Intelligent Drivesystems

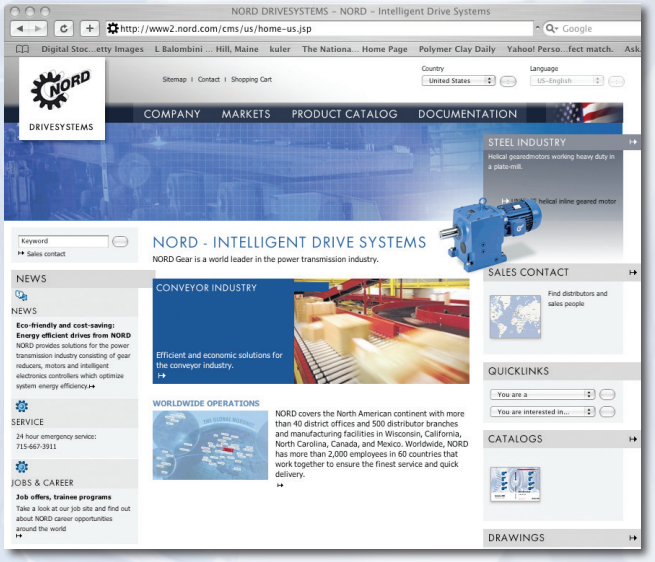
CONVEYOR DRIVES

SK 9055 & SK 9155 Gearmotors & Speed Reducers

G1043

NORD® DRIVESYSTEMS

Dependable and Accessible



Online Tools

NORD offers comprehensive, searchable product information online. The Internet makes it possible for our customers to reach us anytime, anywhere — 365 days a year, 24 hours a day.

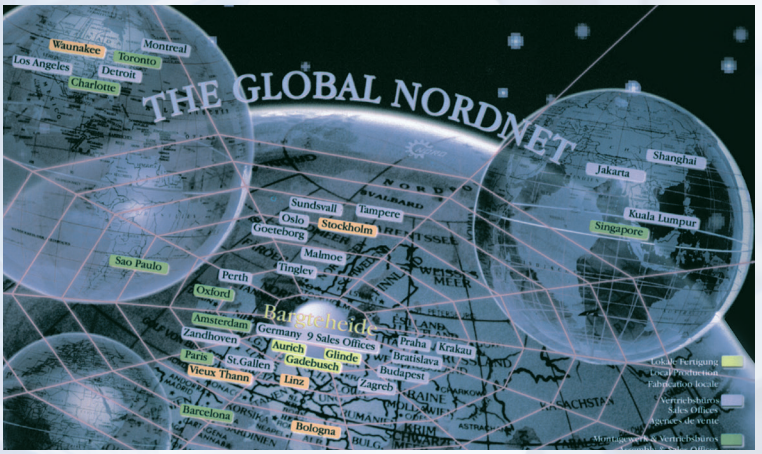
- Online order tracking
- Parts list and maintenance schedules
- Online drive selection software
- DXF scale drawing

Quality

Quality is assured at NORD assembly and manufacturing facilities, based on ISO 9000 standards — from careful inspection of incoming materials to closely monitored machining operations including gear cutting, turning, hardening and grinding as well as finishing and assembly.

Global Availability

From Shanghai to Charlotte, and all points between, NORD reaches customers around the world. Deliveries, service, and product support are close at hand, regardless of your location.



NORD 911

Trouble? Just call **715-NORD-911** (in Canada, 905-796-3606). Emergency service is available 24 hours a day, 7 days a week. We'll answer your call, ship the parts, or build a unit and have it shipped directly to you to provide what you need, when you need it.

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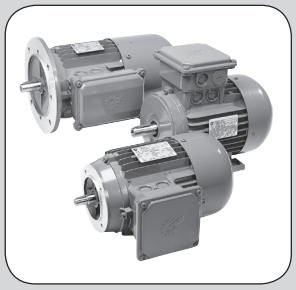


NORD Gear

NORD DRIVESYSTEMS

Company Overview

Since 1965, NORD Gear has grown to global proportions on the strength of product performance, superior customer service, and intelligent solutions to a never ending variety of industrial challenges.

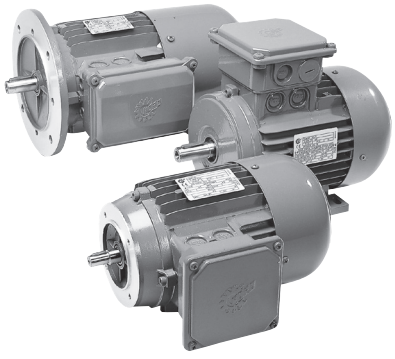
All mechanical and electrical components of a drive are available from NORD Gear. Our products cover the full range of drive equipment: helical in-line, Clincher™ shaft-mount, helical-bevel, and helical-worm gearboxes, motors and AC drives that range from 1/6 hp to 250 hp, with torques from 90 lb-in to 900,000 lb-in.

But NORD Gear does far more than manufacture the world's finest drive components. We provide our customers with optimum drive configurations for their specific purposes. NORD provides each and every one of them with truly complete and efficient systems at a price/quality ratio unmatched in today's fast-changing markets.

NORD Gear makes its wide range of products easily available through a global network that provides all customers with prompt delivery and expert support services to consistently exceed customer expectations. We are firmly committed to being totally responsive to the ideas and specifications of every customer, anywhere in the world.

High-Performance Motors & Brakemotors

NORD motors are designed to run cool for longer service life. Low rotor inertia and high starting torque allow peak performance in the most difficult applications for inverter and vector duty per NEMA MG 1-2006 Section 31.4.4.2 voltage spikes. Our motors are internationally accepted, conforming to North American NEMA MG 1 & international IEC electrical specifications. High performance options include brakes, encoders, and forced cooling fans.



Short, On-Time Delivery

As a NORD customer, you can rest assured that your order will be delivered on time. Because NORD has both decentralized assembly and manufacturing operations paired with a globally linked network, we have the ability to offer our customers:

- Fast, reliable responses
- Greater product versatility
- Shorter lead times
- Timely shipping
- Rapid delivery

Quality

Quality is assured at NORD's assembly and manufacturing facilities, based on ISO 9000 standards — from careful inspection of incoming materials to closely monitored machining operations, including gear cutting, turning, hardening & grinding as well as finishing & assembly.

NORD 911

Trouble? Just call 715-NORD-911 (in Canada, 905-796-3606). Emergency service is available 24 hours a day, 7 days a week. We'll answer your call, ship the parts, or build a unit and have it shipped directly to you to provide what you need, when you need it.

Manufacturing

NORD continually invests in research, manufacturing and automation technology. This is to ensure the highest possible quality at affordable prices. NORD invests heavily in our North American facilities as well as our factories around the world. Recent examples include expanding our Waunakee factory and adding numerous new large gear unit assembly cells. In our Glinde, Germany gear factory we added a state-of-the-art multi-chamber vacuum carburization system.

Global Availability

From Shanghai to Charlotte, and all points in-between, NORD reaches customers around the world. Deliveries, service, and product support are close at hand, regardless of your location.

Worldwide Standards

NORD products are designed and manufactured based on the latest North American and global standards.

Increased North American Presence

NORD covers North America with over 30 district offices and over 500 distributor branches. NORD operates a manufacturing and assembly facility in Waunakee, WI, Charlotte, NC, Corona, CA, Brampton, ON, and Monterrey, Mexico, resulting in an ever-increasing capacity in North America and giving our customers the shortest lead times in the industry.

Energy Efficiency

Lowering your operating costs is one of our greatest goals! NORD research and development focuses on energy efficiency, with gearboxes, motors, and AC vector drives designed for lower energy consumption. Our fully diverse line of in-line or right-angle units and motors has been developed to suit your needs.

Modular Design

NORD's modular design philosophy provides you with a competitive edge by allowing you to configure drive systems to exactly fit your applications.

More than 20,000,000 combinations of totally unique gearmotors and speed reducers are possible – assembled in-line or right-angle, mounted by foot or flange, featuring solid or hollow shafts with either metric or inch shaft extensions – to give you complete freedom to specify a drive solution that's perfect for you.

Benefits

- More output speeds
- More mounting arrangements/Greater flexibility
- Fewer gear stages/Lower cost
- Metric and inch products

NORD engineers stand ready to assist you with your custom applications. Most standard drives can be modified to your purposes, and custom designs can be developed for special applications.

Key Features

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SK 9055 and SK 9155 Conveyor Drive Units

The NORD SK 9055 and SK 9155 Conveyor Drive reducers are designed to be a 'mounting flange and output shaft drop-in' for existing 'industry-standard' overhead conveyor drives.

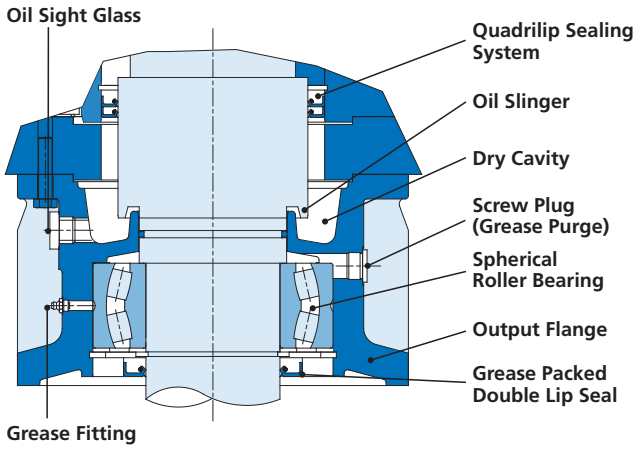
Like all of our standard industrial products, the conveyor drive units offer heavy-duty construction and high quality precision machined components. In addition, these drives incorporate the standard NORD VL3 spread bearing design with dry cavity.

Available Sizes

Unit Size	Ratio Range	Max. Torque [lb-in]
SK 9055	8.83-329.69:1 (3 Stage)	24,780
SK 9055	172.08-4246.38:1 (4 Stage)	24,780
SK 9155	9.16-245.76:1 (3 Stage)	75,225
SK 9155/32	311.10-3251.68 (5 Stage)	75,225
SK 9155/42	134.14-269.39 (5 Stage)	75,225

Spread Bearing Design with Dry Cavity

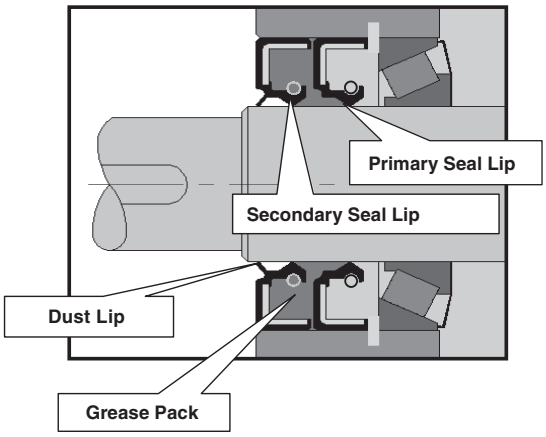
The SK 9055 and SK 9155 Overhead Conveyor Drive gear units have two main features: a spread bearing design or large output bearing span and an oil leakage protection system. The spread bearing design enables the NORD box to handle high, overhung loads. The top bearing is a cylindrical roller bearing and the bottom bearing is a spherical roller bearing, selected for its high radial load capacity.



Key Design Features

- NORD's QUADRILIP™ Seal System prevents oil leakage from the gearbox into the assembly.
- In the event any oil leak develops, oil flowing past the seals will be re-directed into the dry cavity by the output shaft oil slinger.
- To detect oil leakage from the primary reducer shaft seal's an oil sight glass is provided. Upon request, an optional oil proximity sensor can be supplied in place of the oil sight glass.
- The large spherical roller bearing at the bottom of the assembly is protected by a grease-packed double lip shaft seal.

QUADRILIP™ Seal System



UNICASE™ Design

NORD heavy-duty, one-piece gear reducer housings are precisely machined to meticulous standards. Internal reinforcements further increase strength and rigidity. All bearings and seal seats are contained within the casting, eliminating splits or bolt-on carriers that can weaken the housing and allow oil leakage. Bores and mounting faces are machined in one step, producing extremely precise tolerances – thus ensuring accurate positioning of gear teeth, bearings and seals, and longer life for all components.

Modular Design with Multiple Input Options

All NORD products including the SK 9055 and SK 9155 Conveyor Drive gear units are modular in design and provide extraordinary flexibility, with multiple input options available:

- Integral motor (gearmotor)
- NEMA C-face motor adapter
- IEC B5 motor adapter
- Solid input shaft
- Custom motor adapter (servo, hydraulic motors, etc.)

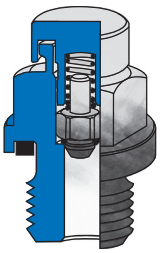
Large Ratio Per Gear Stage

NORD gear cutting technology allows for the production of gear sets with a higher maximum ratio per stage than many other speed reducer manufacturers. NORD commonly produces gear sets with a maximum ratio of between 9:1 and 10:1 per stage. This allows for double reduction gear units with a maximum ratio between 72:1 and 100:1. Most speed reducer manufacturer's can only produce single-stage reduction of between 5:1 & 6:1. This means a two stage reducer with a maximum reduction of about 25:1 to 35:1. NORD can often provide a two-stage reducer when most companies must provide three-stage units. The same situation applies to three, four and higher gear stages. This allows NORD to provide superior value and performance in many conditions.

Benefits

- Better value
- Higher efficiency
- Quieter operation
- Lower weight
- Longer life

AUTOVENT™



The AUTOVENT™ helps prevent bearing and gear damage by behaving like a check valve to block the entry of foreign material and prevent lubrication contamination from dust particles, moisture and air-borne process chemicals. The breather opens at approximately 0.3-0.9 psi during operation and closes tightly as the gearbox cools. This option is perfect for humid conditions and wash-down environments, helping to maintain proper oil cleanliness, while reducing foaming and oxidation.

Benefits

- Cleaner gearbox oil
- Extended lubrication life
- Longer-lasting seals, gears and bearings

High-Quality Gearing (Infinite Life Design)

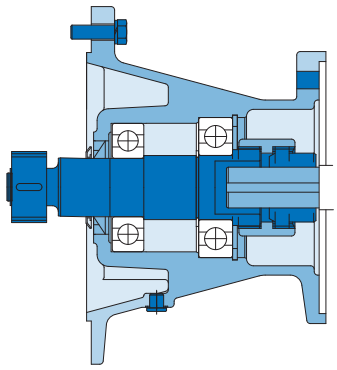
NORD continually invests in state-of-the-art gear production equipment and in gear research. This allows us to produce exceptionally high quality gears.

Benefits

- Designed & manufactured up to AGMA CLASS 13
- Infinite design life
- Case-hardened steel
- Exceptional hardness: 58 Rc minimum
- High-speed gears are ground;
  Low speed gears are skive-hobbed
- 275% momentary overload capacity
- Low noise
- Low maintenance

Compact Coupled NEMA C-Face Motor Adapter

NORD's unique NEMA C-face motor adapter provides the user with a high performance motor attachment system in a compact space. Historically, to have a compact C-face motor mounting the only choice was a low performance quill design with its distinct disadvantages including excessive bearing loading, rapid seal wear and metal-to-metal fretting corrosion. The fretting corrosion inherent with a quill design made the removal of a motor almost impossible. Also in the past, the use of a superior coupling system meant increased cost and a much longer motor bell. NORD's compact NEMA C-face adapter uses a high strength motor coupling and provides the space advantages of a quill but without the severe drawbacks.



Benefits

- Compact space saving design
- Easy motor mounting
- Easy motor removal
- Motor coupling
- Low bearing loading (long bearing life)
- Lower weight

Key Features

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Factory Oil Filled

All SK 9055 and SK 9155 Conveyor Drive reducers are shipped from the factory with a pre-determined oil fill level in accordance to the specified mounting position. Oil filling before shipment prevents damage from dry start-ups and helps assure that the proper lubrication is used.

Proper gearbox lubrication is essential in order to reduce friction, heat, and component wear. Lubricants also help prevent corrosion and oxidation, minimize foam, improve heat transfer, optimize reducer efficiency, absorb shock loads and reduce noise.

Standard Oil Fill

The standard oil fill for the SK 9055 and SK 9155 Conveyor Drive is ISO VG 220, Mineral Oil.

Optional Oil Fill

Both synthetic and food grade oil options are also available upon request.

Paint Coatings

NORD's standard paint coating is a two component, aliphatic polyurethane finish with 316 stainless steel material. This gray stainless steel paint has excellent appearance and outstanding physical properties. It is suitable for both indoor and outdoor applications.

Advantages of NORD's stainless steel polyurethane:

- Excellent adhesion to cast iron, aluminum, steel, and plastics.
- Excellent corrosion resistance
- Excellent chemical resistance
- Excellent gloss and color retention
- Suitable for indoor and outdoor exposure
- Nonporous and excellent abrasion resistance
- Suitable for use in a USDA inspected facility

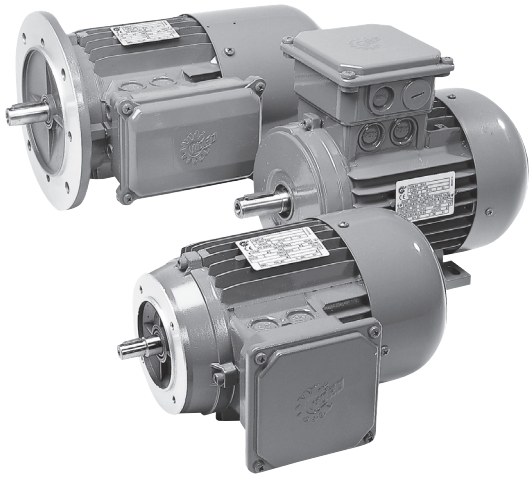
NORD also offers a variety of severe duty paint coatings that provide a high level of protection against water and severe environments both inside and outside.

- NSD+ (NORD Severe Duty) consists of a high-solid alkyd primer undercoat and a stainless steel polyurethane topcoat.
- For the most demanding environments, NORD offers NSD-X3 (NORD Severe Duty Triple Coated) which consists of a primer undercoat, stainless steel polyurethane

Special colors & paints are also possible. Please contact NORD with your specific requirements.

NORD High-Performance Motors & Options

NORD motors are designed to run cool for producing longer service life. Low rotor inertia and high starting torque allow peak performance in the most difficult applications for inverter and vector duty per NEMA MG 1-2006 Section 31.4.4.2 voltage spikes. Our motors are internationally accepted, conforming to North American NEMA MG 1 and international IEC electrical specifications. High performance options include brakes, encoders, and forced cooling fans.



NORD DRIVESYSTEMS

Conveyor Drives Ordering Guide

	Gear Unit		Motor/Input		Motor Options
SK	❶	-	❷		❸

❶

Gear Unit
SK 9055
SK 9155
SK 9155/32
SK 9155/42

❸

Motor Options	
F & FC - Blower Cooling Fan	**OL -** Non Ventilated TENV W/Out Fan
RD - Drip Cover Canopy	**OLH -** Non Ventilated TENV W/Out Fan & Cover
RDD - Double Drip Cover Canopy	**WE* -** Motor Second Shaft Extension
KD - Condensation Drain Holes	**Z -** High Inertia Motor Fan
KB - Condensation Drain Holes Plugged	**IG -** Incremental Encoderr
IP66 - IP66 Motor Enclosure	**TW -** Thermostat
KKV - Potted Terminal Box	**TF -** Thermistor
MS - Quick Power Disconnect, Harting Plug	**SH -** Anti-Condensation Space Heaters
BRE - Brakemotor	

* Special WE shaft extensions available upon request.

❷

Input Shaft	NEMA Adapter	IEC Adapter	Integral Motors	Integral Energy Efficent Motors	Integral Premium Efficent Motors
W	**N56C**	**IEC 63**	**63S/4** - 0.16hp	**80LH/4** - 1hp	**80LP/4** - 1hp
	N140TC	**IEC 71**	**63L/4** - 0.25hp	**90SH/4** - 1.5hp	**90SP/4** - 1.5hp
	N180TC	**IEC 80**	**71S/4** - 0.33hp	**90LH/4** - 2hp	**90LP/4** - 2hp
	N210TC	**IEC 90**	**71L/4** - 0.50hp	**100LH/4** - 3hp	**100LP/4** - 3hp
	N250TC	**IEC 100**	**80S/4** - 0.75hp	**112MH/4** - 5hp	**112MP/4** - 5hp
	N280TC	**IEC 112**	**80L/4** - 1hp	**132SH/4** - 7.5hp	**132SP/4** - 7.5hp
	N320TC	**IEC 132**	**90S/4** - 1.5hp	**132MH/4** - 10hp	**132MP/4** - 10hp
	N360TC	**IEC160**	**90L/4** - 2hp	**160MH/4** - 15hp	**160MP/4** - 15hp
		IEC180	**100L/4** - 3hp	**160LH/4** - 20hp	**160LP/4** - 20hp
		IEC200	**100LA/4** - 5hp	**180MH/4** - 25hp	**180MP/4** - 25hp
		IEC225	**112M/4** - 5.4hp	**180LH/4** - 30hp	**180LP/4** - 30hp
			132S/4 - 7.5hp	**200LH/4** - 40hp	**225RP/4** - 40hp
			132M/4 - 10hp	**225SH/4** - 50hp	**225SP/4** - 50hp
			160M/4 - 15hp	**225MH/4** - 60hp	**225MP/4** - 60hp
			160L/4 - 20hp		
			180MX/4 - 25hp		
			180LX/4 - 30hp		
			200L/4 - 40hp		
			225S/4 - 50hp		
			225M/4 - 60hp		
			Other Speeds Available	Other Speeds Available	Other Speeds Available

Product Specifications

Flange Options

SK9055	SK9155
❍ **Standard - (p/n 168414170)** 3x Thru holes + one side entry threaded hole	❍ **Standard - (p/n 168614060)** 3x Thru holes + one side entry threaded hole
❍ **Alternate - Drop in (p/n 168414180)** 4x threaded holes	❍ **Alternate - Drop in (p/n 168614070)** 4x threaded holes

Ratio

_____ :1

see pages 20 - 28

OR

Output Speed

_____ rpm

see pages 30 - 31

Mounting Position

- ❍ M1
- ❍ M2
- ❍ M3
- ❍ M4
- ❍ M5
- ❍ M6

Paint

- ❍ Standard Stainless Steel Paint
- ❍ NSD+ (gray)
- ❍ NSD+W (white)
- ❍ NSD-X3 (gray)
- ❍ NSD-X3W (white)
- ❍ Casting Primed
- ❍ Special _____

Lubricant

- ❍ Standard
- ❍ Synthetic
- ❍ Food Grade
- ❍ Other _____

Motor Order Form

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	Frame	Size	Poles	Motor Options	Brake Size	Brake Options
SK						

Frame	Size	Poles
63	S	4
71	SH	
80	SP	Other
90	M	Speeds
100	MH	Upon
112	MX	Request
132	MP	
160	L	
180	LA	
200	LH	
225	LX	
	LP	

Paint

- ❍ **Unpainted Aluminum**
- ❍ **Stainless Steel Paint**
- ❍ **NSD+ (gray)**
- ❍ **NSD+W (white)**
- ❍ **NSD-X3 (gray)**
- ❍ **NSD-X3W (white)**
- ❍ **Special** _____

Electrical Motor Options

- ❒ **H** - Energy Efficient Motor
- ❒ **TW** - Thermostat
- ❒ **TF** - Thermistor
- ❒ **SH** - Space Heater (select voltage)
  - ❍ 110 Volt ❍ 230 Volt ❍ 460 Volt
- ❒ **ISO H** - Class H insulation
- ❒ **WU -** High Resistance Rotor
- ❒ **4-2** - 2-Speed, 4/2 Pole, 1800/3600rpm
- ❒ **8-2** - 2-Speed, 8/2 Pole, 900/3600rpm
- ❒ **ECR** - Single Phase Motor

Environmental Options

- ❒ **NSD+** - Nord Severe Duty Paint
- ❒ **NSDx3** - Nord Extreme Duty Paint
- ❒ **RD** - Canopy Drip Cover
- ❒ **RDD** - Double Fan Cover
- ❒ **KB** - Condensation Drain Holes (plugged)
- ❒ **KBO** - Condensation Drain Holes (open)
- ❒ **IP66** - IP66 Enclosure Protection
- ❒ **KKV** - Terminal Box Sealed with Resin
- ❒ **AICM** - Additional Insulation
- ❒ **EP** - Epoxy Dipped Windings

Frequency Inverter Related Options

- ❒ **F** - Blower Fan (200-575V 1 & 3 Phase)
- ❒ **FC -** Blower Cooling Fan (115V, 1 Phase)
- ❒ **IG__** - Incremental Encoder
- ❒ **IG__P** - Incremental Encoder with Plug
- ❒ **AG** - Absolute Encoder

Additional Motor Options

- ❒ **OL -** Totally Enclosed Non-Ventilated (TENV)
- ❒ **OL/H -** (TENV) Without Fan Cover
- ❒ **WE -** Second Shaft Extension (Fan Side)*
- ❒ **HR -** Hand Wheel
- ❒ **Z -** High Inertia Cast Iron Fan
- ❒ **RLS -** Motor Backstop (rotation viewing fan)
  - ❍ Clockwise ❍ Counter-Clockwise
- ❒ **EKK -** Small Terminal Box (not UL approved)
- ❒ **MS -** Quick Power Plug Connector

* Special WE shaft extensions available upon request

Brake Size
BRE 5
BRE 10
BRE 20
BRE 40
BRE 60
BRE 100
BRE 150
BRE 250
BRE 400
BRE 800

Brake Options

- ❒ **HL** - Hand Release Lever
- ❒ **FHL** - Locking Hand Release Lever
- ❒ **HLH** - Hand Release Lever with Hole
- ❒ **RG** - Corrosion Protected Brake
- ❒ **SR** - Dust and Corrosion Protected Brake
- ❒ **ADJ_____Nm** - Adjust Brake Torque
- ❒ **BIP66** - IP66 Brake Enclosure
- ❒ **MIK** - Micro-switch
- ❒ **BSH** - Brake Heating/Bifilar Coil
- ❒ **NRB1** - Quiet Brake Release
- ❒ **NRB2** - Quiet Brake Motor Operation
- ❒ **FBR** - Brass Foil
- ❒ **DBR -** Double Brake
- ❒ **G...P -** High Performance Rectifier
- ❒ **G...V** - Sealed Rectifier
- ❒ **IR** - Current Sensing Relay

Rectifier Selection

Rectifier Wiring

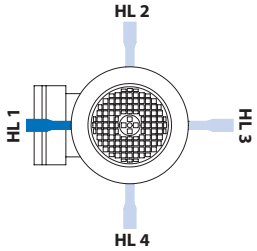
- ❍ Across the line (from motor terminal box)
- ❍ Separate power source (frequency inverter, soft starter)

Brake Supply Voltage

- ❍ 24 VDC
- ❍ 115 VAC
- ❍ 200 VAC
- ❍ 230 VAC
- ❍ 400 VAC
- ❍ 460 VAC
- ❍ 500 VAC
- ❍ 575 VAC
- ❍ Other _____

Hand Release Position

- ❍ HL1
- ❍ HL2
- ❍ HL3
- ❍ HL4



Mounting

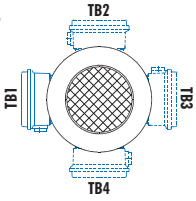
- ❍ Integral to gearbox
- ❍ NEMA C-Face
- ❍ IEC B5 Mount

Voltage & Frequency

- ❍ 230/460V-60Hz
- ❍ 575V-60Hz
- ❍ 208V-60Hz
- ❍ 400V-50Hz
- ❍ 115/230V, 60Hz-1-ph.
- ❍ Other

Terminal Box Pos.

- ❍ TB1
- ❍ TB2
- ❍ TB3
- ❍ TB4

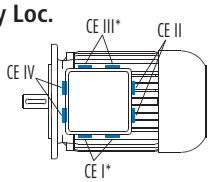


Mtg. Pos. M1 Shown

Conduit Entry Loc.

- ❍ CE I *
- ❍ CE II
- ❍ CE III *
- ❍ CE IV

* Brakemotor



Mtg. Pos. M1 Shown

Gearbox Selection

A number of factors are considered when selecting a gear unit, including gearbox rating, service factor, speed and speed variation, horsepower, thermal capacity, ratio, physical size, ambient conditions and cost. Below are some guideline steps to help aid in the gear unit selection.

1. Determine the speed and/or gear ratio.
2. Determine the required power or torque for the application.
3. Determine the service factor.
4. Select the gearbox type and desired input option.
5. Verify the mounting position.
6. Selection verification - check the overhung load, & thrust load capacity, NEMA motor weight, thermal considerations, & other application considerations.

1. Output Speed and Gear Ratio

The first step in selecting a gear unit is determining the final output speed or speeds you need. This speed is normally described in revolutions per minute (rpm). This output speed or speeds is determined by the input speed to the gear unit divided by its gear ratio. Their relationship is described by the following formulas.

$$\text{i (gear ratio)} = \frac{\text{input speed [rpm]}}{\text{Output speed [rpm]}}$$

$$\text{Output speed [rpm]} = \frac{\text{input speed [rpm]}}{\text{i (gear ratio)}}$$

To specify a gear unit, you can identify either gear ratio needed or the output speed (rpm) if the input speed is known.

2. Power and Torque

The second step for selecting a gear unit is to determine the required power or torque needed to power the load. Torque in this catalog is normally expressed in pound-inches [lb-in].

For a proper selection you must ensure that the motor or other prime mover can produce enough torque or power and that the gear unit has adequate torque or power capacity.

3. Service Factor

Service factor must also be considered when selecting the appropriate gear unit. A service factor is essentially the ratio of extra capacity in a gear unit compared to the power or torque that is needed for the application.

Service factor helps to assure adequate service life in operation, while considering:

- ✔ Hours per day operation.
- ✔ Typical operating cycle or duty cycle.
- ✔ Starting and stopping frequency.
- ✔ Whether or not there are high gear load conditions resulting from the acceleration or deceleration of a large moving mass (high inertia loads).
- ✔ Frequent load reversals.
- ✔ Shock loads resulting in regular load spikes.

For the purpose of selecting an appropriate service factor, please consider the following possible options or consult NORD for assistance:

- Apply the minimum service factor that is specified by the equipment builder or end user.
- Apply the AGMA Service Factor per Table 1

Table 1 - AGMA Service Factors

Conveyors - General Purpose Includes: Overhead Trolly, etc.	Service Per Day		
	≤ 3 hrs	3-10 hrs	≥ 10 hrs
Uniformly Loaded or Fed	1.00	1.00	1.25
Heavy Duty - Not Uniformly Loaded or Fed	1.00	1.25	1.50
Severe Duty - Reciprocating or Shaker	1.25	1.50	1.75

Consult factory for any applications not listed above, all engine driven applications or applications involving the transportation of people.

