Intelligent Drivesystems

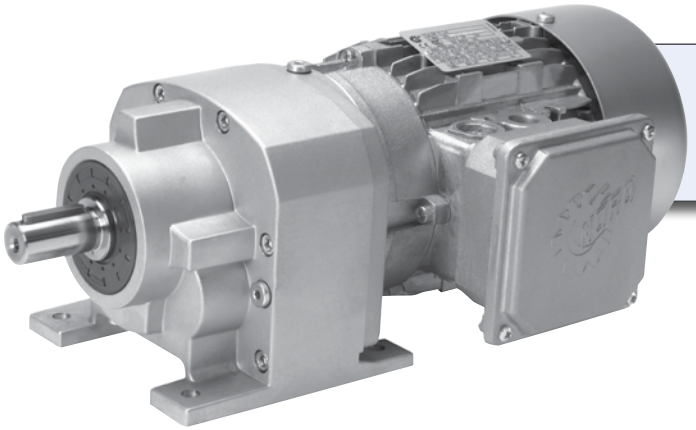
NORDBLOC.1® SERIES GEARMOTORS & SPEED REDUCERS

Compact High Performance

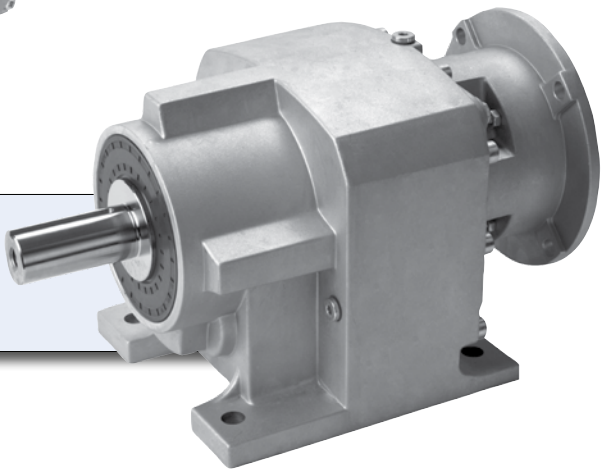
G1013

NORD DRIVESYSTEMS

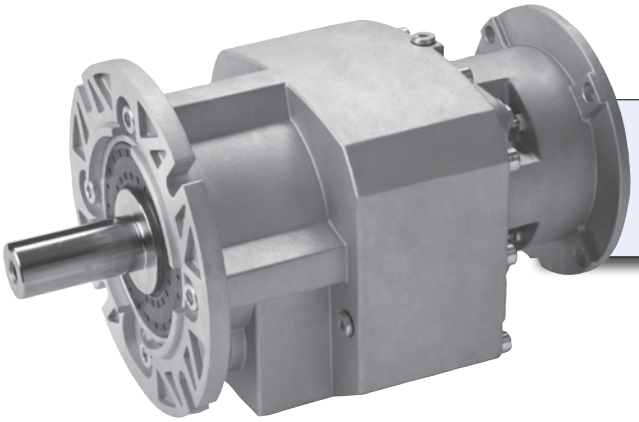
NORDBLOC.1® SERIES
Innovative Design



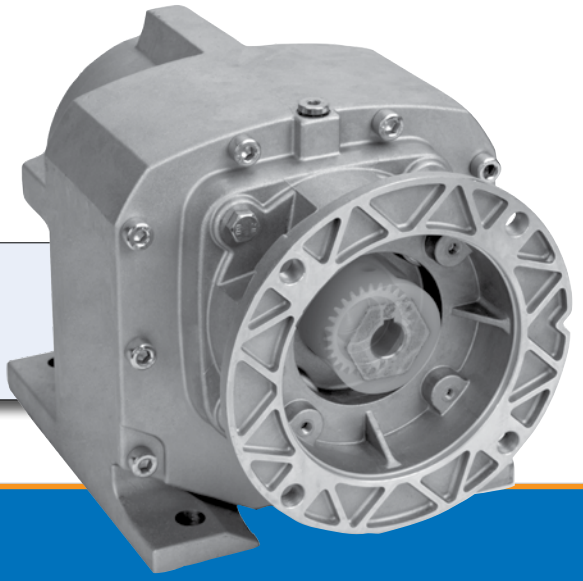
FOOT-MOUNT GEARMOTOR



FOOT-MOUNT REDUCER NEMA C-FACE INPUT



FLANGE-MOUNT REDUCER NEMA C-FACE INPUT



COMPACT COUPLED C-FACE ADAPTER

NORD DRIVESYSTEMS

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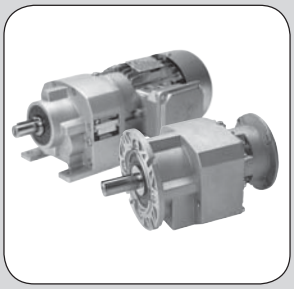
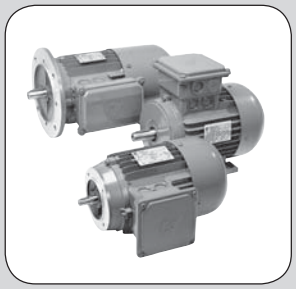
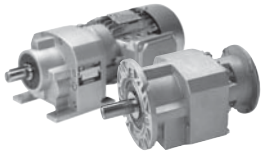
NORD DRIVESYSTEMS

www.nord.com

NORD Gear



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.

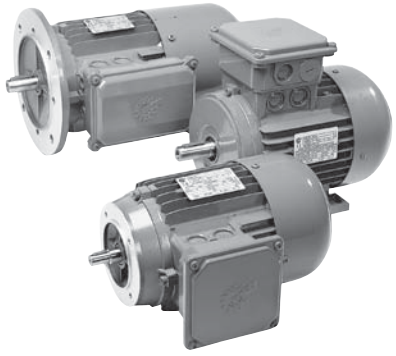
All mechanical and electrical components of a drive are available from NORD Gear. Our products cover the full range of drive equipment: helical in-line, Clincher™ shaft-mount, helical-bevel, and helical-worm gearboxes, motors and AC drives from 1/6 hp to 250 hp, with torques from 90 lb-in to 900,000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

NORDBLOC® Design

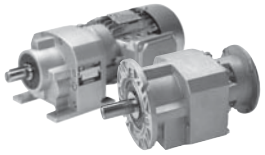
The NORDBLOC® gear units have two different designs for different torque ranges. For the lower torque range NORD has introduced a new NORDBLOC®.1 series with design points specifically tailored to their torque range. One key design point for the NORDBLOC®.1 units is the use of a corrosion resistant aluminum alloy housing material on case sizes up to the 672.1.

NORDBLOC® .1 Units

SK072.1	
SK172.1	
SK372.1	SK373.1
SK572.1	SK573.1
SK672.1	SK673.1
SK772.1	SK773.1
SK872.1	SK873.1
SK972.1	SK973.1

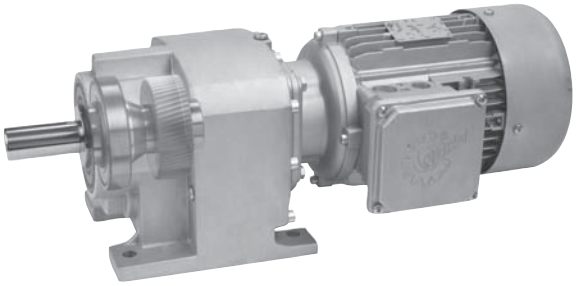
The NORDBLOC® size 772.1 and larger units also have key features optimized for their torque ranges, including class 35 grey cast iron housing as opposed to an aluminum alloy housing.

Key Features

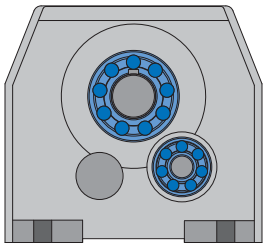


Bearing Design

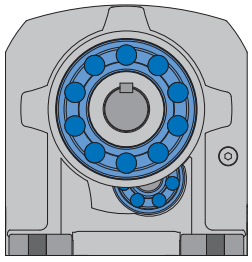
The bearing system design is a key innovation in the new NORDBLOC®.1 units. The output bearing is greatly oversized which provides a number of important advantages.



The design results in a much larger bearing capacity than what is required if the bearing were selected based on load forces. In order to accommodate larger bearings, an innovative design called staggered bearing topology was developed. It is common to have the support bearings for different shafts in the same plane, which greatly restricts the physical size of the bearings. As you can see in the scaled drawing below, the output bearing in the NORDBLOC®.1 unit is much larger than the competitor's unit.



Competitor Unit



NORDBLOC®.1 Unit

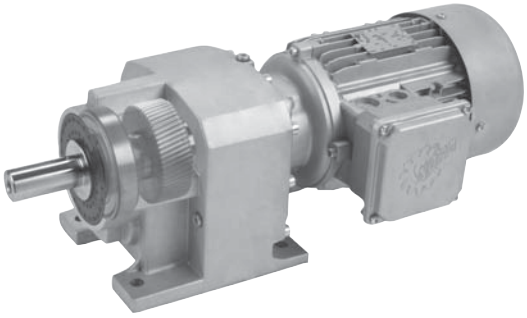
Staggered bearing topology also allows for larger bearing spans, which is a key in bearing system design. The larger bearing spans increase the overall bearing system capacity. Increased shaft diameters are also a byproduct of the larger bearings, thus enhancing shaft strength.

Advantages & Benefits

- Oversized bearings
- Staggered bearing topology
- Longer bearing life
- Higher OHL capacity
- Increased thrust capacity
- No assembly covers needed

Housing

The gear housing design for the new NORDBLOC®.1has many important advantages.

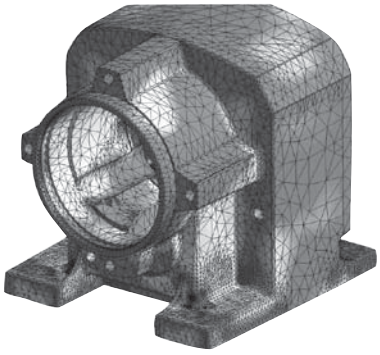


UNICASE®

NORD heavy-duty, one-piece 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.

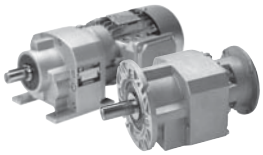
Benefits

- Leak-free design
- Quiet operation
- High output torque capabilities
- Extended lubrication life
- Longer gear and bearing life
- Superior dependability/low maintenance/longer life



Rigid Housing Design (FEM)

NORD's NORDBLOC®.1 design used state-of-the-art Finite Element Modeling as a key design tool. This allowed optimal structural design to maximize the strength and rigidity of the gear box components.



Aluminum Alloy Housing

The NORDBLOC® .1 makes use of the many beneficial material properties of an optimized aluminum alloy for the gear housing on gear units up to size 673.1. The aluminum alloy housing provides an extremely high strength to weight ratio. The housing material is also inherently corrosion resistant and does not need a paint coating. Finally, the aluminum alloy housing is a much better heat conductor than cast iron, which will decrease the gear units operating temperature; this benefits the internal components and will yield longer service life.

Benefits

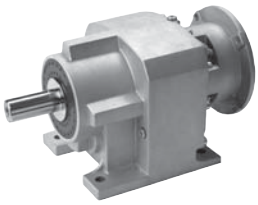
- Paint free
- Light weight
- Corrosion resistant
- Better thermal conductivity (lower temperature)
- Longer service life

Cast Iron Housing

The larger NORDBLOC® .1 units utilize a cast iron gear housing. NORD uses a Class 35 material to produce a stronger finished product. The material paired with FEM design optimization analysis creates an extremely strong and durable gear housing.

Smooth Solid Gear Housing Surface

One goal of the new NORDBLOC®.1 units was to provide a smooth surface to prevent liquids from pooling or solid material build-up on the units. This is an advantage in applications where cleanliness is important. Also, the gear units are designed to not have any assembly covers. This increases the product strength and also provides a smother surface. No rubberized bore plugs are used which provides a smoother, more uniform surface, greater strength and increased sealing integrity.



Benefits

- Easy cleaning
- Smooth surface
- No assembly covers
- No bore plug caps

Standard NORD features

Modular Design

All NORD products including the new NORDBLOC®.1 units are modular in design and provide incredible flexibility. The NORDBLOC®.1 units provide great mounting versatility including:

- Foot mount
- Flange mount B5
- Face flange mount B14
- Foot mount with a B5 or B14 flange

The NORDBLOC®.1 unit can also be provided with a number of different input components including:

- Integral motor (Gearmotor)
- NEMA C-face motor adapter
- IEC B5 motor adapter
- Solid input shaft
- Custom motor adapter
  (servo, hydraulic motors, and more)

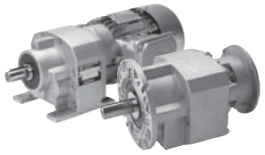
Large Ratio Per Gear Stage

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 80:1 and 100:1. Most speed reducer manufacturer's can only produce single-stage reduction of between 5:1 and 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

Key Features



AUTOVENT™

The AUTOVENT™ prevents bearing damage by blocking entry of foreign material (water, dust, corrosives, etc.) through the breather. A ball and spring check valve opens at approximately 2 psi during operation and closes tightly when the gearbox cools, producing a slightly negative pressure that ensures the valve seals tight. This keeps contaminants out of the oil to maintain proper oil cleanliness reducing contamination, foaming and oxidation. The AUTOVENT™ is perfect for humid conditions, washdown applications, and dusty environments.

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 exceptional high quality gears.

Benefits

- Designed and 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

Factory Oil Filled

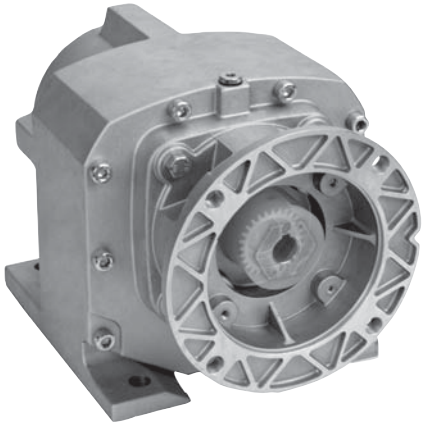
All NORDBLOC® units are filled at the factory with the proper quantity and type of lubrication. Oil fill before shipping prevents damage from dry start-ups.

Benefits

- No need for filling onsite
- Ensures proper oil grade and fill level

Compact Coupled NEMA C-Face Motor Adaptor

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.



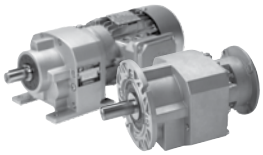
Benefits

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

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.

DRIVESYSTEMS



NORDBLOC®.1 Ordering Guide

	Gear Unit	Shaft/Mounting	Reducer Options		Input/Motor	Motor Options
SK	❶	❷	❸	-	❹	

see page 142

❶

Gear Unit	
072.1	
172.1	
372.1	373.1
572.1	573.1
672.1	673.1
772.1	773.1
872.1	873.1
972.1	973.1

❷ **Shaft/Mounting**

- Footed 16
- **F -** B5 Flange 17
  - B5 Flange Diameter
- **Z -** B14 Flange 17
- **XZ -** Foot/B14 Flange 17
- **XF -** Foot/B5 Flange 17
  - XF Flange Diameter

❸ **Reducer Options**

- ❒ **VL -** Heavy Duty Output Bearings 18
- ❒ **PR -** Flange Pilot Removal 17
- ❒ **FKM -** Fluoro Rubber Seals 18
- ❒ **SWV -** Special Solid Shaft 18
- ❒ **SM5 -** Stainless Steel Output Shaft 18
- ❒ **OSG -** Oil Sight Glass 19
- ❒ **OA -** Oil Expansion Chamber 25
- ❒ **LL -** Long Term Storage 19
- ❒ **MDP -** Magnetic Drain Plug 19
- ❒ **ADP -** Additional Drain Plug 19

❹

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

Product Specifications

Ratio

_____ :1

see pages 54 - 85

— OR —

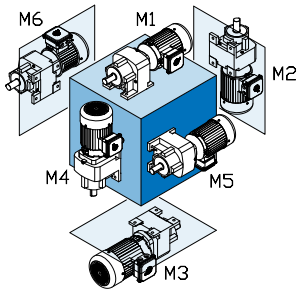
Output Speed

_____ rpm

see pages 88 - 101

Mounting Position 14

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



Paint 20

- ❍ No Paint (Standard)
- ❍ Stainless Steel Paint
- ❍ NSD+ (gray)
- ❍ NSD+W (white)
- ❍ NSD-X3 (gray)
- ❍ NSD-X3W (white)
- ❍ Special _____

Lubricant 22

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

Shaft Diameter

_____

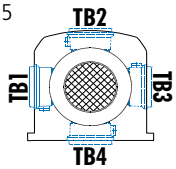
Gearmotor Only Details

Voltage & Frequency

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

Terminal Box Pos. 15

- ❍ TB1
- ❍ TB2
- ❍ TB3
- ❍ TB4

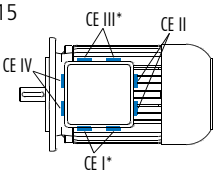


Mtg. Pos. M1 Shown

Conduit Entry Loc. 15

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

* Brakemotor



Mtg. Pos. M1 Shown

Motor Order Form

DRIVESYSTEMS

	Frame	Size	Poles	Motor Options	Brake Size	Brake Options
SK						

Frame	Size	Poles
63	S	4
71	SH	2
80	M	6
90	MH	4-2
100	MX	8-2
112	L	8-4
132	LA	12-2
160	LH	Other
180	LX	
200		
225		

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

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

- ❒ **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

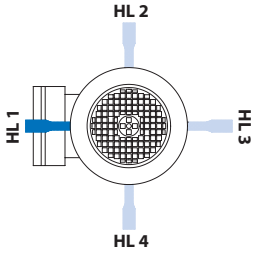
- ❍ 24 VDC
- ❍ 115 VAC
- ❍ 200 VAC
- ❍ 230 VAC
- ❍ 400 VAC
- ❍ 460 VAC
- ❍ 500 VAC
- ❍ 575 VAC
- ❍ Other _____

Braking Method

- ❍ Method 10
- ❍ Method 15
- ❍ Method 20
- ❍ Method 25
- ❍ Method 30
- ❍ Method 35
- ❍ Method 40
- ❍ Method 45
- ❍ Method 50
- ❍ Method 55

Hand Release Position

- ❍ HL1
- ❍ HL2
- ❍ HL3
- ❍ HL4



Mounting

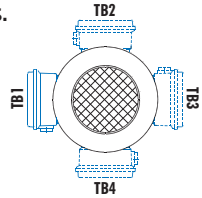
- ❍ Integral to gearbox
- ❍ NEMA C-Face
- ❍ IEC B5 Mount

Voltage & Frequency

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

Terminal Box Pos.

- ❍ TB1
- ❍ TB2
- ❍ TB3
- ❍ TB4

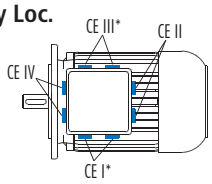


Mtg. Pos. M1 Shown

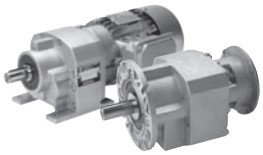
Conduit Entry Loc.

- ❍ 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
3. Determine Service Factor
4. Select the basic gearbox type and input
5. Determine the required mounting position
6. Select options
7. Checks – overhung load, thrust load, NEMA motor weight, thermal considerations, and other application considerations

1. 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 the required power or torque needed to power the load. Torque in this catalog is normally expressed in pound-inches [lb-in].

$$\text{Power [hp]} = \frac{\text{Torque [lb-in] x speed [rpm]}}{63025}$$

$$\text{Torque [lb-in]} = \frac{\text{Power [hp] x 63025}}{\text{speed [rpm]}}$$

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

To specify a gear unit you can identify either torque or power.

3. Service Factor or Service Class

In addition to power or torque, service factor must also be considered. A service factor is essentially the ratio of extra capacity in a gear unit compared to the power or torque that is needed to run that application. The goal of selecting a gear unit with extra capacity (service factor) is to provide adequate service life in operation.

One reason to apply a larger service factor is if a unit operates more hours per day. If a unit runs 24 hours per day it should normally have a higher service factor than a unit that runs 8 hours per day if you expect the same calendar life.

A second reason for applying a larger service factor is to cope with a more difficult application. Even if it takes the same power and speed to operate a rock crusher as a fan, the rock crusher needs a stronger gearbox (higher service factor) to give the same calendar operating life as the gear unit powering the fan.

The real question is how to determine the proper service factor for a gear unit in an application. Following are four possible methods.

Customer or User Specification

Many customers will have their own service factor guidelines or specifications.

AGMA Service Factoring

American Gear Manufacturers Association (AGMA) publishes lists of recommended service factors for different applications. These service factor recommendations have been determined form the experience of many gear manufactures and are in AGMA standard 6010. See page 46 for additional detail.

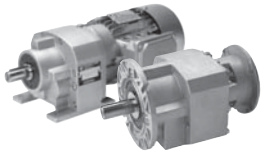
AGMA Service Classes

American Gear Manufactures Association (AGMA) has another method for selecting gear units service factors. AGMA standard 6009 lists many applications by a service class (I, II, III) with class I being the simplest applications and class III being the hardest. These application service classes are associated with a range of service factors by the following table.

AGMA Service Class	Service Factor
I	1.00 to 1.39
II	1.40 to 1.99
III	2.00 and above

In the gearmotors selection table each unit is also classified by an AGMA service class. See page 42 for additional detail.

Selection Information



DRIVESYSTEMS

NORD Mass Acceleration Service Factoring

NORD often uses a calculation based system to properly assign a service factor. This system considers hours of operation per day, the severity of the application and the number of times the equipment is cycled. See page 41 for additional detail.

4. Gearbox Type & Input

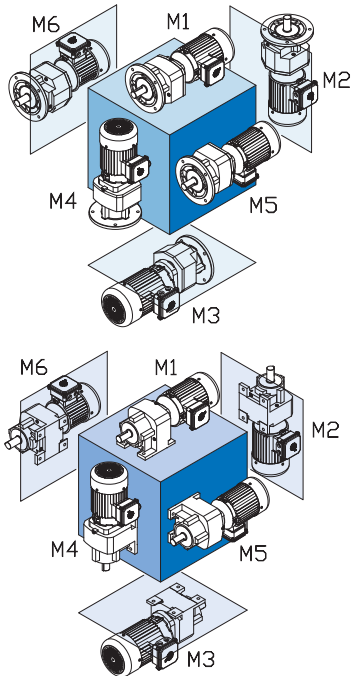
NORDBLOC®.1 gear drives are available in the following mechanical configurations including:

- Foot mount
- Flange mount
- Foot mount with flange

NORD's modular design allows for a number of different inputs to be added to NORD reducers including:

- Integral motor
- NEMA-C and IEC motor adapter
- Solid input shaft

5. Mounting Position



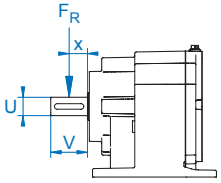
The gearbox mounting position is an important and often overlooked specification. The mounting position determines how much oil the gear reducer requires, in addition to determining the position of the oil drain, oil fill and vent on the gear drive. NORD offers six basic mounting positions. If your application requires a variation from the six basic mounting positions, please contact NORD.

6. Options

NORD offers a number of mechanical, protective, paint and lubrication options for gear reducers and motors. Please see page 16 for gear unit options and refer to the motor section for motor options.

7. Checks

Overhung Load



An overhung or radial load exists when a force is applied at right-angles to a shaft beyond the shaft's outermost bearing. Pulleys, sheaves and sprockets will cause an overhung load when used as a power take-off. The amount of overhung load will vary, depending on the type of power take-off used and where it is located on the shaft.

Overhung load [F_R] can be found in the gearmotor rating tables and input shaft overhung load ratings [F_{R1}] can be found on pages 32 - 36. Overhung load capacities should not exceed the values in the table to ensure long bearing life.

To calculate overhung load see page 32.

Thrust Loads (Axial)

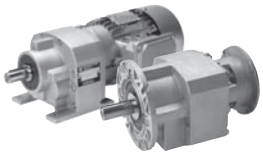
Loads that are directed towards or away from the gearbox along the axis of the shaft are called thrust or axial loads. Output shaft thrust capacity [F_A] can be found in the gearmotor rating tables. Input shaft capacity [F_{A1}] can be found on pages 32. Thrust load capacities should not exceed the values listed in the tables to ensure long bearing life. Contact NORD for combination loads or a more exact examination of the application.

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. If the motor exceeds the listed weight it must be externally supported. 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.

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



⚠ GENERAL WARNINGS & CAUTIONS ⚠

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

NEMA and IEC Adapters

NEMA/IEC adapters have additional shaft coupling and additional bearing seats compared to integral motors. This means that there are higher no-load losses with NEMA or IEC adapters. We recommend mounting the motor directly, since it offers technical and cost advantages.

NEMA and IEC adapters used in hoist, lifts and other applications with danger of personal injury should be reviewed together with NORD.

NEMA C-Face Adapter Capacity

NEMA adapters are designed to handle the torques produced by the standard NEMA power assignment at 4-pole (1800 rpm) motor speeds. If a larger motor power is used than the power below, NORD should be consulted. Also if a NEMA adapter is being used for other than an AC induction motor NORD should be consulted.

Adapter	Max Power [hp]
56C	1
140TC	2
180TC	5
210TC	10
250TC	20
280TC	30
320TC	50

Vertical Mounting for Gear Units and Gear Motors

For observing the reducers thermal limit rating – see page 12. 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.

External Installation, Tropical Use

Gearboxes installed outside, in damp rooms, or used in the tropics may require special seals and anti-corrosion options. Please contact NORD for application assistance.

Special conditions

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

- Exposure to aggressive corrosive materials (contaminated air, gasses, acids, bases, salts, etc.)
- Very high relative humidity
- Direct contact between the motor and liquid
- Material build-up on the gear unit or motor (dirt, dust, sand, etc.)
- High atmospheric pressure
- Radiation
- Extreme temperatures, high, low or large temp. changes
- High vibration, acceleration, shock or impacts
- Other abnormal conditions

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.

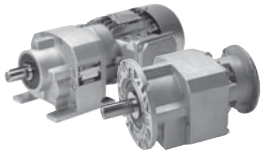
The thermal rating or thermal limit depends upon the amount of heat generated within the reducer and is influenced by a variety of factors including:

- Churning or splashing losses in lubricant levels. These losses depend upon reducer type, ratio, input style, mounting position or oil fill level, as well as the pitch line 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.

Storage Before Installation

The gear units & motors should be stored in a dry area before they are to be installed. Special measures are required for longer storage. Please request long term storage instructions from NORD Gear or see page 19.

Thermal Considerations



Observing the Reducer's Thermal Limit

When to Contact NORD

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

When applying NORDBLOC® gear units of case size SK672.1 and larger, consult NORD if any two or more of the following conditions apply:

- Gear ratio, $i_{total} \leq 24:1$
- Input speed, $n_1 > 1800$
- Vertical positioning (mounting position M2 or M4)
- Input configuration: NEMA C-face, IEC, servo adapter or solid-shaft input (Type-W)
- Elevated ambient temperature ≥ 86° F (30 °C)

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 and deterioration.
- A decrease in lubrication viscosity and film thickness.
- Loss of critical bearing and gear clearances required for proper lubrication.
- Increased contact pressures and 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.

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

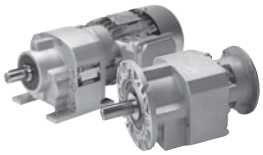
Use caution when specifying gear reducers for high temperature service. If there is concern about exceeding the allowable safe operating temperatures, please consult NORD to discuss alternatives.

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 protecting the reducer from high heat sources.
- Considering an integral motor instead of the bolt-on input assembly covers. In many cases the motor fan will substantially increase air-flow around the gear unit.
- Add an Oil Expansion/Overflow Chamber (Option "OA") see page 25
- Oil Cooler (Option "OC") Consult NORD.

DRIVESYSTEMS



Selection Inquiry

Contact: _____ **Company:** _____

Telephone: _____ **Email:** _____

Fax: _____ **Date:** _____

Project Name: _____ **Application:** _____

Qty: _____ **Type: SK** _____

Gearbox Parameters

Unit

❍ Gearmotor ❍ Gearbox with Motor Adapter
❍ Gearbox with Solid Input Shaft

Mounting Position

❍ M1 ❍ M4
❍ M2 ❍ M5
❍ M3 ❍ M6
❍ Special _____

Lubricant

❍ Standard
❍ Synthetic
❍ Food Grade
❍ Other _____

Flange

❍ None
❍ B14 (Z)
❍ B5 (F) Outside Diameter _____ [mm]

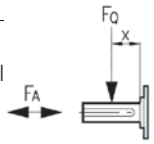
Ratio _____ : 1 or Output Speed _____ [rpm]

Output Torque _____ [lb-in] or Power _____ [hp]

Minimum Service Factor [f_b] _____ [lb]

Radial Load at Output Shaft [F_Q] _____

Axial Load at Output Shaft [F_A] _____[l



Distance from Shaft Shoulder [x] _____

Minimum Required Bearing Lifetime [Lh10] _____ [hours]

Bearing Type

❍ Standard
❍ VL - Heavy Duty
❍ AL - Axial/Thrust

Environmental Parameters

Ambient Temperature Range _____°F to _____ °F

Location of Unit

❍ Indoor
❍ Outdoor
❍ Severe Environment

Paint

❍ No Paint
❍ Stainless Steel Paint
❍ NSD+ (gray)
❍ NSD+W (white)
❍ NSD-X3 (gray)
❍ NSD-X3W (white)
❍ Casting Primed
❍ Special _____

Motor Parameters

Power _____ [hp]

Voltage & Frequency

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

Enclosure

❍ IP55 (Standard)
❍ IP66

Insulation Class

❍ F (Standard)
❍ H

Duty

❍ S-1 Continuous Operation
❍ Periodic/Short Time Operation

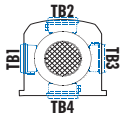
Thermal Protection

❍ None
❍ Thermostat
❍ Thermistor

Cycles Per Hour _____ cycles/hour

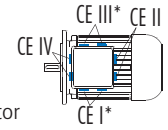
Terminal Box Position

❍ TB1
❍ TB2
❍ TB3
❍ TB4



Conduit Entry Location

❍ CE I *
❍ CE II
❍ CE III *
❍ CE IV
* Brakemotor



Brake Parameters

Brake

❍ No Brake (continue to next section)
❍ Holding Brake/Emergency Brake
❍ Working Brake

Brake Supply

❍ Line power from motor terminal block
❍ Separate Power Source

Brake AC Supply _____ [Volts]

Brake Torque _____ [Nm]

Brake Release

❍ Standard
❍ Fast

Brake Stopping

❍ Standard
❍ Fast
❍ Very Fast

Frequency Inverter Parameters

Frequency Inverter

❍ No Frequency Inverter
❍ Customer Supplied Inverter
❍ NORD Panel Mounted Frequency Inverter
❍ NORD Motor Mounted Frequency Inverter

Line Voltage: _____ [Volts] Frequency _____ [Hz]

Operating Frequency Range: _____ [Hz] to _____ [Hz]

How is the Inverter Controlled?

❍ PC
❍ Operator Control
❍ Other

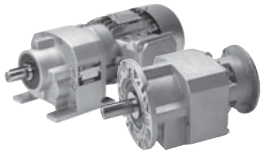
Bus System?

❍ None ❍ InterBus
❍ Profibus ❍ CANopen
❍ CANBus ❍ RS232
❍ AS Interface

Are You Using an Encoder?

❍ No
❍ Yes → ❍ Position Feedback
❍ Speed Control

Mounting Positions



Mounting Positions

The reducer mounting position determines the approximate oil fill level and the appropriate vent location. In some cases the mounting position may dictate possible variation in 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.

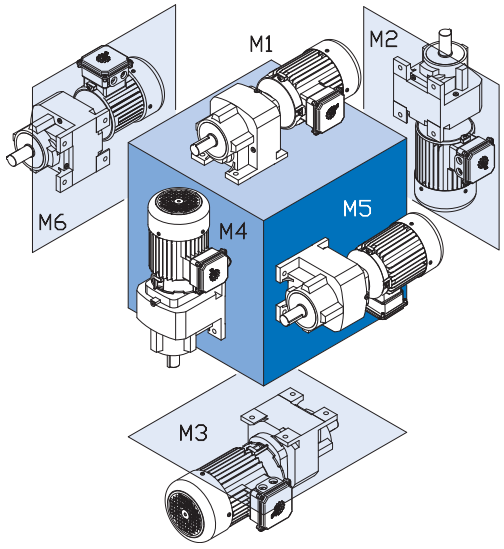
New Mounting Position System

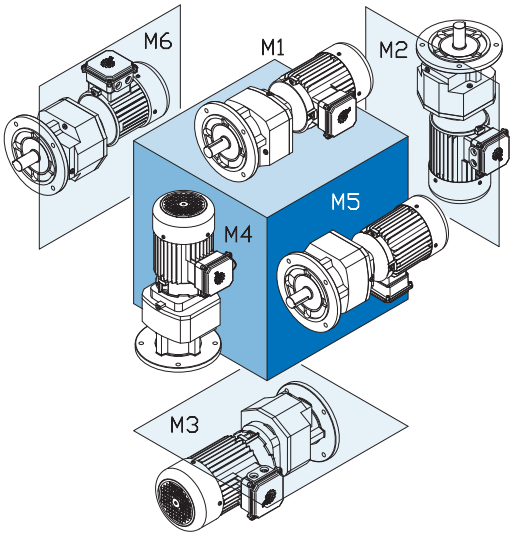
NORD is in the processes of incorporating a new mounting position systems. Historically the NORD mounting position system was based on international motor standards. NORD is changing in an effort to simplify the system. The new systemis based on the six sides of a cube. Below is a cross reference between the old and new mounting position codes.

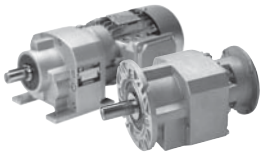
Mounting Position Cross Reference Table

New	M1	M2	M3	M4	M5	M6
Old	B3, B5	V3, V6	B8, B5I	V1, V5	B5II, B6	B7, B5III

NORDBLOC®.1







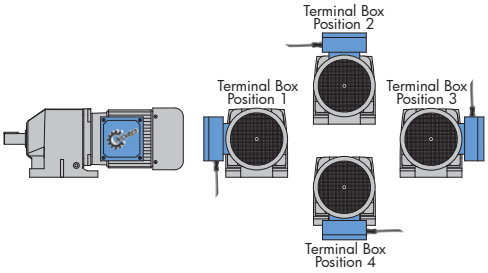
Mounting Configuration

NORD provides gearmotors, speed reducers and motors that can be configured very differently to suit customer needs. When ordering, it is beneficial that the drive be specified exactly the way you want it delivered.

Gearbox mounting positions

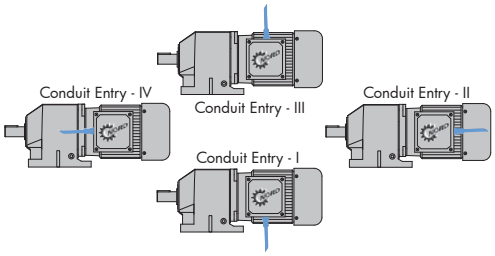
❍ M1 ❍ M2 ❍ M3 ❍ M4 ❍ M5 ❍ M6

Terminal box location



❍ Terminal Box Position 1 ❍ Terminal Box Position 3
❍ Terminal Box Position 2 ❍ Terminal Box Position 4

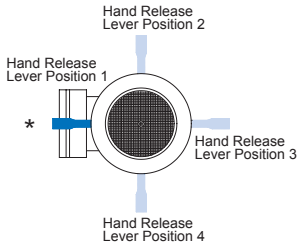
Conduit entry location



❍ Conduit Entry Location I* ❍ Conduit Entry Location III*
❍ Conduit Entry Location II ❍ Conduit Entry Location IV

* Brakemotor available in these locations

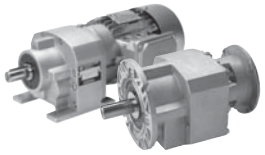
Brake motor with hand release lever



❍ Hand Release Lever Pos. 1* ❍ Hand Release Lever Pos. 3
❍ Hand Release Lever Pos. 2 ❍ Hand Release Lever Pos. 4

* Standard position

Gear Unit Options



NORD DRIVESYSTEMS

NORDBLOC® Gearbox Options

Abbreviation	Description	Page
none	Solid shaft, foot mount	17
ADP	Additional drain plug	19
DR	Autovent	19
F	B5 flange	17
FV	Filtered vent	19
LL	Long term storage	19
MDP	Magnetic drain plug	19
OA	Oil expansion chamber	25
OSG	Oil sight glass	19
OV	Open vent	19
PR	B5 flange pilot removal	17
SM5	Stainless steel output shaft	18
SWV	Special solid shaft	18
VI	(FKM) Fluoro-rubber seals	18
VL	Heavy duty output bearings	18
XF	Foot mount with B5 flange	17
XZ	Foot mount with B14 flange	17
Z	B14 flange	17
none	NSD TupH	21
none	Paint coatings	20

Inputs

NORD's modular design allows for many different types of inputs to be added to gear reducers. All inputs are bolt on and include machined pilots to ensure simple and accurate assembly. NORD offers the following different input types:

- Integral motor
- Solid input shaft
- NEMA C-Face motor adapter
- IEC B5 motor adapter

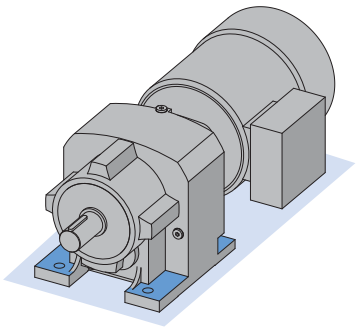
Mounting

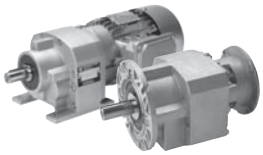
NORD offers a number of different mounting arrangements including:

- Foot (X)
- B5 flange (F)
- B14 flange (Z)
- Foot with B5 flange (XF)
- Foot with B14 flange (XZ)

Foot Mounted (Blank)

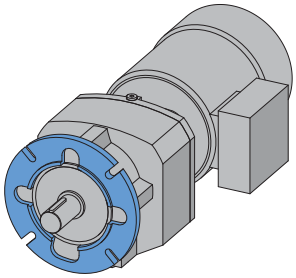
Foot or base mounting is the most common method of reducer mounting. The speed reducer is secured in place with bolts or studs to a mounting base.





B5 Flange (F)

A B5 flange provides a simple, large diameter mounting flange with clearance holes and a centering pilot to firmly secure the speed reducer to the application. The B5 flange utilizes standard metric dimensions and is available for all NORD reducers. NORDBLOC® reducers offer a number of B5 flange diameters.



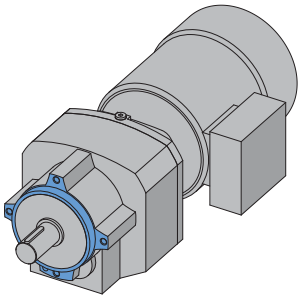
B5 Flange Pilot Removal (PR)

B5 flanges have a centering pilot machined onto the flange. In cases where there is not a matching counter bore or when the flange must sit flush to the mounting surface then the centering pilot must be removed. This pilotless flange is used to firmly secure the speed reducer to the application.

In some cases the matching surface already has a centering pilot and the use of a female pilot (counter bored flange surface) is recommended. Female pilots are frequently used for counter-rotating drive applications

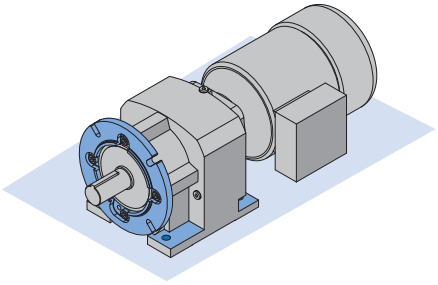
B14 Flange (Z)

The B14 flange consists of threaded holes and a centering pilot machined into the reducer housing. It is commonly used to secure the reducer to the application machine base or to mount one of many bolt on components such as a B5 flange, or shaft cover. The B14 flange uses standard metric dimensions and allows a compact method of securing the reducer.



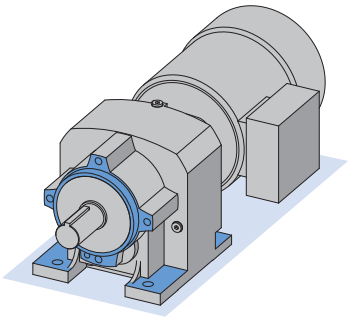
Foot Mounted with B5 Flange (XF)

NORD can supply foot / B5 flange mounted reducers.



Foot mounted with B14 Face Flange (XZ)

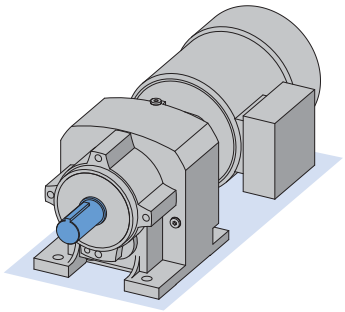
NORD has the ability to provide foot mounted reducers with a B14 face flange.



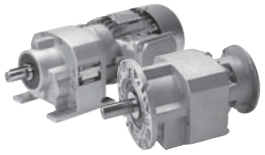
Shaft Options

Solid Shaft (Blank)

NORD's standard keyed solid shafts include a centered threaded hole. Shafts are available in inch or metric versions. The standard shaft material is AISI 1045 high carbon steel, AISI 4140 or equivalent.



Gear Unit Options



Special Shafts & Shaft Materials

Stainless Steel Output Shaft (SM5)

Output shafts made from stainless steel are available and are frequently used in food, pharmaceutical, and washdown applications. In some cases stainless steel solid input shafts may also be provided.

Special Solid Shaft (SWV)

Special solid shaft diameters and lengths may be provided for a nominal price adder. Special features are also available including keyless shafts, cross drilled shafts or special threaded taps. Different shaft materials are also available. NORD has in-house drafting, design and machining departments so we can provide special requirements in short lead times. Specify your shaft requirements and NORD will verify the design's feasibility.

Heavy Duty Output Bearings (VL)

Replacing standard output bearings with heavy-duty versions will increase the external load carrying capacityof the speed reducer. Increased capacity in either or both overhung (radial) or thrust (axial) loading ensures that premature bearing failure will not occur due to high stress to the bearing elements. The increased bearing capacity will also keep the speed reducer as small as possible by not having to select the next larger case size in order to handle the bearing loads. If increased bearing life is desired, larger bearings will reduce the relative stress on the bearings and increae the B10 bearing life. Heavy duty bearings are available for all NORDBLOC®.1 Units except the SK 072.1 & SK 172.1.

(FKM) Fluoro-rubber Seals (VI)

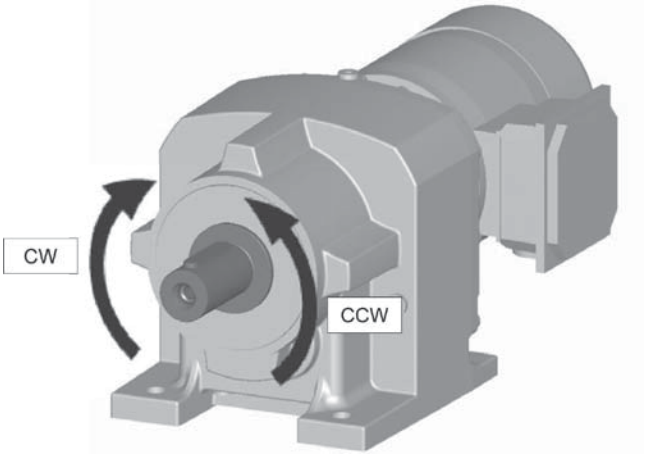
NORD is standard oil seals are made of Nitrile or rubber and are rated for temperatures up to 125°C or 250°F. If ambient or oil temperatures rise above this level NORD recommends using flouro-rubber (also called FKM) oil seals. FKM seals are rated from -30°F to 400°F (-35°C to 200°C).

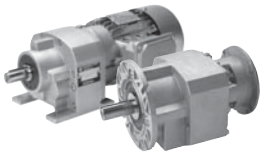
Backstop (RLS)

The anti-rotation backstop allows rotation in one direction. NORD's backstop is installed internally to the motor. The backstop is available on units with motor frame sizes of 80 and larger.

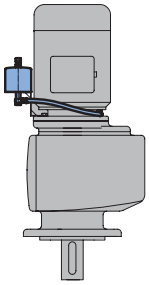
The direction of rotation is required when ordering.

Specify the Allowable Shaft Rotation
❍ CW - Clockwise Rotation
❍ CCW - Counter-clockwise Rotation





Oil Expansion Chamber (OA)

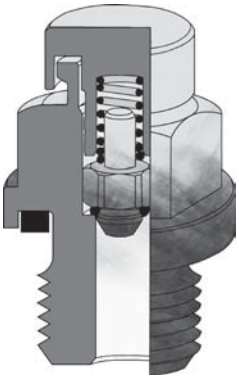


Oil expansion chambers allow for expansion of the oil-air mix in the reducer that can occur during operation. This expansion chamber is similar to a car radiator over-flow chamber. See page 25 for additional details and selection guidelines.

Oil Sight Glass (OSG)

The oil sight glass provides a visible oil level indication on the reducer. The sight glass replaces the standard steel fill plug and consists of a sealed clear porthole centered in the middle of a brass plug. The sight glass allows for quick oil level and color inspection and is available on units SK 572.1 and larger.

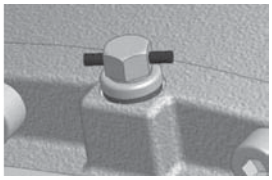
AUTOVENT™ (DR)



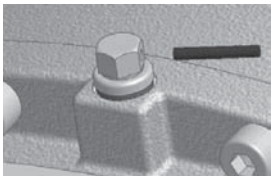
The AUTOVENT™ prevents entry of foreign material, such as water, dust, corrosives, etc. and is perfect for washdown and dusty environments. The AUTOVENT™ is a ball & spring check valve that opens at 2 psi during operation and closes tightly when the gearbox cools. The AUTOVENT™ is standard on all vented NORD reducers some of the benefits are cleaner gearbox oil, extended lubrication life as well as longer lasting seals, gears, and bearings.

Open Vent (OV)

An open vent can be optionally supplied on NORD reducers. The open vent allows for air pressure differences between the inner space of the reducer and the atmosphere. This open vent will be closed upon delivery to prevent oil leakage. Before the reducer is put in service the open vent should be activated by removing the sealing plug.



Sealed vent



Activated vent

Filtered Vent (FV)

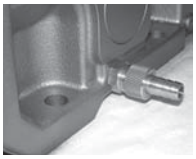
NORD offers a filtered vent, which allows gases to permeate, but does not allow dust and debris to pass through the vent. The filtered vent is available for units SK 572.1 and larger.

Magnetic Drain Plug (MDP)

Magnetic drain plugs attract and hold ferrous metal particles that may circulate inside the reducer's oil sump. These potentially abrasive particles may cause excessive wear in the reducer if they remain circulating. An increase of material collected by the magnetic plug may be a warning sign of future problems. The magnetic plug is available for units SK 572.1 and larger.

Special Drain Plugs

NORD oil drain valves are offered to make draining the oil from the gearbox clean and easy. The drain hose needs to be supplied by the customer. The hose fittings are offered in either 90° or straight to accommodate the user.



A brass drain valve is threaded into the existing oil drain port of the gearbox. The spring valve is closed using a rubber o-ring. When the hose fitting is threaded into the drain valve, the spring valve is pushed open and allows oil to drain. When the hose fitting is removed, the drain valve closes. A brass, threaded cap is supplied to cover the drain valve when not in use.

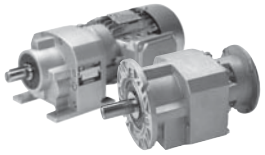
Additional Drain Plug Hole (ADP)

NORD can add an additional drain hole to the reducer housing for a small surcharge if it is required for special oil plumbing needs.

Long Term Storage (LL)

Speed reducers are frequently put in to storage prior to installation for long periods of time and in some cases exposed to the elements. NORD's long term storage option protects the unit from moisture or corrosion by coating all unpainted surfaces with a dry, transparent, durable waxy film. Once installation is necessary this waxy film can be easily removed with a commercial de-greaser or petroleum solvent. If possible the store room should be vented and dry, with room temperatures between 32°F and 104 °F (0 °C and 40 °C).

Gear Unit Options



NORDBLOC® .1 paint free design (SK072.1 - SK673.1)

The NORDBLOC® .1 housings are made from corrosion resistant die-cast aluminum alloy and feature a smooth body design. The smooth aluminum alloy surfaces have natural corrosion protection; therefore paint coatings are not required. Paint coatings can be applied for a surcharge.

NORDBLOC.1® (SK772.1 and larger)

The SK 772.1 and larger housings are made from class 35 gray cast iron and are painted with NORD's stainless steel paint. Additionally a variety of coating options are available including our severe duty coatings.

Paint Coatings

NORD's standard paint coating is a two component, aliphatic polyurethane finish contaning 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.

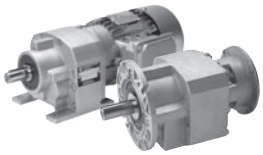
Advantages of NORD's stainless steel two component polyurethane:

- 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
- USDA compliant

NORD also offers a variety of severe duty paint coatings that provide a high level of protection against water and severe environments both indoors and outdoors. NSD+ (NORD Severe Duty) consists of a 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 coating, and a clear topcoat. Paint coatings are also available in alternate colors as seen in the table below.

Finish	Color	Coating	Use
Standard (stainless steel paint)	Stainless steel silver (Gray)	1 x Stainless steel (316) top coat (polyurethane)	Indoor or outdoor moderate environment
Alternate color	Black, Blue, Red, Orange	1 x Color top coat (polyurethane)	Indoor or outdoor protected
NSD+			
NORD Severe Duty + NSD+	Stainless steel silver (Gray)	1 x Primer high solid alkyd system 1 x Stainless steel (316) top coat (polyurethane)	Indoor or outdoor moderate environment
NORD Severe Duty +W NSD+W	White	1 x Primer high solid alkyd system 1 x White top coat (polyurethane)	Indoor or outdoor moderate environment
Alternate color NSD+	Black, Blue, Red, Orange	1 x Primer high solid alkyd system 1 x Color top coat (polyurethane)	Indoor or outdoor moderate environment
NSD X3			
NORD Severe Duty Extreme NSD-X3	Stainless steel silver (Gray)	1 x Primer high solid alkyd system 1 x Stainless steel (316) (polyurethane) 1 x Clear top coat (polyurethane)	Indoor or outdoor more severe environment
NORD Severe Duty Extreme NSD-X3W	White	1 x Primer high solid alkyd system 1 x White (polyurethane) 1 x Clear top coat (polyurethane)	Indoor or outdoor more severe environment
Alternate color NSD-X3	Black, Blue, Red, Orange	1 x Primer high solid alkyd system 1 x Color (polyurethane) 1 x Clear top coat (polyurethane)	Indoor or outdoor more severe environment

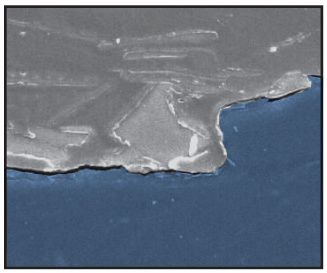
Special colors and paints possible please contact NORD with your specific requirements.



NSD TupH

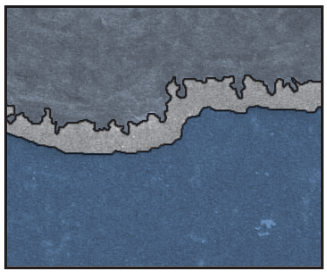
As a leader in the power transmission industry, NORD Gear is committed to providing value to industries where end users demand durable equipment to withstand a variety of harsh environments. The market has long awaited a product with such a large range of standard reducers with the corrosive resistance properties of a stainless steel product without the excessive cost.

In response to these demands, NORD Gear has begun utilizing an electrically catalyzed process to create a uniform case depth protective surface with its existing aluminum alloy housing material. Combined with a sealer, NORD's corrosion resistant cleanable Sealed Surface Conversion system (NSD^{tupH}) allows existing aluminum alloy housings to be protected with a base finish that is 6-7x harder than aluminum alloy. With its stainless steel hardware, optional stainless steel shafts, optional stainless steel motors and optional food grade lubricants, NORD's NSD^{tupH} is the optimal package for applications in a variety of incredibly harsh environments.



Paint Aluminum Surface

Paint simply lies on top of the substrate and may even bridge across pores in the metal. Since paint does not form a permanent bond to the substrate, it can easily release at very low stress levels.

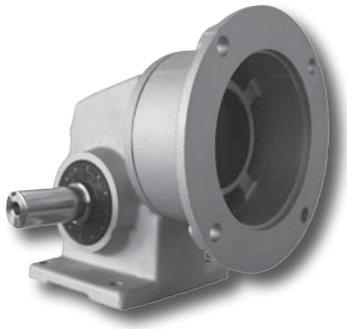


Sealer Aluminum Surface
Surface Conversion

The NSD^{tupH} process includes a base layer that is permanently bonded to the substrate and provides a powerful foundation for adhesion of the surface sealant. This foundation provides excellent roughness, is 6-7x harder than the aluminum substrate and up to 1000x harder than paint.

nsd tupH System Package

- Standard Electrolytic processed reducer housing
- Standard Stainless Steel Hardware
- Standard C-Face Gasket included
- Housings surfaces are self draining
- Food Grade H1 Synthetic Lubrication (optional)
- Stainless Steel output shafting (optional)
- Stainless Steel C-Face Inverter Duty motor up to 10HP (optional)
- 3 Year Warranty when supplied with synthetic lube



nsd tupH is Useful in Many Harsh Environments

(not limited to but including)

- Chemical wash down
- Damp and wet environments
- Marine / Coastal
- Food & Beverage industry
- Car Wash
- Dairy
- Pharmaceutical
- Water and waste treatment

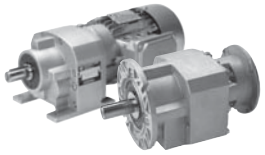
Some of the Many Benefits of nsd tupH

- Cost effective alternate to stainless steel
- Corrosion resistance
- Chip resistance
- Non propagating from scratches or other blemishes
- Highly Cleanable low friction surface
- Non-porous
- Lighter than stainless
- Chemical resistant
- Elimination of galvanic corrosion
- Surface conversion is 1000X harder than paint

Available NORDBLOC.1® worm Units with NSD^{tupH} Conversion

	SK072.1	SK172.1	SK372.1	SK572.1	SK672.1
N48C Input	X				
N56C Input	X	X	X	X	X
N140TC Input		X	X	X	X
N180TC Input			X	X	X
N210TC Input					X

Lubrication



The Importance of Proper Lubrication

Proper gearbox lubrication is essential in order to reduce friction and component wear, and to protect against corrosion and rust. Gear lubricants reduce heat and wear by inserting a load-sharing "protective fluid film" between mating parts and preventing direct metal to metal contact. Properly selected lubricants will operate under various film conditions, improve heat transfer, optimize reducer efficiency, absorb shock loads, reduce noise, inhibit foaming, and separate water readily.

Design Considerations

Along with many other factors, the gear designer must consider the gear load and speed conditions, and the expected operating oil temperatures. These factors help determine a generally suitable oil category, a desired additive package, preferred base-oil type, and oil viscosity.

It is important that the consumer be aware of these many design factors before making any changes in the critical areas (oil category, base-oil type, viscosity, etc.) One should consult their preferred lubrication supplier or NORD Gear when questions arise.

Gear Oil Types, Categorized by Base Oil

Mineral Oil with an EP Additive (DIN 51517, Type CLP)

High performance mineral gear oils are carefully engineered and manufactured to improve aging characteristics, minimize friction, offer good wear protection, provide corrosion and oxidation resistance, minimize foam, and separate water. Mineral gear oils are classified as API Group I or II oils, depending upon viscosity.

The standard NORD mineral gear oil has an extreme pressure (EP) additive ISO Viscosity Grade EP220 (AGMA 5 EP) and is generally acceptable for helical gear units. Good quality mineral oil should have the ability to operate at moderate sump temperatures (up to 80-85 °C) without losing viscosity or thickness. A minimum viscosity index (VI) of 93 or higher is suggested. The oil must also have good film strength to handle shock loads, high torque, and start-up conditions. A minimum FZG Scuffing Load Stage 12 is desirable.

Advantages:

- Most economical of all the gear oil types.
- Generally offers good compatibility with shaft seals, gaskets, paint finishes, etc.
- Offers good corrosion and oxidation protection.
- Effectively reduces internal friction and wear.

When Synthetic Oils Are Used

Synthetic gear oils are suggested when mineral gear oils have reached their performance limit or when they no longer meet certain application requirements. NORD may recommend synthetic oil for any one of the following conditions:

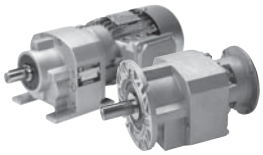
- Severe duty applications or when gears are exposed to frequent starts and stops, high-load or shock.
- For applications in low or high temperature service.
- To extend oil service interval requirements.
- To eliminate the necessity for seasonal oil changes.
- To extend service life of factory-sealed or maintenance-free gear units.
- To take advantage of performance benefits: shear resistance, low traction coefficiency, reduced internal friction, improved lubricity, reduced operating temperatures, improved gear efficiency, etc.

Performance Advantages of Synthetic Oil

Compared to mineral oils, synthetic oils provide a number of performance advantages including:

- Ability to operate at higher temperatures without losing viscosity or thickness, due to a much improved viscosity index.
- Improved low-temperature stability due to a lower pour point
- Increased oil change intervals due to superior oxidative and wear resistance
- Lower tendency to form residues and increased resistance to foaming.
- Other benefits may include: very good shear resistance, low traction coefficiency, reduced internal friction, improved lubricity, reduced operating temperatures, improved gear efficiency, extended component life and wear protection.

When application conditions warrant the use of synthetic oil, NORD may suggest a particular type of synthetic oil, depending upon the gear unit type and the application.



Polyalkylene Glycol or Polyglycol Synthetic Oil (DIN 51517, Type CLP-PG)

Polyalkylene glycol or polyglycol (PAG or PG) synthetic gear oils are made readily available through many lubrication suppliers. PG oils are classified as API Group V gear oils. They can also be formulated for acceptance in food-grade applications.

PG gear oils possess extremely low traction coefficients and a viscosity index higher than any of the other synthetics (often greater than 220 VI), resulting in excellent heat resistant, shear stability, and natural anti-wear properties.

Typical PG gear oils are formulated with a 1:1 or higher ratio of ethylene oxide to propylene oxide (50:50 or 60:40 is common); this makes PG gear oils water soluble, providing them with very good corrosion resistance even when water is present in concentrations that are higher then what is normally allowed.

Advantages:

- PG oils offer the highest viscosity index of any other synthetic resulting in excellent heat resistancy, shear stability, and superior natural anti-wear properties without requiring EP-additives.
- PG gears oils minimize internal friction and often result in improved gear efficiency.
- PG oils have significantly higher film strength than mineral and SHC/PAO oils and out perform these oils at higher operating oil temperatures (approaching 80°C or higher).

IMPORTANT NOTE

Polyglycol (PG) oils are not miscible with other oil types and should never be mixed with mineral oil, hydrosynthesized synthetic or PAO synthetic oils.

Synthetic Hydrocarbon/Polyalphaolefin (SHC/PAO) Oil (DIN 51517, Type CLP-HC)

Synthetic Hydrocarbons (SHC) or Polyalphaolefin (PAO) synthetic base oils offer good miscibility with mineral base oils and are very readily available. SHC/PAO oils are classified as API Group IV oils. The can be formulated with or without anti-wear (AW) or extreme pressure (EP) additives. They can also be formulated for acceptance in food-grade applications.

Advantages:

- Higher viscosity index and therefore greater high-temperature stability than mineral oil.
- Better low-temperature stability and lower pour point than mineral type gear oils
- High surface tension and lower tendency to foam compared to mineral oil, and water-soluble polyglycol gear oils.
- Compatible (miscible) with mineral oil.
- Better water seperability demulsibility than PG oils.

Food-Grade Lubricants

Food-grade lubricants should be manufactured in compliance with FDA 212 CFR 178.3570 and should either satisfy the former 1998 USDA Guidelines as an H1 lubricant or currently qualify as a NSF-H1 lubricant. Please consult with lubrication manufacturers for more information or visit www.nsf.org

H1 food grade oil can only contain additives which appear on the FDA "approved list" for food safe compounds. H1 oils are generally absent of common zinc-based AW additives, and sulfur-phosphorus based, EP chemistries, commonly found in many industrial gear oils.

Food manufacturers control risk and liability by following detailed guidelines outlined by the HACCP (Hazard Analysis and Critical Control Point) program, which includes food-grade H1 lubricants.

Food grade H1 lubricants may be formulated as highly refined mineral oils (white oils), SHC/PAO synthetic oils or PG synthetic oils.

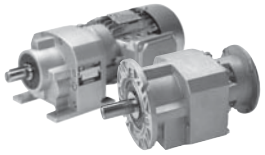
The highly refined nature of good-quality food-grade white-oils provides good long-term oxidative stability and in most cases adequate lubrication under high-load (boundary) conditions. So long as food-grade white oils meet the minimum anti-wear requirements of the normally specified non-food grade oil, they are often acceptable.

Both food-grade white oils and PAO's have an inherent "purity" and absence of polar compounds, making them better than the average mineral oil or even PG oil in terms of demulsibility (water seperability).

Compared to food-grade white-oils, food-grade synthetic PAO or PG oils typically provide:

- Better wear and oxidation resistance.
- Improved high-temperature characteristics.
- Better cold-temperature behavior.

Lubrication



The Importance of Oil Viscosity

Viscosity or the oil's resistance to shear under load, is often considered the singlemost important property of any gear oil.

NORD Gear Designers have selected the most appropriate ISO viscosity grade of oil, for each type or class of gear reducer. Gear oil viscosity is selected by assuming typical ambient conditions, at rated speed and load conditions.

Important Considerations:

- The correct viscosity selection helps provide proper lubrication and assures that a minimum film thickness is maintained between interacting surfaces.
- The degree to which viscosity changes with temperature or the viscosity index, varies from oil to oil, and depends upon the type of lubricant and additive agents used.
- Selecting too low of a viscosity can result in mixed-boundary (partial metal-to-metal contact) or boundary lubrication (full metal-to-metal contact) conditions, increasing internal friction heat build-up and wear.
- Selecting too high of a viscosity results in increased churning and squeezing losses in the load zone and excessive heat (especially when peripheral gear speeds are high); Ultimately, this causes the oil temperature to rise and the viscosity to go down, decreasing the effectiveness of the lubricant.

IMPORTANT NOTE

The user should consult with their primary lubrication supplier before considering changes in oil type or viscosity.

Considering an Oil Viscosity Change

There are three primary reasons to consider a lubrication viscosity change as follows:

1. Low temperature gear oils should be selected so that the pour point is at least 9°F (5°C) lower than the expected minimum ambient temperature. In extreme cases, consider a lower ISO Viscosity rating and test the critical performance of the gear box under cold start-up.

2. High temperature applications may require an increase in the lubricants viscosity to assure proper lubrication conditions in the critical load zones of the gear unit. NORD also recommends switching to synthetic oil if oil sump temperatures exceed 176-185 °F (80-85 °C).

3. In cases of extreme load conditions, gear pairs and antifriction bearings may be more susceptible to scuffing wear. In these operating conditions, it may be beneficial to consider an increased lubrication viscosity and/or lubrication with improved antiwear additive packages.

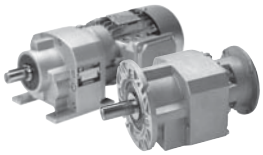
Maximum Oil Sump Temperature Limit

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).

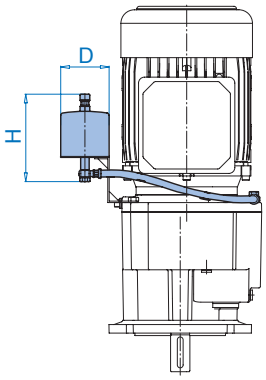
Oil Type	Maximum Oil Temperature Limit	
	NORD	AGMA 9005-D94
Mineral	80-85 °C (176-185 °F)	95 °C (203 °F)
Synthetic	105 °C (220 ° F)	107 ° C (225 ° F)

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.



Oil Expansion Chamber (OA)



NORDBLOC® Gear Unit	Part Number	D [in]	H [in]	Weight [lb]
SK 572.1 / SK 573.1 SK 672.1 / SK 673.1 SK 772.1 / SK 773.1 SK 872.1 / SK 873.1 SK 972.1 / SK 973.1	28390390	3.94	7.09	11.0

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 first 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.

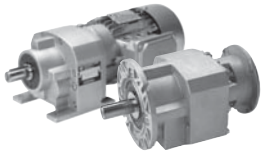
During operation, the oil expansion chamber provides a safe overflow area for the expanded oil-air mixture, thus eliminating excessive pressure build-up, minimizing the formation of foam, and preventing oil-loss through the breather, oil seals, gaskets, etc. As heat is released from the expanded air-oil 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. and is a gear unit size of SK 772.1 and larger, with ratios $i_{total} \leq 24:1$ or an output speed $n_2 \geq 75$ rpm.

- 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.

Lubrication



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 and 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 NORDBLOC® gear units factory-filled with the standard mineral lubrication type and the appropriate quantity.

Standard Oil Lubricants

Gear Unit Type	ISO Viscosity	Oil Type	Ambient Temperature Range	Manufacturer Brand/Type	Notes
Nordbloc.1	VG220	MIN-EP	0 to 40°C (32 to 104°)	Mobilgear 600XP220	♦❶
	VG220	PAO	-35 to 60°C (-31 to 140°F)	Mobil SHC630	♦
	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
Nordbloc.1	VG460	PAO	-35 to 80°C (-31 to 176°F)	Mobil SHC 634	-
	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	-35 to 25°C (-31 to 77°F)	Mobil SHC629	-

Standard Bearing Grease Lubricants

Grease Type/Thickener	NLGI Grade	Ambient Temperature Range	Manufacturer Brand/Type	Notes
Standard (Li-Complex)	NLGI 2	-30 to 60°C (-22 to 140°F)	Mobil Grease XHP222	♦❶
High Temp (Polyurea)	NLGI 2	-40 to 80°C (-40 to 176°F)	Mobil / Polyrex EP 2	♦
Food-Grade (Polyurea)	NLGI 2	-30 to 40°C (-22 to 104°F)	Mobil SHC Polyrex 222	♦

♦ Stocked Lubricants

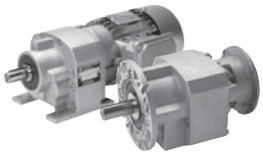
❶ Standard Oil Fill

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
PG	Synthetic Polyglycol Oil
FG	Food-Grade Oil
FG-PAO	Food-Grade, Synthetic Polyalphaolefin Oil



Ventilation

Most gear reducers are equipped with a vent which helps compensate for air pressure differences between the inner space of the gear unit and the atmosphere.

The spring-pressure vent (Autovent™) is commonly supplied and factory-installed. 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.

Prior to reducer start-up, it is important to check the maintenance manual to verify that the vent is properly located with respect to mounting position.

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.

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.

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.

Unless otherwise specified, NORD supplies most all gear units factory-filled with the standard lubrication type per the specified mounting position.

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 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 change the reducer lubricant more often than what is suggested as a typical guideline.

The Importance of Routine Oil Analysis

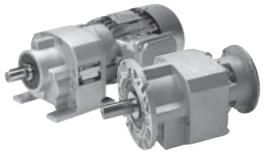
Routine oil analysis, sound lubrication practices, and good tracking of oil performance trends as related to specific equipment, will help establish proper lubrication maintenance and change-out intervals.

To maximize equipment reliability, NORD Gear generally recommends a condition-based lubrication maintenance program. One may take exceptions to this general recommendation on sealed-for-life or maintenance-free gear units or smaller and less costly gear units. In these instances, the replacement cost of the gear unit is often small compared to the costs associated with this type of oil analysis program.

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).
- Acid number tests indicate a significant level of oxidative break-down of the oil and a critical reduction in performance.

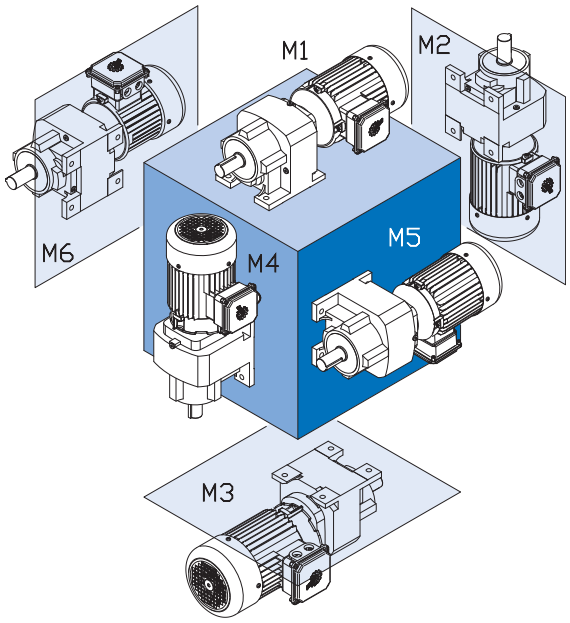
NORDBLOC®.1 Foot Mount Positions & Oil Fill Quantities



DRIVESYSTEMS

NORDBLOC®.1 foot mounted lubrication

The following 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. For additional information, please refer to the "Oil Plug & Vent Locations" documentation for your gear unit.

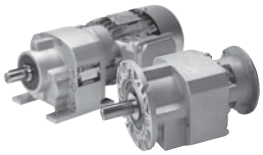


STOP ***HARMFUL SITUATION*** **STOP**

Actual oil volume can vary slightly depending upon the gear case size, mounting and ratio. Prior to commissioning the reducer, check the oil-fill level using the reducer's oil level plug and drain or add addition oil as needed.

For mounting orientations other than shown please consult NORD Gear. Reducer modifications may be required.

Type	M1		M2		M3		M4		M5		M6	
	Quarts	Liters	Quarts	Liters	Quarts	Liters	Quarts	Liters	Quarts	Liters	Quarts	Liters
SK 072.1	0.169	0.160	0.338	0.320	0.222	0.210	0.243	0.230	0.190	0.180	0.210	0.200
SK 172.1	0.285	0.270	0.624	0.590	0.444	0.420	0.529	0.450	0.338	0.320	0.412	0.390
SK 372.1	0.480	0.450	1.11	1.05	0.790	0.750	1.06	1.000	0.630	0.600	0.690	0.650
SK 373.1	0.480	0.450	1.11	1.05	0.791	0.750	1.06	1.000	0.630	0.600	0.690	0.650
SK 572.1	0.790	0.750	2.01	1.90	1.59	1.50	2.11	2.00	1.16	1.10	1.22	1.15
SK 573.1	0.790	0.750	2.00	1.90	1.59	1.50	2.11	2.00	1.16	1.10	1.22	1.15
SK 672.1	1.16	1.10	2.75	2.60	2.27	2.15	2.85	2.70	1.64	1.55	1.74	1.65
SK 673.1	1.16	1.10	2.75	2.60	2.27	2.15	2.85	2.70	1.64	1.55	1.74	1.65
SK 772.1	1.22	1.15	3.86	3.65	2.38	2.25	3.33	3.15	1.43	1.35	2.27	2.15
SK 773.1	2.06	1.95	3.70	3.50	3.38	3.20	3.06	2.90	2.38	2.25	3.12	2.95
SK 872.1	2.75	2.60	8.45	8.00	5.60	5.30	7.40	7.00	2.96	2.80	4.86	4.60
SK 873.1	4.28	4.05	8.03	7.60	7.24	6.85	6.92	6.55	5.28	5.00	6.92	6.55
SK 972.1	4.76	4.50	13.63	12.90	8.56	8.10	13.42	12.70	4.86	4.60	8.24	7.80
SK 973.1	7.82	7.40	12.89	12.20	11.73	11.10	12.26	11.60	8.45	8.00	11.52	10.90



In-line Flange Mount Positions & Oil Fill Quantities

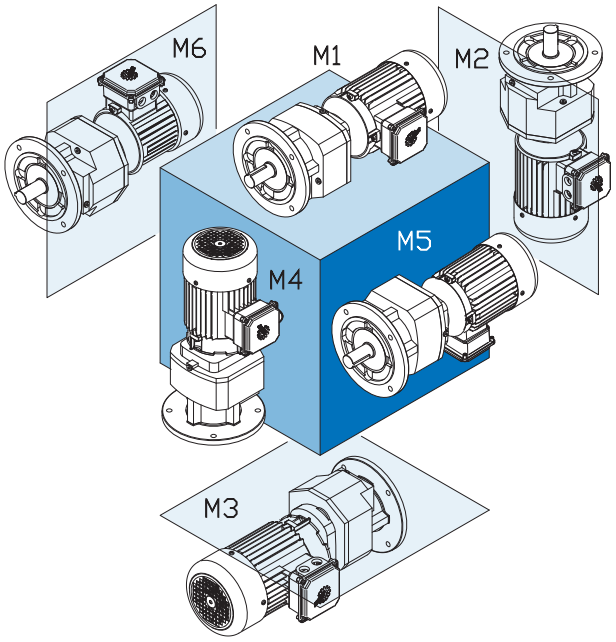
NORDBLOC®.1 flange mounted lubrication

The following 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. For additional information, please refer to the "Oil Plug & Vent Locations" documentation for your gear unit.

STOP ***HARMFUL SITUATION*** **STOP**

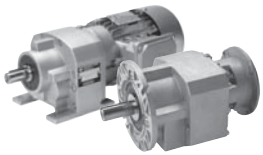
Actual oil volume can vary slightly depending upon the gear case size, mounting and ratio. Prior to commissioning the reducer, check the oil-fill level using the reducer's oil level plug and drain or add addition oil as needed.

For mounting orientations other than shown please consult NORD Gear. Reducer modifications may be required.



Type	M1		M2		M3		M4		M5		M6	
	Quarts	Liters	Quarts	Liters	Quarts	Liters	Quarts	Liters	Quarts	Liters	Quarts	Liters
SK 072.1 F	0.169	0.160	0.338	0.320	0.222	0.210	0.243	0.230	0.190	0.180	0.210	0.200
SK 172.1 F	0.285	0.270	0.624	0.590	0.444	0.420	0.529	0.450	0.338	0.320	0.412	0.390
SK 372.1 F	0.480	0.450	1.11	1.05	0.790	0.750	1.06	1.000	0.630	0.600	0.690	0.650
SK 373.1 F	0.480	0.450	1.11	1.05	0.791	0.750	1.06	1.000	0.630	0.600	0.690	0.650
SK 572.1 F	0.790	0.750	2.01	1.90	1.59	1.50	2.11	2.00	1.16	1.10	1.22	1.15
SK 573.1 F	0.790	0.750	2.00	1.90	1.59	1.50	2.11	2.00	1.16	1.10	1.22	1.15
SK 672.1 F	1.16	1.10	2.75	2.60	2.27	2.15	2.85	2.70	1.64	1.55	1.74	1.65
SK 673.1 F	1.16	1.10	2.75	2.60	2.27	2.15	2.85	2.70	1.64	1.55	1.74	1.65
SK 772.1 F	1.22	1.15	3.86	3.65	2.38	2.25	3.33	3.15	1.43	1.35	2.27	2.15
SK 773.1 F	2.06	1.95	3.70	3.50	3.38	3.20	3.06	2.90	2.38	2.25	3.12	2.95
SK 872.1 F	2.75	2.60	8.45	8.00	5.60	5.30	7.40	7.00	2.96	2.80	4.86	4.60
SK 873.1 F	4.28	4.05	8.03	7.60	7.24	6.85	6.92	6.55	5.28	5.00	6.92	6.55
SK 972.1 F	4.76	4.50	13.63	12.90	8.56	8.10	13.42	12.70	4.86	4.60	8.24	7.80
SK 973.1 F	7.82	7.40	12.89	12.20	11.73	11.10	12.26	11.60	8.45	8.00	11.52	10.90

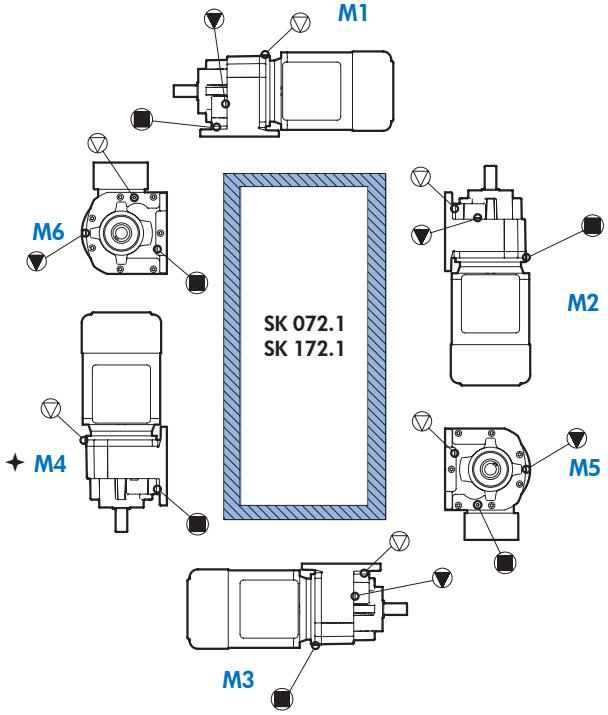
Oil Plug & Vent Locations
SK 072.1 - SK673.1

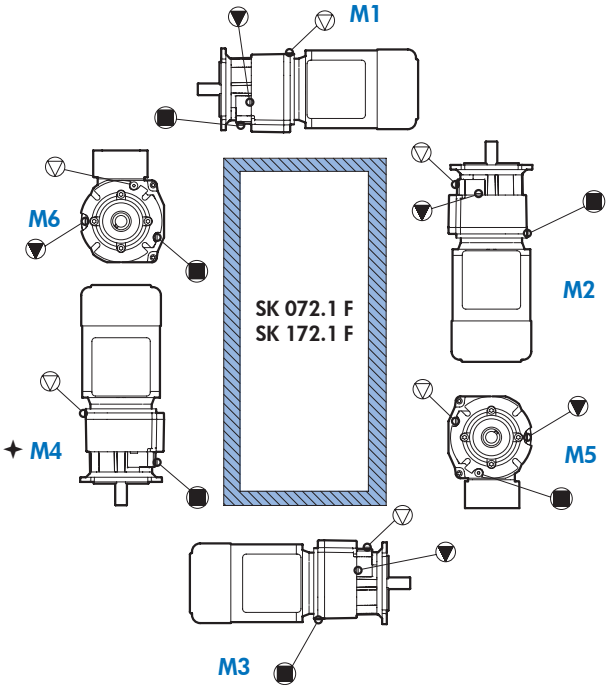


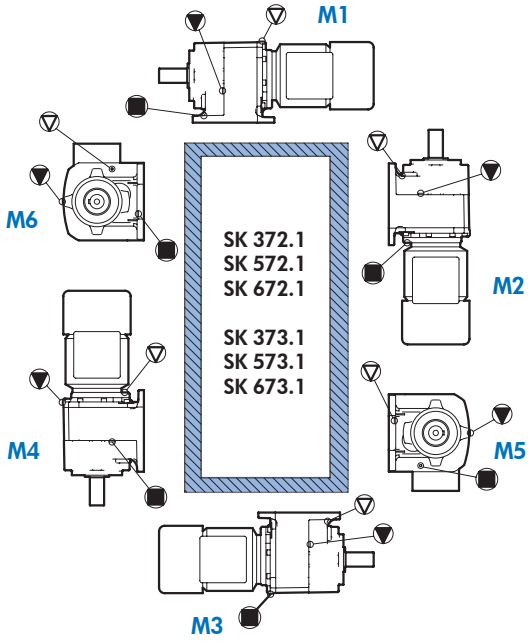
DRIVESYSTEMS

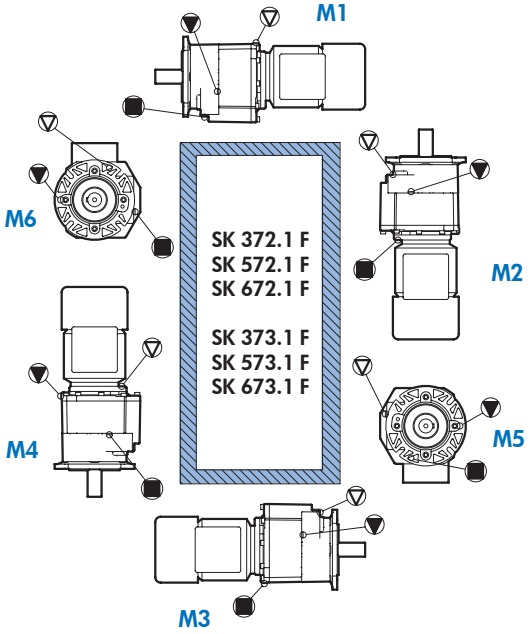
Oil plug connections

Prior to commissioning the reducer, check the oil-fill level using the reducer's oil-level plug and drain or add additional oil as needed. ***For mounting orientations other than shown please consult NORD Gear. New plug locations may be required.***

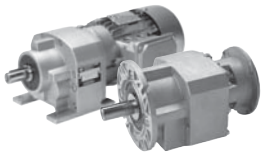








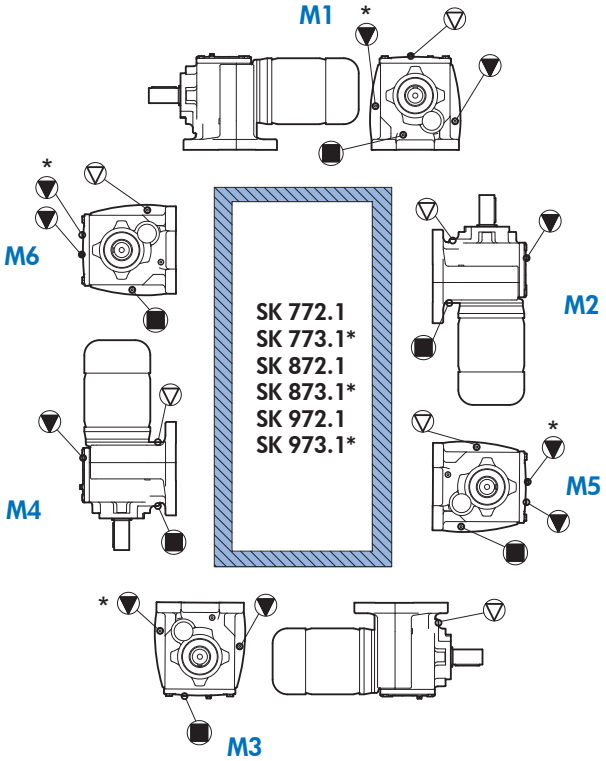
▽ = Vent ▼ = Oil Level ■ = Oil Drain

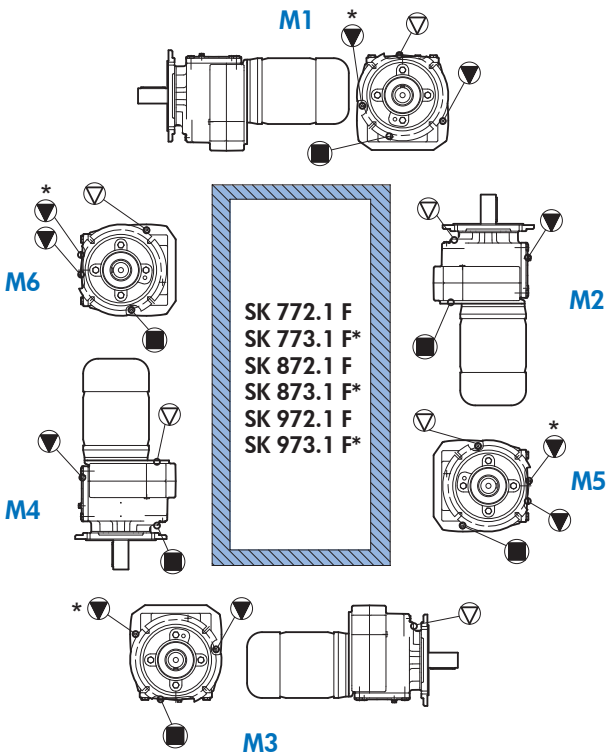


Oil Plug & Vent Locations
SK 772.1 - SK 973.1

Oil plug connections

Prior to commissioning the reducer, check the oil-fill level using the reducer's oil-level plug and drain or add additional oil as needed. ***For mounting orientations other than shown please consult NORD Gear. New plug locations may be required.***

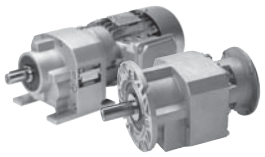




▽ = Vent ▼ = Oil Level ■ = Oil Drain

* Oil fill level for three stage gear units

OHL & Thrust



Radial Overhung Load (OHL)

Any radial force or side force applied to the reducer shaft is a source of OHL and should be examined during the reducer selection process. An overhung load is radial a force that pulls (or pushes) against the reducer's output (or input) shaft.

OHL is produced by one or more of the following conditions:

- Transferring power at a right angle to the reducer's shaft, through an externally mounted power transmission device, such as a belt pulley, chain sprocket, or gear.
- By tensioning of the external belt or chain, which is required to keep belts from slipping, or to assure proper chain wrap around sprockets.
- The hanging weight of a pulley, sprocket or gear, mounted on the reducer shaft.

F_{OHL} = Applied overhung load condition at output shaft [lb]

F_{OHL1} = Applied overhung load condition at input shaft [lb]

OHL Rating – General Conditions

The catalog OHL ratings are based upon the following:

- The applied OHL is at the midpoint of the shaft.
- The worst-case direction of shaft rotation.
- There are no axial or thrust load conditions applied to the reducer shaft.

These above conditions apply whether or not one is evaluating the output shaft or input shaft OHL conditions.

Output Shaft OHL Rating

The maximum permissible output shaft OHL rating is found in the gearmotor selection tables. Output shaft OHL ratings apply to integral gearmotors, C-face reducer, and reducer with solid input shaft.

This is done by identify the power of the gear unit's driving motor or prime mover, and then using the selection tables to match the output shaft OHL rating with the selected gear unit type, power, ratio and output speed condition. Many NORD gear units can be supplied with optional heavy-duty bearings intended for increased overhung load capacity (VL).

F_R = Output shaft OHL rating, at shaft center [lb]

F_{RVL} = Output shaft OHL rating, at shaft center with radial (VL) bearing upgrade [lb]

Input Shaft OHL Rating

Input shaft (Type W) OHL ratings are given on page 34 and are represented by unit type and input power.

F_{R1} = Input shaft OHL rating, at shaft center

Axial Load or Thrust Load

Loads that are directed towards or away from the gearbox, along the axis of the shaft, are considered to be axial loads and are more commonly called thrust loads. Thrust loads can result from the following conditions:

- There is a hanging weight connected to the reducer shaft. This is common in mixer applications.
- While operating the equipment, a net axial force is directed towards or away from the reducer, along the shaft axis. This is common in many screw conveyor or mixer applications.

F_{THRUST} = Applied axial thrust load condition at output [lb]

$F_{THRUST1}$ = Applied axial thrust load condition at input [lb]

Thrust Rating – General Conditions

The published thrust ratings are based upon the following:

- The thrust capacity shown represents the worst case, and is independent of direction.
- Application loads can not exceed the values shown in the tables.

Output Shaft and Input Shaft Thrust Rating

The output shaft thrust capacity can be found in the gearmotor selection tables, adjacent to the OHL ratings. Many NORD gear units can be supplied with optional heavy-duty bearings intended for increased overhung load capacity (VL) and some are available with optional bearings intended to increase thrust capacity (AL).

F_A = Output shaft thrust rating [lb]

F_{AVL} = Output shaft thrust rating with radial (VL) bearing upgrade [lb]

The input shaft thrust capacity is given on page 37.

F_{A1} = Input shaft thrust rating [lb]

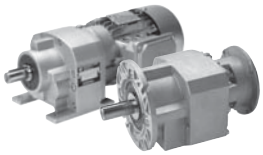
IMPORTANT NOTE

To validate the gear unit selection, assuming negligible OHL, the applied thrust condition must be less than the shaft thrust rating.

Combined OHL and Thrust Load Conditions

Published values for both overhung load and thrust capacity are based upon the presence of a single condition and assume the other condition is absent from the application. In many applications, it is feasible to have both overhung load and thrust at the same time.

Please contact NORD for more exact examination of the application, when both OHL and thrust conditions exist at the same time.



1. Calculate the applied OHL at the designated shaft

The most common radial OHL forces are created by transferring power at a right angle to the reducer's shaft, through an externally mounted power transmission device, such as a belt pulley, chain sprocket, or spur gear.

Included in the overhung load formula is an additional factor that is called the power transmission component factor (f_z). The (f_z) factor accounts for the extra radial force caused by proper tensioning of belts or chains or the additional forces created by the action of meshing gears.

The following equations are used to calculate the OHL forces generated by a belt pulley, chain sprocket, or spur gear and they also account for the extra radial force caused by proper tensioning of the transmission component. These equations treat the hanging weight of the transmission component as being negligible.

Variable definitions

F_{OHL} or F_{OHL1}	=	Calculated shaft overhung load
T_2 or T_1	=	Load Torque [lb-in]
n_2 or n_1	=	Shaft speed [rpm]
P_1	=	Load power at input
η	=	Gear reducer efficiency [%] ❶
D_{OHL}	=	Pitch diameter of power transmission component [in]
f_z	=	Power transmission component factor

❶ Gear reducer efficiency can generally be ignored unless considering compounded gear units, helical worm gear units or worm gear units.

Output shaft equations

$$F_{OHL} = \frac{2 \times T_2}{d_{OHL}} \times f_z \text{ (common equation)}$$

$$F_{OHL} = \frac{2 \times P_1 \times 63025 \times \eta}{n_2 \times d_{OHL} \times 100} \times f_z \text{ (alternate equation)}$$

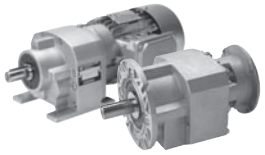
Input shaft equations

$$F_{OHL1} = \frac{2 \times P_1 \times 63025}{n_1 \times d_{OHL}} \times f_z \text{ (common equation)}$$

$$F_{OHL1} = \frac{2 \times T_1}{\quad} \times \quad \text{(alternate equation)}$$

f_z factor table

Transmission Component	Factor f_z	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 Belt Pulley	1.50	-
V-Belt Pulley	1.70	-
Flat Belt Pulley	2.50	-



2. Determine the permissible shaft OHL rating

Output shaft OHL rating

Whether considering an integral gearmotor, C-face reducer, or reducer with solid input shaft, the maximum permissible output shaft OHL rating is found in the gearmotor selection tables. Establish the output shaft OHL rating as follows:

- First, identify the power of the gear unit's driving motor or prime mover.
- Then, use the gearmotor selection tables to identify the output shaft OHL rating, by selecting the appropriate gear unit type, power, ratio and output speed condition.
- Next, identify the output shaft OHL rating.

F_R = Output shaft OHL rating, at shaft center [lb]

F_{RVL} = Output shaft OHL rating, at shaft center with radial (VL) bearing upgrade [lb]

Input shaft OHL rating

Input shaft (Type W) OHL ratings are given below and are represented by unit type and input power.

F_{R1} = Input shaft OHL rating at shaft center [lb]

Permissable Overhung Loads F_{R1} at Input Shaft [Lbs]

Gearbox Type	P_1 [HP]																	
	0.16	0.25	0.33	0.50	0.75	1.0	1.5	2.0	3.0	5.0	7.5	10	15	20	25	30	40	50
SK 172.1	270	270	270	270	270	-	-	-	-	-	-	-	-	-	-	-	-	-
SK 372.1 - SK 673.1	832	809	787	764	742	719	697	674	562	539	494	472	-	-	-	-	-	-
SK 772.1 SK 773.1	517	495	473	466	495	450	439	428	410	394	338	293	158	90	-	-	-	-
SK 872.1 SK 873.1	-	-	-	-	-	-	722	671	637	605	473	401	297	279	209	137	-	-
SK 972.1 SK 973.1	-	-	-	-	-	-	1006	954	938	866	684	621	457	416	360	326	232	194

At midpoint of input shaft with no axial load

⚠ WARNING ⚠

The unit types shown in the table below require that the published overhung load rating (F_R or F_{RVL}) to be reduced by applying a multiplier as shown.

OHL Correction Factors

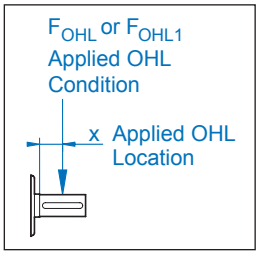
Unit Type	Shaft Ø	B5 Flange Ø	OHL Correction Factor
SK372.1F/SK373.1F	1.000 [25]	4.72 [120]	0.7
SK572.1/SK573.1 *	1.250 [30]	N/A	0.7
SK572.1F/SK573.1F	1.375 [35]	5.51 or 6.30 [140] or [160]	0.7
SK572.1F/SK573.1F	1.250 [30]	7.87 or 9.84 [200] or [250]	0.7
SK572.1F/SK573.1F	1.250 [30]	5.51 or 6.30 [140] or [160]	0.5

3. OHL rating correction – applied load is not at the shaft center or midpoint.

If the OHL force is not applied at the midpoint of the shaft, an overhung load rating correction must be applied to the catalog listed OHL rating. This OHL load correction is evaluated in two steps.

I. Verify the bearing OHL capacity. (Formula I)

II. Verify the shaft OHL capacity. (Formula II)



Overhung Load Variables

F_R	=	Output shaft OHL Rating, at shaft center [lb]
F_{RVL}	=	Output shaft OHL Rating, at shaft center with radial (VL) bearing upgrade [lb]
F_{R1}	=	Input shaft OHL Rating, at shaft center [lb]
F_{RX}	=	Standard Bearing Capacity Rating, with OHL applied at output shaft location "x" [lb]
F_{RXVL}	=	Radial (VL) Bearing Capacity Rating, with OHL applied at the output shaft location "x" [lb]
F_{RX1}	=	Input Shaft Bearing Capacity, with OHL applied at Input shaft location "x" [lb]
F_{RXW}	=	Output shaft OHL Rating, at applied load location "x" with standard bearings [lb]
F_{RXWVL}	=	Output shaft OHL Rating, at shaft location "x" with radial (VL) bearing upgrade [lb]
F_{RXW1}	=	Input shaft OHL Rating, applied at shaft location "x" [lb]
x	=	applied OHL location with respect to shaft shoulder [in]

Refer to Calculation Table Below

z	=	Factor from table [lb-in]
y	=	Internal Geometry Factor from table [in]
f	=	Internal Geometry Factor from table [in]
c	=	Internal Geometry Factor from table [lb-in]
c_{VL}	=	Internal Geometry Factor from table [lb-in]

Make certain to apply the proper table values for the shaft (output or input) that is being evaluated.

Formula I – Verifying Bearing Capacity

Output shaft (Standard bearings) $F_{RX} = \frac{z}{y+x} \times F_R$

Output shaft (VL bearings) $F_{RXVL} = \frac{z}{y+x} \times F_{RVL}$

Input shaft $F_{RX1} = \frac{z}{y+x} \times F_{R1}$

Formula II – Calculating the shaft OHL capacity

Output shaft (Standard bearings) $F_{RXW} = \frac{c}{f+x}$

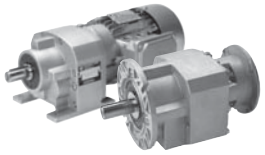
Output shaft (VL bearings) $F_{RXWVL} = \frac{c_{VL}}{f+x}$

Input shaft $F_{RXW1} = \frac{c}{f+x}$

IMPORTANT NOTE

Calculations should always be made in accordance with Formula I (bearing capacity) and Formula II (shaft capacity). The corrected OHL rating (for loads not at the shaft midpoint) will always be the lower of the two limiting values based upon direct application of Formula I or Formula II.

OHL & Thrust



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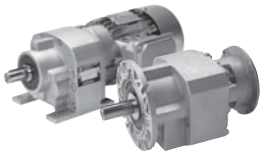
Calculation Table for OHL at Output Shaft for NORDBLOC® Units

Gearbox Type	y [in]	z [in]	c Standard Bearings [lb-in]	c VL Bearings [lb-in]	f [in]	U [in]	V [in]	T_{2max} [lb-in]
SK 072.1	2.62	3.41	708	-	0	0.750	01.57	487
SK 172.1	3.27	4.06	617	-	0	0.750	1.57	814
SK 372.1 SK 373.1	3.43	4.41	885 797	1416 1328	0 0	1.000	1.97	1770 1947
SK 572.1 SK 573.1	4.33	5.71	2301 2213	3452 3452	0 0	1.250 or 1.375	2.36 or 2.76	3805 3982
SK 672.1 SK 673.1	4.82	6.18	1682 3098	3009 2921	0 0	1.375	2.75	5398 5664
SK 772.1 SK 773.1	3.85 4.09	5.43 5.67	3186 3097	7434 5310	0 0	1.625 1.625	3.15 3.15	7257 7655
SK 872.1 SK 873.1	4.74 5.91	6.71 7.87	8850 5487	18673 8230	0 0	2.125 2.125	3.94 3.94	13806 14868
SK 972.1 SK 973.1	5.47 6.42	7.84 8.78	13894 9381	26550 14160	0 0	2.375 2.375	4.72 4.72	24780 28320

Calculation Table for OHL at Input Shaft for NORDBLOC® Units

Gearbox Type	y [in]	z [in]	c Standard Bearings [lb-in]	f [in]	d [in]	l [in]
SK 372.1 - SK 673.1	3.80	4.78	1151	0	0.875	2.00
SK 772.1 SK 773.1	2.717	3.701	964 1088	0 0	0.875	1.97
SK 872.1 SK 873.1	4.055	5.236	2433 2601	0 0	1.125	2.36
SK 972.1 SK 973.1	5.413	7.008	4761 5068	0 0	1.375	3.15



4. Compare the applied OHL to the OHL rating

To validate the unit selection (assuming negligible thrust loading), the applied OHL condition must be less than the rated OHL capacity as shown below.

Output Shaft (standard bearings)

$F_{OHL} < F_R$ (OHL at shaft center)
$F_{OHL} < F_{RX}$ (OHL not at shaft center)

Output Shaft (VL bearings)

$F_{OHL} < F_{RVL}$ (OHL at shaft center)
$F_{OHL} < F_{RXVL}$ (OHL not at shaft center)

Input Shaft

$F_{OHL} < F_{R1}$ (OHL at shaft center)
$F_{OHL} < F_{RX1}$ (OHL not at shaft center)

Output Shaft Comparisons

$$\frac{}{F_{OHL}} < \frac{}{F_R} \quad \text{or} \quad \frac{}{F_{OHL}} < \frac{}{F_{RX}\ \text{(Step 3)}}$$

Input Shaft Comparisons

$$\frac{}{F_{OHL1}} < \frac{}{F_{R1}} \quad \text{or} \quad \frac{}{F_{OHL1}} < \frac{}{F_{RX1}\ \text{(Step 3)}}$$

5.Evaluating Thrust Capacity

To validate the unit selection (assuming negligible thrust loading), the applied thrust condition must be less than the rated thrust capacity as shown below.

Output Shaft

$F_{THRUST} < F_A$

Input Shaft

$F_{THRUST1} < F_{A1}$

The output shaft thrust capacity (F_A) can be found in the gearmotor selection tables, adjacent to the OHL ratings. The input shaft thrust capacity (F_{A1}) can be found in the table below.

Permissable Axial (Thrust) Loads F_{A1} at Input Shaft [Lbs]

Gearbox Type	0.16	0.25	0.33	0.50	0.75	1.0	1.5	2.0	3.0	5.0	7.5	10	15	20	25	30	40	50
SK 172.1	337	337	337	337	337	-	-	-	-	-	-	-	-	-	-	-	-	-
SK 372.1 - SK 673.1	922	899	832	764	652	562	494	449	404	359	270	225	-	-	-	-	-	-
SK 772.1 SK 773.1	517	495	473	466	495	450	439	428	410	394	338	293	158	90	-	-	-	-
SK 872.1 SK 873.1	-	-	-	-	-	-	722	671	637	605	473	401	297	279	209	137	-	-
SK 972.1 SK 973.1	-	-	-	-	-	-	1006	954	938	866	684	621	457	416	360	326	232	194

With no overhung load

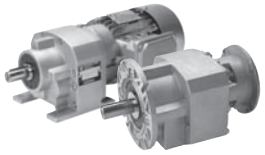
Output Shaft Comparisons

$$\frac{}{F_{THRUST}\ \text{(Supplied By Customer)}} < \frac{}{F_A\ \text{(Gearmotor Selection)}}$$

Input Shaft Comparisons

$$\frac{}{F_{THRUST1}\ \text{(Supplied By Customer)}} < \frac{}{F_{A1}\ \text{(Found in Table)}}$$

OHL & Thrust



DRIVESYSTEMS

Computer Program Analysis Capabilities

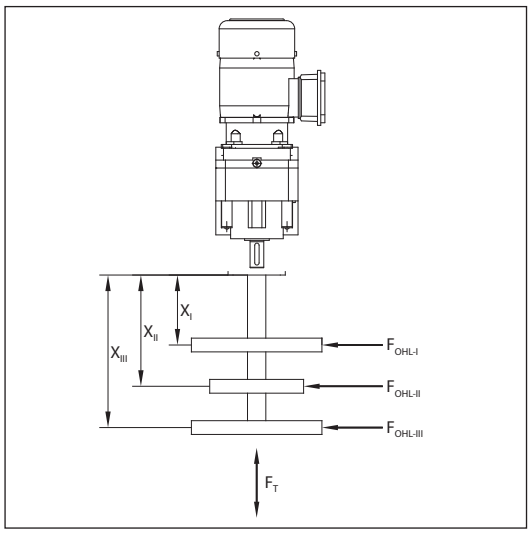
Upon request, NORD can calculate the bearing service life and check the shaft durability for a specific gear unit type and ratio, if provided with the following:

Type	=	Complete gearmotor or reducer model or type
i	=	Gear ratio
P_1	=	Load power at input [Hp]
n_2	=	Operating reducer output speed [rpm]
F_{OHL}	=	Applied shaft overhung load [lb]
F_{THRUST}	=	Applied thrust load condition [lb]
DIR	=	Applied thrust direction (towards or away) from gear unit.
x	=	applied OHL location with respect to the shaft shoulder [in]
L10h	=	Desired bearing service life L10h [hours]

When provided the proper information NORD Engineering can provide detailed analysis using a proprietary calculation program.

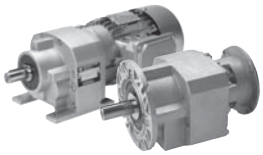
Multiple Impeller Mixer

Multiple impeller mixers are good examples where a computer program analysis is encouraged.



IMPORTANT NOTE

In agitator or mixer applications, where multiple impellers are mounted to the same mixer shaft, please provide each individual radial load force (FOHL) and location distance (x).



Reducer Tolerances

Solid Shaft Diameter Tolerance		[in]
> 0.375	≤ 1.750	+0.0000 / -0.0005
> 1.750	≤ 7.500	+0.0000 / -0.0010

All Keys and Keyways: Inch - ANSI B17

Solid Shaft Diameter Tolerance		[mm]
> 10	≤ 18	+0.012 / +0.001
> 18	≤ 30	+0.015 / +0.002
> 30	≤ 50	+0.018 / +0.002
> 50	≤ 80	+0.030 / +0.011
> 80	≤ 120	+0.035 / +0.013
> 120	≤ 180	+0.040 / +0.015
> 180	≤ 190	+0.046 / +0.017

All Keys and Keyways: Metric - DIN 6885, class m6

Solid Shaft Drill & Tap Shaft End - Threaded Holes		[in]
> ø 0.375	≤ ø 0.500	10-24 x 0.43
> ø 0.500	≤ ø 0.875	1/4-20 x 0.59
> ø 0.875	≤ ø 0.938	5/16-18 x 0.71
> ø 0.938	≤ ø 1.100	3/8-16 x 0.87
> ø 1.100	≤ ø 1.300	1/2-13 x 1.10
> ø 1.300	≤ ø 1.875	5/8-11 x 1.42
> ø 1.875	≤ ø 3.500	3/4-10 x 1.73
> ø 3.500	≤ ø 7.500	1-8 x 2.20

Solid Shaft Drill & Tap Shaft End - Threaded Holes		[mm]
> ø 10	≤ ø 13	M4 x 10
> ø 13	≤ ø 16	M5 x 12.5
> ø 16	≤ ø 21	M6 x 16
> ø 21	≤ ø 24	M8 x 19
> ø 24	≤ ø 30	M10 x 22
> ø 30	≤ ø 38	M12 x 28
> ø 38	≤ ø 50	M16 x 36
> ø 50	≤ ø 85	M20 x 42
> ø 85	≤ ø 130	M24 x 50
> ø 130	≤ ø 190	M30 x 60

Flange Pilot (AK or AK1) Tolerance			[in]
Flange Pilot Diameter		Pilot Tolerance	Fit Class ❶
> ø 1.969	≤ ø 3.150	+0.0005 / -0.0003	j6
> ø 3.150	≤ ø 4.724	+0.0005 / -0.0004	j6
> ø 4.724	≤ ø 7.087	+0.0006 / -0.0004	j6
> ø 7.087	≤ ø 9.055	+0.0000 / -0.0005	h6
> ø 9.055	≤ ø 9.843	+0.0000 / -0.0011	h6
> ø 9.843	≤ ø 12.402	+0.0000 / -0.0013	h6
> ø 12.402	≤ ø 15.748	+0.0000 / -0.0014	h6
> ø 15.748	≤ ø 19.685	+0.0000 / -0.0016	h6

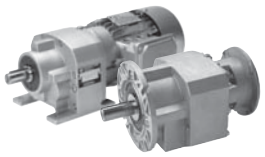
❶ **Inch Pilot Tolerances per ISO286-2**

Flange Pilot (AK or AK1) Tolerance			[mm]
Flange Pilot Diameter		Pilot Tolerance	Fit Class ❶
> ø 50	≤ ø 80	+0.012 / -0.007	j6
> ø 80	≤ ø 120	+0.013 / -0.009	j6
> ø 120	≤ ø 180	+0.014 / -0.011	j6
> ø 180	≤ ø 230	+0.000 / -0.013	h6
> ø 230	≤ ø 250	+0.000 / -0.029	h6
> ø 250	≤ ø 315	+0.000 / -0.032	h6
> ø 315	≤ ø 400	+0.000 / -0.036	h6
> ø 400	≤ ø 500	+0.000 / -0.040	h6

❶ **Metric Pilot Tolerances per ISO286-2**

Casting Surfaces may differ slightly (approximately 0.125 inches or 3.2mm) from the specified nominal dimensions as a result of the manufacturing process

Conversions & Formulas



Metric ⇒ Inch

Multiply	By	To Obtain
Gram [g]	x 0.0353	= oz
Kilogram [kg]	x 2.205	= lb
Newton [N]	x 0.2248	= lb
Newton meter [Nm]	x 8.851	= lb-in
Newton meter [Nm]	x 0.7375	= lb-ft
Inertia [kgm^2]	x 23.75	= lb-ft^2
Kilowatt [kW]	x 1.341	= hp
Meter [m]	x 39.4	= in
Meter [m]	x 3.281	= ft
Meter [m]	x 1.094	= yd
Millimeter [mm]	x 0.0391	= in
Centimeter [cm]	x 0.394	= in
Cubic Centimeter [cm^3]	x 0.061	= in^3
Liter [l]	x 61.023	= in^3
Liter [l]	x 1.057	= qt
Liter [l]	x 0.2642	= gal

Inch ⇒ Metric

Multiply	By	To Obtain
Ounce [oz]	x 28.35	= g
Pound [lb]	x 0.454	= kg
Ounce [oz]	x 0.028	= kg
Pound [lb]	x 4.448	= N
Pound-Inch [lb-in]	x 0.113	= Nm
Pound Feet [lb-ft]	x 1.3558	= Nm
Pound Feet Squared [lb-ft^2]	x 0.0421	= kgm^2
Horsepower [hp]	x 0.746	= kW
Feet [ft]	x 0.3048	= kW
Yard [yd]	x 0.9144	= m
Inch [in]	x 25.4	= mm
Inch [in]	x 2.54	= cm
Inch [in]	x 0.0254	= m
Cubic Inch [in^3]	x 16.39	= cm^3
Cubic Inch [in^3]	x 0.016	= liters
Gallon [gal]	x 3.785	= liters

Temperature

°F = 1.8 °C + 32

°C = 0.5555 x (°F - 32)

°C = °K - 273.16

Linear Velocity

Miles per Hour [mph]	x 88	= ft/min [fpm]
Miles per Hour [mph]	x 1.4677	= ft/sec [fps]
Feet per Minute [fpm]	x 0.3048	= m/min
Feet per Minute [fpm]	x 0.00508	= m/sec
Meter per Minute [m/min]	x 3.2808	= ft/min [fpm]
Meter per Second [m/sec]	x 196.85	= ft/min [fpm]

Power

$$hp = \frac{\text{Torque (lb-in) x rpm}}{63025}$$

$$hp = \frac{\text{Torque (lb-ft) x rpm}}{5252}$$

$$hp_{(Lift)} = \frac{\text{Wgt (lb) x fpm}}{\text{33000 x Efficiency}}$$

$$hp_{(Slide)} = \frac{\text{Wgt (lb) x } \mu \text{ x fpm}}{\text{33000 x Efficiency}}$$

Torque

$$T_{(lb\text{-}in)} = \frac{\text{hp x 63025}}{\text{rpm}}$$

$$T_{(lb\text{-}ft)} = \frac{\text{hp x 5252}}{\text{rpm}}$$

Linear & Rotational Speed

$$fpm = 0.2618 \times Dia_{(in)} \times rpm$$

$$rpm = \frac{\text{fpm x 3.820}}{Dia_{(in)}}$$

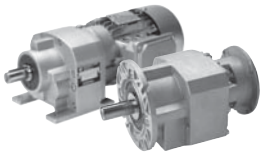
Electric Motor 3-phase

$$hp_{(3ph\text{-}motor)} = \frac{\text{1.732 x V x I x PF x Efficiency}}{746}$$

Metric M Threads

For metric "M" threads, it is customary to omit the thread pitch for course threads. For example, if a thread is called out as an M8 with no pitch shown, it is automatically a course pitch thread.

Course threads and pitch
M6 x 1
M8 x 1.25
M10 x 1.5
M12 x 1.75
M16 x 2
M20 x 2.5
M24 x 3



Mass Acceleration Service Factor

The mass acceleration factor (m_{af}) uses a ratio of the load inertia to motor inertia. This method of service factor calculation can be used for both gearmotors and speed reducers and is valid for helical gear units.

Short-term and infrequent torque impulses significantly influence the load and selection of a gear unit. The gear unit service factor, f_B, takes this and other affects on the gear unit into account.

The mass acceleration factor (m_{af}) represents the relationship between external low-speed output side and high-speed input side masses. The mass acceleration factor significantly influences the level of torque impulses in the gear unit upon start-up and braking procedures, and upon vibration. The external mass moments of inertia also include the load, such as the material transported on conveyor belts. We ask you to consult with NORD if the $m_{af} > 10$, if there is a large play in transfer elements, vibration in the system, uncertainty regarding the load classification, or you are in doubt.

For applications with relatively high external mass moments of inertia, $m_{af} > 2$ (i.e. travel drives, slewing gears, rotary tables, gear drives, agitators, and surface aerators), we recommend breaking torque that does not exceed 1.2 times the rated motor torque. If a higher breaking torque is to be used, this must be considered when selecting the gear unit.

1. Calculate mass acceleration factor:

$$m_{af} = \frac{J_{load}}{J_{motor}} \times \left(\frac{1}{\text{reducer ratio}}\right)^2$$

J_{load} = External load inertia including all components of the system outside of the reducer
J_{motor} = Motor inertia.

For NORD motors see pages 164 - 173

If $m_{af} \leq 0.25$ use curve A (uniform operation)

Light conveyor screws, fans, assembly lines, light conveyor belts, small agitators, elevators, cleaning machines, filling machines, inspection machines, belt conveyors.

