Mixers				Screen Drives	V	III	III
Scale Hoppers - Frequent Starts	M	II	II	Continuous	M	II	II	Stackers	M	II	II
Brick Press (Clay Working)	V	III	III	Intermittent	U	I	-	Utility Winches	M	II	-
Briquette Machines (Clay Working)	V	III	III	Converting Machines (Paper)	M	-	II				

AGMA Application Classifications

U: Uniform load M: Moderate shock load V: Heavy shock load

Application	Load	Class	Application	Load	Class	Application	Load	Class
	Up to 10 hrs/day	Over 10 hrs/day		Up to 10 hrs/day	Over 10 hrs/day		Up to 10 hrs/day	Over 10 hrs/day
Dryers (Paper)	U	-	II					
Dryers and Coolers (Mills, Rotary)	M	II	II					
Dyeing Machinery (Textile)	M	II	II					
Elevators								
Bucket - Uniform Load	U	I	II					
Bucket - Heavy Duty	M	II	II					
Bucket - Continuous	U	I	II					
Centrifugal Discharge	U	I	II					
Escalators	U	I	II					
Freight	M	II	II					
Gravity Discharge	U	I	II					
Man Lifts, Passenger	Refer to Application Engr.							
Escalators	U	I	II					
Fans								
Centrifugal	M	II	II					
Cooling Towers								
Induced Draft	M	II	II					
Forced Draft	Refer to Application Engineering							
Induced Draft	M	II	II					
Large (Mine, etc.)	M	II	II					
Large Industrial	M	II	II					
Light (Small Diameter)	U	I	II					
Feeders								
Apron, belt	M	II	II					
Disc	U	I	II					
Reciprocating	V	III	III					
Screw	M	II	II					
Felt								
Stretchers (Paper)	U	-	II					
Whippers (Paper)	U	-	II					
Flight								
Conveyors, Uniform	U	I	II					
Conveyors, Heavy	M	II	II					
Food Industry								
Beet Slicers	M	II	II					
Bottling, Can Filling Mach.	U	I	II					
Cereal Cookers	U	I	II					
Dough Mixers	M	II	II					
Meat Grinders	M	II	II					
Forming Machines (Metal Mills)	V	III	III					
Generators (Not welding)	U	I	II					
Gravity Discharge Elevators	U	I	II					
Grit Collectors (Sewage)	U	I	II					
Hammer Mills	V	III	III					
Induced Draft Fans	M	II	II					
Jordans (Paper)	U	-	II					
Kilns (Mills, Rotary) Cement	M	II	II	Refer to Application Engr.				
Laundry Washers and Tumblers	M	II	II					
Line Shafts								
Heavy Shock Load	V	III	III					
Moderate Shock Load	M	II	II					
Uniform Load	U	I	II					
Live Roll Conveyors								
Package	U	I	II					
Lobe Blower or Compressors	M	II	II					
Log Hauls (Paper and Lumber)	V	III	III					
Looms (Textile)	M	II	II					
Lumber Industry								
Barkers - Spindle Feed	V	II	III					
Barkers - Main Drive	V	III	III					
Carriage Drive	Refer to Application Engr.							
Conveyors								
Burner	V	II	III					
Main or Heavy Duty	V	II	III					
Main Log	V	III	III					
Re-Saw Merry-Go-Round	V	II	III					
Slab	V	III	III					
Transfer	V	II	III					
Chains - Floor	V	II	III					
Chains - Green	V	II	III					
Cut-Off Saws-Chain	V	II	III					
Cut-Off Saws-Drag	V	II	III					
Debarking Drums	V	III	III					
Feeds - Edger	V	II	III					
Feeds - Gang	V	III	III					
Feeds - Trimmer	V	II	III					
Log Deck	V	III	III					
Log Hauls - Incline, Well Type	V	III	III					
Log Turning Devices	V	III	III					
Planer Feed	V	II	III					
Planer Tilting Hoists	V	II	III					
Rolls - Live-Off Bearing								
Roll Cases	V	III	III					
Sorting Table	V	II	III					
Tipple Hoist	V	II	III					
Transfers - Chain	V	II	III					
Transfers - Craneway	V	II	III					
Tray Drives	V	II	III					
Machine Tools								
Auxiliary Drives	U	I	II					
Bending Rolls	M	II	II					
Main Drives	M	II	II					
Notching Press (Belted)	Refer to Application Engr.							
Plate Planers	V	III	III					
Punch Press (Geared)	V	III	III					
Tapping Machines	V	III	III					
Mangle (Textile)	M	II	II					
Mash Tubs (Brewing and Distilling)	U	-	II					
Meat Grinder (Food)	M	II	II					
Metal Mills								
Draw Bench Carriages & Main Drives	V	III	III					
Forming Machines	V	III	III					
Pinch, Dryer & Scrubber								
Rolls Reversing	Refer to Application Engr.							
Slitters	M	II	II					
Table Conveyors, Non-Reversing	M	II	III					
Reversing	V	-	III					
Wire Drawing & Flattening Machines	M	II	III					
Wire Winding Machines	M	II	II					
Mills, Rotary Type								
Ball, Pebble, Rod	V	III	III					
Cement Kilns	Refer to Application Engr.							
Coolers, Dryers, Kilns	V	II	II					
Tumbling Barrels	V	III	III					
Mixers (Also see Agitators)								
Concrete - Continuous	M	II	II					
Concrete - Intermittent	M	I	-					
Constant Density	U	I	II					
Variable Density	M	II	II					
Nappers (Textile)	M	II	II					
Oil Industry								
Chillers	M	II	II					
Oil Well Pumping	Refer to Application Engr.							
Paraffin Filter Press	M	II	II					
Rotary Kilns	M	II	II					
Ore Crushers	V	III	III					
Oven Conveyors								
Uniform	U	I	II					
Heavy Duty	M	II	II					