4. Gearbox Type and Input Options

The NORD SK 9055 & SK 9155 Conveyor Drive reducers are designed to be output flange mounted.

NORD's modular design also allows for a number of different input options to be added to SK 9055 and SK 9155 Conveyor Drive reducers, including:

- Integral motor or integral brakemotor.
- NEMA-C Adapter (or IEC adapter upon request).
- Optional NORD NEMA C-face motor.
- Solid input shaft.

5. Mounting Position

The reducer mounting position determines the approximate oil fill-level and the appropriate vent location and in some cases mounting position may dictate some variation in final reducer assembly It is important to determine the proper mounting position prior to ordering. Mounting position and oil plug locations are shown in the lubrication section, on pages 14-15.

6. Selection Verification

Verify the final unit selection by checking the following:

- ✔ The shaft overhung load and thrust load capacity compared to estimated load conditions.
- ✔ The NEMA adapter capacity & acceptable motor weight.
- ✔ Whether or not there are special application considerations.
- ✔ Thermal capacity of the gear unit.

Selection Verification

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Radial Overhung Load (OHL) Condition

A radial overhung load force (FOHL) exists when a resultant force is applied to the reducer shaft, by transferring power at a right angle, through an externally mounted power transmission device, such as a belt pulley, chain sprocket, or gear.

Applying the formula shown below to calculate the applied overhung load at the reducer output shaft and check the results against the values shown in Table 3.

Output Shaft Overhung Load Calculation

$$F_{OHL} = \frac{2 \times T_2}{d_{OHL}}$$

F_{OHL} = Calculated output shaft overhung load [lb]
T_2 = Output shaft load torque [lb-in]
n_2 = Output shaft speed [rpm]
P = Load power [Hp]
d_{OHL} = Pitch diameter of power transmission component [in]
f_z = Power transmission factor

Table 2 – Power Transmission Factors 'fz'

Transmission Component	Factor fz	Notes
Gear	1.00	17 teeth or less
Gear	1.15	18 teeth or more
Chain sprocket	1.40	13 teeth or less
Chain sprocket	1.20	13 to 20 teeth
Chain sprocket	1.00	20 teeth or more
Timing/toothed belt pulley	1.50	-
V-belt pulley	1.70	-
Flat belt pulley	2.50	-

Output Shaft OHL Rating

The NORD Conveyor Drives have an output shaft overhung load rating that exceeds the typical capacity of many industry-standard overhead conveyor drives.

Table 3 –Output Shaft Overhung Load Rating

Type	Distance from shaft shoulder [in]	Output Shaft OHL Rating [lb]
SK 9055	5.0	6,000
	7.5	4,200
SK 9155	5.0	16,000
	9.0	10,000

Overhung Load Ratings shown in Table 3 are based upon a combination of the most unfavorable conditions of shaft rotation-direction, speed, load torque, and direction of applied overhung load, while assuming all thrust loads are negligible.

Thrust Load

Loads that are directed towards or away from the gearbox, along the axis of the shaft, are called thrust or axial loads. On the typical SK 9055 or SK 9155 conveyor drive application, the hanging weight of the externally mounted power transmission device (sprocket, pulley, etc.) is the most common source of an output shaft thrust load

Output Shaft Thrust Load Rating

NORD overhead conveyor drive gear units have higher thrust load ratings than industry-standard conveyor drives. The thrust ratings shown in Table 4 represent the worst case and are independent of direction, while assuming the applied overhung load condition is absent or negligible.

Table 4 – Output Shaft Thrust Capacity

Type	Output Shaft Thrust Rating [lb]
SK9055	3,000
SK9155	6,000

Often thrust loads are very small on conveyor drive applications and since very small thrust loads have a negligible impact on reducer bearing life, the equipment builder may choose to ignore this condition.

IMPORTANT NOTE

Please consult NORD if a combined overhung load & a significant thrust load are applied simultaneously.

Input Shaft Load Conditions

Most SK 9055 or SK 9155 conveyor drives are supplied with a motor that is mounted directly either as and integral gearmotor or with a C-face adapter and a direct-coupled NEMA C-face motor. In these instances, input shaft overhung load and thrust load conditions do not exist and can therefore be ignored.

On occasion the customer may decide to use a solid input shaft and use a belt drive to connect the motor. In these instances separate evaluation of the input shaft and bearing loads is recommended.

IMPORTANT NOTE

Please consult NORD if using a solid input shaft with a belt or sprocket drive so that input shaft load conditions and bearing life can be evaluated.

NEMA C-Face Adapter Capacity

The maximum input power of a gear unit with a NEMA C-face adapter is generally limited by the power rating of the standard NEMA C-face motor size. The power limit of the NEMA C-Face adapter is indicated in the reducer rating tables for a standard 4-pole/1750 rpm motor.

In some cases, the rating of the assembled gearbox will be limited by the input power or torque limit shown in the reducer ratings tables, instead of by the NEMA C-Face adapter capacity. In verifying the final gear unit selection, the NEMA adapter limits and the gearbox limits must always be considered.

IMPORTANT NOTE

Please contact NORD if…

- The speed or load conditions required exceed those included in reducer ratings tables.
- The NEMA adapter is being used for mounting a device other than an AC induction motor.

NEMA C-face Motor Weight Limits

When mounting a motor to a NORD NEMA C-face motor adapter it is important to consider the motor's weight. Following is a table that includes the maximum motor weight the NEMA adapter can support.

NEMA Weights

Motor FRAME	56C	143TC	145TC	182TC	184TC
MAX Weight [lb]	66	88	110	130	175
MOTOR FRAME	**210TC**	**250TC**	**280TC**	**324TC**	**326TC**
Max Weight [lb]	220	440	550	770	1100
Motor FRAME	**365TC**				
Max Weight [lb]	1540				

If the motor exceeds the listed weight it must be externally supported in order to remove the load stress from the NORD C-face adapter. When a C-face mounted motor is externally supported care must be taken to ensure that the support system does not impose additional pre-loads on the NEMA motor adapter.

WARNING

Applications with risk of personal injury should be reviewed together with NORD. Examples of these are hoists, lifts or other applications where people may be at risk.

Special Conditions

If special environmental or other conditions exist in transit, storage or operation these need to be considered in the unit selection. Please contact NORD for assistance. Special conditions may include (but are not limited to):

- Exposure to aggressive corrosive materials (contaminated air, gasses, acids, bases, salts, etc.).
- Exposure to very high relative humidity (installed outside, in damp rooms, or used in tropical environments).
- Direct contact between the motor and liquid.
- Material build-up on the gear unit or motor (dirt, dust, sand, etc.).
- High atmospheric pressure.
- Radiation exposure.
- Extreme high or low temperatures or large temperature fluctuations.
- High vibration, rapid accelerations or decelerations, shock or impact loads.
- Other abnormal conditions.

Storage

Prior to installation, storage for up to 9 months is possible, so long as the following conditions are observed:

- Store the gear unit in its actual mounting position in accordance with the specified oil fill-level, in a clean and dry temperature controlled area. Avoid temperature fluctuations within the range of 0°C to 40°C (32°F to 104°F) and avoid relative humidity conditions in excess of 60%.
- Protect all exposed or unpainted shaft and flange surfaces with an anti-corrosion agent or grease.
- Store in a location free from shock and vibration, to avoid damage to the bearing elements and raceways.
- Whenever possible, rotate the shafts periodically, by hand if necessary, to help prevent brinelling of the bearings and to help keep the shaft seals pliable.
- Avoid direct exposure to the sun or UV light and aggressive or corrosive materials in the environment (ozone, gases, solvents, acids, caustic solutions, salts, radioactivity, etc.

IMPORTANT NOTE

For storage periods longer than 9 months, or for storage in less than desirable conditions, please consult NORD for recommendations.

Selection Verification

DRIVESYSTEMS

Gear Reducer Ratings

The permissible continuous power limit of gear reducers is limited by both the mechanical rating and the thermal rating. The mechanical rating depends upon the material strength of the gear reducer's gears, bearings, housing, shafts, etc. The mechanical input power limit to the reducer is also a function of the mechanical power rating divided by the relevant reducer service factor.

Reducer Thermal Capacity

The thermal capacity or thermal limit of the gear unit depends upon the amount of heat generated within the reducer and is influenced by a variety of factors including:

- Churning or splashing losses in the lubricant, which depend upon reducer type, ratio, input style, mounting position or oil fill-level, and the circumferential travel velocities of the gear wheels.
- The actual speed and load conditions. These factors determine load-dependent losses in the gear areas and frictional losses in the gear, bearing and seal areas.
- Ambient Conditions:
  - Ambient Temperature.
  - Amount of free air circulation around the drive.
  - Possible near-by heat sources.
  - Heat dissipation or the ability of the reducer to transfer heat through the housing, shafts, and the mating sub-structure or mounting surface.

Observing the Reducer's Thermal Limit

Through computer program analysis NORD can evaluate application conditions and the impact they have on a reducer's thermal capacity.

When to Contact NORD

When applying the SK9055 or SK9155 Conveyor Drive Units, consult NORD if any two or more of the following conditions apply:

- Gear ratio, $i_{total} \leq 48{:}1$
- Input power, $P_1 \geq 60$ hp (45 kw).
- Input speed, $n_1 > 1800$.
- Vertical motor position (mounting position M2 or M4).
- Input configuration: NEMA C-face adapter or solid-shaft input.
- Elevated ambient temperature ≥ 86° F (30 °C).

Maximum Oil Sump Temperature Limit

To prevent reducer overheating, the reducer's maximum oil sump temperature limit must not be exceeded for prolonged periods of operation (up to 3 hours continuous operation, depending upon reducer size).

Oil Type	Maximum Oil Temperature Limit	
	NORD	AGMA 9005-D94
Mineral	80-85°C (176-185°F)	95°C (203°F)
Synthetic	105°C (220°F)	107°C (225°F)

Dangers of Reducer Overheating

The following problems may result when the reducer's thermal capacity or maximum oil sump temperatures are exceeded:

- Lubrication oxidation, breakdown & deterioration.
- A decrease in lubrication viscosity & film thickness.
- Loss of critical bearing and gear clearances required for proper lubrication.
- Increased contact pressures & increased operating temperatures in the critical load zones of the gearing and bearings.
- An increased possibility for metal-to-metal contact and premature component wear. A significant reduction in the lubricant's ability to prevent scuffing, pitting, and in extreme cases galling or welding.

IMPORTANT NOTE

Use caution when specifying gear reducers for high temperature service. If there is concern about exceeding the allowable safe operating temperatures, please consult NORD to discuss alternatives

Measures to Expand the Application Range

There are a variety of measures that may be taken in order to protect against thermal overload and expand the application range of the gear reducer. Common examples include the following:

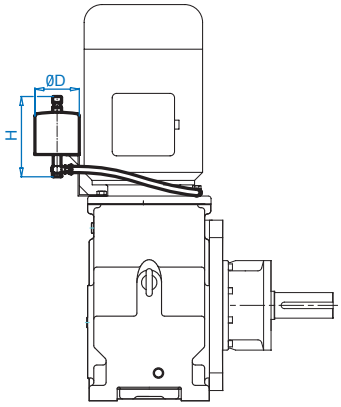
- Recommending a change in lubrication viscosity and/or a specific synthetic lubricant type.
- Applying high-temperature seals.
- Increasing air flow around the gear unit.
- Shielding or protect the reducer from high heat sources.
- Consider an integral motor instead of the bolt-on input adapter. In many cases the motor fan will substantially increase air-flow around the gear unit.

Vertical Mounting and the Oil Expansion Chamber

Vertical Mounting Position for Gear Units & Gear Motors

For observing the reducers thermal limit rating – see the previous page. For motors which are mounted vertically upwards (Mounting position M4) and ratios < 24, we highly recommend oil expansion chambers in order to avoid leakage through the vent plug.

Oil Expansion Chamber (OA)



Gear Unit	Size	Part Number	D	H	[lb]
SK 9055 SK 9155/42	I	28390390	3.94	7.09	11.0
SK 9155	II	28390400	5.91	11.81	13.2

Oil Expansion Chamber (OA)

Gear units with the motor or input shaft mounted vertically upright must be filled almost completely with oil in order to properly supply the 1st stage gearing with oil. Certain operating conditions and higher gear peripheral speeds can result in increased oil churning or splashing losses and heating of the air space located above the oil.

For these conditions an oil expansion chamber or oil overflow chamber is often recommended. At rest, the gear unit is filled to its normal fill-level position and there should be no oil in the expansion chamber.

During operation, the oil expansion chamber provides a safe overflow area for the expanded oil-air mixture, thus eliminating excessive pressure build-up, minimizing the formation of foam, and preventing oil-loss through the breather, oil seals, gaskets, etc. As heat is released from the expanded air-oil mixture contained within the overflow chamber, gravity allows the oil to be returned to the primary gear sump supply, eliminating a critical loss in oil level.

Application Considerations

Nord strongly recommends the use of an oil expansion chamber when the motor is mounted vertical-up or when the reducer mounting position is M4. Any application required to operate above 1800 rpm synchronous motor speeds should also be reviewed to be certain that the reducer thermal limits are observed.

Mounting Positions

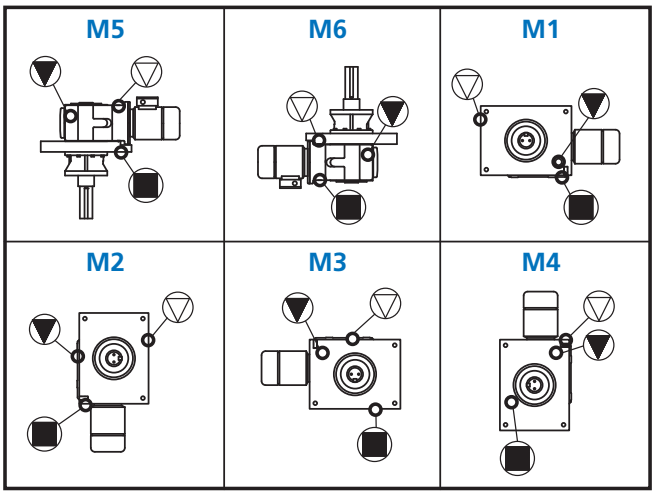
DRIVESYSTEMS

Mounting Position and Oil Plug Locations

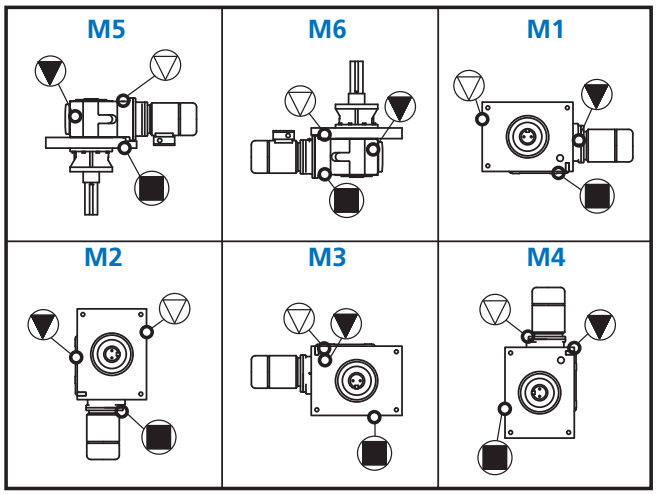
The NORD SK 9055 and SK 9155 Conveyor Drive reducers are designed to be output flange mounted. The following charts detail the six basic mounting positions for the SK 9055 and SK 9155 gear units. The standard or most typical mounting position is M5.

All SK 9055 and SK 9155 NORD gear reducers are shipped from the factory with a pre-determined oil fill level in accordance to the specified reducer size and mounting position. The mounting position also determines the position of the oil drain, oil fill and oil vent locations on the gear unit. SK 9155/42 and SK 9155/32 compound gear unit assemblies have separate oil sump areas.

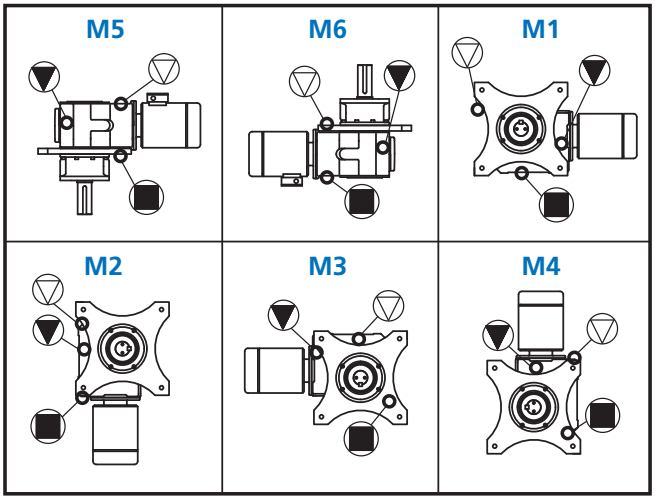
SK 9055 (3 Stage)



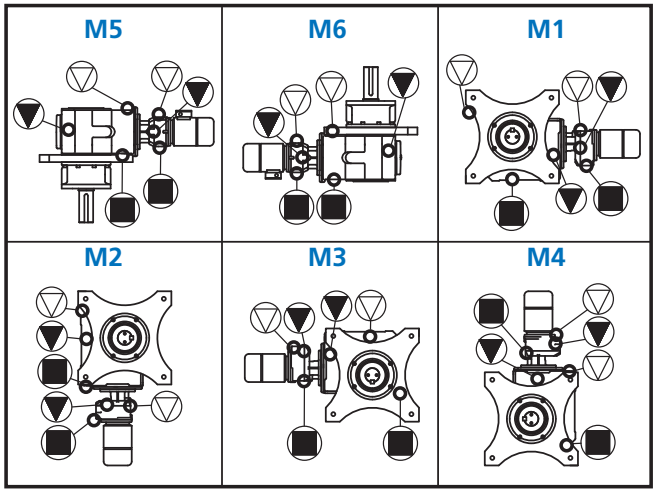
SK 9055 (4 Stage)



SK 9155



SK 9155/42



For mounting position other than shown, please consult NORD Gear.

▽ = Vent

▼ = Oil Level

■ = Oil Drain

Oil Fill Quantities

All SK 9055 and SK 9155 NORD gear reducers are shipped from the factory with a pre-determined oil fill level in accordance to the specified reducer size and mounting position.

Type	Stages	Ratio Range	M1		M2		M3		M4		M5		M6	
			Quarts	Liters	Quarts	Liters	Quarts	Liters	Quarts	Liters	Quarts	Liters	Quarts	Liters
SK 9055	3	8.83 - 329.69:1	3.80	3.60	10.25	9.70	12.05	11.40	12.15	11.50	6.87	6.50	8.66	8.20
SK 9055	4	172.08 - 4246.38:1	6.02	5.70	10.78	10.20	15.53	14.70	15.53	14.70	6.97	6.60	10.14	9.60
SK 9155	3	9.16 - 245.76:1 ❶	12.68	12.00	29.06	27.50	24.87	33.00	40.68	38.50	20.08	19.00	27.47	26.00
SK 9155/32	5	311.10 - 3251.68:1 ❶	12.68	21.00	29.06	27.50	24.87	33.00	40.68	38.50	20.08	19.00	27.47	26.00
		❷	1.37	1.30	3.07	2.90	3.49	3.30	3.28	3.10	2.54	2.40	2.54	2.40
SK 9155/42	5	134.14 - 269.39:1 ❶	12.68	12.00	29.06	27.50	34.87	33.00	40.68	38.50	20.08	19.00	27.47	26.00
		❸	1.90	1.80	4.65	4.40	4.76	4.50	4.23	4.00	3.91	3.70	3.91	3.70

❶ SK 9155 oil level ❷ SK 32 oil level ❸ SK 42 oil level

Service Guidelines for the Extended Bearing Flange

The spherical roller bearing on the extended bearing housing should be re-greased with 0.75 to 1.0 ounces (20-25 grams) of grease after every 2,500 hours of service or at least every 6 months. Prior to re-greasing the screw plug located opposite to the grease nipple should be unscrewed. After re-greasing the screw plug must be reinstalled and tightened. The extended bearing is factory assembled with the proper amount and type of grease. The type of grease supplied depends upon the type of oil specified at time of order.

Bearing Grease Options

Reducer Oil Type	Grease Type	Thickener Type	NLGI Grade	Ambient Temperature Range	Manufacture Brand / Type
Mineral	Standard	Li-Complex	NLGI 2	-30 to 60 °C (-22 to 140 °F)	Mobil Grease XHP222
Synthetic	High-Temperature	Polyurea	NLGI 2	-25 to 80 °C (-13 to 176 °F)	Mobil / Polyrex EP 2
Food-Grade	Food-Grade	Al-Complex	NLGI 2	-25 to 40 °C (-13 to 104 °F)	Mobil / FM222

HARMFUL SITUATION

Grease compatibility depends upon the type of thickener or soap complex used, the base oil type suspended within the thickener, and the type of additives used. The user should check with the lubrication supplier before making substitutions in brand and type in order to assure compatibility and to avoid causing possible damage to the extended bearing.

Lubrication

Factory Oil Filled

All SK 9055 and SK 9155 Conveyor Drive reducers are shipped from the factory with a pre-determined oil fill level in accordance to the specified mounting position.

Oil filling before shipment prevents damage from dry start-ups and helps assure that the proper lubrication is used. Proper gearbox lubrication is essential in order to reduce friction, heat, and component wear. Lubricants also help prevent corrosion and oxidation, minimize foam, improve heat transfer, optimize reducer efficiency, absorb shock loads and reduce noise.

Mounting Position

The reducer mounting position determines the approximate oil fill-level and the appropriate vent location. In some cases mounting position may dictate possible variation in final reducer assembly so it is important to determine the proper mounting position prior to ordering.

Oil Fill Quantities

Oil fill quantities shown in the catalog or maintenance instructions are approximate amounts. The actual oil volume varies depending upon the gear ratio. Prior to commissioning the reducer, the oil-fill level should be checked using the reducer's oil-level plug. It may be necessary to drain excess oil or add additional oil.

Ventilation

The SK 9055 and SK 9155 gear reducers are commonly equipped with a spring-pressure vent (Autovent™) which helps compensate for air pressure differences between the inner space of the gear unit and the atmosphere. Normally open vents may also be supplied as an option; normally-open vents are closed upon delivery in order to prevent oil leakage during transport. When normally open vents are supplied, the sealing plugs must be removed prior to commissioning the reducer.

Lubrication Replacement

If the gear unit is filled with mineral oil, the lubricant should be replaced at least after every 10,000 operating hours or after every two years. If the gear unit is filled with synthetic oil, the lubricant should be replaced at least after every 20,000 operating hours or after every four years. Often gear reducers are exposed to extreme ambient conditions, hostile environments, wet conditions, or dirty and dusty operating areas. Especially in these situations, it is important to establish a condition-based oil service interval.

The Importance of Routine Oil Analysis

Routine oil analysis, sound lubrication practices, and good tracking of oil performance trends will help establish proper lubrication maintenance and change-out intervals. To maximize equipment reliability NORD Gear recommends a condition-based lubrication maintenance program be applied to the SK 9055 and SK 9155 Conveyer Drives.

NORD suggests replacing the gear oil if oil analysis indicates any of the following:

- Viscosity has changed by approximately 10% or more.
- Debris particles (silicon, dust, dirt or sand) exceed 25 ppm.
- Iron content exceeds 150-200 ppm.
- Water content is greater than 0.05% (500 ppm).
- The total acid number (TAN) tests indicate a significant level of oxidative break-down of the oil, and a critical reduction in performance; If the TAN number measured changes by more than 5% over the new oil, then an oil change would be recommended.

Maximum Oil Sump Temperature Limit

To prevent reducer overheating, the reducer's maximum oil sump temperature limit must not be exceeded for prolonged periods of operation (up to 3 hours continuous operation, depending upon reducer size).

Oil Type	Maximum Oil Temperature Limit	
	NORD	AGMA 9005-D94
Mineral	80-85°C (176-185°F)	95°C (203°F)
Synthetic	105°C (220°F)	107°C (225°F)

IMPORTANT NOTE

Use caution when specifying gear reducers for high temperature service. If there is concern about exceeding the allowable safe operating temperatures, please consult NORD to discuss alternatives

Lubrication Types

Proper gearbox lubrication is essential in order to reduce friction, heat, and component wear. Lubricants reduce heat and wear by inserting a protective "fluid boundary" between mating parts & preventing direct metal to metal contact. Lubricants also help prevent corrosion and oxidation, minimize foam, improve heat transfer, optimize reducer efficiency, absorb shock loads and reduce noise.

Mounting position not only determines the proper fill-level but may also have some effect on final reducer assembly. If considering any mounting positions that are not shown as catalog-standard options, it is critical that the customer consult with NORD prior to ordering. Unless otherwise specified, NORD supplies all SK 9055 and SK 9155 Conveyer Drive gear units factory-filled with the standard mineral oil lubrication.

Standard Oil Lubricants

Gear Unit Type	ISO Viscosity	Oil Type	Ambient Temperature Range	Manufacturer Brand/Type	Notes
Conveyor Drives	VG220	MIN-EP	0 to 40°C (32 to 104°)	Mobilgear 600XP220	♦❶
	VG220	PAO-EP	-35 to 60°C (-31 to 140°F)	Mobil SHC Gear 220	♦
	VG220	FG	-5 to 40°C (23 to 104°F)	Fuchs FM220	♦

Optional Oil Lubricants

Gear Unit Type	ISO Viscosity	Oil Type	Ambient Temperature Range	Manufacturer Brand/Type	Notes
Conveyor Drives	VG460	PAO-EP	-35 to 80°C (-31 to 176°F)	Mobil SHC Gear 460	-
	VG460	FG-PAO	-35 to 80°C (-31 to 176°F)	Mobil SHC Cibus 460	-
	VG220	FG-PAO	-35 to 60°C (-31 to 140°F)	Mobil SHC Cibus 220	-
	VG150	PAO-EP	-35 to 25°C (-31 to 77°F)	Mobil SHC Gear 150	-

Standard Bearing Grease Lubricants

Grease Thickener	NLGI Grade	Grease Type	Ambient Temperature Range	Manufacturer Brand/Type	Notes
Li-Complex	NLGI 2	MIN	-30 to 60°C (-22 to 140°F)	Mobil Grease XHP222	♦❶
Li-Complex	NLGI 2	PAO	-40 to 80°C (-40 to 176°F)	Mobil / Mobilith SHC 220	♦
Polyurea	NLGI 2	FG-PAO	-30 to 80°C (-22 to 176°F)	Mobil SHC Polyrex 222	♦

♦ Stocked Lubricants

❶ Standard product on serviceable gear units

IMPORTANT NOTES

- Food grade lubricants must be in compliance with FDA 212 CFR 178.3570 and qualify as a NSF-H1 lubricant. Please consult with lubrication manufacturer for more information.
- When making a lubrication change, check with the lubrication supplier to assure compatibility and to obtain recommended cleaning or flushing procedures.
- Do not to mix different oils with different additive packages or different base oil formulation types. Polyglycol(PG) oils are not miscible with other oil types and should never be mixed with mineral oil.
- Consult NORD if considering oils of ISO Viscosity VG100 or lower.