If ≤ 0.25 $m_{af} \leq 3.00$ use curve B (moderate shocks)

Coilers, feed-mechanism drivers for woodworking machines, dumbwaiters, balancing machines, thread cutting machines, medium-sized agitators and mixers, heavy conveyor belts, winches, sliding doors, manure scrapers, packing machines, concrete mixers, overhead crane traveling mechanisms, mills, bending machines, gear pumps.

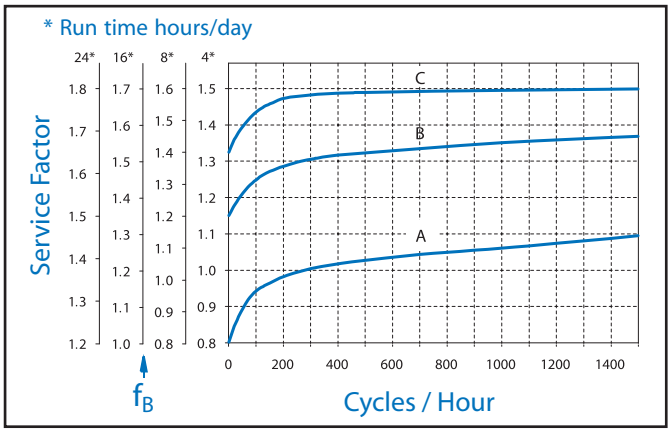
If $3.01 \leq m_{af}$ 10.00 use curve C (heavy shocks)

Heavy mixers, shears, presses, centrifuges, rolling stands, heavy winches and lifts, grinding mills, stone crushers, bucket elevators, punching machines, hammer mills, eccentric presses, folding machines, roller tables, tumbling barrels, vibrators, shredders.

2. Determine the cycles/hour. A cycle is a start or hard stop, where a hard stop decelerates the motion of the system when a mechanical brake is activated.

3. Determine the run time in hours/day.

4. Using the chart; locate the cycles/hour on the horizontal axis and move vertically up to intersect curve A, B, or C based on the m_{af}. From the intersection point, move horizontally left to the service factor f_B, which is based on the run time in hours/day.

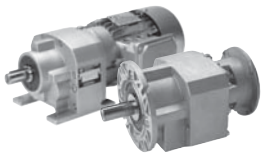


EXAMPLE for gearmotor:

A smooth running conveyor operates 24 hours/day with 500 cycles/hour. The calculated $m_{af} = 0.16$, therefore use curve A for this type of application.

From the chart, find 500 cycles/hour and follow the axis vertically up until you intersect curve A. From the intersection point, move horizontally left to find the service factor $f_B = 1.4$ based on 24 hours/day operation. Consult the selection pages of the catalog to find a gearmotor with a service factor $f_B = 1.4$ or greater.

AGMA Service Classes



AGMA Selection Method

Gearmotors

Before a gearmotor is selected, an application class number must be determined. Since application classification represents the normal relationship between gear design power rating and the maximum potential transmitted power, it is suggested that the application class number be applied to the nameplate rating of the electric motor. The application class numbers are I, II, and III.

Their relationship to service factor is:

Class Numbers	f_B
I	1.0 - 1.39
II	1.4 - 1.99
III	≥ 2.0

Application class numbers may be selected from the table. Some operational characteristics that affect an application's classification are:

- **Starting conditions:** Starting conditions where peak loads exceed 200 percent of rated load, applications with frequent starts and stops and reversing applications require special analysis. Rated load is defined as the unit rating with an application class number of I (1.0 - 1.39 service factor).
- **Overloads:** Loads in excess of the rated load are considered overloads. Overload can be of momentary duration, periodic, quasi-steady state, or vibratory in nature. The magnitude and the number of stress cycles require special analysis to prevent low cycle fatigue or yield stress failure. Applications with high torque motors, motors for intermitent operation and applications where extreme repetitive shock occurs or where high-energy loads must be absorbed as when stalling require special consideration.
- **Brake equipped applications:** When a gear drive is equipped with a brake that is used to decelerate the motion of the system, select the drive based on the brake rating or the equivalent power, which ever is greater. If the brake is located on the output shaft of the gear drive, special analysis is required.
- **Reliability and life requirement:** Applications requiring a high degree of reliability or unusually long life should be given careful consideration by the user and NORD GEAR before assigning an application class number. High reliability and life should be addressed by using an increased safety factor agreed to between NORD and the purchaser.

Synchronous motors, certain types of high torque induction motors and generator drives require special analysis.

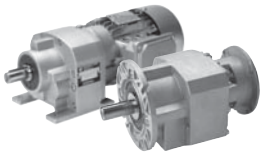
- Synchronous motors have high transient torque during starting and restarting after they trip out momentarily.
- Induction motors of special high slip design can produce extremely high starting torque. High torque loads are produced when the motor trips out for a very short time and then the trip re-closes.
- Generators have extremely high loads when they are out of phase with the main system and when there are across the line short circuits.

Adjustments to the gear drive selection may be necessary when one or more of the following exist:

- Extremes of temperature and environment.
- Lubrication. Any lubricant not in accordance with NORD's recommendations.
- Misalignment and distortions due to inadequate foundations.
- Reversing applications.
- High-risk applications involving human safety.

The purpose of this table is to provide a guide in the selection and application of gear drives designed and rated in accordance with AGMA Standard 6009.

The service factor table has been developed from the experience of manufacturers and users of gear drives for use in common applications and has been found to be generally satisfactory for the listed industries when gears are applied using AGMA standards. It is recommended that the user and NORD Gear agree upon class numbers for special applications when variations of the table may be required.

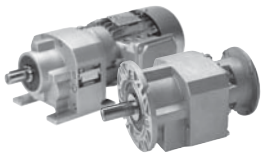


AGMA Service Classes

Application	Load Duration		
	Up to 3 hrs per day	3-10 hrs per day	Over 10 hrs per day
AGITATORS (mixers)			
Pure Liquids	I	I	II
Liquids and Solids	I	II	II
Liquids – Variable Density	I	II	II
BLOWERS			
Centrifugal	I	I	II
Lobe	I	II	II
Vane	I	II	II
BREWING AND DISTILLING			
Bottling Machinery	I	I	II
Brew Kettles – Continuous Duty	II	II	II
Cookers – Continuous Duty	II	II	II
Mash Tubs – Continuous Duty	II	II	II
Scale Hopper – Frequent Starts	II	II	II
CAN FILLING MACHINES	I	I	II
CAR DUMPERS	II	III	III
CAR PULLERS	I	II	II
CLARIFIERS	I	I	II
CLASSIFIERS	I	II	II
CLAY WORKING MACHINERY			
Brick Press	II	III	III
Briquette Machine	II	III	III
Pug Mill	I	II	II
COMPACTORS	III	III	III
COMPRESSORS			
Centrifugal	I	I	II
Lobe	I	II	II
Reciprocating, Multi-Cylinder	II	II	III
Reciprocating, Single-Cylinder	III	III	III
CONVEYORS – GENERAL PURPOSE			
Includes Apron, Assemble, Belt, Bucket, Chain, Flight, Oven and Screw Uniformly loaded or Fed	I	I	II
Heavy Duty – Not Uniformly Fed	I	II	II
Severe Duty – Reciprocating or Shaker	II	III	III
CRANES			
Main Hoist			
Medium Duty	II	II	II
Heavy Duty	III	III	III
Reversing	II	II	II
Skip Hoist	II	II	II
Trolley Drive	II	II	II
Bridge Drive	II	II	II
CRUSHER			
Stone or Ore	III	III	III
DREDGES			
Cable Reels	II	II	II
Conveyors	II	II	II
Cutter Head Dives	III	III	III
Pumps	III	III	III
Screen Drives	III	III	III
Stackers	II	II	II
Winches	II	II	II

Application	Load Duration		
	Up to 3 hrs per day	3-10 hrs per day	Over 10 hrs per day
ELEVATORS			
Bucket	I	II	II
Centrifugal Discharge	I	I	II
Escalators	I	I	II
Freight	I	II	II
Gravity Discharge	I	I	II
EXTRUDERS			
General	II	II	II
Plastics			
Variable Speed Drive	III	III	III
Fixed Speed Drive	III	III	III
Rubber			
Continuous Screw Operation	III	III	III
Intermittent Screw Operation	III	III	III
FANS			
Centrifugal	I	I	II
Cooling Towers	III	III	III
Forced Draft	II	II	II
Induced Draft	II	II	II
Industrial & Mine	II	II	II
FEEDERS			
Apron	I	II	II
Belt	I	II	II
Disc	I	I	II
Reciprocating	II	III	III
Screw	I	II	II
FOOD INDUSTRY			
Cereal Cooker	I	I	II
Dough Mixer	II	II	II
Meat Grinders	II	II	II
Slicers	I	II	II
GENERATORS AND EXCITERS	II	II	II
HAMMER MILLS	III	III	III
HOISTS			
Heavy Duty	III	III	III
Medium Duty	II	II	II
Skip Hoist	II	II	II
LAUNDRY TUMBLERS	II	II	II
LAUNDRY WASHERS	II	II	III

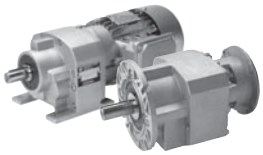
AGMA Service Classes



NORD DRIVESYSTEMS

Application	Load Duration		
	Up to 3 hrs per day	3-10 hrs per day	Over 10 hrs per day
LUMBER INDUSTRY			
Barkers			
Spindle Feed	II	II	II
Main Drive	III	III	III
Conveyors			
Burner	II	II	II
Main or Heavy Duty	II	II	II
Main log	III	III	III
Re-saw, Merry-Go-Round	II	II	II
Slab	III	III	III
Transfer	II	II	II
Chains			
Floor	II	II	II
Green	II	II	III
Cut-Off Saws			
Chain	II	II	III
Drag	II	II	III
Debarking Drums	III	III	III
Feeds			
Edger	II	II	II
Gang	II	III	III
Trimmer	II	II	II
Long Deck	III	III	III
Log Hauls – Incline – Well Type	III	III	III
Log Turning Devices	III	III	III
Planer Feed	II	II	II
Planer Tilting Hoists	II	II	II
Rolls – live-off brg. – Roll Cases	III	III	III
Sorting Table	II	II	II
Tipple Hoist	II	II	II
Transfers			
Chain	II	II	III
Craneway	II	II	III
Tray Drives	II	II	II
Veneer Lathe Drives	II	II	II
METAL MILLS			
Draw Bench Carriage and Main Drive	II	II	II
Runout Table			
Non-reversing Group Drives	II	II	II
Individual Drives	III	III	III
Reversing	III	III	III
Slab Pushers	II	II	II
Shears	III	III	III
Wire drawing	II	II	II
Wire Winding Machine	II	II	II
METAL STRIP PROCESSING MACHINERY			
Bridles	II	II	II
Coilers & Uncoilers	I	I	II
Edge Trimmers	I	II	II
Flatteners	II	II	II
Loopers (Accumulators)	I	I	I
Pinch Rolls	II	II	I
Scrap Choppers	II	II	II
Shears	III	III	III
Slitters	I	II	II

Application	Load Duration		
	Up to 3 hrs per day	3-10 hrs per day	Over 10 hrs per day
MILLS, ROTARY TYPE			
Ball & Rod			
Spur Ring Gear	III	III	III
Helical Ring Gear	II	II	II
Direct Connected	III	III	III
Cement Kilns	II	II	II
Dryers & Coolers	II	II	II
PAPER MILLS[1]			
Agitator (Mixer)	II	II	II
Agitator for Pure liquors	II	II	II
Barking Drums	III	III	III
Barkers – Mechanical	III	III	III
Beater	II	II	II
Breaker Stack	II	II	II
Calender[2]	II	II	II
Chipper	III	III	III
Chip Feeder	II	II	II
Coating Rolls	II	II	II
Conveyors			
Chip, Bark, Chemical	II	II	II
log (including Slab)	III	III	III
Couch Rolls	II	II	II
Cutter	III	III	III
Cylinder Molds	II	II	II
Dryers[2]			
Paper Machine	II	II	II
Conveyor Type	II	II	II
Embosser	II	II	II
Extruder	II	II	II
Fourdrinier Rolls (Includes lump Breaker, Dandy Roll, Wire Turning, and Return Rolls)	II	II	II
Jordan	II	II	II
Kiln Drive	II	II	II
Mt. Hope Roll	II	II	II
Paper Rolls	II	II	II
Platter	II	II	II
Presses – Felt & Suction	II	II	II
Pulper	III	III	III
Pumps – Vacuum	II	II	II
Reel (Surface Type)	II	II	II
Screens			
Chip	II	II	II
Rotary	II	II	II
Vibrating	III	III	III
Size Press	II	II	II
Supercalendar[3]	II	II	II
Thickener (AC Motor)	II	II	II
Thickener (DC Motor)	II	II	II
Washer (AC Motor)	II	II	II
Washer (DC Motor)	II	II	II
Wind and Unwind Stand	I	I	I
Winders (Surface Type)	II	II	II
Yankee Dryers[2]	II	II	II



AGMA Service Classes

Application	Load Duration		
	Up to 3 hrs per day	3-10 hrs per day	Over 10 hrs per day
PLASTICS INDUSTRY – PRIMARY PROCESSING			
Intensive Internal Mixers			
Batch Mixers	III	III	III
Continuous Mixers	II	II	II
Batch Drop Mill – 2 smooth rolls	II	II	II
Continuous Feed, Holding &	II	II	II
Biend Mill Calendars	II	II	II
PLASTICS INDUSTRY – SECONDARY PROCESSING			
Blow Molders	II	II	II
Coating	II	II	II
Film	II	II	II
Pipe	II	II	II
Pre-Plasticizers	II	II	II
Rods	II	II	II
Sheet	II	II	II
Tubing	II	II	II
PULLERS – BARGE HAUL	II	II	II
PUMPS			
Centrifugal	I	I	II
Proportioning	II	II	II
Reciprocating			
Single Acting, 3 or more cylinders	II	II	II
Double Acting, 2 or more cylinders	II	II	II
Rotary			
Gear Type	I	I	II
Lobe	I	I	II
Vane	I	I	II
RUBBER INDUSTRY			
Intensive Internal Mixers			
Batch Mixers	III	III	III
Continuous Mixers	II	II	II
Mixing Mill			
2 smooth rolls	II	II	II
1 or 2 corrugated rolls	III	III	III
Batch Drop Mill – 2 smooth rolls	II	II	II
Cracker Warmer – 2 roll, 1 corrugated roll	III	III	III
Cracker – 2 corrugated rolls	III	III	III
Holding, Feed & Blend Mill – 2 rolls	II	II	II
Refiner – 2 rolls	II	II	II
Calendars	II	II	II
SAND MULLER	II	II	II
SEWAGE DISPOSAL EQUIPMENT			
Bar Screens	II	II	II
Chemical Feeders	II	II	II
Dewatering Screens	II	II	II
Scum Breakers	II	II	II
Slow or Rapid Mixers	II	II	II
Sludge Collectors	II	II	II
Thickener	II	II	II
Vacuum Filters	II	II	II

Application	Load Duration		
	Up to 3 hrs per day	3-10 hrs per day	Over 10 hrs per day
SCREENS			
Air Washing	I	I	II
Rotary – Stone or Gravel	II	II	II
Traveling Water Intake I	I	I	I
SCREW CONVEYORS			
Uniformly loaded or Fed	I	I	II
Heavy Duty	I	II	II
SUGAR INDUSTRY			
Beet Slicer	III	III	III
Cane Knives	II	II	II
Crushers	II	II	II
Mills (low speed end)	III	III	III
TEXTILE INDUSTRY			
Batchers	II	II	II
Calendars	II	II	II
Cards	II	II	II
Dry Cans	II	II	II
Dyeing Machinery	II	II	II
Looms	II	II	II
Mangles	II	II	II
Nappers	II	II	II
Pads	II	II	II
Siashers	II	II	II
Soapers	II	II	II
Spinners	II	II	II
Tenter Frames	II	II	II
Washers	II	II	II
Winders	II	II	II

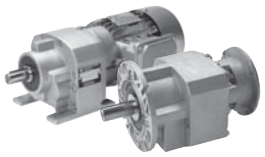
Notes to GEARMOTOR SERVICE FACTOR table:

1) The class numbers listed for paper mill applications are consistent with those shown in TAPPI (Technical Association of Pulp and Paper Industry) Technical Information Sheet 0406-18 1967, Service Factors for Gears on major Equipment in the Paper and Pulp Industry.

2) Anti-friction bearings only.

3) A Class Number of I may be applied at base speed of a super-calendar operating over a speed range of part-range constant horsepower and part-range constant torque where the constant horsepower speed range is greater than 1.5 to 1. A Class Number of II is applicable to supercalendars operating over the entire speed range at constant torque or where the constant horsepower speed range is less than 1.5 to1.

AGMA Service Factors



Speed Reducers

Before an enclosed speed reducer or increaser can be selected for any application, an equivalent unit power rating (service factor = 1.0) must be determined. This is done by multiplying the specified power by the service factor. Since the service factor represents the normal relationship between the gear unit rating and the required application power, it is suggested that the service factor be applied to the nameplate rating of the prime mover or driven machine rating, as applicable.

NORD GEAR and the user must agree upon which power, prime mover rating or driven machine requirements, should dictate the selection of the gear drive. It is necessary that the gear drive selected have a rated unit capacity equal to or in excess of this "equivalent unit power rating".

All service factors listed are 1.0 or greater. Service factors less than 1.0 can be used in some applications when specified by the user and agreed to by NORD GEAR.

The REDUCER SERVICE FACTOR table should be used with caution, since much higher values have occurred in some applications. Values as high as ten have been used. On some applications up to six times nominal torque can occur, such as: Turbine/Generator drives, Heavy Plate and Billet rolling mills.

It has been developed from the experience of manufacturers and users of gear drives for use in common applications. It is suggested that service factors for special applications be agreed upon by the user and NORD GEAR when variations of the values in the table may be required.

Service factors shown are for reducers driven by motors (electric or hydraulic) and turbines (steam or gas) according to AGMA 6010. When the driver is a single cylinder or multi-cylinder engine, the service factors from the table must be modified for the appropriate type of prime mover.

As an example, if the application is a centrifugal blower, the service factor from the REDUCER SERVICE FACTOR table is 1.25 for a motor or turbine. The CONVERSION TABLE changes this value to 1.75 for a single cylinder engine and 1.50 for a multi-cylinder engine.

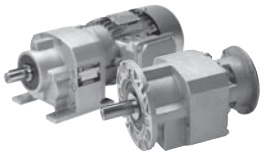
⚠ CAUTION ⚠

Any user of enclosed gear drives should make sure that the latest available information affecting the selection of a gear drive is used. When better load intensity data is available on the driving or driven equipment, this should be considered when a service factor is selected.

Conversion Table

Electric Motor, Steam & Gas Turbines, Hydraulics	Single-Cylinder Engines	Multi-Cylinder Engines
1.00	1.50	1.25
1.25	1.75	1.50
1.50	2.0	1.75
1.75	2.25	2.00
2.00	2.50	2.25
2.25	2.75	2.50
2.50	3.00	2.75
2.75	3.25	3.00
3.00	3.50	3.25

Application	Load Duration		
	Up to 3 hrs per day	3-10 hrs per day	Over 10 hrs per day
AGITATORS (mixers)			
Pure Liquids	1.00	1.00	1.25
Liquids and Solids	1.00	1.25	1.50
Liquids – Variable Density	1.00	1.25	1.50
BLOWERS			
Centrifugal	1.00	1.25	1.50
Lobe	1.00	1.25	1.50
Vane	1.00	1.00	1.25
BREWING AND DISTILLING			
Bottling Machinery	1.00	1.00	1.25
Brew Kettles – Continuous Duty	1.00	1.00	1.25
Cookers – Continuous Duty	1.00	1.00	1.25
Mash Tubs – Continuous Duty	1.00	1.00	1.25
Scale Hopper – Frequent Starts	1.00	1.25	1.50
CAN FILLING MACHINES	1.00	1.00	1.25
CAR DUMPERS	1.25	1.50	1.75
CAR PULLERS	1.00	1.25	1.50
CLARIFIERS	1.00	1.00	1.25
CLASSIFIERS	1.00	1.25	1.50
CLAY WORKING MACHINERY			
Brick Press	1.25	1.50	1.75
Briquette Machine	1.25	1.50	1.75
Pug Mill	1.00	1.25	1.50
COMPACTORS	1.50	1.75	2.00
COMPRESSORS			
Centrifugal	1.00	1.00	1.25
Lobe	1.00	1.25	1.50
Reciprocating, Multi-Cylinder	1.00	1.25	1.50
Reciprocating, Single-Cylinder	1.25	1.50	1.75
CONVEYORS – GENERAL PURPOSE			
Uniformly loaded or fed	1.00	1.00	1.25
Not uniformly fed	1.00	1.25	1.50
Reciprocating or shaker	1.25	1.50	1.75
CRANES			
Dry dock			
Main hoist	1.25	1.50	1.75
Auxilliary hoist	1.25	1.50	1.75
Boom hoist	1.25	1.50	1.75
Slewing drive	1.25	1.50	1.75
Traction drive	1.50	1.50	1.50
Industrial Duty			
Main hoist	1.00	1.25	1.50
CRUSHER			
Stone or ore	1.50	1.75	2.00

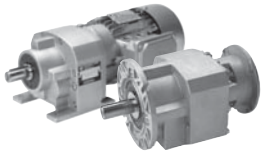


AGMA Service Factors

Application	Load Duration		
	Up to 3 hrs per day	3-10 hrs per day	Over 10 hrs per day
DREDGES			
Cable reels	1.00	1.25	1.50
Conveyors	1.00	1.25	1.50
Cutter Head Dives	1.25	1.50	1.75
Pumps	1.00	1.25	1.50
Screen Drives	1.25	1.50	1.75
Stackers	1.00	1.25	1.50
Winches	1.00	1.25	1.50
ELEVATORS			
Bucket	1.00	1.25	1.50
Centrifugal Discharge	1.00	1.00	1.25
Gravity Discharge	1.00	1.00	1.25
EXTRUDERS			
General	1.25	1.25	1.25
Plastics			
Variable Speed Drive	1.50	1.50	1.50
Fixed Speed Drive	1.75	1.75	1.75
Rubber			
Continuous Screw Operation	1.50	1.50	1.50
Intermittent Screw Operation	1.75	1.75	1.75
FANS			
Centrifugal	1.00	1.00	1.25
Forced Draft	1.25	1.25	1.25
Induced Draft	1.00	1.25	1.50
Industrial & Mine	1.00	1.25	1.50
FEEDERS			
Apron	1.00	1.25	1.50
Belt	1.00	1.25	1.50
Disc	1.00	1.00	1.25
Reciprocating	1.25	1.50	1.75
Screw	1.00	1.25	1.50
FOOD INDUSTRY			
Cereal Cooker	1.00	1.00	1.25
Dough Mixer	1.00	1.25	1.50
Meat Grinders	1.00	1.25	1.50
Slicers	1.00	1.25	1.50
GENERATORS AND EXCITERS	1.00	1.00	1.25
HAMMER MILLS	1.50	1.50	1.75
HOISTS			
Heavy Duty	1.25	1.50	1.75
Medium Duty	1.00	1.25	1.50
Skip Hoist	1.00	1.25	1.50
LAUNDRY TUMBLERS	1.00	1.25	1.50
LAUNDRY WASHERS	1.25	1.25	1.50

Application	Load Duration		
	Up to 3 hrs per day	3-10 hrs per day	Over 10 hrs per day
LUMBER INDUSTRY			
Barkers	1.25	1.25	1.50
Spindle Feed	1.50	1.50	1.50
Main Drive	1.25	1.25	1.50
Conveyors			
Burner	1.25	1.25	1.50
Main or Heavy Duty	1.50	1.50	1.50
Main log	1.50	1.50	1.75
Re-saw, Merry-Go-Round	1.25	1.25	1.50
Slab	1.50	1.50	1.75
Transfer	1.25	1.25	1.50
Chains			
Floor	1.50	1.50	1.50
Green	1.50	1.50	1.50
Cut-Off Saws			
Chain	1.50	1.50	1.50
Drag	1.50	1.50	1.50
Debarking Drums	1.50	1.50	1.75
Feeds			
Edger	1.25	1.25	1.50
Gang	1.50	1.50	1.50
Trimmer	1.25	1.25	1.50
Long Deck	1.50	1.50	1.50
Log Hauls – Incline – Well Type	1.50	1.50	1.50
Log Turning Devices	1.50	1.50	1.50
Planer Feed	1.25	1.25	1.50
Planer Tilting Hoists	1.50	1.50	1.50
Rolls – live-off brg. – Roll Cases	1.50	1.50	1.50
Sorting Table	1.25	1.50	1.50
Tipple Hoist	1.25	1.25	1.50
Transfers			
Chain	1.50	1.50	1.50
Causeway	1.50	1.50	1.50
Tray Drives	1.25	1.25	1.50
METAL MILLS			
Draw Bench Carriage and Main Drive	1.00	1.25	1.50
Runout Table			
Non-reversing			
Group Drives	1.00	1.25	1.50
Individual Drives	1.50	1.50	1.75
Reversing	1.50	1.50	1.75
Slab Pushers	1.25	1.25	1.50
Shears	1.50	1.50	1.75
Wire drawing	1.00	1.25	1.50
Wire Winding Machine	1.00	1.25	1.50

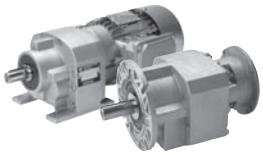
AGMA Service Factors



NORD DRIVESYSTEMS

Application	Load Duration		
	Up to 3 hrs per day	3-10 hrs per day	Over 10 hrs per day
METAL STRIP PROCESSING MACHINERY			
Bridles	1.25	1.25	1.50
Coilers and uncoilers	1.00	1.00	1.25
Edge Trimmers	1.00	1.25	1.50
Flatteners	1.00	1.25	1.50
Loopers (accumulators)	1.00	1.00	1.00
Pinch rolls	1.00	1.25	1.50
Scrap choppers	1.00	1.25	1.50
Shears	1.50	1.50	1.75
Slitters	1.00	1.25	1.50
MILLS, ROTARY TYPE			
Ball & Rod			
Spur Ring Gear	1.50	1.50	1.75
Helical Ring Gear	1.50	1.50	1.50
Direct Connected	1.50	1.50	1.75
Cement Kilns	1.50	1.50	1.50
Dryers & Coolers	1.50	1.50	1.50
MIXERS CONCRETE	1.00	1.25	1.50
PAPER MILLS[1]			
Agitator (Mixer)	1.50	1.50	1.50
Agitator for Pure liquors	1.25	1.25	1.25
Barking Drums	1.75	1.75	1.75
Barkers – Mechanical	1.75	1.75	1.75
Beater	1.50	1.50	1.50
Breaker Stack	1.25	1.25	1.25
Calender[2]	1.25	1.25	1.25
Chipper	1.75	1.75	1.75
Chip Feeder	1.50	1.50	1.50
Coating Rolls	1.25	1.25	1.25
Conveyors			
Chip, Bark, Chemical	1.25	1.25	1.25
log (including Slab)	1.75	1.75	1.75
Couch Rolls	1.25	1.25	1.25
Cutter	1.75	1.75	1.75
Cylinder Molds	1.25	1.25	125
Dryers[2]			
Paper Machine	1.25	1.25	1.25
Conveyor Type	1.25	1.25	1.25
Embosser	1.25	1.25	1.25
Extruder	1.50	1.50	1.50
Fourdrinier Rolls (Includes lump Breaker, Dandy Roll, Wire Turning, and Return Rolls)	1.25	1.25	1.25
Jordan	1.25	1.25	1.25
Kiln Drive	1.50	1.50	1.50
Mt. Hope Roll	1.25	1.25	1.25
Paper Rolls	1.25	1.25	1.25

Application	Load Duration		
	Up to 3 hrs per day	3-10 hrs per day	Over 10 hrs per day
PAPER MILLS (cont)			
Presses – Felt & Suction	1.25	1.25	1.25
Pulper	1.50	1.50	1.75
Pumps – Vacuum	1.50	1.50	1.50
Reel (Surface Type)	1.25	1.25	1.50
Screens			
Chip	1.50	1.50	1.50
Rotary	1.50	1.50	1.50
Vibrating	1.75	1.75	1.75
Size Press	1.25	1.25	1.25
Supercalendar[3]	1.25	1.25	1.25
Thickener (AC Motor)	1.50	1.50	1.50
Thickener (DC Motor)	1.25	1.25	1.25
Washer (AC Motor)	1.50	1.50	1.50
Washer (DC Motor)	1.25	1.25	1.25
Wind and Unwind Stand	1.00	1.00	1.00
Winders (Surface Type)	1.25	1.25	1.25
Yankee Dryers[2]	1.25	1.25	1.25
PLASTICS INDUSTRY – PRIMARY PROCESSING			
Intensive Internal Mixers			
Batch Mixers	1.75	1.75	1.75
Continuous Mixers	1.50	1.50	1.50
Batch Drop Mill – 2 smooth rolls			
Continuous Feed, Holding & Biend Mill	1.25	1.25	1.25
Calendars	1.50	1.50	1.50
PLASTICS INDUSTRY – SECONDARY PROCESSING			
Blow Molders	1.50	1.50	1.50
Coating	1.25	1.25	1.25
Film	1.25	1.25	1.25
Pipe	1.25	1.25	1.25
Pre-Plasticizers	1.50	1.50	1.50
Rods	1.25	1.25	1.25
Sheet	1.25	1.25	1.25
Tubing	1.25	1.25	1.50
PULLERS – BARGE HAUL	1.00	1.50	1.75
PUMPS			
Centrifugal	1.00	1.00	1.25
Proportioning	1.00	1.25	1.50
Reciprocating			
Single Acting, 3 or more cylinders	1.00	1.25	1.50
Double Acting, 2 or more cylinders	1.00	1.25	1.50
Rotary			
Gear Type	1.00	1.00	1.50
Lobe	1.00	1.00	1.25
Vane	1.00	1.00	1.25



AGMA Service Factors

Application	Load Duration		
	Up to 3 hrs per day	3-10 hrs per day	Over 10 hrs per day
RUBBER INDUSTRY			
Intensive Internal Mixers			
Batch Mixers	1.50	1.75	1.75
Continuous Mixers	1.25	1.50	1.50
Mixing Mill			
2 smooth rolls	1.50	1.50	1.50
1 or 2 corrugated rolls	1.75	1.75	1.75
Batch Drop Mill – 2 smooth rolls	1.50	1.50	1.50
Cracker Warmer – 2 roll, 1 corrugated roll	1.75	1.75	1.75
Cracker – 2 corrugated rolls	1.75	1.75	1.75
Holding, Feed & Blend Mill – 2 rolls	1.25	1.25	1.25
Refiner – 2 rolls	1.50	1.50	1.50
Calendars	1.50	1.50	1.50
SAND MILLER	1.00	1.25	1.50
SEWAGE DISPOSAL EQUIPMENT			
Bar Screens	1.00	1.00	1.25
Chemical Feeders		1.00	1.25
Dewatering Screens	1.00	1.25	1.50
Scum Breakers	1.00	1.25	1.50
Slow or Rapid Mixers	1.00	1.25	1.50
Sludge Collectors	1.00	1.00	1.25
Thickener	1.00	1.25	1.50
Vacuum Filters	1.00	1.25	1.50
SCREENS			
Air Washing	1.00	1.00	1.25
Rotary – Stone or Gravel	1.00	1.25	1.50
Traveling Water Intake I	1.00	1.00	1.25
SCREW CONVEYORS			
Uniformly loaded or Fed			
Heavy Duty			
SUGAR INDUSTRY			
Beet Slicer	1.50	1.50	1.75
Cane Knives	1.50	1.50	1.50
Crushers	1.50	1.50	1.50
Mills (low speed end)	1.50	1.50	1.50

Application	Load Duration		
	Up to 3 hrs per day	3-10 hrs per day	Over 10 hrs per day
TEXTILE INDUSTRY			
Batchers	1.00	1.25	1.50
Calendars	1.00	1.25	1.50
Cards	1.00	1.25	1.50
Dry Cans	1.00	1.25	1.50
Dyeing Machinery	1.00	1.25	1.50
Looms	1.00	1.25	1.50
Mangles	1.00	1.25	1.50
Nappers	1.00	1.25	1.50
Pads	1.00	1.25	1.50
Siashers	1.00	1.25	1.50
Soapers	1.00	1.25	1.50
Spinners	1.00	1.25	1.50
Tenter Frames	1.00	1.25	1.50
Washers	1.00	1.25	1.50
Winders	1.00	1.25	1.50

Notes to REDUCER SERVICE FACTOR table:

1) Service factors for paper mill applications are applied to the nameplate rating of the electric motor at the motor rated based speed.

2) Anti-friction bearings only. Use 1.5 for sleeve bearings.

3) A service factor of 1.0 may be applied at base speed of a super calender operating over-speed range of part range constant horsepower, part range constant torque where the constant horsepower speed range is greater that 1.5 to 1. A service factor of 1.25 is applicable to super calenders operating over the entire speed range at constant torque or where the constant horsepower speed range is less than 1.5 to 1. Explanatory notes.

NORDBLOC®.1
Weights

lb

NORD DRIVESYSTEMS

Approximate Gearmotor Weights [lb]

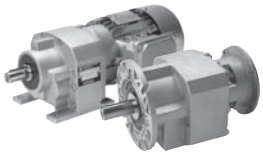
Type	63S	63 L	71 S	71 L	80 S	80 L	90 S	90 L	100 L	100 LA	112MH	132 S	132 M	160 M	160 L	180 MX	180 LX	200 L	225 S
SK 072.1	14	14	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SK 172.1	18	18	18	18	27	31	36	44	-	-	-	-	-	-	-	-	-	-	-
SK 372.1	23	25	27	29	33	35	42	46	55	62	-	-	-	-	-	-	-	-	-
SK 373.1	24	26	28	30	34	36	43	47	-	-	84	-	-	-	-	-	-	-	-
SK 572.1	-	-	-	46	50	52	58	63	72	78	100	-	-	-	-	-	-	-	-
SK 573.1	41	42	45	47	51	53	60	64	73	79	100	-	-	-	-	-	-	-	-
SK 672.1	-	-	-	-	62	64	71	75	84	90	111	141	165	-	-	-	-	-	-
SK 673.1	54	56	58	60	64	66	73	77	86	93	113	-	-	-	-	-	-	-	-
SK 772.1	-	-	-	-	-	-	-	-	110	117	137	168	192	251	-	-	-	-	-
SK 773.1	-	83	86	88	92	94	100	105	114	120	142	171	195	-	-	-	-	-	-
SK 872.1	-	-	-	-	-	-	-	-	186	193	214	244	268	328	383	414	482	-	-
SK 873.1	-	-	-	-	-	-	178	182	191	197	219	248	272	332	388	-	-	-	-
SK 972.1	-	-	-	-	-	-	-	-	-	-	300	330	354	414	469	500	570	642	714
SK 973.1	-	-	-	-	-	-	249	254	262	269	305	335	360	419	474	505	573	-	-

Above weights are approximate. Depending upon ratio, oil quantity and optional equipment, reducer weights may be different than shown. Exact weights can be obtained after the unit is fully assembled.

Approximate Reducer Weights [lb]

Type	W	48C	56C	140TC	180TC	210TC	250TC	280TC	320TC
SK 072.1	-	9	9	-	-	-	-	-	-
SK 172.1	15	-	15	15	-	-	-	-	-
SK 372.1	24	-	22	22	24	-	-	-	-
SK 373.1	26	-	24	24	-				
SK 572.1	40	-	40	40	42	-	-	-	-
SK 573.1	42	-	42	42	44	-	-	-	-
SK 672.1	53	-	51	51	53	57	-	-	-
SK 673.1	55	-	53	53	60	-	-	-	-
SK 772.1	93	-	88	88	97	105	126	-	-
SK 773.1	97	-	93	93	101	110	130	-	-
SK 872.1	192	-	-	180	196	196	227	249	-
SK 873.1	196	-	-	185	201	201	232	254	-
SK 972.1	278	-	-	267	283	283	314	336	382
SK 973.1	282	-	-	272	287	287	318	340	-

Above weights are approximate. Depending upon ratio, oil quantity and optional equipment, reducer weights may be different than shown. Exact weights can be obtained after the unit is fully assembled.

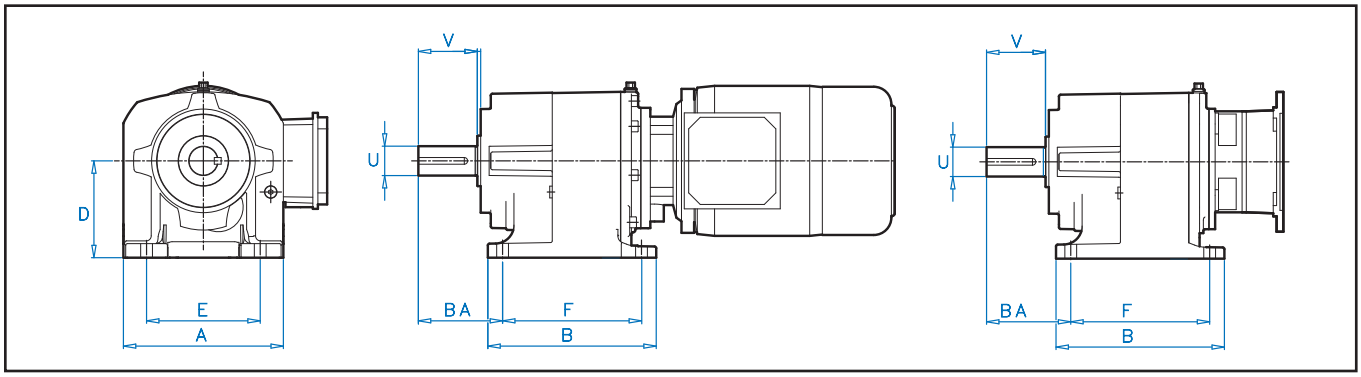


Crossover to the NORDBLOC® .1

With the product re-design we have eliminated the sizes SK 272/SK 273 & SK 472/SK 473. These sized units had the same dimensions as the SK 372/SK 373 & SK 572/SK 573 units. In the case of the SK 472/SK 473 & SK 572/SK 573, the shaft size was the only difference. That is why the SK 572.1/3.1 units are now available with two shaft sizes.

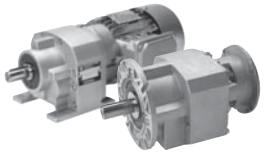
NORDBLOC®	NORDBLOC® .1	Notes
	SK 072.1	new
SK 172	SK 172.1	
SK 272	SK 372.1	
SK 273	SK 373.1	
SK 372	SK 372.1	
SK 373	SK 373.1	
SK 472	SK 572.1	Shaft 1.250" / 30mm or 1.375" / 35mm
SK 473	SK 573.1	Shaft 1.250" / 30mm or 1.375" / 35mm
SK 572	SK 572.1	Shaft 1.250" / 30mm or 1.375" / 35mm
SK 573	SK 573.1	Shaft 1.250" / 30mm or 1.375" / 35mm
SK 672	SK 672.1	
SK 673	SK 673.1	
SK 772	SK 772.1	
SK 773	SK 773.1	
SK 872	SK 872.1	
SK 873	SK 873.1	
SK 972	SK 972.1	
SK 973	SK 973.1	

Basic Dimensions



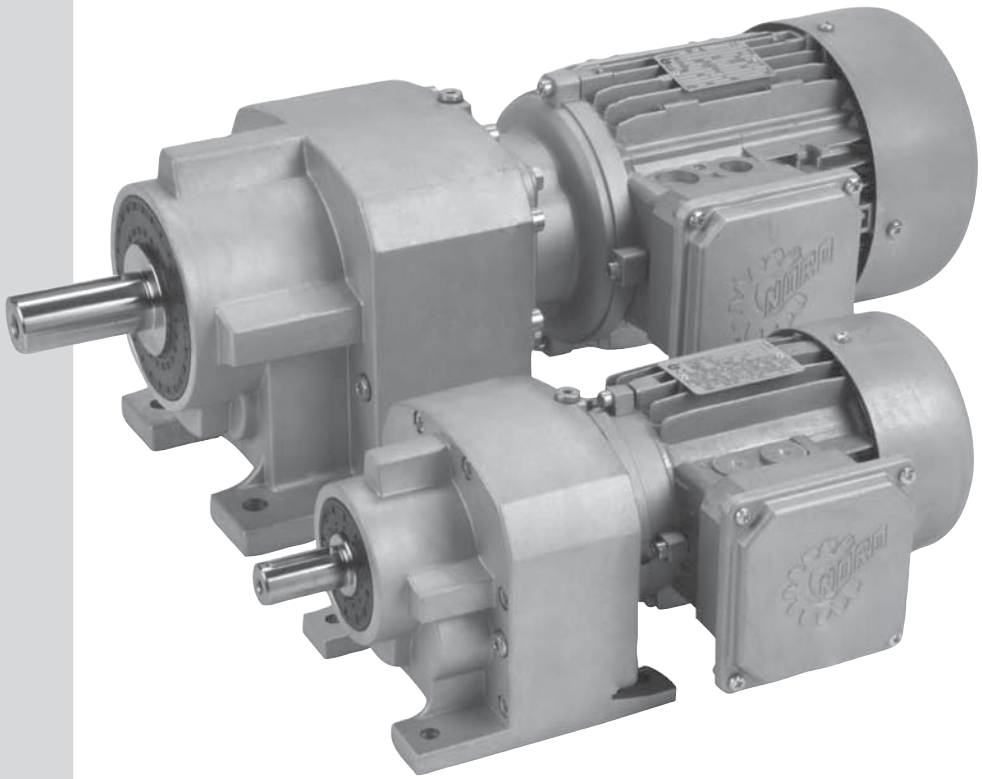
Size	A	B	BA	D	E	F	U	V
SK 072.1	4.09	4.29	1.89	2.56	3.35	3.74	0.750	1.57
SK 172.1	5.51	5.31	2.28	2.95	4.33	4.33	0.750	1.57
SK 372.1 **SK 373.1**	5.91	6.30	2.95	3.54	4.33	5.12	1.000	1.97
SK 572.1 **SK 573.1**	7.48	7.87	3.54	4.53	5.31	6.50	1.250 & 1.375	2.36 & 2.75
SK 672.1 **SK 673.1**	8.27	9.25	3.93	5.12	5.91	7.68	1.375	2.75
SK 772.1 **SK 773.1**	9.33	9.65	4.57	5.51	6.69	8.07	1.625	3.15
SK 872.1 **SK 873.1**	11.81	12.20	5.55	7.09	8.46	10.24	2.125	3.94
SK 972.1 **SK 973.1**	13.70	14.37	6.33	8.86	9.84	12.20	2.375	4.77

Notes



Gearmotor Selection

- 0.16 hp
- 0.25 hp
- 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



NORD DRIVESYSTEMS

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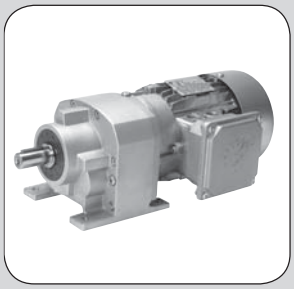
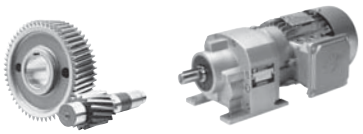
Motor Power P_n [hp]	Output Speed n_2 [rpm]	Output Torque T_a [lb-in]	Service Factor f_B	AGMA Class	Gear Ratio i_{tot}
0.16	108	93	8.0	III	15.76
	91	110	6.7	III	18.60
	83	121	6.2	III	20.37
	76	133	6.1	III	22.42
	69	147	5.5	III	24.80
	62	164	5.0	III	27.62
	55	184	4.4	III	31.00
	49	205	3.7	III	34.52
	44	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



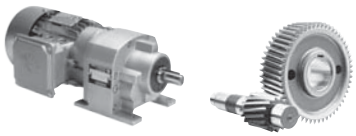
0.16 hp Gearmotors



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}	Standard Bearings F_{RN} OHL [lb]	Standard Bearings F_{AN} Thrust [lb]	Heavy Duty Bearings (VL) F_{RVL} OHL [lb]	Heavy Duty Bearings (VL) F_{AVL} Thrust [lb]	Model Type	Weight [lb]	Dim. Page
0.16	810	13	21.1	III	2.10	347	607	n/a	n/a	SK 072.1 - 63S/4	14	104
	730	14	20.7	III	2.33	360	629	n/a	n/a			
	661	15	21.1	III	2.57	371	649	n/a	n/a			
	596	17	20.7	III	2.85	384	658	n/a	n/a			
	576	18	21.1	III	2.95	389	658	n/a	n/a			
	518	20	20.7	III	3.28	402	658	n/a	n/a			
	475	21	19.9	III	3.58	414	658	n/a	n/a			
	434	23	17.0	III	3.92	426	658	n/a	n/a			
	394	26	17.2	III	4.31	440	658	n/a	n/a			
	356	28	16.5	III	4.77	454	658	n/a	n/a			
	320	32	15.4	III	5.31	470	658	n/a	n/a			
	309	33	14.8	III	5.50	475	658	n/a	n/a			
	285	36	13.7	III	5.96	488	658	n/a	n/a			
	259	39	12.0	III	6.57	503	658	n/a	n/a			
	235	43	11.3	III	7.23	518	658	n/a	n/a			
	191	53	9.2	III	8.91	554	658	n/a	n/a			
	170	60	8.2	III	10.00	563	658	n/a	n/a			
	147	69	6.4	III	11.56	563	658	n/a	n/a			
	129	79	5.3	III	13.20	563	658	n/a	n/a			
	118	86	5.3	III	14.40	563	658	n/a	n/a			
	108	94	5.2	III	15.77	563	658	n/a	n/a			
	98	104	4.7	III	17.35	563	658	n/a	n/a			
	89	115	4.2	III	19.20	563	658	n/a	n/a			
	80	128	3.8	III	21.38	563	658	n/a	n/a			
	77	133	3.7	III	22.22	563	658	n/a	n/a			
	69	148	3.3	III	24.75	563	658	n/a	n/a			
	61	166	2.9	III	27.78	563	658	n/a	n/a			
	52	194	2.5	III	32.45	563	658	n/a	n/a			
	47	217	2.2	III	36.43	563	658	n/a	n/a			
	40	251	1.8	II	42.10	563	658	n/a	n/a			
	35	292	1.4	II	49.00	563	658	n/a	n/a			
	31	328	1.3	I	55.00	563	658	n/a	n/a			
	27	377	1.2	I	63.56	563	658	n/a	n/a			
	733	14	24.7	III	2.32	630	863	n/a	n/a	SK 172.1 - 63S/4	18	106
	683	15	24.1	III	2.49	630	878	n/a	n/a			
	625	16	24.7	III	2.72	630	878	n/a	n/a			
	582	17	24.1	III	2.92	630	878	n/a	n/a			
	528	19	24.7	III	3.22	630	878	n/a	n/a			
	491	21	23.2	III	3.46	630	878	n/a	n/a			
	449	23	23.1	III	3.79	630	878	n/a	n/a			
	408	25	23.1	III	4.17	630	878	n/a	n/a			
	368	28	23.1	III	4.62	630	878	n/a	n/a			
	331	31	24.0	III	5.14	630	878	n/a	n/a			
	295	34	19.8	III	5.77	630	878	n/a	n/a			
	264	38	18.9	III	6.43	630	878	n/a	n/a			
	240	42	17.2	III	7.08	630	878	n/a	n/a			
	217	47	15.5	III	7.83	630	878	n/a	n/a			
	195	52	15.0	III	8.72	630	878	n/a	n/a			
	174	58	12.9	III	9.79	630	878	n/a	n/a			
	157	65	11.8	III	10.83	630	878	n/a	n/a			
	149	68	11.1	III	11.39	630	878	n/a	n/a			
	141	72	10.7	III	12.06	630	878	n/a	n/a			
	126	81	9.3	III	13.54	630	878	n/a	n/a			

(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)



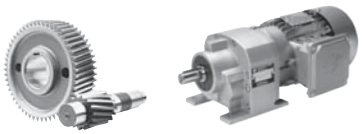
0.16 hp Gearmotors

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}	Standard Bearings F_{RN} OHL [lb]	Standard Bearings F_{AN} Thrust [lb]	Heavy Duty Bearings (VL) F_{RVL} OHL [lb]	Heavy Duty Bearings (VL) F_{AVL} Thrust [lb]	Model Type	Weight [lb]	Dim. Page
0.16	108	94	8.0	III	15.76	630	878	n/a	n/a	SK 172.1 - 63S/4	18	106
	91	111	6.7	III	18.60	630	878	n/a	n/a			
	83	122	6.2	III	20.37	630	878	n/a	n/a			
	76	134	6.1	III	22.42	630	878	n/a	n/a			
	69	148	5.5	III	24.80	630	878	n/a	n/a			
	62	165	4.9	III	27.62	630	878	n/a	n/a			
	55	185	4.4	III	31.00	630	878	n/a	n/a			
	49	206	3.7	III	34.52	630	878	n/a	n/a			
	44	231	3.3	III	38.75	630	878	n/a	n/a			
	41	247	3.0	III	41.36	630	878	n/a	n/a			
	37	277	2.7	III	46.43	630	878	n/a	n/a			
	31	322	2.3	III	54.03	630	878	n/a	n/a			
	27	372	1.5	II	62.36	630	878	n/a	n/a			
	24	418	1.5	II	70.00	630	878	n/a	n/a			
	21	483	1.5	II	81.45	630	878	n/a	n/a			
	28	363	3.7	III	60.83	1375	2295	1800	2295	SK 372.1 - 63S/4*	23	109
	27	382	3.7	III	64.06	1374	2295	1800	2295			
	23	430	3.1	III	72.38	1372	2295	1800	2295			
	28	359	4.9	III	60.22	1375	2295	1800	2295	SK 373.1 - 63S/4*	24	109
	26	386	4.6	III	64.70	1374	2295	1800	2295			
	23	443	4.0	III	74.27	1371	2295	1800	2295			
	21	493	3.8	III	82.57	1369	2295	1800	2295			
	19	546	3.4	III	91.48	1365	2295	1800	2295			
	17	609	2.9	III	102.01	1361	2295	1800	2295			
	14	719	2.5	III	120.54	1353	2295	1800	2295			
	13	781	2.3	III	130.87	1348	2295	1800	2295			
	12	865	2.1	III	145.00	1339	2295	1800	2295			
	10	990	1.9	II	165.94	1326	2295	1800	2295			
	9.2	1104	1.7	II	185.05	1311	2295	1800	2295			
	8.7	1170	1.6	II	196.07	1303	2295	1800	2295			
	8.2	1241	1.4	II	207.98	1292	2295	1800	2295			
	7.4	1362	1.4	II	228.22	1273	2295	1800	2295			
	6.6	1530	1.2	I	256.50	1242	2295	1800	2295			
	6.3	1609	1.2	I	269.67	1227	2295	1800	2295			
	5.6	1808	1.0	I	303.08	1183	2295	1771	2295			
	4.9	2102	0.8	*	343.92	1122	2295	1731	2295			
	14	748	5.3	III	125.45	2352	3263	2475	3263	SK 573.1 - 63S/4*	41	112
	12	842	4.7	III	141.13	2350	3263	2475	3263			
	11	947	4.2	III	158.78	2347	3263	2475	3263			
	9.0	1127	3.5	III	188.91	2341	3263	2475	3263			
	8.5	1200	3.3	III	201.16	2338	3263	2475	3263			
	7.5	1350	2.9	III	226.30	2332	3263	2475	3263			
	6.3	1606	2.5	III	269.26	2319	3263	2475	3263			
	5.6	1807	2.2	III	302.91	2308	3263	2475	3263			
	5.4	1886	2.0	III	316.18	2303	3263	2475	3263			
	4.5	2244	1.6	II	376.20	2278	3263	2475	3263			
	4.2	2390	1.4	II	402.80	2267	3263	2475	3263			
	6.1	1666	3.4	III	279.23	2564	4500	3375	4500	SK 673.1 - 63S/4	54	118
	5.6	1817	3.1	III	304.61	2555	4500	3375	4500			
	5.1	1982	2.9	III	332.23	2545	4500	3375	4500			
	4.7	2151	2.6	III	362.43	2534	4500	3375	4500			

* When ordering this size unit with specific flange or shaft options the OHL information is derated from what is specified. ⇨ 🕮 34

(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)

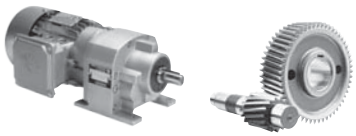
0.25 hp Gearmotors



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}	Standard Bearings F_{RN} OHL [lb]	Standard Bearings F_{AN} Thrust [lb]	Heavy Duty Bearings (VL) F_{RVL} OHL [lb]	Heavy Duty Bearings (VL) F_{AVL} Thrust [lb]	Model Type	Weight [lb]	Dim. Page
0.25	800	20	13.2	III	2.10	346	605	n/a	n/a	SK 072.1 - 63L/4	14	104
	721	22	12.9	III	2.33	358	626	n/a	n/a			
	654	25	13.2	III	2.57	369	646	n/a	n/a			
	589	27	12.9	III	2.85	382	658	n/a	n/a			
	569	28	13.2	III	2.95	386	658	n/a	n/a			
	512	31	12.9	III	3.28	399	658	n/a	n/a			
	469	34	12.4	III	3.58	411	658	n/a	n/a			
	429	37	10.6	III	3.92	423	658	n/a	n/a			
	390	41	10.7	III	4.31	436	658	n/a	n/a			
	352	46	10.3	III	4.77	450	658	n/a	n/a			
	316	51	9.6	III	5.31	466	658	n/a	n/a			
	305	53	9.3	III	5.50	469	658	n/a	n/a			
	282	57	8.5	III	5.96	483	658	n/a	n/a			
	256	63	7.5	III	6.57	497	658	n/a	n/a			
	232	69	7.0	III	7.23	512	658	n/a	n/a			
	210	76	6.4	III	8.00	528	658	n/a	n/a			
	189	85	5.7	III	8.91	545	658	n/a	n/a			
	168	96	5.1	III	10.00	563	658	n/a	n/a			
	145	110	4.0	III	11.56	563	658	n/a	n/a			
	127	126	3.3	III	13.20	563	658	n/a	n/a			
	117	138	3.3	III	14.40	563	658	n/a	n/a			
	107	151	3.2	III	15.77	563	658	n/a	n/a			
	97	166	2.9	III	17.35	563	658	n/a	n/a			
	88	184	2.7	III	19.20	563	658	n/a	n/a			
	79	204	2.4	III	21.38	563	658	n/a	n/a			
	76	212	2.3	III	22.22	563	658	n/a	n/a			
	68	237	2.1	III	24.75	563	658	n/a	n/a			
	60	266	1.8	II	27.78	563	658	n/a	n/a			
	52	310	1.6	II	32.45	563	658	n/a	n/a			
	46	348	1.4	II	36.43	563	658	n/a	n/a			
	40	402	1.1	I	42.10	563	658	n/a	n/a			
	34	468	0.9	*	49.00	563	658	n/a	n/a			
	31	516	0.9	*	55.00	563	658	n/a	n/a			
	724	22	15.4	III	2.32	630	863	n/a	n/a	SK 172.1 - 63L/4	18	106
	675	24	15.0	III	2.49	630	878	n/a	n/a			
	618	26	15.4	III	2.72	630	878	n/a	n/a			
	575	28	15.0	III	2.92	630	878	n/a	n/a			
	522	31	15.4	III	3.22	630	878	n/a	n/a			
	486	33	14.5	III	3.46	630	878	n/a	n/a			
	443	36	14.4	III	3.79	630	878	n/a	n/a			
	403	40	14.4	III	4.17	630	878	n/a	n/a			
	364	44	14.4	III	4.62	630	878	n/a	n/a			
	327	49	15.0	III	5.14	630	878	n/a	n/a			
	291	55	12.4	III	5.77	630	878	n/a	n/a			
	261	61	11.8	III	6.43	630	878	n/a	n/a			
	237	68	10.7	III	7.08	630	878	n/a	n/a			
	215	75	9.7	III	7.83	630	878	n/a	n/a			
	193	83	9.3	III	8.72	630	878	n/a	n/a			
	172	94	8.0	III	9.79	630	878	n/a	n/a			
	155	104	7.4	III	10.83	630	878	n/a	n/a			
	147	109	6.9	III	11.39	630	878	n/a	n/a			
	139	115	6.7	III	12.06	630	878	n/a	n/a			
	124	129	5.8	III	13.54	630	878	n/a	n/a			

(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)



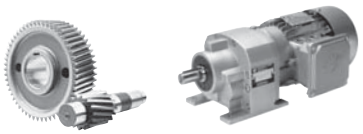
0.25 hp Gearmotors

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}	Standard Bearings $F_{R\,N}$ OHL [lb]	Standard Bearings $F_{A\,N}$ Thrust [lb]	Heavy Duty Bearings (VL) $F_{R\,VL}$ OHL [lb]	Heavy Duty Bearings (VL) $F_{A\,VL}$ Thrust [lb]	Model Type	Weight [lb]	Dim. Page
0.25	107	151	5.0	III	15.76	630	878	n/a	n/a	SK 172.1 - 63L/4	18	106
	90	178	4.2	III	18.60	630	878	n/a	n/a			
	82	195	3.9	III	20.37	630	878	n/a	n/a			
	75	214	3.8	III	22.42	630	878	n/a	n/a			
	68	237	3.4	III	24.80	630	878	n/a	n/a			
	61	264	3.1	III	27.62	630	878	n/a	n/a			
	54	296	2.7	III	31.00	630	878	n/a	n/a			
	49	330	2.3	III	34.52	630	878	n/a	n/a			
	43	370	2.0	III	38.75	630	878	n/a	n/a			
	41	395	1.9	II	41.36	630	878	n/a	n/a			
	36	444	1.7	II	46.43	630	878	n/a	n/a			
	31	516	1.5	II	54.03	630	878	n/a	n/a			
	27	596	1.0	I	62.36	630	878	n/a	n/a			
	24	669	1.0	I	70.00	630	878	n/a	n/a			
	44	364	4.4	III	38.12	1375	2295	1800	2295	SK 372.1 - 63L/4*	25	109
	39	414	3.6	III	43.26	1373	2295	1800	2295			
	31	515	2.8	III	53.84	1367	2295	1800	2295			
	28	581	2.3	III	60.83	1363	2295	1800	2295			
	26	612	2.3	III	64.06	1361	2295	1800	2295			
	23	679	2.0	III	72.38	1356	2295	1800	2295			
	40	406	4.4	III	42.46	1373	2295	1800	2295	SK 373.1 - 63L/4*	26	109
	36	450	4.1	III	47.05	1371	2295	1800	2295			
	31	516	3.6	III	54.00	1367	2295	1800	2295			
	28	576	3.1	III	60.22	1364	2295	1800	2295			
	26	618	2.9	III	64.70	1361	2295	1800	2295			
	23	710	2.5	III	74.27	1354	2295	1800	2295			
	20	789	2.4	III	82.57	1347	2295	1800	2295			
	18	874	2.1	III	91.48	1338	2295	1800	2295			
	16	975	1.8	II	102.01	1327	2295	1800	2295			
	14	1152	1.5	II	120.54	1305	2295	1800	2295			
	13	1251	1.4	II	130.87	1291	2295	1800	2295			
	12	1386	1.3	I	145.00	1269	2295	1800	2295			
	10	1586	1.2	I	165.94	1231	2295	1800	2295			
	9.1	1769	1.1	I	185.05	1192	2295	1777	2295			
	8.6	1874	1.0	I	196.07	1166	2295	1760	2295			
	8.1	1988	0.9	*	207.98	1136	2295	1740	2295			
	7.4	2181	0.9	*	228.22	1009	2295	1703	2295			
	6.2	2530	0.8	*	269.67	775	2295	1626	2295			
	30	533	7.5	III	55.80	2357	3263	2475	3263	SK 573.1 - 63L/4*	42	112
	28	583	6.8	III	60.97	2356	3263	2475	3263			
	25	647	6.2	III	67.64	2355	3263	2475	3263			
	22	735	5.4	III	76.88	2353	3263	2475	3263			
	20	814	4.9	III	85.18	2351	3263	2475	3263			
	18	903	4.4	III	94.50	2348	3263	2475	3263			
	16	1027	3.7	III	107.42	2344	3263	2475	3263			
	13	1199	3.3	III	125.45	2338	3263	2475	3263			
	12	1349	3.0	III	141.13	2332	3263	2475	3263			
	11	1518	2.6	III	158.78	2324	3263	2475	3263			
	8.9	1806	2.2	III	188.91	2308	3263	2475	3263			
	8.4	1923	2.1	III	201.16	2301	3263	2475	3263			

* When ordering this size unit with specific flange or shaft options the OHL information is derated from what is specified. ⇨ 📖 34

(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)

0.25, 0.33 hp Gearmotors

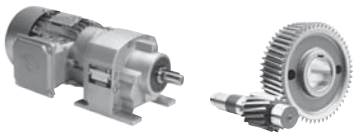


NORD DRIVESYSTEMS

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}	Standard Bearings F_{RN} OHL [lb]	Standard Bearings F_{AN} Thrust [lb]	Heavy Duty Bearings (VL) F_{RVL} OHL [lb]	Heavy Duty Bearings (VL) F_{AVL} Thrust [lb]	Model Type	Weight [lb]	Dim. Page
0.25	7.4	2163	1.8	II	226.30	2285	3263	2475	3263	**SK 573.1 - 63L/4***	42	112
	6.2	2574	1.5	II	269.26	2252	3263	2475	3263			
	5.5	2895	1.3	I	302.91	2221	3263	2475	3263			
	5.3	3022	1.2	I	316.18	2209	3263	2475	3263			
	4.5	3596	1.0	I	376.20	2141	3263	2475	3263			
	4.2	3779	0.9	*	402.80	2117	3263	2475	3263			
	9.4	1701	3.3	III	177.94	2562	4500	3375	4500	**SK 673.1 - 63L/4**	56	118
	9.2	1739	3.3	III	181.88	2560	4500	3375	4500			
	8.7	1855	3.1	III	194.11	2553	4500	3375	4500			
	7.7	2093	2.7	III	219.00	2538	4500	3375	4500			
	6.8	2372	2.4	III	248.20	2517	4500	3375	4500			
	6.0	2669	2.1	III	279.23	2492	4500	3375	4500			
	5.5	2912	1.9	II	304.61	2469	4500	3375	4500			
	5.1	3176	1.8	II	332.23	2442	4500	3375	4500			
	4.6	3400	1.7	II	362.43	2416	4500	3375	4500			
0.33	814	26	10.2	III	2.10	342	598	n/a	n/a	**SK 072.1 - 71S/4**	14	104
	734	29	10.0	III	2.33	353	618	n/a	n/a			
	665	32	10.2	III	2.57	364	638	n/a	n/a			
	600	35	10.0	III	2.85	377	658	n/a	n/a			
	580	36	10.2	III	2.95	381	658	n/a	n/a			
	521	41	10.0	III	3.28	394	658	n/a	n/a			
	478	44	9.6	III	3.58	405	658	n/a	n/a			
	436	48	8.2	III	3.92	417	658	n/a	n/a			
	397	53	8.3	III	4.31	429	658	n/a	n/a			
	358	59	8.0	III	4.77	443	658	n/a	n/a			
	322	66	7.4	III	5.31	458	658	n/a	n/a			
	311	68	7.2	III	5.50	461	658	n/a	n/a			
	287	74	6.6	III	5.96	475	658	n/a	n/a			
	260	81	5.8	III	6.57	487	658	n/a	n/a			
	237	89	5.4	III	7.23	502	658	n/a	n/a			
	214	99	4.9	III	8.00	517	658	n/a	n/a			
	192	110	4.4	III	8.91	534	658	n/a	n/a			
	171	124	3.9	III	10.00	553	658	n/a	n/a			
	148	143	3.1	III	11.56	563	658	n/a	n/a			
	130	163	2.6	III	13.20	563	658	n/a	n/a			
	119	178	2.5	III	14.40	563	658	n/a	n/a			
	108	195	2.5	III	15.77	563	658	n/a	n/a			
	99	214	2.3	III	17.35	563	658	n/a	n/a			
	89	237	2.1	III	19.20	563	658	n/a	n/a			
	80	264	1.8	II	21.38	563	658	n/a	n/a			
	77	275	1.8	II	22.22	563	658	n/a	n/a			
	69	306	1.6	II	24.75	563	658	n/a	n/a			
	62	338	1.4	II	27.78	563	658	n/a	n/a			

* When ordering this size unit with specific flange or shaft options the OHL information is derated from what is specified. ⇨ 🕮 34

(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)



0.33 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}	Standard Bearings F_{RN} OHL [lb]	Standard Bearings F_{AN} Thrust [lb]	Heavy Duty Bearings (VL) F_{RVL} OHL [lb]	Heavy Duty Bearings (VL) F_{AVL} Thrust [lb]	Model Type	Weight [lb]	Dim. Page
0.33	737	29	11.9	III	2.32	630	851	n/a	n/a	**SK 172.1 - 71S/4**	18	106
	687	31	11.6	III	2.49	630	878	n/a	n/a			
	629	34	11.9	III	2.72	630	878	n/a	n/a			
	586	36	11.6	III	2.92	630	878	n/a	n/a			
	531	40	11.9	III	3.22	630	878	n/a	n/a			
	494	43	11.2	III	3.46	630	878	n/a	n/a			
	451	47	11.1	III	3.79	630	878	n/a	n/a			
	410	52	11.2	III	4.17	630	878	n/a	n/a			
	370	57	11.2	III	4.62	630	878	n/a	n/a			
	333	64	11.6	III	5.14	630	878	n/a	n/a			
	296	71	9.6	III	5.77	630	878	n/a	n/a			
	266	79	9.1	III	6.43	630	878	n/a	n/a			
	242	87	8.3	III	7.08	630	878	n/a	n/a			
	218	97	7.5	III	7.83	630	878	n/a	n/a			
	196	108	7.2	III	8.72	630	878	n/a	n/a			
	175	121	6.2	III	9.79	630	878	n/a	n/a			
	158	134	5.7	III	10.83	630	878	n/a	n/a			
	150	141	5.3	III	11.39	630	878	n/a	n/a			
	142	149	5.2	III	12.06	630	878	n/a	n/a			
	126	167	4.5	III	13.54	630	878	n/a	n/a			
	109	195	3.9	III	15.76	630	878	n/a	n/a			
	92	230	3.2	III	18.60	630	878	n/a	n/a			
	84	252	3.0	III	20.37	630	878	n/a	n/a			
	76	277	2.9	III	22.42	630	878	n/a	n/a			
	69	306	2.7	III	24.80	630	878	n/a	n/a			
	62	341	2.4	III	27.62	630	878	n/a	n/a			
	55	383	2.1	III	31.00	630	878	n/a	n/a			
	50	427	1.8	II	34.52	630	878	n/a	n/a			
	44	479	1.6	II	38.75	630	878	n/a	n/a			
	41	511	1.5	II	41.36	630	878	n/a	n/a			
	37	574	1.3	I	46.43	630	878	n/a	n/a			
	32	657	1.1	I	54.03	630	878	n/a	n/a			
	57	372	4.3	III	30.11	1375	2295	1800	2295	**SK 372.1 - 71S/4***	27	109
	51	418	4.0	III	33.84	1373	2295	1800	2295			
	45	471	3.4	III	38.12	1370	2295	1800	2295			
	40	535	2.8	III	43.26	1366	2295	1800	2295			
	32	665	2.1	III	53.84	1357	2295	1800	2295			
	28	752	1.8	II	60.83	1350	2295	1800	2295			
	27	792	1.8	II	64.06	1346	2295	1800	2295			
	24	881	1.5	II	72.38	1338	2295	1800	2295			
	52	410	4.3	III	33.20	1373	2295	1800	2295	**SK 373.1 - 71S/4***	28	109
	46	460	3.8	III	37.23	1371	2295	1800	2295			
	40	525	3.4	III	42.46	1367	2295	1800	2295			
	36	581	3.2	III	47.05	1363	2295	1800	2295			
	32	667	2.8	III	54.00	1357	2295	1800	2295			
	28	744	2.4	III	60.22	1351	2295	1800	2295			
	26	799	2.2	III	64.70	1346	2295	1800	2295			
	23	918	1.9	II	74.27	1334	2295	1800	2295			
	21	1020	1.8	II	82.57	1322	2295	1800	2295			
	19	1130	1.6	II	91.48	1308	2295	1800	2295			

* When ordering this size unit with specific flange or shaft options the OHL information is derated from what is specified. ⇨ 📖 34

(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)

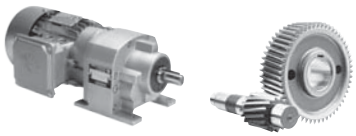
0.33
Gearmotors

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}	Standard Bearings F_{RN} OHL [lb]	Standard Bearings F_{AN} Thrust [lb]	Heavy Duty Bearings (VL) F_{RVL} OHL [lb]	Heavy Duty Bearings (VL) F_{AVL} Thrust [lb]	Model Type	Weight [lb]	Dim. Page
0.33	17	1260	1.4	II	102.01	1289	2295	1800	2295	SK 373.1 - 71S/4*	28	109
	14	1489	1.2	I	120.54	1250	2295	1800	2295			
	13	1617	1.1	I	130.87	1226	2295	1800	2295			
	12	1792	1.0	I	145.00	1187	2295	1773	2295			
	10	2050	0.9	*	165.94	1069	2295	1728	2295			
	9.2	2287	0.8	*	185.05	938	2295	1681	2295			
	8.7	2386	0.8	*	196.07	839	2295	1660	2295			
	31	689	5.8	III	55.80	2354	3263	2475	3263	SK 573.1 - 71S/4*	45	112
	28	753	5.3	III	60.97	2352	3263	2475	3263			
	25	836	4.8	III	67.64	2350	3263	2475	3263			
	22	950	4.2	III	76.88	2347	3263	2475	3263			
	20	1053	3.8	III	85.18	2344	3263	2475	3263			
	18	1168	3.4	III	94.50	2339	3263	2475	3263			
	16	1327	2.9	III	107.42	2333	3263	2475	3263			
	15	1376	2.9	III	111.36	2331	3263	2475	3263			
	14	1550	2.6	III	125.45	2322	3263	2475	3263			
	12	1744	2.3	III	141.13	2312	3263	2475	3263			
	11	1962	2.0	III	158.78	2298	3263	2475	3263			
	9.6	2206	1.8	II	178.56	2281	3263	2475	3263			
	9.1	2334	1.7	II	188.91	2271	3263	2475	3263			
	8.5	2486	1.6	II	201.16	2259	3263	2475	3263			
	7.6	2796	1.4	II	226.30	2231	3263	2475	3263			
	6.4	3327	1.2	I	269.26	2175	3263	2475	3263			
	5.6	3743	1.0	I	302.91	2122	3263	2475	3263			
	5.4	3907	1.0	I	316.18	2100	3263	2475	3263			
	4.5	4577	0.8	*	376.20	1861	3263	2475	3263			
	12	1771	3.2	III	143.30	2558	4500	3375	4500	SK 673.1 - 71S/4	58	118
	11	1995	2.8	III	161.45	2544	4500	3375	4500			
	9.6	2199	2.6	III	177.94	2530	4500	3375	4500			
	9.4	2247	2.5	III	181.88	2527	4500	3375	4500			
	8.8	2398	2.4	III	194.11	2515	4500	3375	4500			
	7.8	2722	2.1	III	220.32	2487	4500	3375	4500			
	7.8	2706	2.1	III	219.00	2489	4500	3375	4500			
	6.9	3067	1.8	II	248.20	2453	4500	3375	4500			
	6.1	3450	1.6	II	279.23	2411	4500	3375	4500			
	5.6	3764	1.5	II	304.61	2371	4500	3375	4500			
	5.1	4105	1.4	II	332.23	2323	4500	3375	4500			
	4.7	4410	1.3	I	362.43	2275	4500	3375	4500			
	7.0	3009	2.5	III	243.53	3194	2025	3825	5625	SK 773.1 - 71S/4	86	121
	6.6	3215	2.4	III	260.18	3182	2025	3825	5625			
	6.4	3277	2.3	III	265.24	3178	2025	3825	5625			
	5.9	3568	2.1	III	288.78	3160	2025	3825	5625			
	5.6	3799	2.0	III	307.42	3144	2025	3825	5625			
	5.1	4136	1.9	II	334.7	3119	2025	3825	5625			
	5.0	4216	1.8	II	341.21	3113	2025	3825	5625			
	4.3	4812	1.6	II	395.46	3062	2025	3825	5625			

* When ordering this size unit with specific flange or shaft options the OHL information is derated from what is specified. ⇨ 📖 34

(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)



0.5 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}	Standard Bearings $F_{R\,N}$ OHL [lb]	Standard Bearings $F_{A\,N}$ Thrust [lb]	Heavy Duty Bearings (VL) $F_{R\,VL}$ OHL [lb]	Heavy Duty Bearings (VL) $F_{A\,VL}$ Thrust [lb]	Model Type	Weight [lb]	Dim. Page
0.5	819	38	6.9	III	2.10	336	589	n/a	n/a	**SK 072.1 - 71L/4**	14	104
	738	43	6.7	III	2.33	347	608	n/a	n/a			
	669	47	6.9	III	2.57	358	628	n/a	n/a			
	604	52	6.7	III	2.85	370	648	n/a	n/a			
	583	54	6.9	III	2.95	374	655	n/a	n/a			
	524	60	6.7	III	3.28	386	658	n/a	n/a			
	480	66	6.5	III	3.58	396	658	n/a	n/a			
	439	72	5.5	III	3.92	408	658	n/a	n/a			
	399	79	5.6	III	4.31	420	658	n/a	n/a			
	361	87	5.4	III	4.77	433	658	n/a	n/a			
	324	97	5.0	III	5.31	447	658	n/a	n/a			
	313	101	4.8	III	5.50	448	658	n/a	n/a			
	289	109	4.5	III	5.96	462	658	n/a	n/a			
	262	120	3.9	III	6.57	473	658	n/a	n/a			
	238	133	3.7	III	7.23	486	658	n/a	n/a			
	215	147	3.3	III	8.00	500	658	n/a	n/a			
	193	163	3.0	III	8.91	515	658	n/a	n/a			
	172	183	2.7	III	10.00	532	658	n/a	n/a			
	149	212	2.1	III	11.56	555	658	n/a	n/a			
	130	242	1.7	II	13.20	561	658	n/a	n/a			
	119	264	1.7	II	14.40	563	658	n/a	n/a			
	109	289	1.7	II	15.77	563	658	n/a	n/a			
	99	318	1.5	II	17.35	563	658	n/a	n/a			
	90	352	1.4	II	19.20	563	658	n/a	n/a			
	80	392	1.2	I	21.38	563	658	n/a	n/a			
	77	407	1.2	I	22.22	563	658	n/a	n/a			
	69	454	1.1	I	24.75	563	658	n/a	n/a			
	62	509	0.9	*	27.78	563	658	n/a	n/a			
	741	43	8.0	III	2.32	630	840	n/a	n/a	**SK 172.1 - 71L/4**	18	106
	691	46	7.8	III	2.49	630	869	n/a	n/a			
	632	50	8.0	III	2.72	630	878	n/a	n/a			
	589	54	7.8	III	2.92	630	878	n/a	n/a			
	534	59	8.0	III	3.22	630	878	n/a	n/a			
	497	63	7.5	III	3.46	630	878	n/a	n/a			
	454	69	7.5	III	3.79	630	878	n/a	n/a			
	412	76	7.5	III	4.17	630	878	n/a	n/a			
	372	85	7.5	III	4.62	630	878	n/a	n/a			
	335	94	7.8	III	5.14	630	878	n/a	n/a			
	298	106	6.4	III	5.77	630	878	n/a	n/a			
	267	118	6.2	III	6.43	630	878	n/a	n/a			
	243	130	5.6	III	7.08	630	878	n/a	n/a			
	220	144	5.1	III	7.83	630	878	n/a	n/a			
	197	160	4.9	III	8.72	630	878	n/a	n/a			
	176	179	4.2	III	9.79	630	878	n/a	n/a			
	159	198	3.8	III	10.83	630	878	n/a	n/a			
	151	209	3.6	III	11.39	630	878	n/a	n/a			
	143	221	3.5	III	12.06	630	878	n/a	n/a			
	127	248	3.0	III	13.54	630	878	n/a	n/a			

(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)

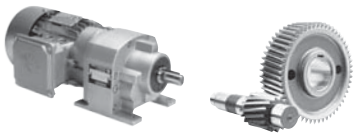
0.5 hp Gearmotors

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}	Standard Bearings F_{RN} OHL [lb]	Standard Bearings F_{AN} Thrust [lb]	Heavy Duty Bearings (VL) F_{RVL} OHL [lb]	Heavy Duty Bearings (VL) F_{AVL} Thrust [lb]	Model Type	Weight [lb]	Dim. Page
0.5	109	289	2.6	III	15.76	630	878	n/a	n/a	SK 172.1 - 71L/4	18	106
	92	341	2.2	III	18.60	630	878	n/a	n/a			
	84	373	2.0	III	20.37	630	878	n/a	n/a			
	77	411	2.0	III	22.42	630	878	n/a	n/a			
	69	455	1.8	II	24.80	630	878	n/a	n/a			
	62	506	1.6	II	27.62	630	878	n/a	n/a			
	55	568	1.4	II	31.00	630	878	n/a	n/a			
	50	633	1.2	I	34.52	630	878	n/a	n/a			
	44	710	1.1	I	38.75	630	878	n/a	n/a			
	118	265	6.3	III	14.57	1379	2295	1688	2295	SK 372.1 - 71L/4*	29	109
	57	547	2.9	III	30.11	1365	2295	1800	2295			
	51	615	2.7	III	33.84	1361	2295	1800	2295			
	45	693	2.3	III	38.12	1355	2295	1800	2295			
	40	787	1.9	II	43.26	1347	2295	1800	2295			
	32	979	1.4	II	53.84	1327	2295	1800	2295			
	28	1106	1.2	I	60.83	1311	2295	1800	2295			
	73	426	4.4	III	23.41	1372	2295	1800	2295	SK 373.1 - 71L/4*	30	109
	66	472	3.9	III	25.94	1370	2295	1800	2295			
	58	541	3.4	III	29.77	1366	2295	1800	2295			
	52	604	2.9	III	33.20	1362	2295	1800	2295			
	46	677	2.6	III	37.23	1356	2295	1800	2295			
	41	772	2.3	III	42.46	1348	2295	1800	2295			
	37	855	2.2	III	47.05	1340	2295	1800	2295			
	32	982	1.9	II	54.00	1327	2295	1800	2295			
	29	1095	1.6	II	60.22	1313	2295	1800	2295			
	27	1176	1.5	II	64.70	1302	2295	1800	2295			
	23	1350	1.3	I	74.27	1275	2295	1800	2295			
	21	1501	1.2	I	82.57	1248	2295	1800	2295			
	19	1663	1.1	I	91.48	1215	2295	1792	2295			
	17	1855	1.0	I	102.01	1171	2295	1763	2295			
	38	832	3.4	III	45.77	2350	3375	2475	3375	SK 572.1 - 71L/4*	46	112
	32	997	3.3	III	54.41	2345	3375	2475	3375			
	41	767	5.2	III	42.18	2352	3263	2475	3263	SK 573.1 - 71L/4*	47	112
	40	789	5.0	III	43.40	2351	3263	2475	3263			
	36	872	4.6	III	47.95	2349	3263	2475	3263			
	35	902	4.4	III	49.60	2348	3263	2475	3263			
	31	1015	3.9	III	55.80	2345	3263	2475	3263			
	28	1109	3.6	III	60.97	2342	3263	2475	3263			
	25	1230	3.2	III	67.64	2337	3263	2475	3263			
	22	1398	2.8	III	76.88	2330	3263	2475	3263			
	20	1549	2.6	III	85.18	2322	3263	2475	3263			
	18	1718	2.3	III	94.50	2313	3263	2475	3263			
	16	1953	1.9	II	107.42	2299	3263	2475	3263			
	15	2025	2.0	III	111.36	2294	3263	2475	3263			
	14	2281	1.7	II	125.45	2275	3263	2475	3263			
	12	2566	1.6	II	141.13	2252	3263	2475	3263			
	11	2887	1.4	II	158.78	2222	3263	2475	3263			
	9.6	3246	1.2	I	178.56	2184	3263	2475	3263			
	8.6	3657	1.1	I	201.16	2134	3263	2475	3263			
	7.6	4114	1.0	I	226.30	2015	3263	2475	3263			

* When ordering this size unit with specific flange or shaft options the OHL information is derated from what is specified. ⇨ 📖 34

(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)



0.5, 0.75 hp Gearmotors

Motor Power	Output Speed	Output Torque	Service Factor	AGMA Class	Gear Ratio	Standard Bearings		Heavy Duty Bearings (VL)		Model Type	Weight	Dim. Page
P_n	n_2	T_2	f_B		i_{tot}	$F_{R\,N}$ OHL	$F_{A\,N}$ Thrust	$F_{R\,VL}$ OHL	$F_{A\,VL}$ Thrust		lb	
[hp]	[rpm]	[lb-in]				[lb]	[lb]	[lb]	[lb]		[lb]	
0.5	26	1199	4.7	III	65.95	2586	4500	3375	4500	**SK 673.1 - 71L/4**	60	118
	23	1339	4.2	III	73.64	2580	4500	3375	4500			
	21	1522	3.7	III	83.70	2572	4500	3375	4500			
	18	1725	3.3	III	94.86	2561	4500	3375	4500			
	17	1881	3.0	III	103.48	2552	4500	3375	4500			
	15	2107	2.7	III	115.89	2537	4500	3375	4500			
	13	2374	2.4	III	130.55	2517	4500	3375	4500			
	12	2605	2.2	III	143.30	2498	4500	3375	4500			
	11	2935	1.9	II	161.45	2467	4500	3375	4500			
	9.7	3235	1.8	II	177.94	2436	4500	3375	4500			
	9.5	3307	1.7	II	181.88	2427	4500	3375	4500			
	8.9	3529	1.6	II	194.11	2401	4500	3375	4500			
	7.9	3982	1.4	II	219.00	2341	4500	3375	4500			
	7.8	4006	1.4	II	220.32	2337	4500	3375	4500			
	6.9	4513	1.3	I	248.20	2259	4500	3375	4500			
	6.2	5077	1.1	I	279.23	2157	4500	3329	4500			
	5.6	5538	1.0	I	304.61	2059	4500	3267	4500			
	12	2523	3.0	III	138.78	3218	2025	3825	5625	**SK 773.1 - 71L/4**	88	121
	11	2913	2.6	III	160.22	3199	2025	3825	5625			
	11	2747	2.3	III	151.1	3207	2025	3825	5625			
	9.6	3246	2.3	III	178.53	3180	2025	3825	5625			
	9.1	3442	2.2	III	189.31	3168	2025	3825	5625			
	8.3	3747	2.1	III	206.11	3148	2025	3825	5625			
	7.7	4081	1.8	II	224.49	3123	2025	3825	5625			
	7.1	4428	1.7	II	243.53	3096	2025	3825	5625			
	6.6	4730	1.6	II	260.18	3069	2025	3825	5625			
	6.5	4822	1.6	II	265.24	3061	2025	3825	5625			
	6.0	5250	1.4	II	288.78	3019	2025	3825	5625			
	5.6	5589	1.3	I	307.42	2984	2025	3825	5625			
	5.1	6085	1.3	I	334.7	2868	2025	3825	5625			
	5.0	6204	1.2	I	341.21	2856	2025	3825	5625			
	4.3	7248	1.0	I	395.46	2597	2025	3814	5625			
0.75	737	64	5.9	III	2.32	630	829	n/a	n/a	**SK 172.1 - 80S/4**	27	106
	687	69	5.5	III	2.49	630	857	n/a	n/a			
	629	75	5.4	III	2.72	630	878	n/a	n/a			
	586	81	5.5	III	2.92	630	878	n/a	n/a			
	531	89	5.4	III	3.22	630	878	n/a	n/a			
	494	96	5.0	III	3.46	630	878	n/a	n/a			
	451	105	5.0	III	3.79	630	878	n/a	n/a			
	410	115	5.0	III	4.17	630	878	n/a	n/a			
	370	128	5.0	III	4.62	630	878	n/a	n/a			
	333	142	5.2	III	5.14	630	878	n/a	n/a			
	296	160	4.3	III	5.77	630	878	n/a	n/a			
	266	178	4.1	III	6.43	630	878	n/a	n/a			
	242	196	3.7	III	7.08	630	878	n/a	n/a			
	218	217	3.4	III	7.83	630	878	n/a	n/a			
	196	241	3.2	III	8.72	630	878	n/a	n/a			
	175	271	2.8	III	9.79	630	878	n/a	n/a			

(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)

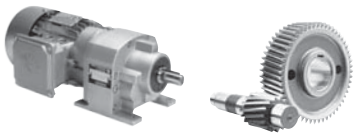
0.75 hp Gearmotors

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}	Standard Bearings F_{RN} OHL [lb]	Standard Bearings F_{AN} Thrust [lb]	Heavy Duty Bearings (VL) F_{RVL} OHL [lb]	Heavy Duty Bearings (VL) F_{AVL} Thrust [lb]	Model Type	Weight [lb]	Dim. Page
0.75	158	299	2.5	III	10.83	630	878	n/a	n/a	SK 172.1 - 80S/4	27	106
	150	315	2.4	III	11.39	630	878	n/a	n/a			
	142	334	2.3	III	12.06	630	878	n/a	n/a			
	126	374	2.0	III	13.54	630	878	n/a	n/a			
	109	436	1.7	II	15.76	630	878	n/a	n/a			
	92	514	1.4	II	18.60	630	878	n/a	n/a			
	84	563	1.3	I	20.37	630	878	n/a	n/a			
	76	620	1.3	I	22.42	630	878	n/a	n/a			
	69	686	1.2	I	24.80	630	878	n/a	n/a			
	62	764	1.1	I	27.62	630	878	n/a	n/a			
	132	359	4.9	III	12.96	1255	2295	1610	2295	SK 372.1 - 80S/4*	33	109
	117	403	4.2	III	14.57	1290	2295	1670	2295			
	104	457	3.7	III	16.50	1308	2295	1733	2295			
	93	509	3.5	III	18.40	1338	2295	1793	2295			
	83	571	2.9	III	20.62	1354	2295	1800	2295			
	74	637	2.8	III	23.00	1359	2295	1800	2295			
	66	715	2.4	III	25.85	1353	2295	1800	2295			
	57	833	1.9	II	30.11	1343	2295	1800	2295			
	51	937	1.8	II	33.84	1332	2295	1800	2295			
	45	1055	1.5	II	38.12	1318	2295	1800	2295			
	40	1197	1.3	I	43.26	1299	2295	1800	2295			
	32	1490	1.0	I	53.84	1250	2295	1800	2295			
	28	1682	0.8	*	60.83	1211	2295	1790	2295			
	92	516	3.3	III	18.63	1318	2295	1794	2295	SK 373.1 - 80S/4*	34	109
	83	568	3.3	III	20.52	1345	2295	1800	2295			
	75	629	3.0	III	22.74	1360	2295	1800	2295			
	73	648	2.9	III	23.41	1359	2295	1800	2295			
	66	718	2.6	III	25.94	1353	2295	1800	2295			
	57	824	2.3	III	29.77	1343	2295	1800	2295			
	52	919	1.9	II	33.20	1334	2295	1800	2295			
	46	1030	1.7	II	37.23	1321	2295	1800	2295			
	40	1175	1.5	II	42.46	1302	2295	1800	2295			
	36	1302	1.4	II	47.05	1283	2295	1800	2295			
	32	1495	1.2	I	54.00	1249	2295	1800	2295			
	28	1667	1.1	I	60.22	1215	2295	1792	2295			
	26	1791	1.0	I	64.70	1187	2295	1774	2295			
	23	2056	0.9	*	74.27	1095	2295	1728	2295			
	21	2283	0.8	*	82.57	876	2295	1682	2295			
	48	987	3.3	III	35.65	2346	3375	2475	3375	SK 572.1 - 80S/4*	50	112
	40	1173	2.8	III	42.38	2339	3375	2475	3375			
	37	1267	2.2	III	45.77	2335	3375	2475	3375			
	31	1505	2.2	III	54.41	2325	3375	2475	3375			
	55	856	4.5	III	30.93	2350	3263	2475	3263	SK 573.1 - 80S/4*	51	112
	49	963	4.0	III	34.80	2346	3263	2475	3263			
	45	1052	3.8	III	38.02	2343	3263	2475	3263			
	41	1167	3.4	III	42.18	2339	3263	2475	3263			
	39	1201	3.3	III	43.40	2338	3263	2475	3263			
	36	1327	3.0	III	47.95	2333	3263	2475	3263			
	34	1373	2.9	III	49.60	2331	3263	2475	3263			
	31	1544	2.6	III	55.80	2323	3263	2475	3263			
	28	1688	2.4	III	60.97	2315	3263	2475	3263			
	25	1872	2.1	III	67.64	2304	3263	2475	3263			

* When ordering this size unit with specific flange or shaft options the OHL information is derated from what is specified. ⇨ 📖 34

(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)



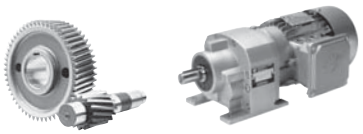
0.75 hp Gearmotors

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}	Standard Bearings F_{RN} OHL [lb]	Standard Bearings F_{AN} Thrust [lb]	Heavy Duty Bearings (VL) F_{RVL} OHL [lb]	Heavy Duty Bearings (VL) F_{AVL} Thrust [lb]	Model Type	Weight [lb]	Dim. Page
0.75	22	2128	1.9	II	76.88	2287	3263	2475	3263	SK 573.1 - 80S/4*	51	112
	20	2358	1.7	II	85.18	2269	3263	2475	3263			
	18	2616	1.5	II	94.50	2248	3263	2475	3263			
	16	3020	1.3	I	109.12	2209	3263	2475	3263			
	16	2973	1.3	I	107.42	2214	3263	2475	3263			
	15	3082	1.3	I	111.36	2202	3263	2475	3263			
	14	3472	1.1	I	125.45	2157	3263	2475	3263			
	13	3775	1.1	I	136.40	2118	3263	2475	3263			
	12	3906	1.0	I	141.13	2089	3263	2475	3263			
	11	4395	0.9	*	158.78	1929	3263	2475	3263			
	9.6	4938	0.8	*	178.56	1699	3263	2475	3263			
	38	1233	3.2	III	44.55	2584	4500	3375	4500	SK 672.1 - 80S/4	62	118
	30	1567	2.3	III	56.65	2569	4500	3375	4500			
	31	1526	3.7	III	55.12	2571	4500	3375	4500	SK 673.1 - 80S/4	64	118
	28	1673	3.4	III	60.45	2564	4500	3375	4500			
	26	1825	3.1	III	65.95	2555	4500	3375	4500			
	23	2038	2.8	III	73.64	2541	4500	3375	4500			
	20	2317	2.4	III	83.70	2521	4500	3375	4500			
	18	2626	2.2	III	94.86	2496	4500	3375	4500			
	17	2864	2.0	III	103.48	2474	4500	3375	4500			
	15	3208	1.8	II	115.89	2439	4500	3375	4500			
	14	3414	1.7	II	123.33	2414	4500	3375	4500			
	13	3727	1.5	II	134.64	2376	4500	3375	4500			
	13	3613	1.6	II	130.55	2391	4500	3375	4500			
	12	4065	1.4	II	146.88	2329	4500	3375	4500			
	12	3966	1.4	II	143.30	2343	4500	3375	4500			
	11	4469	1.3	I	161.45	2265	4500	3375	4500			
	9.6	4925	1.2	I	177.94	2187	4500	3349	4500			
	9.4	5034	1.1	I	181.88	2164	4500	3334	4500			
	8.8	5373	1.1	I	194.11	2096	4500	3290	4500			
	7.8	6098	0.9	*	220.32	1922	4500	3182	4500			
	7.8	6062	0.9	*	219.00	1931	4500	3188	4500			
	6.9	6864	0.8	*	248.20	1692	4500	3049	4500			
	18	2673	2.8	III	96.57	2978	2025	3825	5625	SK 773.1 - 80S/4	92	121
	15	3251	2.4	III	117.46	3138	2025	3825	5625			
	15	3098	2.4	III	111.92	3100	2025	3825	5625			
	12	3841	2.0	III	138.78	3141	2025	3825	5625			
	11	4435	1.7	II	160.22	3095	2025	3825	5625			
	11	4182	1.5	II	151.1	3115	2025	3825	5625			
	9.6	4941	1.5	II	178.53	3049	2025	3825	5625			
	9.0	5240	1.4	II	189.31	3021	2025	3825	5625			
	8.3	5705	1.3	I	206.11	2959	2025	3825	5625			
	7.6	6213	1.2	I	224.49	2836	2025	3825	5625			
	7.0	6740	1.1	I	243.53	2726	2025	3825	5625			
	6.6	7201	1.1	I	260.18	2589	2025	3811	5625			
	6.4	7341	1.0	I	265.24	2573	2025	3800	5625			
	5.9	7993	0.9	*	288.78	2378	2025	3697	5625			
	5.6	8509	0.9	*	307.42	2260	2025	3632	5625			
	5.1	9264	0.8	*	334.7	2017	2025	3504	5625			
	5.0	9436	0.8	*	341.21	1992	2025	3489	5625			

* When ordering this size unit with specific flange or shaft options the OHL information is derated from what is specified. ⇨ 📖 34

(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)

1 hp Gearmotors



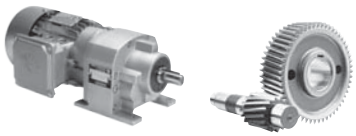
DRIVESYSTEMS

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}	Standard Bearings F_{RN} OHL [lb]	Standard Bearings F_{AN} Thrust [lb]	Heavy Duty Bearings (VL) F_{RVL} OHL [lb]	Heavy Duty Bearings (VL) F_{AVL} Thrust [lb]	Model Type	Weight [lb]	Dim. Page
1	711	89	4.3	III	2.32	630	829	n/a	n/a	**SK 172.1 - 80L/4**	31	106
	663	95	4.0	III	2.49	630	856	n/a	n/a	**SK 172.1 - 80LH/4**		
	607	104	3.9	III	2.72	630	878	n/a	n/a	SK 172.1 - 80LP/4		
	565	112	4.0	III	2.92	630	878	n/a	n/a			
	512	123	3.9	III	3.22	630	878	n/a	n/a			
	477	132	3.6	III	3.46	630	878	n/a	n/a			
	435	145	3.6	III	3.79	630	878	n/a	n/a			
	396	159	3.6	III	4.17	630	878	n/a	n/a			
	357	177	3.6	III	4.62	630	878	n/a	n/a			
	321	196	3.7	III	5.14	630	878	n/a	n/a			
	286	220	3.1	III	5.77	630	878	n/a	n/a			
	257	246	3.0	III	6.43	630	878	n/a	n/a			
	233	271	2.7	III	7.08	630	878	n/a	n/a			
	211	299	2.4	III	7.83	630	878	n/a	n/a			
	189	333	2.3	III	8.72	630	878	n/a	n/a			
	169	374	2.0	III	9.79	630	878	n/a	n/a			
	152	414	1.8	II	10.83	630	878	n/a	n/a			
	145	435	1.7	II	11.39	630	878	n/a	n/a			
	137	461	1.7	II	12.06	630	878	n/a	n/a			
	122	517	1.5	II	13.54	630	878	n/a	n/a			
	105	602	1.2	I	15.76	630	878	n/a	n/a			
	89	711	1.0	I	18.60	630	878	n/a	n/a			
	81	778	1.0	I	20.37	630	878	n/a	n/a			
	74	857	1.0	I	22.42	630	878	n/a	n/a			
	67	948	0.9	*	24.80	630	878	n/a	n/a			
	60	1055	0.8	*	27.62	630	878	n/a	n/a			
	228	278	4.9	III	7.23	1064	2295	1345	2295	**SK 372.1 - 80L/4***	35	109
	201	316	4.7	III	8.22	1093	2295	1400	2295	**SK 372.1 - 80LH/4***		
	176	361	4.5	III	9.40	1122	2295	1459	2295	SK 372.1 - 80LP/4*		
	161	395	4.2	III	10.28	1136	2295	1499	2295			
	143	444	3.8	III	11.55	1164	2295	1555	2295			
	127	498	3.6	III	12.96	1179	2295	1608	2295			
	113	560	3.0	III	14.57	1204	2295	1667	2295			
	100	634	2.7	III	16.50	1205	2295	1727	2295			
	90	707	2.5	III	18.40	1225	2295	1785	2295			
	80	792	2.1	III	20.62	1222	2295	1800	2295			
	72	884	2.0	III	23.00	1237	2295	1800	2295			
	64	993	1.7	II	25.85	1249	2295	1800	2295			
	55	1157	1.4	II	30.11	1224	2295	1800	2295			
	49	1300	1.3	I	33.84	1224	2295	1800	2295			
	43	1464	1.1	I	38.12	1199	2295	1800	2295			
	38	1653	0.9	*	43.26	1189	2295	1794	2295			
	89	716	2.3	III	18.63	1194	2295	1784	2295	**SK 373.1 - 80L/4***	36	109
	80	788	2.4	III	20.52	1210	2295	1800	2295	**SK 373.1 - 80LH/4***		
	73	874	2.1	III	22.74	1224	2295	1800	2295	SK 373.1 - 80LP/4*		
	70	899	2.1	III	23.41	1211	2295	1800	2295			
	64	997	1.9	II	25.94	1221	2295	1800	2295			
	55	1144	1.6	II	29.77	1209	2295	1800	2295			
	50	1275	1.4	II	33.20	1210	2295	1800	2295			
	44	1430	1.2	I	37.23	1146	2295	1800	2295			
	39	1631	1.1	I	42.46	1100	2295	1798	2295			
	35	1808	1.0	I	47.05	1080	2295	1771	2295			
	31	2075	0.9	*	54.00	1005	2295	1724	2295			
	27	2301	0.8	*	60.22	929	2295	1679	2295			

*** When ordering this size unit with specific flange or shaft options the OHL information is derated from what is specified.** ⇨ 🕮 34

(Model Type in blue is an Energy Efficient motor)

(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 light blue is an Premium Efficient motor)



1 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}	Standard Bearings F_{RN} OHL [lb]	Standard Bearings F_{AN} Thrust [lb]	Heavy Duty Bearings (VL) F_{RVL} OHL [lb]	Heavy Duty Bearings (VL) F_{AVL} Thrust [lb]	Model Type	Weight [lb]	Dim. Page
1	61	1037	3.4	III	27.00	2344	3375	2475	3375	SK 572.1 - 80L/4*	52	112
	57	1111	3.0	III	28.91	2341	3375	2475	3375	SK 572.1 - 80LH/4*		
	46	1370	2.4	III	35.65	2331	3375	2475	3375	SK 572.1 - 80LP/4*		
	39	1628	2.0	III	42.38	2318	3375	2475	3375			
	36	1758	1.6	II	45.77	2311	3375	2475	3375			
	30	2079	1.6	II	54.41	2290	3375	2475	3375			
	69	914	4.2	III	23.79	2348	3263	2475	3263	SK 573.1 - 80L/4*	53	112
	62	1028	3.7	III	26.77	2344	3263	2475	3263	SK 573.1 - 80LH/4*		
	53	1188	3.3	III	30.93	2339	3263	2475	3263	SK 573.1 - 80LP/4*		
	47	1337	2.9	III	34.80	2332	3263	2475	3263			
	43	1461	2.7	III	38.02	2327	3263	2475	3263			
	39	1620	2.5	III	42.18	2318	3263	2475	3263			
	38	1667	2.4	III	43.40	2316	3263	2475	3263			
	34	1842	2.2	III	47.95	2306	3263	2475	3263			
	33	1905	2.1	III	49.60	2302	3263	2475	3263			
	30	2144	1.9	II	55.80	2286	3263	2475	3263			
	27	2342	1.7	II	60.97	2271	3263	2475	3263			
	24	2599	1.5	II	67.64	2249	3263	2475	3263			
	21	2954	1.3	I	76.88	2216	3263	2475	3263			
	19	3272	1.2	I	85.18	2181	3263	2475	3263			
	17	3630	1.1	I	94.50	2137	3263	2475	3263			
	15	4278	0.9	*	111.36	1952	3263	2475	3263			
	15	4127	0.9	*	107.42	2029	3263	2475	3263			
	15	4192	1.0	I	109.12	1985	3263	2475	3263			
	13	4819	0.8	*	125.45	1744	3263	2475	3263			
	12	5212	0.8	*	136.40	1589	3263	2475	3263			
	37	1711	2.3	III	44.55	2562	4500	3375	4500	SK 672.1 - 80L/4*	64	118
	29	2165	1.6	II	56.65	2533	4500	3375	4500	SK 672.1 - 80LH/4*		
										SK 672.1 - 80LP/4*		
	37	1723	3.3	III	44.85	2561	4500	3375	4500	SK 673.1 - 80L/4*	66	118
	33	1902	3.0	III	49.50	2550	4500	3375	4500	SK 673.1 - 80LH/4*		
	30	2118	2.7	III	55.12	2536	4500	3375	4500	SK 673.1 - 80LP/4*		
	27	2322	2.4	III	60.45	2521	4500	3375	4500			
	25	2534	2.2	III	65.95	2504	4500	3375	4500			
	22	2829	2.0	III	73.64	2477	4500	3375	4500			
	20	3216	1.8	II	83.70	2437	4500	3375	4500			
	17	3644	1.6	II	94.86	2386	4500	3375	4500			
	16	3975	1.4	II	103.48	2342	4500	3375	4500			
	14	4452	1.3	I	115.89	2270	4500	3375	4500			
	13	4738	1.2	I	123.33	2219	4500	3370	4500			
	13	5015	1.1	I	130.55	2170	4500	3338	4500			
	12	5505	1.0	I	143.30	2066	4500	3271	4500			
	12	5172	1.1	I	134.64	2137	4500	3316	4500			
	11	5643	1.0	I	146.88	2035	4500	3251	4500			
	10	6202	0.9	*	161.45	1892	4500	3164	4500			
	9.1	6950	0.8	*	181.88	1660	4500	3031	4500			
	23	2762	2.7	III	71.89	2701	2025	3825	5625	SK 773.1 - 80L/4	94	121
	21	3044	2.5	III	79.23	2769	2025	3825	5625	SK 773.1 - 80LH/4		
	20	3201	2.4	III	83.32	2808	2025	3825	5625	SK 773.1 - 80LP/4		
	18	3596	2.1	III	93.61	2895	2025	3825	5625			
	17	3710	2.0	III	96.57	2917	2025	3825	5625			
	15	4300	1.7	II	111.92	3025	2025	3825	5625			

* When ordering this size unit with specific flange or shaft options the OHL information is derated from what is specified. ⇨ 📖 34

(Model Type in blue is an Energy Efficient motor)

(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 light blue is an Premium Efficient motor)

1, 1.5 hp Gearmotors

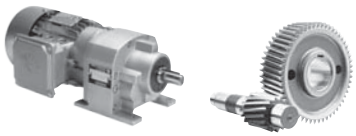
NORD DRIVESYSTEMS

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}	Standard Bearings F_{RN} OHL [lb]	Standard Bearings F_{AN} Thrust [lb]	Heavy Duty Bearings (VL) F_{RVL} OHL [lb]	Heavy Duty Bearings (VL) F_{AVL} Thrust [lb]	Model Type	Weight [lb]	Dim. Page
1	14	4512	1.7	II	117.46	3055	2025	3825	5625	**SK 773.1 - 80L/4**	94	121
	12	5332	1.4	II	138.78	3010	2025	3825	5625	**SK 773.1 - 80LH/4**		
	10	6155	1.3	I	160.22	2851	2025	3825	5625	SK 773.1 - 80LP/4		
	8.7	7273	1.0	I	189.31	2592	2025	3811	5625			
	7.3	8624	0.9	*	224.49	2202	2025	3602	5625			
	6.3	9942	0.8	*	260.18	1810	2025	3394	5625			
1.5	716	132	2.9	III	2.32	621	800	n/a	n/a	**SK 172.1 - 90S/4**	36	106
	667	142	2.7	III	2.49	630	824	n/a	n/a	**SK 172.1 - 90SH/4**		
	610	155	2.6	III	2.72	630	859	n/a	n/a	SK 172.1 - 90SP/4		
	568	166	2.7	III	2.92	630	878	n/a	n/a			
	516	183	2.6	III	3.22	630	878	n/a	n/a			
	480	197	2.4	III	3.46	630	878	n/a	n/a			
	438	216	2.4	III	3.79	630	878	n/a	n/a			
	398	238	2.4	III	4.17	630	878	n/a	n/a			
	359	263	2.4	III	4.62	630	878	n/a	n/a			
	323	293	2.5	III	5.14	630	878	n/a	n/a			
	288	329	2.1	III	5.77	630	878	n/a	n/a			
	258	366	2.0	III	6.43	630	878	n/a	n/a			
	234	403	1.8	II	7.08	630	878	n/a	n/a			
	212	446	1.6	II	7.83	630	878	n/a	n/a			
	190	497	1.6	II	8.72	630	878	n/a	n/a			
	170	558	1.3	I	9.79	630	878	n/a	n/a			
	397	238	4.8	III	4.18	874	2045	1118	2045	**SK 372.1 - 90S/4***	42	109
	356	266	4.7	III	4.66	897	2116	1156	2116	**SK 372.1 - 90SH/4***		
	317	299	4.7	III	5.24	921	2195	1200	2195	SK 372.1 - 90SP/4*		
	279	339	4.2	III	5.95	947	2282	1248	2282			
	252	375	3.8	III	6.58	969	2295	1288	2295			
	241	393	3.8	III	6.89	969	2295	1303	2295			
	230	412	3.6	III	7.23	972	2295	1322	2295			
	202	469	3.4	III	8.22	989	2295	1374	2295			
	177	536	3.1	III	9.40	1003	2295	1430	2295			
	161	586	2.9	III	10.28	1003	2295	1466	2295			
	144	659	2.6	III	11.55	1018	2295	1519	2295			
	128	739	2.4	III	12.96	1012	2295	1568	2295			
	114	831	2.0	III	14.57	1021	2295	1623	2295			
	101	941	1.8	II	16.50	989	2295	1675	2295			
	90	1049	1.7	II	18.40	989	2295	1728	2295			
	81	1176	1.4	II	20.62	953	2295	1779	2295			
	72	1312	1.3	I	23.00	943	2295	1800	2295			
	64	1474	1.1	I	25.85	925	2295	1800	2295			
	55	1717	0.9	*	30.11	840	2295	1785	2295			
	49	1928	0.9	*	33.84	802	2295	1751	2295			
	89	1062	1.6	II	18.63	941	2295	1724	2295	**SK 373.1 - 90S/4***	43	109
	81	1170	1.6	II	20.52	938	2295	1772	2295	**SK 373.1 - 90SH/4***		
	73	1297	1.4	II	22.74	928	2295	1800	2295	SK 373.1 - 90SP/4*		
	71	1335	1.4	II	23.41	900	2295	1800	2295			
	64	1479	1.3	I	25.94	884	2295	1800	2295			
	56	1698	1.1	I	29.77	822	2295	1788	2295			
	50	1893	0.9	*	33.20	787	2295	1756	2295			
	45	2121	0.8	*	37.23	655	2295	1716	2295			

*** When ordering this size unit with specific flange or shaft options the OHL information is derated from what is specified.** ⇨ 🕮 34

(Model Type in blue is an Energy Efficient motor)

(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 light blue is an Premium Efficient motor)



1.5 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}	Standard Bearings F_{RN} OHL [lb]	Standard Bearings F_{AN} Thrust [lb]	Heavy Duty Bearings (VL) F_{RVL} OHL [lb]	Heavy Duty Bearings (VL) F_{AVL} Thrust [lb]	Model Type	Weight [lb]	Dim. Page
1.5	101	939	3.8	III	16.46	2334	3375	2475	3375	**SK 572.1 - 90S/4***	58	112
	85	1116	3.2	III	19.57	2341	3375	2475	3375	**SK 572.1 - 90SH/4***		
	76	1246	3.0	III	21.85	2336	3375	2475	3375	SK 572.1 - 90SP/4*		
	68	1402	2.7	III	24.58	2330	3375	2475	3375			
	61	1540	2.3	III	27.00	2323	3375	2475	3375			
	57	1649	2.0	III	28.91	2317	3375	2475	3375			
	53	1784	1.8	II	31.28	2309	3375	2475	3375			
	47	2033	1.6	II	35.65	2293	3375	2475	3375			
	39	2417	1.4	II	42.38	2265	3375	2475	3375			
	36	2610	1.1	I	45.77	2248	3375	2475	3375			
	31	3100	1.1	I	54.41	2200	3375	2475	3375			
	95	993	3.8	III	17.42	2296	3263	2475	3263	**SK 573.1 - 90S/4***	60	112
	86	1096	3.5	III	19.22	2342	3263	2475	3263	**SK 573.1 - 90SH/4***		
	78	1216	3.1	III	21.32	2337	3263	2475	3263	SK 573.1 - 90SP/4*		
	70	1357	2.8	III	23.79	2331	3263	2475	3263			
	62	1527	2.5	III	26.77	2323	3263	2475	3263			
	54	1764	2.2	III	30.93	2310	3263	2475	3263			
	48	1984	2.0	III	34.80	2297	3263	2475	3263			
	44	2168	1.8	II	38.02	2284	3263	2475	3263			
	39	2405	1.7	II	42.18	2265	3263	2475	3263			
	38	2475	1.6	II	43.40	2260	3263	2475	3263			
	35	2734	1.5	II	47.95	2237	3263	2475	3263			
	33	2828	1.4	II	49.60	2228	3263	2475	3263			
	30	3182	1.3	I	55.80	2191	3263	2475	3263			
	27	3477	1.1	I	60.97	2156	3263	2475	3263			
	25	3857	1.0	I	67.64	2106	3263	2475	3263			
	22	4384	0.9	*	76.88	1913	3263	2475	3263			
	19	4853	0.8	*	85.18	1754	3263	2475	3263			
	57	1658	2.9	III	29.08	2565	4500	3375	4500	**SK 672.1 - 90S/4**	71	118
	51	1858	2.9	III	32.58	2553	4500	3375	4500	**SK 672.1 - 90SH/4**		
	46	2039	2.4	III	35.75	2541	4500	3375	4500	SK 672.1 - 90SP/4		
	37	2540	1.6	II	44.55	2503	4500	3375	4500			
	29	3228	1.1	I	56.65	2436	4500	3375	4500			
	45	2123	2.7	III	37.23	2535	4500	3375	4500	**SK 673.1 - 90S/4**	73	118
	40	2369	2.4	III	41.54	2517	4500	3375	4500	**SK 673.1 - 90SH/4**		
	37	2558	2.2	III	44.85	2502	4500	3375	4500	SK 673.1 - 90SP/4		
	34	2823	2.0	III	49.50	2478	4500	3375	4500			
	30	3143	1.8	II	55.12	2445	4500	3375	4500			
	27	3447	1.6	II	60.45	2411	4500	3375	4500			
	25	3761	1.5	II	65.95	2372	4500	3375	4500			
	23	4199	1.3	I	73.64	2308	4500	3375	4500			
	20	4773	1.2	I	83.70	2213	4500	3366	4500			
	17	5409	1.0	I	94.86	2087	4500	3285	4500			
	16	5901	1.0	I	103.48	1972	4500	3213	4500			
	14	6608	0.9	*	115.89	1779	4500	3098	4500			
	13	7026	0.8	*	123.33	1633	4500	3016	4500			

* When ordering this size unit with specific flange or shaft options the OHL information is derated from what is specified. ⇨ 📖 34

(Model Type in blue is an Energy Efficient motor)

(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 light blue is an Premium Efficient motor)