AGMA Application Classifications

U: Uniform load M: Moderate shock load V: Heavy shock load

Application	Load	Class		Application	Load	Class		Application	Load	Class	
		Up to 10 hrs/day	Over 10 hrs/day			Up to 10 hrs/day	Over 10 hrs/day			Up to 10 hrs/day	Over 10 hrs/day
Paper Mills				Rod Mills	V	III	III	Soapers (Textile)	M	II	II
Agitator (Mixers)	M	II	II								
Barker - Auxiliaries - Hyd.	V	-	III	Rotary				Spinners (Textile)	M	II	II
Barker, Mechanical	V	-	III	Pumps, Gear, Lobe, Vane	U	I	II				
Barking Drum	V	-	III	Screens (Sand or Gravel)	V	II	II	Steering Gears	M	II	II
Beater & Pulper	M	-	II								
Bleacher	M	-	II	Rubber Industry				Stock Chests (Paper)	U	-	II
Calenders	M	-	II	Mixer	V	III	III				
Calenders - Super	M	-	II	Rubber Calender	M	II	II	Stokers	U	I	II
Converting Mach.-				Rubber Mill (2 or more)	M	II	II				
Except Cutters - Platers	M	-	II	Sheeter	M	II	II	Stone Crushers	V	III	III
Conveyors	M	-	II	Tire Building Machines	Refer to Application Engr.						
Couch	M	-	II	Tire, Tube Press Openers	Refer to Application Engr.			Suction Rolls (Paper)	U	-	II
Cutters, Platers	V	-	III	Engr.							
Cylinders	U	-	II	Tubers & Strainers	M	II	II	Table Conveyors			
Dryers	U	-	II					(Metal Mills) Non-Reversing	V	II	III
Felt Stretchers	U	-	II	Sand Mullers	Refer to Application Engr.			Reversing	V	-	III
Felt Whippers	V	-	III								
Jordans	M	-	II	Screens				Tenter Frames			
Log Haul	V	-	III	Air Washing	U	I	II	(Textile)	M	II	II
Presses	M	-	II	Rotary - Sand or Gravel	M	II	II				
Pulp Machine Reels	M	-	II	Traveling Water Intake	U	I	II	Textile Industry			
Stock Chests	M	-	II					Batchers	M	II	II
Suction Rolls	M	-	II	Screw Conveyors				Calenders	M	II	II
Washers & Thickeners	M	-	II	Uniform	U	I	II	Card Machines	M	II	II
Winders	M	-	II	Heavy Duty or Feeder	M	II	II	Cloth Finishing Mach. (Cal-			
								enders, Dryers, Pads,			
Passenger Elevators	Refer to Application Engr.			Scum Breakers				Tenters, Washers)	M	II	II
				(Sewage)	M	II	II	Dry Cans	M	II	II
Pebble Mills	V	III	III					Dyeing Machinery	M	II	II
				Sewage Disposal				Knitting Machinery	Refer to Application Engr.		
Plate Planers	V	III	III	Aerators	Refer to Application Engr.			Looms, Mangles, Nappers	M	II	II
				Bar Screens	U	I	II	Range Drives	Refer to Application Engr.		
Presses (Paper)	V	-	III	Chemical Feeders	U	I	II	Soapers, Spinners	M	II	II
				Collectors	U	I	II	Tenter Frames	M	II	II
Proportioning Pumps	M	II	II	Dewatering Screens	M	II	II	Winders	M	II	II
				Grit Collectors	U	I	II	Yarn Preparatory Mach.			
Pub Mills (Clay)	M	II	II	Scum Breakers	M	II	II	(Cards, Spinners, Slashers)	M	II	II
				Slow or Rapid Mixers	M	II	II				
Pullers (Barge Haul)	V	III	III	Sludge Collectors	U	I	II	Thickeners (Sewage)	M	II	II
				Thickeners	M	II	II				
Pulp Machine Reels	U	-	II	Vacuum Filters	M	II	II	Tumbling Barrels	V	III	III
Pumps				Shaker Conveyors	V	III	III	Vacuum Filters			
Centrifugal	U	I	II					(sewage)	M	II	II
Proportioning	M	II	II	Sheeters (Rubber)	M	II	II				
Reciprocating								Vane Blowers	U	I	II
Single Act., 3 or more cyl.	M	II	II	Single Acting Pump							
Double Act., 2 or more cyl.	M	II	II	1 or 2 Cylinders	Refer to Application Engr.			Winches (Dredges)	M	II	-
Single Act., 1 or 2 cyl.	Refer to Application Engr.			3 or more Cylinders	M	II	II				
Rotary: Gear, Lobe, Vane	U	I	II					Winders			
				Skip Hoist	M	II	II	(Paper)	U	-	II
Punch Press								(Textile)	M	II	II
(Gear Driven)	V	III	III	Slab Pushers	M	II	II	Windlass	M	II	II
Reciprocating				Slitters (Metal)	M	II	II				
Conveyors, Feeders	V	III	III					Wire			
				Sludge Collectors				Drawing Machines	M	II	III
Reciprocating Compressors				(Sewage)	U	I	II	Winding Machines	M	II	II
Multi-Cylinder	M	II	II								
Single cylinder	V	III	III								

Applications not listed in this table, or where the user has data indicating the severity of this usage to be greater than average, should be referred to Application Engineering.