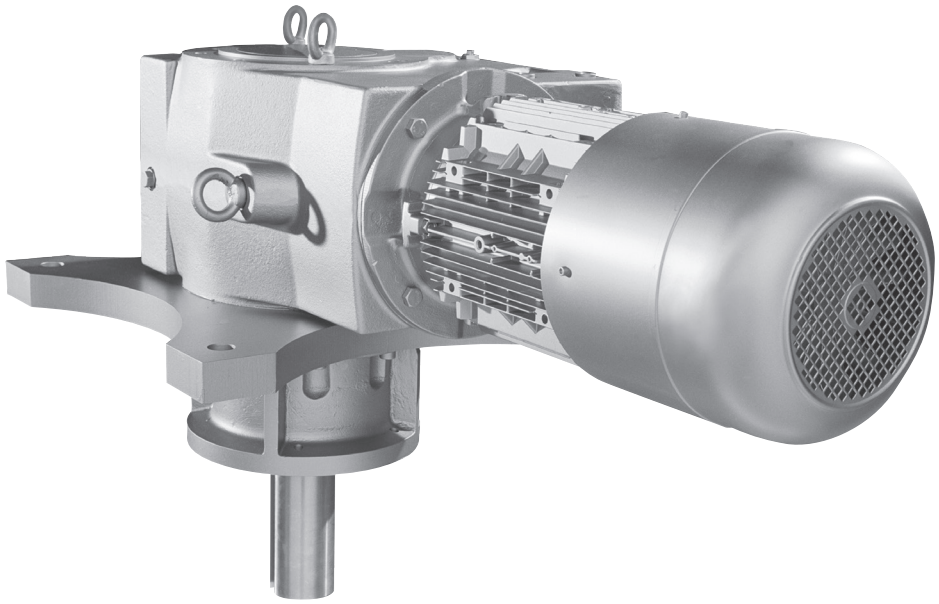
Oil Formulation Codes

MIN-EP	Mineral Oil with EP Additive
PAO	Synthetic Polyalphaolefin Oil
PAO-EP	Synthetic Polyalphaolefin Oil with EP Additive
FG	Food-Grade Oil
FG-PAO	Food-Grade, Synthetic Polyalphaolefin Oil

Notes

Gearmotor Selection

- 0.33 hp
- 0.5 hp
- 0.75 hp
- 1 hp
- 1.5 hp
- 2 hp
- 3 hp
- 5 hp
- 7.5 hp
- 10 hp
- 15 hp
- 20 hp
- 30 hp
- 40 hp
- 50 hp
- 60 hp



NORD® DRIVESYSTEMS

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Motor Power P_n [hp]	Output Speed n_2 [rpm]	Output Torque T_a [lb-in]	Service Factor f_B	AGMA Class	Gear Ratio i_{tot}
0.50	108	93	8.0	III	15.76
	91	110	6.7	III	18.60
	83	121	6.2	III	20.37
	76	133	6.1	III	22.42
	69	147	5.5	III	24.80
	62	164	5.0	III	27.62
	55	184	4.4	III	31.00
	49	205	3.7	III	34.52
	44	230	3.3	III	38.75
	41	245	3.1	III	41.36
	37	275	2.7	III	46.43
	31	321	2.3	III	54.03
	27	370	1.5	II	62.36
	24	415	1.5	II	70.00
	21	483	1.5	II	81.45

SK 9055
0.33 hp - 1.5 hp
Gearmotors

DRIVESYSTEMS

GEARMOTORS

Motor Power P_n [hp]	Output Speed n_2 [rpm]	Output Torque T_2 [lb-in]	Service Factor f_B	AGMA Class	Gear Ratio i_{tot}	Stages	Model Type	Weight [lb]	Dim. Page
0.33	3.0	7019	3.50	III	568.04	4	**SK 9055 - 71S/4**	707	37
	2.7	7972	3.10	III	645.18	4			
	1.9	10893	2.30	III	881.60	4			
	1.5	13756	1.80	II	1113.24	4			
	1.1	18747	1.30	I	1517.17	4			
	0.8	26299	0.90	*	2128.35	4			
0.50	10	3129	7.20	III	172.08	4	**SK 9055 - 71L/4**	708	37
	8.4	3716	6.70	III	204.38	4			
	6.2	5083	4.90	III	279.60	4			
	4.9	6376	3.90	III	350.72	4			
	3.0	10328	2.40	III	568.04	4			
	2.7	11730	2.10	III	645.18	4			
	2.0	16028	1.50	II	881.60	4			
	1.5	20240	1.20	I	1113.24	4			
	1.1	27584	0.90	*	1517.17	4			
0.75	9.9	4763	4.70	III	172.08	4	**SK 9055 - 80S/4**	712	37
	8.4	5657	4.40	III	204.38	4			
	6.1	7739	3.20	III	279.60	4			
	4.9	9707	2.60	III	350.72	4			
	3.0	15722	1.60	II	568.04	4			
	2.7	17857	1.40	II	645.18	4			
	1.9	24401	1.00	I	881.60	4			
1	9.6	6611	3.40	III	172.08	4	**SK 9055 - 80L/4**	714	37
	8.1	7852	3.20	III	204.38	4	**SK 9055 - 80LH/4**		
	5.9	10741	2.30	III	279.60	4	SK 9055 - 80LP/4		
	4.7	13474	1.80	II	350.72	4			
	2.9	21822	1.10	I	568.04	4			
	2.6	24786	1.00	I	645.18	4			
1.5	146	650	5.40	III	11.40	3	**SK 9055 - 90S/4**	688	34
	124	764	4.90	III	13.40	3	**SK 9055 - 90SH/4**		
	106	893	4.80	III	15.66	3	SK 9055 - 90SP/4		
	82	1159	5.40	III	20.32	3			
	69	1362	4.90	III	23.89	3			
	59	1592	4.80	III	27.91	3			
	52	1808	4.40	III	31.70	3			
	48	1961	4.60	III	34.39	3			
	41	2312	5.40	III	40.54	3			
	35	2718	4.90	III	47.67	3			
	30	3176	4.80	III	55.69	3			
	26	3607	4.40	III	63.25	3			
	24	3912	4.60	III	68.61	3			
	22	4344	4.40	III	76.18	3			
	19	4929	4.20	III	86.43	3			
	17	5449	4.10	III	95.56	3			
	14	6717	3.20	III	117.79	3			
	10	9423	1.40	II	165.24	3			
	8.5	11126	2.20	III	195.12	3			
	7.1	13401	1.80	II	235.01	3			
	6.1	15609	1.60	II	273.73	3			
	5.0	18800	1.30	I	329.69	3			
	9.6	9813	2.50	III	172.08	4	**SK 9055 - 90S/4**	721	37
	8.1	11655	2.10	III	204.38	4	**SK 9055 - 90SH/4**		
	5.9	15944	1.60	II	279.60	4	SK 9055 - 90SP/4		
	4.7	19999	1.20	I	350.72	4			
	4.1	23084	1.10	I	404.82	4			

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = f_B ≥ 2.0 * = f_B < 1.0) **(Model Type in blue is an Energy Efficient motor)**

SK 9055
2 hp - 5 hp
Gearmotors

Motor Power P_n [hp]	Output Speed n_2 [rpm]	Output Torque T_2 [lb-in]	Service Factor f_B	AGMA Class	Gear Ratio i_{tot}	Stages	Model Type	Weight [lb]	Dim. Page
2	146	865	4.10	III	11.40	3	**SK 9055 - 90L/4**	692	34
	124	1017	3.70	III	13.40	3	**SK 9055 - 90LH/4**		
	106	1188	3.60	III	15.66	3	SK 9055 - 90LP/4		
	82	1542	4.10	III	20.32	3			
	69	1812	3.70	III	23.89	3			
	59	2117	3.60	III	27.91	3			
	52	2405	3.30	III	31.70	3			
	48	2609	3.40	III	34.39	3			
	41	3075	4.10	III	40.54	3			
	35	3616	3.70	III	47.67	3			
	30	4225	3.60	III	55.69	3			
	26	4798	3.30	III	63.25	3			
	24	5205	3.40	III	68.61	3			
	22	5779	3.30	III	76.18	3			
	19	6557	3.20	III	86.43	3			
	17	7249	3.10	III	95.56	3			
	14	8936	2.40	III	117.79	3			
	10	12535	1.10	I	165.24	3			
	8.5	14802	1.70	II	195.12	3			
	7.1	17828	1.40	II	235.01	3			
	6.1	20766	1.20	I	273.73	3			
	5.0	25011	1.00	I	329.69	3			
	9.6	13054	1.90	II	172.08	4	**SK 9055 - 90L/4**	723	37
	8.1	15505	1.60	II	204.38	4	**SK 9055 - 90LH/4**		
	5.9	21211	1.20	I	279.60	4	SK 9055 - 90LP/4		
	4.7	26606	0.90	*	350.72	4			
3	31	6184	3.8	III	55.69	3	**SK 9055 - 100L/4**	701	34
	27	7023	3.3	III	63.25	3	**SK 9055 - 100LH/4**		
	25	7618	3.3	III	68.61	3	SK 9055 - 100LP/4		
	22	8459	2.9	III	76.18	3			
	20	9597	2.6	III	86.43	3			
	18	10611	2.3	III	95.56	3			
	14	13079	1.6	II	117.79	3			
	13	14745	1.7	II	132.79	3			
	11	17759	1.4	II	159.94	3			
	8.7	21666	1.1	I	195.12	3			
	7.3	26095	0.9	*	235.01	3			
	9.9	19107	1.30	I	172.08	4	**SK 9055 - 100L/4**	727	37
	8.3	22694	1.10	I	204.38	4	**SK 9055 - 100LH/4**		
							SK 9055 - 100LP/4		
5	151	2083	2.50	III	11.40	3	**SK 9055 - 100LA/4**	708	34
	129	2449	2.40	III	13.40	3	**SK 9055 - 112MH/4**		
	110	2862	2.30	III	15.66	3	SK 9055 - 112MP/4		
	85	3714	2.50	III	20.32	3			
	72	4366	2.40	III	23.89	3			
	62	5101	2.30	III	27.91	3			
	54	5793	2.00	III	31.70	3			
	50	6285	2.10	III	34.39	3			
	43	7409	2.50	III	40.54	3			
	36	8712	2.40	III	47.67	3			
	31	10178	2.30	III	55.69	3			
	27	11559	2.00	III	63.25	3			
	25	12539	2.00	III	68.61	3			
	23	13922	1.80	II	76.18	3			
	20	15795	1.60	II	86.43	3			
	18	17464	1.40	II	95.56	3			
	15	21527	1.00	I	117.79	3			
	13	24268	1.00	I	132.79	3			

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = f_B ≥ 2.0 * = f_B < 1.0) **(Model Type in blue is an Energy Efficient motor)**

SK 9055
7.5 hp - 10 hp
Gearmotors

DRIVESYSTEMS

Motor Power P_n [hp]	Output Speed n_2 [rpm]	Output Torque T_2 [lb-in]	Service Factor f_B	AGMA Class	Gear Ratio i_{tot}	Stages	Model Type	Weight [lb]	Dim. Page
7.5	196	2404	4.00	III	8.83	3	**SK 9055 - 132S/4**	759	34
	185	2557	3.90	III	9.39	3	**SK 9055 - 132SH/4**		
	170	2780	3.90	III	10.21	3	SK 9055 - 132SP/4		
	152	3104	3.70	III	11.40	3			
	129	3649	3.50	III	13.40	3			
	111	4264	3.20	III	15.66	3			
	95	4956	3.90	III	18.20	3			
	85	5533	3.70	III	20.32	3			
	73	6505	3.50	III	23.89	3			
	62	7600	3.20	III	27.91	3			
	55	8632	1.30	I	31.70	3			
	50	9365	2.60	III	34.39	3			
	43	11039	2.20	III	40.54	3			
	36	12981	1.90	II	47.67	3			
	31	15165	1.60	II	55.69	3			
	27	17223	1.30	I	63.25	3			
	25	18683	1.30	I	68.61	3			
	23	20744	1.20	I	76.18	3			
	20	23536	1.10	I	86.43	3			
	18	26022	1.00	I	95.56	3			
10	196	3209	3.00	III	8.83	3	**SK 9055 - 132M/4**	783	34
	185	3412	3.00	III	9.39	3	**SK 9055 - 132MH/4**		
	170	3710	2.90	III	10.21	3	SK 9055 - 132MP/4		
	152	4143	2.70	III	11.40	3			
	129	4870	2.60	III	13.40	3			
	111	5691	2.40	III	15.66	3			
	95	6614	2.90	III	18.20	3			
	85	7384	2.70	III	20.32	3			
	73	8682	2.60	III	23.89	3			
	62	10143	2.40	III	27.91	3			
	55	11520	1.00	I	31.70	3			
	50	12497	2.00	III	34.39	3			
	43	14732	1.70	II	40.54	3			
	36	17323	1.40	II	47.67	3			
	31	20238	1.20	I	55.69	3			
	27	22985	1.00	I	63.25	3			
	25	24933	1.00	I	68.61	3			
	23	27684	0.90	*	76.18	3			

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = f_B ≥ 2.0 * = f_B < 1.0) **(Model Type in blue is an Energy Efficient motor)**

SK 9055
15 hp - 20 hp
Gearmotors

Motor Power P_n [hp]	Output Speed n_2 [rpm]	Output Torque T_2 [lb-in]	Service Factor f_B	AGMA Class	Gear Ratio i_{tot}	Stages	Model Type	Weight [lb]	Dim. Page
15	200	4716	2.60	III	8.83	3	**SK 9055 - 160M/4**	822	34
	188	5017	2.60	III	9.39	3	**SK 9055 - 160MH/4**		
	173	5455	2.40	III	10.21	3	SK 9055 - 160MP/4		
	155	6091	2.20	III	11.40	3			
	132	7160	2.50	III	13.40	3			
	113	8367	2.10	III	15.66	3			
	97	9725	2.20	III	18.20	3			
	87	10857	2.10	III	20.32	3			
	74	12765	1.90	II	23.89	3			
	63	14913	1.70	II	27.91	3			
	51	18375	1.30	I	34.39	3			
	44	21661	1.10	I	40.54	3			
	37	25471	1.00	I	47.67	3			
20	200	6306	2.00	III	8.83	3	**SK 9055 - 160L/4**	860	34
	188	6704	2.00	III	9.39	3	**SK 9055 - 160LH/4**		
	173	7290	1.80	II	10.21	3	SK 9055 - 160LP/4		
	155	8139	1.60	II	11.40	3			
	132	9567	1.90	II	13.40	3			
	113	11181	1.60	II	15.66	3			
	97	12994	1.70	II	18.20	3			
	87	14508	1.60	II	20.32	3			
	74	17057	1.40	II	23.89	3			
	63	19927	1.20	I	27.91	3			
	51	24553	1.00	I	34.39	3			
	44	28944	0.90	*	40.54	3			

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = f_B ≥ 2.0 * = f_B < 1.0) **(Model Type in blue is an Energy Efficient motor)**

SK 9155
0.5 hp - 2 hp
Gearmotors

NORD DRIVESYSTEMS

Motor Power P_n [hp]	Output Speed n_2 [rpm]	Output Torque T_2 [lb-in]	Service Factor f_B	AGMA Class	Gear Ratio i_{tot}	Stages	Model Type	Weight [lb]	Dim. Page
0.50	4.5	6257	9.60	III	385.88	5	**SK 9155/32 - 71L/4**	1344	43
	2.9	9701	7.80	III	598.27	5			
	2.2	12446	6.00	III	767.55	5			
	1.8	15789	4.80	III	973.69	5			
	1.5	18972	4.00	III	1169.97	5			
	1.2	23568	3.20	III	1453.44	5			
	0.9	31018	2.40	III	1912.84	5			
0.75	4.4	9918	6.00	III	385.88	5	**SK 9155/32 - 80S/4**	1348	43
	2.9	15376	4.90	III	598.27	5			
	2.2	19727	3.80	III	767.55	5			
	1.8	25025	3.00	III	973.69	5			
	1.5	30070	2.50	III	1169.97	5			
	1.2	37355	2.00	III	1453.44	5			
	0.9	49162	1.50	II	1912.84	5			
	0.7	59642	1.30	I	2320.58	5			
	0.5	83572	0.90	*	3251.68	5			
1	4.3	14034	4.30	III	385.88	5	**SK 9155/32 - 80L/4**	1350	43
	2.8	21758	3.50	III	598.27	5	**SK 9155/32 - 80LH/4**		
	2.1	27914	2.70	III	767.55	5	SK 9155/32 - 80LP/4		
	1.7	35411	2.10	III	973.69	5			
	1.4	42550	1.80	II	1169.97	5			
	1.1	52859	1.40	II	1453.44	5			
	0.9	69566	1.10	I	1912.84	5			
	0.7	84395	0.90	*	2320.58	5			
1.5	12	7649	4.90	III	134.14	5	**SK 9155/42 - 90S/4**	1397	46
	11	8936	4.80	III	156.70	5	**SK 9155/42 - 90SH/4**		
	8.5	11184	5.40	III	196.12	5	SK 9155/42 - 90SP/4		
	6.2	15362	4.80	III	269.39	5			
	5.3	17740	4.20	III	311.10	5	**SK 9155/32 - 90S/4**	1357	43
	4.3	22004	3.40	III	385.88	5	**SK 9155/32 - 90SH/4**		
	3.5	26985	2.80	III	473.22	5	SK 9155/32 - 90SP/4		
	2.8	34116	2.20	III	598.27	5			
	2.2	43769	1.70	II	767.55	5			
	1.7	55524	1.40	II	973.69	5			
	1.4	66716	1.10	I	1169.97	5			
	1.1	82881	0.90	*	1453.44	5			
2	12	10176	3.70	III	134.14	5	**SK 9155/42 - 90L/4**	1399	46
	11	11888	3.60	III	156.70	5	**SK 9155/42 - 90LH/4**		
	8.5	14878	4.10	III	196.12	5	SK 9155/42 - 90LP/4		
	6.2	20436	3.60	III	269.39	5			
	5.3	23601	3.20	III	311.10	5	**SK 9155/32 - 90L/4**	1361	43
	4.3	29274	2.60	III	385.88	5	**SK 9155/32 - 90LH/4**		
	3.5	35899	2.10	III	473.22	5	SK 9155/32 - 90LP/4		
	2.8	45386	1.70	II	598.27	5			
	2.2	58228	1.30	I	767.55	5			
	1.7	73866	1.00	I	973.69	5			

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = f_B ≥ 2.0 * = f_B < 1.0) **(Model Type in blue is an Energy Efficient motor)**

SK 9155
3 hp - 5 hp
Gearmotors

Motor Power P_n [hp]	Output Speed n_2 [rpm]	Output Torque T_2 [lb-in]	Service Factor f_B	AGMA Class	Gear Ratio i_{tot}	Stages	Model Type	Weight [lb]	Dim. Page
3	121	1561	5.10	III	14.06	3	**SK 9155 - 100L/4**	1295	40
	68	2803	5.10	III	25.24	3	**SK 9155 - 100LH/4**		
	58	3252	4.90	III	29.29	3	SK 9155 - 100LP/4		
	48	3907	4.60	III	35.19	3			
	34	5591	5.10	III	50.35	3			
	29	6489	4.90	III	58.44	3			
	24	7797	4.60	III	70.22	3			
	21	8849	4.40	III	79.69	3			
	19	10157	4.20	III	91.47	3			
	15	12234	3.80	III	110.18	3			
	12	15199	3.90	III	136.88	3			
	8.2	22967	3.30	III	206.84	3			
	6.9	27289	2.80	III	245.76	3			
	13	14895	3.70	III	134.14	5	**SK 9155/42 - 100L/4**	1337	46
	11	17400	3.30	III	156.70	5	**SK 9155/42 - 100LH/4**		
	8.7	21777	3.00	III	196.12	5	SK 9155/42 - 100LP/4		
	6.3	29912	2.50	III	269.39	5			
	5.5	34544	2.20	III	311.10	5	**SK 9155/32 - 100L/4**	1370	43
	4.4	42847	1.80	II	385.88	5	**SK 9155/32 - 100LH/4**		
	3.6	52545	1.40	II	473.22	5	SK 9155/32 - 100LP/4		
	2.8	66430	1.10	I	598.27	5			
	2.2	85227	0.90	*	767.55	5			
5	123	2570	3.10	III	14.06	3	**SK 9155 - 100LA/4**	1302	40
	68	4613	3.10	III	25.24	3	**SK 9155 - 112MH/4**		
	59	5353	3.00	III	29.29	3	SK 9155 - 112MP/4		
	49	6431	2.80	III	35.19	3			
	34	9202	3.10	III	50.35	3			
	30	10680	3.00	III	58.44	3			
	25	12833	2.80	III	70.22	3			
	22	14564	2.70	III	79.69	3			
	19	16716	2.50	III	91.47	3			
	16	20136	2.30	III	110.18	3			
	13	25015	2.40	III	136.88	3			
	8.3	37801	2.00	III	206.84	3			
	7.0	44914	1.70	II	245.76	3			
	13	24515	2.20	III	134.14	5	**SK 9155/42 - 100LA/4**	1344	46
	11	28638	2.00	III	156.70	5	**SK 9155/42 - 112MH/4**		
	8.8	35842	1.80	II	196.12	5	SK 9155/42 - 112MP/4		
	6.4	49232	1.50	II	269.39	5			
	5.5	56855	1.30	I	311.10	5	**SK 9155/32 - 100LA/4**	1377	43
	4.5	70521	1.10	I	385.88	5	**SK 9155/32 - 112MH/4**		
	3.6	86483	0.90	*	473.22	5	SK 9155/32 - 112MP/4		

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = f_B ≥ 2.0 * = f_B < 1.0) **(Model Type in blue is an Energy Efficient motor)**

SK 9155
7.5 hp - 10 hp
Gearmotors

DRIVESYSTEMS

Motor Power P_n [hp]	Output Speed n_2 [rpm]	Output Torque T_2 [lb-in]	Service Factor f_B	AGMA Class	Gear Ratio i_{tot}	Stages	Model Type	Weight [lb]	Dim. Page
7.5	123	3829	4.50	III	14.06	3	**SK 9155 - 132S/4**	1353	40
	69	6873	4.50	III	25.24	3	**SK 9155 - 132SH/4**		
	59	7976	4.30	III	29.29	3	SK 9155 - 132SP/4		
	49	9582	4.10	III	35.19	3			
	34	13711	4.50	III	50.35	3			
	30	15914	4.30	III	58.44	3			
	25	19121	3.90	III	70.22	3			
	22	21700	3.50	III	79.69	3			
	19	24908	3.00	III	91.47	3			
	16	30003	2.50	III	110.18	3			
	13	37273	1.60	II	136.88	3			
	11	42826	1.80	II	157.27	3			
	9.3	50883	1.50	II	186.86	3			
	8.4	56324	1.30	I	206.84	3			
	7.1	66922	1.10	I	245.76	3			
	13	36527	1.50	II	134.14	5	**SK 9155/42 - 132S/4**	1388	46
	11	42671	1.30	I	156.70	5	**SK 9155/42 - 132SH/4**		
	8.8	53405	1.20	I	196.12	5	SK 9155/42 - 132SP/4		
	6.4	73357	1.00	I	269.39	5			
10	123	5109	3.40	III	14.06	3	**SK 9155 - 132M/4**	1377	40
	69	9172	3.40	III	25.24	3	**SK 9155 - 132MH/4**		
	59	10644	3.30	III	29.29	3	SK 9155 - 132MP/4		
	49	12788	3.10	III	35.19	3			
	34	18297	3.40	III	50.35	3			
	30	21237	3.30	III	58.44	3			
	25	25518	2.90	III	70.22	3			
	22	28959	2.60	III	79.69	3			
	19	33240	2.30	III	91.47	3			
	16	40040	1.90	II	110.18	3			
	11	57152	1.30	I	157.27	3			
	9.3	67905	1.10	I	186.86	3			
	13	48747	1.10	I	134.14	5	**SK 9155/42 - 132M/4**	1412	46
	11	56945	1.00	I	156.70	5	**SK 9155/42 - 132MH/4**		
	8.8	71270	0.90	*	196.12	5	SK 9155/42 - 132MP/4		
15	174	5445	4.10	III	10.19	3	**SK 9155 - 160M/4**	1417	40
	154	6134	4.00	III	11.48	3	**SK 9155 - 160MH/4**		
	147	6444	3.90	III	12.06	3	SK 9155 - 160MP/4		
	126	7513	3.70	III	14.06	3			
	115	8229	4.10	III	15.40	3			
	97	9773	4.10	III	18.29	3			
	86	11012	4.00	III	20.61	3			
	70	13486	3.70	III	25.24	3			
	60	15650	3.60	III	29.29	3			
	50	18803	3.30	III	35.19	3			
	43	21966	3.10	III	41.11	3			
	35	26903	2.70	III	50.35	3			
	30	31226	2.40	III	58.44	3			
	25	37520	2.00	III	70.22	3			
	22	42580	1.80	II	79.69	3			
	19	48874	1.50	II	91.47	3			
	16	58872	1.30	I	110.18	3			
	11	84033	0.90	*	157.27	3			

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = f_B ≥ 2.0 * = f_B < 1.0) **(Model Type in blue is an Energy Efficient motor)**

SK 9155
20 hp - 30 hp
Gearmotors

Motor Power P_n [hp]	Output Speed n_2 [rpm]	Output Torque T_2 [lb-in]	Service Factor f_B	AGMA Class	Gear Ratio i_{tot}	Stages	Model Type	Weight [lb]	Dim. Page
20	173	7275	3.10	III	10.19	3	**SK 9155 - 160L/4**	1454	40
	154	8196	3.00	III	11.48	3	**SK 9155 - 160LH/4**		
	146	8610	2.90	III	12.06	3	SK 9155 - 160LP/4		
	126	10038	2.80	III	14.06	3			
	115	10995	3.10	III	15.40	3			
	97	13059	3.10	III	18.29	3			
	86	14715	3.00	III	20.61	3			
	70	18021	2.80	III	25.24	3			
	60	20912	2.70	III	29.29	3			
	50	25125	2.50	III	35.19	3			
	43	29351	2.30	III	41.11	3			
	35	35948	2.00	III	50.35	3			
	30	41724	1.80	II	58.44	3			
	25	50135	1.50	II	70.22	3			
	22	56896	1.30	I	79.69	3			
	19	65307	1.20	I	91.47	3			
	16	78665	1.00	I	110.18	3			
25	191	8246	4.60	III	9.16	3	**SK 9155 - 180MX/4**	1507	40
	172	9173	4.40	III	10.19	3	**SK 9155 - 180MH/4**		
	152	10335	4.30	III	11.48	3	SK 9155 - 180MP/4		
	145	10857	4.10	III	12.06	3			
	140	11262	3.90	III	12.51	3			
	124	12657	3.60	III	14.06	3			
	114	13864	4.40	III	15.40	3			
	106	14800	4.50	III	16.44	3			
	96	16465	4.20	III	18.29	3			
	85	18554	4.10	III	20.61	3			
	78	20219	3.70	III	22.46	3			
	69	22722	3.30	III	25.24	3			
	60	26368	2.90	III	29.29	3			
	50	31679	2.40	III	35.19	3			
	43	37009	1.80	II	41.11	3			
	39	40339	1.70	II	44.81	3			
	35	45327	1.60	II	50.35	3			
	30	52610	1.40	II	58.44	3			
	25	63214	1.20	I	70.22	3			
	22	71740	1.00	I	79.69	3			
	19	82344	0.90	*	91.47	3			
30	192	9868	3.80	III	9.16	3	**SK 9155 - 180LX/4**	1507	40
	172	10978	3.70	III	10.19	3	**SK 9155 - 180LH/4**		
	153	12367	3.60	III	11.48	3	SK 9155 - 180LP/4		
	146	12992	3.40	III	12.06	3			
	140	13477	3.30	III	12.51	3			
	125	15147	3.00	III	14.06	3			
	114	16590	3.70	III	15.40	3			
	107	17711	3.70	III	16.44	3			
	96	19704	3.50	III	18.29	3			
	85	22203	3.40	III	20.61	3			
	78	24196	3.10	III	22.46	3			
	70	27191	2.80	III	25.24	3			
	60	31554	2.40	III	29.29	3			
	50	37910	2.00	III	35.19	3			
	43	44288	1.50	II	41.11	3			
	39	48274	1.40	II	44.81	3			
	35	54242	1.30	I	50.35	3			
	30	62957	1.20	I	58.44	3			
	25	75648	1.00	I	70.22	3			
	22	85850	0.90	*	79.69	3			

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = f_B ≥ 2.0 * = f_B < 1.0) **(Model Type in blue is an Energy Efficient motor)**

SK 9155
40 hp - 60 hp
Gearmotors

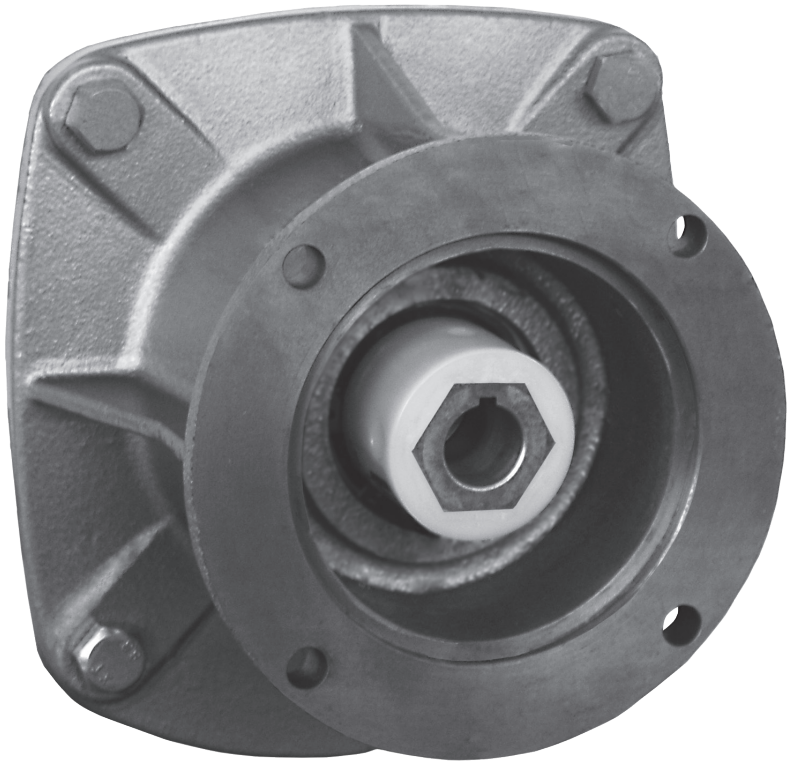
NORD DRIVESYSTEMS

Motor Power P_n [hp]	Output Speed n_2 [rpm]	Output Torque T_2 [lb-in]	Service Factor f_B	AGMA Class	Gear Ratio i_{tot}	Stages	Model Type	Weight [lb]	Dim. Page
40	194	12974	3.20	III	9.16	3	**SK 9155 - 200L/4**	1664	40
	175	14433	2.90	III	10.19	3	**SK 9155 - 200LH/4**		
	155	16260	2.70	III	11.48	3	SK 9155 - 225RP/4		
	148	17082	2.60	III	12.06	3			
	142	17719	2.50	III	12.51	3			
	127	19914	2.30	III	14.06	3			
	116	21812	3.00	III	15.40	3			
	108	23285	2.90	III	16.44	3			
	97	25906	2.70	III	18.29	3			
	86	29192	2.60	III	20.61	3			
	79	31812	2.40	III	22.46	3			
	71	35749	2.10	III	25.24	3			
	61	41486	1.80	II	29.29	3			
	51	49842	1.50	II	35.19	3			
	43	58227	1.20	I	41.11	3			
	40	63468	1.10	I	44.81	3			
	35	71315	1.00	I	50.35	3			
	30	82773	0.90	*	58.44	3			
50	193	16356	2.50	III	9.16	3	**SK 9155 - 225S/4**	1736	40
	173	18196	2.30	III	10.19	3	**SK 9155 - 225SH/4**		
	154	20499	2.20	III	11.48	3	SK 9155 - 225SP/4		
	146	21535	2.10	III	12.06	3			
	141	22338	2.00	III	12.51	3			
	126	25106	1.80	II	14.06	3			
	115	27499	2.40	III	15.40	3			
	107	29356	2.30	III	16.44	3			
	97	32659	2.10	III	18.29	3			
	86	36802	2.00	III	20.61	3			
	79	40106	1.90	II	22.46	3			
	70	45070	1.70	II	25.24	3			
	60	52301	1.40	II	29.29	3			
	50	62837	1.20	I	35.19	3			
	43	73408	0.90	*	41.11	3			
	39	80015	0.90	*	44.81	3			
60	193	19569	2.10	III	9.16	3	**SK 9155 - 225M/4**	1809	40
	174	21769	1.90	II	10.19	3	**SK 9155 - 225MH/4**		
	154	24525	1.80	II	11.48	3	SK 9155 - 225MP/4		
	147	25764	1.70	II	12.06	3			
	141	26726	1.70	II	12.51	3			
	126	30037	1.50	II	14.06	3			
	115	32900	2.00	III	15.40	3			
	108	35121	1.90	II	16.44	3			
	97	39074	1.80	II	18.29	3			
	86	44030	1.70	II	20.61	3			
	79	47982	1.60	II	22.46	3			
	70	53921	1.40	II	25.24	3			
	60	62573	1.20	I	29.29	3			

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = f_B ≥ 2.0 * = f_B < 1.0) **(Model Type in blue is an Energy Efficient motor)**

Speed Reducer Selections

- SK 9055 (3 Stage)
- SK 9055 (4 Stage)
- SK 9155
- SK 9155/32
- SK 9155/42



NORD®
DRIVESYSTEMS

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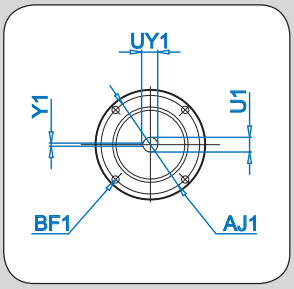
Type	Gear Ratio i_{tot}	Output Speed n_2 1750 rpm [rpm]	Output Torque* $T_{2\,max}$ [lbin]
SK9055 (3 Stage)	17.42	100	3806
	19.22	91	3806
	21.32	82	3806
	23.79	74	3806
	26.77	65	3806
	30.93	57	3894
	34.80	50	3894
	38.02	46	3983
	42.18	41	3983
	43.40	40	3983
	47.95	36	3983