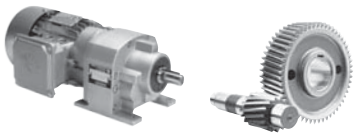
1.5 hp Gearmotors

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}	Standard Bearings F_{RN} OHL [lb]	Standard Bearings F_{AN} Thrust [lb]	Heavy Duty Bearings (VL) F_{RVL} OHL [lb]	Heavy Duty Bearings (VL) F_{AVL} Thrust [lb]	Model Type	Weight [lb]	Dim. Page
1.5	42	2227	3.4	III	39.06	2200	2025	3825	4817	**SK 773.1 - 90S/4**	100	121
	38	2477	3.1	III	43.43	2261	2025	3825	4923	**SK 773.1 - 90SH/4**		
	35	2715	2.8	III	47.61	2315	2025	3825	5019	SK 773.1 - 90SP/4		
	32	2926	2.6	III	51.31	2364	2025	3825	5111			
	29	3287	2.3	III	57.64	2435	2025	3825	5234			
	26	3616	2.1	III	63.42	2491	2025	3825	5328			
	24	3930	1.9	II	68.92	2541	2025	3825	5412			
	23	4099	1.8	II	71.89	2566	2025	3825	5452			
	21	4518	1.7	II	79.23	2618	2025	3825	5525			
	20	4751	1.6	II	83.32	2653	2025	3825	5589			
	18	5338	1.4	II	93.61	2721	2025	3825	5625			
	17	5507	1.4	II	96.57	2738	2025	3825	5625			
	15	6382	1.2	I	111.92	2813	2025	3825	5625			
	14	6698	1.1	I	117.46	2715	2025	3825	5625			
	12	7914	1.0	I	138.78	2420	2025	3717	5625			
	10	9128	0.8	*	160.22	2058	2025	3526	5625			
	27	3482	4.3	III	61.07	4439	4050	5625	7875	**SK 873.1 - 90S/4**	178	124
	25	3849	3.9	III	67.5	4461	4050	5625	7875	**SK 873.1 - 90SH/4**		
	22	4236	3.6	III	74.29	4449	4050	5625	7875	SK 873.1 - 90SP/4		
	20	4738	3.2	III	83.08	4431	4050	5625	7875			
	18	5214	2.9	III	91.43	4412	4050	5625	7875			
	16	5978	2.5	III	104.84	4377	4050	5625	7875			
	16	5761	2.6	III	101.02	4387	4050	5625	7875			
	14	6608	2.3	III	115.88	4344	4050	5625	7875			
	13	7272	2.1	III	127.52	4306	4050	5625	7875			
	12	7755	1.9	II	135.99	4276	4050	5625	7875			
	11	8571	1.8	II	150.31	4219	4050	5625	7875			
	10	9433	1.6	II	165.42	4153	4050	5625	7875			
	8.7	10884	1.4	II	190.86	4025	4050	5625	7875			
	7.9	12029	1.3	I	210.95	3904	4050	5625	7875			
	7.2	13239	1.1	I	232.16	3764	4050	5625	7875			
	6.4	14690	1.0	I	257.61	3566	4050	5569	7875			
	5.8	16236	0.9	*	284.73	3312	4050	5410	7875			
	5.3	17973	0.8	*	315.19	2977	4050	5212	7875			
	4.8	19848	0.8	*	348.37	2505	4050	4958	7875			
	13	7553	3.9	III	132.45	6324	4950	7262	9000	**SK 973.1 - 90S/4**	249	127
	11	8987	3.0	III	157.6	6274	4950	7238	9000	**SK 973.1 - 90SH/4**		
	9.6	9898	2.7	III	173.58	6245	4950	7223	9000	SK 973.1 - 90SP/4		
	9.3	10226	2.9	III	179.32	6231	4950	7217	9000			
	8.4	11262	2.6	III	197.5	6196	4950	7199	9000			
	7.1	13387	2.2	III	234.77	6109	4950	7155	9000			
	6.4	14745	2.0	III	258.57	6056	4950	7128	9000			
	5.6	16851	1.7	II	295.5	5957	4950	7077	9000			
	5.1	18560	1.6	II	325.47	5882	4950	7036	9000			
	4.6	20693	1.4	II	362.89	5775	4950	6980	9000			
	4.0	23650	1.2	I	414.73	5606	4950	6891	9000			
	3.6	26024	1.1	I	456.77	5473	4950	6818	9000			

(Model Type in blue is an Energy Efficient motor)

(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 light blue is an Premium Efficient motor)



2 hp Gearmotors

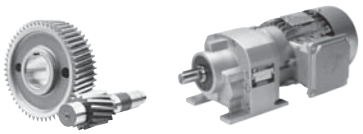
Motor Power P_n [hp]	Output Speed n_2 [rpm]	Output Torque T_2 [lb-in]	Service Factor f_B	AGMA Class	Gear Ratio i_{tot}	Standard Bearings F_{RN} OHL [lb]	Standard Bearings F_{AN} Thrust [lb]	Heavy Duty Bearings (VL) F_{RVL} OHL [lb]	Heavy Duty Bearings (VL) F_{AVL} Thrust [lb]	Model Type	Weight [lb]	Dim. Page
2	716	176	2.2	III	2.32	606	774	n/a	n/a	**SK 172.1 - 90L/4** **SK 172.1 - 90LH/4** SK 172.1 - 90LP/4	44	106
	667	189	2.0	III	2.49	618	795	n/a	n/a			
	610	207	2.0	III	2.72	630	828	n/a	n/a			
	568	222	2.0	III	2.92	630	853	n/a	n/a			
	516	245	2.0	III	3.22	630	878	n/a	n/a			
	480	263	1.8	II	3.46	630	878	n/a	n/a			
	438	288	1.8	II	3.79	630	878	n/a	n/a			
	398	317	1.8	II	4.17	630	878	n/a	n/a			
	359	351	1.8	II	4.62	630	878	n/a	n/a			
	323	390	1.9	II	5.14	630	878	n/a	n/a			
	288	438	1.6	II	5.77	630	878	n/a	n/a			
	258	488	1.5	II	6.43	630	878	n/a	n/a			
	234	538	1.3	I	7.08	630	878	n/a	n/a			
	212	595	1.2	I	7.83	630	878	n/a	n/a			
	190	662	1.2	I	8.72	630	878	n/a	n/a			
	170	744	1.0	I	9.79	630	878	n/a	n/a			
	634	199	4.0	III	2.62	735	1664	954	1664	**SK 372.1 - 90L/4*** **SK 372.1 - 90LH/4*** SK 372.1 - 90LP/4*	46	109
	580	217	3.7	III	2.86	751	1736	980	1736			
	532	237	3.7	III	3.12	767	1817	1008	1817			
	484	260	3.7	III	3.43	784	1897	1038	1897			
	439	287	3.7	III	3.78	801	1955	1070	1955			
	397	317	3.6	III	4.18	819	2020	1105	2020			
	356	354	3.5	III	4.66	837	2088	1143	2088			
	317	398	3.6	III	5.24	855	2164	1185	2164			
	279	451	3.1	III	5.95	873	2249	1231	2249			
	252	499	2.8	III	6.58	889	2295	1270	2295			
	241	523	2.9	III	6.89	885	2295	1284	2295			
	230	548	2.7	III	7.23	881	2295	1302	2295			
	202	624	2.6	III	8.22	886	2295	1351	2295			
	177	713	2.4	III	9.40	886	2295	1403	2295			
	161	780	2.2	III	10.28	872	2295	1437	2295			
	144	876	1.9	II	11.55	874	2295	1486	2295			
	128	983	1.8	II	12.96	847	2295	1530	2295			
	114	1105	1.5	II	14.57	839	2295	1581	2295			
	101	1252	1.3	I	16.50	774	2295	1626	2295			
	90	1396	1.3	I	18.40	755	2295	1675	2295			
	81	1564	1.1	I	20.62	684	2295	1718	2295			
	72	1745	1.0	I	23.00	649	2295	1767	2295			
	64	1964	0.9	*	25.85	600	2295	1744	2295			
	89	1413	1.2	I	18.63	689	2295	1667	2295	**SK 373.1 - 90L/4*** **SK 373.1 - 90LH/4*** SK 373.1 - 90LP/4*	47	109
	81	1557	1.2	I	20.52	665	2295	1710	2295			
	73	1725	1.1	I	22.74	632	2295	1757	2295			
	71	1776	1.0	I	23.41	589	2295	1764	2295			
	64	1968	0.9	*	25.94	546	2295	1744	2295			
	56	2261	0.8	*	29.77	432	2295	1686	2295			

***** **When ordering this size unit with specific flange or shaft options the OHL information is derated from what is specified.** ⇨ 📖 34

(Model Type in blue is an Energy Efficient motor)

(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 light blue is an Premium Efficient motor)**

2 hp Gearmotors



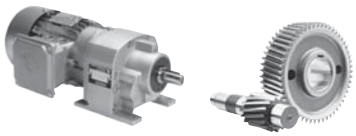
DRIVESYSTEMS

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}	Standard Bearings F_{RN} OHL [lb]	Standard Bearings F_{AN} Thrust [lb]	Heavy Duty Bearings (VL) F_{RVL} OHL [lb]	Heavy Duty Bearings (VL) F_{AVL} Thrust [lb]	Model Type	Weight [lb]	Dim. Page
2	165	762	4.0	III	10.04	1986	3375	2475	3375	**SK 572.1 - 90L/4***	63	112
	148	853	3.9	III	11.25	2029	3375	2475	3375	**SK 572.1 - 90LH/4***		
	131	962	3.7	III	12.68	2072	3375	2475	3375	SK 572.1 - 90LP/4*		
	121	1037	3.4	III	13.67	2085	3375	2475	3375			
	108	1167	3.3	III	15.38	2133	3375	2475	3375			
	101	1249	2.8	III	16.46	2171	3375	2475	3375			
	85	1485	2.4	III	19.57	2228	3375	2475	3375			
	76	1658	2.2	III	21.85	2192	3375	2475	3375			
	68	1865	2.0	III	24.58	2223	3375	2475	3375			
	61	2048	1.7	II	27.00	2227	3375	2475	3375			
	57	2193	1.5	II	28.91	2258	3375	2475	3375			
	53	2373	1.4	II	31.28	2268	3375	2475	3375			
	47	2704	1.2	I	35.65	2236	3375	2475	3375			
	39	3219	1.0	I	42.38	2187	3375	2475	3375			
	95	1322	2.9	III	17.42	2102	3263	2475	3263	**SK 573.1 - 90L/4***	64	112
	86	1458	2.6	III	19.22	2137	3263	2475	3263	**SK 573.1 - 90LH/4***		
	78	1617	2.4	III	21.32	2170	3263	2475	3263	SK 573.1 - 90LP/4*		
	70	1805	2.1	III	23.79	2200	3263	2475	3263			
	62	2031	1.9	II	26.77	2227	3263	2475	3263			
	54	2346	1.7	II	30.93	2193	3263	2475	3263			
	48	2640	1.5	II	34.80	2201	3263	2475	3263			
	44	2884	1.4	II	38.02	2145	3263	2475	3263			
	39	3200	1.2	I	42.18	2102	3263	2475	3263			
	38	3292	1.2	I	43.40	2088	3263	2475	3263			
	35	3638	1.1	I	47.95	2029	3263	2475	3263			
	33	3763	1.1	I	49.60	2006	3263	2475	3263			
	30	4233	0.9	*	55.80	1959	3263	2475	3263			
	27	4625	0.9	*	60.97	1820	3263	2475	3263			
	25	5138	0.8	*	67.64	1617	3263	2475	3263			
	108	1164	3.9	III	15.35	2587	4500	3375	4500	**SK 672.1 - 90L/4**	75	118
	96	1309	3.7	III	17.25	2581	4500	3375	4500	**SK 672.1 - 90LH/4**		
	90	1397	3.4	III	18.41	2577	4500	3375	4500	SK 672.1 - 90LP/4		
	81	1564	3.4	III	20.62	2569	4500	3375	4500			
	57	2206	2.2	III	29.08	2530	4500	3375	4500			
	51	2472	2.2	III	32.58	2509	4500	3375	4500			
	46	2712	1.8	II	35.75	2488	4500	3375	4500			
	37	3384	1.2	I	44.55	2418	4500	3375	4500			
	73	1731	2.3	III	22.82	2561	4500	3375	4500	**SK 673.1 - 90L/4**	77	118
	66	1911	2.3	III	25.19	2550	4500	3375	4500	**SK 673.1 - 90LH/4**		
	60	2095	2.2	III	27.61	2537	4500	3375	4500	SK 673.1 - 90LP/4		
	54	2346	2.0	III	30.92	2519	4500	3375	4500			
	49	2588	2.1	III	34.12	2499	4500	3375	4500			
	45	2824	2.0	III	37.23	2476	4500	3375	4500			
	40	3151	1.8	II	41.54	2444	4500	3375	4500			
	37	3402	1.7	II	44.85	2416	4500	3375	4500			
	34	3755	1.5	II	49.50	2372	4500	3375	4500			
	30	4182	1.4	II	55.12	2310	4500	3375	4500			
	27	4586	1.2	I	60.45	2247	4500	3375	4500			
	25	5003	1.1	I	65.95	2171	4500	3338	4500			
	23	5586	1.0	I	73.64	2046	4500	3259	4500			
	20	6350	0.9	*	83.70	1852	4500	3140	4500			
	17	7206	0.8	*	94.86	1568	4500	2982	4500			

*** When ordering this size unit with specific flange or shaft options the OHL information is derated from what is specified.** ⇨ 📖 34

(Model Type in blue is an Energy Efficient motor)

(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 light blue is an Premium Efficient motor)



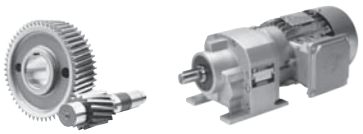
2 hp Gearmotors

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}	Standard Bearings F_{RN} OHL [lb]	Standard Bearings F_{AN} Thrust [lb]	Heavy Duty Bearings (VL) F_{RVL} OHL [lb]	Heavy Duty Bearings (VL) F_{AVL} Thrust [lb]	Model Type	Weight [lb]	Dim. Page
2	42	2963	2.5	III	39.06	2130	2025	3825	4645	**SK 773.1 - 90L/4**	105	121
	38	3295	2.3	III	43.43	2181	2025	3825	4726	**SK 773.1 - 90LH/4**		
	35	3612	2.1	III	47.61	2227	2025	3825	4803	SK 773.1 - 90LP/4		
	32	3892	1.9	II	51.31	2271	2025	3825	4883			
	29	4373	1.7	II	57.64	2330	2025	3825	4977			
	26	4811	1.6	II	63.42	2376	2025	3825	5046			
	24	5228	1.4	II	68.92	2417	2025	3825	5106			
	23	5454	1.4	II	71.89	2436	2025	3825	5133			
	21	6011	1.3	I	79.23	2472	2025	3825	5165			
	20	6321	1.2	I	83.32	2502	2025	3825	5219			
	18	7101	1.1	I	93.61	2551	2025	3825	5274			
	17	7326	1.0	I	96.57	2563	2025	3803	5286			
	15	8502	0.9	*	111.92	2262	2025	3633	5326			
	33	3817	3.9	III	50.32	4123	4050	5625	7875	**SK 873.1 - 90L/4**	182	124
	30	4199	3.6	III	55.35	4229	4050	5625	7875	**SK 873.1 - 90LH/4**		
	27	4633	3.2	III	61.07	4347	4050	5625	7875	SK 873.1 - 90LP/4		
	25	5121	2.9	III	67.5	4415	4050	5625	7875			
	22	5636	2.7	III	74.29	4393	4050	5625	7875			
	20	6303	2.4	III	83.08	4360	4050	5625	7875			
	18	6936	2.2	III	91.43	4326	4050	5625	7875			
	16	7664	2.0	III	101.02	4281	4050	5625	7875			
	16	7953	1.9	II	104.84	4263	4050	5625	7875			
	14	8791	1.7	II	115.88	4203	4050	5625	7875			
	13	9674	1.6	II	127.52	4134	4050	5625	7875			
	12	10316	1.5	II	135.99	4078	4050	5625	7875			
	11	11403	1.3	I	150.31	3971	4050	5625	7875			
	10	12549	1.2	I	165.42	3847	4050	5625	7875			
	8.7	14479	1.0	I	190.86	3597	4050	5590	7875			
	7.9	16003	0.9	*	210.95	3354	4050	5436	7875			
	7.2	17612	0.9	*	232.16	3056	4050	5258	7875			
	6.4	19569	0.8	*	257.61	2594	4050	5003	7875			
	16	7983	3.5	III	105.23	6311	4950	7255	9000	**SK 973.1 - 90L/4**	254	127
	14	9123	3.2	III	120.26	6270	4950	7236	9000	**SK 973.1 - 90LH/4**		
	13	10048	2.9	III	132.45	6240	4950	7221	9000	SK 973.1 - 90LP/4		
	11	11956	2.2	III	157.6	6165	4950	7184	9000			
	9.6	13168	2.0	III	173.58	6121	4950	7161	9000			
	9.3	13604	2.1	III	179.32	6100	4950	7151	9000			
	8.4	14983	1.9	II	197.5	6046	4950	7122	9000			
	7.1	17810	1.6	II	234.77	5912	4950	7053	9000			
	6.4	19616	1.5	II	258.57	5830	4950	7009	9000			
	5.6	22417	1.3	I	295.5	5674	4950	6928	9000			
	5.1	24691	1.2	I	325.47	5552	4950	6861	9000			
	4.6	27530	1.1	I	362.89	5380	4950	6768	9000			
	4.0	31462	0.9	*	414.73	5101	4950	6619	9000			
	3.6	34698	0.8	*	456.77	4710	4950	6493	9000			

(Model Type in blue is an Energy Efficient motor)

(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 light blue is an Premium Efficient motor)**

3 hp Gearmotors

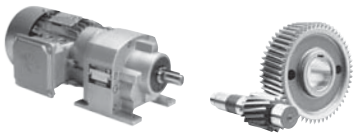


Motor Power P_n [hp]	Output Speed n_2 [rpm]	Output Torque T_2 [lb-in]	Service Factor f_B	AGMA Class	Gear Ratio i_{tot}	Standard Bearings F_{RN} OHL [lb]	Standard Bearings F_{AN} Thrust [lb]	Heavy Duty Bearings (VL) F_{RVL} OHL [lb]	Heavy Duty Bearings (VL) F_{AVL} Thrust [lb]	Model Type	Weight [lb]	Dim. Page
3	651	291	2.7	III	2.62	656	1602	929	1602	**SK 372.1 - 100L/4***	55	109
	596	318	2.5	III	2.86	667	1668	954	1668	**SK 372.1 - 100LH/4***		
	546	346	2.6	III	3.12	678	1742	981	1742	SK 372.1 - 100LP/4*		
	497	381	2.6	III	3.43	688	1825	1009	1825			
	451	420	2.5	III	3.78	698	1894	1039	1894			
	408	464	2.5	III	4.18	707	1954	1072	1954			
	366	517	2.4	III	4.66	716	2017	1107	2017			
	325	582	2.4	III	5.24	722	2088	1146	2088			
	287	661	2.1	III	5.95	726	2165	1188	2165			
	259	731	1.9	II	6.58	730	2229	1224	2229			
	247	765	2.0	III	6.89	716	2248	1236	2248			
	236	803	1.9	II	7.23	701	2274	1251	2274			
	207	913	1.7	II	8.22	682	2295	1294	2295			
	181	1044	1.6	II	9.40	654	2295	1339	2295			
	166	1141	1.5	II	10.28	614	2295	1367	2295			
	148	1281	1.3	I	11.55	591	2295	1410	2295			
	271	700	4.0	III	6.30	1667	3375	2162	3375	**SK 572.1 - 100L/4***	72	112
	228	832	3.7	III	7.49	1726	3375	2281	3375	**SK 572.1 - 100LH/4***		
	209	905	3.5	III	8.15	1741	3375	2337	3375	SK 572.1 - 100LP/4*		
	191	990	3.3	III	8.92	1738	3375	2397	3375			
	170	1115	3.2	III	10.04	1774	3375	2475	3375			
	152	1249	2.9	III	11.25	1793	3375	2475	3375			
	134	1408	2.5	III	12.68	1808	3375	2475	3375			
	125	1518	2.3	III	13.67	1796	3375	2475	3375			
	111	1708	2.2	III	15.38	1816	3375	2475	3375			
	104	1828	1.9	II	16.46	1841	3375	2475	3375			
	87	2173	1.6	II	19.57	1846	3375	2475	3375			
	78	2426	1.5	II	21.85	1741	3375	2475	3375			
	69	2729	1.4	II	24.58	1728	3375	2475	3375			
	55	3470	0.9	*	31.28	1678	3375	2475	3375			
	98	1934	2.0	III	17.42	1714	3263	2475	3263	**SK 573.1 - 100L/4***	73	112
	89	2134	1.8	II	19.22	1720	3263	2475	3263	**SK 573.1 - 100LH/4***		
	80	2367	1.6	II	21.32	1719	3263	2475	3263	SK 573.1 - 100LP/4*		
	72	2642	1.4	II	23.79	1709	3263	2475	3263			
	64	2972	1.3	I	26.77	1688	3263	2475	3263			
	55	3434	1.1	I	30.93	1561	3263	2475	3263			
	49	3864	1.0	I	34.80	1507	3263	2475	3263			
	45	4222	0.9	*	38.02	1372	3263	2475	3263			
	39	4815	0.8	*	43.40	1214	3263	2475	3263			
	124	1521	3.4	III	13.70	2572	4500	3375	4500	**SK 672.1 - 100L/4**	84	118
	111	1704	3.2	III	15.35	2562	4500	3375	4500	**SK 672.1 - 100LH/4**		
	99	1915	2.5	III	17.25	2549	4500	3375	4500	SK 672.1 - 100LP/4		
	93	2044	2.3	III	18.41	2541	4500	3375	4500			
	83	2290	2.3	III	20.62	2523	4500	3375	4500			
	73	2599	2.1	III	23.41	2498	4500	3375	4500			
	65	2913	1.9	II	26.23	2469	4500	3375	4500			
	59	3229	1.5	II	29.08	2436	4500	3375	4500			
	52	3614	1.5	II	32.58	2390	4500	3375	4500			

***** **When ordering this size unit with specific flange or shaft options the OHL information is derated from what is specified.** ⇨ 🕮 34

(Model Type in blue is an Energy Efficient motor)

(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 light blue is an Premium Efficient motor)



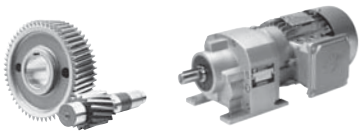
3 hp Gearmotors

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}	Standard Bearings F_{RN} OHL [lb]	Standard Bearings F_{AN} Thrust [lb]	Heavy Duty Bearings (VL) F_{RVL} OHL [lb]	Heavy Duty Bearings (VL) F_{AVL} Thrust [lb]	Model Type	Weight [lb]	Dim. Page
3	75	2534	1.6	II	22.82	2504	4500	3375	4500	**SK 673.1 - 100L/4** **SK 673.1 - 100LH/4** SK 673.1 - 100LP/4	86	118
	68	2797	1.6	II	25.19	2481	4500	3375	4500			
	62	3066	1.5	II	27.61	2452	4500	3375	4500			
	55	3433	1.4	II	30.92	2412	4500	3375	4500			
	50	3789	1.4	II	34.12	2368	4500	3375	4500			
	46	4134	1.4	II	37.23	2316	4500	3375	4500			
	41	4613	1.2	I	41.54	2241	4500	3375	4500			
	38	4980	1.1	I	44.85	2174	4500	3340	4500			
	34	5496	1.0	I	49.50	2068	4500	3272	4500			
	31	6115	0.9	*	55.12	1915	4500	3178	4500			
	92	2050	3.4	III	18.46	1668	2025	3098	3752	**SK 772.1 - 100L/4** **SK 772.1 - 100LH/4** SK 772.1 - 100LP/4	110	121
	84	2255	3.2	III	20.31	1712	2025	3166	3835			
	70	2710	2.3	III	24.41	1787	2025	3275	3967			
	63	2980	2.3	III	26.86	1831	2025	3341	4048			
	79	2386	2.8	III	21.49	1729	2025	3186	3859	**SK 773.1 - 100L/4** **SK 773.1 - 100LH/4** SK 773.1 - 100LP/4	114	121
	70	2690	2.5	III	24.23	1780	2025	3260	3949			
	67	2819	2.6	III	25.39	1803	2025	3298	3995			
	60	3179	2.3	III	28.63	1853	2025	3369	4081			
	54	3534	2.1	III	31.83	1892	2025	3417	4139			
	48	3972	1.8	II	35.77	1939	2025	3477	4212			
	44	4337	1.7	II	39.06	1976	2025	3532	4279			
	39	4822	1.6	II	43.43	2010	2025	3562	4315			
	36	5287	1.5	II	47.61	2041	2025	3596	4355			
	33	5697	1.3	I	51.31	2074	2025	3642	4411			
	30	6400	1.2	I	57.64	2111	2025	3674	4451			
	27	7042	1.1	I	63.42	2137	2025	3692	4472			
	25	7653	1.0	I	68.92	2158	2025	3701	4483			
	24	7982	0.9	*	71.89	2167	2025	3703	4485			
	22	8798	0.9	*	79.23	2007	2025	3575	4440			
	20	9243	0.8	*	83.32	2007	2025	3520	4477			
	49	3895	2.7	III	35.08	3576	4050	5625	6750	**SK 872.1 - 100L/4** **SK 872.1 - 100LH/4** SK 872.1 - 100LP/4	186	124
	44	4305	2.7	III	38.77	3678	4050	5625	6750			
	40	4734	2.6	III	42.67	3776	4050	5625	6750			
	43	4406	3.4	III	39.68	3698	4050	5625	7875	**SK 873.1 - 100L/4** **SK 873.1 - 100LH/4** SK 873.1 - 100LP/4	191	124
	37	5056	3.0	III	45.53	3837	4050	5625	7875			
	34	5587	2.7	III	50.32	3942	4050	5625	7875			
	31	6146	2.4	III	55.35	4033	4050	5625	7875			
	28	6781	2.2	III	61.07	4134	4050	5625	7875			
	25	7495	2.0	III	67.5	4239	4050	5625	7875			
	23	8249	1.8	II	74.29	4243	4050	5625	7875			
	21	9225	1.6	II	83.08	4168	4050	5625	7875			
	19	10152	1.5	II	91.43	4092	4050	5625	7875			
	17	11217	1.3	I	101.02	3990	4050	5625	7875			
	16	11641	1.3	I	104.84	3949	4050	5625	7875			
	15	12867	1.2	I	115.88	3808	4050	5625	7875			
	13	15100	1.0	I	135.99	3504	4050	5530	7875			
	13	14160	1.1	I	127.52	3642	4050	5619	7875			
	11	16690	0.9	*	150.31	3230	4050	5361	7875			
	10	18351	0.8	*	165.42	2894	4050	5165	7875			

(Model Type in blue is an Energy Efficient motor)

(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 light blue is an Premium Efficient motor)**

3, 5 hp Gearmotors



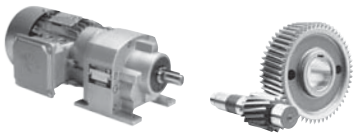
NORD DRIVESYSTEMS

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}	Standard Bearings F_{RN} OHL [lb]	Standard Bearings F_{AN} Thrust [lb]	Heavy Duty Bearings (VL) F_{RVL} OHL [lb]	Heavy Duty Bearings (VL) F_{AVL} Thrust [lb]	Model Type	Weight [lb]	Dim. Page
3	23	8377	3.5	III	75.44	6297	4950	7249	9000	**SK 973.1 - 100L/4**	262	127
	22	8568	3.4	III	77.16	6291	4950	7246	9000	**SK 973.1 - 100LH/4**		
	20	9574	3.1	III	86.22	6253	4950	7228	9000	SK 973.1 - 100LP/4		
	18	10544	2.8	III	94.96	6222	4950	7212	9000			
	16	11684	2.4	III	105.23	6180	4950	7191	9000			
	14	13353	2.2	III	120.26	6110	4950	7156	9000			
	13	14707	2.0	III	132.45	6058	4950	7128	9000			
	11	17500	1.5	II	157.6	5926	4950	7061	9000			
	9.8	19274	1.4	II	173.58	5846	4950	7017	9000			
	9.5	19911	1.5	II	179.32	5809	4950	6999	9000			
	8.6	21930	1.3	I	197.5	5709	4950	6945	9000			
	7.3	26068	1.1	I	234.77	5462	4950	6813	9000			
	6.6	28711	1.0	I	258.57	5302	4950	6726	9000			
	5.8	32812	0.9	*	295.5	5001	4950	6565	9000			
	5.2	36107	0.8	*	325.47	4409	4950	6431	9000			
5	658	479	1.7	II	2.62	507	1512	893	1512	**SK 372.1 - 100LA/4***	62	109
	603	523	1.5	II	2.86	508	1571	915	1571	**SK 372.1 - 112MH/4***		
	553	570	1.6	II	3.12	508	1636	939	1636	SK 372.1 - 112MP/4*		
	503	627	1.6	II	3.43	506	1707	965	1707			
	456	691	1.5	II	3.78	503	1787	991	1787			
	413	764	1.5	II	4.18	495	1850	1020	1850			
	370	852	1.5	II	4.66	484	1904	1051	1904			
	329	958	1.5	II	5.24	467	1963	1084	1963			
	290	1087	1.3	I	5.95	443	2027	1120	2027			
	262	1203	1.2	I	6.58	424	2081	1150	2081			
	250	1259	1.2	I	6.89	390	2091	1157	2091			
	239	1321	1.1	I	7.23	351	2106	1167	2106			
	210	1502	1.1	I	8.22	285	2160	1199	2160			
	184	1718	1.0	I	9.40	201	2214	1231	2214			
	168	1879	0.9	*	10.28	109	2236	1247	2236			
	149	2111	0.8	*	11.55	34	2289	1278	2289			
	591	534	2.7	III	2.92	1231	2793	1657	2793	**SK 572.1 - 100LA/4***	78	112
	528	598	2.7	III	3.27	1263	2944	1716	2944	**SK 572.1 - 112MH/4***		
	450	700	2.7	III	3.83	1304	3184	1803	3184	SK 572.1 - 112MP/4*		
	409	771	2.6	III	4.22	1329	3334	1858	3334			
	368	857	2.6	III	4.69	1353	3375	1918	3375			
	330	956	2.5	III	5.23	1377	3375	1984	3375			
	293	1075	2.5	III	5.88	1400	3375	2056	3375			
	274	1151	2.5	III	6.30	1421	3375	2101	3375			
	230	1369	2.3	III	7.49	1440	3375	2211	3375			
	212	1489	2.1	III	8.15	1425	3375	2260	3375			
	193	1630	2.0	III	8.92	1376	3375	2310	3375			
	172	1835	1.9	II	10.04	1376	3375	2390	3375			
	153	2056	1.8	II	11.25	1347	3375	2465	3375			
	136	2317	1.5	II	12.68	1306	3375	2475	3375			
	126	2498	1.4	II	13.67	1244	3375	2475	3375			
	112	2811	1.4	II	15.38	1209	3375	2475	3375			
	105	3008	1.2	I	16.46	1209	3375	2475	3375			
	88	3576	1.0	I	19.57	1109	3375	2475	3375			
	79	3993	0.9	*	21.85	864	3375	2318	3375			
	70	4492	0.8	*	24.58	763	3375	2257	3375			

***** When ordering this size unit with specific flange or shaft options the OHL information is derated from what is specified. ⇨ 📖 34

(Model Type in blue is an Energy Efficient motor)

(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 light blue is an Premium Efficient motor)



5 hp Gearmotors

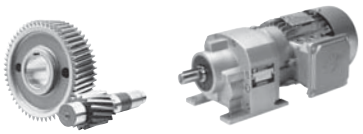
Motor Power P_n [hp]	Output Speed n_2 [rpm]	Output Torque T_2 [lb-in]	Service Factor f_B	AGMA Class	Gear Ratio i_{tot}	Standard Bearings F_{RN} OHL [lb]	Standard Bearings F_{AN} Thrust [lb]	Heavy Duty Bearings (VL) F_{RVL} OHL [lb]	Heavy Duty Bearings (VL) F_{AVL} Thrust [lb]	Model Type	Weight [lb]	Dim. Page
5	99	3184	1.2	I	17.42	965	3263	2346	3263	SK 573.1 - 100LA/4*	79	112
	90	3513	1.1	I	19.22	912	3263	2325	3263	SK 573.1 - 112MH/4*		
	81	3896	1.0	I	21.32	844	3263	2291	3263	SK 573.1 - 112MP/4*		
	73	4348	0.9	*	23.79	753	3263	2237	3263			
	64	4892	0.8	*	26.77	635	3263	2160	3263			
	374	842	2.9	III	4.61	2432	4135	2432	4135	SK 672.1 - 100LA/4*	90	118
	341	925	2.9	III	5.06	2505	4260	2505	4260	SK 672.1 - 112MH/4*		
	309	1022	2.9	III	5.59	2583	4391	2583	4391	SK 672.1 - 112MP/4*		
	282	1118	2.7	III	6.12	2589	4500	2654	4500			
	256	1234	2.7	III	6.75	2584	4500	2735	4500			
	225	1404	2.5	III	7.68	2577	4500	2838	4500			
	203	1550	2.5	III	8.48	2570	4500	2924	4500			
	199	1583	2.3	III	8.66	2569	4500	2940	4500			
	186	1690	2.5	III	9.25	2563	4500	2999	4500			
	166	1895	2.5	III	10.37	2551	4500	3102	4500			
	152	2080	2.0	III	11.38	2539	4500	3181	4500			
	137	2295	2.0	III	12.56	2523	4500	3273	4500			
	126	2504	2.0	III	13.70	2506	4500	3354	4500			
	112	2805	1.9	II	15.35	2480	4500	3375	4500			
	100	3153	1.5	II	17.25	2444	4500	3375	4500			
	94	3364	1.4	II	18.41	2420	4500	3375	4500			
	84	3768	1.4	II	20.62	2370	4500	3375	4500			
	74	4278	1.3	I	23.41	2296	4500	3375	4500			
	66	4794	1.1	I	26.23	2209	4500	3364	4500			
	59	5314	0.9	*	29.08	2108	4500	3298	4500			
	53	5954	0.9	*	32.58	1960	4500	3205	4500			
	76	4170	1.0	I	22.82	2314	4500	3375	4500	SK 673.1 - 100LA/4*	93	118
	68	4604	1.0	I	25.19	2245	4500	3375	4500	SK 673.1 - 112MH/4*		
	62	5046	0.9	*	27.61	2158	4500	3330	4500	SK 673.1 - 112MP/4*		
	56	5651	0.8	*	30.92	2033	4500	3250	4500			
	51	6236	0.9	*	34.12	1885	4500	3160	4500			
	46	6804	0.8	*	37.23	1702	4500	3054	4500			
	120	2628	2.4	III	14.38	1459	1963	2728	3304	SK 772.1 - 100LA/4*	117	121
	110	2855	2.0	III	15.62	1479	1948	2748	3329	SK 772.1 - 112MH/4*		
	104	3045	2.2	III	16.66	1503	1972	2786	3374	SK 772.1 - 112MP/4*		
	93	3374	2.0	III	18.46	1534	1979	2828	3425			
	85	3712	2.0	III	20.31	1565	1994	2873	3480			
	71	4461	1.4	II	24.41	1611	1962	2920	3538			
	64	4909	1.4	II	26.86	1639	1960	2956	3581			
	80	3927	1.7	II	21.49	1571	1953	2867	3473	SK 773.1 - 100LA/4*	120	121
	71	4428	1.5	II	24.23	1602	1937	2901	3514	SK 773.1 - 112MH/4*		
	68	4640	1.6	II	25.39	1620	1955	2930	3550	SK 773.1 - 112MP/4*		
	60	5232	1.4	II	28.63	1647	1923	2956	3580			
	54	5817	1.2	I	31.83	1660	1846	2948	3571			
	48	6537	1.1	I	35.77	1593	1779	2951	3574			
	44	7138	1.1	I	39.06	1560	1765	2973	3601			
	40	7937	1.0	I	43.43	1389	1628	2927	3546			
	36	8701	0.9	*	47.61	1265	1534	2902	3515			
	34	9377	0.8	*	51.31	1209	1499	2910	3524			

* When ordering this size unit with specific flange or shaft options the OHL information is derated from what is specified. ⇨ 📖 34

(Model Type in blue is an Energy Efficient motor)

(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 light blue is an Premium Efficient motor)

5, 7.5 hp Gearmotors

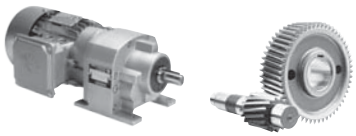


DRIVESYSTEMS

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}	Standard Bearings F_{RN} OHL [lb]	Standard Bearings F_{AN} Thrust [lb]	Heavy Duty Bearings (VL) F_{RVL} OHL [lb]	Heavy Duty Bearings (VL) F_{AVL} Thrust [lb]	Model Type	Weight [lb]	Dim. Page
5	49	6411	1.7	II	35.08	3360	4050	5625	6750	SK 872.1 - 100LA/4*	193	124
	44	7085	1.6	II	38.77	3440	4050	5625	6750	SK 872.1 - 112MH/4*		
	40	7798	1.6	II	42.67	3519	4050	5625	6750	SK 872.1 - 112MP/4*		
	73	4293	3.0	III	23.49	3043	4050	5391	7381	SK 873.1 - 100LA/4	197	124
	67	4695	3.0	III	25.69	3125	4050	5537	7550	SK 873.1 - 112MH/4		
	63	5039	2.9	III	27.57	3171	4050	5622	7643	SK 873.1 - 112MP/4		
	57	5569	2.7	III	30.47	3253	4050	5625	7809			
	54	5892	2.6	III	32.24	3293	4050	5625	7875			
	48	6512	2.3	III	35.63	3375	4050	5625	7875			
	43	7252	2.1	III	39.68	3455	4050	5625	7875			
	38	8321	1.8	II	45.53	3560	4050	5625	7875			
	34	9196	1.6	II	50.32	3637	4050	5625	7875			
	31	10115	1.5	II	55.35	3699	4050	5625	7875			
	28	11161	1.3	I	61.07	3766	4050	5625	7875			
	26	12336	1.2	I	67.5	3834	4050	5625	7875			
	23	13577	1.1	I	74.29	3720	4050	5625	7875			
	21	15183	1.0	I	83.08	3485	4050	5518	7875			
	19	16709	0.9	*	91.43	3229	4050	5360	7875			
	17	18462	0.8	*	101.02	2862	4050	5147	7875			
	16	19160	0.8	*	104.84	2705	4050	5062	7875			
	41	7769	3.0	III	42.51	6315	4950	7258	9000	SK 973.1 - 100LA/4	269	127
	36	8699	3.2	III	47.6	6284	4950	7243	9000	SK 973.1 - 112MH/4		
	33	9562	2.8	III	52.32	6254	4950	7228	9000	SK 973.1 - 112MP/4		
	31	10172	2.8	III	55.66	6233	4950	7218	9000			
	29	10949	2.6	III	59.91	6204	4950	7203	9000			
	26	12058	2.3	III	65.98	6165	4950	7183	9000			
	25	12519	2.3	III	68.5	6143	4950	7173	9000			
	23	13787	2.1	III	75.44	6096	4950	7148	9000			
	22	14101	2.1	III	77.16	6083	4950	7141	9000			
	20	15757	1.9	II	86.22	6006	4950	7103	9000			
	18	17354	1.7	II	94.96	5939	4950	7066	9000			
	16	19231	1.5	II	105.23	5850	4950	7020	9000			
	14	21978	1.3	I	120.26	5700	4950	6941	9000			
	13	24206	1.2	I	132.45	5582	4950	6877	9000			
	11	28802	0.9	*	157.6	5283	4950	6717	9000			
	9.9	31722	0.8	*	173.58	5091	4950	6612	9000			
	9.6	32771	0.9	*	179.32	5006	4950	6568	9000			
	8.7	36094	0.8	*	197.5	4419	4950	6433	9000			
7.5	652	725	3.4	III	2.66	2006	3123	2006	3123	SK 672.1 - 132S/4	141	118
	607	779	3.4	III	2.86	2052	3225	2052	3225	SK 672.1 - 132SH/4		
	565	837	3.4	III	3.07	2098	3332	2098	3332	SK 672.1 - 132SP/4		
	524	902	3.3	III	3.31	2150	3454	2150	3454			
	485	976	3.3	III	3.58	2201	3581	2201	3581			
	447	1057	3.3	III	3.88	2256	3723	2256	3723			
	411	1150	3.2	III	4.22	2316	3886	2316	3886			
	376	1256	3.2	III	4.61	2378	4038	2378	4038			
	343	1379	3.1	III	5.06	2447	4155	2447	4155			
	310	1524	2.8	III	5.59	2519	4278	2519	4278			
	283	1668	2.7	III	6.12	2564	4385	2584	4385			
	257	1840	2.5	III	6.75	2554	4500	2659	4500			

(Model Type in blue is an Energy Efficient motor)

(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 light blue is an Premium Efficient motor)



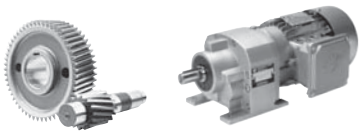
7.5 hp Gearmotors

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}	Standard Bearings F_{RN} OHL [lb]	Standard Bearings F_{AN} Thrust [lb]	Heavy Duty Bearings (VL) F_{RVL} OHL [lb]	Heavy Duty Bearings (VL) F_{AVL} Thrust [lb]	Model Type	Weight [lb]	Dim. Page
7.5	226	2093	2.2	III	7.68	2538	4500	2751	4500	**SK 672.1 - 132S/4**	141	118
	205	2311	2.0	III	8.48	2522	4500	2830	4500	**SK 672.1 - 132SH/4**		
	200	2360	1.6	II	8.66	2518	4500	2842	4500	SK 672.1 - 132SP/4		
	188	2521	1.9	II	9.25	2505	4500	2897	4500			
	167	2826	1.8	II	10.37	2478	4500	2990	4500			
	152	3102	1.4	II	11.38	2450	4500	3054	4500			
	138	3423	1.4	II	12.56	2414	4500	3136	4500			
	127	3734	1.4	II	13.70	2375	4500	3204	4500			
	113	4184	1.3	I	15.35	2311	4500	3300	4500			
	214	2213	2.6	III	8.12	1191	1574	2271	2751	**SK 772.1 - 132S/4**	168	121
	193	2445	2.4	III	8.97	1219	1594	2316	2805	**SK 772.1 - 132SH/4**		
	174	2726	2.2	III	10	1242	1585	2343	2838	SK 772.1 - 132SP/4		
	164	2889	2.1	III	10.6	1263	1617	2382	2886			
	157	3014	2.0	III	11.06	1269	1598	2384	2888			
	149	3181	1.9	II	11.67	1289	1627	2420	2931			
	133	3562	1.7	II	13.07	1310	1605	2442	2958			
	121	3919	1.6	II	14.38	1333	1605	2474	2997			
	111	4257	1.4	II	15.62	1338	1545	2463	2983			
	104	4541	1.5	II	16.66	1355	1552	2489	3015			
	94	5031	1.4	II	18.46	1371	1514	2499	3027			
	85	5536	1.3	I	20.31	1333	1488	2516	3047			
	81	5857	1.1	I	21.49	1229	1401	2477	3001	**SK 773.1 - 132S/4**	171	121
	72	6604	1.0	I	24.23	1114	1314	2462	2982	**SK 773.1 - 132SH/4**		
	68	6920	1.0	I	25.39	1108	1317	2480	3004	SK 773.1 - 132SP/4		
	61	7803	0.9	*	28.63	961	1204	2449	2966			
	55	8675	0.8	*	31.83	746	1028	2371	2872			
	154	3063	4.0	III	11.24	2404	3745	4346	5994	**SK 872.1 - 132S/4**	244	124
	139	3401	3.8	III	12.48	2467	3813	4465	6127	**SK 872.1 - 132SH/4**		
	126	3758	3.5	III	13.79	2534	3893	4586	6269	SK 872.1 - 132SP/4		
	114	4137	3.1	III	15.18	2598	3974	4702	6407			
	102	4622	2.9	III	16.96	2666	4036	4834	6546			
	93	5089	2.7	III	18.67	2731	4050	4954	6683			
	75	6274	2.2	III	23.02	2857	4050	5211	6750			
	68	6934	2.0	III	25.44	2921	4050	5341	6750			
	62	7631	1.9	II	28	2984	4050	5465	6750			
	60	7926	1.7	II	29.08	3000	4050	5510	6750			
	54	8722	1.6	II	32	3061	4050	5625	6750			
	49	9561	1.1	I	35.08	3100	4050	5625	6750			
	45	10567	1.1	I	38.77	3155	4050	5625	6750			
	41	11630	1.1	I	42.67	3209	4050	5625	6750			
	68	7002	2.1	III	25.69	2932	4050	5365	7078	**SK 873.1 - 132S/4**	248	124
	63	7514	1.9	II	27.57	2966	4050	5439	7140	**SK 873.1 - 132SH/4**		
	57	8305	1.8	II	30.47	3027	4050	5570	7256	SK 873.1 - 132SP/4		
	54	8787	1.7	II	32.24	3055	4050	5625	7303			
	49	9711	1.5	II	35.63	3112	4050	5625	7405			
	44	10815	1.4	II	39.68	3163	4050	5625	7485			
	38	12409	1.2	I	45.53	3224	4050	5625	7577			
	34	13715	1.1	I	50.32	3267	4050	5625	7637			
	31	15086	1.0	I	55.35	3293	4050	5533	7653			
	28	16645	0.9	*	61.07	3245	4027	5370	7665			
	26	18397	0.8	*	67.5	2879	3912	5157	7668			

(Model Type in blue is an Energy Efficient motor)

(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 light blue is an Premium Efficient motor)

7.5, 10 hp Gearmotors

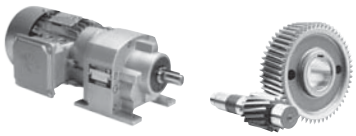


DRIVESYSTEMS

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}	Standard Bearings F_{RN} OHL [lb]	Standard Bearings F_{AN} Thrust [lb]	Heavy Duty Bearings (VL) F_{RVL} OHL [lb]	Heavy Duty Bearings (VL) F_{AVL} Thrust [lb]	Model Type	Weight [lb]	Dim. Page
7.5	63	7539	3.1	III	27.66	5509	4950	7261	9000	**SK 972.1 - 132S/4**	330	127
	57	8256	3.0	III	30.29	5657	4950	7250	9000	**SK 972.1 - 132SH/4**		
	52	9092	2.8	III	33.36	5755	4950	7237	9000	SK 972.1 - 132SP/4		
	47	10136	2.5	III	37.19	5873	4950	7220	9000			
	41	11654	2.2	III	42.76	5946	4950	7192	9000			
	41	11586	2.4	III	42.51	5855	4950	7191	9000	**SK 973.1 - 132S/4**	320	127
	36	12973	2.2	III	47.6	5886	4950	7163	9000	**SK 973.1 - 132SH/4**		
	33	14260	2.0	III	52.32	5894	4950	7136	9000	SK 973.1 - 132SP/4		
	31	15170	1.9	II	55.66	5890	4950	7116	9000			
	29	16329	1.7	II	59.91	5874	4950	7089	9000			
	26	17983	1.6	II	65.98	5886	4950	7051	9000			
	25	18670	1.6	II	68.5	5813	4950	7031	9000			
	23	20561	1.4	II	75.44	5781	4950	6983	9000			
	22	21030	1.4	II	77.16	5757	4950	6970	9000			
	20	23499	1.2	I	86.22	5584	4950	6895	9000			
	18	25881	1.1	I	94.96	5480	4950	6822	9000			
	16	28681	1.0	I	105.23	5305	4950	6728	9000			
	14	32777	0.9	*	120.26	4893	4950	6568	9000			
	13	36099	0.8	*	132.45	4416	4950	6433	9000			
10	652	967	2.6	III	2.66	1973	3055	1973	3055	**SK 672.1 - 132M/4**	165	118
	607	1039	2.6	III	2.86	2018	3153	2018	3153	**SK 672.1 - 132MH/4**		
	565	1116	2.5	III	3.07	2062	3254	2062	3254	SK 672.1 - 132MP/4		
	524	1203	2.5	III	3.31	2111	3370	2111	3370			
	485	1301	2.4	III	3.58	2160	3490	2160	3490			
	447	1410	2.5	III	3.88	2212	3623	2212	3623			
	411	1534	2.4	III	4.22	2269	3776	2269	3776			
	376	1675	2.4	III	4.61	2328	3943	2328	3943			
	343	1839	2.3	III	5.06	2393	4057	2393	4057			
	310	2031	2.1	III	5.59	2461	4172	2461	4172			
	283	2224	2.0	III	6.12	2518	4267	2518	4267			
	257	2453	1.9	II	6.75	2511	4385	2588	4385			
	226	2791	1.7	II	7.68	2481	4500	2669	4500			
	205	3082	1.5	II	8.48	2453	4500	2741	4500			
	200	3147	1.2	I	8.66	2445	4500	2750	4500			
	188	3361	1.4	II	9.25	2422	4500	2800	4500			
	167	3768	1.3	I	10.37	2372	4500	2883	4500			
	152	4136	1.0	I	11.38	2318	4500	2932	4500			
	138	4564	1.0	I	12.56	2250	4500	3004	4500			
	127	4979	1.0	I	13.70	2175	4500	3060	4500			
	113	5578	1.0	I	15.35	2050	4500	3141	4500			
	262	2409	2.2	III	6.63	1086	1357	2125	2575	**SK 772.1 - 132M/4**	192	121
	227	2773	2.0	III	7.63	1095	1263	2077	2516	**SK 772.1 - 132MH/4**		
	214	2951	1.9	II	8.12	1118	1326	2122	2571	SK 772.1 - 132MP/4		
	193	3260	1.8	II	8.97	1140	1345	2154	2609			
	174	3634	1.7	II	10	1152	1308	2160	2616			
	164	3852	1.6	II	10.6	1171	1350	2195	2659			
	157	4019	1.5	II	11.06	1171	1314	2184	2646			
	149	4241	1.4	II	11.67	1188	1337	2216	2684			
	133	4750	1.3	I	13.07	1143	1276	2211	2678			
	121	5226	1.2	I	14.38	1097	1248	2223	2693			
	111	5676	1.0	I	15.62	970	1142	2180	2641			
	104	6054	1.1	I	16.66	950	1133	2194	2658			
	94	6708	1.0	I	18.46	839	1049	2172	2631			
	85	7381	1.0	I	20.31	750	980	2160	2617			

(Model Type in blue is an Energy Efficient motor)

(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 light blue is an Premium Efficient motor)



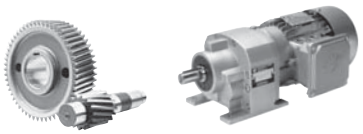
10 hp Gearmotors

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}	Standard Bearings F_{RN} OHL [lb]	Standard Bearings F_{AN} Thrust [lb]	Heavy Duty Bearings (VL) F_{RVL} OHL [lb]	Heavy Duty Bearings (VL) F_{AVL} Thrust [lb]	Model Type	Weight [lb]	Dim. Page
10	81	7809	0.8	*	21.49	592	808	2089	2530	**SK 773.1 - 132M/4**	195	121
	72	8805	0.8	*	24.23	395	624	2024	2452	**SK 773.1 - 132MH/4**		
	68	9227	0.8	*	25.39	371	616	2031	2461	SK 773.1 - 132MP/4		
	224	2809	3.6	III	7.73	2106	3251	3874	5318	**SK 872.1 - 132M/4**	268	124
	196	3223	3.2	III	8.87	2175	3313	4012	5462	**SK 872.1 - 132MH/4**		
	188	3358	3.6	III	9.24	2210	3386	4062	5549	SK 872.1 - 132MP/4		
	166	3794	3.2	III	10.44	2271	3433	4188	5674			
	154	4085	3.0	III	11.24	2323	3519	4275	5796			
	139	4535	2.9	III	12.48	2377	3558	4386	5903			
	126	5011	2.6	III	13.79	2434	3611	4499	6022			
	114	5516	2.4	III	15.18	2489	3669	4607	6140			
	102	6163	2.2	III	16.96	2543	3690	4727	6243			
	93	6785	2.0	III	18.67	2597	3737	4837	6355			
	75	8365	1.7	II	23.02	2690	3732	5065	6518			
	68	9245	1.5	II	25.44	2736	3733	5180	6602			
	62	10175	1.4	II	28	2783	3745	5290	6690			
	60	10568	1.3	I	29.08	2789	3701	5327	6687			
	54	11629	1.2	I	32	2832	3697	5435	6750			
	54	11716	1.3	I	32.24	2821	3646	5433	6726	**SK 873.1 - 132M/4**	272	124
	49	12948	1.2	I	35.63	2854	3592	5499	6770	**SK 873.1 - 132MH/4**		
	44	14420	1.0	I	39.68	2875	3487	5504	6775	SK 873.1 - 132MP/4		
	38	16546	0.9	*	45.53	2894	3323	5377	6762			
	34	18286	0.8	*	50.32	2896	3184	5167	6737			
	79	7991	3.1	III	21.99	5032	4950	7256	9000	**SK 972.1 - 132M/4**	354	127
	75	8427	2.4	III	23.19	4923	4950	7246	9000	**SK 972.1 - 132MH/4**		
	63	10052	2.3	III	27.66	5041	4950	7219	9000	SK 972.1 - 132MP/4		
	57	11007	2.3	III	30.29	5093	4950	7202	9000			
	52	12123	2.1	III	33.36	5138	4950	7182	9000			
	47	13515	1.9	II	37.19	5200	4950	7155	9000			
	41	15539	1.7	II	42.76	5173	4950	7111	9000			
	46	13577	2.1	III	37.36	5096	4950	7151	9000	**SK 973.1 - 132M/4**	344	127
	41	15448	1.8	II	42.51	5057	4950	7110	9000	**SK 973.1 - 132MH/4**		
	36	17298	1.6	II	47.6	4991	4950	7066	9000	SK 973.1 - 132MP/4		
	33	19013	1.5	II	52.32	4911	4950	7023	9000			
	31	20227	1.4	II	55.66	4845	4950	6990	9000			
	29	21771	1.3	I	59.91	4748	4950	6946	9000			
	26	23977	1.2	I	65.98	4664	4950	6883	9000			
	25	24893	1.2	I	68.5	4525	4950	6851	9000			
	23	27415	1.1	I	75.44	4401	4950	6771	9000			
	22	28040	1.0	I	77.16	4350	4950	6750	9000			
	20	31332	0.9	*	86.22	3963	4669	6623	9000			
	18	34509	0.8	*	94.96	3751	4525	6499	9000			

(Model Type in blue is an Energy Efficient motor)

(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 light blue is an Premium Efficient motor)**

15 hp Gearmotors

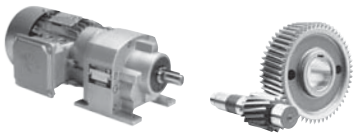


DRIVESYSTEMS

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}	Standard Bearings F_{RN} OHL [lb]	Standard Bearings F_{AN} Thrust [lb]	Heavy Duty Bearings (VL) F_{RVL} OHL [lb]	Heavy Duty Bearings (VL) F_{AVL} Thrust [lb]	Model Type	Weight [lb]	Dim. Page
15	567	1667	2.6	III	3.12	858	995	1730	2095	**SK 772.1 - 160M/4**	232	121
	493	1918	2.3	III	3.59	869	933	1707	2068	**SK 772.1 - 160MH/4**		
	461	2052	2.3	III	3.84	895	1013	1791	2170	SK 772.1 - 160MP/4		
	400	2362	2.0	III	4.42	900	923	1749	2118			
	376	2517	2.0	III	4.71	919	964	1787	2164			
	329	2875	1.8	II	5.38	945	1005	1872	2268			
	286	3307	1.6	II	6.19	902	854	1786	2163			
	267	3543	1.5	II	6.63	885	968	1906	2309			
	232	4077	1.3	I	7.63	781	763	1782	2159			
	218	4339	1.3	I	8.12	816	812	1826	2212			
	197	4793	1.2	I	8.97	768	780	1832	2219			
	177	5343	1.1	I	10	645	674	1797	2177			
	167	5664	1.1	I	10.6	655	698	1825	2211			
	160	5910	1.0	I	11.06	572	621	1791	2169			
	152	6236	1.0	I	11.67	577	639	1815	2198			
	135	6984	0.9	*	13.07	412	494	1758	2130			
	123	7684	0.8	*	14.38	303	408	1731	2097			
	322	2939	3.5	III	5.5	1830	2594	3447	4688	**SK 872.1 - 160M/4**	308	124
	313	3024	3.4	III	5.66	1829	2553	3461	4673	**SK 872.1 - 160MH/4**		
	269	3510	3.1	III	6.57	1903	2691	3602	4839	SK 872.1 - 160MP/4		
	229	4130	2.8	III	7.73	1982	2844	3756	5014			
	200	4739	2.5	III	8.87	2031	2888	3876	5107			
	192	4937	2.5	III	9.24	2067	3003	3927	5201			
	170	5578	2.2	III	10.44	2107	2989	4035	5272			
	157	6006	2.1	III	11.24	2154	3065	4116	5385			
	142	6668	2.0	III	12.48	2188	3047	4209	5442			
	128	7368	1.8	II	13.79	2227	3050	4306	5517			
	117	8111	1.6	II	15.18	2265	3062	4399	5595			
	104	9062	1.5	II	16.96	2292	3006	4495	5630			
	95	9976	1.4	II	18.67	2325	2998	4587	5692			
	77	12300	1.1	I	23.02	2353	2810	4626	5695			
	70	13593	1.0	I	25.44	2367	2719	4629	5698			
	63	14961	0.9	*	28	2382	2648	4640	5713			
	61	15538	0.9	*	29.08	2290	2546	4597	5659			
	55	17098	0.8	*	32	2142	2447	4590	5651			
	69	13727	1.1	I	25.69	2368	2697	4626	5695	**SK 873.1 - 160M/4**	312	124
	64	14731	1.0	I	27.57	2366	2608	4604	5667	**SK 873.1 - 160MH/4**		
	58	16281	0.9	*	30.47	2189	2472	4577	5636	SK 873.1 - 160MP/4		
	55	17227	0.9	*	32.24	2047	2365	4540	5589			
	50	19038	0.8	*	35.63	1799	2184	4483	5519			
	131	7245	3.2	III	13.56	4157	4303	7268	8013	**SK 972.1 - 160M/4**	394	127
	125	7566	3.1	III	14.16	4139	4295	7262	8060	**SK 972.1 - 160MH/4**		
	112	8464	2.9	III	15.84	4172	4348	7247	8237	SK 972.1 - 160MP/4		
	100	9431	2.6	III	17.65	4237	4433	7232	8440			
	90	10537	2.4	III	19.72	4196	4419	7212	8565			
	80	11750	2.1	III	21.99	4240	4488	7191	8762			
	76	12391	1.6	II	23.19	4026	4299	7173	8676			
	64	14779	1.6	II	27.66	4005	4330	7125	8937			
	58	16185	1.5	II	30.29	3974	4330	7093	9000			
	53	17825	1.4	II	33.36	3927	4318	7055	9000			
	48	19871	1.3	I	37.19	3882	4317	7004	9000			
	41	22848	1.1	I	42.76	3662	4165	6920	9000			

(Model Type in blue is an Energy Efficient motor)

(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 light blue is an Premium Efficient motor)



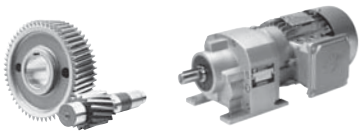
15, 20 hp Gearmotors

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}	Standard Bearings F_{RN} OHL [lb]	Standard Bearings F_{AN} Thrust [lb]	Heavy Duty Bearings (VL) F_{RVL} OHL [lb]	Heavy Duty Bearings (VL) F_{AVL} Thrust [lb]	Model Type	Weight [lb]	Dim. Page
15	79	11980	2.1	III	22.42	4145	4404	7183	8720	**SK 973.1 - 160M/4**	384	127
	69	13631	1.9	II	25.51	4096	4392	7150	8880	**SK 973.1 - 160MH/4**		
	65	14544	1.8	II	27.22	4057	4375	7130	8955	SK 973.1 - 160MP/4		
	57	16548	1.7	II	30.97	3955	4319	7085	9000			
	55	17072	1.7	II	31.95	3920	4298	7071	9000			
	50	18803	1.5	II	35.19	3861	4276	7030	9000			
	47	19962	1.4	II	37.36	3722	4167	6997	9000			
	42	22714	1.2	I	42.51	3501	4010	6920	9000			
	37	25434	1.1	I	47.6	3251	3824	6834	9000			
	34	27956	1.0	I	52.32	3003	3635	6749	9000			
	32	29740	1.0	I	55.66	2819	3492	6685	9000			
	30	32011	0.9	*	59.91	2567	3295	6596	9000			
	27	35255	0.8	*	65.98	2303	3101	6467	9000			
	26	36601	0.8	*	68.5	2039	2874	6404	9000			
20	555	2272	3.3	III	3.18	1531	2015	2937	3997	**SK 872.1 - 160L/4**	345	124
	478	2636	3.0	III	3.69	1595	2112	3058	4144	**SK 872.1 - 160LH/4**		
	438	2879	2.8	III	4.03	1619	2122	3116	4191	SK 872.1 - 160LP/4		
	377	3344	2.9	III	4.68	1683	2219	3242	4337			
	321	3929	2.6	III	5.5	1751	2320	3379	4491			
	312	4044	2.5	III	5.66	1743	2253	3388	4456			
	269	4694	2.3	III	6.57	1805	2342	3519	4595			
	228	5523	2.1	III	7.73	1870	2430	3660	4736			
	199	6337	1.9	II	8.87	1898	2386	3763	4776			
	191	6602	1.9	II	9.24	1936	2513	3815	4878			
	169	7459	1.7	II	10.44	1955	2444	3905	4895			
	157	8030	1.5	II	11.24	1997	2551	3981	4998			
	141	8916	1.5	II	12.48	2010	2481	4057	5005			
	128	9852	1.3	I	13.79	2031	2448	4090	5035			
	116	10845	1.2	I	15.18	2052	2434	4119	5071			
	104	12117	1.1	I	16.96	2051	2288	4090	5036			
	95	13339	1.0	I	18.67	2048	2232	4100	5048			
	91	13817	1.0	I	19.34	1924	2109	4053	4990	**SK 873.1 - 160L/4**	349	124
	83	15275	0.9	*	21.38	1735	1961	4021	4950	**SK 873.1 - 160LH/4**		
	75	16782	0.9	*	23.49	1502	1761	3956	4870	SK 873.1 - 160LP/4		
	69	18354	0.8	*	25.69	1244	1543	3887	4785			
	245	5137	3.5	III	7.19	3430	3406	6183	6697	**SK 972.1 - 160L/4**	431	127
	209	6037	3.3	III	8.45	3486	3558	6389	6920	**SK 972.1 - 160LH/4**		
	188	6716	3.3	III	9.4	3573	3713	6572	7118	SK 972.1 - 160LP/4		
	171	7395	3.0	III	10.35	3615	3769	6708	7266			
	153	8245	2.7	III	11.54	3670	3842	6875	7446			
	137	9188	2.5	III	12.86	3607	3805	6960	7538			
	130	9688	2.4	III	13.56	3676	3880	7069	7656			
	125	10117	2.3	III	14.16	3624	3841	7088	7676			
	111	11317	2.1	III	15.84	3596	3840	7197	7807			
	100	12610	2.0	III	17.65	3609	3880	7173	7972			
	90	14089	1.8	II	19.72	3478	3786	7142	8030			
	80	15711	1.6	II	21.99	3457	3799	7107	8178			

(Model Type in blue is an Energy Efficient motor)

(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 light blue is an Premium Efficient motor)**

20, 25 hp Gearmotors

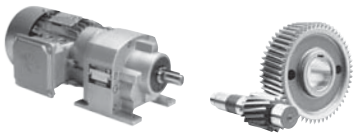


DRIVESYSTEMS

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}	Standard Bearings F_{RN} OHL [lb]	Standard Bearings F_{AN} Thrust [lb]	Heavy Duty Bearings (VL) F_{RVL} OHL [lb]	Heavy Duty Bearings (VL) F_{AVL} Thrust [lb]	Model Type	Weight [lb]	Dim. Page
20	79	16018	1.5	II	22.42	3316	3671	7097	8101	**SK 973.1 - 160L/4**	421	127
	69	18226	1.5	II	25.51	3153	3559	7043	8175	**SK 973.1 - 160LH/4**		
	65	19447	1.4	II	27.22	3050	3486	7011	8202	SK 973.1 - 160LP/4		
	57	22126	1.2	I	30.97	2810	3308	6937	8229			
	55	22827	1.2	I	31.95	2735	3251	6914	8230			
	50	25141	1.1	I	35.19	2576	3141	6846	8270			
	47	26692	1.1	I	37.36	2337	2943	6792	8194			
	42	30371	0.9	*	42.51	1927	2619	6662	8111			
	37	34008	0.8	*	47.6	1486	2264	6516	7987			
	34	37380	0.8	*	52.32	1062	1920	6369	7845			
25	550	2864	2.6	III	3.18	1485	1864	2901	3879	**SK 872.1 - 180MX/4**	398	124
	474	3324	2.3	III	3.69	1542	1938	3016	4011	**SK 872.1 - 180MH/4**		
	434	3630	2.2	III	4.03	1559	1926	3069	4041	SK 872.1 - 180MP/4		
	374	4215	2.3	III	4.68	1615	1992	3188	4167			
	318	4954	2.1	III	5.5	1673	2056	3316	4296			
	309	5098	2.0	III	5.66	1658	1963	3319	4242			
	266	5918	1.8	II	6.57	1708	2007	3440	4352			
	226	6963	1.7	II	7.73	1758	2038	3568	4458			
	197	7989	1.5	II	8.87	1766	1916	3610	4445			
	189	8323	1.5	II	9.24	1805	2045	3700	4555			
	168	9403	1.3	I	10.44	1803	1896	3668	4516			
	156	10124	1.2	I	11.24	1839	1976	3744	4609			
	140	11241	1.2	I	12.48	1832	1831	3708	4565			
	127	12421	1.0	I	13.79	1720	1727	3694	4547			
	115	13673	1.0	I	15.18	1598	1646	3689	4542			
	526	2999	5.0	III	3.33	2743	2522	5050	5469	**SK 972.1 - 180MX/4**	484	127
	468	3369	4.8	III	3.74	2835	2601	5187	5619	**SK 972.1 - 180MH/4**		
	384	4107	4.3	III	4.56	3007	2795	5462	5916	SK 972.1 - 180MP/4		
	333	4729	3.7	III	5.25	3007	2819	5585	6050			
	284	5557	3.3	III	6.17	3042	2908	5764	6243			
	262	6017	3.3	III	6.68	3196	3116	5956	6451			
	243	6476	3.1	III	7.19	3154	3096	6000	6498			
	207	7611	2.7	III	8.45	3161	3179	6173	6686			
	186	8467	2.6	III	9.4	3224	3318	6340	6867			
	169	9322	2.4	III	10.35	3236	3392	6456	6992			
	152	10394	2.1	III	11.54	3257	3479	6598	7146			
	136	11583	2.0	III	12.86	3127	3381	6636	7188			
	129	12214	1.9	II	13.56	3190	3453	6742	7302			
	124	12754	1.9	II	14.16	3102	3381	6736	7296			
	110	14267	1.7	II	15.84	3011	3325	6814	7380			
	99	15898	1.6	II	17.65	2970	3319	6929	7505			
	89	17762	1.4	II	19.72	2749	3143	6919	7494			
	80	19807	1.3	I	21.99	2661	3099	7006	7593			
	78	20194	1.2	I	22.42	2470	2926	6905	7479	**SK 973.1 - 180MX/4**	474	127
	69	22977	1.2	I	25.51	2191	2711	6893	7465	**SK 973.1 - 180MH/4**		
	64	24517	1.1	I	27.22	2022	2578	6864	7443	SK 973.1 - 180MP/4		
	57	27895	1.0	I	30.97	1641	2276	6753	7363			
	55	28778	1.0	I	31.95	1524	2182	6718	7333			
	50	31696	0.9	*	35.19	1261	1957	6612	7297			
	47	33651	0.8	*	37.36	919	1596	6530	7143			

(Model Type in blue is an Energy Efficient motor)

(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 light blue is an Premium Efficient motor)



30, 40 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}	Standard Bearings F_{RN} OHL [lb]	Standard Bearings F_{AN} Thrust [lb]	Heavy Duty Bearings (VL) F_{RVL} OHL [lb]	Heavy Duty Bearings (VL) F_{AVL} Thrust [lb]	Model Type	Weight [lb]	Dim. Page
30	552	3427	2.2	III	3.18	1435	1712	2856	3753	**SK 872.1 - 180LX/4**	398	124
	476	3977	2.0	III	3.69	1485	1764	2966	3869	**SK 872.1 - 180LH/4**		
	435	4343	1.8	II	4.03	1496	1731	3013	3882	SK 872.1 - 180LP/4		
	375	5044	1.9	II	4.68	1544	1769	3124	3989			
	319	5928	1.7	II	5.5	1591	1797	3243	4094			
	310	6100	1.7	II	5.66	1569	1682	3242	4020			
	267	7081	1.5	II	6.57	1608	1686	3333	4103			
	227	8331	1.4	II	7.73	1643	1667	3391	4175			
	198	9560	1.2	I	8.87	1619	1479	3338	4109			
	190	9959	1.2	I	9.24	1672	1610	3434	4227			
	168	11252	1.1	I	10.44	1477	1393	3358	4135			
	156	12114	1.0	I	11.24	1509	1453	3426	4218			
	141	13451	1.0	I	12.48	1259	1247	3349	4123			
	127	14863	0.9	*	13.79	1054	1087	3299	4061			
	116	16361	0.8	*	15.18	875	954	3261	4015			
	527	3589	4.2	III	3.33	2689	2387	4950	5362	**SK 972.1 - 180LX/4**	484	127
	469	4031	4.0	III	3.74	2726	2446	5077	5498	**SK 972.1 - 180LH/4**		
	385	4915	3.6	III	4.56	2845	2614	5336	5779	SK 972.1 - 180LP/4		
	334	5658	3.1	III	5.25	2789	2592	5431	5882			
	284	6650	2.8	III	6.17	2787	2637	5583	6047			
	263	7200	2.8	III	6.68	2947	2844	5780	6260			
	244	7749	2.6	III	7.19	2875	2790	5803	6286			
	208	9107	2.3	III	8.45	2834	2811	5943	6437			
	187	10131	2.2	III	9.4	2875	2913	6094	6600			
	170	11155	2.0	III	10.35	2857	2944	6189	6704			
	152	12438	1.8	II	11.54	2844	2995	6308	6832			
	136	13860	1.7	II	12.86	2650	2828	6302	6826			
	129	14615	1.6	II	13.56	2707	2933	6404	6936			
	124	15261	1.5	II	14.16	2585	2814	6374	6903			
	111	17072	1.4	II	15.84	2433	2709	6409	6942			
	99	19023	1.3	I	17.65	2341	2683	6489	7028			
	89	21254	1.2	I	19.72	2031	2389	6417	6951			
	80	23700	1.0	I	21.99	1879	2299	6464	7001			
	78	24164	1.0	I	22.42	1643	2029	6326	6852	**SK 973.1 - 180LX/4**	474	127
	69	27494	1.0	I	25.51	1252	1676	6237	6755	**SK 973.1 - 180LH/4**		
	64	29337	0.9	*	27.22	1018	1463	6171	6684	SK 973.1 - 180LP/4		
	57	33379	0.8	*	30.97	502	990	6004	6502			
	55	34435	0.8	*	31.95	345	846	5948	6442			
40	535	4718	3.2	III	3.33	2412	2121	4746	5141	**SK 972.1 - 200L/4**	641	127
	476	5299	3.0	III	3.74	2417	2146	4849	5252	**SK 972.1 - 200LH/4**		
	390	6461	2.7	III	4.56	2494	2265	5079	5501			
	339	7438	2.4	III	5.25	2358	2160	5118	5543			
	288	8742	2.1	III	6.17	2285	2126	5220	5653			
	266	9465	2.1	III	6.68	2457	2333	5426	5877			
	248	10187	2.0	III	7.19	2327	2219	5408	5858			
	211	11972	1.7	II	8.45	2195	2136	5483	5939			
	189	13318	1.6	II	9.4	2191	2177	5604	6069			
	172	14664	1.5	II	10.35	2117	2139	5660	6130			
	154	16351	1.4	II	11.54	2039	2107	5733	6209			
	138	18221	1.3	I	12.86	1721	1817	5640	6109			
	131	19213	1.2	I	13.56	1766	1892	5734	6210			
	126	20063	1.2	I	14.16	1579	1714	5658	6128			

(Model Type in blue is an Energy Efficient motor)

(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 light blue is an Premium Efficient motor)

50 hp Gearmotors

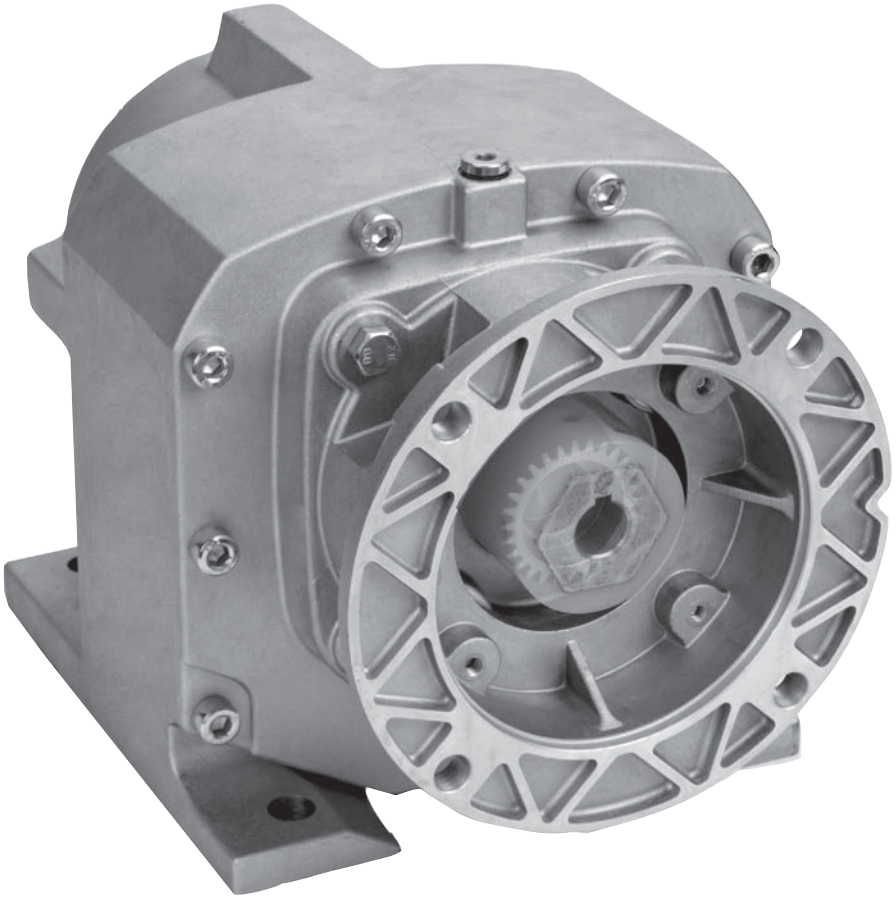
NORD DRIVESYSTEMS

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}	Standard Bearings F_{RN} OHL [lb]	Standard Bearings F_{AN} Thrust [lb]	Heavy Duty Bearings (VL) F_{RVL} OHL [lb]	Heavy Duty Bearings (VL) F_{AVL} Thrust [lb]	Model Type	Weight [lb]	Dim. Page
50	530	5948	2.5	III	3.33	2139	1868	4563	4942	**SK 972.1 - 225S/4**	713	127
	472	6680	2.4	III	3.74	2109	1858	4642	5027	**SK 972.1 - 225SH/4**		
	387	8145	2.2	III	4.56	2143	1931	4842	5245			
	336	9377	1.9	II	5.25	1922	1745	4822	5223			
	286	11020	1.7	II	6.17	1772	1636	4871	5276			
	264	11931	1.7	II	6.68	1958	1847	5088	5511			
	245	12842	1.6	II	7.19	1767	1675	5028	5446			
	209	15093	1.4	II	8.45	1537	1496	5036	5454			
	188	16790	1.3	I	9.4	1486	1485	5124	5549			
	171	18486	1.2	I	10.35	1352	1387	5138	5565			
	153	20612	1.1	I	11.54	1204	1284	5164	5593			
	137	22970	1.0	I	12.86	753	881	4978	5392			
	130	24220	1.0	I	13.56	786	938	5064	5485			
	125	25291	0.9	*	14.16	529	704	4940	5350			

(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

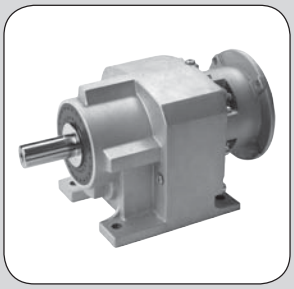
- SK072.1
- SK172.1
- SK372.1
- SK373.1
- SK572.1
- SK573.1
- SK672.1
- SK673.1
- SK772.1
- SK773.1
- SK872.1
- SK873.1
- SK972.1
- SK973.1



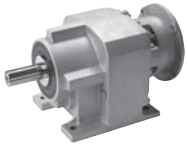
NORD DRIVESYSTEMS

www.nord.com

Type	Gear Ratio i_{tot}	Output Speed n_2 1750 rpm [rpm]	Output Torque* $T_{2\,max}$ [lbin]
SK 573.1	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 072.1
NEMA C
Ratings & Combinations



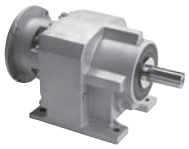
NORD DRIVESYSTEMS

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 48C	56C	140TC	180TC	210TC	250TC
SK 072.1	2.10	833	319	*1.00*	*0.66*	*0.50*		X	X				
	2.33	751	345	*1.00*	*0.66*	*0.50*		X	X				
	2.57	681	363	*1.00*	*0.66*	*0.50*		X	X				
	2.85	614	398	*1.00*	*0.66*	*0.50*		X	X				
	2.95	593	407	*1.00*	*0.66*	*0.50*		X	X				
	3.28	534	416	*1.00*	*0.66*	*0.50*		X	X				
	3.58	489	425	*1.00*	*0.66*	*0.50*		X	X				
	3.92	446	398	*1.00*	*0.66*	*0.50*		X	X				
	4.31	406	443	*1.00*	*0.66*	*0.50*		X	X				
	4.77	367	469	*1.00*	*0.66*	*0.50*		X	X				
	5.31	330	487	*1.00*	*0.66*	*0.50*		X	X				
	5.50	318	487	*1.00*	*0.66*	*0.50*		X	X				
	5.96	294	487	*1.00*	*0.66*	*0.50*		X	X				
	6.57	266	469	*1.00*	*0.66*	*0.50*		X	X				
	7.23	242	487	*1.00*	*0.66*	*0.50*		X	X				
	8.00	219	487	*1.00*	*0.66*	*0.50*		X	X				
	8.91	196	487	*1.00*	*0.66*	*0.50*		X	X				
	10.00	175	487	*1.00*	*0.66*	*0.50*		X	X				
	11.56	151	443	*1.00*	*0.66*	*0.50*		X	X				
	13.20	133	416	0.88	0.58	0.44		X	X				
	14.40	122	451	0.87	0.57	0.43		X	X				
	15.77	111	487	0.86	0.56	0.43		X	X				
	17.35	101	487	0.78	0.51	0.39		X	X				
	19.20	91	487	0.70	0.46	0.35		X	X				
	21.38	82	487	0.63	0.42	0.32		X	X				
	22.22	79	487	0.61	0.40	0.30		X	X				
	24.75	71	487	0.55	0.36	0.27		X	X				
	27.78	63	478	0.48	0.31	0.24		X	X				
	32.45	54	487	0.42	0.27	0.21		X	X				
	36.43	48	478	0.36	0.24	0.18		X	X				
	42.10	42	443	0.29	0.19	0.15		X	X				
	49.00	36	407	0.23	0.15	0.12		X	X				
	55.00	32	443	0.22	0.15	0.11		X	X				
	63.56	28	443	0.19	0.13	0.10		X	X				
	Based upon1750 rpm Input Speed			**1750 rpm**	**1150 rpm**	**875 rpm**		**0.5hp**	**1 hp**	**2 hp**	**5 hp**	**10 hp**	**20 hp**
				Input Speed				**Cface Adapter Maximum Input Power ***					

◈ The maximum input power limit shown is the largest motor power typically combined with the gear unit. These 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 and based on a 1750 rpm motor.

lb	48C	56C
SK 072.1	9	9



SK 172.1
NEMA C + W
Ratings & Combinations

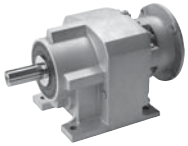
Model Type	Gear Ratio i_{tot}	Output Speed n_2 [rpm]	Output Torque $T_{2\,max}$ [lb-in]	Maximum input power◈ [hp]	[hp]	[hp]	Input Shaft W	NEMA C-Face* Available Combinations 56C	140TC	180TC	210TC	250TC	280TC
SK 172.1	2.32	754	381	*2.00*	*1.32*	*1.00*	X	X	X				
	2.49	703	381	*2.00*	*1.32*	*1.00*	X	X	X				
	2.72	643	407	*2.00*	*1.32*	*1.00*	X	X	X				
	2.92	599	443	*2.00*	*1.32*	*1.00*	X	X	X				
	3.22	543	478	*2.00*	*1.32*	*1.00*	X	X	X				
	3.46	506	478	*2.00*	*1.32*	*1.00*	X	X	X				
	3.79	462	522	*2.00*	*1.32*	*1.00*	X	X	X				
	4.17	420	575	*2.00*	*1.32*	*1.00*	X	X	X				
	4.62	379	637	*2.00*	*1.32*	*1.00*	X	X	X				
	5.14	340	735	*2.00*	*1.32*	*1.00*	X	X	X				
	5.77	303	681	*2.00*	*1.32*	*1.00*	X	X	X				
	6.43	272	726	*2.00*	*1.32*	*1.00*	X	X	X				
	7.08	247	726	*2.00*	*1.32*	*1.00*	X	X	X				
	7.83	223	726	*2.00*	*1.32*	*1.00*	X	X	X				
	8.72	201	779	*2.00*	*1.32*	*1.00*	X	X	X				
	9.79	179	752	*2.00*	*1.32*	*1.00*	X	X	X				
	10.83	162	761	1.95	1.28	0.98	X	X	X				
	11.39	154	752	1.83	1.20	0.92	X	X	X				
	12.06	145	770	1.77	1.17	0.89	X	X	X				
	13.54	129	752	1.54	1.01	0.77	X	X	X				
	15.76	111	752	1.32	0.87	0.66	X	X	X				
	18.60	94	743	1.11	0.73	0.55	X	X	X				
	20.37	86	752	1.03	0.67	0.51	X	X	X				
	22.42	78	814	1.01	0.66	0.50	X	X	X				
	24.80	71	814	0.91	0.60	0.46	X	X	X				
	27.62	63	814	0.82	0.54	0.41	X	X	X				
	31.00	56	814	0.73	0.48	0.36	X	X	X				
	34.52	51	761	0.61	0.40	0.31	X	X	X				
	38.75	45	752	0.54	0.35	0.27	X	X	X				
	41.36	42	752	0.50	0.33	0.25	X	X	X				
	46.43	38	752	0.45	0.30	0.22	X	X	X				
	54.03	32	752	0.39	0.25	0.19	X	X	X				
	62.36	28	566	0.25	0.17	0.13	X	X	X				
	70.00	25	637	0.25	0.17	0.13	X	X	X				
	81.45	21	735	0.25	0.16	0.13	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**
								Cface Adapter Maximum Input Power *					

◈ The maximum input power limit shown is the largest motor power typically combined with the gear unit. These 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 and based on a 1750 rpm motor.

lb	W	56C	140TC
SK 172.1	15	15	15

SK 372.1
NEMA C + W
Ratings & Combinations



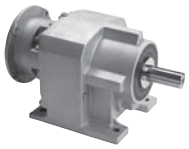
DRIVESYSTEMS

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
SK 372.1	2.62	668	797	*5.00*	*3.30*	*2.50*	X	X	X	X			
	2.86	612	797	*5.00*	*3.30*	*2.50*	X	X	X	X			
	3.12	561	885	*5.00*	*3.30*	*2.50*	X	X	X	X			
	3.43	510	974	*5.00*	*3.30*	*2.50*	X	X	X	X			
	3.78	463	1062	*5.00*	*3.30*	*2.50*	X	X	X	X			
	4.18	419	1151	*5.00*	*3.30*	*2.50*	X	X	X	X			
	4.66	376	1239	*5.00*	*3.30*	*2.50*	X	X	X	X			
	5.24	334	1416	*5.00*	*3.30*	*2.50*	X	X	X	X			
	5.95	294	1416	*5.00*	*3.30*	*2.50*	X	X	X	X			
	6.58	266	1416	*5.00*	*3.30*	*2.50*	X	X	X	X			
	6.89	254	1505	*5.00*	*3.30*	*2.50*	X	X	X	X			
	7.23	242	1505	*5.00*	*3.30*	*2.50*	X	X	X	X			
	8.22	213	1593	*5.00*	*3.30*	*2.50*	X	X	X	X			
	9.40	186	1682	4.97	3.26	2.48	X	X	X	X			
	10.28	170	1682	4.54	2.99	2.27	X	X	X	X			
	11.55	152	1682	4.04	2.66	2.02	X	X	X	X			
	12.96	135	1770	3.79	2.49	1.90	X	X	X	X			
	14.57	120	1682	3.21	2.11	1.60	X	X	X	X			
	16.50	106	1682	2.83	1.86	1.42	X	X	X				
	18.40	95	1770	2.67	1.76	1.34	X	X	X				
	20.62	85	1682	2.26	1.49	1.13	X	X	X				
	23.00	76	1770	2.14	1.40	1.07	X	X	X				
	25.85	68	1682	1.81	1.19	0.90	X	X	X				
	30.11	58	1593	1.47	0.97	0.73	X	X	X				
	33.84	52	1682	1.38	0.91	0.69	X	X	X				
	38.12	46	1593	1.16	0.76	0.58	X	X	X				
	43.26	40	1505	0.97	0.63	0.48	X	X	X				
	53.84	33	1416	0.73	0.48	0.37	X	X	X				
	60.83	29	1328	0.61	0.40	0.30	X	X	X				
	64.06	27	1416	0.61	0.40	0.31	X	X	X				
	72.38	24	1328	0.51	0.33	0.25	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**
								Cface Adapter Maximum Input Power *					

◈ The maximum input power limit shown is the largest motor power typically combined with the gear unit. These 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 and based on a 1750 rpm motor.

lb	W	56C	140TC	180TC
SK 372.1	24	22	22	24



SK 373.1
NEMA C + W
Ratings & Combinations

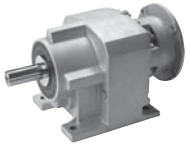
Model Type	Gear Ratio i_{tot}	Output Speed n_2 [rpm]	Output Torque $T_{2\,max}$ [lb-in]	Maximum input power◈ [hp]	[hp]	[hp]	Input Shaft W	NEMA C-Face* Available Combinations 56C	140TC	180TC	210TC	250TC	280TC
SK 373.1	18.63	94	1682	2.51	1.65	1.25	X	X	X				
	20.52	85	1859	2.52	1.65	1.26	X	X	X				
	22.74	77	1859	2.27	1.49	1.13	X	X	X				
	23.41	75	1859	2.20	1.45	1.10	X	X	X				
	25.94	67	1859	1.99	1.31	0.99	X	X	X				
	29.77	59	1859	1.73	1.14	0.87	X	X	X				
	33.20	53	1770	1.48	0.97	0.74	X	X	X				
	37.23	47	1770	1.32	0.87	0.66	X	X	X				
	42.46	41	1770	1.16	0.76	0.58	X	X	X				
	47.05	37	1859	1.10	0.72	0.55	X	X	X				
	54.00	32	1859	0.96	0.63	0.48	X	X	X				
	60.22	29	1770	0.82	0.54	0.41	X	X	X				
	64.70	27	1770	0.76	0.50	0.38	X	X	X				
	74.27	24	1770	0.66	0.43	0.33	X	X	X				
	82.57	21	1859	0.63	0.41	0.31	X	X	X				
	91.48	19	1859	0.56	0.37	0.28	X	X	X				
	102.01	17	1770	0.48	0.32	0.24	X	X	X				
	120.54	15	1770	0.41	0.27	0.20	X	X	X				
	130.87	13	1770	0.38	0.25	0.19	X	X	X				
	145.00	12	1859	0.36	0.23	0.18	X	X	X				
	165.94	11	1859	0.31	0.20	0.16	X	X	X				
	185.05	9.5	1859	0.28	0.18	0.14	X	X	X				
	196.07	8.9	1859	0.26	0.17	0.13	X	X	X				
	207.98	8.4	1770	0.24	0.16	0.12	X	X	X				
	228.22	7.7	1947	0.24	0.16	0.12	X	X	X				
	256.50	6.8	1770	0.19	0.13	0.10	X	X	X				
	269.67	6.5	1947	0.20	0.13	0.10	X	X	X				
	303.08	5.8	1859	0.17	0.11	0.09	X	X	X				
	343.92	5.1	1682	0.14	0.09	0.07	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**
								Cface Adapter Maximum Input Power *					

◈ The maximum input power limit shown is the largest motor power typically combined with the gear unit. These 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 and based on a 1750 rpm motor.

lb	W	56C	140TC
SK 373.1	26	24	24

SK 572.1
NEMA C + W
Ratings & Combinations



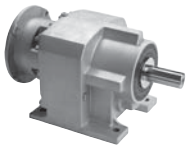
DRIVESYSTEMS

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 572.1	2.92	599	1505	*10.00*	*6.60*	*5.00*	X	X	X	X			
	3.27	535	1682	*10.00*	*6.60*	*5.00*	X	X	X	X			
	3.83	457	1947	*10.00*	*6.60*	*5.00*	X	X	X	X			
	4.22	415	2036	*10.00*	*6.60*	*5.00*	X	X	X	X			
	4.69	373	2213	*10.00*	*6.60*	*5.00*	X	X	X	X			
	5.23	335	2390	*10.00*	*6.60*	*5.00*	X	X	X	X			
	5.88	298	2655	*10.00*	*6.60*	*5.00*	X	X	X	X			
	6.30	278	2832	*10.00*	*6.60*	*5.00*	X	X	X	X			
	7.49	234	3098	*10.00*	*6.60*	*5.00*	X	X	X	X			
	8.15	215	3186	*10.00*	*6.60*	*5.00*	X	X	X	X			
	8.92	196	3275	*10.00*	*6.60*	*5.00*	X	X	X	X			
	10.04	174	3540	9.79	6.43	4.90	X	X	X	X			
	11.25	156	3629	8.96	5.89	4.48	X	X	X	X			
	12.68	138	3806	8.33	5.48	4.17	X	X	X	X			
	13.67	128	3629	7.37	4.84	3.69	X	X	X	X			
	15.38	114	3806	6.87	4.52	3.44	X	X	X	X			
	16.46	106	3540	5.97	3.92	2.99	X	X	X	X			
	19.57	89	3540	5.02	3.30	2.51	X	X	X	X			
	21.85	80	3717	4.72	3.10	2.36	X	X	X	X			
	24.58	71	3806	4.30	2.83	2.15	X	X	X	X			
	27.00	65	3540	3.64	2.39	1.82	X	X	X				
	28.91	61	3363	3.23	2.12	1.62	X	X	X				
	31.28	56	3275	2.91	1.91	1.45	X	X	X	X			
	35.65	49	3275	2.55	1.68	1.28	X	X	X				
	42.38	41	3275	2.15	1.41	1.07	X	X	X				
	45.77	38	2832	1.72	1.13	0.86	X	X	X				
	54.41	32	3275	1.67	1.10	0.84	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**
				Input Speed				**Cface Adapter Maximum Input Power ***					

◈ The maximum input power limit shown is the largest motor power typically combined with the gear unit. These 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 and based on a 1750 rpm motor.

lb	W	56C	140TC	180TC
SK 572.1	40	40	40	42



SK 573.1
NEMA C + W
Ratings & Combinations

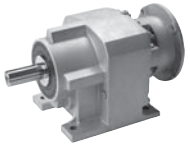
Model Type	Gear Ratio i_{tot}	Output Speed n_2 [rpm]	Output Torque $T_{2\,max}$ [lb-in]	Maximum input power◈ [hp]	[hp]	[hp]	Input Shaft W	NEMA C-Face* Available Combinations 56C	140TC	180TC	210TC	250TC	280TC
SK 573.1	17.42	100	3806	6.07	3.99	3.03	X	X	X	X			
	19.22	91	3806	5.50	3.61	2.75	X	X	X	X			
	21.32	82	3806	4.96	3.26	2.48	X	X	X	X			
	23.79	74	3806	4.44	2.92	2.22	X	X	X	X			
	26.77	65	3806	3.95	2.59	1.97	X	X	X	X			
	30.93	57	3894	3.50	2.30	1.75	X	X	X	X			
	34.80	50	3894	3.11	2.04	1.55	X	X	X	X			
	38.02	46	3983	2.91	1.91	1.45	X	X	X	X			
	42.18	41	3983	2.62	1.72	1.31	X	X	X	X			
	43.40	40	3983	2.55	1.67	1.27	X	X	X				
	47.95	36	3983	2.31	1.52	1.15	X	X	X	X			
	49.60	35	3983	2.23	1.47	1.11	X	X	X				
	55.80	31	3983	1.98	1.30	0.99	X	X	X				
	60.97	29	3983	1.81	1.19	0.91	X	X	X				
	67.64	26	3983	1.64	1.07	0.82	X	X	X	X			
	76.88	23	3983	1.44	0.95	0.72	X	X	X	X			
	85.18	21	3983	1.30	0.85	0.65	X	X	X				
	94.50	19	3983	1.17	0.77	0.59	X	X	X	X			
	107.42	16	3806	0.98	0.65	0.49	X	X	X	X			
	109.12	16	3983	1.01	0.67	0.51	X	X	X				
	111.36	16	3983	0.99	0.65	0.50	X	X	X				
	125.45	14	3983	0.88	0.58	0.44	X	X	X				
	136.40	13	3983	0.81	0.53	0.41	X	X	X				
	141.13	12	3983	0.78	0.51	0.39	X	X	X				
	158.78	11	3983	0.70	0.46	0.35	X	X	X				
	178.56	9.8	3983	0.62	0.41	0.31	X	X	X				
	188.91	9.3	3983	0.59	0.38	0.29	X	X	X				
	201.16	8.7	3983	0.55	0.36	0.27	X	X	X				
	226.30	7.7	3983	0.49	0.32	0.24	X	X	X				
	269.26	6.5	3983	0.41	0.27	0.21	X	X	X				
	302.91	5.8	3894	0.36	0.23	0.18	X	X	X				
	316.18	5.5	3717	0.33	0.21	0.16	X	X	X				
	376.20	4.7	3629	0.27	0.18	0.13	X	X	X				
	402.80	4.3	3275	0.23	0.15	0.11	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
								Cface Adapter Maximum Input Power *					

◈ The maximum input power limit shown is the largest motor power typically combined with the gear unit. These 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 and based on a 1750 rpm motor.

lb	W	56C	140TC	180TC
SK 573.1	42	42	42	44

SK 672.1
NEMA C + W
Ratings & Combinations



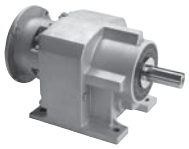
DRIVESYSTEMS

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 672.1	2.66	658	2478	*10.00*	*6.60*	*5.00*	X	X	X	X	X		
	2.86	612	2655	*10.00*	*6.60*	*5.00*	X	X	X	X	X		
	3.07	570	2832	*10.00*	*6.60*	*5.00*	X	X	X	X	X		
	3.31	529	3009	*10.00*	*6.60*	*5.00*	X	X	X	X	X		
	3.58	489	3186	*10.00*	*6.60*	*5.00*	X	X	X	X	X		
	3.88	451	3540	*10.00*	*6.60*	*5.00*	X	X	X	X	X		
	4.22	415	3717	*10.00*	*6.60*	*5.00*	X	X	X	X	X		
	4.61	380	3983	*10.00*	*6.60*	*5.00*	X	X	X	X	X		
	5.06	346	4248	*10.00*	*6.60*	*5.00*	X	X	X	X	X		
	5.59	313	4337	*10.00*	*6.60*	*5.00*	X	X	X	X	X		
	6.12	286	4514	*10.00*	*6.60*	*5.00*	X	X	X	X	X		
	6.75	259	4602	*10.00*	*6.60*	*5.00*	X	X	X	X	X		
	7.68	228	4691	*10.00*	*6.60*	*5.00*	X	X	X	X	X		
	8.48	206	4691	*10.00*	*6.60*	*5.00*	X	X	X	X	X		
	8.66	202	4691	*10.00*	*6.60*	*5.00*	X	X	X	X	X		
	9.25	189	4691	*10.00*	*6.60*	*5.00*	X	X	X	X	X		
	10.37	169	5045	*10.00*	*6.60*	*5.00*	X	X	X	X	X		
	11.38	154	5045	*10.00*	*6.60*	*5.00*	X	X	X	X	X		
	12.56	139	5045	*10.00*	*6.60*	*5.00*	X	X	X	X	X		
	13.70	128	5133	*10.00*	*6.60*	*5.00*	X	X	X	X	X		
	15.35	114	5399	9.77	6.42	4.88	X	X	X	X	X		
	17.25	101	5399	8.69	5.71	4.35	X	X	X	X	X		
	18.41	95	5399	8.14	5.35	4.07	X	X	X	X	X		
	20.62	85	5399	7.27	4.78	3.64	X	X	X	X	X		
	23.41	75	5399	6.40	4.21	3.20	X			X	X		
	26.23	67	5399	5.72	3.76	2.86	X			X	X		
	29.08	60	4868	4.65	3.05	2.32	X	X	X	X			
	32.58	54	5399	4.60	3.02	2.30	X	X	X	X			
	35.75	49	4868	3.78	2.48	1.89	X	X	X				
	44.55	39	3983	2.48	1.63	1.24	X	X	X				
	56.65	31	3540	1.74	1.14	0.87	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
				Input Speed				Cface Adapter Maximum Input Power *					

◈ The maximum input power limit shown is the largest motor power typically combined with the gear unit. These 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 and based on a 1750 rpm motor.

lb	W	56C	140TC	180TC	210TC
SK 672.1	53	51	51	53	57



SK 673.1
NEMA C + W
Ratings & Combinations

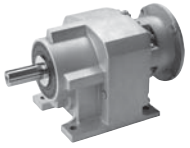
Model Type	Gear Ratio i_{tot}	Output Speed n_2 [rpm]	Output Torque $T_{2\ max}$ [lb-in]	Maximum input power◈ [hp]	[hp]	[hp]	Input Shaft W	NEMA C-Face* Available Combinations 56C	140TC	180TC	210TC	250TC	280TC
SK 673.1	22.82	77	3983	4.85	3.18	2.42	X	X	X	X			
	25.19	69	4425	4.88	3.21	2.44	X	X	X	X			
	27.61	63	4602	4.63	3.04	2.31	X	X	X	X			
	30.92	57	4691	4.21	2.77	2.11	X	X	X	X			
	34.12	51	5310	4.32	2.84	2.16	X	X	X	X			
	37.23	47	5664	4.22	2.78	2.11	X	X	X	X			
	41.54	42	5664	3.79	2.49	1.89	X	X	X	X			
	44.85	39	5664	3.51	2.30	1.75	X	X	X	X			
	49.50	35	5664	3.18	2.09	1.59	X	X	X	X			
	55.12	32	5664	2.85	1.87	1.43	X	X	X	X			
	60.45	29	5664	2.60	1.71	1.30	X	X	X				
	65.95	27	5664	2.38	1.57	1.19	X	X	X				
	73.64	24	5664	2.14	1.40	1.07	X	X	X				
	83.70	21	5664	1.88	1.23	0.94	X	X	X				
	94.86	18	5664	1.66	1.09	0.83	X	X	X				
	103.48	17	5664	1.52	1.00	0.76	X	X	X				
	115.89	15	5664	1.36	0.89	0.68	X	X	X				
	123.33	14	5664	1.28	0.84	0.64	X	X	X				
	130.55	13	5664	1.20	0.79	0.60	X	X	X				
	134.64	13	5664	1.17	0.77	0.58	X	X	X				
	143.30	12	5664	1.10	0.72	0.55	X	X	X				
	146.88	12	5664	1.07	0.70	0.54	X	X	X				
	161.45	11	5664	0.97	0.64	0.49	X	X	X				
	177.94	9.8	5664	0.88	0.58	0.44	X	X	X				
	181.88	9.6	5664	0.86	0.57	0.43	X	X	X				
	194.11	9	5664	0.81	0.53	0.41	X	X	X				
	219.00	8	5664	0.72	0.47	0.36	X	X	X				
	220.32	7.9	5664	0.71	0.47	0.36	X	X	X				
	248.20	7.1	5664	0.63	0.42	0.32	X	X	X				
	279.23	6.3	5664	0.56	0.37	0.28	X	X	X				
	304.61	5.7	5664	0.52	0.34	0.26	X	X	X				
	332.23	5.3	5664	0.47	0.31	0.24	X	X	X				
	362.43	4.8	5664	0.43	0.29	0.22	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**
								Cface Adapter Maximum Input Power *					

◈ The maximum input power limit shown is the largest motor power typically combined with the gear unit. These 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 and based on a 1750 rpm motor.

lb	W	56C	140TC	180TC
SK 673.1	55	53	53	60

SK 772.1
NEMA C + W
Ratings & Combinations



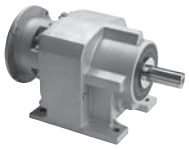
DRIVESYSTEMS

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 772.1	3.12	561	4292	*20.00*	*13.20*	*10.00*	X				X		
	3.59	487	4337	*20.00*	*13.20*	*10.00*	X				X		
	3.84	456	4691	*20.00*	*13.20*	*10.00*	X				X		
	4.42	396	4779	*20.00*	*13.20*	*10.00*	X				X		
	4.71	372	4956	*20.00*	*13.20*	*10.00*	X				X		
	5.38	325	5045	*20.00*	*13.20*	*10.00*	X	X	X	X	X		
	6.19	283	5133	*20.00*	*13.20*	*10.00*	X	X	X	X	X		
	6.63	264	5310	*20.00*	*13.20*	*10.00*	X	X	X	X	X		
	7.63	229	5487	19.97	13.12	9.98	X	X	X	X	X		
	8.12	216	5664	19.37	12.73	9.68	X	X	X	X	X		
	8.97	195	5841	18.08	11.88	9.04	X	X	X	X	X		
	10.00	175	6018	16.71	10.98	8.36	X	X	X	X	X		
	10.60	165	6018	15.76	10.36	7.88	X	X	X	X	X		
	11.06	158	6107	15.33	10.08	7.67	X	X	X	X	X		
	11.67	150	6107	14.53	9.55	7.27	X	X	X	X	X		
	13.07	134	6195	13.16	8.65	6.58	X	X	X	X	X		
	14.38	122	6372	12.30	8.09	6.15	X	X	X	X	X		
	15.62	112	6726	11.96	7.86	5.98	X	X	X	X	X		
	16.66	105	6815	11.36	7.46	5.68	X	X	X	X	X		
	18.46	95	6903	10.38	6.82	5.19	X	X	X	X	X		
	20.31	86	7257	9.92	6.52	4.96	X	X	X	X	X		
	24.41	72	7257	8.25	5.42	4.13	X	X	X	X			
	26.86	65	7257	7.50	4.93	3.75	X	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
								Cface Adapter Maximum Input Power *					

◈ The maximum input power limit shown is the largest motor power typically combined with the gear unit. These 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 and based on a 1750 rpm motor.

lb	W	56C	140TC	180TC	210TC
SK 772.1	93	88	88	97	105



SK 773.1
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]	[hp]	[hp]	Input Shaft W	NEMA C-Face* Available Combinations 56C	140TC	180TC	210TC	250TC	280TC
SK 773.1	21.49	81	6638	8.58	5.64	4.29	X	X	X	X	X		
	24.23	72	6726	7.71	5.07	3.85	X	X	X	X	X		
	25.39	69	7257	7.94	5.22	3.97	X	X	X	X	X		
	28.63	61	7257	7.04	4.63	3.52	X	X	X	X	X		
	31.83	55	7257	6.33	4.16	3.17	X	X	X	X	X		
	35.77	49	7257	5.63	3.70	2.82	X	X	X	X			
	39.06	45	7523	5.35	3.51	2.67	X	X	X	X	X		
	43.43	40	7700	4.92	3.24	2.46	X	X	X	X	X		
	47.61	37	7700	4.49	2.95	2.25	X	X	X	X	X		
	51.31	34	7523	4.07	2.68	2.04	X	X	X	X	X		
	57.64	30	7523	3.62	2.38	1.81	X	X	X	X			
	63.42	28	7523	3.29	2.16	1.65	X	X	X	X	X		
	68.92	25	7523	3.03	1.99	1.52	X	X	X	X			
	71.89	24	7523	2.91	1.91	1.45	X	X	X	X	X		
	79.23	22	7700	2.70	1.77	1.35	X	X	X	X			
	83.32	21	7523	2.51	1.65	1.25	X	X	X	X	X		
	93.61	19	7523	2.23	1.47	1.12	X	X	X	X			
	96.57	18	7523	2.16	1.42	1.08	X	X	X	X			
	111.92	16	7523	1.87	1.23	0.93	X	X	X	X			
	117.46	15	7700	1.82	1.20	0.91	X	X	X				
	138.78	13	7523	1.51	0.99	0.75	X	X	X				
	151.1	12	6195	1.14	0.75	0.57	X	X	X				
	160.22	11	7700	1.33	0.88	0.67	X	X	X				
	178.53	9.8	7523	1.17	0.77	0.59	X	X	X				
	189.31	9.2	7523	1.10	0.73	0.55	X	X	X				
	206.11	8.5	7700	1.04	0.68	0.52	X	X	X				
	224.49	7.8	7523	0.93	0.61	0.47	X	X	X				
	243.53	7.2	7523	0.86	0.56	0.43	X	X	X				
	260.18	6.7	7700	0.82	0.54	0.41	X	X	X				
	265.24	6.6	7523	0.79	0.52	0.39	X	X	X				
	288.78	6.1	7523	0.72	0.48	0.36	X	X	X				
	307.42	5.7	7523	0.68	0.45	0.34	X	X	X				
	334.7	5.2	7700	0.64	0.42	0.32	X	X	X				
	341.21	5.1	7523	0.61	0.40	0.31	X	X	X				
	395.46	4.4	7523	0.53	0.35	0.26	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
								Cface Adapter Maximum Input Power *					

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

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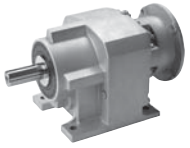
lb	W	56C	140TC	180TC	210TC
SK 773.1	97	93	93	101	110

SK 872.1
NEMA C + W
Ratings & Combinations



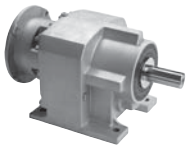
DRIVESYSTEMS

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 872.1	3.18	550	7434	*30.00*	*15.00*	*11.00*	X					X	
	3.69	474	7788	*30.00*	*15.00*	*11.00*	X					X	
	4.03	434	7965	*30.00*	*15.00*	*11.00*	X			X	X	X	
	4.68	374	9735	*30.00*	*15.00*	*11.00*	X			X	X	X	
	5.50	318	10178	*30.00*	*15.00*	*11.00*	X			X	X	X	
	5.66	309	10178	*30.00*	*15.00*	*11.00*	X	X	X	X	X	X	
	6.57	266	10886	*30.00*	*15.00*	*11.00*	X	X	X	X	X	X	
	7.73	226	11505	*30.00*	*15.00*	*11.00*	X	X	X	X	X	X	
	8.87	197	11859	*30.00*	*15.00*	*11.00*	X	X	X	X	X	X	
	9.24	189	12213	*30.00*	*15.00*	*11.00*	X	X	X	X	X	X	
	10.44	168	12390	*30.00*	*15.00*	*11.00*	X	X	X	X	X	X	
	11.24	156	12390	*30.00*	*15.00*	*11.00*	X	X	X	X	X	X	
	12.48	140	13010	*28.95*	*15.00*	*11.00*	X	X	X	X	X	X	
	13.79	127	13010	*26.20*	*15.00*	*11.00*	X	X	X	X	X	X	
	15.18	115	13010	*23.80*	*15.00*	*11.00*	X	X	X	X	X	X	
	16.96	103	13629	*22.31*	*14.66*	*11.00*	X	X	X	X	X	X	
	18.67	94	13629	20.27	13.32	10.13	X	X	X	X	X	X	
	23.02	76	13806	16.65	10.94	8.33	X				X	X	
	25.44	69	14160	15.46	10.16	7.73	X				X	X	
	28.00	62	14160	14.04	9.23	7.02	X				X	X	
	29.08	60	13806	13.18	8.66	6.59	X				X		
	32.00	55	14160	12.29	8.07	6.14	X				X		
	35.08	50	10620	8.41	5.52	4.20	X			X	X		
	38.77	45	11505	8.24	5.41	4.12	X			X	X		
	42.67	41	12390	8.06	5.30	4.03	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**
				Input Speed				**Cface Adapter Maximum Input Power ***					

◈ The maximum input power limit shown is the largest motor power typically combined with the gear unit. These 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 and based on a 1750 rpm motor.

lb	W	56C	140TC	180TC	210TC	250TC
SK 872.1	192	180	180	196	196	227



SK 873.1
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]	[hp]	[hp]	Input Shaft W	NEMA C-Face* Available Combinations 56C	140TC	180TC	210TC	250TC	280TC
SK 873.1	19.34	90	14160	20.33	13.36	10.16	X				X	X	
	21.38	82	14160	18.39	12.08	9.19	X				X	X	
	23.49	74	14603	17.26	11.34	8.63	X	X	X	X	X	X	
	25.69	68	14603	15.78	10.37	7.89	X	X	X	X	X	X	
	27.57	63	14603	14.71	9.66	7.35	X	X	X	X	X	X	
	30.47	57	14868	13.55	8.90	6.77	X	X	X	X	X	X	
	32.24	54	15045	12.96	8.51	6.48	X	X	X	X	X	X	
	35.63	49	15045	11.72	7.70	5.86	X	X	X	X	X	X	
	39.68	44	15045	10.53	6.92	5.26	X	X	X	X	X	X	
	45.53	38	15045	9.18	6.03	4.59	X	X	X	X	X	X	
	50.32	35	15045	8.30	5.46	4.15	X	X	X	X	X	X	
	55.35	32	15045	7.55	4.96	3.77	X	X	X	X	X		
	61.07	29	15045	6.84	4.50	3.42	X	X	X	X	X	X	
	67.50	26	15045	6.19	4.07	3.09	X	X	X	X	X	X	
	74.29	24	15045	5.62	3.70	2.81	X	X	X	X	X	X	
	83.08	21	15045	5.03	3.30	2.51	X	X	X	X	X	X	
	91.43	19	15045	4.57	3.00	2.28	X	X	X	X	X	X	
	101.02	17	15045	4.14	2.72	2.07	X	X	X	X	X		
	104.84	17	15045	3.98	2.62	1.99	X	X	X	X	X		
	115.88	15	15045	3.61	2.37	1.80	X	X	X	X	X		
	127.52	14	15045	3.28	2.15	1.64	X	X	X	X	X		
	135.99	13	15045	3.07	2.02	1.54	X	X	X	X			
	150.31	12	15045	2.78	1.83	1.39	X	X	X	X			
	165.42	11	15045	2.53	1.66	1.26	X	X	X	X			
	190.86	9.2	15045	2.19	1.44	1.09	X	X	X				
	210.95	8.3	15045	1.98	1.30	0.99	X	X	X				
	232.16	7.5	15045	1.80	1.18	0.90	X	X	X				
	257.61	6.8	15045	1.62	1.07	0.81	X	X	X	X			
	284.73	6.1	15045	1.47	0.96	0.73	X	X	X	X			
	315.19	5.6	15045	1.33	0.87	0.66	X	X	X				
	348.37	5	15045	1.20	0.79	0.60	X	X	X				
	383.39	4.6	15045	1.09	0.72	0.54	X	X	X				
	399.60	4.4	15045	1.05	0.69	0.52	X	X	X				
	439.77	4	15045	0.95	0.62	0.47	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**
								Cface Adapter Maximum Input Power *					

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

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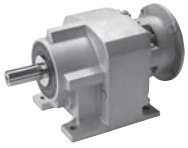
lb	W	56C	140TC	180TC	210TC	250TC
SK 873.1	196	185	185	201	201	232

SK 972.1
NEMA C + W
Ratings & Combinations



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 972.1	3.33	526	15045	*50.00*	*33.00*	*25.00*	X						X
	3.74	468	16151	*50.00*	*33.00*	*25.00*	X					X	X
	4.56	384	17700	*50.00*	*33.00*	*25.00*	X						X
	5.25	333	17700	*50.00*	*33.00*	*25.00*	X			X	X	X	X
	6.17	284	18408	*50.00*	*33.00*	*25.00*	X				X	X	X
	6.68	262	19824	*50.00*	*33.00*	*25.00*	X				X	X	X
	7.19	243	19913	*50.00*	*33.00*	*25.00*	X			X	X	X	X
	8.45	207	20798	*50.00*	*33.00*	*25.00*	X				X	X	X
	9.40	186	21948	*50.00*	*33.00*	*25.00*	X			X	X	X	X
	10.35	169	21948	*50.00*	*33.00*	*25.00*	X			X	X	X	X
	11.54	152	22302	*50.00*	*33.00*	*25.00*	X			X	X	X	X
	12.86	136	23099	49.87	32.77	24.94	X	X	X	X	X	X	X
	13.56	129	23099	47.30	31.08	23.65	X				X	X	X
	14.16	124	23630	46.34	30.45	23.17	X	X	X	X	X	X	X
	15.84	110	24249	42.51	27.93	21.25	X				X	X	X
	17.65	99	24780	38.98	25.62	19.49	X				X	X	X
	19.72	89	24780	34.89	22.93	17.45	X				X	X	X
	21.99	80	24780	31.29	20.56	15.64	X				X	X	X
	23.19	75	20355	24.37	16.02	12.19	X				X	X	
	27.66	63	23010	23.10	15.18	11.55	X				X	X	
	30.29	58	24780	22.72	14.93	11.36	X				X	X	
	33.36	52	25665	21.36	14.04	10.68	X				X	X	
	37.19	47	25665	19.16	12.59	9.58	X				X	X	
	42.76	41	25665	16.67	10.95	8.33	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**
				Input Speed				**Cface Adapter Maximum Input Power ***					

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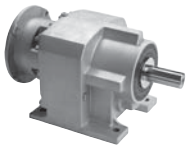
lb	W	56C	140TC	180TC	210TC	250TC	280TC
SK 972.1	278	267	267	283	283	314	336



SK 973.1
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
SK 973.1	22.42	78	24780	30.69	20.17	15.34	X				X	X	X
	25.51	69	26550	28.90	18.99	14.45	X				X	X	X
	27.22	64	26550	27.08	17.80	13.54	X	X	X	X	X	X	X
	30.97	57	27435	24.60	16.16	12.30	X	X	X	X	X	X	X
	31.95	55	28320	24.61	16.17	12.31	X	X	X	X	X	X	X
	35.19	50	28320	22.35	14.68	11.17	X	X	X	X	X	X	X
	37.36	47	28320	21.05	13.83	10.52	X	X	X	X	X	X	X
	42.51	41	28320	18.50	12.16	9.25	X	X	X	X	X	X	X
	47.60	37	28320	16.52	10.86	8.26	X	X	X	X	X	X	X
	52.32	33	28320	15.03	9.88	7.51	X	X	X	X	X	X	
	55.66	31	28320	14.13	9.28	7.06	X	X	X	X	X	X	X
	59.91	29	28320	13.13	8.63	6.56	X	X	X	X	X	X	X
	65.98	27	28320	11.92	7.83	5.96	X	X	X	X	X	X	X
	68.50	26	29205	11.84	7.78	5.92	X	X	X	X	X	X	
	75.44	23	29205	10.75	7.06	5.37	X	X	X	X	X	X	
	77.16	23	29205	10.51	6.91	5.25	X	X	X	X	X	X	X
	86.22	20	29205	9.41	6.18	4.70	X	X	X	X	X	X	
	94.96	18	29205	8.54	5.61	4.27	X	X	X	X	X	X	
	105.23	17	28320	7.47	4.91	3.74	X	X	X	X	X		
	120.26	15	29205	6.74	4.43	3.37	X	X	X	X	X		
	132.45	13	29205	6.12	4.02	3.06	X	X	X	X	X		
	157.60	11	26550	4.68	3.07	2.34	X	X	X	X			
	173.58	10	26550	4.25	2.79	2.12	X	X	X	X			
	179.32	9.8	29205	4.52	2.97	2.26	X	X	X	X			
	197.50	8.9	29205	4.11	2.70	2.05	X	X	X	X			
	234.77	7.5	29205	3.45	2.27	1.73	X	X	X	X			
	258.57	6.8	29205	3.14	2.06	1.57	X	X	X	X			
	295.50	5.9	29205	2.74	1.80	1.37	X	X	X	X			
	325.47	5.4	29205	2.49	1.64	1.25	X	X	X	X			
	362.89	4.8	29205	2.23	1.47	1.12	X	X	X				
	414.73	4.2	29205	1.96	1.28	0.98	X	X	X				
	456.77	3.8	29205	1.78	1.17	0.89	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
								Cface Adapter Maximum Input Power *					

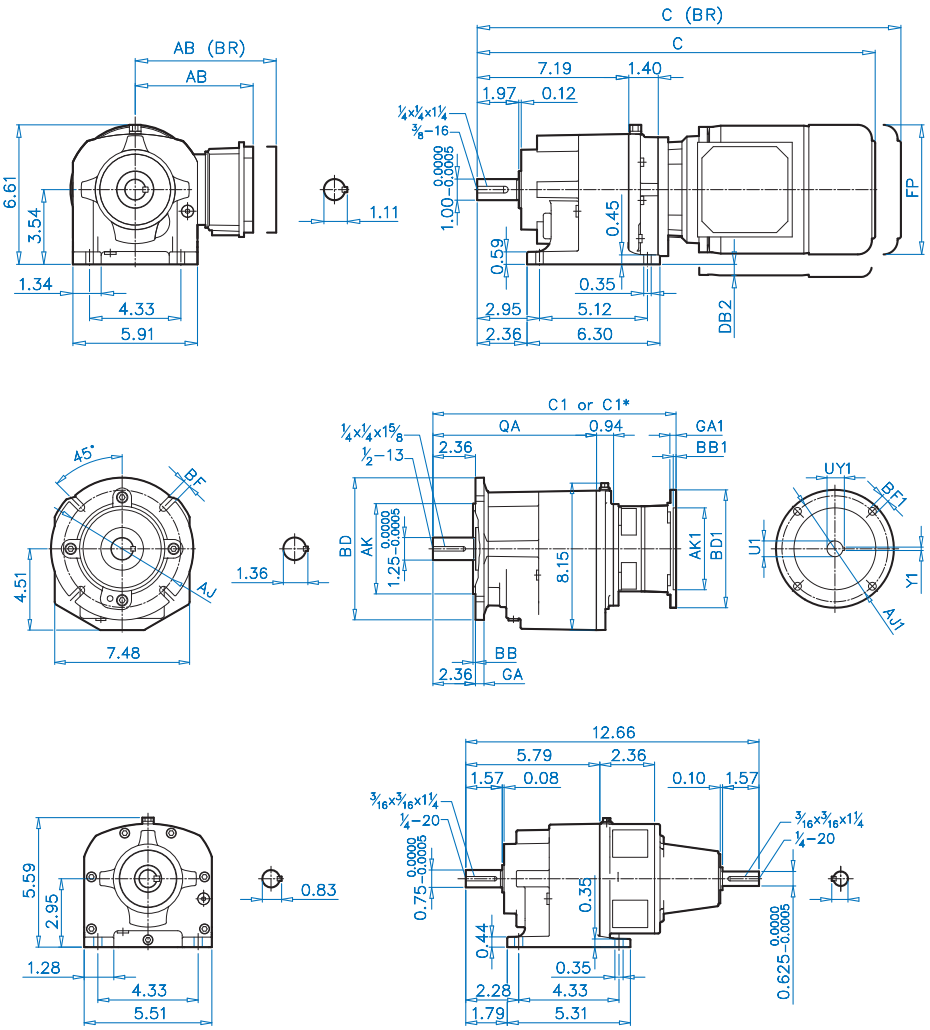
◈ The maximum input power limit shown is the largest motor power typically combined with the gear unit. These values shown are not the mechanical limit and often may be increased through discussion with our sales or engineering department.