SK 9055
NEMA C + W
Ratings & Combinations

NORD DRIVESYSTEMS

Model Type	Gear Ratio i_{tot}	Output Speed n_2 [rpm]	Output Torque $T_{2\ max}$ [lb-in]	Maximum input power◈ [hp]	[hp]	[hp]	Input Shaft W	NEMA C-Face* Available Combinations 56C	140TC	180TC	210TC	250TC	280TC
SK 9055 (3 Stage)	8.83	198	12390	20.00	13.20	10.00	X			X	X	X	
	9.39	186	13275	20.00	13.20	10.00	X			X	X	X	X
	10.21	171	13275	20.00	13.20	10.00	X			X	X	X	
	11.40	154	13275	20.00	13.20	10.00	X	X	X	X	X	X	X
	13.40	131	17700	20.00	13.20	10.00	X	X	X	X	X	X	X
	15.66	112	17700	20.00	13.20	10.00	X	X	X	X	X	X	X
	18.20	96	21683	20.00	13.20	10.00	X	X	X	X			
	20.32	86	23010	20.00	13.20	10.00	X	X	X	X	X	X	X
	23.89	73	23895	20.00	13.20	10.00	X	X	X	X	X	X	X
	27.91	63	24780	20.00	13.20	10.00	X	X	X	X	X	X	X
	31.70	55	11336	9.89	6.53	4.96	X	X	X	X	X		
	34.39	51	24780	20.00	13.20	10.00	X	X	X	X	X	X	
	40.54	43	24780	16.91	11.16	8.45	X	X	X	X	X	X	X
	47.67	37	24780	14.55	9.60	7.27	X	X	X	X	X	X	X
	55.69	31	24780	12.19	8.04	6.09	X	X	X	X	X	X	X
	63.25	28	24780	11.01	7.27	5.50	X	X	X	X	X		
	68.61	26	24780	10.22	6.75	5.11	X	X	X	X	X	X	
	76.18	23	24780	9.04	5.97	4.52	X	X	X	X	X		
	86.43	20	24780	7.86	5.19	3.93	X	X	X	X	X		
	95.56	18	24780	7.08	4.67	3.54	X	X	X	X	X		
	117.79	15	21240	5.06	3.34	2.53	X	X	X	X			
	132.79	13	24780	5.11	3.37	2.56	X	X	X				
	159.94	11	24780	4.32	2.85	2.16	X	X	X				
	165.24	11	13275	2.32	1.53	1.16	X	X	X				
	195.12	9	24780	3.54	2.34	1.77	X	X	X	X			
	235.01	7.4	24780	2.91	1.92	1.45	X	X	X	X			
	273.73	6.4	24780	2.52	1.66	1.26	X	X	X				
	329.69	5.3	24780	2.08	1.38	1.04	X	X	X				
SK 9055 (4 Stage)	172.08	10	24780	3.00	1.98	1.50	X	X	X	X			
	204.38	8.6	24780	3.00	1.98	1.50	X	X	X	X			
	279.60	6.3	24780	2.48	1.63	1.24	X	X	X	X			
	350.72	5	24780	1.97	1.30	0.98	X	X	X	X			
	404.82	4.3	24780	1.69	1.12	0.85	X	X	X	X			
	568.04	3.1	24780	1.22	0.80	0.61	X	X	X				
	645.18	2.7	24780	1.06	0.70	0.53	X	X	X				
	881.60	2	24780	0.79	0.52	0.39	X	X	X				
	1113.24	1.6	24780	0.63	0.42	0.31	X	X	X				
	1517.17	1.2	24780	0.47	0.31	0.24	X	X	X				
	2128.35	0.82	24780	0.32	0.21	0.16	X	X	X				
	2397.14	0.73	24780	0.29	0.19	0.14	X	X	X				
	3026.98	0.58	24780	0.23	0.15	0.11	X	X	X				
	3362.82	0.52	24780	0.20	0.13	0.10	X	X	X				
	4246.38	0.41	24780	0.16	0.11	0.08	X	X	X				
	Based upon1750 rpm Input Speed			1750 rpm	1150 rpm	875 rpm Input Speed	-	1 hp	2 hp	5 hp	10 hp	20 hp	30 hp C-face Adapter Maximum Input Power *

◈ The maximum input power limit shown is the largest motor power typically combined with the gear unit. *The Italicized power values shown are not the mechanical limit and often may be increased through discussion with our sales or engineering department.*

* The NEMA C-face power limit must also be considered when selecting a reducer. The C-face Adapter's Maximum Input Power values are displayed under the Available Combinations are based upon a 1750 rpm motor.

lb	W	56C	140TC	180TC	210TC	250TC	280TC
SK 9055 3 Stage	706	695	695	710	741	763	775
SK 9055 4 Stage	717	721	721	730	-	-	-

SK 9155
NEMA C + W
Ratings & Combinations

Model Type	Gear Ratio i_{tot}	Output Speed n_2 [rpm]	Output Torque $T_{2\,max}$ [lb-in]	Maximum input power◈ [hp]			Input Shaft W	NEMA C-Face* Available Combinations 56C	140TC	180TC	210TC	250TC	280TC	320TC	360TC
SK 9155 (3 Stage)	9.16	191	41595	60.00	39.60	30.00	X			X	X	X	X		
	10.19	172	41595	60.00	39.60	30.00	X			X	X	X	X	X	X
	11.48	152	44250	60.00	39.60	30.00	X			X	X	X	X	X	X
	12.06	145	44250	60.00	39.60	30.00	X			X	X	X	X	X	X
	12.51	140	44250	60.00	39.60	30.00	X			X	X	X	X		
	14.06	124	46020	60.00	39.60	30.00	X			X	X	X	X	X	X
	15.40	114	66375	60.00	39.60	30.00	X			X	X	X	X	X	X
	16.44	106	66375	60.00	39.60	30.00	X			X	X	X	X		
	18.29	96	69030	60.00	39.60	30.00	X			X	X	X	X	X	X
	20.61	85	75225	60.00	39.60	30.00	X			X	X	X	X	X	X
	22.46	78	75225	60.00	39.60	30.00	X			X	X	X			
	25.24	69	75225	60.00	39.60	30.00	X			X	X	X	X	X	X
	29.29	60	75225	60.00	39.60	30.00	X			X	X	X	X	X	X
	35.19	50	75225	59.68	39.39	29.84	X			X	X	X	X	X	X
	41.11	43	68145	46.49	30.69	23.25	X			X	X	X	X	X	X
	44.81	39	68145	42.17	27.83	21.08	X			X	X	X	X		
	50.35	35	72570	40.30	26.60	20.15	X			X	X	X	X	X	X
	58.44	30	75225	35.81	23.63	17.90	X			X	X	X	X	X	X
	70.22	25	75225	29.84	19.69	14.92	X			X	X	X	X	X	X
	79.69	22	75225	26.26	17.33	13.13	X			X	X	X	X		
	91.47	19	75225	22.68	14.97	11.34	X			X	X	X	X		
	110.18	16	75225	19.10	12.60	9.55	X			X	X				
	136.88	13	59295	12.23	8.07	6.12	X			X	X				
	157.27	11	75225	13.13	8.67	6.56	X			X	X	X	X		
	186.86	9.4	75225	11.22	7.40	5.61	X			X	X	X	X		
	206.84	8.5	75225	10.15	6.70	5.07	X			X	X				
	245.76	7.1	75225	8.47	5.59	4.24	X			X	X				
SK 9155/32 (5 Stage)	311.10	5.6	75225	5.00	3.30	2.50	X	X	X	X	X				
	385.88	4.5	75225	5.00	3.30	2.50	X	X	X	X	X				
	473.22	3.7	75225	4.42	2.91	2.21	X	X	X	X	X				
	598.27	2.9	75225	3.46	2.28	1.73	X	X	X	X	X				
	767.55	2.3	75225	2.75	1.81	1.37	X	X	X	X	X				
	973.69	1.8	75225	2.15	1.42	1.07	X	X	X	X	X				
	1169.97	1.5	75225	1.79	1.18	0.90	X	X	X	X	X				
	1453.44	1.2	75225	1.43	0.95	0.72	X	X	X	X	X				
	1912.84	0.91	75225	1.09	0.72	0.54	X	X	X	X					
	2320.58	0.75	75225	0.95	0.63	0.47	X	X	X						
	3251.68	0.54	75225	0.70	0.46	0.35	X	X	X						
	4039.53	0.43	75225	0.57	0.37	0.28	X	X	X						
	4512.24	0.39	75225	0.52	0.34	0.26	X	X	X						
SK 9155/42 (5 Stage)	134.14	13	54870	10	6.6	5	X	X	X	X	X	X	X		
	156.70	11	56640	9.89	6.52	4.94	X	X	X	X	X	X	X		
	196.12	8.9	65490	9.25	6.1	4.62	X	X	X	X	X	X	X		
	269.39	6.5	75225	7.76	5.12	3.88	X	X	X	X	X	X	X		
	Based upon1750 rpm Input Speed			1750 rpm	1150 rpm	875 rpm	-	1 hp	2 hp	5 hp	10 hp	20 hp	30 hp	40hp	70hp
				Input Speed				C-face Adapter Maximum Input Power *							

◈ The maximum input power limit shown is the largest motor power typically combined with the gear unit. *The Italicized power values shown are not the mechanical limit and often may be increased through discussion with our sales or engineering department.*

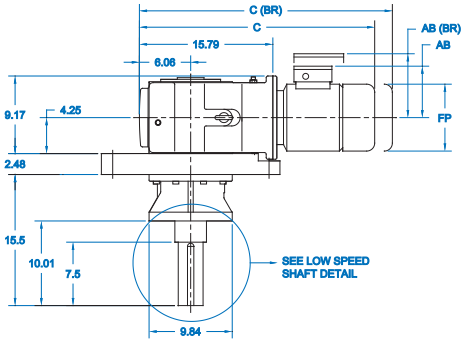
* The NEMA C-face power limit must also be considered when selecting a reducer. The C-face Adapter's Maximum Input Power values are displayed under the Available Combinations are based upon a 1750 rpm motor.

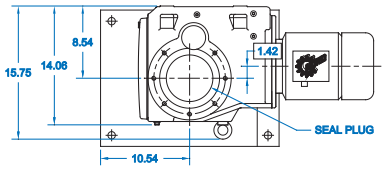
lb	W	56C	140TC	180TC	210TC	250TC	280TC	320TC	360TC
SK 9155	1344	-	-	1317	1346	1401	1401	1401	1432
SK 9155/32	1353	1357	1357	1366	1386	-	-	-	-
SK 9155/42	1412	1401	1401	1417	1447	1469	1469	-	-

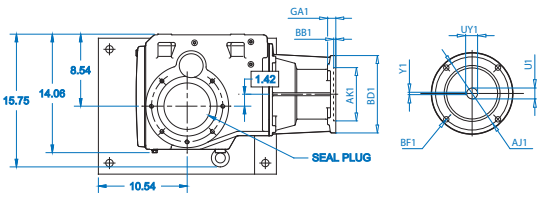
Notes

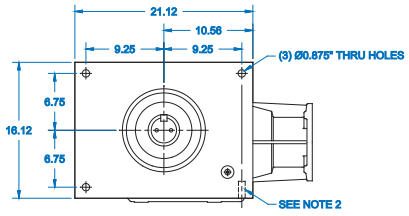
Gearmotors & C-Face Reducers

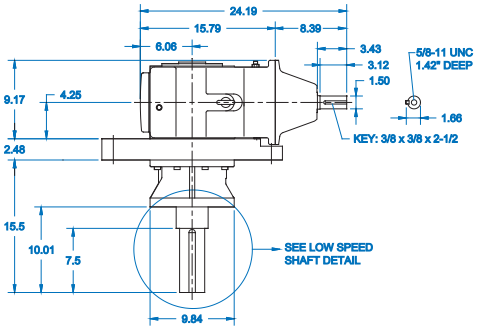
- SK 9055 (3 Stage)
- SK 9055 (4 Stage)
- SK 9155
- SK 9155/32
- SK 9155/42

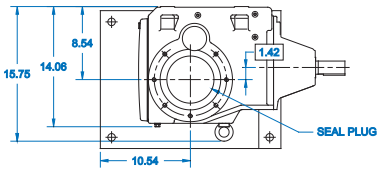












NORD DRIVESYSTEMS

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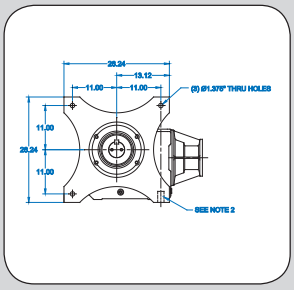
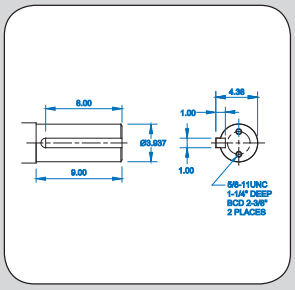
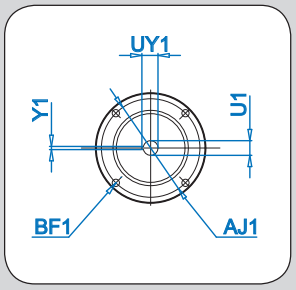


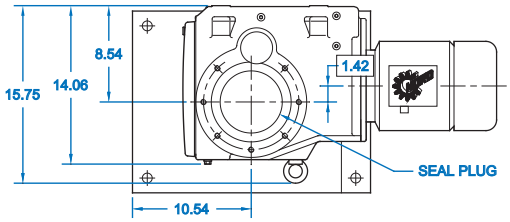


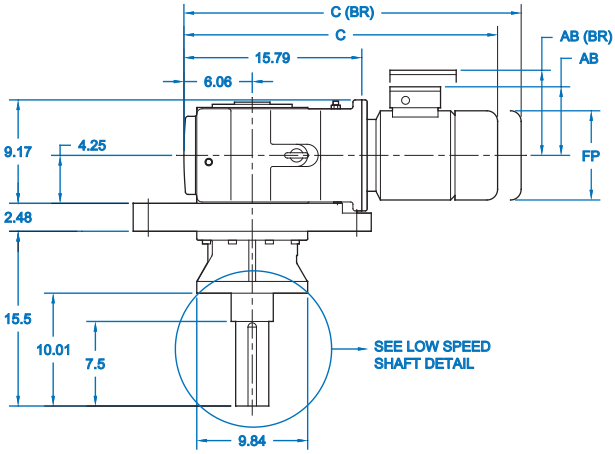


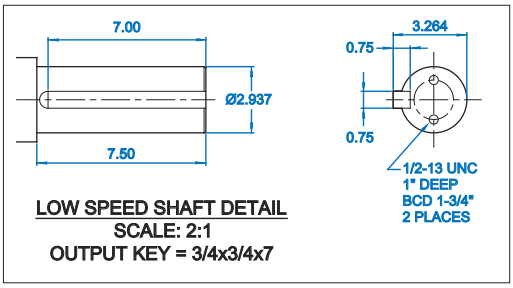
SK 9055 (3 Stage) - Motor Dimensions

DRIVESYSTEMS

SK9055 Integral Motor (3 Stage)



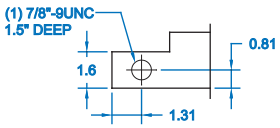




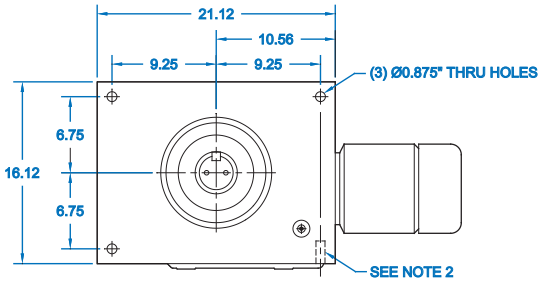
LOW SPEED SHAFT DETAIL
SCALE: 2:1
OUTPUT KEY = 3/4x3/4x7

NOTES
1. DIMENSIONS ARE IN INCHES

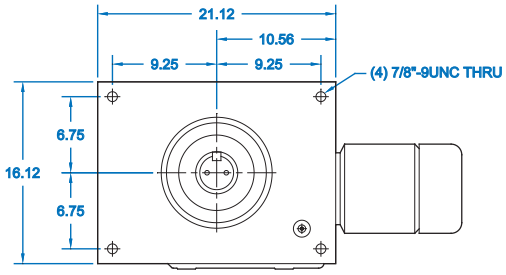
2. DUE TO GEARBOX INTERFERENCE, THE BOLT CANNOT GO THROUGH THE MOUNTING FLANGE. ONE (1) TAPPED HOLE IS SUPPLIED TO ACCOMMODATE SIDE MOUNTING.



3. FOR RATIOS GREATER THAN 329.69:
DIMENSIONS 'C' & 'C(BR)' INCREASE BY 2.72".
DIMENSION 'DB' INCREASES BY 2.4".



STANDARD FLANGE
(3 THRU HOLES/1 TAP)
PART: 168414170



OPTIONAL FLANGE
(4 TAPS)
PART: 168414180

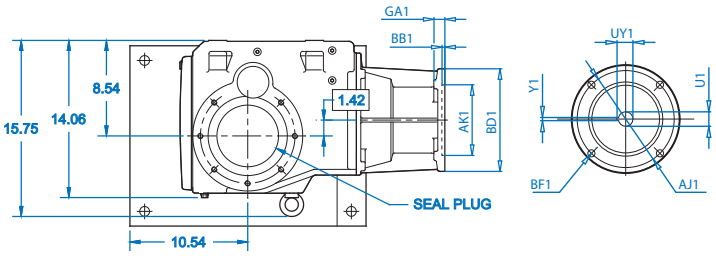
Motor Dimensions

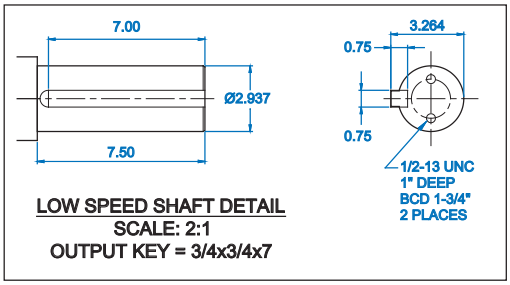
Standard Efficiency	90S/L	100L/LA	112M		132S/M	160M/L	
Energy Efficiency	90SH/LH	100LH	112S/H	112MH	132SH/MH	160MH	160LH
Premium Efficiency	90SP/LP	100LP/AP	-	112MP	132SP/MP	-	160LP
AB	5.79	6.65	7.05	7.05	8.03	9.53	9.53
AB (BR)	5.79	6.77	7.17	-	7.91	9.53	-
C	27.44	27.85	28.60	29.59	32.93	35.20	36.96
C (BR)	30.41	31.47	32.32	-	37.16	40.53	-
FP	7.19	7.90	8.87	8.87	10.45	12.56	12.56

(BR) Denotes Brakemotor

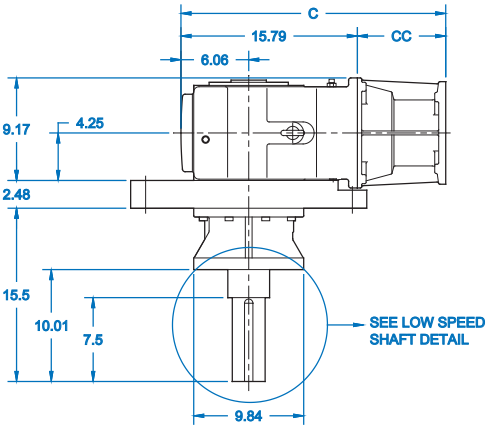
SK 9055 (3 Stage) - NEMA Dimensions

SK 9055 NEMA C-Face (3 Stage)



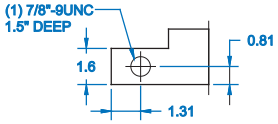


LOW SPEED SHAFT DETAIL
SCALE: 2:1
OUTPUT KEY = 3/4x3/4x7

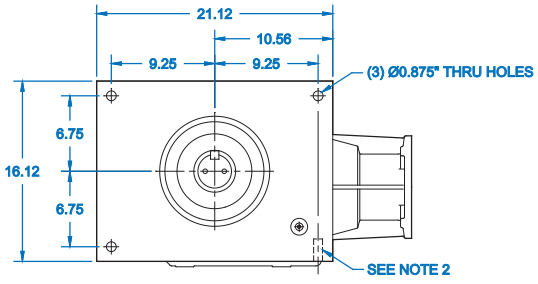


NOTES
1. DIMENSIONS ARE IN INCHES

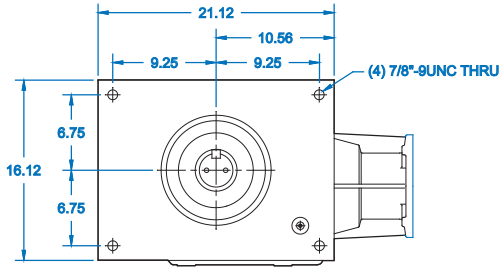
2. DUE TO GEARBOX INTERFERENCE, THE BOLT CANNOT GO THROUGH THE MOUNTING FLANGE. ONE (1) TAPPED HOLE IS SUPPLIED TO ACCOMMODATE SIDE MOUNTING.



3. FOR RATIOS GREATER THAN 329.69:
DIMENSIONS 'C' & 'C(BR)' INCREASE BY 2.72".
DIMENSION 'DB' INCREASES BY 2.4".



STANDARD FLANGE
(3 THRU HOLES/1 TAP)
PART: 168414170



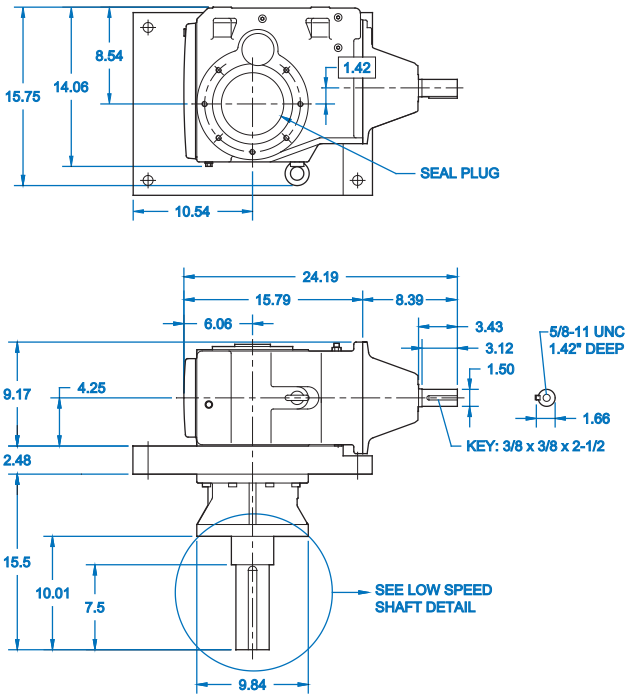
OPTIONAL FLANGE
(4 TAPS)
PART: 168414180

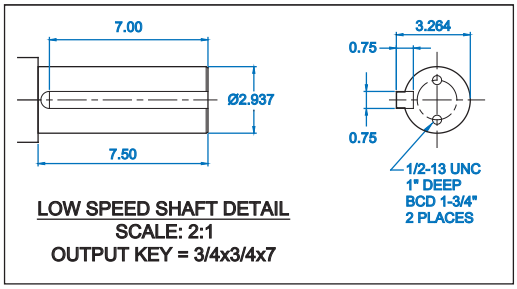
NEMA Dimensions

Type	AJ1	AK1	BB1	BD1	BF1	U1	UY1	Y1	C	CC
56C	5.875	4.500	0.20	6.54	0.43	0.625	0.71	0.1875	20.14	4.33
140TC	5.875	4.500	0.20	6.54	0.43	0.875	0.96	0.1875	20.14	4.33
180TC	7.250	8.500	0.23	9.17	0.59	1.125	1.24	0.250	23.72	7.91
210TC	7.250	8.500	0.23	9.17	0.59	1.375	1.52	0.312	23.72	7.91
250TC	7.250	8.500	0.23	9.17	0.59	1.625	1.80	0.375	23.72	7.91
280TC	9.00	10.500	0.23	13.78	0.55	1.875	2.10	0.500	24.35	8.54

SK 9055 (3 Stage) - W Dimensions

SK 9055 Solid Input Shaft - Type W (3 Stage)

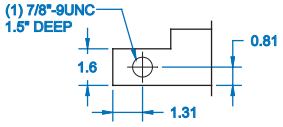




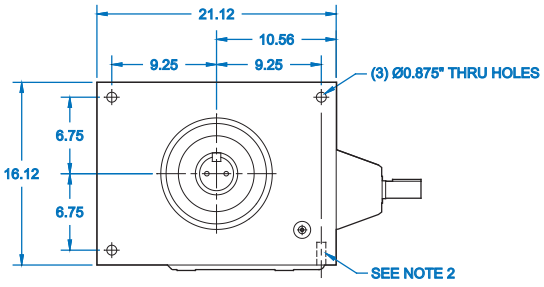
LOW SPEED SHAFT DETAIL
SCALE: 2:1
OUTPUT KEY = 3/4x3/4x7

NOTES
1. DIMENSIONS ARE IN INCHES

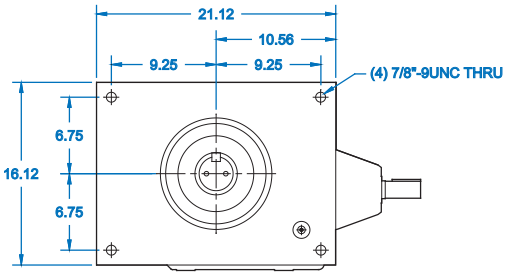
2. DUE TO GEARBOX INTERFERENCE, THE BOLT CANNOT GO THROUGH THE MOUNTING FLANGE. ONE (1) TAPPED HOLE IS SUPPLIED TO ACCOMMODATE SIDE MOUNTING.



3. FOR RATIOS GREATER THAN 329.69:
DIMENSIONS 'C' & 'C(BR)' INCREASE BY 2.72".
DIMENSION 'DB' INCREASES BY 2.4".



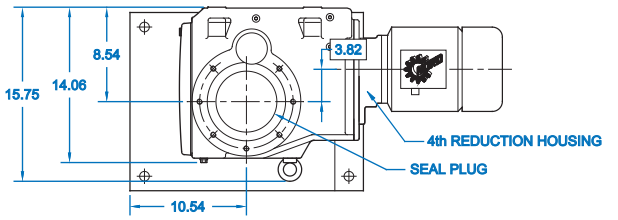
STANDARD FLANGE
(3 THRU HOLES/1 TAP)
PART: 168414170

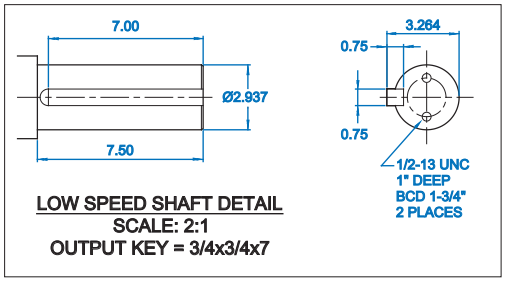


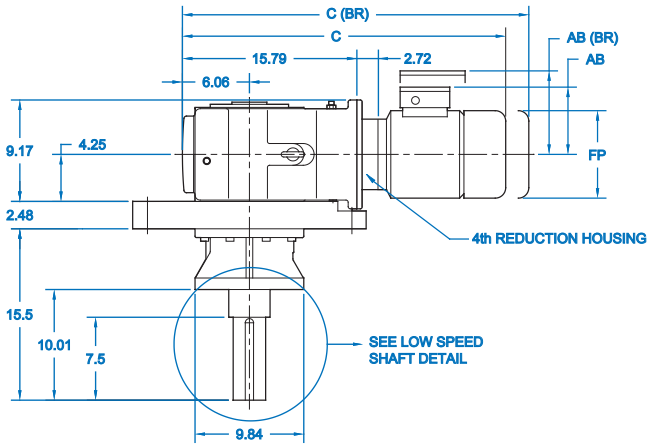
OPTIONAL FLANGE
(4 TAPS)
PART: 168414180

SK 9055 (4 Stage) - Motor Dimensions

SK 9055 Integral Motor (4 Stage)







NOTES
1. DIMENSIONS ARE IN INCHES

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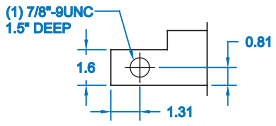
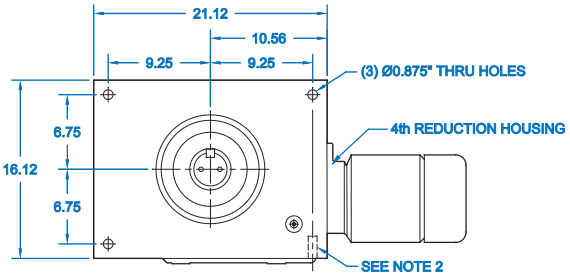
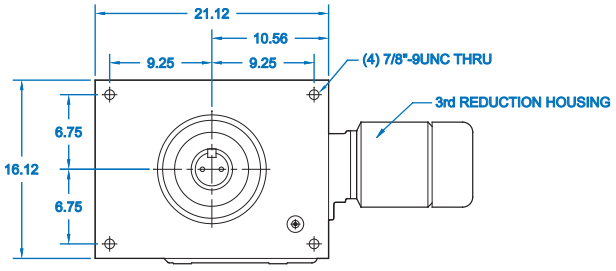


3. FOR RATIOS GREATER THAN 329.69:
DIMENSIONS 'C' & 'C(BR)' INCREASE BY 2.72".
DIMENSION 'DB' INCREASES BY 2.4".



STANDARD FLANGE
(3 THRU HOLES/1 TAP)
PART: 168414170



OPTIONAL FLANGE
(4 TAPS)
PART: 168414180

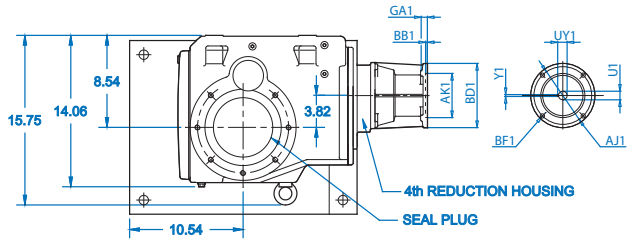
Motor Dimensions

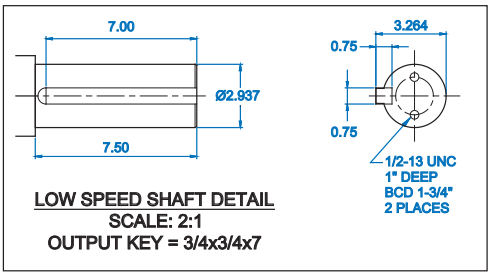
Standard Efficiency	71S/L	80S/L	90S/L	100L/LA
Energy Efficiency		80LH	90SH/LH	100LH
Premium Efficiency		80LP	90SP/LP	100LP/AP
AB	4.86	5.59	5.79	6.65
AB (BR)	5.24	5.59	5.79	6.77
C	27.56	28.56	30.16	31.35
C (BR)	29.86	31.10	33.13	34.98
FP	5.72	6.43	7.19	7.90