* 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 and based on a 1750 rpm motor.

lb	W	56C	140TC	180TC	210TC	250TC	280TC
SK 973.1	282	267	272	287	287	318	340

Gearmotors & C-Face Reducers

- SK 072.1
- SK 172.1
- SK 372.1
- SK 373.1
- SK 572.1
- SK 573.1
- SK 672.1
- SK 772.1
- SK 773.1
- SK 872.1
- SK 873.1
- SK 972.1
- SK 973.1



DRIVESYSTEMS

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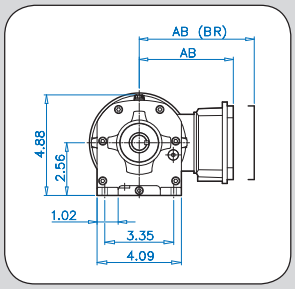
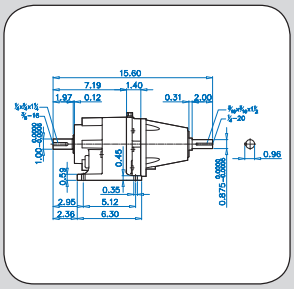
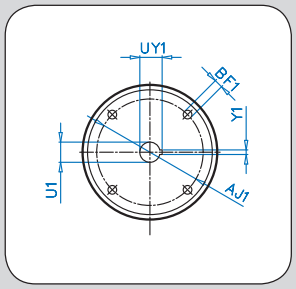
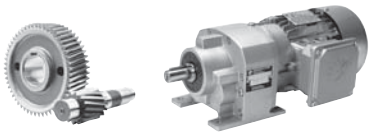




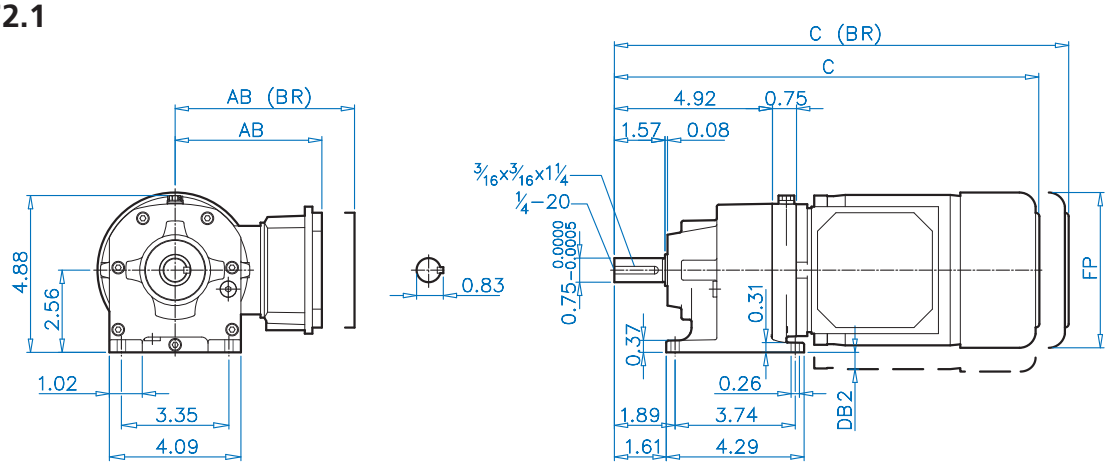


SK 072.1 - Motor
SK 072.1F - Motor

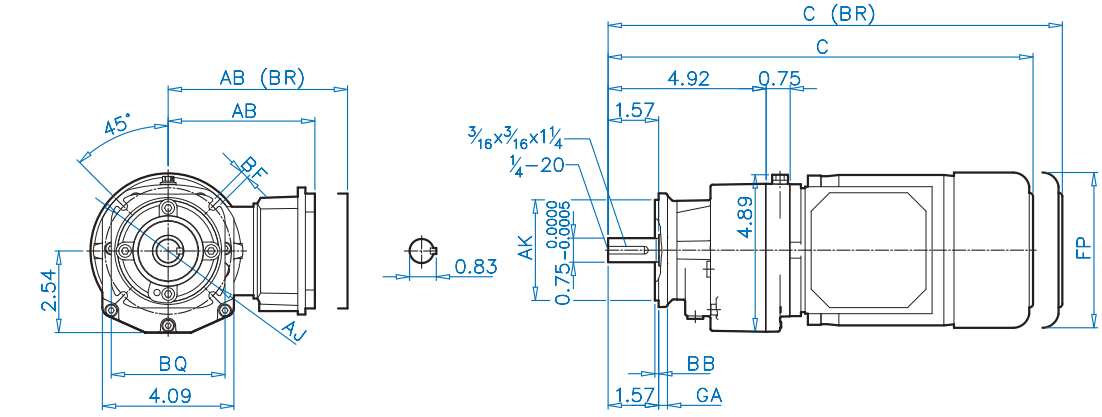


DRIVESYSTEMS

SK 072.1



SK 072.1F



DIMENSIONS

Dimensions in Inches

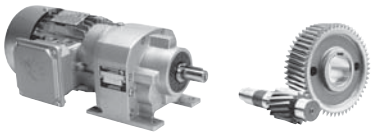
Mounting Flange

BD (mm)	BQ	AJ	AK		BB	BF	GA
4.72 (120)	3.54	3.937	3.150	+0.0005 -0.0004	0.12	0.26	0.28
5.51 (140)	4.33	4.528	3.740	+0.0005 -0.0004	0.12	0.35	0.35
6.30 (160)	4.92	5.118	4.331	+0.0005 -0.0004	0.14	0.35	0.39

Motor Dimensions

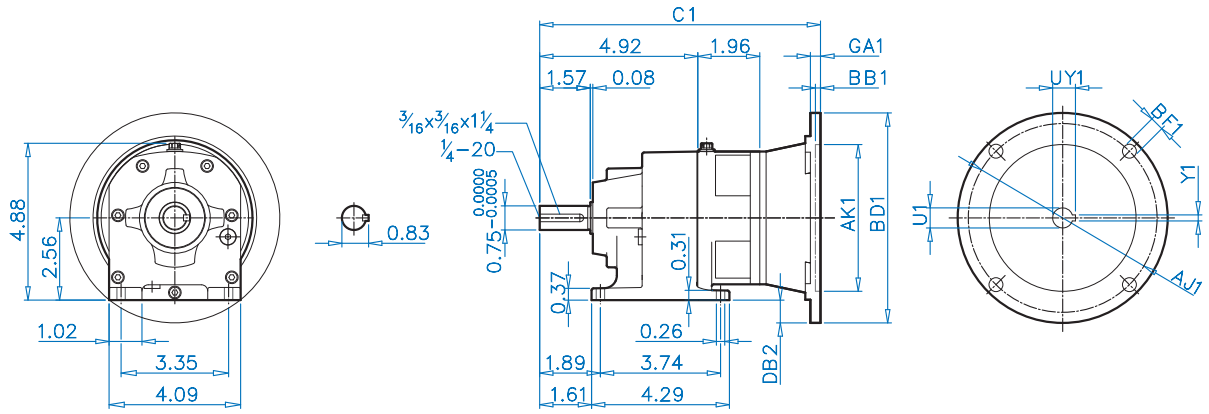
Standard efficiency	63S/L	71S/L
Energy efficiency		
AB	4.51	4.86
AB (BR)	4.84	5.24
C	13.24	14.11
C (BR)	15.44	16.39
FP	5.08	5.72
DB2	0.30	0.30

(BR) Denotes Brakemotor

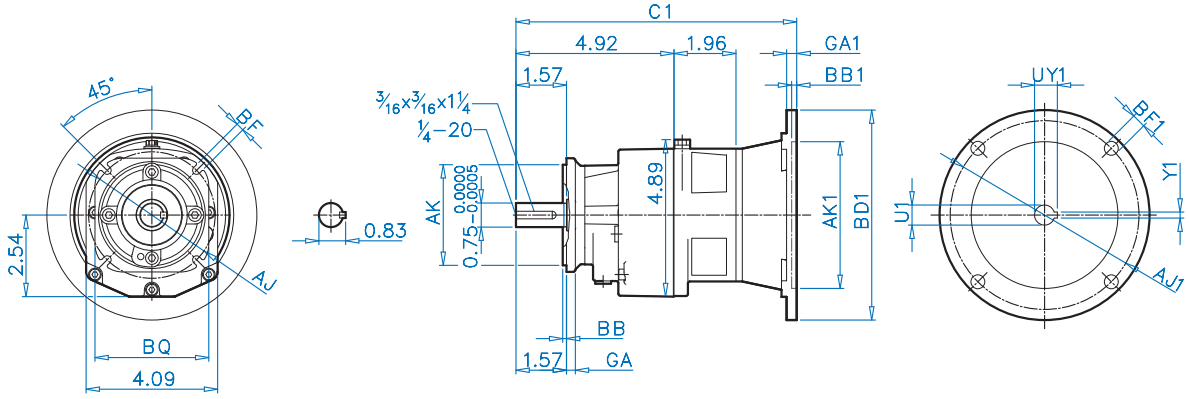


SK 072.1 - NEMA
SK 072.1F - NEMA

SK 072.1



SK 072.1F



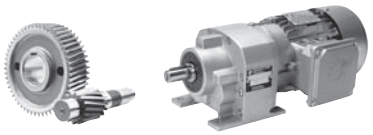
Mounting Flange

BD (mm)	BQ	AJ	AK		BB	BF	GA
4.72 (120)	3.54	3.937	3.150	+0.0005 -0.0004	0.12	0.26	0.28
5.51 (140)	4.33	4.528	3.740	+0.0005 -0.0004	0.12	0.35	0.35
6.30 (160)	4.92	5.118	4.331	+0.0005 -0.0004	0.14	0.35	0.39

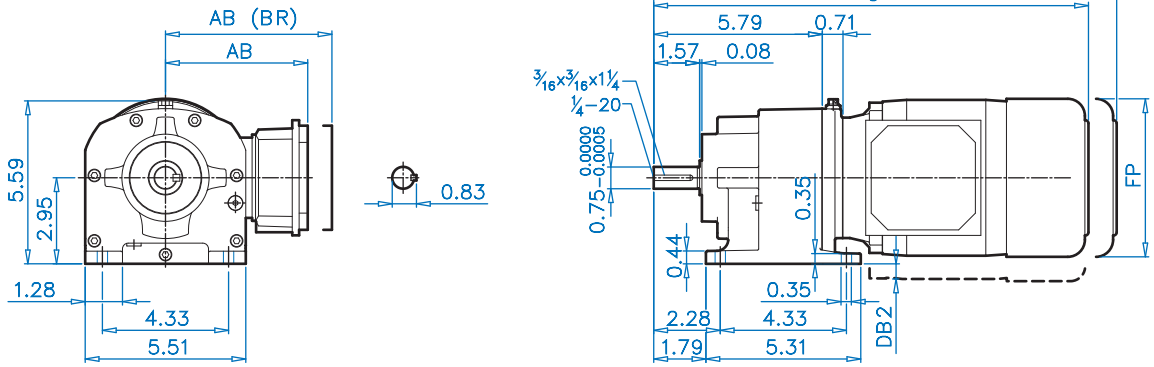
NEMA Dimensions

Type	AJ1	AK1	BB1	BD1	BF1	GA1	U1	UY1	Y1	C1	DB2
48C	3.750	3.000	0.188	4.33	0.28	0.39	0.500	0.56	0.125	8.30	-
56C	5.875	4.500	0.18	6.54	0.43	0.47	0.625	0.71	0.188	8.70	0.71

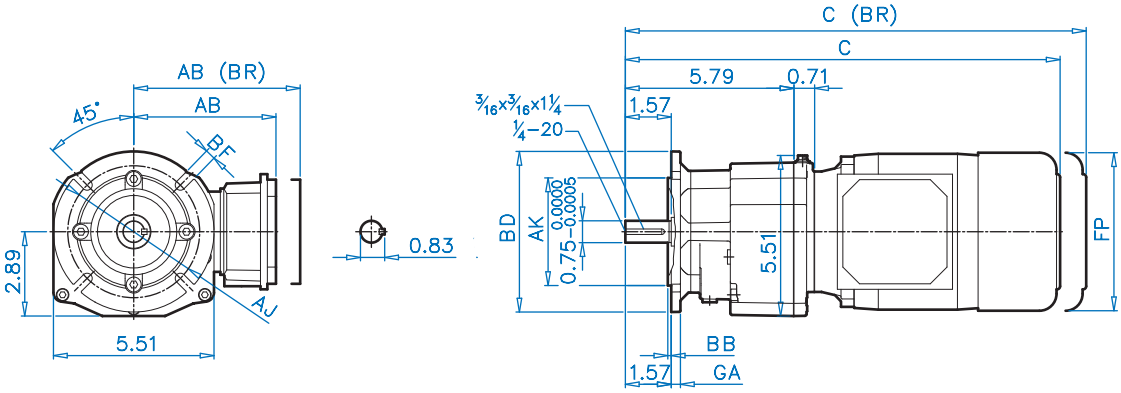
SK 172.1 - Motor
SK 172.1F - Motor



SK 172.1



SK 172.1F



DIMENSIONS — Dimensions in Inches

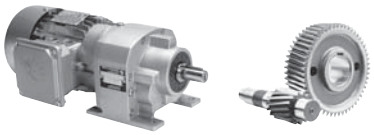
Mounting Flange

BD (mm)	AJ	AK		BB	BF	GA
4.72 (120)	3.94	3.150	+0.0005 -0.0004	0.12	0.26	0.31
5.51 (140)	4.53	3.740	+0.0005 -0.0004	0.12	0.35	0.31
6.30 (160)	5.12	4.331	+0.0005 -0.0004	0.14	0.35	0.39
7.87 (200)	6.50	5.118	+0.0005 -0.0004	0.14	0.43	0.47

Motor Dimensions

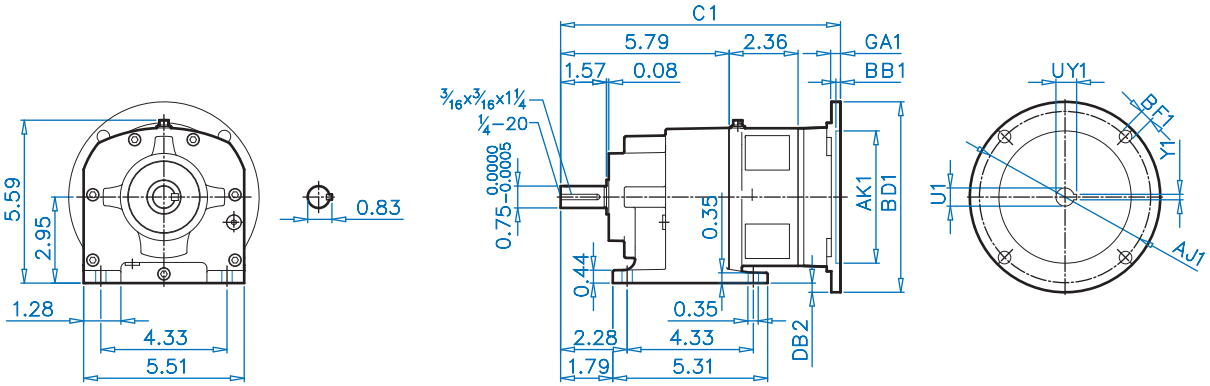
Standard efficiency	63S/L	71S/L	80S/L	90S/L
Energy efficiency			80LH	90SH/LH
Premium efficiency			80LP	90SP/LP
AB	4.51	4.86	5.59	5.79
AB (BR)	4.84	5.24	5.59	5.79
C	14.07	14.93	15.80	17.33
C (BR)	16.27	17.22	18.32	20.29
FP	5.08	5.72	6.43	7.19
DB2	-	-	0.30	0.65

(BR) Denotes Brakemotor

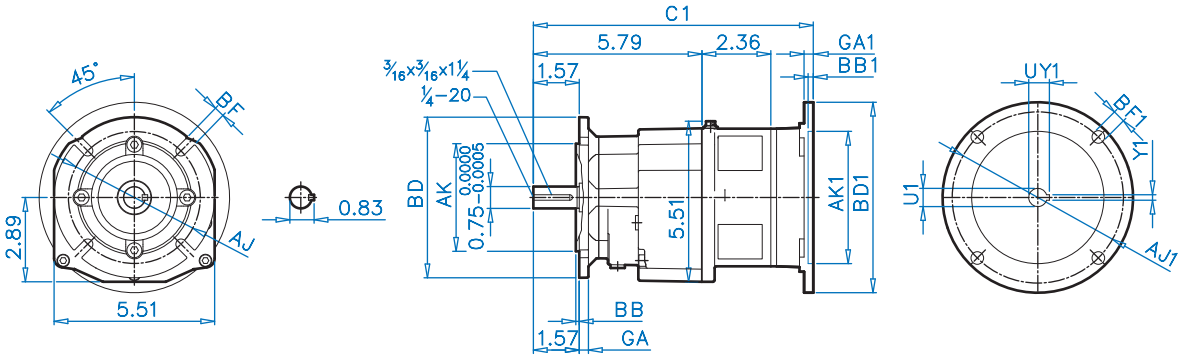


SK 172.1 - NEMA
SK 172.1F - NEMA

SK 172.1



SK 172.1F

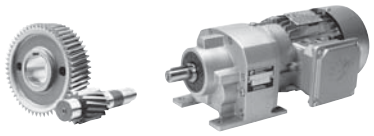


Mounting Flange

BD (mm)	AJ	AK		BB	BF	GA
4.72 (120)	3.94	3.150	+0.0005 -0.0004	0.12	0.26	0.31
5.51 (140)	4.53	3.740	+0.0005 -0.0004	0.12	0.35	0.31
6.30 (160)	5.12	4.331	+0.0005 -0.0004	0.14	0.35	0.39
7.87 (200)	6.50	5.118	+0.0005 -0.0004	0.14	0.43	0.47

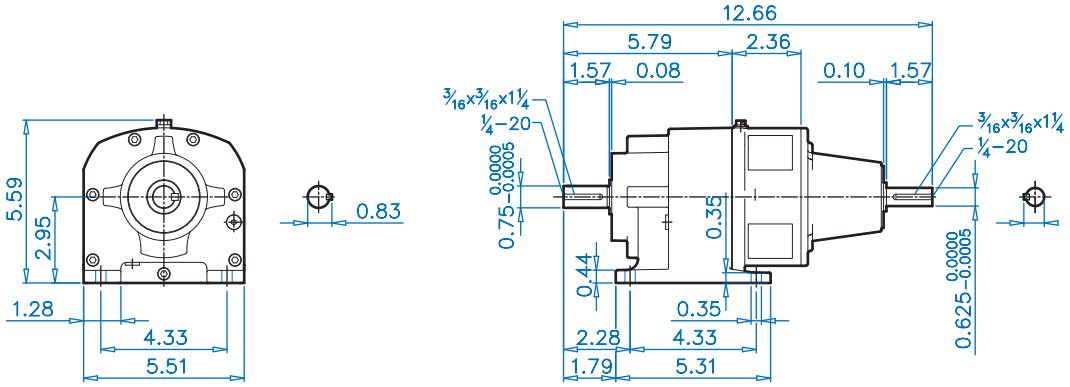
NEMA Dimensions

Type	AJ1	AK1	BB1	BD1	BF1	GA1	U1	UY1	Y1	C1	DB2
56C	5.875	4.500	0.18	6.54	0.43	0.47	0.625	0.71	0.188	9.62	0.32
140TC	5.875	4.500	0.18	6.54	0.43	0.47	0.875	0.96	0.188	10.09	0.32

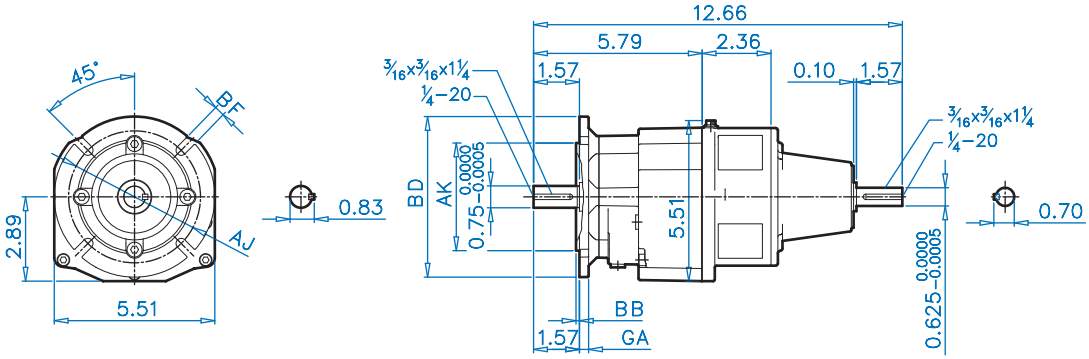


DRIVESYSTEMS

SK 172.1



SK 172.1F

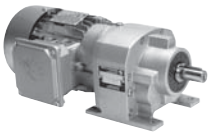


DIMENSIONS

Dimensions in Inches

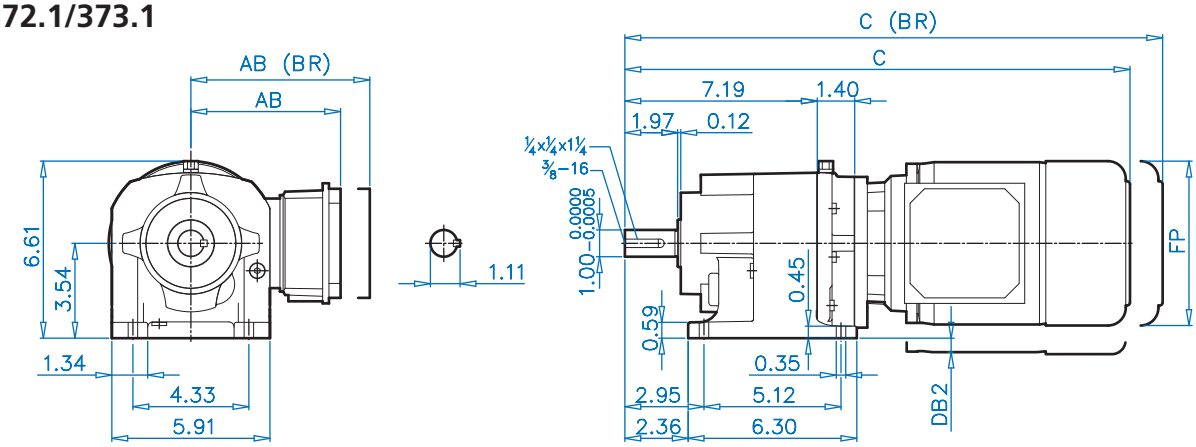
Mounting Flange

BD (mm)	AJ	AK		BB	BF	GA
4.72 (120)	3.94	3.150	+0.0005 -0.0004	0.12	0.26	0.31
5.51 (140)	4.53	3.740	+0.0005 -0.0004	0.12	0.35	0.31
6.30 (160)	5.12	4.331	+0.0005 -0.0004	0.14	0.35	0.39
7.87 (200)	6.50	5.118	+0.0005 -0.0004	0.14	0.43	0.47

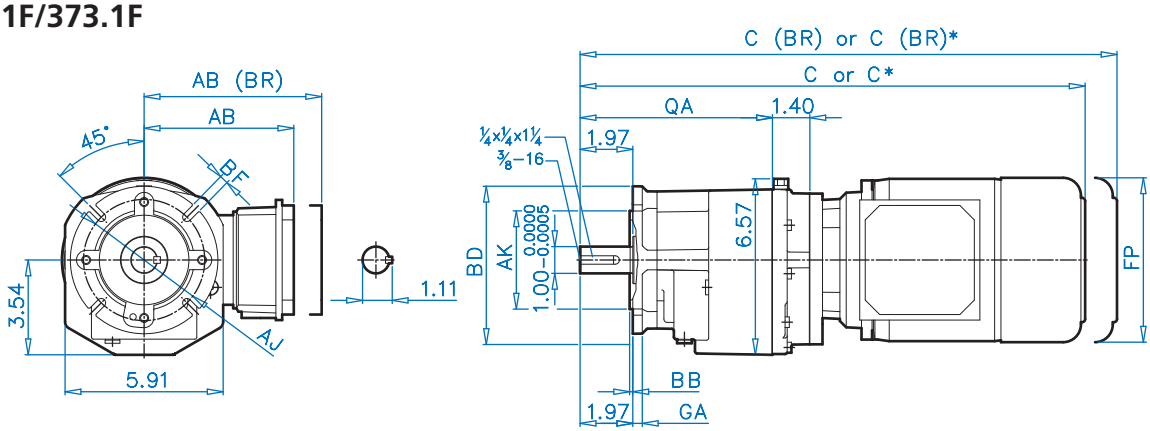


SK 372.1/373.1 + Motor
SK 372.1 F/373.1F + Motor

SK372.1/373.1



SK372.1F/373.1F



Mounting Flange

BD (mm)	AJ	AK		BB	BF	GA	QA	Style
4.72 (120)*	3.94	3.150	+0.0005 -0.0004	0.12	0.26	0.28	8.27	2
5.51 (140)	4.53	3.740	+0.0005 -0.000	0.12	0.35	0.35	7.17	1
6.30 (160)	5.12	4.331	+0.0005 -0.000	0.14	0.35	0.39	7.17	1
7.87 (200)	6.50	5.118	+0.0005 -0.000	0.14	0.43	0.47	7.17	1
9.84 (250)	8.46	7.087	+0.0005 -0.000	0.16	0.53	0.59	7.17	1

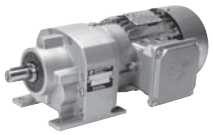
Motor Dimensions

Standard efficiency	63S/L	71S/L	80S/L	90S/L	100L
Energy efficiency			80LH	90SH/LH	100LH
Premium efficiency			80LP	90SP/LP	100LP
AB	4.51	4.86	5.59	5.79	6.65
AB (BR)	4.84	5.24	5.59	5.79	6.77
C	16.32	17.89	18.88	20.45	21.67
C (BR)	18.52	20.17	21.40	23.40	25.27
C* [style 2 flange]	17.42	18.99	19.98	21.55	22.77
C* (BR) [style 2 flange]	19.62	21.28	22.50	24.51	26.38
FP	5.08	5.72	6.43	7.19	7.90
DB2	-	-	-	0.06	0.42

*** When using the 4.72 (120) flange, the C1 and QA dimensions become larger.**

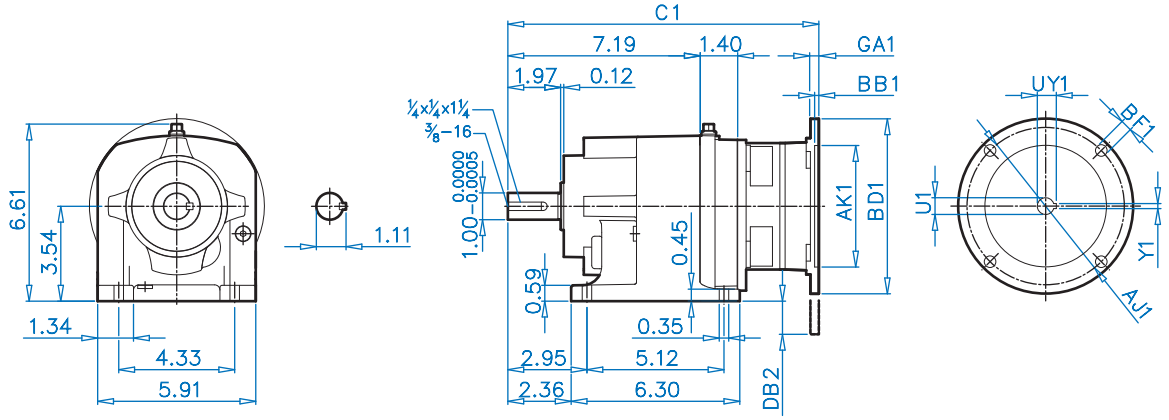
(BR) Denotes Brakemotor

SK 372.1/373.1 - NEMA
SK 372.1F/373.1F - NEMA

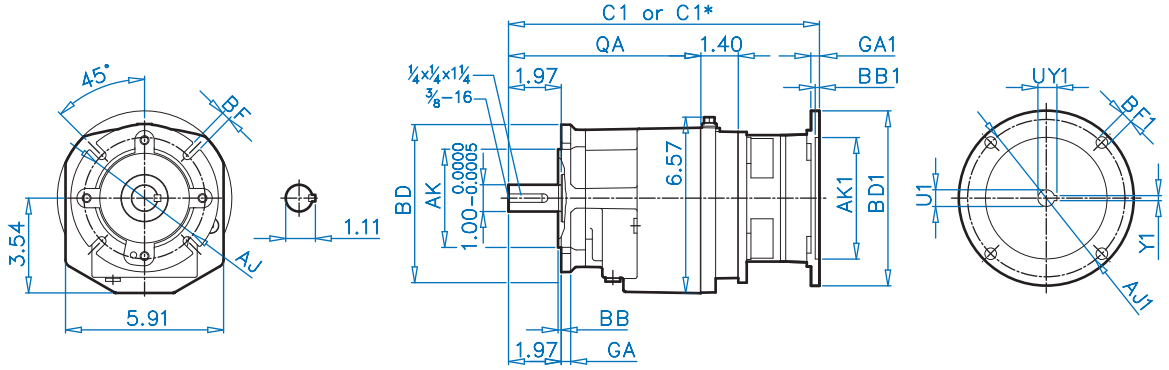


DRIVESYSTEMS

SK 372.1/373.1



SK 372.1F/373.1F



DIMENSIONS

Dimensions in Inches

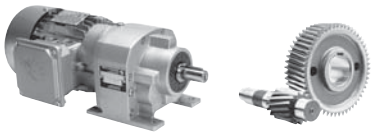
Mounting Flange

BD (mm)	AJ	AK		BB	BF	GA	QA	Style
4.72 (120)*	3.94	3.150	+0.0005 -0.0004	0.12	0.26	0.28	8.27	2
5.51 (140)	4.53	3.740	+0.0005 -0.000	0.12	0.35	0.35	7.17	1
6.30 (160)	5.12	4.331	+0.0005 -0.000	0.14	0.35	0.39	7.17	1
7.87 (200)	6.50	5.118	+0.0005 -0.000	0.14	0.43	0.47	7.17	1
9.84 (250)	8.46	7.087	+0.0005 -0.000	0.16	0.53	0.59	7.17	1

NEMA Dimensions

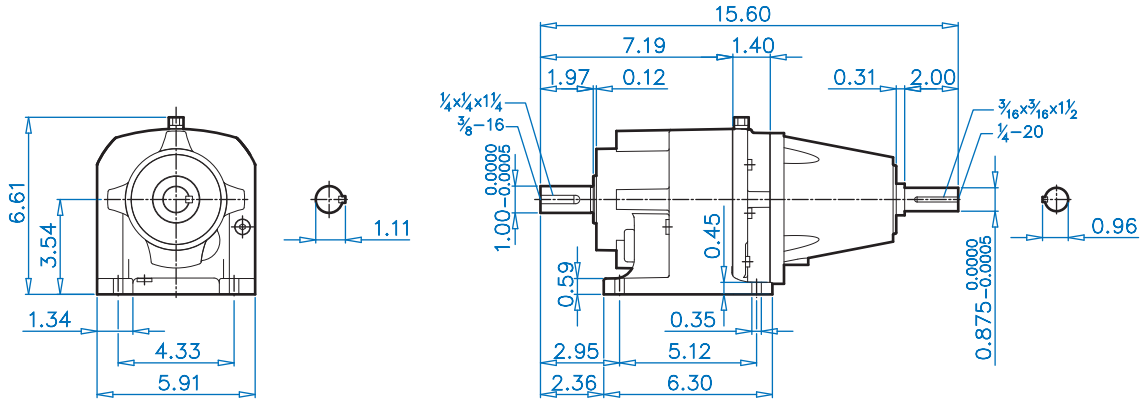
Type	AJ1	AK1	BB1	BD1	BF1	GA1	U1	UY1	Y1	C1	C1*	DB2
56C	5.875	4.500	0.18	6.54	0.43	0.47	0.625	0.71	0.188	12.25	13.35	-
140TC	5.875	4.500	0.18	6.54	0.43	0.47	0.875	0.96	0.188	12.72	13.82	-
180TC	7.250	8.500	0.23	9.17	0.59	0.71	1.125	1.24	0.250	12.95	14.05	1.05

*** When using the 4.72 (120) flange, the C1 and QA dimensions become larger.**

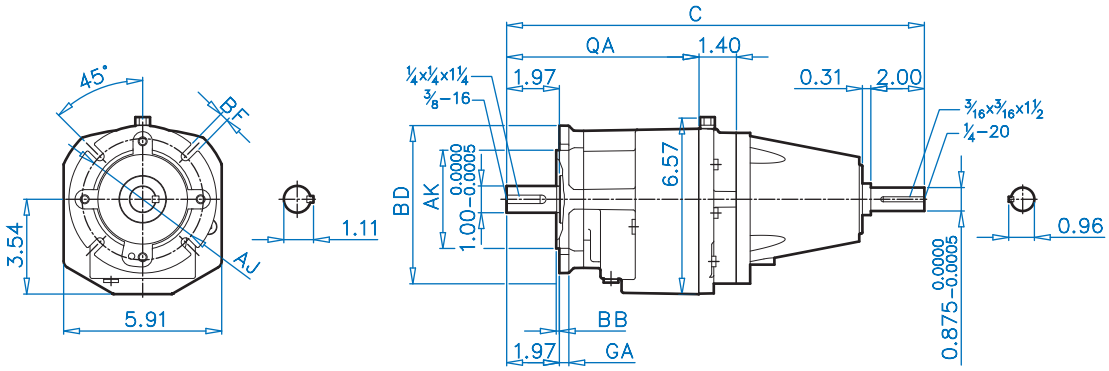


SK 372.1/373.1 - W
SK 372.1 F/373.1F - W

372.1/373.1



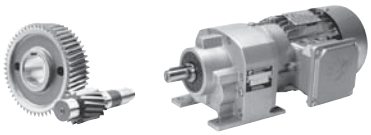
372.1F/373.1F



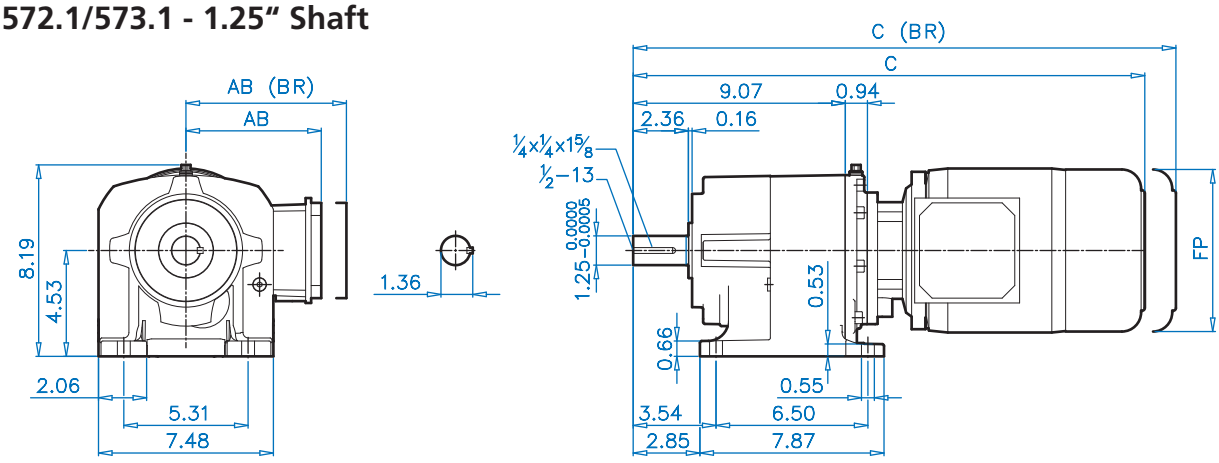
Mounting Flange

BD (mm)	AJ	AK		BB	BF	GA	QA	Style	C
4.72 (120)*	3.94	3.150	+0.0005 -0.0004	0.12	0.26	0.28	8.27	2	16.70
5.51 (140)	4.53	3.740	+0.0005 -0.000	0.12	0.35	0.35	7.17	1	15.59
6.30 (160)	5.12	4.331	+0.0005 -0.000	0.14	0.35	0.39	7.17	1	15.59
7.87 (200)	6.50	5.118	+0.0005 -0.000	0.14	0.43	0.47	7.17	1	15.59
9.84 (250)	8.46	7.087	+0.0005 -0.000	0.16	0.53	0.59	7.17	1	15.59

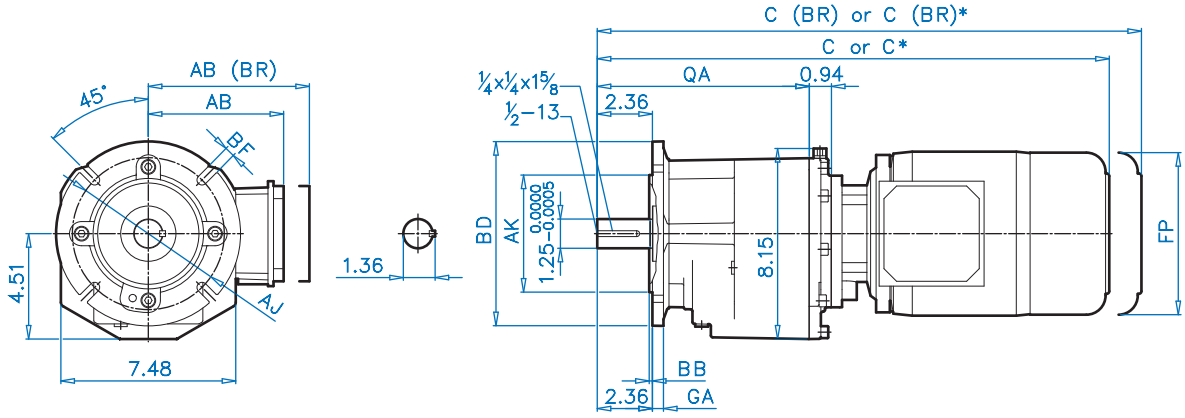
*** When using the 4.72 (120) flange, the C and QA dimensions are larger.**



SK 572.1/573.1 - 1.25" Shaft



SK 572.1F/573.1F - 1.25" Shaft



DIMENSIONS

Dimensions in Inches

Mounting Flange

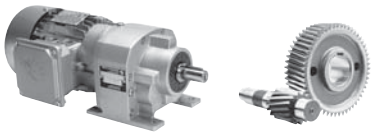
BD (mm)	AJ	AK		BB	BF	GA	QA	Style
5.51 (140)*	4.53	3.740	+0.0005 -0.000	0.12	0.35	0.35	10.35	2
6.30 (160)*	5.12	4.331	+0.0005 -0.000	0.14	0.35	0.39	10.35	2
7.87 (200)	6.50	5.118	+0.0005 -0.000	0.14	0.43	0.47	9.05	1
9.84 (250)	8.46	7.087	+0.0005 -0.000	0.16	0.53	0.59	9.05	1
11.81 (300)	10.43	9.055	+0.0006 -0.001	0.16	0.53	0.71	9.05	1

Motor Dimensions

Standard efficiency	63S/L	71S/L	80S/L	90S/L	100L	112M	
Energy efficiency			80LH	90SH/LH	100LH		112MH
Premium efficiency			80LP	90SP/LP	100LP		112MP
AB	4.51	4.86	5.59	5.79	6.65	7.05	7.05
AB (BR)	4.84	5.24	5.59	5.79	6.77	7.17	7.17
C	17.77	19.35	20.33	21.91	23.13	24.00	24.99
C (BR)	19.98	21.63	22.85	24.86	26.73	27.70	28.69
C* [style 2 flange]	19.07	20.65	21.63	23.20	24.43	25.30	26.29
C* (BR) [style 2 flange]	21.28	22.93	24.15	26.16	28.03	29.00	29.99
FP	5.08	5.72	6.43	7.19	7.90	8.87	8.87

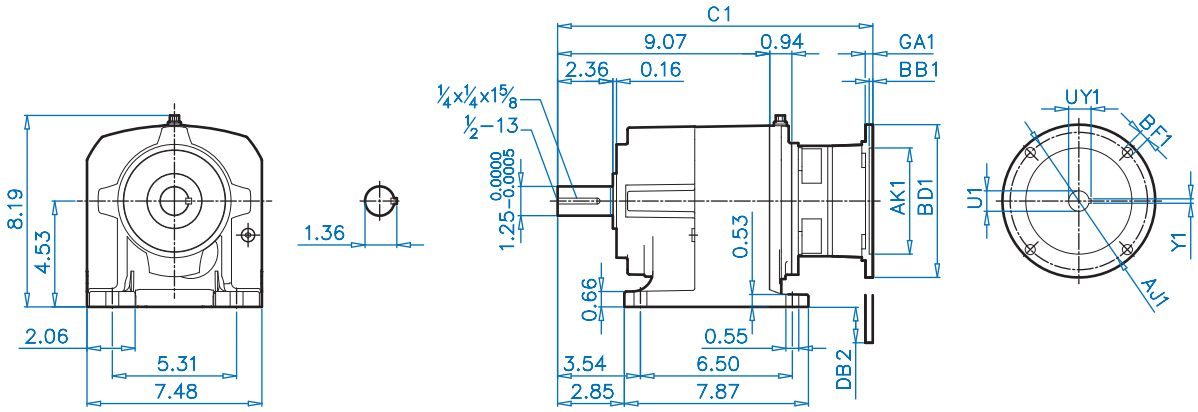
*** When using the 5.51 (140) flange or the 6.30 (160) flange, the C1 and QA dimensions become larger.**

(BR) Denotes Brakemotor

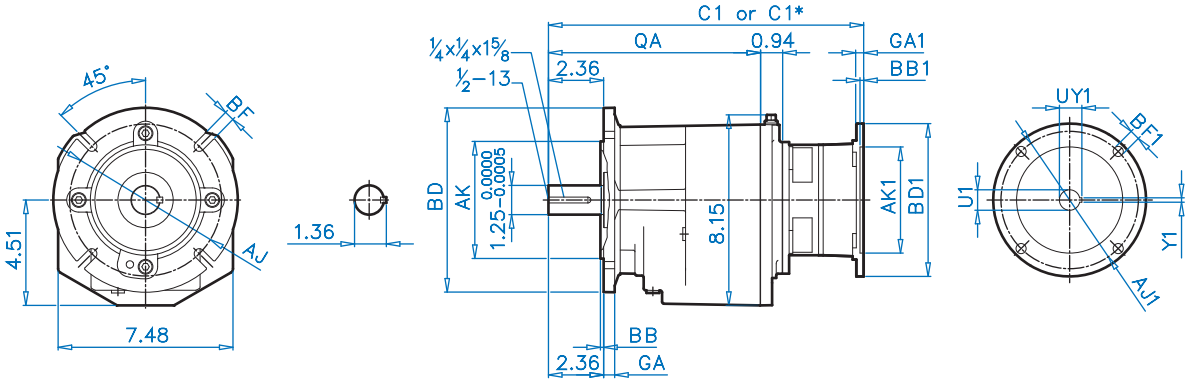


SK 572.1/573.1 - NEMA
SK 572.1F/573.1F - NEMA

SK 572.1/573.1 - 1.25" Shaft



SK 572.1F/573.1F - 1.25" Shaft



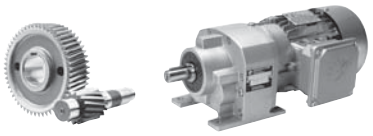
Mounting Flange

BD (mm)	AJ	AK		BB	BF	GA	QA	Style
5.51 (140)*	4.53	3.740	+0.0005 -0.000	0.12	0.35	0.35	10.35	2
6.30 (160)*	5.12	4.331	+0.0005 -0.000	0.14	0.35	0.39	10.35	2
7.87 (200)	6.50	5.118	+0.0005 -0.000	0.14	0.43	0.47	9.05	1
9.84 (250)	8.46	7.087	+0.0005 -0.000	0.16	0.53	0.59	9.05	1
11.81 (300)	10.43	9.055	+0.0006 -0.001	0.16	0.53	0.71	9.05	1

NEMA Dimensions

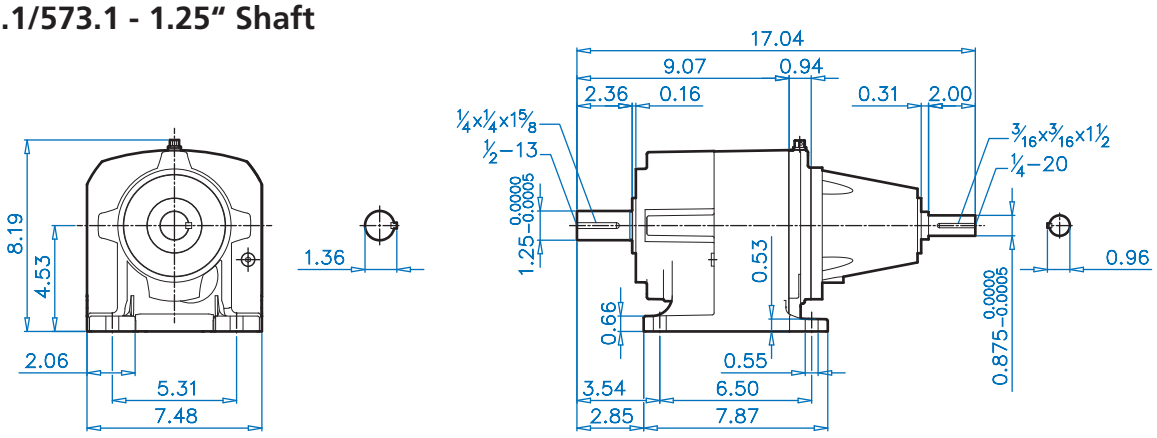
Type	AJ1	AK1	BB1	BD1	BF1	GA1	U1	UY1	Y1	C1	C1*	DB2
56C	5.875	4.500	0.18	6.54	0.43	0.47	0.625	0.71	0.188	13.70	15.00	-
140TC	5.875	4.500	0.18	6.54	0.43	0.47	0.875	0.96	0.188	14.17	15.47	-
180TC	7.250	8.500	0.23	9.17	0.59	0.71	1.125	1.24	0.250	14.40	15.70	0.06

*** When using the 5.51 (140) flange or the 6.30 (160) flange, the C1 and QA dimensions become larger.**

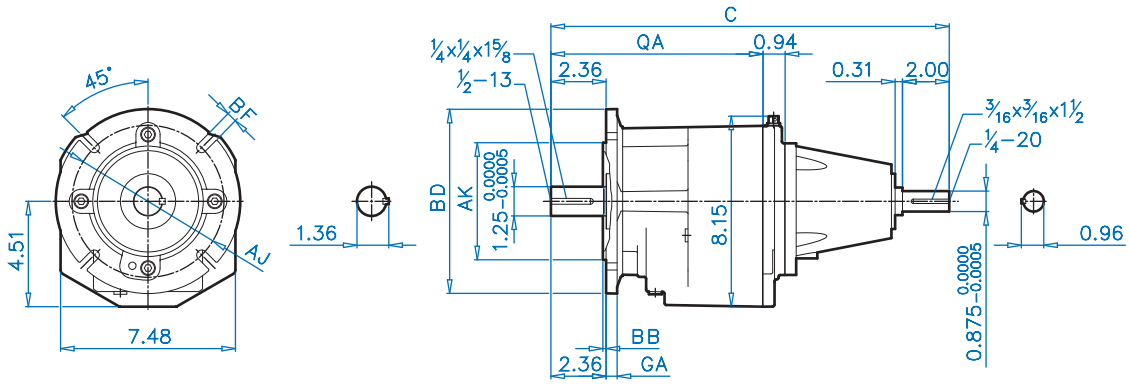


DRIVESYSTEMS

SK 572.1/573.1 - 1.25" Shaft



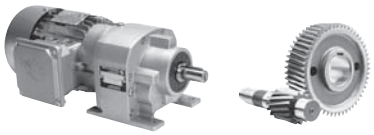
SK 572.1F/573.1F - 1.25" Shaft



Mounting Flange

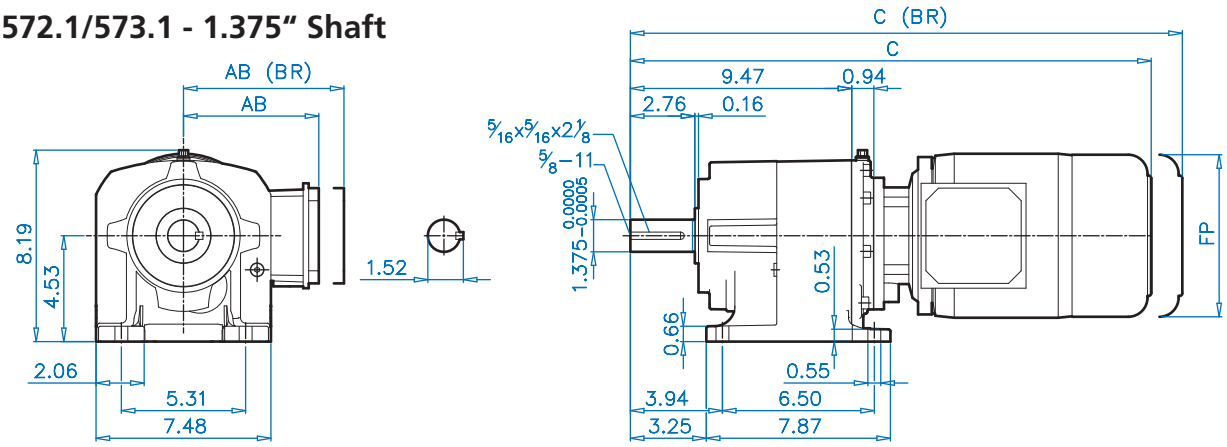
BD (mm)	AJ	AK		BB	BF	GA	QA	Style	C
5.51 (140)*	4.53	3.740	+0.0005 -0.000	0.12	0.35	0.35	10.35	2	18.33
6.30 (160)*	5.12	4.331	+0.0005 -0.000	0.14	0.35	0.39	10.35	2	18.33
7.87 (200)	6.50	5.118	+0.0005 -0.000	0.14	0.43	0.47	9.05	1	17.04
9.84 (250)	8.46	7.087	+0.0005 -0.000	0.16	0.53	0.59	9.05	1	17.04
11.81 (300)	10.43	9.055	+0.0006 -0.001	0.16	0.53	0.71	9.05	1	17.04

*** When using the 5.51 (140) flange or the 6.30 (160) flange, the C and QA dimensions become larger.**

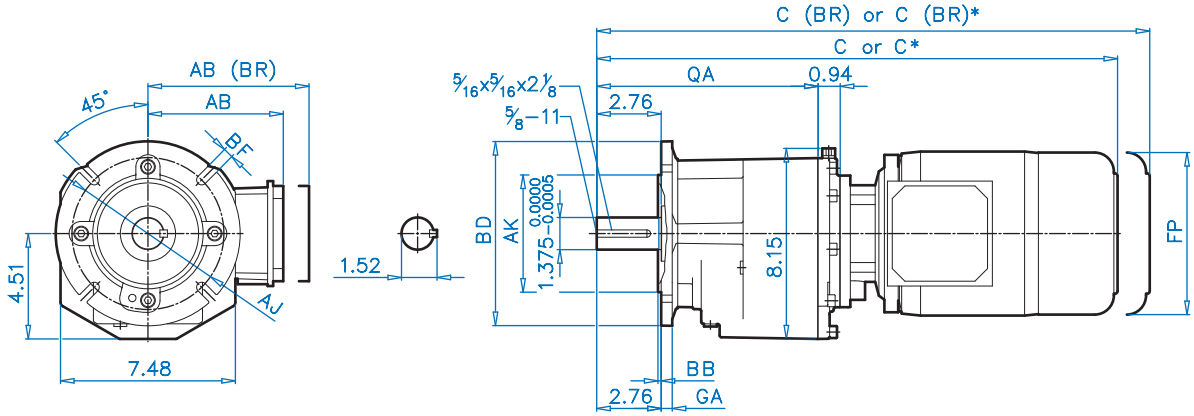


SK 572.1/573.1 + Motor
SK 572.1F/573.1F + Motor

SK 572.1/573.1 - 1.375" Shaft



SK 572.1F/573.1F - 1.375" Shaft



Mounting Flange

BD (mm)	AJ	AK		BB	BF	GA	QA	Style
5.51 (140)*	4.53	3.740	+0.0005 -0.000	0.12	0.35	0.35	10.75	2
6.30 (160)*	5.12	4.331	+0.0005 -0.000	0.14	0.35	0.39	10.75	2
7.87 (200)	6.50	5.118	+0.0005 -0.000	0.14	0.43	0.47	9.45	1
9.84 (250)	8.46	7.087	+0.0005 -0.000	0.16	0.53	0.59	9.45	1
11.81 (300)	10.43	9.055	+0.0006 -0.001	0.16	0.53	0.71	9.45	1

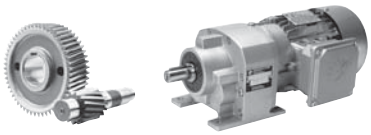
Motor Dimensions

Standard efficiency	63S/L	71S/L	80S/L	90S/L	100L	112M	
Energy efficiency			**80LH**	**90SH/LH**	**100LH**		**112MH**
Premium efficiency			80LP	90SP/LP	100LP		112MP
AB	4.51	4.86	5.59	5.79	6.65	7.05	7.05
AB (BR)	4.84	5.24	5.59	5.79	6.77	7.17	7.17
C	18.17	19.75	20.73	22.31	23.53	24.40	25.39
C (BR)	20.38	22.03	23.25	25.26	27.13	28.10	29.09
C* [style 2 flange]	19.47	21.05	22.03	23.61	24.83	25.70	26.69
C* (BR) [style 2 flange]	21.68	23.33	24.55	26.56	28.43	29.40	30.39
FP	5.08	5.72	6.43	7.19	7.90	8.87	8.87

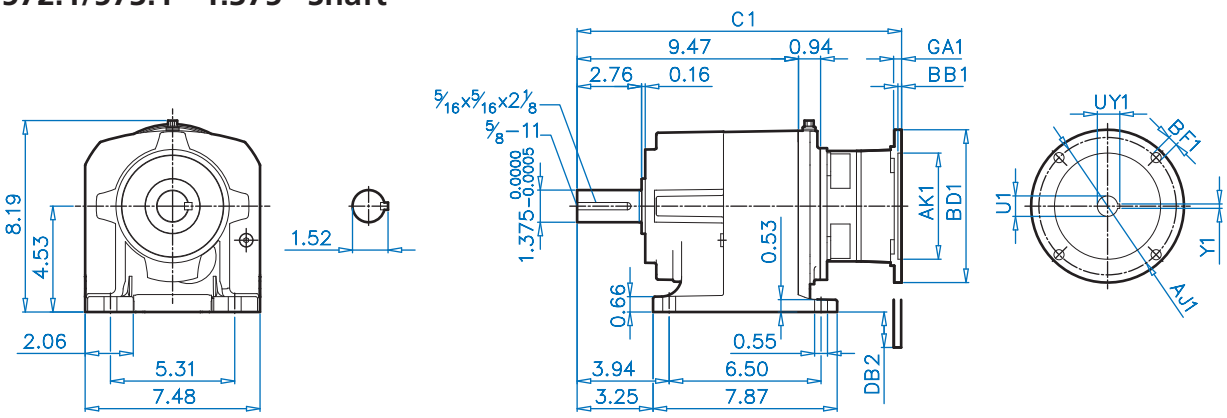
*** When using the 5.51 (140) flange or the 6.30 (160) flange, the C1 and QA dimensions become larger.**

(BR) Denotes Brakemotor

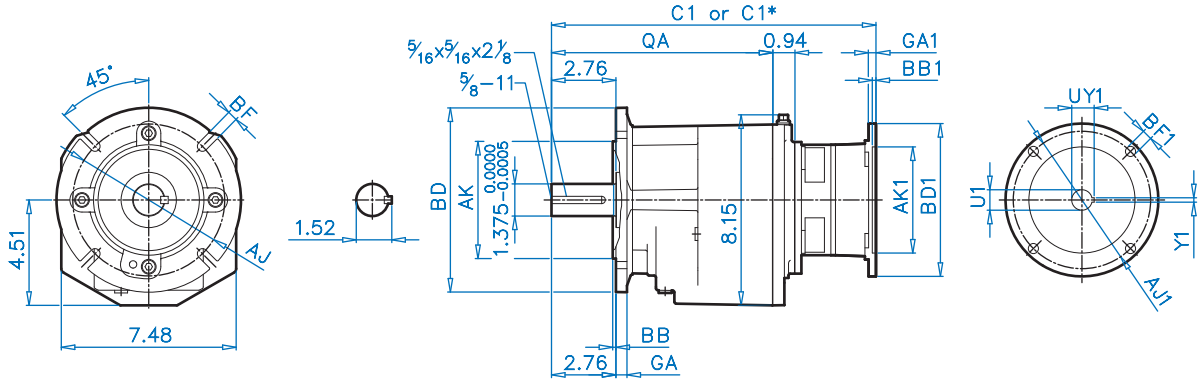
SK 572.1/573.1 - NEMA
SK 572.1F/573.1F - NEMA



SK 572.1/573.1 - 1.375" Shaft



SK 572.1F/573.1F - 1.375" Shaft



DIMENSIONS

Dimensions in Inches

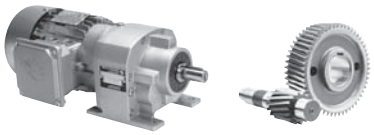
Mounting Flange

BD (mm)	AJ	AK		BB	BF	GA	QA	Style
5.51 (140)*	4.53	3.740	+0.0005 -0.000	0.12	0.35	0.35	10.75	2
6.30 (160)*	5.12	4.331	+0.0005 -0.000	0.14	0.35	0.39	10.75	2
7.87 (200)	6.50	5.118	+0.0005 -0.000	0.14	0.43	0.47	9.45	1
9.84 (250)	8.46	7.087	+0.0005 -0.000	0.16	0.53	0.59	9.45	1
11.81 (300)	10.43	9.055	+0.0006 -0.001	0.16	0.53	0.71	9.45	1

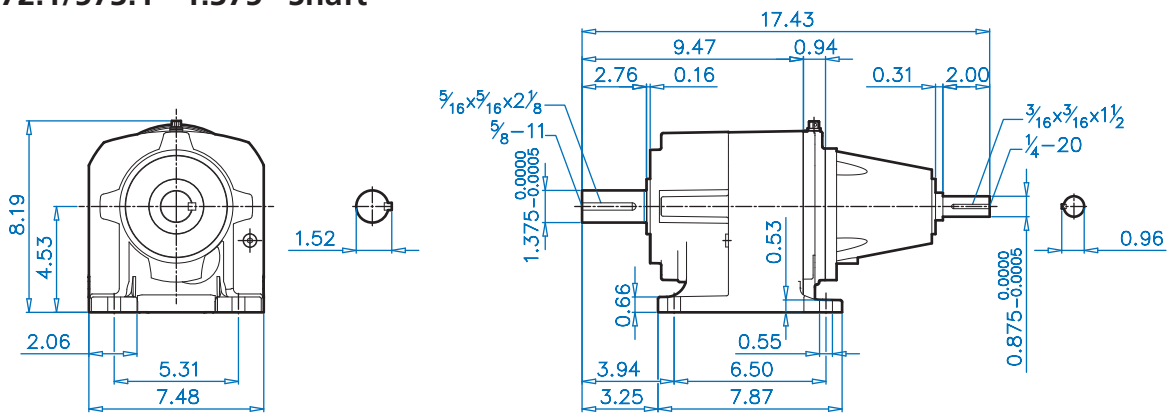
NEMA Dimensions

Type	AJ1	AK1	BB1	BD1	BF1	GA1	U1	UY1	Y1	C1	C1*	DB2
56C	5.875	4.500	0.18	6.54	0.43	0.47	0.625	0.71	0.188	14.10	15.40	-
140TC	5.875	4.500	0.18	6.54	0.43	0.47	0.875	0.96	0.188	14.58	15.87	-
180TC	7.250	8.500	0.23	9.17	0.59	0.71	1.125	1.24	0.250	14.80	16.10	0.06

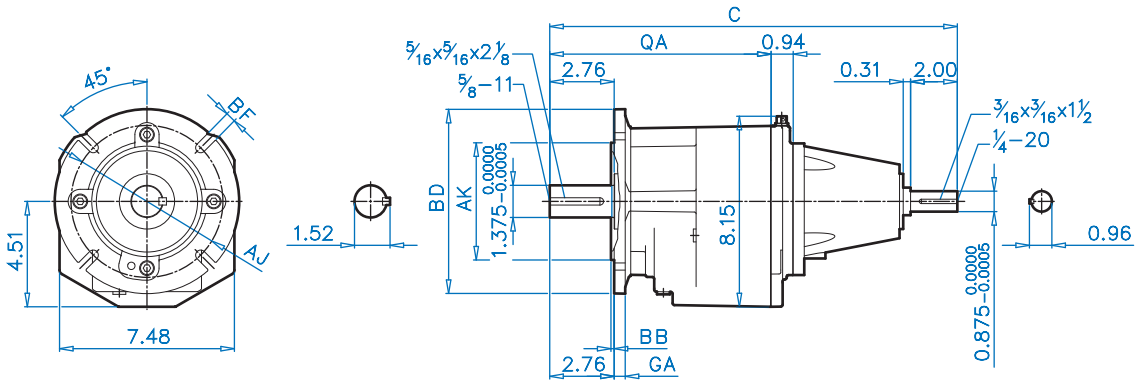
*** When using the 5.51 (140) flange or the 6.30 (160) flange, the C1 and QA dimensions become larger.**



SK 572.1/573.1 - 1.375" Shaft



SK 572.1F/573.1F - 1.375" Shaft

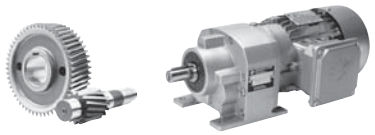


Mounting Flange

BD (mm)	AJ	AK		BB	BF	GA	QA	Style	C
5.51 (140)*	4.53	3.740	+0.0005 -0.000	0.12	0.35	0.35	10.75	2	18.73
6.30 (160)*	5.12	4.331	+0.0005 -0.000	0.14	0.35	0.39	10.75	2	18.73
7.87 (200)	6.50	5.118	+0.0005 -0.000	0.14	0.43	0.47	9.45	1	17.44
9.84 (250)	8.46	7.087	+0.0005 -0.000	0.16	0.53	0.59	9.45	1	17.44
11.81 (300)	10.43	9.055	+0.0006 -0.001	0.16	0.53	0.71	9.45	1	17.44

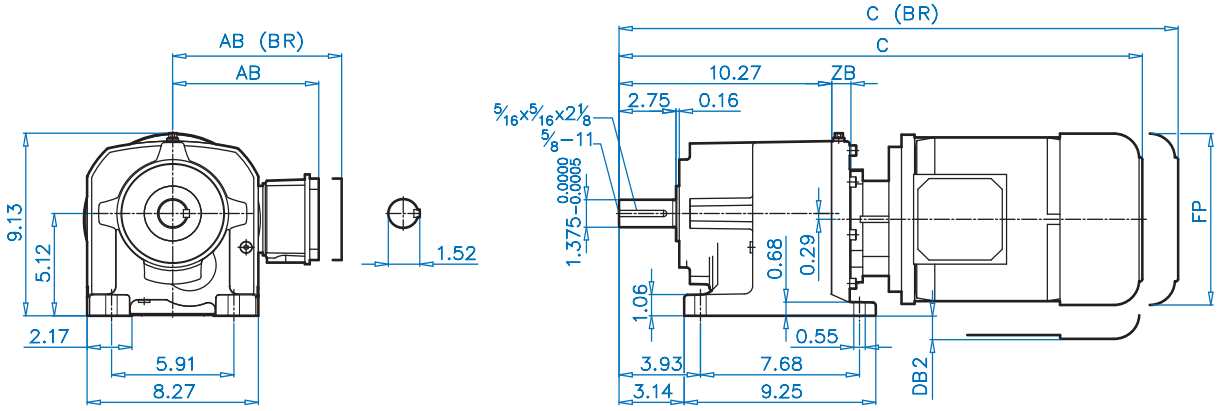
*** When using the 5.51 (140) flange or the 6.30 (160) flange, the C and QA dimensions become larger.**

SK 672.1/673.1 - Motor
SK 672.1F/673.1F - Motor

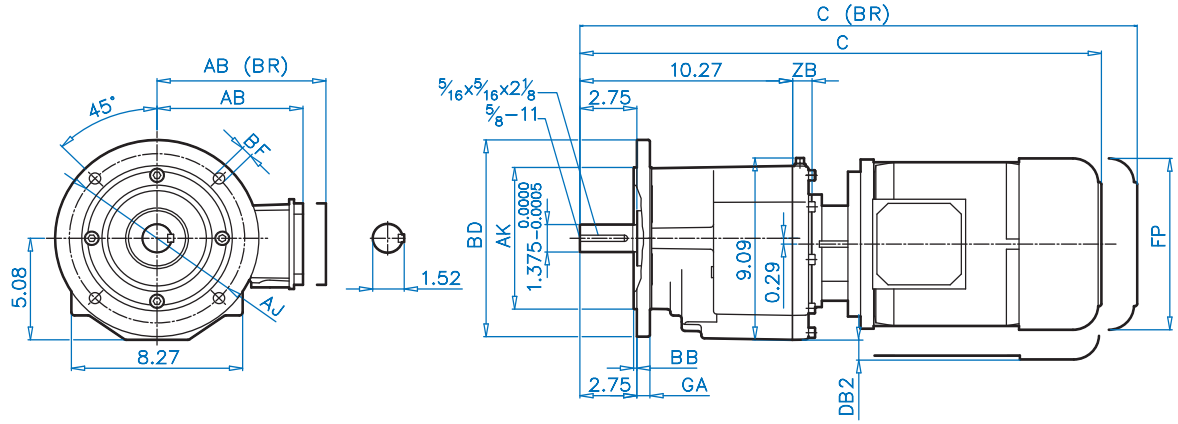


DRIVESYSTEMS

SK 672.1/673.1



SK 672.1F/673.1F



DIMENSIONS — Dimensions in Inches

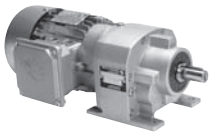
Mounting Flange

BD (mm)	AJ	AK		BB	BF	GA
7.87 (200)	6.50	5.118	+0.0005 -0.000	0.14	0.43	0.47
9.84 (250)	8.46	7.087	+0.0005 -0.000	0.16	0.55	0.63

Motor Dimensions

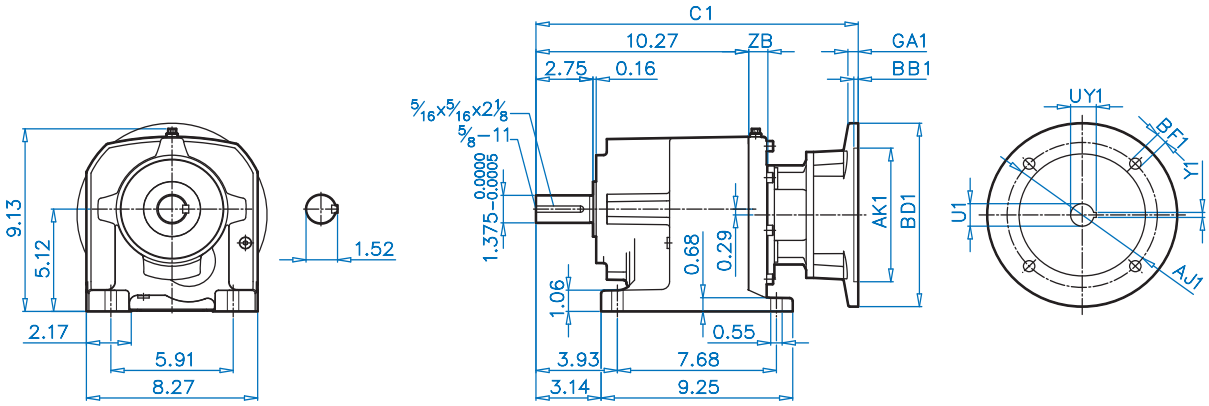
Standard efficiency	63S/L	71S/L	80S/L	90S/L	100L	112M		132S/M
Energy efficiency			80LH	90SH/LH	100LH		112MH	132SH/MH
Premium efficiency			80LP	90SP/LP	100LP		112MP	132SP/MP
AB	4.51	4.86	5.59	5.79	6.65	7.05	7.05	8.03
AB (BR)	4.84	5.24	5.59	5.79	6.77	7.17	7.17	7.91
C	18.93	20.50	21.49	23.06	24.28	25.15	26.14	28.57
C (BR)	21.13	22.79	24.01	26.01	27.88	28.85	29.84	32.79
FP	5.08	5.72	6.43	7.19	7.90	8.87	8.87	10.45
DB2	-	-	-	-	-	-	-	0.11
ZB	0.93	0.93	0.93	0.93	0.93	0.93	0.93	1.16

(BR) Denotes Brakemotor

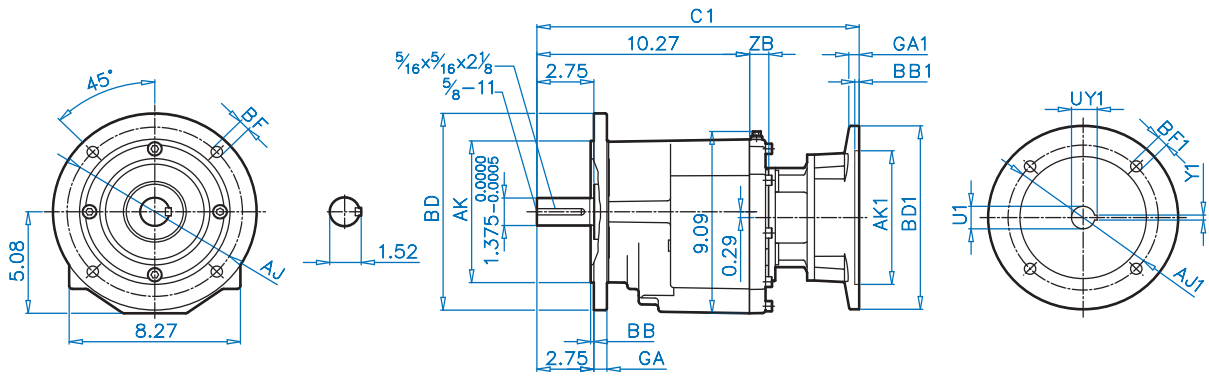


SK 672.1/673.1 - NEMA
SK 672.1F/673.1F - NEMA

SK 672.1/673.1



SK 672.1F/673.1F

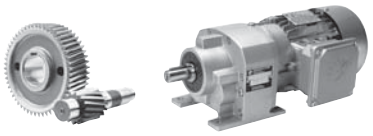


Mounting Flange

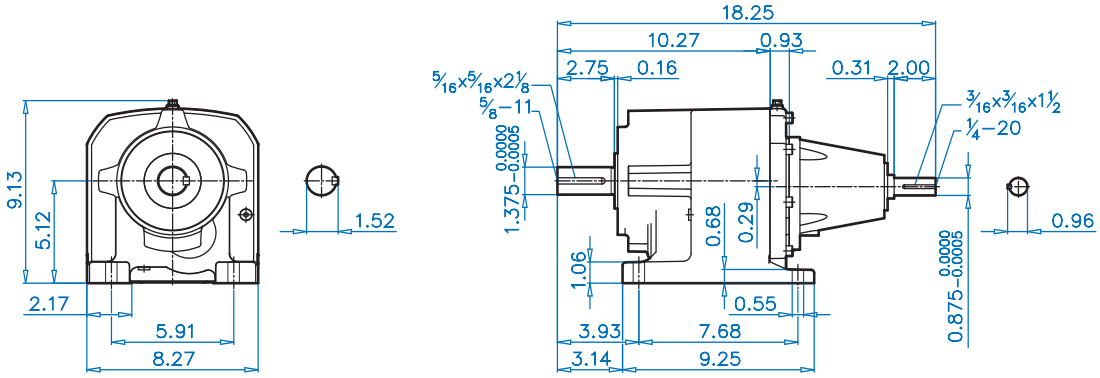
BD (mm)	AJ	AK		BB	BF	GA
7.87 (200)	6.50	5.118	+0.0005 -0.000	0.14	0.43	0.47
9.84 (250)	8.46	7.087	+0.0005 -0.000	0.16	0.55	0.63

NEMA Dimensions

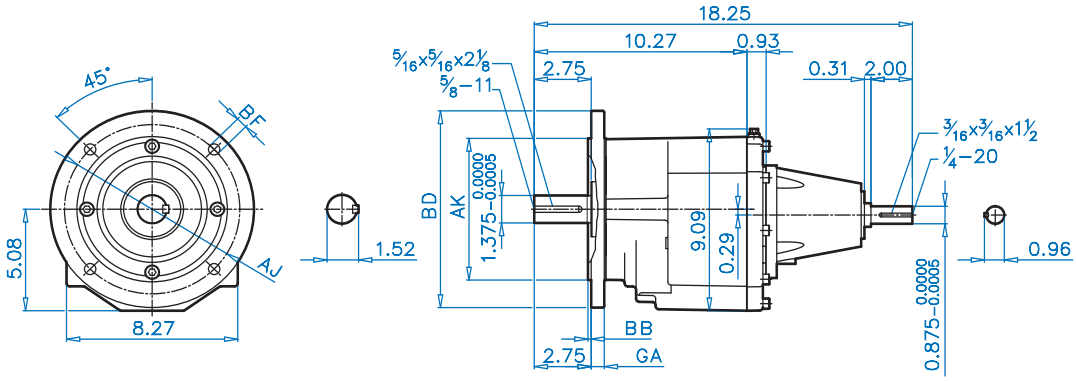
Type	AJ1	AK1	BB1	BD1	BF1	GA1	U1	UY1	Y1	C1	ZB
56C	5.875	4.500	0.18	6.54	0.43	0.47	0.625	0.71	0.188	14.86	0.93
140TC	5.875	4.500	0.18	6.54	0.43	0.47	0.875	0.96	0.188	15.33	0.93
180TC	7.250	8.500	0.23	9.17	0.59	0.71	1.125	1.24	0.250	15.56	0.93
210TC	7.250	8.500	0.23	9.17	0.59	0.98	1.375	1.52	0.312	16.39	1.16



SK 672.1/673.1

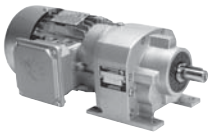


SK 672.1F/673.1F



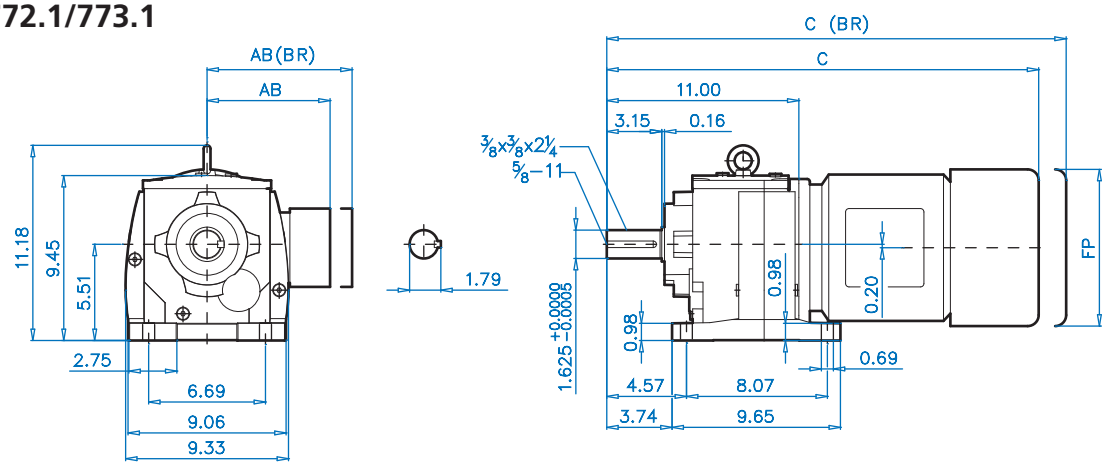
Mounting Flange

BD (mm)	AJ	AK		BB	BF	GA
7.87 (200)	6.50	5.118	+0.0005 -0.000	0.14	0.43	0.47
9.84 (250)	8.46	7.087	+0.0005 -0.000	0.16	0.55	0.63

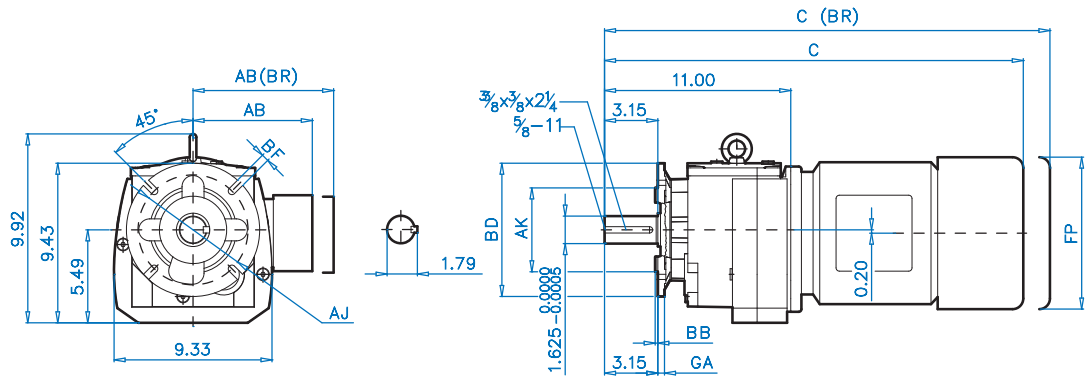


SK 772.1/773.1 - Motor
SK 772.1F/773.1F - Motor

SK 772.1/773.1



SK 772.1F/773.1F



Mounting Flange

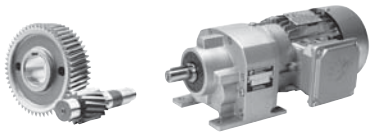
BD (mm)	AJ	AK		BB	BF	GA
7.87 (200)	6.50	5.118	+0.0005 -0.0004	0.16	0.43	0.47
9.84 (250)	8.46	7.087	+0.0005 -0.000	0.16	0.53	0.63
11.81 (300)	10.43	9.055	+0.0006 -0.001	0.16	0.53	0.71

Motor Dimensions

Standard efficiency	71S/L	80S/L	90S/L	100L	112M		132S/M	160M/L	
Energy efficiency		80LH	90SH/LH	100LH		112MH	132SH/MH	160MH	160LH
Premium efficiency		80LP	90SP/LP	100LP		112MP	132SP/MP	160MP	160LP
AB	4.86	5.59	5.79	6.65	7.05	7.05	8.03	9.53	9.53
AB (BR)	5.24	5.59	5.79	6.77	7.17	7.17	7.91	9.53	9.53
C	20.08	21.06	22.63	23.85	24.72	25.72	28.15	31.20	32.96
C (BR)	22.36	23.58	25.59	27.46	28.43	29.65	32.36	36.52	37.41
FP	5.72	6.43	7.19	7.90	8.87	8.87	10.45	12.56	12.56

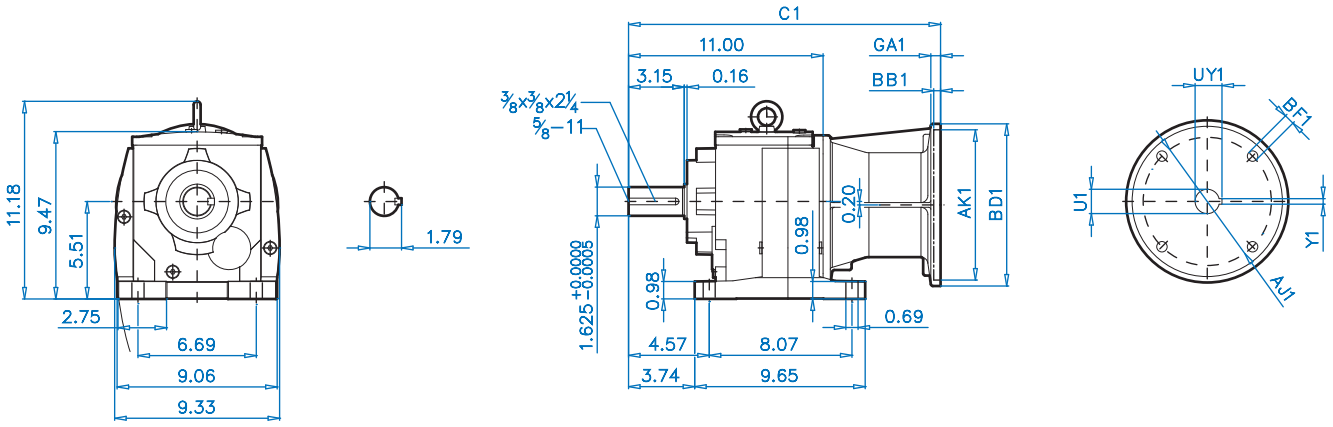
(BR) Denotes Brakemotor

SK 772.1/773.1 - NEMA
SK 772.1F/773.1F - NEMA

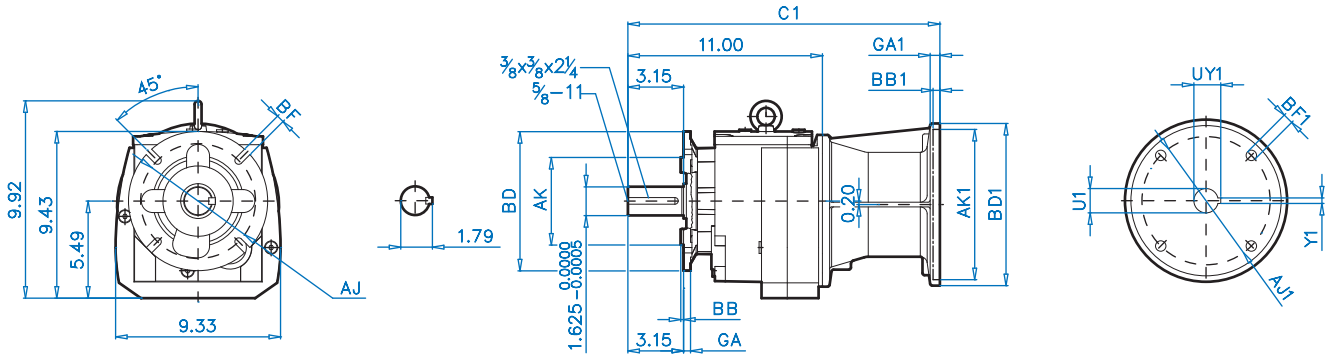


DRIVESYSTEMS

SK 772.1/773.1



SK 772.1F/773.1F



DIMENSIONS

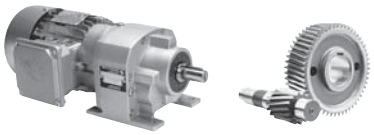
Dimensions in Inches

Mounting Flange

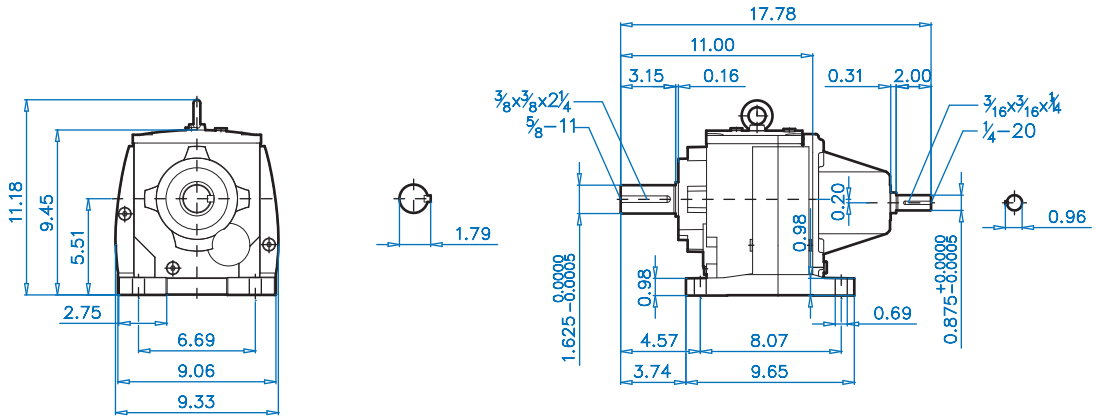
BD (mm)	AJ	AK		BB	BF	GA
7.87 (200)	6.50	5.118	+0.0005 -0.0004	0.16	0.43	0.47
9.84 (250)	8.46	7.087	+0.0005 -0.000	0.16	0.53	0.63
11.81 (300)	10.43	9.055	+0.0006 -0.001	0.16	0.53	0.71

NEMA Dimensions

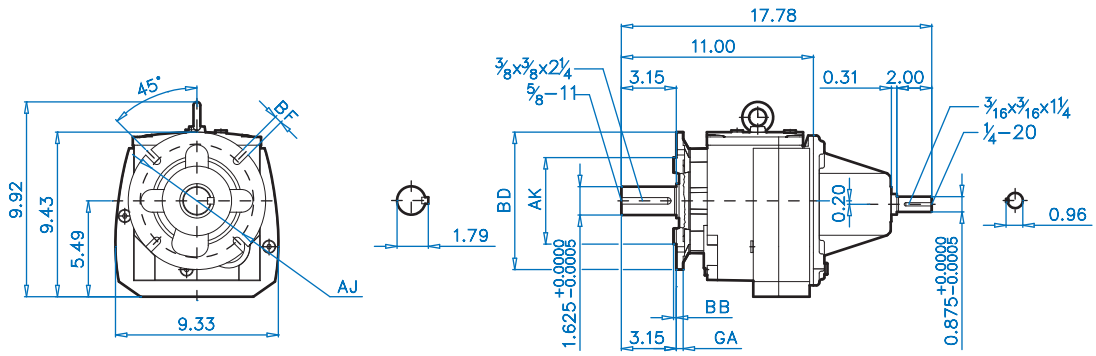
Type	AJ1	AK1	BB1	BD1	BF1	GA1	U1	UY1	Y1	C1
56C	5.875	4.500	0.18	6.54	0.43	0.47	0.625	0.71	0.188	15.61
140TC	5.875	4.500	0.18	6.54	0.43	0.47	0.875	0.96	0.188	15.61
180TC	7.250	8.500	0.23	9.17	0.59	0.71	1.125	1.24	0.250	16.52
210TC	7.250	8.500	0.23	9.17	0.59	0.98	1.375	1.52	0.312	17.65



SK 772.1/773.1



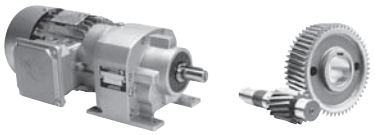
SK 772.1F/773.1F



Mounting Flange

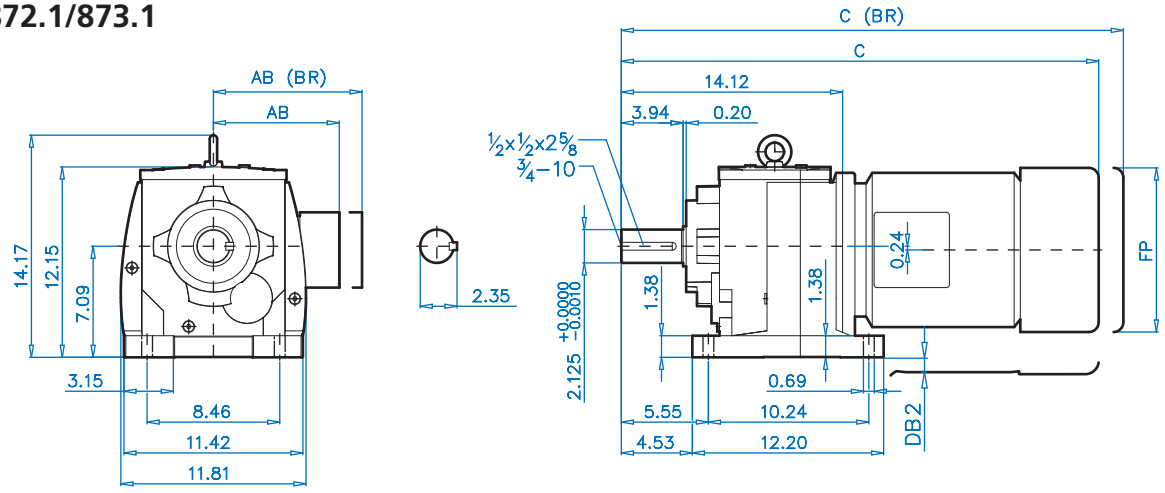
BD (mm)	AJ	AK		BB	BF	GA
7.87 (200)	6.50	5.118	+0.0005 -0.0004	0.16	0.43	0.47
9.84 (250)	8.46	7.087	+0.0005 -0.000	0.16	0.53	0.63
11.81 (300)	10.43	9.055	+0.0006 -0.001	0.16	0.53	0.71

SK 872.1/873.1 - Motor
SK 872.1F/873.1F - Motor

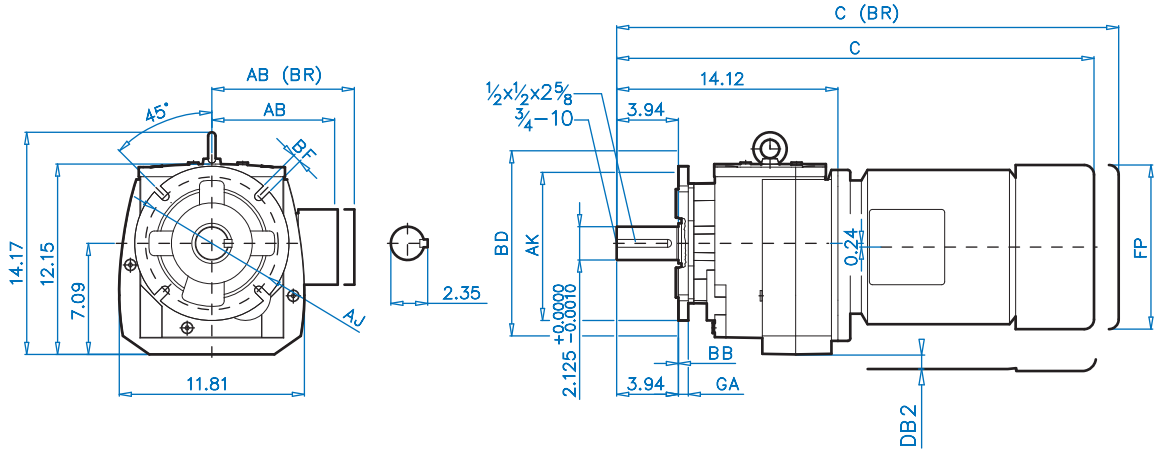


DRIVESYSTEMS

SK 872.1/873.1



SK 872.1F/873.1F



DIMENSIONS

Dimensions in Inches

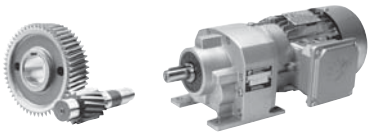
Mounting Flange

BD (mm)	AJ	AK		BB	BF	GA
9.84 (250)	8.46	7.087	+0.0005 -0.000	0.16	0.53	0.63
11.81 (300)	10.43	9.055	+0.0006 -0.001	0.16	0.53	0.79
13.78 (350)	11.81	9.843	+0.0000 -0.001	0.20	0.69	0.79

Motor Dimensions

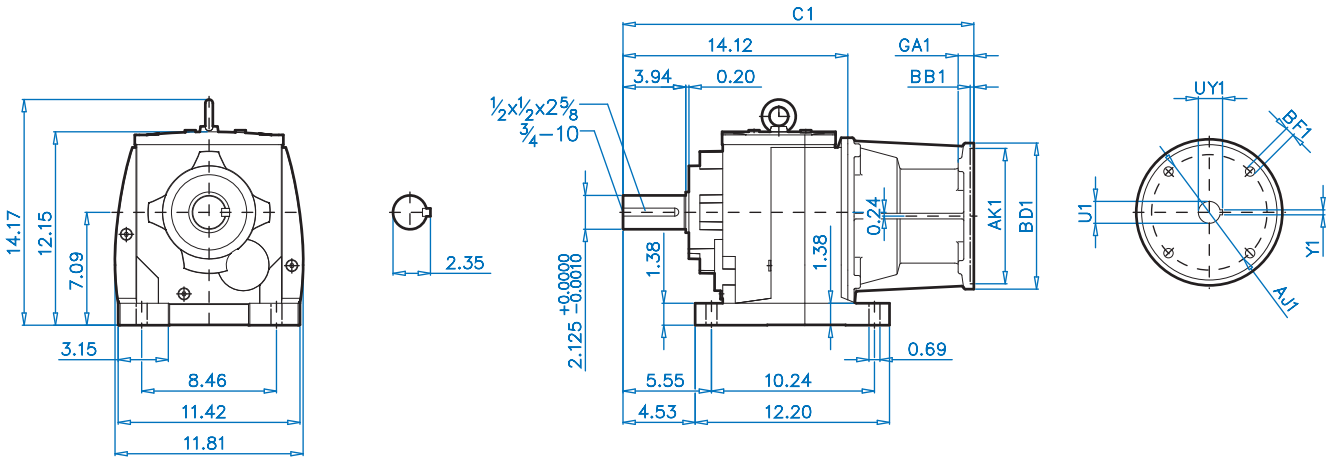
Standard eff.	90S/L	100L	112M		132S/M	160M/L		180MX	180LX	
Energy eff.	90SH/LH	100LH		112MH	132SH/MH	160M/H	160LH			180MH/LH
Premium eff.	90SP/LP	100LP		112MP	132SP/MP	160MP	160LP			180MP/LP
AB	5.79	6.65	7.05	7.05	8.03	9.53	9.53	9.53	9.53	10.04
AB (BR)	5.79	6.77	7.17	7.17	7.91	9.53	9.53	9.53	9.53	9.53
C	24.97	26.19	27.06	28.06	30.49	33.54	35.30	33.54	35.30	38.66
C (BR)	27.93	29.80	30.77	32.78	34.70	38.86	40.53	38.86	40.58	43.66
FP	7.19	7.90	8.87	8.87	10.45	12.56	12.56	12.56	12.56	14.26
DB2	-	-	-	-	-	-	-	-	-	0.04

(BR) Denotes Brakemotor

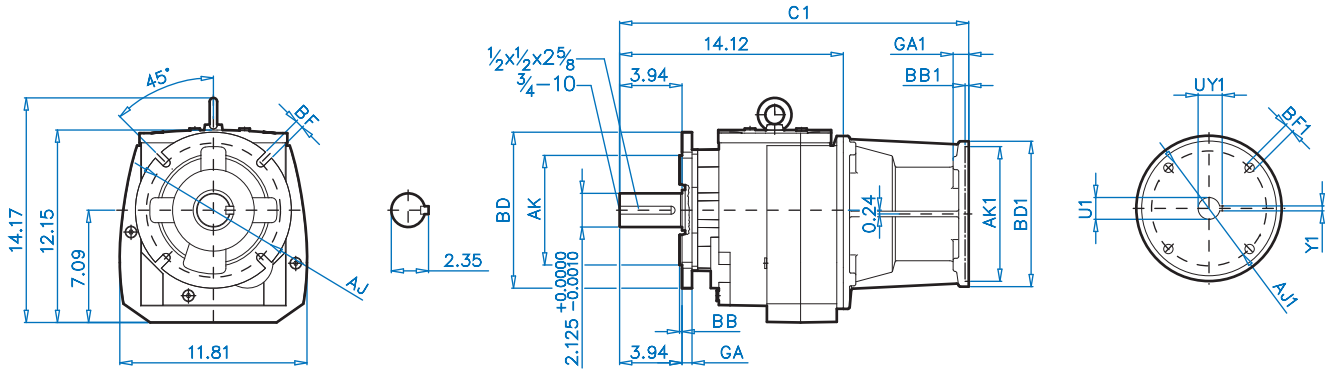


SK 872.1/873.1 - NEMA
SK 872.1F/873.1F - NEMA

SK 872.1/873.1



SK 872.1F/873.1F

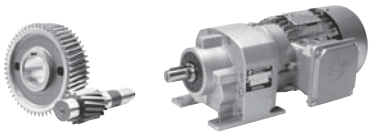


Mounting Flange

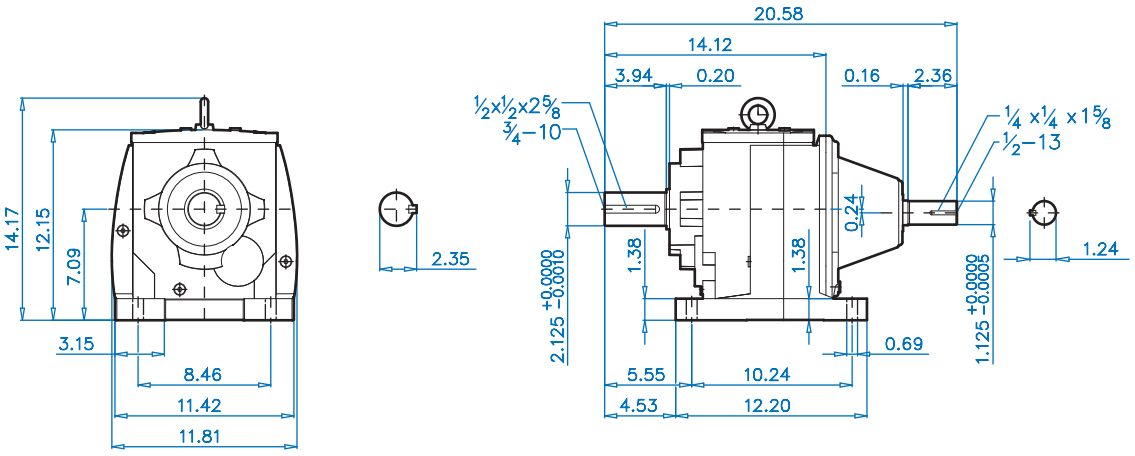
BD (mm)	AJ	AK		BB	BF	GA
9.84 (250)	8.46	7.087	+0.0005 -0.000	0.16	0.53	0.63
11.81 (300)	10.43	9.055	+0.0006 -0.001	0.16	0.53	0.79
13.78 (350)	11.81	9.843	+0.0000 -0.001	0.20	0.69	0.79

NEMA Dimensions

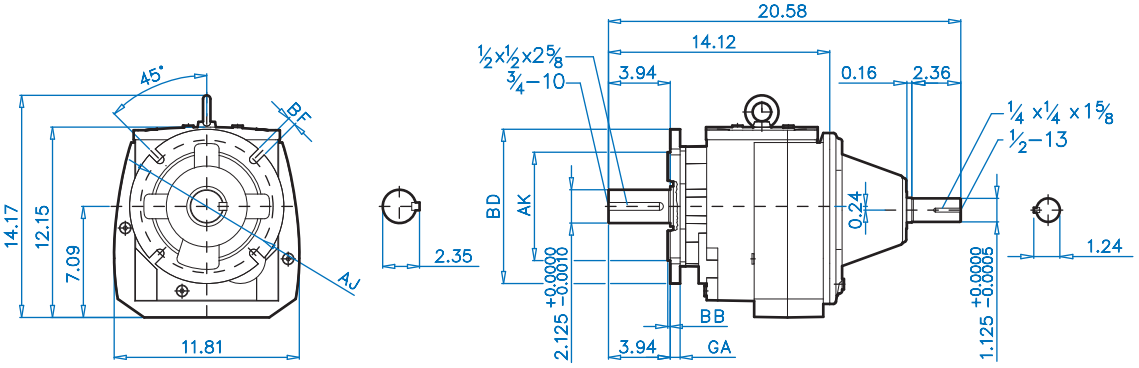
Type	AJ1	AK1	BB1	BD1	BF1	GA1	U1	UY1	Y1	C1
56C	5.875	4.500	0.18	6.54	0.43	0.47	0.625	0.71	0.188	18.46
140TC	5.875	4.500	0.18	6.54	0.43	0.47	0.875	0.96	0.188	18.46
180TC	7.250	8.500	0.23	9.17	0.59	0.71	1.125	1.24	0.250	19.76
210TC	7.250	8.500	0.23	9.17	0.59	0.98	1.375	1.52	0.312	22.05
250TC	7.250	8.500	0.23	9.17	0.59	0.98	1.625	1.80	0.375	22.05



SK 872.1/873.1



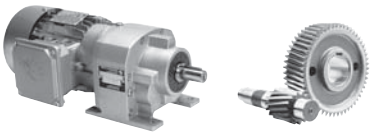
SK 872.1F/873.1F



DIMENSIONS
Dimensions in Inches

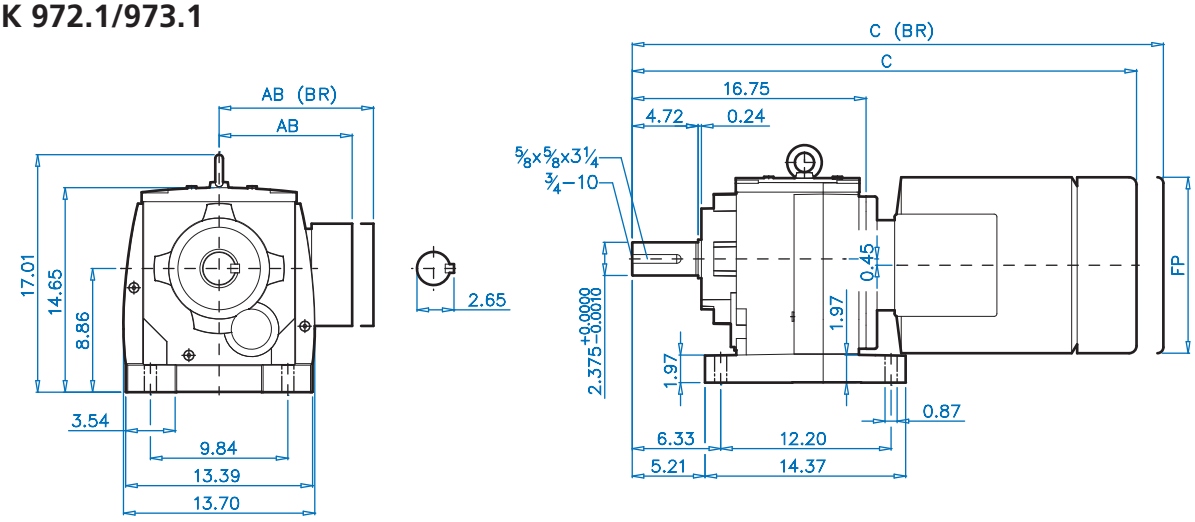
Mounting Flange

BD (mm)	AJ	AK		BB	BF	GA
9.84 (250)	8.46	7.087	+0.0005 -0.000	0.16	0.53	0.63
11.81 (300)	10.43	9.055	+0.0006 -0.001	0.16	0.53	0.79
13.78 (350)	11.81	9.843	+0.0000 -0.001	0.20	0.69	0.79