(BR) Denotes Brakemotor

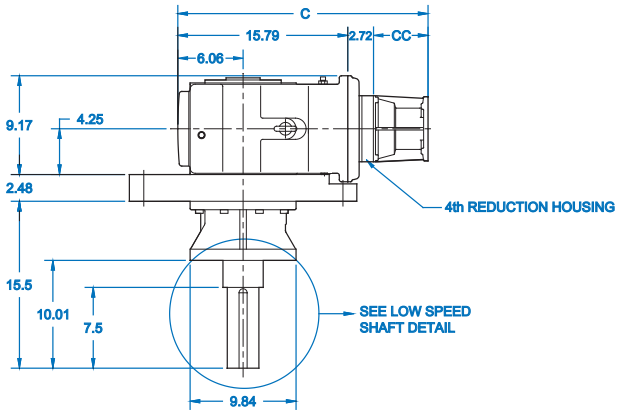
SK 9055 (4 Stage) - NEMA Dimensions

SK 9055 NEMA (4 Stage)





LOW SPEED SHAFT DETAIL
SCALE: 2:1
OUTPUT KEY = 3/4x3/4x7



NOTES
1. DIMENSIONS ARE IN INCHES

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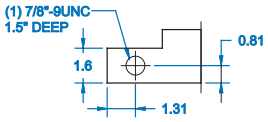
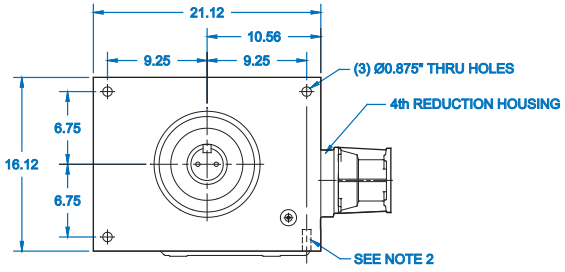
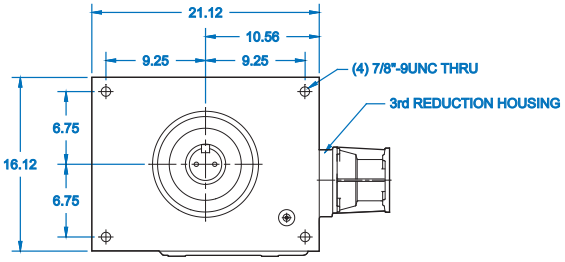


3. FOR RATIOS GREATER THAN 329.69:
DIMENSIONS 'C' & 'C(BR)' INCREASE BY 2.72".
DIMENSION 'DB' INCREASES BY 2.4".



STANDARD FLANGE
(3 THRU HOLES/1 TAP)
PART: 168414170



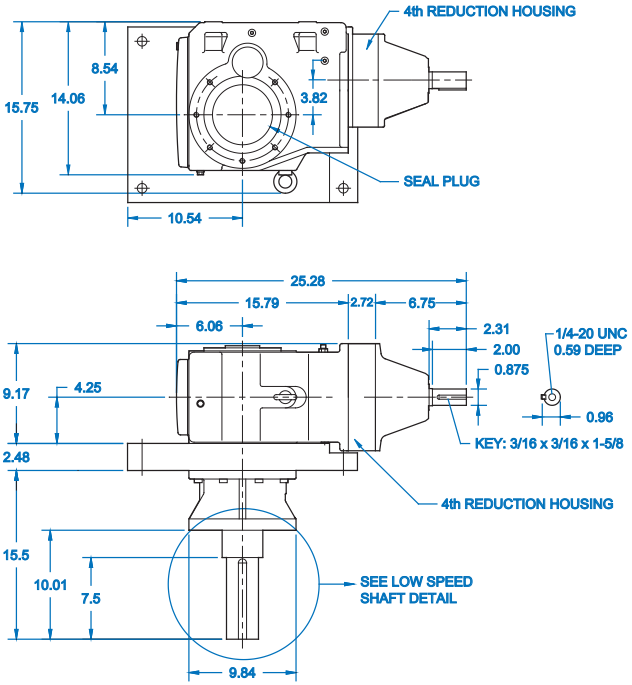
OPTIONAL FLANGE
(4 TAPS)
PART: 168414180

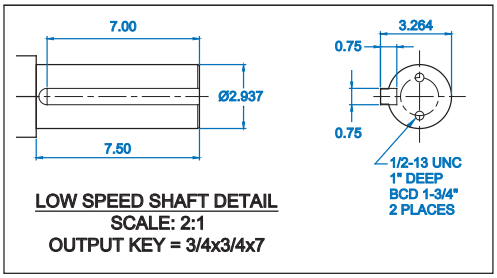
NEMA Dimensions

Type	AJ1	AK1	BB1	BD1	BF1	U1	UY1	Y1	C	CC
56C	5.875	4.500	0.20	6.54	0.43	0.625	0.71	0.1875	23.13	4.61
140TC	5.875	4.500	0.20	6.54	0.43	0.875	0.96	0.1875	23.13	4.61
180TC	7.250	8.500	0.23	9.17	0.59	1.125	1.24	0.250	24.20	5.67

SK 9055 (4 Stage) - W Dimensions

SK 9055 Solid Input Shaft - Type W (4 Stage)





LOW SPEED SHAFT DETAIL
SCALE: 2:1
OUTPUT KEY = 3/4x3/4x7

NOTES

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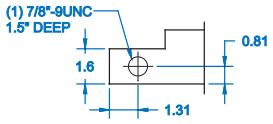
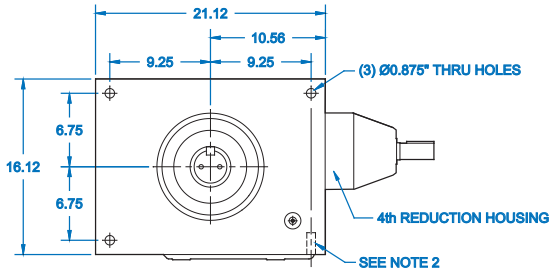
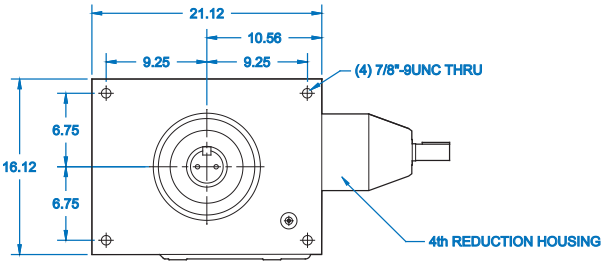


3. FOR RATIOS GREATER THAN 329.69:
   DIMENSIONS 'C' & 'C(BR)' INCREASE BY 2.72".
   DIMENSION 'DB' INCREASES BY 2.4".



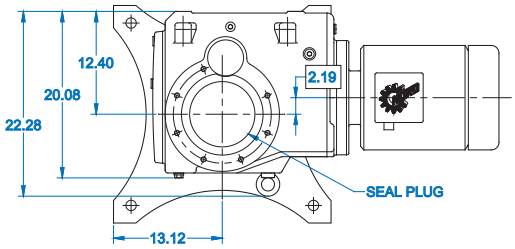
STANDARD FLANGE
(3 THRU HOLES/1 TAP)
PART: 168414170

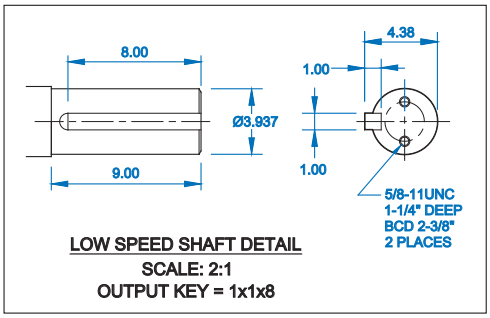


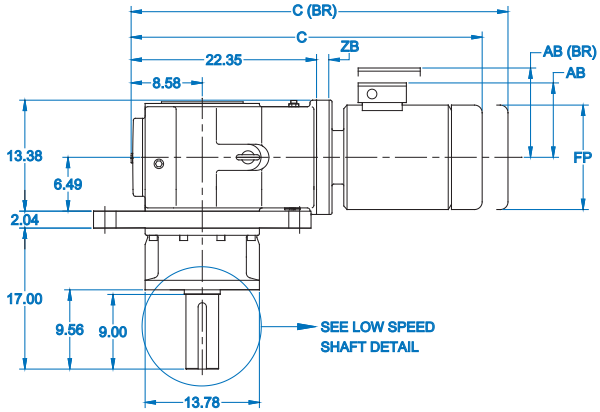
OPTIONAL FLANGE
(4 TAPS)
PART: 168414180

SK 9155 - Motor Dimensions

SK 9155 Integral Motor

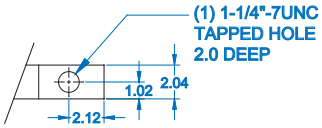


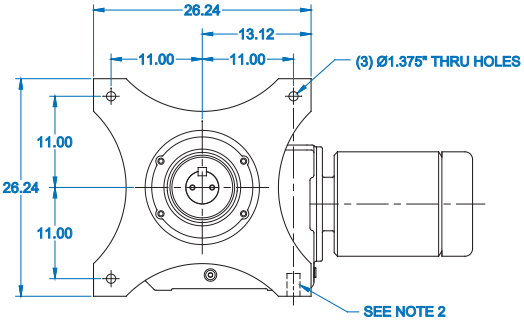




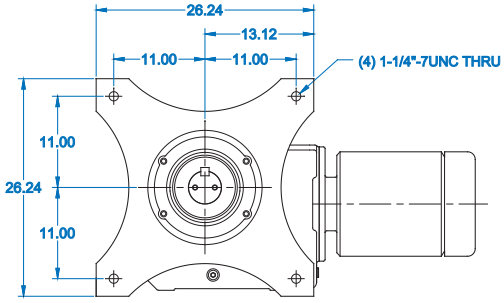
NOTES

1. DIMENSIONS ARE IN INCHES
2. DUE TO GEARBOX INTERFERENCE, THE BOLT CANNOT GO THROUGH THE MOUNTING FLANGE. ONE (1) TAPPED HOLE IS SUPPLIED TO ACCOMMODATE SIDE MOUNTING.





STANDARD FLANGE
(3 THRU HOLES/1 TAP)
PART: 168614060



OPTIONAL FLANGE
(4 TAPS)
PART: 168614070

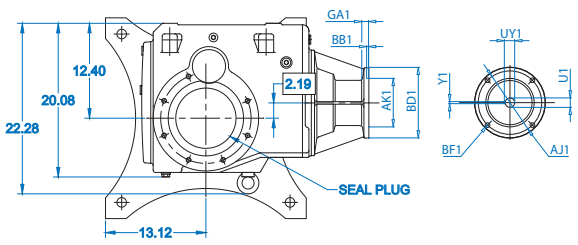
Motor Dimensions

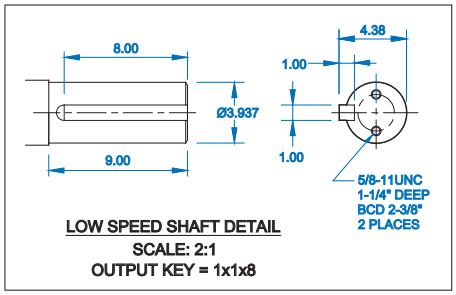
Standard Eff.	100L/LA	112M	-	132S/M	160M/L	-	180MX	180LX	-	200L	225S/M	
Energy Eff.	100LH		112MH	132SH/MH	160M/H	160LH	-	-	180MH/LH	200LH	-	225SH/MH
Premium Eff.	100LP/AP	-	112MP	132SP/MP	-	160LP	-	-	180MP/LP	225RP	-	225SP/MP
AB	6.65	7.05	7.05	8.03	9.53	9.53	9.53	9.53	10.04	12.01	12.01	12.80
AB (BR)	6.77	7.17	-	7.91	9.53	-	9.53	9.53	-	12.01	12.01	-
C	35.14	35.89	36.89	40.22	41.78	43.54	41.78	43.54	46.90	49.46	49.46	52.29
C (BR)	38.75	39.60	-	44.43	47.10	-	47.10	48.82	-	56.03	55.99	-
FP	7.90	8.87	8.87	10.45	12.56	12.56	12.56	12.56	14.26	15.83	15.83	17.52
ZB	0.71	0.71	0.71	0.71	-	-	-	-	-	-	-	-

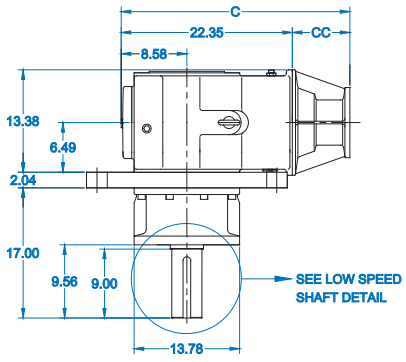
(BR) Denotes Brakemotor

SK 9155 - NEMA Dimensions

SK 9155 NEMA C-Face

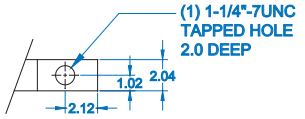


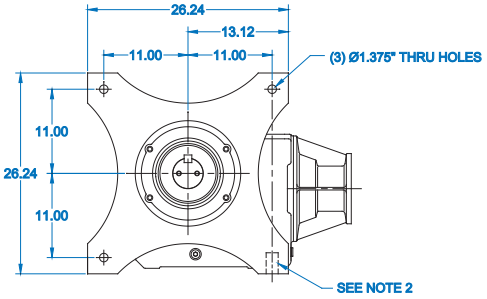




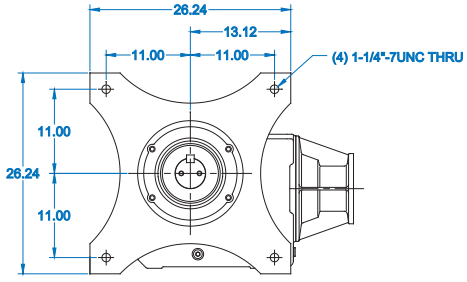
NOTES

1. DIMENSIONS ARE IN INCHES
2. DUE TO GEARBOX INTERFERENCE, THE BOLT CANNOT GO THROUGH THE MOUNTING FLANGE. ONE (1) TAPPED HOLE IS SUPPLIED TO ACCOMMODATE SIDE MOUNTING.





STANDARD FLANGE
(3 THRU HOLES/1 TAP)
PART: 168614060

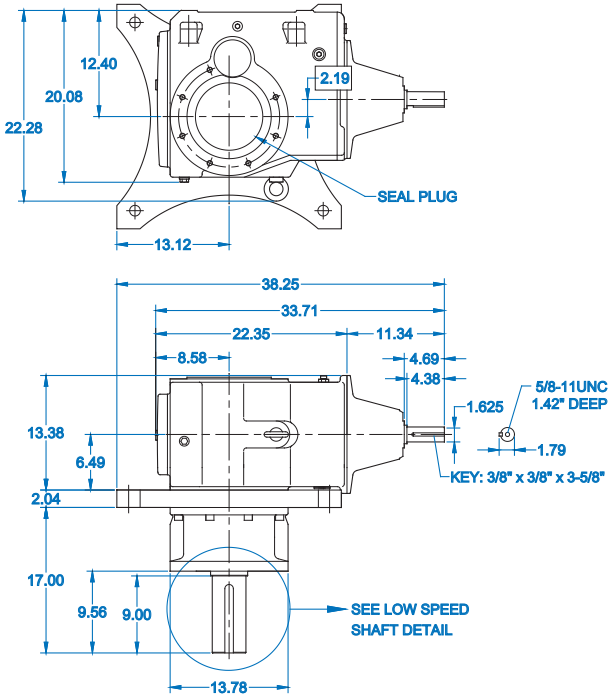


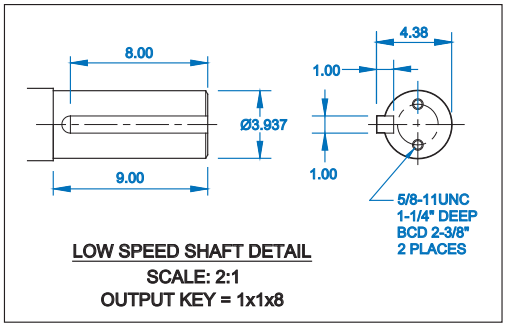
OPTIONAL FLANGE
(4 TAPS)
PART: 168614070

NEMA Dimensions

Type	AJ1	AK1	BB1	BD1	BF1	U1	UY1	Y1	C	CC
180TC	7.250	8.500	0.23	9.17	0.59	1.125	1.24	0.250	29.89	7.52
210TC	7.250	8.500	0.23	9.17	0.59	1.375	1.52	0.312	29.89	7.52
250TC	7.250	8.500	0.23	9.17	0.59	1.625	1.80	0.375	33.75	11.38
280TC	9.00	10.500	0.23	13.78	0.55	1.875	2.10	0.500	33.75	11.38
320TC	11.00	12.500	0.23	15.75	0.71	2.13	2.35	0.500	32.73	10.35
360TC	11.00	12.500	0.16	17.72	0.71	2.38	2.65	0.625	35.64	13.27

SK 9155 Solid Input Shaft - Type W





LOW SPEED SHAFT DETAIL
SCALE: 2:1
OUTPUT KEY = 1x1x8

NOTES

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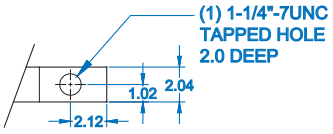
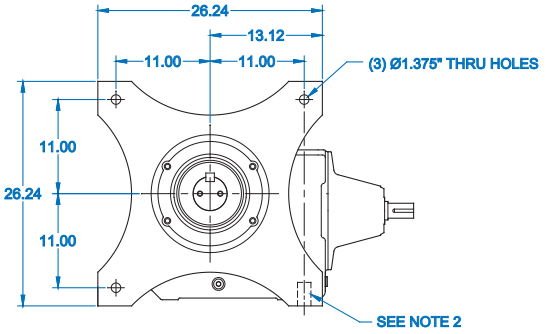
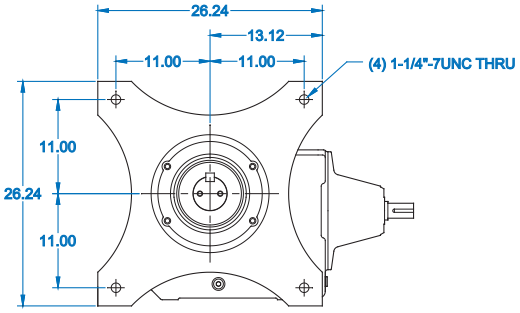




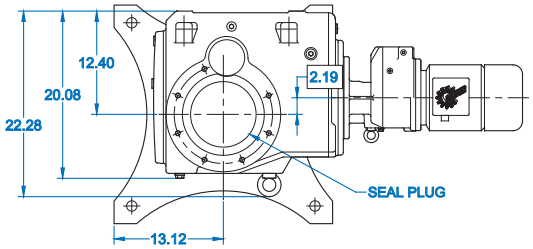
STANDARD FLANGE
(3 THRU HOLES/1 TAP)
PART: 168614060

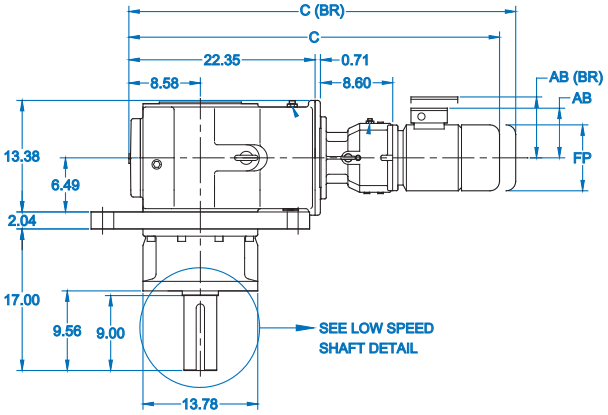


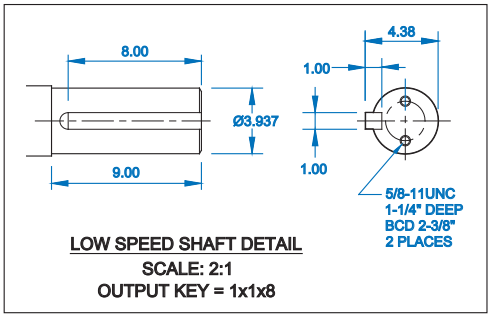
OPTIONAL FLANGE
(4 TAPS)
PART: 168614070

SK 9155/32 - Motor Dimensions

SK 9155/32 Integral Motor







NOTES

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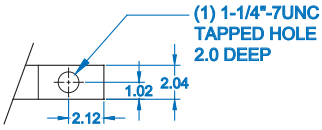
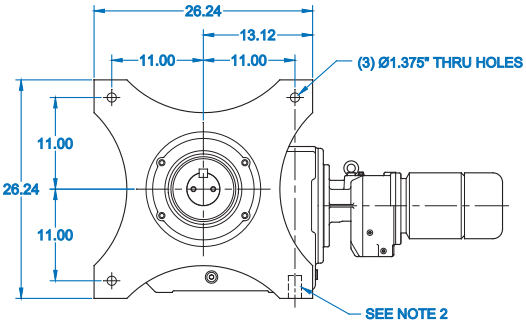
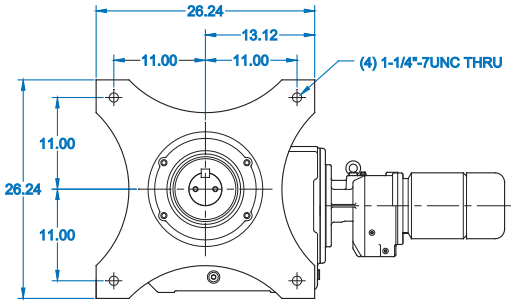




STANDARD FLANGE
(3 THRU HOLES/1 TAP)
PART: 168614060



OPTIONAL FLANGE
(4 TAPS)
PART: 168614070

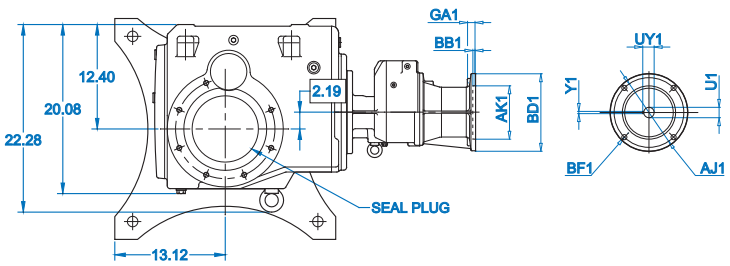
Motor Dimensions

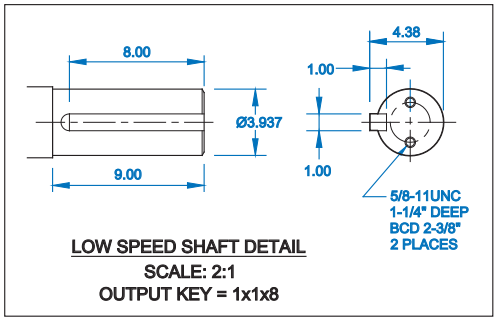
Standard Eff.	71S/L	80S/L	90S/L	100L/LA	112M	-
Energy Eff.	-	80LH	90SH/LH	100LH	-	112MH
Premium Eff.	-	80LP	90SP/LP	100LP/AP	-	112MP
AB	4.86	5.59	5.79	6.65	7.05	7.05
AB (BR)	5.24	5.59	5.79	6.77	7.17	-
C	40.74	41.74	43.34	44.53	45.40	46.39
C (BR)	43.02	44.26	46.29	48.13	49.10	-
FP	5.72	6.43	7.19	7.90	8.87	8.87

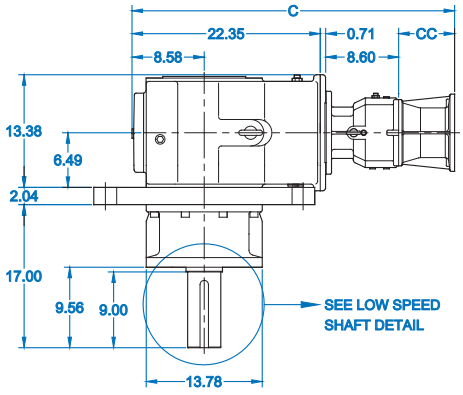
(BR) Denotes Brakemotor

SK 9155/32 - NEMA Dimensions

SK 9155/32 NEMA C-Face







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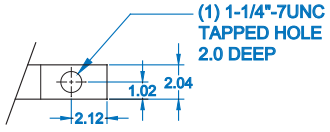
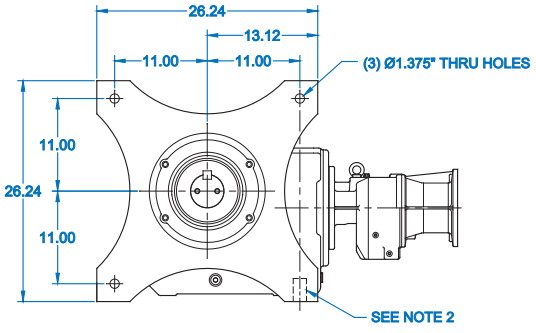
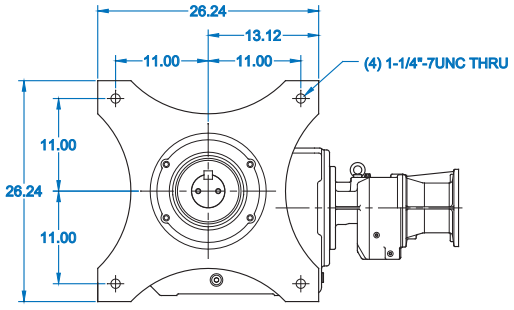




STANDARD FLANGE
(3 THRU HOLES/1 TAP)
PART: 168614060



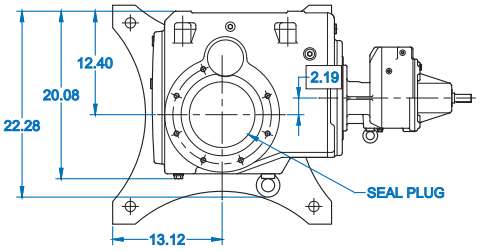
OPTIONAL FLANGE
(4 TAPS)
PART: 168614070

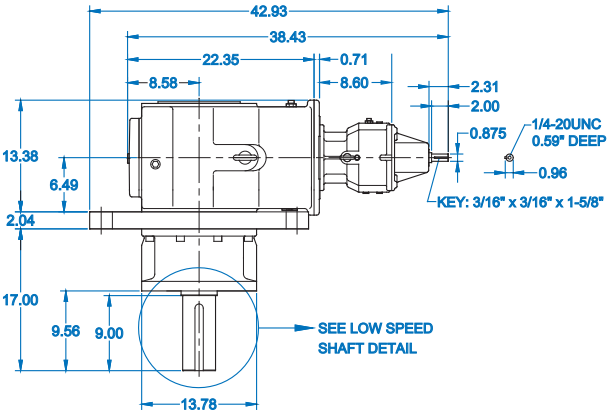
NEMA Dimensions

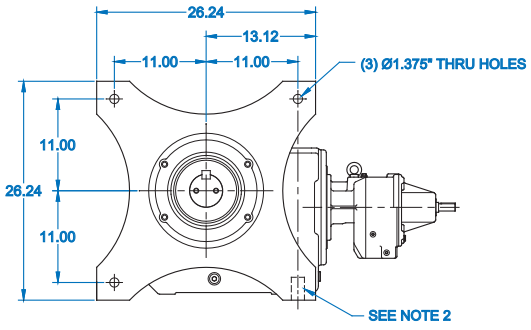
Type	AJ1	AK1	BB1	BD1	BF1	U1	UY1	Y1	C	CC
56C	5.875	4.500	0.20	6.54	0.43	0.625	0.71	0.1875	36.29	4.61
140TC	5.875	4.500	0.20	6.54	0.43	0.875	0.96	0.1875	36.29	4.61
180TC	7.250	8.500	0.23	9.17	0.59	1.125	1.24	0.250	38.33	6.65
210TC	7.250	8.500	0.23	9.17	0.59	1.375	1.52	0.312	38.33	6.65

SK 9155/32 - W Dimensions

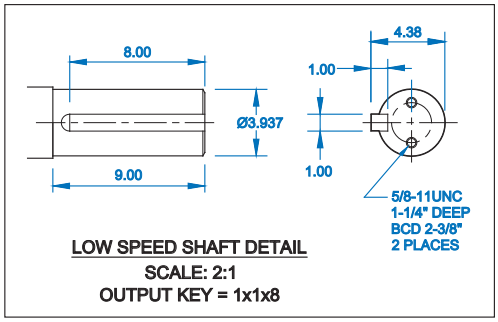
SK9155/32 Solid Input Shaft - Type W







STANDARD FLANGE
(3 THRU HOLES/1 TAP)
PART: 168614060



LOW SPEED SHAFT DETAIL
SCALE: 2:1
OUTPUT KEY = 1x1x8

NOTES

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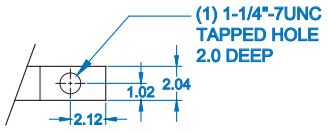
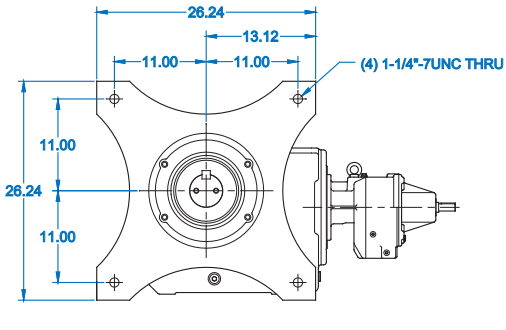
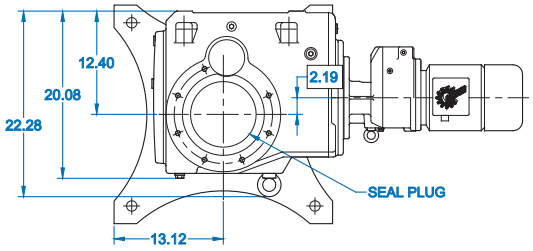


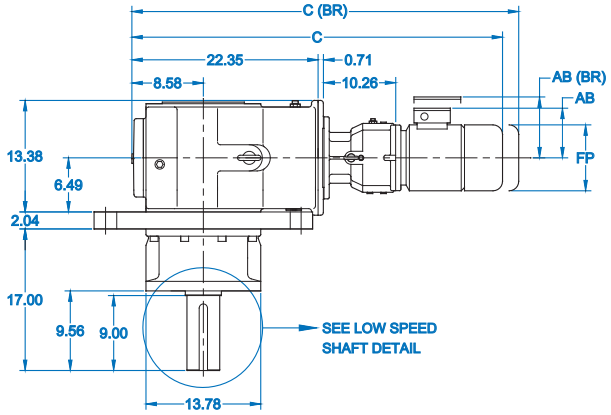


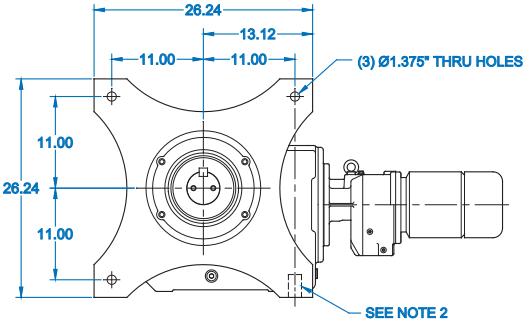
OPTIONAL FLANGE
(4 TAPS)
PART: 168614070

SK 9155/42 - Motor Dimensions

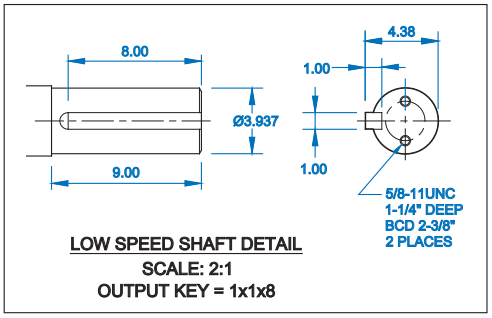
SK 9155/42 Integral Motor







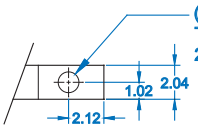
STANDARD FLANGE
(3 THRU HOLES/1 TAP)
PART: 168614060

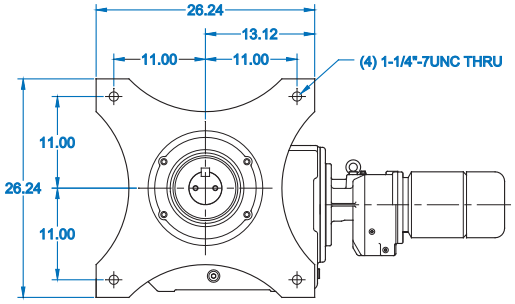


LOW SPEED SHAFT DETAIL
SCALE: 2:1
OUTPUT KEY = 1x1x8

NOTES

1. DIMENSIONS ARE IN INCHES
2. DUE TO GEARBOX INTERFERENCE, THE BOLT CANNOT GO THROUGH THE MOUNTING FLANGE. ONE (1) TAPPED HOLE IS SUPPLIED TO ACCOMMODATE SIDE MOUNTING.





OPTIONAL FLANGE
(4 TAPS)
PART: 168614070

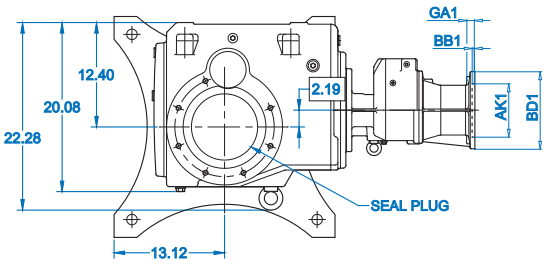
Motor Dimensions

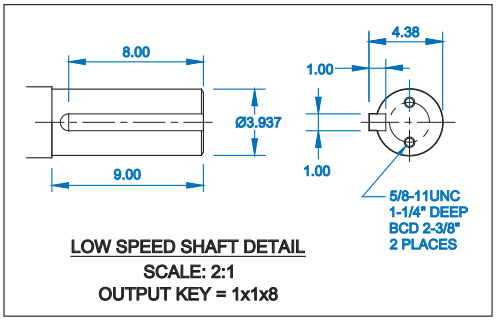
Standard Eff.	90S/L	100L/LA	112M	-	132S/M
Energy Eff.	90SH/LH	100LH	-	112MH	132SH/MH
Premium Eff.	90SP/LP	100LP/AP	-	112MP	132SP/MP
AB	5.79	6.65	7.05	7.05	8.03
AB (BR)	5.79	6.77	7.17	-	7.91
C	44.99	46.19	47.06	48.05	50.48
C (BR)	47.94	49.79	50.76	-	54.69
FP	7.19	7.90	8.87	8.87	10.45

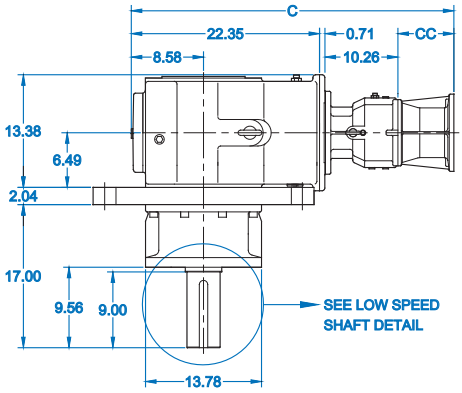
(BR) Denotes Brakemotor

SK 9155/42 - NEMA Dimensions

SK 9155/42 NEMA C-Face







NOTES

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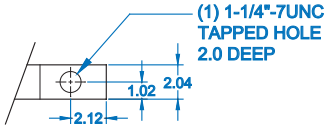
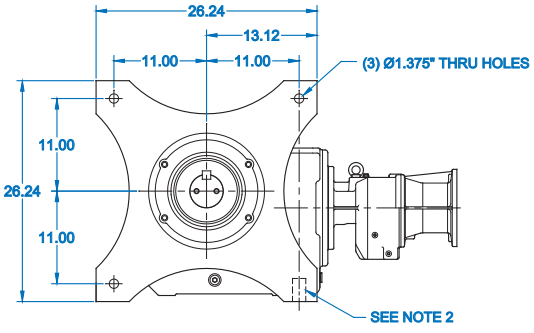
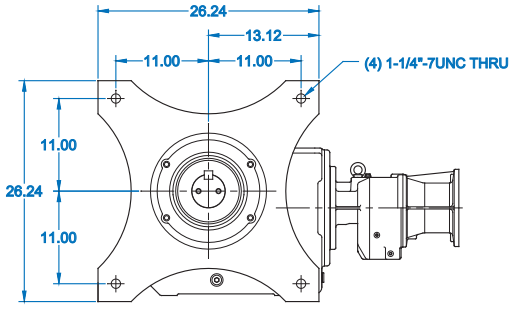




STANDARD FLANGE
(3 THRU HOLES/1 TAP)
PART: 168614060

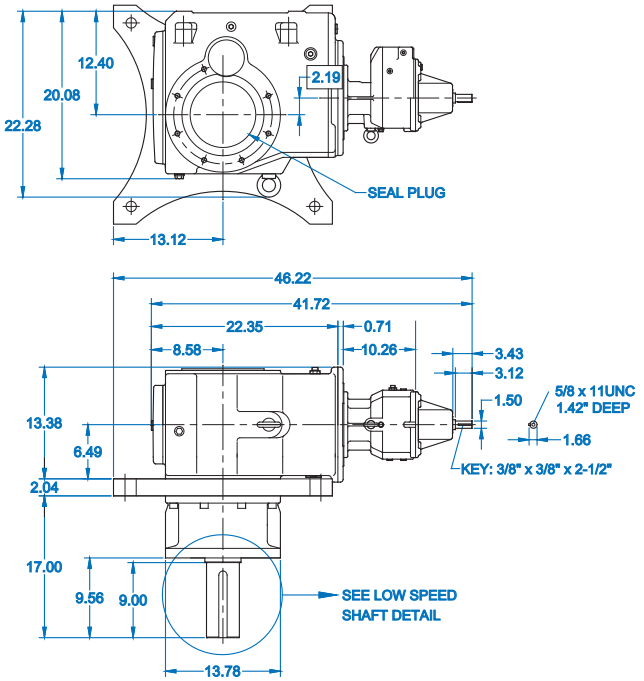


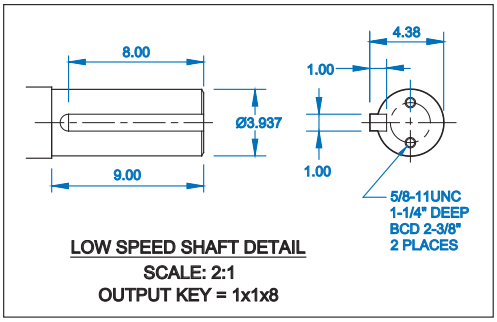
OPTIONAL FLANGE
(4 TAPS)
PART: 168614070

NEMA Dimensions

Type	AJ1	AK1	BB1	BD1	BF1	U1	UY1	Y1	C	CC
56C	5.875	4.500	0.20	6.54	0.43	0.625	0.71	0.1875	37.67	4.33
140TC	5.875	4.500	0.20	6.54	0.43	0.875	0.96	0.1875	37.67	4.33
180TC	7.250	8.500	0.23	9.17	0.59	1.125	1.24	0.250	41.25	7.91
210TC	7.250	8.500	0.23	9.17	0.59	1.375	1.52	0.312	41.25	7.91
250TC	7.250	8.500	0.23	9.17	0.59	1.625	1.80	0.375	41.25	7.91
280TC	9.00	10.500	0.23	13.78	0.55	1.875	2.10	0.500	41.88	8.54

SK9155/42 Solid Input Shaft - Type W

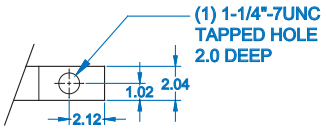


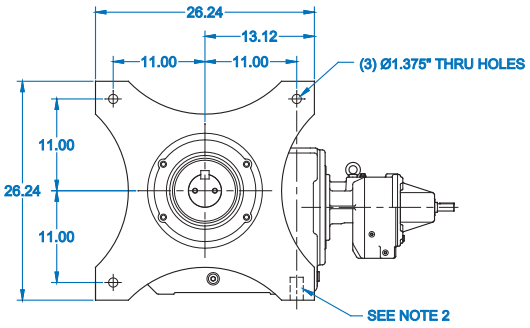


LOW SPEED SHAFT DETAIL
SCALE: 2:1
OUTPUT KEY = 1x1x8

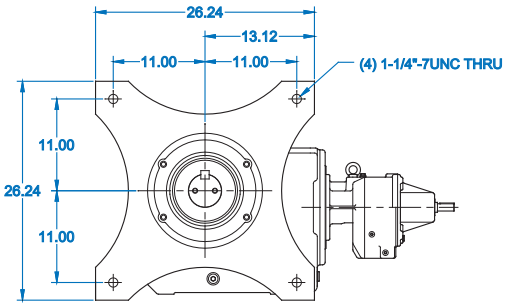
NOTES

1. DIMENSIONS ARE IN INCHES
2. DUE TO GEARBOX INTERFERENCE, THE BOLT CANNOT GO THROUGH THE MOUNTING FLANGE. ONE (1) TAPPED HOLE IS SUPPLIED TO ACCOMMODATE SIDE MOUNTING.





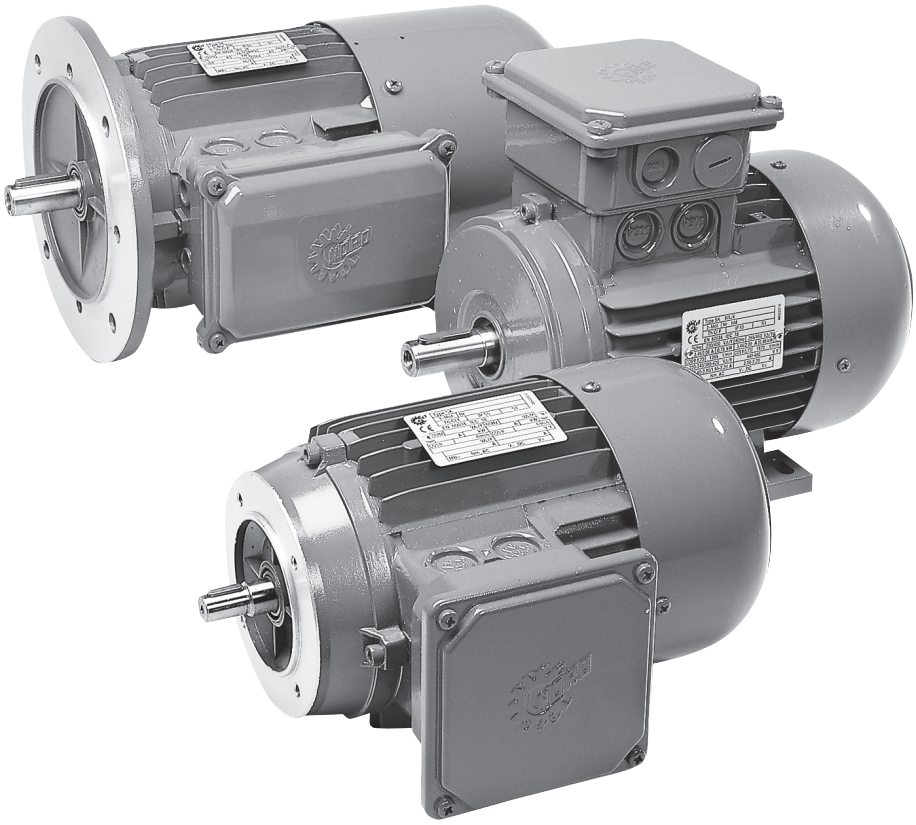
STANDARD FLANGE
(3 THRU HOLES/1 TAP)
PART: 168614060



OPTIONAL FLANGE
(4 TAPS)
PART: 168614070

Motors

- 230/460V - 60Hz
  Standard Efficient
- 230/460V - 60Hz
  Energy Efficient
- 208V - 60 Hz

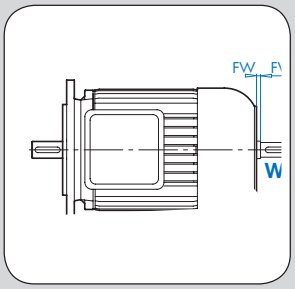


NORD®
DRIVESYSTEMS

www.nord.com

INVERTER DUTY MOTOR

Motor Type	Power Pn		Nn Full-load	In Full-Load Current 230V[a]	In Full-Load Current 460V[a]
	[hp]	[kW]	[rpm]	[A]	[A]
63S/4	0.16	0.12	1700	0.88	0.44
63L/4	0.25	0.18	1680	1.12	0.56
71S/4	0.33	0.25	1710	1.56	0.78
71L/4	0.5	0.37	1720	1.90	0.95
80S/4	0.75	0.55	1710	2.70	1.35
80L/4	1	0.75	1650	3.66	1.83
90S/4	1.5	1.1	1660	4.84	2.42
90L/4	2	1.5	1660	6.34	3.17
100L/4	3	2.2	1705	9.0	4.50
100LA/4	5	3.7	1725	15.2	7.62
132S/4	7.5	5.5	1735	19.8	9.9
132M/4	10	7.5	1735	25.8	12.9
160M/4	15	11	1770	38.4	19.2



Motor Order Form

NORD DRIVESYSTEMS

MOTORS & BRAKES

	Frame	Size	Poles	Motor Options	Brake Size	Brake Options
SK						

Frame	Size	Poles
63	S	4
71	SH	
80	SP	Other
90	M	Speeds
100	MH	Upon
112	MX	Request
132	MP	
160	L	
180	LA	
200	LH	
225	LX	
	LP	

Paint

- ❍ **Unpainted Aluminum**
- ❍ **Stainless Steel Paint**
- ❍ **NSD+ (gray)**
- ❍ **NSD+W (white)**
- ❍ **NSD-X3 (gray)**
- ❍ **NSD-X3W (white)**
- ❍ **Special** _____

Electrical Motor Options

- ❒ **H** - Energy Efficient Motor
- ❒ **TW** - Thermostat
- ❒ **TF** - Thermistor
- ❒ **SH** - Space Heater (select voltage)
  - ❍ 110 Volt ❍ 230 Volt ❍ 460 Volt
- ❒ **ISO H** - Class H insulation
- ❒ **WU -** High Resistance Rotor
- ❒ **4-2** - 2-Speed, 4/2 Pole, 1800/3600rpm
- ❒ **8-2** - 2-Speed, 8/2 Pole, 900/3600rpm
- ❒ **ECR** - Single Phase Motor

Environmental Options

- ❒ **NSD+** - Nord Severe Duty Paint
- ❒ **NSDx3** - Nord Extreme Duty Paint
- ❒ **RD** - Canopy Drip Cover
- ❒ **RDD** - Double Fan Cover
- ❒ **KB** - Condensation Drain Holes (plugged)
- ❒ **KBO** - Condensation Drain Holes (open)
- ❒ **IP66** - IP66 Enclosure Protection
- ❒ **KKV** - Terminal Box Sealed with Resin
- ❒ **AICM** - Additional Insulation
- ❒ **EP** - Epoxy Dipped Windings

Frequency Inverter Related Options

- ❒ **F** - Blower Fan (200-575V 1 & 3 Phase)
- ❒ **FC -** Blower Cooling Fan (115V, 1 Phase)
- ❒ **IG__** - Incremental Encoder
- ❒ **IG__P** - Incremental Encoder with Plug
- ❒ **AG** - Absolute Encoder

Additional Motor Options

- ❒ **OL -** Totally Enclosed Non-Ventilated (TENV)
- ❒ **OL/H -** (TENV) Without Fan Cover
- ❒ **WE -** Second Shaft Extension (Fan Side)*
- ❒ **HR -** Hand Wheel
- ❒ **Z -** High Inertia Cast Iron Fan
- ❒ **RLS -** Motor Backstop (rotation viewing fan)
  - ❍ Clockwise ❍ Counter-Clockwise
- ❒ **EKK -** Small Terminal Box (not UL approved)
- ❒ **MS -** Quick Power Plug Connector

* Special WE shaft extensions available upon request

Brake Size
BRE 5
BRE 10
BRE 20
BRE 40
BRE 60
BRE 100
BRE 150
BRE 250
BRE 400
BRE 800

Brake Options

- ❒ **HL** - Hand Release Lever
- ❒ **FHL** - Locking Hand Release Lever
- ❒ **HLH** - Hand Release Lever with Hole
- ❒ **RG** - Corrosion Protected Brake
- ❒ **SR** - Dust and Corrosion Protected Brake
- ❒ **ADJ_____Nm** - Adjust Brake Torque
- ❒ **BIP66** - IP66 Brake Enclosure
- ❒ **MIK** - Micro-switch
- ❒ **BSH** - Brake Heating/Bifilar Coil
- ❒ **NRB1** - Quiet Brake Release
- ❒ **NRB2** - Quiet Brake Motor Operation
- ❒ **FBR** - Brass Foil
- ❒ **DBR -** Double Brake
- ❒ **G...P -** High Performance Rectifier
- ❒ **G...V** - Sealed Rectifier
- ❒ **IR** - Current Sensing Relay

Rectifier Selection

Rectifier Wiring

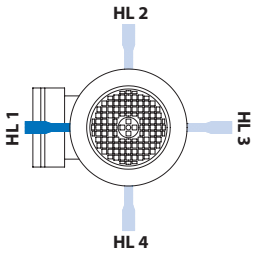
- ❍ Across the line (from motor terminal box)
- ❍ Separate power source (frequency inverter, soft starter)

Brake Supply Voltage

- ❍ 24 VDC
- ❍ 115 VAC
- ❍ 200 VAC
- ❍ 230 VAC
- ❍ 400 VAC
- ❍ 460 VAC
- ❍ 500 VAC
- ❍ 575 VAC
- ❍ Other _____

Hand Release Position

- ❍ HL1
- ❍ HL2
- ❍ HL3
- ❍ HL4



Mounting

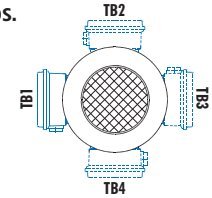
- ❍ Integral to gearbox
- ❍ NEMA C-Face
- ❍ IEC B5 Mount

Voltage & Frequency

- ❍ 230/460V-60Hz
- ❍ 575V-60Hz
- ❍ 208V-60Hz
- ❍ 400V-50Hz
- ❍ 115/230V, 60Hz-1-ph.
- ❍ Other

Terminal Box Pos.

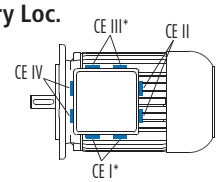
- ❍ TB1
- ❍ TB2
- ❍ TB3
- ❍ TB4



Mtg. Pos. M1 Shown

Conduit Entry Loc.

- ❍ CE I *
- ❍ CE II
- ❍ CE III *
- ❍ CE IV



* Brakemotor

Mtg. Pos. M1 Shown

Stocked NEMA C-Face Motors

NEMA C-Face Motors

The National Electrical Manufacturers Association (NEMA) provides standardization of electrical equipment, enabling customers to select from a range of safe, effective and compatible products. A NEMA C-face motor has a machined face with a pilot and threaded holes for direct mounting onto a NORD reducer or other industrial equipment. NORD offers NEMA C-face motors stocked as finished goods and also will assemble NEMA C-face motors to your specifications.

Stocked NEMA C-Face Motors

Stocked NEMA C-face motors are offered in a standard efficiency, energy efficient and in a brakemotor design. They are available in 230/460V-60Hz and 575V-60Hz up to 10 hp. Part numbers for stocked NEMA C-face motors are in the table below.

Assembled per Order NEMA C-Face Motors

NORD will assemble a NEMA C-face motor to your specifications based upon the available motor options listed in our G1000 catalog.

Motor Type	Power	Part Number 230/460V-60Hz	Part Number 575V-60Hz	Weight [lb]
High Performance Motors				
63S/4-56C	1/6 hp	31110012	31110013	7.9
63L/4-56C	1/4 hp	31610012	31610013	9.3
71S/4-56C	1/3 hp	32110012	32110013	11.9
71L/4-56C	1/2 hp	32610012	32610013	13.9
80S/4-56C	3/4 hp	33110012	33110013	17.6
80L/4-56C	1 hp	33610022	n/a	19.8
80L/4-143TC	1 hp	33610012	n/a	19.8
90S/4-145TC	1.5 hp	34110012	n/a	26.5
90L/4-145TC	2 hp	34610012	n/a	30.9
100L/4-182TC	3 hp	35110012	n/a	39.7
100LA/4-184TC	5 hp	35610012	n/a	46.3
132S/4-213TC	7.5 hp	36410012	n/a	97.0
132M/4-215TC	10 hp	36710012	n/a	121.3
160M/4-254TC TW	15 hp	37310012	n/a	160.9
160L/4-256TC TW	20 hp	37510012	n/a	178.6
180MX/4-284TC TW	25hp	37610012	n/a	276.3
180LX/4-286TC TW	30hp	37810012	n/a	307.2
Energy Efficient Motors				
80LH/4-56C	1 hp	33610094	33610095	19.8
80LH/4-143TC	1 hp	33610092	33610093	19.8
90SH/4-145TC	1.5 hp	34110092	34110093	26.5
90LH/4-145TC	2 hp	34610092	34610093	30.9
100LH/4-182TC	3 hp	35610092	35610093	39.7
112MH/4-184TC	5 hp	36110082	36110083	83.6
132SH/4-213TC	7.5 hp	36410092	36410093	97.0
132MH/4-215TC	10 hp	36710092	36710093	121.3
160MH/4-254TC TW	15 hp	37310092	37310093	160.9
160LH/4-256TC TW	20 hp	37510092	37510093	198.4
Brakemotors				
63S/4-56C BRE5 HL	1/6 hp	31110034 ◈	31110035 ⁎	12.4
63L/4-56C BRE5 HL	1/4 hp	31610034 ◈	31610035 ⁎	13.7
71S/4-56C BRE5 HL	1/3 hp	32110034 ◈	32110035 ⁎	16.3
71L/4-56C BRE5 HL	1/2 hp	32610034 ◈	32610035 ⁎	18.3
80S/4-56C BRE10 HL	3/4 hp	33110034 ◈	33110035 ⁎	24.3
80L/4-56C BRE10 HL	1 hp	33610024 ◈	33610025 ⁎	26.5
80L/4-143TC BRE10 HL	1 hp	33610034 ◈	33610035 ⁎	26.5
90S/4-145TC BRE20 HL	1.5 hp	34110034 ◈	34110035 ⁎	36.4
90L/4-145TC BRE20 HL	2 hp	34610034 ◈	34610035 ⁎	40.8
100L/4-182TC BRE40 HL	3 hp	35110034 ◈	35110035 ⁎	55.1
100LA/4-184TC BRE40 HL	5 hp	35610034 ◈	35610035 ⁎	61.7
132S/4-213TC BRE60 HL	7.5 hp	36410034 ◈	36410035 ⁎	123.5
132M/4-215TC BRE100 HL	10 hp	36710034 ◈	36710035 ⁎	156.5
160M/4-254TC BRE 150 HL TW	15 hp	37310034 ◈	37310035 ⁎	220.5
160L/4-256TC BRE 250 HL TW	20 hp	37510034 ◈	37510035 ⁎	242.5

◈230/460V motors have brake systems supplied with 230VAC to a GVE20L rectifier that outputs 205VDC to the brake coil

⁎ 575V motors have brake systems supplied with 575VAC to a GHE50L rectifier that outputs 250VDC to the brake coil

Performance Data

DRIVESYSTEMS

Standard Efficiency

230/460V – 60Hz

Inverter duty • TEFC
Synchronous speed 1800rpm @ 60Hz • 4-pole • Three-phase
Voltages: 230/460V – 60Hz • 1.15 Service Factor
Continuous Duty • 40°C Ambient • up to 3300ft Elevation
Class B temperature rise • Class F insulation

MOTORS & BRAKES

Motor Type	Power Pn		Nn Full-load	In Full-Load Current 230V[a]	In Full-Load Current 460V[a]	Ia/In	Code Letter	Torque Tn	Ta/Tn	Tk/Tn	pf	Eff.	Jm Inertia
	[hp]	[kW]	[rpm]	[A]	[A]	[%]		[lb-in]				[%]	[lb-ft²]
63S/4	0.16	0.12	1700	0.88	0.44	245	F	5.92	2.1	2.2	0.66	52	0.005
63L/4	0.25	0.18	1680	1.12	0.56	275	E	8.99	2.1	2.2	0.71	57	0.0067
71S/4	0.33	0.25	1710	1.56	0.78	310	G	12.3	2.5	2.4	0.64	63	0.017
71L/4	0.5	0.37	1720	1.90	0.95	355	F	18.0	2.45	2.6	0.69	71	0.0204
80S/4	0.75	0.55	1710	2.70	1.35	355	F	27.0	2.2	2.2	0.71	72	0.0259
80L/4	1	0.75	1650	3.66	1.83	390	G	38.1	2.2	2.3	0.74	70	0.0345
90S/4	1.5	1.1	1660	4.84	2.42	445	G	55.6	2.7	2.6	0.78	73	0.055
90L/4	2	1.5	1660	6.34	3.17	465	G	75.8	2.55	2.5	0.80	74	0.074
100L/4	3	2.2	1705	9.0	4.50	490	G	108	2.3	2.6	0.81	82	0.107
100LA/4	5	3.7	1725	15.2	7.62	510	G	180	2.7	3.1	0.75	81	0.141
132S/4	7.5	5.5	1735	19.8	9.9	545	G	267	2.45	2.75	0.82	86	0.55
132M/4	10	7.5	1735	25.8	12.9	645	H	363	2.9	3.2	0.84	87	0.752
160M/4	15	11	1770	38.4	19.2	665	H	522	2.45	3.0	0.82	88	0.95
160L/4	20	15	1765	49	24.5	725	H	713	2.9	3.3	0.86	89.4	1.23
180MX/4	25	18.5	1750	60	30	860	K	887	2.95	3.4	0.87	89	1.35
180LX/4	30	22	1755	71	35.5	980	L	1052	3.4	3.7	0.87	89.4	1.35
200L/4	40	30	1780	96	48	770	J	1414	2.9	3.6	0.85	92	5.70
225S/4	50	37	1765	-	58	760	H	1759	3.1	3.5	0.86	93.1	7.60
225M/4	60	45	1770	-	70	840	J	2133	3.1	3.6	0.86	93.8	8.54

a) Motors frame 225 and larger are standardly provided as single-voltage 460V and not as dual voltage

Pn - **Full load power**
Nn - **Full load speed**
In - **Full load current**
Ia - **Locked-rotor current**
Ia/In - **Locked-rotor current ratio (%)**
Tn - **Full-load torque**
Ta - **Locked-rotor torque**
Ta/Tn - **Locked-rotor torque ratio**
Tk - **Break-down torque**
Tk/Tn - **Break-down torque ratio**
pf - **Power factor**
Eff - **Normal efficiency**
Jm - **Motor inertia**

Energy Efficient (EPAct)

230/460V – 60Hz / EE

Inverter duty • TEFC
Synchronous speed 1800rpm @ 60Hz • 4-pole • Three-phase
Voltages: 230/460V – 60Hz • 1.15 Service Factor
Continuous Duty • 40°C Ambient • up to 3300ft Elevation
Class B temperature rise • Class F insulation

Motor Type	Power Pn		Nn Full-load	In Full-Load Current		Ia/In	Code Letter	Torque Tn	Ta/Tn	Tk/Tn	pf	Eff.	Jm Inertia
				230V[a)]	460V[a)]								
	[hp]	[kW]	[rpm]	[A]	[A]	[%]		[lb-in]				[%]	[lb-ft²]
80LH/4	1	0.75	1750	3.88	1.94	600	L	36.0	4.6	4.3	0.59	82.5	0.051
90SH/4	1.5	1.1	1740	4.3	2.15	630	J	53.1	3.5	3.8	0.76	84.0	0.085
90LH/4	2	1.5	1745	6.3	3.15	670	K	72.1	4.3	4.5	0.71	84.0	0.092
100LH/4	3	2.2	1765	8.6	4.3	790	L	105	3.6	4.7	0.73	87.5	0.178
112MH/4	5	3.7	1770	14.4	7.2	810	L	176	4.0	4.8	0.76	87.5	0.304
132SH/4	7.5	5.5	1780	20.9	10.5	820	L	259	4.3	4.6	0.74	89.5	0.75
132MH/4	10	7.5	1770	27.0	13.5	735	J	356	3.2	4.0	0.78	89.5	0.84
160MH/4	15	11	1765	35.8	17.9	810	J	527	2.6	3.2	0.85	91.0	1.23
160LH/4	20	15	1765	49	24.5	850	K	712	2.8	3.5	0.85	91.0	1.35
180MH/4	25	18.5	1770	61	30.5	840	K	879	2.8	3.6	0.83	92.4	3.56
180LH/4	30	22	1770	72	36	880	K	1046	3.1	3.9	0.83	92.4	4.51
200LH/4	40	30	1770	94	47	830	J	1424	3.0	3.6	0.86	93.0	7.60
225SH/4	50	37	1782	-	59	810	J	1758	3.0	3.4	0.84	94.1	9.5
225MH/4	60	45	1782	-	70	820	J	2109	3.0	3.5	0.85	94.3	11.6

a) Motors frame 225 and larger are standardly provided as single-voltage 460V and not as dual voltage