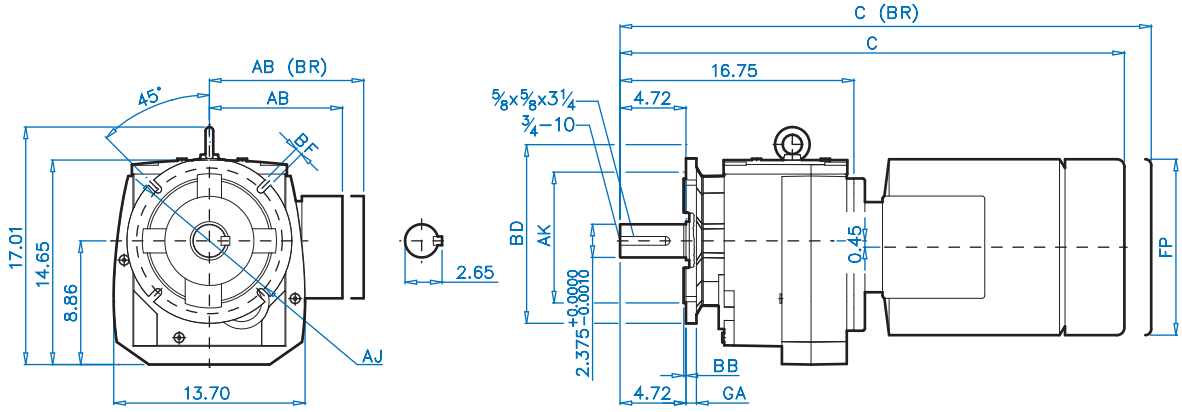


SK 972.1/973.1 - Motor
SK 972.1F/973.1F - Motor

SK 972.1/973.1



SK 972.1F/973.1F



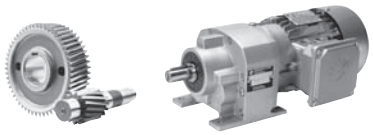
Mounting Flange

BD (mm)	AJ	AK		BB	BF	GA
11.81 (300)	10.43	9.055	+0.0006 -0.001	0.16	0.53	0.79
13.78 (350)	11.81	9.843	+0.0000 -0.001	0.20	0.69	0.79
17.72 (450)	15.75	13.780	+0.0000 -0.001	0.20	0.69	0.87

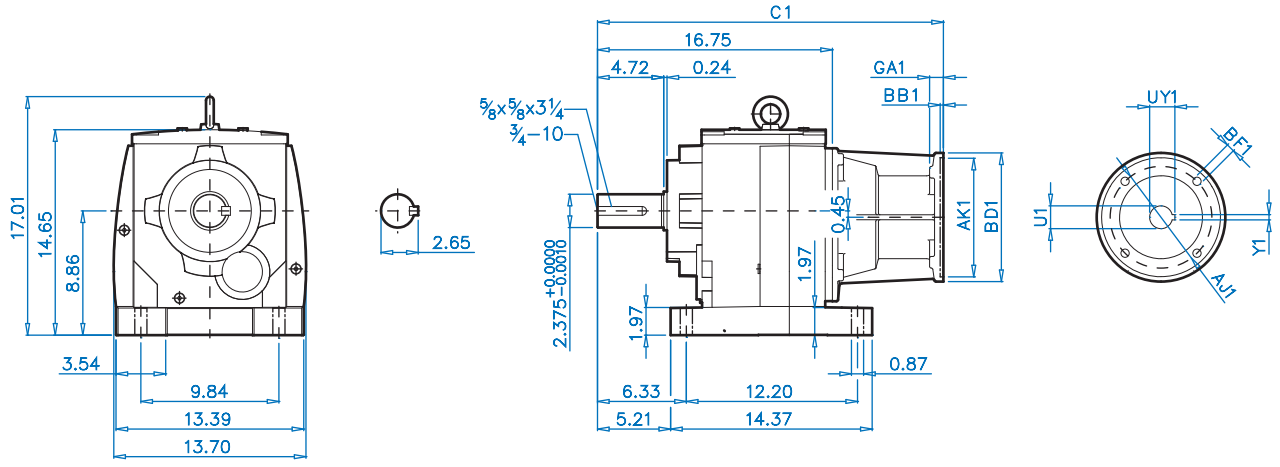
Motor Dimensions

Standard eff.	90S/L	100L	112M		132S/M	160M/L		180MX	180LX		200L	225S
Energy eff.	90SH/LH	100LH		112MH	132SH/MH	160M/H	160LH			180MH/LH	200LH	225SH
Premium eff.	90SP/LP	100LP		112MP	132SP/MP	160MP	160LP			180MP/LP		
AB	5.79	6.65	7.05	7.05	8.03	9.53	9.53	9.53	9.53	10.04	12.01	12.01
AB (BR)	5.79	6.77	7.17	7.17	7.91	9.53	9.53	9.53	9.53	9.53	12.01	12.01
C	27.59	28.81	29.68	30.67	33.10	36.16	37.92	36.16	37.92	41.28	44.23	44.23
C (BR)	30.54	32.41	30.67	35.40	37.31	41.47	43.15	41.47	43.19	46.28	50.80	50.80
FP	7.19	7.90	8.87	8.87	10.45	12.56	12.56	12.56	12.56	14.26	15.83	15.83

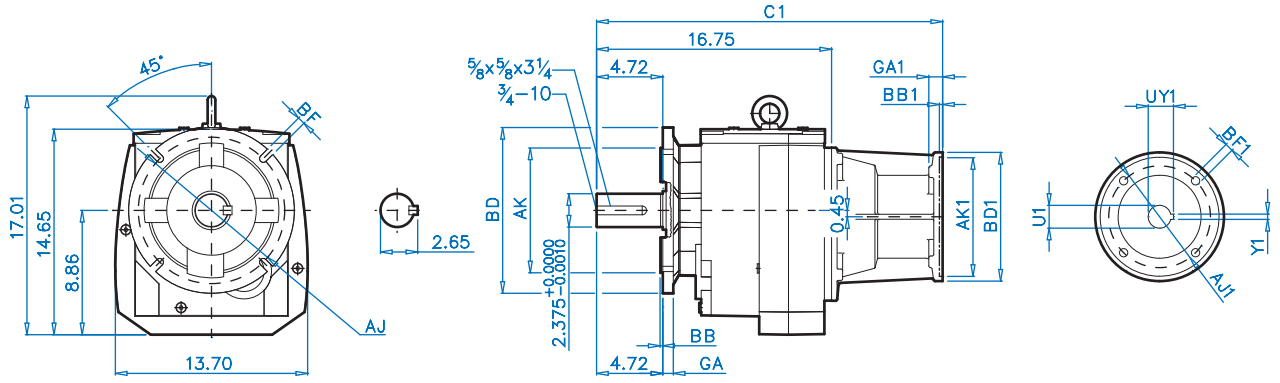
(BR) Denotes Brakemotor



SK 972.1/973.1



SK 972.1F/973.1F

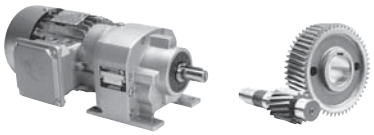


Mounting Flange

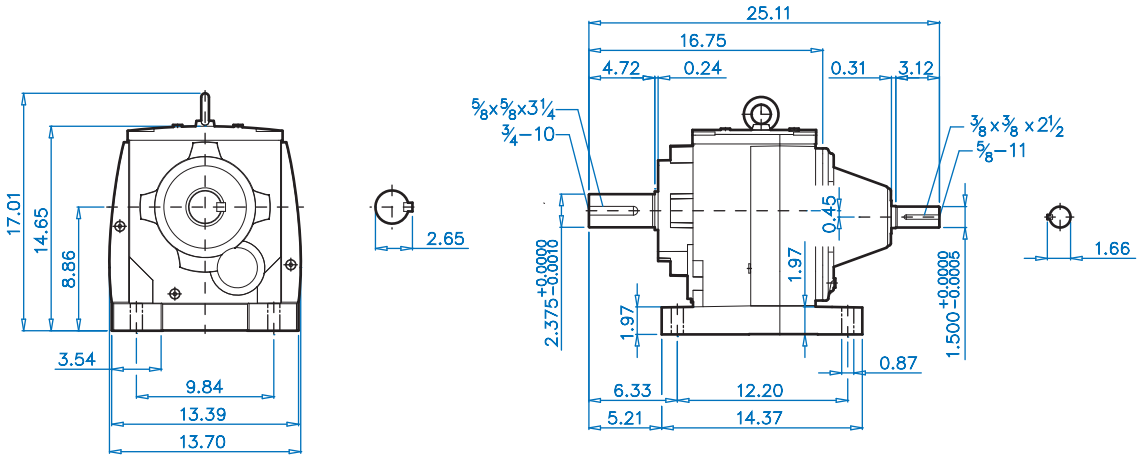
BD (mm)	AJ	AK		BB	BF	GA
11.81 (300)	10.43	9.055	+0.0006 -0.001	0.16	0.53	0.79
13.78 (350)	11.81	9.843	+0.0000 -0.001	0.20	0.69	0.79
17.72 (450)	15.75	13.780	+0.0000 -0.001	0.20	0.69	0.87

NEMA Dimensions

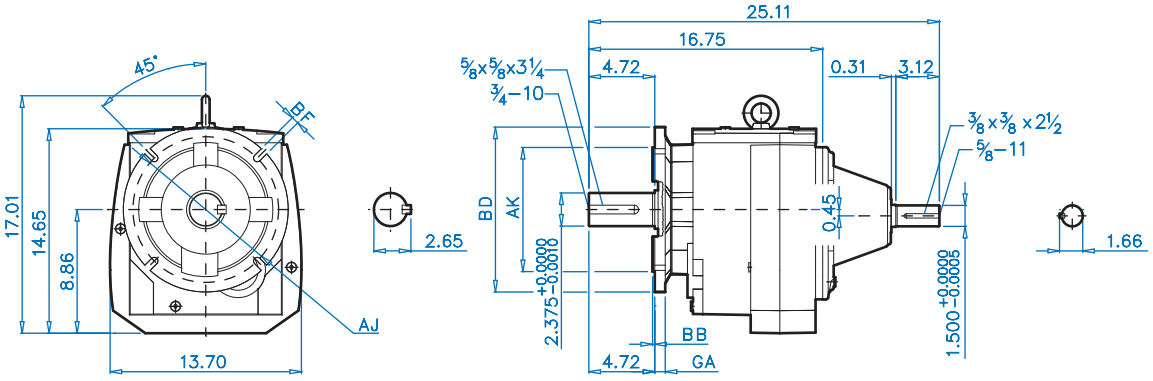
Type	AJ1	AK1	BB1	BD1	BF1	GA1	U1	UY1	Y1	C1
56C	5.875	4.500	0.18	6.54	0.43	0.47	0.625	0.71	0.188	21.08
140TC	5.875	4.500	0.18	6.54	0.43	0.47	0.875	0.96	0.188	21.08
180TC	7.250	8.500	0.23	9.17	0.59	0.71	1.125	1.24	0.250	22.38
210TC	7.250	8.500	0.23	9.17	0.59	0.98	1.375	1.52	0.312	24.66
250TC	7.250	8.500	0.23	9.17	0.59	0.98	1.625	1.80	0.375	24.66
280TC	9.000	10.500	0.23	13.78	0.55	0.79	1.875	2.10	0.500	25.17



SK 972.1/973.1

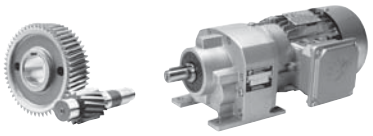


SK 972.1F/973.1F

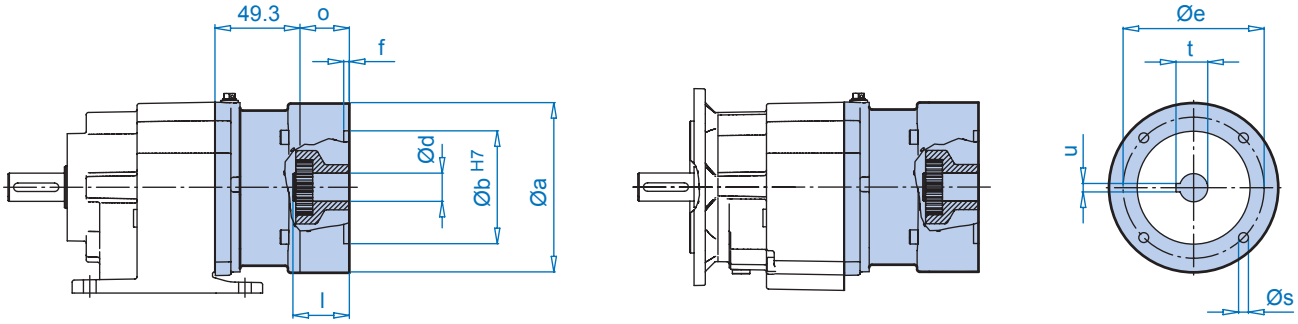


Mounting Flange

BD (mm)	AJ	AK		BB	BF	GA
11.81 (300)	10.43	9.055	+0.0006 -0.001	0.16	0.53	0.79
13.78 (350)	11.81	9.843	+0.0000 -0.001	0.20	0.69	0.79
17.72 (450)	15.75	13.780	+0.0000 -0.001	0.20	0.69	0.87



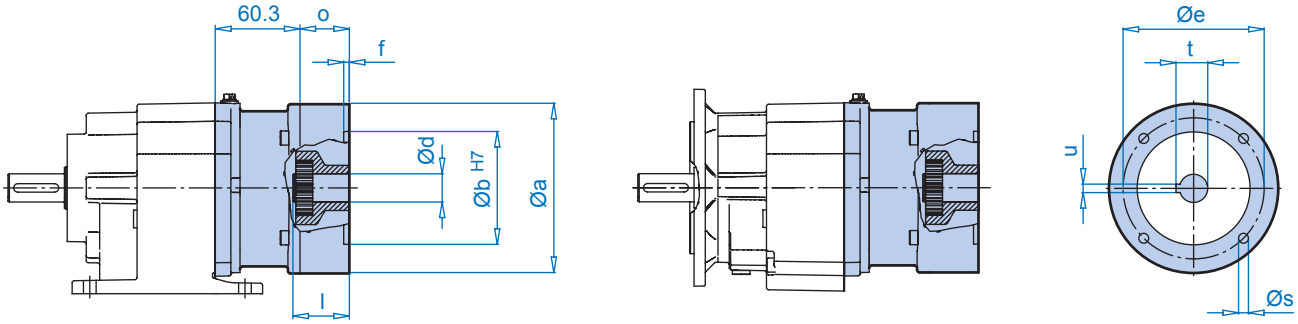
SK 072.1 - IEC 56..71
SK 072.1F - IEC 56..71



	a	b	e	f	s	o	d	l	t	u
IEC 56 - C105	105	70	85	3.0	7	29.5	9	20	11.4	3
IEC 56 - A120	120	80	100	3.5	7	29.5	9	20	11.4	3
IEC 63 - C90*	90	60	75	3.0	6	29.5	11	23	12.8	4
IEC 63 - C120	120	80	100	3.5	7	29.5	11	23	12.8	4
IEC 63 - A140	140	95	115	3.5	9	29.5	11	23	12.8	4
IEC 71 - C105	105	70	85	3.0	7	29.5	14	30	16.3	5
IEC 71 - C140	140	95	115	3.5	9	29.5	14	30	16.3	5

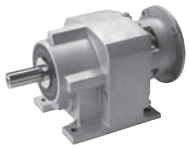
*Standard

SK 172.1 - IEC 56..90
SK 172.1F - IEC 56..90



	a	b	e	f	s	o	d	l	t	u
IEC 56 - C105	105	70	85	3.0	7	32.5	9	20	11.4	3
IEC 56 - A120	120	80	100	3.5	7	32.5	9	20	11.4	3
IEC 63 - C90*	90	60	75	3.0	6	32.5	11	23	12.8	4
IEC 63 - C120	120	80	100	3.5	7	32.5	11	23	12.8	4
IEC 63 - A140	140	95	115	3.5	9	32.5	11	23	12.8	4
IEC 71 - C105	105	70	85	3.0	7	32.5	14	30	16.3	5
IEC 71 - C140	140	95	115	3.5	9	32.5	14	30	16.3	5
IEC 71 - A160	160	110	130	4.0	9	32.5	14	30	16.3	5
IEC 80 - C120*	120	80	100	3.5	7	32.5	19	40	21.8	6
IEC 80 - C160	160	110	130	4.0	9	32.5	19	40	21.8	6
IEC 80 - A200	200	130	165	4.0	M10x20	32.5	19	40	21.8	6
IEC 90 - C140*	140	95	115	3.5	9	45.5	24	50	27.3	8
IEC 90 - C160	160	110	130	4.0	9	45.5	24	50	27.3	8
IEC 90 - A200	200	130	165	4.0	M10x20	45.5	24	50	27.3	8

*Standard



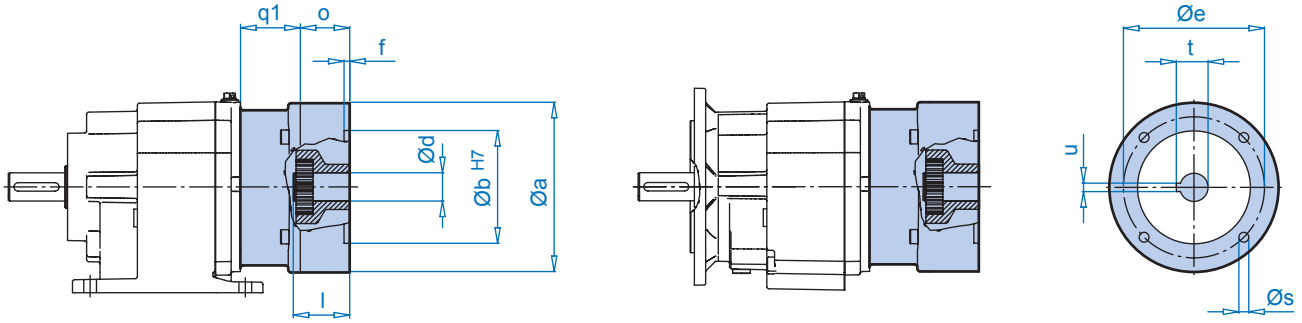
IEC Dimensions

SK 372.1 - IEC 63..90
SK 372.1F - IEC 63..90

Gear Ratio 90	q1
≥16.50	56
<16.50	40

SK 373.1 - IEC 63..90
SK 373.1F - IEC 63..90

Gear Ratio 91	q1
≥82.57	56
<82.57	40

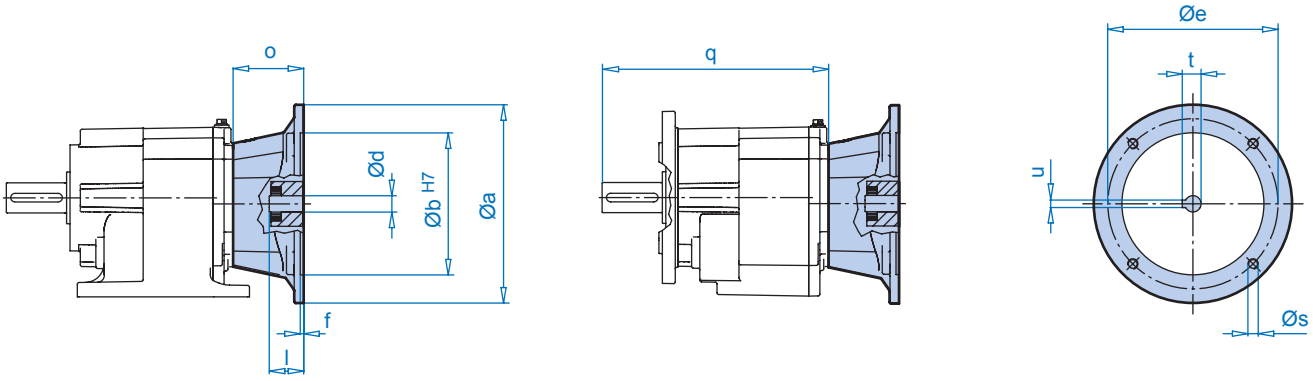


	a	b	e	f	s	o	d	l	t	u
IEC 63 - C90*	90	60	75	3.0	6	32.5	11	23	12.8	4
IEC 63 - C120	120	80	100	3.5	7	32.5	11	23	12.8	4
IEC 63 - A140	140	95	115	3.5	9	32.5	11	23	12.8	4
IEC 71 - C105	105	70	85	3.0	7	32.5	14	30	16.3	5
IEC 71 - C140	140	95	115	3.5	9	32.5	14	30	16.3	5
IEC 71 - A160	160	110	130	4.0	9	32.5	14	30	16.3	5
IEC 80 - C120*	120	80	100	3.5	7	32.5	19	40	21.8	6
IEC 80 - C160	160	110	130	4.0	9	32.5	19	40	21.8	6
IEC 80 - A200	200	130	165	4.0	M10x20	32.5	19	40	21.8	6
IEC 90 - C140*	140	95	115	3.5	9	45.5	24	50	27.3	8
IEC 90 - C160	160	110	130	4.0	9	45.5	24	50	27.3	8
IEC 90 - A200	200	130	165	4.0	M10x20	45.5	24	50	27.3	8

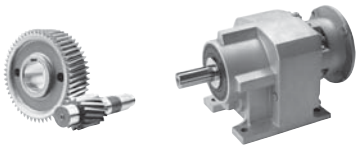
*Standard

SK 372.1 - IEC 100
SK 372.1F - IEC 100

SK 373.1 - IEC 63..90
SK 373.1F - IEC 63..90



	q	a	b	e	f	s	o	d	l	t	u
IEC 100	218	250	180	215	5	M12	82	28	60	31.3	8

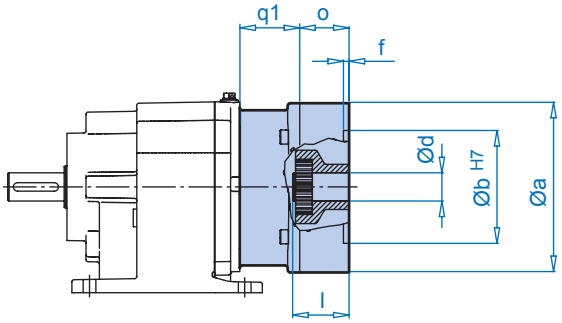


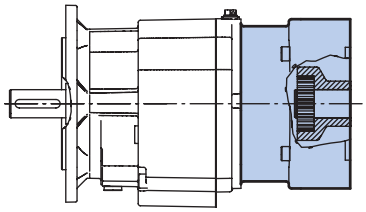
SK 572.1 - IEC 63..90
SK 572.1F - IEC 63..90

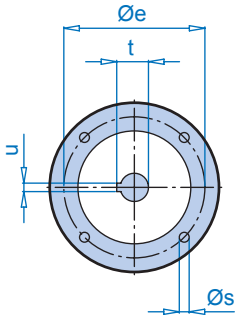
Gear Ratio 📖 92	q1
≥21.85	56
<21.85	40

SK 573.1 - IEC 63..90
SK 573.1F - IEC 63..90

Gear Ratio 📖 93	q1
≥109.12	56
<109.12	40





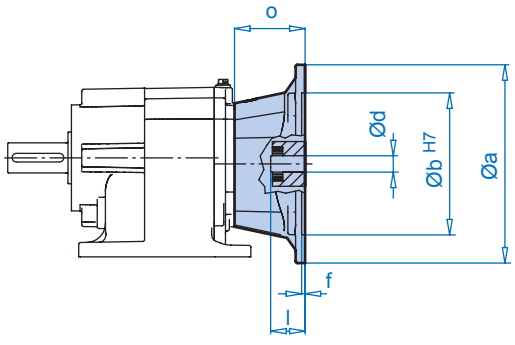


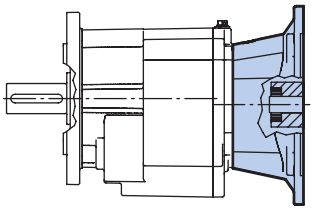
DIMENSIONS — Dimensions in mm

	a	b	e	f	s	o	d	l	t	u
IEC 63 - C90*	90	60	75	3.0	6	32.5	11	23	12.8	4
IEC 63 - C120	120	80	100	3.5	7	32.5	11	23	12.8	4
IEC 63 - A140	140	95	115	3.5	9	32.5	11	23	12.8	4
IEC 71 - C105	105	70	85	3.0	7	32.5	14	30	16.3	5
IEC 71 - C140	140	95	115	3.5	9	32.5	14	30	16.3	5
IEC 71 - A160	160	110	130	4.0	9	32.5	14	30	16.3	5
IEC 80 - C120*	120	80	100	3.5	7	32.5	19	40	21.8	6
IEC 80 - C160	160	110	130	4.0	9	32.5	19	40	21.8	6
IEC 80 - A200	200	130	165	4.0	M10x20	32.5	19	40	21.8	6
IEC 90 - C140*	140	95	115	3.5	9	45.5	24	50	27.3	8
IEC 90 - C160	160	110	130	4.0	9	45.5	24	50	27.3	8
IEC 90 - A200	200	130	165	4.0	M10x20	45.5	24	50	27.3	8

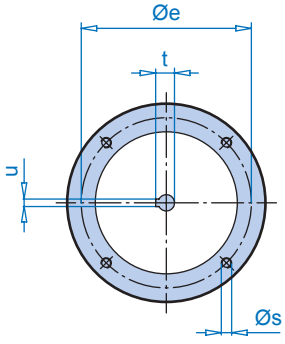
*Standard

SK 572.1 - IEC 100..112
SK 572.1F - IEC 100..112

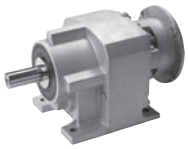




SK 573.1 - IEC 100..112
SK 573.1F - IEC 100..112



	a	b	e	f	s	o	d	l	t	u
IEC 100	250	180	215	5	M12	82	28	60	31.3	8
IEC 112	250	180	215	5	M12	82	28	60	31.3	8



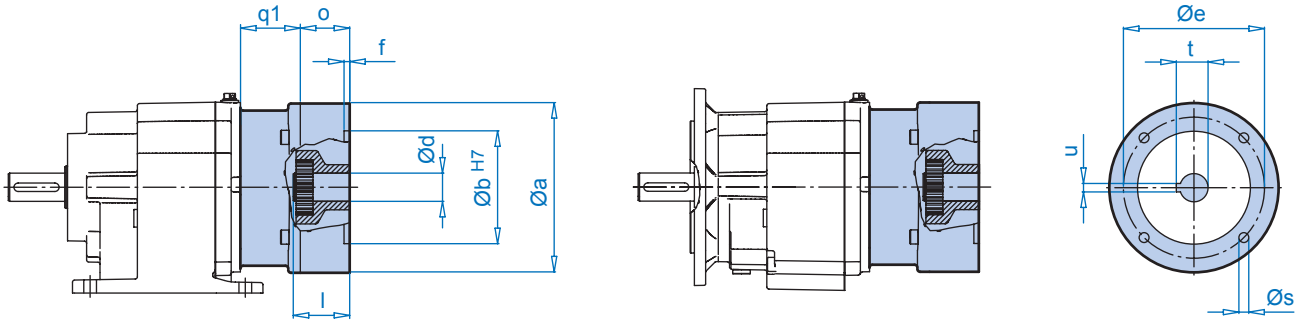
IEC Dimensions

SK 672.1 - IEC 63..90
SK 672.1F - IEC 63..90

Gear Ratio 📖 94	q1
≥23.41	56
<23.41	40

SK 673.1 - IEC 63..90
SK 673.1F - IEC 63..90

Gear Ratio 📖 95	q1
≥115.89	56
<115.89	40

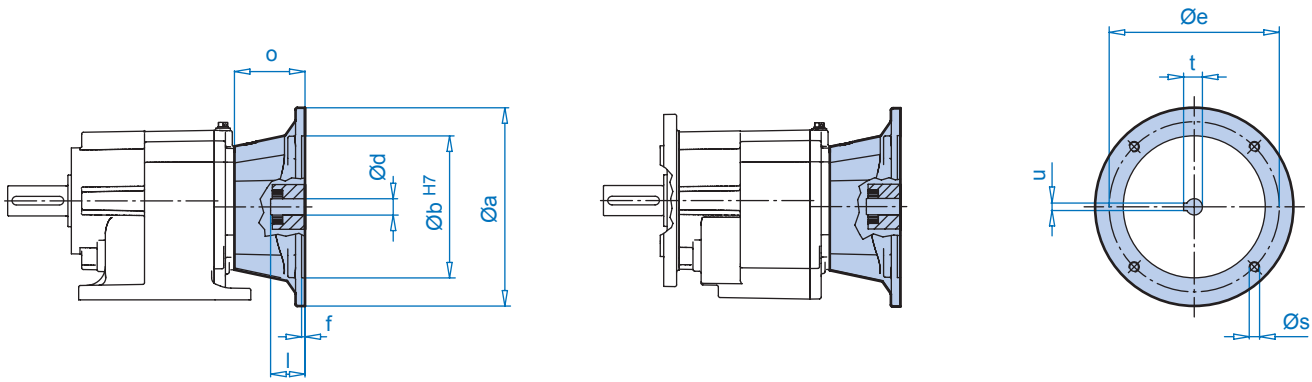


	a	b	e	f	s	o	d	l	t	u
IEC 63 - C90*	90	60	75	3.0	6	32.5	11	23	12.8	4
IEC 63 - C120	120	80	100	3.5	7	32.5	11	23	12.8	4
IEC 63 - A140	140	95	115	3.5	9	32.5	11	23	12.8	4
IEC 71 - C105	105	70	85	3.0	7	32.5	14	30	16.3	5
IEC 71 - C140	140	95	115	3.5	9	32.5	14	30	16.3	5
IEC 71 - A160	160	110	130	4.0	9	32.5	14	30	16.3	5
IEC 80 - C120*	120	80	100	3.5	7	32.5	19	40	21.8	6
IEC 80 - C160	160	110	130	4.0	9	32.5	19	40	21.8	6
IEC 80 - A200	200	130	165	4.0	M10x20	32.5	19	40	21.8	6
IEC 90 - C140*	140	95	115	3.5	9	45.5	24	50	27.3	8
IEC 90 - C160	160	110	130	4.0	9	45.5	24	50	27.3	8
IEC 90 - A200	200	130	165	4.0	M10x20	45.5	24	50	27.3	8

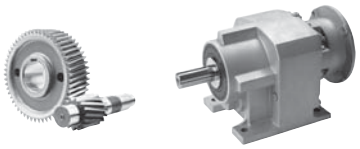
*Standard

SK 672.1 - IEC 100..132
SK 672.1F - IEC 100..132

SK 673.1 - IEC 100..132
SK 673.1F - IEC 100..132

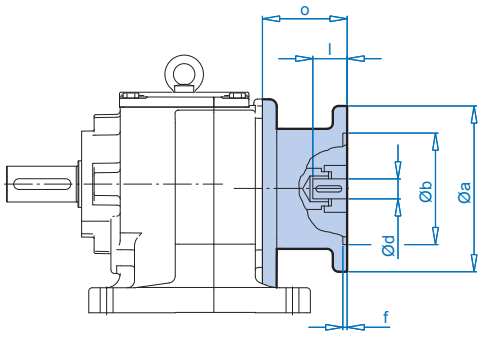


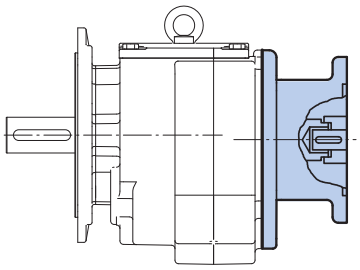
	a	b	e	f	s	o	d	l	t	u
IEC 100	250	180	215	5	M12	82	28	60	31.3	8
IEC 112	250	180	215	5	M12	82	28	60	31.3	8
IEC 132	300	230	265	5	M12	106	38	80	41.3	10

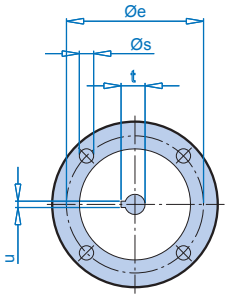


SK 772.1 - IEC63...160
SK 772.1F - IEC 63...160

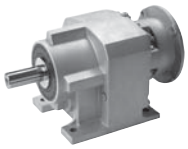
SK 773.1 - IEC63...160
SK 773.1F - IEC 63...160





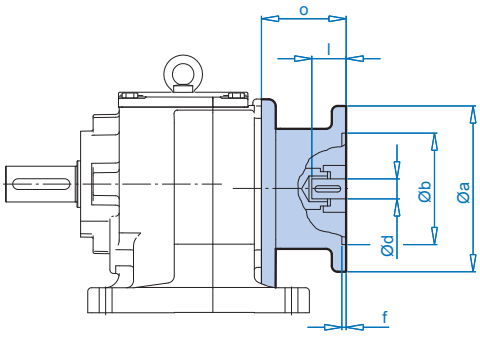


	a	b	e	f	s	o	d	l	t	u
IEC 71	160	110	130	4.0	M8	88	14	30	16.3	5
IEC 80	200	130	165	4.0	M10	108	19	40	21.8	6
IEC 90	200	130	165	4.0	M10	108	24	50	27.3	8
IEC 100	250	180	215	5.0	M12	125	28	60	31.3	8
IEC 112	250	180	215	5.0	M12	125	28	60	31.3	8
IEC 132	300	230	265	5.0	M12	156	38	80	41.3	10

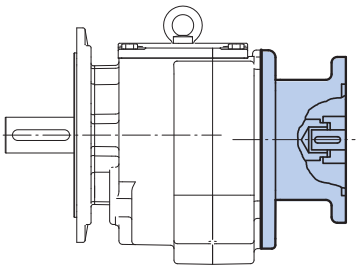


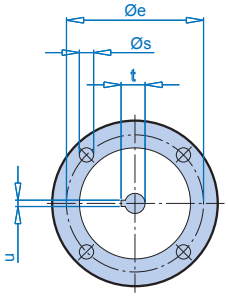
IEC Dimensions

SK 872.1 - IEC63...160
SK 872.1F - IEC 63...160



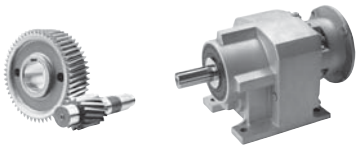
SK 873.1 - IEC63...160
SK 873.1F - IEC 63...160



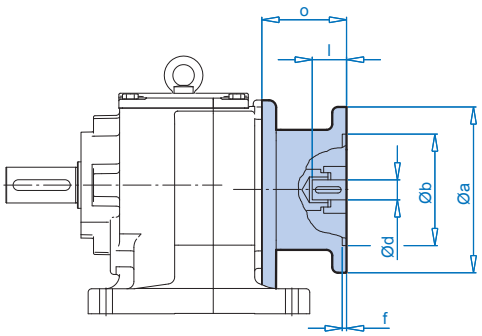


	a	b	e	f	s	o	d	l	t	u
IEC 90	200	130	165	4.0	M10	109	24	50	27.3	8
IEC 100	250	180	215	5.0	M12	133	28	60	31.3	8
IEC 112	250	180	215	5.0	M12	133	28	60	31.3	8
IEC 132	300	230	265	5.0	M12	190	38	80	41.3	10
IEC 160	350	250	300	6.0	M16	194	42	110	45.3	12
IEC 180	350	250	300	6.0	M16	194	48	110	51.8	14

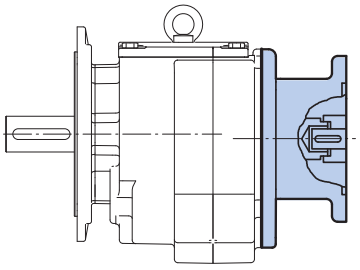
IEC
Dimensions

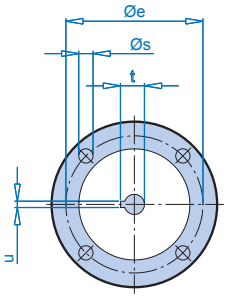


SK 972.1 - IEC63...160
SK 972.1F - IEC 63...160



SK 973.1 - IEC63...160
SK 973.1F - IEC 63...160



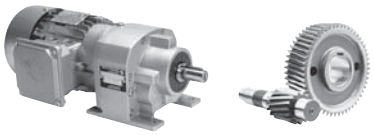


DIMENSIONS

Dimensions in mm

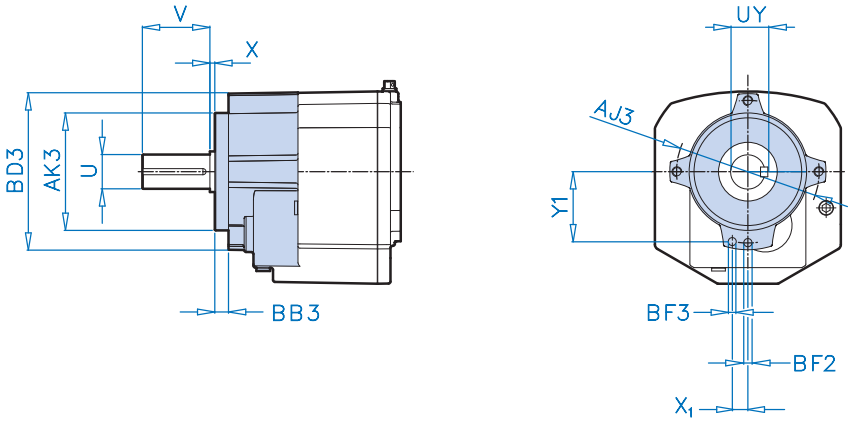
	a	b	e	f	s	o	d	l	t	u
IEC 90	200	130	165	4.0	M10	109	24	50	27.3	8
IEC 100	250	180	215	5.0	M12	133	28	60	31.3	8
IEC 112	250	180	215	5.0	M12	133	28	60	31.3	8
IEC 132	300	230	265	5.0	M12	190	38	80	41.3	10
IEC 160	350	250	300	6.0	M16	194	42	110	45.3	12
IEC 180	350	250	300	6.0	M16	194	48	110	51.8	14
IEC 200*	400	300	350	6.0	M16	245	55	110	59.3	16

*** Available for SK 972.1 & SK 972.1F only**

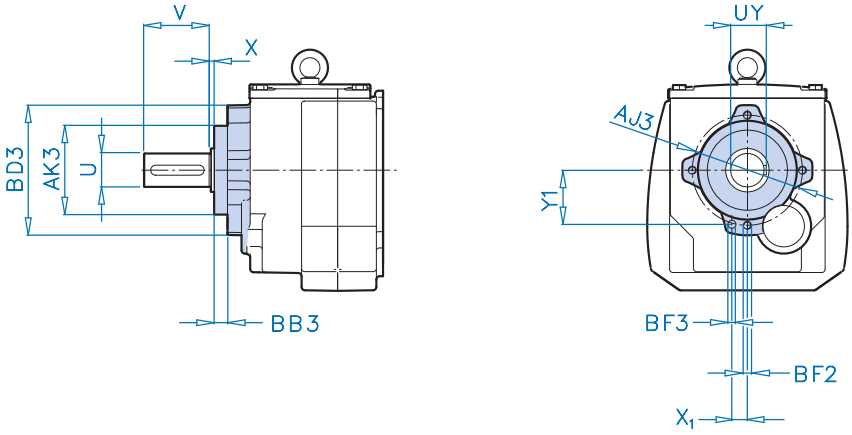


Flange Z (B14) Dimensions

SK 072.1-673.1Z



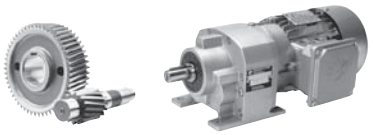
SK 772.1-973.1Z



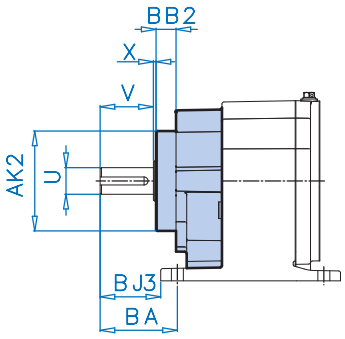
	BD3	AK3	AJ3	BB3	BF2	BF3	X1	Y1	U	UY	KEY	V	X
SK 072.1Z	3.07	2.205	2.68	0.49	M6 x 0.47	Ø 0.20 x 0.63	0.35	1.29	0.750	0.83	3/16 x 3/16 x 1-1/4	1.57	0.08
SK 172.1Z	4.21	2.953	3.62	0.59	M8 x 0.71	Ø 0.32 x 0.57	0.47	1.73	0.750	0.83	3/16 x 3/16 x 1-1/4	1.57	0.08
SK 372.1Z **SK 373.1Z**	5.16	3.740	4.33	0.79	M8 x 0.63	Ø 0.24 x 0.79	0.41	2.13	1.000	1.11	1/4 x 1/4 x 1-1/4	1.97	0.12
SK 572.1Z* **SK 573.1Z***	6.30	4.724	5.71	0.55	M10 x 0.67	Ø 0.32 x 0.79	0.67	2.76	1.250	1.36	5/16 x 5/16 x2-1/8	2.36	0.16
SK 572.1Z* **SK 573.1Z***	6.30	4.724	5.71	0.55	M10 x 0.67	Ø 0.32 x 0.79	0.67	2.76	1.375	1.52	5/16 x 5/16 x 2-1/8	2.75	0.16
SK 672.1Z **SK 673.1Z**	7.09	5.315	6.30	0.55	M10 x 0.79	Ø 0.39 x 0.79	0.79	3.05	1.375	1.52	5/16 x 5/16 x2-1/8	2.75	0.16
SK 772.1Z **SK 773.1Z**	5.98	4.13	5.12	0.63	M12 x 0.79	Ø 0.47 x 0.79	0.79	2.44	1.625	1.79	3/8 x 3/8 x 2-1/4	3.15	0.16
SK 872.1Z **SK 873.1Z**	7.64	5.31	6.50	0.79	M12 x 0.79	Ø 0.47 x 1.18	0.98	3.11	2.125	2.25	1/2 x 1/2 x 2-5/8	3.94	0.20
SK 972.1Z **SK 973.1Z**	9.29	6.61	7.87	0.98	M16 x 1.18	Ø 0.63 x 1.38	1.10	3.78	2.375	2.65	5/8 x 5/8 x 3-1/4	4.72	0.24

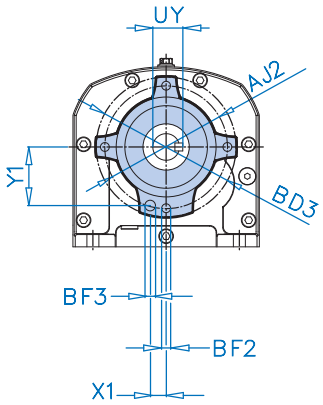
*** When ordering this size unit with specific flange or shaft options the OHL information is derated from what is specified.** ⇨ 📖 34

Foot Flange XZ (B14) Dimensions

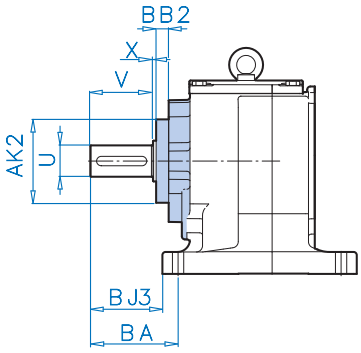


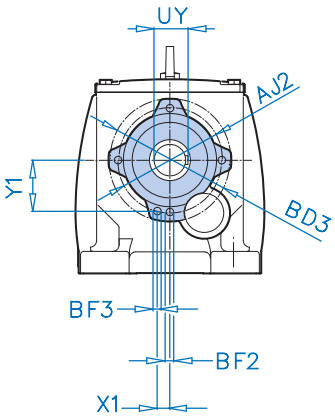
SK 072.1-673.1XZ





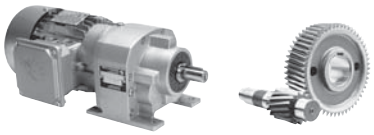
SK 772.1-973.1XZ





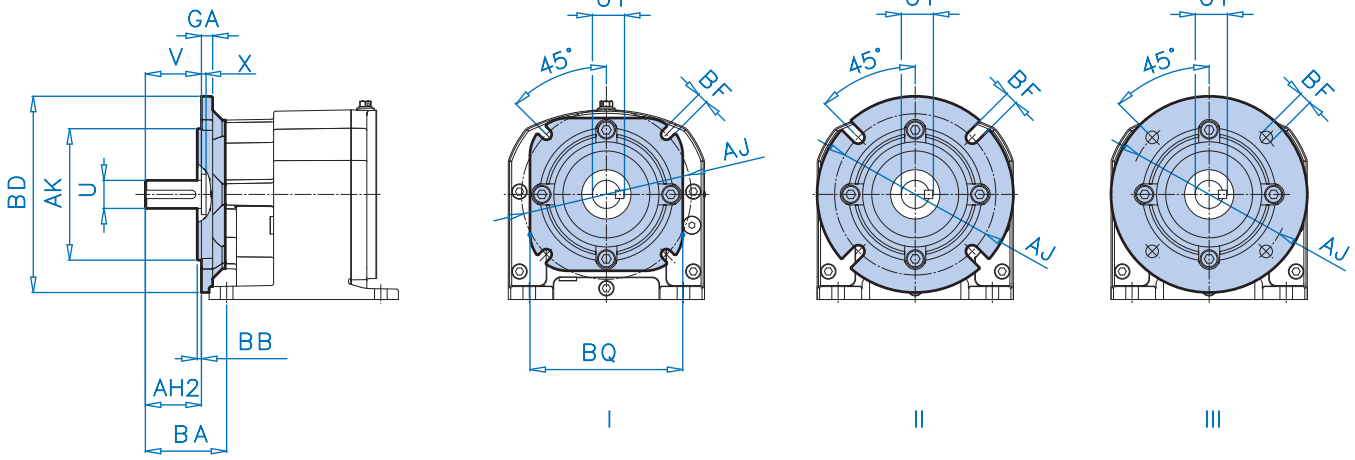
	BD3	AK2	AJ2	BB2	BF2	BF3	X1	Y1	BA	BJ3	U	UY	KEY	V	X
SK 072.1XZ	3.35	2.205	2.68	0.49	M6 x 0.47	Ø 0.20 x 0.63	0.35	1.29	1.89	1.61	0.750	0.83	3/16 x 3/16 x 1-1/4	1.57	0.08
SK 172.1XZ	4.33	2.953	3.62	0.59	M8 x 0.71	Ø 0.32 x 0.57	0.47	1.73	1.57	2.28	0.750	0.83	3/16 x 3/16 x 1-1/4	1.57	0.08
SK 372.1XZ **SK 373.1XZ**	5.12	3.740	4.33	0.79	M8 x 0.63	Ø 0.24 x 0.79	0.41	2.13	2.95	2.36	1.000	1.11	1/4 x 1/4 x 1-1/4	1.97	0.12
SK 572.1XZ* **SK 573.1XZ***	6.30	4.724	5.71	0.55	M10 x 0.67	Ø 0.32 x 0.79	0.67	2.76	3.94	3.25	1.250	1.36	1/4 x 1/4 x 1-5/8	2.36	0.16
SK 572.1XZ* **SK 573.1XZ***	6.30	4.724	5.71	0.55	M10 x 0.67	Ø 0.32 x 0.79	0.67	2.76	3.94	3.25	1.375	1.52	5/16 x 5/16 x2-1/8	2.75	0.16
SK 672.1XZ **SK 673.1XZ**	7.09	5.315	6.30	0.55	M10 x 0.79	Ø 0.39 x 0.79	0.79	3.05	3.94	3.15	1.375	1.52	5/16 x 5/16 x2-1/8	2.75	0.16
SK 772.1XZ **SK 773.1XZ**	6.85	4.016	5.12	0.47	M12 x 0.79	Ø 0.47 x 0.79	0.79	2.44	4.53	3.74	1.625	1.79	3/8 x 3/8 x 2-1/4	3.15	0.16
SK 872.1XZ **SK 873.1XZ**	8.27	5.118	6.50	0.47	M12 x 0.79	Ø 0.47 x 1.18	0.98	3.11	5.51	4.53	2.125	2.25	1/2 x 1/2 x 2-5/8	3.94	0.20
SK 972.1XZ **SK 973.1XZ**	10.24	6.102	7.87	0.59	M16 x 0.98	Ø 0.63 x 1.38	1.10	3.78	6.30	5.22	2.375	2.65	5/8 x 5/8 x 3-1/4	4.72	0.24

*** When ordering this size unit with specific flange or shaft options the OHL information is derated from what is specified.** ⇨ 🕮 **34**



Foot Flange XF (B5) Dimensions

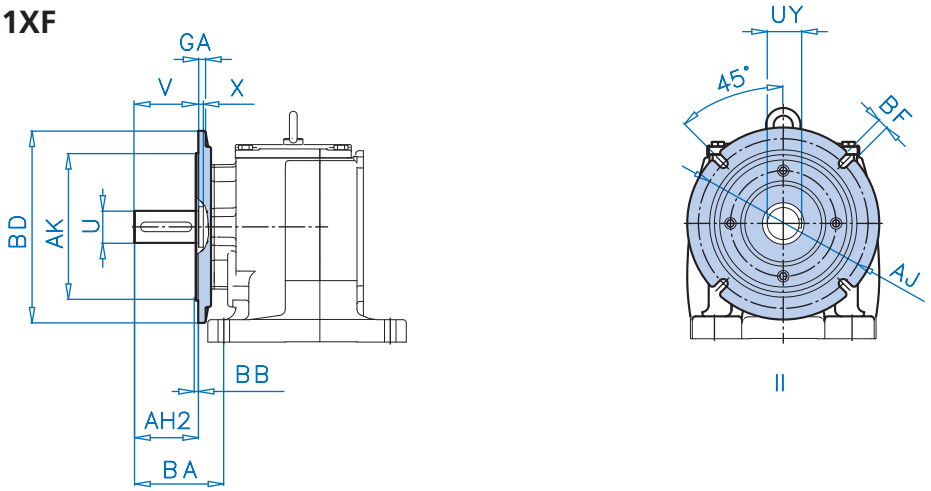
SK 072.1-673.1XF



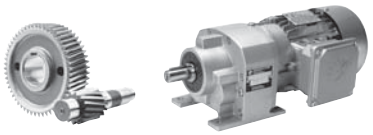
	Pic	BD	AK	BB	AJ	GA	BQ	BF	BA	AH2	U	UY	KEY	V	X
SK 072.1XF	I	4.72	3.150	0.12	3.94	0.28	3.54	0.26	1.89	1.57	0.750	0.83	3/16 x 3/16 x 1-1/4	1.57	0.08
SK 172.1XF	II	4.72 5.51	3.150 3.740	0.12 0.12	3.94 4.53	0.31 0.31	- -	0.26 0.35	2.28 2.28	1.57 1.57	0.750	0.83	3/16 x 3/16 x 1-1/4	1.57	0.08
SK 372.1XF SK 373.1XF	II	5.51 6.30	3.740 4.331	0.12 0.14	4.53 5.12	0.35 0.39	- -	0.34 0.34	2.95 2.95	1.97 1.97	1.000	1.11	1/4 x 1/4 x 1-1/4	1.97	0.12
SK 572.1XF* SK 573.1XF*	II	7.87	5.118	0.14	6.50	0.47	-	0.43	3.94	2.76	1.250	1.36	1/4 x 1/4 x 1-5/8	2.36	0.16
SK 572.1XF* SK 573.1XF*	II	7.87	5.118	0.14	6.50	0.47	-	0.43	3.94	2.76	1.375	1.52	5/16 x 5/16 x 2-1/8	2.75	0.16
SK 672.1XF SK 673.1XF	III	7.87	5.118	0.16	6.50	0.47	-	0.43	3.46	2.76	1.375	1.52	5/16 x 5/16 x 2-1/8	2.75	0.16

*** When ordering this size unit with specific flange or shaft options the OHL information is derated from what is specified.** ⇨ 🕮 34

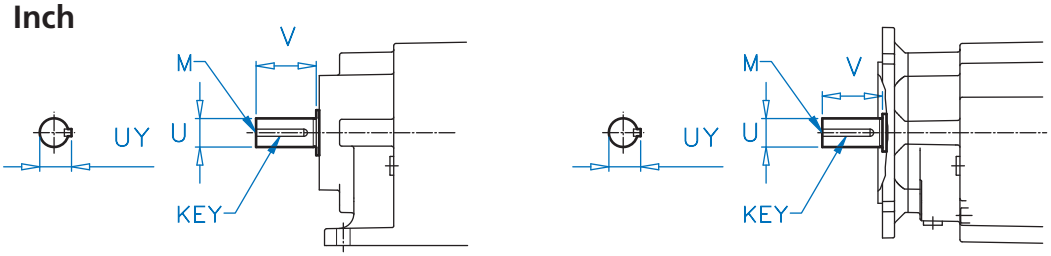
SK 772.1-973.1XF



	Pic.	BD	AK	BB	AJ	GA	BF	BA	AH2	U	UY	KEY	V	X
SK 772.1XF	II	7.87	5.12	0.16	6.50	0.47	0.43	4.53	3.15	1.625	1.79	3/8 x 3/8 x 2-1/4	3.15	0.16
SK 773.1XF		9.84	7.09	0.16	8.46	0.59	0.53	4.53	3.15					
SK 872.1XF	II	9.84	7.09	0.16	8.46	0.63	0.53	5.51	3.94	2.125	2.35	1/2 x 1/2 x 2-5/8	3.94	0.20
SK 873.1XF		11.81	9.06	0.16	10.43	0.79	0.53	5.51	3.94					
SK 972.1XF	II	11.81	9.06	0.16	10.43	0.79	0.53	6.30	4.72	2.375	2.65	5/8 x 5/8 x 3-1/4	4.72	0.24
SK 973.1XF		13.78	9.84	0.20	11.81	0.79	0.69	6.30	4.72					



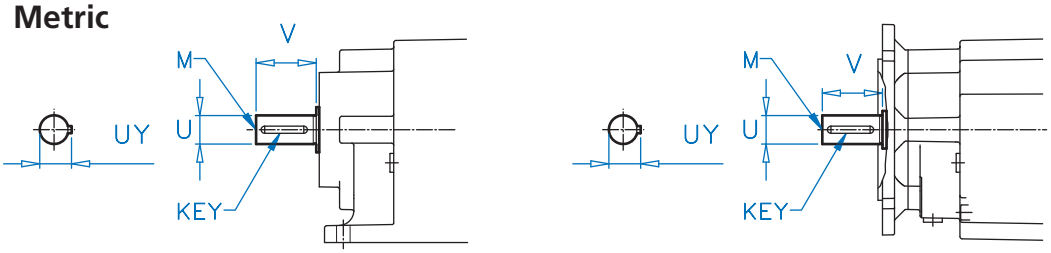
SK 072.1-973.1 Inch



	U	UY	KEY	V	M Tap
SK 072.1	0.750	0.83	3/16 x 3/16 x 1-1/4	1.57	1/4-20
SK 172.1	0.750	0.83	3/16 x 3/16 x 1-1/4	1.57	1/4-20
SK 372.1 SK 373.1	1.000	1.11	1/4 x 1/4 x 1-1/4	1.97	3/8-16
SK 572.1* SK 573.1*	1.250	1.36	1/4 x 1/4 x 1-15/8	2.36	1/2-13
SK 572.1* SK 573.1*	1.375	1.52	5/16 x 5/16 x 2-1/8	2.75	5/8-11
SK 672.1 SK 673.1	1.375	1.52	5/16 x 5/16 x 2-1/8	2.75	5/8-11
SK 772.1 SK 773.1	1.625	1.79	3/8 x 3/8 x 2-1/4	3.15	5/8-11
SK 872.1 SK 873.1	2.125	2.25	1/2 x 1/2 x 2-5/8	3.94	3/4-10
SK 972.1 SK 973.1	2.375	2.65	5/8 x 5/8 x 3-1/4	4.72	3/4-10

***** When ordering this size unit with specific flange or shaft options the OHL information is derated from what is specified. ⇨ 📖 34

SK 072.1-973.1 Metric

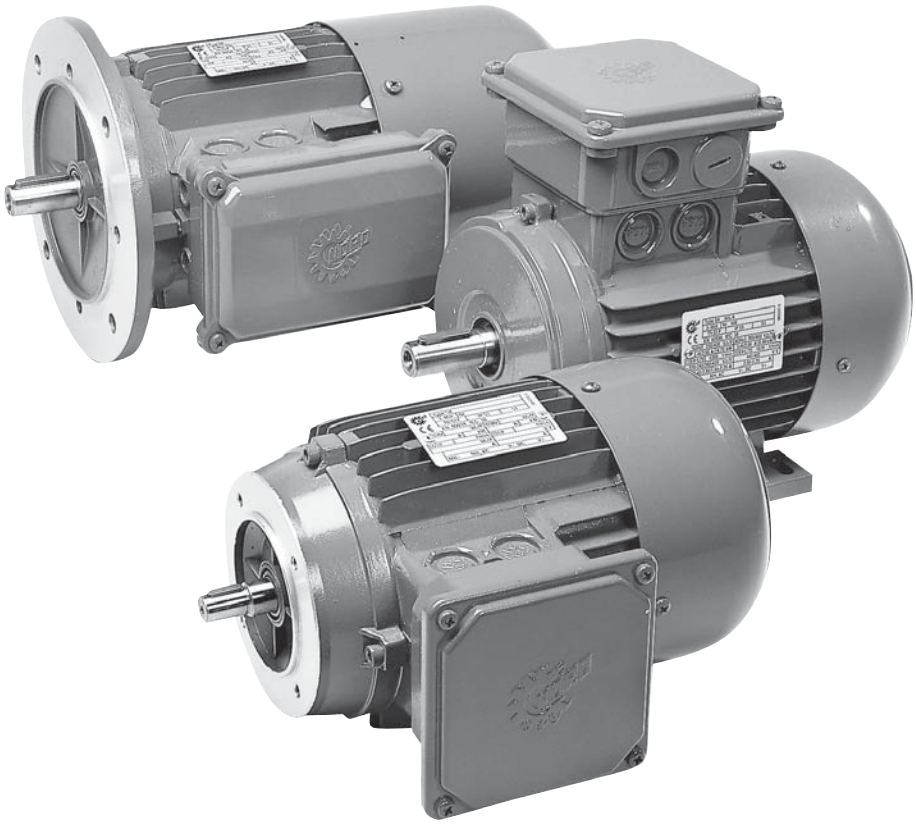


	U	UY	KEY	V	M Tap
SK 072.1	20	22.5	6 x 6 x 32	40	M6
SK 172.1	20	22.5	6 x 6 x 32	40	M6
SK 372.1 SK 373.1	25	28.0	8 x 7 x 40	50	M10
SK 572.1* SK 573.1*	30	33.0	8 x 7 x 50	60	M10
SK 572.1* SK 573.1*	35	38.0	10 x 8 x 60	70	M12
SK 672.1 SK 673.1	35	38.0	10 x 8 x 60	70	M12
SK 772.1 SK 773.1	40	43.0	12 x 8 x 70	80	M16
SK 872.1 SK 873.1	50	53.5	14 x 9 x 80	100	M16
SK 972.1 SK 973.1	60	64.0	18 x 11 x 100	120	M20

***** When ordering this size unit with specific flange or shaft options the OHL information is derated from what is specified. ⇨ 📖 34

Motors

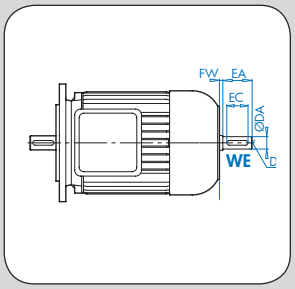
- Order Form
- NEMA C-Face Motors
- Engineering Information
- Options
- Environmental Options
- Additional Options
- Ratings Tables
- Dimensions
- Connection Diagrams



NORD DRIVESYSTEMS

www.nord.com

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



INVERTER DUTY MOTOR

Motor Order Form

NORD DRIVESYSTEMS

	Frame	Size	Poles	Motor Options	Brake Size	Brake Options
SK						

Frame	Size	Poles
63	S	4
71	SH	2
80	M	6
90	MH	4-2
100	MX	8-2
112	L	8-4
132	LA	12-2
160	LH	Other
180	LX	
200		
225		

Paint

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

Electrical Motor Options

- ❒ **H** - Energy Efficient Motor
- ❒ **P** - Premium 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
- ❒ **MG** - Magnetic 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

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

- ❒ **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 ⇨ 209 - 221

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 _____

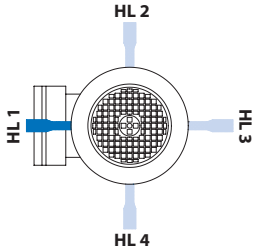
Braking Method

- ❍ Method 10
- ❍ Method 15
- ❍ Method 20
- ❍ Method 25
- ❍ Method 30
- ❍ Method 35
- ❍ Method 40
- ❍ Method 45
- ❍ Method 50
- ❍ Method 55

* More info on page 201

Hand Release Position

- ❍ HL1
- ❍ HL2
- ❍ HL3
- ❍ HL4



Mounting

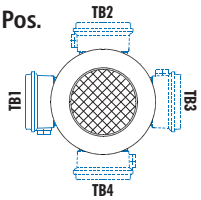
- ❍ Integral to gearbox
- ❍ NEMA C-Face
- ❍ NEMA foot mount
- ❍ IEC B5 Mount
- ❍ IEC B14 Mount
- ❍ IEC foot Mount

Voltage & Frequency

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

Terminal Box Pos.

- ❍ TB1
- ❍ TB2
- ❍ TB3
- ❍ TB4

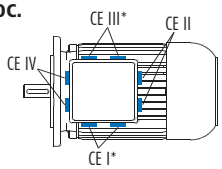


Mtg. Pos. M1 Shown

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 will also assemble NEMA C-face motors to your specifications. For ratings, see page 164.

Stocked NEMA C-Face Motors

Stocked NEMA C-face motors are offered in 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 motoroptions from this 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
Energy Efficient Motors (ee)				
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	37350092	37350093	160.9
160LH/4-256TC TW	20 hp	37550092	37550093	198.4
Premium Efficient Motors (pe)				
80 LP/4-56C TW	1 hp	33610294	33610295	
80 LP/4-143TC TW	1 hp	33610292	33610293	22.5
90 SP/4-145TC TW	1.5 hp	34110292	34110293	33.3
90 LP/4-145TC TW	2 hp	34610292	34610293	36.8
100 LP/4-182TC TW	3 hp	35110292	35110293	55.6
112MP/4-184TC TW	5 hp	36110292	36110293	78.3
132 SP/4-213TC-TW	7.5 hp	36410292	36410293	121.3
132 MP/4-215TC-TW	10 hp	36710292	36710293	136.7
160 MP/4-254TC-TW	15 hp	37350292	37350293	205.0
160 LP/4-256TC-TW	20 hp	37550292	37550293	269.0
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
Energy Efficient Brakemotors (ee)				
80LH/4-56C BRE10 HL	1 hp	33610082 ◈	33610083 ∗	19.8
80LH/4-143TC BRE10 HL	1 hp	33610084 ◈	33610085 ∗	19.8
90SH/4-145TC BRE20 HL	1.5 hp	34110084 ◈	34110085 ∗	26.5
90LH/4-145TC BRE20 HL	2 hp	34610084 ◈	34610085 ∗	30.9
100LH/4-182TC BRE40 HL	3 hp	35110084 ◈	35110085 ∗	39.7
112MH/4-184TC BRE40 HL	5 hp	36110084 ◈	36110085 ∗	83.6
132SH/4-213TC BRE60 HL	7.5 hp	36410084 ◈	36410085 ∗	123.4
132MH/4-215TC BRE100 HL	10 hp	36710084 ◈	36710085 ∗	156.5
160MH/4-254TC TW BRE150 HL	15 hp	37350084 ◈	37350085 ∗	220.4
160LH/4-256TC TW BRE250 HL	20 hp	37550084 ◈	37550085 ∗	242.4
Premium Efficient Brakemotors (pe)				
80LP/4-56C BRE10 HL	1 hp	33610282 ◈	33610283 ∗	19.8
80LP/4-143TC BRE10 HL	1 hp	33610284 ◈	33610285 ∗	19.8
90SP/4-145TC BRE20 HL	1.5 hp	34110284 ◈	34110285 ∗	26.5
90LP/4-145TC BRE20 HL	2 hp	34610284 ◈	34610285 ∗	30.9
100LP/4-182TC BRE40 HL	3 hp	35110284 ◈	35110285 ∗	39.7
112MP/4-184TC BRE40 HL	5 hp	36110284 ◈	36110285 ∗	83.6
132SP/4-213TC BRE60 HL	7.5 hp	36410284 ◈	36410285 ∗	123.4
132MP/4-215TC BRE100 HL	10 hp	36710284 ◈	36710285 ∗	156.5
160MP/4-254TC TW BRE150 HL	15 hp	37350284 ◈	37350285 ∗	220.4
160LP/4-256TC TW BRE250 HL	20 hp	37550284 ◈	37550285 ∗	242.4

◈ 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

Global Standards

Standards

All motors are in accordance with existing standards and regulations:

NEMA MG 1 - Motors and Generators:

- Electrical performance
- Motors for operation on variable AC vector drive

UL 1004 – Electric Motors

CSA C22.2 No. 100-04 - Motors and Generators:

Industrial Products IEC 60034 parts 1, 5, 6, 8, 9, 11, 12 and 14.

- Part 1 – General rules
- Part 5 – Types of enclosures
- Part 6 – Types of cooling
- Part 8 – Terminal lead designations and sense of rotation
- Part 9 – Noise limits
- Part 11 – Integrated thermal protection
- Part 12 – Starting Performance
- Part 14 – Mechanical vibration

INVERTER DUTY MOTOR

Inverter/Vector Duty

NORD single–speed motors are Inverter/Vector Duty. The construction of the NORD motors insulating system takes into account the non-sinusoidal wave forms produced by variable frequency drives. NORD uses high grade insulating components and extra first turn protection as well as double coated wire to ensure long service life when connected to AC vector drives. NORD motors can produce full torque at zero speed if properly sized, selected and controlled.

IEC 60038 – Standard voltages

CE	NORD motors carry the CE mark in accordance with the Low Voltage Directive and, if installed properly, the Electromagnetic Compatibility Directive (EMC). The CE mark is required for installation in European Union (EU) states.
®	Many NORD motors from frame size 63 to 315 are an Underwriters Laboratories Recognized component per UL standard 1004. Frames 63-180 File number E191510 Frames 200+ File number E227215
C SA® US	The Canadian Standards Association CUS mark indicates that CSA has tested and approved NORD motors according to both US and Canadian standards. It is equivalent to the Underwriters Laboratories RU recognition mark (UL standard 1004) and the CSA mark according to CSA Standard C22.2 No. 100-04 Frames 63-180 File number LR112560 Frame 200+ File number LR13494
ee	NORD Energy Efficient motors up to frame 180 have been evaluated by the United States Department of Energy and recieved a Certificate of Compliance to certify the efficiency ratings. The certificate of compliance is CC 092B.
pe	NORD Premium Efficient motors up to frame 180 have been evaluated by the United States Department of Energy and recieved a Certificate of Compliance to certify the efficiency ratings. The certificate of compliance is CC 092B.
SA® energy verified	NORD energy efficient motors carry the CSA energy efficiency verification mark. This mark ensures that CSA has verified that NORD motors are designed and manufactured to meet energy efficiency requirements number EEV112560.
CCC	China Compulsory Certification Nr.: 200 701 040 125 842 9
GOST®	GOST® certificate for the import of motors into Russia.

For more information on current motor efficiency regulations please see page 174.

Standard Motor Construction

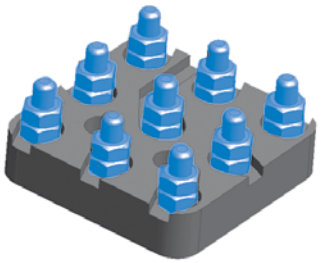
Our motors are an important part of our ability to provide a high quality, competitive, and complete drive system. NORD motors are designed for across the-line or inverter/vector duty operation. NORD motors are constructed with superior insulating methods to provide excellent moisture protection, low temperature rise, and voltage spike resistance in accordance with NEMA MG1. Low rotor inertia and high starting torque allow peak performance in difficult applications involving high start/stop cycling rates or rapid acceleration/deceleration. Standard motors offer protection from the elements with many standard and optional design features.

Some of the standard design bernefits include:

- 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 MG1-2009, section 31.4.4.2 voltage spikes.
- Moisture resistant varnish dipped windings with improved varnish materials.
- Inorganic insulating components for tropical protection.
- Conduit box sealed with gaskets.
- Corrosion resistant alloy materials.
- Threaded cable entry holes.

Terminal Block

Each NORD motor uses a terminal block, which is a superior method of wire termination when compared to pigtail leads. A terminal block ensures long-term reliability of the power connections.



Non-Sparking Fan

The standard NORD motor fan is a non-sparking design. The fan will also provide proper airflow in either direction of rotation.

Inverter/Vector Duty – Voltage Spikes

All NORD motors are constructed with an insulating system designed to withstand the repeated voltage spikes generated by modern AC vector drives. The insulation system withstands the ratings in conformance with NEMA MG 1-2009 Section 31.4.4.2 Voltage Spikes.

$V_{peak} = 3.1 \times V_{rated}$ with a Rise time $\leq 0.1\mu s$.

Insulation System

The NORD motor insulation system is designed to provide a superior degree of protection. NORD utilizes the following insulation components:

- Magnet wire – double coated insulation
- Varnish dip impregnation
- Slot liners
- Phase paper & separators
- Top sticks
- Wire sleeve connectors

Other motor manufacturers eliminate some of these insulating components for cost reduction which leads to less reliability.

Tropical Protection (Anti-fungal)

As a standard the NORD motor insulation system is tropically protected. The insulating and construction components are made of inorganic materials that resist fungal growth.

Low Inertia

The motor inertia in all NORD motors is extremely low which allows for an increased dynamic motor control capability. Low motor inertia is a significant advantage when using NORD motors with AC vector drives or controllers. NORD motors have the ability to cycle more frequently and require less mechanical energy to start than the standard NEMA frame motors. This leaves more energy to start the load.

High Torque

NORD motors produce a higher starting torque than what is required by NEMA standards. This is achieved through improved motor winding, rotor design and construction.

Service Factor

NORD motor's with ratings of either 230/460V-60Hz and 332/575V-60Hz have a service factor of 1.15. Almost all other motors have a service factor of 1.1 or 1.0.

Poles / speeds

NORD offers a variety of single and two speed motors in addition to the standard 4 pole motor. NORD single speed motors are inverter/vector duty rated, however, it is not recommended to run a NORD two speed motor with an AC vector drive.

Number of Poles	Synchronous Speed at 60Hz	Synchronous Speed at 50Hz	Notes:
Single Speed Motors			
4	1800 rpm	1500 rpm	–
2	3600 rpm	3000 rpm	–
6	1200 rpm	1000 rpm	–
Two Speed Motors			
4-2	1800/3600 rpm	1500/3000 rpm	Single winding
8-2	900/3600 rpm	750/3000 rpm	Two winding
8-4	900/1800 rpm	750/1500 rpm	Single winding

Other speeds available upon request.

Voltage and Frequency

NORD motors are available in a number of voltage and frequency options. All standard voltages are commonly available. Optional voltages may be provided, but may include an increase in price and an extended lead time. It also may be possible to provide motors with special voltages and frequency operation points.

Standard Voltages

Single speed motors	Two speed motors
230/460V-60Hz (up to 30 hp)	460V-60Hz
460V-60Hz (40 hp and larger)	230V-60Hz
575V-60Hz	575V-60Hz
400V-50Hz	400V-50Hz

Optional Voltages

Single speed motors	Two speed motors
208V-60Hz (up to 10 hp, not available in energy efficient design)	Other voltages & frequencies available upon request
380V-50Hz	
415V-50Hz	
380V-60Hz	
Other voltages & frequencies available upon request	

Voltage and Frequency Variation

Voltage and frequency variations are based upon the assumption that the nameplate horsepower will not be exceeded and that the motor temperature may increase. Standard allowable deviations are based upon the type of motor labeling.

NEMA and CSA Labeled Motors

Variations are based upon the nominal utilization voltage, and not the service (supply) voltage as per ANSI C84.1. Voltage and frequency tolerances follow the guidelines set forth in NEMA MG-1.

Service Voltages	Utilization Voltages
120V	115V
208V	200V
240V	230V
480V	460V
600V	575V

- Approved voltage variation at rated frequency is ±10%.
- Approved frequency variations at rated voltage is ±5%.
- Approved combined voltage/frequency variation = ±5%.

US and Canadian Standard (CUS)

CUS motor construction defines that NORD motors are constructed in accordance to UL 1004 (electric motors) and CSA C22.2 No. 100-04 (motors and generators) guidelines. This option is standard for 208, 230, 460, and 575 Volt operation at 60 Hz.

Motors nameplated with the CUS option will be marked and indicating that the Underwriters Laboratories and CSA have tested and approved NORD motors according to both US and Canadian standards.

CE Labeled Motors

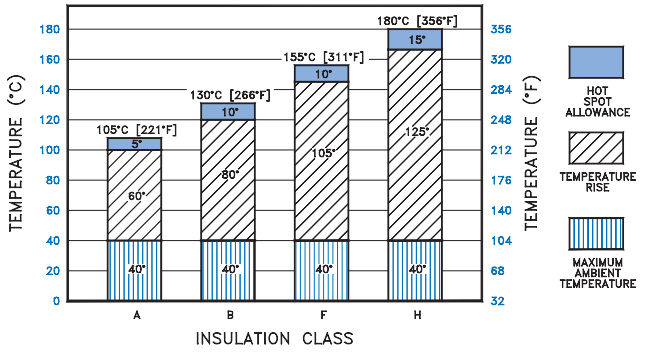
Per IEC 60038, allowable service voltage variations on in the current system, compared to the previous system, are as indicated.

Previous Service Voltages	Current Service Voltages
220V, 380V, 660V	230V, 400V, 690V +6/-10%
240V, 415V	230V, 400V +10/-6%

- Per EN 60034-1, a ±5% voltage variation and a ±2% frequency variation can be tolerated.
- The allowed variations are based upon the voltage (or voltage range) indicated on the motor nameplate.

Insulation Class

NORD motors are constructed with a thermal class F insulating system. Theses motors are also designed for a class B temperature rise of up to 80°C. The use of class F insulation with a class B temperature rise provides increased operating life. Motors constructed with class H insulation are also available as an option.



Ambient Temperature

NORD motors are designed to operate with a maximum ambient temperature of 40°C (104°F). If the motor's operating environment exceeds 40°C, the motor's nominal power P_n either needs to be de-rated (see table below) or use upgraded insulation.

Ambient temp [°F]	113	122	131	140
Ambient temp [°C]	45	50	55	60
De-rate factor	0.96	0.92	0.87	0.82

Motor Rated Power = [P_n x De-rate factor]

Elevation

NORD motors are designed to operate at an elevation of up to 3300 ft (1000 m) above sea level. At higher elevations the air is thinner resulting in less cooling capacity. If the motor's nominal power (P_n) installation elevation exceeds 3300 ft (1000 m), the motor's nominal power either needs to be de-rated (see table below) or requires upgraded insulation.

Altitude [ft]	5000	6500	8200	10000	11500	13000
Altitude [m]	1500	2000	2500	3000	3500	4000
De-rate Factor	0.97	0.94	0.90	0.86	0.83	0.80

Motor Rated Power = [P_n x De-rate factor]

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

NORD DRIVESYSTEMS

Duty Classes

The following duty types are defined in IEC 60034-1.

Duty Type	Explanation Excerpts
S1	Continuous operation at a constant load, the motor reaches thermal equilibrium
S2	Short-time operation at a constant load for a given time followed by a time of rest until the motor is completely cooled down to ambient temperature. Example: S2-10 minutes Recommended values for determination: 10, 30 min.
S3	Sequential intermittent operation, identical run and rest cycles with a constant load. Temperature equilibrium is never reached. Starting current has little effect on temperature rise. The cyclic duration factor (cdf) indicates the portion of operation time in relation to a complete duty cycle. The typical duty cycle time is 10 minutes, unless otherwise specified. Example: S3-40% Recommended values for determination: 25, 40, 60%
S6	Continuous operation with intermittent load sequential, identical cycles of running with constant load and running with no load. No rest periods. Example: S6-40% Recommended values for determination: 25, 40, 60%

Power Increasing Factor for Short-term & Intermittent Operation

Motor ratings in this catalog are based on continuous duty operation (S1). If a motor is designed for S1 duty, but is to be operated for short-time or intermittent operation it can be subjected to higher loads. The available motor power can be raised above the motor rated power by the "increasing factor" in the table below.

Duty Type			Increasing factor
S2	Operating time	10 min	1.40
		30 min	1.15
S3	Cyclic duration factor (cdf)	25%	1.33
		40%	1.18
		60%	1.08
S6	Cyclic duration factor (cdf)	25%	1.45
		40%	1.35
		60%	1.15

Motor Rated Power = [P_n x Increasing factor]

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 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.

Motors for Indoor Operation - Option Codes

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

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

Option Code Key

KB	Condensation Drain Holes - Plugged	Page 152
SH	Space Heater	Page 151
KKV	Terminal Box Sealed with Resin	Page 152
NSD+	NORD Severe Duty Paint	Page 20
NSDx3	NORD Severe Extreme Duty X3 Paint	Page 20
NSD^{tuph}	Tuph Sealed Surface Conversion	Page 21
RD	Canopy Drip Cover	Page 152
RDD	Double Fan Cover	Page 152

Motor Options & Construction

NORD motors are stocked in one of two ways. The first method is to stock a complete motor that is ready to be assembled to a gear reducer or shipped as a stand alone motor. The second method, the motor is assembled from component parts. The Mod next to a motor option designates that the option can be added to a complete motor by simple modification. The Build next to a motor option indicates that the motor will need to be built from component parts in order to incorporate the motor option.

Motor Options

Abbreviation	Description	Mod	Build	Page
AG	Absolute Encoder		✓	161
AICM	Additional Insulation		✓	152
ECR	Single Phase Motors, 60Hz		✓	151
EKK	Small Terminal Box	✓		155
EP	Epoxy Dipped Windings		✓	152
F	Blower Cooling Fan	✓		156
FC	Blower Cooling Fan	✓		156
HR	Hand Wheel		✓	153
IG...P	Incremental Encoder		✓	160
ISO H	Class H Insulation		✓	151
KB	Plugged Condensation Drain Holes		✓	152
KBO	Open Condensation Drain Holes		✓	152
KKV	Terminal Box Sealed with Resin	✓		152
MG	Magnetic Encoder			159
MS	Quick Power Plug Connector	✓		155
OL	Totally Enclosed Non-Ventilated	✓		153
OL/H	Totally Enclosed Non Ventilated without Fan Cover		✓	153
RD	Canopy Drip Cover	✓		152
RDD	Double Fan Cover	✓		152
RLS	Motor Backstop		✓	154
SH	Space Heater		✓	151
TF	Thermistor		✓	150
TW	Thermostat		✓	150
WE	2nd Shaft Extension on Fan Side		✓	153
WU	High Resistance Rotor		✓	151
Z	High Inertia Cast Iron Fan		✓	154
-	IP65 Enclosure Protection	✓		152
-	IP66 Enclosure Protection	✓		152
-	Paint Coatings	✓		20

Motor Protection

Selecting appropriate motor protection is a key factor in reliable motor operation. There are two common classes of motor protection; current based and temperature based. Electrical installation codes require at least two types of protection in the motor circuit, both of which are normally current based. First is short-circuit protection, normally accomplished by fuses or circuit breakers. The Second is "motor overload protection" and is normally a device called a "motor overload" or a "heater." Current based protection is effective in some conditions. NORD can provide two different types of motor temperature based protection, a PTC thermistor (TF) or a bi-metallic thermostat (TW). Temperature based protection is more effective motor protection in many situations, this is explained in the table below.

⬆ = Good protection ⬌= Limited protection ⬇ = No protection	Fuses	Motor Overloads	PTC Thermistor (TF)	Bi-metallic Switch (TW)
Over current up to 200%	⬇	⬆	⬆	⬆
High inertia starting	⬇	⬌	⬆	⬌
Frequent motor starts	⬇	⬌	⬆	⬆
Stalling	⬌	⬌	⬌	⬌
Single phasing	⬇	⬌	⬆	⬆
Supply voltage deviations	⬇	⬆	⬆	⬆
Supply frequency deviations	⬇	⬆	⬆	⬆
Inadequate motor cooling	⬇	⬇	⬆	⬆
Bearing Damage	⬇	⬇	⬆	⬆

Thermostats (TW & 2TW)

Build

Motor thermostats or bi-metallic switches can be wired directly into the control circuit without a separate control module or tripping device. Thermostats operate on a relatively high control voltage so they are much less sensitive to voltage interference from the main power supply. One may often run thermostat leads and motor power leads next to each other when using the appropriate shielded cable. The installer is responsible for wiring the thermostats onto the motor control circuit. The leads may be labeled in a variety of ways as indicated.

Standard connection	Series connected, one per phase
Contact	NC (Normally Closed)/ Auto Re-setting
Response Temperature (Option TW)	311 °F (155 °C) Shut-Off Device
Response Temperature (Option 2TW)	311 °F (155 °C) Shut-Off Device + 266°F (130 °C) Alarm Device
Nominal Current	1.6 Amp at 250 V
Resistance	< 50 mΩ
Switch Rebound	< 1ms
Insulation Rating	2000 VAC
Cycles	10,000 max
Lead Identification (inside terminal box)	P1 and P2 or TB1 and TB2 / 2TB1 and 2TB2

Thermistors (TF)

Build

With a separate control module or tripping device (ex. Kirwan INT69) thermistors are used to sense overload and temperature conditions by converting the critical operating temperature limit into internal resistance changes. Due to their small size, heat sink construction, and high change in resistance value, minor resistance variations caused by relatively long lead runs may be tolerated. This feature also allows for one controller to be used for several temperature sensing locations. Many variable frequency drives come with on-board thermistor inputs. NORD does not supply the thermistor control module.

Standard Connection	Three devices, series connected, one per phase
Type	Positive temperature coefficient (PTC)
Transition Temperature	150°C±5 °C
Resistance	20… 500Ω (below transition) > 4 kΩ (above transition)
Reed Current	< 1mA
Max Voltage	30V
Lead Identification (inside terminal box)	P1 and P2 or TP1 and TP2

⚠ WARNING ⚠

- Thermostats and Thermistors will automatically reset.
- All wiring must be completed by qualified personal and adhere to all local installation codes.

Space Heater (SH)

Build

Motors subjected to extreme temperature fluctuations or severe climatic conditions can be damaged by the formation of condensation. NORD can provide anti-condensation space heaters inside the motor to heat up the windings when the motor is not operating. This will prevent moisture from forming inside the motor. The space heaters must not be switched on while the motor is running.

Space Heater Voltage Must be specified

Voltages available
❍ 115V – 50/60Hz
❍ 230V – 50/60Hz
❍ 460V – 50/60Hz
❍ other voltages available on request

Class H Insulation (ISO H)

Build

NORD motors can be manufactured with a class H insulation system. Standard NORD motors include double coated magnetic wire windings. When these windings are paired with a class H insulation it provides extra temperature capacity for the motor and will increase the motor's life. Class H insulation rated motors are also an advantage in some severe applications such as:

- Increased ambient temperature installations above 40°C (104°F)
- Increased elevation installations – above 3300 ft (1000 m)
- Applications with a high number of starts per hour.
- A lower operating frequency such as when used with an AC vector drive
- For additional information on insulation class see page 147.

High Resistance Rotor (WU)

Build

Using Silumin rotor material, NORD offers a high resistance rotor to soften the motors operation and allow higher overload torques.

Single Phase Motors, 60Hz (ECR)

Build

The ECR series of single phase motors is intended for demanding operation at 60Hz with a supply voltage of 115V or 230V. The permissible voltage range is 115/230V +/- 10%. The ECR motors have a 1.15 service factor and are available from 0.16 - 2 hp.

Environmental Options

Paint Coatings

Mod

NORD's standard paint coating is a two component, aliphatic polyurethane finish contaning 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. For more information and an explanation of all of our paint options please see page 20.

Condensation Drain Holes

NORD motors can be equipped with condensation drain holes. These drain holes are placed in the motor endbells at the lowest possible point. The drain holes are closed at the factory with plastic snap in plugs. They allow for condensation accumulation in the motor to drain after the closing plugs are removed.

The motor drain holes can be provided by NORD either open (KBO) or sealed with a closing plug (KB).

IMPORTANT NOTE

The motor must be installed in the mounting orientation specified on the nameplate or the drain holes will not function properly and may result with the motor filling with water.

Condensation Drain Holes, Plugged (KB)

Build

KB drain holes are plugged for shipment. In order for the holes to effectively drain moisture, the plugs must be removed before using the motor.

Condensation Drain Holes, Open (KBO)

Build

KBO drain holes are shipped open (not plugged).

IP65 Enclosure Protection

Mod

NORD motors can be provided with an IP65 enclosure protection. IP65 protection is suitable for wet, low-pressure wash down and extremely dusty environments.

IP	1st digit Foreign body protection	IP	2nd digit Water protection
6	Dust tight	5	Protection against water jets

IP66 Enclosure Protection

Mod

NORD motors can be provided with an IP66 enclosure protection. IP66 protection is suitable for wet, high-pressure wash down and extremely dusty environments, and includes all requirements included in IP65 enclosure protection.

IP	1st digit Foreign body protection	IP	2nd digit Water protection
6	Dust tight	6	Protection against high pressure water jets

Terminal Box Sealed with Resin (KKV)

Mod

Terminal boxes may be sealed with a flexible, electrically safe resin to ensure that contaminants, water, and moisture cannot pass through the terminal box into the stator body. This option is helpful in extremely dusty, wet and humid environments. Another environment where this option is helpful is in installations that have frequent large temperature swings where condensation may form.

Additional Insulation (AICM)

Build

NORD can provide additional insulation inside the motor to provide additional electrical protection in extremely wet or corrosive environments. An electrically safe insulating material is coated internally in the stator windings and on the rotor body.

Epoxy Dipped Windings (EP)

Build

In extremely wet environments, the motor windings are dipped in epoxy for improved moisture protection. The motor can also be treated with the standard NORD Severe Duty + (NSD+) package for an even higher degree of protection.

Canopy Drip Cover (RD)

Mod

For wet or dirty installations where the fan end of the motor is mounted up, NORD offers a canopy drip cover to block this falling water or debris, thus forcing water or debris to repel from the motor's fan guard, .

Double Fan Cover (RDD)

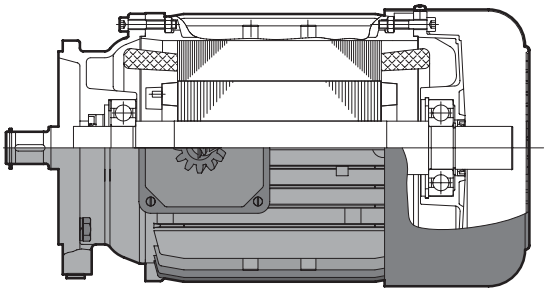
Mod

For wet or dirty installations where the fan end of the motor is mounted up, the NORD Double Fan Cover provides protection against falling or wind blown water, snow, dirt or debris from entering the back of the motor.

Totally Enclosed Non-Ventilated (OL) Mod

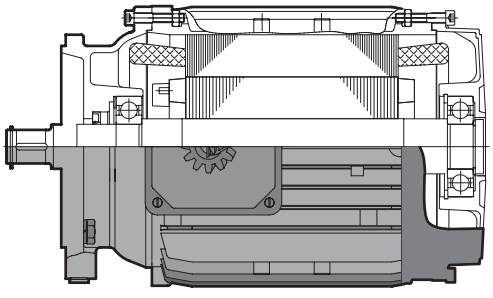
NORD can provide totally enclosed non-ventilated (TENV) motor enclosure. TENV motors provide benefits in certain operating environments; such as extremely dusty or dirty applications, where cooling fans may have material accumulation, which can be detrimental to the motor and the application. The OL series of motors are the standard fan cooled motor construction including the fan cover, but provided without the fan. TENV motors can also be used to reduce cooling fan noise on a standard motor.

A TENV motor's frame size is larger then a totally enclosed fan cooled (TEFC) motor. For intermittent operation, a TENV motor can be operated at a 50% duty cycle at full rated power.



Totally Enclosed Non-Ventilated, without Fan Cover (OL/H) Build

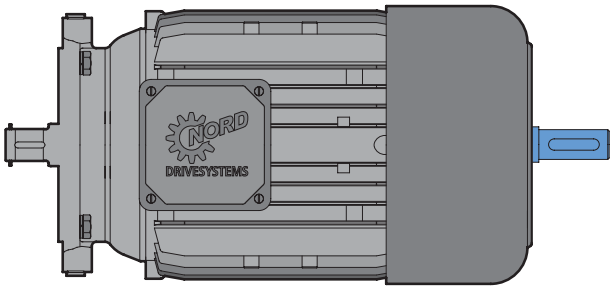
The OL/H series of TENV motors are more compact in space than the OL series. They do not include the rotor shaft extension through the back bearing end bell or the fan cover.



2nd Shaft Extension on Fan Side (WE) Build

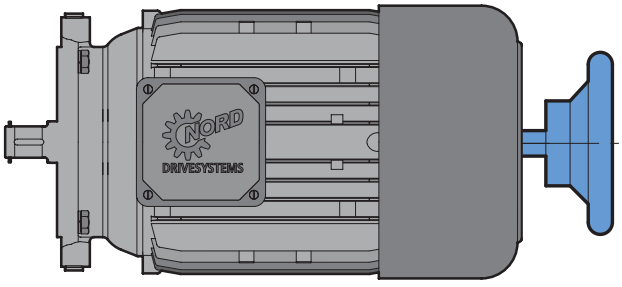
NORD can provide a second shaft extension on the fan side of the motor that protrudes through the fan cover. This extension can be used as a power take-off or to mount customer supplied devices such as encoders and tachometers.

The shaft extension can be provided on motors with and without brakes. The shaft extension can not be used on motors with blower fans (F) or (FC). For dimensions see pages 188 - 194.



Hand Wheel (HR) Build

Motors can be supplied with a hand wheel that is located on the second shaft extension. The hand wheel can be used for manual operation during power outages, or for machine positioning setup. This option is not available on NEMA dimensioned motors. For dimensions see pages 188 - 194.



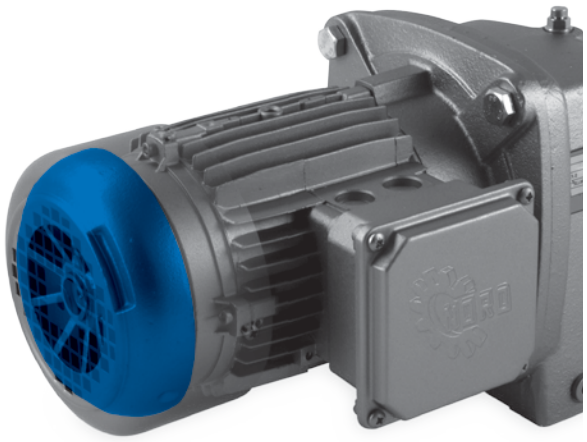
WARNING

The customer is required to provide appropriate safety guarding for the rotating hand wheel.

High Inertia Cast Iron Fan (Z)

Build

An optional cast iron motor cooling fan is available. This fan is used as a mechanical soft start and/or soft stop. This fan adds inertia to the motor. The high inertia fan can also be used for a flywheel effect to store mechanical energy. This can be helpful in smoothing rapid load changes. The cast iron fan replaces the standard plastic motor fan. The motor length is the same as a brakemotor.

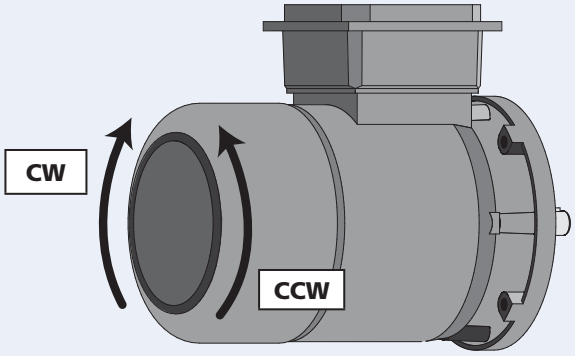


Motor Frame	Fan Inertia J_z[lb-ft²]
71	0.0475
80	0.1140
90	0.2375
100	0.2684
112	0.5653
132	0.9500

Motor Backstop (RLS)

Build

NORD can provide backstops on many motor frames. A backstop will prevent the motor from rotating in one direction. A common use is to prevent a motor from allowing a load to move backwards when power is removed. A motor brake is an alternative that may be used for this same purpose. A backstop adds additional length to the motor. For the motor length extension, see the table below.



The allowable direction of rotation must be specified in the order.

Allowable Shaft Rotation
❍ Clockwise - Back of Motor
❍ Counter Clockwise - Back of Motor

Motor Size	Backstop Torque [lb-in]	Minimum Speed [rpm]	Motor Extension [in]
80S/L	1150	860	2.52
90S/L	1150	860	2.95
100L	1150	860	3.58
112M	3270	750	3.66
132S/M	3270	750	4.21
160M/L	7880	670	6.57
180MX/LX	7880	670	6.73
200L	9120	630	6.57
225S/M	9120	630	6.57
250M	22130	400	9.84
280S/M	51330	320	11.02

For all motor dimensions please see pages 188 - 194.

Quick Power Plug Connector (MS)

Mod

The quick power plug connector (MS) is a simple and fast way to connect and disconnect a motor or brake motor. The MS connector is available on NORD three-phase motors from frame size 63 to 132. The motor connections are made by a modular power plug manfacturer by Harting. After the first installation, the motor can be quickly changed by simply plugging and unplugging the electrical connections. This will ensure the new motor is properly wired. This is a significant advantage to equipment builders who fabricate machinery on site and then ship to another location. The motor with the MS connector can simply be plugged in during final installation.

NORD supplies the male connector half mounted on the motor conduit box. The customer must supply the female connector half mounted on the power wiring. NORD supplies a protective plastic cover on the motor male connector half to protect from dirt and damage prior to installation.

Advantages:

- Simple motor wiring
- Accurate wiring of motor at final job site
- Fast motor replacement
- Accurate wiring of replacement motor
- Ideal for portable equipment
- Reduces the required personnel for motor replacement
- Faster motor changes reduce down time

Plug ratings:

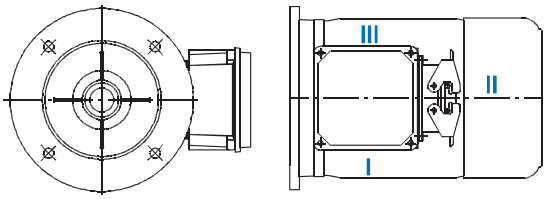
Manufacturer	Harting	
Connector	HAN 10 ES/HAN 10ESS	HAN 10 C-Modular
	Cage Clamp Connectors	
Number of Pins	10-Male	9-Male
Voltage	600VAC per UL/CSA	690VAC per UL/CSA
Current	16A - Continuous	40A - Continuous

Quick Power Plug Kits:

Includes conduit box, mounting hardware & Male Harting Motor Plug

P/N	Motor size
11035350	63 + 71
13035350	80 + 90 + 100
16035350	112
16335350	132

Power Plug Positions



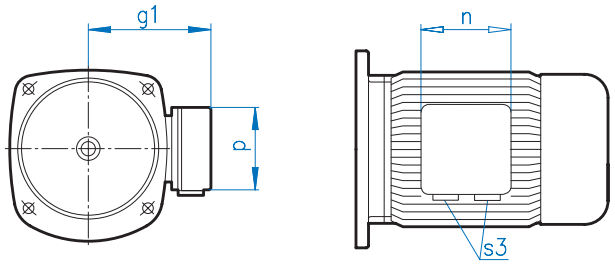
Power plug position must be specified

Power Plug Position		
❍ I	❍ II	❍ III

Mod

Small Terminal Box (EKK)

The motor terminal box can be provided as a smaller, one-piece terminal design. This option is valid for standard motors 0.16 - 10 hp (frame size 63-132) and is not available for Brakemotors.



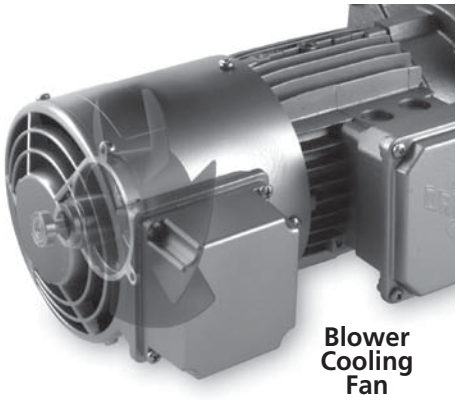
EKK Dimensions				
Motor Frame	g1	n	p	S3
63	3.94	2.95	2.95	2x M16 x 1.5
71	4.29	2.95	2.95	2x M16 x 1.5
80	4.88	3.62	3.62	2x M20 x 1.5
90	5.08	3.62	3.62	2x M20 x 1.5
100	5.51	3.62	3.62	2x M20 x 1.5
112	5.91	3.62	3.62	2x M20 x 1.5
132	6.85	4.13	4.13	2x M25 x 1.5

NORD DRIVESYSTEMS

Blower Cooling Fan (F & FC)

Mod

NORD offers continuous running motor mounted cooling fans that provide motor cooling at low motor speeds. When a motor is operated on an AC vector drive at low frequency, standard rotor fans do not provide adequate airflow for cooling. NORD's separate powered motor cooling fans provide that necessary airflow. These separately powered fans replace the standard motor fan and its cover.



Blower Cooling Fan

Option F – 3ph 220-575V 50/60Hz

Motor Frame	SE	EE	PE	60Hz Ratings			50Hz Ratings		
				Voltage [V]	Current [A]	Power [W]	Voltage [V]	Current [A]	Power [W]
Three phase low-voltage connection - ⊥ (Delta)									
63	S/L			220 – 332	0.08	23	220 – 290	0.10	27
71	S/L			220 – 332	0.08	24	220 – 290	0.10	30
80	S/L	SH/LH	LP	220 – 332	0.08	25	220 – 290	0.10	29
90	S/L	SH/LH	SP/LP	220 – 332	0.21	64	220 – 290	0.28	86
100	L/LA	LH/AH	LP/AP	220 – 332	0.21	66	220 – 290	0.27	86
112	M	SH/MH/LH	MP	220 – 332	0.23	70	220 – 290	0.27	85
132	S/M/LA	SH/MH	SP/MP	220 – 332	0.25	74	220 – 290	0.32	96
160 - 225	M/L	SH/MH/LH	MP/LP	220 – 322	0.49	165	220 – 290	0.52	155
180	MX/LX	MH/LH	MP/PL	220 – 322	0.49	165	220 – 290	0.52	155
200	L/LX	LH/XH		220 – 322	0.49	165	220 – 290	0.52	155
225	S/L			220 – 322	0.49	165	220 – 290	0.52	155
225		SH/LH		220 – 332	0.25	74	220 – 290	0.32	96
250	M	MH		220 – 332	0.25	74	220 – 290	0.32	96
280	S/L	SH/LH		220 – 322	0.49	165	220 – 290	0.52	155
315	M/MA/L	SH/MAH		220 – 322	0.49	165	220 – 290	0.52	155
Three phase high-voltage connection - (Y)									
63	S/L			380 – 575	0.04	23	380 – 500	0.05	29
71	S/L			380 – 575	0.04	25	380 – 500	0.05	30
80	S/L	SH/LH	LP	380 – 575	0.04	26	380 – 500	0.05	29
90	S/L	SH/LH	SP/LP	380 – 575	0.12	62	380 – 500	0.16	82
100	L/LA	LH/AH	LP/AP	380 – 575	0.12	66	380 – 500	0.16	83
112	M	SH/MH/LH	MP	380 – 575	0.13	70	380 – 500	0.16	82
132	S/M/LA	SH/MH	SP/MP	380 – 575	0.14	75	380 – 500	0.18	96
160 - 225	M/L	SH/MH/LH	MP/LP	380 – 575	0.28	165	380 – 500	0.29	155
180	MX/LX	MH/LH	MP/PL	380 – 575	0.28	165	380 – 500	0.29	155
200	L/LX	LH/XH		380 – 575	0.28	165	380 – 500	0.29	155
225	S/L			380 – 575	0.28	165	380 – 500	0.29	155
225		SH/LH		380 – 575	0.14	75	380 – 500	0.18	96
250	M	MH		380 – 575	0.14	75	380 – 500	0.18	96
280	S/L	SH/LH		380 – 575	0.28	165	380 – 500	0.29	155
315	M/MA/L	SH/MAH		380 – 575	0.28	165	380 – 500	0.29	155

Option F – 1ph 220-575V 50/60Hz

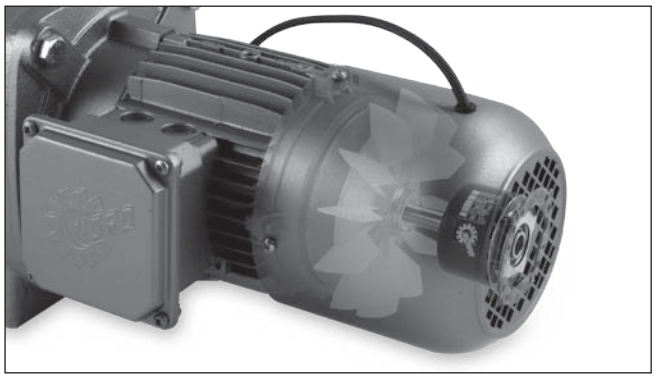
Motor Frame	SE	EE	PE	60Hz Ratings			50Hz Ratings		
				Voltage [V]	Current [A]	Power [W]	Voltage [V]	Current [A]	Power [W]
Single phase connection - ⊥ (Delta)									
63	S/L			230 – 277	0.11	38	230 – 277	0.1	27
71	S/L			230 – 277	0.12	41	230 – 277	0.1	28
80	S/L	SH/LH	LP	230 – 277	0.13	44	230 – 277	0.11	29
90	S/L	SH/LH	SP/LP	230 – 277	0.25	88	230 – 277	0.26	72
100	L/LA	LH/AH	LP/AP	230 – 277	0.28	88	230 – 277	0.26	70
112	M	SH/MH/LH	MP	230 – 277	0.31	107	230 – 277	0.26	73
132	S/M/LA	SH/MH	SP/MP	230 – 277	0.27	89	230 – 277	0.29	82
160	M/L	SH/MH/LH	MP/LP	230 – 277	0.41	140	230 – 277	0.45	128
180	MX/LX	MH/LH	MP/PL	230 – 277	0.41	140	230 – 277	0.45	128
200	L/LX	LH/XH		230 – 277	0.41	140	230 – 277	0.45	128
225	S/L			230 – 277	0.41	140	230 – 277	0.45	128
225		SH/LH		230 – 277	0.27	89	230 – 277	0.29	82
250	M	MH		230 – 277	0.27	89	230 – 277	0.29	82
280	S/L	SH/LH		230 – 277	0.41	140	230 – 277	0.45	128
315	M/MA/L	SH/MAH		230 – 277	0.41	140	230 – 277	0.45	128

Option FC – 1ph 115V 50/60Hz

Motor Frame	SE	EE	PE	60Hz Ratings			50Hz Ratings		
				Voltage [V]	Current [A]	Power [W]	Voltage [V]	Current [A]	Power [W]
Single Phase Connection - ⊥ (Delta)									
63	S/L			100 – 135	0.23	42	100 – 135	0.3	42
71	S/L			100 – 135	0.23	47	100 – 135	0.3	44
80	S/L	SH/LH	LP	100 – 135	0.27	57	100 – 135	0.3	43
90	S/L	SH/LH	SP/LP	100 – 135	0.46	102	100 – 135	0.57	78
100	L/LA	LH/AH	LP/AP	100 – 135	0.53	105	100 – 135	0.54	78
112	M	SH/MH/LH	MP	100 – 135	0.6	115	100 – 135	0.55	80

Encoder Options

Encoder Overview



In many of today's drive applications encoders are needed when it necessary to monitor travel distance, position, or speed. Encoders use integrated electronics to convert sensor detected signals into a digital output format that is easily interfaced with programmable logic controllers (PLC's) and computers.

NORD offers a variety of encoder solutions that will satisfy almost any application. NORD will also work closely with our customers to satisfy many specific encoder requirements or meet specifications for a variety of protocols.

Incremental Encoders

Incremental encoders can be used to monitor position or speed. Position is determined by counting pulses from a zero mark or home position. Speed or velocity data is generated by looking at the time interval between pulses or the number of pulses within a given time period

With incremental encoders it is necessary to re-initialize the system and return the system to the home position in the event of a power loss.

The following pages are an explanation of the types of incremental encoders that NORD offers.

Magnetic Encoders vs. Optical Encoders

Magnetic Encoders use a magnetized wheel spinning in relationship to a fixed magneto-resistive sensor. The wheel causes predictable responses in the sensor, based on the strength of the magnetic field.

Optical Encoders use a spinning disk and a mask. The mask lets light pass through in predictable patterns for interpretation by a photo-electric sensor. In both cases the sensor produces a digital output format that is easily interfaced by the PLC or computer.

- Magnetic Incremental Encoder (Page 159)
- Optical Incremental Encoders (Page 160).

Types of Common Pulse Signals

Incremental encoders can provide different pulse signals for each full rotation of the encoder.

Quadrature pulse signals are represented by two encoder output signals (A & B channel) phased 90° electrically apart; these signals help determine direction of rotation by monitoring the phase relationship between the two channels.

Differential signals are complimentary or mirror image [high (A & B) and low (A & B)] output signals that are generated in order to greatly reduce the encoder's susceptibility to electrical interference or noise. When noise occurs during a given pulse, a mirror image does not result and that small portion of the total signal can be ignored.

A Marker Pulse or Index signal (Z channel) can be provided as one pulse per revolution signal for pulse count verification on the A and/or B channels. This pulse is sometimes used for error detection or re-homing the system after a power failure or fault condition.

Absolute Encoders

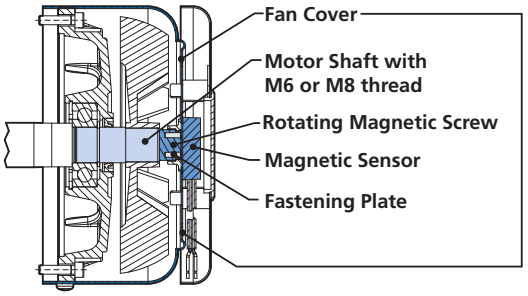
Absolute encoders use a disc system with digital coding on concentric tracks. A unique pattern is assigned to every position. True position verification and reference to home is maintained offering optimal recovery from system and/or power failures. Absolute encoder's also come in a variety of output protocols or interfaces. Additional incremental tracks are often specified to provide speed control along with accurate position monitoring.

- Absolute Encoders (Page 161).
- Absolute Encoders for NORD Vector Drives (Page 162).

Magnetic-Incremental Encoder (MG)

NORD offers a competitively priced magnetic encoder that is easily adaptable to the 63 to 180 frame NORD motors. The magnetic encoder utilizes a special screw installed to the motor's rotor shaft in order to create a permanent rotating magnetic field.

A small [0.78 inch (20 mm)] sensor pick-up is mounted to the back of the motor fan shroud. The sensor converts the changing magnetic fields into HTL, push-pull output signals that can be read by a PLC or computer. Quadrature (2 channels, A and B) output signals are phased electrically apart by 90° in order to help determine the direction of rotation by monitoring the phase relationship between the two channels. Our design enables the encoder's implementation near the vicinity of our electric brakes.



Advantages

- Cost effective, compact, and easy to mount (63– 180 frame motors).
- Minimal dimensional change to back of motor (page 188).
- Non-contacting measuring method using magnetics.
- Accurate resolution, vibration and shock resistancy in order to increase durability.

Technical Data	
Interface	HTL (push-pull) / Quadrature
Supply Voltage	10-30 VDC
Current	40 mA Max / < 30 mA (no load)
Pulse Count	1 PPR, 32 PPR or 512 PPR
Speed Range	0-5000 rpm
Protection Class	IP 68
Temp.	-4 to 176°F (-20 to 80°C)

Wire Color	Designation
Red	(+) Supply Voltage
Black	(-) Supply Voltage
Brown	Channel A
Orange	Channel B
Cable Size	0.19 in x 39 in Lg
Wires	4
Gauge	22 AWG

Pulse Count	Connection Options (Supplier)
01 = 1 PPR	**O** = Open-end cable
20 = 32 PPR	**M** = M12 motor terminal box plug (Lumberg Automation P/N RSFM4/0.5M)
50 = 512 PPR	**N** = M12 male plug connector (Lumberg Automation P/N RSC4/9)
	V = Coupling connector (Phoenix Contact, Quickon P/N 1641879)

Connector Wiring				
M12 Connectors (Option M or N)		**Coupling Connector (Option V)**		
Pin	**Wire Color**	**Pin**	**Wire Color**	**Designation**
1	Brown	1	Red	(+) Supply Voltage
2	Black	2	Brown	(-) Supply Voltage
3	White	3	Orange	Channel A
4	Blue	4	Blue	Channel B

Ordering Example

Encoder Type: MG - Pulse Count - Option

MG – 50 – M

- **M** — M12 Connector Plug
- **50** — 512 PPR (pulses per revolution)
- **MG** — Magnetic Encoder

A Magnetic HTL encoder, with a 512 pulse count that is connected by a M12 connector

Encoder Options

NORD DRIVESYSTEMS

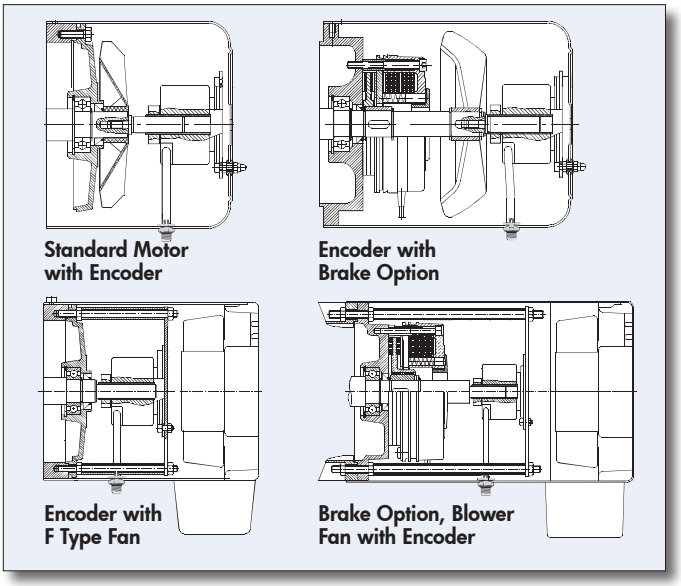
Optical-Incremental Encoder (IG..P)

Build

NORD offers optical incremental encoders to monitor position or speed. These encoders are typically mounted to the back side of the electric motor shaft. Common interface logic types include: TTL, HTL and Line Driver. NORD will also work closely with our customers to provide specified encoder pulse counts or control logic.

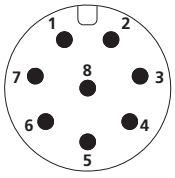
Optical incremental encoders pass light from a light emitting diode (LED) through a partially masked rotating code disc onto a photo-electric receiver. The receiver converts light pulse signals into a square wave digital output format that is easily interfaced by programmable logic controllers (PLC's) and computers.

With optical incremental encoders it is necessary to re-initialize the system and return the system to the home position in the event of power loss.



Advantages

- Quadrature, differential and marker pulse output signals
- Accurate resolution up to 5000 ppr.
- Sturdy double bearing design offers high tolerance to shock and vibration.
- Short-circuit proof outputs and reverse connection protection.
- M12 (8-pin) male plug fixed to motor fan cover for easy wiring and adaptability.



M12 Connecter	Pin	Color	Signal
	1	0V	WH
	2	+V	BN
	3	A	GN
	4	A\	YE
	5	B	GY
	6	B\	PK
	7	Z	BU
	8	Z\	RD

NORD Type	IG1 P	IG2 P	IG4 P	IG11 P	IG21 P	IG41 P	IG12 P	IG22 P	IG42 P	IG13 P	IG23 P	IG43 P
Part Number	19551500	19551510	19551520	19551502	19551511	19551522	19551501	19551512	19551521	19551503	19551513	19551523
Interface	TTL/RS422 (26C31)			TTL/RS422 (26C31)			HTL/Push-pull (IC-WE)			Line Driver (7272)		
Logic [VDC]	5			5			10-30			5-30		
Pulse Count [PPR]	1024	2048	4096	1024	2048	4096	1024	2048	4096	1024	2048	4096
Power Supply [VDC]	4-6	4-6	4-6	10-30	10-30	10-30	10-30	10-30	10-30	5-30	5-30	5-30
Max Current Draw [mA]	100						150					
Max Frequency [kHz]	300											
Temperature Range	-4°F to176°F (-20°C to 80°C)											
IP Rating	IP66											
Cable	M12 8-pin male plug											

Pre-fabricated Encoder Cables

NORD can provide Turck pre-fabricated encoder molded cordsets (M12, 8-pin, shielded, twisted pair)

Length	In-line		Right-angle	
	NORD P/N	Turck P/N	NORD P/N	Turck P/N
2m	19551580	E-RKC 8T-264-2	19551584	E-WKC 8T-264-2
5m	19551581	E-RKC 8T-264-5	19551585	E-WKC 8T-264-5
10m	19551582	E-RKC 8T-264-10	19551586	E-WKC 8T-264-10
15m	19551583	E-RKC 8T-264-15	19551587	E-WKC 8T-264-15
Field Wireable Connector	19551588	CMB 8181-0	-	-
Custom	order from Turck	E-RKC 8T-264-*	order from Turck	E-WKC 8T-264-*

- The above encoder cables are provided with the shielding NOT connected thru the plug nut
- Providing a conducting path thru the cable nut and attaching the shield to ground on both ends of the cable is a possible source of electrical noise

Absolute Encoder (AG)

Absolute encoders do not lose position or home-position reference when power is removed. Absolute encoders provide a higher degree of safety than when using incremental encoders in applications where a loss of position could result in damage to the machinery or injury to the operator.