Pn	-	**Full load power**
Nn	-	**Full load speed**
In	-	**Full load current**
Ia	-	**Locked-rotor current**
Ia/In	-	**Locked-rotor current ratio (%)**
Tn	-	**Full-load torque**
Ta	-	**Locked-rotor torque**
Ta/Tn	-	**Locked-rotor torque ratio**
Tk	-	**Break-down torque**
Tk/Tn	-	**Break-down torque ratio**
pf	-	**Power factor**
Eff	-	**Normal efficiency**
Jm	-	**Motor inertia**

Performance Data

NORD DRIVESYSTEMS

Standard Efficiency

575V – 60Hz

Inverter duty • TEFC
Synchronous speed 1800rpm @ 60Hz • 4-pole • Three-phase
Voltages: 332/575V – 60Hz • 1.15 Service Factor
Continuous Duty • 40°C Ambient • up to 3300ft Elevation
Class B temperature rise • Class F insulation

MOTORS & BRAKES

Motor Type	Power Pn		Nn Full-load	In Full-Load Current 575V	Ia/In	Code Letter	Torque Tn	Ta/Tn	Tk/Tn	pf	Eff.	Jm Inertia
	[hp]	[kW]	[rpm]	[A]	[%]		[lb-in]				[%]	[lb-ft²]
63S/4	0.16	0.12	1700	0.37	245	F	5.92	2.1	2.2	0.66	52	0.005
63L/4	0.25	0.18	1680	0.46	275	E	8.99	2.1	2.2	0.71	57	0.0067
71S/4	0.33	0.25	1710	0.66	310	G	12.3	2.5	2.4	0.64	63	0.017
71L/4	0.5	0.37	1720	0.8	355	F	18.0	2.45	2.6	0.69	71	0.0204
80S/4	0.75	0.55	1710	1.12	355	F	27.0	2.2	2.2	0.71	72	0.0259
80L/4	1	0.75	1650	1.46	390	G	38.1	2.2	2.3	0.74	70	0.0345
90S/4	1.5	1.1	1660	1.94	445	G	55.6	2.7	2.6	0.78	73	0.055
90L/4	2	1.5	1660	2.54	465	G	75.8	2.55	2.5	0.80	74	0.074
100L/4	3	2.2	1705	3.6	490	G	108	2.3	2.6	0.81	82	0.107
100LA/4	5	3.7	1725	6.1	510	G	180	2.7	3.1	0.75	81	0.141
132S/4	7.5	5.5	1735	7.92	545	G	267	2.45	2.75	0.82	86	0.55
132M/4	10	7.5	1735	10.3	645	H	363	2.9	3.2	0.84	87	0.752
160M/4	15	11	1770	14.7	665	H	522	2.45	3.0	0.82	88	0.95
160L/4	20	15	1765	19.5	725	H	713	2.9	3.3	0.86	89.4	1.23
180MX/4	25	18.5	1750	24.0	860	K	887	2.95	3.4	0.87	89	1.35
180LX/4	30	22	1755	28.4	980	L	1052	3.4	3.7	0.87	89.4	1.35
200L/4	40	30	1780	36.0	770	J	1414	2.9	3.6	0.85	92	5.70
225S/4	50	37	1765	50.0	760	H	1759	3.1	3.5	0.86	93.1	7.60
225M/4	60	45	1770		840	J	2133	3.1	3.6	0.86	93.8	8.54
250M/4	75	55	1782		700	H	2636	2.8	3.2	0.84	93.7	16.4
280S/4	100	75	1788		830	J	3497	2.9	3.5	0.84	94.4	30.6
280M/4	125	90	1786		810	J	4385	2.8	3.3	0.86	95.1	34.9
315S/4	150	110	1788		720	H	5255	2.8	3.1	0.84	94.7	47.5
315M/4	175	132	1790		800	J	6125	3.0	3.4	0.85	95.4	58.4
315Ma/4	200	150	1790		810	J	7003	3.2	3.6	0.86	95.7	71.4
315L/4	250	187	1790		850	J	8734	3.2	3.3	0.87	96.3	92.8

Pn - Full load power
Nn - Full load speed
In - Full load current
Ia - Locked-rotor current
Ia/In - Locked-rotor current ratio (%)
Tn - Full-load torque
Ta - Locked-rotor torque

Ta/Tn - Locked-rotor torque ratio
Tk - Break-down torque
Tk/Tn - Break-down torque ratio
pf - Power factor
Eff - Normal efficiency
Jm - Motor inertia

Energy Efficient (EPAct)

575V – 60Hz / EE

Inverter duty • TEFC
Synchronous speed 1800rpm @ 60Hz • 4-pole • Three-phase
Voltages: 332/575V – 60Hz • 1.15 Service Factor
Continuous Duty • 40°C Ambient • up to 3300ft Elevation
Class B temperature rise • Class F insulation

Motor Type	Power Pn		Nn Full-load	In Full-Load Current 575V	Ia/In	Code Letter	Torque Tn	Ta/Tn	Tk/Tn	pf	Eff.	Jm Inertia
	[hp]	[kW]	[rpm]	[A]	[%]		[lb-in]				[%]	[lb-ft²]
80LH/4	1	0.75	1750	1.5	600	L	36.0	4.6	4.3	0.59	82.5	0.051
90SH/4	1.5	1.1	1740	1.75	630	J	53.1	3.5	3.8	0.76	84.0	0.085
90LH/4	2	1.5	1745	2.45	670	K	72.1	4.3	4.5	0.71	84.0	0.092
100LH/4	3	2.2	1765	3.4	790	L	105	3.6	4.7	0.73	87.5	0.178
112MH/4	5	3.7	1770	5.6	810	L	176	4.0	4.8	0.76	87.5	0.304
132SH/4	7.5	5.5	1780	8.3	820	L	259	4.3	4.6	0.74	89.5	0.75
132MH/4	10	7.5	1770	10.8	735	J	356	3.2	4.0	0.78	89.5	0.84
160MH/4	15	11	1765	14.3	810	J	527	2.6	3.2	0.85	91.0	1.23
160LH/4	20	15	1765	19.6	850	K	712	2.8	3.5	0.85	91.0	1.35
180MH/4	25	18.5	1770	24.4	840	K	879	2.8	3.6	0.83	92.4	3.56
180LH/4	30	22	1770	28.8	880	K	1046	3.1	3.9	0.83	92.4	4.51
200LH/4	40	30	1770	37.6	830	J	1424	3.0	3.6	0.86	93.0	7.60
225SH/4	50	37	1782	47.2	810	J	1758	3.0	3.4	0.84	94.1	9.5
225MH/4	60	45	1782	56	820	J	2109	3.0	3.5	0.85	94.3	11.6
250MH/4	75	55	1790	69	820	J	2619	2.9	3.4	0.86	95.1	20.4
280SH/4	100	75	1786	93	830	J	3506	2.9	3.5	0.85	94.5	36.3
280MH/4	125	90	1786	117	800	J	4385	2.8	3.3	0.85	94.9	43.4
315SH/4	150	110	1791	139	760	H	5246	2.8	3.1	0.85	95.5	58.8
315MaH/4	200	150	1791	180	890	J	6995	3.3	3.5	0.86	95.9	86.9

Pn - **Full load power**
Nn - **Full load speed**
In - **Full load current**
Ia - **Locked-rotor current**
Ia/In - **Locked-rotor current ratio (%)**
Tn - **Full-load torque**
Ta - **Locked-rotor torque**
Ta/Tn - **Locked-rotor torque ratio**
Tk - **Break-down torque**
Tk/Tn - **Break-down torque ratio**
pf - **Power factor**
Eff - **Normal efficiency**
Jm - **Motor inertia**

Performance Data

DRIVESYSTEMS

Standard Efficiency

200-208V – 60Hz

Inverter duty • Induction motor • TEFC
Synchronous speed 1800rpm @ 60Hz • 4-pole • Three-phase
Voltages: 208V – 60Hz • 1.15 Service Factor
Continuous Duty • 40°C Ambient • up to 3300ft Elevation
Class B temperature rise • Class F insulation

Motor Type	Power Pn		Nn Full-load	In 208V	Ia/In	Code Letter	Torque Tn	Ta/Tn	Tk/Tn	pf	Eff.	Jm Inertia
	[hp]	[kW]	[rpm]	[A]	[%]		[lb-in]				[%]	[lb-ft²]
63S/4	0.16	0.12	1700	0.97	245	F	5.93	2.1	2.2	0.66	52	0.005
63L/4	0.25	0.18	1680	1.24	275	E	9.38	2.1	2.2	0.71	57	0.0067
71S/4	0.33	0.25	1710	1.73	310	G	12.2	2.5	2.4	0.64	63	0.015
71L/4	0.5	0.37	1720	2.10	355	F	18.3	2.45	2.6	0.69	71	0.0181
80S/4	0.75	0.55	1710	2.99	355	F	27.6	2.2	2.2	0.71	72	0.0304
80L/4	1	0.75	1650	4.05	390	G	38.2	2.2	2.3	0.74	70	0.0392
90S/4	1.5	1.1	1660	5.35	445	G	57.0	2.7	2.6	0.78	73	0.0670
90L/4	2	1.5	1660	7.01	465	G	75.9	2.55	2.5	0.80	74	0.0855
100L/4	3	2.2	1705	9.95	490	G	111	2.3	2.6	0.81	82	0.107
100LA/4	5	3.7	1725	16.8	510	G	183	2.7	3.1	0.75	81	0.162
132S/4	7.5	5.5	1735	21.9	545	G	272	2.45	2.75	0.82	86	0.553
132M/4	10	7.5	1735	28.5	645	H	363	2.9	3.2	0.84	87	0.753

Pn - Full load power
Nn - Full load speed
In - Full load current
Ia - Locked-rotor current
Ia/In - Locked-rotor current ratio (%)
Tn - Full-load torque
Ta - Locked-rotor torque

Ta/Tn - Locked-rotor torque ratio
Tk - Break-down torque
Tk/Tn - Break-down torque ratio
pf - Power factor
Eff - Normal efficiency
Jm - Motor inertia

Enclosure

The NORD standard motors are provided with Totally Enclosed Fan-Cooled (TEFC) with an IP55 enclosure rating. Other enclosures are available, including Totally Enclosed Non-Ventilated (TENV), Totally Enclosed Blower-Cooled (TEBC), and IP66.

The motor integral cooling fan provides proper air flow in either direction of rotation. The IEC cooling classification is IC 411 according to IEC 60034-6.

IP Enclosures per IEC 60034-5 - Simplified

	1st digit Foreign body protection		2nd digit Water protection
0	No protection	0	No Protection
1	Protected against solid objects 50mm (2 in) in diameter and larger	1	Protected against dripping water
2	Protected against solid objects 12 mm (1/2 in) in diameter and larger	2	Protected against dripping water up to a 15 degree angle
3	Protected against solid objects 2.5 mm (0.1 in) in diameter and larger	3	Protection against sprayed water
4	Protected against solid objects 1 mm (0.04 in) in diameter and larger	4	Protection against splashed water
5	Protected against dust	5	Protection against water jets
6	Dust tight	6	Protection against high pressure water jets
7	--	7	Protection against intermittent submersion in water
8	--	8	Protection against continuous submersion in water

Protective Features

All NORD Motors and Speed Reducers are constructed to provide a high degree of protection against wet and severe environments. NORD Motors and Speed Reducers are extremely well sealed against moisture ingress and use corrosion and moisture resistant components. NORD has recently made many enhancements in the motor and gear units standard construction to provide improved environmental protection. Many of the standard protection features of the NORD units are only available at an additional cost from other motor and gear drive suppliers. NORD designs all gearmotors, speed reducers and motors for installation in harsh industrial, commercial and municipal installation environments.

Standard Construction

- Shaft lip seals on both ends of the motor shafts
- Stator to endbell connections sealed to exclude moisture
- Double coated magnetic wire insulation
- Inverter/vector duty insulation system conforms to NEMA MG1-1998, section 31.4.4.2 voltage spikes
- Moisture resistant varnish dipped windings – improved varnish materials
- Inorganic insulating components for tropical protection
- Moisture resistant motor windings
- Conduit box sealed with gaskets
- Corrosion resistant alloy materials
- Threaded cable entry holes

Motors for Indoor Operation - Option Codes

	Dry Conditions	Wet or Humid Conditions
Ambient Temperature Fluctuation	–	KB, SH
Paint	–	NSD+
Vertical Motor Mount 	RD	RDD
Brakemotor	–	RG

Motors for Outdoor Operation - Option Codes

	Sheltered from the Elements	Exposed to the Elements
Ambient Temperature Fluctuation	KB, SH	KB, SH, KKV
Paint	NSD+	NSDx3
Vertical Motor Mount 	RD	RDD
Brakemotor	RG	RG

Option Code Key

KB	Condensation Drain Holes - Plugged
SH	Space Heater
KKV	Terminal Box Sealed with Resin
NSD+	Nord Severe Duty Paint
NSDx3	Nord Severe Extreme Duty X3 Paint
RD	Canopy Drip Cover
RDD	Double Fan Cover
RG	Corrosion Protected Brake

Motor-Brake Option (BRE)

The standard NORD motor brake is spring-set when power is removed from the brake circuit (power-off). The brake coil utilizes a DC voltage supplied through a rectified power source.

Advantages

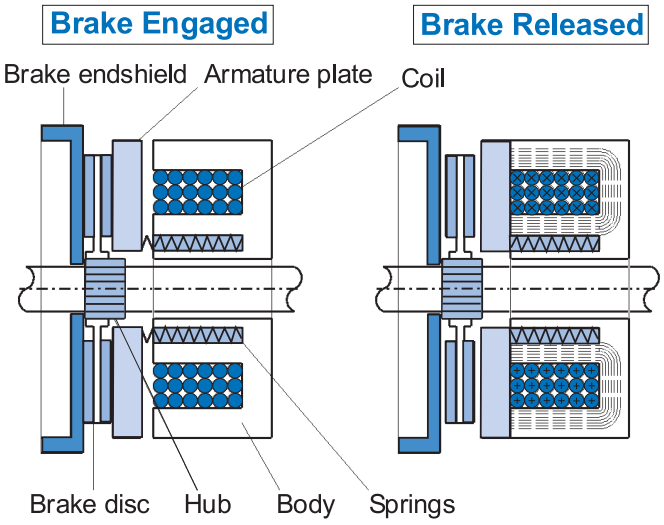
- Each NORD motor frame size has a number of brake sizes available, with different torque capacities.
- Brake adjustment is possible by changing the brake spring combinations. In addition, several common brake sizes also have an additional spanner-nut adjustment available.
- Compared to the many AC brakes on the market, NORD brakes offer better wear capacity, easier field adjustability, greater reliability, and lower end-cost to the consumer.
- NORD motor-brakes operate with a high degree of safety, because the brake is actively engaged with the no brake supply voltage (power-off).
- The rotating brake disc is environmentally safe with an asbestos-free friction material bonded to each side.
- The connection between the rectifier and the brake coil is already completed at the factory.
- The brake air-gap is factory-set but can easily be adjusted in the event of wear.

Operation

The main AC supply power to the brake rectifier can be supplied from either the motor terminal board or from a separately switched power source.

- In typical direct-across-the-line motor operation, AC brake power may be supplied from the motor's terminal board.
- If the motor is a two-speed model, or if the motor is being controlled by a variable frequency drive or electrical soft-start, then the brake rectifier must be powered from a separate AC source.

When the brake is de-energized (Power off), the braking springs exert a force against the armature plate (pressure plate), preventing the brake rotor from rotating. Conversely, when the brake coil is energized (Power on), a magnetic field builds and pulls the armature plate across the air gap to the brake oil casing. This action frees the brake rotor and allows the motor shaft to rotate.



Brake Selection

The selection of a motor brake system is broken down into five phases. The selection of the braking torque, the selection of the braking times (release times and setting times), the selection of the electrical supply and connection, the selection of brake options, and the final phase is the verification of the permissible brake work.

Selection steps

1) Brake torque
2) Brake times
3) Electrical supply and connection
4) Brake options
5) Brake work verification

Brake Options

Brake Options

Abbreviation	Description
ADJ	**Torque Adjustment** - Brake torque may be adjusted at the factory
BSH	**Brake Heating/Bifilar Coil** - Provides a seperate coil for heating to avoid condensation
DBR	**Double Brake (2xBRE)** - Double brakes are used for redundancy and additional safety
FBR	**Brass Foil** - Provides a brass foil in the brake air-gap to provide faster braking times
FHL	**Locking Hand Release Lever** - Lockable manual hand release lever
HL	**Hand Release Lever** - Manual hand release lever
HLH	**Hand Release Lever with Hole** - Hand lever with 5.5mm hole
IP66	**IP66 Brake Enclosure** - Brake with IP66 enclosure
IR	**Current Sensing Relay** - Fast brake engagement (stopping) without external control equipment
MIK	**Micro-Switch** - Brake fitted with a micro-switch for sensing the brake state (released or engaged)
NRB1	**Quiet Brake Release** - An o-ring is placed between the coil body and the armature plate for noise reduction
NRB2	**Quiet Brake Motor Operation** - An o-ring is placed between the carrier hub & the armature plate to prevent clattering.
RG	**Corrosion Protected Brake** - Corrosion protected brake
SR	**Dust & Corrosion Protected Brake** - Dust & corrosion protected brake

Rectifier Options

Abbreviation	Description
Rectifiers	Most NORD brakes are provided with a rectifier that converts AC voltage to DC voltage. Rectifiers are used because most motors are AC powered, but brakes require DC power.
G...V	**Sealed Rectifier** - Rectifiers sealed with an electrically safe resin
GP...	**High Performance Rectifier** - Improves brake release and stopping times

Brake Nomenclature

BRE – –

- Additional Brake Options
- Brake Size/Torque Rating
- Brake

Ordering Examples

BRE 100 HL RG IR

- Current Sensing Relay
- Corrosion Protected Brake
- Hand Release Lever
- 100 Nm Brake Torque
- Brake

Brake, 100 Nm with a hand release lever, corrosion protected brake, and a current sensing relay.

BRE 40 FHL SR

- Dust & Corrosion Prot. Brake
- Locking Hand Release Lever
- 40 Nm Brake Torque
- Brake

Brake, 40 Nm with a locking hand release lever and dust & corrosion protected brake.

Brake Torque Selection

NORD DRIVESYSTEMS

Brake Torque Selection

Each NORD motor size has a number of brake torque sizes available. The bold value in the table below is the standard brake torque size for each motor.

Example for ordering: SK 32 - 80S/4 **BRE 10**

(**BRE 10** indicates the unit has a brake torque size of 10 Nm)

General Selection Considerations

NORD relies on the equipment builder to specify appropriate brake sizing for their application, while giving consideration to the following:

- For most applications, we advise sizing the brake to 1.5 - 2 times the motor rated torque.
- For vertical applications, it may be advisable to size the brake size up to 3 times the motor rated torque.
- For some applications, it may be necessary to specify a reduced brake torque setting to prevent, excessive peak load conditions developed at the reducer output.
- On travel drive applications, excessive brake torque may lead to wheel skid, and excess hoist-cable swing.

Motor Frame	Units	Brake Size									
		BRE5	BRE10	BRE20	BRE40	BRE60	BRE100	BRE150	BRE250	BRE400	BRE800
63S/L	Nm	**5**	10 *[1]								
	lb-ft	**3.7**	7.4 *[1]								
71S/L	Nm	**5**	10 *								
	lb-ft	**3.7**	7.4								
80S	Nm	**5**	10	20 *							
	lb-ft	**3.7**	7.4	15 *							
80L	Nm	5	**10**	20 *							
	lb-ft	3.7	**7.4**	15 *							
90S	Nm		10	**20**	40 *						
	lb-ft		7.4	**15**	30 *						
90L	Nm		10	**20**	40 *						
	lb-ft		7.4	**15**	30						
100L	Nm			**20**	40	60 * [1]					
	lb-ft			**15**	30	44					
100LA/4	Nm			20	**40**	60 * [1]					
	lb-ft			15	**30**	44 * [1]					
112M	Nm			20	40	**60**					
	lb-ft			15	30	**44**					
132S	Nm					**60**	100	150 * [1]			
	lb-ft					**44**	74	110 * [1]			
132M	Nm					60	**100**	150 * [1]			
	lb-ft					44	**74**	110 * [1]			
160M	Nm						100	**150**	250		
	lb-ft						74	**110**	185		
160L	Nm						100	150	**250**		
	lb-ft						74	110	**185**		
180MX/LX	Nm							150	**250**		
	lb-ft							110	**185**		
200L	Nm								250	**400**	
	lb-ft								185	**295**	
225S	Nm									**400**	800 * [2]
	lb-ft									**295**	590 * [2]
+ weight	kg	2	3	5.5	7	10	16	22	32	50	80
	lb	4.4	6.6	12.1	15.4	22	35	49	71	110	176
+ inertia	$kgm^2 \times 10^{-3}$	0.15	0.45	0.153	0.45	0.86	1.22	2.85	6.65	19.5	39
	$lb\text{-}ft^2 \times 10^{-3}$	0.356	1.07	3.63	10.7	20.4	29.0	67.7	158	463	926

* BIP66 – IP66 brake not possible.
1) Brake release lever "HL" and "FHL" not possible.
2) When used as a stopping brake, evaluation of brake work is essential.
3) Designed as holding brake or emergency stop brake only.

1 Nm = 0.738 lb-ft
1 lb-ft = 1.36 Nm

Detailed Brake Performance Data

Brake Size		BRE5	BRE10	BRE20	BRE40	BRE60	BRE100	BRE150	BRE250	BRE400	BRE800
Brake torque $_{-max}$	[lb-ft]	3.7	7.4	15	30	44	74	110	185	295	590
	[lb-in]	44	89	177	354	531	885	1330	2200	3500	7100
	[Nm]	5	10	20	40	60	100	150	250	400	800
Power coil P_{20}	[W]	22	28	39	42	50	75	76	100	140	140
Nominal air gap	[in]	0.008	0.008	0.008	0.012	0.012	0.016	0.020	0.020	0.020	0.023
	[mm]	0.2	0.2	0.2	0.3	0.3	0.4	0.5	0.5	0.5	0.6
Maximum air gap (re-adjust) a_{max}	[in]	0.024	0.013	n/a *	0.035	0.039	0.043	0.043	0.047	0.047	0.047
	[mm]	0.6	0.8	n/a *	0.9	1.0	1.1	1.1	1.2	1.2	1.2
Max brake pad wear - must be replaced	[in]	0.118	0.118	0.039	0.118	0.138	0.138	0.138	0.138	0.138	0.138
	[mm]	3	3	1	3	3.5	3.5	3.5	3.5	3.5	3.5
Minimum brake pad thickness	[in]	0.177	0.217	0.295	0.374	0.453	0.492	0.571	0.571	0.650	0.650
	[mm]	4.5	5.5	7.5	9.5	11.5	12.5	14.5	14.5	16.5	16.5
Max work per cycle W_{rmax}	[Jx10^3]	3	6	12	25	35	50	75	105	150	225
Work until re-adjust W_{rn}	[Jx10^7]	5	12	20	35	60	125	200	340	420	420
Heat load per cycle	[J/s]	80	100	130	160	200	250	300	350	400	600
Release time (start) t_1	[ms]	35	45	70	80	120	160	200	220	230	400
Release time (start) $t_{1\text{-}OE}$	[ms]	15	15	28	28	75	110	110	N/A	N/A	N/A
Setting time (stop) $t_{2\text{-}AC}$	[ms]	70	95	140	175	210	280	350	500	800	1000
Setting time (stop) $t_{2\text{-}DC}$	[ms]	30	45	30	75	90	120	150	180	200	250
Setting time (stop) $t_{2\text{-}DCRP}$	[ms]	5	6	11	12	12	13	17	24	N/A	N/A
IR relay delay (stop) $t_{2\text{-}IR}$	[ms]	18	18	18	18	18	18	18	18	18	N/A
Current – 250VDC coil	[A]	0.09	0.11	0.16	0.18	0.19	0.31	0.31	0.4	0.6	0.6
Current – 225VDC coil	[A]	0.09	0.13	0.18	0.20	0.22	0.35	0.36	0.5	0.6	0.6
Current – 205VDC coil	[A]	0.11	0.13	0.22	0.24	0.28	0.44	0.45	0.5	0.7	0.7
Current – 180VDC coil	[A]	0.12	0.16	0.21	0.25	0.30	0.46	0.47	0.6	0.8	0.8
Current – 105VDC coil	[A]	0.21	0.32	0.36	0.46	0.60	0.88	0.89	1.1	1.3	1.3
Current – 24VDC coil	[A]	0.92	1.17	1.63	1.75	2.08	3.10	3.20	4.2	5.9	5.9

Release times

t_1 – Brake release time - Standard
$t_{1\text{-}OE}$ – Brake release time – Overexcitation (GP)

Set (stop) times

$t_{2\text{-}AC}$ – Brake set time – AC switching
$t_{2\text{-}DC}$ – Brake set time – DC switching
$t_{2\text{-}DCRP}$ – Brake set time – DC switching reduced power
$t_{2\text{-}IR}$ – Additional brake stopping of the IR relay

An increased air gap will alter the braking times.

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eMail: info.us@nord.com

For Sales office or distributors please contact us or see our website at www.nord.com

Canada

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For Sales office or distributors please contact us or see our website at www.nord.com

Mexico

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For Sales office or distributors please contact us or see our website at www.nord.com

NORD GEAR CORPORATION

DRIVESYSTEMS — CONDITIONS OF SALE — WWW.NORD.COM

1. CONTRACT

Any contract between Nord Gear Corporation, hereinafter designated as Seller, and the Buyer is subject to the terms and conditions of sale hereinafter set forth. Any deviation from such terms and conditions must be specifically set forth in writing and consented to by Seller. Accordingly, the Buyer and Seller acknowledge and agree that the terms and conditions set forth below and on the face hereof shall govern Buyer's purchase of the goods described on the face hereof and shall take precedence over and represents the final agreement between Buyer and Seller, notwithstanding any inconsistent, contradictory or other prior or further conditions contained in any oral or written request or purchase order issued by Buyer or any other document furnished by Buyer in connection with its purchase of the Goods, regardless of whether such document or documents are exchanged simultaneously with this Invoice or prior or subsequent thereto. Any additional or different terms or conditions which may appear in any communicaiton, oral or written, from Seller, its officers, employees, agents or representatives, are hereby expressly rejected and shall not be effective or binding upon the Seller, unless specifically hereafter agreed to in writing by Seller and no such additional or different terms or conditions in any document submitted to Seller by Buyer shall become part of the contract between Buyer and Seller, unless such written acceptance by Seller specifically recognizes and assents to their inclusion. Any objection by Buyer to the terms and conditions hereof shall be ineffective unless Seller is advised in writing thereof within two (2) days of the date of this Invoice.

2. CONFIRMATION

An order shall be deemed accepted only when duly confirmed by Seller, at Nord Gear Corporation's home office in Waunakee, Wisconsin, and upon such confirmation the order shall become a contract binding upon the parties hereto, their successors and assigns.

3. PRICES

Prices shown are list prices and may be subject to applicable discounts. Unless otherwise agreed upon in writing, prices are FOB factory Waunakee, Wisconsin. Prices and discounts are subject to change without notice until order is accepted. Seller's prices do not include cost of any inspection permits required.

4. LIMITED WARRANTY

Seller hereby warrants that the goods sold hereunder shall be free from material defects in material and workmanship, if properly installed and used under normal operating conditions, for a period of twelve (12) months from the date of installation or eighteen (18) months from date of shipment, whichever comes first (the "Warranty Period"). With respect to gears and housings only, the Warranty Period is extended to thirty-six (36) months from the date of invoice or twenty-four (24) months from the date of installation, whichever comes first. The limited warranty shall not apply to any components or parts which are subject to normal operational wear and tear, including, but not limited to, belts and traction discs. Should any goods fail to comply with the foregoing limited warranty, Buyer shall provide written notice to Seller of the claimed defect and all relevant details within thirty (30) days of Buyer's discovery of the claimed defect. Buyer shall return the allegedly defective goods to Seller at its facilities in Waunakee, Wisconsin or to such other location within the USA as may be designated by Seller in its sole discretion, with all shipping and transportation charges prepaid by Buyer. Seller shall then examine the returned goods to determine if the claimed defect is covered by the limited warranty. If the claimed defect is covered by the limited warranty, Buyer's sole and exclusive remedy shall be to have Seller repair or replace, at Seller's option, the defective goods or components in accordance with the terms of this limited warranty. Seller shall have a commercially reasonable time to make such repairs or replacements and may use new or reconditioned components. Any repair or replacement shall not extend the Warranty Period unless otherwise agreed by Seller. Buyer shall pay all shipping costs and any costs of removal and re-installation of goods or components.

The foregoing limited warranty shall not apply with respect to any goods or components (i) which are not installed, used, operated, serviced or maintained in accordance with manufacturer's instructions or which are otherwise not properly installed, used, operated, serviced or maintained, or (ii) which are misused, neglected, damaged, altered, repaired, reconfigured or incorrectly wired. Seller makes no representations as to the specifications, capacity or performance of the goods sold hereunder, except as may be specifically set forth in the invoice's written specifications, and any such representations are expressly conditioned upon the accuracy and completeness of the data and information furnished by the buyer and upon the goods being properly installed, used, serviced and maintained by Buyer. Any description or model of the goods is for identification or illustrative purposes only and shall not be deemed to create any warranty, express or implied.

THE FOREGOING LIMITED WARRANTY SHALL EXTEND SOLELY TO BUYER AND NOT TO ANY OTHER PARTY. THE FOREGOING LIMITED WARRANTY IS IN LIEU OF ANY AND ALL OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED. SELLER HEREBY EXCLUDES AND DISCLAIMS ANY AND ALL OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IF BUYER SHALL FAIL TO PAY WHEN DUE ANY PORTION OF THE PURCHASE PRICE OR ANY OTHER PAYMENT REQUIRED FROM BUYER TO SELLER UNDER THIS CONTRACT, ALL WARRANTIES AND REMEDIES SET FORTH HEREIN SHALL BE DEEMED NULL AND VOID, AB INITIO. THE PARTIES ACKNOWLEDGE AND AGREE THAT THE EXCLUSIVE REMEDY UNDER THE FOREGOING LIMITED WARRANTY SHALL NOT HAVE FAILED OF ITS ESSENTIAL PURPOSE (AS THAT TERM IS USED IN THE UNIFORM COMMERCIAL CODE) PROVIDED THAT SELLER REMAINS WILLING TO REPAIR OR REPLACE DEFECTIVE GOODS WITHIN A COMMERCIALLY REASONABLE TIME. BUYER SPECIFICALLY ACKNOWLEDGES AND AGREES THAT THE PRICE CHARGED BY SELLER FOR THE GOODS IS BASED UPON THE LIMITATIONS OF SELLER'S WARRANTY OBLIGATIONS AND OTHER LIABILITIES AS SET FORTH HEREIN.

LIMITATION OF LIABILITY. NOTWITHSTANDING ANY OTHER PROVISION HEREOF, IN NO EVENT SHALL SELLER BE LIABLE TO BUYER OR TO ANY OTHER PARTY FOR ANY INCIDENTAL, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, LOST PROFITS, OR FOR ANY LOSSES, CLAIMS OR DAMAGES RELATING TO OR ARISING FROM THE USE OR OPERATION OF THE GOODS, AND IN NO EVENT SHALL ANY CLAIM OR RECOVERY OF ANY KIND EXCEED THE PURCHASE PRICE OF THE GOODS IDENTIFIED IN THE RELATED INVOICE.

5. SHORTAGE AND NONCONFORMITY

Any claim of shortage or that the goods do not conform with the specifications of the order or model must be made in writing within ten (10) days after delivery of the goods (as to which such claim is made) to Buyer or its nominees, but in no event shall the claim be later than within the time limit provided by the carrier or insurance company, otherwise such claim shall be deemed waived. Buyer may not return any goods claimed to be in non-conformity without Seller's prior written authorization. Goods returned without permission will not be accepted, including for credit, and will be returned to Buyer, F.O.B. Sellter's plant. Any claim based on the receipt of damaged Goods must be filed with the carrier which delivered the goods. The samples, measurements, dimensions and weights contained in the Seller's catalogs, sales manuals, photographs and drawings constitute only an approximate guide. The Seller reserves the right to make any change which the Seller, in its absolute discretion, considers necessary. While the goods will be delivered principally according to specifications or standards or quantities agreed upon, insignificant deviations or insignificant changes in construction are permissible. The same applies to partial deliveries, In the event that Buyer has a verified claim of shortage or nonconformity of the goods to the specifications of the order or the model, and if such claim has been submitted within the required time limit as set forth above, the Seller shall, at its own expense, make up for the shortage of the goods, or replace or repair the goods, as the case may be, but in no event shall Seller be or become liable to Buyer or to any other person or persons for any loss in damage, direct or indirect, arising out of or caused by such incidents or for the loss of profits, business or good will. The liability of the Seller to Buyer, if any hereunder, for breach of warranty, contract, negligence or otherwise, shall in no event exceed the amount of the purchase price of the goods sold with respect to which any damages are claimed. Shipping dates are estimates unless parties expressly agree on time of the essence.

6. FORCE MAJEURE

The obligation of the Seller shall be modified or excused, as the case may be, for reasons of Acts of God, war, governmental law regulations, strikes or lock-outs, fire, breakdown of machinery, whether in its own business enterprise, or if for any other cause beyond Seller's control, the goods cannot be delivered or their delivery becomes delayed in whole or in part. In the above instances time for delivery shall be extended for the period of the delay caused, with the proviso, however, that either party may cancel in writing the undelivered portion of the order or contract if the delay exceeds six (6) months from the delivery date originally confirmed by Seller. In no event shall Seller become liable in the aforesaid instances to Buyer or any third party for consequential damages or business loss.

7. SHIPMENT AS UNIT

Each shipment by Seller shall be treated as a separate and distinct unit with respect, but only with respect to forwarding, terms of payment, and the making of claims by the Buyer: provided, however, that if the Buyer defaults in the payment of any obligation to Seller or any installments thereof, under any agreement between Buyer and Seller, or if Buyer refuses to accept any goods when tendered for delivery, the Seller may, on fifteen (15) days written notice to the Buyer, without prejudice to Seller's other lawful remedies, either defer further performance until the defaulted payments are made in full, or make future deliveries for cash in advance only, or treat the entire contract or contracts with Buyer as breached by the Buyer and pursue its remedies for breach.

8. BUYER'S REFUSAL OF DELIVERY

If Buyer refuses to accept delivery of any goods tendered for delivery, then Seller, without prejudice to Seller's other lawful remedies, may either store or cause such goods to be stored in a warehouse, for buyer's account and at Buyer's cost, risk and expense, or sell such goods (without notice) to any purchases at public or private sale, and hold the Buyer liable for any difference between (a) the contract price of the goods, and (b) the price at which goods are resold less the costs and expense of such resale including brokerage commissions, or restocking charges.

9. GOODS IN TRANSIT

If prior to delivery or while the goods are in transit, Buyer or Seller becomes bankrupt or insolvent, or any petition in bankruptcy or for the reorganization or for a state court receivership is filed against Buyer or Seller, as the case may be, then the other party hereto may forthwith terminate this contract by giving written notice of such termination. Such termination shall not affect any claim for damages available to the Buyer, provided that if Buyer is then indebted to Seller, the amount of any such damage claim shall be abated to the extent that the indebtedness of Buyer to Seller, as actually paid in money, is abated by any order of judgement entered or any plan adopted in any bankruptcy, reorganization, receivership, or similar proceeding. Such termination shall not prejudice the Seller's rights to any amounts then due under the contract. If Buyer becomes bankrupt or insolvent or any petition in bankruptcy or for reorganizing or if a state court receivership is filed against Buyer, then, at its option Seller may take possession of any goods theretofore sold to Buyer, in connection with which the full purchase price has not been paid, analogous to the terns and provisions set forth in Paragraphs 11 and 12 hereinafter.

10. DELIVERY

(a) Any indicated dates of delivery are approximate only, but NORD Gear will attempt to meet them whenever possible. (b) NORD Gear will not be liable for any penalty clausess contained in any specifications or order submitted unless agreed to in writing by an authorized officer of NORD Gear Corporation. (c) Unless otherwise agreed, delivery of the goods to any carrier shall constitute delivery to the Buyer, and thereafter the risk of loss or damage to the goods shall be upon the Buyer. (d) If the Buyer does not give delivery instructions to the Seller at least (10) days prior to the delivery date ex factory confirmed by the Seller, the Seller may deliver the goods to a carrier of its own choosing, at Buyer's cost and risk, or, at Seller's option, may store the goods on the pier or any warehouse, at Buyer's cost and risk. Any purchase price in such event becomes due and payable within ten (10) days of such storage.

11. PAYMENT OF PURCHASE PRICE

Time of payment is of the essence under the contract. Unless otherwise provided, terms of payment are 30 days net from the date of invoice with a 1% discount if paid within 10 days of date of invoice. Upon default in any of the terms of the contract, or failure to comply with any of the conditions thereof, or upon seizure of the property under execution or other legal process, or if the Buyer becomes bankrupt or insolvent, or any petition for reorganization or for a state court receivership is filed against Buyer, or if the Buyer makes any assignment for the benefit of it's creditors or otherwise sells, encumbers or disposes of the goods, or if for any other reason the Seller should deem itself insecure, the full amount of the purchase price then remaining unpaid shall at once become due and payable at the option of the Seller.

12. BUYER'S DEFAULT

Upon the Buyer's default, the Seller may dispose of the merchandise in any manner that it deems fit and, if it desires to resell same, may do so at private or public sale, with or without notice, and with or without the property being at the place of sale, subject, however, to applicable laws. The Seller or its assigns shall have the right to bid at such sale and may become the purchaser of the property. The proceeds of the sale shall first be applied to the expenses incurred in retaking, repairing, storing and selling the goods, reasonable attorney's fees included, and then shall be applied to the payment of the balance due under the contract. Any surplus amount shall be paid to the Buyer. If a deficiency results after the resale, the Buyer agrees to pay such forthwith, together with reasonable attorney's fees, for the recovery of the goods incurred by the Seller. If upon the Buyer's default, the Seller elects not to resell any goods which it may repossess, then the cost of repossession, including reasonable attorney's fees, shall forthwith be due and payable from Buyer to Seller. Buyer agrees to pay all reasonable costs and reasonable attorneys' fees incurred by Seller in enforcing Seller's rights against Buyer, including Seller's right to payment of the purchase price of the goods and Buyer's payment of all other amounts owing to Seller required under this Invoice and Conditions of Sale.

13. SECURITY INTEREST AND TITLE

In states and localities which are governed by the Uniform Commercial Code, this contract shall serve as security agreement, reserving in Seller a security interest until full payment of purchase price. The provisions of the Uniform Commercial Code regarding security interest shall have preference and apply if inconsistent with other terms of the conditions of sale. In states and localities where the Uniform Commercial Code does not apply, title to the goods shall remain in the Seller or its assigns until full payment of the purchase price. Buyer agrees to execute forthwith any and all documents in such a way and form as Seller may need for filing or recording the security interest under the Uniform Commercial Code with the proper registers or offices, or for filing or recording the conditional sales contract.

14. SALES AND USE TAX

Buyer agrees to bear and pay any sales or use tax in connection with the purchase herein, and to hold the Seller harmless from payment. At the option the Seller, Buyer shall give evidence of payment or of exemption certificate.

15. INSURANCE

The Buyer shall keep the goods insured against damage by fire, water or other casualty as required by Seller, with a company acceptable to Seller, with loss payable to Seller for the total purchase price until the Seller is fully paid. Seller, if it so elects, may place said insurance at Buyer's expense; Seller may cancel such insurance at any time and without notice and may receive the return premium, if any.

16. MODIFICATION BY SELLER

Any contract may be assigned or transferred by the Seller, or the time for the making of any payment due by Buyer may be extended by Seller without derogation of any of the rights of the Seller or its assigns. Waiver by any party of any default shall not be deemed a waiver of any subsequent default.

17. RETURNED GOODS

No goods will be accepted for return unless authorized in writing by Seller. In all cases, transportation and restocking charges will be borne by Buyer.

18. PACKING

The Buyer will be charged for export packaging or other special packing desired. Cost for cartage to ship or transfer express will be added to the invoice. No credit will be allowed if no packing is required.

19. CHANGES/CANCELLATION

NORD Gear will not accept changes in specifications to a confirmed order unless such changes are requested in writing and confirmed back in writing. In addition, the purchaser must to agree to any additional charges that may arise from the change. Placing orders on hold or cancellation of orders require Seller's written approval, and are subject to cancellation and/or restocking charges.

20. BUYER'S RESPONSIBILITY AS TO MAINTENANCE

Buyer shall use and shall require its employees and agents to use all safety devices and guards and shall maintain the same in proper working order. Buyer shall use and require its employees and agents to use safe operation procedures in operating the equipment and shall further obey and have its employees and agents obey safety instructions given by Seller. If Buyer fails to meet the obligations herein, Buyer agrees to defend, indemnify and save Seller harmless from any liability or obligation with regard to any personal injuries or property damages directly or indirectly connected with the operation of the equipment. Buyer further agrees to notify Seller promptly and in any event not later than ten (10) days after notice or knowledge of any accident or malfunction involving Seller's equipment which has caused personal injury or property damages and to cooperate fully with Seller in investigating and determining the causes of such accident and malfunction. In the event that Buyer fails to give such notice to Seller or to cooperate with Seller, Buyer shall be obligated to defend, indemnify and save Seller harmless from any such claims arising from such accident.

21. MISCELLANEOUS PROVISIONS

(a) If for any reason a provision of a contract is legally invalid, then in such event the rest of the contract shall remain in full force and affect, except that the parties shall try to replace such invalid provision closest to their original mutual intentions. (b) This Invoice and these Conditions of Sale constitute the entire agreement between the parties regarding the subject matter hereof and supercedes all prior agreements, understandings and statements, whether oral or written, regarding such subject matter. No modification to, change in or departure from, the provisions of this Invoice and Conditions of Sale shall be valid or binding on Seller, unless approved in writing by Seller. No course of dealing or usage of trade shall be applicable unless expressly incorporated into this Invoice and Conditions of Sale. Any amendments to any contract or contracts between the parties shall be valid only upon the written consent of both parties.

22. NON ASSIGNMENT BY BUYER

Contract or contracts may not be assigned by the Buyer without prior written consent of the Seller.

23. APPLICABLE LAW AND VENUE

All contracts and their interpretation are governed by the applicable, substantive laws of the State of Wisconsin. Any litigation brought by the Buyer regarding this Invoice or goods purchased hereunder may only be brought in the Circuit Court for Dane County, Wisconsin.

NORD GEAR LIMITED

Terms and Conditions of Sale

1. CONTRACT

Any contract between Nord Gear Limited, hereinafter designated as Seller, and the Buyer is subject to the terms and conditions of sale hereinafter set forth. Any deviation from such terms and conditions must be specifically set forth in writing and consented to by Seller.

2. CONFIRMATION

An order shall be deemed accepted only when duly confirmed by Seller, at Nord Gear Limited's home office in Brampton, Ontario, and upon such confirmation the order shall become a contract binding upon the parties hereto, their successors and assigns.

3. PRICES

Prices shown are list prices and may be subject to applicable discounts. Unless otherwise agreed upon in writing, prices are FOB factory Bramton, Ontario. Prices and discounts are subject to change without notice until order is accepted. Seller's prices do not include cost of any inspection permits required.

4. LIMITED WARRANTY

Seller warrants the goods sold hereunder to be free from defects in material and workmanship under normal use and service not arising from misuse, negligence, or accident, including but not limited to the use, installation, and transportation of the goods by the Buyer, its agents, servants, employees, or by carriers. Such obligations under this warranty are limited to remedying any deficiencies in the goods at Brampton, Ontario, or at such place or places in Canada as may be designated by Seller. This warranty shall pertain to any part or parts of any goods to which Buyer or its assigns has, within one year from date of original factory invoice, given written notice of claimed defects to Seller. Buyer shall be required to furnish Seller with details of such defects and this warranty shall be effective as to such goods which Seller's examination shall disclose to its satisfaction to have been defective and which at Seller's option shall promptly thereafter be returned to Seller or its nominees. EXCEPT FOR THE EXPRESS WARRANTIES SET FORTH ABOVE, SELLER HAS MADE NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE GOODS SOLD HEREUNDER, INCLUDING, BUT NOT LIMITED TO THEIR MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. ANY DESCRIPTION OR MODEL OF THE GOODS IS FOR IDENTIFICATION OR ILLUSTRATIVE PURPOSES ONLY AND SHALL NOT BE DEEMED TO CREATE AN EXPRESS WARRANTY. THE REMEDIES OF THE BUYER SET FORTH IN THIS SECTION ARE EXCLUSIVE. In no event shall the Seller be liable to the Buyer or to any other person for any loss or damage, direct or indirect, arising out of or caused by the use or operation of the goods, or for the loss of profits, business, or good will, or for any incidental, special or consequential damages. Seller shall in no event be liable to any person or firm (including any assignee or Buyer) except Buyer and its successors. Unless specifically authorized by Seller in writing, Seller shall not become responsible for any repair work done by Buyer or any other party on any goods sold. Any costs of the return of such goods to Seller shall be borne by Buyer. Goods sold but not manufactured by the Seller are being warranted as to defects in material and workmanship consistent with the limited warranty policy of the original manufacturer of the goods and if there is not such a limited warranty policy, the warranty shall be limited to the provisions of the preceding paragraph of Article 4 herein. Standards for the operating characteristics of the gearboxes and the gearmotors are in conformity with Seller's test. THIS WARRANTY IS IN LIEU OF ALL OTHER EXPRESS OR IMPLIED WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE THE SELLER DOES NOT ASSUME, NOR DOES IT AUTHORIZE ANY PERSON TO ASSUME, ON ITS BEHALF, ANY OTHER OBLIGATION OR LIABILITY.

5. SHORTAGE AND NONCONFORMITY

Any claim of shortage or that the goods do not conform with the specifications of the order or model must be made in writing within ten (10) days after delivery of the goods (as to which such claim is made) to Buyer or its nominees, but in no event shall the claim be later than within the time limit provided by the carrier or insurance company, otherwise such claim shall be deemed waived. The samples, measurements, dimensions and weights contained in the Seller's catalogs, sales manuals, photographs and drawings constitute only an approximate guide. The Seller reserves the right to make any changes which the Seller, in its absolute discretion, considers necessary. While the goods will be delivered principally according to specifications or standards or quantities agreed upon, insignificant deviations or insignificant changes in construction are permissible. The same applies to partial deliveries. In the event that Buyer has a verified claim of shortage or noncomformity of the goods to the specifications of the order or the model, and if such claim has been submitted within the required time limit as set forth above, the Seller shall, at its own expense, make up for the shortage of the goods, or replace or repair the goods, as the case may be, but in no event shall Seller be or become liable to Buyer or to any other person or persons for any loss in damage, direct or indirect, arising out of or caused by such incidents or for the loss of profits, business or good will. Shipping dates are estimates unless parties expressly agree on time of the essence.

6. FORCE MAJEURE

The obligation of the Seller shall be modified or excused, as the case may be, for reasons of Acts of God, war, governmental law regulations, strikes or lock-outs, fire, breakdown of machinery, whether in its own business enterprise, or if for any other cause beyond Seller's control, the goods cannot be delivered or their delivery becomes delayed in whole or in part. In the above instances time for delivery shall be extended for the period of the delay caused, with the proviso, however, that either party may cancel in writing the undelivered portion of the order or contract if the delay exceeds six (6) months from the delivery date originally confirmed by Seller. In no event shall Seller become liable in the aforesaid instances to Buyer or any third party for consequential damages or business loss.

7. SHIPMENT AS UNIT

Each shipment by Seller shall be treated as a separate and distinct unit with respect, but only with respect to forwarding, terms of payment, and the making of claims by the Buyer; provided, however, that if the Buyer defaults in the payment of any obligation to Seller or any installments thereof, under any agreement between Buyer and Seller, or if Buyer refuses to accept any goods when tendered for delivery, the Seller may, on fifteen (15) days' written notice to the Buyer, without prejudice to Seller's other lawful remedies, either defer further performance until the defaulted payments are made in full, or make future deliveries for cash in advance only, or treat the entire contract or contracts with Buyer as breached by the Buyer and pursue its remedies for breach.

8. BUYER'S REFUSAL OF DELIVERY

If Buyer refuses to accept delivery of any goods tendered for delivery, then Seller, without prejudice to Seller's other lawful remedies, may either store or cause such goods to be stored in a warehouse, for Buyer's account and at Buyer's cost, risk and expense, or sell such goods (without notice) to any purchaser at public or private sale, and hold Buyer liable for any difference between (a) the contract price of the goods, and (b) the price at which goods are resold less the costs and expense of such resale including brokerage commissions, or restocking charges.

9. GOODS IN TRANSIT

If prior to delivery or while the goods are in transit, Buyer or Seller becomes bankrupt or insolvent, or any petition in bankruptcy or for the reorganization or for appointment of a receiver is filed against Buyer or Seller, as the case may be, then the other party hereto may forthwith terminate this contract by giving written notice of such termination. Such termination shall not affect any claim for damages available to the Buyer, provided that if Buyer is then indebted to Seller, the amount of any such damage claim shall be abated to the extent that the indebtedness of Buyer to Seller, as actually paid in money, is abated by any order or judgment entered or any plan adopted in any bankruptcy, reorganization, receivership, or similar proceeding. Such termination shall not prejudice the Seller's rights to any amounts then due under the contract. If Buyer becomes bankrupt or insolvent or any petition in bankruptcy or for reorganization or if a state court receivership is filed against Buyer, then, at its option, Seller may take possession of any goods theretofore sold to Buyer, in connection with which the full purchase price has not been paid, analogous to the terms and provisions set forth in Paragraphs 11 and 12 hereinafter.

10. DELIVERY

(a) Unless otherwise agreed, delivery of the goods to any carrier shall constitute delivery to the Buyer, and thereafter the risk of loss or damage *to the goods shall be upon the Buyer.* (b) If the Buyer does not give delivery instructions to the Seller at least (10) days prior to the delivery date *ex factory confirmed* by the Seller, the Seller may deliver the goods to a carrier of its own choosing, at Buyer's cost and risk, or, at Seller's option, may store the goods on the pier or on any warehouse, at Buyer's cost and risk. Any purchase price in such event *becomes due and payable within* ten (10) days of such storage.

11. PAYMENT OF PURCHASE PRICE

Time of payment is of the essence under the contract. Upon default in any of the terms of the contract, or failure to comply with any of the conditions thereof, or upon seizure of the property under execution or other legal process, or if the Buyer becomes bankrupt or insolvent, or any petition for reorganization or for appointment of a receiver is filed against Buyer, or if the Buyer makes any assignment for the benefit of its creditors or otherwise sells, encumbers or disposes of the goods, or if for any other reason the Seller should deem itself insecure, the full amount of the purchase price then remaining unpaid shall at once become due and payable at the option of the Seller.

12. BUYER'S DEFAULT

Upon the Buyer's default, the Seller may dispose of the merchandise in any manner that it deems fit and, if it desires to resell same, may do so at private or public sale, with or without notice, and with or without the property being at the place of sale, subject, however, to applicable laws. The Seller or its assigns shall have the right to bid at such sale and may become the purchaser of the property. The proceeds of the sale shall first be applied to the expenses incurred in retaking, repairing, storing and selling the goods, reasonable solicitor's fees included, and then shall be applied to the payment of the balance due under the contract. Any surplus amount shall be paid to the Buyer. If a deficiency results after the resale, the Buyer agrees to pay such forthwith, together with reasonable solicitor's fees, for the recovery of the goods incurred by the Seller. If upon the Buyer's default, the Seller elects not to resell any goods which it may repossess, then the cost of repossession, including reasonable solicitor's fees, shall forthwith be due and payable from Buyer to Seller.

13. SECURITY INTEREST AND TITLE

In provinces which are governed by a Personal Property Security Act, this contract shall serve as Security Agreement, reserving in Seller a security interest until full payment of purchase price. The provisions of the Personal Property Security Act regarding security interest shall have preference and apply if inconsistent with other terms of the conditions of sale herein. In provinces where a Personal Property Security Act does not apply, title to the goods shall remain in the Seller or its assigns until full payment of the purchase price. Buyer agrees to execute forthwith any and all documents in such a way and form as Seller may need for filing or recording the security interest under a Personal Property Security Act with the proper registers or offices, or for filing or recording the Conditional Sales Contract herein.

14. SALES AND USE TAX

The Seller's prices do not include sales, use, excise or other taxes payable to any governmental authority in respect of the sale of Seller's goods. The Buyer shall pay, in addition to the Seller's price the amount of any such taxes or shall reimburse the Seller for the amount thereof that the Seller may be required to pay. At the option of the Seller, Buyer shall give evidence of payment or of exemption certificate.

15. INSURANCE

The Buyer shall keep the goods insured against damage by fire, water or other casualty as required by Seller, with a company acceptable to Seller, with loss payable to Seller for the total purchase price until the Seller is fully paid. Seller, if it so elects, may place said insurance at Buyer's expense; Seller may cancel such insurance at any time and without notice and may receive the return premium, if any.

16. MODIFICATION BY SELLER

Any contract may be assigned or transferred by the Seller, or the time for the making of any payment due by Buyer may be extended by Seller without derogation of any of the rights of the Seller or its assigns. Waiver by any party of any default shall not be deemed a waiver of any subsequent default.

17. RETURNED GOODS

No goods will be accepted for return unless authorized in writing by Seller. In all cases, transportation and restocking charges will be borne by Buyer.

18. PACKING

The Seller does not charge for standard packaging for domestic shipment. The Buyer will be charged, however, for export packaging or other special packing desired. Cost for cartage to ship or transfer express will be added to the invoice. No credit will be allowed if no packing is required.

19. EXPORT ORDER

Export orders are to be accompanied by a confirmed irrevocable Letter of Credit in Seller's favor, in Canadian currency, with an accredited Canadian bank, subject to Seller's draft, with shipping documents attached.

20. CANCELLATION

Placing orders on hold or cancellation of orders require Seller's written approval, and are subject to cancellation and/or restocking charges.

21. BUYER'S RESPONSIBILITY AS TO MAINTENANCE

Buyer shall use and shall require its employees and agents to use all safety devices and guards and shall maintain the same in proper working order. Buyer shall use and require its employees and agents to use safe operating procedures in operating the equipment and shall further obey and have its employees and agents obey safety instructions given by Seller. If Buyer fails to meet the obligations herein, Buyer agrees to indemnify and save Seller harmless from any liability or obligation with regard to any personal injuries or property damages directly or indirectly connected with the operation of the equipment. Buyer further agrees to notify Seller promptly and in any event not later than ten (10) days after notice or knowledge of any accident or malfunction involving Seller's equipment which has caused personal injury or property damages and to cooperate fully with Seller in investigating and determining the causes of such accident and malfunction. In the event that Buyer fails to give such notice to Seller or to cooperate with Seller, Buyer shall be obligated to indemnify and save Seller harmless from any such claims arising from such accident.

22. MISCELLANEOUS PROVISIONS

(a) If for any reason a provision of a contract is legally invalid, then in such event the rest of the contract shall remain in full force and affect, except that the parties shall try to replace such invalid provision with a provision closest to their original mutual intentions. (b) Any amendments to any contract or contracts require the consent in writing by both parties.

23. NON ASSIGNMENT BY BUYER

Contract or contracts may not be assigned by the Buyer without prior written consent of the Seller.

24. APPLICABLE LAW

All contracts are governed by the applicable laws of Ontario.

25. This instrument sets forth the entire understanding and agreement of the parties hereto in respect of the subject matter hereof, and all prior undertakings between the parties hereto, together with all representations and obligations of such parties in respect of such subject matter, shall be superceded by and merged into this instrument.

26. The provisions of this agreement shall bind and enure to the benefit of the parties hereto and their respective heirs, executors, administrators, successors and (subject to any restrictions or assignment herein above set forth) assigns, as the case may be.

27. The parties acknowledge that they have requested this Contract and all notices or other documents relating thereto be drafted in the English language.

Les parties reconnaisent qu'ils ont requis que ce contrat et tous les avis ou autres documents qui s'y rapportent soient rediges en langue anglaise.

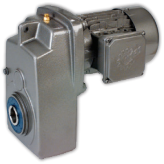
"Terms and Conditions in French available upon request."

Product Overview

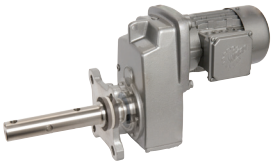
UNICASE™ SPEED REDUCERS

HELICAL IN-LINE
- Foot or Flange Mount
- Torque up to 205,000 lb-in
- Gear ratios – 1.82:1 to over 300,000:1

NORDBLOC®.1 HELICAL IN-LINE
- Foot or Flange Mount
- Torque up to 26,550 lb-in
- Gear ratios – 1.88:1 to over 370:1

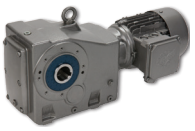


PARALLEL HELICAL CLINCHER™
- Shaft, Flange or Foot Mount
- Torque up to 797,000 lb-in
- Gear ratios – 4.26:1 to over 300,000:1

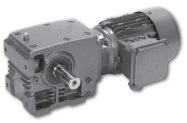


SCP SCREW CONVEYOR PACKAGE
- Shaft, or Flange Mount
- Torque up to 53,100 lb-in
- Gear ratios – 4.32:1 to over 1500:1

RIGHT ANGLE HELICAL-BEVEL 2-STAGE
- Foot, Flange or Shaft Mount
- Torque up to 5,840 lb-in
- Gear ratios – 4.1:1 to 70:1



RIGHT ANGLE HELICAL-BEVEL
- Foot, Flange or Shaft Mount
- Torque up to 283,000 lb-in
- Gear ratios – 8.04:1 to over 300,000:1



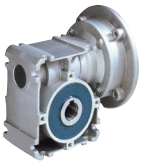
RIGHT ANGLE HELICAL-WORM
- Foot, Flange or Shaft Mount
- Torque up to 27,585 lb-in
- Gear ratios – 4.40:1 to over 300,000:1

HIGH PERFORMANCE MOTORS & BRAKEMOTORS

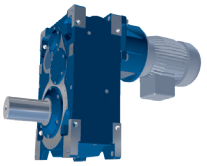
INVERTER/VECTOR DUTY
- Standard or Energy Efficient
- Integral, NEMA or Metric IEC
- 1/6 to 250 hp

UNICASE™ SPEED REDUCERS

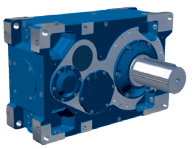
MINICASE™ RIGHT ANGLE WORM
- Foot, Flange or Shaft Mount
- Torque up to 3,540 lb-in
- Gear ratios – 5:1 to 500:1



FLEXBLOC™ WORM
- Modular bolt-on options
- Torque up to 4,683 lb-in
- Gear ratios – 5:1 to 3,000:1



MAXXDRIVE™ LARGE INDUSTRIAL GEAR UNITS PARALLEL HELICAL
- Modular bolt-on options
- Torque up to 2,027,000 lb-in
- Gear ratios – 5:1 to 1,600:1



MAXXDRIVE™ LARGE INDUSTRIAL GEAR UNITS HELICAL-BEVEL
- Modular bolt-on options
- Torque up to 2,027,000 lb-in
- Gear ratios – 5:1 to 1,600:1

NORDAC AC VECTOR DRIVES

SK180E FAMILY
- Distributed, simple speed control
- 380-480V, 3-phase to 3.0 hp
- 200-240V, 3-phase to 1.5 hp
- 200-240V, 1-phase to 1.5 hp
- 100-120V, 1-phase to 0.75 hp

SK200E **FAMILY**
- Distributed, high performance
- 380-480V, 3-phase to 30 hp
- 200-240V, 3-phase to 15 hp
- 200-240V, 1-phase to 1.5 hp
- 100-120V, 1-phase to 1 hp

SK500E FAMILY
- Compact, cabinet mount, high performance
- 380-480V, 3-phase, to 125 hp
- 200-240V, 3-phase, to 25 hp
- 200-240V, 1-phase, to 3 hp
- 100-120V, 1-phase, to 1.5 hp

DRIVESYSTEMS

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Phone: 608.849.7300

EAST
Charlotte, NC
Phone: 980.215.7575

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Brampton, ON (Toronto)
Phone: 905.796.3606