NORD absolute encoders are available with different data protocols or interfaces and many cases they can also be supplied with optional incremental tracks to provide accurate position and speed sensing feedback. We will also work closely with our customers to meet the specifications of the equipment builder or systems integrator.

NORD typically provides multi-turn absolute encoders mounted to the back side of the electric motor shaft. Multi-turn encoders provide turns counting in applications involving more than one revolution of the encoder shaft. Single-turn encoders can also be supplied and they are best suited for short travel, motion control applications where position verification is required within a single turn of the encoder shaft.

Turck Absolute Encoders (AG)

Turck Type	T8.F3683	T8.F3668	T8.5860	T8.5883
Interface	SSI or BiSS-C® ❷	CANopen® ❷	DeviceNet™ ❶	SSI or BiSS-C®
Supply Voltage	5 VDC or 10-30 VDC	10-30 VDC	10-30 VDC	5 VDC or 10-30 VDC
Single-turn Resolution	10, 12-14 & 17 bit	13 bit (default) 16 bit (max.)	13 bit	10-14 & 17 bit
Multi-turn Resolution	12, 16 or 24 bit	12 bit	12 bit	12 bit
Incremental Options	TTL/RS 422 (2048 PPR) or SinCos (2048 PPR)	None	None	TTL/RS 422 (2048 PPR) or SinCos (2048 PPR)
Shaft Version	Ø 8 mm hollow shaft	Ø 8 x 14.5 mm blind hollow shaft	Ø 12 x 30 mm blind hollow shaft	Ø 12 mm hollow shaft
Temperature Range	-40 to +194 °F (-40 to +90 °C)	-40 to +185 °F (-40 to +85 °C)	-4 to +176 °F (-20 to +80 °C)	-22 to +167 °F (-30 to +75 °C)
IP Rating	IP 67	IP 67	IP 67	IP 67

Turck Type	T8.5888	T8.5888	T8.5888	T8.5888
Interface	CANopen® ❷ & ❸	EtherCAT®	PROFIBUS® ❹	PROFINET®
Supply Voltage	10-30 VDC	10-30 VDC	10-30 VDC	10-30 VDC
Single-turn Resolution	13 bit (default) 16 bit (max.)	13 bit (default) 16 bit (max.)	13 bit (default) 16 bit (max.)	13 bit (default) 16 bit (max.)
Multi-turn Resolution	12 bit	12 bit	12 bit	12 bit
Incremental Options	TTL/RS 422 (2048 PPR)	None	None	None
Shaft Version	Ø 12 mm hollow shaft	Ø 12 x 30 mm blind hollow shaft	Ø 12 x 30 mm blind hollow shaft	Ø 12 x 30 mm blind hollow shaft
Temperature Range	-22 to +167 °F (-30 to +75 °C)	-40 to +176 °F (-40 to +80 °C)	-40 to +176 °F (-40 to +80 °C)	-40 to +185 °F (-40 to +85 °C)
IP Rating	IP 67	IP67	IP67	IP67

❶ *DeviceNet™ encoders are subject to magnet interference due to the hall-effect sensors used.*
❷ *Device specific CANopen® profile DS406 V3.2 is also available.*
❸ *CANopen® Lift© profile DS417 V1.1 is also available.*
❹ *Linedriver / RS485 is functionally integrated.*

Encoder Options

Absolute Encoder (AG) - For AC Vector Drives

Many NORD AC variable frequency drives have an on-board CANopen® interface allowing the user to implement vector-drive position control.

The encoders listed in the table below communicate using CANopen® profile DS406 V3.2; device specific add-ons allow parameterization of the absolute encoder directly from the NORD frequency inverter.

The table indicates which encoder options contain incremental tracks so that speed control can also be monitored, which is necessary when speed control is required in addition to positive control.

Consult the appropriate NORD user manuals for frequency drive and encoder wiring. Also consult the encoder manufacture's documentation for the encoder terminal assignments.

Absolute Encoders (AG) - For NORD AC Variable Frequency Inverters

Turck Type (NORD P/N)	T8.5888 (19551883)	T8.5888 (19551891)	T8.5888 (19551881)	T8.5888 (19551886)
NORD AC VFD Type	SK2xxE, SK53xE	SK53xE	SK53xE	SK2xxE
Interface	CANopen® profile DS406 V3.2 ❶	CANopen® profile DS406 V3.2 ❶	CANopen® profile DS406 V3.2 ❶	CANopen® profile DS406 V3.2 ❶
Supply Voltage	10-30 VDC	10-30 VDC	10-30 VDC	10-30 VDC
Single-turn Resolution	13 bit (8192)	13 bit (8192)	13 bit (8192)	13 bit (8192)
Multi-turn Resolution	12 bit (4096)	12 bit (4096)	12 bit (4096)	12 bit (4096)
Node address/Baud rate (kbits/s)	51 / 125 ❷ (fixed/fixed)	51 / 125 ❸ (fixed/fixed)	51 / 125 ❷ (fixed/fixed)	51 / 125 ❷ (fixed/fixed)
Incremental Output	None	None	TTL/RS 422 (2048 PPR)	HTL/Push-Pull (2048 PPR)
Shaft Version	Ø 12 x 30 mm blind hollow shaft	Ø 12 x 30 mm blind hollow shaft	Ø 12 x 30 mm blind hollow shaft	Ø 12 x 30 mm blind hollow shaft
Temperature Range	-40 to +176 °F (-40 to +80 °C)	-22 to +167 °F (-30 to +75 °C)	-40 to +176 °F (-40 to +80 °C)	-40 to +176 °F (-40 to +80 °C)
IP Rating	IP 67	IP 67	IP 67	IP 67
Electrical Connection	Removable Bus Cover with Cable Glands	Fixed Connection - (2m) Radial Cable	3 x M12 Connectors (Bus-in, TTL, Bus-out)	3 x M12 Connectors (Bus-in, HTL, Bus-out)

NORD AC Vector Drive Encoder Compatability

NORD AC Vector Drive	Turck Encoder Type (NORD P/N)			
	T8.5888 (19551883)	T8.5888 (19551891)	T8.5888 (19551881)	T8.5888 (19551886)
SK530E	✓	✓	✓	
SK200E	✓ ❹			✓
SK210E	✓ ❹			✓
SK220E	✓ ❹			✓
SK230E	✓ ❹			✓
SK205E	✓			✓
SK215E	✓			✓
SK225E	✓			✓
SK235E	✓			✓

❶ *CANopen® profile DS406 V3.2 contains device specific add-ons to work with NORD AC Variable Frequency Drives*

❷ *Device specific CANopen® profile DS406 V3.2 is also available.*

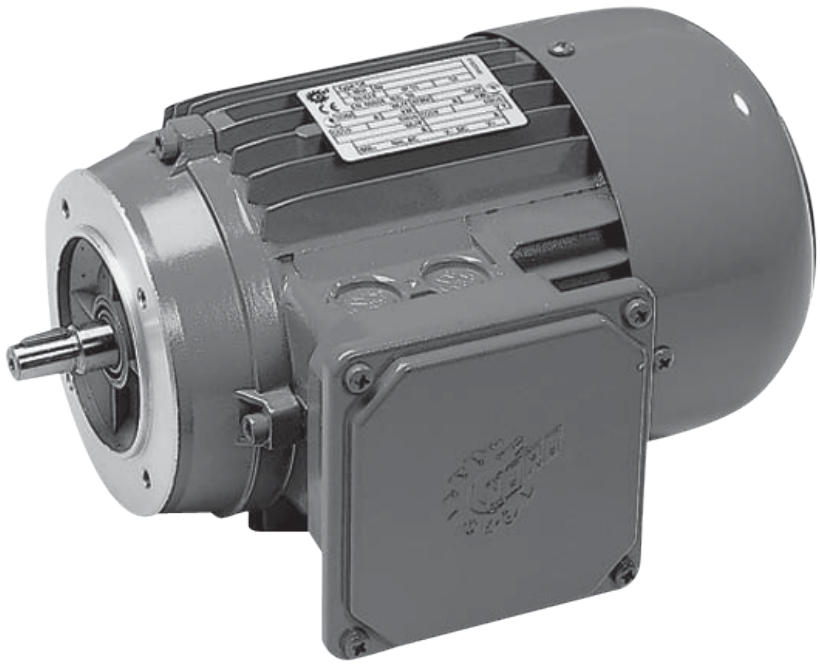
❸ *CANopen® Lift® profile DS417 V1.1 is also available.*

❹ *Linedriver / RS485 is functionally integrated.*

CANopen® is a registered trademark of the Controller Area Network (CAN) automation user's group

Motor Ratings

- 60Hz 230/460V Standard Eff.
- 60Hz 230/460V Energy Eff.
- 60Hz 230/460V Premium Eff.
- 60Hz 575V Standard Eff.
- 60Hz 575V Energy Eff.
- 60Hz 575V Premium Eff.
- 60Hz 200/208V Standard Eff.
- 50Hz 400 Standard Eff.
- 50Hz 230/400V & 400/690V Energy Eff.
- 50Hz 230/400V & 400/690V Premium Eff.
- Energy Efficiency Regulations
- Motor Efficiency Ratings



NORD DRIVESYSTEMS

www.nord.com

INVERTER DUTY MOTOR

ee

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

pe

Performance Data

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

Motor Type	Power P_n		N_n Full-load	I_n Full-Load Current 230V	460V	I_a/I_n	Code Letter	Torque T_n	T_a/T_n	T_k/T_n	pf	Eff.	J_m Inertia
	[hp]	[kW]	[rpm]	[A]	[A]	[%]		[lb-in]				[%]	[lb-ft²]
63 S/4	0.16	0.12	1700	0.88	0.44	250	F	5.9	2.7	3.5	0.66	52.0	0.0050
63 L/4	0.25	0.18	1680	1.12	0.56	270	E	9.4	2.3	2.5	0.71	57.0	0.0066
71 S/4	0.33	0.25	1710	1.56	0.78	310	G	12.2	2.4	2.7	0.64	63.0	0.015
71 L/4	0.5	0.37	1720	1.90	0.95	350	F	18.3	2.3	2.7	0.69	71.0	0.018
80 S/4	0.75	0.55	1710	2.70	1.35	350	F	27.6	2.2	2.3	0.71	72.0	0.030
80 L/4	1	0.75	1650	3.66	1.83	390	G	38.2	2.2	2.3	0.74	70.0	0.039
90 S/4	1.5	1.1	1660	4.84	2.42	490	G	57.0	2.5	2.8	0.78	73.0	0.056
90 L/4	2	1.5	1660	6.34	3.17	510	G	75.9	2.5	2.8	0.80	74.0	0.074
100 L/4	3	2.2	1705	9.00	4.50	490	G	111	2.3	2.6	0.81	76.0	0.107
100 LA/4	5	3.7	1725	15.2	7.62	510	G	183	2.7	3.1	0.75	81.0	0.178
132 S/4	7.5	5.5	1735	19.8	9.90	540	G	272	2.4	2.7	0.82	85.0	0.553
132 M/4	10	7.5	1735	25.8	12.9	630	H	363	2.9	3.2	0.84	87.0	0.752
160 M/4	15	11	1770	35.8	17.9	820	H	534	2.9	3.8	0.85	90.7	1.19
160 L/4	20	15	1760	48.4	24.2	850	K	716	2.9	3.9	0.87	89.4	1.59
180 MX/4	25	18.5	1760	59	29.5	880	J	895	3.4	4.3	0.87	90.5	1.90
180 LX/4	30	22	1765	74	37.2	890	H	1071	3.6	4.4	0.80	92.8	2.18
200 L/4	40	30	1765	97	48.5	770	J	1428	2.9	3.6	0.85	91.0	5.70
225 S/4	50	37	1775	-	58	760	H	1775	3.1	3.5	0.86	93.0	7.59
225 M/4	60	45	1770	-	70	840	J	2136	3.1	3.6	0.88	91.7	8.54
250 M/4	75	55	1782	-	89	610	J	2653	2.4	2.8	0.84	93.0	16.3
280 S/4	100	75	1788	-	118	710	K	3525	2.5	3.0	0.84	93.6	28.2
280 M/4	125	90	1786	-	144	740	K	4411	2.5	3.0	0.86	94.5	33.0
315 S/4	150	110	1788	-	172	640	K	5287	2.5	2.7	0.85	94.5	46.0
315 M/4	175	132	1790	-	205	680	K	6162	2.7	2.9	0.85	95.0	54.8
315 L/4	200	150	1788	-	230	680	K	7050	2.7	2.8	0.85	95.0	68.3

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

P_n - **Full load power**
N_n - **Full load speed**
I_n - **Full load current**
I_a - **Locked-rotor current**
I_a/I_n - **Locked-rotor current ratio (%)**
T_n - **Full-load torque**
T_a - **Locked-rotor torque**
T_a/T_n - **Locked-rotor torque ratio**
T_k - **Break-down torque**
T_k/T_n - **Break-down torque ratio**
pf - **Power factor**
Eff - **Normal efficiency**
J_m - **Motor inertia**

Performance Data

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

CC092B energy verified

Motor Type	Power Pn		N_n Full-load	I_n Full-Load Current 230V	I_n Full-Load Current 460V	I_a/I_n	Code Letter	Torque T_n	T_a/T_n	T_k/T_n	pf	Eff.	J_m Inertia
	[hp]	[kW]	[rpm]	[A]	[A]	[%]		[lb-in]				[%]	[lb-ft²]
80 LH/4	1	0.75	1750	3.88	1.94	600	K	36.0	4.6	4.3	0.59	82.5	0.045
90 SH/4	1.5	1.1	1740	4.30	2.15	630	L	54.3	3.5	3.8	0.76	84.0	0.081
90 LH/4	2	1.5	1745	6.30	3.15	670	K	72.2	4.3	4.5	0.71	84.0	0.093
100 LH/4	3	2.2	1765	8.60	4.30	790	L	107	3.6	4.7	0.73	87.5	0.178
112 MH/4	5	3	1770	14.4	7.20	810	L	178	4.0	4.8	0.74	87.5	0.304
132 SH/4	7.5	5.5	1780	20.9	10.5	820	M	266	4.3	4.6	0.74	89.5	0.752
132 MH/4	10	7.5	1770	27.0	13.5	740	M	356	3.2	4.0	0.78	89.5	0.840
160 MH/4	15	11	1770	26.0	18.0	870	K	534	3.2	3.8	0.84	91.7	1.59
160 LH/4	20	15	1775	48.0	24.0	880	M	710	3.5	4.2	0.84	92.6	2.18
180 MH/4	25	18.5	1780	60.0	30.0	850	K	885	3.5	3.6	0.84	92.4	3.08
180 LH/4	30	22	1780	70.0	35.0	830	K	1,062	3.6	3.6	0.85	92.4	3.80
200 LH/4	40	30	1775	96.0	48.0	830	K	1,420	3.0	3.6	0.84	93.0	7.59
225 SH/4	50	37	1785	-	59.0	680	K	1,765	2.7	3.0	0.84	93.9	9.44
225 MH/4	60	45	1785	-	70.0	690	K	2,118	2.8	3.0	0.85	94.1	11.5
250 MH/4	75	55	1790	-	86.0	740	K	2,641	2.6	3.0	0.86	95.1	20.3
280 SH/4	100	75	1788	-	114	670	K	3,525	2.5	2.8	0.86	95.0	33.0
280 MH/4	125	90	1790	-	144	750	L	4,401	2.7	3.0	0.86	95.0	40.6
315 SH/4	150	110	1791	-	170	700	K	5,278	2.7	2.8	0.87	95.0	54.8
315 MH/4	175	132	1791	-	198	740	L	6,158	2.7	2.8	0.87	95.4	68.3
315 RH/4	200	160	1792	-	225	750	L	7,034	3.0	2.9	0.87	95.4	82.1
315 LH/4	250	200	1792	-	280	750	L	8,793	3.2	3.0	0.87	95.8	100

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

P_n - **Full load power**
N_n - **Full load speed**
I_n - **Full load current**
I_a - **Locked-rotor current**
I_a/I_n - **Locked-rotor current ratio (%)**
T_n - **Full-load torque**
T_a - **Locked-rotor torque**
T_a/T_n - **Locked-rotor torque ratio**
T_k - **Break-down torque**
T_k/T_n - **Break-down torque ratio**
pf - **Power factor**
Eff - **Normal efficiency**
J_m - **Motor inertia**

Performance Data

NORD DRIVESYSTEMS

Premium Efficient (EISA)

230/460V – 60Hz / PE

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

CC092B

energy verified

Motor Type	Power P_n		N_n Full-load	I_n Full-Load Current		I_a/I_n	Code Letter	Torque T_n	T_a/T_n	T_k/T_n	pf	Eff.	J_m Inertia
				230V	460V								
	[hp]	[kW]	[rpm]	[A]	[A]	[%]		[lb-in]				[%]	[lb-ft²]
80 LP/4	1	7.5	1730	3.14	1.57	650	L	36.4	3.4	3.8	0.70	86.1	0.045
90 SP/4	1.5	1.1	1740	4.20	2.10	840	J	54.3	4.1	4.9	0.76	86.9	0.081
90 LP/4	2	1.5	1730	5.60	2.80	760	K	72.9	3.8	4.2	0.78	87.0	0.093
100 LP/4	3	2.2	1770	7.70	3.84	920	L	107	3.0	4.5	0.79	90.0	0.192
112 MP/4	5	3.7	1755	13.0	6.50	910	L	180	3.8	4.3	0.80	90.3	0.332
132 SP/4	7.5	5.5	1770	19.5	9.80	1020	L	267	4.7	5.0	0.77	91.7	0.759
132 MP/4	10	7.5	1765	26.6	13.3	960	J	357	4.7	5.0	0.77	91.7	0.831
160 MP/4	15	11	1770	35.6	17.8	880	K	534	3.2	3.8	0.84	92.5	1.59
160 LP/4	20	15	1775	47.6	23.8	1080	L	710	4.3	4.6	0.85	93.0	2.18
180 MP/4	25	18.5	1780	61.0	30.3	860	K	885	3.4	3.6	0.82	93.6	3.80
180 LP/4	30	22	1780	70.0	34.8	880	J	1062	3.3	3.4	0.85	93.6	3.80

P_n	-	Full load power
N_n	-	Full load speed
I_n	-	Full load current
I_a	-	Locked-rotor current
I_a/I_n	-	Locked-rotor current ratio (%)
T_n	-	Full-load torque
T_a	-	Locked-rotor torque
T_a/T_n	-	Locked-rotor torque ratio
T_k	-	Break-down torque
T_k/T_n	-	Break-down torque ratio
pf	-	Power factor
Eff	-	Normal efficiency
J_m	-	Motor inertia

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

Motor Type	Power P_n		N_n Full-load	I_n Full-Load Current 575V	I_a/I_n	Code Letter	Torque T_n	T_a/T_n	T_k/T_n	pf	Eff.	J_m Inertia
	[hp]	[kW]	[rpm]	[A]	[%]		[lb-in]				[%]	[lb-ft²]
63 S/4	0.16	0.12	1700	0.37	250	F	5.9	2.7	3.5	0.66	52.0	0.0050
63 L/4	0.25	0.18	1680	0.46	270	E	9.4	2.3	2.5	0.71	57.0	0.0066
71 S/4	0.33	0.25	1710	0.66	310	G	12.2	2.4	2.7	0.64	63.0	0.015
71 L/4	0.5	0.37	1720	0.80	350	F	18.3	2.3	2.7	0.69	71.0	0.018
80 S/4	0.75	0.55	1710	1.12	350	F	27.6	2.2	2.3	0.71	72.0	0.030
80 L/4	1	0.75	1650	1.46	390	G	38.2	2.2	2.3	0.74	70.0	0.039
90 S/4	1.5	1.1	1660	1.94	490	G	57.0	2.5	2.8	0.78	73.0	0.056
90 L/4	2	1.5	1660	2.54	510	G	75.9	2.5	2.8	0.80	74.0	0.074
100 L/4	3	2.2	1705	3.63	490	G	111	2.3	2.6	0.81	76.0	0.107
100 LA/4	5	3.7	1725	6.10	510	G	183	2.7	3.1	0.75	81.0	0.178
132 S/4	7.5	5.5	1735	7.92	540	G	272	2.4	2.7	0.82	85.0	0.553
132 M/4	10	7.5	1735	10.3	630	H	363	2.9	3.2	0.84	87.0	0.752
160 M/4	15	11	1770	14.5	820	H	534	2.9	3.8	0.85	907.0	1.19
160 L/4	20	15	1760	19.3	850	K	716	2.9	3.9	0.87	894.0	1.59
180 MX/4	25	185	1760	23.6	880	J	895	3.4	4.3	0.87	905.0	1.90
180 LX/4	30	22	1765	29.8	890	H	1071	3.6	4.4	0.80	928.0	2.18
200 L/4	40	30	1765	38.8	770	J	1428	2.9	3.6	0.85	91.0	5.70
225 S/4	50	37	1775	46.4	760	H	1775	3.1	3.5	0.86	93.0	7.59
225 M/4	60	45	1770	56	840	J	2136	3.1	3.6	0.88	91.7	8.54
250 M/4	75	55	1782	71	610	J	2653	2.4	2.8	0.84	93.0	16.3
280 S/4	100	75	1788	94	710	K	3525	2.5	3.0	0.84	93.6	28.2
280 M/4	125	90	1786	115	740	K	4411	2.5	3.0	0.86	94.5	33.0
315 S/4	150	110	1788	138	640	K	5287	2.5	2.7	0.85	94.5	46.0
315 M/4	175	132	1790	164	680	K	6162	2.7	2.9	0.85	95.0	54.8
315 L/4	200	150	1788	184	680	K	7050	2.7	2.8	0.85	95.0	68.3

P_n - Full load power
N_n - Full load speed
I_n - Full load current
I_a - Locked-rotor current
I_a/I_n - Locked-rotor current ratio (%)
T_n - Full-load torque
T_a - Locked-rotor torque
T_a/T_n - Locked-rotor torque ratio
T_k - Break-down torque
T_k/T_n - Break-down torque ratio
pf - Power factor
Eff - Normal efficiency
J_m - Motor inertia

Performance Data

NORD DRIVESYSTEMS

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

CC092B energy verified

Motor Type	Power P_n		N_n Full-load	I_n Full-Load Current 575V	I_a/I_n	Code Letter	Torque T_n	T_a/T_n	T_k/T_n	pf	Eff.	J_m Inertia
	[hp]	[kW]	[rpm]	[A]	[%]		[lb-in]				[%]	[lb-ft²]
80 LH/4	1	0.75	1750	1.50	600	K	36.0	4.6	4.3	0.59	82.5	0.045
90 SH/4	1.5	1.1	1740	1.75	630	L	54.3	3.5	3.8	0.76	84.0	0.081
90 LH/4	2	1.5	1745	2.45	670	K	72.2	4.3	4.5	0.71	84.0	0.093
100 LH/4	3	2.2	1765	3.40	790	L	107	3.6	4.7	0.73	87.5	0.178
112 MH/4	5	3	1770	5.60	810	L	178	4.0	4.8	0.74	87.5	0.304
132 SH/4	7.5	5.5	1780	8.30	820	M	266	4.3	4.6	0.74	89.5	0.752
132 MH/4	10	7.5	1770	10.8	740	M	356	3.2	4.0	0.78	89.5	0.840
160 MH/4	15	11	1770	14.4	870	K	534	3.2	3.8	0.84	91.7	1.59
160 LH/4	20	15	1775	19.2	880	M	710	3.5	4.2	0.84	92.6	2.18
180 MH/4	25	18.5	1780	24.0	850	K	885	3.5	3.6	0.84	92.4	3.08
180 LH/4	30	22	1780	28.0	830	K	1,062	3.6	3.6	0.85	92.4	3.80
200 LH/4	40	30	1775	38.4	830	K	1,420	3.0	3.6	0.84	93.0	7.59
225 SH/4	50	37	1785	47.5	680	K	1,765	2.7	3.0	0.84	93.9	9.44
225 MH/4	60	45	1785	56	690	K	2,118	2.8	3.0	0.85	94.1	11.5
250 MH/4	75	55	1790	67	740	K	2,641	2.6	3.0	0.86	95.1	20.3
280 SH/4	100	75	1788	92	670	K	3,525	2.5	2.8	0.86	95.0	33.0
280 MH/4	125	90	1790	114	750	L	4,401	2.7	3.0	0.86	95.0	40.6
315 SH/4	150	110	1791	136	700	K	5,278	2.7	2.8	0.87	95.0	54.8
315 MH/4	175	132	1791	158	740	L	6,158	2.7	2.8	0.87	95.4	68.3
315 RH/4	200	150	1792	180	750	L	7,034	3.0	2.9	0.87	95.4	82.1
315 LH/4	250	187	1792	225	750	L	8,793	3.2	3.0	0.87	95.8	100

MOTORS

P_n - Full load power
N_n - Full load speed
I_n - Full load current
I_a - Locked-rotor current
I_a/I_n - Locked-rotor current ratio (%)
T_n - Full-load torque
T_a - Locked-rotor torque
T_a/T_n - Locked-rotor torque ratio
T_k - Break-down torque
T_k/T_n - Break-down torque ratio
pf - Power factor
Eff - Normal efficiency
J_m - Motor inertia

Performance Data

Premium Efficient (EISA)

575V – 60Hz / PE

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

CC092B

energy verified

Motor Type	Power P_n		N_n Full Load	I_n Full-Load Current 575V	I_a/I_n	Code Letter	Torque T_n	T_a/T_n	T_k/T_n	pf	Eff.	J_m Inertia
	[hp]	[kW]	[rpm]	[A]	[%]		[lb-in]				[%]	[lb-ft²]
80 LP/4	1	0.75	1730	1.30	650	L	36.4	3.4	3.8	0.70	86.1	0.045
90 SP/4	1.5	1.1	1740	1.68	840	J	54.3	4.1	4.9	0.76	86.9	0.081
90 LP/4	2	1.5	1730	2.24	760	K	72.9	3.8	4.2	0.78	87.0	0.093
100 LP/4	3	2.2	1770	3.07	920	L	107	3.0	4.5	0.79	90.0	0.192
112 MP/4	5	3.7	1755	5.20	910	L	180	3.8	4.3	0.80	90.3	0.332
132 SP/4	7.5	5.5	1770	7.80	1020	L	267	4.7	5.0	0.77	91.7	0.759
132 MP/4	10	7.5	1765	10.6	960	J	357	4.7	5.0	0.77	91.7	0.831
160 MP/4	15	11	1770	14.2	880	K	534	3.2	3.8	0.84	92.5	1.59
160 LP/4	20	15	1775	19.0	1080	L	710	4.3	4.6	0.85	93.0	2.18
180 MP/4	25	18.5	1780	24.2	860	K	885	3.4	3.6	0.82	93.6	3.80
180 LP/4	30	22	1780	27.8	880	J	1062	3.3	3.4	0.85	93.6	3.80

P_n - Full load power
N_n - Full load speed
I_n - Full load current
I_a - Locked-rotor current
I_a/I_n - Locked-rotor current ratio (%)
T_n - Full-load torque
T_a - Locked-rotor torque
T_a/T_n - Locked-rotor torque ratio
T_k - Break-down torque
T_k/T_n - Break-down torque ratio
pf - Power factor
Eff - Normal efficiency
J_m - Motor inertia

Performance Data

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 P_n		N_n Full-load	I_n 208V	I_a/I_n	Code Letter	Torque T_n	T_a/T_n	T_k/T_n	pf	Eff.	J_m Inertia
	[hp]	[kW]	[rpm]	[A]	[%]		[lb-in]				[%]	[lb-ft²]
63S/4	0.16	0.12	1700	1.06	250	F	5.9	2.7	3.5	0.66	52.0	0.0050
63L/4	0.25	0.18	1680	1.43	270	E	9.4	2.3	2.5	0.71	57.0	0.0066
71S/4	0.33	0.25	1655	1.77	310	G	12.6	2.4	2.7	0.77	63.0	0.015
71L/4	0.5	0.37	1720	2.10	350	F	18.3	2.3	2.7	0.69	71.0	0.018
80S/4	0.75	0.55	1715	3.00	350	F	27.6	2.2	2.3	0.71	72.0	0.030
80L/4	1	0.75	1650	4.05	390	G	38.2	2.2	2.3	0.74	70.0	0.039
90S/4	1.5	1.1	1660	5.35	490	J	57.0	2.5	2.8	0.78	73.0	0.056
90L/4	2	1.5	1660	7.00	510	G	75.9	2.5	2.8	0.80	74.0	0.074
100L/4	3	2.2	1720	10.35	490	J	110	2.3	2.6	0.81	76.0	0.107
100LA/4	5	3.7	1725	16.80	510	G	183	2.7	3.1	0.75	81.0	0.178

P_n - Full load power
N_n - Full load speed
I_n - Full load current
I_a - Locked-rotor current
I_a/I_n - Locked-rotor current ratio (%)
T_n - Full-load torque
T_a - Locked-rotor torque
T_a/T_n - Locked-rotor torque ratio
T_k - Break-down torque
T_k/T_n - Break-down torque ratio
pf - Power factor
Eff - Normal efficiency
J_m - Motor inertia

Performance Data

Standard Efficiency

400V – 50Hz

Inverter duty • Induction motor • TEFC
Synchronous speed 1500rpm @ 50Hz • 4-pole • Three-phase
Voltages: 400V – 50Hz • 1.0 Service Factor
Continuous Duty • 40°C Ambient • up to 3300ft Elevation
Class B temperature rise • Class F insulation

CE

Motor Type	Power P_n		N_n Full-Load	I_n 400 V (380-420V)	I_a/I_n	Code Letter	Torque T_n	T_a/T_n	T_k/T_n	pf	Eff.	J_m Inertia
	[hp]	[kW]	[rpm]	[A]	[%]		[lb-in				[%]	[lb-ft²]
63 S/4	0.16	0.12	1335	0.55	290	H	7.59	2.7	2.7	0.64	49.9	0.0050
63 L/4	0.25	0.18	1360	0.68	330	G	11.2	2.5	2.6	0.64	56.2	0.0066
71 S/4	0.33	0.25	1380	0.76	330	F	15.3	2.2	2.1	0.77	61.3	0.017
71 L/4	0.5	0.37	1380	1.09	360	F	22.7	2.0	2.4	0.71	64.4	0.020
80 S/4	0.75	0.55	1375	1.52	330	E	33.8	1.9	2.0	0.73	75.1	0.026
80 L/4	1	0.75	1375	2.10	350	F	46.1	2.0	2.1	0.74	75.5	0.034
90 S/4	1.5	1.1	1395	2.81	440	G	66.6	2.3	2.6	0.74	77.6	0.056
90 L/4	2	1.5	1395	3.55	480	G	90.8	2.3	2.6	0.78	77.5	0.074
100 L/4	3	2.2	1440	5.22	510	G	129	2.3	3.0	0.74	80.8	0.107
100 LA/4	4	3	1415	6.54	540	G	179	2.5	2.9	0.80	83.3	0.142
112 M/4	5.4	4	1445	8.30	530	G	234	2.3	2.8	0.80	85.1	0.261
132 S/4	7.5	5.5	1445	11.4	550	G	322	2.1	2.7	0.81	87.9	0.570
132 M/4	10	7.5	1445	14.8	550	F	438	2.5	2.8	0.84	87.7	0.759
132 MA/4	12.5	9.2	1450	18.8	600	H	536	2.6	3.1	0.80	86.9	0.831
160 M/4	15	11	1455	20.9	650	G	639	2.4	2.9	0.85	88.8	1.19
160 L/4	20	15	1460	28.2	750	J	868	2.9	3.5	0.85	89.7	1.59
180 MX/4	25	18.5	1460	35.4	750	J	1071	3.2	3.8	0.83	90.3	1.90
180 LX/4	30	22	1460	42.6	750	J	1273	3.3	3.8	0.82	90.3	2.18
200 LX/4	40	30	1470	57.6	690	H	1724	2.6	3.0	0.83	90.7	3.80
225 S/4	50	37	1470	67.0	700	H	2126	2.8	3.2	0.87	91.2	7.59
225 M/4	60	45	1470	81.0	770	J	2586	2.8	3.3	0.87	91.7	8.54
250 M/4	75	55	1480	101	610	G	3140	2.4	2.8	0.85	92.1	16.4
280 S/4	100	75	1485	137	710	H	4267	2.5	3.0	0.85	92.7	28.5
280 M/4	125	90	1485	162	740	H	5120	2.5	3.0	0.86	93.0	33.2
315 S/4	150	110	1488	200	640	G	6245	2.5	2.8	0.85	93.3	45.1
315 M/4	175	132	1488	240	680	H	7495	2.7	2.9	0.85	93.5	54.6
315 L/4	200	160	1486	285	680	H	9097	2.7	2.8	0.86	93.8	68.8
315 L/4	250	200	1486	350	650	H	11371	2.6	2.8	0.88	94.0	83.1

a) Motors 3hp (2.2kW) and below are rated 230/400Y - volts, motors above 3hp (2.2kW) are rated 400/690Y-volts

P_n	-	Full load power
N_n	-	Full load speed
I_n	-	Full load current
I_a	-	Locked-rotor current
I_a/I_n	-	Locked-rotor current ratio (%)
T_n	-	Full-load torque
T_a	-	Locked-rotor torque
T_a/T_n	-	Locked-rotor torque ratio
T_k	-	Break-down torque
T_k/T_n	-	Break-down torque ratio
pf	-	Power factor
Eff	-	Normal efficiency
J_m	-	Motor inertia

Performance Data

Energy Efficient (EPAct)

400V (380-420V) – 50Hz

Inverter duty • Induction motor • TEFC
Synchronous speed 1500rpm @ 50Hz • 4-pole • Three-phase
Voltages: 400V (380-420V) – 50Hz • 1.0 Service Factor
Continuous Duty • 40°C Ambient • up to 3300ft Elevation
Class B temperature rise • Class F insulation

Motor Type	Power P_n		N_n Full-Load	I_n 400V (380-420V)	I_a/I_n	Code Letter	Torque T_n	T_a/T_n	T_k/T_n	pf	Eff.	J_m Inertia
	[hp]	[kW]	[rpm]	[A]	[%]		[lb-in]				[%]	[lb-ft²]
80 SH/4	0.75	0.55	1,420	1.41	510	H	32.7	3.1	3.2	0.70	80.8	0.033
80 LH/4	1	0.75	1,415	1.76	520	H	44.8	3.0	3.1	0.75	82.4	0.045
90 SH/4	1.5	1.1	1,435	2.42	610	H	64.8	3.1	3.5	0.80	81.8	0.081
90 LH/4	2	1.5	1,415	3.34	580	H	89.6	3.3	3.5	0.79	82.8	0.093
100 LH/4	3	2.2	1,445	4.65	730	J	129	3.7	4.3	0.79	86.6	0.178
100 AH/4	4	3	1,425	6.59	630	J	178	3.1	3.5	0.77	85.6	0.178
112 MH/4	5.4	4	1,440	8.02	750	J	235	3.1	3.6	0.83	86.7	0.332
132 SH/4	7.5	5.5	1,460	10.7	750	J	318	3.1	3.5	0.84	88.2	0.759
132 MH/4	10	7.5	1,460	15.0	750	J	434	3.3	3.9	0.81	89.3	0.831
132 LH/4	12.5	9.2	1,450	19.6	740	K	536	3.4	3.8	0.77	89.3	0.831
160 SH/4	12.5	9.2	1,465	17.0	820	J	531	3.3	3.6	0.87	90.5	1.59
160 MH/4	15	11	1,465	20.6	740	H	634	2.9	3.4	0.86	91.2	1.59
160 LH/4	20	15	1,465	27.5	790	J	865	3.0	3.5	0.87	92.0	2.18
180 MH/4	25	18.5	1,475	34.6	770	J	1060	2.9	3.2	0.84	92.2	3.08
180 LH/4	30	22	1,475	40.3	770	J	1260	2.8	3.1	0.86	92.2	3.80
200 XH/4	40	30	1,470	59	710	J	1724	2.8	3.1	0.80	92.4	3.80
200 LH/4	40	30	1,465	54	700	H	1730	3.0	3.2	0.87	92.3	7.59
225 SH/4	50	37	1,480	68	680	H	2112	2.7	3.0	0.85	92.7	9.49
225 MH/4	60	45	1,480	82	690	H	2569	2.8	3.0	0.85	93.1	11.6
250 MH/4	75	55	1,485	98	750	H	3129	2.6	3.0	0.87	93.5	20.4
280 SH/4	100	75	1,485	132	680	G	4267	2.5	2.9	0.87	94.0	33.2
280 MH/4	120	90	1,486	160	750	H	5117	2.7	3.1	0.86	94.2	40.3
315 SH/4	150	110	1,488	193	710	H	6245	2.7	2.9	0.87	94.5	54.6
315 MH/4	175	132	1,488	230	730	H	7495	2.7	2.9	0.88	94.7	68.8
315 RH/4	215	160	1,490	275	740	H	9072	3.0	3.0	0.88	94.9	83.1
315 LH/4	268	200	1,490	345	760	H	11340	3.2	3.0	0.88	95.1	99.7

a) Motors 3hp (2.2kW) and below are rated 230/400Y - volts, motors above 3hp (2.2kW) are rated 400/690Y-volts

P_n	-	Full load power
N_n	-	Full load speed
I_n	-	Full load current
I_a	-	Locked-rotor current
I_a/I_n	-	Locked-rotor current ratio (%)
T_n	-	Full-load torque
T_a	-	Locked-rotor torque
T_a/T_n	-	Locked-rotor torque ratio
T_k	-	Break-down torque
T_k/T_n	-	Break-down torque ratio
pf	-	Power factor
Eff	-	Normal efficiency
J_m	-	Motor inertia

Premium Efficienct

400V (380-420V) – 50Hz

Inverter duty • Induction motor • TEFC
Synchronous speed 1500rpm @ 50Hz • 4-pole • Three-phase
Voltages: 400V (380-420V) – 50Hz • 1.10 Service Factor
Continuous Duty • 40°C Ambient • up to 3300ft Elevation
Class B temperature rise • Class F insulation

IE3 CE

Motor Type	Power P_n		N_n Full-Load	I_n 400V (380-420V)	I_a/I_n	Code Letter	Torque T_n	T_a/T_n	T_k/T_n	pf	Eff.	J_m Inertia
	[hp]	[kW]	[rpm]	[A]	[%]		[lb-in]				[%]	[lb-ft²]
80 LP/4	1	0.75	1,415	1.79	540	H	44.8	3.0	3.1	0.72	83.7	0.045
90 SP/4	1.5	1.1	1,430	2.38	700	J	65.0	3.6	4.0	0.78	85.3	0.081
90 LP/4	2	1.5	1,415	3.23	590	H	89.6	3.3	3.5	0.79	85.3	0.093
100 LP/4	3	2.2	1,465	4.27	820	K	127	2.6	3.9	0.83	88.1	0.192
100 AP/4	4	3	1,460	6.05	730	J	174	2.4	3.6	0.81	88.1	0.192
112 MP/4	5.4	4	1,440	7.82	750	J	235	3.4	3.6	0.83	88.6	0.332
132 SP/4	7.5	5.5	1,465	10.9	860	K	317	3.7	4.0	0.80	90.9	0.759
132 MP/4	10	7.5	1,460	15.0	820	K	434	3.9	4.2	0.80	90.9	0.831
160 MP/4	15	11	1,465	20.5	740	H	634	2.9	3.4	0.85	91.4	1.59
160 LP/4	20	15	1,465	27.9	910	K	865	3.8	4.3	0.85	92.3	2.18
180 MP/4	25	18.5	1,480	34.0	790	J	1056	2.9	3.4	0.84	93.1	3.80
180 LP/4	30	22	1,475	39.3	800	J	1260	2.8	3.2	0.87	93.1	3.80

a) Motors 3hp (2.2kW) and below are rated 230/400Y - volts, motors above 3hp (2.2kW) are rated 400/690Y-volts

P_n	-	Full load power
N_n	-	Full load speed
I_n	-	Full load current
I_a	-	Locked-rotor current
I_a/I_n	-	Locked-rotor current ratio (%)
T_n	-	Full-load torque
T_a	-	Locked-rotor torque
T_a/T_n	-	Locked-rotor torque ratio
T_k	-	Break-down torque
T_k/T_n	-	Break-down torque ratio
pf	-	Power factor
Eff	-	Normal efficiency
J_m	-	Motor inertia

Energy Efficiency Regulations

Energy Efficiency Global Regulation

United States

The United States has implemented amended motor efficiency regulations. This process started with the "Public Law 110-140", which had been passed through legislation on December 19, 2007, and is called the "Energy Independence and Security Act" (EISA). This legislation in most cases replaces the existing law that governed motor efficiency in the USA (Energy Policy Act or EPAct). In general, EISA increases the efficiency requirements for many motors. EISA includes a "Premium Efficiency" motor class in addition to the two existing efficiency classes of motors that had been utilized. This law took effect on December 19, 2010 wheras all motors produced after that date must meet EISA requirements. Motors that had been in stock at that time are exempt and still may be sold.

The EISA law also expanded the scope of motors required to meet efficiency levels. The following classes of motors were not included in EPAct but now must meet efficiency requirements per EISA:

Motor Types Covered in the EISA Efficiency Requirements
U-frame motors
NEMA electrical design C motors
Closed coupled pump motors
Footless motors
Vertical solid shaft thrust motors
8-pole motors
Voltages other then 230 or 460
201-500 hp motors

In this law, the US Department of Energy (DOE) has been responsible for writing the new regulation requirements. These regulations clarify how the law has been implemented and provide an increased level of detail in terms of specifics. The regulations are included in the Federal Register / Volume 74, N0. 54 / Monday, March 23, 2009 – Part 431. The regulations also indicate what style of motors must conform to each efficiency level explained.

Motor Classes Covered by EISA Efficiency Requirements
General Purpose Motors per NEMA MG1
1-500hp
2, 4, 6 & 8 pole
600V and below, 3-phase, 60Hz
NEMA Designs A, B, C & equivalent IEC equivalents
TEFC – Totally Enclosed Fan Cooled
ODP – Open Drip Proof
XP – Explosion Proof (ATEX)
Increased enclosure protections (Examples include Washdown, Severe duty,…)
NEMA Frames 140 and larger
IEC Frames 90 & Larger
NEMA T-frame (and U-frame) & IEC equivalents

Any of the following are exemptions from the EISA requirements:

Motor Classes not Covered by EISA Efficiency Requirements
Definite or Special Purpose per NEMA MG1
Integral gearmotor motors
Less than 1 hp
Multi-speed motors
Single-phase motors
DC Motors
NEMA Design D high slip
NEMA 56 or smaller frame
IEC 80 or smaller frame
50Hz motors
Intermittent duty motors (S2 or S3)
TENV – Totally Enclosed Non-Ventilated
TEAO – Totally Enclosed Air-Over
(TEBC – Totally Enclosed Blower Cooled)
Integrated AC drive (SK200E or SK300E combined with motor)

Energy Efficiency Regulations

Efficiency Requirements for Motors

According to EISA, when motors have a mandated efficiency requirement they are categorized into two classes, Subtype I and Subtype II. In general, motors that needed to be energy efficient per EPAct standards now must be premium efficient, Subtype I.

Motors that did not have a required efficiency per EPAct but now require an efficiency level in EISA are included in Subtype II (energy efficient). The following is a more detailed list of motors included in each efficiency category.

Premium efficiency [Subtype I] – ***must match all of the following criteria***
IEC or NEMA footed or foot+flange
1-200hp
Poles 2,4,6
230/460V-60Hz
Motor or brakemotor
NEMA 140 frame& larger or IEC 90 frame & larger
NEMA Design A or B

Energy efficiency [Subtype II] - ***Meets the premium efficiency guidelines except:***
Footless IEC or NEMA Flange
(NEMA-C or IEC B5 or B14)
Other 60Hz voltages (like 208V and 575V)
8 pole
201-500hp
NEMA Design C
U-Frame

Canada

Three-phase electric induction motors are included in the products governed under Canada's Energy Efficiency Regulations (the Regulations). Natural Resources Canada (NRCan) proposes to amend the Regulations in order to

- Enforce more stringent Minimum Energy Performance Standards (MEPS) on suppliers for electric motors, imported or shipped interprovincially for sale or lease in Canada, and
- Expand the scope to include motors which were previously excluded from the Regulations.

The updated Regulations for motors sold in Canada contains three elements:

- Increase the motor efficiency requirements for 1 to 200 HP (0.75 to 150 kW) class motors to include premium efficiency levels.
- Eliminate most of the current exclusions for 1 to 200 HP(0.75 to 150 kW) motors so that they will be required to meet the current efficiency levels.
- Extend coverage to include 201 to 500 HP (151 kW to 185 kW) motors, which were previously excluded, to the current efficiency level standards.

Standard Efficient Motors

A standard efficiency motor is defined as a rotating machine rated for continuous duty operation that converts electrical power into mechanical power and:

- is an electric induction motor with a polyphase, squirrel cage type design,
- has a minimum output rating of 1 HP (0.746 kW) and up to and including 500 HP (375 kW),
- has a rated voltage of not more than 600 volts AC.
- has a rated frequency of 50/60 Hz or 60 Hz,
- is open or enclosed construction and includes explosion-proof enclosures,
- is constructed to NEMA T frame/U frame dimensions or the IEC equivalent dimensions,
- is NEMA design A, B or C, or IEC design N or H,
- is designed to operate at a single speed,
- has 2, 4, 6 or 8 pole construction,
- is of foot mounted construction or flange mounted construction with or without feet or detachable feet.
- has an IP code from 00 to 66

Premium efficient motors

A premium efficicency motor, is defined in the description above, and includes all of the additional classifications:

- rated size of 1 HP ≥ 200 HP or IEC design motor of size greater than 0.746 kW ≥ 150 kW, and
- 2, 4, or 6 poles, and
- NEMA T frame or IEC frame designation of 90 or above, and
- NEMA design A or B, or IEC design N, and
- standard NEMA shaft, R-shaft or S-shaft or an IEC equivalent.

Energy efficient motors

a motor, as defined in the premium efficiency category, with any of the following classifications, including integral gearmotors:

- 8-pole construction, or
- U frame or equivalent IEC dimensions, or
- NEMA design C or IEC design H, or
- close-coupled pump motor, or
- fire pump duty motor, or
- vertically-mounted solid shaft thrust motor, as tested in the horizontal configuration, or
- footless construction, or
- 2, 4, or 6-pole, NEMA design B motor of size greater than 200 HP and up to and including 500 HP or IEC design N motor of size greater than 150 kW and up to and including 375 kW.

Energy Efficiency Regulations

European Union

New efficiency classes IE1, IE2, IE3 The new standard IEC 60034-30:2008 replaces the various national systems. At the same time, with the IEC 60034-2-1:2007 standard, a new procedure for the measurement of efficiency has been introduced which also contributes to international cohesiveness.

Efficiency Levels

As of June 16 2011, only motors of efficiency class IE2 or better may be used for continuous operation of standard motors with 1hp (0.75 kW) and more in the EU. The basis for this is ErP 2009/125/EC VO640-2009.

Efficiency Level (Europe - New) IEC600034-30	Efficiency Level (Europe - Old) CEMEP
IE3	New
IE2	EFF1
IE1	EFF2

Motors included in the efficiency requirements

- Single speed, three-phase induction motors 50 Hz or 50/60 Hz
- 2, 4 and 6 poles
- Rated voltage up to 1000 V
- Rated power between 0.75 kW and 375 kW
- Continuous duty operation S1 or S3 with cyclic duration factor of 80% or higher

Effective dates:

- June 16, 2011, motors shall not be less efficient than the IE2 efficiencies
- January 1, 2015 motors with a rated output of 7.5-375 kW shall not be less efficient than the IE3 or should meet the IE2 efficiency and be used with an AC drive;
- January 1, 2017 all motors with a rated output of 0.75-375 kW shall not be less efficient than the IE3 or meet IE2 standards and be used in conjunction with an AC speed drive.

Exceptions

- Submersible motors;
- Motors completely integrated in a product (gear, pump, fan or compressor,…) where the energy performance cannot be tested separate from the product
- Motors specifically designed to operate:
  - o At altitudes exceeding 1000 meters elevation;
  - o Where ambient temperature is above 40 °C;
  - o In max. operating temperature above 400 °C;
  - o Where ambient temperatures are less than -15 °C or less than 0 °C for an air cooled motors;
  - o Water cooled motors with cooling water below 5 °C or exceeding 25 °C;
  - o In explosive atmospheres per Directive 94/9/EC
- Brake motors.

Energy Efficiency Regulations

USA

Directive	Preferred Voltages	Circuit	Frequency
EISA 2007	230/460V	YY/Y	60Hz

Designation	Energy Efficient	Premium Efficient
Power range	1.0 - 500hp / 0.75 - 375kW	1.0-200 hp / 0.75 - 150kW
Mandatory Implementation Date	1997	12.19.2010
Number of Poles	2,4,6,8	2,4,6
Relevant Exceptions **• High/Energy Efficiency** **• Premium Efficiency**	1. Special Shafts NORD gear motors (direct attachment) 2. TEAO, TENV Totally enclosed air-over and non-ventilated motors 3. Switchable multi-speed motors 4. Intermittant operation / Short Term Operation: The directive only applies to motors in continuous operation. Other operating modes are exempted from the directive, e.g.: • S2 • S3 • S6 Explanation of Duty Classes 🕮⇨ 148 5. Single phase motors	
Relevant Exceptions	N/A	1. Flange version motors 2. Vertical shaft outlet 3. NEMA Desinged C face Motors 4. Motors with voltages less than 600V and other than 230V or 460V including a +/-10% tolerance
	Motor Data 🕮⇨ 164 - 173	

Mexico

Directive	Preferred Voltages	Circuit	Frequency
NOM-016 ENER-2010	127/220V 440V	Δ/Y	60Hz

Designation	MEPS
Power range	1.0-500hp / 0.75 - 373kW
Mandatory Implementation Date	12.19.2010
Number of Poles	2,4,6,8
Relevant Exceptions **• MEPS**	1. Switchable pole motors 2. Single phase motors 3. Intermittent operation / Short term operation The directive only applies to motors in continuous operation. Other operating modes are exempted from the directive. e.g.: • S2 • S3 • S6 Explanation of Duty Classes 🕮⇨ 148 Motor Data 🕮⇨ 164 - 173

Energy Efficiency Regulations

Canada

Directive	Preferred Voltages	Circuit	Frequency
Energy Efficiency Regulations 1997 Updated Bulletin on Amending the Standards June 2010	332/575V	Δ/Y	60Hz

Designation	Energy Efficient	Premium Efficient
Power range	1.0 - 500hp / 0.75 - 375kW	1.0-200 hp / 0.75 - 150kW
Mandatory Implementation Date	1997	01.01.2011
Number of Poles	2,4,6,8	2,4,6
Relevant Exceptions • **High/Energy Efficiency** • **Premium Efficiency**	1. TENV Non-ventilated motors 2. Switchable multi-speed motors 3. Intermittant operation / Short Term Operation: The directive only applies to motors in continuous operation. Other operating modes are exempted from the directive: • S2 • S3 • S6 Explanation of Duty Classes 📖⇨ 148 Motor Data 📖⇨ 164 - 173 4. Single phase motors	
Relevant Exceptions	N/A	1. Gear Motors 2. Flange version motors 3. Vertical shaft outlet 4. NEMA Design C or IEC Design H NORD IE2 or "high efficiency" motors have IEC Design H characteristics.

European Union

Directive	Preferred Voltages	Circuit	Frequency
ErP 2009/125/IEC **VO 640-2009**	230/400V 400/690V	Δ/Y	50Hz

Designation	IE2 / High Efficient	IE3 / Premium Efficient
Power range	0.75 - 375kW	
Mandatory Implementation Date	06.16.2011	01.01.2015 for P ≥ 7.5kW (10hp) 01.01.2017 for P < 7.5 kW (10hp)
Number of Poles	2,4,6	
Relevant Exceptions • **IE2** • **IE3**	1. Intermittent operation / Short term operation The directive only applies to motors in continuous operation. Operating modes other than S1 as per IEC 60034-1 are exempted from the regulations. e.g.: • S3-70% • S6-80% • S9 Explanation of Duty Classes 🕮⇨ 148 Motor Data 🕮⇨ 164 - 173 2. Brake Motors 3. Switchable multi-speed motors 4. ATEX motors Motors for explosion protection (gas and dust) are exempted from the directive but may be classified according to IE 5. Ambient temperature The directive does not apply to motors which are rated for ambient temperatures > 40°C or <0°F ie: • T_{amb} = -20°C...+45°C 6. Installation altitude The directive does not apply to motors which are rated for an installation altitude greater than 1000m above sea level. 7. Single phase motors	
Special Features	N/A	**IE2 + Frequency Inverters** IE2 motors that may be used with inverters can also be used as an alternative to IE3

Switzerland

Directive	Preferred Voltages	Circuit	Frequency
Eenergy Ordinance AS2009	230/400V 400/690V	Δ/Y	50Hz 50/60Hz

Designation	IE2 / High Efficient	IE3 / Premium Efficient
Power range	0.75 - 375kW	
Mandatory Implementation Date	07.01.2011	open
Number of Poles	2,4,6	
Relevant Exceptions • **IE2** • **IE3**	1. Intermittent operation / Short term operation The directive only applies to motors in continuous operation S1 or S3 > 80%. Operating modes other than S1 as per IEC 60034-1 are exempted from the regulations. e.g.: • S3-70% • S6-80% • S9 Explanation of Duty Classes 📖⇨ 148 Motor Data 📖⇨ 164 - 173 2. Switchable multi-speed motors 3. AC vector drive operation. Special motors for AC vector drive operation as per standard IEC 60034-25 of the International Electrical Engineering Commission. 4. ATEX motors Motors for explosion protection (gas and dust) are exempted from the directive but may be classified according to IE. 5. Ambient temperature The above directive does not apply to motors which are rated for ambient temperatures > 40°C or <0°F (up to 600W) or <15°C, eg.: • T_{amb} = -20°C...+45°C 6. Installation altitude The directive does not apply to motors which are rated for an installation altitude greater than 1000m above sea level. 7. Single phase motors	

China

Directive	Preferred Voltages	Circuit	Frequency
GB 18613-2006	230/400V Maximum 690V	Δ/Y	50Hz

Designation	Grade 2	Grade 1
Power range	0.55 - 315kW	3.0 - 315kW
Mandatory Implementation Date	07.01.2011	Voluntary
Number of Poles	2,4,6	
Relevant Exceptions • **Grade 2** • **Grade 1**	1. Intermittant operation / Short Term Operation: The directive only applies to motors in continuous operation. Operating modes other than S1 as per IEC 60034-1 are exempted from the regulations. eg: • S3-70% • S6-80% • S9 Explanation of Duty Classes 🕮⇨ 148 Motor Data 🕮⇨ 164 - 173 2. Switchable multi-speed motors 3. Single phase motors	

South Korea

Directive	Preferred Voltages	Circuit	Frequency
MKE's Notification 2009-317	220/380V 440V	Δ/Y	60Hz

Designation	MEPS		
Power range	0.75-15kW	15-37kW	37-200kW
Mandatory Implementation Date	07.01.2010	01.01.2010	07.01.2007
Number of Poles	2,4,6,8*		
Relevant Exceptions • **MEPS**	1. The Directive only applies to motors in continuous operation. Operating modes other than S1 as per IEC 60034-1 are exempted from the regulations. e.g. : • S3-70% • S6-80% • S9 Explanation of Duty Classes 🕮⇨ 148 Motor Data 🕮⇨ 164 - 173 2. Switchable multi-speed motors 3. TENV non-ventilated motors 4. 6-pole motors with powers above 160kW 5. 8-pole motors with powers above 110kW 6. Single phase motors * The statutory MEPS comes into effect at a later date for 8-pole motors: from 01.01.2010 37-110kW from 01.01.2011 0.75 - 37kW		

Energy Efficiency Regulations

Australia

Directive	Preferred Voltages	Circuit	Frequency
MEPS AS/NZS 1359.5	230/400V	Δ/Y	50Hz

Designation	MEPS	High Efficiency (Premium Efficient)
Power range	0.73 -185 kW	0.73 -185 kW
Mandatory Implementation Date	04.01.2006	Voluntary
Number of Poles	2,4,6,8	
Relevant Exceptions • **MEPS** • **High Efficiency**	1. Intermittant operation / Short Term Operation: The directive only applies to motors in continuous operation. Operating modes other than S1 as per IEC 60034-1 are exempted from the regulations. eg: • S3-70% • S6-80% • S9 Explanation of Duty Classes 🕮⇨ 148 Motor Data 🕮⇨ 164 - 173 2. Motors for AC vector drive operation 3. Switchable multi-speed motors 4. Single phase motors	

Brazil

Directive	Preferred Voltages	Circuit	Frequency
Decreto n° 4.508	230/380V 440V	Δ/Y	60Hz

Designation	ALTO RENDIMENTO
Power range	0.75 - 185kW
Mandatory Implementation Date	12.08.2009
Number of Poles	2,4,6, 8
Relevant Exceptions • **ALTO RENDIMENTO**	1. Intermittent operation / Short term operation The directive only applies to motors in continuous operation. Operating modes other than S1 as per IEC 60034-1 are exempted from the regulations. e.g.: • S3-70% • S6-80% • S9 Explanation of Duty Classes 🕮⇨ 148 Motor Data 🕮⇨ 164 - 173 2. Motors for AC vector drive operation. 3. Switchable multi-speed motors 4. 6-pole motors with powers above 150kW 5. 8-pole motors with powers above 110kW 6. Single phase motors

US & Canadian Motor Efficiencies for Energy Efficient 60Hz Motors

Full-Load Efficiencies of General Purpose Electric Motors [Subtype II] - Energy efficiency								
Motor Horse-power	Nominal full load efficiency							
	Open motors				Enclosed motors			
	8 pole	6 pole	4 pole	2 pole	8 pole	6 pole	4 pole	2 pole
1	74.0	80.0	82.5		74.0	80.0	82.5	75.5
1.5	75.5	84.0	84.0	82.5	77.0	85.5	84.0	82.5
2	85.5	85.5	84.0	84.0	82.5	86.5	84.0	84.0
3	86.5	86.5	86.5	84.0	84.0	87.5	87.5	85.5
5	87.5	87.5	87.5	85.5	85.5	87.5	87.5	87.5
7.5	88.5	88.5	88.5	87.5	85.5	89.5	89.5	88.5
10	89.5	90.2	89.5	88.5	88.5	89.5	89.5	89.5
15	89.5	90.2	91.0	89.5	88.5	90.2	91.0	90.2
20	90.2	91.0	91.0	90.2	89.5	90.2	91.0	90.2
25	90.2	91.7	91.7	91.0	89.5	91.7	92.4	91.0
30	91.0	92.4	92.4	91.0	91.0	91.7	92.4	91.0
40	91.0	93.0	93.0	91.7	91.0	93.0	93.0	91.7
50	91.7	93.0	93.0	92.4	91.7	93.0	93.0	92.4
60	92.4	93.6	93.6	93.0	91.7	93.6	93.6	93.0
75	93.6	93.6	94.1	93.0	93.0	93.6	94.1	93.0
100	93.6	94.1	94.1	93.0	93.0	94.1	94.5	93.6
125	93.6	94.1	94.5	93.6	93.6	94.1	94.5	94.5
150	93.6	94.5	95.0	93.6	93.6	95.0	95.0	94.5
200	93.6	94.5	95.0	94.5	94.1	95.0	95.0	95.0
250	94.5	94.5	95.4	94.5	94.5	95.0	95.0	95.4

US & Canadian Motor Efficiencies for Premium Efficient 60Hz Motors

Full-Load Efficiencies of General Purpose Electric Motors [Subtype I Premium Efficiency						
Motor Horse-power	Nominal full load efficiency					
	Open motors			Enclosed motors		
	6 pole	4 pole	2 pole	6 pole	4 pole	2 pole
1	82.5	85.5	77.0	82.5	85.5	77.0
1.5	86.5	86.5	84.0	87.5	86.5	84.0
2	87.5	86.5	85.5	88.5	86.5	85.5
3	88.5	89.5	85.5	89.5	89.5	86.5
5	89.5	89.5	86.5	89.5	89.5	88.5
7.5	90.2	91.0	88.5	91.0	91.7	89.5
10	91.7	91.7	89.5	91.0	91.7	90.2
15	91.7	93.0	90.2	91.7	92.4	91.0
20	92.4	93.0	91.0	91.7	93.0	91.0
25	93.0	93.6	91.7	93.0	93.6	91.7
30	93.6	94.1	91.7	93.0	93.6	91.7
40	94.1	94.1	92.4	94.1	94.1	92.4
50	94.1	94.5	93.0	94.1	94.5	93.0
60	94.5	95.0	93.6	94.5	95.0	93.6
75	94.5	95.0	93.6	94.5	95.4	93.6
100	95.0	95.4	93.6	95.0	95.4	94.1
125	95.0	95.4	94.1	95.0	95.4	95.0
150	95.4	95.8	94.1	95.8	95.8	95.0
200	95.4	95.8	95.0	95.8	96.2	95.4

Motor Efficiency Ratings

NORD DRIVESYSTEMS

European Motor Efficiencies 50Hz

Efficiency Classes of IE1, IE2, and IE3 motors									
Motor Power [kW]	IE1, 50Hz			IE2, 50HZ			IE3, 50Hz		
	2 pole	4 pole	6 pole	2 pole	4 pole	6 pole	2 pole	4 pole	6 pole
0.75	72.1	72.1	70.0	77.4	79.6	75.9	80.7	82.5	78.9
1.1	75.0	75.0	72.9	79.6	81.4	78.1	82.7	84.1	81.0
1.5	77.2	77.2	75.2	81.3	82.8	79.8	84.2	85.3	82.5
2.2	79.7	79.7	77.7	83.2	84.3	81.8	85.9	86.7	84.3
3.0	81.5	81.5	79.7	84.6	85.5	83.3	87.1	87.7	85.6
4.0	83.1	83.1	81.4	85.8	86.6	84.6	88.1	88.6	86.8
5.5	84.7	84.7	83.1	87.0	87.7	86.0	89.2	89.6	88.0
7.5	86.0	86.0	84.7	88.1	88.7	87.2	90.1	90.4	89.1
11	87.6	87.6	86.4	89.4	89.8	88.7	91.2	91.4	90.3
15	88.7	88.7	87.7	90.3	90.6	89.7	91.9	92.1	91.2
18.5	89.3	89.3	88.6	90.9	91.2	90.4	92.4	92.6	91.7
22	89.9	89.9	89.2	91.3	91.6	90.9	92.7	93.0	92.2
30	90.7	90.7	90.2	92.0	92.3	91.7	93.3	93.6	92.9
37	91.2	91.2	90.8	92.5	92.7	92.2	93.7	93.9	93.3
45	91.7	91.7	91.4	92.9	93.1	92.7	94.0	94.2	93.7
55	92.1	92.1	91.9	93.2	93.5	93.1	94.3	94.6	94.1
75	92.7	92.7	92.6	93.8	94.0	93.7	94.7	95.0	94.6
90	93.0	93.0	92.9	94.1	94.2	94.0	95.0	95.2	94.9
110	93.3	93.3	93.3	94.3	94.5	94.3	95.2	95.4	95.1
132	93.5	93.5	93.5	94.6	94.7	94.6	95.4	95.6	95.4
160	93.8	93.8	93.8	94.8	94.9	94.8	95.6	95.8	95.6
200-375	94.0	94.0	94.0	95.0	95.1	95.0	95.8	96.0	95.8

Efficiency classes for 50Hz in accordance with IEC 60034-30:2008

European Motor Efficiencies 60Hz

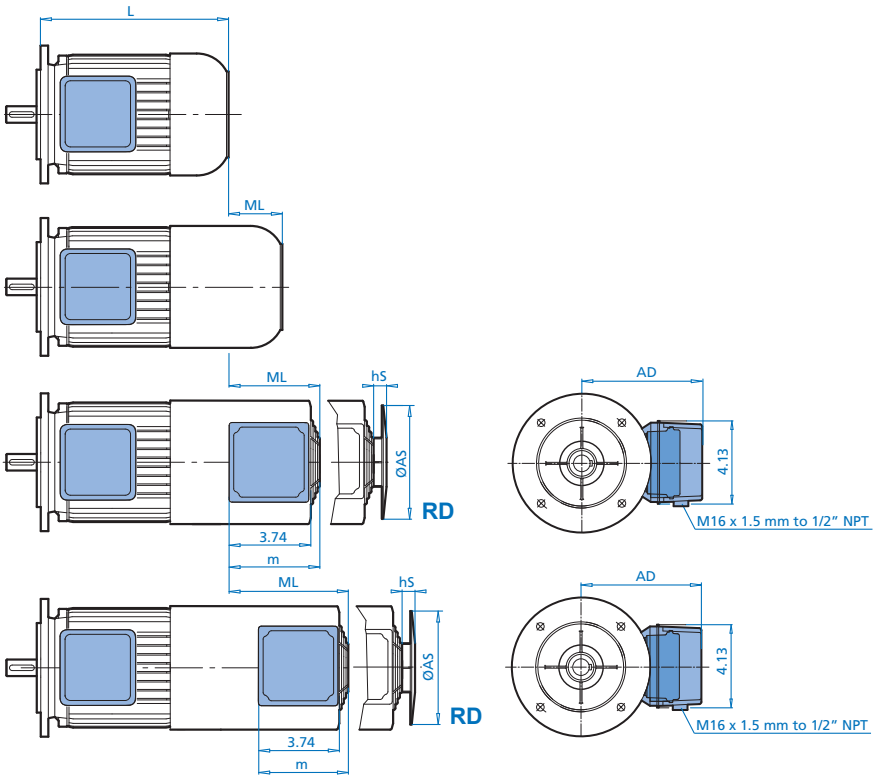
Efficiency Classes of IE1, IE2, and IE3 motors									
Motor Power [kW]	IE1, 60Hz			IE2, 60HZ			IE3, 60Hz		
	2 pole	4 pole	6 pole	2 pole	4 pole	6 pole	2 pole	4 pole	6 pole
0.75	77.0	78.0	73.0	75.5	82.5	80.0	77.0	85.5	82.5
1.1	78.5	79.0	75.0	82.5	84.0	85.5	84.0	86.5	87.5
1.5	81.0	81.5	77.0	84.0	84.0	86.5	85.5	86.5	88.5
2.2	81.5	83.0	78.5	85.5	87.5	87.5	86.5	89.5	89.5
3.7	84.5	85.0	83.5	87.5	87.5	87.5	88.5	89.5	89.5
5.5	86.0	87.0	85.0	88.5	89.5	89.5	89.5	91.7	91.0
7.5	87.5	87.5	86.0	89.5	89.5	89.5	90.2	91.7	91.0
11	87.5	88.5	89.0	90.2	91.0	90.2	91.0	92.4	91.7
15	88.5	89.5	89.5	90.2	91.0	90.2	91.0	93.0	91.7
18.5	89.5	90.5	90.2	91.0	92.4	91.7	91.7	93.6	93.0
22	89.5	91.0	91.0	91.0	92.4	91.7	91.7	93.6	93.0
30	90.2	91.7	91.7	91.7	93.0	93.0	92.4	94.1	94.1
37	91.5	92.4	91.7	92.4	93.0	93.0	93.0	94.5	94.1
45	91.7	93.0	91.7	93.0	93.6	93.6	93.6	95.0	94.5
55	92.4	93.0	92.1	93.0	94.1	93.6	93.6	95.4	94.5
75	93.0	93.2	93.0	93.6	94.5	94.1	94.1	95.4	95.0
90	93.0	93.2	93.0	94.5	94.5	94.1	95.0	95.4	95.0
110	93.0	93.5	94.1	94.5	95.0	95.0	95.0	95.8	95.8
150	94.1	94.5	94.1	95.0	95.0	95.0	95.4	96.2	95.8
185-375	94.1	94.5	94.1	95.4	95.4	95.0	95.8	96.2	95.8

Efficiency classes for 60Hz in accordance with IEC 60030-30:2008

Notes

Motors Dimensions

- IG, F, IGF Option Motor Dimensions
- IG, F, IGF Option Brakemotor Dimensions
- HR, MS Dimensions
- MG Dimensions
- WE, RD, RDD Motor Dimensions
- WE, RD, RDD Brakemotor Dimensions
- Conduit Box & Cable Entry Dimensions
- Connection Diagrams



DRIVESYSTEMS

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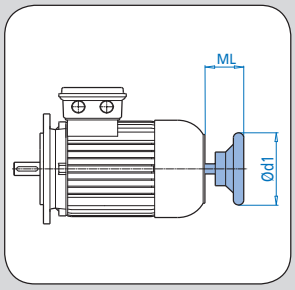
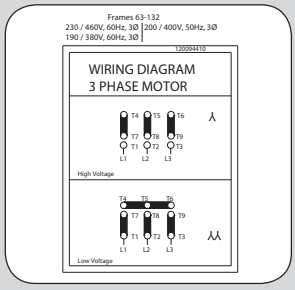
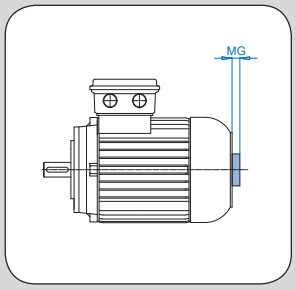


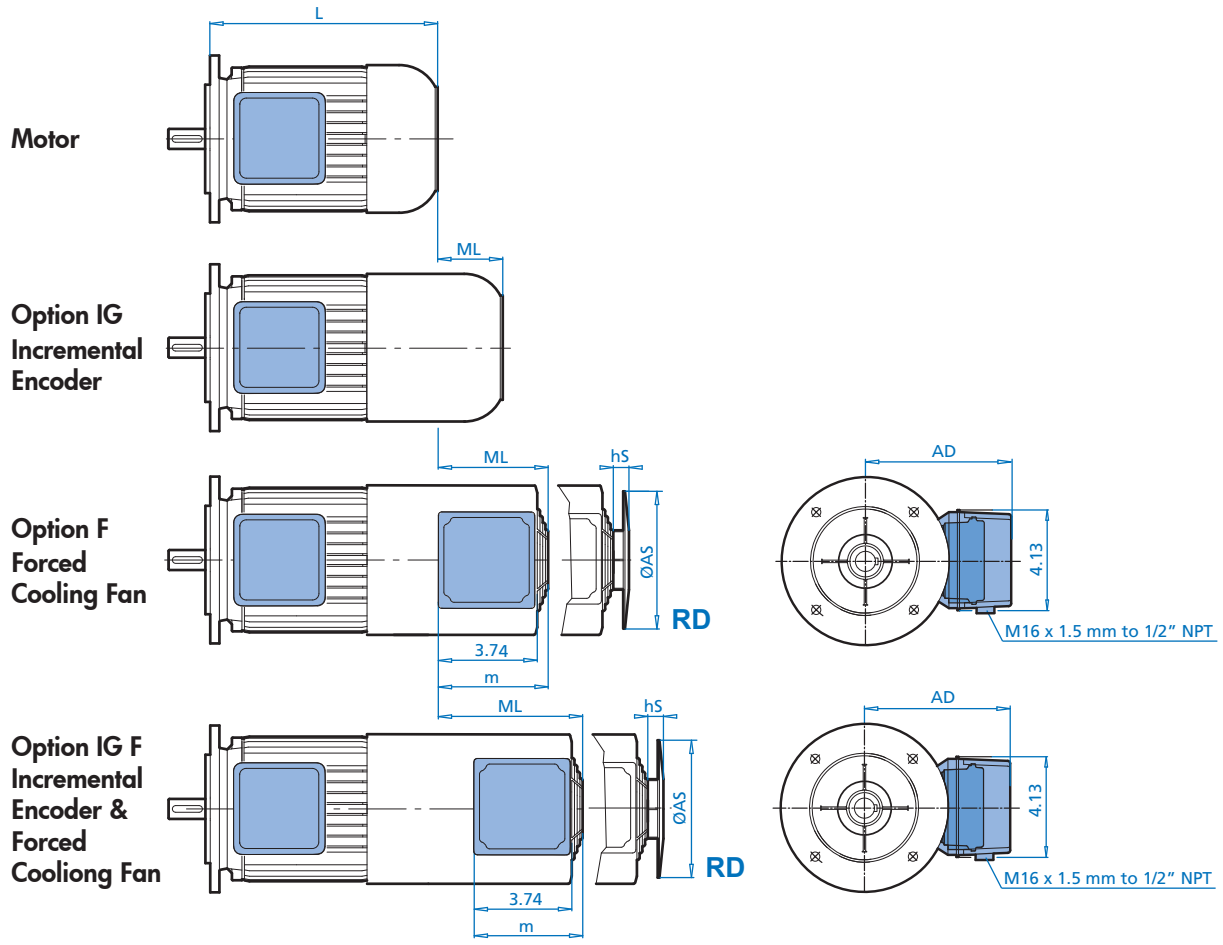




INVERTER DUTY MOTOR

IG, F, IGF Option
Motor Dimensions

NORD DRIVESYSTEMS

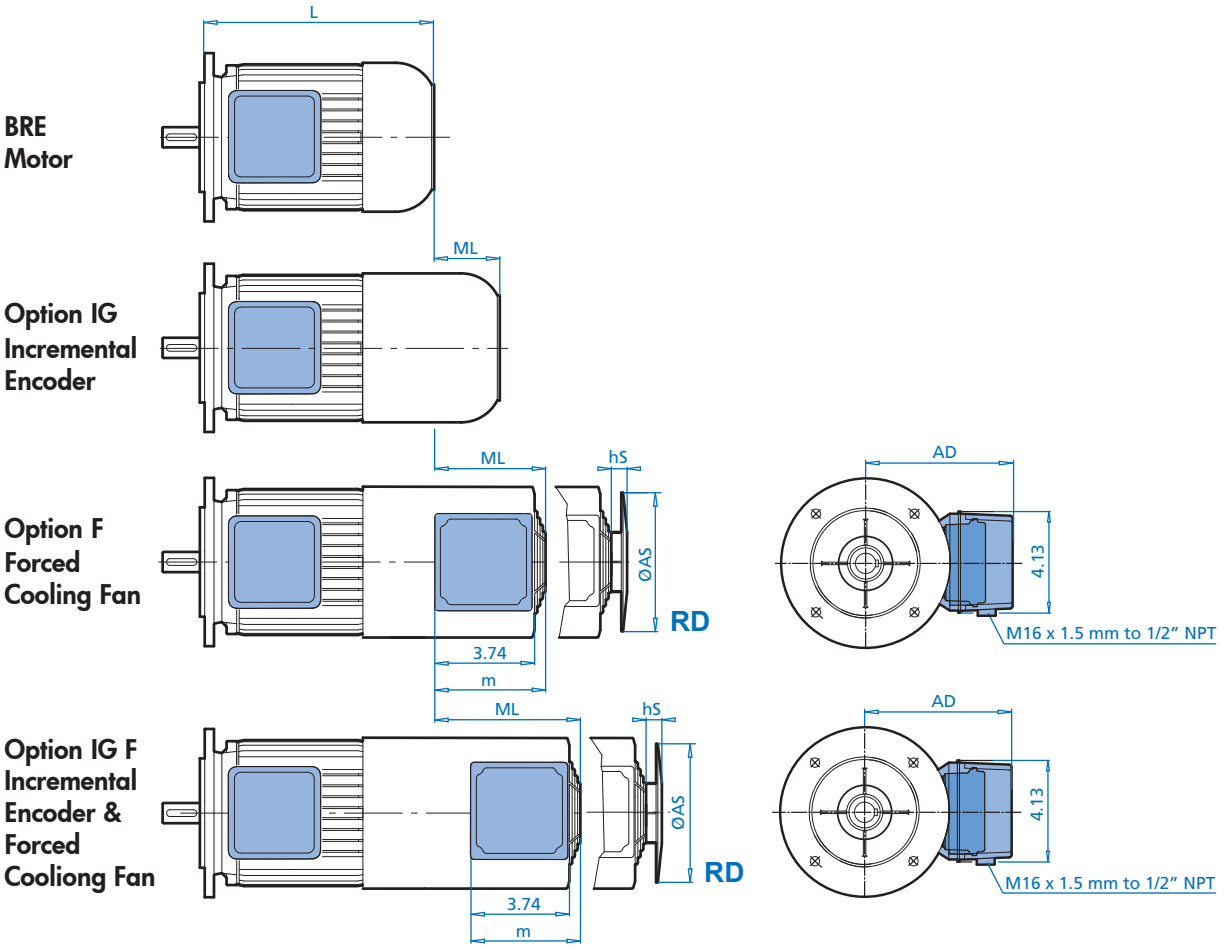


MOTORS

Motor Frame Size	Efficiency			IG	F					IG F				
	SE	EE	PE	ML	ML	AS	hS	AD	m	ML	AS	hS	AD	m
63	S/L			2.17	3.46	5.24	1.46	4.49	4.21	6.22	5.24	1.46	4.49	4.21
71	S/L			2.20	3.50	5.91	1.46	4.84	4.21	5.67	5.91	1.46	4.84	4.21
80	S/L	SH/LH	LP	2.40	3.54	6.69	1.57	5.20	4.21	5.51	6.69	1.57	5.20	4.21
90	S/L	SH/LH	SP/LP	2.83	4.09	7.40	1.18	5.59	4.61	5.87	7.40	1.18	5.59	4.61
100	L/LA	LH/AH	LP/AP	2.72	3.74	8.27	1.10	5.94	4.61	6.10	8.27	1.10	5.94	4.61
112		SH/LH		2.68	3.90	9.80	1.30	6.42	4.61	5.87	9.80	1.30	6.42	4.61
112	M	MH	MP	2.68	3.90	9.80	1.30	6.42	4.61	5.87	9.80	1.30	6.42	4.61
132	S/M/LA	SH/MH	SP/MP	2.48	4.53	11.81	0.98	7.20	5.00		11.81	0.98	7.20	5.00
160	M/L	SH/MH	MP	2.76	5.91	13.31	1.26	8.25	5.00		13.31	1.26	8.25	5.00
160		LH	LP	2.76	5.71	13.31	1.26	8.25	5.00		13.31	1.26	8.25	5.00
180	MX			2.76	5.91	13.31	1.26	8.25	5.00		13.31	1.26	8.25	5.00
180	LX			2.76	5.71	13.31	1.26	8.25	5.00		13.31	1.26	8.25	5.00
180		MH/LH	MP/PL	2.76	6.02	13.31	1.26	8.25	5.00		13.31	1.26	8.25	5.00

* Not available with NEMA dimensioned motors.

IG, F, IGF Option
Brakemotor Dimensions



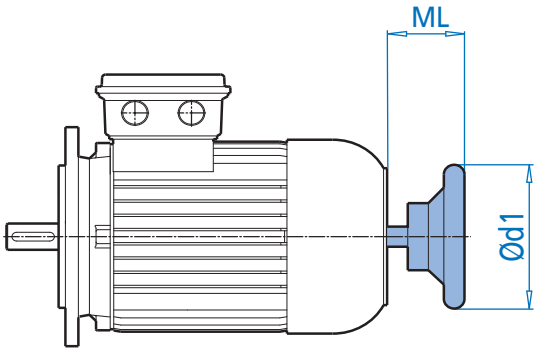
Motor Frame Size	Efficiency			IG	F					IG F				
	SE	EE	PE	ML	ML	AS	hS	AD	m	ML	AS	hS	AD	m
63	S/L			2.44	3.54	5.24	1.46	4.49	4.21	4.92	5.24	1.46	4.49	4.21
71	S/L			2.91	3.70	5.91	1.46	4.84	4.21	5.47	5.91	1.46	4.84	4.21
80	S/L	SH/LH	LP	2.24	3.54	6.69	1.57	5.20	4.21	5.51	6.69	1.57	5.20	4.21
90	S/L	SH/LH	SP/LP	2.76	3.94	7.40	1.18	5.59	4.61	5.71	7.40	1.18	5.59	4.61
100	L/LA	LH/AH	LP/AP	2.76	4.13	8.27	1.10	5.94	4.61	5.51	8.27	1.10	5.94	4.61
112		SH/LH		2.52	4.13	9.80	1.30	6.42	4.61	5.51	9.80	1.30	6.42	4.61
112	M	MH	MP	2.52	4.13	9.80	1.30	6.42	4.61	5.51	9.80	1.30	6.42	4.61
132	S/M/LA	SH/MH	SP/MP	2.56	4.92	11.81	0.98	7.20	5.00		11.81	0.98	7.20	5.00
160	M/L	SH/MH	MP	2.76	5.71	13.31	1.26	8.25	5.00		13.31	1.26	8.25	5.00
160		LH	LP	2.76	5.71	13.31	1.26	8.25	5.00		13.31	1.26	8.25	5.00
180	MX			2.76	5.71	13.31	1.26	8.25	5.00		13.31	1.26	8.25	5.00
180	LX			2.76	5.71	13.31	1.26	8.25	5.00		13.31	1.26	8.25	5.00
180		MH/LH	MP/PL	2.76	5.75	13.31	1.26	8.25	5.00		13.31	1.26	8.25	5.00

* Not available with NEMA dimensioned motors.

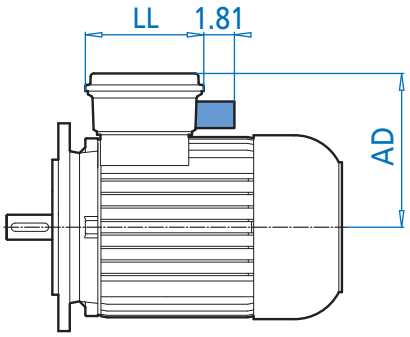
HR, MS Option Dimensions

DRIVESYSTEMS

Option HR



Option MS



Standard Motor

Motor Frame Size	Efficiency			HR		MS	
	SE	EE	PE	ML	d1	LL	AD
63	S/L	-	-	1.54	3.94	4.49	5.51
71	S/L	-	-	1.57	3.94	4.49	5.87
80	S/L	SH/LH	LP	1.93	3.94	4.49	6.22
90	S (B3)	-	-	1.65	6.30	4.49	6.42
90	S/L	SH/LH	SP/LP	2.64	6.30	4.49	6.42
100	L/LA	LH/AH	LP/AP	2.99	6.30	4.49	6.85
112	-	SH/LH	-	2.91	6.30	4.49	7.24
112	M	MH	MP	2.91	6.30	4.49	7.24
132	S (B3)	-	-	3.19	7.87	4.80	8.03
132	S/M/LA	SH/MH	SP/MP	4.69	7.87	4.80	8.03
160	M/L	SH/MH	MP	5.59	12.40	-	-
160	-	LH	LP	5.59	12.40	-	-
180	MX	-	-	5.59	12.40	-	-
180	LX	-	-	5.59	12.40	-	-
180	-	MH/LH	MP/PL	5.59	12.40	-	-

* Not available with NEMA dimensioned motors.

MOTORS

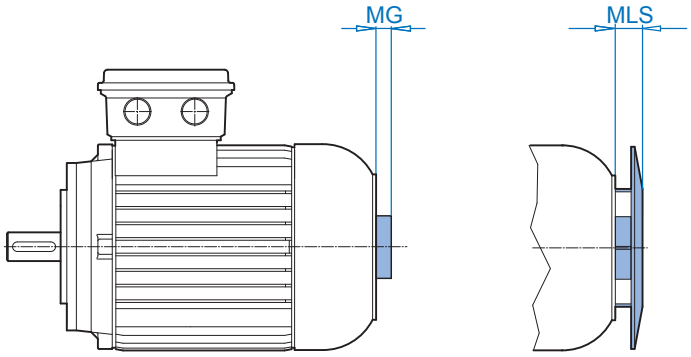
Brakemotor

Motor Frame Size	Efficiency			HR		MS	
	SE	EE	PE	ML	d1	LL	AD
63	S/L	-	-	1.69	3.94	4.49	5.51
71	S/L	-	-	1.69	3.94	4.49	5.87
80	S/L	SH/LH	LP	1.97	3.94	4.49	6.22
90	S (B3)	-	-	1.30	6.30	4.49	6.42
90	S/L	SH/LH	SP/LP	2.28	6.30	4.49	6.42
100	L/LA	LH/AH	LP/AP	3.15	6.30	4.49	6.85
112	-	SH/LH	-	3.03	6.30	4.49	7.24
112	M	MH	MP	3.03	6.30	4.49	7.24
132	S (B3)	-	-	2.87	7.87	4.80	8.03
132	S/M/LA	SH/MH	SP/MP	4.37	7.87	4.80	8.03
160	M/L	SH/MH	MP	5.59	12.40	-	-
160	-	LH	LP	5.59	12.40	-	-
180	MX	-	-	5.59	12.40	-	-
180	LX	-	-	5.59	12.40	-	-
180	-	MH/LH	MP/PL	5.59	12.40	-	-

* Not available with NEMA dimensioned motors.

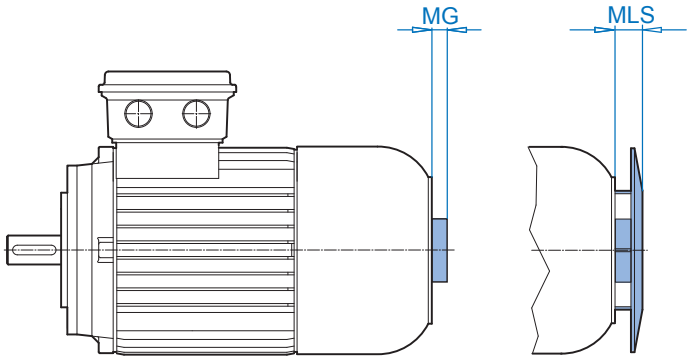
MG Option Dimensions

Option MG



MG With Cover

Option MG BRE



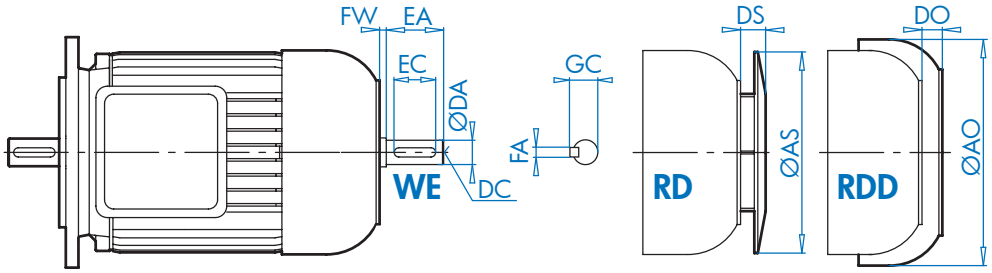
Brakemotor
MG With Cover

Motor Frame Size	Efficiency			MG		BRE + MG	
	SE	EE	PE	MG	MLS	BRE + MG	BRE + MLS
63	S/L	-	-	0.43	0.87	0.59	1.02
71	S/L	-	-	0.47	0.91	0.67	1.10
80	S/L	SH/LH	LP	0.39	0.75	0.47	0.83
90	S/L	SH/LH	SP/LP	0.55	0.91	0.51	0.87
100	L/LA	LH/AH	LP/AP	0.51	0.83	0.51	0.87
112	-	SH/LH	-	0.47	0.83	0.51	0.87
112	M	MH	MP	0.47	0.83	0.51	0.83
132	S/M/MA	SH/MH	SP/MP	0.39	0.83	0.35	0.79
160	M/L	SH/MH/LH	MP/LP	Available on Request			
180	-	MH/LH	MP/LP				

WE, RD, RDD Option
Motor Dimensions

DRIVESYSTEMS

Standard Motor

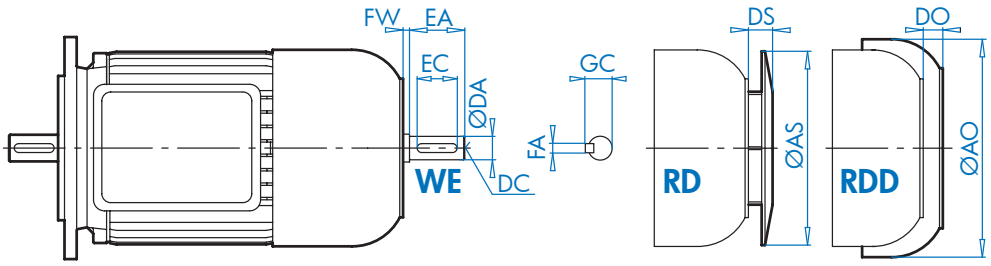


MOTORS

Motor Frame Size	Efficiency			WE								RD		RDD	
	SE	EE	PE	DA	GC	CW	EA	FW	DC	EC	FA	ØAS	DS	ØAO	DO
				[mm]								[in]			
63	S/L	-	-	11	12.5	23	23	0	M4	16	4	4.84	0.43	6.02	1.06
71	S/L	-	-	11	12.5	24	23	1	M4	16	4	5.43	0.43	6.65	0.94
80	S/L	SH/LH	LP	14	16.0	33	30	3	M5	20	5	6.14	0.59	7.20	1.22
90	S/L	SH/LH	SP/LP	19	21.5	47	40	7	M6	32	6	6.93	0.59	7.91	1.22
100	L/LA	LH/AH	LP/AP	24	27.0	56	50	6	M8	40	8	7.64	0.59	8.86	1.10
112	-	SH/LH	-	24	27.0	54	50	4	M8	40	8	8.58	0.59	10.43	1.50
112	M	MH	MP	24	27.0	54	50	4	M8	40	8	8.58	0.59	10.16	1.50
132	S/M/LA	SH/MH	SP/MP	32	35.0	90	80	10	M12	70	10	10.12	0.67	12.51	1.61
160	M/L	SH/MH	MP	42	45.0	119	110	9	M16	90	12	12.20	0.67	14.45	2.76
160	-	LH	LP	42	45.0	119	110	9	M16	90	12	12.20	0.67	14.45	2.76
180	MX	-	-	42	45.0	119	110	9	M16	90	12	12.20	0.67	14.45	2.76
180	LX	-	-	42	45.0	119	110	9	M16	90	12	12.20	0.67	14.45	2.76
180	-	MH/LH	MP/PL	48	51.5	119	110	9	M16	100	14	13.70	0.67	15.87	2.76

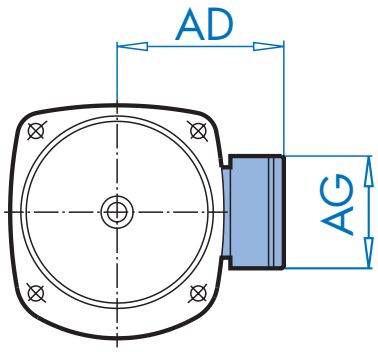
WE, RD, RDD Option
Brakemotor Dimensions

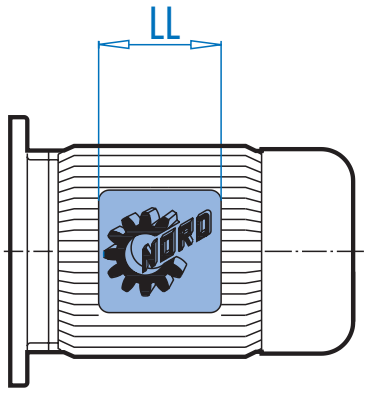
Standard BRE Motor



Motor Frame Size	Efficiency			WE								RD		RDD	
	SE	EE	PE	DA	GC	CW	EA	FW	DC	EC	FA	ØAS	DS	ØAO	DO
				[mm]								[in]			
63	S/L	-	-	11	12.5	27	23	4	M4	16	4	4.84	0.43	6.02	1.06
71	S/L	-	-	11	12.5	27	23	4	M4	16	4	5.43	0.43	6.65	0.94
80	S/L	SH/LH	LP	14	16.0	34	30	4	M5	20	5	6.14	0.59	7.20	1.22
90	S/L	SH/LH	SP/LP	19	21.5	48	40	8	M6	32	6	6.93	0.59	7.91	1.22
100	L/LA	LH/AH	LP/AP	24	27.0	60	50	10	M8	40	8	7.64	0.59	8.86	1.10
112	-	SH/LH	-	24	27.0	57	50	7	M8	40	8	8.58	0.59	10.43	1.50
112	M	MH	MP	24	27.0	57	50	7	M8	40	8	8.58	0.59	10.16	1.50
132	S/M/LA	SH/MH	SP/MP	32	35.0	90	80	10	M12	70	10	10.12	0.67	12.51	1.61
160	M/L	SH/MH	MP	42	45.0	119	110	9	M16	90	12	12.20	0.67	14.45	2.76
160	-	LH	LP	42	45.0	119	110	9	M16	90	12	12.20	0.67	14.45	2.76
180	MX	-	-	42	45.0	119	110	9	M16	90	12	12.20	0.67	14.45	2.76
180	LX	-	-	42	45.0	119	110	9	M16	90	12	12.20	0.67	14.45	2.76
180	-	MH/LH	MP/PL	48	51.5	119	110	9	M16	100	14	13.70	0.67	15.87	2.76

Dimensions
Conduit Box & Cable Entry



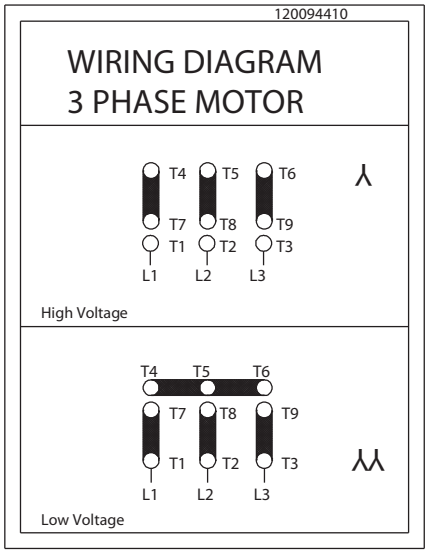


Motor Frame Size	Efficiency			Conduit Box & Cable Entry				
	SE	EE	PE	AD	AG	LL	O	Conduit Adapter
63	S/L	-	-	4.53	3.94	3.94	M20 X 1.5	1/2" NPT
71	S/L	-	-	4.88	3.94	3.94	M20 X 1.5	1/2" NPT
80	S/L	SH/LH	LP	5.59	4.49	4.49	M25 X 1.5	3/4" NPT
90	S/L	SH/LH	SP/LP	5.79	4.49	4.49	M25 X 1.5	3/4" NPT
100	L/LA	LH/AH	LP/AP	6.65	4.49	4.49	M32 X 1.5	1" NPT
112	-	SH/LH	-	7.05	4.49	4.49	M32 X 1.5	1" NPT
112	M	MH	MP	7.05	4.49	4.49	M32 X 1.5	1" NPT
132	S/M/LA	SH/MH	SP/MP	8.03	4.80	4.80	M32 X 1.5	1" NPT
160	M/L	SH/MH	MP	9.53	7.32	7.32	M40 X 1.5	1" NPT
160		LH	LP	9.53	7.32	7.32	M40 X 1.5	1" NPT
180	MX	-	-	9.53	7.32	7.32	M40 X 1.5	1" NPT
180	LX	-	-	9.53	7.32	7.32	M40 X 1.5	1" NPT
180	-	MH/LH	MP/PL	10.20	7.32	7.32	M40 X 1.5	1" NPT

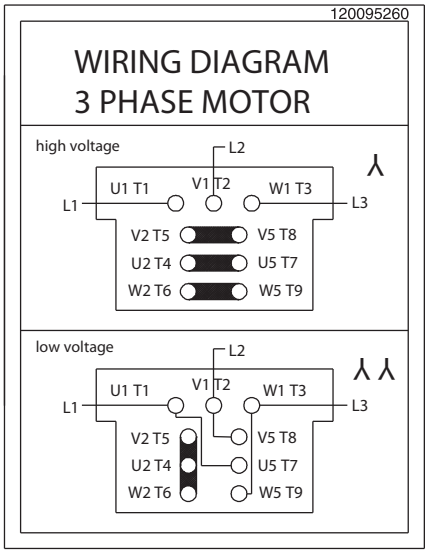
Brakemotor Frame Size	Efficiency			Conduit Box & Cable Entry				
	SE	EE	PE	AD	AG	LL	O	Conduit Adapter
63	S/L	-	-	4.84	3.50	5.28	M20 X 1.5	1/2" NPT
71	S/L	-	-	5.20	3.50	5.28	M20 X 1.5	1/2" NPT
80	S/L	SH/LH	LP	5.59	4.25	6.02	M25 X 1.5	3/4" NPT
90	S/L	SH/LH	SP/LP	5.79	4.25	6.02	M25 X 1.5	3/4" NPT
100	L/LA	LH/AH	LP/AP	6.77	4.25	6.02	M32 X 1.5	1" NPT
112	-	SH/LH	-	7.17	4.25	6.02	M32 X 1.5	1" NPT
112	M	MH	MP	7.17	4.25	6.02	M32 X 1.5	1" NPT
132	S/M/LA	SH/MH	SP/MP	7.91	5.47	7.28	M32 X 1.5	1" NPT
160	M/L	SH/MH	MP	9.53	7.32	7.32	M40 X 1.5	1" NPT
160	-	LH	LP	9.53	7.32	7.32	M40 X 1.5	1" NPT
180	MX	-	-	9.53	7.32	7.32	M40 X 1.5	1" NPT
180	LX	-	-	9.53	7.32	7.32	M40 X 1.5	1" NPT
180	-	MH/LH	MP/PL	10.20	7.32	7.32	M40 X 1.5	1" NPT

Connection Diagrams

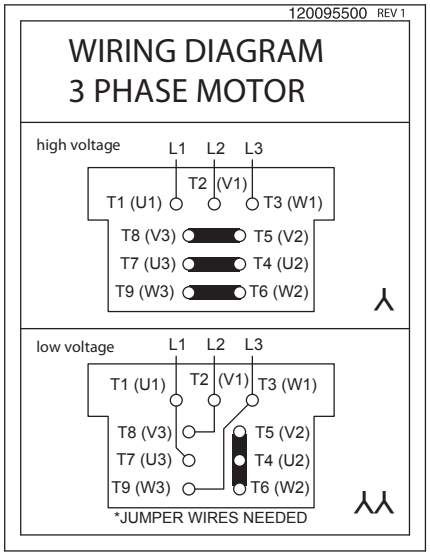
Frames 63-132
230 / 460V, 60Hz, 3Ø | 200 / 400V, 50Hz, 3Ø
190 / 380V, 60Hz, 3Ø



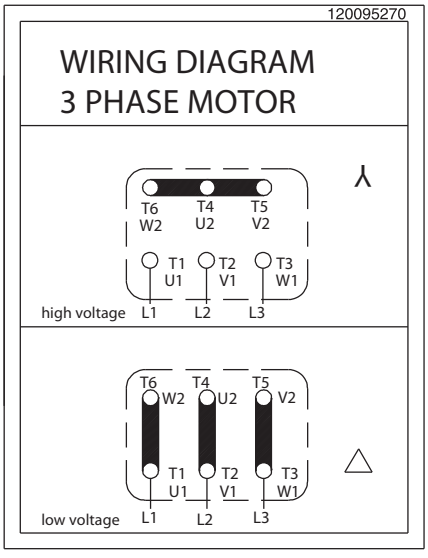
Frames 160 +
230 / 460V, 60Hz, 3Ø | 200 / 400V, 50Hz, 3Ø
190 / 380V, 60Hz, 3Ø



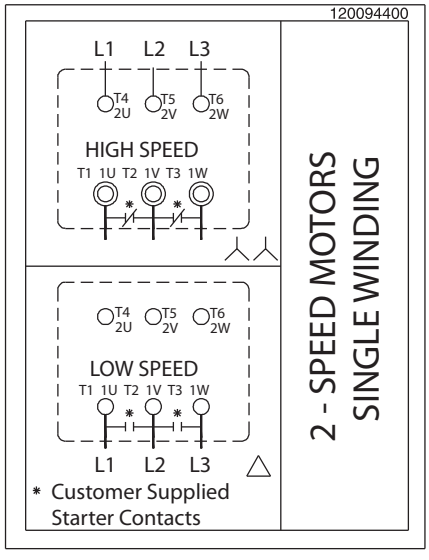
Frames 160 +
230 / 460V, 60Hz, 3Ø | 200 / 400V, 50Hz, 3Ø
190 / 380V, 60Hz, 3Ø



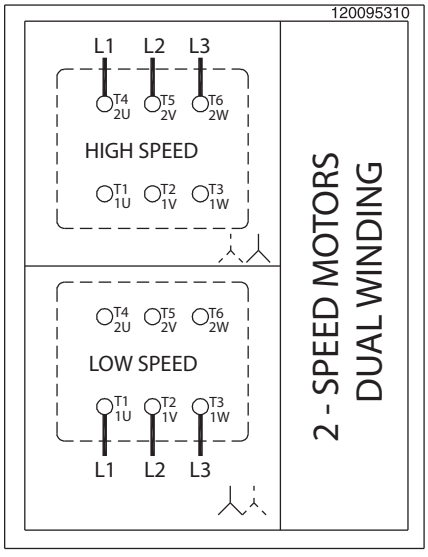
460 / 800V, 60Hz, 3Ø | 230 / 400V, 50Hz, 3Ø
208 / 360V, 60Hz, 3Ø | 400 / 690V, 50Hz, 3Ø
332 / 575V, 60Hz, 3Ø



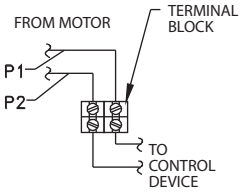
2 - SPEED MOTORS
SINGLE WINDING (4-2 & 8-4 POLE)



2 - SPEED MOTORS
DUAL WINDING (8-2 POLE)



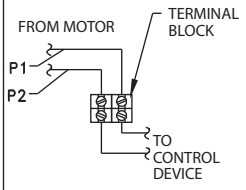
Connection Diagrams



* MAX. OPERATING VOLTAGE 2.5V.
* SWITCH TEMP. 155°C
* RESPONSE TIME < 5 SECONDS

THERMISTOR "TF" OPTION

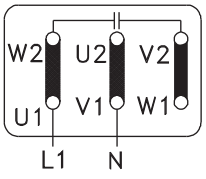
120095240



* NC (NORMALLY CLOSED)
* CONTACTS RATED 1.6A AT 2.50 VAC
* 6-500 VAC WORKING RANGE
* AUTOMATIC RESET AT 30 ± 15°C TEMP. DROP

THERMISTATS "TW" OPTION

120095230



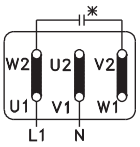
1 PHASE
115V*
50/60 Hz

* CAPACITOR IS SUPPLIED

BLOWER COOLING FAN "FC" OPTION

120095450

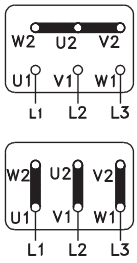
OPTION "F" 1 PH



230V
50 / 60 Hz

* CAPACITOR IS SUPPLIED

OPTION "F" 3 PH

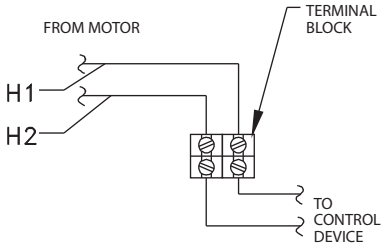


380-575V
50 / 60 Hz

220-332V
50 / 60 Hz

BLOWER COOLING FAN "F" OPTION

120095250



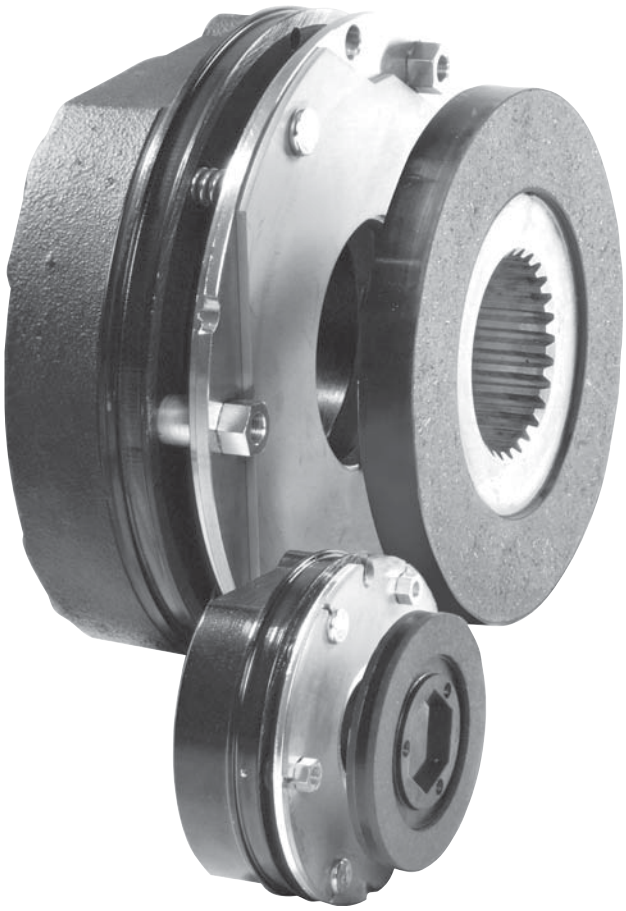
SPACE HEATER "SH" OPTION

120095220

MOTORS

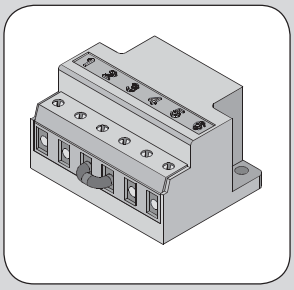
Brakes

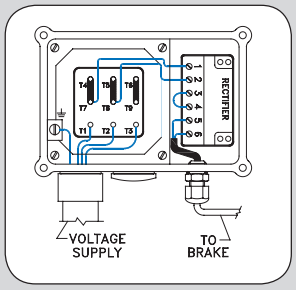
- Operation
- Selection-Torque
- Mechanical Options
- Rectifiers
- Selection-Performance
- Connection Diagrams



NORD DRIVESYSTEMS

www.nord.com





Motor Brake (Option BRE)

The standard NORD motor brake is spring-set when power is removed from the BRE 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 torque adjustments are possible by changing the brake spring combinations. In addition, brake sizes from 5-40 Nm (3.7-30 lb-ft) are typically supplied with an additional spanner-nut adjustment on the back of the brake.
- NORD brakes provide a high degree of safety because when power is removed the brake will automatically set to hold the load.
- The brake rotor or brake disc is environmentally safe and asbestos-free.
- The connection between the rectifier and the brake coil is completed at the factory and the brake air-gap is factory-set but can be adjusted in the event of wear.

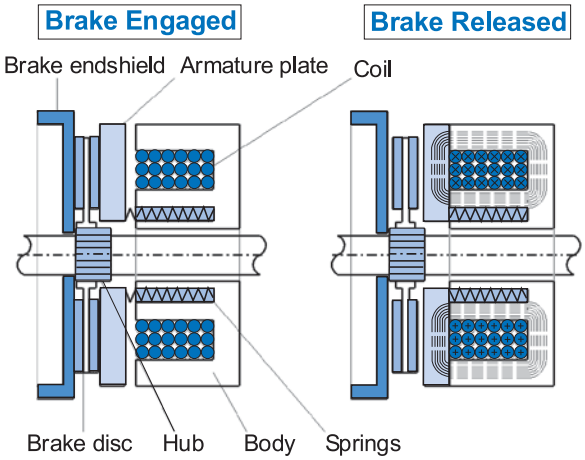
Basic Brake Operation

The standard NORD motor brake is “spring set”. When power is removed and the brake is de-energized (power-off), the brake springs exert a force against the armature plate in turn preventing the brake rotor (or brake disc) from rotating. When the brake coil is energized (power-on), a magnetic field pulls the armature plate across the air gap to the brake casing, which releases the brake rotor and allows the motor shaft to rotate.

NORD brakes are DC voltage brakes and in most instances are supplied with a motor mounted brake rectifier for easy connections to AC power. AC power is taken directly form the power line or from the terminal block of the motor and converted to DC by the supplied rectifier.

IMPORTANT NOTE

If the motor is connected to a frequency inverter, soft start, or is a two-speed motor, the AC power must be supplied separately to the brake rectifier.



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.

Each NORD motor may be supplied with a number of brake torque sizes. Each brake may be adjusted to different brake torque values. (pages 199 - 200)

Selection steps

1) Brake torque selection (page 199)
2) Brake times & electrical selection (page 201)
3) Electrical supply and connection (page 202 & 224-234)
4) Brake options (page 205)
5) Brake work verification (page 223)

Brake Torque Selection

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

Example for ordering: SK 32 - S/4 **BRE10**

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

CAUTIONS

- BRE800 and BRE1200 brakes may only be controlled with a fast reaction rectifier (overexcitation), the maximum permissable nominal currents of the rectifier must be considered!

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; in addition on crane applications excess hoist-cable swing can result.

Motor Size & Efficiency				Brake Size and Torque											
Frame Size	SE	EE	PE		BRE5	BRE10	BRE20	BRE40	BRE60	BRE100	BRE150	BRE250	BRE400	BRE800	BRE1200
				Nm	5	10	20	40	60	100	150	250	400	800	1200
				lb-in	44	89	177	354	531	885	1328	2213	3540	7080	10620
				lb-ft	3.7	7.4	14.8	29.5	44.3	73.8	111	184	295	590	885
63	S/L				Std.	Opt. * #									
71	S/L				Std.	Opt. *									
80	S	SH			Std.	Opt.	Opt. *								
80	L	LH	LP		Opt.	Std.	Opt. *								
90	S	SH	SP			Opt.	Std.	Opt.							
90	L	LH	LP			Opt.	Std.	Opt.							
100	L	LH	LP				Std.	Opt.	Opt. #						
100	LA	AH	AP				Opt.	Std.	Opt. #						
112		SH					Opt.	Std.	Opt.						
112	M	MH	MP				Opt.	Opt.	Std.						
132	S	SH	SP						Std.	Opt.	Opt. *				
132	M	MH	MP						Opt.	Std.	Opt. *				
132	MA								Opt.	Opt.	Std. *				
160		SH								Opt.	Std.	Opt.			
160	M	MH	MP							Opt.	Std.	Opt.			
160	L	LH	LP							Opt.	Opt.	Std.			
180	MX										Opt.	Std.			
180	LX										Opt.	Std.			
180		MH	MP									Std.	Opt.		
180		LH	LP									Std.	Opt.		
200	LX	XH										Opt.	Std.		
200	L											Opt.	Std.		
225	S	SH											Std.	Opt. *2)	
250	M	MH											Opt.	Std. *2)	
280	S	SH												Std. *2)	Opt. *3)
280	M	MH												Std. *2)	Opt. *3)
Weight		kg			2	3	5.5	7	10	16	22	32	50	80	100
		lb			4.4	6.6	12.1	15.4	22	35	49	71	110	176	220
Inertia		kg-m² x 10³			0.015	0.045	0.153	0.45	0.86	1.22	2.85	6.65	19.5	39	39
		lb-ft² x 10³			0.356	1.068	3.63	10.68	20.4	29.0	67.6	158	463	925	925

* IP66 brake not possible

Manual brake release option not possible

2) When used as a stopping brake, evaluation is essential.

3) Designed as a holding brake or emergency stop only.

Std - Standard Offering

Opt - Optional Offering

BRAKES

Brake Torque Selection

DRIVESYSTEMS

⚠ CAUTIONS ⚠

- **Brake torque -** The brake torque is measured with a mean friction radius of the brake pad surface with a circumferential speed of 1m/sec (197 fpm).
- **Brake torque tolerance -** For different applications and operating conditions, brake torque can vary from +40/-20% compared to the rated brake torque.
- **Hoisting (lifting/lowering) applications -** must have the brake wired for fast response (DC-switching)
- **Initial operation & wear-in period -** In new condition,the brake will have a reduced torque of up to 30%. In order to achieve full rated brake torque, a short run-in period is required. The run in time will vary depending on system loads.
- **The brake rotor or brake pad -** must be protected against foreign matter, oil and grease. Contaminants of this type can greatly influence wear and reduce breaking torque.

Brake Torque Adjustment

Brake torque adjustments are possible by changing the brake spring combinations or by removing springs.

Brake Torque Reduction - Spring Removal

"Brake Size"	7 Springs		5 Springs		3 Springs	
	[Nm]	[lb-ft]	[Nm]	[lb-ft]	[Nm]	[lb-ft]
BRE 5	5	3.7	3.5	2.6	2	1.5
BRE10	10	7.4	7	5.2	4	3.0
BRE20	20	14.8	14	10.3	8	5.9
BRE40	40	29.5	28	20.7	17	12.5
BRE60	60	44.3	43	31.7	26	19.2
BRE100	100	73.8	70	51.6	42	31.0
BRE150	150	111	107	78.9	65	47.9
"Brake Size"	8 Springs		6 Springs		4 Springs	
	[Nm]	[lb-ft]	[Nm]	[lb-ft]	[Nm]	[lb-ft]
BRE250	250	184	187	138	125	92
BRE400	400	295	300	221	200	148
BRE800	800	590	600	443	400	295
BRE1200	1200	885	900	664	600	443

When adjusting the brake torque, start by removing the outer springs at opposite corners to prevent uneven brake wear.

On brake sizes 5-150 Nm (3.7-111 lb-ft) full brake torque is achieved with all (7) springs. The brake springs are placed in such a manner where there are (3) inner and (4) outer springs.

On brake sizes 250-1200 Nm (184-885 lb-ft) full brake torque is achieved with all (8) springs. The brake springs are placed in such a manner where there are (4) inner and (4) outer springs.

Spanner Nut Adjustment

"Brake Size"	Torque Reduction*		Max. Turns	Minimum Torque✹	
	[Nm]	[lb-ft]		[Nm]	[lb-ft]
BRE 5	0.2	0.15	6	0.8	0.59
BRE10	0.2	0.15	12	1.6	1.18
BRE20	0.3	0.22	12	4.4	3.25
BRE40	1	0.74	9	8.0	5.90

✹ **With the minimum number of springs and maximum number of turns to the spanner nut.**

* **Per each turn of the spanner nut**

In addition, brake sizes from 5-40 Nm (3.7-30 lb-ft) are typically supplied with a threaded adjustment nut or spanner nut. Additional fine torque adjustment can be made by unscrewing the spanner nut a number of turns or "clicks" with a spanner wrench.

Brake Times & Electrical Selection

Brake timing performance is critical in selecting the optimal brake system. NORD brakes can provide exceptional performance in terms of the release (start) times and engagement (stop) times. Use the following guidelines in order to select the correct brake control components and connections.

1) Determine if the brake needs to be wired directly from the motor terminal block or powered by a separate source.

- If you are using a frequency inverter, soft-start or a two speed motor you will need to supply the rectifier from.
- If the motor is powered direct across-the-line the rectifier power can be supplied from the motor's terminal block.

2) What type of performance do I need?

- Is the standard brake performance OK?
- Is a higher performance required for fast brake release or very fast brake stopping?

3) Determine the brake supply voltage and check the rectifier compatibility table on 202

Selection Sugestions

When Fast or Very Fast Stopping is Recommended

Any applications that require quick stops and positive action at stand-still.

Recommended Applications

- conveyors and inclined conveyors
- hoists and lifts
- bulk material handling equipment (bucket elevators, idler conveyor's).

CAUTIONS

- **Hoisting (lifting/lowering) applications** - must have the brake wired for fast response.

When Fast-Release is Recommended (Overexcitation)

Any application that is very high-cycling with frequent starts and stops. These applications require the brake to release very-quickly in order to avoid excessive heat build-up in the AC motor and brake coil.

Recommended Applications

- Index conveyors
- Diverters
- Storage and retrieval crane systems

Power Source	Brake Release (start)	Brake engagement (stop)	Braking Method *	Rectifier
Motor Terminal Block	Standard	Standard (AC switching)	10	GVE/GHE/GUE
	Standard	Fast (DC switching)	15	GVE/GHE/GUE
	Standard	Very Fast (Reduced power holding)	40	GPE/PMG
	Fast (Overexcitation)	Standard (AC switching)	30	GPE/PMG
	Fast (Overexcitation)	Fast (DC switching)	35	GPE/PMG
Separate Power Source	Standard	Standard (AC switching)	20	GVE/GHE/GUE
	Standard	Fast (DC switching)	25	GVE/GHE/GUE
	Standard	Very Fast (Reduced power holding)	55	GPU/PMG
	Fast (Overexcitation)	Standard (AC switching)	45	GPU/PMG
	Fast (Overexcitation)	Fast (DC switching)	50	GPU/PMG

*** Braking methods referenced in connection diagrams on pages 224 - 226**

Rectifier Styles

GV - Full Wave Rectifier (Bridge)
GH - Half Wave Rectifier
GU - Combo Rectifier, Can be connected full or half wave
GPE - Hybrid Rectifier, Full wave then switches to half wave.
PMG - Hybrid Rectifier, Full wave then switches to half wave.
GPU - Hybrid Rectifier, Full wave, then switches to half wave. Has integrated DC Switching via voltage sensing.

Brake Rectifier Compatability

Supply Voltage (VAC)	Coil Voltage (VDC)	Braking Method	Rectifier Type	Rectifier P/N	BRE 5	BRE 10	BRE 20	BRE 40	BRE 60	BRE 100	BRE 150	BRE 250	BRE 400	BRE 800	BRE 1200
115 (105-120)	105	20	GVE20	19141000	X	X	X	X	X	X	X	X	X		
	105	25	GVE20	19141000	X	X	X	X	X	X	X	X	X		
208 (200-208)	105	10	GHE40	19141010	X	X	X	X	X	X	X				
	180	10	GVE20	19141000	X	X	X	X	X	X	X	X	X		
	105	15	GHE40	19141010	X	X	X	X	X	X	X				
	180	15	GVE20	19141000	X	X	X	X	X	X	X	X	X		
	105	20	GHE40	19141010	X	X	X	X	X	X	X				
	180	20	GVE20	19141000	X	X	X	X	X	X	X	X	X		
	105	25	GHE40	19141010	X	X	X	X	X	X	X				
	180	25	GVE20	19141000	X	X	X	X	X	X	X	X	X		
	105	30	GPE20	19140230	X	X	X	X							
	105	30	PMG500	19140200					X	X	X	X	X	X	X
	105	35	GPE20	19140230	X	X	X	X							
	105	35	PMG500	19140200					X	X	X	X	X	X	X
	180	40	GPE20	19140230	X	X	X	X	X	X	X				
	180	40	PMG500	19140200								X	X	X	X
	105	45	GPU20	19140090	X	X	X	X							
	105	45	PMG500	19140200					X	X	X	X	X	X	X
	105	50	GPU20	19140090	X	X	X	X							
	105	50	PMG500	19140200					X	X	X	X	X	X	X
	180	55	GPU20	19140090	X	X	X	X	X	X	X				
	180	55	PMG500	19140200								X	X	X	X
230 (220-240)	105	10	GHE40	19141010	X	X	X	X	X	X	X				
	205	10	GVE20	19141000	X	X	X	X	X	X	X	X	X		
	105	15	GHE40	19141010	X	X	X	X	X	X	X				
	205	15	GVE20	19141000	X	X	X	X	X	X	X	X	X		
	105	20	GHE40	19141010	X	X	X	X	X	X	X				
	205	20	GUE40V	19140300	X	X	X	X	X	X	X				
	205	20	GVE20	19141000	X	X	X	X	X	X	X	X	X		
	105	25	GHE40	19141010	X	X	X	X	X	X	X				
	205	25	GUE40V	19140300	X	X	X	X	X	X	X				
	205	25	GVE20	19141000	X	X	X	X	X	X	X	X	X		
	105	30	GPE20	19140230	X	X	X	X							
	105	30	PMG500	19140200					X	X	X	X	X	X	X
	105	35	GPE20	19140230	X	X	X	X							
	105	35	PMG500	19140200					X	X	X	X	X	X	X
	205	40	GPE20	19140230	X	X	X	X	X	X	X				
	205	40	PMG500	19140200								X	X	X	X
	105	45	GPU20	19140090	X	X	X	X							
	105	45	PMG500	19140200					X	X	X	X	X	X	X
	105	50	GPU20	19140090	X	X	X	X							
	105	50	PMG500	19140200					X	X	X	X	X	X	X
	205	55	GPU20	19140090	X	X	X	X	X	X	X				
	205	55	PMG500	19140200								X	X	X	X

Brake Rectifier Compatability

Supply Voltage (VAC)	Coil Voltage (VDC)	Braking Method	Rectifier Type	Rectifier P/N	BRE 5	BRE 10	BRE 20	BRE 40	BRE 60	BRE 100	BRE 150	BRE 250	BRE 400	BRE 800	BRE 1200
332	180	30	GPE40	19140240	X	X	X	X							
	180	30	PMG500	19140200					X	X	X	X	X	X	X
	180	35	GPE40	19140240	X	X	X	X							
	180	35	PMG500	19140200					X	X	X	X	X	X	X
	180	45	GPU40	19140170	X	X	X	X							
	180	50	GPU40	19140170	X	X	X	X							
400 (380-415)	180	10	GHE40	19141010	X	X	X	X	X	X	X	X	X		
	180	15	GHE40	19141010	X	X	X	X	X	X	X	X	X		
	180	20	GHE40	19141010	X	X	X	X	X	X	X	X	X		
	180	25	GHE40	19141010	X	X	X	X	X	X	X	X	X		
	180	30	GPE40	19140240	X	X	X	X	X	X	X				
	180	30	PMG500	19140200								X	X	X	X
	180	35	GPE40	19140240	X	X	X	X	X	X	X				
	180	35	PMG500	19140200								X	X	X	X
	180	45	GPU40	19140170	X	X	X	X	X	X	X				
	180	45	PMG500	19140200								X	X	X	X
	180	50	GPU40	19140170	X	X	X	X	X	X	X				
	180	50	PMG500	19140200								X	X	X	X
460 (440-480)	205	10	GHE40	19141010	X	X	X	X	X	X	X	X	X		
	205	15	GHE40	19141010	X	X	X	X	X	X	X	X	X		
	205	20	GHE40	19141010	X	X	X	X	X	X	X	X	X		
	205	20	GUE40V	19140300	X	X	X	X	X	X	X				
	205	25	GHE40	19141010	X	X	X	X	X	X	X	X	X		
	205	25	GUE40V	19140300	X	X	X	X	X	X	X				
	205	30	GPE40	19140240	X	X	X	X	X	X	X				
	205	30	PMG500	19140200								X	X	X	X
	205	35	GPE40	19140240	X	X	X	X	X	X	X				
	205	35	PMG500	19140200								X	X	X	X
	205	45	GPU40	19140170	X	X	X	X	X	X	X				
	205	45	PMG500	19140200								X	X	X	X
	205	50	GPU40	19140170	X	X	X	X	X	X	X				
	205	50	PMG500	19140200								X	X	X	X
575 (550-600)	250	10	GHE50	19141020	X	X	X	X	X	X	X	X	X		
	250	15	GHE50	19141020	X	X	X	X	X	X	X	X	X		
	250	20	GHE50	19141020	X	X	X	X	X	X	X	X	X		
	250	25	GHE50	19141020	X	X	X	X	X	X	X	X	X		

Brake Options

Abbreviation	Description	Page
ADJ	**Torque Adjustment** - Brake torque may be adjusted at the factory	200
DBR	**Double Brake (2xBRE)** - Double brakes are used for redundancy and additional safety	208
FBR	**Brass Foil** - Provides a brass foil in the brake air-gap to provide faster braking times	206
FHL	**Locking Hand Release Lever** - Lockable manual hand release lever	205
HL	**Hand Release Lever** - Manual hand release lever	205
HLH	**Hand Release Lever with Hole** - Hand lever with 5.5mm hole	205
IP66	**IP66 Brake Enclosure** - Brake with IP66 enclosure	205
IR	**Current Sensing Relay** - Fast brake engagement (stopping) without external control equipment	207
MIK	**Micro-Switch** - Brake fitted with a micro-switch for sensing the brake state (released or engaged)	206
NRB1	**Quiet Brake Release** - An o-ring is placed between the coil body and the armature plate for noise reduction	206
NRB2	**Quiet Brake Motor Operation** - An o-ring is placed between the carrier hub & the armature plate to prevent clattering.	206
RG	**Corrosion Protected Brake** - Corrosion protected brake	205
SR	**Dust & Corrosion Protected Brake** - Dust & corrosion protected brake	205

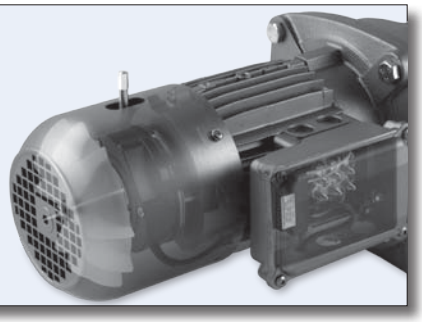
Rectifier Options

Abbreviation	Description	Page
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.	209
G...V	**Sealed Rectifier** - Rectifiers sealed with an electrically safe resin	209
GP...	**High Performance Rectifier** - Improves brake release and stopping times	209
GU...	**Dual Rectifier** - Full/Half-Wave	209
PMG	**High Performance Rectifier** - Improves brake release & stopping times - High current capacity	218
EBRG	**Digital Input Dual Rectifier**	220

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

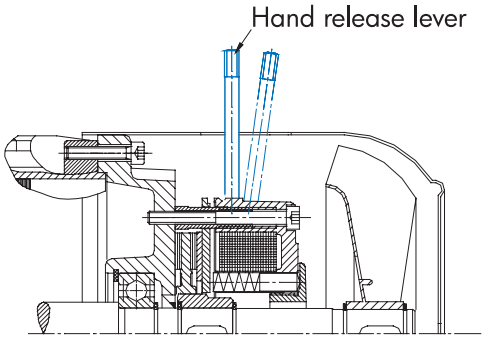
- Dust & Corrosion Prot. Brake
- Locking Hand Release Lever
- 40 Nm Brake Torque
- Brake

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

Hand Release Lever (HL)

Mod

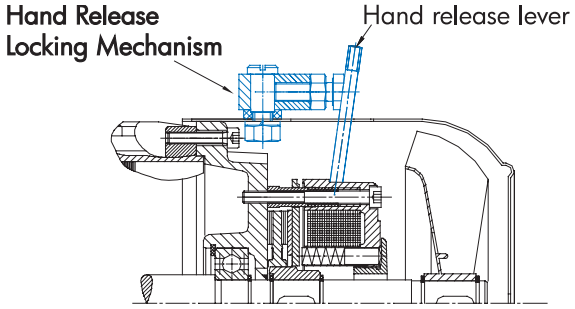
The hand release option allows the brake to be manually released without requiring that the brake be energized with voltage. The lever has a spring return that allows the brake to be hand released and returned automatically to its set position. The hand release lever can be unscrewed for easy removal.



Locking Hand Release Lever (FHL)

Mod

This option allows the brake to be manually released and locked off without requiring voltage to the brake. The lock mechanism prevents the spring from returning the brake to a closed state without manual action by the user. The hand release lever can be unscrewed for easy removal.



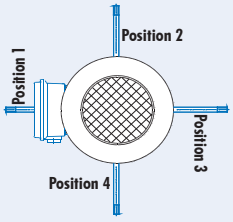
Hand Release Lever With Hole (HLH)

Build

The hand release levers can be provided with a 5.5mm through hole. The hole can be used for attaching external pulling devices such as a cord to release the brake at a distance. This option is available for brake sizes BRE5 to BRE60.

Hand Release Lever Location Required for HL, FHL and HLH

- ❍ Position 1
- ❍ Position 2
- ❍ Position 3
- ❍ Position 4



Corrosion Protected Brake (RG)

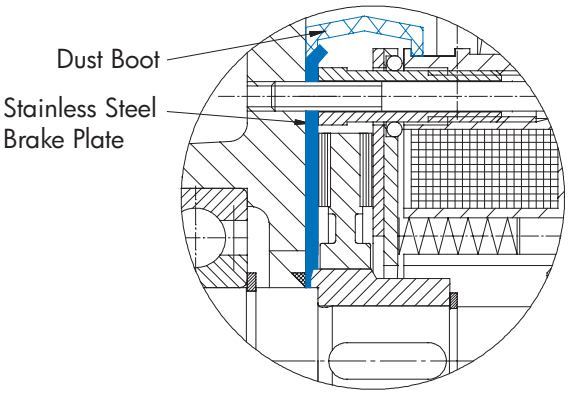
Build

The brake is fitted with a stainless steel brake plate to provide additional corrosion protection in severe and wet environments.

Dust & Corrosion Protected Brake (SR)

Build

A rubber-sealing boot is installed on the brake to provide additional protection in dusty environments. This feature includes the stainless steel brake plate (RG).



IP66 Brake Enclosure (IP66)

Build

A sealed brake with IP66 enclosure protection can also be provided. This brake has a different mechanical housing that provides a higher degree of protection against severe environments.

Brake Heating

Build

Brakes can be provided with a number of different heating systems. Contact NORD to discuss the details of your application

Quiet Brake Release (NRB1)

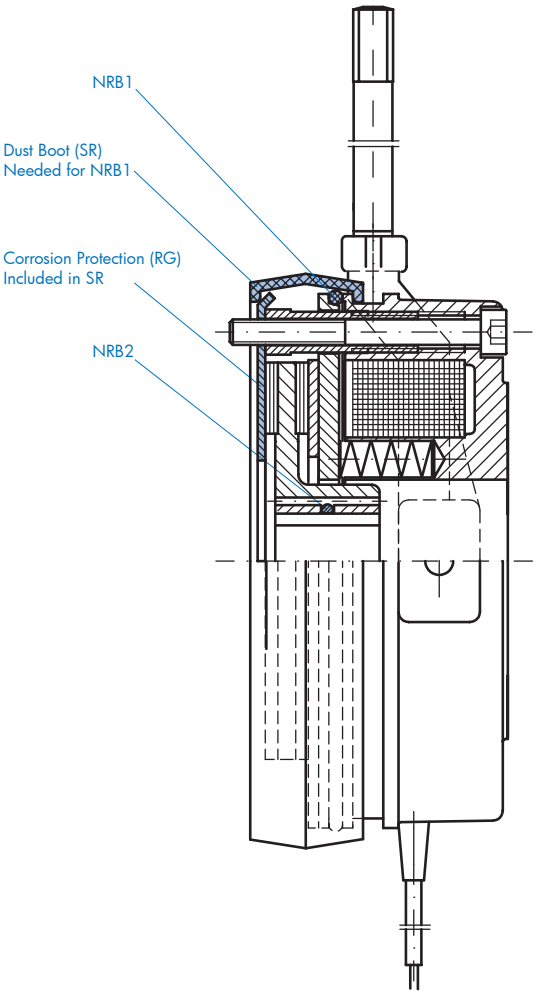
Build

To reduce the noise of the brake release, an o-ring can be placed between the brake coil body and the armature plate (stationary disc). The o-ring dampens the impact caused by the armature plate hitting the brake coil body during the release process. When ordering NRB1, the SR (Dust Boot) option is required. The SR option also includes the RG stainless steel corrosion plate.

Quiet Brake Motor Operation (NRB2)

Build

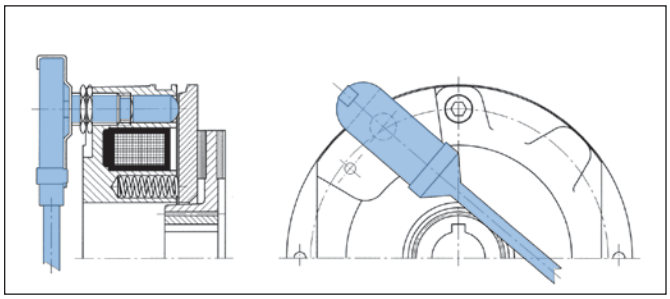
Noise due to vibration in the brake components is possible during motor operation particularly with variable frequency drive or single phase motor operation. To reduce this vibration the brake can be constructed with an o-ring between the brake carrier hub and the brake disc. This o-ring will prevent the clattering caused by the rapid micro speed changes in the motor caused by inverter or single phase operation.



Micro Switch (MIK)

Build

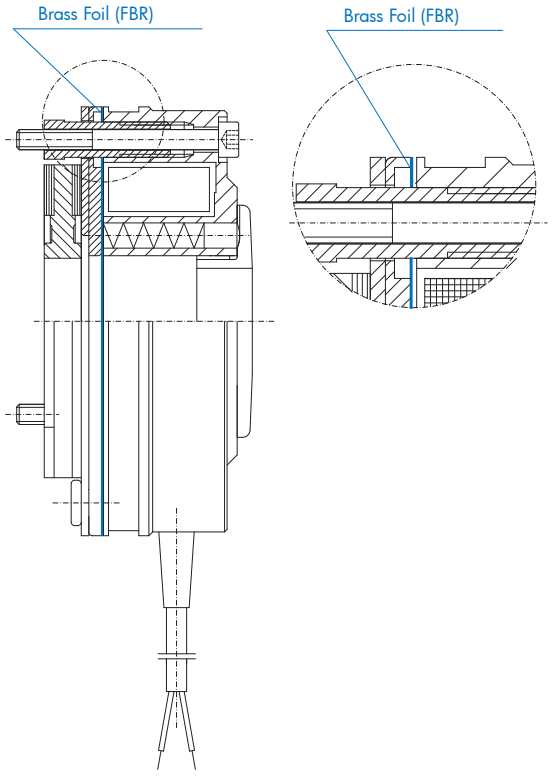
The micro switch monitors the release state of the brake and can be wired into external control circuitry to provide additional safety. The switch can also be used to detect certain brake service problems including excessive brake wear.



Brass Foil (FBR)

Build

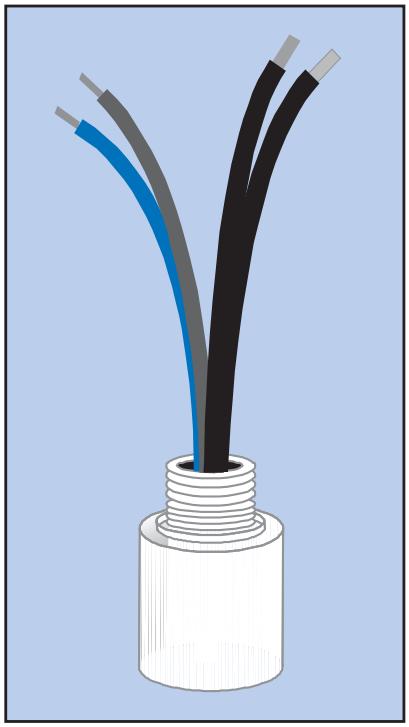
NORD brakes can be fitted with a brass foil in between the armature plate and the brake coil body. The foil acts as a magnetic resistance to weaken the brake coil's magnetic attraction to the armature plate. The weaker magnetic attraction between the armature plate and the brake coil will provide faster brake reaction (stopping) times. The brake release (start) times will be increased. The brass foil is normally used in combination with the fast GP rectifiers in over excitation mode.



Current Sensing Relay (IR)

Mod

The current sensing relay, is used to achieve a fast brake engagement (stopping) without the use of external control equipment or additional wiring. The relay is mounted directly on the conduit box, and is powered from the motor's terminal block. The power leads for the relay replace one of the brass jumper bars on the terminal block of any single speed motor. The switch leads are connected to terminals 3 and 4 of the rectifier. When the power to the motor is shut off, the IR relay opens the brake circuit on the DC side which allows the brake to de-magnetize quickly.



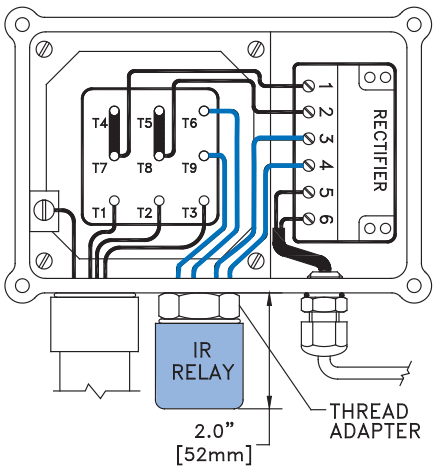
CAUTIONS

Requirements

- Brake must be powered from the motor's terminal block (not seperately powered)
- Motor must be a single speed and should not be powered by a frequency inverter or soft starter.

Ratings

Part number	18556010	18556020
AC Input Current - black/white wires	25AAC 75AAC - 0.2 s	50 AAC 75 AAC - 0.2 s
DC Brake Current - red/blue wires	1.0 ADC	1.0 ADC
Additional Brake Setting Delay	18 ms	18 ms
Ambient Temp.	- 25 to 90 °C - 40 to 167 °F	- 25 to 90 °C - 40 to 167 °F
Enclosure Rating	IP65	IP65



Connection Notes

Rectifier			IR-Relay Wires to Rectifier	
Model Type	Part Number	Design	Red	Blue
GVE20L	1914000	Full-wave	3	4
GHE40L	19141010	Half-wave	4	3
GHE50L	19141020	Half-wave	4	3
GPE20L	19140230	Push-hybrid	4	3
GPE40L	19140240	Push-hybrid	4	3

Conduit Box Thread Adapter

Thread	Motor Frame	Part Number
M20	63-71	18542006*
M25	80-90	18522253
M32	100-132	18522320
M40	160-180	18522400 + 18522253

* Spacer

NORD DRIVESYSTEMS

Double Brakes (DBR)

Build

Some applications require two independent brakes to meet industry safety guidelines.

Double Brakes for Theatrical Applications

Many international standards for braking systems used on theatre hoists mandate the use of brakes that automatically set when power is removed. Redundancy is also required with the system brakes. If one brake fails, the other brake can still operate the system by running independently and parallel to each other. NORD DBR (2xBRE) brake systems are designed to meet these requirements. The NORD double brakes are also designed for quiet operation < 50dB(A).

Some safety standards require that the load brake hold 1.25 times the rated load at test. We recommend selecting the brake for approximately 1.6 to a maximum of 2.0 times the required operating torque for each brake.

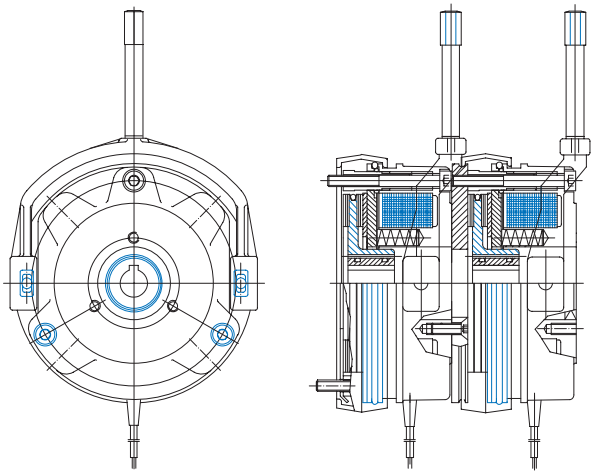
The NORD double theatre brakes do not need to be worn-in and will achieve their full braking toque initially.

Two brake rectifiers are required for operating a double brake systems. These will be provided as loose parts and are normally mounted in the customers control panel.

The double brake option will add motor length compared to the single brake.

CAUTIONS

- NORD recommends delayed operation of one of the brakes. If the brakes are operated simultaneously, the combined torques may result in excessive torque for the gear unit or other mechanical system elements. If the brakes are set at the same time even in an E-stop condition, the gear units must be sized to handle this increased torque.



Motor	Brake	7 Springs		5 Springs		4 Springs	
		[Nm]	[lb-ft]	[Nm]	[lb-ft]	[Nm]	[lb-ft]
63S/L	DBR6	2 x 6	2 x 4.4	2 x 4	2 x 3	2 x 3.5	2 x 2.6
71S/L	DBR6	2 x 6	2 x 4.4	2 x 4	2 x 3	2 x 3.5	2 x 2.6
80S	DBR6	2 x 6	2 x 4.4	2 x 4	2 x 3	2 x 3.5	2 x 2.6
80L	DBR12	2 x 12.5	2 x 9.2	2 x 8.5	2 x 6.3	2 x 7	2 x 5.2
90S	DBR12	2 x 12.5	2 x 9.2	2 x 8.5	2 x 6.3	2 x 7	2 x 5.2
90L	DBR25	2 x 25	2 x 18.4	2 x 17.5	2 x 12.9	2 x 14	2 x 10.3
100L	DBR25	2 x 25	2 x 18.4	2 x 17.5	2 x 12.9	2 x 14	2 x 10.3
100LA/4	DBR50	2 x 50	2 x 37	2 x 35	2 x 26	2 x 28	2 x 20.7
112M	DBR50	2 x 50	2 x 37	2 x 35	2 x 26	2 x 28	2 x 20.7
132S	DBR75	2 x 75	2 x 55	2 x 52	2 x 38	2 x 42	2 x 31
132M	DBR125	2 x 125	2 x 92	2 x 89	2 x 66	2 x 70	2 x 52
160M	DBR187	2 x 187	2 x 138	2 x 132	2 x 97	2 x 107	2 x 79
160L	DBR187	2 x 187	2 x 138	2 x 132	2 x 97	2 x 107	2 x 79
180MX/LX	DBR300	2 x 300	2 x 221	2 x 225	2 x 166	2 x 150	2 x 111
200L	DBR500	2 x 500	2 x 369	2 x 375	2 x 277	2 x 250	2 x 184

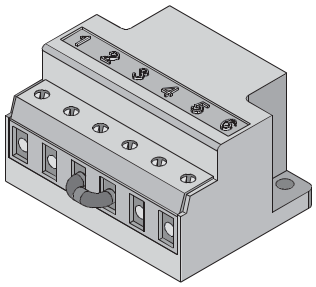
Brake Rectifier Overview

Brake Control Rectifiers

NORD brake control rectifiers convert AC voltage to DC voltage. Rectifiers are used because in many instances AC voltage is used to power the motor, but DC voltage is required to power the brake, and DC power is not typically available. NORD brakemotors typically include a rectifier that is located inside the terminal box. NORD rectifiers can be powered by the motor terminal block, or by a separate power source.

Rectifier Advantages

- Individual power source for each brake.
- Compact size, mounted inside the terminal box.
- Multiple types, voltage options and release/engagement modes available.
- Mountable in a separate control cabinet.
- Integral protection against voltage spikes.



Rectifier Terminals	Description
1, 1a, 1b & 2	Brake Supply AC Voltage
3 & 4	DC-Switching Contact or Jumper
5 & 6	Connection to Brake Coil

Rectifier Nomenclature

G H E 4 0 L

- **Electronic Protection**
  - L = Varnish coated
  - V = Encapsulated
- **Components Current Rating**
  - 0 = 0.5A (75°C)
  - 1 = 1.5A (75°C)
- **Voltage Range**
  - 2 = up to 275VAC input
  - 4 = up to 480VAC input
  - 5 = up to 575VAC input
- **Type of DC Switching**
  - E = External DC-switching (contact)
  - U = Internal DC-switching (voltage)
- **Type of Rectifier**
  - H = Half-wave
  - V = Full-wave (bridge)
  - P = Push-Hybrid (full & half-wave)
  - U = Combo (full & half-wave)
- **Rectifier**

Rectifier Protection

Coated Electronics (G...L)

NORD standard rectifiers are provided with each brake motor (except 24 VDC brakes) unless a sealed or high performance rectifier is specified.

Standard Rectifiers

Nomenclature	Part #	Type	Color
GVE20L	19141000	Full-wave	Black
GHE40L	19141010	Half-wave	Yellow
GHE50L	19141020	Half-wave	Grey

Potted Electronics G...V

NORD offers rectifiers that are sealed with an electrically safe resin to ensure that water and moisture will not pass into the rectifier. Sealed rectifiers have the same brake performance ratings as the standard rectifier and can be beneficial if water is present in the motors terminal box.

Sealed Rectifiers

Nomenclature	Part #	Type	Color
GVE20V	19141030	Full-wave	Black
GHE40V	19141040	Half-wave	Yellow
GHE50V	19141050	Half-wave	Grey
GUE40V	19140300	Full/Half-Wave	Black

Rectifier Types

Full-wave rectifier:

The DC output voltage is 90% of the applied input AC voltage.

Half-wave rectifier:

The DC output voltage is 45% of the applied input AC voltage.

Dual Rectifier (Full/Half Wave):

The GUE rectifier is a "dual" rectifier that is either a full-wave or a half-wave rectifier depending on how it is connected. An advantage for using this rectifier is when using it together with a 205 VDC brake coil, it is able to operate on either a 230 VAC or 460 VAC power connection.

Push-Hybrid rectifier (Full/Half Wave):

These rectifiers are designed to switch from an initial full-wave mode to a final half-wave mode. They include GPE, GPU, and PMG rectifier types and are utilized to improve brake performance by providing faster stopping times or shorter brake release times.

DRIVESYSTEMS

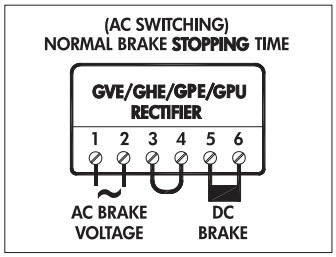
Stopping Methods

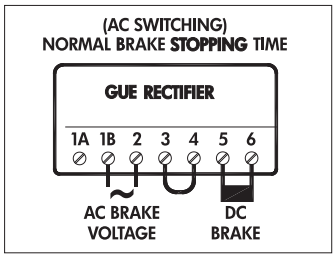
NORD brake rectifiers have the ability to provide different stopping performance. The different performance is achieved by using a different rectifier and/or wiring the rectifier differently. The different methods include:

- **Standard Stopping** (AC Switching)
- **Fast Stopping** (DC Switching)
- **Fast Stopping** (DC Switching via Integrated Voltage Sensing)
- **Very Fast Stopping** (Reduced Power Holding and DC Switching)
- **Very Fast Stopping** (Reduced Power Holding and DC Switching via Integrated Voltage Sensing)

Standard Stopping (AC Switching)

The rectifier can be wired to operate by supplying and removing AC power, commonly called AC switching. The advantage to using AC switching is that the rectifier can be powered directly from the motor's terminal block and no additional wiring is required. However, tapping into the motor's terminal block gives the slower stopping time due to the de-energizing time of the motor's magnetic field. The stopping time can be improved by wiring the rectifier from an external power supply.



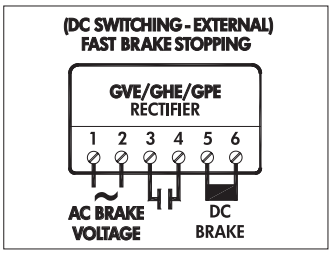


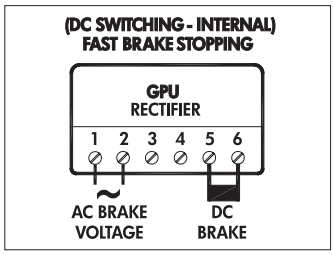
Power Source	Brake Release (start)	Brake engagement (stop)	Braking Method *	Rectifier
Motor Terminal Block	Standard	Standard (AC switching)	10	GVE GHE or GUE
Motor Terminal Block	Fast (Overexcitation)	Standard (AC switching)	30	GPE or PMG 500
Seperate Power Source	Standard	Standard (AC switching)	20	GVE GHE or GUE
Seperate Power Source	Fast (Overexcitation)	Standard (AC switching)	45	GPU or PMG 500

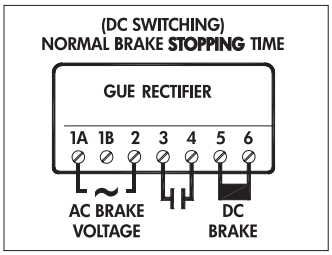
*** Braking methods referenced in connection diagrams on pages 224 - 226.**

Fast Stopping (DC switching)

DC switching directly interrupts the current flow in the DC circuit of the rectifier. This provides much faster stopping, because you do not need to wait for the motor's magnetic field to de-energize. To implement DC switching, a normally open relay must be installed between terminals 3 and 4 on the rectifier for rectifier types GVE, GHE, and GPE. For GPU type rectifiers simply remove the jumper between terminals 3 & 4 to activate DC switching.







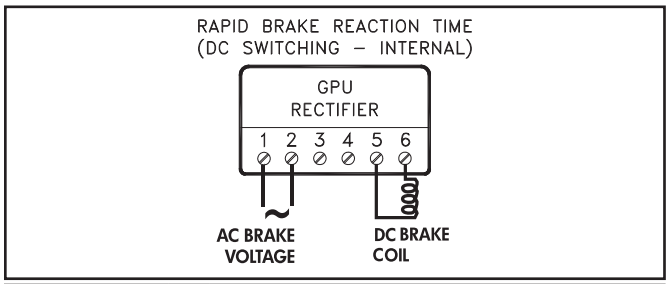
Power Source	Brake Release (start)	Brake engagement (stop)	Braking Method *	Rectifier
Motor Terminal Block	Standard	Fast (DC switching)	15	GVE GHE or GUE
Motor Terminal Block	Fast (Overexcitation)	Fast (DC switching)	35	GPE or PMG 500
Seperate Power Source	Standard	Fast (DC switching)	25	GVE GHE or GUE
Seperate Power Source	Fast (Overexcitation)	Fast (DC switching)	50	GPU or PMG 500

*** Braking methods referenced in connection diagrams on pages 224 - 226.**

Fast Stopping
(DC switching Via Integrated Voltage Sensing)

Our GPU rectifier's integrate DC-Switching by sensing the AC voltage supplied to the rectifier. When no voltage is present the GPU rectifier automatically opens the DC circuit. The GPU rectifier is primarily designed for use with a separate brake power source, such as inverter powered motors, soft-start motors, and two-speed motors.

The GPU rectifier is primarily designed for use with a separate brake power source, such as inverter powered motors, soft-start motors, and two-speed motors.



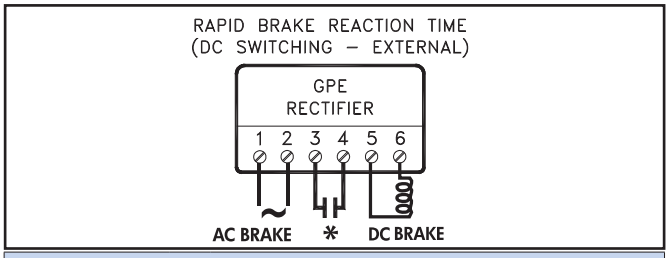
Terminals 1 & 2	-	Brake system connection to AC supply voltage
Terminals 3 & 4	-	No Jumper Connected
Terminals 5 & 6	-	DC Voltage Connection to the brake coil

Power Source	Brake Release (start)	Brake engagement (stop)	Braking Method *	Rectifier
Seperate Power Source	Fast (Overexcitation)	Fast (DC switching)	50	GPU

*** Braking methods referenced in connection diagrams on pages 224 - 226.**

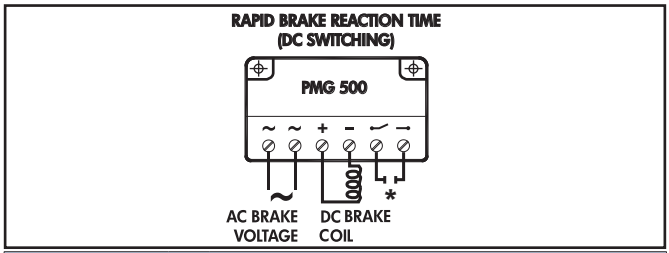
Very Fast Stopping
(DC switching Via Reduced Power Holding)

In reduced power holding, the rectifier initially supplies the rated DC voltage to the brake coil. When voltage is first applied, the rectifier operates as a full-wave rectifier (90% of the applied AC voltage), releasing the brake in the standard time. After the brake is released, the rectifier switches to half-wave mode (45% of the applied DC voltage), weakening the brake's magnetic field. The weaker field will allow the brake to stop more quickly when power is removed. In this method the brake coil is selected as if the brake system is powered by a full-wave rectifier. Therefore, the brake coil's DC-voltage rating should be 90% of the AC voltage applied to the rectifier.



Terminals 1 & 2	-	Brake system connection to AC supply voltage
Terminals 3 & 4	-	Installed Jumper for AC switching or Switch contact (as shown) for DC switching
Terminals 5 & 6	-	DC Voltage Connection to the brake coil

*** The normally open contact/s (NO) is not supplied by NORD. It must close at the same time power is supplied to the brake. The contact must be capable of switching inductive loads and/or be rated IEC AC3.**



Terminals ~ & ~	-	Brake system connection to AC supply voltage
Terminals + & -	-	DC Voltage Connection to the brake coil
Terminals ⌣ & ⇀	-	Installed Jumper for AC switching or Switch contact (as shown) for DC switching

*** The normally open contact/s (NO) is not supplied by NORD. It must close at the same time power is supplied to the brake. The contact must be capable of switching inductive loads and/or be rated IEC AC3.**

Power Source	Brake Release (start)	Brake engagement (stop)	Braking Method *	Rectifier
Motor Terminal Block	Standard	Very Fast (Reduced Power Holding)	40	GPE or PMG 500
Seperate Power Source	Standard	Very Fast (Reduced Power Holding)	55	GPU or PMG 500

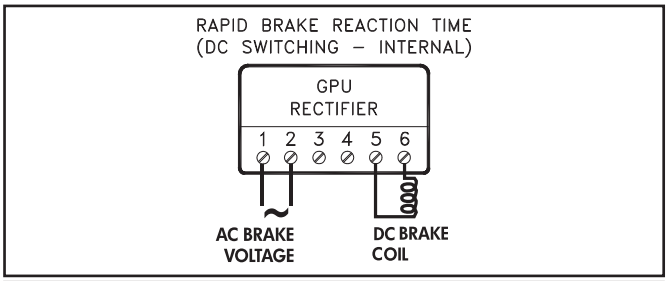
*** Braking methods referenced in connection diagrams on pages 224 - 226.**

DRIVESYSTEMS

Very Fast Stopping
(DC switching Via Reduced Power Holding & Integrated Voltage Sensing)

In reduced power holding, the rectifier initially supplies the rated DC voltage to the brake coil. When voltage is first applied, the rectifier operates as a full-wave rectifier (90% of the applied AC voltage), releasing the brake in the standard time. After the brake is released, the rectifier switches to half-wave mode (45% of the applied DC voltage), weakening the brake's magnetic field. The weaker field will allow the brake to stop more quickly when power is removed. In this method the brake coil is selected as if the brake system is powered by a full-wave rectifier. Therefore, the brake coil's DC-voltage rating should be 90% of the AC voltage applied to the rectifier.

These GPU rectifier s integrate DC-Switching, which is triggered by sensing the AC voltage supplied to the rectifier. When no voltage is present the GPU rectifier automatically opens the DC circuit. The GPU rectifier is primarily designed for use with a separate brake power source, such as inverter powered motors, soft-start motors, and two-speed motors.



Terminals 1 & 2	-	Brake system connection to AC supply voltage
Terminals 3 & 4	-	No Jumper Connected
Terminals 5 & 6	-	DC Voltage Connection to the brake coil

Power Source	Brake Release (start)	Brake engagement (stop)	Braking Method *	Rectifier
Seperate Power Source	Standard	Very Fast (Reduced Power Holding)	55	GPU

*** Braking methods referenced in connection diagrams on pages 224 - 226.**

Release Methods (Motor Starting)

NORD brake rectifiers can provide different types of release performance. The difference in performance is achieved by using a different rectifier and/or wiring the rectifier differently. The different methods include:

- Standard Brake Release (Constant Voltage)
- Fast Brake Release (Overexcitation)

Standard Brake Release (Constant Voltage)

For the standard brake release method the DC Brake coil is supplied by a constant rated DC voltage to magnetize the brake coil and release the brake. Typically the DC brake voltage is supplied via a brake rectifier. The brake rectifier converts AC supply voltage to DC output voltage to power the brake. NORD can supply rectifiers that are either full-wave or half-wave designs. The brake is released by supplying the rectifier with AC voltage which in turn supplies the brake coil with the needed DC voltage.

Example

Full-Wave

System voltage:	230 VAC
Brake coil:	205 VDC

Half-Wave

System voltage:	460 VDC
Brake coil:	205 VDC

Fast Brake Release (Overexcitation)

In overexcitation the rectifier initially over-voltages the brake coil. This overexcitation of the rectifier produces a magnetic field in the brake coil that is stronger than normal, releasing the brake much more quickly. The rectifier is then switched over to a lower holding voltage so as not to thermally overload the brake coil. In this method the brake coil is selected as if the brake system is powered by a half-wave rectifier. Therefore, the brake coil's DC-voltage rating should be 45% of the AC voltage applied to the rectifier. This type of brake control is also called "Voltage Forcing" and "Supercharging."

Example

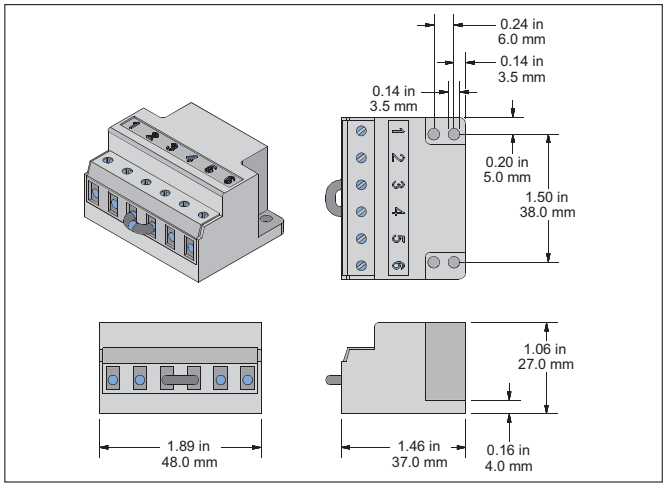
System voltage:	230 VAC
Brake coil:	105 VDC
Initial brake release voltage:	205 VDC
Holding brake voltage:	105 VDC

Full-Wave Rectifiers (GVE)

Full-Wave Rectifiers (GVE)

Our Full-Wave rectifiers' DC output voltage is 90% of the applied input AC voltage.

GVE Rectifier Dimensions



IMPORTANT NOTE

If the motor is connected to a frequency inverter, soft start, or is a two-speed motor, the AC power must be supplied to the brake rectifier seperately from the motor power.

Ratings & Part Numbers

Model Type	GVE20L	GVE20V
Part Number	19141000	19141030
Protection (electronics)	Coated	Encapsulated
Color	Black	
Input Voltage (V_{AC})	110-275 +/- 10% V_{AC}	
Output Voltage (V_{DC})	(V_{DC} =0.90 x V_{AC})	
Rated Current @ 40°C	2.0 A	
Rated Current @ 75°C	1.0 A	
Temperature Range	-20 °C to 75 °C	
DC-Switching via	External Contact or IR Relay	

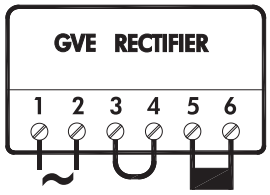
Braking Method

Braking Method	Break Release (Start)	Brake Engage (Stop)	Power Source
10	Standard	Standard (AC-Switching)	Motor terminals
15	Standard	Fast (DC-switching)	Motor terminals
20	Standard	Standard (AC-Switching)	Separate power
25	Standard	Fast (DC-switching)	Separate power

Basic Connection (AC & DC Switching)

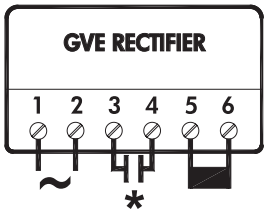
The GVE brake system can be connected for standard stopping (AC-Switching) or fast stopping (DC-Switching).

STANDARD STOPPING AC-SWITCHING



1 & 2	3 & 4	5 & 6
AC BRAKE VOLTAGE	JUMPER	DC BRAKE

FAST STOPPING DC-SWITCHING



1 & 2	3 & 4	5 & 6
AC BRAKE VOLTAGE	NORMALLY OPEN CONTACT	DC BRAKE

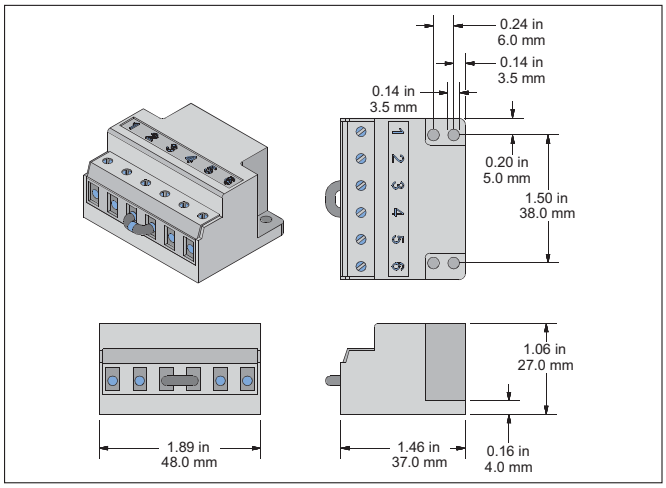
* The normally open contact/s (NO) is not supplied by NORD it must close at the same time power is supplied to the brake. The contact must be capable of switching inductive loads and/or be rated at IEC AC3.

BRAKES

Half-Wave Rectifiers (GHE)

Our Half-Wave rectifiers' DC output voltage is 45% of the applied input AC voltage.

GHE Rectifier Dimensions



IMPORTANT NOTE

If the motor is connected to a frequency inverter, soft start, or is a two-speed motor, the AC power must be supplied to the brake rectifier seperately from the motor power.

Ratings & Part Numbers

Model Type	GHE40L	GHE40V
Part Number	19141010	19141040
Protection (electronics)	Coated	Encapsulated
Color	Yellow	
Input Voltage (V_{AC})	230-480V_{AC} +/- 10%	
Output Voltage (V_{DC})	(V_{DC}=0.45 x V_{AC})	
Rated Current @ 40°C	2.0A_{DC}	
Rated Current at 75°C	1.0A_{DC}	
Temperature Range	-20°C to 75°C	
DC-Switching via	External Contact	

Model Type	GHE50L	GHE50V
Part Number	19141020	19141050
Protection (electronics)	Coated	Encapsulated
Color	Grey	
Input Voltage (V_{AC})	230-480V_{AC} +/- 10%	
Output Voltage (V_{DC})	(V_{DC}=0.45 x V_{AC})	
Rated Current @ 40°C	2.0A_{DC}	
Rated Current @ 75°C	1.0A_{DC}	
Temperature Range	-20°C to 75°C	
DC-Switching via	External Contact or IR Relay	

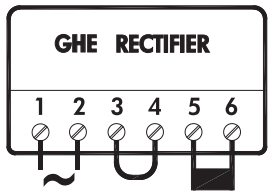
Braking Method

Braking Method	Break Release (Start)	Brake Engage (Stop)	Power Source
10	Standard	Standard (AC-Switching)	Motor terminals
15	Standard	Fast (DC-switching)	Motor terminals
20	Standard	Standard (AC-Switching)	Separate power
25	Standard	Fast (DC-switching)	Separate power

Basic Connection (AC & DC Switching)

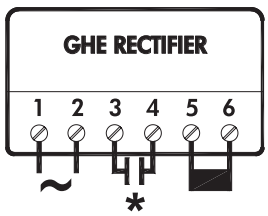
The GVE brake system can be connected for standard stopping (AC-Switching) or fast stopping (DC-Switching)

STANDARD STOPPING AC-SWITCHING



1 & 2	3 & 4	5 & 6
AC BRAKE VOLTAGE	JUMPER	DC BRAKE

FAST STOPPING DC-SWITCHING



1 & 2	3 & 4	5 & 6
AC BRAKE VOLTAGE	NORMALLY OPEN CONTACT	DC BRAKE

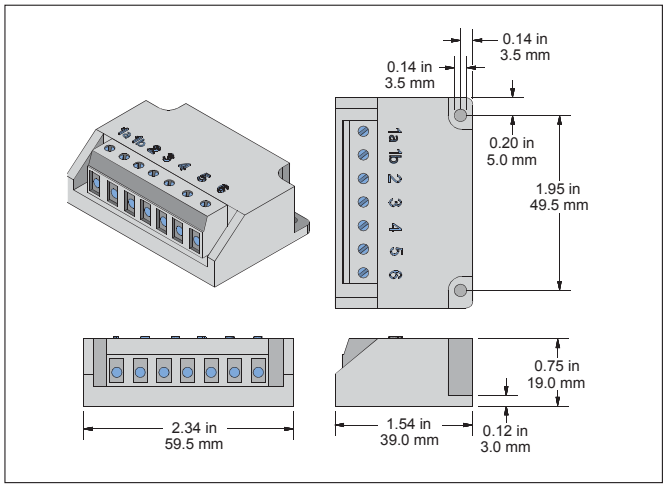
* The normally open contact/s (NO) is not supplied by NORD it must close at the same time power is supplied to the brake. The contact must be capable of switching inductive loads and/or be rated at IEC AC3.

Dual-Wave Rectifiers (GUE)

Dual-Wave Rectifiers (GUE)

The GUE rectifier is a "dual" rectifier that is either a full-wave or a half-wave rectifier depending on how it is connected. An advantage for using this rectifier is when using it together with a 205VDC brake coil, it is able to operate on either a 230 VAC or 460VAC power connection.

GUE Rectifier Dimensions



IMPORTANT NOTE

If the motor is connected to a frequency inverter, soft start, or is a two-speed motor, the AC power must be supplied to the brake rectifier seperately from the motor power.

Ratings & Part Numbers

Model Type	GUE40V
Part Number	19140300
Protection (electronics)	Coated
Color	Black
Input Voltage (V_{AC})	230-460V_{AC} +/- 10%
Output Voltage (V_{DC})	(V_{DC}=0.45 x V_{AC}) - As Steady State (V_{DC}=0.90 x V_{AC}) - As Initial State
Rated Current @ 40°C	0.7 A
Rated Current @ 75°C	0.5 A
Temperature Range	-20°C to 75°C
DC-Switching via	External Contact or IR Relay

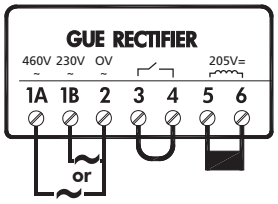
Braking Method

Braking Method	Break Release (Start)	Brake Engage (Stop)	Power Source
10	Standard	Standard (AC-Switching)	Motor terminals
15	Standard	Fast (DC-switching)	Motor terminals
20	Standard	Standard (AC-Switching)	Separate power
25	Standard	Fast (DC-switching)	Separate power

Basic Connection (AC & DC Switching)

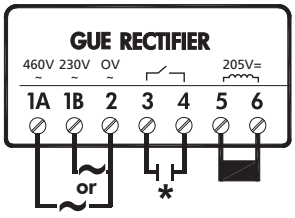
The GUE brake system can be connected for standard stopping (AC-Switching) or fast stopping (DC-Switching)

STANDARD STOPPING AC-SWITCHING



1B & 2	3 & 4	5 & 6
AC BRAKE VOLTAGE	JUMPER	DC BRAKE

FAST STOPPING DC-SWITCHING



1 & 2	3 & 4	5 & 6
AC BRAKE VOLTAGE	NORMALLY OPEN CONTACT	DC BRAKE

* The normally open contact/s (NO) is not supplied by NORD it must close at the same time power is supplied to the brake. The contact must be capable of switching inductive loads and/or be rated at IEC AC3.

BRAKES

Push-Hybrid Rectifiers External DC Switching (GPE)

Push-Hybrid Rectifiers External DC Switching (GPE)

Like the standard NORD brake control rectifiers, NORD's fast acting brake control rectifiers convert AC voltage to DC voltage. The "Fast Acting Brake Rectifiers"are utilized to improve brake performance and are often recommended in order to provide shorter brake release times or to provide faster stopping times.

All of the fast acting rectifiers are a two-stage "push" design meaning that when power is first applied these rectifiers operate like a full-wave rectifier and then after a relatively short period of time they act like a half-wave rectifier. For example, the GPE type rectifiers start out in full-wave mode when power is first applied and then after approximately 250 ms they act like a half-wave rectifiers.

GPE rectifiers were designed for external control of the brake's DC-switching. Primarily used in across-the-line applications where the brake power is supplied by the motor terminals and may also be used in situations where the brake power is supplied separate from the motor.

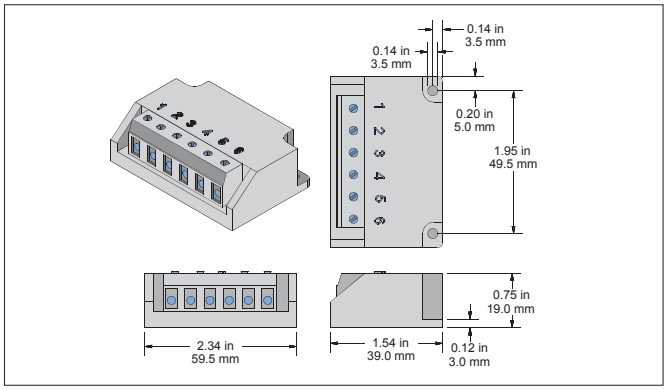
There are two ways to apply the fast acting rectifiers:

- The first method, known as "Overexcitation," provides fast brake release. The brake coil is selected like a half-wave system (45% of the AC supply voltage).
- The second method, known as "Reduced Power Holding," provides very fast brake stopping. The brake coil is selected like a full-wave system (90% of the AC supply voltage).

IMPORTANT NOTE

If the motor is connected to a frequency inverter, soft start, or is a two-speed motor, the AC power must be supplied to the brake rectifier seperately from the motor power.

GPE Rectifier Dimensions



Ratings & Part Numbers

Model Type	GPE20L	GPE40L
Part Number	19140230	19140240
Protection (electronics)	Coated	Coated
Color	Black	
Input Voltage (V_{AC})	200V-275V	380V-480V
Output Voltage (V_{DC})	(V_{DC} =0.90 x V_{AC}) - As Initial State (V_{DC} =0.45 x V_{AC}) - As Steady State	
Rated Current @ 40°C	0.7 A	1.0A
Rated Current @ 75°C	0.5 A	0.5A
Temperature Range	-20°C to 75°C	
DC-Switching via	External Contact or IR Relay	

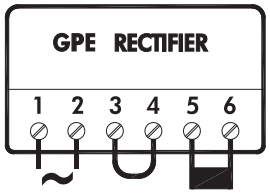
Braking Method

Braking Method	Break Release (Start)	Brake Engage (Stop)	Power Source
40	Standard	Very Fast (Reduced Power Holding)	Motor terminals
30	Fast (Overecitation)	Standard (AC Switching)	Motor terminals
35	Fast (Overecitation)	Fast (DC Switching)	Motor terminals

Basic Connection (AC & DC Switching)

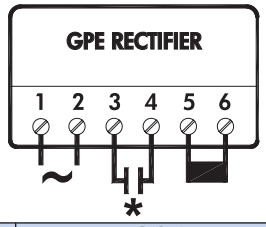
The GPE brake system can be connected for standard stopping (AC-Switching), fast stopping (DC-Switching) and very fast stopping (Reduced power holding & DC-Switching). Fast brake release can also be achieved by selecting a different brake coil combination.

STANDARD STOPPING (AC-SWITCHING)



1 & 2	3 & 4	5 & 6
AC BRAKE VOLTAGE	JUMPER	DC BRAKE

FAST & VERY FAST STOPPING (DC-SWITCHING)



1 & 2	3 & 4	5 & 6
AC BRAKE VOLTAGE	NORMALLY OPEN CONTACT	DC BRAKE

* The normally open contact/s (NO) is not supplied by NORD it must close at the same time power is supplied to the brake. The contact must be capable of switching inductive loads and/or be rated at IEC AC3.

Push-Hybrid Rectifiers
External DC Switching (PMG)

NORD DRIVESYSTEMS

Push-Hybrid Rectifiers
External DC Switching (PMG)

Like the standard NORD brake control rectifiers, NORD's fast acting brake control rectifiers convert AC voltage to DC voltage. The "Fast Acting Brake Rectifiers"are utilized to improve brake performance and are often recommended in order to provide shorter brake release times or to provide faster stopping times.

All of the fast acting rectifiers are a two-stage "push" design meaning that when power is first applied these rectifiers operate like a full-wave rectifier and then after a relatively short period of time they act like a half-wave rectifier. For example, the PMG type rectifiers start out in full-wave mode when power is first applied and then after approximately 250 ms they act like a half-wave rectifiers.

PMG rectifiers were designed for external control of the brake's DC-switching. Primarily used in across-the-line applications where the brake power is supplied by the motor terminals and may also be used in situations where the brake power is supplied separate from the motor.

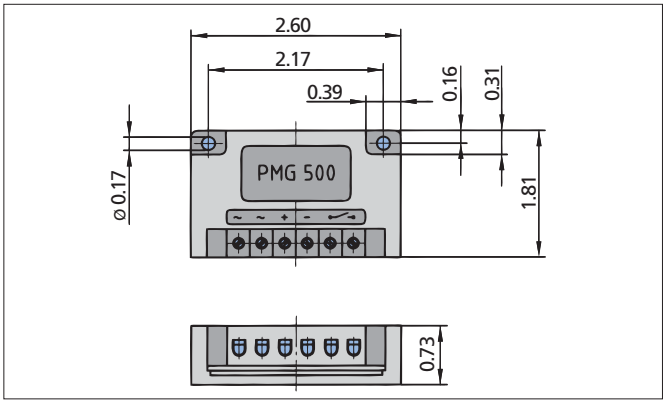
There are two ways to apply the fast acting rectifiers:

- The first method, known as "Overexcitation," provides fast brake release. The brake coil is selected like a half-wave system (45% of the AC supply voltage).
- The second method, known as "Reduced Power Holding," provides very fast brake stopping. The brake coil is selected like a full-wave system (90% of the AC supply voltage).

IMPORTANT NOTE

If the motor is connected to a frequency inverter, soft start, or is a two-speed motor, the AC power must be supplied to the brake rectifier seperately from the motor power.

PMG Rectifier Dimensions



Ratings & Part Numbers

Model Type	PMG 500
Part Number	19140200
Protection (electronics)	Coated
Color	Black
Input Voltage (V_{AC})	200-500V_{AC} +/- 10%
Output Voltage (V_{DC})	(V_{DC}=0.90 x V_{AC}) - As Initial State (V_{DC}=0.45 x V_{AC}) - As Steady State
Rated Current @ 40°C	0.4 A
Rated Current @ 75°C	2.8 A
Temperature Range	-15°C to 80°C
DC-Switching via	External Contact

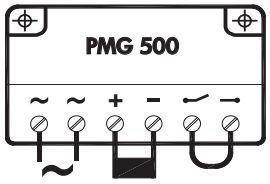
Braking Method

Braking Method	Break Release (Start)	Brake Engage (Stop)	Power Source
40	Standard	Very Fast (Reduced Power Holding)	Motor terminals
30	Fast (Overecitation)	Standard (AC Switching)	Motor terminals
35	Fast (Overecitation)	Fast (DC Switching)	Motor terminals
55	Standard	Very Fast (Reduced Power Holding)	Seperate power
45	Fast (Overecitation)	Standard (AC Switching)	Seperate power
50	Fast (Overecitation)	Fast (DC Switching)	Seperate power

Basic Connection (AC & DC Switching)

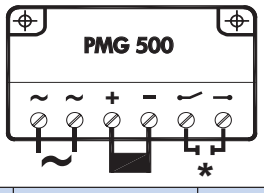
The PMG brake system can be connected for standard stopping (AC-Switching), fast stopping (DC-Switching) and very fast stopping (Reduced power holding & DC-Switching). Fast brake release can also be achieved by selecting a different brake coil combination.

STANDARD STOPPING (AC-SWITCHING)



~ & ~	+ & -	⏦ & ⊸
AC BRAKE VOLTAGE	DC BRAKE	JUMPER

FAST & VERY FAST STOPPING (DC-SWITCHING)



~ & ~	+ & -	⏦ & ⊸
AC BRAKE VOLTAGE	DC BRAKE	NORMALLY OPEN CONTACT

* The normally open contact/s (NO) is not supplied by NORD it must close at the same time power is supplied to the brake. The contact must be capable of switching inductive loads and/or be rated at IEC AC3.

BRAKES

Push-Hybrid Rectifiers
Integrated DC Switching (GPU)

Push-Hybrid Rectifiers
Integrated DC Switching (GPU)

Like the standard NORD brake control rectifiers, NORD's fast acting brake control rectifiers convert AC voltage to DC voltage. The "Fast Acting Brake Rectifiers"are utilized to improve brake performance and are often recommended in order to provide shorter brake release times or to provide faster stopping times.

The GPU fast acting rectifiers are a two-stage "push" design meaning that when power is first applied these rectifiers operate like a full-wave rectifier and then after a relatively short period of time they act like a half-wave rectifier. For example, the GPU type rectifiers start out in full-wave mode when power is first applied and then after approximately 250 ms they act like a half-wave rectifiers.

GPU rectifiers were designed for integrated control of the brake's DC-switching and for voltage sensing. Primarily used in applications where the brake power is supplied by the motor terminals and includes applications that involve two-speed motors and motors that are powered by an inverter or soft-starter..

There are two ways to apply the fast acting rectifiers:

- The first method, known as "Overexcitation," provides fast brake release. The brake coil is selected like a half-wave system (45% of the AC supply voltage).
- The second method, known as "Reduced Power Holding," provides very fast brake stopping. The brake coil is selected like a full-wave system (90% of the AC supply voltage).

IMPORTANT NOTE

The GPU rectifier may also be utilized for across-the-line applications; however it must always be powered separate from the motor and have its own pair of contactors or starters. It is unadvisable to use the motor terminal block to supply the GPU rectifier's AC power due to the motor's slow energy dissipation when switched off.

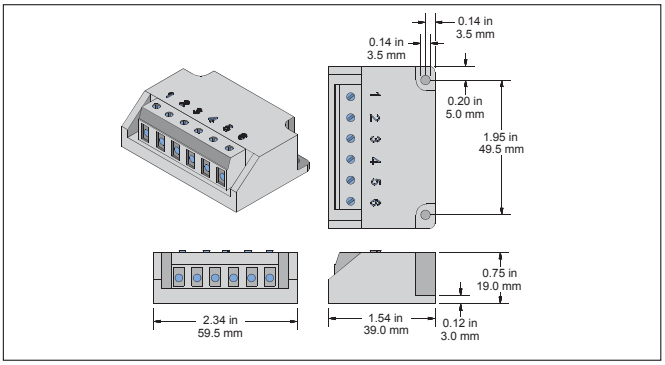
IMPORTANT NOTE

If the motor is connected to a frequency inverter, soft start, or is a two-speed motor, the AC power must be supplied to the brake rectifier seperately from the motor power.

Braking Method

Braking Method	Break Release (Start)	Brake Engage (Stop)	Power Source
55	Standard	Very Fast (Reduced Power Holding)	Seperate power
45	Fast (Overecitation)	Standard (AC Switching)	Seperate power
50	Fast (Overecitation)	Fast (DC Switching)	Seperate power

GPU Rectifier Dimensions



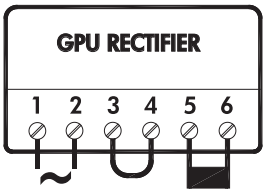
Ratings & Part Numbers

Model Type	GPU20L	GPU40L
Part Number	19140090	19140170
Protection (electronics)	Coated	Coated
Color	Black	
Input Voltage (V_{AC})	200V-275V	380V-480V
Output Voltage (V_{DC})	(V_{DC}=0.90 x V_{AC}) - Initial State (V_{DC}=0.45 x V_{AC}) - Steady State	
Rated Current @ 40°C	0.7A	1.0A
Rated Current @ 75°C	0.5A	0.5A
Temperature Range	-20°C to 75°C	
DC-Switching via	Internal Activation	

Basic Connection (AC & DC Switching)

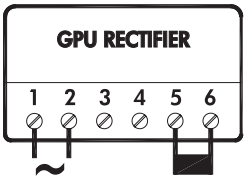
The GPU brake system can be connected for standard stopping (AC-Switching), fast stopping (DC-Switching) and very fast stopping (Reduced power holding & DC-Switching). Fast brake release can also be achieved by selecting a different brake coil combination.

STANDARD STOPPING AC-SWITCHING



1 & 2	3 & 4	5 & 6
AC BRAKE VOLTAGE	JUMPER	DC BRAKE

FAST & VERY FAST STOPPING DC-SWITCHING



1 & 2	3 & 4	5 & 6
AC BRAKE VOLTAGE	-	DC BRAKE

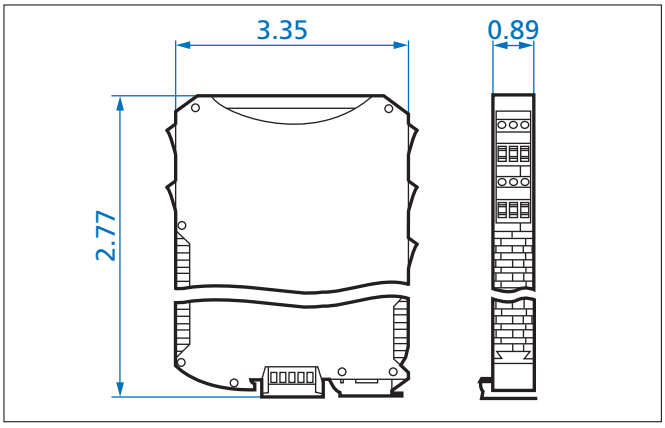
Digital Input
Dual Wave Rectifiers (EBGR)

Digital Input Activated Dual Full & Half Wave Rectifiers (EBGR)

The EGBR-1 provides brake control by an internal 24VDC signal or contact closure. This allows the motor brake to be easily operated by an external controller like a PLC or an AC drive without the need for a piloting relay. The rectifier can be connected as either a full-wave or half-wave brake power source, similar to the GUE rectifier. The EBGR module also provides status notification to an external device like a PLC. The device is designed for DIN rail mounting.

The module must be supplied with 24VDC power connected to terminal 44 and control ground to terminal 40 for proper operation. The terminals 44 and 40 are bridged to terminal 44 and 40 on the opposite side of the rectifier. This power is the source for the digital output used as an acknowledgement to a supervisory device (PLC or Drive). The digital input controls both the on/off state of the brake coil power, acknowledging the digital output. In the event that the brake coil becomes detached the acknowledgement will not function, indicating a problem with the brake or wiring.

EBGR Rectifier Dimensions



Ratings & Part Numbers

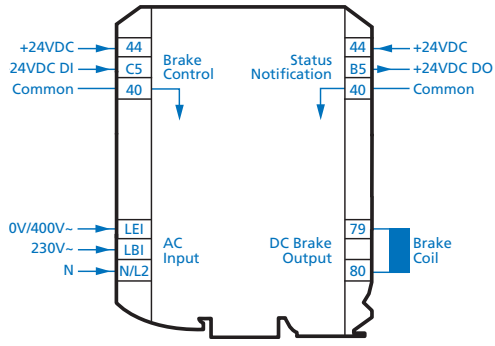
Model Type	EBGR
Part Number	19140990
Protection (electronics)	IP20
Input Voltage (V_{AC})	100-275V +/- 10% as Initial State
	380 - 500V +/- 10% as Steady State
Output Voltage (V_{DC})	(V_{DC}=0.90 x V_{AC}) - As Initial State
	(V_{DC}=0.45 x V_{AC}) - As Steady State
Rated Current @ 40°C	0.7A
Rated Current @ 75°C	0.5A
Temperature Range	-20°C to 75°C
DC-Switching via	

Braking Method

Braking Method	Break Release (Start)	Brake engage (Stop)	Power source
25	Standard	Fast (DC-switching)	Separate power

Basic Connection (AC & DC Switching)

The EBGR rectifiers can be wired for either standard engagement (AC-Switching) or fast engagement (DC-Switching) switching the AC power source (input) or the DC voltage supply (output).



Description	Terminal	Position Description
24VDC power supply input bridged to output	44	1 Top Layer
Digital input used to control DC brake coil	C5	
Common reference signal ground DC	40	
AC main power Half-wave rectifier input 380-500VAC	LE1	2 Top Layer
AC main power Full-wave rectifier input 100-275VAC	LB1	
Neutral or line 2 common AC connection	N/L2	
Common 24VDC power supply from input side	44	3 Bottom Layer
Digital output DC brake coil acknowledgement	85	
Common DC reference signal ground	40	
DC brake coil connection Plus +	79	4 Bottom Layer
No connect	-	
DC brake coil connection minus -	80	

CAUTION

Be sure not to connect higher voltage AC mains to the DC rated terminals as this will result in damage to the unit. AC terminals include numbers and the DC terminals are all numbers only. Follow UL standards for protection.

Terminals	Screw type	Terminal blocks
Cable cross section	0.2 to 2.5mm	12-30 AWG
PE connection	Grounded through DIN rail	Snap on rail must be grounded.

Main Line Voltage	Brake Coil Voltage	Terminal Number
230 VAC	205 VDC	LB1 + N/L2
400 VAC	180 VDC	LE1 + N/L2
460 VAC	205 VDC	LE1 + N/L2

Standard Brake Components

Standard brake components will be provided if no brake components are specified by the customer.

Motor Voltage 230/460V-60Hz (208-230/460V) (YY/Y)

Brake Sizes	BRE5-BRE400	BRE800-BRE1200
Brake Coil Voltage	205VDC	No standard – must be specified
Rectifier	GVE20L – full-wave	PMG500
Brake AC Supply	230VAC	No standard – must be specified

Notes – The 230VAC standard brake can be used on either motor voltage connection (230V or 460V) when the motor is powered directly with line power and the brake voltage is provided by the motor terminals. When the brake is separately powered, like inverter operation, the brake AC voltage should match the motor connected voltage 230VAC or 460VAC. A 460VAC brake requires a different rectifier to be specified.

Motor Voltage 460/800V-60Hz (Δ/Y)

Brake Sizes	BRE5-BRE400	BRE800-BRE1200
Brake Coil Voltage	205VDC	205VDC
Rectifier	GHE40L – half-wave	PMG500
Brake AC Supply	460VAC	460VAC

Motor Voltage 332/575V-60Hz (Δ/Y)

Brake Sizes	BRE5-BRE400	BRE400-BRE1200
Brake Coil Voltage	250VDC	No standard – must be specified
Rectifier	GHE50L – half-wave	No standard – must be specified
Brake AC Supply	575VAC	No standard – must be specified

Motor Voltage 208/360V-60Hz (Δ/Y)

Brake Sizes	BRE5-BRE400	BRE800-BRE1200
Brake Coil Voltage	180VDC	No standard – must be specified
Rectifier	GVE20L –full-wave	PMG500
Brake AC Supply	208VAC	No standard – must be specified

Motor Voltage 230/400V-50Hz (220-240/380-420V) (Δ/Y)

Brake Sizes	BRE5-BRE400	BRE800-BRE1200
Brake Coil Voltage	205VDC	No standard – must be specified
Rectifier	GVE20L – full-wave	PMG500
Brake AC Supply	230VAC	No standard – must be specified

Motor Voltage 400/690-50Hz (380-420/660-720V) (Δ/Y)

Brake Sizes	BRE5-BRE400	BRE800-BRE1200
Brake Coil Voltage	180VDC	No standard – must be specified
Rectifier	GHE40L – half-wave	No standard – must be specified
Brake AC Supply	400VAC	No standard – must be specified

Brake Performance Data

Brake Size		BRE5	BRE10	BRE20	BRE40	BRE60	BRE100	BRE150	BRE250	BRE400	BRE800*	BRE1200*
Brake torque – max	[lb-ft]	3.7	7.4	15	30	44	74	110	185	295	590	1180
	[lb-in]	44	89	177	354	531	885	1330	2200	3500	7100	10600
	[Nm]	5	10	20	40	60	100	150	250	400	800	1200
Power coil P	[W]	22	28	39	42	50	75	76	100	140	140	140
Nominal air gap	[in]	0.008	0.008	0.008	0.012	0.012	0.016	0.020	0.020	0.020	0.024	0.024
	[mm]	0.2	0.2	0.2	0.3	0.3	0.4	0.5	0.5	0.5	0.6	0.6
Maximum air gap (re-adjust) a	[in]	0.024	0.013	n/a	0.035	0.039	0.043	0.043	0.047	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	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	0.138
	[mm]	3	3	1	3	3.5	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	0.650
	[mm]	4.5	5.5	7.5	9.5	11.5	12.5	14.5	14.5	16.5	16.5	16.5
Max work per cycle W	[Jx10^3]	3	6	12	25	35	50	75	105	150	112	112
Work until re-adjust W	[Jx10^7]	5	12	20	35	60	125	200	340	420	420	210
Heat load per cycle	[J/s]	80	100	130	160	200	250	300	350	400	600	600
Release time (start) t	[ms]	35	45	70	80	120	160	200	220	230	400	450
Release time (start) t	[ms]	15	15	28	28	75	110	110	n/a	n/a	n/a	n/a
Setting time (stop) t	[ms]	70	95	140	175	210	280	350	500	800	1000	600
Setting time (stop) t	[ms]	30	45	30	75	90	120	150	180	200	250	180
Setting time (stop) t	[ms]	5	6	11	12	12	13	17	24	n/a	n/a	n/a
IR relay delay (stop) t	[ms]	18	18	18	18	18	18	18	18	18	n/a	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	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	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	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	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	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	5.9

*** Holding Brakes with emergency-stop properties - switched with fast acting brake rectifier**

Brake Calculations

Brake Size Calculation

Torque and inertias below are based on the motor speed. Load side torques must always be divided by the gear reduction ratio. Inertias must be divided by the *square* of the gear ratio. You must also consider any external reduction ratio outside the gearbox.

Selection for holding loads (static)

$$T_{req} = T_{stat} = T_{load} \times K$$

Selection for stopping loads (static + dynamic)

$$\sum J = J_{motor} + \frac{J_{load}}{i^2}$$

Typically other inertias, like the gearbox, can be ignored.

$$T_{dyn} = \frac{\sum J \times n}{25.7 \times t}$$

$$T_{req} = (T_{dyn} \pm T_{load}) \times K$$

For driving loads use: $-T_{load}$
For overhauling loads use: $+T_{load}$

Brake Work Verification

$$W = \frac{\sum J \times n^2}{5880} \times \frac{T_B}{T_B \pm T_{load}} \Rightarrow W \leq W_{max}$$

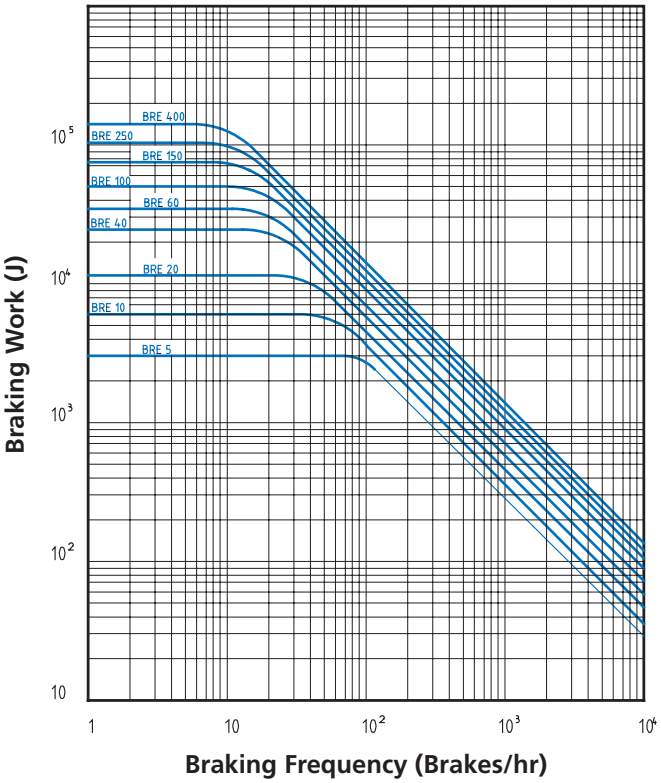
For driving loads use: $+T_{load}$
For overhauling loads use: $-T_{load}$

The permissible values for W_{max} (Friction work) depend on the stopping frequency. See diagram at right.

In applications where the brake is operated frequently, two brake work values should be evaluated to ensure adequate brake life: the braking work compared to the braking frequency and the maximum work limit for a single operation, such as an E-stop. Reviewing these two values will help determine the optimal solution and ensure long brake life.

Abbreviation Key

c/h	=	Number of brakes per hour
J [lb-ft²]	=	Inertia
J_{motor} [lb-ft²]	=	Motor inertia
i	=	System reduction ratio
K	=	Safety factors. Based on application and according to industry rules and practices Hoisting >2 Hoisting with people >2..3 Travel drives 0.5 to 1.5
T_B [lb-in]	=	Brake torque
T_{dyn} [lb-in]	=	Dynamic torque
T_{req} [lb-in]	=	Required brake torque
T_{load} [lb-in]	=	Load torque
T_{stat} [lb-in]	=	Static torque
n [rpm]	=	Motor speed
t_r [sec]	=	Stopping time
W [J]	=	Brake work
W_{max} [J]	=	Maximum brake work for one brake operations

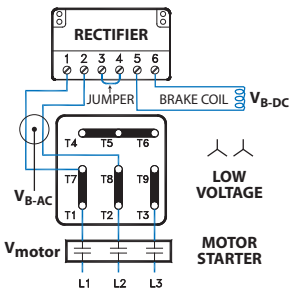


Connections
GHE & GVE Rectifiers

NORD DRIVESYSTEMS

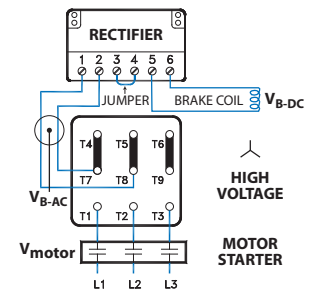
GHE & GVE Connection Diagrams

BR101A — POWERED FROM MOTOR TERMINAL BLOCK — STANDARD RELEASE — NORMAL STOPPING (AC-SWITCHING) — 10



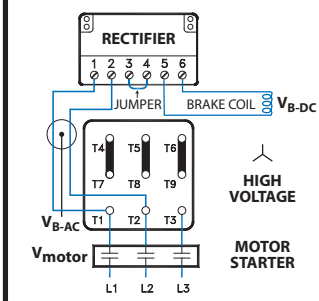
MOTOR	RECTIFIER	Vmotor	VB-AC	VB-DC
208-230YY/460Y	GVE20	208 VAC	230 VAC	205 VDC
230YY/460Y	GVE20	230 VAC	230 VAC	205 VDC

BR101B — POWERED FROM MOTOR TERMINAL BLOCK — STANDARD RELEASE — NORMAL STOPPING (AC-SWITCHING) — 10



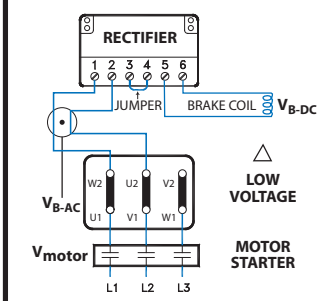
MOTOR	RECTIFIER	Vmotor	VB-AC	VB-DC
230YY/460Y	GVE20	460 VAC	230 VAC	205 VDC

GP101C — POWERED FROM MOTOR TERMINAL BLOCK — STANDARD RELEASE — NORMAL STOPPING (AC-SWITCHING) — 10



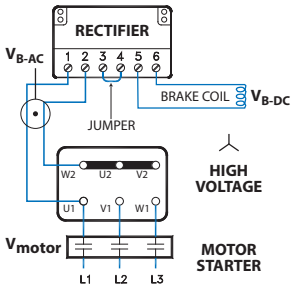
MOTOR	RECTIFIER	Vmotor	VB-AC	VB-DC
230YY/460Y	GHE40	460 VAC	460 VAC	205 VDC

BR601A — POWERED FROM MOTOR TERMINAL BLOCK — STANDARD RELEASE — NORMAL STOPPING (AC-SWITCHING) — 10



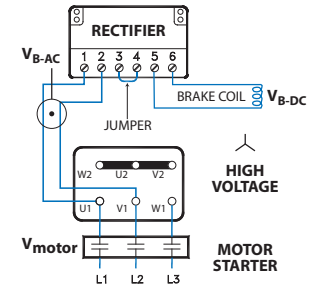
MOTOR	RECTIFIER	Vmotor	VB-AC	VB-DC
208Δ/360Y	GVE20	208 VAC	208 VAC	180 VDC
230Δ/400Y	GVE20	230 VAC	230 VAC	205 VDC
400Δ/690Y	GHE40	400 VAC	400 VAC	180 VDC
460Δ/Y	GHE40	460 VAC	460 VAC	205 VDC

BR601B — POWERED FROM MOTOR TERMINAL BLOCK — STANDARD RELEASE — NORMAL STOPPING (AC-SWITCHING) — 10



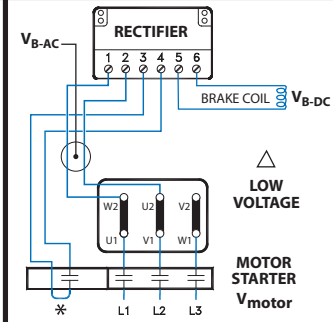
MOTOR	RECTIFIER	Vmotor	VB-AC	VB-DC
230Δ/400Y	GVE20	400 VAC	230 VAC	205 VDC

BR601C — POWERED FROM MOTOR TERMINAL BLOCK — STANDARD RELEASE — NORMAL STOPPING (AC-SWITCHING) — 10



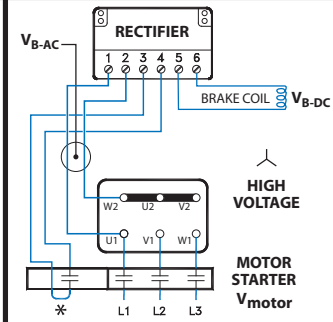
MOTOR	RECTIFIER	Vmotor	VB-AC	VB-DC
332Δ/575Y	GHE50	575 VAC	575 VAC	250 VDC

BR603A — POWERED FROM MOTOR TERMINAL BLOCK — STANDARD RELEASE — FAST STOPPING (DC-SWITCHING) — 15



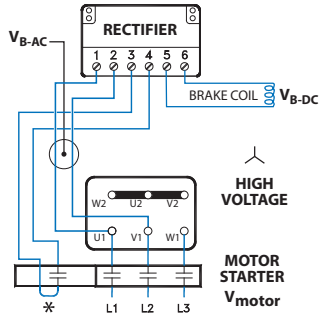
MOTOR	RECTIFIER	Vmotor	VB-AC	VB-DC
208Δ/360Y	GVE20	208 VAC	208 VAC	180 VDC
230Δ/400Y	GVE20	230 VAC	230 VAC	205 VDC
400Δ/690Y	GHE40	400 VAC	400 VAC	180 VDC
460Δ/Y	GHE40	460 VAC	460 VAC	205 VDC

BR603B — POWERED FROM MOTOR TERMINAL BLOCK — STANDARD RELEASE — FAST STOPPING (DC-SWITCHING) — 15



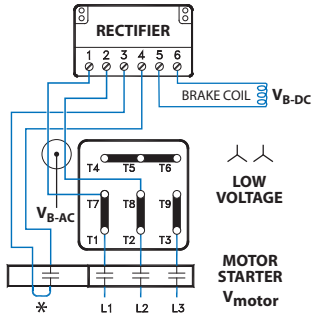
MOTOR	RECTIFIER	Vmotor	VB-AC	VB-DC
230Δ/400Y	GVE20	400 VAC	230 VAC	105 VDC

BR603C — POWERED FROM MOTOR TERMINAL BLOCK — STANDARD RELEASE — FAST STOPPING (DC-SWITCHING) — 15



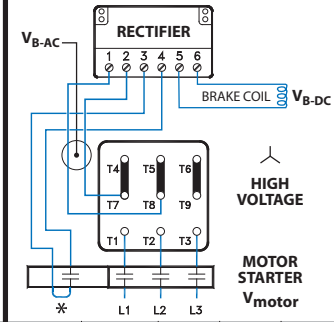
MOTOR	RECTIFIER	Vmotor	VB-AC	VB-DC
332Δ/575Y	GHE50	575 VAC	575 VAC	250 VDC

BR103A — POWERED FROM MOTOR TERMINAL BLOCK — STANDARD RELEASE — FAST STOPPING (DC-SWITCHING) — 15



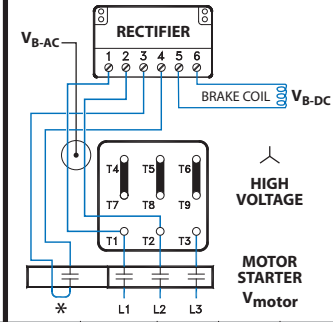
MOTOR	RECTIFIER	Vmotor	VB-AC	VB-DC
230YY/460Y	GVE20	208 VAC	230 VAC	205 VDC

BR103B — POWERED FROM MOTOR TERMINAL BLOCK — STANDARD RELEASE — FAST STOPPING (DC-SWITCHING) — 15



MOTOR	RECTIFIER	Vmotor	VB-AC	VB-DC
230YY/460Y	GVE20	460 VAC	230 VAC	205 VDC

BR103C — POWERED FROM MOTOR TERMINAL BLOCK — STANDARD RELEASE — FAST STOPPING (DC-SWITCHING) — 15



MOTOR	RECTIFIER	Vmotor	VB-AC	VB-DC
230YY/460Y	GHE40	460 VAC	460 VAC	205 VDC

* The normally open contact/s (NO) is not supplied by NORD. It must close at the same time power is supplied to the brake. The contact must be capable of switching inductive loads and/or be rated IEC AC3.

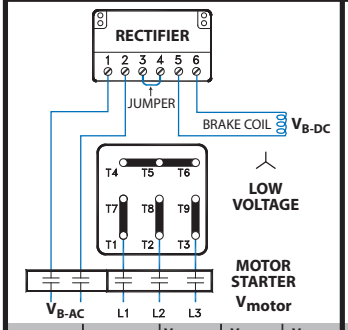
= Braking Method

GHE & GVE Connection Diagrams

BR102A

SEPERATE POWER SOURCE
STANDARD RELEASE
NORMAL STOPPING (AC-SWITCHING)

20

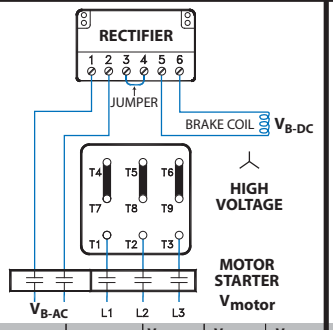


MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
208-230YY/460Y	GVE20	208 VAC	230 VAC	205 VDC
230YY/460Y	GVE20	230 VAC	230 VAC	205 VDC

BR102B

SEPERATE POWER SOURCE
STANDARD RELEASE
NORMAL STOPPING (AC-SWITCHING)

20

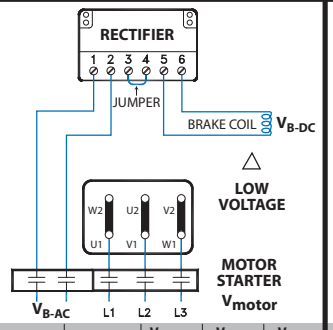


MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	GHE40	460 VAC	460 VAC	205 VDC

BR602A

SEPERATE POWER SOURCE
STANDARD RELEASE
NORMAL STOPPING (AC-SWITCHING)

20

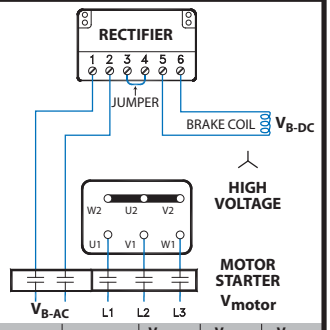


MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
208Δ/360Y	GVE20	208 VAC	208 VAC	180 VDC
230Δ/400Y	GVE20	230 VAC	230 VAC	205 VDC
400Δ/690Y	GHE40	400 VAC	400 VAC	180 VDC
460Δ/Y	GHE40	460 VAC	460 VAC	205 VDC

BR602B

SEPERATE POWER SOURCE
STANDARD RELEASE
NORMAL STOPPING (AC-SWITCHING)

20

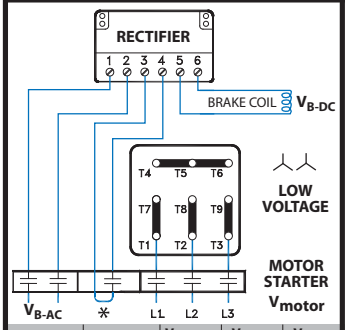


MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230Δ/400Y	GHE40	400 VAC	400 VAC	180 VDC
332Δ/575Y	GHE50	575 VAC	575 VAC	250 VDC

BR104A

SEPERATE POWER SOURCE
STANDARD RELEASE
FAST STOPPING (DC-SWITCHING)

25

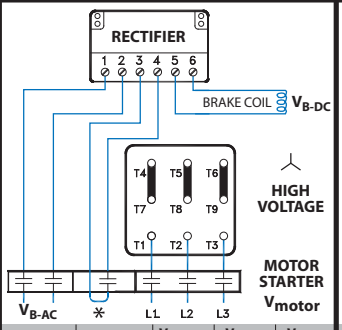


MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
208-230YY/460Y	GVE20	208 VAC	230 VAC	205 VDC
230YY/460Y	GVE20	230 VAC	230 VAC	205 VDC

BR104B

SEPERATE POWER SOURCE
STANDARD RELEASE
FAST STOPPING (DC-SWITCHING)

25

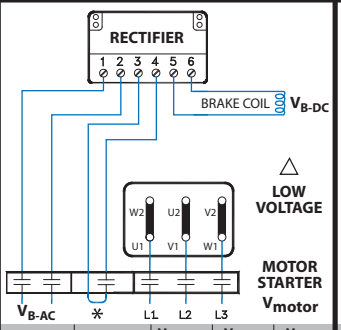


MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	GHE40	460 VAC	460 VAC	205 VDC

BR604A

SEPERATE POWER SOURCE
STANDARD RELEASE
FAST STOPPING (DC-SWITCHING)

25

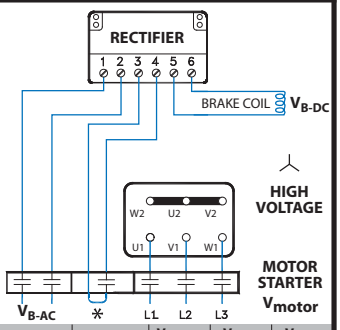


MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
208Δ/360Y	GHE20	208 VAC	208 VAC	105 VDC
230Δ/400Y	GHE20	230 VAC	230 VAC	105 VDC
400Δ/690Y	GHE40	400 VAC	400 VAC	180 VDC
460Δ/Y	GHE40	460 VAC	460 VAC	205 VDC

BR604B

SEPERATE POWER SOURCE
STANDARD RELEASE
FAST STOPPING (DC-SWITCHING)

25



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230Δ/400Y	GHE20	400 VAC	230 VAC	105 VDC
332Δ/575Y	GHE40	575 VAC	332 VAC	180 VDC

✻ The normally open contact/s (NO) is not supplied by NORD. It must close at the same time power is supplied to the brake. The contact must be capable of switching inductive loads and/or be rated IEC AC3.

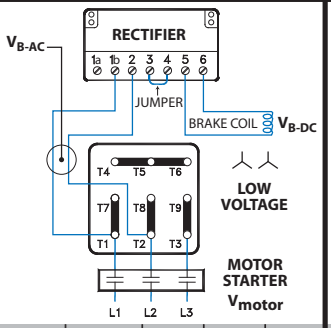
= Braking Method

DRIVESYSTEMS

GUE Dual Rectifier - Connection Diagrams

GU101A — 10

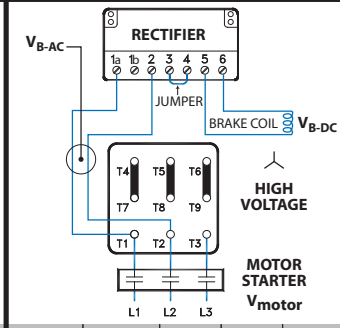
POWERED FROM MOTOR TERMINAL BLOCK
STANDARD RELEASE
STANDARD STOPPING (AC-SWITCHING)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
208-230YY/460Y	GUE40V	208 VAC	230 VAC	205 VDC
230YY/460Y	GUE40V	230 VAC	230 VAC	205 VDC

GU101B — 10

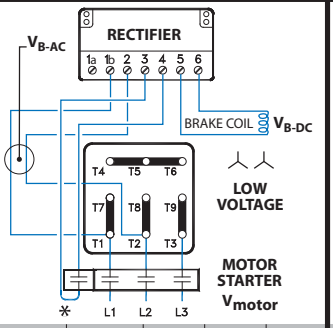
POWERED FROM MOTOR TERMINAL BLOCK
STANDARD RELEASE
STANDARD STOPPING (AC-SWITCHING)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
208-230YY/460Y	GUE40V	460 VAC	460 VAC	205 VDC
230YY/460Y	GUE40V	460 VAC	460 VAC	205 VDC

GU103A — 15

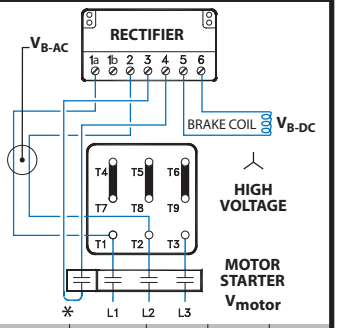
POWERED FROM MOTOR TERMINAL BLOCK
STANDARD RELEASE
FAST STOPPING (DC-SWITCHING)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
208-230YY/460Y	GUE40V	208 VAC	230 VAC	205 VDC
230YY/460Y	GUE40V	230 VAC	230 VAC	205 VDC

GU103B — 15

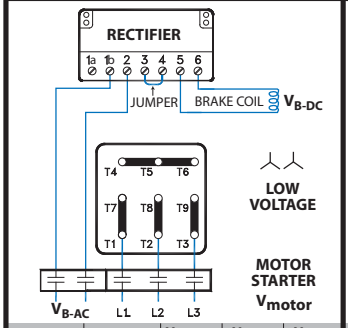
POWERED FROM MOTOR TERMINAL BLOCK
STANDARD RELEASE
FAST STOPPING (DC-SWITCHING)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
208-230YY/460Y	GUE40V	460 VAC	460 VAC	205 VDC
230YY/460Y	GUE40V	460 VAC	460 VAC	205 VDC

GU102A — 20

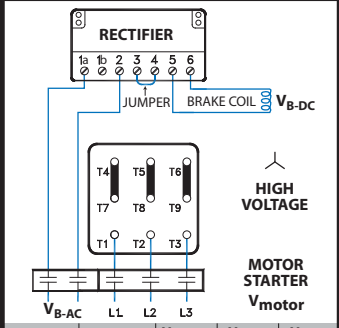
SEPERATE POWER SOURCE
STANDARD RELEASE
STANDARD STOPPING (AC-SWITCHING)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
208-230YY/460Y	GUE40V	208 VAC	230 VAC	205 VDC
230YY/460Y	GUE40V	230 VAC	230 VAC	205 VDC

GU102B — 20

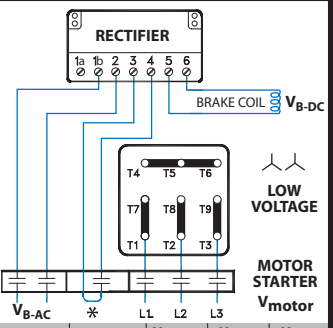
SEPERATE POWER SOURCE
STANDARD RELEASE
STANDARD STOPPING (AC-SWITCHING)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
208-230YY/460Y	GUE40V	460 VAC	460 VAC	205 VDC
230YY/460Y	GUE40V	460 VAC	460 VAC	205 VDC

GU104A — 25

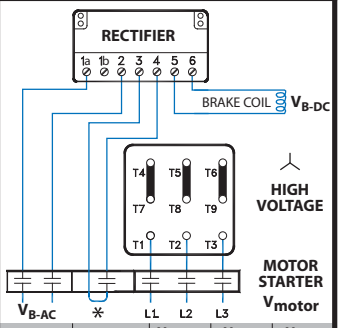
SEPERATE POWER SOURCE
STANDARD RELEASE
FAST STOPPING (DC-SWITCHING)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
208-230YY/460Y	GUE40V	208 VAC	230 VAC	205 VDC
230YY/460Y	GUE40V	230 VAC	230 VAC	205 VDC

GU104B — 25

SEPERATE POWER SOURCE
STANDARD RELEASE
FAST STOPPING (DC-SWITCHING)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
208-230YY/460Y	GUE40V	460 VAC	460 VAC	205 VDC
230YY/460Y	GUE40V	460 VAC	460 VAC	205 VDC

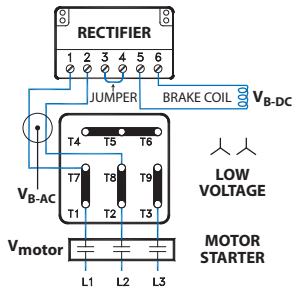
✻ The normally open contact/s (NO) is not supplied by NORD. It must close at the same time power is supplied to the brake. The contact must be capable of switching inductive loads and/or be rated IEC AC3.

= Braking Method

GPE Rectifier - Connection Diagrams

GP101A

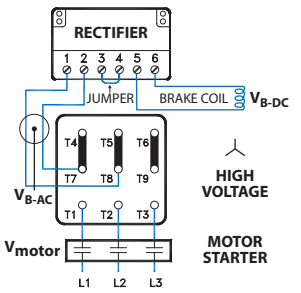
POWERED FROM MOTOR TERMINAL BLOCK 30
FAST-RELEASE (OVER EXCITATION)
NORMAL STOPPING (AC-SWITCHING)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	GPE20L	230 VAC	230 VAC	105 VDC

GP101B

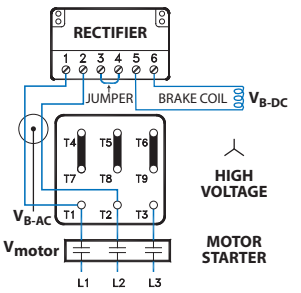
POWERED FROM MOTOR TERMINAL BLOCK 30
FAST-RELEASE (OVER EXCITATION)
NORMAL STOPPING (AC-SWITCHING)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	GPE20L	460 VAC	230 VAC	105 VDC

GP101C

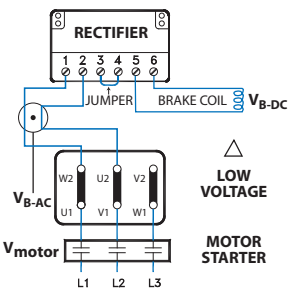
POWERED FROM MOTOR TERMINAL BLOCK 30
FAST-RELEASE (OVER EXCITATION)
NORMAL STOPPING (AC-SWITCHING)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	GPE40L	460 VAC	460 VAC	205 VDC

GP101D

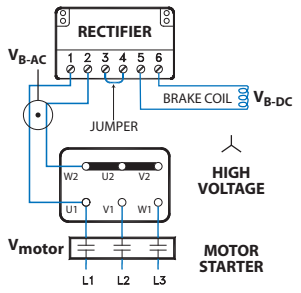
POWERED FROM MOTOR TERMINAL BLOCK 30
FAST-RELEASE (OVER EXCITATION)
NORMAL STOPPING (AC-SWITCHING)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
208Δ/360Y	GPE20L	208 VAC	208 VAC	105 VDC
230Δ/400Y	GPE20L	230 VAC	230 VAC	105 VDC
400Δ/690Y	GPE40L	400 VAC	400 VAC	180 VDC
460Δ/Y	GPE40L	460 VAC	460 VAC	205 VDC

GP101E

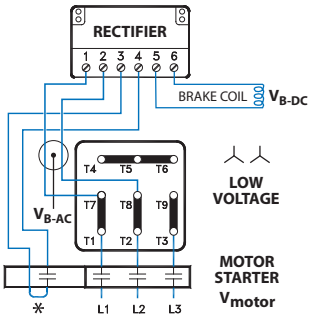
POWERED FROM MOTOR TERMINAL BLOCK 30
FAST-RELEASE (OVER EXCITATION)
NORMAL STOPPING (AC-SWITCHING)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230Δ/400Y	GPE20L	400 VAC	230 VAC	105 VDC
332Δ/575Y	GPE40L	575 VAC	332 VAC	180 VDC

GP102A

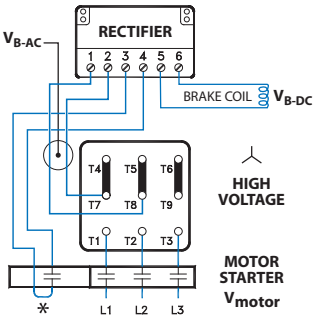
POWERED FROM MOTOR TERMINAL BLOCK 35
FAST-RELEASE (OVER EXCITATION)
FAST STOPPING (DC-SWITCHING)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	GPE20L	230 VAC	230 VAC	105 VDC

GP102B

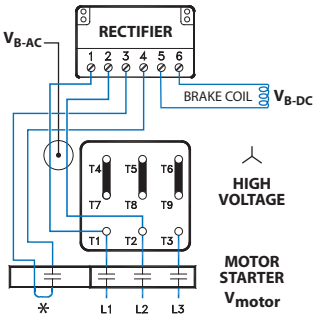
POWERED FROM MOTOR TERMINAL BLOCK 35
FAST-RELEASE (OVER EXCITATION)
FAST STOPPING (DC-SWITCHING)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	GPE20L	460 VAC	230 VAC	105 VDC

GP102C

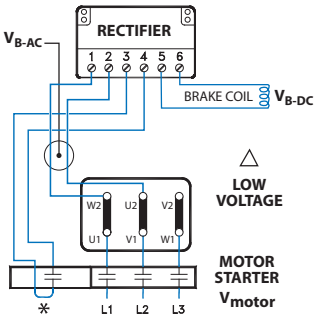
POWERED FROM MOTOR TERMINAL BLOCK 35
FAST-RELEASE (OVER EXCITATION)
FAST STOPPING (DC-SWITCHING)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	GPE40L	460 VAC	460 VAC	205 VDC

GP102D

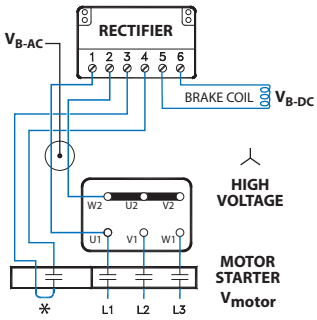
POWERED FROM MOTOR TERMINAL BLOCK 35
FAST-RELEASE (OVER EXCITATION)
FAST STOPPING (DC-SWITCHING)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
208Δ/360Y	GPE20L	208 VAC	208 VAC	105 VDC
230Δ/400Y	GPE20L	230 VAC	230 VAC	105 VDC
400Δ/690Y	GPE40L	400 VAC	400 VAC	180 VDC
460Δ/Y	GPE40L	460 VAC	460 VAC	205 VDC

GP102E

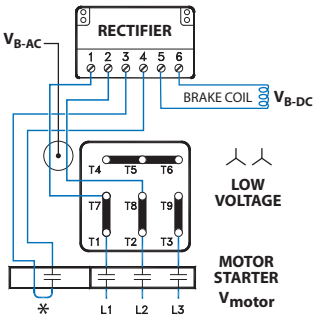
POWERED FROM MOTOR TERMINAL BLOCK 35
FAST-RELEASE (OVER EXCITATION)
FAST STOPPING (DC-SWITCHING)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230Δ/400Y	GPE20L	400 VAC	230 VAC	105 VDC
332Δ/575Y	GPE40L	575 VAC	332 VAC	180 VDC

GP103A

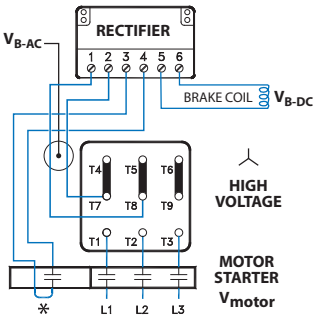
POWERED FROM MOTOR TERMINAL BLOCK 40
STANDARD RELEASE
VERY FAST STOPPING
(DC-SWITCHING + REDUCED POWER HOLDING)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	GPE20L	230 VAC	230 VAC	205 VDC

GP103B

POWERED FROM MOTOR TERMINAL BLOCK 40
STANDARD RELEASE
VERY FAST STOPPING
(DC-SWITCHING + REDUCED POWER HOLDING)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	GPE20L	460 VAC	230 VAC	205 VDC

✱ The normally open contact/s (NO) is not supplied by NORD. It must close at the same time power is supplied to the brake. The contact must be capable of switching inductive loads and/or be rated IEC AC3.

= Braking Method

BRAKES

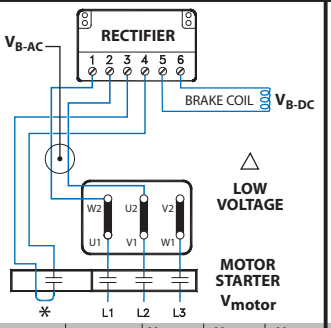
DRIVESYSTEMS

GPU Rectifier - Connection Diagrams

GP103C

POWERED FROM MOTOR TERMINAL BLOCK
STANDARD RELEASE
VERY FAST STOPPING
(DC-SWITCHING + REDUCED POWER HOLDING)

40

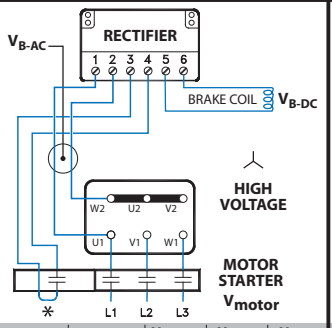


MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
208Δ/360Y	GPE20L	208 VAC	208 VAC	180 VDC
230Δ/400Y	GPE20L	230 VAC	230 VAC	205 VDC

GP103D

POWERED FROM MOTOR TERMINAL BLOCK
STANDARD RELEASE
VERY FAST STOPPING
(DC-SWITCHING + REDUCED POWER HOLDING)

40

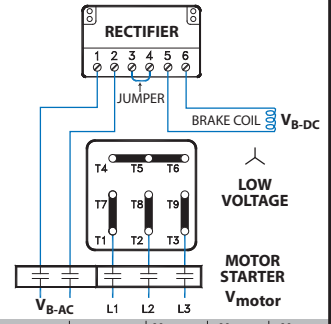


MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230Δ/400Y	GPE20L	400 VAC	230 VAC	205 VDC

GP104A

SEPERATE POWER SOURCE
FAST-RELEASE (OVER EXCITATION)
NORMAL STOPPING (AC-SWITCHING)

45

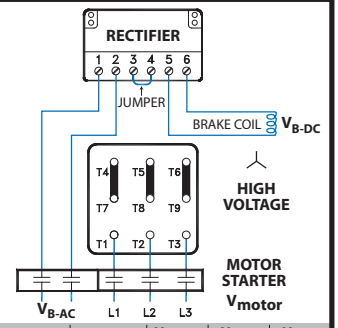


MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	GPU20L	230 VAC	230 VAC	105 VDC

GP104B

SEPERATE POWER SOURCE
FAST-RELEASE (OVER EXCITATION)
NORMAL STOPPING (AC-SWITCHING)

45

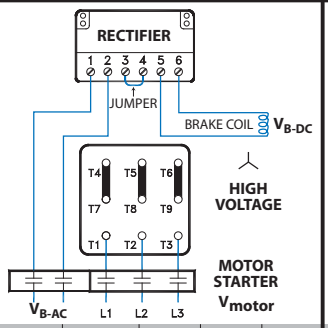


MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	GPU20L	460 VAC	230 VAC	105 VDC

GP104C

SEPERATE POWER SOURCE
FAST-RELEASE (OVER EXCITATION)
NORMAL STOPPING (AC-SWITCHING)

45

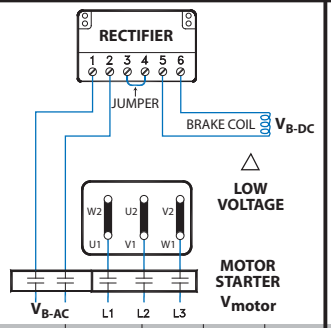


MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	GPU40L	460 VAC	460 VAC	205 VDC

GP104D

SEPERATE POWER SOURCE
FAST-RELEASE (OVER EXCITATION)
NORMAL STOPPING (AC-SWITCHING)

45

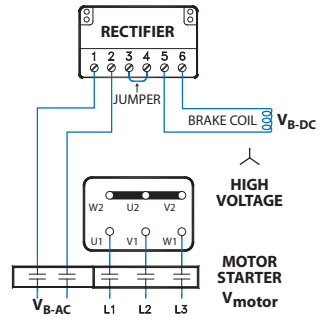


MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
208Δ/360Y	GPU20L	208 VAC	208 VAC	105 VDC
230Δ/400Y	GPU20L	230 VAC	230 VAC	105 VDC
400Δ/690Y	GPU40L	400 VAC	400 VAC	180 VDC
460Δ/Y	GPU40L	460 VAC	460 VAC	205 VDC

GP104E

SEPERATE POWER SOURCE
FAST-RELEASE (OVER EXCITATION)
NORMAL STOPPING (AC-SWITCHING)

45

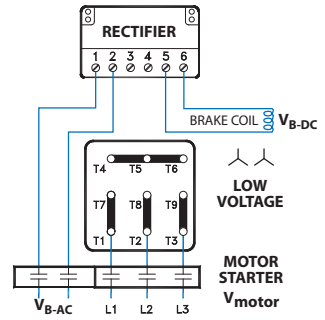


MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230Δ/400Y	GPU20L	400 VAC	230 VAC	105 VDC
332Δ/575Y	GPU40L	575 VAC	332 VAC	180 VDC

GP105A

SEPERATE POWER SOURCE
FAST-RELEASE (OVER EXCITATION)
FAST STOPPING (DC-SWITCHING)

50

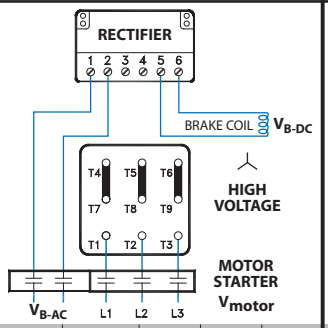


MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	GPU20L	230 VAC	230 VAC	105 VDC

GP105B

SEPERATE POWER SOURCE
FAST-RELEASE (OVER EXCITATION)
FAST STOPPING (DC-SWITCHING)

50

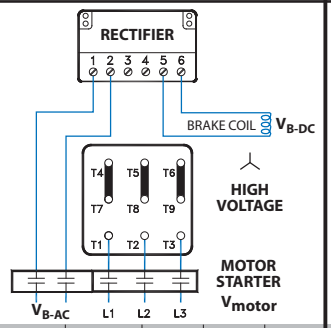


MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	GPU20L	460 VAC	230 VAC	105 VDC

GP105C

SEPERATE POWER SOURCE
FAST-RELEASE (OVER EXCITATION)
FAST STOPPING (DC-SWITCHING)

50

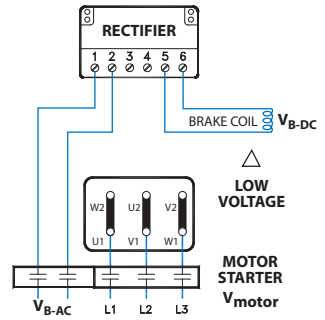


MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	GPU40L	460 VAC	460 VAC	205 VDC

GP105D

SEPERATE POWER SOURCE
FAST-RELEASE (OVER EXCITATION)
FAST STOPPING (DC-SWITCHING)

50

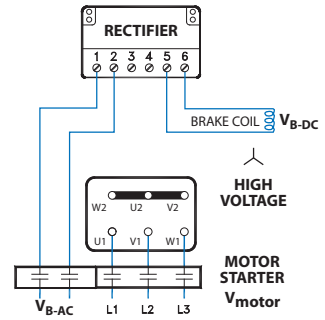


MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
208Δ/360Y	GPU20L	208 VAC	208 VAC	105 VDC
230Δ/400Y	GPU20L	230 VAC	230 VAC	105 VDC
400Δ/690Y	GPU40L	400 VAC	400 VAC	180 VDC
460Δ/Y	GPU40L	460 VAC	460 VAC	205 VDC

GP105E

SEPERATE POWER SOURCE
FAST-RELEASE (OVER EXCITATION)
FAST STOPPING (DC-SWITCHING)

50



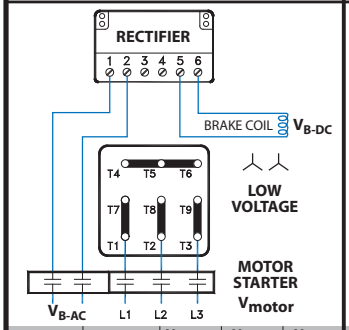
MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230Δ/400Y	GPU20L	400 VAC	230 VAC	105 VDC
332Δ/575Y	GPU40L	575 VAC	332 VAC	180 VDC

✱ The normally open contact/s (NO) is not supplied by NORD. It must close at the same time power is supplied to the brake. The contact must be capable of switching inductive loads and/or be rated IEC AC3.

= Braking Method

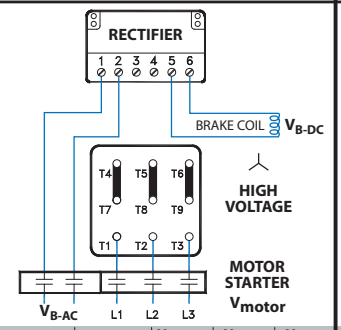
GPE & GPU Rectifier - Connection Diagrams

GP106A — SEPERATE POWER SOURCE · STANDARD RELEASE · VERY FAST STOPPING (DC-SWITCHING + REDUCED POWER HOLDING) — 55



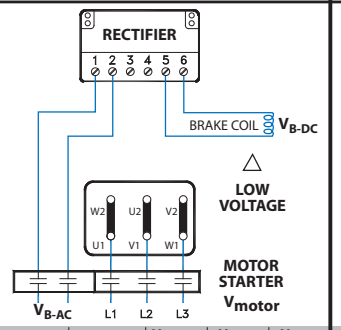
MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	GPU20L	230 VAC	230 VAC	205 VDC

GP106B — SEPERATE POWER SOURCE · STANDARD RELEASE · VERY FAST STOPPING (DC-SWITCHING + REDUCED POWER HOLDING) — 55



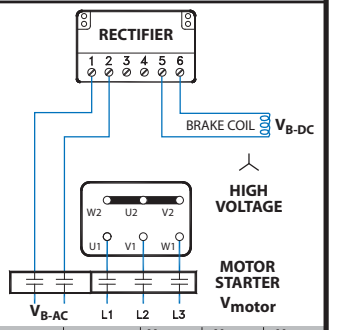
MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	GPU20L	460 VAC	230 VAC	205 VDC

GP106C — SEPERATE POWER SOURCE · STANDARD RELEASE · VERY FAST STOPPING (DC-SWITCHING + REDUCED POWER HOLDING) — 55



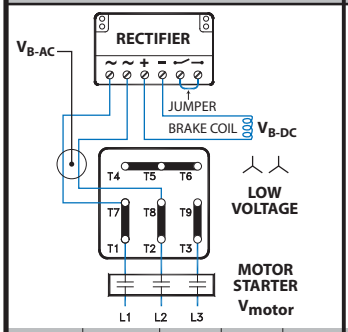
MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
208Δ/360Y	GPU20L	208 VAC	208 VAC	180 VDC
230Δ/400Y	GPU20L	230 VAC	230 VAC	205 VDC

GP106D — SEPERATE POWER SOURCE · STANDARD RELEASE · VERY FAST STOPPING (DC-SWITCHING + REDUCED POWER HOLDING) — 55



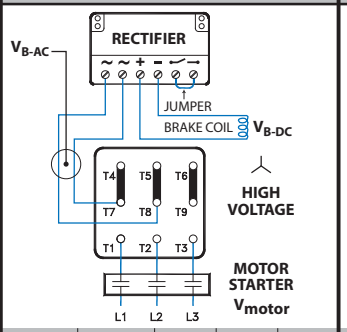
MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230Δ/400Y	GPU20L	400 VAC	230 VAC	205 VDC

PMG101A — POWERED FROM MOTOR TERMINAL BLOCK · FAST-RELEASE (OVER EXCITATION) · NORMAL STOPPING (AC-SWITCHING) — 30



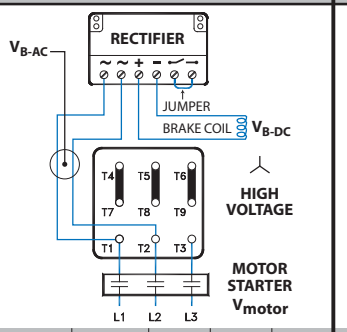
MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	PMG500	230 VAC	230 VAC	105 VDC

PMG101B — POWERED FROM MOTOR TERMINAL BLOCK · FAST-RELEASE (OVER EXCITATION) · NORMAL STOPPING (AC-SWITCHING) — 30



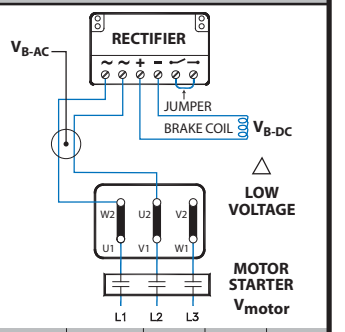
MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	PMG500	460 VAC	230 VAC	105 VDC

PMG101C — POWERED FROM MOTOR TERMINAL BLOCK · FAST-RELEASE (OVER EXCITATION) · NORMAL STOPPING (AC-SWITCHING) — 30



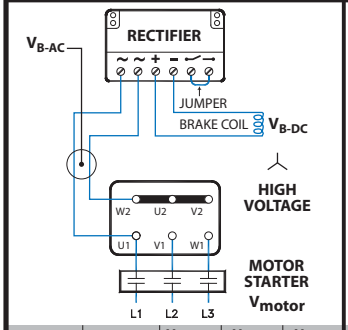
MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	PMG500	460 VAC	460 VAC	205 VDC

PMG101D — POWERED FROM MOTOR TERMINAL BLOCK · FAST-RELEASE (OVER EXCITATION) · NORMAL STOPPING (AC-SWITCHING) — 30



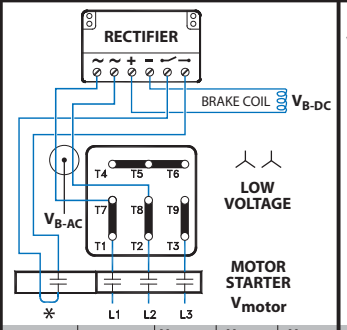
MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
208Δ/360Y	PMG500	208 VAC	208 VAC	105 VDC
230Δ/400Y	PMG500	230 VAC	230 VAC	105 VDC
400Δ/690Y	PMG500	400 VAC	400 VAC	180 VDC
460Δ/Y	PMG500	460 VAC	460 VAC	205 VDC

PMG101E — POWERED FROM MOTOR TERMINAL BLOCK · FAST-RELEASE (OVER EXCITATION) · NORMAL STOPPING (AC-SWITCHING) — 30



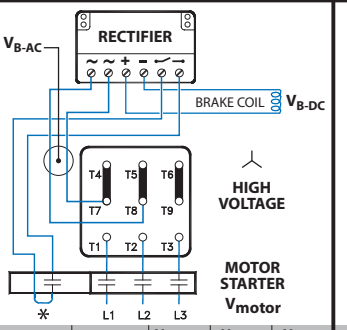
MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230Δ/400Y	PMG500	400 VAC	230 VAC	105 VDC

PMG102A — POWERED FROM MOTOR TERMINAL BLOCK · FAST-RELEASE (OVER EXCITATION) · FAST STOPPING (DC-SWITCHING) — 35



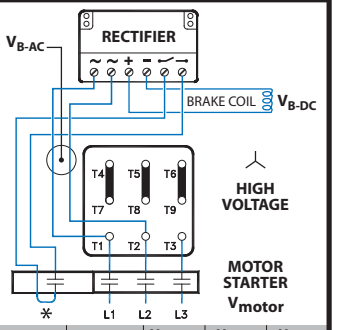
MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	PMG500	230 VAC	230 VAC	105 VDC

PMG102B — POWERED FROM MOTOR TERMINAL BLOCK · FAST-RELEASE (OVER EXCITATION) · FAST STOPPING (DC-SWITCHING) — 35



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	PMG500	460 VAC	230 VAC	105 VDC

PMG102C — POWERED FROM MOTOR TERMINAL BLOCK · FAST-RELEASE (OVER EXCITATION) · FAST STOPPING (DC-SWITCHING) — 35



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	PMG500	460 VAC	460 VAC	205 VDC

✻ The normally open contact/s (NO) is not supplied by NORD. It must close at the same time power is supplied to the brake. The contact must be capable of switching inductive loads and/or be rated IEC AC3.

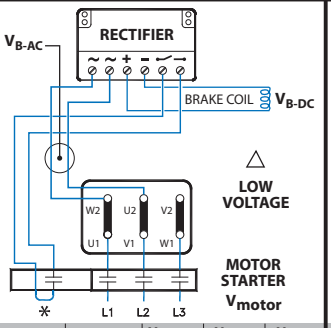
= Braking Method

BRAKES

PMG Rectifier - Connection Diagrams

PMG102D — 35

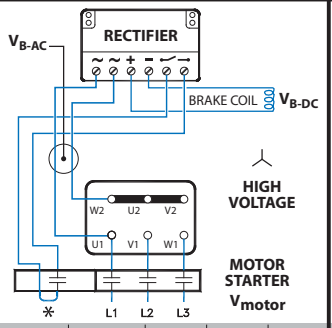
POWERED FROM MOTOR TERMINAL BLOCK
FAST-RELEASE (OVER EXCITATION)
FAST STOPPING (DC-SWITCHING)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
208Δ/360Y	PMG500	208 VAC	208 VAC	105 VDC
230Δ/400Y	PMG500	230 VAC	230 VAC	105 VDC
400Δ/690Y	PMG500	400 VAC	400 VAC	180 VDC
460Δ/Y	PMG500	460 VAC	460 VAC	205 VDC

PMG102E — 35

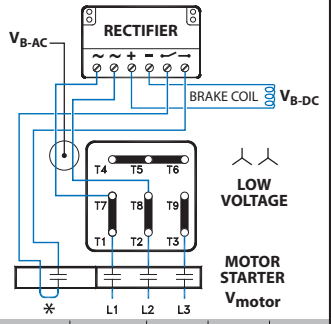
POWERED FROM MOTOR TERMINAL BLOCK
FAST-RELEASE (OVER EXCITATION)
FAST STOPPING (DC-SWITCHING)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230Δ/400Y	PMG500	400 VAC	230 VAC	105 VDC

PMG103A — 40

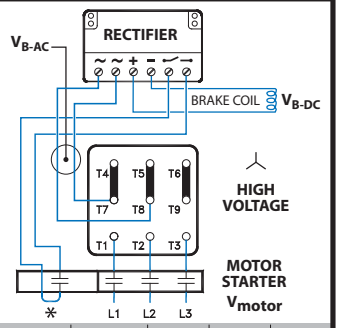
POWERED FROM MOTOR TERMINAL BLOCK
STANDARD RELEASE
VERY FAST STOPPING
(DC-SWITCHING + REDUCED POWER HOLDING)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	PMG500	230 VAC	230 VAC	205 VDC

PMG103B — 40

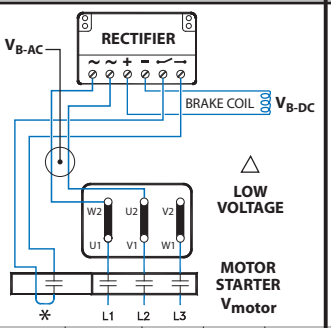
POWERED FROM MOTOR TERMINAL BLOCK
STANDARD RELEASE
VERY FAST STOPPING
(DC-SWITCHING + REDUCED POWER HOLDING)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	PMG500	460 VAC	230 VAC	205 VDC

PMG103C — 40

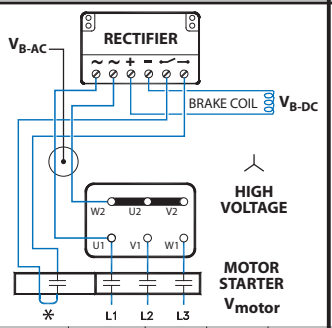
POWERED FROM MOTOR TERMINAL BLOCK
STANDARD RELEASE
VERY FAST STOPPING
(DC-SWITCHING + REDUCED POWER HOLDING)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
208Δ/360Y	PMG500	208 VAC	208 VAC	180 VDC
230Δ/400Y	PMG500	230 VAC	230 VAC	205 VDC

PMG103D — 40

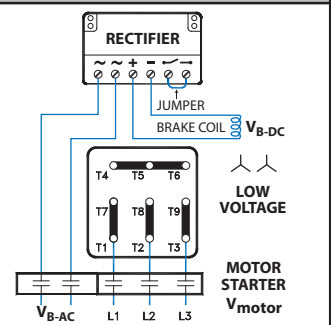
POWERED FROM MOTOR TERMINAL BLOCK
STANDARD RELEASE
VERY FAST STOPPING
(DC-SWITCHING + REDUCED POWER HOLDING)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230Δ/400Y	PMG500	400 VAC	230 VAC	205 VDC

PMG104A — 45

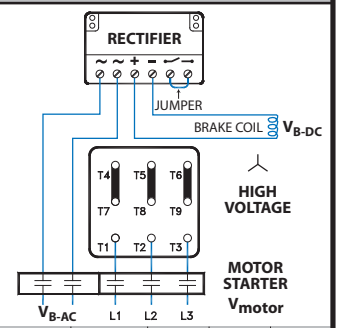
SEPERATE POWER SOURCE
FAST-RELEASE (OVER EXCITATION)
NORMAL STOPPING (AC-SWITCHING)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	PMG500	230 VAC	230 VAC	105 VDC

PMG104B — 45

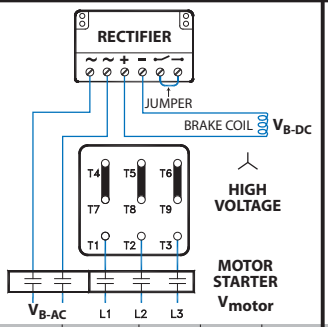
SEPERATE POWER SOURCE
FAST-RELEASE (OVER EXCITATION)
NORMAL STOPPING (AC-SWITCHING)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	PMG500	460 VAC	230 VAC	105 VDC

PMG104C — 45

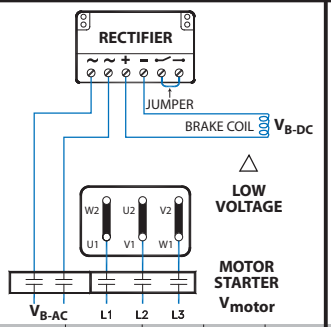
SEPERATE POWER SOURCE
FAST-RELEASE (OVER EXCITATION)
NORMAL STOPPING (AC-SWITCHING)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	PMG500	460 VAC	460 VAC	205 VDC

PMG104D — 45

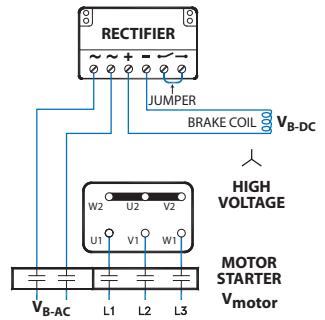
SEPERATE POWER SOURCE
FAST-RELEASE (OVER EXCITATION)
NORMAL STOPPING (AC-SWITCHING)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
208Δ/360Y	PMG500	208 VAC	208 VAC	105 VDC
230Δ/400Y	PMG500	230 VAC	230 VAC	105 VDC
400Δ/690Y	PMG500	400 VAC	400 VAC	180 VDC
460Δ/Y	PMG500	460 VAC	460 VAC	205 VDC

PMG104E — 45

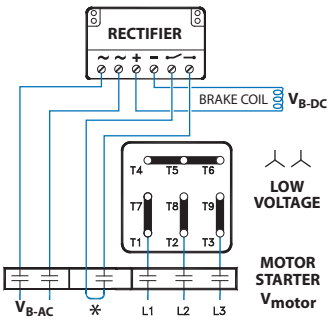
SEPERATE POWER SOURCE
FAST-RELEASE (OVER EXCITATION)
NORMAL STOPPING (AC-SWITCHING)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230Δ/400Y	PMG500	400 VAC	230 VAC	105 VDC

PMG105A — 50

SEPERATE POWER SOURCE
FAST-RELEASE (OVER EXCITATION)
FAST STOPPING (DC-SWITCHING)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	PMG500	230 VAC	230 VAC	105 VDC

✱ The normally open contact/s (NO) is not supplied by NORD. It must close at the same time power is supplied to the brake. The contact must be capable of switching inductive loads and/or be rated IEC AC3.

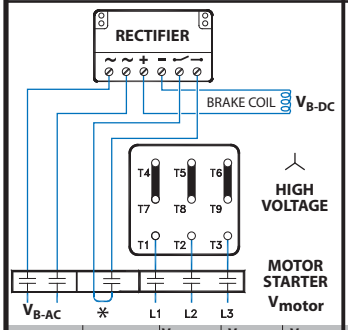
= Braking Method

PMG Rectifier - Connection Diagrams

PMG105B

SEPERATE POWER SOURCE
FAST-RELEASE (OVER EXCITATION)
FAST STOPPING (DC-SWITCHING)

50

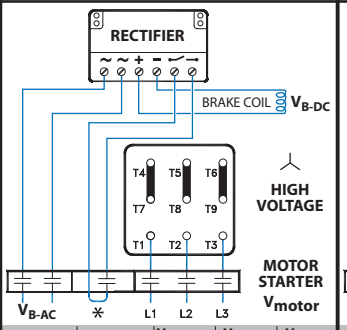


MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	PMG500	460 VAC	230 VAC	105 VDC

PMG105C

SEPERATE POWER SOURCE
FAST-RELEASE (OVER EXCITATION)
FAST STOPPING (DC-SWITCHING)

50

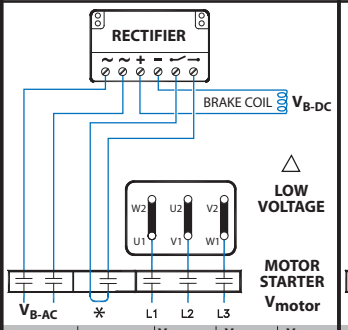


MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	PMG500	460 VAC	460 VAC	205 VDC

PMG105D

SEPERATE POWER SOURCE
FAST-RELEASE (OVER EXCITATION)
FAST STOPPING (DC-SWITCHING)

50

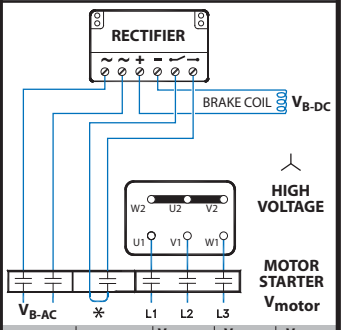


MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
208Δ/360Y	PMG500	208 VAC	208 VAC	105 VDC
230Δ/400Y	PMG500	230 VAC	230 VAC	105 VDC
400Δ/690Y	PMG500	400 VAC	400 VAC	180 VDC
460Δ/Y	PMG500	460 VAC	460 VAC	205 VDC

PMG105E

SEPERATE POWER SOURCE
FAST-RELEASE (OVER EXCITATION)
FAST STOPPING (DC-SWITCHING)

50

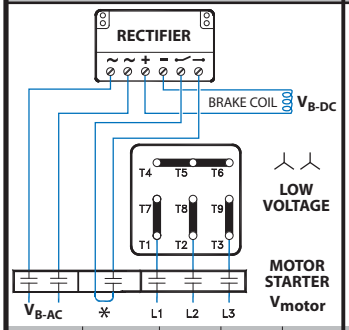


MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230Δ/400Y	PMG500	400 VAC	230 VAC	105 VDC

PMG106A

SEPERATE POWER SOURCE
STANDARD RELEASE
VERY FAST STOPPING
(DC-SWITCHING + REDUCED POWER HOLDING)

55

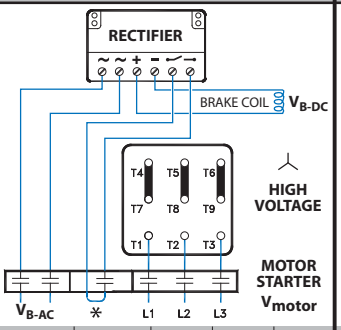


MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	PMG500	230 VAC	230 VAC	205 VDC

PMG106B

SEPERATE POWER SOURCE
STANDARD RELEASE
VERY FAST STOPPING
(DC-SWITCHING + REDUCED POWER HOLDING)

55

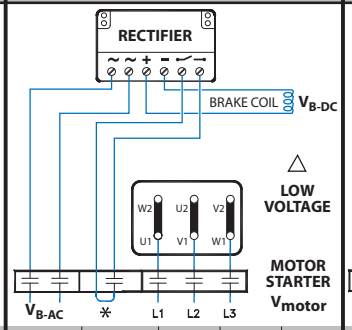


MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	PMG500	460 VAC	230 VAC	205 VDC

PMG106C

SEPERATE POWER SOURCE
STANDARD RELEASE
VERY FAST STOPPING
(DC-SWITCHING + REDUCED POWER HOLDING)

55

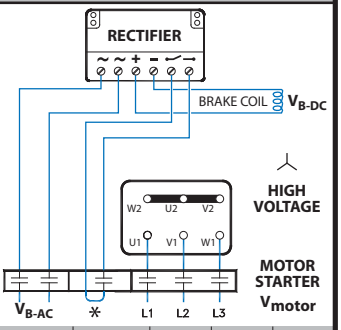


MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
208Δ/360Y	PMG500	208 VAC	208 VAC	180 VDC
230Δ/400Y	PMG500	230 VAC	230 VAC	205 VDC

PMG106D

SEPERATE POWER SOURCE
STANDARD RELEASE
VERY FAST STOPPING
(DC-SWITCHING + REDUCED POWER HOLDING)

55



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230Δ/400Y	PMG500	400 VAC	230 VAC	205 VDC

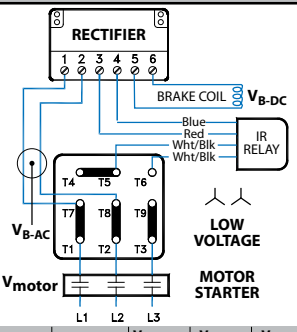
✱ The normally open contact/s (NO) is not supplied by NORD. It must close at the same time power is supplied to the brake. The contact must be capable of switching inductive loads and/or be rated IEC AC3.

= Braking Method

DRIVESYSTEMS

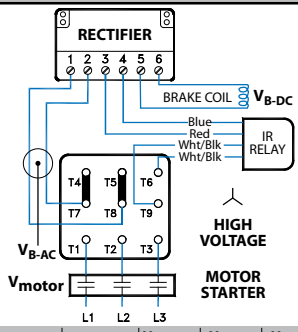
IR Relay Typical Connection Diagrams

IR101A — POWERED FROM MOTOR TERMINAL BLOCK — STANDARD-RELEASE — FAST STOPPING (DC-SWITCHING) — 15



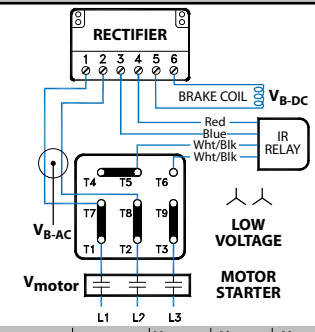
MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
208-230YY/460Y	GVE20	208VAC	230 VAC	205 VDC
230YY/460Y	GVE20	230 VAC	230 VAC	205 VDC

IR101B — POWERED FROM MOTOR TERMINAL BLOCK — STANDARD-RELEASE — FAST STOPPING (DC-SWITCHING) — 15



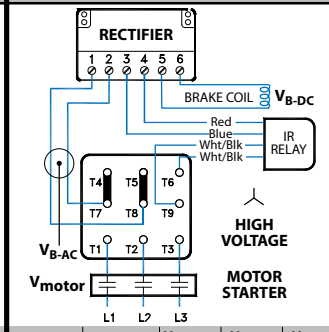
MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	GVE20	460 VAC	230 VAC	205 VDC

IR102A — POWERED FROM MOTOR TERMINAL BLOCK — STANDARD-RELEASE — FAST STOPPING (DC-SWITCHING) — 15



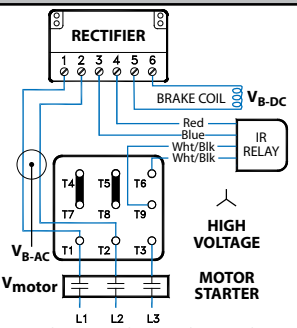
MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
208-230YY/460Y	GHE40	208VAC	230 VAC	105 VDC
230YY/460Y	GHE40	230 VAC	230 VAC	105 VDC

IR102B — POWERED FROM MOTOR TERMINAL BLOCK — STANDARD-RELEASE — FAST STOPPING (DC-SWITCHING) — 15



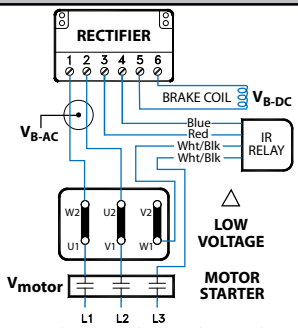
MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	GHE40	460 VAC	230 VAC	105 VDC

IR103 — POWERED FROM MOTOR TERMINAL BLOCK — STANDARD-RELEASE — FAST STOPPING (DC-SWITCHING) — 15



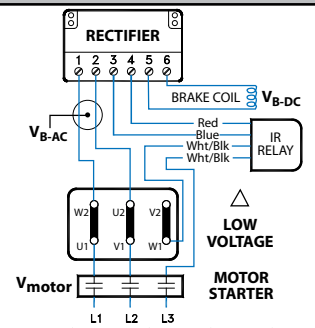
MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230Δ/460Y	GHE40	460 VAC	460VAC	205 VDC

IR301 — POWERED FROM MOTOR TERMINAL BLOCK — STANDARD-RELEASE — FAST STOPPING (DC-SWITCHING) — 15



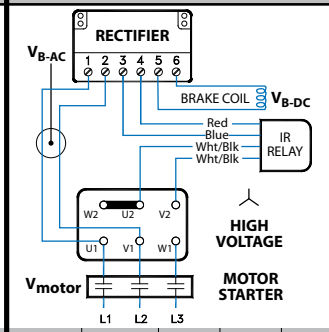
MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
208Δ/360Y	GVE20	208 VAC	208 VAC	180 VDC
230Δ/400Y	GVE20	230 VAC	230 VAC	205 VDC

IR401 — POWERED FROM MOTOR TERMINAL BLOCK — STANDARD-RELEASE — FAST STOPPING (DC-SWITCHING) — 15



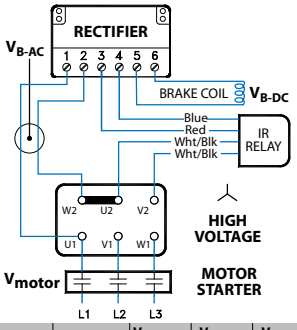
MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
460Δ/800Y	GHE40	460 VAC	460 VAC	205 VDC

IR501 — POWERED FROM MOTOR TERMINAL BLOCK — STANDARD-RELEASE — FAST STOPPING (DC-SWITCHING) — 15



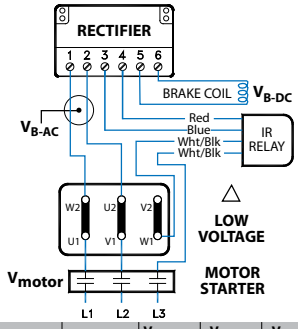
MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
332Δ/575Y	GHE50	575 VAC	575 VAC	250 VDC

IR601 — POWERED FROM MOTOR TERMINAL BLOCK — STANDARD-RELEASE — FAST STOPPING (DC-SWITCHING) — 15



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230Δ/400Y	GVE20	400 VAC	230 VAC	205 VDC

IR602 — POWERED FROM MOTOR TERMINAL BLOCK — STANDARD-RELEASE — FAST STOPPING (DC-SWITCHING) — 15



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
400Δ/690Y	GHE40	400 VAC	400 VAC	180 VDC

CAUTIONS

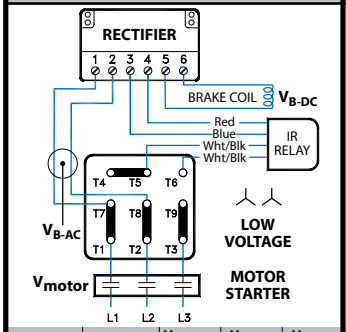
Requirements

- Brake must be powered from the motor's terminal block (not seperately powered)
- Motor must be a single speed and should not be powered by a frequency inverter or soft starter.

BRAKES

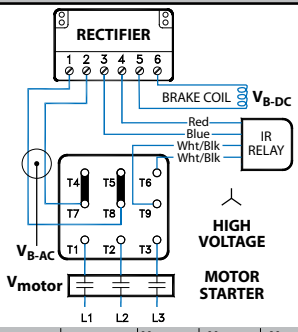
GPE Rectifier for External DC-Switching with IR Relay

IR151A — POWERED FROM MOTOR TERMINAL BLOCK — 35
FAST RELEASE (OVER EXCITATION)
FAST STOPPING (DC-SWITCHING)



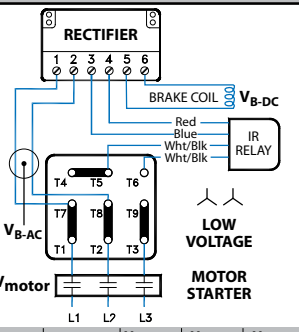
MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	GPE20L	230 VAC	230 VAC	105 VDC

IR151B — POWERED FROM MOTOR TERMINAL BLOCK — 35
STANDARD-RELEASE
FAST STOPPING (DC-SWITCHING)



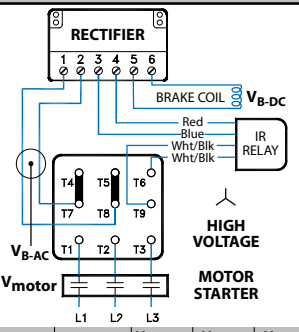
MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	GPE20L	460 VAC	230 VAC	105 VDC

IR152A — POWERED FROM MOTOR TERMINAL BLOCK — 40
STANDARD-RELEASE
VERY FAST STOPPING
(REDUCED POWER HOLD)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	GPE20L	230 VAC	230 VAC	205 VDC

IR152B — POWERED FROM MOTOR TERMINAL BLOCK — 40
STANDARD-RELEASE
VERY FAST STOPPING
(REDUCED POWER HOLD)



MOTOR	RECTIFIER	V_{motor}	V_{B-AC}	V_{B-DC}
230YY/460Y	GPE20L	460 VAC	230 VAC	205 VDC

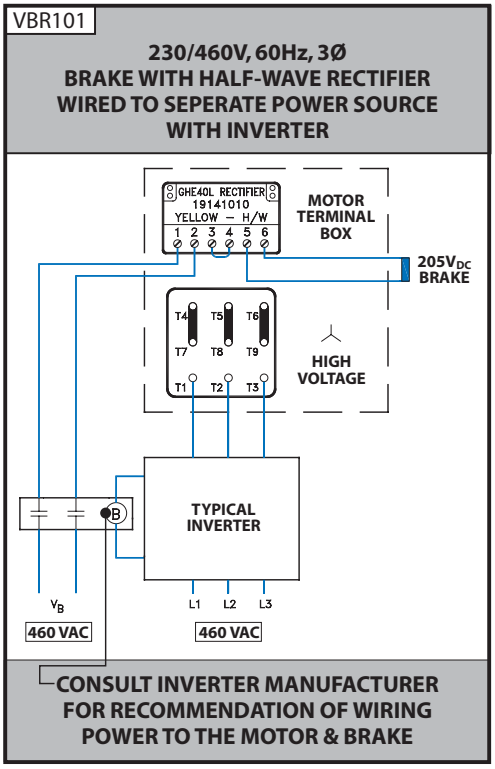
CAUTIONS

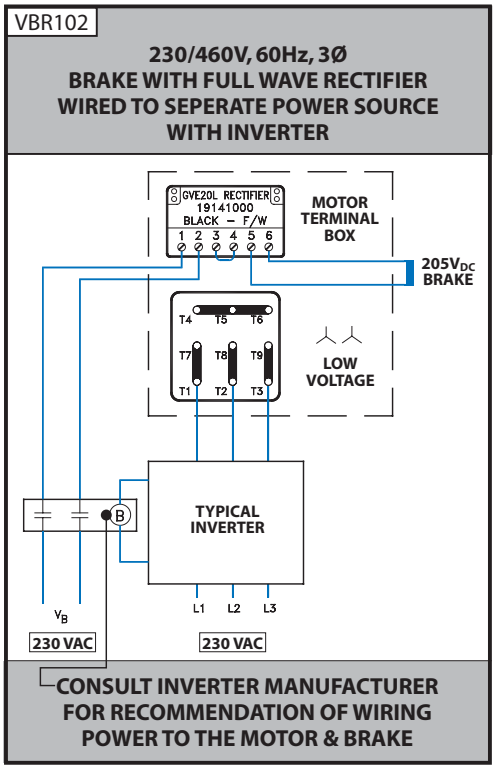
Requirements

- Brake must be powered from the motor's terminal block (not seperately powered)
- Motor must be a single speed and should not be powered by a frequency inverter or soft starter.

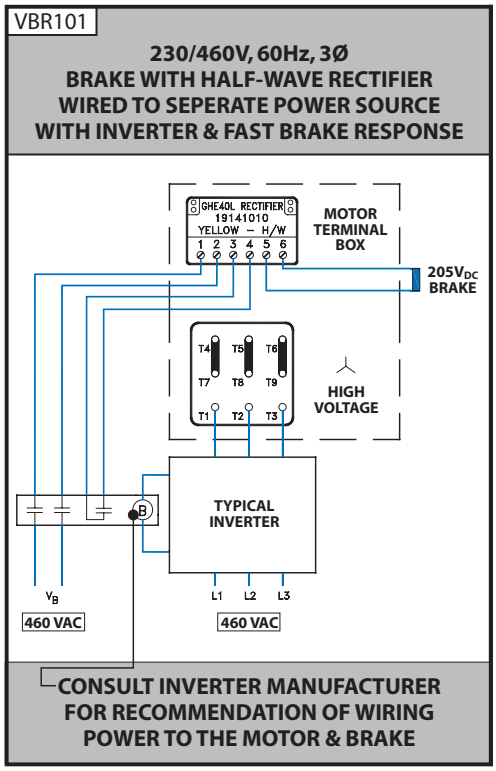
Inverter Driven Brakemotors

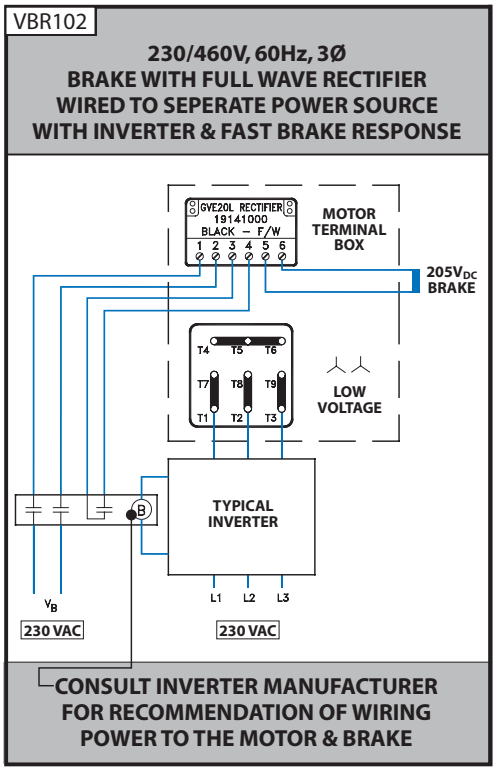
Connection Guide for Brakes with AC-Switching





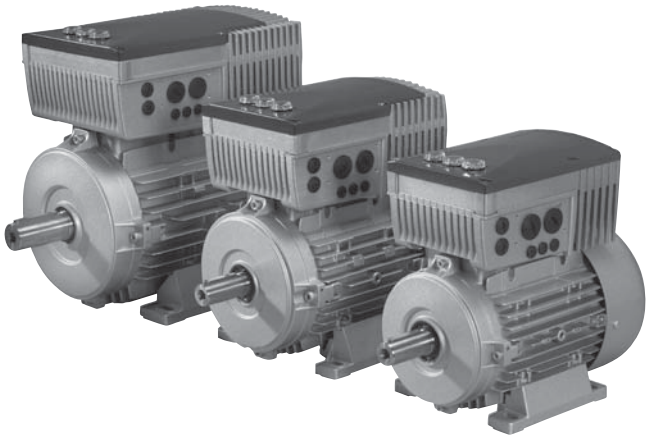
Connection Guide for Brakes with DC-Switching





AC Vector Drives

- AC Vector Drive SK 200E
- AC Vector Drive SK 500E
- Dimensions



DRIVESYSTEMS

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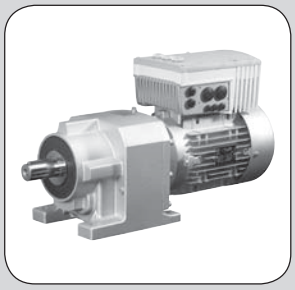
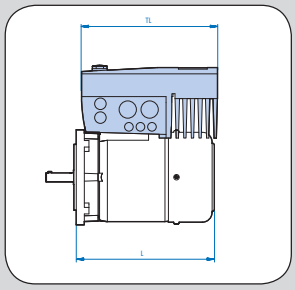
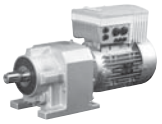
INVERTER DUTY MOTOR





AC Vector Drive
SK 200E Selection



NORDAC SK 200E
Motor Mounted AC Vector Drives

NORD has now added a new member to the distributed control family, the new SK 200E AC vector drive. This series is designed to be mounted directly on the motor terminal box to create a combined, fully integrated unit for use in the field.

The functional spectrum of the SK 200E ranges from simple drive applications to complex positioning control. Their low-cost design, variable equipment, compact size and their compatibility with various connection systems, makes them especially suitable for material handling, pumping, packaging, and a variety of other industrial and commercial applications.

Features of the SK 200E include, but not limited to:

- Sensorless & closed-loop vector control modes for superior speed regulation
- Positioning control capabilities
- Incremental encoder input as standard
- Mechanical brake rectifier and controls
- Configuration DIP switches for quick commissioning
- Plug-in storage module (EEPROM)
- "Safe Stop" and AS-Interface options
- Dynamic braking control for regenerative loads
- Various potentiometer and field bus modules for AC vector drive control
- IP55 & IP66 rated enclosures

SK 200E AC Vector Drive Ratings

- 1~115V 0.33 - 1 hp (0.25 - 0.75kW)
- 1~240V 0.33 - 1.5 hp (0.25 - 1.1 kW)
- 3~240V 0.33 - 15 hp (0.25 - 11 kW)
- 3~480V 0.75 - 30 hp (0.55 - 22 kW)

Electromechanical Brake Interface & Coil Voltage Selection

200E Selection

The SK 200E is supplied electro-mechanical brake controls with the use of a dedicated high voltage DC power supply. The SK 200E utilizes a half-wave rectifier and the brake coil voltage must be specified per the following table:

Nominal AC Input Voltage	Brake Coil Voltage
115/230 V	105 V
400 V	180 V
460/480 V	205 V

Selection Steps

1. SK 2X0E or 2X5E Inverter Selection:
Choose the SK 200E AC Vector drivebased on drive features, motor power rating, input voltage and protection class.

SK 2X0E - Component Class Drive
SK 2X5E - System Class Drive

2. SK 200E Motor Adapter Selection:
Select the required SK 200E motor adapter based on Frame size, Series, Input phases and protection class.

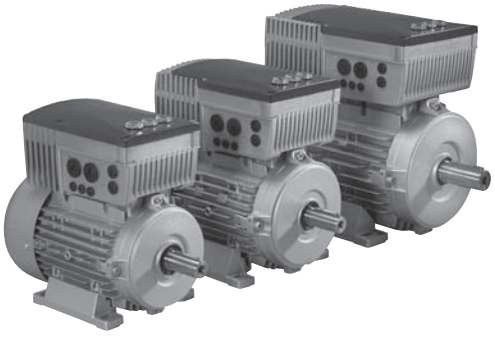
3. Option Module Selection (if required)**:**
Choose specific option modules such as 24VDC power supply, a speed POT or L-O-R switch, or a Fieldbus /IO Extension if they are required for your AC Vector Drives needs.

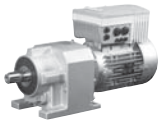
4. Technology Unit Adapter Selection (if required)**:**
Select an assembly adapter based on a specified technology unit and protection class if required.

5. Dynamic Braking Resistor Selection (if required)**:**
Choose a specific braking resistor based on its location as well as its voltage rating and number of phases if required for your Inverter selection.

6. Wall Mount Adapter Selection (if required)**:**
Select a wall mounting unit based on either frame size and/or technology unit if the unit is not to be mounted to a motor.

7. Programmer/Operator Selection (if required)**:**
Choose a specific type of programming/operation device based on specified needs. (if required)





AC Vector Drive
SK 200E Selection

SK200E AC Vector Drives

The range of performance allows users to select a compact device with exactly the features that are required for the particular application, thus ensuring an extremely efficient use of resources. All SK 200E versions have the same appearance, enabling uniform operation and handling. All devices and optional external technology units such as field bus or I/O systems can be linked via an integrated system bus to make integration much simpler.

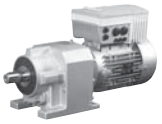
		SK 200E	SK 205E	SK 210E	SK 215E	SK 220E	SK 225E	SK 230E	SK 235E
	Power range 0.33 - 30hp (0.25 kW - 22 kW) (IP55/IP66)	☑	☑	☑	☑	☑	☑	☑	☑
Design	Same Design	☑	☑	☑	☑	☑	☑	☑	☑
	Motor and Wall mounting Available	☑	☑	☑	☑	☑	☑	☑	☑
Characteristics	All standard drive functions	☑	☑	☑	☑	☑	☑	☑	☑
	Consistent parameter structure	☑	☑	☑	☑	☑	☑	☑	☑
	Multiple field bus systems available	☑	☑	☑	☑	☑	☑	☑	☑
Basic functions	Integrated 24V power supply	☑	❍	☑	❍	☑	❍	☑	❍
	24V Control voltage required		☑		☑		☑*		☑*
	Brake Management, mechanical motor brake	❍**	☑	❍**	☑	❍**	☑	❍**	☑
	Brake chopper (brake resistor optional)	☑	☑	☑	☑	☑	☑	☑	☑
	DC Braking	☑	☑	☑	☑	☑	☑	☑	☑
	Flying Start (catching a spinning motor)	☑	☑	☑	☑	☑	☑	☑	☑
	Sensorless current vector control (ISD control)	☑	☑	☑	☑	☑	☑	☑	☑
	Plug-in storage module (EEPROM)	☑	☑	☑	☑	☑	☑	☑	☑
	Line filter Class C2	☑	☑	☑	☑	☑	☑	☑	☑
	Switchable parameter sets	☑	☑	☑	☑	☑	☑	☑	☑
	Process controller / PID controller	☑	❍	☑	❍	☑	❍	☑	❍
	Incremental encoder evaluation ❶	☑	☑	☑	☑	☑	☑	☑	☑
	POSICON (positioning control) ❷	☑	☑	☑	☑	☑	☑	☑	☑
	Automatic flux adaptation (energy saving function)	☑	☑	☑	☑	☑	☑	☑	☑
Special functions	"Safe stop" function			☑	☑			☑	☑
	AS interface on board					☑	☑	☑	☑
Options	Bus modules with/without M12 plug connectors for I/Os	❍	❍	❍	❍	❍	❍	❍	❍
	I/O Modules	❍	❍	❍	❍	❍	❍	❍	❍
	Stand-alone operation (24V control power supply)	☑	❍	☑	❍	☑	❍*	☑	❍*
	Power connectors (e.g. Harting HAN 10E)	❍	❍	❍	❍	❍	❍	❍	❍
	Internal/external brake resistors	❍	❍	❍	❍	❍	❍	❍	❍
	Potentiometer versions	❍	❍	❍	❍	❍	❍	❍	❍

☑ Standard Functions ❍ Optional Functions * 24V Supply via AS-i ❍** Size 4 Includes brake management

❶ Requires HTL output encoder on motor for closed loop vector.

❷ With HTL output incremental encoder or CAN output absolute encoder.

AC Vector Drive
SK 200E



Step 1: SK 2XXE Selection

	Component Class		kW Rating		Input Voltage		Protection Class
SK	❶	E	❷	-	❸		❹

	System Class		kW Rating		Input Voltage		Protection Class
SK	❶	E	❷	-	❸		❹

❶ Component Class Series
200 - Basic Unit
210 - Basic Unit + Safe Stop Function
220 - Basic Unit + AS Interface
230 - Basic Unit + AS Interface + Safe Stop

❶ System Class Series
205 - Basic Unit
215 - Basic Unit + Safe Stop Function
225 - Basic Unit + AS Interface
235 - Basic Unit + AS Interface + Safe Stop

❷ Power Rating
250 - 0.25 kW (0.33 hp)
370 - 0.37 kW (0.50 hp)
550 - 0.55 kW (0.75 hp)
750 - 0.75 kW (1.00 hp)
111 - 1.1 kW (1.50 hp)
151 - 1.5 kW (2.00 hp)
221 - 2.2 kW (3.00 hp)
301 - 3.0 kW (4.00 hp)
401 - 4.0 kW (5.00 hp)
551 - 5.5 kW (7.50 hp)
751 - 7.5 kW (10.0 hp)
112: 11.0 kW (15.0 hp) *** Size 4 only**
152: 15.0 kW (20 hp) *** Size 4 only**
182: 18.0 kW (25 hp) *** Size 4 only**
222: 22.0 kW (30 hp) *** Size 4 only**

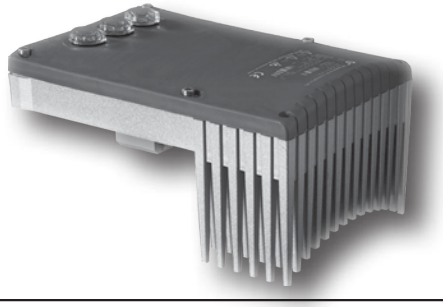
❷ Power Rating
250 - 0.25 kW (0.33 hp)
370 - 0.37 kW (0.50 hp)
550 - 0.55 kW (0.75 hp)
750 - 0.75 kW (1.00 hp)
111 - 1.1 kW (1.50 hp)
151 - 1.5 kW (2.00 hp)
221 - 2.2 kW (3.00 hp)
301 - 3.0 kW (4.00 hp)
401 - 4.0 kW (5.00 hp)
551 - 5.5 kW (7.50 hp)
751 - 7.5 kW (10.0 hp)

❸ Input Voltage
112-O - 100-120V, 1-phase (0.25-0.75 kW) (0.33-1 hp)
123-A - 200-240V, 1-phase (0.25-1.1 kW) (0.33-1.5 hp)
323-A - 200-240V, 3-phase (0.25-4.0 kW) (0.33 - 5 hp)
323-A - 200-240V, 3-phase (0.5.5-11 kW) (7.5 - 15 hp) *** Size 4 only**
340-A - 380-480V, 3-phase (0.75-7.5 kW) (1-10 hp)
340-A - 380-480V, 3-phase (11-22 kW) (15-30 hp) *** Size 4 only**

❸ Input Voltage
112-O - 100-120V, 1-phase (0.25-0.75 kW) (0.33-1 hp)
123-A - 200-240V, 1-phase (0.25-0.55 kW) (0.33-0.75 hp)
323-A - 200-240V, 3-phase (0.25-4.0 kW) (0.33 - 5 hp)
340-A - 380-480V, 3-phase (0.75-7.5 kW) (1-10 hp)

❹ Protection Class
Blank - IP55
-C - IP66

❹ Protection Class
Blank - IP55
-C - IP66



Step 2: SK 200E Motor Adapter Selection

	Frame Size		Series		# of Input Phases		Protection Class
SK TI4	❺	E	❶	-	❻		❹

❺ Frame Size
• **1** - 100-120V, 1-phase (0.25-0.37 kW) (0.33-0.50 hp) - 200-240V, 1-phase (0.25-0.55 kW) (0.33-0.75 hp) - 200-240V, 3-phase (0.25-1.1 kW) (0.33-1.5 hp) - 380-480V, 3-phase (0.75-2.2 kW) (0.33-3 hp)
• **2** - 100-120V, 1-phase (0.55-0.75 kW) (0.75-1.0 hp) - 200-240V, 1-phase (0.75-1.1 kW) (1-1.5 hp) - 200-240V, 3-phase (1.5-2.2 kW) (2-3 hp) - 380-480V, 3-phase (3.0-4.0 kW) (4-5 hp)
• **3** - 200-240V, 3-phase (3.0-4.0 kW) (4-5 hp) - 380-480V, 3-phase (5.0-7.5 kW) 6.5-10 hp)
• **4** - 200-240V, 3-phase (5.5-11.0 kW) (7.5-15 hp) - 380-480V, 3-phase (11.0-22.0 kW) (15-30 hp)

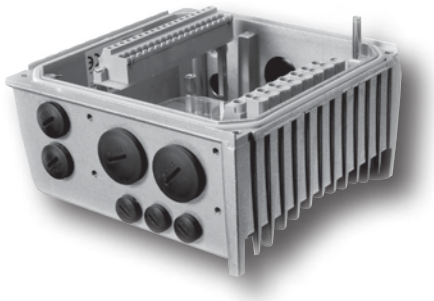
❶ Series
200 - Basic Unit (Component Class)
205 - Basic Unit (System Class)
210 - Basic Unit + Safe Stop Function (Component Class)
215 - Basic Unit + Safe Stop Function (System Class)
220 - Basic Unit + AS Interface (Component Class)
225 - Basic Unit + AS Interface (System Class)
230 - Basic Unit + AS Interface + Safe Stop (Component Class)
235 - Basic Unit + AS Interface + Safe Stop (System Class)

❻ # of Input Phases
3 - 3-phase

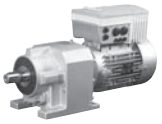
❹ Protection Class
Blank - IP55
- C - IP66

Motor Adapter Interface

The SK 200E requires a motor adapter/interface so it may be properly mounted to the motor or to an appropriate wall-mount bracket. The motor adapter houses the input power and motor terminals, as well as the standard control I/O. The motor adapter also allows the user to install internal option modules and dynamic braking resistors. The outside of the motor adapter has provisions to install external option modules and dynamic braking resisters, as well as quick-disconnect power and control connectors.



AC Vector Drive
SK 200E



Step 3: 24VDC Power Supply Selection (if required)

	Module Type		Module Input Voltage*		Protection Class*
SK	❼	- 24V -	❽		❹

* applies only to external "TU4" units

❼ Module Type (Internal/External)
CU4 - Internal Customer Unit
TU4 - External Technology Unit

❽ Module Input Voltage
123B - All 100-120V & 200-240V Units
140B - All 380-480V Units

❹ Protection Class
Blank - IP55
-C - IP66

Step 3: Speed POT & L-O-R Switch (if required)

	Module Type		Module Input Voltage*		Protection Class*
SK	❼	- POT -	❽		❹

* applies only to external "TU4" units

❼ Module Type (Internal/External)
CU4 - Internal Customer Unit
TU4 - External Technology Unit

❽ Module Input Voltage
123B - All 100-120V & 200-240V Units
140B - All 380-480V Units

❹ Protection Class
Blank - IP55
-C - IP66

Step 3: Fieldbus / IO Extention Selection (if required)

	Module Type		Fieldbus/IOE Option		M12 Connect Option*		Protection Class*
SK	❼	-	❾	-	❿		❹

* applies only to external "TU4" units

❼ Module Type (Internal/External)
CU4 - Internal Customer Unit
TU4 - External Technology Unit

❾ Fieldbus, I/O Extension Module
PBR - Profibus
CAO - CANopen
DEV - DeviceNet
IOE - I/O Extension

❿ M12 Connectors for Module I/O
Blank - Not required
M12 - M12 Connectors Included

❹ Protection Class
Blank - IP55
-C - IP66

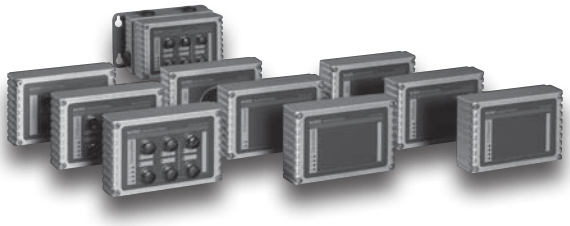
Customer Units

Internal customer interfaces enable the expansion of the range of functions of SK 200E AC vector drive without changing the physical size. Users have access to communication modules, an internal control power module or an I/O expansion.

Technology Units

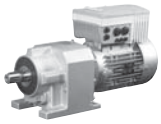
For the distributed control SK 200E AC vector drives, optional technology units are available.

These units may be mounted directly on the device or separately on the machine frame or plant component. Communication systems both with & without connection facilities for sensors, actuators and control modules are available for most current applications. All external technology adapters require an adapter for proper operation and coordination with the SK 200E. (SK TI4-TU-XXX selection on page 241)



Customer & Technology Unit Options Include:

- 24Vdc power supply
- Potentiometer & start/stop selector switch
- Expanded I/O control
- Profibus
- CANopen
- DeviceNet



Step 4: Technology Unit Adaptor Selection
(required for all "SK TU44-xxx" modules)

	Assembly Adaptor for TU4*	Protection Class*
SK TI4-TU-	⓫	❹

* applies only to external "TU4" units

⓫ Assembly Adaptor for TU4 Technology Units
BUS - For all PBR, CAO, DEV, and IOE Technology Units
NET - For all 24V and POT Technology Units

❹ Protection Class
Blank - IP55
-C - IP66

Step 5:Dynamic Braking Resistor Selection (if required)

	Dynamic Braking Resistor Location	Dynamic Braking Resistor Rating
SK TI4-TU-	⓬	⓭

⓬ Dynamic Braking Resistor Location
BUS - For all PBR, CAO, DEV, and IOE Technology Units
NET - For all 24V and POT Technology Units

⓭ Dynamic Braking Resistor Rating
1-100-100 - 100-120V, 1-phase & 200-240V 1-phase (all ratings)
1-200-100 - 200-240V, 3-phase (0.25-2.2 kW)
2-100-200 - 200-240V, 3-phase (3.0-4.0 kW)
1-400-100 - 380-480V, 3-phase (0.55-4.0 kW)
2-200-200 - 380-480V, 3-phase (5.5-7.5 kW)

Step 6: Wall Mount Adaptor Selection (if required)

	Selection Code For Adaptor
SK TIE4-WMK-	⓮

⓮ Selection Code for Adaptor
1 - For inverter frame sizes 1 & 2**
2 - For inverter frame size 3**
TU - For external Technology Units

** See Box ❺ on page 239 for frame sizes

Step 7: Programmer/Operation Device (if required)

Programmer/Operation Device Selection
❑ **SK CSX-3H -** Simple Box (LED Display)
❑ **SK PAR-3H -** Parameter Box (LCD English Display)
❑ **SK PAR-2E -** Panel Mount Parameter Box (LCD English Display)
❑ **RJ12-SUB/D -** PC Cable for NORDCON software

Dynamic Braking Resistor

The SK 200E also has options for internal and external dynamic braking resistors (DBR). A DBR is used for applications with regenerative loads such as lifting, cyclical, and high inertia loads. The DBR will dissipate the regenerative energy from the motor as heat using the internal brake chopper that is provided with the SK 200E.

Wall Mount Kit

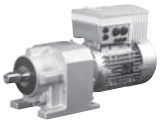
The SK 200E may be installed away from the motor with the use of a wall-mount kit. The motor adapter is mounted on the wall-mount kit instead of on the motor conduit box and may be installed on a wall, piece of machinery, or in a panel. The IP55 or IP66 protection is maintained when used with a wall-mount kit.

Programming Tools

A variety of programming and operation interfaces are available for the SK 200E. The SK PAR-3H (handheld) and SK PAR-2E (panel mount) provide programming, troubleshooting, and operation controls with an easy to use LCD English display. These modules have the capability of storing up to 5 different parameter sets for simple transfer of settings to other units.

The SK CSX-3H is used in a similar fashion as the SK PAR-3H and SK PAR-2E, but implements a bright, 4-digit 7-segment LED display.

With the use of Nord's RJ12-SUB/D cable, users may connect a SK 200E to a PC and configure it with NORDCON software. NORDCON is a Windows-based program that enables the user to program, upload/download parameter sets, troubleshoot with built-in oscilloscope function, and control their AC vector drive.



SK 200E General Specifications

	Inverter type SK 2xxE...	Input voltage	Output voltage	Nominal motor power 230V [kW]	Nominal motor power 230V [hp]	Nominal output current rms [A]	Typical input current rms [A]
1 ~ 100 ... 120V	-250-112-O	1 ~ 100...120V -/+10% 47...63Hz	3 AC 0–200...240V	0.25	1/3	1.7	8.9
	-370-112-O			0.37	1/2	2.2	11
	-550-112-O			0.55	3/4	3.0	13.1
	-750-112-O			0.75	1	4.0	20

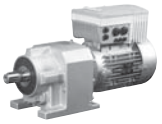
	Inverter type SK 2xxE...	Input voltage	Output voltage	Nominal motor power 230 V [kW]	Nominal motor power 230 V [hp]	Nominal output current rms [A]	Typical input current rms [A]
1 ~ 200 ... 240V	-250-123-A	1 ~ 200...240V -/+10% 47...63Hz	3 AC 0–200...240V	0.25	1/3	1.7	3.9
	-370-123-A			0.37	1/2	2.2	5.8
	-550-123-A			0.55	3/4	3.0	7.3
	-750-123-A			0.75	1	4.0	10.2
	-111-123-A			1.1	1 1/2	5.5	14.7

SK 200E General Specifications

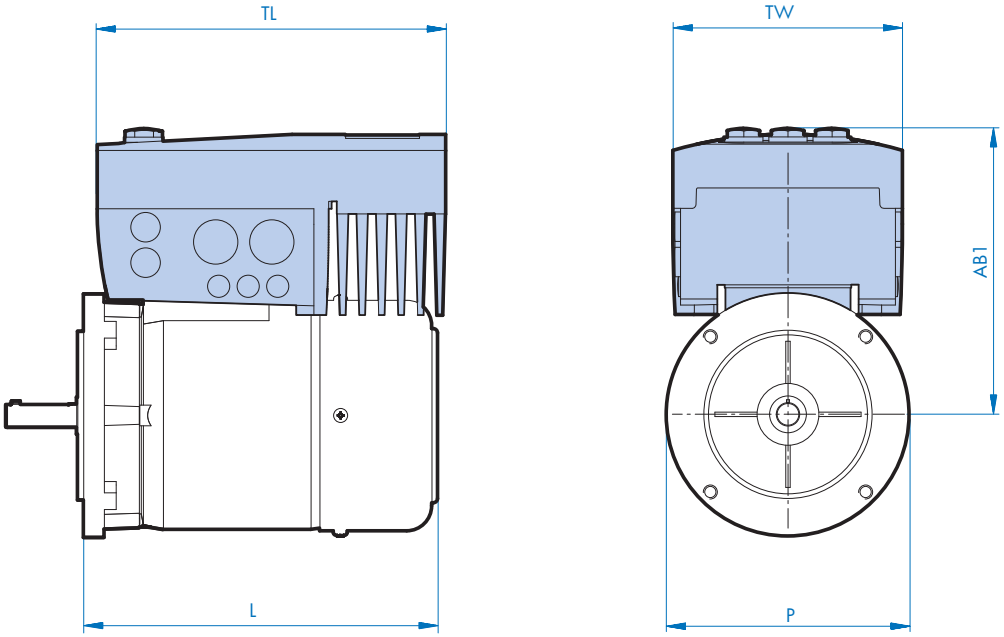
	Inverter type SK 2xxE...	Input voltage	Nominal motor power 230V [kW]	Nominal motor power 230V [hp]	Nominal output current rms [A]	Typical input current rms [A]
3 ~ 200 ... 240V	-250-323-A	3 ~ 200...240V -/+10% 47...63Hz	0.25	1/3	1.7	1.4
	-370-323-A		0.37	1/2	2.2	1.9
	-550-323-A		0.55	3/4	3.0	2.6
	-750-323-A		0.75	1	4.0	3.5
	-111-323-A		1.1	1 1/2	5.5	5.1
	-151-323-A		1.5	2	7.0	6.6
	-221-323-A		2.2	3	9.5	9.1
	-301-323-A		3	4	12.5	11.8
	-401-323-A		4	5	16	15.1

	Inverter type SK 2xxE...	Input voltage	Nominal motor power 400V [kW]	Nominal motor power 460V [hp]	Nominal output current rms [A]	Typical input current rms [A]
3 ~ 380 ... 500V	-550-340-A	3 ~ 380...500V -20%/+10% 47...63Hz	0.55	3/4	1.7	1.6
	-750-340-A		0.75	1	2.3	2.2
	-111-340-A		1.1	1 1/2	3.1	2.9
	-151-340-A		1.5	2	4.0	3.7
	-221-340-A		2.2	3	5.5	5.7
	-301-340-A		3.0	4	7.5	7.0
	-401-340-A		4.0	5	9.5	8.3
	-551-340-A		5.5	7 1/2	12.5	11.7
	-751-340-A		7.5	10	16	15.0

Dimensions
SK 200E AC Vector Drive



Motor Dimensions with SK 200E Motor Mounted AC Vector Drive



AC Vector Drive Size	Motor	Width P [in]	Width TW [in]	Length L [in]	Length TL [in]	AB1 [in]	Weight [lbs]
Size 1	71S/L	5.71	6.14	8.43	9.29	7.91	6.61
	80S/L	6.50		9.29		7.68	
	90S/L	7.20		10.87		7.87	
	100L/LA	7.91		12.05		8.23	
Size 2	80S/L	6.50	6.93	9.29	10.47	7.95	9.04
	90S/L	7.20		10.87		8.15	
	100L/LA	7.91		12.05		8.58	
	112M	8.98		12.83		8.98	
Size 3	100L/LA	7.91	8.58	12.05	12.99	9.88	15.21
	112M	8.98		12.83		10.28	
	132S/M	10.47		16.18		10.31	
Size 4	132S/M	10.47	12.01	16.18	18.90	12.32	37.48
	160M/L	12.60		19.37		12.52	
	180MX/LX	14.09		24.17		13.19	

SK 200E General Specifications

Function	Specification
Power / Voltage	• 1~100...120V -/+10% 0.33 - 1 hp (0.25-0.75 kW) • 1~100...240V -/+10% 0.33 - 1 hp (0.25 - 0.75 kW) • 1~200...240V -/+10% 0.33 - 1.5 hp (0.25 - 1.1 kW) • 3~200...240V -/+10% 0.33 - 15 hp (0.25 - 11 kW) • 3~380...500V -20% +10% 0.75 - 30 hp (0.55 - 22 kW)
Input frequency rating tolerance	47 … 63 Hz
Output frequency	0.0 ... 400.0 Hz
Pulse frequency	3.0 ...16.0kHz, standard setting = 6kHz Power reduction > 8kHz for 115/230V device, > 6kHz for 400V device
Rated overload capacity	150% for 60s, 200% for 3.5s
Protective measures against	• Overheating of the frequency inverter • Short circuit, earthing fault • Over/under-voltage • Over/underload, idling
Motor Turndown	• V/f Const Torque 10:1 • Closed Loop Vector 1000:1 • Sensorless Vector 30:1
Motor temperature Monitoring	Temperature sensor (PTC), temperature monitor (bimetal), I^2t- motor
Digital input	4x, low 0-5V, high 14-30, R_i = 9.5kΩ, C_i = 10nF, cycle time =4mc
Electrical isolation	Control terminals
Control Methods	• V/f Constant torque • Sensorless Vector (ISD) • Energy saving mode • Closed-Loop Vector
Control outputs	Digital output: 18-30V DC (according to VI 24V), maximum 200mA, maximum 100kΩ load Brake rectifier: maximum 0.5A choke voltage, voltage according to mains
Interfaces	Standard: RS 485 (USS), RS 232 (single slave), System Bus Optional: Profibus, CANopen, DeviceNet, AS Interface
Energy Efficiency of AC drive	Approximately 95% according to size
Ambient temperature	-25 ...+40°C (S1- 100% ED), -25 ... +50°C(S3 - 75% ED 15min)
Storage & transport temp.	-25 ...+60 / 70°C
Long term storage	• Connect the FI & the 24V modules to the mains voltage for 60 min. before 1 storage year • Connect the FI & the 24V modules to the 24V control for 60 min. before 1 storage year • Maintain this cycle throughout the storage period
Protection class	IP55, optional IP66
Maximum mounting altitude above sea level	• Up to 1000m – No power reduction • 1000 - 4000m – 1% per 100m power reduction (up to 2000m overvoltage cat.3) • 2000 - 4000m – Overvoltage cat. 2 is maintained, external overvoltage protection at the mains input is necessary
Waiting period between power-up cycles	60 seconds for all devices in a normal operating cycle
Accel / Decel Time	0.0 … 320.0s
Connection terminals	• Mains or motor / brake resistance - 4mm² with wiring sleeves, 6mm² with rigid cable • Control unit / system bus - 2.5mm² with 1.5mm² wiring sleeves • RS485 / RS232 - 1xRJ12 (6-pin)
Connection terminal screw tightening torque	1.2 - 10.5 Nm
External 24V supply voltage	18...30V DC, at least 200-800mA according to load

AC Vector Drives
SK 500E

NORDAC SK 500E AC Vector Drives

NORD has now expanded it centralized control family by adding increased functionality with new versions of the SK 500E AC vector drive line. This series is designed to be mounted in a control panel to seamlessly integrate with the centralized controls.

With the SK 500E series of AC vector drives, NORD offers intelligent and cost effective drive solutions with scalable equipment options, which are all fully compatible with regard to motor performance range, supply voltage and sizes. The basis for all models is a well-equipped basic unit with expansion possibilities through optional modules. SK 500E AC vector drives are suitable for all application areas and can be easily adapted to specific requirements with plug-in technology units.

Features of the SK 500E include, but not limited to:

- Sensorless & closed loop vector control modes for superior speed regulation
- Positioning control capabilities
- Incremental and absolute encoder inputs
- "Safe Stop" as per EN 954-1, max. Cat. 4
- Dynamic braking control for regenerative loads
- Various potentiometer and field bus modules for AC vector drive control

SK 500E AC Vector Drive Ratings

- 1~115V 0.33 - 1 hp (0.25 - 0.75kW)
- 1~240V 0.33 - 3 hp (0.25 - 2.2 kW)
- 3~240V 0.33 - 25 hp (0.25 - 18.5 kW)
- 3~480V 0.75 - 125 hp (0.55 - 90 kW)

Selection Steps

1. SK 500E Inverter Selection:
Choose the SK 500E AC vector drive based on motor power rating, input voltage supply, and drive features. Use the SK 500E Rating & Voltage Matrix to ensure the desired Series is available in the selected kW Rating and Input Voltage ratings.

2. Interface Module (Tech. Unit) Selection (if required)**:**
Choose specific technology unit such as speed POT with start/stop, fieldbus interface, or programming and display module.

3. Dynamic Braking Resistor Selection (if required)**:**
Choose a specific braking resistor based on the AC vector drive's voltage and power rating

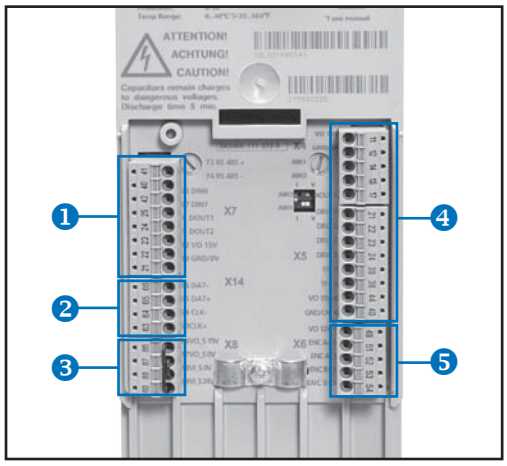
4. Programmer/Operator Selection (recommended)**:**
Choose a specific type of programming/operation device based on specified needs. (if required)

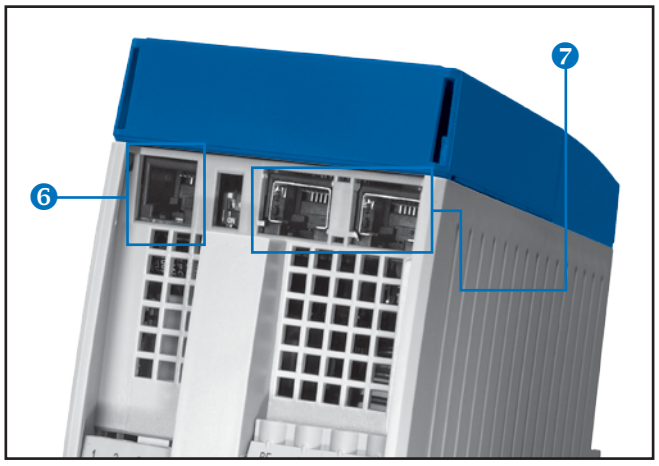
NORDAC SK 500E AC Vector Drives

The range of options and performance allows users to select a device with the exact features that are required for the application, thus ensuring an extremely efficient use of resources. All SK 500E versions have the same appearance, enabling uniform operation and handling. All devices and optional technology units such as field bus or I/O systems can be linked via an integrated system bus to make integration much simpler.

		SK 500E	SK 505E	SK 510E	SK 511E	SK 515E	SK 520E	SK 530E	SK 535E	SK 540E	SK 545E
Power	Power range 0.33 kW - 10 kW	☑	☑	☑	☑		☑	☑	☑	☑	☑
	Power range 15kW - 125kW					☑			☑		☑
Basic functions	Same design	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
	Coldplate up to Size 4, external heat sink technology up to Size 2	☑	☑	☑	☑		☑	☑	☑	☑	☑
Basic functions	Sensorless current vector control (ISD control)	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
	Line filter Class C2	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
	Brake management, mech. motor brake	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
	Brake chopper (brake resistor optional)	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
	Switchable parameter sets	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
	All normal drive functions	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
	Process controller / PID controller	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
	Consistent parameter structure	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
	All common bus systems via Tech. Units	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
	Automatic flux optimisation (energy saving function)	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Special options	"Safe stop" function			☑	☑	☑		☑	☑	☑	☑
	CANopen on Board				☑	☑ (Size 5-7)	☑	☑	☑	☑	☑
	Incremental encoder input						☑	☑	☑	☑	☑
	Additional control inputs and outputs						☑	☑	☑	☑	☑
	POSICON (positioning control)							☑	☑	☑	☑
	24V power supply for control board (mandatory up to 10kW, optional above 15kW)		☑			☑			☑		☑
	PLC logic function									☑	☑
	Universal encoder interface									☑	☑
	Synchronous motor operation									☑	☑

AC Vector Drives
SK 500E





Interfaces	SK 500E	SK 505E	SK 510E	SK 511E	SK 515E	SK 520E	SK 530E	SK 535E	SK 540E	SK 545E
4 5x digital inputs 2x analog inputs (0...10V, 0/4...20mA) 1x analog output 2x multi-function relays RS 485 and RS 232 on RJ 12 socket	☑	☑	☑	☑	☑*	☑	☑	☑*	☑ up to Size 4: One DIN implemented as potential-isolated thermistor input	☑*
5 1x Incremental encoder input						☑	☑	☑	☑	☑
1 Additionally 2x digital inputs 2x digital outputs 1x RS 485 to terminal						☑	☑	☑	☑ One DIN can be parameterised as DOUT & one DOUT as DIN	☑
Additional potential-isolated thermistor input					☑ (above Size 5)			☑ (above Size 5)		☑ (above Size 5)
External 24V supply for the control board		☑			☑			☑		☑
3 Safety Function "Safe Stop"			☑	☑	☑		☑	☑	☑	☑
7 2x RJ 45 for CANopen In/Out				☑	☑ (above Size 5)	☑	☑	☑	☑	☑
6 1x RJ 12 for operation and diagnosis	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
2 Universal encoder interface									☑	☑

* From Size 5 and above the analog inputs can also be used for +/- 10V signals

SK 500E Rating and Voltage Matrix

kW (hp)	SK 500E				SK 505E				SK 510E				SK 511E				SK 515E			
	120V 1-ϕ	230V 1-ϕ	230V 3-ϕ	460V 3-ϕ	120V 1-ϕ	230V 1-ϕ	230V 3-ϕ	460V 3-ϕ	120V 1-ϕ	230V 1-ϕ	230V 3-ϕ	460V 3-ϕ	120V 1-ϕ	230V 1-ϕ	230V 3-ϕ	460V 3-ϕ	120V 1-ϕ	230V 1-ϕ	230V 3-ϕ	460V 3-ϕ
0.25 (0.33)	♦	♦	♦			✹	✹			♦	♦			♦	♦					
0.37 (0.50)	♦	♦	♦			✹	✹			♦	♦			♦	♦					
0.55 (0.75)	♦	♦	♦	♦		✹	✹	✹		♦	♦	♦		♦	♦	♦				
0.75 (1.0)	♦	♦	♦	♦		✹	✹	✹		♦	♦	♦		♦	♦	♦				
1.1 (1.5)		♦	♦	♦		✹	✹	✹		♦	♦	♦		♦	♦	♦				
1.5 (2.0)		♦	♦	♦		✹	✹	✹		♦	♦	♦		♦	♦	♦				
2.2 (3.0)		♦	♦	♦		✹	✹	✹		♦	♦	♦		♦	♦	♦				
3.0 (4.0)			♦	♦			✹	✹			♦	♦			♦	♦				
4.0 (5.0)			♦	♦			✹	✹			♦	♦			♦	♦				
5.5 (7.5)				♦				✹				♦				♦			✪	
7.5 (10.0)				♦				✹				♦				♦			✪	
11.0 (15.0)																			✪	✪
15.0 (20.0)																			✪	✪
18.5 (25.0)																			✪	✪
22.0 (30.0)																				✪
30.0 (40.0)																				✪
37.0 (50.0)																				✪
45.0 (60.0)																				✪
55.0 (75.0)																				✪
75.0 (100.0)																				✪
90.0 (125.0)																				✪

♦ 24VDC control voltage supply internal ✹ 24VDC control voltage required from external source ✪ 24VDC control voltage supply internal or external

kW (hp)	SK 520E				SK 530E				SK 535E				SK 540E				SK 545E			
	120V 1-ϕ	230V 1-ϕ	230V 3-ϕ	460V 3-ϕ	120V 1-ϕ	230V 1-ϕ	230V 3-ϕ	460V 3-ϕ	120V 1-ϕ	230V 1-ϕ	230V 3-ϕ	460V 3-ϕ	120V 1-ϕ	230V 1-ϕ	230V 3-ϕ	460V 3-ϕ	120V 1-ϕ	230V 1-ϕ	230V 3-ϕ	460V 3-ϕ
0.25 (0.33)	♦	♦	♦		♦	♦	♦			✹	✹		♦	♦	♦			✹	✹	
0.37 (0.50)	♦	♦	♦		♦	♦	♦			✹	✹		♦	♦	♦			✹	✹	
0.55 (0.75)	♦	♦	♦	♦	♦	♦	♦	♦		✹	✹	✹	♦	♦	♦	♦		✹	✹	✹
0.75 (1.0)	♦	♦	♦	♦	♦	♦	♦	♦		✹	✹	✹	♦	♦	♦	♦		✹	✹	✹
1.1 (1.5)		♦	♦	♦		♦	♦	♦		✹	✹	✹		♦	♦	♦		✹	✹	✹
1.5 (2.0)		♦	♦	♦		♦	♦	♦		✹	✹	✹		♦	♦	♦		✹	✹	✹
2.2 (3.0)		♦	♦	♦		♦	♦	♦		✹	✹	✹		♦	♦	♦		✹	✹	✹
3.0 (4.0)			♦	♦			♦	♦			✹	✹			♦	♦			✹	✹
4.0 (5.0)			♦	♦			♦	♦			✹	✹			♦	♦			✹	✹
5.5 (7.5)				♦				♦			✪	✹				♦			✪	✹
7.5 (10.0)				♦				♦			✪	✹				♦			✪	✹
11.0 (15.0)											✪	✪							✪	✪
15.0 (20.0)											✪	✪							✪	✪
18.5 (25.0)											✪	✪							✪	✪
22.0 (30.0)												✪								✪
30.0 (40.0)												✪								✪
37.0 (50.0)												✪								✪
45.0 (60.0)												✪								✪
55.0 (75.0)												✪								✪
75.0 (100.0)												✪								✪
90.0 (125.0)												✪								✪

♦ 24VDC control voltage supply internal ✹ 24VDC control voltage required from external source ✪ 24VDC control voltage supply internal or external

AC Vector Drives
SK 500E

Step 1: SK 500E Inverter Selection

	Series		kW Rating		Input Voltage
SK	❸*	**E**	❶*	**-**	❷*

❶*	kW Rating
250 - 0.25 kW (0.33 hp)	
370 - 0.37 kW (0.50 hp)	
550 - 0.55 kW (0.75 hp)	
750 - 0.75 kW (1.00 hp)	
111 - 1.10 kW (1.50 hp)	
151 - 1.50 kW (2.00 hp)	
221 - 2.20 kW (3.00 hp)	
301- 3.00 kW (4.00 hp)	
401 - 4.00 kW (5.00 hp)	
551 - 5.50 kW (7.50 hp)	
751 - 7.50 kW (10.00 hp)	
112 - 11.0 kW (15 hp)	
152 - 15.0 kW (20 hp)	
182 - 18.5 kW (25 hp)	
222 - 22.0 kW (30 hp)	
302 - 30.0 kW (40 hp)	
372 - 37.0 kW (50 hp)	
452 - 45.0 kW (60 hp)	
552 - 55.0 kW (75 hp)	
752 - 75.0 kW (100 hp)	
902 - 90.0 kW (125 hp)	

❷*	Input Voltage
112-O - 100-120V, 1-phase (0.25 - 0.75 kW) (0.33 - 1.00 hp)	
323-A - 200-240V, 1-phase (0.25 - 2.20 kW) (0.33 - 3.00 hp)	
323-A - 200-240V, 3-phase (0.25 - 18.5 kW) (0.33 - 25.0 hp)	
340-A - 380-480V, 3-phase (0.55 - 90.0 kW) (0.75 - 125.0 hp)	

❸*	Series
500 - Basic Unit	
505 - Basic Unit + 24V Operation®	
510 - Basic Unit + Safe Stop	
511 - Basic Unit + Safe Stop + CANopen	
515 - Basic Unit + 24V Operation® + Safe Stop + CANopen	
520 - Basic Unit + CANopen + Encoder + Extra I/O	
530 - Basic Unit + Safe Stop + CANopen + Encoder Input + Extra I/O + POSICON	
535 - Basic Unit + Safe Stop + CANopen + Encoder Input + Extra I/O + POSICON + 24V Operation®	
540 - Basic Unit + Safe Stop + CANopen + Encoder Input + Extra I/O + POSICON + Integrated PLC functionality + Universal Encoder Interface	
545 - Basic Unit + Safe Stop + CANopen + Encoder Input + Extra I/O + POSICON + Integrated PLC functionality + Universal Encoder Interface + 24V Operation®	

*** Please Refer to the Rating and Voltage Matrix on page 923 to ensure the desired Series is available in the selected KW and Input Voltage Ratings that you have selected.**

® External 24V supply required on select ratings. Refer to the Rating and Voltage Matrix on page 923 for more detail.

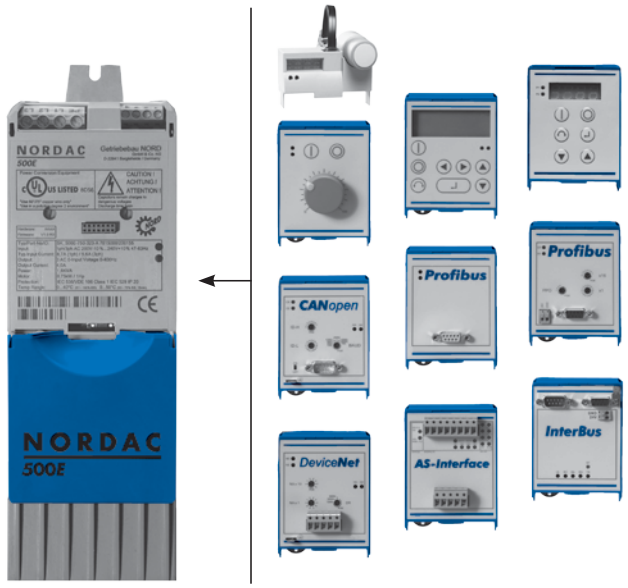
Step 2: Interface Module (Tech. Unit) Selection

SK TU3 - ❶ (Module Type)

Module Type (Internal/External)
CTR - Control box programmer & display
PAR - Parameter box programmer & English display
POT - Speed potentiometer with star/stop and reverse direction
PBR - Profibus interface
PBR-24V - Profibus interface requiring external 24VDC supply
IBS - Interbus interface
CAO - CANopen interface
DEV - DeviceNet interface
AS1 - AS interface
ECT - Ethercat interface
PNT - Profinet interface
EIP - Ethernet/IP Interface
POL - Powerlink Interface

Technology Units

Each SK 500E is equipped with a modular slot with re-movable cover. Here, a technology unit specific for the application can be added to program or control the unit, or to access the field bus system.



Step 3: Dynamic Braking Resistor Selection

SK BR4 - ❶ (Model Type) ❷ (R. Ohms) / ❸ (C. Rating)

❶ Model Type	Input Voltage	Drive Rating	❷ Resistance Ohms	❸ Continuous Rating
4: Footprint (SK 500E) (SK 505E) (SK 510E) (SK 511E) (SK 520E) (SK 530E) (SK 540E)	115/ 230V	0.25 - 0.37 kW	**240**	**100**
		0.55 - 0.75 kW	**150**	**100**
		1.1 - 2.2 kW	**75**	**200**
		3.0 - 4.0 kW	**35**	**400**
	460V	0.55 - 0.75 kW	**400**	**100**
		1.1 - 2.2 kW	**210**	**200**
		3.0 - 4.0 kW	**100**	**400**
		5.5 - 7.5 kW	**60**	**600**
2: Chassis (SK 515E) (SK 535E) (SK 545E)	230V	3.0 - 4.0 kW	**35**	**400**
		5.5 - 7.5 kW	**22**	**600**
		11.0 kW	**12**	**1500**
		15.0 - 18.5 kW	**9**	**2200**
	460V	3.0 - 4.0 kW	**100**	**400**
		5.5 - 7.5 kW	**60**	**600**
		11.0 - 15.0 kW	**30**	**1500**
		18.5 - 22.0 kW	**22**	**2200**
		30.0 - 37.0 kW	**12**	**4000**
		45.0 - 55.0 kW	**8**	**6000**
		75.0 - 90.0 kW	**6**	**7500**

Dynamic Braking Resistors

The SK 500E has options for bottom-mounted (foot-print type) and external-mounted (chassis-type) dynamic braking resistors (DBR). A DBR is used for applications with regenerative loads such as lifting, cyclical, and high inertia loads. The DBR will dissipate the regenerative energy from the motor as heat us-ing the internal brake chopper that is provided with the SK 500E.

Only the bottom-mounted dynamic braking resis-tors are shown in this selection guide. If a DBR for an AC vector drive that was selected is not shown in this guide, refer to the SK 500E operation manual BU 0500 GB for additional information.

The bottom-mounted DBRs are for general braking purposes. Larger DBRs may be required depending on the application parameters. Contact NORD for assistance with selecting the appropriate DBR.

Step 4: Programmer/Operation Selection
(recommended)

Programmer/Operation Selection
SK CSX-3HS - Handheld Simple Box (LED Display)
SK PAR-3H - Handheld Parameter Box (LCD English Display)
SK CSX-3E - Panel Mount Simple Box (LED Display)
SK PAR-3E - Panel Mount Parameter Box (LCD English Display)
RJ12-SUB/D - PC cable for NORDCON software
SK CSX-0 - Simple programmer and display mounted on top of SK 500E

A variety of programming and operation interfaces are available for the SK 500E. The SK PAR-3H (handheld) and SK PAR-3E (panel mount) provide programming, troubleshooting, and operation controls with an easy to use LCD English display. These modules have the capability of storing up to 5 different parameter sets for simple transfer of settings to other units.

SK PAR-3H

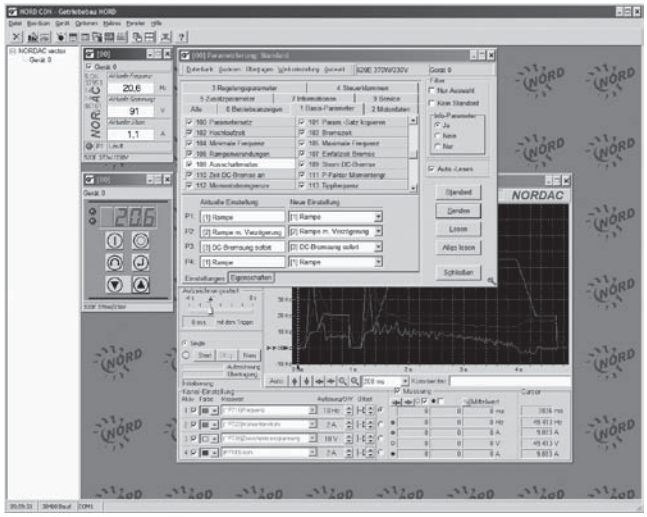
SK PAR-3E

The SK CSX-3H (handheld) and SK CSX-3E (panel mount) is used in a similar fashion as the SK PAR-3H and SK PAR-3E, but implements a bright, 4-digit 7-segment LED display.

SK CSX-3H

SK CSX-3E

With the use of Nord's RJ12-SUB/D cable, users may connect a SK 500E to a PC and configure it with NORDCON software. NORDCON is a Windows-based program that enables the user to program, upload/download parameter sets, troubleshoot with built in oscilloscope function, and control their AC vector drive.



The CSX-0 is a simple programming and control tool that is installed on the top of the SK 500E and provides access to the drive settings and can be used as a local speed controller. An example of when this device may be used is when a field bus technology unit is already installed and the user would like a programming tool with speed readout also installed on the AC vector drive.

SK 500E General Specifications

	Inverter type SK 5xxE...	Mains voltage	Output voltage	Nominal motor output 230 V [kW]	Nominal motor output 240 V [hp]	Nominal output current rms[A]	Typical input current rms[A]	Dim. L x B x D [mm]
1 ~ 110 ... 120V	-250-112-O	1 ~ 110...120V -/+10%. 47...63Hz	3 AC 0-220...240V	0.25	1/3	1.7	8	size1: 186 x 74 x 153
	-370-112-O			0.37	1/2	2.2	10	
	-550-112-O			0.55	3/4	3.0	13	
	750-112-O			0.75	1	4.0	18	

	Inverter type SK 5xxE...	Mains voltage	Nominal motor output 400 V [kW]	Nominal motor output 480 V [hp]	Nominal output current rms[A]	Typical input current rms[A]	Dimensions L x B x D [mm]
1/3 ~ 200 ... 240V	-250-323-A	1/3 ~ 200...240V -/+10%. 47...63Hz	0.25	1/3	1.7	3.7 / 2.4	size1: 186 x 74 x 153
	-370-323-A		0.37	1/2	2.2	4.8 / 3.1	
	-550-323-A		0.55	3/4	3.0	6.5 / 4.2	
	-750-323-A		0.75	1	4.0	8.7 / 5.6	
	-111-323-A		1.1	1 1/2	5.5	12.0 / 7.7	size2: 226 x 74 x 153
	-151-323-A		1.5	2	7.0	15.2 / 9.8	
	-221-323-A		2.2	3	9.0	19.6 / 13.3	

SK 500E General Specifications

	Inverter type SK 5xxE...	Mains voltage	Nominal motor output 400 V [kW]	Nominal motor output 480 V [hp]	Nominal output current rms[A]	Typical input current rms[A]	Dimensions L x B x D [mm]
3 ~ 200 ... 240V	-301-323-A	3 ~ 200...240V. -/+10%. 47...63Hz	3.0	4	12.5	17.5	size3: 241 x 98 x 178
	-401-323-A		4.0	5	16.0	22.4	
	-551-323-A		5.5	$7\frac{1}{2}$	20	28.0	size5: 324 x 157 x 224
	-751-323-A		7.5	10	27	38.0	
	-112-323-A		11	15	40	56.0	size6: 364 x 183 x 234

SK 500E General Specifications

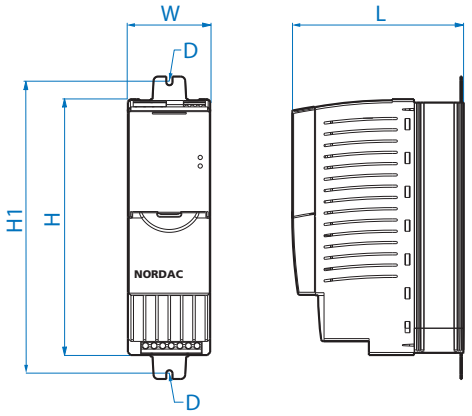
	Inverter type SK 5xxE...	Mains voltage	Nominal motor output 400 V [kW]	Nominal motor output 480 V [hp]	Nominal output current rms[A]	Typical input current rms[A]	Dimensions L x B x D [mm]
3 ~ 380...480V	-550-340-A	3 ~ 380...480V -20%/+10%. 47...63Hz	0.55	3/4	1.7	2.4	Size 1: 186 x 74 x 153
	-750-340-A		0.75	1	2.3	3.2	
	-111-340-A		1.1	1 1/2	3.1	4.3	Size 2: 226 x 74 x 153
	-151-340-A		1.5	2	4.0	5.6	
	-221-340-A		2.2	3	5.5	7.7	
	-301-340-A		3.0	4	7.5	10.5	Size 3: 241 x 98 x 174
	-401-340-A		4.0	5	9.5	13.3	
	-551-340-A		5.5	7 1/2	12.5	17.5	Size 4: 286 x 98 x 174
	-751-340-A		7.5	10	16	22.4	
	-112-340-A		11.0	15	23	33.6	Size 5: 324 x 157 x 224
	-152-340-A		15.0	20	30	43.4	
	-182-340-A		18.5	25	37	53.2	Size 6: 364 x 183 x 234
	-222-340-A		22.0	30	45	64.4	
	-302-340-A		30.0	40	60	84.0	Size 7: 456 x 210 x 236
	-372-340-A		37.0	50	75	105.0	
	-452-340-A		45.0	60	90	125.0	Size 8: 598 x 265 x 286
	-552-340-A		55.0	75	110	145.0	
	-752-340-A		75.0	100	150	200.0	Size 9: 636 x 265 x 286
	-902-340-A		90.0	125	180	230.0	

AC Vector Drives
SK 500E

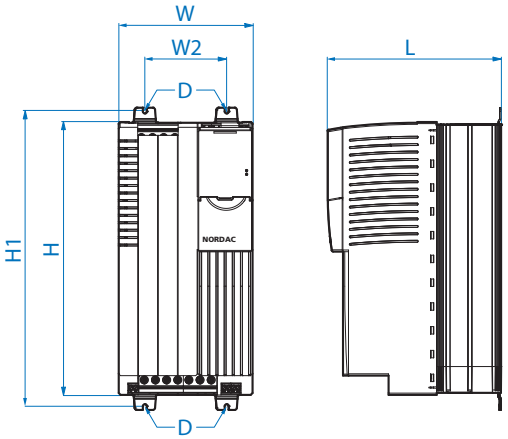
SK 500E General Specifications

Function	Specification
Power / Voltage	• 1~110-120V +/-10% 0.33 - 1.0 hp (0.25 - 1.1 kW) • 1~200-240V +/-10% 0.33 - 3.0 hp (0.25 - 2.2 kW) • 3~200-240V +/-10% 0.33 - 25 hp (0.25 - 18.5 kW) • 3~380-480V +/-10% 0.75 - 125 hp (0.55 - 90.0 kW)
Input frequency rating tolerance	47 - 63Hz
Output frequency	0 - 400Hz
Pulse frequency	3.0 - 16.0kHz, standard setting = 6kHz Power reduction > 8kHz for 115/230V device, > 6kHz for 400V device
Rated overload capacity	150% for 60 seconds, 200% for 5 seconds
Protective measures against	• Overheating of the frequency inverter • Short circuit, earthing fault • Over/under-voltage • Over/underload, idling
Motor Turndown	• V/f Constant Torque 10:1 • Closed Loop Vector 1000:1 • Sensorless Vector 30:1
Motor temperature Monitoring	Temperature sensor (PTC), temperature monitor (bimetal), I^2t- motor
Digital input	5x, 7.5 - 30V (500E), 7x, 7.5 - 35V (520-530E)
Control Methods	• V/f Constant torque • Sensorless Vector (ISD) • Energy saving mode • Closed-Loop Vector
Control outputs	2x Digital output: 15V, 200mA maximum, 100kΩ load (520-530E) 2x Relay output: 230 VAC/24VDC, 24 Amp maximum
Interfaces	Standard: RS 485 (USS), RS 232 (single slave), System Bus Optional: Profibus, CANopen, DeviceNet, AS Interface, Interbus
Energy Efficiency of AC drive	Approximately 95% according to size
Ambient temperature	0 - 40°C (S1 - 100% ED), 0 - 50°C (S3 - 70% ED)
Storage & transport temp.	-25 - 60 / 70°C
Long term storage	• Connect the FI & the 24V modules to the mains voltage for 60 min. before 1 storage year • Maintain this cycle throughout the storage period
Protection class	IP20
Maximum mounting altitude above sea level	• Up to 1000m – No power reduction • 1000 - 4000m – 1% per 100m power reduction (up to 2000m overvoltage cat.3) • 2000 - 4000m – Overvoltage cat. 2 is maintained, external overvoltage protection at the mains input is necessary
Waiting period between power-up cycles	60 seconds for all devices in a normal operating cycle
Accel / Decel Time	0.0 - 320.0s
Connection terminals	• Mains or motor / brake resistance - 25mm² with wiring sleeves, 35mm² with rigid cable • Control unit / system bus - 1.0mm² with wiring sleeves • Relay 1/2 - 1.5mm² with wiring sleeves (S1-4), 4.0 mm² with wiring sleeves (S5-7) • RS485 / RS232 - 1xRJ12 (6-pin) • CANbus/CANopen - 2x RJ45 (8-pin) (except SK 50xE and 510E)
Connection terminal screw tightening torque	0.5 - 0.6 Nm
External 24V supply voltage	18...30V DC, at least 800-1000mA according to load (SK5x5E only)

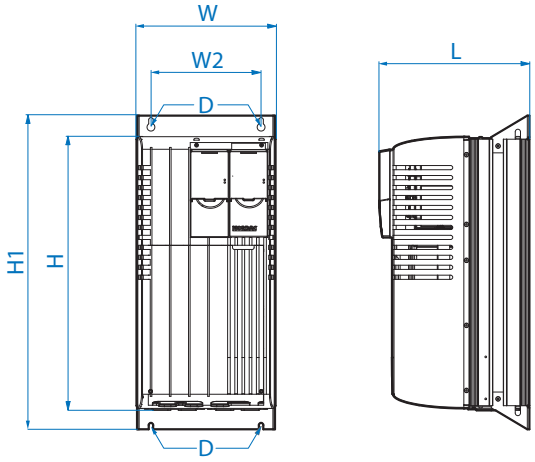
SK 500E AC Vector Drive Dimensions



Case Sizes 1 - 4



Case Sizes 5 - 7



Case Sizes 8 - 9

Case Size	H	H1	L	W	W2	D	Weight
Case Size 1	7.32 [186 mm]	8.66 [220 mm]	6.02 [153 mm]	2.91 [74 mm]	-	ø0.216 [5.5 mm]	3.08 lb [1.4 kg]
Case Size 2	8.90 [226 mm]	10.24 [260 mm]	6.02 [153 mm]	2.91 [74 mm]	-	ø0.216 [5.5 mm]	3.97 lb [1.8 kg]
Case Size 3	9.49 [241 mm]	10.83 [275 mm]	7.13 [181 mm]	3.86 [98 mm]	-	ø0.216 [5.5 mm]	5.95 lb [2.7 kg]
Case Size 4	11.26 [286 mm]	12.60 [320 mm]	7.13 [181 mm]	3.86 [98 mm]	-	ø0.216 [5.5 mm]	6.83 lb [3.1 kg]
Case Size 5	12.76 [324 mm]	14.09 [358 mm]	8.82 [224 mm]	6.18 [157 mm]	3.66 [93 mm]	ø0.216 [5.5 mm]	17.64 lb [8.0 kg]
Case Size 6	14.33 [364 mm]	15.67 [398 mm]	9.21 [234 mm]	7.20 [183 mm]	4.33 [110 mm]	ø0.216 [5.5 mm]	22.71 lb [10.3 kg]
Case Size 7	17.95 [456 mm]	19.09 [485 mm]	9.29 [236 mm]	8.27 [210 mm]	5.12 [130 mm]	ø0.216 [5.5 mm]	35.28 lb [16.0 kg]
Case Size 8	22.91 [582 mm]	23.54 [598 mm]	11.26 [286 mm]	10.43 [265 mm]	8.27 [210 mm]	ø0.335 [8.5 mm]	47.17 lb [21.4 kg]
Case Size 9	24.41 [620 mm]	25.04 [636 mm]	11.26 [286 mm]	10.43 [265 mm]	8.27 [210 mm]	ø0.335 [8.5 mm]	66.12 lb [30.0 kg]

Notes

NOTES

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- North America
- Global

NORD DRIVESYSTEMS

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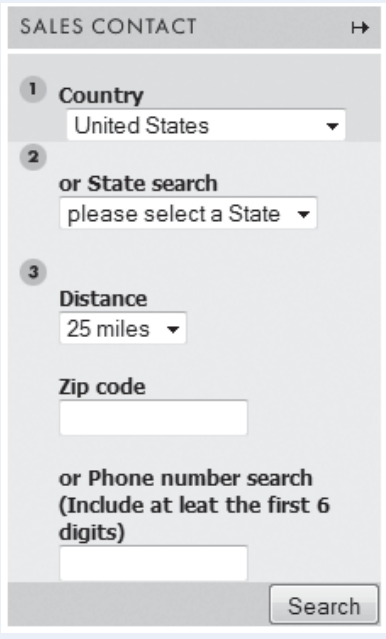
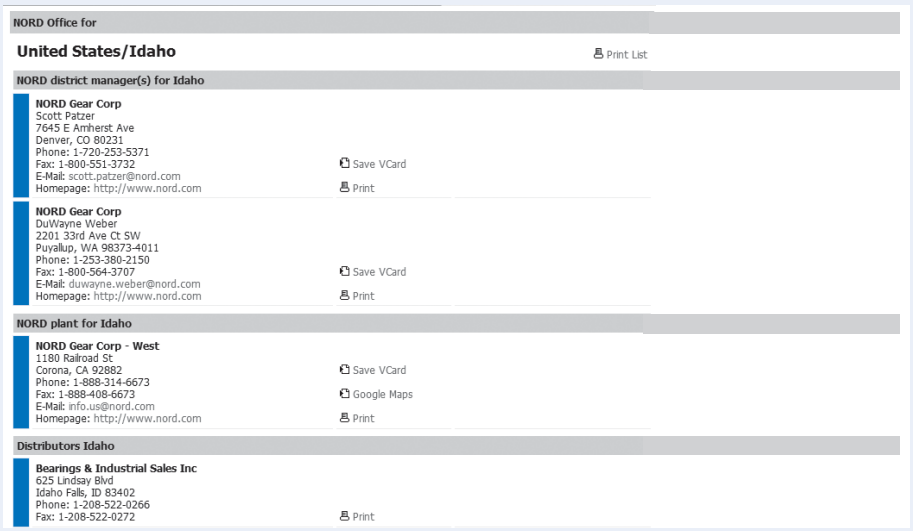
Nord Locator Tool

For international contacts (outside of North America), NORD makes it easy for you to locate address and phone number of the sales contact or facility nearest you on our homepage or with the web address: www.locator.nord.com.



It is as easy as submitting your location and we provide you with a list of our nearest district managers, distributors and plant locations for your convenience.



NORD GEAR LIMITED
Terms and Conditions of Sale

1. CONTRACT
Any contract between Nord Gear Limited, hereinafter designated as "Seller", and the party or parties accepting these terms and conditions of sale and any agent, officer, servant, employee or subcontractor of such party or parties, hereinafter designated as "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 orders 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 Brampton, Ontario. Prices and discounts are subject to change without notice until the 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 Buyer, its agents, servants, employees, or by carriers. 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 delivery 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 Buyer's exclusive remedy for claims arising from defective or nonconforming goods shall be limited to the repair or replacement thereof at the Seller's sole option. THE SELLER SHALL NOT BE RESPONSIBLE OR LIABLE FOR CONSEQUENTIAL DAMAGES ARISING OUT OF OR IN CONNECTION WITH THE SALE, DELIVERY, USE, PERFORMANCE, OR SERVICE OF THE GOODS SOLD UNDER THIS AGREEMENT. SELLER SHALL NOT BE LIABLE FOR ANY LOST PROFITS OR FOR ANY CLAIM OR DEMAND AGAINST SELLER BY ANY PARTY. IN NO EVENT WILL SELLER BE LIABLE FOR SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, EVEN IF SELLER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. SELLER'S AGGREGATE LIABILITY FOR DAMAGES UNDER THIS AGREEMENT, WHETHER ARISING FROM OR BASED UPON BREACH OF WARRANTY, BREACH OF CONTRACT, TORT OR OTHER CAUSE OF ACTION, SHALL IN NO CASE EXCEED THE PURCHASE PRICE THAT BUYER PAYS FOR THE PARTICULAR GOODS INVOLVED. 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 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 Article 4 herein. Standards for the operating characteristics of the gearboxes and the gear motors are in conformity with Seller's tests. THIS WARRANTY IS IN LIEU OF ALL OTHER EXPRESS OR IMPLIED WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE 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 Seller's catalogs, sales manuals, photographs and drawings constitute only an approximate guide. Seller reserves the right to make any changes which Seller, in its absolute discretion, considers necessary. While the goods will be delivered principally according to specifications of 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, Seller shall, at its own expense, make up for the shortage of the goods, or replace or repair the goods, as the cause 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 of good will. Shipping dates are estimates unless parties expressly agree on time of the essence.

6. FORCE MAJEURE
The obligation of 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 of 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 Buyer; provided, however, that if 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, Seller may, on fifteen (15) days written notice to 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 to treat the entire contract or contracts with Buyer as breached by Buyer and pursue its remedies for breach.

8. BUYER'S REFUSAL OF D ELIVERY
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 Buyer, to Seller, as actually paid in money, is abated by any order of judgment entered or any plan adopted in any bankruptcy, reorganization, receivership, or similar proceeding. Such termination shall not prejudice 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 Buyer, and thereafter the risk of loss or damage to the goods shall be upon Buyer. (B) If Buyer does not give delivery instructions to Seller at least ten (10) days prior to the delivery date ex factory confirmed by Seller, 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 Buyer becomes bankrupt or insolvent, or any petitions for reorganization or for appointment of a receiver is filed against Buyer, or if 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 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 Seller. Interest on the delinquent payment from the due date thereof until paid shall be at a rate of two (2%) percent per month.

12. BUYER'S DEFAULT
Upon Buyer's default, 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. 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 Buyer. If a deficiency results after the sale, Buyer agrees to pay such forthwith, together with reasonable solicitor's fees, for the recovery of the goods incurred by Seller. If upon Buyer's default, 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 a security agreement, reserving in Seller a security interest until full payment of the 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
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. Buyer shall pay, in addition to Seller's price, the amount of any such taxes or shall reimburse Seller for the amount thereof that Seller may be required to pay. At the option of Seller, Buyer shall give evidence of payment or of exemption certificate.

15. INSURANCE
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 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 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 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
Seller does not charge for standard packaging for domestic shipment. 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. MISCELLANOUS 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. Headings in this document are for ease of reference only.

23. NON ASSIGNMENT BY BUYER
Contract or contracts may not be assigned by Buyer without prior written consent of Seller.

24. APPLICABLE LAW
This agreement shall be governed by the laws of the Province of Ontario and the applicable laws of Canada. Buyer and Seller agree that any judicial proceeding with respect to this agreement must be brought and maintained in the City of Toronto, In the Province 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 undertaking between the parties hereto, together with all representations and obligations of such parties in respect of such subject matter, shall be superseded by and merged into this instrument.

26.
The provisions of this agreement shall bind and ensure 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 document and all notices or other documents relating thereto be drafted in the English language.

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

"Terms and Conditions in French available upon request."

NORD GEAR CORPORATION
Terms andConditions of Sale

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 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 Waunakee, Wisconsin, or at such place or places in the United States of America 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 GIVEN WRITTEN NOTICE OF CLAIMED DEFECTS TO SELLER. NORD GEAR CORP. WARRANTS ITS PRODUCTS AGAINST DEFECTS IN MATERIAL AND WORKMANSHIP FOR A PERIOD OF 12 MONTHS FROM DATE OF INSTALLATION OR 18 MONTHS FROM DATE OF SHIPMENT WHICHEVER COMES FIRST ON ALL COMPONENTS. 36 MONTHS FROM DATE OF INVOICE OR 24 MONTHS FROM DATE OF INSTALLATION WHICHEVER COMES FIRST ON GEARS AND HOUSINGS ONLY. PARTS WHICH ARE SUBJECT TO OPERATIONAL WEAR AND TEAR, SUCH AS BELTS & TRACTION DISCS, ARE NOT COVERED BY THE LIMITED WARRANTY. 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. THE LIMITED WARRANTY SET FORTH HEREIN IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED. EXCEPT FOR THE EXPRESS WARRANTIES SET FORTH HEREIN, SELLER HAS MADE AND MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, 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 ANY WARRANTY, EXPRESS OR IMPLIED. SELLER MAKES NO REPRESENTATIONS AS TO THE CAPACITY OR PERFORMANCE OF THE GOODS SOLD HEREUNDER, EXCEPT AS SET FORTH IN THE INVOICE'S SPECIFICATIONS OR OTHER VALID AGREEMENT OR CONDITION AGREED TO BETWEEN THE PARTIES, AND ANY SUCH REPRESENTATIONS ARE EXPRESSLY CONDITIONED UPON THE CORRECTNESS OF THE DATA AND INFORMATION FURNISHED BY THE BUYER AND UPON THE GOODS BEING PROPERLY INSTALLED AND MAINTAINED. THE REMEDIES OF THE BUYER PROVIDED HEREUNDER 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 and all costs of the return to the Seller of such goods and all related costs to remove and re-install such goods, 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 provision 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 tests.

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 terms 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.

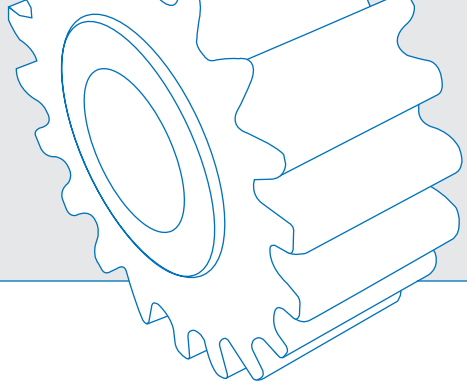
20. BUYER'S RESPONSIBILITY AS TO MAINTENANCE
Buyer shall use and shall require its employees and agents to use all safety devices and guards and shall maintain the same in proper working order. Buyer shall use and require its employees and agents to use safe operation procedures in operating the equipment 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.

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 72:1

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

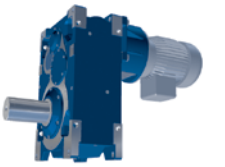
HIGH PERFORMANCE MOTORS & BRAKEMOTORS

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

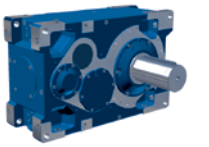
UNICASE™ SPEED REDUCERS

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

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 50hp
- 200-240V, 3-phase, to 25hp
- 200-240V, 1-phase, to 3hp
- 100-120V, 1-phase, to 1.5hp

DRIVESYSTEMS

www.nord.com

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CANADA
Brampton, ON (Toronto)
Phone: 905.796.3606

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